Operating System Strategies:

Upgrade versus Migration

July 2007

Executive Summary

Technology continues to play an increasing role in achieving and maintaining the success of businesses of all sizes, across all industries. Early adoption of new tools and trends can often give an organization a competitive advantage that propels them significantly ahead of their competition. Information Technology and the CIO are no longer considered a cost of doing business; they are considered a strategic investment that supports revenue and company performance that differentiates them from the competition.

This white paper is for SCO OpenServer™ 5.0.x IT organizations that are evaluating the relative merits of upgrading to OpenServer 6 versus migrating to a Linux® operating environment. While this document doesn't provide specific details regarding how to upgrade to OpenServer 6, SCO offers several aids for such purpose, including webinars, online product documentation, a comprehensive porting and migration guide and e-mail interaction with SCO engineers for that purpose. Upgrade questions can be directed to SCO engineers by sending e-mail to osr5to6@sco.com

Who Should Read This Guide?

- Software vendors and IT solution providers running previous releases of SCO UNIX today and who are considering future operating system strategies.
- IT Managers who are planning software budgets for the next fiscal period.
- Administrators and System Engineers, who maintain SCO UNIX systems
- Linux enthusiasts who want to understand more about SCO UNIX

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The SCO Group, Inc. - Company Overview

The SCO Group (Nasdaq: SCOX) is a leading provider of UNIX software technology and mobile services. SCO offers UnixWare for enterprise applications, OpenServer for small to medium businesses, as well as large enterprises, SCO Mobile products to enhance the productivity of mobile workers, and Me Inc services, a growing suite of subscription-based mobility services which give businesses and "community leaders" new ways to communicate more effectively with entire groups of people at a time.

SCO's highly innovative and reliable solutions help millions of customers grow their businesses everyday, from SCO OpenServer on Main Street to UnixWare on Wall Street, and beyond.

SCO owns the core UnixWare operating system, with its roots in the UNIX originally developed by AT&T/Bell Labs and is the exclusive licensor to Unix-based system software providers. SCO also owns the OpenServer operating system.

With over twenty-five years of experience in the operating system industry, SCO products have developed a reputation for stability and reliability. SCO employs leading technology developers with many years of experience including numerous who have been involved in UNIX development since it originated from AT&T Bell Labs.
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Headquartered in Lindon, Utah, SCO has a worldwide network of thousands of resellers and developers. SCO Global Services provides reliable localized support and services to partners and customers. The SCO business in Central, Eastern and Northern Europe is handled out of the office in Germany. For more information on SCO products and services, visit http://www.sco.com.

Introduction

Ultimately, the decision to stay with a particular operating system or to migrate to a new platform must be driven by the goals and objectives of the business.

This guide examines key considerations to help IT managers make the right choice by presenting information about the capabilities of OpenServer 6 and Linux. Its purpose is to cut through the hype surrounding what might be considered operating system "wars" by providing the reader with clear distinctions, including the benefits and risks of upgrading from OpenServer 5 to OpenServer 6 versus migrating to a Linux platform.

Open, Standards-based Operating Systems

There has been so much hype about the advantage of Linux as an open source product that the value of being an “open” operating system has gotten lost. To be clear, Linux is an open source code product. That means that the source code is readily available for anyone to examine, thereby deducing how to write to other software products that integrate with Linux.

OpenServer, on the other hand is an open operating system, meaning that the interfaces and API set are published. Anyone who wants to write code to interface with OpenServer need only refer to published documents. All of SCO’s UNIX® products are today, as they have always been, open operating systems.

Among Linux enthusiasts, interfaces that have been adopted as standards and an open source product are often coupled as having some synergistic value relative to Linux. However, this is not the case. Standards conformance makes a product “open” (e.g., OpenServer) since compliance to a standard can only be achieved if the standards definition is readily ascertainable by the public. The reverse is not true. Software can be “open source” (e.g., Linux) which means that the source code is available in the public domain. But public domain source code can surely include a set of interfaces unique to that particular software component (i.e. non-standard). In the world of software, the value of standards is that two products that conform to the same standard are easier to integrate with each other.

OpenServer 6 is a System V Interface Definition (SVID) compliant UNIX system that has POSIX-compliant libraries and commands. Linux also includes POSIX-compliant services, and where no POSIX standards are defined, many Linux distributions offer SVR4 functionality. The point here is that Linux distributions have no advantage over OpenServer 6 in their ability to easily integrate into heterogeneous environments.

