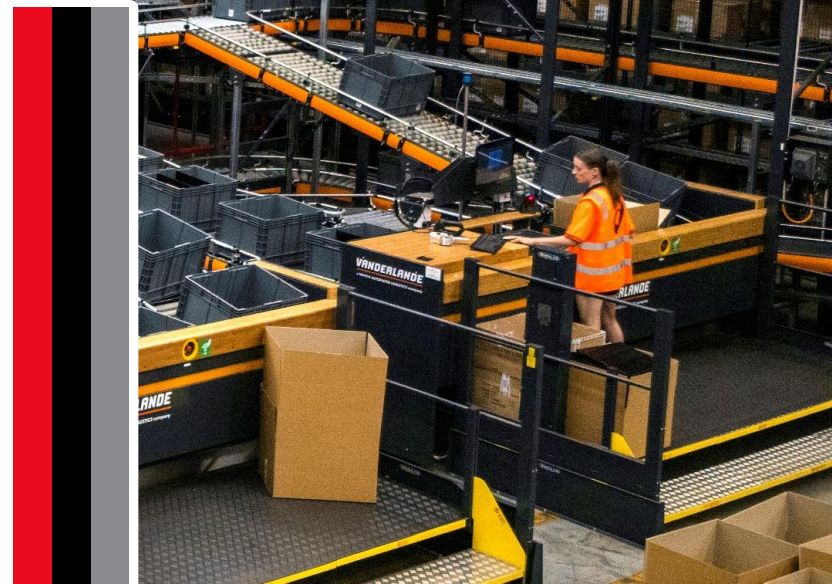


Operating diverse connected Material Handling Systems

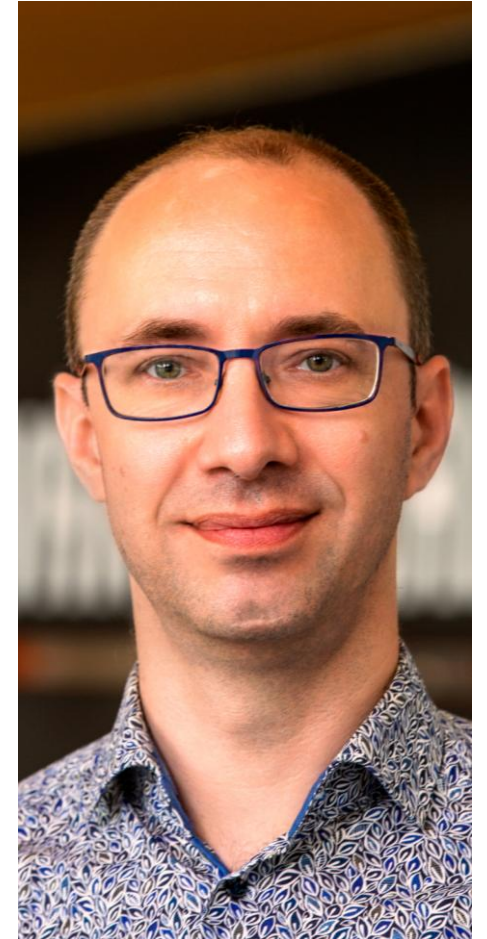
Stijn Hoop

1 June 2026



Who am I

- Stijn Hoop
 - Stream Architect for Digital Services
 - 10 years at Vanderlande, now Toyota Automated Logistics (TAL)
-
- Live in Eindhoven, married with two daughters



