सी-डैक
CDAC

ANNUAL REPORT

2014-15

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

www.cdac.in

Governing Council

(As on 10th February 2015)

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Overview

The Year 2014-15 witnessed numerous technological achievements, events and recognitions for C-DAC. During the year, the National Supercomputing Mission (NSM) was favourably recommended by the Expenditure Finance Committee (EFC) and a cabinet note seeking approval of Cabinet Committee on Economic Affairs (CCEA) was prepared and submitted. On the occasion of Good Governance Day celebrated on December 25, 2014 at New Delhi, Hon'ble MC&IT launched PARAM Shavak – Supercomputer in a Box and carried out ToT of various solutions related to industrial automation and intelligent transportation. The National Voter Service Portal (NVSP) was launched on January 25, 2015 at New Delhi on the occasion of National Voters' Day by Hon'ble Former President of India, late Dr. Abdul Kalam with the aim to provide single window services to electors. C-DAC also bagged several awards during the year for its technologies and solutions.

During the year, C-DAC's PARAM Yuva II system helped process more than 1,40,000 jobs from various science and engineering domains till March 2015. These jobs were executed by 689 HPC users from 56 different institutions spread across the country. Various HPC applications for weather forecasting, computational fluid dynamics, earthquake engineering, etc. were ported on PARAM Yuva II. Monitoring and scheduling software for HPC clusters was also developed and deployed. Various cloud based solutions such as Cloud Connect – a web interface for connecting Clouds and C-DAC Cloud IP Store - secure storage were also developed. Towards next generation high speed low latency interconnect, a 40/100 Gbps Bit Error Rate Tester (BERT) platform was developed.

Hon'ble MC&IT launched ".भारत" top level international domain for 8 languages viz. Hindi, Marathi, Sindhi, Nepali, Maithili, Bodo, Dogri and Konkani on August 27, 2014. MANTRA-Rajya Sabha system for Synopsis domain was deployed at Synopsis section of Rajya Sabha Secretariat. A system for extracting and retrieving textual information from mass media data on web was developed for General Election 2014 of Madhya Pradesh. C-DAC's Localization Projects Management Framework (LPMF) for community participation in localization process enables any interested user or translator to contribute and update the translations through crowd-sourcing. The National Portal and Digital Repository for Museums of India was developed for the Ministry of Culture, Government of India. It provides online access to digital collections from several national museums located all across India. C-DAC has developed and carried out pilot implementation of e-Goshwara for Hon'ble Supreme Court of India and District Courts of Delhi.

C-DAC has designed and developed solutions for smart buildings including lighting, HVAC and automation and indoor air quality monitoring. Adaptive Traffic Control System software named CoSiCoSt (Composite Signal Control Strategy) was deployed at Delhi Integrated Multimodal Transit System (DIMTS) and at Traffic Control & Management Center, Surat. A 25 kWp grid interactive Solar Photovoltaic (SPV) power plant was developed and deployed in C-DAC's own premise at Technopark Campus, Thiruvananthapuram. Genesys - an advanced Field Programmable Gate Array (FPGA) based system was developed, catering to high speed network applications pertaining to 10G/40G Ethernet/OTN. C-DAC has designed screen centrifuge machine and developed calibration model for removal of surface water from tea leaves.

BOSS GNU/Linux Version 6.0 was released with wide Indian language support and packages, relevant for use in the Government domain. In e-Governance, Mobile Seva platform integrated more than 1600 government departments/agencies during the year. Rajasthan Works Online Monitoring System was deployed at Public Works Department, Government of Rajasthan, Jaipur. C-DAC developed e-Saadhya (Saral Anukulaney Adhyayan), which is an adaptable and accessible e-Learning framework for children with mild mental retardation and autism and de-

ployed the same in special schools in Andhra Pradesh, Karnataka and Delhi. During the year, 9 more language portals (Bengali, Gujarati, Kannada, Malayalam and Tamil and beta versions – Sanskrit, Urdu, Punjabi and Oriya) were added to the existing five languages (Hindi, English, Telugu, Assamese and Marathi) of Vikaspedia. As a part of Digital India initiative, C-DAC is developing and customizing innovative solutions to contribute towards bringing the benefits of ICT solutions to the common man.

Anti-malware solution developed by C-DAC was deployed in various organizations such as CERT-IN, ISRO, DRDO and Indian Navy. During the year, C-DAC enhanced various cyber forensics tools and solutions and conducted training and awareness programmes across the country in information security and cyber forensics. ICT based Capacity Development Laboratories on Cybercrime were developed for seven North East High-Courts/High-Court benches. C-DAC developed a Unified Threat Management (UTM) appliance, which is a gateway security solution that integrates various features such as firewall, intrusion detection and prevention, virtual private network and anti-malware engine. To address the threats related to mobile phones, C-DAC developed a comprehensive security solution named “M-Kavach” for Android devices.

Healthcare Knowledge System developed by C-DAC has been deployed at 42 locations across all the 8 North East states. C-DAC is carrying out deployment of its supply chain management system at Telangana, Andhra Pradesh, Gujarat, Madhya Pradesh and Delhi. To promote usage and adaption of SNOMED CT® in the country, C-DAC developed a toolkit named “C-DAC's SNOMED CT Toolkit (CSNOtk)” for simple and rapid integration of SNOMED CT® in healthcare applications. Additional telemedicine solutions are being deployed across Assam, Punjab, Odisha and Kerala.

Automation tools for managing GATE 2015 and JAM 2015 examinations were developed using which more than 10 lakh candidates applied for the examination and received the online status updates and results. Various software that can aid in management and delivery of education and training in effective manner were also developed. C-DAC continued to offer its M.Tech programmes, PG Diploma programmes, and other training and skill development programmes during the year.

The above mentioned activities have resulted in several research publications, patents, many awards and several new collaborations with academic and research institutions both in India and abroad.

This annual report covers the accomplishments and major activities of C-DAC during the year 2014-15.

Technical Areas

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

C-DAC continued its various initiatives in the fields of HPC systems and facilities, HPC applications, HPC system software, HPC solutions and services, as well as grid and cloud computing. The activities carried out by C-DAC during the year 2014-15 in this area are briefly covered below.

National Supercomputing Mission (NSM)

During the year, a proposal titled "National Supercomputing Mission: Building Capacity and Capability" was evolved by Department of Science and Technology (DST) and Department of Electronics and Information Technology (DeitY), Government of India. The proposal aims to consolidate the ongoing initiatives by various agencies in supercomputing in the country into a collaborative program along with effective governance and monitoring mechanisms.

The Expenditure Finance Committee (EFC), chaired by Secretary (Expenditure), in its meeting held on August 28, 2014 favourably recommended the proposal with an outlay of Rs. 4500 Crores over a period of seven years, to be jointly steered and implemented by the Department of Science and Technology (DST) and Department of Electronics and Information Technology (DeitY).

Based on the recommendations of EFC, a Cabinet Committee on Economic Affairs (CCEA) note seeking approval for NSM was prepared and submitted. The note included the salient features of NSM, phasing of expenditure and availability of plan allocations, etc.

High Performance Computing (HPC)

The major activities carried out during the year and some of the significant achievements made by C-DAC scientists and engineers working in different areas of HPC are briefly described below.

High Speed Interconnect and Accelerator Technologies

High Speed Interconnect

New interconnects with higher bandwidth and lower latency form an important component of cluster-based supercomputing architecture. The architecture of such interconnects depends on the technology trends in processor, I/O and systems. As a result, next generation interconnects will be designed by using newer, faster and reliable physical layer technologies and host I/O bus technologies. Activities carried out during this year include exploration of several component technologies around host interfaces, link interfaces, learning new techniques and challenges of high speed PCBs, design of mechanical enclosures with thermal and EMI/EMC compliance checking. This resulted in the development of 40/100 Gbps Bit Error Rate Tester and Reconfigurable Computing System platforms.

Design of a stable data channel running at 40 Gbps with acceptable bit error rates was done and it was tested over copper and fiber cables. Successful operation of data channel working at 100 Gigabits/sec (at serial loopback level) was also achieved. This link level design was complemented by IP of PCIe DMA controller, which was designed, validated and tested on target hardware platform. An extensive study of existing interfaces along with futuristic requirements of high performance interconnect hardware was done. These will act as the building blocks

for next generation high speed, low latency interconnect to be used for making future supercomputing systems.

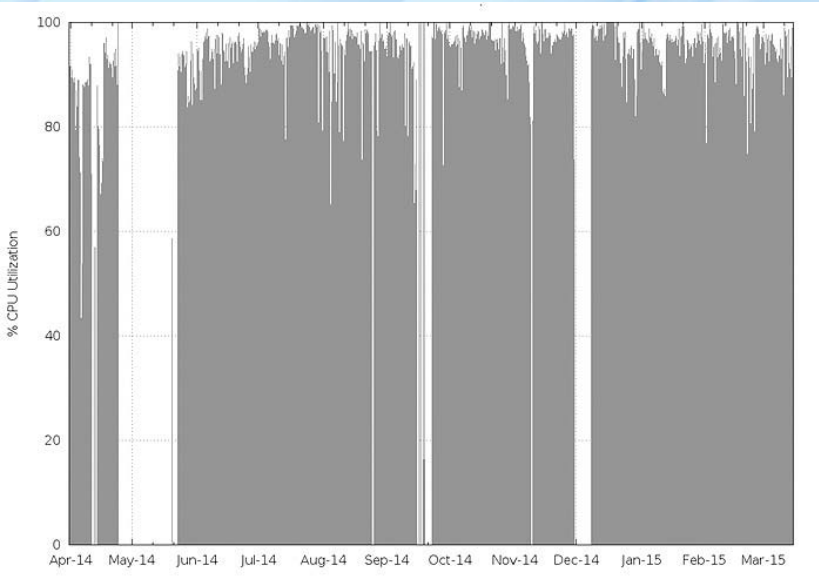
Reconfigurable Computing System (RCS)

RCS is a FPGA (Field Programmable Gate Array) based high performance application accelerator card for accelerating applications. It is very compact and 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.

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 1,40,000 jobs have been processed by PARAM Yuva II till March 2015. About 689 users across 56 institutions executed their jobs on PARAM Yuva II for their scientific research, out of which about 115 users were Ph.D. students who used PARAM Yuva II for their thesis work. PARAM Yuva II file system and logical cluster partitioning software were fine-tuned and upgraded in April 2014 to cater to the growing demands of more users. A workshop on "Scientific Applications on PARAM Yuva II" was organized on January 8-9, 2015 to enable PARAM Yuva II users to share their experiences and provide feedback to further improve the NPSF services for them. The workshop featured invited talks and presentations by users of PARAM Yuva II (including C-DAC members) highlighting the scientific work carried out by them.



CPU utilisation of PARAM Yuva II during April 2014 to March 2015

Barring the scheduled maintenance periods, the utilisation of PARAM Yuva II was very high throughout the year as can be seen from its CPU utilization given in the figure.

To improve the user experience in using PARAM Yuva II, a Dedicated Slot Booking Facility (DSBF) was introduced for the users to offer better quality of service over and above the usual batch processing system. The primary aim of this scheme is to encourage users towards capability computing and scaling exercise of their applications, keeping in mind the preparedness required for the future Peta scale computing systems.

PARAM Shavak: Supercomputer in a Box

PARAM Shavak is a supercomputing system in a box, designed for research organizations and academic institutions wishing to undertake HPC related activities. It was launched by Shri Ravi Shankar Prasad, Hon'ble Minister of

Communications and IT, Government of India on the occasion of Good Governance Day celebrated on December 25, 2014 at New Delhi.

PARAM Shavak is designed to be a table top system with 2 Teraflop and above computing power. It is pre-loaded with parallel programming development environment, libraries, and tools for scheduling and resource management. It has built-in select HPC applications across several scientific and engineering domains including Bio-informatics, Molecular Dynamics, Materials Science, Quantum Chemistry, Atmospheric and Ocean Modelling and Computational Fluid Dynamics. It has support for C-DAC's Reconfigurable Computing System (RCS) technology to speed up applications through hardware.

PARAM Shavak

HPC Applications

Development of BCG Vaccine and Complementary Diagnostics for TB Control in Cattle

Tuberculosis infection in cattle remains a major problem in both developed and developing nations. In addition to being a cause of huge economic loss in livestock farming, Mycobacterium bovis infection can spread from infected cattle to humans by aerosol or by consumption of contaminated dairy products to cause zoonotic tuberculosis. This project in collaboration with University of Surrey, UK and TRPVB, Chennai aims to generate a synergistic vaccine and diagnostic approach using HPC systems. This will allow the vaccination of cows without interfering with the surveillance of bovine tuberculosis using advanced sequencing approaches.

Met@India: Weather Data and Analytics Portal

Met@India, the weather data and analytics portal is a query based database management system for immediate access of historic weather data. The portal disseminates weather data processed on PARAM Yuva II and observations of Indian locations for the past years, months and days till yesterday. The system provides extreme events statistics such as heat waves, cold waves and heavy rainfall occurring at various locations in India. It is a tool for verifying and analysing the accuracy of forecasted weather and can be useful for researchers and students. It provides maximum and minimum temperature, relative humidity, pressure, wind speed, wind direction and rainfall since 2008. It acts as a service gateway for commercial industries such as wind energy, solar energy, environment assessment and hydro-power systems.

Anuman

Anuman offers the latest weather updates on mobile devices. It provides hour-to-hour weather forecast for over 50000 locations all over India using high resolution weather model output generated using C-DAC's PARAM supercomputer. Users can use it to obtain daily forecast for next 3 days on a single click. They can also use it to

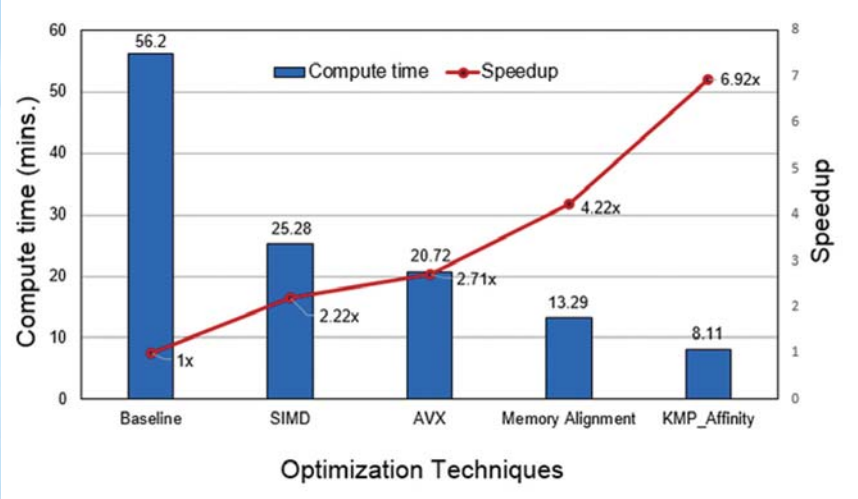
obtain hourly forecast including maximum temperature, minimum temperature, relative humidity, sea-level pressure, probability of rainfall, cloud condition, wind speed and direction for a specific location on request. It supports Geo-positioning, retrieving the latest weather conditions for current location.

UrbAirIndia

UrbAirIndia is an integrated web-based GIS enabled system for Indian urban air quality management, developed in collaboration with Central Pollution Control Board (CPCB). It is an 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. It provides useful inputs to policy makers for taking air quality management decisions, to environmental researchers for analysing scientific data, and to public as an information portal. Besides its use as an automatic framework for strategies to reduce pollution, environmental researchers and policy makers can also use UrbAirIndia to assess air pollution impacts due to present and future developments for a sustainable future.

3D Kirchhoff Depth Migration

"SeisKDM" a 2D/3D Kirchhoff Depth Migration software indigenously developed by C-DAC has been optimized on PARAM Yuva II by applying various optimization techniques like pragma level, compiler level, memory level and run level on baseline code. The resultant application was tested on synthetic seismic data.

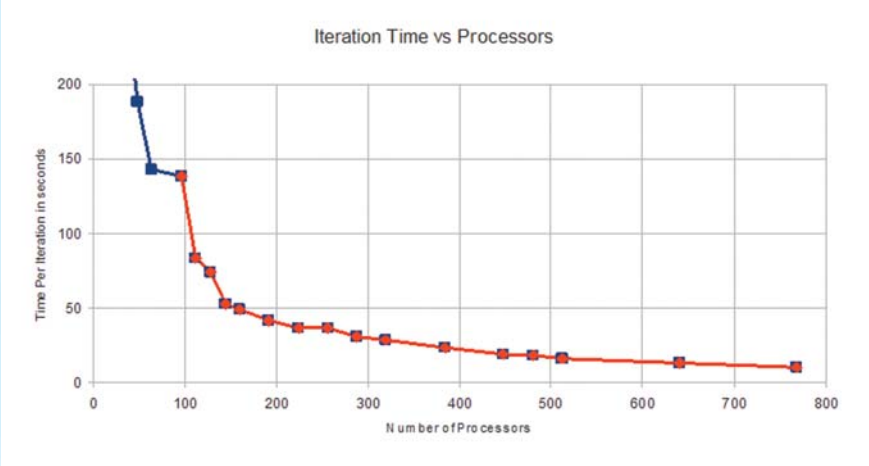


Optimization of 3D Kirchhoff Depth Migration software

The figure shows the result of different optimization levels. The blue bars show compute time and the red line shows speed-up for augmentative optimizations from left to right w.r.t the baseline. The optimizations resulted in 6.92 times improvement in performance over baseline code. As a next step, the application is being improved for general seismic data.

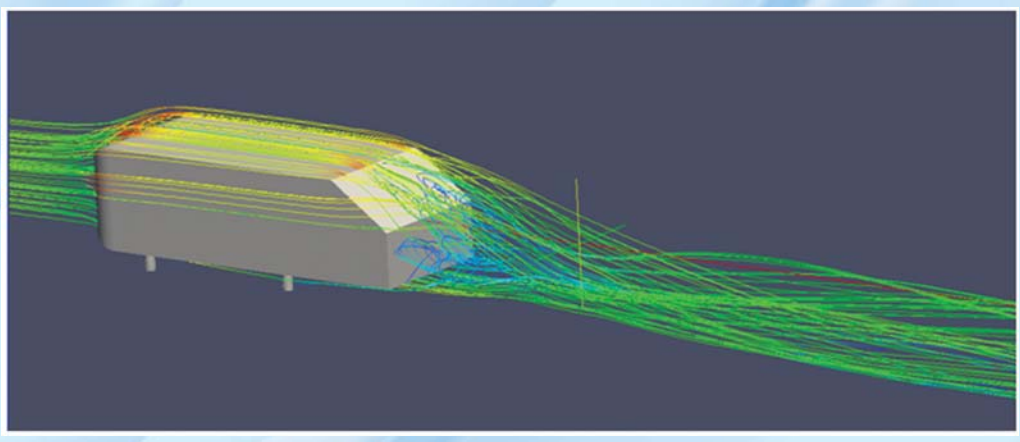
OpenFOAM

OpenFOAM is an open-source general purpose software suite for Computational Fluid Dynamics (CFD) computation and is fully parallelized using MPI. It is widely used in academia, R&D institutes and industries. The code was ported and benchmarked on GPGPU as well as on MIC architecture to run it in native and symmetric modes. In native mode, it runs on the Xeon-Phi coprocessor, whereas in symmetric mode it runs on both the host processors as well as on Xeon-Phi co-processors.



Parallel benchmark study of an IcoFoam solver of OpenFOAM on Xeon host processor for a lid driven cavity

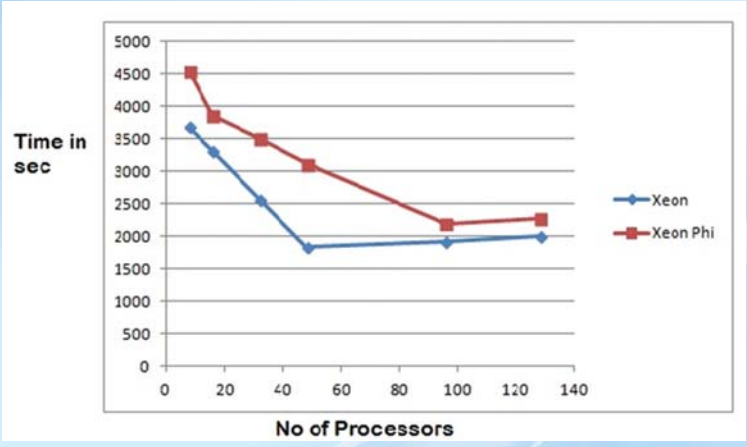
The figure shows parallel benchmark study of an IcoFoam solver of OpenFOAM on Xeon host processor for a lid driven cavity (50 million cells).



Flow streams over Ahmed Body computed by OpenFOAM on GPGPU

OpenSEES

Open System for Earthquake Engineering Simulation (OpenSEES) software, an open-source software for geotechnical and earthquake engineering simulation, was ported on Xeon-Phi architecture and its performance was analysed. This analysis will help in making OpenSEES available on new hybrid HPC system and to carry out earthquake simulation studies for different structures.



Comparison of results of OpenSEES on Xeon and Xeon Phi

Parallel Signal Processing Software for Ooty Radio Telescope (ORT)

The Ooty Radio Telescope (ORT) operated by NCRA-TIFR was the first large radio telescope built in India. C-DAC collaborated with National Centre for Radio Astrophysics (NCRA), Pune and Raman Research Institute (RRI), Bangalore for developing its parallel signal processing software on hybrid architecture for upgradation of ORT.

The challenge addressed by C-DAC in this initiative was to handle the data generated at the rate of 62 GB per second. The data was reduced for easy storage and handling using FFTs and Correlation operations. Such a massive signal processing was realized through the use of C-DAC's HPC systems. The system was used to calculate FFTs of 264 channels on host, offload correlations to MIC (Xeon-Phi) cards, and to understand the communication profile between host and MIC. The development of data transfer module between Xeon and Xeon Phi processors was successfully completed by C-DAC for this activity.

HPC System Software

Hybrid Cluster Monitoring Tool

Monitoring accelerator-based hybrid clusters is imperative for early detection of any service degradation to enable immediate rectification. The Hybrid Cluster Monitoring tool is a pluggable and customizable monitoring solution for heterogeneous multi-accelerator clusters, which can be independently used and can also integrate with other third party tools. It enables monitoring of CPU, GPU and FPGA accelerators, network, storage, user jobs and other relevant services of a heterogeneous cluster. It is extendible to monitor any new accelerator/device, provides facility to analyse archived data and has alert facility for faults/degradations of resources/services.

Hybrid Cluster Scheduler

The hybrid cluster scheduler is unique in the sense that it considers all the accelerator resources (GPUs, FPGAs) with the CPU while allocating resources for a job. It takes into account the applications requirements of diverse computational resources and provides the best fit match for its execution. The scheduling algorithm is designed to improve the cluster utilization considering multiple parameters such as job type, job age, resource status (availability, load, memory) and information of prior job executions and availability of alternate resources to allocate the resources. In this manner, it offers better turn-around time for jobs and improved resource utilization.

HPC Solutions and Services

The expertise developed by C-DAC in the area of HPC was extended to other organizations/institutes to enable them to meet their HPC requirements. Some of the activities carried out and initiated during the year towards this include:

- Providing consultancy for establishment of 750 TeraFlop HPC system with 1 Petabyte storage system at IIT, Delhi.
- Conducting a HPC workshop for delegates from Ghana–India Kofi-Annan Centre of Excellence in ICT at Accra, Ghana from August 4-14, 2014.
- Establishing a Centre of Excellence in HPC for Engineering Study and Research at Assam Engineering College, Guwahati, Assam and deploying C-DAC's HPC solution at NIT, Agartala for engineering study, research and skill development.

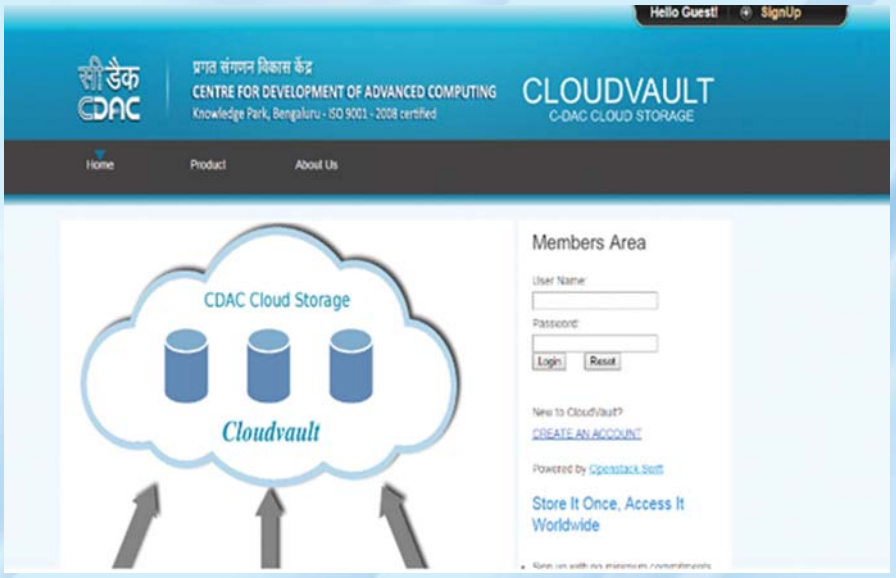
Cloud and Grid Computing

Cloud Connect

Cloud Connect is an easy to use web interface for connecting clouds and simplifies the use of Infrastructure-as-a-Service (IaaS) feature of cloud. It abstracts creation of security group, management of network topology, creation of virtual machine, elastic block storage and snapshot, and automatic mounting of elastic block storage to virtual machine.

Cloud Vault

Cloud Vault is an enterprise-class cloud storage solution offered as Storage-as-a-Service. Users and organizations can use Cloud Vault to store large data efficiently, safely and cheaply. Its key features include Single Sign On (SSO) authentication using user mail-id, object-based storage, file and directory operations support, data isolation, reliability, high availability and 2-way redundancy for data, and multiple client interfaces such as web, java API's and command line.



User Interface of Cloud Vault

Multi-Site Disaster Recovery as a Service on Cloud

C-DAC is working on a solution for Multi-site Disaster Recovery-as-a-Service (DRaaS) on cloud for state and national data centres having cloud infrastructure. This leverages cloud technology to provide logically centralized and physically distributed "Disaster Recovery-as-a-Service" model for service continuity of e-governance applications.

Multilingual Computing and Heritage Computing

C-DAC continued to contribute towards overcoming language barriers in computing and preservation of historical and cultural documents. Contributions during the year for this include work on machine translation, speech technologies, language tools and tutors, linguistic resources and heritage computing. Following sections bring out the details of these activities.

Machine Translation

Anuvadaksh: English to Indian Languages Machine Translation (EILMT) System

Anuvadaksh is a state-of-the-art English to Indian Languages Machine Translation System developed by C-DAC along with 13 institutes. It currently allows translating English text to eight Indian languages namely Hindi, Bengali, Marathi, Urdu, Tamil, Oriya, Gujarati and Bodo in supported domains namely tourism, health and agriculture.

Anuvadaksh is designed with pre-processing modules that carry out text extraction from uploaded files, morphological analysis, part-of-speech tagger, etc. The system's post-processing modules support morph synthesizer for smoothening the translated output, multiple translation option, and transliteration facilities. In addition, the system offers NLP components for researchers to get the intermediate output of the system modules and feedback facility to evaluate the translated output.

Web Based Angla Machine Aided Translation System

This system has been developed for translations in 8 Indian languages in tourism, health and general domains. Its key features include paragraph, file translation and facility to choose from alternate translations with editing. The system is available at: *http://tdil-dc.in.* As part of Phase-II of the project, alpha version of English to Assamese translation system was developed.

Urdu-Hindi Cognate Translation System

This is a rule based cognate translation system that converts text from Urdu to Hindi and vice versa. It is available as a web service and is an integral part of C-DAC's Translator plug-in (Go-Translate).

Mantra Rajya Sabha Translation System

This system translates English documents to Hindi pertaining to Parliamentary domains (Upper House of Parliament of India). Phase-I consists of translation of documents related to List of Business (LOB), Papers to be Laid on the Table (PLOT), and Parliamentary Bulletin Part-I. Unicode version of Phase-I along with Bulletin Part-II has been successfully deployed at Rajya Sabha. A version of the system for Synopsis domain has been deployed at Synopsis section of Rajya Sabha secretariat and the section has started preparing the said documentation through Mantra tool on Synopsis.

Go Translate: GIST Online Translation Framework

Go Translate is a centralized system for community participation in localization process. It can be used to translate website(s) dynamically/on-the-fly just by the click of a button. It enables any interested user or translator to contribute and update the translations through crowd-sourcing. In order to translate/post-edit, various machine translation systems are also integrated to aid the crowd and translator in contributing to the translations. The crowd and translators can also make use of the virtual keyboard to edit or contribute to a new translation.

Currently it supports localization options for English to Hindi, English to Marathi, English to Punjabi, English to Gujarati, English to Malayalam, English to Bengali, Hindi to Urdu and Urdu to Hindi. As there is no need to change anything in the source code of the websites, it is easier and hassle free for website owners to make their content available in local languages. It can be downloaded from *www.localisation.gov.in.*

gDoc Translation: GIST Document Translation System

This system is designed to translate English text in word documents to an Indian language in just one click by leveraging web service. While translating, it retains formatting of the document such as bullets, font attributes, images, tables, etc. It currently supports translation from English to six Indian languages namely Hindi, Marathi, Guajarati, Malayalam, Punjabi and Bengali. It supports Microsoft Word 2007 and above.

Sampark: Indian Language to Indian Language Machine Translation (ILMT) System

This is a multipart machine translation system developed with the combined effort of 11 institutions in India. It consists of machine translation engines for 18 language pairs. These are: 14 bi-directional pairs between Hindi and Urdu/Punjabi/Telugu/Bengali/Tamil/Marathi/Kannada and 4 bi-directional pairs between Tamil and Malayalam/ Telugu.

mTranslator

This is an Android based application for translating SMS/sentences from English to nine Indian languages. At the back end, it uses the Angla Machine Translation system developed under the consortia mode. It was showcased at Mobile World Congress (MWC) 2014, Barcelona. It is currently deployed at the Google Play Store and has so far been used by users for translating more than 3.3 lacs strings. Its key features include support for English to Bengali, Hindi, Punjabi, Malayalam, Telugu, Tamil, Marathi, Oriya and Urdu; transliteration for user convenience; and facility to store user preferences and settings.

mTranslator

Speech Technologies

Speech-to-Speech MAT Based Dialogue System from Hindi to Indian Languages

This project aims to develop a system for translating given speech input in Hindi to specified target Indian language speech output for four language pairs namely Hindi-English, Hindi-Bangla, Hindi-Punjabi, Hindi-Malayalam and vice-versa for tourism domain. The main components of this system are:

- Speech recognition system [for Hindi, English, Bangla, Punjabi and Malayalam]
- Text-to-Speech system [for Hindi, English, Bangla, Punjabi and Malayalam]
- Text-to-Text machine assisted translation system [for Hindi-English, Hindi-Bangla, Hindi-Punjabi and Hindi-Malayalam]

U-STAR Speech-to-Speech Translation System

As part of an international research consortium titled Universal Speech Translation Advanced Research (U-STAR), C-DAC is conducting research and development on a network-based Speech-to-Speech Translation (S2ST) system. The developed system follows the plug-and-play approach and has no dependency among the modules. It supports speech-to-speech translation between 30 language pairs and services are available as mobile app called "VoiceTra4U".

Language Tools/Tutors

Intelligent Script Manager Basic

Intelligent Script Manager Basic, also known as ISM Basic, is the latest addition to the popular family of ISM products from C-DAC. This software consists of various aesthetic Indian language fonts and tools that users often require for working with Indian languages on computers. It enables typing in 26 Indian languages including Assamese, Bangla, Gujarati, Hindi, Kannada, Marathi, Malayalam, Odia, Punjabi, Sanskrit, Tamil, Telugu, Manipuri (Bengali), Nepali, Konkani, Boro, Santali (Devanagari), Santali (OL-CHIKI), Maithili, Dogri, Kashmiri (Devanagari), Kashmiri (PA), Manipuri (MeeteiMayek), Sindhi (Dev), Sindhi (PA) and Urdu.

