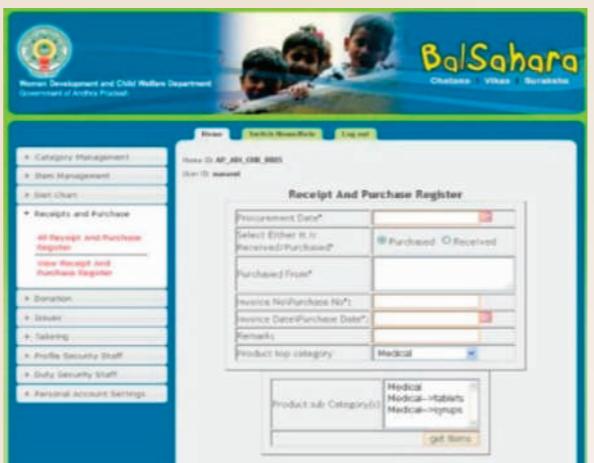


In order to encourage use of ICT resources by the differently abled, specialized Linux distributions have been made for the visually challenged and cognitively (mild) challenged. Specialized tools for gesture based interaction; predictive writing, tagging files with visual tags, etc. have been built. Most of these solutions are available online as open source.

### E-Learning

C-DAC has developed a number of indigenous solutions for content management, evaluation and assessment, virtual classroom, and collaborative learning for e-learning domain. Some of the solutions are listed below:

- **e-Shikshak** - a learning management system with rich support for Indian languages
- **NOES (National Online Examination System)** - an online examination system for conducting recruitment examinations, with rich support for interview related activities such as biodata management, panel management, etc.
- **OLabs (Online Labs)** - provides students the ease and convenience of conducting experiments over the Internet
- **Veda** - a general purpose online testing and question banking system, supporting multiple choice questions
- **e-Saadhyा (SaralAnukulaneyAdhyayan)** - an adaptable and accessible e-Learning framework for the children with mild mental retardation and autism. It is developed with the domain support provided by the National Institute for the Mentally Handicapped (NIMH). It has local language support in three Indian languages, namely Hindi, Telugu and Kannada.
- **Seekha** - an academic networking portal for the faculty members, students, and academic institutions to network and share information about courses, academic events, projects, etc.



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# Software Technology



Free/Open Source Software

e-Governance and m-Governance

Spatial Sciences and Disaster Management

ICT Solutions for Social Development

E-Learning

In software technology area, C-DAC fosters R&D activities in the following sub-domains: Software-intensive systems engineering, Emerging software technologies, Distributed systems and Database technologies. The technologies and solutions developed by C-DAC in this area are described below.

#### Free/Open Source Software

C-DAC is spearheading the Free/Open Source Software (FOSS) initiative within the country through its NRCFOSS (National Resource Centre for Free and Open Source Software) and BOSS (Bharat Operating System Solutions) initiatives.



Bharat Operating System Solutions with GNU/Linux distribution developed by C-DAC is derived from Debian for enhancing the use of Free/Open Source Software throughout India. The latest version of BOSS, coupled with GNOME Desktop Environment with wide Indian language support and packages, is in use in various Government agencies including defence establishments. A variant of BOSS, called EduBOSS, is being used for school education.

#### e-Governance and m-Governance

C-DAC is working on multiple levels to support the (National e-Governance Plan) NeGP's vision. It has designed and developed the messaging middleware(s) that are core components of e-Governance infrastructure. At central level, successful deployment of National e-Governance Service Delivery Gateway (NSDG) has resulted in its replication at the State level Service Delivery Gateways (SSDGs), creating a constellation of messaging gateway exchange. The current architecture of e-Gov Exchange (i.e., the constellation of NSDG, NSD and SSDGs) complements the Messaging Service Delivery Platform (MSDP). It provides seamless integration with backend departments through the existing e-Gov Exchange infrastructure.

