# NextGen DISE

## NextGen District Information System for Elections

Edited by **VINOD KUMAR GARG**

The District Information System for Elections (DISE) was developed by NIC Punjab in 2007 and has since been implemented in multiple regions, including Punjab, Himachal Pradesh, Karnataka, Delhi, Chandigarh UT, Mizoram, and Manipur. In recognition of its potential for national application, the Election Commission of India (ECI) has asked the Chief Electoral Officer (CEO) of Punjab to demonstrate DISE with the intention of scaling it up nationwide. Subsequently, a presentation on the proposed NextGen DISE was delivered by the CEO of Punjab and the State Informatics Officer (SIO) of Punjab at the ECI office. The ECI granted in-principle approval and mandated a pilot implementation during the 18th General Elections to the Lok Sabha.

In this backdrop Shri Vivek Verma, DDG & SIO Punjab spearheaded the initiative to develop NextGen DISE software. It has been developed in a short duration of six months and comprises of following modules:

- **Polling Personnel Management System (PPMS):** Web based application for data digitization, data import from iHRMS/APIs/Excel/4.

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

**Usha Rai**
Sr. Technical Director & ASIO
usha.rai@nic.in

**Dinesh Sharma**
Sr. Technical Director
dinesh.sh@nic.in

NextGen DISE developed by NIC Punjab comprises of Polling Personnel Management System (PPMS), Poll Activity Monitoring System (PAMS) and Queue Information System (QIS). PPMS is a web-based software for data digitization, data import and random deployment of Polling Staff, Micro-Observers and Counting Staff. PAMS captures the data of pre-poll, polling and post-poll events using mobile app and renders the data on dashboard in real time. QIS offers real-time queue information at polling station to the voters through WhatsApp chat bot.

CSV for the random deployment of Polling Staff, Micro-Observers and Counting Staff with distributed architecture for replication in states. It was implemented in Punjab, Himachal Pradesh and UT Chandigarh during General Elections –2024.

- **Poll Activity Monitoring System (PAMS):** PAMS was deployed in Punjab and Ladakh to capture pre-poll, poll-day and post-poll events through mobile app by the officers on field duty and render the data on portal dashboard for monitoring the events in real time by senior authorities at state and district level.

- **Queue Information System (QIS):** QIS is an innovative system which facilitates voters to access real-time queue information via WhatsApp chat bot, using location of the voter or details of the polling booth. Voters can ascertain queue length, facilitating timely visit to polling stations. It was implemented in Lok Sabha Elections 2024 in Punjab and Ranchi (Jharkhand).

## Features

### PPMS

- Dashboards for management, monitoring and updation of employee data
- Generation of checklists and verification of employee data submitted by Offices/ Sub-Departments
- Management of exemptions based on certain criteria
- Flexibility to change the level at which an employee can be deployed as per the requirements or change in criteria for selection
- Provision to use staff in overlapping/

I wanted to take a moment to express my sincere appreciation for the commendable work NIC Punjab has been doing. The dedication, creativity, and meticulous attention to detail have been instrumental in delivering high-quality solution in the shape of 8.      NextGen DISE, PAMS and QIS that consistently exceed our expectations. The collaborative spirit and professionalism of the divisions  and district centres of NIC Punjab set a benchmark for the entire country.

Keep up the phenomenal work!

**Sibin C.**
Chief Electoral Officer
Punjab

non-overlapping mode for Polling Personnel, Micro Observers and Counting Parties

- Three Stage Randomization of Polling Personnel
- Two Stage Randomization of Micro Observers
- Three Stage Randomization of Counting Parties
- Management of rehearsals for all stages
- Marking of absentees and cancellations
- Provision to push additional staff in the event of shortfall after first stage
- Provision for processing reserve staff, export data from one district to another to meet shortfalls
- Provision to export parties formed at Second Stage for ACs having polling stations falling in two districts
- Generation of duty orders, attendance sheet, ID Cards with photo for all stages, summaries of shortlisted, left-over and exempted staff
- Generation of Form 12, 12A, 12B (EDC) for Polling Personnel and Micro Observers

