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## **Oracle Unbreakable Linux: True Enterprise-Quality Linux Support**

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## Introduction

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Since 2003, when industry analysts were reporting revenue increases of more than 50 percent for Linux-based server hardware, the once upstart operating system has continued to steadily gain acceptance and respect in enterprise data centers. As of 2004 an estimated 75 percent of Fortune 500 companies had deployed Linux or were planning to do so in the near future. At the New York Linuxworld Open Solutions Summit early in 2007, the IT research firm IDC put the market value for Linux at \$18 billion and projected that it will be worth \$40 billion by 2010. The operating system's low cost and reputation for stability contribute to a current server market growth, according to IDC, of nearly 30 percent per year.

While Linux has certainly come of age and proven itself a full-featured and dependable operating system, a number of factors have kept many enterprises from fully standardizing on the platform — particularly when it comes to mission-critical systems supporting core business activities. Support has traditionally been a sticking point for enterprises considering open source software, and the factors limiting the potential adoption of Linux in the enterprise largely fall under the umbrella of questions about support. Linux vendors as well as businesses dedicated to providing Linux support have addressed some of these factors to one degree or another; however, what has been lacking is enterprise-quality support of the caliber that major commercial software vendors extend to their applications.

This report was developed to assist enterprise customers in making the best possible choice for their Linux support. The report draws a close comparison between Red Hat Linux support versus the Oracle Unbreakable Linux support program, through which Oracle is offering the same enterprise-class support for Linux as it provides for its database, middleware, and applications. Oracle has also made available Oracle Enterprise Linux, an installable binary Linux download distribution that Oracle claims to be fully compatible with Red Hat Enterprise Linux. Oracle Enterprise Linux is free to download and re-distribute. Edison's labs ran a comparison of the code to verify this claim, with the results included in this report.

## Enterprise-Quality Support for Linux: What it is, What it Means to Your Enterprise

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Lack of true enterprise-class, quality support for Linux has been the primary factor behind reluctance in the enterprise toward adopting the Linux platform. A few of the many hallmarks of true enterprise-class support include:

- **Backports** — Customers do not want to be forced to upgrade to an entire update release, consisting of multiple patches, to get just the one bug fix they need.
- **Real-World Testing** — Testing should include real-world regression and stress testing that is customer-centric; the more extensive the testing, the better.
- **Lifetime Support** — Customers should have the option of remaining on a stable platform for as long as they wish, without forced migrations/upgrades.

Edison has determined that the Unbreakable Linux support program offered by Oracle cannot be ignored by any enterprise running or planning to run mission-critical operations on Linux. Oracle has dedicated the full weight of its massive Linux development, testing, and support organizations to businesses running Linux. With Unbreakable Linux support, Oracle fully addresses the concerns of businesses regarding Linux and — along with making continued contributions to the Linux community — encourages the further growth of the enterprise Linux market.

## What is Oracle Unbreakable Linux Support?

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It is clear that the decision to venture into the Linux support services business is a natural outgrowth of Oracle's long-term commitment to and involvement with Linux, and years of groundwork have gone into its preparation. The Oracle Unbreakable Linux support program that Oracle offers today delivers enterprise-class support for Linux with premier backports, lifetime support, comprehensive Linux server lifecycle management, cluster software, full indemnification, extensive testing, and more. At the same time, it significantly lowers the cost of support for users. Available to anyone running Linux whether or not they are currently running any Oracle database, middleware, or business applications, this support comes in a tiered offering suitable for different levels of support requirements, as follows:

- **Network Support** — Access to patches and updates via Oracle Unbreakable Linux Network (ULN). This is equivalent to Red Hat’s Basic support, for less than a third of Red Hat’s price.
- **Basic Support** — Access to patches and updates via ULN, plus 24x7 support and complete Linux server lifecycle management with Oracle’s Management Pack for Linux, and Oracle Clusterware. This support is equivalent to the very best support offered by Red Hat, for far less than what Red Hat charges. The Management Pack not only delivers functionality unavailable from Red Hat but is also free as opposed to Red Hat’s RHN modules and satellite server products that are available for a fee.
- **Premier Support** — Access to patches and updates via ULN, 24x7 support, complete Linux server lifecycle management with Oracle’s Management Pack for Linux, Oracle Clusterware, backporting, and lifetime support. This support, unavailable elsewhere, is what Oracle — and its enterprise customers — mean by true enterprise support. It is the sort of support available to commercial OSes but not previously available for Linux. Targeted bug fixes and patches are not merely obtainable in the latest or future versions, they are obtainable for the version the customer is currently running. This is essential for mission-critical operations impeded by a problem in the operating system. Lifetime support ensures that, after the standard support cycle, customers can continue to obtain support and knowledge on their existing deployments without their having to move to later versions.

