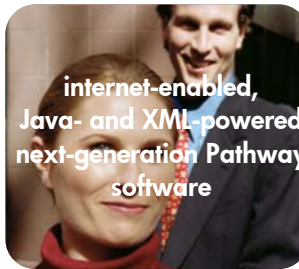




hp Pathway/iTS software



a product description from hp

features at a glance

- Powerful Internet transaction processing capabilities
- Quick conversion of SCOBOL to Internet clients
- Simplified administration with HP Pathway/XM software (optional product)
- HP worldwide support, professional services, and education

HP Pathway/iTS software is the next-generation Internet transaction processing software for HP NonStop™ servers. With this software, customers can

- Use standards-based Internet technologies such as Java™, HTTP, and XML for high-performance transaction processing applications
- Fully leverage their existing Pathway/TS (SCOBOL) application investments
- Migrate terminal clients to Internet clients without reprogramming
- Benefit from the unrivaled scalability, reliability, and manageability of Pathway server classes in an Internet-enabled environment
- Maintain a single application domain for applications distributed across geographically dispersed NonStop servers

Pathway/iTS software, a superset of the widely deployed Pathway/TS transaction processing software, contains all the functionality and transaction protection provided by Pathway/TS and Pathway server classes while enabling the use of state-of-the-art Internet technologies. With Pathway/iTS software, existing SCOBOL Pathway application code that is not based on intelligent device support (IDS) can be converted without modification to Java technology-based applets running in standard Web browsers while maintaining traditional terminal (green screen) compatibility and coexistence in mixed environments. So, terminals can be migrated gradually to Internet clients without reprogramming and with a single SCOBOL or Java source code base.

Pathway/iTS software, combined with NonStop Transaction Services/MP (NonStop TS/MP) software, provides an advanced application server environment that enables applications to be distributed across geographically dispersed NonStop servers while maintaining a single application domain—a capability that competing transaction processing solutions do not offer. This feature, combined with NonStop SQL distributed database capabilities, enables customers to efficiently create and manage large-scale applications such as worldwide distributed payments systems, distributed stock trading systems, and Internet-based electronic markets.

powerful internet transaction processing capabilities

Pathway/iTS software enables customers to create Internet transaction processing environments that

- Leverage Pathway server classes for industry-leading reliability, scalability, performance, and manageability
- Use standards-based Internet technologies, including HTTP, XML, and Java
- Support highly distributed yet easily managed applications

leveraging Pathway server classes and process-pair technology

Like all previous-generation Pathway iterations, Pathway/iTS software is based on proven Pathway server class technology—a platform that reflects 25 years of transaction processing expertise and that underpins the majority of the world’s highest performing and most critical transaction processing applications. Pathway server class technology—and, by extension, Pathway/iTS software—fully leverages the parallel architecture of NonStop servers to optimize application reliability, scalability, and performance.

In addition, Pathway server classes simplify the writing, execution, and management of Pathway/iTS applications. With Pathway/iTS software, you assign server rules to your application, and Pathway server class technology automatically takes care of starting, stopping, and dynamically adjusting the number of application instances, balancing instances across processors and servers and substantiating and redistributing them in the event of failure.

fault tolerance and continuous availability

The touchstone of fault-tolerant computing, NonStop servers utilize the patented HP process-pair technology, which enables immediate failover in the event of hardware, operating system, or application software faults. Pathway server classes are designed to take advantage of process-pair technology, and all key components of Pathway/iTS software are written as process pairs, including the transaction monitor components, communication components, router, and so on. Hence, all system components are always available and resistant to failures of any kind—hardware, software, or operator induced. If a failure should occur, Pathway/iTS software instantly replays the transaction; in most cases, the end user is not aware that a processor or application failure has occurred.

With fully fault-tolerant applications, end users do not notice a single hardware component failure and most transient software failures. Because the Pathway/iTS environment provides fault tolerance automatically, the application programmer does not need to produce code for this purpose.

