

# Intel<sup>®</sup> Omni-Path Fabric Software

Release Notes for 10.3.2

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*September 2017*



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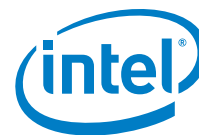
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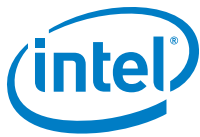
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## Contents

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<b>1.0 Overview of the Release</b> .....	4
1.1 Introduction.....	4
1.2 Audience .....	4
1.3 Software License Agreement .....	4
1.4 If You Need Help .....	4
1.5 New Enhancements and Features in this Release .....	4
1.6 Supported Features .....	5
1.7 Release Packages .....	5
1.8 Firmware Files .....	6
1.9 Operating Systems .....	6
1.10 Parallel File Systems .....	7
1.11 Compilers.....	7
1.11.1 MPI .....	7
1.11.2 MVAPICH2 and Open MPI .....	8
1.12 Hardware .....	8
1.13 Installation Requirements .....	9
1.13.1 Software and Firmware Requirements.....	9
1.13.2 Installation Instructions .....	9
1.14 Product Constraints .....	10
1.15 Product Limitations .....	10
1.15.1 RHEL* 6.7 and CentOS* 6.7 Support .....	10
1.16 Token ID (TID) RDMA Information .....	11
1.17 Documentation.....	11
<b>2.0 Issues</b> .....	13
2.1 Introduction.....	13
2.2 Resolved Issues .....	13
2.3 Open Issues .....	15
<b>3.0 Documentation Errata</b> .....	22
<b>Tables</b>	
1-1 Firmware Files.....	6
1-2 Operating Systems Supported .....	6
1-3 MPI Compilers.....	7
1-4 MVAPICH2 and Open MPI .....	8
1-5 Hardware Supported .....	8
1-6 Related Documentation for this Release .....	12
2-1 Issues resolved in this release .....	13
2-2 Issues resolved in prior releases .....	13
2-3 Open Issues.....	15



## 1.0 Overview of the Release

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### 1.1 Introduction

This document provides a brief overview of the changes introduced into the Intel® Omni-Path Software by this release. References to more detailed information are provided where necessary. The information contained in this document is intended as supplemental information only; it should be used in conjunction with the documentation provided for each component.

These Release Notes list the features supported in this software release, open issues, and issues that were resolved during release development.

### 1.2 Audience

The information provided in this document is intended for installers, software support engineers, service personnel, and system administrators.

### 1.3 Software License Agreement

This software is provided under license agreements and may contain third-party software under separate third-party licensing. Please refer to the license files provided with the software for specific details.

### 1.4 If You Need Help

Technical support for Intel® Omni-Path products is available 24 hours a day, 365 days a year. Please contact Intel Customer Support or visit <http://www.intel.com/omnipath/support> for additional detail.

### 1.5 New Enhancements and Features in this Release

The 10.3.2 release contains no new features; this release is a maintenance release that contains bug fixes. See [Table 2-1](#) for details.

The following enhancements and features were new in the 10.3.1 release:

- Support for Token ID (TID) RDMA, which is a Verbs protocol extension. See [Section 1.16](#) for details.
- Support for SKX and SKX-F hardware.
- Supports RHEL\* 6.7 and CentOS\* 6.7.
- Support for active optical cables (AOC) on server platforms using integrated HFI for OPA (commonly known as "-F").



## 1.6 Supported Features

- The list of supported operating systems is in [Table 1-2](#).
- The list of supported hardware is in [Table 1-5](#).
- Coexistence with Intel® True Scale Architecture. This release supports True Scale hardware serving as an InfiniBand\* storage network with the Intel® Omni-Path hardware used for computing. Note that connecting a True Scale adapter card to an Omni-Path switch, or vice-versa, is not supported. For more details on this feature, refer to *Intel® Omni-Path Fabric Host Software User Guide*.
- Supports Dual Rail: Two Intel® Omni-Path Host Fabric Interface (HFI) cards in the same server connected to the same fabric
- Supports Dual Plane: Two HFI cards in the same server connected to separate fabrics.
- Limited validation testing performed on network storage file systems:
  - NFS over TCP/IP
- Active Optical Cables. For details, see the Cable Matrix at: <http://www.intel.com/content/www/us/en/high-performance-computing-fabrics/omni-path-cables.html>
- MPI applications are provided in a stand-alone package.
- Intel® Xeon® v4 processor (codename Broadwell) support
- Intel® Xeon Phi™ support
- Monitored Intel® Omni-Path Host Fabric Interface
- DHCP and LDAP supported on Intel® Omni-Path Edge Switch 100 Series and Intel® Omni-Path Director Class Switch 100 Series hardware.
- Added support for Enterprise Edition for Lustre\* software version 3.1.
- Support for the Enhanced Hypercube Routing Engine is outside the scope of Intel® OPA support. However, Intel partners may offer such support as part of their solutions. In addition there is an open source community who may be able to answer specific questions and provide guidance with respect to the Enhanced Hypercube Routing Engine.

## 1.7 Release Packages

There are two Intel® Omni-Path Fabric Software packages:

- Basic for compute nodes
- IFS for the management node

The Basic package includes:

- Software that installs the following packages to the distribution OpenFabrics Alliance\* (OFA):
  - libumad is based on the RHEL\* or SLES\* release package. It contains Intel patches that support Intel® Omni-Path Architecture (Intel® OPA) technology.
  - ibacm is the latest upstream code applied with RHEL\* patches.
  - hfi1-firmware, hfi1-psm, hfi1-diagtools-sw, libhfi1verbs
  - Open MPI built for verbs and PSM2 using gcc, and Intel compilers.
  - MVAPICH2 built for verbs and PSM2 using gcc, and Intel compilers.
  - mpitests



- mpi-selector
  - GASnet
  - openSHMEM
  - srptools (includes the latest upstream code)
  - Firmware files listed in [Table 1-1](#).
- compat-rdma which delivers kernel changes based on the OFA version. The components installed are the hfi1 driver and Intel-enhanced versions of other kernel packages. See the *Building Lustre\* Servers with Intel® Omni-Path Architecture Application Note* for details.
- Note:** In the Intel® Omni-Path Software package for RHEL\* 7.2, the hfi1 driver and ifs-kernel-updates are supplied as a smaller package.

