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Transport Optional Upgrade Release Transition Release Notes

The information in this document applies to the following Transport and STREAMS transition patches supported on HP-UX operating system version 11i v2 Update 2 (B.11.23);
also referred to as HP-UX 11i v2 September 2004.

Table 1: Transport and STREAMS Transition Patches

<table>
<thead>
<tr>
<th>HP-UX Version</th>
<th>Transport Transition Patch</th>
<th>STREAMS Transition Patch</th>
</tr>
</thead>
<tbody>
<tr>
<td>11i v2 September 2004</td>
<td>PHNE_35765</td>
<td>PHNE_34788</td>
</tr>
</tbody>
</table>
Announcement

Transport and STREAMS functionalities are delivered as part of the HP-UX operating system. Previously, additional features and defect fixes for Transport and STREAMS were delivered via additional and fully supported web releases called TOUR, for 11i v2 September 2004.

This document discusses the following:

- Cumulative Transport Transition Patch: PHNE_35765 contains enhancements and defect fixes for HP-UX Transport on HP-UX 11i v2 September 2004
- Cumulative STREAMS Transition Patch: PHNE_34788 contains enhancements and defect fixes for STREAMS on HP-UX 11i v2 September 2004

The Transport and STREAMS cumulative transition patches are co-dependant on each other. See “Installing the Transition Patches” on page 10 for more details. The Transport and STREAMS cumulative transition patches are available from the ITRC web site at http://www.itrc.hp.com.

Features and Enhancements in the Transport Transition Patches

The Transport transition patch PHNE_35765 contains features and enhancements for HP-UX Transport on HP-UX 11i v2 September 2004. Table 2 lists the features and enhancements in the Transport transition patch:
This section provides a summary of the HP-UX transport enhancements included in PHNE_35765.

**NOSYNC Support**  This feature was introduced in TOUR 3.0.

In previous releases of the TCP/IP stack, the IP module had to serially handle multiple requests arriving on the same queue. The NOSYNC feature, a new STREAMS synchronization level, removes this restriction and enables the IP module to handle requests simultaneously. The transition patch PHNE_35765 (for HP-UX 11i v2 September 2004) improves network throughput for high speed network interfaces such as multi-port Gigabit cards in an Auto Port Aggregation (APA) configuration or 10Gigabit cards.

**Forward-Retransmission Timeout (F-RTO)**  This feature was introduced in TOUR 3.0.

When a retransmission timeout occurs, the last window of data is retransmitted. Spurious retransmission timeouts occur, especially due to mobile network devices switching between access points. In such cases, the unnecessary retransmission of the last window of data degrades TCP performance.

The transition patch PHNE_35765 (for HP-UX 11i v2 September 2004) implements the F-RTO algorithm supported by RFC 4138 to detect spurious timeouts.

<table>
<thead>
<tr>
<th>Transition Patch</th>
<th>Transport Enhancement</th>
<th>HP-UX Version</th>
<th>Introduced in TOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHNE_35765</td>
<td>• NOSYNC Support</td>
<td>11i v1 and 11i v2 September 2004</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>• Forward-Retransmission Timeout (F-RTO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• New Parameter for the route Command</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Congestion Window Validation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Internal TCP and UDP Enhancements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dynamic keying support for MIPv6 A.02.01 (or later) with IPSec A.02.01 (or later)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HP-UX Transport Enhancements**

This section provides a summary of the HP-UX transport enhancements included in PHNE_35765.
The F-RTO algorithm also responds to a spurious timeout. When the Retransmission Timeout (RTO) expires, F-RTO retransmits the first unacknowledged segment and monitors the incoming acknowledgments to determine if the timeout was spurious. Then, F-RTO determines whether to send new segments or retransmit the unacknowledged segments. The algorithm effectively reduces additional unnecessary retransmissions. The impact of spurious timeouts on TCP performance is reduced. Refer to the RFC at [http://www.ietf.org/rfc/rfc4138.txt?number=4138](http://www.ietf.org/rfc/rfc4138.txt?number=4138) for more details.

Alternatively, TCP Congestion Window Validation supported by RFC 2861 can be used to respond to spurious timeouts detected by F-RTO. Refer to the RFC at [http://www.ietf.org/rfc/rfc2861.txt?number=2861](http://www.ietf.org/rfc/rfc2861.txt?number=2861) for details.

