

WEBINAR

Accelerating Digital Transformation and IIoT in Pharma Manufacturing with MQTT Sparkplug

Hosted By  **HIVEMQ**



Speakers



Ravi Subramanyan

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Ravi is a product management leader with extensive experience delivering high-quality products and services that have generated revenues and cost savings of over \$10B for companies such as Motorola, GE, Bosch, and Weir. His expertise spans industries such as Mining, O&G, Industrial Automation, Automotive, Mobile Devices, Enterprise communications, Automotive and Fleet Management. He also has technical expertise in Data Analytics, Artificial Intelligence (AI), Big Data, Data Security, Product Marketing, Product Engineering, Cloud Platforms, SaaS/PaaS, and Agile Methodologies.



Speakers



Ryan Dussiaume

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Ryan is a software developer by trade with a passion for learning how the latest advancements in software development processes and technologies can be leveraged to the benefit of individuals, teams and businesses. This led to past roles as a platform product manager, bringing multiple enhancements to market focused on the operational aspects of middleware and cloud native technologies, as well as addressing the needs of internal stakeholders such as Site Reliability Engineering and Support teams for SaaS platforms. He is now using this experience to help companies on their journey to Industry 4.0.



Future of Pharma Manufacturing



Automation



Cybersecurity



Advanced Analytics



Pharma 4.0



Smart Sensors



Cloud Computing



AI / ML



Challenges for Pharma Manufacturing



- Constrained supply chains caused due to pandemic
- Additional regulatory reporting due to increased productions
- High cost of operations
- Need to streamline production to meet demands

Goals for Digital Transformation



- Access to real-time data
- Visibility of operations throughout the manufacturing process
- Interlinking manufacturing processes to ensure data integrity.
- Modular automation in a manufacturing plant,
- Scaling pharmaceutical production per demand
- Identifying bottlenecks in process and improve efficiency
- Maintaining electronic batch manufacturing records
- Automate regulatory reporting



Digital Transformation in IIoT



Cultural

- Agility
- Experimentation
- Iteration & Fast failure
- DevOps

Technological

- Containerization & Cloud Native
- SaaS, PaaS, IaaS
- Big Data & Analytics
- Artificial Intelligence

- Reliable
- Scalable
- Secure
- Observable
- Flexible



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Reliability is the most important factor for Pharma

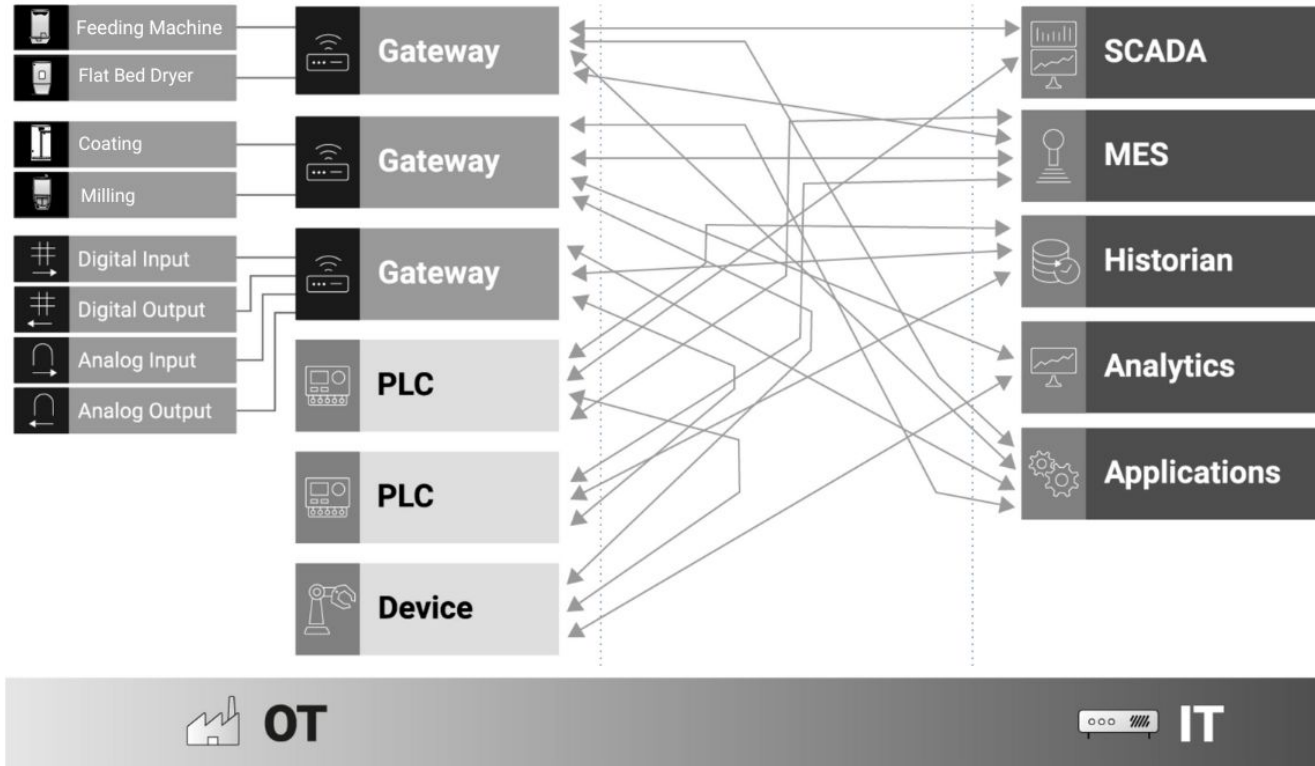
- **Reliable**
- Scalable
- Secure
- Observable
- Flexible

