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Annual Report
2015-16

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

Governing Council

(As on 31st March 2016)

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Secretary, Governing Council C-DAC and
Registrar, C-DAC

Contents

Overview

The year 2015-16 is marked with the numerous technological achievements, events and recognitions for C-DAC. During the year, National Supercomputing Mission (NSM) was approved by Cabinet Committee on Economic Affairs (CCEA) to be jointly implemented by Ministry of Electronics and Information Technology (MeitY) and Department of Science and Technology (DST) with C-DAC and Indian Institute of Science, Bangalore being the executing agencies. Hon'ble Prime Minister of India Shri Narendra Modi inaugurated the India-Kazakhstan Centre of Excellence in ICT (IKCoEICT) at Eurasian National University, Astana, Kazakhstan on July 07, 2015 where C-DAC's PARAM Bilim supercomputer is deployed. Hon'ble Prime Minister also inaugurated the 1st India-Central Asia Telemedicine Link at Bishkek, Kyrgyzstan, powered by C-DAC's Telemedicine Solution on July 12, 2015. On the occasion of Good Governance week celebration, Online Labs Rollout was launched by Hon'ble Union Minister for Communications and Information Technology, Shri Ravi Shankar Prasad on December 28, 2015 at New Delhi. C-DAC bagged several awards during the year for its technologies and solutions.

C-DAC's PARAM Yuva II system helped to process more than 1,90,000 jobs till March 2016. These jobs were executed by 812 HPC users from 72 different institutions spread across the country from various science and engineering domains. PARAM Shavak - Supercomputer in a Box solution was installed at various educational institutions across the country and Supercomputing centres were established using the same. C-DAC developed and deployed HPC system software solutions for cluster monitoring and management, integrated development environment and automatic program generator. C-DAC contributed to the land-use and land-cover (LULC) estimation for the Western-Ghats and Krishna river basins of India and enhanced various HPC applications for air quality management, weather forecast and bio-informatics. C-DAC has developed Big Data platform for analysis and visualization of pharmacogenomics data from multiple sources.

C-DAC enabled localization of several government portals in 10 Indian languages including the Digital India portal using its Localization Project Management Framework (LPMF). C-DAC has developed several tools and technologies for Modi script and Sindhi language. C-DAC enhanced its machine translation systems for English to Indian Languages and Indian language to Indian language and has hosted the same for use by various agencies. C-DAC is carrying out the development of Virtual Museum on the life and work of Dr. B. R. Ambedkar for the Ministry of Social Justice, Govt. of India. C-DAC developed and established the pilot digital repository infrastructure at National Archives of India (NAI), which includes various software tools. C-DAC has setup Indian language technology proliferation and deployment centre as a single window system and hosted key resources such as linguistic resources & tools, validators/localization tools, application showcase and standardisation.

C-DAC carried out transfer of technologies of its solutions including Digital Programmable Hearing Aid (DPHA) and Pebrine-O-Scope to various agencies. HARITA PRIYA solution that provides micro-climate information from agriculture fields using Wireless Sensor Networks (WSN) was deployed in Andhra Pradesh. C-DAC has developed and deployed solution for energy market services for state load dispatch centres in Assam and Meghalaya. Development of National Emergency Response System (NERS) platform is being carried out for emergency response to converge emergency signals from various sources into a unified platform.

C-DAC is contributing towards review, monitoring, testing and validation of an indigenous/Indian Conditional Access System (ICAS) that is being developed as a part of Government Initiative for head-end operators and domestic set-

top-box manufacturers. C-DAC has initiated development of new solutions and customization of its existing solutions based Internet of Things (IoT), sensor systems and communication infrastructure for Smart Cities.

Meri Sadak Mobile app developed by C-DAC was launched by Hon'ble Union Minister for Rural Development, Panchayati Raj, Drinking Water and Sanitation, Government of India on July 20, 2015. With about 84 crores voters data view and 1.2 billion hits, National Voters Services Portal developed by C-DAC provides a very high significant value to the citizen as a one-stop solution to assist voters. Bharat Operating Software Solutions (BOSS) and its variants were deployed across many government agencies during the year. C-DAC completed the development of eBasta portal where 17 publishers are registered and 1250 books are published on the portal. During the year, more than two crores transactions have taken place through NSDG, 26 states are using SSDG solution and more than 2000 government departments have been integrated by using Mobile Seva platform. C-DAC developed e-Hastakshar eSign solution that facilitates instant signing of documents online by citizens in a legally acceptable form and C-DAC became Certifying Authority on June 29, 2015 for offering eSign services.

M-Kavach - a comprehensive mobile device security solution has been enhanced and deployed for various government agencies. DARPAN – Network Management System (NMS) was deployed for various government end users. During the year, C-DAC enhanced its Cyber Forensics tools with additional features and carried out deployments at various organizations including law enforcement agencies across the country. As a part of Information Security Education and Awareness (ISEA) Project Phase-II, 160 workshops have been conducted across the country through the centres of C-DAC, NIELIT and the participating institutes of ISEA.

C-DAC carried out Technology Transfer of e-SafeT, an object tracking system for environment sensitive items in transit. C-DAC deployed e-Aushadhi - Drug Supply Chain Management Solution in the states of Andhra Pradesh, Telangana, Madhya Pradesh and Gujarat. C-DAC has developed solutions for veterinary purposes such as Mobile Tele-veterinary units for treating needy animals at their location and Animal Lifting and Standing Support Devices to help lift injured animals easily and provide treatment.

Automation tools for managing GATE 2016 and JAM 2016 examinations from C-DAC were used with more than 10 lakh candidates for GATE 2016 and forty thousand candidates for JAM 2016 examinations. C-DAC has designed and developed new post graduate diploma programmes in the areas of Internet of Things (IoT) and High Performance Computing (HPC).

The above mentioned activities have resulted in several research publications, patents, awards, recognitions and new collaborations with academic and research organizations within the country and abroad.

This annual report covers the accomplishments and major activities of C-DAC during the year 2015-16.

Technical Areas

High Performance Computing (HPC), Grid Computing and Cloud Computing

C-DAC continued its various activities in the areas of HPC systems and facilities, HPC applications, HPC system software, HPC solutions and services, Grid, Cloud Computing and Big Data and initiated activities under the National Supercomputing Mission. The activities carried out by C-DAC during the year 2015-16 are briefly covered below.

National Supercomputing Mission (NSM)

Cabinet Committee on Economic Affairs (CCEA) approved the project titled "National Supercomputing Mission (NSM) : Building Capacity and Capability" on April 9, 2015 to be implemented jointly by the Ministry of Electronics and Information Technology (MeitY) and Department of Science and Technology (DST) with Indian Institute of Science, Bangalore and C-DAC being the executing agencies. The duration of the mission is 7 years and the major activities of NSM include:

- Setting up of supercomputing facilities and infrastructure in the country
- Research & Development leading to self-reliance in supercomputing
- Supercomputing application development of national relevance
- Human Resource Development to develop supercomputing talent in the country

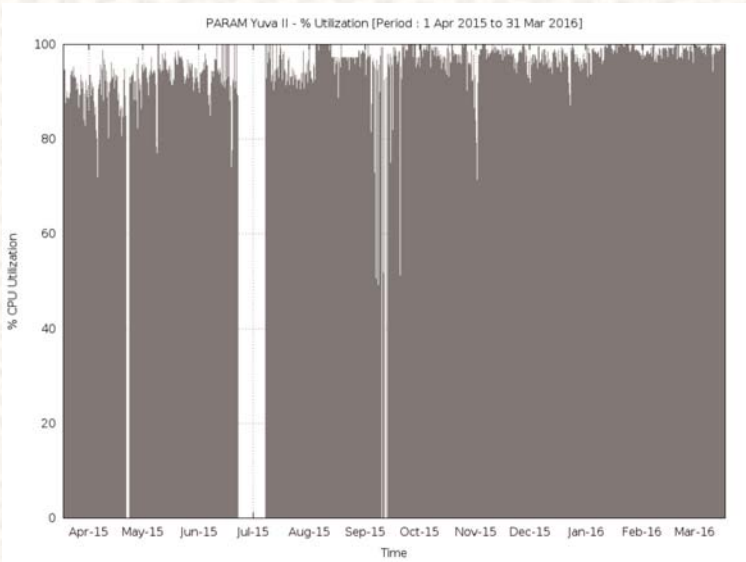
It is planned to establish several supercomputing systems of different computational powers in various academic and R&D institutions in India. These systems will be deployed using both Build approach and Buy approach. C-DAC is majorly focusing on Build approach to implement HPC systems under this mission. Under Build approach it is envisaged to design and manufacture the sub-systems of HPC system locally in India. During the year, C-DAC started the preparatory activities for the mission such as identification of project implementation teams for various activities, preparation of project proposals on various application developments and R&D on HPC system components and system software. On recommendation of Technical Advisory Committee (TAC) of NSM, C-DAC prepared and submitted the document on proposed design and project implementation strategy covering proposed Build approach of C-DAC, activities covered under supercomputing infrastructure, R&D, application development and human resource development. C-DAC also prepared preliminary design document for various system configurations as recommended by TAC of NSM.

High Performance Computing (HPC)

HPC Systems and Facilities

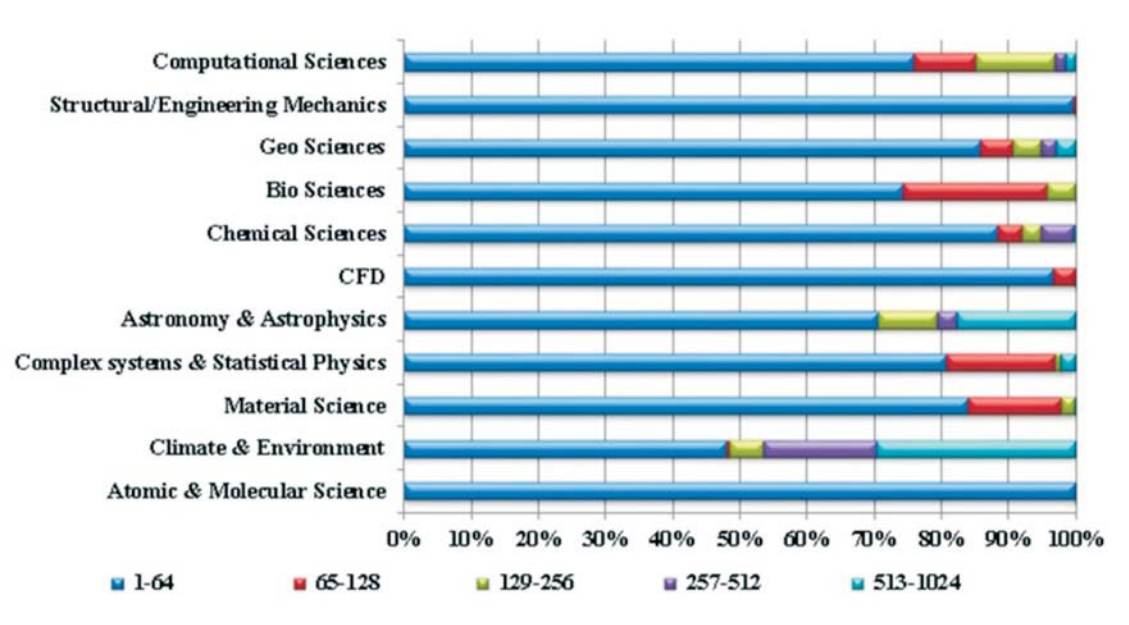
PARAM Yuva II

Since its commissioning in 2013 at C-DAC's National PARAM Supercomputing Facility (NPSF) in Pune, PARAM Yuva II has been extensively used by many scientists and engineers across the nation for their research. More than 1,90,000 jobs have been processed by PARAM Yuva II till March 2016. About 812 users across 72 institutions executed their jobs on PARAM Yuva II for their scientific research, out of which about 141 users were Ph.D. students who used PARAM Yuva II for their thesis work.



CPU Utilization of PARAM Yuva II from April 2015 to March 2016

Utilization of PARAM Yuva II was quite high throughout the year barring the scheduled maintenance periods as can be seen from the CPU utilization shown in the figure. The resources on PARAM Yuva II are grouped into homogeneous groups known as partitions. Various queues ensure a spectrum of quality of service according to the resource requirement of the users for different computing exercises and queue wait time has been reduced with effective use of partitioning. C-DAC uses Dedicated Slot Booking Facility (DSBF) for the users to offer better quality of service over and above the usual batch processing system.



Job Size (CPU cores) across application domains

PARAM Shavak: Supercomputer in a Box

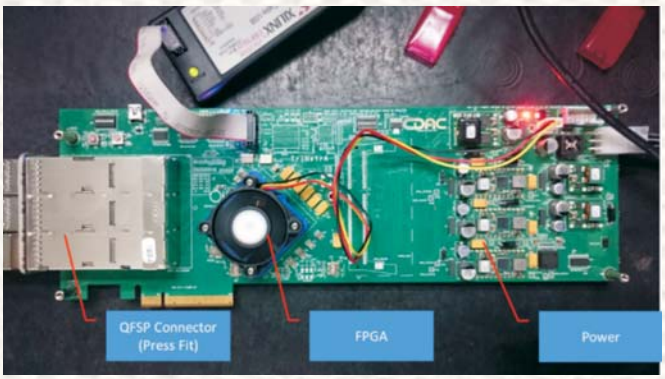
PARAM Shavak an affordable supercomputing solution in a box, aims to provide computational resource (Capacity building) with advanced technologies to perform high-end computations for scientific, engineering and academic programs to address and catalyze the research using modelling, simulation and data analysis. During the year, PARAM Shavak was installed at several educational institutes across the country. PARAM Shavak has been used to establish Supercomputing Centres in the North East India at Assam Engineering College (AEC), Guwahati and National Institute of Technology, Agartala.

High Speed Interconnect and Accelerator Technologies

Trinetra: Next Generation HPC network

C-DAC is carrying out development of next generation indigenous HPC interconnect called “Trinetra” for efficient inter-node communication between compute nodes under National Supercomputing Mission (NSM). The next generation network is being designed for performance, power efficiency and support for large scale systems.

During the year, C-DAC developed a Proof of Concept (PoC) platform called Trinetra-I, capable of supporting six 40 Gbps channels (240 Gbps full duplex switching performance) which would be used as validation platform for experimentation of various architectural concepts.



Trinetra-I – PoC Platform for indigenous HPC Interconnect

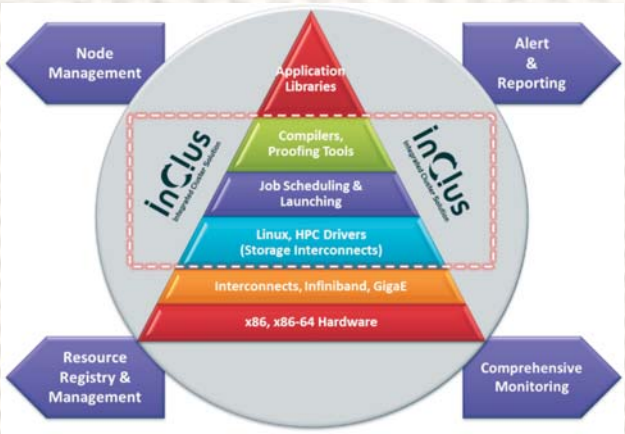
Reconfigurable Computing System (RCS)

RCS is a FPGA (Field Programmable Gate Array) based high performance application accelerator card for accelerating applications. This energy efficient card supports Linux and Windows Operating Systems. The FPGA-based RCS cards designed and developed by C-DAC have been incorporated as accelerator cards in a number of HPC systems commissioned by C-DAC in the country and is part of PARAM-Bilim supercomputer deployed by C-DAC at Kazakhstan in July, 2015.

HPC System Software

Integrated Cluster Solution (InClus)

InClus is a cluster management and monitoring software developed by C-DAC which helps to seamlessly install, manage and monitor HPC clusters. It facilitates monitoring of HPC resources such as CPUs, storage, network, user jobs, etc. InClus web based user interface is simple to use and helps in managing multiple Linux cluster systems from a centralized location. Key features include development platform with parallel and serial libraries, compilers, debuggers and profilers, industry standard resource manager and scheduler, policy based accounting and accelerator based support.



InClus Framework

Hybrid IDE (HiPAD)

HiPAD is an Integrated Development Environment, developed by C-DAC, for writing hybrid codes on configurable heterogeneous clusters. It provides a single interface having all the functionality required for developing hybrid parallel programs. It includes a web based IDE that is compatible with different browsers and makes the target clusters accessible over internet to remote users.

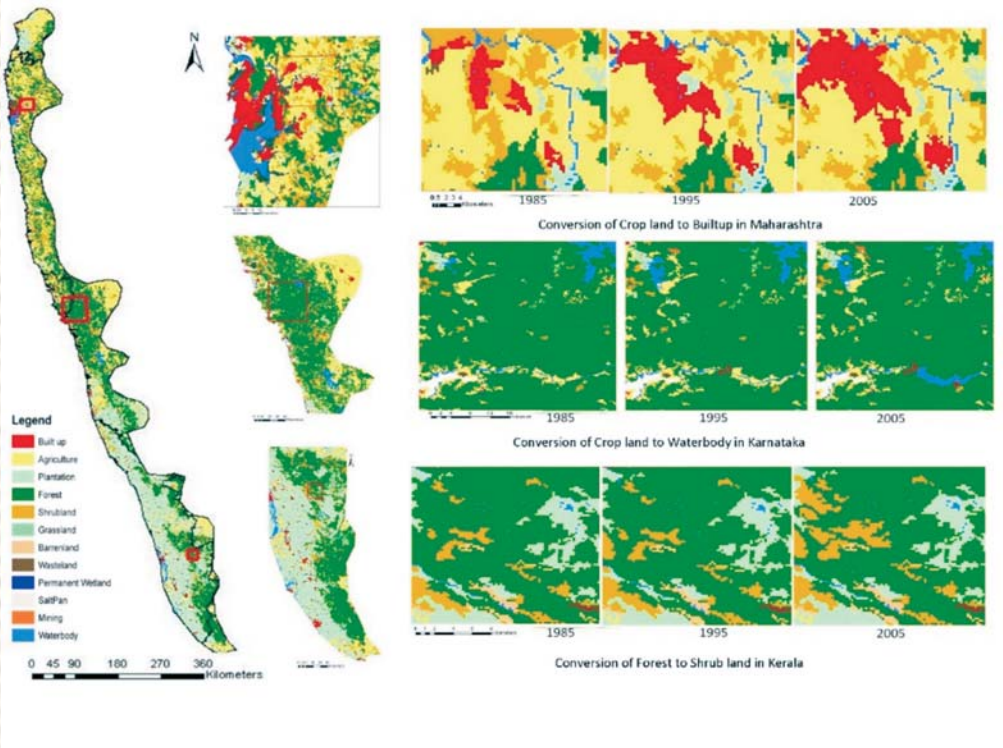
Automatic OpenCL Program Generator (OpenCLGen)

OpenCLGen is a software service developed by C-DAC to automatically generate OpenCL program from the kernel code. OpenCLGen service takes the kernel code and kernel parameters as input and provides the complete OpenCL program as output. It improves the productivity by automatically generating complex OpenCL codes.

HPC Applications

Land use-Land cover (LULC) estimation

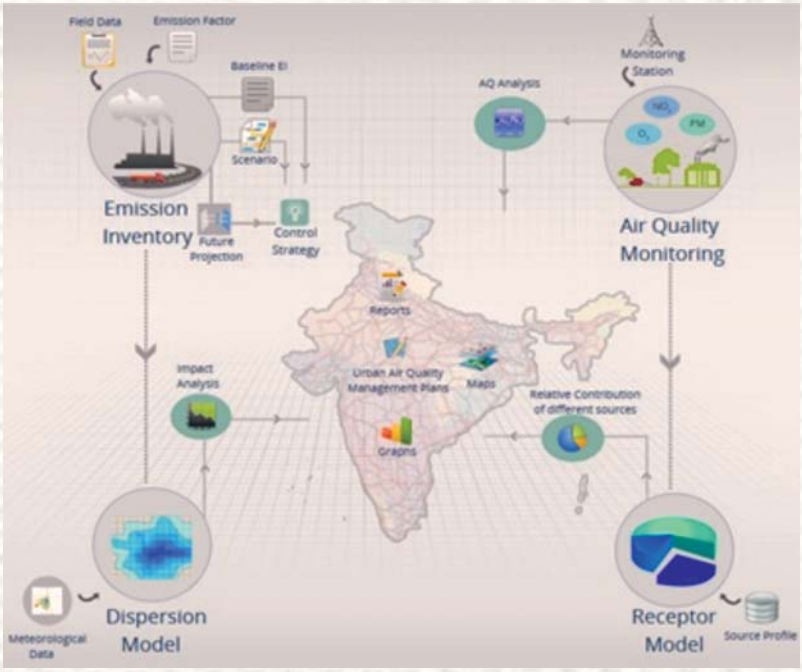
C-DAC contributed to Land-Use and Land-Cover (LULC) estimation for the Western-Ghats and Krishna river basins of India for three decades i.e. 1985, 1995 and 2005 under ISRO – Geosphere Biosphere programme. The dataset prepared using multi-temporal and variable (medium) resolution satellite imageries is the first of its kind and forms a very strong basis for future scientific LULC simulation endeavors. Based on this initiative, LULC, Socio-economic and Climatic database for the year 2005, 2010 and 2015 at taluka level and future LULC for the years 2015 and 2025 for the Western-Ghats and Krishna river basins were prepared.



Land Use Land Cover Dynamics for Western Ghats of India

UrbAir India

C-DAC enhanced its UrbAirIndia expert system that deals with various components of air quality management viz. air quality monitoring, emission inventory, dispersion and receptor modelling and multiple scenario analysis. This web-based GIS enabled system developed in collaboration with Central Pollution Control Board (CPCB), provides useful inputs to policy makers, environmental researchers and general public. Presently, the system is being used by IIT Bombay and Maharashtara Pollution Control Board.



UrbAirIndia – A decision support system for Indian Urban Air Quality Management

Weather Forecast Applications

During the year, C-DAC carried out enhancements in the following weather forecast applications:

- Porting, optimization and validation of CFSV2 (Climate Forecast System Version 2) from IBM Power based HPC Systems to x86 based HPC systems in collaboration with Indian Institute of Tropical Meteorology (IITM), Pune
- Met@India, Weather data and analytics portal developed earlier was enhanced with more data and validations. The portal disseminates weather data processed on PARAM Yuva II and is a tool for verifying and analyzing accuracy of forecasted weather.

RNAseq analysis of breast cancer data

C-DAC developed a pipeline for RNAseq data analysis for differential expression and carried out analysis that helped to identify the genes and pathways involved in hypoxia response in breast cancer. Samples of breast cancer from Tata Memorial Hospital were analysed to understand the effect of progesterone as a therapeutic agent. This case study aided in understanding the complexities in handling large volumes of data in HPC environment.

Modeling network of gene responses to abiotic stress in rice

Abiotic stresses are the major causes for lower productivity in rice and it accounts for 50% yield loss. In India, salinity and high temperature stress are two important abiotic stresses which need immediate attention. To overcome the computational challenges involved in analysis of high-throughput data sets of gene responses to abiotic stress in rice, C-DAC is developing GRN analysis algorithms using its Bioinformatics Resources and Applications Facility (BRAF).

HPC Solutions and Services

During the year, C-DAC deployed HPC solutions and offered HPC related services to various national and international agencies. The details regarding some of the deployments are given below.

- C-DAC deployed a PARAM Bilim supercomputer at India-Kazakhstan Centre of Excellence in ICT (IKCoEICT) at Eurasian National University, Astana, Kazakhstan to boost academics and scientific research program. The supercomputing facility was inaugurated by Hon'ble Prime Minister of India, Shri Narendra Modi on July 07, 2015.

- C-DAC established a HPC Cluster - PARAM Kanchanjunga, at National Institute of Technology Sikkim in May 2015. The cluster is built with C-DAC's indigenously developed cluster building tool InClus and is being used by faculties and researchers at NIT, Sikkim.
- C-DAC is setting up a hybrid supercomputing system at IIT Guwahati. The system is named as PARAM-ISHAN and is currently under implementation at IIT, Guwahati.
- C-DAC has provided consultancy for design and implementation of state-of-the-art HPC facility at IIT Delhi. The centralized hybrid supercomputing system titled PADUM was installed at IIT Delhi and is operational since November 2015.

Training/Workshops on HPC

During the year, C-DAC conducted 10 HPC workshops at various locations across the country. Through these workshops, C-DAC proliferated HPC technologies and provided exposure and hands-on experience on parallel computing, performance optimization techniques, performance analysis and profiling tools to academic and scientific community.

Cloud, Grid Computing and Big Data

Cloud Computing

C-DAC Cloud IP-Store (CCIPS)

C-DAC Cloud IP Store provides secure and centralized facility for storing and accessing the Intellectual Property (IP) generated by various groups across all the C-DAC centers through a single point web access. The authentication to access the Cloud IP Store is provided using C-DAC's Single-Sign-On (SSO) service.

SuMegha – Scientific Cloud

SuMegha offers an on demand access to the shared pool of virtual HPC resources (e.g., servers, storage, networks, applications and software) that can be easily provisioned as and when needed by the HPC applications. Features of SuMegha include creation of Virtual Machines (VM), Virtual Clusters (VC) (Hadoop, MPI), Scalability and Problem Solving Environments (PSEs). SuMegha was enhanced with various components such as Cloud IP-Store, Cloud Vault, Scientific Cloud Portal, PSE for SFM, PSE for Next Generation Sequencing (NGS) and PAN C-DAC Cloud Test bed.

Meghdoot-Openstack

Meghdoot is a comprehensive cloud suite built on free and open source cloud computing tools for building cloud computing environment. The current version of Meghdoot is based on Open stack components. Meghdoot simplifies the building of cloud computing environment, easy management, enhanced security and scalability. Sabarkantha District Panchayat has established Green Mini data centre in Himatnagar, Gujarat using C-DAC's Meghdoot cloud suite.

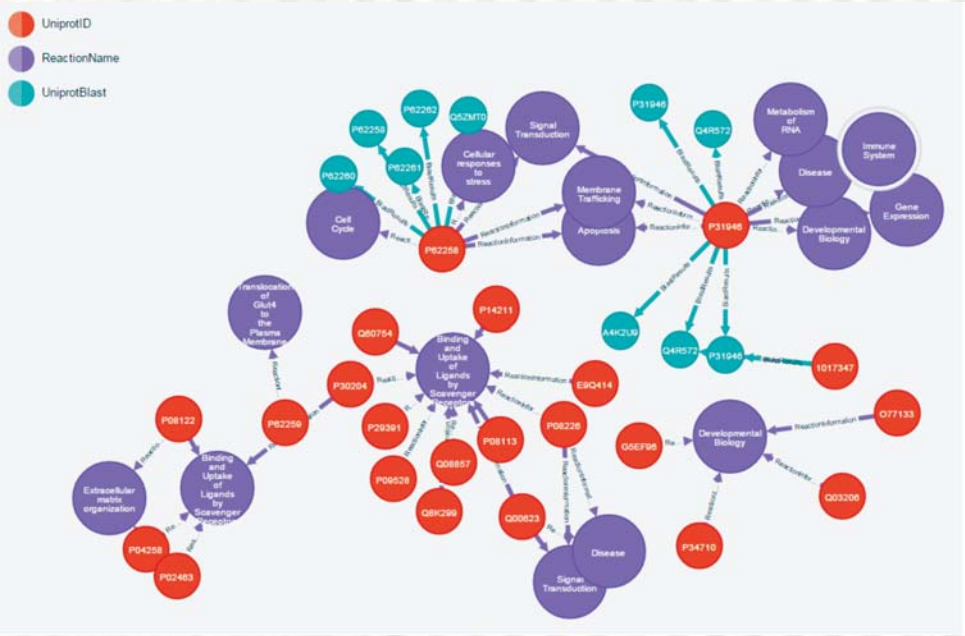
National Grid Computing initiative-GARUDA

Started in the year 2004 GARUDA (Global Access to Resources Using Distributed Architecture) provides Pan-India e-infrastructure to catalyze the research in the field of science & engineering. GARUDA has expanded to include a total of 77+ partnering institutes spanning R&D organizations and academic institutes. All partnering institutes are connected via the National Knowledge Network and GAURDA affiliation crossed 3000+ users from various domains. The users belong to various virtual organizations such as Bioinformatics, Computer Aided Engineering and Open Source Drug Discovery (OSDD) community, etc.

Big Data

A Big Data Platform for Graph-based Pharmacogenomics Data

Pharmacogenomics studies are widely adopted in clinical practices and these help in understanding the effects of drug and its dosage based on individual's genetic makeup. C-DAC has developed Big Data platform by integrating the existing pharmacogenomics data from multiple sources. A web application has been developed with an easy to use interface for querying this integrated database and to visualize results graphically.



Visualization of Pharmacogenomics data using Big data Platform

H-bond Bigdata Analysis Tool (H-BAT)

Molecular Dynamics (MD) is a computational technique that utilizes Newton's equations of motion to study the dynamics of various biomolecules and is commonly used by structural biologists. Currently, there is a need to have advanced analytics platforms and algorithms which can analyze data faster and more efficiently. C-DAC implemented an algorithm within the map and reduce paradigm to calculate hydrogen bonding (including water-water interactions) in large trajectories. Benchmarking of the algorithm brought out a linear scalability with up to 5TB of data.

Multilingual Computing and Heritage Computing

C-DAC continued to carry out development of new tools and technologies and enhancements in its existing solutions to remove language barriers in computing and facilitate digital preservation of heritage and culture. Contributions during the year in this area include work on machine translation, speech technologies, language tools and technologies and heritage computing. The activities carried out during the year are described below.

Machine Translation

Go Translate - Localization Projects Management Framework

Go Translate Framework is a centralized system developed by C-DAC for community participation in localisation process. It can be used to translate website(s) dynamically / on the fly just by the click of a button. It enables crowd and translators to contribute and update the translations. In order to translate/post-edit, various Machine Translation (MT) systems are also integrated to aid the crowd and translators. It is provided with virtual keyboard to edit or contribute to a new translation.

The digital India portal http://digitalindia.gov.in, that was envisaged for spreading knowledge and awareness of all stakeholders in 10 Indian languages viz. Assamese, Bangla, Guajarati, Kannada, Malayalam, Marathi, Oriya, Punjabi, Tamil, Telugu was made available by making use of LPMF. C-DAC has carried out localisation of about 30 portals, various sites including *http://ict-ipr.in, http://cdac.in, localisation.gov.in, http://indiapost.gov.in, http://farmer.gov.in, http://soilhealth.gov.in* and *http://cdac.in in* various Indian languages.

Farmers Portal localized using LPMF

English to Indian Languages Machine Translation System based on AnglaBharati approach

AnglaBharati uses a pseudo-interlingua approach for translating English to Indian languages. It analyses English only once and creates an intermediate structure with most of the disambiguation performed. The intermediate structure is then converted to each Indian language through a process of text-generation. Using this, eight MT systems viz. Assamese, Bangla, Hindi, Malayalam, Nepali, Punjabi, Telugu and Urdu have been developed. The system is hosted on *http://tdil-dc.gov.in.*

During the year, the system is being adapted for quick translation of Government web-site contents from English to Bengali and KokBorok for the North-Eastern state of Tripura. The system is available in desktop, web and cloud versions and supports integrated Indian language keyboard for easy user editing of outputs.

Mantra Rajya Sabha Translation System

This system facilitates translation of English documents to Hindi documents for Parliamentary domain (Upper House of Parliament of India). Unicode version of the system has been developed and deployed at Rajya Sabha secretariat to translate daily proceedings pertaining to List of Business [LOB], Papers to be Laid on the Table [PLOT] and Bulletin Part-I and II. During the year, Synopsis documents were prepared through MANTRA – Rajya Sabha Synopsis system. Data analyzer tool was enriched for lexicon authentication and enhancements were carried out in the workflow modules.

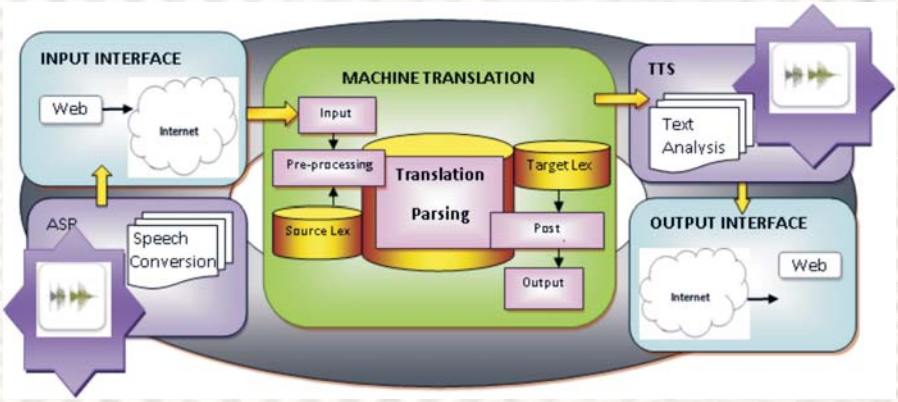
Sampark - Indian Language to Indian Language Machine Translation System

Sampark is a multipart machine translation system developed by C-DAC along with 11 institutions in India. Language technologies have been developed for 9 Indian languages resulting in MT for 18 language pairs. These are: 14 bi-directional pairs between Hindi and Urdu / Punjabi / Telugu / Bengali / Tamil / Marathi / Kannada and 4 bidirectional between Tamil and Malayalam / Telugu. Services available on *www.tdil-dc.gov.in* for Hindi, Urdu, Punjabi, Bangla, Malayalam and Telugu languages Systems deployed on MeghRaj Cloud of NIC server.

