

Oracle Unbreakable Linux: An Overview

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INTRODUCTION

Oracle Unbreakable Linux is a support program that provides enterprises with industry-leading global support for the Linux operating system at significantly lower costs.

The support program, which is available for any customer whether or not they're running Oracle, currently supports two architectures, x86 and the latest Intel and AMD chips, such as Xeon and Opteron (x86_64) as used by most of the Linux users. The program offers support for any existing Red Hat Enterprise Linux installations and for new installations of Oracle Enterprise Linux, an open source Linux operating system that is fully compatible—both source and binary—with Red Hat Enterprise Linux.

Complete Support for the Complete Software Stack

Oracle's industry-leading support organization offers expertise that looks at the entire application stack running on top of Linux; only Oracle delivers complete support for the complete software stack—database, middleware, applications, management tools, and the operating system itself.

By delivering enterprise-class quality support for Linux, Oracle addresses a key enterprise requirement from customers. When problems occur in a large, complex enterprise environment, it's often impossible to reproduce such occurrences with very simple test cases. Customers need a support vendor who understands their full environment, and has the expertise to diagnose and resolve the problem by drawing from their knowledge of and familiarity with their framework, as opposed to requesting a simple reproducible test case.

Another customer demand is for bug fixes to happen in a timely manner, as customers cannot always afford to wait for months to get a fix delivered to them. Moreover, it's common for customers to be very reluctant to apply a whole set of many unrelated bug fixes in order to solve one particular problem, because doing so heavily disrupts their carefully tuned and tested environments.

Often systems exhibiting the symptoms are in mission-critical production environments with high demand, and consequently cannot afford any downtime, so the risk of applying a patch needs to be as low as possible. The Oracle Unbreakable Linux backport policy addresses this concern.

In addition to the need for true enterprise-class support and timely bugfixes, another key concern facing customers is the high cost of support for the Linux operating system. Addressing this issue, Oracle Unbreakable Linux support costs are much lower than alternatives, offering a variety of levels, with low costs more closely aligned with customer expectation.

Oracle Enterprise Linux is not a fork of Linux, as it is fully compatible—both source and binary—with Red Hat Enterprise Linux. Compatibility and uniformity is of the utmost

importance to Oracle, as the same version of Oracle products must run on many different Linux distributions; Oracle has no reason to fork Linux.

New feature development for Linux is done by Oracle kernel team while working with the upstream maintainers and the Linux community directly, and integrated in the upstream repositories from the start. The intent is that Novell, Red Hat and other distributors will absorb those features in their releases. Oracle will always make sure that all the features are in the mainline and benefit all of the distributions, as the intent is not to cause more fragmentation of the market, but instead to make the market stronger and better.

Oracle Unbreakable Linux Support

Oracle provides three levels of Unbreakable Linux support:

- **Network Support** - access to patches and updates via ULN
- **Basic Support** - access to patches and updates via ULN, 24x7 support, complete Linux server lifecycle management
- **Premier Support** - access to patches and updates via ULN, 24x7 support, Linux server lifecycle management, backporting, lifetime support

For Premier support customers, Oracle issues backports of individual bugfixes to any version of any package currently deployed by the customer as long as such version is not older than six months. For more comprehensive and up to date information on support offerings and pricing read the [Oracle Unbreakable Linux data sheet](#).

Oracle Unbreakable Linux is For Anyone

Oracle Unbreakable Linux support is available for anyone, even if they're not running any Oracle products. Oracle is fully committed to supporting the Linux operating system regardless of which products are running on top of it.

Full Indemnification

Indemnification against intellectual property infringement claims has become an important issue for the Linux community. With the Oracle Unbreakable Linux support program, customers have full indemnification from the world's largest enterprise software vendor. Indemnification applies to all levels of support (Network, Basic and Premier) and the amount of indemnification is not limited in any way by the amount of money a customer has paid to Oracle. Read the [Top 5 Facts About Oracle's Indemnification for Linux](#).

Oracle Enterprise Linux is Free to Download

Before committing to a purchase, customers should be able to download software for installation, testing and evaluation. With Linux, it's always been possible to download free, consumer-oriented desktop distributions (i.e. Fedora, Ubuntu, OpenSUSE). But enterprise customers had to pay for a support contract to actually get an enterprise Linux distribution, even if they just wanted to evaluate it. With Oracle Unbreakable Linux, customers can always download the binaries and the source code for free, no support subscription required. [Download Oracle Enterprise Linux](#).

