

## Powering Innovation at Zhongguancun Hegu Innovation Industrial Park

At the forefront of China's innovation drive, the Zhongguancun Hegu Innovation Industrial Park required an equally advanced foundation for its supercomputing (HPC) data center. The immense density of computing equipment created significant risks from heat, power instability, and system interdependence. By implementing a comprehensive, intelligent monitoring solution, the park now possesses a resilient nerve center for its HPC operations. This system proactively safeguards critical infrastructure, ensures 100% uptime for vital research computations, and empowers data-driven facility management.

### The Challenge: Mitigating Invisible Risks in a High-Stakes Environment

A supercomputing data center is an ecosystem of extreme interdependency. The park's management faced the critical challenge of managing invisible but catastrophic risks inherent to high-density computing environments:

- **Cascading Failure Risk:** A single point of failure in cooling or power could halt entire research projects.
- **Thermal Threats:** Extreme heat from dense server racks risked immediate hardware damage and performance loss.
- **Reactive Operations:** Isolated monitoring and manual checks prevented proactive issue detection, leading to a disruptive "break-fix" cycle.



The mission was clear: transition from a fragile, reactive infrastructure to a resilient, intelligently managed asset that could support the park's ambition as a leader in scientific and technological innovation.

### Omara Solution: An Integrated Nerve Center for HPC Infrastructure

We delivered a unified, intelligent monitoring platform that acts as the central nervous system for the supercomputing data center. The solution provides granular visibility and automated control across all critical subsystems:

**Comprehensive Sensor Fusion:** A network of high-precision sensors was deployed for temperature, humidity, and smoke detection, with leak detection cables surrounding cooling units and under raised floors to catch moisture at the source.

**Deep Infrastructure Integration:** The system interfaces directly with precision air conditioning units, UPS systems, and utility power distribution to monitor not just basic status but detailed operational parameters—from three-phase voltage/current to internal UPS component health (rectifier, inverter, battery).

**Unified Visualization & Analytics:** All data streams are aggregated into a single-pane-of-glass dashboard. This provides administrators with a real-time, holistic view of the entire facility's status, from power usage effectiveness (PUE) to thermal maps.

**Intelligent, Tiered Alerting:** Advanced analytics process sensor data against configurable thresholds. Any anomaly triggers immediate, prioritized alerts (via SMS, email, or visual/audible on-site alarms), enabling engineers to respond to threats before they impact operations.



## The Results: A Foundation for Uninterrupted Discovery

Since its deployment in June 2022, the intelligent monitoring system has become indispensable, delivering transformative outcomes for the Innovation Park:

**Guaranteed Business & Research Continuity:** By preventing environmental and power-related incidents, the system has virtually eliminated unplanned HPC downtime, ensuring that long-running, complex computational jobs complete successfully and on schedule, directly supporting the park's core research mission.

**Proactive Risk Mitigation & Asset Protection:** The ability to predict trends—such as a gradual rise in temperature or a drop in UPS battery efficiency—has enabled preventive maintenance, avoiding costly hardware failures and extending the lifespan of millions of dollars in computing equipment.

**Data-Driven Strategic Management:** The accumulation of historical operational data provides management with unprecedented insights for capacity planning, energy optimization, and informed budgeting for future upgrades, transforming facility management into a strategic function.

In summary, we provided more than a monitoring system; we delivered operational resilience and strategic insight. The Zhongguancun Hegu Innovation Industrial Park now has a future-proof digital infrastructure that actively protects its most critical asset—the power to compute, discover, and innovate without interruption.