Speech Technologies

U-STAR Speech-to-Speech Translation System

C-DAC is conducting research and development on a network based Speech-to-Speech (S2S) Translation system as part of an international research consortium titled Universal Speech Translation Advanced Research (U-STAR). This would enable a person speak his/her own language at one end, and the person at the other end shall be able to listen in his/her own language. This involves the speech recognition of speaker at one end, converting it to text and translating to the text in the language of the listener and then synthesizing that to voice form which is listened by the person at the other end. Services are made available using mobile app called “VoiceTra4U”. The developed system has a user base of more than 47000 till March 2016 and more than 2 lacs utterances have been tried out.



Block diagram of Speech to Speech System

Automatic Speaker Recognition System

C-DAC is developing a system for automatic speaker recognition on conversational speech data. Automatic recognition of speaker is carried out in two steps. The system firstly detects the individual speech sources automatically from a given conversational speech data and obtain individual speech source segments. Secondly, the system validates the diarized or segmented speech data through automatic speaker recognition.

Language Tools/Tutors

Unicode Typing Tool with prediction

C-DAC developed a software tool which enables typing of Indian Languages in editors of Windows based applications with Unicode compliant font. It supports typing in various languages such as Assamese, Bangla, Bodo, Dogri, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Maithili, Malayalam, Marathi, Manipuri, Nepali, Odia, Punjabi, Sanskrit,

Sindhi, Santali, Tamil, Telugu, and Urdu. Along with Sakal Bharati font, this typing tool contains two open type fonts for each language.

During the year, the solution was enhanced to support iWriting – a Predictive typing feature with INSCRIPT Keyboard which currently supports 10 languages such as Assamese, Bangla, Bodo, Hindi, Marathi, Odia, Punjabi, Tamil, Telugu, and Urdu. It provides multiple options for auto-completion of word and has intelligent self-learning feature. The tool has been made available as a free download from *http://tdil-dc.in, http://localization.gov.in* and *http://ildc.in*

Unicode Typing Tool

Audio ebook creation for Hindi Vishwa Sahitya Sammelan

C-DAC developed an audio book for showcasing the technology in Hindi Vishwa Sahitya Sammelan at Bhopal. This is an effort towards helping people with visual challenges as well as others who can listen to these types of books while travelling or otherwise. These books can be read on smart phones with eBook readers like Azarde and are compliant with .ePub 3 standard.

Internationalized Domain Names for Indian Languages

C-DAC has developed a solution to allow users to create and access domain names in their respective Indian languages, under ".भारत" ccTLD (Country Code Top Level Domain) in a safe and secure manner and enabled ".भारत" top level international domain for Indian languages. During the year, C-DAC submitted ccTLD applications to Internet Corporation for Assigned Names and Numbers (ICANN) for Assamese, Kannada, Kashmiri (Perso-Arabic), Malayalam, Oriya, Sindhi (Perso-Arabic). With this submission, now 20 languages have their ccTLD.

Online Character Recognition (OLCR) based on Android based Handheld Devices

C-DAC designed and developed a multilingual framework for Online Character Recognition (OLCR) system based on android handheld devices such as smart phone and tablets. This SFAM (Simplified Fuzzy ARTMAP) classifier-based system supports Malayalam Online Character Recognition and is augmented with support for Tamil and Urdu languages. System also has provision to save the recognized output text and send it as SMS. Other languages supported include Hindi, Telugu, Kannada, Punjabi and Urdu.

Other Language Tools

Tools and Technologies for Sindhi Language

Towards development and propagation of Sindhi Language on the digital medium, C-DAC has developed various tools and technologies.

Sindhi language learning App

C-DAC developed a Sindhi language learning application to create awareness, increase proliferation, help in preservation of Sindhi language and placing it on the digital platform.

Development of Sakal Sindhi Font

C-DAC developed Sakal Sindhi font supporting Hindi-Sindhi as well as Arabic-Sindhi languages. This is a single font which supports Devanagari as well as Perso Arabic script. This is an Open Type and highly calligraphic font and contains a unicode keyboard driver with on screen keyboard.

Sindhi Trilingual Dictionary App

C-DAC designed and developed a trilingual dictionary application for Sindhi-DV (Devanagari)– Sindhi-PA (Perso-Arabic) and English language dictionary for Android 4.4 and above.

Mithram "Picture Oriented Communication (POC) Tool

C-DAC developed a picture oriented communication tool to help speech disabled especially ALS patients to communicate their needs. The tool aids the speech disabled to Initiate, maintain and terminate conversation, establish or maintain interpersonal relationships, share ideas, express feelings, give information, ask questions, describe events, solve problems, direct others, entertain, show imagination, refuse, learn and function with greater independence. It can be used by anyone with communication impending disabilities such as autism, muscle injury in vocals, dysarthria, stroke etc. as well as therapists, teachers and parents who wants to bridge the communication gap with them. This tool is based on android platform and is enabled for Malayalam.

Revamping of Kumar Vishwakosh and Marathi Vishwakosh web portals

C-DAC worked with Maharashtra Rajya Marathi Vishwakosh Nirmiti Mandal, Mumbai for revamping of its Kumar Vishwakosh and Marathi Vishwakosh web portals. New portals contain various features such as compliance with International Standards (W3C), better User Interface (UI), easy and different means of searching articles via search engine, visual search and volume-wise search. C-DAC also developed visual thesaurus for Marathi Vishwakosh web portal to represent and search articles in an interactive way.

Indian Language Technology Proliferation & Deployment Centre

C-DAC has setup infrastructure, system and services for TDIL-DC (*http://tdil.dc.in*) which is a single window system for hosting and distribution of all the outcomes of MeitY funded projects under Technology Development for Indian Languages (TDIL) programme. It is a national repository for linguistic resources, standards, contents of language CD's, tools and applications being developed under the various MeitY/TDIL funded projects. Standardization, Linguistic Resources & Tools, Validators/Localization Tools, Application Showcase, Research Areas, Technology Handshake and IPR are the existing verticals.

Heritage Computing

Development of Virtual Museum on Life and Work of Dr. B. R. Ambedkar

C-DAC is carrying out the development of Virtual Museum on Life and Work of Dr. B. R. Ambedkar for the Ministry of Social Justice and Empowerment towards celebration of the 125th anniversary of Dr. B. R. Ambedkar. Virtual museum facilitates search and retrieval in English and Hindi, automatic keyword suggestions, 3D interactive gallery, integrated digitized content such as photographs, handwritten manuscripts, speeches, letters and video films and recordings of important places related to Dr. B. R. Ambedkar. An android based mobile app on Dr. B. R. Ambedkar is made available.

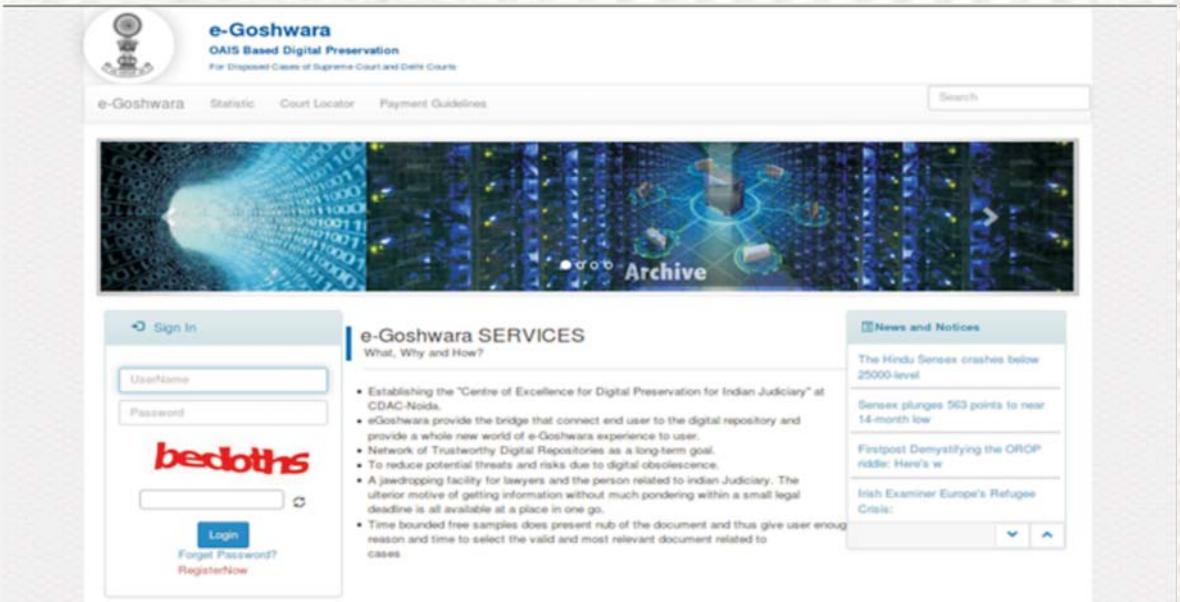
Centre of Excellence for Digital Preservation

C-DAC developed and established the pilot digital repository infrastructure at National Archives of India (NAI) which

includes various software tools such as DIGITALAYA: Open Archival Information System, e-RUPANTAR: data processing solution before archival, Repository Portal, Online Records Reporting System and necessary hardware and remote backup facility. The digital repository for National Archives of India is now accessible from www.digitalarchive.gov.in. It facilitates to search and retrieve through 22 Lakh catalogues and around 10,000 public records, private archives and cartographic maps. Through this, C-DAC has provided a complete digital preservation workflow to NAI, starting from digitization, pre-archival processing, preservation and public access through online repository portal.

e-Goshwara : e-Court Solution

e-Goshwara aims at long term and trustworthy digital preservation of disposed cases for Indian Judiciary. During the year, C-DAC carried out various enhancements pertaining to customization of Disposed Case Portfolio Manager (DCPM) for Supreme Court of India as per the requirements of Supreme Court. C-DAC also carried out integration with their existing Content management system, operationalization of Data Processing Centre, design and implementation of preservation environment for Delhi district courts as per the OAIS (Open Archival Information System) framework, Design and Development of web based dissemination services, e-Goshwara portal, self-audit and certification for trusted digital repository.



e-Goshwara : e-Court solution

Tools and Technologies for Modi Script

Modi Script Learning App

C-DAC developed a mobile app for learning Modi Script. This script was used as a cursive “shorthand” or speed writing to note down the royal edicts. As traditional Devanagari script was found to be excessively time-consuming as each character required 3 to 5 strokes and lifting of hand between strokes. Modi script overcame this obstacle by “bending” the letters without lifting the hand. Learning Modi script is useful to Academicians, Historians, Researchers and Legal experts and also for knowing more about cultural and heritage preservation.

Digital annotation and archiving system

C-DAC designed and developed a web portal useful to search online Modi Script documents. Published Modi script documents from various archive centres are used for search purposes. These documents are useful to researchers, historians, academicians, students and common people. Users can search Modi script documents by using subject names, type, published year, types of letters and archive centres etc.

Digital Annotation and Archiving System for Heritage Script

Portal for setting up of National Virtual Library of India

C-DAC in collaboration with, NIC, IGNOU, IIT-B and Kalyani University is developing a portal for setting up of National Virtual Library of India (NVLI) with rich user experience design and multilingual / federated search and retrieval. NVLI portal will provide unified access over NVLI resources, analytics and text extraction based value added services. It shall offer search service through online repositories such as Museums of India, National Archive of India and National Cultural Audiovisual Archives to facilitate integrated search through NVLI portal.

Professional Electronics, VLSI and Embedded Systems

During the year, C-DAC continued to design and develop various solutions in the primary areas of professional Electronics including Control & Communication Systems, Strategic Electronics, Agri-electronics, and Power Electronics. The details of the activities carried are described in this section.

Agri-Electronics

HARITA PRecIsion TechnologY for Agriculture (HARITA PRIYA)

HARITA PRIYA provides micro-climate information from agriculture fields using Wireless Sensor Networks (WSN). This enables dissemination of location specific advisories to farmers for pest and disease forewarning and optimal irrigation scheduling. WSN gathers real time micro-climate data at crop canopy, from farmer fields and is used by decision support models to provide location specific personalized agro advisories through a web-based Graphical User Interface (GUI). System is deployed with 100 WSN nodes and 5 Gateways for groundnut crop at 5 villages of Anantapur District, in Andhra Pradesh.

Conveyorized Vision Inspection (CT-VIEU) System

CT-VIEU is an image processing system for quality estimation based on appearance and quality attributes of chilly and turmeric. Key features include automatic sample handling and spreading arrangement by using digital camera for image acquisition with controlled LED based illumination. Field trials of the system are being carried out at National Collateral Management Services Limited (NCML), Hyderabad and Agricultural Produce Market Committee (APMC) Laboratory, Hubli, Karnataka.

Pebrine-O-Scope

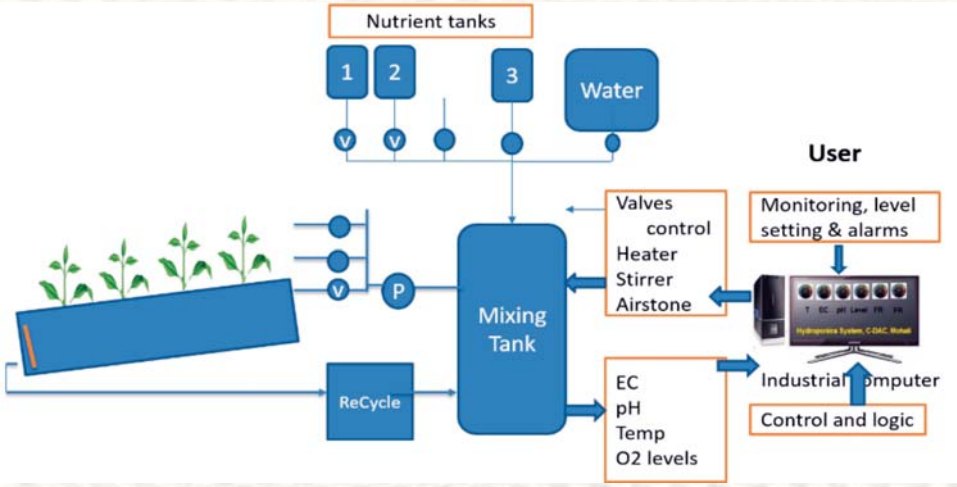
C-DAC has developed Pebrine-O-Scope system to detect pebrine disease in tasar moth, a Chinese moth that produces a brownish silk. Pébrine is caused by microsporidian parasites, by which the affected silkworm larvae get usually covered in brown dots and are unable to spin silkworm thread. The system automates the pebrine spore detection process by capturing digital images from the microscope slide through USB camera mounted on top of the microscope and classifying pebrine spores within the captured images using digital image processing techniques. The technology has been transferred to Tribal Development Fund (TDF), Jharkhand.

Pebrine-O-Scope

Jalkrishi - Automated Hydroponics

Hydroponics is a method of growing plants using mineral nutrient solutions, in water, without soil. The plants roots need only three things: water/moisture, nutrients, and oxygen. C-DAC used Nutrient Film Technique (NFT) continuous flow wherein a very shallow stream of water containing all the dissolved nutrients required for plant growth is re-circulated past the bare roots of plants in a channel called gully. The continuous flow Hydroponics control system

controls the Electro-Conductivity (EC) and pH levels according to the programmed requirements. Continuous monitoring of parameters such as ambient temperature, dissolved oxygen and liquid levels is provided in the system. The system is suitable for areas with scarcity of agriculture land as it makes optimal use of water resources. Increased control and reduced plant diseases enable a higher yield from the crop. Field trials are being carried out at Dr. Y. S. Parmar University of Horticulture and Forestry, Solan, Himachal Pradesh.



The scheme of controlled hydroponic system

Medical Electronics

TARANG - Digital Programmable Hearing Aid

C-DAC has developed Tarang, a feature rich, affordable and easily maintainable digital programmable hearing aid. It uses advanced digital signal processing techniques and is based on indigenously developed application specific integrated circuit known as NAADA. Key features include programmable filter and compression parameters, audio indication for change of listening, multi-channel signal processing and supports both linear and non-linear prescriptive procedures. During the year, Transfer of Technology (ToT) of the above solution was carried to industry partners, M/s KELTRON, Thiruvananthapuram and M/s Best Hearing Solution, New Delhi.

Tarang

Indigenous Magnetic Resonance Imaging (IMRI)

IMRI is a National Mission being jointly executed by Society for Applied Microwave Electronic Engineering and Research (SAMEER), C-DAC, Inter University Accelerator Centre (IUAC) and Dayanand Sagar College-Medical Imaging Research Centre. The development shall lead to manufacturing of MRI machines within India at much lower costs compared to imported machines. C-DAC is developing MR Image Visualization software for a multi-institution project of MRI Scanner. The software enables quantitative analysis of different clinical applications wherein medical data would be analyzed and quantified for visualization that can aid in investigating the anatomy and physiology of the body.

Strategic Electronics

SDR based V/UHF FM Receiver

C-DAC is providing support towards development of V/UHF frequency modulation (FM) Receiver on a Software Defined Radio (SDR) based hardware platform. This shall improve the efficiency of secure radio communication.

Ultrasound based Diameter Measurement System

C-DAC has developed a high precision Ultrasonic Diameter Measuring System which is capable of measuring diameter of heat-resistant composite alloy pipes with precision better than 10µm. The high precision measurement of internal pipe diameter helps to extend the usage period of pipes thereby reducing the overall cost for maintenance.

Acoustic Vector Sensor System (AVSS)

C-DAC has developed an Acoustic Vector Sensor System capable of identifying the direction and range of gunshots from small arms using their acoustical signatures. These systems can be used by security agencies to identify the direction of gunfire, the source, and in some cases, even the type of weapon used for firing.

Sonic Ultrasonic Non Destructive Test System (SOUNDS)

SOUNDS is a system for Non-Destructive Testing (NDT) and evaluation of materials using sonic and ultrasonic frequencies. Using SOUNDS, the user can measure the velocity of a sonic-ultrasonic wave through the test specimen and the attenuation of the wave in the material. SOUNDS can be used for detecting internal flaws in test specimens as well as for studying the characteristics of materials under test.

Control & Communication Systems

National Emergency Response System (NERS)

C-DAC is developing National Emergency Response System (NERS) platform that converges emergency signals from various sources to be processed by a unified platform which operates on a central data center infrastructure. The various sources of emergency signals that shall be handled by the platform include calls made to 100, women helpline (181, 1090, etc.), emergency SMS, panic signals from public transport, email, SMS alerts, and many more. The state-level police command & control center will seamlessly integrate with the central framework, to communicate between them and share information & resources. This shall enable state governments to quickly setup a command & control system with lesser resources and plug in to the central system to avail the complex and core features.

Vehicle Safety Alert System

Vehicular communication systems are type of networks in which vehicles (on-board units) and roadside units are the communicating nodes providing each other with information, such as safety warnings and traffic information. Based on the cooperative approach, vehicular communication systems works effectively to avoid accidents and traffic congestions. C-DAC has developed a vehicle safety alert system using Dedicated Short Range Communications (DSRC) for road safety applications.

ATCS Compatible Conventional Traffic Signal Controller (ACTSC)

C-DAC has developed a conventional (wired) traffic signal controller to have Vehicle Actuated operation and Area Traffic Control System (ATCS) compatibility to operate in semi-vehicle actuated and full-vehicle actuated modes. It supports remote connectivity for centralized signal control and ATCS Composite Signal Control Strategy (CoSiCoSt). GPS based time synchronization is used for signal coordination. Feedback mechanisms for Lamp control, Hardware and Software conflicts are provided and the system is integrated with C-DAC's Traffic Monitoring and Managing System (TraMM).

ACTSC System Installation

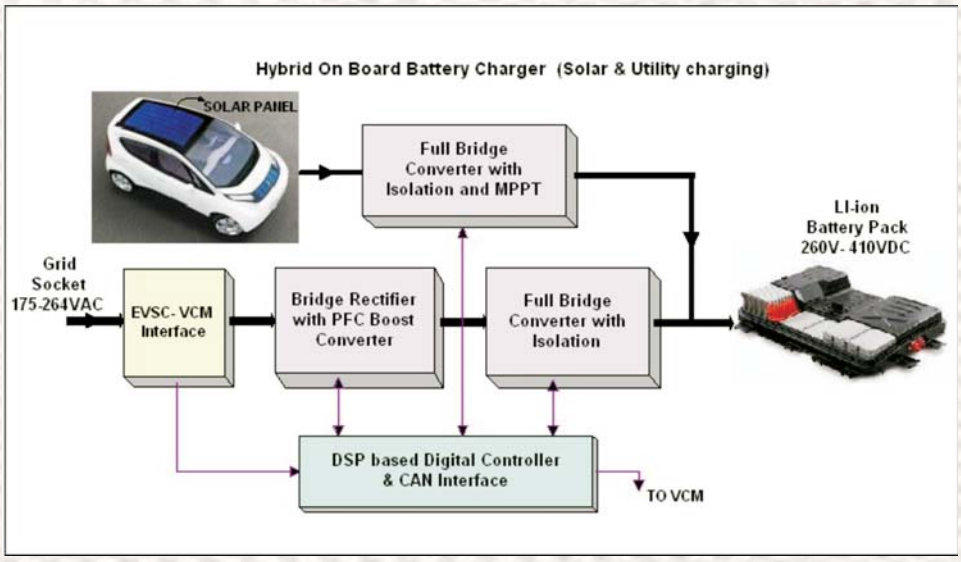
Power Electronics

10kV Power Supply with Solid State Crowbar Protection

High voltage DC power supply is used in wide areas such as space, industry, medical and military applications. C-DAC has developed 10kV, 1kA Crowbar made of solid state device. The High Voltage Power Supply (HVPS) is built using Series Resonant Converter (SRC) topology. Solid state crowbar is used as a protection to the sensitive load connected at the output of the power supply. Crowbar ensures that during fault in the HVPS or load, the energy dumped into the load is below the value specified for the load.

Hybrid On-board Battery Charger

C-DAC developed a Hybrid Charger for Electric Vehicles that can operate using both the conventional utility power as well as the Solar Photo Voltaic power as its charging source. The system uses Controller Area Network (CAN) protocol for communication and is provided with a PC-based GUI for testing. The output power in solar charging mode is 400 W and it goes up to 3.3 kW in the normal AC charging mode.

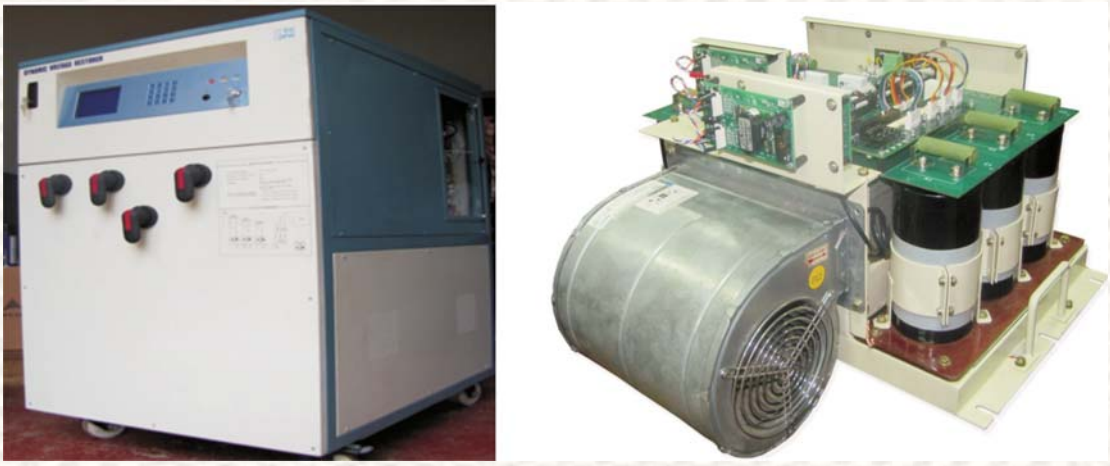


Hybrid On-board Battery Charger

Dynamic Voltage Restorer based Voltage Source Stabilizer (D-VSS)

C-DAC has developed Dynamic Voltage Restorer (DVR) which protects critical loads from supply side disturbances

other than outages. It is connected in series with the distribution feeder. Sag/swell in the grid is mitigated through series injection of voltage. DVR has a series compensator connected in series with the grid using an injection transformer and a shunt converter maintains the DC bus. The system works on a DSP-FPGA based Controller up to 10KVA rating with fast and accurate dynamic response.



D-VSS System and internals

Energy Market as a service through Cloud Infrastructure for State Load Dispatch Center

Energy market services are Intra State Bilateral Short Term Open Access (STOA) and Energy Scheduling. STOA supports to maintain GRID discipline for smart load management. Energy scheduling helps to generate and maintain the entire workflow of the schedule process. These services are deployed in cloud environment at North East Regional Despatch centre (NERLDC) for use by the State Load Despatch Centre (SLDC) of NE states. This provides a standardised, cost effective solution for all the SLDCs. In the initial phase, these services are provided to both Assam and Meghalaya SLDCs.

Short Term Open Access

Smart Systems

Systems and Solutions for Smart Cities

Smart Water Distribution system

C-DAC is developing a smart water distribution system which consists of devices and associated software to monitor the water quality parameters such as pH, turbidity, residual chlorine, pressure and flow rate along with

critical aspects of distribution points. A web based dashboard is also being developed for the system along with mobile app for user to understand his consumption and water quality.

Smart Energy Solutions

C-DAC is developing a smart home energy network providing effective itemization of energy consumption at home level with the networks formed by smart plugs/switches and smart energy gateway along with web and mobile monitoring setup. C-DAC is also developing single-phase and 3-phase Smart energy meters for residential and industrial applications which shall enable reduction of aggregate Technical & Commercial (AT & C) losses such as low metering efficiency, theft & pilferages in the distribution side.

Air and Noise Pollution Monitoring System

As per Central Pollution Control Board (CPCB) of India, the major air pollutants are Sulphur Dioxide, Nitrogen Dioxide, Ozone, Carbon Monoxide, Ammonia, Lead, PM2.5 and PM10 particulate matter. Towards environmental pollution monitoring, C-DAC is developing systems with ambient temperature and relative humidity sensor, ambient light intensity, atmospheric pressure sensor, dust particle detectors and sensors with necessary hardware and software and communication modes.

Smart Bins

C-DAC is developing sensor based Smart Bin, an effective waste management system that detects the level of waste in bins and schedules a day wise plan for collection and disposal.

Substation Automation System

Digitized substations and Monitoring and control of power delivery systems in the substation helps to reduce the occurrence of outages and shorten the duration of outages. C-DAC is developing fast peer to peer communication of sampled values with time synchronization using Generic Object Oriented Substation Events (GOOSE). This is a controlled model mechanism in which any format of data (status, value) is grouped into a data set and transmitted within a time period of 4 millisecond.

Sewer Network Monitoring System

Towards smart waste water management, C-DAC is developing sewer network monitoring system for monitoring of sewage level in manholes. The system shall raise alarms in the Local Control Room when the level in manholes exceed the preset limit value to take action in advance to prevent overflow.

SMART Transportation System

Towards Smart Mobility, C-DAC has already developed products such as Vehicle actuated traffic signal controller, adaptive traffic control system, parking management system, red light violation detection system, vehicle counting system, traveler information system and route & trip planner. C-DAC is now developing SMART mobility dashboard and is being integrated with its existing products.

Intelligent Green Energy Management Systems

C-DAC is developing intelligent energy management system including controller, multi agent intelligent energy control algorithms, demand response systems, smart power distribution panel (SPDP) and communication infrastructure.

Metro Mitra

C-DAC has developed Metro Mitra, a mobile application that provides user with route from source to destination giving high priority to metro routes. The app is designed as per requirements vetted by Bangalore Metro Rail Corporation Limited (BMRCL).

Smart Surveillance

C-DAC is developing following smart surveillance systems:

- Face recognition model for better accuracy of recognition on CCTV footages and building distributed network for surveillance
- Cloud Based Applications, Map based Graphical Visualization Dashboard for surveillance cameras, head count of people passing through the camera and soft alerts based features for verification

Command and Control Decision Centre for a City

A city has several resources - people and assets, e.g. law enforcement, transport, hospitals, power, etc. Each of these is controlled independently by its own owners. C-DAC is developing a pluggable framework where each agency can enter data about resources, controllers, sensors etc. and a customizable dashboard for fast decision making. This is especially critical during times of disaster/emergency.

Framework for Dynamic Allocation and Positioning of Resources

C-DAC is developing a framework for dynamic allocation of essential services such as police patrol, ambulances and extra buses etc. and optimal positioning of the vehicles.

Centralized MPNSS Card Management System

C-DAC is developing a central key management system that will allow authorized Issuers to issue new cards to the beneficiaries of Mahatma Phule National Social Security (MPNSS) scheme. Each user shall be registered and issued a portable Smart Card that would act as a secured Identity Card and store information related to the multitude of welfare schemes being offered by the Government. The system is being developed for Ministry of Labour and Employment and aims to provide social security benefits to about 40 Crore workers in the unorganized sector.

Ecosystem for Metro Gate Validation Terminal

C-DAC is developing solution for testing of metro gate validation terminal. This includes development of prototypes of software for transmission of configuration information, transmission of transaction data and inter-operability aspects.

Development & Implementation of Indian Conditional Access System

C-DAC is contributing towards review, monitoring, testing and validation of an indigenous/Indian Conditional Access System (ICAS) that is being developed as a part of Government Initiative. The system is devised for head end operators and domestic set top box (STB) manufacturers with all the required features. This would meet the technical requirements of the broadcasters to enable them adopt the same.

Card Key Management System

C-DAC is developing airport control system including Airport Entry Permit (AEP) Card Key Management System (KMS) for Bureau of Civil Aviation Security (BCAS). This shall enable automation of the process for issuance of all types of airport entry permits and grant staff access to various zones of terminal based on biometric verification. Smart card based AEP shall assist in security against duplication and illegal tampering of information and thereby preventing illegal entry.

Software Technologies including FOSS

C-DAC continued to carry out development and deployment of various software solutions for e-Governance, Free and Open Source Software (FOSS), social development and eLearning. C-DAC also contributed to software solutions in health, education, agriculture and Bharat Operating System Solutions as part of Digital India initiative of Government of India. Details of activities carried out during the year by C-DAC in this thematic area are described below.

e-Governance

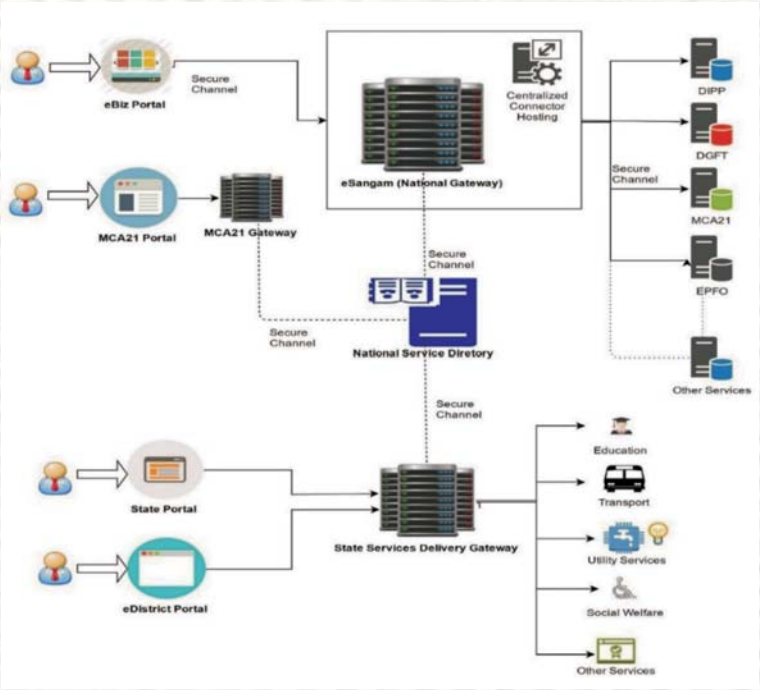
e- Governance Platforms and Frameworks

National Voters Services Portal (NVSP)

It is a one-stop solution developed by C-DAC to assist voters and providing information related to elections, polling booths and electoral rolls. NVSP provides online services like national electoral roll search, registration of new voter, registration of overseas voter, correction of entries in electoral roll, information about polling process, electronic voting machine, etc. With about 84 crores voters data view, the NVSP provide a very high significant value to the citizen.

eSangam (NSDG II)

National eGovernance Service Delivery Gateway (NSDG) is one of the 31 Mission Mode Projects under the National e-Governance Plan (NeGP) of Government of India. State e-Governance Service Delivery Gateways (SSDGs) act as a core infrastructure for achieving standards-based interoperability between state level-Government applications and geographically dispersed locations. This initiative is being carried out in collaboration with IIT Bombay and IIIT Hyderabad and C-DAC is offering its solutions to various government agencies. More than two crores transactions have taken place through NSDG. SSDG is being used by 26 states and has integrated 1800 departmental services.



eSangam Constellation of eGovernance Service Delivery Gateways

e-Pramaan: A National Authentication Framework

e-Praman is a national authentication framework developed by C-DAC, which provides a standard based uniform authentication mechanism for various government services. It offers secure authentication with various levels of assurances by verifying the credentials of e-Praman users accessing different government services through internet or mobile devices. It provides various authentication mechanisms such as password based authentication, OTP based authentication, digital certificate based authentication and biometric (fingerprint) based authentication. Various

departments are already integrated with ASA-AUA eco system and more than one crore transactions have been completed.

