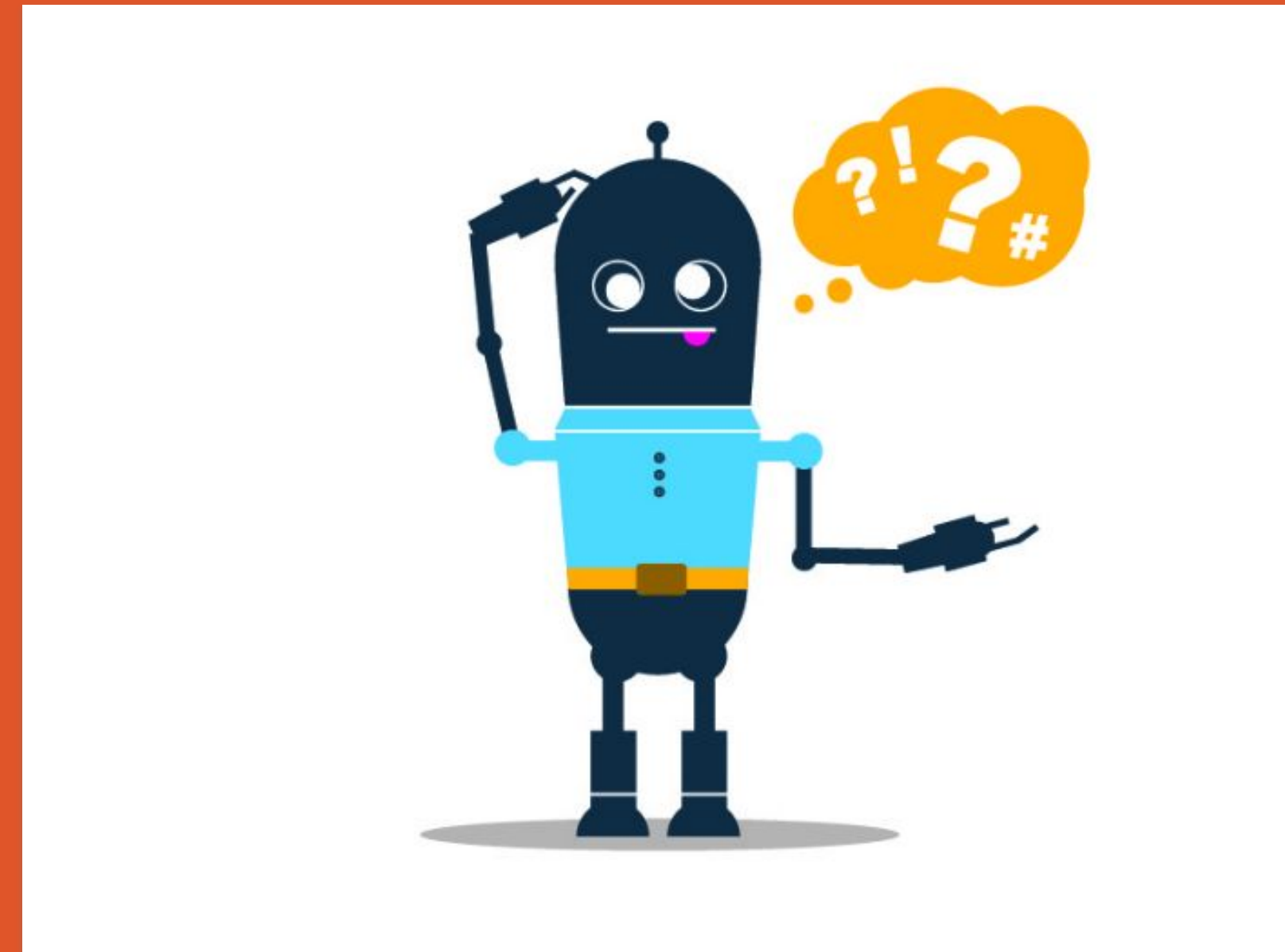## ROBOTS CAN'T FIGURE OUT WHERE THEY ARE IN SPACE

Figure 4: Confused robot.

- This project helps OptiTrack customers that use Robot Operating System (ROS) to easily and efficiently pull in positional data from Motive.

- Motive is a software that works with the OptiTrack camera system to manage and display motion capture data. See figure 1 for a screenshot of the application.

- The plugin will help people easily communicate between ROS and Motive. Simply adding the plugin to their existing ROS systems will allow developers to incorporate motion capture data into their projects.

- The project will help minimize the errors clients experience in different industries, such as cinema, video game production, biomechanics, and manufacturing.

- The project would provide industrial clients with a way to meet their needs with motion capture systems by minimizing the risk of engineering failures and their associated costs.