Oracle Unbreakable Linux Network (ULN)

The [Unbreakable Linux Network](#) (ULN) is equivalent from a user interface point of view to what Red Hat Network (RHN) offers. ULN is a comprehensive resource for Oracle Unbreakable Linux support subscribers, offering access to Linux software patches, updates and fixes, along with information on the update program and support policies. Built on open standards, ULN is an easy to use website accessed via linux.oracle.com.

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 delivers comprehensive

provisioning, patching, monitoring and administration capabilities via a single, web-based interface, further reducing the complexity and cost of managing Linux environments. Learn more about the [Oracle Management Pack for Linux](#).

WHAT IS ORACLE ENTERPRISE LINUX?

Oracle Enterprise Linux is based on Red Hat Enterprise Linux and is fully compatible—both source and binary—with Red Hat Enterprise Linux as it includes the exact same set of packages at the same version levels with the same source code as the Red Hat distributions. There are approximately 1,000 packages in the distributions. A byte-by-byte comparison of the source code of the two will reveal no difference, the only changes being the removal of trademarks and copyrights.

After such minor changes, the Oracle Enterprise Linux source code has been recompiled by Oracle into binaries and made available for download and produced into CD images. Oracle also applied a number of bugfixes on top of the original code. These are very limited in scope, and they are critical for customers to have as soon as possible in their production deployment. For a complete listing, read the following data sheets:

- [Certification with Oracle Enterprise Linux 4](#)
- [Certification with Oracle Enterprise Linux 5](#)

In order to get Linux support from Oracle, a user does not have to install Oracle Enterprise Linux, if they already have Red Hat Enterprise Linux installed on their systems.

Oracle Cluster File System 2 (OCFS2)

Oracle Enterprise Linux includes full support for the [Oracle Cluster File System](#) (OCFS2), an open source cluster file system included in the mainline Linux Kernel. Other Oracle specific packages are available as additional downloads from a separate Unbreakable Linux Network channel, such as Oracle Instant Client, Oracle ASMlib, Oracle Database Express Edition, Oracle SQLDeveloper. These packages are also freely downloadable from the [Oracle Technology Network](#).

Extensive Testing

Tremendous effort has gone into assuring that there is no divergence from the original Red Hat source code, given that the main goal of Oracle Enterprise Linux and the Oracle Unbreakable Linux program is to not fragment the Linux code base, but to improve Linux quality and support. In addition, Oracle heavily invests in testing and releases critical bugfixes faster, making Linux overall a better option for enterprise deployments.

Packages released by Oracle as part of Oracle Enterprise Linux undergo a long testing cycle which includes the routine testing of the full software stack with the help of the Oracle Validated Configurations toolkit to ensure that the underlying operating system behavior is correct in all circumstances. Oracle's industry-leading QA team has worked with strategic customers for many years now, and this depth of experience has helped build an extensive test matrix.

Since the focus of the Oracle Unbreakable Linux support program is to ensure the further success and growth of Linux among all customers large and small, the program is available for current Red Hat Enterprise Linux (3, 4 and 5) subscribers as well. Such customers can submit problem reports to Oracle and will receive bugfixes that apply to their RHEL version.

In a similar fashion, for those who may still want to run Oracle products—database, middleware, applications—on Red Hat Enterprise Linux, Novell SLES or Asianux, Oracle continues to fully support the same set of Oracle products on Linux, Oracle will

continue direct cooperation with our partners in the Linux community and will certify Oracle products on those distributions.

Fully Compatible with Red Hat Enterprise Linux

Oracle synchronizes bug fixes at regular intervals with Red Hat Enterprise Linux to maintain full compatibility. Whenever a new version of an individual package (an errata) gets released by Red Hat, not just as part of an update release, the corresponding package for Oracle Enterprise Linux is made available very quickly, in a matter of hours. If a package has no trademarks and no Oracle specific patches, it will simply be recompiled and reissued for Oracle Enterprise Linux immediately after going through testing.

If a package has trademarks or Oracle Enterprise Linux specific changes, Oracle will examine the source code and compare it against the bug fixes that have been already applied and released as part of Oracle Enterprise Linux. If the Oracle patches are still relevant, then they are reapplied, but if the problems have been fixed in the Red Hat version, whether in the same or in a different way, the Oracle specific patches are dropped and the package recompiled (always checking for trademarks and copyrights issues) and released as part of Oracle Enterprise Linux via the Unbreakable Linux Network (ULN).