The IFS package includes the Basic package plus:

- Fabric Manager, which allows comprehensive control of administrative functions using a mature Subnet Manager. Fabric Manager simplifies subnet, fabric, and individual component management, easing the deployment and optimization of large fabrics.
- Fabric Suite FastFabric Toolset, which enables rapid, error-free installation and configuration of Intel® OPA host software and management software tools, as well as simplified installation, configuration, validation, and optimization of HPC fabrics. For details, refer to the Fabric Suite FastFabric documentation in [Table 1-6](#).

## 1.8 Firmware Files

This release of the Intel® Omni-Path Software contains the firmware files listed in [Table 1-1](#).

Table 1-1. Firmware Files

Description	File Name	Version
HFI1 UEFI Option ROM	HfiPcieGen3_1.3.2.0.0.efi	1.3.2.0.0
UEFI UNDI	HfiPcieGen3Loader_1.3.2.0.0.rom	1.3.2.0.0
HFI1 SMBus Microcontroller Firmware (Thermal Monitor)	hfi1_smbus.fw	10.2.1.0.3

## 1.9 Operating Systems

This release of the Intel® Omni-Path Software supports the operating systems listed in [Table 1-2](#).

Table 1-2. Operating Systems Supported

Operating System	Update/SP	Kernel Version
Red Hat* Enterprise Linux* (RHEL*) 6.7 X86_64	Update 7	2.6.32-573.el6.x86_64
CentOS* 6.7 X86_64	Update 7	2.6.32-573.el6.x86_64
Red Hat* Enterprise Linux* (RHEL*) 7.2 X86_64	Update 2	3.10.0-327.el7.x86_64
Red Hat* Enterprise Linux* (RHEL*) 7.3 X86_64	N/A	3.10.0-514.el7.x86_64
CentOS* 7.2 X86_64	N/A	3.10.0-327.el7.x86_64



**Table 1-2. Operating Systems Supported**

Operating System	Update/SP	Kernel Version
Scientific Linux* 7.2 X86_64	N/A	3.10.0-327.el7.x86_64
SUSE* Linux* Enterprise Server (SLES*) 12.1 X86_64	Service Pack 1	3.12.49-11.1-default
SUSE* Linux* Enterprise Server (SLES*) 12.2 X86_64	Service Pack 2	4.4.21-69-default

## 1.10 Parallel File Systems

The following parallel file systems have been tested with this release of the Intel® Omni-Path Software:

- Intel® Enterprise Edition Lustre\* (IEEL) 3.1
  - RHEL\* versions supported by Intel® Omni-Path Software.
- IBM\* General Parallel File System (GPFS) version 4.0.1
  - RHEL\* 7.2.

Refer to the *Intel® Omni-Path Fabric Performance Tuning User Guide* for details on optimizing parallel file system performance with Intel® Omni-Path Software.

## 1.11 Compilers

### 1.11.1 MPI

This release supports the following MPI implementations:

**Table 1-3. MPI Compilers**

MPI Implementation	Runs Over	Compiled With
Open MPI 1.10.4	Verbs	GCC
	PSM2	GCC, Intel
MVAPICH2-2.1	Verbs	GCC
	PSM2	GCC, Intel
Intel® MPI 5.1.3	Verbs	GCC
	PSM2	GCC, Intel



## 1.11.2 MVAPICH2 and Open MPI

MVAPICH2 and Open MPI have been compiled for PSM2 to support the following versions of the compilers:

Table 1-4. MVAPICH2 and Open MPI

Compiler	Linux* Distribution	Compiler Version
(GNU) gcc	RHEL* 7.2	gcc (GCC) 4.8.5 20150623 (Red Hat* 4.8.5-4)
(GNU) gcc	RHEL* 7.3	gcc (GCC) 4.8.5 20150623 (Red Hat* 4.8.5-11)
(GNU) gcc	SLES* 12 SP 1	gcc (SUSE* Linux*) version 4.8.5
(GNU) gcc	SLES* 12 SP 2	gcc (SUSE* Linux*) version 4.8.5
(Intel) icc	RHEL* 7.2	icc (ICC) 15.0.1
(Intel) icc	RHEL* 7.3	icc (ICC) 15.0.1
(Intel) icc	SLES* 12 SP 1	icc (ICC) 15.0.1
(Intel) icc	SLES* 12 SP 2	icc (ICC) 15.0.1

*Note:* Refer to the *Intel® Omni-Path Fabric Host Software User Guide* for set up information when using Open MPI with the SLURM PMI launcher and PSM2.

## 1.12 Hardware

Table 1-5 lists the hardware supported in this release.

*Note:* The Intel® PSM2 implementation has a limit of four (4) HFIs.

Table 1-5. Hardware Supported

Hardware	Description
Intel® Xeon® Processor E5-2600 v3 product family	Haswell CPU-based servers
Intel® Xeon® Processor E5-2600 v4 product family	Broadwell CPU-based servers
Next generation Intel® Xeon® Processor (codename Skylake)	Skylake CPU-based servers (pre-production samples)
Intel® Xeon Phi™ Processor x200 product family	Knights Landing CPU-based servers
Intel® Omni-Path Host Fabric Interface 100HFA016 (x16)	Single Port Host Fabric Interface (HFI)
Intel® Omni-Path Host Fabric Interface 100HFA018 (x8)	Single Port Host Fabric Interface (HFI)
Intel® Omni-Path Switch 100SWE48Q	Managed 48-port Edge Switch
Intel® Omni-Path Switch 100SWE48U	Externally-managed 48-port Edge Switch
Intel® Omni-Path Switch 100SWE24Q	Managed 24-port Edge Switch
Intel® Omni-Path Switch 100SWE24U	Externally-managed 24-port Edge Switch
Intel® Omni-Path Director Class Switch 100SWD24	Director Class Switch 100 Series, up to 768 ports
Intel® Omni-Path Director Class Switch 100SWD06	Director Class Switch 100 Series, up to 192 ports

*Note:* For RHEL\* 6.7 and CentOS\* 6.7, only the following processors are supported:

- Intel® Xeon® Processor E5-2600 v3 product family
- Intel® Xeon® Processor E5-2600 v4 product family





## 1.13 Installation Requirements

### 1.13.1 Software and Firmware Requirements

Table 1-2 lists the operating systems supported by this release. Refer to the *Intel® Omni-Path Fabric Software Installation Guide* for the required packages.

### 1.13.2 Installation Instructions

There are two Intel® Omni-Path Fabric Software packages:

- IntelOPA-IFS.<distro>-x86\_64.<version>.tgz for the management node.
- IntelOPA-Basic.<distro>-x86\_64.<version>.tgz for compute nodes.

