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UTS Robotika

## 1. ROS2 Topic Explanation 1 with Talker/Listener

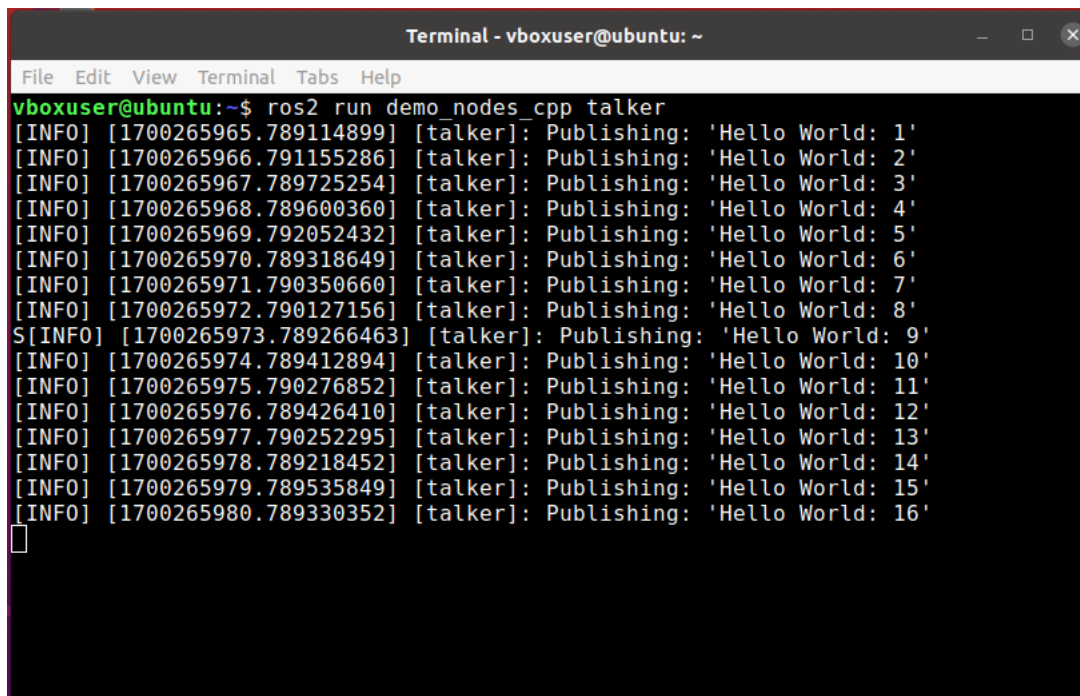
ROS2 node berkomunikasi satu sama lain dengan topik

Node talker : publikasi

Sehingga node talker akan mempublikasikan topik chatter dan pendengar/listener akan subscribe chatter. Jadi untuk membuat satu node berkomunikasi dengan node lainnya hanya dengan mengirimkan data dari satu ke yang lain.

Kita akan menggunakan topik, sebenarnya talker tidak langsung ke listener tetapi talker berhubungan dengan chatter dan listener subscribe ke chatter sehingga pada akhirnya talker yang mengirim node yang diterima oleh listener dan di subscribe oleh chatter atau topik

**ros2 run demo\_nodes\_cpp talker** : seperti yang anda lihat ini terminal akan menulis beberapa log terminal dan akan menampilkan hello word dengan nomor

