ISEN | école d'ingénieurs

ALL IS DIGITAL!

:::ROS

ROS

- Nodes

  - Processing entities

    - Mono or multi thread

    - Written in whatever language

    - Responds to an unified protocol

ROS

- rosnode command

  - ping   test connectivity to node

  - list   list active nodes

  - machine list nodes running on a particular machine or list machines

  - info   print information about node

  - kill   kill a running node

  - cleanup   purge registration information of unreachable nodes

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services
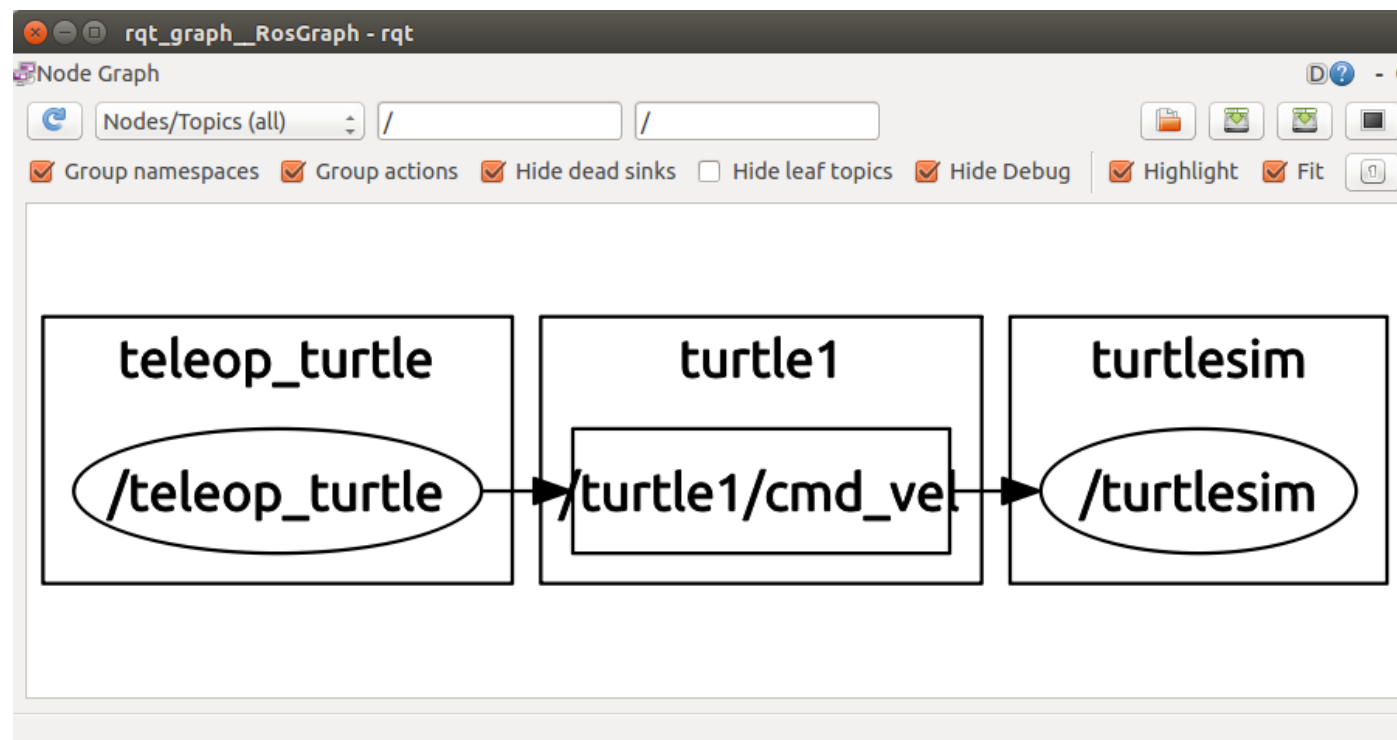
- What is a Robotic system?

ROS

- Messages

  - A message is a unit of communication

  - It has an arbitrary, yet static and predefined structure

  - In ROS 1 is transmitted under TCP/IP protocol.

- ROS Ecosystem

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- What is a Robotic system?

ROS

- rosmsg command

  - show   Show message description

  - info   Alias for rosmsg show

  - list   List all messages

  - md5   Display message md5sum

  - package   List messages in a package

  - packages   List packages that contain message
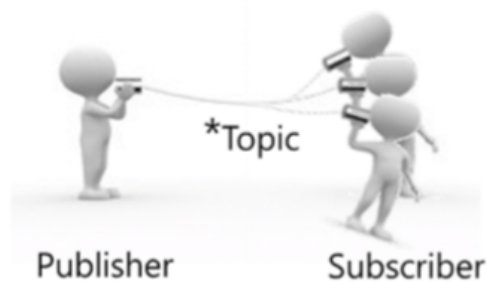
- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

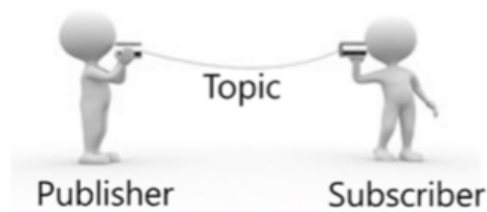- What is a Robotic system?

ROS

- rqt_graph command

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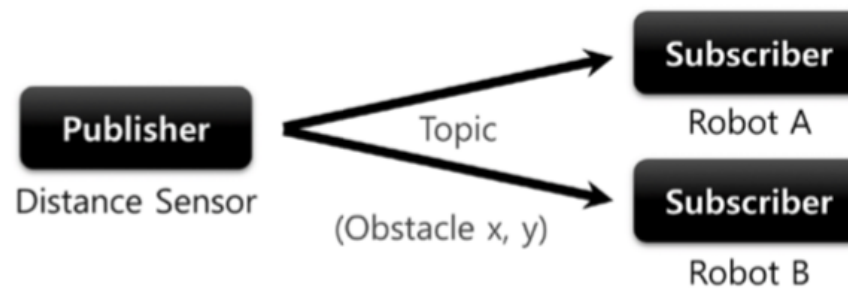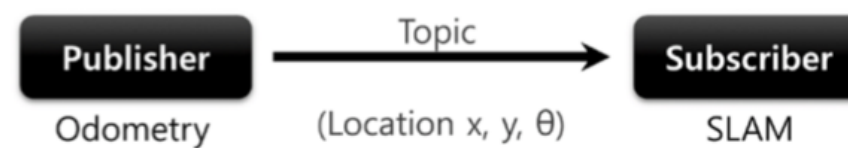
- What is a Robotic system?

