Department of Electronics & Information Technology (DeitY)
Ministry of Communications and Information Technology
Government of India

सत्यमेव जयते

Digital India
Power To Empower

Electronics and InformationTechnology

Annual Report 2015-16

Digital India
Power To Empower

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Vision, Mission, Objectives, Structure and Functions of DeitY

1.1   Introduction

Department of Electronics and Information Technology (DeitY) in the Ministry of Communications and Information Technology is responsible for formulation, implementation and review of national policies in the field of Information Technology, Electronics and Internet (all matters other than licensing of Internet Service Provider).

1.2   The Vision

The Vision of the Department coincides with the overarching vision outlined under the Digital India programme of making digital infrastructure as a utility to every citizen, Governance and Services on demand and Digital Empowerment of citizens.

1.3   The Mission

The Mission is to promote e-Governance for empowering citizens, promoting the inclusive and sustainable growth of the Electronics and IT & ITeS industries, enhancing India's role in Global Platforms of Internet Governance, adopting a multipronged approach that includes development of human resources, promoting R&D and innovation, enhancing efficiency through digital services and ensuring a secure cyberspace.

1.4   The Objectives

- Providing e-infrastructure for delivery of e-services
- Promotion of electronics hardware manufacturing and IT-ITeS industry

- Enabling creation of Innovation in emerging areas of ICT&E
- Enabling creation of R&D Infrastructure
- Establishment of mechanism for R&D translation
- Providing support for development of e-Skills and knowledge network
- Securing India's cyber space
- Promoting the use of ICT for more inclusive growth
- Enhancing India's role in Global Platforms of Internet Governance.

1.5 Functions/Activities (allocation of business rules)

i.   Policy matters relating to Information Technology; Electronics; and Internet (all matters other than licensing of Internet Service Provider)

ii. Promotion of internet, IT and IT enabled services

iii. Assistance to other departments in the promotion of E-Governance, E-Commerce, E-Medicine, E-Infrastructure, etc.

iv. Promotion of Information Technology education and Information Technology-based education

v.   Matters relating to Cyber Laws, administration of the Information Technology Act, 2000 (21 of 2000) and other IT related laws

vi. Matters relating to promotion and manufacturing of semiconductor devices in the country excluding all matters relating to Semiconductor Complex Limited (SCL), Mohali; The Semiconductor Integrated Circuits Layout Design Act, 2000 (37 of 2000)

vii. Interaction in IT related matters with international agencies and bodies, e.g. Internet for Business Limited (IFB), Institute for Education in Information Society (IBI) and International Code Council – on line (ICC)

viii. Initiative on bridging the Digital Divide: Matters relating to Media Lab Asia

ix. Promotion of standardization, Testing and Quality in IT and standardization of procedure for IT application and tasks

x.   National Informatics Centre (NIC)

xi. Initiatives for development of hardware/software industry including knowledge–based enterprises, measures for promoting IT exports and competitiveness of the industry

xii. All matters relating to personnel under the control of Department

xiii. Unique Identification Authority of India (UIDAI).

1.6   Organization Structure

The Secretariat of the Department of the Electronics and Information Technology is headed by Secretary, who is assisted by one Additional Secretary, JS&FA, Sr. Adviser, Group Coordinators and Heads of Organisations under the administrative charge of DeitY. The organisational chart is given below:-

Dr. Aruna Sharma
Secretary (DeitY)

Group Coordinators (GCs) and their respective Groups

Dr. Ajay Kumar, AS / GC & CVO
(i)   International Cooperation & Industrial Promotion
        (Bilateral and Multilateral)
(ii)   E-Commerce & BPO Schemes
(iii)   Electronics and Hardware Manufacturing
        (MSIPS, EMC, ITIR & Standards)
(iv)   DG(NIC)(Additional Charge)
(v)   NICSI (Chairman-NICSI)
(vi)   NeGD
(vii)   MyGov

Shri Sanjiv Kumar Mittal, JS / GC
(i)   E-Governance Group
(ii)   E-Infrastructure
(iii)   National Knowledge Network (NKN) & Smart Cities
(iv)   Internet Governance Division
(v)   CSC
(vi)   CIC Division Office Automation, DeitY Website & e-Office
(vii)   NIXI
(viii) UIDAI
(ix)   ERNET India

Shri B.J. Srinath Scientist-G / GC
(i)   Cyber-Laws & E-Security Group
(ii)   ICERT
(iii)   Controller of Certifying Authorities (CCA)
(iv)   STQC
(v)   Cyber Appellate Tribunal (CAT)

Dr. Debashis Dutta, Scientist-G / GC
(i)   R&D in Electronics
(ii)   Semiconductor ICs Layout Design Registry
(iii)   Nano-Technology Initiatives
(iv)   Innovation & IPR
(v)   R&D in Information Technology
(vi)   Language Computing
(vii)   CMET
(viii) CDAC

Ms. Anuradha Mitra, JS & FA / GC
Financial Management Group

Dr. M.R. Anand, Senior Adviser / GC
(i)   Economic Planning Division
(ii)   Coordination Division
(iii) Support Group (Parliament Section)
(iv)   Support Units (Public Relation/Grievances Unit/RTI Cell)
(v)   Director of Grievances (vi) Nodal Officer RTI
(vi)   Medial Lab Asia (MLA)

Shri Rajiv Kumar, JS / GC
(i)   Personnel Group
(ii)   Support Group (General Administration Div. & Raj Bhasha Section)
(iii) Support Units (Information & Documentation Centre Library)
(iv)   Chief Records Officer
(v)   E-Learning
(vi)   NIELIT
(vii) International Cooperation & Industrial Promotion
       (Bilateral and Multilateral)
(viii) E-Commerce & BPO Schemes
(vii & viii) above through AS(AK)]

Shri Rajiv Bansal, JS / GC
(i)   Electronics and Hardware Manufacturing
       (a) Innovation & Entrepreneurship Support,
       (b) MSIP, EMC, ITIR & Standards [through AS (AK)]
(ii)   Industrial Promotion-Software ITS and Trade &
       Investment Promotion
(iii) STPI

Shri B. M. Baveja, Scientist-G / GC
(i)   R&D in Convergence. Communications and
       Broadband Technologies
(ii)   SAMEER

In order to operationalise the objectives of DeitY, schemes are formulated and implemented, either directly or through its Responsibility Centres (Organizations/Institutions) under its jurisdiction. To make the technology robust and state-of-the-art, collaborations with the academia and the private/public sector is also sought. DeitY has three Attached Offices (viz., NIC, STQC and UIDAI), seven Autonomous Societies (viz., CDAC, CMET, NIELIT, SAMEER, STPI and ERNET), four Statutory Organizations (viz., CAT, CCA, ICERT and SICLDR) and three Section 25 companies (viz., NICSI, NIXI and MLA) under its charge to carry out the business allocated to the Department.

DEPARTMENT OF ELECTRONICS AND INFORMATION TECHNOLOGY (DeitY) ORGANISATION STRUCTURE

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Digital India: Power to Empower
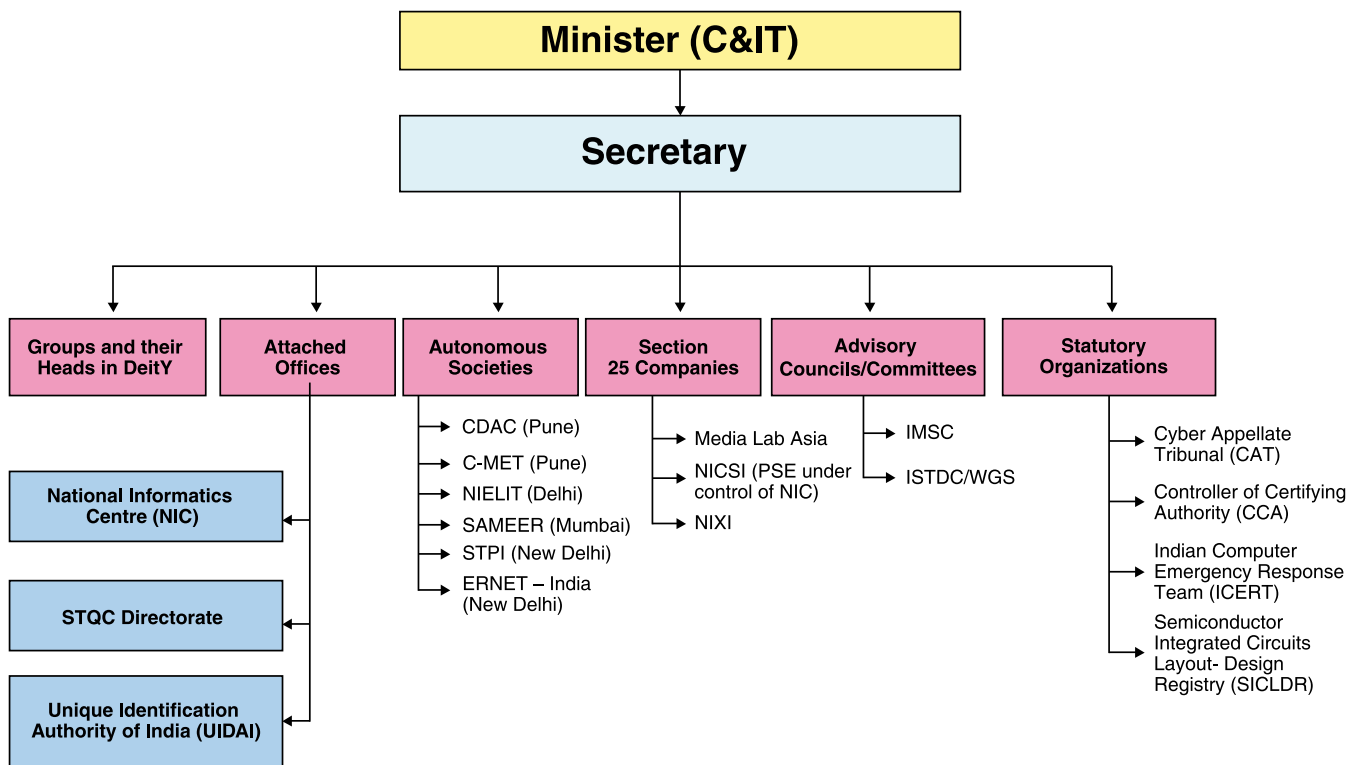
Digital India is an umbrella programme to prepare India for a knowledge based transformation. It weaves together a large number of ideas and thoughts into a single, comprehensive vision so that each of them is seen as part of a larger goal. The focus of Digital India programme is on being transformative to realize - IT (Indian Talent) + IT (Information Technology) = IT (India Tomorrow) and on making technology central to enabling change. This programme pulls together many existing schemes. These schemes have been restructured and re-focussed and are being implemented in a synchronized manner.

Vision of Digital India

The Digital India programme is centred on three key vision areas:

1. Digital Infrastructure as a Utility to Every Citizen
2. Governance and Services on Demand
3. Digital Empowerment of Citizens

Vision Area 1: Digital Infrastructure as a Utility to Every Citizen includes:

- Availability of high speed internet as a core utility for delivery of services to citizens
- Cradle to grave digital identity that is unique, lifelong, online and authenticable to every citizen
- Mobile phone & bank account enabling citizen participation in digital & financial space
- Easy access to a Common Services Centre
- Shareable private space on a public cloud
- Safe and secure cyber-space

Vision Area 2: Governance & Services on Demand includes:

- Seamlessly integrated services across departments or jurisdictions
- Services availability in real time from online & mobile platforms

- All citizen entitlements to be available on the cloud

- Digitally transformed services for improving ease of doing business

- Making financial transactions electronic & cashless and

- Leveraging GIS for decision support systems & development

Vision Area 3: Digital Empowerment of Citizens includes:

- Universal digital literacy

- Accessible digital resources universally

- All documents/certificates to be available on cloud

- Availability of digital resources/services in Indian languages

- Collaborative digital platforms for participative governance and

- Portability of all entitlements through cloud

Pillars of Digital India

This transformational programme has been designed to build holistic capabilities across infrastructure, manufacturing, processes, skill sets and delivery platforms, which in turn will lead to the creation of a self-reliant, knowledge economy. The focus is on improving direct services to citizens as well as making the country ready for ease of doing business. Accordingly, the initiatives under this programme aim to build and sustain all associated layers required for a digital empowerment of the people and building digital economy.

To ensure focus on each of these layers, following nine pillars of growth areas have been identified under the Digital India programme:

1. Broadband Highways

2. Universal Access to Mobile Connectivity

3. Public Internet Access Programme

4. e-Governance – Reforming Government through Technology

5. e-Kranti - Electronic Delivery of Services

6. Information for All

7. Electronics Manufacturing – Target NET ZERO Imports

8. IT for Jobs and

9. Early Harvest Programmes.

Implementation Approach

Digital India is an umbrella programme that covers multiple Government Ministries and Departments. It weaves together a large number of ideas and thoughts into a single, comprehensive vision so that each of them can be implemented as part of a larger goal. Each individual element stands on its own, but is also part of the entire Government. Digital India is implemented by the entire Government and being coordinated by the DeitY.

All the initiatives including establishing and expanding core ICT infrastructure to delivery of services under this programme have a definitive completion time target and are being tracked accordingly. Majority of the initiatives are planned to be realized within next three years. Many of the quick-wins (being tracked under the umbrella of "Early Harvest Programmes") and citizen communication initiatives (being tracked under "Information for All") have been implemented in 2015.

The Digital India programme aims at pulling together many existing schemes. The schemes have been restructured and re-focused and are being implemented in a synchronized manner. The common branding of programmes as Digital India highlights their transformative impact. While implementing this programme, Government of India is making wider consultation with citizens, industry and Academia to discuss various issues to arrive at innovative solutions for achieving the desired outcome of Digital India. DeitY had already implemented a digital platform named as "myGov" (www.mygov.nic.in) to facilitate collaborative and participative governance.

Programme Management and Monitoring

Programme management structure of Digital India has been established for monitoring the implementation of the Digital India Programme. Key components of the management structure would consist of a Monitoring Committee on Digital India headed by the Prime Minister, Digital India Advisory Group chaired by the Minister of Communications and IT, an Apex Committee chaired by the Cabinet Secretary and the Expenditure Finance Committee (EFC)/Committee on Non Plan Expenditure (CNE).

2.1 Digital Infrastructure as a Core Utility to Every Citizen

2.1.1 Public Internet Access Programme (including Wi-Fi in Universities)

The potential and utility to connect people within the country and outside is now well recognized. Present network of 1.5 lakh CSC centers already operational in rural areas of the country, including far off and inaccessible areas, are mandated to provide internet facility to the rural citizens across the country. Besides, in the near future it is planned to have CSCs co-located in all 2.5 lakh Gram Panchayats with a view to facilitate better access and delivery of various e-governance services in the rural areas. This would also help bridge the Digital Divide inter and intra state.

Wi-Fi in 5 Universities

- One of the Early Harvest Programmes under Digital India is Setting up Wi-Fi in Universities. DeitY is providing model Wi-Fi enabled campus networks at five universities, namely, University of Allahabad, University of Pune, Osmania University, Hyderabad Utkal University, Bhubaneswar and North Eastern Hill University (NEHU), Shillong. The model is replicable and can be replicated at other higher learning institutions/universities/hospitals across India. This would enable on campus students, faculty, teachers, visitors, guests to have entry to cyber world with Wi-Fi devices to access, retrieve and post information on any-time-any-where basis.

- ERNET India is deploying Wi-Fi in these five universities. The work is going on for setting up Wi-Fi infrastructure at University of Allahabad. More than 630 access points have been installed. The backbone of the campus network has been upgraded to 10 Gbps and new core and distribution switches have been installed. For Pune University, order has been placed for extension of existing network to provide Wi-Fi all over the university. For remaining 3 universities, namely Utkal, Osmania and NEHU, the implementing agency is going through a tender process.

Setting up Eduroam Services in India

- Eduroam stands for Education Roaming. It is a secure, world-wide roaming access service developed for the international research and education community.

It allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their mobile devices and working on local Wi-Fi network. The project is funded by DeitY.

- ERNET acts as the National eduroam operator in India and is the central point for connecting all the Universities/institutes with access to the Indian eduroam national federation service. ERNET facilitates through this service, eligible students, researchers and staff from participating institutions access to internet connectivity at eduroam connected institutions globally.

Setting-up VSAT connectivity for Internet/Intranet in the North-Eastern part of the country

- The objective of the project is to establish C-band VSAT connectivity at 60 institutes (research institutes/colleges and government organizations) in remote areas of North Eastern of the country to provide Internet access. As part of the project only those institutes will be connected which do not have any form of Internet connectivity. The project is implemented by ERNET India.

- ERNET India is going through a tender process to upgrade VSAT network.

IPv6 Training Programme for Staff of Government/Ministries and Institutions

- The objective of the project is capacity building in the area of next generation Internet protocol IPv6 to enhance adoption and deployment of IPv6 especially in Government organizations and associated institutions. It is expected that around 3000 staff from Central/State Government/Ministries and related organizations will be trained on use and deployment of IPv6 free of cost. ERNET India is implementing the project.

- 200 Government Officials have been trained by ERNET India so far. An action plan was submitted by ERNET India to convert the IPv6 training programme into sustainable IPv6 training centre.

2.1.2 Digital Identity: Aadhaar - An efficient and targeted service delivery platform

Unique Identification Authority of India (UIDAI) is a

transformational e-governance initiative that involves establishing an identity infrastructure for providing unique digital identity to residents. The digital IDs are verifiable online as a tool to enhance the quality of service delivery mechanisms, improve governance, aid financial inclusion and promote fiscal prudence.

Unique Identification Authority of India (UIDAI) has been mandated to empower every resident of India with a Unique Identification Number and provide a digital platform for authentication in an easy, electronic, cost-effective way.

The Aadhaar System is built on a sound strategy and a strong technology backbone and has now evolved into a vital digital identity infrastructure.

Once the enrolment takes place, the data undergoes various stages of screening and validations in Central Identities Data Repository (CIDR). This ensures that the source of data is authentic besides ensuring that no duplicate exists. Quality checks are done on demographic and biometric data collected from residents. After passing the data quality checks and other validations, the packet goes for de-duplication and Aadhaar gets generated.

Key features of Aadhaar:

1. 12-digit random unique number obtained through the process of de-duplication involving biometrics.
2. Only a number and not a card.
3. The number does not contain any intelligence
4. Scalable technology architecture
5. Open source technologies
6. One Resident = One Aadhaar

Aadhaar, being a unique digital ID – provides a powerful platform for authenticating a resident anytime and anywhere which is in line with the vision of the UIDAI. The purpose of authentication is to enable residents to prove their identity and for service providers to confirm that the residents are 'who they say they are' in order to supply services and give access to benefits.

2.1.2.1 e-Pramaan

DeitY has conceptualized the e-Pramaan framework for e-Authentication for electronic delivery of government services to its intended recipients in a secure manner, as well as build citizen's trust in online environment, which is prone to identity thefts and other associated risks. Moreover, e-Pramaan provides a uniform approach to manage identified authentications of all citizens for the delivery of various public services over internet and mobile platforms. The "e-Pramaan: Framework for e-Authentication" was notified in December 2012. The implementing agency for e-Pramaan is C-DAC, Mumbai.

Major steps towards achieving the desired outcome are:
- Notification of e-Pramaan Framework
- Development of e-Authentication standards
- Two phased approach in implementation:
  a. **Phase I**: Development of pluggable authentication components/modules for government applications and related APIs for integration. It will help departments to implement e-authentication as defined in the e-Pramaan framework and as per the standards, keeping e-authentication mechanisms robust, uniform and consistent.
  b. **Phase II**: Offer e-Pramaan as an authentication service to departments with all levels of authentication as defined in e-Pramaan framework and facilitate on-boarding of government departments by providing integration APIs, guideline documents and technical support.

Achievements

- e-Authentication standards and specifications developed under guidance of e-Authentication Standards Committee comprising of members from academia, industry, UIDAI, DSCI, NASSCOM etc. have been notified in The Gazette of India.
- E-Pramaan services live from NIC Shastri Park Data Centre https://epramaan.gov.in
- e-Pramaan authentication Level 1 and 2 services developed and launched. Departments can register through portal to avail e-Pramaan Authentication Services.
- e-Pramaan has become AUA, ASA, KUA and KSA so as to provide Aadhaar based Authentication Services and e-KYC services.
- ASA services has been operationalized with 13 departments integrated.

2.1.2.2 Online e-Sign

One of the initiatives taken under Digital India Programme is to provide non-repudiable authentication of applicant's identity through a facility called eSign. This facility is an online digital signature service.

For creating electronic signatures, the signer is required to obtain a Digital Signature Certificate (DSC) from a Certifying Authority (CA) licensed by the Controller of Certifying Authorities (CCA) under the Information Technology (IT) Act, 2000. Before a CA issues a DSC, the identity and address of the signer must be verified. The private key used for creating the electronic signature is stored in hardware cryptographic token which is secured with a password/pin. This current scheme of in-person physical presence, paper document based identity & address verification and issuance of hardware cryptographic tokens does not scale to a billion people. For offering fully paperless citizen services, mass adoption of digital signature is necessary. A simple to use online service is required to allow everyone to have the ability to digitally sign electronic documents.

eSign is an online electronic signature service which can be integrated with service delivery applications via an open API to facilitate an Aadhaar holder to digitally sign a document. Using authentication of the Aadhaar holder through Aadhaar e-KYC service, online electronic signature service is facilitated.

Achievements

- Notification of Electronic Signature or Electronic Authentication Technique and Procedure Rules, 2015 in which the technique known as "e-authentication technique using Aadhaar e-KYC services" for the eSign Online Service introduced which allows everyone to have the ability to digitally sign electronic documents.
- eSign was formally launched by Hon'ble Prime Minister on July 1, 2015.
- Launch of C-DAC's eSign facility.
- Development of STPI's and NIC eSign facility in progress.
- eMudhra and C-DAC (govt. ESP) are empanelled to offer e-Sign Services.

2.1.3 High Speed Broadband Connectivity

High speed broadband connectivity would be made available up to all 2.5 lakh Gram Panchayats in the country under NOFN/BharatNet programme presently being implemented by Department of Telecommunications. With the availability of high speed broadband connectivity upto Gram Panchayats, it would be easier for the Central and State governments to deliver various G2B, G2G and G2C services to the citizens across the country.

Besides availability of robust connectivity in turn would make it feasible to plan and deliver other social sector services like e-Health, e-Education, e-Agriculture, skill development and also financial inclusion. It is envisaged that it would be possible in the near future under the Digital India Programme to have inter and intra State socio economic development in the country.

2.1.4 Safe and Secure Cyberspace

'Digital India' is an ambitious programme of the Government with a vision to transform India into a digitally empowered society and knowledge economy. **'Safe and secure Cyberspace'** is one of the key components envisaged for the success of "Digital India" initiative. Besides, the efforts to create necessary infrastructure and facilities for enabling R&D and training activities in the country, specific initiatives have been taken up to improve situational awareness with respect to cyber security incidents and cyber attacks and to take up proactive response and mitigation actions. These include:

National Cyber Coordination Centre (NCCC)

National Cyber Coordination Centre (NCCC) is a mechanism for Situational Awareness and early warning. NCCC will scan the internet traffic (flowing within the country, as well as traffic originating from and terminating in the country) and aggregate information from various identified sources for near real time threat assessment and situational awareness that will help in analysis and generation of timely alerts and periodic reports. This is expected to help in securing the cyber space and strengthening the cyber security posture in the country by leveraging the expertise of people, deploying standard processes and sharing of resources. The project is being implemented by CERT-In, in close coordination and collaboration with all relevant stakeholders in the country.

Botnet Cleaning and Malware Analysis Centre

CERT-In is implementing a project for setting up of Botnet Cleaning and Malware Analysis Centre for detection of compromised systems in India and to notify, enable cleaning and securing systems of end users to prevent further malware infections. The project is being implemented in close coordination and collaboration with Internet Service Providers and industry. Project has been approved for implementation and is in advance stage of implementation.

Application Security

The cyber security division of NIC is involved in the following activities for providing application security: Formulation of policies/Guidelines/Advisories, Audit of security services by multi-agency audit team/STQC audit team and Cert-IN for exigency hosting, preparation of RFP for malware and forensic analysis setup, web application firewall solutions, application security audit services, security testing tools, secure application development environment for source code analysis, black-box scanning and security audit of applications/secure code development, web applications security audit process enhancement, mobile app audit, process to handle exigency hosting, server security compliance audit at OS/web server/application level, version control compliance and enforcing remediation, penetration testing for server scanning, malicious codes/penetration testing of applications and ticket-based remediation. Also securing critical web applications with WAF

management and 24x7 monitoring of WAF services and migration of configuration from NIC IDC to NDCSP, malware analysis and incident handling done with log analysis, remediation and advisories, analysis of targeted attacks/malware analysis, sanitization of security controls based on analysis results. Development of security portal, Application Security Audit Management System (ASAMS) and Firewall Access Rule Processing system (FARPS), Security Training on OWASP Standard, Appsec process, Incident Handing, Source Code Analysis for PHP/ASP.Net/JAVA Codes, Black Box Tool based Audit and Audit of Web Services & Mobile Apps are other activities undertaken.

Network Security

NIC provides network security for networks, servers and client systems by implementing security solutions at the critical network segments of NICNET using network firewalls, Intrusion Prevention Systems (IPS), URL filtering, etc. Solutions for patch management and anti-virus are in place. The cyber security Policy for NICNET information infrastructure has been finalized, security audit of NIC IT Infrastructure by multi-agency audit committee has been undertaken, 323 new antivirus signatures have been developed. Checkpoint firewall solution in 10 locations, multi-function security appliances in 9 locations have been deployed, Intrusion Prevention Systems (IPS) have been installed in 14 locations. About 89000 firewall rules have been applied for securing the websites. Antivirus solution have been installed on 3700 new systems and patch management solution on 5300 new systems. Vulnerability Assessment has been done for 3100 servers/VMs, network security audit of critical Government offices, Security Alerting & Reporting System (SARS) enhanced, application for firewall rule processing enriched with a numerous features.

2.1.5 State Wide Area Network (SWAN)

The Government has approved the Scheme for establishing State Wide Area Networks (SWANs) across the country, in March, 2005 to connect all State/UT Headquarters up to the Block level via District/sub-Divisional Headquarters, in a vertical hierarchical structure with a minimum bandwidth capacity of 2 Mbps per link. Each State/UT can enhance the bandwidth up to 34 Mbps between SHQ and DHQ and upto 8 Mbps between DHQ and BHQ depending upon the utilization.

Presently, SWANs have been made operational in 34 States namely Andhra Pradesh, Chandigarh, Chhattisgarh, Delhi, Gujarat, Goa, Haryana, Himachal Pradesh, Jharkhand, Kerala, Karnataka, Lakshadweep, Maharashtra, Orissa, Punjab, Puducherry, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Assam, Bihar, Madhya Pradesh, Uttarakhand, Manipur, Arunachal Pradesh, Mizoram, Nagaland, Meghalaya, Rajasthan, Dadra & Nagar Haveli and Daman & Diu. The States/UTs are utilizing the core infrastructure of SWAN for providing the closed user connectivity to various Government offices in the State/UTs. These offices access their applications through SWAN in secured environment hosted at State Data Centres (SDCs). SWAN implementation is however pending in the State of J&K and UT of Andaman & Nicobar Islands and the concerned State/UT government is taking further necessary action in this regard.

The States have been utilizing the core infrastructure of SWAN for connectivity and dedicated close user application access connectivity. SWAN has been integrated with NKN in 29 States/UTs at SHQ level and 440 at the district level to provide the high bandwidth.

Increasing digitization amongst States has led to higher utilization of bandwidth. Presently, 30 States/UTs are utilizing more than 60% of bandwidth of the existing link capacity. To monitor the performance of SWANs, the Department has mandated positioning of Third Party Auditors (TPAs) in the States/UTs. As on date, 29 States have empanelled the TPAs for monitoring the performance of the SWANs in the respective States/UTs. Remaining States/UTs are in the process of empanelment of TPA.

National Information Infrastructure (NII)

The Department has deliberated in detail and initiated a proposal on National Information Infrastructure (NII) which proposes to integrate various ICT infrastructure created across all the States, namely, SDCs, SWAN, NKN, NICNET, SSDG including NOFN/BharatNet. The proposed NII would make available upgraded infrastructure from technological, administrative and e-governance perspective. However, the present proposal on National Information Infrastructure is on hold for the time being till the acceptance of Infrastructure Committee Report on BharatNet by DoT. In the mean time, a pilot proposal for a period of one year on National Information Infrastructure for one district each in 7 States, namely, Nagaland, Karnataka, Kerala, Gujarat,

Uttarakhand, UTs of Chandigarh and Puducherry is already under implementation. The pilot project would facilitate to have broad idea on gaps/challenges that exist in rural areas in the delivery of various e-governance and other social sector services. Thereafter, based on SWOT analysis, these would be suitably incorporated in the National rollout of NII on its approval.

2.1.6 State Data Centre

State Data Centre (SDC) is one of the three core infrastructure components under the NeGP. Under the SDC Scheme, it is proposed to establish Data Centres in all the States/UTs to consolidate services, applications and infrastructure in order to provide efficient electronic delivery of Government to Government (G2G), Government to Citizen (G2C) and Government to Business (G2B) services. These services can be rendered by the States through common service delivery platforms seamlessly supported by core connectivity infrastructure such as SWAN and CSC as the front-end delivery outlets at the village level. Some of the key functionalities that can be provided through SDC are central repository for the State; secure data storage, online delivery of services, citizen information/services portal, State Intranet Portal, disaster recovery, remote management and service integration, etc. SDCs also provide better operation & management control with minimized overall cost of data management, IT resource management, deployment and other costs for States/UTs.

Till now, 24 SDCs have been declared operational (Tamil Nadu, Puducherry, West Bengal, Andhra Pradesh, Meghalaya, Karnataka, Manipur, Odisha, Sikkim, Haryana, Kerala, Maharashtra, Gujarat, Tripura, Rajasthan, Nagaland, Uttar Pradesh, Andaman & Nicobar, Madhya Pradesh, Lakshadweep, Chhattisgarh, Jammu & Kashmir, Mizoram and Bihar).

In order to make SDCs Cloud enabled, DeitY has circulated a template Request for Proposal (RFP) to States for initiating a bid process for Cloud Enablement of SDCs. Seven States (Maharashtra, Haryana, Madhya Pradesh, Chhattisgarh, Rajasthan, West Bengal and Kerala) have completed Cloud enablement and 8 States are in various stages of Cloud enablement.

Since the SDCs are expected to host critical Government applications/services, including important citizen data, protection of the same is of prime importance. In this regard, the SDC scheme has provisioned for a Disaster

Recovery (DR) mechanism through storage based replication as part of the SDC enhancement. Till now 12 States (Tamil Nadu, West Bengal, Meghalaya, Manipur, Orissa, Kerala, Maharashtra, Tripura, Rajasthan, Uttar Pradesh, Madhya Pradesh, Chhattisgarh) are DR enabled and 8 States are in various stages of DR enablement.

DeitY is providing continuous support and guidance to the States/UTs in order to ensure smooth implementation of the project across the country. Policy guidelines, roles and responsibilities of different agencies/stakeholders including various issues/concerns to be addressed while planning, implementation and operations & maintenance of the Data Centres have been formulated. Guidelines are updated from time to time and are communicated to the States/UTs leading towards creation of consistent and state of art infrastructure.

Achievements

- In FY 2015-16, Bihar SDC got operational.
- Implementation of 3 SDCs (Himachal Pradesh, Jharkhand, Dadar and Nagar Haveli (DNH) & Daman & Diu (DD) (DNH & DD have combined SDC), is in progress.
- In 2 States (Punjab and Goa) bid process is in advance stage and in 3 States (Assam, Arunachal Pradesh and Uttarakhand) RFP is floated and bid process management is undergoing for selection of a Data Center Operator (DCO).
- Percentage of rack space utilization in Twenty three States is more than 50% of the SDC infrastructure.

2.1.7 GI Cloud (MeghRaj)

In order to realize the Digital India vision, and to utilize and harness the benefits of Cloud Computing, Government of India has embarked upon an ambitious initiative – "GI Cloud" which has been named as 'MeghRaj'. MeghRaj initiative is intended to deliver ICT services over cloud to all the departments/ministries at the Centre and the States/UTs. The vision of this initiative is to accelerate delivery of e-services in the country while optimizing ICT spending of the Government. As per the MeghRaj policy Government departments at the Centre and States are to first evaluate the option of using the GI Cloud for implementation of all new projects funded by the government. Existing applications, services and projects are to be evaluated to assess whether they should migrate to the GI Cloud".

The GI Cloud "MeghRaj" will provide services to government departments, citizens and businesses through internet as well as mobile connectivity. In addition to accelerating the delivery of e-services to citizens and businesses, the government's cloud-based service delivery platform will also support a number of other objectives including increased standardization, interoperability and integration, a move towards an OPEX model, the pooling of scarce, under-utilized resources and the spread of best practices. It will also support on-going cost effectiveness and manageability.

Some of the major benefits of GI Cloud are listed below:

- Driving cost efficiencies with increased utilization of IT Infrastructure resources through cloud.
- Enable conversion of CAPEX to OPEX paving the way for consumption based billing and faster procurement of IT Infrastructure services.
- Rapid development, deployment and re-use of ICT applications.
- On demand scalability of infrastructure to meet the long term capacity requirements and elasticity to cater to the peak load and off-peak load requirements.
- Central GI Cloud "MeghRaj" services directory for publishing single instances of applications on cloud.

Major components of GI Cloud include:

- Cloud computing platforms at National and State levels
- Common platform to host and run applications – e-Gov AppStore
- GI Cloud Services Directory that will act as the single window or portal for GI Cloud service delivery
- Setting up of Cloud Management Office (CMO)
  - Setting up an ecosystem for Cloud proliferation (policies, guidelines, templates, security norms, certification, migration support, business models for applications, tariff & revenue models etc.)
  - Empanelment/Accreditation of Cloud Service Providers (CSPs)
  - Awareness workshops and training programmes for cloud adoption for departments
- Setting up of Clouds by other Government entities
- Setting up of Dedicated Clouds by Private CSPs

- Institutional mechanism which will be established to operate and manage the GI Cloud environment

A National Cloud (https://cloud.gov.in) under MeghRaj implemented by NIC is operational since 4th Feb 2014.

Provisional Empanelment of Cloud Service Offerings of Cloud Service Providers

While CMO will proceed as planned, the immediate need is to provisionally empanel few of the cloud service offerings from the Cloud Service Providers (CSPs) for two years which can be extended for one more year. The empanelment will be done for the following cloud service offerings for a combination of the deployment models namely Public Cloud, Virtual Private Cloud and Government Community Cloud:

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Disaster Recovery as a Service (DRaaS)
- Dev / Test Environment as a Service (DevOps)
- Virtual Desktops as a Service (VDaaS)

Achievements

- Supporting more than 250 user Departments with 5000 Virtual Servers
- Applications hosted range from simple websites to transactional portals
- Initiatives under Digital India Programme hosted on National Cloud include
  - Digital India Portal
  - Digital Locker
  - Digitize India
  - Make-in-India
  - Skill Development
  - Smart Cities
  - Online Registration System (e-Hospital)
  - Aadhaar based Biometric Attendance of government employees
  - Jeevan Pramaan - service for pensioners
  - MyGov - largest citizen engagement platform of the government
  - RFP for provisional empanelment of cloud service offerings of private cloud service providers has been published.

2.1.8 Service Delivery Gateway

National e-Governance Plan was established in 2006 with a vision to "Make all Government services accessible to the common man in his locality, through common service delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs to realize the basic needs of the common man". The Government services should be seamlessly integrated across departments or jurisdictions to provide easy and a single window access to all citizens. It will reduce the time and efforts involved in various approvals, clearances, etc. It would also ensure transparency to the system. In order to meet the objective of seamless integration across the departments, architecture of the application should be designed in a way that interfaces with other systems and may be built whenever required. The Service Delivery Gateway is an initiative of DeitY that has provision of single point access for citizens and middleware to enable sharing of information across databases for efficient service delivery.

The State Portal, SSDG and E-Forms initiative facilitates Electronic Service Delivery by providing significant benefits to the citizens especially in the form of a single gateway to service delivery. Thus holistic and harmonious use of the Common Service Centres (CSCs) along with the common infrastructure (SWAN, SDC) and technology across the States/UTs for all application and services shall be achieved.

This project intends to provide easy, anywhere and anytime access to government services (both informational & transactional) thereby reducing the number of visits of citizens to a government office/department for availing the services. It also aims to reduce administrative burden and service fulfillment time and costs for the government, citizens and businesses and creating a more efficient communication and service delivery system through an integrated State portal.

Guidelines have been formulated to provide technical and financial assistance to the States/UTs for setting up State Portals, SSDGs and electronic forms. In order to facilitate the quick implementation and roll out of the project, DeitY has empanelled 5 consultants who will assist the States/UTs in preparation of the proposals and in the bidding and selection process of implementing agencies. DeitY has also empanelled 6 implementing agencies which can bid for the State projects. DPRs and funding have been

approved for 34 States/UTs in the country. Out of these States/UTs, 31 States/UTs have already floated RFPs for selection of the implementing agency (IA) for the project.

Achievements

- At present, 25 States/UTs have gone live with 719 services and 4,67,29,208 transactions have been reported as on 31.12.2015.
- 2 States/UTs are in process of IA selection.
- 4 States/UTs are in the implementation phase.
- 2 States/UTs (Gujarat and Haryana) are in the final stage for Go-Live.

eSangam (erstwhile NSDG), an integrated MMP under the NeGP, is a middleware infrastructure acting as a standards based routing and message switch which provides seamless interoperability and exchange of data across heterogeneous applications of geographically dispersed departments. The NSDG is being implemented by CDAC and is live since August 2008. It facilitates the following:

- Interoperability between various e-Governance applications
- Secure messaging between governmental applications
- Shared Services Hub for Departmental Application– Payment Gateway Services, Mobile Gateway Services, Authentication services (via UID)

Following list of services were made operational on production environment of eSangam (NSDG)

- PAN allocation service of NSDL and UTITSL
- EPFO service
- PESO service
- Four services of MCA
- IEC service of DGFT
- eSign Service
- Twenty three services of eBiz
- Three services of RBI
- Seventy four services of Dadra and Nagar Haveli
- Sixty Six services of Daman and Diu

2.1.9 National Knowledge Network (NKN)

1. In March 2010, the Cabinet Committee on Infrastructure (CCI) approved the establishment of the National Knowledge Network (NKN) to be implemented by NIC over a period of 10 years.

2. The Objective of the NKN is to inter-connect all knowledge institutions across the country through high speed data communication network, to encourage sharing of resources and collaborative research. It was envisaged to cover about 1500 Institutions comprising of all Universities, Institutions of Higher Learning and Research.

3. The salient features of the NKN are:

   a) Establishing an ultra-high-speed national information network for the country.

   b) Connecting all major knowledge institutions (Universities & Research Institutions) for knowledge creation, collation and dissemination.

   c) Connecting the Indian knowledge institutions to the International knowledge community for knowledge sharing.

   d) Enabling sectoral virtual networks in various application areas (Agriculture, Health, Education, E-governance and Grid Computing).

   e) Setting up a platform for development of new processes and technologies based on high bandwidth and low latency networks.

   f) Enabling a test-bed for network and securing technology development for the country.

   g) Link to Global Networks to collaborate with the research communities across the globe.

4. It was envisaged that a high speed data communication network would be established, which would interconnect institutions of higher learning and research. NKN will facilitate creation, acquisition and sharing of knowledge resources among the large participating institutions; collaborative research; countrywide classrooms (CWCR) etc. and help the country to evolve as Knowledge Society.

   - 1577 links to institutions have been commissioned and made operational. This includes 378 links to institutions under National Mission on Education through Information and Communications Technology (NMEICT), which have been migrated to NKN.

   - NKN connectivity has also been extended to 440 NIC district centres.

   - 66 Virtual Classrooms have been set up.

- 89 Nos of Core Links have been commissioned and made operational.
- NKN connectivity has been extended to SWAN in 29 States/UTs and SDC in 27 States/UTs.

2.1.10 Mobile Seva Platform

DeitY has initiated a massive countrywide initiative on mobile governance to provide government services to the people through mobile phones and tablets. As a part of this initiative, the Framework for Mobile Governance was notified in February 2012.

Mobile Seva has been developed by DeitY as the core infrastructure for all Government departments and agencies in the country for enabling the availability of public services through mobile devices. Mobile Seva enables the integration of the mobile platform with the common e-Governance infrastructure consisting of SDCs, SWANs and SSDG/NSDG. It enables a Government department to integrate both web and mobile based services seamlessly and enhances the access to electronic services tremendously due to the very high penetration of mobile phones, especially in rural areas. It provides all possible mobile based channels for delivering services, such as SMS, USSD, IVRS and mobile applications (m-Apps). Availability of government-wide shared infrastructure and services enable rapid development and reduced costs for the departments in rolling out electronic services. The national rollout of Mobile Seva project was approved in November 2012.

Achievements

- More than 632 additional Government departments and agencies have been integrated with the platform (in total more than 2102).
- The total number of Push SMS transactions has crossed 764 crores.
- The total number of services available to citizens and businesses over Pull SMS has reached 606.
- On the Mobile Seva AppStore, total 727 live m-apps have been developed and hosted. The apps have been downloaded over 5.11 lakh times.
- IVRS Services 25 lakh transactions.
- USSD Service 5.3 lakh transactions.
- To strengthen DeitY's mission to m-enable government departments and agencies across the nation, another project – "m-Enablement of Government Departments

through Mobile Seva", was approved in June 2014 for 36 months.
- Mobile Seva got Order of Merit in SKOCH Smart Technology Award 2015
- DeitY is a winner at United Nations Public Service Awards (2014) under the category "Promoting Whole-of-Government Approaches in the Information Age" for its Mobile Seva initiative (the only winner from India in 2014).
- Commonwealth Association for Public Administration and Management has recognized Mobile Seva as a Finalist in the 2014 International Innovations.

2.1.11 Geographical Information System (GIS)

Geographical Information System (GIS) based decision making is being promoted by National Centre of Geo-Informatics (NCoG), DeitY. The GIS platform established by National Centre of Geo-Informatics (NGoG) is a single source GIS platform for sharing, collaboration, location based analytics and decision support system, catering to Central and State government departments across the country.

GIS platform has provision to integrate with MIS data of Ministries/Departments, e.g. MGNREGA, Panchayati Raj, Mines, etc.

GIS Platform will provide the citizen centric services on web and mobile platform, navigation facility including location based information system.

Achievements

- GIS application has already been developed for Ministry of Urban Development, Rural Electrification Corporation and Ministry of Mines by NCoG.
- NCoG is also working on developing the portal for Indian Council of Medical Research (ICMR), Ministry of Environment and Forest, Digital Land Record Modernization Project (Department of Land Resources) and National Disaster Management Authority.

2.2 Governance and Services on Demand

2.2.1 e-Kranti: Electronic Delivery of Services

The National e-Governance Plan (NeGP) was approved in 2006 with a vision to make all Government services accessible to the common man in his locality through common services delivery outlets and ensure efficiency, transparency & reliability of such services at affordable costs. In the past 8 years, NeGP has achieved significant success in its objectives. 24 out of the 31 Mission Mode Projects (MMPs) under NeGP are live and delivering 222 out of the 252 envisaged services. DeitY has implemented a number of projects in the e-Governance domain. These include the core ICT infrastructure projects such as State Data Centres (SDCs), State Wide Area Networks (SWANs), Common Services Centres (CSCs), National/State Service Delivery Gateway (NSDG/SSDG), Meghraj Cloud platform, Mobile Seva etc. These projects have helped the Government Departments at the Centre and State to implement their e-Governance applications and deliver citizen-centric services more efficiently and effectively. Under the Digital India programme, NeGP has been transformed into "e-Kranti" with increased portfolio of MMPs from 31 to 44. The objectives of e-Kranti are the following:

i.   To redefine NeGP with transformational and outcome oriented e- Governance initiatives

ii.   To enhance the portfolio of citizen centric services

iii. To ensure optimum usage of core Information & Communication Technologies (ICTs)

iv.   To promote rapid replication and integration of e-Governance applications

v.   To leverage emerging technologies

vi.   To make use of more agile implementation models

e-Kranti is based on the following principles:

i.   Transformation and not Translation

ii.   Integrated Services and not Individual Services

iii. Government Process Reengineering (GPR) to be mandatory in every Mission Mode Project (MMP)

iv.   Cloud by Default

v.   Mobile First

vi.   Mandating Standards

vii. Language Localization

The following 13 new MMPs were added under e-Kranti:

i.   e-Sansad

ii.   e-Vidhaan

iii. Financial Inclusion

iv.   Roads and Highways Information System (RAHI)

v.   Agriculture 2.0

vi.   NGIS

vii. Rural Development

viii. Social Benefits

ix.   Women and Child Development

x.   Common IT Roadmap for Paramilitary Forces (CAPF)

xi.   e-Bhasha

xii. NMEICT

xiii. Urban Governance

Various schemes/projects are being implemented by DeitY under e-Kranti. The overview of MMPs under e-Kranti are as follows:

i.   There are 15 Central, 17 State and 12 Integrated MMPs

ii.   Out of the 44 MMPs:

    a. 15 MMPs are delivering full range of services

    b. 12 MMPs are partially delivery services across select geographies

    c. 3 MMPs are under implementation

    d. 3 MMPs are in design and development phase

    e. 11 MMPs are under scoping

2.2.2 e-District

e-District is a Mission Mode Project (MMP) that aims to provide high volume citizen centric services which are delivered from the district or sub-district level. The scheme was approved by the Government on 20th April 2011. Under the e-District MMP, back end computerization has to be undertaken and services would be delivered through the CSCs established all over the country. The e-District MMP will utilize the infrastructure currently created such as SWANs and SDCs. e-District aims to radically improve the way district administration works and will provide essential services to the citizens. The MMP envisages :

(a) Leveraging and utilizing the four pillars of e-infrastructure, namely, SDCs, SWANs, SSDGs and CSCs, optimally to deliver public services electronically to citizens at their door steps.

(b) Business Process Re-engineering (BPR) to enable process simplification and significant value addition to citizens.

(c) Automation of back end processes, development of applications at the State level as well as digitization of legacy data.

(d) Providing easy, anywhere and anytime access to Government Services (both informational and Transactional) to ensure reliability, efficiency, transparency and accountability.

(e) Reducing number of visits of citizens to a Government office/department for availing the services and thereby eliminating harassment.

(f) Enhancing perception & image of the Government and its constituent Departments.

The e-District MMP currently covers all districts across all 36 States/UTs. Under the scheme, DeitY is funding the State Designated Agencies (SDAs) of each State/UT for implementation of the project over a period of 4 years. A minimum of 10 service categories have to be implemented under this scheme covering all districts in the country. Out of these, 5 service categories are mandatory and the State/UT needs to identify another 5 categories. In total, a minimum of 20 services (within these 10 categories) have to be electronically delivered under this project.

The status of National Rollout of e-District MMP as on 29th February 2016:

- Empowered Committee has approved DPRs of all 35 States/UTs (Approval of revised DPR from new States -Telangana and Andhra Pradesh is pending).

- SPMU selected in 36 States/UTs (100% in 36 States/UTs).

- DeGS formed in 36 States (100% in 33 States/UTs, partially completed in 03 States/UTs).

- e-District Managers selection initiated in 34 States/UTs. (100% selected in 28 States/UTs, partially selected in 03 States/UTs, process initiated in 03 States/UTs and 02 States/UTs have not initiated)

- Implementation under progress – 27 States/UTs have selected SI for implementation

- Bid process in Advance stage/implementation about to start – 1 State in advance stage

- 13 States/ UTs have decided to appoint NIC as their Application Development Agency - MoU signed by 13 States/UTs

- Launch of eDistrict services – Overall, eDistrict services have been launched in 513 districts across 25 States. (FY 2012-13: 102 districts; FY 2013-14:196 districts; FY 2014-15: 116 districts, FY 2015-16: 99 districts)

- Issuance of Guidelines / Advisories
  - National Rollout Guidelines
  - eDistrict Manager Hiring Guidelines
  - Integrated Framework for Delivery of e-District Services Guidelines
  - Implementation Guidelines 2012 (Providing Flexibility to States)
  - Horizontal Connectivity Guidelines
  - Draft Agreement Template for States / UTs opting NIC as the Implementation Agency for eDistrict MMP
  - Report on "Business Process Re-engineering of High Volume Government to Citizen Services"
  - Advisory on Operational Expenses of eDistrict Manager
  - Advisory on Implementing Ration Card services under e-District project
  - Advisory on Implementing Birth & Death services under e-District project
  - Guidelines for using Handheld devices for eDistrict Services.

Achievements

The key achievements of e-District project are as follows:

- 1 additional State has selected State Project Management Unit (SPMU). In total, all 36 States/UTs have selected SPMU Agencies.

- 2 additional States/UTs have formed District

eGovernance Society (DeGS) in all their districts. 100% DeGSs have been formed in 33 States/UTs have DeGS formed in all their districts and in total, DeGS has been formed in 619 non-pilot districts across the country.

- 3 additional States/UTs have hired eDistrict Project Managers (eDPMs) in all their districts. In total, 28 States/UTs have hired eDPMs in all their districts. In this year, 42 additional eDPMs have been hired and in total, 502 eDPMs have been hired across 31 States / UTs.

- 2 additional States/UTs have selected System Integrators (SI) for State-wide rollout. In total, 27 States / UTs have selected SI for State-wide rollout of the project.

  eDistrict services have been launched in additional 99 non-pilot districts across 7 States/UTs. In total, eDistrict services have been launched in 513 non-pilot districts across 25 States/UTs.

2.2.3   All Services through online & mobile

JAM Trinity– Jan-Dhan, Aadhaar, Mobile- can help government to implement large-scale, technology-enabled and real-time Direct Benefit Transfers (DBTs) to improve economic lives of India's poor. Introduction of DBT in LPG and MGNREGS have proved that use of JAM can considerably reduce leakages, reduce idle funds, lower corruption and improve ease of doing business with the government.

e-KYC– Based on industry inputs, which was looking for digital KYC solution coming directly from the issuer of KYC, UIDAI developed another service called e-KYC. While developing this, UIDAI maintained the privacy of the individual, by sharing demographic data of an individual only after receiving explicit authorization (consent) from the concerned individual. UIDAI has established an ecosystem which ensures that a resident can digitally share the KYC with a registered service provider by authorizing UIDAI whenever he/she wanted to share his/her KYC with the service provider to avail a service.

With the explicit consent/authorization by the resident, the Aadhaar e-KYC service provides an instant, electronic, non-repudiable proof of identity and proof of address along with date of birth and gender. In addition, it also provides the resident's mobile number and email address to the service provider, which helps in further streamlining the process of service delivery.

2.2.3.1   Good Governance & Best Practices

The National e-Governance Plan has been implemented to deliver government services to citizens in electronic mode. Though a number of e-Governance Applications have been developed and are delivering government services to citizen in their localities, these applications are not replicated across the States/UTs. Hence, there is a dire need to replicate the best practices of e-Governance and successful e-Governance applications.

The Government of India has launched new e-Governance initiatives in the process of strengthening existing ones in the country. Accordingly, DeitY is implementing a scheme on "Good Governance and Best Practices" to promote ICT enabled good governance in the country. This funding scheme aims to promote e-Governance in the country wherein, the replication of successful e-Governance practices and applications would be taken up and departments would also be encouraged to come up with new applications in uncovered domains.

The indicative areas in which proposals have been undertaken are listed below:

a) Replication of Best Practices from other projects/ schemes

b) Pilot and prototypes for e-Governance

c) Innovative projects in uncovered domains

d) Automation of existing Government Processes (G2G / G2C)

e) Transformation of existing Government Processes (Government Process Reengineering)

f) Information Dissemination to Citizens

g) Enabling mobile service delivery

h) Capacity building of Government Officials

Achievements

5 projects have been approved. 7 proposals have been recommended by the working group and are under approval at various stages.

2.2.3.2   World Bank assisted "India: e-Delivery of Public Services" Project

Following approval of a Development Policy Loan amounting to USD 150 million (about ₹ 700 crore) from the

World Bank for programme management and financial support for National e-Governance Plan (NeGP), DeitY has been utilising this support as a focal point to convene all the associated departments of the central and State governments around a concrete reform agenda for e-governance in the country. DeitY is supporting critical policy and institutional actions of the Central/State/UT governments that entail e-delivery of services leading to more robust implementation of NeGP, with significant social benefits for the population and positive impacts on the poor.

Rapid Replication Projects funded under World Bank: DeitY has approved 6 projects under rapid replication initiative, namely:

- 2 projects of ePASS
- XLN
- eHospital
- eHRMS
- Mee Seva

As on 31.12.2015, a total of 39 projects have been approved. Funds for 36 projects have been released to the implementing agencies in various States/UTs. A total of 46 projects have been considered under e-Bharat scheme for funding assistance till date.

Achievements

- 9 projects have been launched/implemented and funds have been released for various projects funded under this scheme.

2.2.3.3 National Scholarship Portal

National Scholarships Portal was launched by Hon'ble Prime Minister of India under the Digital India Programme on 1st July 2015. It is a one-stop solution to implement end-to-end disbursement of the scholarship to the beneficiaries. The process includes student registration, application, approval and disbursement. It was conceptualized based on the directives received from the Prime Minister's Office for streamlining and fast tracking the release of scholarships across Government Ministries/Departments.

The system enables the scholarship disbursement to the intended beneficiaries directly into their bank accounts in Direct Benefits Transfer (DBT) mode. The key benefits of the National Scholarships Portal are improved transparency in the entire process, single unified database of beneficiaries leading to minimal duplication in processing of scholarships, simplified process, comprehensive MIS and decision support system, etc.

