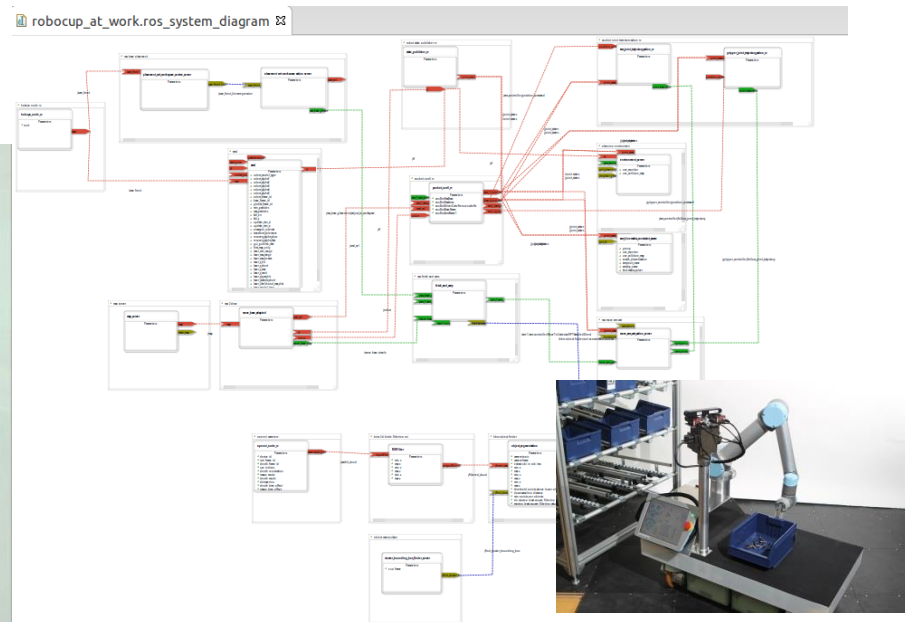


Improve your ROS code with Model-Driven-Engineering and save development time while doing it

ROSCon 2013 – May 11, 2013

Alexander Bubeck



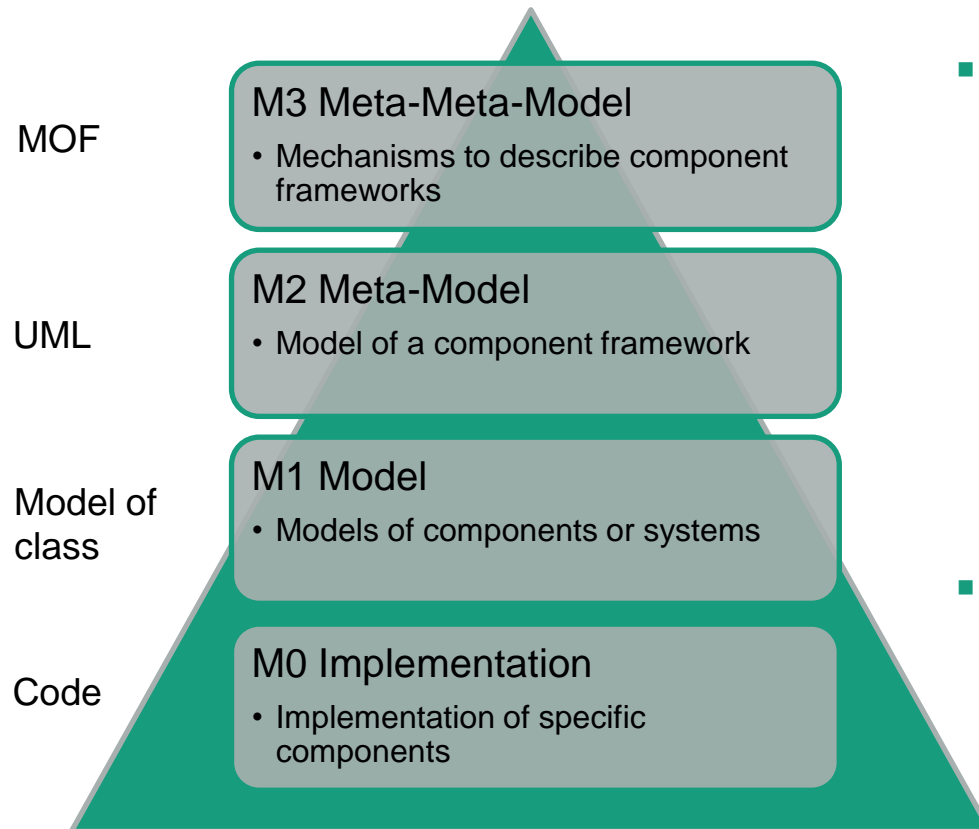
Current challenges in the ROS community

Software quality and reuse

- Reuse ...
- Understandable code ...
- Standards / Best practices ...
- Learning curves ...
- Fast releases ...
- Distributed development ...

