

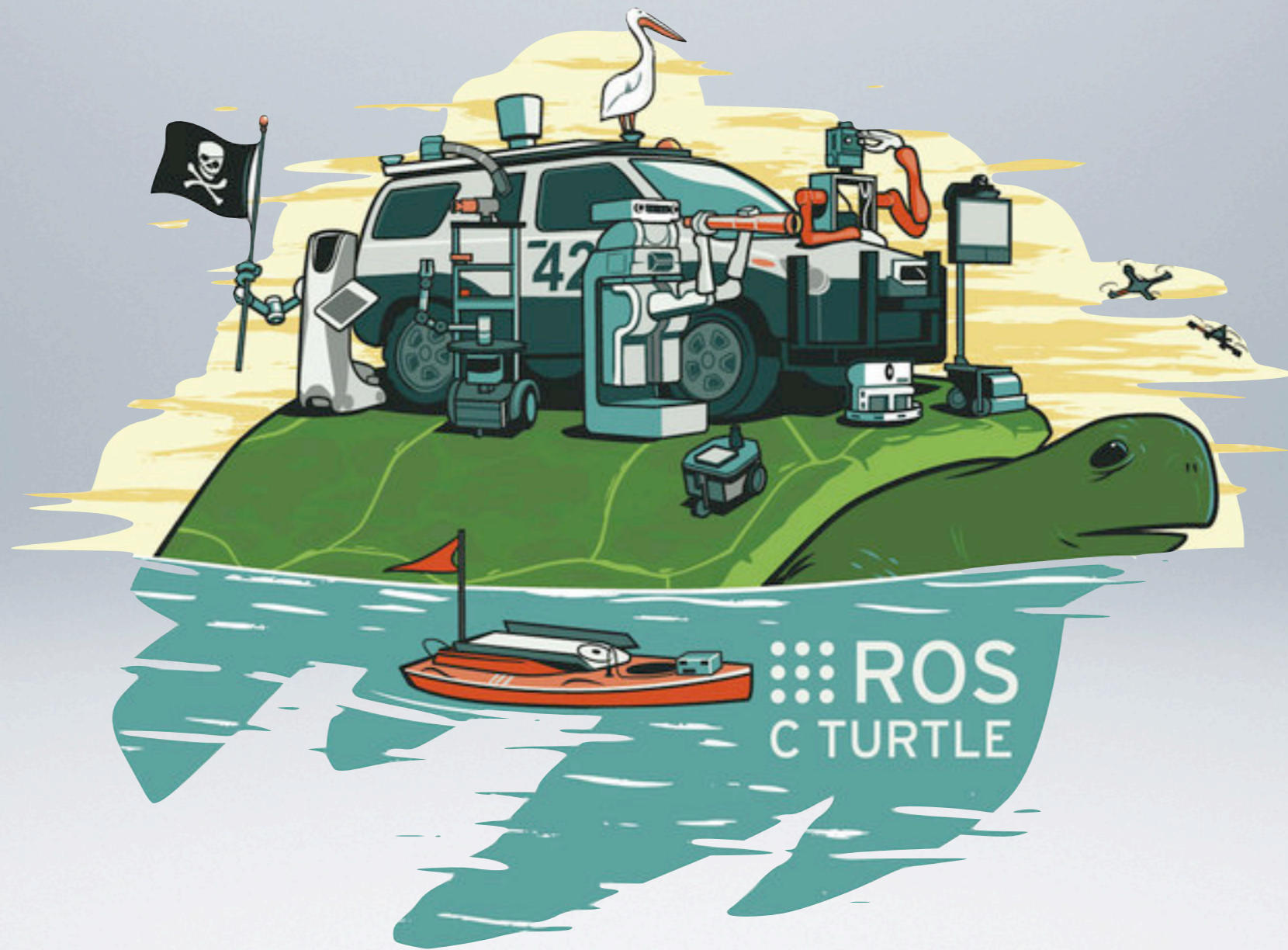
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16 February 2011  
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# What is ROS?



