

ROS2 implementation for MCUs

osamu.matsushima.wm@renesas.com



Worldwide MCU Market Share (CY2016)

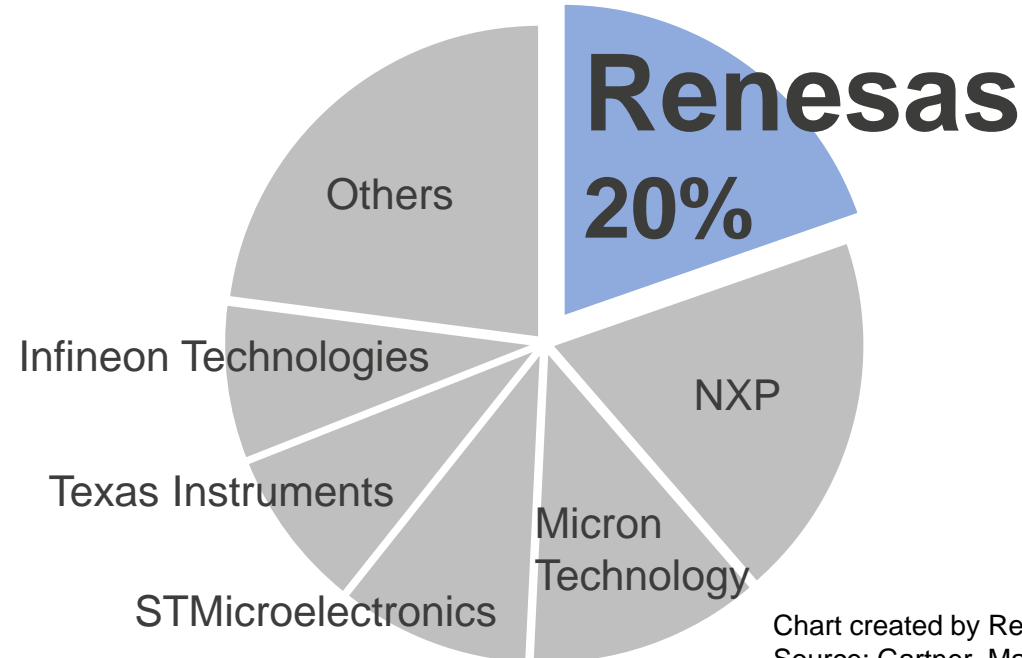
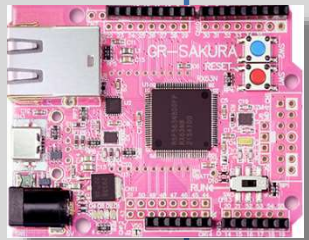


Chart created by Renesas based on Gartner Research,
Source: Gartner, Market Share: Semiconductor Devices and
Applications, Worldwide, 2016, 30 March 2017

ROS2 Implementation to MCU DEMO

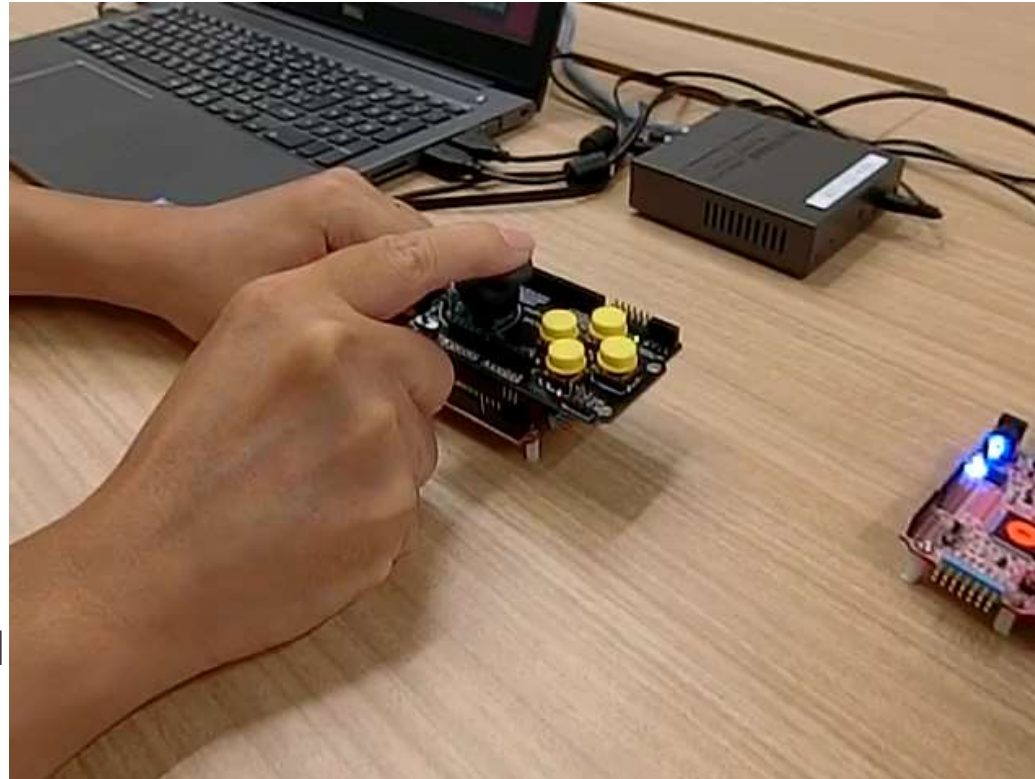
Sensor node (publisher)