Achievements

- So far, twenty one schemes of nine Ministries/ Departments of Central Government have been on-boarded on the Portal.
- Over 1 crore students registered with 1141 institutes across the country have applied for scholarships through this portal. Currently, these applications have been scrutinized at various levels and the scholarship disbursement to the selected students is in process.

2.2.3.4 Digital Locker & other initiatives

Digital Locker

DigiLocker is a key initiative under Digital India, the Indian Government's flagship programme aimed at transforming India into a digitally empowered society and knowledge economy.

Targeted at the idea of paperless governance, DigiLocker is a platform for issuance and verification of documents & certificates in a digital way, thus eliminating the use of physical documents. Indian residents who sign up for a DigiLocker account get a dedicated cloud storage space.

Organizations that are registered with Digital Locker can push electronic copies of documents and certificates (e.g. Driving License, Voter ID, School certificates) directly into citizens' lockers. Citizens can also upload scanned copies of their legacy documents in their accounts. These legacy documents can be electronically signed using the eSign facility.
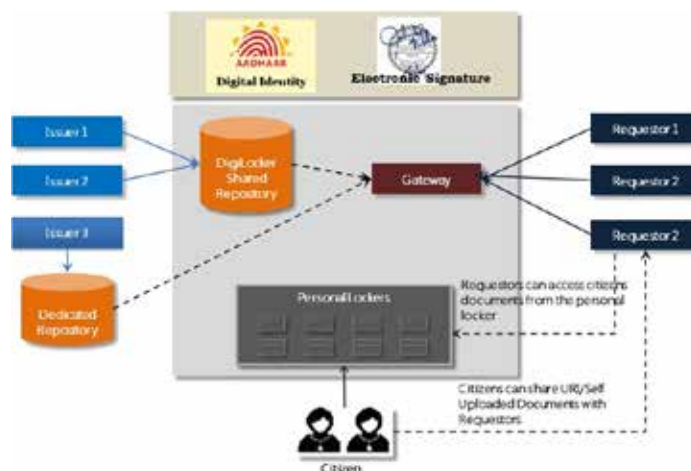
Benefits of DigiLocker

1. **Access**: Citizens can access their digital documents anytime, anywhere and share it online.
2. **Paperless**: It reduces the administrative overhead of Government departments by minimizing the use of paper.
3. **Authenticity**: Digital Locker makes it easier to validate the authenticity of documents as they are issued directly by the registered issuers.
4. **eSign**: Self-uploaded documents can be digitally signed using the eSign facility (which is similar to the process of self-attestation).

Achievements

Product Milestones (As on 2nd March 2016):
- 11.09 lakh Registered Users
- 50.71 lakh Issued Documents
- 18.42 lakh Uploaded Documents
- 2.33 lakh eSigned Documents

2.2.3.5 Citizen Contact Centre

Citizen Contact Centre (CCC) is a G2C pilot project being implemented by DeitY to provide non-emergency (Informational and Transactional) cloud based call centre services over a single unique number 166 across the country. The project aims to simplify Government-Citizen relationship where the hardships experienced by citizen in accessing government services are done away with.

The project envisages to use Automatic Speech Recognition (ASR), automatic query identification and customer relationship systems to enhance the effectiveness and responsiveness. It is currently being implemented in four pilot States Tamil Nadu, J&K, Jharkhand and Chhattisgarh for the State level non-emergency services and also few Central Government services.

Achievements

- The project implementation is in progress by CDAC-Mumbai in three pilot States namely, Chhattisgarh, J&K and Jharkhand.
- Hosting of the central Infrastructure in cloud environment has been initiated.
- Development Work on ASR, TTS and CRM is in progress.

2.2.3.6 Enabling All Schools with Virtual Class Rooms

DeitY is implementing a scheme on "Enabling All Schools with Virtual Class Rooms". The project is proposed to be implemented in the Pilot States of Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Rajasthan, Tamil Nadu and Tripura.

The total number of targeted schools in Phase – I are 3500 plus 50 DIET/any central locations in the district. The project will enable the school teachers to reach at far locations without physical presence and on the other hand empower the student to be taught by subject expert sitting at far end. It is envisaged that in Phase – I of the project the five States (taken as pilot States as identified by MHRD) will be taken where a substantial number of DIET locations (to be selected based on availability of raw power / Internet connectivity, etc.) along with schools under its jurisdiction from all the five States will be picked for implementation of project.

Achievements

- One project with a total outlay of ₹ 94.07 Cr. has been approved
- The project aimed at creating smart virtual classroom facilities in 3500 schools & 50 District Institute of Education & Training (DIETs) across 07 States i.e. Himachal Pradesh, Gujarat, Rajasthan, Tripura, Andhra Pradesh, Haryana and Tamil Nadu.
- All the 07 States have shared the first cut list of their nominated schools / DIETs to ERNET (Implementing agency). Also working to arrange the pre-requisites facilities if not available in the nominated locations.
- ERNET floated the tender for procurement of smart class equipment's and selected the SI.

2.2.3.7 Open Government Data (OGD) platform for National Data Sharing & Accessibility Policy (NDSAP)

Driven by the NDSAP-Open Data Policy notified by Government of India in March 2012, National Informatics Centre (NIC) has set up the Open Government Data (OGD) Platform India - https://data.gov.in to provide open access by proactive release of the data available with various ministries/departments/organizations of Government of India. Main features include single point access to open datasets, responsive web layout design, enhanced visualization platform, better user experience and efficient discoverability of resources, cataloging of similar resources, APIs, embedding catalogs, widgets to share filtered set of catalogs, catalogs subscription, community participation through forums, blogs, infographics and visualizaion and much more.

Achievements:

From 1st April 2015 till date, 14 (13 Central, 1 State) Chief Data Officers (CDO) have been nominated, 7575 resources contributed under 321 catalogs with 265 Visualizations created.

Two workshops have also been organized for the CDOs & Data Contributors during this period.

Till date OGD India has 5.02 million times viewed and datasets have been downloaded 1.98 million times. 21665 APIs requests submitted in the portal, 8092 API keys availed by users and 279 APIs are created.

OGD Platform is available as Software as a Service (SaaS) model. Setting up OGD SaaS instances for States viz. Sikkim, Telangana, Odisha are under process. OGD is strongly promoted through newsletters, social media, workshops, challenges and participation in data meets etc.

2.2.3.8 Electronic Transaction Aggregation & Analysis Layer (eTaal)

A large number of eGovernance initiatives including various Mission Mode Projects (MMPs) under National eGovernance Plan (NeGP) are being implemented in the country by the Central and State Governments and organizations for ensuring efficient, affordable, transparent and convenient service delivery to citizens. Several of these initiatives have national importance and are included in the country's IT strategy. Some applications use internal performance measurement mechanisms defined through Service Levels and Key Performance Indicators (KPIs), but there is no standard Government-wide criterion or metric to evaluate the impact

of all initiatives. In view of the rapid growth in the number of services delivered through electronic means in India, DeitY and NIC, the nodal ICT organization, identified the number of end-to-end electronic transactions as the best indicator for measuring the real-time performance of eGovernance services in terms of service delivery to citizens.

DeitY and NIC have developed eTaal; URL: http://etaal.gov.in, as an electronic dashboard for providing a real-time aggregated view of eServices being delivered across different States and levels of government. eTaal provides an aggregated view of e-Transactions performed through eGovernance applications implemented including, but not limited to, the national-level projects like Digital India initiatives and MMPs defined under the NeGP. eTaal automatically pulls the e-transaction count from the applications integrated with it using Web Services technology.

The present system deals with quantitative analysis only, whereas, plan is afloat to develop eTaal 2.0 to address the qualitative aspects of service delivery, thereby, bringing in the concept of 'QUANTILITY', which means 'QUANTIty' with 'quaLITY'. In eTaal 2.0, a system is being developed for assigning appropriate weightages for various categories of e-Services. To facilitate view of eServices being delivered across the country, eService Directory has been developed under eTaal 2.0. It provides the details of e-Governance application delivering the service such as name of the department, description of service etc. along with the spatial spread for a given service.

eTaal portal captures the data for approx. 2936 e-Services from 21 central ministries, 36 States/UTs and mission mode projects (MMP). Around 1330 crore e-Transactions have been recorded so far.

Achievements:
- No. of services integrated as on date: 2,964
- Total no. of e-Transactions: 13,55,31,14,281
- No. of services integrated since 1st April 2015: 190

- Total no. of e-Transactions since 1st April 2015: 5,90,06,57,032
- No. of projects/Dept. integrated since 1st April 2015: 30

2.2.3.9   E-Hospital Project

Hon'ble Prime Minister of India launched Online Registration System (ORS) under e-Hospital project during Digital India Week. ORS services include taking online appointment, viewing of lab reports and checking of status of blood availability in blood banks. Apart from this, online payment has been facilitated wherever applicable. So far these services have been implemented in AIIMS, New Delhi, Dr RML Hospital, New Delhi, Sports Injury Centre (SIC), Safdarjung Hospital, New Delhi and NIMHANS, Bengaluru.

E-Hospital is aimed at implementation of Hospital Management Information System (HIMS) for internal workflow of hospital. The patient interface of the e-Hospital has been facilitated through ORS where services related to patients will be delivered electronically.

E-Hospital is available to government hospitals through Software as a Services (SaaS) model. Hospitals are relieved from Application & Server Management as e-Hospital is available on cloud. This simplified the on-boarding process and master data management for Hospitals. It enables single interface for patients through Online Registration System (ORS) for various services and also creates uniformity of e-Hospital Application across all government hospitals. E-Hospital application built using open source technology and standards recommended by Ministry of Health & Family Welfare (MoHFW). E-Hospital application has 16 modules, which are loosely coupled and implementable in a phased manner. E-Hospital is an Open Source based HMIS application software developed by NIC.

So far 32 hospitals have already joined the Online Registration System (ORS) and more than1.50 lakh appointments have been taken through ORS.

2.2.3.10   Jeevan Pramaan

In a big relief to over a crore retired employees of Government and PSUs, under Jeevan Pramaan, a pensioner can now digitally provide proof of his existence to the authorities for continuity of pension every year instead of requiring to present himself physically or through a Life Certificate issued by specified authorities. This facility has been widely acclaimed by the pensioners.

"The Aadhaar enabled biometric digital certification will do away with the requirement of a pensioner having to submit a physical Life Certificate in the month of November every year calendar, in order to ensure continuity of pension being credited in the account".

"Jeevan Pramaan" portal has been inaugurated by the Hon'ble Prime Minister on 10th Nov 2014. Total number of pensioners registered on the portal for Digital Life Certificate (DLC) are 13,50,314. This includes Central Govt., State Govt., EPFO, DPDO, Post Office, PSUs etc. Haryana is the first State in the country to implement Jeevan Pramaan for their State Government Pensioners.

Pension Disbursing Agencies (PDA) like Bank, DPDO, EPFO and State Govt. etc. may download/upload data pertaining to their domain through the respective login facility for processing of DLCs. Call Centre facility is being used to bridge the gap in data. The total number of successfully processed DLCs by the PDAs are 9,14,994.

2.2.3.11   Biometric Attendance System (BAS) – A National Rollout
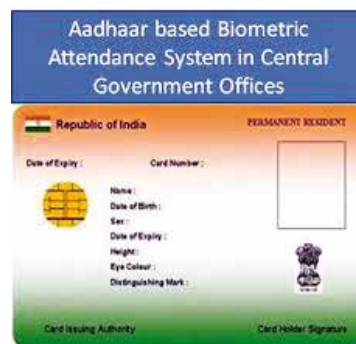
As part of the "Digital India" programme of Government of India, DeitY/NIC/UIDAI implemented Aadhaar enabled Biometric Attendance System (BAS) in all Central Government Offices in Delhi and is now being extended to offices of all State governments.

The system enables an employee to register attendance by simply presenting his/her biometric (Fingerprint/Iris) and is authenticated online with their biometric attributes stored with UIDAI. The system allows anyone authenticated to track the employee attendance details in government organisations that is visible on attendance.gov.in

The Cloud-based software is installed and operated from NIC National Data Centre and UIDAI. Presently 394 organisations/offices are registered in this system covering 90243 employees and 3042 active devices.

2.2.3.12 PRAGATI Video Conferencing

Hon'ble Prime Minister, after assuming office, has been quite anxious to design a credible mechanism for redressal of Public Grievances and is equally keen to see that programmes and projects launched by the Government(s) are monitored properly for timely implementation and desired outcome. For holistic development of the Country, Hon'ble Prime Minister launched an IT based redressal and monitoring system on the 25th March, 2015 which combines Data Management & Analysis, GIS/other locational application as well as video-conferencing. This becomes a multi-purpose and multi-modal platform known as PRAGATI (**PR**o-**A**ctive **G**overnance **A**nd **T**imely **I**mplementation) which is a three-tier system. Through this platform, Hon'ble PM interacting with the GoI Secretaries & Chief Secretaries through video-conferencing. The design is that when PM reviews the issue he should have on his screen the issues as well as the latest updates regarding the same. During the interaction, PM discusses and understands the problem areas and will give suitable directions. These directions will remain in the system for further follow up and review till finality of the matter. The primary objective of PRAGATI is to speed up implementation of State level projects, central level schemes and resolution of grievances between States and Central level departments in implementation of schemes of national importance.

This programme has proved effective in addressing and resolving issues by bringing down the inter-departmental communication gaps and thus minimizing the time taken for implementation of projects and schemes. It is a robust system in prompting for e-Transparency and e-Accountability with real-time presence and exchange among the key stakeholders.

2.2.3.13 Digitize India Platform (DIP)

Digitize India Platform (DIP) is an initiative of the Government of India under the Digital India Programme to provide digitization services for scanned document images or physical documents for any organization. The aim is to digitize and make usable all the existing content in different formats and media, languages, digitize and create data extracts for document management, IT applications and records management. This platform was launched in August, 2015 under Digital India.

The main objective of this project is to provide an end-to-end workflow based IT framework for digitization of Government records to enhance service delivery to the Citizen and to empower numerous self-identified volunteers, part-time workers, housewives, students and general public, who add small portions of their contribution through crowd sourcing mechanism to achieve the greater result.

DIP provides an innovative solution by combining machine intelligence and a cost effective crowd sourcing model. It features a secure and automated platform for processing and extracting relevant data from document images in a format that is usable for meta-data tagging, IT application processing and analysis.

Achievements:

About 19,664 Digital Contributors have so far registered in this platform. About 24.15 lakh Snippets texts have been organized by the platform through crowd sourced contributions, out of which 21.19 lakh have been digitized for approximately 2.62 lakh of documents.

2.2.4 Financial transactions electronic & cashless

As Aadhaar is unique and does not change over the lifecycle of an individual, the 12-digit Aadhaar is sufficient to transfer any payments to an individual. Today, in order to transfer money to a beneficiary, the Governments/ Institutions need to know the bank account, IFSC Code, and bank branch details etc. which is prone to change. However, Aadhaar offers the possibility of sending money by just using the 12-digit number for life without bothering about any changes in the bank account of the individuals. Thus, with this unique property of being valid for a lifetime, Aadhaar is very well perceived as a Financial Address in the banking sector.

2.2.4.1 Direct Benefit Transfer (DBT)

In order to achieve targeted delivery of welfare services in a transparent and efficient manner, the Government launched Direct Benefit Transfer through Aadhaar Payment Bridge (APB) and other channels in 2013.

Aadhaar Payment Bridge (APB) has been established by National Payments Corporation of India (NPCI) which is approved by RBI as a valid Payment System. It helps deal with the challenges related to banking transactions with benefits to both the stakeholders, namely, the Government and the Residents. As per the directions of Government of India, all Centrally sponsored and Central sector schemes come under the purview of DBT which is to be implemented across India. As on 15th Jan 2016, around 3.27 crore transactions have been carried out over APB disbursing over ₹ 2683 crore. Several schemes other than DBT schemes are leveraging APB platform for efficient delivery of benefits.

Aadhaar Enabled Payment System (AEPS)

A unified payment network called the Aadhaar-enabled Payment Systems (AEPS) has been designed and implemented by NPCI. The AEPS system works through a device called 'MicroATM' using a Mobile SIM card, whereby data connectivity authenticates the resident with UIDAI database based on his/her Aadhaar and fingerprints. If it matches, the AEPS routes the transaction to the bank for the financial transaction and the cycle gets completed. If the resident's authentication fails, appropriate message is provided to him. Aadhaar enabled Payments System (AePS) facilitates basic banking access (viz. cash withdrawal, cash deposit, balance enquiry, fund transfers) to the beneficiaries in a hassle free manner at/near the doorstep. Further, usage of Aadhaar authentication enables transactions in real time in an inter-operable environment.

Till 15th January 2016, 108 banks and Department of Post, are active on AePS platform and banks performed 6.84 crore transactions.

Direct Benefits Transfer for LPG (DBTL)

The Government has launched Direct Benefit Transfer on LPG (DBTL), a scheme whereby the subsidy that was earlier transferred as lump sum to State oil companies is now being transferred to individuals directly into their bank accounts.

DBTL Phase-II started with a consumer base of 15.29 crore. This reduced to 12.92 crore as on 31st March 2015. During this phase, the scheme was implemented across the country. Since the time the consumer has now expanded to 16.43 crore. In the existing consumer base of 16.43 crore, about 11.03 crore consumers have given Aadhaar to OMC companies, out of which 9.27 crore have given Aadhaar to bank. As a result, a total of 72.63 crore transactions have taken place on APB alone disbursing subsidy worth about ₹ 18,772 crore with a success rate of 99.72%.

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

A total of 5.48 crore workers have got their Aadhaar seeded in MGNREGS data base till 15th Jan 2016. As on 15th Jan 2016, more than 2.25 crore payments have been done under MGNREGS by paying over ₹ 1398 crore through APB.

Pradhan Mantri Jan-Dhan Yojana (PMJDY)

Pradhan Mantri Jan-DhanYojana (PMJDY) is a National Mission for Financial Inclusion to ensure access to financial services, namely, Banking/Savings & Deposit Accounts, Remittance, Credit, Insurance, Pension in an affordable manner. The PMJDY was launched in August 2014. As on 15th Jan 2016, about 20.19 crore accounts have been opened under the scheme with Aadhaar seeding in 8.64 crore accounts.

2.2.4.2 National Payment Service Platform

In the financial space, DeitY has collaborated with NSDL Database Management Limited (NDML), a wholly owned subsidiary of National Securities Depository Limited (NSDL), for providing National Payment Service Platform (PayGov), a centralized platform for facilitating all government departments and services to collect online payments from citizens for public services.

PayGov offers an end-to-end transactional experience for citizens who can opt from various payment options such as Net Banking (70+ banks), debit cards, credit cards, cash cards/prepaid cards/ wallets, and NEFT/RTGS, etc.

Achievements

- Another 10 departments have gone live during this financial year
- Total of 54 departments/agencies are live with transaction worth ₹ 1850 crore.
- Major leading departments are Commercial Taxes, Transport and Generic Portal (Jharkhand), CSC (Kerala), Delhi Jal Board, MahaOnline, CSC e-Governance Services India Limited, NIELIT, Centre for eGovernance (UP), M-One (Karnataka), etc.

Department of Electronics & Information Technology

Pay Gov India
National Payment Services Platform

Ministry of Communications & IT
Government of India

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HOME   ABOUT PAYGOV   GOVT. DEPTS./ AGENCIES INTEGRATED   DOWNLOAD FORMS   PARTNERS

Total Depts./ Agencies Integrated	Last Week	Last Month	Till Now
54	👤 229431 ₹ 220867254	👤 735905 ₹ 624561035	👤 8130284 ₹ 18500767875

Last 6 Months Report

Status till 10-Feb-2016

- 54 Depts./ Agencies are Live with transactions worth Rs. 1850.08 Cr.
- 9 Depts./ Agencies have completed integration and is about to Go-Live soon.
- Integration is in progress with 26 Depts./ Agencies.
- Integration has been initiated with 91 Depts./ Agencies.
- Major leading Depts./ Agencies last month: Commercial Taxes, Transport and Generic Portal (Jharkhand), CSC (Kerala), Delhi Jal Board, MahaOnline, CSC e-Governance Services India Limited, NIELIT, Centre for eGovernance (UP), M-One (Karnataka), etc.

Govt. Department express interest in using PayGov payment gateway

1 PayGov team understands the current process of the Govt. Department

2 PayGov team shares the documents required for integration

3 On receipt of documents test URL is shared with Govt. Department to test the integration

On successful completion of testing, the service is made live
Necessary MIS / Reports made available to the Govt. Department in the secured login created for them
On receipt of all documents the process takes approximately 15 days to be made live

Who can avail PayGov Services? know more

How to avail PayGov Services? know more

Got Questions? Contact Us know more

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ABOUT PAYGOV   FORMS NEEDED   GOVT. DEPTS./ AGENCIES INTEGRATED   PARTNERS   FAQs   CONTACT US

Powered by NSDL

2.2.5 Technical and Other Support

Considering the complexity of the NeGP and the need to look at issues such as overall technology architecture, framework, standards, security policy, funding strategy, service delivery mechanism, sharing of common infrastructure etc. at a programme level, DeitY is providing technical and other support like technical appraisal of all NeGP projects prior to a project being placed before the EFC/CNE. DeitY has already set up a Programme Management Unit, namely National eGovernance Division (NeGD) to provide support to departments in conceptualizing, developing, appraising, implementing and monitoring respective MMPs.

2.2.5.1 Rapid Replication of Applications

The "Rapid Replication Roll-out Initiative" is a unique initiative which leverages sharing of infrastructure and rapid replication of successful applications across States. The initiative requires customization of successful applications as per the Seeker State's requirements and then hosting this application either at the Giver State's SDC or Seeker State's SDC. The proposals of 5 applications namely e-Pass of Centre for Good Governance (CGG) Andhra Pradesh, Xtended Licensing & Laboratory Node (XLN) from NIC Gujarat, e-Hospital from NIC Tripura, MeeSeva from Andhra Pradesh Technology Services (APTS) Andhra Pradesh

and Human Resource Management System (HRMS) from NIC Himachal Pradesh, were approved by DeitY for replication in other States.

Achievements

The implementation status of 5 applications is as follows:

- **XLN -** All 6 modules of XLN have been successfully implemented in Chhattisgarh, Himachal Pradesh, Kerala and Karnataka. Application is hosted on NDC, Shastri Park, New Delhi. Food & Drugs Control Administration (FDCA) of the Seeker States are now totally online and issuing licenses to manufacturers & sales licenses to retailers & wholesalers of pharma & related products online. The applications for drug licensing have no requirement of physical file movement right from taluka places to the head offices. The online applications are totally stabilized and paperless culture is around 95 percent.

- **ePass-** The application is customized for online disbursement of scholarships in the seeker States. The system links all welfare departments, treasury, databases of Secondary Schools Certificate (SSC), colleges and banks of the Seeker States.

- Himachal Pradesh - Currently 29 schemes on-boarded including Central, State and Technical.

- Karnataka - 6 schemes of BC welfare department of Karnataka implemented successfully.

- Tripura - 2 schemes of welfare departments of Tripura implemented successfully.

- Jharkhand - 6 schemes of Jharkhand implemented successfully.

- **eHospital:** 5 modules of eHospital application implemented in Phase - I in 3 hospitals of Karnataka (Jayanagar Hospital, KC Hospital and Sanjay Gandhi Hospital). The application is hosted in SDC Karnataka.

   - Also, Online Registration System (ORS) has been developed for better crowd management and elimination of long queues in government hospitals to provide Aadhaar based online registration and appointments. The application is hosted on National cloud for global access. ORS application was launched by Hon'ble PM on 1st July 2015 during Digital India Week. ORS portal provides following functionalities.

   - Online appointment for doctors

   - Online availability of lab reports

   - Online availability check for blood in blood banks

- **MeeSeva:** 2 modules i.e. MeeSeva Request Tracking System (MRSTS) and Transfer Protocol implemented in Assam on 10th Feb 2015. Application componentized into 10 components successfully. All 10 components are made available on eGov AppStore for adoption by any seeker State.

- **HRMS**: The eHRMS application was developed as the product model for providing a generalized human resource management solution for Government Departments to help them in taking right decisions at right time and for proper monitoring, manpower planning, recruitment, postings, promotion and transfer based on employee skill sets. Currently, after due customization, the application has been rolled out in Jharkhand State and hosted on NDC Shastri Park New Delhi. The data digitization has been completed and verification of data is in progress. Mobile app has been developed for leave application. At present, functionality for merging the departments is under development.

2.2.5.2 e-Gov App Store

An e-Gov Application Store (AppStore) was launched on 31st May 2013 (https://apps.gov.in). It is a common repository and market place of customizable & configurable applications, which can be reused by various government agencies/departments at Center and States without investing much effort in development of such applications:

a) e-Gov AppStore will host both cloud and non-cloud enabled applications

b) Consumers will have an option to download an application from the e-Gov AppStore or run it directly from the cloud

Following are the objectives of setting up the eGov AppStore:

- Speeding up the development and deployment of eGov applications

- Easy replication of successful applications across States

- Avoid duplication of effort and cost in development of similar applications

- Ensure availability of certified application following common standards at one place

Revamping of MMPs

In order to improve the service delivery to citizens, based on the study and recommendations of NeGD, it was decided to revamp the existing applications like PDS, Road Transport, Scholarship, Pension, Treasury, Prison, NLRMP, e-Courts, CCTNS under e-Gov AppStore project to develop them as a Common Application Software (CAS)/ Product, to be used by any Government user/agency as per their requirements with mere changes in configurations. The changes included process change to enhance user experience, scope of work, change in architecture, adoption of open source software, open standards and development of Application Programme Interface (API) for making the application interoperable, development of mobile App, payment gateway interface, etc.

Achievements

- The new version of the eGov AppStore has been launched with better framework and new user design.

- 5 awareness workshops have been conducted across the country.

- Application development and reengineering guidelines have been developed and published on AppStore.

- Currently, 52 applications (including application components and web services) have been added to the AppStore.

- Out of 52 applications, 3 MMPs (ePrison, Transport and PDS) were selected for revamping. PPSMS application is developed afresh for generic project proposal and monitoring system. The status of the applications are as follows:

  - **ePrison**: National Portal for prisons have been developed and hosted on the National Cloud. The application has improved MIS reports, eMulakat (video conferencing for inmates with their relatives) feature, online registration and scheduling for visitors and integration with Aadhaar.

  - **Transport**: Common Application Software (CAS) for transport has been developed and hosted centrally on the National Cloud. It is implemented in 8 States (63 sites). The application is role based and provides service to the citizens for Vehicle registration and Driving Licence.

  - **PDS**: Productization of Common Application Software is under progress and test run underway in Uttarakhand.

  - **PPSMS**: The application is developed and UAT is done with World Bank team as pilot.

2.2.5.3 National Centre for e-Governance Standards and Technology (NeST)

Following Standards documents were prepared and published on the e-Gov Standards portal (https://egovstandards.gov.in): (i) Standards and Specifications for e-Pramaan – a Framework for e-Authentication. (ii) Framework for Adoption of Open Source Software in e-Governance Systems (iii) Guidelines for E-mail Account Management and Effective E-mail Usage Guideline (iv) Guidelines for Use of IT Devices on Government Network (v) E-mail policy of Government of India (vi) Policy on use of IT resources of Government of India (vii) Policy on Open Application Programming Interfaces (APIs) for Government of India (viii) Guidelines on Mobile as Digital identity (ix) Gazette Notifications of: E-mail Policy of Government of India, Policy on use of IT resources of Government of India, Policy on Open Application Programming Interfaces (APIs) for Government of India, Constitution of Expert Committee for Formulation of Standards for Mobile Governance, first draft of the document prepared for further discussions. The Project on eGov Standards closed on March 31, 2015 and the activities have been transferred to the NeST Project (National Centre for eGov Standards and Technologies), executed by STQC, DeitY, GoI. A two-day workshop, under NeST, organised in September, 2015, on Implementation of E-Gov Standards in Tripura for NIC Officials from eight North East States.

Standards for e-Governance are critical for ensuring sharing of information and seamless interoperability of data across e-Governance applications and can help in promoting innovation. Recognizing the critical role that well-designed standards play in the rapid growth of eGovernance in the country, DeitY has set up an Institutional Mechanism under the National eGovernance Programme (NeGP) to evolve/adopt Standards for eGovernance. Further to achieve the objective of Digital India Programme, emphasis has been given to interoperability among all e-Governance systems and applications.

In this regard, DeitY has initiated 'National Centre for e-Governance Standards & Technology (NeST)' project in March 2015 for a period of 3 years. The main objective of the project is:

- To develop and adopt ICT standards and technologies for effective and efficient implementation of e-Governance project in India.
- To undertake capacity building at various levels in order to facilitate understanding of Standards and Technologies.
- To promote adoption of Open Technology which include Open Standards and Open Source Software to avoid vendor lock-in.

Achievements

- Framework for Adoption of Open Source Software in e-Governance Systems has been notified in The Gazette of India
- Policy on Open Application Programming Interface for GoI notified in The Gazette of India
- Notified Guidelines on Mobile as Digital Identity
- Interoperability Framework for eGovernance (IFEG) approved and notified
- 5 Capacity Building programmes have been organized

2.2.5.4 Capacity Building Scheme 2.0

Capacity Building (CB) scheme Phase II is a continuation of initiative under CB scheme Phase I and the scheme would also support the implementation of vision of Digital India including e-Governance and e-Kranti. The key components of the existing scheme are proposed to be continued for a further period of 2 years at total outlay of ₹ 423.87 crore and the scope has been enlarged to cover central line ministry in various training and knowledge initiatives. The objective of the CB scheme Phase II is to provide professional resources and training to political and policy level decision makers for all States/UTs to build the in-house capacity for implementation of various e-Governance initiatives.

Major components:

- Recruitment, deployment and HR management of the 340 specialized resources in the SeMTs in all States and UTs.
- Training and development initiatives, including, inter alia,
  - Development of competency frameworks, training guidelines, content, case studies etc for different groups of stakeholders
  - Developing a pool of certified trainers
  - Develop Online and Web Based Training and Learning Management System
  - Certification programmes for specialized/key roles

- Knowledge management and sharing through workshops, development of case studies, sharing best practices and creation of knowledge repositories etc.

Achievements

The following training programmes/workshops have been conducted under CB schemes Phase II till 31.12.2015 in FY 2015-16:

Training Programme/Workshops	No. of Programmes	No. of Participants
SeMT Orientation	1	21
eGCF Workshop	3	112
Collaboration Workshop with Apex and ATIs	1	114
Train the Trainer(TTT)	2	32

Certificate Training Programme for SC/ST Government Official

The project aims to bridge the divide in capacities of officers to undertake e-Governance especially those working in the Scheduled Caste Sub Plan (SCSP) and Tribal Sub Plan (TSP) areas to mainstream of working. The project also meets one of the objectives of the plan towards human resource development of SCs and STs by providing adequate educational and health services. The project includes skill building through training and development under Digital India.

Achievements

- The project has been approved for duration of 2 years.
- The National e-Governance Division (NeGD) is the Implementing Agency.
- 104 participants have been trained in 5 batches in FY 2015-16.

Preparing North East for Digital India

The Hon'ble Prime Minister stated that "the Government is committed for realising potential of the NE region and accelerating its progress as India will not develop till it develops". Also, according to the survey report of National Council of Applied Economic Research dated 12th Aug 2011, e-Readiness of North East region is below average achievers. So, the project has been conceptualized for the capacity building of NE State government officials. The project includes skill building through training and development under Digital India.

Achievements

- The project has been approved for duration of 2 years.
- The National e-Governance Division (NeGD) is the Implementing Agency.
- The following training programmes/workshops have been conducted under CB schemes Phase II till 31.12.2015 in FY 2015-16:

Training Programme / Workshops	No. of Programmes	No. of Participants
Consultative workshop on Preparing NE under Digital India	1	111
Train the Trainer (TTT)	3	30
Leadership Skill Enhancement Programme (LSeP) 1 week	2	114
e-Governance Skill enhancement programme	1	34

2.2.6 Common Services Centre (CSC)
CSC Scheme under NeGP:

The CSC Scheme was approved by the Government of India in September 2006 under National e-Governance Plan (NeGP), which aimed for the establishment of one lakh ICT enabled front-end service delivery outlets, equitably spreading across rural India in the ratio of one CSC per six villages, thereby covering all six lakh villages. CSCs were envisaged as assisted front end ICT (Information and Communication Technology) enabled centres for delivery of various G2C (Government to Citizen) and other B2C (Business to Citizen) services to the citizens. In addition, CSCs are also used as the following:– (a) Permanent Enrolment Centres (PEC) for Aadhaar, (b) Insurance service centres, (c) Business Correspondences (BCs) under Financial Inclusion for Banking services, (d) Educational and Skill Development Centres, (e) EPIC enrolment centres, (f) Information Centre for various schemes etc. As on date (31-Jan-2016), the total number of CSCs operational across the States/UTs is 156,217. Average number of transactions per month through CSCs is approx. 89.2 lakh (over last 10 quarters Total transactions captured through etaal. gov.in was 8.92 crore).

Following are some of the key achievements of CSCs as on 31-Jan-2016:

- **Business Correspondents (BC):**
  The number of CSCs approved as BCA (Business Correspondents agents) is 28,111. As on 31 January, 2016, a total of 11,089 BCAs set up at CSCs have been active. In the month of January, 2016, a total sum of ₹ 733.19 lakh has been earned by the VLEs from BC business; while, during April, 2015 to January, 2016, total commission of ₹ 4556.67 lakh has been earned by the VLEs from BC functions.

- **Insurance Service:**
  So far, 9,532 Rural Authorized Persons (RAPs) were registered at CSCs pan India for Insurance Services. Among this, RAP license allowed till January, 2016 was 5,732. Out of those 5,732 licensed RAPs, 3,793 VLEs have been granted RAP license during the period from April, 2015 to January, 2016 (provisional). VLEs working as insurance agent as on 31 January, 2016 : 17,847 VLEs. Insurance premium collected till January, 2016 : ₹ 767.13 lakh from 77,384 customers. Renewal insurance premium collected till January, 2016 was ₹ 18118.65 lakh from 5,89,742 customers

- **Aadhaar related services:**
  The number of CSCs acting as Permanent Enrolment Centres (PECs) is 14,330. CSC SPV is now **ranked 2nd** in the country wide UID Registrar Ranking. Around 20 lakh Aadhaar Enrolments happened in January, 2016, while during April, 2015 to January, 2016 total 550 lakh Enrolment for Aadhaar Numbers have happened through CSC Network. In January, 2016, 62.18 lakh Aadhaar Numbers have been generated, while during April, 2015 to January, 2016, in total 525 lakh Aadhaar Numbers have been generated through CSC Network and till date, 8.844 crore Aadhaar Numbers have been generated.

- **Education Services:**
  Registered: In January, 2016, a total of 6,69,706 persons have got themselves registered for the IT Mass Literacy Programme. During September, 2014 to January, 2016, 43.61 lakh candidates were registered under NDLM [8.12 lakh candidates against target of 10 lakh (Phase-I) for IT Mass Literacy,and, 35.49 lakh candidates against target of 42.5 lakh (Phase-II) for Digital Saksharata Abhiyan-DISHA].

  Trained: In January, 2016, a total of 4,62,248 persons have been trained under IT Mass Literacy Programme. While during September, 2014 to January, 2016, in total 31,05,126 persons have been trained under this programme against registration done during this period. (Phase-I : 791880 + Phase-II : 23,13,246.)

  Certified: 2,68,811 beneficiaries have been certified under Mass IT Literacy Programme in January, 2016. While during September, 2014 to January, 2016, in total 10,96,018 persons have been certified under this Programme. (Phase-I : 647483 + Phase-II : 4,48,535).

- **Achievement over current FY 2015-16** :
  - As on 31 Jan., 2016, total operational CSCs is 156,271, among which 103,631 at Gram Panchayat level (against the target of 242,571 CSCs to be set up at GP level) and remaining 52,640 at other village levels & urban levels. During April, 2015 to January, 2016, total operational CSCs added 15,338, among which, 10,077 at Gram Panchayat level and remaining 4,876 at other village levels & urban level.
  - Apart from this, During April, 2015 to January, 2016 total BCAs added 1,089; total UID generated 5.25 crore; total Permanent Enrolment Centres added 7,182.

Achievements over current FY 2015-16 till Jan-2016				
S. No.	Items	1-April-2015	31-Jan-2016	Achievement
1	Planned CSCs (at least one at each Gram Panchayat level)		242,571	
2	Operating CSCs	140,933	156,271	15,338
	Operating CSCs (at GP level)	93,554	103,631	10,077
	Operating CSCs (at other villages and urban areas)	47,764	52,640	4,876
3	CSCs approved as BCA	26,750	28,111	1,361
	CSCs active as BCA	Approx. 10,000	11,089	1,089
4	UID generated	3.59 Crores	8.84 Crores	5.25 Crores
5	Setting up of PEC	7,148	14,330	7,182

CSC 2.0 under Digital India:

Based on the learning from the above mentioned existing CSC scheme and the feedback received from various stakeholders including the State Governments, the Govt. of India has approved a Project "CSC 2.0-A Way Forward" in August 2015 under Digital India Programme. It aims for establishing self sustaining network of 2.5 lakh CSC centres at Gram Panchayat (GP) level under Digital India- Pillar 3-Public Internet Access Programme – National Rural Internet Mission and deliver various citizen centric services. It is being implemented by CSC e-Governance Services India Ltd. (CSC SPV). The project implementation duration is 4 years. CSC 2.0 model is envisaged as transaction based and service delivery based model, delivering a large bouquet of e-services through a single delivery platform, which would increase the sustainability of the CSCs across the country.

ACTION PLAN FOR ROLL OUT OF CSCs UNDER CSC 2.0 Project (Digital India)

Total Number of Panchayats in India	24,2571
CSC present in Panchayats as on 1-Apr-2015----A	93,554
CSC present in Panchayats as on 31-Jan-2016 (cumulative)----B	1,03,631
CSC added in Panchayats from 1-Apr-2015 to 31-Jan-2016 (B-A)	10,077
Panchayats yet to be covered	1,38,940

2.2.7 e-Governance Standards

Following Standards documents were prepared and published on the e-Gov Standards portal (https://egovstandards.gov.in): (i). Standards and Specifications for e-Pramaan – a Framework for e-Authentication. (ii). Framework for Adoption of Open Source Software in e-Governance Systems (iii). Guidelines for E-mail Account Management and Effective E-mail Usage Guideline (iv). Guidelines for Use of IT Devices on Government Network (v). E-mail policy of Government of India (vi). Policy on use of IT resources of Government of India (vii). Policy on Open Application Programming Interfaces (APIs) for Government of India (viii). Guidelines on Mobile as Digital identity (ix). Gazette Notifications of: E-mail Policy of Government of India, Policy on use of IT resources of Government of India, Policy on Open Application Programming Interfaces (APIs) for Government of India, Constitution of Expert Committee for Formulation of Standards for Mobile Governance, first draft of the document prepared for further discussions. The Project on eGov Standards closed on March 31, 2015 and the activities have been transferred to the NeST Project (National Centre for eGov Standards and Technologies), executed by STQC, DeitY, GoI. A two-day workshop, under NeST, organised in September, 2015, on Implementation of E-Gov Standards in Tripura for NIC Officials from eight North East States.

2.3 Digital Empowerment of Citizens

2.3.1 e-Learning

e-Learning is one of the thrust areas identified by DeitY for imparting education using educational tools, which is facilitated and supported by Information and Communication Technologies (ICT). Advancements in ICT have made possible the availability of quality education to millions of people in a cost effective manner. The use of ICT in education has opened the doors for "anytime, anywhere" learning. Supplementing the formal way of education with E-Learning tools/content and use of ICT in formal education is important to facilitate enhanced learning environment; especially when there is large gap in demand and supply of quality content and educators.

The broad objective is to develop tools and technologies to promote e-learning. The Department has been financially supporting R&D projects in the area of e-Learning at various academic educational institutes, R&D Labs etc.

Achievements during 2015-16

During 2015-16, following R&D projects were supported:

(i) Online Labs (OLabs) for school experiments - Phase 2, CDAC, Mumbai jointly with Amrita Vishwa Vidyapeetham, Kollam, Kerala

The objectives include to extend OLabs for Class 11 and Class 12 (Physics, Chemistry and Biology) and for Class 9, 10 (Maths, Biology, English) and enhancing OLabs phase I experiments for multilingual support i.e. translation of content to Hindi, Malayalam, Marathi along with enhancement of the framework to M-Learning for supporting OLabs on Android tablets.

The expected outcome of the project is to enhance the OLabs framework to support accessibility features and add multi-lingual support to the OLabs framework. The project duration is 2 ½ years including extension of 6 months with total outlay of ₹ 449.80 lakh.

Under Online labs for schools project, total of 148 experiments/activities for classes IX, X, XI and XII have been developed. These include 118 in Science (Physics, Chemistry and Biology), 20 Mathematics activities and 10 English activities. Out of these labs, 24 activities have been translated in Hindi, 22 in Marathi and 48 in Malayalam (only instructions in lab). As per latest report, 143 schools are using OLabs. 11 teachers' workshops were conducted and so far 764 teachers have been trained. With regard to registration, total no. of students registered are 57809. Translation work in above three local languages is in progress.

(ii) Online Assessment and Evaluation System (OAES) for National Level Certification Examinations, IIIT, Bangalore jointly with NIELIT, New Delhi

The objectives are to create item banks, development of evaluation methods and online assessment and evaluation system (OAES). O-Level programme of NIELIT has been proposed as the basis for creation of item banks along with a suitable software platform to conduct online examinations, which will help in online evaluation of students' performance.

The expected outcome of the project is to develop item banks (1000 items per course) for the eight O-Level courses with cumulative sum of 8000 items across all the courses. In addition, online evaluation

of students' performance will also be done against all the items in the item bank. Further, a software platform will also be developed that will enable any agency to design and conduct online examination, and thereby evaluate the students' performance. The project duration is 3 ½ years including 6 months extension with total outlay of ₹ 329.99 lakh.

All four modules, namely Item Authoring module, Assessment Instrument Generation module, Exam module and Evaluation module have been completed. Question bank of approx. 4000 questions (total 18 types) has also been completed; framing remaining 2000 questions is in progress. Afterwards, try-out and validation of this examination framework will be done by NIELIT.

(iii) **Development of Personalized and Performance based E-Learning tool for existing E-resources, NIT Durgapur jointly with Bannari Amman Institute of Technology, Erode District, Tamil Nadu and IIT Kanpur.**

The objectives are to estimate the online learners' proficiency based on their navigation & search history, to sort and prioritize search results in the learning contents, tracking the searching process in a content particular for learners, improve search engine performance and to increase user (online learners) satisfaction.

The expected outcome of the project is to develop the content in new format for five courses, which can be used profile dependent learning experience through Brihaspati-3 LMS. The source code for the proposed module of the Brihaspati-3 shall be released in open source along with Brihaspati. The project duration is 3 years with total outlay of ₹ 99.90 Lakh.

Overall architecture of the system with its layout and incorporating with Brihaspati-3 platform has been completed. The homepage of the website has links for registration, sign up, and sign in link for students and a separate section for the various administrators. The student section of the project has been built. The system as described above is working well. Currently two courses i.e. 'Operating System' and 'Data Structure' have been completed and others are in process.

(iv) **MedSim–e-Learning platform for Medical Simulation, C-DAC, Thiruvanathapuram jointly with Amrita**

Vishwa Vidyapeetham, Kollam, Kerala

The objectives are to build an e-Learning platform that supports Computer based Medical Simulations and to allow students pursuing medical sciences to visualize, learn, practice and experience interactive clinical cases using Virtual Patients that integrates 2D and 3D animations

The expected outcome/ deliverables of the project is to develop medical e-Learning platform, portal with Administrative, Assessment and reporting tools (Medical Framework) along with medical simulations in two broad areas based on inputs from medical faculty (Pilot at 2 Hospitals). In addition, virtual patient cases will also be enriched with interactive 2D, 3D simulations and animations. The project duration is 2 years with total outlay of ₹ 199.80 Lakh.

Development of web based e-learning framework is completed and the domain "medsim.in" is up and running. Medsim system study was conducted to select virtual cases to be implemented in the broad areas of Cardiovascular system and Respiratory system. The development of virtual case modules has been completed and the same is demonstrated to the doctors and medical experts for feedback. The project team also had discussions with Principals of Government Medical College, Thiruvanathapuram and Kerala State Institute of Health and Family Welfare, Thiruvanathapuram for providing feedbacks. In addition, one workshop was conducted where about 55 doctors participated and they appreciated the above simulations.

(v) **Setting up ICT E-Learning Centres in 204 schools in Srikakulam district of Andhra Pradesh, ERNET India**

The objective is to set up e-Learning ICT centers in 204 high schools in rural and tribal area of district Srikakulam to integrate ICT for learning and teaching to improve learning outcomes of rural and tribal children.

The expected outcome/ deliverables of the project is to setting-up ICT Centers in schools in rural and tribal area of Srikakulam and to develop digital content of Science, Maths and English in Telgu and English language mapped with Andhra Education curriculum and make available to rural and tribal students equitably and uniformly. It is expected that approx. 50000 students would be benefited through

the use of e-Learning ICT deployment in the rural and tribal area of Srikakulam. Total duration of the project is 3 years with total outlay of ₹ 24.96 crores.

ERNET India has signed MoU with Education Department of AP Government. The installation and integration of ICT equipments have been completed in 100 schools, which are operational and functional and for 50 schools, it is in progress. Work related to connectivity, content and training of teachers is in process.

(vi) **Design and Development of Context Aware Mobile assisted Augmented Reality Framework for Learning Environment, CDAC, Bangalore**

The objective is to study various usage scenarios of cloud based Augmented Reality (AR) in e-Learning ecosystem and to design and develop the framework for mobile platforms.

The expected outcome/deliverables of the project is an intuitively simple, user-friendly software framework to create augmented reality based e-learning applications for students along with documentation including user's manual, help and support for the framework via online forums and sample projects to kick start. In addition, one workshop and two training programs will also be conducted. Total duration of the project was 2 years, which was further extended by 8 months. The total budget outlay of the project is ₹ 185.00 Lakh.

User friendly web based framework to create augmented reality based learning applications has been developed. In addition, three pilot applications namely Augmented Reality based Board, Augmented Reality based Book, Augmented Reality Games. One workshop and two training programmes have also been conducted.

(vii) **Deployment and management of Brihaspati-3 services over NKN for Indian Academia, IIT, Kanpur**

Major objective of the project is to make installations on the servers deployed in NKN network and to maintain and upgrade them with every new patch and version being released. The academic institutes, which are subscribing to NKN connectivity, will get very good reliable access to the services of Brihaspati-3 and its upgraded versions. All other services developed in open source, which are being integrated with Brihaspati-3 will also be deployed

and managed.

The expected outcome of the project is to deploy Brihaspati-3 services and allied services on NKN. The experience of the deployment and running Brihaspati- services shall be documented. The feedback from the services will be used in the development process to add more features and remove all kinds of bugs. Total duration of the project is 3 years with total outlay of ₹ 46.50 Lakh.

The server access at NKN data center has been received and with this, now, the installation and transfer of current user data for Brihaspati -3 has been completed. The services are up and running. Few more institutes have been added. The server from NKN Data centre was earlier accessible from NICnet, ERNET and NKN. After continuous follow-up, now it is accessible from anywhere in the world.

(viii **Enhancing the outreach of Electronic System Design and Training through e-learning, CDAC, NOIDA**

The main objective of this project is to develop low cost educational kits and to educate and provide training in the areas of Embedded System Design (ESD), Designing using Field Programmable Gate Array (FPGA) and Digital Signal Processing. Both hands-on and training through e-learning will be organized periodically throughout the project duration.

The expected outcome/ deliverables of the project is to develop educational kits for performing lab along with user manuals to perform experiments. Project will generate trained faculties, students, and other participants in different areas of Electronic Systems. Furthermore, the design & development of boards and training using different kits will enhance the knowledge base for commercial production of electronic systems. About 200 participants are expected to be trained through the Training Programs conducted at C-DAC, NOIDA. Additionally, based on an average registration of about 50 participants per Module, about 400 participants will be trained using the e-learning Mode. Total duration of the project is 3 years with budget outlay of ₹ 3.69 crores.

List of experiments related to Digital Logic Design has been prepared after reviewing the syllabus of some universities in a brainstorming workshop. All the given experiments have been performed on Basys-2

board to understand the working of Basys-2 FPGA board. The board offers a rich set of features that make it suitable for use in a laboratory environment for university and college courses for a variety of design projects, as well as for the development of sophisticated digital systems. The board is typically powered from a USB cable. For DSP Board, the prescribed syllabus of the Indian universities both in the Govt. and private sector were studied. The common topics were filtered out to design the lab experiments. For ESD boards, syllabus for 8051 boards has been prepared after reviewing syllabus of various Universities. e-learning portal and content development is in progress in order to provide complete LMS solution to the students in the above three areas.

(ix) **ICT-based framework to enhance the teaching and learning experience in large classroom, IIT, Guwahati**

Objectives of the project are to develop the framework and interface to deliver the lecture on the diverse portable computing devices carried by the students and for interaction between the teacher and the students both in the class and outside the class. In addition, the project also aims to develop a framework and interface for examination management (conduct and evaluate short exams/ quizzes/ home assignments).

The expected outcome of the project is to develop a framework for an ICT-based large classroom management system for automatic collection of attendance and scalable for real-time delivery of lecture content (slides and voice) to students and synchronization between mobile devices in the classroom (e.g. smart phones, tablets and laptop). This system will enable personalized interaction between the teacher and students and also facilitate to conduct and evaluate short exams. Total duration of the project is 2 years with budget outlay of ₹ 94.32 Lakh.

As far as progress is concerned, an authentication login system for instructor and students has been prepared. After authenticated login, separate interface for instructor and student is displayed. Various panels namely, files, queries, attendance and audio also implemented. Further, a system has been developed for personalized lecture delivery in which slides are being shared by the instructor and are viewed in the students' devices instantaneously

without any efforts. The system developed has applications that enable the instructor to create the content of the examination. Afterwards, a novice and basic model of attendance collecting and monitoring system have also been developed.

(x) **Rollout of OLabs, CDAC, Mumbai jointly with Amrita Vishwa Vidyapeetham, Kollam, Kerala**

Major objectives of the project are to create infrastructural and support framework for making OLabs (online labs for schools) accessible and usable by students and teachers across India and to train approximately 30000 teachers across India in effective use of OLabs resources to enhance the teaching learning experience.

The expected outcome of the project is to host the content related to OLabs on NKN and to provide training to 30,000 teachers in 3 years (2 teachers from each school out of total about 15000 CBSE schools). Total duration of the project is 3 years with budget outlay of ₹ 816.00 Lakh.

Regarding resource material, slides covering the concept, status and how to use are available, and being used along with short video covering introduction to Olabs and bootable DVD. In addition, a helpdesk has also been established in which queries over e-mails are being monitored regularly and responded by teams at C-DAC, Mumbai and Amrita University. For hosting the content at NKN, Amrita University has been identified since the site is currently hosted by them.

During 'Good Governance Day' on Dec 28, 2015, Hon'ble Minister of Communications & Information Technology has launched OLabs for CBSE schools.

2.3.2 Digital Literacy

Two Schemes for spreading Digital Literacy to the masses in the Country

(i) IT Mass Literacy (National Digital Literacy Mission)

In line with the objective of the National Policy on IT 2012 to make one person in every household in the country e-literate, a scheme for IT Mass Literacy (renamed as National Digital Literacy Mission) with an objective to provide IT training, relevant to the need of the trainee, which enables the beneficiaries to use IT and related applications for their livelihood

earning and employability has been approved. The Scheme aims to train 10 lakh persons at two levels of literacy throughout the country. The Scheme has been launched by Hon'ble Prime Minister at Ranchi, Jharkhand on 21-08-2014.

(ii) Scheme for 'Digital Saksharta Abhiyan' (DISHA)

This expanded scheme has been approved by Government on 09.12.2014 under 'Digital India' with the objective to make additional 42.5 lakh persons digitally literate in a period of four years. Both these Schemes are being implemented concurrently. Out of the total target of 52.50 lakh of both the schemes, 5 Lakh candidates are to be trained by Industry, Non-Governmental Organisations and others through their own resources/ under Corporate Social Responsibility and remaining 47.50 lakh candidates would be supported by Government.

Under the above Schemes, so far out of around 37.4 lakh persons enrolled for training, 27.17 lakh persons have been trained and 8.5 lakh candidates have been certified.

2.3.3 Initiatives on Accessibility

A National Policy on Universal Electronic Accessibility was formulated by Department of Electronics and Information Technology (DeitY) and it was notified on October 25, 2013. The policy facilitates equal and unhindered access of Electronics and ICTs products and services by differently-abled persons.

Under this Policy, accessibility audit of 50 most popular/ visited Government Websites was conducted with the help of ERNET India. A High Level Advisory Committee (HLAC) was constituted with multiple stakeholders' participation to decide further course of action to implement the policy. As per decisions taken by the HLAC, various initiatives have been taken.

DeitY has funded a project titled 'Development of Content Management Framework (CMF) for Government Websites' implemented by NIC, in which, 100 Central Ministries/ Departments Websites will be made accessible as per Guidelines of Indian Government Websites (GIGW). This project is fully funded by DeitY and it does not have cost implications on the Ministries/Departments.

For remaining Government websites, HLAC decided that respective organization may take necessary action regarding making their websites accessible either by

their own team or through agencies empanelled by NICSI. In this regard, DeitY has written to various organizations for the same vide communication no. 18(2)/2009-e-Infra (Vol. IV) dated June 04, 2015. The expenditure for the same will be borne by the respective departments from their respective budget.

