

Factory Automation



Factory Automation is a factory-level workflow engine to coordinate different systems and applications in order to achieve high-automation

Overview

For companies that want to deploy high automation, it's necessary to have a system that both listens to factory events, and coordinates and orchestrates the different systems and applications to respond to that factory event. For example, once an equipment finishes the processing of a lot, an event will be published and a workflow needs to be triggered to correctly handle that event from a factory perspective. Other scenarios may include asking the MES where to send a completed lot, the next lot to be sent to the equipment or to calculate and coordinate the transport of lots to their destination using the appropriate automated transport system. The system accommodates fully automatic, mixed and manual scenarios.

Over time, as factory processes become more stable and mature, manufacturers can progressively increase their level of factory automation by automating more business workflows.

Factory Automation supports the definition of workflows and links the events to workflows. It also supports hierarchical job structures as well as long running jobs which have their state and context persisted in the database. Factory Automation also has the capability to perform error handling to recover from a variety of possible problems.

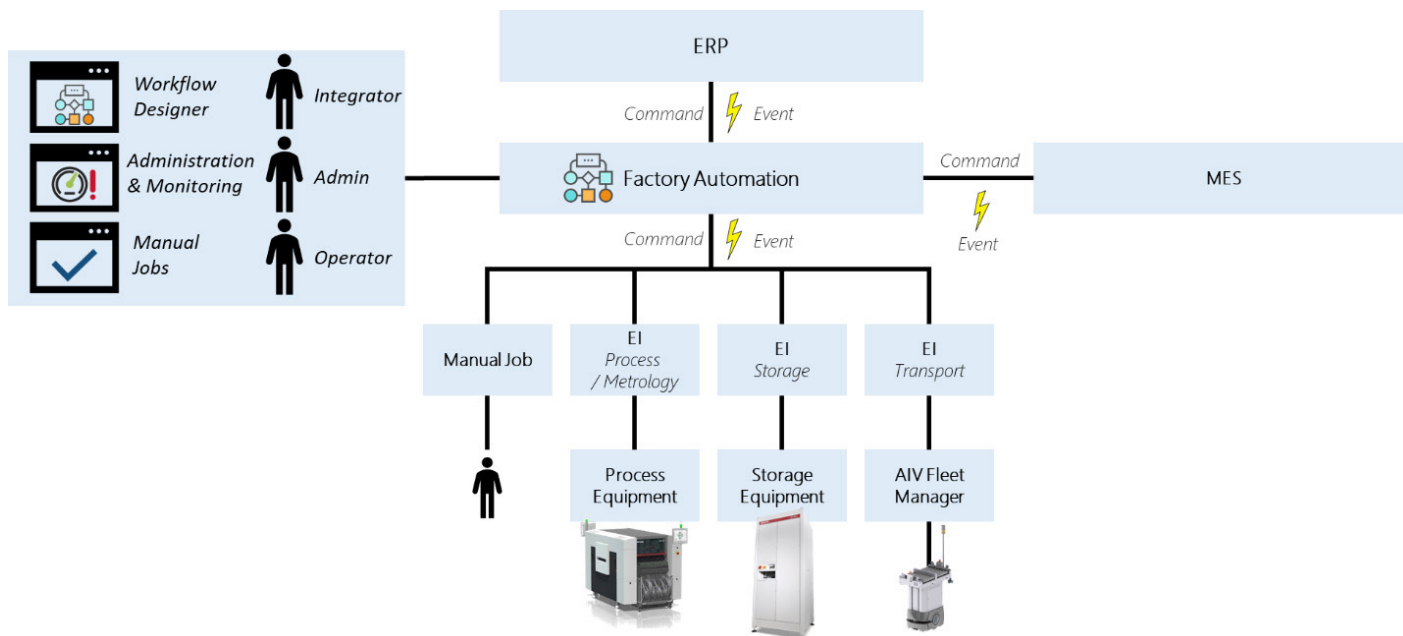


Figure 1 Factory Automation architecture

Key Features

- Design workflows graphically
- Create a library of re-usable workflows
- Support short and long-running jobs as well as job hierarchies
- Trigger one or more workflow jobs based on an event
- Supports job creation, execution, and monitoring
- Extensible architecture allows new tasks to be created and added to the framework

Benefits

- Increased operational efficiency
- Improved equipment utilization
- Reduction in the opportunities for errors
- Shorter cycle times

