

Case Study

Embedding a BTL-Certified BACnet/IP Stack in a Medical Device

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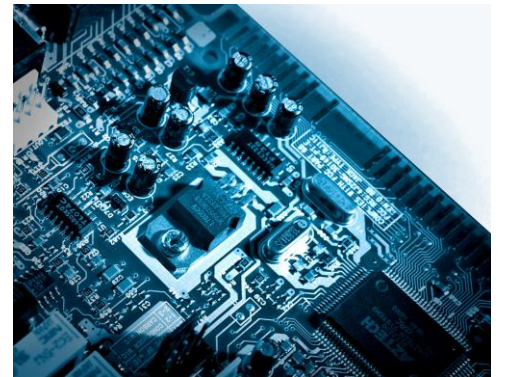
Overview

A manufacturer develops hospital-grade clean air devices intended for use in medical environment. The device required an **embedded BACnet/IP** interface so it could be integrated into building management systems during installation.

Because the product was designed for hospital deployments, the BACnet implementation also needed to achieve BTL certification, A requirement for acceptance in many hospital environments as well as commercial and institutional installations.

UV Partners licensed **Chipkin's BACnet Stack (CAS BACnet Stack)** and engaged Chipkin for **Pre-BTL testing services**. Chipkin supported the BACnet stack implementation, reviewed BACnet behavior against certification requirements, and prepared the device for formal BTL testing. This included executing BTL test plans, identifying conformance issues, and providing detailed guidance on required changes.

Chipkin also supported UV Partners during the official BTL testing phase by assisting with documentation review, test clarification, and issue resolution. This approach reduced iteration during certification and shortened the overall path to BTL approval.



Customer Goals and Challenges

The customer's goal was not simply to add BACnet, but to implement a BACnet interface that would integrate cleanly with BACnet BMS, reduce installation and commissioning effort, and achieve BTL certification. Certification was required to support deployment across a wide range of regulated environments, including hospitals, government buildings, and military facilities.

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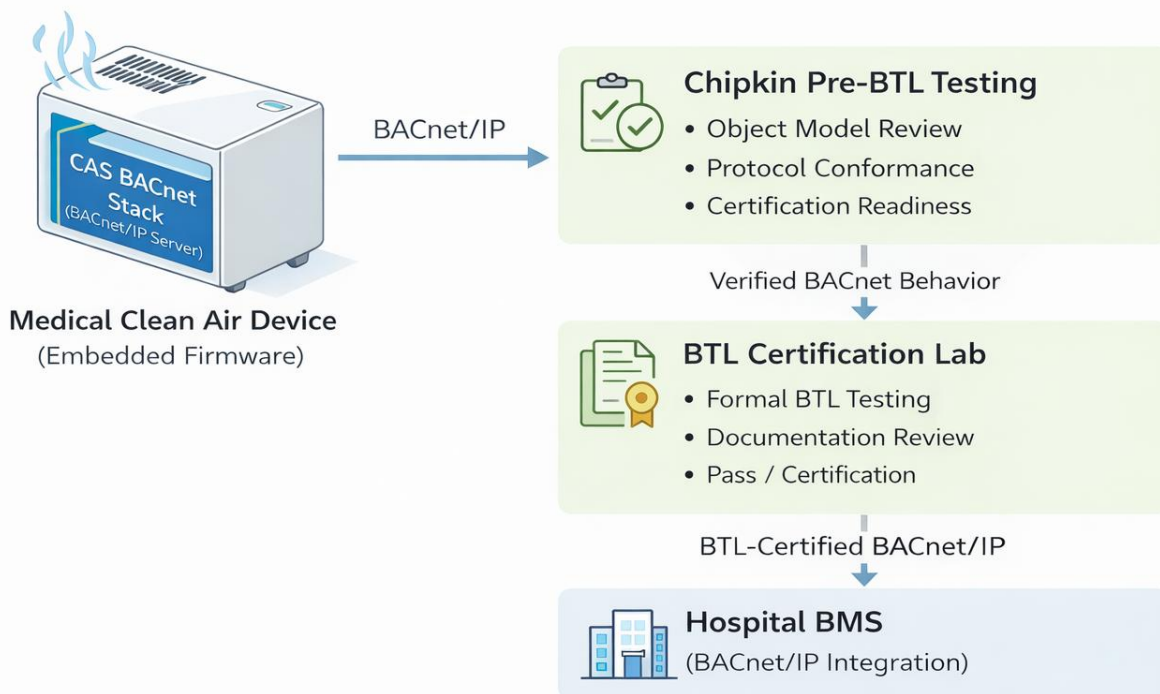


Figure: Embedded BACnet/IP implementation with Pre-BTL testing to reduce certification risk and accelerate hospital deployment.

Meeting these goals introduced challenges beyond basic protocol implementation. BACnet requires domain-specific design decisions, not just message encoding. Building automation systems expect consistent object models, standard services, and predictable runtime behavior. Many BACnet issues are subtle and do not become apparent until interoperability testing or formal certification begins.

- Successfully navigating these challenges requires deep experience in the BACnet industry, including:
- Understanding what constitutes a well-designed BACnet interface in real deployments
- Knowing how different BMS platforms interpret and rely on BACnet behavior
- Identifying common implementation pitfalls early, before they become costly to correct
- Anticipating how BTL test tools and real-world systems will exercise the device

Without this expertise, manufacturers often reach BTL testing with a “mostly working” implementation that still fails certification due to subtle but critical compliance issues.

Chipkin's approach to the solution

Our client licensed Chipkin's CAS BACnet Stack and engaged Chipkin to support the project from initial BACnet integration through BTL certification. The BACnet stack was embedded directly into the device firmware, providing a standards-compliant BACnet/IP interface suitable for regulated environments.

Chipkin provided end-to-end BACnet expertise throughout the project, including:

- Rapid integration of a proven BACnet stack into the embedded device
- Early review of BACnet object models and service behavior
- Certification-focused testing to identify issues prior to BTL submission
- Clear explanations of issues discovered and guidance on how to resolve them correctly
- Ongoing support during the official BTL lab testing phase

By addressing BACnet design and conformance issues early, the solution reduced rework during certification and provided a clear, controlled path from embedded implementation to BTL approval.

Results and Key Takeaway

The project resulted in a clean, standards-compliant BACnet/IP interface suitable for hospital and other regulated environments.

Key outcomes included:

- Reduced installation and commissioning effort for BACnet integrators
- Fewer issues encountered during formal BTL lab testing
- A faster and more predictable path to BTL certification
- Increased confidence that the device will interoperate reliably across a wide range of BMS platforms
- Successful completion of BTL testing, enabling deployment in hospitals and other facilities where certification is mandatory

For hospital-grade products, BACnet integration is not simply a software task—it requires industry expertise. By working with Chipkin from initial BACnet integration through BTL certification, the customer reduced risk, lowered support costs, and ensured the product was ready for real-world BACnet deployments.