Release Notes
SmartHBA 2100 and SmartRAID 3100
Software/Firmware

Released
August 2020
## Revision History

<table>
<thead>
<tr>
<th>Revision</th>
<th>Revision Date</th>
<th>Details of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>August 2020</td>
<td>SR 2.5.2.2 Production Release with Firmware 3.00</td>
</tr>
<tr>
<td>23</td>
<td>March 2020</td>
<td>SR 2.5.2 Production Release with Firmware 2.93</td>
</tr>
<tr>
<td>22</td>
<td>March 2020</td>
<td>SR 2.5 Production Release with Firmware 2.66</td>
</tr>
<tr>
<td>21</td>
<td>February 2020</td>
<td>SR 2.5.2 Production Release</td>
</tr>
<tr>
<td>20</td>
<td>October 2019</td>
<td>SR 2.5 Production Release</td>
</tr>
<tr>
<td>19</td>
<td>September 2019</td>
<td>Updated for SR 2.4.8.1 (fw v2.31 Build 0)</td>
</tr>
<tr>
<td>18</td>
<td>August 2019</td>
<td>Updated for SR 2.4.8</td>
</tr>
<tr>
<td>17</td>
<td>January 2019</td>
<td>SR 2.4 Production Release</td>
</tr>
<tr>
<td>16</td>
<td>June 2018</td>
<td>SR 2.3 Production Release</td>
</tr>
<tr>
<td>15</td>
<td>June 2018</td>
<td>Updated for RC Release</td>
</tr>
<tr>
<td>14</td>
<td>October 2017</td>
<td>Update supported OSs</td>
</tr>
<tr>
<td>13</td>
<td>October 13, 2017</td>
<td>First Production Release</td>
</tr>
<tr>
<td>1-12</td>
<td>June 2016-July 2017</td>
<td>Pre-Production Releases.</td>
</tr>
</tbody>
</table>
Contents

1 About This Release..............................................................................................................................................1
   1.1 Release Identification.................................................................................................................................1
   1.2 Components and Documents Included in this Release...................................................................................2
   1.3 Files Included in this Release........................................................................................................................3

2 What is New?.......................................................................................................................................................6
   2.1 Features..........................................................................................................................................................6
   2.2 Fixes..............................................................................................................................................................7
      2.2.1 Firmware Fixes.....................................................................................................................................7
      2.2.2 UEFI Fixes..........................................................................................................................................8
      2.2.3 Driver Fixes........................................................................................................................................8
      2.2.4 Management Software Fixes...........................................................................................................10
   2.3 Limitations..................................................................................................................................................11
      2.3.1 Firmware Limitations.........................................................................................................................11
      2.3.2 UEFI Limitations.................................................................................................................................13
      2.3.3 Driver Limitations...............................................................................................................................13
      2.3.4 Hardware Limitations..........................................................................................................................14
      2.3.5 Management Software Limitations...................................................................................................14

3 Updating the Board Firmware for PQI Operation...............................................................................................15
   3.1 Updating Controllers to latest (PQI) Firmware.................................................................................................15

4 Installing the Drivers.........................................................................................................................................17
1 About This Release

The development release described in this document includes firmware, OS drivers, tools, and host management software for the SmartHBA 2100/SmartRAID 3100 controller solutions from Microsemi.

1.1 Release Identification

The firmware, software, and driver versions for this release are shown in the following table.

<table>
<thead>
<tr>
<th>Table 1 • Release Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solutions Release</strong></td>
</tr>
<tr>
<td><strong>Package Release Date</strong></td>
</tr>
<tr>
<td><strong>Firmware Version</strong></td>
</tr>
<tr>
<td><strong>UEFI Version</strong></td>
</tr>
<tr>
<td><strong>Legacy BIOS</strong></td>
</tr>
<tr>
<td><strong>Driver Versions</strong></td>
</tr>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>arcconf/Maxview</strong></td>
</tr>
</tbody>
</table>

**Note:**

1. Downgrading to 1.04 B0 or older builds from this release or prior 1.29 releases may cause the board to not boot or have supercap errors due to an incompatibility in SEEPROMs between this release and prior releases. Refer to the section "Updating the Controller Firmware" to downgrade an existing board.

2. If the firmware running on the board is older than 0.01 B594, existing data in the logical volumes must be backed up if it needs to be used after the upgrade. After the upgrade from firmware prior to 0.01 B594, the logical volumes will need to be recreated.

