中南大學
CENTRAL SOUTH UNIVERSITY

ROS 机器人操作系统

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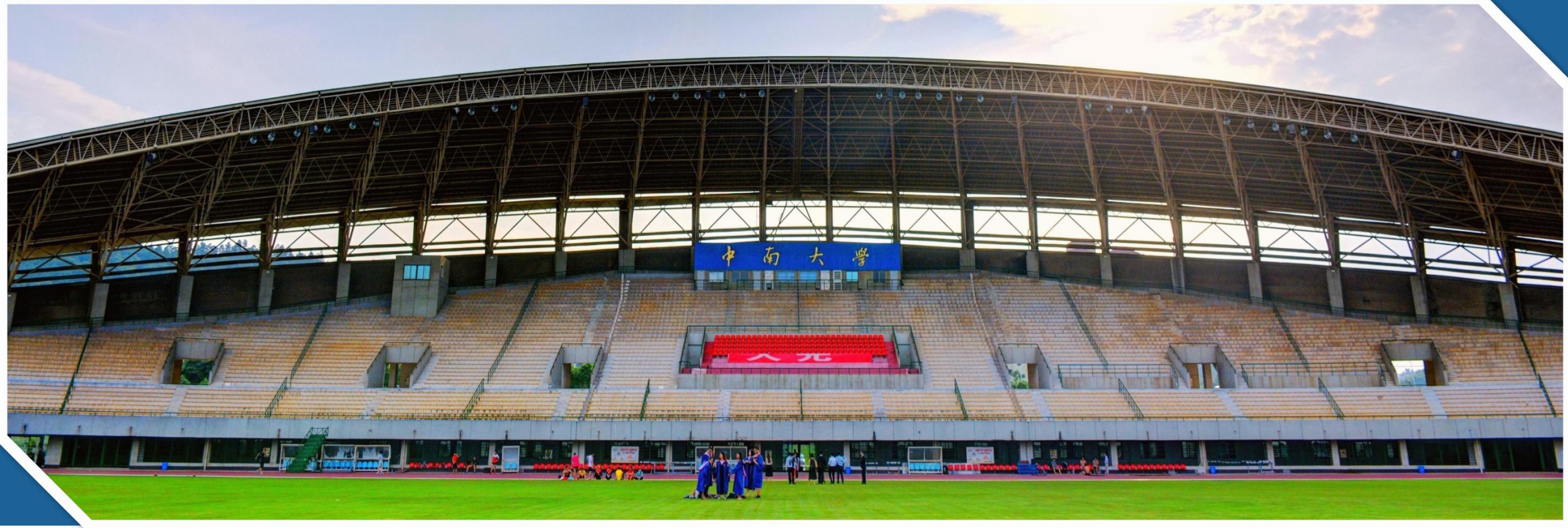


01

PART 01

第一部分
ROS简介

01

ROS简介

Robot Operating System

制造机器人是一个浩大工程

机械结构　电子电路　驱动程序

通信架构　组装集成　调试　上层算法

ROS简介

ROS起源

2000s，斯坦福大学，机器人软件系统架构

ROS正式发布

2007，柳树车库(Willow Garage)发起

ROS 1.0发布

2010，许多组建和API沿用至今

ROS Hydro

2013

ROS Indigo(LTS)

2014，14.04

ROS Jade

2015

ROS Kinetic(LTS)

