

# Engineering Framework For Service-oriented Automation systems

J. Marco Mendes, Armando W. Colombo

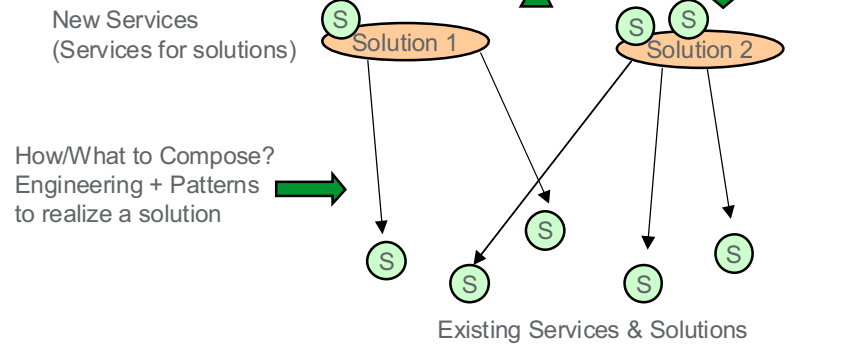


## Introduction

- SOA is an ascending concept ....
  - ... Also in Industrial Automation & Manufacturing
- Integration and interoperation of resources
- “Pluggability” of resources
- Everything as “SERVICES”
- Existing research projects

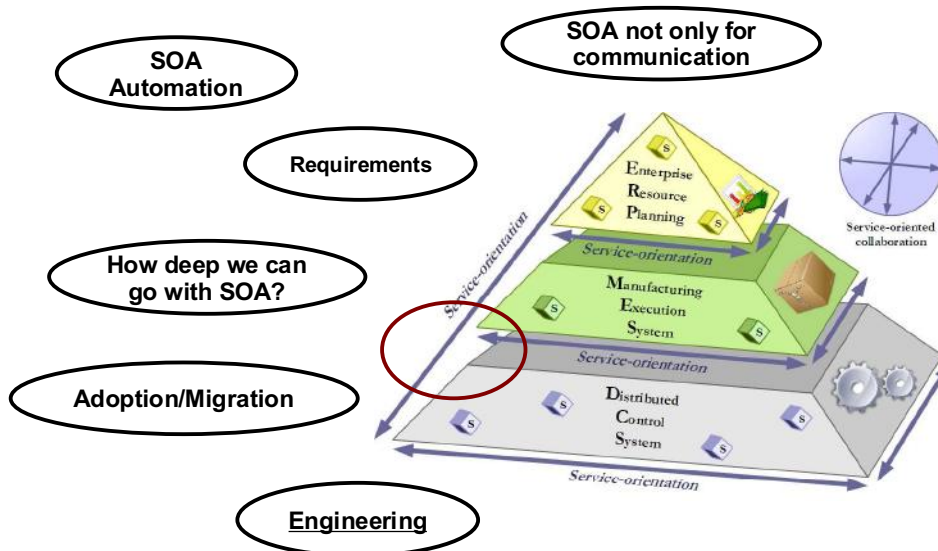
# Introduction

## Composing Services into Solutions



Promote Reusability!