The packages in the tgz file are RPMs. Installing individual RPMs is not supported in the 10.3.2 release.

Refer to the *Intel® Omni-Path Fabric Software Installation Guide* for related software requirements and complete installation procedures. Refer to the *Intel® Omni-Path Fabric Hardware Installation Guide* for related firmware requirements.

#### 1.13.2.1 Installation Prerequisites for RHEL\* 6.7 and CentOS\* 6.7

Install the following packages using yum from the RHEL\* or CentOS\* distributions:

- libibverbs
- librdmacm
- libibcm
- qperf
- perftest
- rdma
- infinipath-psm
- opensm-devel
- expat
- elfutils-libelf-devel
- libstdc++-devel
- gcc-gfortran
- atlas
- c-ares
- tcl
- expect
- tcsh
- sysfsutils
- pciutils
- bc (command line calculator for floating point math)
- rpm-build
- redhat-rpm-config
- kernel-devel



- opensm-libs

### 1.13.2.2 Required Pre-Installation to perform external modules builds on SLES\* 12 Systems

*Note:* This step is required only if the installed distribution kernel has been updated to a distribution security update.

SLES\* 12 kernel-development environment is not ready "out-of-box" for external modules build. It has to be prepared prior to the installation. To rebuild SLES\* 12 kernel pieces, perform the following steps:

1. Change directory:  
`cd /lib/modules/3.12.28-*****/source`
2. Create the following files:  
Make `cloneconfig`  
Make `oldconfig`  
Make `__headers`
3. Only build as needed.

## 1.14 Product Constraints

None.

## 1.15 Product Limitations

This release has the following product limitations:

- The embedded version of the Fabric Manager supports a maximum of 100 nodes within a fabric. This is due to the limited memory and processing resources available in the embedded environment.
- PA Failover should **not** be enabled with FMs running on differing software versions. PA Failover is enabled via  
`configuration:<PM>/<ImageUpdateInterval> > 0`
- Enabling UEFI Optimized Boot on some platforms can prevent the HFI UEFI driver from loading during boot. To prevent this, do not enable UEFI Optimized Boot.

### 1.15.1 RHEL\* 6.7 and CentOS\* 6.7 Support

- Processor support:
  - Intel® Xeon® Processor E5-2600 v3 product family
  - Intel® Xeon® Processor E5-2600 v4 product family
- File system support:
  - GPFS
  - NFS
  - Lustre\*

**Note:** For Enterprise Edition 3.0 Clients (support RHEL\* 6.7) and Enterprise Edition 3.1 Servers (support RHEL\* 7.3): You cannot upgrade your Clients beyond version 3.0 until you move to a newer RHEL\* version.



- MVAPICH2 and Open MPI have been compiled for PSM2 to support the following versions of the compilers:

Compiler	Linux* Distribution	Compiler Version
(GNU) gcc	RHEL* 6.7 CentOS* 6.7	gcc (GCC) 4.4.7
(Intel) icc	RHEL* 6.7 CentOS* 6.7	icc (ICC) 15.0.1

- Performance is within 2%-5% of RHEL\* 7.2 performance for the following features:
  - PSM bandwidth
  - MPI latency
  - Verbs bandwidth

## 1.16 Token ID (TID) RDMA Information

Token ID (TID) RDMA is a Verbs protocol extension to improve the performance of RDMA write and RDMA read operations on Intel® Omni-Path hardware.

This extension improves the efficiency of large message transfers to provide performance benefits for storage protocols and other Verbs-based protocols. The performance benefits include increased achievable bandwidth with reduced CPU utilization. The TID RDMA protocol accelerates the OpenFabrics Alliance\* (OFA) Verbs API with no changes required to API consumers. The acceleration technique is performed by the host driver and the application running over the OFA Verbs API does not need to make any code change.

TID RDMA is off by default.

To enable it, add `cap_mask=0x4c09a01cbba` to the `/etc/modprobe.d/hfi1.conf` file. Instructions on how to do this are in the *Intel® Omni-Path Fabric Performance Tuning User Guide*, "Setting HFI1 Driver Parameters" section.

## 1.17 Documentation

Table 1-6 lists the end user documentation for the current release.

Documents are available at the following URLs:

- Intel® Omni-Path Switches Installation, User, and Reference Guides  
[www.intel.com/omnipath/SwitchPublications](http://www.intel.com/omnipath/SwitchPublications)
- Intel® Omni-Path Fabric Software Installation, User, and Reference Guides  
[www.intel.com/omnipath/FabricSoftwarePublications](http://www.intel.com/omnipath/FabricSoftwarePublications)
- Drivers and Software (including Release Notes)  
[www.intel.com/omnipath/downloads](http://www.intel.com/omnipath/downloads)



Table 1-6. Related Documentation for this Release

Document Title
<b>Hardware Documents</b>
<i>Intel® Omni-Path Fabric Switches Hardware Installation Guide</i>
<i>Intel® Omni-Path Fabric Switches GUI User Guide</i>
<i>Intel® Omni-Path Fabric Switches Command Line Interface Reference Guide</i>
<i>Intel® Omni-Path Edge Switch Platform Configuration Reference Guide</i>
<i>Intel® Omni-Path Fabric Switches Release Notes (includes managed and externally-managed switches)</i>
<i>Intel® Omni-Path Host Fabric Interface Installation Guide</i>
<b>Fabric Software Documents</b>
<i>Intel® Omni-Path Fabric Software Installation Guide</i>
<i>Intel® Omni-Path Fabric Suite Fabric Manager User Guide</i>
<i>Intel® Omni-Path Fabric Suite FastFabric User Guide</i>
<i>Intel® Omni-Path Fabric Host Software User Guide</i>
<i>Intel® Omni-Path Fabric Suite Fabric Manager GUI Online Help</i>
<i>Intel® Omni-Path Fabric Suite Fabric Manager GUI User Guide</i>
<i>Intel® Omni-Path Fabric Suite FastFabric Command Line Interface Reference Guide</i>
<i>Intel® Performance Scaled Messaging 2 (PSM2) Programmer's Guide</i>
<i>Intel® Omni-Path Fabric Performance Tuning User Guide</i>
<i>Intel® Omni-Path Host Fabric Interface Platform Configuration Reference Guide</i>
<i>Intel® Omni-Path Fabric Software Release Notes</i>
<i>Intel® Omni-Path Fabric Manager GUI Release Notes</i>
<i>Intel® Omni-Path Storage Router Design Guide</i>
<i>Intel® Omni-Path Fabric Staging Guide</i>
<i>Building Lustre* Servers with Intel® Omni-Path Architecture Application Note</i>



## 2.0 Issues

### 2.1 Introduction

This section provides a list of the resolved and open issues in the Intel® Omni-Path Software.

