

WEBINAR

Modernize Your Industry 4.0
Architecture with UNS, ISA95
and MQTT Sparkplug



HIVEMQ



Speaker



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Kudzai is Technology Communicator and Founder at Industry40.tv. He is currently involved in four efforts: Industry4.0 Research, Educational Videos, Podcast Host, and IIoT Systems Integration. He has a background in Embedded Systems Design, Software Engineering, and Industrial Automation.



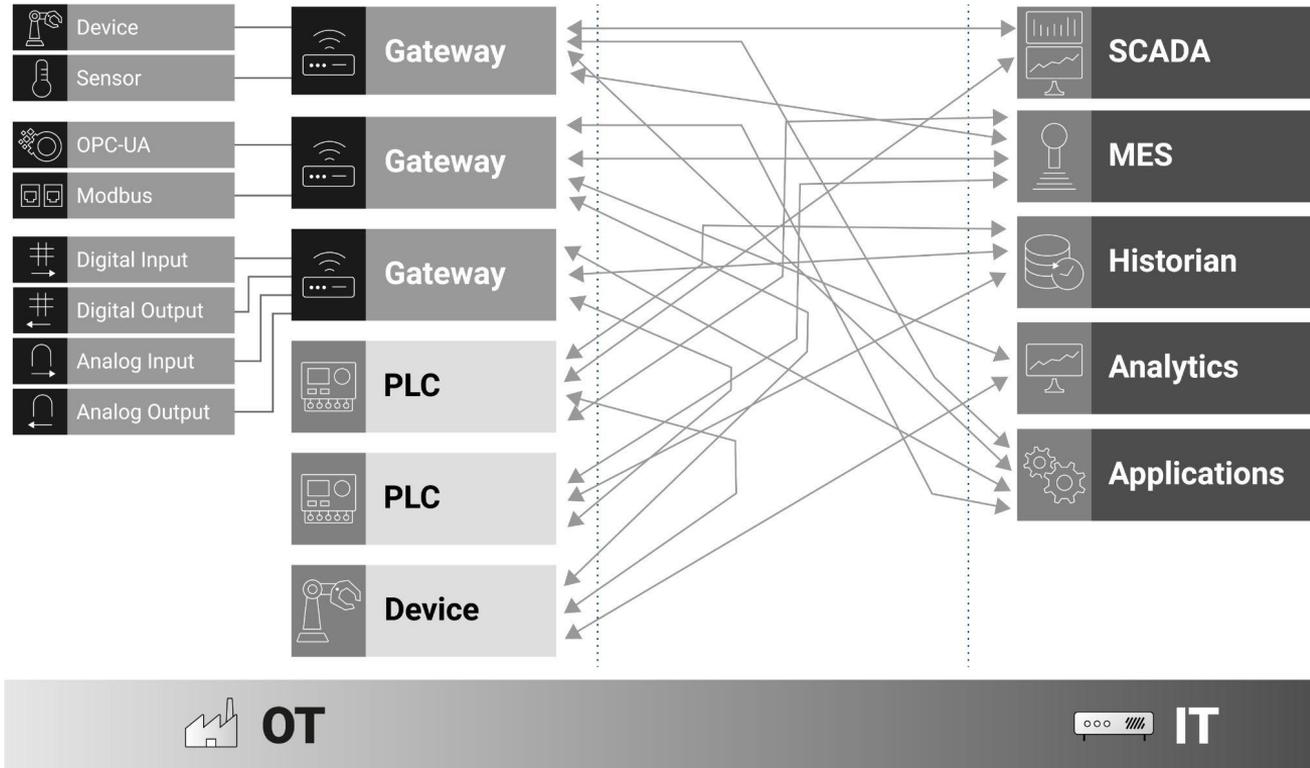
Why Lot-Size-One?