3. Only run the driver on firmware 0.01 build 500 or later.
1.2 Components and Documents Included in this Release

Download the firmware, drivers, host management software, and supporting documentation for your SmartHBA 2100/SmartRAID 3100 controller SmartHBA 2100/SmartRAID 3100 controller and SmartRAID 3100 controller solutions from the Microsemi Web site at

https://storage.microsemi.com/en-us/support/start/
1.3 Files Included in this Release

This release consists of the files listed in the following tables:

Firmware Files

Table 2 • Firmware Files

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Pre-Assembly Use</th>
<th>Post-Assembly Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>SmartFWx100.bin</td>
<td>Programmable NOR Flash File Use to program NOR Flash for boards that are already running firmware.</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Table 3 • Firmware Programming Tools

<table>
<thead>
<tr>
<th>Tool</th>
<th>Description</th>
<th>Executable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arcconf romupdate</td>
<td>The command allows to upgrade/downgrade the firmware and BIOS image to the controller.</td>
<td>Refer to Table 7 • Host Management Utilities on page 5</td>
</tr>
<tr>
<td>maxView firmware up-grade wizard</td>
<td>The firmware upgrade wizard allows to upgrade/downgrade the firmware and BIOS image to one or more controller(s) of same model in the system.</td>
<td>Refer to Table 7 • Host Management Utilities on page 5</td>
</tr>
</tbody>
</table>

Driver Files

Table 4 • Windows Storport Miniport SmartPQI Drivers

<table>
<thead>
<tr>
<th>Package</th>
<th>Drivers</th>
<th>Binary</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Server 2019</td>
<td>SmartPqi.sys</td>
<td>x64</td>
</tr>
<tr>
<td></td>
<td>Server 2016 and Windows 10</td>
<td>SmartPqi.inf</td>
<td>x64</td>
</tr>
<tr>
<td></td>
<td>Server 2012 SP1, R2 SP1 and Windows 8.1, 8</td>
<td>SmartPqi.cat</td>
<td>x64</td>
</tr>
<tr>
<td>2008</td>
<td>Server 2008 R2 SP1 and Windows 7</td>
<td>SmartPqi.sys</td>
<td>x64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SmartPqi.inf</td>
<td>x64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SmartPqi.cat</td>
<td>x64</td>
</tr>
</tbody>
</table>

Table 5 • Linux SmartPQI Drivers

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hat Enterprise Linux 8.2, 7.8</td>
<td>x64</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux/CentOS 8.1, 8.0, 7.7, 7.6, 7.5¹</td>
<td>x64</td>
</tr>
<tr>
<td>Red Hat Enterprise Linux/CentOS 6.10, 6.9¹</td>
<td>x64</td>
</tr>
<tr>
<td>CentOS 7.4</td>
<td>x64</td>
</tr>
<tr>
<td>SuSE Linux Enterprise Server 12², SP5, SP4, SP3, SP2</td>
<td>x64</td>
</tr>
<tr>
<td>Drivers</td>
<td>Version</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>SuSE Linux Enterprise Server 15 SP1¹</td>
<td>x64</td>
</tr>
<tr>
<td>Oracle Linux 7.5 with UEK4u7 (4.1.12-124)</td>
<td>x64</td>
</tr>
<tr>
<td>Oracle Linux 7.6 with UEKSu2 (4.14.35)</td>
<td>x64</td>
</tr>
<tr>
<td>Oracle Linux 7.7 with UEKSu2 (4.14.35)</td>
<td>x64</td>
</tr>
<tr>
<td>Oracle Linux 8.0</td>
<td>x64</td>
</tr>
<tr>
<td>Oracle Linux 8.1 with UEK6</td>
<td>x86</td>
</tr>
<tr>
<td>Ubuntu 20.04</td>
<td>x86</td>
</tr>
<tr>
<td>Ubuntu 19.10</td>
<td>x64</td>
</tr>
<tr>
<td>Ubuntu 18.04.4, 18.04.3, 18.04.2, 18.04.1</td>
<td>x64</td>
</tr>
<tr>
<td>Ubuntu 16.04.5, 16.04.4</td>
<td>x64</td>
</tr>
<tr>
<td>Debian 10.3</td>
<td>x64</td>
</tr>
<tr>
<td>Debian 9.12</td>
<td>x64</td>
</tr>
<tr>
<td>Citrix xenServer 8.1, 8.0, 7.6</td>
<td>x64</td>
</tr>
<tr>
<td>Fedora 30</td>
<td>x64</td>
</tr>
</tbody>
</table>

**Note:** 1. To mitigate against the Spectre Variant 2 vulnerability, the RHEL 6u9/RHEL7u4/RHEL7u5 and SLES11 SP3 and higher drivers have been compiled to avoid the usage of indirect jumps. This method is known as "Retpoline".