Indemnification against intellectual property infringement claims has become an important issue for the Linux community. Indemnification is offered for all Oracle-supported Linux users, and is included with Network, Basic, and Premier Linux support. With Oracle Unbreakable Linux support, customers have indemnification from the world’s largest enterprise software vendor. Unlike Red Hat, Oracle’s indemnification is not limited to the amount of money a customer has paid Oracle for Linux support.

Oracle also offers Oracle Enterprise Linux as an installable binary download that is free to anyone. Based on Red Hat Enterprise Linux, it is fully compatible — both source and binary — with Red Hat Enterprise Linux. It includes the identical set of packages at the same version levels with the same source code as the Red Hat distribution. Additionally, Oracle applies fixes to bugs found in the rigorous testing to which it subjects each version of Linux on enterprise application stack configurations. The fixes are limited to those considered critical to such environments, and are dropped in subsequent versions coming out of Red Hat, provided Red Hat’s developers have addressed the bug.

As part of the Oracle Unbreakable Linux Support program, Oracle supports existing Red Hat Enterprise Linux implementations as well as new Oracle Enterprise Linux implementations. Existing Red Hat customers who wish to switch to Oracle Unbreakable Linux support do not need to install Oracle Enterprise Linux or to reinstall

any Linux software. Unbreakable Linux support is available for current implementations of Red Hat Enterprise Linux (3, 4, and 5) for Linux x86 and x86-64 architectures, and support for Red Hat Enterprise Linux 4 Update 6 for Linux Itanium architectures. Switching from Red Hat support to Unbreakable Linux support merely entails registering with the ULN and downloading the small up2date RPM provided by Oracle. The entire process is accomplished in a matter of minutes.

## What Makes Oracle Unbreakable Linux Support the Best Choice

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The focus of Oracle Unbreakable Linux support is to ensure the further success and growth of Linux among enterprises of any size, and to raise the bar for Linux support in order to make it acceptable to even the most demanding, mission-critical enterprise operation. For many customers, previously existing support available for Linux did not rise to the level their enterprises demand. With Oracle Unbreakable Linux support, Oracle has addressed three main support-related factors — lack of high-quality and true enterprise-level support, litigation liability potential, and high total cost — that have held businesses back from adopting Linux to run their most vital operations.

### Oracle's Core Strengths for Linux

Many Oracle database, middleware, and applications customers run their Oracle products on Linux. Oracle recognizes Red Hat's version of Linux as an established Linux operating system and has produced a true Red Hat-compatible version of Linux rather than creating and endorsing a version of Linux of its own; to make it easier for existing Red Hat users to switch and to avoid forking Linux and creating a different product. Oracle maintains that Oracle Enterprise Linux is binary and source compatible with Red Hat; it is also — unlike Red Hat Enterprise Linux — available for free download.

Oracle is leveraging its global industry presence, its size, and its vast resources to ensure that Linux offers precisely the same high degree of accountability and quality of support to enterprise customers as that offered for Oracle's other enterprise software products. With more than 74,000 employees and more than \$18 billion in annual sales, Oracle has a great deal to offer in the Linux support arena.

The following table provides a side-by-side comparison of Red Hat's enterprise-level support with the Oracle Unbreakable Linux support.

Support Feature	Red Hat	Oracle
Global Reach	Limited	24x7 in 145 countries
Service & Support Professionals Association (SSPA) Awards	No	Yes
200+ Advanced Support Tools	No	Yes
Centralized View of Server, OS, and Oracle Environment	No	Yes
Local Language Support	Limited	Global (27 languages)
Support Professional Skills	Trained on Linux	Trained on the complete software stack; Oracle products support staff is trained on Linux; Linux support staff is trained on Oracle products
Support Professionals	~ 200 (both desktop and server)	7,000+ (server-focused)

Multiple factors contribute to Oracle’s ability to provide superior support for Linux, as described in the rest of this section.