Pathway/iTS applications also exhibit continuous availability because they can be modified without interrupting users. For example, when you update applications online, users interact with the new version the next time the program is called with no interruptions or error messages.

transactional integrity

In addition to the protection afforded by process pairs, all Pathway server classes are fully transaction protected by NonStop Transaction Management Facility (NonStop

TMF) software. An integral part of the robust HP NonStop transaction processing infrastructure, NonStop TMF provides transaction protection and recovery services to a variety of HP processing environments, including Pathway/iTS, Pathway/TS, NonStop Tuxedo, NonStop CORBA, and NonStop ODBC Server.

Essentially, NonStop TMF software ensures the integrity of Pathway server classes and associated distributed databases by

- Constantly monitoring transactions to see that they are completed entirely, or not at all
- Coordinating updates to HP Enscribe or NonStop SQL databases

NonStop TMF software also provides high-performance recovery services and enables database consistency in the event of a hardware or software malfunction or power outage.

scalability—easily manageable distributed applications on worldwide clusters

Pathway server classes have always been able to scale application instances across processors. Pathway/iTS software, combined with NonStop TS/MP software, adds the ability to scale applications across geographically dispersed NonStop servers to create powerful superclusters that can be managed as a single system (see figure 1). Interserver communication among up to 255 systems is accomplished via HP Expand networking software, the communications utility that enables physically separated nodes in a NonStop S-series server complex to interact and share a unified file structure over Asynchronous Transfer Mode (ATM) and other high-speed networks.

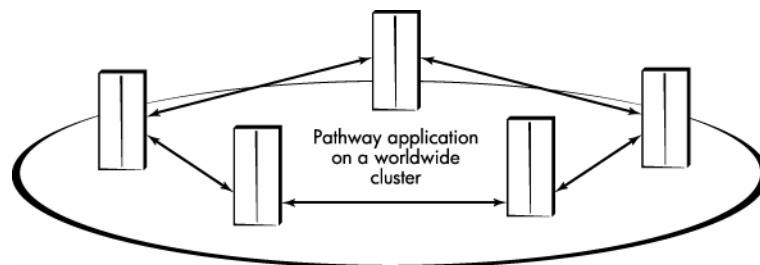


Figure 1. In a Pathway/iTS- and Pathway/XM-enabled worldwide cluster, the actions of a client in Tokyo, London, or anywhere on the network are visible instantly across the entire system. To expand the system to other geographical locations, you simply add up to 255 nodes. Pathway/iTS with Pathway/XM software automatically extends the application and its single application domain to the new locations.

It is also possible to interconnect up to 24 NonStop servers using a NonStop ServerNet Cluster, which provides an ultrafast, fiber-optic medium for Expand software (see figure 2). Running Expand software over a NonStop ServerNet Cluster interconnect results in interserver data transfer speeds of up to 1 gigabit per second.

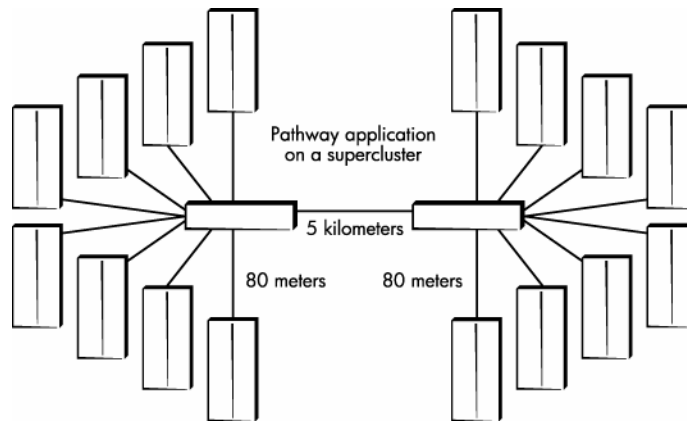


Figure 2. In a Pathway/iTS- and Pathway/XM-enabled supercluster, Pathway applications spread over a high-speed supercluster fabric to satisfy the scalability requirements of the most demanding Internet transaction processing.

