

SONY

Sony Robotics System & ROS/ROS2

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Agenda

- Self-Introduction
- Sony Robotics Architecture
- aibo Introduction
- Why ROS?
- What about ROS2?

Who am I?

- Tomoya Fujita

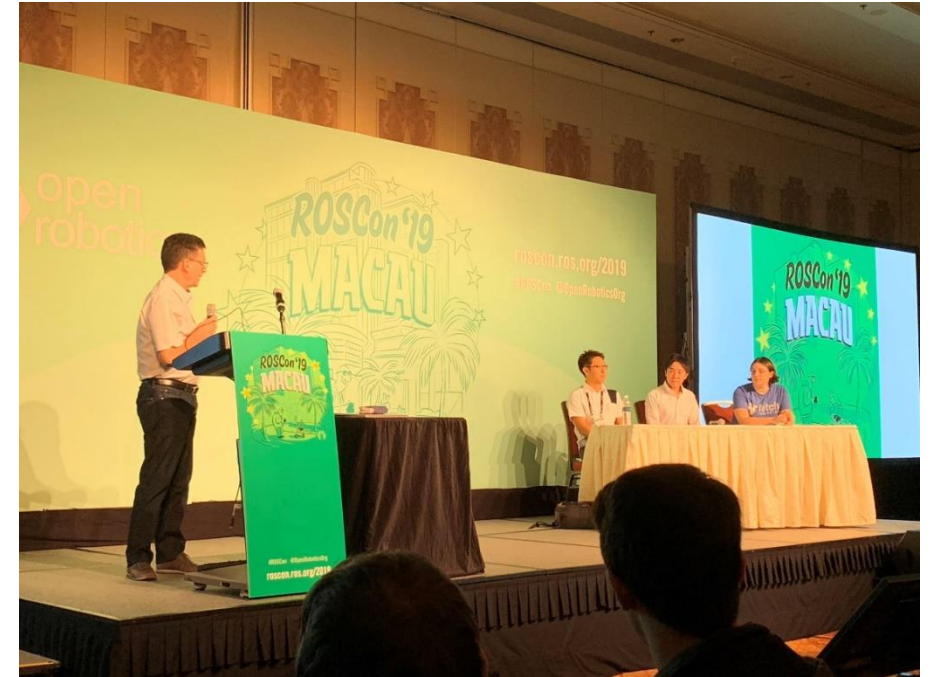
- <https://www.linkedin.com/in/tomoya-fujita-5bb656b6/>
- <https://github.com/fujitatomoya>