Most Linux distributions do adhere to some or all of the Linux Standards Base (LSB). Conformance, however, varies by distribution; so it’s best to check the conformance level of the particular distribution that you may be considering. The essential point to remember, however, is that being open source doesn’t guarantee anything about standards conformance.

Administration Costs of SCO OpenServer 6 vs Linux

OpenServer 6 has the familiar SCOadmin interface so there is no need to incur costs to retrain system administrators. The SCO admin interface can be used to easily manage remote and local systems using either a GUI or command line interface. In addition, OpenServer 6 supports loadable modules so that device drivers and modules can be dynamically loaded / unloaded as necessary. There are some cases where, in the course of proper administration of the operating system, the kernel (whether OpenServer or Linux) does need to be rebuilt. The process to rebuild the kernel under Linux is more complex and more costly than building the kernel under OpenServer.

Cost to Maintain SCO OpenServer vs Linux

According to a survey of companies using Linux in production environments[1], adopting code from an open community can become a support challenge. For example, if there is a code failure, finding a fix may require a great deal of searching for resources that can provide updates. Leveraging open source generally requires additional development and integration time on the part of the internal IT staff as compared to products like OpenServer, which has been developed and is supported by a single commercial vendor, offering to you the convenience of a single point of contact.

Along with the burden of maintaining the Linux operating system comes the advantage of being able to build a high degree of customization into your operating system platform. OpenServer 6 is a general purpose operating environment for performing traditional business transaction and business inquiry functions on commodity servers. Businesses that differentiate themselves by using highly customized operating system functions for special purpose platforms might consider migrating to Linux. System and kernel level engineers can tailor the Linux distribution to build customized appliances.

Businesses that need a general purpose platform, and prefer to invest staff resources in building innovation and differentiation into the business processes are advised to use operating system products that are developed and supported by a commercial vendor (i.e.., The SCO Group)

Cost to Upgrade vs the Cost to Migrate to Linux

Cost factors include:

- Out of pocket fees, including license fees, subscription services, and retraining costs.
- Time and resources to move applications from OpenServer 5 to the target platform.
- Resources and time necessary to move data, users and business operations from one environment to another.

[1] Survey conducted by Crestline Partners in 2006 among small to medium sized businesses, running 50 to 250 PCs

Out-of-pocket Fees

It is a widely accepted fact that the retraining costs associated with migration will far exceed the out-of-pocket license or subscription fee. Furthermore, while Linux is sometimes referred to as a "free" operating system, the volatile nature of the code base causes most commercial Linux operations to buy subscription services, which quickly drive up the out-of-pocket costs for Linux. This is how traditional Linux vendors such as Red Hat and Novell make their money on Linux. In some cases, Linux cannot be obtained from a Linux vendor without a subscription or services component, which drives up the price Depending on the Linux product under consideration, the OpenServer perpetual right to use license fee is approximately 24 to 36 months of Linux annual subscription fees. SCO also does not require a subscription or services agreement.

Costs to Move Applications

This is likely the biggest challenge if the option to migrate to Linux is chosen. In previous releases of the Linux kernel (version 2.4) SCO binaries were sometimes run using Linux ABI[2]. However, this option is not available on current Linux releases with 2.6.x kernel; and migrating the applications requires a careful review of all aspects of the application, including design choices, porting application code from OpenServer 5 to Linux, as well as getting the OSR5-specific code to run under Linux.

By contrast, most OpenServer 5 applications will just run on OpenServer 6. There is generally no need to change or recompile an OpenServer 5 application for OpenServer 6. In the unlikely case that application changes or a recompile were necessary, the e-mail alias osr5to6@sco.com is available to assist you with any questions or problems you may encounter.

Moving data and users to the target environment

Migrating data from OpenSever 5 to OpenServer 6 is a fairly trivial task. The new default filesystem type on OpenServer 6 is the Veritas Filesystem, as it is on SCO UnixWare. It is faster and even more reliable than the OpenServer 5 HTFS filesystem. OpenServer 6 supports reading from a HTFS Filesystem. After OpenServer 6 is installed, connect your old disk to the OpenServer 6 system, mount the HTFS filesystem, and copy the files over to your new disk. An alternative would be to use backup software that creates a full disaster backup of OpenServer 5 and keep that backup in a safe place. Then also recreate a backup of your data, install it OpenServer 6, install the same backup software and restore your data. (Click here to read more: http://sco.com/support/docs/openserver/600/upgrade/)

While there are substantial structural and other similarities between UNIX file systems and certain file systems supported by Linux, migrating data from OpenServer 5 to Linux is both more complicated and time consuming because there are certain differences between SCO UNIX and Linux filesystems. Linux builds the file system directly on the