Lots of Data Silos





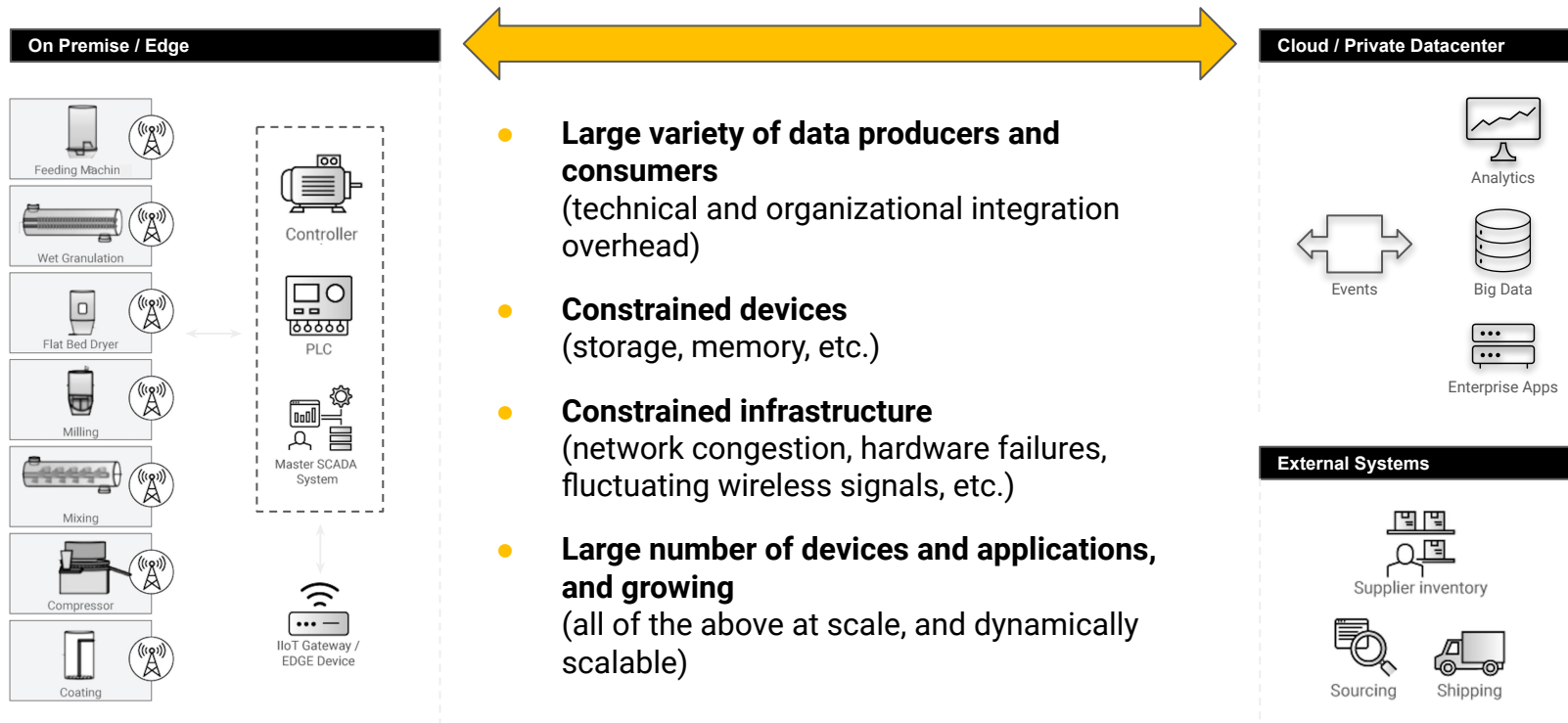
Siloed OT Systems - No Interoperability



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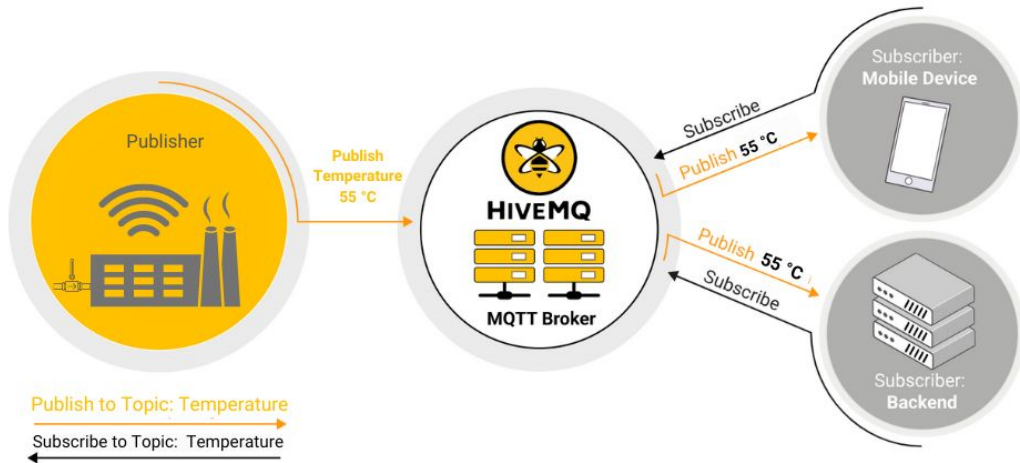


Bridging the Gap Between Industry 3.0 and 4.0

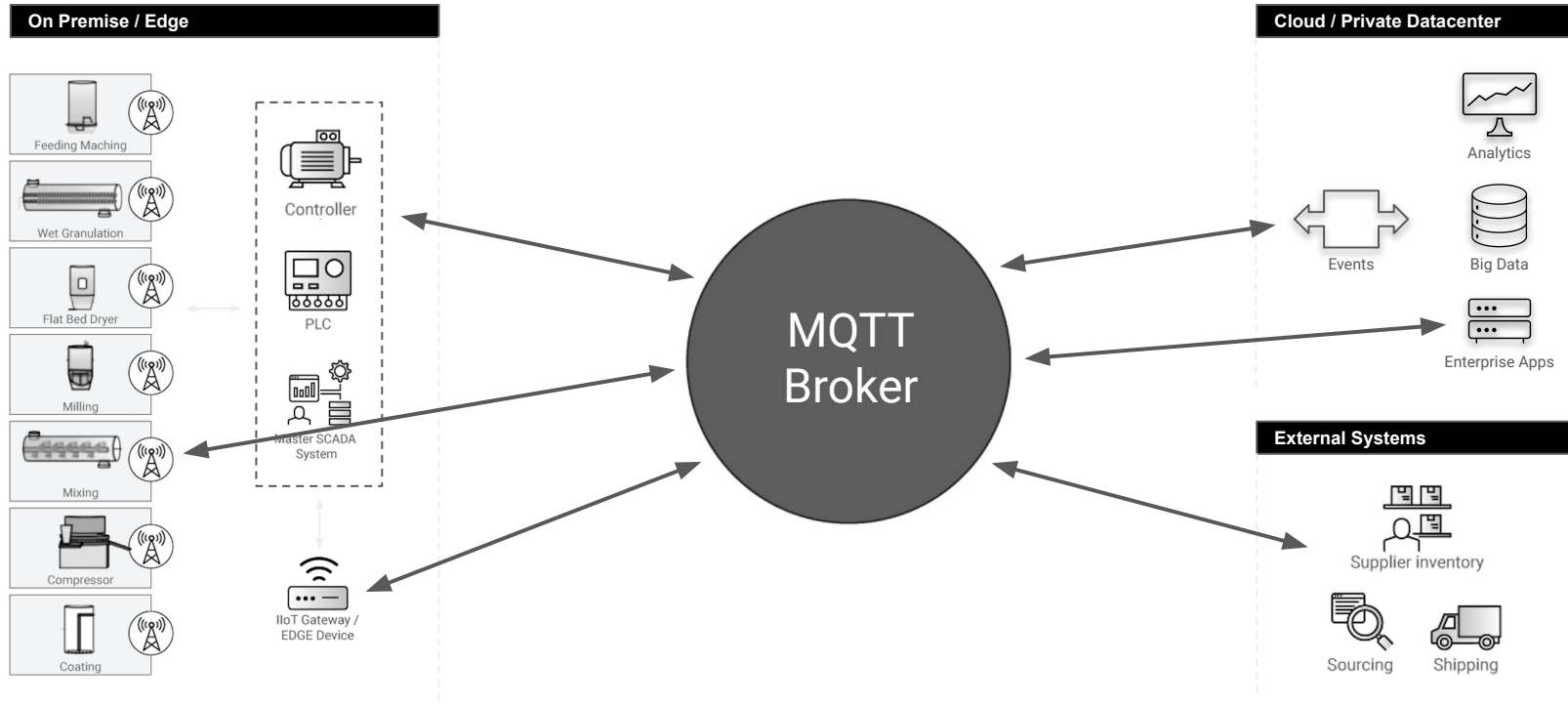


What is MQTT?

- A standard binary publish-subscribe messaging protocol designed for fast and reliable data transport between devices especially under very constrained conditions
- Constraints include unreliable network connectivity, limited bandwidth, limited battery power, and so on
- Built on top of TCP/IP
- Ideal for the Industrial Internet of Things



MQTT Message Broker to Connect Producers and Consumers



What is Sparkplug?



