Robotics Competition 2023-24

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Services

It provides a wide range of services and features to facilitate the development of robotic applications. One of the key communication mechanisms in ROS 2 is the use of services, which allow nodes to request and receive specific data or perform actions from other nodes in a request-response manner. Here are some of the key services in ROS 2:

1. **Service Server:** A service server is a node that provides a specific service. It waits for requests from other nodes and responds to those requests with the requested data or by performing a specific action. Service servers are defined using a service message, which specifies the request and response types.

2. **Service Client:** A service client is a node that requests a specific service from a service server. It sends a request message to the server and waits for a response message. Service clients are typically used by higher-level control nodes to interact with lower-level hardware or subsystems.

3. **Service Messages:** Service messages are used to define the structure of requests and responses for a particular service. These messages are defined in ROS 2 interface description language (IDL) files. Each service has a pair of messages: one for the request and one for the response. These messages define the data that is exchanged between the client and server.

   - Service Messages structure we will use in task 1B

   - First part is request and second is response

```
int64 request_goal
---
float64 x_goal
float64 y_goal
float64 theta_goal
int64 end_of_list
```

4. **Service Calls:** Service calls are the actual requests made by a service client to a service server. When a service client makes a service call, it sends a request message to the server and waits for a response. Once the server processes the request, it sends a response message back to the client.

5. **Service Callbacks:** When you implement a service server, you define a callback function that gets executed when a service call is received. This callback function is responsible for processing the request and generating the response.

NOTE: *There is no need to create service in this task we have done that for you, as you launch gazebo service is launched, we have give the code to send response to the service to get goal pose, with each launch the poses will change as a random shape is chosen and pose of that shape is sent as response.*