A meta operating system for robotics



# Where can I run ROS?



## Supported

- Ubuntu 10.10
- Ubuntu 10.04
- Ubuntu 9.10
- Ubuntu 9.04

## Experimental

- Mac OS X
- Arch
- Fedora
- Gentoo
- OpenSUSE
- Slackware

## Partial Functionality

- Windows
- FreeBSD



# What sets ROS apart?



Modular



Multi-language



Tools Based



Open Source





Modular



# How is ROS organized?



## Packages

- Nodes
- Messages
- Services



## Stacks

Groups of packages



Modular



# How do Nodes talk?

## Messages



Node A



Node B



Modular

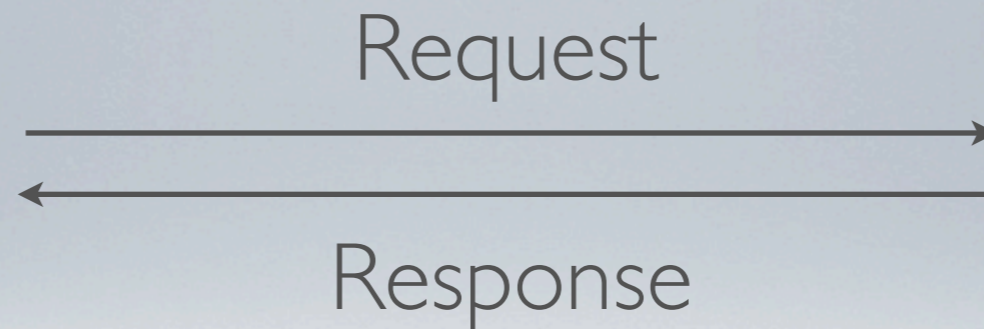


# How do Nodes talk?

## Services



Node A



Node B



Modular

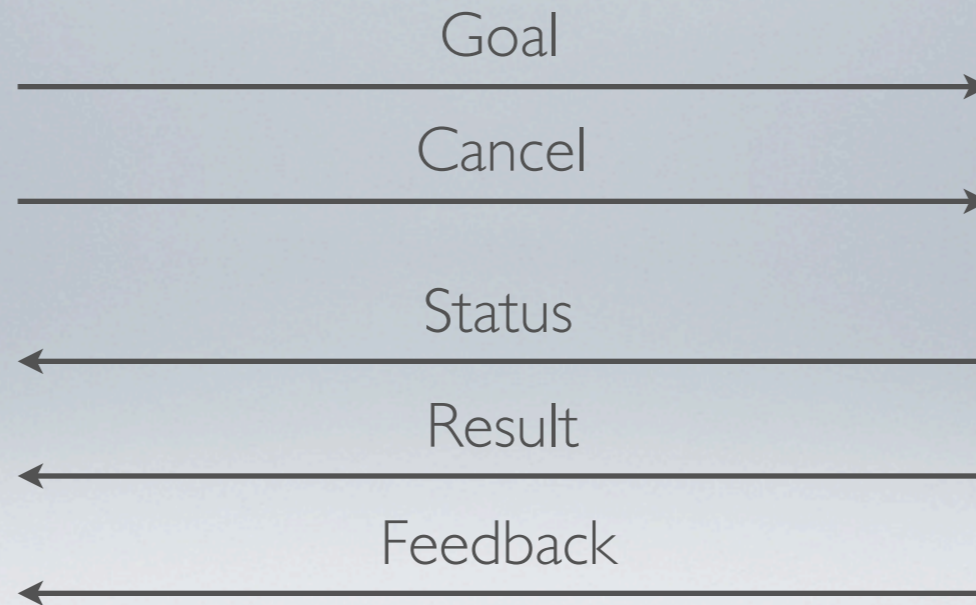


# How do Nodes talk?

## Actions



Action Client



Topics



Action Server





Multi-language





# ROS Client Libraries

- roscpp - C++ client library
- rospy - Python client library

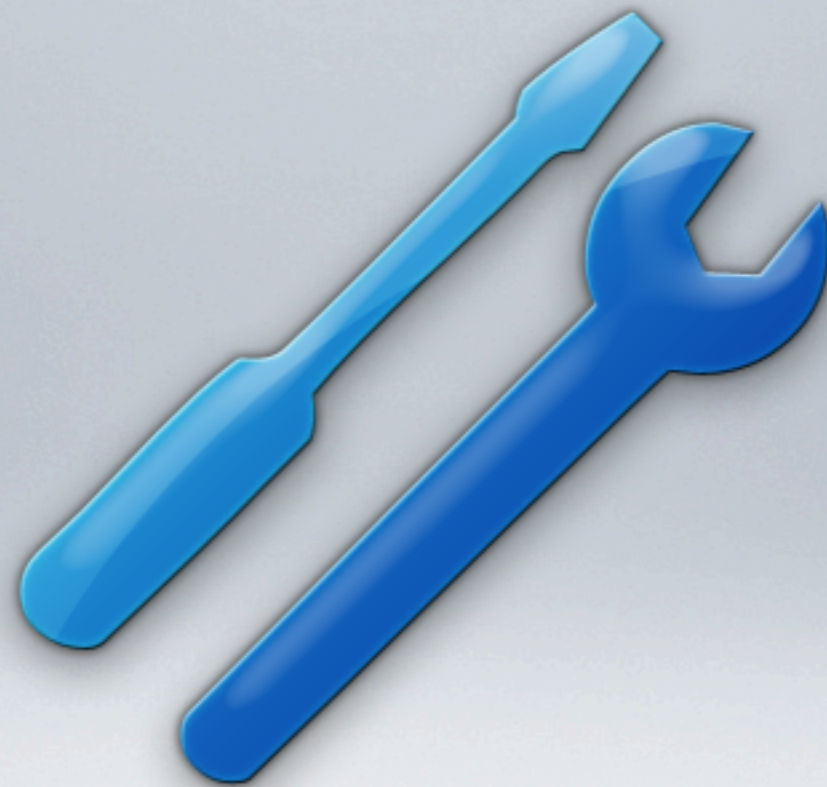