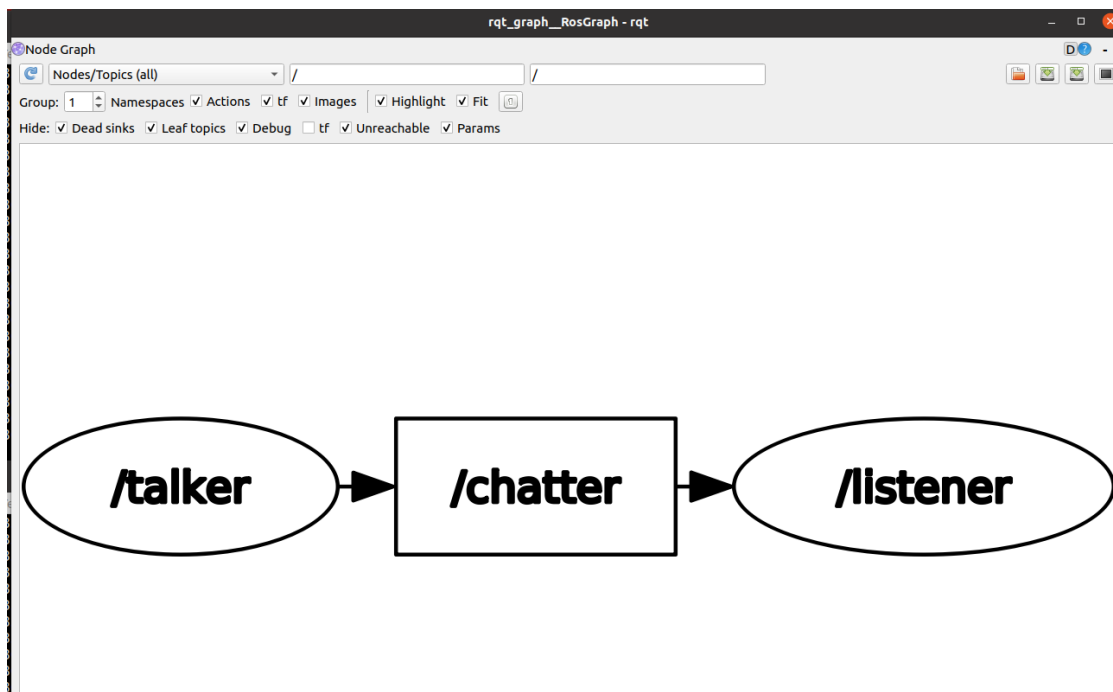
A screenshot of a terminal window titled "Terminal - vboxuser@ubuntu: ~". The terminal shows the command "ros2 run demo\_nodes\_cpp talker" being executed. The output consists of 16 lines of log messages, each starting with "[INFO]" followed by a timestamp and the message "[talker]: Publishing: 'Hello World: X'" where X ranges from 1 to 16. The terminal window has a menu bar with "File", "Edit", "View", "Terminal", "Tabs", and "Help".

```
Terminal - vboxuser@ubuntu: ~
File Edit View Terminal Tabs Help
vboxuser@ubuntu:~$ ros2 run demo_nodes_cpp talker
[INFO] [1700265965.789114899] [talker]: Publishing: 'Hello World: 1'
[INFO] [1700265966.791155286] [talker]: Publishing: 'Hello World: 2'
[INFO] [1700265967.789725254] [talker]: Publishing: 'Hello World: 3'
[INFO] [1700265968.789600360] [talker]: Publishing: 'Hello World: 4'
[INFO] [1700265969.792052432] [talker]: Publishing: 'Hello World: 5'
[INFO] [1700265970.789318649] [talker]: Publishing: 'Hello World: 6'
[INFO] [1700265971.790350660] [talker]: Publishing: 'Hello World: 7'
[INFO] [1700265972.790127156] [talker]: Publishing: 'Hello World: 8'
S[INFO] [1700265973.789266463] [talker]: Publishing: 'Hello World: 9'
[INFO] [1700265974.789412894] [talker]: Publishing: 'Hello World: 10'
[INFO] [1700265975.790276852] [talker]: Publishing: 'Hello World: 11'
[INFO] [1700265976.789426410] [talker]: Publishing: 'Hello World: 12'
[INFO] [1700265977.790252295] [talker]: Publishing: 'Hello World: 13'
[INFO] [1700265978.789218452] [talker]: Publishing: 'Hello World: 14'
[INFO] [1700265979.789535849] [talker]: Publishing: 'Hello World: 15'
[INFO] [1700265980.789330352] [talker]: Publishing: 'Hello World: 16'
```