Mobile Seva

Mobile Seva is a national mobile governance platform that provides multiple mobile based channels such as SMS, USSD, IVRS and m-Apps for delivery of public services over mobile devices. Citizens can access SMS, USSD and IVRS based services through very basic phones. Mobile Seva platform provides a government App Store which hosts a number of mobile applications developed for various government departments. The App Store supports hosting of applications for multiple mobile platforms (e.g. Android, JavaME, etc.). Government departments can develop and deploy mobile applications for providing their services through mobile devices. More than 2000 government departments have been integrated using Mobile Seva.

e-Governance Applications and Services

Meri Sadak – Citizen Feedback System

With an objective to enable citizens to register their complaints regarding Pradhan Mantri Gram Sadak Yojana (PMGSY) roads, “Meri Sadak” mobile app was developed by C-DAC. The same was launched by Ministry of Rural Development on July 20, 2015 and made available for free download from Google Play Store. The mobile app enables citizens to provide feedback with the photographs from the site to National Rural Roads Development Agency (NRRDA). NRRDA after verification forwards the feedback to the concerned State Quality Coordinators (SQCs) of the Nodal Department implementing PMGSY who responds to the feedback posted by the citizen. Citizen can also monitor the redressal of his / her feedback through this app.

e-Governance for Central Drug Standard Control Organization (SUGAM)

SUGAM is a web-based e-Governance system developed by C-DAC for Central Drug Standard Control Organization (CDSCO), India’s drug regulatory agency. It is a single window system that connects Pharmaceutical industry, CDSCO offices across India and citizens of India. The system facilitates complete life-cycle of user application starting from application submission to CDSCO till grant of licenses and approvals from CDSCO. SUGAM portal was launched by Hon’ble Union Minister for Health and Family Welfare Shri J. P. Nadda on November 14, 2015 at Indian Pharmacopoeia Commission (IPC), Ghaziabad, Uttar Pradesh.

e-Hastakshar – C-DAC’s eSign Service

C-DAC has developed e-Hastakshar – C-DAC’s eSign Service that facilitates instant signing of documents online by citizens in a legally acceptable form. Using this, an Aadhaar holder with registered mobile number with Aadhaar can electronically sign a form/document anytime, anywhere, using any device. Through e-Hastakshar, C-DAC offers hassle-free fully paperless citizen services and convenience to users. C-DAC utilizes service of Unique Identification Authority of India (UIDAI) for on-line authentication and Aadhaar eKYC service. C-DAC became Certifying Authority (CA) under Controller of Certifying Authorities (CCA) on June 29, 2015 for offering eSign services.

National Imports Database v2 (NIDB2)

NIDB2 is an assessment tool and a decision support system for customs officers. It is used for assessment of imported goods at the numerous custom stations in India. NIDB2 provides instant information to compare declared values with contemporaneous import prices as well as current international prices of identical and similar goods. This enables them to take well-informed decisions on valuation and classification of imported goods and to prevent loss of revenue on account of under valuation or miss-declaration. It has been deployed at Directorate General of Valuation, India.

Kenya Revenues Authority Valuation System (KRAVS) - Phase 2

KRAVS is an assessment tool and decision support system for custom officers of Kenya Revenue Authority (KRA),

Kenya. It is enriched with various features such as up-to-date price reference database on accepted transaction values, valuation based risk management system, statistical and analytical reports and graphical reports and facility to upload international prices for easy reference etc. During the year, pilot deployment was carried out and hands-on training sessions were provided to KRA ICT officials on KRAVS2 application at Nairobi, Kenya.

e-Mulazim

e-Mulazim is a web based open source Human Resource management software for small and medium enterprises. This user friendly system automates the complete employee scheduling process and allows the user to maintain employee attendance records, leaves, payroll, inventory, CMS, Forums, and claim details electronically and helps to reduce overall management costs and time. During the year, C-DAC deployed the solution at National Agro Biotech Institute (NABI), Mohali and Center of Innovative and Applied Bio Research (CIAB), Mohali.

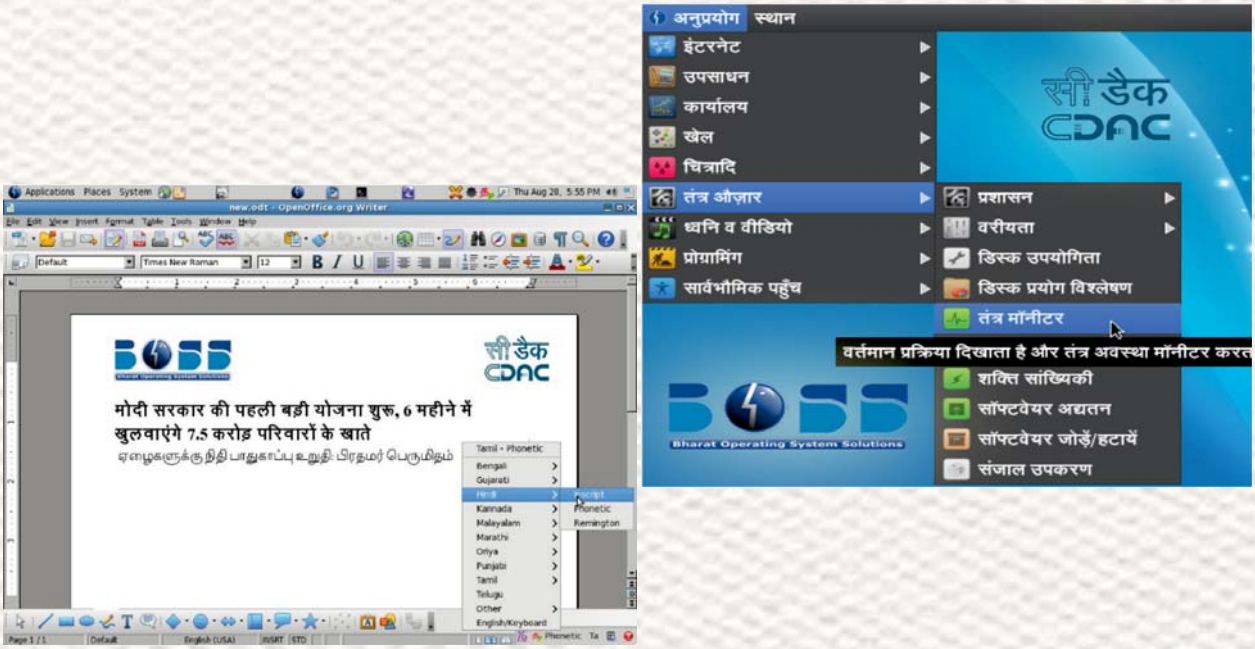
Electronic Project Proposal System (e-PPMS)

ePPMS is a cloud based solution to manage the life cycle of funded research projects, enables researchers to make online submission of proposals, technical evaluation, financial approvals and tracking of proposal status, etc. During the year, C-DAC deployed the same for Indian Council of Medical Research and Department of Health Research.

Free and Open Source Software Solutions (FOSS)

BOSS Linux 6.1

Bharat Operating Software Solutions (BOSS) GNU/Linux Version 6.1 – code named as Anoop, is coupled with GNOME Desktop Environment 3.14 version with wide Indian language support and packages, relevant for use in the Government domain. User interface was enhanced with more glossy themes and tab like look and feel on the desktop with latest applications from the Open Source community. During the year, C-DAC carried out several deployments for BOSS 6.1 for many agencies including Defence Research and Development Laboratory (DRDL), Indian Army, government departments and educational institutes of Tamil Nadu and Andaman and Nicobar.



BOSS Localized Desktop and Indic Language Input Support

EduBOSS

EduBOSS, educational variant of BOSS Linux is a full-featured, user-friendly Linux operating system, with educational applications that are useful for schools (primary and higher levels). It is a variant of BOSS GNU/Linux and developed in collaboration with teachers with features such as graphical installer, office application suite, onscreen keyboard, smart common input method, web browser, educational games, paint and graphic tools, typing tutor, screen reader, text to speech application and a host of tools and packages for learning and teaching. C-DAC carried out around 60000 deployments of EduBOSS across various primary and secondary Government schools of Maharashtra.

BOSS Server OS

BOSS advanced server is built with the Linux Kernel as its core and is easier to maintain. It has standard features of a high end server such as stability, powerful hardware optimization, auto security patch installation and reliability etc. During the year, C-DAC carried out BOSS server OS deployments for Indian Army, Indian Navy and Defence Research and Development Laboratory (DRDL), Hyderabad.

NavIOS2.0

C-DAC developed a secure custom BOSS GNU/Linux called NavIOS 2.0 and deployed for Indian Navy. The system is hardened for naval requirements and it enables only those services that are really required. In addition to hardening, logging/monitoring and alerts have also been implemented for the defined events that are significant from the security standpoint.

BOSS Minimalistic Object Oriented Linux (MOOL)

C-DAC is developing service oriented component based Operating System (OS) on the basis of research work of IIT Madras. The main objective behind SOA in Linux is to loosen the coupling between the various kernel entities and plug-and-play nature of services. This introduces higher degree of flexibility in the kernel and fault tolerance. The BOSS Minimalistic Object Oriented Linux (MOOL) OS allows developers to develop device drivers in C++. The scheduler objects are designed to minimize communication latency and offer better performance.

E-learning

Online Labs (OLabs) for school experiments - Phase-II

After the success of Phase I with 30 labs, scope of OLabs was expanded in phase 2 to cover all labs of Physics, Chemistry and Biology for classes 9 – 12 and a collection of Maths and English labs was also added. At present OLabs are having 150 experiments/interactive activities in Physics, Chemistry, Biology, Mathematics and English covering a variety of topics such as Hooke's law, Chemical Reactions, Verification of Pythagoras theorem and Tense conversion. It is being used by a large number of students and teachers and these labs are also available in local languages such as Marathi, Hindi and Malayalam. Online Labs (*www.olabs.edu.in*) Rollout was launched by Hon'ble Union Minister for Communications and Information Technology, Shri Ravi Shankar Prasad on December 28, 2015 during Good Governance week at New Delhi.

Online Labs

eBasta: School Books to eBooks

In line with the government's Digital India initiative, eBasta provides a framework to make the school books accessible in digital form as e-books. It reduces the burden of school books to the students and enables schools and teachers to overcome the logistic problems of book publishing, transport and delivery, especially at remote locations, and significantly shortens the cycle of book content editing/changes which today is limited to a yearly cycle at best. The development of eBasta portal has been completed and is operational at *http://www.ebasta.in*. During the year, 17 publishers have been registered on the portal and 1250 books have been published on the portal by CBSE, State Boards and Private Publishers. eBasta Android App is available for download from Google Play Store and Mobile Seva App store. Google Analytics has also been incorporated in eBasta Portal as well as eBasta App.

ICT for Social Development

Vikaspedia with additional languages support

Vikaspedia is a multilingual, multi-sectoral knowledge portal that seeks to empower poor and underserved communities through provision of information, products and services in regional languages. The system facilitates information generation in local languages through crowd sourcing and covers six key livelihood sectors such as Agriculture, Health, Education, Social Welfare, Energy and e-Governance. During the year, 9 more languages (Santhali, Sindhi, Dogri, Bodo, Maithili, Kashmiri, Nepali, Konkani and Manipuri) were added to the existing fourteen languages of Vikaspedia and eSOP - an e-Learning portal on Standard Operating Procedures for Deendhayal Grameen Kaushalya Yojana was launched by Chaudhary Birender Singh, Hon'ble Minister of Rural Development on October 20, 2015 at Bengaluru.

Automatic Facial Expression Recognition System (AFERS)

Automatic Facial Expression Recognition System developed by C-DAC can recognize six basic emotional facial expressions of human beings irrespective of gender and age such as happiness, disgust, fear, surprise, anger and sadness from video sequences in online mode using camera followed by saving the video for offline analysis at a later time.

A unique feature of AFERS is quantifying with a score for each of the expressions based on the intensity or degree of expression exhibited by the person. The scores so exhibited have been validated by Human Psycho-visual judgment. It has been deployed at special schools for Autism such as Alokdhara Inclusive School and Pradip Centre for Autism Management in West Bengal.

Shradha - A Multimodal Interface to Desktop for Elderly

Shradha is a customized version of Linux operating system that addresses the identified issues of elderly user while interacting with the computer systems. System has been developed by C-DAC through the active participation of user group and medical practitioners who work in the area of geriatric problems and developers. The unique features of the system include - categorized grid view to minimize the complexity, single mouse click environment for any operation, gesture based interaction and password manager.

Citizen Facilitation Services

IT for Masses Project in Punjab

C-DAC carried out an initiative regarding IT for Masses in Punjab to raise awareness amongst the members of the Scheduled Castes about various Punjab Scheduled Castes Land Development and Finance Corporation (PBSCFC) related loan schemes and self-employment opportunities. Touch enabled self-service awareness kiosks were installed in 22 Districts of Punjab. These kiosks are provisioned with the multimedia audio-visual learning eContent on 18 popular skill areas/business ventures as per PBSCFC's loan schemes/purposes and are designed and developed by subject matter experts. The e-Content in Punjabi and English, can be browsed through an interactive kiosk software, developed by C-DAC.

Social Media Analysis and Visualization in Emergency (SAVE)

C-DAC is developing a software that uses machine learning techniques and natural language processing to analyse big data arising from social media/tweets generated during disasters in real time. It extracts disaster related actionable and subjective information from the huge data generated from social media to inform disaster relief agencies such as National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF) and other rescue teams.

Mission for Developing Digitally Inclusive and Smart Community (DISC)

As a part of Digital India initiative of Government of India, C-DAC is carrying out development and customization of solutions in four areas - Health, Education, Agriculture and Bharat Operating System Solutions (BOSS). During the year, C-DAC carried out the following activities under these areas.

- Telemedicine - C-DAC is customizing and enhancing its telemedicine solution for Pan-India implementation. Telemedicine sites including Tele-Consultation Centres (TCCs) and specialist hospitals are being identified to deploy the solutions.
- Education - eBasta Android App is available for download from Google Play Store and Mobile Seva App store. C-DAC has initiated discussions with various stakeholders such as state boards, publishers, schools and teachers for leveraging eBasta.
- Agriculture - C-DAC has developed software for quality analysis of rice, paddy, tur, moong, bengal gram, kaboli chana.
- BOSS - C-DAC has upgraded and released BOSS Desktop with the Linux Kernel 3.16 and Libreoffice 5.0.

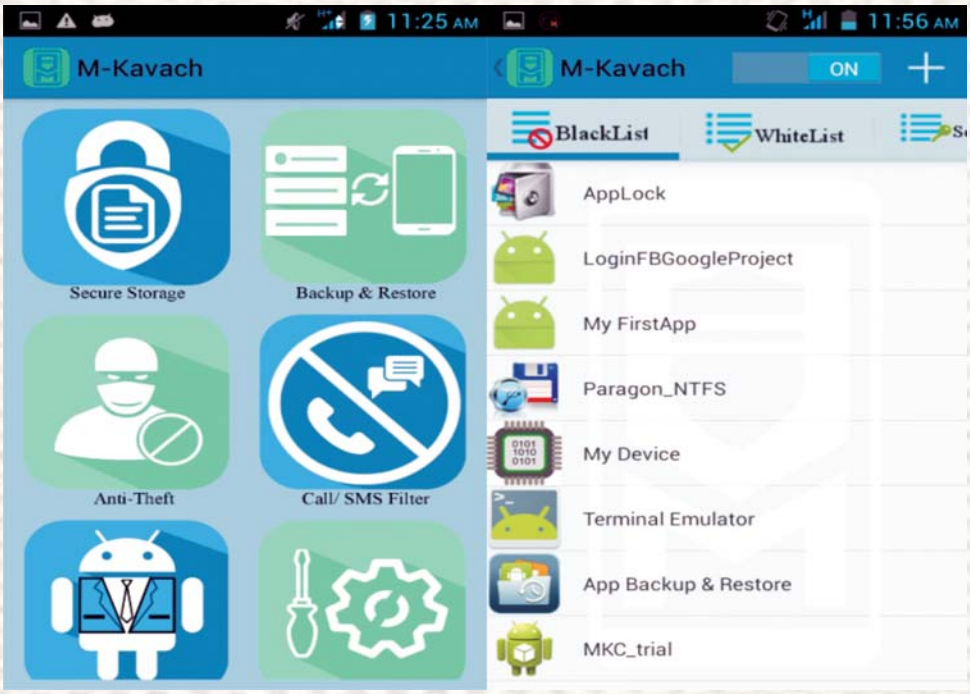
Cyber Security and Cyber Forensics

C-DAC carried out development and deployment of various solutions in the domains of mobile security, authentication, network management, attack analysis and cyber forensics. C-DAC carried out vulnerability assessment and penetration testing and security auditing services and actively contributed to the nation-wide cyber security awareness programmes.

Cyber Security Solutions

M-Kavach - Mobile Security

M-Kavach is a comprehensive mobile device security solution developed by C-DAC to secure mobile device resources. It is designed to provide protection against the data compromise, malicious applications, physical thefts and mis-utilization of hardware resources. Key features include secure storage, application manager, anti-theft, call/sms filter and authorized access to device resources like WiFi, bluetooth and camera. Application analyzer is also developed for classifying malicious and benign applications. During the year, M-Kavach Enterprise Edition is enhanced with GeoFencing feature that facilitates access to hardware resources based on the location of the device. Deployment of the solution was carried out for government agencies and the solution have been made available for download from Google play store and mGov app store.



M-Kavach Mobile device security solution

Cyber Threat Analyzer

The cyber threat analyzer solution is developed with capabilities for dynamically configuring various sensors in terms of network domains, contents and configurations. This supports large-scale attack data collection, threat monitoring and determination of latest attack trends. Towards detection of attacks of specific operating system, threaded light weight sensors are implemented. The system is deployed at various academic institutions.

Cyber Threat Analyzer

DARPAN

DARPAN – Network Management System (NMS) is an open source platform and open standards based NMS, indigenously developed by C-DAC. This can be used for managing mission critical networks of our nation and is devised to manage small enterprise networks to huge country-wide networks. Key features include network monitoring and management facilities such as fault management, configuration management, performance management and security management. During the year, C-DAC has deployed DARPAN for various government end users.

Online Signature Verification System

An online signature verification system developed by C-DAC, is a popular behavioral biometric technique and is one of the most powerful and acceptable means of personal authentication. It provides a robust, user friendly and language independent solution capable of verifying human identity. This system has a wide range of applications in financial and banking sectors, access control, R&D labs, POS application, forgery detection, branch automation, etc.

Cyber Forensics

Cyber Forensics Tools and Solutions

C-DAC has developed and deployed various cyber forensics tools and solutions such as disk forensics, network forensics, mobiles/smart phones analysis, SIM card imaging and analysis, hardware based disk imaging and Portable Forensics. During the year, these solutions were enhanced with additional features and deployments were at carried out at various organizations including law enforcement agencies across the country. These deployments include, disk and network forensics solutions at 15 organizations, solution for analyzing call detail record at 16 organizations, live forensics of specific operating system at 13 organizations, hardware based disk imaging tool at 8 organizations, portable forensics solution at 7 organizations, SIM analyzer at 18 organizations and Analyzer for mobile/smart phones at 20 organizations.

True Traveller – Portable Cyber Forensics Soluti

Cyber Security and Cyber Forensics Services

ICT Lab for Cyber Forensics

C-DAC has established cybercrime related training laboratories at the North-Eastern High Courts and its Benches. It is deployed at 7 different benches of High court of Guwahati, Tripura, Manipur and Meghalaya. These laboratories enable carrying out hands on experiments related to computer forensics, mobile handset forensics, mobile operator data forensics and basic network forensics. Total 23 training programs have been organized across 7 North-Eastern states with 660 participants. Towards providing advanced facilities for the investigation of cybercrimes, C-DAC has setup Cyber Forensics Analysis Lab at Forensic Science Laboratory lab in Karnataka.

Awareness and Training Programmes

As a part of Information Security Education and Awareness (ISEA) Project Phase-II, C-DAC carried out capacity building in the area of Information Security, training of Government personnel and creation of mass Information Security awareness targeted towards various user segments.

As on March 2016, under ISEA activity, workshops at various locations have been conducted through the centres of C-DAC, NIELIT and the participating institutes of ISEA. 160 workshops have been organized across the country covering a total of 14,857 participants including 2816 school children, 7562 students, 907 teachers, 279 faculty, 353 master trainers, 2292 central/ state govt. officers, 189 police, 204 parents/house wife, 30 SMEs and 180 cyber cafe/ CSC operators.

Under Government Officers training, 1590 members were trained across India from various government offices such as Naval Dockyard, Visakhapatnam, ISRO, AP Intelligence, STPI, DRDO Labs, RCI, CRPF, Police, Electricity Board and NIC staff.

Vulnerability Assessment and Penetration Testing

C-DAC is continuing to offer Vulnerability Assessment and Penetration Testing (VA/PT), security testing and auditing services to all Government organizations from last two years. C-DAC is actively involved in carrying out security audit of web applications, mobile applications, websites and IT Infrastructure like desktops, servers, firewalls, routers & switches, for various agencies. During the year, C-DAC has carried out security audits for various departments in Haryana and carrying out audits for the states of Punjab and Chandigarh.

Health Informatics

C-DAC has initiated development of new solutions and has carried out enhancements/customization and deployment of its healthcare solutions for various agencies in India and abroad. The activities carried out by C-DAC in the sub-areas of health informatics including health information systems, telemedicine, healthcare solutions and solutions for veterinary purposes are described below.

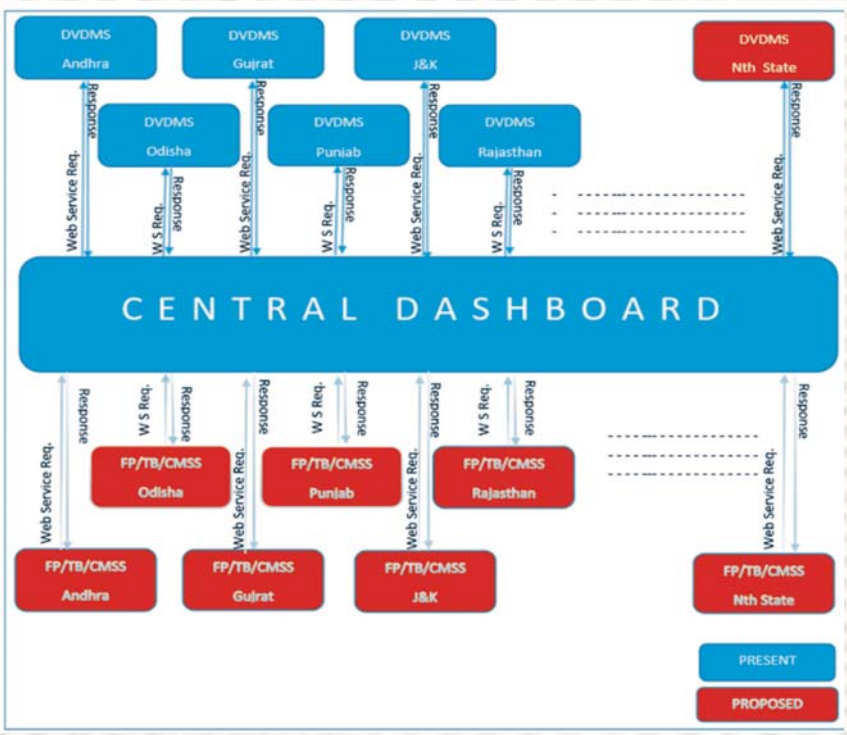
Health Information Systems

e-SafeT: Object Tracking System for Environment Sensitive Items in Transit

e-safeT is a compact, ultra-low power data logger developed by C-DAC that consists of a high resolution temperature sensor, memory, visual indicators and wireless link. This is used to track the thermal history of the items such as vaccines, blood bags, medicines, perishable goods, and other temperature sensitive items while in storage or in transit. Transfer of Technology of the same was carried out to M/s ITI Limited, Raebareli on April 13, 2015.

Drug Supply Chain Management Solution

C-DAC's e-Aushadhi solution deals with the purchase, inventory management and distribution of various drugs, sutures and surgical items to various District Drug Warehouses (DDWs), Medical Colleges, District Hospitals, Community Health Centres (CHCs), Primary Health Centres (PHCs) and Drug Distribution Centres (DDCs) in an entire state. e-Aushadhi solution has been selected for deployment at states of Jammu & Kashmir and Uttarakhand. During the year, C-DAC deployed e-Aushadhi in the states of Andhra Pradesh, Telangana, Madhya Pradesh and Gujarat.



Central Dashboard Architecture

Computerisation of Health Services

A SaaS based solution was developed by C-DAC to computerise the activities of out-patient panagement and in-Patient admissions of the Hospital, and integrate it with the Medical Records Library software at Thiruvananthapuram for Directorate of Health Services. The software supports numerous end-users in a multi-client, shared application environment of Software-as-a-Service (SaaS) model. Deployments were carried out at Taluk Hospitals at Neyyattinkara and North Paravur; W&C Hospital at Kozhikode; and District Hospitals at Peroorkada, Kottayam, Vatakara, Palakkad, Kannur, Vaikom and Quilandy.

Medicine Manufacturing Information System

C-DAC is developing Medicine Manufacturing Information System (MMIS), a system for verification of authentic medicines which will aid in detecting spurious medicines. MMIS generates random and unique codes and assigns the codes to medicine stripes and maintains in a central database. Citizens can carry out verification through scanning, SMS or application. This software system will be used by manufacturers, brand owners, exporters and responsible entities.

Tele-Medicine solutions

Kyrgyzstan Telemedicine Network

Telemedicine Network linking 6 Hospitals in Kyrgyz Republic has been commissioned, operationalized and handed over to Ministry of Health, Government of Kyrgyz Republic in July 2015. Out of the six locations, three locations were in Bishkek region and one location each in Osh, Karakol and Talas regions. Hon'ble Prime Minister of India inaugurated this 1st India-Central Asia Telemedicine Link at Bishkek, Kyrgyzstan, powered by C-DAC's Telemedicine Solution on July 12, 2015.

Tele-Consultation Centres at 2 border villages along India Bangladesh border

During the year, C-DAC established Telemedicine linkage between two locations (at Karimganj and Lalabajar) and Cachar Cancer Hospital and Research Center, Silchar, Assam and the solution is being used since May, 2015.

Telemedicine Network (Phase-III) in Odisha

Based on the support from National Health Mission (NHM) Directorate, Department of Health & Family Welfare, Government of Odisha, C-DAC deployed telemedicine solution at Odisha. This connects thirty districts headquarter hospitals that include three state-level Super Specialty Hospitals along with State Institute of Health & Family Welfare (SIH&FW) forming a complete referral chain. The solution was extended with Intensive Care Unit (e-ICU) at identified locations with continuation of operation and support of existing Telemedicine services.

Telemedicine for Central and Open Prisons at Kerala

C-DAC is implementing Telemedicine System with Electronic Medical Records at Central Prisons at Thiruvananthapuram and Viyyur, and Open Prisons at Nettukalthery and Cheemeni for providing timely access to healthcare, early detection of disease and follow-up consultation for the patients in the prison. Patients in these prisons can avail teleconsultation with a specialty hospitals such as Medical Colleges, District and General Hospitals in Kerala, Regional Cancer Care (RCC) Thiruvananthapuram, and Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram.

Healthcare Solutions

Big Data Analytics for Healthcare

C-DAC is developing Big Data analytics solutions for healthcare analysis to help in deriving valuable knowledge from large amounts of data, which can be used to identify needs and provision of services. Some of the solutions developed are given below.

- C-DAC is developing Big Data framework for Healthcare Analytics with generic web application for better health care management. The framework facilitates statistical analysis on consolidated healthcare data for analyzing various disease patterns to track the outbreak of disease and to provide quicker response.
- As a part of, "BIONIC: Big Imaging data approach for Oncology in a Netherlands India Collaboration" initiative, C-DAC is developing Big Data technology based decision support systems for cancer treatments. This is being developed in collaboration with academic, industrial and clinical leaders in India and Netherlands.

Research in Antisense Technology

Antisense technology is important for designing drugs for several diseases. Advanced research is being carried out at C-DAC in the area of antisense technology, where small modified oligonucleotides bind sequence specifically to target mRNA / DNA and inhibits the process of either transcription or translation. Specific challenges include computational analysis to be carried out on antisense drug molecules and its new modifications. This shall help in designing novel antisense modification which can overcome the drawbacks of currently available modifications.

RNA : PNA antisense complex

Health Assessment Kit for Neonates – Neokit

C-DAC has developed Neokit, a hardware device for measuring SpO2 (Blood Oxygenation Saturation - a measure of oxygen dissolved in blood), heart rate, and perfusion index which is a measure of blood reaching the capillaries and a direct indicator of pulse strength. The device is low cost, non-invasive unit suitable for use in rural, primary care and community based clinical settings.

Medical Image Analyser for Cervical Cancer pre-screening – AutoPAP

C-DAC's CerviScan is a computer assisted screening solution used for analysing and classifying digitized images of the PAP-Smear through image processing and machine learning algorithms. Under a joint collaboration between C-DAC and Uppsala University, Sweden under Swedish Research Links program funded by Swedish Research Council, CerviSCAN solution was enhanced further by building a prototype of an automated slide scanner, z-focus and algorithmic optimizations towards making it fully automated unit.

Tuberculosis Treatment Adherence System

Tracking of Tuberculosis (TB) patients who have defaulted on treatment is logistically difficult, resulting in significant delay in finding TB patients who have missed doses. The delay in tracking defaulters of TB treatment worsens symptoms of TB, and may convert case to Multiple Drug Resistant (MDR-TB). To address these issues, C-DAC is developing, an Interactive Voice Response System (IVRS) based Tuberculosis Treatment Adherence system using mobile and ICT for systematic and continuous treatment monitoring of TB patients. This enables obtaining near-real time information to identify TB treatment defaulters, and build Pill box compatibility to help with treatment adherence.

Solutions for Veterinary Purposes

Animal Lifting Devices – ALD

C-DAC has developed Animal Lifting and Standing Support Devices to help lift injured animals easily and provide treatment. The device will assist in treatment of animals which are unable to stand on their own either due to accident or sickness as they need to be raised within six hours to prevent degeneration of health due to impairment of blood circulation. The developed device is only portable animal lifting device of its kind.

Mobile Tele-veterinary Unit

Mobile Tele-veterinary units for treating needy animals at their location has been developed and handed over to Animal Husbandry Department, Government of Kerala. These mobile units equipped with digital X-ray device, ultrasound scanner, surgical equipment, animal lifting and standing support mechanism, backup generator, workstation computer, small refrigerator, 3G connectivity, and web camera for use.

Education and Training

C-DAC's education and training division is involved in the following activities:

- Industry-specific training programmes
- Formal education programmes in collaboration with Universities
- Corporate training programmes
- TechSangam – Industry-academia collaborative programmes
- IT Skill Development programmes
- International Initiatives
- Technology Development for education and training

Following are the major activities carried out under these categories during the year:

Industry-specific Training Programmes

Major focus of C-DAC's education and training is to generate industry-ready manpower in ICTE areas. Towards this objective, C-DAC conducts the following PG Diploma programmes:

- PG Diploma in Advanced Computing (PG-DAC)
- PG Diploma in Big Data Analytics (PG-DBDA)
- PG Diploma in Wireless and Mobile Computing (PG-WiMC)
- PG Diploma in VLSI Design (PG-DVLSI)
- PG Diploma in IT Infrastructure, Systems and Security (PG-DITISS)
- PG Diploma in Integrated Embedded System and VLSI Design (PG-DIVESD)
- PG Diploma in Geo informatics (PG-DGi)
- PG Diploma in Biomedical Instrumentation and Health Informatics (PG-DBIHI)
- PG Diploma in Embedded System Design (PG-DESD)
- PG Diploma in System Software Development (PG-DSSD)
- PG Diploma in Automation SCADA Systems (PG-DASS)

During the year, C-DAC trained more than 5800 students through these PG diploma programmes. C-DAC has designed and developed new post graduate programmes in the areas of Internet of Things and High Performance Computing.

Formal Education Programmes in collaboration with Universities

Towards high-end education, C-DAC conducts the following programmes in collaboration with leading universities for award of Masters Degree:

- M.E. in Wireless & Mobile Computing
- M.E. in IT System & Network Security
- M. Tech. in VLSI & Embedded Systems Design
- M. Tech. in High Performance Computing

About 183 students were enrolled during the year in these programmes.

Corporate Training

C-DAC based on its expertise in various R&D areas offers corporate training programmes to the government and corporate sector. As a part of this initiative, C-DAC has conducted various types of training programmes for Indian Army, Indian Navy and other Defence establishments. Corporate training programmes conducted during the year include Diploma in System Administration and Networking Management, Certificate Course in Cyber Audit and Cyber Law, Certificate Course in Information Security and Certificate Course in Network Management. These training programmes are usually conducted at users' premises. Hence, they were conducted at locations in New Delhi, Pune, Mumbai, Ahmednagar, Hissar, Bhatinda, Ranchi, Mathura, Bikaner, Alwar, Jaipur, Sriganganagar and Kota. More than 450 officers were imparted training through this initiative during the year.

Tech Sangam – Industry-Academia Collaborative Programmes

C-DAC has collaborated with the leading technical Institutions for providing faculty upgradation programmes, e-Learning, Research & Development and IT skill courses for the students of engineering institutions located at Udaipur, Pune, Coimbatore and Nagpur.

IT Skill Development Programmes

In-line to the government's IT skill development initiative, C-DAC has carried out various training programmes during the year. Details of these programmes are given below.