### 2.2 Resolved Issues

Table 2-1 lists issues that are resolved in this release.

**Table 2-1. Issues resolved in this release**

ID	Description	Resolved in Release
137950	OFED DELTA 10.3.1 package fails to build on RHEL* 7.2 kernel version: kernel-devel-3.10.0-327.46.1.el7.x86_64	10.3.2
138475	IntelOPA-IFS.RHEL72-x86_64.10.3.1.0.22 fails to build on RHEL* 7.2 kernel version: 3.10.0-327.49.2.el7.x86_64	10.3.2
139031	IntelOPA-IFS.SLES12-x86_64.10.3.1.0.22 fails to build on SLES* 12 SP1 kernel version: 3.12.74-60.64.40	10.3.2

Table 2-2 lists issues that are resolved in prior releases.

**Table 2-2. Issues resolved in prior releases (Sheet 1 of 2)**

ID	Description	Resolved in Release
132219	Server platforms running IFS 10.3.0 release (or Intel® OPA software delivered in certain Linux* OS distributions) and using integrated HFI for OPA (commonly known as "-F") may not support Active Optical Cables (AOC) after boot up.	10.3.1
133377	irqbalance settings are not being honored correctly after a reboot.	10.3
133707	Updating to the RHEL* 7.2 kernel for the CVE-2016-0728 update in OSes prior to 7.2 causes the Intel® Omni-Path installation to fail.	10.3
134111	On some older HFI and HFI-like cards, running hfi1_eprom -V -c to inquire the version of the AOC configuration file on the card may return an invalid version of "etnIRFWI".	10.3
134124	HFI port stuck in INIT state due to SM failure to set pkeys.	10.3
134135 134429	When running communication-intensive workloads with 10KB MTU, it is possible to encounter node and/or job failures.	10.3
134283	When downgrading on a SLES* 12.X system from Intel® OPA version 10.2.X to a previous version, the following install errors occur: ERROR - Failed to install and error: Failed dependencies: libibmad5 is needed by opa-basic-tools...	10.3
134772	opatmmtool will fail if provided with a filename (full path) that is longer than 63 characters.	10.3
134866	hostverify.sh cannot properly detect if SRP is enabled on target node.	10.3.1



Table 2-2. Issues resolved in prior releases (Sheet 2 of 2)

ID	Description	Resolved in Release
134956	ib0 fails to become ready on warm reboots.	10.3.1
135000	Fabric Manager configuration files that specify IncludeGroup fields with undefined or nonexistent device groups could cause Fabric Manager failure.	10.3
135649	The XPPSL kernel changes conflict with items in the SLES* 12 SP1 kernel RPM. This causes the recompile of the SLES* 12 SP1 compat-rdma package to have an error.	10.3.1
135729 135870	KNL-F/SKL-F ports are offline in pre-boot setting when connected with AOC.	10.3.1
135812	FM may crash and restart in the event of a failure during topology assignments. This may result in mismatched port physical states on a link. While unlikely, this event may occur when there are integrity issues on a link.	10.3.1
135958	Spurious segmentation faults with greater than 2MB PSM2 transfers on Intel® Xeon Phi™ platforms.	10.3.1
136027	IFS hostverify.sh script does not provide reliable results for pstates_on and governor tests on RHEL* 7.3 and SLES* 12 SP2.	10.3.1
136028	Two versions of the UEFI firmware are contained in the hfi-uefi RPM in the 10.3.0 IFS and BASIC packages. The files are functionally identical except the unsigned files (HfiPcieGen3Loader_<version number>.unsigned.rom and HfiPcieGen3_<version number>.unsigned.efi) are not signed for secure boot.	10.3.1
136152	Server platforms using integrated HFI for OPA (commonly known as "-F") require BIOS that provides UEFI version 1.3.1.0.0 and a configuration data file for pre-boot support of Active Optical Cables (AOC). Some servers may not have these files available in BIOS and will therefore not support AOC in pre-boot.	10.3.1
136215	For RHEL6.7, the opaconfig command will not change the autostart settings for OPA service.	10.3.1
136318	SM crashes showing segfault errors in logs and high CPU usage. These crashes were caused by a mismatch of pahistory file versions.	10.3
136621	PCIe Fatal Errors during reboot cycles on server platforms using integrated HFI for OPA (commonly known as "-F").	10.3.1
136628	A bug in the Linux* kernel (CVE-2016-5195, also called Dirty COW) requires you to update the kernel for your operating system.	10.3.1
136723	Upgrading your OPA installation from version 10.2 to 10.3 may not install the correct host driver.	10.3.1



## 2.3 Open Issues

Table 2-3 lists the open issues for this release.

Table 2-3. Open Issues (Sheet 1 of 7)

