

hp Pathway/XM version 1.5 software

product description



As Pathway environments grow beyond their limits, companies are forced to partition them into two or more environments. This requires changing the application code and results in additional management burden.

With Pathway/XM software, this division is no longer necessary. Pathway/XM software, an add-on product to Pathway/TS and Pathway/iTS software, automates Pathway management, enables scalability over HP Expand networks and superclusters, and increases availability for Pathway applications. Pathway/XM software does not replace Pathway/TS or Pathway/iTS software; rather, it augments and enhances them, improving manageability and availability without changing existing Pathway applications.

Version 1.5 of Pathway/XM software offers new features such as rolling configurations for dynamic changes, Pathway services for third-party software configurations, and the Pathway/XM Analyst tool for visual configuration planning.

features at a glance

- Simplified Pathway management
- Growth beyond today's Pathway limits
- Increased application availability
- \$CMON support (optional)
- Choice of server classes for flexibility and compatibility
- Easy adoption



With Pathway/XM software, you leverage the power of your HP NonStop server to make all the right configuration and workload choices (see figure 1). You gain three benefits.

- You can reassign information technology people and budget to more visible projects.
- Applications perform better.
- The Pathway environment suffers from fewer operator errors and recovers even faster from faults in hardware or software.

With Pathway/XM software, never again will you need to manually partition or change Pathway application code to expand your environment. The result: automated management, growth beyond current limits, and increased availability for your applications.

simplified Pathway management

Pathway/XM software enables your Pathway environment to manage itself, freeing your talents for other projects.

unified view of Pathway environment

Pathway/XM software enables you to view, manage, and configure a single logical Pathway environment, no matter how many actual physical environments there are. As a result, management takes less time and requires far less in-depth Pathway expertise.

no more MAXLINKS or LINKDEPTH

Because of dynamic load balancing, you no longer need to manually associate processors with servers and manage partitions. You work with logical rather than physical partitions and are shielded from physical details such as MAXLINKS, LINKDEPTH, CREATEDELAY, and DELETEDELAY.

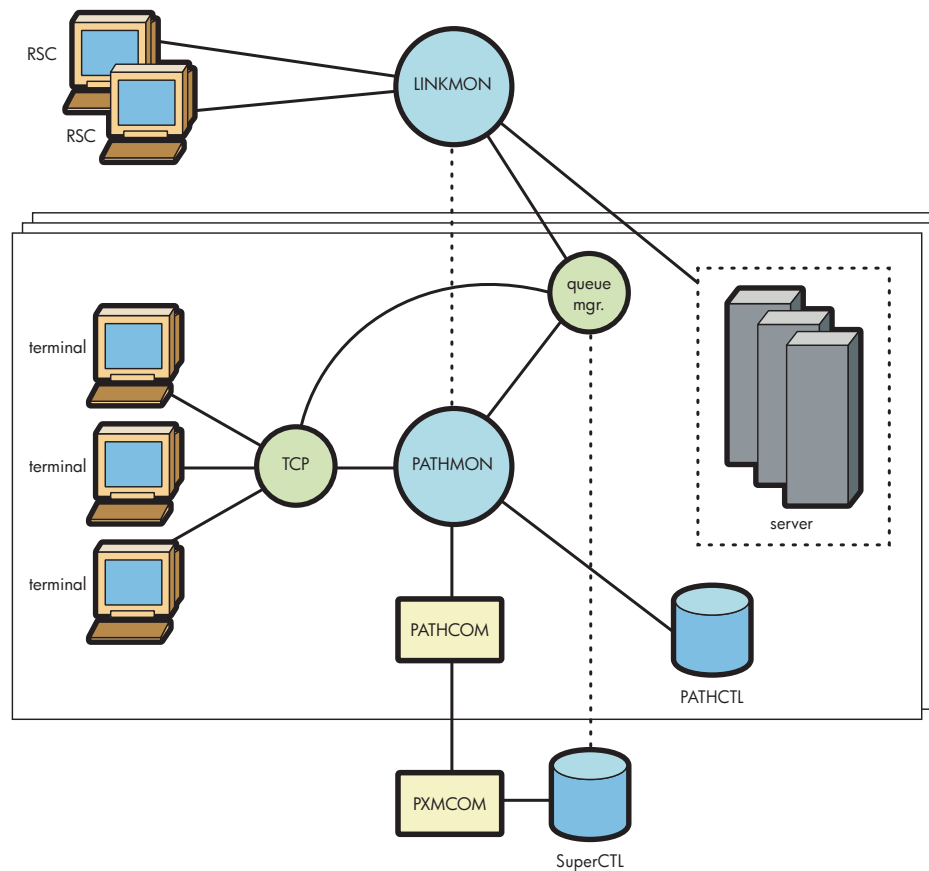


Figure 1. The source of Pathway/XM software benefits is a queue manager, which receives all server requests. The queue manager is aware of the total workload for a server class, so it assigns work to a server only when the server is available to process it. Because it holds the queue of outstanding requests, the queue manager can intelligently start or stop server processes as needed, without causing client errors.

predefined configurations for instant changes

With Pathway/XM software, you can predefine multiple configurations to adapt to varied operational requirements. For example, you might define one configuration file for weekdays, another for evenings, and still another for weekends. As the configuration files are generated, you can test and modify them until they meet your needs. When you are satisfied with the results, you can keep the files in a database. Because you start with a predefined configuration, you always know the current and initial object definitions.