- Job oriented career training for scheduled caste students of Maharashtra was offered based on the support provided by Dr. Babasaheb Ambedkar Research and Training Institute (BARTI), an autonomous society of Social Welfare Department, Government of Maharashtra. Scheduled Caste (SC) women candidates were trained in Diploma in Advanced Software Development Methodologies (DASDM) course.
- Capacity building of candidates belonging to SC/Scheduled Tribe (ST)/Other Backward Class (OBC) and Minorities on computer proficiency was carried out, based on support from Directorate of SC, OBC and Minorities, Government of Himachal Pradesh. About 2000 candidates were trained and placed.
- Capacity Building in IT Skills of ST Candidates in Andaman & Nicobar in collaboration with Dr. B R Ambedkar Institute of Technology , Port Blair, Andaman & Nicobar: As a part of this initiative, C-DAC is setting up three IT Training Centres in Car Nicobar, Kamotra and Mayabunder in Andaman & Nicobar Islands and imparting training to 3300 ST candidates in Basic Skills on Information Technology.
- Capacity Building in IT Skills of ST Candidates in Chatisgarh is being carried out in collaboration with CHiPS, Chattisgarh where C-DAC is setting up three IT Training Centres in Rajnandgaon, Ambikapur and Jagdalpur.
- Skill Development for Youth in IT Sector of Bihar is being carried out by C-DAC in collaboration with NIELIT, Patna and Department of Information Technology, Government of Bihar.
- HPC skill development and capability building through Internship Scheme for Under Graduate/PG/ research Students of recognized Universities/institutes in North-East India is being carried out.

International Initiatives

C-DAC extends its expertise to other countries in ICTE by setting up of Centre of Excellence, setting up of IT infrastructure & training, deployment of solutions and course-ware. These activities are being carried out based on the support from Ministry of External Affairs (MEA), Government of India. During the year, the following activities were carried out as part of this initiative:

- India – Kazakhstan Centre of Excellence in ICT at Astana (IKCEICT) – IKCEICT was inaugurated by Hon'ble Prime Minister of India, Shri Narendra Modi on July 07, 2015. The centre is imparting training on professional IT courses in Computer Networking, C Programming & Data Structure, Project Management, Data Analytics with R, C++ Programming and Software Security.
- India – Palestine Centre of Excellence in ICT (IPCEICT) at Abu Dis and Digital Learning & Innovation Centre (DLIC) in Ramallah
    - Hon'ble President of India, Shri Pranab Mukherjee in the presence of H.E. Dr. Rami Hamadallah, Prime Minister of the State of Palestine inaugurated India – Palestine Centre of Excellence in ICT (IPCEICT) on October 13, 2015.
    - Hon'ble External Affairs Minister of India, Smt. Sushma Swaraj in the presence of Dr. Imad Abu Kisk, President of Al Quds University inaugurated Digital Learning & Innovation Centre (DLIC) on January 17, 2016.

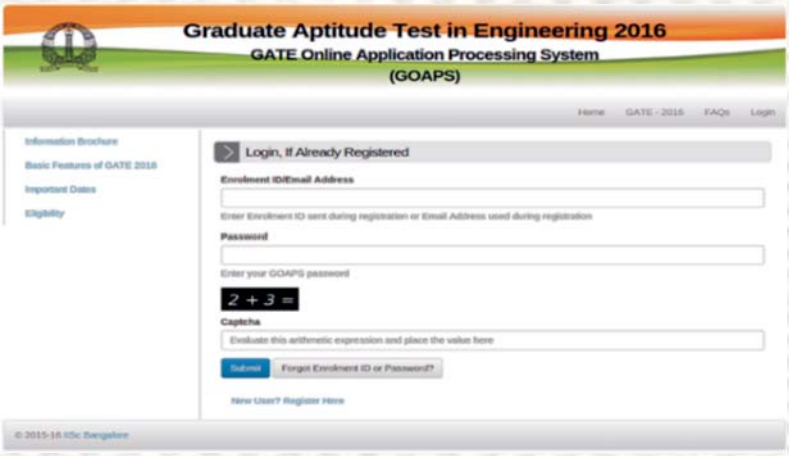
- Trained more than 2000 students at India – Myanmar Centre for Enhancement of IT Skills (IMCEITS) at Yangon and upgraded IT Infrastructure.
- Trained 2900 students/Government employees for short term IT courses at Jawaharlal Nehru India – Uzbekistan Centre for IT (JNIUCIT) at Tashkent
- Trained personnel on IT infrastructure and Language software provided at Language Laboratory & E-Resource Centre at Yangon & Nay Pyi Taw, Myanmar
- Signed agreement for setting up of ICT Resource Centre in Nelson Mandela African Institute of Science & Technology (NM-AIST) at Arusha, Tanzania and initiated training
- Handed over the Centre of Excellence in IT centres established in many countries including the following:
  - Centre of Excellence in IT (CEIT) at UTN in Ibarra, Ecuador and offering training to more than 367 students
  - India – Peru Centre of Excellence in IT (IPCEIT) at Lima, Peru and trained more than 567 students
- Continued to support the Centre of Excellence established earlier in (1) Alajuela, Costa Rica, (2) Roseau, Common Wealth of Dominica and (3) Panama City – Panama.

Use of Technologies for Imparting Education and Training

C-DAC develops and uses various software that aid in management and delivery of education and training in effective manner. Some of these are described below.

GATE 2016 and JAM 2016 Exam Automation

- Automation of GATE 2016 examination covering candidate registration, online application, application scrutiny, seat allocation, hall ticket issue, result processing and score generation. About 10 Lakh candidates appeared for the examination.



GATE Online Application Processing System – GOAPS

- Automation of JAM 2016 examination covering candidate registration, online application, hall ticket issue, result processing and score generation, choice filling, application scrutiny and seat allocation. About 40 thousand candidates appeared for the examination.

eMentor - Learning and Content Management System (LCMS)

eMentor is web based LCMS, that enables content uploading, content delivery, assessing performance, inter user communication, search and quality of service and web based guidelines/tutorials/help etc. During the year, the system was deployed in India Kazakhstan Centre of Excellence in ICT (IKCEICT) and India – Palestine Centre of Excellence in ICT (IPCEICT).

Resources, Facilitation Services and Initiatives

Collaborations/Cooperation

1. C-DAC signed Memorandum of Understanding (MoU) with Institute of Electrical and Electronics Engineers (IEEE) in the area of Cloud Interoperability for participation and contribution to IEEE Intercloud testbed.
2. C-DAC collaborated with University of Surrey, UK and Translational Research Platform for Veterinary Biologicals (TRPVB), Chennai for Development of vaccine and diagnostics for Mycobacterium bovis (M. bovis).
3. C-DAC signed the following two Tripartite Memorandum of Understanding (MoUs) with Russian agencies
   i. OJSC “GLONASS” and GLONASS Union for Development of Technologies and Applications based on Navigational Satellites
   ii. Indian Institute of Science (IISc), Bangalore and Lomonosov Moscow State University (MSU) for Education in High Performance Computing
4. C-DAC collaborated with United Institute Informatics Problems (UIIP), National Academy Sciences, Belarus for establishment of Centre of Excellence in HPC UIIP, Belarus.
5. C-DAC collaborated with IPT (Institute of Post & Telecommunications), Government of Lao PDR for setting up of sustainable IT infrastructure for advanced IT training using conventional, virtual classroom and e-Learning technologies in CLMV/ASEAN.
6. C-DAC collaborated with Department of Technology Promotion & Coordination, Ministry of Science & Technology, Government of the Republic of the Union of Myanmar for Creation of a Sustainable IT Infrastructure for Advanced IT Training using conventional, virtual classroom and e-Learning technologies in CLMV/ASEAN.
7. C-DAC collaborated with National Institute of Posts, Telecoms & ICT Ministry of Posts & Telecommunications, Government of the Kingdom of Cambodia (NIPTICT) for setting up of a sustainable IT infrastructure for Advanced IT Training using conventional, virtual class room and e-Learning Technologies.
8. C-DAC in collaboration with Ministry of External Affairs, Government of India is setting up of Computer labs in 37 schools in Tajikistan.
9. C-DAC is collaborating with United Institute Informatics Problems (UIIP) National Academy Sciences, Belarus for establishment of Centre of Excellence in High Performance Computing at UIIP, Belarus.
10. C-DAC is collaborating with Universal Speech Translation Advanced Research (U-STAR) Consortium in the technology domain of Speech to Speech Translation System to cross the language barrier.

Patents

Patents Awarded

1. "An Automatic Locking Device for Preventing Reverse Power Flow in Rotary Power Transmission", Inventor(s): Ratheesh Ravi and D K Warrier, Patent No: 384/CHE/2009.
2. "Distributed Time Synchronisation of Road Traffic Signal Controller using GPS", Inventor(s): V P Muralidharan and Ravikumar P, Patent No. 1619/CHE/2005.
3. "An Apparatus for, and Method of Detection of Land Mines and Other Buried Objects by Acoustic Excitation and Ultrasonic non-contact Sensing Method", Inventor(s): Mohanachandran R, Murali R and Rajesh KR; Patent No. 703/CHE/2009.

Patents Filed

1. "An Apparatus for Automatic Capturing of Facial Images in unattended mode and Process Thereafter", Inventor(s): Debasis Mazumdar and Ritesh Mukherjee.
2. "Device And System For Locating Text On A Printed Document", Inventor(s): N.S. Sreekanth, Nobby Varghese, Indu Sasidharan, Harish P Johnson, Karthika Venkatesan and Sarat Chandra Babu.
3. "Method and system for dynamically generating system for dynamically generating self-configurable application based on activities related to entity", Inventor(s): Sandesh Jain and Uday Kumar M.
4. "An Apparatus for Automatic Capturing of Facial Images in unattended mode and Process Thereafter", Inventor(s): Debasis Mazumdar and Ritesh Mukherjee.
5. "Process for Automatic Facial Expression Recognition and a system therefore", Inventor(s): Soma Mitra, Debasis Mazumdar, Washef Ahmed and Kunal Chanda.
6. "Apparatus for estimation of quality of beverages through electrochemical sensing technology", Inventor(s): Hena Ray, Alokesh Ghosh, Amritasu Das, Tarun Kanti Ghosh, Rabindranath Kanjilal and Nabarun Bhattacharya.
7. "Design and development of applications for physically challenged persons based on Non-invasive Brain Computer Interface (BCI)", Inventor(s): Sumit Soman, Sujeet Kumar, Praveen Srivastava and B K. Murthy.
8. "System and method for ompression and decompression of text data", Inventor(s): Mahesh Kulkarni, Ajay Lohokare, Swapnil Belhe, Umesh Vithalkar and Vinodkumar Pache.
9. "Automated Cervical Cancer Screening System", Inventor(s): Rajesh, Deepak, Byju, Sibi, Sharathkumar,Pournami, Sujathan and Ewert, Patrik.
10. "A Gadget for the Estimation of Aided sound Recognition Score (GEARS) to assess the Benefit of an Augmented Listening Device", Inventor(s): Gopakumar G, Biju C Oommen, Krishnakumar Rao and Vishnu Venugopal.
11. "A method for implementing secure transaction applications with portable communication devices", Inventor(s): Manoj Chandran Ramachandran, Krishnakumar Rao Sanjeeva Rao and Biju Cheriyan Oommen.
12. "Acoustic Mobility Aid for Visually Challenged", Inventor(s): Murali R, Byju C, Harikrishnan C S, and Parvathy S R.
13. "A method for optimizing target resolution and transmission power of an acoustic/ultrasonic based mobility aid", Inventor(s): Murali R, Byju C, Harikrishnan C S, Mohanachandran R., Aravind C. R. and James Varghese.
14. "A Method of Power Management for Battery Assisted Passive Processor Based UHF Smartcard", Inventor(s): Manoj Chandran Ramachandran, Krishnakumar Rao Sanjeeva Rao, Biju Cheriyan Oommen and Rajat Moona.
15. "Method and System for Enhancing addressing capability and traditional 8051 MC", Inventor(s): Jaya Sulekha, Gopakumar Gopinathan Nair, Krishnakumar Rao Sanjeeva Rao and Biju Cheriyan Oommen.
16. "A Device for Road Traffic Control using CAN and a Method thereof; Inventor(s): Sathyanarayanan Krishnamurthy, Ravikumar Poolathodi.

17. “A System for Differently abled Pedestrian Friendly Traffic Signaling Control and a Method thereof”, Inventor(s): Ravikumar Poolathodi, Hemant Jeevan Magadum (ITNS.
18. “Digital Identity Gadget for Mobile Computing Platforms”, Inventor(s): Jiju Kuttipalakkal, Arya Girija Lal and Stanley Regis Muthuswamy.
19. “On-line monitoring and control system for Renewable Energy Sources”, Inventor(s): Jiju K, Ramesh P, Brijesh P and Sreekumari B, et al..
20. “A Device to modify pre-timed Road Traffic Signal Controller to Vehicle Actuated Controller and a Method thereof”, Inventor(s): Ravikumar Poolathodi and Vattaparambil Abraham Mathai.
21. “An Electronic Assembly for voltage balancing during turn-on of S/C devices”, Inventor(s): Subhash Joshi, Aby Joseph, Dr. Lakaparampil and Dr. Vinod John.
22. “Method and system for integrating a 360° rotating camera into a mobile phone”, Inventor(s): Deepa Sivan, Krishnakumar Rao Sanjeeva Rao and Biju Cheriyan Oommen.
23. “A high voltage high pulse power switch using electrically triggered thyristor”, Inventor(s): Subhash Joshi, Aby Joseph, Dr. Lakaparampil and Dr. Vinod John.
24. “A method and a device for estimating sound recognition score (SRS) of a subject”, Inventor(s): Gopakumar G, Biju C Oommen, Krishnakumar Rao and Vishnu Venugopal.

Copyrights

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1. “Content Management System for Floral Diversity”, Inventor(s): Mina HK Desai, Gautam Kumar Saha, Niladri Sekhar Saha, Samaresh Das and Arghya De.
2. “Eflora - a Knowledge Management tool for Botanical domain to manage research data of botanical Survey of India”, Inventor(s): Mina HK Desai, Gautam Kumar Saha, Niladri Sekhar Saha and Samaresh Das.
3. “D-World - Web based content management system OAIS compliant and supports all formats”, Inventor(s): Mina HK Desai, Gautam Kumar Saha, Utpal Kumar Saha, Sankha Nath Ghosh and Arghya Ghosh.
4. “RIAG: Retinal Image Annotation and Grading Software”, Inventor(s): Deepak R.U; Sharath Kumar P. N. and Rajesh Kumar R.
5. “ePSS – Electronic Personal Safety System”, Inventor(s): Kalai Selvam, Dipuraj D S, Vikas V and Jessy C M.
6. “DCRMS – Distress Call Response Management”, Inventor(s): Kalai Selvam, Dipuraj D S, Vikas V and Jessy C M.
7. “m-CAD Report: A GUI based software to generate mammography”, Inventor(s): Nisha Kumari K N., Byju N B and Rajesh Kumar R.
8. “UHID: An Algorithm for Universal Health Identifier Generation”, Inventor(s):Sumit Soman, Praveen Srivastava and B.K. Murthy.

Awards/Recognitions

1. C-DAC has won 6th eNorth East Award 2016 for the Ongoing North-East Project "Centralized e-Auction System for North Eastern States (Sikkim, Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Tripura and Nagaland)" on February 26, 2016. The project has been judged as the Winner in the Category of eCommerce and Business.

2. C-DAC has won 6th eNorth East Award 2016 for commendable efforts in the Design & Delivery of e-Education in Health & Medical Sciences to the Medical Colleges of North East Region under the category of e-Learning & Education on February 26, 2016.

3. C-DAC received the award for HARITA PRIYA - Harmonized Information of Agriculture, Revenue and Irrigation for a Transformation Agenda project which is a Wireless Sensor Networks based Advisory model for farmers. The award was presented during 42nd SKOCH Summit held at India Habitat Centre, New Delhi during December 10-11, 2015.

4. C-DAC has been awarded for "Tamper Evident Recorder and Player (TERP)" that captures multiple forms of information along with the date, time, place and system information. The award was presented during 42nd SKOCH Summit held at India Habitat Centre, New Delhi during December 10-11, 2015.

5. C-DAC has been awarded for the project “e-Hastakshar: An Online Digital Signing Facility (C-DAC's e-sign Service)”. C-DAC is a Certifying Authority and has been empanelled as a e-Sign Service Provider (ESP) to offer eSign services to various Application Service Providers. The award was presented during 42nd SKOCH Summit held at India Habitat Centre, New Delhi during December 10-11, 2015.

6. C-DAC has been awarded for the project “Design, Development and Enhancement of Cyber Forensics Tools” pursued by Resource Centre for Cyber Forensics, Thiruvananthapuram. The award was presented during 42nd SKOCH Summit held at India Habitat Centre, New Delhi during December 10-11, 2015.

7. The sixth year award ceremony was held on November 6, 2015 at Bangalore where the Best VLSI/Embedded Design Company Award was presented by Mr Walden C Rhines, Chairman and CEO of Mentor Graphics USA to C-DAC.

Best VLSI/Embedded Design Company Award was presented by Mr Walden C Rhines, Chairman and CEO of Mentor Graphics USA to C-DAC

8. C-DAC has been awarded the Most Innovative Pilot Implementation Project on “Centre of Excellence for Digital Preservation” under National Digital Preservation Program by the EMC Forum 2015 held at New Delhi on October 15-16, 2015.

Most Innovative Pilot Implementation Project on “Centre of Excellence for Digital Preservation”

Events/Conferences

1. Conducted “Think Parallel Conference” in collaboration with Intel, NVIDIA, Lenovo and IEEE Bangalore for Parallel Programming for Engineers & Scientists during July 20-24 and November 30-December 4, 2015 at C-DAC, Bangalore.

2. Conducted “GARUDA-NKN Partners Meet 2015” in collaboration with National Informatics Centre (NIC) during September 10-11, 2015 at Indian Institute of Science (IISc), Bangalore.

GARUDA-NKN Partners Meet 2015

3. Conducted a 3-day workshops on "Data Science and Big Data Analytics - DSBDA" during August 5-7, 2015 and October 14-16, 2015 at C-DAC, Bangalore which included talks and hands-on-sessions on Hadoop, R, Machine learning techniques & tools, RHadoop, data visualization, life sciences applications.

4. Conducted a one day workshop on “IPv6” for DOS/ISRO Employees on May 15, 2015 at C-DAC, Bangalore focusing on Next Generation Internet Protocol version 6. The workshops for Enterprises were also organized on August 18 and November 19, 2015 in association with NIXI. The event was attended by more than 80 participants from government organizations and academic institutes.

IPv6 Workshop

5. Conducted training for “BOSS Enterprise Administration” for Eastern Command of Indian Army, Kolkata on January 27, 2016.

6. Conducted National Workshop on “Mobile Apps in Indian Languages” at Jawaharlal Nehru Technological University (JNTU), Hyderabad on July 24, 2015 in collaboration with School of IT, at Jawaharlal Nehru

Technological University (JNTU), Hyderabad.

7. Conducted a 3-Day Workshop on “Cloud Computing, Big Data Technologies and Security” at C-DAC Hyderabad on January 6-8, 2016.

8. Conducted Training Programme on Cyber Crime Related Capacity Development on the Theme “Cyber Crime and Cyber Forensics Techno-Legal Challenges” at Guwahati High Court, Aizawl Bench, Aizawl, Mizoram during April 24-25, 2015.

9. Bilingual Awareness guide book named “Cyber Safety” was published at CII Auditorium, Kolkata on July 6, 2015.

Bilingual Awareness guide book “Cyber Safety” was published on July 6, 2015.

10. Conducted Workshop cum User-meet on “Machine Aided Translation system with reference to AnglaBangla/ AnglaAssamese “Project at NIT Silchar, Assam on August 4, 2015.

11. Conducted Workshop on “Translation Software” at BangaBhavan, Silchar, Assam on August 3, 2015.

12. Conducted Training on “IT Security and Cyber Security” at Ordinance Factory Board, Kolkata on September 9-11, 2015.

13. Conducted training on “Cyber Crime and Cyber Forensics Techno-Legal Challenges” at Itanagar, Arunachal Pradesh and Agartala, Tripura on September 26-27, 2015.

14. Conducted Workshop on “ICT based Language Translation” at ICFAI University, Tripura on October 1, 2015.

15. Conducted “Information Security” Workshop at Manipur University on October 29, 2015.

16. Conducted “Information Security Education & Awareness Workshop (ISEA) at High Court of Meghalaya on November 9, 2015.

ISEA programme at High Court of Meghalaya

17. Inaugurated “BOSS Lab” at Department of Computer Science, RCC Institute of Information Technology (RCCIIT), Kolkata on December 17, 2015.

18. Conducted 3 days training on “Information Security for Govt. Officers” at Ordnance Factory Board, Head Quarters, Kolkata on January 20-22, 2016.

19. Conducted 3 days training on “Information and Cyber Security” at Indian School of Mines, Dhanbad on January 28-30, 2016.

20. Launched “SUGAM’ e governance Portal by Shri J. P. Nadda ,Hon’ble Union Minister of Health and Family Welfare, Gen (Dr.) V. K. Singh (Retd.), Minister of State, External Affairs, Overseas Affairs and Statistics and Programme Implementation(Independent charge) on November 14, 2015.

ToT of eSafeT was carried out to M/s ITI Limited, Raebareli on April 13, 2015.

Launch of Meri Sadak Mobile app by Hon’ble Union Minister for Rural Development, Panchayati Raj, Drinking Water and Sanitation, Chaudhary Birender Singh on July 20, 2015

Dr. Ajay Kumar, IAS, Additional Secretary, MCIT inaugurating Jagrukta Kiosk at Dr. B. R. Ambedkar Bhawan, Amritsar (Punjab) in July 2015

Inauguration of C-DAC – AEC PARAM Supercomputing Centre at Assam Engineering College, Guwahati by Shri Tarun Gogoi, Hon'ble Chief Minister of Assam

Inauguration of C-DAC- NIT Agartala PARAM Supercomputing Centre at NIT, Agartala by Shri Manik Sarkar, Hon'ble Chief Minister of Assam

H-bond Bigdata Analysis Tool (H-BAT) released in 'Accelerating Biology 2016' symposium held in January 2016

Launch of Integrated Cluster Solution (InClus) by Dr. V. K. Saraswat, Member, NITI Aayog on the occasion of 29th Foundation Day of C-DAC

Inauguration of "Bhubaneswar Computer Aided Design (CAD) Centre" by Shri Naveen Patnaik, Hon'ble Chief Minister of Odisha on December 10, 2015

Inauguration of Kyrgyzstan Telemedicine Network in Bishkek by Hon'ble Prime Minister of India, Shri Narendra Modi on July 9, 2015

ToT of Pebrine-o-Scope carried out by Shri R. S. Sharma, Secretary, MeitY, Govt. of India on July 27, 2015

Research Papers/Publications

1. Pinak Ranade, Asima Mishra, Sunil Londhe and Pankaj Bhatnagar, “Web GIS Enabled Faunal Information System (WGFIS) for Monitoring and Analysis of Species Zoo-Geographic Distribution”, International Journal of Advanced Remote Sensing & GIS, Volume 4, Issue 1, Pp. 960-964, April 2015.

2. Pinak Ranade and Asima Mishra, “Web-GIS based Livestock Information Management System (WGLIMS): review of Indian Scenario”, International Journal of Applied Sciences and Engineering Research, Volume 4, Issue 2, Pp. 200-204, April 2015.

3. Murugesh Prabu, V Siva Kumar, Binay Kumar, C Biju and Pinak Ranade, “GIS and Sensor Based Monitoring and Prediction of Landslides with Landslide Monitoring and Prediction System (LMPS) for Indian Scenario”, IOSR Journal of Applied Geology and Geophysics, Volume 3, Issue 3, Pp.13-16, May-June 2015.

4. Pinak Ranade, Sunil Londhe and Asima Mishra, “Smart Villages through Information Technology-Need of Emerging India”, IPASJ International Journal of Information Technology, Volume 3, Issue 7, Pp. 1-6, July 2015.

5. Pinak Ranade and Yashwant Katpatal, “Rainwater harvesting (RWH) potential assessment for micro-watersheds in highly urbanized city using geo-spatial techniques”, IPASJ International Journal of Information Technology, Volume 2, Issue 7, Pp. 1-3, July 2015.

6. Roy P S and Kale, M P et al., “New Vegetation type map of India prepared using satellite remote sensing: Its comparison with global vegetation maps and utilities”, International Journal of Applied Earth Observation and Geoinformation, Elsevier, Vol. 39, Pp. 142-159, 2015.

7. Roy P S, Roy A, Joshi P K and Kale M P, et al., “India’s decadal (1985-1995-2005) Land Use and Land Cover spatial database: A new source for studying land dynamics and climate change”, Remote Sensing, Vol. 7, Pp. 2401-2430, 2015.

8. Kale Manish, Chavan Manoj and Lele Nikhil, “Restoration Prioritization at Landscape Level considering Biodiversity, Carbon and Community criteria with special reference to CDM/REDD+ - A Geomatics perspective”, International Journal of Advancement in Remote Sensing GIS and Geography, Vol. 3, No. 1a, Pp. 17-28, 2015.

9. S Ramachandran, Sumita Kedia and Varun Sheel, “Spatiotemporal characteristics of aerosols in India: Observations and model simulations” Journal of Atmospheric Environment, Volume 116, Pp.225-244, September 2015.

10. Sudhakar Mishra, Shefali Sonavane and Anil K Gupta, “Study of Traffic Generation Tools”, International Journal of Advanced Research in Computer and Communication Engineering, Volume 4, Issue 6, Pp. 159-162, June 2015.

11. Murugesh Prabhu T S, Sivakumar V, Binay Kumar, Biju C and Pinak Ranade, “GIS and Sensor Based Monitoring and Prediction of Landslides with Landslide Monitoring and Prediction System (LMPS) for Indian Scenario”, IOSR Journal of Applied Geology and Geophysics (IOSR-JAGG), e-ISSN: 2321–0990, p-ISSN: 2321– 0982, Volume 3, Issue 3, Ver. I, Pp. 13-16, May-June 2015.

12. Richa Rastogi, Abhishek Srivastava, Kiran Khonde, Kirannmayi M Sirasala, Ashutosh Londhe and Hitesh Chavhan, “An efficient parallel algorithm: Poststack and Prestack Kirchhoff 3D depth migration using flexi-depth iterations”, Computers & Geosciences, Volume 80, Pages 1-8, ISSN 0098-3004, July 2015.

13. Vinod Jani, Uddhavesh Sonavane and Rajendra Joshi, "Traversing the folding pathway of proteins using temperature aided Cascade Molecular Dynamics with conformation dependent charges”, Eur Biophys J. 2016 Jul;45(5):463-82. doi: 10.1007/s00249-016-1115-4, February 13, 2016.

14. Kalasagar B, Arunachalam B, Vineeth Simon Arackal and Prahlada Rao B B, “Grid portal with Compiler Service, Advanced Reservation QoS and Job Management using Mobile services”, International Journal of Advanced Intelligence Paradigms, Vol. 7, Issue 3-4, Pp. 250-263, January 2015.

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17. Madan, Suneet and Ila Joshi, “Verbal versus Visual: An Analysis of High School Edublogs”, International Journal of Engineering Trends and Technology (IJETT), Volume 19, Issue 5, Pp. 265-270, ISSN: 2231-5381, January 2015.

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21. Shashi Pal Singh, Ajai Kumar, Akanksha Gehlot and Vaishali Sharma, “Hindi to English Transfer Based Machine Translation System” International Journal of Advanced Computer Research, ISSN (Print): 2249-7277, ISSN (Online): 2277-7970, Volume-5, Issue-19, June 2015.

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23. Krishnanjan Bhattacharjee, Swati Mehta, and Ajai Kumar, “A Novel Natural Language Processing (NLP) based Approach for Developing Automated Semantic Clause Parser”, International Journal of Research in Engineering and Technology, Vol. 4, Special Issue-6: NCEITCS-2015, Pp. 22-26, 2015.

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25. Akhil Goyal and Navdeep S. Chahal, “A Proposed Approach for Efficient Energy Utilization in Cloud data Center,” International Journal of Computer Applications, Vol. 115, No. 11, Pp. 24-27, ISBN: 973-93-80886-02-2, April 2015.

26. Vikash Kumar and Paras Nath Barwal, “Implementation of Highly Optimized Search Engine Using Solr”, International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET) 2016, Vol. 5, Issue 3, ISSN (Print): 2347-6710, March 2016.

27. Dhruv Pant, Paras Nath Barwal and B K Murthy, “Information Security in 21st Century”, International Journal of Advanced Engineering and Global Technology (IJAEGT), Vol.03, Issue-10, ISSN No: 2309-4893, November 2015.

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30. Shaila Eksambekar and Prof. Suhasini Itkar, "Survey on Different Techniques in SQL to Prepare Dataset for Data Mining", International Journal of Emerging Trends & Technology in Computer Science (IJETTCS), Vol. 4, Issue 2, Pp. 158-162, March-April 2015.

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39. Sucheta Pawar, Ashish Ranjan, Chitranjan Singh, Abhishek Sharma and Sanjay Wandhekar, “HPC Real View, Analysis, Report through InClus” International Supercomputing Conference 2015, Frankfurt, Germany, July 12-16, 2015.

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67. Kumar Mandula, Ramu Parupalli, Ch AS Murty, E. Magesh and Rutul Lunagaria, “Mobile based Home Automation using Internet of Things (IoT)”, IEEE International Conference on Control Instrumentation, Communication and Computational Technologies, Kanyakumari, India, December 18-19, 2015.

68. Akhil Goyal and Navdeep S Chahal, “Bio Inspired Approach for Load Balancing to Reduce Energy Consumption in Cloud Data Center”, IEEE International Conference on Communication, Control and Intelligent Systems (CCIS), Pp. 406-410, November 7-8, 2015.

69. Renu Sharma, Sukhendu Das and Padmaja Joshi, “Score Normalization in Multimodal Systems using Generalized Extreme Value Distribution”, British Machine Vision Conference (BMVC), pages 1-12. BMVA Press, September 2015.

70. Urjaswala Vora, Avani Vakharwala, Peeyush Chomal, and Mohasin Sutar, "Mining Environmental Data for

Prediction of Transmission Patterns of Communicable Diseases", 17th IEEE International Conference on e-Health Networking, Application & Services (IEEE HEALTHCOM 2015), Boston, USA, October 14-17, 2015.

71. Kapil Kant Kamal, Manish Kumar, Bharat Varyani and Kavita Bhatia, “Efficient Use of Voice as a Channel for Delivering Public Services”, 17th International Conference on Enterprise Information Systems (ICEIS), Barcelona, Spain, April 27-30, 2015.

72. Kapil Kant Kamal, Manish Kumar and Bharat Varyani, “Paradigm shift in Mobile Communication Carrier”, 4th International Conference on Advances in Computing, Communications and Informatics (ICACCI), Kerala, August 10-13, 2015.

73. Manish Kumar, Kapil Kant Kamal, Bharat Varyani and Meghana Kale, “Analysis of Optimization Requirement of Mobile Application Testing Procedure", 10th International Conference on Software Engineering Advances (ICSEA 2015), Barcelona, Spain, November 15 - 20, 2015.

74. Kapil Kant Kamal, Manish Kumar, Bharat Varyani, Soumya Shrivatva and Prabin Tripat, “Mobile Platform as a Service A Case Study of User Friendly Approach to Mobile Strategy”; 13th International Conference on Advances in Mobile Computing & Multimedia (MoMM2015), December 11-13, 2015.

75. Nidhi Gaur, Padmaja Joshi, Vijay Jain and Rajeev Srivastava, ”CPN Model for Web Architectures of Web and Database Servers”, International Conference on Web Engineering and Technology (ICWET), Toronto, Canada, 1173, World Academy of Science, Engineering and Technology, ISSN:1307-6892, Vol.-1, No. 6, Pages -1075, June 15-16, 2015.

76. Sanjay Singh, Ashwin Nivangune, Sathish Kumar, Ranjan Kumar, Padmaja Joshi and Dhiren Patel, “Extending App Installable Memory in Android Smartphones”, IEEE/ACM International Conference on Mobile Software Engineering and Systems, MobileSoft’16, Austin, TX, USA, May 16-17, 2016.

77. Dilay Parmar, A Sathish Kumar, Ashwin Nivangune, Padmaja Joshi and Udai Pratap Rao, “Discovery and Selection Mechanism of Cloudlets in a Decentralized MCC environment”, IEEE/ACM International Conference on Mobile Software Engineering and Systems, MobileSoft’16, Austin, TX, USA, May 16-17, 2016.

78. Vaidehi Takalikar and Padmaja Joshi, "Inter-page Access Metrics for Web Site Structure and Performance", International Conference on Computational Techniques in Information and Communication Technologies (ICCTICT), New Delhi, March 11-13, 2016.

79. Nirmala Salam and Rekha Nair, “Noise Robustness of Speaker Verification System Using Auditory Features", IEEE Conference on Computer Graphics, Vision and Information Security, Bhubaneshwar, November 2-3, 2015.

80. Ranjan Kumar, Ashwin Nivangune and Padmaja Joshi, "Challenges in Transition from Web to App", ACM Proceedings of the Third International Workshop on Mobile Development Lifecycle (MobileDeli), Pittsburg, USA, Pp. 9-10, ISBN: 978-1-4503-3906-3 doi>10.1145/2846661.2846677, October 26, 2015.

81. Padmaja Joshi, Ashwin Nivangune, Ranjan Kumar, Sathish Kumar, Rakesh Ramesh, Sushant Pani and Arif Chesum, “Understanding the Challenges in Mobile Computation Offloading to Cloud through Experimentation”, 2nd ACM Conference MobileSoft 2015, Co-located with International Conference on Software Engineering (ICSE), Flourence, Italy, Pp. 158-159, May 16-17 2015.

82. Renu Sharma, Sukhendu Das and Padmaja Joshi, "Score Normalization in Multimodal Systems Using Generalized Extreme Value Distribution", British Machine Vision Conference (BMVC), Swansea, U.K., September 7-10, 2015.

83. Ankita Dubey, Zia Saquib and Surabhi Dwivedi, "Electronic Authentication for e-Governance Services- A Survey", 10th IET System Safety and Cyber Security Conference 2015, Bristol, UK, October 20-22, 2015.