F-RTO is disabled by default. To enable F-RTO, the following new ndd tunable is provided:

tcp_frto_enable

The values for tcp_frto_enable are:

0  The local system does not use F-RTO. This is the default value.
1  The local system uses the F-RTO algorithm for detecting and responding to spurious timeouts.
2  The local system uses the F-RTO algorithm for detecting spurious timeouts. The response algorithm is based on TCP Congestion Window Validation.

**New Parameter for the route Command**  This feature was introduced in TOUR 3.0.

Previously, the `route` command had no routing ioctl to set the source IP address of an interface. The kernel always determined a default interface for a route. Users could neither change this specification, nor force the route to be associated with a specific interface.

The transition patch PHNE_35765 (for HP-UX 11i v2 September 2004) implements the enhanced route command that has the following syntax:

```
route inet6 [-f] [-n] delete [net|host] v6destination [ / prefix] v6gateway [count] [source v6src]
```

The enhanced `route` command provides users with greater control over their network packet flow. It greatly enhances the viability of the Strong End System (Strong ES) model of routing packets.

**Congestion Window Validation**  This feature was introduced in TOUR 3.0.
The estimate of the available network capacity is reflected by the congestion validation window. Previously, this estimation becomes less accurate over time. This happens when the capacity that was previously used by a network-limited connection is used by other traffic. Thus the most recent knowledge of the TCP connection, regarding the state of the network path, is not reflected when the sender is application limited.

The transition patch PHNE_35765 (for HP-UX 11i v2 September 2004) implements Congestion window validation according to RFC 2861. The capacity reflected by the congestion window is more accurate due to the following modifications:

- TCP’s congestion control algorithm decays the congestion window $cwnd$ after transitioning from a sufficiently long application-limited period while using the slow-start threshold $ssthresh$ to save the previous value of the congestion window.
- An application-limited TCP sender that has not fully used the current congestion window, does not increase the congestion window.

**Internal TCP and UDP Enhancements**  This feature was introduced in TOUR 3.0.

The transition patch PHNE_35765 (for HP-UX 11i v2 September 2004) contains enhancements that modify some of the internal behavior of TCP and UDP. This results in improved network scalability, especially for high end Non-Uniform Memory Access (NUMA) systems and under heavy load conditions.

**Dynamic keying support for MIPv6 A.02.01 (or later) with IPSec A.02.01 (or later)**

This feature was introduced in TOUR 3.0.

Features and Enhancements in the STREAMS Transition Patch

The STREAMS transition patch contains features and enhancements for HP-UX STREAMS on HP-UX 11i v1 and HP-UX 11i v2 September 2004.

<table>
<thead>
<tr>
<th>Transition Patch</th>
<th>Transport Enhancement</th>
<th>HP-UX Version</th>
<th>TOUR Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHNE_34788</td>
<td>HP-UX STREAMS NOSYNC</td>
<td>11i v2 September 2004</td>
<td>3.0</td>
</tr>
</tbody>
</table>

HP-UX STREAMS NOSYNC Enhancement

In previous STREAMS releases, one execution of the put procedure of a given queue is supported at a time. When there are multiple requests to the same queue, the STREAMS framework synchronizes the requests depending on the synchronization level of a module. Synchronization ensures that only one request will be executed at a time. With high speed I/O, the synchronization limits imposed by STREAMS may lead to a performance bottleneck.

The STREAMS transition patches lift the restriction imposed by the previous STREAMS synchronization methods. This is done by providing a new synchronization method referred to as NOSYNC. This feature allows multiple instances of a put procedure for a given queue, as well as the service routine for that queue, to run concurrently. Modules and drivers are responsible for synchronizing access to their own private data structures accordingly.

To realize the NOSYNC performance gain, all the modules (i.e. IPFilter and DLPI) between IP and the LAN driver must also be NOSYNC enabled. Install the following products before or along with the transition patches if your networking environment uses IPFilter and DLPI, and you want to realize NOSYNC performance gain:

- IPFilter A.03.05.14 or later
- DLPI patch PHNE_33429 (or later) for HP-UX 11i v2 September 2004
Installing the Transition Patches

This section includes information on obtaining and installing the transition patches and IPv6NCF11i bundle. It includes information needed before and after you install the transition patches.