ID	Description	Workaround
129563	Memory allocation errors with Mvapich2-2.1/Verbs.	When running mvapich2 jobs with a large number of ranks (for example, between 36 and 72 ranks), you must set the following parameters in <code>/etc/security/limits.conf</code> : * hard memlock unlimited * soft memlock unlimited Also, you must increase the <code>lkey_table_size:LKEY</code> table size in bits ( $2^n$ , $1 \leq n \leq 23$ ) from its default of 16 to 17. For instructions on setting module parameters, refer to Appendix A in the <i>Intel® Omni-Path Fabric Performance Tuning User Guide</i> .
130336	<code>hfi1stats</code> cannot be run at user level due to mount-point privileges.	The administrator can provide <code>sudo</code> access to <code>hfi1stats</code> or provide root access to users.
131017	Verbs <code>ib_send_bw</code> , <code>ib_read_bw</code> , and <code>ib_write_bw</code> are not working with the <code>-R</code> option to use the RDMA CM API to create QPs and exch data.	The following combinations of client and server DO NOT allow RDMA CM connections: Client            Server SLES* 12.1    SLES* 12.1 or            (intermittent) RHEL* 7.2 Using SLES* clients results in "Unexpected CM event bl bika 0" errors. Additionally, there are long (5-10 sec) initial delays when using these combinations: Client            Server SLES* 12.1    RHEL* 7.2 SLES* 12.0    RHEL* 7.2
131745	When running OpenMPI 1.10.0 on SLES* 12 with large number of ranks per node (over 40), it may happen that the ORTE daemon (orted) "hangs" during the finalization of job.	Stopping and resuming the "hung" orted process allows the job to finish normally. To find the hung process, run the <code>ps</code> and find a node with several job zombie processes. In that same node, identify the orted process ID and send a stop signal ( <code>kill -19 &lt;PID&gt;</code> ) and a continue signal ( <code>kill -18 &lt;PID&gt;</code> ).
132207	Kernel crash caused by the <code>ib_srpt</code> module.	Install this kernel patch: <a href="https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/commit/?id=51093254bf879bc9ce96590400a87897c7498463">https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/commit/?id=51093254bf879bc9ce96590400a87897c7498463</a>
133596	The install script does not check for packages that are necessary prerequisites for installation.	Refer to the <i>Intel® Omni-Path Fabric Software Installation Guide</i> , in the OS RPMs Installation Prerequisites section for the complete list.
133604	Bonding driver incorrectly shows hardware address of IPoIB interfaces.	Use the <code>opa_info</code> command to retrieve the PortGUID and <code>ip_addr show ib0</code> to get the correct 20-byte hardware address of OPA network interface.
133633	OpenMPI and Mvapich2 compiles fail to link properly when using the Intel compilers.	No workaround available.
134268	The Option ROM image (e.g. containing a UEFI driver) may not be executed if the BIOS configures the HFI Expansion ROM BAR with an address that is not 16MB aligned.	Use a BIOS that configures the HFI Expansion ROM BAR with an address that is 16MB aligned. Note that the main memory BAR of the device is 64MB in size and therefore requires 64MB alignment. A BIOS implementation that places the Expansion ROM BAR immediately after the main memory BAR automatically provides this workaround. Many BIOS implementations have this property and automatically meet the workaround criteria.



Table 2-3. Open Issues (Sheet 2 of 7)

ID	Description	Workaround
134353	Very infrequently, when a link goes down, the logical link state can remain stuck in the 'Init' state.	The device containing the affected port must be rebooted in order to resolve the issue. Ports in this state have a logical link state of 'Init' but do NOT have a physical port state of 'LinkUp'.
134471	The HFI UEFI driver cannot boot via PXE using Grub 2.	Use Elilo instead.
134493	When using Mvapich2 with Intel® Omni-Path PSM2, users will notice unexpected behavior when seeding the built-in random number generator with functions like srand or srandom before MPI_Init is called. MPI_Init re-seeds the random number generator with its own value and does not restore the seed set by the user application. This causes different MPI ranks to generate different sequences of random numbers even though they started with the same seed value.	Seed the random number generator after MPI_Init is called or use the reentrant random number generator functions such as drand48_r.
134494	Open MPI uses srand() family functions at MPI_Init() time. Therefore, if the user sets srand() before calling MPI_Init(), the values will be altered.	a) Fixed in Open MPI 2.0.1. b) Call srand() functions family after calling MPI_Init().
134819	In KNL-F EFI shell, the command ifconfig -l does not correctly display the IP address after being assigned via DHCP.	Launch a newer, working version of the EFI shell from the embedded shell.
134821	The UEFI network stack is initialized with a default network address before the driver receives a MAD packet containing an updated and actual subnet prefix. Therefore, in ARP and IP UEFI drivers the old (default) HW address is still used, causing problems with packet receiving and transmitting.	Use default subnet prefix, 0xfe80000000000000, when configuring a subnet for PXE boot over OPA.
134904	Legacy PXE boot using iPXE while the HFI UEFI driver is loaded causes a hang.	Configure PXE operation to boot using UEFI boot mode.
135040	You can't currently specify portions of an Intel® DCS chassis that is not populated and is not expected to be populated. If CoreFull is 1, all the internal links for that chassis are generated when run against opaxlat topology. If CoreFull is 0, none of the links are generated.	Copy internal configuration of desired Intel® DCS switch into the main topology tab of the spreadsheet. Then delete all lines corresponding to leafs or spines that are not present in the configuration.
135068	When PXE booting using older versions of Grub 2 over Ethernet while the HFI UEFI driver is loaded, some servers will crash with an RSOD (Red Screen of Death).	Upgrade to the latest version of Grub 2.
135084	During extensive power cycle testing, HFI adapter might fail to appear in PCI config space.	Reboot or power cycle the platform.
135180	OpenMPI/PSM2 timeouts during MPI stress tests on Haswell and Intel® Xeon® mixed fabrics.	Load the hfi1 module with the following parameter: sudo modprobe hfi1 rcvhdrcnt=16352
135259	On rare occasions, the HFI links do not come up after a reboot.	Reboot or bounce the link.
135326	Calling opasmaquery fails when called from a non-SM node to a node which has not booted to the OS.	Use the SM node when calling opasmaquery in this way.





Table 2-3. Open Issues (Sheet 3 of 7)

