

ROS - Robot Operating System

Brian Gerkey

Willow Garage, Inc

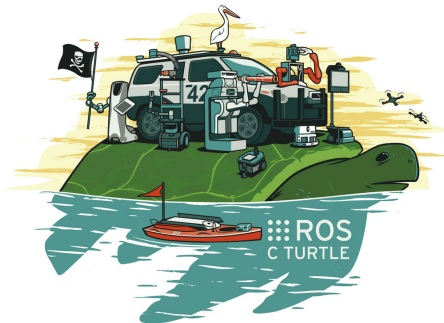
<http://www.willowgarage.com>

March 17, 2011



Overview

What is ROS? (1/2)



- ▶ Meta operating system for robotics
- ▶ Obtain, build, write, and run code across multiple computers, and multiple robots

Overview

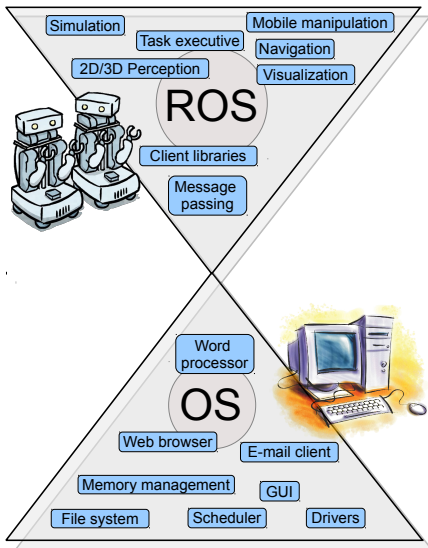
What is ROS? (2/2)



- ▶ Meta operating system for robotics
- ▶ Obtain, build, write, and run code across multiple computers, and multiple robots

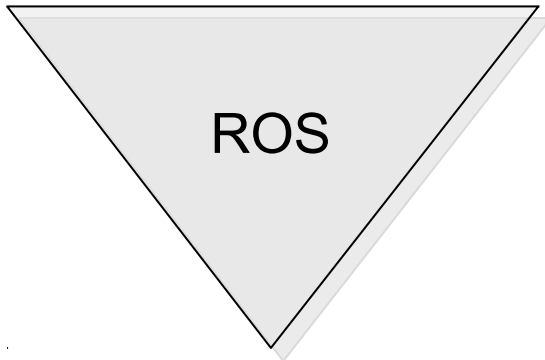
Overview

High-level view



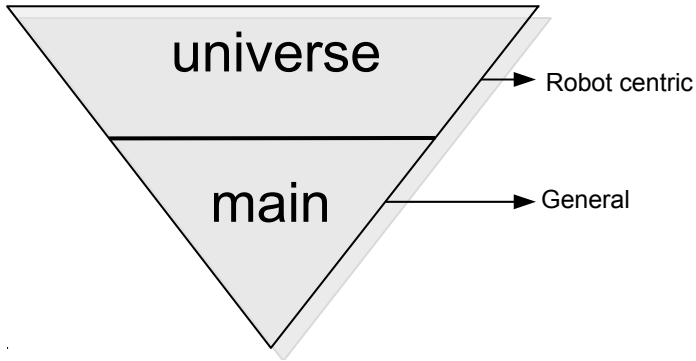
Overview

ROS ecosystem (1/3)



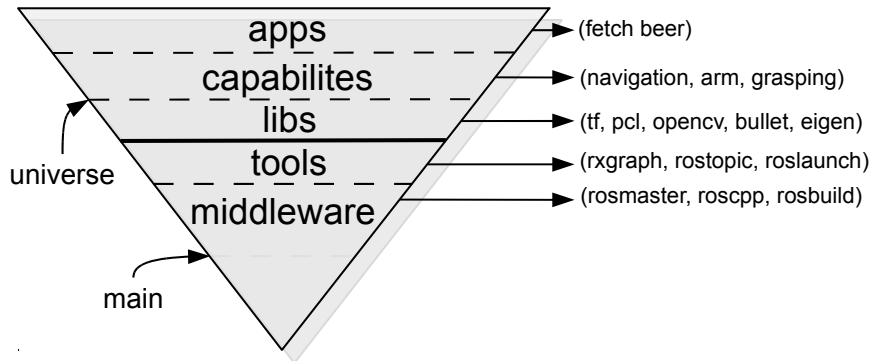
Overview

ROS ecosystem (2/3)



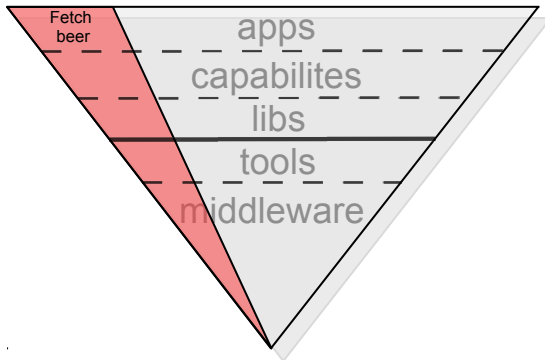
Overview

ROS ecosystem (3/3)



