EU FP7 IP AESOP

ArchitecturE for Service-Oriented Process Monitoring and Control

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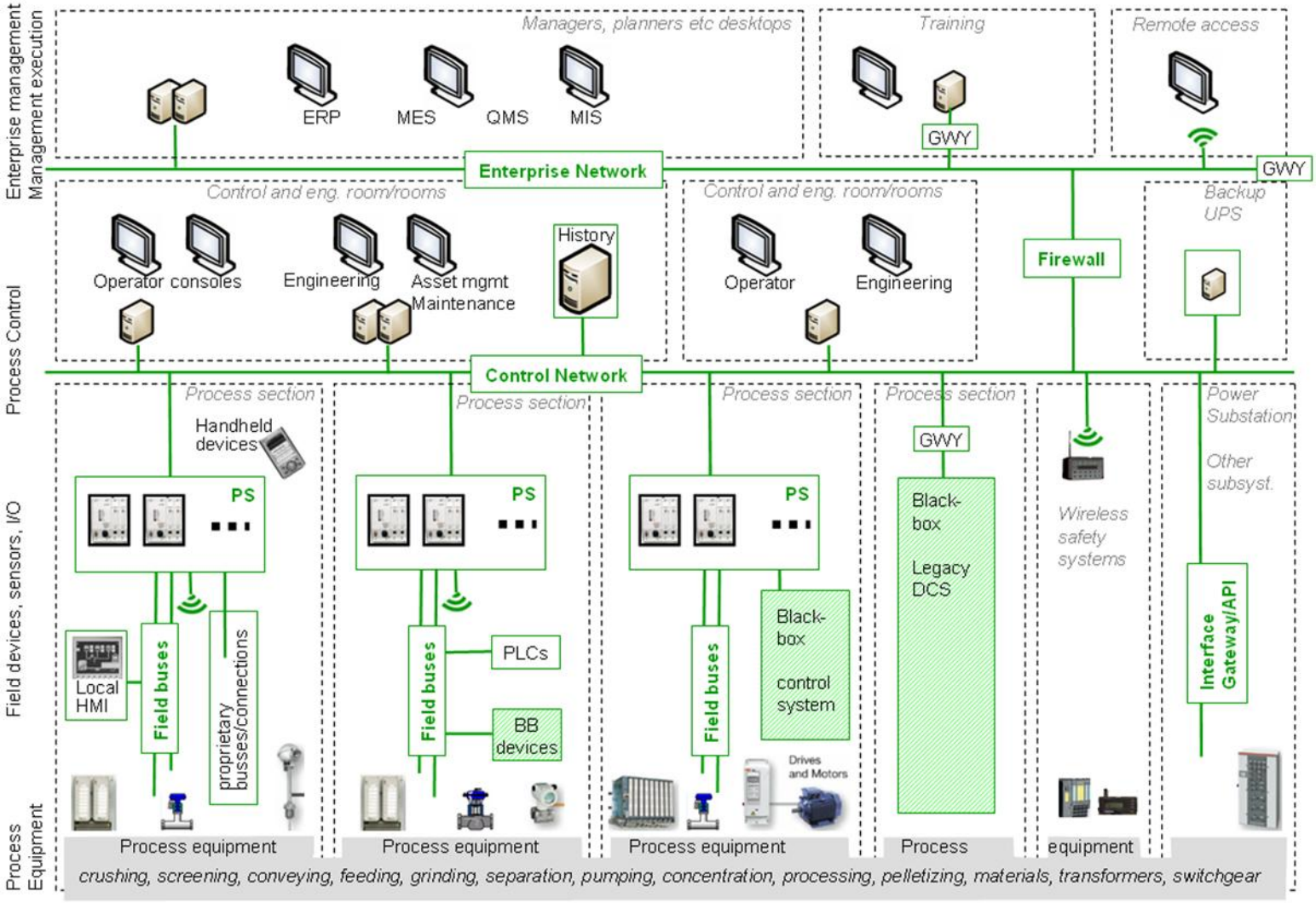
September 29th 2010
Brussels, Belgium