## PAMS

- Real time-based voter turnout feature with dynamic colour coding
- Security based registration and access of Mobile App using Passcode and OTP
- Managing events based on their occurrence times. Any event can be added, removed or made active. Facilitates ARO to update Event on behalf of Sector Officer
- Captures data for simultaneous elections of Lok Sabha and Vidhan Sabha through single user account
- Equipped to capture data from areas where Internet facility is not available
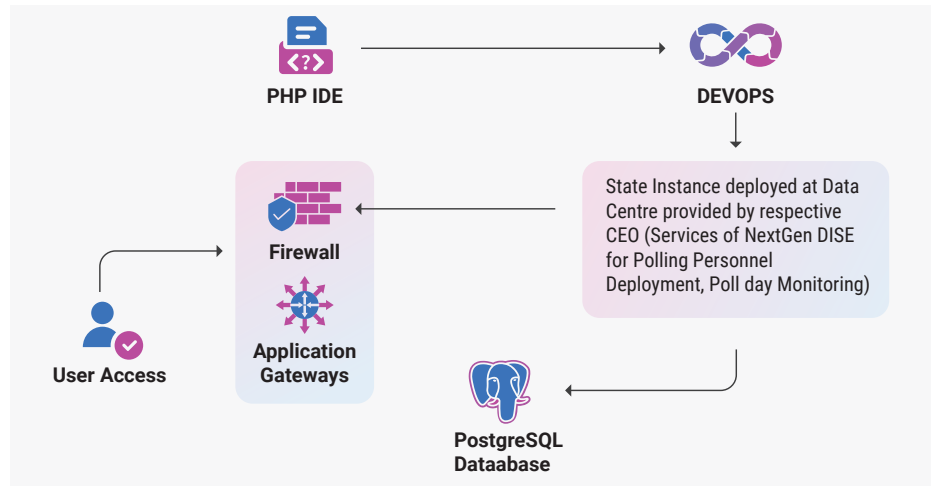


▲ Fig 2.1    **Nextgen DISE System Architecture**

- Role based Dashboards for CEO, PC, AC, District etc. Based on roles, different levels of access and permissions can be granted to users to monitor activities
- Notifications and SMS Alerts to stakeholders to update events
- Reporting tools to track and analyse data. State specific dashboards & visual representations such as charts and events to portray progress
- Poll interruption to give alert message at higher level. Interruptions deal with the Law & Order situation and faulty EVMs
- Flexibility as per the states and type of election
- Addition of virtual machines, CPU, memory, storage to handle spikes in usage. Handle a high volume of clicks, ensuring the system

The NextGen DISE is indeed a testament to the NIC's dedication to delivering top-notch digital solutions. The collaborative efforts and professionalism demonstrated by NIC Punjab and NIC UT Chandigarh have undoubtedly set a high standard nationwide.

I wish continued success to NIC Punjab & UT Chandigarh and their contributions to the field of IT and public service!