2016，16.04

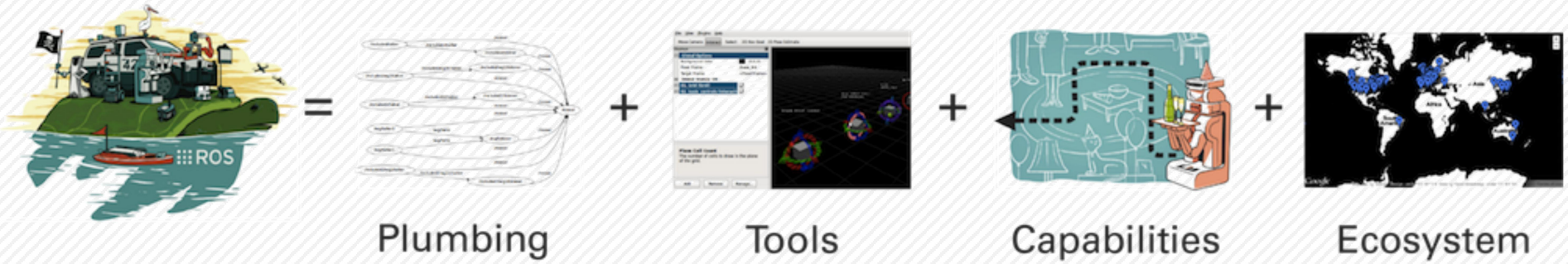
ROS Lunar

2017

ROS

中间件/类操作系统

硬件抽象、底层设备控制、
进程间通信、包管理



02

PART 02

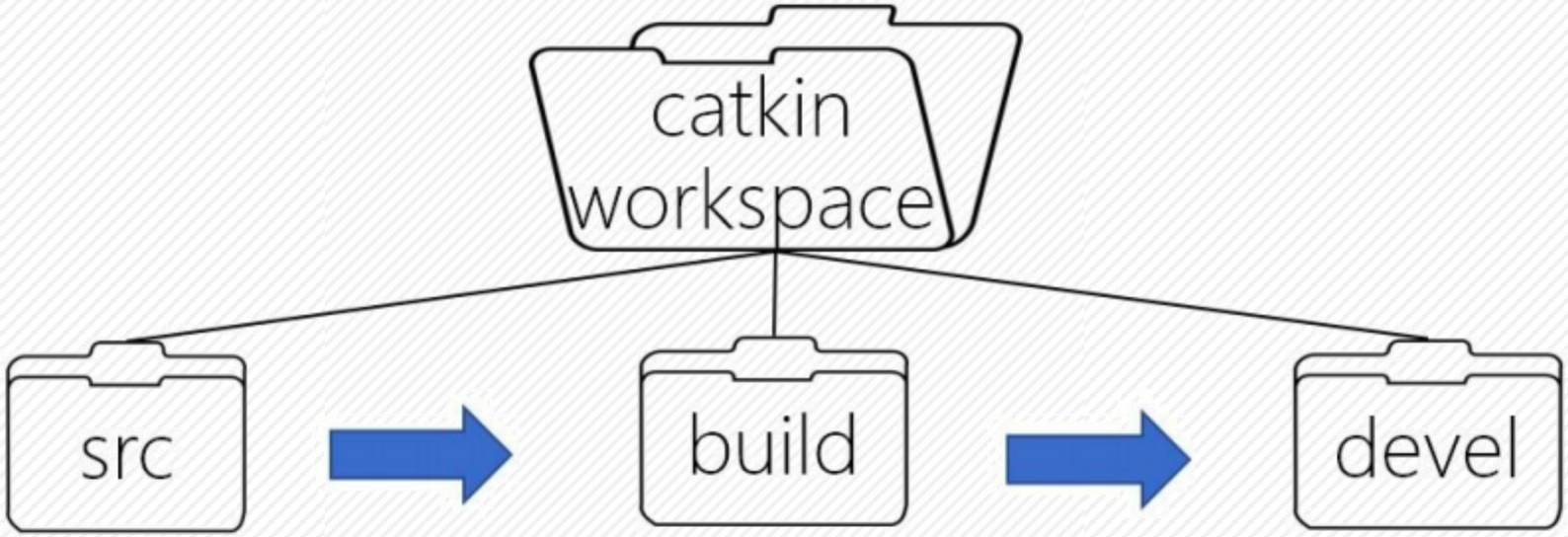
第二部分
ROS工程结构

02

ROS工程结构

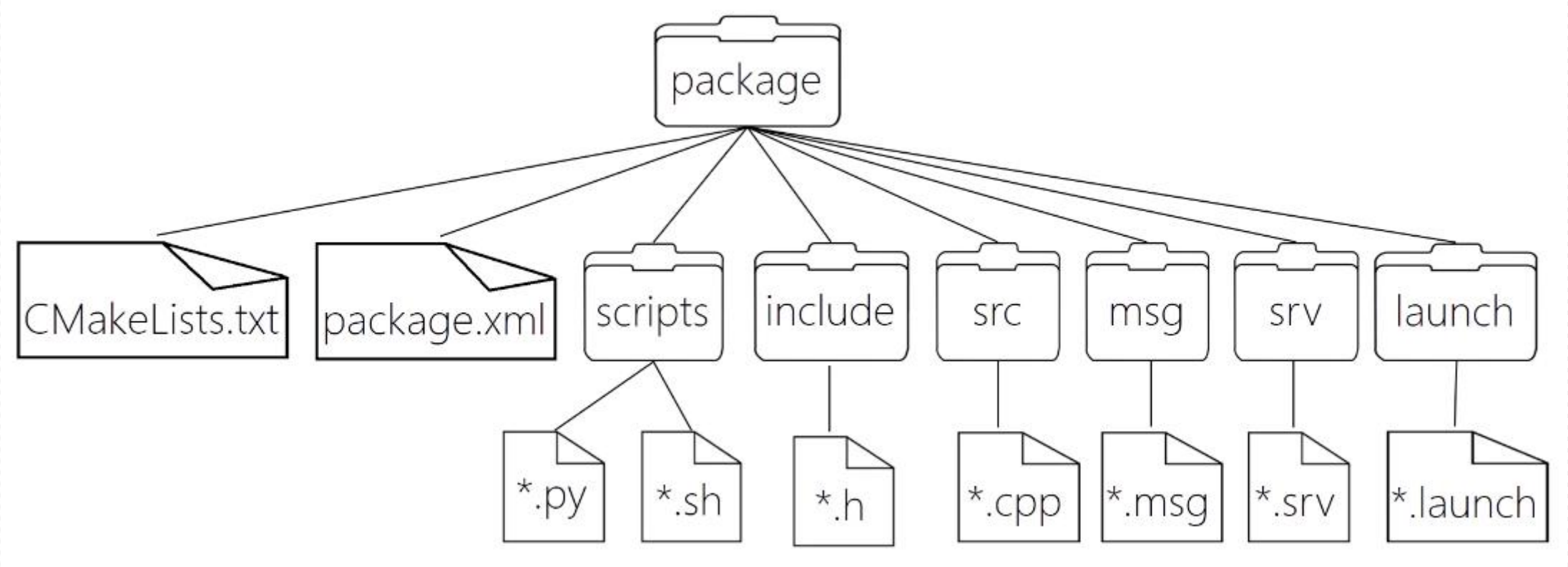
Engineering Structure

ROS工程结构



package源代码包　　cmake&catkin缓存和中间文件　　目标文件

02 ROS工程结构


package
CMakeLists.txt
package.xml
scripts
include
src
msg
srv
launch
*.py
*.sh
*.h
*.cpp
*.msg
*.srv
*.launch