ROS

- Asynchronous

- Unidirectional

- N2N

- Persistent connection
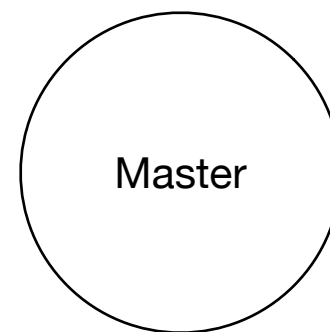
- Used for streaming information

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

- What is a Robotic system?

ROS

Topic — Publisher / Subscriber

Publisher → Topic (Location x, y, θ) → Subscriber
Odometry / SLAM

Publisher → *Topic → Subscriber

Publisher → Topic (Obstacle x, y) → Subscriber Robot A / Subscriber Robot B
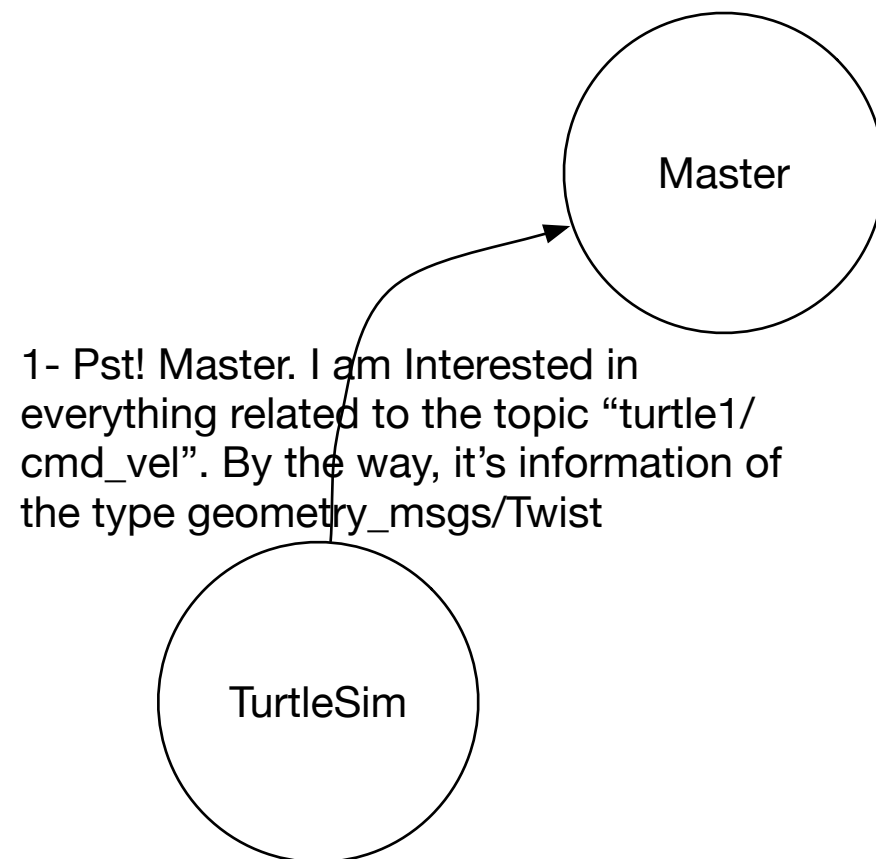Distance Sensor

*Topic not only allows 1:1 Publisher and Subscriber communication, but also supports 1:N, N:1 and N:N depending on the purpose.

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

- What is a Robotic system?