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>FreeBSD 12.1, 11.3</td>
<td>x64</td>
</tr>
<tr>
<td>Solaris 11.4, 11.3</td>
<td>x64</td>
</tr>
<tr>
<td>VMware 6.7 U3/U2/U1, 6.5 U3/U2/U1</td>
<td>x64</td>
</tr>
<tr>
<td>VMware 7.0 (inbox only)</td>
<td>x64</td>
</tr>
</tbody>
</table>

*Table 6 • FreeBSD, Solaris, and VMware SmartPQI Drivers*
### Host Management Software

<table>
<thead>
<tr>
<th>Description</th>
<th>OS</th>
<th>Executable</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCCONF Command Line Utility</td>
<td>Windows x64</td>
<td>See the Arcconf download package for the OS-applicable installation executable.</td>
</tr>
<tr>
<td></td>
<td>Linux x64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VMware EXSI 6.x/7.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XenServer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FreeBSD x64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Solaris x86</td>
<td></td>
</tr>
<tr>
<td>ARCCONF for UEFI</td>
<td>Included as part of the firmware downloadable image.</td>
<td></td>
</tr>
<tr>
<td>maxView Storage Manager</td>
<td>Windows x64</td>
<td>See the maxView Storage Manager download package for the OS-applicable installation executable.</td>
</tr>
<tr>
<td></td>
<td>Linux x64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VMware EXSI 6.x/7.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>XenServer</td>
<td></td>
</tr>
<tr>
<td>maxView vSphere Plugin</td>
<td>vCenter 6.0</td>
<td>See the VMware maxView Storage Manager download package for the OS-applicable installation executable.</td>
</tr>
<tr>
<td>Boot USB (offline or pre-boot) for ARCCON-NF and maxView Storage Manager</td>
<td>Linux x64</td>
<td>See the maxView BootUSB download package for the .iso file.</td>
</tr>
</tbody>
</table>
## 2 What is New?

### 2.1 Features

The following table lists features supported for this release.

**Table 8 • Feature Summary**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Supported in this Release</th>
<th>Future Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>UEFI Driver, Boot Support</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Legacy Boot Support</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Dynamic Power Management</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SMR Drive Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enumeration, Unrestricted Command Flow-Through</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SATL Translation for HA/HM SMR Management</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Identify All Drive Types</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Driver Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Linux</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>VMware</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>FreeBSD</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Solaris</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>OS certification</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Out of Band interface selection support of MCTP or PBSI</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Flash Support</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MCTP BMC Management</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Configurable Big Block Cache Bypass</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Green Backup Support for SmartRAID</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4Kn Support in RAID</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
2.2 Fixes

2.2.1 Firmware Fixes

2.2.1.1 Fixes and Enhancements for Firmware Release 3.00 B0

This release includes the following fixes and enhancements:

- Added a process that restarts Background Parity Initialization, which runs once for any logical drive that was created with prior firmware releases and is reporting parity initialization failed or has not yet completed parity initialization.

- Fixed an issue where the host management software reports that a drive has been detected with unrecoverable media errors after consistency check completes multiple iterations.
  - Root Cause: Consistency check did not repair Unrecoverable Read Errors (URE) for RAID 1 and RAID 5 logical drives that use 12G SAS drives.
  - Fix: Consistency check properly repairs UREs for all supported drive types.
  - Risk: Low

- Fixed an issue where in some I/O workloads, the filesystem or application may read incorrect data from an encrypted RAID 0 or RAID 10 logical drive.
  - Root Cause: RAID 0 logical drive created with two or more physical drives or RAID 10/10ADM logical drive created with four or more physical drives with large I/O write operations can result in the data being incorrectly encrypted as it was written to the drive.
  - Fix: Data will be correctly encrypted.
  - Risk: Low

