

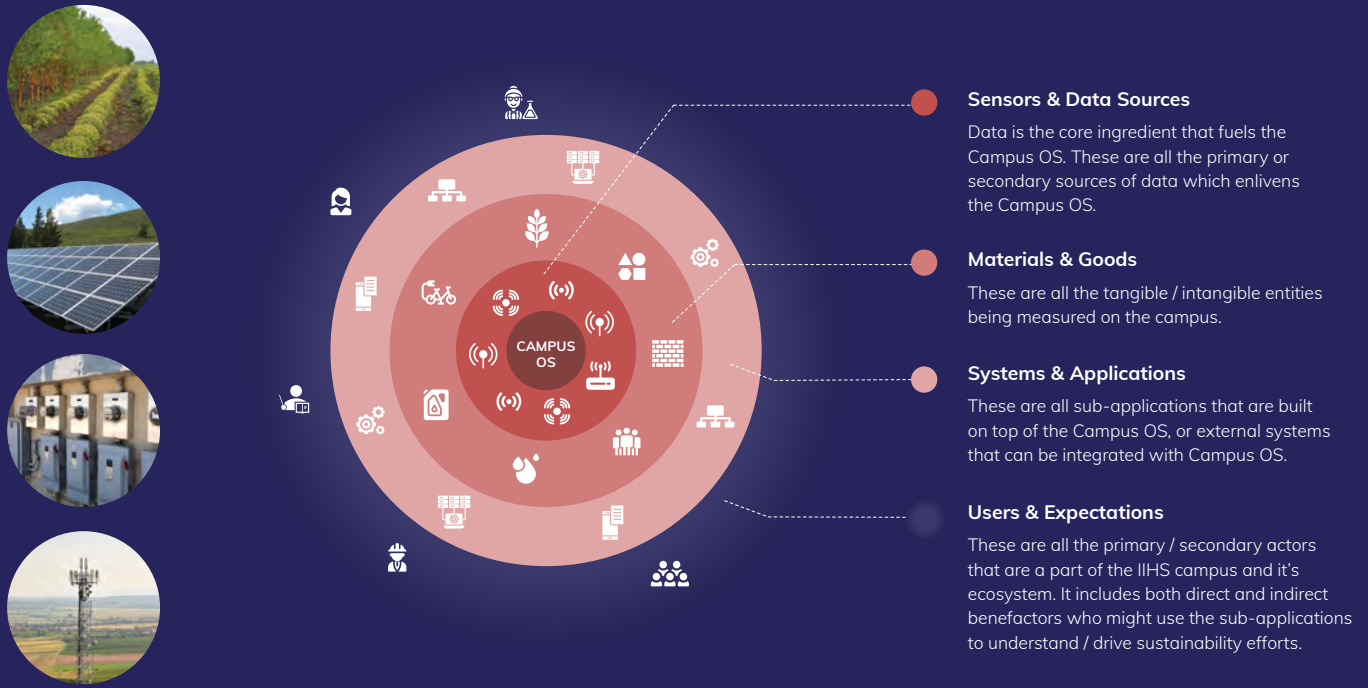
Building a Smart Campus with Custom-Built Platform Engineering and IoT Solutions



The Indian Institute for Human Settlements (IIHS) is a national education institution committed to the equitable, sustainable and efficient transformation of Indian settlements.

One of the key principles in IIHS' imagination of this transformation is to demonstrate a campus that incorporates all levels of sustainability in keeping with the UN Sustainable Development Goals. To bring this vision to life, IIHS chose to partner with us to design a purpose-built solution, leveraging platform engineering and IoT for its Kengeri Campus that would serve as the backbone of IIHS's forward-looking educational ecosystem.

The IIHS Campus Operating System (OS) was a complex challenge with an intricate network of components, including IoT gateways and edge nodes, web services, backend data processors, interactive mobile apps, and web portals. The complexity was amplified by IIHS' vision for scalability beyond the current phase, anticipating future development over the next decade.



Design Principles:

A unique challenge emerged from the vision of IIHS to develop the Campus OS as an open source, non-proprietary, protocol agnostic, hardware plug and play, simple, scalable, modular and economical.

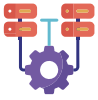
Scalability and Modularity:

We architected a scalable OS, ensuring it could seamlessly adapt to the evolving needs of IIHS in future phases of development. This modularity facilitated edge-level decision-making capabilities, providing a flexible framework for growth.

Resilience and Non-Proprietary Systems:

Committed to open learning, research, and collaboration, IIHS envisioned a resilient, non-proprietary solution. Our design prioritized systems that would remain robust and adaptable over time.

Outcomes for IIHS:



Data Pipeline Establishment

We set up a robust data pipeline, ensuring seamless communication of information from local sensors to central repositories. This meticulous process guaranteed that all campus data was captured, stored, and available for extensive research.



Water and Energy Dashboards

We developed intuitive dashboards for monitoring and analyzing water and energy consumption data. These dashboards not only provided visual insights but also facilitated informed decision-making for research initiatives.



Rule Engine for Energy Management:

To optimize energy consumption, we implemented a rule engine and management system. This allowed for precise control and monitoring of energy usage at a granular level, contributing to sustainable campus operations.



Technological Landscape:

Our solutions leveraged a cutting-edge tech stack, including Golang for robust backend development, Kafka for efficient event streaming, Mosquitto for MQTT protocol, Plotly and Redash for data visualization, React and Redux for seamless frontend experiences, and Python for versatile scripting capabilities.



Impact and Future-Readiness:

By incorporating scalability, modularity, and non-proprietary systems, our custom-built platform engineering and IoT solution have helped IIHS meet its objectives for a smart and sustainable campus in the long term.