ROS

Master
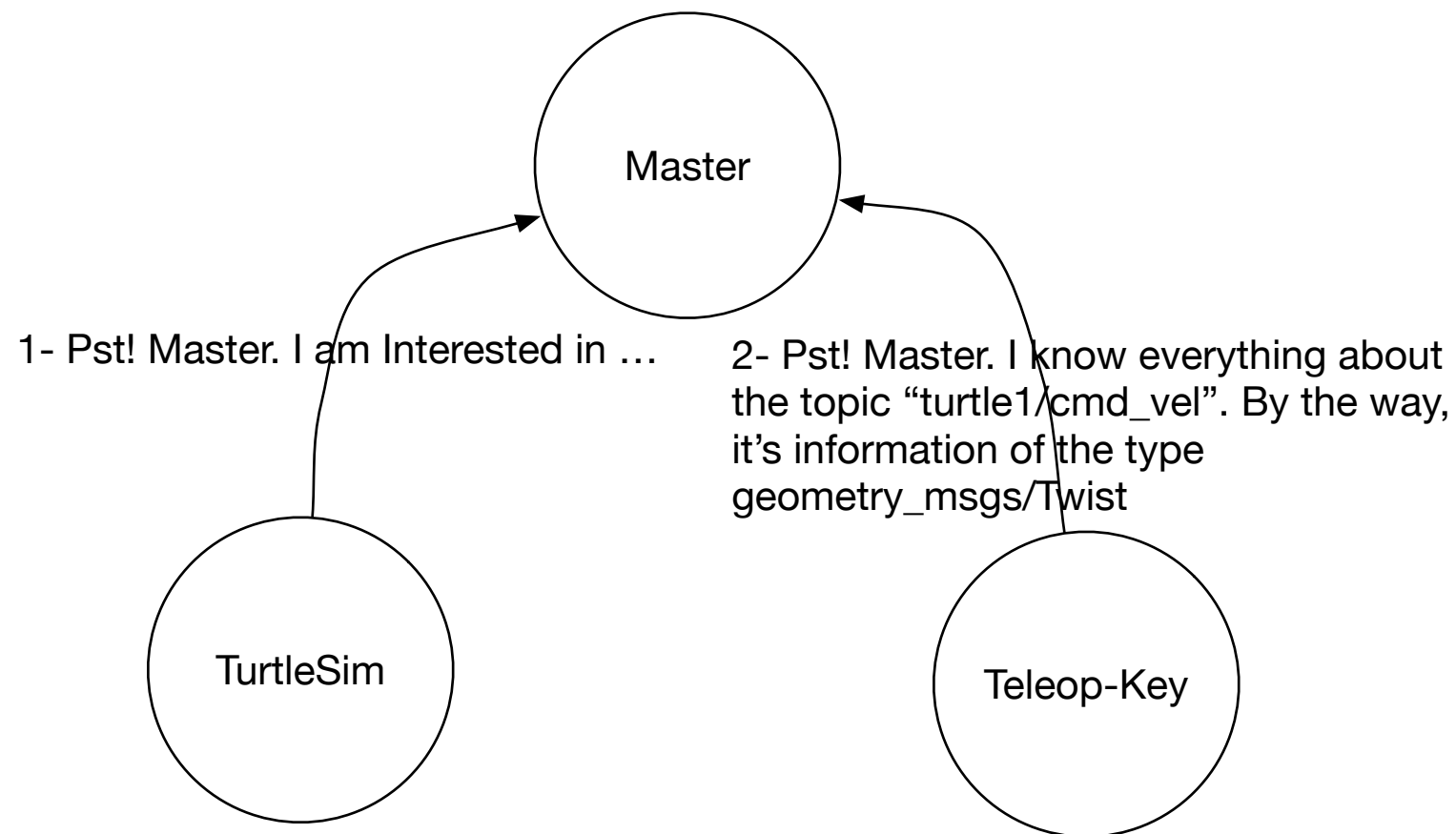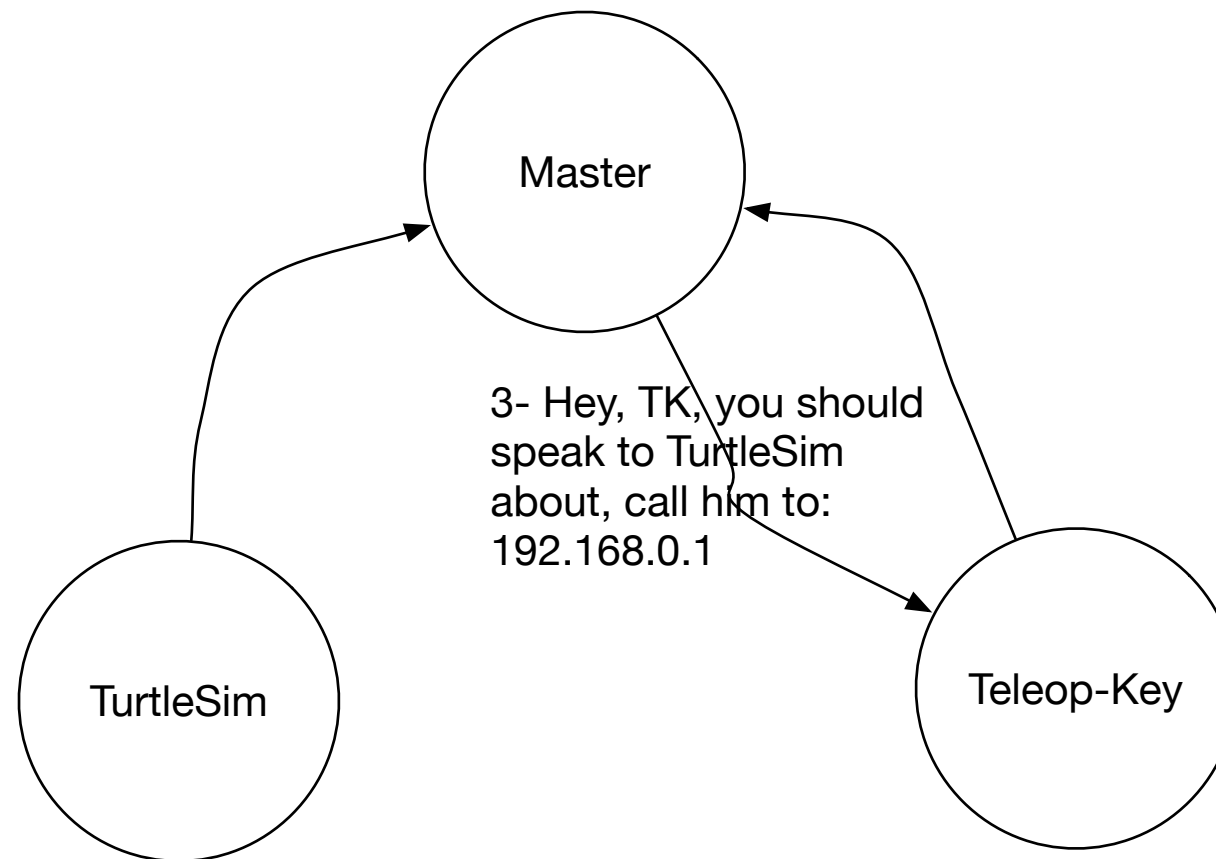
- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

- What is a Robotic system?

ROS

Master

1- Pst! Master. I am Interested in everything related to the topic "turtle1/cmd_vel". By the way, it's information of the type geometry_msgs/Twist