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.

single application domain

Not only does Pathway/iTP with Pathway/XM software allow global superclusters to be created, 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 interconnected machines. Also, this single domain can be associated with a single NonStop SQL database that is distributed across multiple servers while presenting a single database image.

high performance for the internet and other dynamic environments

Pathway/iTS software represents a high-performance transaction processing environment in which performance is built in rather than programmed in. Instead of writing threads, which are difficult to program and debug, to increase performance, programmers write simple, straightforward programs. Pathway server classes take care of providing optimum performance *automatically*.

Multiple clients or terminals are concentrated automatically into a few processes, simplifying management and improving transaction throughput by preserving system resources. Loads are then distributed over as many processors and nodes as required to attain the desired throughput.

When application demand increases, response times are managed via dynamic front-end load balancing, a feature of Pathway/iTS software. The router (listener) process routes client requests for processing to the appropriate terminal control process (TCP) processes based on current load characteristics.

Pathway dynamic load balancing on the back end distributes work among server objects and automatically creates new objects when response times exceed predefined criteria. Server objects can be distributed among dispersed sites in applications that employ a distributed database.

The benefits of dynamic load balancing are most apparent in Internet and other dynamic environments, where unpredictability is almost guaranteed.

internet and Java clients

Pathway/iTS software enables NonStop servers running Pathway to be accessed from any device capable of running Microsoft® Internet Explorer browser, including the new class of network computers and wireless devices. The Pathway/iTS Java client is a 100% Pure Java implementation and includes no native methods, so it runs on any platform with a standard Java Virtual Machine (JVM) for complete client platform independence.

efficient, scalable links

Pathway/iTS Java clients (Java applets) access Pathway server classes via the Pathway/iTS gateway component, which supports ultra-efficient and scalable HTTP-based links for high-volume Internet transaction processing for e-commerce and other e-business applications.

Pathway/iTS software enables efficient, scalable, and higher performance links that are standards based. With Pathway/iTS software, the Buy command prompts the Pathway/iTS Java client to package the user request into an XML message that is transported over HTTP *directly* to the Pathway/iTS gateway residing on a NonStop server. The gateway delivers the request to Pathway servers and returns their responses to the client. The use of Internet proxy servers is supported.

The Pathway/iTS gateway validates user access and performs multiple functions on behalf of the client. These include user conversion routines, unsolicited message processing, and “sends” to Pathway server processes. The gateway also performs the front-end load balancing described in “high performance for the Internet and other dynamic environments” sections. The client message then goes directly to a Pathway server class.

Like all major components of Pathway/iTS software, the Pathway/iTS gateway leverages process-pair technology and other reliability enhancing features of the NonStop platform to guarantee all transactions.

Web server software, such as HP iTP WebServer, runs on the same NonStop server as Pathway/iTS software (see figure 3).