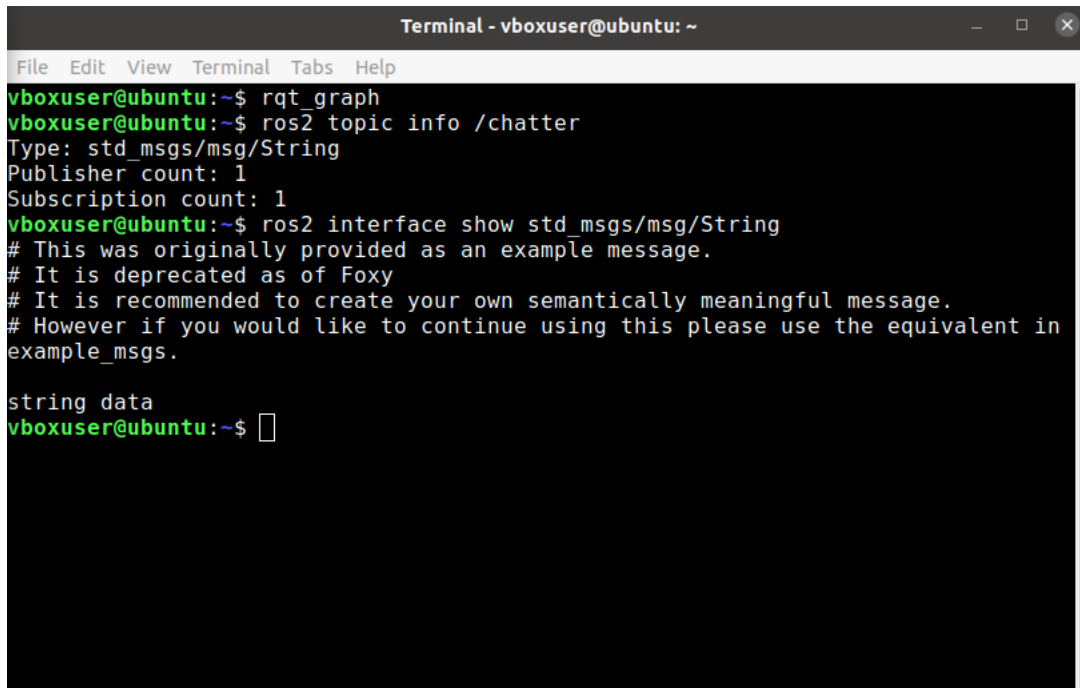
**Ros2 run demo\_nodes\_cpp listener** : di terminal ini jelas bahwa apa yang dikirim apa yg dipublikasikan, disini hello word 25 diterima oleh listener node

```
Terminal - vboxuser@ubuntu: ~
File Edit View Terminal Tabs Help
ros2: error: argument Call `ros2 <command> -h` for more detailed usage.: invalid
choice: 'demo_nodes_cpp_list' (choose from 'action', 'bag', 'component', 'daemon',
'n', 'doctor', 'extension_points', 'extensions', 'interface', 'launch', 'lifecycl
e', 'multicast', 'node', 'param', 'pkg', 'run', 'security', 'service', 'topic',
'wtf')
vboxuser@ubuntu:~$ ros2 run demo_nodes_cpp listener
[INFO] [1700266056.789467922] [listener]: I heard: [Hello World: 89]
[INFO] [1700266057.797722356] [listener]: I heard: [Hello World: 90]
[INFO] [1700266058.789665655] [listener]: I heard: [Hello World: 91]
[INFO] [1700266059.790087901] [listener]: I heard: [Hello World: 92]
[INFO] [1700266060.790201690] [listener]: I heard: [Hello World: 93]
[INFO] [1700266061.789552438] [listener]: I heard: [Hello World: 94]
[INFO] [1700266062.790837893] [listener]: I heard: [Hello World: 95]
[INFO] [1700266063.789591073] [listener]: I heard: [Hello World: 96]
[INFO] [1700266064.814038954] [listener]: I heard: [Hello World: 97]
[INFO] [1700266065.791382788] [listener]: I heard: [Hello World: 98]
[INFO] [1700266066.790839142] [listener]: I heard: [Hello World: 99]
[INFO] [1700266067.809065813] [listener]: I heard: [Hello World: 100]
[INFO] [1700266068.843393621] [listener]: I heard: [Hello World: 101]
[INFO] [1700266070.244790323] [listener]: I heard: [Hello World: 102]
[INFO] [1700266070.789519032] [listener]: I heard: [Hello World: 103]
[INFO] [1700266071.789485957] [listener]: I heard: [Hello World: 104]
[INFO] [1700266072.790646881] [listener]: I heard: [Hello World: 105]
```

Terminal selanjutnya saya akan melihat **rqt\_graph**, kita dapat refresh dan menampilkan all dan kita punya tampilan seperti tersebut, apa itu chatter adalah topik, atau cara untuk berkomunikasi antar node



