

A TECHNICAL GUIDE TO GETTING STARTED with

Red Hat® Linux ENTERPRISE EDITION optimised for Oracle8i™

By **Andrew Anderson** | **MIS Manager**

www.europe.redhat.com

What is Linux?

Linux is a POSIX-compliant UNIX clone written from the ground up by Linus Torvalds with assistance from a loosely-knit team of developers linked via the Internet around the world. Linux is licensed under the GPL (General Public License), which ensures that the source code is freely available to anyone.

The availability of the source code has allowed for the remarkable development model that has evolved. Programmers of all types, from university and graduate students to professional programmers at government agencies and Fortune 500 corporations have contributed to Linux. The strong commitment to peer review has resulted in a very stable and well maintained code base. This development model continues to challenge the world's largest operating system vendors to keep pace with the tens of thousands of programmers contributing to Linux.

Linux has all the features you would expect in a modern UNIX OS, including true multitasking, virtual memory, shared libraries, demand loading, shared copy-on-write executables, proper memory management and TCP/IP networking.

Prototypes Pilot and Development Projects

Red Hat Linux supports a broad range of computer hardware, and for a pilot project almost any available system could be used. Red Hat Linux ships with one of the most extensive driver libraries in the market, and continues to work with hardware vendors, including Compaq, Dell, HP and IBM, to certify new hardware as it becomes available (http://bugzilla.redhat.com/certification/).

You won't need to worry about searching for drivers to add to your server after the base install. Linux supports (E) IDE, SCSI and Fibre Channel storage systems; Ethernet, Fast Ethernet, FDDI and Token Ring networking; industry standard memory; and video cards from all major manufacturers.

Production Deployment Considerations

When you're ready to select server equipment for a production deployment of Red Hat Linux Enterprise Edition Optimised for Oracle8i™ in your business, look for server-grade equipment on which to run your applications.

Enterprise Server Features

Red Hat Linux supports all of the features you would expect to find on a mid-range server.

Symmetric Multi-Processing (SMP)

By making use of more than one processor per server, this allows you to scale your applications to a greater extent than is possible on a single processor machine.

For compute-intensive tasks, Linux has been shown to scale very well on SMP hardware. On other operating systems, if you add an additional processor, you will only see a 40% increase in server capacity. Under Red Hat Linux, this increase can be as high as 70%, allowing you to deploy dual-processor systems that may approach the performance of a quad-processor machine running another non-Linux OS.

ECC memory

ECC memory allows a machine to automatically detect and correct many memory errors without affecting the integrity of the data in memory.

SCSI

Traditional UNIX hardware vendors such as SUN and HP are still using 40M SCSI in their server equipment. Red Hat Linux supports the new 160M SCSI standard, allowing you to build servers capable of sustaining tremendous I/O loads. This translates into faster application responsiveness, faster data loads and exports, faster backups, and overall better system responsiveness under Red Hat Linux.

Red Hat Europe **For more details, call +44** (0)1483 300169

redhat®

Copyright© 2000 Red Hat, Inc. All rights reserved. "Red Hat", the "Shadow Man" logo, are trademarks or registered trademarks of Red Hat, Inc. In the U.S. and other countries. Red Hat Linux Enterprise Edition optimized for Oracle8*i* is a registered trademark of Red Hat, Inc. Oracle8*i* is a trademark and Oracle is a registered trademark of Oracle Corporation. Linux is a trademark of Linus Torvalds. All other trademarks are the property of their respective owners.



RAID

Red Hat Linux supports both hardware and software RAID. You can use RAID controllers from leading vendors such as AMI and DPT, or you can take advantage of the built-in software-based RAID, and use the existing storage technologies already in your environment today.

This allows for a great range of flexibility in the design of your enterprise storage solution, and does so without requiring additional software investment/costs.

