

Jabil Software Services (JSS)



Embedded
Systems

Web &
Mobile

IoT

Cloud

Wireless
Networking



Wireline
Networking

CASE STUDY

Jabil Diagnostics Operating System

JABIL

Customer Needs

Jabil's *Enterprise & Infrastructure* (E&I) sector serves customers requiring a broad range of communication, computing, cloud, and storage solutions. The E&I sector designs and manufactures server platforms, storage platforms, RF solutions, switches, routers, optical solutions, and photonics solutions.

The E&I sector required a reference Operating System which would be leveraged to facilitate the rapid development of multi-gigabit network switches for a wide range of customers. The Operating System would provide a range of foundational services to support each customers' network switch hardware and would be easily customizable to meet the specific needs of each customer – thus reducing time-to-market and time-to-revenue for customers leveraging Jabil's Diagnostics Operating System.

Scope

JSS developed all firmware and software components for the Jabil Diagnostics Operating System (JABOS), including the bootloader, Board Support Package (BSP), Network Operating System (NOS), HW drivers, abstraction layers (OS, HW, statistics), PHY drivers, integration with the Broadcom Strata XGS/DNX ASIC switch SDK, and a set of diagnostic utilities for testing switches during the manufacturing process.

JSS developed several abstraction layers and an open modular architecture to ensure that JABOS can be quickly ported to different customer hardware platforms and extended to meet specific customer needs.

The project was commenced in 2016 and enhancements continue to this day. JSS dedicated a team of 15 staff to developing the JABOS platform, including architects, embedded developers, and testers. JSS retains full end-to-end responsibility for the ongoing development and maintenance of JABOS, including configuring the platform to meet the needs of specific customers.

Deliverables

JSS provided a complete multi-layered solution to Jabil E&I which is actively used as the foundation for developing network switches for multiple customers. JSS also delivered several reusable utilities to test network switches during the manufacturing process. The diagnostic utilities leverage a range of diagnostic API's to abstract platform specifics, and include features for testing port loops, port traffic injection, I2C, LPC TPM/CPLD, mSATA SDD, Management ETH, PCIe, SPI BIOS, UART & system memory.

