

HP Auto Port Aggregation (APA) Release Notes

HP-UX 11i v1, 11i v2, and 11i v3



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1 HP APA Overview for HP-UX 11i v1

This chapter provides information about the HP-UX 11i v1 (B.11.11.30) September 2007 release of HP Auto Port Aggregation (APA) and LAN Monitor software.

This release of HP APA now supports Nortel Split Multi-Link Trunking (SMLT) technology and MANUAL mode link aggregate creation from ports with different group capability values.

Auto Port Aggregation

HP APA is a software product that creates link aggregates, often called "trunks," which provide a logical grouping of two or more physical ports into a single "Fat-Pipe." Network traffic is load balanced across all of the links in the aggregation, which allows you to build large bandwidth logical links into the server that are highly available and completely transparent to the client and server applications.

In addition, HP APA provides automatic link failure detection and recovery, and optional support for load balancing of network traffic across all of the links in the aggregation.

HP APA supports HP Serviceguard with certain conditions. See the *HP Auto Port Aggregation (APA) Administrator's Guide* for more information.

Failover Group

HP APA supports the creation of failover groups (link aggregates in LAN_MONITOR mode), providing a failover capability for links. In the event of a link failure, LAN Monitor automatically migrates traffic to an available, standby link (port or link aggregate) in the failover group. Failover groups do not support HP Serviceguard.

New Features in This Release

The B.11.11.30 version of HP APA:

- Supports Nortel's Split Multi-Link Trunking (SMLT) technology. A link aggregate can span over more than one switch, which removes switches as a single point of failure.
- Enables the use of an optional `HP_APA_LACP_TIMEOUT` parameter in the `/etc/rc.config.d/hp_apacnf` file. Valid values are 0 (slow) and 1 (fast). The default value is 0.
- Supports the creation of MANUAL mode link aggregates with ports that do not have the same group capability value. In addition, the ports are not required to have the same group capability value as the link aggregate
- Supports the resetting of link aggregates and failover groups with the `lanadmin` command,
- Enables you to programmatically obtain the multicast addresses enabled on a link aggregate or failover group.

See the *HP Auto Port Aggregation (APA) Administrator's Guide* (HP Part Number J4240-90039) for more information on the new features and how to use them.

Known Problems Fixed in This Version

Table 1.1 lists the known problems and fixes in this release of HP APA B.11.11.30.

Table 1-1 Fixes in the HP APA B.11.11.30 Release

Defect ID	Description
CR: JAGaf48622 SR: 8606388472	Under some stress situations (for example, a port is continuously enabled and then disabled to run LACP), the system panics due to data page fault with the following stack trace: panic+0x8c report_trap_or_int_and_panic+0x94 interrupt+0x4e4 ihandler+0x940 lACP_processing_poll_timer+0x128 lACP_ctrl+0x1e8 lACP_poll_timeout+0x60 invoke_callouts_for_self+0x234 soft_intr_handler+0x1 sw_service+0x1c mp_ext_interrupt+0x478 ihandler+0x91c
CR: JAGaf58421 SR: 8606398439	When creating a MANUAL mode link aggregate from a set of ports, if some of the ports do not exist, APA does not create the link aggregate.
CR: JAGaf61223 SR: 8606401274	When a user application sends a DL_HP_MULTICAST_LIST_REQ primitive to a link aggregate or failover group, APA returns the error code 233 (EOPNOTSUPP).
CR: JAGaf61667 SR: 8606401730	Unable to create a MANUAL mode link aggregate from ports with different Group Capability values.
CR: JAGaf65504 SR: 8606405583	Unnecessary failover can occur with cost-based failover groups.
CR: JAGaf65775 SR: 8606405865	No information on proactive failover is saved to the var/adm/syslog/syslog.log file.
CR: JAGaf65776 SR: 8606405866	The NetTL messages that describe proactive failover events do not provide enough information.
CR: JAGaf67974 SR: 8606408071	When the LACP timeout values of link partners are changed, APA responds in a manner that does not conform to the IEEE 802.3ad standard. This can cause a temporary connection loss.
CR: JAGaf68386 SR: 8606408484	If an LACP port's link partner times out and then recovers, the LACP port might not rejoin its original link aggregate.
CR: JAGaf68450 SR: 8606408548	LACP ports might take up to 90 seconds to detect a unidirectional link failure.
CR: JAGaf68497 SR: 8606408595	When one link of a LACP link aggregate becomes unidirectional (a link can either receive or transmit), network connectivity of the aggregate is lost.
CR: JAGaf68634 SR: 8606408732	Sometimes the LACP states of APA does not match those of its link partners. This can cause a temporary connection loss.
CR: JAGaf68635 SR: 8606408733	When one link partner is not ready to receive packets but others are ready, network connectivity is lost .
CR: JAGaf68823 SR: 8606408921	APA sets the collecting and distributing bits in the LACP PDU when the synchronization bit is cleared.
CR: JAGaf69439 SR: 8606409555	Under some stress situations (for example, a port is continuously enabled and then disabled to run LACP), the system panics with data page fault in the lACP_tx_sm () function.

