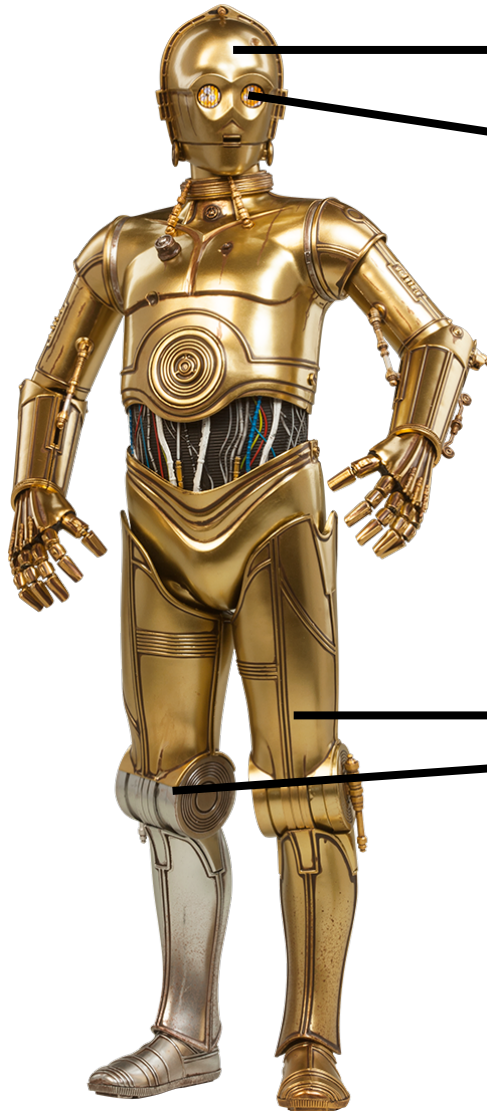


ROS NODES & TOPICS



CPU

Video stream

How does it
work parallelly?

Balance

APPROACHES OF PARALLELISM

Threads

Advantages:

- United memory
- Easy data transfer

Disadvantages:

- Data race
- Memory locks

Processes

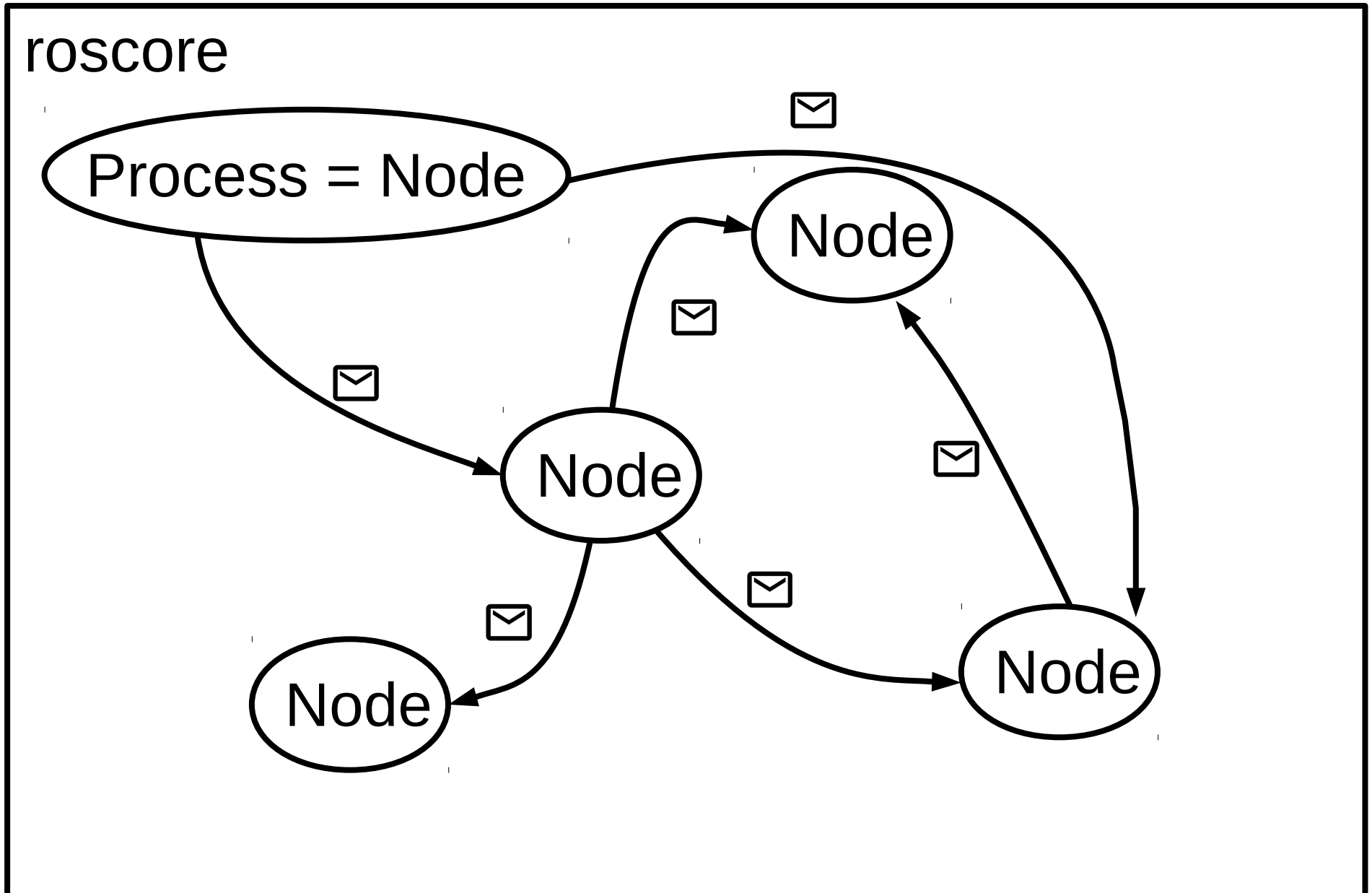
Advantages:

