unitree_bridge_readme.md

0.引言:

该脚本基于ros1_bridge开源功能包编写,适用于ROS2与ROS1的桥接，用于将ROS2的topic数据转换为ROS1的topic数据，也可将ROS1的topic数据转换为ROS2的topic数据。
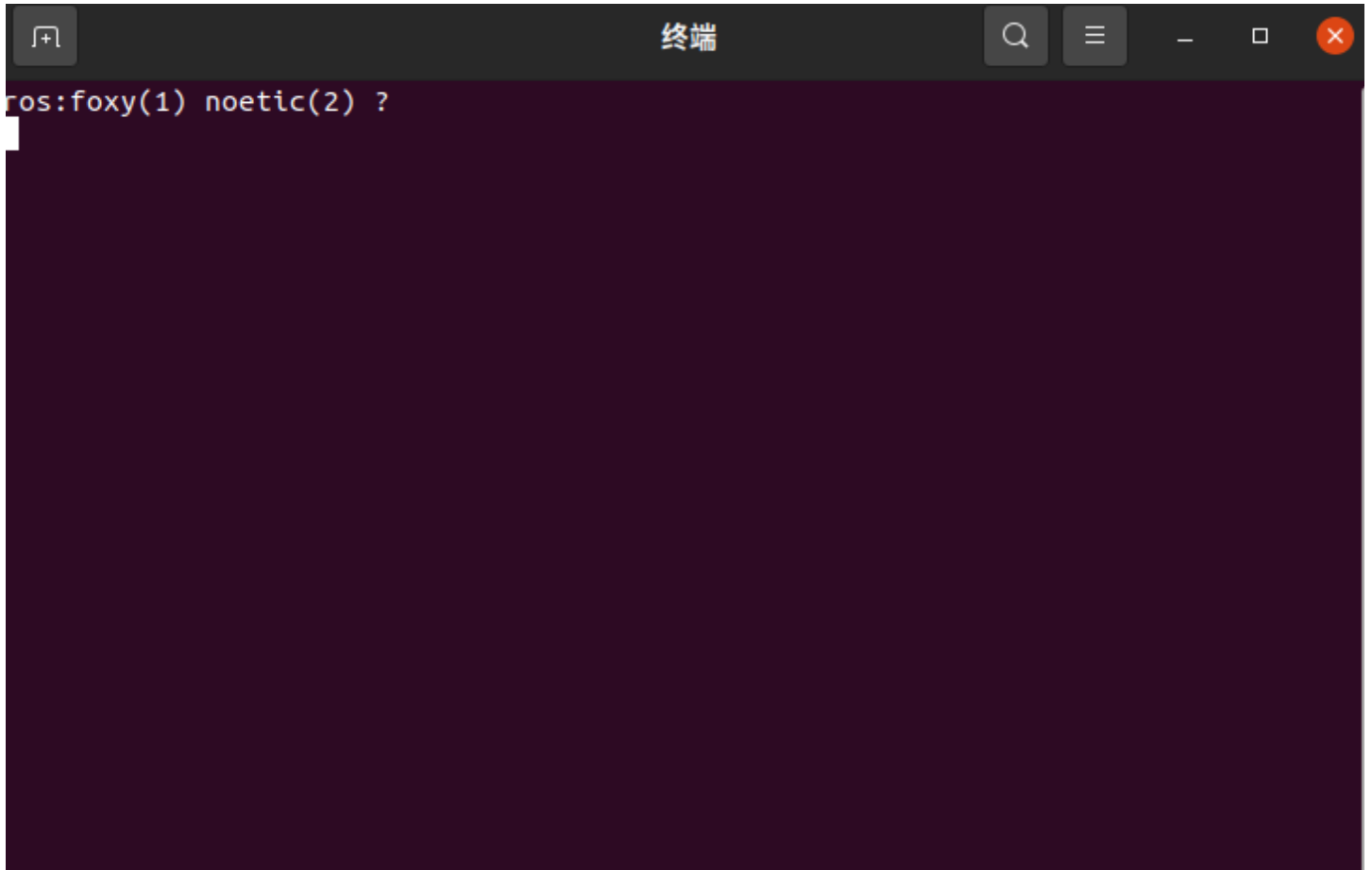
- **1. 支持指定话题,指定消息类型桥接**
- **2. 支持单话题,多话题桥接**
- **3. 无需过多配置环境,执行.sh文件即可完成桥接**

1.测试环境:

- Noetic与Foxy同时存在的ubuntu20.04虚拟机
- Noetic与Foxy同时存在的ubuntu20.04物理机(Orin NX)

2.前期准备:

2.1 ros1_bridge安装:

在Foxy中安装ros1_bridge:

```
sudo apt install ros-foxy-ros1-bridge
```

2.2 sh文件参数修改:

```bash
#!/bin/bash

# 1 加载 ROS1 和 ROS2 环境
source /opt/ros/noetic/setup.bash
source /opt/ros/foxy/setup.bash


# 2 设置默认参数
TOPIC_NAMES="/a /b /c"
MESSAGE_NAMES="std_msgs.msg.String,geometry_msgs.msg.Twist,geometry_msgs.msg.Twist"


# 3 解析输入参数
if [ $# -ge 1 ]; then
    TOPIC_NAMES="$1"
fi


if [ $# -ge 2 ]; then
    MESSAGE_NAMES="$2"
fi


# 4 启动 roscore（如果尚未启动）
if ! pgrep -x "roscore" > /dev/null; then
    echo -e "\033[92m[INFO] 启动 roscore...\033[0m"
    roscore &
    sleep 3  # 等待 roscore 启动
else
    echo -e "\033[93m[WARN] roscore 已在运行\033[0m"
fi


# 5 启动 ros1_bridge
echo -e "\033[92m[INFO] 启动 ros1_bridge...\033[0m"
ros2 run ros1_bridge dynamic_bridge  &  # 后台运行
# ros2 run ros1_bridge dynamic_bridge --bridge-all-topics &  # 后台运行


# 6 运行 Python 话题桥接
echo -e "\033[92m[INFO] 运行 topic_bridge.py...\033[0m"
python3 topic_bridge.py "$TOPIC_NAMES" "$MESSAGE_NAMES"
```

