Pathway for the 21st Century - Product Update

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Subjects

- Overall Pathway product strategy
- Announcing TS/MP 2.3!
- Pathway/iTS 1.1
- Future Pathway directions
- Summary
Subjects

- Overall Pathway product strategy
## NonStop software objectives by product segment

<table>
<thead>
<tr>
<th>Application programming models</th>
<th>Enable the development of applications conforming to current standard tools and programming models</th>
<th>“Common standards…”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application infrastructure</td>
<td>Provide an ultra-robust application deployment environment that delivers continuous availability, unrivaled data integrity, and virtually unlimited scalability</td>
<td>“…uncommon advantages”</td>
</tr>
<tr>
<td>Platform infrastructure</td>
<td>Provide the underpinnings for an accessible, open, secure, and easy to manage platform</td>
<td></td>
</tr>
</tbody>
</table>
# Application infrastructure – deploy

<table>
<thead>
<tr>
<th>Objective</th>
<th>Provide an ultra-robust application deployment environment that delivers continuous availability, unrivaled data integrity, and virtually unlimited scalability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technologies</td>
<td>Relational database</td>
</tr>
<tr>
<td>Strategic Products</td>
<td>SQL/MX</td>
</tr>
</tbody>
</table>
Pathway with NonStop TS/MP product strategy – high level

• Used by practically every NonStop customer and solution provider across all industries/geographies

• Used internally by many NED products
  – iTP WebServer, NSJSP, NSSOAP, NSTuxedo, NSCORBA, ODBC/JDBC, DSM/SCM, ...

• Major software revenue earner for NED

• Therefore:
  – Pathway is considered strategic for existing and new application and solution development on the NonStop server platform
  – Continued future investment for new Pathway feature/function is planned

Future product plans, dates, and functionality are subject to change without notice
Pathway with NonStop TS/MP – core product objectives

- Fully exploit increased performance and capacity of Itanium processor by removing Pathway limits
- Increase application availability via planned outage elimination
- Address specific customer requirements and RFEs
- Provide required infrastructure for dependent NED products
Subjects

• Announcing TS/MP 2.3!
Announcing TS/MP 2.3 (1)

• TS/MP 2.3 is *turbocharged* Pathway
  – Designed to exploit the increased capacity and performance of the Integrity NonStop server and provide decreased downtime

• Principal benefits
  – Pathway Domains for planned outage elimination and raised configuration limits
  – Additional capacity increases
  – More efficient link management
  – Miscellaneous RFEs

• Built on Application Cluster Services (ACS) technology
  – Completely compatible with existing (correct) applications
  – Easy migration from TS/MP 2.0/2.1
Announcing TS/MP 2.3 (2)

- Generally Available now on H and J series
  - Available on SCOUT with H06.14 & J06.03
  - Product IDs: HSR53 & QSR53
  - No upgrade charge for existing TS/MP 2.0/2.1 licensees (HSR50/HSR52/HSR76)
  - Runs on H06.06 or later
Who should use TS/MP 2.3?

• Anyone requiring maximum Pathway exploitation of HP Integrity NonStop server capacity
• Anyone running into Pathway limits issues
• Anyone seeking to increase availability
  – reduce planned downtime
• Anyone requiring new Pathway functionality
  – all new Pathway features will be on the ACS code base only

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Benefits of TS/MP 2.3 vs 2.0 (1)

Significant capacity increases

- More server links (per CPU)
- More requesters (per CPU)
- More concurrent Pathsends (per CPU)
- More serverclasses (per CPU)
- More Pathway environments (per CPU)
- Raised configuration limits
# TS/MP 2.3 capacity increases

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TS/MP 2.0</th>
<th>TS/MP 2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server links (/CPU)</td>
<td>1750</td>
<td>4095</td>
</tr>
<tr>
<td>Requesters (/CPU)</td>
<td>1024</td>
<td>CPU limit</td>
</tr>
<tr>
<td>Concurrent Pathsends (/CPU)</td>
<td>1600</td>
<td>4045</td>
</tr>
<tr>
<td>Serverclasses (/CPU)</td>
<td>1024</td>
<td>4045</td>
</tr>
<tr>
<td>Pathway environments (/CPU)</td>
<td>256</td>
<td>4046</td>
</tr>
<tr>
<td>Configuration limits</td>
<td>1x</td>
<td>1x(#Pathmons in domain)</td>
</tr>
</tbody>
</table>
Benefits of TS/MP 2.3 vs 2.0 (2)