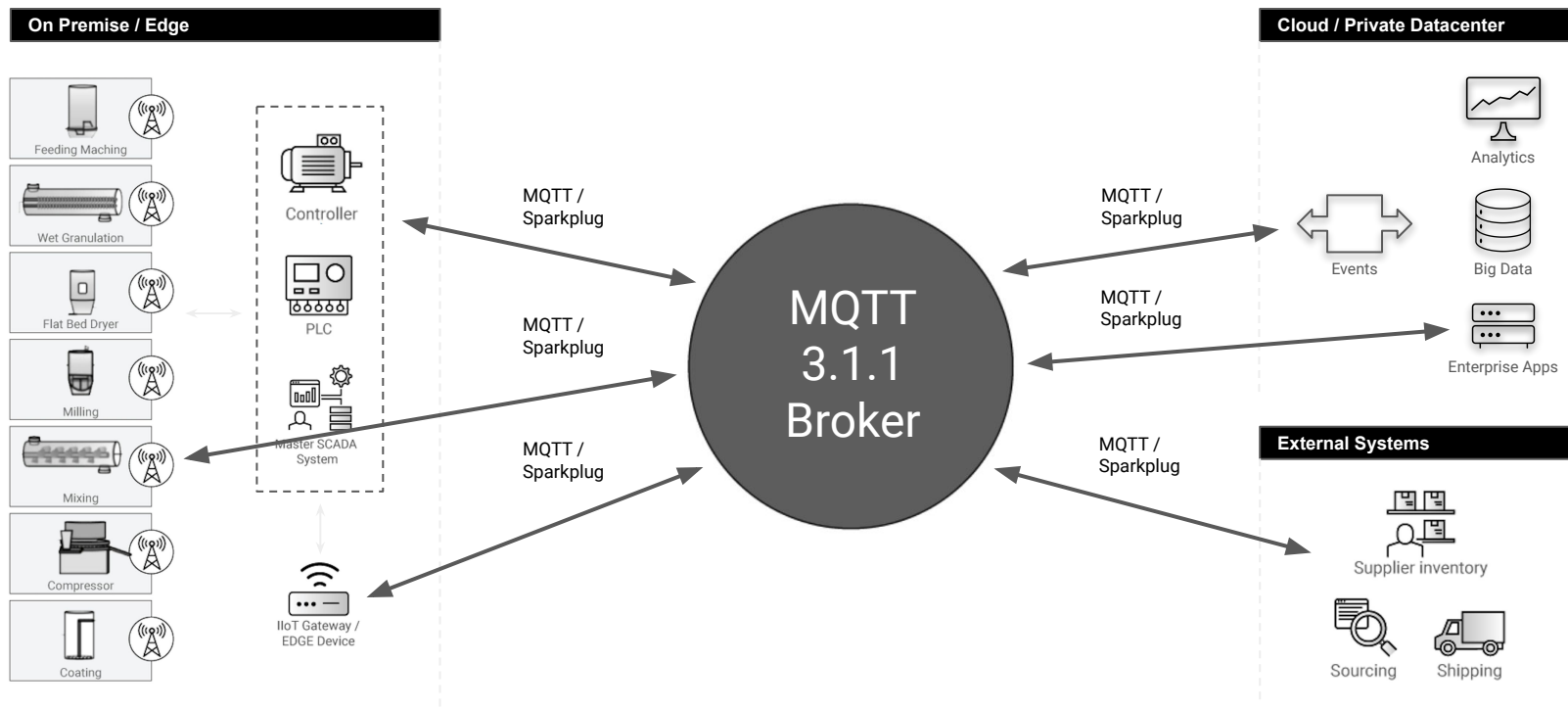
Sparkplug

KEY CONCEPTS

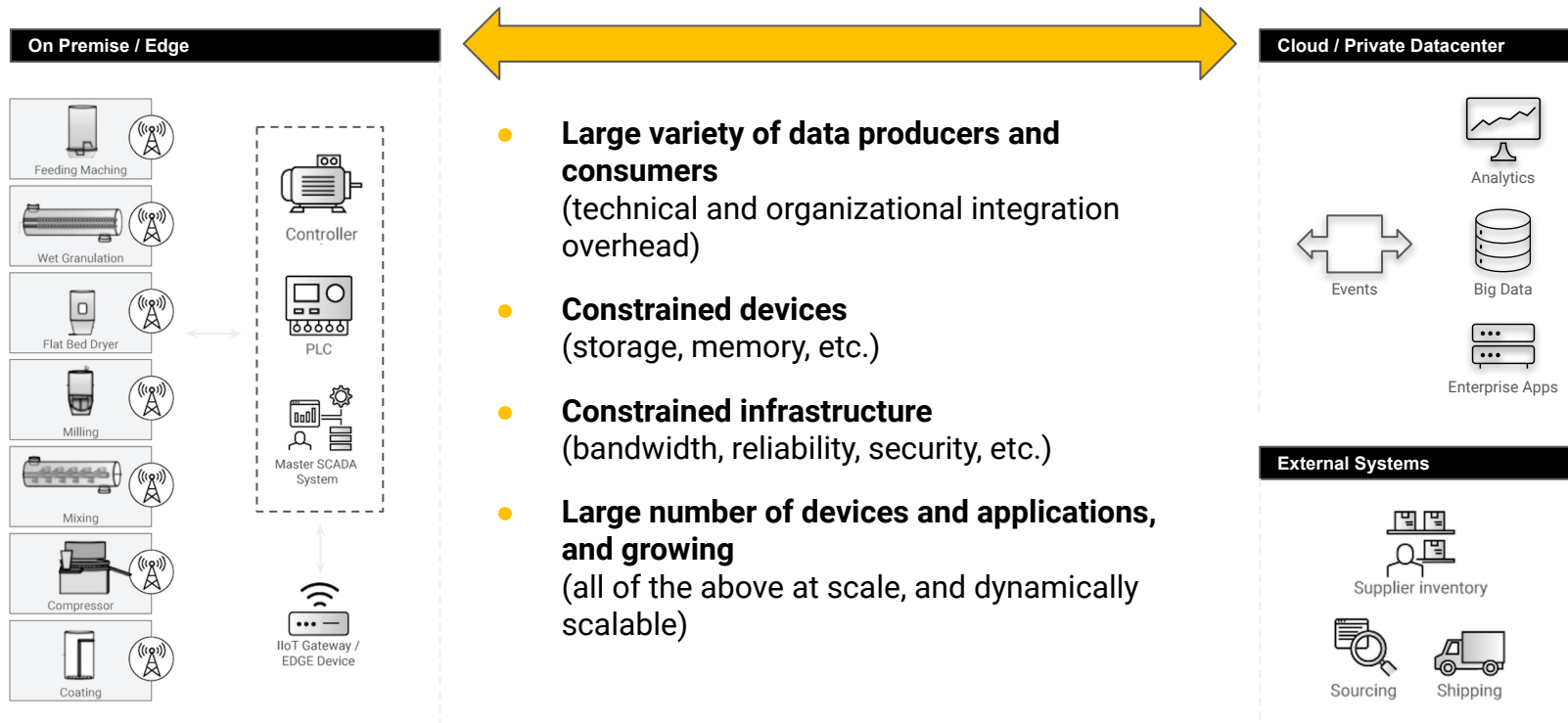
- Specifies how to use the MQTT protocol
- Provides MQTT end-users a bidirectional, near plug-and-play experience with their IoT devices.
- Defines:
 - Topic namespace