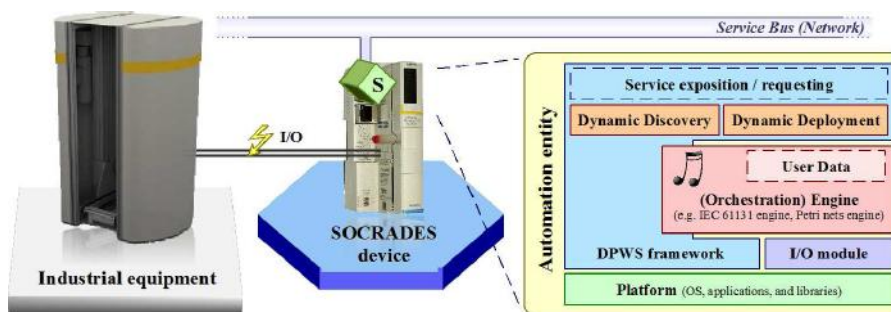
# Introduction



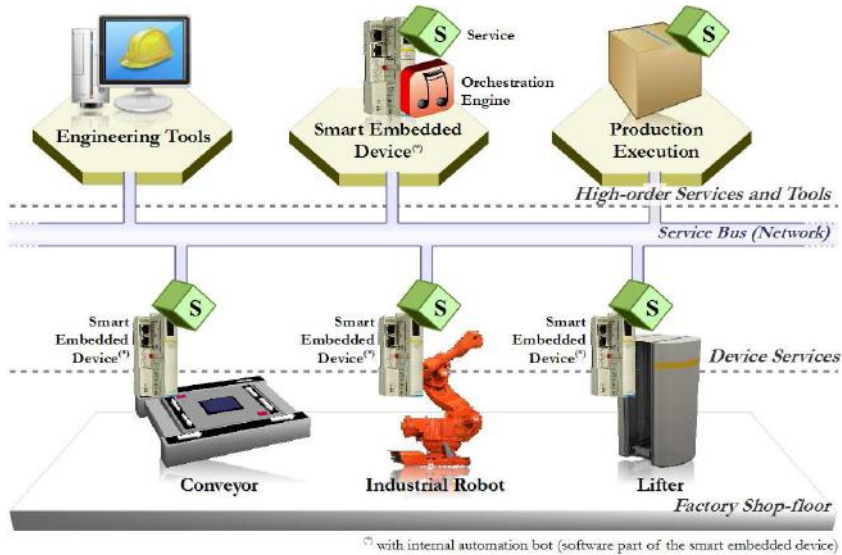
# Introduction

- Engineering Framework for SOA-Automation
  
- Architecture >> Methodology >> Engineering

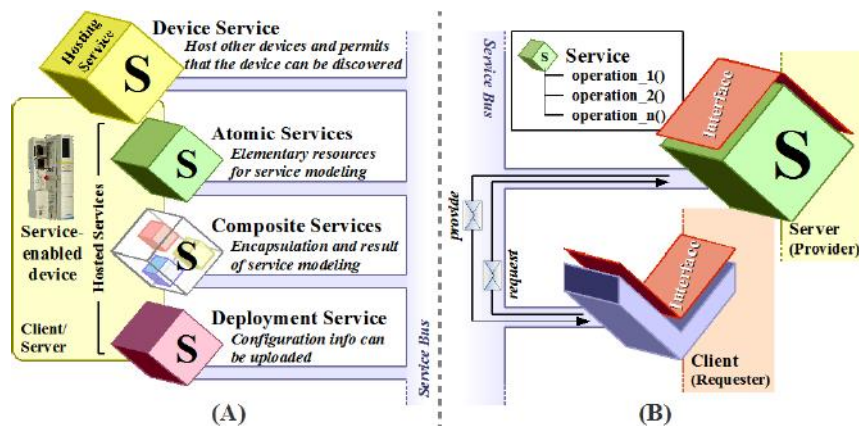
# SOA-device



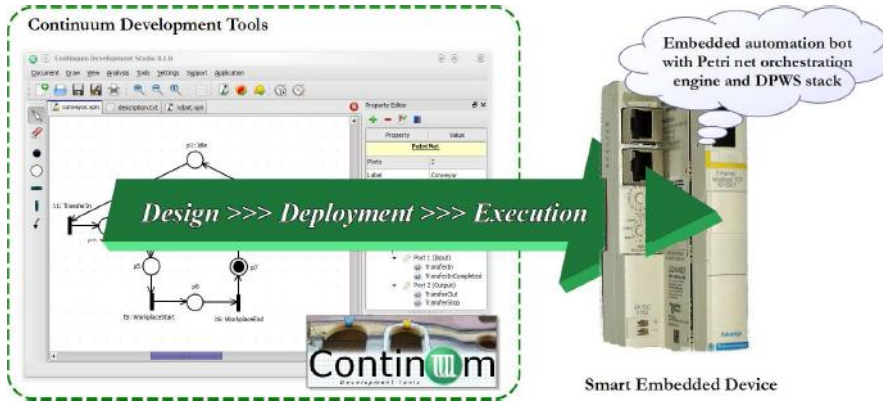
# SOA-Automation



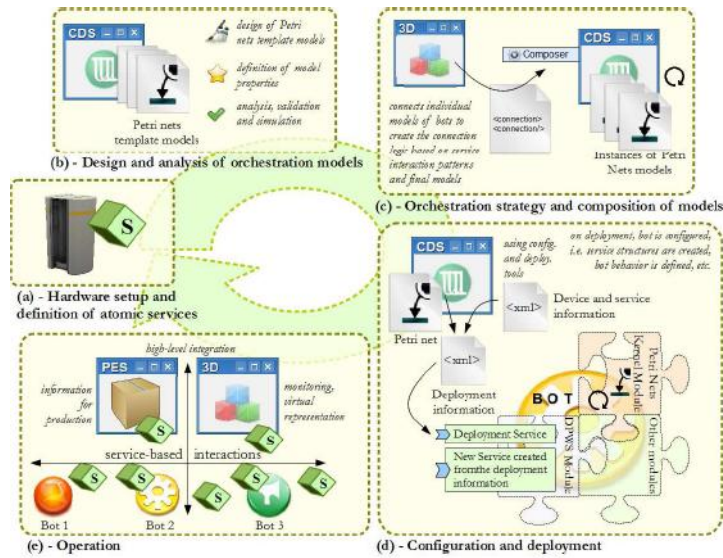