[2] Please refer to the SCO End user license agreement before copying or using any of the SCO shared libraries. SCO has not authorized the use of its intellectual property outside of the terms of authorized SCO license agreements.

partitions, whereas SCO UNIX' “divwy” is used to create divisions. Each division can contain up to 7 file systems. The file systems available in SCO Open Server 5 are:

- HTFS High Throughput file system (2GB File size, 1 TB file system size)
- DTFS Desktop file system (2GB File size, 1 TB file system size)
- EAFS Extended Acer file system (2GB File size, 2GB file system size)
- AFS, S51K or XENIX

Popular Linux distributions provide file system support for:

- JFS
- ReiserFS v3, ext3
- XFS
- OCFS2

There is no simple way to just mount an existing file system of SCO Open Server R5 under Linux; and typically the best way to import data is to use a tape or the network (via NFS)”.

As mentioned earlier, the migration from an OpenServer 5 filesystem to Linux is both complex and time consuming.

The task of migrating users and groups from OpenServer 5 to OpenServer 6 is trivial. Simply use the Account profile Command (the ap command) on both platforms. The user data is collected with ap on OpenServer 5, and the file can be saved and subsequently restored with ap on OpenServer 6. (Click here to read more: http://sco.com/support/docs/openserver/600/upgrade/)

Migrating users and groups to Linux will typically involve writing a script where the users and passwords are read from one system and added with useradd on the other. This could be a fairly simple process unless passwords are encrypted.

Update Critical Applications with a New Look and Feel

SCO understands that applications don’t outlive their usefulness just because the user interface seems dated. So SCO and April System Design and Alpha Micro are working together to help customers upgrade the look and feel of the applications interface while preserving the investment in those critical applications. Using terminal emulation or graphical screen design tools, customers can convert many of their UNIX green screen applications to a graphical user interface without the need to rewrite applications.

April System Design’s AniTa Telnet Terminal Emulator makes a UNIX text-based application look like a Windows application. It creates 3-D box attributes as well as color and multimedia support for UNIX applications. The terminal emulator also allows UNIX applications to interface with existing Windows applications.

Alpha Micro’s TruGUIT provides a way for green screen applications to be converted to graphical applications by using a forms editor, an easy-to-learn WYSIWYG screen design tool. The forms editor uses text commands and requires no previous experience using C# or Visual Studio.

Either of these solutions provide developers and customers with a very easy, inexpensive and effective way to give applications a modern look and feel.

And More is On the Way!

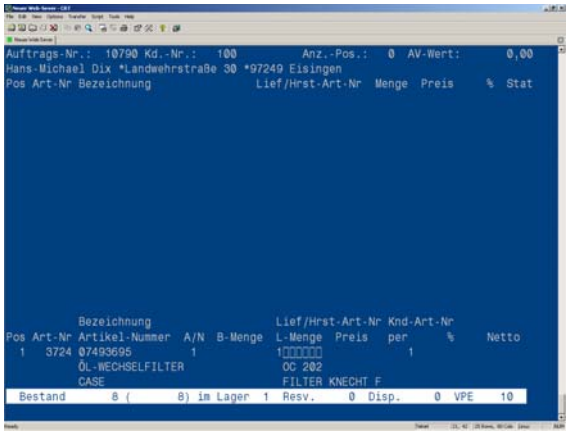
Over the last 25 years, SCO has built a world-class business with a single objective in mind: to deliver high performance, reliable, and scalable solutions at an affordable price point to businesses of all sizes.

SCO's expertise in building platforms for deploying high volume, line of business transactions is being harnessed to build mobile-enabling technology into the operating system. Mobile applications in the entertainment, gaming and personal organization industries are becoming ubiquitous, but enterprises have not provided mobile workers with widespread access to back end corporate systems. The primary reason is that mobile applications require more data security and user authentication and other system level functions that are not yet available in most operating systems. SCO will make the SCO Mobile Server Technology available in conjunction with OpenServer and UnixWare in the near future.

By incorporating mobile functionality with the operating system, SCO will help simplify the task of delivering productivity enhancing solutions for mobile workers to conduct and close business anywhere, anytime even when a network connection is unreliable.

SCO Mobile Server Technology

SCO is currently working with a number of customers to mobilize existing applications in a short amount of time. Using SCO's newest product, SCO Mobile Server, a customer specializing in auto parts on OpenServer 6 quickly and easily developed a mobile client in order to connect online to his existing Order Entry system. This was a character-based application. Nothing was changed on the existing backend application; but by using the SCO Mobile Server, the customer has developed a mobile client for Windows® Mobile smart phones in order to provide a whole new mobile access to his customers. This customers business is now faster, more effective and completely mobile.



