# AWS re:Invent

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MFG302

# Modernizing MES in the cloud

Steve Blackwell
WW Tech Leader Manufacturing
AWS

Jan Metzner
Manufacturing Specialist Solutions Architect
AWS

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# What you get out of this chalk talk?

Features of modern manufacturing systems

Let’s build your modern manufacturing architecture

Live demo with AWS Services

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# What are YOUR drivers to modernize a MES

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# Strategic topics detailing why customers are (re)building their MES

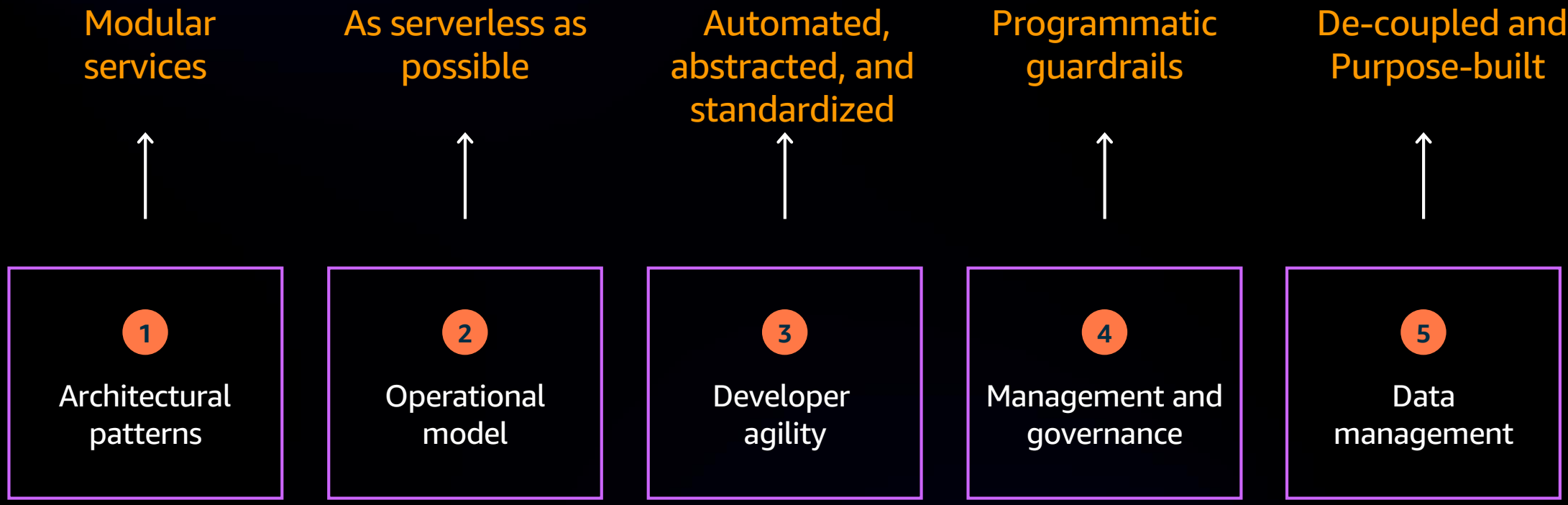
- Current MES is not suitable for new products
- Data-driven manufacturing
  - Connect the data between research and development, planning, production, and after sales
  - Share data with suppliers
- Real-time interaction
  - Reporting/KPIs
  - Automated process optimization
- New infrastructure
  - Automate machine integration
  - Integrate wearables and other devices

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# Building a modern manufacturing application

