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Infocus

Generative AI

pg. 20

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PRINT & CIRCULATION
UXDT Division
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National Informatics Centre
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CONTACT ADDRESS
INFORMATICS
379, A4B4, Floor-3, NIC
A-Block, CGO Complex, Lodhi Road
New Delhi-110003, INDIA
Phone: 011 -24305363/65
Email: editor.info@nic.in

Editorial

As the world embraces digital transformation, developing nations like ours are at a critical juncture in modernizing governance. Government apps are quickly becoming the go-to tools for public service delivery, and their effectiveness is directly linked to the underlying technologies that drive them. Among these technologies, two stand out for their ability to shape the future of governance: artificial intelligence (AI) and cybersecurity. Together, they form the backbone of smart, efficient, and secure government apps, which are essential for addressing the needs of a diverse and growing population.

AI is fundamentally transforming how government services are delivered. With AI, government apps can now offer personalized, data-driven services to individual needs. For instance, AI can analyze a citizen's data to recommend welfare schemes, healthcare advice, or financial services. This level of personalization is particularly crucial in a country as diverse as ours, where one-size-fits-all approaches often fail.

Beyond personalization, AI automates routine tasks, from processing applications to answering citizen queries. Chatbots, powered by AI, are increasingly becoming the first point of contact for citizens seeking government services, offering instant assistance 24/7. This automation not only speeds up service delivery but also reduces the burden on human administrators.

AI is also enabling predictive governance. In areas such as health, AI can predict disease outbreaks, helping governments take preemptive action. In infrastructure, AI-driven traffic management systems can optimize urban planning and reduce congestion. In short, AI is helping governments be more proactive, efficient, and responsive to the needs of their citizens.

As AI powers efficiency, cybersecurity ensures trust. With the increasing reliance on government apps for essential services, securing these platforms against cyber threats is critical. Cybersecurity measures such as encryption, multi-factor authentication, and real-time monitoring safeguard sensitive citizen data and protect against unauthorized access. In a world where data breaches and cyberattacks are a constant threat, strong cybersecurity frameworks are essential for building and maintaining public trust. Without this trust, the adoption of digital government services could be hindered, limiting the success of digital governance initiatives.

When AI and cybersecurity come together, they form a powerful combination that can transform governance. AI can not only improve services but also enhance security. For example, AI systems can monitor user behavior and detect anomalies that may indicate cyberattacks. This real-time threat detection, combined with robust cybersecurity measures, ensures that government apps are both efficient and safe.

Despite the immense potential, concerns around the ethical use of AI and the shortage of cybersecurity professionals need urgent attention. Governments must invest in both technological infrastructure and human capital to realize the full benefits of AI and cybersecurity.

AI and cybersecurity are the twin pillars of future governance. Together, they are revolutionizing how government services are delivered and protected, making governance more efficient, inclusive, and secure. For a developing nation like ours, these technologies represent the way forward, ensuring that digital progress benefits every citizen and builds a more equitable and secure.

-Editor-In-Chief

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Haryana State

Empowering Haryana Through Digital Innovation

Edited by **VINOD KUMAR GARG**

Since 1988, NIC Haryana has been a vital technology partner for the Government of Haryana, transforming governance with advanced IT systems and seamless e-Governance solutions. Leveraging AI, Cloud Computing, and Data Analytics, NIC Haryana has automated workflows, digitized records, and ensured efficient service delivery. Anchored by the NIC Mini Cloud and Haryana State Data Centre, it powers initiatives like SARAL, Parivar Pehchan Patra (PPP), AePDS, and Meri Fasal Mera Byora, revolutionizing public services with transparency and real-time support. Committed to inclusive governance, NIC Haryana drives digital innovation, aligning with the Digital India vision and inspiring nationwide advancements.

ICT Initiatives in the State

NIC Haryana has been a pioneer in implementing innovative ICT solutions that enhance governance and simplify access to public services for citizens. Some of the key initiatives that have transformed governance in Haryana include:

Parivar Pehchan Patra

https://meraparivar.haryana.gov.in/

The Parivar Pehchan Patra (PPP) is a groundbreaking initiative by the Government of Haryana, aimed at establishing a comprehensive family database across the state. Each household is assigned a unique 8-digit Family ID, unifying all family members under a single record. This system streamlines the delivery of government schemes and services by enabling real-time verification of socio-economic and demographic data.

NIC Haryana has transformed the State into a digitally empowered economy by implementing innovative, cashless, paperless, and faceless solutions. These efforts ensure fast, hassle-free, and time-bound service delivery while combating nepotism and corruption. Flagship programs like Antyodaya SARAL, Parivar Pehchan Patra, and Integrated Web-HALRIS, launched by the Hon'ble Chief Minister, provide over 600 services and schemes to citizens, supported by comprehensive dashboards for efficient governance.

Currently, over 76 lakh families are registered under the PPP, with more than 73 lakh verified through an extensive cross-checking process. By integrating with over 400 government services and schemes, the PPP simplifies access to benefits such as Old-Age Pensions, Caste and Income Certificates and various welfare programs, eliminating the need for repeated documentation.

With its dynamic and authentic database, the PPP has transformed service delivery, adopting a proactive governance approach. Eligible citizens are automatically identified, and the government contacts them for consent. Once approved, benefits are provided from the following month. Notable proactive services include Old Age Pension, Widow Pension, Divyang Pension, BPL Ration Card, Ayushman Bharat Medical Insurance, and Mukhya Mantri Vivah Shagun Yojna.

Beyond streamlining service delivery, the PPP facilitates proactive governance by automatically updating records for life events such as births, deaths, or marriages. Citizens can also update or verify their family information at their nearest Atal Seva Kendra or SARAL Kendra, ensuring the system remains accurate. This initiative fosters transparency, efficiency, and inclusivity, establishing Haryana as a pioneer in digital governance.

Auto Appeal System

https://aas.saralharyana.nic.in

To ensure timely and transparent service delivery, the National Informatics Centre, Haryana State Centre, developed the Auto Appeal System (AAS) for the Haryana Right to Service Commission. Launched by the then Chief Minister of Haryana on September 1, 2021, AAS is a pioneering initiative in India.

The Auto Appeal System automates the filing of appeals under the Right to Service Act for eligible individuals when application timelines are breached, while also allowing for manual appeal submissions. If an application surpasses the deadline, an automatic appeal is generated and forwarded to the First Grievance Redressal Authority (FGRA). If no action is taken or a final decision is not reached within 30 working days, the appeal escalates to the Second Grievance Redressal Authority (SGRA). A further escalation to the Haryana Right to Service Commission (HRTSC) occurs if the SGRA fails to act within another 30 days.

Grievance authorities, including the HRTSC, may summon the Designated Officer (DO) and

Deepak Bansal
Dy. Director General & SIO
deepak.bansal@nic.in

Deepak Sawant
Technical Director
sawant.deepak@nic.in

the appellant for hearings, issue directives, and request responses, which can be uploaded online. The system supports rescheduling hearings, issuing interim orders, and delivering final judgments, while both the HRTSC and SGRAs have the authority to impose penalties on DOs, with compensation potentially awarded to citizens.

The AAS also supports manual appeal submissions via the Antyodaya Saral Portal (https://saralharyana.gov.in) or the Antyodaya Saral Helpline at 0172-3968400. If applicants are dissatisfied with FGRA or SGRA decisions, they can use the Auto Appeal System (https://aas.saralharyana.nic.in) alongside the portal and helpline for further appeals.

To date, 440 services and schemes across 41 Departments, Boards, and Corporations have been integrated into AAS, with over 14.23 lakh appeals filed and 98.7% (14.04 lakh) successfully resolved.

Policy Based Transfers in HRMS

The online policy-based transfer system is a vital part of the government's administrative framework, designed to efficiently manage large-scale employee transfers within specific cadres. Each cadre follows a transparent, government-approved policy framework outlining clear transfer criteria. At the core of this system is a detailed policy document, specifying factors like service tenure, performance ratings, and other relevant criteria. Eligible employees are identified, objectively scored, and matched to vacancies, ensuring fairness and merit-based decisions.

The system operates through two portals: HRMS (https://hrmshry.nic.in), the administrative hub for nodal officers to manage transfers, and IntraHry (https://intrahry.gov.in), where employees can review scores, submit preferences, and participate in the process. This streamlined, technology-driven approach reflects the government's commitment to efficiency, transparency, and employee welfare. So far, 8,138 employees have been transferred under 156 policies.

NIC Haryana has been instrumental in transforming Haryana into a digitally empowered economy. Today the Citizens of Haryana get fast, hassle-free, and time-bound service delivery. The innovative, cashless, paperless, and faceless digital solutions have ensured an end to nepotism and corruption.

Haryana provides nearly 600 digital services to citizens. The Flagship programs like Antyodaya SARAL, Parivar Pehchan Patra (PPP), Integrated Web-HALRIS, Meri Fasal Mera Byora and GePNIC e-procurement platform are unique initiatives providing e-services, family and personal identity services, authentic land records, direct payment to farmers for their produce and transparent e-tendering facilities. By automating workflows, digitizing records, and enabling real-time data sharing, NIC Haryana has created a transparent and responsive governance system that delivers citizen services more efficiently.

The dynamic and authentic PPP database comprising 73 lakh verified families ensures that citizens can easily access benefits such as old-age pensions, caste and income certificates, and other welfare programs without repeatedly providing documentation. The paradigm of service delivery has now shifted towards "proactive service" delivery where the applicant doesn't need to fill up a form or apply for a service, rather, it is the Government that reaches out to the citizen who is found to be eligible for any state welfare scheme. Consent is taken from citizen for the welfare scheme and if citizen is interested in availing the scheme, benefit of the scheme accrues from next month. A few examples of proactive services are Old Age Pension, Widow Pension, Divyang Pension, Widower and Unmarried Pension, BPL Ration Card, Ayushman Bharat Medical Insurance and Mukhya Mantri Vivah Shagun Yojna.

Vijayendra Kumar, IAS
Principal Secretary, Human Resources Department, Govt. of Haryana

HRMS Haryana

https://hrmshry.nic.in/

The Human Resource Management System (HRMS) platform in Haryana is used to manage the service records of over 3.3 lakh employees. It automates HR functions like transfers, promotions, and leave applications. The system has processed 38 lakh ACRs, 1,34,035 general Transfers, and 17 lakh Leaves, providing a more transparent and efficient HR management framework for the state government.

10.44 Lakh+ Proactive SC Certificates Issued	**16.32 Lakh+** Proactive Income Certificates Issued	**7.65 Lakh+** Proactive BC Certificates Issued
2.95 Lakh+ New Beneficiaries added in Old Age Pension	**~16 Lakh** Additional Ration Cards added in PDS as compared to before proactive scenario	**~14 Lakh** Additional families enrolled under the Health Insurance Scheme (Chirayu)
15000+ Schools, Colleges, Universities, ITIs & Polytechnics integrated for admissions	**10 Lakh+ Farmers** Procurement of produce linked to land records and payments directly into accounts	**1.75 Lakh+** Proactive OBC Certificates Issued

Comprehensive Cashless Health Facility

The Ayushman Bharat Haryana Health Protection Authority, in collaboration with NIC-Haryana, has developed a portal to issue Comprehensive Cashless Health Facility (CCHF) cards to government employees and pensioners.

To generate a CCHF card, an employee must ensure their Parivar Pehchan Patra (PPP) ID is linked with the HRMS and e-Pension system databases.

NIC has created and shared an API with the Ayushman Bharat National Health Authority (NHA) to facilitate the generation of CCHF cards. This API has been successfully tested and integrated by the NHA team.

Antyodaya SARAL Haryana

http://saralharyana.gov.in

SARAL (Simple, All-Inclusive, Real-Time, Action-Oriented, Long-Lasting) is a flagship initiative by the Government of Haryana, aligned with the Digital India vision. It digitizes and streamlines 744 services and schemes across 59 departments, enhancing accessibility, transparency, and efficiency. Built on the Service Plus Framework, SARAL offers online access to 542 services, with real-time tracking through the Antyodaya SARAL Dashboard.

Processing over 50,000 applications daily via 117 SARAL Kendras and 18,000+ Common Service Centers (CSCs), the platform delivers reliable service. During the pandemic, SARAL swiftly

▲ Fig 1.1 : Shri Manohar Lal, the then Chief Minister of Haryana, distributed Certificates under Various Government Schemes integrated with Parivar Pehchan Patra on 7th April 2022

launched new services in 6-8 hours, ensuring uninterrupted access. To date, it has received 8.84 crore applications, processing 97.9% successfully.

CM Windows & Jan Samvaad

CM Window is a web-based Grievance Management portal for processing and resolving citizen grievances registered at kiosks in DC and SDM Offices. Grievances are routed to state marking teams and field officers, achieving a resolution rate of 1,216,474 out of 1,321,522. Integrated with CPGRAMS and Haryana's Auto Appeal System (AAS), it includes Jan Samvaad for tracking requests and development projects from the Chief Minister's public functions. Out of 60,975 Development Works, 16,930 are completed, with the rest ongoing. The system covers all Haryana Departments.

Social Media Grievances Tracker

The Social Media Grievances Tracker (SMGT) is an application for monitoring citizen grievances posted on the social media platform X (formerly Twitter). It captures tweets, filters them for grievances, and forwards them to state-level marking users who assign them to field officers for resolution. The system supports parallel marking to multiple officials for prompt action, and grievances are closed only after satisfactory resolution, with updates sent to citizens via tweet. Focused on urgent issues, the tracker operates across all Haryana Departments. Out of 440,116 tickets created, 422,171 have been resolved.

Track and Trace System

This system for the Excise and Taxation Department enables tracking liquor products and tracing their production or import origin. Each bottle is labeled with a unique Bar/QR code, scanned at every movement stage to maintain a comprehensive tracking record. Managing around 117 crore codes annually, the system handles large volumes of data efficiently.

Haryana Mines & Geology Information System

https://mis.minesharyana.gov.in/

This system manages passes for material transport from mines to crushers and permits for mining activities. It provides online status checks, monitors eRawaana authenticity, and sends proactive SMS alerts. Dashboard reports offer insights on payments and operations, aiding the state in preventing illegal mining. It currently oversees 41 Contractors, 43 Mines, 416 Screening Plants, and 1,059 Crusher Units.

Web-HALRIS

https://jamabandi.nic.in/

Web-HALRIS (Web-based Haryana Land Records Information System), developed by NIC Haryana, digitizes property registration and land records management. It offers services like deed writing, stamp duty calculations, deed appointments, and access to Record of Rights (RoR) and registered deeds. Handling over 60,000 property deeds and 200,000 RoR transactions monthly, Web-HALRIS enhances transparency and efficiency.

The e-Girdawari mobile app, launched on February 4, 2022, is an extension of Web-HALRIS, enabling Patwaris to perform digital crop inspections. Integrated with Web-HALRIS, the app records crop details, damage assessments, and encroachments, supporting timely land record updates and the Digital India initiative.

iFMS Haryana

http://ifmsharyana.nic.in/

Haryana's iFMS (Integrated Finance Management System) integrates financial management systems such as OBAMAS, eBilling, OTIS, eGRAS, and ePension to ensure smooth financial operations across the state. It supports real-time bill processing, electronic payments, and the management of over 1.59 lakh pensioners, streamlining financial workflows and reducing administrative delays.

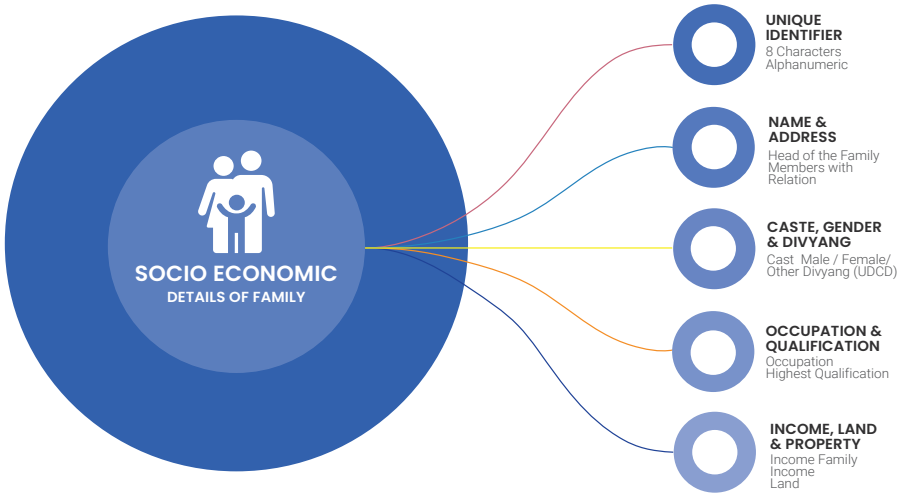
Meri Fasal Mera Byora

https://fasal.haryana.gov.in/

Meri Fasal Mera Byora (MFMB) is a key initiative by the Government of Haryana that empowers farmers by providing a unified platform for crop registration and access to government schemes. Integrated with land records and databases, it ensures accurate and transparent data management.

Key features include PPP-based crop registration, real-time verification with land records, and direct access to government benefits like subsidies, crop insurance, and MSP. API integration with schemes like eKharid and seed programs allows seamless data sharing. With 12.03 lakh registered farmers, MFMB enhances transparency, prevents overproduction claims, and promotes agricultural sustainability.

▼ Fig 1.2 **An Overview of Parivar Pehchan Patra**



AePDS

AePDS is a transformative initiative in Haryana aimed at ensuring the efficient and transparent distribution of subsidized food grains. By integrating Aadhaar-based biometric authentication at Fair Price Shops (FPS), AePDS has minimized fraud and leakages, ensuring only eligible beneficiaries receive food supplies.

Key features include biometric verification, One Nation One Ration Card portability, and real-time monitoring for transparent distribution. With over 35 lakh transactions processed monthly, AePDS also integrates with Annapurti Grain ATMs to enhance the convenience and transparency of food distribution, significantly improving food security and public welfare across the state.

Litigation Management System

https://lmshry.gov.in/

The Litigation Management System (LMS) in Haryana is a workflow-based platform designed to monitor and manage court cases involving government departments, corporations, and state bodies, ensuring timely legal case management.

Key features include integration with Bharat API for seamless access to court cases, real-time reports and dashboards, online access to petitions, and email/SMS alerts for case updates. LMS is being used by 197 departments, tracking 21.5 lakh court cases, and supports 5,800+ registered users with around 1,600 daily logins, ensuring efficient legal process management.

Other Initiatives in the State

NIC Haryana has implemented several other critical initiatives across various sectors to enhance governance, ensure transparency, and improve the delivery of services. These initiatives cover a wide range of areas, from education and transportation to healthcare and finance.

NeVA

The National e-Vidhan Application (NeVA) is a digital initiative aimed at making legislative processes paperless, allowing legislators to manage documents, discussions, and legislative work electronically, for promoting eco-friendly and efficient governance. On August 8, 2022, the then Hon'ble Chief Minister Haryana, Shri Manohar Lal, launched NeVA at the monsoon session of the Haryana Legislative Assembly. This shift enables Members to use iPads for accessing proceedings, replacing traditional paper methods.

NIC Haryana played a pivotal role in NeVA's implementation, preparing the Detailed Project Report, finalizing technical specifications, and ensuring 1 Gbps connectivity for the Assembly. They also established a Wi-Fi network, configured iPads, and provided support during a mock session. The NIC Haryana team, led by Shri Deepak Bansal, was commended for enabling this transition to paperless governance.

e-Office

e-Office is a fully digital platform for managing file movements and official communications within government departments, promoting a paperless work environment. Presently 5 instances of e-Office in the State of Haryana and many more organisations / universities are in process of onboarding the e-office in their organisation.

▲ Fig 1.3 : Shri Manohar Lal, the then Hon'ble Chief Minister of Haryana, inaugurating National e-Vidhan Application (NeVA) for Haryana Legislative Assembly on 8th August 2022

S3WaaS - Haryana

S3WaaS (Secure, Scalable, and Sugamya Website as a Service) platform has enabled the development and hosting of secure and user-friendly websites for government departments. Haryana is the first state to have all district websites hosted, along with 50 departmental websites, making government information easily accessible to citizens while ensuring compliance with web accessibility standards.

GePNIC

Government e-Procurement System (GePNIC) in Haryana is a comprehensive digital procurement platform used by government departments and PSUs. With 8,586 procurement entities and 83,706 registered contractors, the platform processes an average of 5,800 tenders per month, with over 3.9 lakh tenders valued at ₹ 2.35 lakh crore to date. The system ensures transparent and efficient procurement, reducing delays and enabling fair competition.

Revenue Record Room Management System

This system digitizes property and land records, providing seamless access to important documents for government officials and citizens alike. It has significantly improved land record management across Haryana, handling millions of revenue documents annually, ensuring transparency in property transactions.

eTransport

eTransport integrates key components like eChallan, PUCC, Vahaan, and Sarathi to streamline and digitize transport services. eChallan enables electronic enforcement of traffic violations, allowing authorities to issue fines and process payments online. PUCC ensures vehicles meet environmental standards by digitizing the issuance of Pollution Under Control Certificates. Meanwhile, Vahaan handles vehicle registration, ownership transfers, and road tax collection, while Sarathi manages driving licenses, including issuance, renewal, and online tests.

Together, these components provide a comprehensive, transparent, and citizen-friendly platform for managing transport services. The eTransport system enhances road safety, ensures regulatory compliances, and simplifies access to critical services like vehicle registration and licensing, making the entire process more efficient and accessible for citizens and authorities alike.

Punjab and Haryana High Court

https://highcourtchd.gov.in/

NIC Haryana has digitized the operations of the Punjab and Haryana High Court, allowing citizens to access judicial services online. The system provides

▼ Fig 1.4 : Implementation status of e-Office at e-Sachivalya and other PSUs in Haryana

KPI	eSachivalya	PSU	SVSU
No. of e-Files Generated	1098683	15159	6785
No. of e-Receipts Generated	3919752	55991	46056
No. of Departments/ PSUs	160	29	--
No. of Users	32960	3202	360

▲ Fig 1.5 : Shri Manohar Lal, the then Hon'ble Chief Minister of Haryana, launching VMTS Mobile App to enhance transparency and monitor vehicle logistics across the state

access to 33 lakh cases and 67 lakh orders and has issued over 11 lakh notices online. It facilitated 7 lakh bail orders and offers a completely digitized experience for court proceedings, reducing the reliance on physical paperwork.

ICJS

The Interoperable Criminal Justice System (ICJS) platform integrates law enforcement, judicial, and forensic departments, enabling seamless sharing of criminal case data in real time. It allows for better case tracking and management across multiple agencies, promoting the swift delivery of justice.

Online Admissions and eCounselling

Haryana's Online Admissions and eCounselling system simplifies the entire admission process, right from application submission to the seat allocation, for higher education institutions. The platform handles over 50,000 admissions annually, integrating with DigiLocker and PPP for document verification, benefiting both students and 500+ institutions.

CeFMaTIS

https://cfmsharyana.nic.in/

The Centralized File Movement and Tracking Information System (CeFMaTIS) tracks the movement of government files, ensuring accountability and timely processing. It supports over 266 departments and handles 753 lakh transactions, tracking 6.5 lakh file movements monthly.

MedLEaPR Haryana

https://medleaprhry.gov.in/

MedLEaPR is a centralized, web-based workflow system for preparing Medico-Legal (MLR) and Post-Mortem Reports (PMR) using legally approved forms. It provides role-based access for doctors and health institutions and integrates with forensic and specialized labs, like FSL and CFSL, to examine samples for court and police cases. The system features SMS/email notifications for sample status and is linked with CCTNS.

Highlighted in recent legislation for digital report transmission, MedLEaPR is now adopted by the Ministry of Home Affairs as the standard solution for all medico-legal cases. 27 States & UTs have onboarded this system and it supports 737 institutions in Haryana, generates over 2 lakh reports annually, and serves as a crucial component of the Interoperable Criminal Justice System.

▼ Fig 1.6 : Training & demonstration session by NIC Haryana officers on installation, configuration and conduct of OCET

ODISCM

https://dpmuhry.gov.in

The Online Drug Inventory and Supply Chain Management System (ODISCM) streamlines drug procurement and distribution across Haryana's Health Institutions. It enables centralized order placement, real-time monitoring, and vendor tracking, ensuring efficient drug availability and adherence to quality controls as per the state's new drug policy.

Serving over 1,249 Health Institutes and 400 vendors, ODISCM has processed ₹90 crore in purchase orders and integrates with Sandes for alerts and interactive services.

Online Release Orders and Billing System for DIPRL Haryana

The Online Release Orders and Billing System is an ERP solution developed by NIC Haryana for the Information, Public Relations, and Languages Department. Initiated under the directive of the Hon'ble Chief Minister to ensure transparency and expedite payments for government print media advertisements, it automates the issuance of release orders and billing processes.

Launched on December 14, 2020, the system served 339 organizations and 851 newspapers, issuing 31,371 release orders and processing 104,392 bills totaling over ₹28,004 lakh.

IVFRT Haryana

The Immigration, Visa, and Foreigners Registration & Tracking (IVFRT) system is implemented in all 22 districts of Haryana, offering online services for visa extensions, nationality verification, and tracking of foreign residents. It facilitates seamless data sharing between institutions and law enforcement agencies.

Haryana Seed Portal

https://uttamseed.haryana.gov.in

This portal was launched by the then Hon'ble Chief Minister of Haryana, Shri Manohar Lal, on October 30, 2021, in Chandigarh. Developed by NIC Haryana, the portal ensures transparency in the seed production process for both government and private seed-producing agencies, enhancing the quality of certified seeds.

Farmers can apply for the Seed Development Program through the portal, and seeds are issued by seed-producing agencies. Integrated with the MFMB portal, it provides real-time monitoring of seed availability through an inventory system. Future plans include integrating the portal with the seed certification program for survey and testing, ensuring comprehensive seed quality management.

HREX

The Haryana Employment Exchanges Portal (HREX) connects job seekers with potential employers, offering over 4.5 lakh active jobseekers the opportunity to apply for vacancies posted by 9,669 registered employers. The portal enables online job fairs and real-time recruitment through 65 employment exchanges.

HRERA & HREAT

https://haryanarera.gov.in/

The Haryana Real Estate Regulatory Authority (HRERA) and Haryana Real Estate Appellate Tribunal (HREAT) platforms regulate the real estate sector in Haryana, ensuring transparency in property transactions. To date, 1,718 advocates, over 1,604 real estate projects, 36,904 complaints and 3,580 appeals have been registered on the system, ensuring compliance with real estate regulations.

Notably, NIC Haryana received the CSI SIG e-Governance Award for Haryana Real Estate Regulatory Authority (HRERA) under State Government Project Category on 23rd April 2022 as part of the 19th CSI SIG e-Governance award 2021 at MNNIT, Allahabad, Prayagraj, Uttar Pradesh.

HRAWAS

https://awas.haryanapwd.gov.in/

The House Allotment System (HRAWAS) automates the process of allocating government housing to employees based on their seniority and preferences. The system ensures transparency and efficiency, eliminating manual errors in the allotment process.

