

intel[®] Technical Advisory

TA-445-3

5200 NE Elam Young Parkway
Hillsboro, OR 97124

January 29, 2002

SRCU21, SRCU31L, and SRCU31 Drives Marked Offline

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Products Affected

Product Code	Description	Intel RAID Software
BOXSRCU21	Intel [®] Server RAID Controller U2-1 (SRCU21)	v3.x and earlier
BOXSRCU31	Intel [®] Server RAID Controller U3-1 (SRCU31)	v4.x and earlier
BOXSRCU31L	Intel [®] Server RAID Controller U3-1L (SRCU31L)	v5.x and earlier

Note: this document collectively refers to Intel RAID Software versions 3.x, 4.x, and 5.x as "v5.x and earlier".

Description

This Technical Advisory is a replacement of the Intel Technical Advisory TA-445-2 published 12/20/2001. Intel has induced both RAID 1 and RAID 5 volume failures where one or more hard disk drives (HDDs) are marked "failed" on the Intel RAID cards (shown above) when operating with the Windows* 2000 operating system.

In situations where two or more HDDs are marked "offline", "missing", or "failed" in a RAID volume, there is a potential for data loss and under certain conditions the RAID volume may not be recoverable. This advisory recommends updating the RAID controller firmware to minimize situations where data loss conditions can occur.

Customers are advised to read this Technical Advisory in its entirety before taking any actions to correct a potentially-failed RAID volume.

Root Cause

Root cause has been determined to be the result of the on card PCI Bridge being disabled under some operating conditions. This condition results in drives being marked as "failed" or "offline". Intel has only induced the RAID volume failure condition on RAID levels 1 and 5, using the Intel RAID software stack v5.x and earlier.. In addition, the RAID volume failures have only been induced on the Microsoft* Windows* 2000 Server family of operating systems (with and without service packs 1 or 2).

Analysis of the failure has determined that the cause is not the result of faulty system components or Intel RAID controller hardware. In addition, Intel RAID software stack 6.x and higher is not subject to the problem.

Corrective Actions

Intel has provided a firmware update for the affected RAID controller cards that corrects the problem. The table below illustrates the products affect along with the recommended firmware update version.

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Product Code	Description	Firmware Update Version	File Version (displayed during POST)
BOXSRCU21	Intel® Server RAID Controller U2-1 (SRCU21)	v3.30	v3.24a.007
BOXSRCU31	Intel® Server RAID Controller U3-1 (SRCU31)	v4.25	v4.20.014
BOXSRCU31L	Intel® Server RAID Controller U3-1L (SRCU31L)	v5.13	v5.11a.018

New system integrations should be built on the Intel RAID software stack v6.1.2.6i (or newer). Existing systems built on the Intel RAID software stack v5.x or earlier may apply the applicable firmware update or may choose to migrate to v6.1.2.6i (or newer) during the next preventive maintenance opportunity.

There are four types of corrective actions that need to be fully understood before continuing:

- 1) Update an existing system to the new version of version 5.x or earlier.
- 2) Migration to the new Intel RAID software stack v6.1.2.6i (or newer).
- 3) Disable write caching on the RAID controller and all HDDs to minimize the risk of data loss.
- 4) Recovery steps when HDDs are marked "failed", "missing", or "offline".

1) Update an existing system to the new version of 3.x, 4.x, or 5.x firmware.

This option applies to systems currently in place that are using an older version of the firmware and that are subject to the "offline" or "failed" error. This option involves a flash update to the firmware code located on the RAID controller card. Instructions for performing the update are available in a document titled "Server RAID Controller Flash Update Guide - [FLASH_UPD.PDF]". The firmware update and instructions are available for download at:

<http://support.intel.com/support/motherboards/server>.

2) Update Migration to the new Intel RAID software stack v6.1.2.6i or newer

Intel is shipping the Intel RAID software stack v6.x (or newer) with all new models of Intel RAID controllers. The v6.1.2.6i (and newer) RAID software is validated on the SRCU31 and SRCU31L for those customers who would like to migrate their data to the new software stack and minimize their exposure to a failed RAID volume condition under v5.x (and earlier).

The SRCU21 RAID controller is discontinued and is not supported under the Intel RAID software stack v6.x (or newer).