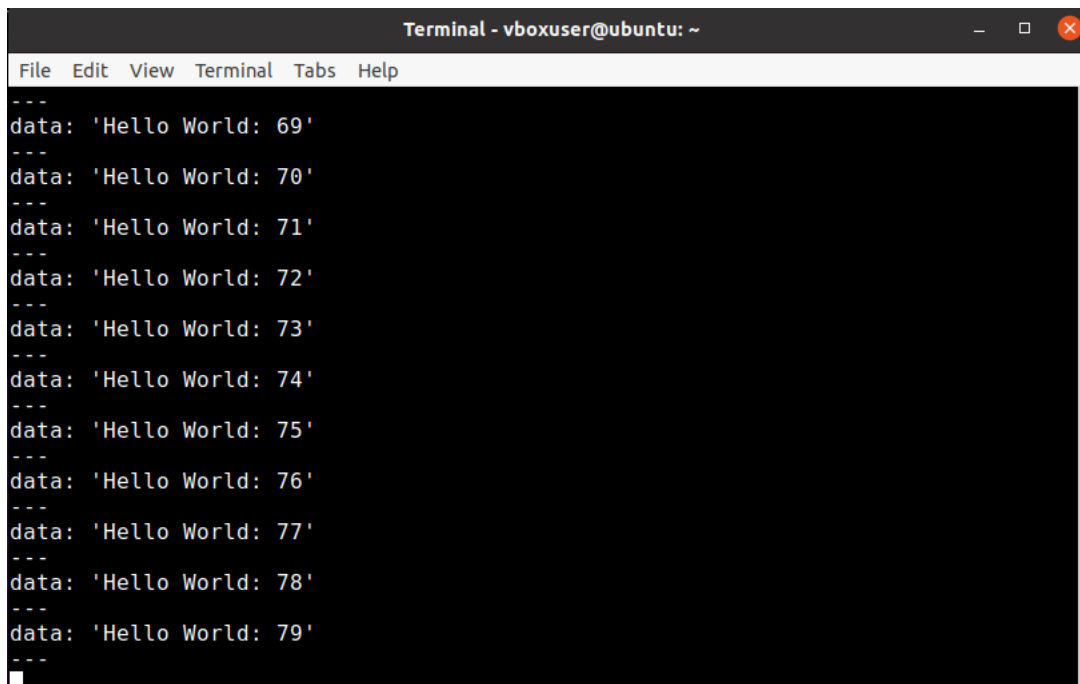
**ros2 topic list, ros2 topic info /chatter, ros2 interface show std\_msgs/msg/String:** jadi apa yang sebenarnya dikirim antara talker dan listener sebenarnya adalah pesan yang disebut `std_msgs/msg/String` yang bertipe string