HUM

https://harudhyam.edisha.gov.in

The Haryana Udhyam Memorandum (HUM) platform is a digital database for enterprises and workers in Haryana. With 56,400 registered industries, the system provides a holistic view of the state's industrial landscape, enabling the efficient delivery of industry-related services.

e-Tourism/Guest House Booking

The e-Tourism platform allows online booking for 45 resorts and 48 guest houses, with over 15 lakh bookings processed to date. The system has generated ₹320 crore in revenue, offering citizens a convenient, digital way to manage their stays.

ICT Infrastructure in Haryana

NIC Haryana has established a robust and scalable ICT infrastructure that supports the state government's digital governance initiatives. This infrastructure enables seamless communication, data management, and service delivery, ensuring that the government operates efficiently while providing essential services to citizens. The ICT infrastructure encompasses various components, including LAN networks, cloud platforms, high-speed internet connectivity, secure email systems, and advanced video conferencing solutions.

▲ Fig 1.7 : NIC Haryana team receiving 19th CSI SIG e-Governance Award under State Government Project Category for Haryana Real Estate Regulatory Authority (HRERA)

NIC LAN

NIC Haryana has established a comprehensive LAN infrastructure connecting key government offices across the state for efficient communication and data exchange. Six major LANs in Chandigarh link over 5,000 nodes across buildings like the Secretariat and Vidhan Sabha. Wi-Fi services are available in five government offices, and the network extends to all 22 districts, encompassing over 5,000 nodes.

NIC Haryana Mini Cloud

Launched in 2018, the NIC Haryana Mini Cloud is a state-of-the-art platform for rapid deployment of government applications and e-Governance services. With 1,056 vCPUs, 6,144 GB of RAM, and 210 TB of storage, it ensures high performance and scalability. Key features include load balancing, advanced firewalls, intrusion prevention, and DDoS protection. Connected via high-speed 10 Gbps bandwidth, it supports large-scale e-Governance and the state's digital transformation efforts.

NICNET and NKN in Haryana

NIC Haryana delivers high-speed, secure internet through NICNET and the NKN. NICNET serves government offices, while NKN connects 39 research and educational institutions across the state. NICNET links all 22 district offices to the State Data Centre via leased circuits, supported by a 10 Gbps connection to the Integrated Network Operations Centre (INoC), ensuring seamless and secure connectivity.

Email Services

NIC Haryana delivers secure email and messaging services for state government officials, integrating over 158,500 users across departments and PSUs. The platform features backup and disaster recovery, anti-virus and anti-spam protection, and 24/7 support. Additionally, it manages 1.25 crore SMS alerts monthly for e-Governance services and public awareness campaigns.

Video Conferencing Services

NIC Haryana has established a robust video conferencing infrastructure to enable seamless communication among government officials, especially during critical times. The state operates 95 video conferencing studios, logging over 8,000 hours annually. The indigenous NICMEET platform supports 166,700 users, offering features like personalized video rooms, SMS/email notifications, and secure connections.

Awards

NIC Haryana was honored with the CSI SIG e-Governance Award for the Haryana Real Estate Regulatory Authority project in the State Government Project category on April 23, 2022, at MNNIT, Prayagraj, Uttar Pradesh. Other major accolades include the Business World Digital India Award for Web-HALRIS, the Gem of Digital India Award for e-Panchayat, and multiple TechGov Awards for digital governance innovations.

On Good Governance Day (December 25, 2022), NIC Haryana received two prestigious awards form the then Hon'ble Chief Minister, Shri Manohar Lal: one for the AAS under State Flagship Schemes and another for eFarad.

Way Forward

NIC Haryana is set to maintain its pivotal role in advancing digital transformation across both state and national levels. Several innovative projects developed in collaboration with the state have already been adopted on a national scale. The full implementation of the PPP platform will streamline the delivery of all state services through a unified system, significantly improving efficiency and accessibility for citizens.

Contact for more details

State Informatics Officer
NIC Haryana State Centre
G-03, New Haryana Secretariat
Sector-17, Chandigarh – 160017
Email: sio-hry@nic.in, Phone: 0172-27411642

Odisha State

Endeavouring Digital Transformation for Effective Governance

Edited by **KAVITA BARKAKOTY**

Founded in 1985 as one of NIC's four Regional Centres, NIC Odisha was designated as the State Centre in 1998. It has since played a crucial role in driving e-Governance and ICT growth in Odisha, continuously evolving to meet increasing digital service demands. With advanced technologies like AI, data analytics, cybersecurity, cloud, and mobile computing integrated into governance, NIC Odisha is positioned for a transformative leap. The establishment of the National Data Centre in Bhubaneswar has further energized of NIC Odisha ICT initiatives.

ICT Initiatives in the State

Bhu-Arjan

https://larrmsodisha.nic.in

Bhu-Arjan is a sophisticated, web-enabled application designed to comply with the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation, and Resettlement (RFCTLARR) Act, 2013, and Odisha RFCTLARR Rules, 2016. Engineered for efficiency, it automates the full spectrum of land acquisition processes, from Social Impact Assessments (SIA) to Rehabilitation, Resettlement, and Grievance Redressal.

Adopted by 12 departments of Govt. of Odisha, BHU-ARJAN integrates seamlessly with Bhulekh for accurate land records and Property Registration for precise plot valuations. Its automated award calculation and family tree creation tools enhance accuracy, ensuring rightful beneficiaries are included in R&R processes. The platform also features a robust Grievance Management module, enabling citizens to submit concerns related to land acquisition and R&R anytime, anywhere.

To date, BHU-ARJAN has generated error-free cost estimates totaling ₹628 crore for acquiring 47,000 acres of land across 527 projects, covering

In the ever-evolving landscape of technology, NIC Odisha consistently stood at the forefront, driving digital transformation and fostering innovation. Known for organizational trustworthiness and cost effective solutions at both State level and Pan India, NIC Odisha thrives on applications that encompasses emerging technologies like AI, Cloud, DevOps, Micro-services, IIoT, GIS, RPA, and Cyber Security, etc. The shift from e-Governance to Digital India emphasizes inclusiveness, extending mere governance to true citizen empowerment. With this vision, NIC Odisha has undertaken numerous initiatives creating many comprehensive digital ecosystems.

Fast, reliable and affordable connectivity is not the only way to create a brilliant platform for digital transformation, but it is considered the most important one, and National Informatics Centre (NIC) is a leader in this direction. It is heartening that NIC, Odisha, through its State and District Centres has been working with the administration in addressing grassroots level challenges through ICT enabled solutions. NIC Odisha has played a pivotal role in driving the State towards a future where technology and governance work hand in hand to enhance the lives of our citizens. I extend my heartfelt congratulations to the entire team at NIC Odisha for their dedicated effort towards shaping a digitally empowered Odisha.

Raghubar Das
Hon'ble Governor of Odisha
(Excerpt from his Forward message)

Ashok Kumar Hota
Dy. Director General & SIO
sio-ori@nic.in

Jayant Kumar Mishra
Scientist-F
jkmishra@nic.in

Mamata Khamari
Scientist-F
m.khamari@nic.in

2,254 proposals and 319 Terms of Reference (TOR), making it a transformative tool in Odisha's land acquisition and resettlement landscape.

GePNIC

https://tendersodisha.gov.in/

As a founding state of GePNIC, Odisha's State Mission Team and Procurement Cell, in collaboration with NIC Odisha, drives continuous improvements to the platform. NIC Odisha, aligned with the state's goals, provides a comprehensive eProcurement solution through GePNIC. Recent advancements include integration with the Works & Accounts Management Information System (WAMIS) for seamless pre- and post-tender activities. Currently, integration with NeSL for electronic Bank Guarantees (eBG) is underway, simplifying Bank Guarantee submissions.

To ensure objectivity in tender selection, an automated technical evaluation system is being implemented via the Contractor Database Management System (CDMS). An online e-Agreement process between bidders and departments is also in development process, further boosting efficiency and transparency in eProcurement.

e-Detection

https://vahan.parivahan.gov.in/eDetection/#/login

The e-Detection system addresses non-compliant vehicles operating without valid Motor Vehicle (MV) documents—such as tax, fitness, insurance, PUC, permits, and overloading violations. By leveraging Toll Plaza data, it automatically generates e-Challans for defaulters under the "One Nation One Challan" policy. Cross-referencing data with the Vahan database, the system identifies fake vehicles with incorrect number plates, enhancing enforcement precision. Key features include defaulter tracking, vehicle classification-comparisons, and automated e-Challan issuance, all of which contribute to increased state revenue.

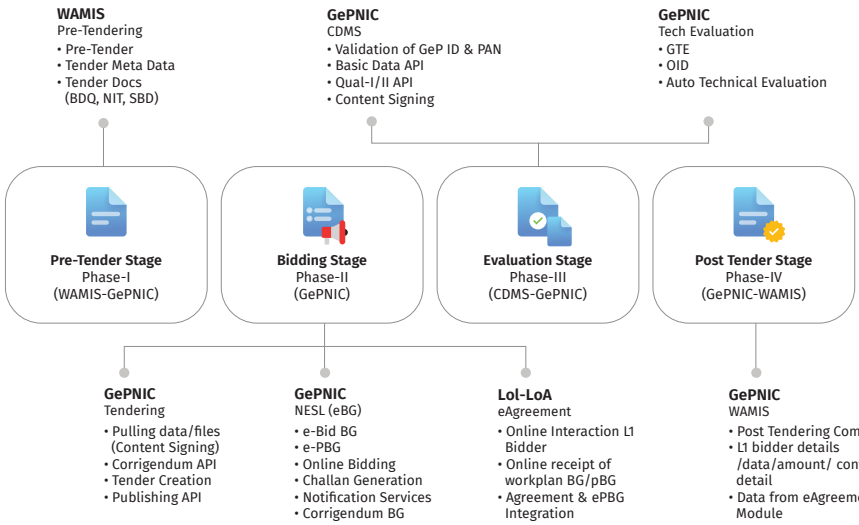
This system reduces manual errors in challan issuance, strengthens transport regulation compliance, minimizes road accidents, and eliminates fake challans for improved transparency. It lightens enforcement officials' workload, reduces traffic congestion, and promotes an efficient, and paperless process. Currently active in Odisha, Chhattisgarh, and Bihar, e-Detection has proven effective in flagging non-compliant vehicles and issuing e-Challans. Planned enhancements include API data sharing, mobile app development, weigh-in-motion technology for overloading detection, and integration with databases like GST, Mining, and e-Waybill.

Overall, e-Detection is a powerful tool for enhancing road safety, ensuring transport law compliance, and streamlining enforcement operations.

e-Abkari

https://stateexcise.odisha.gov.in

e-Abkari is a comprehensive supply chain management system for regulating spirits, mohua, molasses, alcoholic beverages, and essential narcotic drugs within the state excise sector. It minimizes public health risks from illicit distribution and ensures robust revenue collection from excisable goods. Initiated under the Business Reforms Action Plan (BRAP), e-Abkari has transformed excise operations through digital automation, earning full adoption by stakeholders and marking a significant shift to efficient, technology-driven governance.



▲ Fig 2.1 : GePNIC: An End-to-End Procurement System for Streamlining Transparent and Efficient Public Procurement

e-District

https://edistrict.odisha.gov.in

The e-District application, developed on the ServicePlus "low-code, no-code" platform, powers over 73 configurable services across 14 departments in Odisha, tailored to departmental needs since December 28, 2019. It has processed over 31.9 million applications with 31.5 million completions, depositing ₹266.7 million into the government account, reflecting its efficiency. A dashboard enables real-time monitoring, ensuring robust performance oversight across stakeholder levels.

e-Panchayat Sabha

https://panchayatsabha.odisha.gov.in/

e-Panchayat Sabha is a digital workflow-based solution designed to streamline and enhance the meeting processes at the Gram Panchayat (GP) level. By providing a digital interface, it strengthens the governance through effective monitoring and implementation of development schemes and social welfare initiatives.

The mobile application complements this system, enabling GP officials to manage meeting tasks and allowing stakeholders access to meeting information and documents anytime, anywhere. Successfully deployed across all 6,794 GPs in Odisha, e-Panchayat Sabha has become an essential tool for improved transparency and governance at the grassroots level.

e-Panchayat Sabha web application is transforming GP into a digitally empowered Institution. This IT solution facilitates conduct of meetings including fixing of meeting date, issue of notices with agenda, circulation of minutes of meeting at GP level through a digital platform. It empowers as well as streamlines the functioning of PRI Institutions for better developmental planning and project execution in a timely manner.

I would like to congratulate NIC Odisha team for providing technical support and Officials of Panchayati Raj & Drinking Water Department for making this project a successful.

Sushil Kumar Lohani, IAS

Principal Secretary, Panchayati Raj & Drinking Water Department, Government of Odisha

SATHI

https://seedtrace.gov.in

SATHI (Seed Authentication, Traceability, and Holistic Inventory) Portal enables seamless digital oversight of seed production, quality certification, and precise distribution. Built on a scalable microservice architecture, it supports independent, efficient operations across 20 states, including Rajasthan, Punjab, and Maharashtra. Developed by NIC Odisha, SATHI establishes a National Seed Grid, enhancing transparency and trust in the seed supply chain, empowering farmers nationwide.

I extend my heartfelt appreciation and congratulations to the NIC team for their unwavering dedication and sustained efforts in the effective implementation and adept handling of change management, to suit state-specific flavors contributing to the success of the transformative initiative named 'SATHI'.

Pankaj Yadav, IAS
Joint Secretary (Seeds)
Dept. of Agriculture and Farmer's Welfare

e-Counselling

e-Aushada serves as a centralized portal fore-Counselling is a web enabled service provided to academic Institutions/Universities across the state for examination management, counselling and admission services for admission into UG and PG courses. The application is deployed for Odisha Joint Entrance Examination (https://ojee.nic.in), Swami Vivekanand National Institute of Rehabilitation Training and Research (https://admission.svnirtar.nic.in/) and Directorate of Medical Education and Training, Odisha (https://dohodisha.nic.in/).

e-Office

Since 2015, Odisha has steadily expanded e-Office, initially launched by the Commercial Taxes Department and now deployed across departments, directorates, corporations, educational institutions, and districts. Jagatsinghpur district leads nationally, digitizing file management in all 325 offices down to the Gram Panchayat level, a model now adopted by other districts.

The Centre for Modernising Government Initiatives (CMGI) procured 23,000 user licenses, supporting e-Office adoption in 1,117 offices across 86 departments and institutions. NIC Odisha has been instrumental in extending e-Office to 16 pan-India institutes under BRIC and DBT, AIIMS Bhubaneswar, SVNIRTAR, and soon to IIT Bhubaneswar, IISER Berhampur, NISER Bhubaneswar, and the Institute of Physics, Bhubaneswar.

e-Granthalaya

e-Granthalaya is an Integrated Library Management Software developed in NIC for Automation and Networking of Indian Libraries. The current version of the software is 4.0 – a Cloud Ready Application. It provides a web-based data entry solution with a centralized database for cluster of libraries. More than 230 libraries have on boarded e-Granthalaya in Odisha including Harekrushna Mahatab State Library, Utkal University (Parija Library) and Kanika Library, Cuttack.

DAMPS

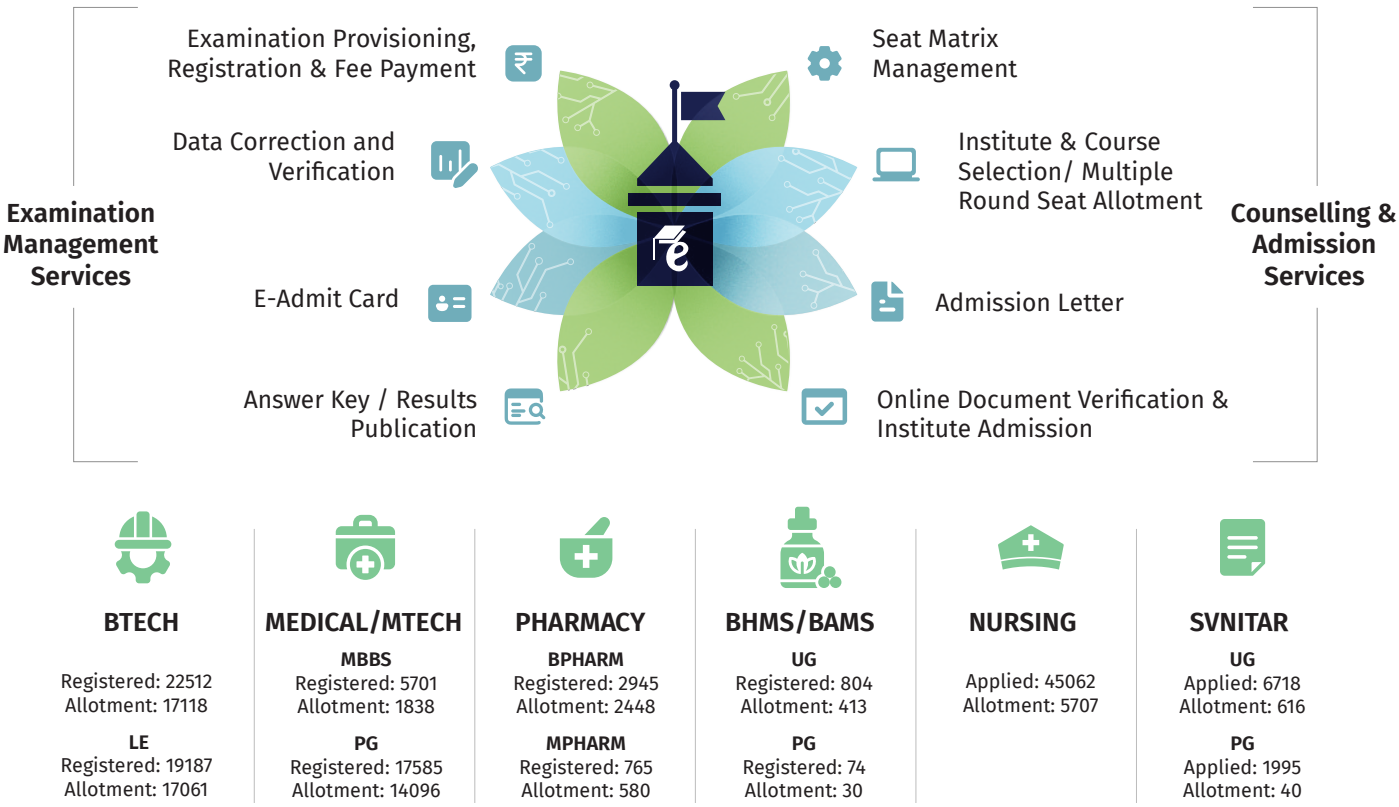
https://dampsodisha.nic.in/

DAMPS (Disaster Assistance Monitoring & Payment System) aims at availability of quality services to each disaster affected victims in terms of ex-gratia payment to families of deceased persons. The solution is to ensure that the financial assistance given to the Next of Kin (NOKs) / victims should reach them in timely, hassle free and transparent manner, transferred directly to their bank accounts. DAMPS is implemented in 30 districts of Odisha covering 317 tahsils and more than 2,400 Revenue Inspector (RI) Circles serving a wide range of people.

e-Gazette

To implement provisions under Section 8 of the I.T. Act, 2000, the Government of Odisha has introduced e-Gazettes aimed at reducing delays and improving accessibility for both the public and official users. This initiative minimizes printing needs, promotes paperless and environment friendly practices, and significantly reduces government expenses. The Odisha e-Gazette platform is designed for publishing

▼ Fig 2.2 : e-Counselling Across Odisha: A Comprehensive Overview of Digital Initiatives for Seamless Student and Admissions Allocations



various government notifications, regulations, and announcements. An Extraordinary Gazette is published as needed, while a Weekly Gazette is published every week.

NeVA

The National e-Vidhan Application (NeVA) is a Government of India initiative to digitize state legislatures. Since 2021, the Odisha Legislative Assembly (OLA) has pioneered this by adopting digital presentations for the state budget and Governor's Address on NeVA. Modules like List of Business, Question/Reply, Committees, and Digital Library are also active, enabling same-day uploads of replies and reports, significantly reducing paper usage. Due to significant digital transformation achieved the OLA by adopting NeVA, it received the CSI-SIG e-Governance Award for 2021-22.

ODRN Portal

https://odrn.nic.in/

Odisha Disaster Resource Network (ODRN) is a Web-GIS application developed for resource mobilisation for Disaster Management. The application helps the administration to mobilize various Human Resources, Equipment and Infrastructure, those are available at various locations during all stages for Disaster Management i.e. Mitigation, Preparedness, Response, and Recovery. The application helps in creating Disaster Management Plan at various levels i.e. State Level, District Level, Block Level, Gram Panchayat Level and Village Level.

IWCRCM

https://industrialwaterod.nic.in/

IWCRCM (Industrial Water Consumption & Revenue Collection Monitoring) is an integrated platform for streamlined water billing and payments, serving large industries, MSMEs, mines, commercial and drinking water suppliers. Since 2019, it has enabled seamless payments via IFMS, with transparent billing for efficient financial management. The platform manages registration, meter reading, billing, and MIS report generation. Equipped with IoT sensor-based readings and an OCR-based water meter app enhanced by machine learning, it minimizes manual errors. A dashboard provides insights into consumption, allocation, and billing.

To date 1,213 industries are registered, generating water fees of ₹4,418.88 crore. Current allocations include 793.135 cusecs for surface water, 178.243 cusecs for groundwater, and 940.682 cusecs for irrigation. The system also supports online water allocation through the e-Jal Abantan platform.

Agricultural Assets Mapping

https://gisodisha.nic.in/agriassets/

Agricultural Assets Mapping is a Web-GIS application developed for the Directorate of Agriculture & Food Production, under the Department of Agriculture & Farmers' Empowerment, Government of Odisha. It serves as a platform to integrate various schemes managed by the Directorate, combining both spatial and non-spatial data. This system integrates information from five key schemes: Jalanidhi, Soura Jalanidhi, River Lift, Farm Mechanisation, and Pest Management. It also incorporates administrative data such as the boundaries of states, districts, blocks, gram panchayats, villages, and their headquarters, along with base maps like NIC Street Map, NIC Satellite Imageries, NIC Terrain Map, ESRI Street Map, ESRI Satellite Imageries, and Bing Maps. All data and information are accessed and updated in real-time through API integration.

GCMS

https://gcms.tpodisha.com

The GCMS web and mobile applications, developed with the Ministry of Panchayati Raj, Government of India; Panchayati Raj & Drinking Water Department, Govt. of Odisha; NIC, and Tata Power, make Odisha the first state to integrate NIC's eGramSwaraj application with billing system. This integration allows 6,794 Gram Panchayats to easily pay electricity bills online, streamlining payments for PRIs and improving DISCOM tracking. Odisha's success has inspired the Ministry of Panchayati Raj, Govt. of India to encourage other states to adopt similar integrations with their DISCOMs.

DEPMOS

https://depmodisha.nic.in

The DEPMOS (Directorate of Export Promotion and Marketing - Online Services) platform provides a single window for MSME registration, application scrutiny, and issuance of EPM certificates. Key services include application submission for registration, renewals, rate contracts, and delivery tests. It offers seamless, end-to-end workflow for DEPM and MSME units across Odisha, with integrations to the CMS portal for ORTPSA service monitoring and IFMS for online fee payments.

AIM

https://diodisha.nic.in/

The Administration of Incentives for MSMEs (AIM 2.0) streamlines incentive access for MSMEs, crucial drivers of rural economic growth, by automating processes and facilitating G2G and G2B interactions. This single-window platform manages MSME registration, application scrutiny, IFMS online payments, and document uploads across 31 DICs. Integrated with the Central Monitoring System (CMS) for tracking ORTPSA services, AIM 2.0 enhances support for inclusive growth within rural communities.

Investigation and Prosecution Management System

https://vipms.odisha.gov.in

The application provides a web interface for managing vigilance cases, from FIR entry to trial and judgment. Key modules include charge sheet filing, investigations, witness examinations, statement recording, seizure management, case diaries, and report preparation. It streamlines communication among Vigilance, Prosecuting, and Investigating Officers, as well as SPs, DIGs, IGs, and the Department Director. Pre-formatted forms capture data at every stage, generating essential registers and reports.

In sync with the vision of Government of Odisha, NIC Odisha has facilitated seamless and efficient service delivery, significantly enhancing the quality of governance by implementing advanced technological solutions across various government sectors. It is diligently transforming every sector, from agriculture and education to finance, administration, transport, judiciary, land records, and beyond. Through these dedicated efforts, we are paving the way for a next-generation Odisha, ensuring that technology enhances the lives of all citizens.

NIC District Centres are playing diverse roles right from executing various projects under e-Governance and Digital India initiatives to day-to-day ICT-driven technical support and consultancy to various departments in the districts. The contributions of District Informatics Officers (DIOs) for smooth conduct of simultaneous election-2024 are commendable.

I extend my heartfelt greetings to the entire team at NIC Odisha for their unwavering dedication and look forward to our continued journey towards even greater achievements.

Satyabrata Sahu, IAS
Special Relief Commissioner & Additional Chief Secretary to Government Revenue & Disaster Management Department, Govt. of Odisha

Kaushal Panjee

https://kaushalpanjee.nic.in/

Kaushal Panjee is a web and mobile tool for registering beneficiaries in the Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) and RSETI programs, targeting unemployed rural youth aged 18-35 for skill development. Launched nationwide in October 2017, it has registered 5,125,118 candidates, with 1,933,319 enrolled in training, 1,760,169 trained, and 1,146,672 placed across sectors.

LRMS

https://lrmsodisha.nic.in

The Land Records Management System (LRMS), or eMutation, is a flagship initiative by the Government of Odisha to deliver efficient, transpar-

ent, and citizen-friendly land services. Built on a transaction-oriented framework, LRMS supports real-time land transactions with automated Form-3 and Form-4 downloads, reducing manual input. It employs rule-based algorithms to initiate land mutation cases, seamlessly integrated with the state's e-Registration platform for synchronized updates. Revenue officials can securely access sale deeds online, ensuring data confidentiality and integrity with biometric authentication for updating Records of Rights (RoRs).

Hosted at NDC Bhubaneswar in hybrid cloud mode, LRMS is accessible to Tahasildars and Addl. Tahasildars over MPLS, with Revenue Inspectors connecting via web VPN.

ePauti

https://odishalandrevenue.nic.in

This web-based application enables citizens to pay land revenue online anytime, anywhere. Launched on August 15, 2019, by the then Hon'ble Chief Minister Shri Naveen Patnaik, it integrates with Odisha Treasury's iFMS 2.0 for seamless online payments. Key features include automatic Tenant Ledger updates for each fiscal year, digitization and auto-generation of Revenue Inspector office registers, and Business Process Re-engineering, reducing registers from 16 to 9 as per the Board of Revenue. The system-generated payment receipt holds full legal validity for citizens.