Table 1-1 Fixes in the HP APA B.11.11.30 Release (continued)

Defect ID	Description
CR: JAGaf69619 SR: 8606409736	Under some stress situations (for example, a port is continuously enabled and then disabled to run LACP), the system panics with data page fault in the <code>lacp_notify_msg()</code> function.
CR: JAGaf69665 SR: 8606409782	When a user application sends a <code>DL_HP_HW_RESET_REQ</code> primitive to a link aggregate or failover group, APA returns the error code 233 (EOPNOTSUPP).
CR: JAGaf69724 SR: 8606409841	Under some stress situations, the system panics with a data page fault in LACP subsystem.
CR: JAGaf78771 SR: 8606418941	Four ports are connected to two Nortel switches using Split Multi-Link Trunking (SMLT), and LACP is used for trunking. When one of the Nortel switches is powered down and then powered up, the LACP ports migrate to a different link aggregate on the server. Because the new link aggregate has no IP address configured, the network connection is lost completely.
CR: JAGaf78775 SR: 8606418945	Four ports are connected to two Nortel switches using Split Multi-Link Trunking (SMLT), and LACP is used for trunking. When one of the switches is powered down, the network connection is lost completely. SMLT is a proprietary technology to make link aggregates across switches.
CR: JAGaf78780 SR: 8606418950	APA removes a port from LACP link aggregates only after the port fails to send an LACP PDU for more than 90 seconds.
CR: JAGaf87533 SR: 8606428052	When two LACP ports on an HP server are connected to two Nortel switches using SMLT (each port is connected to a unique switch), they initially form a link aggregate. After one switch fails, the link aggregate disappears.
CR: JAGaf87544 SR: 8606428063	The system might hang after setting <code>ifAdmin</code> states of APA link aggregates. This is a rare occurrence.
CR: JAGaf98281 SR: 8606440400	The <code>lan*conf</code> commands can log unneeded information to NetTL.
CR: JAGaf98454 SR: 8606440645	A <code>bad_news</code> panic in the <code>apa_lacp_check_linkagg()</code> function with the following stack trace: <pre>panic_save_regs_switchstack+0x110 panic+0x490 bad_news+0x440 bubbleup+0x8e0 apa_lacp_check_linkagg+0xa0 apa_update_linkagg_properties+0x2c0 apa_ioctl_del_linkagg_ports+0x3b0 apa_ioctl_clear+0x650 apa_process_event+0x460 apa_process_queue+0x330 invoke_callouts_for_self+0x2e0 soft_intr_handler+0x240 external_interrupt+0x620 bubbleup+0x8e0 deadlock_check+0x190 sl_pre_check+0x1f0 spinlockx+0x90 prioceil_restore_pri+0x90 rwlock_unlock+0x430 pm_unlink_thread_from_active+0x50 exit+0x4c0 rexit+0x40 syscall+0x1430</pre>
CR: JAGag15219 SR: 8606459037	During heavy loads, ports in PAgP link aggregates drop out of link aggregates and then rejoin. This disrupts the traffic flow across the link aggregate interface.

Table 1-1 Fixes in the HP APA B.11.11.30 Release (continued)

Defect ID	Description
CR: JAGag17374 SR: 8606461410	The lanqueryconf command might put ports having VLANs configured on them into failover groups. The lanapplyconf command fails if it detects these ports inside a failover group.
CR: JAGag17375 SR: 8606461411	The lanapplyconf command cannot create failover groups whose member ports have an MTU of 259 or less.
CR: JAGag17382 SR: 8606461420	The lanapplyconf command dumps core if the NODE_NAME value in the /etc/lanmon/lanconfig.ascii file is different from the server's hostname.
CR: JAGag23067 SR: 8606467695	While experiencing a large number of port state changes, HP APA might place LACP ports in the wrong link aggregate.
CR: JAGag23068 SR: 8606467696	When ports in a LACP link aggregate experience many protocol events, they might move to the wrong LACP link aggregate.
CR: JAGag38447 SR: 8606485460	System hangs after repeatedly starting and stopping PAgP or LACP on ports.