- Fixed a controller hang during SSD logical drive Rapid Parity Initialization (RPI) when Test Unit Ready (TUR) commands failed.
  - Root Cause: During SSD volume creation using RPI method, over provisioning (OPO) is performed. If SSDs start failing TUR commands intermittently after 30 seconds of OPO, error handling logic does not have an upper time limit, leading to a loop and controller hang.
  - Fix: OPO error handling logic is modified to time limit the OPO process to a max of 65 seconds during SSD volume creation process, preventing the controller hang.
  - Risk: Low

- Fixed an issue where the filesystem or application may read old data during or after a rebuild completes.
  - Root cause: Under extreme I/O loads, rebuild operations and host writes may concurrently write to the same stripe of a logical drive.
  - Fix: Rebuild process will correctly lock stripes so host I/Os will not access the same stripe at the same time.
  - Risk: Medium

- Fixed an issue where the filesystem or application may read incorrect data after Background Parity Initialization (BPI) completes on an array with multiple logical drives.
  - Root Cause: Background Parity Initialization (BPI) running on RAID5, RAID50, RAID6, or RAID60, may overwrite the beginning of the next logical drive in the same array.
  - Fix: BPI correctly stops writing at the end of the logical drive being initialized.
  - Risk: Low

- Fixed a controller lockup issue while repairing a URE for a RAID 5 volume.
  - Root Cause: While executing a read operation as part of repairing a URE, an unsynchronized wait flag between two firmware threads caused a lockup.
  - Fix: Firmware fixes the lockup by correctly synchronizing the wait flag between the firmware threads.
  - Risk: Low
• Fixed a controller lockup issue during maxCache error handling.
  ◦ Root Cause: During maxCache dirty cache page write error handling, an I/O resource gets queued for error handling, but is freed before starting to process the error. The same I/O resource is then allocated by another controller task and when the maxCache error handler starts to handle the error it is using the same I/O resource. Both maxCache and the other task using the same I/O resource result in a controller lockup.
  ◦ Fix: maxCache error handling will complete before freeing the I/O resource.
  ◦ Risk: Medium
• Fixed a controller lockup issue during controller boot in maxCache configuration.
  ◦ Root Cause: During controller boot with maxCache configurations, firmware uses an internal IO processing thread to read maxCache metadata from disk. While reading the maxCache metadata firmware pauses the external I/O processing thread. If a maxCache metadata read command fails, the metadata read is retried using the external I/O processing thread. Since the external I/O processing thread is paused a thread deadlock condition occurs between the internal I/O thread and external I/O thread that results in a controller lockup.
  ◦ Fix: maxCache metadata read failures are posted to the internal I/O processing thread to avoid the thread deadlock and controller lockup.
  ◦ Risk: Low
• Fixed an issue where the filesystem or application may read incorrect data when a coalesced host request encounters a fatal error.
  ◦ Root cause: Firmware may coalesce smaller host requests into larger requests to provide better performance during sequential IO workloads. When coalescing occurs, the completion status of the smaller I/O requests is initialized to a SCSI GOOD status. If the larger coalesced I/O fails, firmware un-coalesces the larger request back into the original smaller requests and executes them individually. If one of the smaller I/O request encounters a fatal error again, the previously initialized GOOD status is returned to the filesystem or application instead of a CHECK CONDITION completion status resulting in the filesystem or application receiving incorrect data.
  ◦ Fix: After executing the individual I/O requests, return the appropriate completion status.
  ◦ Risk: Low

2.2.2 UEFI Fixes

Note: Microsoft signed and secure boot is supported.

2.2.2.1 Fixes and Enhancements for UEFI Driver 1.3.10.2/Legacy BIOS v1.3.10.2

There are no fixes for this release.

2.2.3 Driver Fixes

2.2.3.1 Fixes and Enhancements for Linux Driver Build 1.2.14-017

This release includes the following enhancements:

• Added support for SLES15 SP2 GM kernel.

