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





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



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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



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BRIDE – An Eclipse based MDE-toolchain for ROS Textual workflow

- Do I really have to use all this IDE stuff?
 - Xtext based DSL's
- # vi model/mymodel.ros_package
- Standalone M2T compilers
 # rosrun bride_compilers m2t
- Integration into the rosbuild system
 # make regen







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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

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Walk-through BRICS Showcase

Creating Systems

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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

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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 !

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n manually created ROS components, ROS-specific code parts are usually mixed with the framework-independent agothmic core of a component, in contrast, BRIDE allows for a clear separation of framework-independent and amework-is-pecie code: Component intrafaces and behaviors are modeled in a abstract representation. This spresentation can then be used to auto-generate source code for different middleware and programming language protein.



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

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