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Using Oracle Ksplice as a Diagnostic Tool with Oracle Support

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Introduction

One of the most powerful and often overlooked features of the Ksplice feature of Oracle Linux is its ability to be used as a diagnostic tool for troubleshooting issues with the Oracle Linux Kernel. Ksplice allows for diagnostic patches to be loaded into the kernel in real time without the need to reboot. This article will provide additional insight to how this process works when working with Oracle Support.

Getting Started

The customer begins the process by filing a service request with Oracle Linux Support. The Oracle Linux Support organization will work with the customer to identify the nature of the underlying problem and will check to see if this is a known issue. If the issue is with a known bug the customer will be advised how to resolve the issue. When the underlying problem is not known, more information is often needed to determine the root cause and resolve the issue. The Oracle Linux support organization may contact development to request a diagnostic Ksplice patch be created to collect additional information about the problem. There are many options available to the engineering team on what information should be collected. Additional debug messages can be added to specific parts of the code or in a case where the contents of memory are needed, the diagnostic patch can generate a core dump for a detailed analysis. It's important to note that engineering will attempt to use the least disruptive method possible when collecting diagnostic information on a customer's production system(s). These diagnostic Ksplice patches are then applied and removed from the system without rebooting.

Applying the Ksplice diagnostic patch provided by Oracle Linux Support is a very simple procedure. Three files are included with the diagnostic patch, and a `README` file provides full instructions for the installation and information about the Ksplice patch. The `uptrack.tar` file includes scripts to assist with the installation of the Ksplice patch and a `ksplice-XXver.tar.gz` file contains the actual Ksplice patch that will be installed. The `ksplice-XXver.tar.gz` file will be named uniquely for the Ksplice patch that is being installed. The customer then runs the `ksplice-apply` script to apply the patch. The `ksplice-apply` script is written in the Perl language and is used to apply the Ksplice patch to the running kernel. The script does not require the user have any of the Ksplice binaries pre-installed on the system. The script provides the functionality of these binaries through the Perl module `ksplice.pm`.

The following section will walk through an example of the steps for applying a Ksplice diagnostic patch. For the purpose of this article we are using a nonexistent `ksplice-XXver.tar.gz` as our example.

Installing a Ksplice Diagnostic Patch

The procedure for installing the patch is very simple and takes only a few minutes. A reboot of the system is not required to apply this Ksplice patch and important diagnostic information is begins collecting as soon as the Ksplice patch is applied.

1. Check your kernel version and make sure it matches the version in the `README` file provided. The version must match exactly as these patches are designed for specific versions of the kernel code.

   ```
   uname -r
   ```

2. Unpack the `uptrack.tar` file using the `tar` utility.

   ```
   tar xvf uptrack.tar
   ```

3. Move the `ksplice-XXver.tar.gz` file into the `uptrack` directory that was just created.

   ```
   mv ksplice.tar.gz
   ```

4. Change Directory into the `uptrack` directory.

   ```
   cd uptrack
   ```

5. Apply the patch using the `ksplice-apply` script.

   ```
   ./ksplice-apply ksplice-XXver.tar.gz
   ```

6. Once the patch is installed you can view it with the `ksplice-view` script.

   ```
   ./ksplice-view
   ```

Removing a Ksplice Diagnostic Patch

Removing the Ksplice patch is also an easy process. Rebooting the machine will restore it to its original configuration but rebooting takes time, interrupts services and is unnecessary when using Ksplice. We include the `ksplice-undo` script, which can be used to remove the Ksplice patch without restarting the system. It is worth noting that you need to use the name of the patch rather than the filename of the `ksplice-XXver.tar.gz` file when removing the patch. To determine the name of the patch, simply use the `ksplice-view` command and then type the following to remove:

```
./ksplice-undo XXver
```

After this completes, the machine is back to state it was in before applying the patch. No downtime!

The Solved Problem

Once the diagnostic information is collected and provided to support, the engineering team has the additional information needed to develop a fix and provide the final patch. Once the patch is developed, engineering may issue another one-off Ksplice patch (hot fix) to verify the solution before the final errata is released to the Unbreakable Enterprise Network (ULN). At this point, customers with Oracle Linux Premier Support can apply the final Ksplice patch using the Ksplice uptrack utility, again with zero-downtime.

The Oracle Linux and Ksplice Advantage

The ability to preserve the system state and collect diagnostic information is a very powerful feature that only Ksplice is able to offer. This allows a system to be diagnosed and patched permanently without the need to reboot. No maintenance windows, no downtimes and with minimal work required for the customer.

You may be thinking this is very interesting, but how does this relate to my environment? Imagine for a moment you are running a large farm of 100 mission critical servers all running the same production application. One of the systems runs into a bug, and by sheer luck 99 of the systems have not yet displayed symptoms yet, but are all based on the same master image. By working on the problem on a single system with Oracle Support and doing diagnostics with Ksplice without rebooting, you now have a patch that will prevent 99 servers from ever encountering the same bug. That is a lot of unplanned downtime you just saved patching and rebooting 100 systems. How much does unplanned downtime cost at your company?

Additional Information

Installation instructions for Ksplice Uptrack:

https://www.ksplice.com/uptrack/install

Information on using Ksplice:

https://www.ksplice.com/uptrack/using

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