2.2.3.2 Fixes and Enhancements for FreeBSD Driver Build 4010.0.101

This release provides the following enhancements and bug fixes:

• Added new versioning scheme: New driver version scheme will be "smartpqia.b.c.d".
  ◦ a—2 digits OS version (based on operating system it will change dynamically in driver.)
  ◦ b—4 digits feature/fix version
  ◦ c—1 digit
• Fixed an issue where FreeBSD 12.1 crashes during array creation and deletion.
  ◦ Root Cause: While processing an array deletion operation the SmartPQI driver removed the SCSI logical device from its listings, but there was an outstanding asynchronous call from the OS SCSI CAM layer that resulted in a null pointer being accessed causing a crash.
  ◦ Fix: Added a check to prevent accessing a null pointer.
  ◦ Risk: High
• Fixed an issue where HBA device ID fields are not displaying when the command `camcontrol negotiate da0 -v` is run.
  ◦ Root Cause: Structure members were not initialized correctly.
  ◦ Fix: Initialize structure members to the correct values.
  ◦ Risk: Low
• Fixed an issue with the smartpqi driver running out of memory resulting in I/Os being re-queued.
  ◦ Root Cause: Using the wrong return code when memory is exhausted.
  ◦ Fix: Return resource unavailable code which enables a delay before re-queing the I/O.
  ◦ Risk: Low
• Fixed flooding of dmesg with kernel error messages.
  ◦ Root Cause: An uninitialized variable causing a kernel ring buffer overflow.
  ◦ Fix: Make sure the variables are initialized and remove a redundant print statement.
  ◦ Risk: Low
• Fixed an issue with the smartpqi driver not responding to host commands when using the ZFS file system on FreeBSD 12.1.
  ◦ Root Cause: A race condition in the driver's handling of I/O completions was causing queued I/Os to become stuck.
  ◦ Fix: Set the correct flags for queued I/Os.
  ◦ Risk: High
• Fixed an issue to avoid unnecessary host memory allocation.
  ◦ Root Cause: The smartpqi driver is allocating large or continuous DMA buffers based on the wrong structure.
  ◦ Fix: Allocate host memory correctly for the host scatter/gather buffers.
  ◦ Risk: Medium
• Fixed an issue where the reboot command is failing after a controller is offlined due to a lockup.
  ◦ Root Cause: Incorrect kernel function used when attempting to stop the controller’s heartbeat timer, resulting in a kernel deadlock.
  ◦ Fix: Use the correct kernel function when stopping the heartbeat.
  ◦ Risk: Low
• Fixed an issue with the driver not releasing used tags in the correct order.
  ◦ Root Cause: A race condition exists if a used tag is cleared before the rcb structure is reset, resulting in a system crash.
  ◦ Fix: Clear the rcb structure before releasing used tag.
  ◦ Risk: Low

2.2.3.3 Fixes and Enhancements for Solaris Driver Build 4010.0.101

This release provides the following enhancements and bug fixes:
• Added new versioning scheme: New driver version scheme will be "smartpqi-a.b.c.d".
  ◦ a—2 digits OS version (based on operating system it will change dynamically in driver.)
  ◦ b—4 digits feature/fix version
  ◦ c—1 digit
  ◦ d—3 digits (build number)
2.2.3.4 Fixes and Enhancements for Windows Build 106.178.4.1017

This release provides the following enhancements and bug fixes:

- Fixed an issue while executing HCK CHAOS test, SmartPQI driver crashes with bugcheck 0x7A(KERNEL_DATA_INPAGE_ERROR).
  - Root Cause: While returning from hibernation, the storport workitem is not able to queue the worker thread. This causes the initialization of the controller to fail resuming from hibernation that causes the kernel to crash with bugcheck 0x7A.
  - Fix: Replace storport workitem with direct function call for initializing and configuring the controller after returning from Hibernate/Sleep.

2.2.3.5 Fixes and Enhancements for VMware Driver Build 4010.1.106

This release provides the following enhancements and bug fixes:

- Added feature for handling SCSI status for RAID path error scenario.
  - Details: Raid path error handling is not taking care of SCSI status in some cases where data_out_result is success.
- Fixed a dependency issue in 6.5/6.0 as OS upgrades from 6.5 to 7.0 fails.
  - Root Cause: OS upgrade from 6.5 to 7.0 was failing due to vmkapi dependency.
  - Fix: vmkapi_2_2_0_0 dependency is specified in the smartpqi.sc file.
- Fixed an issue for out-of-bound memory access.
  - Root Cause: While processing the queue depth list for the logical drives attached to the controller, the driver incorrectly included an entry for the controller itself that resulted in a PSOD.
  - Fix: Omit controller entry while processing queue depth list.
  - Risk: Low
- Renaming the vendor name from Microchip to Microsemi.
  - Details: While submitting the SmartPQI driver for certification, VMware is not accepting it with the vendor name "Microchip". VMware expects the vendor name to be "Microsemi".
- Added new versioning scheme for VMware.
  - New driver version scheme will be "smartpqi-a.b.c.d".
  - a—2 digits OS version (for example, for ESXI 6.7, it will be 67).
  - b—4 digits feature/fix version, assigned by Microchip build system.
  - c—1 digit hardcoded to zero in the driver.
  - d—3 digits (build number) assigned by Microchip build system.
- Fixed an issue of PSOD during the hotplug drive removal.
  - Root Cause: During an OS initiated hotplug drive removal, the driver was not removing the drive from the internal remove_device_list when the path was deleted.
  - Fix: In an OS initiated hotplug drive removal event, remove the drive from the remove_device_list.
  - Risk: Medium