For official updates of existing major releases, for example Red Hat Enterprise Linux 4 Update 5, Oracle re-bundles the Red Hat patches in the update and reissues them as Oracle Enterprise Linux 4 Update 5, including free ISOs, almost immediately.

As a new major RHEL release is issued, there is usually the need to do some additional testing before Oracle can consider it an official Oracle Enterprise Linux version. For instance, when Red Hat Enterprise Linux 5 was released, Oracle ensured that the corresponding Oracle Enterprise Linux product had been well tested before issuing its own version of it, since in the past, it's taken many months for a new major release to stabilize.

Patches and Bugfixes

Another aspect of compatibility with Red Hat Enterprise Linux is around patches and bugfixes written by Oracle and not appearing in the Red Hat distribution. Oracle has independently been providing bug fixes to customers for problems occurring in Red Hat Enterprise Linux for the last four years, and has maintained full compatibility by ensuring that the resolution of the problems does not break application compatibility.

As an example, the kernel ABI is a very important interface to keep stable, and Oracle has been requiring that none of the patches provided to customers or partners breaks that stability, by testing the variables and checksums so that the resulting code is fully compliant with that restriction. There are very few modifications to the existing Oracle Enterprise Linux code base, only critical bugfixes and no new features. Patches for any of the bugs that are fixed in Oracle Enterprise Linux will also be contributed back to Red Hat, Novell, and other distributions as applicable. Moreover, if the fixes are also relevant to the upstream source trees maintained by the community, then Oracle assures that they get applied there as well.

There is just one edition (and just one CD set) for Oracle Enterprise Linux, and it's available for all three levels of support. This corresponds to the Red Hat Enterprise Linux Advanced Server edition for version 4, and to the Red Hat Enterprise Linux Server edition for version 5. Both contain all the packages in Red Hat's high-end offering without limiting the set of packages that are available to customers under support contracts or for free downloads. A new set of ISOs will be made available for free download for every new update of Oracle Enterprise Linux. Therefore, users of Oracle Enterprise Linux will be at most one update behind even if they do not purchase any support contract. This is in contrast with the Red Hat Enterprise Linux offering, where

just the original initial release is available as a set of ISOs while updates are delivered via RHN only to paying subscribers.

For a detailed comparison of Oracle Enterprise Linux and Red Hat Enterprise Linux, read the following data sheets:

- [Certification with Oracle Enterprise Linux 4](#)
- [Certification with Oracle Enterprise Linux 5](#)

WHAT IS BACKPORTING?

In general, there are two types of backporting. The first is more traditional, and is what distribution vendors are offering right now. It's the default engineering development practice with Oracle Enterprise Linux, independent from the type of support agreement. In this model, important bug and security fixes applied to the latest major release of a software package also get applied (when relevant) to a previous major release, resulting in an updated software package for both releases.

For example, let's assume that the latest kernel RPM for Oracle Enterprise Linux 4 is kernel-2.6.9-42.0.3.0.2 while the latest kernel RPM for Oracle Enterprise Linux 5 is kernel- 2.6.18-8.0.0.4.1.el5. If a critical security or bug fix is produced for the Oracle Enterprise Linux 5 kernel, it will be also released for the Oracle Enterprise Linux 4 kernel, if the latter suffers from the same vulnerability. There will be a new RPM for Oracle Enterprise Linux 5 (kernel- 2.6.18-8.0.0.4.2.el5), and a new RPM for Oracle Enterprise Linux 4 (kernel-2.6.9-42.0.3.0.3). In order to get the fixes, customers who are running either release should upgrade to the latest version of that software package for the applicable release.

However, this model does have drawbacks. For example, customers who are running an older version of the package on Oracle Enterprise Linux 4 (say kernel-2.6.9-42.0.3.0.1) would be required to upgrade to the latest (kernel-2.6.9-42.0.3.0.3) in order to get the critical fix. Unfortunately if they did so, more than that single critical bugfix would be applied to their running kernel.

To eliminate this drawback, Oracle Unbreakable Linux Premier support includes backporting where individual bugfixes 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 just contains a specific critical bugfix. This type of backporting benefits customers who deploy systems requiring high availability and reliability and want just one particular issue resolved; with Oracle, they can now achieve that without the need to undertake a new complete test cycle to account for the many other changes introduced by upgrading the package to its latest version.

