

Foundation for Open Cloud Infrastructure

Delivering Application Services Securely and Effectively

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Introduction

IT organizations face the challenge of delivering services to enable shifting business priorities—supplying strategic applications quickly, securely and with the required quality of service. Enterprise architects look for deployment methodologies that enable agility, make efficient use of IT resources, and lower capital and operating expenses. For this reason, many IT departments deploy applications as virtualized or cloud-based services using open source Linux. In fact this approach is increasingly becoming the norm for delivering enterprise applications.

Oracle Linux is optimal for enterprise application delivery regardless of whether deployments are traditional, virtual, or cloud-based. It is developed, and extensively tested, with demanding mission-critical workloads such as Oracle Database, Oracle Fusion Middleware, and Oracle applications such as Oracle PeopleSoft etc., as well as many third-party enterprise applications.

While Oracle Linux is open source and includes standard technologies, tools and features, Oracle has extended it to deliver a complete, integrated and supported platform for performance-driven production workloads. In addition to a Red Hat compatible kernel, Oracle supplies its own optimized [Unbreakable Enterprise Kernel](#), initially developed to support highly scalable Oracle Engineered Systems.

Support for Oracle Linux is affordable and the release is free to both download and distribute, unlike other commercial Linux distributions. Adding even greater value, Oracle bundles significant additional capabilities such as Ksplice for zero-downtime updates, support for Docker and Linux Containers, OpenStack, Oracle Clusterware for High Availability (HA), and more—at no additional charge with an Oracle Linux Premier Support contract. As a result of these additions, companies receive greater value from their Linux support investment, allowing IT organizations to achieve a higher return on investment (ROI).

This paper describes the Oracle Linux 7 features that help IT organizations deploy strategic applications effectively, securely and efficiently. It discusses the advantages of choosing Oracle Linux and how the operating system brings value to enterprise application delivery. It also explores versatile technologies that are supported with Oracle Linux (such as Containers, Docker, Oracle VM, and OpenStack) that allow IT architects to choose how best to deploy and meet requirements for agile cloud and virtualized application environments.

Engineered for Open Cloud

Oracle Linux is designed for business-critical workloads in the cloud with 128,000 hours per day of testing by Oracle Engineers. Oracle Linux powers Oracle Engineered Systems and contains comprehensive virtualization technologies such as Openstack, Docker and Linux Containers. These options make Oracle Linux highly flexible for all types of cloud deployments. Proven tested cloud deployment with 5.5 million users on Oracle Cloud.

Lowering the Cost of Ownership

Oracle Linux can help to simplify IT operations and lower administrative and operational expenses. There are a number of ways in which Oracle Linux makes potential savings and efficiencies possible:

- » Oracle Linux support contracts include access and support for add-on technologies—including systems management tools, high availability, and support for Docker and OpenStack—at no additional charge. Other commercial Linux vendors charge a significant uplift for these capabilities.
- » Ksplice technology, which allows administrators to perform both kernel and user space patching without a reboot or application interruption, is included with Oracle Linux Premier Support
- » Customers can choose which systems to place under contract and freely download the same patches and errata—for unsupported systems as well as systems covered under contract.
- » Oracle Linux is free to download, use, and redistribute without a support contract.
- » Oracle Linux support costs are much lower than support costs for other commercial Linux distributions.

Let's explore how each of these advantages adds value to Oracle Linux deployments.

How Ksplice Simplifies Operations and Reduces Cost

In day-to-day IT operations, administrators tend to focus on two key responsibilities:

- » Keeping systems and servers patched and up-to-date. As software problems and Common Vulnerabilities and Exposures (CVEs) are discovered and addressed, patches must be applied quickly to minimize risk of security exposure, data compromise, and unplanned outages.
- » Troubleshooting user and developer problems as well as performance issues across the end-to-end stack.