84. Vijay Jain, Ranjan Kumar and Zia Saquib, "An Approach towards Digital Signatures for e-Governance in

India", ACM Electronic Governance and Open Society: Challenges in Eurasia (EGOSE 2015), St. Petersburg, Russia, November 24-25, 2015

85. Payal Abichandani, Rishi Prakash, Paras Nath Barwal and B. K. Murthy, “Tool for Metadata Extraction & Content Packaging as Endorsed in OAIS Framework”, 17th International Conference on Digital Preservation (ICDP 2015), Barcelona, Spain, August 17-18, 2015.

86. Nisha Sharma, Paras Nath Barwal and B K Murthy, “Development of e-PPMS for Research Proposals Based on Integrated Spring and Hibernate Framework”, 2nd International Conference on “Computing for Sustainable Global Development, Bharati Vidyapeeth’s Institute of Computer Applications and Management (BVICAM), New Delhi, India, March 11-13, 2015.

87. Sunita Arora, Dipankar Ganguly, Karunesh Kumar Arora, Bulusu Krishna Murthy and Shyam Agrawal, “Building Multiple Number of Sets of Phonetically Rich Sentences from Web Crawled Text”, International Conference Oriental COCOSDA/CASLRE, Shanghai, China, October 28-30, 2015.

88. Sandeepika Sharma, Sneha Choudhary and Bhupendra Kumar, “Recognition of Machine Printed Broken Oriya Characters Using Sift Features”, Sixth International Conference on Computer and Communication Technology 2015, Allahabad, India, Pp-106-109, ISBN: 978-1-4503-3552-2, September 25-27, 2015.

89. Sneha Choudhary, Sandeepika Sharma and Bhupendra Kumar, “Recognition Of Printed Oriya Script Using Gradient Based Features”, 12th IEEE India International Conference INDICON-2015, New Delhi, India, Pp. 17-20, December 2015.

90. Sumit Kumar Saurav, Manisha Chauhan and Ganga Prasad G. L., “Adaptive Power Management for HPC Applications”, International Conference on Green High Performance Computing (ICGHPC 2016), St. Xavier's Catholic College of Engineering, Nagercoil, India, February 26-27, 2016.

91. Lagineni Mahendra, K Jagan Mohan, RK Senthil Kumar and Ganga Prasad G.L., “Fault-tolerant Energy Scheduling System”, 6th IEEE International Conference on Power Systems (ICPS 2016), Indian Institute of Technology, Delhi and India Habitat Centre, New Delhi, India, March 4- 6, 2016.

92. Sivanantham A, “Measurement of Heart Beat Respiration and Movement Detection using Smart Bed”, IEEE Recent Advances in Intelligent Computational Systems 2015, Trivandrum, December 10-12, 2015.

93. S Irene and R Pitchiah, “Distributed and scalable context reasoning in a home environment”, 12th Annual IEEE International Conference on Sensing, Communication, and Networking (SECON), Seattle, WA, June 22-25, 2015.

94. Ajeya Anand, Raja Vasudevan, Sayantani Bhattacharya, Arun R and Sivanantham, “A Retrofit control solutions for old buildings using WSN”, IEEE 2015 International Conference on Computer, Communication and Control Technology (I4CT 2015), Sarawak, Malaysia, April 21-23, 2015.

95. Sajitha Andrews and Subhash Joshi T.G, “Performance Improvement of Dynamic Voltage Restorer using proportional Resonant Controller”, PCIM (Power conversion and Intelligent Motion) Europe 2015, Nuremberg, Germany, ISBN 978-3-8007-3924-0, May 19-21, 2015.

96. Amarjeet Singh Cheema, Siddharth Srivastava, P K Srivastava and Dr. B K Murthy, "A Standard Compliant Blood Bank Management System with Enforcing Mechanism", IEEE International Conference on Computing, Communication and Security (ICCCS-2015), Kanyakumari, India, November 2015.

97. Siddharth Srivastava, Astha Rai and A S Cheema, "HealthCare: The state of the art and the role of technology", International Conference on Telecommunication Technology & Management, New Delhi, April 11-12, 2015.

98. Devendra Rao, Praveen Srivastava, M Balasubramaniam and Vikas Bansal, "Synchronization software tool for effective data mining", IEEE International Conference on Computing for Sustainable Global Development (INDIACom-2016), New Delhi, India, March 2016.

99. Sumit Soman, Praveen Srivastava and B K Murthy, "Unique Health Identifier for India: An algorithm and feasibility analysis on patient data", 17th IEEE International Conference on E-health Networking, Application & Services (HealthCom 2015), Pp. 250-255, Boston, MA, USA, October 2015.

100. Manasvi Kalra and Sujeet Kumar, "Various Image Enhancement Techniques for Skin Cancer Detection using Mobile Apps", IEEE International Conference on Computer, Communication and Control (IC4), Indore, India, September 2015.

101. Jayadeva, Sumit Soman and Amit Bhaya, "The MC-ELM: Learning an ELM-like Network with Minimum VC Dimension", 2015 IEEE International Joint Conference on Neural Networks (IJCNN 2015), Killarney, Ireland, July 2015.

102. Siddharth Srivastava, Prashant Kumar, Ashu Krishna, Rajiv Yadav and B K Murthy, "Mobile based Open Source GIS, routing and searching for mobile platforms", 2015 ICEIT Second Conference on Advances in Mobile Communications, Networking and Computing, ICIET, New Delhi, India, April 2015.

103. Siddharth Srivastava, Ashu Krishna, Rajiv Yadav and B K Murthy, "Mobile based Intelligent Recommender and Planner for Tourist Places", 2015 ICEIT Second Conference on Advances in Mobile Communications, Networking and Computing, ICIET, New Delhi, India, April 2015.

104. Manoj D Rote, Vijendran N and David Selvakumar, “High performance SHA-2 Core using Round Pipelined Technique”, International Conference on Electronics, Computing and Computational Technique (CONECCT) 2015, India, July 10-11, 2015.

105. Vijay Bahadur, David Selvakumar, Vijendran and Sobha P M, “Reconfigurable Side Channel Attack resistant True Random Number Generator”, The International Conference on VLSI Systems, Architecture, Technology and Applications, Bangalore, January 10-12, 2016.

106. Akanksha Joshi and Abhishek Gangwar, "Color local phase quantization (CLPQ)-A new face representation approach using color texture cues," 8th IAPR International Conference on Biometrics (ICB), pp.177,184, DOI: 10.1109/ICB.2015.7139049, May 19-22, 2015.

107. Renu Sharma, Sukhendu Das and Padmaja Joshi, “Rank Level Fusion in Multibiometric Systems”, Fifth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), Patna, Bihar, December 16-19, 2015.

108. Rohitkumar Gautam, Sanjeev Kumar and Jhilik Bhattacharya, “Optimized virtual Honeynet with implementation of host machine as Honeywall”, 2015 Annual IEEE India Conference (INDICON), New Delhi, December 17-20, 2015.

109. Saurabh Chamotra, Rakesh Kumar Sehgal and Sanjeev Ror, “Bot detection and Botnet tracking in Honeynet context”, International Conference on ICT for Intelligent Systems (ICTIS-2015), Ahmedabad, India, November 28-29, 2015.

110. Sanjeev Kumar, Rakesh Kumar Sehgal and Saurabh Chamotra, “A Framework for Botnet Infection Determination through Multiple Mechanisms Applied on Honeynet Data”, 2016 Second International Conference on Computational Intelligence & Communication Technology, (CICT), Ghaziabad, India, February 12-13, 2016.

111. Ramesh Naidu Laveti, Prahlada Rao B B, Vineeth Simon Arackle and Arunachalam B "Seasonal Ensemble Forecasting Application On Dependable Sumegha Scientific Cloud Infrastructure", International Symposium on Grids and Clouds Academia Sinica, Taipei, Taiwan, March 13-18, 2016.

112. Ramesh Naidu Laveti, “Automatic dynamic stack management in large scientific applications: A case study using a global spectral model”, International Symposium on Grids and Clouds Academia Sinica, Taipei, Taiwan, March 13-18, 2016

113. S Irene, N Shwetha, P Haribabu and R Pitchiah, “Development of ZigBee Triaxial Accelerometer based Human Activity Recognition System”, International Symposium on Advances in Ubiquitous Computing and Networking (AUCN-2015), Liverpool, UK, October 26-28, 2015.

114. Abhishek Gangwar and Akanksha Joshi, "Local Gabor Rank Pattern (LGRP): A novel descriptor for face representation and recognition," 7th IEEE International Workshop on Information Forensics and Security (WIFS 2015), Rome, Italy, November 16-19, 2015.

115. Kulkarni, Annarao, et al., "Hindi-Kannada Named Entity Transliteration: Issues and Possible Solutions", Indian Journal of Science and Technology, Vol. 8, Issue 27, pp. 61-65, 2015.

116. Dileep K P, A Raghavendra Rao, Suman M, Devesh G and S V Srikanth, “The LinK+ Project for Linux Kernel Developers”, Open Source for You (OSFY) Magazine, April, 2015.

117. Abhiram Amaraneni, Mahendra Lagineni, Rajesh Kalluri, Senthil Kumar R K and Ganga Prasad G L, ‘Transient Analysis of Cyber-attacks on power SCADA using RTDS”, Central Power Research Institute (CPRI) Journal, Vol. 11. Issue 1, ISSN 0973-0338, March 2015.

118. Mohan Labade, Sri Sai Meher Krottapalli, and Vikas Kumar, “Flow simulation studies on HPC platform using hardware accelerator”, 42nd National Conference on Fluid Mechanics and Fluid Power, NIT Surathkal, December 14-16, 2015.

119. Mohan Labade, Supriyo Paul, Vikas Kumar, and Srisai Meher, “Flow simulation studies on HPC platform with GPU accelerator”, 42nd National Conference on Fluid Mechanics and Fluid Power, National Institute of Technology Surathkal, December 14-16, 2015.

120. Ganesh J Bhabad, Mangesh B Chaudhari and Vikas Kumar, “CFD Modeling of a High End Server, 23rd National and 1st International ISHMT-ASTFE Heat and Mass Transfer Conference”, Liquid Propulsion Systems Centre (LPSC), Indian Space Research Organization (ISRO), Trivandrum, December 17-20, 2015.

121. Krishnanjan Bhattacharjee, Swati Mehta and Ajai Kumar, “A Novel Natural Language Processing (NLP) based Approach for Developing Automated Semantic Clause Parser”, National Conference on Emerging & Innovative Trends in Computer Science (NCEITCS - 2015), Hyderabad, April 1-2, 2015.

122. Sandhya Singh, Krishnanjan Bhattacharjee, Swati Mehta, Ajai Kumar, and Hemant Darbari, "Natural Language Generation: The Emerging Evolution in Artificial Intelligence towards True Cognition", Second Annual National Multi-Disciplinary Conference, V-CMT 2015. McGraw Hill Education (India) Private Limited. New Delhi, India, pp. 101-107, 2015.

123. Kumar Mandula, Ramu Parupalli, Annie Joyce Vullamparthi, Ch AS Murty, E Magesh and Sarat Chandra Babu Nelaturu, “ICT based Special Education Assessment Framework for Inclusive Education in India”, 10th INDIA Com & 3rd 2016 International Conference on Computing for Sustainable Global Development, New Delhi, India, March 16-18, 2016.

124. Renu Sharma, Sukhendu Das and Padmaja Joshi, "Rank Level Fusion in Multibiometric Systems", 5th National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), Indian Institute of Technology (IIT), Patna, 2015

125. Saurav Gupta, Sanjay P Sood and D K Jain, “Personal Health Record Management System: System Architecture and Design”, SEEDS, Srinagar, March 2016.

126. Dija S, “Indicators of Malicious Activities in Exe’s and PDF’s”, International Journal of Engineering Research & Technology (IJERT), National Seminar on New Materials & Nanotechnology (NSNMN -2015), Pp: 51-56, April 21, 2015.

Invited Talks

1. Subrata Chattopadhyay, “Challenges of advanced e-infrastructures for supporting scientific collaboration and innovation”, 3rd International conference on application and innovations in Mobile computing (AIMOC - 2016), Jadavpur University, Kolkata, February 11, 2016.
2. N S Sreekanth, “Applications of Hidden Markov Modeling”, National Workshop on Digital Signal Processing, Special Emphasis on Speech Signal Processing, Dept. Physics, Govt. College Madappally, Vadakara, Kozhikode, Kerala, February 4, 2016.
3. Subrata Chattopadhyay, “Big Data, Big Science and Big Challenges”, Mindtree campus, Bangalore, October 26, 2015.
4. B Arunachala, “SuMegha”, International Symposium on Grids and Clouds (ISGC) 2016, Academia Sinica Grid Computing Centre, Taipei, Taiwan, March 13-18, 2015.
5. N S Sreekanth, “Accessible Computing Through Open source”, Two day National Workshop On Linux and FOSS (Free and Open Source Software), NITK Suratkal, May 9-10, 2015.
6. R K Senthil Kumar, “Cloud based Energy Market Services for SLDCs of NER States”, eAssam 2015 Digital Innovations Summit, Guwahati, April 10, 2015.
7. Rajesh Kalluri, “Security Incident Management and Response”, SCADA Security workshop organized by DSCI and Petrofed, New Delhi, August 13, 2015.
8. K Jagan Mohan, “SCADA & Automation”, ESDM workshop, NITTE University, Mangalore, November 1, 2015.
9. Jayanth B, “SCADA Labkit” ESDM workshop, NITTE University, Mangalore, November 1, 2015.
10. GL Ganga Prasad, “Security in Smart Grid” in the panel discussion on “Digital World in Power sector” The biennial International Conference STSE-2016, Amrita School of Engineering, Bengaluru, January 21, 2016.
11. G L Ganga Prasad, ” Big data o Smart Grid & SCADA Security”, International Conference on Current Trends in Advanced Computing (ICCTAC), Kristu Jayanti college, Bangalore, March 10-11, 2016.
12. L R Prakash, “Expansion of Cooperation in the Field of Communications and ICTs”, Meeting of BRICS Ministers of Communications in Russia, Moscow, Russia, October 22-23, 2015.
13. Kailash S, Prabha V A, Mahendran E, Srikrishnan V, “Cloud Computing”, Cloud Computing Faculty Development Program, National Institute for Technical Teachers Training and Research (NITTR), Chennai, August 25-28, 2015.
14. Kailash S, “Workshop on Cloud”, 3rd International conference on Big data & Cloud Computing Challenges ISBCC ’16, VIT University, Chennai, March 3-4, 2016.
15. K Vijay Kumar, “Digital India Awareness”, Digital India awareness event, PSNA College of Engineering and Technology Kothandaraman Nagar, Dindigul, Tamilnadu, February 26, 2016.
16. K K Dhanesh, “FOSS adoption in Business development”, Business development and best practices using FOSS for iNautix Technologies India Private Limited (A group company of Bank of New York Mellon), Chennai, Tamil Nadu, July 2015.
17. Deepak R, “Vikaspedia - a multilingual knowledge sharing platform”, State Level Master's Training Programme on Beti Bachao Beti Padhao, National Institute of Public Cooperation and Child Development, Raipur, June 5, 2015.
18. Nandeeshwar, “Secure Usage of Internet, E-mail, Mobile Apps usage, Social Networking usage and Wireless Security”, ISEA Awareness workshop, National Remote Sensing Centre (NRSC), Hyderabad, July 23, 2015.
19. Deepak R, “Vikaspedia - a Multilingual Knowledge Sharing Platform”, State Level Master's Training

Programme on Beti Bachao Beti Padhao, National Institute of Public Cooperation and Child Development, New Delhi, August 7, 2015.

20. Tyeb Naushad, “Secure Usage of Internet, E-mail, Mobile Apps usage, Social Networking usage and Wireless Security”, ISEA Awareness workshop, Indian Airforce, Dindugal, August 17, 2015.

21. I L N Rao, “Secure Usage of Internet, E-mail, Mobile Apps usage, Social Networking usage and Wireless Security”, ISEA Awareness for Andhra Pradesh Police Department, September 29, 2015.

22. Vijayalakshmi B, “ICT initiatives of C-DAC, Hyderabad in Agriculture”, Training on ICT in Agriculture for officers of Agriculture Department, Telangana organized by State Agriculture Management and Extension Training Institute (SAMETI), Hyderabad, September 30, 2015.

23. I L N Rao, “Information Security for Police officials”, ISEA Awareness workshop, AP Intelligence Wing Police Department Greenlands, Hyderabad, October 13, 2015.

24. Nandeeshwar B, “Information Security for the SMEs”, ISEA Awareness workshop, Indian Railway Institute Of Signal Engineering and Telecommunications, Secunderabad, October 15, 2015.

25. Rakesh K, “Vikaspedia - a multilingual knowledge sharing platform”, State Level Master's Training Programme on Beti Bachao Beti Padhao, National Institute of Public Cooperation and Child Development, Punjab University, Chandigarh, October 17, 2015.

26. Jagadish Babu M, “Vikaspedia-multilingual collaborative content creation platform”, Workshop on CSC v2.0 initiative to deliver services to Citizens organized by the Center for Innovations in Public Systems (CIPS) and Andhra Pradesh Human Resource Development Department, District Collectorate, Guntur, Andhra Pradesh, October 28 & 29, 2015.

27. Rakesh K and Jagadish Babu M, “Vikaspedia - multilingual collaborative content creation platform”, Workshop on CSC v2.0 initiative to deliver services to Citizens organized by the Center for Innovations in Public Systems (CIPS) and Andhra Pradesh Human Resource Development Department, District Collectorate, Kurnool, Andhra Pradesh, November 18 & 19, 2015.

28. Nandeeshwar B & K S Balaji, “Information/Cyber Security for Government officials”, ISEA Awareness workshop, Ministry of Civil Aviation, Rajiv Gandhi Bhavan, New Delhi, November 23, 2015.

29. E Magesh, “Secured Use of Internet and Cyber Security”, ISEA Awareness workshop, Salem District Police, February 17, 2016.

30. Mahesh Patil, “Mobile Device Security @Android”, Mobile Banking Security and Testing (MBSAT), Institute for Development and Research in Banking Technology, IDRBT, Hyderabad, February 17, 2016.

31. P R Lakshmi Eswari, “Cyber Security”, Dr. E. V. Rao Endowment Lecture of Instrument Society of India, Osmania University Campus, Hyderabad, October 12, 2015.

32. P R Lakshmi Eswari, “Cyber Security”, TECHNOZION 2015, NIT Warangal, October 28, 2015.

33. M Kumar, “Mobile Apps in Indian Languages”, National Workshop on Mobile Apps in Indian Languages, Jawaharlal Nehru Technological University Hyderabad, July 24, 2015.

34. M Kumar, “Mobile Governance and Mobile Apps in Indian languages”, 1-Day sensitization workshop on CSC 2.0 conducted, Kakinada and Visakhapatnam, November 27 and 28, 2015.

35. M Kumar, “Mobile Apps: complementing Nutrition Education and Training”, 1-Day Workshop, ICMR - National Institute of Nutrition (NIN), Tarnaka, December 10, 2015.

36. Anoop Kumar & Tapas, “Noble way of Transport planning for Smart Cities”, Smart City Landscape 2015, New Delhi, September 11, 2015.

37. M K Chaithanya, “Secure Coding Practices for Android”, National Workshop on Mobile Apps in Indian languages, JNTU Auditorium, July 3, 2015.

38. Nabarun Bhattacharyya, “E-Nose and its applications”, Conference RAIT 2016, India School of Mines, Dhanbad, March 4-5, 2016.

39. Asok Bandyopadhyay, “Digital publishing issues in Bangla Language: An Overview”, Interaction session on “Digital Publishing in India-Next Steps” organized by W3C India, C-DAC, Mumbai, April 22, 2015.

40. Amit Chaudhuri, “Telecommunications and ICTs: Drivers of Innovation and Concerns for Cyber Security”, Lecture session, Institution of Engineers, West-Bengal State Centre, May 17, 2015.

41. Amit Chaudhuri, Sanjay Kumar Choudhury and Barnali Pal, “Machine Translation”, Lecture session, NIT, Silchar, August 4, 2015.

42. Amit Chaudhuri, Sanjay Kumar Choudhury and Barnali Pal, “Translation Software”, Lecture session, Banga Bhabhan, Silchar, August 3, 2015.

43. Amit Chaudhuri, “Risk Management Fundamental”, Lecture session (ISEA), Ordnance Factory Board, Kolkata, September 11, 2015.

44. Jayanta Parial, “Information Security in Education Awareness”, Lecture session (ISEA), Ordnance Factory Board, Kolkata, September 9-10, 2015.

45. Kousik Maiti, “Cloud Fundamentals and Storage Media Forensics”, Lecture session (ISEA), Ordnance Factory Board, Kolkata, September 10, 2015.

46. Prithwis Mukherjee, “E-mail Forensics”, Lecture session, Ordnance Factory Board, Kolkata, September 11, 2015.

47. Asok Bandyopadhyay, “Perception Based Decision Support System for Handwriting Behaviour Analysis”, International Conference on Intelligent Human Computer Interaction (IHCI-2015), IIIT Allahabad, December 14-16, 2015.

48. Amit Chaudhuri, “The Holistic Approach towards Information Security”, Workshop on Information & Cyber Security, Indian School of Mines (ISM), Dhanbad, January 28, 2016.

49. Sourav Mitra, “Crimes in Cyberspace-Techno-Legal Challenges Security”, Workshop on Information & Cyber Security, Indian School of Mines (ISM), Dhanbad, January 30, 2016.

50. Jayanta Parial, “Cloud Security & Cloud Forensics”, Workshop on Information & Cyber Security, Indian School of Mines (ISM), Dhanbad, January 30, 2016.

51. Amit Chaudhuri, “ICT based Instrumentation in Water and Sediment Management, Recollecting Some R& DE Experiences for Indian Conditions”, Lecture session organized by the Science Association of Bengal, Jadavpur University as an event of Science Day celebration, Jadavpur University, February 29, 2016.

52. Amit Chaudhuri, “Telecommunications and ICTs: Drivers of Innovation and its relevance to present India”, The Institution of Electronics and Telecommunication Engineers (IETE) Kolkata, May 17, 2015.

53. Saurav Gupta, “Mobile for Smart Health: mSwasthya case study”, UNICEF-State Consultation on Mobile Phones: A tool for Social & Behaviour Change, Guwahati, Assam, April 9, 2015.

54. Zia Saquib, “TEQIP Talk on Information Security”, National Institute of Technology, Surat, April 16, 2016

55. Zia Saquib, “Technical session on “Secured Storage”, Annual Storage Developer Conference, Storage Network Industry Association (SNIA), Bengaluru, May 29, 2015.

56. Zia Saquib, “Mobile PKI”, IEEE Conference, Sahyadri Valley College of Engineering & Technology, Rajuri, Maharashtra, September 15, 2015.

57. Padmaja Joshi, “ePramaan”, for Tanzanian Delegates organized by STQC and DeitY, DeitY, New Delhi, September 11, 2015.

58. Padmaja Joshi, "ePramaan", in the workshop by e-Governance Department, Govt. of Karnataka in collaboration with C-DAC, Bangalore, October 14, 2015.

59. Mohsin Sutar, "Environmental Data for Prediction of Transmission Patterns of Communicable Diseases", 17th IEEE International Conference on e-Health Networking, Application & Services (IEEE HEALTHCOM 2015), Boston, USA, October 14-17, 2015.

60. A S Cheema, “Networking of Blood Bank and Management of Inventory”, Workshop on Strengthening of Blood Bank Services for the North East States, Sikkim, November 18, 2015.

61. Tushar Patnaik and Bhupendra Kumar, “Oriya OCR”, OCR Skill Workshop, Bhubaneshwar, November 26, 2015.

62. Hemant Darbari, “Perspective of High Performance Computing and the transformation ahead”, Supercomputing Conference 2015, Austin, Texas, November 15-20, 2015.

63. Manoj K Khare, “Role of GIS in Municipal Services and GIS data integration with MIS” and “Role of e-Governance in Delivery of Municipal Services” organized by Regional Centre for Urban and Environmental Studies (RCUES), Ministry of Urban Development, Lucknow, Gangtok (Sikkim), February 11, 2016.

64. Rajendra Joshi, “Decoding Life: Towards Digital Biology”, DBT Transcriptomics workshop, Department of Botany, Savitribai Phule Pune University, Pune, October 20, 2015.

65. K Sunitha Manjari, “Overview of sequence alignment and Differential expression analysis using RNA-Seq data”, DBT Transciptomics workshop, Department of Botany, Savitribai Phule Pune University, Pune, October 6-15, 2015.

66. Rashmi Mahajan and K Sunitha Manjari, “Anvaya overview”, DBT Transciptomics workshop, Department of Botany, Savitribai Phule Pune University, Pune, October 15, 2015.

67. Akshara Kaginalkar, “'Role of ICT in sustainable smart cities”, International Symposium on ‘Knowledge Sharing for Capacity Building for Planning of Sustainable Smart Cities’, Pune, October 8-9, 2015.

68. Gaur Sunder, “SNOMED CT - A Technologist’s Perspective”, 6th International Conference on “Transforming Healthcare with IT, Bengaluru, October 17, 2015.

69. Rishi Pathak, “Digital Signatures & eSign – An Overview”, e-Hastakshar (eSign) Workshop for Application Service Providers (ASP), December 17-18 2015.

70. Yogindra S Abhyankar, “Hardware + Biology imply Accelerated Biology”, Symposium on “Accelerating Biology 2016: Decoding the Deluge”, Yashwantrao Chavan Academy of Development Administration (YASHADA), Pune, January 21, 2016.

71. Y S Swarup, "HPC Cooling Technologies", ACR TrendZ 2015, Pune, September 11, 2015.

72. Prof. Basavaraj Hooli and Parimal Wagh, “Soft Computing”, National Conference on Latest Databases, Pratibha College of Commerce and Computer Studies, Chinchwad, Pune on January 13, 2016.

73. Dinesh Katre, “Digital Preservation of e-Governance Records: A Case Study of Preserving Registered Documents”, CNZ Conference 2015, Prague, Czech Republic, October 6, 2015.

74. E B Benoy Gopal, “Leapfrogging Road Safety: Way Forward”, annual convention organized by Society for Automotive Fitness and Environment in association with Ministry of Road Transport and Highways, Transport Department, Govt. of Kerala, April 21, 2015.

75. V.C.V. Rao, “Distributed Graph Algorithms and Computational Challenges”, Faculty Development Programme on Graph Theory Computations, National Institute of Technology, Warangal, March 08-17, 2016.

76. Nabeel Koya, “Collection of Scientific Evidence-Analysis of Documents”, Officers of Kerala Police Training programme, Institute of Management in Government (IMG), Thiruvananthapuram, May 28, 2015.

77. Nabeel Koya, “Cyber Crimes and Cyber Forensics”, Officers of Kerala Police Training programme, Police Training College (PTC), Thiruvananthapuram, May 29, 2015.

78. Ajith Ravindran, “Digital Forensics - Successful Case Studies”, Officers of Kerala Police, Cyber Crime Awareness Workshop organized by Data Security Council of India (DSCI), Kerala Police Academy, Thrissur, May 28, 2015.

79. K L Thomas “Search and Seizure on Digital Evidence - Best Practices”, Cyber Crime Awareness Workshop organized by Data Security Council of India (DSCI), Kerala Police Academy, Thrissur, May 29, 2015.

80. Satheesh Kumar S, “Search and Seizure on Digital Evidence – Best Practices”, Officers of Kerala Police Cyber Crime Awareness Workshop organized by Data Security Council of India (DSCI), Kerala Police Academy, Thrissur, May 29, 2015.

81. Nabeel Koya, A, “Cyber Forensics related to economic offences”, Officers of Kerala Police training programme organized by Crime Branch Crime Investigation Department (CBCID) Headquarters at Institute of Management in Government (IMG), Thiruvananthapuram, June 8, 2015.

82. Nabeel Koya A, “Cyber Crimes and Investigation procedures”, Officers of Kerala Police training programme organized by Police Training College (PTC), Thiruvananthapuram, June 26, 2015.

83. K. L. Thomas and C. Balan, “RCCF capabilities”, Officers of CBI, CBI Headquarters, New Delhi, June 13, 2016.

84. Bhadran V K, “Project Management-Overcoming Challenges”, “WAVES 2015”, Project Management Institute (PMI) Kerala, June 13, 2015.

85. C Balan, “Cyber Forensics : Tools and Techniques”, to Advocates and Law teachers from southern states of the country, in a workshop jointly organized by National Law School, Bangalore and Menon Institute of Legal Advocacy Training, Thiruvananthapuram, June 25, 2015.

86. Satheesh Kumar S, “Cyber Forensics”, Kerala Police officers at Forensics Science Laboratory, Thiruvananthapuram July 30, 2015.

87. K L Thomas, “Cyber Forensics activities and solutions”, CFS Conference, Kochi, July 7, 2015.

88. Nabeel Koya, “Computer and Mobile phone as a tool for committing cybercrime related to economic offences”, Officers of Kerala Police training programme organized by CBCID HQ at the Institute of Management in Government (IMG), Thiruvananthapuram, July 9 & 22, 2015.

89. Nabeel Koya A, “Computer and Mobile phone as a tool for committing cybercrime related to economic offences”, Officers of Kerala Police training programme organized by Police Training College (PTC), Thiruvananthapuram, July 15 & 23, 2015.

90. Nabeel Koya A, “Cyber Crimes and its Social Aspects”, a seminar organized by State Resource Centre (SRC), Kerala, Trivandrum, July 25, 2015.

91. Jayan V, “Malayalam Computing”, at the fourth International Conference on Kerala Studies 2015, Sarvodaya School, Thrissur, July 12, 2015.

92. Vidya V, “Online Character Recognition System in Multilingual Framework”, International Symposium on Intelligent Systems Technologies and applications (ISTA’15), August 19, 2015.

93. Nabeel Koya A, “Cyber Crimes an Overview”, 35 Officers of Kerala Police, Forensics Science Laboratory, Thiruvananthapuram, August 20, 2015.

94. Satheesh Kumar S, “Cyber Forensics”, 35 Officers of Kerala Police, FSL, Thiruvananthapuram, August 21, 2015.

95. Satheesh Kumar S, “Introduction to Digital Forensics - Disk Forensics & Mobile Forensics”, Faculty Members and Students of North Eastern Police Academy (NEPA), Meghalaya, August 25, 2015.

96. Satheesh Kumar S., “Search and Seizure of Digital Evidence-Best Practices”, Biju Patnaik State Police Academy, Bhubaneswar, Odisha, Data Security Council of India (DSCI), September 9, 2015.

97. Anoop V and Midhun Mohan, “Collection of Evidence in IT related economic Offences”, officers of Kerala Police, Police Training College, Thiruvananthapuram, September 08, 2015.

98. Jayan V, “Machine Aided Translation”, Central Institute of Indian Languages (CIIL), Mysore, October 10, 2015.

99. Mithun Mohan M G, “Introduction of Online Frauds- e-banking, plastic cards, e-mail cheating, etc.”, CBCID officers of Kerala Police, Institute of Management in Government (IMG), Thiruvananthapuram, October 7, 2015.

100. Nabeel Koya A, “Hacking, Phishing, High end web crimes, etc., and Technology to identify such crimes”, CBCID officers of Kerala Police, Institute of Management in Government (IMG), Thiruvananthapuram, October 8, 2015.

101. Amala R, “Fundamentals of Digital Storage Media & Computer Hardware” ,Officers of Kerala Police at Police Training College, Thiruvananthapuram, October 12, 2015.

102. Mithun Mohan M G, “Data Storage Fundamentals”, Officers of Kerala Police, Police Training College, Thiruvananthapuram, October 12, 2015.

103. Nabeel Koya A, “Cyber Crimes”, Officers of Kerala Police, Police Training College, Thiruvananthapuram, October 13, 2015.

104. Gautam N, “CDR Analysis” and demonstrated Advik CDR Analyser tool”, Officers of Kerala Police, Police Training College, Thiruvananthapuram, October 14, 2015.

105. Mithun Mohan M G, “Introduction to Cyber Forensics Principles”, Officers of Kerala Police, Police Training College, Thiruvananthapuram, October 15, 2015.

106. Nabeel Koya A, “Common Computer/Mobile Phone Crimes, Disk Forensics and Mobile Phone Forensics” , Officers of Kerala Police, Police Training College, Thiruvananthapuram, October 15, 2015.

107. Nabeel Koya A, “Computer and Mobile Phones as a tool for committing crimes”, CBCID officers of Kerala Police, Institute of Management in Government (IMG), Thiruvananthapuram, October 19, 2015.

108. Mithun Mohan M G, “Call Data Record (CDR) Analysis” CBCID officers of Kerala Police, Institute of Management in Government (IMG), Thiruvananthapuram, October 20, 2015.

109. Jayan P P, “full Spectrum Simulator for educational institutions (FSS Mini)“, NIT Warangal, Workshop on DSP based Power electronics Controller, September 28, 2015.

110. Ajeesh A, “High speed Reconfigurable Power electronics Controller”, NIT Warangal, Workshop on DSP based Power electronics Controller, September 28, 2015.

111. Jayan V, “Translation Portal Development and Interface Issues and Memory tools producing multiple translations in Indian Languages”, Workshop on Developing Translation Corpus (Parallel) in Indian Languages-Phase 2, Central Institute of Indian Languages (CIIL), Mysore, November 3-5, 2015.

112. Bhadran V K, “International Colloquium on Information security in e-Governance”, organized by Computer Society of India, Trivandrum Chapter in Association with Valiant Technologies, Abudhabi, UAE and EMC2.

113. Shobana Devi, “Multilingual Speech to Speech MT Based Chat System”, CoCoNet-S13: Symposium on

Multimedia, Visualization and Human Computer Interaction (SMVH'15).

114. Nimtha Manohar, "Spellchecker for Malayalam using finite state transition models", International Conference on Recent Advances in Computational Systems, Institute of Electrical and Electronics Engineers (IEEE) Kerala, Trivandrum, October 10-12, 2015.