03

PART 03

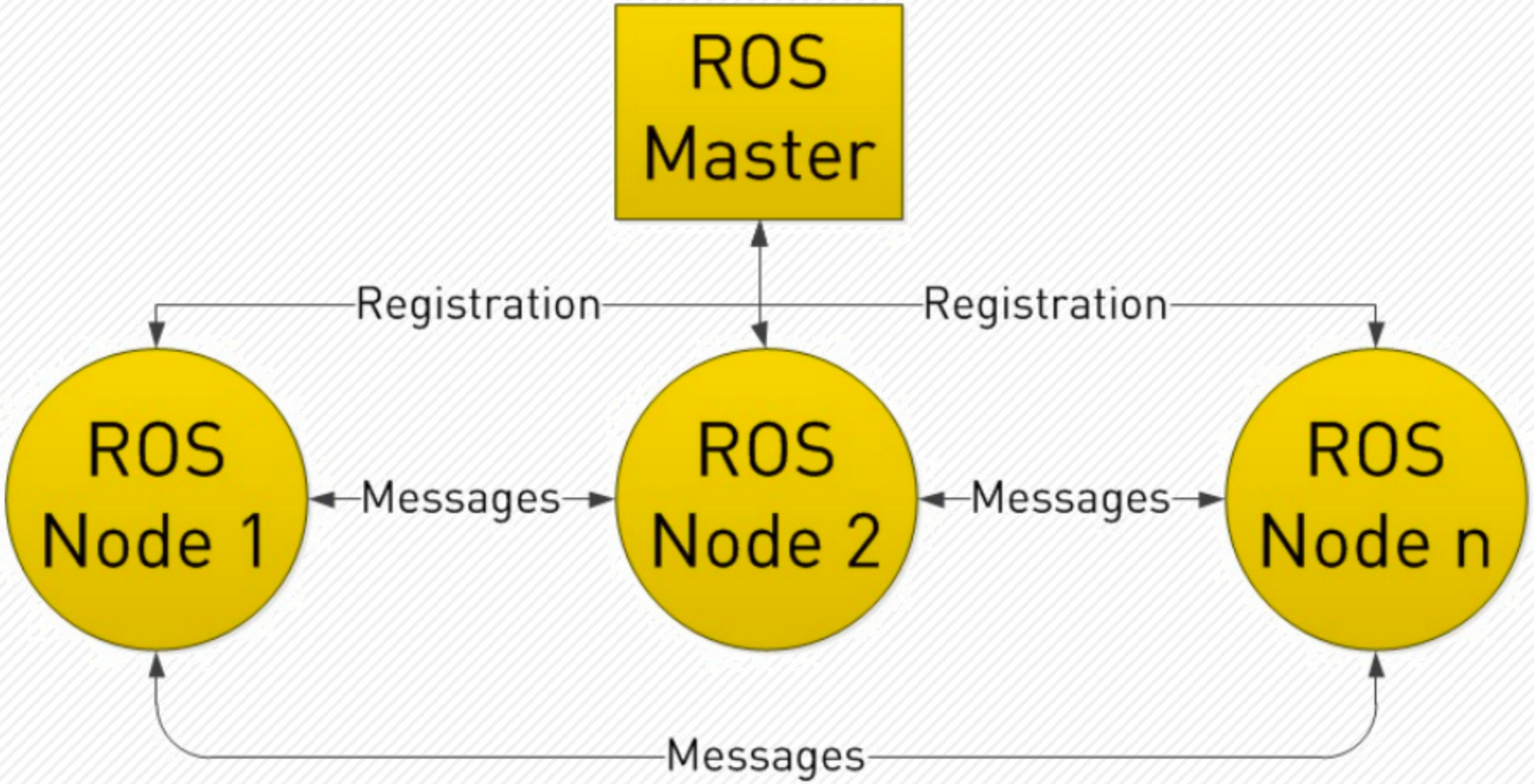
第三部分
ROS通信架构

03

ROS通信架构

Communication Architecture

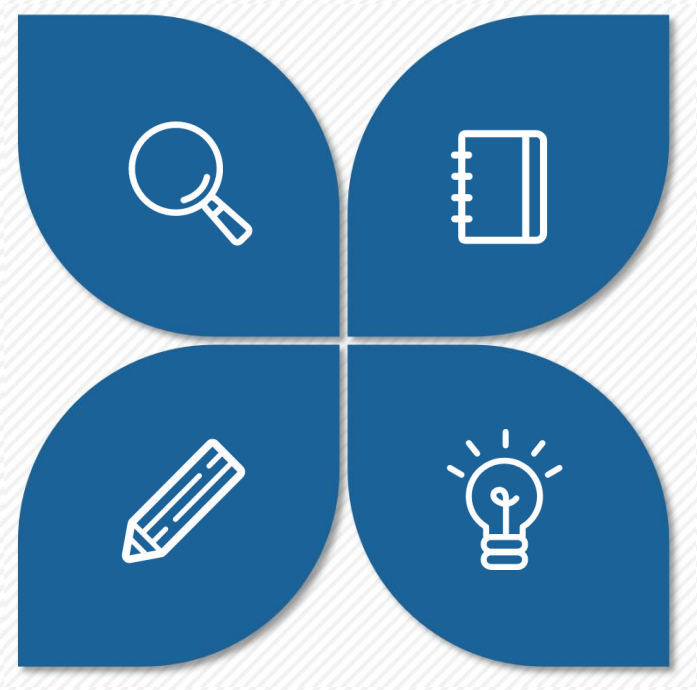
01 ROS通信架构


ROS Master
Registration
Registration
ROS Node 1
Messages
ROS Node 2
Messages
ROS Node n
Messages