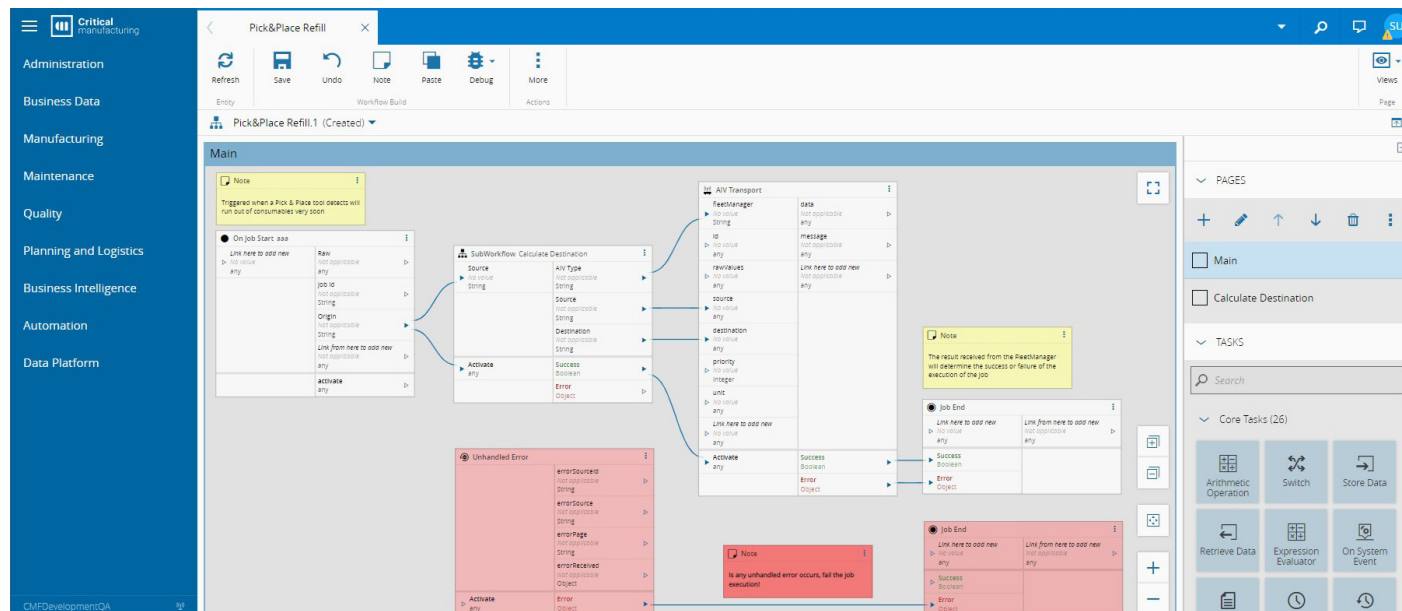


Figure 2 Factory Automation workflow designer

| JOB | TYPE | CONTROLLER | EVENT | MODE | QUEUED DATE | START DATE | DURATION | COMPLETED DATE | SCHEDULI... | SYSTEM ST... | ERROR MESSAGE |
|---------------------------------------|--------------|-------------------|------------------|------------|---------------------|---------------------|-----------|---------------------|-------------|--------------|---|
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:37 PM | 09/30/2020 02:37 PM | 224ms | | RUNNING | EXECUTING | |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:37 PM | 09/30/2020 02:37 PM | 1s 567ms | | RUNNING | EXECUTING | |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:37 PM | 09/30/2020 02:37 PM | 2s 674ms | | RUNNING | EXECUTING | |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:37 PM | 09/30/2020 02:37 PM | 4s 64ms | | RUNNING | EXECUTING | |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:37 PM | 09/30/2020 02:37 PM | 4s 141ms | | RUNNING | EXECUTING | |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:31 PM | 09/30/2020 02:31 PM | 1m 450ms | 09/30/2020 02:32 PM | ERROR | ERROR | Job TriggerActivated -> Pick&Place Refill |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:28 PM | 09/30/2020 02:28 PM | 10s 390ms | 09/30/2020 02:29 PM | ERROR | ERROR | Timeout occurred |
| TriggerActivated -> Pick&Place Refill | TransportJob | Pick&Place Refill | TriggerActivated | Automation | 09/30/2020 02:23 PM | 09/30/2020 02:23 PM | 10s 373ms | 09/30/2020 02:23 PM | PROCESSED | COMPLETED | |

Figure 3 Factory Automation job monitor