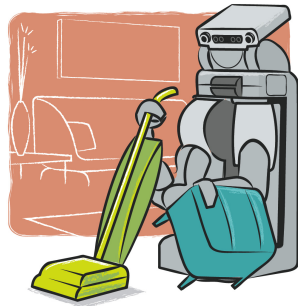
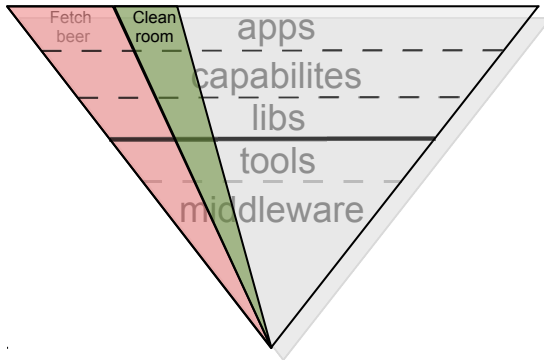
Overview

ROS ecosystem. Example application (1/2)



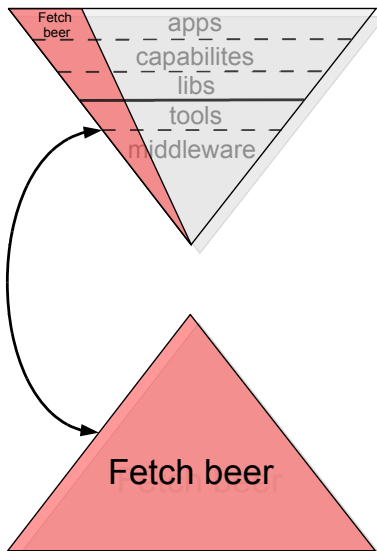
Overview

ROS ecosystem. Example application (2/2)



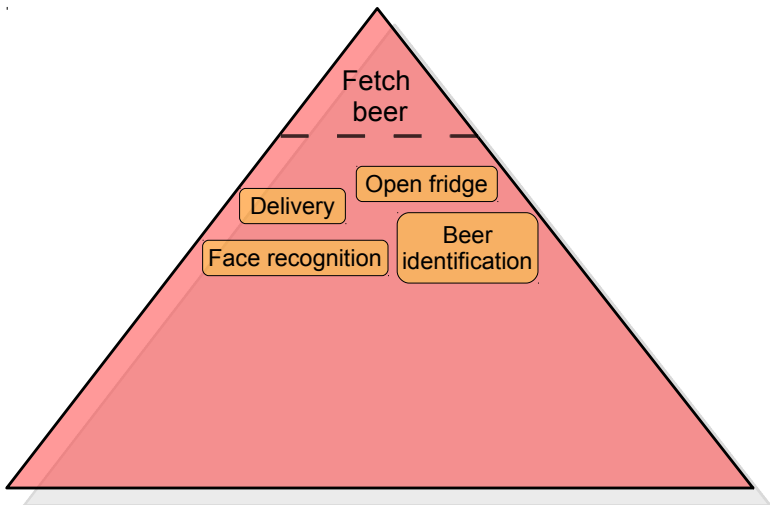
Overview

Example application (1/4)



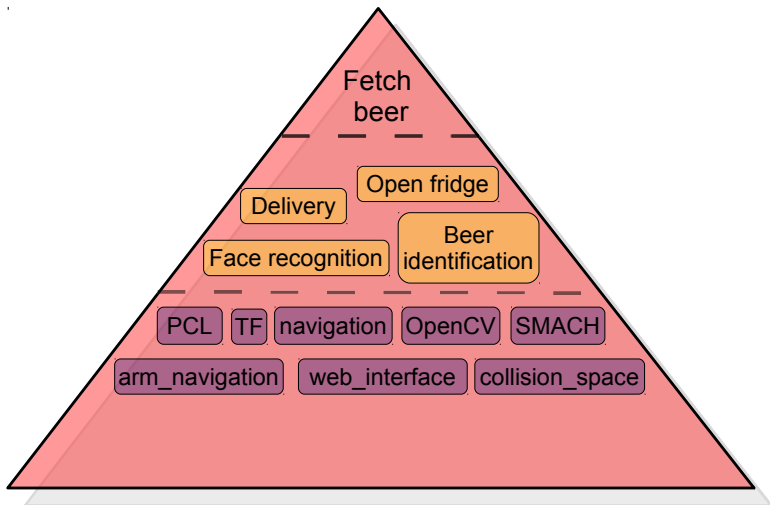
Overview

Example application (2/4)