 - Data Model and Structure
 - Extensible process variable payload
 - Defines MQTT state management
- Enables:
 - Interoperability
 - Consistency
 - Efficiency
 - Agility



Sparkplug for Producer and Consumer Integration

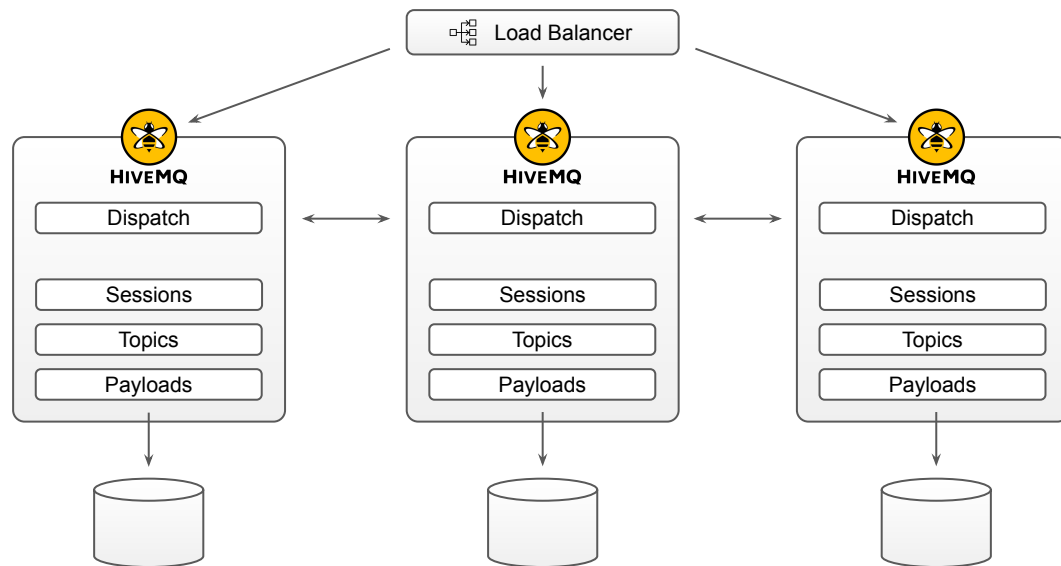


Are we missing anything?