# Types of services



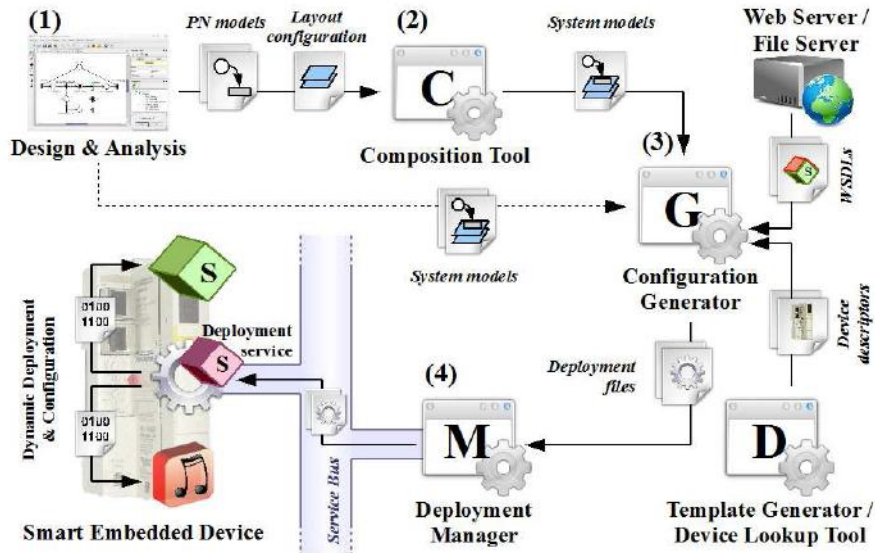
# Engineering



# Engineering



## Engineering



Schneider Electric - EU Projects - Mendes, Colombo - 29th June 2011

11

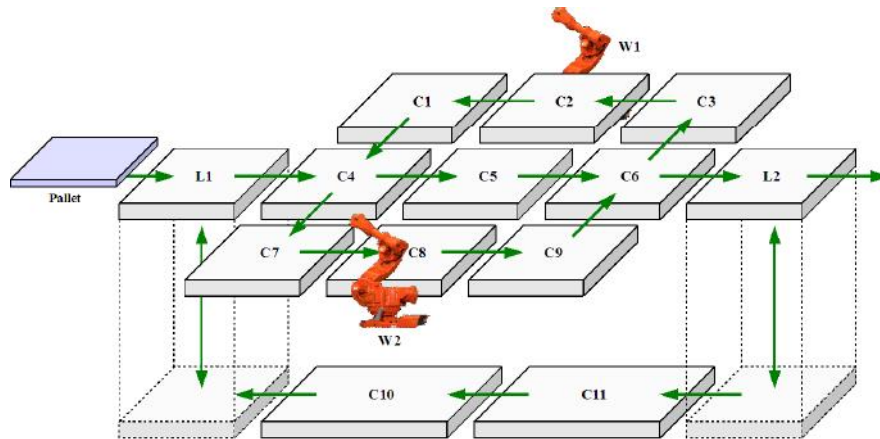
## Application – Pallet management



Schneider Electric - EU Projects - Mendes, Colombo - 29th June 2011

12

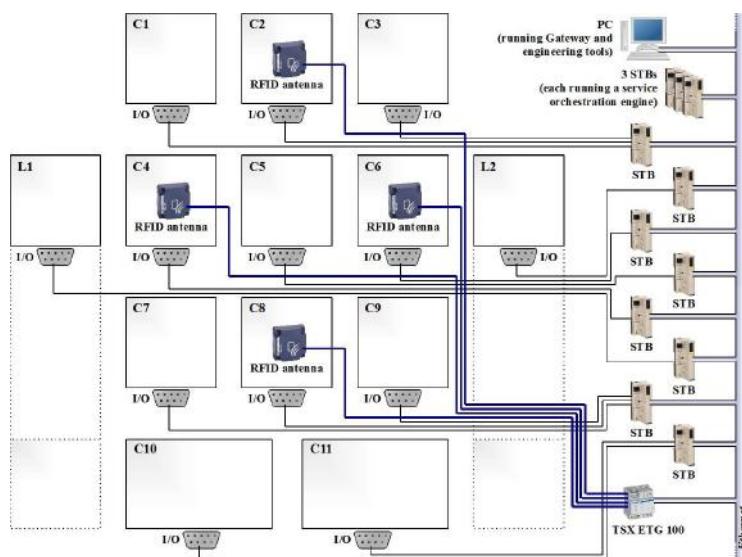