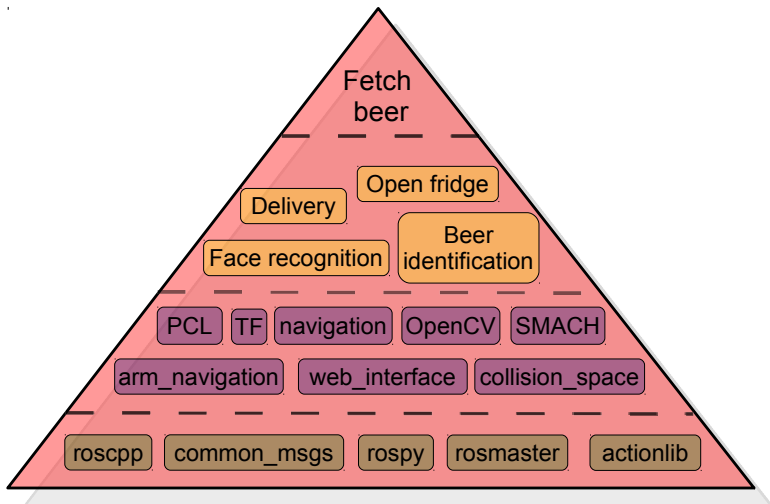
Overview

Example application (3/4)



Overview

Example application (4/4)





Package

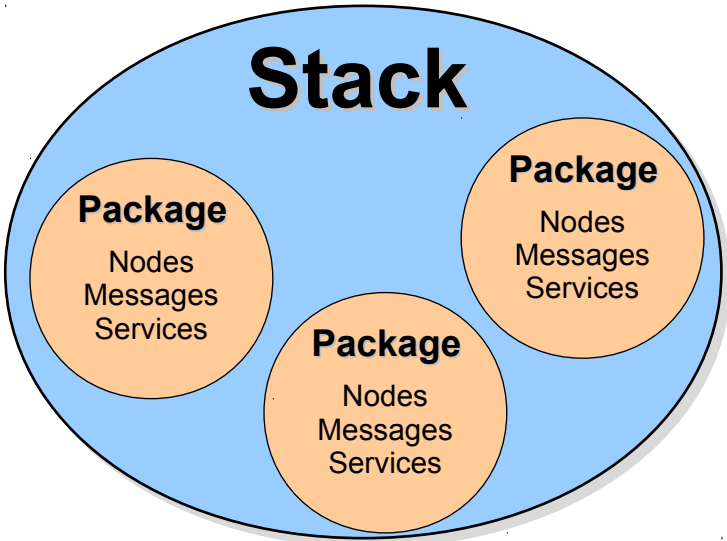
Nodes

Messages

Services

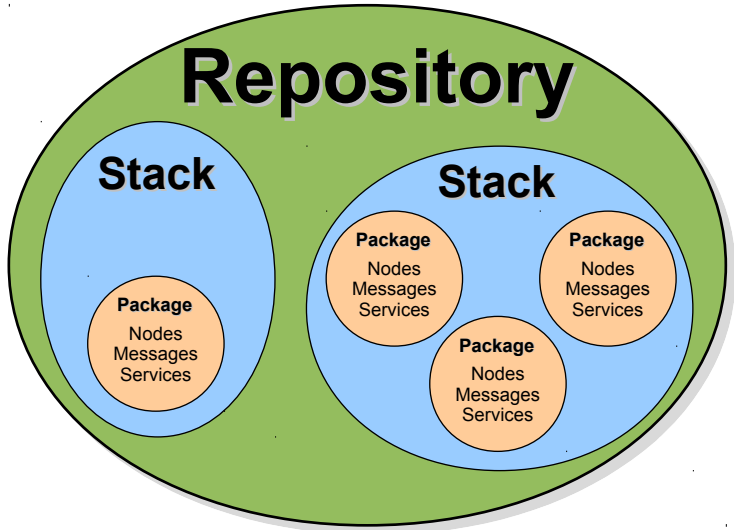
Overview

Organizational Diagram (2/4)



