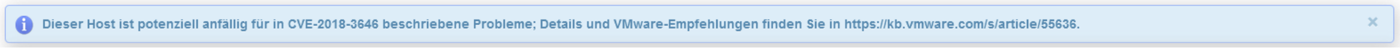
# CVE-2018-3646

Dieser Host ist potenziell anfällig für in CVE-2018-3646 beschriebene Probleme; Details und VMware-Empfehlungen finden Sie in https://kb.vmware.com/s/article/55636.



Dieser Host ist potenziell anfällig für in CVE-2018-3646 beschriebene Probleme; Details und VMware-Empfehlungen finden Sie in https://kb.vmware.com/s/article/55636.

SSH:

```
esxcli system settings kernel set -s hyperthreadingMitigation -v TRUE
```

Quelle: https://knowledge.broadcom.com/external/article?legacyId=55806

1. **Update Phase: Apply vSphere Updates and Patches**

   The Sequential-context attack vector is mitigated by a vSphere update to the product versions listed in VMware Security Advisory VMSA-2018-0020. This mitigation is dependent on Intel microcode updates (provided in separate ESXi patches for most Intel hardware platforms) which are also documented in VMSA-2018-0020. This mitigation is enabled by default and does not impose a significant performance impact.

   **Note**: As displayed in the workflow above, vCenter Server should be updated prior to applying ESXi patches. Notification messages were added in the aforementioned updates and patches to explain that the ESXi Side-Channel-Aware Scheduler must be enabled to mitigate the Concurrent-context attack vector of CVE-2018-3646. If ESXi is updated prior to vCenter you may receive cryptic notification messages relating to this. After vCenter has been updated, the notifications will be shown correctly.
2. **Planning Phase: Assess Your Environment**

   The Concurrent-context attack vector is mitigated through enablement of the ESXi Side-Channel-Aware Scheduler which is included in the updates and patches listed in VMSA-2018-0020. This scheduler is not enabled by default. Enablement of this scheduler may impose a non-trivial performance impact on applications running in a vSphere environment. The goal of the Planning Phase is to understand if your current environment has sufficient CPU capacity to enable the scheduler without operational impact.

   The following list summarizes potential problem areas after enabling the ESXi Side-Channel-

Aware Scheduler:

- VMs configured with vCPUs greater than the physical cores available on the ESXi host
- VMs configured with custom affinity or NUMA settings
- VMs with latency-sensitive configuration
- ESXi hosts with Average CPU Usage greater than 70%
- Hosts with custom CPU resource management options enabled
- HA Clusters where a rolling upgrade will increase Average CPU Usage above 100%

**Important**: The above list is meant to be a brief overview of potential problem areas related to enablement of the ESXi Side-Channel-Aware Scheduler.

**Note**: It may be necessary to acquire additional hardware, or rebalance existing workloads, before enablement of the ESXi Side-Channel-Aware Scheduler. Organizations can choose not to enable the ESXi Side-Channel-Aware Scheduler after performing a risk assessment and accepting the risk posed by the Concurrent-context attack vector. This is NOT RECOMMENDED and VMware cannot make this decision on behalf of an organization.

3. **Scheduler-Enablement Phase:**
   a. **Enable the ESXi Side-Channel-Aware Scheduler in ESXi 5.5, 6.0, 6.5, and 6.7 (prior to 6.7u2) and 7.0.**

After addressing the potential problem areas described above during the Planning Phase, the ESXi Side-Channel-Aware Scheduler must be enabled to mitigate the Concurrent-context attack vector of CVE-2018-3646. The scheduler can be enabled on an individual ESXi host via the advanced configuration option *hyperthreadingMitigation* .

**Notes**:

- Enabling this option will result in the vSphere UI reporting only a single logical processor per physical core; halving the number of logical processors if Hyperthreading was previously enabled. In addition Hyperthreading may be reported as 'Disabled' in various configuration tabs.
- The current ESXi Side-Channel-Aware scheduler also addresses CVE-2018-5407 .