- Independent life time
- Separate namespaces

Disadvantages:

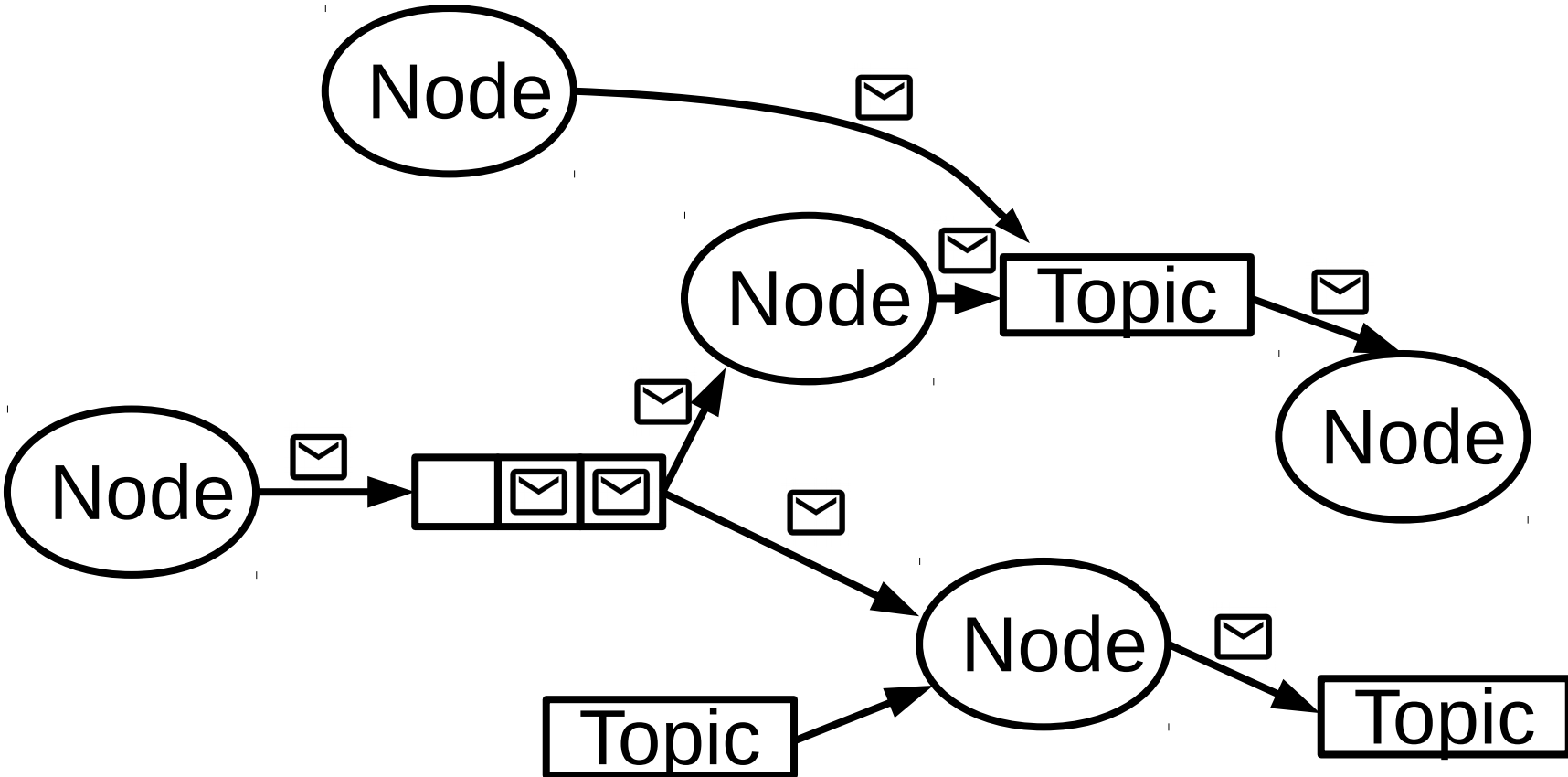