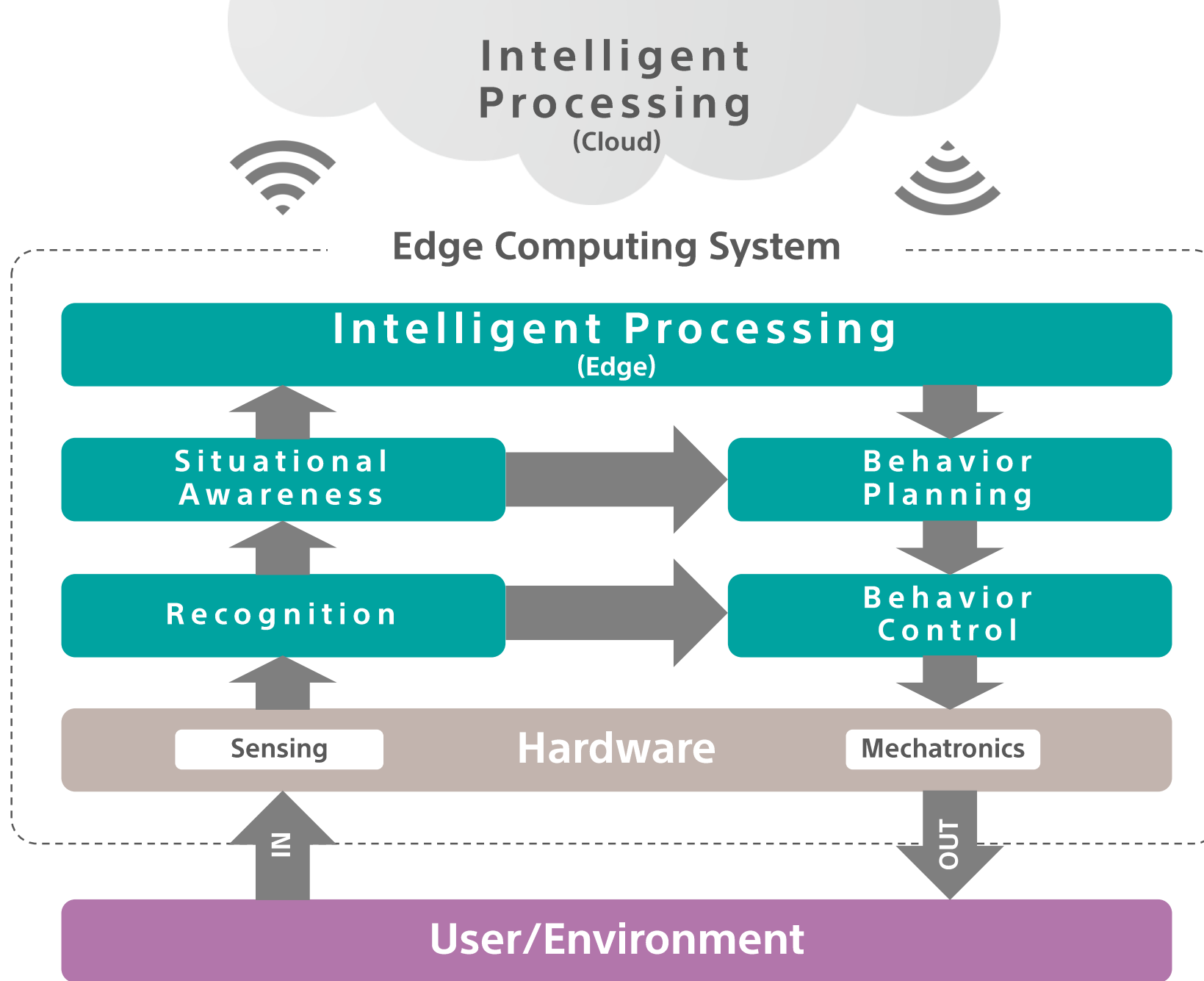
- 2016 – Sony Corporation

- System Software Engineer / Architect
- Robotics Product Development
- ROS/ROS2 System Engineer
- Cloud Framework (Kubernetes)

- ROS Relate Work

- <https://vimeo.com/293292255> (ROSCon2018)
- <https://www.theconstructsim.com/openai-ros-workshop-roscon/rosdevcon19-tomoya-fujita/> (ROSDevcon2019 Hands-On)