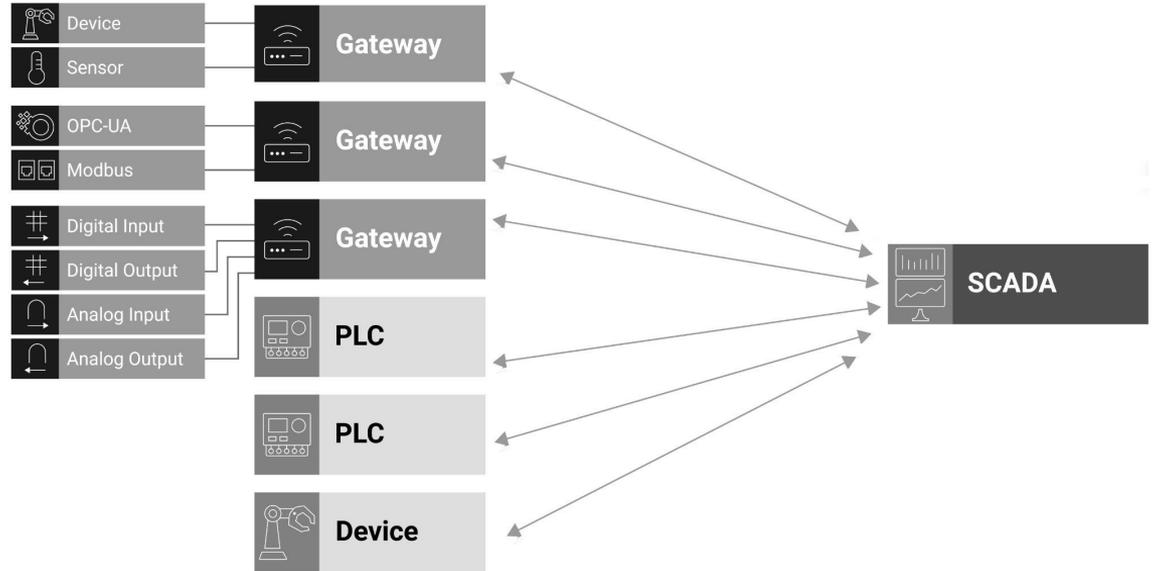
Introducing The Unified Namespace Network Architecture