In order to make the Government websites accessible, DeitY has also issued an office memorandum no. 3(4)/2009-EG II (Vol. II) dated May 28, 2015 regarding various accessibility guidelines viz. making Government notifications/circulars etc. accessible by putting them into ePub or OCR (Optical Character Recognition) based PDF and making all procurement GIGW complaint to the Secretaries of all Central Ministries/Departments and IT Secretaries of all States/UTs. After multiple follow-ups and discussions in HLAC, IRCTC, which is one of the most visited website/citizen centric portal, has made its website accessible by providing One Time Password (OTP) in addition to Visual CAPTCHA.

Regarding accessibility audit, DeitY (e-Governance Group) has been supporting a project titled 'Website Quality Evaluation' of 2000 Government websites (including 100 above websites) as per GIGW, which is executed by STQC. The cost of GIGW compliance testing for a website is ₹ 50,000/- + Service Tax would be required to be paid to STQC by the concerned Department.

HLAC also decided that Department of Empowerment of Persons with Disabilities (PwDs), Ministry of Social Justice and Empowerment will organize awareness workshops and trainings for Web Developers, Disabled Persons and Procurement Personnel including vendors by leveraging existing Institutions and NGOs. For this purpose, ERNET India may be appointed as a Technical Consultant to Department of Empowerment of PwDs. DEPwD has initiated 'Accessible India Campaign' on pan India basis in which all the matters related to accessibility have been covered.

DeitY has also taken several steps for empowerment of differently-abled persons using ICT. ERNET India has set up ICT Vocational Centres in 101 Schools in the 26 States and 3 Union Territories of India from the year 2009 to 2013. In these vocational Centers, ICT infrastructure such as, PCs, Server, Computer furniture, Printer, Scanner, UPS, LAN & Internet connectivity were provided along with specially designed assistive tools for different disabled sectors i.e. for Visually Impaired,

Hearing Impaired, Physically Handicapped, Mentally Retarded and Conscious Problem along with Internet connectivity. Instructors for teaching special children were also posted. The outcome of the project was that around 12,000 differently-abled students were benefited from this project. There was sharp increase in number of students who went for higher education from these schools. The number of differently-abled students going for professional education also increased significantly. A good number of teachers was trained. There was sharp increase in number of students who got jobs.

Recently, during Standing Finance Committee (SFC) meeting on Scheme for Implementation of Persons with Disabilities Act (SIPDA) under the chairmanship of Secretary, Department of Empowerment of Persons with Disabilities (DEPwD), Ministry of Social Justice and Empowerment held on January 04, 2016, it was decided that DEPwD will utilize 101 ICT centres set-up by ERNET India under the financial support from DeitY for the trainings on skill development for differently-abled persons.

Centre for Development of Advance Computing (CDAC) Thiruvananthapuram was also funded ₹ 4.42 crore by DeitY for Setting up of ICT Based Distance Education Facility for Special Educators, Parents and other Rehabilitation Professional from December 2009 to May 2013. Under this project, VSAT based network of 100 special schools to facilitate distance training to the special teachers, other rehabilitation professionals and parents of mentally retarded children was set-up. Three studios were set up to conduct live lecture to beam to 100 schools. 200 episodes of content on the different topic were created and made available through a portal. Advance training to 800 special teachers and other rehabilitation professionals was given. 7500 children with mental retardation was covered. Awareness and training was given to about 15000 parents of the disabled children.

2.3.4 Collaborative Digital Platforms: MyGov

MyGov platform is a unique path breaking initiative which was launched on July 26, 2014. It encourages citizens as well as people abroad to participate in various activities i.e. Discuss, Do, Poll, Talk, Blog, etc. There are multiple theme-based discussions where a wide range of people can share their thoughts and ideas. MyGovs popular Creative Corner became a creative backbone for the

Government. In this process it has also reduced design cost and the time taken to design creative material. Some examples of these tasks are Swachh Bharat, Pradhan Mantri Jan Dhan Yojana, New Education Policy, Smart City Project, Digital India, National Digital Literacy Mission etc. Currently MyGov has 40 Groups, 471 Discussion Themes, 382 Tasks, 150 Blogs, 153 Polls and 49 Talks. So far around 17,90,000 people have registered on the Platform. A special section has been created, Mann Ki Baat Prime Minister's radio address and successfully crowd sourced ideas from the registered users on the radio address for the last 15 broadcasts. The MyGov Mobile App was launched. 7 MyGov Talks on New Education Policy were conducted. Smart City Mission on MyGov was launched for 100 cities. Successfully managing special site on Swachh Bharat Abhiyan - http://swachhbharat.mygov.in. Special site on MyGov Blogs: https://blog.mygov.in was launched.

Citizen Feedback: MyGov

MyGov is a citizen engagement platform founded by the Government of India to promote the active participation of Indian citizens in their country's governance and development. MyGov was launched on 26th July 2014 by Hon'ble Prime Minister Shri Narendra Modi to facilitate continuous engagement between the government and the citizens. The upgraded version of the application software (MyGov v.2.0) was launched on 27th Feb 2015.

Vision: Creating a participatory digital democracy, leveraging technology to enable every citizen to contribute ideas and efforts for nation-building, transforming these ideas into action and recognizing individual contributions

The current analytics show 18.5 Lakh users registered on MyGov with over 5.5 crore views of the website. There are 43 groups running on MyGov in association with 38 Ministries. So far, 489 discussions, 394 tasks and 147 polls have been hosted on the platform. As a response, over 26.2 lakh comments and over 1.72 lakh task submissions have been received. In addition, 130 citizens have volunteered for MyGov till date. MyGov is very active on the social space as well, with initiation of MyGov's Facebook page and 2.90 Lakh followers on Twitter.

2.3.4.1 The major attributes of MyGov

Discussion- This section invites suggestions from users

on various governance issues.

Do- It includes tasks and activities that encourage users to showcase their creative skills.

Talks- It is an initiative to facilitate live interaction with senior government decision makers, domain experts and eminent academicians on current governance topics and initiatives.

Polls- It is an objective method to gauge the opinion of the citizens through voting on current issues of public importance

Blogs- Provides insight about the activities managed by MyGov

2.3.4.2 Prominent activities held by MyGov

MyGov platform has been successful in keeping the citizens engaged on important policies, issues and governance. Some of the prominent activities on MyGov are:

1. 'Mann Ki Baat,' radio Show of Hon'ble Prime Minister Shri Narendra Modi commenced on 3rd October 2014 seeking citizen-ideas. So far 17 shows have been on air, receiving on an average of 35,000 Calls and 4,500 comments.

2. On 18th May 2015, MyGov provided expert group discussion for AIM (ATAL Innovation Mission) and SETU (Self Employment and Talent Utilisation) under NITI Aayog.

3. Android Mobile applications for MyGov and Swachh Bharat Abhiyan were launched by Hon. PM Shri Narendra Modi on 1st July 2015 during Digital India Week, with 50,000 downloads and 10,000 downloads of each respectively.

4. MyGov hosted a competition, in collaboration with Google to design the PMO Android Application. The competition was divided in three phases: During the Ideation phase 50,000 entries were received, subsequently 119 wire-frames were submitted in the second phase. Finally, 5 teams were mentored by Google and team 'Sanskrit' won the contest. The final application is expected to be launched in April 2016.

5. MoUD recommended MyGov as the core platform for citizen consultation for 'Smart City Mission'. During the first round, MyGov offered cities a range of consultation methods to select the most active city by hosting 182 discussion forums, 163 tasks, 126

online polls, public 23 talks, and 70 blogs, which received over 24,22,451 comments.

6. MyGov in collaboration with Department of Science & Technology, Intel hosted 'Innovate for India Challenge' to benefit nation's technological and economical endeavors. This challenge received over 1,900 entries.

7. The Ministry of HRD partnered with MyGov for citizen consultation about New Education Policy from ground level by reaching out to nearly 2.6 lakh Panchayats and urban bodies. They also hosted 33 discussions, 7 talks and 3 blogs to attain online consultations from citizens. The logo of NEP was crowdsourced by inviting submissions on this platform. HRD Minister, Smt. Smriti Irani wrote an editorial for MyGov describing the features of NEP.

8. Accessible India campaign in collaboration with MyGov hosted a talk with Union Minister for Social Justice and Empowerment Shri Thaawar Chand Gehlot and Secretary Shri Lov Verma, conducted 50 discussions to promote inclusiveness of specially-abled people in the society. The logo of the campaign was crowdsourced by hosting a contest on MyGov

9. Swachh Bharat Abhiyaan, one of the most pivotal programme running, was launched on 2nd October 2014. The logo of Swachh Bharat Abhiyan was crowdsourced on the platform of MyGov. MyGov's Swachh Bharat microsite is a collaborative network for this immense social cause, engaging users to post before and after videos and nominate friends and family members to take up cleanliness drives collectively. So far, 6,902 citizens have taken a pledge and over 1 billion hours have been contributed to implement Swachh Bharat Abhiyaan.

10. For two consecutive years, MyGov in association with Ministry of Railways solicited ideas for Railway Budget. During 2015, 10 ideas were incorporated in the budget, whereas, in 2016 the number has increased to 15, which displays the ardent citizen-participation in governance.

11. Ministry of Finance invited citizen-suggestions for consecutively two years. 10 ideas were reflected in Union Budget 2015 and 2016.

12. 'Ek Bharat Shreshth Bharat' was launched on Rashtriya Ekta Divas, 31st October 2015 marking the birth anniversary of Sardar Vallabh Bhai Patel.

The initiative aims to promote cultural infusion and fraternity through exchange of language, trade, culture, travel and tourism. MyGov hosted an essay competition seeking suggestions to link States and districts. 3,000 ideas were received during the contest, and the scheme was included in the Union Budget 2016-2017.

Along with above notable stories, Logos and Taglines for National Schemes were also crowdsourced on the platform of MyGov such as: Pradhan Mantri Jan Dhan Yojana, National Digital Literacy Mission, FCI Depots.

2.3.4.3 MyGov's Future Programmes

Expanding Scope of Current Activities:

1. IVRS and SMS integration - Creating new avenues for citizens to reach out to the government and share their suggestions, MyGov now has new features like IVRS and SMS for the citizens' convenience

2. Monthly event with Ministries - MyGov proposes to help ministries that currently have activities on MyGov, organise monthly events to supplement online activities.

3. Merchandise store - MyGov proposes to have an in-house online merchandise store providing users an opportunity to get MyGov branded products and also as a token of appreciation for volunteers and other MyGov users

4. Volunteer module - MyGov intends to create a volunteer mobile application under which people can engage with ministry led initiatives by volunteering for physical events, activities, and field execution of tasks at hand.

5. Deploy analytics software - To analysis tool of MyGov would help in internal analysis of user suggestions by the team and reporting to Ministries and Departments engaging with citizens on MyGov

6. State instances of MyGov - MyGov has already helped initiate State MyGov instances for the Government of Maharashtra and Haryana. More State instances will be launched shortly.

7. Single sign on & open ID- Operating a single sign-on for MyGov and then incorporating the websites under DeitY, which will help in capturing users who log in to MyGov.

2.3.5 Digital India Communication

Digital India, a flagship program of the Government of India, aims to "transform India into a digitally empowered society and knowledge economy". This program centres on three key vision areas of "Infrastructure as a Utility to Every Citizen", "Governance and Services on Demand" and "Digital Empowerment of Citizens".

The Hon'ble Prime Minister of India Shri Narendra Modi launched the Digital India Week on July 1, 2015 at a mega function organized at the Indira Gandhi Indoor Stadium, New Delhi. This was followed by State and Union Territory level events organised right from the village level to the National level, connecting large cross sections of people to convey the message of this transformative initiative, disseminate relevant information about the Digital India Program, enhance visibility of existing e-services, upcoming e-services and service delivery channels. The main objectives of the DI Week were to:

(i) Inform, educate and engage the audience at points of digital presence such as CSCs, Post Offices, schools, Gram Panchayats etc

(ii) Connect citizens through Digital Campaigns and Social Media

(iii) Popularize the concept and potential of e-services

Promotion, Publicity & Marketing of DI Week:

To achieve the above objectives, extensive promotion, publicity & marketing of the DI Program was a prerequisite for building the Digital India brand, disseminating information about the DI Program, its Pillars, amongst all stakeholders. Towards this end, several activities and campaigns were undertaken for the Digital India Program.

2.3.5.1 Mass media

For the DI Week, the following **mass media activities** were undertaken

(i) Films on Digital India, its products, and the Digital India logo were produced and played out during the DIW launch

(ii) Full page Print Ad on DI Program was published in leading dailies and regional dailies (All India) in the following 14 languages all India- Assamese, Bengali, English, Gujarati, Hindi, Kannada, Malayalam, Manipuri, Marathi, Oriya, Punjabi, Tamil, Telugu, Urdu

(iii) For informing diverse stakeholders about the various initiatives/prpducts/services under the DI Program, brochures, posters were published in English for disseminating information about the DI Program, its various products and services

(iv) For generating adequate buzz and publicity about this event and interest amongst masses about the Digital India Program and inform them about the various products/projects that were launched by the Hon'ble PM, an outdoor Media Campaign was undertaken to do branding in major arterial routes in the capital; Outdoor media included Billboards, Hoardings, Bridge panels, BRT Bus Corridor Shelters, Metro Pillars, Metro Station Signage, Public Utility, Stainless Steel Bus Shelters, Unipole and DMRC Train Panels.

Apart from activities undertaken for the DIW launch, varied mix of **Mass Media** such as Films, TV Ads, Radio Spots, Skit Scripts have been produced for the following products under Digital India.

a) **Television Commercials (TVCs):** To inform, educate and communicate to the masses regarding Digital India, two TV Commercials in 14 languages have been produced on **National Scholarships Portal** and **Bharat.Net**.

b) **Films:** They are an extremely powerful means for conveying messages to the audience, raise awareness and educate them on various schemes and projects. A number of films in English, Hindi, 12 regional languages and a few films even in 6 foreign languages have been produced for the following DI products

- Digital Locker
- E-Waste
- E-Sign
- Electronics Manufacturing
- Skill Development
- PhD Scheme
- E-Hospital

c) **Radio**: Despite rapid developments in communication technologies in the last few decades, radio broadcasting is one of the most cost effective ways to reach rural and disadvantaged

communities, especially with low literacy rates and little or no access to good quality education.To enhance visibility of Digital India, especially at the grass root level, Radio Campaigns are planned to be undertaken on AIR and private FM Channels to reach out to the rural audience, inform and educate them about what role ICT in general and Digital India in particular can play in empowering them. An essential components for broadcasting through this medium are Radio jingles/Radio Spots which have been produced in 14 languages for the following

- Digital India
- National Scholarships Portal
- Digital Locker
- E-Hospital
- E-Waste
- E-Sign
- Electronics Manufacturing
- Skill Development
- PhD Scheme
- Bharat.net

A radio campaign was undertaken from 26-28 January, 2016 on AIR and top FM channels in Delhi & NCR to create a buzz create about the Digital India Republic Day Tableau to inform, communicate and showcase to the citizens the various benefits of the program. The Digital India Republic Day Tableau won the 1st prize amongst Central Line Ministries at the Republic Day Parade 2016.

d) **Print Advertisements:** Print media unlike web, radio or television mediums, is tangible and provides readers the opportunity to study articles, look at images & view advertisements at their leisure. The medium is widely circulated amongst loyal patrons and provides long term durability and hence has a longer life span. This medium is also very useful to reach specific audience, geographically spread. To raise awareness and provide information about the Digital India Program, its products, launch of Institutes/Centers/Academies in the ESDM sector etc amongst diverse stakeholders, advertisements were published in leading dailies (in specific cities) in English, Hindi and various regional languages such as

- Incubation Centre for Medical Electronics at IIT Patna

- Inauguration of Electronics & ICT Academy at NIT Patna
- Seminar on Opportunities in Electronics Manufacturing & Initiation of Electronics Manufacturing Cluster in Bihar

e) **Skits:** Several skits scripts have been prepared in English, Hindi and 12 regional languages on various Digital India products to raise awareness about the products especially amongst rural masses, youth etc. Towards this end, skits in regional languages were performed enthusiastically at 20 University Workshops held across 19 States in the country by the University students on the following products

- Digital India
- E-Waste (Digital Swachh Bharat)
- Skill Development
- National Scholarships Portal

2.3.5.2 Portal

NeGD Portal has played a key role in raising awareness about the Digital India Program. Over the past year, critical information about the DI Program as well its services/products are regularly posted on the site. The portal has played a key role in disseminating information and knowledge about various events, that have been organized under Digital India. This website has created a rich repository of audio visual, textual materials such as books and brochures, presentations, documents, reports etc. Additionally, important information about various events such as the Digital India Week, Good Governance Day, Workshops under Digital India etc. have been widely promoted on the site.

2.3.5.3 Social Media

Social media has played a pivotal role in creating awareness about the Digital India Program. Over the past 18 months several campaigns and contests have been organized and promoted through social media. Additionally, various events such as the Digital India Week, Good Governance Day, and Workshops under digital India etc. have been widely promoted using Facebook, Twitter, Instagram and You Tube. Under the programme, all available Audio-Video material has been compiled and uploaded for viewing on Digital India channels (you Tube and Facebook). At several occasions, Digital India social media channels have been used for inviting public

opinion/consultation on various RFEs, Mann ki Baat etc. Regular posts, infographics and news updates are posted daily on the social media channels on information regarding Digital India schemes and projects. Some of the key activities undertaken on Social Media are listed below

- Dissemination of exclusive content on social media channels like Tip of The Day, news updates, service updates etc.

- Promotion of services by various Mission Mode Projects

- Running contests like Digital India quizzes, crosswords, Caption The Image etc. on Facebook and Twitter for user engagement

- Promotion of various discussions and tasks from MyGov which were related to Digital India

- Promotion and live coverage of Good Governance Day on all social media channels

- Promotion of services launched during Good Governance Day

These campaigns have been essential to raise awareness about the DI Program, its various pillars and the e-services being enabled across the country, by reaching diverse audience spread geographically in a speedy manner. It has also helped build the Digital India brand.

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3.1   Incentives:

3.1.1   Large Scale Manufacturing:

In order to promote large scale manufacturing in the country, a Modified Special Incentive Package Scheme (MSIPS) was announced by the Government in July 2012. The salient features of the policy are as follows:

I.   The scheme provides subsidy for investments in capital expenditure- 20% for investments in Special Economic Zones (SEZs) and 25% in non-SEZS. It also provides for reimbursements of CVD/ excise for capital equipment for the non-SEZ units. For select very high technology and high capital investment units like fabs, reimbursement of central taxes and duties which include Customs duty, Service Tax and Excise Duties are also provided. The incentives are provided on reimbursement basis.

II.   The incentives are available for a period of 10 years from the date of application.

III.   The incentives are available for selected electronic products categories/ verticals. Units across the value chain starting from raw materials including assembly, testing, packaging and accessories of these products and their chips, components are included.

IV.   The threshold of investment for each project has been prescribed. The thresholds vary from ₹ 1 crore for manufacture of accessories to ₹ 5000 crore.

V.   The policy provides for an inter-ministerial Appraisal Committee to evaluate investment applications. Based on the recommendation of Appraisal Committee, approval of Competent Authority is obtained.

VI.   Under the "Digital India" Programme and the "Make in India" Programme, the MSIPS has attained renewed vigour. Giving a big boost to electronics manufacturing in the country, in July 2015, the Government approved the extension and expansion of the Modified Special Incentive Package Scheme. The Government's decision has three major parts which will be boon to the industry. First, the scope of the scheme has been expanded to cover 15 new product categories, which were not covered earlier. Second, the Government has also made it easier to receive benefits under the scheme. Some of the simplifications approved by the Cabinet include -

allowing MSIPS incentives from the date of receipt of application, disbursement of incentives on a quarterly basis as against annual basis under the earlier scheme, and allowing MSIPS in any part of the country as against only in notified areas. Third, the scheme has been extended for a period of 5 years beyond July 26, 2015. The notification in this regard was issued on 03.08.2015.

Status of MSIPS applications
The status as on 31st January 2016 is as under:

Particulars	Nos.	Amount in ₹ (crore)
Applications approved	49	12,154
Applications under appraisal	95	94,319
Recommended applications	09	2,845
Applications closed	22	9,224
Total Applications	**175**	**1,18,542**

During the period April 1, 2015 to January 31, 2016, disbursement of incentives has been made to M/s Bosch Automotive Electronics, Bangalore to the tune of ₹ 1.91 crore ; M/s. SGS Techniks Manufacturing Pvt. Ltd. of ₹ 2.48 crore and to M/s Desai Electronics Pvt. Ltd., Pune. of ₹ 39.10 lakh. The other disbursement applications are under process.

3.1.2 Electronic Clusters

The Government has notified the Electronics Manufacturing Cluster (EMC) Scheme in October 2012 to support creation of world-class infrastructure for attracting investments in electronics manufacturing. This Scheme is open for receiving applications for a period of five years from the date of notification. The assistance for the projects in Greenfield Electronics Manufacturing Clusters is restricted to 50% of the project cost subject to a ceiling of ₹ 50 crore for every 100 acres of land. For larger areas, pro-rata ceiling applies. For lesser area, the extent of support would be decided by the Steering Committee for Clusters (SCC) subject to the ceiling of ₹ 50 crore. For Brownfield EMC, 75% of the cost of infrastructure, subject to a ceiling of ₹ 50 crore is provided as grant.

Till 31st January 2016, DeitY has received 44 applications under EMC scheme [40 applications for setting up of Greenfield EMCs and 4 applications for setting up of Common Facility Centres (CFC) in Brownfield Clusters, out of which Department has accorded final approval to seven (7) Greenfield EMCs and one (1) CFC in Brownfield Cluster and In- Principle approval to seventeen (17) Greenfield EMCs and three (3) CFCs in Brownfield Clusters]. The details are as under:

List of Final Approved Greenfield EMC

S.No.	State	Location/City
1	Madhya Pradesh	Village-Badwai, District-Bhopal
2	Madhya Pradesh	Village-Purva, District-Jabalpur
3	Rajasthan	SPL-1A, Salarpur, Khushkhera, Bhiwadi
4	Jharkhand	Adityapur, Saraikela-Kharsawan District
5	Chhattisgarh	Village-Tuta, Sector-22, Naya Raipur, Tehsil-Abhanpur, District-Raipur
6	Andhra Pradesh	Chilamathur, Anantapur District
7	West Bengal	Sector-IV & V, Falta Industrial Centre, P.S Ramnagar, District South 24 Parganas

Hon'ble PM laid down the foundation stone for setting up of Greenfield Electronics Manufacturing Cluster at Naya Raipur on 21.02.2016. First Instalment of 20% of Grant-in-aid of ₹ 8.61 crore has been sanctioned for the project. First instalment of Grant-in-aid of 20% of ₹ 3.55 crore has been sanctioned to Greenfield EMC at Purva, Jabalpur in the State of Madhya Pradesh Further, a tranche of Grant-in-aid of ₹ 2.02 crore has been sanctioned to Greenfield EMC at Bhiwadi, Rajasthan.

List of Final Approved Common Facility Centre (CFC) in Brownfield EMC:

S. No.	State	Location/City
1	Karnataka	Plot No. 360, KIADB Industrial Area, Hebbal, Hottagalli, Mysore

List of Greenfield EMCs accorded In-Principle approval:

S.No.	State	Location of EMC
1	Andhra Pradesh	Satyavedu Mandal, Chittoor District
2		Village-Gurramapalem, Pendurthi Mandal, District-Visakhapatnam
3		Vikruthamala Village, Yerpadu Mandal, Chittoor District
4		Tirupati, Renigunta Mandal , Chittoor District
5	Bihar	Abgilla village, Gaurichak district, Patna
6	Goa	Village-Tuem , Taluka- Pernem, Goa
7	Gujarat	Village-Khoraj, Taluk-Sanand, District-Ahmadabad
8		Village-Tunda, Taluka- Mundra, District-Kutch
9	Kerala	Kakkanad, District-Ernakulam
10	Odisha	Khurda ,Bhubaneswar Industrial Area
11	Tamil Nadu	Annur Taluk, Coimbatore,
12	Telangana	e-city Hyderabad
13		Raviriyal village, Maheshwaram,
14	Uttar Pradesh	Plot No. 6/A, Sector-24, Yamuna Expressway, Greater Noida
15		Greater Noida
16		Plot No. 3/A, Sector-24, Yamuna Expressway,
17	West Bengal	Naihati Town, North 24, Parganas District

List of Common Facility Centres accorded In-Principle approval

S.No.	State	Location/City
1	Karnataka	Electronic City, Bangalore
2	Maharashtra	Pimpri Industrial Area, Pune
3		Shendra Industrial Area, Aurangabad

3.1.3   Mega Electronics Manufacturing

It is proposed to introduce a package of incentives for attracting investments in very large projects in the Electronics System Design and Manufacturing (ESDM) sector in the country through a policy for Mega ESDM Projects (involving fresh investment over 1 Billion USD in 3 years in a window of 3 years) by providing incentives, in addition to those available under the existing incentive schemes.

3.1.4 Setting up of Semiconductor Wafer Fabrication (FAB) manufacturing facilities in India

Semiconductors form the heart of all electronics. They contribute, on an average, about 30 percent of the value of the electronic product. Moreover, a compromised semiconductor can also be cause of a cyber-attack. Therefore, design and development of the semiconductors is essential for development of electronics manufacturing value chain.

India does not have any commercial semiconductor manufacturing facility in the country. Earlier efforts to set up semiconductor wafer FAB have not succeeded mainly due to the following reasons: (i) highly capital intensive, fast changing technology industry; (ii) only few players in the world who own the latest technology; and (iii) semiconductor chips attract zero basic customs duty, being an item covered under the Information Technology Agreement (ITA-1), have very low freight-to-cost ratio and therefore, can be distributed globally without having to distribute manufacturing.

However, considering the strategic importance of semiconductor wafer fabrication facility for developing the electronics industry in India, special efforts have been made in this regard. The Cabinet, in its decision dated 20.04.2011 had set up an Empowered Committee (EC) with the mandate, inter alia, to identify technology and potential investors for setting up semiconductor wafer fabrication manufacturing facilities in the country, and to recommend nature and quantum of Government support.

The EC adopted a proposal-based initiative for inviting Expression of Interest (EoI) for setting up of FAB facilities with the aim of attracting investments into a complex and financially challenging hi-tech manufacturing sector. In response to the EoI, proposals were received from two business consortia, one led by M/s. Jaiprakash Associates Limited (with IBM, USA and Tower Semiconductor Limited, Israel as partners) and the other led by M/s. HSMC Technologies India Pvt. Ltd. (with ST Microelectronics and Silterra Malaysia Sdn. Bhd. as partners). Based on the recommendations of the EC, the Cabinet in its meeting held on 12.02.2014 had accorded approval to the aforesaid proposals. Letters of Intent (LoI) dated 19.03.2014 were issued to the two consortia for setting up FAB facilities in India. For Demonstration of Commitment, both Consortia were required to submit the following documents:

(a) Detailed Project Report (DPR) with detailed costing and implementation plan.

(b) Incorporation of Special Purpose Vehicle (SPV) for the project, in accordance with proposed equity structure.

(c) At least 25% of equity funding required for Phase I of the project to be injected by the promoters into the SPV.
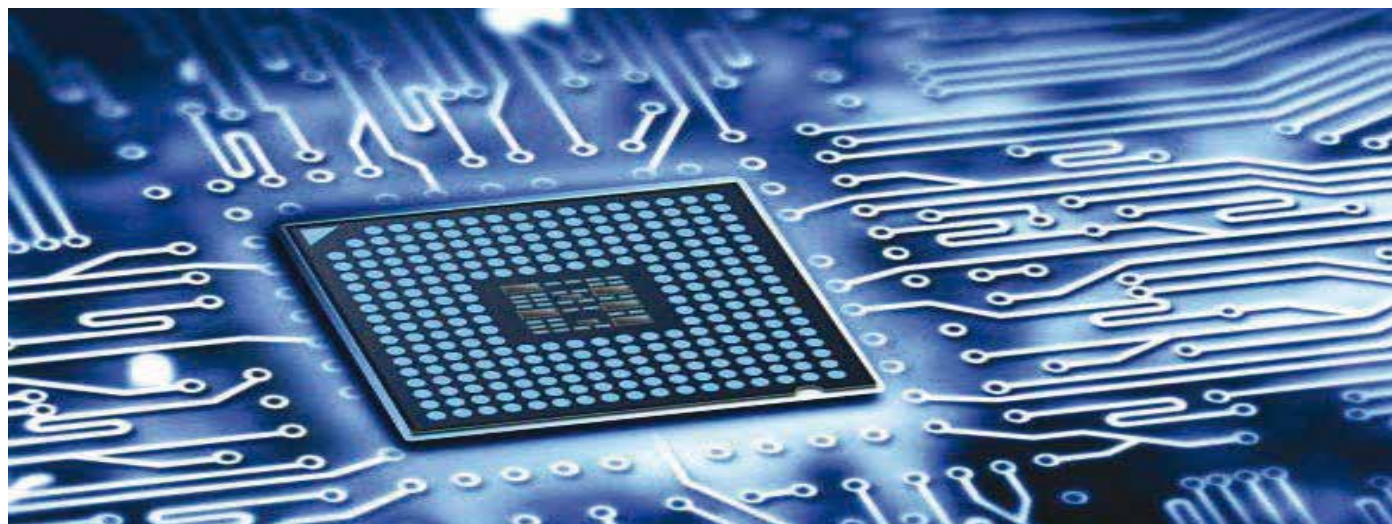
(d) A letter of "in-principle" approval from Financial Institutions/Banks for at least 10% of debt funding requirement of Phase I, or INR 1000 Crores, whichever is higher.

(e) Agreements between consortium partners specifying inter se performance guarantees.

(f) Proof of legal possession of adequate and suitable land as outlined in the proposals.

(g) Performance guarantee agreement with GoI.

Both M/s. HSMC Technologies India Pvt. Ltd. and M/s. Jaiprakash Associates Ltd., on behalf of their respective consortia sought time to comply with the requirements enunciated in LoI. The EC in its meeting held on 23.11.2015 decided to extend the last date of submission of all the documents for demonstration of commitment, till 30.04.2016 for both the consortia. Subsequently, the consortium led by M/s. Jaiprakash Associates Ltd. has withdrawn from the aforesaid project.

3.1.5 Incentives for Fabless Design

Semiconductors, also known as chips or ICs, are at the heart of any electronics product and constitute around 30% of the total value of the Bill of Material (BOM) and in case of high-end equipment and mobile handsets; this content goes as high as 60%. Semiconductor chip manufacturing is characterized by two type of companies: Integrated Device Manufacturers (IDMs) and Fabless Manufacturers. The IDMs (such as Intel, Texas Instruments) designs, manufactures and sells its own chips while fabless companies (like Qualcomm, Broadcom) designs and sells its chips but gets the chip manufactured by a third-party. Presently, most of the major chip innovations have come from fabless design companies. A Policy for Promotion of Fabless Design Industry is under formulation.

3.2 Policy

3.2.1 Preference to Domestically Manufactured Electronic Products (DMEPs)

The Department of Electronics and Information Technology (DeitY) has notified the policy for providing preference to domestically manufactured electronic products in Government procurement for its own use and not with a view to commercial resale or with a view to use in the production of goods for commercial sale on 23.12.2013.

The DMEPs are products manufactured by companies registered in India and engaged in Manufacture in India and including Contract Manufacturers, but excluding traders. All companies registered in India engaged in manufacturing of electronic products in India and the sole selling agents/ authorised distributors/ authorised dealers/ authorised supply houses of the domestic manufacturers of electronic products are eligible for consideration under the Policy. The electronic products to be notified under this policy shall meet the minimum 25% domestic value-addition in terms of Bill of Material (BoM) from domestic manufacturers. The percentage of procurement to be made from DMEP(s) shall not be less than 30% of the total procurement value of that electronic product(s).

The policy is applicable to all Ministries / Departments (except Ministry of Defence) and their agencies for electronic products purchased for Governmental purposes and with a view to commercial resale or with a view to use in goods for commercial sale. This is also applicable for procurement of electronic products made under all Centrally Sponsored Schemes and grants made by Central Government.

Nine generic electronic products, which are procured across sectors, viz., Desktop PCs, Laptop PCs, Tablet PCs, Dot Matrix Printers, Smart Cards, LED Products, Biometric Access Control/ Authentication Devices, Biometric Finger Print Sensors and Biometric Iris Sensors have been notified by the DeitY and 23 Telecommunications Products have been notified by the Department of Telecommunications (DoT), in furtherance of the policy. DGS&D has issued guidelines for implementing the policy in their rate contract process.

An Online Monitoring System "www.deity-pma.gov.in" has become operational w.e.f. 27.01.2015 for reporting by Ministries / Departments about the compliance of Policy. As on 31st January 2016, Eighty Three (83) Ministries/ Departments/Agencies have been provided the access credentials (User Ids and Passwords) for submitting the compliance reports on the PMA online monitoring system (www.deity-pma.gov.in). The 3rd meeting of National Planning and Monitoring Council for Electronics Products (NPMC-EP) was held on 08.05.2015.

Revised Policy Guidelines for providing preference to domestically manufactured electronic products in Government procurement have been issued on 16.11.2015 by the Department.

The highlights of the revised Guidelines are as follows:

(i) The bidders who are sole selling agents / authorized distributors / authorized dealers / authorized supply houses of the domestic manufacturers of electronic products are eligible to bid on behalf of the domestic manufacturers under the policy.

(ii) Each domestic manufacturer shall furnish the Affidavit of self-certification to the procuring agency declaring that the electronic product is domestically manufactured in terms of the domestic value addition prescribed.

(iii) It shall be the responsibility of the domestic manufacturer to ensure that the products so claimed are DMEPs in terms of the domestic value addition prescribed for the product. The domestic manufacturer shall also be required to provide a value-addition certificate on half-yearly basis .

3.2.2 Compulsory Safety Standards for Electronics

Keeping in view, safety of India Consumers from sub-standard electronic products, the "Electronics and Information Technology Goods (Requirements for Compulsory Registration) Order, 2012" was notified on 03rd October 2012 under the provision of compulsory Registration Scheme of BIS Act, 1986. This order had come into effect from 03rd July 2013. The order necessitates creation of institutional mechanism for developing and mandating standards and certification for electronic products to strengthen Quality Assessment infrastructure nationwide. The initiative aims to:

• Provide Indian consumers with the right to enjoy world class goods.

• Upgrade the quality of domestic products for bringing Global competitiveness.

• Develop strategy to stop dumping of non-compliant goods.

• Save business interest of entrepreneurs for effective negotiation at International trade agreements, Bilateral and Multilateral trade agreements.

• For projecting a positive image internationally as a country with quality production of the Electronics & IT goods.

As per the Scheme, the manufactures seeking registration of goods with the Bureau of Indian Standards (BIS) have to get their products tested at BIS recognised labs.

Testing is also to be performed on selected samples during the surveillance, subsequent to Registration. The surveillance program has been initiated by placing of 635 orders to collection agencies for picking of samples and Nodal Officers are being appointed by various State Governments.

This Order initially covered 15 notified electronic products categories namely Electronic Games (Video), Laptop/Notebook/Tablets, Plasma/ LCD/LED Television of screen size 32" or above, Optical disc players with built in amplifiers or input power 200W and above, Microwave Ovens, VDUs, Video Monitors of screen size 32" and above, Printers/Plotters, Scanners, Wireless Keyboards, Telephone Answering Machines, Amplifiers with input power 2000W and above, Electronic Musical Systems with input power 200W and above, Electronics clocks with Main powers, Set Top Box and Automatic Data Processing Machines.

Fifteen additional electronic items have further been notified under this Order on 13th November 2014. The new list covers:

Power Adaptors for IT Equipments; Power Adaptors for Audio, Video & Similar Electronic Apparatus; UPS of rating ≤ 5kVA; Invertors of rating ≤ 5kVA; Secondary Cells / Batteries / Power Banks containing Alkaline or other non-acid Electrolytes for use in portable applications; D.C. Supplied Electronic Control gear for LED Modules; Self-Ballasted LED Lamps for General Lighting Services; Fixed General Purpose LED Luminaires; Mobile Phones; Cash Registers; Point of Sale Terminals; Copying Machines / Duplicators; Smart Card Readers; Mail Processing Machines / Postage Machines / Franking Machines and Passport Reader.

A portal to bring transparency & make information easily available to stakeholders has been launched facilitating online registration process, surveillance process, access to database of Registered Manufacturing Units and products covered. Regular stakeholder consultations and Technical consultations are held for the purpose. The Compulsory Registration scheme has resulted into high compliance of notified electronic goods to Indian safety standards and more than 3000 manufacturing units have been registered with BIS covering approximately 20,000 products models/series.

Bureau of Indian Standards (BIS) has notified the Standard Mark for Compulsory Registration Scheme

along-with the "Guidelines for use of Standard Mark and labelling requirements" on 01.12.2015. For the Electronics & IT goods notified under the Compulsory Registration Order, DeitY has issued a notification on 10.02.2016 for enabling the provision of using either the Self-Declaration Statement or the Standard Mark on the notified products till 30th June 2016. However, marking of Standard Mark on notified goods is essential wef 1.7.2016.

Scheme for setting up / up-gradation of Electronic product testing / Quality Control Laboratories:

To strengthen the conformity assessment infrastructure, DeitY notified "Scheme for setting up / up-gradation of Electronic product testing / Quality Control Laboratories" on 25th August 2013.The objective of the scheme is to encourage setting up testing facilities by Central / State / Academic Institutions which will be used for evaluating goods under the "Electronics and Information Technology Goods (Compulsory Registration) Order, 2012". The scheme for Grant-in-Aid is open for setting up / up-gradation of up-to 15 labs. The total GIA available under the scheme is ₹ 150 Lakh subject to the following:

• For laboratory equipment is ₹120 Lakh (maximum).

• 25% cost of basic supporting testing infrastructure is ₹ 20 Lakh (maximum).

• Professional Fee/ Expert fee for setting up / up-gradation of laboratories and cost of obtaining recognition / accreditation / calibration charges thereof, cost for follow up action as well as interim assessments by DeitY is ₹ 10 Lakh (maximum).

Who is eligible

• Central Government and its organizations

• State Government and its organizations

• Universities (including deemed universities)

Current Status

The following project proposals have been approved:

(i)   CEC, IIT Madras, Chennai.

(ii)   CSIR-Central Institute of Mining and Fuel Research (CIMFR), Dhanbad.

(iii)   MPSEDC, Bhopal

(iv)   NRTC-Parwanoo

Scheme for supporting MSMEs in the electronics sector

The Scheme for supporting MSMEs in the electronics sector aims at providing financial support to MSMEs to promote manufacturing, to build quality into Indian manufacturing and also to encourage exporters. The support under the Scheme will be provided in the form of reimbursement to the manufacturers in the MSMEs. The scheme for providing financial support as Grant-in-Aid is expected to benefit the manufacturers, domestic industry and exporters in the electronics sector. The Scheme will provide Grant–in-aid (GIA) for the following activities:-

I.   Reimbursement of expenses relating to compliance of electronic goods with "Indian Standards".

II.   Reimbursement of expenses for testing and certification required for export.

III.   Development of Electronic Manufacturing Clusters.

The Scheme is available for 2 years from the date of its notification for the MSMEs, which could be extended based on necessary approvals. The GIA under the scheme would be available for number of models proposed under the Scheme or till the allocated budget is available for that particular area of the Scheme, whichever is earlier. The disbursements of ₹ 11.53 Lakh have been made to 9 MSMEs under the scheme.

3.3   Growth of Electronics Sector:

The Electronics sector has several verticals in terms of its main constituents. At present the availability of data on the production from this sector is limited to the information provided by various industry Associations. Based on the same the production profile of the Electronics Sector is as follows:-

The following table provides the production figures of the Electronics Hardware sector on various verticals:

SI.No	Item	2012-13	2013-14	2014-15 *	2015-16*
**Production of Electronics Sector**				**Figures (₹ Crore)**	
1	Consumer Electronics@	40447	47599	55806	-
2	Industrial Electronics	25800	33600	39374	45083
3	Automotive Electronics	5629	7278	NA	-
4	Computer Hardware	9376	17484	18691	-
5	Mobile phones	34600	26650	18900	54000
6	Strategic Electronics	9000	13800	15700	-
7	Electronic Components	26645	32102	39723	-
8	Light Emitting Diodes (LED)	1275	1941	2172	3590

Notes: Data above is as provided by the Industry Associations

Source: 1 - CEAMA; 2, 6, 7 & 8 - ELCINA; 3 GARTNER; 4 MAIT; 5- ICA;

@- Includes Home Appliances, viz., Refrigerator, Washing Machine, Air Conditioner & Microwave - from 2012-13 onwards
*- estimates are as provided by respective Industry Associations.

3.3.1 Consumer Electronics

As per estimates of CEAMA, the overall production of this segment of electronic industry was ₹ 55,806 crore in 2014-15 and grew at about 17.24% over ₹ 47,599 Crore in 2013-14.

A notable feature of growth in Consumer Electronics has been a rise in imports over the years in respect of certain items like LCD/ LED TVs. The government had accordingly stopped duty free import of such items as baggage and imposed a 36.5% duty on the same in 2013-14.

As per estimates from the industry association (CEAMA), the production of LCD/LED TVs has been estimated to have increased to 12.0 million numbers valued at ₹ 21,000 crore in 2015-16, from 8.75 million numbers valued at ₹ 16,200 crore in 2014-15 exhibiting a growth rate of 37% and 30% in quantity and value terms respectively. This segment has also witnessed a reduction in the average prices during this period.

In contrast to the LCD/ LED segment, the conventional TV (with Picture Tube) continued to register negative growth with production declining from 3.5 million valued at ₹ 1400 crore in 2014-15 to 2.5 million valued at ₹ 1000 crore in 2015-16.

Similarly, production of DVD players also continued to decline due to rapid growth of DTH sector, digitalization of cable TV network and use of set Top Boxes (STB). Public Address systems in the Consumer electronics industry has exhibited a growth rate in production of about 12% with a production of ₹ 1000 crore in 2015-16, vis-à-vis the growth rate of 5% during the previous year.

3.3.2 Industrial Electronics

Industrial electronics sector is closely linked to the investment taking place in infrastructure and industry including the power sector. Process Control Equipment, industrial control systems, Test & measurement devices, Power Electronics, Automated / automation equipments and Analytical Instruments, agriculture electronic instruments, environment monitoring instruments etc. are some of the key segments of this industry. Critical hardware technologies and Information Technology are playing a major role in value added Industrial Electronics.

Most of the domestic demand is catered to by the local manufacturing, whereas, about 10% of the sophisticated products are imported. The total production of Industrial Electronics during 2014-15 (as per estimates provided by ELCINA) is estimated to be about ₹39,374 crore as against ₹ 33,600 crore during 2013-14 showing a

growth of about 17.2%. During the year 2015-16, this sector is estimated to have grown by about 14 % with the production estimated to reach ₹ 45083 crore. Some recent trends in the Industrial electronics segment which could potentially change the landscape of the sector are as under:-

- Availability of products with Artificial intelligence. This would help the industry to be more efficient, improve quality control and reduce manual supervision costs.

- Integration of production and business operations: Newer software are being launched to help the companies integrate their production and business operations so as to maximize production, manage labor and reduce overheads.

- Introduction of robotics to manage process and equipments for sensitive industries like Chemical industry, Nuclear power generation, etc.

- Some of the other notable trends are Decision Analysis, 3-D co-ordinate systems, Smart Image processing, Nanotechnology, Nanoscale assemblies, Distributed control systems, etc., which are also being increasingly made available.

3.3.3 Automotive Electronics

With the growth in the Automobile industry and the increasing digitisation of automobile controls, Automotive Electronics has come to occupy an important segment of the industry. As per available estimates, the production of Automotive Electronics Sector was placed at ₹ 7278 crore in 2013.

3.3.4 Computer Hardware

The value of production arrived by aggregating the different segments falling under category of Computers and peripherals amounted to ₹ 18,691 crore in 2014-15 (as per estimates by MAIT), as against ₹17,484 crore in 2013-14 thereby registering a growth of about 6.9%.

The Indian computer Hardware Industry has been undergoing a change in its product composition. The production of notebooks registered growth of about 17% from a level of ₹ 9010 Crore in 2013-14 to ₹ 10542 Crore in 2014-15. Production of Tablet PCs also registered robust growth of 27% to grow from ₹ 1126 Crore in 2013-14 to ₹ 1430 Crore in 2014-15. In contrast to the foregoing, the production of Desktop PCs registered negative growth of 16%, from ₹ 4309 Crore in 2013-14 to ₹ 3620 Crore in

2014-15. The sale of Monitors registered a growth of 2% from ₹ 2466 Crore in 2013-14 to ₹ 2515 Crore in 2014-15.

3.3.5 Mobile Phones

India has the Second largest wireless network in the world. As on 31st June 2015, the gross telephone subscribers in the country was 1007 million covering total wireless subscribers of 981 million and wire-line subscribers of 26.15 million respectively. The overall tele-density was about 80 per cent with overall urban and rural tele-densities being 149.7 and 48.6 respectively. The break-up of the Tele-density with respect to wireline and wireless are 2.08 and 77.9 respectively. The total domestic broadband subscriber base was 99.2 million as 31 March 2015.

India witnessed a rise in manufacture of mobile handsets during the past decade. As per ICA estimates, at its peak India was producing approximately 155 mn units of mobile handsets in 2011-12, whereas domestic demand stood at nearly 180–200 mn units during that period. Almost 85% of the domestic demand was produced locally. However, the production activity went down with the Nokia manufacturing facility closing down in 2014-15. As a consequence, the production of mobile handsets stood at only 60 mn units during 2014-15 compared to 130 mn units in 2013-14. The value of production of Mobile Handsets for 2014-15 was estimated at ₹ 18900 crore as against ₹ 26650 crore in 2013-14, i.e., a negative growth of about 29%.

With the drop in production in 2014-15, there was substantial reduction in exports of mobile handsets compared to the preceding years. In 2014-15, the export of mobile handsets declined to 14 mn units compared to 72.5 mn units in 2013-14 with a negative growth rate of about 81%. With a rise in domestic demand accompanied by a significant drop in domestic production, the market shifted to the import route to meet domestic demand.

Following several initiatives taken during 2015-16, based on the Make in India and Digital India programmes and the outreach to various ESDM destinations, enhancing duty differential benefits in favor of domestic manufacturers vis-à-vis importers from 5% earlier to 11.5% vide Budget 2015–2016, significant new manufacturing operations got established in India during 2015–2016. It is estimated that at the end of 2015–16 the total production of mobile handsets in India is expected to reach 110 mn units

compared to 60 mn units, produced in 2014–15, with a growth of approx. 83%.

3.3.6 Strategic Electronics

The strategic electronics segment consists of Military Communication systems, Radars and Sonars, Network Centric systems, Electronic Warfare systems, Weapon systems, Satellite-based Communication, Navigation and Surveillance systems, Navigational aids, underwater electronic systems, infra-red based detection and ranging system, disaster management system, internal security system etc.

The Indian strategic electronic industry is dominated by BEL and has some contribution from DPSU's such as HAL, ECIL and BDL. More recently, a few domestic small and medium scale companies have emerged as they have capability to absorb technology and meet stringent requirements of strategic equipment. Some of these companies provide EMS services and meet critical supply requirements of MNCs as well as DPSUs. The estimated production figure for this segment for 2014-15 is ₹ 15700 Crore as against ₹ 13800 Crore in 2013-14, with a growth of about 13.77%.

3.3.7 Medical Electronics

Another growth area in the field of electronics pertains to Medical Electronics. The growth of this segment is closely linked to the need for diagnostics in the health care sector. Therefore it is now classifiable as a separate vertical. However, there are no separate estimates on the production of Medical Electronics.

3.3.8 Electronic Components

Rapid growth in domestic manufacturing of electronic components is vital for supporting the growth in electronics manufacturing. The estimated production figure for this segment during 2014-15 is ₹ 39,723 crore (excluding LED) as against ₹ 32,102 crore in 2013-14, showing a growth of about 23.74 per cent.

The emerging high growth areas for domestic manufacturing are LED Lighting, Automotive electronics, energy meters, solar energy and IT products such as Tablets. These products are now driving the growth of electronic component manufacturing. These products are an addition to existing segments such as telecommunications, consumer electronics and industrial electronics.

The Indian electronic component market is dominated by components like electromechanical components (like relays, switches etc.) with 29% share, passive components (like capacitors, resistors, etc.) with 24% share. Further Active components (like ICs, Diodes, Transistors, Picture Tubes, etc.) and the Associate Components (like optical disc, magnets, RF Tuners etc.) constitute 18% and 29%

share of the components respectively. While the industry composition is not predicted to change substantially, there is a rapid decline in products such as Cathode Ray Picture Tubes and CD/DVDs which had till recently constituted a significant share of the manufacturing base and market. This is an outcome of advancing technology and consumer preferences.

Consumer Durables and Telecommunications account for about 60% of the demand for electronic components in India. This is followed by IT & Office Automation and Automotive industries which contribute 22%. Other application industries like Industrial electronics, Medical electronics, Strategic electronics and Lighting industry contribute the balance of the market. Industries like lighting and strategic electronics are expected to witness substantial growth in the near future.

3.3.9 Light Emitting Diodes (LEDs)

One of the driving forces for growth in electronics manufacturing and for growing component demand is the Indian Lighting market. The demand for energy efficiency has brought forward an immediate need for more energy efficient products and also has pushed market towards more efficient products such as Light Emitting Diodes (LEDs). Over the years, opportunities for Light Emitting Diodes (LEDs) in Indian lighting markets have increased in automobiles, communications, signage, signalling, architecture and entertainment sectors. The opportunity for LEDs in the general space illumination segment of residential and commercial buildings has also emerged and expanding very rapidly. As per ELCINA, LED manufacturing in India has grown by 11.9% to reach ₹2100 Crore in 2014-15 and is projected significantly to reach ₹ 3590 crore in 2015-16.

3.3.10 Imports 2014-15

Total import of Electronics into India in 2014-15 was USD 36,857 million. The overall import of electronics exceeds domestic production thus making India dependent on imports. Import of electronics accounts for over 8 % of total imports by India.

Import of electronics showed strong growth of 13.8 per cent in 2014-15 driven largely by growth in telecom instruments followed by computer hardware & peripherals. A breakup given below shows that telecom instruments accounts for a large share in total electronics

imports (39.9 per cent) followed by computer hardware (19.7 per cent).

Imports 2015-16 (April-December) grew by 11.5 per cent compared to 12.1 per cent during the corresponding period of the previous year. Telecom instruments which grew at 13.4 per cent, compared to 30.6 per cent last year, continued to be the largest item in the basket of electronic imports. Growth in import of electronic components turned strongly positive compared to the negative rate experienced in 2014-15 (Apr.-Dec.). On the other hand, consumer electronics imports declined by 2.6 per cent during Apr.-Dec. of 2015-16.

3.3.11 Exports (2014-15)

The total export of electronics from India in 2014-15 was of the order to USD 6009 million. Electronics exports account for a very small proportion of total exports from India accounting for just about 1.94 per cent. Electronic exports showed a sharp decline in 2014-15 with a growth rate of (-) 21 per cent with the sharpest decline being in telecom instruments.

In terms of composition, export of electronics comprises of electronics instruments and electronic components having a share of around 31 per cent each with the balance accounted for by consumer electronics and computer hardware.

Exports 2015-16 (April-December) continued to decline by 9.8 per cent on top of the declining trend witnessed in the previous year. Growth in export of computer hardware turned positive compared to negative rate experienced in 2014-15 (Apr.-Dec.). On the other hand, growth of electronic components turned sharply negative during Apr.-Dec. of 2015-16. Growth in telecom instruments which was negative during 2014-15 continued to remain so during Apr.-Dec. of 2015-16.

3.4 Rationalization of Tariff Structure

Rationalization of tariff structure in electronics hardware manufacturing sector is an on-going exercise. To promote indigenous manufacturing of electronic goods, following steps have been taken to rationalize the tariff structure in the Union Budget 2016-17:

(i) Extension of differential excise duty dispensation made available to mobile handsets/ tablet computers to specified electronic equipment:

The differential excise duty dispensation made available to mobile handsets/ tablet computers has been extended to the following electronic equipment. However, these will be charged excise duty of 4% (without input tax credit) while Countervailing Duty (CVD) on imports shall be 12.5%. To enable this, parts, components, accessories and subparts used for the manufacture of parts, components, accessories have also been exempted from Basic Customs Duty (BCD), Excise Duty/CVD and Special Additional Duty of Customs (SAD):

(i)   Routers

(ii) Broadband modems

(iii) Set-top boxes for gaining access to internet

(iv) Set-top boxes for TV

(v)   Digital Video Recorder (DVR) / Network Video Recorder (NVR)

(vi) CCTV Camera / IP Camera

(vii) Lithium-ion batteries (other than those for mobile handsets including cellular phones)

(ii) Mobile Handsets: To promote domestic value addition in mobile handsets, duty exemption has been withdrawn on charger or adapter, battery, wired headsets and for manufacture of mobile handsets while excise duty structure on these items for supply to mobile handset manufacturers has been changed. These will be charged excise duty of 2% (without input tax credit) while CVD on imports shall be 12.5%. To enable this, inputs, parts and sub-parts for the manufacture of these goods have also been exempted from BCD, Excise Duty/CVD and SAD.

(iii) Semiconductor wafer fabrication/LCD fabrication and ATMP units: BCD and SAD have been exempted on machinery, electrical equipment, other instruments and their parts (except populated Printed Circuit Boards) for use in semiconductor wafer fabrication/LCD fabrication and Assembly, Test, Marking and Packaging of semiconductor chips (ATMP) units.