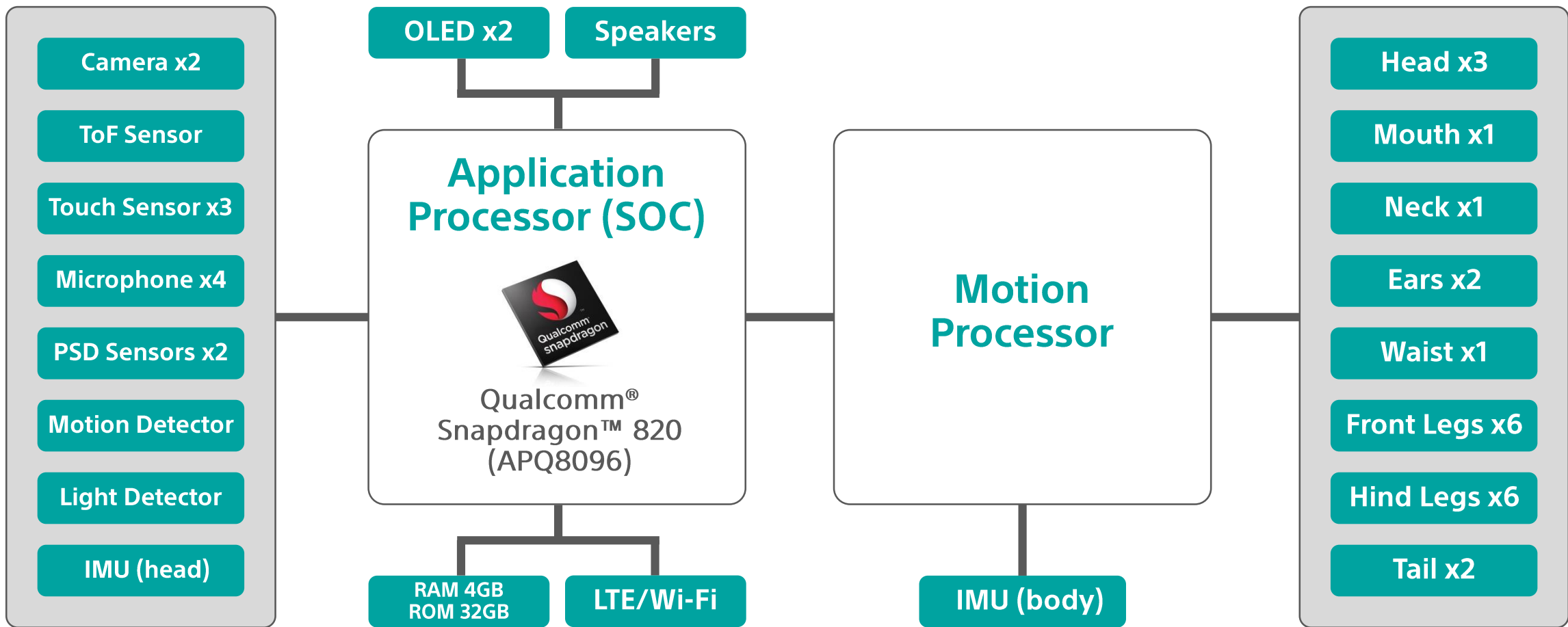






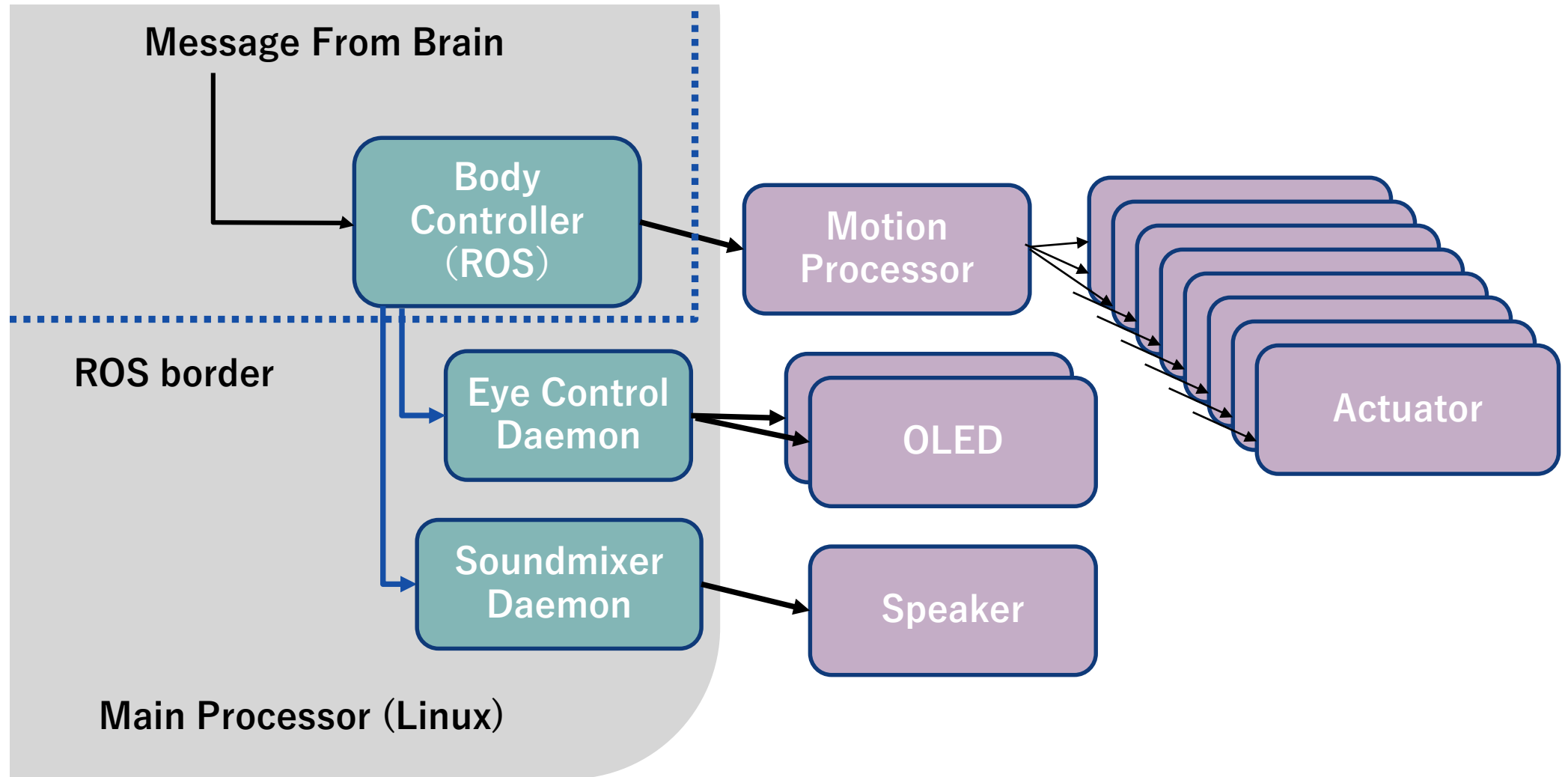
aibo
ERS-1000





Sensing Devices

Actuators



**Mass
Production**



Latest Robot Tech

ROS



Mobile

**Cloud
IoT**

Wireless Tech
Camera Tech
Sensor Tech
Security Tech

Mech

Motion
Tech

Inspe
ction

CS
Tech

AI Deep Learning
Reinforcement
Learning

**AWS IoT
AWS Cloud**

Why ROS?