TurtleSim
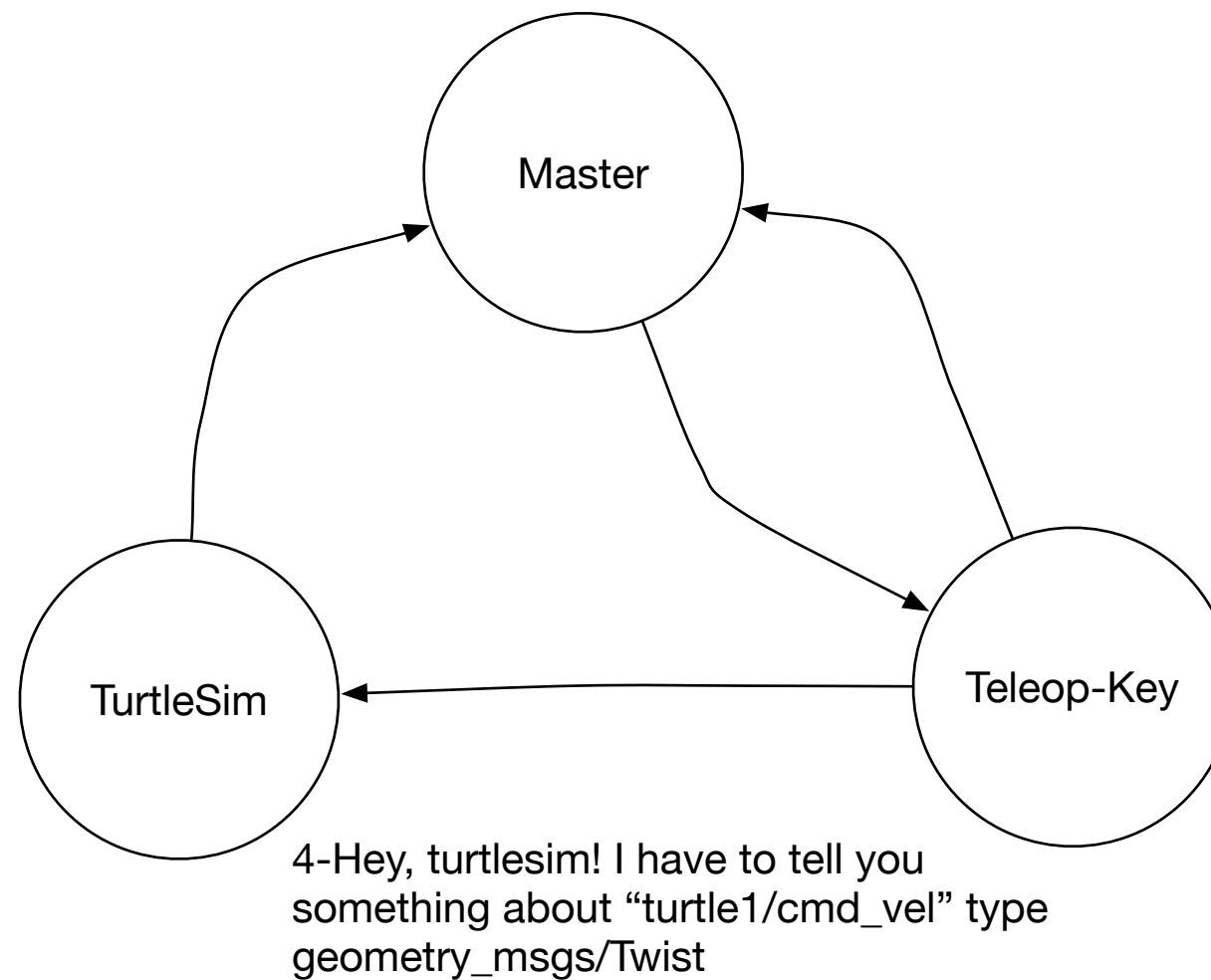
- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

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- Services

- What is a Robotic system?

ROS

Master

1- Pst! Master. I am Interested in …

2- Pst! Master. I know everything about the topic "turtle1/cmd_vel". By the way, it's information of the type geometry_msgs/Twist
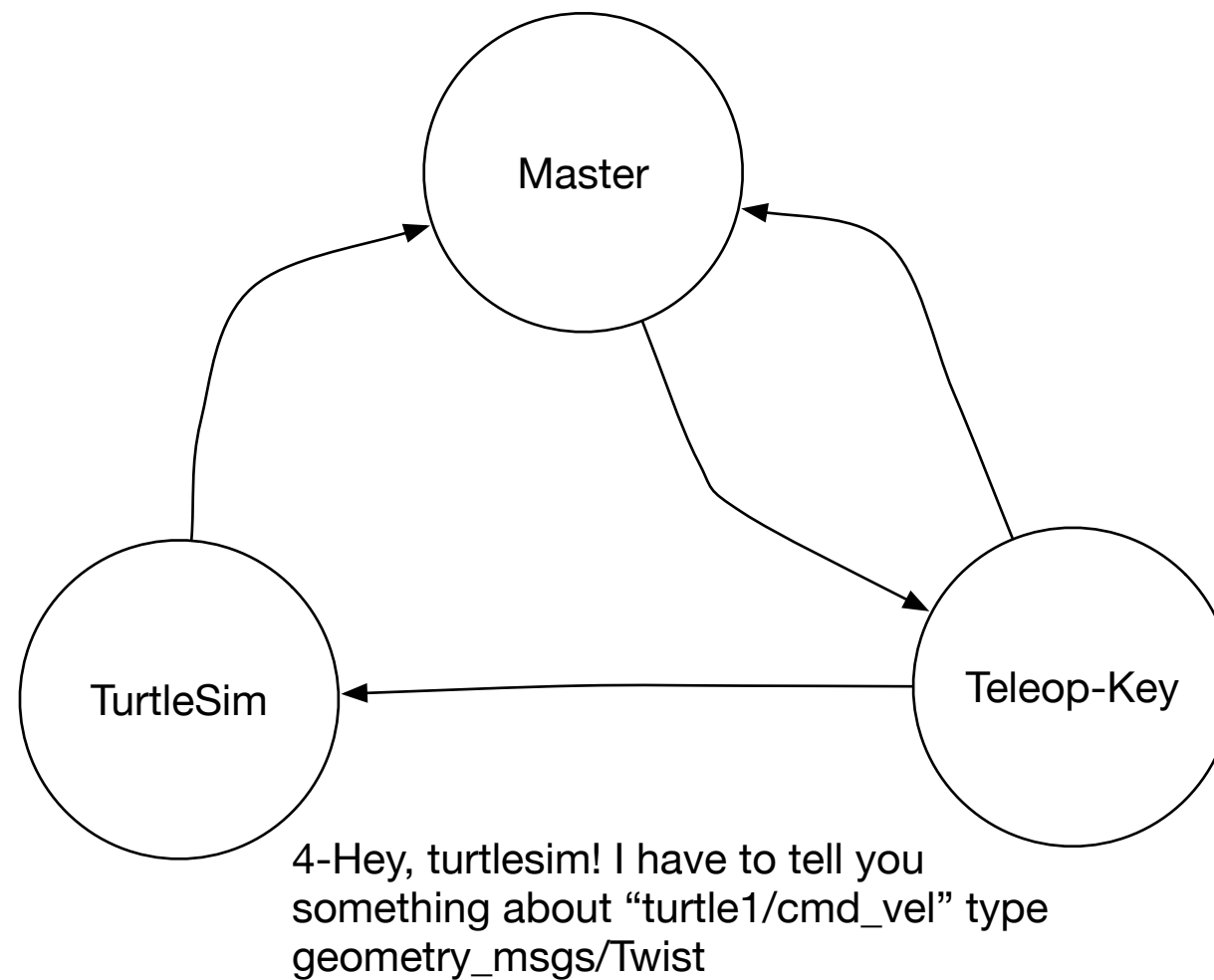
TurtleSim

Teleop-Key

- ROS Ecosystem
- Distributed Processing
- Nodes and Messages
- Topics
- Publisher / Subscriber
- Services
- What is a Robotic system?