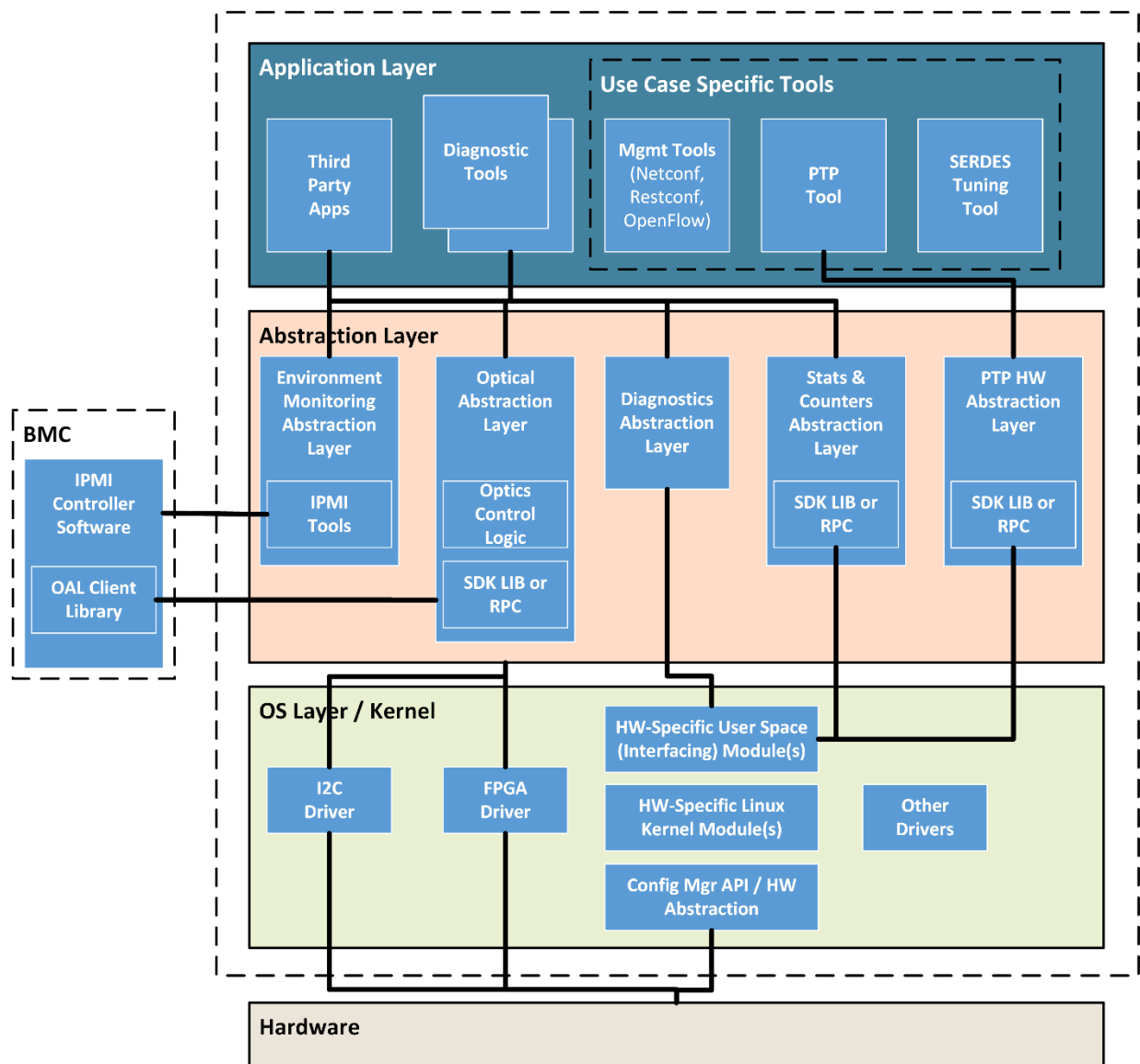
Deliverables also included an environmental abstraction layer to abstract platform specifics and permit the monitoring of fans, temperature, voltage, and other

characteristics, and an optical abstraction layer to abstract platform specific hardware details (such as CPLD vs. FPGA, Broadcom vs. Cavium, etc.) and to enable reading of optical information and propagation of optical events.

The project was delivered using a waterfall approach. A full set of deliverables were provided including source code, images, test reports, and user documentation. JSS and E&I clearly agreed scope and schedule expectations, and JSS leveraged a formal project management methodology to ensure efficient delivery.

JABOS has been actively leveraged by several Jabil customers to support a wide range of network switches and continues to be utilized and extended as a key foundational component of Jabil's customer offering.

A block diagram of the JABOS architecture is shown below:



Strategic Value

The Jabil Diagnostics Operating System permits the more efficient and more cost-effective development of networking solutions for Jabil's customers, leveraging Jabil's curated and extensible platform. JABOS can be rapidly adapted to each customer's hardware platform and specific needs. The integrated diagnostic utilities permit rapid online testing of network switches during the manufacturing process, ensuring the highest quality of all delivered products.

"The Jabil Diagnostics Operating System developed by JSS improves the value proposition of Jabil E&I to customers in the networking sector and has been leveraged several times with a range of customers to speed time-to-market and lower costs. JSS's contributions have allowed Jabil E&I to provide improved vertically-integrated customer solutions."

Ed Wong, Jabil VP Engineering

About Enterprise & Infrastructure (E&I)

Jabil's *Enterprise & Infrastructure* (E&I) sector serves customers requiring a broad range of communication, computing, cloud, and storage solutions. The E&I sector designs and manufactures server platforms, storage platforms, RF solutions, switches, routers, optical solutions, and photonics solutions. Jabil E&I is a well-established leader in the provision of such solutions to Tier 1 worldwide customers.

About Jabil Software Services (JSS)

Jabil Software Services (JSS) delivers a broad range of advanced software services across several industries, leveraging an experienced team of architects, software developers and quality assurance engineers. JSS specializes in the efficient development of embedded systems, web & mobile apps, IoT solutions, cloud solutions, and networking solutions (wireless/wireline).