A terminal window titled "Terminal - vboxuser@ubuntu: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the following commands and output:

```
vboxuser@ubuntu:~$ rqt_graph
vboxuser@ubuntu:~$ ros2 topic info /chatter
Type: std_msgs/msg/String
Publisher count: 1
Subscription count: 1
vboxuser@ubuntu:~$ ros2 interface show std_msgs/msg/String
# This was originally provided as an example message.
# It is deprecated as of Foxy
# It is recommended to create your own semantically meaningful message.
# However if you would like to continue using this please use the equivalent in
example_msgs.

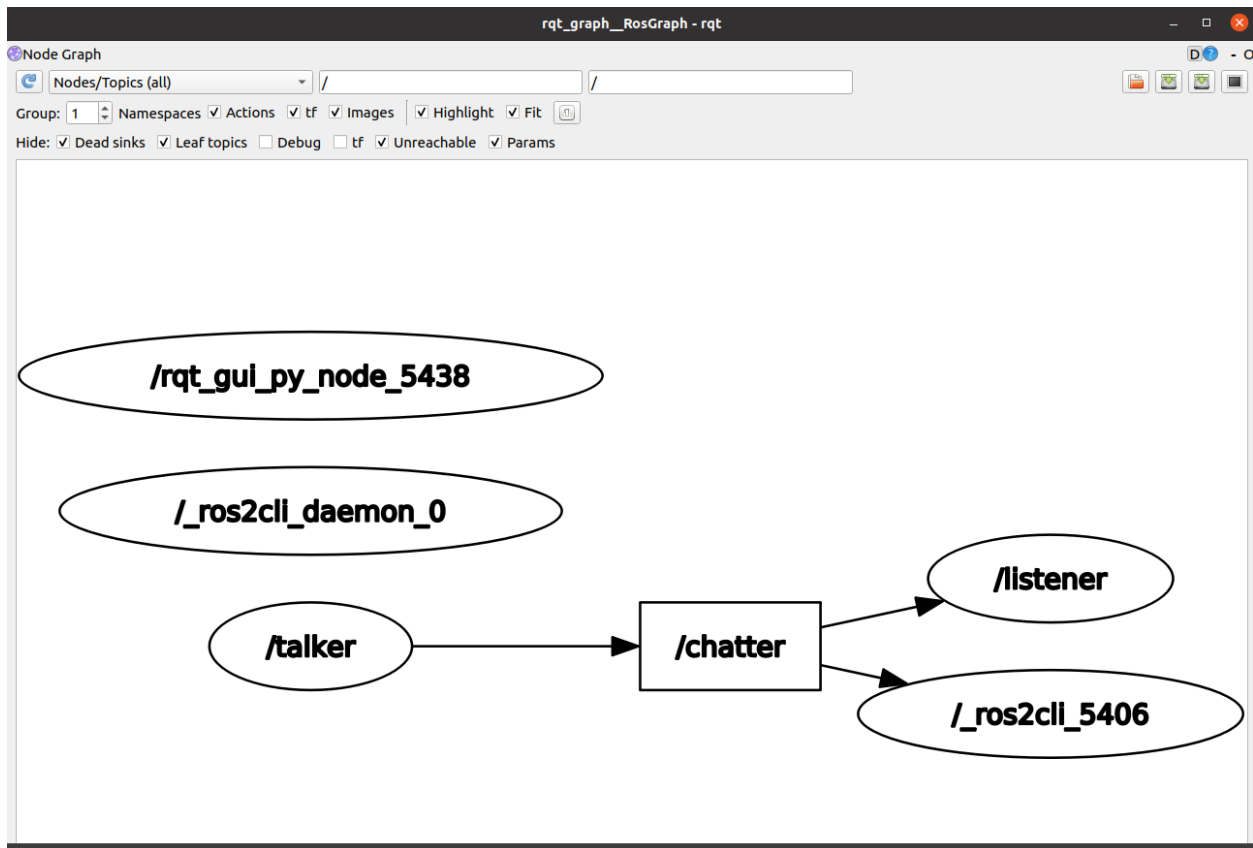
string data
vboxuser@ubuntu:~$
```

**ros2 topic echo /chatter** : yang terjadi disubscribe dengan pendengar adalah pesan itu akan diproses karena kita tidak memiliki data hanya memiliki string

A terminal window titled "Terminal - vboxuser@ubuntu: ~" with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the output of the command `ros2 topic echo /chatter`, which is a stream of messages from the /chatter topic:

```
---
data: 'Hello World: 69'
---
data: 'Hello World: 70'
---
data: 'Hello World: 71'
---
data: 'Hello World: 72'
---
data: 'Hello World: 73'
---
data: 'Hello World: 74'
---
data: 'Hello World: 75'
---
data: 'Hello World: 76'
---
data: 'Hello World: 77'
---
data: 'Hello World: 78'
---
data: 'Hello World: 79'
---
```