Pathway/XM Analyst for offline configuration planning

Pathway/XM Analyst is a graphical user interface (GUI) that provides an alternative method for configuring a Pathway/XM environment using a series of interactive screens. Based on the information you enter for various questions, the tool builds a relational database on your terminal that contains all the appropriate configuration parameter values. You can modify these values, as needed.

When you are ready, Pathway/XM Analyst generates a configuration source file that you transfer to the system in which Pathway/XM software is to run. You can use PXMCFG to open that file and add any other configuration commands needed before generating the SuperCTL file.

A visual display of the workload and resource distribution is generated according to the configuration you defined using this tool. After you enter configuration information using Pathway/XM Analyst, it displays the distribution of server processes among processors and the distribution of terminals among terminal control processes (TCPs) and processors. The tool is especially useful for testing changes to the configuration; when you make changes, graphs show the potential effect of these changes on a given Pathway/XM node, on the Pathway/XM environment as a whole, and on the client application.

Pathway/XM Analyst is included in the Pathway/XM software price, but it must be ordered as a separate line item on the Pathway/XM order.

logical nodes for management flexibility

Pathway/XM software enables you to assign objects to server resources without explicit physical resource allocation (see figure 2). The use of logical nodes minimizes management and can improve performance.

For example, with a six-processor system, you could create a logical node called *finance*. This logical node could be assigned to use processors 3, 4, and 5. As your application grows, you can add two processors. By reassigning logical node *finance* to processors 5, 6, and 7, you can redistribute your application and take advantage of the newly available resources without identifying server classes, stopping them, and reassigning them individually.

Pathway/XM software even enables partitions to run on Expand software nodes, which provides additional room for application growth.

object grouping: wildcard-like capability

A capability more powerful than wildcarding enables you to manage groups of objects instead of individual ones. First, you create a group, such as *accounting* or *finance*, and create a template that defines the default attributes for group members. Then you assign individual objects, such as terminals, to the group. The objects automatically inherit the attributes defined at the group level.

With a single command you can control all of the objects in the group. For example, suppose you want to modify all 100 terminals used for accounting. Without Pathway/XM software, you would have to modify each one individually. With Pathway/XM software, you can simply modify the object called *accounting*, saving 99 keyboard commands.

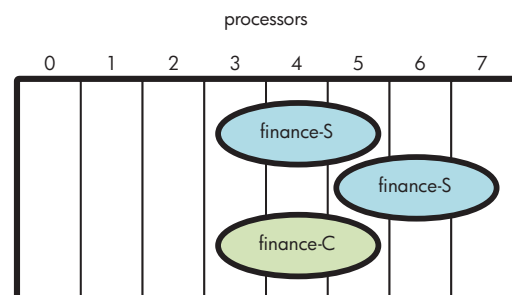


Figure 2. Pathway/XM software enables you to assign objects to server resources without explicit physical resource allocation. By using logical nodes, you can minimize management and improve performance without ever having to stop the application.

Pathway services for adding applications easily

Pathway services provide a way to configure a set of server classes and create a SuperCTL file that is independent of physical resources. The SuperCTL file can then be imported into customer configurations where node resources are assigned. This provides an easy way to add applications such as third-party software to a running system (production environment) without major reconfigurations.

growth beyond today's Pathway limits

Many Pathway users want to grow beyond today's Pathway limits. Currently, when the number of terminals or the total of server classes and server processes exceeds 4,094, the system manager must partition the Pathway environment into multiple environments—a time-consuming process that requires changes to the application code and complicates system management.

Pathway/XM software enables growth without constraints. You gain the freedom to expand your Pathway environment by adding TCPs, terminals, and server classes, as well as the capability to manage them as a single environment. You never again need to partition your Pathway environment manually.

The following table shows how Pathway/XM software relieves previous Pathway limits. The net result: Your environment can grow practically without limit.