Jala Abantan

https://waterallocationod.nic.in/

Launched in 2020, Jala Abantan enables online water allocation for sectors including commercial, public health, rural water supply, sanitation, railways, and ports. The platform offers real-time, basin-wise water availability updates and integrates with the treasury payment gateway for smooth fee processing. Automated SMS and email notifications keep applicants informed, while a dashboard and real-time tracking enhance transparency in the allocation process.

EnergySoft

https://eicelectricityodisha.nic.in

EDSoft is a robust system enhancing electricity duty (ED) collection in Odisha by creating a comprehensive consumer database, calculating duty, enabling e-payments, and tracking arrears, exemptions, and export grants. The platform ensures transparent, efficient billing and duty collection for Captive Power Plants (CPP) and Independent Power Producers (IPP). Integrated with the treasury payment gateway, EDSoft facilitates seamless online ED payments, streamlining financial processes.

PARIVESH

PARIVESH (Pro-Active Responsive facilitation by Interactive and Virtuous Environmental Single-window Hub) is a web-based, role-specific workflow application designed for the online submission and monitoring of proposals seeking Environment, Forest, Wildlife, and CRZ clearances from Central, State, and District authorities. The platform automates the entire proposal lifecycle, enabling new submissions, edits, updates, and real-time status tracking at each workflow stage.

Farm Mechanization Automation System

https://odishafarmmachinery.nic.in

Farm mechanization is pivotal for boosting productivity and reducing manual labor in agriculture. The automated subsidy system developed by NIC Odisha leverages Aadhaar-integrated IRIS and fingerprint scanners to authenticate beneficiaries, eliminating human intervention from application to permit generation. This ensures direct disbursement of funds to farmers' bank accounts, enhancing transparency and efficiency.

Innovations include validating the farmer's bank account for purchasing, implements and cross-checking tractor registration via the Parivahan portal. The integration of NPCI's e-Rupee is underway to streamline dealer transactions further. This initiative has garnered multiple awards, including CSI-SIG's "Award of Recognition" and the National e-Governance Silver Award, underscoring its transformative impact on farm mechanization.

Simultaneous General Election-2024

Being IT Nodal Officers for SGE-2024 in the districts, DIOs of NIC Odisha handle all the IT related management of election activities in their respective districts under the aegis of NIC State Centre, Odisha. They performed the following critical activities with at most transparency, sincerity and impartiality way:

- Daily reporting on violation of Law and Order and Model Code of Conduct
- Deployment of Polling Personnel, Police Personnel to conduct poll and Counting Personnel for counting of votes polled
- Booth Information System & Control Room Monitoring
- Strengthening Cyber Security Awareness in Electoral Processes
- Implementation of all ECI ICT solutions for conduct of free and fair election.

I would like to put on record and convey my wholehearted appreciation to the team of NIC, Odisha including DIOs and ADIOs of the districts, for providing excellent technical support to the DEOs and ROs for conducting Simultaneous General Elections-2024.

The Election Team of NIC, Odisha State Hqrs has provided timely solutions for carrying out various election activities. They also have efficiently coordinated with all the DIOs for seamless use of different ICT initiatives.

I take this opportunity to congratulate and extend my best wishes to the State level and district level NIC officials.

Nikunja B. Dhal, IAS
Chief Electoral Officer & Addl. Chief Secretary, Government of Odisha

NSAP

NSAP is an umbrella scheme of Ministry of Rural Development, Govt. of India. At present, it comprises of five sub-schemes namely

- Indira Gandhi National Old Age Pension Scheme (IGNOAPS)
- Indira Gandhi National Widow Pension Scheme (IGNWPS)
- Indira Gandhi National Disability Pension Scheme (IGNDPS)
- National Family Benefit Scheme (NFBS) and Annapurna Scheme.

NSAP covers the persons who are below the poverty line (BPL) category. Persons who don't come under BPL status can also get benefits under NSAP provided they should be certified by the Sub Collector based on their income and other criteria.

▼ Fig 2.3 : Hon'ble Governor, Odisha Shri Raghubar Das released the Annual Book 2023-24 of National Informatics Centre (NIC), Odisha named as "Digital Pathway – Enabling eGovernance Platforms"

CoEAS-AppSec Bhubaneswar

Centre of Excellence in Application Security (CoE-AppSec), Bhubaneswar having a mandate for ensuring complete security of Web Applications, Mobile Apps, APIs and their hosting infrastructure for aligned states including Odisha, has been undertaking security audit of Applications, ensuring that a secured version of application goes live in the NIC cloud environment. The following table lays down the figures on security testing in different stages in regard of digital assets of NIC Odisha during the period of January-September, 2024.

Audit Category	No. of Audits Taken up	No. of Iterations for which report issued	No. of audits cleared
Static Code Analysis (SCA)	12	23	03
Black Box Audit	09	14	02
Manual Audit	02	02	05
Self Assessed Site	03	04	03
Third Party Audited Sites	06	-	06

At the same time, Vulnerability Assessment (VA) and Penetration Testing (PT) were undertaken for sites/ applications in production environment and 11 new PT tickets were raised/ escalated with respect to NIC Odisha for mitigation of security exposures. 4 tickets were closed.

Important Events organized

Cuttack Baliyatra Utsav-2023

Baliyatra, celebrating Odisha's ancient maritime links with Southeast Asia, was held at Silk City Cuttack from November 27 to December 4, 2023, drawing nearly 5 lakh daily visitors. NIC Odisha, in partnership with the District Administration, showcased essential citizen services and cyber safety tips at their pavilion. Interactive displays, e-service facilities, and a quiz on e-governance engaged visitors, complemented by a brochure detailing NIC's offerings.

▲ Fig 2.4 : NIC Odisha honored with Bhoomi Samman Award 2023 by Hon'ble President Smt. Droupadi Murmu for excellence in implementing Digital India Land Records Modernization Programme (DILRMP)

NIC Odisha's Tech Expo, 2024

On May 9, 2024, NIC Odisha hosted a Tech Expo featuring 20 pioneering technologies, from self-driving frameworks and LoRA nodes to AR/ VR applications. Highlights included AI-driven databases, blockchain with BigchainDB, IoT demos, RISC-V processors, and more. The expo presented innovations in quantum computing, RPA, 3D printing, and advancements in space tech, marking a vibrant tech showcase.

Accolades

Bhoomi Samman Award-2023

Odisha was honored as the Best State in the nation for Digital India Land Records Modernization, with 19 districts achieving 100% DILRMP objectives. Hon'ble President Smt. Droupadi Murmu presented the award on July 18, 2023, at Vigyan Bhawan.

Digital India Award-2022: e-Abkari

The e-Abkari Project received the Digital India Award for Ease of Doing Business, presented by Hon'ble President Smt. Droupadi Murmu and Union Minister Shri Ashwini Vaishnaw. The award was accepted by Shri Sushil Kumar Lohani, IAS, and team.

36th Technology Sabha Excellence Awards-2024

The e-Detection System, e-Panchayat Sabha, and BhuArjan were awarded in the 'Enterprise Applications' category for their excellence in digital governance.

CEO, Odisha Felicitates DIOs

For outstanding IT support during the 2024 General Election, all DIOs were honored by CEO Odisha, Shri Nikunj Bihari Dhal, IAS , on June 28, 2024, for their roles in enabling smooth election operations.

Way Forward

NIC Odisha drives impactful collaborations with academia, industries, and private sectors, focusing on cutting-edge research, sustainability models, infrastructure scaling, crowdsourced solutions, and capacity building. Key initiatives include Blockchain integration for secured land records and certificate verification and various AI driven applications like pest surveillance for agriculture, multi-lingual chatbots for Transport and eDistrict, face analytic services for ePrisons, text summarization, report interpretation and intelligence building in Cyber Security, etc. These efforts aim to enhance data security, foster innovation and improve efficiency.

▼ Fig 2.5 **Services offered by CoEAS-AppSec Bhubaneswar**

Contact for more details

State Informatics Officer
National Informatics Centre
Odisha State Centre
Unit-IV, Sachivalaya Marg, Bhubaneswar, Odisha-751001
Email: sio-ori@nic.in, Phone: 0674-2508438

Mahesana, Gujarat

A New Digital Technology horizon of the North Gujarat

Edited by **SUSHMA MISHRA**

NIC Mahesana, established in 1988, has become an essential technological backbone for the District Administration, offering cutting-edge ICT support and driving e-Governance initiatives within the district. Nestled in the District Collectorate campus, NIC Mahesana has emerged as a technological hub for the North Gujarat area, delivering advanced IT solutions, expert consultations, and implementing a range of key e-Governance projects and applications that are transforming the lives of citizens and improving the efficiency of public services.

ICT Initiatives in the District

District Grievance Management System

One of NIC Mahesana's most notable projects is the District Grievance Management System (DGMS). This in-house application is a testament to the Centre's capability to develop tailored ICT solutions that address the needs of the local community. DGMS empowers citizens to log grievances online, track the status of their complaints, and ensure timely resolution. The system records crucial details such as the applicant's name, address, contact number, and complaint specifics, allowing for an organized approach to grievance redressal.

By forwarding these complaints to the appropriate officials, the DGMS ensures that every issue is promptly addressed. Furthermore, the District Collector regularly monitors the system, holding meetings to follow up on pending issues. The application is built using ASP.Net and SQL Server, with a suite of reports designed for the oversight of district officials. These reports enable better monitoring and supervision of complaints, facilitating faster resolutions. In fact, this application is so effective that it has been adopted by other districts in Gujarat.

Jai Singh Chouhan
Scientist- C & DIO
jaisingh.chouhan@nic.in

NIC Mahesana has been in forefront to drive digital transformation by delivering innovative, citizen-centric e-Governance services. The District Centre aims to bridge the digital divide and foster an inclusive, technology-driven society that enhances the quality of life for all. It is committed to empowering citizens through accessible services, ensuring sustainable development, and establishing Mahesana as a leader in digital governance and technological excellence.

Key Benefits of DGMS

- **Timely grievance resolution:** The system ensures that complaints are addressed within a set time frame, leading to faster redressal.
- **Comprehensive tracking:** Citizens can monitor their complaints from submission to resolution.
- **Efficient oversight:** District officials can supervise the progress of complaints, ensuring accountability across the board.
- **Close monitoring by the District Collector:** Regular meetings ensure that issues are not only logged but also actively pursued until closure.

Mahesana District Website

The Mahesana District Website is a cornerstone of digital governance for the district, designed to offer citizens easy access to essential services and information. Built on the S3WaaS (Secure, Scalable, and Sugamya Website as a Service) platform, the website is a robust and secure solution that caters to the needs of a diverse population. Its bilingual nature ensures that both English and Gujarati-speaking citizens can navigate the website seamlessly, making it inclusive and accessible to a broad audience.

Other Key Initiatives

In addition to district initiatives, NIC Mahesana provides technical support for several state-developed applications. These applications cater to various citizen services, driving the district's digital transformation:

Digital Gujarat

Digital Gujarat is a comprehensive citizen service portal offering access to over 300 services. It plays a pivotal role in streamlining citizen interactions with government departments by offering digital services for essential documents such as caste, income, and domicile certificates, ration card services, and scholarships.

SevaSetu

SevaSetu is an initiative designed to bring essential government services to rural citizens through village-level camps. The goal is to reduce the urban-rural divide by ensuring that government services are accessible to everyone, regardless of their location or access to digital infrastructure.

SWAGAT

SWAGAT (State-Wide Attention on Grievances by Application of Technology) is a grievance redressal system that operates at the Taluka, District, and State levels. This initiative provides citizens with a platform to raise their grievances and ensures that these issues are resolved in a timely and efficient manner.

PDS/FPS

PDS/FPS (Public Distribution System/Fair Price Shops) is a system designed to ensure the efficient and transparent distribution of public goods, such as food grains, through Fair Price Shops (FPS). It is an essential service for ensuring food security for the underprivileged sections of society.

eDhara / iORA

eDhara and iORA are comprehensive platforms

that streamline land record management in Gujarat, handling land mutations, ownership verification, and the Non-Agricultural (NA) land portal. These systems simplify land administration, enhance transparency, reduce paperwork, and minimize disputes through automated workflows and easy access to digital records.

AnyROR

AnyROR (Any Records of Rights) is an advanced platform designed to give citizens easy access to land ownership documents and records. It streamlines the process of verifying land titles, making it more efficient and user-friendly. By providing a transparent and reliable system, it reduces paperwork, minimizes the risk of fraud, and empowers landowners with quick and secure access to essential property information.

iRCMS

iRCMS (Integrated Revenue Case Management System) is a platform for tracking and managing revenue cases, ensuring that land-related disputes and cases are handled in a systematic and timely manner.

CSIS

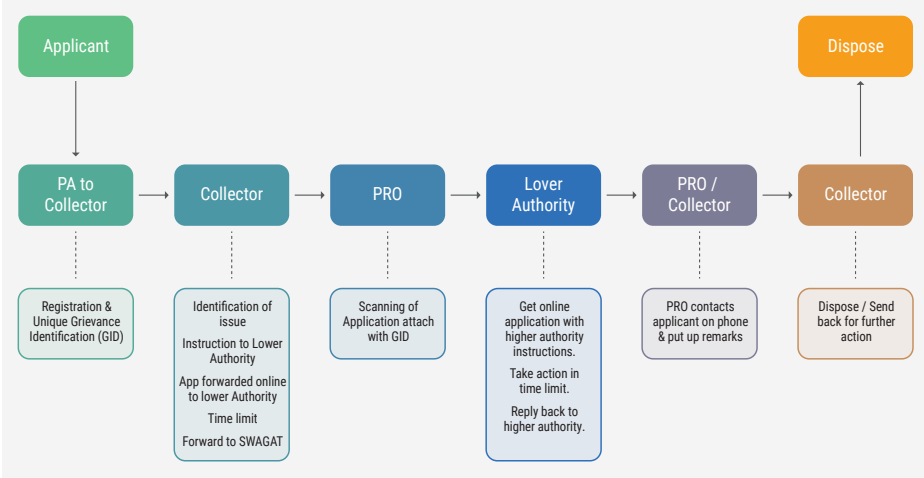
CSIS (Computerized System of Information on Property) is an urban property card system that centralizes property data, ensuring efficient and transparent management of property records in urban areas.

Garvi

Garvi (Automation of Administration of Registration, Valuation & Indexing in Gujarat) is an online platform dedicated to the registration of documents, providing a streamlined process for registering legal documents related to property and other transactions.

IILMS

IILMS (Integrated Litigation Management System) is a platform for court case mapping and status monitoring, providing transparency and efficiency in legal proceedings. By leveraging this system, stakeholders gain streamlined access to real-time updates, fostering accountability and informed decision-making.



▲ Fig 3.1 DGMS Application Process Flow' as there is no reference of BGMS in the article

e-OLAKH

e-OLAKH is an online system for the registration of births and deaths, simplifying what was once a time-consuming and paper-intensive process. This initiative ensures accurate and efficient record-keeping, enhancing public service delivery and reducing bureaucratic delays.

Events organized

Over the years, NIC Mahesana has played a crucial role in organizing significant district events, providing essential technical support. Highlights include:

- **PMO Setup at Valinath:** Ensured seamless technical support for setting up the Prime Minister's Office during a major event.
- **PM Event at KVK, Ganpat University:** Managed technological arrangements for a high-profile event.
- **Amrit Mahesana Startup and Innovation Mission:** Supported local innovation through this key initiative.
- **Geo-Tagging for ODOP:** Assisted in geo-tagging cumin, lemon, and cotton crops for the "One District One Product" initiative.
- **Viksit Bharat Sankalp Yatra Events:** Provided support for events like the District Garba at Becharaji Temple and Surya Namaskar at Modhera Sun Temple.
- **PMJANMAN Programme:** Delivered technical support for public health initiatives under this programme.

Accolades

NIC Mahesana's District Informatics Officer (DIO) received the Best Government Technical Performance Officer award during the 78th Independence Day celebrations, chaired by Health Minister Shri Rishikeshbhai Patel. This recognition highlights NIC Mahesana's ongoing commitment to advancing e-Governance and delivering innovative solutions in the district.

Way Forward

NIC Mahesana's vision is to foster a digitally inclusive society, using technology to drive sustainable development and improve citizens' quality of life. Aiming to be a leader in digital empowerment, the Centre is committed to bridging the digital divide through accessible e-Governance services. With a focus on innovation and inclusivity, NIC Mahesana continues to be a technological beacon in North Gujarat, shaping a more connected and brighter future for all.

▼ Fig 3.2 : NIC Mahesana's DIO honored with the Best Government Technical Performance Officer award at the 78th Independence Day celebrations, chaired by Hon'ble Health Minister Shri Rushikeshbhai Patel

Contact for more details

District Informatics Officer
NIC Mahesana District Centre
Jilla Seva Sadan, Ground Floor, Block No. 3, M. S. Building
Rajmahal Road, Mahesana, Gujarat - 384001
Email: gujmeh@nic.in, Phone: 02762-221076

East Singhbhum, Jharkhand

Empowering Governance through Digital Innovation

Edited by **SUSHMA MISHRA**

East Singhbhum is a key hub for mining and industrial activities in Jharkhand, with Jamshedpur, one of India's major industrial cities, as its headquarters. Located in the southeastern part of Jharkhand, East Singhbhum was established on January 16, 1990, by carving out nine blocks from the larger Singhbhum district. The name "Singhbhum," meaning "Land of Lions," is thought to highlight the area's historical presence of lions.

Since the 1990s, the NIC East Singhbhum (Jamshedpur) District Centre has led efforts in designing, developing, and implementing ICT projects, playing a crucial role in achieving the Digital District mission. Among its significant initiatives are the Swagatam (Visitor Management System) Portal and the Guest Verification System for Jamshedpur Police, both developed by NIC Jharkhand State Centre, Ranchi. The district centre also provides vital ICT support during VVIP visits, underscoring its importance in strengthening the region's digital infrastructure.

ICT Initiatives in the District

Swagatam Visitor Management System

https://dcjsr.swagatam.gov.in

The Swagatam Portal streamlines the process for citizens to easily book online appointments. Developed by NIC Delhi, this cloud-based application features a user-friendly graphical interface and robust security measures. As a unified and centralized solution, it can be implemented across various government offices. Launched by Shri Manjunath Bhajantri, IAS, then

Kishore Prasad
Scientist - D & DIO
dio-esm@nic.in

Poonam Verma
Scientist - C & ADIO
adio-esm@nic.in

NIC East Singhbhum drives digital transformation by providing critical ICT support to the district administration. It implements e-Governance initiatives, manages online services, and ensures secure, efficient digital platforms for public access. Through innovation and a focus on citizen-centric services, NIC enhances transparency and promotes good governance in the district.

Deputy Commissioner and District Magistrate of East Singhbhum, Jamshedpur, the portal was created to facilitate a smoother experience for citizens attending the DC's Janta Darbar to present their grievances and receive resolutions.

Guest Verification System for Police

https://jhpoliceverification.nic.in/

To curb crime and prevent unlawful activities by individuals staying in hotels with forged documents, the Jamshedpur Police has taken a significant step by introducing an online hotel guest police verification system. This system simplifies and accelerates the process of verifying the identities of hotel guests, eliminating the need for the traditional manual verification process. The new system saves time and effort for both the guests and the police. Developed by NIC Jharkhand State Centre, the Guest Verification System has been successfully implemented in East Singhbhum and Saraikela Kharsawan districts.

iRAD

https://irad.parivahan.gov.in

Implemented in East Singhbhum, iRAD (Integrated Road Accident Database) collects accident data from stakeholders like the Police, Transport, and Health Departments. This initiative supports enhanced road safety across Jharkhand, with thorough training provided to all involved parties.

Jharbhoomi

https://jharbhoomi.jharkhand.gov.in

Jharbhoomi is a digital platform developed to implement the Digital India Land Record Modernization Program (DILRMP), aimed at creating a system of up-to-date land records. It facilitates automated mutations, integrates textual

In achieving the goals of the Administration in the field of ICT and implementing related initiatives at the grassroots level, the NIC District Unit in East Singhbhum (Jamshedpur) has played a pivotal role in promoting ICT usage and executing both State and Central e-Governance programs. This includes facilitating information sharing through district websites, providing IT infrastructure, and implementing various applications of the Election Commission of India (ECI) and the State Election Commission (SEC) during elections.

The introduction of the "Swagatam Portal" for online appointments and the Visitor Management System (VMS) has further enhanced the citizen experience and improved security.

Ananya Mittal, IAS
District Magistrate, East Singhbhum

▲ Fig 4.1 : Hon'ble Prime Minister, Shri Narendra Modi, virtually inaugurating the Vande Bharat train at Tatanagar Junction Railway Station on 15th September 2024, with NIC East Singhbhum overseeing and managing the technical facilities

and spatial records, and ensures interconnectivity between revenue and registration departments. The platform also aims to transition from the existing deeds registration and presumptive titling system to a conclusive titling system with title guarantees. Jharbhoomi has been successfully implemented in the district, running modules such as Jharbhoomi MIS, JharBhuLagan, JharBhuNaksha, ULPIN, and Parishodhan.

NextGen e-Hospital System

NextGen e-Hospital, designed to streamline the Hospital Management Information System for efficient internal hospital workflows, has been implemented in East Singhbhum District at two major government hospitals: MGM College and Hospital, Jamshedpur, and Sadar Hospital, Jamshedpur. Currently, the Registration and In-Patient Department (IPD) modules are operational at these hospitals. Additionally, the Online Registration System (ORS) has been implemented at Sadar Hospital, Jamshedpur.

BOR Portal

Designed and developed by NIC Jharkhand State Unit, this portal facilitates the conduct of various departmental examinations organized by the Board of Revenue, Jharkhand. It regularly hosts examinations for government employees of Jharkhand. Employees can self-enroll and apply to participate in the examinations listed on the portal. After verification, users can check the latest status of their application on the dashboard page.

JharSewa

https://jharsewa.jharkhand.gov.in

JharSewa is a user-friendly, transparent, and interactive web-based service portal built on the ServicePlus framework, providing citizens with easy access to various essential services. Applications can be submitted through multiple channels, such as online, CSCs, and Panchayat Swayamsewaks, and are automatically routed to the appropriate office based on the applicant's location. Once processed, the digitally signed service delivery is made available online for the applicant. Services offered through JharSewa include income certificates, caste certificates, local residence certificates, and EWS certificates.

IT Support

NIC East Singhbhum team provided extensive ICT support for key events and operations in 2023:

- Set up two-way communication for the Hon'ble Prime Minister's visit, the Vande Bharat train inauguration, Rozgar Mela, and the launch of PM Vishwakarma.
- Ensured smooth election operations, managing applications such as: Polling party and personnel randomization, Vehicle Management, Material Management, Poll day monitoring
- Supported critical systems, including: Observer and Encore Portals, e-Affidavit, C-Vigil, EMS
- Provided NKN connectivity to educational institutions and essential network services across the district.

▼ Fig 4.2 : DIG Kolhan Ajay Linda, addressing attendees at Hotel Sonnet on 4th November 2023, discussed plans for the implementation of the Hotel Guest Verification System across the State

I am writing to express my heartfelt appreciation and commendation for the exceptional work carried out by Meity NIC Jharkhand State Unit, Ranchi and NIC District Unit East Singhbhum(Jamshedpur) in developing the commendable web application "Guest Verification System" for the Police Department. This System is an invaluable asset to our day-to-day policing work, and it is poised to make a significant positive impact on combating crime. It helps local police administration to track guest details to minimize the risk of fraudulent activities by anti-social elements. It provides comprehensive solution for seamless and secure guest verification across the district.

The software application which Meity NIC has delivered exemplifies the very essence of excellence in innovation and technology integration. It will not only streamline our operational processes but also elevate performance and responsiveness of police department to a whole new level.

We are eager to continue working alongside you as we embark on new digital initiatives and strive for further advancements in smart policing.

Manoj Ratan Chothe, IPS
Deputy Inspector General
Singhbhum (Kolhan) Range

Way Forward

NIC East Singhbhum District Centre continues to provide seamless support to the district administration, ensuring transparent, efficient, and rapid service delivery that directly benefits citizens at the grassroots level. As technology evolves, the Centre remains committed to enhancing its support, driving more effective and efficient administrative processes to further the development of the district and its people.

Contact for more details

District Informatics Officer
Room No- G9 To G10 , Ground Floor
Office of The Dy. Commissioner, Old Court Campus
Sakchi, Jamshedpur-831001
Email: dio-esm@nic.in, Phone: 0657-2430170

In Focus

Generative AI

Generative AI is experiencing unprecedented growth and adoption across diverse industries, fundamentally transforming organizational operations and the landscape of creativity and innovation. This technology, rooted in advanced machine learning algorithms, leverages vast datasets to autonomously generate original text, images, audio, video, and even more complex outputs. It goes beyond mere automation—generative AI enhances human capabilities, reshaping workflows and pushing boundaries in productivity, customer service, product design, content creation, research, and even data synthesis.

The skills and knowledge required to work with generative AI have become crucial in the modern workforce as businesses increasingly invest in tools and platforms to boost creativity, streamline efficiency, and drive competitive advantage. With applications across sectors like healthcare, finance, media, and education, professionals with expertise in generative AI are now pivotal in optimizing operations and developing transformative solutions.

A cornerstone of this evolution is the Transformer architecture, a neural network model that has shifted the paradigm of natural language processing and AI model efficiency. Transformers excel at interpreting language context, understanding not just the meaning of individual words but also their relationships within entire phrases and sentences. Unlike older models that process information sequentially, Transformers analyze all parts of an input simultaneously, making them faster, highly scalable, and well-suited for parallel processing on GPUs. This simultaneous approach has facilitated the emergence of foundation models like GPT, BERT, and others, which serve as adaptable, general-purpose models that can be fine-tuned for specific tasks.

Generative AI techniques are diverse, with each model family serving distinct functions. GANs (Generative Adversarial Networks), for example, have proven adept at creating hyper-realistic images by pitting two networks against each other in a "creative rivalry," whereas VAEs (Variational Autoencoders) are well-suited for data compression and synthesis, generating smooth data representations that are invaluable for tasks like anomaly detection and recommendation systems.

These models do not serve as one-size-fits-all solutions. Instead, their impact lies in carefully integrating them into tailored applications that fit specific industry needs. For instance, while Transformers have revolutionized text and language-based applications, GANs have unlocked new levels of visual realism for media and entertainment industries, and VAEs are proving valuable in healthcare for generating synthetic patient data to advance medical research while safeguarding patient privacy.

Generative AI holds the potential for profound industry shifts, not only enabling businesses to innovate at scale but also empowering them to discover new possibilities and operate more inclusively and effectively. As these models continue to evolve, so too will the breadth of generative AI's applications—ushering in a future where creativity, innovation, and efficiency intersect, reshaping the digital world in remarkable and unforeseen ways.

V. Uday Kumar
Dy. Director General & HoG
uday.kumar@nic.in

What's AI/ML and Deep Learning?

Artificial Intelligence (AI) refers to a broad set of technologies that empower machines to perform tasks traditionally requiring human intelligence. Two significant subfields within AI—Machine Learning (ML) and Generative AI—have particularly gained attention for their transformative capabilities.