WHY IT MATTERS FOR SMART MANUFACTURING

Traditional Manufacturing Systems Interconnection



Industry 3.0 Architectural Challenges



 OT

 IT

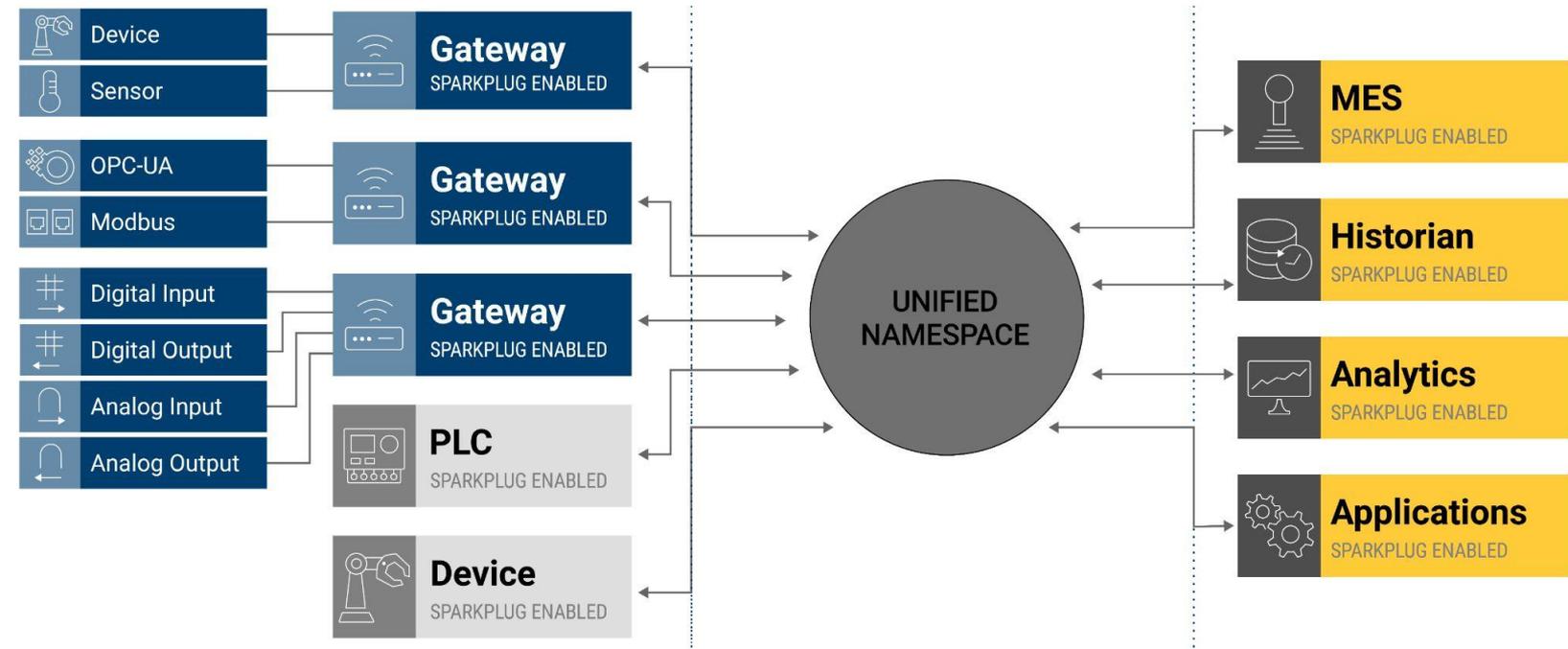
Industry 3.0 Summary

HARD TO MANAGE

TIGHTLY COUPLED

NOT SCALABLE

Unified Namespace System Architecture

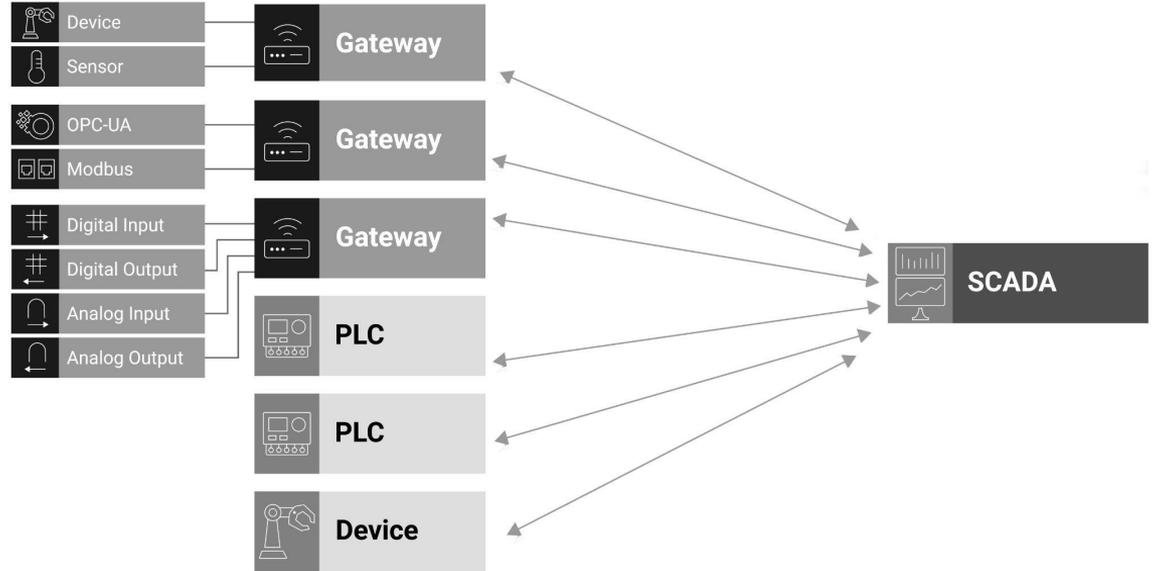


OT



IT

IMPLEMENTING A UNIFIED NAMESPACE