## Application – Pallet management



Schneider Electric - EU Projects - Mendes, Colombo - 29th June 2011

13

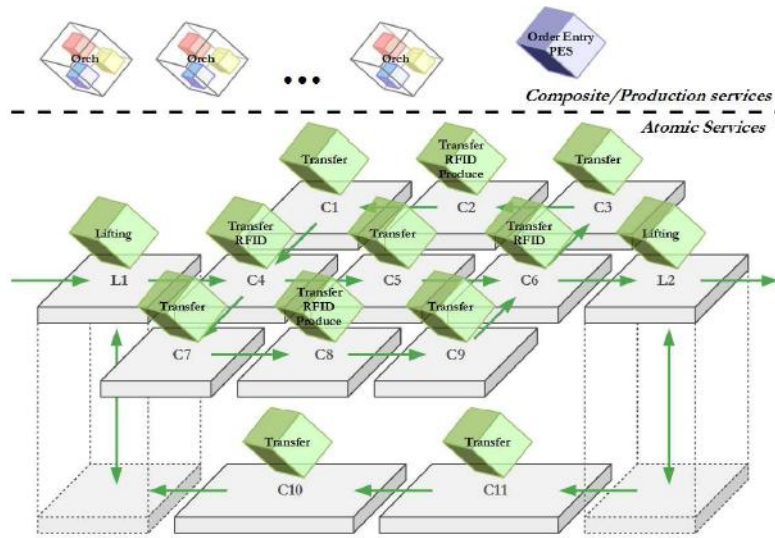
## Application – Connection layout



Schneider Electric - EU Projects - Mendes, Colombo - 29th June 2011

14

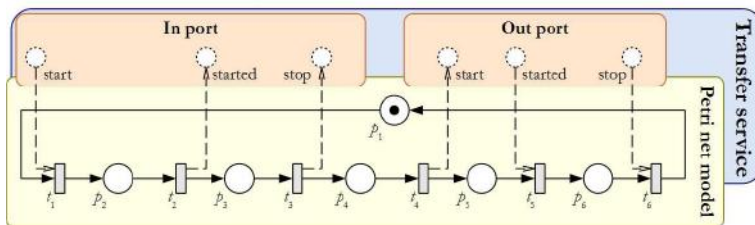
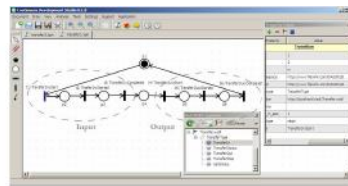
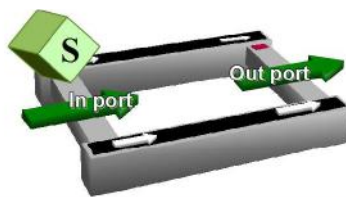
# Application – Service layout