AI and Machine Learning

Artificial Intelligence (AI): AI involves simulating human-like intelligence in machines, enabling them to think, learn, reason, solve problems, understand natural language, and interpret sensory information. This broad concept underpins many advancements that are reshaping industries today.

Machine Learning (ML): ML is a specialized subset of AI that focuses on creating algorithms capable of making data-driven predictions. Rather than being explicitly programmed for each task, ML models use statistical methods to identify patterns in data and improve performance over time. Common use cases include recommendation engines, fraud detection systems, and predictive analytics.

Deep Learning

Deep learning, a sophisticated subfield of ML, uses artificial neural networks with multiple layers to analyze and interpret complex data. These deep architectures excel at tasks like image and speech recognition, as they can autonomously extract features from raw data without the need for manual feature engineering. This automation has led to significant advancements in fields requiring pattern recognition and data analysis.

Generative AI

Generative AI, a subset of AI that often utilizes deep learning, is dedicated to creating new content that mirrors the data it has been trained on. This includes the generation of images, videos, text, and audio that are novel yet bear a resemblance to the original input data. Models such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs) are specifically designed to learn and replicate the patterns within input data distributions, producing creative outputs that are both innovative and contextually relevant.

Evolution of Generative AI

Early 1950s: Foundations of Machine Learning and Neural Networks

Generative AI has its roots in the early days of machine learning and deep learning research. In 1952, Arthur Samuel created the first machine learning algorithm, designed to play checkers, which laid the groundwork for self-improving programs and introduced the term "machine learning." Shortly after, in 1957, Frank Rosenblatt, a psychologist at Cornell University, developed the Perceptron. This was the first "neural network" capable of learning, consisting of a single layer of perceptrons with adjustable weights and thresholds. Although the Perceptron demonstrated some learning capabilities, it struggled with more complex tasks due to its limited architecture, ultimately stalling progress in the field.

1960s–1970s: The Rise of Early AI Programs and Pattern Recognition

During the 1960s, AI research expanded to include early generative applications. In 1961, Joseph Weizenbaum developed ELIZA, a program that used basic natural language processing to emulate a Rogerian psychotherapist, marking a breakthrough in conversational AI. ELIZA used pattern matching and substitution methodologies to simulate empathetic responses, a foundational concept for later chatbot development. In parallel, computer vision and pattern recognition research gained traction, with Ann B. Lesk, Leon D. Harmon, and A. J. Goldstein advancing facial recognition technology in 1972. Their study, "Man-Machine Interaction in Human-Face Identification," identified 21 unique markers (such as lip thickness and hair color), establishing a framework for automatic facial recognition systems. In 1979, Kunihiko Fukushima proposed the Neocognitron, the first deep-learning neural network with a multilayer, hierarchical structure designed for visual pattern recognition, particularly for handwritten characters. This architecture inspired later convolutional neural networks (CNNs), laying the groundwork for advanced image recognition.

1990s: The Impact of Gaming and Graphics Processing on AI Development

The gaming industry inadvertently accelerated generative AI advancements in the 1990s, particularly through the development of high-powered graphics cards. With Nvidia's release of the GeForce 256 in 1999—the first GPU capable of advanced graphical computations—researchers found that GPUs could efficiently process neural networks, speeding up AI training. The parallel processing power of GPUs soon became indispensable in AI research, particularly for tasks that required large-scale data processing and complex pattern recognition.

2000s: Smarter Chatbots and the Rise of Generative Networks

The early 2000s saw the emergence of more sophisticated virtual assistants, starting with Apple's release of Siri in 2011 as the first digital virtual assistant capable of executing voice commands. Meanwhile, in 2014, a landmark advancement came with the introduction of Generative Adversarial Networks (GANs) by Ian Goodfellow. GANs consist of two neural networks—the generator and the discriminator—that work in tandem to produce highly realistic images, videos, and audio by learning from real-world data. GANs have since been used extensively in creative fields, from deepfake technology to digital art.

2018–Present: The Transformer Architecture and Modern Generative

AI The Transformer architecture, introduced in 2017, marked a significant leap in natural language processing and generative AI. Unlike recurrent neural networks (RNNs) and long short-term memory (LSTM) models, Transformers analyze all parts of an input simultaneously rather than sequentially. This parallel processing approach, combined with self-attention mechanisms, enables Transformers to capture intricate language nuances. Google's BERT (Bidirectional Encoder Representations from Transformers), developed in 2018, exemplifies this advance, allowing deeper contextual understanding in natural language tasks. BERT is widely used for applications such as search engine optimization, chatbots, virtual assistants, sentiment analysis, and topic classification.

In 2022, OpenAI introduced ChatGPT, a generative language model built on Transformers, marking a turning point in the field. Powered by large language models, ChatGPT demonstrated unprecedented capabilities in conversational AI, handling tasks such as writing, research, coding, and creating realistic multimedia content. ChatGPT's abilities have expanded AI's reach across industries, from customer service and content creation to research and education. Despite its transformative impact, generative AI models like ChatGPT face scrutiny over "hallucinations"—the generation of plausible but incorrect information—a limitation researchers are actively working to address.

The Future: Generative AI as a Core Pillar of Innovation

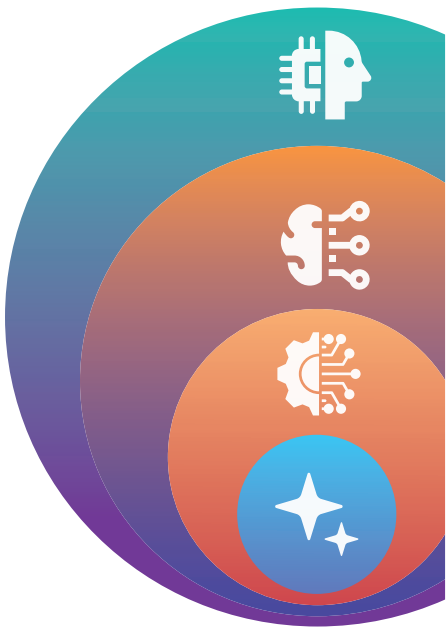
Generative AI continues to evolve, promising to reshape industries by enabling more intuitive user experiences, automating complex tasks, and unlocking creative potential. The trajectory from early machine learning algorithms to today's advanced generative systems illustrates an accelerating pace of innovation, with each decade building on previous breakthroughs. As generative AI tools become more accessible and refined, they are poised to empower a new era of creativity, productivity, and exploration across every sector.

Recent Advancements

Language Processing

Natural Language Processing (NLP) is a core branch of artificial intelligence that focuses on the interaction between computers and human language. Generative AI has significantly advanced NLP applications, enabling systems to understand context, compose coherent language, and hold meaningful conversations.

Generative AI models, such as GPT, excel in producing coherent and contextually relevant content. NLP in generative AI is crucial for recognizing the nuances of spoken or written language. These NLP tools enhance generative

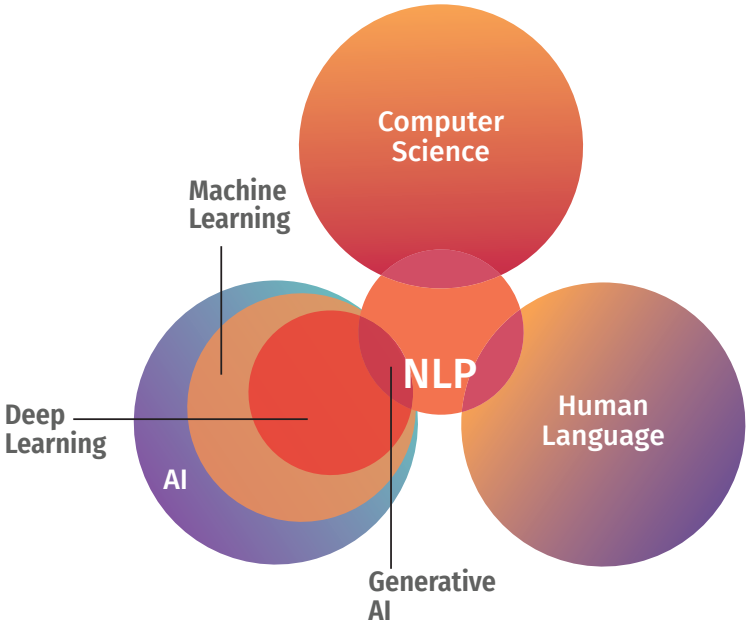


Artificial Intelligence
AI involves techniques that equip computers to emulate human behavior, enabling them to learn, make decisions, recognize patterns, and solve complex problems in a manner akin to human intelligence.

Machine Learning
ML is a subset of AI, uses advanced algorithms to detect patterns in large data sets, allowing machines to learn and adapt. ML algorithms use supervised or unsupervised learning methods.

Deep Learning
DL is a subset of ML which uses neural networks for in-depth data processing and analytical tasks. DL leverages multiple layers of artificial neural networks to extract high-level features from raw input data, simulating the way human brains perceive and understand the world.

Generative AI
Generative AI is a subset of DL models that generates content like text, images, or code based on provided input. Trained on vast data sets, these models detect patterns and create outputs without explicit instruction, using a mix of supervised and unsupervised learning.



AI's ability to comprehend user inputs and process human language, generating appropriate and meaningful responses or content.

NLP is a transformational technology that improves human-computer interaction across a range of applications. From chatbots to virtual assistants, NLP facilitates seamless communication between humans and machines, making it a vital component of the digital world. As technology evolves, NLP's capabilities will continue to expand, paving the way for more sophisticated applications in fields like healthcare, finance, and education.

Various Models Available in the Market

Several generative AI models have emerged, each with unique capabilities. Known for their ability to generate large amounts of written content, LLMs (Large Language Models) are highly versatile and can handle tasks ranging from text generation to language translation on a broad scale. Examples include Google's Gemini, GPT-4, Claude Opus, and Llama3.

OpenAI's GPT (Generative Pre-trained Transformer): This model excels in natural language processing tasks like text creation, summarization, and translation.

- **GPT-1:** Launched in 2018, this was the first large-scale model, laying the groundwork for future advancements.
- **GPT-2:** Released in 2019, it featured increased scale and enhanced capabilities.
- **GPT-3:** Introduced in 2020, it demonstrated the ability to produce human-like text.
- **GPT-3.5:** Released in 2022, it offered improved context generation and text editing features.
- **GPT-4:** Launched in 2023, it can process both text and images, offering better reasoning and contextual understanding.

Multimodal Models

These models accept various input types, such as text and images, to generate versatile outputs like text, images, and audio. Examples include DALL-E, Midjourney, and Stable Diffusion.

- **OpenAI's DALL-E:** Generates images from textual descriptions, showcasing the ability to create visual content from language input.
- **Stable Diffusion:** A widely used model for generating high-quality images based on text prompts.
- **Gemini:** Developed by Google, this multimodal architecture can process context, images, audio, and video.
- **Project Astra:** An ongoing Google project focused on creating AI agents that enhance NLP, complex reasoning, and productivity tools.

Neural Radiance Fields (NeRFs)

A powerful generative AI tool for creating 3D imagery from 2D images. NeRFs are increasingly used in virtual reality, computer graphics, and related fields.

RAG (Retrieval-Augmented Generation)

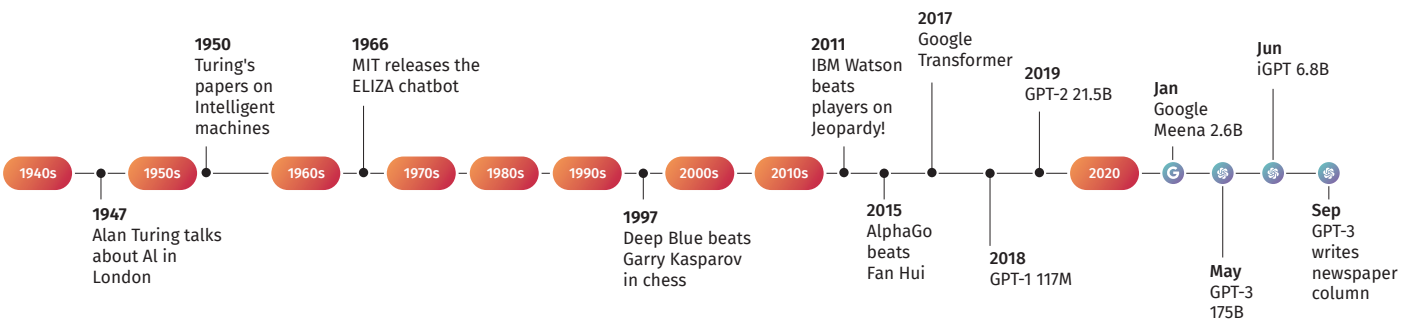
RAG combines retrieval-based techniques with generative models to improve the generation process. It retrieves data from external databases or publications to provide more accurate and relevant responses. This approach leverages real data to enhance the reliability of generated content.

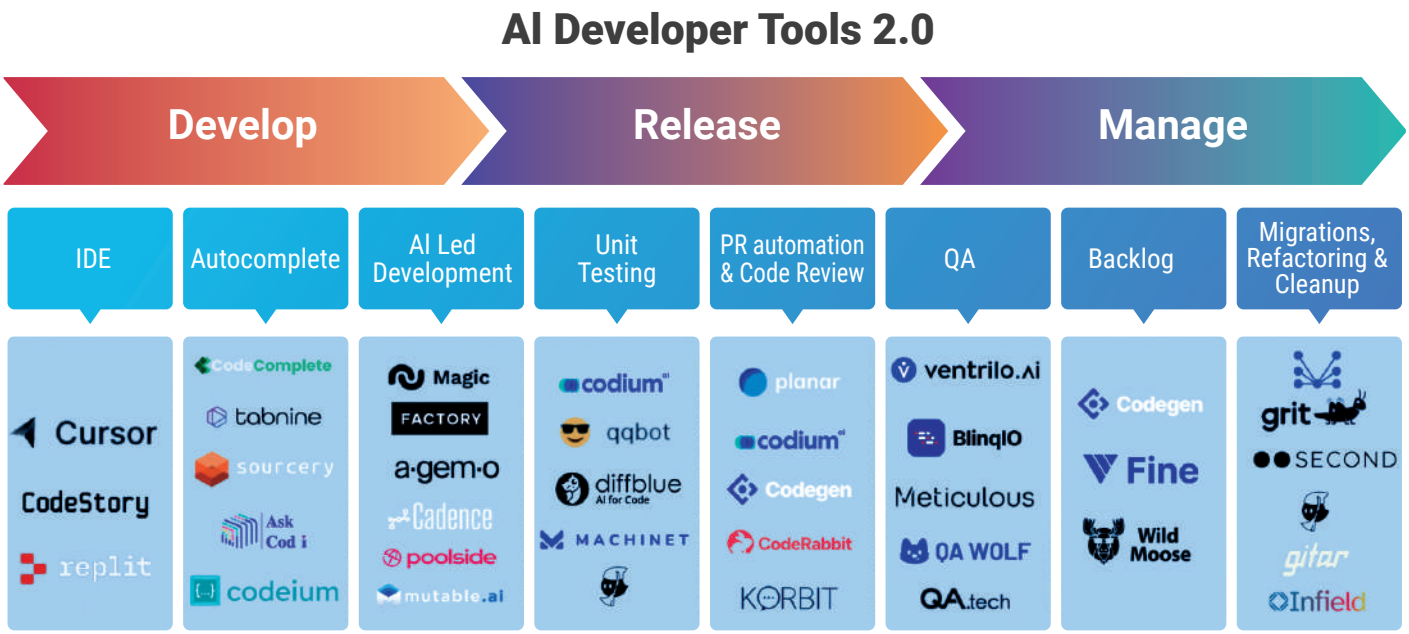
Coding and Generative AI

Generative AI is rapidly being integrated into software development processes. Tools like GitHub Copilot use generative models to assist developers by suggesting code snippets based on comments or existing code. This helps improve coding efficiency and reduce errors through context-aware suggestions.

Generative AI is transforming software development by automating coding tasks, fostering creativity, and boosting efficiency. It uses machine learning models to generate new content, including code, based on patterns found in existing datasets. Here are some key effects of generative AI on coding and software development:

- **Quality Control:** Generated code may not always meet quality or security standards, requiring human review and validation before deployment.
- **Dependence on Data:** The effectiveness of generative AI relies heavily on the quality and diversity of the training data. Poor data quality can lead to subpar outcomes.
- **Ethical Considerations:** Like any AI system, generative AI must address ethical concerns, such as intellectual property rights and biases in generated outputs.





Indian Scenario

AI and generative technologies are rapidly gaining traction in India, with applications spanning sectors like healthcare, banking, education, and entertainment. Startups are using generative AI for content creation, automating customer service, and implementing customized marketing strategies. The government is also encouraging programs that promote AI research and development.

Many people in India have used ChatGPT, a chatbot developed by OpenAI, which is built on large language models (LLMs). These models interpret and generate content using massive datasets, primarily trained on English data worldwide. However, several Indian companies are taking a different approach. They are developing regional and Indic language models, both large and small, to cater to the linguistic diversity of the country. Smaller language models require fewer but more specialized datasets, which are easier to source locally.

Key players in this space include Bhavish Aggarwal's Krutrim, Tech Mahindra's Indus project, AI4Bharat's Airawat series, Sarvam AI's OpenHathi series, CoRover.ai's BharatGPT, and SML India's Hanooman LLM series.

Other notable generative AI initiatives in India include The Nilekani Center at AI4Bharat, Sarvam AI, Project Vaani (a collaboration between AI and Robotics Technology Park at IISC and Google), Ozontel (cloud-based communications), and Swecha Telangana at the Indian Institute of Information Technology-Hyderabad, among others.

NIC & MeitY Initiatives

The Ministry of Electronics and Information Technology (MeitY) has initiated the implementation of a 'National Programme on AI,' which includes four main components: Data Management Office, National Centre for AI, Skilling on AI, and Responsible AI. The 'IndiaAI' framework complements this program by providing a focused and comprehensive approach to address specific gaps in the AI ecosystem. As one of the largest Global South economies leading the AI race, India has been appointed as the Council Chair of the Global Partnership on AI (GPAI), securing more than two-thirds of first-preference votes.

IndiaAI's mission-centric strategy emphasizes bridging gaps in AI infrastructure, including compute resources, data availability, financing, research, innovation, targeted skills development, and institutional data management. This comprehensive approach is crucial for maximizing AI's impact on India's progress.

To further strengthen its AI capabilities, India is establishing multiple Centres of Excellence, developing a national dataset platform, setting up a Data Management Office for governance, and exploring design approaches for indigenous AI chipsets. Moving forward, MeitY plans to establish a compute center with 10,000 GPUs, providing 40 Exaflops of computational power and approximately 200 PB of storage. The focus will be on prioritizing AI use cases in Governance, Agriculture, Health, Education, and Finance.

Centre of Excellence in Artificial Intelligence (NIC Initiatives)

NIC took a significant leap in advancing AI in governance by establishing the Centre of Excellence in Artificial Intelligence in 2019. This pioneering initiative aims to explore, develop, and implement AI applications specifically tailored to enhance public services and governance structures in India. At its core, the center focuses on model building in critical areas such as Image and Video Analytics, Speech Synthesis and Recognition, and Natural Language Processing, each geared toward creating solutions that streamline citizen services and improve administrative efficiencies.

To make AI accessible and scalable for various government agencies, NIC launched AI as a Service (AIaaS) on its Meghraj Cloud in January 2021. This service allows agencies to tap into AI capabilities without needing to develop or manage complex infrastructure. Here is a comprehensive overview of NIC's key AI initiatives that are driving transformation in Indian governance:

- **AI - Manthan:** A versatile platform for creating, training, and testing AI-based deep learning models. It simplifies the model development process, making it easier for developers to design effective solutions.
- **AI - Tainaatee:** An inference testbed specifically designed for deploying models created in AI – Manthan. Once models are trained, Tainaatee allows them to be tested for real-world deployment, ensuring that they are production-ready. This testbed optimizes model performance for practical applications in government projects.
- **AI - Tippanee:** Annotation tools and services essential for building reliable AI models. AI – Tippanee provides a suite of tools for tagging, labeling, and preparing data, which is a crucial step in the machine learning process, especially in supervised learning scenarios.
- **AI - Satyapikaanan (Face Recognition as a Service - FRAAS):** Satyapikaanan offers API-based face recognition and liveness detection services. This technology has enabled numerous e-governance applications, such as:
    - Life Certificate Verification for pensioners in Meghalaya.
    - Faceless Services in Regional Transport Offices (RTOs) for convenient public service access.

- Attendance Tracking for skill development trainees under the Ministry of Minority Affairs.

- **AI - ParichayID:** An API service dedicated to verifying and matching form details accurately. This tool helps in validation processes where user-submitted information must be cross-checked for accuracy and completeness, supporting initiatives that require secure and verified data submissions.

- **AI - VANI (Virtual Assistance by NIC):** VANI encompasses chatbots, voicebots, and transliteration tools, provided via the Meghraj Cloud. As a highly adaptable AI service, VANI has been instrumental in supporting multiple government projects:
  - NIC has deployed 20 chatbots, including for services like eWayBill and iKhedut (a portal for farmers), some of which offer multilingual support.
  - Additionally, eight bilingual voice support services, including for PM-Kisan and PM-Kusum, serve diverse citizen groups, enabling more inclusive access to government services across multiple states and ministries.

- **AI - Vividh:** A customizable AI application development service that also supports compute-only requests. Vividh is responsible for various specialized projects, such as:
  - SwachhAI, an automated toilet seat detection tool, supporting sanitation efforts under Swachh Bharat Urban.
  - Cognitive Search Tools for motor accident claim cases within eCourts, making case information retrieval faster and more efficient for legal and administrative personnel.

- **AI - Prabandhan:** A comprehensive framework for managing the lifecycle of AI models, including retraining, backup, infrastructure scaling, and disaster recovery. Prabandhan ensures that AI systems are not only functional but also sustainable, allowing continuous updates to keep models relevant and effective as data and requirements evolve.

BHASHINI Initiative

BHASHINI aims to break language barriers, making digital services accessible in local languages using voice-based technology. Launched in July 2022 by Honorable PM Shri Narendra Modi under the National Language Technology Mission, BHASHINI provides translation services for twenty-two scheduled Indian languages. Key features include automatic speech recognition, neural machine translation, text-to-speech conversion, language detection, and voice activity detection. This initiative holds the promise of bridging both linguistic and digital divides, empowering every citizen to engage with technology seamlessly.

Challenges of Generative AI

Despite its immense potential, generative AI faces several significant challenges:

- **Hallucination:** Generative models often rely on patterns from training data without real-world validation, producing outputs that may seem plausible but are incorrect or nonsensical. These AI hallucinations, particularly prevalent in large language models (LLMs), undermine the reliability and trustworthiness of AI systems. While generative AI can present content that appears factual, it often lacks true understanding, and inaccuracies in training data exacerbate this issue. Furthermore, generative AI can easily create misleading content, such as fake news and deepfakes. Since models are designed to generate convincing outputs even without a factual basis, all AI-generated content should be independently verified for accuracy.

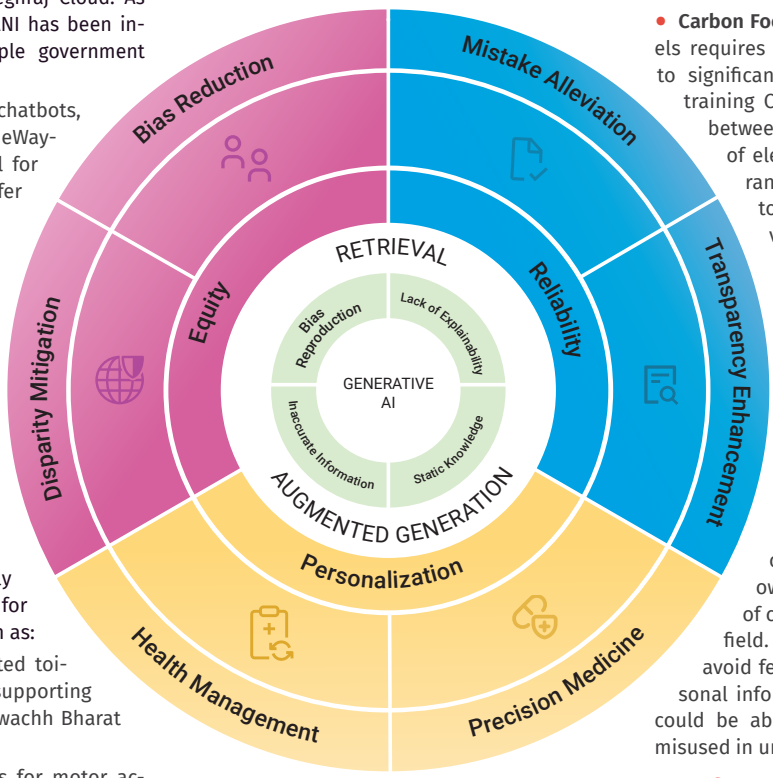
- **Bias:** Bias in AI arises from systematic favoritism embedded in AI systems, leading to skewed outcomes or uneven treatment. This issue can manifest in critical areas like hiring, lending, criminal justice, and healthcare. As AI becomes more integrated into decision-making processes, it is crucial to identify and address these biases to ensure fairness and equity.

- **Limitations:** Despite rapid advancements, AI technology still has fundamental limitations that restrict its effectiveness across various fields. Understanding these constraints is essential for developers, businesses, and policymakers to make informed decisions about AI adoption and deployment.

- **Privacy and Regulation:** The widespread use of AI raises serious privacy concerns, necessitating comprehensive legal frameworks to protect personal data. As AI systems become more common, individuals, organizations, and regulators must be aware of the implications for data privacy and establish robust safeguards.

- **Carbon Footprint:** Training generative AI models requires substantial electricity, contributing to significant carbon emissions. For instance, training ChatGPT-4 is estimated to consume between 51,772 and 62,318 megawatt hours of electricity, resulting in CO_2 emissions ranging from 1,035 to 14,994 metric tonnes. These environmental impacts vary based on the geographical location of data centers. To put this into perspective, a 3,000-mile round-trip flight from London to Boston produces roughly one metric tonne of carbon dioxide.

- **Copyright & Ownership:** Generative AI often produces content that mimics or summarizes existing material, sometimes without the original creators' consent. This raises issues of copyright, intellectual property, and ownership, especially given the lack of clear legal guidelines in this evolving field. Users should exercise caution and avoid feeding copyrighted or sensitive personal information into AI tools, as such data could be absorbed into training datasets and misused in unintended or unethical ways.



Way forward

To use generative AI responsibly, it is essential to:

- **Prioritize Ethical Considerations:** Ensuring transparency in model training methods and proactively addressing biases is crucial for ethical AI development.

- **Pursue Cross-Disciplinary Collaboration:** Advancing toward real Artificial General Intelligence (AGI), where machines demonstrate human-like cognitive abilities across diverse tasks, will require continuous research and collaboration across various fields.