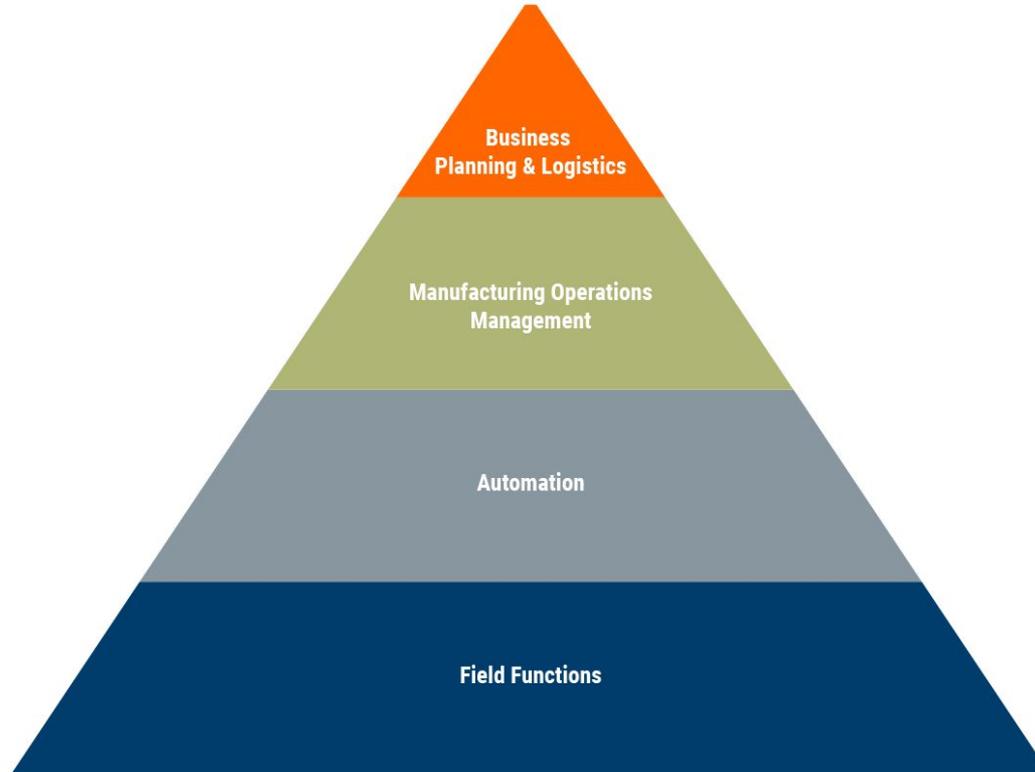


 **OT**

 **IT**

Introducing ISA 95

Pyramidal Architectural Structure

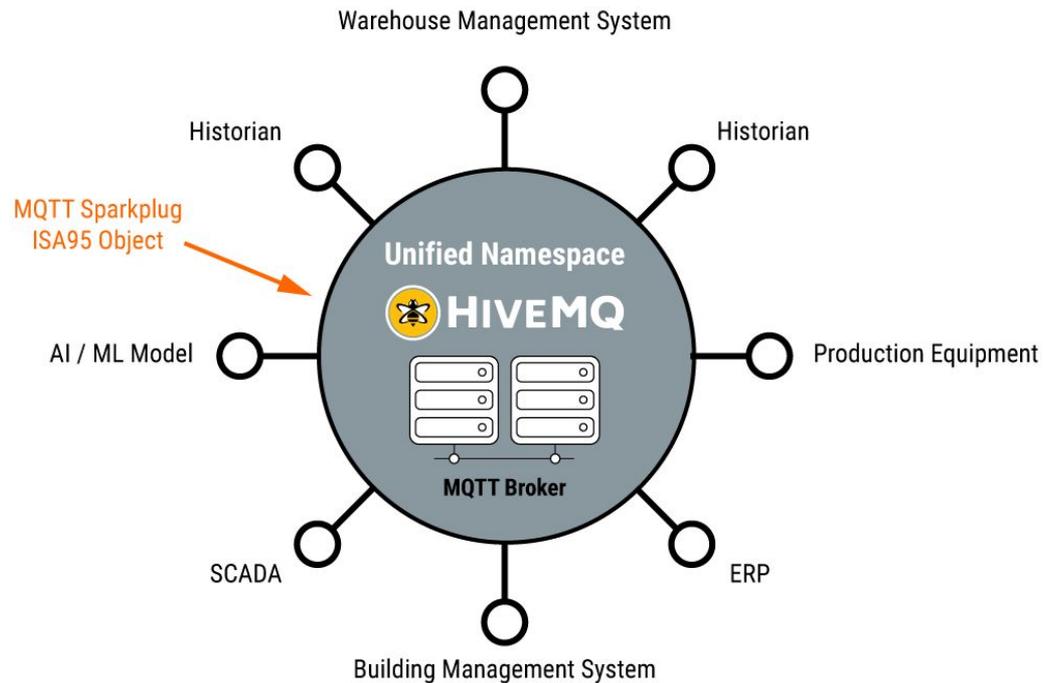


Dennis L Brandl - Original ISA 95 Developer

“Even though it is not imposed by the ISA95 standard, one traditional implementation of the ISA95 functional model into a physical architecture is a pyramidal network-and-system architectural structure.”

“Can the concepts of ISA95 that have been well understood and accepted in industry be used in the context of Industry 4.0/smart manufacturing? Yes, by “simply” replacing the hierarchical pyramid with the networked activity model that is also defined in the ISA95 Part 3 standard”

Unified Namespace and ISA 95



How ISA 95 Works

Top-Floor

MANUFACTURING EXECUTION SYSTEM (MES)

