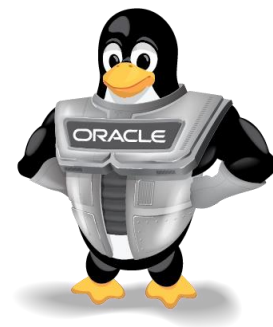**ORACLE**
Ksplice

Protecting Linux systems with Oracle Ksplice zero-downtime updates

Oracle Ksplice updates the Linux operating system (OS) kernel, hypervisor and key user space libraries *while the OS is running* on-premises or in the cloud, without a reboot or interruptions. Only Oracle Linux Premier Support subscriptions offer this unique capability, making it possible to apply critical security patches and important updates immediately, and without the resources, operational costs, and business disruptions associated with forced reboots.

The cost of rebooting

Linux kernel updates with important new security and reliability patches are released about once per month. Updates for critical user space libraries (`glibc` and `openssl`) also are released regularly.

Industry regulations and best practices require companies to apply these security updates and patches as soon as possible because security will be compromised by a failure to update.

Linux systems usually need to restart in order to have kernel, hypervisor or critical user space patches take effect, thus system administrators are forced to choose between known best practices versus forced system reboots that are costly and disruptive.

Oracle Linux Premier Support customers can increase the security, reliability and availability of their Oracle Linux systems—as well as those running other Linux operating systems such as Red Hat Enterprise Linux, CentOS Linux, and Ubuntu—by applying updates using Ksplice without rebooting.

Why use Ksplice?

Ksplice allows system administrators to install critical patches with lower costs, less downtime, increased security, and greater flexibility and control.

- **Improve security**: Postponing the installation of updates to a convenient time is a tempting practice but it is also dangerous. Systems that are not up

Key benefits

- Increase security with the ability to apply OS patches without reboots

- Lower operational costs by reducing the amount of resources required for scheduling and managing reboots

- Improve application availability and uptime

- Experience world-class, enterprise support for Linux and virtualization environment

- Supports multiple Linux distributions

Supported OS and Hardware

Oracle Ksplice supports Oracle Linux on the following hardware architectures

- 64-bit Intel and AMD (x86-64)

- 64-bit Arm (aarch64)

Visit Oracle Linux Hardware Compatibility List (HCL).

Oracle Ksplice also supports additional OSs on x86-64 platforms

- Oracle VM Server for x86

- Red Hat Enterprise Linux (RHEL)

- CentOS Linux

- Ubuntu

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to date are vulnerable. Ksplice makes it easy to keep systems up to date and secure, reducing the window of vulnerability by applying updates in a timely manner. In addition to protecting systems, Ksplice can alert administrators to suspicious activities with its known exploit detection feature. As a result, security compliance is vastly improved.

- **Reduce operational costs**: Customers can stop spending long nights and weekends rebooting servers for critical updates. In addition, customers do not need to coordinate with system users about outages caused by reboots, which typically need significant advanced planning and costly supervision across hardware, OS, database, and application layers. Complications can happen during a reboot: for example, services might not start properly, or the interrupted system may cause a problem with a separate system. Ksplice saves customers this hassle and lets them focus elsewhere.

- **Improve availability**: With Ksplice, updates are installed quickly—a few seconds to a few minutes—without interrupting running applications or the people using those applications. The current status of systems can be easily checked before rolling out needed updates. Installing those updates requires no downtime, improving system availability. Critical updates and security patches are applied without rebooting. Rolling back Ksplice updates is also easy and is done without downtime, while other Linux live patching technology may require a reboot to revert live patches. Uninstalling all Ksplice updates can bring a Linux system back to the original stock kernel, or individual updates can be uninstalled by specifying a Ksplice identifier (KID) while the Linux system is running.

- **Experience world-class, enterprise support**: Oracle Linux Premier Support, Oracle VM Premier Support, or Oracle Cloud Infrastructure customers benefit from using Ksplice for zero-downtime diagnostic and security patches. For customers running an Oracle solution, there is one point of support for the entire stack.

- **Multiple OS support**: With Oracle Linux Premier Support (also included with an Oracle Cloud Infrastructure subscription or Oracle Premier Support for Systems), customers can use Oracle Ksplice for zero-downtime patching for supported Linux kernels in Oracle Linux, Red Hat Enterprise Linux, CentOS Linux, and Ubuntu.

How to get Ksplice and how does it work?

Users can obtain an access key by subscribing to Oracle Linux Premier or Oracle VM Premier Support, which gives the customer access to the Unbreakable Linux Network (ULN). They can then request a Ksplice access key through ULN.

After installing Ksplice, customers can easily apply all important Linux kernel, KVM and Xen hypervisor updates without needing to reboot. No configuration changes or initial reboot is needed to install. Ksplice loads a Linux kernel module that rewrites portions of the running kernel to apply the updates.