Enabling the ESXi Side-Channel-Aware Scheduler using the vSphere Web Client or vSphere Client

1. Connect to the vCenter Server using either the vSphere Web or vSphere Client.
2. Select an ESXi host in the inventory.
3. Click the **Manage** (5.5/6.0) or Configure (6.5/6.7/7.0) tab.
4. Click the **Settings** sub-tab.
5. Under the System heading, click **Advanced System Settings**.

6. Click in the Filter box and search `VMkernel.Boot.hyperthreadingMitigation`
7. Select the setting by name and click the **Edit** pencil icon.
8. Change the configuration option to true (default: false).
9. Click **OK**.
10. Reboot the ESXi host for the configuration change to go into effect.

Enabling the ESXi Side-Channel-Aware Scheduler using ESXi Embedded Host Client

1. Connect to the ESXi host by opening a web browser to https://*HOSTNAME* .
2. Click the **Manage** tab.
3. Click the **Advanced settings** sub-tab.
4. Click in the Filter box and search `VMkernel.Boot.hyperthreadingMitigation`
5. Select the setting by name and click the **Edit** pencil icon.
6. Change the configuration option to true (default: false).
7. Click **Save**.
8. Reboot the ESXi host for the configuration change to go into effect.

Enable ESXi Side-Channel-Aware Scheduler setting using ESXCLI

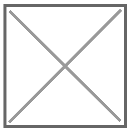
1. SSH to an ESXi host or open a console where the remote ESXCLI is installed. For more information, see the ESXCLI Developer Portal.
2. Check the current runtime value of the HTAware Mitigation Setting by running `esxcli system settings kernel list -o hyperthreadingMitigation`
3. To enable HT Aware Mitigation, run this command:

```
esxcli system settings kernel set -s hyperthreadingMitigation -v TRUE
```

4. Reboot the ESXi host for the configuration change to go into effect.

b. **Enable the ESXi Side-Channel-Aware Scheduler (SCAv1) or the ESXi Side-Channel-Aware Scheduler v2 (SCAv2) in ESXi 6.7u2 (13006603) or later**

**Note:** ESXi 6.7u2 (13006603) and future release lines of ESXi include the ESXi Side-Channel-Aware Scheduler v2. Prior release lines such as 6.5, 6.0, and 5.5 cannot accommodate this new scheduler.



VMware has published a white paper entitled Performance of vSphere 6.7 Scheduling Options which provides a more detailed look into the performance differences between SCAv1 and SCAv2. Please review this document before continuing.

Enabling the ESXi Side-Channel-Aware Scheduler (SCAv1) using the vSphere Web Client or vSphere Client

1. Connect to the vCenter Server using either the vSphere Web or vSphere Client.
2. Select an ESXi host in the inventory.
3. Click the Configure tab.
4. Under the System heading, click **Advanced System Settings**.
5. Click **Edit**.
6. Click in the Filter box and search `VMkernel.Boot.hyperthreadingMitigation`.
7. Select the setting by name.
8. Change the configuration option to true (default: false).
9. Click in the Filter box and search `VMkernel.Boot.hyperthreadingMitigationIntraVM`.
10. Change the configuration option to true (default: true).
11. Click **OK**.
12. Reboot the ESXi host for the configuration change to go into effect.

Enabling the ESXi Side-Channel-Aware Scheduler (SCAv1) using ESXi Embedded Host Client

1. Connect to the ESXi host by opening a web browser to https://*HOSTNAME*.
2. Click **Manage** under host navigator.
3. Click the **Advanced settings** Tab.
4. Use the search box to find `VMkernel.Boot.hyperthreadingMitigation`
5. Select the `VMkernel.Boot.hyperthreadingMitigation` setting and click the **Edit** Option.
6. Change the configuration option to true (default: false).
7. Click **Save.**
8. Use the search box to find `VMkernel.Boot.hyperthreadingMitigationIntraVM`.
9. Select the `VMkernel.Boot.hyperthreadingMitigationIntraVM` setting and click the **Edit** Option.
10. Change the configuration option to true (default: true).
11. Click **Save**.
12. Reboot the ESXi host for the configuration change to go into effect.