When it comes to performing both these tasks, Oracle Linux's Ksplice technology provides exceptional value. Available exclusively with Oracle Linux Premier Support, Ksplice applies updates while the operating system and applications are running, without requiring a reboot or interruption. Ksplice makes it possible to apply critical security patches, kernel updates, and debugging kernels without the need to coordinate outages and take systems down. Administrators can use Ksplice with both the Unbreakable Enterprise Kernel as well as with the Red Hat Compatible Kernel. For existing Red Hat Enterprise Linux customers, Oracle even offers a 30-day free trial of Ksplice technology (see www.ksplice.com/rhel-signup).

Using Ksplice for Zero Downtime Kernel Updates

When IT organizations take advantage of Ksplice, they can manage Linux environments with greater availability, increased security, and greater flexibility and control. When a kernel defect or security vulnerability is discovered, Oracle's support organization creates a new set of Ksplice kernel modules and makes them available on the Unbreakable Linux Network (ULN), the Oracle Linux support site.

Administrators can choose to automate the delivery and application of Ksplice kernel. For Linux servers covered by Oracle Linux Premier Support, an updated kernel module can be automatically downloaded and applied, instantly replacing the relevant portion of the running kernel without any disruption to facilitate a "rebootless" update.



Administrators can also opt to download and apply Ksplice patches manually. Ksplice can also apply patches to many core user space libraries to speed patching and reduce costly downtime.

Other commercial Linux vendors release kernel patches as upgrades that can also contain new device drivers and back-ported features. This can pose a problem for IT organizations that need to keep servers on a specific kernel release because of known software incompatibilities or conservative upgrade policies designed to preserve stability. Recognizing these limitations, *Oracle develops Ksplice modules for every kernel of each given major distribution release*. This allows IT administrators to apply kernel updates that resolve critical problems and CVE security vulnerabilities without introducing new device drivers and other features that aren't needed.

Ksplice for improved diagnostics and troubleshooting

Ksplice also greatly simplifies diagnostics and troubleshooting since an administrator can swap in a modified kernel without a reboot. When a developer is troubleshooting a potential kernel problem, Oracle support often supplies a debugging kernel targeted specifically at gathering data about the issue. Ksplice dynamically applies the kernel module to the production system without a reboot. Not only can Ksplice apply a debugging kernel to help identify the issue's root cause but also it can install an Oracle support hotfix as a stopgap measure, along with the final errata release, all with zero downtime.

Reducing Cost and Increasing Efficiencies

Clearly Ksplice is a significant advantage in improving uptime and reducing operational costs. From a business perspective, it can also minimize lost opportunity costs since administrators can apply security patches and updates while revenue-generating systems are still running. Oracle Linux can help organizations lower costs and achieve efficiencies in other ways, allowing companies realize greater value from their software and support investments.

Greater Value from a Support Contract

Oracle offers two levels of high-quality, enterprise-class support—Basic and Premier—that provide excellent value. Both support levels include these capabilities at no additional charge:

- » High Availability (HA) using Oracle Clusterware. For mission-critical applications that require HA—including Oracle Database and Oracle applications as well as other critical business applications—Oracle Clusterware supports application failover between cluster nodes. While other Linux vendors impose a substantial uplift for HA functionality, Oracle Clusterware is included with both the Basic and Premier Oracle Linux levels of support.
- » Linux lifecycle management using Oracle Enterprise Manager 12c. While other commercial Linux vendors require an add-on at an additional cost to obtain Linux server management functionality, Oracle Linux support subscriptions include access to Oracle Enterprise Manager 12c. This is an intuitive management interface that controls Oracle Linux provisioning, patching, monitoring, administration, and configuration management.
- » Support for Spacewalk. An Oracle Linux support contract also includes support for Spacewalk, the open-source community project that is the basis for solutions such as Red Hat Satellite Server and SUSE Manager. Customers with Oracle Linux support subscriptions have access to a fully supported Spacewalk build, which can help to simplify platform management during an Oracle Linux evaluation or migration.

