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Robo-OS™
Lightweight Web-Managed and CloudSmart™ Operating System for Next Generation RoboSwitch™ Product Line

BROADCOM®
Robo II
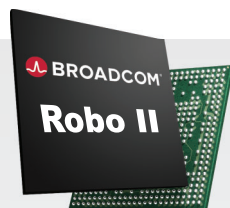
- Lightweight Operating System for L2 focused applications.
- Designed for next-generation RoboSwitch architecture – Robo II.
- Utilizing internal Robo II CPU (ARM M7) and RAM memory.
- Full software stack, from drivers to applications and web-pages for simple device management.
- Optimized for mobile devices including smartphones, tablets, and laptops.
- RESTful APIs for integration into cloud managed networks.
- Utilizing open-source software packages.
- Includes localization framework to enable simple adaptation to non-English languages.

Robo-OS	
✓	Full SW Stack
✓	Web GUI
✓	Restful API
✓	Localization Framework
✓	SMB Features (QoS Protection, Forwarding, and Management)
✓	RBOM Optimized

OVERVIEW

The Broadcom® Robo-OS™ is a lightweight operating system designed for L2 switching platforms that utilize next generation Robo-Switch™ architecture, also-known-as Robo II. It is a full software stack for system vendors, ODM, and OEM customers who are looking for a complete software solution for Web-managed SMB and industrial switches. Its supported features and design were carefully selected for these web-managed applications as well as the needed capabilities of the emerging cloud-managed switch market.

The Robo-OS lean structure and modest resource requirements, from compute and memory perspectives, enable it to run on-chip in its entirety, minimizing RBOM cost, and development effort for OEMs and ODMs.

The Robo-OS operating system building blocks (depicted in the block diagram below) utilize open-source-based software packages, such as OpenRTOS (based on the open-source FreeRTOS), LwIP (a lightweight open source TCP/IP stack) and other packages. By using open-source software packages, Robo-OS customers to benefit from a large community of developers and validation engineers delivering robust and up-to-date solutions to the broad industry. Moreover, this community constantly generates new features that can be easily integrated into the Robo-OS.

The Robo-OS is also designed to support cloud management solutions, where the network nodes are managed from a central location out-side the business premise. All of the Robo-OS web-based features can be activated through RESTful APIs and cloud agents. Through the integration of cloud management, end-users can deliver many of the features in managed switches using the same low-cost Robo Switch web-managed solution.
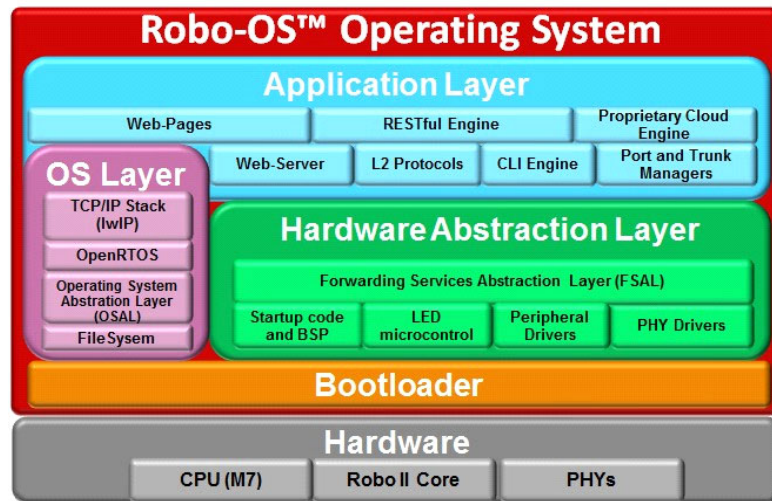
BENEFITS

- A lightweight L2 switching operating system designed for cost optimized Web-managed devices and utilizes internal CPU and internal RAM only.
- Delivered by Broadcom for Web-Managed ('W') Robo II SKUs.
- Feature-set optimized for SMB applications.
- Easy check-box-like configuration through a modern web GUI.
- Optimized for mobile devices (laptops, smartphones, tablets) via use of HTML5 technology.
- RESTful APIs for integration with cloud managed networks where devices' usage are not limited by the internal device compute and storage resources.
- Feature-rich with extensive support for QoS, protection, and management requirements of SMB applications.

FEATURES

- 25 WEB GUI screens for complete check-box-like feature activation.
- Port-level configuration: port speed and LAG construction.
- Rapid Spanning Tree for loop prevention and network failure restoration.
- Multicast support via static multicast group configuration and IGMP snooping.
- Ingress and egress mirroring for troubleshooting and traffic analysis purposes.
- Rich QoS support, including metering, shaping, scheduling (SP + WRR) and congestion avoidance (tail drop + WRED), 802.3x flow control.
- IEEE 1588v2 transparent clock support for end-to-end network time synchronization.
- Network node auto-discovery support via LLDP.
- CloudSmart management support via the RESTful APIs.
- Easy-to-use localization-engine for a simple adaptation of the Web-GUI to non-English languages used by the customer.

Robo-OS Block Diagram

ROBO-OS COMPONENTS

Layer	Components	Description	Code Source
Bootloader Layer	Bootloader	Broadcom bootloader with Dual Image support.	Broadcom
Hardware Abstraction Layer	Start-up code and BSP	Drivers for Avenger Peripherals (Flash, I^2C etc.). ARM CMSIS layer to setup internal ARM core.	Broadcom
Hardware Abstraction Layer	PHY Drivers	Support for external PHYs.	Broadcom
Hardware Abstraction Layer	LED microcode	LED customization.	Broadcom
Hardware Abstraction Layer	Switch Configuration FSAL API	APIs exposing Avenger hardware features.	Broadcom
OS Layer	OpenRTOS	Multi-threaded Operating System – commercial version of FreeRTOS (non GPL open source OS).	Open-Source/Commercial
OS Layer	TCP/IP Stack	Open Source lwIP (non-GPL). Supports IPv4/6, Autoconf, DHCP, ARP, ICMP, TCP/UDP, etc.	Open Source
OS Layer	OSAL	Operating System Abstraction Layer.	Broadcom
OS Layer	Persistent Configuration/ FileSystem	Save and retrieve switch configuration from flash in JSON format utilizing FAT filesystem.	Open-Source/Commercial
Application Layer	Web Engine	Cesanta Mongoose commercial web-server.	Open-Source/Commercial
Application Layer	Web Pages	Reference web pages to configure switch features.	Broadcom
Application Layer	CLI Engine	CLI engine to enable customers to add CLI commands.	Broadcom
Application Layer	L2 Protocols	IGMP Snooping, LLDP, and RSTP.	Broadcom / Open Source
Development Tools	Toolchain	Standard open source GCC ARM toolchain.	SDK

ORDERING INFORMATION

Robo-OS is provided with specific part-numbers in Broadcom's next generation RoboSwitch product line, also known as Robo II. Please refer to the Robo II devices (53112, 5315x, 5316x) Data Sheet and Product Brief ordering information to locate the web-managed part-numbers that are associated with the Robo-OS software.

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Broadcom (NASDAQ: AVGO) is a diversified global semiconductor leader built on 50 years of innovation, collaboration and engineering excellence. Broadcom's extensive product portfolio serves multiple applications within four primary end markets: wired infrastructure, wireless communications, enterprise storage and industrial & others. Broadcom is changing the world by Connecting everything®.