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PRIMERGY CUSTOMER INFORMATION BULLETIN

Number/Revision:
PY-CIB046-04

Issue Date:
April 19, 2021

Title:
CPU Internal Errors on PRIMERGY Mx Servers

Applies to:
PRIMERGY M1 thru M5

Effective Duration:
Permanent

Problem:
Under certain circumstances, a PRIMERGY RX/TX/BX/CX Mx server may crash displaying CPU internal error (IERR), typically for all CPUs in the Hardware System Event log. If such an error occurs it means that the CPU detected a problem in the system which cannot be identified and corrected by internal routines. This may not be a sign of a defective CPU as it can be caused by any system component either hardware or software. This can also be due to the delayed memory access after the CPU returns to operation mode from power-saving mode.

Solution / Workaround:
Resolving this error requires structured analysis and troubleshooting to find out which component is the root cause for the error.

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If the system powered off due to repeated CPU errors, remove the power cable, press the power button for at least 10 seconds, then reconnect the power cables and turn on the server.

Please follow the instructions below:

- Ensure to use the latest UEFI version (BIOS) and iRMC firmware on the system.
- If NV-DIMM (Intel DCPMM) are installed in an M5 system refer to Appendix A.
- Check if an upgrade of any hardware components or an update has been done previously. Keep in mind that external components might cause trouble, if using KVM use a standalone mouse, keyboard and display.
- Check if the system was able to create a crash dump file. If yes, please try to analyze it. Date and time must be identical to the CPU IERR event logged in SEL.
- Check if any other event entries are logged by the Operating System occurring around the same time as the CPU IERR occurred. If any other errors are identified, resolve these errors as identified.

Systems Running Windows

For systems running Windows, make the following changes based on model:

- **On M4/M5 CX Systems Only**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Power Technology	“Custom”	(default: Energy Efficient)
-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance	"Performance"	(default: Balanced Performance)
-Package C State Limit	"C0"	(default: Auto)

- **On all other M4/M5 except CX Systems**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance	"Performance"	(default: Balanced Performance)
-CPU C1E Support	"Disabled"	(default: Enabled)
-CPU C3 Report	"Disabled"	(default: Enabled)
-Package C State Limit	"C0"	(default: Auto)

- **On M2/M3 Systems:**
  From BIOS Setup Utility, change the following settings in the order as they appear below.
  Advanced → CPU Configuration

-Power Technology Efficient)	"Custom"	(default: Energy
-Enhanced Speedstep	"Enabled"	(default: Enabled)
-Turbomode	"Disabled"	(default: Enabled)
-CPU C1E Support	"Disabled"	(default: Enabled)
-CPU C3 Report	"Disabled"	(default: Disabled)
-CPU C6 Report	"Disabled"	(default: Enabled)
-Package C State limit	"C0"	(default: C6)
-Enhanced Speedstep	"Disabled"	(default: Enabled)

- **On M1 Systems**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Power Technology Efficient)	“Custom”	(default: Energy
-Override OS Energy Performance	“Enabled”	(default: Disabled)
-Energy Performance Performance)	“Performance”	(default: Balanced
-CPU C6 Report	“Disabled”	(default: Enabled)
-Package C State limit	“C0”	(default: C6)

Systems Running VMware

For systems running VMware, make the following changes based on model:

- **On M4/M5 CX Systems Only**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Power Technology Efficient)	“Custom”	(default: Energy
-HWPM Support	“Native Mode	(default: Native Mode)
-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance Performance)	"Performance"	(default: Balanced
-Package C State Limit	"C0"	(default: Auto)

- **On all other M4/M5 except CX Systems**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-HWPM Support	“Native Mode”	(default: Varies)*1
-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance	"Performance"	(default: Balanced Performance)
-Package C State Limit	"C0"	(default: Auto)

  *1 Varies means default depends on system type and UEFI version.

- **On M2/M3 Systems:**
  From BIOS Setup Utility, change the following settings in the order as they appear below.
  Advanced → CPU Configuration

-Enhanced Speedstep	"Enabled"	(default: Enabled)
-Power Technology	"Custom"	(default: Energy Efficient)
-Turbomode	"Disabled"	(default: Enabled)
-CPU C1E Support	"Disabled"	(default: Enabled)
-CPU C3 Report	"Disabled"	(default: Disabled)
-CPU C6 Report	"Disabled"	(default: Enabled)
-Package C State limit	"C0"	(default: C6)
-Enhanced Speedstep	"Disabled"	(default: Enabled)

- **On M1 Systems**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Power Technology	“Custom”	(default: Energy Efficient)
-Override OS Energy Performance	“Enabled”	(default: Disabled)
-Energy Performance	“Performance”	(default: Balanced Performance)
-CPU C6 Report	“Disabled”	(default: Enabled)
-Package C State limit	“C0”	(default: C6)

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Systems Running Linux

For systems running Linux, make the following changes based on model:

- **On M4/M5 CX Systems Only**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Power Technology Efficient)	“Custom”	(default: Energy
-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance Performance)	"Performance"	(default: Balanced
-Package C State Limit	"C0"	(default: Auto)

- **On all other M4/M5 except CX Systems**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance Performance)	"Performance"	(default: Balanced
-Package C State Limit	"C0"	(default: Auto)

- **On M2/M3 Systems:**
  From BIOS Setup Utility, change the following settings in the order as they appear below.
  Advanced → CPU Configuration