The Oracle Linux Premier Support level also includes access to Ksplice, XFS, support for patch back porting, and lifetime sustaining support. In addition, Premier Support also entitles customers to support for Docker and OpenStack (described later in this paper). Details on Oracle Linux support policies are available at oracle.com/us/support/library/enterprise-linux-support-policies-069172.pdf.

Free to Download, Use, and Distribute



True to the open source philosophy, Oracle provides the Oracle Linux distribution as a free download. Anyone can download the binaries, installation media, and the source code at no charge—even without a support subscription. This applies to errata (bug fixes, security updates) as well, making Oracle Linux an ideal enterprise Linux distribution for both production and testing/development servers. For organizations that want to standardize on a single OS, this means that the same Oracle Linux distribution can be used across the enterprise, with the same patches and security updates. Because IT has the flexibility to deploy the operating system everywhere—whether or not servers carry a support contract—using Oracle Linux increases administrative simplicity and permits more cost-effective operations.

Oracle Linux binaries are freely available to download from edelivery.oracle.com/linux, the Oracle e-delivery site. No site or activation keys are required. Source code for Oracle Linux is also publicly available (oss.oracle.com/projects).

Choose Which Systems to Support

While support contracts are crucial for production servers that host business-critical application stacks, there may be many non-production enterprise systems, such as test and development systems, that don't truly require support. Oracle believes that IT should be able to selectively determine which Linux systems need support contracts and therefore makes Oracle Linux patches and security errata freely available. No contract is needed to download and install updates. This allows administrators to apply the exact same errata across all Oracle Linux systems in the enterprise, regardless of whether or not they are on support subscriptions. Oracle makes these updates available at the same time as it releases updates on the Oracle Unbreakable Linux Network (ULN), Oracle's access site for Linux support. In this way administrators can retrieve the exact same errata for both supported and unsupported systems. This approach is distinctively different than that of other commercial Linux vendors.

Under a support contract, customers receive access to Oracle's world-class support infrastructure with 24/7 Linux support in 145 countries worldwide. Support is assigned on a per-server basis, and is available for servers that run the Red Hat Compatible Kernel as well as the Unbreakable Linux Kernel. To simplify support engagements, Oracle also offers support for existing server configurations that host Red Hat Enterprise Linux as well as systems with Oracle Linux.

Lower Software Support Costs

In comparison to support costs for other commercial Linux distributions, the price point for Oracle Linux support is significantly lower. The [Oracle VM and Oracle Linux Cost Calculator tool](#) contrasts potential support costs based on publicly available pricing data. By entering a system configuration (the number of sockets and virtual guests), a server quantity, and the term of the subscription (one or three years), the tool generates estimated support expenses. For one or two-socket server configurations (with unlimited virtual guests), Oracle also offers limited-version support contracts at discounted prices.

Deployment Flexibility and Choice

Oracle Linux Ksplice is a clear benefit in keeping Tier 1 production applications up and running and reducing operational costs. To keep costs down and provision applications quickly, customers seek greater deployment agility, which is why many IT organizations are taking advantage of advances in virtualization and cloud computing technologies. Recognizing the need for deployment choice, Oracle provides Oracle Linux support for many flexible deployment scenarios including:

- » Lightweight LXC Linux containers
- » Support for Docker application containers on UEK R4 (support is included with Oracle Linux Premier support)
- » Support for hypervisor-based virtual machines in Oracle VM, ideal for virtualizing Tier 1 applications

- » Support for OpenStack cloud deployments (OpenStack support is included with Oracle Linux and Oracle VM Premier support and is valid for either Oracle OpenStack or a third-party OpenStack distribution)
- » Oracle Engineered Systems: pre-integrated and purpose-built solutions that incorporate Oracle Linux

Linux Containers (LXC)

Linux Containers (LXC) can host multiple isolated Linux instances, called containers, on a single host. In contrast with hypervisor-based virtualization technologies like Oracle VM, Linux containers are lightweight and share a single kernel image (a hypervisor-based virtualization technology such as Oracle VM is able to support different operating systems and different kernels as virtual guests).