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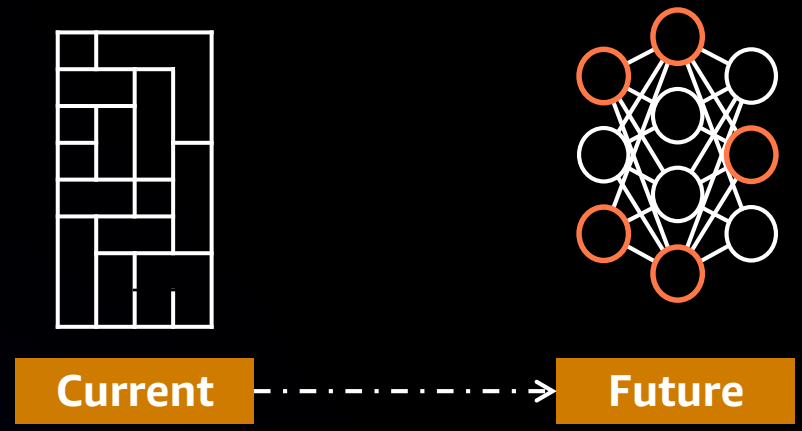
# How to build a modern application?




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# Benefits of microservice architecture

- Reduction of complexity
- Each service is independent and enables modularity
- Independent development
- Service independence and flexibility
- Independent deployment
- Changes have no hard dependencies
- Independent scalability
- Each service can scale to meet capacity and availability




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# The challenge

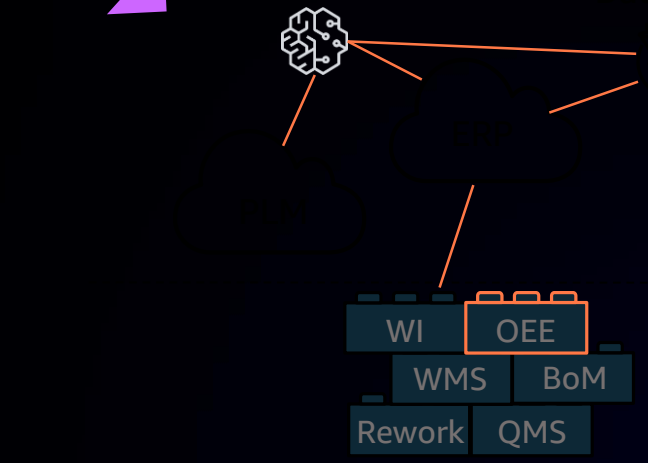
## From complex, layered architecture to small autonomous services

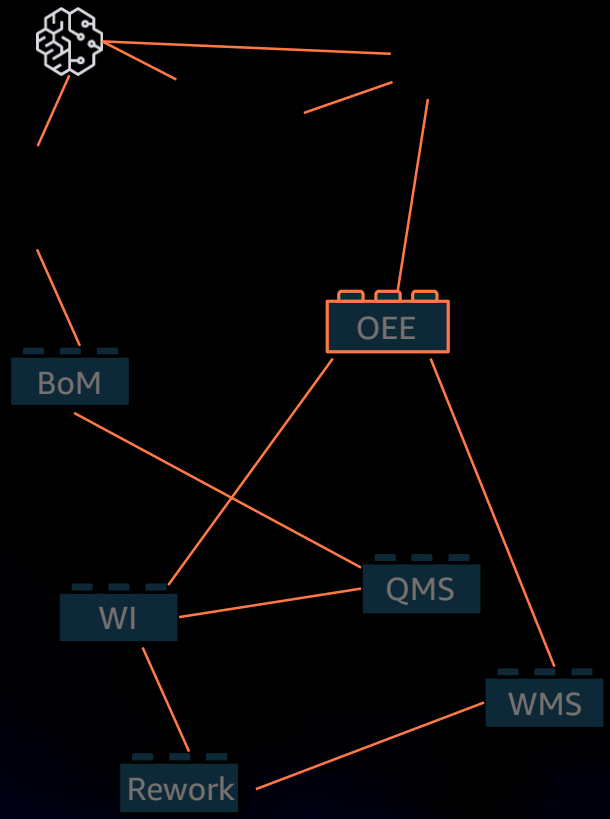
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# Industry 4.0 application landscape



| | |
|---|---|
| Level 4 – Business planning and logistics | ERP/PLM |
| Level 3 - Manufacturing operations management | MES |
| Level 2 - Monitoring and supervision | SCADA |
| Level 1 - Control | PLC |
| Level 0 – Sensors and signals | Machines |