In summary, while generative AI holds the promise to transform numerous industries, its long-term success will depend on addressing challenges through strong ethical standards.

Contact for more details

V. Uday Kumar
Deputy Director General & HoG
National Informatics Centre, A Block
CGO Complex, Lodhi Road, New Delhi - 110003
Email: uday.kumar@nic.in, Phone: 011-24305075

PM-USHA Portal

Enhancing Higher Education in the light of NEP 2020

Edited by **NEETA CHAUHAN**

To align with the five pillars of the New Education Policy (NEP) 2020—accessibility, quality, equity, accountability, and affordability—the Ministry of Education, Government of India, has launched the Pradhan Mantri Uchchatar Shiksha Abhiyan (PM-USHA) scheme under the Department of Higher Education. This initiative aims to enhance the overall quality of State Higher Educational Institutions (HEIs) by promoting adherence to established norms and standards and by encouraging accreditation as a framework for quality assurance.

PM-USHA is a centrally sponsored scheme led by the Ministry of Education, targeting both Government and Government-aided Higher Education Institutions. The scheme focuses on elevating educational quality by advancing teaching methodologies, refining accreditation processes, enhancing digital infrastructure, and establishing model academic institutions to foster a progressive educational landscape. The Higher Education Informatics Division of NIC serves as the technology partner, responsible for designing and developing the PM-USHA Portal.

Shashi Bhushan
Dy. Director General & HoG
bhushan@nic.in

Mohd. Anwar Khan
Sr. Technical Director & HoD
anwar.khan@nic.in

Sandhya Rani
Scientist- D
sandhya.rani@nic.in

Kunal Kashyav
Scientist- C
kunal.kashyav@nic.in

With aims to cater to the five pillars of the NEP 2020, viz. accessibility, quality, equity, accountability, and affordability in the higher education sector of India, Pradhan Mantri Uchchtar Shiksha Abhiyan (PM-USHA) Scheme has been launched by the Dept. of Higher Education, Ministry of Education, Government of India. The main objective of the scheme is to improve the overall quality of existing state Higher Educational Institutions by ensuring their conformity to prescribed norms and standards and adoption of accreditation as a quality assurance framework.

Key Modules

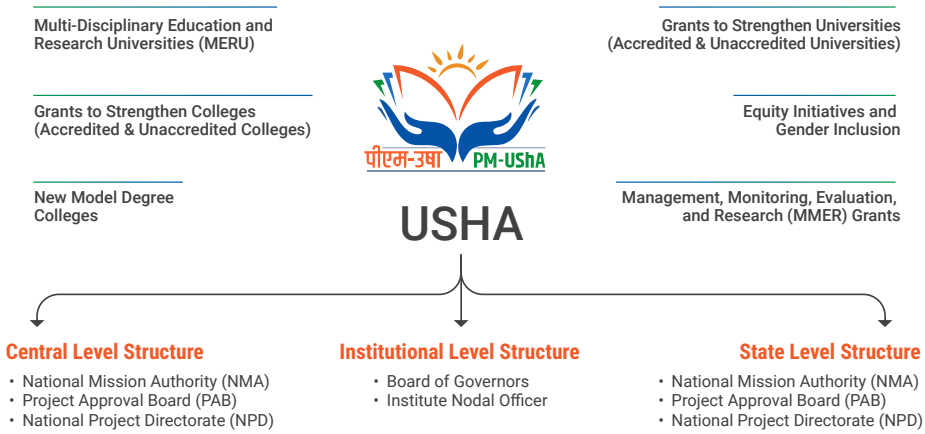
The portal streamlines the onboarding of key stakeholders, including the National Project Directorate (NPD), State Project Directorate (SPD), State Approval Authority (SAA), as well as uploading signed MoUs with states and state-provided data for Focus Districts. It integrates with AISHE and supports onboarding of State and District Nodal Officers. Key functionalities include workflow-driven credential creation, proposal submission from institutions, states, and districts, proposal shortlisting by states, state-level approvals, and approval/rejection by the Project Approval Board (PAB) at the national level. Additional features include automated proposal scoring, progress tracking of approved projects, submission of progress and inspection reports, utilization certificates, completion certifications, and comprehensive monitoring of Rashtriya Uchchatar Shiksha Abhiyan (RUSA) and PM-USHA, along with MIS reporting.

> The PM USHA Portal helped in timely evaluation of proposals submitted by various States/ UTs. It will help in regular monitoring of RUSA and PM-USHA projects.
>
> 
>
> **S. K. Barnwal,** IAS
> Additional Secretary, D/o Higher Education
> Ministry of Education, Govt. of India

Key Features

PM-USHA's key features encompass essential tools and functionalities that empower stakeholders, reinforce transparency, and support data-driven decision-making:

- Develop a comprehensive databank encompassing all components of PM-USHA to centralize information.
- Implement an analytical dashboard featuring KPIs and performance indices, providing a clear view of project metrics and progress.
- Integrate a Decision Support System for the Ministry (NPD/SPD) and other stakeholders to facilitate data-driven decision-making.
- Offer quantitative insights to inform policy-making and strategic planning, ensuring alignment with long-term goals.
- Enable evidence-based decision-making through advanced information analysis, allowing for well-substantiated adjustments to initiatives.
- Provide quantitative feedback on the effec-



▲ Fig 6.1 **PM-USHA Components**

tiveness of policies and schemes, supporting continuous improvement.

- Establish an online verification and reporting system to streamline monitoring and enhance transparency.
- Allow HEIs to apply for, track, and manage their proposals, as well as submit milestones, outcomes, and deliverables online at specified intervals.

Technology Used

This web application is REST-API driven Single Page Application (SPA) and is based on the Microservice Architecture. It uses JAVA Spring Boot framework for developing APIs. Swagger framework is used for API documentation. All of the APIs are based on OpenAPI specification 2.0. Angular framework is used for front end. In addition, application uses Bootstrap/HTML5/CSS3, Type/Java script, JQuery for designing and scripting purposes. PostgreSQL is used for database of application. JasperReports is used for generating reports at different steps. Linux RHEL is used for Servers/VMs hosted in MeghRaj (NIC-Cloud) at Shastri Park Data Centre, Delhi.

- **Website:** HTML, CSS, JavaScript, CMS tool
- **Front End:** Angular JS
- **Backend:** Rest API, Java, Spring Boot, Swagger
- **Server:** Apache, Tomcat
- **API Gateway:** NAPIX
- **Reporting Tools:** Jasper Reports Server
- **Database:** PostgreSQL
- **OS:** Linux

System Workflow

The PM-USHA Portal enables seamless interactions between multiple components and stakeholders to streamline the processing and management of proposals for various PM-USHA Scheme initiatives.

Key User Roles

- **Central Level (NPD/TSG/PAB):** The National Project Directorate (NPD), Technical Support Group (TSG), and Project Approval Board (PAB) at the central level hold key responsibilities. Central users can register all State Approval Authorities (SAAs), access all modules, and oversee state submissions. PAB is responsible for the final approval of state proposals, and NPD delegates proposals to TSG for scrutiny with designated logins for TSG members. Central users also maintain a comprehensive overview of all submitted proposals, including system-driven scoring.
- **State Level (SAA/SNO/SPD):** State-level users, including SAA, SNO, and SPD, manage state profiles, select Focus Districts, allocate PM-USHA components, and onboard District and Institutional Nodal Officers (DNO/INO). Only SAA can shortlist proposals submitted by HEIs and DNOs and forward these to the NPD for PAB approval using Aadhaar-based e-Sign. Additionally, they verify and update legacy RUSA data for scoring, monitoring, and reporting.
- **Institution/District Nodal Officer (INO/DNO):** Institution and District Nodal Officers, onboarded by state-level users, access the portal using unique IDs (e.g., AISHE Code for INOs). INOs can submit proposals for approved components such as MERU, University Strengthening, and College Strengthening. DNOs focus on Equity Initiative and Gender Inclusion (EI&GI) and New Model Degree Colleges (NMDC) components, with user credentials aligned to specific roles.

Core Modules

The PM-USHA Portal encompasses a range of core modules designed to optimize project management and streamline stakeholder interactions:

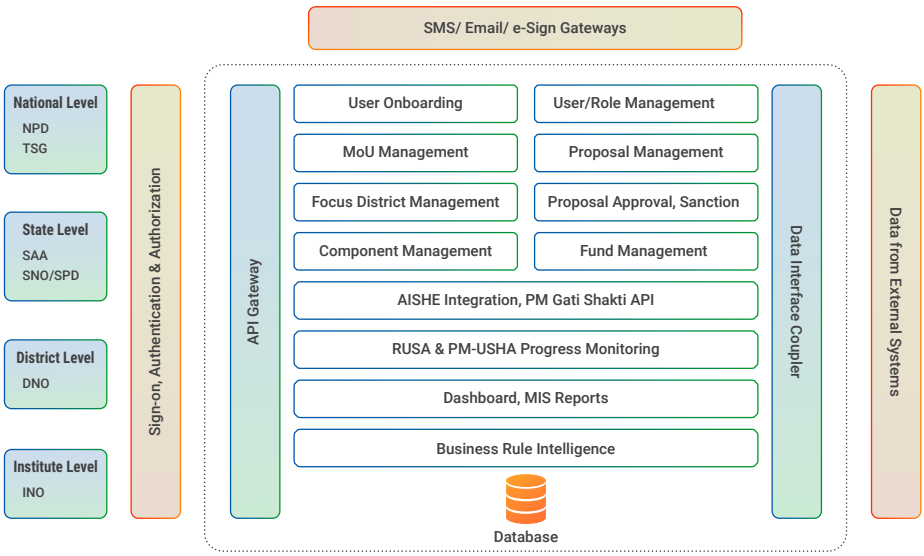
- **Automated Scoring:** Each proposal is evaluated with automated scoring across five PM-USHA components, streamlining the proposal shortlisting process.
- **Proposal Revision:** Proposals approved by PAB can be resubmitted if corrections are required.
- **MoU Management:** MoUs signed by states/UTs with the central government are uploaded by NPD, enabling SAA user creation and easy viewing.
- **Fund Demand:** States can request funds for RUSA-1, 2, and PM-USHA proposals through e-Sign, including quarterly utilization certificates (UC).
- **Document and Event Management:** The NPD can manage various documents and events, maintaining a digital repository for role-based document visibility and event tracking.

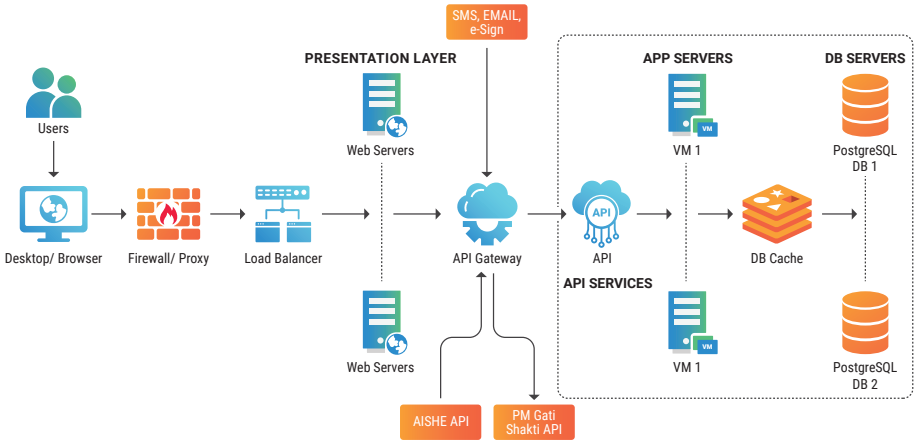
External Integrations

PM-USHA is externally integrated with the following applications and services to ensure enhanced data flow, compliance, and operational efficiency:

- AISHE
- PM Gati Shakti
- E-Sign
- SMS and E-Mail

▼ Fig 6.2 **PM-USHA Application Architecture**





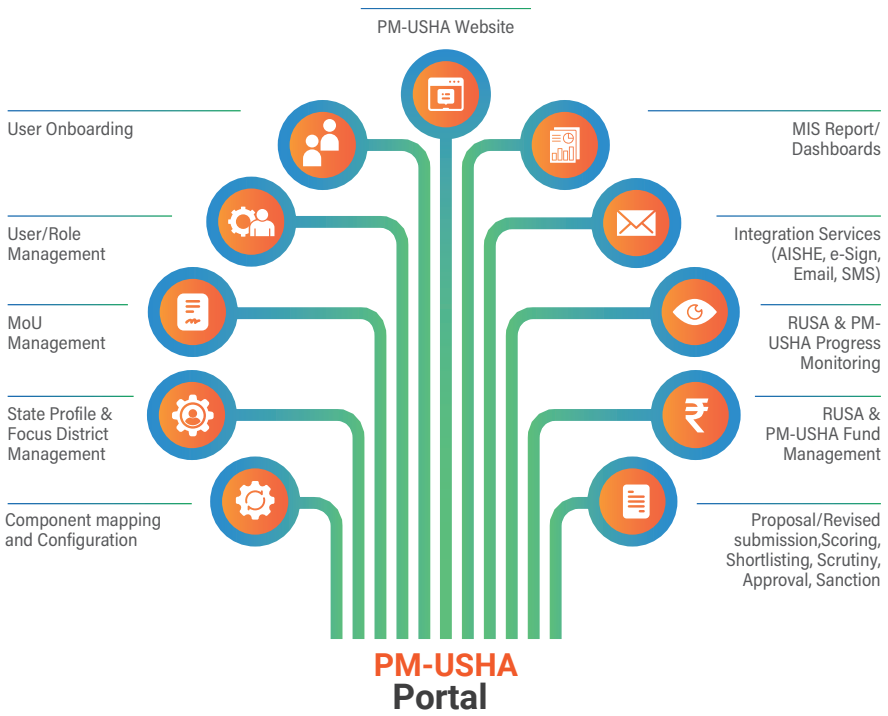
▲ Fig 6.3 **PM-USHA Deployment Architecture**

Benefits

The PM-USHA Portal introduces numerous benefits, driving operational efficiency, accuracy, and sustainable practices across the scheme's lifecycle:

- **Transparency in processing and sanction of the proposals:** It permits to track the proposal processing stage with just a click. This visibility ensures accountability, clarity and efficient processing and monitoring throughout the process. Additionally, no legal hassles due to transparency in system-driven score calculation. No load of RTI requirements.
- **Less prone to error:** Due to automation of Proposal processing & Management. With scoring handled by software, it is not susceptible to errors compared to manual methods. This reduces the risk of mistakes and ensures accuracy.
- **Efficient monitoring:** Unlike manual processes that require cumbersome process of gathering proposals data from HEIs/Districts, collation, compilation and manual analysis, this web application with it's comprehensive reports, enable them to monitor every stage of the proposal processing effortlessly. This simplifies oversight and enhances efficiency.
- **Quick implementation:** Easy for States as Institution/District Nodal Officer submits detail proposals themselves. States does not need to get all of the proposal details from the concerned nodal officers, collate it, compile it and then submit it to NPD. Easy to update/modify the proposals by un/locking of the proposals.
- **Paperless operation:** The system saves significant amounts of paper usage. This not only promotes environmental conservation but also streamlines operations by eliminating paperwork-related inefficiencies.

▼ Fig 6.4 **PM-USHA Portal Overview**



Impact

PM-USHA Portal has introduced an efficient and user-friendly system by completely automating the PM-USHA Scheme from Proposal Submission to PAB Approval & Monitoring. It helps the Dept. of Higher Education, Ministry of Education (National Project Directorate) to easily implement the scheme by eliminating the difficulties of the traditional manual approach. It also facilitates 24/7 availability, reliability, and transparency. The Portal facilitates ease of doing business and it acts as an improved decision-making system. The portal helped the Ministry achieve the vision of quality higher education through a comprehensive, holistic, and integrated education ecosystem.

> The PM USHA Portal serves as a MIS system for the scheme, monitoring various crucial aspects to improve the overall implementation of the scheme.

Manmohan Kaur
Adviser (Cost), D/o Higher Education
Ministry of Education, Govt. of India

Way Forward

The PM-USHA Portal introduces a fully automated and user-friendly environment, improving efficiency and transparency across proposal submissions, approvals, and monitoring. The portal enables 24/7 access to critical data and promotes ease of business, enhancing decision support for the Ministry of Education. Looking ahead, enhanced reporting dashboards are planned to further strengthen oversight, support project monitoring, and maintain a dynamic databank of all stakeholders. This progression aligns with the Ministry's goal to create a holistic, quality-focused higher education ecosystem in India.

Contact for more details

Mohd. Anwar Khan
Sr. Technical Director & HoD
Higher Education Informatics Division
NIC, CGO Complex, Lodhi Road, New Delhi - 110003
Email: anwar.khan@nic.in, Phone: 011-24305260

CollabFiles

Suite of Office Products towards an enhanced work place experience

Edited by **NISSY GEORGE**

India's digital transformation, spearheaded by initiatives like Atmanirbhar Bharat and Digital India, aims to create a self-reliant and digitally empowered nation. At the heart of this transformation is CollabFiles, a versatile, cloud-based platform designed to streamline document creation, collaboration, and management for government enterprises. Developed by NIC, it supports seamless cooperation across departments, offering a state-of-the-art solution to enhance workplace efficiency.

In alignment with India's push for self-reliance, CollabFiles is one of the flagship platforms developed to enable government organizations to create, collaborate, and manage office documents in a secure and efficient manner. With the ever-growing demand for secure digital platforms, CollabFiles offers a unified solution for document processing and real-time collaboration, accessible from anywhere on web and mobile devices. Its flexibility and high scalability make it a valuable tool for modern governance, enabling officials to work across ministries and states without technological barriers.

Objectives

The objectives of CollabFiles are clear and targeted at addressing the specific needs of government enterprises:

I.P.S. Sethi
Dy. Director General & HoG
sethi@nic.in

Dr. P. Gayatri
Sr. Technical Director & HoD
gayatri.ap@nic.in

Y. Sreevani
Technical Director
yvani@nic.in

CollabFiles is a secure, cloud-based platform developed by NIC to streamline document creation, collaboration, and management for government enterprises. Offering real-time collaboration, integration with government systems, and robust security features, it enables efficient workflows across ministries and states. Designed with scalability in mind, CollabFiles plays a crucial role in modernizing India's government operations under the Digital India initiative.

- To provide a centralized, web-based platform for document creation, management, and collaboration.
- To enable seamless, real-time collaboration on office documents, with role-based access controls to ensure secure sharing.
- To support portability by offering compatibility with industry-standard formats like DOCX, XLSX and PDF.
- To integrate with other government platforms such as NICEmail, SMS, Sandes, and eOffice, ensuring a cohesive and interoperable digital environment.
- To ensure high availability through a robust disaster recovery and business continuity plan, minimizing downtime.

Architecture

The architecture of CollabFiles is built with a layered approach, designed for scalability, security, and interoperability. Users can access the platform from a variety of devices, and the architecture emphasizes security at every level, using features such as Single Sign-On (SSO), data encryption, and secure cloud storage. As illustrated in Figure 7.1, this architecture integrates key components such as access channels, services offered, functional modules, and ICT infrastructure.

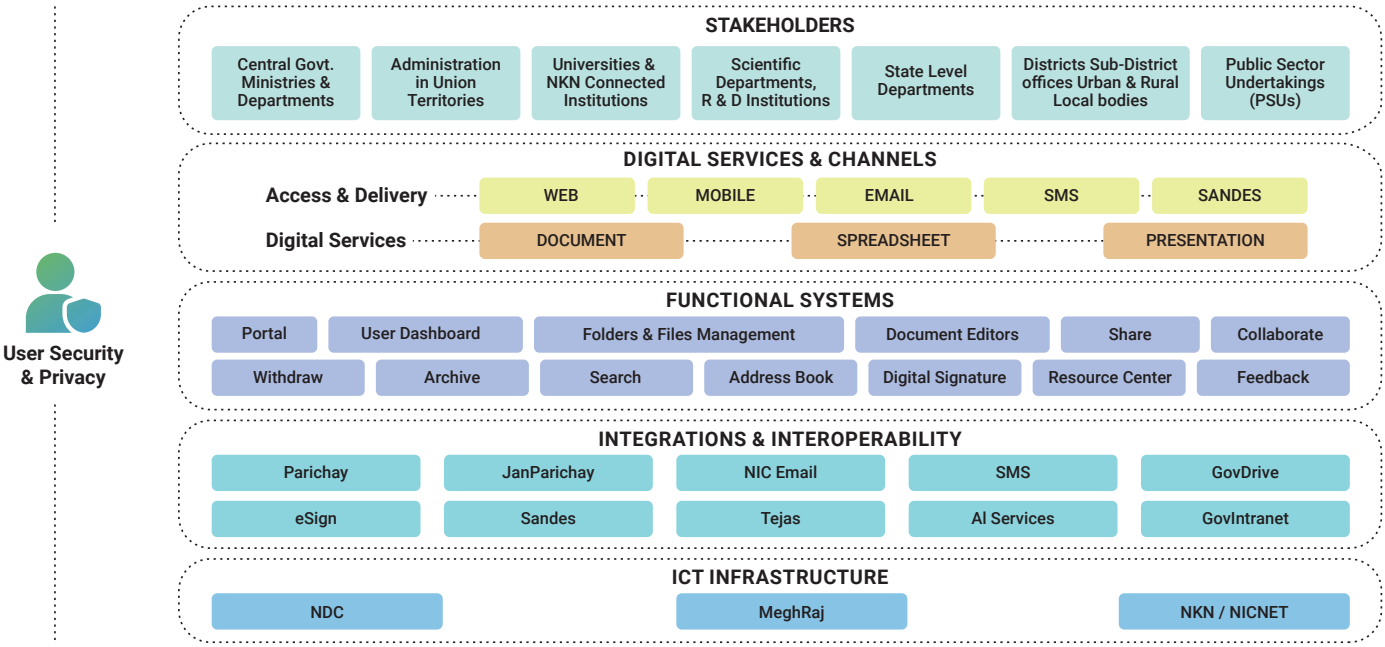
> CollabFiles demonstrates commendable performance. Its wide range of features for report drafting, presentation creation, and spreadsheet development has significantly boosted user efficiency. It functions as an all-encompassing solution for both the creation and collaboration on Office documents.
>
> **Vindhya Pratap Singh**
> Addl. GM (IT), DMRC, MoHUA

The platform is designed following the principles of Open API and microservices-based architecture, which allows it to easily integrate with other government platforms. It also supports a high level of scalability, making it capable of handling large volumes of user traffic, which is crucial for government operations.

Features

CollabFiles offers a rich suite of features designed to facilitate seamless document management and collaboration for government users. The platform's key features include:

- **Web-Based, Cloud-Enabled Platform:** The platform is accessible from anywhere, making it easier for government officials to collaborate, regardless of their location.
- **Document Creation and Management:** Users can create, edit, and manage documents, spreadsheets, and presentations with support for industry-standard file formats.
- **Real-Time and Asynchronous Collaboration:** CollabFiles allows multiple users to collaborate on documents simultaneously, whether in real time or asynchronously, supporting remote work and inter-departmental cooperation.
- **File Sharing and Access Controls:** The platform enables secure file sharing, with options for read-only or editable access, and the ability to



▲ Fig 7.1 **Layered Architecture of CollabFiles**

share files for a limited time or publicly.

- **Integrated Messaging and Notifications:** Integrated with NICEmail, SMS, and Sandes, CollabFiles sends automatic notifications for file sharing and updates, ensuring users stay informed.
- **Advanced File Management:** Features such as file versioning, renaming, and search enhance efficiency and streamline document management.
- **Dashboards for Monitoring:** Both personalized and admin dashboards provide users with detailed insights into document activity, collaboration statistics, and system usage.
- **Security and Privacy:** The platform is built with strong encryption, access control, and secure cloud storage to protect sensitive government data.

Technologies Used

CollabFiles is built using following technology stack:

- **Development Stack:** It uses ASP.NET Core 8.0, as development framework; Bootstrap 5.3 for responsive design, and PostgreSQL 16 as RDBMS.
- **Deployment Stack:** The platform is deployed on Windows 2019 with IIS 10.0 and leverages third-party office-suite tools. It uses RabbitMQ for message brokering, Redis for caching, and PostgreSQL replication for disaster recovery.

Status

Since its launch, CollabFiles has been adopted by following organizations:

- **Top States:** Delhi (2500+ users), Uttar Pradesh (800+ users), Telangana, Maharashtra, and Karnataka.
- **Top Ministries:** MeitY (3000+ users), Ministry of Communications (1400+ users), and MoHUA.

This broad adoption demonstrates the platform's utility and effectiveness in facilitating collaborative work across government bodies.

Way Forward

CollabFiles, despite its success, faces challenges in tailoring its user interface to diverse needs, ensuring robust security against cyber threats, and complying with the Digital Personal Data Protection Act (DPDPA) - 2023. Success hinges on secure development, user training, adaptability to technological changes, and performance monitoring. By addressing these and fostering continuous improvement, CollabFiles can remain indispensable for secure and scalable government collaboration.

> As a long-time user since its inception, I can confidently say that CollabFiles has been invaluable for our team's data and document needs (Share/Receive). Its seamless functionality makes it the ideal choice for collecting and sharing files across different states, even with multiple users accessing them simultaneously. It has truly streamlined our workflow and enhanced collaboration within our organization.
>
> **Arvind Kumar Shrivas**
> Technical Director, Office of The Registrar General & Census Commissioner, MHA

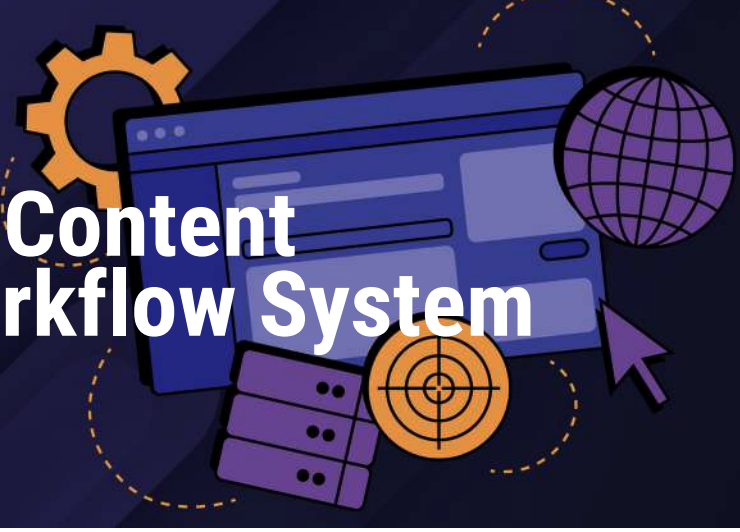
▼ Fig 7.2 : Shri I.P.S. Sethi, Head of Group, Collabfiles along with Dr. P. Gayatri receiving the Elets Innovation Award 2022 for Collabfiles at the Aatmanirbhar Bharat Summit in New Delhi

Contact for more details

Dr. P. Gayatri
Senior Technical Director
National Informatics Centre, BRKR Bhawan
Tankbund Road, Hyderabad - 500063
Email: gayatri.ap@nic.in, Phone: 040-23494416

Comprehensive Web Content Management and Workflow System

Efficient, Secure, and Dynamic Content & Workflow Management



Edited by **VINOD KUMAR GARG**

The demand for an all-encompassing platform that addresses both Web Content Management and Workflow Automation is growing rapidly. As businesses expand their digital footprints, they require solutions that simplify content publishing while facilitating process automation through workflows and dynamic forms. This Content Management System (CMS) provides a comprehensive solution, offering seamless integration of content management, workflow automation, dynamic forms, and data analytics in a user-friendly and secure interface.