Before installing the Intel RAID software stack v6.1.2.6i (or newer), all data on the pre-existing RAID volume must be backed up to an external data source, and then restored to the new RAID volume after the HDDs are reformatted. **When overwriting a v5.x (or earlier) RAID volume with v6.1.2.6i (or newer) RAID software, all data on the existing RAID volume is destroyed and cannot be recovered. You must therefore have all data backed up to an external source BEFORE starting the installation of the Intel RAID software stack v6.1.2.6i (or newer).**

The Intel RAID software stack v6.1.2.6i (and newer) uses a disk data format that is not compatible with data created on a v5.x (or earlier) RAID volume. The v6.1.2.6i (and newer) RAID software formats the RAID volume with a different disk data format, thus data cannot be "converted" from v5.x (or earlier) to v6.1.2.6i (or newer).

Please visit <http://support.intel.com/support/motherboards/server> to obtain the new Intel RAID software stack v6.1.2.6i (or later) and full migration instructions.

2) Disable write caching on the RAID controller and all HDDs to minimize the risk of data loss.

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Intel recommends disabling RAID controller and HDD write caching on all systems running the Intel RAID software stack v5.x (or earlier). Disabling write caching on the RAID controller and the HDDs can reduce the risk of data loss in a failed RAID volume scenario. There are two types of write caching. The first type uses the controller's cache (on a per volume basis) and the second uses the cache on each HDD. In order to completely remove write caching, both controller and disk write caching must be checked and disabled. Use the following procedure to turn off write caching on an Intel RAID controller and on the disk drives connected to that controller:

Disable write caching on each volume (controller cache): SRCU31 & SRCU31L

Management Tool to use: Advanced RAID Configuration Utility (ARCU) or Storage Console

1. Boot to the Intel[®] Server RAID Controller Resource CD.
2. From the main menu (ARCU or Storage Console) select "View/Actions" under *RAID Volumes*
3. Ensure that "Disabled" is listed under the *Write Cache* column for all volumes.
 - a. If "Disabled" is displayed in the *Write Cache* column for all volumes, write caching is already disabled at the controller. Skip to the next section (below) to disable write caching on the HDDs.
 - b. If any of the volumes do not display "Disabled" under the *Write Cache* column (and instead display "Seq. Enabled", or "Full Enabled") proceed to step 3 below to disable write caching on each volume.
4. Repeat this step for ALL volumes that display "Seq. Enabled" or "Full Enabled" under the *Write Cache* column.
 - a. Select the "none" hot link under the *Actions* column in order to bring up a list of possible actions.
 - b. Select "Disable Write Cache" and then "Submit". Select "Yes" twice to accept action.
 - c. "Disabled" should now be listed under the *Write Cache* column for all volumes. Write back caching has not been disabled at the controller. Move on to the next section (below) to disable write caching on the hard disks.

Disable write-back caching on the HDDs (disk cache): SRCU31L only

Management Tool to use: Advanced RAID Configuration Utility (ARCU) or Storage Console

Note: *The SRCU31 controller does not allow setting of hard disk cache. The SRCU31 automatically disables the hard disk cache on all connected hard disks. Therefore, it is not necessary to follow this section for the SRCU31 controller.*

1. Boot to the Intel[®] Server RAID Controller Resource CD.
2. From the main menu (under ARCU or Storage Console) select "View/Actions" under *Physical Disks*.
3. Repeat this step for every hard disk in the list: Select the "none" hot link under the *Actions* column in order to bring up a list of possible actions. Select "Disable Write Cache" and "Submit" and then "Yes" to accept action. If "Disable Write Cache" is not listed as an action (and "Enable Write Cache" is listed instead), then write cache has already been disabled and no action is necessary on the selected hard disk.

3) Recovery steps when HDDs are marked "failed", "missing", or "offline"

It is critical that you follow the correct procedure while investigating a server where the RAID volume may have failed. When a RAID volume is failed, you must follow the correct procedure or data loss may occur.

If you suspect that your server may have a failed RAID volume, DO NOT reboot the server, insert or remove any disks, or perform SCSI bus scans.

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Download the document "[Intel® Server RAID Controllers SRCU21, SRCU31 and SRCU31L - RAID Volume Recovery Procedures - \[RAID_VOL_RECOVER_PROC.PDF\]](#)" located at <http://support.intel.com/support/motherboards/server/> and follow the recovery steps. Additional debug information can be obtained by contacting Intel Customer Support.

Please contact your Intel Sales Representative or Intel Customer Support if you require more specific information about this issue.

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