Today's reality
General architecture of a process control system



Today‘s reality
Diversity of data and interfaces

Components

ERP and MES

Plant Information Bus

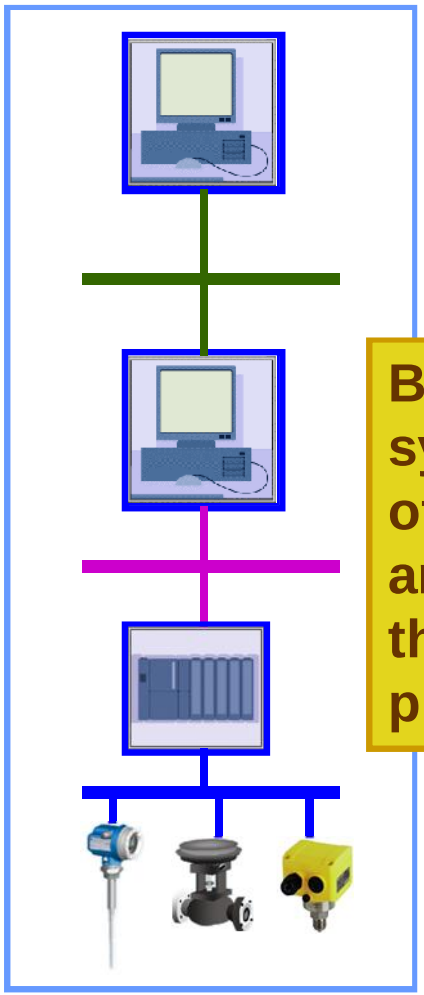
SCADA, DCS

Fieldbus specific Communication driver

PLC programming

Specific fieldbus

Field devices



Models

XML

Behavioural models, syntax and semantics of data and interfaces are different throughout the plant IT and AT

Technologies

B2MML

IEC/ISO 62264

OPC UA

e.g. PDM, FDT

DDXML,
ML, ...

OPC

61131-3

IEC 61158

Embedded

What happens if systems become lager? Thousands of devices!

- How can we do Large Scale Industrial Monitoring and Control?
- How to manage the overall system ?

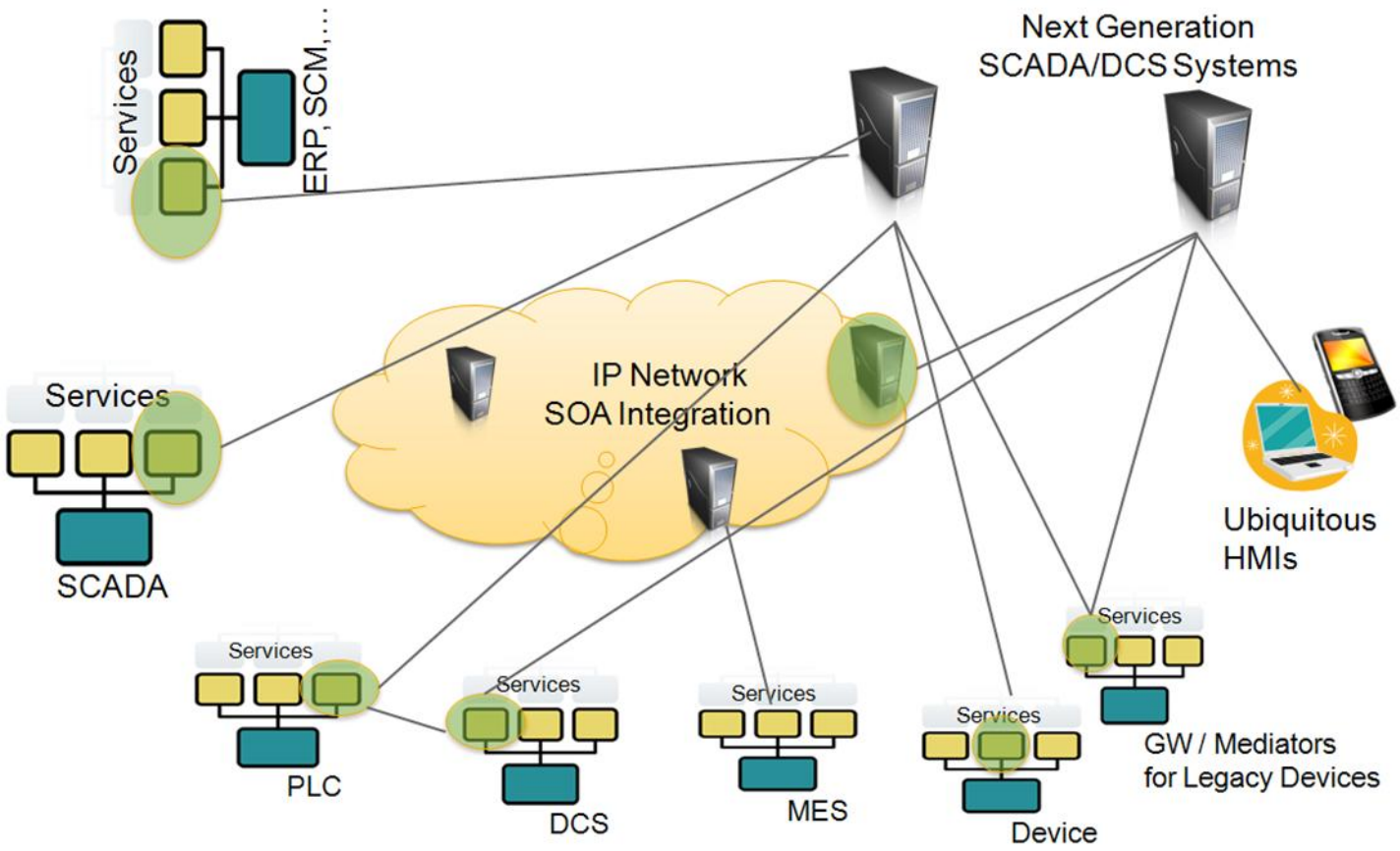
AESOP → Use of Service oriented Architecture

