Automation and IT integration

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Agenda

- Roadmap

- Our Approach: EMOS (EMbedded Object Server)

- The IBM experiment

- Physical view

- Conclusion

IT and automation: roadmap

- Bridge the gap between ERP/MES and production sensors

- Remove bridges (hard) and save space

- Provide seamless and smooth dataflow

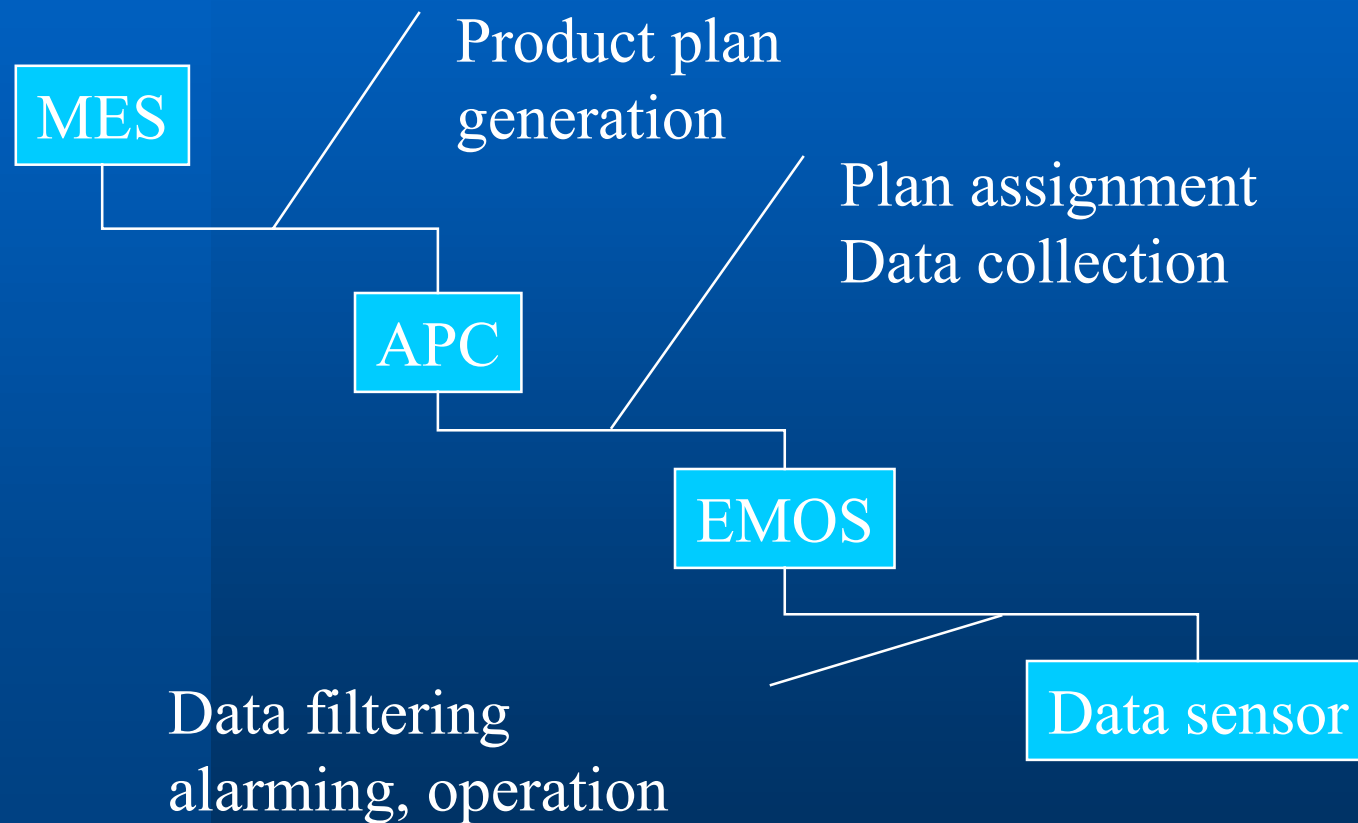- Allow embedded data filtering and alarming (towards control distribution)