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# Decomposition process

## Capabilities decomposition

- Start with functionality and capabilities, NOT the data
- Look at capabilities outside-in (model services from customer's perspective)
- Avoid anemic CRUD services

## Data decomposition

- Capabilities drive the data decomposition
- Additional services based on data access decomposition
- Data needs to be owned exclusively by a SINGLE service

## Deployment decomposition

- Separating services into distinct deployments
- Expose APIs
- Decide on integration methods

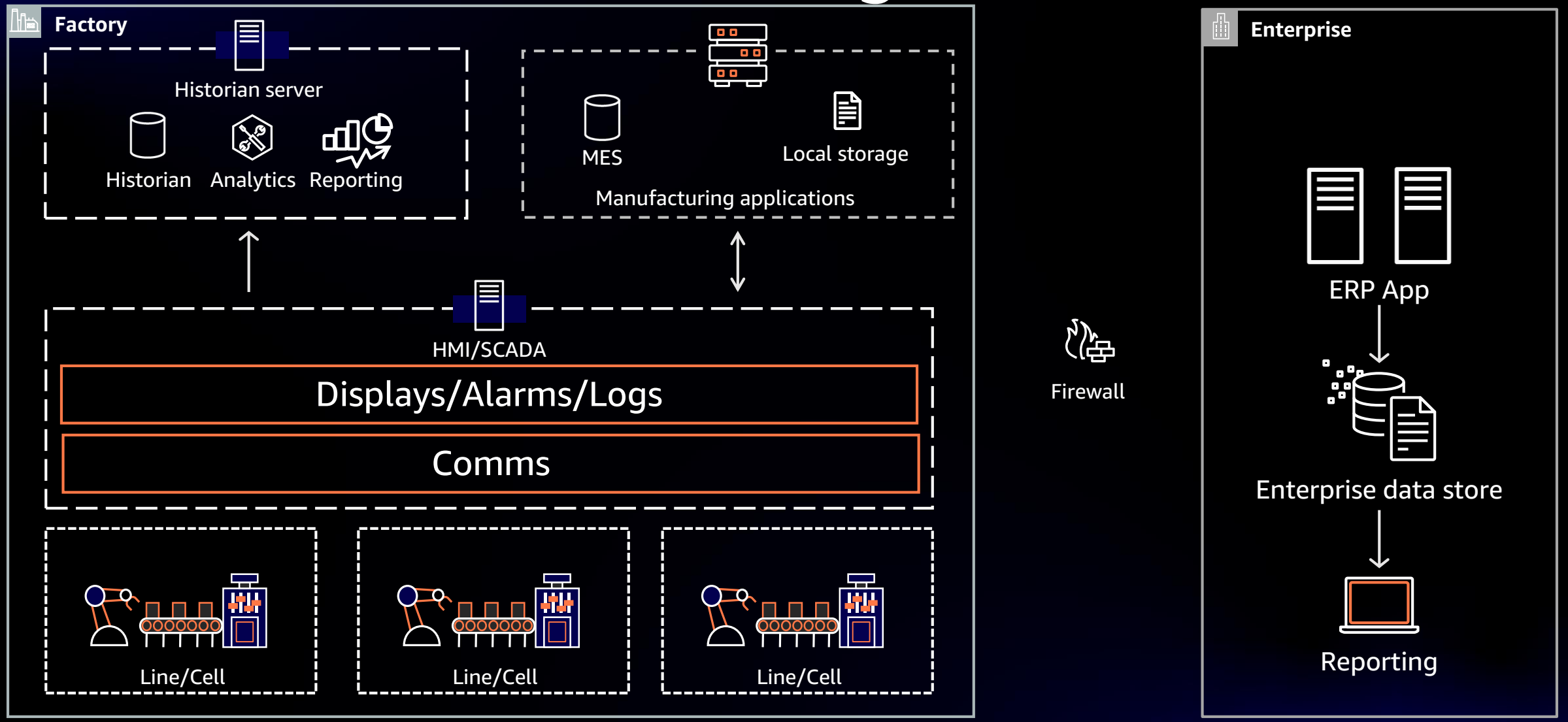
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# Forward to an architecture blueprint