Known Problems and Limitations

This section provides a list of known problems and limitations as known to HP at time of publication. If workarounds are available, they are included.

- **HP ProCurve Switches**

When disabling Cisco's Fast Ether Channel protocol on the HP 9000 server, the HP ProCurve switches block that particular port from further use.

Corrective Action: In order to use the network physical port on the HP 9000 server, physically move the connection from the server to the switch to another non-Cisco Fast EtherChannel port on the switch.

- **Cisco Catalyst 5000 Switches**

- Turning off Cisco's Fast Ether Channel protocol on one network physical port on the HP 9000 server might cause the entire link aggregate (the port it is associated with) to be deconfigured.

Corrective Action: Reconfigure the switch; do not include the port in the link aggregate being configured. See the appropriate switch documentation for information on how to reconfigure link aggregates.

The Catalyst 5000 switch only allows two- or four-port link aggregates. See the *Cisco Catalyst 5000 Configuration Guide* for information about these limitations.

- When interfacing a HSC 100Base-TX or PCI 4-port 100Base-TX to a Cisco Catalyst 5000 switch (with firmware version 4.5(4)) and ports in Desirable Mode connected to an HP server with ports running HP APA, the link aggregations might go up and down repeatedly.

Corrective Action: Install patch PHNE_23465 or its superseding patch.

- **3Com SuperStack II Switches**

To interoperate with the switch, disable the Trunk Control Message Protocol (TCMP) on all of the ports that are being used with HP Integrity servers.

Compatibility and Installation Requirements

This section describes the compatibility information and installation requirements for this release. For specific installation instructions, see the *HP Auto Port Aggregation (APA) Administrator's Guide*.

First-time Installation

For an initial HP APA installation, two files, `hp_apaconf` and `hp_apaportconf` are placed in `/etc/rc.config.d`.

The default configuration port mode is MANUAL.

Configuration File Changes

The configuration file changes for this release are as follows:

- This release enables the use of an optional `HP_APA_LACP_TIMEOUT` parameter in the `/etc/rc.config.d/hp_apaconf` file. Valid values are 0 (slow) and 1 (fast). The default value is 0.

Operating System and Version Compatibility

This release is specific for HP-UX 11i v1 (B.11.11).

Hardware Requirements

This version of HP APA runs on HP 9000 servers with the HP-UX 11i v1 (B.11.11) operating system.

HP APA supports Cisco's FastEtherChannel (PAgP) protocol, the Link Aggregation Control Protocol (IEEE 802.3ad), or manual trunking mechanisms.

HP has tested switches from the following vendors to work with HP APA:

- 3Com Corebuilder and SuperStack
- All Cisco Catalyst series
- HP ProCurve
- Foundry
- Alteon
- Nortel
- Extreme

HP APA also supports Nortel's Split Multi-Link Trunking (SMLT) technology. Specifically, HP has tested the Passport 8006 and Passport 8010 switches with the version 3.7.13.0 of the software.



NOTE: Hot Standby and LAN Monitor modes are both supported with all switches; however, HP strongly recommends using LAN Monitor rather than Hot Standby mode.

The following network adapter cards are supported:

- All HP HP-PB, HSC, and PCI 10/100Base cards (both FX and TX)
- All HP HP-PB, HSC, and PCI 1000Base cards (both Base-T and SX)
- PCI Token Ring (LAN Monitor mode only)
- PCI FDDI (LAN Monitor mode only)
- All HP PCI-X 2-port Combination cards (network ports only)

Other Requirements

- HP APA must be installed with the system up.
- A reboot will be required.

- Installation requires superuser permissions.
- Estimated time to install the software is 3 to 5 minutes, depending on the complexity of your system.

Related Information

The latest documentation for HP APA is available in at <http://www.docs.hp.com> in the *Internet & Networking* topic area, in the *I/O Cards and Networking Software* collection under *Auto Port Aggregation (APA)* at:

<http://www.docs.hp.com/hpux/netcom/index.html#Auto%20Port%20Aggregation%20%28APA%29>

Available documents include:

- *HP Auto Port Aggregation (APA) Administrator's Guide*
- *Performance and Scalability White Paper*
- *Using APA to Build a Screaming Fast Network Server Connection*

Software Availability in Native Languages

The HP APA product is available only in the English language.