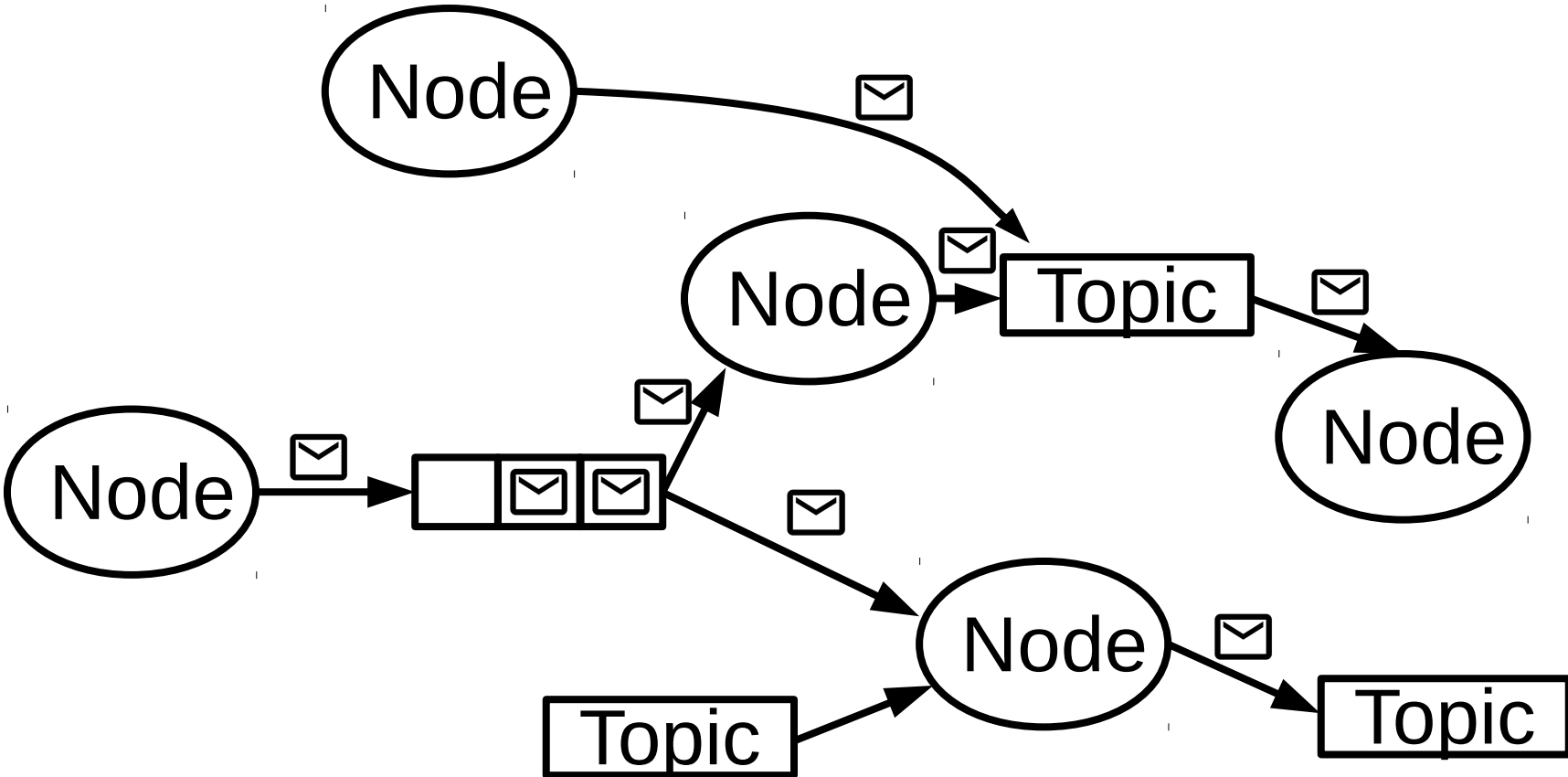
- Complicated data transfer

