ROS Actions

- As you know ROS Services provide Client-Server request-response type architecture.
- So, ROS Services are Synchronous i.e the Client would wait for the Server for its response on the request sent by the client.
- This kind of behaviour is useful if you want to do something quickly and don't want to wait for the server to complete processing.
    - For eg. You can have a Server which can activate and deactivate vacuum grippers attached to a robotic arm. You can then have a client which would send activation or deactivation request using ROS Services to the Server and once request has been processed the server will send back the response.

- Now, let's say there is a case where the Client,
    - Does not want to wait for the server to complete the request.
    - Wants to get periodic feedback on progress of the request as it is being processed.
    - Wants to cancel the request in-between.
- In this case, ROS Actions are more appropriate than ROS Services.
- In ROS Actions,
    - Client can send multiple **goals** to the Server. (Like Requests in ROS Services)
    - Client can **cancel** any Goal or all the Goals anytime.
    - Client can get **feedback** and **status** of the Goal while it is being processed.
    - Client won't have to wait for the result from the server as processing will happen **asynchronously** at server. So, client can work on other things while the server is processing the goal.

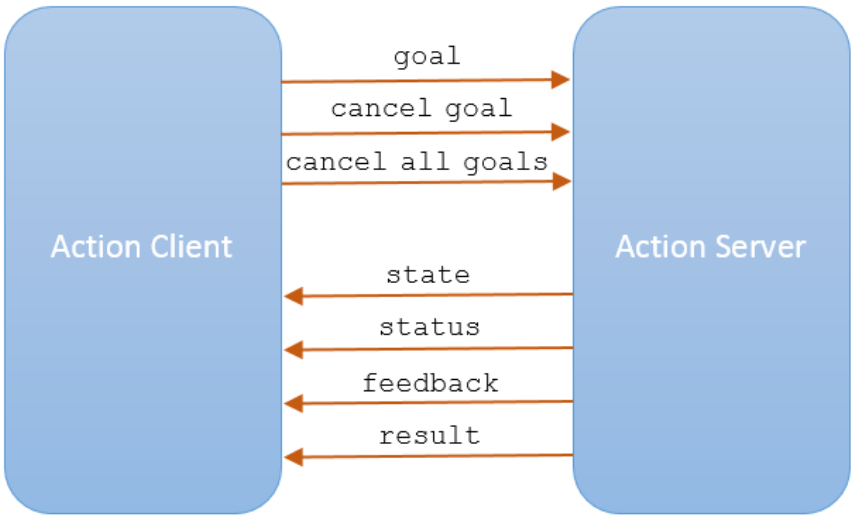

Image by Mathwork

Usage

- To use ROS Actions you would have to use `actionlib` library provided by ROS in your ROS Nodes.
- The `actionlib` library provides following classes,
    - `ActionServer` and `ActionClient` : These two classes are used to make your ROS Nodes Action Server and Action Client respectively.
    - `SimpleActionServer` and `SimpleActionClient` : These two classes provides simple interface for the users to use ROS Actions. Some of the features of `ActionServer` and `ActionClient` are missing in this.

Reading Assignment

1. ROS Robot Programming Book (available in Books Section) - Page: 172 - Section 7.4 Writing and Running the Action Server and Client Node
2. ROS Wiki - actionlib