coordinating materials

coordinating the personnel

Reporting to top-floor

coordinating the equipment

taking requests from top-floor

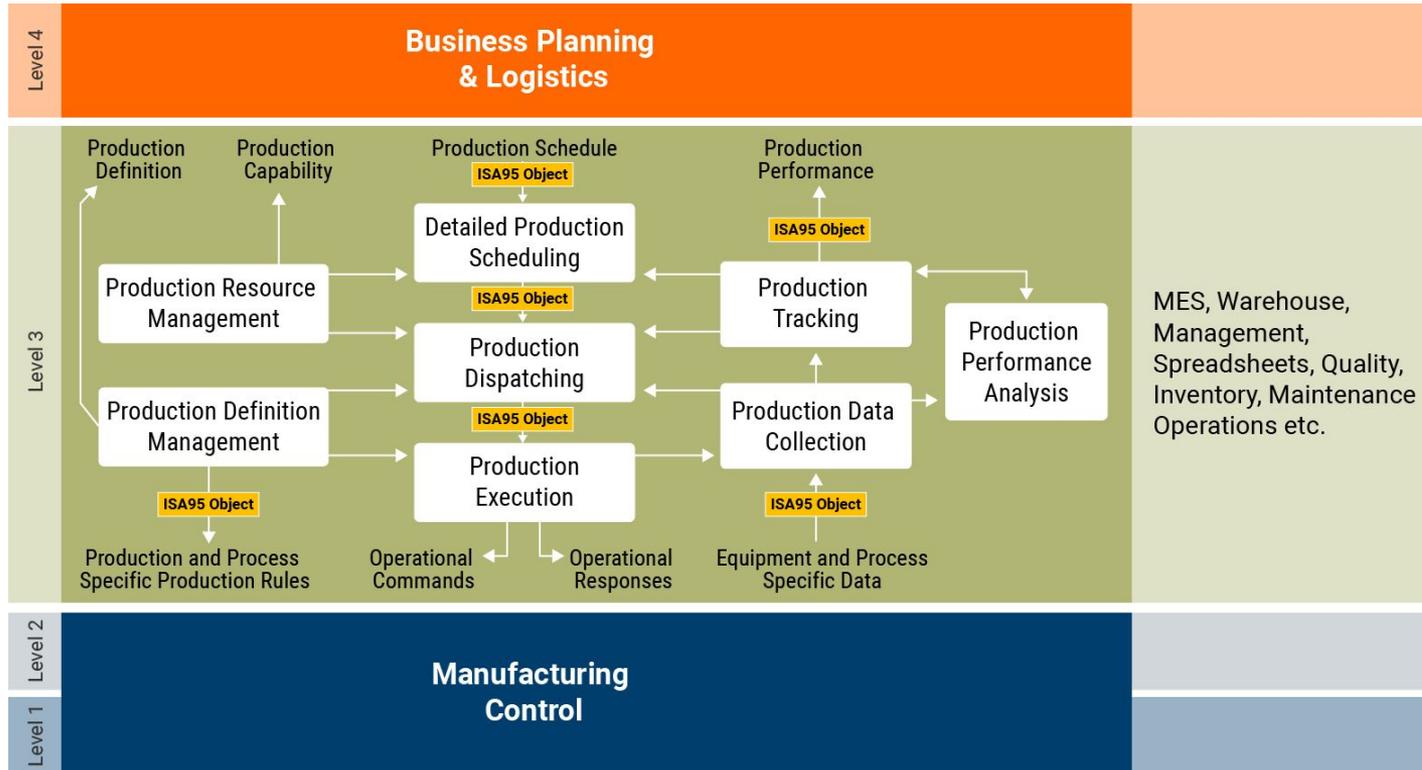
Executing request

Shop-Floor

ISA 95 Levels

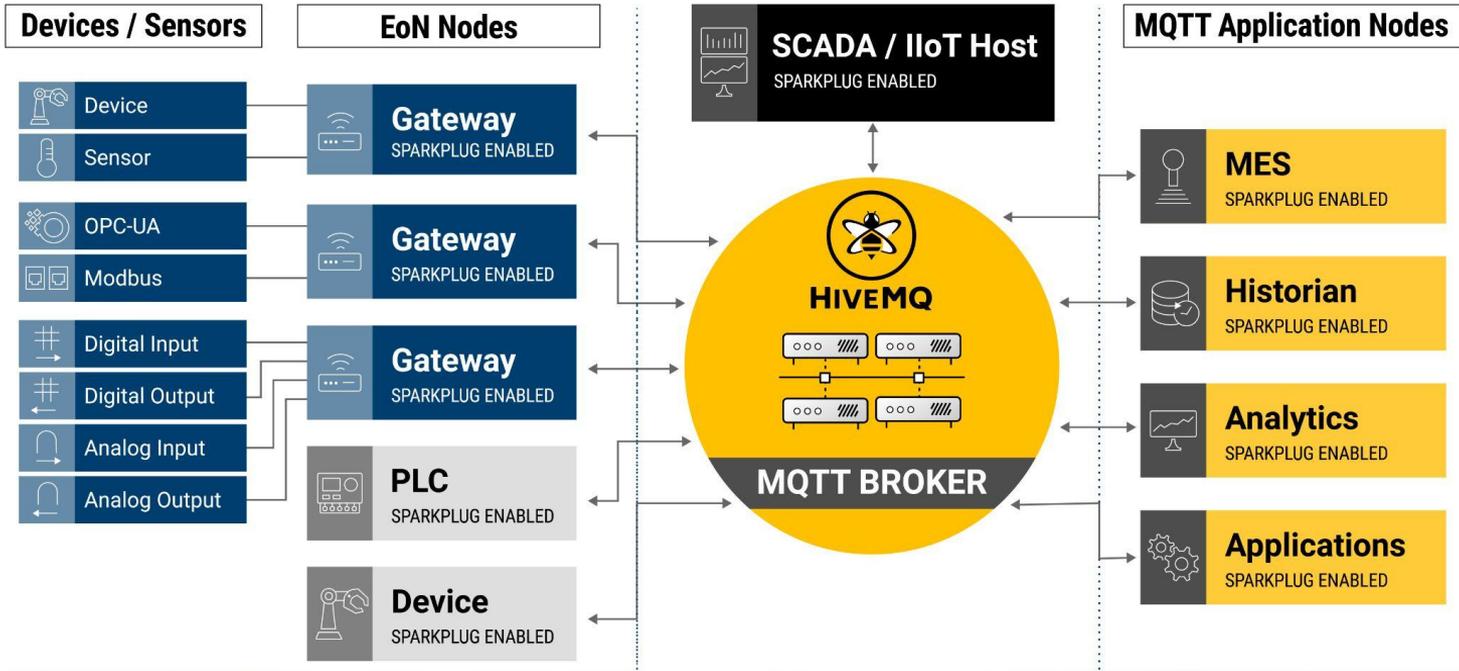
Level 4	Business Planning & Logistics	Establishing basic plant schedule - production, material use, delivery, and shipping. Time frame: month, weeks, days, shifts.
Level 3	Manufacturing Operations Management	Work flow / Recipe control to produce the desired end products, maintaining records, and optimising the production process. Time frame: shifts, hours, minutes, seconds.
Level 2	Manufacturing Control	Monitoring, supervisory, and automated control of the production process.
Level 1		Sensing and manipulating the production process.
Level 0	Production Process	The physical production process.