## Experimental Client Libraries

- rosoct - Octave client library
- roslisp - LISP client library
- rosjava - Java client library
- roslua - Lua client library



Multi-language



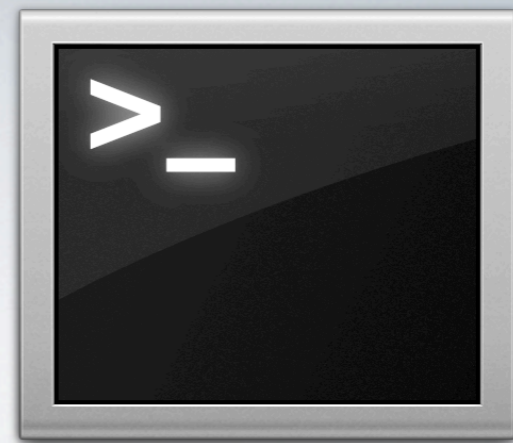


Tools Based



# Command-line Tools

- rosbag
- rosbash
- roscd
- rosclean
- roscore
- rosdep
- rosed
- roscreeate-pkg
- roscreate-stack
- rosrun
- roslaunch
- roslocate
- rosmake
- rosmsg
- rosnode
- rospack
- rosparam
- rossrv
- rosservice
- rosstack
- rostopic



Tools Based



# GUI Tools for ROS

## rx Stack

- rxbag - ROS bag recording, playback and visualization
- rxgraph - ROS graph visualization
- rxplot - ROS topic data visualization
- rxconsole - ROS/rosout logging output

## rviz

- A 3d visualization environment for robots using ROS



## Tools Based



# rosbag and rxbag



[http://www.youtube.com/watch?v=pwlbArh\\_neU](http://www.youtube.com/watch?v=pwlbArh_neU)



