



Ministry of Electronics and Information Technology
Government of India



URBAN IOT CHALLENGE - 2025



***Empowering Urban Innovation
Through Real-Time Data Visualization***



(Only for Students)



Registrations open from
21-03-2025 till 09-04-2025



Total prize pool of ₹1,75,000



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1. Hackathon Title

C-DAC URBAN IOT CHALLENGE 2025

2. Introduction

Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY) for carrying out R&D in IT, Electronics and associated areas. C-DAC represents a unique facet working in close conjunction with MeitY to realize the nation's policy and pragmatic interventions in Information Technology.

CDAC Centres at Bengaluru, Hyderabad, Silchar, Delhi along with IIT Bhubaneswar is working on a project titled "Smart City 2.0: Empowering Indian Industries with Smart Solutions" in which Indian industry is being encouraged for developing sensor enabled indigenous solutions for automation of utilities in Indian cities. These solutions will enhance the functionality of utilities in urban cities and these will help the smart city mission. Ministry of Electronics and Information Technology, Government of India (MeitY) is supporting this project.

As part of this project, C-DAC proudly announces "**C-DAC URBAN IOT CHALLENGE 2025**", a platform where creativity meets purpose to drive transformative solutions for India's future! This hackathon brings together passionate students to tackle real-world challenges aligned with India's most ambitious government initiatives.

Join us in this journey to accelerate India's transformation and make a tangible difference through innovation

3. Problem Statement:

Smart IoT Dashboard for Real-Time Data Monitoring and Analytics

3.1 Background:

In today's IoT-driven landscape, users demand dashboards that provide seamless interaction with connected devices. Existing solutions may be either too rigid or overly dependent on proprietary ecosystems. This challenge invites participants to develop an open, web-based IoT dashboard that enables real-time data visualization, device control, and customizable widgets—all while ensuring scalability, security, and a user-friendly interface.

3.2 Objectives

- **Real-Time Monitoring:** Design a dashboard that continuously receives and displays live data from various IoT devices (e.g., temperature sensors, humidity sensors, motion detectors).
- **Remote Device Control:** Enable users to send control commands (such as toggling switches or adjusting settings) directly through the dashboard.
- **Customization and Flexibility:** Allow users to configure the dashboard layout with drag-and-drop widgets, select different chart types, and personalize data views.

- **Alerts and Automation:** Integrate threshold-based alerts and simple automation rules (e.g., "If temperature exceeds X °C, trigger a notification or control action").
- **Security and Multi-User Support:** Implement secure user authentication, role-based access, and end-to-end encrypted data communications to protect device data and control functions.

3.3 Scope

- **Data Integration:**
 - Interface with one or more IoT data sources using protocols such as MQTT, HTTP, HTTPS or WebSockets.
 - Support both real-time streaming and historical data retrieval for analysis.
- **User Interface & Experience:**
 - Develop a responsive web interface that adapts across desktop, tablet, and mobile devices.
 - Provide customization features (e.g., drag-and-drop widgets, configurable themes, dark/light mode) to enhance usability.
- **Control & Automation:**
 - Integrate interactive controls (e.g., toggle buttons, sliders) for device management.
 - Enable basic automation routines to trigger actions based on sensor readings.
- **Security & Access Management:**
 - Implement user login and role-based access control (e.g., administrators, operators, viewers).
 - Use secure communication protocols (e.g., TLS/SSL) for data transfer.

3.4 Key Features

- **Live Data Visualization:**
Dynamic graphs, charts, and tables to represent sensor readings and device status updates.
- **Customizable Dashboard:**
Modular design with user-defined widgets, allowing personalized layout and widget selection without hardcoding specific device brands.
- **Interactive Controls:**
Real-time control elements to operate connected devices (e.g., switches, dimmers) and trigger automation rules.
- **Alert System:**
Configurable thresholds that trigger visual and audible alerts, and notifications (SMS, email, or in-app) when readings fall outside safe limits.

- **Export Data:**

Download reports in CSV or JSON format.

- **Secure API Integration:**

Provide RESTful endpoints for third-party integrations and allow seamless data exchange with external platforms.

3.5 Technical Requirements

- Front-end: **React.js with hooks and functional components.**
- Styling: **Tailwind CSS / Material-UI design.**
- API Integration: **Fetch or generate random IoT data.**
- State Management: **React Context API, Redux**
- Data Visualization: **Any graph library (e.g., Chart.js, D3.js) or a custom solution.**

3.6 Expected Deliverables

- **A fully functional, web-based IoT dashboard that demonstrates:**
 - Live data integration from simulated or real IoT devices.
 - Customizable layout with drag-and-drop functionality.
 - Interactive control elements to manage device states.
 - Automated alerts and notifications based on predefined thresholds.
 - Secure user authentication and role-based access control.
- **Documentation covering:**
 - System architecture and technical design.
 - API documentation and instructions for setting up the data sources.
 - User manual for configuring and using the dashboard.