Pathway environmental limits comparison

environmental components	Pathway/TS or Pathway/iTS and NonStop TS/MP software	Pathway/XM software
TCP objects	160	204,800
Terminal (TERM) objects	4,094	1 million plus
Server classes	4,094*	4,094 x 4,094
Server processes	4,094*	4,094 x 4,094

* The sum of the server classes and server processes cannot exceed 4,094 in Pathway and NonStop TS/MP environments.

scalability over Expand software and superclusters

Pathway server classes have always had the ability to scale application instances across processors. Pathway/XM software adds the ability to scale applications across geographically dispersed NonStop servers to create powerful superclusters that can be managed as a single system.

It is also possible to interconnect up to 24 NonStop servers using NonStop ServerNet Cluster, which provides an ultra-fast, fiber-optic medium for Expand software (ServerNet version of Expand internode). Running Expand over a NonStop ServerNet Cluster interconnect results in interserver data transfer speeds of up to 1 gigabit per second. The net result is the ability to create location-transparent, globally dispersed transaction processing systems that benefit from the reliability, performance, and manageability of Pathway server classes and that can be managed as a single system.

Not only does Pathway/XM software enable global superclusters, but it also enables them to be managed centrally as a single application domain. In contrast, other large-scale transaction processing solutions would be forced to manage such a configuration as a partitioned system—a collection of connected machines. This single domain can be associated with a single NonStop SQL database, distributed across multiple servers, that presents a single database image.

improved overall system performance

Pathway/XM software improves overall system performance in three ways. First, it improves throughput, enabling the server to process more requests in any given time period. Second, it requires significantly fewer resources to complete the same job, reducing the number of objects you must manage. Third, response times improve because Pathway/XM software reacts to changes in the workload much more quickly. As a result, response times also become more uniform.

The percentage improvement varies by environment. In general, the larger and more rapidly changing your environment, the greater the benefit.

dynamic load balancing

Pathway/XM software provides automatic and dynamic load balancing through replication and distribution of processes and server classes in response to actual loads. It starts the optimum number of servers to achieve consistent response times and then stops servers when they are no longer needed. Transaction requests to servers are balanced on a per-transaction basis.

Dynamic load balancing provides three key benefits. The first is better resource utilization. Before Pathway/XM software, some Pathway users overconfigured to ensure adequate response times. Now, because Pathway/XM software releases resources when they are not needed, fewer servers are needed to accomplish the same job. For large applications, for example, automatic load balancing can reduce 10-second response times to subsecond response times.

Second, automatic load balancing results in more uniform response times. Before Pathway/XM software, a given terminal or requester could send requests to only one server because the link mechanism allocated links to a particular server process. If that server had a queue, a short transaction might be stuck behind several long transactions, even when another server was available. As a result, end users experienced inconsistent response times. Pathway/XM software eliminates inconsistent response times by routing transactions to available server processes and creating more server processes when they are needed.

Third, dynamic load balancing reduces boot time because it brings up only those processes that are currently needed—for example, 20 out of 100. As the load increases, Pathway/XM software starts new processes.



more uniform response times

increased application availability

rolling configurations

Pathway/XM software provides a rolling configuration feature that allows you to migrate from your current configuration to an entirely new configuration online. Pathway/XM software compares the active configuration to the new one and automatically generates a migration plan. You can execute the migration plan—which adds, deletes, and modifies objects as necessary to produce the new configuration—at any time online.

The new SuperCTL file is generated with the knowledge of a prior SuperCTL file that is in use. The PXMCFG utility develops a migration plan that is placed in the new SuperCTL file. When PXMCOM opens the new SuperCTL file, it validates the migration plan. If the plan has a status of *supersedes*, the prior SuperCTL file is superseded by the new SuperCTL file. The database-handling routines automatically reroute all requests to the appropriate file.

online server replacement

Pathway/XM software enables online server replacement. With this capability, you can update applications or maintain servers without causing error messages to be sent to end users or shutting down the application. Instead, you simply suspend operation of a server class; change its attributes, including the new version of the server program; and then resume operation. Users remain blissfully unaware. Requests are all held in the Pathway/XM queue manager and forwarded later, when the server class becomes available.

Online server replacement reduces planned downtime, which often affects overall availability more than unplanned downtime. It also reduces risk. Typically, administrators accumulate numerous changes to enact during planned downtime. When changes can be made online, the risks of planned downtimes are reduced.



easy redirection using logical nodes

If a processor is down for hardware expansion or maintenance, you can use logical nodes to indicate which alternate processors a server should use. This can be done without reconfiguring the system. The entire application is migrated to the newly assigned processors without any application outage.

\$CMON support (optional)

Pathway/XM software optionally offers \$CMON support, enabling the system manager to maintain control over which processors are used. So when Pathway/XM software balances the load, it first checks with \$CMON to see what is allowed. For example, you can reserve certain processors for certain departments, such as software development.

automatic reconfiguration after processor failures and reloads

In the event of processor failure in the current Pathway system, the Pathway environment loses its optimal balance. What's more, it continues to be poorly balanced even after a failed processor is reloaded. Therefore, system managers must either migrate server processes manually one at a time or restart the entire application.