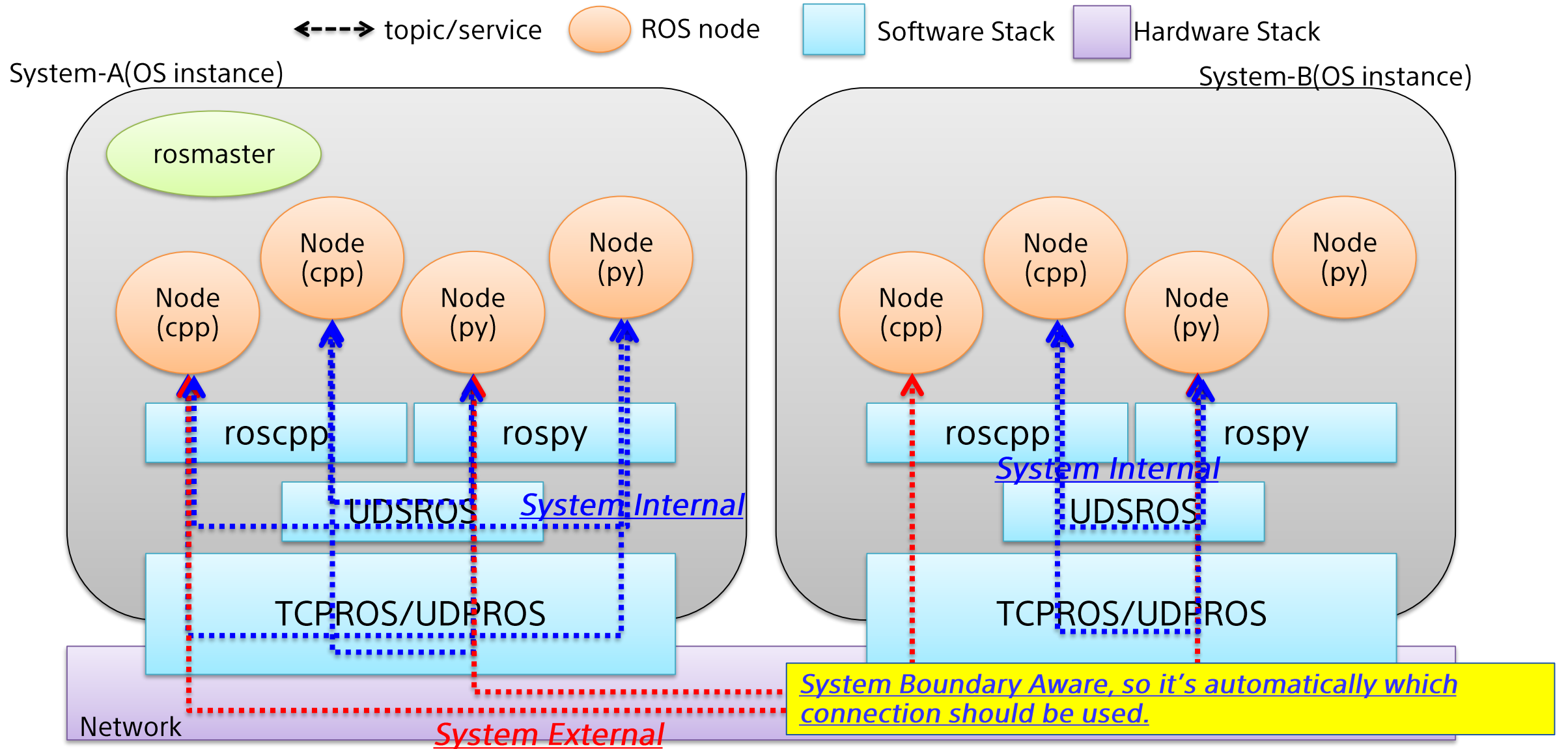
- Pros

- Open Source
- Packages
- Vendor Drivers
- Simulation
- Debug Utilities
- Document
- Well-Defined API

- Cons

- Centralized Architecture
- Security
- *Real-Time*
- *Resource Consumption*

Extended Transport Overview



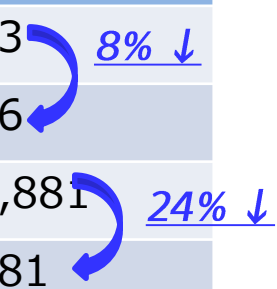
Improvement Result

- HelloWorld Benchmark

- Publisher:Subscriber=1:1
- Synchronous test loop using shared memory.
- Latency is the time window between publish and callback entrance.
- Environment: amd64(skylake) and arm64(hikey)

- Result Comparison

Platform	ROS Transport	Duration [nsec]		
		min	max	average
Skylake	TCP/IP	46,582	287,173	70,393
	UDS	42,877	286,130	64,796
Hikey	TCP/IP	552,224	6,040,312	1,145,881
	UDS	435,833	10,075,833	872,981



