



Unified Facility Architectures for Faster Deployment and Maintenance

The building management system (BMS) serves as the operational anchor for a data center's environmental health, overseeing the complex coordination of CRAC/CRAH units, pumps, chillers, and boilers. In the era of high-density AI clusters, cooling is no longer a static utility but a dynamic requirement that must scale with compute loads. The central challenge for modern BMS architectures is the protocol gap. Most mechanical cooling equipment communicates via legacy Modbus RTU, while the centralized management layer operates on BACnet/IP. To achieve real-time energy dispatching and rapid troubleshooting, facility operators require a high-speed, seamless translation layer that can unify these disparate systems into a single, actionable dashboard.

System Requirements

- **Thermal Optimization:** The network must provide the granular data necessary to optimize HVAC and server room cooling cycles. This involves tracking sub-second changes in temperature, flow rates, and pressure to prevent hotspots.
- **High-volume Monitoring:** Facilities are becoming increasingly dense, requiring the simultaneous monitoring of hundreds of chillers, pumps, and sensors. The solution must be cost-effective at scale without sacrificing data integrity.
- **Centralized Protocol Convergence:** The architecture must reliably convert a massive volume of southbound Modbus RTU signals from mechanical hardware into northbound BACnet/IP packets for the BMS workstation.

Why Moxa

- **High-density Protocol Convergence:** Our [MGate 5217 Series](#) is designed for large-scale BMS deployments, providing high-density Modbus-to-BACnet conversion. A single gateway manages numerous downstream devices, reducing hardware footprint and cabling complexity.
- **Simplified Troubleshooting and Maintenance:** Our [MGate MB3660 Series](#) gateways feature built-in traffic monitoring and diagnostic tools for quickly identifying wiring faults or protocol mismatches without expensive external analyzers. This minimizes maintenance overhead and significantly reduces mean time to repair (MTTR).
- **Cost-effective Scalability:** Moxa's high-port density solutions and intuitive web-based configuration speed up commissioning time for EPCs and contractors, lower total cost of ownership (TCO), and provide a scalable foundation for future cooling expansion.