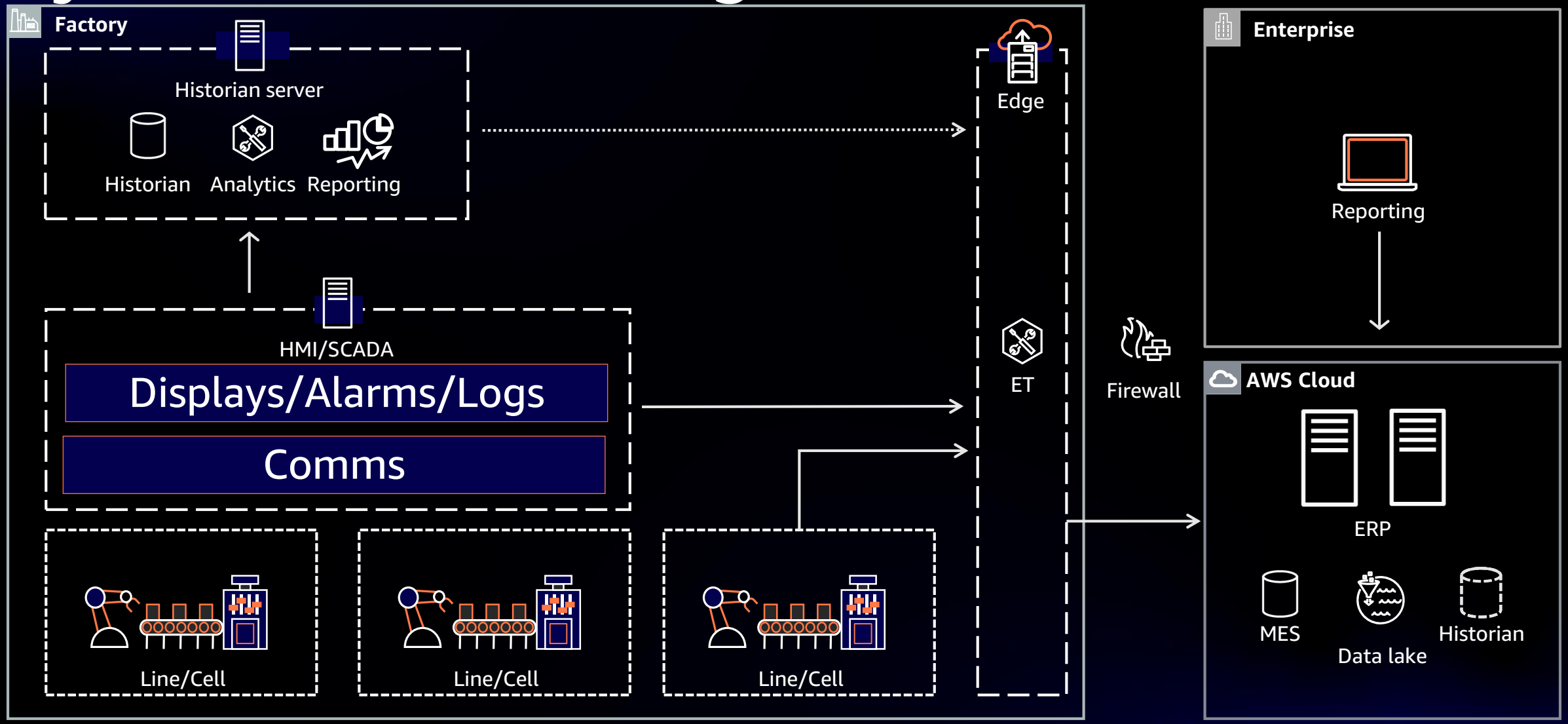
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# Traditional manufacturing