2 HP APA Overview for HP-UX 11i v2

This chapter provides information about the HP-UX 11i v2 (B.11.23.40) December 2007 release of HP Auto Port Aggregation (APA) and LAN Monitor software.

This release of HP APA now supports HP Serviceguard version A.11.15 or later. HP Serviceguard can use both link aggregates and failover groups (LAN_MONITOR mode). In addition, this release also supports Nortel Split Multi-Link Trunking (SMLT) technology and improved HP Integrity virtual machine support.

Auto Port Aggregation

HP APA is a software product that creates link aggregates, often called "trunks," which provide a logical grouping of two or more physical ports into a single "Fat-Pipe." Network traffic is load balanced across all of the links in the aggregation, which allows you to build large bandwidth logical links into the server that are highly available and completely transparent to the client and server applications.

In addition, HP APA provides automatic link failure detection and recovery, and optional support for load balancing of network traffic across all of the links in the aggregation.

HP APA supports Serviceguard. See the *HP Auto Port Aggregation (APA) Administrator's Guide* for more information.

Failover Group

HP APA supports the creation of failover groups (link aggregates in LAN_MONITOR mode), providing a failover capability for links. In the event of a link failure, LAN Monitor automatically migrates traffic to an available, standby link (port or link aggregate) in the failover group.

New Features in This Release

The B.11.23.40 version of HP APA:

- Supports using the load distribution algorithm specified in the HP APA raw mode packet within HP Integrity virtual machines. This requires that you install the HPVM PHSS_36737 patch. Previous releases of HP APA were restricted to the LB_MAC distribution algorithm.

See the *HP Auto Port Aggregation (APA) Administrator's Guide* (HP Part Number J4240-90041) for more information on the new features and how to use them.

Known Problems Fixed in This Version

Table 2.1 lists the known problems and fixes in this release of HP APA B.11.23.40.

Table 2-1 Fixes in the HP APA B.11.23.40 Release

Defect ID	Description
CR: JAGag03238 SR: 8606445801	System panics after starting PAgP on a port that was added to a system using online addition.
CR: JAGag06609 SR: 8606449449	PAgP ports in link aggregates join different aggregates after they are reset or the CKO setting changes.
CR: JAGag46484 SR: 8606494551	Under some conditions, you cannot configure an IP address after LACP negotiation fails on a port.

Known Problems and Limitations

This section describes the known problems and limitations as known to HP at time of publication. If workarounds are available, they are included.

Known Problems with Switches

- **3Com SuperStack II Switches**

To interoperate with the switch, disable the Trunk Control Message Protocol (TCMP) on all of the ports that are being used with HP Integrity servers.

Compatibility and Installation Requirements

This section describes the compatibility information and installation requirements for this release. For specific installation instructions, see the *HP Auto Port Aggregation (APA) Administrator's Guide*.

Required Patches

HP APA requires the following patches:

- PHKL_31500 or its superseding patch
- Streams patch PHNE_34788 or its superseding patch
- LAN Cumulative patch PHNE_35545 or its superseding patch.
- ARPA Transport patch PHNE_35766 or its superseding patch



NOTE: HP recommends the Streams, LAN Cumulative, and ARPA Transport patches only if you want to use 8 ports for trunking; they are not required. HP recommends the LAN Cumulative patch only if you want VLAN over APA support.

You can download patches from the following Web site:

<http://www2.itrc.hp.com/service/patch/mainPage.do>

Required Software

HP APA requires the following software only if you want to use 8 ports for trunking:

- IPFilter version A.03.05.14, if you use IP Filter

You can download software from the following Web site:

<http://www.hp.com/go/softwaredepot>

Enter IPFilter into the Search box at the top of the page.

Operating System and Version Compatibility

This release is specific for HP-UX 11i v2 (B.11.23).

Hardware Requirements

This version of HP APA now runs on either HP 9000 servers or HP Integrity servers with the HP-UX 11i v2 (B.11.23) operating system.

HP APA supports Cisco's FastEtherChannel (PAgP) protocol, the Link Aggregation Control Protocol (IEEE 802.3ad), or manual trunking mechanisms.

HP has tested switches from the following vendors to work with HP APA:

- 3Com Corebuilder and SuperStack
- All Cisco Catalyst series
- HP ProCurve
- Foundry

- Alteon
- Nortel
- Extreme

HP APA also supports Nortel's Split Multi-Link Trunking (SMLT) technology. Specifically, HP has tested the Passport 8006 and Passport 8010 switches with the version 3.7.13.0 of the software.