The above screen shot shows the existing server-based application. Now, there is a mobile client available for this application.

Need Assistance to Upgrade?

SCO provides resources to assist in upgrading from OpenServer 5 to OpenServer 6. The upgrade guide is available at:

http://sco.com/support/docs/openserver/600/upgrade/

In addition, SCO engineers are available to answer specific upgrade questions by sending e-mail to osr5to@sco.com. The engineers that monitor this e-mail alias are strategically located throughout the world to ensure prompt response to all questions

Additional Technical Resources

SCO OpenServer 6 Product Homepage at http://www.sco.com/products/openserver6/ This Page is the starting point for you if you are looking for information about the current OpenServer Product. It features QuickFacts, Datasheet, FAQs an many other useful information.

The **SCO UNIX Upgrade Map** outlines the recent updates for all of SCOs UNIX products at http://www.sco.com/power/

A technical Whitepaper is available at http://sco.com/products/openserver6/technical_whitepaper.html

A porting Guide is available at:

http://sco.com/support/docs/openserver/600/migration/index.html

A **comprehensive Sales Guide for OpenServer 6** is available at:
http://sco.com/products/openserver6/sales_guide.html

An archive of technical Newsletters is available at:
http://sco.com/partners/news/

Testing OpenServer 6
The easiest way to test OpenServer 6 is to download the installation CD image (CD1) from the Support Download area at the SCO Website.
You can press the ***F8*** key during installation to enable a 60 day EVAL license. (Enterprise License, 10 users, 4CPUs)

Access our Support Database (SCO Website /ta)
SCO Support Engineers actively maintain this great source of information. Whether it is new Supplements that we describe or Step by Step Documentation about how to achieve a certain goal on SCO UNIX or whether it's reported issues and identified solutions for these issues – this is a very good starting place for you in case you need Free of Charge Support Services.

Obviously our Support Engineer will be able to help you directly if you have signed up for Support. But don't get confused here. We are talking about Support from SCO directly with all the nice Support features like guaranteed response time and such. You do not need to sign up for this, if you just want to download released supplements or new feature packs.
For an official SCO Support offer please get in touch with your SCO representative.

Check out the List of tested and certified or compatible Hardware Solutions at the SCO Website (/chwp)
Together with many Hardware vendors in the worlds we actively maintain a database of certified hardware. Hardware listed here as Certified has been tested from SCO and/or the vendor and is fully supported for supported customers. Other hardware might work of course as well; we just cannot guarantee Support for it.

Summary

Upgrading to OpenServer 6 is the better choice if the business needs:

- A reliable and stable platform because downtime is very costly and disruptive to the business operations.
- A single source vendor, to provide scheduled and timely updates and maintenance
- Vendor commitment to preserve investment in existing application by making new releases forward compatible.
- A powerful and easy to use interface for system administration

Your existing business applications represent a large investment, and therein lies the greatest risk associated with any change in platform. Upgrading to OpenServer 6 is the least –risk path to moving to a modern platform with updated software, including Samba, KDE3, postgreSQL, OpenOffice, and retaining your investment in your applications in the process. In addition, SCO continues to innovate by offering mobile middleware ("SCO Mobile Server") and through strategic alliances (April System Design and Alpha Micro)

Appendix

SCO OpenServer 6 At A Glance

OpenServer is a mature, reliable, scalable high performance platform for running business critical applications. SCO has enhanced OpenServer Release 5 by incorporating the UnixWare 7 kernel. The rock solid reliability of OpenServer has been combined with the high availability, scalability, and performance of UnixWare to create a single platform that leverages the performance and cost-effectiveness of Intel industry standard hardware.

In addition, SCO's longstanding commitment to backward compatibility means that legacy binaries from XENIX 386, SCO OpenServer 5 (and SCO UNIX and Open Desktop), and UnixWare will run without modification on SCO OpenServer Release 6.