### *Mainline Upstream Linux Development*

Oracle grasped the true potential of the Linux open source operating system very early on and proactively set out to improve it. In 1998 Oracle began its dedication to Linux and remains a strong contributor to Linux and an active member in many open source communities.

As a leader in software for the enterprise, Oracle approached Linux fully versed in the requirements and challenges of enterprise-scale computing. [Oracle has invested heavily in building its Linux development and testing resources, making numerous contributions to mainline Linux kernel](#), and formulated a roadmap for enhancing Linux, making it suitable for mission-critical use. Examples of more recent contributions to open source Linux coming out of Oracle’s development initiatives include:

- **Oracle Cluster File System (OCFS)** – A shared storage file system developed by Oracle Corporation and released under the GNU General Public License (GPL), [OCFS2 is a true general-purpose file system in Linux](#), and Oracle Unbreakable Linux subscribers can call Oracle Support for assistance in using OCFS2 in all use cases. It is a testament to Oracle’s reputation for excellence in development as well as its

adherence to open source community contribution methodology that OCFS2 was the first cluster file system to be adopted into the mainline Linux kernel.

- **Btrfs** — File systems must scale in their ability to address and manage large storage, and also in their ability to detect, repair, and tolerate errors in the data stored on disk. The super-efficient Btrfs file system, still under heavy development and benchmarking, dramatically reduces metadata overhead for large files.
- **New Asynchronous I/O Interface**—Oracle is working to replace the existing asynchronous I/O interface in the kernel with a more generic subsystem. The new kernel-based implementation should provide a single access point, allowing most system calls to become asynchronous to reduce complexity at both the kernel and application level.

### *Oracle's Internal Use of Linux*

Oracle clearly does not view Linux merely as a source of revenue for Linux-based products and Linux support. The company has several thousand production servers running on Linux to support its business operations. More than 9,000 developers at Oracle use Linux to develop Oracle products; Oracle is quite likely the largest software development company in the world running on Linux. A great deal of software developed by Oracle is developed and tested on Oracle Enterprise Linux. These operations take place on a 24x7 basis.

Oracle also runs Linux at the Oracle On Demand data center in Austin. This impressive facility, used by Fortune 1000 clients with millions of users overall, runs on more than 10,000 Linux servers, both 32 and 64-bit Linux, with multiple petabytes of storage. On Demand customers such as Worthington Industries, Thermos, and Genworth Financial have their transactional applications deployed and managed at the data center, and rely on Oracle Unbreakable Linux support to keep their mission-critical core business systems up and running smoothly.

Oracle's extensive use of Linux in every aspect of its business including its day-to-day operations contributes to a vast amount of knowledge and appreciation for Linux as it is used in real-world enterprise environments.

### *Experienced Support Organization*

With Oracle Unbreakable Linux, Oracle supports Linux with the same award-winning support organization that supports all of Oracle's other enterprise software. Linux had previously never had such a top-tier worldwide support organization behind it. One of the world's largest, it has more than 7,000 support professionals using more than 200 advanced support tools. Thanks to a global reach spanning nearly 150 countries and including nearly 30 languages, a technical issue opened with Oracle's support team can

literally “follow the sun” until it is resolved, if necessary. Oracle also offers — with the Premium support package — local off-hours support. Only Oracle support has received awards from the Service & Support Professionals Association (SSPA) for superior customer support services.

Compare this to Red Hat’s support infrastructure. Headquartered in Raleigh, NC, Red Hat has over 50 satellite offices spanning the globe. With some 1,800 employees, the company has grown to where it can now provide support in approximately 30 countries and in about a dozen different languages. Standard business hours for telephone support in the United States extend from 9 am to 9 pm.

### *A History of Dedication to Linux*

In 1998, Oracle became the first commercial database on Linux. Today, Oracle is a prominent market leader in Linux. The Oracle relational database is the number one database on Linux, with 82.6 percent market share, and more than \$1.95 billion in Linux database revenues, according to Gartner. Linux is also a very popular platform for deploying Oracle middleware and Oracle applications. In 2002 Oracle contributed the Oracle Cluster File System (OCFS) to Linux, which is an important technology for realizing Oracle’s vision of high-performance Linux grids.

Oracle also made significant strides toward the important goal of making Linux secure for the enterprise and for government. In 2004 Oracle, at considerable expense, sponsored the first Linux Security Certification and was instrumental to getting Linux certified by the U.S. federal government for use in secure systems.