Model driven engineering

In a nutshell



- Development and use of domain models to represent abstract knowledge to
 - Encapsulate complexity
 - Differentiate user roles
 - Enforce architectures
 - Support reuse
- Object management group defines multi-layer architecture

BRIDE – An Eclipse based MDE-toolchain for ROS

Overview

The BRICS IDE (BRIDE) is an Eclipse distribution including:

- Graphical model editors for different developer roles in a ROS development



- Automatic generation of
 - C++ or Python ROS nodes
 - Launch files configuring ROS topics, services and parameters
- Separation of ROS independent user code and ROS skeletons
- Integration with Eclipse development environments for C++ and python (CDT and pydev)

BRIDE – An Eclipse based MDE-toolchain for ROS

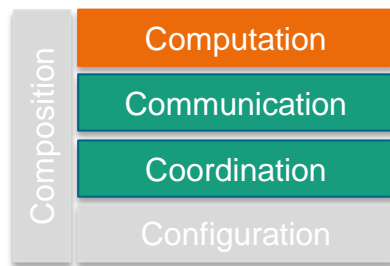
Different types of ROS users

- Domain expert
- System integrator
- Application engineer
- End user
- Architect

BRIDE – An Eclipse based MDE-toolchain for ROS Development process

Capability building

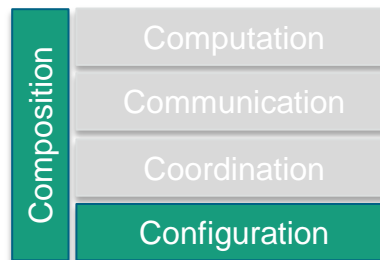
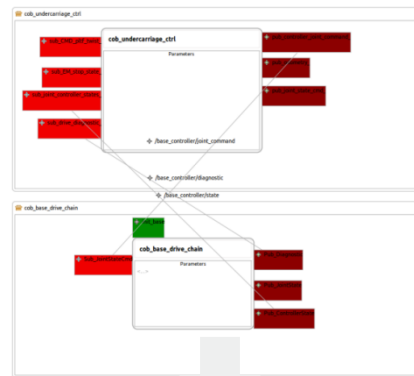
ros_package



ROS package + node

System deployment

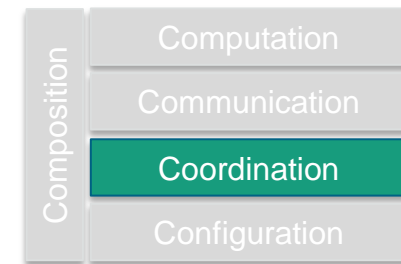
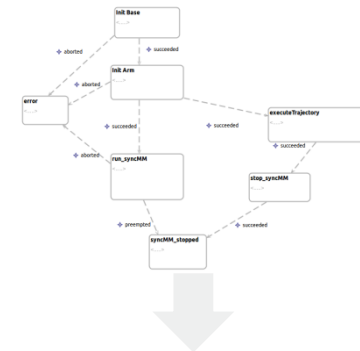
ros_system