Docker Technology

Docker is an open source project that enables the fast creation and distribution of application containers across Oracle Linux and other Linux systems. Docker runs a single application in a similar manner to LXC application containers—both technologies provide isolation from other running processes within a single physical system. Also similar to LXC, all Docker application containers execute system calls to the same underlying kernel. Oracle Linux customers that have the Premier level of support automatically receive support for Docker at no additional cost.

Docker's strength lies in its ability to capture the precise configuration of an application and its software dependencies into a virtual container that can then be deployed across any number of Linux servers. By using Docker, administrators can deploy application images rapidly, reliably and consistently without software dependency and portability problems that often derail projects and delay time-to-production. Docker can be used effectively to deploy Linux containers across different machines, making Linux application containers portable.

Use cases for Docker technology include, but aren't limited to, the following examples:

- » Application isolation. As with Linux Containers, Docker enables application deployment in a lightweight, isolated environment.
- » Platform neutrality. Docker can help to mitigate issues surrounding application compatibility and server updates. An administrator can deploy a Docker image and support a new application that runs on an older host in a container.
- » Rapid deployment. An administrator can install an application in a Docker container with Oracle Linux and save the modified container as an image that can be propagated rapidly. For example, by building an image that contains an Apache HTTP server on Oracle Linux, an administrator can deploy multiple web servers quickly, installing them rapidly across many Linux servers in a data center.
- » Software development and testing. Docker is ideal for development environments where it's necessary to manage pipelines and test code in consistent, known software configurations. When a Docker image is captured and created, it contains the complete state of the environment, including installed packages and patches. Docker also enables version control capabilities that resemble `git` capabilities. Storing Docker images in cloud-based repositories (either publicly on the Docker Hub registry or in private internal registries) simplifies software distribution, helping to streamline provisioning.

Customers that choose to use Docker can deploy it on UEK R4 (with either Oracle Linux 6 or Oracle Linux 7), and it is fully supported by an Oracle Linux Premier Support agreement. In conjunction with Oracle Linux Premier Support, Docker deployments can also take advantage of Ksplice updates. By running a Ksplice update in the main Oracle Linux environment, for example, an administrator can easily apply the latest bug fixes and CVEs without impacting applications running across numerous Docker or LXC containers.

Oracle VM for Hypervisor-Based Virtualization

Many production environments that deploy Tier 1 applications want the advantages of full hypervisor-based virtualization for application isolation, resource management, and high service levels. Oracle VM is Oracle's



hypervisor-based virtualization technology and can support multiple guest operating systems (Oracle Linux, Oracle Solaris, Microsoft Windows, and other Linux distributions)—unlike the lightweight container technologies of LXC and Docker. The Oracle VM software, like Oracle Linux, is free to download and use. There are no licensing fees and customers pay only a low annual fee for enterprise-class support of selected servers.

Oracle VM is part of Oracle's end-to-end technology stack. Together with Oracle Linux, it is the most widely deployed application environment internally within Oracle, hosting more than 310,000 virtual machines across Oracle's development and public cloud data centers. In addition to broad internal use, Oracle conducts extensive testing of Oracle Database, Oracle Fusion Middleware, and Oracle applications using Oracle VM in virtualized deployments.

Oracle VM Templates accelerate Tier 1 application provisioning—both for customers and Oracle internally—allowing administrators to stand up complete Oracle application stacks reliably and repeatedly. Templates with complete applications built on Oracle Linux are available for Oracle Database (Real Application Clusters as well as single instance), Oracle E-Business Suite, Oracle PeopleSoft, JD Edwards EnterpriseOne, Oracle Fusion Middleware, and more. (See the complete list of available applications at oracle.com/technetwork/server-storage/vm/overview/templates-101937.html.)