Enable ESXi Side-Channel-Aware Scheduler (SCAv1) using ESXCLI

1. SSH to an ESXi host or open a console where the remote ESXCLI is installed. For more information, see the ESXCLI Developer Portal..
2. Check the current runtime values by running `esxcli system settings kernel list -o hyperthreadingMitigation` and `esxcli system settings kernel list -o hyperthreadingMitigationIntraVM`.
3. To enable the ESXi Side-Channel-Aware Scheduler Version 1 run these commands:
4. `esxcli system settings kernel set -s hyperthreadingMitigation -v TRUE`
5. `esxcli system settings kernel set -s hyperthreadingMitigationIntraVM -v TRUE`
6. Reboot the ESXi host for the configuration change to go into effect.

Enabling the ESXi Side-Channel-Aware Scheduler Version 2 (SCAv2) using the vSphere Web Client or vSphere Client

1. Connect to the vCenter Server using either the vSphere Web or vSphere Client.
2. Select an ESXi host in the inventory.
3. Click the Configure tab.

4. Under the System heading, click **Advanced System Settings**.
5. Click **Edit.**
6. Click in the Filter box and search `VMkernel.Boot.hyperthreadingMitigation`.
7. Select the setting by name.
8. Change the configuration option to true (default: false).
9. Click in the Filter box and search VMkernel.Boot.hyperthreadingMitigationIntraVM.
10. Change the configuration option to false (default: true).
11. Click **OK**.
12. Reboot the ESXi host for the configuration change to go into effect.

Enabling the ESXi Side-Channel-Aware Scheduler Version 2 (SCAv2) using ESXi Embedded Host Client

1. Connect to the ESXi host by opening a web browser to https://*HOSTNAME*.
2. Click **Manage** under host navigator.
3. Click the **Advanced settings** Tab.
4. Use the search box to find `VMkernel.Boot.hyperthreadingMitigation`.
5. Select the `VMkernel.Boot.hyperthreadingMitigation` setting and click the **Edit** Option.
6. Change the configuration option to true (default: false).
7. Click **Save.**
8. Use the search box to find `VMkernel.Boot.hyperthreadingMitigationIntraVM`.
9. Select the `VMkernel.Boot.hyperthreadingMitigationIntraVM` setting and click the **Edit** Option.
10. Change the configuration option to false (default: true).
11. Click **Save**.
12. Reboot the ESXi host for the configuration change to go into effect.

Enable ESXi Side-Channel-Aware Scheduler Version 2 (SCAv2) using ESXCLI

1. SSH to an ESXi host or open a console where the remote ESXCLI is installed. For more information, see the ESXCLI Developer Portal..
2. Check the current runtime values by running `esxcli system settings kernel list -o hyperthreadingMitigation` and `esxcli system settings kernel list -o hyperthreadingMitigationIntraVM`
3. To enable the ESXi Side-Channel-Aware Scheduler Version 1 run these commands:
4. `esxcli system settings kernel set -s hyperthreadingMitigation -v TRUE`
5. `esxcli system settings kernel set -s hyperthreadingMitigationIntraVM -v FALSE`
6. Reboot the ESXi host for the configuration change to go into effect.

**ESXi 6.7u2 (and later) Scheduler Configuration Summary**

| hyperthreadingMitigation | hyperthreadingMitigationIntraVM | Scheduler Enabled |
|---|---|---|
| FALSE | TRUE or FALSE | Default scheduler (unmitigated) |
| TRUE | TRUE | SCAv1 |
| TRUE | FALSE | SCAv2 |

## HTAware Mitigation Tool

VMware has provided a tool to assist in performing both the **Planning Phase** and the **Scheduler-Enablement Phase** at scale. This tool has been updated to include SCAv2 support and can be found in HTAware Mitigation Tool Overview and Usage (328935) along with detailed instructions on its usage, capabilities, and limitations.