(iv) Populated Printed Circuit Boards: To promote indigenous manufacturing of Populated Printed Circuit Boards (PCBs), exemption of SAD (of 4%) on Populated PCBs for manufacture of personal computers (laptop or desktop) including tablet computers has been withdrawn and concessional SAD of 2% on Populated PCBs for manufacture of mobile handsets/tablet computers has been imposed.

(v) Capacitor grade polypropylene granules: BCD on capacitor grade polypropylene granules or resins for the manufacture of capacitor grade plastic film has been exempted.

(vi) e-Readers: BCD at the rate of 7.5% has been imposed on e-Readers. BCD on raw materials or parts for use in manufacture of e-Readers has been reduced to 5%.

(vii) Magnetron for microwave ovens: BCD has been exempted on magnetron of up to 1.5KW used for the manufacture of domestic microwave ovens.

(viii) Telecommunication equipment: BCD exemption has been withdrawn on the following specified telecommunication equipment:

(a) Soft switches and Voice over Internet Protocol (VoIP) equipment namely VoIP phones, media gateways, gateway controllers and session border controllers;

(b) Optical Transport equipment; combination of one / more of Packet Optical Transport Product/Switch (POTP/POTS), Optical Transport Network(OTN) products, and IP Radios;

(c) Carrier Ethernet Switch, Packet Transport Node (PTN) products, Multiprotocol Label Switching-Transport Profile (MPLS-TP) products;

(d) Multiple Input / Multiple Output (MIMO) and Long Term Evolution (LTE) Products.

(ix) Preform of Silica: BCD exemption has been withdrawn on Preform of Silica for the manufacture

of telecommunication grade optical fibres or optical fibre cables.

(x) **Sub-miniature fuses, micro fuses, resettable fuses and thermal fuses:** BCD has been exempted on specified raw materials and capital goods for use in manufacture of sub-miniature fuses, micro fuses, resettable fuses and thermal fuses.

(xi) **BLDC motors:** BCD on Neodymium Magnet (before Magnetization) [85051190] and Magnet Resin (Strontium Ferrite compound/before formed, before magnetization) [38249032] for use in manufacture of Brushless Direct Current (BLDC) motors has been reduced from 7.5% / 10% to 2.5%.

(xii) **Simplification of Import of Goods at Concessional Rate of Duty for Manufacture of Excisable Goods Rules:** The existing Customs (Import of Goods at Concessional Rate of Duty for Manufacture of Excisable Goods) Rules, 1996 are being substituted with the Customs (Import of Goods at Concessional Rate of Duty for Manufacture of Excisable Goods) Rules, 2016 with a view to simplify the rules, including allowing duty exemptions to importer/manufacturer based on self-declaration instead of obtaining permissions from the Central Excise authorities. Need for additional registration is also being done away with. The new Rules will be effective from 01.04.2016.

3.5 Promotion of Indigenous Manufacturing

3.5.1 Set Top Boxes (STBs)

The Department is taking steps to promote indigenous manufacturing of Set Top Boxes (STBs) for Cable/ DTH TV, keeping in view the huge indigenous requirement on account of roadmap for digitalization of the broadcast sector. Following specific measures have been taken for promoting domestic manufacturing of Set Top Boxes:

1. A Basic Customs Duty (BCD) of 10% has been imposed on imported STBs w.e.f. 01.03.2013.

2. The domestic STB manufacturers had to pay CST equivalent to VAT rate (typically 12.5%) since the Multi-System Operators (MSOs) were unable to issue C-Form because these are not sold to the users but installed at the customer's premises on "Right to Use" basis. In this model, an imported STB by the service provider does not require State VAT to be paid. To resolve the issue, the Department of Revenue has issued an O.M dated 13th August, 2014, wherein the facility of form 'C' has been extended to Set Top Boxes which have been defined as goods for use in the "Telecommunication Network" under Section 8(3)(b) of Central Sales Tax Act, 1956. This has addressed the issue of inverted duty faced by domestic manufacturers of STBs over their imported counterparts.

3. To curb inflow of sub-standard STBs, especially from China mandatory compliance to notified safety standards has been provided for w.e.f. 3rd July 2013.

4. Export incentive of 2% has been provided for export of STBs under Foreign Trade Policy 2015-2020.

5. Development and implementation of Indian Conditional Access System (CAS).

3.5.2 Development of Indian Conditional Access System (iCAS)

A Conditional Access System (CAS) is a system used to limit the access of TV signals to only authorized viewers and forms an integral part of Set Top Boxes (STBs). Conditional Access systems are highly proprietary and dominated by few global companies, which is a major impediment in design and development of domestic STBs. Therefore, the need as well as an opportunity was felt to develop indigenous CAS for boosting the development of STBs in the country. Based on the recommendations of a Committee of Experts, the specifications of Indian Conditional Access System (iCAS) were finalized.

After following due tendering processes, M/s. ByDesign India Pvt. Ltd., Bangalore was shortlisted for the development and implementation of the iCAS in association with the Centre for Development of Advanced Computing (C-DAC). C-DAC is primarily responsible for design review, code review, monitoring, testing and validation of the entire project.

Letter of Award was issued to M/s. ByDesign India Pvt. Ltd., Bangalore on 05.11.2014. Tripartite Agreement has been executed between DeitY, C-DAC and M/s. ByDesign India Pvt. Ltd., Bangalore for development and Implementation of Indian CAS on 18.11.2014. As per the Tripartite Agreement, the completion date for Development Stage of iCAS was 14.11.2015, i.e. 12 months from start of the project. Development Stage of iCAS has been successfully completed as on 14.11.2015

and it is under implementation w.e.f 15.11.2015.

M/s. ByDesign shall make available the developed ICAS to all domestic manufacturers of STBs or to the operators at not more than USD 0.5/license (including Smart Card, if required) for a period of 3 years.

The implementation of iCAS in the cable networks has already started. More than 25,000 STBs with iCAS have already been deployed across the country during December 2015 - January 2016.

3.6 Marketing and attracting investment in electronic sector

Under the aegis of Communication & Brand Building Campaign, DeitY has engaged with the stakeholders of the Electronics System Design & Manufacturing (ESDM) sector through various levels of Below The Level (BTL) events such as conferences, seminars and workshop.

3.6.1 Specific Verticals related National Workshops

DeitY has supported five Workshops to target the needs of specific verticals in the electronics hardware manufacturing space conducted through Electronics Industry Associations covering sectors such as Computers and peripherals; Mobile handsets, parts and accessories; Colour TV Sets and Set Top Boxes; Telecom Equipment; Industrial Electronics; Semiconductors, Memories and ATMP; Electronic Components; Liquid Crystal Displays (LCDs); Light Emitting Diodes (LEDs), LED Packaging and LED Lights; defence electronics; Solid State Memory Products - Memory Cards, USB Drives and Electronics Manufacturing Services.

3.6.2 State Level Workshops

The effort to make India as a global destination for ESDM can only be possible with the proactive role of State Governments. They have a crucial role in attracting the ESDM industry to their respective States. Development of world class infrastructure, sector specific incentives, streamlining of procedures and appropriate labour reforms, among others are the steps needed in this direction. Therefore, in order to take the States on board in this endeavour, 12 State-level Workshops have been organised with support of Grant-in-Aid till December 2015.

3.6.3 Industry Conferences

Department has also supported 30 Industry Conferences by providing Grant-in-aid to Electronics Industry Associations/ Industry Chambers / Organisations.

3.6.4 Outreach to Academia and Students

The outreach programme is meant to make academia, students and citizens aware of this sector and its importance for economic growth of the country and to attract greater talent to the sector for meeting its intellectual and human resource requirements. This programme is available for academia (Government Institutions/ Non-Govt Institutions/ Polytechnics in the North East States - 4 UGC/ AICTE-recognized Universities/Colleges per State per year).

3.6.5 Promotions to attract investment in ESDM sector

A Government Industry Indian delegation led by Secretary, DeitY visited Taiwan during the period March - April, 2015 to attract investment in ESDM sector. The Indian delegation had several one-to-one meetings with leading ESDM companies of Taiwan including Foxconn Technology Group, Innolux, Inventec, Delta Electronics, TECO Group, D-Link Corporation, Delta, Lite-On, AU Optronics, MediaTek, Epistar, Wistron Corporation. The delegation also participated in the "India-Taiwan Technology Forum" during the visit.

A Government-Industry delegation visited Taiwan during October, 2015 to attract investment in electronics sector and participate in TAITRONICS 2015. Various workshops and seminars connected with TAITRONICS 2015 were organised.

The 3rd Joint Working Group (JWG) meeting was convened between India and Japan in November, 2015 at New Delhi. During the meeting, the new policy initiatives taken by Government of India in the electronics sector were discussed with Japanese side.

3.6.6 Handholding and facilitation for Investors to attract investment in ESDM sector

Investment Facilitation Cell has been established for DeitY to handhold and help investors during their various stages of transition.

Help-Desk within the Department have also been reconstituted for Japan and Israel respectively to

expedite and facilitate the proposals of investment from companies; facilitate interactions with State Governments and other agencies of Government of India.

3.6.7 Twitter Handle

In the global scenario of cyberspace prominence, social media has emerged as an increasingly preferred media by the decision makers and general public at large to communicate, interact and engage with each other. Taking view of this emerging reality, Department launched a Twitter Handle "@Electronics_GoI", which is being well appreciated by all the ESDM stakeholders and is fast turning out to be a preferred engagement medium by the people. This handle has already crossed a followership of 16500 Tweeple / twitters in a short span.

3.6.8 B2B Portal

In order to attract investment into ESDM sector and create opportunities to introduce latest technologies

to Indian industry, a need was felt to have a common platform where the Technology providers, Technology seekers and JV seekers could come together to explore possibilities of tie up and possible collaboration.

In this endeavour, Department created a platform on its website which helps various technology players to explore potential partners for technology transfer and joint ventures for electronics manufacturing in India. The platform has been utilized by 36 multinational and domestic companies to display their intent to seek suitable partners. Link for the Portal is:
http://www.deity.gov.in/esdm/offers.

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Make in India: Software & Services

4.1 Global Perspective

The Indian Information Technology (IT) - Information Technology Enabled Services (ITES) sector has registered tremendous growth over the past decade, achieving iconic status all over the world and a reputation for reliable and cost-effective delivery of IT services. The major developed markets are sourcing IT-ITES from India to gain bottom-line benefits, improving their competitive edge.

"Worldwide technology products and services (IT and BPM Services excl. hardware) related spend had been estimated to reach US$ 1.2 trillion in 2015, a near flat growth of 0.4 per cent over 2014. Cloud-based applications, big-data analytics, mobile systems, social media and cyber security may contribute significantly towards incremental expenditure in the coming years." The Global off-shoring market size is estimated at USD 162-166 Billion in 2015. The Global outsourcing market grew at 8.5 % over 2014. The role of technology has also undergone a significant change; technology is no longer exclusive to only the corporate sector. Consumers,

leveraging mobile and 24X7 connectivity, are now the influencing forces shaping technology spend. Government has also begun to use technology as the platform for citizens outreach and G2C services.

India continued as the World's No. 1 sourcing destination with a share of 56 % in 2015. India's share in the global IT services outsourcing and ITES/BPO has reached upto 67% and 38% respectively.

Majority of the Fortune 500 and Global 2000 corporations are sourcing IT-ITES from India. Indian IT companies have set up around 670 overseas delivery centres across the world and are engaged in providing services with presence in over 200 cities over ~ 80 countries.

Indian IT-ITES industry has emerged as one of the most dynamic sectors in India's economy and is responsible for the global recognition of India as a "soft" power. The consistent growth of the IT segment has created phenomenal wealth, employment, exports and a significantly large reservoir of highly competent technocrats and knowledge workers.

4.2 e-Commerce

India has emerged as a fast growing e-commerce destination. This is reflected through the fact that FTAs being signed have a specific chapter on e-commerce. The Department spearheaded the negotiations on e-commerce chapter under various forums/Free Trade Agreements (FTAs) such as Regional Comprehensive Economic Partnership (RCEP), WTO, BRICS, EU-India Bilateral Trade and Investment Agreement (BTIA) etc. A white paper or such negotiations was also evolved with inter-ministerial consultation.

4.3 IT Service and BPO

BPO Promotion Scheme under Digital India Programme

The following two schemes have been launched under Digital India Programme for creation of jobs in BPO/ITeS Sector and secure balanced regional development:

(i) North East BPO Promotion Scheme (NEBPS)

(ii) India BPO Promotion Scheme (IBPS).

The above schemes provide capital support in the form of Viability Gap Funding to eligible Companies. The Software Technology Parks of India (STPI), an autonomous society of DeitY has been designated as the Nodal Agency for implementation of the NEBPS. A brief on each of the schemes is as under:

North East BPO Promotion Scheme (NEBPS)

The NEBPS aims to incentivize establishment of 5000 seats in respect of BPO/ITES operations in the States of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, through the capital support in the form of Viability Gap Funding (VGF) to eligible Companies.

After three rounds of bidding, 300 seats have been allotted (100 at Guwahati, Shillong, Itanagar each) to one successful bidder. One unit in Guwahati was inaugurated on 28.12.2015.

NEBPS has been reviewed and various changes like incentive for promoting local entrepreneurs, participation of Societies (registered under Societies registration Act 1860) as consortium with eligible Indian Company, inclusion of special incentives viz. training incentive, incentive for diversity & inclusion, and incentive for

providing employment beyond target, have been incorporated in NEBPS.

India BPO Promotion Scheme (IBPS)

About 48300 seats have been planned with distribution across State(s)/UT(s) based on population percentage as per Census 2011, excluding metro cities viz. Bangalore, Chennai, Hyderabad, Kolkata, Mumbai, NCR (Delhi, Gurgaon, Noida, Faridabad), and Pune and States of North East Region (NER). IBPS envisages to provide capital support as Viability Gap Funding (VGF) for setting up of BPO/ITeS operations. The IBPS involves 2 stage approach: 1. Expression of Interest 2. Open bidding through Request for Proposal (RFP). The first stage, the Expression of Interest (EOI) was completed, which has received encouraging response. The RFP of IBPS is under finalisation.

4.4 International Outreach –showcasing India's IT talent

With the Government's new outlook on economic diplomacy, ambitious National Digital initiatives and India strength, the International Cooperation (IC) Division of this department has been synergized its efforts to further IT-ITES Trade globally including diversification of to geographies other then USA and UK. Efforts have also been made to evolve strategic cooperation with potential partners in emerging and frontier areas of information technology under bilateral and regional framework of cooperation. IC Division's interactions with countries, international bodies, academia institutions for forging partnerships for mutual progress, also provide an opportunity for sharing of knowledge and experience. The IC Division has been involved in the following tasks:

- Aligning foreign collaboration activities in India's 'Digital India program' and 'Make in India' initiatives of the Government of India.
- Creating a conducive environment for international cooperation to help industries to cooperate with the industries of other countries
- Fostering, encouraging and promoting research and development in the application of information technology related facilities.
- Coordinating technical and policy issues with international bodies/institutions like UN, WSIS, World Bank, WTO etc. to safeguard India's interest.

- Initiating joint projects like IT institutes, software parks, programmes for joint R&D and facilitating IT Advisers etc.
- Showcasing India's ICT strength to the globe by organizing, sponsoring and participating in trade fairs, symposiums, exhibitions etc.

The Department has been pursuing the above objectives through Joint Working Groups (JWG) meetings, signing Memorandum of Understandings (MoUs), executing projects in developing economies to showcase India's strength and showcasing them in major IT fairs and symposiums. Also, issues faced in regard to India's IT exports have been handled at various forums and platforms from time to time.

Cooperation through Working Groups/Bilateral Interactions

Subsequent to the successful visit of delegation led by Secretary, DeitY during 12th-16th January, 2015 and signing of a Joint Declaration of Intent on 23rd January, 2015 the cooperation on ICT with USA was re-energised. As follow up of these, a number of key initiatives were taken during the year with a number of interactions on various forums. A number of bilateral meetings with USA were organised and interactions for increased cooperation in Internet Governance and issues with regard to ease of doing business were discussed. A number of CEOs from major US IT companies including Facebook, Microsoft, Google etc. visited India and cooperation agreements were confirmed through meetings at the highest level. 40 top emerging ICT start-ups accompanied Hon'ble PM of India to Silicon Valley, with an objective to enhance business and innovation cooperation.

To further IT-ITeS cooperation, JWGs with South Africa, Poland, BRICS, South Korea, Russia, Japan, and Tunisia were held during the year to further our IT-ITeS trade with these geographies and also to forge cooperation in the area of innovation and R&D. A concrete outcome based action plan and specific initiatives including projects were identified for furthering such cooperation. Also during the year, the Department participated in the first ICT Minister level meeting in which a Joint Statement for a comprehensive action plan in ICT under the BRICS was evolved.

A number of bilateral high level meetings with delegations from Indonesia, Germany, Bhutan, Saudi Arabia, Tajikistan, USA, Australia, Japan, Korea etc. were also held to further ICT cooperation.

MoUs/Agreements/JDIs: To further cooperation with other emerging economies the MoUs/Agreements/JDIs were signed with Qatar, Japan, and Jordon. The MoUs were based on a comprehensive study on potential cooperation areas in ICT domain. In addition to these MoUs, specific agreements on Cyber Security cooperation were also signed with Canada, Malaysia, Uzbekistan, Singapore and Japan. CDAC was also facilitated to sign an MoU with OJSC-GLONASS and GLONASS Union for Joint development of technology and solution based on navigational satellite system. CDAC and IISc, Bangalore have also signed an MoU with Lomonosov Moscow State University on collaboration for education in High Performance Computing. The two MoUs were outcomes of the India-Russia working group meeting on ICT which was held in October, 2015. A Work Plan with European Patent Office was also signed in November, 2015 for cooperation on ecosystem related to computer related inventions.

International Projects in ICT: To showcase India's prowess in IT-ITeS, DeitY has been assisting the Ministry of External Affairs to execute a number of strategic projects in developing and least developed countries. Under such initiatives, more than 40 Centers of Excellence on IT, IT Parks, Capacity Building Institutes, tele-medicine and tele-education facilities, e-network have been established till date. During the year, India-Kazakhstan Center of Excellence in ICT at Astana, Kazakhstan and tele-medicine and tele-education facility in Kyrgyzstan were operationalised. Also following projects were initiated/are under execution during the year:

i. Setting up of Digital Library in Bhutan and Nepal
ii. Up-gradation of ICT infrastructures and equipments at CARICOM secretariat in Guyana.
iii. Setting up of Centre of Excellence on IT in all Pacific Island Countries.
iv. Setting up of a Sustainable IT Infrastructure for Advanced IT Training Using Conventional Virtual Class Room and e-learning Technologies in CLMV/ASEAN countries.
v. South Asia Sub-regional Economic Cooperation Information Highway (IH) Project (SASEC)
vi. Setting up of Central Asia e-Network to connect India for Tele-medicine & Tele-education
vii. IT Training for African nationals as Development Cooperation Project in 3rd India-Africa Forum Summit.
viii. Setting up Centres for Excellence in IT in Costa Rica, Commonwealth of Dominica and Panama.

4.5 Growth of Software and Services Sector

Indian technology players are leveraging the confluence of current technologies such as big data, internet of Things (IoT), social media, robotics, mobility and cloud platforms. India Technology firms are also scaling up their digital business/portfolio through collaboration with start-ups by setting up incubators and accelerators, creating independent digital business units, encouraging design thinking and investing in automation platforms, driving M&As and fostering partnerships.

Technology adoption in India is increasing rapidly driven by penetration of mobile among masses, ubiquitous connectivity and increasing data consumption focused on improving efficiency and productivity driven connected devices, Social, Mobile, Analytics and Cloud (SMAC) etc. eGovernance services are using technology as the platform to deliver G2G, G2B and G2C services driving growth. eCommerce, a separate segment, is also spearheading technology consumption leveraging mobility and analytics. Software Product is being driven by increased adoption of SaaS and cloud. The BPO/ITES Services is being driven by BFSI, Telecom, eCommerce and growing consumption in non-metro locations which is providing opportunity of next generation growth to service sector.

4.6 Overall IT-ITES Performance

The revenue aggregate (Exports + Domestic) of IT-ITES industry is expected to grow by 9.2 % and reach USD 130.0 billion in 2015-16 as compared to USD 118.8 billion in 2014-15. (~ ₹ 8,40,455 crore in 2015-16 as compared to ₹ 7,29,432 crore in 2014-15 with a growth of 15.22% in INR terms).
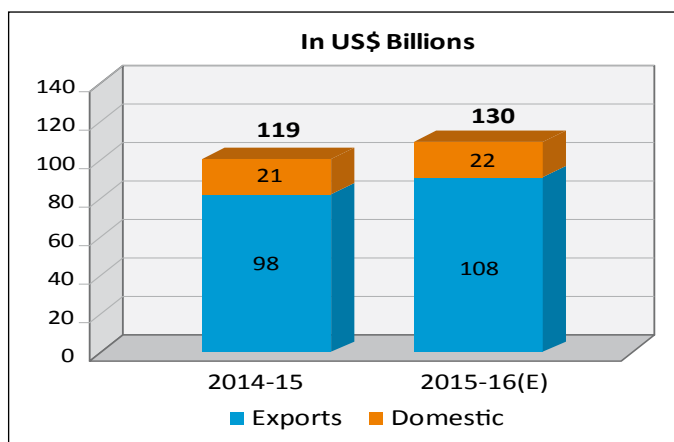
Overall IT-ITES Revenue growth (Y-o-Y)

IT-ITES Exports revenue

The Indian software and services exports including ITES/BPO are estimated at USD 107.8 billion in year 2015-16 as compared to USD 97.8 billion in year 2014-15, a 10.3 % growth in dollar terms. (~ ₹ 7,00,000 crore in 2015-16 as compared to ₹ 6,00,000 crore in 2014-15 with a growth of 16.6 % in INR terms).

- **IT Services** has been the largest segment within the Indian IT-ITES sector. This segment is estimated to grow at 10.3 % and to generate exports revenues of the order of USD 61.0 billion in year 2015-16 as compared to USD 55.3 billion in year 2014-15.

- **ITES/BPO segment** has been reinventing itself in the past few years and is expected to grow at 8.8 % and generate export revenue of the order of USD 24.4 Billion in year 2015-16 as compared to USD 22.5 Billion in year 2014-15.

- **Engineering R&D and Product Development** has registered a growth of about 12.4 % and is estimated to reach USD 22.4 billion in year 2015-16 from the level of USD 20.0 billion in year 2014-15.

- US and UK are the leading customer markets with a combined share of nearly 80%. However there is growing demand from APAC, Latin America and Middle East Asia.

- The IT-ITES industry export growth trend over the past 5 years is as under:
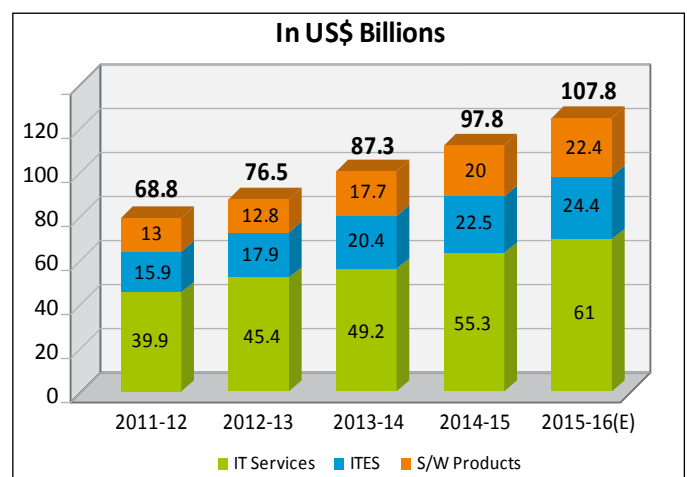
Source : NASSCOM Strategic Review 2016

The IT Services exports accounts for the largest share of 56.6 %; ITES/BPO exports contribute 22.6 %, ER&D and software products that together accounts for 20.8% .

Domestic IT-ITES Performance

Though the IT-ITES sector is largely export driven, the size of the domestic market is also significant. The revenue from the Domestic IT market (excluding hardware) is expected to grow to ₹ 1,41,000 crore in year 2015-16 as compared to ₹ 1,28,500 crore in 2014-15, an Y-o-Y growth of 10.0 % in ₹ terms.

- **Domestic IT Services** sector is expected to reach ₹ 89,500 crore in year 2015-16 as compared to ₹ 81,500 crore in year 2014-15 with an estimated growth of about 10.2 %.

- **Domestic ITES/BPO** revenue is estimated to increase from ₹ 23,500 crore in year 2015-16 to about ₹ 21,500 crore in year 2014-15, a growth of 10.0 % in ₹ terms.

- **Domestic Engineering R&D and Product Development**, which is estimated to reach ₹ 28,000 Crore in year 2015-16 from the level of ₹ 25,500 Crore in year 2014-15 with a Y-o-Y growth of 11.0 % in ₹ terms.

In INR 1000 Crores
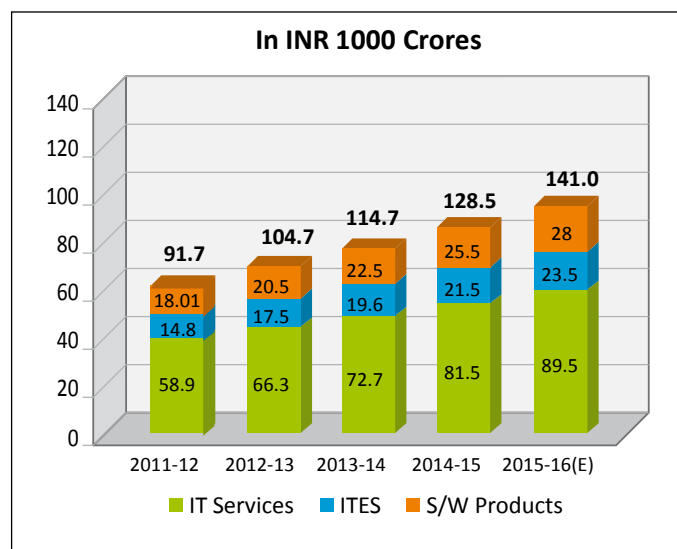
Source : NASSCOM Strategic Review 2016

4.7 IT-ITES Employment Scenario

The IT-ITES sector has become one of the key sectors for the Indian economy because of its economic impact. Direct employment in the IT services and BPO/ITeS segment is estimated to grow by 6.0 % reaching 3.69 million in 2015-16 with net addition of 2 Lakh people. Being one of the organized private sector employers in the country, this sector is also playing a key role in enabling higher levels of employment in adjacent verticals like, transportation, real estate and hospitality, Security services, Housekeeping etc. The indirect employment created by the sector is estimated at 10.0 million.

Direct employment in the IT-ITES segment (In Millions)					
	2011-12	2012-13	2013-14	2014-15	2015-16(E)
Direct Employment	2.775	2.966	3.267	3.485	3.688
Net Addition	0.233	0.191	0.301	0.218	0.203

Source : NASSCOM

IT-ITeS/BPO industry provides employment to people with various skill levels i.e. Engineers, Lawyers, Arts/Science/ Commerce/ Literature etc. graduates; High School Pass outs etc. This sector is the largest employment provider of women and has about 30% of its workforce comprises of women. In the ITeS/ BPO segment, women employment is about 40%.

*****

Innovate and design in India
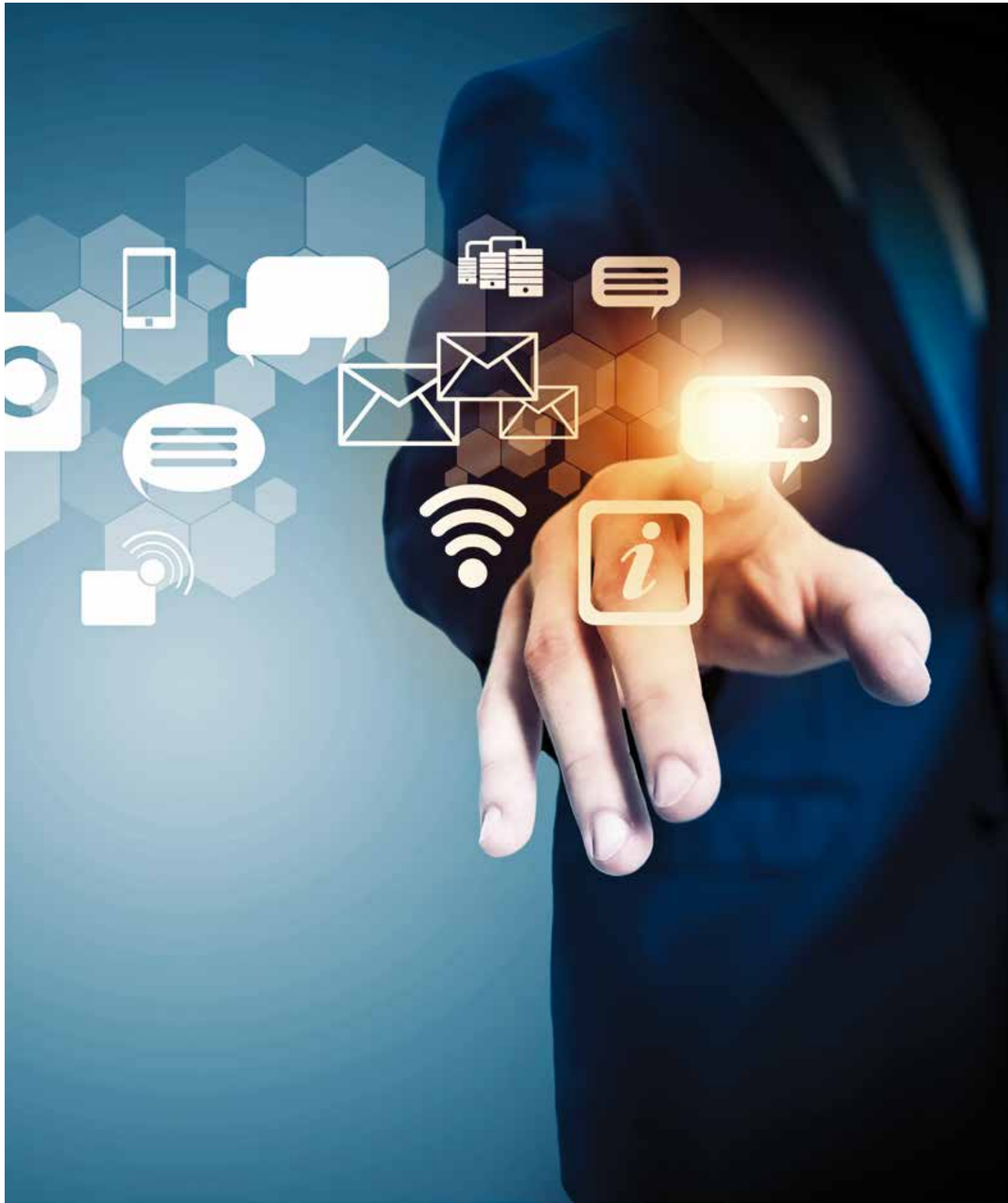
5.1 Creation of Research Eco-System

5.1.1 National Supercomputing Mission (NSM)

HPC or Supercomputing has emerged as the 4 Paradigm for cutting edge S&T research, and Technology and accordingly special thrust has been provided to the capacity and capability building in the Supercomputing in the 12 Five Year Plan (2012-17).

In pursuance of this objective, the "National Supercomputing Mission (NSM): Building Capacity & Capability", has been launched by Government in 2015, which is to be jointly steered and implemented by DeitY and DST over a period of 7 years. The programme is being implemented by C-DAC and IISc.

The main objectives of the mission are:

- Creation of state-of-the-art HPC facilities and infrastructure to enhance the national capability to enable cutting-edge research in various domains in solving grand challenge problems.Development of HPC Applications for major Science and Engineering domains.

- Promote Research and Development in HPC leading to next generation Exa-scale computing readiness.

- Human Resource Development to handle and spearhead HPC activities in the country.

5.1.2 Electronics Development Fund (EDF)

The objective of the EDF policy is to support Daughter Funds including Early Stage Angel Funds and Venture Funds in the area of Electronics System Design and Manufacturing, Nano-electronics and IT. The supported Daughter Funds will promote innovation, R&D, product development and within the country in the specified fields of ESDM, nano-electronics and IT. They will also support acquisition of foreign companies and technologies for products imported in India in large volume. The Cabinet approved the policy on 10th December 2014 and it was notified on 9th January 2015.

Hon'ble Prime minister Shri Narendra Modi launched the policy Document of EDF on the occasion of Inauguration of Digital India Week on 1.07.2015.Government has appointed CANBANK Venture Capital Funds Ltd. (CVCFL)

as Fund Manager of the Electronics Development Fund.

EDF has been launched by Hon'ble Minister for Communication and Information Technology on 15.02.2016. Four Daughter Funds have been issued in-principle letter of commitments for contribution of ₹ 169 Crore from EDF. The EDF is now receiving requests from Venture Funds, Angel Funds and Seed Funds in areas of electronics, IT and nano-electronics, which in-turn will provide risk capital to electronics industry.

5.1.3 Incubators for Electronics

Setting up of Incubation Centre in Delhi-NCR: Department has approved a project for setting up of an Incubator by Software Technology Parks of India (STPI), New Delhi in association with India Electronics & Semiconductor Association (IESA) and Delhi University (DU). The Electropreneur Park is being set in area of over 10,000 sq. ft. constructed space with state of the art facilities at South Campus, Delhi University. The total project duration to set up the Electropreneur Park is 5 years. DeitY will be providing the funding support required to set up and manage the centre over the initial 5 years, thereafter the project will be run by the implementing agencies in a self-sustaining mode. The project will support 50 start-ups over a period of 5 Years.

The project proposals are being evaluated by STPI for selection of the entrepreneurs/start-ups. The civil work of the Incubation Centre at South Campus, Delhi University is underway. A full time CEO has been appointed for looking after the day to day operations of the Electropreneur Park. Electropreneur Park has received around 203 proposals from various researchers /start-ups for initiation of their developmental activities. After evaluation of the proposals, 8 start-ups have been selected as the first batch of incubatees.

Setting up of Incubation Centre with focus on Medical Electronics at IIT, Patna

Hon'ble Prime Minister of India has launched the Incubation Centre for medical electronics at IIT Patna in an event held on 25th July 2015 at Patna, Bihar. Incubation center would support start-ups in electronics and is expected to provide impetus in developing new products and solutions enabling creation of Intellectual Property within the country for maximizing the domestic value add and diminishing the external independence

in the sector especially in the Medical Electronics segment. It will also help develop medical electronic devices especially relevant for Indian conditions and health requirements at affordable cost. The project is proposed to be implemented through joint funding from DeitY and Government of Bihar. This incubation center is being set up in area of 3000 sq meters constructed space. The administrative approval has been issued. The project envisages 45 start-ups over a period of 5 years. The incubation centre has started recruiting the manpower. The first call for proposals is expected soon. IIT- Patna has filed application for registration of society under IIT- Patna which will oversee the implementation of the project.

Electronics Incubator by IIITM-Kerala and Start-up Village at Cochin, Kerala: The project for setting up of Consumer Electronics Incubator at Cochin, Kerala by Indian Institute of Information Technology and Management Kerala (IIITMK) and M/s Startup Village has been approved on 23rd April 2015. The main objectives of the Electronics Incubator is creation of new enterprises focused on Consumer Electronics, providing entrepreneurs access to infrastructure that facilitates manufacture of electronic hardware in a cost effective and sophisticated manner, providing mentorship to mitigate the risk that start-ups face while manufacturing electronics hardware , bridge the time delay taken to absorb new technologies etc. This Incubator will incubate 40 Startups over a period of 4 years.

The administrative approval for the project was also issued on 24th April 2015. In this regard, Memorandum of Understanding between DeitY and IITM-Kerala signed on 3rd June 2015.

5.1.4 R&D and IP development

1. **Development of Digital Programmable Hearing Aid (DPHA):** C-DAC has designed and fabricated an ASIC (Application Specific Integrated Circuit) named *NAADA*. Using this ASIC, CDAC developed a Digital Programmable Hearing Aid (DPHA) module named *TARANG* at an affordable cost. *TARANG* is available as Body-Worn (BW) and Behind-the-Ear (BTE) models. TARANG can be customized and programmed/reprogrammed using SHRUTHI software also developed by C-DAC. It covers a wide range of hearing profiles for patients with mild, moderate and profound hearing loss. Extensive field

trials were carried out at major National Institutes like All India Institute of Medical Science New Delhi, Ali Yavar Jung National Institute for The Hearing Handicapped Mumbai etc. More than 2500 DHPAs have been deployed. CDAC is in the process of transferring technology.

2. **8 bit secured Microcontroller IP Core (BE 80501):** Under a DeitY supported project entitled "Design, Simulation, Development and Fabrication of 8-Port, Secured Microcontroller" Bharat Electronics Ltd has designed an 8 bit micro controller core with secured inbuilt flash memory. The design was fabricated by using 250nm Embedded Flash CMOS process of UMC Taiwan and assembled in an 80 pin Quad Package. BEL has transferred the technology to Advanced Numerical Research & Analysis Group (ANURAG), DRDO.
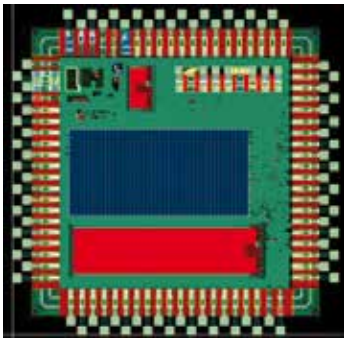
BE 80501 Embedded Flash Micro controller (Physical Design)

3. **Design of 20 GHz Low Noise Amplifier :** Under a DeitY supported project entitled "Design and Characterization of CMOS based Millimeter-wave Components for 60-GHz Integrated Broadband Transceivers" IISc Bangalore has designed fabricated and demonstrated a Low Noise Amplifier (LNA) operational upto 20 GHz. This LNA amplifies weak RF signals. Process has been initiated for Transfer of Technology of 20 GHz based LNA to industry.

20 GHz Low Noise Amplifier (LNA)

4. **Low Temperature and Low Pressure Cu-Cu Fine Pitch Bonding for Vertical (3-D) Integration:** Under a DeitY supported project entitled "Low Temperature and Low Pressure Cu-Cu Fine Pitch Bonding for Vertical (3-D) Integration" technology has been developed by IIT Hyderabad for fine pitch/blanket Cu-Cu bonding at 175 centigrade temperature and 4 bar pressure for Vertical integration (3D IC applications).

5. **MEMS based hand held sensor for Carbon Monoxide and Ammonia:** Under a DeitY supported project, CEERI Pilani has developed sensor for Carbon-monoxide and Ammonia gases. The Ammonia Gas Sensor has been tested for 20 ppm sensitivity while Carbon Monoxide sensor has been tested for 150 ppm sensitivity.

Handheld electronic for gas sensor power and readout.   MEMS gas sensor capped with perforated metal cap.

6. **Smart Camera for Object Tracking and Change Detection:** Under DeitY supported project entitled "Design of an Embedded Processor for Smart Camera System", CEERI Pilani and IIT Delhi have jointly developed and lab demonstrated the active smart camera having the capability to facilitate intelligent processing of captured images and purposive movement of the camera based upon visual feedback. Algorithms for Object Tracking and Change Detection is developed as part of this project

7. **Perception:** Bioinformatics Resource and Application Facility operational   at CDAC, Pune wherein Bioinformatics applications   utilize the Garuda grid infrastructure and a grid-enabled Bioinformatics Resources (Computing Power, Databases and the Software) provided to industry, academia. There is a sizable number of users of BRAF both national and international. The usage percentage of machine is about 95%.

- **Cloud activities:**
  - The middleware installations and testing and generating multiple instances of OS have been successfully completed on the cloud test-bed at CDAC bioinformatics team.

- **Cloudconnect** software has been released in the symposium 2015. It has unique feature of user friendly access to any cloud (private or public).

- **Outreach Activity:**
  - "Accelerating Biology 2015: Catalyzing Evolution" during Jan 20-22, 2015 at Yashada Baner, Pune.

BRAF hardware: PARAM Biogene BRAF hardware: PARAM Biochrome

8. Convergence, Communications & Broadband Technologies

Convergence Communications & Broadband Technologies have been recognized world over as the key technologies for economic growth and development. In the context of the vision of Digital India which has a focus on digital empowerment of citizens and advancement in Information and Communication Technologies and objective of Make in India, the Research & Development (R&D) in the next generation Communications, Broadband and Strategic technologies is aimed at indigenous and innovative technology development.

The programme aims at R&D in areas of Next Generation Communication, Convergent and Network Technologies, Green Communication, Cloud Communication, Broadband Wireless technology deployments, Big Data Analytics for societal applications and disaster management, pervasive computing, wearable smart devices, sensor networks, Internet of Things (IoT), e-Mobility, 5G and Strategic Electronics.

Achievements

A number of technology development projects supported at various institutions across the country in the thrust areas were successfully completed.

Some of these are Building Delay Tolerant Peer to Peer Network, Wireless monitoring system for landslides in North Eastern Region, Software Defined Radio, Wireless LAN Manager for Performance Management, Low-cost Real-time Detection of Harmful Gases, Online Prediction and Emergency Response Management of Vector Borne Diseases, Multiple Language subtitles on DTH, Android based application for Geo Profile, Spectrum Aware Rural Connectivity, Study of Software Defined Network and Safety Alert & Advisory Information System using Vehicular Communication.

The on-going projects in progress include, TV White Space Trials, 5G Research and Building Next Gen Solutions, Innovation hub on Cyber-Physical Systems, Indian Sign Language Captioning Framework, Tracking system for controlling illegal mining and coal transportation, Broadband wireless communication system using THz technology, Cellular Cognitive Radio Network, Dual- Connectivity LTE- Wifi Solution for Broadband Wireless Networks, Re-configurable frequency hopping transmitter and receiver for long haul Software Defined Radio, Self-Powered wireless chipset for building to building communication, Software Defined Radio development platform, Multi Mobile Wireless Sensor Networks in Tracking and Surveillance, Applications for smart grid and formation of Unmanned Arial Vehicles (UAVs), Energy efficient radio access technologies for 4G LTE, Decision Support System for integrated hydrogeological modelling, Low Power Terabit for Broadband Communication Links, Early Fire detection and Safe Exit Guiding System, Converged Cloud Communication technologies, Small Cell WiFi Networks for the enterprise, Distributed Bayesian learning for Big Data, Robust Communication Receiver for TV white space, Deployment of Multilingual DVB Subtitle solution, Mobile Ad Hoc Networks, Autonomic Energy Aware Management of Network & Cloud, Smart Campus Water Management, QoS Provisioning in Internet of Things (IoT), Safety Alert System using dedicated Short Range Communication, Feasibility Assessment model for adaptation of underground coal gasification technology in the NE region. Under Indo-Dutch collaboration, following are the ongoing projects: Kumbh mela crowd control management, Code Self-verification for IoT Devices, Big Imaging data approach for Oncology, Data Mining & Prediction in Airlines Operations, Privacy Aware Smart Public Buildings.

5.1.5   Free & Open Source Software (FOSS)

DeitY has taken many initiatives for promoting and fostering the adoption of FOSS including development of indigenous Operating System distribution BOSS with

Indian languages support and its wide deployment in various organizations. BOSS Desktop, Server and educational variant EduBOSS are released under GPL license and available for free downloads from http://bosslinux.in. Pan-India Support Centres have been established for hand-holding support to users. Research & development of secured, service-oriented component based operating system and multi-core architectural simulator are also being addressed. Development of BOSS Mool, Dhara and Bharti Sim are notable outcome of these efforts. For promotion of usage of FOSS, Department has brought out a Policy on Adoption of Open Source Software for Government of India.

i. Self-aware Service-oriented Component-based Operating System

The new Component based Operating System "DHARA" has been developed. This is achieved through redesign of Kernel in service oriented architecture with different subsystems and modules designed as collection of services to optimize processes execution time on multicore environment. The kernel is expected to optimize the execution time by 25% to 30% on multicore systems by scheduling the processes on different cores efficiently.

In BOSS-MOOL (Minimalistic Object Oriented Linux) project, the existing Linux kernel has been re-designed to provide Object Oriented abstractions of various subsystems of the kernel (e.g. Interrupt Handler, Kernel Memory Manager etc). MOOL achieves this by providing OO wrappers for the core kernel in C++. The MOOL kernel has been made real-time (RT) capable. A distance learning program is designed on Database & BOSS-MOOL. The course is aimed to provide a real time exposure to the students on Database and MOOL kernel.

CDAC has signed an MOU with one of the companies for bundling BOSS MOOL operating system in laptops/Desktops/ Servers to be deployed across the country in all govt. departments and educational institutions for their productivity.

SETS Lab, Chennai have ported the Integrated Threat Management Application on BOSS-MOOL. ECIL will be taking up the production of this and use BOSS-MOOL in their product.

ii. BOSS Proliferation & Adoption

Development of BOSS- the indigenous Linux based Operating System distribution with Indian languages support is a significant milestone of National Resource Centre for Free & Open Source Software (NRCFOSS) http://bosslinux.in.

BOSS has been widely deployed in education and government sectors in various States/ UTs across the country. Indian Navy & Army have adopted BOSS for their office applications. BOSS has also been deployed in Tamil Nadu, Chhattisgarh, Orissa, Kerala, Maharashtra Tripura, Pondicherry, Andaman & Nicobar Islands and Haryana in various applications. Tamil Nadu Government has mandated the use of BOSS Linux as one of the Operating Systems in all Government Departments. BOSS Linux has been deployed under the free laptop scheme in Tamilnadu.
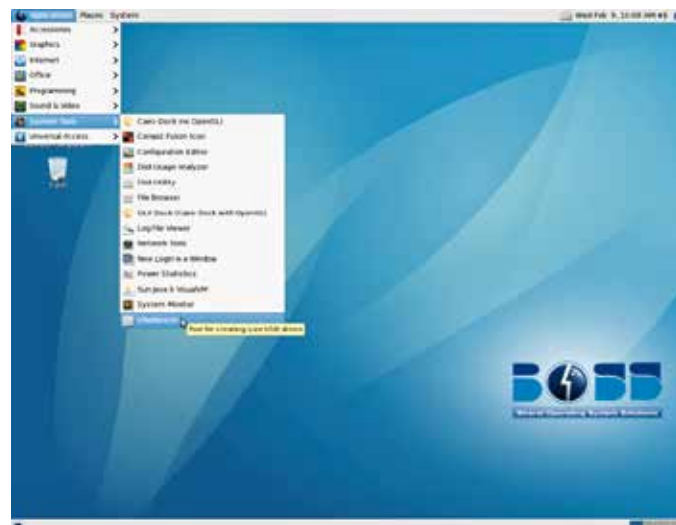
BOSS preloaded HCL desktops are being deployed by Govt of Orissa and CHiPS Chhattisgarh. EduBOSS is being deployed in schools under EDUSAT project of Govt. of Punjab and schools of Pondicherry and Maharashtra; BOSS deployments have resulted in indirect savings of over ₹300 crore by not using proprietary software.

Total Deployments: 32,00,000
Online Downloads: 34,000

Indian Navy:
1500

Indian Army:
7000

Punjab
EduSat Society
PICTS
1,01,400

Chandigarh
Deptt. of IT (School)
1,000

Haryana
ICT
57,000

New Delhi
Cabinet Secretariat
29

Chhattisgarh
Student Laptop Scheme
Districts Administratin
19,000

Maharashtra
School
60,000

Andhra Pradesh
DRDL
Few Colleges
280

**Andaman &
Nicobar Islands**
1000

Puducherry
Higher Secondary
School, Puducherry
52

Tamil Nadu
Students Laptop Scheme
Village Admin. Officer Laptop Scheme
State Govt. Deptt
Rural Development Agency Dektop Scheme
Boss Lab in Colleges
29,13,307

Kerala
NIC Thrissur
NIC Thirupuram
800

BOSS Proliferation Map

(This Map does not purport to be Political map of India. It is for representation purpose only.)

(iii) Bharti Sim : An Advanced Micro-architectural Simulator

BhartiSim (renamed as Tejas) has been developed at IIT Delhi as a highly configurable simulator with simple Extensible Markup Language (XML) interface. The salient features of the simulator are parallel execution, support for multiple emulators, transactional, memory, accelerators and Network on Chip (NoC). This simulator has been released on the web with an open source Apache 2 license. It is now fully functional, and has been used to publish numerous research papers in the areas of computer architecture, and compiler design. The simulator has been integrated into the teaching curricula of various universities worldwide, and has been downloaded by users from 15 countries roughly 400 times. It is also being used to teach courses at IIT Delhi, IIIT Allahabad and ISI Kolkata, and is being actively considered in many European universities as well.

5.2 Translation R&D

5.2.1 Medical Equipment/ Tools

The technology development of 6 MV Linear Accelerator (LINAC) has been completed at SAMEER, Mumbai and four Linac machines have been fabricated for deployment at four hospitals in the country for cancer treatment. The first LINAC machine has been commissioned at Indian Institute of Head and Neck Oncology, Indore, M.P and patient treatment has been going on since June 2014. During the current financial year, 10383 patient exposures have been completed till November 2015 using this machine. The installation of second and third Linac machines at Amravati Hospital, Maharashtra and B K L Walawalkar Hospital, Dervan, Chiplun, Maharashtra is in progress. For the remaining one machine, the bunker at Kidwai Hospital, Bangalore is under modification. The machine will be dispatched and commissioned once the site is ready with necessary AERB clearance.

5.2.2 Micro & Nano Electronics

1. **Design of 20 GHz Low Noise Amplifier:** Under a DeitY supported project entitled "Design and Characterization of CMOS based Millimeter-wave Components for 60-GHz Integrated Broadband Transceivers" IISc Bangalore has designed fabricated and demonstrated a Low Noise Amplifier (LNA). This LNA amplifies weak RF signals and is operational upto 20 GHz. This LNA has been. Process initiated for Transfer of Technology of 20 GHz based LNA to industry.

20 GHz Low Noise Amplifier (LNA)

2. **Nanotechnology Products:**

   i. **Design and development of MEMS Pressure Sensors for Aerospace applications:** Design, development, and fabrication of MEMS pressure sensors (0-200 bar, 0-400 bar) for aerospace applications and those in the strategic sector have been completed at Centre for Excellence in Nanoelectronics (CEN) IISc Bangalore. The technology is being transferred to Bharat Electronics Ltd. to supply these vital devices to the strategic sector.

   ii. **Design and development of MEMS Pressure Sensors for Medical Diagnosis:** Design, development and fabrication of MEMS pressure sensors (0-1.2 bar) for intracranial pressure (ICP) measurements for medical diagnosis has been completed at CEN IISc and transfer of technology has been initiated to Society for Integrated Circuit Technology & Applied Research (SITAR), DRDO Bangalore.

   iii. **Development of a novel type of lithography– termed electrolithography – based on contolled electromigration in metals** has been undertaken at CEN IISc.The process is protected by a PCT (patent) filing and is at the Technology

Readiness Level (TRL) of 4. It is anticipated that either a start-up company will be founded to develop the technology into a product, or that the technology will be licensed to an appropriate "global player".

iv. **Design and Development of Explosive Detector device:** A hand-held Explosive Detector Prototype for RDX/ TNT/ PETN has been developed at CEN, IIT Bombay. The project activity has been funded by the Principal Scientific Advisor's office but utilized entirely the facilities created from the DeitY CEN project. This handheld system has the potential to replace a sniffer dog for explosive detection. The system can also be configured for other applications including sniffing of volatile organic compounds in agriculture areas. With the help of PSA office, extensive tests are currently being carried out using real explosive samples, involving the national security agencies. A Start-up company NanoSniff has been established to commercialize it.

5.2.3 Language Technologies

1. Text to speech synthesis in the unit selection (Festivox) and statistical frameworks (HTS) have been successfully developed for 11 Indian languages (Hindi, Marathi, Bengali, Assamese, Tamil, Telugu, Malayalam, Kannada, Odia, Rajasthani and Manipuri). MOU with OS Labs India Pvt. Ltd for integration of the TTS in 9 Indian languages in Android based Regional Operating System Indus OS for making it available in Mobile / Wireless devices. Under the ongoing project of Text-to-speech (TTS) system in Indian languages, TTS for 2 more Indian languages (Bodo and Kannada) is under final stages of development.

TTS Browser-plug-in for Mozillla and Chrome browser in 9 Indian languages has also been integrated with Vikaspedia portal (http://www.vikaspedia.in) to facilitate the access of information to multilingual users and visually challenged citizens in 6 domains namely Agriculture , Education , Health , Energy, Social Welfare and E-Governance.

5.2.4 Green computing

Green computing or IT sustainability is the study and practice of environmentally sustainable IT or computing. This can include "designing, manufacturing, using, and disposing of computers, servers, and associated subsystems efficiently and effectively with minimal or no impact on the environment. Besides IT itself being green, it can support, assist, and leverage other environmental initiatives to achieve energy efficiency and reduce carbon footprint in every walk of life by offering innovative solutions. In addition to moving itself in a greener direction and leveraging other environmental initiatives, ICT could also help create green awareness by assisting in building communities, engaging groups and supporting education and green advocacy campaigns.

Under the program, DeitY has already developed (through CDAC Bengaluru and Chennai centers) deployable ICT technologies for Smart buildings with low carbon emissions. The technologies primarily are for Lighting control, HVAC control and Air quality monitoring in buildings. The technologies/products developed are deployed in CDAC buildings at Pune and Hyderabad and at DeitY for demonstration. Transfer of Technology (ToT) of these technologies/products is underway for large scale production.

DeitY has now initiated development of technologies and solutions for Smart Cities using Internet of Things (IOT). Four centers of CDAC (Bengaluru, Chennai,

Hyderabad and Thiruvananthapuram) are entrusted with the development work.