ISA 95 Objects



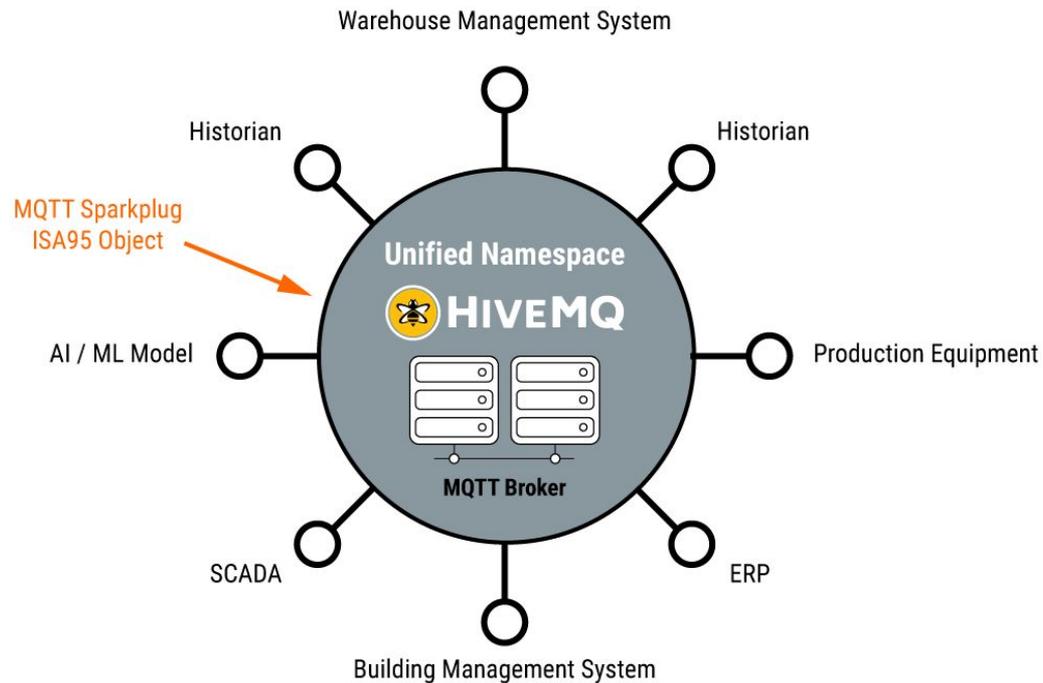
Introducing MQTT Sparkplug

Sparkplug Architecture



Sparkplug Unified Namespace Implementation with ISA95 Models

Unified Namespace and ISA 95



Using Sparkplug to Map ISA 95 Enterprise Structure in a UNS Architecture

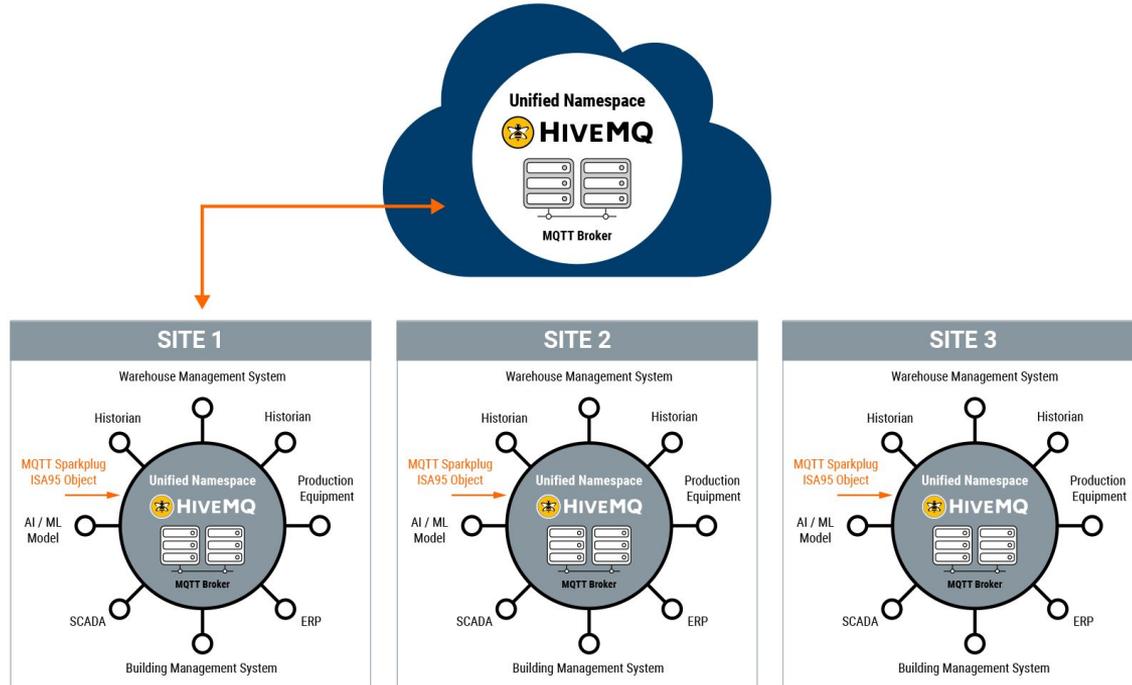
Structuring Data Sources with ISA 95

Enterprise => Site => Area => Line => Cell

Sparkplug Example

```
{  
  "timestamp": 1486144502122,  
  "metrics": [{  
    "name": "Enterprise/Site/Area/Line/Cell",  
    "alias": 1,  
    "timestamp": 1479123452194,  
    "dataType": "String",  
    "isHistorical": false,  
    "value": "Test"  
  }],  
  "seq": 2  
}
```

Multi-Site Unified Namespace Architecture



Conclusion

ANY QUESTIONS?

Reach out to community.hivemq.com



Next Steps



Read the Whitepaper

[Smart Manufacturing Using ISA95, MQTT Sparkplug and the Unified Namespace](#)

Additional Resources



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

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

Get started with HiveMQ today: <https://www.hivemq.com/downloads/>

THANK YOU

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