ROS

Master

3- Hey, TK, you should speak to TurtleSim about, call him to: 192.168.0.1
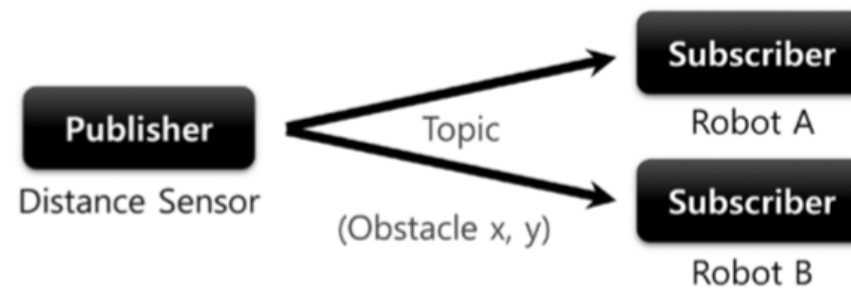
TurtleSim

Teleop-Key
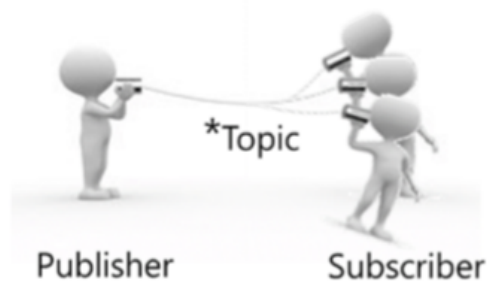
- ROS Ecosystem

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- What is a Robotic system?

ROS

Master

TurtleSim

Teleop-Key

4-Hey, turtlesim! I have to tell you
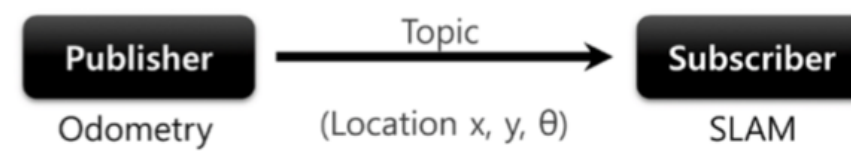something about "turtle1/cmd_vel" type
geometry_msgs/Twist

- ROS Ecosystem

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- Topics

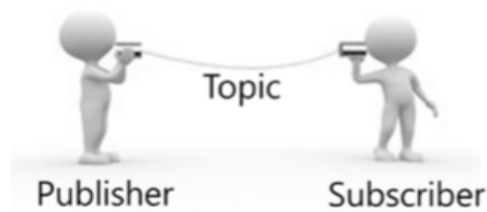- Publisher / Subscriber

- Services

- What is a Robotic
  system?

ROS

Master

TurtleSim

Teleop-Key

4-Hey, turtlesim! I have to tell you something about "turtle1/cmd_vel" type geometry_msgs/Twist

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- What is a Robotic system?

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Publisher —— Topic —— Subscriber

Publisher → Topic (Location x, y, θ) → Subscriber
Odometry   SLAM

Publisher —— *Topic —— Subscriber

Publisher → Topic (Obstacle x, y) → Subscriber (Robot A)
Distance Sensor   → Subscriber (Robot B)

*Topic not only allows 1:1 Publisher and Subscriber communication, but also supports 1:N, N:1 and N:N depending on the purpose.

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

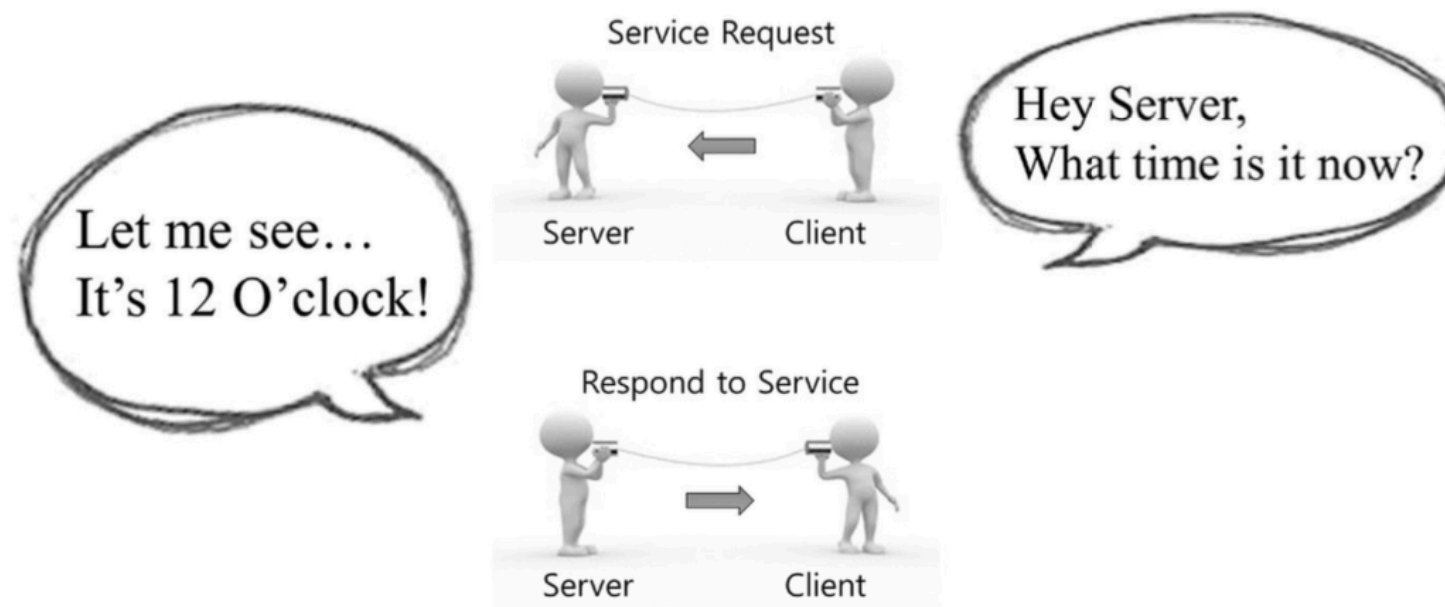- What is a Robotic system?