The object of the project includes:

a) Design and Development of a Secure Network Architecture for Smart Cities using Internet of Things and Software Defined Networks which address the needs of various domains like
   – Smart Utilities: Smart Electrical Distribution Systems, Smart Water Distribution Networks, Solid Waste Management,
   – **Smart Mobility**: Smart Transportation Management Systems, Emergency Services.
   – **Smart Environment:** Pollution Control, City wide Surveillance
   – **Smart Citizen:** Mobile Crowd Sourcing
   b) Design and Development of a unified cloud framework for standardized data aggregation, storage and analytics for the above services.
   c) Prototype demonstration of developed Smart City applications

5.2.5 Technology Development & Demonstration for Indian Industries: National Mission on Power Electronics Technology (NAMPET) Phase-II

To generate electric power from solar energy, development of futuristic indigenous Power Conversion Technology for Grid Connected Solar Photovoltaic Power Plant, with cumulative 1 MW Power have been completed and deployed at Jamuria, West Bengal. This technology has many advantages over the imported technology including cost, maintenance, upgradation etc. Technology development for Full Spectrum Simulator, System on Programmable Chip (SOPC) based Power Electronic Controller, Induction Motor for Propulsion Applications, Permanent Magnet Machines, Low Voltage Direct Current Architecture and Silicon Carbide Technology have been completed and successfully demonstrated. Shortly, these technologies will be offered to industries for commercialisation. The sub-projects in the areas of Smart Meters and Grid connected Solar Inverters have been initiated.

The technology of Static Synchronous Compensator (STATCOM), a device used to regulate the reactive power on the load side in the power transmission networks, has been demonstrated and transferred to M/s RRB Energy Systems, Chennai.

Two-500kVA STATCOM installation at Techno park
STATCOM-I   STATCOM-II

Vehicle Control Unit (VCU) and Train Communication Network (TCN) for Railway Locomotives to control traction motors, auxiliary converters, etc., have been demonstrated. Technology transfer agreement for this technology has been signed with M/s Crompton Greaves Ltd, Mumbai. Two other organisations i.e. BHEL and Medha Electronics, Hyderabad have also approached for taking this technology.

Block Diagram of Modern AC Electric Locomotive
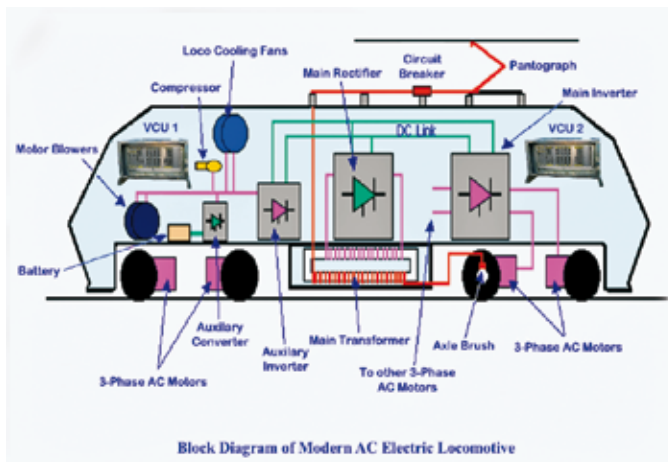
Universal Analog input module and HART Compatible input-output modules

Technology is being developed to upgrade the iCON controller, developed under the ASTeC programme, with three new types of input-output modules namely, Universal Analog Input Module with interfaces to thermocouple / RTD / 4-20mA/ 0 to ±10V signals, HART compatible Analog Input and HART compatible Analog Output modules. Testing of a prototype Analog Input

& Analog Output circuit with on-board HART modem has been completed. The project is in its final stage for implementations.

To showcase the effectiveness of indigenous technology development and to inculcate the confidence among the user industries, the generic automation technologies, developed under ASTeC project are being tried in the real life plants in association with Cement and Sugar industries.

Advanced Automation & Process Optimisation System for Cement Factory

Advanced automation and optimisation has been attempted in the four important areas i.e. Kiln optimisation, Cement Mill optimisation, Cyclone jamming & detection and Stacker-reclaimer of a cement factory. Stacker-Reclaimer monitoring system using Wireless Sensor Network has been developed, tested and deployed. For Cyclone Jamming Detection System, Expert System approach is finalised based on Real Time Expert System Shell (iRESS). This is being validated with the historic data provided by plant. For Cement Mill Optimisation System, Cement Mill Model and Fuzzy Logic Decision System (FLDS) have been developed. Kiln Burning Zone temperature estimation using image processing has been developed and validated with pyrometer data. For Optimization System, installation of Hardware like iCON Embedded Controller, Workstation Computer, interfacing with Distributed Control System (DCS) etc. have been completed. Development of Kiln Optimisation system is in progress. The Fuzzy logic Decision System and Fuzzy rule base so far developed are being tested. Overall system implementation in Cement plant is in advance stage of completion.

Automation of the Sugar Plant using Indigenous Technology

The major objective of the project is to deploy the technologies/systems developed under the Automation Systems Technology Centre (ASTeC) programme at Thandava Co-operative Sugar Factory (TCSL), Visakhapatanam, Andhra Pradesh for improving the productivity and energy efficiency of the plant. Detailed system studies have been conducted and Detailed Project Report covering equipment specifications, Bill of Materials, Detailed plant instrumentation and piping diagrams, control schemes and implementation

methodologies have been prepared. Preparation of process diagram of TCSL, Piping and Instrumentation (P&I) diagram and formulation of control schemes have also been completed. The project is progressing in its final stage of implementation, etc.

5.2.6 Electronic Materials and Component Development

Under Electronic Materials Development Program, the process technology for nano NTC powder based chip-in-glass thermal sensors has been developed at Centre for Materials for Electronics Technology (C-MET), Thrissur. This sensor has high precision, high reliability and fast response to very small changes in ambient temperatures. The technology of chip thermistors and chip in glass thermistors has been transferred to M/s Deem Sensing Technologies Pvt. Ltd, Bangalore on non-exclusive basis. The company has initiated the production. Two more potential industries, engaged in NTC thermistor production, have expressed interest in the developed technology.

NTC Thermistor- Various

Air Conditioner sensor

Surface Mount Sensor

Skin Temperature Sensor

- Substrate for microwave circuits has been developed at Centre for Materials for Electronics Technology (C-MET), Thrissur using the high dielectric-constant compositions like ceramic-filled polymers, like poly (tetrafluorethylene). The technology of microwave substrate has been transferred to M/s. Speedlam Electro Materials Pvt. Ltd., Hyderabad (A Subsidiary of M/s Micropack Limited, Bangalore) on non-exclusive basis for strategic applications, such as satellites, power amplifiers and radar.
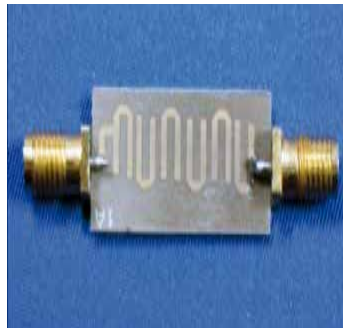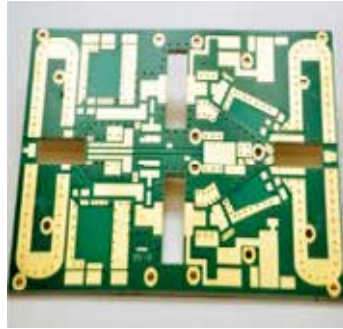
- Development of Fiber Bragg grating sensor for condition monitoring of railway catenary-pantograph structure: Pantographs used in Indian railway lines are facing problem regarding poor adjustment, frequent damaging of current collectors due to strong contact force, subsequently damaging infrastructure, generating electric arcing and causing damage to its carbon strips, and overhead contact wire. Replacing conventional electrical sensors like load cells, strain gauges etc. can be a solution to address this problem. Optical fibre Bragg grating (FBG) is being used globally due to its immunity to interference (EMI/EMC) and being safer in a hazardous environment. No power is required at sensing region in future.

A project is under completion stage at Central Glass & Ceramic Research Institute (CGCRI), Kolkata to develop FBG transducers for online monitoring of the pantograph/catenary mechanical interactions and to develop indigenously sensing technology for the specific application. This will require estimation of contact force, contact position and impact oscillations between the pantograph and the overhead conductor. M/s. Stone India, a leading manufacturer of pantograph of Indian railways is engaged in field trail and necessary clearance from Indian Railway for the for the sensor developed at laboratory stage at end-user's site (M/s. Stone India).
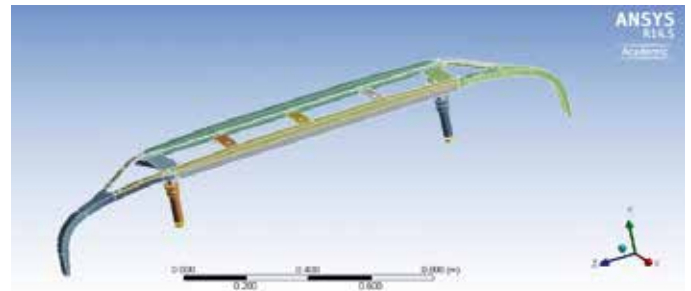
5.3 Centres of Excellence

5.3.1 Nano-Technology Centres

(i) Centres of Excellence in Nano-electronics Phase II – a joint project between IISc, Bangalore and IIT Bombay

The project Centres of Excellence in Nanoelectronics (CEN) Phase II has been initiated at IISc Bangalore and IIT Bombay to accelerate research and development activities in new areas of nanoelectronics and integrated sensor systems as well as to generate a critical mass of highly trained manpower through the Indian Nanoelectronics User Program (INUP) to propel these areas. The notable outcomes this year of the activities include development of various sensors for medical, environmental and agricultural applications. A significant number of innovations have been made as part of these development activities and some patents have also been filed. Start-up companies are being incubated to commercialize some of these technologies.

(ii) Nano Fabrication Prototyping Facility for SMEs and Start-ups in the area of Micro Electromechanical Systems (MEMS) & Nano Electromechanical Systems (NEMS) at IIT Bombay
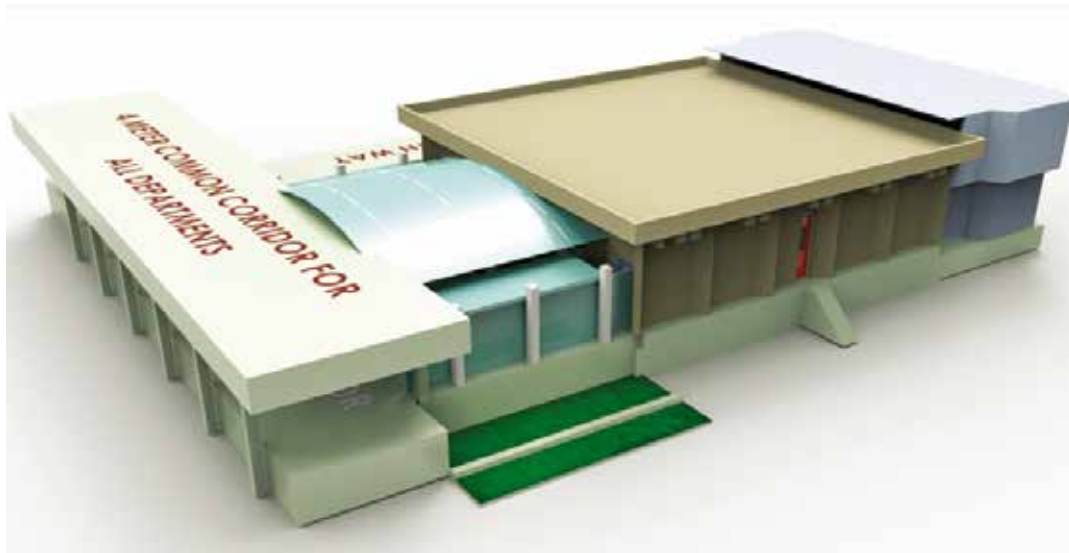
The Nanofabrication prototyping facility in IIT Bombay is an initiative to bridge the gap between lab research and market products. This facility is expected to greatly boost the eco-system for start-ups in the areas of Micro and Nano scale technologies. The primary objective of this facility is to enable researchers and industrial partners/ incubator companies to fabricate and manufacture nanoscale devices. Such a facility will provide an accessible platform to bring technologies from Technology Readiness Level TRL 4 to TRL 9. This facility can provide assistance in efficiently scaling up nano-manufacturing operations in a quality controlled environment. It is expected that providing sustained and industry standard manufacturing facilities will encourage startup companies and entrepreneurs to explore ideas and opportunities in the micro/nanofabrication technology. The complete facility is likely to be commissioned by June 2016 and open for use by Startups and SMEs.

(iii) Development of Molecular Beam Epitaxy (MBE) cluster tool based epitaxial nano-semiconductor infrastructure and process integration facility for high performance RF/Microwave compound semiconductor heterostructure nano-devices on silicon at IIT Kharagpur
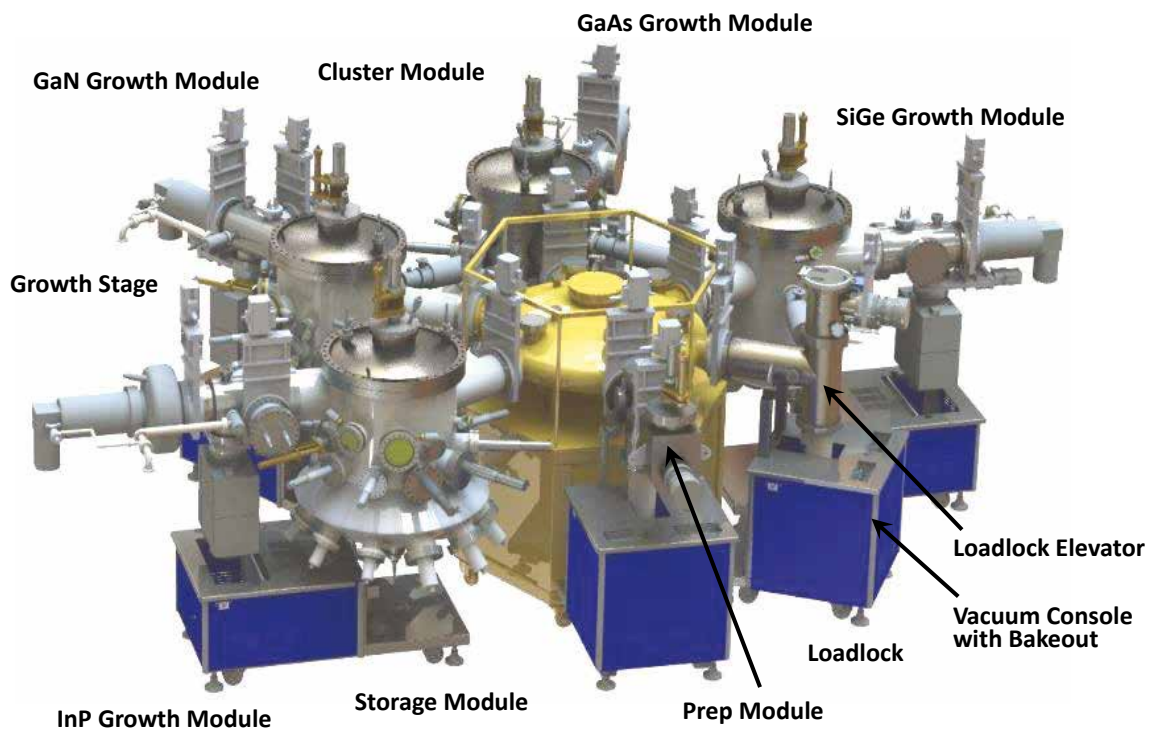
Under the project, a MBE cluster tool, first of its kind in India, has been installed for growth of GaAs, InP, GaN, SiGe, AlGaAs, InGaAs, InGaP, AlGaP, AlGaN, InGaN layers for the development of high frequency devices for communication sector. Epitaxial growth and characterization of III-Nitride on both Sapphire and Si substrates has been done using the cluster tool MBE. Fine tuning the growth processes of a few heterostructures like AlGaN/ GaN and AlGaAS/ GaAs on sapphire and Silicon and production of device quality wafers of these materials for HEMT (High Electron Mobility Transistor) devices is under process.

(iv) **Centre of Excellence in R&D in Theranostics Devices at IIT Guwahati**

This project has been initiated at IIT Guwahati with the broad aim to cater the local needs by the development of low cost micro/ nano health and agriculture sensors aiming applications in Theranostics (a combined terminology for therapeutics and diagnostics). In North East region, diseases like esophageal, hypo pharyngeal and oral cancers are common, probably due to the habit of consumption of betel-nut (Areca nut) and higher use of alkaline food in the region. The Centre will provide the new opportunities to the researchers of North Eastern region and will cater the local needs by the development of low cost health and agriculture sensors.

(v) **Centre for Nano Electromechanical Systems (NEMS) and Nanophotonics at IIT Madras:**

The aim of the project is to promote Nanotechnology in areas of health, food safety, communication and material science. Centre is pursuing research in the areas of NEMS resonators, Nano resonator based biomolecular detection system, Nanophotonics components and systems etc. Complete process flow starting from mask fabrication to device release has been developed for nano-electromechanical resonator with all individual steps standardized.

(vi) **Centre for Nano fabrication and Nanoscale devices based on non-silicon technologies at IIT Delhi**

This project involves setting up of a nanofabrication facility at IIT Delhi and its use for developing Nanofabrication processes and their use for making non-silicon nanoscale devices. The project also aims building and demonstration of select device prototypes in specific research areas.

(vii) **Centre for Nanometerology at NPL Delhi**

Calibration facilities for the measurement of electrical parameters such as voltage, current, resistance and charge in nano range have been established to serve as a national facility in NPL, New Delhi.

5.3.2 National Centre for Large Area Flexible Electronics (NCFlexE)

National Centre of Excellence for Large Area Flexible Electronics (NCFlexE) was approved to be set up at IIT Kanpur with an outlay of ₹ 132.99 crore for 5 years to act as resource centre in the emerging area of flexible electronics. NCFlexE was formally launched by Hon'ble Prime Minister on 1st July 2015.

The Centre is in the initial phase of being set up. A Chief Operating Officer (COO) for the Centre has been recruited. A new building for NCFlexE is under construction at IIT Kanpur. Development of applied technology based on the industry need has been identified as fundamental principle of the Centre. The Centre is mandated to take up the challenges which industry is facing for development of new products in this area.

To make it's presence felt and for joint development of products for industry need, the Centre conducted a number of workshops and round tables. NCFlexE also participated in TAITRONICS an exhibition of Electronics in Taiwan. The Centre is also trying to forge International collaboration with other leading innovation centres in the world.

The NCFlexE has already identified industry partners to work on some projects.

5.3.3 National Centre for Excellence in Technologies for Internal Security (NCETIS)

National Centre of Excellence in Technologies for Internal Security (NCETIS) has been set up at IIT Bombay for as a resource centre for State police forces to help them with technology appreciation, technology selection, choice of products and technology roadmap advisory and will provide consultancy and advisory services.

NCETIS is acting as a National Centre with long term goals by creating a consortium with other institutes including R & D labs and industry for its long term sustainability. The Centre will aim at technologies/projects that are either state of art (i.e. better than available and /or cheaper)

and projects that are relevant to the user agencies and address the requirements of security forces. The Centre will also work with industry to develop commercially viable products. NCETIS will setup a mechanism of structured interaction with State/Central police forces for understanding their technology requirements.

Within a couple of months since its launch, the Centre has made progress through its interactions with industry. NCETIS is working with industry for development of number of projects.

5.3.4 Internet of Things (IOT)

DeitY in association with ERNET a nodal agency of DeitY and NASSCOM has established Center of Excellence(CoE) for Internet of Things(IoT) on a Public Private Partnership (PPP) model to "Enable IoT ecosystem through maximizing indigenous solutions across the IoT value chain, leveraging India's strength in IT through collaborative efforts of Industry- Government- Academia -Start-ups/Entrepreneurs" for India's contribution to global competitiveness and wellbeing.

The CoE, over a period of time and through IoT will enable India to emerge as a "Consumption + Creation Economy" rather than being a "Consumption Economy" as of now and act as an enabler/catalyst for IoT eco system supporting policy and regulation development, resident competency, monitor the IPR generated in the system and support other incubators in the country with program support

The CoE will create an innovation platform for start-ups/entrepreneurs, Enterprises in the space of IoT with 'Democratisation of Innovation' as the key pillar. The proposal is to establish 5 CoE such over a period of time across multiple centres.

Government of Karnataka has joined the initiative as a State partner through grant of space as well as program execution support in the State.

COE would focus on Agriculture, Water, Health, Transportation, Security & Safety and Energy as vertical segments. Three workshops have been conducted on IOT leading to collation of 228 IoT related startups and understanding of the core requirements of the startups. The CoE for IoT was launched by Hon'ble Prime Minister on 1st July 2015.

5.3.5 Innovation IPR and IP Development

The main objective of this activity is development of an ecosystem to promote innovation in ICTE by way of supporting incubation centre to nurture innovative ideas and technology start-ups, creating awareness about Intellectual Property Rights and to facilitate academic/ R&D institutions and industry in protection of IPRs in the E&IT sector.

Achievements

Two schemes are being supported to encourage innovation in ICTE sector. These are, 1) Technology Incubation and Development of Entrepreneurs (TIDE) and 2) Multiplier Grant Scheme.

- **The Technology Incubation and Development of Entrepreneurs (TIDE) Scheme**

  The Department is implementing the scheme at the institutions of higher learning. The Scheme aims to nurture technology innovation and enable local development of Electronics and ICT products and packages in the long run. The Scheme provides financial support for nurturing the techno-entrepreneurs as well as for strengthening the technology incubation activity at the institutions.

  Under the scheme till date 27 TIDE Centres have been provided financial support.

  The following are the main outcomes of the TIDE Scheme:
  - 27 TIDE Centres supported at IITs/IIMs/NITs/ Premier Institutes all over India.
  - 155 startups benefited.
  - Out of 155 startups, 75 have successfully graduated till date.
  - More graduations likely to follow as some of the startups incubated in recent years
  - 43 startups attracted Venture Capitalists, resulting into investments of ₹ 55 Crores
  - 286 entrepreneurs emerged and out of which 34 are women entrepreneurs.
  - 1909 jobs created throughout 27 TIDE Centres.
  - 228 products have been developed by these startups out of which 171 are software products and 57 are hardware products.
  - 29 successful patents registered based on the products developed by the startups.

- **Multiplier Grant Scheme (MGS)**

MGS is to encourage collaborative R&D between industry and academics/ R&D institutions for development of products and packages. The Scheme aims to strengthen industry-institute linkages, encourage and accelerate development of indigenous products/ packages and bridge the gap between R&D and commercialisation. Under the Scheme, if industry supports R&D for development of commercializiable products at an institution, the Government may provide financial support up to twice the amount provided by industry. The proposals for providing financial support under the Scheme were to be submitted jointly by the industry and institutions.

There are two Projects being supported under Multiplier Grants Scheme (MGS) as summarized below:

1. The project titled "Reliable Processor Platform for critical Applications" is being implemented by IIT Bombay in conjunction with Powai Labs Technology Pvt.Ltd. The objective of the project is to deliver a fully verified and fault tolerant processor (RTL+Development Board) with Real Time Operating system (RTOS) and development tools. This project has been jointly funded by DeitY, Govt. of India and an industry partner (Powai Labs Technologies, Mumbai) under the Multiplier Grant scheme (MGS).

2. The project titled Prototyping a CVD Reactor and Recipe for Grapheme Growth" is being implemented by Indian Institute of Science, Bangalore jointly with KAS Technologies, Mumbai. The broad objective of the project is to build a CVD optimized reactor to produce a high quality single layer Graphene(SLG). This project has been jointly funded by DeitY, Govt. of India and an industry partner (KAS Technologies, Mumbai) under the Multiplier Grant scheme (MGS).

DeitY's Initiatives on IPR

The Department of Electronics and Information Technology (DeitY), has been in the process of facilitating ICT innovators, SMEs and Technology Start-Ups in ICT domain through following broad actions:

- Creating Awareness and Provisioning Facilitating Support
- Providing Help-Desk and services for increased IPR Creation
- Development and provisioning of IPR support tools and technologies.

"Support for International Patent Protection in E&IT (SIP-EIT) Phase -II" :

DeitY had launched a scheme titled "Support for International Patent Protection in E&IT (SIP-EIT)" in the year 2014 towards facilitating support and creating awareness and sensitization about IP and IP rights.

SIP EIT II comprises of two schemes:

1. Support for International Patent Protection in E&IT

   The scheme is targeted at providing financial support to MSMEs and Startups to file secure international ICTE Patents and so establish competitive advantage. Since its inception in 2014, 8 applications from MSME and 2 from technology startup units have been supported so far.

2. Scheme to Support IPR Awareness Seminars/ Workshops in E&IT Sector

To spread awareness and sensitize various stakeholders about intellectual property rights, DeitY is providing financial support to industry bodies and academic institutions for organizing ICTE centric workshops and seminars through the SIP-EIT Scheme. In the year 2015, 14 such workshops were supported pan India. 10 of them were organized by academic institutions, 3 by industry bodies and 1 international conference was jointly organised by DeitY and European Patent Office.

DeitY and EPO Work Plan 2015-2017:

DeitY and European Patent Office (EPO) in an endeavour to further cooperation, have signed a work plan 2015-2017 subsequent to the successful implementation of the Work Plan 2013-15. This work plan aims to share best practices in ICT-related patenting especially for computer implemented inventions (CII) between Europe and India through exchanges, training programmes and workshops.

As part of this collaboration the 3rd conference titled "India-Europe Conference on Building a Sustainable IPR-ICT Ecosystem for Promoting Innovation" was organised at Bengaluru, India. On the sidelines of the conference a training programme on patent search and patent information was also held in New Delhi.

In addition, DeitY is also facilitating DeitY scientists, societies and grantee institutions to file IPR applications comprising patents, copyrights, trademarks and industrial design applications through its various R& D related activities. In the year 2015, DeitY has facilitated filing 20 patent applications including 3 international applications. Also, 2 patents are granted by USPTO in 2015. DeitY's IPR portfolio now consist of a total of 55 granted patents, 294 filed Patent Applications, 494 registered copyrights and 36 filed copyrights and 117 registered trademarks and 51 filed trademark applications.

Towards creating conducive infrastructure for creation of IPR eco-system, Center of Excellences in IP setup at DeitY, New Delhi and CDAC, Pune are providing a gamut of IPR related services to academic institutions, Scientific Societies of DeitY, SMEs, Start-ups and independent inventors. During the year 2015, 110 Prior Art Searches have been conducted successfully. In addition a landscape report in the Area of Power optimisation in Mobile Communication systems has also been prepared for the benefit of researchers and Industry.

Taking advantage of the digital media, a customized version of WIPO's IP Panorama, a user friendly e-learning multimedia toolkit has been developed at C-DAC Pune. IP Panorama which delves into various facets of IPR is attuned to Indian IP laws and systems and posted on the Patent Analysis and Management Portal (ict-ipr) for the benefit of Indian innovators, SMEs and Startups.

5.3.5.1 Collaborative Research & Development through GITA

To provide funding and support to industry and academic institutions for undertaking collaborative research, DeitY has approved a proposal submitted by Global Innovation and Technology Alliance (GITA). The project aims to promote Innovation, IP, R&D and commercialization of products, etc. in the ESDM sector by providing funding support to an Industry, for doing collaborative research with an Academic Institute in the priority areas with a timeline of not more than two years. The areas in which DeitY is initially focusing are:

1. Large Area Flexible Electronics
2. IOT
3. Technology for Internal Security

A maximum of 9 R&D projects will be funded under the scheme. Initial list of countries for this bilateral programme are Canada, Finland, Israel, Japan, South Korea, Spain, Sweden, Taiwan and the UK. In this regard, administrative approval has been issued on 14.08.2014 and MoU was signed on 22nd May 2015.

The Request for Proposal under this Programme for joint R&D between India & Republic of Korea(RoK) and India & Finland has been completed. The evaluation of India & RoK call has been completed. The evaluation of India & Finland call is under progress.

The Request for Proposal under this Programme for joint R&D between India & UK was announced on November 09, 2015 and will close on April 20, 2016. The Request for Proposal for joint R&D between India & Spain has been announced on December 16, 2015 and will close on May 13, 2016.

5.3.5.2 Supporting Research in Medical Electronics through BIRAC

To promote scientific and technological research in Medical Electronics sector in India, DeitY has approved a proposal submitted by Biotechnology Industry Research Assistance Council (BIRAC). The objective is to promote scientific and technological research in Medical Electronics sector in India to address the pressing challenges associated with the development of innovative medical electronics and making it available, accessible and affordable to the people at the bottom of the pyramid. The project aims to fund a portfolio of Indian led pilot projects that target innovations in the multi-disciplinary areas comprising of electronics, engineering, medical devices, healthcare, software, algorithms and information technology. This will provide support to seed, early transition and transition to scale stages.

The 'Expression of Interest' from Innovators, Start ups, SMEs and large Indian companies individually or in partnership/consortia was announced on 30th May 2015. The last date of submission of 'Expression of Interest' was 30th June 2015.

BIRAC received 118 proposals out of which 15 proposals were recommended for funding by Apex Committee. BIRAC is currently in the process of signing the contracts with the companies for the proposed research work.

5.3.6 Centre of Excellence for Digital Preservation

Digital Preservation addresses the long term preservation and access of digital data (born digital as well as reformatted digital) in the midst of technological obsolescence in terms of storage, file formats, operating systems, software etc.

Government has initiated Centre of Excellence for Digital Preservation at CDAC, Pune and CDAC, Noida with the following objectives:

- Continuing R&D in Digital Preservation for development of tools in various domains.
- Develop pilot Digital Preservation repositories.
- Define the Digital Preservation Standards and Best Practices.
- Spread awareness about the potential threats and risks due to digital obsolescence

The notable achievements made during the year include the following:

Development of pilot digital repositories initiated at the following domain institutions reached advance levels

of implementation by creating digital preservation infrastructure at these intuitions.

- Stamps & Registration Department, Government of Andhra Pradesh
  - Computerization of Registration Documents (CARD) project
- National Archives of India, New Delhi
  - Government Archives
- Indira Gandhi National Centre for Arts (IGNCA), New Delhi
  - Cultural Data
- Delhi District Court
  - Court case records

The infrastructure includes various software tools (electronic record management and archival system, e-records extraction system, pre-archival processing system etc.) developed by the Centre of Excellence, digital repository portals along with storage, backup and server hardware. The digital archival and technical processes are designed to comply with the requirements of ISO 16363 Audit and Certification of Trustworthy Digital Repositories. The digital repository of National Archive of India developed through this project is made online and can be accessed from www.digitalarchive.gov.in

In the year 2015, Pilot implementation of Delhi District Court is extended to Supreme Court of India based on the request by e-Committee of Supreme Court of India for 2TB of digitized records by customizing various tools developed for Delhi District Court. A Disaster recovery site has also been established at CDAC Hyderabad.

The staff of these domain institutions is trained to use the software tools and processes for digital preservation.
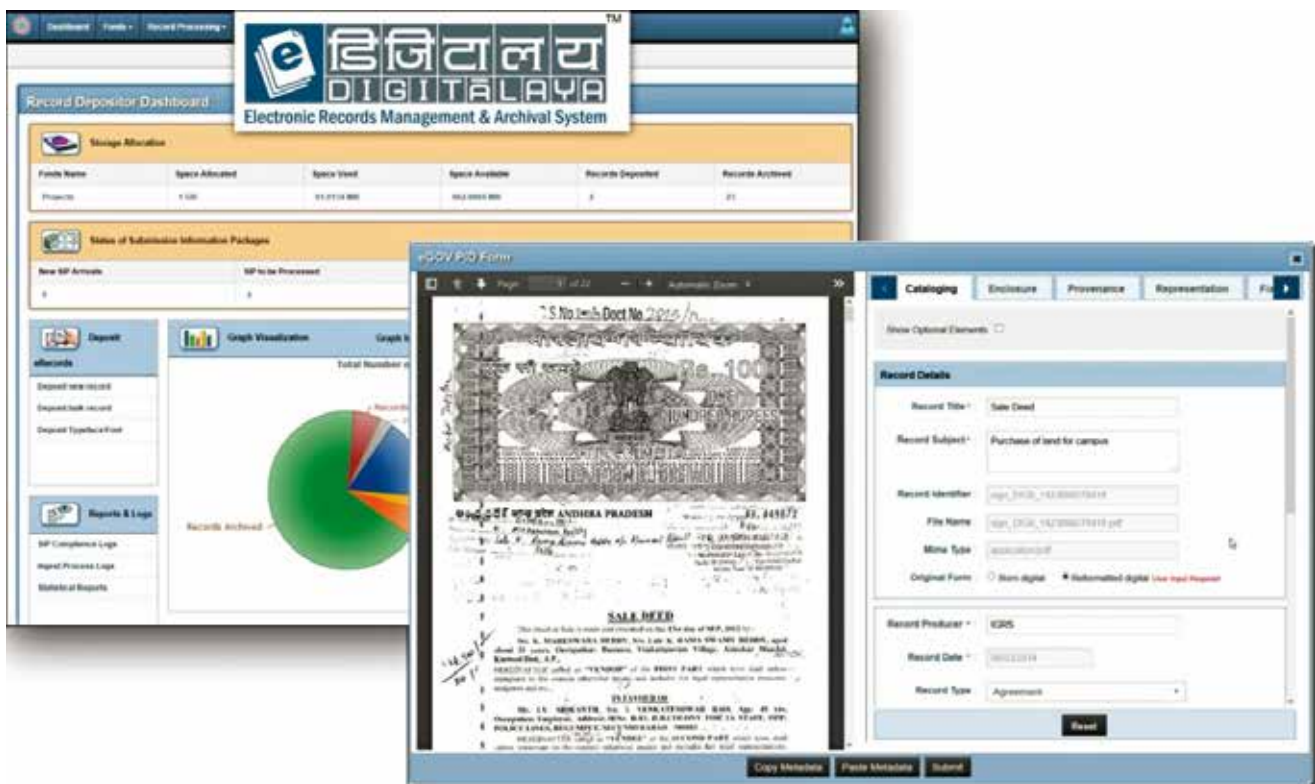
5.3.7 Demonstration Facility of Super Capacitors at C-MET, Thrissur:

Energy storage is a key challenge globally. Supercapacitors are promising energy storage devices, which store electrical charges 100 to 10,000 times more than that of electrolytic capacitors. High usable capacitance, low ESR, longer capacitor life, fast charge-discharge characteristics, light in weight and wide range of operating temperatures, etc. made aerogel supercapacitors more attractive and desirable component for many electronic applications, including automobile sector due to reduced battery size and higher battery life. The market demand for supercapacitors would reach $ 3000 million in 2016 with 15-16% annual growth and demand for applications in automobile and Power (Energy) sectors are ~30%. Since, there is no supercapacitor manufacturer in India, the entire supercapacitor requirement of the country is met by import.

Being an emerging area, a project was successfully completed for developing carbon aero-gel and fabrication of aero-capacitors upto 35 F capacitance at C-MET, Thrissur, which was appreciated by end-users, like M/s Chadha Electronics. Pune, Tata etc. A pilot-scale demonstration plant for production of aerogel supercapacitor has therefore undertaken for the first time in the country to facilitate the transfer of technology for commercialization. The pilot plant has been co-funded by Department of Science & Technology has been initiated at C-MET, Thrissur alongwith M/s Keltron Component Complex Ltd. (KCCL). The project aims at development of process technology for preparation of carbon aerogel

in 2-3 kg level batches, for fabrication of carbon aerogel electrodes of 10-15 m long for use as supercapacitor electrodes of 0.47-50F in fairly large nos. (2000-3000 pcs) and demonstration of technology in pilot scale (2-3 kg/ level batches) production and aerogel supercapacitors of 10F/50 F with the help of collaborative industry.

Development of the Aero-gel Super-capacitor for Electronics Application, C-MET, Thrissur

5.4 Exploratory Blue Sky Research

5.4.1 Bio Technology

With increasing ability to monitor neuronal activity using nonintrusive approaches, of late, there has been significant interest in driving machines using Brain Machine Interfaces (BMI). Brain–machine interfaces are being developed to assist paralyzed patients by enabling them to operate machines with recordings of their own neural activity. One-dimensional cursor trajectory control has been accomplished using spike activity recorded from a paralyzed human. These recordings

have been made largely, but not exclusively, from the motor cortex, a part of the brain that normally encodes parameters of limb movements. A 3DOF Manipulator with interchangeable end effector is being designed that can execute a subset of hand motions specializing in desk work and regular pick and place.
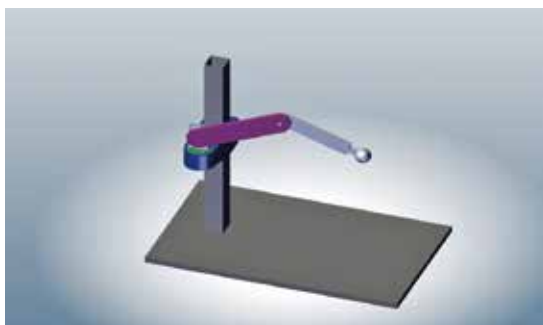
3DOF articulated arm (first design iteration)

5.4.2   Reseach on secured Cyberspace

Cyber Security R&D is aimed at development / enhancement of skills and expertise in areas of cyber security by facilitating basic research, technology demonstration and proof-of-concept and R&D test bed projects. Research and development is carried out in the thrust areas of cyber security including (a) Cryptography and cryptanalysis, (b) Network & System Security, (c) Monitoring & Forensics and (d) Vulnerability Remediation & Assurance through sponsored projects at recognized R&D organisations. A Working Group constituted with experts from Govt., academic / R&D and user organizations provides advisory support for implementation of cyber security R&D.

During the year 2015-16, thirteen new projects have been initiated in the areas of: (a) Person identification system (i) using excitation source information of speech production and (ii) matching near- infrared facial images to visible light images, (b) Defence against attacks in virtualization and hypervisor layers of Cloud Computing Infrastructure, (c) Defence against collaborative attacks in peer-to-peer networks, (d) Detection of Malware in Embedded Systems, (e) Authenticated encryption schemes for light weight applications, (f) Security testing and validation Methodologies for Cryptographic Modules, (g) network security situational awareness and (h) capacity development in mobile forensics investigation.

Efforts in the on-going projects have resulted in the development of certain indigenous security solutions which are deployed / being deployed at user organisations. These included: (i) Pilot system developed to analyse online content of multiple social media sites to gather intelligence has been enhanced with additional features and installed at various user organizations. More than 100 officers from user agencies have been trained on using the system, (ii) Mobile Device Security Solution developed with User space and Kernel space components for Android platform as well as Android based application analyser have been field tested, (iii) A Working prototype system of network situational awareness platform (using DNS, BGP and Net flow) for detection of malicious hosts, Botnets and Phishing schemes for early warning has been field tested and deployed at the user agencies, (iv) A Prototype system for detection of XML based injection vulnerabilities in web applications has been developed and tested with vulnerable applications, (v) A working prototype of face recognition system to handle a large data base of facial images has been developed and tested for one lakh facial images. The field testing of the system by user agencies is in progress, (vi) Information security assurance framework with assessment aids for E-governance projects is under implementation and testing at pilot sites, (vii) A prototype system consisting of sub-systems for (a) Securing data aggregation and (b) Code attestation based intrusion detection for wireless sensor networks has been developed, (viii) Algorithms were developed for an integrated Crypto System that can offer services of Key exchange, Confidentiality, Data integrity verification and authentication based on a single Cryptographic primitive of Elliptic point multiplication unit and the implementation of the same is in progress, (ix) Advance version of Cyber Forensic tools developed have been provided to various user agencies for their use and necessary training on the use of the tools has also been provided to these user agencies. A number of training programme have also been organized in the area of Cyber Forensics to various user agencies and (x) A prototype system has been developed with P2P traffic classifier, P2P bot-traffic detector and firewall modules to identify malicious traffic and testing of the system is in progress.

Efforts / activities in North East

Efforts were made to continue and strengthen the cyber security activities in the North East region. The efforts were towards strengthening the R&D capability building and training and awareness creation activities.

Activities in the on-going R&D projects have progressed. Towards developing multi-modal broadcast analytic system, sub-systems for video analysis, speech processing and text mining have been developed and testing of individual sub-systems is in progress. A prototype of multi level person authentication system involving voice password, text dependent and text independent modules has been developed and it is under testing. Algorithms have been developed for network traffic classification based approach for Botnet detection. A test bed for large scale network emulation has been set up. The algorithms developed have been validated using the datasets generated using the test bed.

Proposed efforts during 2016-17

The R&D activities in the program will be carried forward during 2016-17 to promote research and development of indigenous cyber security solutions, proof of concepts and prototypes and skilled manpower in the thrust areas of cyber security with special focus on mobile device security, cloud security and cloud forensics, intelligent traffic analysis, predictive intelligence based on Big Data Analytics, malware detection and advanced cyber forensics.

5.4.3 Language computing

Windows Smart Input Panel with 80% word level accuracy of based on Online Handwriting Recognition System for 5 Indian languages Hindi, Tamil, Malayalam/ Assamese, Bengali has been developed. This has also been ported on Android platform for Hindi and Tamil.

5.5   Societal Reach R&D

5.5.1 Medical Tools, Equipments & Software

(i)   **Design and Development of Magnetic Resonance Imaging (MRI) System for Medical Imaging**- The objective of the proposed project is to design, develop and test an indigenous 1.5 Tesla MRI System for medical imaging. The System Requirement Specifications have been finalised by CDAC. The mechanical design of patient couch has been completed by SAMEER and design of the other modules is in progress.

(ii) **High energy linear accelerator (LINAC)**: The objective is to design & develop a 30MeV energy electron linear accelerator (LINAC) and about 5-10kW beam power. It will be sufficient to generate Molybdenum-99 (Mo-99) which is used to elute radio isotope Technetium-99 (Tc-99m). Such high energy Linac systems have various other applications. The Linac can be used to produce high flux neutrons via (, n) reaction. This neutron source can be used for neutron radiography in space applications and medical applications. SAMEER will design & develop a technology for 30MeV linear accelerator with beam power of about 5-10kW which will produce Tc-99m and clinically assess novel Tc-99m radio labelled analogues which could be available for all patients in India. The project was recently initiated and the procurement of software, training etc has been initiated.

(iii) **Computer Aided Detection System for Mammograms** is being developed jointly by CDAC Trivandrum, Regional Cancer Centre (RCC) Trivandrum and Calcutta University. The system will assist the radiologist in screening of Breast Cancer from mammogram images. The prototype of the system has been evaluated in over 500 patients.

(iv) **Diabetic Retinopathy Identification Software for Timely Intervention** is being developed jointly by CDAC Trivandrum and Regional Institute of Ophthalmology, Trivandrum. The system will assist ophthalmologists in early detection and screening of Diabetic Retinopathy, a leading cause of preventable blindness resulting from complications of diabetes. The prototype system has been evaluated in over 350 patients.

(v)   **Biomedical Signal Analyzer for Seizure Prediction –** The objective of the project is to design and develop proof-of-concept software for seizure prediction (detection of preictal region) using offline EEG data recordings. The software has been developed for seizure prediction using intracranial EEG data which is capable of patient specific automatic learning to differentiate preictal and interictal patterns of brain wave synchronization. The system has been tested with data from 36 patients and has achieved an overall sensitivity of 95.6 percent.

(vi) **Leukoanalyser** – The project aims to design and develop an automated tool, Leukoanalyzer, for minimal residual disease estimation (MRD) in B-Lineage acute lymphoblastic leukaemia (ALL), a type of blood cancer, using image processing

techniques. The developed system will make the technology of MRD monitoring/detection in acute leukemia easily available, cost effective and faster.

(vii) **Diabetes Monitoring System**: Diabetes is a major Indian health care issue and systems for monitoring indicators other than blood glucose levels are very expensive. Towards this, a low-cost hand-held Diabetes Monitoring System has been developed at CEN IISc. This device can perform Glucose, HbA1c, and Glycated Albumin tests for efficient glycemic control and also various tests for malnutrition and liver disease as well as tests for diabetic nephropathy. The technology has a comprehensive IP portfolio (7 Indian patents, 1 issued US patent and 5 more international patents filed

The technology is being developed into a product by PathShodh Healthcare Pvt. Ltd., a medical device research and development company incubated at IISc. The pre-clinical validation of the device is already completed with blood and urine samples. After a comprehensive clinical validation, the product will be launched in the market during the third/fourth quarter of 2016.

- High precision, reliable and fast response nano NTC powder based chip-in-glass thermal sensors developed under EMDP program has been used to to develop a thermal sensor based monitoring system for the Early Detection and Screening of Breast Cancer.

(viii) **Development of Packaged Fiber Laser Modules for making stents and marking plastic balloons as well as orthopedic parts:**

Fiber laser based systems are replacing all kinds of conventional laser based devices both for industrial and medical applications. Demand is also growing in India significantly. However, the country is totally dependent on imported laser systems procured at high cost. Moreover, the lasers with desired specification are often not available. Import of fiber lasers, with more than 50W CW output, is restricted due to strategic reasons.

A project was initiated to develop Fiber Laser Modules for making stents and marking plastic balloons as well as orthopedic parts at Central Glass & Ceramic Research Institute (CGCRI), Kolkata where end-user industry already took interest for possible rolling out of this technology. Technology developed under the project would result in significant cost reduction of the laser system. It will open up business opportunities and generate employment in several other sectors, such as, diamond processing, solar cell scribing, microelectronic devices, printing electronic circuit board etc.

(ix) **Development of an Object Tracking System for Environment Sensitive Items in Transit (SOTS)**

The project titled "Design and Development of an Object Tracking System for Environment Sensitive Item in Transits" (Radio-frequency identification (RFID) based applications-blood sample tracking) designed and developed by CDAC Noida has been successfully completed with Transfer of technology to ITI Limited, Raebareli.

Under the project , an ultra-low power of 50 micro-watt and size of 20 x 64 x 6 mm3 data logger was developed consisting of Temperature Sensor, memory and Wireless link with visual indicators by which the thermal history of the Vaccine, Blood, Medicines, Perishable items, Photo Sensitive items etc may be monitored, and subsequent fitness for use of the tracked material may be quickly ascertained in reference of real time and position stamping. This product is a single, cost effective, generic, Time – Temperature Wireless Tag which can be configured through high speed USB to mimic the stability characteristics of nearly any material of interest.

The end application varies from Hospitals for tracking of Blood Bags and temperature sensitive medicines, Cold chains for tracking of food item, Universal Immunization program.

Figure: Temperature Data Logger

The following new projects have been initiated during the current year:

(i) **Design & Development of Indigenous Colour Doppler Ultrasound Scanner with centralised PNDT database compliance:** The project aims to design and develop indigenous Color Doppler Ultrasound Scanner Prototype with Pre Natal Diagnostic Techniques (PNDT) Act compliance. Ultrasound Imaging is a prominent technology among all patient diagnostic techniques. The advantage of Ultrasound is that it uses non-ionized radiations and thus has fewer side effects. Other advantages include minimal patient preparation and painless diagnosis. This modality is also easier to use than regular radiography.

(ii) **Studies on detection of cancer, processing infrared images and developing appropriate Instrumentation system for initial deployment in N.E. States:** The project aims to carry out study and research on cancer-detection system based on infra-red image processing for oral & breast cancer. It will create data-collection centre and test-bed for validation of results in a Cancer Hospital at North East. The project proposes to develop one type of cancer detection/screening system using Infrared Imager. The project envisages using thermal imaging based integrated methodology solution towards a low-cost, non-invasive technique for early detection of oral and breast cancer.

(iii) **Personal Health Record System:** The Department has initiated a project on the development of Personal Health Record (PHR) System with a facility to exchange information with EMR/EHR systems. A PHR is maintained by the patient and contains all the patient health related information including diagnostic reports, prescriptions, immunization details, allergies, medical history, medicines to be taken, schedule of visits to doctors, results of routine tests like sugar, BP, etc.

The system is being developed with an interface to a widely used open-source EMR and clinical practice management system, openEMR which is being customized to meet the local requirements.

A prototype system would be made available to the public for feedback by 2016. The system would be made available as open source software hosted on cloud to bring down the cost of implementation of EMR systems substantially.

(iv) **Technology Development for Early Diagnosis of Alzheimer's Disease from Visuospatial Perception Profiling Using Functional Magnetic Resonance Imaging:** To develop a novel technology for early diagnosis of AD that is able to determine AD onset and progression through fMRI imaging based tracking of specific functional alterations of brain networks in AD.

5.5.2 Agriculture

1. **Automatic Speech Recognition (ASR) system** for Agricultural Commodity prices for 6 Indian Languages developed namely Hindi, Bengali , Assamese, Tamil, Telugu and Marathi have been developed. The system acts as voice interface for NIC Agmarknet portal (http://www.agmarknet.nic.in) and citizens can access real-time agricultural commodity prices through Mobile / Landline telephone. Pilot deployment of the ASR systems in collaboration with Ministry of Agriculture is being initiated for 2 States Tamil Nadu and Maharashtra for Tamil and Marathi languages.

2. **Application of Electronics for Agriculture & Environment**

   The collaborative project e-AGRIEN addressing to the multi-disciplinary fields of Agri-Electronics has resulted in successful development and deployment of eight product/technologies. Two technologies namely, Pebrine-O-Scope for sericulture has been transferred to Tasar Development Foundation and Handheld Electronic Nose has been transferred to Nagarjuna Finance Limited for commercialization. This project has been successfully completed and formally closed.

3. **Green Technology based Electronic Milk Analyser**

   For measurement of fat, solid non-fats, protein, lactose, water and density in raw milk, the development of prototypes of an affordable portable instrument on Ultrasonic Milk Analyser and Infra Red (IR) based technologies have been developed and tested at laboratory. The system may find application at village level milk collection centres. Affordable cost, measurement without chemicals, improved response are the features of this development.

Milk analyser

4. **Design & Development of continuous Flow Hydroponic System**

   Hydroponic farming has the potential to increase agricultural production in the areas of infertile soil as it does not require soil. Design and development of an Automatic continuous flow Hydroponics system with continuous monitoring and programmable control of pH and EC of solution along with Micro and Macro nutrient dispensing system is in progress. Hardware has been designed, developed and tested. Field trials of the system are being carried out at Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh.

5. **Soil moisture sensor**

Versatile soil moisture sensor and system has been developed at CEN IIT Bombay with wireless sensor network for use in agricultural open fields. The sensor can measure Soil moisture, Soil temperature, and Relative humidity with good accuracy. The network may have a few to more than 10 nodes as per the requirements and area of the farm. Nodes are powered by a small solar panel for each node. Each node measures soil moisture, soil temperature, ambient temperature and humidity, and can be easily used for other soil parameters. The measured data may be sent to a control room for automatic control of irrigation, or to the farmer on mobile phone, or to a base station for more centralized operation. The work is being carried out in collaboration with agricultural scientists. The product is currently undergoing field testing at various locations. A new Start–up company named as SoilSenS Technologies Pvt. Ltd. is being incubated at IIT-Bombay to commercialize the product.
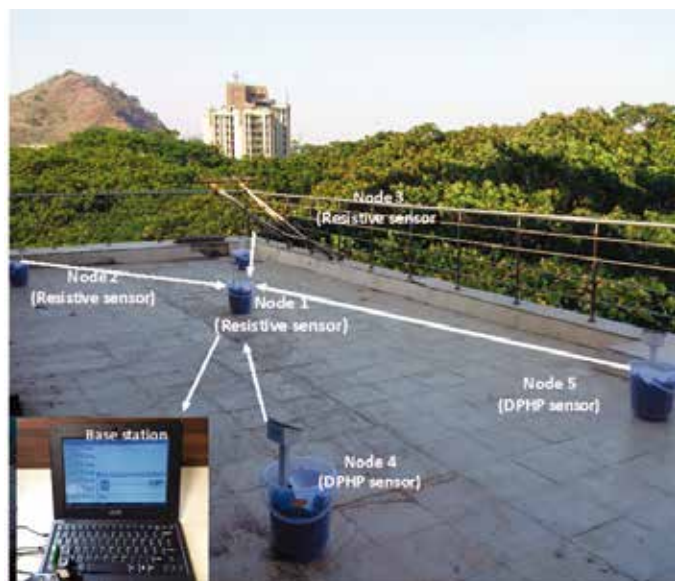
6. Envirobat Wireless Sensor for Air Quality

Pollution and pollution monitoring are big issues that confront India today.

Development of air quality monitoring gas sensor device has been undertaken at CEN, IISc Bangalore with four gas sensor array for measuring CO, CO_2, SO_2, NO_2 in the surrounding environment. The device also contains integrated temperature and humidity sensors and optional micro SD card for data logging or wireless data communication interface for remote monitoring.

5.5.3   E- waste Recycling:

• **Pilot Demonstration of E-waste Recycling Facility at E-Parisara, Bangalore :**

The environmental hazards of e-waste recycling are mainly due to the unscientific incineration and dangerous metal recovery processes being practiced by the informal sector. To address the issue of e-waste, recovery of precious metals from PCB had been successfully achieved through pyrolysis process by Centre for Materials for Electronics Technology (C-MET), Hyderabad and M/s E-Parisaraa Pvt. Ltd., Bangalore. For further scaling-up, second phase of the project is being implemented to set-up a demonstration plant at Bangalore. This project is co-funded by Government of Karnataka.