Our approach: EMOS

EMOS is an embedded object server running on our PLCs providing multi-standard interfaces (CORBA, RMI, HTTP, …) to automation data:
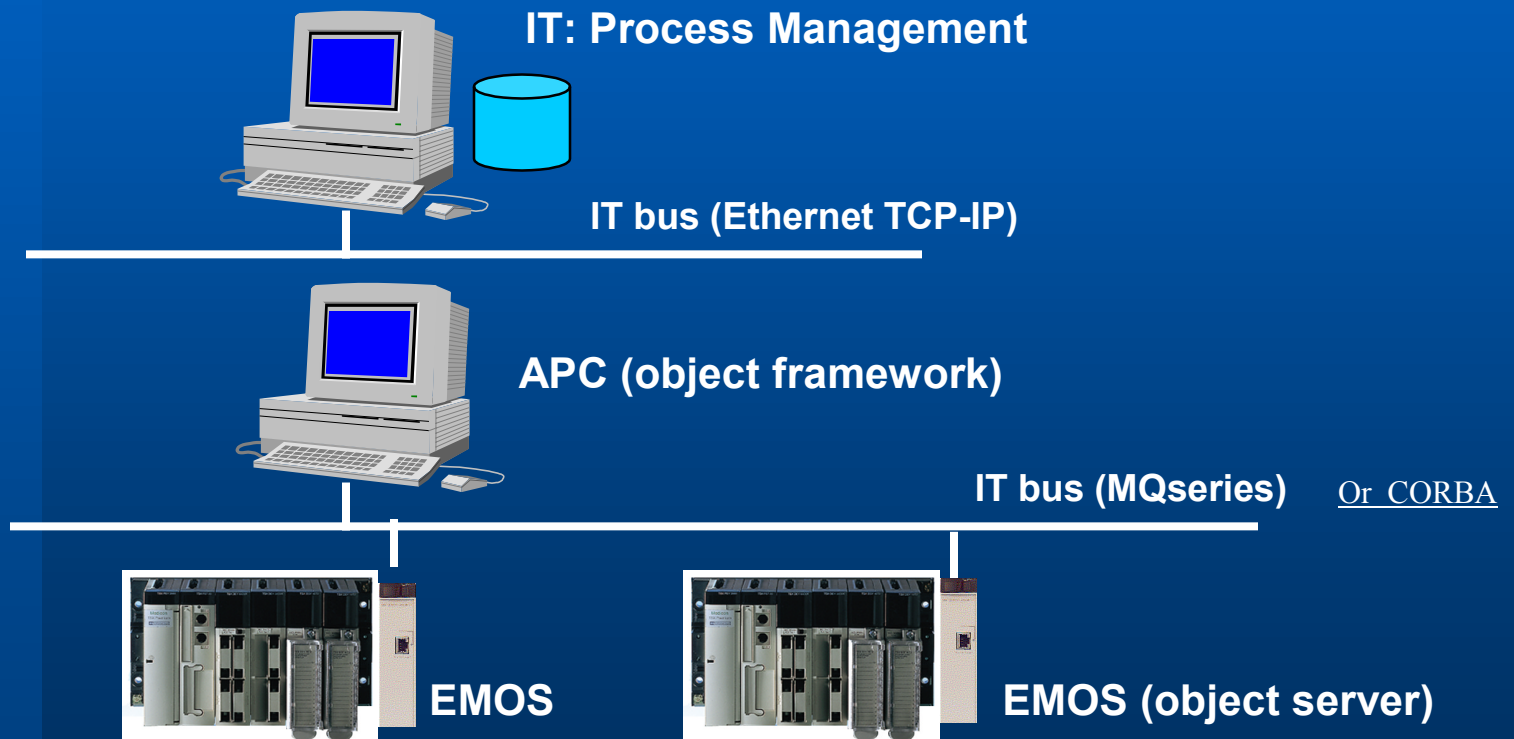
- Hardware : PowerPC 50 Mhz, 16 Mo Flash, 32 Mo SDRAM
- 100% Java
- Middleware Voyager
- Observer pattern
- Java code download, and remote emulation
- Spaces and factories

The IBM experiment

MES

Product plan
generation

Plan assignment
Data collection

APC

EMOS

Data sensor

Data filtering
alarming, operation

Physical view

IT: Process Management

IT bus (Ethernet TCP-IP)

APC (object framework)

IT bus (MQseries) Or CORBA

EMOS

EMOS (object server)

Implementation

2 experiments have been conducted:

- CORBA only : CORBA used from sensor to APC through Emos. APC Sensor Interface implementation with Emos. Dataplan storage in Emos. Data shipped on event triggers.
- MOM + XML : APC/MQ Series bridge. DTDs for data, commands and errors. Replies to commands. Synchronous mode, no asynchronous subscribers. Polling loops.

Comparison

- MOM/XML : Flexible command and data interface, multiple polling loops, synchronous/asynchronous design issue. Mapping between commands and replies.

- CORBA : Smooth and regular data flow with CORBA. Seamless code, operational conflicts (start/stop issues). Event notification. ORB interoperability

Conclusion

- Emos used for : APC implementation, monitoring, hardware emulation. Facade pattern for different interfaces (MQ Series, CORBA)

- Seamless integration

- Complementarity of CORBA/XML: XML used for configuration

- CORBA used for : alarming, monitoring, data and command sending

- Short trial and error cycle

- Use of APC framework

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