## **Oracle’s Unique Value to Customers**

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Oracle’s core strengths for Linux and its advantages as a very large and successful organization having an international presence allow it to sharply differentiate Oracle Unbreakable Linux from support packages offered by other vendors, including Red Hat. Key unique differentiators and benefits to customers are discussed in this section.

### **Superior Linux Testing**

The degree of focus that Oracle puts on Linux testing may well be unique. Oracle focuses on testing features and capabilities that matter most to enterprise customers, including:

- Oracle and non-Oracle workloads — running concurrently.

- Adverse conditions, such as low memory, low disk space, CPU limits, etc.
- Long, continuously running stress tests — for instance, to detect memory leaks.
- Checks for performance regression and degradation.

Oracle has leveraged its testing resources, its experience with enterprise customers and systems, and its close relationships with a broad range of prominent industry hardware vendors to establish its Validated Configurations. These are pre-tested, validated architectures with software, hardware, storage, and networking components together with documented best practices for deployment. Oracle Validated Configurations include a full range of products, with the entire “real world” hardware-software stack tested together rather than just a small portion of it. Support testing includes running actual workloads, both internal and provided by customers.

Oracle Unbreakable Linux undergoes a long testing cycle that includes the routine testing of the full software stack (not just the individual components) with the help of the Oracle Validated Configuration toolkit to ensure that the underlying operating system behavior is correct in all circumstances. Over many years of working with strategic customers, Oracle’s huge, dedicated QA team has applied its depth of experience to building an extensive test matrix for Linux.

## **True Enterprise-Level Support with Premier Backports**

True enterprise support means that targeted bugs can be fixed on the version currently running and that there are no forced upgrades to the latest “update” release. This is a form of “backporting” and has important advantages over what is commonly meant by traditional backporting.

Traditional backporting is what Red Hat and other Linux distribution vendors currently offer. With this type of backporting, important bug and security fixes applied to the latest major release of a software package (such as the Linux OS) are also applied, where relevant, to a previous major release. The result is an updated software package for both releases. In order to get the fixes, customers who are running either release must upgrade to the latest version of that software package for the applicable release.

This approach, however, does have its drawbacks. For instance, a customer who is running an older version of the package on, for example, Red Hat Enterprise Linux 4 is required to upgrade to the latest package to address a fix that is causing system problems. Unfortunately, doing so means that more than the single critical fix will be applied to the customer’s running kernel, introducing a level of risk and uncertainty regarding other ongoing processes that is unacceptable to most mission-critical enterprise operations.

### ***IHOP Switches and Saves 20% with Oracle Unbreakable Linux Support***

While the well-known family restaurant chain IHOP has successfully been in operation for nearly 50 years, over the past five years or so the business has seen unprecedented growth. IHOP's CIO Patrick Piccininno attributes a good portion of this latest success to an overhaul of IHOP's entire IT infrastructure that has improved customer satisfaction and retention through business intelligence supporting decisions on products, menu items, marketing strategies, etc. Two requirements Piccininno describes as primary in this technology overhaul include:

- Drive very low cost of ownership and long-term flexibility and scalability in the data center to adapt to changes in business strategy and/or scope.
- Reduce the complexity and cost of support issues by consolidating vendor support as much as possible.

IHOP scrapped its antiquated data center and deployed an entirely new infrastructure consisting of roughly 45 cost-effective commodity Dell computers mostly running Red Hat Enterprise Linux and a full Oracle enterprise stack. In the beginning of 2007, IHOP made a seamless switch from Red Hat Enterprise Linux support to Oracle Unbreakable Linux support. "The service and support we got from Red Hat was inconsistent and disappointing considering the amount of money we're paying," explains Piccininno.

Switching met IHOP's requirements as follows:

- **Enterprise-quality support for a cost-effective Linux platform running a mission-critical database and application environment.** "When I first saw Oracle's support offering, it really brought to light for the first time how important and enterprise-worthy the Linux operating system had, in fact, become," says Piccininno.
- **Consolidated support providers.** Bringing the operating system into the same support organization with which the center's entire infrastructure team was already quite familiar reduced IHOP's support costs by 20 percent. "As you continue down the stack and look at the various components that could, in fact, affect performance and reliability of the application infrastructure," Piccininno says, "it becomes obvious that the operating system and the database go hand-in-hand."
- **Support that is well-versed in the entire application stack and its integral operation.** "We know that Oracle is not only committed to its applications and its database but also to the operating system in which we have made a significant investment, both in terms of dollars and resources," says Piccininno.