C-DAC has developed and deployed a number of software solutions at various user organizations. These include:

- National e-Governance Service Delivery Gateway
- State e-Governance Service Delivery Gateway
- Mobile Services Delivery Gateway
- Fulcrum - e-Forms Designer and Engine
- e-Pramaan - a National e-Authentication System
- e-PPS - Electronic Project Proposal System for DeitY and ICMR
- e-MSIPS - Electronic MSIPS Application System for ESDM Standards
- eRA - e-Governance Application Integration with Reconfigurable Architecture, a reconfigurable middleware with support for workflow and rule-based service configurations for evolving e-Governance systems
- Revival - a disaster recovery solution that facilitates zero Recovery Point Objective (RPO) and negligible Recovery Time Objective (RTO) for service delivery gateways



C-DAC has also developed and deployed various e-Governance applications such as:

- Solutions for the Department of Stamps and Registration - Sarita (Maharashtra), Kaveri (Karnataka) and Gauri (Goa)
- Online Management, Monitoring and Accounting System (OMMAS) for Ministry of Rural Development, Government of India
- Fund and Accounts Management System for National Literacy Mission Authority, Government of India
- Framework for Public Infrastructure - Works and Accounts Management Information System (WAMIS), implemented in Odisha, Maharashtra, Tripura, Goa and Meghalaya
- Human Resource Management System - implemented in Public Works Department (Maharashtra, Goa, Meghalaya, Tripura) and Naval Dockyard (Mumbai and Visakhapatnam)
- Customs Valuation System (CVS) - a decision making analysis tool to assist customs officers in price valuation of a commodity, implemented in Kenya, Ethiopia and India

Mobile Seva enables offering of public services to the citizens over mobile phones and tablets. As a part of this national initiative of Government of India, C-DAC has created a centralized platform as the core infrastructure for enabling Government departments to offer public services through mobile devices. More than 1250 central and state Government departments are integrated with Mobile Seva platform and are using it for providing SMS-based services. A mobile application store (m-App Store) has been created that currently hosts over 300+ mobile applications.

#### Spatial Sciences and Disaster Management (SS&DM)

Under SS&DM, C-DAC carries out R&D in remote sensing, digital image processing, digital photogrammetry, terrain analysis, spatial analysis and modelling, software development, customization, development of spatial decision support systems, web GIS application development and location based services for providing solutions and services in a wide range of application areas.

Some of the solutions developed include:

- **GRIMMS** - a GIS based Road Information Management Monitoring System providing GIS interface
- **Saarathy** - a mobile navigation system with multilingual support
- **Flood Response System** for the Brahmaputra basin with a web based interface for damage assessment
- **Aranya** - a decision support system for the Bodoland Territorial Areas District (BTAD)



#### ICT Solutions for Social Development

C-DAC is developing various solutions for the benefit of the masses that addresses challenges faced by women, differently abled, elderly people and children covering various domains like education, health and agriculture. Some of the solutions developed are given below:

- **Kudumbashree** - Sreesakthi portal for women empowerment and integrated Management Information System (MIS) for monitoring the activities of Kudumbashree mission of Kerala
- **ePSS (Electronic Personal Safety System)** – a solution to assist women, children and the elderly in cases of emergency
- **m-Sahayak** - an Android based application for real-time assistance in Indian agricultural and health sectors
- **GEM (Gestures with Mouse)** - an input mechanism (for GNOME desktop) which uses gestures as input to the system. Gestures can be drawn with a mouse or some equivalent device like touch pad, joystick, pen tablet, etc.
- **IASF (Intelligent Advisory System for Farmers)** - a system for automatically answering queries related to farming activities in North-Eastern states
- **ALViC (Accessible Linux for Visually Challenged)** - a navigation system for visually challenged
- **MOTHER** - a mobile based voice alert system facilitating maternal health awareness
- **InDG (India Development Gateway)** - a country-wide initiative that targets specific country needs in the domain of rural and social development. The multilingual portal, [www.vikaspedia.in](http://www.vikaspedia.in), provides information and services on thematic areas relevant to social empowerment like agriculture, education, health, social welfare, energy and e-Governance
- **e-Learning framework for children with cognitive disability** - a framework for children below 16 years of age with mild mental retardation and autism. It is in line with Sarva Shiksha Abhiyan (SSA) program
- **BALSAHARA** – a mobile and web based automation system for children homes