- How to describe the logical view of the application using services?
- How to deploy this logical view on the physical available resources (e.g. devices)?
- How to do data and message reduction?
- How to address network issues (segmenting the network, addressing performance and security issues)?
- How to address legacy compatibility issues? Carry the user from where he is today!

The most challenging scientific aspects of the project

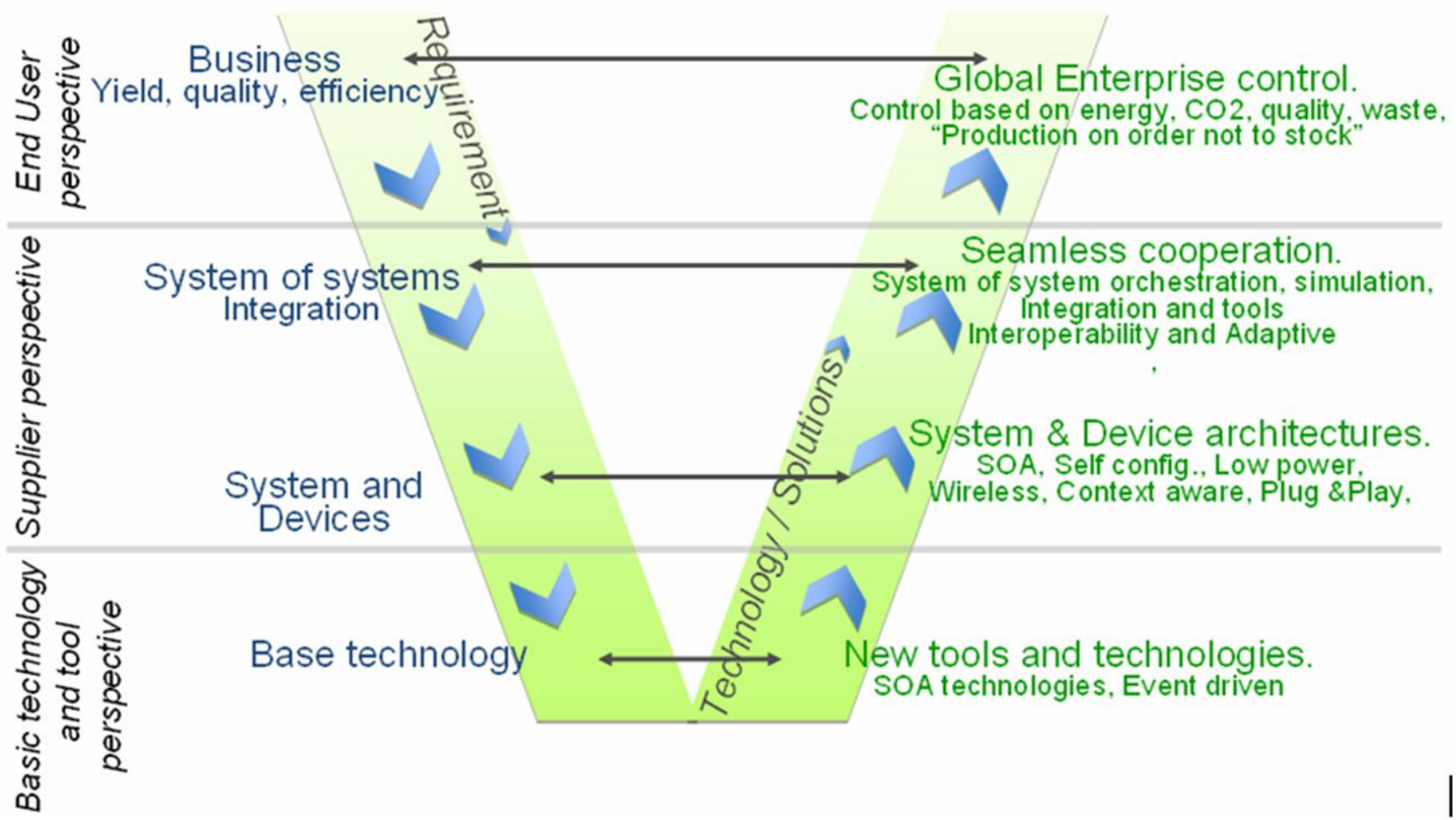
- **Robust and predictable SOA based monitoring and control framework for systems of very large numbers of sensors and actuators**
  - Event based system control and monitoring
  - Management of event handling, reduction of network load
  - Formal based high level modeling and SW generation approaches supporting runtime analysis
- **Towards real-time SOA featuring different component classes**
  - Down to resource-constrained devices
- **Migration strategies from legacy systems to SOA framework – and the way around**
  - Encapsulation of scan-based oriented subsystem processing in event based system processing
  - Interfacing of event based subsystem processing to scan-based system processing