WARNING  Do not install the TOUR web release product after installing the cumulative Transport and STREAMS transition patches. HP recommends installing the latest Transport and STREAMS patches as they contain all the functionality provided in previous TOUR web releases. Installing TOUR on a system with the cumulative Transport and STREAMS transition patches will roll back the Transport and STREAMS patch equivalency level:

Downloading the Transition Patches and Dependencies

Perform the following steps to download the transition patches:

**Step 1.** Go to the HP ITRC at http://www.itrc.hp.com.

**Step 2.** Download the following transition patches for HP-UX 11i v2 September 2004:

**Table 4**  Transport and STREAMS Transition Patches

<table>
<thead>
<tr>
<th>HP-UX Version</th>
<th>Transport Transition Patch</th>
<th>STREAMS Transition Patch</th>
</tr>
</thead>
<tbody>
<tr>
<td>11i v2 September 2004</td>
<td>PHNE_35765</td>
<td>PHNE_34788</td>
</tr>
</tbody>
</table>

**Step 3.** If you want to realize the NOSYNC performance gain, and use DLPI and IPFilter, download the following:

- IPFilter A.03.05.14 (or later) from http://www.hp.com/go/softwaredepot
- DLPI PHNE_33429 (or later) for HP-UX 11i v2 September 2004

**Step 4.** If you require the IPSec functionality, download IPSec A.02.01.01 from http://www.hp.com/go/softwaredepot. Search for IPSec.
Installing the Transition Patches on HP-UX 11i v2 September 2004

If your HP-UX 11i v2 September 2004 system has TOUR installed, the cumulative Transport and STREAMS patches will clean TOUR from your system.

NOTE

The IPv6 enablement and functionality, PPPoE/PPV6 functionality and upgrade, Router Advertisement Daemon, Mobile IPv6 products are present on the base HP-UX 11i v2 September 2004 release.

Perform the following steps to install the transition patches on an HP-UX 11i v2 September 2004 system:

**Step 1.** If you require the IPSec functionality, download IPSec A.02.01.01 from http://www.hp.com/go/softwaredepot. Search for IPSec.

**Step 2.** `swcopy` the following into a single installation bundle called `COMBO.depot`:

- Transition Patches and their dependencies: described in “Downloading the Transition Patches and Dependencies” on page 10
- IPSec A.02.01.01: if you require IPSec functionality

See the `swcopy` man page for more details.

**Step 3.** Run the `swinstall` command:

    swinstall -x autoreboot=true -s /tmp/COMBO.depot

The system reboots automatically if the `swinstall` installation completes without any errors.

Verifying the Transition Patch Installation

Complete the following steps to verify the transition patch installation on your system:

**Step 1.** Examine the following log files for error messages:

- `/var/adm/sw/swinstall.log`
- `/var/adm/sw/swagent.log`

**Step 2.** Run the `swlist` command as follows:

    swlist PHNE_35765 PHNE_34788
Installing the Transition Patches

If the transition patches are installed successfully, they will be listed in the `swlist` output.

**Step 3.** Run the following `swverify` command to verify that there were no errors during the transition patch installation:

```
swverify PHNE_35765 PHNE_34788
```

If the transition patches are successfully installed, the following message is displayed:

```
Verification succeeded
```

Removing the Transition Patches

This section describes how to remove the transition patches from the system.

---

**CAUTION**  
If TOUR was installed on the system prior to the transition patches, the Transport and STREAMS patch equivalency will revert to the level BEFORE TOUR was installed.

---

Perform the following steps to remove the transition patches from the system:

**Step 1.** Run the `swremove` command:

```
swremove -x autoreboot=true PHNE_35765 PHNE_34788
```

**Step 2.** Run the `swlist` command to verify that the removal was successful:

```
swlist
```

If the transition patches were removed successfully, they will not be listed in the `swlist` output.

**Step 3.** Check the `swremove.log` log file to verify that the removal was successful.
**Known Problems and Limitations**

This section includes information on known problems and limitations in the transition patches.

**Known Limitations**

This section discusses the known limitations of the Transport and STREAMS transition patches:

**Limitation 1**

Removing the Transport or STREAMS transition patch will revert your system to the pre-TOUR patch equivalency level.