**Table 1**: Affected Intel Processors Supported by ESXi

| Intel Code Name | FMS | Intel Brand Names |
|---|---|---|
| Nehalem-EP | 0x106a5 | Intel Xeon 35xx Series;<br>Intel Xeon 55xx Series |
| Lynnfield | 0x106e5 | Intel Xeon 34xx Lynnfield Series |
| Clarkdale | 0x20652 | Intel i3/i5 Clarkdale Series;<br>Intel Xeon 34xx Clarkdale Series |
| Arrandale | 0x20655 | Intel Core i7-620LE Processor |
| Sandy Bridge DT | 0x206a7 | Intel Xeon E3-1100 Series;<br>Intel Xeon E3-1200 Series;<br>Intel i7-2655-LE Series;  Intel i3-2100 Series |
| Westmere EP | 0x206c2 | Intel Xeon 56xx Series;<br>Intel Xeon 36xx Series |
| Sandy Bridge EP | 0x206d7 | Intel Pentium 1400 Series;<br>Intel Xeon E5-1400 Series;<br>Intel Xeon E5-1600 Series;<br>Intel Xeon E5-2400 Series;<br>Intel Xeon E5-2600 Series;<br>Intel Xeon E5-4600 Series |
| Nehalem EX | 0x206e6 | Intel Xeon 65xx Series;<br>Intel Xeon 75xx Series |
| Westmere EX | 0x206f2 | Intel Xeon E7-8800 Series;<br>Intel Xeon E7-4800 Series;<br>Intel Xeon E7-2800 Series |
| Ivy Bridge DT | 0x306a9 | Intel i3-3200 Series; Intel i7-3500-LE/UE, Intel i7-3600-QE,<br>Intel Xeon E3-1200-v2 Series;<br>Intel Xeon E3-1100-C-v2 Series;<br>Intel Pentium B925C |
| Haswell DT | 0x306c3 | Intel Xeon E3-1200-v3 Series |
| Ivy Bridge EP | 0x306e4 | Intel Xeon E5-4600-v2 Series;<br>Intel Xeon E5-2400-v2 Series;<br>Intel Xeon E5-2600-v2 Series;<br>Intel Xeon E5-1400-v2 Series;<br>Intel Xeon E5-2600-v2 Series |
| Ivy Bridge EX | 0x306e7 | Intel Xeon E7-8800/4800/2800-v2 Series |
| Haswell EP | 0x306f2 | Intel Xeon E5-2400-v3 Series;<br>Intel Xeon E5-1400-v3 Series;<br>Intel Xeon E5-1600-v3 Series;<br>Intel Xeon E5-2600-v3 Series;<br>Intel Xeon E5-4600-v3 Series |
| Haswell EX | 0x306f4 | Intel Xeon E7-8800/4800-v3 Series |

| | | |
|---|---|---|
| Broadwell H | 0x40671 | Intel Core i7-5700EQ;<br>Intel Xeon E3-1200-v4 Series |
| Avoton | 0x406d8 | Intel Atom C2300 Series;<br>Intel Atom C2500 Series;<br>Intel Atom C2700 Series |
| Broadwell EP/EX | 0x406f1 | Intel Xeon E7-8800/4800-v4 Series;<br>Intel Xeon E5-4600-v4 Series;<br>Intel Xeon E5-2600-v4 Series;<br>Intel Xeon E5-1600-v4 Series |
| Skylake SP | 0x50654 | Intel Xeon Platinum 8100 (Skylake-SP) Series;<br>Intel Xeon Gold 6100/5100 (Skylake-SP) Series<br>Intel Xeon Silver 4100, Bronze 3100 (Skylake-SP) Series |
| Broadwell DE | 0x50662 | Intel Xeon D-1500 Series |
| Broadwell DE | 0x50663 | Intel Xeon D-1500 Series |
| Broadwell DE | 0x50664 | Intel Xeon D-1500 Series |
| Broadwell NS | 0x50665 | Intel Xeon D-1500 Series |
| Skylake H/S | 0x506e3 | Intel Xeon E3-1500-v5 Series;<br>Intel Xeon E3-1200-v5 Series |
| Kaby Lake H/S/X | 0x906e9 | Intel Xeon E3-1200-v6 |

Revision #2
Created 9 September 2024 11:25:13 by Julian
Updated 9 September 2024 11:28:06 by Julian