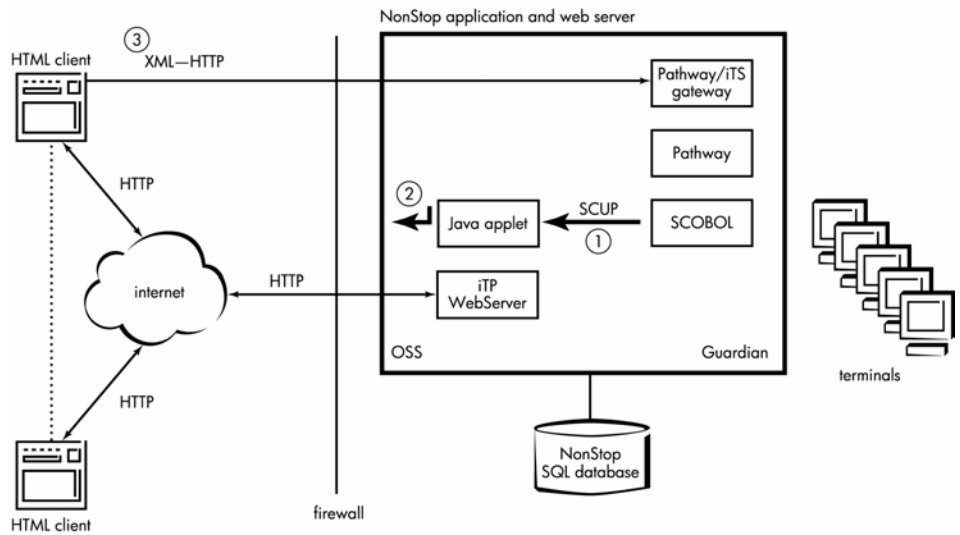


Figure 3. Pathway/iTS and iTP WebServer software can be added to an existing Pathway/TS system to support both traditional terminals and Internet clients without any changes to the existing applications.

It is also possible to run the Web server software on a separate front-end NonStop server together with the Pathway/iTS gateway (see figure 4).

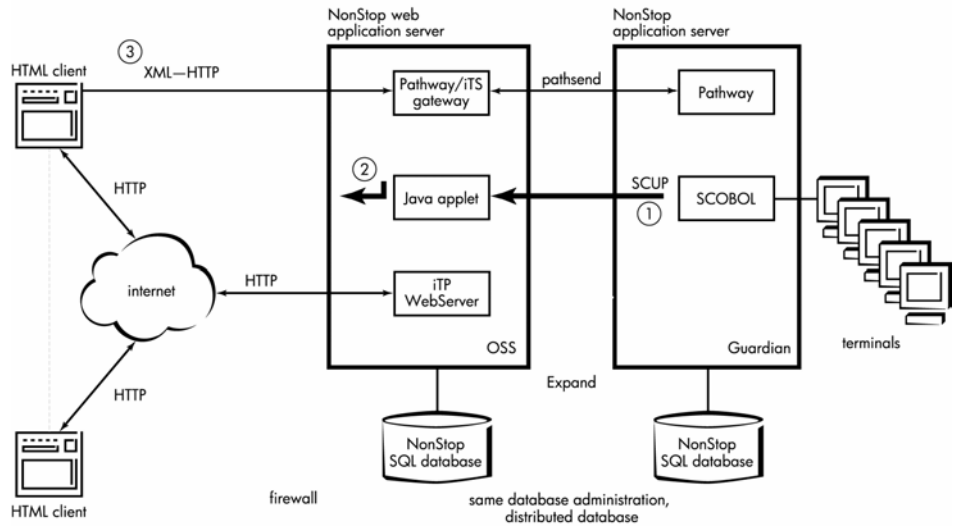


Figure 4. A front-end NonStop system, often a small configuration, can be added to host iTP WebServer software and the Pathway/iTS gateway. The existing system remains intact with no software or hardware changes or additions.

100% pure Java applets as clients

Pathway/iTS Java clients present a wide range of benefits aside from the obvious one of Internet enablement. Because Pathway/iTS Java clients are 100% Pure Java implementations and thus run on any system capable of running Microsoft Internet Explorer browser, customers do not have to worry about certifying client devices. Pathway/iTS Java clients completely eliminate the need for client software distribution—the Java applet takes care of that, on demand. Version control is also eliminated, as clients have the latest applet every time they need to use it.

One of the most important benefits of pure Java implementation is the ability to work in the Java language, which provides an easy but powerful programming environment with sophisticated, standardized development tools and built-in security mechanisms.

terminal clients (SCOBOL)

Pathway/iTS software supports traditional terminal clients as well as Java clients. Hence, customers can use Pathway/iTS software with their existing Pathway/TS terminal clients (which can remain entirely unchanged), develop new terminal clients, and mix and match Internet and terminal clients in the same environment. Pathway/iTS software also enables existing Pathway terminal clients to be quickly and easily converted to Internet clients (HTML and Java) with all their benefits.