NOTE: Hot Standby and LAN Monitor modes are both supported with all switches; however, HP strongly recommends using LAN Monitor rather than Hot Standby mode.

The following network adapter cards are supported:

- All HP PCI 10/100Base cards (both FX and TX)



NOTE: HP APA does not support the 10/100 BT Standard/Management LAN interface found on some systems and controlled by the `int1100` driver, and any other devices controlled by the `int1100` driver.

- All HP PCI 1000Base cards (both Base-T and SX)
- PCI-X 10 GbE Fiber cards (LAN Monitor mode only)
- PCI Token Ring (LAN Monitor mode only)
- PCI FDDI (LAN Monitor mode only)
- All HP PCI-X 2-port Combination cards (network ports only)

Required Disk Space

Approximately 2 MB.

First-time Installation

For an initial HP APA installation, two files, `hp_apaconf` and `hp_apaportconf` are placed in `/etc/rc.config.d`.

The default configuration port mode is MANUAL.

Configuration File Changes

This release enables the use of an optional `HP_APA_LACP_TIMEOUT` parameter in the `/etc/rc.config.d/hp_apaconf` file. Valid values are 0 (slow) and 1 (fast). The default value is 0.

Other Requirements

- HP APA must be installed with the system up.
- A reboot will be required.
- Installation requires superuser permissions.
- Estimated time to install the software is 3 to 5 minutes, depending on the complexity of your system.

Related Information

The latest documentation for HP APA is available in at <http://www.docs.hp.com> in the *Internet & Networking* topic area, in the *I/O Cards and Networking Software* collection under *Auto Port Aggregation (APA)* at:

<http://www.docs.hp.com/hpux/netcom/index.html#Auto%20Port%20Aggregation%20%28APA%29>

Available documents include:

- *HP Auto Port Aggregation (APA) Administrator's Guide*
- *Performance and Scalability White Paper*
- *Using APA to Build a Screaming Fast Network Server Connection*

Software Availability in Native Languages

The HP APA product is available only in the English language.

3 HP APA Overview for HP-UX 11i v3

This chapter provides information about the HP-UX 11i v3 (B.11.31.10) December 2007 release of HP Auto Port Aggregation (APA) and LAN Monitor software.

This release of HP APA now supports

Auto Port Aggregation

HP APA is a software product that creates link aggregates, often called "trunks," which provide a logical grouping of two or more physical ports into a single "Fat-Pipe." Network traffic is load balanced across all of the links in the aggregation, which allows you to build large bandwidth logical links into the server that are highly available and completely transparent to the client and server applications.

In addition, HP APA provides automatic link failure detection and recovery, and optional support for load balancing of network traffic across all of the links in the aggregation.

HP APA supports Serviceguard. See the *HP Auto Port Aggregation (APA) Administrator's Guide* for more information.

Failover Group

HP APA supports the creation of failover groups (link aggregates in LAN_MONITOR mode), providing a failover capability for links. In the event of a link failure, LAN Monitor automatically migrates traffic to an available, standby link (port or link aggregate) in the failover group.

New Features in This Release

The B.11.31.10 version of HP APA:

- Enables you to monitor link aggregate MIB statistics using the `nwmgr` command.
- Supports the resetting of link aggregates and failover groups with the `nwmgr` and `lanadmin` commands.

See the *HP Auto Port Aggregation (APA) Administrator's Guide* (HP Part Number J4240-90041) for more information on the new features and how to use them.

Known Problems Fixed in This Version

Table 2.1 lists the known problems and fixes in this release of HP APA B.11.31.10.

Table 3-1 Fixes in the HP APA B.11.31.10 Release

Defect ID	Description
CR: JAGag07481 SR: 8606450414	PAGP ports in link aggregates join different aggregates after the ports are reset or the CKO setting changes.
CR: JAGag27459 SR: 8606472604	HP APA commands appear to hang because of multiple <code>mp_timeout()</code> processes.
CR: JAGag28381 SR: 8606473759	When changing port modes from LACP to MANUAL, there is a panic in <code>igelan_callback()</code> ,
CR: JAGag33139 SR: 86064788988	The <code>nwmgr</code> command accepts malformed decimal values for the <code>poll_interval</code> parameter.
CR: JAGag34093 SR: 8606479954	HP APA fails to form a link aggregate when a single PPA is unavailable.