ROS

Writing a publisher and a subscriber:
Chat exercise.

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services
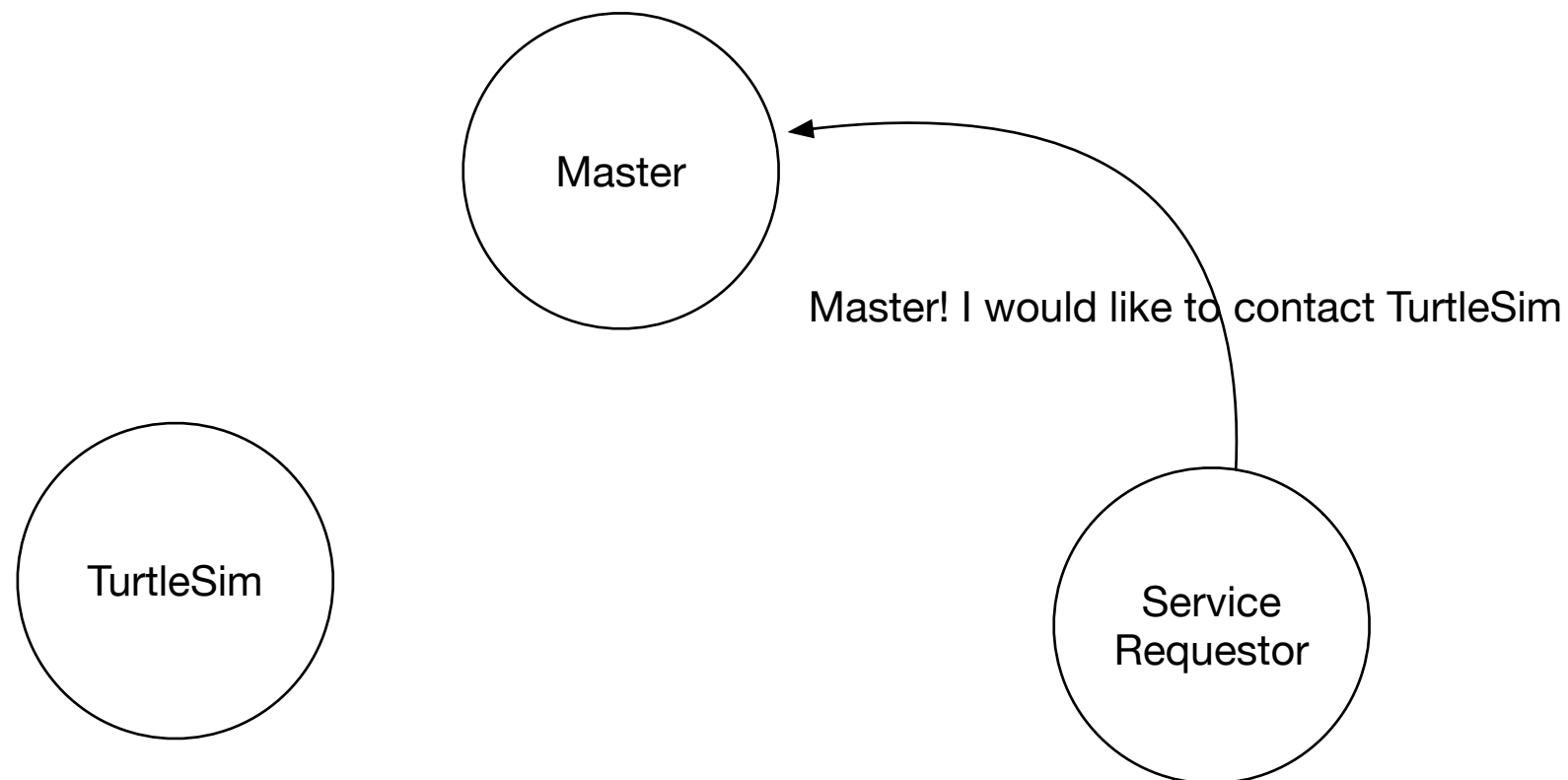
- What is a Robotic system?