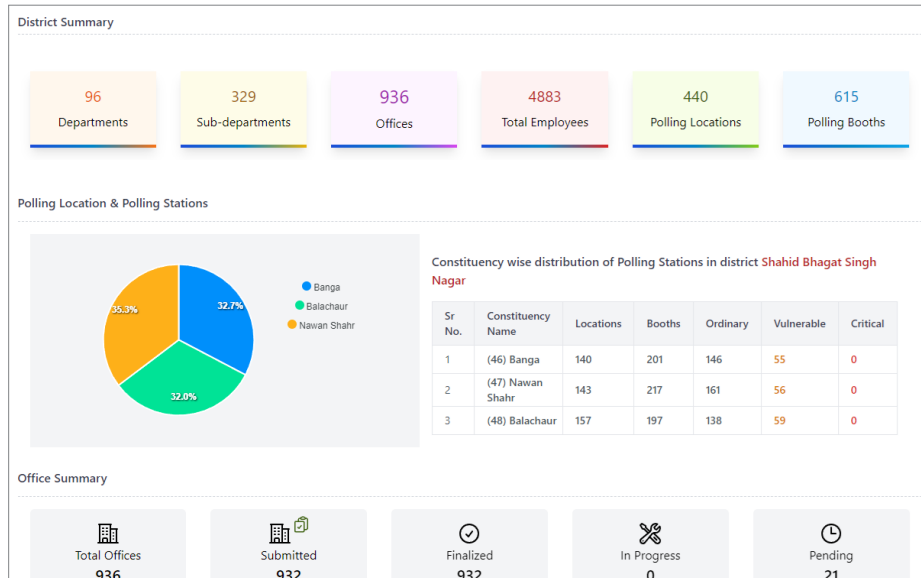**Vijay N. Zade**
Chief Electoral Officer
Chandigarh
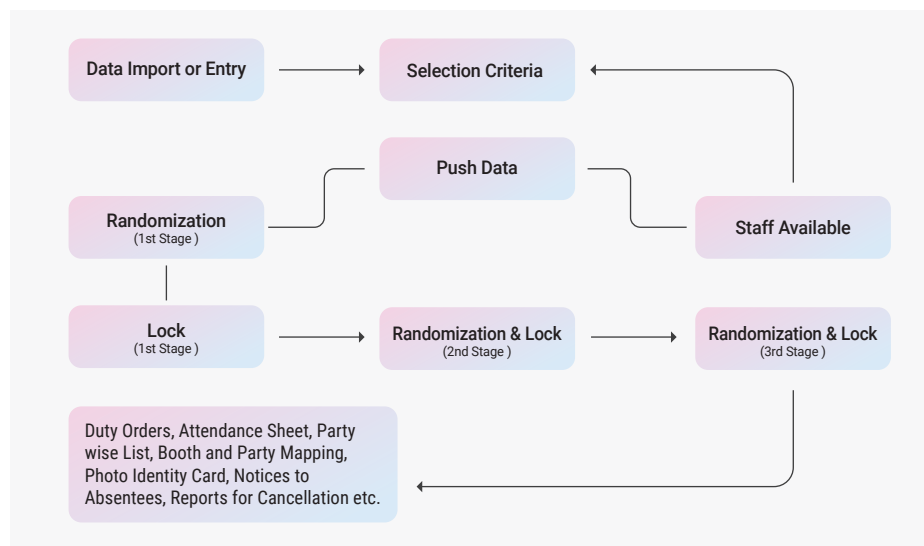
remains responsive during peak usage

- Functions well on different web browsers, ensuring a consistent user experience regardless of platform or device
- Utilize advance token-based access algorithms for secure interactions between the app and the server
- Web socket APIs for access of information in real time

## QIS

- Voter need to send a message by typing 'Vote' to the WhatsApp number 7447447217
- Voter receives a link, which on clicking, presents two options: (1) Location Wise and (2) Booth Wise
- For the location-wise option, voter shares lo-



▼ Fig 2.2    **PPMS Workflow**

**District Summary**

| 96 Departments | 329 Sub-departments | 936 Offices | 4883 Total Employees | 440 Polling Locations | 615 Polling Booths |

**Polling Location & Polling Stations**

Constituency wise distribution of Polling Stations in district **Shahid Bhagat Singh Nagar**

| Sr No. | Constituency Name | Locations | Booths | Ordinary | Vulnerable | Critical |
|---|---|---|---|---|---|---|
| 1 | (46) Banga | 140 | 201 | 146 | 55 | 0 |
| 2 | (47) Nawan Shahr | 143 | 217 | 161 | 56 | 0 |
| 3 | (48) Balachaur | 157 | 197 | 138 | 59 | 0 |

**Office Summary**

| Total Offices 936 | Submitted 932 | Finalized 932 | In Progress 0 | Pending 21 |