Github Repository

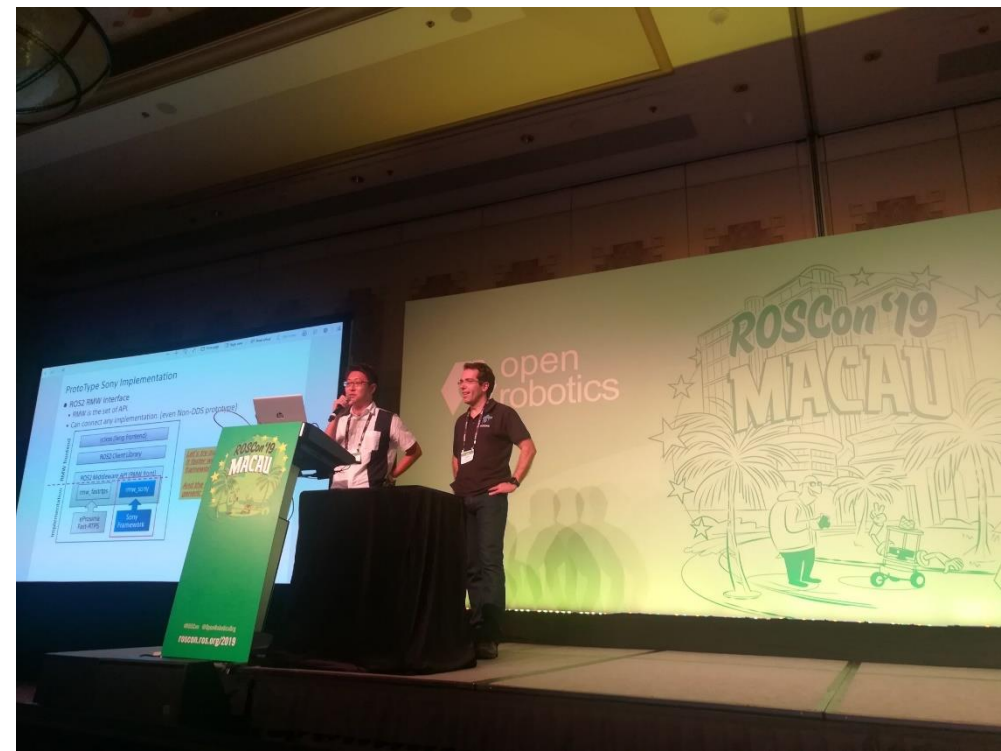
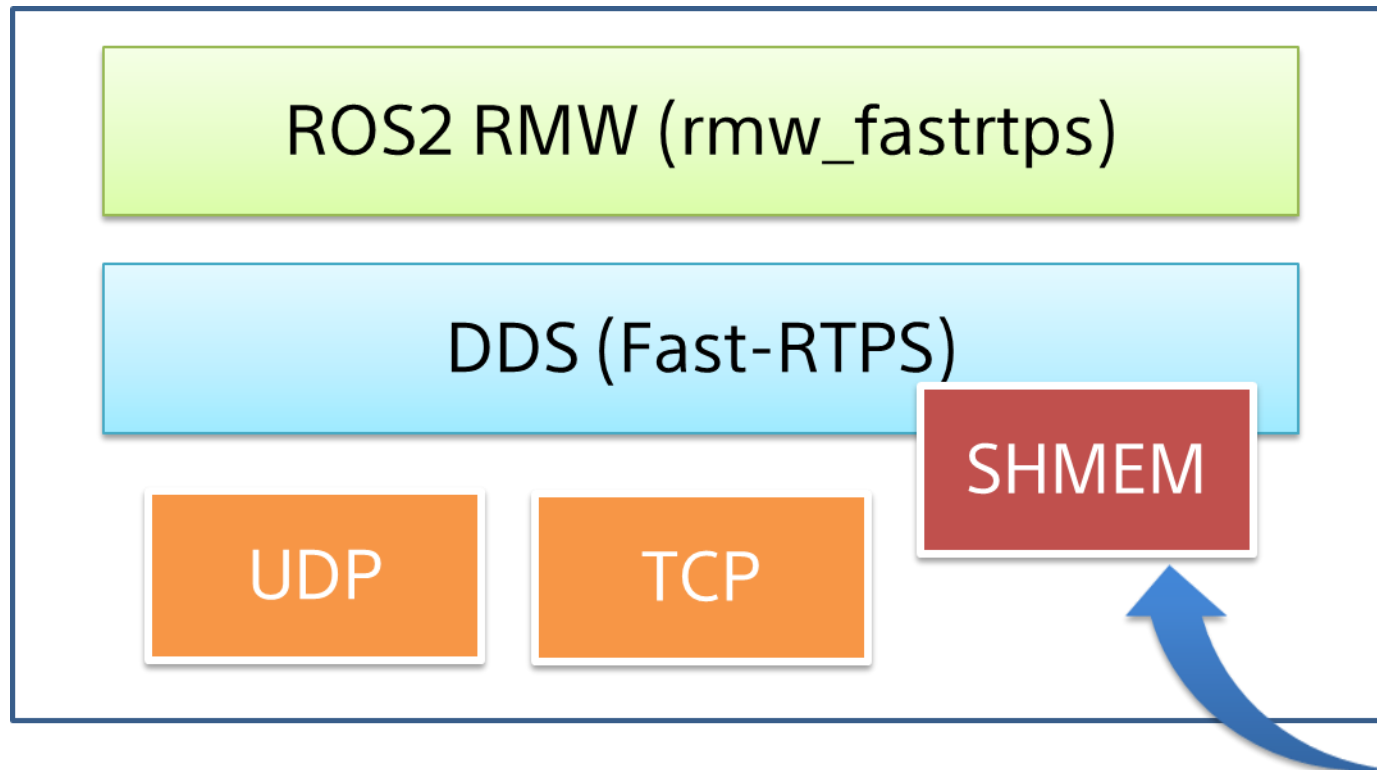
https://github.com/fujitatomoya/ros_comm/tree/topic-melodic-devel-uds-support

What about ROS2?

- Distributed System
- ROS Middleware (RMW)
- *DDS (Data Distributed System) Implementation*
- Security Support via SROS2
- Real-Time / micro-ROS

DDS Shared Memory Transport

- Collaboration with eProsima
- DDS with Shared Memory
- Open Source (Fast-RTPS)



EPROSIMA
The Middleware Experts

2

Sony
Technology

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Future Activities

- ROS2 Contribution
- *Fleet Management*
- Interaction Best Practices
- Field Experience
- Open Collaboration

Special Thanks