Textual Information Extraction and Retrieval System

C-DAC developed a system for extracting and retrieving textual information from mass media data on web (Internet) for General Election 2014 in Madhya Pradesh. This system was used to keep track of the textual data e.g. online newspapers, websites, websites for political leaders and political parties, twitter and facebook (social media), and check for possible Model Code of Conduct violations by members/candidates of political parties in the General Election 2014 in Madhya Pradesh.

Internationalized Domain Names for Indian Languages

C-DAC 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 8 languages viz. Hindi, Marathi, Sindhi, Nepali, Maithili, Bodo, Dogri and Konkani. The system was launched by Shri Ravi Shankar Prasad, Hon'ble Minister for Communication and IT, Govt. of India on August 27, 2014.

OCR for Documents in Indian Scripts

C-DAC has developed a robust OCR system for possible conversion of legacy and printed documents into electronically accessible format. It can process documents in languages such as Bangla, Devanagari, Malayalam, Gujarati, Telugu, Tamil, Kannada, Gurmukhi, Oriya, Tibetan, Bodo, Urdu, Assamese, Marathi and Manipuri. It facilitates the digitization of bilingual document images having complex layout and varying font styles as well as symbols and fonts.

Gesture and Text to Indian Sign Language

C-DAC is developing the technology for capturing the nuances of sign language and translating it to text. It uses the state-of-the-art technologies for transcription and sign notation systems, video rotoscopy, corpus creation, 3D motion capture and many others. Once completed, the aim is to provide disaster related alerts in sign language on TV. Also, research is being carried out by C-DAC to develop technologies for conversion of sign language gestures to text or speech. Various algorithms and innovative image processing tools are developed for recognizing full body gestures and converting them to text. So far the technology can recognize hundreds of sign language gestures and will be scaled up to recognize many thousands.

Other Language Tools

1. **Paribhashika: GNU/Linux Based Online Translation System**
   Paribhashika is a pattern directed and rule based English to Malayalam machine aided translation system based on AnglaBharati technology.

2. **Shruthilekhita: Malayalam Dictation System**
   C-DAC has developed a dictation system in which Malayalam Automatic Speech Recognition (ASR) system is integrated with Open Office writer. The system was released on November 01, 2014 on the occasion of the birth of Kerala by Sri. V S Achuthanandan.

3. **Ezhuthachan: Malayalam Tutor**
   Malayalam tutor is a self instructional English software package meant for assisting foreigners and students to easily learn Malayalam language.

4. **English to Bengali Corpora Creation Workbench**
   C-DAC has developed a workbench to translate the 20k BTEC from English to Bengali. In this workbench, existing available translation systems are used to help the translators build the English-Bengali parallel BTEC corpora. The workbench environment is available as a web service.

5. **Bangla Sentence Analyzer**
   C-DAC has developed a parser for Bangla language that supports workbench for generation of linguistic resources, Bangla morphological analyzer and synthesizer, and Bangla shallow parser with limited set of rules.

6. **Unicode Convertor for Punjabi Fonts**
   C-DAC has developed a Unicode converter for Punjabi language with facilities for font encoding to Unicode and vice versa, in-built word editor, and dictionary of English-Punjabi and Punjabi-English.

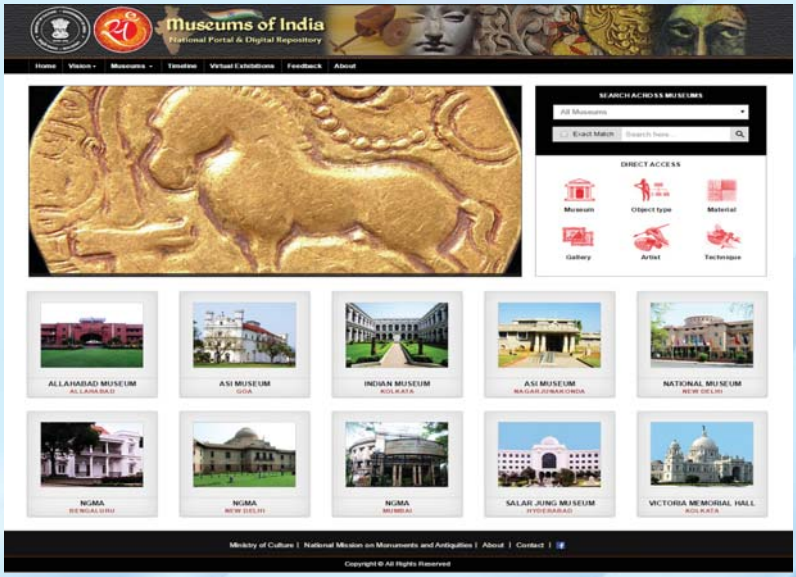
7. **Modi Script Unicode Content Creation Tool**
   Modi is a script used to write Marathi language that was used in Maharashtra for 500 years. Modi typing tool is primarily for typing and creation of documents in Modi script. The software pack can be used for digital libraries, data entry, and digitization of rare books, manuscripts and ancient literature.

Heritage Computing

National Portal and Digital Repository for Museums of India

This system provides online access to digital collections from 10 national museums located in different states of India. JATAN, the Virtual Museum Builder software developed by C-DAC, is used to develop and transfer digital collections for preservation in the digital repository.

The portal provides online access to 30,000 historical antiquities with approximately 1,50,000 digital images with metadata. The national portal *http://www.museumsofindia.gov.in* was inaugurated on October 21, 2014 by Hon'ble Minister for Ministry of Culture, Govt. of India.



National Portal and Digital Repository for Museums of India

DIGITALAYA

C-DAC has developed an Electronic Records Management and Archival system called DIGITALAYA for preservation of documents of various file formats viz. word, postscript, spread sheets, e-mails, images, presentations, text and XML. It provides a searchable database of record retention schedules and archival strategies as per the specified file format and preservation duration

e-Records Capturing Tool

This tool developed by C-DAC, automatically extracts preservation metadata in compliance with eGOV-PID standard and allows the user to connect with eGOV database for capturing the electronic records stored in the database of an e-governance system, uploading of e-record schemas, mapping with database, mapping of preservation metadata as per eGOV-PID standard, etc. It has been deployed for extracting the registered documents stored in the database of Computer Aided Administration of Registered Documents (CARD), Hyderabad and about 25 lacs documents with preservation metadata have been successfully extracted using this system.

e-Goshwara: e-Court Solution

C-DAC is engaged in developing a set of standards, tools and technologies for digital preservation of records pertaining to disposed cases of Indian Judiciary. This is necessary for compliance with the ISO 14721 - Open Archival Information System (OAIS) reference model and ISO 16363 - Audit and Certification of Trustworthy Digital Repositories for e-records. Technology development and pilot implementation of e-Goshwara for Hon'ble Supreme Court of India and District Courts of Delhi have been completed. E-Committee – Supreme Court of India has included the same in e-Court Phase II policy for national rollout.

e-Goshwara

Professional Electronics, VLSI and Embedded Systems

C-DAC continued to develop cost-effective electronic systems and solutions for industrial purposes and social empowerment. These include Solutions for smart buildings, Network systems, Power electronics, Traffic control systems, Agri-electronics, Ultrasonic systems, and Control systems for industrial automation. The activities carried out during the year in these areas are described below.

Solutions for Smart Buildings

Lighting

C-DAC has designed, developed and deployed Zigbee controlled dimmable LED (ZLED) luminaire to provide energy efficient illumination in buildings. Different levels of dimming (5% to 100%) are provided for optimum illumination in work place. ZLED luminaire can be automatically controlled for optimum illumination based on human occupancy by using an Android application. A deployment with cluster tree topology which is controlled wirelessly through Zigbee network having human occupancy prediction using Hidden Markov Model (HMM) has energy savings up to 60%.

HVAC and Automation

Smart homes are designed to have a HVAC system (heating, ventilation, and air conditioning) to maximize the comfort of the residents with minimal energy consumption. C-DAC has developed a prototype to control the Air Conditioner (AC) in a room. The sensing, controlling and actuation is done using Zigbee based wireless sensor networks. Occupancy plays a major role in determining the efficiency of the system. Occupancy detection modules based on both motion and carbon di-oxide sensors were developed to enhance the accuracy of HVAC control.

Sensor Embedded Zigbee Modules for Temperature and 3D Accelerometer

This is a miniaturized coin cell operated wireless sensor node with onboard sensors like accelerometer, temperature and relative humidity. The RF interface is compliant to the IEEE 802.15.4/ Zigbee standards. This device is suitable for various dedicated applications like data centre monitoring, AC control, gesture reorganization, activity monitoring, etc. The droplet shape of this device is attractive and suitable for deployment at various places.

Indoor Air Quality Monitoring System

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially relating to the parameters that affect the health and comfort of building occupants. C-DAC has developed a toolkit to monitor real time measurement of temperature, humidity, CO and CO_2 using WSN (Wireless Sensor Network) motes and particulate matters using aerosol monitor. IAQ has been formed as per Environmental Protection Agency (EPA) standards from these measurements. These data are useful for HVAC control system.

Bluetooth Low Energy (BLE) Mote

Bluetooth Low Energy (BLE) is a new specification aimed at ultra low power wireless applications with an option to interact with the existing mobile devices. A BLE mote has been developed by C-DAC to address the unique requirements of application areas like health monitoring, home automation, smart home, smart city, etc.

C-DAC has also designed the power-aware C-mote which monitors the available power sources and selects the optimum one. Along with various power saving mechanisms, the device is also capable of harvesting energy from solar, due to which it can sustain for a longer time.

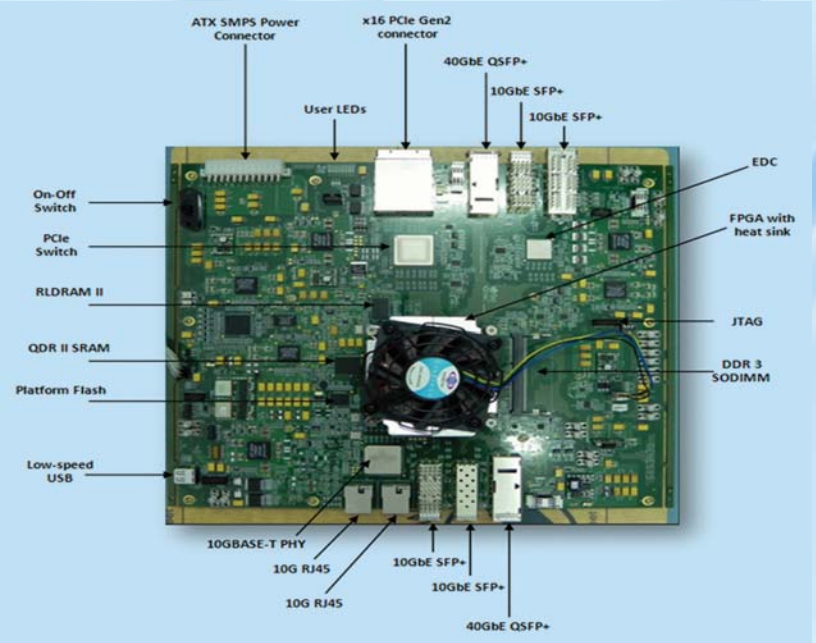
Smart Card Reader for Access Management System

Smart card reader for attendance/access management is an intelligent tablet based smart card reader on the Aakaash tablet with Android-OS. The user interface acts as a frontend for dissemination of official information at the time of attendance process. Events, notices and other important information can be delivered through this system. Personalized employee specific delivery of information can also be integrated with the help of backend management system. The system is currently deployed and is in use in all C-DAC centres.

Network Systems

Genesys: FPGA based Network Resource System

Genesys is an advanced Field Programmable Gate Array (FPGA) based system for high speed network applications catering to 10G/40G Ethernet/OTN. Typical applications include packet capture and processing, network monitoring and analysis, extensive packet filtering, slicing, tagging and indexing, physical layer validation of multi-lane interfaces, network traffic generator, Layer1/Layer2 10G/40G Ethernet tester, network jammer, triple-play tester, Ethernet protocol analyzer, delay emulator, skew tester, packet capture and playback, etc. This system can also be used as a development platform for designing high speed network and high performance systems. The system supports three 40G and 10G Ethernet ports fully compliant to IEEE802.3ba and 16 Lane PCI-Express based host interface.



Genesys 40GbE/10GbE FPGA based Network Resource System

Inter-operability Standard

IEEE 1451 recommends implementation of Wireless Transducer Interface Module (WTIM) and Network Capable Application Processor (NCAP) networks. WTIM side program is implemented using NesC, TinyOS on C-DAC motes. WTIM motes communicate to NCAP networks via base station motes connected to PC. A prototype of inter-operability for ZigBee motes network based on IEEE 1451 with Activity Recognition (AR) sensor, Passive Infra-red (PIR) sensor, accelerometer sensor, humidity sensor, and temperature sensor has been developed by C-DAC.

Testing Tools

TCP Throughput Testing (T3) Tool

TCP Throughput Testing tool (T3 tool) performs real time Ethernet network testing and measures end-to-end TCP throughput in a managed IP network as per IETF RFC 6349 standard. The T3 tool performs a series of tests based on Layer 4 and identifies various network characteristics viz., MTU, RTT, bottleneck, bandwidth, window size, etc. Calculated TCP metrics, namely, TCP transfer time ratio, buffer delay, and TCP efficiency depict clear picture of real time network to users. The tool also generates detailed technical test report as per standard. T3 tool is capable of testing up to 10Gbps on an Ethernet network.

Unicast and Multicast Testing Tool

Unicast testing tool performs a series of tests to benchmark network devices for unicast traffic of speeds upto 10 Gbps. It identifies throughput, back-to-back frames, frame loss, and latency at various frame sizes from 64 bytes to

jumbo frames as per benchmarking methodology for network interconnect devices from IETF RFC 2544. This tool provides detailed technical reports of automated performance testing of Layer 2/Layer 3 network devices. Multicast testing tool performs real time testing of network devices and measures throughput, overhead and latencies of Internet Group Management Protocol (IGMP) group membership characteristics of devices as per IETF RFC 3918 standard. The tool performs a series of tests based on multicast property and identifies various multicast characteristics, namely, multicast throughput, mixed class throughput, group join delay, group leave delay, and multicast latency.

Both the tools provide service providers with the means to fully validate and benchmark their network devices through comprehensive testing and reporting of critical components before establishing the network.

Power Electronics

25 kW Solar Power Plant

The effective integration of renewable energy sources to existing power grid infrastructure has a great impact on modernization of legacy grid to smart grid, which monitors, controls and optimizes the operation of interconnected elements. The grid connected Solar Photovoltaic (SPV) power plant exports power generated by the SPV array to grid during day time, when there is enough solar exposure. The 25 kWp grid interactive SPV power plant is an integration of three Basic Interface Modules (BIM), each of them rated for 10 kWp. The system developed by C-DAC is deployed at Technopark campus, Thiruvananthapuram. Key features include maximum power point tracking, Android based touch screen Graphical User Interface (GUI), remote monitoring and control facility through Internet, and power export at unity power factor.

Solar PCU (Power Control Unit) developed by C-DAC

DC-DC Converter for SPV Applications

DC-DC converter for Solar Photovoltaic (SPV) applications is a high performance and high efficient power electronic converter. This boost converter is used to track the maximum power from PV. An Interleaved Boost Converter (IBC) enhances the power output from PV by minimizing the ripple introduced in the PV panel. The advantages of IBC are low input current ripple, high efficiency, fast transient response, reduced EMI and improved reliability. The product has been installed at National Institute of Technology (NIT), Trichy.

DC-DC Converter for Solar Photovoltaic (SPV) system

High Speed Reconfigurable Power Electronic (PE) Controller

A reconfigurable controller architecture (on FPGA), which can replace the conventional embedded microcontroller/ Digital Signal Processor (DSP) based controller design for real-time control and monitoring of power electronic systems, has been developed by C-DAC, which implements hardware based parallel processing. Supported custom made instructions/functions for PE specific IPs are simple and easily understandable by the users. Reduced processor obsolescence risk provides long term support for industrial PE systems.

Low Voltage Direct Current (LVDC) Architecture

The fastest growing portion of residential electricity use is in consumer electronics and small appliances. These devices primarily run on DC power. But converting the AC power to DC power involves lot of wasted energy. Many of these devices have a conversion efficiency of 65 to 80 percent. The LVDC distribution house will use less electricity compared to the same house with conventional AC distribution. C-DAC's development of LVDC paves the way for easier integration of renewable energy from sources like solar, wind and wave, etc. It reduces the cost of appliances by eliminating the need for separate adapters. It offers better quality power as there is neither need for power factor correction nor harmonic compensation. It has higher reliability and lower energy losses because of less hardware.

Traffic Control Systems

Software for Adaptive Traffic Control System

An adaptive traffic control system software, called CoSiCoSt (Composite Signal Control Strategy), has been designed by C-DAC to address the traffic problems arising due to the highly heterogeneous traffic characteristics and poor lane discipline prevalent in developing countries like India. In the vehicle-actuated mode of traffic signal operation, CoSiCoSt, in conjunction with vehicle detectors deployed at strategic locations, assesses traffic demand in real-time and generates optimum signal timings for signal coordination. This innovative signaling strategy helps minimize stops and delays at traffic junctions and brings about appreciable reduction in the overall journey time. It is scalable from two junctions to 6000 junctions or 200 corridors x 30 junctions on a 32-bit machine. It is programmable to provide transit signal priority to vehicles such as emergency service vehicles. It is currently deployed at Delhi Integrated Multimodal Transit System (DIMTS) and at Traffic Control and Management Center (TCMS), Surat.

iRIDS Intersection Controller and Red Light Violation Detection System

iRIDS is a total solution system for handling traffic red light violations. It features automatic capturing of red light violations in video and still frame; automatic ticket generation of violated vehicles; interfaces with RTO (Regional Transport Office) database to retrieve owner details; has compatibility to integrate with any make of traffic signal controller, and has IR operation facility during low light condition.

TraMM: Software for Traffic Signal Monitoring and Management

TraMM is an application software for monitoring and managing road traffic signal controllers remotely from a central server located at the Traffic Management Centre (TMC). TraMM works with C-DAC developed WiTraC (Wireless Traffic Control System) and UTCS (Urban Traffic Control system) controllers. It is a web based application with full featured HMI to view stage timings of junctions and remote administration to change the running mode of junction.

Intelligent Transportation System (ITS)

ITS is a national level effort to develop field deployable products and solutions for better transportation. The following products/solutions have been developed by C-DAC as part of this initiative:

1. **Wireless Traffic Control System (WiTraC)**
   WiTraC is a solar powered vehicle actuated traffic signal control equipment using wireless communication technology for switching signals.

2. **Real-time Traffic Counting and Monitoring System (RTTC&MS)**

   RTTC&MS provides classified counts of vehicles using the inductive loop technique in real time for traffic planners and other ITS applications like advanced traveler information and incident detection.

3. **Intelligent Parking Lot Management System (IPLMS)**

   IPLMS provides an efficient mechanism for managing the parking lot and includes driver guidance cum assistance system as well.

4. **Advanced Traveller Information System (ATIS) for Indian Cities**

   ATIS is a technology demonstration project for providing dynamic traffic information using Intelligent Transportation System (ITS) gadgets and sensors. The developed prototype was implemented in the 16 km study corridor identified at Taramani Road, South Chennai. It uses advanced technologies, GPS, video cameras, wireless communication, traffic models and algorithms to provide traffic information such as travel time in alternate routes, route diversion, accident information, etc. and information is updated every five minutes.

5. **Intelligent Transit Trip Planner and Real-time Route Information (ITTP&RTRI)**

   The Intelligent Transit Trip Planner (ITTP) captures user preferences and provides information in GPS tracking-enabled online GIS system. On the other hand, the Real-time Transit Route Information (RTRI) provides real time bus transit route information.

6. **SAFE-DRIVE**

   SAFE-DRIVE stands for Safety Alert Systems using Dedicated Short Range Communication for On-Road Vehicles. It is a Dedicated Short Range Communication (DSRC) system for vehicles, which uses secure vehicle-to-vehicle (V2V) as well as vehicle-to-roadside infrastructure (V2I) communications to act as an enabling technology for providing a variety of intelligent transportation applications such as electronic toll collections, parking lot payment, early warning system for vehicles, vehicle collision avoidance system, traffic signal priority recognition system (for emergency vehicles preemption), etc. It offers safer driving and fewer vehicle accidents.

7. **Vehicle Tracking and Management System (VTMS)**

   GPS based vehicle tracking system caters to continuous monitoring of transport vehicles for better road safety and better support for enforcement services. Major features are Map and GeoServer, Geo-fencing, Points of Interest (POI), control room tools, tagging, data archival, mobile interface, access control system, alerts and reports. The system can be customized and replicated for tracking all registered vehicles in the country.

Agri-Electronics

Screen Centrifuge System

Quality control is very important in agro-based industry such as tea. The quality of tea leaves are to be inspected primarily for the percentage of fine count and for the surface moisture. Determination of bio-chemical contents is done by Near Infra-Red (NIR) spectroscopy. C-DAC has designed screen centrifuge machine for removal of surface water of tea leaf. A potentiostat based on three electrodes estimates percentage of fine count of tea. Calibration model has been developed with two NIR spectrometers for estimation of polyphenol content of inward tea leaves. Accuracy of prediction achieved is more than 80%.

Ultrasonic Systems

SOUNDS

SOnic Ultrasonic Non Destructive test System (SOUNDS) is designed for non-destructive testing and evaluation of materials, using sonic and ultrasonic frequencies. Characteristics of the material used in the test specimen and its

internal flaws can be detected by measuring the velocity and attenuation of a sonic-ultrasonic wave while passing through the test specimen. The hardware is designed for wideband operation and amplification over wide dynamic range of signals. Special enclosure is designed for transducers and cables for fire safe operation. It has security features built-in for use in non-destructive testing in areas handling explosives. SOUNDS MK2 R4 is the first equipment of its kind developed in India for the solid motor segment inspection.

Echosounder

Echosounder is a product developed by C-DAC for Indian navy, for use in ships for measuring depth of sea water. The equipment is being manufactured by KELTRON based on a ToT agreement with C-DAC. The upgraded version supports synchronized operation (with other sonar systems) as well as mine hunting sonar and has successfully completed sea trials.

Acoustic Landmine Detection System (ALMS)

ALMS can be fitted on BMP vehicles (amphibious infantry fighting vehicle) such that the measurement of characteristics of the vibrations transferred to ground by BMP vehicle while moving can be used for detection of buried land mines. ALMS uses a separate earth exciter for generating the interrogation beam which would lead to an optimally designed ground exciter for ALMS.

Ultrasonic Diameter Measuring System (UDMS)

C-DAC has taken up a project to develop a high precision measuring system of diameter of heat-resistant composite alloy pipes employed in power plants based on ultrasonic principles. The technology can also be used in a wide variety of applications such as precision liquid level measurement, precise machinery control in industries, robotic control, non-destructive testing applications, biomedical imaging, etc.

Control Systems for Industrial Automation

Real Time Simulation with OpenModelica

The real time simulation system developed using C-DAC's embedded controller and the OpenModelica platform is a powerful tool for operator training and for developing advanced control strategies for process optimization in different industrial processes and systems. This product can be delivered as a technology for the automation vendors for large scale manufacturing and for the user industries for their daily use and operator guidance.

Open Object Oriented Modeling and Simulation tool for multi-domain applications is also available. The application areas include industrial process modeling, simulation in power plants and water treatment plants, etc.

Software Technologies including FOSS

C-DAC carries out development and deployment of various software solutions for e-Governance, Free and Open Source Software (FOSS), social development, e-learning and citizen facilitation. C-DAC is also actively involved in the "Digital India Initiative" of Govt. of India. Details of activities carried out during the year by C-DAC in this thematic area are described below.

E-Governance

National Roll out of e-Services of Election Commission of India

C-DAC is engaged in this ambitious project of Election Commission of India (ECI) funded under National e-Governance action plan. This project envisages e-delivery of services of ECI to the citizens of India through optimum use of ICT. The services under the same are divided into four different categories viz., (1) Citizen self services, (2) Citizen information services, (3) Election information services and (4) Services for ECI officials.

National Voters' Services Portal

The National Electoral Search System was launched on April 8, 2014 by ECI with features including name and EPIC based search for information related to polling stations, locating polling station on map, printing of voter information slip and map based information of BLO and ERO, etc.

National Voter Service Portal (NVSP) was launched on National Voters' Day (25.01.2015). It offers the following mobile and web-based services to electors:

- Multi-lingual electoral roll services such as inclusion, deletion, correction and transportation of entries
- Tracking status of the applications
- Getting contact details of BLO, ERO and other election officers and
- Linking Aadhaar with Electoral roll

Mobile Seva

Mobile seva is a national mobile governance platform that provides multiple mobile based channels (e.g., 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. Departments integrating with any one channel can effortlessly integrate with all the other operational channels as well. Mobile seva platform provides a government AppStore, which hosts a number of mobile applications developed for various government departments. The AppStore 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 1600 departments have been integrated using mobile seva.

Mobile Seva

e-Pramaan

e-Pramaan is a national authentication framework that provides a standard based uniform authentication mechanism for various government services. e-Pramaan offers secure authentication with various levels of assurances by verifying the credentials of e-Pramaan users accessing different e-Governance services through the Internet or mobile devices. e-Pramaan provides various authentication methods such as password based authentication, OTP based authentication, digital certificate based authentication, and biometric based authentication. There are 14 departments/services integrated with UIDAI ASA-AUA service and have completed about one crore transactions.

eSangam

Under eSangam, C-DAC carries out three major initiatives – National e-governance Service Delivery Gateway (NSDG), State e-governance Service Delivery Gateway (SSDG), and eRA: eGovernance application integration with Reconfigurable Architecture.

NSDG is one of the 31 mission mode projects under the National e-Governance Plan (NeGP) of Government of India (GOI). NSDG is aligned with the aim of NeGP to co-operate, collaborate and integrate information across different departments in the centre, state and local government.

State e-Governance Service Delivery Gateway (SSDGs) act as a core infrastructure for achieving standards-based interoperability between state-level Government applications and geographically dispersed locations.

eRA extends the eService delivery framework by facilitating multiple protocol support for service integrations as well as integrated services delivery with workflow rules defined for the constituent services. The asynchronous and/or synchronous services based on different protocols and offered by multiple government departments can be integrated and delivered as a single service to the government departments (G2G)/businesses (G2B)/citizens (G2C).

Online Management, Monitoring and Accounting System (OMMAS)

Online Management, Monitoring and Accounting System (OMMAS) for Pradhan Mantri Gram Sadak Yojana (PMGSY) is a system developed by C-DAC for Ministry of Rural Development, Government of India. OMMAS application is developed using the latest technologies with better usability considering the new requirements of the PMGSY II scheme. The application is integrated with the mobile application for the monitors to inspect the road works and upload the inspection reports to OMMAS application right from the inspection site. Data entry is made at origin to avoid duplicity of effort. During the year, the system has been deployed in National Rural Road Development Agency (NRRDA), New Delhi.

Rajasthan Works Online Monitoring System

Public Works Department (PWD), Government of Rajasthan is executing the construction of road works under the scheme “Rajasthan Road Sector Modernization Projects” (RRSMP). The software application captures the details of the contractors, proposal details and sanction by the department at the state level, agreement details, and

physical and financial progress details. During this year, the system was deployed at Public Works Department, Government of Rajasthan, Jaipur.

e-Mulazim

e-Mulazim is an web based open source Human Resource Management (HRM) software for small and medium enterprises (SMEs). It can host and manage critical employee data, increase reliability, and minimize compliance risk. It provides an easy to use, intuitive interface for HR departments with many features. During the year, the solution was deployed at following locations:

- Translational Health Science and Technology Institute (THSTI), which is an autonomous institute of Department of Biotechnology, Ministry of Science and Technology, Govt. of India, Gurgaon.
- Haryana State Electronics Development Corporation Limited (HARTRON), which is an undertaking of Haryana Govt., Chandigarh.
- National Institute of Technical Teachers Training and Research (NITTTR), Chandigarh, Ministry of HRD, Govt. of India.

Kenya Revenues Authority Valuation System

This is an assessment tool and decision support system for custom officers of Kenya Revenue Authority, Kenya. The system provides up-to-date price reference database on accepted transaction values, valuation based risk management system, dynamic reports, audit logs and secure communication.

National Imports Database (NIDB)

National Imports Database (NIDB) is a powerful assessment tool and a Decision Support System (DSS) for customs officers. For those who are engaged in day-to-day assessment of imported goods at the numerous custom stations in India, this 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 mis-declaration. A prototype for NIDB2 was deployed in June 2014 at DGOV premises, Mumbai.

Free and Open Source Software (FOSS)

BOSS Linux 6.0

BOSS GNU/Linux Version 6.0 – 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. The distribution includes over 13500 new packages, for a total of over 58383 packages. The major updates in BOSS GNU/Linux include Kernel updated from 3.10 to 3.16 with support for more hardware peripherals and improved file system performance and updated LibreOffice. During this year, BOSS was deployed for many agencies including defense.

Localisation and Hardware Interfacing for Android/BOSS based Mobile Services

C-DAC has developed a context-aware framework as a set of libraries. The library makes use of the features of available sensors (presently supports accelerometer, proximity, light, GPS). It provides the feature to users to enable them to directly work with these sensor data. Additional support for storing these sensor data in the local database as well (using SQLite support) has been added. The sever side version to provide support for saving data and querying from the server has also been developed and made available. Some of the applications developed to demonstrate include, distress notification for women's safety, media player application, location based notification service application, and call log application.

Trainers Training and Student Talent Transformation for CBSE

As a part of this initiative, C-DAC developed instructional materials and multimedia self-learning materials in Maths, Science and Social Sciences for IX Std and X Std CBSE courses. The repository is to be made available to all CBSE schools along with question banks, test instruments and other materials.

ICT for Social Development

DISC: Mission for Developing Digitally Inclusive and Smart Community

Digital India is an initiative of Government of India to make technology as the key enabler for transformative changes in the delivery of public services. As a part of this initiative, C-DAC is contributing in four areas - health, education, agriculture, and Bharat Operating System Solutions (BOSS) through a project titled “DISC: Mission for Developing Digitally Inclusive and Smart Community”. Under the aegis of this project, C-DAC is developing and customizing innovative solutions to contribute towards bringing the benefits of ICT solutions to the common man.

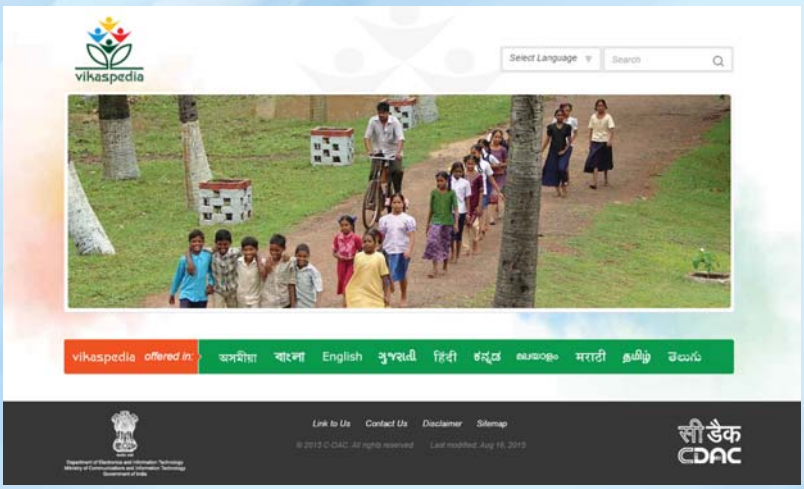
eSaadhya

eSaadhya is an adaptable e-Learning accessibility model for the disabled. It is an education framework for children with autism and mild mental retardation. The framework supports creation of education plans for individuals and monitoring the status of individuals towards the education plans. It supports both teaching and learning for individual and associated stakeholder including educators, parents and therapists in English, Kannada, Hindi and Telugu.