ID	Description	Workaround
135355	<p>Due to changes in where the IFS packages are installed, customers using the FastFabric tools and upgrading to 10.3 from an earlier release must find each occurrence of /opt/opa in the opafastfabric.conf file and replace the string with /usr/lib/opa.</p>	<p>This includes:</p> <pre>export FF_MPI_APPS_DIR=\${FF_MPI_APPS_DIR:- /opt/opa/src/mpi_apps} export FF_SHMEM_APPS_DIR=\${FF_SHMEM_APPS_DIR:- /opt/opa/src/shmem_apps} export FF_PRODUCT=\${FF_PRODUCT:-IntelOPA- Basic.`cat /opt/opa/tools/osid_wrapper`}</pre> <p>These lines should be changed to:</p> <pre>export FF_MPI_APPS_DIR=\${FF_MPI_APPS_DIR:- /usr/lib/opa/src/mpi_apps} export FF_SHMEM_APPS_DIR=\${FF_SHMEM_APPS_DIR:- /usr/lib/opa/src/shmem_apps} export FF_PRODUCT=\${FF_PRODUCT:-IntelOPA- Basic.`cat /usr/lib/opa/tools/osid_wrapper`}</pre>
135390	<p>For certain older HFI adapters, the card may not be flashed with the AOC configuration file, or may be flashed with an older version of the AOC configuration file. With release 10.3, these adapters will fail to link up with AOCs, and these messages may be seen in dmesg:</p> <pre>[ 26.903186] hfi1 0000:d5:00.0: hfi1_0: parse_platform_config:Bad config file [ 26.903186] hfi1 0000:d5:00.0: hfi1_0: parse_platform_config:File claims to be larger than read size</pre> <p>In addition to:</p> <pre>[ 27.351555] hfi1 0000:d5:00.0: hfi1_0: tune_serdes: Unknown port type</pre>	<p>For HFI and HFI-equivalent customers, the resolution for this issue is to flash the AOC configuration file provided in /lib/firmware/updates/hfi1_platform.dat to the card using the following command line:</p> <pre># hfi1_eprom -w -c /lib/firmware/updates/hfi1_platform.dat -o /opt/opa/bios_images/HfiPcieGen3Loader_&lt;v ersion&gt;.rom -b /opt/opa/bios_images/HfiPcieGen3_&lt;version &gt;.efi -d /sys/bus/pci/devices/&lt;PCI address&gt;/resource0</pre>
135545	<p>A change has been made to several SA record attributes which causes incompatibilities between the Fabric tool suite and the SA.</p>	<p>You must update both the SA and the Fabric tool suite at the same time to avoid this incompatibility.</p>
135648	<p>MPI applications are installed under the /usr/lib directory structure, which may be set up to be read-only overall. This causes resulting FastFabric operations to fail since mpi_apps contain source code and run scripts for sample MPI applications, test programs and benchmarks.</p>	<p>If you want to build them via the "Rebuild MPI Library and Tools" option in the opafastfabric menu, you must first perform the following steps to copy the files out of /usr/lib that may be a read-only directory:</p> <ol style="list-style-type: none"> <li>1) Create a mirror directory named mpi_apps in a writable area, such as under \$HOME. <pre>mkdir \$HOME/mpi_apps</pre> </li> <li>2) Copy /usr/lib/opa/src/mpi_apps/* to the mirror directory. <pre>cp -r /usr/lib/opa/src/mpi_apps/* \$HOME/mpi_apps</pre> </li> <li>3) Edit /etc/sysconfig/opa/opafastfabric.conf and change the setting of FF_MPI_APPS_DIR to the new mirror directory. <pre>export FF_MPI_APPS_DIR=\${FF_MPI_APPS_DIR:- \$HOME/mpi_apps}</pre> </li> </ol> <p>You can now execute the "Rebuild MPI Library and Tools" option safely.</p>



Table 2-3. Open Issues (Sheet 4 of 7)

ID	Description	Workaround
135711	After generating the opa_fm.xml file from the config_generate script, the FE is not enabled.	None.
135873	hostverify.sh fails with RHEL* 6.7 due to the Intel P-State driver not being the default cpufreq driver.	Item 1 in the <a href="#">Documentation Errata</a> section of this document describes how to set the Intel P-State driver as the default.
135929	Intel® Omni-Path Boot nodes occasionally dropped from fabric when switching master SM from one node to another.	Reboot PXE client node.
135951	When creating host verify punchlist, the following error message is displayed: unable to parse filter -s Invalid slot number	None.
135963	Cannot install IFS software on RHEL* 7.3 using the command: ./INSTALL -vv -a	Use the -v option instead.
135975	After performing an OPA software configuration update, some unmanaged switches do not update the settings for LinkWidth and LinkWidthDnGrade enables.	A reboot is required for configuration changes made to an externally managed switch to become active.
136049	The expected width of a card is not showing up correctly in opaverifyhosts.	<p>For a cluster with mixed server or HFI configurations, the correct edited hostverify.sh script should be pushed to each group of servers.</p> <p>If using the TUI:</p> <ul style="list-style-type: none"> <li>• Create a /etc/sysconfig/opa/myhosts file for each type of server configuration. For example: computehosts, storagehosts, mgmhosts, etc.</li> <li>• Pick the desired hosts file in menu item 0 of the "Host Verification/Admin" menu, then run the "Perform Single Host Verification" function.</li> <li>• Edit the sample hostverify.sh script, putting in the proper settings for the server config (HFI PCIe bus, server memory size, expected single node HPL performance for server, etc).</li> <li>• When prompted, run the hostverify function on the given subset.</li> <li>• Repeat for each of the hosts files.</li> </ul>
136137	The hfi1_eprom tool man page contains incorrect information in the -d device option.	<p>The following text is correct in the man page: -d device</p> <p>Specify the device file to use. The default method which uses the resource0 file will attempt to autodetect the first device. This can be changed by pointing to the correct file found in /sys/bus/pci/devices/XXXXX/resource0</p> <p>The incorrect text shown below will be removed in a future release:</p> <p>For the alternative driver method the device file should be /dev/hfi1_N, where N represents the desired hfi. Note for cards with multiple HFIs, any device can be used as there is only one EPROM per card.</p>
136160	<p>On some Intel® Xeon Phi™ with integrated Intel® Omni-Path fabric platforms, the second integrated HFI is discovered first and is subsequently identified as the first HFI device. As a result, when issuing Intel® Omni-Path commands, the second HFI appears first in the results.</p> <p>In Linux* and various Intel® Omni-Path tools, the HFI reporting order may be the opposite of the order appearing on the Intel® Xeon Phi™ with integrated Intel® Omni-Path fabric cable/faceplate.</p>	<p>You can identify the second integrated HFI by inspecting the Node GUID or Port GUID/Port GUID reported by opainfo or other commands such as hfi1_control -i. Note that bit 39 of the PortGUID, the most significant bit, is set for the second HFI, and is clear for the first HFI.</p> <p>Keep in mind that when issuing various Intel® Omni-Path CLI commands targeted at a specific HFI using the -h option, -h 1 correlates to the device that is listed as hfi1_0. As a result, the issued command affects the second HFI instance in cases where the second HFI port instance appears first.</p>
136432	Certain perfctest tools such as ib_write_bw do not work on RHEL* 7.3 when using the RDMA CM with UD QPs.	Roll back the perfctest package to the level found in RHEL* 7.2, which is perfctest-2.4. Then install this package on RHEL* 7.3.