The Premier level of Oracle Unbreakable Linux support addresses the needs of such mission-critical operations. It includes Premier Backports, where individual bug fixes are backported on request to any version of any package released within the previous six months. Customers can get a customized version of a package that contains just a single, specific critical bug fix. This type of backporting benefits customers who deploy systems requiring high availability and reliability and want just one particular issue resolved. They can now achieve this without the need to undertake a new complete test

cycle to account for the many other changes that would otherwise be introduced by upgrading the package to its latest version.

This type of backporting is what Oracle and other major application vendors offer for their products, and what major commercial operating systems offer, as well. Lack of it has been the main factor slowing Linux adoption in the enterprise. With Oracle Unbreakable Linux Premier Backports, customers can stay on their current version of Linux, with no forced upgrades or untimely delays waiting for a bug fix.

## **Support That Never Expires**

Oracle Unbreakable Linux support at the Premier level offers lifetime support; that is, after the standard support cycle, customers who remain with their current deployments either because they cannot or do not wish to upgrade can continue indefinitely to obtain support and knowledge — configuration or installation issues, access to existing bug fixes, tuning, etc. — for their existing deployments.

Red Hat Enterprise Linux is currently at version 5. Red Hat Enterprise Linux 3 was introduced in September 2003 and will be supported until August 2010. Red Hat Enterprise Linux 4 was released in February 2005; Red Hat has not specified how long support for the version will continue. However, no assurance or option is offered by Red Hat entailing support for version 4 (or any other version) indefinitely.

## **One-Stop Support for the Entire Software Stack**

No other vendor offers the type of comprehensive support for an organization's entire software stack — database, middleware, applications, and management tools — in addition to the Linux operating system itself. A general lack of understanding and resources exists among other Linux vendors regarding what it takes to truly support a mission-critical environment. Oracle has more than 30 years of experience supporting enterprise customers, numerous software applications central to business operations widely deployed in Linux installations, and support for Linux going back to the year 2002.

Consolidating the number of vendors involved in the organization's software infrastructure further serves to expedite troubleshooting and streamline support. Every data center is familiar with the finger-pointing that occurs among software vendors when a problem of less-than-obvious origin crops up. It wastes time and delays production — a luxury not available to businesses at critical junctures. With Oracle Unbreakable Linux, customers obtain Linux support from Oracle via the same support organization, using the same phone number, as they do for any other Oracle product.

This advantage is especially great for organizations that have standardized on an Oracle platform, of course. But Oracle Unbreakable Linux support is available to any organization running Linux, whether they are running Oracle software or not.

## Oracle Management Pack for Linux

For no additional charge, Oracle Unbreakable Linux Basic and Premier Support customers get the Oracle Management Pack for Linux, which provides an integrated and cost-effective solution for complete Linux server lifecycle management. Based on Oracle Enterprise Manager 10g, it delivers comprehensive provisioning, patching, monitoring, and administration capabilities via a single, web-based interface — the Enterprise Manager console — reducing the complexity of managing Linux. With rollback and bare metal install capabilities, the Management Pack can be hosted internally and operated seamlessly from the Unbreakable Linux Network (ULN); customers logging into ULN can view and manage all the systems they have registered.

Much of Oracle Management Pack for Linux functionality can be quite important to mission-critical operations. For instance, Oracle Management Pack can be used to set up channels to the versions and updates installed on a given system, giving customers the option to remain with the current configuration and not have to jump to every new release in order to continue applying updates.

Red Hat offers the Red Hat Network in differently priced tiered modules, where management and provisioning functionality is paid for according to the module chosen. A management module provided in some tiers allows for increased management capabilities and scalability in the enterprise. Red Hat's provisioning also allows organizations to manage their Linux infrastructure through the complete life cycle.

Viewed through the narrow lens of a Linux-related offering, the management functionalities of Red Hat and Oracle have close similarities. However, the Oracle Management Pack for Linux is based on Oracle's existing Enterprise Manager product, which has been around for years. Its original scope was to help administrators manage thousands of databases; Management Pack for Linux extends that capability. It thus fits into a broader-based framework that can be used on an enterprise scale to manage databases and application components along with Linux servers. The result is better single-console visibility and manageability across an enterprise's entire IT infrastructure.