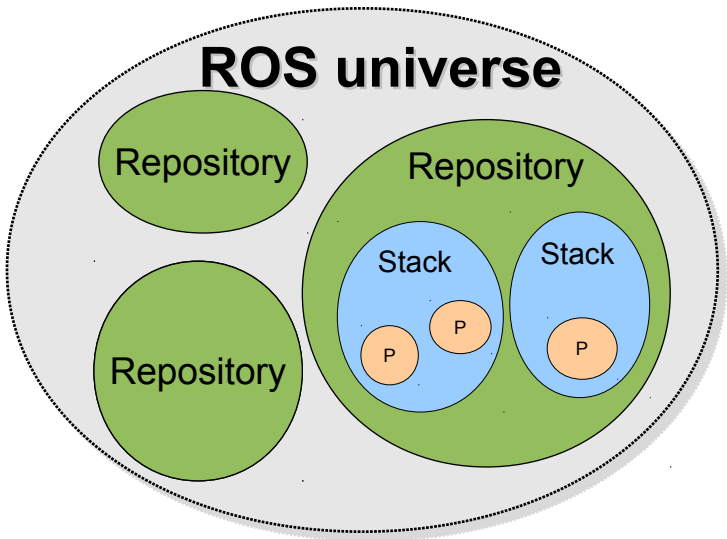
Overview

Organizational Diagram (3/4)



Overview

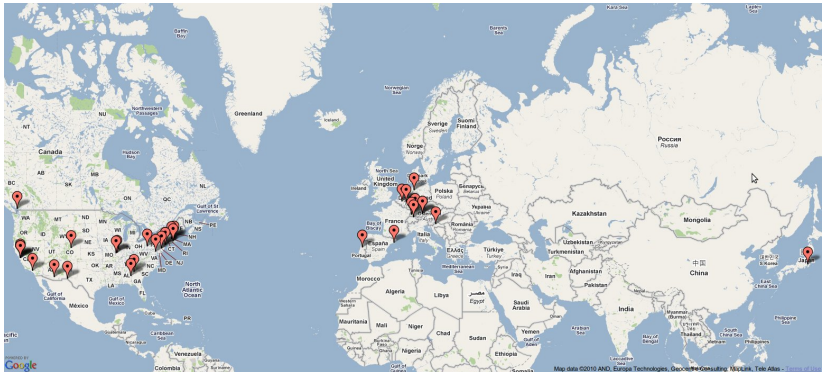
Organizational Diagram (4/4)



Overview

ROS Repositories Map

- ▶ collection of packages and stacks, hosted online
- ▶ **many** repositories (>50): Stanford, CMU, TUM, etc

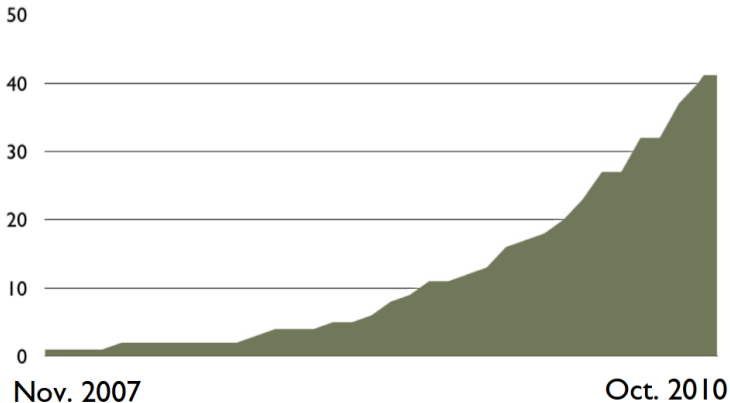


Overview

ROS Repositories Graph

- ▶ growing trends: almost exponential

ROS Repositories



Overview

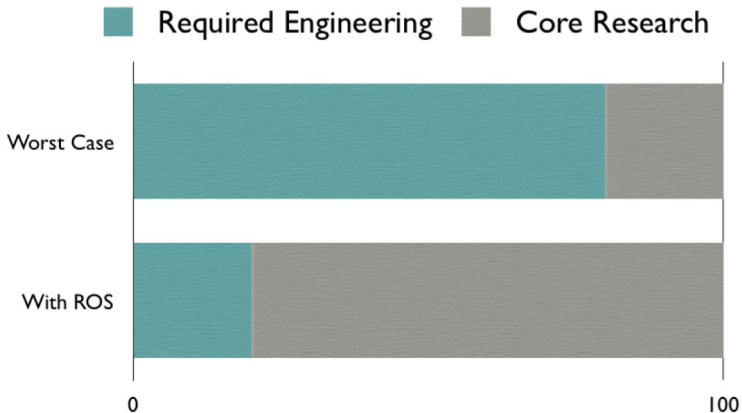
Robots Using ROS

- ▶ many robots (>50) using ROS



Overview

Why use ROS (1/3)



Overview

Why use ROS (2/3)



- ▶ > 150 Engineering Person-Years
- ▶ Lines of source code: cpp (67.96%), python (23.57%), xml (5.26%), sh (2.05%), lisp (1.16%)
- ▶ Open Source
- ▶ BSD Licensed
- ▶ documentation, tutorials, tech support
- ▶ community, community, community

Overview

Why use ROS (3/3)

ROS strengths

- ▶ visualization
- ▶ object recognition
- ▶ navigation
- ▶ manipulation/grasping
- ▶ plugging in