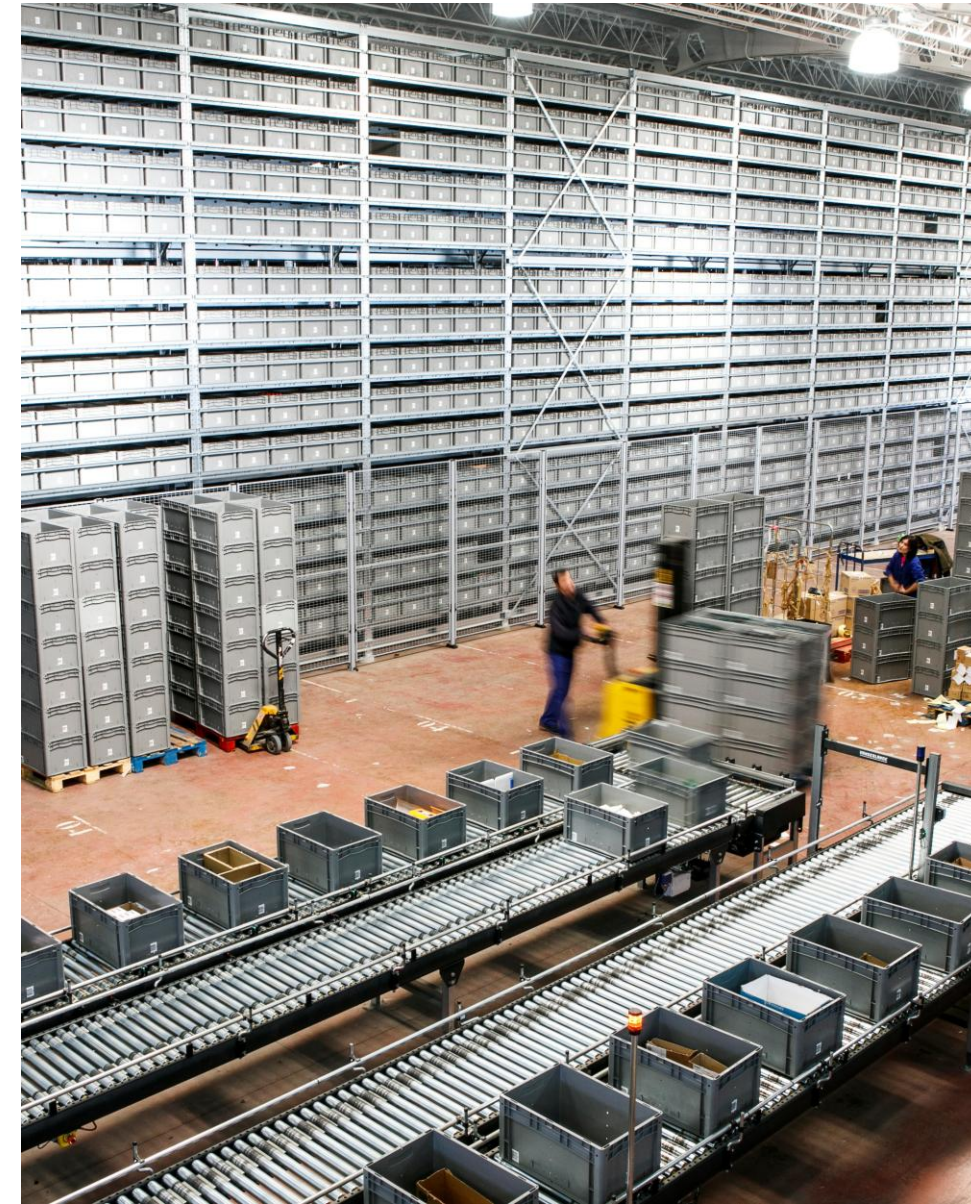
TAL / Vanderlande

- As of 1st April 2026, the Vanderlande warehouse part merged with viastore and Bastian Solutions to form Toyota Automated Logistics
- Vanderlande is part of Toyota Industries Corporation since 2017
 - Served three different business domains: Airports, Warehouse and Distribution
- Connectivity design created in 2020 at Vanderlande so incorporates elements for all three business domains