**Limitation 2**

Installing TOUR over the transition patches will succeed. This will revert the Transport and STREAMS patch equivalency of the system to that of the installed TOUR release. Installing some TOUR releases over the transition patches may cause your system to panic. See “Installing the Transition Patches” on page 10 for more details.
Defect Fixes in the Transition Patches

All the defect fixes and new functionalities in the transition patches are listed in the following patch documents available at http://itrc.hp.com.

- PHNE_35765.text - Transport transition patch for HP-UX 11i v2 September 2004
- PHNE_34788.text - STREAMS transition patch for HP-UX 11i v2 September 2004

In addition, the transition patches also include the following defect fixes for TOUR 3.1:

<table>
<thead>
<tr>
<th>SR Number</th>
<th>Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8606394658</td>
<td>Removed duplicate assignment statement in ill_frag_timeout.</td>
</tr>
<tr>
<td>8606407460</td>
<td>Panic in ar_rput.</td>
</tr>
<tr>
<td>8606414334</td>
<td>HP-UX panics or hangs during NFS file copy over IPv4-in-IPv6 tunneling.</td>
</tr>
<tr>
<td>8606419996</td>
<td>Panic in tcp_reinit if the system has low memory and allocb fails.</td>
</tr>
<tr>
<td>8606449326</td>
<td>The system keeps sending unnecessary ICMP dead gateway detection packets when receiving the gratuitous arp packets.</td>
</tr>
<tr>
<td>8606450897</td>
<td>In TOUR 3.x, TCP connections can lose the ability to defer ACKs, resulting in an ACK-only segment in response to every received segment.</td>
</tr>
<tr>
<td>8606415577</td>
<td>When repeatedly changing the MTU size on a network interface, ICMP sends an ICMP message with incorrect data type to TCP, that could panic the system.</td>
</tr>
<tr>
<td>8606457119</td>
<td>TCP slow start after packet loss was broken. TOUR 3.x broke this feature that was working in TOUR 2.X for HP-UX 11i v1, and was working in HP-UX 11i v2 September 2004.</td>
</tr>
<tr>
<td>8606458794</td>
<td>The dead gateway detection patch is more resilient.</td>
</tr>
<tr>
<td>8606463395</td>
<td>Make netstat output for Pmtu for loopback interfaces display value of 4136.</td>
</tr>
<tr>
<td>8606467990</td>
<td>ALLOCB_MBLK_MM arena memory allocations unnecessarily waste system memory.</td>
</tr>
<tr>
<td>8606452851</td>
<td>Race during close operation on NOSYNC and QUEUE SYNCH modules/drivers.</td>
</tr>
<tr>
<td>8606480763</td>
<td>Delay after setting default route to own interface address.</td>
</tr>
</tbody>
</table>
Related Documentation

The following documents, available on http://www.docs.hp.com, provide additional information on HP-UX Transport, STREAMS, and related components:

- Transport Optional Upgrade Release (TOUR) 1.0 Release Notes
- Transport Optional Upgrade Release (TOUR) 2.0 Release Notes
- Transport Optional Upgrade Release (TOUR) 2.2 Release Notes
- Transport Optional Upgrade Release (TOUR) 2.4 Release Notes
- Transport Optional Upgrade Release (TOUR) 2.5 Release Notes
- Transport Optional Upgrade Release (TOUR) 3.0 Release Notes
- Transport Optional Upgrade Release (TOUR) 3.1 Release Notes
- STREAMS/UX Programmer’s Guide
- HP-UX IPv6 Transport Administrator’s Guide for TOUR 2.0
- HP-UX IPv6 Porting Guide
- HP-UX IPv6 Transition Mechanisms (White Paper)
- HP-UX PPPoE/v6 Administrator’s Guide for TOUR 2.0
- HP-UX PPP Enhancements - PPPoE and PPPv6 (White Paper)
- HP-UX Mobile IPv6 A.01.00 Administrator’s Guide
- HP-UX Mobile IPv6 A.01.01 Release Notes
- HP-UX Mobile IPv6 A.01.00 Release Notes
- HP-UX IPSec A.02.01.01 Release Notes
- HP-UX IPsec version A.02.01 Administrator’s Guide
- HP-UX IPFilter Version A.03.05.14 Administrator’s Guide
- Introducing HP-UX Mobile IPv6 (White Paper)
Software Availability in Native Languages

Information on the transition patches is only available in the English language.