OpenStack Open Source Cloud Technology

Many IT organizations seek to evolve application provisioning and implement a cloud service delivery model that optimizes agility and data center resource use. OpenStack is open source software technology that provides an efficient means of deploying and managing cloud-based environments. OpenStack can control large pools of compute, storage, and networking resources across a data center, managing them through the OpenStack dashboard or the OpenStack API. It can connect components from different vendors and expose a consistent API regardless of underlying components like hypervisors, network devices, storage systems, and compute servers.

Oracle provides an OpenStack distribution that installs directly on top of Oracle Linux and Oracle VM and is supported for production environments. Oracle OpenStack is based on the OpenStack Icehouse release. It allows customers to easily take advantage of the efficiency, performance, scalability, and security of Oracle Linux and Oracle VM, simplifying the deployment of private cloud environments. A typical production cloud implementation installs the OpenStack control node on an Oracle Linux instance and uses Oracle VM to replicate OpenStack compute nodes across multiple servers. The OpenStack compute nodes can then host any guest operating system supported on Oracle VM—Oracle Linux, Oracle Solaris, Microsoft Windows, and other Linux distributions.

For customers that have Oracle Linux Premier Support or Oracle VM Premier Support, support for OpenStack is included at no additional cost. Oracle gives customers a choice of which OpenStack technology they want to deploy—under an Oracle Linux or Oracle VM Premier Support agreement, Oracle supports Oracle OpenStack or any third-party OpenStack distribution. Since Oracle includes OpenStack support with these support contracts, customers can make a single phone call to Oracle and receive support across an end-to-end cloud deployment.

Oracle Engineered Systems

Many IT departments want to standardize on Linux and build an infrastructure using Linux Containers, Docker, hypervisor-based virtualization, and OpenStack. As discussed, Oracle Linux is a compatible and unifying technology given any of these deployment approaches. Some organizations, however, prefer to avoid the cost and complexity of designing and implementing IT infrastructure themselves, and look to Oracle to provide optimized infrastructure for Oracle database, middleware, and application workloads. For these customers, Oracle develops and validates purpose-built Oracle Engineered Systems.



Oracle Engineered Systems accelerate time-to-production and take the guesswork out of building IT infrastructure. These systems incorporate state-of-the-art Oracle hardware and software components and are configured according to best practices for a specific workload. Each Oracle Engineered System is fully validated and optimized for performance, scalability and high service levels.

Oracle Linux is a core technology in all x86-based Oracle Engineered Systems, and is either the base operating system or a key component:

- » **Oracle Private Cloud Appliance.** This appliance is a turnkey converged infrastructure solution that integrates Oracle VM with compute, network, and storage resources in a software-defined fabric. It supplies a production-ready infrastructure that scales easily from 2 to 25 compute nodes per rack. In conjunction with Oracle VM Templates, this engineered system allows administrators to provision production-ready applications across VMs in a matter of minutes. Oracle Linux can be used as the operating system for virtual guests and Oracle Linux Premier Support is included at no additional charge with Oracle Premier Support for Systems.
- » **Oracle Database Appliance.** The Oracle Database Appliance is an entry-level, 2-node database appliance that pre-integrates Oracle RAC, Oracle Linux, Oracle VM, x86 servers, storage, and networking. It is a fully integrated system that delivers highly available, optimized database services for online transaction processing (OLTP) and data warehousing applications.
- » **Oracle Exalogic Elastic Cloud.** This Oracle engineered system integrates compute, network, and storage components with Oracle VM virtualization, providing a high-performance infrastructure on which to deploy Oracle business applications, Oracle Fusion Middleware, or other software products. Oracle VM is tightly integrated with the I/O backplane using a technique called Single-Root I/O Virtualization (SR-IOV). SR-IOV allows the same InfiniBand I/O adapter to be shared by up to 63 virtual machines, eliminating overhead and delivering exceptional application performance.
- » **Oracle Exalytics In-Memory Machine.** Built using best-in-class hardware, market-leading business intelligence software and in-memory Oracle Database technology, Oracle Exalytics is an optimized system that provides speed-of-thought analysis with unmatched intelligence, simplicity, and manageability. It is designed specifically for applications that perform business intelligence, modeling, forecasting, and planning.
- » **Oracle Exadata Database Machine.** Oracle Exadata features a scale-out design with industry-standard x86 servers and intelligent storage that includes state-of-the-art flash technology and a high-speed InfiniBand internal fabric. It provides extreme performance and availability for Oracle Database workloads—for both OLTP and data warehousing—making it an ideal platform for large-scale database consolidation.