Considerations for migration from other commercial UNIX platforms

Existing shell scripts

Database administrators have a collection of shell scripts that they use to monitor, tune, and maintain Oracle databases. Likewise your system administration staff also has a similar set of scripts for user maintenance, system monitoring, and other automation tasks.

These scripts can represent a significant investment of time over several years, and can be highly integrated into your existing production environment. Red Hat Linux provides a wide selection of available scripting environments so that your investment can be preserved in the new production environment with few, if any, modifications.

Red Hat Linux ships with the 'bash' shell, which is a Bourne (sh) compatible shell; a Korn shell, pdksh, which is a clone of the commercial ksh shell found on Solaris, HP/UX, AIX, and other commercial UNIX versions; and 'tcsh', an enhanced version of the 'csh' shell.

The vast majority of your existing scripts will work largely unmodified, and will not need an extensive rewrite that, for example, a move to a Windows NT environment would require.

Development Environment

Most organizations have developed in-house software to solve specific business problems. Red Hat recognises the significant investment in resources that this software represents, and has included a full development suite with Red Hat Linux to help you bring these applications to the Linux environment.

Red Hat Linux Enterprise Edition ships with a rich set of development tools. This includes the Motif development and run-time environments, which allow you to redeploy your existing Oracle Forms based applications on the Linux environment with as little as a simple recompile, with the included C/C++ compilers.

Also included in the Red Hat Linux Enterprise Edition Optimised for Oracle8i is Version 1.1.8 of IBM's Java runtime and development environment. This will allow you to deploy your Java applications under Linux with/on a world-class JRE/JDK.

Performance Monitoring Tools

When time comes to integrate a Red Hat Linux server into your existing production environment, your operational staff will need to leverage your existing monitoring infrastructure to guarantee the level of service that your business requires.

Red Hat Linux comes with several utilities that can be used both interactively and in a scripted environment to monitor the health and performance of the system. These utilities include top, vmstat, netstat, and a Linux specific utility called 'procinfo'. Red Hat Linux also ships with SNMP support, which allows integration with network based monitoring programs, such as HP Openview, SUN NetManager, or IBM Nways Manager.

System Automation Scheduling

System automation is a valuable tool that is widely used to decrease the amount of administration time for both operating system and database functions. Many organizations have a set of automated jobs that perform system backups, database monitoring, system health reporting, end user report generation, among other routine tasks.

Red Hat Linux ships with the same standard scheduling tools that your staff is already accustomed to using with commercial UNIX systems: 'cron' and 'at'. These tools can be used to schedule automation tasks on a one-off or routine basis.



End User Environments

The end user environment under Linux will be familiar to users of any existing UNIX system. Red Hat Linux ships with the standard set of command line tools, and includes X Windows for GUI tools. This allows you to bring a Linux server into your environment with little or no end user retraining needs. Most users won't even notice that they are connecting to a different back-end server.

System administrators will appreciate the ease with which they can add the Oracle environment to all users on a Linux server. By simply creating Bourne and C shell scripts to set the required Oracle settings and placing the scripts into /etc/profile.d, they can make system distributing updates to all users' startup files. This mechanism allows custom changes to your system environment that is maintained across operating system upgrades, reducing the long-term maintenance overhead of a Linux server.

System Run-time Environments

The Linux kernel is both highly tunable and highly flexible. This is accomplished through the use of the /proc virtual file system, and a modular approach to kernel programming.

By making use of the /proc filesystem, kernel variables—such as SHMMAX, which is commonly tuned for Oracle database servers—can be tuned at run time, rather than compile time. Simply echo the new value of SHMMAX into /proc/sys/kernel/shmmax, and your changes will be incorporated immediately. Limits for the number of files, inodes, and mounted filesystems that the system will support can be changed in a similar manner.

Also, because the Linux kernel makes extensive use of modules for device drivers, many hardware settings can be set at run time as well. As a driver is loaded, a global configuration file is checked for load options. This would allow, for example, a system administrator to increase the number of buffers reserved for a tape drive and speed up system backups. Again, that type of change could be incorporated without a system reboot, thus maximising server availability.