Launchfile + yaml

Coordination building

ros_coordinator



SMACH + yaml

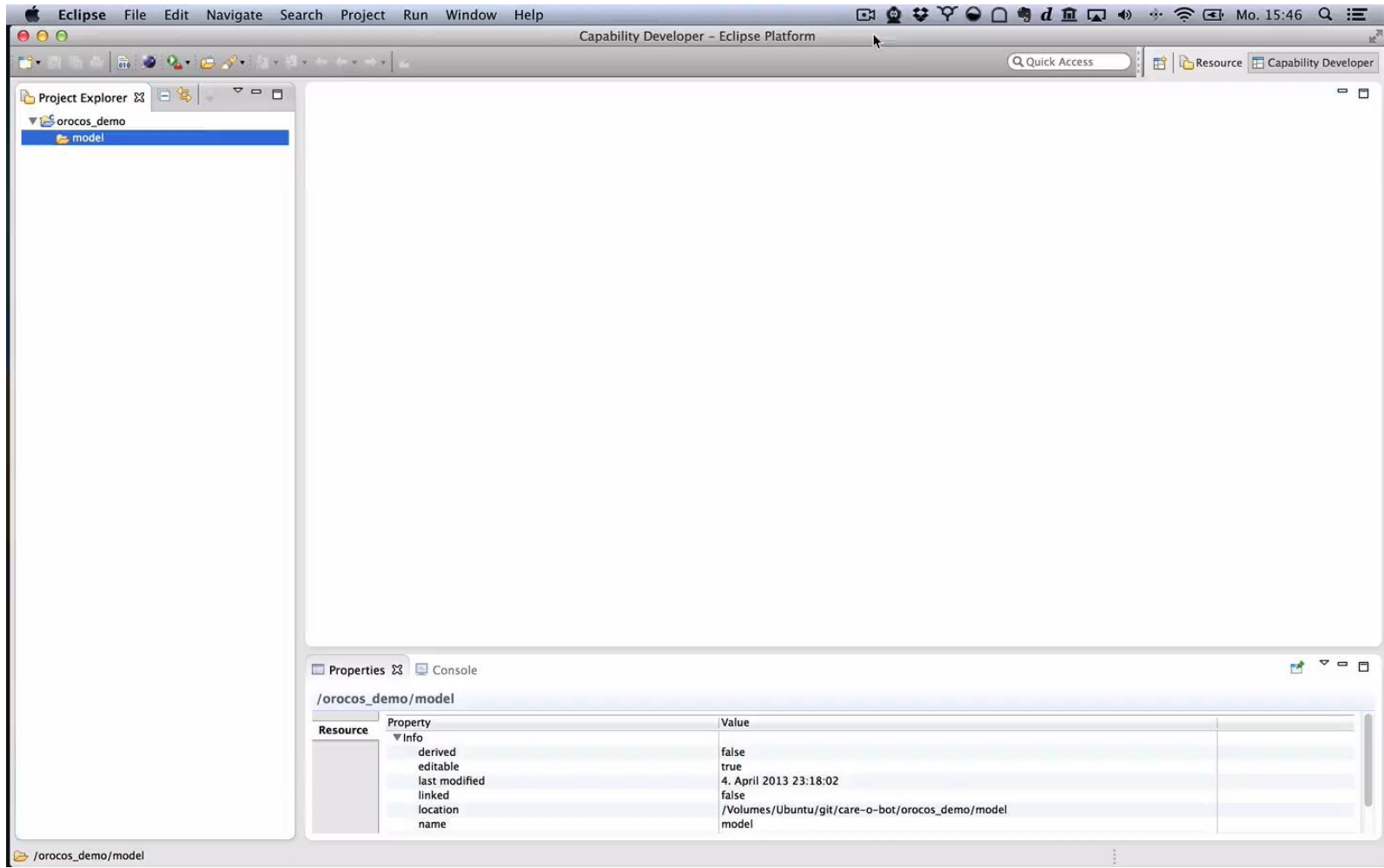
BRIDE – An Eclipse based MDE-toolchain for ROS

Flexibility

- Cross toolchain
 - Generate OROCOS components with the same computational code*
- Configuration management
 - Support for rosparam server, dynamic_reconfigure and yaml based configuration
 - Automatic generation of yaml files*
- Legacy code
 - Use existing (non-MDE) ROS components in your systems and coordinators