Key features of the system include child profiling, assessments, Individualized Educational Plans (IEP), conventional and Computer Assisted Instruction (CAI), Curriculum Based Measurement/Assessment (CBM), utility support module, visual schedulers (mobile based teaching using AR), collaboration components, and child learning environment. Field deployment and implementation of e-Saadhya software has been done in various special schools in Andhra Pradesh, Karnataka and Delhi.

Vikaspedia

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, global search of the portal content in regional languages, opinion polls, page rating, page sharing on social networking sites, feedback mechanisms and mobile compliance. During the year, nine more language portals (Live – Bengali, Gujarati, Kannada, Malayalam and Tamil; and Beta versions – Sanskrit, Urdu, Punjabi and Oriya) were added to the existing five languages (Hindi, English, Telugu, Assamese and Marathi) of Vikaspedia.



Vikaspedia

Skim-read Software

Skim-read is a software for partially blind that provides a quick overview of a text document. It was enhanced with additional features, such as ‘highlight’ feature was added to increase its usability by partially blind users. When Skim-read is enabled, it underlines the current line; and when it starts, it informs the user about current position of cursor in document and accordingly gives information to the user.

Balsahara

Balsahara is a software developed by C-DAC for automation of juvenile justice system and child protection. It is a multilingual, mobile and web based software to automate the activities of the various children homes, established for the overall growth and welfare of disadvantaged children who are in need of care and protection. The software is currently operational in 21 homes for boys and 81 homes for girls across all the districts in Andhra Pradesh and Telangana states.

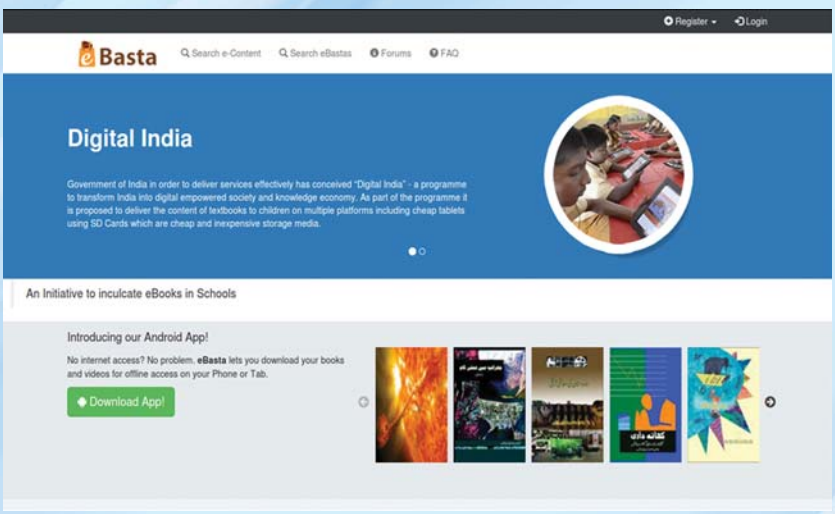
Systemization of Dairy Development Department

C-DAC developed Direct Benefit Transfer (DBT) software that enables cattle feed subsidy transfer through the network, to respective farmer's bank account, benefiting more than 1.5 Lakh farmers in more than 150 blocks throughout Kerala, in the first month. The same process was carried out in subsequent months for another 96000 farmers, resulting in a remarkable achievement for Dairy Development Department. The milk testing module is used to record and analyze the composition of milk and related products against hundreds of parameters fixed by the department. The system generates various managerial, statistical and qualitative analytical reports on the samples submitted. It was extensively used in peak festival seasons in a timely manner to solve consumer complaints.

E-Learning

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 (e-books) so that they can be read and used on tablets. The main idea is to bring the various publishers – free as well as commercial – and the schools together on one platform. In addition to the portal, a structure to facilitate organization and easy management of such resources has also been made, along with an App that can be installed on the tablet for navigating such a structure. The framework, implemented as a portal, brings together three classes of stakeholders: the publishers, the schools, and the students. The eBasta App, freely downloadable from the portal, runs on any Android device. It can access the basta created using the portal framework, and render it for easy navigation by the students. The content considered by the App is as defined by the teacher/school in the basta structure, irrespective of what resources are on the SD card or storage.



URL: www.ebasta.in

e-Sikshak and Megh-Sikshak

e-Sikshak is a multilingual e-Learning framework based on component based architecture. Apart from C-DAC, the framework is being used by many Indian as well as International academic/training institutions. The system includes SCORM compliant course organizer, online assessment with QTI conformance, bulletin board, personal space with blogs, user profile and RSS subscription, collaborative content development through WikiSikshak, and

web album with image, text, audio, video sharing from mobile. It supports various Indian languages including Telugu, Tamil, Marathi, Sanskrit, Hindi, Malayalam, Kannada, Bengali, Assamese and Gujarati. This system has recently been installed at National Institute of Agricultural Extension Management.

e-Sikshak has been customized for cloud platform as Megh-Sikshak that offers e-Sikshak's multi-lingual e-learning services leveraged by cloud computing capabilities. This cloud based e-learning solution provides the tenant management system along with essential Learning Management System (LMS) services offered by e-Sikshak such as SCORM based content delivery, QTI based online assessment, query handler service, and some other communication and collaboration services. Deployed over National Knowledge Network (NKN), at National Informatics Centre (NIC), New Delhi, it is being used by various institutes connected to NKN.

Online Labs (OLabs) for School Lab Experiments

OLabs provides school students with the ease and convenience of conducting experiments and learning activities over the Internet. It has been developed to supplement the traditional physical labs and bridge the constraints of time and geographical distances. This not only reduces the costs incurred in conducting experiments in traditional school laboratories, but also gives a student the flexibility to explore and repeat experiments till they are thorough. OLabs includes features such as recording observations, plotting graphs, calculations, generating lab sheet, etc., which enhance the overall learning experience. There is intuitive feedback and guidance at relevant places. At present, the lab covers 93 Physics, Chemistry, Biology, Mathematics and English experiments for classes 9th to 12th.

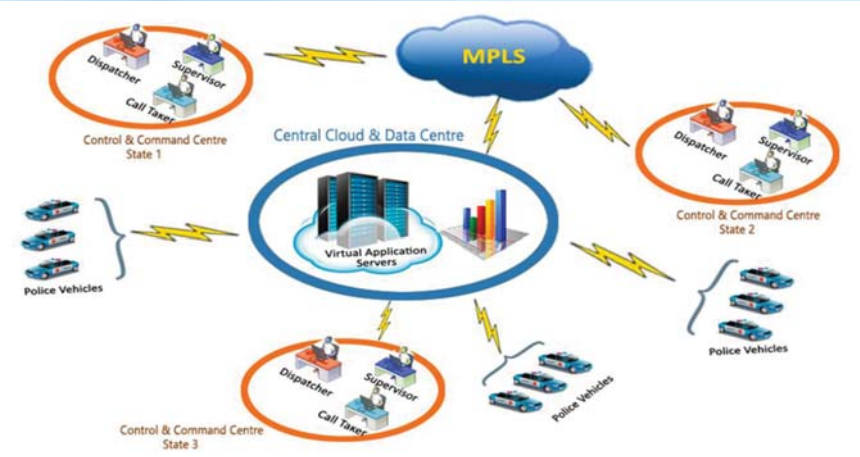
Computer Enabled Continuous and Comprehensive Evaluation (CCE) Using Adaptive Learning Technology

This system involves development of ICT enabled CCE framework, including mechanisms for data entry, visualisations, and question bank for select subjects. In order to automate the process of continuous evaluation, a web-based system has been developed for use by CBSE students, teachers and administrators.

Citizen Facilitation Services

Nation-wide Emergency Response System

The nation-wide emergency response system is a platform for providing emergency services to the citizens in distress. The system consists of a Central Cloud and Data Centre, which has all the necessary infrastructure comprising the virtual application servers, central database server, GIS servers, vehicle tracking servers, SMS server, and web servers along with national level supervisor module for monitoring and statistics. The state-wide control rooms will have only the client machines for call takers, dispatchers and supervisors.



Schematic of the Nation-wide Emergency Response System

Integrated Village Information Services System (IVISS)

This system aims to provide better citizen centric services and complete transparency of operation, for reducing the number of visits and direct interaction of citizens to the Government office/department while availing the services. The system is deployed at Haryana and offers the services through Common Service Centers (CSCs). The services related to Revenue department (caste certificate, income certificate, and residence certificate), Home department (marriage registration and certification), Women and Child Welfare department (orphan certificate issuance), Health department (birth and death report, modification in existing record, name inclusion, still birth, birth and death legacy record) and RTI application are offered.

Cyber Security and Cyber Forensics

In the area of cyber security and cyber forensics, C-DAC carried out research and development leading to various technologies and solutions in network and gateway security, end-point security, mobile security, security analysis, authentication and identity management, and cyber forensics. C-DAC provided vulnerability assessment and penetration tesing services and conducted skill-based training and nation-wide awareness programmes in this area. The activities carried out during the year are described below.

Network and End-Point Security

Anti-Malware Solution

Anti-malware solution is an end-point security solution with centralized management console to manage client components in Windows Active Directory Domain Network, which enforces application whitelisting, USB mass storage device control, application analysis and verification, and secure browser add-on. This solution is deployed at various organizations such as CERT-IN, ISRO, DRDO and Indian navy. Browser JSGuard, a secure browser add-on to protect from HTML and JavaScript based attacks at the client is accepted by AMO Mozilla add-on community and is available for free download from Mozilla and Chrome repositories and is being used by international community.

Unified Threat Management Appliance

C-DAC developed a Unified Threat Management (UTM) appliance integrating various components developed earlier such as intrusion detection and Vitual Private Network (VPN). It carries out network traffic analysis and detects intrusions based on signature and anomaly detection techniques. It also has capabilities to carryout gateway level malware detection, VPN , firewall and network anomalies. The user interface is devised in a way that it consolidates the interesting and useful events based on these detection methods and offers better security visualization.

RTU Vulnerability Testing Tool

This state-of-the-art cyber security test bench ensures the security and wellness of controllers in a process plant operating with complex logic and controlling sensitive machines. It is an open source cyber security analysis tool integrated with an in-house developed RTU penetration testing tool. This tool can be used for testing automation controllers developed by C-DAC and third party products.

Mobile and Web Security

M-Kavach

M-Kavach is a comprehensive mobile security solution for Android devices addressing threats related to mobile phones. The system provides secure storage for storing critical information along with backup and restore facility. The system protects against anti-theft such as protection from unauthorized access, remote control of device through web console/SMS, and tracking of lost device. Other capabilities are secure SMS, protected access to bluetooth and Wi-Fi, and application analyzer for classifying malicious and benign applications.

M-Kavach

URL Analyzer and Classifier

URL analyzer and classifier is a browser-Independent solution for detecting malicious URLs. It employs emulated browser to detect malicious websites using static analysis. It is available for both stand-alone desktop solution and distributed framework. It addresses several security issues such as suspicious URL detection, malicious Javascript collection and analysis, and detection of drive-by-download attacks.

Authentication and Identity Management

Biometrics R&D Lab

C-DAC has established a biometrics R&D lab based on the bilateral collaborative initiative of UIDAI (Unique Identification Authority of India) and C-DAC. This lab serves as a national resource center for building capabilities in biometrics technology and governing the biometrics based security solutions. Some of the development work carried out as part of this initiative include development of light-weight fingerprint SDK for client applications, SDK for PoS (Point-of-Sale) devices, fingerprint SDK for authentication server, and multimodal biometric systems (iris and fingerprint modalities).

Third Eye

Third Eye is a gadget developed by C-DAC for real-time unsupervised offsite preservation of intruder's image with time information. This invention relates to an apparatus and method for capturing suspicious activities in unattended mode for future reference. More particularly, it has method for instant detection of face followed by offsite preservation of the same for future reference. Novel features of the gadget are detection and capturing of face image of the intruder in unattended mode and preservation of facial image with date and time stamp using Wi-Fi/ cellular data channel ensuring lesser amount of storage space. Offsite data preservation reduces the risk of destruction of evidence.

Cyber Forensics

Cyber Forensics Tools and Solutions

C-DAC has developed various cyber forensics tools and solutions that are used by law enforcement agencies. These include CyberCheck suite (Disk forensics tool), MobileCheck (forensics tool for mobiles/smart phones), NetForce suite (network forensics), Advik (CDR analyser), Win-LiFT (Windows live forensics tool), SIMXtractor (SIM card imaging and analysis tool), TrueImager (a hardware based disk imaging tool) and TrueTraveller (portable forensics tool). During the year, C-DAC enhanced the features of several of these tools by adding new capabilities to them.

Portable Cyber Forensics Toolkit

ICT based Capacity Development Laboratory on Cybercrime for High Courts

ICT based user-oriented labs were established for seven North East High Courts/High Court benches under the North East judiciary project by C-DAC. 450 judicial officers were trained to face the techno-legal challenges in the field of cybercrime. Areas of training include IT law based cases, appreciation of electronic evidence, cyber forensics, mobile forensics, etc. Course materials were specially designed for this new target group. The facilities created in the ICT labs include C-DAC forensics solutions like CyberCheck, MobileCheck, etc., along with other infrastructure.

Awareness and Training Programmes

C-DAC continued carrying out nation-wide Information Security Education and Awareness (ISEA) programmes for various sections of users including those from academia, Government, and business communities. Some of them are listed below.

- **Information Security Education and Awareness (ISEA) - Phase II**: As a part of its ISEA initiative, C-DAC is creating a national repository of courses designed, course contents and learning material, MIS about the professionals trained through this scheme, technology forecast and assessment, changes in the market trends and the resultant human resource requirement.
- **PKI Body of Knowledge Development and Dissemination:** As a part of its PKI awareness initiative, C-DAC conducted various training and awareness programs catering to different sections of users – end users, developers and administrators.
- **Security Audit of Websites and IT Infrastructure:** C-DAC is actively involved in carrying out security audit of web applications, websites and IT Infrastructure like desktops, servers, firewalls, routers, switches, and mobile applications for various agencies based on various guidelines and standards such as CERT-IN, OSSTMM and OWASP.
- **Cyber Forensics Training:** Training for Government personnel in the area of information security was conducted by C-DAC in collaboration with 51 institutions across the country. C-DAC established a Cyber Forensic Training Facility (Cyber Centre) in Uttarakhand to facilitate development of human resources in cyber forensics.

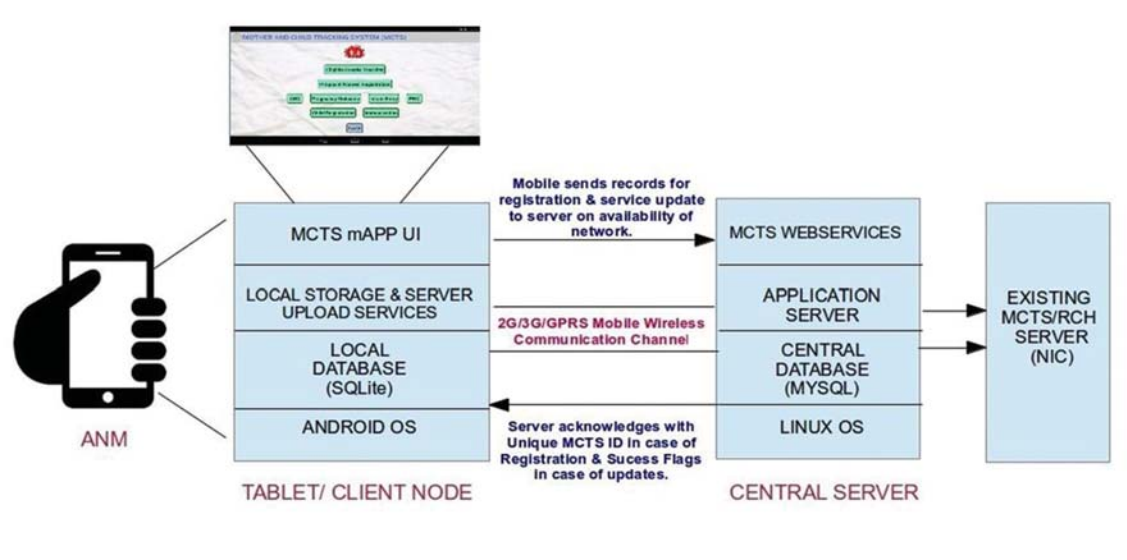
Health Informatics

C-DAC has been at the forefront of development and propagation of ICT in healthcare domain. During the year, C-DAC developed many healthcare solutions for diagnosis purposes, health information systems towards improvisation of health processes, healthcare standards towards compliance to standards, and telemedicine to scale up and offer healthcare services. C-DAC also initiated few other activities to contribute towards offering effective healthcare services. The activities carried out by C-DAC during the year in this thematic area are described below.

Healthcare Solutions

Mother and Child Tracking System (MCTS)

Mother and Child Tracking System (MCTS)/Reproductive and Child Health (RCH) is an Android based mobile application that helps to improve delivery of healthcare services to pregnant women and children by monitoring service delivery to each beneficiary. It is an initiative of Ministry of Health and Family Welfare (MoH&FW). The information/details of beneficiaries are obtained by ANM/ASHA workers in various Reproductive Child Healthcare (RCH) registers in standard formats at field level, and are entered into the MCTS application either at Primary Health Centre (PHC) or at Block level by data entry operators. This process reduces the time to obtain this information and avoids error-prone data entry given the multiple human interactions involved.



Mother and Child Tracking System

mSwasthya

mSwasthya is a healthcare mobile app store having mobile applications on health, wellness and fitness. Over 20 mobile applications designed in health, wellness and fitness are now available at *www.mswasthya.in* and mGov app store. The applications are designed as self-care applications and are targeted for citizens of India. More than 10,000 users have downloaded the applications during the year.

Diabetics Measurement System

The technology developed uses an infrared camera as an innovative component for the diabetic measurement software system. The system consists of thermal image capturing, image analysis, extraction of statistical feature and machine learning. The level of diabetic/non-diabetic measure is collected from FBS and PPBS blood biochemical test reports of each subject. The system is planned to be deployed at various medical institutions across Indian states.

Seizure Prediction System

C-DAC is developing a biomedical signal analyzer for seizure prediction. This solution detects preictal regions for seizure prediction using offline EEG data recordings. The system is equipped with automatic learning capability to differentiate preictal and interictal patterns of brain wave synchronization, opening up new therapeutic possibilities. The system is being deviced to find the preictal region before seizure onset by applying advanced digital signal processing methods along with machine learning techniques.

Diabetic Retinopathy System

C-DAC is developing a system for automatic detection of diabetic retinopathy from retinal images. This solution will eventually be used as a screening system for retinopathy towards prevention of blindness in diabetic patients. The system works by analysing retinal images captured using fundus photography for possible lesions like exudates, cotton-wool-spots, haemorrhage and tiny blood spots – micro aneurisms – which are the early signs of diabetic retinopathy.

Human Emotion Recognition System

Emotional impairment is a very common feature of individuals with autism. They are unable to recognize and understand other's emotions and are unable to express their own emotions. The present work is targeted to improve the cognitive-affective faculty of individuals with autism, so that their emotional well-being may be enhanced and social interactions improved to a certain extent. This is done by using as an assistive aid computerized system based on identification of facial expressions recognized from visual cues expressed for happiness, anger, disgust, surprise, sadness and fear.

Bluetooth EEG

An Electroencephalograph (EEG) is the signal generated by human brain cells. A linear phase processing of this EEG signal is very important for analyzing the mental health such as epilepsy, sleep disorders, brain tumors, etc. of a patient under consideration. To amplify the EEG signal and reduce the noise components in it, proper acquisition and processing circuitry is needed. The system uses two silver plated electrodes that acquire potential difference of positions of human scalp. To amplify EEG signal, an instrumentation amplifier with very high CMRR (Common Mode Rejection Ratio), very high input resistance, very low offset voltage, and very low input noise are required. For filtering out the unwanted signal, an eighth order active band-pass Bessel filter with passband of 0.4 to 35 Hz is designed. The EEG signal is digitized with a sampling rate of 1000 samples/sec. Bluetooth module is used in the C-DAC product for wireless transmission of processed data.

e-SafeT: An 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 tempera ture 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. The wireless link is used for location stamping at key transit points. The logged data can be downloaded and viewed on a computer to enable corrective actions in the cold chain and also to ascertain the suitability of the tracked material for use. e-safeT is a Windows based software package that is included with every e-safeT data logger. It allows for easy setup, retrieval, interpretation and export of the recorded data. It is simple to connect e-safeT data logger to the USB port and begin communicating immediately. The offline analysis provides graphical representation of the temperature variation over a period of time and identification of zones where temperature violation took place.

Health Information Systems

Blood Bank Management System (BBMS)

C-DAC completed a project to streamline the workflow of the IMA Blood Bank, Dehradun using C-DAC developed Blood Bank Management System (BBMS). C-DAC is now involved in annual maintenance of existing BBMS and

addition of new modules as per the requirements of IMA Blood Bank.

Drug Supply Chain Management System

C-DAC has been awarded projects by Telangana, Andhra Pradesh, Gujarat, Madhya Pradesh and Delhi governments to provide a complete supply chain management system for drugs and to bring transparency in generic drug delivery to patients free of cost. The primary objectives of these projects are to ease the management, monitoring and functioning of drug procurement, testing and distribution together as a supply chain from district/corporation level to local level.

Hospital Management System

C-DAC has undertaken a project to provide Hospital Information Management Systems (HIMS) based on SaaS (Software-as-a-Service) model in the states of Telangana and Andhra Pradesh. The primary objectives of this project are to ease the management, monitoring and functioning of patients, staff, reports and other related entities in hospitals throughout the state. One such deployment will also be done at Nizam's Institute of Medical Sciences, Hyderabad.

Healthcare Knowledge System

C-DAC has developed a Healthcare Knowledge System (HKS), which is based on knowledge graphs/concept maps. The web-enabled HKS consists of networks of health concepts. It has been deployed at 42 locations across all the 8 North East states. Nine workshops have been conducted across North East states for promoting public health awareness and education.

Healthcare Analytics

C-DAC along with AIIMS, New Delhi, is developing an analytic big data framework that uses multiple inputs of healthcare data to derive metric based insights. This shall enable healthcare providers (hospitals and doctors) and funding agencies (governments) to standardize best practices on medication, improve the patients' experience, and institute preventive and corrective measures in the field of healthcare. As part of this initiative, an infrastructure for healthcare data consolidation is being established and integrated with healthcare analytics framework to facilitate deep analytics on the combined data set including analytics, modelling and data prediction, and business intelligence.

Healthcare Standards

SNOMED CT Toolkit

To promote usage and adaption of SNOMED CT® in the country, under the guidance of Ministry of Health and Family Welfare (MoH&FW), C-DAC has developed a toolkit called C-DAC's SNOMED CT Toolkit (CSNOtk) for simple and rapid integration of SNOMED CT® in healthcare applications. CSNOtk provides simple to use suite of tools for SNOMED CT® database integration, generic and term/suffix based search, as well as ready to use jQuery based custom control for SNOMED CT® UI enablement. This toolkit enables clinicians and researchers to find out relevant SNOMED CT® codes with their synonyms, fully specified names and different types of relationship between concepts.

India, as a member country of International Health Terminology Standards Development Organization (IHTSDO), is setting up an Interim National Release Center (iNRC) of India at C-DAC for SNOMED CT coding system of IHTSDO. The iNRC will be the central point of contact for distribution of SNOMED CT release files and related information, licenses, integration assistance, etc. SNOMED CT is a comprehensive clinical vocabulary standard, owned, maintained, and distributed by IHTSDO.

Healthcare Record Standards Compliance

C-DAC has undertaken a project to develop techniques, methodologies, tools and manpower for test engineering and related technology for standards compliance evaluation of the EHR (Electronic Health Record) system and compliance with notified standards. This will enable standardized EHR implementations at national/state level for e-Governance in healthcare sector. It will also help public and private healthcare operators become compliant to notified and relevant standards.

Clinical Record Integration Platform

C-DAC has undertaken a project to build a clinical records integration platform at multi-specialty trauma center, JPNATC, AIIMS, New Delhi, to integrate clinical records from multiple and diverse existing systems.

Telemedicine

Telemedicine Facilities at Punjab and Odisha

C-DAC enhanced the telemedicine solution deployed earlier at Punjab Health Systems Corporation (PHSC) at 27 telemedicine centers of Punjab state and provided support. Similarly, C-DAC enhanced the telemedicine network deployed by it in the state of Odisha and provided support.

Telemedicine Facility at Kerala

C-DAC implemented a telemedicine system at Medical College Manjery using Kerala State Wide Area Network (KSWAN) connectivity. With the introduction of the telemedicine facility, Medical College Manjery carries out expert consultations with other telemedicine-equipped hospitals and seeks expert opinions from premier institutes like Regional Cancer Centre (RCC) and Sreechitra Tirunal Institute of Medical Science and Technology (SCTIMST), Thiruvananthapuram. The telemedicine system facilitates tele-radiology and tele-cardiology services as well. This facilitates doctors to interact with the specialists through video conferencing and access the Electronic Medical Record (EMR) of the patient undergoing tele-consultation.

Telemedicine Facility at Assam

C-DAC has undertaken a project to establish Telemedicine Consultation Centres (TCC) at Cachar Cancer Hospital & Research Centre and two villages on a pilot basis in association with NIT Silchar to provide specialized healthcare services to the rural population. After successful implementation and utilization, the model will be replicated in 15 other border villages along India-Bangladesh border. Three TCCs at Cachar Cancer Hospital & Research Centre (specialist node) CCHC, Babutilla/Madhutilla (remote node) and Tukagram/Bhanga (remote node) at Silchar are being established. The two remote TCCs will be equipped with basic telemedicine equipment (which includes medical equipment and other related equipment), and will connect with the TCC at CCHC.

New Initiatives

C-DAC continues to undertake new challenges for creating technologies targeting different needs and requirements in healthcare domain. Continuous innovation and focus to deliver usable solutions remains the hallmark of C-DAC's contribution and effort in the healthcare domain. Following are some of the major new initiatives of C-DAC in healthcare domain.

Indigenous Magnetic Resonance Imaging Technology

C-DAC (as a part of a national mission) is engaged in developing MRI technology along with Swadeshi Chumbakiya Anunaad Chitran – Ek Rashtriya Abhiyaan. MRI is the technology by which non-invasive imaging of different inner organs of human body is possible. In this multi-institutional project, the developed image visualization software shall be integrated with earlier developed 1.5 Tesla MRI scanner. C-DAC's main contribution in this initiative is the

development of software modules for MR image visualization, whereas Medical Imaging Research Center of DSI Bengaluru is providing the prototype.

Tele-Consultation Centres

As a part of the Digital India initiative, C-DAC is carrying out a project called Developing Digitally Inclusive and Smart Community (DISC). Under this project, with respect to telemedicine, C-DAC shall establish Tele-Consultation Centers (TCC) to provide specialized healthcare services to the people residing in remote and rural population of India as well as the urban populace using telemedicine. It is proposed that tele-consultation centers at about 75 locations across India shall be identified and equipped with basic telemedicine equipment (which includes medical equipment, IT and networking equipment for internet connectivity).

Mobile based Surveillance System for Malaria

Major objective of this initiative is to develop and deploy mobile/tablet based integrated malaria surveillance system – iMoSQuIT, along Indo-Bhutan, Indo-Myanmar and Indo-Bangladesh international borders with new features like geo-tagging of patients location, spatial epidemiology, vector surveillance, drug inventory and continuous medical education. Developed system will dynamically map malaria hot spots. It will also point out the geographic locations of hot pockets to carry out focused malaria control by state health authorities.

Telemedicine Network in Armenia

Under this initiative, C-DAC shall deploy telemedicine network at various locations in Armenia for providing specialized healthcare facility to the people of Armenia under Indo-Armenian cooperation initiatives of Ministry of External Affairs, Government of India.

Cloud-enabled Personal Health Record

This project shall create Personal Health Records (PHRs) of individuals by aggregating their clinical and health information for better disease management, thereby leading to a healthier lifestyle.

Education and Training

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

- Industry-specific training programmes
- Industry-academia collaborative Masters programmes
- Corporate training programmes
- Faculty development initiatives
- IT skill development initiatives
- International initiatives
- Use of technologies for imparting education and training

The major activities carried out during the year under these categories are described below.

Industry-specific Training Programmes

A major focus of C-DAC's education and training division is to generate industry-ready manpower in ICT and electronics areas. Towards this objective, C-DAC conducts following PG Diploma programmes:

- PG Diploma in Advanced Computing (PG-DAC)
- 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 Healthcare Informatics (PG-DHI)
- 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 4700 students through these PG Diploma programmes.

Industry-Academia Collaborative Masters Programmes

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

- ME in Wireless and Mobile Computing
- ME in IT System and Network Security
- ME in VLSI and Embedded Systems Design
- ME in High Performance Computing

About 225 students were enrolled during the year in these programmes.

Corporate Training Programmes

C-DAC transfers its expertise in various R&D areas to the corporate sector for larger national benefit through its corporate training programmes. As part of this initiative, C-DAC conducted various types of training programmes during the year for the personnel of Indian army, Indian navy and other Defence establishments. The 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.

Faculty Development Initiatives

Training the trainers is an important objective of C-DAC's education and training division. C-DAC's faculty development initiatives are targeted towards this objective. During the year, C-DAC offered two weeks training to faculty

members of 249 engineering colleges spread across 25 states in India covering hardware, embedded systems, system software and application software areas.

IT Skill Development Initiatives

Government has emphasized IT skill development need in our youth and other citizens to improve their employability. To aid development of IT skills in workforce, C-DAC took various IT skill development initiatives during the year which include the following:

- Training students in various IT skills like Java, Software testing, VLSI, Embedded security and Microsoft .Net
- Conducting job-oriented training programmes such as Post Graduate Diploma in Advanced Computing (PG DAC) for Scheduled Caste (SC) students of Maharashtra.
- Students belonging to Scheduled Castes (SC) and Scheduled Tribes (ST) were trained in high-end skill oriented, 6 months diploma programs viz. Diploma in Embedded Systems Design (DESD), Diploma in Systems Software Development (DSSD) and Diploma in Advanced Computing (DAC).
- For building a scalable model of imparting such trainings, job-oriented vocational IT trainings were conducted for economically weaker women and Self Help Group (SHG) members/local youth of Purba Medinipur district of West Bengal to create a batch of master trainers and equip them with necessary skills to support local Government in various sectors such as data entry, data maintenance, documentation, hardware maintenance, and maintenance of e-Governance activity. About 200 master trainers comprising 160 women and 40 SC/ST/Minority candidates were trained. Master trainers in turn provided training to 2094 local youths with the guidance of C-DAC under IT literacy programme. 25 trained persons have been placed and others are self-employed.

International Initiatives

Management Development Programme

C-DAC conducted a ten days workshop from February 2, 2015 to February 11, 2015 at Pune for Centre Heads/ Managers of the IT Centers of ten different countries. The workshop had expert speakers from academia, industry and Government departments. The workshop focused on the best practices for centre management, course management, course delivery mechanism, marketing and promotions, quality standards, placement support, student management, virtual learning technology, instructions on online pedagogy and digital learning technology. The event was attended by around 22 representatives from Turkmenistan, Belarus, Ghana, Tanzania, Seychelles, Cambodia, Armenia, Kazakhstan, Greneda and Vietnam.

Nurturing International ICT Centres

With support from Ministry of External Affairs (MEA), C-DAC extends its expertise in ICT to collaborating nations and nurtures their ICT centres. During the year, the following activities were carried out as part of this initiative:

- C-DAC deputed experts at Lima (Peru) and Quito (Ecuador) for course delivery and centre coordination for a duration of two years for setting up of India-Peru Centre of Excellence in IT (IPCEIT) at Lima, and India-Ecuador Centre of Excellence in IT (IECEIT) at Quito.
- An agreement was signed on August 22, 2014 for setting up of India-Palestine Centre of Excellence in ICT and Digitial Learning and Innovation Centre.
- Six participants from Palestine, three participants from Ghana and two participants from Turkmenistan were enrolled in the February 2015 batch of C-DAC's PG Diploma programmes. They successfully completed their respective programmes.
- In order to strengthen the India-Myanmar Centre of Enhancement of IT Skills (IMCEITS), and create awareness about the C-DAC courses as well as promote IMCEITS as an institution providing advanced skills in Myanmar, C-DAC conducted the marketing research study to suggest the branding strategy.
- C-DAC and National Chiao Tung University, Taiwan have initiated the student exchange programme for R&D and Education and Training programmes for the benefit of the students of the University and those of C-DAC.