Designed to cater to diverse organisational needs, the platform is a robust solution for Content Management and Workflow Automation. By providing streamlined content publishing tools, multi-language support, and customizable forms with validation, the platform empowers users with minimal technical expertise to manage and optimise their web presence. At the same time, its powerful workflow automation reduces manual processes, enhancing efficiency and accuracy.

Features

The platform boasts a wide range of powerful features that streamline Content Management, Workflow Automation and Data Analytics, providing a secure and user-friendly environment for organisations.

This platform delivers an intuitive, feature-rich, and secure environment for managing websites and workflows. It incorporates tools for content editing, form management, and role-based publishing. Its innovative architecture enables dynamic form creation with validation and workflow-based form movements, while the built-in analytics dashboard provides actionable insights from available datasets. This system is ideal for enterprises aiming to streamline content and process management, enhancing their digital presence while maintaining robust security.

- **Intuitive Dashboard:** The user-friendly interface allows easy navigation and management of both content and workflows, empowering non-technical users to maintain websites and processes with minimal training.
- **Responsive Themes:** Ensures that websites and forms are responsive, displaying beautifully across all devices and providing a seamless user experience for visitors and administrators alike.
- **Content Editing and Publishing Tools:** Equipped with a rich text editor, the platform supports multimedia content, scheduling, and automated publishing workflows, enabling teams to plan and execute content strategies efficiently.
- **Dynamic Form Creation with Validation:** The system allows users to design and customize forms with built-in validation rules. These forms can adapt dynamically to meet various data collection needs, ensuring accuracy, compliance, and consistency.
- **Workflow-Based Form Movement:** Supports multi-step approval processes, task assignments, and notifications through role-based workflows. This feature ensures smooth form(s) movement between users, based on their roles, reducing bottlenecks in form processing.
- **Multi-language Support:** The platform supports content creation and workflows in multiple languages, making it easy for organizations to reach global audiences with localized content.
- **Role-Based Publishing Controls:** Administrators can assign roles and permissions to manage content and workflows securely, ensuring that only authorized personnel can publish or modify critical content.
- **Analytics Dashboard from Dataset:** The customizable analytics dashboard allows users to process and visualize data collected from forms or website interactions. With built-in graphs and charts, decision-makers can track performance metrics and gain actionable insights in real-time.
- **Built-in SEO Tools:** Integrated SEO features, such as meta-tagging, SEO-friendly URLs, and keyword analysis, enable users to optimize content effectively, boosting search engine rankings and online visibility
- **Social Media Integration:** Simplifies the process of sharing content across multiple social media platforms, expanding the organization's reach and engagement with audiences.
- **Pre-designed Templates:** Ready-to-use templates accelerate website and form creation, allowing users to launch projects quickly without the need for coding expertise.
- **Security Audits:** Regular audits and vulnerability checks are conducted to protect the platform from potential threats like Cross-Site Scripting (XSS) and SQL Injection, ensuring data security and platform integrity.

Technologies Used

The platform is built using modern technologies that ensure flexibility, security, and high performance:

Vivek Verma
Dy. Director General & SIO
vivek.verma@nic.in

Anoop Kumar Jalali
Sr. Technical Director & HoD
anoop.jalali@nic.in

Lokesh Dwivedi
Scientist D
lokesh.dwivedi@nic.in

- **Back-end:** The content and workflow management functionalities are powered by a high-performance framework built on Django and Python. These core technologies provide scalability, flexibility, and strong security, enabling the platform to support business-specific modules and customization.
- **Front-end:** Responsive design and seamless user experience are delivered through modern front-end frameworks, including HTML, CSS, SCSS, JavaScript, and jQuery. This ensures that both web content and forms are interactive and accessible on all devices.
- **Database: A** scalable relational database (e.g., MySQL or PostgreSQL) manages content, form data, and workflows efficiently. It ensures fast data retrieval even while handling large datasets, ensuring smooth performance under heavy traffic.
- **Security:** The platform employs multiple layers of security, including SSL encryption, role-based access controls, and input validation. These measures safeguard sensitive data and protect the platform from external threats.

Software Architecture

The platform's software architecture emphasizes flexibility and scalability, with a range of innovative features like:

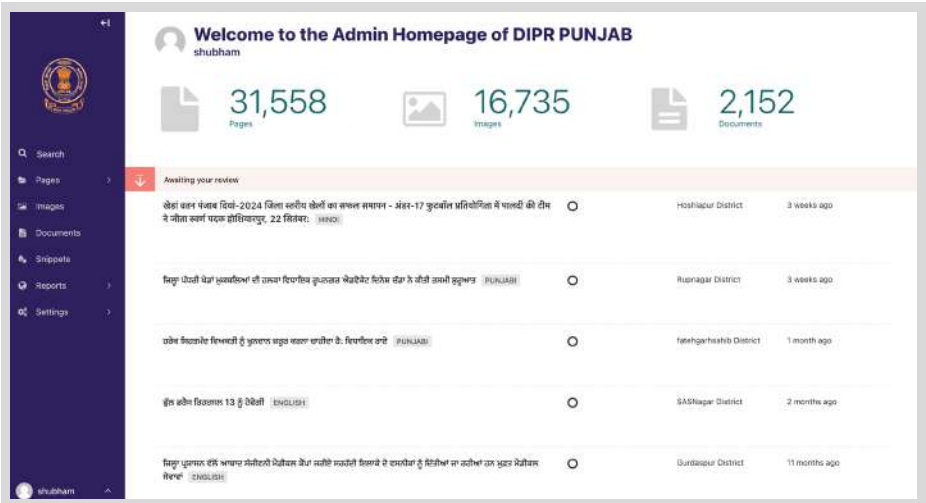
- **Modular Design:** The modular structure allows for independent management of content, workflows, and analytics. This architecture supports additions and removals of features without disrupting the core system, ensuring adaptability to evolving business needs.
- **Workflow Automation:** The built-in workflow engine allows organizations to automate multi-step approval processes and task management, significantly reducing manual intervention and improving efficiency.
- **Dynamic Form Builder:** The form builder allows users to design forms dynamically, with built-in validation logic that ensures data accuracy and compliance with organizational standards.
- **Microservices Integration:** Media management, analytics dashboards, and other components are managed by microservices, that can be scaled independently from the core platform. This ensures optimal performance even as the organization's needs grow.
- **Headless CMS Option:** For organizations seeking to deliver content across various platforms, including mobile apps and IoT devices, the system can function as a headless CMS, serving content via APIs to front-end platforms.

Benefits/Impact

By leveraging these cutting-edge features, the platform delivers following benefits:

- **Faster Development and Deployment:** Pre-designed templates, dynamic form creation, and workflow automation tools reduce the time required for both development and deployment, allowing businesses to launch projects quickly and efficiently.
- **Ease of Use:** The intuitive interface allows non-technical users to manage web content, create dynamic forms, and automate workflows, reducing the reliance on IT teams.
- **Streamlined Workflows:** Automated form workflows improve task management, ensuring that forms are routed correctly for approvals reduces delays caused by manual processes.
- **Customization:** The platform allows users to tailor forms and workflows to meet specific business needs, providing the flexibility to create custom solutions.
- **Enhanced Analytics:** The analytics dashboard provides real-time tracking of form submissions, website traffic, and user interactions, offering valuable insights that inform business decisions and optimize operations.
- **Improved SEO and Social Reach:** With built-in SEO tools and social media integration, organizations can increase their content's visibility across search engines and social platforms, improving audience engagement.
- **Security and Stability:** Regular security audits, role-based access controls, and input validations ensure that the platform remains secure and stable, providing peace of mind for organizations managing sensitive data.

▼ Fig 8.1 : Screenshot of DIPR Punjab Admin Dashboard featuring a Comprehensive Web Content Management and Workflow System



NIC Punjab has done excellent work in implementation of various e-Governance projects in state of Punjab including Comprehensive "Web Content Management and Workflow System". This platform offers an intuitive, feature-rich, secure environment for managing websites and workflows and helps in rapid development of web Portals..

This innovative architecture supports various features like dynamic form creation with validation and workflow-based form movements, while its built-in analytics dashboard offers insights from available datasets. It helps various departments looking to streamline content and process management while enhancing their digital presence.

I would like to place on record my appreciation for the effective and continuous ICT Support provided by NIC Punjab to the Government of Punjab and hope that similar efforts will continue in future for bringing Government and Citizen closer through digital empowerment.

Girish Dayalan, IAS
Special Secretary-cum-Director, Department of Governance reforms & Public Grievances

Way Forward

To ensure the platform remains robust and future-proof, upcoming enhancements include regular advanced security audits to safeguard against emerging threats, AI-driven analytics for real-time insights into content and form data, expanded workflow automation with predictive features, and enhanced API integration to support seamless connections with third-party tools, mobile apps, and IoT devices, ensuring scalability and adaptability.

Contact for more details

Anoop Kumar Jalali
Senior Technical Director & HoD
Room No 29, Punjab Civil Secretariat
Sector - 1, Chandigarh - 160001
Email: anoop.jalali@nic.in, Phone: 0172-2742829

e-Urvarak

A Comprehensive Digital Governance Solution

Edited by **NEETA CHAUHAN**

e-Urvarak/ Integrated Fertilizer Management System (iFMS) is a comprehensive and all-inclusive technology solution designed to streamline, monitor, and control the end-to-end flow of fertilizer disbursal and subsidy management system across the country.

The system captures sale of fertilizer at retail point using Point of Sale (PoS) devices and based on the actual sale, the subsidy is disbursed to the companies. This integrated system provides real-time visibility and coordination between multiple supply chain processes, including requirement gathering, supply plan, procurement, production, stock management, distribution, e-PoS-based Sales, buyer complaints, quality control and other value-added services.

e-Urvarak is a comprehensive system where all fertilizer supply chain activities converge and data is interconnected and managed through a single platform. By leveraging advanced technologies, the system enhances collaboration between Central and State Governments, Fertilizer manufacturers, stock points, dealers, and end-point buyers. This integration allows the Government to optimize distribution while reducing costs, improving efficiency, and authorizing each and every fertilizer sale via Aadhaar-based Biometric authentication.

The system is critical in ensuring timely procurement of raw materials, efficient production scheduling, maintenance of optimal stock levels, and quick and smooth sale, all while maintaining full monitoring and control of the Department of Fertilizers. Real-time data and insights enables the department to respond quickly to changes in demand, disruptions in the supply chain, or any other unforeseen events, ensuring continuous supply and minimizing downtime.

In addition to operational efficiency, the system offers robust subsidy disbursement-related capabilities, allowing the department to track, manage budgets, verify and process subsidy bills, which amounted to almost INR 2 Lakh Crores in 2023-24.

e-Urvarak represents an advancement in supply chain governance and subsidy claim processing in the country. Boasting a user base exceeding 3.5 lakh (Govt. and Private) and facilitating transactions for more than 12 crore fertilizer buyers nationwide, e-Urvarak has emerged as a cornerstone of efficiency and transparency in the critical sector. The system regulates the nationwide production, movement and e-PoS sale of over 640 LMT fertilizer in over 18 crore transactions while processing the subsidy claims on a weekly basis.

The Integrated Fertilizer Management System (iFMS) has revolutionized fertilizer subsidy governance in India by ensuring transparency, efficiency, and accountability. Through real-time tracking and Direct Benefit Transfer (DBT), it links subsidies to actual fertilizer sales, preventing misuse and ensuring timely authorised access for farmers. With data-driven decisions, iFMS enables better planning and timely distribution of fertilizers, empowering farmers as intended beneficiaries and promoting the Government's commitment to using technology to improve service delivery and transparency.

Jagat Prakash Nadda
Hon'ble Minister of Health & Family Welfare and Chemicals & Fertilizers

e-Urvarak enables control, facilitation and capture of transactional data starting from:

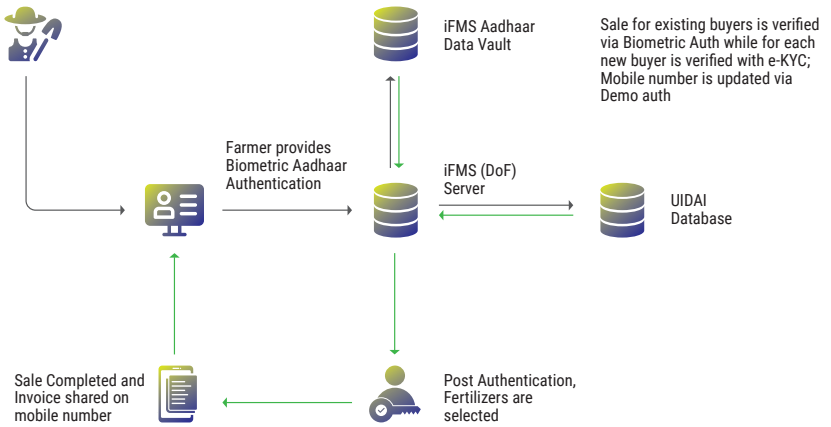
- Gathering of district-wise seasonal fertilizer requirements from State Agriculture Governments; finalization of the monthly supply plan by the Department of Fertilizers (DoF) where each company is assigned production and supply targets
- Procurement of Raw Materials/Finished Goods by Fertilizer Manufacturers via different modes as per the Supply Plan under regularization and monitoring by DoF.
- Production of fertilizers based on demand, capacity and targets by private, cooperative and PSU fertilizer manufacturers where the daily pro-

V. Uday Kumar
Dy. Director General
uday.kumar@nic.in

Aseem Gupta
Sr. Technical Director
aseemg@nic.in

Ritika Gupta
Scientist- D
ritika.gupta@nic.in

Ashutosh Tiwari
Scientist- D
ashutosh.t@nic.in



▲ Fig 9.1 **POS Sale Process**

▲ Fig 9.3 **e-Urvarak: Technology Ecosystem**

duction, opening balance and MRP is monitored

- Imports of critical fertilizers and raw materials by State Trading Enterprises as per directions of DoF
- Fertilizer Movement from plant and ports by rail or road to district warehouses in accordance with the monthly supply plan where DoF subsidizes freight cost of the movement
- Distribution from district warehouse to wholesalers, from wholesalers to retailers based on localized requirements
- Quantity and Quality-based certification of Fertilizer arriving in States at NABL/State Labs
- e-PoS Sales based on Aadhaar authentication/e-KYC from Retailers to Buyers to provide subsidy benefits directly to the buyers

Standout features for e-Governance

- **Demand and Supply Chain Management:** Aligning production schedules, and stock levels with anticipated demand across the country.
- **Authorized Transactional/ Sale Data Collection:** secured by Aadhaar Authentication, e-PoS at all retail points of data collection
- **Real-Time Data Dashboard/ MIS Reports:** Generates detailed reports and dashboards that monitor key supply chain performance indicators (KPIs), such as stock levels, sale analysis, subsidy expenditure, and custom KPIs as per Department requirements.
- **Comprehensive Subsidy Management:** Streamlines the subsidy disbursement process, making it faster and more accurate by integrating data from multiple stakeholders, including manufacturers, wholesalers, and retailers and linking sales to farmers directly with subsidy claims, it reduces delays in subsidy processing and payments to fertilizer companies.
- **API Based Integration with External Stakeholders/Govt Portals:** Real-time data sharing between e-Urvarak and external stakeholders, which enables quick and informed decision-making, accurate data collection, data sharing, cost efficiency, and scalability while ensuring compliance and visibility.

Technologies Used

IFMS Application Stack consists of Open Source software and tools at each level:

- Front End – HTML 5, CSS
- Mobile – Angular 10, Android 9.1, Cordova 11
- Backend – Spring MVC 5.1.0
- Data – PostgreSQL 9.3
- Infra – VMware ESXi 7.0.0

Innovations Applied

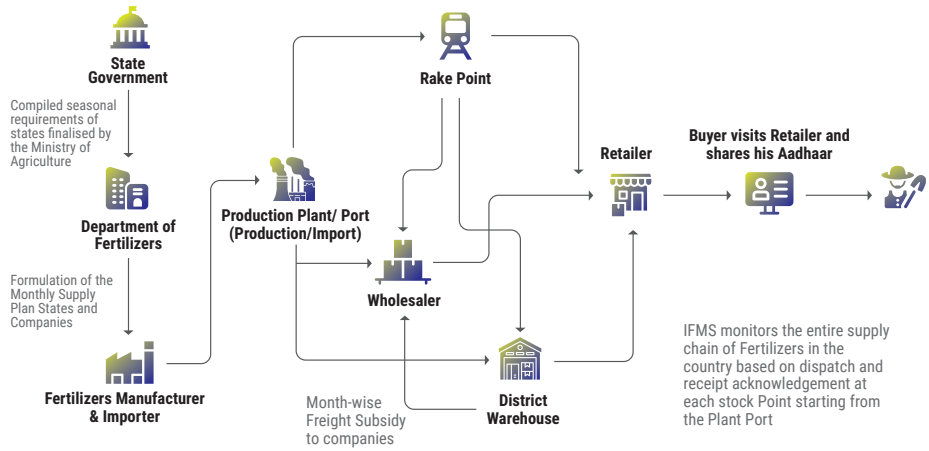
The flow has multiple feedback loops (dispatch and its acknowledgements) between various stakeholders, indicating ongoing communication and data exchange to ensure efficient stock management, tracking, and reporting. The system also ensures that subsidies are directly linked to authenticated purchases for preventing misuse.

The diagram reflects the integration of a digitized value chain where stock movements and transactions are continuously monitored, allowing for efficient fertilizer distribution across the country.

Way Forward

iFMS has been the catalyst for transformation within the fertilizer sector. iFMS has enabled the Department of Fertilizers to foster practices that excel in OOMF, SDG, and DGQi goals set by the government. The system's agile design is easily adaptable to changing requirements, allowing for rapid development and deployment of new functionalities enabling the introduction of Fermented Organic Matter, Drones, Community Radio, Digital PMKSKs to name a few and new modules like monitoring of Imports in the coming future. By leveraging advanced data analytics, iFMS provides actionable insights derived from the captured data, facilitating informed decision-making and continuous optimization of the supply chain and governance.

▼ Fig 9.2 **Digitalised Supply Chain**



Contact for more details

Aseem Gupta
Senior Technical Director
National Informatics Centre, A-Block, CGO Complex
Lodhi Road, New Delhi - 110003
Email: aseemg@nic.in, Phone: 011-23070087

eGov Products & Services

Online Portal for Government Recruitments

Digital Gateway to Public Services and Opportunities in Puducherry UT

Edited by **NISSY GEORGE**

In Puducherry UT, NIC is playing a pivotal role in implementing various ICT initiatives for delivering government services which has revolutionized various aspects of public administration, including the recruitment process. The integration of e-governance in government recruitments has introduced transparency, efficiency, and accessibility, transforming the traditional bureaucratic procedures. Gone are the days where the departments spend lot of time in collecting manual application forms and scrutinize the eligibility and issue hall tickets. Here comes, a much modernized approach which has modernized the complete gamut of activities. NIC, Puducherry has designed and developed a generic recruitment portal for all the Government departments to utilize the services for the end-to-end support.

Features

Puducherry UT is very unique with a composition of having diverse regional classification with languages of Tamil, Malayalam and Telugu. Accordingly, the Government has to consider all the precautions of covering diverse requirements.

The portal is developed by NIC, Puducherry UT and being used by various Government Departments with minimal configuration, the application can be made live to receive the online application and hosting multiple recruitments with less code with or without change requirement. The application is developed in such a way that it is mobile responsive and Quality certified by and quality certified by NIC HQ and incorporating all security guidelines and fulfilling all Quality Assurance checklist.

V. Gopi Swaminathan
Sr. Technical Director & SIO
gopi.pon@nic.in

S. Arulraj
Sr. Technical Director
s.arulraj@nic.in

Sheik Rasheed
Scientist - D
sheik.rasheed@nic.in

Government recruitments are essential for maintaining an efficient, effective, and responsive public administration that serves the needs of the citizens. Government recruitments have challenges such as lengthy hiring processes, bureaucratic delays, and the need for continual updates to the applicants keep pace with technological advancements. Efforts to improve these processes include streamlining application procedures, preparation processes for the conduct of the examination.

Streamlined Application Processes

One of the primary benefits of the portal is the digitization of the application process. Government departments of Puducherry host their notifications followed by finalizing the application format in the portal where candidates can submit applications, upload documents, and track their application status. This digital approach eliminates the need for physical paperwork, reduces processing time, and minimizes human error.

Enhanced Transparency and Accountability

The portal ensures transparency throughout the recruitment process. It allows candidates to view detailed information about the vacancies of the posts, eligibility criteria, and application deadlines. Moreover, the entire selection process, from application submission to final shortlisting, can be tracked online. This transparency promotes a fair and merit-based selection process.

Efficient Screening and Shortlisting

The automation provided in the initial screening based on the pre-defined eligibility criteria filters the eligible candidates. Similarly, the evaluation data provided by OMR will be utilized by the exam cell for shortlisting of candidates as per the reservation criteria. The system Based on the score, the system automatically assigns the rank, ensuring that only, ensuring that only eligible candidates are considered. This automation speeds up the initial screening process as well as merit list preparation after evaluation, allowing exam cell to focus on more critical evaluation stages.

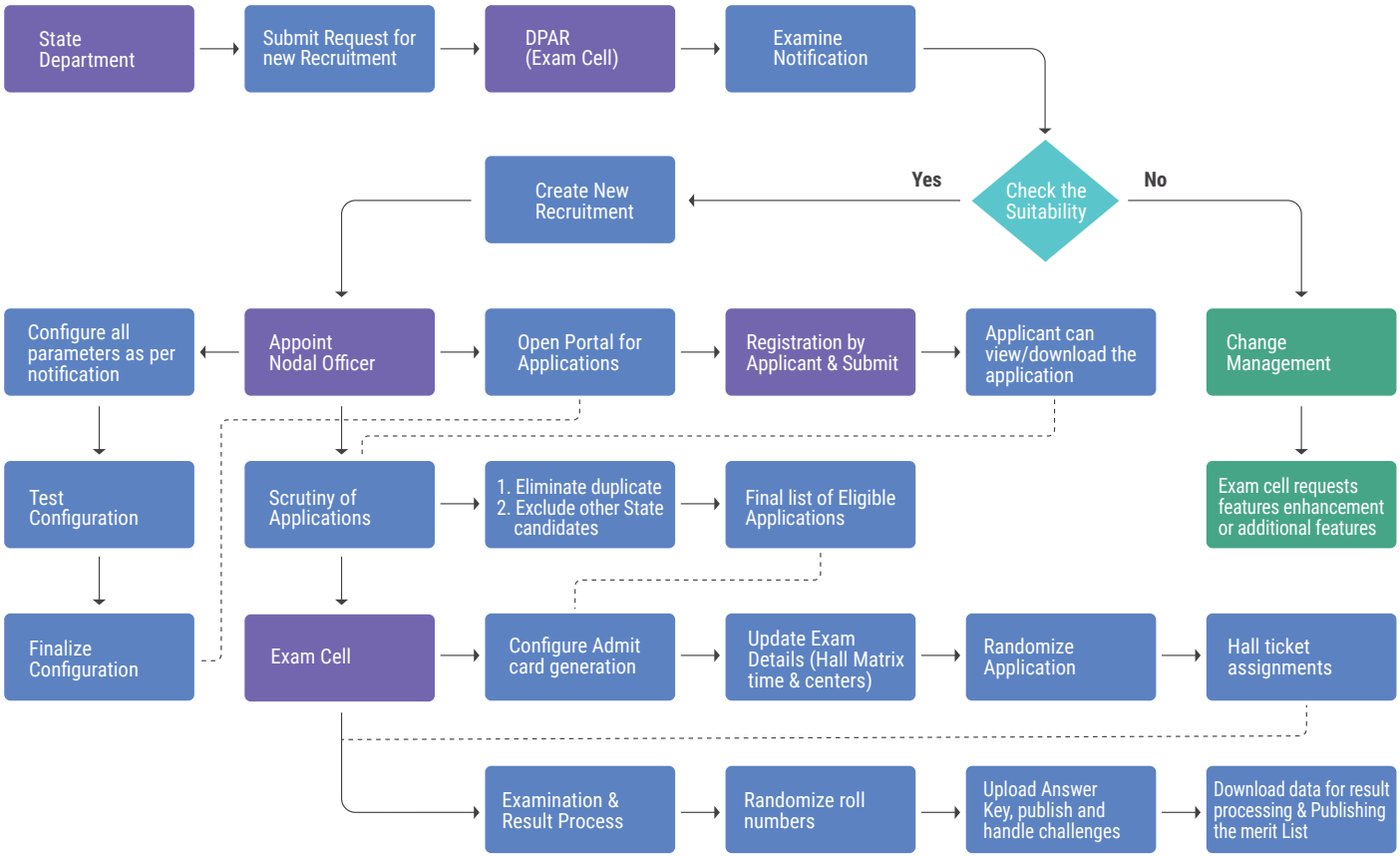
Improved Communication and Notifications

The portal facilitates better communication between the government and applicants. Automated email and SMS notifications keep candidates informed about important updates, such as examination dates, interview schedules, and application status. This continuous communication enhances the candidate experience and ensures they remain engaged throughout the recruitment process.

Data-Driven Decision Making

The portal enables the collection and analysis of vast amounts of data related to the recruitment process. Governments can use this data to make informed decisions about recruitment strategies, identify areas for improvement, and predict future recruitment needs. Data analytics can also help in region wise, qualification wise, gender wise aspirants assessing the effectiveness of recruitment arrangements and optimizing resource allocation.

The details of eligible candidates are shared with the agency conducting the Physical Endurance Test (PET). Additionally, the agency provides



▲ Fig 10.1 **Application Processes**

the list of eligible candidates after the test, along with the marks, for awareness.

Equal Opportunity and Accessibility

The portal features are accessible to a wider audience, including those with disabilities. It ensures that job information and application processes are designed to be user-friendly and inclusive. This equal access helps in attracting a diverse pool of candidates, promoting equal opportunity in government employment.

Cost and Time Efficiency

Digitizing the recruitment process through e-governance significantly reduces costs associated with printing, mailing, and manual processing of applications. It also saves time for both candidates and Government departments. Faster processing times allow vacancies to be filled more quickly, ensuring that public services remain uninterrupted by staffing shortages.