Red Hat makes no attempt to present a one-console approach to managing all the enterprise components, in the belief that putting all its focus on managing Red Hat Linux will yield the best Linux capabilities.

## Oracle Clusterware for Unbreakable Linux

Oracle Unbreakable Linux support customers at the Basic and Premier support levels can download and deploy [Oracle Clusterware](#) at no additional license fee or support cost. Oracle Clusterware is portable cluster software that groups together individual servers so they can cooperate as a single system. A fundamental component of Oracle Real Application Clusters, Oracle Clusterware can operate independently and helps ensure the protection of an application, Oracle or third-party.

Oracle Clusterware, which is available for x86 and x86-64, enables high availability, an essential component of business continuity, for applications and databases managed in the cluster environment--including Oracle Single Instance Databases, Oracle Application Servers, Oracle Enterprise Manager components, third party databases, and other applications.

### Legal Indemnification

Red Hat's Open Source Assurance program provides certain assurances to customers in the event there is an intellectual property issue with Red Hat Enterprise Linux or any other Red Hat-branded subscription product. These assurances include (i) replacing the infringing portion of the software, (ii) modifying the software so that its use becomes non-infringing, or (iii) obtaining the rights necessary for a customer to continue its use of the software without interruption. As an additional protection, Red Hat also provides indemnification in its Open Source Assurance program up to the subscription price of the support contract.

#### ***Introducing Oracle VM: Faster, Lower-Cost Server Virtualization***

Oracle has recently introduced a product, available for free download that customers can use to leverage the benefits of server virtualization. Introduced in November 2007, Oracle VM fully supports both Oracle and non-Oracle applications, and is three times more efficient than other server virtualization products.

Oracle now combines the benefits of server clustering and server virtualization technologies to deliver integrated clustering, virtualization, storage, and management for grid computing. Several notable industry-leading partners – including AMD, Dell, Emulex, HP, Intel, Liquid Computing, NetApp, Pillar Data Systems, and Qlogic - endorse Oracle VM.

Because it is backed by Oracle's support organization, customers using Oracle VM now have a single point of enterprise-class support for their entire virtualization environment, including the Linux operating system, Oracle Database, Fusion Middleware, and Application software. These and other Oracle products are certified with Oracle VM.

For Unbreakable Linux customers, Oracle VM offers a very compelling solution for effectively optimizing hardware resources and further reducing their costs by consolidating servers and saving on power, cooling, and space in their data centers.

For more information about Oracle VM, visit [oracle.com/virtualization](http://oracle.com/virtualization).

Oracle Unbreakable Linux support customers get indemnification against intellectual property infringement claims. Oracle's indemnification is not limited to the amount of money a customer has paid Oracle for Linux support, and indemnification covers all levels of Linux support. Indemnification also applies to backports provided by Oracle as part of Oracle's Premier support.

It is highly unlikely that indemnification up to the subscription price of the support contract, as offered by Red Hat, would suffice to cover any real-world damages claim in the event that such a claim were ever to succeed. In addition, having the vendor replacing and/or modifying portions of software in a running installation might not sit well with an organization operating mission-critical business processes.

### **Free Linux Binaries**

Red Hat provides its Enterprise Linux products on a per-system annual subscription basis. Along with support and access to the Red Hat automated software delivery and update capabilities via the Red Hat Network, the Red Hat Enterprise Linux binary code is included as part of the paid subscription.

Unlike Red Hat, Oracle makes Oracle Enterprise Linux binaries and source code available for download completely free of charge. This encourages anyone to install and try out Oracle Enterprise Linux free of any financial obligation or risk, and to choose any level of Unbreakable Linux Support at their convenience, if and when it is desired.

### **Delivering Significantly Lower Total Cost**

Oracle Unbreakable Linux support program lowers the total cost of Linux support, both directly through lower upfront subscription fees and indirectly through greater efficiency that reduces total cost of ownership.

#### ***Lower Subscription Fees***

Oracle Unbreakable Linux support lists for as much as 72 percent less than the equivalent Red Hat Enterprise Linux support, depending upon the level of support. Oracle's premier support — for which there is no equivalent from Red Hat — costs less than half of Red Hat's premium level of support. Oracle's equivalent to Red Hat's premium level — the Basic package — costs nearly a third of the price.