Tools Based



# rviz

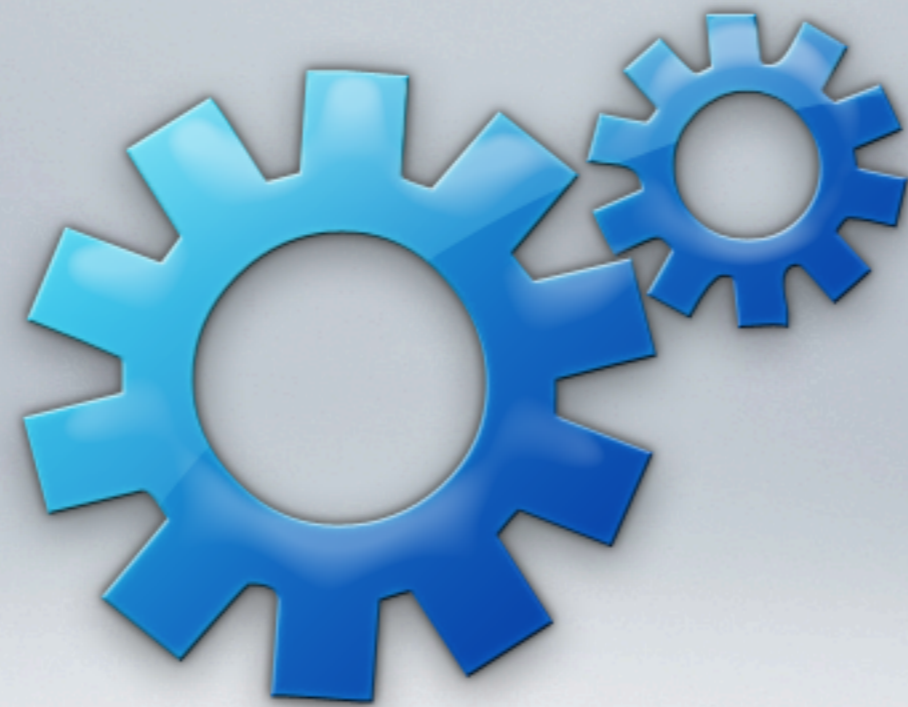


<http://www.youtube.com/watch?v=i--Sd4xH9ZE>

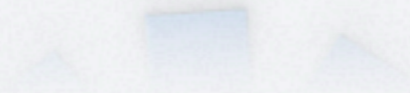


## Tools Based



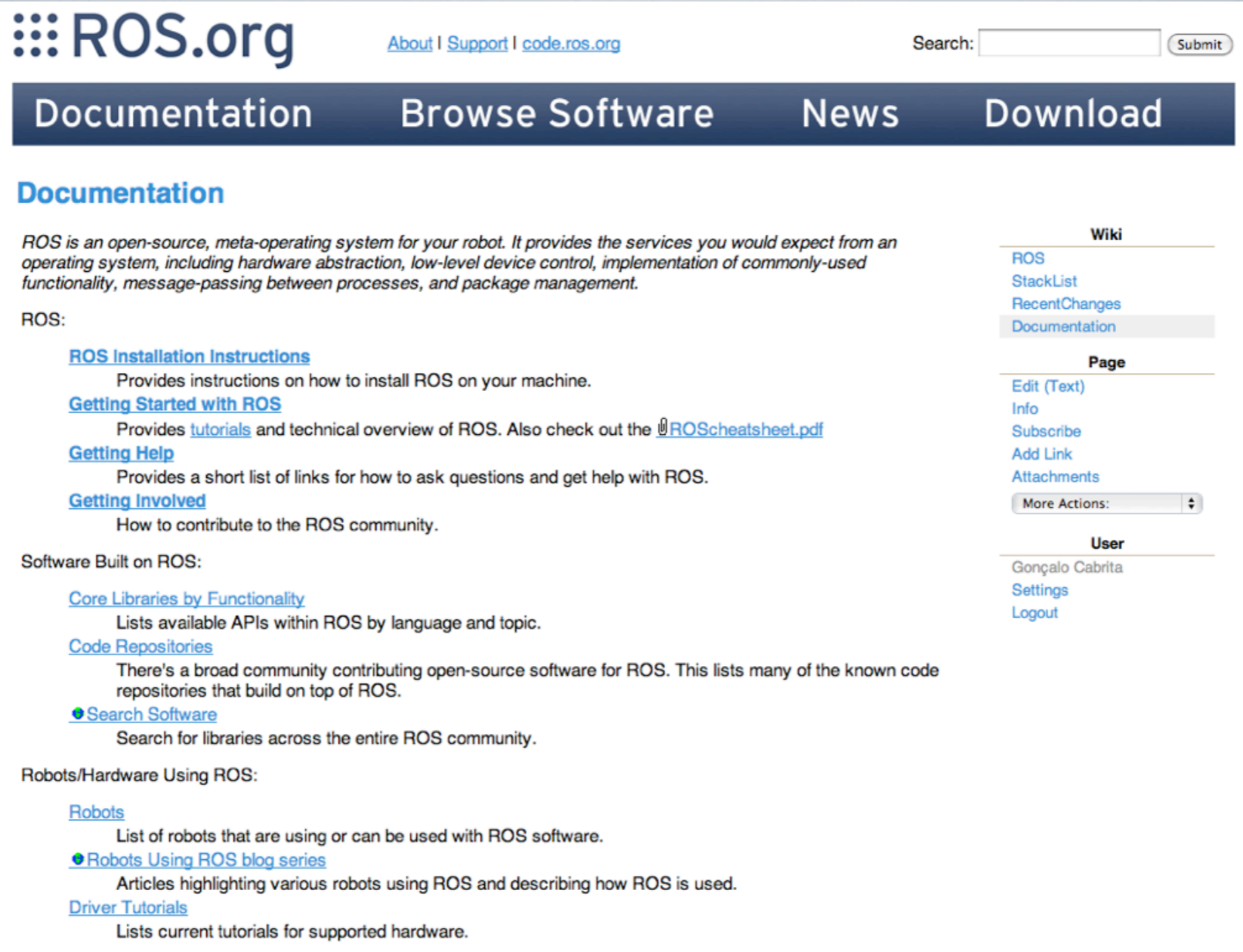


Open Source

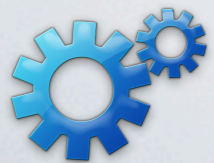




# ROS Wiki



The screenshot shows the ROS Wiki homepage. At the top left is the ROS.org logo with navigation links for 'About', 'Support', and 'code.ros.org'. A search bar is located at the top right. Below the logo is a dark blue navigation bar with buttons for 'Documentation', 'Browse Software', 'News', and 'Download'. The main content area is titled 'Documentation' and contains a paragraph describing ROS as an open-source meta-operating system. Below this are sections for 'ROS:', 'Software Built on ROS:', and 'Robots/Hardware Using ROS:', each with several links to related content. On the right side, there is a sidebar with sections for 'Wiki' (containing links to ROS, StackList, RecentChanges, and Documentation), 'Page' (containing links to Edit (Text), Info, Subscribe, Add Link, and Attachments), and 'User' (containing links to Gonçalo Cabrita, Settings, and Logout).



# Open Source



# ROS Wiki

- BSD license (ROS)
- Documentation
- Tutorials
- Community support
- You can contribute too!