The most challenging scientific aspects of the project

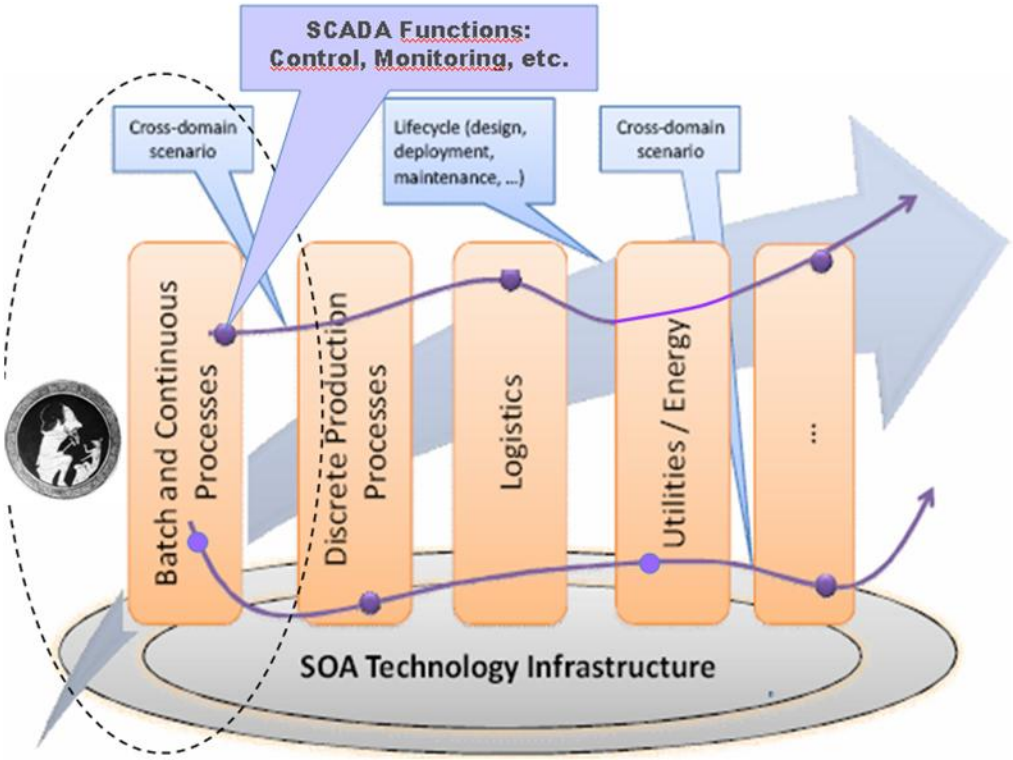


AESOP Approach: Far beyond current Process Control Systems
Towards a "Distributed Dynamically Collaborative" System of Systems