When Oracle Exadata and Oracle Exalogic were first introduced, Oracle created the Oracle Linux UEK to provide a modern high-performance Linux kernel for these engineered systems. Today the UEK is still the kernel of choice for x86-based Oracle Engineered Systems because it is optimized to scale as the number of CPUs, memory, and InfiniBand connects increase. The Oracle Linux team collaborates in ongoing engineering efforts with their counterparts in Oracle Engineered Systems, enhancing the Oracle Linux UEK and optimizing performance, especially in the areas of scalability, memory management, and Infiniband.

Unbreakable Enterprise Kernel

Oracle tests the Oracle Linux UEK extensively with Oracle workloads, recommending it for Tier 1 Oracle applications and other mission-critical workloads. Internally Oracle deploys the UEK exclusively for its build and QA systems for Oracle Database and other Oracle software products. Furthermore, since it offers optimized performance, the UEK is used in all Oracle Linux benchmarks.

In addition to testing on Oracle hardware and engineered systems, the UEK is certified with many third-party hardware systems, including systems from HP, Dell, Cisco and Lenovo. As a matter of fact, Oracle publishes a [Hardware Certification List \(HCL\) for Oracle Linux and Oracle VM](#) that lists third-party systems on which these products are certified.

Achieving Fast and Reliable Deployments with Less Risk

Oracle invests significantly in testing Oracle Linux with Oracle database, middleware, and application workloads, making it an ideal foundation for all enterprise deployments. Because of the extensive testing that Oracle Linux receives running Oracle applications, the operating system can provide the proven scalability, stability and resiliency needed to support both Oracle and non-Oracle mission-critical workloads.

Packages released by Oracle as part of Oracle Linux undergo a long testing cycle that includes the routine testing of the full software. Oracle's industry-leading QA team has worked with internal teams as well as strategic ISVs and customers for many years. This depth of experience has helped build an extensive and ever-growing test matrix of real-life workloads. Formal QA testing for Oracle Linux, of course, is in addition to the more than 128,000 compute hours per day that the operating system undergoes running Oracle workloads internally within Oracle itself.

Oracle invests in helping enterprises deploy Oracle Linux quickly and with greater confidence. For this reason Oracle has developed Oracle Linux pre-installation packages that resolve software dependencies for common Oracle software deployment scenarios. For example, to optimize security for a database configuration, an administrator can install a minimized Oracle Linux configuration and install the Oracle Database 11g or 12c pre-installation RPM before installing the database software. Pre-installation RPMs are also available for Oracle E-Business Suite and the Oracle Enterprise Manager 12c agent.

Oracle also offers the Oracle Linux and Oracle VM Validated Configuration Program to validate Oracle software configurations that integrate complementary, third-party components and technologies. Oracle partners, such as AMD, Brocade, Cisco, Dell, EMC, Emulex, Fujitsu, HP, IBM, Intel, Microsoft, NetApp, QLogic, and others, take advantage of the program to validate and document Oracle Linux and Oracle VM configurations and publish best practice guidelines. The result is more reliable Oracle Linux and Oracle VM configurations that can be deployed rapidly with lower implementation costs. For more information, visit oracle.com/technetwork/topics/linux/validated-configurations-085828.html.

Conclusion

Oracle is the only vendor in the industry that offers a complete Linux-based solution stack—applications, middleware, database, management tools, operating system and hardware—along with a single point of support. Customers that deploy Oracle Linux benefit greatly from the latest Linux innovations as well as rigorous testing with real world workloads.