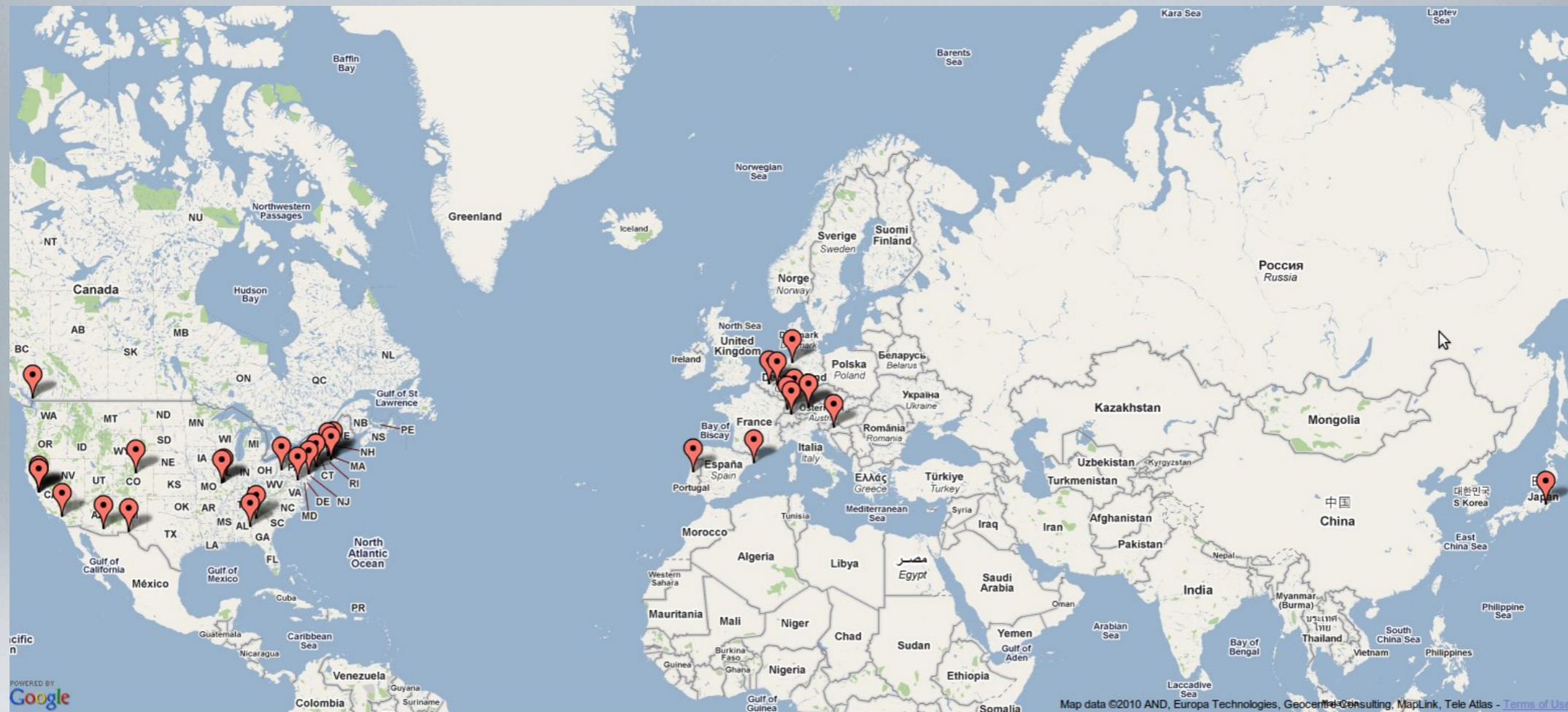
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Open Source



# Who's using ROS?



Over 50 ROS repositories worldwide



# Open Source



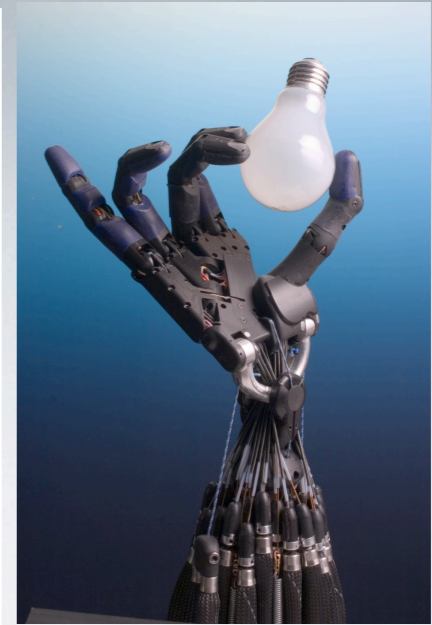


Robots





# How flexible is ROS?



Robots





What's inside?

