



Seamless lab data streaming for Danfoss Climate Solutions

Client

Danfoss, a global leader in climate and energy solutions, is headquartered in Denmark and employs over 39,000 people worldwide. This project was carried out for the Controls and Thermal Management (CTM) division within **Danfoss Climate Solutions**, focusing on advanced innovations for refrigeration, air conditioning, heating, and district energy technologies.

Technologies

Java, Gradle, Ignition SDK, Apache Kafka, Avro, Apache Wicket, Confluent

Enabling scalable data streaming for RD&E innovation

Danfoss Climate Solutions and its CTM division piloted new approaches for RD&E lab data integration, enabling efficient, real-time test data streaming.

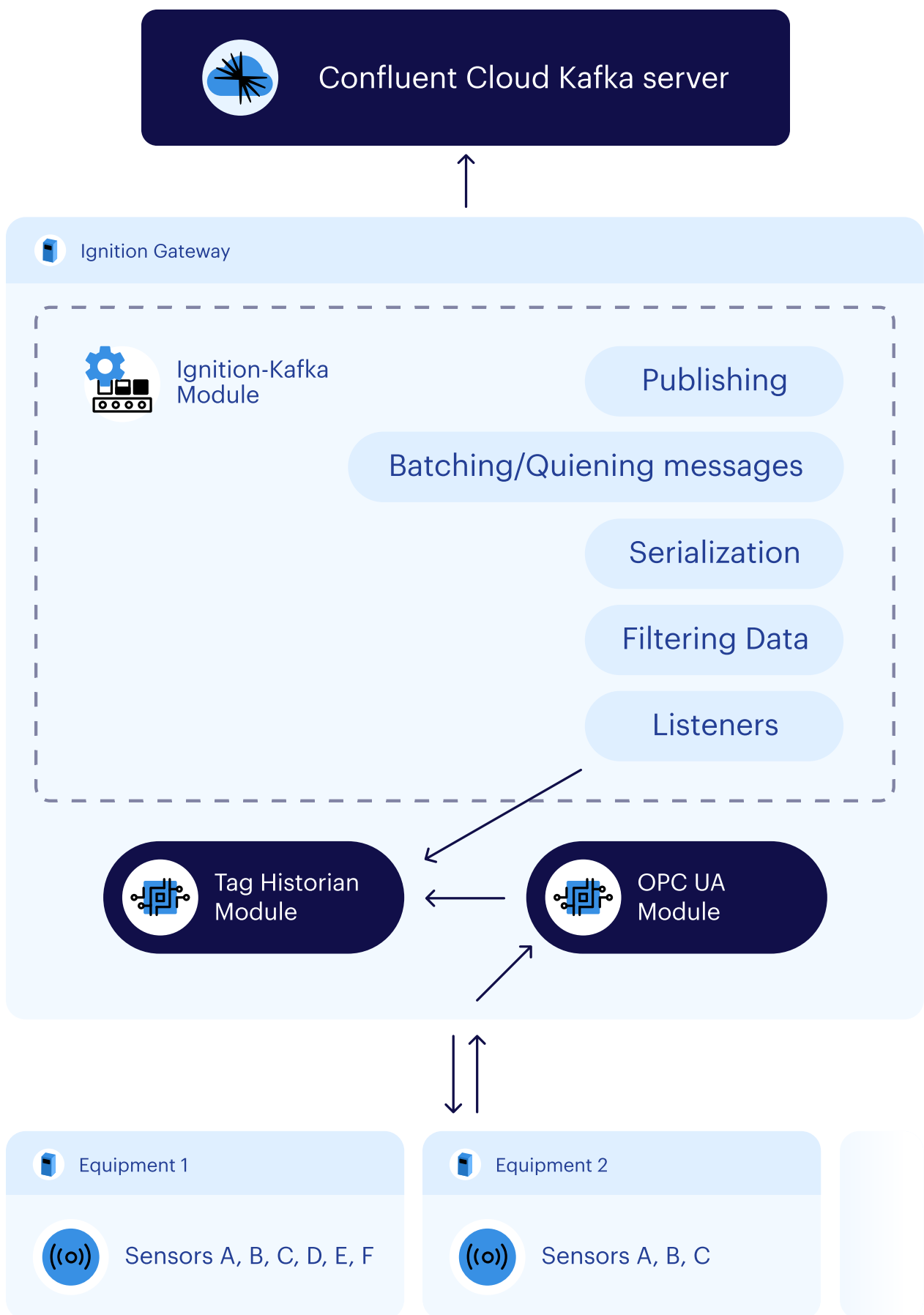
Challenge: Integrating RD&E test data efficiently

Danfoss Climate Solutions’ RD&E test labs, including those within the Controls and Thermal Management (CTM) division, generate valuable data to support product and process improvements. The team needed an efficient way to collect and transfer results from multiple test machines to central data systems for analysis and ongoing research.

Their existing Ignition SCADA setup, while important for daily test operations, did not offer a built-in method to stream data to Kafka. This made it difficult to scale data integration for future RD&E projects. The goal was to find a practical, admin-friendly solution focused on RD&E needs – one that would not require changes to live production environments.

Solution: Custom Ignition module for test data streaming in RD&E

To support RD&E teams with reliable access to test results, Proekspert piloted a custom module for Ignition SCADA, specifically designed for test environments. The module connects multiple lab machines to a central Kafka system using admin-configurable streaming. Integration with Ignition leverages the platform's tag-based architecture – by subscribing to tag change events, the module detects updated test data across a variety of lab devices.



Configuration is managed through an admin-facing interface, built using Apache Wicket, that allows lab specialists to set up Kafka connection parameters, define topics, and adjust critical policies (security, retries, timeouts) without needing specialist coding skills. Rather than introducing new data formats, the pilot made use of the client's existing Avro serialization, working with their team to ensure seamless compatibility with downstream analytics platforms and Confluent's Schema Registry.

Results: Proof-of-concept findings and technical learnings

The proof-of-concept demonstrated how custom data streaming from RD&E lab devices to Kafka can be implemented and tested within the Danfoss Climate Solutions environment.

Specifically, the project:

- Demonstrated the ability to stream test data to Kafka from lab devices using a custom Ignition module.
- Verified compatibility with the client’s established Avro serialization and downstream analytics tools.
- Piloted an admin-configurable setup for managing Kafka connections, topics, and operational policies, tailored for RD&E administrators.
- Evaluated the adaptability of integration patterns from other departments, identifying specific adjustments needed for RD&E workflows.

The project delivered hands-on technical knowledge and clarified what must be refined before any broader deployment in other labs. The system is not in production; further adaptation will guide the next phase.

Impact for the client’s RD&E organization

This proof-of-concept strengthened Danfoss Climate Solutions’ understanding of how to approach scalable data integration in their RD&E labs. The project validated technical concepts for streaming test data from lab equipment to central systems, provided hands-on experience for RD&E administrators configuring and managing the solution, and highlighted practical considerations for adapting these methods to lab workflows.

As a result, the client now has:

- **A proven integration approach that can inform future expansion** of test data streaming and analytics in RD&E.
- **Clear insights into necessary adaptations** to lab systems and configuration approaches before broader deployment.
- **A pathway for connecting additional lab equipment in the future**, using familiar, admin-friendly technologies and integration patterns.

This PoC provides a foundation for informed decision-making as Danfoss Climate Solutions evaluates next steps for digitalization, integration, and expansion of lab data capabilities within their RD&E operations.