Table 2-3. Open Issues (Sheet 5 of 7)

ID	Description	Workaround
136436	On SLES* 12.2, node_desc is not populated with the host name when system is booted up.	Install and run the rdma-ndd daemon on each node. 1. Unpack IFS: <pre># tar xzf IntelOPA-IFS.SLES122-x86_64.10.3.0.0.81.tgz # ls IntelOPA-IFS.SLES122-x86_64.10.3.0.0.81 IntelOPA-IFS.SLES122-x86_64.10.3.0.0.81.tgz</pre> 2. Uninstall infiniband-diags and libibnetdisc5 libraries. (SLES* splits out the libibnetdisc library but it is included in the IFS infiniband-diags version.) <pre># rpm -e infiniband-diags # rpm -e libibnetdisc5</pre> 3. Install the older version of infiniband-diags from the IFS package. <pre># cd IntelOPA-OFED_DELTA.SLES122-x86_64.10.3.0.0.82/ # rpm -Uvh ./infiniband-diags-1.6.7-2.x86_64.rpm</pre> 4. Enable rdma-ndd: <pre># systemctl daemon-reload # systemctl status rdma-ndd rdma-ndd.service - RDMA Node Description Daemon Loaded: loaded (/usr/lib/systemd/system/rdma-ndd.service; disabled; vendor preset: disabled) Active: inactive (dead) # systemctl enable rdma-ndd Created symlink from /etc/systemd/system/multi-user.target.wants/rdma-ndd.service to /usr/lib/systemd/system/rdma-ndd.service.</pre> 5. Start rdma-ndd and check the status: <pre># systemctl start rdma-ndd # systemctl status rdma-ndd</pre> 6. Test that it is working: <pre># cat /sys/class/infiniband/hfi1_0/node_desc phs1fnive08u26 hfi1_0 # hostname foo # cat /sys/class/infiniband/hfi1_0/node_desc foo hfi1_0 # hostname phs1fnive08u26 # cat /sys/class/infiniband/hfi1_0/node_desc phs1fnive08u26 hfi1_0 # reboot ... # cat /sys/class/infiniband/hfi1_0/node_desc phs1fnive08u26 hfi1_0</pre>
136437	When using RHEL* 7.2, the default generic PXE boot image does not work due to missing driver and firmware files.	None.
136500	RDMA perftests can hang on start on a client side when RDMA CM (-R option) is used.	None.

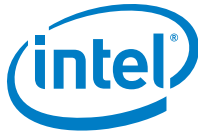


Table 2-3. Open Issues (Sheet 6 of 7)

ID	Description	Workaround
136728	<p>If hundreds of links are bouncing while the FM is sweeping, the FM sweep time may be significantly extended. This can result in unexpected delays in FM responsiveness to fabric changes or host reboots. (The issue is that active links bounce between the time FM discovers one side of the link versus the other side of the link.)</p> <p>In Release 10.3.1 a fix was included to address the situation that occurs in fabrics of &gt;1000 nodes when numerous links bounce (or hosts are rebooted) at once.</p>	<p>The following workarounds are recommended:</p> <ul style="list-style-type: none"> <li>When rebooting nodes on a production cluster, perform reboots in batches of 300 nodes or less.</li> <li>During cluster deployment, carefully follow the procedures in the <i>Intel® Omni-Path Fabric Staging Guide</i> and use FastFabric to check signal integrity and placement of all cables. Correct or disable any problematic links before starting production use of the cluster.</li> <li>When replacing or expanding a production cluster, repeat the procedures in the <i>Intel® Omni-Path Fabric Staging Guide</i> to verify the new hardware. Correct or disable any problematic links before resuming production use of the cluster.</li> <li>Use the PM, FM logs, FM GUI, FastFabric, and other tools to monitor signal integrity and link stability. Correct or disable any problematic links when discovered.</li> </ul>
136733	Slow memory deregistration has been observed.	None.
136822	AOC support is not available on integrated HFI platforms (-F platforms) if the Intel UEFI driver is not executed during boot. Some BIOS will not execute the UEFI driver in Legacy BIOS boot mode. Also, some BIOS configuration settings or other system settings will bypass execution of the HFI driver.	<p>Avoid the use of Legacy BIOS boot mode if your platform does not execute the HFI driver in that mode.</p> <p>Avoid BIOS settings or other configuration settings that do not execute the HFI driver during boot.</p>
136901	Occasionally, pre-boot nodes are dropped by the Fabric Manager during fabric sweeps, where the system containing the dropped pre-boot node has more than one HFI on a single socket.	Bounce the link of the dropped pre-boot port.
136902	<p>A snapshot file with a multicast group with rate 10g will not be read properly.</p> <p>The following error is returned:  opafabricanalysis: Port 0:0 Error: Unable to analyze fabric snapshot. See /var/usr/lib/opa/analysis/latest/fabric.0:0.links.stderr  opafabricanalysis: Possible fabric errors or changes found</p>	<p>On all nodes running opafm, run:  systemctl stop opafm</p> <p>On all switches running ESM, run:  smControl stop</p> <p>For all nodes/servers running ibacm:  1. Create a file /etc/rdma/ibacm_opts.cfg with one line:  min_rate 40  2. Restart ibacm</p> <p>In the nodes running the host FM, restart opafm or start opafm with the command:  systemctl start opafm</p> <p>In the switches running ESM, run:  smControl start</p>
136945	When using the TID RDMA feature, certain Mvapich over Verbs tests may cause error messages.	None.
136971	When using the TID RDMA feature, certain Verbs Multi-PPN tests may cause error messages.	None.
136985	opahfirev has output errors when the HFI driver is not installed.	None.
136995	The opahfirev tool output uses the term "HWRev" to indicate the revision of the silicon on the card.	None.
137015	The state and configuration of ipoib interfaces are controlled by the NetworkManager service. The NetworkManager in RHEL* 7.2 mistakenly assumes the ipoib interface is type 'ethernet' and fails to initialize it, due to a mismatch against its actual type which is 'infiniband'.	<p>Add "TYPE=InfiniBand" in the ifcfg-ib* files to ensure correct NetworkManager configuration.</p> <p>In order for ifcfg-ib* changes to take effect, you must reboot the host or run the following command as root:  nmcli connection reload</p>



Table 2-3. Open Issues (Sheet 7 of 7)

ID	Description	Workaround
137054	Pinging an Intel® OPA UEFI permanent IP address from a DHCP server fails on subsequent reboots unless the corresponding network interface has first been initialized in the UEFI network stack.	Before pinging a UEFI permanent IP address, first initialize the corresponding network interface in the UEFI network stack.
137096	The IFS package does not install all the RPMs that it contains. In particular, infiniband-diags and libibmad are not automatically installed. The absence of infiniband-diags may result in failure of node descriptions to be populated, such that all hosts have the same <code>hf11_0</code> description.	Manually install the infiniband-diags and libibmad packages.
137106	When running SLES* 12.2 with typical OS drivers installed and connected with copper QSFP, the state does not change from "Offline" to "Physical Linkup (Init)" as expected.	Add a <code>platform.dat</code> file in <code>/lib/firmware/updates</code> , then restart.
137108	When using the TID RDMA feature, virtual machines, and other cases where the IOMMU is enabled, do not operate correctly. This can lead to stability issues, and possibly data corruption, because the address used to receive data into will be incorrect.	None.
137142	When using the TID RDMA feature, certain MPI benchmark tests may cause Kernel panic.	None.
137212	The RHEL* 6.7 base version of the <code>perftest</code> package includes a <code>ib_send_lat</code> utility that may cause a segmentation fault when run with the <code>-z</code> option.	Run the utility without using the <code>-z</code> option.
137221	Querying for switch info with <code>opasmaquery</code> while using the <code>-g</code> option will print incorrect IPv4 addresses.	Do not use the <code>-g</code> option.