Pathway/iTS terminal-based applications are written in Screen COBOL (SCOBOL), an extension of standard COBOL that provides robust features for defining screens and invoking servers. A device-independent language, SCOBOL can drive HP terminals, IBM 3270 terminals, and (using optional HP General Device Support software) a variety of other popular terminals and intelligent devices. SCOBOL facilitates programming and enables customers to leverage the COBOL expertise of their programmers. In addition, code maintenance is simplified because programmers can examine and modify SCOBOL programs using the HP interactive symbolic debugging tool, Inspect.

Terminal clients link to Pathway servers via TCPs (see figure 5). A TCP interprets and executes screen program instructions for each I/O device or process it is configured to handle. The TCP coordinates communication between screen programs and their I/O devices or processes and establishes links between screen programs and server processes. A single TCP can manage many user terminals and execute many screen programs concurrently to handle complex groups of operations for many users simultaneously.

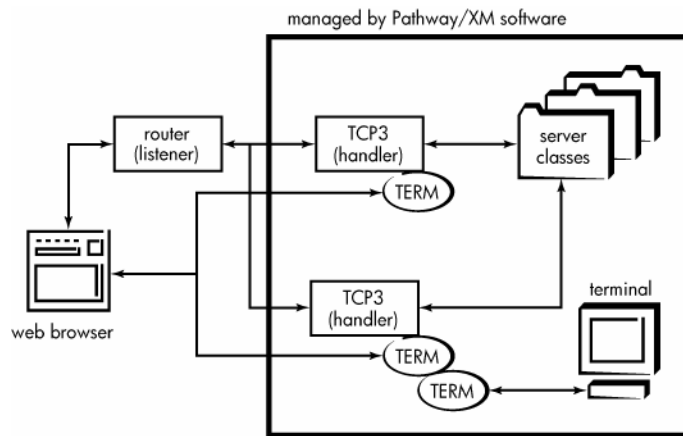


Figure 5. Terminal clients link to Pathway servers via highly reliable (process-pair based) TCPs. Pathway/iTS software introduces new TCP3 processes that support both Internet clients and traditional terminals. These processes, together with a router, provide front-end scalability and load balancing. Management of the whole environment is automatic and easy with Pathway/XM software (optional product).

quick conversion of SCOBOL to internet clients

One of the key features of Pathway/iTS software is that it enables customers to Internet enable their SCOBOL client base quickly and easily. No massive code rewrites are required, and both terminal and Internet clients can be maintained from a single source code, if desired.

conversion utility

Pathway/iTS software has enhanced the Screen COBOL Utility Program (SCUP) by incorporating a conversion utility. SCUP has many commands to copy, delete, and list SCOBOL files. A new command in Pathway/iTS software enables SCUP to scan existing SCOBOL-generated binary code (PObj files) and automatically convert SCOBOL to Java objects and HTML pages (see figure 6). Customers don't even need to have source code for the conversion.