The table presented here shows the comparative price structure for a 1-year subscription for both Oracle Unbreakable Linux support and Red Hat Enterprise Linux (RHEL) support.

Offering	Red Hat	Oracle
Installable Binaries	Fee-Based	Free
Network Access (Patches & Updates)	\$349	\$119
Basic Limited (Better Than RHEL ES Support; 2 or Less CPUs)	\$799 (Limited Features, Limited Hours)	\$499
Basic (Equivalent to RHEL AS Premium Support; More Than 2 CPUs)	\$2,499	\$1199
Premier Limited (2 or Less CPUs)	No Equivalent Support	\$1,399
Premier (More Than 2 CPUs)	No Equivalent Support	\$2,299

Oracle also gives credit to time unused on Red Hat support for those who want to switch in order to protect their previous investment in Linux support. That is, a Linux customer who has purchased a three-year support contract from Red Hat but has only had it for one year can purchase a three-year support contract from Oracle Unbreakable Linux Support and effectively receive five years of support from Oracle.

### *Lower Cost of Operations*

Aside from direct upfront reductions in cost, customers adopting Oracle Unbreakable Linux Support can benefit from ongoing cost reduction in a number of ways not possible for Red Hat support customers. Some of these ways include

- **One-Stop Support** – Having a single vendor who understands the entire software stack to take charge of diagnosing and resolving problems frees staff for other tasks and reduces costs.
- **Consolidated Infrastructure Vendors** – Adopting a standardized software infrastructure that supports the heterogeneous data center enables organizations to reduce complexity and drive down costs.
- **Free and Streamlined Lifecycle Management** – Lifecycle management is bundled free at no additional charge with Basic and Premier levels of support.
- **Real-World Testing** – Thoroughly testing Oracle Enterprise Linux on a wide variety of system configurations and under various conditions before making it available reduces the risk of downtime.

## Oracle Enterprise Linux: Addressing Compatibility

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Since Oracle announced the availability of Oracle Enterprise Linux, concerns have been raised that it may represent a new fork in the Linux operating system. However, Oracle is adamant about not fragmenting the Linux code base with an entirely new distribution. Oracle is well aware that a common Linux open source kernel helped contribute to the operating system's capturing of market share away from the splintered UNIX world of AIX, HP-UX, and Solaris. In offering Oracle Enterprise Linux, Oracle goes to great lengths to assure that there is no divergence from Red Hat Enterprise Linux.

Oracle Unbreakable Linux support customers can use either Red Hat Enterprise Linux or Oracle Enterprise Linux.

Oracle Enterprise Linux faithfully tracks all Red Hat Enterprise Linux package releases in order to ensure continued compatibility; the bug fixes that Oracle applies are few and have been determined, via Oracle's extensive testing, to be critical for customers to have as soon as possible in their production deployment. If the problems addressed by such fixes are adequately corrected in a later Red Hat version, Oracle drops the fix applied in the earlier version of Oracle Enterprise Linux. By investing heavily in testing and releasing critical bug fixes faster, Oracle makes Linux overall a better option for enterprise deployments. The goal is to improve Linux quality, starting with the Linux software chosen for good reason by the overwhelming majority of business organizations.

The procedure Oracle takes in preparing a release of Oracle Enterprise Linux is summed up as follows:

- Red Hat Enterprise Linux source code is brought into Oracle's source code control system.
- Any trademarks are removed from the source.
- Oracle-generated bug fixes are merged into the source. If a problem that previously required a bug fix patch is now addressed in this Red Hat release, the corresponding Oracle patch is dropped. Oracle-generated bug fixes do not change or remove interfaces or structures that could affect compatibility.
- The package is compiled to generate the binary packages.
- The software undergoes thorough and rigorous testing with a wide variety of hardware and software products and configurations. This includes installing Oracle software and running Oracle workloads to ensure compatibility.

- The binary and source packages are made available for free download on the Oracle website.