Efficient Link Management

- Relief from link starvation problem
  - Fewer servers required to do the same amount of work
  - For test application
    - TS/MP 2.0 uses up to 800 links
    - TS/MP 2.3 uses only 50 links for the same transaction throughput
  - TS/MP 2.3 is a better performer for selecting server processes on less busy CPUs
    - TS/MP 2.0 uses the oldest link as the basis for assigning future work
    - TS/MP 2.3 considers server response time as one of the parameters for assigning future work

- Results in better overall system performance (utilization)
Benefits of TS/MP 2.3 vs 2.0 (3)

- **Pathway domains – phase 1**
  - Helps eliminate planned outages
    - online reconfiguration and rebalancing of Pathway environments, without having to take the Pathway application down
  - Raises single Pathway configuration limits by up to 4x
    - e.g. MAXSERVERPROCESSES is raised from 4096 to up to 16380
Pathway domains for planned outage elimination (1)

- Multiple Pathway environments (PATHMON’s) within a node behave as one application domain
  - Replicated serverclasses across environments
  - Single serverclass namespace looks like one big serverclass to applications
  - Transparent load-balancing across environments by ACS
  - Management via new Pathway Domain Management Interface (PDMI)

- Take down one environment, others in domain continue processing work
  - Dynamically change serverclass process management attributes
    - Link tuning, cpu allocation, number of static/dynamic servers, etc.
Pathway domains for planned outage elimination (2)

Integrity NonStop server node

ACS subsystem

Pathway Domain %PMX

Pathmon $PM1

Pathmon $PM2

$ZACS

SC1

SC1

SC2

SC2

Single logical serverclass spans Pathmon's

Pathway Domain $PMY

Pathmon $PM3

Pathmon $PM4

SC4

SC4

SC3

SC3

Requests ➔ $ZACS ➔ Requests

Future product plans, dates, and functionality are subject to change without notice.
Pathway domains for planned outage elimination (3)

- Configuration (1)
  - Max 4 replicated Pathway (Pathmon) environments per domain
  - Replicating Pathway environments is as simple as obeying the configuration of a single Pathway
    - Update the existing Pathway configuration if necessary
    - Then use PDMI to replicate the Pathway configuration for the number of Pathmons in the domain. E.g.
      ```
PDMI> OPEN $PM1, $PM2, $PM3, $PM4
PDMI> OBEY <single Pathway config-file>
```
  - If you have named processes, alter the server configuration in each Pathmon to avoid server process name collision
  - If the Pathway configuration file is not available, generate one from the existing live Pathway environment
    ```
PATHCOM> INFO /OUT <out-file> PATHMON, OBEYFORM
PATHCOM> INFO /OUT <out-file> PATHWAY, OBEYFORM
PATHCOM> INFO/OUT <out-file> SERVER *, OBEYFORM
```
Pathway domains for planned outage elimination (4)

- Configuration (2)
  - Update ACSCTL config file and start 2.3 ACS sub-system with domain information
  - Example of an ACSCTL file with a single Pathway domain called %ABC comprising four Pathway environments ($PM1 - $PM4)

```
[ACS DOMAIN]
SIERRA = \SIERRA

[PATHWAY DOMAIN]
# Domain name = Pathmon:Link_distribution_weight_factor_%
%ABC = $PM1:25, $PM2:25, $PM3:25, $PM4:25

[OWNER MEMBERSHIP]
ACS.PWYBUILD = %ABC
```
Pathway domains for planned outage elimination (5)

• **Operation/Management**
  – Pathway Domain Management Interface (PDMI) provides basic PATHCOM commands in domain context
    • start/stop configuration objects, query for stats, status, etc
      PDMI> OPEN $PM1, $PM2, $PM3
      PDMI> START PAYROLL-SERVER
    – PDMI is a superset of PATHCOM

• **Application programming**
  – Pathsend and SCOBOL API’s support domain serverclass addressability
  – No application changes if domain feature not used
  – No application changes if Pathsend to any serverclass instance (Pathmon) in domain - the usual case
  – Send to specific Pathmon in domain will require a minor application change
Pathway domains for planned outage elimination (6)