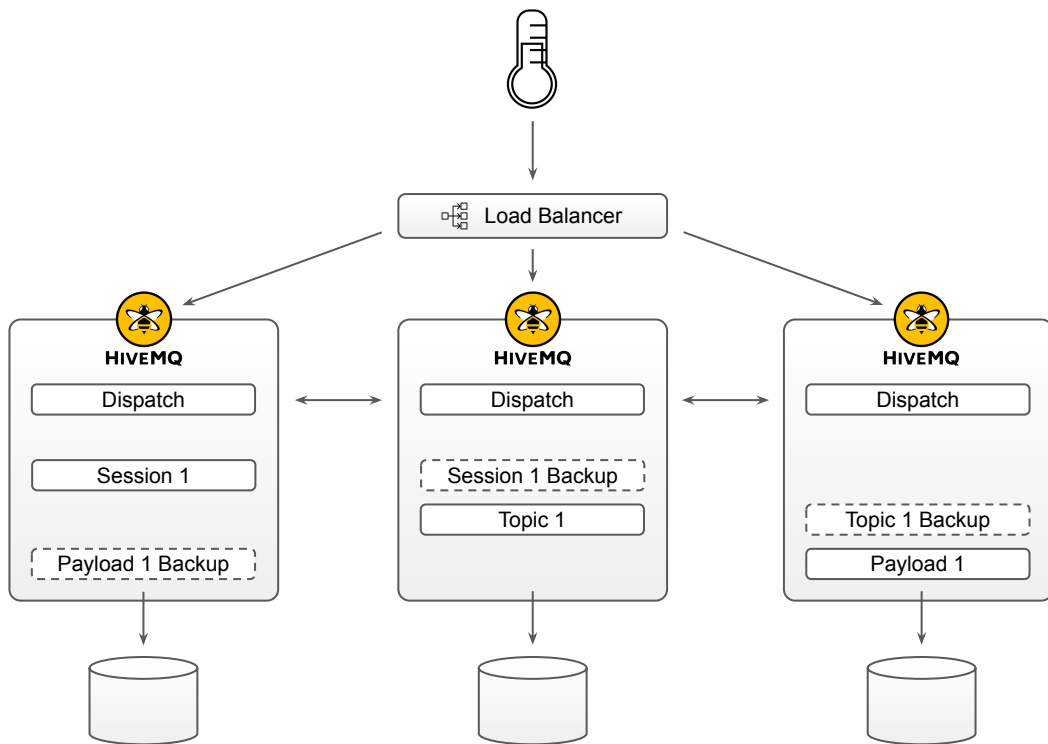


Masterless Cluster Architecture

- ▶ **Masterless Load Balancing:** Each broker can determine the best way to distribute load throughout the cluster, making deployment configuration simple and less error prone
- ▶ **Balanced by Data, Not Clients:** Client activity in terms of message size and number of topics can vary dramatically, so balancing by data, instead of by client, is necessary for speed and efficiency
- ▶ **Data Persistence:** Storing data in persistent storage, rather than keeping it only in memory, is necessary in order to avoid data loss

