HP Selects LynxOS for its LaserJet Operating System

Founded in 1939, Hewlett-Packard Company (HP)—a leading global provider of computing and imaging solutions and services—is focused on making technology and its benefits accessible to individuals and businesses through simple appliances, useful e-services and solutions.

In the late 1990s, HP turned the printing and imaging market upside down by reinventing the role of printers and printing. HP's strategy has been to lead in the development and invention of new printing services. The company now stands at the intersection of appliances, infrastructure and services, giving it an opportunity to foster and nurture an entirely new ecosystem of printing e-services.

HP's 4550 LaserJet series features LynuxWorks' LynxOS real-time operating system

Establishing the Common Firmware Initiative Unifying Operating Systems

Warren Johnson is a Project Manager in the Imaging and Printing Systems group, responsible for first-level management of low level firmware and operating systems for HP's LaserJet printers. The group provides the firmware—the operating instructions for LaserJet models produced by HP.

LaserJets have traditionally come in flavors: printers that operate in color and those that operate in monochrome. Historically each type had its own distinct code base.

By unifying these two code bases, HP hoped to reduce expenses and address time-to-market pressures. To address these issues, the company established the Common Firmware Initiative.

Johnson's charter was to focus his team on core development work and outsource other components. As a result,

he sought an off-the-shelf operating system.

HP wanted to focus on providing innovative solutions to their customers and turn the OS development over to an expert in its field.

The OS had to be able to support the current firmware. The monochrome code group used a homegrown OS and the color group used an outsourced OS. Johnson and his team drew up a set of requirements that were needed for the common code base. Their criteria included that:

1. the product be available and 'off-the-shelf,'
2. it would provide support for POSIX interfaces and thread priorities,
3. the new OS offer support for shared libraries and
4. it needed to run on HP's chosen hardware platforms.

Choosing the Laserjet Operating System

Johnson and his team looked at several alternatives, including embedded NT. After shortlisting two products and conducting extensive evaluations, HP selected LynxOS® real-time operating system (RTOS) from LynuxWorks™. "We knew what features we were going to need to support the architecture. Overall, LynxOS was technically superior," remarked Johnson.

LynxOS is unique in the real-time embedded software market. It is a true RTOS that combines deterministic performance, reliability, and scalability together with open standards-based interfaces to the operating system. LynxOS was also designed to be UNIX®-compatible and pass the stringent POSIX®-conformance test suites. With an open API, LynxOS embedded application developers can leverage open-source or commercially available software to achieve faster time to market.

Collaborating for Success

Johnson and his team identified the initial set of products to be based on this firmware and that drove the timing. The two companies worked closely together in the design phase—and LynuxWorks delivered an alpha version of the OS on schedule. "Our relationship with the LynuxWorks team was more one of synergy than a customer-supplier relationship," recalled Johnson.

Over the next 18 months, the two companies collaborated on a final version of the OS—in time for its release date. "The implementation was straightforward. We demonstrated that the architecture was mostly independent of the underlying OS. Our end goal was an off-the-shelf OS and that's pretty much what we received," Johnson remarked. LynuxWorks also provided training courses for HP users, as well as the opportunity for its engineers to work closely with the HP engineering staff.

Another outcome was that the Common Firmware Initiative resulted in a consolidated code base—one that is modular in design and provides stable interfaces. As such, it is better suited to the future direction for HP and will enable the company to continue to provide the innovative solutions for which it is known.

The HP-LynuxWorks relationship has been a winning one—and the companies anticipate working together on future projects. Johnson found that LynuxWorks demonstrated a real commitment to both HP and his group.

"LynuxWorks was committed to HP—they did whatever it took to make us successful," Johnson concluded.

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Warren Johnson
Project Manager
Hewlett-Packard

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