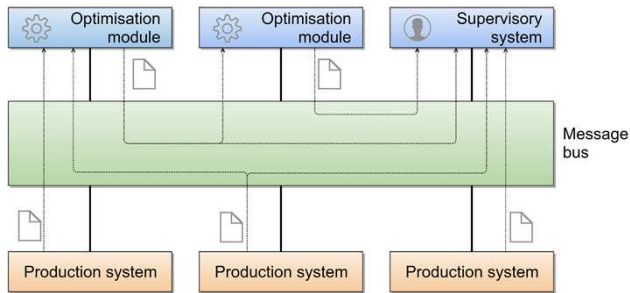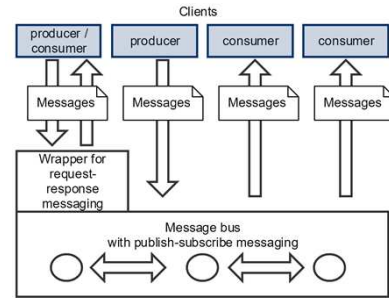# Software Architecture

General Architecture

- Promote loose coupling of systems
- Communication based on
  1. a message bus
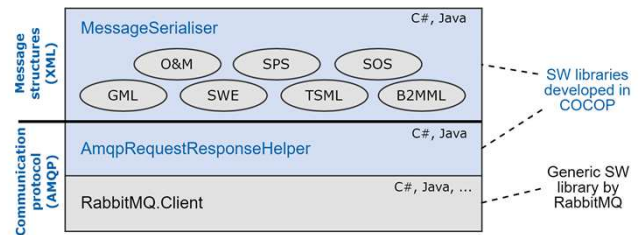 2. commonly agreed message structures

Supported communication patterns:
- publish-subscribe -> scalable for data streaming
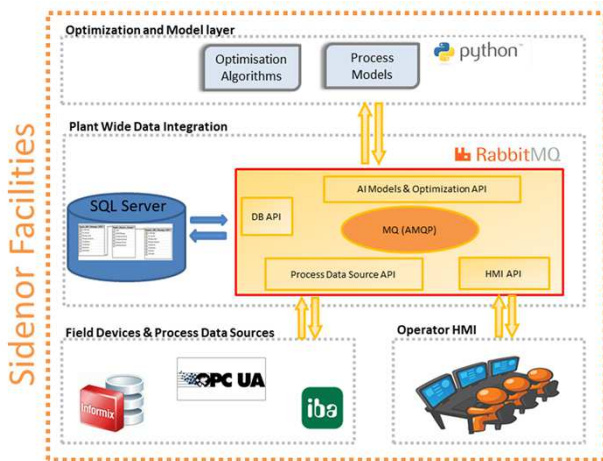- request-response -> enable integration to a variety of existing systems

SDK

- Message structures and communication protocol are in separate layers
- The communication protocol is AMQP (v. 0-9-1)
- Messages structures are based on standards
  - O&M, SPS, SOS, GML, SWE, TSML: Open Geospatial Consortium (http://opengeospatial.org)
  - B2MML (implements ANSI/ISA-95): MESA International (http://www.mesa.org/en/B2MML.asp)
- SDK developed for .NET (C#) and Java
  - Still, messages are platform independent -> mixed platforms can exchange data

	Standard/specification	Purpose
AMQP	Advanced Message Queueing Protocol	Message bus
B2MML	Business to Manufacturing Markup Language	In COCOP: schedules
GML	Geography Markup Language (2016)	Measurement values
O&M	Observations and Measurements (2013)	Metadata of measurements
SOS	Sensor Observation Service (2012)	Request-response delivery of measurements
SPS	Sensor Planning Service (2011)	Remote control of tasks
SWE	SWE Common Data Model Encoding (2011)	Measurement values
TSML	TimeseriesML (2016)	Time series

Implementation: Steel

Implementation: Copper

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