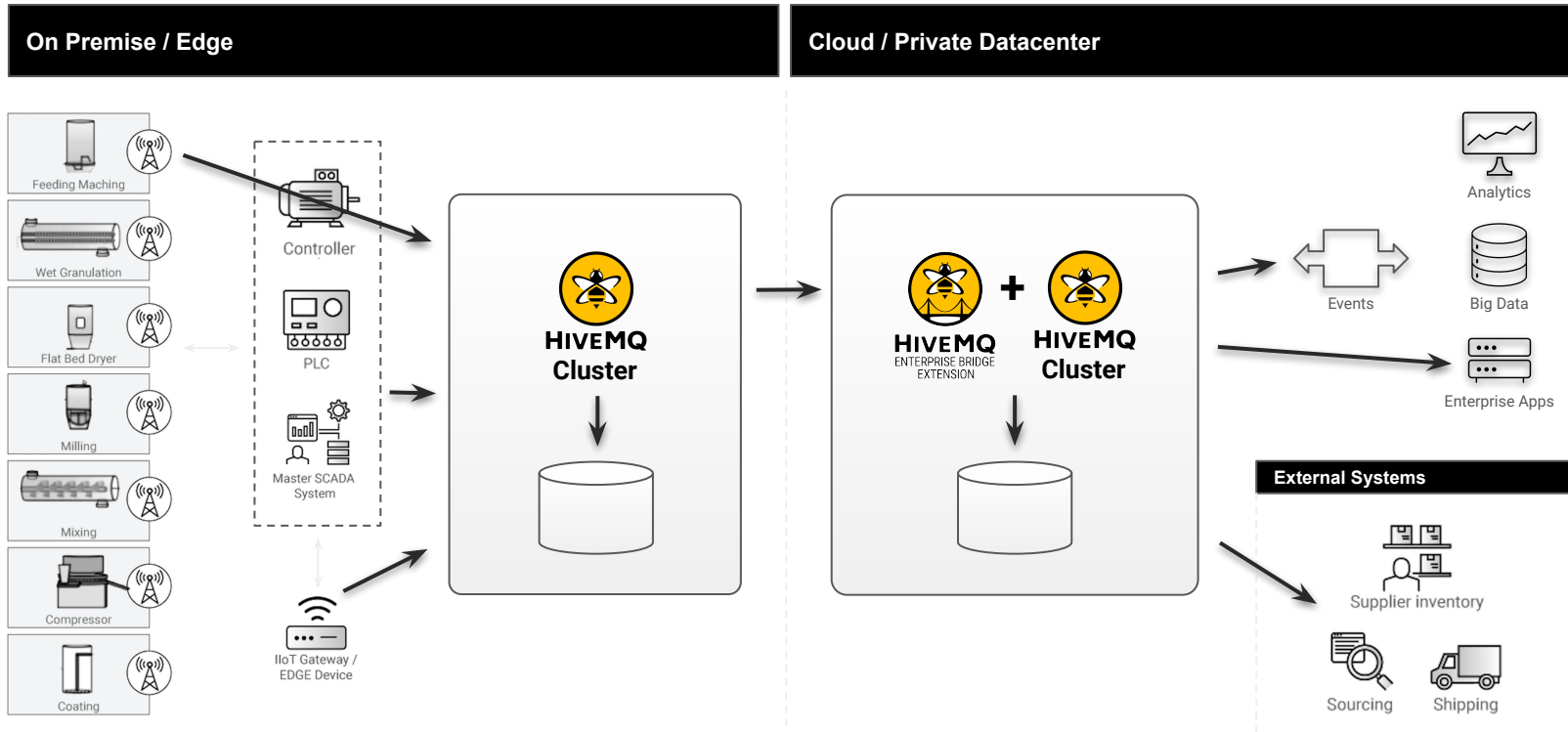


High Availability - Replication

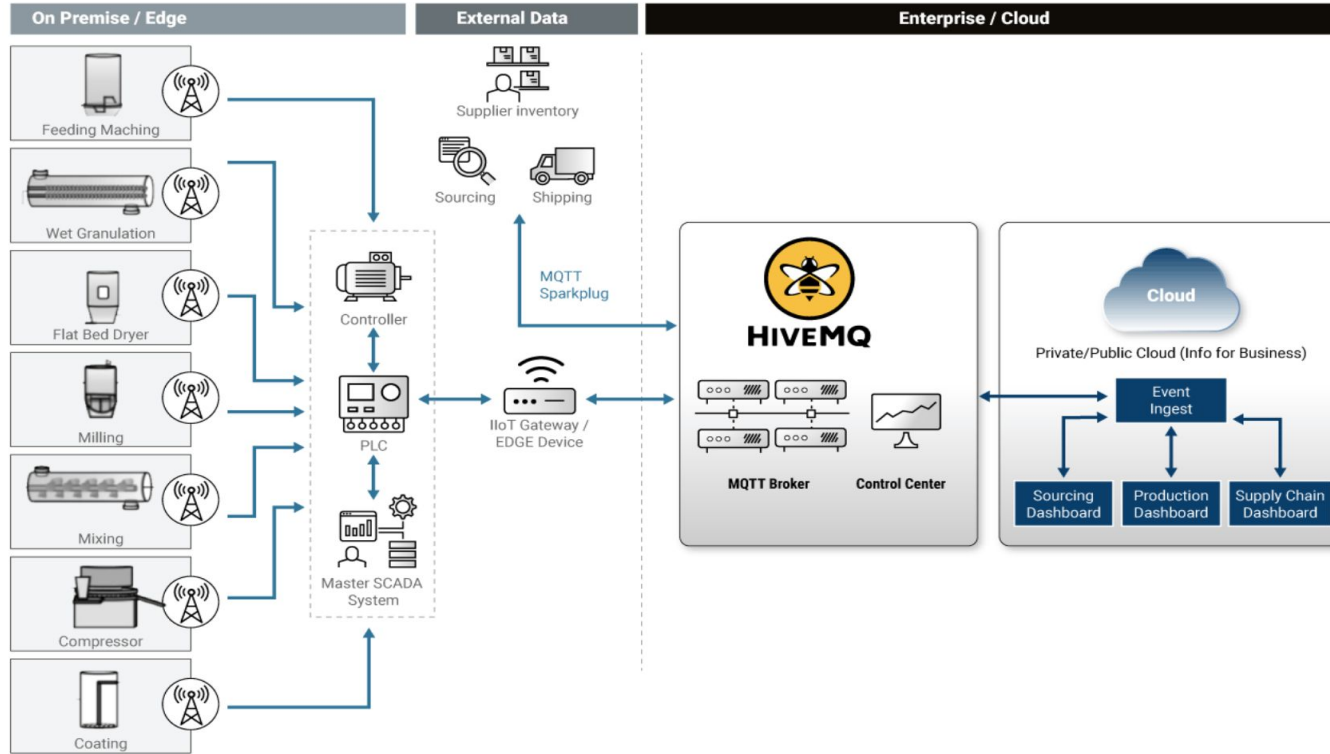


- ▶ **No Single Point of Failure:** There are copies of all data on separate cluster nodes, meaning that if a node unexpectedly exits the cluster there is no service degradation
- ▶ **Rolling Upgrades:** Upgrading a node requires the node to go offline, but upgrading nodes one by one will not result in downtime
- ▶ **Rebalancing:** The level of replication is maintained, even when nodes leave the cluster, maintaining performance and reliability
- ▶ **True QoS:** Replication, and persistence of replicated data, is part of the QoS flow, meaning the broker does not confirm receipt until the data is protected