Promoting Indian Industry in Non-English Speaking Countries

C-DAC has initiated the training of about 1500 IT professionals/employees/students in 4-5 foreign languages such as Chinese, Japanese, German, French and Spanish within a span of three years so as to promote Indian industry and ventures especially the IT, ITES, BPO, KPO in the non-English speaking countries.

ITEC Portal

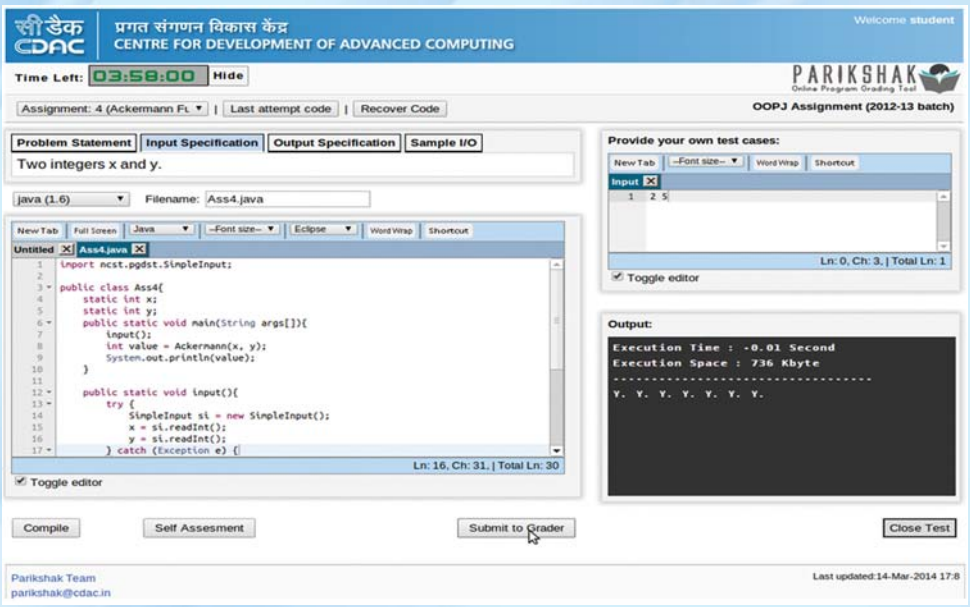
The Indian Technical and Economic Cooperation (ITEC) programme is the flagship capacity building programme of the Government of India for training thousands of foreign officials in India every year. C-DAC has made an initiative to revamp the existing ITEC portal to facilitate concerned stakeholders. The new ITEC Portal will be having features for applicant registration and processing, financial reports, provision for proposal submission by institutes and its acceptance/rejection by MEA.

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.

Parikshak

Parikshak is an automated program grading and analysis tool. Its key features include automatic evaluation and grading of computer programs, maintaining logs of all submission records of students, supporting test and assignment modes, easy result processing and publishing, supporting question bank, plagiarism detection module, and live monitoring of exams and assignments.



Parikshak

eMentor

eMentor is a web-enabled learning solution that encompasses training, education, just-in-time information and communication, computer-based learning, virtual classrooms and digital collaborations. It involves interactivity which may include online interaction between the learner and the teacher, and between peers. eMentor was also deployed at India-Myanmar Centre for Enhancement of IT Skills (IMCEITS), Myanmar.

ePariksha

ePariksha is a web-based application for automation of the examination process. It assists in preparing question papers, scheduling exams, monitoring exams and generating results.

ConWMS (Conference and Workshop Management System)

The ConWMS system automates the process of planning and conduction of conferences and workshops and minimizes the efforts of committee members. It provides two layers of review process - first with the abstract and once the abstract is accepted, then the entire content of the paper. An important feature of ConWMS is to check the originality of the submitted paper. The system also facilitates the user in the management of various workshop activities including team creation, session creation and updation, participant registration and confirmation, and handling payments.

Placement Management System

Placement Management System (PMS) automates the manual processes of carrying out placement and recruitment. It is a web-based and authority-based batch-wise information system for maintaining student information, company information, campus activity, and statistical reports.

e-Mulyankan

e-Mulyankan is a web application that enables the students to appear for the lab tests and to upload their answered files for evaluation. e-Mulyankan helps the examiner to evaluate the answers and generate evaluation reports at any time. It also helps to analyze the performance of the students in each module.

e-Mulyankan

GATE 2015 and JAM 2015 Exams for IITs

Automation tools for managing GATE 2015 and JAM 2015 examinations were developed and these facilitated candidate registration, online application, application scrutiny, seat allocation, hall ticket issue, result processing, and score generation. About 10 Lakh candidates took GATE 2015 and about 40000 candidates took JAM 2015 examination.

New Initiatives

Virtual Class Rooms for B.Tech. Programme of NIT Manipur

C-DAC has initiated discussions with NIT, Manipur and NIT, Silchar to setup virtual classroom infrastructure at NIT, Manipur and enable NIT, Silchar to conduct virtual courses for the students of NIT, Manipur. Link up with other NITs of North East region will also be established and minimum infrastructure will be provided there for conducting and recording of video lectures.

Project Management

C-DAC has initiated the “Certificate Course in Project Management” especially for the PSU/ Government employees to enhance their skills for executing the mission mode projects successfully.

Big Data Analytics

C-DAC has initiated Post Graduate Diploma programme in Big Data Analytics domain for the students to understand the search methods and visualization techniques, techniques for mining data stream, and development of applications using Map Reduce concepts.

Resources, Facilitation Services and Initiatives

Collaborations/Cooperations

1. C-DAC collaborated with University of Surrey, UK in the area of Bioinformatics Analysis for Tuberculosis Vaccine and Diagnostics Development in Cattle.
2. C-DAC collaborated with Pirbright Instiute, UK in the area of Bioinformatics Analysis for Viral Resistance/ Susceptibility in Chicken.
3. C-DAC collaborated with OHSL USA, PSNC Poland, Chalmers University Sweden, and Notre Dame University, USA for usage of collaborative cloud network useful for research related with health science and doing a Proof-of-Concept (PoC) with use cases.
4. C-DAC collaborated with C R Rao Advanced Institute of Mathematics, Statistics and Computer Science, Indiana University and Broad Institute, USA for using the BRAF resources to run simulations using MS Simulator and generate samples for biomarker analysis.
5. C-DAC collaborated with Institute for Computer Aided Design, Moscow, Russia to promote Indo-Russian research co-operation in the area of HPC Simulation Studies in Computational Fluid Dynamics (CFD) and HPC Simulation Studies in Computational Structural Mechanics (CSM).
6. C-DAC collaborated with IEEE in the area of Cloud Interoperability for participation and contribution to IEEE Inter-cloud testbed.
7. C-DAC collaborated with Institute of Mathematics and Physical Sciences (IMSP), Benin for providing training on establishment of ICT Infrastructure at Benin.
8. C-DAC in collaboration with Ministry of External Affairs (MEA), Govt. of India provided training under ITEC/ SCAAP scheme of MEA to 147 participants from over 50 countries at C-DAC Noida in areas of e-Governance, Open source, Cybercrime, e-Learning, GIS, etc.
9. C-DAC collaborated with Centre for Image Analysis (CBA), Uppsala University, Sweden in the area of Medical Image Analysis for Early Detection of Cervical Cancer.
10. C-DAC collaborated with University of Napoli Federico II, Italy in the area of Network Monitoring and Measurements for Performance Evaluation and Comparison of Traffic Generators on 10Gbps and 40Gbps Network Links.
11. C-DAC signed MoU with IEEE for joint collaborative work in the areas of Standardization and Skills development.

Patents

Patents Awarded

1. "Distributed Time Synchronization of Road Traffic Signal Controllers Using GPS", Inventor(s): P Ravikumar and V Muralidharan, Patent No: 265001.

Patents Filed

1. "Method and System for Dynamic Adaptation of Program Execution on Different Target Hardware", Inventor(s): Shamjith K V, Mangala N, Deepika H V, Prachi Pandey, Prahlada Rao B B and N Sarat Chandra Babu.
2. "An Education Framework for Individuals with Cognitive Disabilities and a Method Thereof", Invenror(s): Annie Joyce Vullamparthi, Karthika Venkatesan, Sharadhi Manjeshwara, Sivaranjani Duraisamy and N Sarat Chandra Babu.
3. "System and Method for Performing Science Experiments", Inventor(s): N S Sreekanth, Nobby Varghese and Supriya N Pal.
4. "Multi-channel Wireless Personal Area Network (WPAN) Gateway and End Device", Inventor(s): David Selva Kumar, Haribabu, Kaushik Nanda and Kiran Naik.
5. "Apparatus and Methodology for Measurement of Obnoxious Odorant Concentrations and Odour Intensity in Pulp and Paper Industry", Inventor(s): Nabarun Bhattacharyya, Arun Jana, Devdulal Ghosh, Jayanta Kumar Roy, Rabindranath Kanjilal, Ravi Sankar, Amritasu Das, R A Pandey, Sharvari Deshmukh and Satish R Wate.
6. "Process for Automatic Facial Expression Recognition and a System Therefor", Inventor(s): Soma Mitra, Debasis Mazumdar, Washef Ahmed and Kunal Chanda.
7. "Automatic Speaker Recognition Using Voice Biometric and Method Therefor", Inventor(s): Debasis Mazumdar, Soma Khan and Joyanta Basu.
8. "Apparatus for Automated Monitoring of Facial Images and a Process Therefor (Third Eye)", Inventor(s): Debasis Mazumdar and Ritesh Mukherjee.
9. "System and Solution for One Time Mobile Originated PKI", Inventor(s) : Zia Saquib, Kapil Kant Kamal, Manish Kumar and Bharat Varyani.
10. "System and Method for Robust Iris Recognition", Inventor(s): Abhishek Gangwar, Akanksha Joshi and Ashutosh Singh.
11. "A Transducer-less Computing Unit for Electric Parameters and a Method Thereof", Inventor(s): Latha Bhaskara Kaimal, Sindhu Rajan, Titus Antony Chazhoor, Sudeep Balan and Vijaya Bhaskara Rao.
12. "A Lifting Device for Lifting Animal to Upright Position", Inventor(s): M C Kartha and L S Unnithan.
13. "Support Structure for Animals", Inventor(s): M C Kartha and L S Unnitha.
14. "A Device for Determining Sucrose Concentration in a Solution and a Method Thereof", Inventor(s): S Rominus Valsalam, Sindhu R, Lajitha C S and Arun Krishnan K.
15. "Method and System for Adaptive Power Management", Inventor(s): Gopakumar G, Deepu K Krishnan, Deepa Sivan, Krishnakumar Rao and Biju C Oommen.
16. "A Vehicle Mountable Rolling Earth Exciter System for Landmine Detection", Inventor(s): K Raveendran Nair, Murali R, Rajesh K R and James Varghese.
17. "Device for Distance Measurement Using Single Probe Ultrasound Sensor and a Method Thereof", Inventor(s): Murali R, Subodh P S, Byju C, Nimmy Mathew and Nithin Prashanth.

Copyrights

Copyrights Awarded

1. "Krishi Sandesh", Inventor(s): Ritesh Mukherjee, Debdulal Basak, Shampa Dey, Niladri Sekhar Saha, Argha De and Samaresh Das.
2. "Krishi Barta", Inventor(s): Niladri Sekhar Saha, Shampa Dey, Debdulal Basak, Samaresh Das, Ritesh Mukherjee and Argha De.
3. "Krishi Vani", Inventor(s): Argha De, Debdulal Basak, Ritesh Mukherjee, Niladri Sekhar Saha, Samaresh Das and Shampa Dey.
4. "AMMAR", Inventor(s): Abhra Pal, Tamal Dey, Amitava Akuli, Nabarun Bhattacharyya and Rabindranath Kanjilal.
5. "E-Nose for Tea", Inventor(s): Devdulal Ghosh, Arun Jana, Jayanta Kumar Roy and Nabarun Bhattacharyya.
6. "E-Tongue for Tea", Inventor(s): Subrata Sarkar, Arun Jana, Jayanta Kumar Roy and Devdulal Ghosh.
7. "Tea-Ferm Vision", Inventor(s): Amitava Akuli, Abhra Pal, Vamshi Krishna Palakurthi, Nabarun Bhattacharyya, Jayanta Kumar Roy and Rabindranath Kanjilal.
8. "Tea-Appearance Analyser", Inventor(s): Abhra Pal, Amitava Akuli, Vamshi Krishna Palakurthi and Nabarun Bhattacharyya.
9. "Tea-Vision", Inventor(s): Abhra Pal, Tamal Dey, Amitava Akuli, Nabarun Bhattacharyya and Rabindranath Kanjilal.
10. "Resham Darshan", Inventor(s): Abhra Pal, Jayanta Kumar Roy, Amitava Akuli, Nabarun Bhattacharyya and Rabindranath Kanjilal.

Copyrights Filed

1. "A System for Determining Erosion in a River Bank Using a Laser Based Range Finder", Inventor(s): Anil Kumar Gupta, Manoj Khare, Gaurav Wable, Tarun Batra and Murugesh Prabhu.
2. "Fund and Accounts Management System", Inventor(s): Prashant Nayak, Shripad S Kalambkar, Amit Deshmukh, Srinivasa Rao, Anita Ghule, Mahendra Mhadam and Chetan Sharma.
3. "ECR Analysis", Inventor(s): Prashant Nayak, Amit Deshmukh, Vaishali Jaiswal, Vikas Rajane and Gaurav Paliwal.
4. "ANUVIDH", Inventor(s): Savita Pethkar, Geetanjali Gadre, Vinod Kumar M, Atulchandra Bodas, Vaishali Mhasade, Vikas Ranjane, Shashikant Kumbhar and Prashant Nayak.
5. "Works Online, Monitoring System (WOMS)", Inventor(s): Prashant Nayak, Shripad S Kalambkar, M Srinivasa Rao, Devendra Yadav, Mahendra Mhadam, Shyam Yadav, Vikram Nandanwar and Prince Paliwal.
6. "Quality Monitoring System (QMS)", Inventor(s): Prashant Nayak, M Srinivasa Rao, Mahendra Mhadam, Anand Singh, Shyam Yadav, Pankaj Kumar, Samerendra Prasad, Jyoti Zagade and Mahavir Tirkey.
7. "Document Registration of Goa Valuation and E-Registration Software (GAURI)", Inventor(s): Prashant Nayak, Shripad S Kalambkar, Ajit Singh Tomar, Shaila Sagar Eksambekar, Aparna Amar Deshmukh, Prashant M V Prajakta Waghamare and Jyoti Zagade.
8. "Bug Tracking Tool (BTT)", Inventor(s): Prashant Nayak, Amit Deshmukh, Samarendra Biswal, Pankaj Kumar, Devendra Yadav, Jyoti Zagade and Vaishali Mhasade.
9. "Context Aware Framework", Inventor(s): Sridevi S and Sayantani Bhattacharya.
10. "Smart Plug Embedded Communication Firmware", Inventor(s): Arunkumar V.
11. "Prediction Control of HVAC in Smart Buildings Using WSN", Inventor(s): Sayantani Bhattacharya, Sridevi S and Arun R.
12. "Z-LED Lighting Solution", Inventor(s): S Sridevi, Dhivya G, R Arun and Harikrishnan V S.
13. "Indoor Air Quality Monitoring Tool", Inventor(s): Sayantani Bhattacharya and Sridevi S.
14. "Empowering RNTCP Stakeholders with Effective TB Treatment Adherence and Control Using Mobile and ICT – Technology", Inventor(s): Anuradha Lele.
15. "Retinal Image Annotation and Grading Software", Inventor(s): Deepak R U, Sharath Kumar P N and Rajesh Kumar R.

Awards/Recognitions

1. The International Telecommunication Union (ITU) awarded "MOTHER (MObile based maTernal HEalth awaReness)" application in e-Health category. The award was presented during the WSIS High-Level Event held at Geneva, Switzerland on June 10, 2014.
2. "Mobile Seva" received 2nd Place Winner Award of United Nations Public Service in the Category of "Promoting Whole-of-Government Approaches in the Information Age" at Seoul, Republic of Korea.
3. The project titled "Development and Deployment of IT-based Design Tools for Common Weavers and Artisans" received the "Manthan South Asia Award" at the 11th Manthan Award Summit held on December 04, 2014 at New Delhi.

4. The project titled "Digital Library for North Eastern States (Content Creation, Storage and Access)" received the "5th eNorthEast Award 2014" on November 7, 2014 at Mizoram, Aizwal in the eCulture and Heritage category.
5. "Mobile Based Surveillance Quest Using IT (MoSQUIT) for Malaria" received the "5th eNorthEast Award 2014" on November 7, 2014 at Mizoram, Aizwal in the e-Health category.

6. "mSwasthya – A Healthcare App Store" received certificate of recognition at "mBillionth South Asia Awards 2014" on July 18, 2014 held at India Habitat Centre, New Delhi.
7. "e-Aushadhi – An Advanced Drug Warehouse Management System" received following awards in the category of IT Implementation:
   - "PCQuest Best IT Implementation Award 2015" on March 20, 2015 at Kochi.
   - "South Asia E-Health Summit Award 2014" on December 10, 2014 at Delhi.
   - "Skoch Awards for Excellence 2014" on September 20, 2014 at Delhi.
   - "Maharashtra Healthcare Leadership Awards 2014" and "State e-Gov Awards 2014" on August 21, 2014 at Mumbai.
8. "Integration of KAVERI – with E-Swathu (Rural Development and Panchayat Raj Department)" received "eINDIA Awards 2014" in the category of Government to Citizens (G2C) on November 14-16, 2014 at Kerala.

Events/Conferences

1. Conducted a workshop on “HPC Systems, Parallel Programming on Multi & Many Core and Scientific Domains” for delegates from Ghana-India-Kofi-Annan Centre of Excellence in ICT at Accra, Ghana during August 4-14, 2014 at C-DAC, Pune.
2. Conducted “Indo-Russian Workshop and Poster Presentation on High Performance Computing (HPC) for Computer Aided Engineering and Sciences” during November 18-20, 2014 at NCRA, Pune University Campus, Pune.
3. Conducted “CHAIN REDS Workshop” at IIT, Guwahati, on December 17, 2014 in collaboration with EGI Europe and NKN.
4. Conducted a ten days workshop on “Manager Development Programme (MDP)” to proliferate ICT skill development in friendly countries where the IT Centres are setup across the globe. Heads, Directors and Coordinators from 11 countries namely Belarus, Ghana, Turkmenistan,Tanzania, Seychelles,Cambodia, Armenia,Grenada,Vietnam, Kazakhstan,and Uzbekistan participated in this workshop.

Participants of Manager Development Programme (MDP)

5. Conducted an international workshop on “Medical Image Analysis for Early Detection of Cervical Cancer” during February 26, 2015 to March 5, 2015 atC-DAC Thiruvananthapuram.
6. Conducted a workshop on “Ethical Hacking” at CSI Bangalore Chapter on December 19, 2014 in collaboration with CSI Bangalore Chapter.
7. Conducted “GARUDA-NKN Partners Meet 2014” at IISc, Bangalore during September 19-20, 2014 in collaboration with NIC.
8. Conducted 2nd edition of the National Conference on “Parallel Computing Technologies - PARCOMPTECH 2015” during February 19-20, 2015 at NIAS Auditorium, IISc, Bangalore in collaboration with NIC and NKN.

PARCOMPTECH India 2015

9. Conducted “e-Pramaan Authentication Service Awareness Program” at Secretariat, Andaman and Nicobar Administration, Port Blair during April 7-8, 2015.
10. Conducted training on “BOSS” to IT Department Officials, Govt. of Tamil Nadu on April 11, 2014 and to Tamil Nadu Departments Officials on July 2, 2014 at C-DAC, Chennai.
11. Conducted a workshop on “Cloud Computing and Virtualization” at Institute for Development and Research in Banking Technology, Hyderabad during July 23-24, 2014.
12. Conducted a workshop on “Health Care Knowledge System” for Public Health Awareness & Education at SMIMS Medical College, Tadong, Gangtok, Sikkim on April 8, 2014 and another workishop on the same theme at NEIGRIHMS, Mawdiangdiang on June 14, 2014.
13. Conducted a workshop on “Technology Disclosure of Handheld Electronic Nose (HEN) and Resham Darshan” at Bengal Chamber of Commerce and Industry, Kolkata on August 11, 2014.
14. Organized a User’s Meet on “Quality Evaluation of Jasmine Flower and Concrete by Electronic Means” at TNAU, Coimbatore on February 5, 2015.
15. Conducted 2nd International Conference on “Perception and Machine Intelligence” at Saha Institute of Nuclear Physics (SINP), Kolkata on February 26-27, 2015 in collaboration with Machine Intelligence Unit (MIU), Indian Statistical Institute (ISI), Kolkata.
16. Conducted a workshop on “ICT Awareness for Dealing with Cyber Crime” at Bharani Bhawan, Alipur, Kolkata on June 19, 2014 in collaboration with CID, West Bengal.
17. Conducted “ISEA Master Training Workshop” for teachers of West Bengal Higher Secondary Examination and CBSE schools at C-DAC, Kolkata during January 27-29. 2014.
18. Conducted Information Security Awareness Workshop at office of Urban Development, Govt. of West Bengal, Salt Lake, Kolkata on February 19, 2015 for the Urban Development Officers, Govt. of West Bengal.
19. Conducted Information Security Education and Awareness (ISEA) Workshop for Police Officers at Central Detective Training School (CDTS), Kolkata on March 9, 2015.
20. Organized Exhibition of C-DAC’s Cyber Forensics tools at Guwahati High Court during March 21-22,2015.
21. Conducted a National Workshop on “Digitization and Digital Preservation of Documents and Books” at Shillong, Meghalaya during November 4-5, 2014.
22. Conduced a Workshop on “Honeynet Attack Data Collection and Analysis” at Department of Computer Science and Engineering, MIMIT, Malout (Govt. of Punjab) on January 29, 2015.
23. Conducted a Workshop on “eSangam Awareness” for the State e-Governance Mission Teams and SSDG IAs at C-DAC, Mumbai on May 23, 2014.
24. Conducted a Workshop on “Innovation Promotion by Nurturing Startups under TIDE Scheme of DeitY” at DeitY, New Delhi on December 3, 2014.
25. Conducted a Workshop on “Spatial Technologies in Disaster Management” at Symbiosis Institute of Geoinformatics, Pune on October 11, 2014 in collaboration with Indian Society of Geomatics, Indian Water Resources Society and Symbiosis Institute of Geoinformatics.
26. Organized 2nd Frequently Used Entry List (FUEL) - Globalization, Internationalization, Localization and Translation (GILT) Conference 2014 at Yashwantrao Chavan Academy for Development Administration (YASHADA), Pune during November 14-15, 2014 in collaboration with Red Hat.

FUEL GILT Conference 2014

27. Conducted a Workshop on “Accelerating Biology 2015: Catalyzing Evolution” at Yashwantrao Chavan Academy for Development Administration (YASHADA), Pune during January 20-22, 2015.
28. Conducted a Workshop on “SNOMED CT-Introduction and Implementation” by FICCI and C-DAC under the guidance of MoH&FW, Govt. of India for clinicians and vendors at New Delhi on Aug 26, 2014.
29. Conducted a Workshop on "Parallel Computing Architecture and Applications on Multi Core to Many Core Processing Systems" (PCAMS-2014), in collaboration with CUDA Centre of Excellence (CCOE) IIT, Bombay during June 16-20, 2014 at IIT Bombay.
30. Conducted a National Workshop on “GPU Programming and Applications (GPA2-2014)” in collaboration with IIT-Madras, CUDA Centre of Excellence (CCOE), IIT Bombay, and NVIDIA Corporation, during July 17-19, 2014 at IIT-Madras.
31. Conducted a Workshop on “GPU Programming and Applications (GPA3-2014)” in collaboration with Indian Institute of Technology (IIT)-Guwahati, CUDA Centre of Excellence (CCOE), IIT-Bombay and NVIDIA Corporation at IIT-Guwahati during September 12-14, 2014.
32. Conducted “HPC Workshop” in collaboration with NIT, Silchar during April 4-9, 2014 at NIT, Silchar.
33. Conducted a Workshop on “Digital Publishing in India” at Yashwantrao Chavan Academy for Development Administration (YASHADA), August 22, 2014 in collaboration with W3C.
34. Conducted a Workshop on “Drug and Vaccine Distribution Management System” at C-DAC, Silchar during March 26-27, 2015 in collaboration with MoH&FW, Govt. of India.
35. Organized Industry-Institute Partnership Meet for “Transfer of Technology of Tarang Digital Programmable Hearing Aid” at Bengal National Chamber of Commerce and Industry, Kolkata, on April 30, 2014.
36. Conducted “National Workshop on Power Electronics (NWPE 2014)”, under the aegis of National Mission on Power Electronics Technology (NaMPET-II) at BIT, Mesra Ranchi, during November 7-8, 2014.

National Workshop on Power Electronics (NWPE-2014)

ToT Meet of Tarang Digital Programmable Hearing Aid

Hon'ble Minister of Communication & IT, Shri Ravi Shankar Prasad, handing over the technology for iRIDS – Red Light Violation Detection System to M/s Shakti Enterpirses, Jaipur

Hon'ble Minister of Communication & IT, Shri Ravi Shankar Prasad, handing over the technology for iRIDS – Red Light Violation Detection System to M/s ITS Planners and Engineers Pvt Ltd., Hyderabad

C-DAC Participation in Good Governance Day Event at Delhi held on December 25, 2014

Research Papers/Publications

1. Divya M G, Rajeshwari and Subrata Chattopadhyay, "Application of Statistical Tools in Resource Allocation - A Study at Computational Grid-GARUDA", International Journal of Conceptions on Management and Social Sciences, Vol. 2, Issue. 3, September 2014, ISSN: 2357 – 2787.
2. R Rahmoune, P Ferrazzoli, Yogesh Singh, Y Kerr, P Richaume and A Albitar, "SMOS Retrieval Results over Forests: Comparisons with Independent Measurements", IEEE-JSTARS (Journal of Selected Topics in Applied Earth Observations and Remote Sensing), Vol. 7 No. 9, pp. 3858-3866. DOI: 10.1109/JSTAR.2014.2362597. (IF: 2.874), 2014
3. Mahendra K Verma, Pankaj Mishra, Mani Chandra and Supriyo Paul, "Energy Spectra in Rayleigh-Benard Convection", Journal of Physics: Conference Series, Vol. 318, 2014.
4. Melani R, K Khare, M Shah and P Gavali, "Incremental Dynamic Analysis of Reinforced Concrete Frame with Application on Grid Computing" at IABSE India, The Bridge and Structural Engineer, Volume 44, pp. 1-15, March, 2014
5. S Jadhav and Gouri Kadam, "Seismic Assessment of Existing Bridge Using OpenSEES", International Journal of Modern Engineering Research IJMER Vol. 4, Issue 7, July 2014.
6. Vinod Jani, Uddhavesh B Sonavane and Rajendra Joshi, "REMD and Umbrella Sampling Simulations to Probe the Energy Barrier of the Folding Pathways of Engrailed Home Domain", Journal of Molecular Modeling, May 2014, 20:2283.
7. Viraj P Patil, Anirban Ghosh, Uddhavesh Sonavane, Rajendra Joshi and Suresh B Waghmode, "Enantioselective Synthesis of Benzomorphon Analogues by Intramolecular Oxa-Pictet Spengler Cyclization", Tetrahedron: Asymmetry, Vol. 25, Issue 6-7, pp. 489-496, April 2014.
8. Sharma N, Sonavane U and Joshi R, "Probing the Wild-type HRas Activation Mechanism Using Steered Molecular Dynamics, Understanding the Energy Barrier and Role of Water in the Activation", Eur Biophys J. March 2014; 43(2-3):81-95. doi: 10.1007/s00249-014-0942-4. PubMed PMID: 24442446.
9. Ghosh A, Sonavane U and Joshi R, "Advances in GPCR Modeling Evaluated by the GPCR Dock 2013 Assessment: Meeting New Challenges", Structure 22, pp. 1120-1139, August 5, 2014.
10. Nilima A Vyas, Satish S Bhat, Avinash S Kumbhar, Uddhavesh B Sonawane, Vinod Jani, Rajendra R Joshi, Shefali N Ramteke, Prasad P Kulkarni and Bimba Joshi, "Ruthenium (II) Polypyridyl Complex as Inhibitor of Acetylcholinesterase and Aß Aggregation", Original Research Article European Journal of Medicinal Chemistry, Vol. 75, March 21, 2014, pp. 375-381.
11. Anirban Ghosh, Uddhavesh Sonavane and Rajendra Joshi, "Multiscale Modelling to Understand the Self-Assembly Mechanism Ofhuman_2-adrenergic Receptor", Lipid Bilayer Comput. Biol. Chem. 2014 Feb;48:29-39. doi:10.1016/j.compbiolchem.2013.11.002.
12. Swapan S Jain, Uddhavesh B Sonavane, Mallikarjunachari V N Uppuladinne, Emily C McLaughlin, Weiqing Wang, Sheneil Black and Rajendra R Joshi, "Structural Insights into the interactions of xpt riboswitch with Novel Guanine Analogues: a Molecular Dynamics Simulation Study", J Biomol Struct Dyn. 2014 January 3.
13. Inamdar H, Datta A, Manjari K S and Joshi R, "Rule-based Integration of RNA-Seq Analyses Tools for Identification of Novel Transcripts", J Bioinform Comput Biol. Oct; 12(5):1450026; 2014.
14. Bhakti Limaye, Sandeep Malviya, Sunitha Manjari K, Rashmi Mahajan and Rajendra Joshi, "GenoPipe: A Platform for High Throughput Comparative Genomics", C-DAC Technical Reports (August 2014).
15. Vaibhav Pol et al., "SUCHITRA (System for Urban, Clean, Healthy India Transformation through Rating) – A Cleanliness Rating tool for Cities to Empower Citizens", IOSR-JHSS, Vol. 20, Issue 2, pp. 07-11, February 2015.
16. B Raja Singh, S Rominus Valsalam, H Pratheesh, K T Sujimon and C Aditi, "Real-time Pulverised Coal Flow Soft Sensor for Thermal Power Plants using Evolutionary Computation Techniques", ICTACT International Journal on Soft Computing: Special Issue on Soft-Computing Theory, Application and Implications in Engineering and Technology, ISSN 0976 6561, 2015.
17. Lancy Thomas, Shankar S S, Parvathy V J and Arun C S, "Characterization of Paper Pulp Fiber Using Image

Processing Techniques", International Journal of Engineering Research and Technology (IJERT), Vol. 3, Issue 9, e-ISSN: 2278-0181, September 2014.