ROS2 PLUGIN

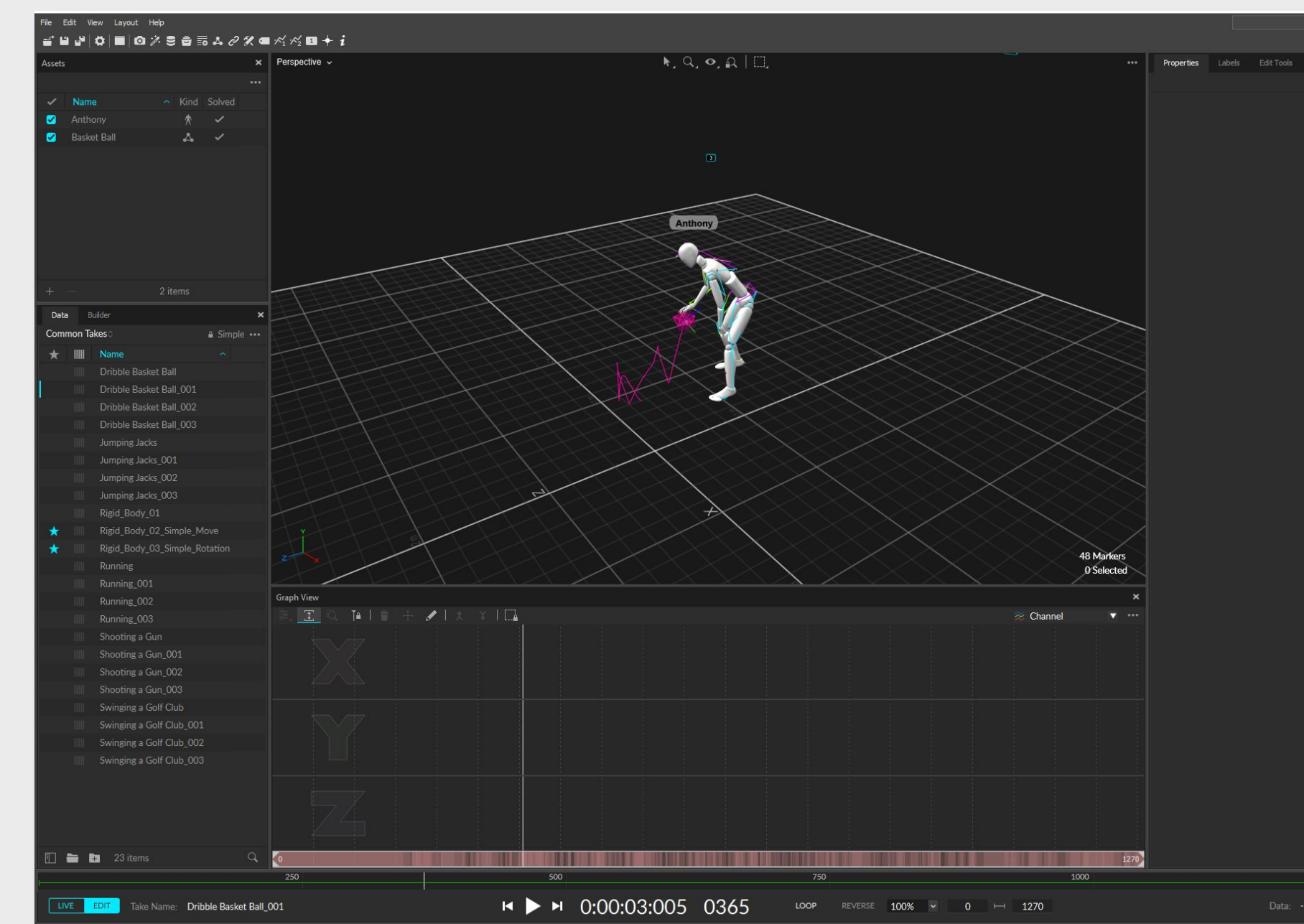## Precisely tracking robots in real-time with motion capture technology.

Figure 1: OptiTrack's Motive software displaying real time motion-capture data.