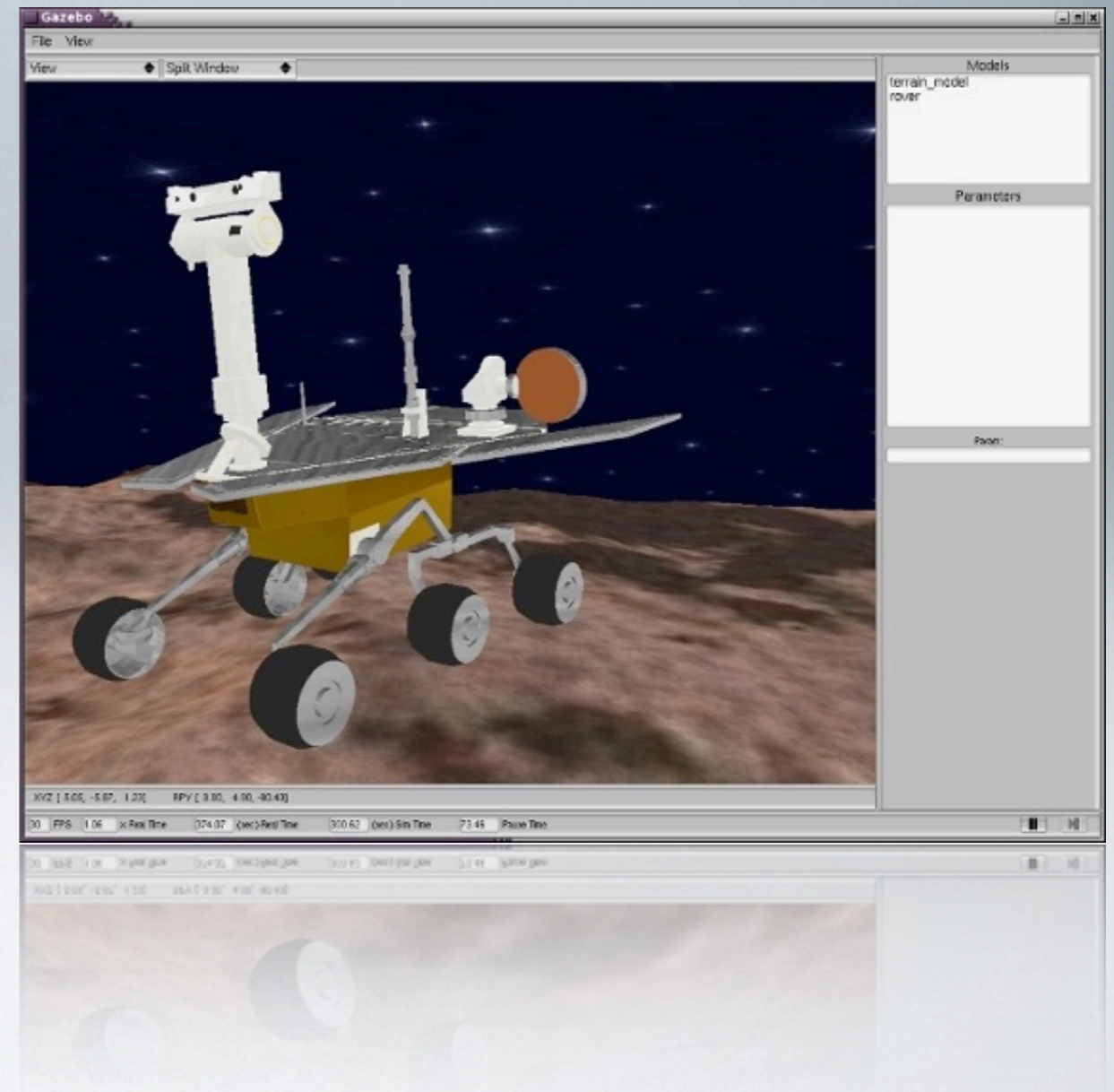
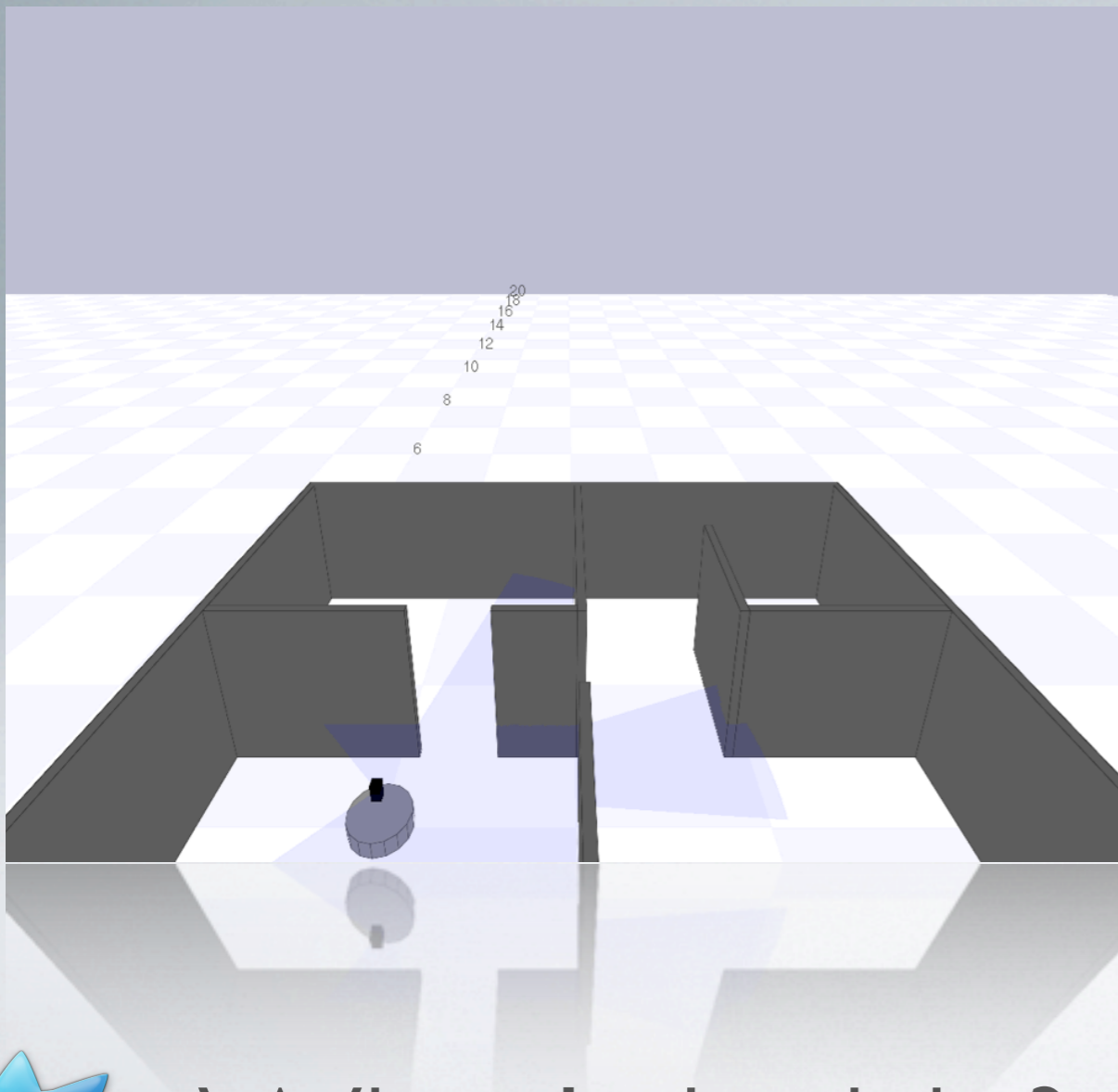




# Simulation

Stage

Gazebo



What's inside?



# Navigation



<http://www.youtube.com/watch?v=qziUJcUDfBc>



What's inside?



# Visual SLAM



<http://www.youtube.com/watch?v=DUmLJapio7o>



What's inside?



# PCL



[http://www.youtube.com/watch?v=gvRjULI\\_FKM](http://www.youtube.com/watch?v=gvRjULI_FKM)



What's inside?



Can we actually do  
anything useful with

 **ROS** ?





Yes, we can.



# Beer hackathon



<http://www.youtube.com/watch?v=c3Cq0sy4TBs>





Questions?