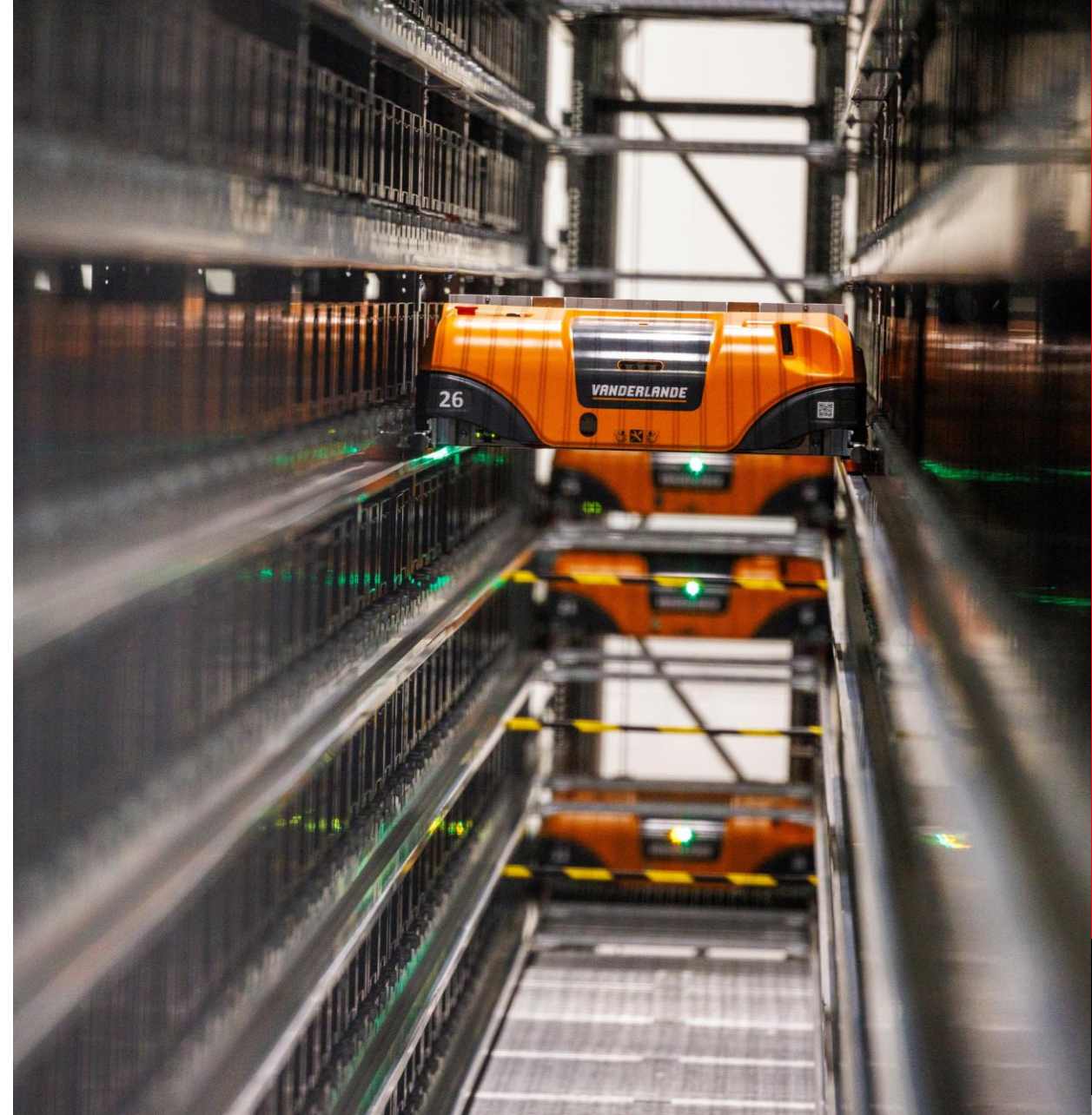
What do we deliver?

- Our business: on-premise material handling solution delivery
 - Hardware (depalletizers, conveyors, automated storage and retrieval, goods-to-picker stations, palletizers, ...)
 - **Software (PLC, flow controllers, warehouse execution system, ...)**
 - Integration with customer ERP / warehouse management system
 - Integration with 3rd party on-site equipment and software
- Diverse set of customers and sites
 - Range from storage automation only to full process automation
- Aim: about 80% of system configure to order
 - Corollary: 20% of system specific to site