ROS ARCHITECTURE (short view)



ROS ARCHITECTURE (full)

roscore

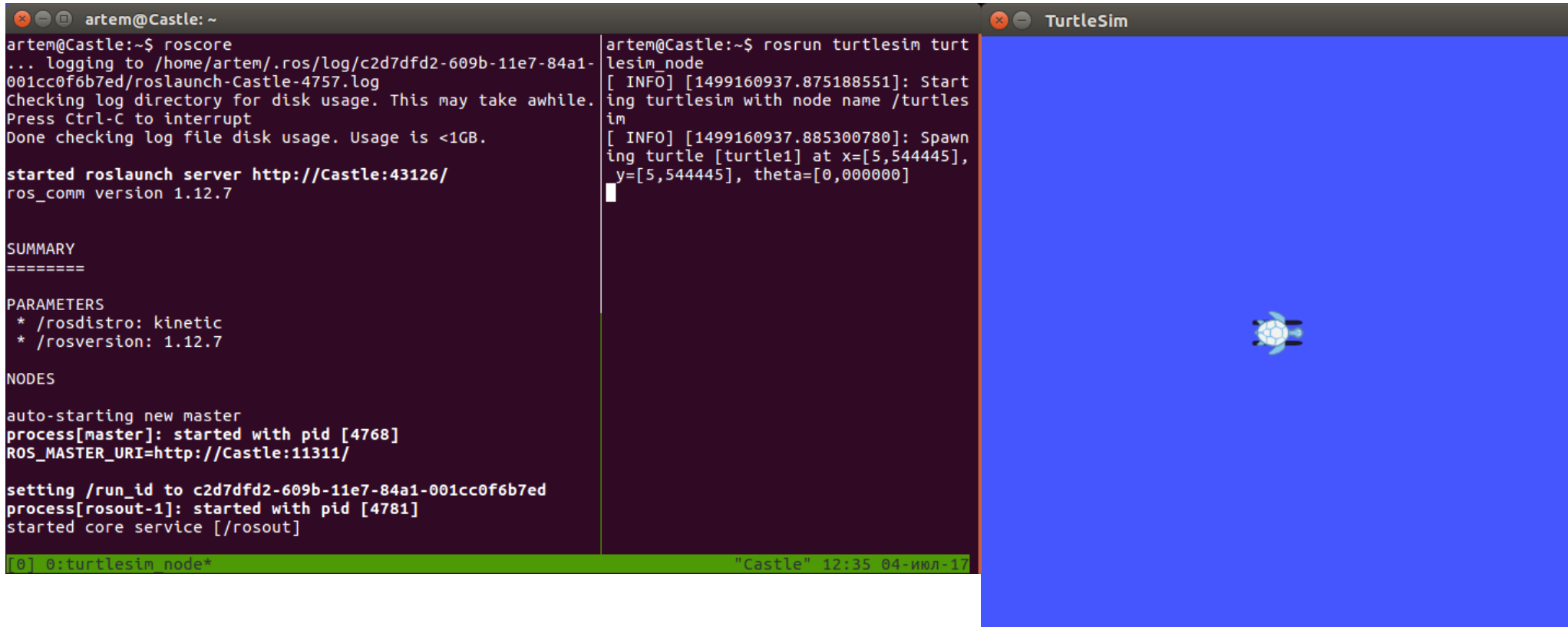


NODES

\$ rosrun <package name> <node name> [<params>]

example:

\$ rosrun turtlesim turtlesim_node



The image shows a terminal window and a TurtleSim window. The terminal window, titled 'artem@Castle: ~', displays the output of the 'roscore' command, which logs the start of a ROS master and the 'roslaunch' server. It also shows the output of the 'roslaunch' command, which starts the 'turtlesim' node. The terminal window has a green status bar at the bottom showing '[0] 0:turtlesim_node*' and the time '12:35 04-июл-17'. The TurtleSim window, titled 'TurtleSim', has a blue background and a small turtle icon in the center.

```
artem@Castle:~$ roscore
... logging to /home/artem/.ros/log/c2d7dfd2-609b-11e7-84a1-001cc0f6b7ed/roslaunch-Castle-4757.log
Checking log directory for disk usage. This may take awhile.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://Castle:43126/
ros_comm version 1.12.7

SUMMARY
=====

PARAMETERS
* /rostdistro: kinetic
* /rosversion: 1.12.7

NODES

auto-starting new master
process[master]: started with pid [4768]
ROS_MASTER_URI=http://Castle:11311/

setting /run_id to c2d7dfd2-609b-11e7-84a1-001cc0f6b7ed
process[rosout-1]: started with pid [4781]
started core service [/rosout]

artem@Castle:~$ roslaunch turtlesim turtlesim_node
[ INFO] [1499160937.875188551]: Start
ing turtlesim with node name /turtles
im
[ INFO] [1499160937.885300780]: Spawn
ing turtle [turtle1] at x=[5,544445],
y=[5,544445], theta=[0,000000]
[0] 0:turtlesim_node*
"Castle" 12:35 04-июл-17
```

NODE PARAMS (NAME)

```
$ rosrun turtlesim turtlesim_node  
$ rosrun turtlesim turtlesim_node
```

But only one node exists.

Solution:

```
$ rosrun turtlesim turtlesim_node  
$ rosrun turtlesim turtlesim_node  
__name:=new_turtlesim
```

NODES INFO

Information about nodes:

```
$ rosnode <command>
```

A list of nodes:

```
$ rosnode list
```

Information about one node:

```
$ rosnode info <node>
```

NODE INFO

```
artem@Castle:~$ rosnode info /rosout
```

Node [/rosout]

Publications:

- * /rosout_agg [rosgraph_msgs/Log]

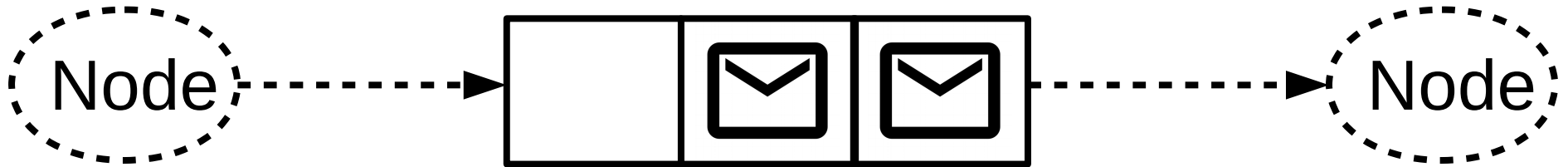
Subscriptions:

- * /rosout [unknown type]

Services:

- * /rosout/get_loggers
- * /rosout/set_logger_level

TOPICS



Topic:

- Name [ex /rosout]
- Type [ex std_msgs/String]
- Size [ex 100]

TOPICS INFO

Information about topics:

```
$ rostopic <command>
```

A list of topics:

```
$ rostopic list
```

Information about one topic:

```
$ rostopic info <topic>
```

TOPIC INFO

```
artem@Castle:~$ rostopic info /rosout
```

```
Type: rosgraph_msgs/Log
```

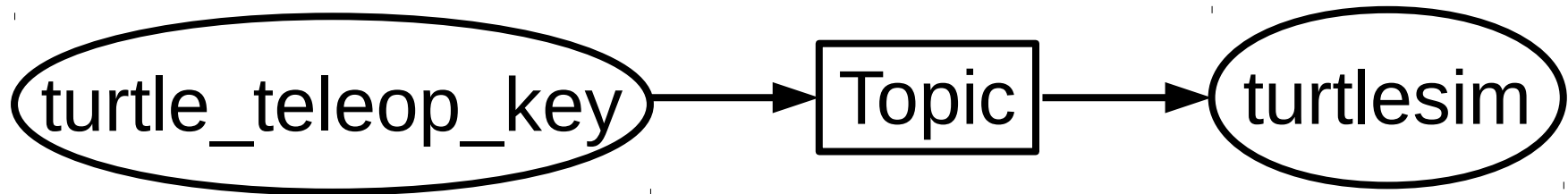
```
Publishers: None
```

```
Subscribers:
```

```
* /rosout (http://Castle:36485/)
```

```
$ rosmmsg show rosgraph_msgs/Log
```

WORKING EXAMPLE



```
$ rosrun turtlesim turtlesim_node
$ rosrun turtlesim turtle_teleop_key
$ rosnode list
$ rosnode info /turtlesim
$ rosnode info /teleop_turtle
$ rostopic list
$ rostopic info /turtle1/cmd_vel
$ rosmmsg show geometry_msgs/Twist
```

RQT_GRAPH

```
$ rosrun rqt_graph rqt_graph
```