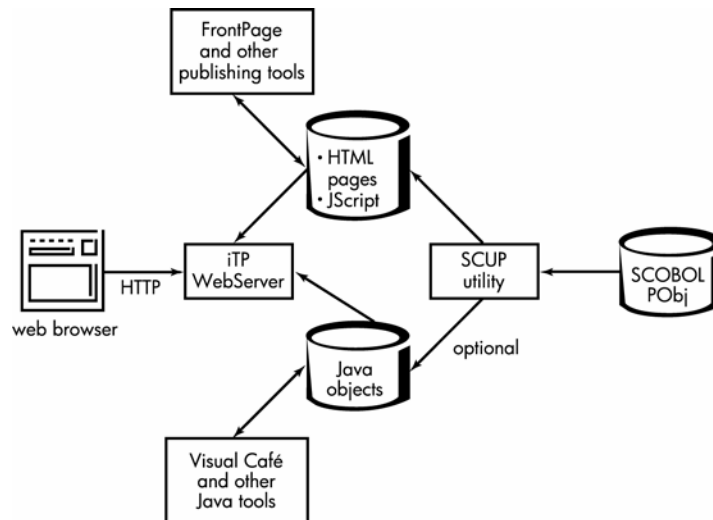


Figure 6. SCUP automatically converts SCOBOL programs in binary form (PObj files) to HTML (presentation logic) and Java (business logic) code, which are downloaded to standard Web browser clients. Both HTML and Java code can be modified with standard tools such as Microsoft FrontPage and WebGain Visual Café software.

In the conversion, business logic is mapped to Java source files, and presentation logic is mapped to HTML source files. This mapping enforces the separation of business and presentation logic in the converted code and enables customers to enhance presentation with industry-standard Web publishing tools. Any changes made to the SCOBOL business logic can be propagated to the Internet clients by reconverting the new PObj files. The new HTML files that result from this process can then be discarded, and the old enhanced HTML files can be reused to preserve any customization made to the presentation logic.

If single-source code is not desired, the converted code can be easily modified and enhanced to add new Java technology-based functionality whenever necessary. *Note:* From that point, only Java source code can be maintained.

advantages of presentation logic in HTML

The advantages of maintaining presentation logic in HTML include the ability to work with a standard programming language via easy-to-use, standard tools. HTML is also, of course, platform independent and is the lingua franca of the Internet.

During SCUP conversion, the screen section of the SCOBOL program is converted into a set of HTML pages. Each base screen is converted to an HTML page. If the program contains overlay screens, the converter generates one HTML page for each unique combination of overlay screens, overlay areas, and base screen used in the SCOBOL program.

Each HTML page has one HTML form. The HTML file name is derived from the program unit name.

advantages of business logic in Java

The advantages of maintaining business logic in Java likewise include platform independence and the ability to use a standard programming language with easy-to-use standard tools. Just as HTML is the lingua franca of the Internet, Java is the development platform of choice for companies engaged in e-commerce over the Internet. Customers can quickly and easily develop in Java and use standard application program interfaces (APIs) to link to existing back-end applications, enabling their businesses to move at Internet speed.

In SCUP conversion, the main Java applet is the generic applet code, which acts as a container for individual program unit classes. The main Java applet starts an execution thread for the program units and retains the context across program units during call processing. It also provides methods to be called from HTML pages on completion of HTML events.

During conversion, SCUP creates a Java class for each program unit with its name derived from the program unit's name. The conversion mapping is as follows:

- Each SCOBOL program unit is converted to a Java class.
- The SCOBOL working storage data items within a program unit are converted to member data items within the class.
- Each paragraph in the program unit is converted to member methods in the Java class.
- Screen field objects for I/O elements are converted in the screen section.

simplified administration with HP Pathway/XM software (optional product)

Pathway/XM software, which is an optional product, simplifies the management of Pathway/iTS applications. It provides a centralized configuration and management interface with automatic load balancing, online reconfiguration and server replacement, simplified object naming, and an increased overall system capacity.