Schneider Electric - EU Projects – Mendes, Colombo – 29th June 2011

15

# Application - Modeling

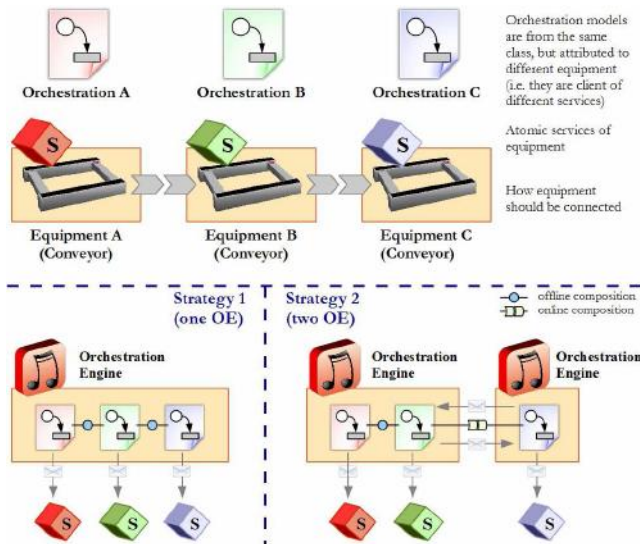


Schneider Electric - EU Projects – Mendes, Colombo – 29th June 2011

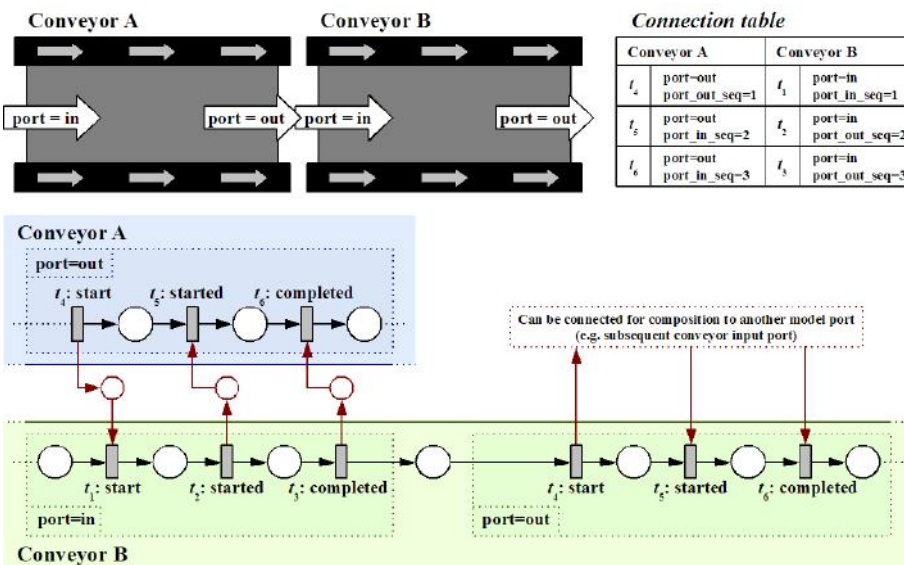
16



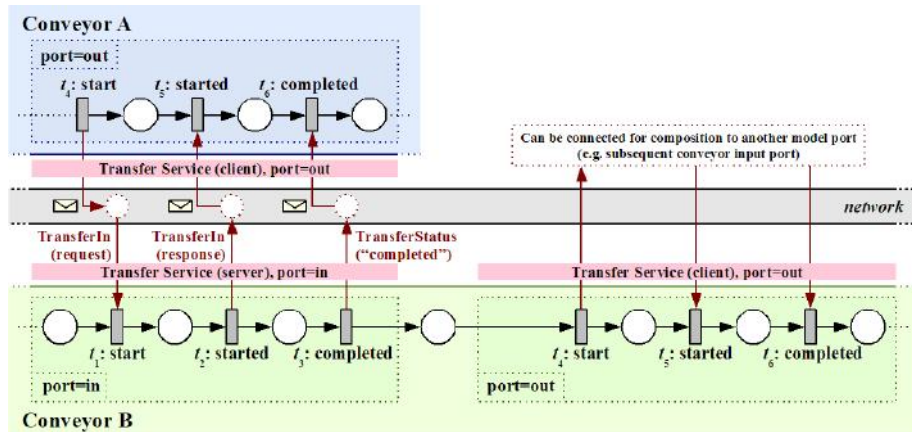
# Application - Composition



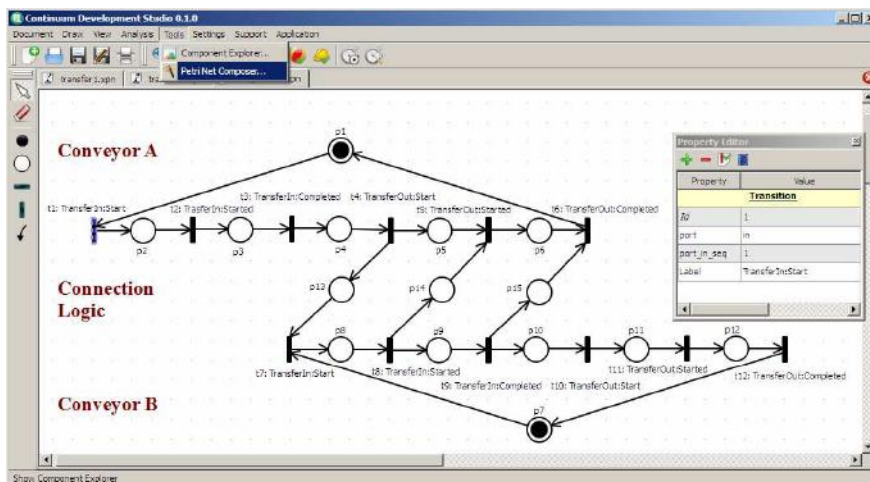
# Application - Composition



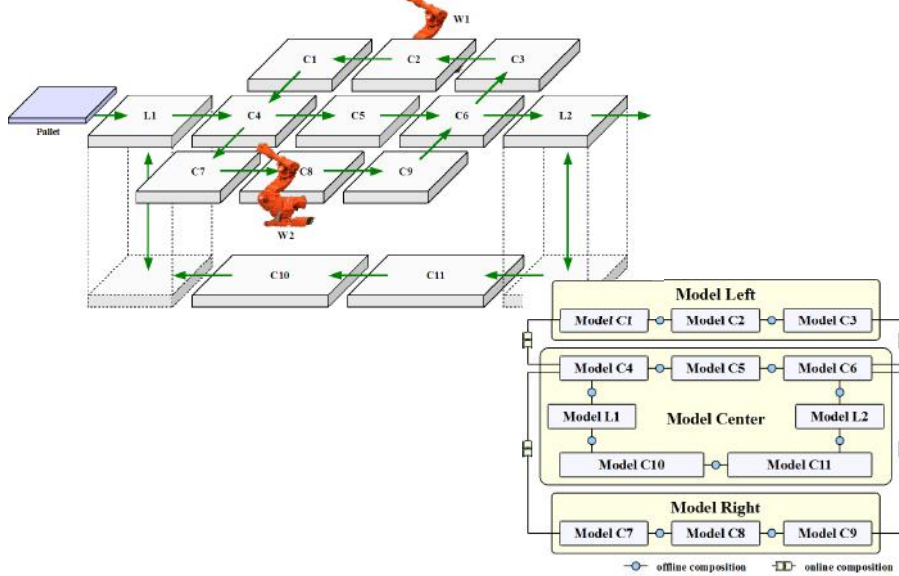
# Application - Composition



# Application - Composition



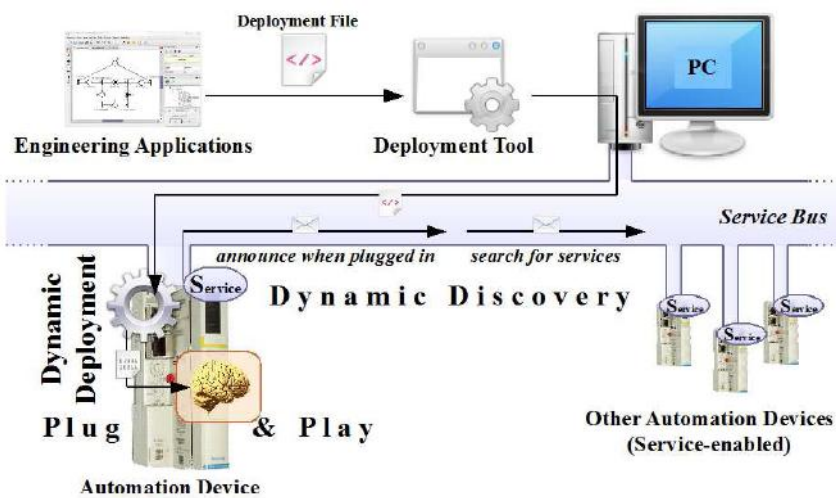
## Application - Composition



Schneider Electric - EU Projects - Mendes, Colombo - 29th June 2011

21

## Application - Deployment & Execution



Schneider Electric - EU Projects - Mendes, Colombo - 29th June 2011

22

## Conclusions

- Engineering Framework for SOA-Automation
  - Reinforce Re-usability (life-cycle & device specification)
  - Expansion and extension
  - “Distributed orchestration”
  - Composition strategy
  - Device distribution abstraction
  - Active conflict/decision management
  - Engineering process
  - Bottom-up approach
  - Reduction of design and configuration efforts
  - Service-orientation in Automation

## Future Directions

- Automatic composition & reconfiguration
- Event Processing in SOA / SOA 2.0
- Error handling
- Decision support and integration
- Performance
- Script engine
- Migration legacy → new approaches
- Cost reduction, energy efficiency
- SOA Manufacturing
- “True” service-orientation
- Industrial adoption / standards / education / dissemination

# Thank you!

[marco.ioao@schneider-electric.com](mailto:marco.ioao@schneider-electric.com)

[armando.colombo@schneider-electric.com](mailto:armando.colombo@schneider-electric.com)