Table 3-1 Fixes in the HP APA B.11.31.10 Release *(continued)*

Defect ID	Description
CR: JAGag34099 SR: 8606479960	HP APA commands abort because of an assertion failure.
CR: JAGag34121 SR: 8606479982	When adding an disabled link aggregate, an incorrect message displays.
CR: JAGag34122 SR: 8606479983	When adding invalid ports, an incorrect message displays.
CR: JAGag34123 SR: 8606479984	After modifying the vmtu value, the displayed value is incorrect.
CR: JAGag38403 SR: 8606485414	HP APA sends an incorrect LACP Marker response PDU.
CR: JAGag38416 SR: 8606485427	Under heavy load, outbound PAgP hello packets stop.
CR: JAGag38440 SR: 8606485453	When stopping PAgP, the group capability set by the administrator might be cleared.
CR: JAGag38738 SR: 8606485777	When a user application sends a DL_HP_HW_RESET_REQ primitive to a link aggregate or failover group, HP APA returns the error code 233 [EOPNOTSUPP].

Known Problems and Limitations

This section describes the known problems and limitations as known to HP at time of publication. If workarounds are available, they are included.

Known Problems with Switches

- **HP ProCurve Switches**

When disabling Cisco's Fast Ether Channel protocol on the HP 9000 server, the HP ProCurve switches block that particular port from further use.

Severity: Medium

Corrective Action: In order to use the network physical port on the HP 9000 server, physically move the connection from the server to the switch to another non-Cisco Fast EtherChannel port on the switch.

- **Cisco Catalyst 5000 Switches**

- Turning off Cisco's Fast Ether Channel protocol on one network physical port on the HP 9000 server might cause the entire link aggregate (the port it is associated with) to be deconfigured.

Severity: High

Corrective Action: Reconfigure the switch; do not include the port in the link aggregate being configured. See the appropriate switch documentation for information on how to reconfigure link aggregates.

The Catalyst 5000 switch only allows two- or four-port link aggregates. See the *Cisco Catalyst 5000 Configuration Guide* for information about these limitations.

- **3Com SuperStack II Switches**

To interoperate with the switch, disable the Trunk Control Message Protocol (TCMP) on all of the ports that are being used with HP Integrity servers.

Compatibility and Installation Requirements

This section describes the compatibility information and installation requirements for this release. For specific installation instructions, see the *HP Auto Port Aggregation (APA) Administrator's Guide*.

Operating System and Version Compatibility

This release is specific for HP-UX 11i v3 (B.11.31.10).

Hardware Requirements

This version of HP APA runs on HP Integrity servers with the HP-UX 11i v3 (B.11.31.10) operating system.

HP APA supports Cisco's FastEtherChannel (FEC, also known as PAgP) protocol, the Link Aggregation Control Protocol (IEEE 802.3ad), or manual trunking mechanisms.

HP has tested switches from the following vendors to work with HP APA:

- 3Com
- Cisco
- HP Procurve
- Foundry
- Alteon
- Nortel
- Extreme

For Nortel SMLT support, HP has tested the Passport 8006 and Passport 8010 switches with the version 3.7.13.0 of the software.



NOTE: HOT_STANDBY and LAN_MONITOR modes are both supported with all switches; however, HP strongly recommends using LAN_MONITOR mode.

The following network adapter cards are supported:

- All HP PCI 10/100Base cards (both FX and TX)
- All HP PCI 1000Base cards (both Base-T and SX)
- All HP PCI-X 2-port Combination cards (network ports only)
- PCI-X 10 GbE Fiber cards (failover groups only)

Required Disk Space

Approximately 2 MB.

First-time Installation

For an initial HP APA installation, two files, `hp_apacnf` and `hp_apaportcnf` are placed in `/etc/rc.config.d`.

The default configuration port mode is MANUAL.

Other Requirements

- HP APA must be installed with the system up.
- A reboot will be required.
- Installation requires superuser permissions.
- Estimated time to install the software is 3 to 5 minutes, depending on the complexity of your system.

Related Information

The latest documentation for HP APA is available in at <http://www.docs.hp.com> in the *Internet & Networking* topic area, in the *I/O Cards and Networking Software* collection under *Auto Port Aggregation (APA)* at:

<http://www.docs.hp.com/hpux/netcom/index.html#Auto%20Port%20Aggregation%20%28APA%29>

Available documents include:

- *HP Auto Port Aggregation (APA) Administrator's Guide*
- *Performance and Scalability White Paper*
- *Using APA to Build a Screaming Fast Network Server Connection*

Software Availability in Native Languages

The HP APA product is available only in the English language.



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