115. Vidya P V, "Web Page Ranking Using Multilingual Information Search Algorithm - A Novel Approach", International Conference on Emerging Trends in Engineering, Science and Technology – ICETEST, Government Engineering College, Trichur, December 9-11, 2015.

116. SruthiSankar K P, "Unsupervised Approach to Word Sense Disambiguation in Malayalam", International Conference on Emerging Trends in Engineering, Science and Technology (ICETEST), held at Government Engineering College, Trichur, December 09-11, 2015.

117. Satheeshkumar S, "Cybercrime investigation", Police Officers at AR Camp Kottayam, Kerala, January 29, 2016.

118. Satheesh G, "C-DAC and DeitY initiatives in the ITS domain, and the future plans on Smart Mobility", REINVEST International Workshop, Indian Institute of Technology (IIT) Bombay, January 8-9, 2016.

119. Bhadran V K, "Towards smarter Systems", Workshop on Role of Computation Communication and Signal Processing, College of Engineering, Perumon, Kollam, March 22, 2016.

120. Bhadran V K, "Towards smarter Systems", Dr. V P Kulkarni Memorial Lecture Series, LBS College of Technology for Women, Poojappura, Trivandrum, March 19, 2016.

121. Bhadran V K, "Brainstorming Conclave on Assistive Technology", National Institute of Speech and Hearing (NISH), Kovalam, March 10, 2016.

122. Lagineni Mahendra, "SCADA & Automation", ESDM workshop, K.L.S. Gogte Institute of Technology, Belgaum, October 17-18, 2015.

123. V.C.V. Rao, "High Performance Computing and Big Data Analytics using Parallel Processing Platforms", Faculty Development Programme on High Performance Computations, Malaviya National Institute of Technology, Jaipur, April 08-12, 2016.

124. Saravana Kumar A., "Security Assessment and Power Management in Smart Grid (SAMPMS 2015), Faculty Development Programme (FDP), National Institute of Technology, Calicut, June 17, 2015.

Human Resource Development

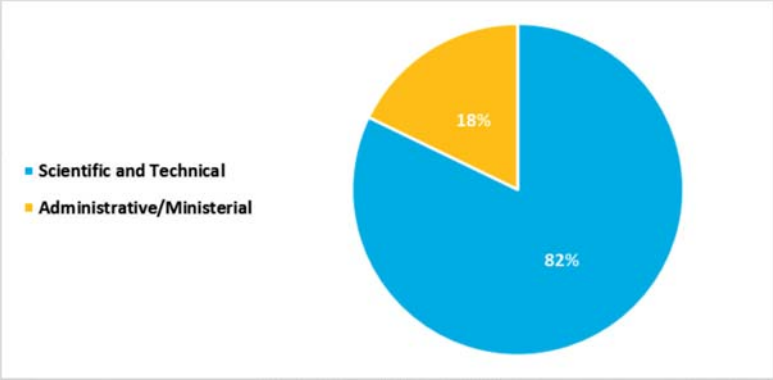
Human Resource Development function, being one of the most sought after internal service provider and strategic partner, have always strived to support the organization in its meaningful sustenance and qualitative growth. C-DAC being an organization built upon its knowledge base and innovation capabilities drive its success through the competency of its employees, deriving synergic collaboration across all corners of C-DAC and outside. The HRD function takes a queue from this insight and delivers quality services to its stake holders. For facilitating increased knowledge attainment, collaboration and synergic results, there had been initiatives viz: job rotation scheme, inter-centre officers' exchange scheme, centralized trainings etc. Seamless functional coordination of Corporate HRD with respective HR departments at the centres of C-DAC paved path for the success of the function in constructively partnering in embracing organizational effectiveness. Some of the highlights from the initiatives of HRD department during the year 2015-16 are;

- Enhancement of iHRMS, an integrated application for employment administration and services
- Introduction of organization specific Annual Performance Appraisal system (C-DAC-APAR), for objective evaluation of individual performances viz-a-viz organizational vision and mission.
- Pan C-DAC Learning and Development efforts covered 415 man-days of specialized central trainings, in addition to several man hours of centre specific trainings.
- HR Meet, involving all key HR professionals from all the centres brought out eleven break-through proposals of which most are already implemented. The meet which is an annual affair is a catalyst of increased coordination and communication of HR function in C-DAC.
- Outsourcing non-core activities had been the trend of modern organizations. To leverage the fruits, an appropriate model was designed for C-DAC.
- As part of continuing efforts for streamlining the HR administration, consolidated guidelines for designation and progression was notified.
- In order to cater to the changing requirements of the organization, appropriate changes/modifications in MOA/RR/Bye-laws and staff rules was also instituted, obtaining necessary approvals.

Human Resource Structure

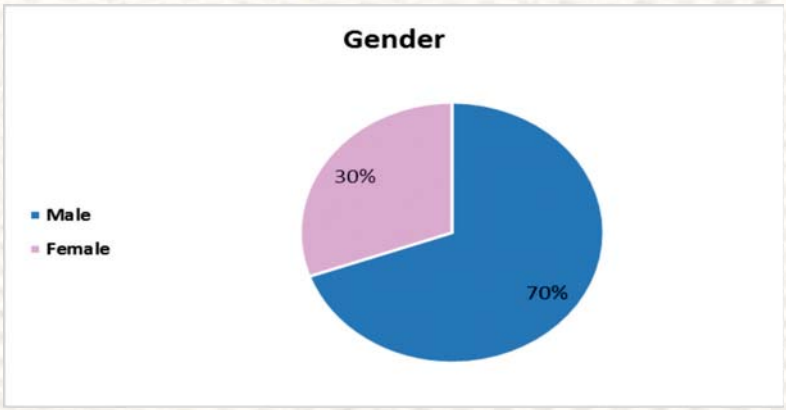
Functional Distribution

C-DAC is 2695 strong as on March 2016, spread across 11 centres and corporate office. The strength is broadly classified as Scientific and Technical and Administrative/Ministerial.



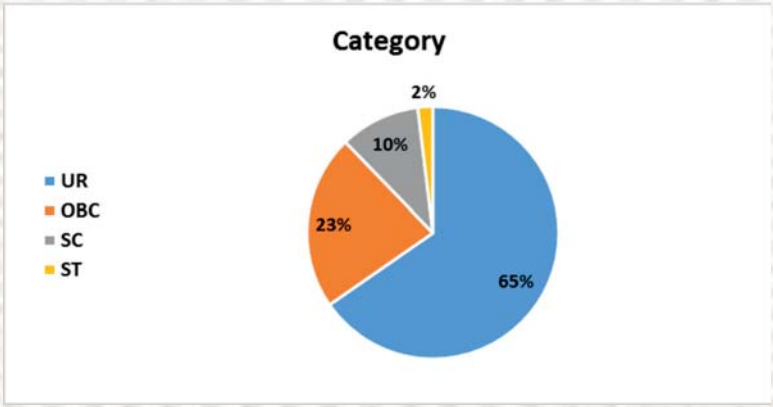
Gender Distribution

C-DAC being a model employer had always been striving to create a gender balance in its employee fold. As on March 2016, thirty percent of C-DAC's human resources are women, six percent above the national average of the sector. There is a significant presence of women in senior executive cadre also.



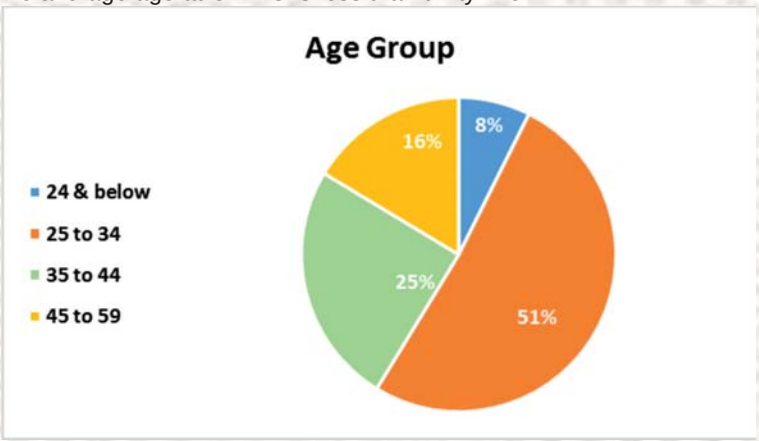
Category Distribution

C-DAC being a law abiding model employer has ensured adequate representation of Scheduled Caste, Scheduled Tribe and OBC members. Even though the Group-A S&T positions, which forms the majority in C-DAC, are exempted from the purview of reservation orders, C-DAC cherishes the national priority responsibly and holds a good representation of reserved category employees.



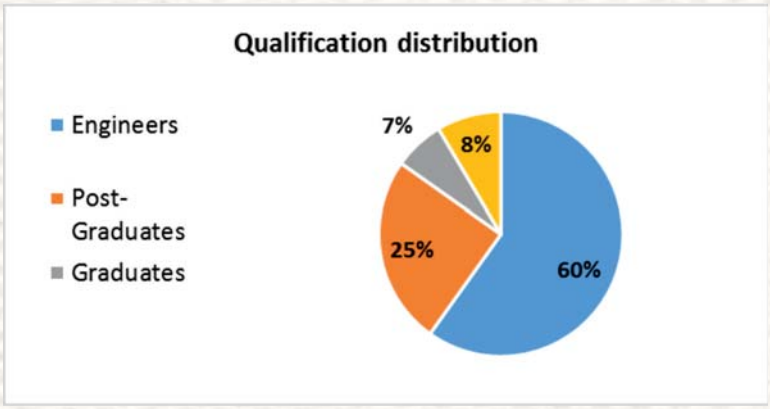
Age Distribution

Though C-DAC started its journey in the year 1988, in 2002 with the merger of four other societies into C-DAC brought in a much older legacy into the organization. However, since C-DAC always retained itself in the growth and expanding track it retains an impressive age distribution among its employees. Fifty nine percent of the employees are below thirty five. The average age at C-DAC is less than thirty five.



Qualification Distribution

C-DAC being a knowledge driven organization is mandated to attract and retain highly qualified individuals. It is successful in doing so and holds an excellent mix of educated employees.



Apprenticeship/Training

C-DAC supports the academia by way of extending apprenticeships and training. As on March 2016, C-DAC has eighty seven members in this category.

Way Forward

Some of the paths thought for the HR function for the coming days are;

HR Data Analytics: To develop an analytic model for converting HR data into strategic insights.

Automation: To expand the scope of iHRMS into human resource development routines viz: performance assessment and management, learning and development etc. To develop and adopt a unified software application for recruitment in order to establish uniformity, efficiency and lawfulness in recruitment process across C-DAC centres.

Collaboration: To establish various forms of collaboration with premier knowledge organization, both academic/ research and industrial for achieving synergic knowledge enhancement targets in the interest of the C-DAC, its employees and the nation at large.

Legal and IPR

Corporate Legal cell plays a crucial role in the smooth and effective functioning of C-DAC. Its key activities are as follows:

- To examine/vet replies, applications and other documents to be submitted in relation to various court cases, draft of multiple types of contracts/MOUs from legal perspective with a view to ensure protection of C-DAC's interest. It is remarkable that during the year, more than 125 documents were vetted/drafted by the legal department.
- To monitor and keep updates of the latest court decisions, more than 35 legal opinion on judgments of High Court/Supreme Court were provided by the legal cell to concerned departments like Purchase/Finance/HRD/ RTI etc.
- Legal cell coordinated the court cases with centres and provided valuable inputs/ legal opinions well supported by relevant judgments pronounced by various courts of India.
- C-DAC, Pune is executing the MeitY funded project "Centre of Excellence in IP". Through this project, C-DAC (MeitY) offers a few select services free of cost to SMEs Academia/R&D Institutions/Inverters etc. This year the total number of registered users crossed 2500. The project deliverables have been met within the given time frame. It also circulated 530 abstracts of published patent applications by Indian Patent Office to all centres during the year to keep them abreast of latest technological trends for which patents have been filed. Legal group of C-DAC, Pune reviewed/vetted/drafted 150 plus documents during the year

RTI

C-DAC is a Public Authority as provided in Section 2(h) of the RTI Act. Request for information under RTI Act can either be filed at any of the locations of C-DAC or can be submitted online through the *rtionline.gov.in.* Mandatory disclosures as per the guidelines of Section 4(1)(b) have been published in the RTI module on C-DAC's website. The same are updated periodically.

During the year 2015-16, total 403 RTI applications were received, which were duly processed.

ISO Implementation

STQC conducted the third surveillance audit for ISO 9001:2008 certification for Corporate Office of C-DAC on December 28, 2015 and recommended the continuation of certification.

Financials

INDEPENDENT AUDITOR'S REPORT

To,
The Members,
Governing Council,
Centre for Development of Advanced Computing,
Pune University Campus,
Pune-411007

Report on the Financial Statements

We have audited the accompanying consolidated financial statements of **Centre for Development of Advanced Computing (C-DAC),** which comprise the consolidated Balance sheet as 31st March, 2016, and the consolidated Income Expenditure Account and the consolidated Receipts & Payments Account for the year ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation of these consolidated financial statements that give a true and fair view of the consolidated financial position, consolidated financial performance and consolidated cash flows of the Company in accordance with accounting principles generally accepted in India. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation and presentation of the consolidated financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risk of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the Society's preparation and presentation of consolidated financial statements that give a true and fair view in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness

of the accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.
We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

a) We further report that;

i. We have not audited the financial statements of Delhi, Noida, Kolkata, Mohali, Bangalore, Hyderabad, Thiruvananthapuram and Chennai Centre's whose financial statements reflect total assets of ₹512.84 crores as at 31.03.2016 and total revenues of ₹129.15 crores for the year ended. These financial statements have been audited by other auditor's, whose reports have been furnished to us, and our opinion, in so far as it relates to the amounts included in respect of these Centre's is based on the reports of such other auditor's and is subject to the note No. 20 of Schedule 19, wherein Centre specific notes are disclosed.

ii. Balance of Debtors, Creditors, Current Assets, Loans & Advances and Current Liabilities are subject to confirmation and further reconciliation. The extent of adjustment that may arise and their effect on accounts is not ascertainable at this stage.

b) In our opinion and to the best of our information and according to the explanations given to us, the said accounts read with the notes to accounts and subject to note no's. 1, 4, 5, 11, 12 and note no. 20, regarding Centre specific notes of Schedule 19 and significant accounting policy no. 4.2, the consolidated financial statements give a true and fair view in conformity with the accounting principles generally accepted in India:

a) In the case of the consolidated Balance Sheet, of the state of affairs of the society as at 31st March 2016.

b) In the case of the consolidated Income & Expenditure, of the Surplus for the year ended on that date; and

c) In the case of the consolidated Receipts & Payments Account, of the Receipts & Payment for the year ended on that date.

For B.N.Adke & Co.
Chartered Accountant
FRN 100038W

Place: Pune
Date: 06.09.2016

C.A.B.N.Adke
M.No.033988

CONSOLIDATED BALANCE SHEET AS AT 31st March 2016

Amount in ₹

Particulars	Schedule	2015-2016	2014-2015
CORPUS/CAPITAL FUND AND LIABILITIES			
Corpus/Capital Fund	1	3,18,35,13,088	3,21,76,70,829
Reserves and Surplus	2	1,62,53,33,674	1,55,63,46,618
Earmarked and Endowment Funds	3	1,64,06,86,844	1,42,38,06,091
Secured / Unsecured Loan from Bank		1,00,00,000	4,90,00,000
Current Liabilities and Provisions	4	1,11,31,09,734	93,61,21,833
Total		**7,57,26,43,340**	**7,18,29,45,371**
ASSETS			
Fixed Assets			
Acquired out of Own Funds	5	33,14,55,351	32,64,94,430
Acquired out of Grant in Aid	6	1,35,76,60,001	1,31,34,76,454
Acquired out of Project Grants	7	26,76,73,673	24,28,70,164
Current Assets, Loans, Advances etc.	8	5,61,58,54,315	5,30,01,04,323
Miscellaneous Expenditure		-	-
Total		**7,57,26,43,340**	**7,18,29,45,371**

Significant Accounting Policies, Notes to Accounts and Schedules form an integral part of the Balance Sheet.

CA Raghu Bhargava
Director Finance

Col. Anoop Kumar Khare(Retd.)
Registrar

Prof. Rajat Moona
Director General

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
M/s B.N. Adke & Co. (FRN: 100038W)
CHARTERED ACCOUNTANTS

CA B.N. Adke
Proprietor (Membership No. 033988)
Pune

Date : 6-Sep-2016

Consolidated Income and Expenditure Account for the year ending 31st March 2016

Amount in ₹

Particulars	Schedule	2015-2016	2014-2015
INCOME			
Income from Sales/Services	9	67,25,93,788	58,08,66,213
Grants/Subsidies	10	53,70,69,972	80,87,26,796
Fees/Subscription	11	69,82,16,325	60,66,83,523
Income from Investments (Income on Investments from earmarked/endowment funds transferred to funds)	12	-	-
Interest Earned	13	24,75,44,280	23,60,99,856
Other Income	14	97,65,727	1,33,48,546
Prior Period Income		79,51,895	83,23,299
Increase/(decrease) in stock of Finished Goods and Work-in-progress	15	(2,12,088)	39,96,478
TOTAL (A)		**2,17,29,29,899**	**2,25,80,44,711**
EXPENDITURE			
Establishment Expenses	16	1,40,50,54,980	1,29,61,44,571
Other Administrative Expenses	17	75,48,78,411	81,02,37,938
Prior Period Expenses		37,54,644	5,57,52,497
Depreciation (corresponding to Schedule 5)		4,48,99,822	3,44,65,579
TOTAL (B)		**2,20,85,87,857**	**2,19,66,00,585**
Transferred to / (from) Balance of Mission Grants		(6,37,41,943)	(10,14,60,386)
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**2,80,83,985**	**16,29,04,512**
SIGNIFICANT ACCOUNTING POLICIES	18		
CONTINGENT LIABILITIES AND NOTES TO ACCOUNTS	19		

Significant Accounting Policies, Notes to Accounts and Schedules form an integral part of the Balance Sheet.

CA Raghu Bhargava
Director Finance

Col. Anoop Kumar Khare(Retd.)
Registrar

Prof. Rajat Moona
Director General

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
M/s B.N. Adke & Co. (FRN: 100038W)
CHARTERED ACCOUNTANTS

CA B.N. Adke
Proprietor (Membership No. 033988)
Pune

Date : **6-Sep-2016**

Amount in ₹

Particulars	2015-2016	2014-2015
Schedule 1 - Corpus/Capital Fund		
Balance as at the beginning of the year	3,21,76,70,829	3,10,83,12,339
Add: Surplus as per Income & Expenditure Account	2,80,83,987	16,29,04,512
Less : Own contribution to Core / Projects and Other Adjustments / Transfers	6,22,41,728	5,35,46,022
Balance as at the year - end	**3,18,35,13,088**	**3,21,76,70,829**
Schedule 2 - Reserves and Surplus		
1. Capital Reserve :		
As per last Account	1,55,63,46,618	1,50,39,25,472
Addition during the year	33,74,19,742	29,16,89,194
Less : Deductions during the year	26,84,32,686	23,92,68,048
Total	**1,62,53,33,674**	**1,55,63,46,618**
Schedule 3 - Earmarked/Endowment Funds		
1. Balance of Core Grants		
a) Opening balance of the funds	6,48,19,711	16,62,80,096
b) Additions to the Funds		
I) Donations/Grants	54,50,00,000	83,70,00,000
II) Income from Investments made on account of funds	-	-
III) Other additions (C-DAC Contribution and Other Income)	37,02,707	15,37,676
Total (b)	54,87,02,707	83,85,37,676
Total (a)+(b)	61,35,22,418	1,00,48,17,772
c) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	79,30,028	2,82,73,204
Others	-	-
Total I	79,30,028	2,82,73,204
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	47,19,64,404	73,50,58,826
Componants, Consumables and Other Direct Expenses	15,99,835	1,14,98,280
Travel	78,49,277	1,27,99,152
Contingencies, Overheads and Other Administrative Expenditure	12,31,01,106	15,23,68,599
Total II	60,45,14,622	91,17,24,857
Total (c)	61,24,44,650	93,99,98,061
Net Balance as at Year - End (a+b-c) Total 1	10,77,768	6,48,19,711
Projects wise Allocated Core Grant (Annexure 1)		
d) Opening balance	(11,94,88,099)	(11,94,25,609)
e) Additions to the Funds		
I) Donations/Grants	41,90,36,000	67,29,17,000
II) Income from Investments made on account of funds	(26,37,647)	46,43,194
III) Other additions (C-DAC Contribution and Other Income)	10,83,56,885	5,35,63,522
Total (e)	52,47,55,238	73,11,23,716
Total (d)+(e)	40,52,67,139	61,16,98,107

Amount in ₹

Particulars	2015-2016	2014-2015
f) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	11,85,34,236	11,85,70,571
Others	-	-
Total I	11,85,34,236	11,85,70,571
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	8,55,03,748	28,42,43,633
Componants, Consumables and Other Direct Expenses	1,62,21,558	4,76,01,096
Travel	66,68,543	1,85,45,127
Contingencies, Overheads and Other Administrative Expenditure	88,59,622	10,85,65,265
Total II	11,72,53,471	45,89,55,121
Total Expenditure (f)	23,57,87,707	57,75,25,692
g) Refund / Transfer and Other Adjustments	1	15,36,60,514
Net Balance as at Year - End (d+e-f-g) Total 2	16,94,79,431	(11,94,88,099)
Core Grant Balance as at Year - End (Total 1 + Total 2) Total 3	17,05,57,199	(5,46,68,388)
2. Balance of Unutilized Funded Project Grants (Annexure 2)		
a) Opening balance of the funds	1,47,39,44,963	63,25,96,289
b) Additions to the Funds		
I) Donations/Grants	2,00,32,16,366	2,13,35,42,408
II) Income from Investments made on account of funds	5,10,29,845	4,57,99,393
III) Other additions (C-DAC Contribution and Other Income)	16,88,91,916	17,93,71,167
Total (b)	2,22,31,38,127	2,35,87,12,968
Total (a)+(b)	3,69,70,83,090	2,99,13,09,257
c) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	21,13,29,121	14,51,05,312
Others	-	-
Total I	21,13,29,121	14,51,05,312
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	83,36,68,929	53,15,11,488
Componants, Consumables and Other Direct Expenses	28,22,94,420	16,84,47,272
Travel	7,00,74,603	5,73,06,830
Contingencies, Overheads and Other Administrative Expenditure	52,13,25,571	38,47,61,446
Total II	1,70,73,63,523	1,14,20,27,036
Total (c)	1,91,86,92,644	1,28,71,32,348
d) Refund / Transfer and Other Adjustments	31,31,29,093	23,02,31,946
Net Balance as at Year - End (a+b-c-d) Total 4	1,46,52,61,353	1,47,39,44,963
3. Employee and Other Funds:		
As per last Account	45,29,516	41,93,510
Addition during the year	5,22,453	5,03,086
Less : Deductions during the year	1,83,677	1,67,080
Total (5)	48,68,292	45,29,516
Grand Total (Total 3+ Total 4+Total 5)	**1,64,06,86,844**	**1,42,38,06,091**

Annexure 1 of Schedule 3 **Projects wise Allocated Core Grant**
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr.No.	Name of the Project	Opening Balance	Grants Received During the year	Interest Earned	Other Income & CDAC's Contribution During the year	Capital Expenditure	Salary, Wages Allowances etc.	Componants, Consumables and Other Direct Expenses	Travel	Contingencies, Overheads and Other Administrative Expenditure	Total Expenses	Refund / Transfer & Other Adjustments	Closing Balance
1	Acoustic Mine Detection System - MK2	8,65,803	-	-	-	-	-	2,99,726	4,82,953	83,124	8,65,803	-	-
2	Autonomic Real Time Multiprotocol Gateway	-	-	-	-	-	-	-	-	-	-	-	-
3	Building a Pan-C-DAC Cloud Computing Framework	(99,58,197)	80,00,002	(2,93,000)	-	-	-	-	-	-	-	-	(22,51,195)
4	Building Fund	(7,03,970)	7,50,00,000	-	6,26,15,047	10,38,49,374	7,23,000	-	-	3,388	10,45,75,762	1	3,23,35,314
5	E-Learning Solutions in Areas of Automated Grading & Analysis of Software Programs	51,05,890	-	-	-	-	-	-	-	-	-	-	51,05,890
6	E-Securities Initives Related to Security for USB Date Drives Automated Web Application Security Assessment Framework	51,32,586	-	(3,34,358)	(272)	9,18,687	73,47,469	5,09,827	3,81,742	-	91,57,725	-	(43,59,769)
7	IP Awarness in E&IT Sector	-	-	-	-	-	-	-	-	-	-	-	-
8	Mobile Computing and Applications	(1,40,20,932)	1,04,99,998	-	-	-	-	-	-	-	-	-	(35,20,934)
9	National Grid Computing Initiative - GARUDA - Grid Technology Services for operational Phase of Garuda	-	-	-	-	-	-	-	-	-	-	-	-
10	North East Projects	17,43,75,863	8,00,00,000	(6,89,866)	4,56,90,000	87,24,724	4,33,62,210	1,36,82,066	41,44,404	72,17,360	7,71,30,793	-	22,22,45,204
11	Pan C-DAC Knowledge & Resource Management Lab (PCKRML)	-	-	-	-	-	-	-	-	-	-	-	-
12	Pan C-DAC Research Initive in Perception Engineering	3,09,26,016	-	(13,20,423)	-	1,82,689	2,70,40,539	12,98,533	10,83,852	-	2,96,05,593	-	-
13	Power Optimization of HPC Sys & Facilities	(26,84,640)	26,00,000	-	-	-	-	(640)	-	-	(640)	-	(84,000)
14	Trainers Training and Students Talent Transfor	-	-	-	-	-	-	-	-	-	-	-	-
15	Speech to Speech MAT Based Dialogue Sys. From Hindi To Indian Language	(6,36,62,336)	4,72,00,000	-	-	-	-	-	-	-	-	-	(1,64,62,336)
16	Dev. & Adaption of applications, System S/W & H/W Tech. for Hybrid Archi Based HPC System	(7,77,03,844)	5,75,00,000	-	-	-	-	-	-	-	-	-	(2,02,03,844)
17	Provisioning of Hybrid Tech. in NPSF and CTSF - A Step towards Next Generation HPC	(5,43,13,732)	4,02,00,000	-	-	-	-	-	-	-	-	-	(1,41,13,732)
18	Advanced Research in Ubiquitous Computing	(2,42,64,138)	1,79,00,000	-	-	-	-	-	-	-	-	-	(63,64,138)
19	Design and Development of a unified threat management (UTM) Solution	(1,52,51,545)	1,15,00,000	-	-	-	-	-	-	-	-	-	(37,51,545)
20	BOSS Support Centres and Business Dev. (Ph II)	(4,69,64,283)	3,47,00,000	-	-	-	-	-	-	-	-	-	(1,22,64,283)
21	Development of Advanced tools for Cloud Security Transactions	(42,50,936)	38,00,000	-	-	-	-	-	-	-	-	-	(4,50,936)
22	Centre of Excellence in Smart Card Technology	(1,22,04,737)	87,00,000	-	-	-	-	-	-	-	-	-	(35,04,737)
23	Design & Development of a Rapid Product Dev. Platform	-	-	-	-	-	-	-	-	-	-	-	-
24	OCR Sys. On Android based Handheld Devices using Multi Framework for Malayam, Bangla, Punjabi, Hindi, Urdu, Tamil & Telugu	17,461	-	-	-	-	-	396	1,283	15,783	17,461	-	-
25	Ubiquitous Speech Collection & Analysis System for Surveillance Application (USCAS)	(99,64,000)	74,00,000	-	-	-	-	-	-	-	-	-	(25,64,000)
26	C-DAC Silchar	35,572	1,40,36,000	-	52,110	48,58,782	70,30,530	4,31,622	5,74,309	15,39,967	1,44,35,210	-	(3,11,528)
	Total	**(11,94,88,099)**	**41,90,36,000**	**(26,37,647)**	**10,83,56,885**	**11,85,34,236**	**8,55,03,748**	**1,62,21,558**	**66,68,543**	**88,59,622**	**23,57,87,707**	**1**	**16,94,79,431**

Annexure 2 of Schedule 3 **Funded Projects**
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr.No.	Name of the Project	Opening Balance	Grants Received During the year	Interest Earned	Other Income & CDAC's Contribution During the year	Capital Expenditure	Salary, Wages Allowances etc.	Componants, Consumables and Other Direct Expenses	Travel	Contingencies, Overheads and Other Administrative Expenditure	Total Expenses	Refund / Transfer & Other Adjustments	Closing Balance
1	Bangalore Centre												
	MeitY Projects	2,46,24,422	8,38,70,314	24,24,414	-	1,77,60,328	4,94,73,797	1,15,42,275	43,00,393	1,15,57,445	9,46,34,238	65,09,935	97,74,977
	Other Agency Projects	(8,63,625)	33,59,880	-	-	74,306	10,24,191	7,03,750	2,65,299	22,29,978	42,97,524	-	(18,01,269)
	Total Bangalore Centre	2,37,60,797	8,72,30,194	24,24,414	-	1,78,34,634	5,04,97,988	1,22,46,025	45,65,692	1,37,87,423	9,89,31,762	65,09,935	79,73,708
2	Chennai Centre												
	MeitY Projects	1,93,77,534	6,37,08,000	5,00,665	-	56,22,826	4,30,57,089	29,44,584	61,74,993	1,17,84,020	6,95,83,512	70,66,705	69,35,982
	Other Agency Projects	-	12,55,000	-	-	-	25,46,765	-	32,420	-	25,79,185	-	(13,24,185)
	Total Chennai Centre	1,93,77,534	6,49,63,000	5,00,665	-	56,22,826	4,56,03,854	29,44,584	62,07,413	1,17,84,020	7,21,62,697	70,66,705	56,11,797
3	Corporate Office												
	MeitY Projects	15,20,27,000	(15,20,27,000)	-	-	-	-	-	-	-	-	-	-
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Corporate Office	15,20,27,000	(15,20,27,000)	-	-	-	-	-	-	-	-	-	-
4	Delhi Centre												
	MeitY Projects	1,99,64,088	80,00,000	5,93,119	-	-	84,97,904	55,99,458	31,327	27,56,289	1,68,84,978	1,83,835	1,14,88,394
	Other Agency Projects	5,38,19,363	22,00,30,151	-	5,56,716	-	86,26,623	13,36,43,347	46,41,912	8,20,252	14,77,32,134	7,59,359	12,59,16,737
	Total Delhi Centre	7,37,83,451	22,80,30,151	5,93,119	5,56,716	-	1,71,24,527	13,92,42,805	46,73,239	35,76,541	16,46,17,112	9,43,194	13,74,05,131
5	Hyderabad Centre												
	MeitY Projects	37,99,88,804	6,06,74,051	99,54,541	83,53,152	3,51,85,918	5,10,57,469	7,59,150	93,80,176	3,60,59,381	13,24,42,094	22,34,42,948	10,30,85,506
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Hyderabad Centre	37,99,88,804	6,06,74,051	99,54,541	83,53,152	3,51,85,918	5,10,57,469	7,59,150	93,80,176	3,60,59,381	13,24,42,094	22,34,42,948	10,30,85,506
6	Kolkata Centre												
	MeitY Projects	5,04,62,552	8,93,06,143	11,44,896	-	32,62,227	3,89,86,034	1,91,33,949	75,46,081	46,31,519	7,35,59,810	29,22,227	6,44,31,554
	Other Agency Projects	16,79,207	53,33,514	12,365	-	31,850	8,89,408	7,86,455	3,01,865	2,71,390	22,80,968	16,79,207	30,64,911
	Total Kolkata Centre	5,21,41,759	9,46,39,657	11,57,261	-	32,94,077	3,98,75,442	1,99,20,404	78,47,946	49,02,909	7,58,40,778	46,01,434	6,74,96,465
7	Mohali Centre												
	MeitY Projects	47,30,683	6,99,47,817	22,30,914	-	65,05,391	2,29,90,836	36,29,056	17,29,892	30,36,243	3,78,91,418	2,594	3,90,15,402
	Other Agency Projects	3,36,20,783	-	21,27,953	-	1,00,380	42,65,247	55,03,535	39,351	65,104	99,73,617	-	2,57,75,119
	Total Mohali Centre	3,83,51,466	6,99,47,817	43,58,867	-	66,05,771	2,72,56,083	91,32,591	17,69,243	31,01,347	4,78,65,035	2,594	6,47,90,521
8	Mumbai Centre												
	MeitY Projects	27,21,46,851	16,98,06,005	70,07,706	9,06,85,979	5,17,82,229	11,06,01,341	32,20,872	82,24,007	20,40,94,563	37,79,23,012	4,35,88,396	11,81,35,133
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Mumbai Centre	27,21,46,851	16,98,06,005	70,07,706	9,06,85,979	5,17,82,229	11,06,01,341	32,20,872	82,24,007	20,40,94,563	37,79,23,012	4,35,88,396	11,81,35,133
9	Noida Centre												
	MeitY Projects	56,27,030	4,34,57,818	1,51,000	-	1,35,65,641	2,79,71,031	12,94,580	14,18,383	93,42,572	5,35,92,207	48,23,859	(91,80,216)
	Other Agency Projects	42,42,115	76,63,872	-	-	42,42,115	27,18,842	-	95,030	-	70,55,987	-	48,50,000
	Total Noida Centre	98,69,145	5,11,21,690	1,51,000	-	1,78,07,756	3,06,89,873	12,94,580	15,13,413	93,42,572	6,06,48,194	48,23,859	(43,30,216)
10	Pune Centre												
	MeitY Projects	10,52,66,320	82,18,66,062	62,98,190	30,14,864	4,44,02,848	22,24,49,189	2,37,09,737	1,45,20,245	6,37,39,883	36,88,21,902	1,22,41,731	55,53,81,803
	Other Agency Projects	(1,78,42,572)	4,13,92,340	46,476	2,500	33,71,690	2,15,76,554	2,14,978	12,98,263	83,37,548	3,47,99,033	(29,373)	(1,11,70,916)
	Total Pune Centre	8,74,23,748	86,32,58,402	63,44,666	30,17,364	4,77,74,538	24,40,25,743	2,39,24,715	1,58,18,508	7,20,77,431	40,36,20,935	1,22,12,358	54,42,10,887