Proposed Process Flow Chart

Collection of PCBs → Depopulation → Calcination → Smelting → Electro Refining for Cu → Solvent Extraction/ Hydrometallurgical techniques → Precious metals (Anode Sludge)
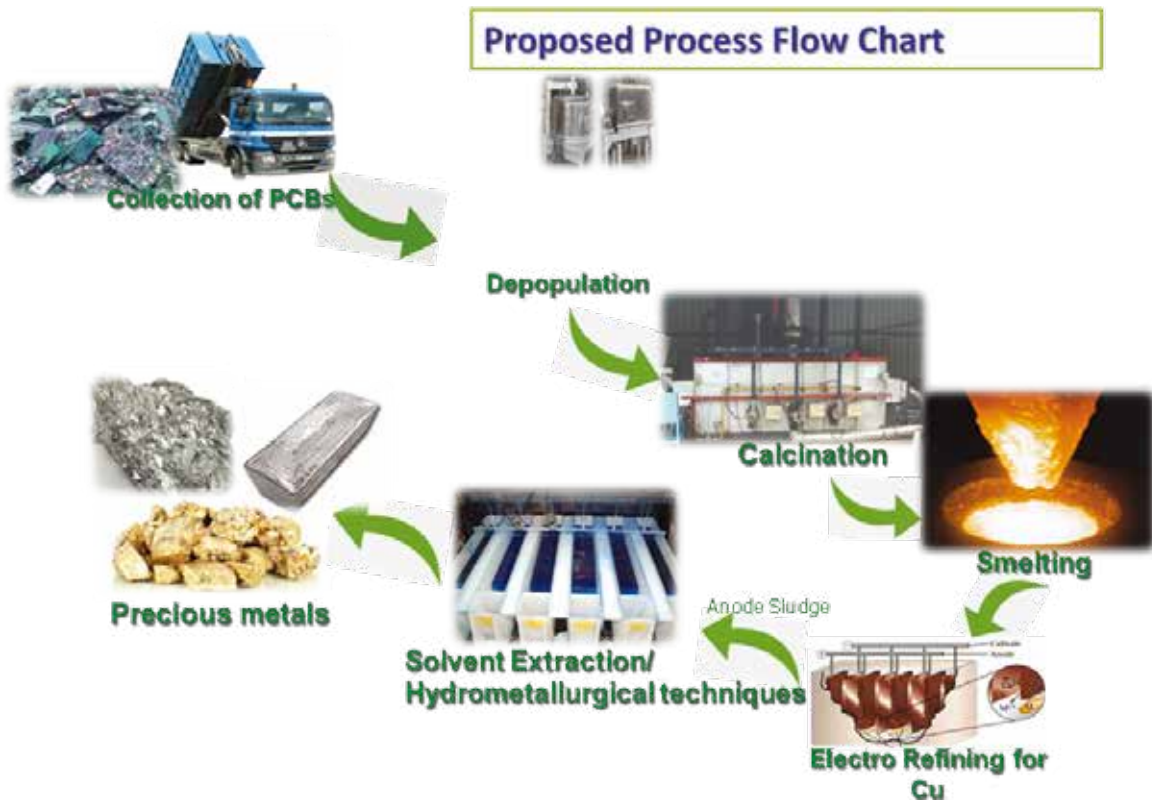
Demonstration of the prototype for PCBs recycling facility at C-MET, Hyderabad and E-Parisara, Bangalore

- **Electronic waste Awareness programme:** Lack of awareness amongst the citizens about the ill-effect of e-waste recycling in informal sector is one of the serious challenge to our society. An "Awareness Programme on Environmental Hazards of Electronic Waste" has been initiated since March 2015 to create awareness among the public about the hazards of e-waste recycling by the unorganized sector and to educate them about alternate methods of disposing their e-waste. The programme would stress the need for adopting environment friendly e-waste recycling practices. Short modules and films would be created for spreading general awareness about the hazards of the recycling methods being used by the unorganized sector vis-à-vis best practices available for environmentally friendly recycling. The general public would be encouraged to participate in "Swachh Digital Bharat" by giving their e-waste to the authorized recyclers only. During the entire project duration of 5 years, a city each in the 10 identified States would be covered in pilot stage. The stakeholders involved are schools/ Colleges/ Residents' Welfare Associations/ Bulk Consumers/ Regulatory Bodies, media engagement etc. Suitable course content for various stakeholders, organising awareness programme and inventory study of quantum of e-waste are broad agenda. So far, one project on content development and two projects on inventory study for the four States Uttar Pradesh, Jharkhand, West Bengal and Odisha have been initiated. Another project to organize workshop, in proposed ten States, would be initiated to disseminate the developed contents. Further, two more projects to create awareness for government officials from State Government on E-waste and Restriction of Hazardous Waste are under process for final approval.

- **Established Restriction of Hazardous Substances – RoHS Testing facility in India:** Development of modern electronic gadgets such as cell phone, iPOD, Palm Top/LapTop computers, etc. results in the high use of different hazardous substance. These hazardous substances used in various electronic equipments are very harmful for environment as well as for human body. European Union (EU) had restricted use of hazardous substances (RoHS) like Cd, Pb, Cr^{6+}, Hg and poly brominated compounds, and had banned importing these products in

EU countries since 2006. In India, in the E-Waste (Management and Handling) Rules, 2011, has also banned products containing similar materials w.e.f. May 1, 2014. DeitY had thus created world class, first government testing laboratory facilities for hazardous substances presence in electronics and electrical equipments at C-MET Hyderabad and to issuing internationally valid certificate as per ISO 17025. More RoHS Testing facility would be required in other part of country for helping manufacturers to comply the E-Waste Rule.

RoHS Chemical Testing and Certification laboratory at C-MET, Hyderabad

5.5.4 Rehabilitation of Divyang

(i) **Tactile Graphics:** With the objective to create national expertise in tactile graphics production, Department supported an R&D project on Tactile graphics at IIT Delhi for providing assistance to visually impaired students. Tactile graphics or maps are images that use raised surfaces to convey non-textual information through touch. They play an integral role in helping visually impaired people understand content which cannot be completely understood merely through use of text/Braille like maps, diagrams, equations etc. Under the project Grade-IX NCERT textbook for mathematics for visually impaired persons has been prepared in tactile form.

(ii) **Development of Digital Programmable Hearing Aid (DPHA):** C-DAC has designed and fabricated an ASIC (Application Specific Integrated Circuit) named *NAADA*. Using this ASIC, CDAC developed a Digital Programmable Hearing Aid (DPHA) module named *TARANG* at an affordable cost. *TARANG* is available as Body-Worn (BW) and Behind-the-Ear (BTE) models. TARANG can be customized and programmed/reprogrammed using SHRUTHI software also developed by C-DAC. It covers a wide range of hearing profiles for patients with mild, moderate and profound hearing loss. Extensive field trials were carried out at major National Institutes like All India Institute of Medical Science New Delhi, Ali Yavar Jung National Institute for The Hearing Handicapped Mumbai etc. More than 2500 DHPAs have been deployed. CDAC is in the process of transferring technology to M/s. Best Hearing Solutions, Delhi and M/s. Keltron, Thiruvananthapuram.

Body worn Type DPHA   Behind The Ear (BTE) Type   ASIC NAADA

(iii) Design of an Embedded System of low cost Haptic Rendering of Emotion Expressions to the blind: Efforts are on to develop a system that enables real-time analysis, tagging, and inference of cognitive-affective mental states through recognition of emotion expressions from non-invasive techniques like facial video. Facial Expression Softwares are under development.

(iv) **Indic OCR for Braille Book production in Tamil:** Optical Character Recognition Software (OCR) for Tamil with Braille interface facilitates printed text-books into conversion of Braille Books. The system has been installed at RCMCT Worth Trust Rehabilitation Centre, Chennai and they have been running it as a service for blind students. Worth Trust uses the OCR to recognize and convert printed text

to Unicode first and then to Braille code and prints them on a Braille printer and gives the Braille book to the requesting blind person. So far, more than 500 Tamil books (school, college, story and general) have been converted by OCR and delivered as Braille books to hundreds of blind students in Tamil Nadu. This effort received recognition and won Manthan Award in the year 2014.

5.5.5 Education

(i) e-Basta Portal: School books to e-Books:

e-Basta Portal has been developed for making availability of school books from various publishers to schools in e-book format. This enables (i) publishers to upload the electronic content with relevant data, (ii) schools to search and collate e-content into e-Basta and (iii) students to download e-Basta contents (free as well as paid content) for use through an App on their tablet / PC. The e-Basta portal is operational at http://www.ebasta.in. Payment for paid content is made operational through http://paygov.in. Currently over 1000 books have been published on the portal by CBSE, State Boards and Private Publishers. Around 3000 books' information has been provided for the e-Basta portal, which is in various stages of getting uploaded/published on portal. 15 private publishers have registered on the portal so far. eBasta App is available for download from Google Play Store and Mobile Seva App store. Google Analytics has been incorporated in eBasta Portal as well as eBasta App.

(ii) Computer enabled Continuous and Comprehensive Evaluation (CCE) using Adaptive Learning Technologies

In order to manage the process of continuous and comprehensive evaluation (CCE) prescribed by CBSE, CDAC Mumbai and Amrita University have developed a web-based system for use by CBSE students, teachers and administrators. The system has two major components – (a) Comprehensive data capture mechanism for school specific and assessment specific information and (b) a rich visualization and reporting module providing a variety of view of the data, for the teachers, for the students and for the school administration. In addition, the project also created a number of teaching resources and a question bank. This system has been pilot-deployed in about 25 CBSE schools. Currently under the Digital India initiative, the system is being extended to support various State Boards also, and is being targeted for deployment in various schools.

5.5.6 Societal Misc.

Development and Deployment of an Electronic Personal Safety System (ePSS) at Police Control Room, Jaipur

The ePSS system has been developed to provide quick help to a person in distress. The development and deployment of Devices and back end system for ePSS integrated with existing Dial 100 system has been completed and installed at Jaipur Police Control Room. The system also includes Mobile Display Terminals with requisite software installed in PCR vans. Extensive field trials and user training of the system has been carried out. Subsequent to successful implementation of the ePSS at Jaipur, the same model is being adopted by other stake holders.

Transportation

Enhanced, user-friendly Advanced Traveller Information System (ATIS)

The technology of Advanced Travelers' Information System (ATIS) for Indian cities was developed and deployed in a 16 km corridor around IIT-Madras. The technology suggests a less congested route to the commuter through variable message signboards erected at the strategic locations in the corridor. This real time information is also available on the website. The technology is being enhanced and finally it will be handed over to user agency, the Chennai Traffic Police for their regular operation. This is a generic technology which could be replicated in other cities with necessary customization. Auto-diagnosis tools have been developed to detect route deviation; algorithms have been developed to detect the occurrence of an extreme event using Camera data. Feasibility study of communication link between IIT Madras and Police head quarter has been completed.

Tools for designing and weaving of Banarasi Sarees

The Department has initiated a project to develop low-cost ICT-based tool to help the artisans in designing and weaving of Banarasi Sarees. The tool being developed will not only help in creating new innovative designs but will also increase the productivity. Under this project, an open source software tool is being developed which takes into account the specific requirements of the Banarasi Saree weaving and provides a user-friendly graphical-interface with icons familiar to the local artisans.

A prototype system would be available by December, 2016. Though the tool is being developed for the artisans engaged in the weaving of Banarasi Sarees, it can be customized, later on, for the artisans involved in making other types of fabrics in the country. The tool is being developed by Media Lab Asia with the help of the experts in weaving and computer graphics.

Software Tools –Multilingual Basic Information Processing Kit (BIPK)

Free language CDs containing various software tools like Libre Office, Open Type Fonts, Keyboard Drivers, Firefox Web Browser, E-mailing Client, etc have been released for public use for all 22 constitutionally recognized Indian languages to facilitate human machine interaction in Indian languages.

These software tools and fonts are useful for Office productivity applications and e-content development. These software tools and CDs are being used by different PSUs, Banks, Educational Institutions, etc. The new CDs are compatible with win 8.1 and Ubuntu 11.04. As on date about 13 lakh CDs have been distributed and there has been about 1.4 crore downloads. These software tools can also be downloaded free from http://www.ildc.in.

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Internet Governance and Secured Cyber Space

6.1 Internet Governance

Internet Governance, broadly defined, is the development and application by Governments, the private sector and civil society, in their respective roles, of shared principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet. It covers activities such as development and coordination of technical standards, operation of critical infrastructure and public policy issues.

Conceptually Internet Governance includes following layers
– Physical Infrastructure layer
– Code or Logical layer
– Content layer
– Security
– Internet Governance involves Internet Protocol Addressing (IP Addressing), Domain Name System (DNS), Routing, Technical Innovations, Standardization, Security, Public Policy, Privacy,

Legal Issues, Cyber Norms, Intellectual Property and taxation

6.1.1 Achievements

Some of the significant achievements of DeitY includes representation of India's Public Policy Concerns on global platform, Awareness on Internet Governance, Encouraging greater participation in Internet Engineering Task Force (IETF) Working groups and Engagement with Internet Society (ISOC), Promotion of Multi stakeholder model of Internet Governance within India etc.

6.1.1.1 Engagement in International Forums/Meetings

I. **IGF -** The Internet Governance Forum (IGF) serves to bring people together from various stakeholder groups as equals, in discussions on public policy issues relating to the Internet. India's concerns on the issues of public policy on Internet and its Governance is appropriately voiced in the meetings of the IGF through regular participation, holding workshops and Dynamic Coalition meetings and

multi-lateral and bi-lateral meetings. Recently, officials from DeitY and other concerned department participated in the 10th IGF annual meeting held on the theme, "Evolution of Internet Governance: Empowering Sustainable Development", in João Pessoa, Brazil, on 10 to 13 November 2015.

II. **WSIS+10 UNGA High Level Meeting:** The General Assembly High-level Meeting on the overall review of the implementation of the outcomes of the World Summit on the Information Society took place on 15-16 December 2015 at the UN Headquarters in New York. This high-level meeting provided an opportunity for in-depth discussions on important issues in the implementation of the WSIS outcomes, including the progress, gaps and challenges, as well as areas for future actions. India also participated through a delegation headed by Secretary, DeitY. DeitY has prepared initial comments with the inputs/ views from multi stakeholder consultation group on the Non paper and Zero Draft paper published during WSIS+10 review process.

III. **Engagement with ICANN:** DeitY is closely monitoring all the activity of ICANN (Internet Corporation for Assigned Names and Numbers) and participating through GAC (Governmental Advisory Committee) and other public engagement. The GAC's key role is to provide advice to ICANN on issues of public policy and especially where there may be an interaction between ICANN's activities or policies and national laws or international agreements. DeitY is also providing views/comments on IANA Stewardship transition and Enhancing ICANN Accountability tracks. Submission of India to various international forums/discussions can be accessed at **www. indiaig.in**

IV. **Multi stakeholder Consultations:** India has supported for multi-stakeholder model of Internet Governance Mechanisms, which would involve all stakeholders and help to preserve the character of the Internet as a unified, dynamic engine for innovation, and which encourage equity and inclusion. A series of Multi stakeholder consultations/ roundtable meetings are being organized by Department of Electronics & Information Technology in collaboration with National Internet Exchange of India. There have been 9 Multi stakeholder consultation meetings till December 2015. Topics of the consultation include technical and policy related issues with respect to Internet Governance like WHOIS related issues, The New Generic Top Level Domain Programme – Opportunities and Challenges for India , IANA Stewardship and CCWG Accountability, WSIS+10 Review etc.

6.1.1.2 The Research, Development and awareness agenda that have been undertaken in this area

I. **Capacity Development Program for Increased India's Participation in IETE by Internet Society Kolkata Chapter :**

The objective of the capacity development is to expose and encourage participation in the Internet Engineering Task Force (IETF) process across India and to create connections between new and established open Internet standards developers. Awareness camps & seminars are being conducted to provide awareness and opportunities for fellows to participate in the global Internet ecosystem and also to interact and engage with the broader Internet engineering community. The link http://www.iicb.org/ provides the details of the activities.

II. **Wireless Internet Protocol enabled time slotted and channel hopping Senor Network (WIPSeN) jointly by C-DAC, Thiruvananthapuram and IISc Bangalore:**

The Internet Engineering Task Force (IETF) has set up the 6TiSCH group to focus on enabling IPv6 over the Time Slotted Channel Hoping (TSCH) mode of the IEEE 802.15.4e standard. There is immense scope for participating and contributing to the IETF standardization effort for the emerging 6TiSCH architecture which focus real time applications using low power wireless sensor networks, mainly for the industries.

The main activities envisaged in the project are:

• Active participation in the IETF draft proposals in terms of Providing feedback to the 6TiSCH working group discussions through the implementation / experimentation in lab set-up.

• Setting up of a 6TiSCH test bed facility for emulating realistic environments to evaluate the proposed architectures and IETF drafts and developing additional protocol specifications based on the inputs from the IETF WG members, end users comprising

of industry, R&D groups and academic community, evaluate their functionality and performance on the test bed.

- Conducting 6TiSCH workshops to highlight the various activities of the IETF WG and demonstrate the working implementation of related IETF standards to enhance adoption of the same.

III. **An Ecosystem for Active Participation in Internet Standard Organizations implementing by Centre for Development of Advanced Computing (C-DAC), Bangalore:**

The primary objective is to get involved in the process of Internet Standard development by developing internal competencies and propose & contribute to select areas of Internet Security. Create and foster focus groups to work on specific technical issues of interest concerning Internet Standards, propose new standards and contribute to ongoing drafts in areas related to Internet Security, Encouraging direct participation in the meetings of the Internet organisations, Engage with academic community (students and faculty), industry and civil society for their participation and contributions towards the Internet organizations, Scholarships & fellowships for deserving candidates to encourage participation in IETF activities, Prepare for conduction of an IETF or similar such meetings in India in future.

IV. **Internet Research & Policy Hub- Centre for Communication Governance at National Law University, Delhi:**

The Centre for Communication Governance (CCG) aims to direct its research expertise at filling the knowledge gaps in internet policy clusters identified by the 2014 UN Commission on Science and Technology for Development (CSTD) mapping report, with a view to build capacity and inform policymaking among Indian stakeholders. The UNCSTD carried out a mapping and gap analysis of international public policy issues pertaining to the Internet. The mapping document included the following clusters relating to international Internet public policy issues:

a) Infrastructure and standardization cluster

b) Security cluster

c) Human Rights cluster

d) Legal cluster

e) Economic cluster

f) Development cluster

g) Sociocultural cluster.

In this regard, policy papers are being prepared on the above as well as on the following:

i. To formulate a draft legislation/regulation for improvement in the operation of Country Code Top Level Domains (ccTLDs) including delegation and re-delegation of ccTLDs to feed into the work of the GAC

ii. Potential uses of new gTLD auction Proceeds

iii. Cybercrime and the international law framework, including recommendations on what the Indian approach could be.

6.2 National Internet Exchange of India (NIXI)

NIXI is a not for profit organization set up under section 25 of the Companies Act, 1956 (now section 8 under Companies Act, 2013) for peering of ISPs among themselves and routing the domestic traffic within the country. With seed funding from Department of Electronics and Information Technology. NIXI is performing the following three activities.

- Internet Exchanges
- .IN Registry and Internationalized Domain Names (IDNs)
- National Internet Registry (NIR).

Internet Exchanges

Seven Internet Exchange Nodes are functional at Delhi (Noida), Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad and Ahmedabad. The Internet Exchange nodes have been successful in ensuring peering of Internet Service Providers (ISPs) among themselves for the purpose of routing the domestic traffic within the country, instead of taking abroad, thereby resulting in better quality of service (reduced latency) and reduced bandwidth charges for ISPs by saving on International Bandwidth. The maximum volume of Internet traffic being handled by NIXI at present is 40Gbps.

All functional NIXI nodes are IPv6 ready. NIXI also undertakes training and workshop for Network managers and other Technical engineers in co-operation with Asia Pacific Network Information Centre (APNIC).

IN Registry and Internationalized Domain Names (IDNs)

Since 2005, NIXI also manages the .IN Registry (www.registry.in). At present, 110 Registrars have been accredited to offer .IN domain Name registration worldwide to customers. This has helped proliferation of web hosting in the country and promotion of Indian language content on the Internet. Over 18 Lakh .IN Domain names have been registered till 7th January 2016.

IDN's in Hindi, Bodo, Dogri, Konkani, Maithili, Marathi, Nepali Sindhi, Bengali, Gujarati, Manipuri, Punjabi, Tamil, Telugu and Urdu languages were launched during the year 2014-15 and over 6000 IDNs domain names have been registered till date. NIXI has sought delegation of all remaining languages (Assamese, Kannada, Malayalam, Oriya, Sanskrit, Santali in Devanagari Script and Kashmiri & Sindhi in Perso-Arabic Script) from ICANN.

National Internet Registry (NIR)

Since March, 2012 NIXI is also running the National Internet Registry (NIR) for India named as Indian Registry for Internet Names and Numbers (IRINN). IRINN is responsible for allocation of Internet Protocol (IP) address and Autonomous Numbers (AS) within the country. As on January 2016 over 1400 affiliates have joined IRINN. Out of 1400 Affiliates, 218 affiliates have taken IPv6 as well as IPv4.

6.3 Cyber Laws

Comprehensive legal framework in terms of IT Act 2000 and its amendments provides for

- Collection and sharing of information related to cyber incidents (sections 69B & 70B) for effective proactive/reactive actions by CERT-In and investigative actions by law enforcement agencies

- Prescription and implementation of cyber security best practices and guidelines to prevent occurrence and recurrence of cyber security incidents (section 43A &70 B)

- Protection of critical information infrastructure (section 70 A)

- Effective deterrence provisions (sections 43, 43A, 66, 66F & 72A) in terms of compensation and punishment to deal with cyber crime such as cyber terrorism and child pornography, criminal act using computer etc.

6.4 Indian Computer Emergency Response Team (CERT-In)

CERT-In is a functional organisation of Department of Electronics and Information Technology, Ministry of Communications and Information Technology, Government of India. CERT-In has been designated under Section 70B of the Information Technology (Amendment) Act, 2008 to serve as the national agency to perform the following functions in the area of cyber security:

• Collection, analysis and dissemination of information on cyber security incidents

• Forecast and alerts of cyber security incidents

• Emergency measures for handling cyber security incidents

• Coordination of cyber security incident response activities

• Issue guidelines, advisories, vulnerability notes and white papers relating to information security practices, procedures, prevention, response and reporting of cyber incidents

• Such other functions relating to cyber security as may be prescribed.

CERT-In creates awareness on security issues through dissemination of information on its website (http:// www. cert-in.org.in) and operates 24x7 incidence response Help Desk. CERT-In provides Incident Prevention and Response services as well as Security Quality Management Services.

The activities carried out by CERT-In during 2015-16 comprised of the following:

Cyber Security Incident – Early warning and Response

Activities	Number
Cyber Security Incidents handled	38279
Cyber Security Alerts issued	10
Advisories Published	58
Vulnerability Notes Published	245
Trainings Organised	15
Indian Website Defacements tracked	22254
Open Proxy Servers tracked	1420
Bot Infected Systems tracked	8618241

Up-gradation of the technical infrastructure

The existing infrastructure at CERT-In has been upgraded and augmented. Bandwidth from different gateways has been deployed in order to achieve optimum uptime for the CERT-In operations. Additional security equipment has been deployed to enhance the capability to handle distributed denial of service attacks on CERT-in operational network. Security infrastructure has been augmented for thwarting intrusion attempts at critical applications running at CERT-In. Reverse proxy has been deployed for protection of resources at the application layer. Automated replication of web server, mail server and incident tracking data from the main site to disaster recovery site has been configured. Disaster recovery infrastructure has been upgraded with additional link load balancers, dual bandwidth links from different service providers, deployment of an additional Intrusion prevention system and upgradation of the firewall.

Collaboration

Strengthening International cooperation to effectively deal with cyber security issues has been one of the main focus areas of the Government. As such, this aspect is being dealt with by way of security cooperation arrangements in the form of Memorandum of Understanding (MoU) between Indian Computer Emergency Response Team and its overseas counterpart agencies that are willing to work together and share information in a timely manner for preventing cyber crimes and cyber attacks as well as collaborating for providing swift response to such incidents. At present such MoUs have been signed with countries such as USA, Japan, South Korea, Australia, Malaysia, and Singapore.

CERT-In is regularly coordinating with leading service providers and product vendors with in and outside the country to obtain advance information on latest cyber threats and attack trends and devise appropriate proactive and prevent measures.

Cyber Security Assurance

Under Cyber Security Assurance Framework, CERT-In has empanelled 57 auditors to carry out information security audit, including the vulnerability assessment and penetration test of the networked infrastructure of government and critical sector organizations. Government and critical sector organizations are

implementing the security best practices in accordance with ISO 27001 standard and as per the advice issued by CERT-In. Services of CERT-In empanelled IT security auditors are being used to verify compliance.

Crisis Management Plan

Government has formulated a Crisis Management Plan (CMP) for countering cyber attacks and cyber terrorism for implementation by all Ministries/Departments of Central Government, State Governments/UTs and their organizational units in critical sectors. In addition, several guideline documents and templates have been published to assist development and implementation of sectoral Crisis Management Plans. Crisis Management Plan (CMP) for countering Cyber-Attacks and Cyber Terrorism is updated periodically on annual basis to take into account changing scenario of cyber threat landscape. The 6th version of CMP is being circulated to all the key Central Government Ministries/Departments and States/UTs. CERT-In/DeitY has been conducting workshops to appraise various organizations under the Central Ministries/States/UTs about the CMP implementation and all necessary assistance is being provided to them with regard to implementation of CMP. Till date, more than 40 CMP enabling workshops have been conducted covering Central Government Ministries/Departments and State Government/UTs.

Cyber Security Drills

The effectiveness of CMP is being regularly tested by way of conducting comprehensive cyber security drills to enable assessment of security preparedness of organizations and their ability to respond and mitigate cyber attacks as outlined in the CMP. These drills have helped tremendously in improving the cyber security posture of the information infrastructure and training of manpower to handle cyber security incidents, besides increasing the cyber security awareness among the key sector organizations. So far 10 such drills have been conducted involving more than 175 organisations in various sectors such as Finance, Telecom, Defence, Transport, Energy, Petroleum & Natural Gas and IT as well as private sector. The last drill was conducted on 28th Jan 2016.

Parallel Test bed facility established at IISc, Bangalore for CERT-In is being used to provide support in conducting cyber security exercises.

An international drill with ASEAN member countries ACID 2015 was conducted in October 2015 focussing on Malware Analysis and incident response.

Security awareness, skill development and training

CERT-In is regularly conducting trainings / workshops to train officials of Government, critical sector, public sector industry, financial & banking sector and ISPs on various contemporary and focused topics of Cyber Security. During 2015-16, CERT-In has conducted 18 trainings (including a separate training programme one each for SC/ST IT officers and women IT officers) on various specialized topics of cyber security. 580 officers including System/Network Administrators, Database Administrators, Application Developers, IT Managers, Chief Information Security Officers (CISOs)/ Chief information officers (CIOs), and IT Security professional have been trained.

As a part of Awareness creation efforts, Cyber Crime Awareness Workshops have been organized at Kerala Police Academy, Thrissur (Kerala) and Biju Patnaik State Police Academy, Bhubaneswar (Orissa) wherein a more than 300 Police Officers attended. The participants were also exposed to the latest tools and technologies currently being used for cybercrime investigation purposes.

Activities to train Police officers have been continued utilizing the Cyber Labs created at Police Headquarters in Mumbai, Pune, Bangalore and Kolkata. More than 6000 Police officers have been trained in Cybercrime investigation with 5-day programmes, 2-day short term courses and 1-day Cyber Crime Awareness Programmes.

A Cyber Lab has been setup at National Law School of India University (NLSIU) Bangalore for training of Judiciary and Law teachers. A Post Graduate Diploma in Cyber Laws & Cyber Forensics has been designed and launched. Training manuals have been prepared for training of Law Enforcement Agencies and Law teachers and training programmes were conducted. More than 200 Law teachers, BAR Council members, Law Enforcement Officers and Judiciary have been trained.

Cyber Forensic Training lab has been setup at National Institute of Technical Teachers Training and Research (NITTTR) Chandigarh for training of technical teachers. More than 1100 technical teachers from various Engineering and Polytechnic colleges have been trained in the area of Cyber Security.

Efforts / activities in North East

During 2015-16, activities to train the judiciary utilizing the Cyber Crime investigation training Labs in the States of Northeast were continued. More than 100 judicial officers in the States of Assam, Manipur, Meghalaya, Tripura, Nagaland, Arunachal Pradesh, Mizoram & Sikkim were trained with regard to Cyber forensics and legal aspects. Infrastructure at these labs has also been upgraded.

Cyber security training and awareness efforts have been progressed in the North Eastern States of Sikkim, Manipur, Nagaland and Tripura by organizing 1-day and 2-day programmes as well as 5-day advanced training course on cyber forensics. More than 7,900 students and staff have been trained in 2-day programmes. More than 240 Government employees and 80 law enforcement officials have attended 1-day programmes. Around 120 school teachers were trained as Master Trainers in 2-day programmes. A 5-day advanced course on Cyber Forensics has been conducted and around 25 police officers attended. A 3-month programme on Cyber Security and Cyber Laws was organized for ST youth and more than 100 ST youth attended.

Cyber Forensics

CERT-In is equipped with cyber forensic and mobile device forensic analysis facility to extract and analyse the data from the digital devices involved in the cyber security incidents and cyber-crimes. CERT-In has imparted training on cyber forensics and mobile device forensics through lectures, demonstrations and hands on practical training sessions during the training workshops, which covers handling, seizing, preservation, imaging and analysis. CERT-In has also provided support to the State police departments and other training institutes in imparting training on investigation of cyber-crimes, cyber security incidents using Cyber Forensic Techniques.

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Skill India: Capacity Building

7.1 Skill India

HRD activities of DeitY are targeted to ensure availability of trained human resources for the manufacturing & service sectors of electronics and IT industry. Initiatives include identifying gaps emerging from the formal sector and planning programmes in non-formal and formal sectors for meeting these gaps. This includes Skill Development in the domain of Electronics & IT and related areas. In the succeeding sections, brief details about various ongoing initiatives including skill development and indicative list of major Schemes/Projects are presented.

The Skill Development activities of the Department are primarily being taken up by its two autonomous societies viz. National Institute of Electronics and Information Technology (NIELIT previously known as DOEACC) and Centre for Development of Advanced Computing (C-DAC). In addition, the various organizations / attached offices under the Department viz. ERNET India, Media Lab Asia, CSC E-Governance Services India Limited, STQC, NIC etc. also engaged in training of various stakeholders in small numbers.

The following schemes/activities for Electronics and ICT sector have been targeted and have been approved/ under formulation:

7.1.1 Post Graduate and Doctorate Level

Scheme to give a thrust to Research in areas of Electronic System Design and Manufacturing (ESDM) and IT/IT Enabled Services (ITES) ["Visvesvaraya PhD Scheme for Electronics and IT"]:

The objective of the above scheme is to generate 1500 PhDs for each of ESDM and IT/ITES sectors over a period of 5 years, in order to promote innovation and development of new products in IT/ITES and ESDM sectors. Out of which 500 PhDs for each of ESDM and IT/ITES sectors over a period of 5 years would have fellowship support and the other 1000 enrolled/registered over the period of the Scheme would receive one time incentive for each of ESDM and IT/ITES sectors to encourage working professionals and non PhD faculty members to pursue PhD in the ESDM or IT/ITES sectors. In addition, 200 Young Faculty Research Fellowships would be provided

to encourage and recognize the eligible Young Faculty involved in research and technology development in the areas of ESDM and IT/ITES to retain as well as attract young faculty in academia.

The duration of scheme would be for five years for the purposes of selecting PhD candidates for support under the scheme. However, the funding would be continued till 9th year for the commitments already made during the scheme period.

Government has approved for implementation of the PhD Scheme at a total estimated cost of ₹ 401 crore (now revised to ₹ 466 cr w.e.f. 01.09.2015) over a period of nine years in February 2014.

The Scheme was launched in the academic-year 2014-15. The total number of support (for PhD candidates) approved is 1086 full-time and 350 part-time [this includes supports approved till 5th meeting of the Academic Committee (AC) for the PhD Scheme held on 16.09.2015]. AC also approved support for 11 Young Faculty Research Fellowships (YFRF) from 6 institutions under the PhD Scheme.

7.1.2 Graduate level

Scheme of Financial Assistance for setting up of Electronics and ICT Academies

The objective of the above scheme is to set up seven (07) Electronics and ICT Academies as a unit in IITs, IIITs, NITs, etc., for faculty/mentor development/up gradation to improve the employability of the graduates/ diploma holders in various streams, through active collaboration of States/UTs with financial assistance from the Central Government. Electronics and ICT Academy would aim to provide specialized training to the faculties of the Engineering, Arts, Commerce & Science colleges, Polytechnics etc, by developing state-of-the-art facilities. The Scheme has been approved with a total outlay of ₹ 147.48 crore over a period of five years. Out of the Seven(07) Academies, Five(05) Academies would be setup in Category 'A' with an annual target to train 4000 faculty and the remaining two(02) Academies would be setup in Category 'B' with an annual target to train 1600 faculty. Each Academy is expected to generate revenue by charging fee and taking up other activities from the second year onwards to meet the remaining cost in a gradual manner and become self-sustainable by the end of fourth year onwards. The scheme would lead to enhancement of the skills of the students in the Electronics and ICT sector.

Approval has been accorded for setting up of 07 such Academies in NIT Patna(Bihar) , IIITDM Jabalpur(Madhya Pradesh), NIT Warangal(Telangana), IIT Guwahati(Assam), IIT Kanpur(Uttar Pradesh), IIT Roorkee(Uttrakhand) and MNIT Jaipur(Rajasthan).

7.1.3 Vocational, Skill development level

(i)   Two Schemes on Skill Development in ESDM sector have been approved:

(a) Scheme for financial assistance to select States/ UTs for Skill Development in ESDM sector

The Scheme has been approved with a target of skilling 90,000 candidates (in 5 levels) at a total outlay of ₹113.77 crore with Grant-in-Aid support of ₹ 100.00 crore (approx.) in a period of 4 years. The Scheme is under implementation in Eight (08) States viz. Andhra Pradesh (jointly with Telangana with 50% targets each), Jammu & Kashmir, Karnataka, Kerala (for 3 levels only), Punjab, Uttarakhand and Uttar Pradesh (for two levels only).

(b) Scheme for 'Skill Development in ESDM for Digital India'

This expanded Scheme has been approved with a target of skilling 3.28 lakh candidates at a total outlay of ₹ 411 crore in a period of 4 years for implementation in 32 States/UTs.

Under the above two Schemes, an Expert Committee has approved a basket of 64 courses to be covered under both the schemes. So far under both the above Schemes, a total of 39,829 candidates have been enrolled for training in various States/UTs out of which 5,310 candidates have passed.

(ii) 'Skill Development in Electronics Hardware' being implemented by NCPUL/NIELIT Chandigarh

The project has been approved for a duration of 3 years for conducting One-year Diploma course jointly by National Council for Promotion of Urdu Language (NCPUL) and NIELIT, Chandigarh for training 10,000 candidates. The training is being conducted at 50 select NCPUL centres where requisite training facilities has been set up and trained faculty is being provided by NIELIT. So far 5142 candidates have been enrolled under the programme.

(iii) Efforts to generate greater participation of Industry through Sector Skill Councils – Electronics, Telecom, IT/ITeS

DeitY is actively associating and supporting the various skill development activities of the following Sector Skill Councils (SSCs) concerning the domains addressed by this Department:

i. Sector Skill Council: Electronics

ii. Sector Skill Council: IT-ITeS

iii. Sector Skill Council: Telecom

iv. Sector Skill Council: Health (for Medical Electronics)

v. Sector Skill Council: Automotive (for Automotive Electronics)

The above Sector Skill Councils have taken up various courses for skilling of candidates in their respective domains.

(iv) Skill Development Training of Citizen leading to enhancement in Employability under 8th pillar of Digital India – IT for Jobs

A proposal prepared by NIELIT to create a pool of trained 55 Lakh Citizens including candidates from SC/ST/ BPL Section and Women candidates in the area of ICT over a period of 4 years is under process.

7.1.4   Capacity Building in Niche Areas

(i)   Information Security Education and Awareness (ISEA) Project Phase-II

The project has been approved with an outlay of ₹ 96.08 crore to be implemented over a period of 5 years w.e.f. 01.4.2014. Under the ISEA Project Phase-II, 1.14 lakh persons are proposed to be trained under formal and non-formal courses, faculty training etc. In addition, about 400 Paper publications are expected. The project also aims to provide training to more than 13,000 Government officials and creating mass information security awareness targeted towards Academic users, Government users and General users (approximately 3 crore Internet users in five years through direct and indirect mode). 51 institutions have been identified for the implementation of academic activities under the project.

(ii)   Capacity building in the areas of Electronic Product Design and Production Technology

The project has been initiated for development of human resource at various levels including Certificate, Diploma, Post Graduate and Research Professionals with adequate competence levels with a target of training 11,515 candidates in five years. The project further aims at upgrading the competence of working professional in Indian Industries and knowledge/ skills of faculty of technical institutions. The project is being implemented by NIELIT Centres at Aurangabad & Chennai and CDAC Hyderabad. Under this project, NIELIT Aurangabad has launched M.Tech(part time) in Electronic product design and B.Tech(full time), both in affiliation with Dr. B.A.M. University, Aurangabad with a vision to bridge the gap between academia and Industry, the implementing agencies have launched 6 week modular courses in Electronic Product Design, Embedded System Design, Electronic Packaging, Wireless Embedded System. Further, a 6 month (full time) Post Graduate Diploma in Electronic Product Design has also been launched. So far 3471 candidates have been trained/undergoing training in various formal/non-formal courses launched at CDAC-Hyderabad, NEILIT Centres at Aurangabad and Chennai.

(iii)   Special Manpower Development Program for Chips to System Design

A programme entitled 'Special Manpower Development Programme for Chips to System Design' was initiated by the Department under 'Digital India Programme' in December 2014. The objective of the programme is to broaden the VLSI Design base in the country, generate specialized manpower in the area of VLSI and system level design, as well as to bring in a culture of System-on-Chip / System Designing which will ensure moving up in the value chain in the "System Design Space". The program is being implemented at 60 institutions spread across the country including all IITs, all NITs, etc. These institutions have been divided in two categories – Resource Centers (10) and Participating Institutions (50). The Resource Centers are the Mentoring Institutions in the program. The project has an outlay of ₹ 99.72 Crore with duration of 5 years.

The programme will result in generation of over 50 thousand specialized manpower in the area of VLSI and system level design at PhD, Post Graduate and Graduate level along with development of 10 systems/ sub-systems and design of Applications Specific Integrated Circuits (ASICs). The program will also lead to generation of Intellectual Property Cores, publication of papers etc. Under the program, Instruction Enhancement

Programmes for faculty of participating institutions would be organized along with organizing ZOPP workshop etc. The programme will also result in broadening the base of quality research in the country by supporting 'Networked PhD programme' which will make use of expert faculty, to be called Mentoring Guides, available in IITs (Resource Centers). These Mentoring Guides along with the guides of the Participating Institutions would guide the researchers of the Participating Institute.

Ten clusters project proposals have been initiated for development of 10 working prototype of Systems/sub-systems/ SoCs, development of Application Specific Integrated Circuits (ASICs) and Field Programmable Gate Array (FPGA) based board level design. This, inter alia, include ASICs and FPGA based design. Besides this, MoUs have been signed with institutions implementing the program, a ZOPP workshop organized at IISc Bangalore to work out the implementation matrix of the program & assigning components of the program to each participating institutions, model syllabus developed for M.Tech program on VLSI with emphasis on system design and approval obtained for enrollment of 46 PhDs at implementing institutions under Visvesvaraya PhD Scheme of DeitY.

(iv) Indian Nanoelectronics Users Program (INUP)

INUP (Indian Nanoelectronics Users Program) initiated in March 2014 at the CENs of IISc Bangalore and IIT Bombay to facilitate and support the generation of expertise and knowledge in Nanoelectronics through participation by external users in INUP and their utilization of the facilities established at the Centres of Excellence in Nanoelectronics (CEN) at IISc and IITB.

During the year, 6 familiarization workshops on Nanoelectronics have been organized at IIT Bombay, IISc Bangalore, IIT Patna and Tezpur University. Also, 10 hands-on-training in various categories such as Fabrication and Characterization of GaN LED, crystalline Si Solar cell, fabrication of cantilevers and MEMS based sensors and MOS Capacitor have been conducted. More than 400 persons have been trained on nanofabrication through Hand-on training workshops at the CEN facilities at IISc Bangalore and IIT Bombay. The small and medium term projects being executed under INUP Phase II have resulted in around 75 research publications and 8 patents by the researchers from all over the country during the past one year. A special training course in "Nanofabrication Technologies" for India-neighboring countries is also being organized under the programme from 17 Jan-3 Feb2016.

(v) INFORMATION TECHNOLOGY RESEARCH ACADEMY (ITRA):

ITRA is an enabling programme initiated by Department of Electronics & Information Technology (DeitY), Ministry of Communications & Information Technology, Government of India, to help build a national resource for advancing the quality and quantity of R&D in Information

and Communications Technologies and Electronics and its applications in IT and related institutions across India. ITRA is currently operating as a division of Media Lab Asia.

ITRA had taken up two focus areas, viz., "Mobile Computing, Networking and Applications (ITRA-Mobile)" and "IT based Innovations in Water Resources Sustainability (ITRA-Water)". ITRA is also up two more focus areas, viz. "IT based Transformations in Indian Agriculture and Food (ITRA-Ag&Food) and "Human Simulator for Amyloids related Diseases (ITRA-HuSim)"

ITRA-Mobile projects are ongoing in 34 institutions, involving 66 faculties and 81 Ph.D. students. During FY 2015-16, ITRA-Mobile research community has published more than 130 research papers; 12 courses have been developed/modified; and conducted 28 workshops. 8 researchers have been deputed abroad for various interactions & collaborations. The projects under ITRA-Mobile were evaluated in Jan 2016 by a panel of domain experts.

ITRA-Water projects are ongoing at 24 research institutions, involving 35 faculty and 30 Ph.D. students. During FY 2015-16, ITRA-Water research community published 48 research papers; 8 courses were developed/modified; and conducted 8 workshops. 3 researchers have been deputed abroad for various interactions & collaborations. The projects under ITRA-Water were evaluated in Jan 2016 by a panel of domain experts.

(vi) Simulation Centre for Power Electronics applications.

A Simulation Centre has been established at IIT-Bombay to simulate Power Electronics applications. It has trained 500 candidates including students, faculty members and industry personals in design of Power electronics applications. The centre has been dedicated to nation by Secretary, DeitY in October, 2015.

As a part of awareness programs, the National Workshop on Power Electronics and three short term courses on various themes of Power Electronics have been organized at different geographical locations in the country.

Capacity generation has been achieved in the country in High Voltage power supply areas. Development of 10kV Power Supply with Solid State Crowbar has been achieved and successfully demonstrated. The expertise generation in high voltage area has lead to a project, financially sponsored by Institute of Plasma Research (IPR), Ahmedabad, to develop power supplies of higher ratings for their use.

7.1.5 Create skill development facilities in deprived areas through strengthening of National Institute of Electronics and Information Technology (NIELIT)

(i)   A project on "Development of North-Eastern Region by enhancing the Training/ Education capacity in the Information, Electronics & Communications Technology (IECT) Area" has been initiated with the following objectives:

a) Upgrading the six existing centres of the NIELIT in the North-Eastern Region at Guwahati, Imphal, Shillong, Itanagar, Gangtok and Aizwal.; and

b) Setting up of ten new Extension centres and upgrading two existing Extension centres

Sixteen (16) out of proposed Eighteen(18) Centres/ Extension Centres are operational as on date. The new eight Extension Centres are imparting training from rented built-up space at Silchar, Jorhat and Kokrajhar in Assam; Pasighat in Arunachal Pradesh; Senapati & Churachandpur in Manipur; Tura in Meghalaya and Lunglei in Mizoram. Efforts are being made for allotment/ hiring of built-up space for remaining 2 Extension Centres at, Dibrugarh (Assam) and Tezu in Arunachal Pradesh. A total of 9774 students were trained so far under the project. Possession of land for construction of permanent campuses has been obtained at 16 locations in Pasighat, Guwahati, Kokrajhar, Jorhat, Tezpur, Dibrugarh, Silchar, Imphal, Senapati, Churachandpur, Aizawl, Lunglei, Gangtok, Shillong, Tezu and Chuchuyimlang land is yet to be obtain at Tura and Itanagar. Three Central PSUs have been appointed as Project Management Consultants (PMCs) for construction of permanent NIELIT Centres & Extension Centres.

(ii) NIELIT is presently offering trainings courses from 18 locations in all eight (08) NE States covering two additional locations at Agartala and Kohima under other funded projects by the DeitY.

(iii) Setting up/ upgradation of NIELIT Centres at Srikakulam (change of location to Tirupati) and Ropar is underway.

7.1.6 IT for Masses Programme

Development of Weaker Sections

As a part of its inclusive development strategy, the Government is committed to the welfare and development of weaker sections. Accordingly, DeitY has been implementing number of ICT training / capacity building projects in different States / UTs, targeted at these sections, to improve IT literacy, skill enhancement and to promote the use of ICT tools.

The following projects were initiated / on-going:

Projects covering Scheduled Caste (SC) beneficiaries

- IT Mass Literacy Programme for SCs – Kerala
- Capacity building for empowerment of SC candidates on ICT at Cooch Behar district of West Bengal - West Bengal
- IT training for Scheduled Caste (SC) candidates - Punjab
- ICT training in Advance Animation / 3D Animation / Graphic & Web Designing to SC / Women candidates at Mumbai
- ICT training to SC / ST / Women - Jammu & Kashmir
- e-Inclusion: IT training for Rural Scheduled Caste (SC) Beneficiaries - Uttar Pradesh, West Bengal, Bihar, Andhra Pradesh, and Tamil Nadu
- Development of Bi-lingual multimedia e-Contents / Portal and setting up of Knowledge Kiosk at 11 districts for facilitating entrepreneurship creation amongst Scheduled Castes (SC) – Punjab
- Capacity building of SC & ST students of North Orissa University & its affiliated colleges in IT tools – Odisha
- Training and Certification of Scheduled Caste (SC) students in job oriented courses in Information Technology – Kerala

Projects covering Scheduled Tribe (ST) beneficiaries

- IT Mass Literacy Programme for STs – Kerala
- IT skills & e-Inclusion through low cost access devices based awareness program for Scheduled Tribes – Kerala
- ICT training to SC / ST / Women - Jammu & Kashmir
- Capacity building in IT skills of Scheduled Tribes (ST) candidates - Chhattisgarh
- Capacity building in IT skills of Scheduled Tribes (ST) candidates - Andaman & Nicobar
- e-Inclusion: IT training for Rural Scheduled Tribe (ST) Beneficiaries - Madhya Pradesh, Chhattisgarh, Meghalaya, Mizoram and Jharkhand
- Capacity building for the upliftment of 2000 Scheduled Tribes (ST) candidates - Union Territory of Lakshadweep
- Capacity building of SC & ST students of North Orissa University & its affiliated colleges in IT tools – Odisha
- IT infrastructure creation and capacity building in IT tools of Scheduled Tribes (ST) candidates - Madhya Pradesh

Gender Empowerment

Gender Empowerment through ICT has been one of the major initiatives of the Government. The objective of this initiative is to empower women through capacity building in ICT and IT training so as to enhance their employability. Accordingly, DeitY has been implementing number of ICT training / capacity building projects for empowerment of women in different States / UTs.

The following projects were initiated / on-going:

Projects covering Gender (Women) beneficiaries

- IT oriented Handloom Sector Development Program for creative design, development & deployment by Artisians / Weavers of Jharkhand & Odisha State – Jharkhand, Odisha
- IT Mass Literacy Programme for Women – Kerala
- ICT training in Advance Animation / 3D Animation / Graphic & Web Designing to SC / Women candidates at Mumbai
- Project for the benefit of Girls / Women – Haryana
- ICT training to SC / ST / Women - Jammu & Kashmir
- ICT based integrated development program for women empowerment in Lallapura craft cluster of Varanasi – Uttar Pradesh
- Training of Women in Delhi for creating women entrepreneurs / data entry operators, to promote awareness and to enhance vocational skill in IT - Delhi
- e-Inclusion: IT training for Rural Women Beneficiaries - Bihar, Odisha, Madhya Pradesh, Himachal Pradesh and Jammu & Kashmir

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8.1 Authentication framework under the IT Act: Controller of Certifying Authorities (CCA)

Digital Signature Certificates (DSC) are issued by Certifying Authorities (CA) who have been licensed by the Controller of Certifying Authorities (CCA). The Application Form for DSC issuance and the supporting documents for proving credentials of the applicant were mandatorily paper based. To make the DSC issuance process more efficient, electronic authentication mechanisms were sought to be incorporated.

8.1.1 eSign Online electronic signature service - eAuthentication for Digital Signature Certificate issuance

Leveraging the electronic authentication provided by Aadhaar eKYC into the DSC issuance process, the eSign Online electronic Signature framework was launched by Hon'ble Prime Minister in July 2015. Online DSC Application Forms were also introduced, resulting in DSCs being generated for signing electronic transactions as and when required.
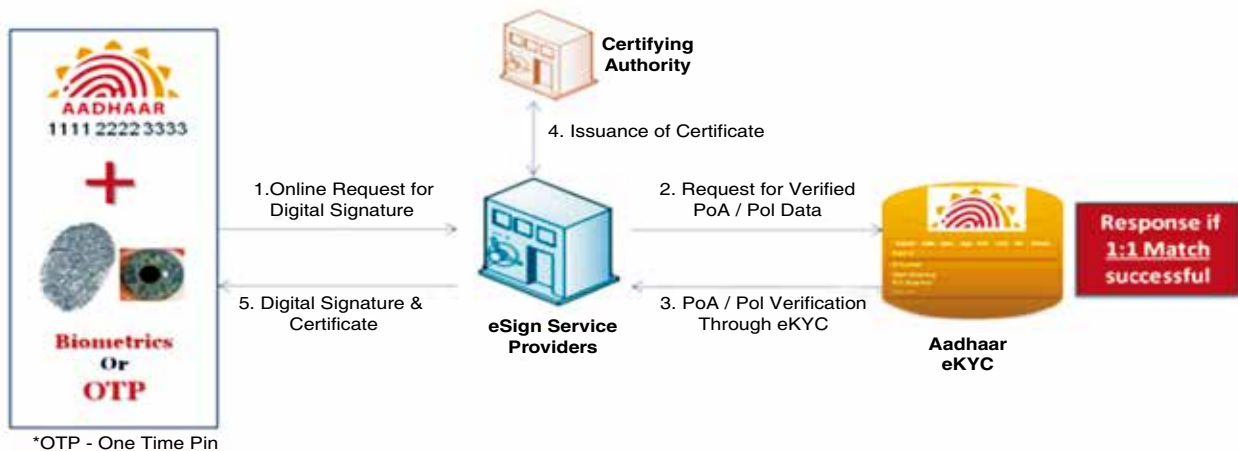
eSign is an online electronic signature service that can be integrated with service delivery applications to facilitate an Aadhaar holder to digitally sign a document. Only Aadhaar holders can use eSign online electronic signature service for electronically signing a document based on OTP or Biometric (Fingerprint/Iris) authentication through Aadhaar e-KYC service.

• Easy and secure way to digitally sign information anywhere, anytime using Aadhaar e-KYC service.

• Facilitates legally valid signatures

• Flexible and easy to implement - eSign provides authentication in line with Aadhaar e-KYC service (both biometric and OTP) and also records the Aadhaar ID used to verify the identity of the signer.

• Ensures privacy

• eSign services are facilitated by trusted third party service providers (currently limited to Certifying Authorities (CA) licensed under the IT Act).

The Office of CCA empanels licensed CAs for offering eSign Services for which the legal framework and guidelines are already in place. So far, three of the eight licensed CAs have been empanelled by the Office of CCA for providing eSign Service. These **eSign Service Providers (ESP)** are expected to facilitate digital signing for Aadhaar holders only on the basis of their eKYC from UIDAI.

While more than 12 million DSCs have already been issued based on paper application form and supporting documents, **eSign** too has already been used in signing more than 4.5 lakh transactions. These have been in sectors such as Government, Banks, Brokerages and Mutual Funds. Framework is being developed for extending the service to include organizational affiliation of the Aadhar Holder.

8.2   Semiconductor Integrated Circuits Layout Design Registry (SICLDR)

To promote the growth of semiconductor industry in the country, the Semiconductor Integrated Circuit Layout Design Registry (SICLDR) has been set up in Department of Electronics and Information Technology, New Delhi, under the Semiconductor Integrated Circuit Layout Design Act, 2000. The registry has been made operational with effect from 1st May 2011. The website http://www.sicldr.gov.in

has been redesigned and bears a new look with up to date information and contains all the information about Semiconductor Integrated Circuits Layout Design Act and Rules, notices and notifications issued by DeitY relating to the SICLD Registry, reports, "Semiconductor Integrated Circuits Layout-Design Journal" etc. and downloadable formats of various application forms etc. Applications are being accepted for registration of semiconductor layout designs at its Head Office in DeitY. One semiconductor layout-design has been registered and one application has been received for registration of layout-design in the SICLD Registry so far.

8.3 Cyber Appellate Tribunal (CAT)

In accordance with the provision contained under Section 48(1) of the IT Act 2000, the Cyber Regulations Appellate Tribunal (CRAT) was established in October, 2006. As per the IT Act, any person aggrieved by an order made by the Controller of Certifying Authorities or by an Adjudicating Officer under the Act can appeal before the Cyber Appellate Tribunal (CAT). This Tribunal is headed by a Chairperson who is appointed by the Central Government by notification as provided under Section 49 of the IT Act 2000.

Before the amendment of the IT Act in the year 2009, the Tribunal was known as CRAT and the Chairperson was known as the Presiding Officer. Provision has been made in the amended Act for the Tribunal to comprise a Chairperson and such number of other members as the Central Government may notify/appoint. The name of CRAT has also been changed to CAT.