## rqt\_graph



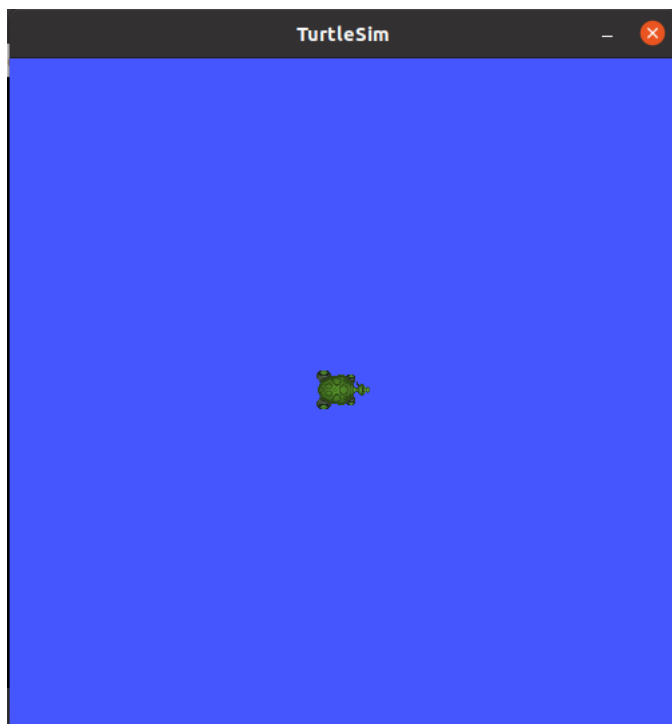
## ros2 run demo\_nodes\_cpp talker

```
Terminal - vboxuser@ubuntu: ~  
File Edit View Terminal Tabs Help  
[INFO] [1700268675.735260188] [talker]: Publishing: 'Hello World: 205'  
[INFO] [1700268676.735100056] [talker]: Publishing: 'Hello World: 206'  
[INFO] [1700268677.739957799] [talker]: Publishing: 'Hello World: 207'  
[INFO] [1700268678.735406397] [talker]: Publishing: 'Hello World: 208'  
[INFO] [1700268679.737683664] [talker]: Publishing: 'Hello World: 209'  
[INFO] [1700268680.735220801] [talker]: Publishing: 'Hello World: 210'  
[INFO] [1700268681.735043695] [talker]: Publishing: 'Hello World: 211'  
[INFO] [1700268682.737284255] [talker]: Publishing: 'Hello World: 212'  
^C[INFO] [1700268683.686879179] [rclcpp]: signal_handler(signal_value=2)  
vboxuser@ubuntu:~$ ros2 run demo_nodes_cpp listener  
^C[[D  
^C[INFO] [1700268759.778269428] [rclcpp]: signal_handler(signal_value=2)  
vboxuser@ubuntu:~$ ros2 run demo_nodes_cpp talker  
[INFO] [1700268766.096038718] [talker]: Publishing: 'Hello World: 1'  
[INFO] [1700268767.096078082] [talker]: Publishing: 'Hello World: 2'  
[INFO] [1700268768.095880934] [talker]: Publishing: 'Hello World: 3'  
[INFO] [1700268769.095735637] [talker]: Publishing: 'Hello World: 4'  
[INFO] [1700268770.097600068] [talker]: Publishing: 'Hello World: 5'  
[INFO] [1700268771.096161731] [talker]: Publishing: 'Hello World: 6'  
[INFO] [1700268772.096207439] [talker]: Publishing: 'Hello World: 7'  
[INFO] [1700268773.095929157] [talker]: Publishing: 'Hello World: 8'  
[INFO] [1700268774.095554811] [talker]: Publishing: 'Hello World: 9'
```

## 2. ROS2 Topic Explanation 1 with Talker/Listener

**ros2 run turtlesim turtlesim\_node**

```
Terminal - vboxuser@ubuntu: ~
File Edit View Terminal Tabs Help
vboxuser@ubuntu:~$ ros2 run turtlesim_node
usage: ros2 run [-h] [--prefix PREFIX] package_name executable_name ...
ros2 run: error: the following arguments are required: executable_name, argv
vboxuser@ubuntu:~$ ros2 run turtlesim turtlesim_node
[INFO] [1700267726.729165906] [turtlesim]: Starting turtlesim with node name /turtlesim
[INFO] [1700267726.740268395] [turtlesim]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
█
```



