

**ROS Lightning talk** 

## IHMC Pub/Sub

RTPS/ROS2 communication protocol in realtime Java

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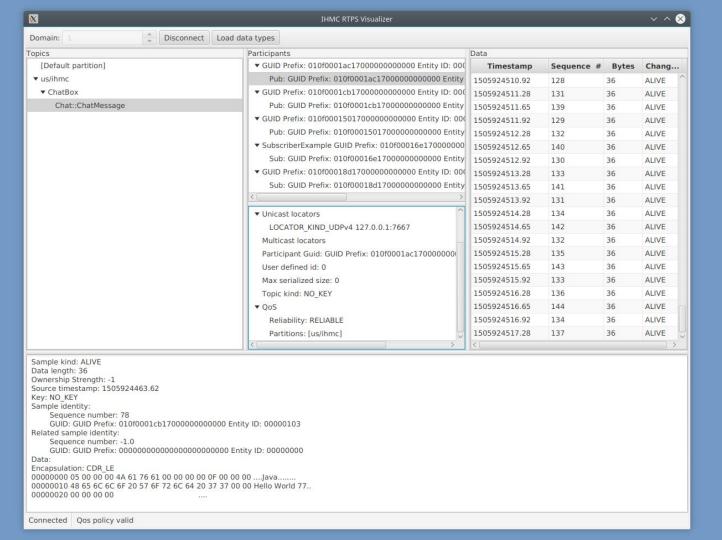
https://github.com/ihmcrobotics/ihmc-pub-sub



## What does IHMC Pub/Sub do

- Lightweight wrapper around Fast-RTPS
  - No memory allocations for sending/receiving objects
  - Object orientated based on Fast-RTPS pub/sub interfaces
  - Could provide other back-ends (JRTPS?)
- Native Java IDL compiler
  - Every element is pre-allocated
  - No backing C/C++ code
  - Export data to YAML for long term storage
- RTPS Visualizer
  - Alpha quality





# Why custom Java implementation

- Real-time safe
  - No allocations necessary to send/receive
  - Native Java objects
  - No need to compile messages to C++ and then generate a Java wrapper
- Allow abstract implementations of .idl files
  - Re-use existing data types
  - Vector, Point etc
  - Backwards compatible with our codebase



### First results

- Variable logging using IHMC Pub/Sub
  - 10000 64 bit variables (LZ4 compression)
  - o 1 Khz
  - RTPS Best Effort
- Do not use Fast-RTPS write directly from Realtime thread
  - Blocking call
  - Use separate thread with lockless data sync.
- Share large models over history
  - Be careful to tune heartbeat period for large topics
  - Use newest Fast-RTPS



### Further work

- Support for ROS 2 messages
- Compilation step between .msg ← .idl necessary?
- Proper topic names and partitions for ROS 2
- Stabilize IHMC RTPS Visualizer