At present the CAT is functioning at Jeevan Bharti (LIC) Building, New Delhi. The former Chairperson demitted the charge on 30.06.2011. Two posts: Member (Judicial) and Member (Technical) were created and both the posts are filled in. Member (Technical) is functioning as Head of the Department.

During the year 2015-16, 6 fresh appeals have been filed by the parties which are awaiting admission hearing, in addition to 58 appeals from the previous years. The same will be disposed off on joining of Chairperson, CAT, who is the Competent Authority for the disposal of the appeals.

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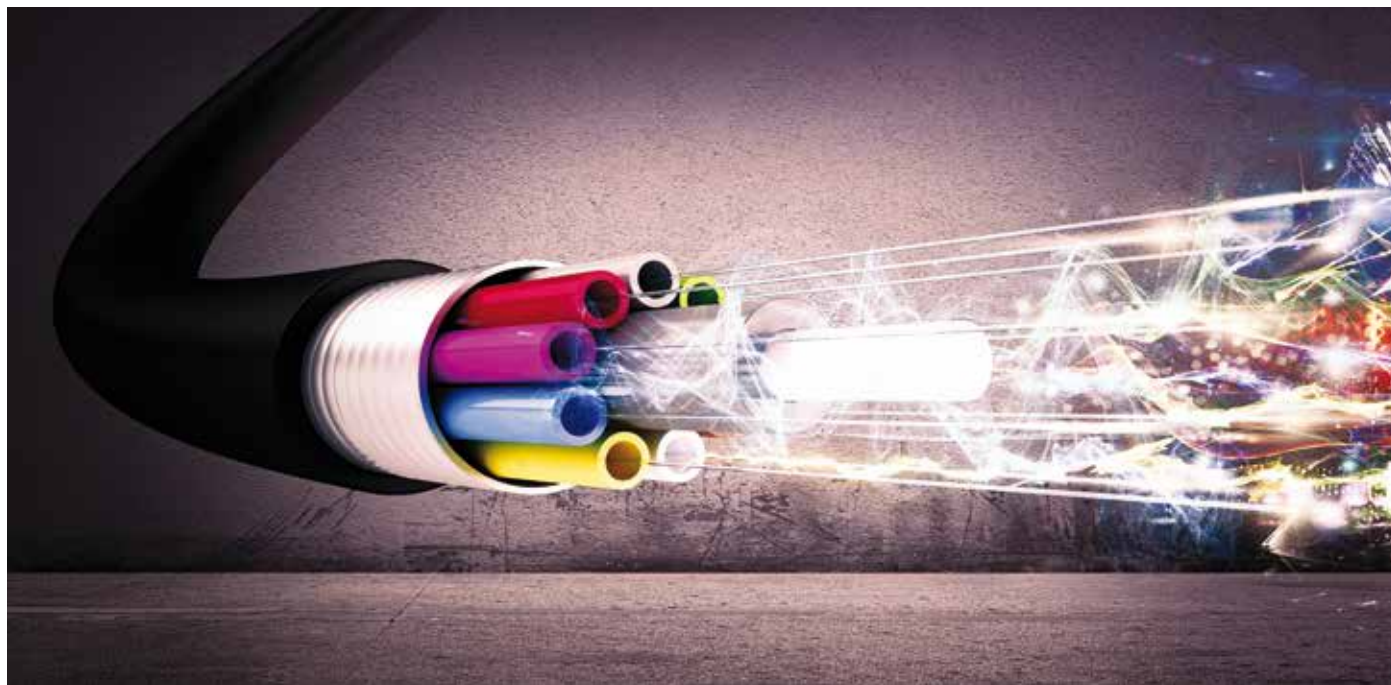
In order to operationalise the objectives of the Department, schemes are formulated and implemented by the Department. The schemes are implemented directly by the Department and through the organizations/institutions under its jurisdiction. To make the technology robust and state-of-the-art, collaboration of the academia and the private/public sector is also obtained. The Department has three Attached Offices and six Autonomous Societies. Their performance during the year is discussed as under:

9.1   High-end Software, Systems: Centre for Development of Advanced Computing (C-DAC)

During the year 2015-16, C-DAC has made significant advancements in developing and deploying various solutions, organizing key events, providing training and collaborating with organizations of repute both at national and international level. Key technological achievements of C-DAC during this year in each of its focus areas are outlined below.

9.1.1 High Performance Computing (HPC), Grid Computing and Cloud Computing

- PARAM Shavak, is a "Supercomputer-in-a-Box" solution - a ready-to-use and affordable solution pre-loaded with scientific and engineering applications, along with development and resource management tools. It is a table top model of supercomputer indigenously developed by C-DAC which is also equipped with 2 to 3 Tera-Flop computing power, 8 TB of storage and pre-loaded development tools and libraries. The PARAM Shavak is being installed at various academic and engineering institutions across the country and C-DAC has already deployed 25 such systems.

PARAM Shavak

- C-DAC has provided services towards establishment of state-of-the-art Hybrid HPC facilities at IIT Delhi having a peak performance of 900 TF (525 TF sustained) and is engaged in setting up HPC facility at IIT Guwahati with a peak performance of 250 TF.

9.1.2 Multilingual Computing and Heritage Computing

- During the year with respect to .Bharat (.भारत), C-DAC created a Generation Panel for "Neo-Brahmi scripts" covering Bengali, Devanagari, Gujarati, Gurumukhi, Kannada, Malayalam, Odia, Tamil and Telugu scripts for Internet Corporation for Assigned Names and Numbers (ICANN) Root LGR Project.

- National Voters Services Portal (NVSP) is a one-stop solution developed by C-DAC to assist voters and providing information related to elections, polling booths and electoral rolls. With about 84 crores voters data view and 1.2 billion hits, the NVSP provide a very high significant value to the citizen.

9.1.3 Professional Electronics, including VLSI and Embedded Systems

- Transfer of Technology (ToT) of the following solutions developed by C-DAC was carried out during the year.
  - Digital Programmable Hearing Aid
  - Pebrine-O-Scope.

- The Wireless Traffic Control System (WiTraC) solution of C-DAC was deployed in 165 junctions spanning across five cities in India.

- The new Automated Dial-100 System (AD-100) for the Kerala Police in Calicut City Police Control Room was commissioned in April-2015.

9.1.4 Software Technologies, including FOSS

- During the year, C-DAC deployed about eleven Lakh of Bharat Operating System Solution (BOSS) at Tamil Nadu and for Indian Army Northern Command and Eastern Command.

- C-DAC through its Mobile Seva platform, integrated 1989 Government departments across the country, which provides services to the citizens through mobile phones and tablets.

- Vikaspedia http://www.vikaspedia.in/, a multilingual collaborative content creation platform to provide e-knowledge products and services for underserved communities, was made available in all 22 scheduled languages of the country and English (with the addition of 13 languages during the year).

9.1.5 Cyber Security and Cyber Forensics

- C-DAC deployed various Cyber Forensic Tools at various law enforcement agencies (LEAs) and conducted advanced level training programs to officers of Army, Navy, NIC, NPA, BARC, ECIL, CBI Academy, Kerala Police, Madhya Pradesh Police, Jharkhand Police, FSL Bangalore and other LEAs.

- As part of Information Security Education and Awareness (ISEA) Phase - II initiative, overall 115 awareness workshops were conducted across many States covering about 8225 participants out which 5392 are School/Engineering/Degree college students, 399 are Faculty/Teachers, 2251 are Government/police officials and 183 are Parents.

9.1.6 Health Informatics

- During the year, C-DAC deployed e-Aushadhi, a web based Supply Chain Management solution in the States of Andhra Pradesh, Telangana, Madhya Pradesh and Gujarat.

- Telemedicine Network linking 6 Hospitals in Kyrgyz Republic has been commissioned, operationalized & handed over to Ministry of Health, Government of Kyrgyz Republic in July 2015. Honorable Prime Minister of India inaugurated this 1st India-Central Asia Telemedicine Link at Bishkek, Kyrgyzstan, powered by 'eSanjeevani' on July 12, 2015.

9.1.7 Education and Training

- C-DAC is conducting various Post Graduate Diploma programs in electronics ad ICT areas and a total of 6000 students shall be trained by March 2016.

- C-DAC, for the third consecutive year, has been supporting the IITs in conducting the annual GATE examination.JAM was also conducted for the second consecutive year using C-DAC's software solution supporting about 40000 candidates

9.1.8 North-East

- C-DAC has established HPC facilities in various academic institutes of North East region including NIT Sikkim, Assam Engineering College, Guwahati, Tezpur University, Assam University, Guwahati, and NIT Agartala.

- C-DAC has deployed Telemedicine solution by establishing Telemedicine Consultation Centres for providing specialized healthcare services to rural population of Cachar, Hailakandi and Karimganj districts of Assam.

9.1.9 International Initiatives

During the year, C-DAC in collaboration with the Ministry of External Affairs (MEA) initiated/completed the following activities:

- Hon'ble Prime Minister of India Shri Narendra Modi and Hon'ble Prime Minister of Kazakhstan Mr. Karim Massimov inaugurated the India-Kazakhstan Centre of Excellence in ICT (IKCEICT) at Eurasian National University (ENU), Astana on July 7, 2015 to carry out Research and Development activities in several scientific and engineering areas.

- Under an Agreement with MEA, C-DAC is setting up a Centre of Excellence in IT (CEIT) at UTN (National Technical University) in Alajuela, Costa Rica and Dominica State College in Roseau, Commonwealth of Dominica.

- During the year, C-DAC has signed an agreement with MEA to setup ICT Resource Centre at Nelson Mandela African Institute of Science & Technology (NM-AIST) at Arusha, Tanzania.

- C-DAC signed an Agreement with National Institute of Posts, Telecoms and ICT (NIPTICT) under Ministry of Posts and Telecommunications (MPT), in Cambodia and Department of Technology Promotion and Coordination (DTPC) under MOST (Ministry of Science and Technology) in Myanmar.

9.2 Strategic Need: Society for Applied Microwave Electronics Engineering and Research (SAMEER)

SAMEER is a premier R&D institution with Centres at Mumbai, Chennai, Kolkata and has also recently established two more new centers at Visakhapatnam and Guwahati. SAMEER Centres work in high end technology areas of RF/Microwaves and allied disciplines. It undertakes design, development and delivery of hardware to meet stringent specifications of user agencies in its core areas of expertise including High Power RF amplifiers, Communication systems, Atmospheric Radar Instrumentation, Linear Accelerators, RF/ Microwave/ Millimeter wave subsystems and systems, Photonics, Microwave components/ modules and Industrial RF/ Microwave application products, Digital signal processing, Thermal Engineering of electronic hardware; design, test, measurement and consultancy services in electromagnetic Interference/ compatibility (EMI/EMC).

9.2.1 Achievements

During the period 2015-16, achievements made in different projects are detailed below:

A wide band circularly polarized antenna for two RF channel CDMA transmitter

This antenna has been developed for critical communication application. The antenna comprises of a crossed dipole loaded with Magneto Electric (ME) dipole. A semi rigid coaxial line is used to feed the crossed dipole configuration.
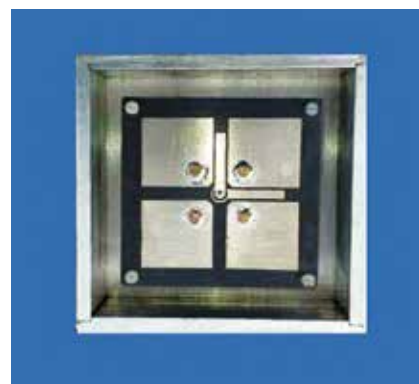
Wideband Circularly Polarized antenna

MOU between SAMEER and BEL, Chennai for development of FCS Systems

SAMEER- Centre for Electromagnetics, Chennai has developed 3 variants of Fire Control System (FCS) based on the specifications provided by the end user. In order to meet the system requirements of the end user, an MOU is signed with BEL, Chennai for development of 5 FCS systems in two different configurations. The collaborative work executed by BEL and SAMEER is successfully completed.

Thermal Design of Rugged Electronics Chassis

The electronics Chassis uses both Fan and vents to cool the system.Computational fluid dynamics software is used to predict the air flow and temperature of components. Suitable thermal path is designed to keep the components within their specification temperature.

Thermal Simulation of Rugged Electronis

Development of Ka Band Polarimetric Doppler Radar for Cloud Profiling:

This system enables atmospheric scientists and meteorologists to remotely sense cloud structure, their shape, size orientation, concentration in real time.
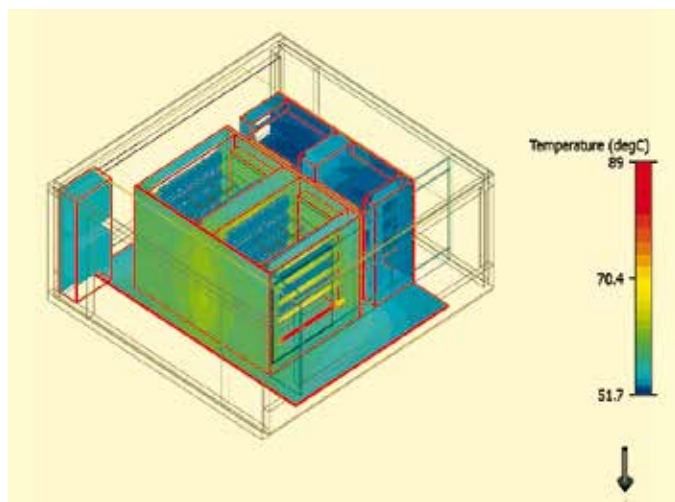
Development of High Power MW Source

Development of two sources each having a capacity to generate 3 kW CW/ Pulsed power at 2.45GHz completed. Fabrication of applicator completed and System installation at site is completed.

Development of terahertz technology for imaging and spectroscopy

The terahertz laboratory has been set up to perform applied research in terahertz related technologies for detecting hidden objects. Experiments have been performed on frequency domain terahertz generation and its application to spectroscopy.

Development of High energy Electron Linear accelerator for medical applications

The aim is to develop a high energy electron linear accelerator with high electron beam power to elute Technetium 99 from the irradiated enriched molybdenum-100 material. Currently, ^{99m}Tc alone is by far the dominant radioisotope used as a nuclear medicine for diagnostics in humans. This project is to use Linac as an alternate and clean technology to produce these isotopes.

Development of Dual Photon and Multiple electron energy oncology system

The electron beam bending system has been successfully designed, developed and tested . All other subsystems have also been developed and integrated with the gantry. The initial integrated testing is in progress.

Development of 1680 MHz and 403 MHz Radiosonde & Ground System

The 403MHz Radiosonde and ground system for India Meteorological Department (IMD) for upper air weather data collection has been developed successfully. SAMEER has fabricated seven units of 403MHz Radiosonde receivers .

Design and Development of Automation System for IMD's Synoptic observatories

Completed commissioning of synoptic observatory automation at 200 observatories of IMD. Currently these systems are being operational eliminating manual data processing region wise.

Indigeneous Magnetic Resonance Imaging system:

The indigenous development of MRI scanner with an objective to design, develop & conduct clinical trials of 1.5 Tesla has been initiated.

Multileaf Collimator (MLC) For Dual Energy LINAC System:

A new, customized, small sized design of MLC for Dual Energy LINAC was taken up. Every leaf has independent motor and are controlled. The achieved leaf speed is 20mm/s with motion accuracy 0.1 mm.

Window for 42 GHz, 200 kW Gyrotron

Developed the double-disc tunable sapphire window through which 200 kW mm wave power. It is one of the critical and vulnerable components of the Gyrotron system.

ST Radar

ST Radar National facility at Guwahati for NE States is being established with emphasis on cost effective indigenization. The fabrication and testing of 600 numbers of each sub system is nearing completion.

T/R module for ST Radar

Development of broadband wireless communication system using terahertz technology

A laboratory system has been developed to demonstrate short distance wireless communication using terahertz technology which enables data transmission up to 600 Mb/s over 1 meter distance riding over optical wave as carrier.

9.2.2   Centre for Electromagnetic Environmental Effects at Visakhapatnam

A new Centre for Electromagnetic Environmental Effects (E[3]) has been established at Visakhapatnam for highly specialized state-of-the-art EMI/EMC test facilities including Electromagnetic Pulse (EMP) and Pulse Current Injection (PCI) set up to meet the requirements as per International EMC Standards. The centre also aims to develop skilled manpower in this specialized E[3] field and will disseminate R&D findings through regular Workshops, Seminars and Faculty/student training programmes.

9.2.3   Centre of High Power Microwave Tube and Component Technology, SAMEER, IIT Guwahati

Another new centre at IIT Guwahati specializing in high power microwave tubes/ components has been established in collaboration with IIT Guwahati. The Centre will focus on R&D of 3.1 MW magnetron at 2.998 GHz, design and development of 3 kW circulator at 2.998 GHz and 6 kW RF load at 2.998 GHz.

9.2.4 SAMEER has also undertaken following projects during the year 2015:

- Two axes Gyro Stabilized Servo-control System
- High power amplifier at X band
- W-Band Frequency MMIC Based Low Noise Amplifier
- W-Band Attenuator
- W-Band Frequency Tripler
- X band Transceiver for Two way airborne data link system
- X band Power Amplifier of 10 Watt output for Transmitter
- X-band antennas for Two way airborne data link system.
- Multiband Wrap around Antenna
- Ka-band Telemetry Transmitter system
- S/Ka band tracking antenna
- S/Ka band Tracking Antenna with MonopulseFeed
- Ka/S-band Telemetry RF Receiver
- X-band Antennas for airborne one way data-link system
- Radial horn antenna for X-band data link.
- Power dividers
- Vacuum Assisted RF Dryer System
- Digital Ionosonde system for Dibrugarh University
- Brix Measurement System for Sugar Industry
- RF dryer
- RF based disinfestations system & Quality parameter Measurement
- 10kW Microwave heating system
- High power solid state amplifier
- Conformal antennas
- Millimeter-wave Radiometer for profiling of Temperature and Humidity of Troposphere.

9.3 High-end Materials, Composite: Centre for Materials for Electronics Technology (C-MET)

Centre for Materials for Electronics Technology (C-MET) was set up as a registered Scientific Society in March 1990 under the Department of Electronics (now Department of Electronics & Information Technology) as a unique concept for development of viable technologies in the area of materials mainly for electronics. C-MET is operating through its laboratories situated at Pune, Hyderabad and Thrissur. The objectives of C-MET are:

- To establish technology up to pilot scale for a range of electronic materials and transfer the same to industry for commercialization.
- To establish relevant characterization facilities.
- To undertake applied research activities in the areas of its operation.
- To establish national data base on Electronic Materials.

During the year 2015-2016, C-MET implemented projects encompassing following programs:

- Integrated Electronics Packaging.
- Nanomaterials, Thick films and NanoComposites.
- Ultra High Purity Materials and Compound Semiconductors.
- Materials for Renewable Energy.
- E-Waste Management.
- National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited Restriction of Hazardous Substances (RoHS) facility.
- Sensors and Actuators.
- Aerogel and Graphene for Super-capacitors.

9.4 Network & Infrastructure: ERNET

ERNET India is an Autonomous Scientific Society of Department of Electronics and Information Technology, Government of India. ERNET has made significant contribution to the emergence of networking in the country.

In addition to providing connectivity, ERNET has been meeting the needs of academic and research institutions by providing IT consultancy, project management and training.

9.4.1 Domain Registration

ERNET has been providing Domain name services and connectivity services, both terrestrial & via VSAT from its inception. ERNET India has been designated as exclusive domain registrar for registering domains under विद्या.भारत besides edu.in,ac.in and res.in for the education and research sector of the country. ERNET has also been providing Domain Name Services for education institutes. In addition to strengthening the existing services, ERNET in 2105-16 initiated new services such as usage of White Spaces of connectivity & initiating projects as part of its IoT initiatives.

9.4.2 Internet of Things (IoT)

To support the country-wide initiative of "Start-up India, Stand-up India", ERNET launched a Center of Excellence (COE) with NASSCOM in Public Partnership Mode (PPP) at Bangalore. This center was created to support Entrepreneurship by creating a complete Incubation facility with support from Industry. This technology incubation center already has 7 technology partners and a large number of knowledge partners on board. With a very positive response from start-ups, this incubation center has already started various workshops and Design challenges in IoT, to increase the awareness and interest.

ERNET had also worked with DeitY in taking the IoT concept at the policy level during the year 2014. Work was also done in incorporating requirements and comments from different Ministries, industry bodies, associations and academia in the Policy. This policy endeavors to create an IoT industry of USD 15 billion by 2020 in India. It will also aim to undertake capacity development, Research and Development and domain specific product developments. The policy is expected to support Innovation and R&D, Capacity Building, HRD, Demonstration Centers and Engagement with right incentives to industry. Areas like Smart City, safety, healthcare, agriculture, resource optimization, etc., were highlighted as part of this.

In continuation to our ongoing research activities in the domain of Internet of Things (IoT), prototype design and implementation of real-time water quality monitoring and control based on emerging IETF protocols such as IPv6 for Low power Wireless Personal Area Networks (6LoWPAN) and Constrained Application Protocol (CoAP) was completed. This prototype implementation used pH,

temperature, ORP (oxidation reduction potential) and electrical conductivity sensors and it can be extended to incorporate various other sensors in real scenario for drinking water quality monitoring by Government water boards and monitoring of effluents discharged from the industry by pollution control boards. Also, ERNET India in collaboration with Central Power Research Institute (CPRI), autonomous society under the Ministry of Power, currently evaluating IETF 6TiSCH (IPv6 layer for the IEEE 802.15.4e Time Slotted Channel Hopping) for its suitability in the home automation and Substation Automation scenarios to meet deterministic bandwidth and real-time requirements of Smart Grid.

9.4.3 Pilot Project of White Space TV

The Government of India had a vision to connect the rural masses to the national mainstream by creating Digital Highways through National Optical Fiber Network (NOFN) up to Gram Panchayats. So, ERNET India had initiated a research experiment on emerging technologies; an attempt to use the available White Spaces("defined as the frequencies allocated to a broadcasting service but not used locally") for low cost connectivity in remote areas. The research experiment proposes to effectively use channels in TV band for internet connectivity while continuing to allow TV transmission unhampered.

9.4.4 WiFi & Eduroam services

ERNET has been supporting the cities & education institutes in Strategic planning for WiFi. ERNET completed network/WiFi implementation at NIFTEM Sonipat and also launched services of University of Allahabad. Work for Campus LAN augmentation at University of Pune was also initiated. Under this project, 10 Gigabit fibre backbones are being laid. MHRD also used ERNET has a partner to get the sizing for LAN & WiFi for their 38 central universities and has decided to use ERNET for project management for these 38 universities.

ERNET acts as the National eduroam operator for India and is the central point for connecting all the universities/institutes with access to the global eduroam services. "eduroam" - education roaming, is secure, world-wide roaming access service developed for the international research and education community. It allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening

their laptop and working on local Wi-Fi network. Over 100 universities have been added as part of this service.

9.4.5 Set-up smart virtual class room facilities

ERNET in past has done a lot of projects on setting-up video conferencing setup and Smart Class room. ERNET completed one project for NIELIT for setting-up a Smart Class room environment for 17 hard nodes. To support Digital India and remote education, a Pilot project of Smart Class room was conceptualized, covering 3500 schools and 50 District Institute of Education and Training (DIET), Schools in 7 States of Himachal, Gujarat, Rajasthan, Tripura, Haryana, Andhra Pradesh and Tamil Nadu with the focus to improve the quality of education to students from remote/rural part of the country were chosen. Also a centralized control system would be established in Delhi at ERNET's data centre which will host the MCU, streaming/recording server and other associated component for multiparty audio/ video interaction and also offline access of classroom sessions round the clock for learning/ collaboration between all the stakeholders. The basic aim of the project is to create a technology enhanced classrooms that foster opportunities for teaching and learning by integrating learning technology, such as computers, electronic white boards, projectors, specialized software, interactive audio-video systems, etc. The projects is already in process of rollout.

9.4.6 Support School Education

ERNET India had signed a Memorandum of Understanding (MOU) in January 2014 with Department of School Education, Andhra Pradesh Government to establish e-Learning Information & Communication Technologies (ICT) Infrastructure in 204 Schools located in rural/tribal areas of Srikakulam, Andhra Pradesh with the objective to deliver state-of-art e-Learning ICT infrastructure model in schools. The management and control of these ICT Centers will be transferred to the Department of School Education, Andhra Pradesh Government after the period of three years or in extended period as per mutual agreement. ERNET has also signed with government of Daman & Due to create IT infrastructure for the 67 laboratories.

9.4.7 Connecting the unconnected using VSATs

ERNET provides services in "C" band, which is the most stable band for connecting the remote areas. In the

current year, ERNET has undertaken a strategic initiative to upgrade the VSAT network. ERNET is also working on:

(i) To "Establish VSAT connectivity for Internet/Intranet access in the North Eastern States of the country at 60 locations". The procurement of equipments and finalization of sites is under process.

(ii) To "Provide a high capacity Single Carrier Per Channel(SCPC) VSAT link at Port Blair, the U.T. of A&N Islands and at Kavaratti, the U.T. of Lakshadweep Islands under NKN project. The regulatory approval from DoT to establish the link is awaited. The equipment procurement is in process through open tender. The requirement of transponder space for these links has been informed to Department of Space.

9.4.8 IPv6-Leading the world to develop smartly

ERNET has been declared the Nodal agency for IPv6 by Department of Electronics & IT (DeitY), and has been also endorsed by Department of Telecom (DOT) to carry on and promote IPv6 in this country. ERNET is handholding organizations to adapt this new technology and has also launched skill development program in new technology to help achieve the skill sets required by the country in this new evolving future internet and make the country cyber –world competent.

To keep pace with the evolving future internet technologies and develop in-house infrastructure for the future internet, ERNET has taken different initiatives in collaboration with research organizations globally as given below:

a. All website contents are available on IPv6 as part of the Digital India imitative

b. Hosting the next generation IPv6 ONLY root DNS server and a resolving root server to server this part of the globe with IPv6 queries.

c. Hosting a portal www.ipv6.ernet.in capable of providing test and diagnostic capabilities to organization experimenting and trying to develop tools and application on this evolving future technology.

d. Imparting hands-on skill development training on state of the art infrastructure

e. Assessment and Certification program for certifying individuals to have achieved a certain level of skill set

9.4.9 ISEA Training

ERNET India is one of the implementing agency in the DeitY funded Information Security Education and Awareness (ISEA) Project Phase II to impart computer/network security awareness programs to Government officers. Under this 5 year project, ERNET will be conducting four 2-day training, one 3-day training and one 5 day training program on an annual basis.

9.4.10 Terrestrial Operation

Presently, Internet Bandwidth to ERNET users are being served either by a leased line from the user location to one of ERNET India's 12PoPs(Points of Presence) or by delivering Internet to the user sites directly from the Point of Presence of upstream providers. ERNET has reduced its tariff to be competitive with the other service providers.

9.5 e-Governance Solution: NeGD

To meet ever growing demand of e-Governance across the nation, National e-Governance Division was established as amalgamation of experts from the Private sector and the Government. NeGD has been playing a pivotal role in discharging the key tasks including Programme Management and Technical Support of various components of the Digital India Programme.

Some of the major activities of NeGD include monitoring & coordination of the entire Digital India Programme; technical appraisal, assistance to DeitY and other Central Ministries/Departments on e-Governance Projects. NeGD has significantly contributed in the revamping of several existing Mission Mode/e-Governance Projects to make them State-of-the-art architecture; development of Standards, Policies and Guidelines related to e-Governance; Technical appraisal and formulation of architecture design for several e-Governance projects; consultation and coordination with Apex Committee and Mission Leaders to review the progress of Digital India and provide advisory and assistance on issues to expedite the implementation of Digital India. Several consultative workshops on Cloud, Mobile, open API, etc., have also been conducted by NeGD with Industry to arrive at the innovative solution of various components of Digital India. NeGD is instrumental in creating concept notes on International ICT cooperation, status report to PMO and several activities related to Digital India.

NeGD is a central agency for implementation of Capacity building scheme. It has also been significantly contributing towards spreading the awareness about the Digital India Programme through Social Media, workshops and several outreach programmes.

NeGD has recently taken several new initiatives to bring paradigm shift in the entire eco system of e-Governance in India. These initiatives include Digital Locker System, Rapid Assessment System (RAS), GIS as Decision Support System, Centralized e-Governance Competency Framework, etc. that have already been implemented and currently being scaled up. Some other initiatives including Unified Mobile Application for New Age Group (UMANG), India Language Support on all Mobile phone, etc. have been conceptualized.

9.6 Government's IT infrastructure: National Informatics Centre (NIC)

NIC was established in 1976, and has since emerged as a "prime builder" of e-Government / e-Governance applications up to the grassroots level as well as a promoter of digital opportunities for sustainable development. NIC, through its ICT Network, "NICNET", has institutional linkages with all the Ministries / Departments of the Central Government, 36 State Governments/ Union Territories, and about 650+ District administrations of India. NIC has been instrumental in steering e-Government/e-Governance applications in government ministries/departments at the Centre, States, Districts and Blocks, facilitating improvement in government services, wider transparency, promoting decentralized planning and management, resulting in better efficiency and accountability to the people of India.

NICNET, the nationwide Network has more than 70,000+ end users. There are 2953 e-Services from various ministries, States/UTs and all Mission Mode Projects (MMP) with over approx. 1345 crores eTransactions till date. *Citizens* across India access NIC portals every day for information and services. The data centres of NIC host more than 8000+ websites of the Government in the secured environment. The NIC National Cloud (Meghraj) is presently hosting a number of critical applications on over 5000 virtual servers in the cloud environment. A new state-of-the-art data centre at Bhubaneshwar being set up. NIC has the largest e Mail service of the country with more than *220 million* e-Mails transacted per month. It

has the largest Video Conferencing network in the country facilitating around 25000 multisite conferences with total of 3,00,000 site hours of VC sessions conducted. Over National Knowledge Network (NKN), a total of 1511 links to various institutions have been commissioned and made operational. NIC is providing vital support to PRAGATI (PRo Active Governance And Timely Implementation of various government schemes) wherein Hon'ble Prime Minister monitors implementation of critical projects of various ministries / Departments across the country.

9.6.1 NIC IT Infrastructure

Data Centres Infrastructure

New National Data Centre (NDC) at Bhubneswar is being setup. At NDC Shastri Park, 90 server racks power capacity upgraded from 5KVA to 10KVA. A new NDC at Bhopal is being planned in 5 acres land. At Internet Data Centre (IDC),NIC-HQ, renovation work is in process. Tender evaluation for selection of agency is in progress. NDC Hyderabad renovation work for 100 racks is in process. At NIC-HQ for power redundancy is buildup. Solar based UPS systems for NIC District Centres is under progress. NIC State Data Centre basic infra work at Shillong completed and for Gangtok, Itanagar, Goa, Dehradun proposals in process. DDA has allotted 5 acres of land to NIC for office/New Data Centre Complex.

e-Learning Services

NIC over the virtual classroom environment has successfully conducted 1049 i-Class sessions with 12956 participants, 1142 i-Meetings sessions with 10133 participants and 17 i-seminars with 1844 participants. Some of the main usage were - CEC (Consortium for Educational Communication) online orientation training on regular basis regarding MOOCs for Subject Experts and Technical Staff located at 17 Media Centres across the country. E Learning Session were used to train 3500 personnel on Central Public Procurement portal. Training was provided to manpower at 500 locations on Computerization and Computer networking of consumer forum in the Country (CONFONET). E-learning was also used in Digital India Week (DIW) to provide training to district officers of NIC.

eMail and SMS Services

NIC provides messaging services to entire Central and State Government. A comprehensive web based

Messaging Service has been extended to all the Ministries and Departments of the government, including the offices of the President and Prime Minister of India and Indian missions abroad. The primary setup is at Shastri Park, the near DR setup has been configured at IDC Delhi. The primary email domain is userid@gov.in. The email policy has been approved by Committee of Secretaries. The service with infrastructure to handle 5 million users will be operational soon. The tender for the upgradation of the service has already been initiated and it is expected that the same would be completed soon. SMS Gateway Services: An SMS gateway has been setup to integrate the various applications hosted by NIC for sending alerts and updates. Since its launch it has advanced features like international SMS, toll free number, and outbound dialing. The SMS application is a Web- enabled Government to Business (G2B), Government to Citizen (G2C) and Government to Employee (G2E) interface. This was setup in NIC with the objective to empower Govt to connect with its users through their applications. Projects with scattered field-force can access and update centralized information database from anywhere using their mobile phones. The approx traffic per month is 30 crore. The service has been augmented by integrating for the first time in the government a application push and pull service with a two way SMS communication on a short code.

9.6.2 NICNET – E- Governance Network Backbone

Core of NICNET backbone is fully upgraded 10 Gbps with sufficient redundancy. States are connected through multiple 1/10Gbps links and districts 34/100 Mbps links with redundancy built at State and District links. Last mile redundancy for NICNET has been extended to more number of districts, with primary link from BSNL and secondary links from Railtel/PGCIL. Most of the Bhawan links at Delhi which are currently on 34 Mbps are upgraded to 100 Mbps and those are on 100 Mbps are upgraded to 1Gbps. Direct peering of NICNET with BSNL is completed at Delhi and Hyderabad for saving Internet Bandwidth and faster access of each others Network. Peering with Google and Akamai Content Delivery Network for faster access to Google services and other important International web sites. Re-structuring of Video-conferencing network to minimize delay and capable to handle large scale important video conferencing such as PRAGATI of Hon'ble PM. Global server Load Balance setup at NDC, Shastri Park and Hyderabad and many

websites migrated for seamless fail-over. Improvements in design change up to District PoP has been done to provide requisite SLAs to NICNET customers. The management and monitoring of various links and applications are monitored both centrally at Delhi and in distributed manner by respective State NOC. Network is configured to run completely on IPv6 along with Current IPv4. IPV6 is extended to Data Centres to make more no of web sites available on IPv6. Internet services to users and to data centres are provided to ensure that the applications hosted in the data centre are accessible to all the users across the globe with minimum latency and to provide smooth Internet access to all NICNET users throughout the country.

9.6.3 NICNET - VSAT Services

NIC has been running satellite based VSAT Network for providing Data and Video conferencing services for more than two decades. While most of the Network connectivity has been migrated to high speed terrestrial and broadband services, however, there are areas with difficult terrain such as North Eastern States, hilly regions of Himachal Pradesh, Uttaranchal and J&K, which are dependent on the VSAT based Network services offered by NICNET. Some of these locations have VSATs as primary source of connectivity, while others utilize VSATs as backup connectivity, where terrestrial leased lines are not stable. In addition to this, NIC is also providing satellite bandwidth from NICNET pool to various projects of Central/State government departments for delivering e-Governance services to the rural citizens of India at their doorstep. For the above VSAT services, NIC has leased transponder bandwidth from ISRO on the INSAT-4CR satellite. NIC is also providing VSAT services through NICSI to various Ministry funded projects of National importance. This includes Common Service Centers (CSC) project of DeitY to provide broadband type internet enabled connectivity in geographically difficult locations of NE States and other parts of the country, for delivering e-Gov and other Social Sector services at the grass root level. Another such venture is the NECP project of MHA for the National Disaster Response Force (NDRF) Battalions. The VSAT connectivity is being provided using Fixed and Quick deployable VSATs which can be carried to the disaster sites anywhere in the country by the NDRF personnel for setting up Emergency Operation Centers (EoC), during crisis situations for facilitating relief and rescue work like Nepal earthquake etc.

9.6.4 Video Conferencing (VC) Services

VC Division is engaged in providing Multipoint conferences over NICNET from its 631 existing studios spread across India. NIC augmented its infrastructure to cater very large conferences involving more than 150 locations in a VC Session being chaired by Hon'ble PM for PRAGATI. Hon'ble President of India has addressed Students of various Centrally funded institutions on 10th Aug 2015. Hon'ble President also addressed and interacted with Hon'ble Governor of States/UT on 10th Jan 2015. Hon'ble Prime Minister initiated an ambitious program PRAGATI (PRo Active Governance And Timely Implementation of various government schemes) by interacting will all Secretaries to Government of India and Chief Secretaries of States / UTs every month. Hon'ble PM has so far chaired 8 PRAGATI VC sessions till date. Hon'ble PM also interacted with school children on occasion of Teachers Day over Videoconferencing on 4th Sept 2015. Various Union Ministers have interacted with Press over Videoconferencing on multiple occasions. Important meetings were conducted over NICs Videoconferencing facilities e.g. Cabinet Secretary (92), Chief Ministers (69), Central Information Commission (10,500), Election Commission (246) etc. Around 25000 multisite conferences with total of 3,00,000 site hours of VC sessions were conducted saving more than ₹ 1000 crore to the exchequer. Web based VC implemented over NICNET is being utilized by Central & State Governments. It is being used extensively by Government of Madhya Pradesh for educating students of 400 Tribal Schools and Colleges.

Hon'ble Prime Minister Holding PRAGATI Videoconferencing session with All Secretaries to GoI and Chief Secretaries of States/UTs

9.6.5 Open Technology Group (OTG)

The OTG continued to support the project teams to understand & adopt the Open Source Software solutions. The Security clearance of Drupal Projects was continued for projects ACB-Telangana & Organic Farming - Maharashtra. Kick Started DVD for e-Courts, e-Committee & Supreme Court of India. Support to CDAC team on BOSS Linux for testing & integrating the Digital Signature Tokens. Help to National Transport Project for Single Sign on & to Tamil Nadu for Platform Independent Signature Module. OTG Assisted Digital India Project team for performance configuration. Pilot done for FCI application design compatible for desktop and mobile. Support continued to ORS for e-Hospital, DDU-GKY, Division, Ministry of Rural Development, Public Financial Management System, Service Delivery Platform, OCMMS for TN, Kerala and Punjab, RTIMIS, WB SME for Configuration, Performance Tuning, Operations & debugging. Submission of proposal for adoption of Open Technology related components under NesT project of DeitY. Testing of Pilot module PGRS for e-Municipality. A workshop was held for effective implementation of the Policy on adoption of Open Source Software in e-Governance Projects. Compilation of information on Projects developed by NIC using a Survey to capture information on use of Open Source Tools. Preparation of CentOS-7 templates for the NIC Cloud environment.

9.6.6 Software Development Unit (SDU), Pune

SDU, NIC, Pune is developing software applications for Finance, Agriculture, Registration, Land Records & Education mainly for Maharashtra & few other States. The eCourts (Case Information System-CIS) for District & Taluka (National Core) is implemented nationally in 28 States at 4784 locations. The web enabled version of CIS was released for pilot implementation in 13 States and tested & operationalized at 364 establishments. The Online Clinical Trials Application Monitoring System which is web application & cloud enabled has been developed & released for Central Drugs Standard Control Organisation. The Web enabled Marriage Registration s/w was launched in October 2015 for citizens on IGR website for 3 districts & is shortlisted nationally to be redeveloped as a product for all the States. The applications for Right to Education (RTE) 25 admissions & Sanch Manyata are developed & released. Application Sevaarth which is the rule based integrated web enabled general education databases(School, Student & Teachers database) as a payroll package is developed by SDU, Pune & was shortlisted by CAG to be used for all central govt. offices nationally which will be made part of PFMS.

9.6.7 Software Development Unit (SDU) & Training Centre Kochi

The application support and implementation has been done for following: e-Coir (Coir Sector MSME Benefit Management System), Fisheries Marketing and Production Management System (FMPMS) for NIFPHATT, Common Admission Test (CAT) 2015 for Cochin University of Science & Technology for real-time counseling and admissions, Web Portal for Kerala State Mediation Centre, Web Portal for Employee State Insurance, KOMPAS - Mines and Geology Movement and Permit Management System, BAS Implementation in Central Organizations, Payroll, Personnel and Budget Management Systems for NIFPHATT, NOC or POP for 47 Locations including Airport, few districts, CBI, NIC Lakshadweep etc., Web Services and Security Audit Support and Training Services for Central Organizations, eOffice implementation in Spices Board and Coir Board, HAWALA database for Enforcement Directorate Web Portal for CIFNET etc.

9.6.8 National Informatics Centre Services Inc. (NICSI)

NICSI provides total ICT solutions comprising of consulting, resources, hardware, software, design & development, quality check, operations & management, as well as end-to-end ICT solutions & services to Central/ State Government Departments and Organizations including state-of-the-art solutions in all ICT related domains. During F Y 2015-16, NICSI has continued these activities. By the end of the financial year, NICSI would be involved in implementation of around 2500 + new projects. NICSI has also added number of new clients, products and services to its list. Some of the major projects under implementation includes National Optic Fibre Network (NOFN), Immigration, Visa and Foreigners Registration & Tracking (IVFRT) Centre, Collaborative Application Development Platform by opening the Source Code of Government Applications, Portal Development of Digital India Programme, Computerization of Central Administrative Tribunal (CAT)-Implementation of Case Management System (CMS), National Centre for e-Governance Standards & Technology (NeST), Asset Mapping of Panchayats, Digital Signature to Lok Sabha MPs, Project Proposal for funding of eTaal 2.0, E-mail solution for Government of India, Aadhaar Enabled Biometric Attendance System (AEBAS) for Government of India Offices in Delhi, Jeevan Pramaan-Awareness, Prison Management Information System and Govt. of Telangana and Andhra Pradesh.

9.7 Standardization, Testing and Quality Certification: STQC services at a glance

STQC Directorate is an attached office of Department of Electronics and Information Technology, Government of India. A network of Testing and Calibration laboratories has been established by STQC Directorate across the country including North East region. The laboratories are equipped with state of the art standards and equipment. These laboratories provide Testing, Calibration, Training and Certification services to industry. Many national and international accreditations/recognitions have made these services widely acceptable not only in India but at international level also. Currently, STQC services are being utilized by more than 10,000 organizations representing the entire segment of industry, Government departments, R&D organizations etc. With this STQC has established itself as a premier organization for Quality Assurance in the field of Electronics and Information Technology (IT) in the country. Services offered and locations of Laboratories / Centres are indicated below

Laboratories/Centres	Locations	Services offered
Electronics Regional Test Labs (ERTLs)	Delhi, Kolkata, Mumbai, Thiruvananthapuram	Testing and Calibration
Electronics Test & Development Centres (ETDCs)	Bengaluru, Guwahati, Hyderabad, Chennai, Mohali, Pune, Goa, Agartala, Jaipur, Solan, Ajmer	Testing and Calibration
IT Centres	Delhi, Bengaluru, Hyderabad, Kolkata, Chennai, Pune, Guwahati, Mohali, Thiruvananthapuram	Testing of IT solutions for Functional and Non-functional (Performance, Usability, Security, etc.) parameters

Laboratories/Centres	Locations	Services offered
IT Centres; Common Criteria Test Lab	Kolkata	Testing of IT products for Security
IT Centres; Bio-metrics Devices Test Lab	Mohali	Testing and Certification of Finger Print Scanners, Cameras and Iris Scanners
Centre for Reliability	Chennai	Reliability testing
Indian Institute of Quality Management (IIQM)	Jaipur	Training courses on Quality Management, Information Security, Website Quality etc.
Centre for Electronic Test Engineers (CETE) – Capacity Building	Bengaluru, Kolkata, Hyderabad, Pune, Noida, Delhi	Practice oriented skill based Training programs
Regional Certification Centres	Delhi, Kolkata, Mumbai, Bengaluru	Certification services for Quality Management and Product Safety, Information Security Management, IT Service Management

STQC also supports Government policies, initiatives and programs concerning Standardization, Quality Assurance and Management besides providing above mentioned services to the industry on commercial basis. A number of projects sponsored by the Department in the area of Software Quality Assurance, Information Security Management, Quality Assurance of Indian Language Technology & Products have been executed.

STQC has also been contributing in quality assurance of Digital India, Make in India initiatives of DeitY and also in Skill India.

9.7.1 Standards

In order to bring in Standardization in e-Governance, a National Centre for eGovernance Standards & Technology (NeST) at New Delhi with satellite centre at Bangalore and Kolkata have been established with following objectives -

- Developing and adopting ICT Standards and Technologies for effective and efficient implementation of e-Governance projects in India.
- Promotion of innovation to facilitate standardization of technology and processes.
- Undertaking capacity building at various levels in order to facilitate understanding of Standards and Technologies.
- Facilitating compliance by developing assessment

and evaluation methodologies.

- Promoting adoption of Open Technology which include Open Standards and Open Source Software to avoid vendor lock-in.
- Working closely with National and International agencies developing and promoting ICT Standards and Technologies.

9.7.2 Quality in Electronics

Test and Calibration Services

STQC laboratories have provided test and calibration services to a large number of industry, public sector undertakings and Government organisations. Some of the major Testing and Calibration projects undertaken during the period are indicated below-

Safety Testing

- Part of cell transaction unit as per IEC 60950-1-2013.
- Thin client computer system (CRS as per IS-13252-Pt1)
- Juicer mixer grinder (JMG) as per IEC 60335-2-14.
- Bed side patient monitor (Medical Equipment) as per IEC-60601-1 or 1-2 & 2-49
- Panel mount fuse holder as per IEC-60127-6
- Surge Protection Device(SPD) as per IEC-BSEN-61643-11

System testing

- Testing of Data Wall TV
- Power Adaptors for IT equipments, Mobile phones, Cash registers, Point of sale terminals, Copying machines / Duplicators, Smart card readers, Mail processing machines / Postage machines / Franking machines, Passport reader, Power bank for use in portable applications as per IS 13252 (Part 1).
- Power adaptors for Audio, Video & similar electronics apparatus as per IS 616.
- D.C. or A.C. Supplied Electronic Control gear for LED Modules as per IS 15885 (Part 2/Sec 13).
- Uninterruptible Power Systems (UPS) as per IS 16242 (Part 1).
- Microwave Ovens as per IS 302(Part 2/Sec 25).
- Clocks as per IS 302(Part 2/Sec 26).
- Initiated testing of Biometric Attendance Devices as per DGS&D specifications.
- Initiated type test of VRLA Batteries upto 225AH as per IS:13369

EMC Testing

- For WPC Parameters: Wireless Access point, Mobile Signal generator (repeater), In Vehicle Router & Wi-Fi Access, Wireless RF ID Equipment, Wi-Fi Access point, Multi Radio Mobile Access & Application
- As per TEC Specs: Router EPABX etc.
- General EMC Specs: Fiber Optic Multiplexer FOX 505 ABB, Power Interface unit 10 KVA & 15 KVA, Video endoscope processor, Bus display Board, Home automation system, Network camera, PIS, Endo Washer Cook Top, Cook Top, MINI ROV, Tactical Access Switch, Vending Machine, Set top box, Ethernet to E1 Converter, Finger print scanner, Bluetooth Dongle, High Frequency Electrosurgical Apparatus

Environmental Testing

- Ribbon optical fiber splicing machine and Ethernet traffic analyzer as per QM-333, cat-b. Testing witnessed by BSNL representative.
- Environment test on Rubber below flexible ducting as per JSS 55555. Testing witnessed by DGQA official.
- Brake control unit (for electric & diesel) and pneumatic panel testing carried out as per railway specification, IEC-61373.

Calibration

- Calibration of equipment for water level of DAM measurement for NHPC.
- Air craft fuel tank tester calibration

Highlights of Testing and Calibration Services in STQC Labs

- ETDC Bangalore is NABL accredited for the Electro-technical (DC to 40GHz), Non-Electrical (Temp./RH) & parameters with enhanced Scope of Accreditation covering EMC parameters and Mechanical parameter (Acceleration).
- ETDC(Ch) has carried out Calibration and Testing of over 300 numbers of Electronic Energy Meters for the Tamil Nadu Power Generation and Distribution Company (TANGEDCO), TNEB, Wind Farms, Bio-Mass Energy producing companies and co-Generation plants in Tamil Nadu in their mission to proliferate usage of electronic meters for accurate metering and also to curtail losses on the part of the generation as well as consumer, public and industries
- ERTL (W) has provided environmental test services for testing of X-Ray machines manufactured by M/s Bharat Electronics Limited, Pune for its use in screening of baggage at Railway & Metro Stations. Environmental Stress Screening (ESS) of populated PCBs and sub-assemblies were also undertaken for the vendors of Indian Defence establishments.
- Centre for Reliability, Chennai has carried out Accelerated Reliability Testing of 24 modules of Complex Programmable Logic Devices (CPLD) and their associated bias test circuits used in long term Reactor Control systems for IGCAR, Dept. of Atomic Energy, Kalpakkam. Also, carried out Reliability Prediction Analysis of Stabilised Optronic Pedestal for Indigenous Aircraft Carrier deployed for surveillance, observation and effective engagement of stationery and moving targets with ability to process image and enhancement to improve performance at night and limited visibility conditions. This analysis was carried out for Bharat Electronics, Ministry of Defence, Nandambakkam, Chennai.
- **Medical Electronics lab of ERTL(S):** It has got accreditation for testing medical electrical equipment as per IEC 60601-1 3rd edition for Defibrillator, Electro cardiograph , Bed side monitors and High Frequency

Surgical diathermy by IECEE as CB test lab and has carried out testing of medical equipment for several manufacturers which has enabled them to get 'CB' certificate and 'CE' marking for these products. The lab has carried out calibration of medical electrical equipment like ECG, Defibrillator, High Frequency diathermy equipments, Blood Pressure monitors and similar sophisticated equipments of several hospitals in and outside Kerala.

STQC's continuing participation in Space Programmes

ERTL(S), Thiruvananthapuram has carried out screening of more than seventy five thousand components which includes LCR devices, Discrete devices, ICs-digital & Linear of different packages leaded as well as SMDs for our major customers like Tata Institute of Fundamental Research (TIFR) and Indian Space Research organizations viz. VSSC, LPSC, MVIT and IISU. Qualification tests are being carried out regularly for different types of components for space application viz. screening of isolators used for mounting various Electronic packages used in GSLV/PSLV launch vehicles. Stack level testing of Advanced Telemetry System used in PSLV/GSLV launch vehicles has been initiated and more than 28 stacks have been evaluated. ERTL(S) is regularly conducting Test & Evaluation of power modules (50 nos) and Data. Acquisition units (30 nos) used in GSLV/PSLV. Actions initiated for taking up evaluation of Navigation, Guidance and Control (NGC) packages of launch vehicles. VSSC has identified ERTL(S) as a major test centre for screening of SMD Devices. ERTL(S) also carried out screening of RTD sensors and new types of Transient Absorption Zeners and has developed test facility for screening of Low Voltage Integrated Circuits.

National Accreditations of Test and Calibration facilities

It is the constant endeavorur of STQC to obtain accreditation or recognition of their services from national or international bodies.

9.7.3 Quality in Information technology (IT) Strengthening of STQC IT Services

IT Centres have been provided with versatile software tools to further strengthen their services. STQC IT Centres have successfully executed Testing and Assessment of the number of e-Governance, Defence and major IT Projects of Central and State Governments. Some of typical projects are indicated below-

1. STQC IT Services has completed the evaluation of e-District (State MMP) application pilot projects for most of the States in the eastern and north eastern part of the country. out of which State of Mizoram has already completed state wide roll out and presently the application being used extensively. The e-district State roll out application for West Bengal and Chhattisgarh has also been evaluated. The functional testing of e-District application of UT of Daman Diu and Dadra Nagar Haveli has also been completed. The successful roll out after this evaluation facilitates various services like Issue of Certificates, Social Welfare Schemes, Ration Cards, Education, Health etc. for all citizens across these States.

2. The third party evaluation of the Integrated Financial Management Information System (IFMIS) of Govt. of Madhya Pradesh, a State MMP and one of the largest project in terms of volume and scope in financial domain, is in the final stage. The integrated solution for the State of Madhya Pradesh which includes IFIMS , HRMS & PENSION Application, comprising of 16 integrated modules like project management, planning, budgeting, purchase and inventory, receipts and disbursement along with debt and investment, strong room, deposits and GLA module covering 50000 active users and 3500 concurrent users impacting 7 Lakh State employees.

3. Conformity assessment of e-Auction system for Mining Lease has been completed in time bound manner. The system is developed and managed by MSTC, Kolkata.

4. Conducted annual TPA (Third Party Audit) of Passport Seva Project of Ministry of Economic Affairs (MEA) to assess functionality, security and IT service delivery of the project.

5. Conducted conformity assessments of State Portals, E-forms and State Service Delivery Gateways (SSDG) of North East States of Arunachal Pradesh, Tripura, Assam and Union Territories of Damam-Diu & Dadra Nagar Haveli and Chhattisgarh State. The conformity assessment includes certification of State Portals as per Guidelines for Indian Government Websites (GIGW 2009) requirements, Certification of Services through E-forms, Application Security testing of

Portals & E-forms, Vulnerability Assessments of IT Infrastructure and Functional verification of SSDGs. Also carried out the audit of Service Level Agreements (SLA) for monitoring of the State Portals & E-Forms applications pertaining to Bihar and Chhattisgarh.

6. Under the Project 'Strengthening STQC IT Centres for Website Quality Testing to support e-Governance Implementation in India' 20 websites of various Ministries /Departments of Government of India were evaluated as per Guidelines for Indian Government Websites (GIGW 2009). Total 150 websites were tested for GIGW compliance so far. This included important websites like 'mygov', 'President of India', 'etaal' etc.

7. Conducted TPA (Third Party Auditor) audit for various SDCs (State Data Centre) for North-East States (Tripura, Meghalaya, Manipur, Sikkim), and other states (West Bengal, Odisha, Chhattisgarh). The audit is carried out to ensure that the Infrastructure & Utilisation, Security, Service Level Agreements and Operation & Management audits done by TPA are adequate in terms of audit methodology, findings & their follow up.

8. System and Software Testing of Akash Weapon System Simulator (AWSS): STQC IT Services Bangalore has taken up System and Software testing of Akash Weapon System Simulator (AWSS) for Vehicle and Classroom version for Indian Army. Simulator provides complete sequence of Akash Weapon system operations that are available in actual weapon system to the commanders and operators under training.