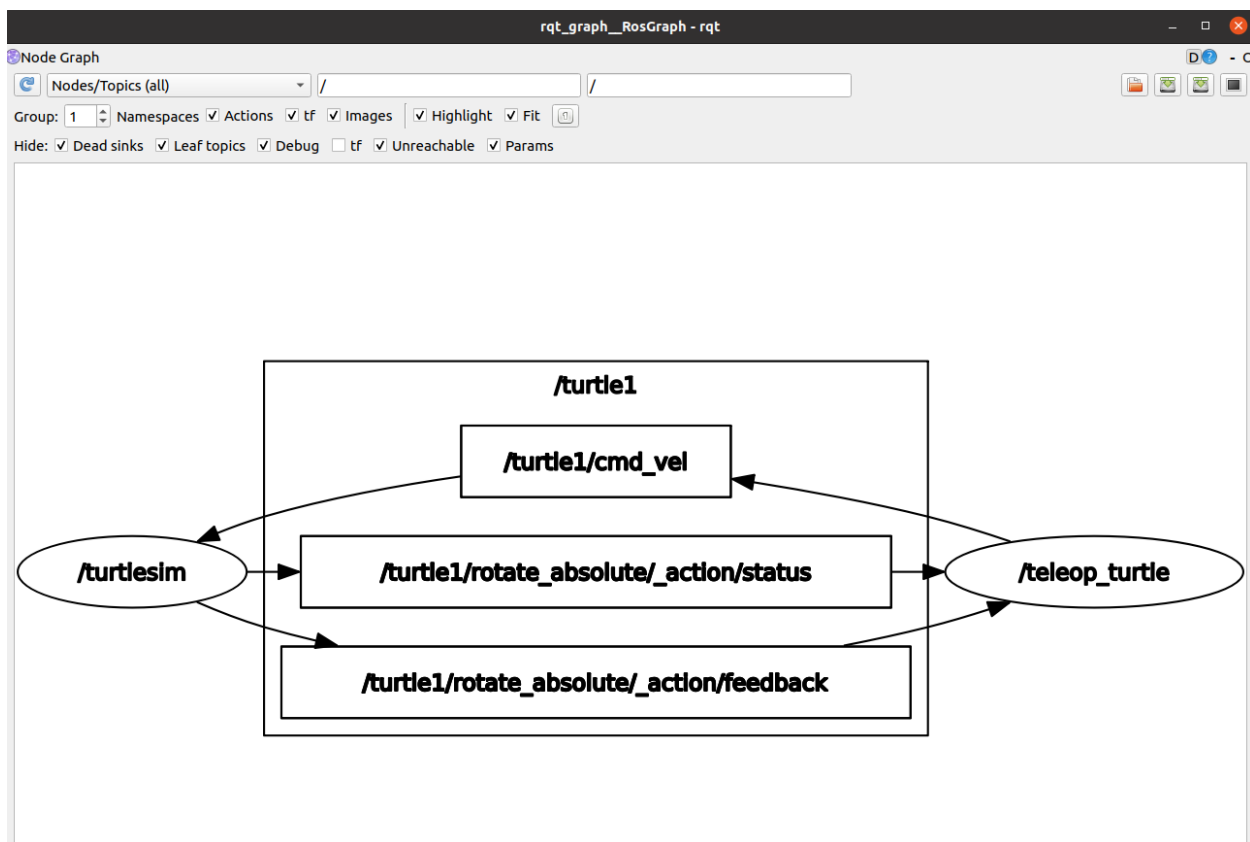
**ros2 run turtlesim turle\_teleop\_key**

```
Terminal - vboxuser@ubuntu: ~
File Edit View Terminal Tabs Help
vboxuser@ubuntu:~$ ros2 run turtlesim turtle_telop_key
No executable found
vboxuser@ubuntu:~$ ros2 run turtlesim turtle_teleop_key
Reading from keyboard
-----
Use arrow keys to move the turtle.
Use G|B|V|C|D|E|R|T keys to rotate to absolute orientations. 'F' to cancel a rotation.
'Q' to quit.
```



Rqt\_graph, Ros2 topic list, Ros2 topic info /turtle1\_cmd\_vel, Ros2 interface show geometry\_msgs/msg/Twist

```
Terminal - vboxuser@ubuntu: ~
File Edit View Terminal Tabs Help
vboxuser@ubuntu:~$ rqt_graph
vboxuser@ubuntu:~$ ros2 topic list
/parameter_events
/rosout
/turtle1/cmd_vel
/turtle1/color_sensor
/turtle1/pose
vboxuser@ubuntu:~$ ros2 topic info /turtle1/cmd_vel
Type: geometry_msgs/msg/Twist
Publisher count: 1
Subscription count: 1
vboxuser@ubuntu:~$ ros2 interface show geometry_msgs/msg/Twist
# This expresses velocity in free space broken into its linear and angular parts
.
Vector3 linear
Vector3 angular
vboxuser@ubuntu:~$ rqt_graph
```



Sebenarnya node tidak langsung berbicara satu sama lain mereka hanya mempublish atau subscribe, anda dapat memiliki beberapa node yang mempublish topik yang sama dan beberapa node subscribe untuk topik yang sama. Jadi topik memiliki nama yang sebenarnya merupakan Alamat topik sehingga node tau dimana untuk mempublikasikan atau dimana untuk subscribe dan mereka memiliki tipe data sehingga mereka tahu apa yang harus dikirim dan apa yang harus diterima. Mekanisme topiknya anonim yang berarti bahwa misalnya jika sebuah node subscribe suatu topik, ia hanya akan menerima pesan dari topik itu dan tidak tau node mana yang mempublishnya.