需要修改的参数有:

```
TOPIC_NAMES="/a /b /c"

MESSAGE_NAMES="std_msgs.msg.String,geometry_msgs.msg.Twist,geometry_msgs.msg.Twist"
```

其中TOPIC_NAMES为需要桥接的topic名称，多个topic之间用空格隔开，MESSAGE_NAMES为需要桥接的topic对应的消息类型，多个消息类型之间用逗号隔开。

2.3 查看topic的对应消息类型并修改.sh参数:

```
rostopic info /topic_name
```

```
ros2 topic info /topic_name
```

```
unitree@ubuntu:~/unitree_bridge$ ros2 topic info /utlidar/imu
Type: sensor_msgs/msg/Imu
Publisher count: 1
Subscription count: 0
```

以这个imu数据为例(ros2):我们得到了 /unitree/imu 的消息类型为 sensor_msgs/msg/Imu
所以我们需要将.sh参数修改为

```
TOPIC_NAMES="/unitree/imu"
MESSAGE_NAMES="sensor_msgs.msg.Imu"
```

3.执行.sh文件:

在unitree_bridge目录下打开终端执行:

```
sudo chmod 777 *
```

输入用户密码赋予文件可执行权限,然后继续输入

```
./ros1_bridge.sh
```

```
unitreego2w@ubuntu:~/unitree_ros1_ws/src/ros2_imu_bridge/script$ ./topic_bridge.sh
ROS_DISTRO was set to 'foxy' before. Please make sure that the environment does not mix paths from different distributions.
ROS_DISTRO was set to 'noetic' before. Please make sure that the environment does not mix paths from different distributions.
[INFO] 启动 roscore...
... logging to /home/unitreego2w/.ros/log/e838d756-00a0-11f0-a5e1-bb19cfd0e71c/roslaunch-ubuntu-107066.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://ubuntu:43607/
ros_comm version 1.17.0


SUMMARY
========

PARAMETERS
 * /rosdistro: foxy
 * /rosversion: 1.17.0

NODES

auto-starting new master
process[master]: started with pid [107075]
ROS_MASTER_URI=http://ubuntu:11311/

setting /run_id to e838d756-00a0-11f0-a5e1-bb19cfd0e71c
process[rosout-1]: started with pid [107085]
started core service [/rosout]
[INFO] 启动 ros1_bridge...
[INFO] 运行 topic_bridge.py...
!!! ROS~ROS2 SUCCESS !!!
[INFO] 话题 /a -> String 已创建
[INFO] 话题 /b -> Twist 已创建
[INFO] 话题 /c -> Twist 已创建
created 1to2 bridge for topic '/a' with ROS 1 type 'std_msgs/String' and ROS 2 type 'std_msgs/msg/String'
created 1to2 bridge for topic '/b' with ROS 1 type 'geometry_msgs/Twist' and ROS 2 type 'geometry_msgs/msg/Twist'
created 1to2 bridge for topic '/c' with ROS 1 type 'geometry_msgs/Twist' and ROS 2 type 'geometry_msgs/msg/Twist'
created 1to2 bridge for topic '/rosout' with ROS 1 type 'rosgraph_msgs/Log' and ROS 2 type 'rcl_interfaces/msg/Log'
created 1to2 bridge for topic '/rosout_agg' with ROS 1 type 'rosgraph_msgs/Log' and ROS 2 type 'rcl_interfaces/msg/Log'
created 2to1 bridge for topic '/rosout' with ROS 2 type 'rcl_interfaces/msg/Log' and ROS 1 type 'rosgraph_msgs/Log'
```

得到以下结果,即运行成功!!!

4.测试桥接:


```
z: -9.582023620605469
linear_acceleration_covariance: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
---
header:
  seq: 5590
  stamp:
    secs: 1741933731
    nsecs: 588490486
  frame_id: "utlidar_imu"
orientation:
  x: -0.7583603262901306
  y: -0.6368070840835571
  z: 0.014862117357552052
  w: 0.12559160590171814
orientation_covariance: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
angular_velocity:
  x: 0.007264770567417145
  y: 0.003030316438525915
  z: -0.0027294789906591177
angular_velocity_covariance: [0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
linear_acceleration:
  x: 1.0027998685836792
  y: -2.1675713062286377
  z: -9.392213821411133
```

可以看到imu数据在ros1能正常显示.

5.注意事项:

```
ros2 run ros1_bridge dynamic_bridge  &  # 后台运行
# ros2 run ros1_bridge dynamic_bridge --bridge-all-topics &  # 后台运行
```

--bridge-all-topics :

会将所有话题桥接,但是有个问题就有时候,ros2中没有ros1有的话题,启动后,ros2还是没有(这个真不好说,我的虚拟机环境是没有的,但是物理机环境却可以,但也不完全可以,有部分话题可以,有部分不可以),同理,ros1中没有ros2有的话题,启动后,ros1也没有(但一般有)
所有为了保证稳定性,还是选取不添加这个参数,ros1和ros2中都有的topic(name,msg都相同)进行桥接,这样不会出现ros1没有ros2有的话题,ros2没有ros1有的话题的情况.