OPTITRACK SYSTEM TRACKS POSITIONAL DATA

- Using OptiTrack's camera and software solutions, we can track the position of markers on robots and objects in the volume with sub-millimeter precision.
- The motion capture software, Motive, can handle capture and process hundreds of frames per second.
- The system can automatically identify and label different objects in the volume based on marker configurations in real-time.
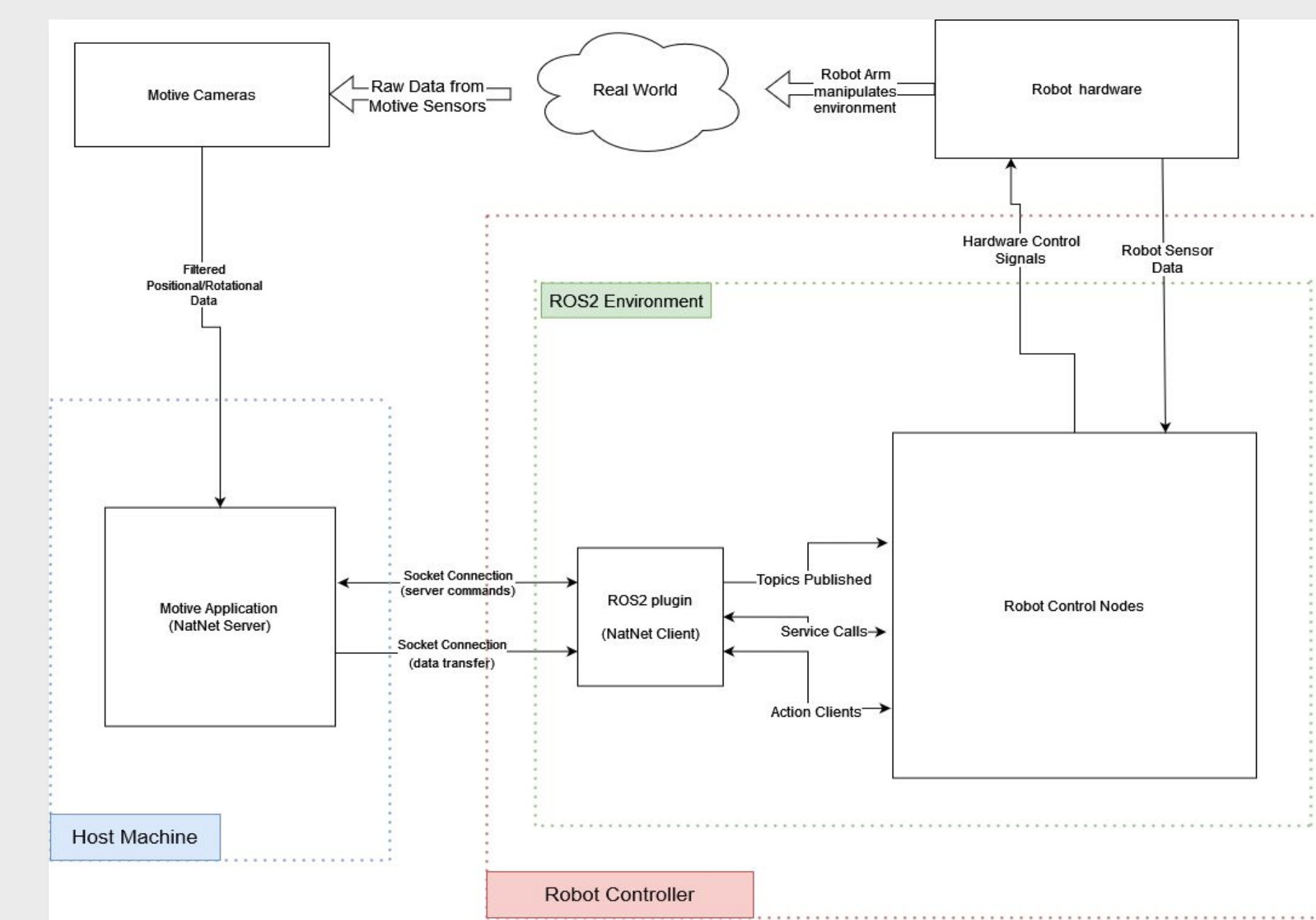- All this data is streamed out of Motive to our plugin using the NatNet SDK.

NATNET SDK: RETRIEVING DATA FROM MOTIVE

- Using OptiTrack's NatNet SDK, we can stream the data from Motive to our plugin.
- The plugin translates data from NatNet into a ROS-digestible format and makes it available to the ROS ecosystem.
- The plugin also acts as an intermediary between ROS and Motive, passing information and commands bidirectionally between the two systems.

Figure 2: Network diagram of the plugin interacting with a combined ROS/OptiTrack system.

ROBOT DEMONSTRATION

- The robot will be receiving and parsing through all data collected by Motive at a frequency defined by the customer.
- The robot finds the position of its base and of its head based on unique qualities streamed from Motive.
- The robot shall verify the location of a particular object, identified by a unique identifier established in Motive.
- Upon confirming that the object is within a designated proximity, the robot shall execute a movement to position its head in contact with the object.

Figure 3: JetMax HiWonder robot.

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