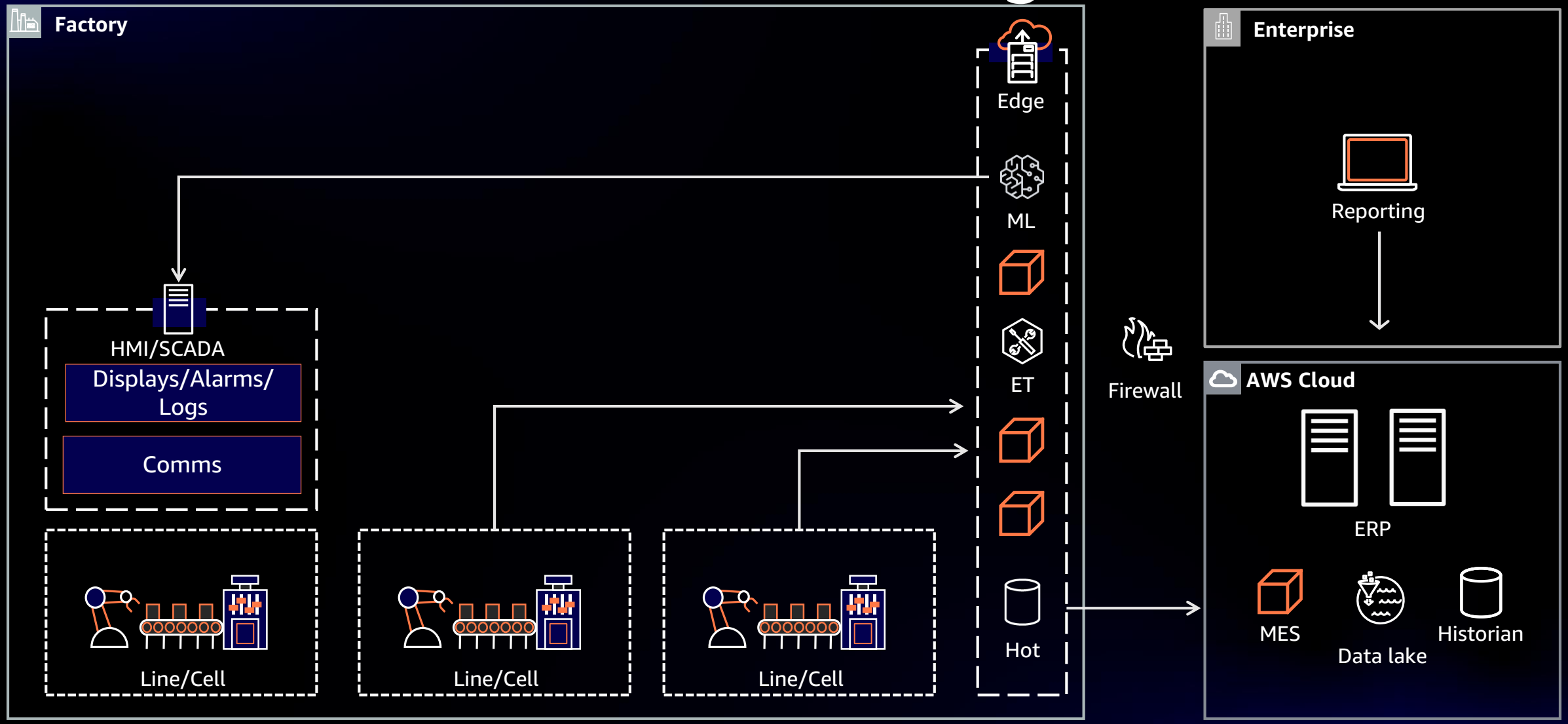

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# Hybrid manufacturing



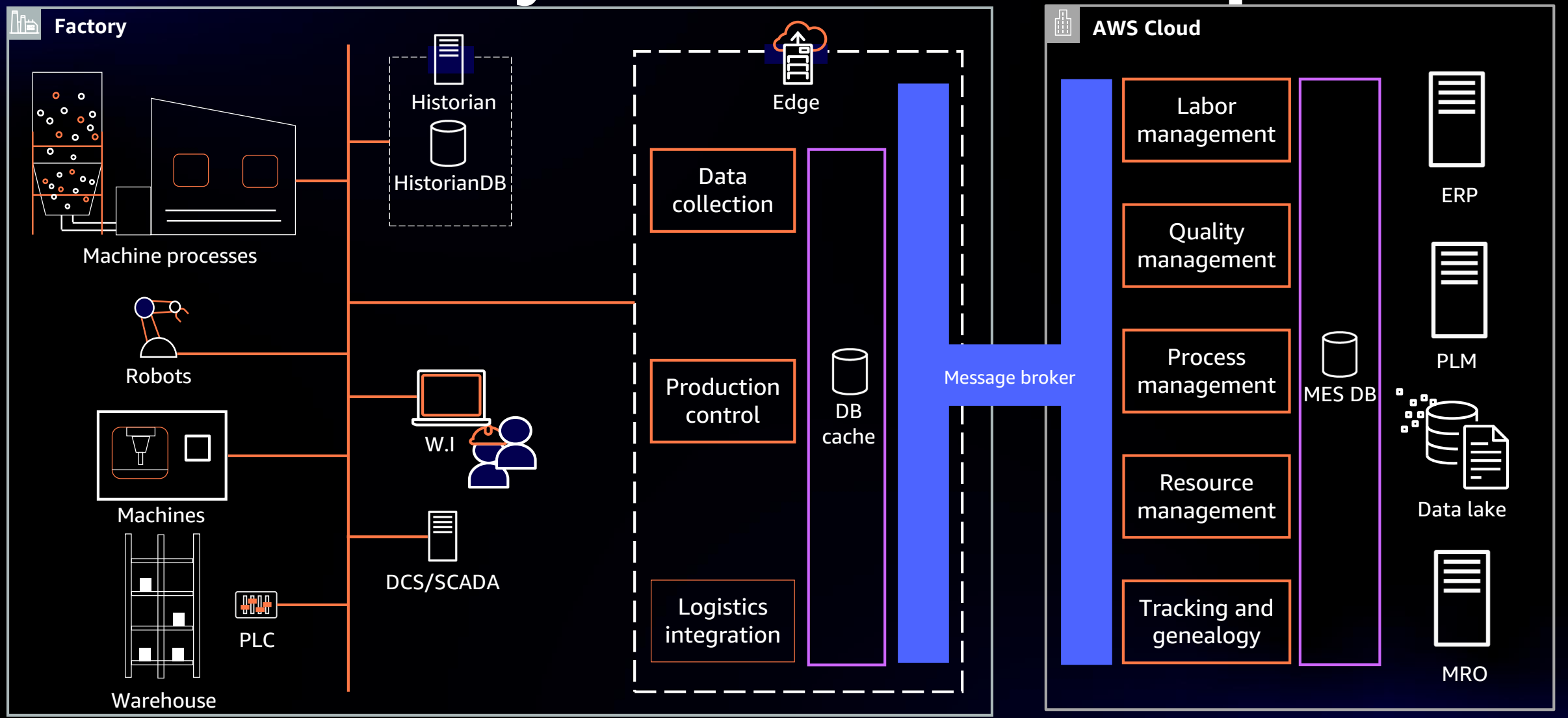

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# Cloud-centered manufacturing




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# Microservices hybrid cloud MES blueprint