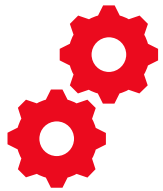


Goods to Picker



Adapto AS/RS

Services for Connected Systems



Commissioning



Operational Insights

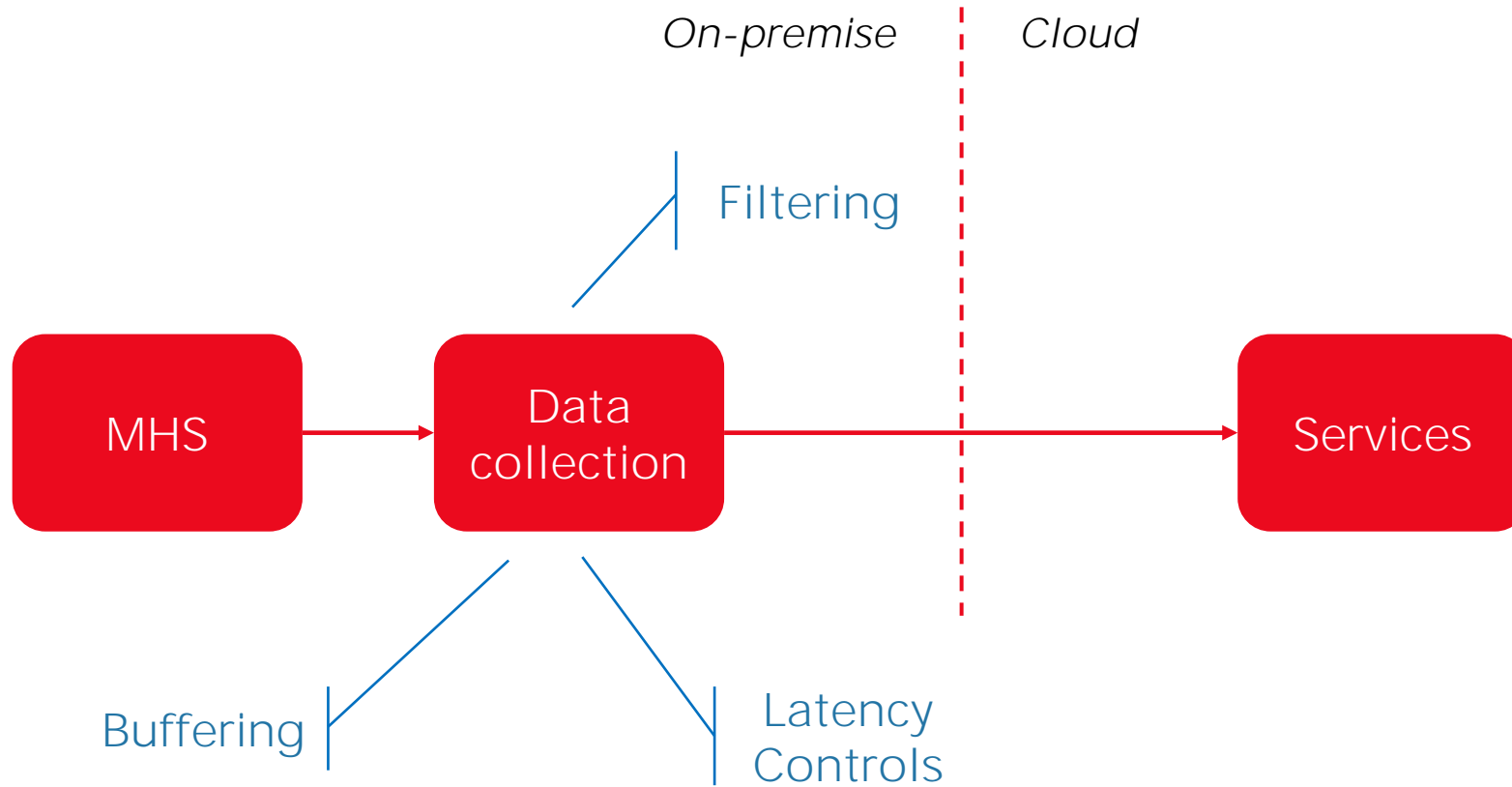


Predictive
Maintenance

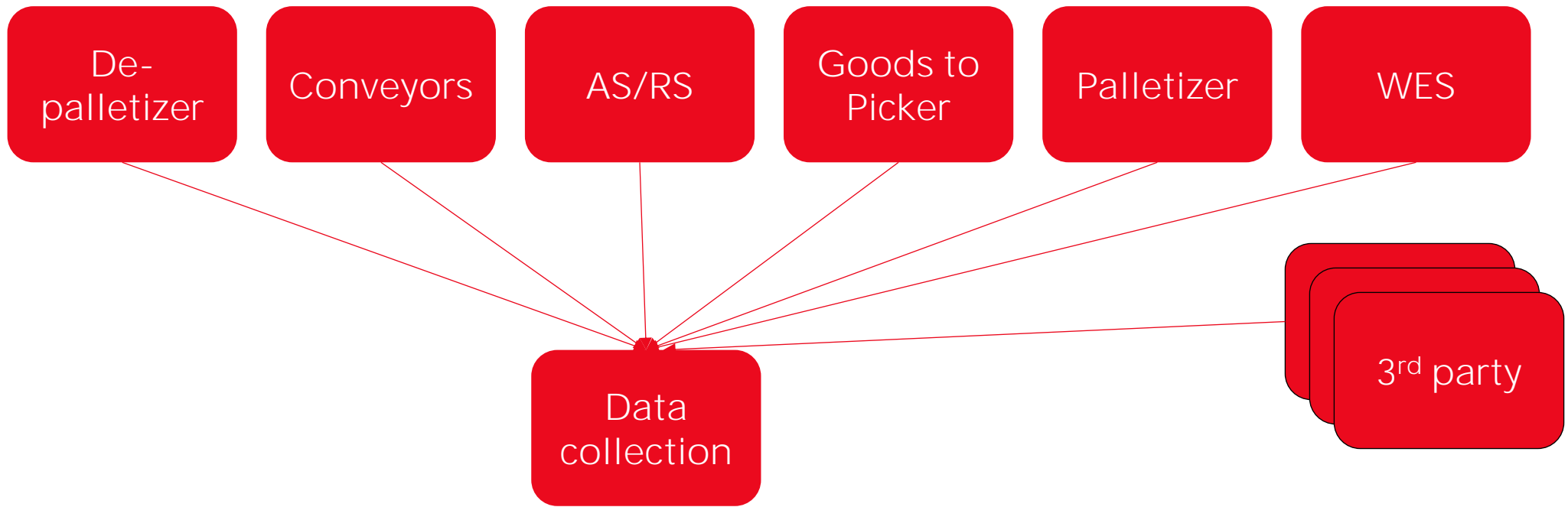