ROS

- Synchronous

- Bidirectional

- N2N

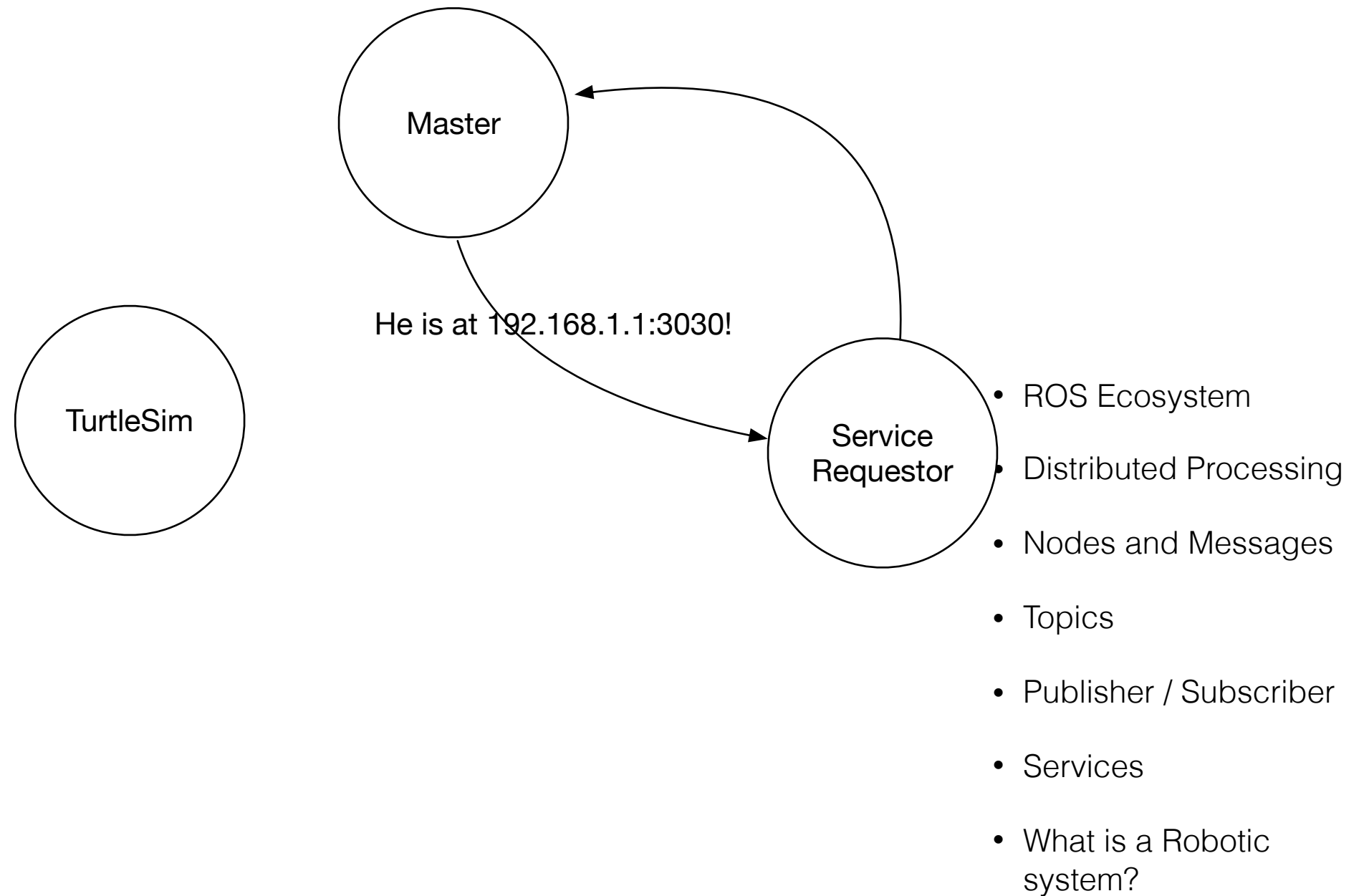- Transient connection

- Used for requesting a service

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber
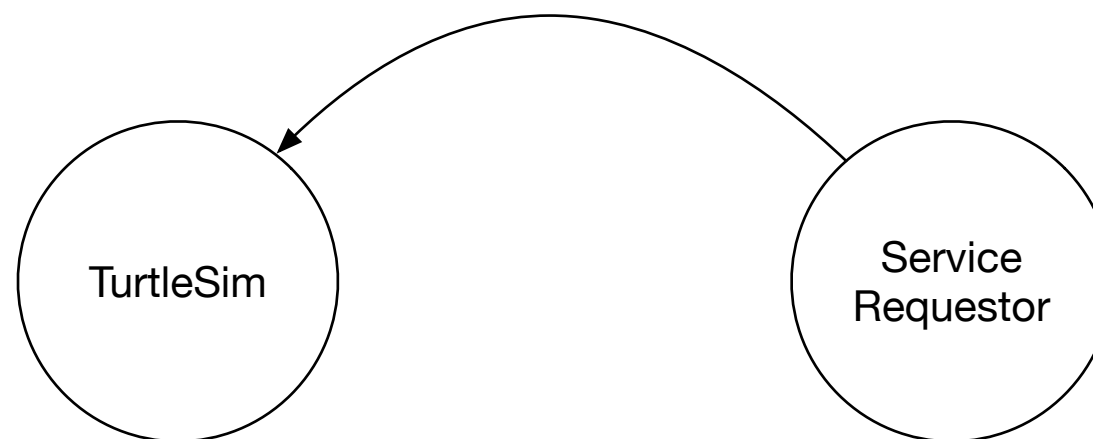
- Services

- What is a Robotic system?

ROS

- ROS Ecosystem
- Distributed Processing
- Nodes and Messages
- Topics
- Publisher / Subscriber
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- What is a Robotic system?

ROS

Master

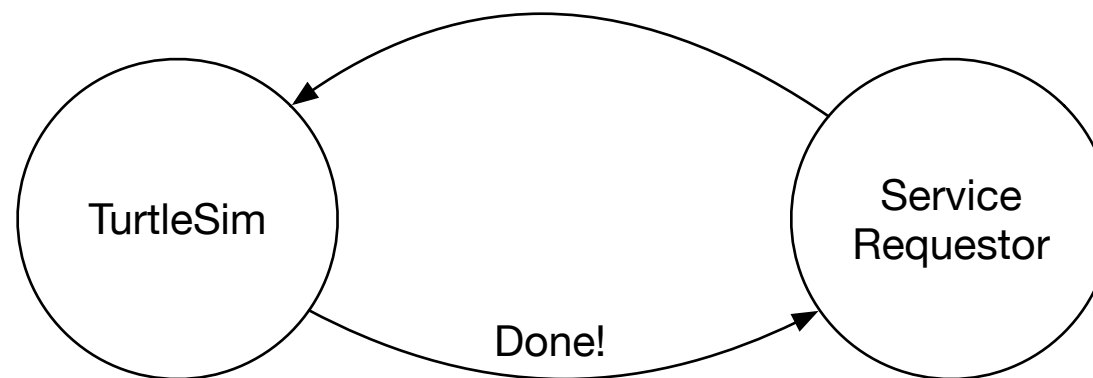Master! I would like to contact TurtleSim

TurtleSim

Service
Requestor

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

- What is a Robotic
  system?

ROS

Master

TurtleSim

He is at 192.168.1.1:3030!

Service Requestor

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

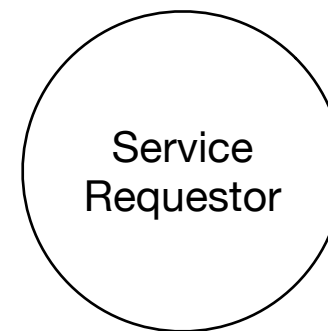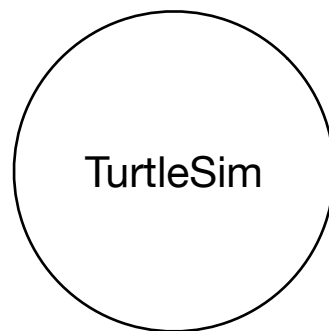- Publisher / Subscriber

- Services

- What is a Robotic system?