As an example of this backport policy consider the kernel: At a given point in time kernel 2.6.9-42.0.3.0.2 is released on ULN. A few weeks later a security and bugfix kernel release is out on ULN: kernel- 2.6.9-42.0.4.0.1 (reissued from Red Hat kernel-2.6.9-42.0.4). Another ULN security release follows in a few more weeks: kernel- 2.6.9-42.0.5.0.1 (reissued from Red Hat kernel-2.6.9-42.0.5). Following that there is a bugfix release: kernel- 2.6.9-46.0.1.0.1.

Let's assume that a customer is running kernel version 2.6.9-42.0.3.0.2 in production environments, and encounters a critical problem, and that the problem is fixed in the latest Oracle Enterprise Linux 4 kernel version 2.6.9-46.0.1.0.1. Without this type of backporting, the customer would be required to upgrade to the latest (kernel-2.6.9-46.0.1.0.1) in order to get the critical fix.

Unfortunately if they did so, more than that single critical bugfix would be applied to their running kernel. Such bug fixes could destabilize the production environment, however, that specific fix is necessary. If the customer is at the Premier support level, and if the

kernel version deployed is dated not earlier than six months before the latest ULN issued kernel, then the customer is entitled to receiving a customized kernel which will be the same he was running plus the fix for his problem applied.

The Unbreakable Linux Network

The [Unbreakable Linux Network](#) (ULN) is equivalent from a user interface point of view to what Red Hat Network (RHN) offers. Customers need to register their systems first, then they can access the ULN website using their User ID and Password. On the website, customers can see all of the registered systems, what channels are available and which packages they contain, which versions have been applied, when was the last time one checked in their servers, and so forth. It's also possible to download individual packages online, instead of getting them from CD, including the source code. Visit the Unbreakable Linux Network for more information.

Unlike RHN, the Unbreakable Linux Network channels for older update versions of Oracle Enterprise Linux are kept up to date and available. For instance, issuing update 5 of Oracle Enterprise Linux 4 does not obsolete update 4 of Oracle Enterprise Linux 4, as the Update 4 ULN channels are kept alive. Therefore the customer who decides not to jump patch sets or update releases can always rely on the old channel and keep getting bugfixes from there. For instance, as of this writing, the ULN channels look like this:

i386 Architecture	x86-64 Architecture
el5_i386_latest	el5_x86_64_latest
el5_ga_i386_base	el5_ga_x86_64_base
el5_ga_i386_patch	el5_ga_x86_64_patch
el4_i386_addons	el4_x86_64_addons
el4_i386_latest	el4_x86_64_latest
el4_u4_i386_base	el4_u4_x86_64_base
el4_u4_i386_patch	el4_u4_x86_64_patch
el4_u5_i386_base	el4_u5_x86_64_base
el4_u5_i386_patch	el4_u5_x86_64_patch
el4_i386_oracle	el4_x86_64_oracle
el3_i386_latest	el3_x86_64_latest
el3_u8_i386_patch	el3_u8_x86_64_patch
el3_u9_i386_patch	el3_u9_x86_64_patch
el3_u9_i386_base	el3_u9_x86_64_base

Another important ULN component is the Satellite server. The concept behind Satellite server is to install Oracle Enterprise Linux on one system that is registered with ULN and kept updated using up2date. The system is in turn configured as a Yum server, and then all the systems in the same site or company can use Yum to pull the packages in.

Yum is an Open Source program that can be used to retrieve packages from a repository and resolve their interdependencies. While customers who have the satellite server from Red Hat need to get a RHN entitlement for each system, ULN doesn't do entitlement checking;

therefore there are no authentication keys. This is consistent with the same policy in place for all Oracle products.

In addition, the Oracle Management Pack for Linux provides complete Linux server lifecycle management, is available at no additional charge for Basic and Premier support customers. In the future Oracle also plans to release a satellite server based on the same open source software that runs the central ULN repository. All the components of ULN will provide a completely non-proprietary functional equivalent to RHN.

SWITCHING FROM RED HAT TO ORACLE UNBREAKABLE LINUX SUPPORT

Existing Red Hat Enterprise Linux users can easily switch to Oracle Unbreakable Linux support by simply changing the location to download patches and updates to point to the Unbreakable Linux Network (ULN) instead of Red Hat Network (RHN). There is no need to reinstall the operating system. The software customers have installed on top of the OS doesn't need to be reinstalled either, and they don't have to start from scratch or perform any special migration to Oracle Enterprise Linux.