• Example of making an online configuration change
  – Consider a domain %PAYROLL having Pathmons $PRL1, $PRL2, and $PRL3, and a server class PAY-SERV configured in all three Pathmons
  – Consider that the MAXSERVS and MAXLINKS are required to be updated with no application outage
  – Use PDMI:
    PDMI 1> OPEN PATHMON $PRL1
    PDMI 2> STOP SERVER PAY-SERV
    PDMI 3> ALTER PAY-SERV MAXSERVERS 100, MAXLINKS 200
    PDMI 4> START PAY-SERV
    PDMI 5> OPEN PATHMON $PRL2
    PDMI 6> … repeat commands 2-4 for PAY-SERV update …
    PDMI 9> OPEN PATHMON $PRL3
    PDMI 10> … repeat commands 2-4 for PAY-SERV update …
Benefits of TS/MP 2.3 vs 2.0 (4)

Miscellaneous RFES

- Serverclass can use all possible ASSIGN and DEFINE pre-allocated space within a PATHMON
  - E.g. if PATHMON ASSIGN limit is set to 1000, then a server class can reference 1000 ASSIGNs in its configuration
  - PATHMON pre-allocated space for ASSIGN and DEFINE is increased to 8191

- Wildcarding will be allowed on PATHCOM commands
  - E.g. STATUS TERM S-WDL* to get status on all TERMs having names starting with ‘S-WDL’

- Default security will be changed from “N” to “O”
  - With new security feature, by default, it is the local owner and the local super user who have permission to alter any Pathmon controlled objects
  - Is applicable only when a Pathway environment is cold started using the new PATHMON and for subsequent cool starts
Subjects

• Pathway/iTS 1.1
Pathway/iTS 1.1 overview (1)

• Pathway/iTS 1.1 is generally available now (HSR76/QSR76)
• Further capacity increases and enhanced functionality for SCOBOL requesters
• New API’s enable SCOBOL requesters to use context-sensitive (“dialog”) communication style
  – Exchange multiple messages with same Pathway server in same transaction context
  – Removes single 32K message size limitation
• New PathTCP4 process will share links across both PathTCP and TERM objects by using Pathsend instead of WRITEREAD based send operations
  – Enables more concurrent sends to be outstanding
Pathway/iTS 1.1 overview (2)

- Strongly recommend use of Pathway/iTS with TS/MP 2.3
  - With TS/MP 2.0, PathTCP competes with Linkmon for links
  - With TS/MP 2.3, ALL links handled by single link manager per CPU
    - Reduced competition for links
    - Better overall link distribution and no link starvation
  - Eliminates communication with Pathmon
  - Relief from Pathsend Limits
  - Utilize domain feature for planned outage elimination
Subjects

- Future Pathway directions
Future Pathway directions (1)

- Planned outage elimination phase 2 - online application upgrade
  - Next stage of Pathway domain support will enable Pathway server *application object* upgrades with no loss of service
  - Change existing server applications, deploy new server applications
  - TS/MP will manage application version consistency across domain

- Pathsend large message support
  - Support context-free single message exchanges up to 2MB
    - New api semantically equivalent to current Serverclass_Send
  - Will be exploited by internal SOA and Java products to give end-to-end support for large SOAP/XML messages
Future Pathway directions (2)

• Improved CPU utilization
  – More user control over server placement to ensure similar load across CPUs

• Further limits removal
  – More server links per CPU
  – More concurrent Pathcoms per CPU

• Additional RFEs being considered
  – Improved link handling; Raise GDSX transaction limit; Support node independent DEFINEs; Increase granularity of CREATEDELAY; Pathcom history buffer; Domain-level PDMI commands
Subjects

• Summary
Summary

• New TS/MP 2.3 release (HSR53/QSR53)
  – further limits relief and capacity increases
  – helps eliminate planned outages
  – miscellaneous RFEs
  – generally available now

• Pathway/iTS 1.1 (HSR76/QSR76)
  – SCOBOL dialogs
  – capacity increases
  – generally available now

• Significant enhancements planned going forward
Further information

- Product announcement; Updated product data sheet; “Modern application development for Pathway” white paper

- TS/MP 2.3 Release Supplement manual
  - Provides release content overview and migration considerations

- Other TS/MP 2.3 manuals also on [www.docs.hp.com](http://www.docs.hp.com)
Pathway is thriving in the 21st century!!

- The enhancements provided with the latest and upcoming versions of NonStop TS/MP software allow Pathway applications to take full advantage of the power of HP Integrity NonStop servers.
- This combination of new software and hardware provides a continued growth path for Pathway users, as well as unparalleled performance for the most demanding mission-critical OLTP applications.
...Questions?