18. Sandeep Roman, Amit Kumar Jha, Janardhan Reddy, Himanshu Pareek and P R Lakshmi Eswari, "Practical Application Whitelisting", Journal of Information Assurance and Security, Vol. 10, Issue 2, pp. 53-60, 2015.
19. Ravi Kishore K, Mallesh M, Jyostna G, P R L Eswari and Samavedam Satyanadha Sarma, "Javascript Defender: Malicious Javascript Based Drive by Download Attack Analyzer and Defender", Journal of Information Security Research, Vol. 5, Issue 1, 2015.
20. Asok Bandyopadhyay, "Smart Bio-metric Authentication Instrument Using Handwritten Text and Signature Verification", International Journal of Research (IISRR), Vol. 1, Issue 2, 2015.
21. Bhagyashri Katole and Suresh V, "Design and Development of Cryptographic Primitives Provider", International Journal of Advanced Research in Computer Engineering and Technology, Vol. 4, Issue 2, pp. 275-278, 2015.
22. Sudhansu Sekhar Dash, Mina Desai, Arghya Ghosh and Samaresh Das, "Semantic Network Based Modelling to Design a Knowledge-Driven Decision Support Tool for Floral Diversity", Journal of Medical and Bioengineering, Vol. 5, No. 1, pp. 53-57.
23. Akhil Goyal and Navdeep S Chahal, "A Proposed Approach for Efficient Energy Utilization in Cloud Data Center," International Journal of Computer Applications © 2015 by IJCA Journal, Vol. 115, No. 11, pp. 24-27, April 2015. ISBN: 973-93-80886-02-2.
24. Sneh Garg and Sunil Chhillar, "Review of Text Reduction Algorithms and Text Reduction Using Sentence Vectorization", International Journal of Computer Applications (0975 – 8887), Vol. 107, No. 12, December 2014.
25. Sneh Garg and Sunil Chhillar, "Document Summarization and Evaluation Using Knowledge Based Super Set Features", International Journal of Computer Applications (0975 – 8887), Vol. 113, No. 2, March 2015.
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144. Urjaswala Vora, Peeyush Chomal, Avani Vakharwala, Mohsin Sutar, Ankit Gupta and Hemant Kirar, "eRA: eGovernance Reference Architecture", Proceedings of the 23rd Australian Software Engineering Conference (ASWEC), Sydney, Australia, April 2014.
145. Vijay Jain and Amol Kolambkar, "Modeling Web Attachment Storage for Web Applications", Asia Pacific Software Engineering Conference (APSEC' 2014), Jeju, South Korea, pp. 98-102, December 1-4, 2014.
146. Sumit Garethiya, Himanshu Agrawal, Shilpa Gite, Suresh V, Amit Kudale, Gaurav Wable and Girishchandra Yendargaye, “Affordable System for Alerting, Monitoring and Controlling Heat Stroke inside Vehicles”, International Conference on Industrial Instrumentation and Control (ICIC 2015).
147. Y Kirani Singh, “Generlized Error Diffusion Method for Halftoning”, Proceedings of IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), Coimbatore, pp. 1519-1524, 2015.
148. Goutam Kumar Saha, “Web-based Healthcare Knowledge Representation and Dissemination – The Challenges", Proceedings of the 32nd NITC 2014, Colombo, Sri Lanka, 2014.
149. Goutam Kumar Saha, “Semantic Network Based Health Knowledge Representation for Public Health Awareness”, International Conference on Science, Management, Engineering and Technology 2015 (ICSMET 2015), Dubai, UAE, March 18-19, 2015.
150. Goutam Kumar Saha and Sandeep Kumar, “Symptom Checker Search Engine”, International Conference on Science, Management, Engineering and Technology 2015 (ICSMET 2015), Dubai, UAE, March 18-19, 2015.
151. Kunal Chanda, Washef Ahmed, Soma Mitra and Debasis Mazumdar, “Improvement in Quantification of Intensity of Facial Expression for Human Computer Interaction”, IEEE Computational Intelligence Workshop (CIW), October 13-15, 2014, Allahabad.
152. Kunal Chanda, Washef Ahmed, Soma Mitra and Debasis Mazumdar, “Improvement and Estimation of Intensity of Facial Expression Recognition for Human-Computer Interaction”, 2nd International Conference on Advanced Computing, Networking, and Informatics (ICACNI-2014) held from June 24-26, 2014, Springer, Advanced Computing, Networking and Informatics – Volume 1, ISBN 978-3-319-07352-1, Kolkata.
153. Saurav Gupta and D K Jain, “Use of Mobiles for Reducing Infant Mortality by Increasing Adherence to Vaccinations in a Low Resource Setting”, eTelemed, February 2015.
154. Saurav Gupta and S P Sood, “Context Aware Mobile Agent for Reducing Stress and Obesity by Motivating Physical Activity – A Design Approach”, IEEE-IndiaCom, March 2015.
155. Saurav Gupta and D K Jain, “MOOCs for Medical Education: An Indian Perspective”, IEEE International Conference on MOOCs, Innovation and Technology in Education (MITE), December 2014.

156. J S Bhatia, Saurav Gupta and Chanpreet, “Assessing the Outcome of a Technology-driven Health Camp: An Indian Case Study”, IEEE MedCom 2014.
157. T Singh, L Jamir, Saurav Gupta, Navpreet Kaur, P Roy, D K Jain and R Kumar, “Use of Mobile Technology for Determining the Consumption and Healthcare Expenditure in the State of Punjab”, IAPSM-2015.
158. L Jamir, P Roy, T Singh, Saurav Gupta, Navpreet Kaur, D K Jain and R Kumar, “Maternal Healthcare Expenditure in Shaheed Bhagat Singh District of Punjab: A Baseline Survey for Universal Health Coverage”, IAPSM-2015.
159. B K Murthy, Praveen K Srivastava, Ajay K Gupta and A S Cheema, “Research Initiatives in Supply Chain System for Drug Delivery and Management System”, IC-Life 2014, JIIT Noida, August 30, 2014.
160. B K Murthy, P K Srivastava and A S Cheema, “Implementation Challenges of Hospital Information System in Super Specialty Hospital, A Case Study of PGIMER, Chandigarh", IEEE GHTC-SAS 2014, IEEE Global Humanitarian Technology Conference - South Asia Satellite 2014, September 26-27, 2014.
161. P K Srivastava, Ajay K Gupta and Himani Goel, “A Standalone Utility-'e-Aushadhi Desktop'”, IACC IEEE 2014, Conference DOI: 10.1109/IAdCC.2014.6779362 Publication Year: 2014 , pp. 428-431.
162. P K Srivastava, Ajay K Gupta and Himani Goel, “Cost Estimation Tool for Government Hospitals and Healthcare Facility Based on Modified Step Down Approach”, IACC IEEE 2014 Conference DOI: 10.1109/IAdCC.2014.6779288 Publication Year: 2014, pp. 17-22.
163. Soman Sumit, Parth Gargava and Karan Sindwani, "Controlling an Arduino Robot using Brain Computer Interface", 3rd IEEE International Conference on Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions), October 2014.
164. Shailendra Singh Narwariya and Gaur Sunder, "Telemedicine : March Towards Cloud and Personal Devices" 10th International Telemedicine Conference of Telemedicine Society of India - Telemedicon 2014, November 7-9, 2014, Bhopal, Madhya Pradesh, India.
165. Ranjeet Masram, Vivek Shahare, Jibi Abraham, Rajni Moona, Pradeep Sinha, Gaur Sunder, Prashant Bendale, and Sayali Pophalkar, “Dynamic Selection of Symmetric Key Cryptographic Algorithms for Securing Data Based on Various Parameters”, CSIA Conference, New Delhi, May 24-25, 2014.
166. Sharath Kumar P N, Rajesh Kumar R, Anuja Sathar and Sahasranamam V, “Automatic Detection of Red Lesions in Digital Color Retinal Images”, International Conference on Contemporary Computing and Informatics (IC3I 2014), pp. 1148 – 1153, November 2014.
167. Deepak R U, Sharathkumar P N, Rajesh Kumar R and K Sujathan, “Automated Identification of Neutrophils In PAP Smear Images”, IEEE's International Conferences for Convergence of Technology (I2CT-2014), Conference Proceedings, April 2014.
168. Sunita Prasad, Zaheeruddin and D K Lobiyal, “A Multiobjective Model for Energy Efficient QoS Provisioning using Genetic Algorithm”, IEEE 4th International Conference on Communication Systems and Network Technologies (CSNT-2014), April 7-9, 2014, NITTTR, Bhopal, India.
169. Sunita Prasad, Zaheeruddin and D K Lobiyal, “Energy Efficient QoS Provisioning - A Multi-Colony Approach”, IEEE 3rd International Conference on Advances in Computing, Communications and Informatics (ICACCI-2014), September 24-27, 2014, GCET, NOIDA, India.
170. Rashmi Gupta and Neha Bajpai, “A Keyword-driven Tool for Testing Web Applications (KeyDriver)”, IEEE Potentials, Digital Object Identifier 10.1109/MPOT.2012.2202135, 0278-6648/14@2014 IEEE, September/October 2014.
171. Lakshmi Kalyani, V K Sharma and B K Murthy, “e-Education for Creating Awareness and Sensitization in Disaster Management for the Masses”, September 6-7, 2014, ACSEICT Conference, JNU, New Delhi.
172. Shipra Sharma, “Empowering Youth by Value Based Education: A Conceptual Framework”, Published in Broombury, University School of Management Studies, Indraprastha University, February, 2015.
173. Manisha Chauhan, Nazia Parveen, Sumit Kumar Saurav, Ganga Prasad G L, “Energy Efficient Rescheduling Algorithm for High Performance Computing”, PARCOMPTECH 2015 Conference, February 19-20, Bangalore.

174. Raghu H V and Ganga Prasad G L, "Autonomic Management of Server Components for Power Optimization in High Performance Computing, 1st Indian Symposium on Computer Systems, INDOSYS'14 Conference, June 28-29, 2014, Bangalore.
175. Ancy Thomas, Sikka D R and Kaginalkar Akshara, “Assessment of SST Prediction Using CFSV2 for the Climatology Years”, Proceedings of Annual Monsoon Workshop 2015, Indian Institute of Tropical Meteorology (IITM), Pune, March 2015.
176. Harmeet Singh Sawhney, Sandeep Agrawal, Jatinder Singh Chandok, Prashant Dinde, Sanjay Wandhekar, “Exploration of Applications of HPC, Big Data and Analytics for Power Plants”, Published in Proceedings of Global Energy Technology Summit GETS-2014, India.
177. Vikas Kumar, "Heat Transfer Studies of Shell and Tube Heat Exchanger with Helical Baffle", 5th International and 41st National Conference on Fluid Mechanics and Fluid Power, Indian Institute of Technology, Kanpur, December 12-14, 2014
178. Ajinkya N Deshmukh, Rahul S Pawar, Sourabh S Kulkarni, Vikas Kumar, Mangesh B Chaudhari and Sandeep K Joshi, "CFD Simulation Studies of High Performance Computing (HPC) Facilities", 5th International and 41st National Conference on Fluid Mechanics and Fluid Power, Indian Institute of Technology, Kanpur, December 12-14, 2014.
179. Vinaya S, Vikas Kumar and Srisai Meher K, "Designing a Parallel Algorithm for Heat Conduction Using MPI, OpenMP and CUDA", PARCOMPTECH – 15, Bangalore.
180. Supriyo Paul, "Proper Orthogonal Decomposition vs. Fourier Analysis for Extraction of Large-scale Structures in Thermal Convection", IUTAM Symposium on Advances in Computation, Modeling and Control of Transitional and Turbulent Flows, December 15-18, 2014, Goa.
181. V Yesubabu, Sahidul Islam, D R Sikka, Akshara Kaginalkar, Sagar Kashid and A K Srivastava, “Impact of Variational Assimilation Technique on Simulation of a Heavy Rainfall”, Pune, India, Natural Hazards, March 2014, Volume 71, Issue 1, pp. 639-658.
182. Ancy Thomas, Basanta K Samala and Akshara Kaginalkar, “Simulation of North Indian Ocean Tropical Cyclones using RAMS Numerical Weather Prediction Model”, Tropical Cyclone Research and Review.
183. K Ashok, Nagaraju C, Alex Sen G and D S Pai, “Decadal Changes in the Relationship Between the Indian and Australian Summer Monsoons, Climate Dynamics”, Volume 42, Issue 3-4, pp. 1043-1052.
184. Rastogi R, Srivastava A, Khonde K, Sirasala K, Londhe A and Chavhan H, “An Efficient Parallel Algorithm: Poststack and Prestack Kirchhoff 3D Depth Migration using Flexi-depth Iterations”, Computers and Geosciences (Elsevier), Volume 80, pp. 1-8.
185. Khan S, Basu J, Basu T, Bepari M S, Pal M, Roy R, “Bengali Basic Travel Expression Corpus: A Statistical Analysis”, Co-ordination and Standardization of Speech Databases and Assessment Techniques (COCOSDA), 2014, IEEE, Phuket, Thailand, pp. 1-6, September 10-12, 2014.
186. Priyanka Jain, Sagri Sharma and Hemant Darbari, "Brain Learning Software Solution [BLESS]", Maharashtra IPHA & IAPSM Joint Conference 2015, January 30-31, 2015, Bharati Vidyapeeth University Medical College, Pune.
187. Sajini T, Arun Gopi and Bhadran V K, “Implementation of Augmentative Alternative Communication (AAC) Device for Android Platform in Malayalam”, Swadeshi Science Congress 2014, Conference Proceedings, ISBN: 978-81-928129-2-2, pp. 863-869, 2014.
188. Divya Das, Jose Stephen and Bhadran V K, “Study of Different Methods for Training and Enhancing Dysarthric Speech”, National Conference on Computational Linguistics and Information Retrieval (NC CLAIR 2014), Vol. 4/Issue 1/pp. 27-32, 2014.
189. Sooraj R, Anjali M, Arun Gopi and Bhadran V K, “Interactive News Reading For Malayalam, An Android App”, National Conference on Computational Linguistics and Information Retrieval (NC CLAIR 2014), Vol. 4/Issue 1/pp. 15-19, 2014
190. Vidya V, Indhu T R and Bhadran V K, “Broken Character Restoration of Degraded Malayalam Printed Documents”, 27th Kerala Science Congress Proceedings, ISBN 81-86366-88-1, pp. 147, 2015.

191. Jayan V, Sunil R and R Ravindrakumar, “Computational Aspect of Translation of Texts”, Translation Today (NTM), Volume 8/No. 1/pp. 176-187/ISSN 0972-8740, 2014.
192. Anish Sathyan, Sindhu R, Anju Mohan, Lijo Francis and Manju S, “An Indigenous Solution for Automation in Agriculture: Design Architecture of SMARTFARM System for Precision Farming”, 27th Kerala Science Congress Proceedings, January 27-29, 2015.
193. Mithuna Chandran O, Libin T T, S Krishnakumar Rao and Biju C Oommen, “System Verilog Based Design and Implementation of LCD Controller IP Core”, Conference on VLSI Systems, Architecture, Technology and Applications (VLSI-SATA 2015), ISBN 978-1-4799-7925-7, DOI:10.1109/VLSI-SATA.2015.7050481, pp. 1-6, January 8-10, 2015.
194. K. Phaninder Reddy, V Babu Rajesh, Himanshu Pareek and Mahesh U Patil, “Dynaldroid: A System for Automated Dynamic Analysis of Android Applications, RAECE-2015”, National Conference on Recent Advances in Electronics and Computer Engineering, IIT-Roorke, February 14-15, 2015.
195. Jagadish Babu, Magesh E, Vijayalakshmi B and Kathiresan C, “ICT for Societal Challenges - India Development Gateway Initiative", Proceedings of National Information Technology Conference (NITC), Computer Society of Sri Lanka, Colombo, pp. 240-245, 2014.
196. Jagadish Babu, et al., "Knowledge Management – India Development Gateway as an Initiative", Proceedings of XAVIT-2014 - National Conference on e-Governance: Challenges and Opportunities, Ranchi, Jharkhand, pp. 1-2, 2014.
197. Siddharth Srivastava, Ramji Gupta, Astha Rai and A S Cheema, “Electronic Health Records and Cloud Based Generic Medical Equipment Interface”, NCMI 2014, AIIMS Delhi, 9th National Conference on Medical Informatics, October 30, 2014.

Invited Talks

1. Subrata Chattopadhyay, “The Role and Challenges of e-Infrastructures for Supporting Big Science Discoveries”, National Conference on Big Data Analytics (BiDA 2014), CR Rao Advanced Institute of Mathematics, Statistics and Computer Science, Hyderabad, August 22 - 24, 2014.
2. Jibin Sunny, “Analysis of Job Execution Reliability in a Grid through Job Accounting Tool”, ICDSE-IEEE Conference, CUSAT Cochi, August 27, 2014.
3. Subrata Chattopadhyay, “Advanced Services on Garuda Grid for Scientific Collaboration”, Workshop on Scientific Application on Param Yuva II, IITM, Pune, January 9, 2015.
4. Subrata Chattopadhyay, “C-DAC and its Role in Innovation of Advanced Cyber Infrastructure for Science and Technology”, Workshop on Accelerating International Collaboration of Science through Connective Computation, Delhi, March 10, 2015.
5. Subrata Chattopadhyay, “Role of Advanced e-Infrastructure in Scientific Collaboration and Big Discovery”, ISI CoData International Training Workshop on Big Data, ISI, Bangalore, March 18, 2015.
6. N Sarat Chandra Babu, “Solving Interoperability Challenges Between Garuda Grid and European Grid (EGI) in CHAIN-REDS Experiments”, International Symposium on Grid and Cloud (ISGC)-2015, Academia Sinica, Taipei, March 19, 2015.
7. Prahlada Rao, “Big Data – Introduction”, ISI CoData International Training Workshop on Big Data, Bangalore, March 17, 2015.
8. Swapnil Srivastava, “NoSQL Databases for Big Data”, ISI CoData International Training Workshop on Big Data, Bangalore, March 17, 2015.
9. Prahlada Rao, “Next Gen HPC Technologies: Heterogeneous Clusters, Grid and Cloud Computing”, PARCOMPTECH - 2015 Tutorial Session, Bangalore, February 18, 2015.
10. Vineeth Simon Arackal, Tutorial on “Cloud for High Performance Computing/Scientific Computing”, IEEE Indicon 2014 Conference, Pune, December 11, 2014.
11. Prahlada Rao, Tutorial on “Hadoop and Map-Reduce for Big Data”, Wipro Auditorium, Electronic City, Bangalore, November 20, 2014.
12. Prahlada Rao, “Scientific Cloud Computing”, GARUDA Partners Meet, Bangalore, September 20, 2014.
13. Prahlada Rao, “Scientific Cloud Computing”, International Conference on ICDS, SASTRA University, Thanjavur, September 13, 2014.
14. B. Arunachalam, “Grid Portal with Compiler Service, Advanced Reservation QoS and Job Management using Mobile Services”, International Conference on ICDS, SASTRA University, Thanjavur, September 12, 2014.
15. Prahlada Rao and Mangala N, “Trends in Scientific Computing”, Kshitij 2015, IIT Kharagpur, February 2, 2015.
16. Mangala N, “Hybrid Computing: An Overview”, TEQUIP Workshop on Hybrid (CPU-GPU) Computing and Its Applications with Hands-on”, Nitte Meenakshi Institute of Technology, Bangalore, June 8, 2014.
17. Annie Joyce, “eSaadhya Tool”, South Asia International Autism Conference (SAIAC 2015), India Habitat Centre, Delhi, February 7-8, 2015.
18. Surekha K, “ICT for Intellectual Disability”, National Workshop on Using ICT for Inclusive Education in India, India International Centre (IIC), New Delhi, February 23-24, 2015.
19. N S Sreekanth, “Multimodal Computing - Future of HCI”, Faculty Development on Scope of Research in NLP, Dept. of Computer Science, Central University of Kerala, January 7, 2015.
20. N S Sreekanth, “Human Computer Interaction”, Invited Lecture Series, Dept. of Computer Science, Central University of Kerala, February 23, 2015.
21. R S Patil and Vijay Bahadur, “Cryptanalytic Attacks - An Overview/Implementation Issues of Cryptosystems”, Workshop on Cryptography and Information Security, National Institute of Technology Calicut, January 24-25, 2015.
22. R K Senthil Kumar, “SCADA Security”, National Conference on Cyber Space Security (NCCSS) 2015, Bangalore, March 14, 2015.

23. Rajesh Kalluri, “SCADA Security Issues in Power Sector”, Workshop on Cyber Security for Power Engineers, CPRI, Bangalore, March 16, 2015.
24. Balaji, “PKI Components, Architecture and Research Directions”, 9th CSI National Conference for IT in Defence 2014, Bangalore, September 3, 2014.
25. Hari Babu, “Precision Agriculture Using WSN”, COMSNETS 2015, Bangalore, January 9, 2015.
26. Hari Babu, “Network and Device Architecture, Possible Protocols for Realization of IOT”, IEEE Workshop on Big Data and Smart Devices: Opportunities and Challenges, Wipro Auditorium, Bangalore, November 20, 2014.
27. Hari Babu, “Security in IOT”, National Conference on Cyber Space Security-2015, March 14, 2015.
28. Kaushik Nanda, “C-Mote: A Smart Wireless Sensor Node”, National Institute of Technology, Calicut, January 24, 2015.
29. Uttam Ghosh, “Security in WSN”, National Institute of Technology, Calicut, January 24, 2015.
30. S. Kailash, “Cloud Computing and its Applicability in Communication”, Broadcast Engineers Society, Chennai Chapter, September 2014.
31. Mahendran, Session on “Cloud Computing”, Faculty Development Program at Madras University, Chennai, October 2014.
32. S. Kailash and Mahendran, Tutorial on ”Establishing Cloud Computing Environment Using Open Source Tools”, 3rd International Conference on Eco-friendly Computing and Communication Systems (ICECCS), NIT Suratkal, Mangalore, December 2014.
33. Vijayalakshmi, “Multilingual Crowd-sourcing Platform – Vikaspedia as a Case”, Workshop on Technologies for Maharashtra Gene Bank at IISER, Pune, May 22, 2014.
34. Kathiresan, “ICT Based Knowledge Management and Regional Language Content: Experiences from India Development Gateway”, Workshop on ICT in Agriculture organized by Rubber Board, Kottayam, Kerala, June 2-3, 2014
35. Naresh, “Vikaspedia – A Multilingual Knowledge Platform”, Annual Event on Environment Protection organized by Lee Shreyus Foundation, Hyderabad, June 5, 2014.
36. Vijayalakshmi, “India Development Gateway and MOTHER”, World Summit on Information Society Meet held at Geneva, Switzerland, June 8-13, 2014.
37. Kathiresan, “ICT Initiatives for Information Dissemination Using Web and Mobile Services”, Training Program on Mass Media for Transfer of Technology organized by Extension Education Institute, Hyderabad, June 17, 2014.
38. Naresh, “Vikaspedia – Collaborative Knowledge Sharing Platform”, International Youth Day Celebrations 2014, AP State AIDS Control Society, Hyderabad, August 12, 2014.
39. Kathiresan, “Vikaspedia – A Multilingual Knowledge Platform”, Training Program on ICT Applications and e-Governance organized by NIRD, Hyderabad, September 18, 2014.
40. Kathiresan, “Content Development in Regional Languages – Experiences from Vikaspedia”, Training Course on Use of ICT for Increasing Production of Oilseeds, Directorate of Oilseeds Research, Hyderabad, October 9, 2014.
41. Kathiresan, “eContent and ICT Enabled Services to Community in Future”, India Public Libraries Conference 2015, India International Centre, New Delhi, organized by DEF & DELNET, Delhi, March 17, 2015.
42. Kathiresan, “Mobile Learning”, Workshop on Technology Mediated Training in Agriculture and Allied Organizations, EEI, Hyderabad, March 27, 2015.
43. Santosh Sam Koshy, “IoT Applications”, Workshop on IoT Applications at NEHU, Shillong, September 4, 2014.
44. Prateek Rajgrahia, “Experience of C-DAC in WSN for Agriculture”, National Workshop on WSN and Robotics in Agriculture, State Planning Commission, Kerala, March 17-18, 2015.
45. S V Srikanth, “Mobile Based Maternal Health Awareness (MOTHER)”, HMRI, Hyderabad, September 2, 2014.
46. M Kumar, “Mobile Apps in Agricultural Domain”, Workshop for Agricultural Extension Officers at Education

Extension Institute (EEI), Prof. Jayashanker Telangana State Agricultural University, Hyderabad, March 27, 2015.

47. Ramu Parupalli, "Mobile Augmented Reality Application for Telugu Language Learning", 2nd IEEE International Conferences on MOOC's, Innovation and Technology in Education, Thapar University, Patiala, Punjab, December 19-20, 2014.
48. M Kumar, "E-Content Development for M-Learning", Banking Staff Training Program, IDRBT, Hyderabad, February 5, 2014.
49. Sandesh Jain, "e-Sikshak as Service over NKN Infrastructure", 3rd NKN Annual Workshop 2014, IIT, Guwahati, December 15-17, 2014.
50. P R Lakshmi Eswari, Mahesh Patil, Jyostna, Ravi Kishore and Sai Gopal, "Linux System Programming", BHEL R&D, Hyderabad, July 21-25, 2014.
51. P R Lakshmi Eswari, "Endpoint Security", Cyber Security Conference at Confederation of Indian Industry (CII India), July 18, 2014.
52. Ch A S Murty, "Big Data", Workshop on Architecture Alg. Analytics for Big Data Using Cloud and Distributed Computing, NIT Warangal, March 8, 2014.
53. K Indraveni, "Ethical Hacking", Ethical Hacking and Network Security Training Program at National Police Academy, Hyderabad, May 13, 2014.
54. K Indraveni, "Cloud Computing", National Seminar on Cloud Computing, Kakatiya University, Hyderabad, March 28, 2014.
55. S Om Aarathi, "Information Security", Training Program on Information Security, UGC Academic Staff College, JNTU, Hyderabad, June 5, 2014 and October 14, 2014.
56. Ch A S Murty, "Identity Theft", Program on Information Security, Confederation of Indian Industry (CII India), July 18, 2014.
57. S Om Aarathi, "Cybercrimes", Information Security Awareness Campaign, Air force Station, Begumpet, Hyderabad, October 16, 2014.
58. K Indraveni and S Om Aarathi, "Online Threats, Web Attacks and Social Engineering", Training Program on Cyber Security and Cyber Laws, MCRHRD, Hyderabad, October 20, 2014.
59. Ch A S Murty, "Internet Based Attacks on Organizations: A Vigilance Approach", Mishradatu Nigam Ltd. (MIDANI), October 20, 2014.
60. K Indraveni, "Web Security Importance", Training Program on Cyber Security Issues, State Police Academy, Hyderabad, November 27, 2014.
61. B Nandeeshwar, "Cyber Security and Cyber Safety", Cyber Security and Cyber Safety Awareness Campaign, CISF, Medak, December 6, 2014.
62. Nandeeshwar and Tyeb Naushad, "Internet Security and Safety", Cyber Security and Cyber Safety Awareness Campaign, CISF, ECIL, December 23, 2014.
63. Nandeeshwar, "Cyber Crime and Safety", Awareness Campaign for Army and Police Staff, CISF, Sainikpuri, December 26, 2014.
64. K Indraveni, "Internet Safety and Security", Information Security Awareness Campaign, DRDL, Hyderabad, December 30, 2014 and January 20, 2015.
65. Ch A S Murty, Tyeb Noushad, Nandeeshwar and Saleem, "Web Application Security, Cyber Laws and System & Network Security", Workshop on Information Security Awareness, MCRHRD, Hyderabad, February 10-12, 2015
66. Nandeeshwar and K Indraveni, "Information Security Awareness", Intelligence Bureau, Hyderabad, March 17, 2015.
67. Tyeb Noushad, "Secure Usage of Computers Which are Connected to Internet", Workshop on Information Security for Ministry of Civil Aviation, DGCA and AAI, Delhi, March 25-27, 2015.
68. Nabarun Bhattacharyya and Amitava Akuli, "Agri and Environmental Electronics", Technical Lecture on Agri-Instruments developed by C-DAC Kolkata under eAgriEn Flagship Program, ICRISAT, Hyderabad, September 12, 2014.

69. Nabarun Bhattacharyya, “Olfaction and Perception Engineering”, Machine Olfaction and Perception Engineering, IIIT Allahabad, October 13, 2014.
70. Nabarun Bhattacharyya, “Electronic Olfaction”, User’s Meet on Quality Evaluation of Jasmine Flower and Concrete by Electronic Means, TNAU, Coimbatore, February 5, 2015.
71. Amit Chaudhuri, “Cyber Crime Related Tools and Technologies”, Guwahati High Court, August 23, 2014.
72. Amit Chaudhuri, “Significance of Handwriting Based Behavior Analysis”, Inauguration Program of Data Collection Facility for Handwriting Project, CID Head Quarter, Assam, August 25, 2014.
73. Biswajit Saha, “Mobile Forensics”, Guwahati High Court, August 24, 2014.
74. Asok Bandyopadhyay, “Digital Publishing Activity for Bangla”, W3C Workshop on Digital Publishing, Pune, August 22, 2014.
75. Amit Chaudhuri, “ICT for Social Progress in Indian Context”, 18th National Exhibition on the Theme of Service to the Nation for Progress of India, Amarabati Maidan, Sodepur, West Bengal, September 7, 2014.
76. Abhisek Hazra, “Perception Based Handwriting Analysis”, IEEE CIW 2014 Workshop, IIIT Allahabad, October 14, 2014.
77. Sangam Kumar Chaturvedi, “Learner Friendly E-Learning Platform in Cloud Environment”, International Conference on Trends and Innovations in Language Teaching – TILT 2014, Satyabama University, Chennai, November 15, 2014.
78. Amit Chaudhuri, “Leveraging ICTs for Building Smart Cities”, IETE Foundation Day Celebration 2014, IETE, Kolkata Chapter, November 2, 2014.
79. Asok Bandyopadhyay, “Intelligent Solution for Digital Library through e-Publishing”, State Central Library, Shillong, Meghalaya, November 1, 2014.
80. Amit Chaudhuri, “SCADA and SCADA Security”, Techno India, Salt Lake, Kolkata, February 9, 2015.
81. Biswajit Saha, “Mobile Forensics”, Regional Conference on Cyber Law, Guwahati High Court, March 21, 2015.
82. Saurav Gupta, “m-Powering Healthcare”, Mobiles for Social and Behavioral Change organized by UNICEF and DEF, Bhopal, Madhya Pradesh, June 17-18, 2014.
83. Saurav Gupta, “Personal Health Records and mSwasthya”, 1st Public Health Symposium on Health Informatics: Challenges and Opportunities, PGIMER, Chandigarh, March 7-8, 2015.
84. Urjaswala Vora, “Precepts and Evolvability of Complex Systems”, International Conference on Soft Computing and Software Engineering (SCSE), University of California, Berkeley, USA, March 2015.
85. Urjaswala Vora, “eRA: eGovernance Reference Architecture”, 23rd Australasian Software Engineering Conference (ASWEC), Sydney, Australia, April 2014.
86. Kapil Kant Kamal, “Mobile Seva”, Biennial Conference 2014, Malaysia, October 2014.
87. Ranjan Kumar, “Assessment of the Performance and Efficiency of Public Services Being Delivered Through Mobile Seva”, 8th International Conferences on Theory and Practice of Electronic Governance, Portugal, October 2014.
88. Zia Saquib, “Converge of Technology”, IEEE Institute and Conference, Pune, April 7, 2014.
89. Zia Saquib, “Cyber Physical System Security”, Tech Mahindra, Mumbai, September 11, 2014.
90. Sagun Baijal, “Accessible Solutions by C-DAC”, National Conference on ICT for Persons with Disabilities, New Delhi, September 9-10, 2014.
91. Sagun Baijal, “Overview of Current Status of Accessibility”, Swatantra-2014 - Fifth Free Software International Conference, Thiruvananthapuram, Kerala, December 18-20, 2014.
92. Leena Chourey, “Accessible Computing at C-DAC”, Using ICT for Inclusive Education in India 2015, New Delhi, February 24, 2015.
93. A S Cheema, “Generation of Medical Health Record Using HIS”, Role of IT in Medicine and Healthcare, Postgraduate Institute of Medical Education and Research, Chandigarh, April 29, 2014.
94. V K Sharma and Arti Noor, “Vulnerabilities in Secure Systems and Some Suggestions in Its Handling”, National Conference on Recent Advances in Electronics and Computer Engineering, IIT Roorkee, February 14, 2015.