-Enhanced Speedstep	"Enabled"	(default: Enabled)
-Power Technology Efficient)	"Custom"	(default: Energy
-Turbomode	"Disabled"	(default: Enabled)
-CPU C1E Support	"Disabled"	(default: Enabled)
-CPU C3 Report	"Disabled"	(default: Disabled)
-CPU C6 Report	"Disabled"	(default: Enabled)
-Package C State limit	"C0"	(default: C6)
-Enhanced Speedstep	"Disabled"	(default: Enabled)

- **On M1 Systems**:
  From BIOS Setup Utility, change the following settings
  Advanced → CPU Configuration

-Power Technology Efficient)	"Custom"	(default: Energy
-Override OS Energy Performance	"Enabled"	(default: Disabled)
-Energy Performance Performance)	"Performance"	(default: Balanced
-CPU C6 Report	"Disabled"	(default: Enabled)
-Package C State limit	"C0"	(default: C6)

Linux OS Settings common to all Systems

Include the following value to the kernel parameters in addition to the above BIOS Settings:

–**For Red Hat Enterprise Linux 6**:

1) Include "intel_idle.max_cstate=0" to the kernel line under /boot/grub/grub.conf.
2) Reboot the system to apply changes

-**For Red Hat Enterprise Linux 7 & 8:**

1) Include "intel_idle.max_cstate=0 processor.max_cstate=0" to the /etc/default/grub under GRUB_CMDLINE_LINUX line.
2) Execute the following commands to apply the setting values:
   - BIOS mode: # grub2-mkconfig -o /boot/grub2/grub.cfg
   - UEFI mode: # grub2-mkconfig -o /boot/efi/EFI/redhat/grub.cfg
3) Reboot the system to apply changes.

-For SUSE Linux Enterprise Server 11:

Procedures differ depending on the environment.

BIOS mode

1) On kernel line of /boot/grub/menu.lst,
   add "intel_idle.max_cstate=0 processor.max_cstate=0"

2) Restart system to reflect the setting

UEFI mode

1) On append line of /etc/elilo.conf,
   add "intel_idle.max_cstate=0 processor.max_cstate=0"

2) Execute the below command
   #elilo

3) Restart system to reflect the setting

-**For SUSE Linux Enterprise Server 12 & 15:**

1) Include “intel_idle.max_cstate=0 processor.max_cstate=0” to the /etc/default/grub under GRUB_CMDLINE_LINUX line

2) Execute the following command to apply the setting value. (This is common to BIOS and UEFI modes)
   # grub2-mkconfig -o /boot/grub2/grub.cfg

3) Reboot the system to apply changes.

Appendix A:

If NV-DIMM (Intel DCPMM) is installed in an M5 system, check the installed firmware version and, if required, update it to a Firmware version supported by the latest UEFI Version.

```
PRIMERGY RX2540 M5 uEFI FW changes:

Please note:
Online update via ASP or eLCM/UME Offline update from BIOS R1.8.0 only
possible to R1.11.0 and may take longer as usual. This is temporary
restriction for BIOS updates from R1.8.0 to newer ones only.
Online and eLCM/UME Offline updates to R1.12.0 and newer requires at
least R1.11.0 running.

If you installed Intel Optane DCPMM modules on your PRIMERGY please refer
to supported DCPMM FW version as documented for each uEFI FW release. If
needed please verify installed DCPMM FW in uEFI FW setup.


uEFI FW - V5.0.0.14 R1.19.0 for D3384-B1x
================================================================================
Supported DCPMM FW: 01.02.00.5417
```

More information about Intel DCPMM Firmware update procedure:
https://support.ts.fujitsu.com/IndexDownload.asp?Softwareguid=3B1CD2AD-092D-4E21-8F48-B608D00BED9C

The installed firmware version of NV-DIMM can be determined in iRMC or UEFI setup.

Volatile Memory Mode	1LM

	Status	Socket	Type
❯	OK	DIMM-1A	DDR4/RDIMM
	OK	DIMM-2A	
❯	OK	DIMM-1B	DDR4/RDIMM
	OK	DIMM-2B	
❮	OK	DIMM-1C	NVM/LRDIMM

Approved	✓
Manufacturer	Intel
Part Number	NMA1XXD128GPS
Serial Number	00001275
Manufacturing Date	2019,11
Voltage	1.2V

NVM

Memory Capacity	0GB
Persistent Capacity	126GB
Raw capacity	126GB
Predicted Life Left	100%
Average/Peak Power Budget	15000 / 20000 mW
Firmware Revision	1.2.0.5417

	OK	DIMM-2C	

In UEFI setup, open menu Advanced
-> Intel(R) Optane(TM) DC Persistent Memory Configuration
-> DIMMs
-> DIMM ID 0xXXXX

View settings or select an action below.

DIMM UID	8089-A2-1911-00001275
DIMM handle	0x0020
DIMM physical ID	0x0033
Manageability state	[Manageable]
Health state	[Healthy]
Health state reason	None
Capacity	126.4 GiB
Firmware version	01.02.00.5417
Firmware API version	01.15
Lock state	[Disabled]
Staged firmware version	N/A
Firmware update status	Update loaded successfully
Manufacturer	Intel

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Revision History:

REVISION	DATE	CHANGE SUMMARY
0000	13 July 2018	Initial Release
0001	01 April 2019	Included additional M2, M3 & M4 Servers.
0002	24 April 2019	Removed the Footer “INTERNAL USE ONLY”
0003	09 March 2021	Added M5 Systems and BIOS setting for M4/M5
0004	19 April 2021	Included SUSE Linux 11