The way towards …

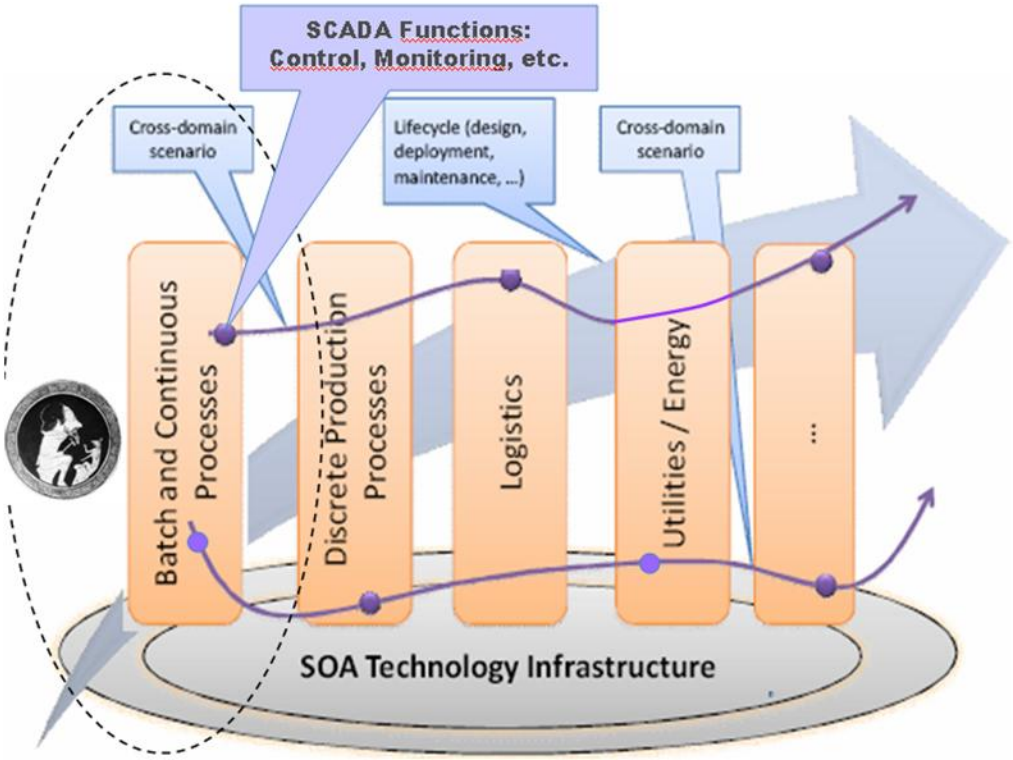


Impact and Synergies



- SOA based process automation systems, services and devices resulting from the project will provide more distributed intelligence.
- It will result in more system functionality and more device autonomy.
- Better resilience and reliability will be provided by dynamic characteristics of Web Services (plug & play)
- by automatic service replacement by a similar service, when a service becomes unavailable

Impact and Synergies



- **Efficient use of resource, by its adaptability to process conditions, as for example the use of event-driven communications (no communication if nothing happens in the process)**
- **Ease of use for non-experts will be provided thanks to implemented Web services with plug-and-play mechanisms.**
- **Tools will automatically detect devices and their embedded services.**
- **They will propose several filtered and aggregated views of devices or services.**