2.2.4 Management Software Fixes

2.2.4.1 Fixes and Enhancements for Arcconf/maxView Build B23731

This release includes the following fixes and enhancements for arccconf/maxView:
• Fixed an issue in arcconf CLI, where the creation of RAID60 on an existing Array may fail intermittently with error message "Not enough space in array 0 to create logical drive", when sufficient space is available in the array.
  ◦ Root Cause: Array unused size calculation was not always resulting in the correct size due to the uninitialized RAID 60 spanned segments.
  ◦ Fix: Proper initialization of the RAID 60 spanned segments consistently resolved the array size calculation.
  ◦ Risk: Low

• Fixed an issue in maxView Redfish server module, under Windows Server 2019, on continuous RAID configuration management operation, maxView may lose its communication with the maxView Redfish service.
  ◦ Root Cause: maxView Redfish server module got into an exception while accessing the event log file.
  ◦ Fix: Proper synchronization and retry logic is used to overcome the file access issue.
  ◦ Risk: Low

• Fixed an issue where spare management is not enabled when the array has a failed dedicated spare.
  ◦ Root Cause: Spare management was disabled based on the failed status of array and status of the member devices was not considered.
  ◦ Fix: Added changes to consider the states of member physical devices along with status of array to enable spare management.
  ◦ Risk: Low

• Fixed an issue where heal array option is enabled when the array has a failed dedicated spare.
  ◦ Root Cause: Heal array option was enabled based on the status of array and status of the member physical devices was not considered.
  ◦ Fix: Added changes to consider the failed member physical devices along with status of array to enable heal array option.
  ◦ Risk: Low

• Fixed an issue where Change Drive operation was not listing SATA HDD devices for a SATA SSD array.
  ◦ Root Cause: Change drive operation was considering only interface type for the devices.
  ◦ Fix: Added changes for change drive operation, to allow change between SSD, HDD, and vice-versa.
  ◦ Risk: Low

• Fixed an issue where login to Redfish server failed with reason "Connection removed from server".
  ◦ Root Cause: Whenever file handle acquiring for PluginsTrace.log fails, Redfish server goes into indefinite wait causing maxView to fail respond to user requests.
  ◦ Fix: Added changes to fix the file handle accessibility allowing maxView to respond to user requests.
  ◦ Risk: Low

• Fixed an issue where move operation on a logical drive on a SAS HDD array is not allowed to a SATA SSD array.
  ◦ Root Cause: Move operation was not allowed on arrays with different interface types.
  ◦ Fix: Added changes to allow Move operation on arrays with different interface types.
  ◦ Risk: Low

### 2.3 Limitations

#### 2.3.1 Firmware Limitations

#### 2.3.1.1 Limitations for Firmware Release 3.00

This release includes the following firmware limitations:
• In a maxCache configured server, when a logical drive gets hot added when the server is in a dirty shutdown state, the maxCache metadata along with its dirty data will be lost.
  ◦ Workaround: None

• If redundant data can’t be regenerated during a host write request on a degraded logical volume due to bad blocks on all data drives, the respective LBA will still be marked bad, but it won’t be returned with error status. A subsequent read to these LBAs will result in a medium error with sense data (KCQ, 03/11/00) because the block is already marked bad by firmware.
  ◦ Workaround: None

• SATA drives attached to a non-Microsemi expander may get into a failed state when upgrading the controller firmware from previous releases to this release due to the expander not clearing STP affiliation.
  ◦ Workaround: Power cycle the expanders to clear the STP affiliation.