As this paper describes, IT organizations that standardize on Oracle Linux have a number of deployment options from which to choose. With the advent of new advances in open source technologies, IT departments can deploy applications more quickly using lightweight Linux Containers and Docker images, or combine these approaches to improve application isolation, resource control, and rapid provisioning. Traditional virtualization using Oracle VM can be an optimal approach for Tier 1 applications or when application requirements dictate the need for multiple operating systems. To deliver applications as private cloud services, Oracle OpenStack technology may be an ideal approach in conjunction with Oracle VM.

In any of these deployment scenarios, Oracle Linux can add value through its optimized performance and scalability and the ability to perform seamless, zero-downtime upgrades with Ksplice. As the number of application environments expands across data centers, managing them on a day-to-day basis becomes a greater administrative challenge and expense. Customers that have Oracle Linux Premier Support contracts can use Ksplice to help keep their critical application environments—whether using containers, VMs, or OpenStack compute nodes—updated



with the latest security errata and bug fixes, without interruption. And Oracle's comprehensive support—providing support for Docker and OpenStack as a part of Oracle Linux Premier Support—helps IT organizations innovate and evolve cost-effectively while building a new generation of agile application solutions.

Get started with Oracle Linux by downloading the software at edelivery.oracle.com/linux. Contact your Oracle representative or visit www.oracle.com/linux (or the references below) to learn more.

References

TABLE 1. RESOURCES FOR MORE INFORMATION	
Web Resources	Web URL
Oracle Linux Home Page	oracle.com/us/technologies/linux
Oracle Linux Download	edelivery.oracle.com/linux
Oracle Public Yum server	public-yum.oracle.com/
Oracle Linux Source	oss.oracle.com/git
Oracle Linux Blogs	blogs.oracle.com/linux/
Oracle Linux 7 Documentation	docs.oracle.com/cd/E52668_01/index.html
Oracle Linux Cost Calculator	oracle.com/us/media/calculator/linuxco/
Hardware Certification List (HCL) for Oracle Linux and Oracle VM	linux.oracle.com/hardware-certifications
Webcasts and Podcasts	Web URL
Building the Modern Cloud-Enabled Data Center with Oracle Linux 7	w.on24.com/r.htm?e=877873&s=1&k=771B677E7446BAFCBC53A2B654A93719
Oracle Linux 7 Q&A with Wim Coekaerts	streaming.oracle.com/ebn/podcasts/media/20209545_Oracle-Linux-7.mp4
Spacewalk and Ksplice: Keeping Oracle Linux Systems Up to Date and Secure	w.on24.com/r.htm?e=877877&s=1&k=44834EA17D303C812AE38EA6EE567A63
White papers	Web URL
"Oracle Linux: Maximize Value, Minimize Cost"	oracle.com/us/technologies/linux/linux-max-value-min-cost-wp-2209610.pdf
"Ksplice: Zero Downtime Updates for Oracle Linux"	oracle.com/us/technologies/linux/ksplice-datasheet-487388.pdf
"Using Oracle Ksplice as a Diagnostic Tool with Oracle Support"	oracle.com/us/technologies/linux/using-ksplice-wp-2228962.pdf
"Ksplice Offline"	oracle.com/us/technologies/linux/ksplice-offline-updates-ds-1898638.pdf
"Oracle Linux Management with Oracle Enterprise Manager 12c"	oracle.com/us/technologies/linux/linux-with-enterprise-manager-1959006.pdf
"Oracle Clusterware for Oracle Linux"	oracle.com/technetwork/database/database-technologies/clusterware/overview/clusterware-for-linux-088663.html?ssSourceSiteId=ocomen
"What Makes Oracle Linux the Best Platform for Oracle Database 12c"	oracle.com/us/technologies/linux/linux-for-oracle-database-wp-2068570.pdf



Integrated Cloud Applications & Platform Services

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