Year	No. of Recruitment	No. of Application Received
2022	37	1,47,609
2023	7	40,563
2024	12	43,866
Total	56	2,32,038

▲ Fig 10.2 : Brief Statistics on number of Recruitments and number of Applications received for the past 3 years

Enhanced Security and Confidentiality

E-governance systems are equipped with robust security measures to protect the confidentiality and integrity of candidate information. Secure online platforms ensure that personal data is encrypted and stored safely, reducing the risk of data breaches. This focus on security and helps in building trust among applicants. It also complies to the Aadhaar and DPDP Acts.

The recruitment portal has brought significant improvements to government recruitment processes. By leveraging digital technologies, the Government has achieved a transparent, efficient, and accessible recruitment system. This not only enhances the candidate experience but also promotes merit-based recruitments. As e-governance continues to evolve, its influence on government recruitment is expected to increase, further streamlining and democratizing the recruitment process.

Conclusion

The recruitment portal of Puducherry UT has provided significant benefits to the government in filling up vacant posts efficiently and transparently. Firstly it has streamlined the recruitment process by automating application online registration, scrutinizing, and candidate shortlisting, reducing manual labor and time spent. The portal enables real-time tracking and management of applications, allotment of exam halls, hall tickets and attendance sheets ensuring a smoother workflow.

Secondly, it enhances transparency and fairness by using standardized criteria for accepting the applications from candidates, minimizing human errors. This builds trust in the recruitment process.

Finally, the portal can reach broader, diverse regions allowing candidates from Puducherry UT regions to apply easily. This ensures that the government can receive registrations from across the UT, improving the quality of public service delivery in recruitment.

Contact for more details

V. Gopi Swaminathan
Senior Technical Director & SIO
NIC Puducherry State Centre
A Block, 4th Floor, Chief Secretariat
Pondicherry, Puducherry UT - 605001
Email: sio-pon@nic.in, Phone: 0413 – 2336675

Technology Update

AI Powered Cyberattacks

A key technology in enterprise IT toolbox becoming a weapon of cybercriminals

Edited by **MOHAN DAS VISWAM**

Modern Artificial Intelligence, powered by Machine Learning, is decorating the position that Computers occupied during the latter half of the last century. While the common man looked at both with wonder, experts and enthusiasts explored them to extract their potential for benefit of mankind. As the technologies matured, adversaries boarded the bandwagon to reap the benefits of the sweat on other's brows. Presently, threat actors utilize algorithms and techniques powered by AI to automate, accelerate, and enhance various phases of cyberattacks.

Characteristics of AI-Powered Cyberattacks

AI-powered cyberattacks have the following five main characteristics

Attack automation

Until very recently, most cyberattacks required significant hands-on support from a human adversary. However, growing access to AI and generative AI-enabled tools is allowing adversaries to automate attack research and execution.

Efficient data gathering

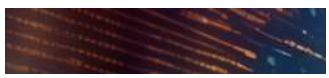
The first phase of every cyberattack is reconnaissance where the attackers search for targets, exploitable vulnerabilities, and assets that could be compromised. AI can automate or accelerate much of this legwork, enabling adversaries to drastically shorten the research phase and potentially improve the accuracy and completeness of their analysis.

Customization

One of the key capabilities of AI is data scraping, where the information from public sources, such as social media sites and corporate websites, is gathered and analyzed. In the context of a cyberattack, this information can be used to create hyper-personalized, relevant, and timely messages that serve as the foundation for phishing attacks and other attacks that leverage social engineering techniques.

A. Ramadevi
Scientist- D
rama.a@nic.in

AI-powered cyberattacks leverage AI and ML algorithms and techniques to automate, accelerate, and enhance various phases of a cyberattack. This includes identifying vulnerabilities, deploying campaigns along identified attack vectors, advancing attack paths, establishing backdoors within systems, exfiltrating or tampering with data, and interfering with system operations. The adaptability of AI algorithms to learn and evolve over time enables the threat actors to avoid detection by creating attack patterns that security systems can't distinguish.



Reinforcement learning

AI algorithms learn and adapt in real time. In the same way that these tools continuously evolve to provide more accurate insights for corporate users, they also evolve to help adversaries improve their techniques or avoid detection.

Employee targeting

Similar to attack customization, AI can be used to identify individuals within an organization that are high-value targets. These are people who may have access to sensitive data or broad system access, may appear to have lower technological aptitude, or have close relationships with other key targets.

Types of AI-Powered Cyberattacks

There are multiple types of cyberattacks enabled by AI and machine learning. Some include:

AI-Driven Social Engineering Attacks

Social engineering attack aims to manipulate human behavior to fulfill a purpose, such as sharing sensitive data, transferring money or ownership of high-value items, or granting access to a system, application, or database. AI driven attacks leverage AI algorithms to assist in the research, creative conception, and execution of a social engineering attack. It can identify ideal attack targets and develop online presence to communicate with them so that attention is generated through a realistic scenario.

AI-Driven Phishing Attacks

These attacks use generative AI to create highly personalized and realistic emails, SMS messages, phone communication, or social media outreach to achieve a desired result. AI-powered ChatBots can support interactions that make them nearly indistinguishable from humans. In most cases, the goals of these attacks are the same as that of a social engineering attack: to access sensitive information, gain access to a system, receive funds, or prompt a user to install a malicious file on their device.

DeepFakes

A DeepFake is an AI-generated video, image, or audio file that is meant to deceive people. DeepFakes commonly appear on the internet to enter-

tain and confuse. However, they can also be used more maliciously as part of disinformation campaigns, "fake news," smear campaigns of high-profile individuals, or cyberattacks. Attackers sometimes use existing voice/video footages of one person to create a doctored footage and instruct another person to take specific actions, such as transferring funds or granting system access.

Adversarial AI/ML

Adversarial AI or ML is a process used by an attacker to disrupt the performance or decrease the accuracy of AI/ML systems through manipulation or deliberate misinformation. Attackers use several adversarial AI/ML techniques that target different areas of model development and operation. Poisoning attacks, Evasion attacks and Model tampering are typical methodologies employed by adversaries to compromise the system and produce inaccurate outputs.

Malicious GPTs

A generative pre-trained transformer (GPT) is a type of AI model that can produce intelligent text in response to user prompts. A malicious GPT refers to an altered version of a GPT that produces harmful or deliberately misinformed outputs. In the context of cyberattacks, a malicious GPT can generate attack vectors (such as malware) or supporting attack materials (such as fraudulent emails or fake online content) to advance an attack.

Ransomware Attacks

AI-driven ransomware attacks leverages AI to improve its performance or automate some aspects of the attack path such as research targets, identify system vulnerabilities, or encrypt data. AI can also be used to adapt and modify the ransomware files over time, making them more difficult to detect with cybersecurity tools.

Mitigation of AI-Powered Cyberattacks

AI technology makes it potentially easier and faster for cybercriminals to carry out cyberattacks, effectively lowering the barrier to entry for some actors and increasing the level of sophistication of established players. AI-powered attacks are often more difficult to detect and prevent than attacks that use traditional techniques and manual processes, making them a significant security threat to all companies. Recommendations across four key categories to protect and defend against AI-powered cyberattacks are given below:

Regular Security Assessments

Deploying a comprehensive cybersecurity platform that offers continuous monitoring, intrusion detection, and endpoint protection is the preliminary step towards mitigation of any cyber-attacks. Baselines may be developed for system activity and user behavior to serve as a standard of comparison for future activity and establish user and entity behavior analytics (UEBA). Analyzing systems for abnormal user activity or unexpected changes within the environment may indicate onset of an attack. Real-time analysis of input and output data for the AI/ML system may be implemented to protect against adversarial AI attacks.

Incident Response

An incident response plan that outlines the procedures, steps, and responsibilities in the event of a cyberattack may be put in place within the organization. The plan should be capable of determining the type and severity when a security incident occurs. Restrict system use and operation to limit the spread and impact of the attack. Also execute remedial measures as envisaged in the plan to restore system usage. Patch the vulnerabilities detected and implement additional security measures to prevent similar attacks in the future and safeguard against a wider range of threats.

Awareness Training

Human beings being the weakest link in the cyber security chain, regular and updated training may be imparted to all stakeholders to prevent all kinds of cyber-attacks. Specific modules focusing on AI-powered attacks may be included in the training schedules. Teams may be trained to recognize suspicious activities, behaviours and outputs related to AI/ML-based systems. Awareness may be created on how realistic and convincing AI-enabled attack techniques can be, especially when it relates to social engineering techniques and DeepFake chat and audio-based attacks.

Use of AI-Powered Solutions

Organizations may use AI itself to counter AI-based attacks. AI-enabled tools may be leveraged to automate security-related tasks, such as monitoring, analysing datasets, identifying attack patterns, prevention, patching, and remediation. System parameters that alert teams to high-risk activity may be developed to device and prioritize the responses.

Conclusion

Organizations need to keep up to date and stay informed about the latest research and developments in the space of AI-powered security attacks and ways to prevent/remediate the exploits. Perform regular security audits to detect security vulnerabilities and make sure your infrastructure is compliant and secure. Proactively take measures to prevent these advanced security exploits. Invest in generative AI-powered security tools to take advantage of the benefits they offer in combating the fast-evolving cyber threats. Provide adequate training to your teams and create awareness about AI security risks and ways to take advantage of them securely.

Contact for more details

State Informatics Officer
NIC, Tamil Nadu State Centre
E2-A, Rajaji Bhavan, Besant Nagar
Chennai, Tamil Nadu 600090
Email: sio.tn@nic.in, Phone: 044-24917850

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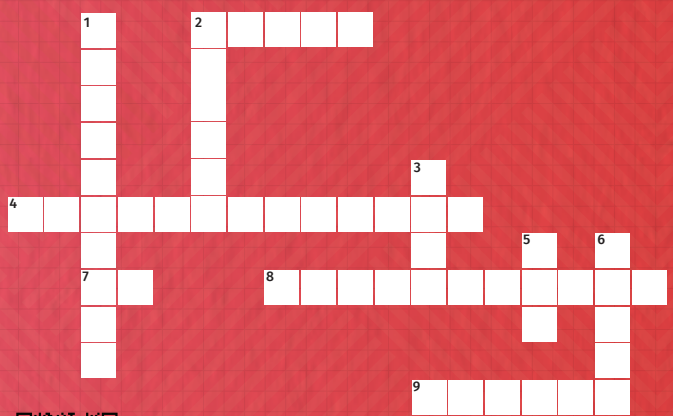

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2. Flagship Haryana initiative for proactive service delivery
4 F.ramework enabling modular design in software like SATHI
7. Technology that powers predictive governance and chatbots
8. Collaboration tools for government file management
9. For faster development and deployment of digital platforms

Down

1. Ensures secure record-keeping in land records and contracts
2. Website hosting service ensuring scalability and security
3. National e-Vidhan Application for legislative digitization
5. Used in disaster management for mapping and planning
6. Aadhaar-enabled Public Distribution System for ration distribution

Technology Update

Mitigating Cybersecurity Misconfigurations

Exploring Common Cybersecurity Misconfigurations and Effective Techniques for Securing Digital Infrastructure

Edited by **MOHAN DAS VISWAM**

In today's rapidly evolving cybersecurity landscape, even a single misconfiguration can open up an entire organization to a vast array of vulnerabilities. Security misconfigurations occur when system settings are improperly adjusted or essential security protocols are omitted, leaving systems open to attacks. These configuration errors often happen in cloud environments, network setups, applications, or databases, each representing potential entry points for cyber threats. With misconfigurations cited as one of the leading causes of data breaches and unauthorized access incidents, they are a significant area of concern in digital security.

This risk is especially pronounced in cloud environments, where the growing complexity and integration of services can introduce a web of configurations. Cloud misconfigurations, such as open storage buckets, overly permissive access controls, and inadequate encryption, often go undetected until exploited. For organizations that rely on cloud services to support remote work, customer engagement, and core business operations, the potential for security misconfigurations grows exponentially with each new service or added application.

As cloud adoption accelerates, understanding and addressing security misconfigurations is crucial. Organizations of all sizes must be proactive in managing configurations to protect their infrastructure and data from potential threats. This article highlights the ten most common misconfigurations, as identified by the NSA and CISA, and offers practical techniques to mitigate these risks, empowering organizations to build resilient cybersecurity defenses.

R. Bindu Madhavi
Scientist- D
r.bindumadhavi@nic.in

Cybersecurity landscape is an ever-evolving battleground in this age of rapid digital transformation. Organizations must stay one step ahead of adversaries to protect digital infrastructures effectively. The National Security Agency and Cybersecurity and Infrastructure Security Agency have released cybersecurity advisory to highlight the most common cybersecurity misconfigurations and techniques to mitigate them.

Default Configurations of Software and Applications

When software and applications are installed, they often come with default settings designed for ease of use. Unfortunately, these pre-set configurations are not always optimized for security. Default settings may include weak passwords, unnecessary features, open ports, enabled guest accounts, excessive permissions, publicly accessible management interfaces, and insecure SSL/TLS configurations.

Mitigation: The first step in securing software and applications is to change all default usernames and passwords immediately after installation. Disable any unnecessary features and services, close unneeded ports, and tighten file permissions. Management interfaces should never be publicly accessible without additional security layers, such as IP restrictions or VPNs.

Improper Separation of User and Administrator Privileges

Allowing users to have administrative privileges unnecessarily can lead to serious security risks. This misconfiguration occurs when users are granted more access than required for their roles, or when administrators do not properly secure their accounts. Such accounts often have wide-reaching access, making it easier for attackers to move laterally across the network with a compromised credential.

Mitigation: Enforce the principle of least privilege (PoLP), ensuring that users only have the access they need to perform their job functions. Administrators should use dedicated, secured accounts for system administration tasks and avoid using them for everyday activities. Regular reviews of access permissions are essential to ensure that roles are correctly assigned.

Insufficient Internal Network Monitoring

Without sufficient monitoring of internal network activities, suspicious events can go unnoticed for extended periods, allowing attackers to operate undetected. This lack of oversight can lead to the compromise of sensitive data, malware infections, or unauthorized access to systems, which can remain unaddressed until it's too late.

Mitigation: Deploy comprehensive internal monitoring tools that provide real-time alerts for suspicious activities. Network traffic should be continuously analyzed for abnormal patterns, and any anomalies should be investigated immediately. Organizations should implement intrusion detection and prevention systems (IDPS) to ensure prompt responses to potential threats.

Lack of Network Segmentation

Network segmentation is a critical security

measure that divides a network into isolated segments to prevent attackers from moving freely across the network. Without proper segmentation, attackers who gain access to one part of the network can easily move to other systems, increasing the risk of data breaches and insider threats.

Mitigation: Segment the network based on roles and functions, ensuring that sensitive areas (such as databases or production environments) are separated from user and public-facing areas. Utilize firewalls, VLANs, and access control lists (ACLs) to enforce strict communication rules between network segments. Implement zero-trust principles where every network access request is verified, regardless of origin.

Poor Patch Management

Patch management is crucial for addressing known vulnerabilities in software and systems. However, many organizations fail to apply patches in a timely manner, leaving their systems vulnerable to attacks. Unpatched systems are often easy targets for attackers using publicly available exploits.

Mitigation: Implement an automated patch management process that regularly checks for updates and applies patches as soon as they are available. Prioritize patches based on the severity of vulnerabilities and maintain an accurate inventory of all software and systems to ensure that nothing is overlooked. Organizations should also avoid using unsupported software or hardware, as they no longer receive security updates.

Bypass of System Access Controls

Attackers can bypass access controls through methods such as brute force attacks, phishing, or using stolen credentials. This allows them to gain unauthorized access to systems and sensitive data. Weak access control mechanisms, especially in third-party applications, often exacerbate this risk.

Mitigation: Implement strong password policies that require complex, unique passwords, and enforce multi-factor authentication (MFA) across all accounts. Regularly audit and update access controls to ensure they remain effective against evolving threats. Centralized identity management solutions can help enforce consistent access control policies across all systems and applications.

Weak or Misconfigured Multi-Factor Authentication (MFA)

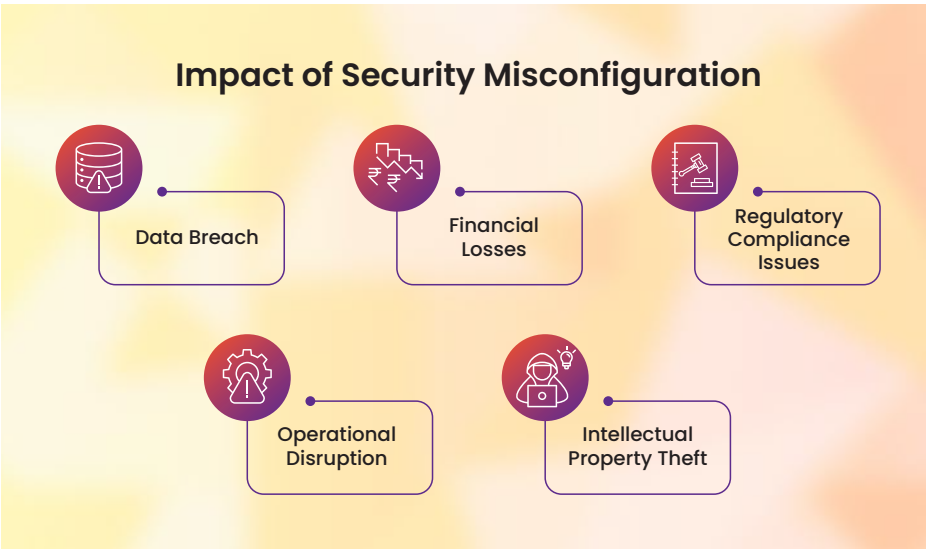
While MFA provides an additional layer of security, misconfigurations or weak implementations can still leave systems vulnerable to attacks. Allowing insecure fallback options, such as SMS-based authentication, or not enforcing MFA across all user accounts, reduces its effectiveness.

Mitigation: Ensure that MFA methods are robust and resistant to common attacks such as phishing or SIM swapping. Organizations should consider using more secure options like app-based authenticators or hardware tokens. MFA should be enforced for all users, particularly for privileged accounts and remote access.

Insufficient Access Control Lists (ACLs) on Network Shares and Services

ACLs define who can access certain resources on a network. If not properly configured, unauthorized users may gain access to sensitive data, modify files, or even take control of systems. Poor ACL configurations on network shares are a common target for attackers.

Mitigation: Carefully configure ACLs to restrict access to sensitive resources. Ensure that only authorized users can access network shares and services, and regularly audit ACL settings for vulnerabilities. Use role-based access control (RBAC) models to simplify the management of permissions.



Poor Credential Hygiene

Many organizations suffer from poor credential hygiene, including the use of weak passwords, password reuse, and storing passwords in plaintext. These practices make it easier for attackers to gain access to systems, especially if MFA is not enabled.

Mitigation: Enforce strong password policies, requiring complex and unique passwords for each account. Implement a password management solution to help users securely store and manage their credentials. Regularly rotate passwords, and never store them in plaintext.

Unrestricted Code Execution

Unrestricted code execution occurs when attackers can run arbitrary code on a target system. This can happen through vulnerabilities such as buffer overflows, SQL injection, or cross-site scripting (XSS). Attackers often exploit system drivers or use scripting languages to execute malicious activities without triggering security alerts.

Mitigation: Regularly update and patch all software to prevent exploitation of known vulnerabilities. Use web application firewalls (WAFs) and input validation to protect against SQL injection and XSS attacks. Restrict the use of executable files and scripting languages to trusted sources, and regularly monitor for suspicious activities related to code execution.

Conclusion

Misconfigurations are among the leading causes of cybersecurity breaches Addressing them proactively can significantly reduce the risk of compromise. By following best practices such as enforcing access control, implementing MFA, establishing effective patch management, and configuring ACLs properly, organizations can bolster their defenses against cyberattacks. Continuous monitoring, regular audits, and proactive configuration management are essential steps in maintaining robust security configurations.

Ultimately, mitigating cybersecurity misconfigurations requires vigilance and a proactive approach to manage digital infrastructure effectively. Organizations that prioritize security settings and take preventative measures are better equipped to safeguard their networks and data from evolving threats. This proactive stance not only protects vital information but also enhances an organization's reputation, ensuring trust and reliability among its clients and stakeholders.

Contact for more details

State Informatics Officer
NIC, Tamil Nadu State Centre
E2-A, Rajaji Bhavan, Besant Nagar
Chennai, Tamil Nadu - 600090
Email: sio.tn@nic.in, Phone: 044-24917850

Technology Update

Securing CI/CD Pipelines

Addressing the Unique Challenges in DevOps

Edited by **MOHAN DAS VISWAM**

As organizations increasingly adopt DevOps practices, Continuous Integration and Continuous Delivery (CI/CD) pipelines have become essential for streamlining the software development lifecycle. However, this fast-paced development environment is not without its risks. A secure CI/CD pipeline is critical to ensuring that the rapid deployment of code doesn't expose your systems to vulnerabilities or malicious attacks. In this paper, we will explore the unique security risks inherent to CI/CD pipelines and offer strategies for mitigating them.

Understanding the CI/CD Pipeline

The CI/CD pipeline is a development methodology designed to automate the process of integrating, testing, and deploying code. While it offers immense benefits, such as faster release cycles and higher-quality code, it also creates new attack vectors that adversaries can exploit. The pipeline typically includes the following stages:

- **Code Repository:** Code is stored in a version control system (e.g., Git). Each push or pull request can trigger automated actions in the pipeline.
- **Build Stage:** The code is compiled into artifacts. This process may involve resolving dependencies, packaging the application, and preparing for deployment.
- **Test Stage:** Automated tests (e.g., unit, integration) are run to verify that the application functions correctly. Failures at this stage can halt further progression in the pipeline.
- **Deploy Stage:** If the tests pass, the application is deployed to a staging or production environment for final validation and monitoring.

Jeevitha J.
Scientist - D
j.jeevitha@nic.in

CI/CD pipelines enable fast software delivery but come with security risks like weak flow control, IAM gaps, and dependency exploits. Mitigation includes role-based access control, multi-factor authentication, secure secrets management, and automated testing. Tools like Jenkins and GitLab CI/CD help enhance security. Best practices include isolating environments, using immutable infrastructure, and conducting regular audits. A real-world example of dependency confusion highlights the importance of securing the CI/CD process to protect against evolving threats.

- **Production Stage:** Once the application has successfully passed all previous stages, it is deployed to the live production environment. The production stage is particularly sensitive, as any issues at this point directly affect end users. Continuous monitoring in production is crucial to ensure the application remains secure and performs as expected. Malicious actors may attempt to exploit vulnerabilities in this stage to inject backdoors, steal data, or compromise the system's integrity.

Each of these stages presents unique security challenges, requiring organizations to enforce strict security controls throughout the process.

Top Security Risks in CI/CD Pipelines

Insufficient Flow Control Mechanisms

Risk: Inadequate management of the flow between stages in the pipeline can allow attackers to manipulate the order or conditions under which code is tested and deployed. Without proper sequencing, unauthorized actions may bypass critical security checks.

Mitigation:

- Implement detailed policies that define the exact order of operations in the pipeline.
- Use CI/CD tools that support flow control features, ensuring that code must pass through predefined security gates before proceeding.

Inadequate Identity and Access Management

Risk: Poorly managed identity and access controls can expose sensitive environments. Attackers could gain unauthorized access to the codebase, modify deployment scripts, or introduce malicious code.

Mitigation:

- Use role-based access control (RBAC) to limit access to specific pipeline actions.
- Enforce multi-factor authentication (MFA) for accessing critical components of the pipeline.
- Regularly audit user access permissions to ensure compliance with the principle of least privilege.

Dependency Chain Abuse

Risk: Modern software development relies heavily on third-party libraries and packages. If these dependencies are compromised, attackers can inject malicious code into your project through seemingly legitimate updates.

Mitigation:

- Regularly scan dependencies for known vulnerabilities using tools like Snyk or npm audit.
- Pin dependencies to specific versions to prevent automatic updates from introducing malicious code.
- Download packages only from trusted sources, and implement package integrity checks to ensure that they haven't been tampered with.

Poisoned Pipeline Execution (PPE)

Risk: In a PPE attack, adversaries compromise the CI/CD pipeline itself, injecting malicious

commands that are executed during the build or deployment process. This can result in unauthorized modifications to the codebase or even the insertion of backdoors into production systems.

Mitigation:

- Segment the pipeline so that each stage has access only to the resources necessary for that step.
- Use secure secrets management systems to store sensitive credentials.
- Employ logging and monitoring to detect unusual activities within the pipeline, such as unexpected builds or unauthorized changes.

Pipeline-Based Access Control (PBAC) Weaknesses

Risk: Insufficient access controls can allow unauthorized code or configuration changes to pass through the pipeline stages without proper vetting. A misconfigured pipeline can lead to untested or malicious code being deployed into production.

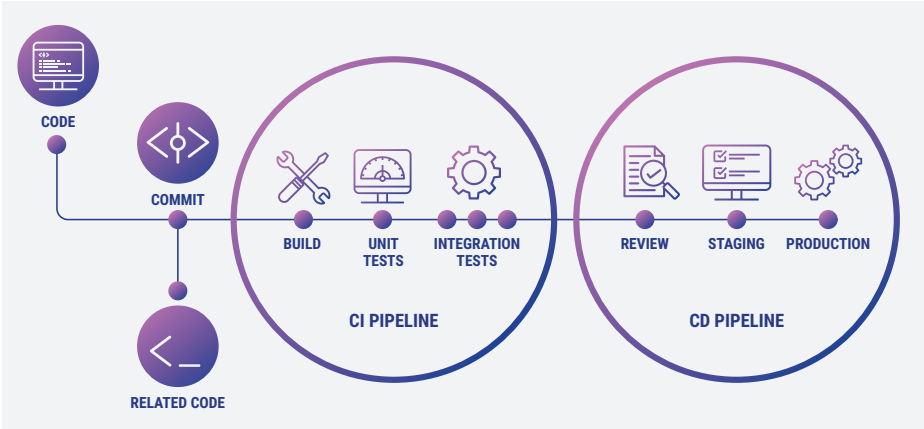
Mitigation:

- Implement least privilege access for all users and services interacting with the pipeline.
- Require manual code reviews and automated security testing before code can be merged or deployed.
- Regularly audit and update the pipeline's access controls to account for new roles and responsibilities.

Tools and Technologies to Strengthen CI/CD Security

To secure CI/CD pipelines, organizations should leverage industry-leading tools that offer built-in security features and robust integration with their existing workflows:

- **Jenkins:** Jenkins integrates with security tools like OWASP ZAP, allowing automated scanning for vulnerabilities within the pipeline.
- **GitLab CI/CD:** Provides built-in security features, such as dependency scanning and static application security testing (SAST), to detect vulnerabilities early in the development cycle.
- **AWS CodePipeline:** Can be integrated with other AWS security services, such as AWS Secrets Manager, to ensure secure storage of credentials.