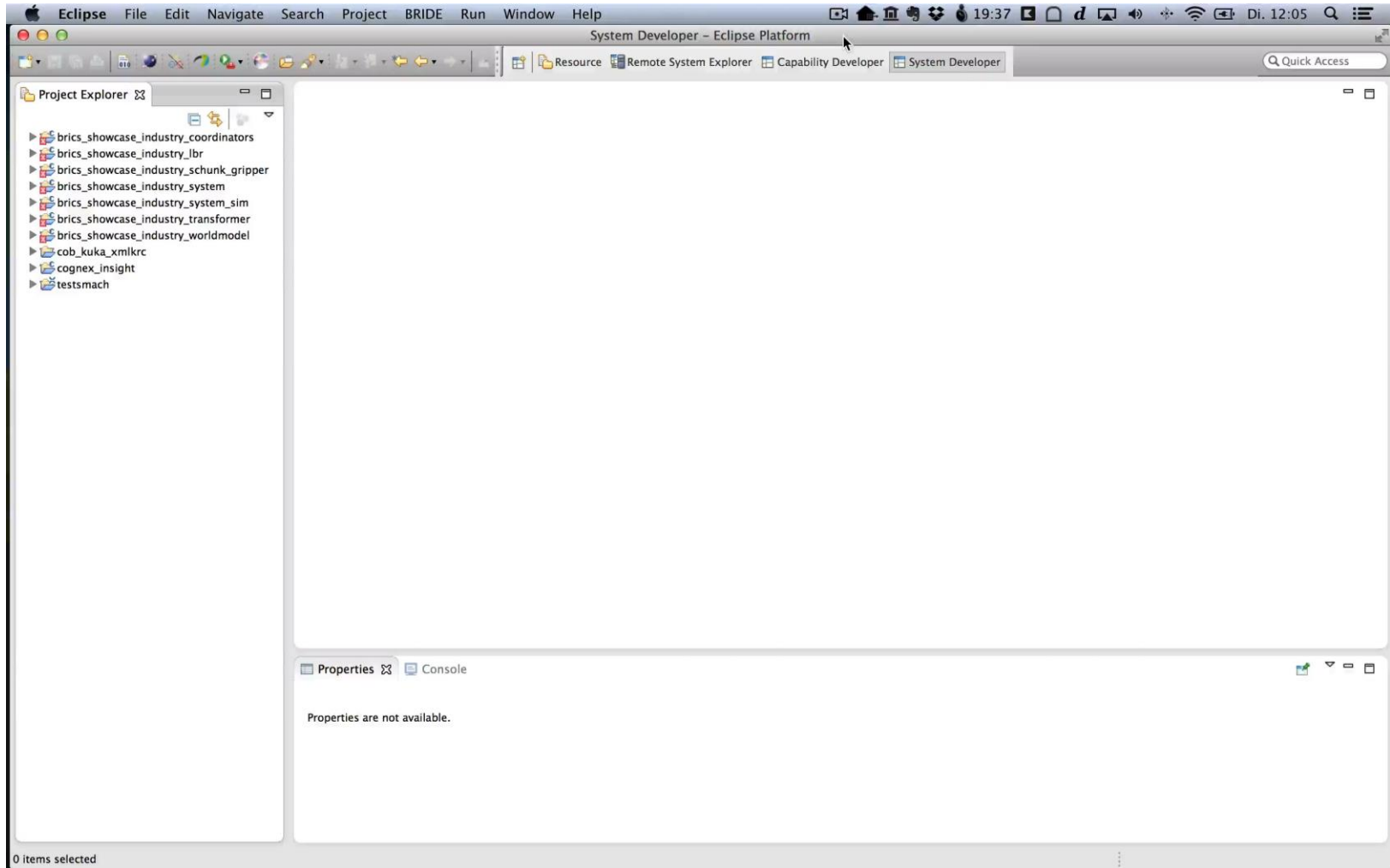
Walk-through BRICS Showcase

Creating Capabilities



Walk-through BRICS Showcase

Creating Systems



BRIDE – An Eclipse based MDE-toolchain for ROS

Call for participation

- **Use it + Refactor !**

And give feedback of the toolchain

- **Complain about the code !**

Help improve the code templates (bride_templates)

- **Share your ideas !**

What are your use cases?

bride-users@best-of-robotics.org

<https://github.com/ipa320/bride>

Current challenges in the ROS community

Software quality and reuse -- Recap

- Reuse **components by adapting**
- Understandable code **is created because crosscutting concerns are separated and the component models document the structure of a ROS node**
- Standards / Best practices **can be enforced by reuse of models**
- Learning curves **change because beginners don't fight with boost pointers etc.**
- Fast releases **can be handled by updating the code templates**
- Distributed **development is endorsed by communicating with models**

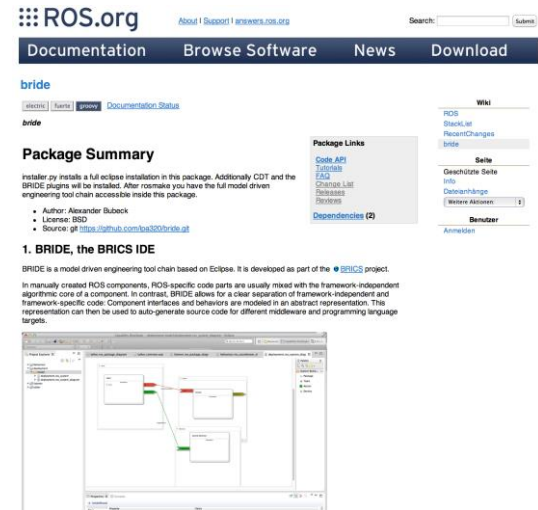
Summary

BRIDE for ROS development

- BRIDE, a model driven engineering tool chain, disseminates Software Engineering techniques in the ROS community
- Current released version 0.2:
 - Capability Development and System Deployment
 - Coordinator Development
 - Standalone compiler
- Please participate in this activities !

Acknowledgement to the project FP7-ICT-231940-BRICS (Best Practice in Robotics)
www.best-of-robotics.org

ROSCon 2013 – Stuttgart, Germany



BRIDE for ROS:
<http://ros.org/wiki/bride>
`sudo apt-get install ros-fuerte-bride`

Contact:
Alexander Bubeck
alexander.bubeck@ipa.fraunhofer.de
Tel: +49 711 970 1314