ROS

Hey, Turtle sim, change your pen color to yellow, please.
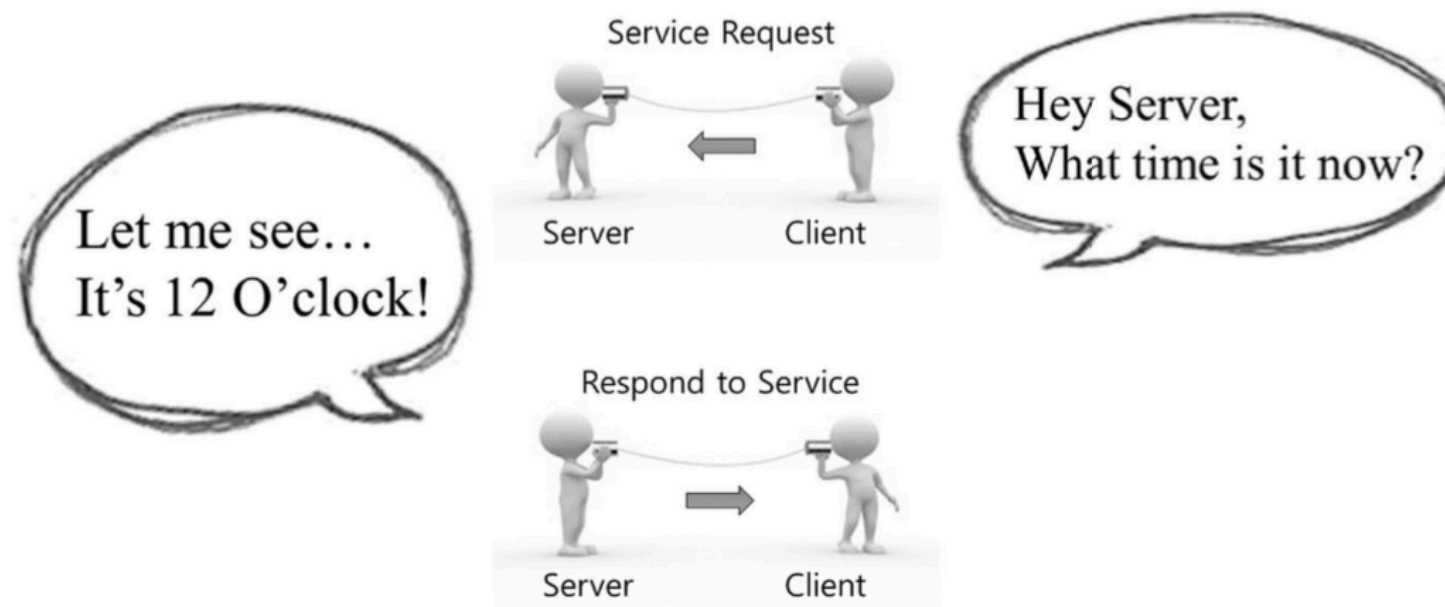
TurtleSim

Service Requestor

- ROS Ecosystem

- Distributed Processing

- Nodes and Messages

- Topics

- Publisher / Subscriber

- Services

- What is a Robotic system?

ROS

- ROS Ecosystem

- Distributed Processing

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- Publisher / Subscriber

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ROS

TurtleSim

Service Requestor

- ROS Ecosystem

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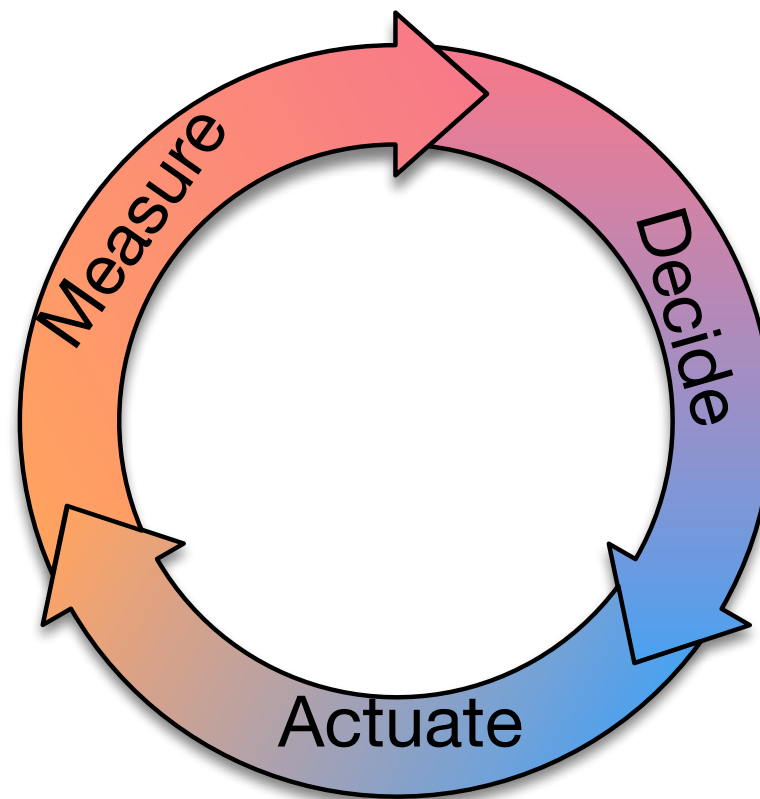- Services

- What is a Robotic system?

ROS

- ROS Ecosystem

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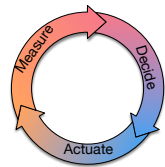- Services

- What is a Robotic system?

ROS

- Robot

  A mechanical device capable of performing a variety tasks interacting with the environment

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- What is a Robotic system?

ROS

- Measure specific environmental properties

- Analyse and model specific aspects of reality

- Act over the environment for transforming the reality

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- What is a Robotic system?

ROS

Then, what is a program in ROS?

- ROS Ecosystem

- Distributed Processing

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