▲ Fig 2.3 **NextGen DISE District Summary Dashboard**

cation, which displays a list of polling booths near the location on the mobile

● By entering the Booth Number, voter receives real-time information on how many voters are standing in the queue at that booth

● For the booth-wise option, voter selects the State, followed by the District. This brings up all the Assembly Constituencies in that district. After selecting the Assembly Constituency and entering the Booth Number, voter is provided number of voters in the queue at that "booth"

## Technologies Used

PPMS has been developed using Open-Source Technologies (PHP-Laravel and PostgreSQL). It can be deployed in Linux as well as Windows environment. Queue Management feature of Laravel is used for parallel processing in randomization modules. DomPDF, jsPDF and FPDF libraries are used for reporting.

PAMS has been developed using comprehensive technology stack ensuring robustness and scalability. The backend utilizes RESTful APIs developed with .NET Core Framework 8, PostgreSQL version 15. PAMS portal leverages React with Next.js.

For mobile app, Flutter and Dart are used to build a responsive user interface on Android and iOS platforms.

## Benefits / Impact

NextGen DISE facilitates Manpower Management of all aspects of elections right from collection of Polling Staff data to scheduling the rehearsals and randomizing of Polling Staff, Micro Observers and Counting Staff. It makes elections more efficient and transparent. Following showcases the benefits and impact made by NextGEN DISE:

● PPMS has been used for randomizations of Polling Staff, Micro-Observers and Counting Staff in 13 Parliamentary Constituencies covering 23 Districts, 117 Assembly Constituencies and 24522 Polling Booths of Punjab. Replicated in Himachal Pradesh having 4 Parliamentary Constituencies, 68 Assembly Constituencies and 7618 Polling Booths. Successful replication in Chandigarh UT having 1 Parliamentary Constituencies and 599 Polling Booths

● PAMS automates the process of monitoring of poll events and streamlines the poll process flow.

● PAMS is an API based PAMS is an API based software that can be integrated with other applications

● PAMS improves decision-making by access to real-time data and analytics, resulting in increased efficiency and enhanced decision-making

● QIS facilitates voters by providing number of voters in queue at a particular polling station through Whatsapp Chat Bot

## Way Forward

The future of NextGEN DISE is focused on significant upgrades to enhance scalability and efficiency. The system will incorporate advanced features such as Database Sharding for large-scale operations, QR-based logins, AI-driven data verification, and automated SMS and WhatsApp alerts. It will support separate roles for departments and AROs, introduce workflows for exemption management, and enable checklist generation at the DEO level. Additionally, the system will include capabilities for data export between districts, data import for Police Personnel, and updating employee transfer details. PAMS is being developed into a comprehensive solution for Election Monitoring, featuring modules like the Counting Day Real-Time Event Capturing Portal and Booth Watch LIVE, a map-based interface for Real-Time Polling Booth Monitoring. The system will also include a Vehicle Monitoring System to track the movement of vehicles from Collection Centers to Polling Stations in real-time.

N extGen DISE is a very useful web application developed by NIC. It has been successfully used in Himachal Pradesh during Lok Sabha Elections-2024 & Bye-Elections-2024 for data entry of Polling Personnel, performing three stage randomization and deployment of Polling Parties at Polling Stations. I appreciate hard-work and efforts made by NIC in developing NextGen DISE application.

**Maneesh Garg**
Chief Electoral Officer
Himachal Pradesh

T he execution of PAMS portal and mobile app was exemplary. This innovative system ensured real-time issue resolution allowing problems to be swiftly addressed and thus minimizing disruptions and maintaining the integrity of electoral process.

I extend my deepest gratitude to NIC Ladakh and NIC Punjab for relentless efforts and extraordinary contribution.

**Sonam Chosjor**
Joint Chief Electoral Officer, Ladakh

**Contact for more details**

**Vivek Verma**
Dy. Director General & SIO
NIC Punjab State Centre
Room No 109, Punjab Civil Secretariat - 2
Sector – 9, Chandigarh- 160009
Email: sio-punjab@nic.in, Phone: 0172-2747357