## Edison Compatibility Tests

Oracle already does a considerable amount of testing to ensure that Oracle Enterprise Linux 5 is compatible with Red Hat Enterprise Linux 5. For example, the same Oracle Database software release (e.g., Oracle Database 10gR2 or 11g) is installed, tested, and certified on *both* Oracle Enterprise Linux 5 and Red Hat Enterprise Linux 5. The Oracle Database software loads and runs as expected on *either* Linux release without the need for separate, re-compiled versions. Given that Oracle Database software relies on a great deal of significant functionality from many system libraries, this is already a great a useful test that demonstrates compatibility between Oracle Enterprise Linux and Red Hat Enterprise Linux. Although the Oracle Enterprise Linux 5 source is basically the same as the Red Hat Enterprise Linux 5 source (except for trademark and bugfix changes), Edison undertook its own test to check binary compatibility between Oracle Enterprise Linux 5 and Red Hat Enterprise Linux 5 for the x86 platform.

The test was performed in Edison's lab with the most recently available version of the Linux Test Project suite (ltp-20070930).<sup>1</sup> The Linux Test Project (LTP) is a joint multi-vendor project (currently maintained by IBM) with the purpose of delivering test suites that validate the reliability, robustness, and stability of Linux. The LTP kernel test-suite is widely used by Linux kernel developers and Linux vendors for system and integration testing. It delivers a large collection of automated and semi-automated tests for testing the Linux kernel, with the primary focus on the kernel reliability and stability. Thorough and fairly time-consuming, the most recent version of the LTP test suite contains 3,000+ tests. For the convenience of the tester, the testing procedure is automated with scripts.

Installation of the tested Linux release was based on the media images downloadable from the respective vendor's websites. Installation was performed on the same hardware by the same team of engineers. The tests were run in accordance with the documentation provided by LTP.

When the test execution completed, the tests results were saved. The tests passed on both RHEL5 and Oracle Enterprise Linux 5. The test binaries on RHEL5 that were compiled as part of the test execution were then copied over to the Oracle Enterprise Linux 5 system, and the tests were run again on the Oracle Enterprise Linux 5 system using the RHEL5 test binaries. The test results produced from this run were identical to

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<sup>1</sup> <http://prdownloads.sourceforge.net/ltp/ltp-full-20070930.tgz?download>

the previous set of test results, indicating that binaries built on RHEL5 that exercise a wide range of system features and functionalities are able to successfully run unmodified on Oracle Enterprise Linux 5. This gives Edison great confidence that Oracle Enterprise Linux 5 is compatible with Red Hat Enterprise Linux 5.

While the test procedures themselves are rather involved, the output is simple. The complete test output is available from the Edison upon request. Also, note that the test is [available for public download](#) to anyone wishing to confirm Edison's findings.

## Summary

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Edison believes that [Oracle Unbreakable Linux](#) support should give enterprises the full confidence they need to run all their core business, mission-critical, and risk-sensitive applications on the Linux platform. The same enterprise-level quality of support that IT managers and CIOs are accustomed to getting for other operating systems and for major commercial software applications is now available for Linux. Compelling benefits to the organization include:

- Top-notch support for the specific version of Linux currently being run, with no pressure to upgrade to later versions. Premier Backports keep mission-critical operations up and running by letting customers apply fixes in the version of Linux currently being run, without forced upgrades or untimely delays.
- The support resources and rigorous testing capabilities of an enormous world-class global organization with long involvement with Linux and solid expertise in enterprise software issues and requirements.
- Superior Linux testing with Validated Configurations of the full stack of hardware, operating system, applications, and networking instead of just the individual components.
- Support that has evolved to service the Linux platform in multiple critical aspects of Oracle's own day-to-day core business operations.
- Lower total cost of operations through lower up-front contract pricing as well as through lower costs due to consolidated vendor support, streamlined management, real-world testing, and economy of scale.
- Full indemnification against intellectual property litigation, regardless of the amount paid by customers to Oracle.

In removing the primary factors that have slowed the adoption of Linux in the enterprise — lack of true enterprise-class support, backporting, full-featured lifecycle

management, wariness regarding litigation, and high total cost of support — Oracle has likely done a great deal to advance Linux in the enterprise. By offering considerably superior support, testing, software, and indemnification at significantly less total cost, Oracle has also come up with what may well be an irresistibly attractive support package.

Edison strongly recommends that anyone interested in leveraging the superior stability and cost-effectiveness of Linux for core business operations review the support offerings of both Oracle and Red Hat, and consider which of the two would better serve the goals and requirements of their organization.

Visit [oracle.com/linux](http://oracle.com/linux) for more information.