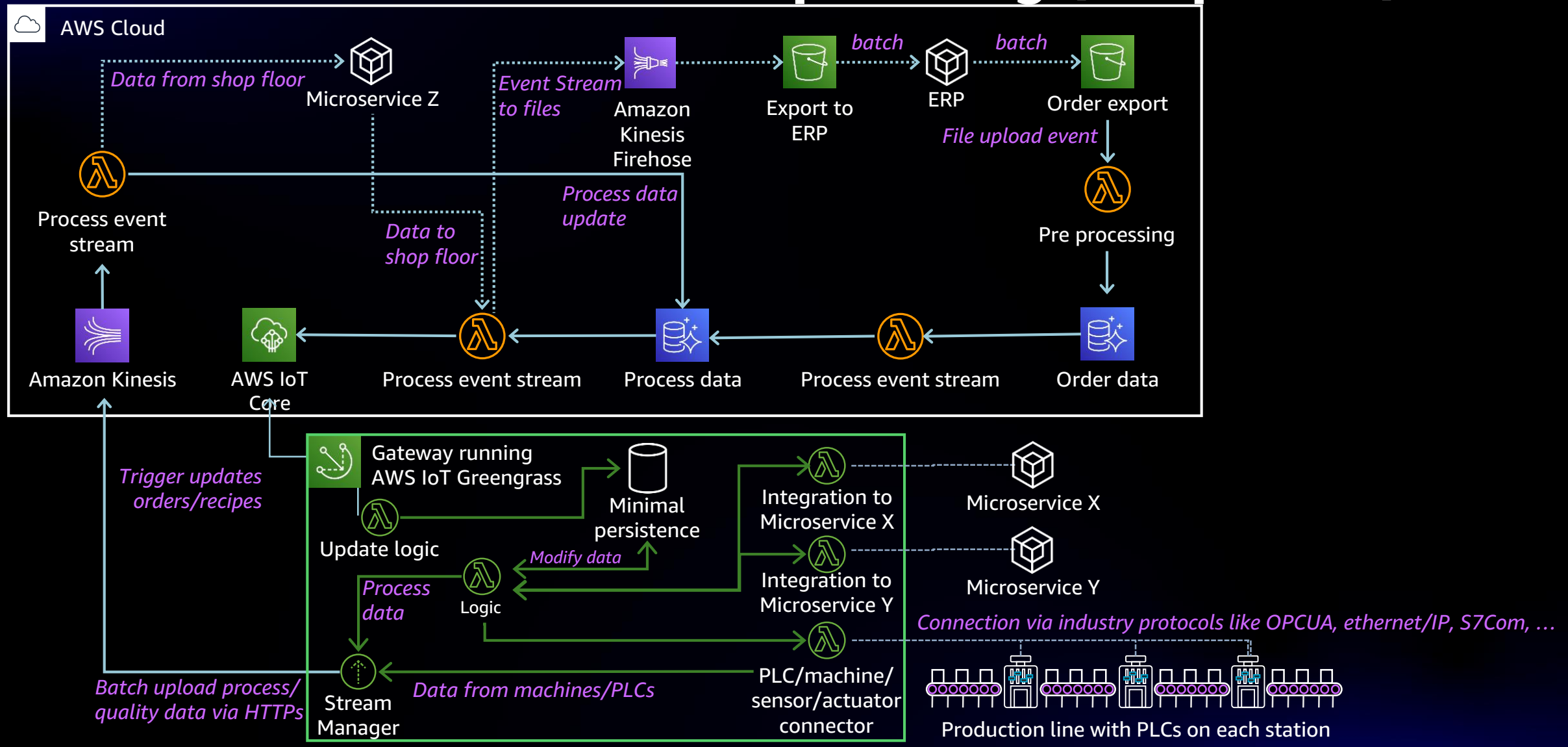



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# Example use case: Order dispatching

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# MES architecture - Order dispatching (simplified)




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# Where you should start

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# Thank you!

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AWS

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