## 3.0 Documentation Errata

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This section describes issues in the user documentation that are relevant to this release. The documentation updates will be made in a future release.

### 1. Include `hostverify` changes in performance guide

Issue: 136684

Document: *Intel® Omni-Path Fabric Performance Tuning User Guide*

New Text: A new section will be added to the document as follows.

### 3.2.3 Switching to the Intel P-State Driver to Run Certain FastFabric Tools

Some Intel-provided tools require the use of the Intel P-State driver rather than the `acpi_cpufreq` driver. For example, the `hostverify.sh` tool fails with RHEL\* 6.7 due to the Intel P-State driver not being the default `cpufreq` driver.

If you are using the `acpi_cpufreq` driver, perform the following steps to temporarily switch to the Intel P-state driver in order to use the target tool.

#### Temporary Switch to Intel P-State Driver

To temporarily switch to the Intel P-state driver, perform the following steps:

1. Make sure `cpupowerutils` package is installed.  

```
# yum install cpupowerutils
```
2. Check if any other `cpufreq` kernel driver is active.  

```
# cpupower frequency-info -d
```
3. Unload another `cpufreq` kernel driver (if any).  

```
# rmmmod acpi_cpufreq
```
4. Load `intel_pstate` driver.  

```
# modprobe intel_pstate
```
5. Set `cpufreq` governor to 'performance'.  

```
# cpupower -c all frequency-set -g performance
```
6. After using `hostverify.sh` or other tools that needed the Intel P-state set, you may reboot to return to the `acpi_cpufreq` driver.

#### Load Intel P-State Driver at Boot Time

To load the Intel P-state driver at boot time, perform the following steps:

1. Create a script file `/etc/sysconfig/modules/intel_pstate.modules` and add the below text to it.  

```
#!/bin/sh
/sbin/modprobe intel_pstate >/dev/null 2>&1
```
2. Add executable permissions for the file:  

```
# chmod +x /etc/sysconfig/modules/intel_pstate.modules
```



3. Reboot the system for the changes to take effect.
4. Verify that the Intel P-state driver is loaded.
5. Install the cpupowerutils package, if not already installed:  

```
# yum install cpupowerutils
```
6. Set cpufreq governor to 'performance' using the command:  

```
# cpupower -c all frequency-set -g performance
```

To re-enable the acpi\_cpufreq driver, perform the following:

1. Disable intel\_pstate in the kernel command line:  
Edit `/etc/default/grub` by adding `intel_pstate=disable` to `GRUB_CMDLINE_LINUX`.  
For example:  

```
GRUB_CMDLINE_LINUX=vconsole.keymap=us console=tty0  
vconsole.font=latacyrheb-sun16 crashkernel=256M  
console=ttyS0,115200 intel_pstate=disable
```
2. Apply the change using:  

```
if [ -e /boot/efi/EFI/redhat/grub.cfg ]; then  
GRUB_CFG=/boot/efi/EFI/redhat/grub.cfg  
else if [ -e /boot/grub2/grub.cfg ]; then  
GRUB_CFG=/boot/grub2/grub.cfg  
grub2-mkconfig -o $GRUB_CFG
```
3. Reboot.  
When the system comes back up with `intel_pstate` disabled, the `acpi_cpufreq` driver is loaded.



## 2. Update documentation with ESM limitations

Issue: 136895

Document: *Intel® Omni-Path Fabric Suite Fabric Manager User Guide*

New Text: The following section will be updated with new text and a table (see changebars).

### 1.4.3 Choosing Between Host and Embedded FM Deployments

Refer to the *Intel® Omni-Path Fabric Software Release Notes* or embedded firmware for more guidance in choosing between deploying a host or embedded FM solution.

**Table 1. HSM versus ESM Major Capability Differences**

Capability	HSM	ESM
Maximum Fabric Node Size	See <i>Intel® Omni-Path Fabric Software Release Notes</i> for value.	See <i>Intel® Omni-Path Fabric Software Release Notes</i> for value.
PA Short Term History	Supported	Not Supported - disabled
Dynamic Configuration	Supported	Not Supported - disabled
FM Control User Interface	opafmcmd CLI	Chassis CLI
FE OOB Security		
File directory location	Configurable	/mmc0: 4
Ciphers Support	<ul style="list-style-type: none"> <li>• ECDHE-ECDSA-AES128-GCM SHA256</li> <li>• ECDHE-ECDSA-AES128-SHA256</li> <li>• DHE-DSS-AES256-SHA</li> </ul>	DHE-DSS-AES256-SHA
Pre-defined Topology Verification	Supported	Not Supported - disabled

### Host-Based Fabric Manager or Embedded Fabric Manager Recommendations

Both fabric managers provide full functionality and the host-based fabric manager can be used in any scenario. The embedded fabric manager is implemented on lightweight internal hardware for smaller fabrics. As a result, the following recommendations exist.

- Director Class Switch configurations - A host-based subnet manager is required. host-based fabric managers run on a minimally configured server. For redundancy, two or more servers can run the host fabric manager simultaneously.
- Managed Edge switches - For fabrics of more than 100 nodes, which typically occur with three or more 48-port switches in a fabric, a host-based fabric manager is suggested.

	Host-Based Fabric Manager	Embedded Fabric Manager
HFI's back-to-back	Yes	Not Applicable
48-port Edge switches - less than 100 nodes	Yes	Yes
48-port Edge switches - greater than 100 nodes	Yes	No
192 or 768 Director Class switch	Yes	No
Director Class switch + Edge switches	Yes	No

