

# LynxOS and VeriFone: Managing the Business of Business



*VeriFone®*, Inc. is a leading global provider of secure electronic-payment solutions for a variety of business environments. The company's unique high-level systems deliver the speed, convenience, and security of e-payment to financial institutions, government agencies, telecommunications services, healthcare institutions, merchants in stores and those on-line.



*In the petroleum and transaction-automation industry, VeriFone's Ruby SuperSystem provides an integrated point-of-sale (POS) solution for petroleum/convenience store operators. Enriched by Sapphire, a powerful onsite controller and web server, Ruby represents a fundamental investment in the future for business operations that demand optimal power and flexibility.*

Managing and tracking commerce has become big business in itself. Profiting in today's dynamic economy requires a powerful technology infrastructure capable of accurately monitoring business activity, along with an equally fierce commitment to customer service. In the highly competitive petroleum/convenience-store market, quick customer turnaround, easy pump control, and accurate record keeping are at a premium.

Functioning like a supercharged cashier, VeriFone's Ruby SuperSystem expedites all business transactions, and then some. The Ruby expertly packs credit-card processing, fuel dispensing, dispenser card reader (DCR) control, and electronic cash register (ECR) functions into a compact unit that renders customer purchasing transactions faster and easier. Ruby's multitasking architecture lets it communicate effortlessly with a variety of peripherals, including several back-office software solutions that connect to remote hosts to quickly consolidate sales data into integrated management reports, facilitating comprehensive summaries of any given station's business activities.



Sapphire is a powerful on-site controller and web server that functions alongside existing Ruby systems.

## **A jewel of a system**

One of the newest members of VeriFone's Gemstone product family, Sapphire is a powerful onsite controller and web server



that functions alongside existing Ruby systems, adding peripheral management bandwidth and allowing for future configuration expandability. Created for the petroleum and retail industry, Sapphire provides open systems connectivity using standard components such as TCP/IP and XML data interchange.

In developing Sapphire, VeriFone mandated a real-time operating system (RTOS) capable of 1) leveraging the power and functionality of the Ruby SuperSystem; 2) supporting demanding performance and connectivity requirements; and 3) appropriately responding to both current and emerging needs of VeriFone customers by providing a migration path for future expansion.

"Because VeriFone was originally a part of Hewlett-Packard, we evaluated different RTOSes and discovered that some other HP divisions thought highly of LynxOS®," said Brad McGuinness, direc-

**"From both a business and technical standpoint, LynxOS made sense."**



**Brad McGuinness**  
Director of Engineering, Verifone, Inc.

tor of engineering at VeriFone. "Our key requirements included the ability to run common UNIX® applications and to provide support for task memory protection, both of which LynxOS fulfilled."

### Complete Linux-like capability

LynxWorks' LynxOS blends performance, reliability, and scalability with patented technology for real-time event handling. The application programming interfaces to the OS have been written to be compatible with Linux® and UNIX and are fully POSIX®.1, .1B and .1C conformant. LynxOS' unique blend of POSIX-style threads of execution within the kernel, coupled with priority tracking, provides developers greater control over process scheduling than in a traditional RTOS, such that processes can execute at their assigned priorities regardless of other activities in a given system. With a fully preemptable kernel featuring fast, deterministic context switching, combined with LynxWorks' dedicated support, LynxOS fit VeriFone's requirements.

"From both a business and technical standpoint, LynxOS made sense," said McGuinness. "Because LynxOS can prioritize deterministically, Sapphire is more resilient should it become flooded with messages. LynxOS also allows us to run web-server and mission-critical software, which would be more difficult to accomplish without a Linux-like system."

LynxWorks' comprehensive TCP/IP routing protocol and SNMP manage-



ment protocols accelerated development and quelled any connectivity issues VeriFone's engineers may have felt during preliminary production. "We proceeded with hardware development, produced a prototype, integrated LynxOS, and worked with LynxWorks' technical support every step of the way," said McGuinness.

### Good-business partnering

LynxWorks' professional technical experts helped ensure that VeriFone completed its project efficiently and systematically. Not only is the company pleased with its selection of LynxOS, but sees future opportunities to use BlueCat Linux, LynxWorks' open-source Linux distribution product, in a terminal-based device that will run embedded Linux. "Our experience with LynxOS and LynxWorks' engineers makes it the next logical step in what is fast becoming a rewarding partnership," said McGuinness.

In promoting Sapphire to potential clients, many of whom currently employ standard operating systems, LynxOS has been well received. "LynxOS' reputation as a strong UNIX-like RTOS has calmed any initial reservations. The performance level of LynxOS certainly met our expectations," said McGuinness.



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