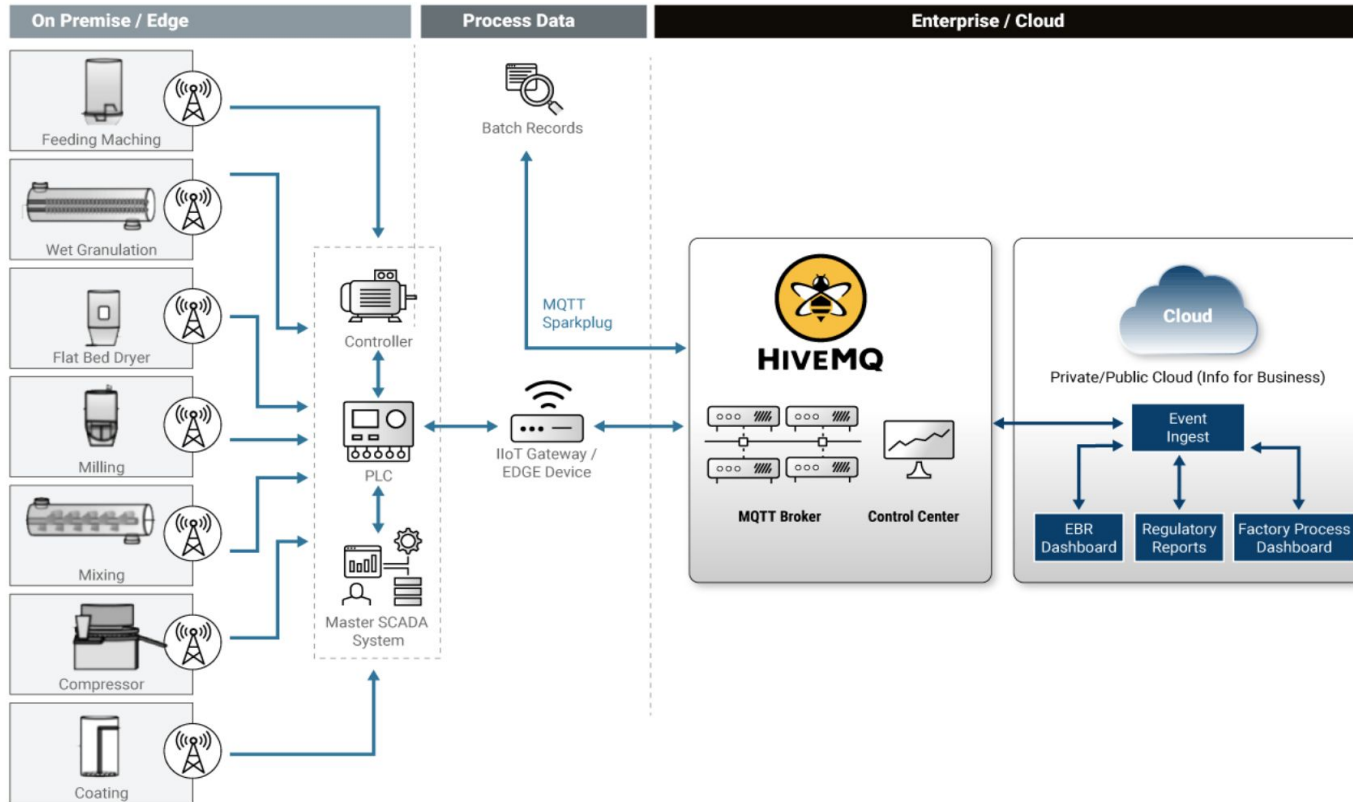
Broker Bridge for Edge Cache



Use Case 1: Pharma Supply Chain Optimization



Use Case 2: Regulatory Reporting Enablement



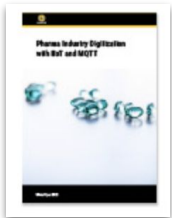
Next Steps



New to MQTT? [Get the MQTT Essentials e-Book](#)



New to MQTT Sparkplug? [Get the MQTT Sparkplug Essentials e-Book](#)



Read our whitepaper [Powering Digitization in the Pharma Manufacturing Industry with IIoT and MQTT](#)



Next Steps



[Get started with HiveMQ for free today!](#)



**ANY
QUESTIONS?**

THANK YOU

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