95. Lakshmi Kalyani, “Information Security, Training of Indo-Tibet Officers”, IIPA, New Delhi, May 9, 2014.
96. Lakshmi Kalyani, “e-Learning”, Training of Officers of IEBC, Kenya on Election Management: Emerging Challenges at IIIDEM, ECI, New Delhi, December 16, 2014.
97. K Sunitha Manjari, “Comparative Genomics of Mycobacteria, Tuberculosis Control – The Road Ahead”, Translational Research Platform for Veterinary Biologicals (TRPVB), Chennai, November 10, 2014.
98. K Sunitha Manjari, “Transcriptomics Analysis of Breast Cancer Samples”, Mumbai Bio-banking Workshop, Tata Memorial Centre, Mumbai, November 21, 2014.
99. Rajendra Joshi, “RAS Cancer Protein Simulations”, International Conference on Radiation Biology, New Delhi, November 11-13, 2014.
100. Rajendra Joshi, “Decoding Life: Need for Extreme Computing”, HiPC 2014, Goa, December 17-20, 2014.
101. Rajendra Joshi, “Decoding Life: Decoding the Encyclopedia of Life: A BIGDATA Challenge”, BIG DATA in Life Sciences (BigLSW’14), C-DAC, Bangalore, December 15, 2014.
102. K Sunitha Manjari, “Bioinformatics Overview”, Omics Workshop, IASRI, New Delhi, December 11, 2014.
103. Rashmi Mahajan, “Anvaya Product”, Omics Workshop, IASRI, New Delhi, December 11, 2014.
104. Dinesh Katre, “Design and Development of National Digital Repository and Portal for Museums of India”, ICLAM 2014, New Delhi, November 27, 2014.
105. Sandeep K. Joshi, “PARAM Yuva II Green 500 Level 3 Benchmarking Exercise”, Energy Efficient HPC Working Group, Ms. Natalie Bates, Lawrence Berkeley National Laboratory, USA, Webinar (Joined from C-DAC Pune), Aug 5, 2014.
106. Suresh V, “Saving Lives through Internet of Things”, ACC 2014 organized by CSI Pune Chapter in association with CSI Division V, YASHADA, Pune, October 10, 2014.
107. Yogesh Kumar Singh, “Flood Monitoring Using Passive Microwave Remote Sensing”, Indo-German Workshop on Near Real Time Forecasting of Soil Moisture for Water Resource Management, Indian Institute of Science, Bangalore, March 24-26, 2014.
108. T S Murugesh Prabhu, “ANUGA GIS Model for Flood Monitoring in a River Basin”, Remote Sensing and GIS – An Overview, for Senior Officers of CWC and other Centre/State Govt. Organizations, National Water Academy (NWA), CWC, Khadakwasla, Pune, October 10, 2014.
109. Gaur Sunder, “C-DAC's SNOMED CT Toolkit (CSNOtk)”, National Health Mission (NHM) Meeting organized by MoH&FW, Delhi, June 11, 2014.
110. Shailendra Narwariya, “Need Selection of Telemedicine Software”, 3rd Annual Conference of the Telemedicine Society of India, Odisha Chapter (Oditelecon 2014), Rourkela, Odisha, April 19, 2014.
111. Shailendra Narwariya, “Designing Telemedicine Architecture”, 3rd Annual Conference of Telemedicine Society of India, Odisha Chapter (Oditelecon 2014), Rourkela, Odisha, April 20, 2014.
112. Shailendra Narwariya, “Telemedicine for Cloud and Android - Mercury Nimbus”, Second Annual Conference of Telemedicine Society of India (TSI) - Maharashtra Chapter (MahaTelemedicon-14), Sangli, Maharashtra, India, August 24, 2014.
113. Shailendra Narwariya, “Telemedicine: March towards Cloud and Personal Devices”, 10th International Telemedicine Conference of Telemedicine Society of India - Telemedicon 2014, Bhopal, Madhya Pradesh, India, November 7-9, 2014.
114. Hemant Darbari, “Role of Academia in Growth of ICT Ecosystem”, eBIHAR 2015 Summit, Patna, February 19-20, 2015.
115. Aditya Sinha, “Emerging Opportunities in Skill Development and Employability”, eBIHAR 2015 Summit, Patna, February 19-20, 2015.
116. V C V Rao, “Tuning and Performance of FDM/FEM Computations on Cluster with Accelerators (A Case Study Using GPUs and Xeon Phi Co-processors)”, Scientific Application on PARAM YUVA II Workshop, IITM, Pune, January 8-9, 2015.
117. V C V Rao, “An Overview of Distributed Computing Platforms – HPC and BIG Data Perspective and Graph Computations”, Big Data Analytics - Statistical Methods and Graph Theory, Dept. of Computer Science, Vigyan University Guntur, Andhra Pradesh, October 18-19, 2014.

118. V C V Rao, “BIG Data Analytics Implementation on Distributed Systems Programming Approach”, BIDA-2014 (Big Data Analytics 2014), C.R. Rao Advanced Institute of Mathematics, Statistics and Computer Science, Hyderabad, August 22-24, 2014.
119. Akshara Kaginalkar, “Decision Support System for Air Quality Management”, A National Forum on Air Quality Management, IIT, Bombay, January 22, 2015.
120. Sahidul Islam, “Computational Performance of Weather and Ocean Models on PARAM Yuva II”, Scientific Applications on PARAM Yuva II, IITM, Pune, January 9, 2015.
121. Richa Rastogi, “Seismic Applications on PARAM Yuva II”, Scientific Applications on PARAM Yuva II, IITM, Pune, January 9, 2015.
122. Ashish Ranjan, “PARAM Shavak – A Supercomputing in a Box Solution”, PARCOMPTECH-2015, IISc, Bangalore, February 19, 2015.
123. Shweta Das, “C-DAC’s Efforts Under IPCC Program”, Intel Parallel Computing Centre (IPCC) Program Event at New Orleans, USA, Ernest N. Morial Conventional Centre, New Orleans, LA, USA, November 17, 2014.
124. Mahesh Kulkarni, “Soft Computing and Image Processing, W3C India Activities and New Initiatives of Standardization viz. Accessibility, Internationalization and Digital Publishing”, W3C F2F Meeting, MIT, Cambridge, USA, June 2014.
125. Shubhanshu Gupta and Yogesh Angadi, “Opportunities for Advanced Interactive Services on DTT”, Conference organized by Doordarshan, Delhi, August 2014.
126. Shubhanshu Gupta, “Opportunities for Advanced Interactive Services on DTT”, Broadcast India Exhibition and Conference organized by Saicom Trade Fairs & Exhibitions Pvt. Ltd., Bombay Exhibition Centre, Mumbai, October 2014.
127. Mahesh Kulkarni, “Web and TV - New Dimensions and Standards”, Broadcast Engineering Society Workshop, Doordarshan, Worli, Mumbai, India, November 2014.
128. Atul Godbole and Atish Vaze, “Presentation and Demonstration of Mobile OCR and Mobile OHWR Technology”, Document Analysis and Recognition (DAR) Workshop under the ICVGIP 2014 Conference, IISc, Bangalore, December 2014.
129. Ranjit Chogale and Shubhanshu Gupta, “Paradigm Shift from Conventional to Interactive TV”, Workshop on Updating Content Program on Audio Video Systems, Navi Mumbai, December 2014.
130. Mahesh Kulkarni, “Web and TV - New Dimensions and Standards”, Seminar-cum-workshop Themed “TV on Web” organized by Broadcast Engineering Society - Ahmedabad Chapter, Ahmedabad, Gujarat, February 2015.
131. Neha Gupta, “IDN Variant TLD Program”, 50th ICANN Public Conference, London, England, February 2015.
132. Nishit Jain, “IDN Variant TLD Program”, 51st ICANN Public Conference, Los Angeles, February 2015.
133. C Balan, “C-DAC Cyber Forensics Tools - Case Study”, Kerala Police Officers at Cyber Forensics and Digital Analysis Centre of Kerala Police, Thiruvananthapuram, May 19, 2014.
134. Ullas B and Jose Stephen, “Malayalam Computing”, Workshop on Malayalam Computing for the Faculties, Lal Bahadur Shastri Centre, Thiruvananthapuram, May 24, 2014.
135. K L Thomas and C Balan, “Cyber Forensics”, Computer Society of India at Techno Park, Thiruvananthapuram, July 17, 2014.
136. Z V Lakaparampil, “Power Electronics”, Short-term Course on Power Electronics Applications for Large Pumped Storage Hydro Power, IIT Roorkee, July 14-18, 2014.
137. Bhadran V K and Jose Stephen, “Assistive Technologies and Software Based Therapy Tool for Dysarthric Patients”, Social Welfare Department, Govt. of Kerala, Thiruvananthapuram, August 6, 2014.
138. Nabeel Koya, “Cyber Forensics”, Police Training College, Thiruvananthapuram, August 5-7, 2014.
139. Ajith Ravindran, “Cyber Forensics”, Kerala Police at FSL, Thiruvananthapuram, September 22, 2014.
140. Satheesh Kumar S, “Cyber Crimes and Cyber Forensics”, Kerala Police at Police Training College, Thiruvananthapuram, October 14, 2014 and October 29, 2014.
141. Bhadran V K, “Introduction to Natural Language Processing and Machine Translation Technology”, National Translation Mission (NTM), CIIL, Mysore, October 28, 2014.

142. Nabeel Koya, “Research Perspectives on Cyber Forensics”, University of Kerala, Thiruvananthapuram, October 29, 2014.
143. Gopakumar G, “Metric Driven Verification of Reconfigurable Memory Controller IPs Using UVM Methodology for Improved Verification Effectiveness and Reusability”, International Conference on IP-Embedded Systems [IP-SOC 2014], Grenoble, France, November 5-6, 2014.
144. Jayan V, “Machine Translation”, Workshop on Malayalam Computing at Kanakakkunnu Palace, Thiruvananthapuram , November 7, 2014.
145. Ajeesh A, “SOPC Power Electronic Controller”, NWPE 14, BIT, Ranchi, November 7-8, 2014.
146. Renji V Chacko, “Real-time Simulator Platform FSS & FSS Mini for Power Electronics Applications”, NWPE 14, BIT, Ranchi, November 7-8, 2014.
147. Rajasree, “C-DAC Capabilities in Assistive Technologies”, International Symposium on Assistive Technologies and Rehabilitation Management, Centre for Disability Studies, Thiruvananthapuram, December 2-3, 2014.
148. Sreedevi M L, “EV Powertrain Simulation in Forward Modeling Approach to Enable Real-time Simulation and HIL Controller Prototyping”, IEEE PEDES 2014, IIT Bombay, December 16-19, 2014.
149. Manju A S, “Modified SRF-PLL to Operate Under Unbalance Grid for Grid Synchronization of DVR”, IEEE PEDES 2014, IIT Bombay, December 16-19, 2014.
150. Ramesh P, “Control of DC-DC Converter and Inverter for Stand-alone Solar Photovoltaic Power Plant”, IEEE PEDES 2014, IIT Bombay, December 16-19, 2014.
151. Arun Gopi, “Improving the Accuracy of Pronunciation Lexicon Using Naïve Bayes Text Classifier with Character n-gram as Feature”, Eleventh International Conference on Natural Language Processing (ICON-2014), December 18-21, 2014.
152. Muralidharan V, “ITS in India and C-DAC/DeitY Initiatives in ITS”, National Traffic Technology Summit 2015, Ahmadabad, January 2, 2015.
153. Muralidharan V, “Indigenous ITS Solutions for Traffic Safety”, Workshop on ITS and Road Safety, Sastrabhavan, Pattom, Thiruvananthapuram, January 14, 2015.
154. Vidya V, Indhu T R and Bhadran V K, “Broken Character Restoration of Degraded Malayalam Printed Documents”, 27th Kerala Science Congress, Alappuzha, January 27-29, 2015.
155. Chandrasekar V and A Saravanakumar, “Application of Power Electronics to Renewable Energy Systems and Micro Grids”, Workshop at NIT, Trichy, February 8-10, 2015.
156. Nabeel Koya, “Cyber Crimes”, Kerala Police, Police Training College, Thiruvananthapuram, February 12, 2015.
157. P J Binu, “Telemedicine - An Overview”, State Level Workshop on Tele Health and Medical Education Project, Kerala, February 24, 2015.
158. Jiju K, “Integration of Renewable Energy Power Stations with Remote Monitoring and Control System for Smart Grid Applications”, PETPES 2015, National Institute of Technology Karnataka (NITK), Suratkal, March 6, 2015.
159. Nabeel Koya, “Cyber Crimes, Cyber Forensics and Cyber Security”, PTC, Thiruvananthapuram, March 12-13, 2015.
160. Jerry Daniel J, “Application of Electronics and IT in Agriculture – DeitY Initiative”, National Workshop on Wireless Sensor Networks and Robotics in Agriculture and Rural Development, Thiruvananthapuram, March 17-18, 2015.
161. Anish Sathyan, “Remote Agricultural Farm Parameter Monitoring Using Wireless Sensor Networks and Advanced Automation for Smart Farming”, National Workshop on Wireless Sensor Networks and Robotics in Agriculture and Rural Development, Thiruvananthapuram, March 17-18, 2015.
162. C Balan, “Cyber Forensics”, Workshop for Police Officers by DSCI, Dehradun, March 25, 2015.
163. Ajith Ravindran, “Cyber Forensics”, PTC, Thiruvananthapuram, March 25, 2015.
164. Satheesh Kumar S, “Cyber Forensics”, FSL, Thiruvananthapuram, March 27, 2015.

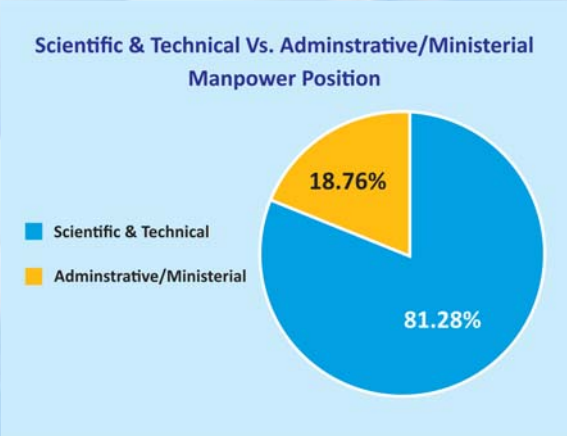
Human Resource Development

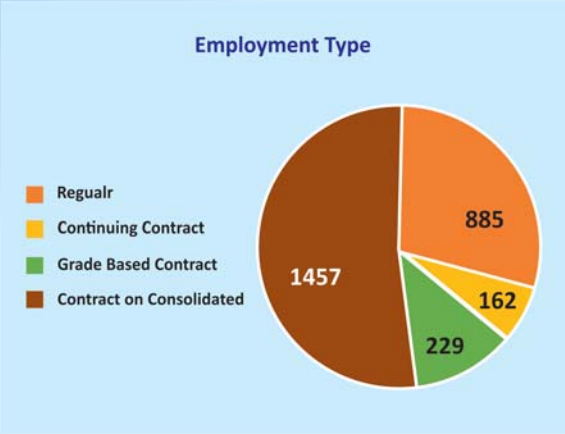
C-DAC attaches great importance to quality in recruitment, training and development of its human capital. Corporate HRD over the time has built a team of HR professionals contributing towards developing and unleashing human expertise through organisational development initiatives and personnel training for the purpose of improved performance of employees at various centres of C-DAC. Establishing enhanced connect with employees to achieve seamless two-way communication had been a major thrust area during the year. Some of the key HR initiatives taken during the year include the following:

- **Post-Retirement Medical Scheme:** Social Security measure for superannuating/superannuated employees was approved by the Governing Council.
- **Human Resource Enablers:** Extension of HR arm into line functions to disseminate 'right information' among the workforce and also to help the management in formulating people and performance centric policies by analysing direct feedback from the employees.
- **Higher Education Scheme:** An initiative towards continuous learning and development for employees.
- **Centralised Training Programme:** An initiative for providing trainings on subjects of common interests across centres in both technical and soft skill areas. This added value to entire learning process in the organisation.
- **Unified Induction Training Programme:** Familiarisation with the organisation and to help new entrants understand the expectations and objectives of the organisation from a common perspective. This had been a maiden endeavour in 2014-15 after the merger of different units of DeitY in C-DAC.

Spread of HR

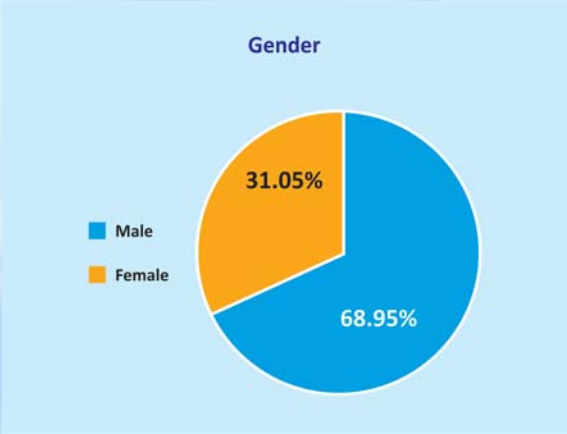
C-DAC has 2895 employees as on March 2015 spread across various scientific/technical thematic areas and supported by administrative and support staff. The composition of the employees is shown below:





Gender Distribution

C-DAC has been paying due attention to gender equality in employment. Female employees account for 31 percent of the total C-DAC workforce against the national average of around 24 percent in the computer, electronic and optical product industries. In addition to the increased presence among general workforce, the proportion of women in the senior executive positions also is encouraging in C-DAC, being a model employer.

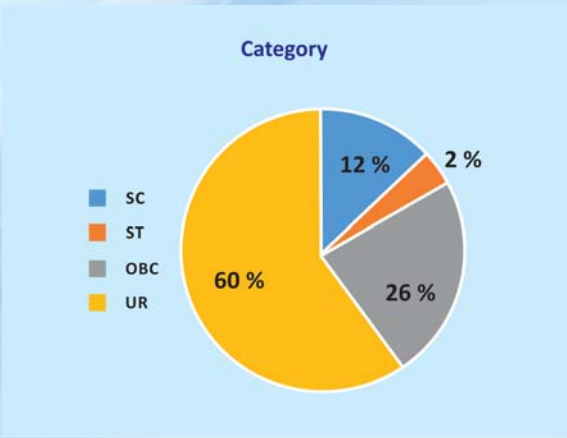


Apprentice/Trainees

Considering the importance of skill development of youth of the nation, C-DAC has introduced learning through working scheme, and opportunities are provided to eligible youth to learn new things in the respective area as intern/trainee/apprentice at the various centres. The number of apprentice/trainees so engaged is ninety two as on March, 2015.

SC/ST/OBC/PWD Employees

C-DAC being a law abiding model employer has always ensured adequate representation of SC, ST, OBC and differently abled people. C-DAC conducts 'special recruitment drive' from time-to-time in order to comply with the statutory provisions laid down by Government of India. Even after the Group A (excluding the lowest grade of Group A) scientific and technical positions being exempted from the purview of reservations orders, C-DAC obliges the national priority in fair terms, and has significant representation of SC/ST/OBC employees.



Way Forward

Corporate HRD understands that in the changing world, it needs to align the HR strategies with the macro objectives of the organization. For this, few priorities defined by Corporate HRD include the following:

- To develop the human capital in such a way that they should have research and development excellence in addition to strategic and long term orientation with respect to organisational goal.
- To focus on improved cross functional excellence and customer/national service orientation.
- To formulate policies and systems to develop leadership qualities and value and culture driven members committed to nation building.
- To encourage the transfer/transmission of knowledge and experience between generations and masses.

Legal and IPR

Legal department plays a crucial and critical role in the functioning of C-DAC. Its key activities are as follows:

- To carefully examine/vet/draft multiple types of contracts/MOUs with a view to ensure protection of C-DAC's legal interest. During the year, more than 200 documents were vetted/drafted by the legal department.
- To keep updated about the latest court decisions, 87 relevant judgments of High Court/Supreme Court were circulated by the legal department to concerned departments like Purchase/Finance/HRD/RTI etc.
- 2014 witnessed surge in court cases at various centres of C-DAC. Legal department gave its valuable inputs/ opinions containing relevant HC/SC judgments.
- To spread awareness among scientists/engineers about the importance of IP. Towards this, legal department conducted 5 IPR awareness programmes during the year for the benefit of C-DAC's scientists and engineers. Similarly, 393 abstracts of published patent applications by Indian Patent Office were circulated to all centres during the year to keep them abreast of latest technological trends for which patents have been filed.
- Legal department along with GIST is also executing the DeitY funded project "Centre of Excellence in IP". Through this project, C-DAC (DeitY) 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 1100. The project deliverables have been met within the given time frame.

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 financial year 2014-15, total 352 RTI applications were received, which were duly processed.

ISO Implementation

STQC conducted the second surveillance audit for ISO 9001:2008 certification for Corporate Office of C-DAC on February 27, 2015 and recommended the continuation of certification.

Financials

Prof. Rajat Moona, Director General, C-DAC
finalising the Annual Report with Auditors

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 at 31st March, 2015, and the consolidated Income & Expenditure Account and the consolidated Receipts & Payment Account for the year then 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 risks 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 the 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 Bangalore, Delhi, Hyderabad, Kolkata, Mohali, Noida, Thiruvananthapuram and Chennai Centre's whose financial statements reflect total assets of ₹52,591.64 Lacs as at 31.03.2015 and total revenues of ₹12,290.22 Lacs for the year then 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. 19 of Schedule 19, wherein Centre specific notes are disclosed.

ii. The Institute has made provision of ₹1, 850.28 Lacs up to 31st March, 2015 for bad & doubtful debts outstanding for the period more than three year. The Provision as made is adequate as per the opinion of the Management. Appropriate steps should be initiated for the recovery, since substantial funds are blocked.

iii. Balances of Debtors, Creditors, Current Assets, Loans & Advances and Current Liabilities are subject to confirmation and further reconciliation, if any. The extent of adjustment that may arise and their effect on accounts is not ascertainable as 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 nos. 1, 4, 5, 11, 12, and note no.19 regarding Centre specific notes of Schedule 19, 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, 2015;

(b) in the case of the consolidated Income and 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 Gokhale & Gokhale
Chartered Accountants
FR No. 111953W

CA Sanjiv Moreshwar Gokhale
Partner
M. No. 041010

Date: 26th August, 2015 **Place: Pune.**

CONSOLIDATED BALANCE SHEET AS AT 31st March 2015

Amount in ₹

Particulars	Schedule	2014-2015	2013-2014
CORPUS/CAPITAL FUND AND LIABILITIES			
Corpus/Capital Fund	1	3,21,76,70,829	3,10,83,12,339
Reserves and Surplus	2	1,55,63,46,618	1,50,39,25,473
Earmarked and Endowment Funds	3	1,42,38,06,091	68,36,44,286
Secured Loan from Bank		4,90,00,000	9,50,00,000
Current Liabilities and Provisions	4	93,61,21,833	95,09,75,430
Total		**7,18,29,45,371**	**6,34,18,57,528**
ASSETS			
Fixed Assets			
Acquired out of Own Funds	5	32,64,94,430	37,17,73,115
Acquired out of Grant in Aid	6	1,31,34,76,454	1,25,89,11,242
Acquired out of Project Grants	7	24,28,70,164	24,50,14,231
Investments-from Earmarked/Endowment Funds		-	-
Investments-Others		-	-
Current Assets, Loans, Advances etc.	8	5,30,01,04,323	4,46,61,58,940
Miscellaneous Expenditure		-	-
Total		**7,18,29,45,371**	**6,34,18,57,528**

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
Gokhale & Gokhale (FRN: 111953W)
CHARTERED ACCOUNTANTS

CA Sanjiv Moreshwar Gokhale
Partner (Membership No. 041010)
Pune

Date : 26-Aug-2015

Consolidated Income and Expenditure Account for the year ending 31st March 2015

Amount in ₹

Particulars	Schedule	2014-2015	2013-2014
INCOME			
Income from Sales/Services	9	58,08,66,213	61,77,21,668
Grants/Subsidies	10	80,87,26,796	99,66,16,942
Fees/Subscription	11	60,66,83,523	58,45,60,595
Income from Investments (Income on Investments from earmarked/endowment funds transferred to funds)	12	-	-
Interest Earned	13	23,60,99,856	21,82,25,124
Other Income	14	1,33,48,546	1,88,56,215
Prior Period Income		83,23,299	96,46,067
Increase/(decrease) in stock of Finished Goods and Work-in-progress	15	39,96,478	(17,70,047)
TOTAL (A)		**2,25,80,44,711**	**2,44,38,56,564**
EXPENDITURE			
Establishment Expenses	16	1,29,61,44,571	1,25,12,98,601
Other Administrative Expenses	17	81,02,37,938	74,25,82,055
Prior Period Expenses		5,57,52,497	5,40,58,847
Depreciation (corresponding to Schedule 5)		3,44,65,579	3,85,20,487
TOTAL (B)		**2,19,66,00,585**	**2,08,64,59,990**
Transferred to / (from) Balance of Mission Grants		(10,14,60,386)	(8,93,60,517)
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**16,29,04,512**	**44,67,57,091**
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
Gokhale & Gokhale (FRN: 111953W)
CHARTERED ACCOUNTANTS

CA Sanjiv Moreshwar Gokhale
Partner (Membership No. 041010)
Pune

Date : 26-Aug-2015

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CDAC

Centre for Development of Advanced Computing, Pune

ANNUAL ACCOUNTS 2014-15

Amount in ₹

Particulars	2014-2015	2013-2014
Schedule 1 - Corpus/Capital Fund		
Balance as at the beginning of the year	3,10,83,12,339	2,67,55,43,823
Add: Surplus as per Income & Expenditure Account	16,29,04,512	44,67,57,091
Less : Own contribution to Core / Projects and Other Adjustments / Transfers	5,35,46,022	1,39,88,575
Balance as at the year - end	**3,21,76,70,829**	**3,10,83,12,339**
Schedule 2 - Reserves and Surplus		
1. Capital Reserve :		
As per last Account	1,50,39,25,473	1,49,61,45,494
Addition during the year	29,16,89,194	28,31,53,738
Less : Deductions during the year	23,92,68,049	27,53,73,759
Total	**1,55,63,46,618**	**1,50,39,25,473**
Schedule 3 - Earmarked/Endowment Funds		
1. Balance of Core Grants		
a) Opening balance of the funds	16,62,80,096	30,42,74,144
b) Additions to the Funds		
I) Donations/Grants	83,70,00,000	1,04,00,00,000
II) Income from Investments made on account of funds	-	(4,86,33,530)
III) Other additions (C-DAC Contribution and Other Income)	15,37,676	71,14,634
Total (b)	83,85,37,676	99,84,81,104
Total (a)+(b)	1,00,48,17,772	1,30,27,55,248
c) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	2,82,73,204	4,66,27,712
Others	-	-
Total I	2,82,73,204	4,66,27,712
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	73,50,58,826	82,90,56,014
Componants, Consumables and Other Direct Expenses	1,14,98,280	2,02,68,785
Travel	1,27,99,152	1,51,99,627
Contingencies, Overheads and Other Administrative Expenditure	15,23,68,599	22,53,23,014
Total II	91,17,24,857	1,08,98,47,440
Total (c)	93,99,98,061	1,13,64,75,152
Net Balance as at Year - End (a+b-c) Total 1	6,48,19,711	16,62,80,096
Projects wise Allocated Core Grant (Annexure 1)		
d) Opening balance	(11,94,25,609)	45,30,83,083
e) Additions to the Funds		
I) Donations/Grants	67,29,17,000	22,35,39,000
II) Income from Investments made on account of funds	46,43,194	(53,56,891)
III) Other additions (C-DAC Contribution and Other Income)	5,35,63,522	1,39,88,575
Total (e)	73,11,23,716	23,21,70,684
Total (d)+(e)	61,16,98,107	68,52,53,767

Amount in ₹

Particulars	2014-2015	2013-2014
f) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	11,85,70,571	7,36,02,686
Others	-	-
Total I	11,85,70,571	7,36,02,686
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	28,42,43,633	27,67,81,825
Componants, Consumables and Other Direct Expenses	4,76,01,096	4,82,85,181
Travel	1,85,45,127	2,14,23,364
Contingencies, Overheads and Other Administrative Expenditure	10,85,65,265	13,18,79,472
Total II	45,89,55,121	47,83,69,842
Total Expenditure (f)	57,75,25,692	55,19,72,528
g) Refund / Transfer and Other Adjustments	15,36,60,514	25,27,06,848
Net Balance as at Year - End (d+e-f-g) Total 2	(11,94,88,099)	(11,94,25,609)
Core Grant Balance as at Year - End (Total 1 + Total 2) Total 3	(5,46,68,388)	4,68,54,487
2. Balance of Unutilized Funded Project Grants (Annexure 2)		
a) Opening balance of the funds	63,25,96,289	88,25,81,212
b) Additions to the Funds		
I) Donations/Grants	2,13,35,42,408	1,12,96,05,558
II) Income from Investments made on account of funds	4,57,99,393	4,42,12,758
III) Other additions (C-DAC Contribution and Other Income)	17,93,71,167	98,42,557
Total (b)	2,35,87,12,968	1,18,36,60,873
Total (a)+(b)	2,99,13,09,257	2,06,62,42,085
c) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	14,51,05,312	16,52,10,119
Others	-	-
Total I	14,51,05,312	16,52,10,119
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	53,15,11,488	51,47,98,010
Componants, Consumables and Other Direct Expenses	16,84,47,272	20,82,12,744
Travel	5,73,06,830	5,73,52,467
Contingencies, Overheads and Other Administrative Expenditure	38,47,61,446	36,59,95,429
Total II	1,14,20,27,036	1,14,63,58,650
Total (c)	1,28,71,32,348	1,31,15,68,769
d) Refund / Transfer and Other Adjustments	23,02,31,946	12,20,77,027
Net Balance as at Year - End (a+b-c-d) Total 4	1,47,39,44,963	63,25,96,289
3. Employee and Other Funds:		
As per last Account	41,93,510	38,70,408
Addition during the year	5,03,086	6,20,372
Less : Deductions during the year	1,67,080	2,97,270
Total (5)	45,29,516	41,93,510
Grand Total (Total 3+ Total 4+Total 5)	**1,42,38,06,091**	**68,36,44,286**