9. Acceptance testing of e-Biz project: STQC IT Services has taken up Acceptance testing for more than 15 Services which included the integration testing for Joined-Up services. Joined-Up service provides immense value to the businesses by joining up the workflow of the backend departments in such a manner that a single request from the business user is routed to the appropriate government Departments/ Authorities in a logically sequential manner so as to minimize the delays due to dependencies typically observed in G2B interactions.

10. e-Security Testing and Assessment: STQC IT Services provides Web Applications Security Testing/Assessment services VA/PT and Network Security Assessment Services to various government and semi government departments.

11. The services provided to Bangalore Water Supply and Sewerage Board (BWSSB), Bangalore Electricity Supply Company Ltd. (BESCOM), Directorate of Electronic Delivery of Citizen Services, Karnataka Udyog Mitra, Department of Stamps and Registration, Karnataka Renewable Energy Development Limited, Department of Labour, Department of Transport and Road Safety, KSSIDC Limited, Karnataka Resident Data Hub (KRDH), E-GOV SSA Office, State Level Environmental Impact Assessment Department, Income Tax Department, Principal Controller of Defence Accounts, ISRO, Antrix Corporation.

9.7.4 Common Criteria Evaluation and Certification

An infrastructure for Testing and Certification of IT Products for Security Specification compliance as per Common Criteria Standard has been established at STQC Kolkata with DeitY`s initiatives. The salient features are indicated below -

• Considering the national initiative of 'Digital India' and emphasis on the need for a safe and secure cyber eco-system, the infrastructure has been established for security testing and certification of IT products in accordance with the globally accepted Common Criteria (CC)/ ISO 15408 standards.

• India has been awarded the status of a `Certificate Authorising Participant', hence the testing and certification in India is acceptable to all the CCRA member countries such as USA, UK, Germany France, Japan, Korea etc.

• This initiative also has the opportunity of making India a hub of security testing and certification of IT products, catering to global needs, as has been done in IT services sector, coinciding with the vision of `Make in India' program.

9.7.5 Certification Services

STQC Certification Services has broadened its scope of certification and is now providing Certification Service in Quality Management System, Product Certification, Information Security Management System, IT Service Management, Website Quality, Smart Card, Biometric Devices along with a host of other schemes for the benefit of the industry and government organizations. It caters to the need of third party certification for the products in line

with National and International Standards and schemes.

9.7.6 Training services

Indian Institute of Quality Management provides training to industries and organizations in the area of Quality Management System (ISO 9001), Laboratory Management System (ISO 17025 and ISO 15189), Information Security Management System (ISO 27001), IT Service Management (ISO 20000).

- 23 training programs were conducted by CETE(Noida) where in 249 officials from 112 organizations were imparted training

- A tailor made course on 'Electrical Measuring Instruments for Mechanical Engineers for RITES' was designed and conducted.

- 14 courses, 308 participants trained on ISO/IEC 17025, Uncertainty Measurement, CSTM, ISMS-LA & Awareness courses by ETDC(Bg).

- Conducted an exclusive 5 day training program for 25 Scientists from Defence Laboratories all over India on "Quality Assurance and Quality Control in Product Design and Development"

- ETDC, Guwahati & Agartala are regularly conducting training course specially for the NE Region where in IAF officials, Industrial Entrepreneur, SC/ST/OBC/Economically backward section of the society, Nursing and other students community are the beneficiaries. ETDC, Guwahati & Agartala conducts courses on 'Information Security Management-Basics', 'Laboratory Quality Management', 'Office Application Software', DOEACC Accredited "O" & "A" Level, 'PC Fundamentals', "PC Hardware & Server Management", 'Computer Fundamental & Networking' etc.

- ETDC Chennai has conducted two National Level Reliability Engineering open training programs named "Certified Reliability Professional (CRP) Program" during this year. The program has been designed with latest tools and techniques practiced in Reliability Engineering worldwide. Non-resident Indians who work in Middle East and Europe have participated in this program.

9.7.7 Activities in North-East region

Test & Calibration services of ETDC Guwahati & ETDC Agartala are extended to the organizations located throughout the NE Region covering all the 8 States towards improvement of Quality of their products and services. The services are received by most of the small, medium and large scale industries covering the industrial sectors like – Oil & Natural Gas, Refineries, Exploration units, Railways, Power – Generation, Transmission & Distribution, Cable & Conductors etc. To make the STQC services available at the door steps of the customers' site located at various places in the remote corners of NE Region, about 29-Nos. of on-site calibration camps have been organized by ETDC Guwahati to facilitate the qualitative requirements of the industries and technology users.

About 280 – SSI(68), MSI(24) & LSI(30) and other organizations including Health Care units. 21 Govt. departments, 30 PSUs, 89 Private and 18 other organizations are the beneficiaries of these services.

Initiatives in IT Test & Assessment Services in North East Region

Initiatives have been taken towards facilitating services in the field of Testing/Assessment of Software Applications, Website/Web Applications, IT Infrastructure under various e-Governance projects like –Website Quality, e-District, SSDG/SP/e-Forms, SDC, SWAN etc. being implemented in the States of NE Region. ETDC Guwahati & ETDC Agartala together have tested about 48 - nos. of Websites corresponding to Govt. / Semi Govt. organisation for their Functionality & Quality in compliance to the 'Guidelines for Indian Government Websites (GIGW)'. ETDC, Guwahati also conducted Security Test/Assessment of Web Application in compliance to security requirements of OWASP International guidelines. Beneficiaries are the Govt./PSU/Autonomous/Society/Educational   Institution/ Research Centres & other organization of the country.

ETDC Guwahati & ETDC Agartala carried out SDC-TPA assessments/audits of the State Data Centres projects of North Eastern States to assess the various requirements of Audit frameworks & procedures, Infrastructural, O&M process and control, Service Level Agreement, Usage, Security, Functionality & Qualitative parameters towards improvement of quality of SDC services.

9.7.8 Implementation of Raj Bhasha

- ETDC(Mohali) received Second Prize from Ministry of Home Affairs in Oct, 2015, for implementation of Official Language Policy in Region 'B' (Category-Office) of North India.

- ETDC Goa, is notified by Govt. of India under sub-

rule (4) of Official Language Act 1976 for more than 80% of its staff having working knowledge of Hindi. Parliamentary Committee on Official Language has inspected Official Language work of ETDC Goa in January 2015. The Honorable Members of the Committee appreciated the Official Language work done by ETDC Goa.

9.7.9 Development of SC / STs and Weaker sections

• Conducted a number of courses on industrial automation under STQC Programme for Women & SC/ST participants & North East Region Students by ERTL (E)/ETDC Guwahati & Agartala.

• ETDC (Hyderabad) conducted three batches of job-oriented long term training on "Industrial Automation (Programmable Logic Controllers & SCADA)" exclusively for SC/ST/Minority Youth & Women category students under DeitY sponsorship.

9.8 Aadhaar – A digital platform for Authentication Service: UIDAI

Unique Identification Authority of India (UIDAI)

9.8.1 Introduction

The Unique Identification Authority of India (UIDAI) was established in January 2009, as an attached office to the Planning Commission with a vision, "*To empower residents of India with a unique identity and a digital platform to authenticate anytime, anywhere".*

A key objective of Aadhaar program is to provide an **identity infrastructure** for delivery of various social welfare programs and for effective targeting of welfare services. The potential of Aadhaar can be realized through its use of the infrastructure as an ID proof and as a unique key by various State departments, central ministries, PSUs, and private sector entities to provide service delivery to residents in an integrated fashion.

There are many benefits associated with such integration for the various stakeholders that range from better compliance management to significant savings in leakages and increased efficiency and accountability in service delivery.

In order to carry forward the mandate given to UIDAI,

besides its Head Quarters in New Delhi and technology Centre at Bengaluru, UIDAI had set-up eight (8) regional offices at the following locations at Bengaluru, Chandigarh, Delhi, Guwahati, Hyderabad, Lucknow, Mumbai and Ranchi.

UIDAI is presently headed by Director General and Mission Director. The UIDAI Headquarter has seven functional divisions, headed by a Deputy Director General (Joint Secretary level officer). Additionally, each of the eight (8) Regional Offices is headed by a Deputy Director General.

9.8.2   Value Proposition of Aadhaar

Uniqueness

Any individual, irrespective of age and gender, who is a resident in India and satisfies the verification process laid down by the UIDAI, can enroll for Aadhaar. An individual is required to enroll only once; the process is free of cost. In case, the resident enrolls more than once, only one Aadhaar shall be generated, as the **Uniqueness** is achieved through biometric de-duplication.

Aadhaar as Financial Address

As Aadhaar is unique and does not change over the lifecycle of an individual, the 12-digit Aadhaar is sufficient to transfer any payments to an individual. Today, in order to transfer money to a beneficiary, the Governments/Institutions need to know the bank account, IFSC Code, and bank branch details etc. which is prone to change. However, Aadhaar offers the possibility of sending money by just using the 12-digit number for life without bothering about any changes in the bank account of the individuals. Thus, with this unique property of being valid for a lifetime, Aadhaar is very well perceived as a Financial Address in the banking sector.

Authentication

One of the other challenges the resident frequently faced was to establish his/her identity. The problem gets further complicated owing to the fact of using proxy documents and circulation of counterfeit documents in the country, which leads to lack of trust between service providers and the resident. However, Aadhaar's property of **Authentication** enables an Aadhaar holder to authenticate with a service provider Anytime, Anywhere in the country to prove his/her identity. To facilitate this,

UIDAI has established an ecosystem based on best global practices to ensure data privacy and reliability of authentication, with UIDAI being agnostic to the fact as to why was the authentication done.

9.8.3   Approach and Strategy: Enrolment Ecosystem

Enrolment Implementation Model

Aadhaar enrolment ecosystem is built in partnership with multiple Registrars, wherein Registrars are primarily State Governments, Public Sector Banks, Registrar General of India (RGI), etc. All the Registrars in the ecosystem are signatories to MoUs with UIDAI.

As on date, UIDAI has partnered with 101 Registrars, wherein 40 Registrars are from State/UTs, 31 are PSUs/PSBs and 30 are Central Ministries/Departments.

Enrolment Philosophy

One of the key considerations is to keep the Aadhaar system purely focused on identity. The Aadhaar system only collects minimal data to provide unique identity, issue the Aadhaar after biometric de-duplication and manage lifecycle changes of that identity record.

As recommended by the Demographic Data Standards and Verification Committee Report (DDSVP) and Biometric Standards Committee, the UIDAI is collecting bare minimum demographic information from the residents such as Name, Age, Gender, Address, Biometric (photograph, ten fingerprints and two iris) and Relationship details in case of minors.

While the above fields are mandatory for every enrolment, there are other optional fields, such as e-Mail and Mobile Number. In case of children below 5 years age, biometric information is not collected and their Aadhaar is linked to parent's/guardian's Aadhaar.

Enrolment Statistics

Enrolment Status as of **31st Dec 2015** (%age as per projected population 2015)

- Total Enrolments – **111 crore**
- Total Aadhaar generation – **95.23 crore (74%)**
- 18+ Aadhaar generation – **72.23 crore (90%)**
  - UIDAI States/UTs –58.61 crore (94%)
  - RGI States/UTs – 13.76 crore (75%)

- Total records rejected due to duplicates, errors, process violations – **12.18 crore**

The current average of Aadhaar generation is approximate 4 Lakh per day.

Updation

In order to maintain the data of the residents current and up-to-date, UIDAI has provided an institutional mechanism to enable residents to update their data. The updates include corrections and/or changes in the demographic details of residents due to change of address, mobile number or change of name after marriage, etc. and biometric attributes that need to be updated by the children upon attaining the age of 5 and 15 years, etc.

UIDAI has institutionalized the process of Updation through post, manual updation through its Permanent Enrolment Centres and electronic/online Updation through its Self Service Update Portal (SSUP).

As on 31st Dec 2015, over 16 thousand Permanent Enrolment Centres (PECs) existed across the country, which in addition to Aadhaar enrolments facilitated Updation services. UIDAI received total of 2.56 Cr updation requests, out which 2.38 Cr were approved and updated. Out of the total requests 18 lakh requests were rejected and 3.61 lakh are pending.

Enrolment Drive of Children below 5

In compliance to the UIDAI's policy, Aadhaar is issued to all residents including the children below 5 years of age. However, the biometrics viz. fingerprints and iris image is not captured for children below 5 years of age. In lieu of the same a dedicated client called "**Child Enrollment Lite Client**" has been developed to capture the demographic data and photograph of the children below 5 years of age. In order to facilitate and expedite enrolment of approximately twelve (12) crore children in FY2015-16, UIDAI intends to leverage the Aaganwadi worker network through partnership with Ministry of Women and Child Development.

Document Management System

UIDAI has deployed Aadhaar Document Management System (ADMS) to store physical sets of records provided by the resident at the time of enrolment both in electronic as well as physical form in a secured manner.

Currently, around 65 crore EID sets have been physically and electronically archived. However, to do away with collection of physical documents, a decision has been taken to introduce scanning of documents at the time of enrolment itself by enrolment operator.

Recovering Lost EID/UID Number

When a resident loses his/her EID slip or UID number/letter, UIDAI has developed a process to recover the UID number by an Aadhaar holder. This requires an 'Identity Check' which involves capturing the resident's biometric and demographics and comparing it against the UID database in order to locate the UID number of the resident. This service has been institutionalized through its Permanent Enrolment Centers.

As a special measure, Advance Search and e-Aadhaar download facilities can be used to find out Aadhaar details and download the Aadhaar by the resident. The resident can also use Find EID/UID, verify Aadhaar facilities available on the UIDAI website to recover the EID/UID details.

9.8.4   Aadhaar Letter Printing and Delivery

Each Aadhaar letter comprises a printed, laminated, four-colour document with a photograph, date of birth, demographic information of the person, the Aadhaar number, barcodes and a Quick Response (QR) code. For the printing of Aadhaar letters, UIDAI has on-boarded three printers at various locations. Currently the installed printing capacity is 1.5 million letters per day in 13 different regional languages.

The Department of Post is the partner for delivery of the Aadhaar letters to the residents at the address they have provided at the time of enrolment. Since inception and until 31st December 2015, a total of 94.31 crore Aadhaar letters (this includes 19.6 Crore letter sent by Speed Post) have been printed and dispatched to the Residents through India Post as First Class Digitally Franked articles.

e-Aadhaar

UIDAI has launched the e-Aadhaar portal for downloading the Aadhaar letter in PDF format from the website of UIDAI (www.uidai.gov.in).

The e-Aadhaar, which is digitally signed, is a valid and secure electronic document, treated at par with

the printed Aadhaar letter. In the Aadhaar system, the resident's details can be verified through an established on-line authentication process. Therefore, the e-Aadhaar is acceptable as a valid Proof of Identity and Proof of Address. The relevant circulars have been posted on the website of UIDAI and media campaigns have also been undertaken for wide publicity to the validity of e-Aadhaar. The total e-Aadhaar downloads till 31st Dec 2015 are approx. 32.5 Cr.

Aadhaar Support Services- Aadhaar Sampark Kendra

UIDAI has established a centralized Contact Centre to serve as a helpline to the residents and other stakeholders for interaction on UID related issues, including grievance redressal.

Details of the services are:-

Email: "help@uidai.gov.in"

Contact Number (Toll Free) : 1800-300-1947 or 1947 (Mon-Sat, 7 am to 11 pm) (Sun- 8 am to 5 pm)

At present, Interactive Voice Response System (IVRS) and inbound agent phone support are provided in 12 languages (Hindi, English, Telugu, Bengali, Punjabi, Marathi, Kannada, Malayalam, Tamil, Gujarati, Oriya and Assamese). E-mail support is provided in English only.

Currently, UIDAI's Contact Centre daily receives approximately 1.28 lakh calls and 640 e-mails. Out of the total calls received at the Contact Centre approximately 50% of the calls are being handled and resolved at the IVRS level and rest 50% are being transferred to the Aadhaar Sampark Kendra agent.

9.8.5 Authentication Ecosystem

Aadhaar, being a unique digital ID – provides a powerful platform for authenticating a resident anytime and anywhere which is in line with the vision of the UIDAI. The purpose of Authentication is to enable residents to prove their identity and for service providers to confirm that the residents are 'who they say they are' in order to supply services and give access to benefits.

The UID architecture is designed on an on-line system – data is stored centrally and authentication is done online. This is a forward-leaning approach that makes it possible to avoid the problems associated with many ID card schemes.

Aadhaar Authentication service is built to handle upto 10 crore authentications a day across two data centers in an active-active fashion and is benchmarked to provide sub-second response time.

Aadhaar Authentication

Aadhaar authentication is the process wherein Aadhaar, along with other attributes (demographic/biometrics/OTP) is submitted to UIDAI's Central Server for verification; the Central server verifies whether the data submitted matches the data available in the server and responds with a "Yes/No". As on date, UIDAI supports Biometric (fingerprint + iris) based authentication, Demographic-based authentication and One-time Password authentication.

Authentication Implementation Model

UIDAI provides Authentication and e-KYC services through agencies called Authentication User Agency (AUA), Authentication Service Agency (ASA), e-KYC User Agency (KUA) and e-KYC Service Agency (KSA).

Authentication User Agency (AUA)

AUA is any government/public/private legal agency registered in India that seeks to use Aadhaar authentication for providing access to its services. An AUA is the principal agency that sends authentication requests to enable its services/business functions. An AUA connects to the UIDAI Data Centre/ Central Identity Repository (CIDR) through an ASA (either by becoming ASA on its own or contracting services of an existing ASA) using a secured protocol. As on 31st December 2015, 197 entities have been on-boarded by UIDAI as AUAs and as on 31st December 2015, 114.8 crore authentication transactions have been performed.

Authentication Service Agency (ASA)

ASAs are entities that transmit authentication requests to the CIDR on behalf of one or more AUAs. They play the role of enabling intermediaries through secure connection established with the CIDR. ASAs receive CIDR's response and transmit the same back to the AUAs. As on 15th January 2016, 34 ASAs are on-boarded with UIDAI.

Know Your Customer Agency (KUA)

KUAs are extension AUAs that send KYC requests in electronic manner to enable its services/business

functions. KUA connects to the CIDR through a KSA. As on 15th January 2016, 175 KUA entities are on-boarded on Aadhaar platform; carrying out a total of about 6.7 crore e-KYC transactions successfully, till 16th December 2015.

Know Your Service Agency (KSA)

KSA are an extension of ASA entity that transmits KYC requests in electronic manner to the CIDR on behalf of one or more KUAs. As on 15th January 2016, 21 entities are on-boarded as KSA on Aadhaar platform.

Revised AUA / KUA Eligibility Criteria and on-boarding process

The eligibility criteria for becoming Authentication User Agency (AUA) and/or eKYC User Agency (KUA) has been revised to enable more entities become part of UIDAI eco-system as AUA / KUA and use Aadhaar for service delivery.

The process of AUA / KUA on-boarding has also been simplified which will help entities to quickly start using Aadhaar services.

Authentication alert notification on email

Around 10 crore Aadhaar based biometric / OTP authentication transactions are being performed by AUA / KUA (UIDAI eco-system partner). UIDAI has started sending Email alert notification for every biometric authentication / OTP authentication to the registered email ID of the resident. E-mail notification alert is being sent for all successful and failed authentication transactions with the details such as masked Aadhaar number, time/date of authentication, AUA name, modality of authentication, Status of Authentication (Success / Failed).

IRIS Device Specifications

Iris Device Specifications were drafted more than 3 yrs ago and with the emergence of new category of handheld devices, it was required to assess the feasibility of integrating Biometric sensor in the devices like mobile phones, tablets etc.

POC was conducted by UIDAI for IRIS Devices with IRIS device vendors, mobile manufacturers. Based on the POC conducted by UIDAI and various discussions with Device Vendors, STQC has finalized and shared the non-optical parameters, environmental test specifications.

9.8.6 Aadhaar Seeding Ecosystem

Aadhaar seeding is a one-way process by which UIDs of residents are accurately included in the service delivery database of service providers for enabling Aadhaar based authentication during service delivery. The seeding process is accomplished in two steps. In the first step Aadhaar is to be **captured** into the beneficiary database and in the second step after **verification** with reference to UIDAI database (CIDR) it is linked to the beneficiary record in the database of the service provider.

UIDAI has undertaken multiple activities to ensure Aadhaar seeding is facilitated in various scheme databases. The Aadhaar seeding framework includes:

• A Standard Protocol Covering the Approach & Process for Seeding Aadhaars in Service Delivery Databases is available on UIDAI website.

• Empanelled 48 seeding agencies for undertaking seeding on behalf of central and State departments.

Once the Aadhaar is captured in the Scheme database, it can be verified and linked using different services and facilities offered by UIDAI as follows:

• **Biometric Authentication and eKYC:** These methods provide the most accurate way of seeding but require physical presence of Aadhaar holder at the time of seeding.

• **Demographic Authentication:** UIDAI offers a facility for bulk demographic authentication. Using this facility the demographic data available in Scheme database can be matched with that of UIDAI (CIDR) and confirmed.

• **DBT Data Seeding Data Viewer (DSDV):** The facility permits the departments/ Agencies to view the demographic details of Aadhaar holder directly from CIDR. This facility is limited to participants of the Authentication ecosystem.

Aadhaar seeding in various large databases has grown steadily and as on 31st Dec 2015, a total of 10.81 crore Aadhaars were seeded in LPG database, 5.29 crores in MGNREGS, 9.54 crore in PDS (Ration Card) and 23.01 crore in bank accounts.

Aadhaar Authentication and Seeding Workshops – In order to help understand Aadhaar Services, Applications and Aadhaar Seeding, UIDAI has developed a training module for various Ministries, State Government

Departments, Banks and other organizations. So far, UIDAI has conducted more than 60 such workshops at various locations all over India.

9.8.7 Training, Testing and Certification ecosystem

UIDAI has worked diligently to create a Training, Testing and Certification ecosystem. This ecosystem consists of (i) Content Development Agency and (ii) Testing and Certification Agencies. UIDAI engages Certified Operators, Supervisors and Child Enrolment Lite Client Operators in Aadhaar enrolment process. Various training methodologies including Mega Training and Certification Camps, Refresher Training and DLO/PRI Training Program were adopted by UIDAI to ensure that all the stakeholders involved in enrolment and other processes are trained effectively. As of 31.12.2015, UIDAI in partnership with the Testing and Certification agencies has certified **3,46,995** Enrolment Operators, Supervisors and CELC Operators.

UIDAI Website

UIDAI provides up to date information about Aadhaar in its web site: www.uidai.gov.in. This web site has information that is needed for all the key stakeholders including the Resident and various Ecosystem Partners. Besides English& Hindi, the web site is available in 10 other regional languages in order to reach out better. One of the key takeaways of the web site besides providing general information of Aadhaar and the process of partnering with Aadhaar is, the array of services it provides for the convenience of the Resident that range from knowing the nearest enrolment center, where one can book an appointment online - to knowing the status of Aadhaar and also to download the e-Aadhaar. An average of 5.7 lakh hits a day occurs on the web site seeking information or using one of the services offered online.

Besides www.uidai.gov.in, UIDAI also maintains the following web sites that provide online services:

- https://developer.uidai.gov.in - which provides an online platform for all partners developer community who are interested in building Aadhaar enabled applications and
- https://resident.uidai.net.in – which provides information on various services that the Resident would like to know on Aadhaar enrolment and generation and also to get the grievances addressed.

9.8.8 Data security and privacy

Security and privacy of personal data has been fundamental in design of Aadhaar system without sacrificing utility of the national identity system. When creating a national identity system of this scale, it is imperative that privacy and security of personal data are designed into the strategy of the system from day one. The immense degree to which UIDAI depends upon information systems indicates that the protection of the underlying processes and systems is paramount to its success. In order to achieve these objectives, a number of initiatives have been taken by UIDAI.

UIDAI certified as ISO 27001

UIDAI has established the Information Security Management System and obtained the ISO 27001:2013 certification from STQC. The certification was received on 30th March 2015 and it will be valid upto 29 March, 2018.

CIDR Infrastructure to be considered as NCIIPC

Security of UIDAI-CIDR information is of paramount importance for safeguarding resident data being uploaded and stored as part of enrolment, secure data storage management and provisioning of secure authentication services in CIDR environment. Confidentiality, Integrity and Availability of the information is maintained at all times through controls that are commensurate to the criticality of the information assets, so as to protect the Information Systems from all types of threats (Cyber related, Virtual Logical Cross-border of CIDR Interface, National or International interests, internal or external, deliberate or accidental). UIDAI-CIDR has also been identified to be declared as "Critical Information Infrastructure" by National Critical Information Infrastructure Protection Centre (NCIIPC) adding another layer of IT security assurance.

Governance Risk Compliance and Performance Service Provider (GRCP-SP) On-boarded

The vision of GRCP framework is to facilitate creation of a robust, comprehensive, secure environment for UIDAI to operate. To achieve the goals, the GRCP-SP shall provide UIDAI management with oversight of UIDAI and partner ecosystem in terms of Visibility, Effectiveness and Control.

Awards and Recognitions

UIDAI has been awarded at various award functions over the years. In 2015 as well, UIDAI is one of the finalists in the Data Security Council of India's (DSCI) Excellence Award. Outcome of the categories were:

• Winner of Security Leader of the Year

• Winner of Security in e-Governance

• Finalist in Privacy in other Sectors

Fraud Management System at UIDAI

The fraud management system has been consolidated further over the course of last one year. UIDAI has a well-designed, multi-layer approach and robust security system in place and the same is being constantly upgraded to maintain highest level of data security and integrity. The architecture of Aadhaar ecosystem has been designed to ensure data security & privacy which is an integral part of the system from the initial design to the final stage. UIDAI is covered under IT Act, 2000.

UIDAI-CIDR facility, Information Assets, Logistics Infrastructure and Dependencies installed at UIDAI have been declared as Protected System by Central Government vide Gazette Notification dated 11.12.2015 published in the Gazette of India, Extraordinary on 21.12.2015. UIDAI

has been declared as Critical Information Infrastructure (CII) under section 70 of IT Act, 2000.

9.8.9   Aadhaar - A Tool for Governance Reform

Aadhaar Payment Bridge (APB)

APB implementation helps deal with the challenges related to banking transactions with benefits to both the stakeholders, namely, the Government and the Residents.

At ecosystem level, APB has already achieved wide acceptance, and is presently an approved payment system by RBI. As on 15th Jan 2016

• 725 banks including all nationalized banks, RRBs and many co-operative banks are live on the APB platform.

• Over 78.16 crore APB transactions have successfully been carried out over APB, amounting to ₹ 24,290 crore.

Aadhaar Enabled Payment System (AEPS)

The Government payments are being credited directly into the accounts of the targeted Beneficiaries using APB platform. However, access to these funds encounters a number of last mile servicing issues. Aadhaar enabled Payments System (AePS) facilitates basic banking

access (viz. cash withdrawal, cash deposit, balance enquiry, fund transfers) to the beneficiaries in a hassle free manner at/ near the doorsteps. Further, usage of Aadhaar authentication enables transactions in real time in an interoperable environment.

Till 15th February 2016, 108 Banks and Department of Post, are active on AePS platform and Banks alone performed 8.53 crore transactions.

MicroATM Incentive Scheme

The scheme was initially launched on 1st October, 2012 with objective of promotion of deployment of MicroATMs to roll out Aadhaar based payments. UIDAI is willing to subsidize upto ₹ 15,000 per microATM. The scheme is applicable for all scheduled banks, Post Office Savings banks, and applicable to other banks based on need. The bank can claim the funds by carrying out 2,000 successful Aadhaar based transactions subject to fulfilling certain criteria. Till 15th February 2016, over ₹ 22 crores have been paid to various institutions.

Public Distribution System (PDS)

The PDS network consists of more than 4 lakh Fair Price Shops (FPS) and is estimated to distribute essential commodities to more than 25 crore families. So far, States such as Andhra Pradesh & Telangana, Jharkhand, Delhi, etc have already or are in the process of implementing Aadhaar-enabled PDS (AePDS). In the process, 2,689 Fair Price Shops, covering 19 lakh beneficiaries' cards have been transitioned to AePDS.

Jeevan Pramaan

Digital life Certificate for Pensioners scheme known as "Jeevan Pramaan" based on Aadhaar bio-metric authentication was introduced. A successful authentication generates Digital Life Certificate which gets stored in Life Certificate Repository. Pension Disbursing Authority can access the certificate online. Presently, the service is available for Central Government, Defense, EPFO, Postal, Railway and Telecom pensioners as an additional facility. As on 15th January, 2016 more than 13 lakh pensioners have already registered for Jeevan Pramaan.

ITR Filing

The Central Board of Direct Taxes (CBDT) has introduced Aadhaar based electronic verification for filing the Income Tax Returns (ITR) as an option to send ITR-5 directly to the department. This initiative makes the filing of income tax completely Electronic (Paperless) and simplifies the process of ITR Filing. Over 30 lakh individuals used Aadhaar based electronic verification for filing ITR for the AY 2015-16.

e-KYC based SIM Issuance - Ministry of Home Affairs has conveyed its 'No Objection' for the use of Aadhaar based e-KYC services for issuing SIM Cards by Telecom Service Providers to the subscribers subject to the adherence of the existing tele-verification policy. This shall not be applicable in case of bulk, outstation and foreign customers.

Aadhaar linkage with UAN (EPFO)

Employee Provident Fund Organisation (EPFO) intends to leverage Aadhaar e-KYC for deploying a homogeneous method of subscriber authentication. Such a deployment will help in hastening claims settlements and delivery of other services which have so far been delayed on account of employer driven employee verification processes. As on date more than 1.06 crore accounts have been linked with Aadhaars.

9.8.10 Creation of requisite Technology Infrastructure

UIDAI has commissioned technology infrastructure to cater to about 120 crore enrolments. In line with the target of time bound universal enrolment and future needs of online authentication and other services, the IT infrastructure is being adequately augmented and upgraded. UIDAI has appointed HCL Info Systems Limited as Manage Service Provider (MSP) for its CIDR for development and maintenance of applications, operation and maintenance of CIDR, biometric de-duplication, etc.

The data center at Bangalore has been migrated to UIDAI captive Data center at Hebbal, Bangalore. The migration of other data center i.e. Greater Noida Data Centre to Manesar Data Center is also in progress.

9.8.11 Construction of UIDAI, HQ building

All requisite statutory approvals/NOCs towards construction of UIDAI Headquarter building have been received from respective Departments/Organizations. Tender for construction of HQ Building has been awarded to M/s Parnika Commercial and Estate Private Limited on 23.12.2015 through M/s EIL and work has commenced on site, almost 50% of excavation work & barricading has

been completed. An aggressive 18 months completion plan is envisaged.

9.8.12 Use of Rajbhasha

UIDAI is making all efforts to increase use of Hindi in official work.   The percentage of correspondences in Hindi has increased from 36.9% during 2014-15 to 54.5% during 2015-16. During the year 2015-16, UIDAI initiated the process of providing resident-centric information on its website in Hindi and 10 other regional languages. As a result, out of total 120 pages of website, information on 90 pages is available in Hindi.   To promote the use of Hindi, two workshops and four competitions were organized during the Hindi fortnight (14-28 September 2015).

9.8.13 Details of Budget & Expenditure during 2015-16

During 2015-16 (upto 31st December, 2015), an expenditure of ₹1272.21 crore has been incurred against Revised Estimate of ₹ 1916.43 crore. The total expenditure incurred so far is ₹7252.83 crore.

9.9 National Institute of Electronics and Information Technology (NIELIT)

9.9.1 Introduction:

NIELIT a Scientific Society of the DeitY, is actively engaged in Capacity Building and Skill Development in the areas of Information Technology (IT); Electronics; Communication Technologies; Hardware; Cyber Law; Cyber Security; IPR; GIS; Cloud Computing; ESDM; e-Waste; IoT; e-Governance and related verticals. NIELIT offers courses both in the Formal as well as the Non-Formal sectors and is also one of the National Examination bodies which accredit institutes / organizations for the conduct of courses in the Non Formal sector. NIELIT is also the preferred agency for many State Governments for rolling out IT Literacy programmes for its employees and the masses. The NIELIT courses have also been recognized by many State Governments for recruitment/ promotion of employees. The NIELIT courses are revised on regular in intervals taking into account the needs of the industry and technological trends and are also retrofitted with soft skill components, leading to enhanced employment opportunities.

NIELIT has established itself as a premier organization having PAN INDIA presence through a network of 32 own Centres/ Extension centres located at Agartala, Aizawl,

Ajmer, Aurangabad, Calicut, Chandigarh, Chennai, Delhi, Gangtok, Gorakhpur, Guwahati, Tezpur, Imphal, Itanagar, Kohima, Chuchuyimlang, Kolkata, Kokrajhar, Lucknow, Patna, Shimla, Shillong, Lunglei, Jorhat, Silchar, Churachandpur, Ranchi, Senapati, Srikakulam, Leh with its Head quarters at New Delhi. It is also well networked through 900+ accredited training institutions, besides a network of about 9000+ facilitation centres.

At present, NIELIT is skilling about 5 lakh candidates per annum, which includes women and rural youth, besides under-privileged sections of the society. Since inception, NIELIT has trained about 50 Lakh candidates.

9.9.2 Some Notable Achievements

In an event held on May 15, 2015, the foundation stone of NIELIT headquarters was laid at Dwarka, New Delhi by Shri Ravi Shankar Prasad, Hon'ble Union Minister for Communications and Information Technology, Government of India.

Toll-Free Helpline number 1800-11-65-11 was launched by Shri Ravi Shankar Prasad, Hon'ble Union Minister for Communications and Information Technology, Government of India on May 15, 2015.

In order to empower rural India, NIELIT Computer Saksharta Kendra was inaugurated by Shri Ravi Shankar Prasad, Hon'ble Minister of Communications and IT on May 18, 2015 in Alawalpur Village, Patna.

With the objective of using technology for process re-engineering, Accreditation and Registration processes have been simplified by self certification of documents.

e-Contents on Government of India's initiatives on ICT awareness and Basic Computer Concepts for Hon'ble Members of Rajya Sabha have been successfully developed and deployed on NIC Cloud to facilitate learning in the Online mode.

Repertoire of NIELIT Digital Literacy courses has been enhanced through add-on modules on e-Governance, concepts of cyber security, Financial Inclusion etc.

Under the National Digital Literacy Mission (NDLM) / *Digital Saksharta Abhiyan* (DISHA), NIELIT is one of the major assessment agency which has so far conducted assessments of more than 8 lakh candidates and is the ONLY organization in the country that is issuing Digitally Signed e-Certificates linked with Digital Locker.

NIELIT Patna City Centre was inaugurated by Hon'ble

Minister of Communications & IT on July 14, 2015.

NIELIT has proactively contributed in organizing the launch of Digital India Week on July 1, 2015. More than One Lakh participants / citizens were mobilized. A cycle campaign was organized to spread the message that Digital India is irrespective of age, gender, religion or caste.

In line with the vision of the Hon'ble Minister of Communications & IT, a Digital Marketing Course was launched for the Warli Artists in the Talasari, Maharashtra on September 14, 2015. The programme was conducted in association with Larsen & Tubro (L&T), and Snapdeal and the 'Warli' Artists were taught the nuances of selling their products Online though e-Commerce portal for improving reach and livelihood.

9.10   Software Technology Parks of India (STPI)
Introduction:

Software Technology Parks of India was set up in 1991 as an autonomous society under the DeitY.   STPI's main objective has been the promotion of software exports from the country. STPI acts as 'single-window in providing services to the software exporters. The services rendered by STPI for the software exporting community have been statutory services, data communications services, incubation facilities, training and value added services. STPI has played a key developmental role in the promotion of software exports with a special focus on SMEs and start up units.

STPI is responsible for implementation of the Software Technology Parks (STP) scheme and the Electronics Hardware Technology Parks (EHTP) scheme. The phenomenal success of the IT-ITES industry has been possible, inter-alia, due to pivotal role played by the STP Scheme and fiscal benefits provided under Section 10A of the Income Tax Act (available upto 31-03-2011). STP Scheme is a unique scheme, designed to promote the software industry including innovations and growth of Start-Ups and SMEs without any locational constraints. As on 31.12.2015, more than 2,500 units are exporting under STP scheme and more than 70 units were exporting under EHTP.

During the FY 2015-16 (till December 2015), estimated IT-ITeS export earnings from STP units are ₹ 2,00,800 crore and Electronics Hardware export of ₹ 4,712 crore under EHTP scheme.

STPI Centres

To provide statutory and incubation services to industry, major thrust was given on the establishment of new centres as well as revamping of existing centres. As of now, a total of 54 STPI centres/Sub-centres are operational across the country, out of which 47centres are in Tier II and Tier III cities.

This Map does not purport to be Political map of India. It is for representation purpose only.

STPI is working closely with the respective State Governments/local authorities for creation of more space, equipped with state-of–the-art infrastructure facilities, for development of the software industry and increasing exports. STPI is in the process of implementation of 24 new approved STPI Centres at various Tier II/III locations.

Services:

The main services rendered by STPI for the software exporting community are incubation facilities, data communications services which inter-alia are as under.

- **Statutory Services**

  STPI provides Single Window Clearance to Software exporters under the STP Scheme. STP Scheme provides these units with various fiscal incentives making it a phenomenal success.

- **Incubation Facilities**

  STPI provides the incubation services. Plug'n Play Offices are made available to startups. These Incubation facilities offer excellent facilities at reasonable rates.

- **Datacom Services**

  STPI provides one of the best connectivity solutions, required for mission critical data transfer needs. Its services on Satellite and Fiber Technology with domain expertise in last mile connectivity make it an ideal service provider.

- **Consultancy Services**

  STPI provides consultancy and Project Management Services and turnkey solution to various national and International organizations in the areas of Communication Networks, Network Operation Centers, Network Management Systems, computerization, E-Governance networks etc. The technology capability coupled with process strengths has enabled STPI to secure a number of projects from time to time.

Creation of Incubation Space and Infrastructure

- STPI has created basic infrastructural support in the form of Business Incubators with state of art facilities with Plug & Play facilities for start-up companies. These incubation services enable small and medium enterprises to set up operations at minimal fixed costs with low start-up investment, thereby encouraging entrepreneurship and creating jobs. STPI is in process of creating additional incubation space at Mohali, Allahabad, Bhilai, Bhubaneswar, Hyderabad, Shillong, Patna, Ranchi, Bhilai, Vijayawada etc.

- STPI is working on ESDM Incubators for creation of a holistic eco-system for encouraging R&D, innovation, Entrepreneurship and enabling creation of Intellectual Property within the country for maximizing the domestic value addition and diminishing the external dependence in the sector. First-of-its-kind "Electropreneur Park" to support start-ups in electronic design and manufacturing is also being setup by STPI at Delhi University in association with University of Delhi and India Electronics and Semi-Conductors Association (IESA).

- In order to encourage and boost the promising segment of semiconductor industry in India, STPI in association with Government of Karnataka has setup a Semiconductor Measurement Analysis & Reliability Test (SMART) Lab in Bengaluru.

Promotion of Small and Medium Entrepreneurs by creating a conducive environment in the field of Information Technology

STPI has been promoting SMEs and their cause by offering incubation services, organizing events, sponsoring/co-sponsoring events, participation in events and export promotion efforts. Some of the major events in which the participation was organized by STPI includes:

- Connect 2015 on 13th August, 2015 at Coimbatore
- CeBIT India 2015 from 29th–31st October, 2015 at Bengaluru
- INFOCOM 2015 from 3rd-5th December, 2015 at Kolkata
- Bangalore ITE.Biz 2015 from 8th–10th December, 2015 at Bengaluru
- TiEcon 2015 from 11th -15th May, 2015 Santa Clara, USA
- IT Asia 2015 from 24th -26th September, 2015 at Hyderabad

STPI also sponsored/co-sponsored the following major events:

- CII 11th Innovation Summit 2015 from 6th - 7th August, 2015 at Bengaluru
- TiEcon Delhi 2015 from 16th - 17th October, 2015 at Delhi
- PUNE Connect - 2015 on 28th November, 2015 at Pune
- India IT Summit on 12th December, 2015 at Kochi

North East BPO Promotion Scheme (NEBPS)

DeitY has launched the NEBPS under the Digital India Programme to incentivize establishment of 5000 BPO/ITES seats, with an outlay of ₹ 50 crore providing NEBPS capital support in the form of Viability Gap Funding (VGF) for remaining period of 12th Five Year Plan i.e. 31.03.2017. STPI has been designated as implementing agency for the NEBPS.

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Other Matters

10.1 Use of Hindi in Government Work and Expected Technological Development

In order to review the progressive use of Hindi in official work and the implementation of Official Language Policy of Government of India, Parliamentary Committee on Official Language did inspections during the period under review at NIC, Bhubneswar; NIC, Srinagar; C-DAC, Noida; NIELIT, Aurangabad; C-DAC, Pune and ETDC, Pune, which are under administrative control of DeitY. Concerned organizations are working according to the suggestions given by the Committee. Besides this, Parliamentary Committee on Official Language did inspection of the department also on 22 June, 2015.

Reconstitution of Hindi Advisory Committee has been done and its resolution issued. Preparation is going on to conduct its next meeting. Three issues of the departmental Hindi magazine **'Spandan'** have already been released and 4th issue is going to be released soon. To promote the use of Hindi in official work, a Monthly Incentive Scheme has also been started in addition to Annual Incentive Scheme for Noting & Drafting in Hindi.

Hindi Pakhwada was organized by the department during September 2015. In order to enhance the use of official language Hindi in government work, many competitions were held and winners were awarded. Also prize money of the awards has been enhanced substantially to encourage participation. Organization of some other competitions related to Hindi has also been proposed.

In order to implement the official language policy and promote usage of Hindi in government work, an official inspection pertaining to official language implementation was done in three offices under administrative control of DeitY i.e. C-DAC, Bangaluru; STPI, Bangaluru and C-MET, Pune.

During the period under review various important departmental documents like Annual Report, Performance Budget, Outcome Budget, various cabinet notes, notes for Parliamentary Standing Committee, parliamentary questions, Demand for Grants, follow up action reports, monthly report for cabinet and miscellaneous documents

pertaining to Digital India and other subjects were translated from English to Hindi.

10.2 RTI

DeitY and its Attached / Subordinate Offices/ Societies are separate Public Authorities in terms of Section 2(h) of RTI Act, 2005. They have their own websites and each of these Public Authorities has its own Central Public Information Officers (CPIOs)/ Appellate Authorities (AAs). For any information relating to these Authorities, applications need to be submitted to the concerned CPIOs as per provisions of RTI Act, 2005. There is an RTI Cell in the Department, which is receiving point for RTI applications and also coordinates matters relating to RTI. All Public Authorities have also hosted relevant inputs/ documents on their respective websites, as required under Section 4 of the RTI Act. The relevant contents are reviewed and updated periodically by the concerned Public Authorities.

10.3 Public Grievances Redressal Mechanism

The number of grievances received online as well as physically by RTI/PG Cell till 31.12.2015 is as given below:

Source of Grievance	No. of Grievances received	No. of Grievances redressed
Online	6041	6030 (99.81%)
Physically	166	148 (89.16%)

10.4 Information & Documentation Centre (Library)

This Department has a spacious well planned Library viz Information and Documentation Centre (I&DC), with an inventory of latest books and journals. It uses RFID based Library Management System to manage issue & returns of Journals. I&DC also provides various other services like inter –Library loan facility to the officials of the Department through DELNET (Developing Library Network) and also arrange books from libraries of various organizations. Services are also provided to the retired officials of the Department and trainees who undertake projects in the Department.

The Information & Documentation Centre possesses approximately 30,000 books on various subjects including Electronics, Computer, IT, Computer Languages, Fiction, Hindi and English literature. I&DC procures on an average 100 books and approximately 60 Journals per annum. Currently, e-books service (Books 24x7) is available to the authorized users.

The Department is spearheading an Intra-Ministerial initiative viz the Library Consortium, Ministry of Communication & Information Technology(MCIT), Consortium of the Department (MCIT Consortium) comprises the users from the National Information Centre (NIC), C-DAC, NIELIT, SAMEER, C-MET, STQC Dte, STPI, CCA ERNET India, DOT, C-DOT and Department of Posts. The Department provides on–line access to various e-resources i.e. IEL ACM digital library and ISO Standards to its users through MCIT Library Consortium.

10.5 Parliament Matters

During the year, a number of Parliament Questions were received and handled by the Parliament Section mainly related to Digital India Project, National e-Governance Plan, Cyber Security, Employment through Digital India Programme, BPOs in Small Towns, Cyber Crime, Electronics Manufacturing, Hacking incidents of Government Websites, Misuse of Social Media, National Policy on Electronics, Internet of Things, National Knowledge Network, Data Protection and Privacy, Open Source Software, e-Translation, Employment to Youth, Paperless Sarkar, Making AADHAR Card, e-Kranti, Cloud Technology, Proposals for Investment in IT Sector, Tide Scheme, Development of e-Skills, e-Literacy, Internationalized Domain Name, Encouragement to Small and Medium Sized IT companies, Super Computers Violation of Privacy on Internet, National Policy on Information Technology, Internet Related Polices, E-Governance at Grass root Level, Promotion of IT in NER, Migration of IT Professionals and Report on India's Surveillance Laws and Mechanisms etc.

The Department Related Parliamentary Standing Committee on Information Technology (DRPSC on IT) discussed and considered the Demands for Grants 2015-16 of the Department of Electronics and Information Technology and laid its 22nd Report on the Table of the Lok Sabha on 21.12.2015.

The Standing Committee on Information Technology selected the following subjects for discussion during the year 2015-2016.

- Digital India Programme
- Promotion of Electronics/IT Hardware Manufacturing Sector
- Digital/Online Privacy: Problems and Challenges
- Expansion of Rural BPOs and Challenges faced by them
- Challenges relating to internet and e-fraud and measures to counter them
- Start-up Companies in the IT Sector – Problems and Challenges

The Annual Reports 2014-15 and Audited Accounts of all Societies, (except ERNET India) under the Administrative Control of the Department of Electronics and Information Technology were laid on the Table of both the Houses of Parliament during the Winter Session, 2015 of Parliament.

10.6 Gender Empowerment / Prevention of sexual harassment of women at work place

No cases of sexual harassment have been reported in DeitY during the year.

10.7 Activities undertaken for the benefit of differently abled persons

- Development projects in frontier of technology and societal benefit areas are taken up and supported by E-Infrastructure Division viz., ICT for Empowerment of Differently Abled.

- **National Policy on Universal Electronic Accessibility**

  National Policy on Universal Electronic Accessibility was approved by the Cabinet in October 2013, which recognizes the need to eliminate discrimination on the basis of disabilities and to facilitate equal access to electronics and Information and Communication Technologies (ICTs).

- The total percentage of employees of PWDs are given at Appendix III.

- Under Media Lab Asia (MLA) Programme, Information related to different disability aspects such as Legal Instruments, Resources, Assistive Devices, Blogs, Accessible Content, Latest News, Events, Employment Opportunities, Publications, helplines etc. is being disseminated through the portal.

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Appendix I

Summary of Important Audit Observations

Sl. No.	Year	No. of Paras/ PAC reports on which ATNs have been submitted to PAC after vetting by Audit	Details of the Paras/PA reports on which ATNs are pending		
			No. of ATNs not sent by the Ministry even for the first time	No. of ATNs sent but returned with observations and Audit is awaiting their resubmission by the Ministry	No. of ATNs which have been finally vetted by audit but have not been submitted by the Ministry to PAC
1.	2002-03		Nil	-	Nil
2.	2003-04		Nil	-	Nil
3.	2004-05		Nil	-	Nil
4.	2005-06		Nil	-	Nil
5.	2006-07		Nil	-	Nil
6.	2007-08		Nil	-	Nil
7.	2008-09		Nil	-	Nil
8.	2009-10		Nil	-	Nil
9.	2010-11		Nil	-	Nil
10.	2011-12		Nil	-	Nil
11.	2012-13		Nil	-	Nil
12.	2013-14	1 PAC Para # Para No.2.1- 2.35 of Report No.8 of 2013	Nil	-	Nil
13.	2014-15	Nil	Nil	-	Nil

Status of ATN on C&AG Paras :

Para No.2.1 of Report No.12 of 2006: There were 8 sub-paras as detailed below have been settled

1. **No.5.2.3–** Internal Audit - **Settled.**
2. **No.5.2.5.2-** Non abolition of vacant posts -**Settled**
3. **No.5.2.5.4-**Non-constitution of Staff Inspection Unit– **Settled**
4. **No.5.2.6-** Outstanding Advances -**Settled**
5. **No.5.2.6.1-**Inadequate monitoring resulting in non-recovery of ₹76.31 crore- Loans Statement -**Settled**
6. **No.5.2.6.2-**Inadmissible payment of Transport Allowance - **Settled**
7. **No.5.2.6.3-**Unauthorized expenditure of ₹88.02 lakh- STPI- Performance Incentives –**Settled**
8. **No.5.2.6.5-** Irregular payment of Conveyance charges and Local Travelling Allowances-**Settled**

 # PAC Para No. 2.1- 2.35 of Report No.8 of 2013 - Para has been transferred to Department of Commerce.

ATN pending with DeitY:

Para No.4.2 of Report No.17 of 2014 – ATN was sent to O/o DGA, P&T vide letter No. 3(17)/2014-Budget(Audit) dated 21.01.2016 for settlement. O/o DGA, P&T vide letter dated 29.02.2016 has returned the ATN with the remarks which has been communicated to Programme Division for furnishing the information/reply sought by Audit.

Audit Para

S. No.	Year	Audit Para No.	Subject	Action Taken/Status Note
1.	2015	4.1	Creation of Infrastructure for National e-Governance Plan (NeGP) and Delivery Services Centres (CSCs). Audit observations are as under: **SWAN** ✓ Delay in implementation of SWAN ✓ SWAN Project approved without approval of Empowered Committee ✓ Non approval of Additional Central Assistance (ACA) component of SWAN by EC. ✓ Non imposition of penalty on Network Operator ✓ Third Party Audit agency not appointed in States ✓ Non empanelment of Agency for Impact Assessment of SWAN as envisaged by Cabinet Committee on Economic Affairs (CCEA) **State Data Centres (SDCs)** ✓ Delay in implementation of SDC ✓ Excess Expenditure of ₹ 343.65 Lakh over the approved cost of ₹ 90.00 Lakh on SDC Programme Management Unit (PMU) ✓ Penalty of ₹ 1.12 crore not recovered from Data Centre Operator in Kerala ✓ Underutilization of SDC in Tamil Nadu **Common Service Centres (CSC)** ✓ Non Availability of Government to Citizen (G2C) services ✓ Concurrence of CCEA for funding of State Service Delivery Gateways (SSDG) component not approved under NeGP. ✓ Delay in implementation of SSDG	ATN was sent to O/o DGA, P&T vide letter No. 3(20)/2015-Budget(Audit) dated 21.01.2016 for vetting. O/o DGA, P&T vide letter dated 25.02.2016 has returned the ATN with the remarks which has been communicated to Programme Division for furnishing the information/reply sought by Audit.

Appendix II

Annual Plan 2016-17 of DeitY

Sl. No.	Scheme/Programme	Budgetary Support (₹ in crore)
1	**National Inforamatics Centre**	**800.00**
2	**UIDAI**	**800.00**
3	**Regulatory Authorities**	**183.00**
3.1	Standardisation Testing and Quality Certification (STQC)	105.00
3.2	Cyber Security	70.00
3.3	CCA	8.00
4	**Digital India**	**1282.00**
4.1	Manpower Development	365.00
4.2	Electronic Governance	420.00
4.3	Externally Aided Project (e-Governance)	50.00
4.4	National Knowledge Network	250.00
4.5	Promotion of Electronics & IT Hardware Mfg	70.00
4.6	Promotion of IT/ITeS Industries	5.00
4.7	R&D in IT/Electronics/ CCBT	122.00
5	**Assistance to Autonomous & Other Bodies**	**135.00**
5.1	Centre for Development of Advanced Computing (C-DAC)	83.00
5.2	Society for Applied Microwave Electronics Engineering and Research (SAMEER)	35.00
5.3	Centre for Materials for Electronics Technology (C-MET)	12.00
5.4	National Institute of Electronics and Information Technology (NIELIT)	0.00
5.5	Media Lab Asia (MLA)	5.00
	TOTAL	**3200.00**

Appendix III

Employees structure

Total Employees structure (Total and SCs/STs/PWDs as on 01.01.2016)

Group	Permanent/ Temporary	Total No. Of Employees	SC	% of SC total employees	ST	% of ST total employees	Persons with disabilities	% of PWDs
Group 'A'	Permanent Other than lowest rung of Class-I	97	15	15.46%	06	6.19%	01	.1.03%
	Lowest rung of Class-I	18	03	16.67%	01	5.56%	-	-
	Temporary Other than lowest rung of Class-I Lowest rung of Class-I	33 26	05 02	15.15% 07.69%	02 01	6.06% 3.85%	-- 01	-- 3.85
Group 'B' (Gazetted)	Permanent	52	07	13.46%	03	5.77%	01	1.92%
	Temporary	Nil	-	-	-	-	--	--
Group 'B' (Non-Gazetted)	Permanent Temporary	114 00	24 00	21.05% 00%	07 00	6.14% 00%	05 --	4.38% --
Group 'C' Multi-Tasking Staff , Group 'C' (Erstwhile Group 'D')	Permanent	170	55	32.35%	11	6.47%	04	2.35%
	Temporary	25	04	16.00%	02	8.00%	01	4.00%
Total		**535**	**135**	**25.23%**	**33**	**6.17%**	**13**	**2.43%**

Digital India Tableau won a special prize at the Republic Day Parade 2016

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