Agentic AI for
Control Room

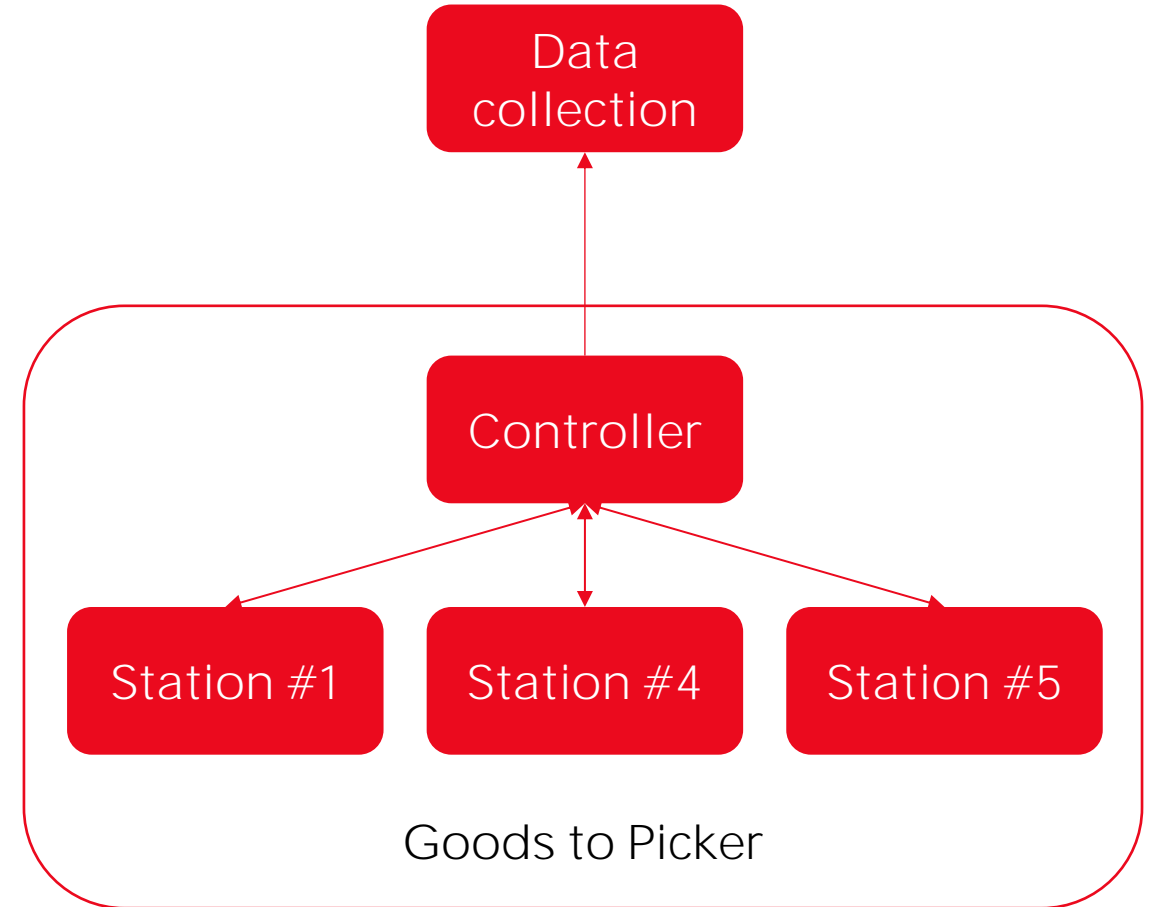
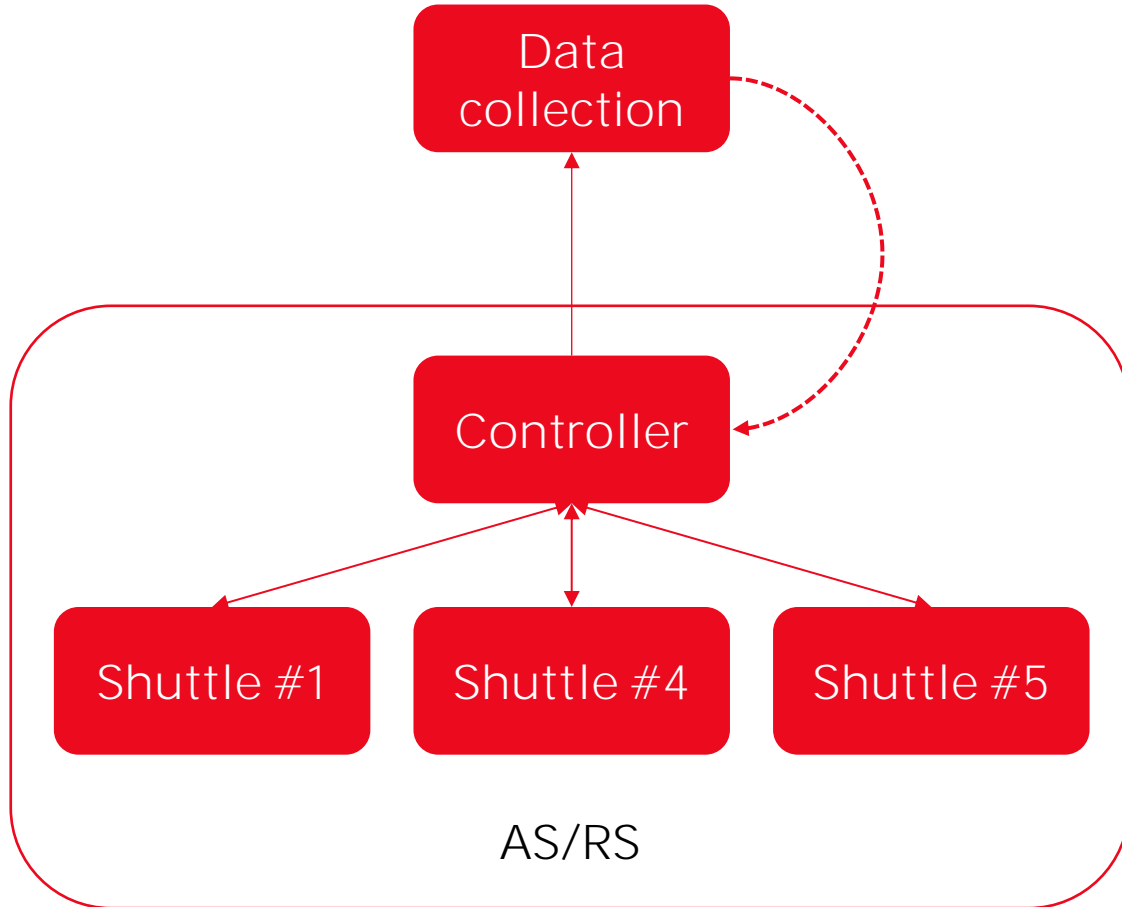
System Overview