▲ Fig 13.1 CI/CD Pipeline

Best Practices for CI/CD Security

- Automate Security Checks: Automated security testing should be part of the pipeline from the earliest stages, with tools running continuous vulnerability scans and static analysis on code. This ensures that security is baked into the process rather than being an afterthought.
- Isolate Environments: Keep development, testing, and production environments isolated from each other. Artifacts should be signed and verified before promotion between environments, ensuring that compromised code cannot reach production without detection.
- Immutable Infrastructure: Use containers or virtual machines that are destroyed after each build. This ensures that a compromised environment cannot be used repeatedly for attacks, limiting the persistence of malicious actors.
- Regular Security Audits: Conduct periodic audits of the pipeline's security mechanisms. This includes verifying that dependencies are up-to-date, access controls are appropriately configured, and all changes to the pipeline are logged and monitored.

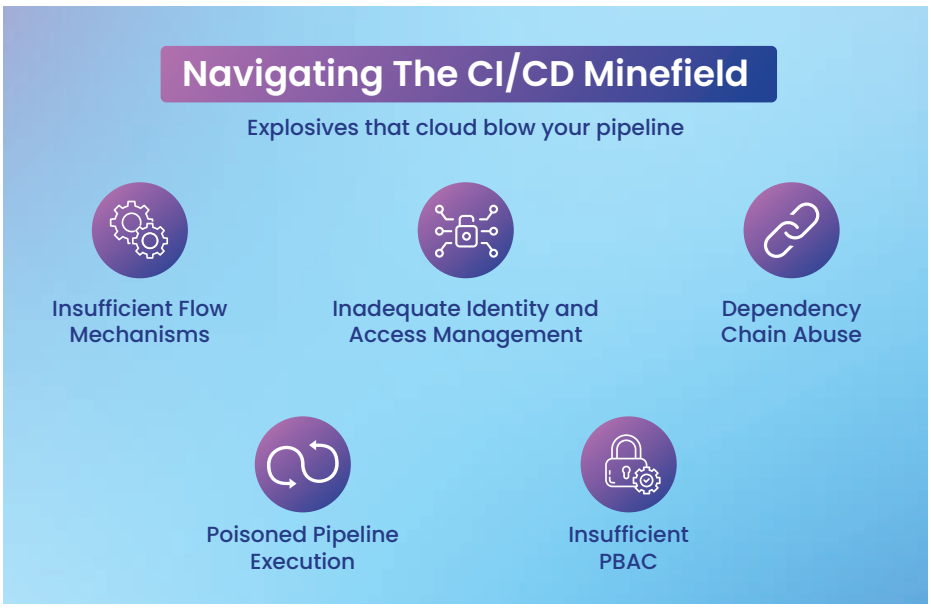
Real-World Example: Dependency Confusion Attack

In a high-profile example, attackers used a dependency confusion vulnerability to inject malicious code into companies like Amazon and Slack. By exploiting the fact that dependency managers prioritize public repositories over internal ones, attackers were able to push harmful packages that were automatically pulled into internal builds, compromising the entire software supply chain.

Conclusion

CI/CD pipelines enable rapid software delivery but present unique security challenges. By implementing strong access controls, automating security testing, and using best practices to secure dependencies and environment segregation, organizations can significantly reduce the risk of attacks. Proactive measures such as continuous monitoring, logging, and regular audits will help maintain the security integrity of the CI/CD process as the threat landscape evolves.

▼ Fig 13.2 Top five CI/CD Security Risks



Contact for more details

State Informatics Officer
NIC, Tamil Nadu State Centre
E2-A, Rajaji Bhavan, Besant Nagar
Chennai, Tamil Nadu - 600090
Email: sio.tn@nic.in, Phone: 044-24917850

Appscape

Mobile technology has emerged as a primary tool for governments to serve their citizens. It has bypassed the need of traditional physical networks for communications and collaborations. It is also much more affordable and accessible, thus strengthening the nation through better citizen-government interaction. To further nourish this interactivity, NIC has created a repository of more than 730 mobile apps available through both the Android and iOS platforms. This issue of Appscape covers some of the more popular mobile apps launched recently. These apps belong to different sectors such as Administration, Development, Finance, Public Distribution, Health and Education.

STEMS

STEMS app is a groundbreaking initiative under the Government of Meghalaya's ambitious "Vision 2030," aimed at transforming the state's transport landscape. This innovative platform is designed to provide a reliable, efficient, and climate-resilient commuting solution for citizens, businesses, and industries. By addressing mobility challenges in critical sectors like tourism, agriculture, and passenger transport, the app supports the government's growth strategies while enhancing accessibility.

Launched by the Sustainable Transport and Efficient Mobility Society (STEMS) in 2022, the app introduces a comprehensive city-wide shared commute system that prioritizes comfort and affordability for school and office commuters.

Key features of the STEMS app include real-time tracking, allowing users to monitor bus and shared vehicle locations, thus facilitating smarter travel planning. The seat-booking functionality ensures that commuters have guaranteed spots during peak hours, minimizing wait times and overcrowding. By leveraging cutting-edge technology, the STEMS app not only improves daily commutes but also promotes sustainable urban development. This initiative reflects Meghalaya's commitment to innovation and efficient mobility, paving the way for a greener, more connected future.

Shri Santhosh V. T. (sio-megh@nic.in)

For NIC apps related query, please contact

Android
Sandeep Sood
Email: sood.sandeep@nic.in | Phone: 0177-2880890

iOS
Andrews Varghese
Email: kerkan@nic.in | Phone: 0497-2700761

eSakshya

The eSakshya app is a pivotal mobile application designed to assist police in recording and managing evidence in criminal cases. As part of India's broader digital transformation, this app aligns with new criminal laws aimed at modernizing the justice system. The app allows police officers to record the scene of a crime, including search and seizure activities, directly from their mobile phones. Each recording can last up to four minutes, and multiple recordings can be uploaded for each First Information Report (FIR). Officers must upload these files to a cloud-based platform along with a selfie for authenticity. In case of connectivity issues, recordings can be made on personal devices and uploaded later.

eSakshya plays a crucial role in ensuring uniformity in investigations across states, which is expected to enhance the conviction rate. The app supports compliance with the Bharatiya Nagarik Suraksha Sanhita (BNSS) requirements for audiovisual recording and forensic examination in serious offenses. While it streamlines processes and optimizes resources, challenges like internet connectivity and training for police personnel must be addressed to ensure effective implementation. Overall, eSakshya is a significant step forward in digitizing India's criminal justice system, enhancing procedural integrity and evidence management.

Shri Manoj Kumar Mishra (hog-molid@nic.in)

Govin Secure Intranet

Govin Secure Intranet is a transformative initiative aimed at enhancing government-to-employee (G2E) communication and operational efficiency across all Ministries and Departments. This innovative platform provides a comprehensive suite of features and seamless access to multiple applications through a single sign-on, eliminating the need for separate logins for various tools.

Among the key applications accessible via Govin are eMail, eOffice, SPARROW, Bharat VC, eHRMS, the Ministry Performance Dashboard, and the PRAYAS Portal. This centralized access significantly simplifies workflows for government employees, fostering greater productivity and collaboration. The application boasts modules such as an Interactive Dashboard, Calendar Scheduler, Task Management, Goal Tracker, and Correspondence features. These tools empower users to manage their daily calendars, set and track goals, schedule meetings, assign tasks to team members, and monitor progress efficiently.

Additionally, the platform facilitates event planning and allows users to share documents and prereads directly within meeting links. With integrated Minutes of the Meeting (MoM) formats, documentation becomes quick and effortless. It marks a major advancement in government operations, boosting communication and productivity among employees.

Shri Inder Pal Singh Sethi (hog-meityprojects@nic.in)

Mera Ration 2.0

The Mera Ration 2.0 App is a pivotal initiative under the "One Nation, One Ration Card" plan, designed to streamline the distribution of subsidized food grains to ration card holders across India. This innovative application ensures that beneficiaries can access their entitled food grains from any Fair Price Shop (FPS) nationwide, utilizing their existing NFSA ration card.

With the app, users can lift their allocated rations after biometric or Aadhaar authentication on electronic Point of Sale (ePoS) devices. This feature not only enhances the convenience for beneficiaries but also ensures the security and accuracy of transactions, reducing the risk of fraud.

Under this scheme, entitled beneficiaries can continue to receive essential food items such as Rice at ₹3, Wheat at ₹2, and Coarse Grain at ₹1 per kilogram, regardless of the state they are in. This flexibility is especially beneficial for migrant workers and their families, allowing them to access food security no matter where they reside.

Overall, the Mera Ration 2.0 App significantly strengthens India's commitment to food security, ensuring that all citizens have equitable access to subsidized food grains, fostering a more inclusive and resilient society.

Shri Alok Tiwari (hog-mocafpd@nic.in)

NSP OTR

The National Scholarship Portal (NSP) has introduced the NSP OTR App, designed to facilitate a streamlined One Time Registration (OTR) process for students seeking scholarships. This innovative application simplifies the registration procedure by utilizing Aadhaar Face RD Services for secure user authentication through the Unique Identification Authority of India (UIDAI):

One of the standout features of the NSP OTR App is that it eliminates the need for external biometric devices for face authentication. This enhances accessibility, allowing students to complete the registration process efficiently without additional hardware.

Users can easily download the Aadhaar Face RD application from the Android App Store by searching for "AadhaarFaceRD." Once installed, students can authenticate their identity using facial recognition technology, ensuring a secure and seamless registration experience. By incorporating these advanced features, the NSP OTR App simplifies the scholarship registration process while reinforcing the government's commitment to using technology for educational empowerment. This initiative aims to ensure deserving students can easily access scholarships, promoting equal opportunities for all.

Umesh Kumar Agarwal (umesh.agarwal@nic.in)

PCTS

The PCTS App (Pregnancy, Child Tracking & Health Services Management System) is an innovative mobile application developed by the Medical, Health & Family Welfare Department of the Government of Rajasthan. This app serves as an essential tool for effective planning and management of health services, digitizing data for over 16,700 government health institutions across the state.

Designed primarily for Auxiliary Nurse Midwives (ANMs), the PCTS App facilitates the online tracking of pregnant women, enabling case-specific monitoring that has significantly reduced maternal and infant mortality rates. It enhances health surveillance and improves the monitoring of vaccination programs, contributing to better child health outcomes.

The PCTS App features identification of sterilization cases for population control, monitoring area-wise sex ratios at birth, and generating alerts for immunization dropouts. It maintains a comprehensive directory of health institutions, supports infrastructure planning, and provides detailed reports on vaccine stock and institutional performance. Additionally, it tracks the health of pregnant women and children, enhancing healthcare delivery and outcomes across Rajasthan.

Shri Jitendra Kumar Verma (sio-raj@nic.in)

Panchayat NIRNAY

Panchayat NIRNAY is a pioneering initiative by the Ministry of Panchayati Raj, Government of India, aimed at empowering rural India through efficient decision-making processes at the grassroots level. The app, aptly named after its purpose, stands for National Initiative for Rural India to Navigate, Innovate, and Resolve Panchayat Decisions.

This user-friendly mobile application simplifies the process of scheduling and conducting Panchayat meetings. It allows users to upload meeting agendas, designate meeting chairpersons, invite attendees, capture meeting photos and videos, and record decisions made during the meeting.

Panchayat NIRNAY is not just for officials; it is a tool for community involvement and transparency. Residents of Panchayats can access the app to view meeting schedules, agendas, decisions taken during meetings, and even watch videos of past meetings. This level of accessibility fosters greater accountability and participation in local governance.

Panchayat NIRNAY digitizes and streamlines decision-making, enhancing efficiency in Panchayat operations. It empowers officials and residents to contribute to community development, driving positive change in rural India.

Shri Alok Tiwari (hog-panchayatraj@nic.in)

Hon'ble Union Home Minister Launches Four Digital Platforms to Modernize India's Criminal Justice System

Hon'ble Union Home Minister and Minister of Cooperation, Shri Amit Shah, today launched four groundbreaking digital platforms - e-Sakshya, Nyaya Setu, Nyaya Shruti, and e-Summon - aimed at modernizing India's criminal justice system. The launch, held in Chandigarh, was attended by dignitaries including the Governor of Punjab and Administrator of Chandigarh, Shri Gulab Chand Kataria, and the Union Home Secretary on 4th August 2024.

Shri Shah emphasized that the successful implementation of the newly introduced criminal laws - Bharatiya Nyaya Sanhita (BNS), Bharatiya Nyaya Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA) - requires enhanced technical capabilities across the entire legal and law enforcement framework. He reiterated that these new laws, replacing outdated colonial-era legislation, reflect India's ethos and commitment to justice.

The newly launched digital tools will play a crucial role in streamlining legal procedures:

- **e-Sakshya** will store videography, photography, and testimonies on an e-evidence server, ensuring immediate availability to courts for faster legal processes.
- **e-Summon** allows summons to be sent electronically from the courts to police stations and individuals, improving efficiency in the communication of legal orders.
- **Nyaya Setu** interlinks Police, Medical, Forensic, Prosecution, and Prisons departments on a single dashboard, enabling investigators to access relevant information with a single click.
- **Nyaya Shruti** enables courts to hear witness testimonies via video conferencing, saving both time and resources while expediting case resolutions.

A Police Officer from Chandigarh Police giving demo of Nyaay Setu portal to Hon'ble Union Home Minister Shri Amit Shah and other dignitaries

Shri Shah described these reforms as transformative, aimed at restoring public trust in the justice system by addressing long-standing issues of delayed hearings and inefficiency.

– Pratibha Singh, Chandigarh

Union Minister for Coal & Mines Inaugurates Final Mine Closure Plan & License Modules of Mining Tenement System

Shri G. Kishan Reddy, Hon'ble Union Minister for Coal & Mines, inaugurated the Final Mine Closure Plan (FMCP) and License Modules of the Mining Tenement System (MTS) developed by the National Informatics Centre (NIC). The event, held at the Dr. Ambedkar International Centre in New Delhi, marked a significant step toward digitizing critical mining processes in India. Shri Satish Chandra Dubey, Minister of State for Coal & Mines, was also present.

The newly launched modules aim to streamline the submission of FMCPs and digitize the process of acquiring Exploration, Composite, and Prospecting Licenses. These tools are expected to enhance transparency, efficiency, and compliance in the mining sector by providing a digital platform for filing mine closure plans and tracking licenses.

In his address, Shri G. Kishan Reddy emphasized the importance of digital transformation in modernizing the mining industry, which plays a crucial role in India's economic growth. He highlighted that these modules will promote environmental sustainability by ensuring proper mine closures and adherence to regulatory requirements.

The NIC-developed Mining Tenement System represents a key milestone in the government's commitment to fostering transparency and accountability in the mining sector. By digitizing the FMCP and licensing processes, the government aims to expedite operations and reduce the environmental impact of mining activities.

Hon'ble Union Minister for Coal & Mines, Shri G. Kishan Reddy, inaugurated FMCP & Other License modules of the Mining Tenement System at the Dr. Ambedkar International Centre, New Delhi on 07th August 2024

- Hemendra Kumar Saini, NIC-HQ

Chhattisgarh gets Three E-Governance Portals to Boost Efficiency and Transparency

On August 21, Hon'ble Chief Minister of Chhattisgarh, Shri Vishnu Deo Sai, unveiled three new online platforms to promote e-Governance and transparency in the state's administrative functions. The launch included the e-office system, the Chief Minister's Office (CMO) portal, and the 'Swagatam' portal. These tools are designed to increase efficiency and curb corruption by embedding IT solutions into various government operations.

At the event, then Hon'ble CM approved a file digitally, instructing the chief secretary to implement the e-office system across all departments. Initially, the system will roll out in the general administration department before expanding to others. This digital office system aims to streamline file management, reduce paperwork, and secure documents against tampering or loss.

The Swagatam portal simplifies the process for visitors to schedule appointments with officials at Mahanadi Bhawan, while improving security and maintaining better visitor records. On the other hand, the CMO portal offers easy access to details about government schemes, programs, and public decisions, alongside information on Chhattisgarh's rich art, culture, and district-specific data.

Hon'ble CM emphasized that these platforms mark a significant move toward good governance and digital integration. The new systems are expected to reduce delays, minimize errors, and enable seamless tracking of files. The launch event was also attended by Hon'ble Deputy Chief Minister, Shri Vijay Sharma, Hon'ble Minister of Food and Civil Supplies, Shri Dayaldas Baghel, and other senior officials.

Hon'ble Chief Minister of Chhattisgarh unveils three new online platforms to advance e-Governance and transparency in the state's administrative functions

- Y. V. Shreenivas Rao, Chhattisgarh

Odisha Pioneers Digital Payment Integration for Gram Panchayats with GCMS Launch

Hon'ble CM Odisha inaugrates GCMS at Lokseva Bhawan, Bhubaneswar On August 13, 2024

On August 13, 2024, the Government Consumer Management System (GCMS) was officially launched by Shri Kanak Vardhan Singh Deo, Deputy Chief Minister of Odisha, and Shri Rabi Narayan Naik, Hon'ble Minister of Panchayati Raj & Drinking Water, at Lokseva Bhawan, Bhubaneswar. Developed in collaboration with the Ministry of Panchayati Raj, Government of India, NIC, and Tata Power, the GCMS introduces an innovative platform for managing electricity payments across Odisha's 6,794 Gram Panchayats.

With Odisha becoming the first state to integrate NIC's eGramSwaraj application with Tata Power's billing system, the platform enables Gram Panchayats to pay their electricity bills online, making the payment process more efficient and transparent. This integration also enhances the ability of distribution companies (DISCOMs) to track pending payments, promoting better service delivery and good governance.

The launch event was attended by key officials, including Shri Sushil Kumar Lohani, Principal Secretary of Panchayati Raj & Drinking Water Department, Shri Saswat Mishra, Principal Secretary of Energy Department, and Dr. Ashok Kumar Hota, Deputy Director General of NIC Odisha. Shri Sanjay Banga, President of Tata Power, participated virtually, expressing gratitude to the government departments and NIC for making this initiative a success.

Shri Kanak Vardhan Singh Deo emphasized the importance of GCMS in promoting digital governance, while Shri Rabi Narayan Naik highlighted its role in improving service delivery for rural areas. Shri Sushil Kumar Lohani noted that this pioneering step would greatly enhance e-Governance at the grassroots level and set an example for other states. The Ministry of Panchayati Raj has already encouraged other states to adopt similar integrations for their own eGramSwaraj portals.

- Jayanta Kumar Mishra, Odisha

Karaikal Gets DARPAN DM Dashboard and LicenseSoft Application for Enhanced Governance

District Collector of Karaikal, Puducherry, launches the NIC-developed DARPAN DM Dashboard and the LicenseSoft Application for enhanced governance

In a significant move towards improving governance and project management, the District Collector of Karaikal, Puducherry, has launched the NIC-developed DARPAN DM Dashboard and the LicenseSoft Application. The launch event, aimed at enhancing the efficiency of government operations, took place on 5th August 2024.

The DARPAN DM Dashboard is designed for real-time monitoring of government projects across the district, enabling officials to track progress, assess performance, and ensure accountability. This innovative tool provides a comprehensive overview of various initiatives, fostering transparency and facilitating informed decision-making.

In addition to the dashboard, the LicenseSoft Application has been introduced to streamline license-related services of the Karaikal Revenue Department. This application aims to simplify the process of obtaining licenses, making it more accessible and efficient for citizens. By digitizing these services, the Karaikal Revenue Department seeks to enhance the user experience and reduce bureaucratic delays.

The implementation of these digital solutions reflects the commitment of the Karaikal District Administration to leverage technology for better service delivery and governance. With these initiatives, the district is poised to set a benchmark in efficient management of government projects and services.

- N. S. Kumaran, Puducherry

Ministry of Parliamentary Affairs Launches Multiple Digital Initiatives for Parliament

Hon'ble Union Minister Kiren Rijiju officially launched several groundbreaking digital initiatives developed by the Ministry of Parliamentary Affairs (MPA India) in collaboration with the National Informatics Centre (NIC) today. The initiatives unveiled include the National e-Vidhan Application (NeVA) 2.0, NeVA Mobile App 2.0, NYPS Portal 2.0, Subordinate Legislation Management System, and Consultative Committee Management System.

During the launch event, Hon'ble Minister emphasised the critical role these digital tools play in enhancing the efficiency, transparency, and accessibility of parliamentary processes. He noted that the upgraded versions of the National e-Vidhan Application and its mobile counterpart are designed to facilitate smoother legislative procedures, enabling Members of Parliament (MPs) to access information, track legislation, and engage more effectively with their constituents.

The NYPS Portal 2.0 is another significant development aimed at streamlining the management of the National Youth Parliament Scheme, encouraging youth participation in the democratic process. Meanwhile, the Subordinate Legislation Management System is set to improve the handling of subordinate legislation, ensuring better compliance and easier access to regulatory information.

The Consultative Committee Management System aims to enhance the coordination and effectiveness of consultative committees, allowing for more organized discussions and collaboration among MPs on various issues.

Hon'ble Minister stated, "These initiatives are a testament to our commitment to leveraging technology for better governance. By making legislative processes more accessible and user-friendly, we are ensuring that every citizen can engage with and understand the workings of our democracy."

Hon'ble Minister addresses the audience during the launch event, highlighting their importance

This launch marks a significant step towards digital transformation in parliamentary affairs, aligning with the government's broader vision of a transparent and accountable governance framework. As these digital initiatives roll out, they are expected to empower MPs and citizens alike, fostering a more engaged and informed populace.

- Archana Sharma, NIC-HQ

NIC Organizes Training Programs on ‘eSakshya App’ for Police Officials in Ladakh

NIC has successfully organized a comprehensive training program on the ‘eSakshya App’ in Kargil District, Ladakh on 10th Septmeber 2024. This initiative saw participation from over 60 police officials, including all Station House Officers (SHOs), Investigating Officers (ICs), and Principal Police Staff (PPS) from across the Kargil region. NIC officers delivered detailed presentations highlighting the app’s features and functionalities, aimed at enhancing the efficiency of police operations.

In a parallel initiative, NIC also conducted a training session on the ‘eSakshya App’ for officials of the Leh Police at the District Police Lines in Choglamsar. This session was attended by key personnel, including the Deputy Superintendent of Police (Dy. SP) for DAR, Reserve Inspector of the District Police Line, SHOs, ICs, PPS, and Investigating Officers of the Leh Police.

The ‘eSakshya App’ is designed to streamline the processes of evidence management and case handling within the police force, facilitating better coordination and quicker access to vital information. By equipping police officials with the necessary skills and knowledge to utilize this digital tool, the NIC aims to enhance law enforcement effectiveness and promote transparency within the policing system.

Both training programs underscore NIC’s commitment to empowering law enforcement agencies with technology, thereby improving service delivery and fostering a safer environment for the citizens of Ladakh.

Senior NIC officer guiding two Ladakh police officers on the effective use of the eSakshya App, empowering them with essential skills for enhanced policing and efficient evidence management

- Hemendra Kumar Saini, NIC-HQ

DIG Jharkhand Launches “Guest Verification System” to Enhance Guest Safety and Security

Shri Manoj Ratan Clothem, DIG Kolhan launches Guest Verification System to enhance guest safety and security in Jharkhand in an event on 12th August 2024 in Adityapur, Jamshedpur District, Jharkhand

In a significant step towards bolstering guest safety and improving security measures, the Deputy Inspector General (DIG), Kolhan, Jharkhand, Shri Manoj Ratan Clothe, officially launched the “Guest Verification System,” developed by the NIC, during an event at Adityapur, Jamshedpur District, Jharkhand on 12th August, 2024.

The Hotel Guest Verification System aims to streamline check-in processes while enhancing the overall safety of guests. By enabling local administrations to effectively track guest details, the system helps mitigate the risks associated with fraudulent activities in hospitality establishments.

During the launch, the DIG emphasized the importance of leveraging modern technology to create a seamless and secure guest verification experience. “This system not only improves the efficiency of check-in procedures but also plays a crucial role in ensuring the safety of our visitors,” he stated. “By utilizing open-source technology, we have minimized costs while maximizing functionality.”

The Guest Verification System incorporates encrypted databases and robust data protection measures, ensuring that sensitive guest information remains secure and confidential. This comprehensive solution aims to provide a smooth check-in experience for guests while enabling hotels and local authorities to maintain oversight and accountability.

As the initiative rolls out across the region, it is expected to significantly enhance the guest experience while simultaneously addressing security concerns, thereby fostering a safer environment for both visitors and residents in Jharkhand.

- Rajiv Kumar Sinha, Jharkhand

NIC State Centres Win Big at Gems of Digital India Award 2024

NIC State Centres of Himachal Pradesh and Chandigarh made a significant mark at the 5th Gems of Digital India Awards 2024, receiving the Analyst's Choice award for their innovative digital solutions. The awards ceremony, organized by Coeus Age, took place on July 26, 2024, at The Claridges Hotel, New Delhi.

NIC Himachal Pradesh was recognized for its two software applications, "Grievance Appellate Committee MIS" (https://gac.gov.in) and "School Safety MIS" (https://hpsdmaplan.nic.in/ssmis/), which enhance grievance redressal and school safety monitoring. Senior IT Directors Shri Sandeep Sood, Shri Sanjay Kumar, and Joint Directors Shri Mangal Singh and Shri Ashish Sharma accepted the award on behalf of NIC Himachal Pradesh.

Meanwhile, NIC Chandigarh UT's "Court Case Monitoring System" (CCMS) (https://ccms.chd.gov.in) also received the Analyst's Choice award for its role in streamlining court case management. CCMS is integrated with NAPIX for district and high court cases, includes CAT cases, and provides automatic notifications, mobile apps for stakeholders, and a fee bill tracking system for advocates. Shri Ramesh Kumar Gupta, DDG & SIO NIC UT Chandigarh, and Shri Girish Pant, Director (IT), were present to receive the award.

These awards recognize NIC's commitment to advancing e-Governance and improving public services through digital innovation.

NIC Chandigarh SIO Honored for Pioneering IT Initiatives in Chandigarh

During the Independence Day celebrations on August 15, 2024, Shri Ramesh Kumar Gupta, DDG & SIO of NIC UT Chandigarh, was honored with a 'Certificate of Appreciation' by the Hon'ble Governor of Punjab and Administrator of U.T. Chandigarh, Shri Gulab Chand Kataria. This award recognizes Shri Gupta's exemplary leadership in spearheading key IT initiatives across various sectors in Chandigarh.

Shri Gupta's contributions include the successful implementation of three new criminal laws and the launch of several transformative platforms like eSakshya, Nyay Shruti, Nyay Setu, and eSummons. He has also played a pivotal role in the deployment of critical systems such as the GIS System, e-Awas System, Court Case Monitoring System, Ration Card Management System, and the Engineering Works and Budget Monitoring System. Additionally, his efforts have facilitated over 250 faceless services for citizens, enhancing accessibility and efficiency in public service delivery.

The event was attended by distinguished dignitaries, including the Advisor to the Administrator UT Chandigarh, Shri Rajeev Verma, Deputy Commissioner Shri Vinay Pratap Singh, and DGP UT Chandigarh, Shri Surendra Singh Yadav.