• When I/Os are performed on drives that respond slowly or which do not respond to READ or WRITE commands, and when Secure Erase is performed on other SATA drives, I/Os become stalled for a period of time. The time the I/Os are paused depends directly on the amount of unflushed data in the cache and speed with which the device responds to error recovery.
  ◦ Workaround: None

• Controller cache will not be converted into 100% read cache, if any backup power source cable error, charge or charge timeout error occurs when expansion or transformation task is active.
  ◦ Workaround: None

• Performance drop is observed on certain queue depth for the 4 KB sequential write workload on RAID logical volumes with SmartPath and DDR caching disabled.
  ◦ Workaround: Enable the DDR caching for RAID 0 and RAID 1 volumes, to avoid this problem. There are no known workarounds for parity RAID volumes such as RAID 5 or 6.

• A logical drive undergoing an expansion or array type transformation may not complete properly (including controller lockup) if it is migrated from one controller to another controller.
  ◦ Workaround: Wait for transformations/expansion activities to complete before migrating to another controller.

• The maxCache reconfiguration operations like changing from write back to write through or maxCache cache delete may not complete successfully.
  ◦ Workaround: Reboot controller and reconfigure maxCache cache as required.

• If a system is warm rebooted to complete a firmware update while a rekey/encryption operation on a maxCache-enabled volume is in progress, the user may see a POST message informing that a firmware update is pending and the rekey/encryption operation will be paused until the user performs another reboot.
  ◦ Workaround: To avoid this issue, perform a complete shutdown (power off completely) after a firmware update and then power on the server again.

2.3.1.2 Limitations for Firmware Release 1.32 Build 0

• Firmware release 1.32b0 may become unresponsive while attempting to flash firmware or execute other RAID logical volume operations.
  ◦ Description: Refer to entry "Fixed an issue where firmware may become unresponsive while attempting to flash firmware or execute other RAID logical volume operations" in the Firmware fixes section.
  ◦ A fix for this issue is available in the 1.60 B0 firmware release. If a firmware flash failure is occurring, try the following workarounds:
    ▪ Workaround: If there are no target devices (expanders or drives) attached to the controller, attach a target device to the controller and try the host management operation again.
    ▪ Workaround: If the system is operating using UEFI, the HII tool can be used to flash the firmware to this release as outlined in the Microsemi SmartIOC 2100/SmartROC 3100
2.3.2 UEFI Limitations

2.3.2.1 Limitations for UEFI Build 1.3.10.2/Legacy BIOS Build 1.3.10.2
There are no known limitations for this release.

2.3.3 Driver Limitations

2.3.3.1 Limitations for Linux Driver Build 1.2.14-017
This release includes the following Linux limitations:

- When the user attempts to install SLES15 SP2 or RHEL 8.2 OS when a native 4 KiB device is connected to the controller using the out-of-box driver (by interrupting the GRUB), the OS installation may hang after the out-of-box driver is loaded.
  - Workaround: Use the inbox driver that came with the OS distribution to install the Linux OS and then upgrade to the out-of-box driver.

2.3.3.2 Limitations for Windows Driver Builds 106.178.4.1017
There are no known limitations for this release.

2.3.3.3 Limitations for FreeBSD Driver Build 4010.0.101
There are no known limitations for this release.

2.3.3.4 Limitations for Solaris Driver Build 4010.0.101
There are no known limitations for this release.

2.3.3.5 Limitations for VMware Driver Build 4010.1.106
This release includes the following VMware driver limitation:

- Description: During an OS upgrade from ESXi 6.7/6.5 to 7.0, one of the following scenarios can occur:
  - If SmartPQI driver 1.0.4.3017 driver is installed with 6.7/6.5 then the upgrade to ESXi 7.0 will complete and an untested and uncertified configuration of ESXi 7.0 with SmartPQI 1.0.4.3017 will be running.
  - If SmartPQI driver 4010.1.106 is installed with 6.7/6.5 then the upgrade to ESXi 7.0 will fail with the following error:

  ![Figure 1 • Error Message](image)

  - Workarounds: Follow these steps to upgrade from ESXi 6.7/6.5 to ESXi 7.0.
    1. Downgrade to the VMware out-of-box SmartPQI driver version 1.0.4.3008 (SR 2.5 driver).
    2. Upgrade the OS from ESXi 6.7/6.5 to ESXi 7.0.
After OS upgrade, the expected VMware inbox SmartPQI driver 1.0.4.3011 will be loaded.
To check after OS upgrade:

```
[root@hostname:~] esxcli software vib list | grep smartpqi
smartpqi         1.0.4.3011-1vmw.700.1.0.15525992   VMW     VMwareCertified
                   2020-03-17
```

Future interim out-of-box driver releases for VMware ESXi 7.0+ can be applied normally.