3.7 Use Case Examples

- **Smart Home Automation:** Monitor and control home appliances, lighting, and HVAC systems in real time.
- **Industrial Monitoring:** Oversee machine status, energy consumption, and environmental parameters in manufacturing settings.

4. Judging Criteria

Criterion	Description	Weightage
Functionality	Real-time data streaming, control capabilities, and automation features	30%
Usability & Design	User interface aesthetics, customization options, and responsiveness	25%

Innovation	Novel features, scalability, and overall technical approach	20%
Security & Robustness	Implementation of secure authentication, error handling, and data protection	15%
Documentation & Deployment	Quality of documentation, clarity of API, and ease of deployment	10%

5. Final Thoughts

Participants are encouraged to create a dashboard that emphasizes flexibility, user-centric design, and secure, real-time interaction with IoT devices. The solution should serve as a robust platform that can be adapted across various domains without reliance on any proprietary design language. This problem statement aligns with current industry challenges and provides a platform for innovative solutions that empower users to monitor and control IoT devices seamlessly.

6. Guidelines for Submission

- **Team Composition:** Student teams must consist of 2 to 4 members.
- **Institutional Requirement:** All team members must belong to the same institution.
- **Eligibility:**
 - Students from centrally funded technical institutions in India pursuing UG/PG programs
 - Students from technical institutions in India approved by AICTE or recognized by UGC pursuing UG/PG programs
- **Application Process:** Applications must be submitted exclusively through the Google Forms provided on the official social media link. Submissions via any other method will not be considered.
- **Application Format:** Submissions must strictly follow the format available on the social media link. Applications in any other format will be rejected.
- **Selection Process:** The initial screening and finalist selection will be conducted online/offline. Shortlisted teams must be available online/offline for the presentation/demo stage.
- **Rules & Modifications:** The Hackathon Organizing Committee reserves the right to modify the event's rules, format, or prizes at any time. Any changes will be communicated to participants in a clear and timely manner.
- **Participation Certificate:** Teams that successfully pass the initial screening will receive a certificate of participation.
- **NOC :** Participants must obtain a No Objection Certificate (NOC) from their HOD to be eligible for the hackathon.

7. Evaluation Process Flow



8. Certificates and Awards

Team	Prize Money
Winner	INR 1,00,000
First Runner-up	INR 50,000
Second Runner-up	INR 25,000

- Prize Money mentioned above is for the team and not for each individual. The total prize money for this hackathon is Rs. 175000.
- The winning team members will be requested to submit an undertaking mentioning the saving bank account and details, to which the prize money will be transferred through e payment.

9. Timeline/Important Dates

Event	Date	Mode
Launch of Challenge	21st March 2025	Online
Application Submission Deadline	09th April 2025	Online
5 Finalists Announcement	09th May 2025	Online
Grand Finale (Presentation/Demo)	13th June 2025	Online/Offline
Award Ceremony	TBD	Offline

10. Intellectual Property Rights

Any Intellectual Property (IP) arising from projects submitted at this hackathon will be the sole property of C-DAC. By participating in the hackathon, all participants agree that any inventions, designs, code, patents, or other forms of IP created during the event or submitted at this event will be transferred to and owned by C-DAC.

11. Managing Committee

- Devadatta Sasmala, Scientist F, C-DAC Delhi
- Sunnam Venkata Srikanth, Scientist E, C-DAC Hyderabad
- Jitesh Choudhary, Centre Head, C-DAC Silchar
- Kaushik Nanda, Scientist D, C-DAC Bangalore

12. Organizing Committee

- Gaswin Kastro G, Sr. Project Engineer, C-DAC Delhi
- Virendar Zode, Sr. Project Engineer, C-DAC Delhi
- Sai Shiva Reddy, Project Engineer, C-DAC Hyderabad
- Sai Prakash Goud, Project Engineer, C-DAC Hyderabad
- Atul Rawat, Scientist B, C-DAC Silchar

13. Registration form: <https://forms.gle/tFJgDi2A9dKG3djN7>**14. Proforma for Submitting Technical Proposal:** [Proforma for Submitting Technical Proposal](#)**15. Need Support?** Email us: smartcities.challenges@cdac.in