All that is required is to register with the Unbreakable Linux Network and download the up2date RPM provided by Oracle. From that point on nothing else needs to be done, as the patches and erratas from Oracle will be received directly via ULN.

Customers who do not have Red Hat Enterprise Linux, and have either another Linux distribution or a different operating system installed can instead just [download the full ISOs for Oracle Enterprise Linux](#) and install it from scratch.

FOCUS ON QUALITY ASSURANCE AND TESTING

Oracle Validated Configurations are pre-tested, validated architectures with software, hardware, storage and networking components together with documented best practices for deployment. Oracle and its strategic partners offer and recommend these configurations to enable end-users to deploy fully tested solutions to achieve standardization with high performance, scalability and reliability while lowering infrastructure costs.

Oracle Validated Configurations offer guidance to customers deciding what should be run as a full system with an Oracle product running on top of a Linux operating system, in turn running on top of hardware, and at the same time listing the most effective set of tuning parameters for their setups (for both kernel and Oracle applications), and workarounds for known problems. Oracle Validated Configurations include a full range of products, with the entire hardware-software stack tested, not just a small portion of it. Testing includes also working with real workloads, both internal and provided by customers. Read the [Oracle Validated Configurations overview page](#) for more details on how customers can deploy Linux faster.

Oracle has been working with vendors such as Dell, EMC, HP, IBM, NetApp, Sun, Brocade, Cisco, Emulex QLogic, and many others, representing a wide range of the server hardware vendors, to make sure that the fully integrated stacks were completely tested. In general, many OS vendors test their product in-house, focusing on testing the operating system specifically on a number of hardware pieces, and doing so provides enough confidence in their product. However, in the case of Linux there are a large number of choices, forcing the distribution vendors to heavily rely on companies like HP, IBM and Oracle to do the testing.

Such testing has been happening for many years and Oracle has been building out a very large test suite for this purpose, which runs everywhere. The full test suite for Oracle products on Linux (the Oracle Linux Test) runs 24/7 on thousands of machines. Such tests are designed to verify stability and correct behavior of both the operating system and the Oracle applications running on top of it. It includes installation, functional, stress and

destructive tests, which are executed under varying workloads types (I/O intensive, CPU intensive, for instance) with various database sizes. Several parameters are varied during the full run of the test suites, which also include crashes scenarios in Oracle Real Application Cluster configurations.

THIRD PARTY SOLUTIONS

Partners including OEMs, ISVs and other third party vendors are strongly endorsing and supporting Oracle Unbreakable Linux Program, and Oracle Enterprise Linux is listed as a certified platform by infrastructure vendors and third party applications providers. Oracle has a long history of working with industry-leading companies such as Dell, HP, IBM, Intel, AMD, EMC, NetApp, Emulex, Qlogic and many others. In addition, infrastructure vendors are making sure that their customers can get Linux support from Oracle too.

The partner community realizes there is no re-certification necessary, because the Oracle Enterprise Linux code is identical to Red Hat Enterprise Linux, therefore anything that was certified on that is also certified on Oracle Enterprise Linux. This is also true of the Oracle product suite itself, as it is fully certified on Oracle Enterprise Linux, since there are no modifications to the source code except removal of trademarks/logos, and no portions of any of the software packages have been rewritten.

If customers have an application deployed on Red Hat Enterprise Linux, it will continue to run “as-is” on Oracle Enterprise Linux. From a software vendor and a hardware vendor point of view, Oracle certifies and supports all the applications that are certified on Red Hat Enterprise Linux. For a detailed comparison of Oracle Enterprise Linux and Red Hat Enterprise Linux, read the following data sheets:

- [Certification with Oracle Enterprise Linux 4](#)
- [Certification with Oracle Enterprise Linux 5](#)

ORACLE AND LINUX: A STRONG COMMITMENT

Oracle’s involvement with Linux began in 1998, when Oracle Database Release 8 became the first commercial database to be ported to that operating system. Even though there was a still relatively small amount of interest in Linux at the time, it was already used for development and testing environments and Oracle recognized its potential as a viable operating system. At the same time, Oracle started making some investments into some of the Linux start up companies.

In 2002, the initial Oracle Unbreakable Linux program was launched, underscoring Oracle’s commitment to Linux as a viable enterprise operating system. At that time, Oracle’s Linux team had been working with Linux distributors to make sure that certain features were included in the operating system, and Oracle provided considerable QA on the distributions before their official release. Also in 2002, when Oracle 9i Release 2 with Oracle Real Application Clusters was launched, it became the basis for Oracle’s Grid Computing technology by making it possible to build a big system based on smaller, cheap components, and run it as one big computer.