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	-	1,89,00,000	-	-	-	13,00,000	11,28,515	9,22,555	9,41,131	42,92,201	1,37,41,996	8,65,803
2	Autonomic Real Time Multiprotocol Gateway	-	-	-	-	-	-	-	-	-	-	-	-
3	Building a Pan-C-DAC Cloud Computing Framework	(1,37,48,312)	3,89,49,000	8,27,756	-	7,02,988	2,13,05,011	24,58,247	17,32,042	86,06,670	3,48,04,958	11,81,683	(99,58,197)
4	Building Fund	1	3,00,00,000	-	5,35,63,522	8,34,57,021	5,87,371	-	-	2,23,101	8,42,67,493	-	(7,03,970)
5	E-Learning Solutions in Areas of Automated Grading & Analysis of Software Programs	(1,31,426)	69,51,000	(42,609)	-	4,21,626	-	4,025	5,32,617	-	9,58,268	7,12,806	51,05,891
6	E-Securities Initives Related to Security for USB Date Drives Automated Web Application Security Assessment Framework	21,56,804	95,00,000	3,34,358	-	12,41,914	44,14,322	73,220	4,15,105	7,13,975	68,58,536	40	51,32,586
7	IP Awarness in E&IT Sector	11,19,993	-	-	-	-	11,18,661	-	-	-	11,18,661	1,332	-
8	Mobile Computing and Applications	(1,24,50,023)	1,50,00,000	(53,296)	-	8,75,720	1,06,58,324	2,91,010	8,90,144	37,89,611	1,65,04,809	12,804	(1,40,20,932)
9	National Grid Computing Initiative - GARUDA - Grid Technology Services for operational Phase of Garuda	-	-	-	-	-	-	-	-	-	-	-	-
10	North East Projects	18,65,39,195	16,99,14,572	8,66,689	-	16,00,853	2,57,51,439	1,99,43,136	29,65,199	1,07,79,376	6,10,40,003	12,19,04,591	17,43,75,862
11	Pan C-DAC Knowledge & Resource Management Lab (PCKRML)	(9,667)	-	-	-	-	-	-	-	-	-	(9,667)	-
12	Pan C-DAC Research Initive in Perception Engineering	93,97,412	4,00,00,000	13,20,423	-	9,77,612	1,09,09,854	30,88,657	12,03,825	36,11,738	1,97,91,686	132	3,09,26,017
13	Power Optimization of HPC Sys & Facilities	6,47,276	2,80,00,000	89,774	-	11,19,602	1,66,46,039	48,00,629	7,36,117	28,17,101	2,61,19,488	53,02,201	(26,84,639)
14	Trainers Training and Students Talent Transfor	(75,69,816)	-	-	-	-	-	-	-	-	-	(75,69,816)	-
15	Speech to Speech MAT Based Dialogue Sys. From Hindi To Indian Language	(3,81,94,427)	3,00,00,000	-	-	1,80,072	4,38,29,764	4,59,502	10,05,312	99,92,427	5,54,67,077	832	(6,36,62,336)
16	Dev. & Adaption of applications, System S/W & H/W Tech. for Hybrid Archi.Based HPC System	(7,40,58,700)	6,40,00,000	-	-	1,29,76,176	4,06,77,742	62,47,101	13,64,409	63,80,015	6,76,45,443	(298)	(7,77,03,845)
17	Provisioning of Hybrid Tech. in NPSF and CTSF - A Step towards Next Generation HPC	(9,18,67,523)	6,40,00,000	-	-	-	1,17,63,984	9,89,669	3,08,823	1,33,83,733	2,64,46,209	-	(5,43,13,732)
18	Advanced Research in Ubiquitous Computing	(2,63,84,968)	4,50,00,000	8,49,248	-	51,70,063	2,43,69,064	42,37,526	17,37,546	73,64,969	4,28,79,168	8,49,251	(2,42,64,139)
19	Design and Development of a unified threat management (UTM) Solution	(1,92,48,585)	3,00,00,000	2,99,184	-	38,66,311	1,86,17,420	4,94,975	10,31,752	19,92,708	2,60,03,166	2,98,978	(1,52,51,545)
20	BOSS Support Centres and Business Dev. (Ph II)	(2,74,36,682)	2,65,17,000	1,51,667	-	6,24,661	3,33,73,721	5,65,062	19,19,101	94,10,364	4,58,92,909	3,03,360	(4,69,64,284)
21	Development of Advanced tools for Cloud Security Transactions	(55,88,425)	40,00,000	-	-	-	17,60,590	22,254	3,14,937	9,29,509	30,27,290	(3,64,779)	(42,50,936)
22	Centre of Excellence in Smart Card Technology	51,40,753	3,00,00,000	-	-	11,20,794	56,53,000	18,60,140	3,27,682	2,51,21,002	3,40,82,618	1,32,62,872	(1,22,04,737)
23	Design & Development of a Rapid Product Dev. Platform	11,65,190	-	-	-	9,10,514	-	-	71,938	4,16,185	13,98,637	(2,33,447)	-
24	OCR Sys. On Android based Handheld Devices using Multi Framework for Malayam, Bangla, Punjabi, Hindi, Urdu, Tamil & Telugu	-	51,00,000	-	-	-	-	1,53,602	2,48,016	4,15,278	8,16,896	42,65,643	17,461
25	Ubiquitous Speech Collection & Analysis System for Surveillance Application (USCAS)	(89,03,679)	70,00,000	-	-	4,54,280	56,00,000	7,83,826	1,71,660	10,50,554	80,60,320	-	(99,63,999)
26	C-DAC Silchar	-	1,00,85,428	-	-	28,70,364	59,07,327	-	6,46,347	6,25,818	1,00,49,856	-	35,572
	Total	**(11,94,25,609)**	**67,29,17,000**	**46,43,194**	**5,35,63,522**	**11,85,70,571**	**28,42,43,633**	**4,76,01,096**	**1,85,45,127**	**10,85,65,265**	**57,75,25,692**	**15,36,60,514**	**(11,94,88,099)**

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CDAC

Centre for Development of Advanced Computing, Pune
ANNUAL ACCOUNTS 2014-15

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												
	DeitY Projects	2,51,64,297	8,63,25,292	30,18,608	-	3,82,62,522	2,64,28,233	83,95,972	29,30,768	1,11,17,896	8,71,35,391	27,48,384	2,46,24,422
	Other Agency Projects	30,62,589	80,51,731	-	2,37,000	2,02,576	44,42,333	2,00,950	15,29,309	57,78,133	1,21,53,301	61,644	(8,63,625)
	Total Bangalore Centre	2,82,26,886	9,43,77,023	30,18,608	2,37,000	3,84,65,098	3,08,70,566	85,96,922	44,60,077	1,68,96,029	9,92,88,692	28,10,028	2,37,60,797
2	Chennai Centre												
	DeitY Projects	1,07,30,947	8,72,02,682	4,75,079	-	1,26,78,773	3,75,40,191	21,42,093	45,91,206	1,46,76,191	7,16,28,454	74,02,720	1,93,77,534
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Chennai Centre	1,07,30,947	8,72,02,682	4,75,079	-	1,26,78,773	3,75,40,191	21,42,093	45,91,206	1,46,76,191	7,16,28,454	74,02,720	1,93,77,534
3	Corporate Office												
	DeitY 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												
	DeitY Projects	85,90,127	2,17,73,817	94,000	-	-	43,75,201	21,57,848	70,390	37,73,404	1,03,76,843	1,17,013	1,99,64,088
	Other Agency Projects	2,83,81,905	8,55,26,156	-	-	-	27,79,614	4,84,47,556	25,84,399	4,24,350	5,42,35,919	58,52,779	5,38,19,363
	Total Delhi Centre	3,69,72,032	10,72,99,973	94,000	-	-	71,54,815	5,06,05,404	26,54,789	41,97,754	6,46,12,762	59,69,792	7,37,83,451
5	Hyderabad Centre												
	DeitY Projects	6,18,18,357	43,62,31,000	57,39,685	37,15,817	1,84,16,067	5,39,16,547	24,95,360	41,93,700	3,89,15,808	11,79,37,482	95,78,573	37,99,88,804
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Hyderabad Centre	6,18,18,357	43,62,31,000	57,39,685	37,15,817	1,84,16,067	5,39,16,547	24,95,360	41,93,700	3,89,15,808	11,79,37,482	95,78,573	37,99,88,804
6	Kolkata Centre												
	DeitY Projects	5,27,44,470	6,60,92,000	16,69,479	-	18,80,415	3,19,74,280	84,16,426	52,04,370	91,70,813	5,66,46,304	1,33,97,093	5,04,62,552
	Other Agency Projects	72,05,115	1,47,40,756	28,352	-	-	30,38,657	2,47,012	1,71,682	18,37,311	52,94,662	1,50,00,354	16,79,207
	Total Kolkata Centre	5,99,49,585	8,08,32,756	16,97,831	-	18,80,415	3,50,12,937	86,63,438	53,76,052	1,10,08,124	6,19,40,966	2,83,97,447	5,21,41,759
7	Mohali Centre												
	DeitY Projects	59,17,342	1,85,68,652	6,60,043	88	24,95,769	1,14,48,222	24,96,957	6,91,686	32,82,808	2,04,15,442	-	47,30,683
	Other Agency Projects	3,51,31,552	20,250	19,12,797	-	-	11,37,020	6,335	5,406	22,95,055	34,43,816	-	3,36,20,783
	Total Mohali Centre	4,10,48,894	1,85,88,902	25,72,840	88	24,95,769	1,25,85,242	25,03,292	6,97,092	55,77,863	2,38,59,258	-	3,83,51,466
8	Mumbai Centre												
	DeitY Projects	10,01,50,267	36,71,16,290	49,41,803	3,19,25,144	2,13,95,921	4,28,91,418	18,94,130	55,37,476	12,09,97,855	19,27,16,800	3,92,69,853	27,21,46,851
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Mumbai Centre	10,01,50,267	36,71,16,290	49,41,803	3,19,25,144	2,13,95,921	4,28,91,418	18,94,130	55,37,476	12,09,97,855	19,27,16,800	3,92,69,853	27,21,46,851
9	Noida Centre												
	DeitY Projects	3,65,54,003	14,37,24,610	13,33,103	-	72,73,069	3,89,85,399	20,76,758	22,36,530	2,39,10,152	7,44,81,908	10,15,02,778	56,27,030
	Other Agency Projects	81,78,372	11,95,623	-	-	29,84,000	20,65,000	-	-	82,880	51,31,880	-	42,42,115
	Total Noida Centre	4,47,32,375	14,49,20,233	13,33,103	-	1,02,57,069	4,10,50,399	20,76,758	22,36,530	2,39,93,032	7,96,13,788	10,15,02,778	98,69,145

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
10	Pune Centre												
	DeitY Projects	(33,52,922)	21,53,31,152	24,36,876	26,03,278	1,82,57,737	12,36,78,321	38,06,410	1,20,06,694	5,54,12,613	21,31,63,775	(10,14,11,711)	10,52,66,320
	Other Agency Projects	(67,92,122)	3,05,13,504	74,589	-	5,33,767	1,29,02,276	3,02,364	15,61,006	1,42,33,511	2,95,32,924	1,21,05,619	(1,78,42,572)
	Total Pune Centre	(1,01,45,044)	24,58,44,656	25,11,465	26,03,278	1,87,91,504	13,65,80,597	41,10,774	1,35,67,700	6,96,46,124	24,26,96,699	(8,93,06,092)	8,74,23,748
11	Thiruvananthapuram Centre												
	DeitY Projects	19,32,61,802	29,33,17,626	91,69,266	14,08,89,840	1,79,83,627	11,68,93,776	6,99,85,513	1,24,01,517	6,94,26,382	28,66,90,815	12,46,06,847	22,53,40,872
	Other Agency Projects	6,58,50,188	10,57,84,267	1,42,45,713	-	27,41,069	1,70,15,000	1,53,73,588	15,90,691	94,26,284	4,61,46,632	-	13,97,33,536
	Total Thiruvananthapuram Centre	25,91,11,990	39,91,01,893	2,34,14,979	14,08,89,840	2,07,24,696	13,39,08,776	8,53,59,101	1,39,92,208	7,88,52,666	33,28,37,447	12,46,06,847	36,50,74,408
	Total DeitY Projects	49,15,78,690	1,88,77,10,121	2,95,37,942	17,91,34,167	13,86,43,900	48,81,31,588	10,38,69,467	4,98,64,337	35,06,83,922	1,13,11,93,214	19,72,11,550	1,25,95,56,156
	Total Other Agency Projects	14,10,17,599	24,58,32,287	1,62,61,451	2,37,000	64,61,412	4,33,79,900	6,45,77,805	74,42,493	3,40,77,524	15,59,39,134	3,30,20,396	21,43,88,807
	Grand Total	**63,25,96,289**	**2,13,35,42,408**	**4,57,99,393**	**17,93,71,167**	**14,51,05,312**	**53,15,11,488**	**16,84,47,272**	**5,73,06,830**	**38,47,61,446**	**1,28,71,32,348**	**23,02,31,946**	**1,47,39,44,963**

Amount in ₹

Particulars	2014-2015	2013-2014
Schedule 4 - Current Liabilities and Provisions		
A. Current Liabilities		
1. Trade Payables (For Goods and Others)	23,94,07,036	29,33,74,015
2. Advances Received		
a) Advances Received from Parties	19,94,07,957	13,28,28,658
b) Fees Received in Advance	19,97,373	20,75,829
c) AMC Charges Received in Advance	-	-
d) Other Income Received in Advance	11,71,52,800	8,26,166
3. Statutory Liabilities		
a) Members CPF Recovery Payable	93,10,348	78,48,135
b) Members VPF Payable	11,57,695	10,65,785
c) Members CPF Loan Recovery Payable	1,10,821	2,98,555
d) Members Benevolent Fund Payable	6,20,436	8,65,815
e) Members CGEIS/Group Insurance Payable	33,045	13,449
f) Members Other Recoveries Payable	9,40,253	9,71,519
g) C-DAC's Contribution to CPF Payable	1,40,40,690	1,07,34,223
h) Gratuity Payable	66,30,702	1,81,26,647
i) Leave Salary and Pension Contribution Payable	3,30,33,927	6,51,00,530
j) Members Income Tax Payable	55,83,939	1,25,50,577
k) Tax Deducted at Source Payable	94,80,801	44,73,525
l) Profession Tax Payable	2,32,605	2,77,380
m) General Sales Tax / VAT Payable	9,19,395	2,09,269
n) Central Sales Tax Payable	46,018	7,48,794
o) Works Contract Tax Payable	-	15,659
p) Service Tax Payable	3,42,794	2,72,64,648
q) Local Body Tax Payable	11,40,238	-
4. Other Current Liabilities		
a) Unpaid Salaries	85,93,502	56,43,970
b) Library Deposits Payable	1,73,950	93,450
c) Other Security Deposits Payable	1,01,55,083	89,78,715
d) Earnest Money Deposit Contractors Payable	65,31,237	75,68,137
e) Retention Deposit Contractors	1,91,30,528	94,81,133
f) Refund of Course Fees Due	17,99,430	16,20,823
g) ATC's & Others Share in Fees Payable	43,08,658	1,34,30,990
h) Other Current Liabilities	17,07,73,962	29,76,16,824
Total (A)	86,30,55,223	92,41,03,220
B. Provisions		
1. Others (Specify)		
a) Provisions / Accrued Liabilities for Expenses	7,30,66,610	2,68,72,210
Total (B)	7,30,66,610	2,68,72,210
Total (A)+(B)	**93,61,21,833**	**95,09,75,430**

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	-	-	-	-	3,21,46,675	-	-	0%	-	-	3,21,46,675	3,21,46,675
	b) Leasehold	19,14,97,278	3,80,909	83,82,000	87,62,909	2,60,53,683	17,42,06,504	1,25,66,929	(29,58,676)	0%	19,08,026	1,74,33,631	15,67,72,873	17,89,30,349
2	Building													
	a) On Freehold Land	65,65,566	-	-	-	-	65,65,566	31,15,065	-	10%	3,45,050	34,60,115	31,05,451	34,50,501
	b) On Leasehold Land	12,94,37,024	-	-	-	2,04,83,150	10,89,53,874	7,51,89,319	55,50,934	10%	39,31,550	7,35,69,935	3,53,83,939	5,42,47,705
	c) Ownership Flats/Premises	3,92,36,295	-	-	-	-	3,92,36,295	2,75,31,686	-	10%	11,70,461	2,87,02,147	1,05,34,148	1,17,04,609
	d) Superstructures on Land not belonging to the entity	1,47,34,869	-	-	-	-	1,47,34,869	1,22,84,433	-	10%	2,45,044	1,25,29,477	22,05,392	24,50,436
3	Plant, Machinery and Equipments	6,00,60,810	32,419	8,76,317	9,08,736	16,32,106	5,93,37,440	4,99,66,031	12,57,988	15%	15,94,409	5,03,02,452	90,34,988	1,00,94,779
4	Vehicles	1,26,15,268	-	-	-	-	1,26,15,268	69,68,258	-	15%	8,47,052	78,15,310	47,99,958	56,47,010
5	Furniture & Fixtures	8,70,64,244	15,21,025	12,50,446	27,71,471	-	8,98,35,715	5,79,52,133	-	10%	31,88,359	6,11,40,492	2,86,95,223	2,91,12,111
6	Office Equipments	2,92,57,094	2,00,216	11,45,309	13,45,525	6,64,619	2,99,38,000	2,02,69,696	5,63,436	15%	15,34,759	2,12,41,019	86,96,981	89,87,398
7	Air Conditioning Equipments	3,22,25,828	1,69,400	19,64,019	21,33,419	17,68,000	3,25,91,247	2,56,40,588	13,58,501	15%	12,46,376	2,55,28,463	70,62,784	65,85,240
8	Computer Peripherals	29,87,92,236	32,49,099	1,05,20,426	1,37,69,525	1,11,12,306	30,14,49,455	28,61,31,677	1,10,99,018	60%	1,58,50,077	29,08,82,736	1,05,66,719	1,26,60,559
9	Electrical Installations	5,16,78,017	20,801	26,55,147	26,75,948	4,82,548	5,38,71,417	4,05,07,019	4,37,096	10%	13,80,152	4,14,50,075	1,24,21,342	1,11,70,998
10	Electronic Tools & Lab Equipments	72,59,654	54,249	1,71,918	2,26,167	-	74,85,821	45,10,587	-	15%	4,46,285	49,56,872	25,28,949	27,49,067
11	Library Books	1,41,55,592	46,877	3,78,319	4,25,196	1	1,45,80,787	1,38,36,678	-	60%	4,46,466	1,42,83,144	2,97,643	3,18,914
12	Copyright Know-how	66,950	-	-	-	-	66,950	60,312	-	25%	1,660	61,972	4,978	6,638
13	Other Fixed Assets	51,66,329	1,03,164	9,52,950	10,56,114	-	62,22,443	40,23,419	-	15%	3,29,853	43,53,272	18,69,171	11,42,910
	Total	1,01,19,59,729	57,78,159	2,82,96,851	3,40,75,010	6,21,96,413	98,38,38,326	64,05,53,830	1,73,08,297		3,44,65,579	65,77,11,112	32,61,27,214	37,14,05,899
	Capital Work-in-progress	3,67,216	-	-	-	-	3,67,216	-	-		-	-	3,67,216	3,67,216
	Grand Total	**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**
	Previous Year	**94,99,26,199**	**1,72,49,177**	**6,07,78,089**	**7,80,27,266**	**1,56,26,520**	**1,01,23,26,945**	**60,33,20,537**	**12,87,194**		**3,85,20,487**	**64,05,53,830**	**37,17,73,115**	**34,66,05,662**

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	18,35,882	-	0%	1,71,770	20,07,652	1,47,38,059	1,49,09,829
2	Building													
	a) On Freehold Land	6,58,09,591	-	-	-	-	6,58,09,591	5,34,48,304	-	10%	12,36,129	5,46,84,433	1,11,25,158	1,23,61,287
	b) On Leasehold Land	11,95,35,420	-	22,86,258	22,86,258	-	12,18,21,678	8,63,43,789	-	10%	35,47,788	8,98,91,577	3,19,30,101	3,31,91,631
	c) Ownership Flats/Premises	33,41,269	-	-	-	-	33,41,269	27,18,368	-	10%	62,290	27,80,658	5,60,611	6,22,901
	d) Superstructures on Land not belonging to the entity	-	-	-	-	-	-	-	-	10%	-	-	-	-
3	Plant, Machinery and Equipments	8,42,13,529	17,95,290	6,12,738	24,08,028	1,82,468	8,64,39,089	6,54,57,175	1,61,668	15%	31,71,538	6,84,67,045	1,79,72,044	1,87,56,354
4	Vehicles	1,37,75,607	-	-	-	-	1,37,75,607	1,10,32,788	-	15%	4,11,422	1,14,44,210	23,31,397	27,42,819
5	Furniture & Fixtures	10,52,96,455	6,34,758	19,18,520	25,53,278	40,30,743	10,38,18,990	7,10,88,953	21,20,601	10%	34,85,064	7,24,53,416	3,13,65,574	3,42,07,502
6	Office Equipments	5,18,26,811	5,06,576	5,56,028	10,62,604	3,21,211	5,25,68,204	3,53,60,779	2,25,848	15%	26,14,992	3,77,49,923	1,48,18,281	1,64,66,032
7	Air Conditioning Equipments	4,91,46,890	43,42,280	1,04,361	44,46,641	25,363	5,35,68,168	3,84,56,220	24,533	15%	22,70,473	4,07,02,160	1,28,66,008	1,06,90,670
8	Computer Peripherals	1,19,30,26,398	2,01,64,783	2,28,67,310	4,30,32,093	2,82,000	1,23,57,76,491	1,12,22,35,379	2,12,880	60%	6,82,52,398	1,19,02,74,897	4,55,01,594	7,07,91,019
9	Electrical Installations	6,13,34,021	6,20,942	11,37,072	17,58,014	14,77,795	6,16,14,240	3,87,86,235	7,97,145	10%	23,62,516	4,03,51,606	2,12,62,634	2,25,47,786
10	Electronic Tools & Lab Equipments	9,23,32,913	15,09,477	20,18,044	35,27,521	-	9,58,60,434	7,06,99,813	-	15%	37,74,093	7,44,73,906	2,13,86,528	2,16,33,100
11	Library Books	3,90,13,827	6,15,275	1,04,717	7,19,992	1,595	3,97,32,224	3,87,48,505	1,578	60%	5,91,177	3,93,38,104	3,94,120	2,65,322
12	Copyright Know-how	4,40,660	-	-	-	-	4,40,660	4,40,576	-	25%	21	4,40,597	63	84
13	Other Fixed Assets	70,73,990	-	23,987	23,987	-	70,97,977	49,18,711	-	15%	3,26,891	52,45,602	18,52,375	21,55,279
	Total	1,90,78,17,942	3,01,89,381	3,16,29,035	6,18,18,416	63,21,175	1,96,33,15,183	1,64,15,71,477	35,44,253		9,22,78,562	1,73,03,05,786	23,30,09,397	26,62,46,465
	Capital Work-in-progress	99,26,64,777	48,583	4,12,16,864	4,12,65,447	(4,65,36,833)	1,08,04,67,057	-	-		-	-	1,08,04,67,057	99,26,64,777
	Grand Total	**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**	**1,25,89,11,242**
	Previous Year	**2,78,24,23,596**	**6,56,35,294**	**5,56,26,369**	**12,12,61,663**	**32,02,540**	**2,90,04,82,719**	**1,51,27,65,370**	**21,71,275**		**13,09,77,382**	**1,64,15,71,477**	**1,25,89,11,242**	**1,26,96,58,226**

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	15,88,45,412	3,26,79,952	57,85,146	3,84,65,098	(7,15,59,954)	26,88,70,464	13,43,58,997	(5,75,67,493)		3,58,72,752	22,77,99,242	4,10,71,222	2,44,86,415
2	Chennai Centre Project Assets	6,73,57,659	21,09,171	1,07,87,999	1,28,97,170	2,56,938	7,99,97,891	4,58,10,697	38,541		1,24,26,632	5,81,98,788	2,17,99,103	2,15,46,962
3	Corporate Project Assets	-	-	-	-	-	-	-	-		-	-	-	-
4	Delhi Centre Project Assets	15,72,623	-	-	-	-	15,72,623	15,50,236	-		7,716	15,57,952	14,671	22,387
5	Hyderabad Centre Project Assets	12,12,80,147	1,31,95,417	52,20,650	1,84,16,067	-	13,96,96,214	10,12,70,856	-		2,19,18,276	12,31,89,132	1,65,07,082	2,00,09,291
6	Kolkata Centre Project Assets	-	-	18,80,415	18,80,415	-	18,80,415	-	-		11,28,249	11,28,249	7,52,166	-
7	Mohali Centre Project Assets	7,52,76,092	2,09,795	22,85,974	24,95,769	2,09,848	7,75,62,013	6,46,83,036	1,94,469		26,55,510	6,71,44,077	1,04,17,936	1,05,93,056
8	Mumbai Centre Project Assets	28,41,03,107	47,67,988	1,66,27,933	2,13,95,921	7,15,59,954	23,39,39,074	23,98,96,858	5,75,67,493		1,91,35,598	20,14,64,963	3,24,74,111	4,42,06,249
9	Noida Centre Project Assets	5,69,73,498	34,84,808	67,72,261	1,02,57,069	2,87,663	6,69,42,904	4,88,90,961	43,149		63,28,835	5,51,76,647	1,17,66,257	80,82,537
10	Pune Centre Project Assets	40,56,24,382	74,54,055	1,13,37,449	1,87,91,504	-	42,44,15,886	38,06,19,650	-		2,41,45,711	40,47,65,361	1,96,50,525	2,50,04,732
11	Thiruvananthapuram Centre Project Assets	24,48,63,389	93,70,784	1,13,53,912	2,07,24,696	-	26,55,88,085	15,38,00,787	-		2,33,70,207	17,71,70,994	8,84,17,091	9,10,62,602
	Total	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
	Capital Work-in-progress	-	-	-	-	-	-	-	-		-	-	-	-
	Grand Total	**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**
	Previous Year	**1,27,40,56,884**	**5,91,57,157**	**10,60,52,962**	**16,52,10,119**	**2,33,70,694**	**1,41,58,96,309**	**1,04,75,69,616**	**2,10,83,914**		**14,43,96,376**	**1,17,08,82,078**	**24,50,14,231**	**22,64,87,268**

Amount in ₹

Particulars	2014-2015	2013-2014
Schedule 8 - Current Assets, Loans and Advances Etc.		
A. Current Assets		
1. Inventories :		
a) Stock in trade		
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
b) Stock of Course Material	11,60,080	11,94,750
2. Sundry Debtors		
Trade Receivables	54,63,74,208	47,34,43,682
Less: Provision for Bad and Doubtful Debts	18,50,28,354	14,71,96,233
	36,13,45,854	32,62,47,449
3. Cash balances in hand (including cheques/drafts and imprest)	9,35,803	3,84,624
4. Bank Balances		
a) With Scheduled Banks		
On Deposit Accounts (includes margin money)	3,11,53,70,483	3,25,72,45,880
On Savings/Current Account	1,23,71,51,845	42,85,52,549
b) Funds/Goods in Transit	16,28,768	72,53,419
5. Post Office-Savings Accounts	7,503	-
Total (A)	4,72,42,32,361	4,02,34,79,548
B. Loans, Advances and Other Assets		
1. Loans		
a) Staff	1,03,08,030	95,30,546
b) Other (Specify)	-	-
2. Advances and other amounts recoverable in cash or in kind or for value to be received		
a) On Capital Account	-	-
b) Prepayments (Advances to Suppliers)	2,25,96,594	2,74,24,957
c) To Employees	1,29,64,353	70,35,938
d) To Others	2,17,21,717	1,36,40,905
3. Income Accrued		
a) On Investments from Earmarked/Endowment Funds	-	-
b) On Bank Deposits	12,07,25,252	13,42,80,782
c) Others		
I) Course Fee Receivable	4,69,633	6,54,779
ii) Receivable from Guest House Receipts	-	-
iii) Other Grants Receivables	15,10,37,290	5,00,000
4. Claims Receivable		
a) Insurance Claims Lodged but not received	-	68,044
b) Cliams due but not received	6,25,354	6,25,354
c) Excise Duty paid under Protest	-	-
d) Income Tax Deducted at Source	8,58,40,363	9,92,50,947
e) Sales Tax / VAT Paid Under Protest	-	-
f) Sales Tax / VAT Refund Due	4,80,963	4,80,963
g) Receivable from PF Trust	81,766	2,071
h) Other Receivables	1,83,33,869	2,21,80,581
5. Prepaid Expenses		
a) Insurance	5,97,668	19,23,259
b) Other Expenses	63,07,019	52,01,768
6. Deposits (Assets)		
a) Telephone Deposit	11,91,559	11,98,776
b) Lease Rent Deposit	4,59,15,903	5,16,07,953
c) Other Deposits	2,45,14,708	2,40,37,886
d) Security Deposit	3,93,62,423	3,42,04,309
e) Excise PLA Deposit	5,45,736	5,43,871
f) Excise Under D3 and 57F3	-	-
g) EMD / Tender Deposit	31,28,669	51,22,415
7. Differed Expenses		
a) Unutilised Modvat / Cenvat	91,23,093	31,63,288
b) Differed Expenses on Projects	-	-
Total (B)	57,58,71,962	44,26,79,392
Total (A+B)	**5,30,01,04,323**	**4,46,61,58,940**

Amount in ₹

Particulars	2014-2015	2013-2014
Schedule 9 - Income from Sales/Services		
1. Income from Sales		
a) Sale of Finished Goods	7,66,72,859	13,43,95,937
b) Sale of Raw Material	-	-
c) Sale of Scraps	6,64,493	1,05,574
2. Income from Services		
a) Software Development Charges	15,38,37,048	11,74,36,621
b) Others (Specify)		
AMC Charges Received	3,31,24,128	4,69,50,574
Consultancy Charges / Service Charges	31,65,67,685	31,88,32,962
Networking Charges	-	-
3. Inter Unit / Inter Branch Sales / (Purchases)	-	-
Total	**58,08,66,213**	**61,77,21,668**
Schedule 10 - Grants/Subsdies		
(Irrevocable Grants & Subsdies Received)		
1. Central Government	83,70,00,000	1,04,00,00,000
2. Others (Specify)		
a) C-DAC's own Contribution and Other Adjustments	-	32,44,654
3. Less : Amount utilised for Capital Expenditure in the current year transferred to Capital Reserve	2,82,73,204	4,66,27,712
Total	**80,87,26,796**	**99,66,16,942**
Schedule 11 - Fees/Subscriptions		
(Accounting Policies towards each item are to be disclosed)		
1. Entrance Fees	12,500	25,600
2. Course Fees	54,87,06,431	51,96,85,602
3. Annual Fees/Subscriptions	2,18,75,248	2,44,54,866
4. Authorization Fees	5,33,708	42,00,000
5. Others (Specify)		
a) Virtual Centre Processing Fees	25,000	47,000
b) Admission Cancellation Fees	33,06,995	30,91,926
c) Examination Fees	1,85,27,206	1,99,22,496
d) Late Fee	71,174	71,211
e) Registration Fees / Project Fee	13,47,251	9,71,667
f) Students Hostel Fees	1,22,78,010	1,20,90,227
TOTAL	**60,66,83,523**	**58,45,60,595**
Schedule 12 - Income From Investments		
Income on Investment from Earmarked/Endowment Funds transferred to Funds)		
Interest		
1. On Term Deposits		
a) With Scheduled Banks	-	(4,81,64,145)
2. On Savings Accounts		
a) With Scheduled Banks	-	(4,43,719)
3. On Loans		
a) Employees/Staff	-	(25,666)
Total	-	(4,86,33,530)
Transferred to Earmarked/Endowment Funds	-	(4,86,33,530)
Net Balance	-	-

Amount in ₹

Particulars	2014-2015	2013-2014
Schedule 13 - Interest Received		
1. On Term Deposits		
a) With Scheduled Banks	22,61,46,032	20,37,47,378
2. On Savings Accounts		
a) With Scheduled Banks	90,69,543	1,41,80,405
3. On Loans		
a) Employees/Staff	8,84,281	2,97,341
Total	**23,60,99,856**	**21,82,25,124**
Schedule 14 - Other Income		
1. Profit on Sale/Disposal of Assets		
a) Owned Assets	(1,24,951)	(2,53,033)
b) Assets acquired out of grants, or received free of cost	(15,645)	(4,79,418)
2. Exports Incentives Realized	-	-
3. Fees for Miscellaneous Services	26,52,128	41,41,952
4. Miscellaneous Income	1,08,37,014	1,54,46,714
Total	**1,33,48,546**	**1,88,56,215**
Schedule 15 - Increase/(Decrease) In Stock of Finished Goods & Work-In-Progress		
a) Closing 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
b) Less : Opening Stock		
Finished Goods	1,08,460	16,73,360
Work-in-progress	13,23,651	5,83,518
Raw Material	11,68,766	23,93,042
Loose Tools	-	-
Course Material Stock	11,94,750	9,15,754
Total (a-b)	**39,96,478**	**(17,70,047)**
Schedule 16 - Establishment Expenses		
a) Salaries & Wages	93,17,64,332	90,45,73,416
b) Allowances & Bonus		-
Awards & Prizes	4,45,249	1,95,042
Bonus	24,19,857	19,50,726
Canteen Facility	2,37,36,794	2,62,16,940
Hire Charges - Contractual Services	5,48,10,077	4,95,82,380
Lease Rent for Employees Quarters	4,89,72,554	4,75,01,364
Leave Travel Concession	80,73,621	58,33,358
Medical Reimbursement	5,18,42,833	4,79,38,003
Members Medical & Accident Insurance Expenses	6,05,432	15,52,920
Misc. Allowances and Other Reimbursements	92,99,514	88,45,276
Staff Recruitment Expenses	28,42,241	30,16,840
Staff Training Expenses	11,54,491	48,32,636
Transfer & Relocation Expenses	3,79,485	1,95,223
c) Contribution to Provident Fund	7,96,70,325	6,69,06,366
d) Staff Welfare Expenses	97,79,017	1,17,20,330
e) Expenses on Employees Retirement and Terminal Benefits		-
Gratuity	1,74,53,988	1,02,32,949
Leave Encashment	3,19,65,643	4,30,03,770
Leave Salary & Pension Contribution	1,91,60,908	1,57,61,654
f) Others (Specify)	17,68,210	14,39,408
Total	**1,29,61,44,571**	**1,25,12,98,601**

Amount in ₹

Particulars	2014-2015	2013-2014
Schedule 17 - Other Administrative Expenses Etc.		
a) Purchases	3,53,17,077	4,74,13,908
b) Direct Expenses		
Consumables	1,60,85,516	1,88,14,974
Design and Development Charges	-	20,00,000
Excise/Custom Duty/Service Tax Paid	11,30,527	30
Freight and Handling Expenses	1,81,622	4,11,817
Labour Charges	-	75,559
Liquidated Damages	-	-
Material Insurance Expenses	-	-
Octroi	16,85,971	15,20,699
Other Packing Charges	4,425	54,159
Royalty and Support Fees	-	14,000
Software Development Consultancy Charges	21,76,984	1,10,11,777
Technical Service Charges	75,02,446	46,87,022
Warehouse Charges	1,96,000	-
c) Expenses on Courses		
Advertisement Expenses	1,54,79,413	1,50,13,859
ATC's Share in Fees	15,96,04,380	15,12,67,112
Awards & Prizes	-	-
Campus Interview Expenses	13,28,599	15,61,146
Course Material Production Expenses	2,52,17,033	1,68,40,701
Data Entry & Scanning Expenses	-	47,524
Examination Expenses	23,38,944	26,64,658
Faculty Members Expenses	1,97,40,213	2,99,90,703
Other Course Related Expenses	1,57,78,066	1,71,88,886
Printing of Forms & Prospectus	1,14,667	4,42,474
Students Hostel Expenses	1,04,327	3,73,795
d) Administrative Expenses		
Administrative Charges on Provident Fund	34,75,176	26,91,702
Asset Hire Charges	39,08,282	18,78,378
Auditors Remuneration	16,38,612	10,36,515
Bank Charges and Commission	14,12,952	16,09,868
C-DAC's Contribution to Funded Projects	27,46,065	20,86,793
Cultural Program Expenses	29,28,625	26,44,031
Development Contracts and Spon. Project Expenses	7,42,417	11,16,440
Electricity, Power and Water Charges	8,79,49,439	5,86,77,401
Entertainment/Hospitality Expenses	19,16,123	19,52,350
Foreign Exchange Fluctuation	7,00,398	14,64,820
Gifts and Presentation	15,60,993	24,95,723
Insurance	13,53,946	8,31,523
Interest Paid	37,07,873	6,90,329
Irrecoverable Balances Written-off/(Written-back)	28,81,924	(15,67,924)
Legal & Professional Charges	2,11,06,208	2,10,77,152
Miscellaneous Expenses	28,98,223	27,86,368
Office Expenses	65,67,218	78,57,578
Postage, Telephone & Communication Charges	1,67,68,560	1,76,13,348
Printing and Stationery	94,31,115	89,72,433
Provision for Bad and Doubtful Debts/Advances	4,55,18,864	90,97,039
Rent, Rates and Taxes	9,86,47,511	8,39,29,700
Sales Tax	72,34,881	33,76,893
Service Hire Charges	5,37,25,541	5,12,43,827
Subscription of Periodicals & Newspapers	20,56,680	26,49,787
Tender Expenses	1,34,738	1,19,620
Training Expenses	3,74,607	5,26,652
Transit Quarter & Guest House Expenses	44,47,520	34,72,953
Transportation Charges	3,28,078	8,99,364
Vehicles Hire, Running and Maintenance	1,34,33,402	1,45,74,383

Amount in ₹

Particulars	2014-2015	2013-2014
e) Repairs and Maintenance		
Air Conditioning Equipments	33,03,267	34,96,716
Building	1,05,70,853	2,06,32,702
Computers	79,46,995	74,82,615
Electrical Fittings	1,41,18,300	92,97,791
Furniture and Fixtures	87,34,897	60,55,906
Garden Maintenance	14,75,325	5,53,198
Lab Equipments	8,40,113	12,17,393
Office Equipments	18,80,513	19,88,942
Other Assets	23,01,312	34,08,918
f) Travelling and Conveyance Expenses		
Inland Travel Expenses		
Director	46,73,488	44,87,218
Members	2,88,01,761	2,83,49,711
Others	21,61,421	25,07,158
Foreign Travel Expenses		
Director	3,96,129	2,89,224
Members	58,24,254	69,32,131
Others	2,25,923	2,87,594
g) Selling Distribution and Business Promotion Expenses		
Advertisement Expenses	31,19,673	32,67,337
Expenses on Exhibition, Seminars/Workshops	46,08,364	58,74,406
Distribution Expenses	26,89,750	83,83,755
Product Literature & Brochures Expenses	-	-
Other Sales Promotion Expenses	3,17,442	1,89,557
h) Corporate Office Expenses	-	-
i) Other Expenses	26,65,977	6,79,934
Total Other Administrative Expenses	**81,02,37,938**	**74,25,82,055**

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 **Gokhale & Gokhale**
Chartered Accountants
(FR No. 111953W)

CA Sanjiv Moreshwar Gokhale
Partner (Membership No. 041010)

Date: **26th August, 2015**
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.
However the process for transfer of title deeds of Immovable property of the above centre is under process. The Management of C-DAC is of the opinion that there will be no liability on transfer of assets for stamp duty, taxes and other expenses and hence the same is not provided for in the books. However liability if any will be accounted for in the year of payment.