With other operating systems, charging the system run-time environment can be a very time consuming process. Under Solaris, for example, to put system-level changes into place, you must reboot the server and test your new changes. If they are not sufficient, then you must make another set of new changes, reboot, and test again.

The process for HP/UX not only includes rebooting the system, but it also includes linking and installing a new kernel for the system.

Again, the process of re-linking the kernel, installing the new kernel, rebooting the machine, and testing the new settings can be a long process that keeps both your system and database administrators occupied.

Backups

Backups are a critical part of any system. Red Hat Linux can integrate easily into nearly any existing backup architecture. Whether you use a commercial backup package, such as Knox Arkeia, Computer Associates ARCserveIT, Veritas NetBackup or Legato NetWorker, or you use standard UNIX utilities, such as tar, cpio, or dump, you will be able to painlessly plug a Linux server into your existing environment. Oracle recovery running on Red Hat Linux enables automated backup and recovery directly through integration with products such as Knox Arkeia.

Operating System Scalability

Red Hat Linux Enterprise Edition Optimised for Oracle8i introduces several features that address the special needs of production database installations:

Support for Large Databases

Red Hat Linux for Oracle 8i delivers the power to run large-scale Oracle database installations. Red Hat's 64-bit file I/O allows access to files greater than 2GB is size, and is robust enough to handle the terabytes of data common with today's enterprise applications. By maintaining a single database instance, system administration and maintenance requirements are also reduced.



Scalability

Linux has inherent scalability that outperforms most other popular operating systems. Red Hat has tuned its Enterprise Linux kernel to optimise scalability for CPU-intensive applications typically found on the Oracle platform. The result is efficiency gains of up to 90% in the maximum Intel configuration. You experience greatly improved database response while leveraging a cost-effective hardware platform. This capability is particularly attractive for clustered Web and e-business environments.

Certified Java Support

Red Hat Linux for Oracle 8i is the first Java client-side implementation to be certified on the Oracle/Linux platform. This creates a major opportunity for those looking to deploy Oracle on Java-compatible systems other than Windows. Oracle certification ensures Red Hat users get a stable, reliable Java environment and an open, economical alternative.

Maximised Oracle Database Server Performance

Red Hat Linux for Oracle 8i is optimised to allow physical access to four full gigabytes of RAM, the maximum supported in the Intel environment. While traditional Linux configurations have utilised only one gigabyte of RAM, Red Linux Enterprise Edition for Oracle8i now quadruples the productivity of your CPU regarding Oracle's ability to handle requests. This is especially important for Oracle databases, which can frequently be RAM- and disk-intensive because of their typical industrial strength deployments.

Raw I/O Enables Oracle Parallel Server

Red Hat Linux for Oracle 8i includes Raw I/O as an enabling technology to the Oracle Parallel Server (OPS). This feature circumvents operating system intervention in data-centric processes, allowing Oracle direct control over its database without interference form the system kernel. Working at the machine rather than the CPU level reduces CPU overhead, and enables faster data access and a more efficient use of memory. Upcoming versions of Red Hat Linux Enterprise Edition will provide full support for Oracle Parallel Server and its fail-over protection.

Remote Management

System administrators can efficiently administer multiple machines from remote locations. With the increased popularity of system co-location, this allows corporate systems administrators to effectively run and manage their systems without having to be on-site.

Conclusions

Server hardware investments for a Linux solution will be minimal compared to the hardware required in proprietary commercial UNIX implementations, and can leverage the commoditized PC hardware market to your advantage.

Red Hat Linux provides a rich development and end user environment that gracefully compliments the strengths of an Oracle database and its tools.

A Red Hat Linux server can be integrated easily into an existing UNIX-based environment with a minimal need for retraining any of your staff, whether they be end users, operational staff, or system and database administrators.