An enhanced Ksplice client for Oracle Linux can be installed to patch in-memory pages of Ksplice-aware shared libraries such as `glibc` and `openssl`. A reboot is

Key features

Rollback capability. Any update that can be applied using Ksplice can also be reversed without rebooting.

No performance impact. Ksplice does not negatively affect performance. No daemon or system agent is required.

Web interface and API. View and manage the status of Ksplice on Linux systems from one place – a web interface or programmatically via a REST API.

Virtualization and container compatibility. Ksplice works well in virtualization and container environments.

User space patching. Ksplice supports updates to many critical user space libraries such as `glibc` and `openssl` without rebooting.

Offline Updates. Ksplice can update systems not directly connected to the internet by using an internal update mirror.

Known exploit detection. Ksplice automatically sends an alert if an attacker attempts to exploit patched privilege escalation vulnerabilities.

Proxy support. Ksplice supports standard HTTP proxies to pass through firewalls.

Access policies. Ksplice offers access policies for individual systems or groups.

Email notifications. Administrators can choose to be notified when new Ksplice updates are available for their systems.

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required after installing the enhanced Ksplice client so that the system will use the Ksplice-aware versions of the user space libraries without rebooting for future updates.
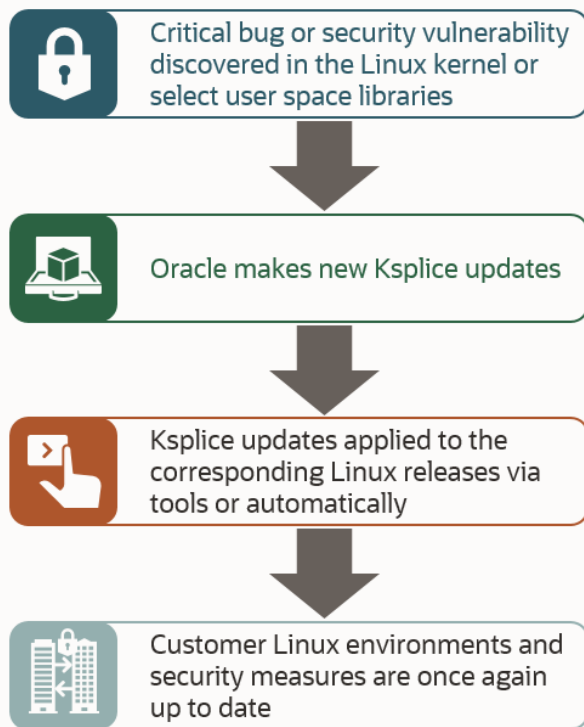

Figure 1: Lifecycle of a Ksplice update

Known exploit detection

An additional benefit of Ksplice is the ability to alert administrators when an alarm is detected via Ksplice Known Exploit Detection. When Oracle Linux systems are patched with Ksplice, not only is the security vulnerability closed, but tripwires are laid down for privilege escalation vulnerabilities. This means that if an attacker attempts to exploit a vulnerability that has been patched, Ksplice sends notification.

Management tool integration and ISV interoperability

Oracle Autonomous Linux provides automated zero-downtime patching by leveraging Oracle Ksplice. Autonomous Linux and Ksplice are integrated with the Oracle Cloud Infrastructure (OCI) OS Management Service. The OS Management Service provides tools to automate common operating system management tasks, such as patch and package management, and security and compliance reporting for Oracle Linux Compute instances deployed in OCI.

Oracle Enterprise Manager has integrated Ksplice patching functionality to enable a simplified approach to the management of Oracle Linux in a single place including the ability to patch using Ksplice for both kernel and user space updates.

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[Oracle Linux Manager](#) can be configured to act as a Ksplice mirror with repositories and associated software channels for the Oracle Linux releases to run the offline client in order to meet customers' Linux lifecycle management and flexible deployment requirements.

Furthermore, Ksplice interoperates with common vulnerability scanners such as Qualys Cloud Platform, Rapid7 Nexpose, and Tenable Nessus. They support patches applied through Ksplice.

Established track record

With over 2.5 million servers protected each month, and over 100 million updates applied, Ksplice can be trusted to keep customers' mission-critical systems up to date.

Get started

To see which patches should be applied to the supported Linux systems, use the free online tool [Ksplice inspector](#) to help proactively identify vulnerabilities.

To get hands-on experience using Ksplice, read the [tutorial](#) which is available in an [Oracle-provided free lab environment](#).

With Oracle Linux Premier Support subscriptions, which are included in [Oracle Cloud Infrastructure](#) subscriptions without additional cost, customers can use Ksplice to bring their Linux kernels and critical user space libraries up to date with the latest, important security and bug fix patches.

Please [contact the Oracle team](#) for more information about obtaining [Oracle Linux Premier Support](#) or [Oracle Cloud Infrastructure subscriptions](#) to help improve the Linux security and compliance with Ksplice.

To learn more about Oracle Ksplice, visit [ksplice.oracle.com](#) and [Ksplice User's Guide](#).

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