2. Capital Commitment

Capital Commitments ₹5,638.84Lacs not provided for. (Previous year ₹317.57Lacs)

3. Sponsored Projects

Funded Projects show the unspent balance of ₹16,633.25 Lacs and amount receivable from the granting authorities of ₹1,893.80 Lacs. In addition to ₹3,359.47 Lacs in respect of Core Grant Projects is also receivable.

4. Contingent Liabilities

4.1. Against Bank Guarantees: ₹539.07Lacs. (Previous year ₹383.54Lacs)

4.2. Against Letter of Credit ₹83 Lacs. (Previous year ₹45.20Lacs)

4.3. Against Service Tax: ₹0.00 Lacs (Previous year ₹315.42Lacs)

4.4. Against Sales Tax: ₹72.35 Lacs (Previous year ₹21.64 Lacs)

4.5. Sales Tax / VAT Assessments are completed up to financial year 2004-05 for Delhi, 2008-09 for Bangalore & Noida, 2010-11 for Pune, 2013-14 for Mohali and Thiruvananthapuram. No assessment are pending for Chennai, Hyderabad, Mumbai and Kolkata

4.6. Against disputed matters ₹13.84 Lacs. (Previous year ₹145.44 Lacs)

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

5. Statutory Liabilities

5.1. 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.

5.2. The Management of C-DAC is of the opinion that C-DAC is exempt from payment of Contribution u/s 58 and Rule 32 of the Bombay Public Trust Act, 1950. Consequently, no provision has been made in books of account.

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	410.09	644.58	1054.67
Previous Year	513.13	274.35	787.48

6.2 **Expenditure in foreign currency for Travel:** ₹41.92 Lacs. (Previous Year ₹48.03 Lacs.)

6.3 **Other Expenditure in foreign currency**: ₹14.58 Lacs (Previous Year ₹36.01 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	20,234.5	1,12,173.04
GB Pounds	0.00	0.00
UAE Dirham	0.00	0.00
Euro	21,424.95	48,802.78
Total Value in ₹ (In Lacs)	29.66	115.21

7 Remuneration to Statutory Auditors (Including Branch Auditors)

For Statutory Audit ₹5.71 Lacs. (Previous year ₹5.41 Lacs) For Other Services Including Tax audit ₹1.38 Lacs (Previous year ₹0.84 Lacs) Out of Pocket Expenses ₹1.71 Lacs (Previous year ₹0.69 Lacs)

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.

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	6.24	0.12	0.00	0.75	162.50	169.61
Chennai	51.67	0.97	0.00	0.00	0.00	52.64
Delhi	263.63	2.43	0.95	4.79	121.59	393.39
Hyderabad	0.00	0.00	0.00	0.00	0.00	0.00
Kolkata	11.80	55.55	0.00	0.00	5.00	72.35
Mohali	329.12	0.00	0.00	16.33	52.66	398.11
Mumbai	509.27	99.76	49.22	79.40	29.33	766.98
Noida	657.91	133.31	8.28	31.47	872.04	1703.01
Pune	392.52	50.21	96.28	37.97	1,036.14	1613.12
Thiruvananthapuram	155.37	8.90	49.75	16.28	64.22	294.52
Total	2377.53	351.25	204.48	186.99	2343.48	5463.73
Previous Year	1,174.91	726.06	341.99	590.69	1,900.58	4,734.43

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. Lease Obligations AS19

Lease rent of ₹1,264.65 Lacs for various premises are debited in the various heads of Income & Expenditure Account for the period under audit.

15. The Prior period Expenses of ₹557.52 Lacs includes ₹604.68 Lacs (Hyderabad ₹81.07 Lacs, Mohali ₹156.09 Lacs, Mumbai ₹60.08 Lacs and Thiruvananthapuram ₹307.43 Lacs) towards payment and provision of Service tax and interest thereon. However, ₹47.16 Lacs is reversal of the expenditure related to previous years.

16. Advances paid to employees include ₹0.23 Lacs as advances paid to directors (Previous Year ₹0.39 Lacs).

17. Employees benefit relating to Gratuity and Leave encashment has been paid/provided as per provision of AS I5.

18. 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 14 on Accounting for Amalgamations, Accounting Standard 17 on Segment Reporting, Accounting Standard 18 on Related Party Disclosure, Accounting Standard 26 in respect of Intangible Assets and Accounting Standard 29 in respect of Provisions, Contingent Liabilities & Contingent Assets, are not applicable.

19. <u>Centre Specific Notes</u>

19.1 Bangalore Centre

Electronic City, Bangalore unit merged with C-DAC, Knowledge Park, Bangalore centre on 30.10.2012 (As per Office Order No. 19/12 dated 30.10.2012). All project assets and other assets procured on or before 31.10.2012 for C-DAC, Electronic City Unit has been transferred during the year 2014-15 with cost value of ₹1,056.96 Lacs and accumulated depreciation value of ₹806.74 Lacs from Mumbai books of account and accordingly taken in Bangalore books of accounts.

19.2 Delhi Centre

19.2.1 CDAC was awarded IPO Project by DIPP with an outlay of ₹2,340 Lacs. M/s IBILT Technology Ltd has filed a civil suit of recovery for ₹322.98 Lacs with Hon'ble High Court Delhi. Case is under cross examination. No liability has been provided for.

19.2.2 FAR charges of ₹465.37 Lacs paid to DDA in 2013-14 from own funds and capitalized in Land cost in Business assets in 2013-14 are adjusted during the year as CDAC contribution in the project and transferred to WIP in Grants Schedule VII from business assets.

19.3 Hyderabad Centre

19.3.1 No provision was made towards Service Tax of ₹15.98 Lacs, interest and penalty of ₹100/- per day, for the year 2004-2005 as 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, which the decision is pending. Service tax has been paid for the year 2005-06 to2009-10 but the Interest of ₹88 lacs till 31.12.2014 has not been provided thereon as the matter is pending in appeals at various levels of the department

19.3.2 During the year the hired premises at JNTU complex was vacated and assets of `27.89 Lacs WDV could not be taken out such as partitions networking Electrical fittings and were charged to revenue (Other expenses).

19.4 Kolkata Centre

Fixed Assets for which WDV is amounting to ₹0.14 Lacs as on 31st March 2015, included in the Fixed Assets Schedule (Gross Block ₹15.05 Lacs) which were transferred in the earlier year to SAMEER, Kolkata under DIT, Govt. of India on loan basis.

19.5 Mumbai Centre

19.5.1 The Centre has an unspent balance of ₹163.95 Lacs from the DGF-R&T Project (DGF Project Phase II) as on 31st March, 2015. According to the meeting of the Board of Directors held in 2008, this unspent amount is to be utilized for the evaluation of the products developed under the project and for the future activities related thereto. As the project has been completed, this unspent balance has been grouped under Sundry Creditors as the unspent funds for the intended purpose are not yet utilized.

19.5.2 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 as per the advice of legal consultant.

19.5.3 As per LIC the total liability for Pension Fund is ₹994 Lacs during the year including the past deficit. However, due to less allocation of GIA, a provision of ₹191 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.

19.5.4 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.

19.6 Noida Centre

19.6.1 CDAC Noida acquired a plot of land 20,000 Square meter at B-30 Sector 62 Noida on ninety years lease in the year 2001. In the year 2011-12 balance amount paid of ₹204.83 Lacs to Noida authority was wrongly debited to building account instead of Land. The amount is transferred in the current year from Building to Land account. Accordingly the difference of Depreciation of ₹25.93 Lacs (₹55.51 Lacs – ₹29.58 Lacs) is shown as prior period income.

19.6.2 Under the project "Set top box for Internet Access on TV" sponsored by DST, ₹29.84 Lacs was incurred as capital expenditure in the year 2005-06.The same assets was wrongly allocated under own fund account instead of project account. Rectification entry has been passed during the year. Depreciation written back of ₹26.06 Lacs has been accounted for as prior period income during the year.

19.7 Pune Centre

19.7.1 Activities of ACTS, Pune are shifted from Bio-Informatics Building, Pune University Campus to the premises located at 12 Thube Park, Shivajinagar, Pune, in the year 2004-2005. Some of the fixed assets of ACTS, Pune could not be shifted to this premises. Written down value of these assets as on 31st March 2015 is ₹7.46 Lacs.

19.7.2 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 2015 is ₹41.40 Lacs.

19.7.3 "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.

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

19.7.5 CDAC is holding the funds belonging to CDAC Employees Benevolent Fund and CDAC Members Welfare Fund. C-DAC has not contributed any amount to Benevolent Fund due to changes in Staff Rules. Separate investments for the funds of Employees Benevolent Fund are maintained till August 2012; however, the funds of Members Welfare Fund and employee's contribution to Benevolent Fund from November 2012 are not separately invested up to the date of Balance Sheet.

19.7.6 Advances of ₹99.51 Lacs is pending against various claims of employees, will be booked during the financial year 2015-16. Since most of the claims will directly be debited to the Projects / Grants no provision is made and deficit will not be affected.

19.8 Thiruvananthapuram Centre

19.8.1 Advances includes the amount paid to M/s. Eworkz, Los Angeles, 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.

19.8.2 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.

20 The consolidated Income & Expenditure and Balance Sheet is prepared based on the Annual Audited 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.

21 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.

22 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 **Gokhale & Gokhale**
Chartered Accountants
(FR No. 111953W)

CA Sanjiv Moreshwar Gokhale
Partner (Membership No. 041010)

Date: **26th August, 2015**
Place: **Pune**

Annexure 19(A): FINANCIAL PERFORMANCE OF C-DAC FOR THE FINANCIAL YEAR 2014-2015

(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	Silchar	TVM
A	**OPENING BALANCE**															
(i)	**Grant -in- Aid**			**4.69**												
	Plan		16.63		0.45	0.97	9.98	0.56	0.00	2.64	0.00	0.00	0.00	0.03	0.00	2.00
	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	0.00
	Core Grant Projects		-11.94		-4.97	-4.43	15.69	0.00	-0.52	2.24	-0.66	-0.55	-1.03	-19.23	0.89	0.63
(ii)	**Grant for Sponsored Projects**			**63.26**												
	DeitY		49.16		2.52	1.07	0.00	0.86	6.18	5.27	0.59	10.02	3.66	-0.34	0.00	19.33
	Other Agencies		14.10		0.30	0.00	0.00	2.84	0.00	0.72	3.51	0.00	0.82	-0.68	0.00	6.59
B	**RECEIPTS & INCOME**															
(i)	**Grant -in- Aid**			**150.99**												
	Plan		80.70		9.21	2.11	0.85	1.16	3.19	1.85	4.52	7.79	7.92	24.10	0.00	18.00
	Non-Plan		3.00		0.00	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		67.29		9.78	4.42	7.96	1.00	0.94	6.51	1.85	0.73	3.09	20.99	1.01	9.01
(iii)	**Grant for Sponsored Projects**			**213.35**												
	DeitY		188.77		8.63	8.72	15.20	2.18	43.62	6.61	1.86	36.72	14.37	21.53	0.00	29.33
	Other Agencies		24.58		0.81	0.00	0.00	8.55	0.00	1.47	0.00	0.00	0.12	3.05	0.00	10.58
(iv)	**Revenue Earnings**			**118.75**												
	Training		60.66		6.88	0.60	0.00	0.00	2.80	0.15	3.17	1.79	6.21	37.23	0.00	1.83
	Commercial		58.09		0.29	0.54	0.00	1.23	0.32	1.65	3.66	9.35	15.07	19.14	0.00	6.84
(v)	**Interest, Other Income & C-DAC Contribution**			**5.97**												
	Plan		0.15		0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.04	0.00	0.00	0.00	0.01
	Core Grant Projects		5.82		0.19	0.02	0.00	3.64	1.41	0.17	0.01	0.03	0.00	0.35	0.00	0.00
				22.52												
	DeitY Spon Projects		20.88		0.30	0.05	0.00	0.01	0.95	0.17	0.07	3.69	0.13	0.50	0.00	15.01
	Spon. By Other Agencies		1.64		0.02	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.01	0.00	1.42
				26.02												
	Training		13.68		1.33	0.47	0.06	0.00	2.37	0.01	2.77	0.02	3.34	2.04	0.00	1.27
	Commercial		12.34		0.28	0.00	0.06	1.65	0.00	2.25	0.66	0.25	3.64	1.64	0.00	1.91
	TOTAL (A+B)		**605.55**	**605.55**	**36.02**	**14.54**	**49.80**	**23.68**	**61.26**	**31.81**	**22.20**	**69.88**	**57.34**	**110.36**	**1.90**	**126.75**
C	**REVENUE EXPENDITURE**															
(i)	**Expenditure from Grant-In-Aid**			**137.07**												
	Plan Total Expenses		88.17													
	Establishment Expenses	70.51			7.95	1.02	2.98	1.51	1.98	2.64	3.53	3.90	5.03	21.88	0.00	18.09
	Other Administrative Expenses	17.66			1.62	1.16	2.21	0.21	1.47	1.17	0.77	3.77	1.53	1.91	0.00	1.84
	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	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	0.00
	Core Grant Projects		45.90													
	Establishment Expenses	28.44			5.79	5.23	0.00	0.00	0.40	2.71	0.79	0.22	1.07	10.32	0.59	1.32
	Other Administrative Expenses	17.46			2.37	1.83	0.00	0.00	0.04	1.24	0.49	0.61	0.55	5.99	0.13	4.21

Annexure 19(A): FINANCIAL PERFORMANCE OF C-DAC FOR THE FINANCIAL YEAR 2014-2015

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

(ii)	**Expenditure on Sponsored Projects**			**114.17**											
	DeitY Total Expenses		99.22												
	Establishment Expenses	48.63			2.64	3.75	0.00	0.44	5.39	3.20	1.14	4.29	3.90	12.19	0.00	11.69
	Other Administrative Expenses	50.59			2.24	2.14	0.00	0.60	4.56	2.28	0.65	12.85	2.82	7.27	0.00	15.18
	Other Agencies Total Expenses		14.95												
	Establishment Expenses	4.33			0.44	0.00	0.00	0.28	0.00	0.30	0.11	0.00	0.21	1.29	0.00	1.70
	Other Administrative Expenses	10.62			0.75	0.00	0.00	5.15	0.00	0.23	0.23	0.00	0.01	1.61	0.00	2.64
(iii)	**Other Revenue Expenditure**			**128.48**											
	Training Total Expenses		55.06												
	Establishment Expenses	16.67			1.61	0.06	0.00	0.00	1.39	0.02	2.57	0.38	4.12	5.66	0.00	0.86
	Other Administrative Expenses	38.39			1.38	0.37	-0.61	0.00	1.69	0.02	2.57	1.21	1.20	28.20	0.00	2.36
	Commercial Total Expenses		73.42												
	Establishment Expenses	39.43			0.05	0.13	0.00	1.13	0.00	0.56	0.92	8.01	13.21	15.38	0.00	0.04
	Other Administrative Expenses	33.99			0.48	0.00	-0.58	0.40	0.08	0.41	1.15	1.70	6.15	20.54	0.00	3.66
	TOTALC		**379.72**	**379.72**	**27.32**	**15.69**	**4.00**	**9.72**	**17.00**	**14.78**	**14.92**	**36.94**	**39.80**	**132.24**	**0.72**	**66.59**
D	**CAPITAL EXPENDITURE**														
(i)	**Expenditure from GIA for Core R&D**			**14.68**											
	Plan		2.83		0.09	0.00	0.04	0.00	-0.26	0.78	0.23	0.16	1.35	0.35	0.00	0.09
	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	0.00
	Core Grant Projects		11.85		0.93	0.07	0.00	4.65	1.42	0.22	0.07	0.02	0.05	2.81	0.29	1.32
(ii)	**Expenditure from GIA for Sponsored Proj.**			**14.51**											
	DeitY		13.87		3.82	1.27	0.00	0.00	1.84	0.19	0.25	2.14	0.73	1.83	0.00	1.80
	Other Agencies		0.64		0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.05	0.00	0.27
(iii)	**Expenditure from Own Funds**			**3.41**											
	Training		1.74		0.07	0.05	0.00	0.00	0.57	0.00	0.41	0.09	0.11	0.44	0.00	0.00
	Commercial		1.67		0.00	0.00	0.00	0.10	0.00	0.00	0.07	0.33	0.91	0.12	0.00	0.14
	TOTAL D		**32.60**	**32.60**	**4.93**	**1.39**	**0.04**	**4.75**	**3.57**	**1.19**	**1.03**	**2.74**	**3.45**	**5.60**	**0.29**	**3.62**
E	**REFUND / TRANSFER OTHER ADJUSTMENTS**														
(i)	**From GIA for Core R&D**			**15.37**											
	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	0.00
	Core Grant Projects		15.37		0.20	-0.76	10.35	0.00	0.02	0.22	0.10	0.00	0.36	0.26	0.89	3.73
(ii)	**From Sponsored Projects**			**23.03**											
	DeitY		19.72		0.27	0.74	0.00	0.01	0.96	1.34	0.00	3.93	10.15	-10.14	0.00	12.46
	Other Agencies		3.31		0.01	0.00	0.00	0.59	0.00	1.50	0.00	0.00	0.00	1.21	0.00	0.00
	TOTAL (E)		**38.40**	**38.40**	**0.48**	**-0.02**	**10.35**	**0.60**	**0.98**	**3.06**	**0.10**	**3.93**	**10.51**	**-8.67**	**0.89**	**16.19**
F	**TOTAL EXPENDITURE (C+D+E)**		**450.72**	**450.72**	**32.73**	**17.06**	**14.39**	**15.07**	**21.55**	**19.03**	**16.05**	**43.61**	**53.76**	**129.17**	**1.90**	**86.40**
G	**Unspent Balance / Surplus / Deficit (A+B-F)**															
(i)	**Grant -in- Aid**			**-5.47**												
	Plan		6.48		0.00	0.90	5.60	0.00	0.00	0.00	-0.01	0.00	0.01	-0.01	0.00	-0.01
	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	0.00
	Core Grant Projects		-11.95		-4.29	-6.36	13.30	-0.01	-0.05	4.53	-0.25	-0.64	0.03	-17.27	0.00	-0.94
(ii)	**Sponsored Projects**			**147.42**												
	DeitY		126.00		2.48	1.94	15.20	2.00	38.00	5.04	0.48	27.22	0.56	10.54	0.00	22.54
	Other Agencies		21.42		-0.09	0.00	0.00	5.37	0.00	0.16	3.36	0.00	0.42	-1.78	0.00	13.98
(iii)	**Other**			**16.29**												
	Training		19.28		5.22	0.64	0.67	0.00	2.09	0.12	0.80	0.22	4.23	5.41	0.00	-0.12
	Commercial		-2.99		0.04	0.41	0.64	1.35	0.24	2.93	2.25	-0.11	-0.65	-15.14	0.00	5.05

Annexure 19(B):

CENTRE WISE BALANCE SHEET AS AT 31st March 2015

(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	321.77	11.02	7.56	3.59	12.32	23.21	19.10	39.79	2.33	90.05	91.51	21.29
Reserves and Surplus	155.64	7.56	2.99	0.11	5.08	14.03	2.71	2.83	4.40	6.39	53.01	56.53
Earmarked and Endowment Funds	142.36	(1.88)	(3.53)	34.09	7.38	37.95	9.73	3.58	26.58	1.02	(8.12)	35.56
Secured / Unsecured Loan from Bank	4.90	-	-	-	-	0.50	1.40	-	-	-	-	3.00
Current Liabilities and Provisions	93.62	2.90	(0.01)	2.10	6.66	1.86	4.37	6.55	6.48	17.53	23.59	21.59
Branch & Divisions	-	22.95	3.05	(17.24)	3.58	(1.47)	(0.95)	(1.35)	(0.90)	0.05	(6.49)	(1.23)
Total	**718.29**	**42.55**	**10.06**	**22.65**	**35.02**	**76.08**	**36.36**	**51.40**	**38.89**	**115.04**	**153.50**	**136.74**
ASSETS												
Fixed Assets												
Acquired out of Own Funds	32.66	5.19	0.13	-	2.51	0.73	0.98	1.27	0.38	9.98	10.23	1.26
Acquired out of Grant in Aid	131.35	3.45	0.81	0.11	5.07	12.37	2.64	1.79	1.16	5.21	51.05	47.69
Acquired out of Project Grants	24.28	4.11	2.18	-	-	1.65	0.07	1.04	3.25	1.18	1.96	8.84
Investments-from Earmarked/Endowment Funds	-	-	-	-	-	-	-	-	-	-	-	-
Investments-Others	-	-	-	-	-	-	-	-	-	-	-	-
Current Assets, Loans, Advances etc.	530.00	29.80	6.94	22.54	27.44	61.33	32.67	47.30	34.10	98.67	90.26	78.95
Miscellaneous Expenditure	-	-	-	-	-	-	-	-	-	-	-	-
Total	**718.29**	**42.55**	**10.06**	**22.65**	**35.02**	**76.08**	**36.36**	**51.40**	**38.89**	**115.04**	**153.50**	**136.74**

Annexure 19(B):

CENTRE WISE INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st March 2015

(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
INCOME												
Income from Sales/Services	58.09	0.28	0.54	-	1.23	0.32	1.65	3.66	9.35	15.07	19.15	6.84
Grants/Subsdies	80.87	9.12	2.11	0.81	1.16	3.45	1.07	4.29	7.63	6.57	23.75	20.91
Fees/Subscription	60.67	6.88	0.60	-	-	2.80	0.15	3.17	1.79	6.21	37.24	1.83
Income from Investments (Income on Investments from earmarked/endowment funds transferred to funds)	-	-	-	-	-	-	-	-	-	-	-	-
Interest Earned	23.62	1.45	0.42	0.12	1.58	2.35	2.00	3.25	0.06	6.42	3.31	2.66
Other Income	1.34	0.02	0.05	-	0.06	0.01	0.29	0.16	0.06	0.05	0.12	0.52
Prior Period Income	0.82	-	-	-	-	0.01	0.06	0.02	0.19	0.52	-	0.02
Increase/(decrease) in stock of Finished Goods and Work-in-progress	0.40	0.15	-	-	-	-	-	-	-	-	0.25	-
Total	**225.81**	**17.90**	**3.72**	**0.93**	**4.03**	**8.94**	**5.22**	**14.55**	**19.08**	**34.84**	**83.82**	**32.78**
EXPENDITURE												
Establishment Expenses	129.60	9.60	1.21	2.98	2.64	3.37	3.22	7.01	12.29	22.37	42.91	22.00
Other Administrative Expenses	81.05	3.15	1.50	0.99	0.57	2.30	1.49	2.50	5.66	7.94	50.48	4.47
Prior Period Expenses	5.56	0.01	0.01	0.03	-	0.81	-	1.56	0.65	0.01	(0.68)	3.16
Depreciation (corresponding to Schedule 5)	3.45	0.32	0.03	-	0.04	0.14	0.11	0.42	0.38	0.93	0.84	0.24
Total	219.66	13.08	2.75	4.00	3.25	6.62	4.82	11.49	18.98	31.25	93.55	29.87
Transferred to / (from) Balance of Core Grants	(10.14)	(0.45)	(0.07)	(4.39)	(0.56)	-	(2.64)	-	-	-	(0.03)	(2.00)
SURPLUS / (DEFICIT)	**16.29**	**5.27**	**1.04**	**1.32**	**1.34**	**2.32**	**3.04**	**3.06**	**0.10**	**3.59**	**(9.70)**	**4.91**

Consolidated Receipt and Payments for the year ended 31st March 2015

Amount in ₹

Receipts	2014-2015	2013-2014
I. Opening Balance		
a) Cash on hand	3,84,624	66,448
b) Bank Balances		
i) In Savings/Current Accounts	42,85,52,549	59,51,85,790
II. Grants Received		
a) From Government of India	58,41,17,213	72,11,00,000
b) From State Government	24,96,75,369	-
b) Grant and Other Income Received for Projects	2,17,51,76,696	1,37,14,06,228
III. Income from Encashment of FDRs	3,22,38,93,889	3,60,23,69,632
IV. Interest Received		
a) On Bank Deposits	14,97,39,579	10,92,42,088
b) Loans and Advances	44,64,584	7,07,723
V. Other Income (Specify)		
a) Previous years Income recovered	(1,63,55,452)	(2,13,048)
b) Advances Received from Customers	5,09,84,088	5,75,15,837
d) Fees/Subscription & Direct Income	62,13,89,523	53,73,51,041
e) Other Income	32,65,65,656	12,91,24,568
f) Amount Received from Debtors	53,07,73,905	45,85,73,773
g) Loans and Advances Recovered	6,53,01,521	7,38,92,682
VI. Amount Borrowed		
Branch and Divisions	1,22,51,02,614	91,41,07,657
Bank Loan	-	4,51,57,114
VII. Any Other Receipt (Give Details)		
a) Deposits (Liabilities)	1,94,06,688	12,72,26,631
b) Addition to Reserve Fund	-	-
Total	**9,63,91,73,046**	**8,74,28,14,164**

Amount in ₹

Payments	2014-2015	2013-2014
I. Expenses		
a) Establishment Expenses	1,06,31,80,321	87,91,62,629
b) Administrative Expenses	42,41,82,022	35,49,15,585
c) Payment made to Creditors for Goods and Others	1,73,64,84,571	1,78,70,01,641
II. Payments made against funds for various projects	16,80,57,726	15,40,13,244
(Name of the Fund or Project along with the particulars of payment made for each project shown in separate schedule)		
III. Investments and Deposits made	3,13,05,31,391	3,01,17,41,505
IV. Expenditure on Fixed Assets and Capital Work in Progress		
a) Purchase of Fixed Assets	3,79,35,438	7,36,78,175
b) Expenditure on Capital Work in Progress	8,43,436	-
V. Refund of Surplus money/loans	2,63,36,520	10,20,66,629
VI. Finance Charges (Interest)	41,804	1,10,17,317
VII. Other Payments (Specify)	-	-
a) Deposit (Assets)	45,48,414	5,51,29,939
b) Loans and Advances	7,27,28,007	11,00,67,395
c) Previous years outstanding payments	77,53,10,868	68,89,35,730
d) Prepaid Expenses	59,86,360	56,31,538
e) Branch and Divisions	90,47,52,392	1,01,66,48,543
f) Deposits (Liabilities) Refunded	5,01,66,128	6,38,67,121
VIII. Closing Balance		
a) Cash on hand	9,35,803	3,84,624
b) Bank Balances		
i) In Savings Accounts	1,23,71,51,845	42,85,52,549
Total	**9,63,91,73,046**	**8,74,28,14,164**

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
Gokhale & Gokhale (FRN: 111953W)
CHARTERED ACCOUNTANTS

CA Raghu Bhargava
Director Finance
Pune

Col. Anoop Kumar Khare (Retd)
Registrar

Prof. Rajat Moona
Director General

CA Sanjiv Moreshwar Gokhale
Partner (Membership No. 041010)
Date: 26-Aug-2015

Hon'ble Minister of Communications & IT, Shri Ravi Shankar Prasad, handing over the PARAM Shavak Certificate to the first user during Good Governance Day celebration at New Delhi on December 25, 2014 in presence of Shri R. S. Sharma, Secretary, DeitY

Hon'ble Minister of Communications & IT, Shri Ravi Shankar Prasad, handing over the technology for ASTeC Products to a ToT Partner during Good Governance Day celebration at New Delhi on December 25, 2014 in presence of Shri R. S. Sharma, Secretary, DeitY

Advanced Computing For Human Advancement

C-DAC/Media & Communications /Annual Report/2015