Annexure 2 of Schedule 3 **Funded Projects**
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr.No.	Name of the Project	Opening Balance	Grants Received During the year	Interest Earned	Other Income & CDAC's Contribution During the year	Capital Expenditure	Salary, Wages Allowances etc.	Componants, Consumables and Other Direct Expenses	Travel	Contingencies, Overheads and Other Administrative Expenditure	Total Expenses	Refund / Transfer & Other Adjustments	Closing Balance
11	Thiruvananthapuram Centre												
	MeitY Projects	22,53,40,872	42,86,91,657	1,17,87,606	6,62,76,705	1,98,28,046	15,92,39,750	5,05,92,677	77,42,653	14,36,85,551	38,10,88,677	47,55,000	34,62,53,163
	Other Agency Projects	13,97,33,536	3,68,80,742	67,50,000	-	55,93,326	5,76,96,859	1,90,16,017	23,32,313	1,89,13,833	10,35,52,348	51,82,670	7,46,29,260
	Total Thiruvananthapuram Centre	36,50,74,408	46,55,72,399	1,85,37,606	6,62,76,705	2,54,21,372	21,69,36,609	6,96,08,694	1,00,74,966	16,25,99,384	48,46,41,025	99,37,670	42,08,82,423
	Total MeitY Projects	1,25,95,56,156	1,68,73,00,857	4,20,93,051	16,83,30,700	19,79,15,454	73,43,24,440	12,24,26,338	6,10,68,150	49,06,87,466	1,60,64,21,848	30,55,37,230	1,24,53,21,696
	Total Other Agency Projects	21,43,88,807	31,59,15,499	89,36,794	5,61,216	1,34,13,667	9,93,44,489	15,98,68,082	90,06,453	3,06,38,105	31,22,70,796	75,91,863	21,99,39,657
	Grand Total	**1,47,39,44,963**	**2,00,32,16,366**	**5,10,29,845**	**16,88,91,916**	**21,13,29,121**	**83,36,68,929**	**28,22,94,420**	**7,00,74,603**	**52,13,25,571**	**1,91,86,92,644**	**31,31,29,093**	**1,46,52,61,353**

Amount in ₹

Particulars	2015-2016	2014-2015
Schedule 4 - Current Liabilities and Provisions		
A. Current Liabilities		
1. Trade Payables (For Goods and Others)	33,45,96,075	23,94,07,036
2. Advances Received		
a) Advances Received from Parties	21,60,76,673	19,94,07,957
b) Fees Received in Advance	9,03,868	19,97,373
c) AMC Charges Received in Advance	-	-
d) Other Income Received in Advance	14,41,86,734	11,71,52,800
3. Statutory Liabilities		
a) Members CPF Recovery Payable	98,52,450	93,10,348
b) Members VPF Payable	13,12,055	11,57,695
c) Members CPF Loan Recovery Payable	19,228	1,10,821
d) Members Benevolent Fund Payable	9,80,254	6,20,436
e) Members CGEIS/Group Insurance Payable	39,261	33,045
f) Members Other Recoveries Payable	9,47,505	9,40,253
g) C-DAC's Contribution to CPF Payable	1,56,26,378	1,40,40,690
h) Gratuity Payable	1,15,37,936	66,30,702
i) Leave Salary and Pension Contribution Payable	3,82,84,227	3,30,33,927
j) Members Income Tax Payable	75,23,826	55,83,939
k) Tax Deducted at Source Payable	1,69,55,584	94,80,801
l) Profession Tax Payable	2,25,604	2,32,605
m) General Sales Tax / VAT Payable	2,49,218	9,19,395
n) Central Sales Tax Payable	10,38,159	46,018
o) Works Contract Tax Payable	27,008	-
p) Service Tax Payable	1,50,78,516	3,42,794
q) Local Body Tax Payable	-	11,40,238
4. Other Current Liabilities		
a) Unpaid Salaries	40,83,465	85,93,502
b) Library Deposits Payable	2,82,350	1,73,950
c) Other Security Deposits Payable	2,01,51,173	1,01,55,083
d) Earnest Money Deposit Contractors Payable	1,30,18,037	65,31,237
e) Retention Deposit Contractors	1,56,70,429	1,91,30,528
f) Refund of Course Fees Due	20,78,040	17,99,430
g) ATC's & Others Share in Fees Payable	32,08,388	43,08,658
h) Other Current Liabilities	16,06,96,904	17,07,73,962
Total (A)	1,03,46,49,345	86,30,55,223
B. Provisions		
1. Others (Specify)		
a) Provisions / Accrued Liabilities for Expenses	7,84,60,389	7,30,66,610
Total (B)	7,84,60,389	7,30,66,610
Total (A)+(B)	**1,11,31,09,734**	**93,61,21,833**

Schedule-5 FIXED ASSETS Acquired out of own funds

(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

		Gross Block						Depreciation					Net Block	
Sr.No.	Particulars	Cost/Valuation as on beginning of the year	Additions During the Year			Deletion/Adjustments During the Year	Cost/Valuation as on end of the year	Depreciation as at beginning of the year	Depreciation Written Back	Depreciation Rate	Depreciation for Current Year	Total Depreciation up to the year end	WDV (Closing)	WDV (Opening)
			On or Before 30th September	After 30th September	Total Additions during the year									
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Land													
	a) Freehold	3,21,46,675	20,800	-	20,800	-	3,21,67,475	-	-	0%	-	-	3,21,67,475	3,21,46,675
	b) Leasehold	17,42,06,504	3,80,909	-	3,80,909	-	17,45,87,413	1,74,33,631	-	0%	6,97,292	1,81,30,923	15,64,56,490	15,67,72,873
2	Building													
	a) On Freehold Land	65,65,566	3,41,157	20,06,233	23,47,390	-	89,12,956	34,60,115	-	10%	5,45,284	40,05,399	49,07,557	31,05,451
	b) On Leasehold Land	10,89,53,874	-	-	-	-	10,89,53,874	7,35,69,935	-	10%	35,38,394	7,71,08,329	3,18,45,545	3,53,83,939
	c) Ownership Flats/Premises	3,92,36,295	4,90,000	-	4,90,000	-	3,97,26,295	2,87,02,147	-	10%	11,02,415	2,98,04,562	99,21,733	1,05,34,148
	d) Superstructures on Land not belonging to the entity	1,47,34,869	-	-	-	-	1,47,34,869	1,25,29,477	-	10%	2,20,540	1,27,50,017	19,84,852	22,05,392
3	Plant, Machinery and Equipments	5,93,37,440	-	6,37,650	6,37,650	27,64,951	5,72,10,139	5,03,02,452	23,21,945	15%	13,84,445	4,93,64,952	78,45,187	90,34,988
4	Vehicles	1,26,15,268	3,150	6,36,336	6,39,486	-	1,32,54,754	78,15,310	-	15%	8,15,916	86,31,226	46,23,528	47,99,958
5	Furniture & Fixtures	8,98,35,715	24,04,152	3,67,613	27,71,765	7,01,379	9,19,06,101	6,11,40,492	5,37,913	10%	31,30,351	6,37,32,930	2,81,73,171	2,86,95,223
6	Office Equipments	2,99,38,000	2,54,282	35,66,687	38,20,969	7,30,503	3,30,28,466	2,12,41,019	6,78,255	15%	18,69,854	2,24,32,618	1,05,95,848	86,96,981
7	Air Conditioning Equipments	3,25,91,247	1,08,400	6,49,943	7,58,343	17,68,000	3,15,81,590	2,55,28,463	14,19,926	15%	11,20,959	2,52,29,496	63,52,094	70,62,784
8	Computer Peripherals	30,14,49,455	2,74,40,221	87,68,791	3,62,09,012	85,33,372	32,91,25,095	29,08,62,736	85,01,376	60%	2,80,46,242	31,04,27,602	1,86,97,493	1,05,66,719
9	Electrical Installations	5,38,71,417	6,48,203	90,256	7,38,459	5,46,074	5,40,63,802	4,14,50,075	4,68,370	10%	13,10,012	4,22,73,717	1,17,90,085	1,24,21,342
11	Electronic Tools & Lab Equipments	74,85,821	95,566	52,273	1,47,839	-	76,33,660	49,56,872	-	15%	4,01,518	53,58,390	22,75,270	25,28,949
12	Library Books	1,45,80,787	95,357	3,15,156	4,10,513	34,951	1,49,56,349	1,42,83,144	34,907	60%	4,24,867	1,46,73,104	2,83,245	2,97,643
13	Copyright Know-how	66,950	-	-	-	-	66,950	61,972	-	25%	1,245	63,217	3,733	4,978
14	Other Fixed Assets	62,22,443	24,651	58,646	83,297	41,383	62,64,357	43,53,272	25,502	15%	2,90,488	46,18,258	16,46,099	18,69,171
	Total	**98,38,38,326**	**3,23,06,848**	**1,71,49,584**	**4,94,56,432**	**1,51,20,613**	**1,01,81,74,145**	**65,77,11,112**	**1,40,06,194**		**4,48,99,822**	**68,86,04,740**	**32,95,69,405**	**32,61,27,214**
	Capital Work-in-progress	3,67,216	-	15,18,730	15,18,730	-	18,85,946	-	-		-	-	18,85,946	3,67,216
	Grand Total	**98,42,05,542**	**3,23,06,848**	**1,86,68,314**	**5,09,75,162**	**1,51,20,613**	**1,02,00,60,091**	**65,77,11,112**	**1,40,06,194**		**4,48,99,822**	**68,86,04,740**	**33,14,55,351**	**32,64,94,430**
	Previous Year	**1,01,23,26,945**	**57,78,159**	**2,82,96,851**	**3,40,75,010**	**6,21,96,413**	**98,42,05,542**	**64,05,53,830**	**1,73,08,297**		**3,44,65,579**	**65,77,11,112**	**32,64,94,430**	**37,17,73,115**

Schedule-6 FIXED ASSETS Acquired out of Grant-In-Aid

(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

		Gross Block						Depreciation					Net Block	
Sr.No.	Particulars	Cost/Valuation as on beginning of the year	Additions During the Year			Deletion/Adjustments During the Year	Cost/Valuation as on end of the year	Depreciation as at beginning of the year	Depreciation Written Back	Depreciation Rate	Depreciation for Current Year	Total Depreciation up to the year end	WDV (Closing)	WDV (Opening)
			On or Before 30th September	After 30th September	Total Additions during the year									
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Land													
	a) Freehold	49,04,850	-	-	-	-	49,04,850	-	-	0%	-	-	49,04,850	49,04,850
	b) Leasehold	1,67,45,711	-	-	-	-	1,67,45,711	20,07,652	-	0%	1,59,103	21,66,755	1,45,78,956	1,47,38,059
2	Building													
	a) On Freehold Land	8,58,09,591	3,07,28,383	12,59,24,999	15,66,53,382	3,16,600	22,21,46,373	5,46,84,433	2,57,934	10%	1,67,71,987	7,11,98,486	15,09,47,887	1,11,25,158
	b) On Leasehold Land	12,18,21,678	-	45,25,818	45,25,818	-	12,63,47,496	8,98,91,577	-	10%	36,45,592	9,35,37,169	3,28,10,327	3,19,30,101
	c) Ownership Flats/Premises	33,41,269	-	-	-	-	33,41,269	27,80,658	-	10%	56,062	28,36,720	5,04,549	5,60,611
	d) Superstructures on Land not belonging to the entity	-	-	-	-	-	-	-	-	10%	-	-	-	-
3	Plant, Machinery and Equipments	8,64,39,089	2,43,600	-	2,43,600	-	8,66,82,689	6,84,67,045	-	15%	27,32,347	7,11,99,392	1,54,83,297	1,79,72,044
4	Vehicles	1,37,75,807	-	-	-	32,14,738	1,05,60,869	1,14,44,210	26,48,384	15%	2,94,758	88,90,584	16,70,285	23,31,397
5	Furniture & Fixtures	10,38,18,990	2,30,13,039	20,58,359	2,50,71,398	72,212	12,68,18,176	7,24,53,416	58,566	10%	56,42,332	7,80,37,182	5,07,80,994	3,13,65,574
6	Office Equipments	5,25,68,204	7,71,422	6,39,712	14,11,134	2,75,691	5,37,03,647	3,77,49,923	2,49,160	15%	24,30,433	3,99,31,196	1,37,72,451	1,48,18,281
7	Air Conditioning Equipments	5,35,68,168	2,84,277	15,050	2,99,327	32,087	5,38,35,408	4,07,02,160	28,783	15%	19,74,303	4,26,47,680	1,11,87,728	1,28,66,008
8	Computer Peripherals	1,23,57,76,491	1,61,93,405	65,24,198	2,27,17,603	8,54,355	1,25,76,39,739	1,19,02,74,897	8,49,089	60%	4,09,28,359	1,23,03,54,167	2,72,85,572	4,55,01,594
9	Electrical Installations	6,16,14,240	1,32,57,166	25,200	1,32,82,366	2,815	7,48,93,791	4,03,51,606	1,319	10%	34,54,351	4,38,04,638	3,10,89,153	2,12,62,634
11	Electronic Tools & Lab Equipments	9,58,60,434	12,87,769	14,45,270	27,13,039	56,507	9,85,16,966	7,44,73,906	49,769	15%	36,13,925	7,80,38,062	2,04,78,904	2,13,86,528
12	Library Books	3,97,32,224	91,747	22,966	1,04,713	2,042	3,98,34,895	3,93,38,104	2,032	60%	2,99,292	3,96,35,364	1,99,531	3,94,120
13	Copyright Know-how	4,40,660	-	-	-	-	4,40,660	4,40,597	-	25%	16	4,40,613	47	63
14	Other Fixed Assets	70,97,977	-	-	-	-	70,97,977	52,45,602	-	15%	2,77,857	55,23,459	15,74,518	18,52,375
	Total	**1,96,33,15,183**	**8,58,40,808**	**14,11,81,572**	**22,70,22,380**	**48,27,047**	**2,18,55,10,516**	**1,73,03,05,786**	**43,45,036**		**8,22,80,717**	**1,80,82,41,467**	**37,72,69,049**	**23,30,09,397**
	Capital Work-in-progress	1,08,04,67,057	4,328	2,29,31,934	2,29,36,262	12,30,12,367	98,03,90,952	-	-		-	-	98,03,90,952	1,08,04,67,057
	Grand Total	**3,04,37,82,240**	**8,58,45,136**	**16,41,13,506**	**24,99,58,642**	**12,78,39,414**	**3,16,59,01,468**	**1,73,03,05,786**	**43,45,036**		**8,22,80,717**	**1,80,82,41,467**	**1,35,76,60,001**	**1,31,34,76,454**
	Previous Year	**2,90,04,82,719**	**3,02,37,964**	**7,28,45,899**	**10,30,83,863**	**(4,02,15,658)**	**3,04,37,82,240**	**1,64,15,71,477**	**35,44,253**		**9,22,78,562**	**1,73,03,05,786**	**1,31,34,76,454**	**1,26,89,11,242**

Schedule-7 FIXED ASSETS Acquired out of Project Grants

(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

		Gross Block						Depreciation					Net Block	
Sr.No.	Name of the Project	Cost/Valuation as on beginning of the year	Additions During the Year			Deletion/Adjustments During the Year	Cost/Valuation as on end of the year	Depreciation as at beginning of the year	Depreciation Written Back	Depreciation Rate	Depreciation for Current Year	Total Depreciation up to the year end	WDV (Closing)	WDV (Opening)
			On or Before 30th September	After 30th September	Total Additions during the year									
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Bangalore Centre Project Assets	26,88,70,464	24,43,583	1,53,91,051	1,78,34,634	-	28,67,05,098	22,77,99,242	-		2,51,94,119	25,29,93,361	3,37,11,737	4,10,71,222
2	Chennai Centre Project Assets	7,99,97,891	65,205	55,57,621	56,22,826	-	8,56,20,717	5,81,98,788	-		94,06,077	6,76,04,865	1,80,15,852	2,17,99,103
3	Corporate Project Assets	-	-	-	-	-	-	-	-		-	-	-	-
4	Delhi Centre Project Assets	15,72,623	-	-	-	-	15,72,623	15,57,952	-		3,944	15,61,896	10,727	14,671
5	Hyderabad Centre Project Assets	13,96,96,214	-	3,51,85,918	3,51,85,918	-	17,48,82,132	12,31,89,132	-		3,19,60,382	15,51,49,514	1,97,32,618	1,65,07,082
6	Kolkata Centre Project Assets	18,80,415	24,46,717	8,47,360	32,94,077	-	51,74,492	11,28,249	-		24,27,746	35,55,995	16,18,497	7,52,166
7	Mohali Centre Project Assets	7,75,62,013	10,05,447	56,00,324	66,05,771	-	8,41,67,784	6,71,44,077	-		51,57,496	7,23,01,573	1,18,66,211	1,04,17,936
8	Mumbai Centre Project Assets	23,39,39,074	1,22,02,187	3,95,80,041	5,17,82,228	12,36,086	28,44,85,216	20,14,64,963	12,35,762		3,99,64,900	24,01,94,101	4,42,91,115	3,24,74,111
9	Noida Centre Project Assets	6,69,42,904	1,78,07,756	-	1,78,07,756	-	8,47,50,660	5,51,76,647	-		88,31,331	6,40,07,978	2,07,42,682	1,17,66,257
10	Pune Centre Project Assets	42,44,15,888	1,02,61,631	3,75,12,907	4,77,74,538	3,99,98,568	43,21,91,856	40,47,65,361	3,96,25,249		3,84,49,596	40,35,89,708	2,86,02,148	1,96,50,525
11	Thiruvananthapuram Centre Project Assets	26,55,88,085	1,37,50,195	1,16,71,178	2,54,21,373	-	29,10,09,458	17,71,70,994	-		2,47,56,378	20,19,27,372	8,90,82,086	8,84,17,091
	Total	**1,56,04,65,569**	**5,99,82,721**	**15,13,46,400**	**21,13,29,121**	**4,12,34,654**	**1,73,05,60,036**	**1,31,75,95,405**	**4,08,61,011**		**18,61,51,969**	**1,46,28,86,363**	**26,76,73,673**	**24,28,70,164**
	Capital Work-in-progress	-	-	-	-	-	-	-	-		-	-	-	-
	Grand Total	**1,56,04,65,569**	**5,99,82,721**	**15,13,46,400**	**21,13,29,121**	**4,12,34,654**	**1,73,05,60,036**	**1,31,75,95,405**	**4,08,61,011**		**18,61,51,969**	**1,46,28,86,363**	**26,76,73,673**	**24,28,70,164**
	Previous Year	**1,41,58,96,309**	**7,32,71,970**	**7,20,51,739**	**14,53,23,709**	**7,54,449**	**1,56,04,65,569**	**1,17,08,82,078**	**2,76,159**		**14,69,89,486**	**1,31,75,95,405**	**24,28,70,164**	**24,50,14,231**

Amount in ₹

Particulars	2015-2016	2014-2015
Schedule 8 - Current Assets, Loans and Advances Etc.		
A. Current Assets		
1. Inventories :		
a) Stock in trade		
Finished Goods	30,73,526	38,72,610
Work-in-progress	6,93,880	1,59,608
Raw Material	25,14,446	25,99,807
b) Stock of Course Material	12,98,165	11,60,080
2. Sundry Debtors		
Trade Receivables	68,55,13,556	54,63,74,208
Less: Provision for Bad and Doubtful Debts	17,50,01,480	18,50,28,354
	51,05,12,076	36,13,45,854
3. Cash balances in hand (including cheques/drafts and imprest)	5,11,856	9,35,803
4. Bank Balances		
a) With Scheduled Banks		
On Deposit Accounts (includes margin money)	3,45,86,28,051	3,11,53,70,483
On Savings/Current Account	1,12,20,56,726	1,23,71,51,845
b) Funds/Goods in Transit	66,23,301	16,28,768
5. Post Office-Savings Accounts	3,235	7,503
Total (A)	5,10,59,15,262	4,72,42,32,361
B. Loans, Advances and Other Assets		
1. Loans		
a) Staff	1,05,30,568	1,03,08,030
b) Other (Specify)	-	-
2. Advances and other amounts recoverable in cash or in kind or for value to be received		
a) On Capital Account	2,59,24,000	-
b) Prepayments (Advances to Suppliers)	11,57,20,765	2,25,96,594
c) To Employees	1,02,00,109	1,29,64,353
d) To Others	1,54,77,387	1,47,71,717
3. Income Accrued		
a) On Investments from Earmarked/Endowment Funds	-	-
b) On Bank Deposits	11,68,14,983	12,07,25,252
c) Others		
I) Course Fee Receivable	8,47,466	4,69,633
ii) Receivable from Guest House Receipts	-	-
iii) Other Grants Receivables	-	15,79,87,290
4. Claims Receivable		
a) Insurance Claims Lodged but not received	-	-
b) Cliams due but not received	6,25,354	6,25,354
c) Excise Duty paid under Protest	-	-
d) Income Tax Deducted at Source	7,03,36,559	8,58,40,383
e) Sales Tax / VAT Paid Under Protest	-	-
f) Sales Tax / VAT Refund Due	4,80,963	4,80,963
g) Receivable from PF Trust	32,501	81,766
h) Other Receivables	1,32,22,405	1,83,33,869
5. Prepaid Expenses		
a) Insurance	11,89,793	5,97,668
b) Other Expenses	65,07,778	63,07,019
6. Deposits (Assets)		
a) Telephone Deposit	12,21,808	11,91,559
b) Lease Rent Deposit	4,41,15,042	4,59,15,903
c) Other Deposits	2,45,59,186	2,45,14,708
d) Security Deposit	4,02,22,938	3,93,62,423
e) Excise PLA Deposit	4,04,375	5,45,736
f) Excise Under D3 and 57F3	-	-
g) EMD / Tender Deposit	34,30,315	31,28,669
7. Differed Expenses		
a) Unutilised Modvat / Cenvat	59,96,280	91,23,093
b) Differed Expenses on Projects	20,78,478	-
Total (B)	50,99,39,053	57,58,71,962
Total (A+B)	**5,61,58,54,315**	**5,30,01,04,323**

Amount in ₹

Particulars	2015-2016	2014-2015
Schedule 9 - Income from Sales/Services		
1. Income from Sales		
a) Sale of Finished Goods	10,64,85,855	7,66,72,859
b) Sale of Raw Material	-	-
c) Sale of Scraps	18,26,904	6,64,493
2. Income from Services		
a) Software Development Charges	14,06,87,490	15,38,37,048
b) Others (Specify)		
AMC Charges Received	8,57,33,623	3,31,24,128
Consultancy Charges / Service Charges	33,78,59,916	31,65,67,685
Networking Charges	-	-
3. Inter Unit / Inter Branch Sales / (Purchases)	-	-
Total	**67,25,93,788**	**58,08,66,213**
Schedule 10 - Grants/Subsdies		
(Irrevocable Grants & Subsdies Received)		
1. Central Government	54,50,00,000	83,70,00,000
2. Others (Specify)		
a) C-DAC's own Contribution and Other Adjustments	-	-
3. Less : Amount utilised for Capital Expenditure in the current year transferred to Capital Reserve	79,30,028	2,82,73,204
Total	**53,70,69,972**	**80,87,26,796**
Schedule 11 - Fees/Subscriptions		
(Accounting Policies towards each item are to be disclosed)		
1. Entrance Fees	8,850	12,500
2. Course Fees	63,45,71,547	54,87,06,431
3. Annual Fees/Subscriptions	2,06,34,090	2,18,75,248
4. Authorization Fees	25,00,000	5,33,708
5. Others (Specify)		
a) Virtual Centre Processing Fees	-	25,000
b) Admission Cancellation Fees	40,55,856	33,06,995
c) Examination Fees	2,36,91,950	1,85,27,206
d) Late Fee	50,213	71,174
e) Registration Fees / Project Fee	4,12,180	13,47,251
f) Students Hostel Fees	1,22,91,639	1,22,78,010
TOTAL	**69,82,16,325**	**60,66,83,523**
Schedule 12 - Income From Investments		
Income on Investment from Earmarked/Endowment Funds transferred to Funds)		
Interest		
1. On Term Deposits		
a) With Scheduled Banks	-	-
2. On Savings Accounts		
a) With Scheduled Banks	-	-
3. On Loans		
a) Employees/Staff	-	-
Total	-	-
Transferred to Earmarked/Endowment Funds	-	-
Net Balance	-	-
Schedule 13 - Interest Received		
1. On Term Deposits		
a) With Scheduled Banks	23,40,34,672	22,61,46,032
2. On Savings Accounts		
a) With Scheduled Banks	1,27,44,244	90,69,543
3. On Loans		
a) Employees/Staff	7,65,364	8,84,281
Total	**24,75,44,280**	**23,60,99,856**

Amount in ₹

Particulars	2015-2016	2014-2015
Schedule 14 - Other Income		
1. Profit on Sale/Disposal of Assets		
a) Owned Assets	(22,655)	(1,24,951)
b) Assets acquired out of grants, or received free of cost	4,43,737	(15,645)
2. Exports Incentives Realized	-	-
3. Fees for Miscellaneous Services	22,60,880	26,52,128
4. Miscellaneous Income	70,83,765	1,08,37,014
Total	**97,65,727**	**1,33,48,546**
Schedule 15 - Increase/(Decrease) In Stock of Finished Goods & Work-In-Progress		
a) Closing Stock		
Finished Goods	30,73,526	38,72,610
Work-in-progress	6,93,880	1,59,608
Raw Material	25,14,446	25,99,807
Loose Tools	-	-
Course Material Stock	12,98,165	11,60,080
b) Less : Opening Stock		
Finished Goods	38,72,610	1,08,460
Work-in-progress	1,59,608	13,23,651
Raw Material	25,99,807	11,68,766
Loose Tools	-	-
Course Material Stock	11,60,080	11,94,750
Total (a-b)	**(2,12,088)**	**39,96,478**
Schedule 16 - Establishment Expenses		
a) Salaries & Wages	97,29,37,420	93,17,64,332
b) Allowances & Bonus		-
Awards & Prizes	3,40,813	4,45,249
Bonus	23,79,393	24,19,857
Canteen Facility	2,77,93,669	2,37,36,794
Hire Charges - Contractual Services	7,64,24,819	5,48,10,077
Lease Rent for Employees Quarters	5,89,51,726	4,89,72,554
Leave Travel Concession	30,10,040	80,73,621
Medical Reimbursement	5,31,30,686	5,18,42,833
Members Medical & Accident Insurance Expenses	32,69,193	6,05,432
Misc. Allowances and Other Reimbursements	1,41,04,126	92,99,514
Staff Recruitment Expenses	37,15,411	28,42,241
Staff Training Expenses	3,17,629	11,54,491
Transfer & Relocation Expenses	1,33,354	3,79,485
c) Contribution to Provident Fund	9,94,37,934	7,96,70,325
d) Contribution to Other Funds (Benevolent Fund)	-	-
e) Staff Welfare Expenses	42,35,665	97,79,017
f) Expenses on Employees Retirement and Terminal Benefits		-
Gratuity	2,46,11,031	1,74,53,988
Leave Encashment	4,19,48,219	3,19,65,643
Leave Salary & Pension Contribution	1,73,72,599	1,91,60,908
g) Others (Specify)	9,41,253	17,68,210
Total	**1,40,50,54,980**	**1,29,61,44,571**
Schedule 17 - Other Administrative Expenses Etc.		
a) Purchases	3,51,67,488	3,53,17,077
b) Direct Expenses		
Consumables	1,26,89,908	1,60,85,516
Design and Development Charges	-	-
Excise/Custom Duty/Service Tax Paid	9,69,829	11,30,527
Freight and Handling Expenses	2,26,953	1,81,622
Labour Charges	41,100	-
Liquidated Damages	4,27,500	-
Material Insurance Expenses	-	-
Octroi	2,46,316	16,85,971
Other Packing Charges	-	4,425
Royalty and Support Fees	-	-
Software Development Consultancy Charges	69,000	21,76,984
Technical Service Charges	39,61,618	75,02,446
Warehouse Charges	3,50,700	1,96,000

Amount in ₹

Particulars	2015-2016	2014-2015
c) Expenses on Courses		
Advertisement Expenses	1,25,25,425	1,54,79,413
ATC's Share in Fees	19,49,36,965	15,96,04,380
Awards & Prizes	33,391	-
Campus Interview Expenses	6,30,165	13,28,599
Course Material Production Expenses	2,76,70,540	2,52,17,033
Data Entry & Scanning Expenses	-	-
Examination Expenses	54,52,801	23,38,944
Faculty Members Expenses	1,70,56,596	1,97,40,213
Other Course Related Expenses	1,26,91,276	1,57,78,066
Printing of Forms & Prospectus	-	1,14,667
Students Hostel Expenses	1,33,719	1,04,327
d) Administrative Expenses		
Administrative Charges on Provident Fund	56,58,273	34,75,176
Asset Hire Charges	13,55,183	39,08,282
Auditors Remuneration	15,48,475	16,38,612
Bank Charges and Commission	13,26,537	14,12,952
C-DAC's Contribution to Funded Projects	27,90,277	27,46,065
Cultural Program Expenses	3,30,361	29,28,625
Development Contracts and Spon. Project Expenses	3,79,851	7,42,417
Electricity, Power and Water Charges	9,54,08,701	8,79,49,439
Entertainment/Hospitality Expenses	8,53,058	19,16,123
Foreign Exchange Fluctuation	9,12,071	7,00,398
Gifts and Presentation	3,58,494	15,60,993
Insurance	11,75,376	13,53,946
Interest Paid	7,61,403	37,07,873
Irrecoverable Balances Written-off/(Written-back)	(1,62,087)	28,81,924
Legal & Professional Charges	1,40,37,299	2,11,06,208
Miscellaneous Expenses	12,43,838	28,98,223
Office Expenses	40,35,417	65,67,218
Postage, Telephone & Communication Charges	1,73,55,933	1,67,68,560
Printing and Stationery	81,13,708	94,31,115
Provision for Bad and Doubtful Debts/Advances	(89,94,199)	4,55,18,864
Rent, Rates and Taxes	10,16,40,296	9,86,47,511
Sales Tax	31,78,505	72,34,881
Service Hire Charges	6,09,65,917	5,37,25,541
Subscription of Periodicals & Newspapers	34,24,616	20,56,680
Tender Expenses	4,64,968	1,34,738
Training Expenses	1,33,356	3,74,607
Transit Quarter & Guest House Expenses	38,98,199	44,47,520
Transportation Charges	1,43,118	3,28,078
Vehicles Hire, Running and Maintenance	1,70,99,373	1,34,33,402
e) Repairs and Maintenance		
Air Conditioning Equipments	36,49,026	33,03,267
Building	1,66,80,230	1,05,70,853
Computers	62,86,738	79,46,995
Electrical Fittings	1,31,09,895	1,41,18,300
Furniture and Fixtures	9,50,898	87,34,897
Garden Maintenance	14,05,368	14,75,325
Lab Equipments	6,45,671	8,40,113
Office Equipments	9,52,100	18,80,513
Other Assets	26,28,145	23,01,312
f) Travelling and Conveyance Expenses		
Inland Travel Expenses		
Director	52,62,924	46,73,488
Members	2,64,71,036	2,88,01,761
Others	14,27,268	21,61,421
Foreign Travel Expenses		
Director	18,90,266	3,96,129
Members	17,65,766	58,24,254
Others	2,23,726	2,25,923
Conveyance Expenses	-	-
g) Selling Distribution and Business Promotion Expenses		
Advertisement Expenses	17,52,560	31,19,673
Expenses on Exhibition, Seminars/Workshops	40,94,491	46,08,364
Distribution Expenses	5,32,138	26,89,750
Product Literature & Brochures Expenses	-	-
Other Sales Promotion Expenses	4,21,965	3,17,442
h) Corporate Office Expenses	-	-
i) Other Expenses	10,593	26,65,977
Total Other Administrative Expenses	**75,48,78,411**	**81,02,37,938**

Schedule 18: Significant Accounting Policies:

1. Accounting Convention

The financial statements are prepared under the historical cost convention C-DAC follows Mercantile System of Accounting and recognizes Income and Expenditure on Accrual basis except otherwise stated, and the following items, due to their peculiar nature are recognized otherwise:

1.1. The course fees of Diploma in Advanced Computing and other Courses commencing before the end of financial year and the duration of which falls beyond the financial year are recognized entirely in the year under audit. In respect of these courses, entire expenditure of course material and agreed proportionate share of the Authorized Training Centers (ATCs) is also accounted for in the year under audit.

1.2. Bonus is accounted for on Cash Basis.

1.3. Expenditure incurred on incomplete Software Development Projects is expensed out in the year of incurrence.

2. Revenue Recognition

2.1. Sales are recognized as net of Trade Discount, Sales Returns and Excise Duty, but including Central Sales Tax & Vat.

2.2. Software Development Charges are recognized on the basis of Terms of Individual Contract and / or as per Phases of completion.

2.3. The income in respect of Annual Maintenance Contract is recognized on accrual basis and as per the terms of individual contracts entered into with parties.

2.4. Income in respect of consultancy charges/service charges is recognized on accrual basis and on the basis of terms of individual contracts entered into with the parties.

2.5. Grants in aid received from the government are treated as income to the extent of net of capital expenditure incurred during the year.

