1. Introduction to ROS2

1. Overview of ROS2

ROS2 is an upgraded version of the second-generation Robot Operating System, ROS1, which solves some problems existing in ROS1. The earliest version of ROS2, Arden, was released in 2017. With the iteration of the version, it has been continuously updated and optimized, and now it has a stable version. With the passage of ROS1, the choice of Linux version and ROS2 version is also related, the corresponding versions of the two are as follows:

ROS2 version	Ubuntu version
Foxy	Ubuntu20.04
Galactic	Ubuntu20.04
Humble	Ubuntu22.04

Download the corresponding ROS2 version according to your own Linux version. This product course is based on the Foxy version.

2. ROS2 characteristics

2.1. ROS2 fully supports three platforms

- Ubuntu
- Mac OS X
- Windows 10

2.2 Distributed architecture is implemented

Cancel the Master central node to realize distributed discovery, publish/subscribe, request/response communication of nodes.

2.3. Support real-time

2.4. Use a new programming language

- C++11
- Python3.5+

2.5. New compilation system Ament (ROS for Catkin) was used

2.6. ROS1 can communicate with ROS 2 via rosbridge

3. Differences between ROS2 and ROS1

3.1. Platform

ROS1 currently only supports running in Linux systems, and is commonly built and used in Ubuntu. At present, ROS2 can be built and used on Ubuntu, Windows and even embedded development boards, and the platform is more extensive.

3.2. Language

- C++

 The core of ROS1 is C++03, while ROS2 uses C++11 extensively.

- Python

  ROS1 uses Python2, ROS2 uses Python at least 3.5, and Foxy uses Python 3.8.

3.3. Middleware

Before starting ROS1, roscore needs to be turned on, which is the master that controls all the communication between nodes, while ROS2 does not, only an abstract middleware interface through which data is transmitted. Currently, all implementations of this interface are based on the DDS standard. This enables ROS 2 to provide a variety of high-quality Qos service policies that improve communication across different networks.
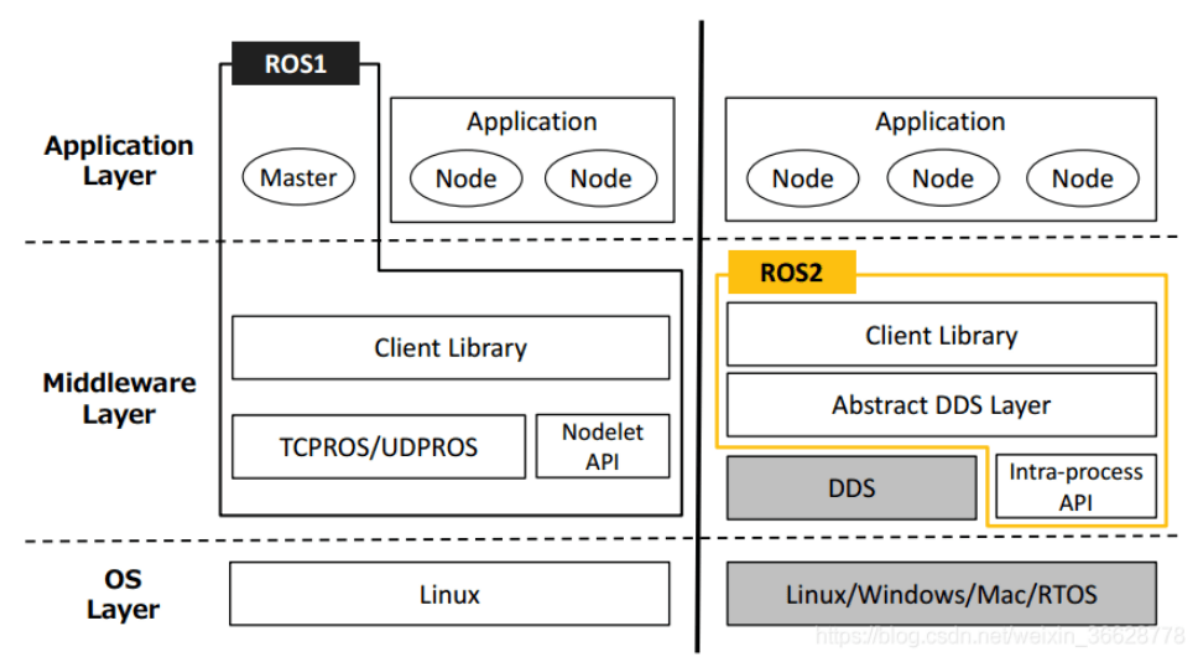
3.4. Compile commands

The compile command for ROS1 is catkin_make, while the compile command for ROS2 is colcon build.