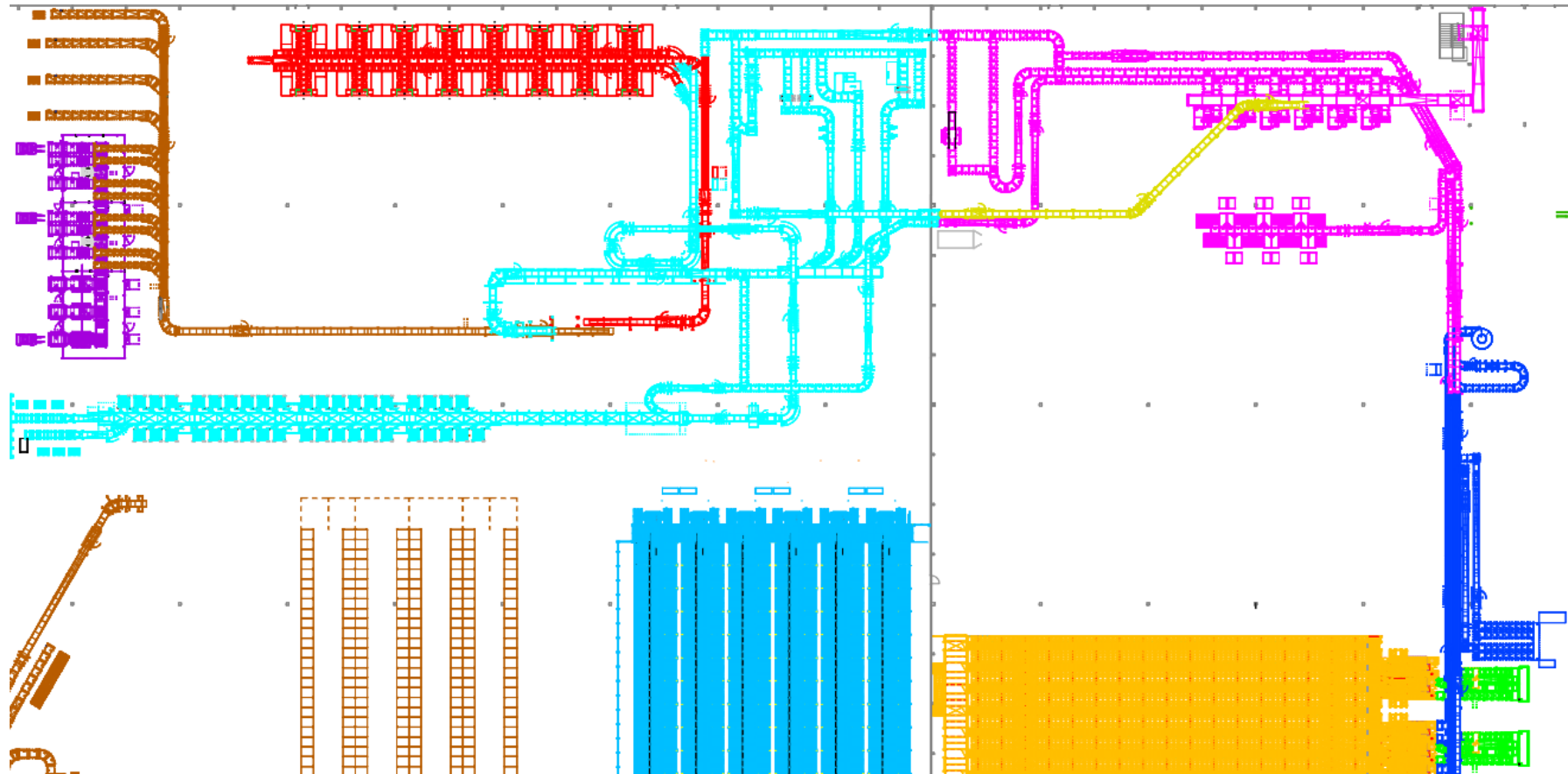
Solution Decomposition



Delegation of responsibility

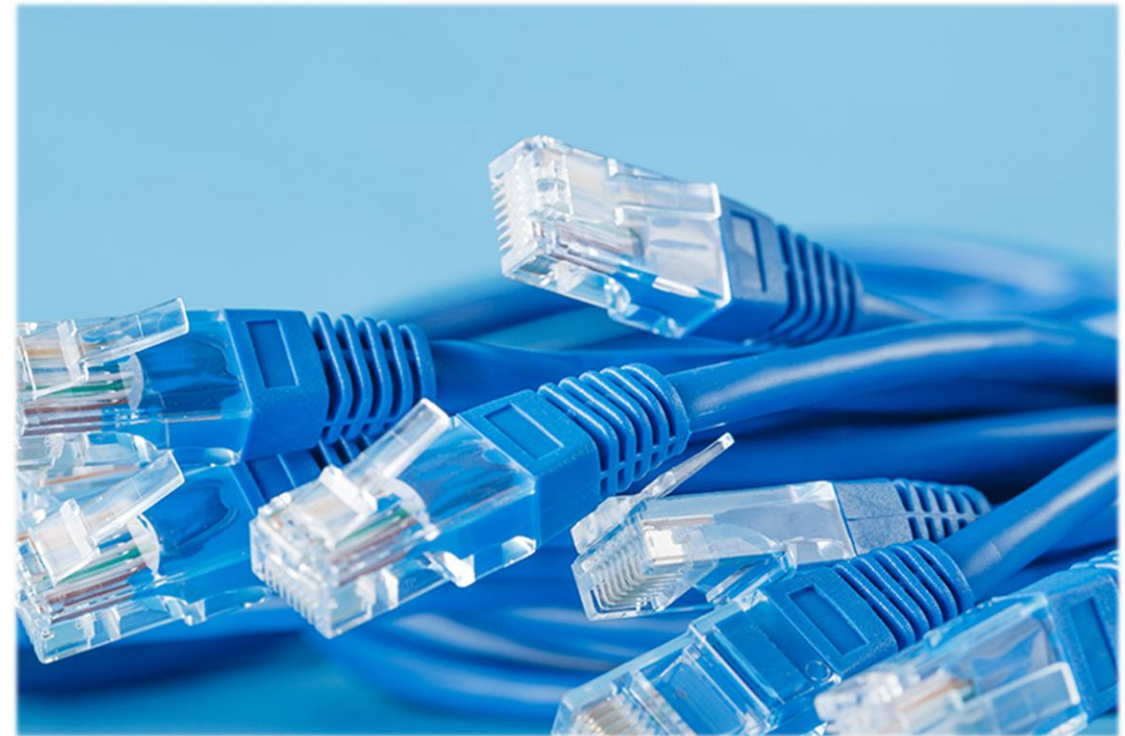


Physical Layout



Data Transfer

- Kafka/AVRO to minimize bandwidth
 - Side effect: force teams to align about exported data schema
- Data-schema agnostic pipeline
- Mini batches to avoid huge cost of realtime messaging
- **Not enough filtering....**



Deployment Considerations

- Building in progress
- Customer internet connection
- After commissioning, always dependent on customer approval
 - No system changes during Black Friday