OpenServer 6 – Quick Reference to Features

Feature	Description
Large scale memory	Support for up to 16GB of general purpose memory and 64GB of special-purpose (dedicated) memory.
Kernel-level threads	Unlike user-level threads, kernel-level threads can make use of multiple processors.
Improved Boot	Updated network boot and network install, utilizing PXE technology for media-less installs (available post FCS) Install/boot above the 1024 cylinder/8GB boundary Bootable CD-ROM support changed from floppy-emulation to non-emulation mode
Network Storage Device support	Fibre Channel, SAN, and NAS. HP StorageWorks Modular Smart Array (MSA) provides direct attach, small clusters, as well as entry-level and mid-range SAN environments.
Improved internal storage support	Including AHCI Serial ATA (SATA) and support for more than two Parallel ATA (PATA) controllers in a system. Serial Attached SCSI (SAS) is supported on HP Proliant and other popular OEM systems.
Network Card support	New Gigabit support, better throughput with new stack, support for wireless
Optical media writing support	Full support for writing data CDs and DVDs, including internal and external drives (based on Cdrtools-ProDVD 2.01.01)
Expanded USB device support	USB 2.0 support for EHCI Host Controllers USB 1.1 support for OHCI and UHCI Host Controllers Bootable USB CD-ROM support USB printer support

	Class Drivers, including Keyboards, Pointing Devices, CD-ROMs, Floppy, and Mass Storage Devices
ACPI support	Includes detection of hyper-threaded and dual core CPUs
New Intel and AMD Processor support	Intel Pentium® 4, AMD® Athlon, Athlon XP, Duron, Athlon 64, and Opteron®
Integrated encryption	The base 56-bit encryption utilities previously available as an add-on package have been integrated into SCO OpenServer Release 6. Support for filesystem encryption has also been added.
FAT32 and VFAT	Support for FAT32 and VFAT filesystem types has been added to allow mounting, reading and writing of these DOS filesystems.
Updated network protocols and services	New versions of the Apache web server, the Squid proxy server, TCP/IP performance improvements, and the Mozilla browser.
Java	Support for Java 2 and Java 5
Database support	PostgreSQL and MySQL open source databases are included.
Windows application support	Windows XP and Windows 2000 applications can be run on SCO OpenServer Release 6 with MergePro.

OpenServer 6 – Quick Reference to Licenses and model numbers

SCO OpenServer 6 Editions

Starter Edition	Enterprise Edition
2 User 1 CPU 1 GB Memory LA250-UX00-6.0	10 User 4 CPU‘s 4 GB Memory LA260-UX00-6.0

Additional GB Memory

Starter Edition	Enterprise Edition
Up to 4 GB Starter Edition: LA 214-UX0004W-6.0	Up to(8/16/32/64) GB Enterprise Edition LA 214-UX000(8)W-6.0

Additional User Licence Packs

Starter Edition	Enterprise Edition
5 User - LA213-ST05W-6.0	10 additional User - LA213-0010W-6.0 25 additional User - LA213-0025W-6.0 100 additional User - LA213-0100W.6.0 500 additional User - LA213-0500W.6.0

Additional Processor Licence

All Editions
Additional Processor - LA 213-UX00-6.0

Upgrades to OpenServer 6 from OpenServer 5.0.7 and OpenServer 5.0.6

From 5.0.7 to OpenServer 6	From 5.0.6 to OpenServer 6
To: OpenServer 6 Enterprise From: OpenServer 5.0.7 Enterprise LX260-2600W-6.0	To: OpenServer 6 Enterprise From: OpenServer 5.0.6 Enterprise LX260-2601W-6.0
To OpenServer 6 Starter from OpenServer 5.0.7 Host LX250-2400W-6.0	To OpenServer 6 Starter from OpenServer 5.0.6 Host LX250-2401W-6.0
To OpenServer 6 Starter from OpenServer 5.0.7 Desktop LX250-2200W-6.0	To OpenServer 6 Starter from OpenServer 5.0.6 Desktop LX250-2201W-6.0
To OpenServer 6 Enterprise from OpenServer 5.0.7 Host LX260-2400W-6.0	To OpenServer 6 Enterprise from OpenServer 5.0.6 Host LX260-2401W-6.0

TradeIn to OpenServer 6 from OpenServer 5.0.5 … 5.0.x

Operating System License TradeIn	User License TradeIn
To: OpenServer 6 Enterprise From: OpenServer 5.0.0 - 5.0.5 Enterprise LX260-UX00W-6.0	10 Users from 10 or more User LX213-0010W-6.0
To OpenServer 6 Starter From OpenServer 5.0.0 - 5.0.5 Host LX250-UX00W-6.0	25 Users from 25 or more User LX213-0025W-6.0
To OpenServer 6 Starter From OpenServer 5.0.0 - 5.05 Desktop LX250-UX00W-6.0	100 Users from 100 or more User LX213-0100W-6.0
To OpenServer 6 Enterprise From OpenServer 5.0.0 - 5.05 Host LX260-UX00W-6.0	500 Users from 100 or more User LX213-0500W-6.0