ROS通信架构

Topic

Parameter Service



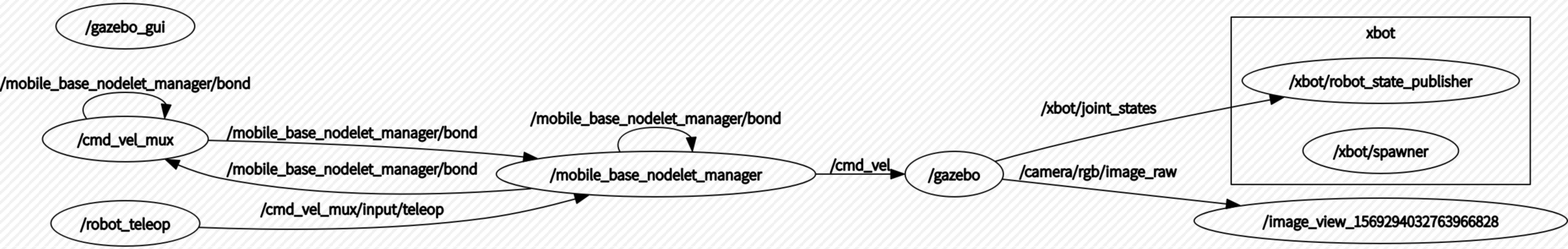
Service

Actionlib

ROS通信架构

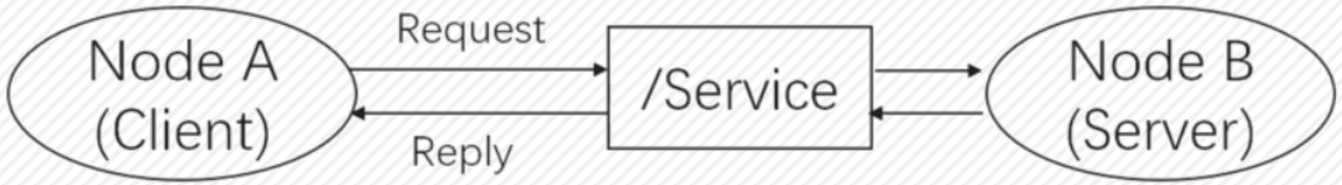
Topic

sub-pub通信



Service

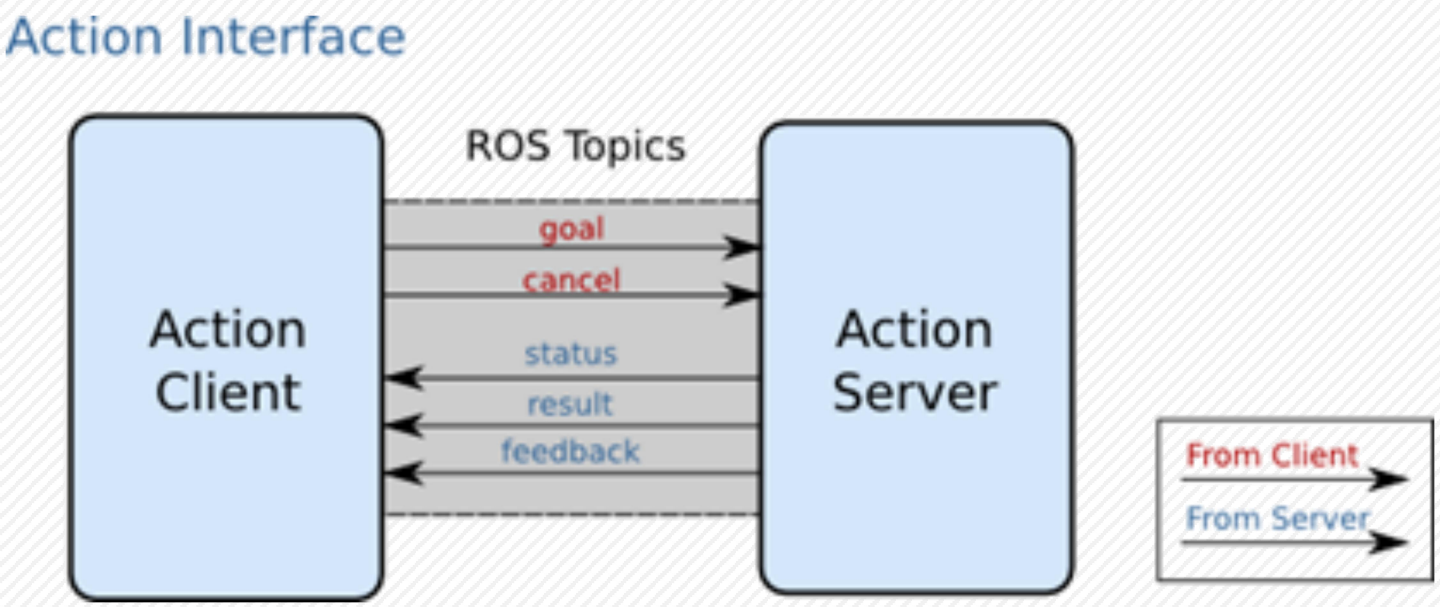
request-reply通信



Parameter server

Key	/rosdistro	/rosversion	/use_sim_time	…
Value	‘kinetic’	‘1.12.7’	true	…

Actionlib


Action Interface
ROS Topics
Action Client
Action Server
goal
cancel
status
result
feedback
From Client
From Server