Joystick shield



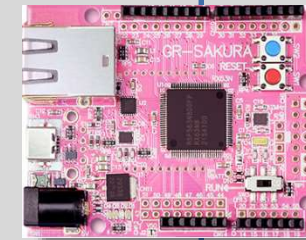
GR-SAKURA II

FreeRTOS



Actuator node (subscriber)

Pan-tilt
unit

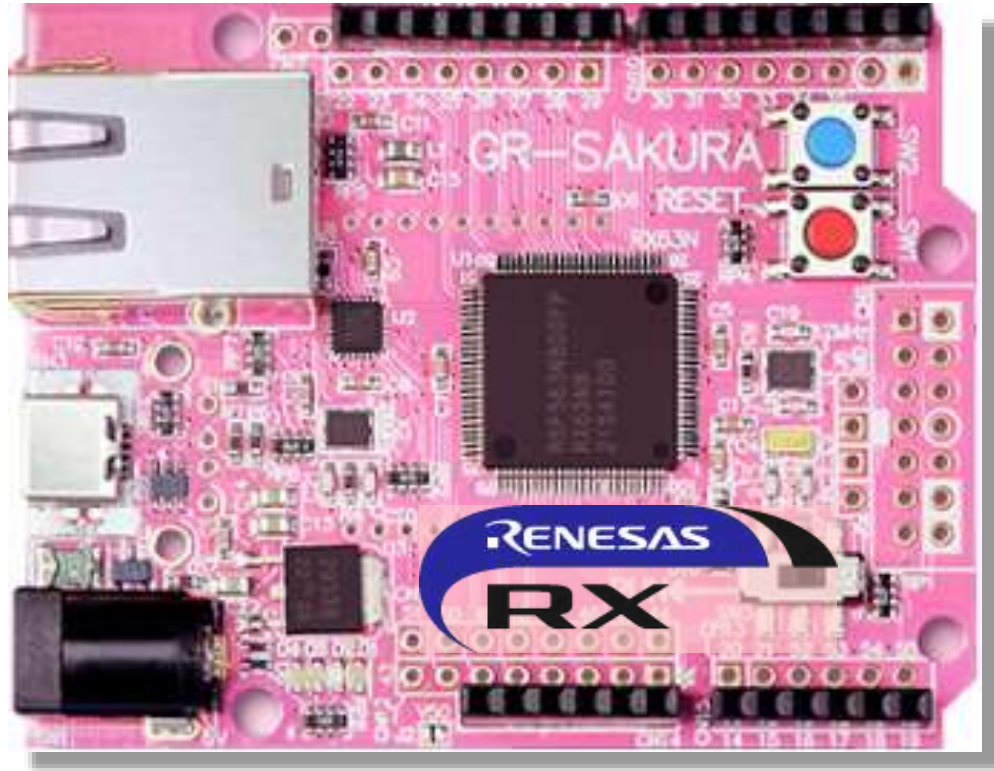


GR-SAKURA II

FreeRTOS



GR-SAKURA II board powered by RX MCU

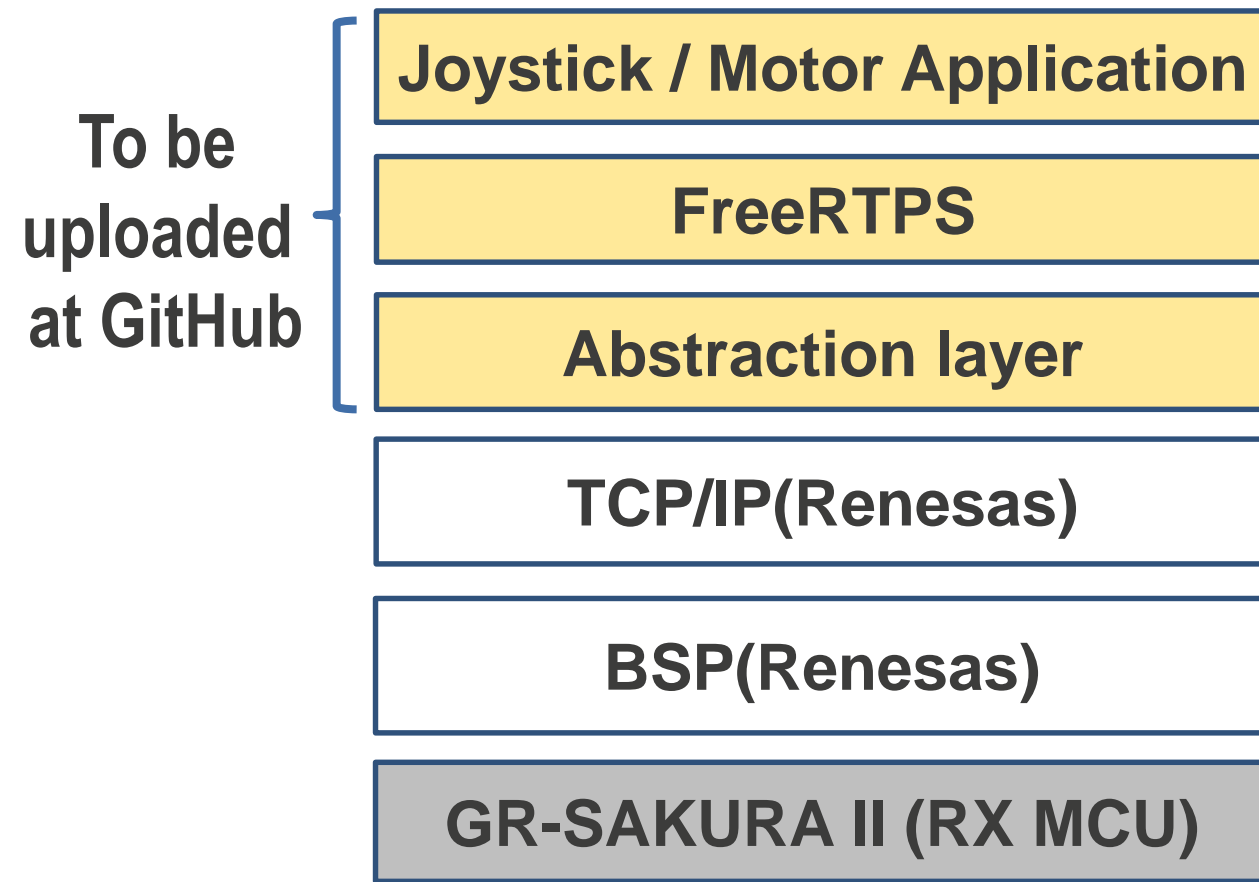


Microcontroller:	RX63N
Operating Voltage:	5V
Clock Speed:	96MHz
Digital I/O Pins:	55
Analog Input Pins:	16
Flash Memory:	1MB
RAM:	256KB
Peripherals:	Ethernet, USB, Micro SD I/F

<http://in.element14.com/renesas/gr-sakura-full/32-bit-mcu-dev-board/dp/2311256>

<http://int.rsdelivers.com/productlist/search?query=GR-SAKURA&tag=&family=9584>

Software Architectural Overview



Code Size and RAM Usage

Component	ROM(KB)	RAM(KB)
Joystick / Motor App	3.3	0.3
FreeRTOS	14.9	31.4
Abstraction layer	2.0	15.2
TCP/IP	31.9	3.5
BSP	17.1	1.5
Total	69.2KB	51.9KB

What's Next?

- Implement ROS2 under FreeRTOS using Iwip stack
- Expand ROS2 support to other Renesas MCU line-ups
- Code size optimization and improve execution time
- Improve features and interoperability of FreeRTOS
- Support rmw and rcl layer for user application

Contact: osamu.matsushima.wm@renesas.com