2.6. Interest and other miscellaneous incomes are accounted for on accrual basis.

3. Fixed Assets

3.1 Actual cost of fixed assets acquired is accounted for as per the terms of purchase order; any recovery is netted off to the cost of the asset and all expenses directly attributable to the acquisition and installation of the fixed assets are capitalized.

3.2 Fixed Assets are stated at Cost less Accumulated Depreciation.

3.3 Direct Material Cost with respect to major Fixed Assets developed in-house is capitalized along with manpower and Overhead costs. The Manpower and Overhead costs are charged on basis of man-days spent on the development of Assets as ascertained by the Management. Cost of prototype incurred in the process is charged to Revenue.

3.4 Costs incurred on Assets, which are in process of acquisition, or installation or development is treated as Capital WIP.

3.5 Fixed Assets created out of Sponsored Project Grants and lying at project site are not capitalized and shown as consumables under revenue expenditure.

4. Depreciation

4.1. The ownership of assets acquired out of Mission Grants & Sponsored Projects Grants rests with the respective funding agencies. However, depreciation is charged on the WDV basis on all assets including on those acquired out of Mission and Sponsored Project Grants. The Written-Down Value of the said assets is represented by an equivalent amount of Capital Reserve.

4.2. All additions to Fixed Assets are fully depreciated irrespective of the date of acquisition. Depreciation is charged at the rates prescribed by Income Tax Act 1961.

5. Inventory Valuation

The inventories are valued and certified by the Management as under –

5.1. Components, Raw Materials and Loose Tools in stock are valued at cost or net realizable value whichever is lower.

5.2. Work in Progress and Finished Goods are valued at cost.

5.3. Course Material stock is valued at landed cost. The course material, which is outdated due to change in the syllabus, is shown at nil value.

6. Deferred Expenditure on Projects

The expenditure incurred on incomplete business projects for which income is to be recognized in the ensuing period is deferred.

7. Foreign Currency Transaction

7.1. Transactions denominated in foreign currency are accounted at the exchange rate prevailing on the date of transaction and difference between the date of transaction and payment/receipt are accounted for as income or expenditure as the case may be.

7.2. Current assets and current liabilities denominated in foreign currency are converted at the exchange rate prevailing as at the year-end and the resultant gain/loss is adjusted to revenue account. Contingent liabilities denominated in foreign currency are converted at the exchange rate prevailing as at the year-end.

8. Retirement Benefits

Retirement benefits in respect of Provident Fund, Pension Fund, Gratuity and Leave Encashment has been provided for on accrual basis.

9. Other Policies

All other Accounting Policies are generally consistent with normally accepted accounting practices.

CA Raghu Bhargava
Director (Finance)

Col. Anoop Kumar Khare(Retd.)
Registrar

Prof. Rajat Moona
Director General

For
M/s B.N. Adke & Co. (FRN: 100038W)
Chartered Accountants

CA B.N. Adke
Proprietor (Membership No. 033988)

Date: **6th September, 2016**
Place: **Pune**

Schedule 19: Notes to Accounts

1. Merger of Societies with C-DAC

The Assets, Liabilities and Other obligations at the book value as on December 15, 2002 are merged in C-DAC in respect of the societies viz. Electronics Research And Development Centre at Kolkata, Noida, Thiruvananthapuram, National Centre for Software Technology Mumbai, and Centre For Electronics Design And Technology of India, Mohali, due to merger of these Societies in C-DAC as per the Government of India orders.

The process for transfer of title deeds of Immovable properties in the name of C-DAC of the above centres is under process. No liability towards expenses such as stamp duty, taxes and other expenses (if any) is provided for. The same will be accounted for in the year of payment.

2. Capital Commitment

Capital Commitments ₹5,291.81 Lacs not provided for. (Previous year ₹5,638.84 Lacs)

3. Sponsored Projects

Balance of Core Grant Projects as per 'Annexure 1' of the Schedule 3 to the Balance Sheet includes unutilized grants amounting to ₹2,593.75 lacs and ₹898.95 lacs grants receivable on account of expenditure incurred in anticipation of release of grants on projects.

Balance of unutilized Funded Projects grants as per 'Annexure 2' of the Schedule 3 to the Balance Sheet includes unutilized grants amounting to ₹17,006.02 lacs and ₹2,353.41 lacs grants receivable on account of expenditure incurred in anticipation of release of grants on projects.

4. Contingent Liabilities

4.1. Against Bank Guarantees: ₹646.25 Lacs. (Previous year ₹539.07Lacs)

4.2. Against Letter of Credit ₹34.97 Lacs. (Previous year ₹83.00 Lacs)

4.3. Against Liquidated Damages: ₹4.28 Lacs (Previous year ₹0.00 Lacs)

4.4. Against Sales Tax: ₹71.73 Lacs (Previous year ₹72.35 Lacs)

4.5. Sales Tax / VAT Assessments are completed up to financial year 2010-2011 for Bangalore, 2011-2012 for Noida & Pune, 2014-15 for Mohali and Thiruvananthapuram. No assessment is pending for Chennai, Delhi, Hyderabad, Mumbai and Kolkata centres.

4.6. Against disputed matters ₹8.84 Lacs. (Previous year ₹13.84 Lacs)

4.7. Cases related to staff are pending at various levels for which liability cannot be assessed.

5. Statutory Liabilities

The entire income of C-DAC is exempt u/s 10(21) being a scientific research association notified u/s 35(1)(ii) of the Income Tax Act, 1961, Hence no provision for income tax has been made.

6 Foreign Currency Transactions

6.1 **Imports:** Total Rupee value of imports (CIF) during the year is as follows:

(₹ in Lacs)

Centre	Raw Material / Components	Capital Goods	Total
Current Year	116.51	267.92	384.43
Previous Year	410.09	644.58	1054.67

6.2 **Expenditure in foreign currency for Travel:** ₹59.22 Lacs. (Previous Year ₹41.92 Lacs.)

6.3 **Other Expenditure in foreign currency:** ₹49.57 Lacs (Previous Year ₹14.58 Lacs.)

6.4 **Earnings in Foreign Exchange:** Total Earnings in Foreign Exchange during the year are as follows.

Currency	Current Year	Previous Year
US Dollars	42,935.00	20,234.50
Euro	0.00	21,424.95
Total Value in ₹ (In Lacs)	28.52	29.66

7 Remuneration to Statutory Auditors (Including Branch Auditors)

(₹ in Lacs)

Particulars	Current Year	Previous Year
Audit Fees (inclusive of Service Tax)	3.89	5.92
Out of Pocket Expenses	--Nil--	0.76

8 Accounting of grants is made on accrual basis as per policy instead of receipt basis. The Core Grants (net off capital expenditure) & expenditure related to Core Grants is routed through Income & Expenditure account.

9 Interest received on grants is treated as liability. Expenses on the core/sponsored projects are also charged to respective grant account and not routed through Income & Expenditure Account.

10 Fixed Assets: The depreciation on the assets purchased out of grants is debited to Capital Reserve.

11 Current Assets and Current Liabilities

a. Balances of Debtors, Creditors, Receivables and Payables are subject to adjustments, writing off and confirmation and reconciliation from parties.

b. The amount outstanding for more than three years has been provided for as Bad and Doubtful Debts except the amount realized till date & the amount realizable from the existing customers. In the opinion of Management the said provision is adequate. During the year ₹140.45 lacs was reversed out of provisions made for bad and doubtful debts and new provision of ₹50.51 lacs is made.

Age wise Analysis of Sundry Debtors is as follows:

₹ In Lacs

Centre	Less than 6 months	More Than 6 months	More Than 1 year	More Than 2 years	More Than 3 years	Total
Bangalore	27.58	2.01	0.12	0.00	163.99	193.70
Chennai	27.96	0.00	5.69	0.00	0.00	33.65
Delhi	149.10	0.04	1.96	0.77	117.43	269.30
Hyderabad	77.71	1.66	0.00	0.00	0.00	79.37
Kolkata	9.16	0.00	55.55	0.00	5.00	69.71
Mohali	152.93	470.56	29.00	0.00	12.45	664.94
Mumbai	165.27	136.40	419.82	41.22	100.73	863.44
Noida	796.16	523.17	109.95	6.35	860.12	2,295.75
Pune	619.51	48.76	136.33	105.9	958.04	1,868.54
Thiruvananthapuram	303.49	42.39	73.19	39.93	57.74	516.74
Total	2,302.87	1,224.99	831.61	194.17	2,275.50	6,855.14
Previous Year	2,377.53	351.25	204.48	186.99	2,343.48	5,463.73

12. Physical Verification

Physical verification of Fixed Assets/ stores has been carried out during the year. Reconciliation of some of the centers is in progress.

13. Internal Audit / Internal Control Systems

The centre has an internal control system, which is commensurate with the size and financial transactions of C-DAC. Internal audit is being conducted by external auditors during the year.

14. Employee Benefits

Employees benefit relating to Gratuity and Leave encashment has been paid/provided as per provisions of Accounting Standard I5 Employee Benefits.

15. Lease Obligations

Lease rent of ₹1,237.79 Lacs for various premises are debited in the various heads of Income & Expenditure Account for the period under audit as per Accounting Standard 19 Leases.

16. Impairment of Assets

As per Accounting Standard 28 Impairment of Assets, fixed assets are reviewed for impairment and there is no impairment of assets during the year, as the carrying amount of the assets are less than the realizable value.

17. Other Discloser Requirements

The Management of C-DAC is of the opinion that C-DAC being a scientific society and not a listed company and therefore the reporting requirements as per Accounting Standard 3 on Cash flow statement, Accounting Standard 17 on Segment Reporting, Accounting Standard 18 on Related Party Disclosures and Accounting Standard 26 in respect of Intangible Assets are not applicable.

18. Advances paid to employees include ₹0.05 Lacs as advances paid to Director General (Previous Year ₹0.23 Lacs).

19. The consolidated Balance Sheet and Income & Expenditure are prepared based on the Audited Annual Accounts received from the centers. Centre wise "Financial Performance" and centre wise details of Assets and Liabilities, Income & Expenditure is attached as Annexure 19 (A) and 19(B). The details of assets procured and expenses incurred from NE funds by C-DAC Silchar Centre is given in Annex 1 of schedule 3.

20. Centre Specific Notes

20.1 Delhi Centre

No liability has been provided for in respect of civil suit of recovery for ₹322.98 Lacs with Hon'ble High Court Delhi filed by M/s IBILT Technology Ltd in DIPP's IPO Project with an outlay of ₹2340 Lacs, since the case is under cross examination.

20.2 Hyderabad Centre

No provision was made towards Service Tax of ₹15.98 Lacs and penalty of ₹ 100/- per day, for the year 2004-2005. CESTAT has made decision in favor of C-DAC. Being grieved by the Order, Service Tax Department has gone in appeal against the CESTAT order to Supreme Court, for which the decision is pending.

20.3 Mohali Centre

Electric Transformer which was provided by M/s. NBCC Ltd., being part of Building is disposed off for ₹1,73,600/- during the year having original cost was ₹3,16,600/- and WDV ₹58,666/-.

20.4 Mumbai Centre

20.4.1 No liability is provided for an amount of ₹2,799/- Lacs (₹1,191/- Lacs towards License Fees & ₹1,608/- Lacs towards Interest) as claimed by Air India towards payment of enhanced license fee for 8th Floor, Air India Building, Mumbai for the period from April 1995 to Feb 2013 since an appeal filed before the Ministry of Law and Justice, Department of Legal Affairs, New Delhi and there is a good chance of winning the same as per the advice of the legal consultant.

20.4.2 As per LIC the total liability for Pension Fund is ₹2,015/- Lacs including the past deficit, as on 31st March2016, against the fund value of ₹1202 Lacs. However due to less allocation of GIA, a provision of ₹174 Lacs is made during the year. As per the office of CAG advice, CDAC is moving a proposal to GOI for transferring the Pension fund to Government treasury.

20.4.3 Conveyance Deed for the office and residential buildings in Mumbai has not been executed by the Bombay Housing & Area Development Board (BH&ADB), though the Centre has made the payment towards the acquisition of the said assets. The possession for the office building and the residential buildings has been obtained from BH&ADB from 1st April, 1986 and 1st June, 1986, respectively.

20.4.4 Invoice No.2014/48 dated 10/10/2014 raised on Unique Identification and Authority of India (UIDAI) in the FY. 2014-2015 amounting to ₹158.48 Lacs has been reversed and replaced with new invoices amounting to ₹115.10 Lacs during the year. As a result the sales of ₹43.38 Lacs is less reported.

20.5 Noida Centre

Under the project " IT Consultancy Clinic for IT Cluster of SME's in Noida " sponsored by DSIR, ₹42.42 Lacs was incurred as capital expenditure during 2005 to 2008, which were wrongly allocated under own fund account instead of project account. Rectification has been done and the depreciation written back of ₹37.98 Lacs accounted for as prior period income during the year.

20.6 Pune Centre

20.6.1 Activities of C-DAC, Pune are shifted from 12 Thube Park, Shivajinagar, Pune to the premises located at NSG-IT Park, Aundh, Pune, in the year 2008-2009. Some of the fixed assets of C-DAC, Pune could not be shifted to this premises. Written down value of these assets, as on 31st March 2016 is ₹36.70 Lacs.

20.6.2 "Memorandum of Understanding" (MOU) or "Leave and License Agreement", as the case may be, entered into with University of Pune and Small Industries Development Institute (SIDI) regarding transfer of rights to use and develop immovable properties viz. Main Building, NPSF Building, NMRC Building and assets therein respectively are not registered. Lease agreements for accommodations hired for staff are not registered since most of the cases lease agreements are for the period of 12 months.

20.6.3 The Lease period of Vishrantwadi land has not been extended till date.

20.6.4 Assets acquired out of project grant entitled *"Expansion of the state-of-the-art facility for advanced Information Technology Training Programmes for the increase of 40% of admission"* amounting to ₹399.98 Lacs for which WDV as on 1st April 2015 is ₹3.73 Lacs has been transferred from "Assets Acquired from Project Grants" to "Assets Acquired out of Own Funds" with the approval of competent authority vide MeitY's letter No. 3(4)/2008-HRD dated 9th September 2015. Accordingly, corpus and assets are increased

20.6.5 Funds belonging to CDAC Employees Benevolent Fund and CDAC Members Welfare Fund was invested separately till August 2012; after that the funds are not separately invested up to the date of Balance Sheet.

20.6.6 Advances to employees of ₹43.38 Lacs against various claims, will be booked during the financial year 2016-17. Since most of the claims will directly be debited to the Projects / Grants no provision is made.

20.7 Thiruvananthapuram Centre

20.7.1 Advances includes the amount paid to M/s. Eworkz, Los Angels, USA, ₹25.41 Lacs for the supply and installation of a LCD based video wall system at police control room Kochi and the customs duty paid to clear the consignment. Since the Indian agent of the party has not come forward for the installation of the system, Centre has taken action to recover the advance through legal recourse.

20.7.2 Land on which the main building at Vellayambalam of the Centre is situated is on lease from Government of Kerala, but no lease deed has been registered so far and the land has not been assigned in favor of C-DAC's name. In the absence of specific demand, lease rent has not been provided in the books of account.

21 The consolidated Balance Sheet and Income & Expenditure are prepared based on the Audited Annual Accounts received from the centers. Centre wise "Financial Performance" and centre wise details of Assets and Liabilities, Income & Expenditure is attached as Annexure 19 (A) and 19 (B). Assets procured and expenses incurred from NE funds by C-DAC Silchar Centre is given in Annex 1 of schedule 3.

22 Current year figures from audited financial statements of Centre's are regrouped wherever necessary in preparation of consolidated financial statements. Previous year's figures are regrouped, rearranged and reclassified wherever necessary.

23 Figures in the Financial Statements are rounded off to nearest Indian rupee.

CA Raghu Bhargava
Director (Finance)

Col. Anoop Kumar Khare(Retd.)
Registrar

Prof. Rajat Moona
Director General

For
M/s B.N. Adke & Co. (FRN: 100038W)
Chartered Accountants

CA B.N. Adke
Proprietor (Membership No. 033988)

Date: **6th September, 2016**
Place: **Pune**

Annexure 19(A): FINANCIAL PERFORMANCE OF C-DAC FOR THE FINANCIAL YEAR 2015-2016

(Attached to and forming an integral part of Balance Sheet)

Amount in Crore ₹

Sr.No.	Particulars		Total		Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Pune	TVM
A	**OPENING BALANCE**														
(i)	**Grant -in- Aid**			**-5.46**											
	Plan		6.48		0.00	0.90	5.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Non-Plan		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Core Grant Projects		-11.94		-4.27	-6.37	13.31	0.00	-0.05	4.52	-0.25	-0.65	0.03	-17.27	-0.94
(ii)	**Grant for Sponsored Projects**			**147.39**											
	MeitY		125.95		2.46	1.94	15.20	2.00	38.00	5.05	0.47	27.21	0.56	10.53	22.53
	Other Agencies		21.44		-0.08	0.00	0.00	5.38	0.00	0.17	3.36	0.00	0.42	-1.78	13.97
B	**RECEIPTS & INCOME**														
(i)	**Grant -in- Aid**			**96.40**											
	Plan		51.50		5.95	1.20	0.28	1.03	2.14	2.69	2.92	4.67	4.75	15.07	10.80
	Non-Plan		3.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00
	Core Grant Projects		41.90		4.76	4.92	1.13	6.00	0.05	3.11	1.39	0.51	0.85	17.08	2.10
(ii)	**Grant for Sponsored Projects**			**200.32**											
	MeitY		168.73		8.39	6.37	-15.20	0.80	6.07	8.93	6.99	16.98	4.34	82.19	42.87
	Other Agencies		31.59		0.34	0.12	0.00	22.00	0.00	0.53	0.00	0.00	0.77	4.14	3.69
(iii)	**Revenue Earnings**			**137.08**											
	Training		70.42		8.03	0.57	0.00	0.00	3.39	0.16	2.74	2.83	6.80	43.78	2.12
	Commercial		66.66		0.33	1.12	0.00	1.70	2.09	0.43	11.30	1.67	17.86	16.30	13.86
(iv)	**Interest, Other Income & C-DAC Contribution**			**10.95**											
	Plan		0.38		0.15	0.00	0.00	0.00	0.00	0.03	0.01	0.14	0.00	0.00	0.05
	Core Grant Projects		10.57		0.00	0.00	0.00	0.00	5.48	-0.16	0.00	-0.03	0.00	4.50	0.78
				21.99											
	MeitY Spon Projects		21.04		0.24	0.05	0.00	0.06	1.83	0.11	0.22	9.77	0.02	0.93	7.81
	Spon. By Other Agencies		0.95		0.00	0.00	0.00	0.06	0.00	0.00	0.21	0.00	0.00	0.00	0.68
				26.15											
	Training		14.19		1.70	0.57	0.14	0.00	2.20	0.01	2.88	0.23	3.21	2.07	1.18
	Commercial		11.96		0.12	0.00	0.11	1.85	0.00	2.28	0.48	0.23	3.66	0.87	2.36
	TOTAL (A+B)		**634.82**	**634.82**	**28.12**	**11.39**	**20.55**	**40.88**	**61.20**	**27.86**	**32.72**	**63.56**	**43.27**	**178.41**	**126.86**
C	**REVENUE EXPENDITURE**														
(i)	**Expenditure from Grant-In-Aid**			**72.17**											
	Plan Total Expenses		57.45												
	Establishment Expenses	44.19			3.93	2.07	3.66	0.83	1.30	1.62	2.43	2.39	4.04	11.36	10.56
	Other Administrative Expenses	13.26			2.16	0.03	2.00	0.20	0.84	0.58	0.48	2.39	0.72	3.57	0.29
	Non Plan Total Expenses		3.00												
	Establishment Expenses	3.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00
	Other Administrative Expenses	0.00			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Core Grant Projects		11.72												
	Establishment Expenses	8.55			0.55	0.00	0.00	0.00	0.00	4.96	0.17	0.00	0.55	1.95	0.37
	Other Administrative Expenses	3.17			0.23	0.00	0.00	0.00	0.00	0.77	0.27	0.00	0.14	1.48	0.28
(ii)	**Expenditure on Sponsored Projects**			**170.73**											
	MeitY Total Expenses		140.85												
	Establishment Expenses	73.43			4.95	4.31	0.00	0.85	5.11	3.90	2.29	11.06	2.80	22.24	15.92
	Other Administrative Expenses	67.42			2.74	2.09	0.00	0.84	4.62	3.13	0.84	21.55	1.21	10.20	20.20
	Other Agencies Total Expenses		29.88												
	Establishment Expenses	9.93			0.10	0.25	0.00	0.86	0.00	0.09	0.43	0.00	0.27	2.16	5.77
	Other Administrative Expenses	19.95			0.32	0.00	0.00	13.91	0.00	0.14	0.56	0.00	0.01	0.98	4.03

Annexure 19(A): FINANCIAL PERFORMANCE OF C-DAC FOR THE FINANCIAL YEAR 2015-2016

(Attached to and forming an integral part of Balance Sheet)

Amount in Crore ₹

Sr.No.	Particulars		Total		Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Pune	TVM
(iii)	**Other Revenue Expenditure**			160.42											
	Training Total Expenses		76.57												
	Establishment Expenses	33.61			6.83	0.10	0.00	0.00	1.78	0.04	3.58	6.89	5.77	7.12	1.50
	Other Administrative Expenses	42.96			1.91	0.74	-0.71	0.00	2.13	0.06	1.46	2.15	1.45	33.40	0.37
	Commercial Total Expenses		83.85												
	Establishment Expenses	59.69			0.13	0.96	0.00	1.37	1.72	1.48	2.89	0.38	18.68	22.97	9.11
	Other Administrative Expenses	24.16			0.29	1.14	-0.67	0.43	0.09	0.98	0.58	1.49	5.43	10.91	3.49
	TOTALC		**403.32**	**403.32**	**24.14**	**11.69**	**4.28**	**19.29**	**17.59**	**17.75**	**15.98**	**48.30**	**41.07**	**128.34**	**74.89**
D	**CAPITAL EXPENDITURE**														
(i)	**Expenditure from GIA for Core R&D**			12.65											
	Plan		0.80		0.01	0.00	0.11	0.00	0.00	0.52	0.02	0.03	-0.03	0.14	0.00
	Non Plan		0.00												
	Core Grant Projects		11.85		0.17	0.00	0.00	0.00	8.53	0.87	0.01	0.00	0.00	1.09	1.18
(ii)	**Expenditure from GIA for Sponsored Proj.**			21.13											
	MeitY		19.79		1.78	0.56	0.00	0.00	3.52	0.33	0.65	5.18	1.36	4.44	1.98
	Other Agencies		1.34		0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.42	0.34	0.56
(iii)	**Expenditure from Own Funds**			4.69											
	Training		1.79		0.66	0.01	0.00	0.00	0.13	0.00	0.62	0.03	0.08	0.26	0.00
	Commercial		2.90		0.05	0.00	0.00	0.09	0.00	0.00	0.06	0.25	2.08	0.37	0.00
	TOTAL D		**38.47**	**38.47**	**2.68**	**0.57**	**0.11**	**0.09**	**12.18**	**1.72**	**1.37**	**5.49**	**3.91**	**6.64**	**3.72**
E	**REFUND / TRANSFER OTHER ADJUSTMENTS**														
(i)	**From GIA for Core R&D**			0.00											
	Plan		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Core Grant Projects		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ii)	**From Sponsored Projects**			31.31											
	MeitY		30.55		0.65	0.71	0.00	0.02	22.34	0.29	0.00	4.36	0.48	1.22	0.48
	Other Agencies		0.76		0.00	0.00	0.00	0.07	0.00	0.17	0.00	0.00	0.00	0.00	0.52
	TOTAL (E)		**31.31**	**31.31**	**0.65**	**0.71**	**0.00**	**0.09**	**22.34**	**0.46**	**0.00**	**4.36**	**0.48**	**1.22**	**1.00**
F	**TOTAL EXPENDITURE (C+D+E)**		**473.10**	**473.10**	**27.47**	**12.97**	**4.39**	**19.47**	**52.11**	**19.93**	**17.35**	**58.15**	**45.46**	**136.20**	**79.61**
G	**Unspent Balance / Surplus / Deficit (A+B-F)**														
(i)	**Grant -in- Aid**			17.07											
	Plan		0.11		0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
	Non-Plan		0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Core Grant Projects		16.96		-0.46	-1.45	14.44	6.00	-3.05	0.67	0.69	-0.17	0.19	-0.21	0.11
(ii)	**Sponsored Projects**			146.53											
	MeitY		124.53		0.97	0.69	0.00	1.15	10.31	6.44	3.90	11.81	-0.93	55.55	34.63
	Other Agencies		22.00		-0.17	-0.13	0.00	12.60	0.00	0.30	2.57	0.00	0.49	-1.12	7.46
(iii)	**Other**			2.81											
	Training		8.04		0.99	0.30	0.85	0.00	1.66	0.07	0.58	-5.98	2.79	5.33	1.43
	Commercial		-5.23		0.03	-0.98	0.78	1.75	0.28	0.25	8.31	0.03	-2.59	-16.71	3.62

Annexure 19(B):

CENTRE WISE BALANCE SHEET AS AT 31st March 2016

(Attached to and forming an integral part of Balance Sheet)

Amount in Crore ₹

Particulars	Total	Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Pune	TVM
CORPUS/CAPITAL FUND AND LIABILITIES												
Corpus/Capital Fund	318.35	23.92	6.88	5.22	19.83	19.69	19.42	48.67	(3.61)	90.24	62.53	25.56
Reserves and Surplus	162.53	6.13	2.47	0.15	5.07	20.16	3.31	2.66	5.39	6.52	53.54	57.13
Earmarked and Endowment Funds	164.07	0.35	(0.87)	14.53	19.75	7.26	7.63	7.15	11.66	(0.23)	54.65	42.19
Secured / Unsecured Loan from Bank	1.00	-	-	-	-	-	1.00	-	-	-	-	-
Current Liabilities and Provisions	111.31	4.15	0.27	1.44	7.10	5.09	4.04	4.91	8.07	23.04	29.28	23.92
Branch & Divisions	0.00	9.07	0.96	(1.84)	(2.71)	(0.53)	(0.63)	(1.25)	(0.94)	(5.60)	4.35	(0.88)
Total	**757.26**	**43.62**	**9.71**	**19.50**	**49.04**	**51.67**	**34.77**	**62.14**	**20.57**	**113.97**	**204.35**	**147.92**
ASSETS												
Fixed Assets												
Acquired out of Own Funds	33.14	5.26	0.12	-	2.56	0.74	0.88	1.43	0.33	10.30	10.16	1.36
Acquired out of Grant in Aid	135.76	2.76	0.67	0.15	5.07	18.19	3.15	1.46	0.96	4.45	50.68	48.22
Acquired out of Project Grants	26.76	3.37	1.80	-	-	1.97	0.16	1.19	4.43	2.07	2.86	8.91
Investments-from Earmarked/Endowment Funds	-	-	-	-	-	-	-	-	-	-	-	-
Investments-Others	-	-	-	-	-	-	-	-	-	-	-	-
Current Assets, Loans, Advances etc.	561.60	32.23	7.12	19.35	41.41	30.77	30.58	58.06	14.85	97.15	140.65	89.43
Miscellaneous Expenditure	-	-	-	-	-	-	-	-	-	-	-	-
Total	**757.26**	**43.62**	**9.71**	**19.50**	**49.04**	**51.67**	**34.77**	**62.14**	**20.57**	**113.97**	**204.35**	**147.92**

CENTRE WISE INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st March 2016

Amount in Crore ₹

Particulars	Total	Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Pune	TVM
INCOME												
Income from Sales/Services	67.26	0.33	1.12	-	1.70	2.09	0.43	11.30	1.67	17.86	16.30	14.46
Grants/Subsdies	53.71	5.94	1.20	0.16	1.03	2.14	2.18	2.90	4.65	4.78	14.93	13.80
Fees/Subscription	69.82	8.03	0.57	-	-	3.39	0.16	2.74	2.83	6.80	43.78	1.52
Income from Investments (Income on Investments from earmarked/endowment funds transferred to funds)	-	-	-	-	-	-	-	-	-	-	-	-
Interest Earned	24.75	1.77	0.51	0.26	1.69	2.19	2.17	3.22	0.47	6.39	2.81	3.27
Other Income	0.97	0.03	0.05	-	0.07	0.01	0.14	0.13	0.14	0.08	-	0.32
Prior Period Income	0.80	0.17	-	-	0.09	-	-	0.01	-	0.39	0.14	-
Increase/(decrease) in stock of Finished Goods and Work-in-progress	(0.02)	0.01	-	-	-	-	-	-	-	-	-	(0.03)
Total	**217.29**	**16.28**	**3.45**	**0.42**	**4.58**	**9.82**	**5.08**	**20.30**	**9.76**	**36.30**	**77.96**	**33.34**
EXPENDITURE												
Establishment Expenses	140.50	10.89	3.13	3.66	2.20	4.80	3.14	8.90	9.66	28.49	41.46	24.17
Other Administrative Expenses	75.49	3.69	1.85	0.67	0.59	2.95	1.52	2.03	5.62	5.73	47.03	3.81
Prior Period Expenses	0.38	0.03	0.03	(0.03)	-	-	-	-	0.08	0.11	0.15	0.01
Depreciation (corresponding to Schedule 5)	4.49	0.65	0.02	-	0.03	0.11	0.10	0.49	0.33	1.76	0.70	0.30
Total	220.86	15.26	5.03	4.30	2.82	7.86	4.76	11.42	15.69	36.09	89.34	28.29
Transferred to / (from) Balance of Core Grants	(6.38)	-	(0.90)	(5.50)	-	-	-	-	-	0.02	-	-
SURPLUS / (DEFICIT)	**2.81**	**1.02**	**(0.68)**	**1.62**	**1.76**	**1.96**	**0.32**	**8.88**	**(5.93)**	**0.19**	**(11.38)**	**5.05**

Consolidated Receipt and Payments for the year ended 31st March 2016

Amount in ₹ *Amount in ₹*

Receipts	2015-2016	2014-2015	Payments	2015-2016	2014-2015
I. Opening Balance			**I. Expenses**		
a) Cash on hand	9,35,803	3,84,624	a) Establishment Expenses	94,92,43,491	1,06,31,80,321
b) Bank Balances			b) Administrative Expenses	46,38,66,152	42,41,82,022
i) In Savings/Current Accounts	1,23,71,51,845	42,85,52,549	c) Payment made to Creditors for Goods and Others	2,11,89,23,613	1,73,64,84,571
II. Grants Received			**II. Payments made against funds for various projects**	16,85,81,422	16,80,57,726
			(Name of the Fund or Project along with the particulars of		
a) From Government of India	35,87,00,000	58,41,17,213	payment made for each project shown in separate schedule)		
b) From State Government	-	-			
b) Grant and Other Income Received for Projects	2,66,31,09,302	2,42,48,52,065	**III. Investments and Deposits made**	3,23,53,19,509	3,13,05,31,391
			IV. Expenditure on Fixed Assets and Capital Work in		
III. Income from Encashment of FDRs	3,00,25,12,522	3,22,38,93,889	**Progress**		
IV. Interest Received			a) Purchase of Fixed Assets	13,21,72,787	3,79,35,438
a) On Bank Deposits	15,64,77,624	14,97,39,579	b) Expenditure on Capital Work in Progress	5,12,100	8,43,436
b) Loans and Advances	36,20,420	44,64,584	**V. Refund of Surplus money/loans**	90,00,000	2,63,36,520
V. Other Income (Specify)			**VI. Finance Charges (Interest)**	-	41,804
a) Previous years Income recovered	2,34,97,067	(1,63,55,452)	**VII. Other Payments (Specify)**	-	-
b) Advances Received from Customers	3,04,99,757	5,09,84,088	a) Deposit (Assets)	26,75,714	45,48,414
d) Fees/Subscription & Direct Income	74,05,61,698	62,13,89,523	b) Loans and Advances	11,17,55,295	7,27,28,007
e) Other Income	23,85,25,203	32,65,65,656	c) Previous years outstanding payments	79,64,26,513	77,53,10,868
f) Amount Received from Debtors	47,23,89,852	53,07,73,905	d) Prepaid Expenses	62,73,960	59,86,360
g) Loans and Advances Recovered	16,17,90,070	6,53,01,521	e) Branch and Divisions	1,41,94,19,350	90,47,52,392
VI. Amount Borrowed			f) Deposits (Liabilities) Refunded	5,74,49,502	5,01,66,128
Branch and Divisions	1,46,91,54,607	1,22,51,02,614	**VIII. Closing Balance**		
Bank Loan	-	-			
VII. Any Other Receipt (Give Details)			a) Cash on hand	5,11,856	9,35,803
a) Deposits (Liabilities)	3,52,62,220	1,94,06,688	b) Bank Balances		
b) Addition to Reserve Fund	-	-	i) In Savings Accounts	1,12,20,56,726	1,23,71,51,845
Total	**10,59,41,87,990**	**9,63,91,73,046**	**Total**	**10,59,41,87,990**	**9,63,91,73,046**

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
M/s B.N. Adke & Co. (FRN: 100038W)
CHARTERED ACCOUNTANTS

CA Raghu Bhargava
Director Finance
Pune

Col. Anoop Kumar Khare(Retd.)
Registrar

Prof. Rajat Moona
Director General

CA B.N. Adke
Proprietor (Membership No. 033988)
Date: 6-Sep-2016

Inauguration of Centre of Excellence in ICT (IKCoEICT) at Eurasian National University, Astana, Kazakhstan by Hon'ble Prime Minister of India, Shri Narendra Modi on July 07, 2015.

Launch of Online Labs Rollout by Hon'ble Union Minister for Communications and Information Technology, Shri Ravi Shankar Prasad on December 28, 2015 during Good Governance week at New Delhi.

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