With Pathway/XM software, reconfiguration is automatic after processor failure as well as after reload. When a processor goes offline, Pathway/XM software reroutes requests to the processor with the most available capacity. When a processor is back online, Pathway/XM software begins using it again, without any intervention from the system manager.

Automatic reconfiguration also can reduce startup time. For example, without Pathway/XM software, an installation with 1,000 servers might take 45 minutes to bring up manually after a failure. Pathway/XM software brings up all 1,000 servers automatically in a matter of seconds.

choice of server classes for flexibility and compatibility

Pathway/XM software offers a choice of three server classes: distributed, direct, and replicated. Distributed server classes deliver the maximum benefit of Pathway/XM software. The other server classes provide an option for environments with unusual requirements.

- *Distributed server classes* offer automatic processor redistribution upon failure and restart, online server replacement, and a shared server pool across PATHMON processes.
- *Direct server classes* offer essentially the same functionality as today's Pathway server classes. In addition, they provide automatic processor assignment at startup and support user-assigned process names. However, they do not support processor redistribution or online server replacement. Direct server classes offer maximum compatibility with the existing Pathway environment or NonStop Transaction Services/MP (NonStop TS/MP) software.
- *Replicated server classes* are midway between distributed and direct server classes. Like direct server classes, they offer automatic processor assignment at startup. They use traditional Pathway link management with static, rather than dynamic, processor distribution.

easy adoption

Pathway/XM software is easy to adopt, requiring no changes to server applications. It supports both remote server call (RSC) and Pathsend application program interfaces (APIs).

Pathway/XM software also requires no changes to SCOBOL requesters. For ease of future expansion, however, requesters that reference external PATHMON names should be converted to use the default. They must be converted only if the PATHMON names are hard coded for a partitioned system.

Included with the product is an intelligent conversion utility that automates adoption of Pathway/XM software (see figure 3).

Conversion takes just a few hours, depending on the amount of testing and fine-tuning you perform. No manual intervention is required; however, many system managers use the opportunity to further fine-tune the environment. The system manager might choose to use the source file to gain new insights into how to manage the system optimally—for example, by discovering which resources are underutilized or overutilized.

If you have multiple Pathway environments, you can enhance one, some, or all of them with Pathway/XM software. It is not necessary to convert them all to Pathway/XM at the same time. You can obtain all the Pathway/XM benefits even if you migrate only one of multiple Pathway environments. For example, you can manage all your future growth within the Pathway/XM environment.

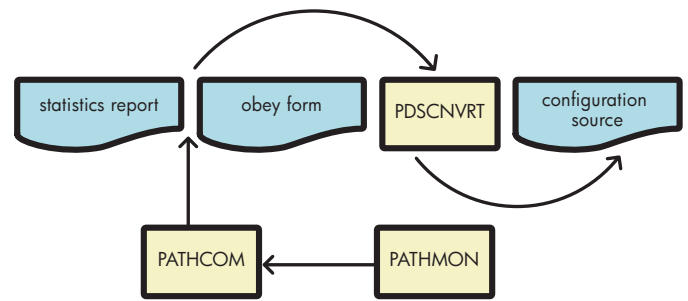


Figure 3. An automatic conversion utility, included with Pathway/XM software, looks at the current PATHMON environment to extract statistics and current configuration data. From this extraction it creates a statistics report and an obey form. The utility then converts these two files into a source file with a proposed environment. Because the generated file is a text file, you can easily edit it so that it better reflects your requirements.

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Many HP partners can provide professional services, such as migration of your Pathway systems to the Pathway/XM environment.

ordering information

product ID	description
SA63V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release D32 and later
SA65V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release D42 and later
SR57V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release G02 and later (1 to 4 processors)
SR58V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release G02 and later (5 to 16 processors)
SR79V1	Pathway/XM Analyst is included in the Pathway/XM software price, but it must be ordered as a separate line item on the Pathway/XM order.

specifications

system requirements

Hardware	NonStop K-series and S-series servers (Note: Only RISC systems are supported.)
Operating system	NonStop Kernel operating system, Release D32, D42, G02 and later
Other software	Pathway/TS, Pathway/iTS, or NonStop TS/MP software

supported Pathway configurations

Single PATHMON environment, partitioned PATHMON environments, and partitioned PATHMON environments across Expand systems

licensing

Pathway/XM software for NonStop K-series servers has a per-system licensing agreement. Pathway/XM software for NonStop S-series servers has a per-processor licensing agreement.



For more information, go to www.hp.com/go/nonstop.

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