Commodity hardware needed a commodity operating system, and Linux was the perfect choice because the alternative would have been an expensive, propriety operating system. At the same time Oracle started providing direct support for the Linux operating system for customers running Oracle products. Any fixes in the OS produced by Oracle for priority one bugs were contributed back to the vendors on whose distribution they manifested and incorporated in their official Linux releases.

Oracle also created a fully open source Linux Cluster File System—Oracle Cluster File System (OCFS)—which was geared towards helping Oracle Real Application Clusters adoption with Oracle 9i. The second version of this, OCFS2, was the first cluster file

system to become part of the Linux mainline kernel (in version 2.6.16). At the time Oracle also started sponsoring the Linux security evaluations, because they are important for government contracts and some customers require such level of certification.

Oracle has a dedicated Linux operating system development team in house, and a good number of the engineers are community members and have experience with other Linux distribution vendors. The team has been growing since 2000 and it is fully focused on the operating system, rather than the Oracle products.

Today, the Oracle Linux engineering team focuses on contributing future functionality to the operating system with the Linux community. All the development done by the team takes place in the mainline and upstream communities.

Oracle can provide support for the full software stack within one single team. Such a team is very familiar with the Linux operating system, because Oracle has already been moving to Linux for many years and there is already a large Linux customer base.

Many of Oracle's database support analysts and applications developers are used to working with Linux, and the talent and experience of Oracle's support organization is reflected in numerous awards, including a JD Power certification and four consecutive years of Service and Support Professionals Association (SSPA) Awards. If a customer has a product concern that affects both the OS and the Oracle product stack, Oracle's support organization has the critical knowledge and experience required to resolve the customer's issue.

Today, [Oracle Database is #1](#) on Linux with more than 82% market share. Oracle Applications and [Oracle Fusion Middleware](#) continue to build significant momentum on Linux as well, with more than 30 percent of Oracle 11i applications and about 50 percent of Oracle Fusion Middleware shipping on Linux last year. Linux is also very strategic to Oracle as a business because it's an open source, open standards alternative to other operating systems, and Oracle participates heavily in open standards, making the combination very good for the company and its customers.

Within the company, there are scores of Linux production deployments as well, making Oracle itself a significant Linux customer. Oracle Enterprise Linux is Oracle's development environment and Oracle's production environment, with several thousands production systems running Oracle Enterprise Linux and more than 9,000 developers using it as their development platform.

For 30 years, Oracle has provided enterprise-quality support to serve the needs of our customers. Oracle provides a very large-scale support organization, with more than 7,000 professionals in 145 countries providing 24x7 support. Issues can get easily translated in many different languages and they can be followed 24/7 by support professionals around the globe. Oracle Unbreakable Linux leverages Oracle's entire support infrastructure, providing a unique level of scope, experience, and quality.

Complete support for the complete software stack has other advantages in addition to the technical expertise of Oracle's support professionals. When a customer logs into Oracle's bug tracking system they can see all their issues, whether related to the Linux OS or any Oracle products, and the same diagnostic tools that are used to pull information from systems running Oracle products are also used for Linux OS itself.

Oracle is the only vendor in the industry that offers full support for a complete Linux stack – applications, middleware, database, management tools and the operating system.

ADDITIONAL RESOURCES

For more information about Oracle Unbreakable Linux, access the following resources online:

- **Unbreakable Linux on Oracle.com**
oracle.com/linux
- **Download Oracle Enterprise Linux**
edelivery.oracle.com/linux
- **Oracle Validated Configurations**
oracle.com/features/hp/linux-validated-0606.html
- **Top 5 Indemnification Facts**
oracle.com/technologies/linux/ubl-indemnify.pdf
- **General FAQ on Oracle Unbreakable Linux**
oracle.com/technologies/linux/ubl-faq.pdf
- **Purchase Oracle Unbreakable Linux support**
oraclestore.oracle.com/linux
- **Certification with Oracle Enterprise Linux 4**
oracle.com/technologies/linux/el4cert-ds.pdf
- **Certification with Oracle Enterprise Linux 5**
<http://www.oracle.com/technologies/linux/el5cert-ds.pdf>
- **Unbreakable Linux Network**
linux.oracle.com



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