

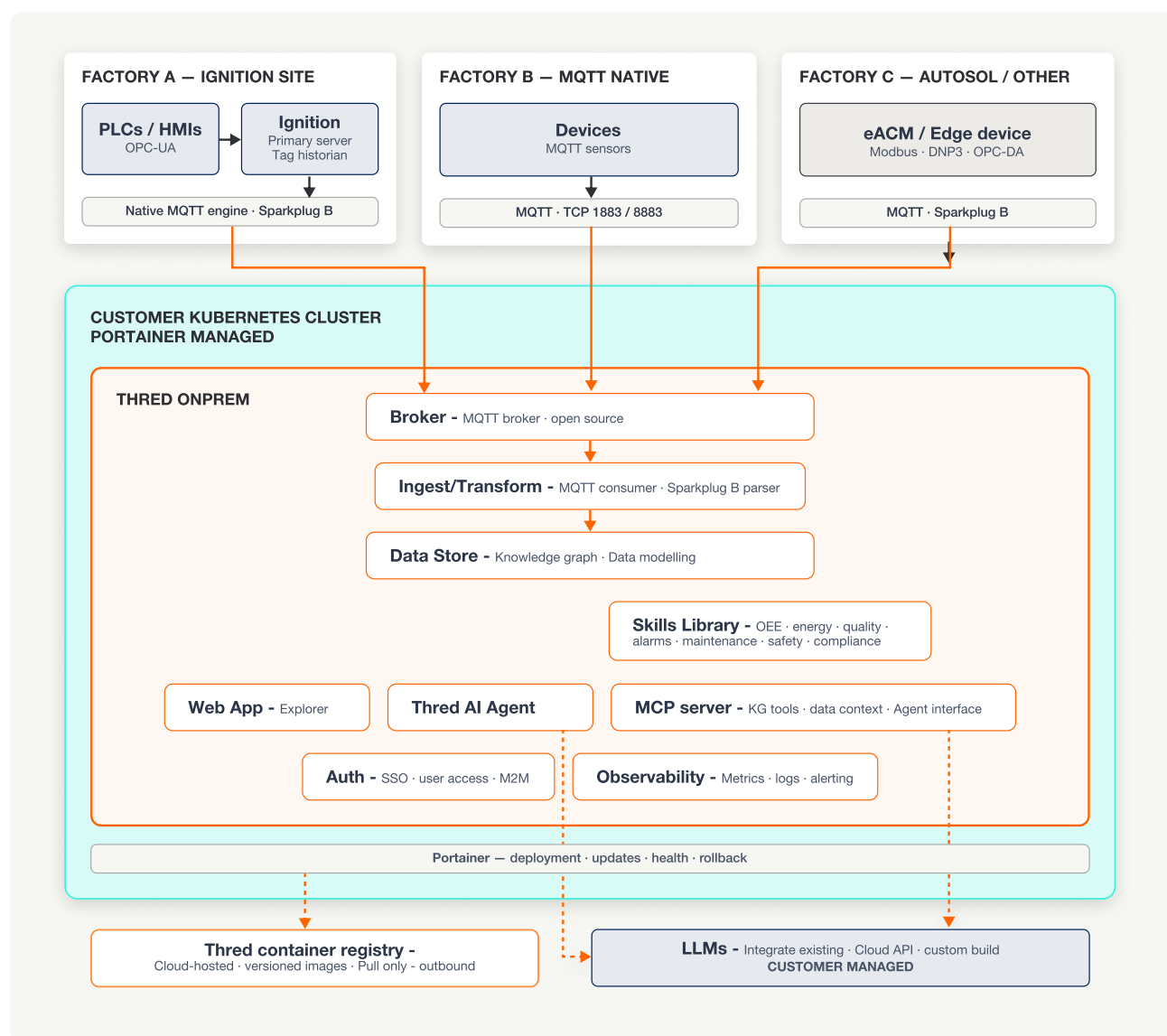
Thred on Portainer: An On-Premises Reference Architecture

How Ignition, MQTT, and OPC data become a plant knowledge graph, and how AI Skills turn that graph into answers, deployed and run entirely by Portainer without ever leaving your network.

Thred turns the operational data your plant already generates into a knowledge graph that provides practical, real-time answers. The entire stack runs inside your own Kubernetes cluster, deployed, updated, and kept healthy by Portainer.

Skills reach the graph through the MCP server. Each Skill is a documented engineering discipline executed against your own data, so new capability arrives as content, not a forklift upgrade, no change window, no re-integration.

Portainer deploys and manages the broker, ingest layer, data store, web app, agent, and MCP server, each as its own container, so updates, health checks, and recovery all run through a single, consistent operational layer rather than a collection of one-off scripts.



Two systems, one architecture

Thred turns plant data into answers on a cadence, shift by shift, month by month, quarter by quarter, not as a one-time project. Portainer ensures it runs everywhere, reliably and without leaving your network. Here's what each side is actually responsible for.

One graph, many answers: what Thred runs

- **Operations:** shift handover, operations reporting, monitoring and notification agents, live dashboards, conversational drill-down
- **Throughput:** OEE, downtime analysis, cycle time, process optimization
- **Quality:** SPC and capability analysis, golden-batch comparison
- **Efficiency:** energy optimization, building and HVAC audits, kiln and furnace performance, methane accounting, ESG and climate disclosure
- **Reliability:** preventative maintenance and RCM, fault detection and diagnostics, alarm rationalization, root-cause analysis, safety risk and incident investigation
- **Graph Health:** data-quality verification, Knowledge Index (an OEE-style score for the plant's own understanding), relationship and context building, veracity audit

New Skills are distributed to the same on-prem deployment, so the platform's capabilities grow without changing the architecture.

One deployment, every site: what Portainer runs

- **Deployment:** one manifest, every site, whether it's one line or ten plants across three continents
- **Updates:** new Skills and platform updates roll out through Portainer's pipeline, no manual per-site upgrade
- **Rollback:** a failed update reverts automatically, no on-site troubleshooting
- **Access control:** role-based access per site and per team, so a production operator isn't managing the cluster
- **Hardware:** runs on brownfield and legacy hardware from any vendor, no rip-and-replace to start
- **Network posture:** pull-only outbound registry access, everything else stays inside your network

Building the tenth site costs a fraction of what the first one took: same update, same rollback, same security posture, pushed everywhere at once.

What stays on-prem, and what doesn't

Portainer manages deployment, updates, health, and rollbacks for every component of the stack, on your infrastructure and under your control. Only two things ever reach outside the plant network: pulling versioned container images from Thred's registry (outbound only), and, only if you choose to use one, a connection to an LLM, which can be your own existing model, a cloud API, or a custom build you manage yourself. Nothing about running Thred requires shipping plant data to a public cloud.



ThredCloud is an industrial knowledge layer for Ignition and the wider industrial data ecosystem. It takes the OT data you already have, maps how everything connects with knowledge graphs and AI to make that context instantly explorable, and makes it searchable in plain language - so operators, engineers, integrators, and data teams can finally ask "why?" and get answers they can act on. Learn more at thredcloud.com

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Portainer is the world's leading container management platform, helping organizations deploy, manage, and secure containerized applications across Docker, Kubernetes, and edge environments without the specialist overhead. Portainer simplifies container operations through a consistent, intuitive interface designed for both developers and operations teams. Learn more at [Portainer.industries](https://portainer.io) follow Portainer Industrial & IoT on LinkedIn