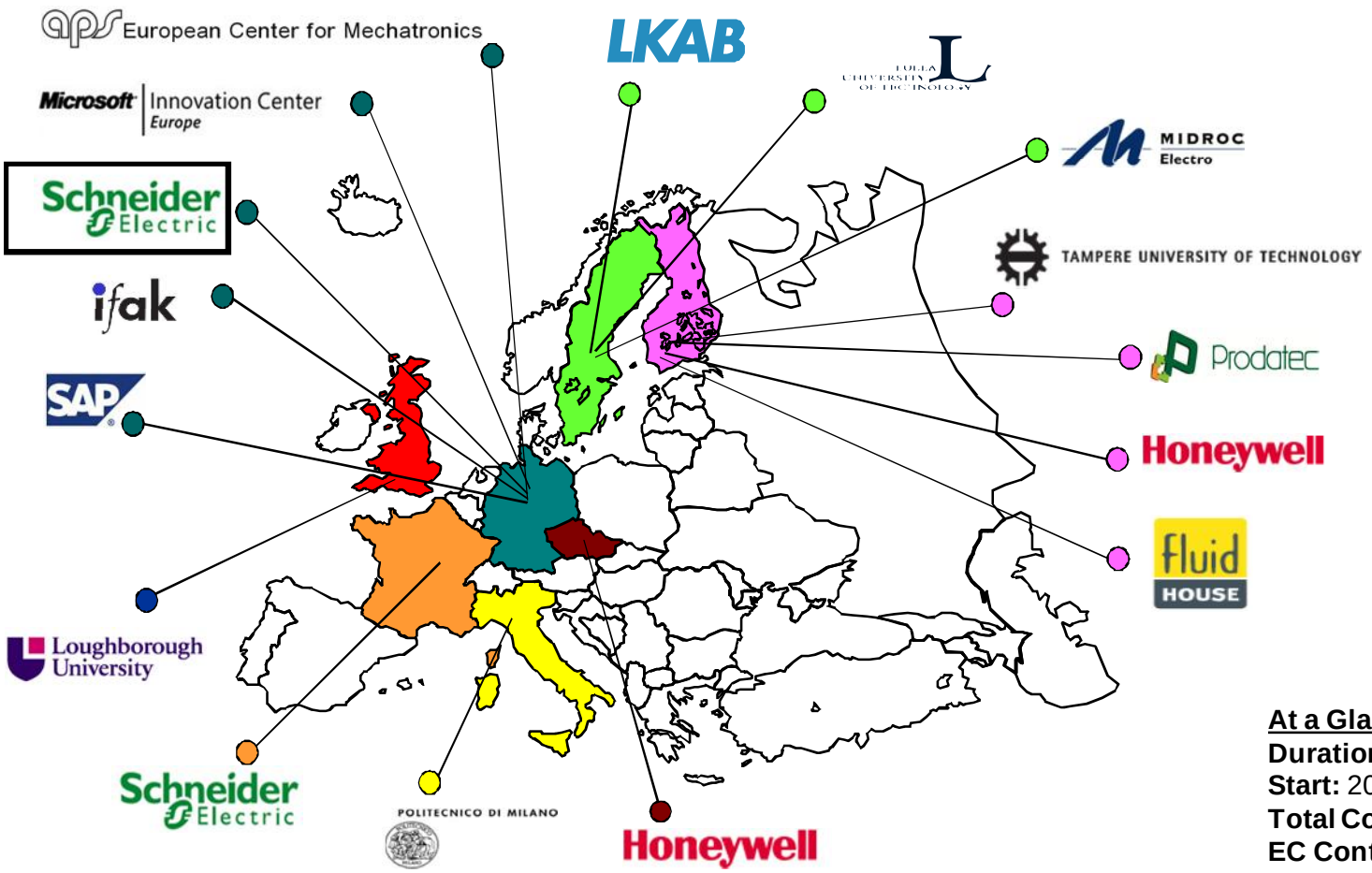
How to proof

Plant Energy Optimization is one Key Use Case to be investigated in AESOP

Application	Use case	1 Plant lubrication	2 Oil lubrication	3 Plant energy optimization
Evolution addressed	Migration of legacy systems	X	X	X
	Building completely new systems		X	X
Tasks dedicated	Engineering	X	X	
	Control	X		X
	Monitoring	X	X	X
	Maintenance	X		
Use case raised by:	LKAB	X		
	Fluidhouse		X	
	Customers of Honeywell			X

A E S O P

ArchitecturE for Service-Oriented Process - Monitoring and Control



European Commission
Information Society and Media

SEVENTH FRAMEWORK PROGRAMME

At a Glance
Duration: 30 months
Start: 2010.09.01
Total Cost: 7.282.000 €
EC Contribution: 4.500.000 €
Contract: INFSO-ICT-258682
Web: www.aesop-mc.eu

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