### 2.3.4 Hardware Limitations

This release includes the following hardware limitations:
- Two Wire Interface (TWI) address conflicts can cause system DDR memory to not be discovered.
  - Description: The SmartRAID 3100 and SmartHBA 2100 boards include two TWI targets on the host-facing SMBUS interface with the following slave addresses:
    - 0xA0 – Field Replaceable Unit (FRU) SEEPROM
    - 0xDE – PBSI (default)
  - According to the JEDEC specification, the default TWI addresses for the DDR SPD is 0xA0-0xAE (the spec uses 7 bit addressing which is 0x50-0x57). On platform system board designs with SMBUS wiring that has both PCIe slots and DDR slots shared on the same TWI bus, the TWI devices for the DDR and Smart controller are exposed to address conflicts which can result in the system memory not being discovered. The Smart controller PBSI interface defaults to a value of 0xDE (0x6F in 7-bit addressing) and is not a problem unless it is changed to an address that conflicts with the JEDEC defined values. The Smart controller FRU SEEPROM is hardwired to 0xA0.
  - Workaround: None available. If this issue is encountered, contact your Microsemi support engineer to determine the next steps for your system.
  - Performance with workaround: Not applicable
  - Performance without workaround: Not applicable

### 2.3.5 Management Software Limitations

#### 2.3.5.1 Limitations for Arcconf/maxView Build B23731

There are no known limitations for this release.
### 3 Updating the Board Firmware for PQI Operation

This section describes how to update the board's firmware components to the latest release.

#### 3.1 Updating Controllers to latest (PQI) Firmware

This procedure describes how to prepare your board to be programmed with the latest board PQI firmware.

**Note:**
1. If the running firmware is older than 1.98 and a transformation is in progress, complete the transformation before proceeding with the following steps to upgrade the firmware.
2. Complete these procedures exactly as described for proper functionality. If you do not follow all of the steps correctly, you could encounter unusual runtime behavior.

**Flashing the board to the latest PQI firmware:**

This section describes how to update all the firmware components on SmartHBA 2100 controller boards to the latest release.

**If the controller is currently running 1.60 b0 firmware or newer, follow these steps:**

1. **Mandatory:** Flash the target with the provided "SmartFWx100.bin" image with arcconf/maxView software.
2. **Mandatory:** Use the OS shutdown/restart operation to gracefully reboot the system to complete the firmware update process.

**Note:**
After completing the firmware update, if the firmware version is still showing the prior version, retry the firmware update steps.

**If the controller is currently running 1.32 b0 firmware, follow these steps:**

1. **Mandatory:** Flash the target with the provided "SmartFWx100_v1.29_b314.bin" image with arcconf/maxView software.
   - If the arcconf/maxView software becomes unresponsive or hangs then power cycle the system to recover and refer to firmware limitation section *Limitations for Firmware Release 1.32 Build 0* on page 12.
2. **Mandatory:** If flashing completes, use the OS shutdown/restart operation to gracefully reboot the system to complete the firmware update process.

**Note:**
After completing the firmware update, if the firmware version is still showing the prior version, retry the firmware update steps.

**If the controller is currently running 1.04 b0 firmware, follow these steps:**

1. **Mandatory:** Flash the controller with the provided "SmartFWx100_v1.29_b314.bin" image with arcconf/maxView software.
2. **Mandatory:** Reboot the system to refresh all components.
3. **Mandatory:** Flash the target with the provided "SmartFWx100.bin" image with arcconf/maxView software.
4. **Mandatory:** Use the OS shutdown/restart operation to gracefully reboot the system to complete the firmware update process.

At this point, the controller would be updated and would be ready to use. Install the SmartPQI driver and the latest version of the Arcconf/maxView management utility to monitor and configure the controller.

**Note:** Downgrading firmware could lead to unexpected behavior due to an incompatibility in SEEPROMs between this release and the prior release.
4 Installing the Drivers

See the "Microsemi Adaptec® SmartRAID 3100 Series and SmartHBA 2100 Series Host Bus Adapters Installation and User's Guide (ESC-2171547)" for complete driver installation instructions.
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