04

PART 03

第四部分
常用工具

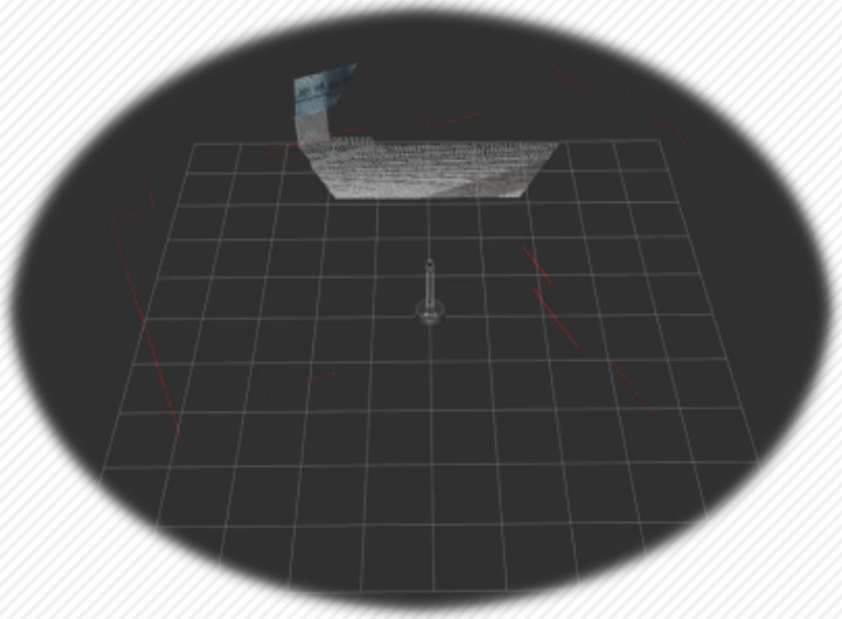
04

常用工具

Common Tools

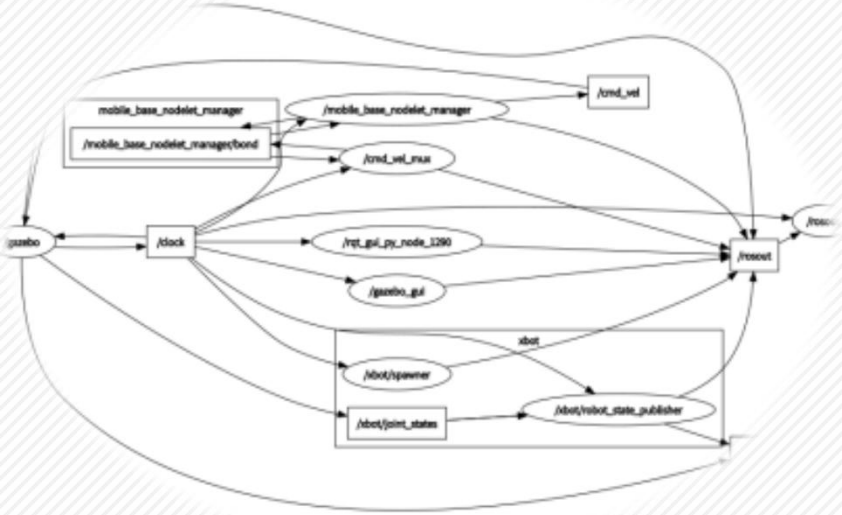
Gazebo

Gazebo是一个机器人仿真工具，模拟器，也是一个独立的开源机器人仿真平台。



RViz

RViz实现的是可视化，呈现接收到的信息。相当于是一个个的subscriber,



Rqt

显示系统整体通信架构、以及实时数据绘制

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谢 谢 大 家

THANKS FOR ALL