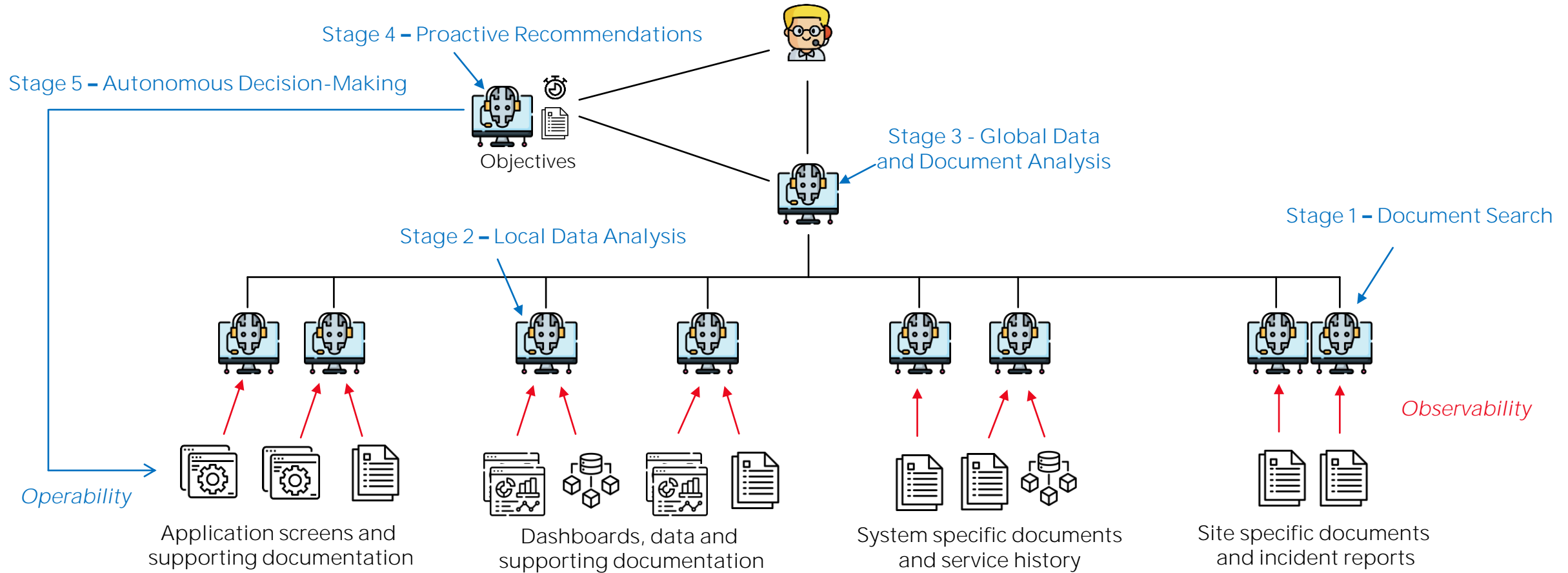


Cybersecurity

- Azure IoT Edge
 - No inbound connections
 - Device identity and configuration management
 - Standards compliant
 - Hierarchical rollout (ISA-95)
- Docker-based data collection deployments
 - Cloud managed software updates
- Container-based Linux OS with A/B partitioning and factory reset



Towards Autonomous Systems



Next Steps

- More internal standardization
- More integration in engineering workflow
- Leverage on-premise compute more for better filtering / preprocessing
- Re-assess framework used to complete feedback loop



AUTOMATED LOGISTICS