Pathway/XM software automates the process of configuring a complex Pathway environment by allowing customers to define logical configurations that are decoupled from physical resources. With Pathway/XM software, you define processes such as TCPs and server classes in terms of abstractions, or templates, rather than individual instances. Based on the entire configuration, Pathway/XM software automatically determines how many instances of each process should be configured. It then automatically designates interrelationships between processes and tasks—for example, assigning TCPs and server classes to PATHMON processes and terminal tasks to TCPs—to optimize throughput.

managing distributed environments

For large Pathway/iTS applications and multiple Pathway environments, a single Pathway/XM environment provides a simpler management interface. Users can define over one million processes (PATHMON processes, TCPs, and servers) and terminal tasks in a single management environment, without using external TCPs, external PATHMON processes, or associative servers. For multiple applications that need to be managed separately, multiple Pathway/XM environments can run on the same set of NonStop servers.

rolling configurations

Pathway/XM software provides a rolling configuration feature that eases migration from current configurations to entirely new ones, online. Pathway/XM software compares your active configuration to your new one and automatically generates a migration plan. This plan, which can be executed at any time online, adds, deletes, and modifies objects as necessary to produce the new configuration.

online server replacement

Pathway/XM software allows you to temporarily deactivate distributed server classes for online server replacement, for example, without shutting down the application. You can suspend operation of a server class, change configured values (including the distribution of system and processor resources), and then resume its operation. While the server class is suspended, transaction requests are queued so that they can be serviced as soon as the server class is back online.

dynamic load balancing

Pathway/XM software simplifies application tuning by automatic load balancing, which is achieved by replicating and distributing the processes that support terminals (TCPs) and server classes. Transaction requests to servers are balanced on a per-transaction basis. System workload is automatically rebalanced when a processor fails or is reloaded. The Pathway/XM configuration interface allows system resources (Expand nodes and processors) to be defined for load balancing requester and servers.

GUI configuration planner

Pathway/XM Analyst is a graphical user interface (GUI) that provides an alternative method for configuring a Pathway/XM environment with a series of interactive screens. Based on the information entered for various questions, the tool builds a relational database on an administrator's workstation that contains all the appropriate configuration parameter values, which can be modified as needed. Pathway/XM Analyst then generates a configuration source file that you transfer from the workstation to the system on which Pathway/XM software will run.

hp worldwide support, professional services, and education

With more than 20 years of experience in providing service and support to the world's most demanding customers, HP offers a wide variety of support, professional services, and education programs. Worldwide technical support options, a full complement of educational products and services, and targeted professional services options help customers use systems more effectively, implement solutions faster, and increase staff skills.

ordering information

<i>product id</i>	<i>description</i>
SR76V1	Pathway/iTS software for NonStop S-series servers (1 to 4 processors)
SR77V1	Pathway/iTS software for NonStop S-series servers (5 to 16 processors)

SR78V1	Pathway/iTS software for NonStop K-series servers (per system license); requires a NonStop Transaction Services/MP (NonStop TS/MP) software license
SA65V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release Version D42 and later
SR57V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release Version G02 and later (1 to 4 processors)
SR58V2	Pathway/XM Version 1.5 software for NonStop Kernel operating system, Release Version G02 and later (5 to 16 processors)

specifications system requirements

Server hardware	Any NonStop server running the NonStop Kernel operating system, Release Version D46, G06, or later
Client hardware	Any Java-enabled hardware platform
Server software	NonStop Kernel operating system, Release Version D46, G06, or later iTP WebServer software Open System Services (OSS) operating system (required to run iTP WebServer software) NonStop TS/MP software
Client software	Any client platform with a Java-enabled browser such as Netscape Navigator 6.0 or later, Microsoft Explorer 5.0 or later, and JVM to run Java applets or standalone applications JDK version 1.2 or later is required in development to compile the converted code.
Browser client	A Web page builder like Adobe Pagemill or Microsoft FrontPage is required to enhance and add graphics to the generated HTML page. A standard Java development tool such as WebGain Visual Café is required for Java development.

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

August 2002, first published 2000. Java is a U.S. trademark of Sun Microsystems, Inc. Microsoft is a U.S. registered trademark of Microsoft Corporation. Netscape Navigator is a U.S. trademark of Netscape Communications Corporation. All other product names mentioned herein may be trademarks of their respective companies. HP shall not be liable for technical or editorial errors or omissions contained herein. The information is subject to change without notice. The warranties for HP products are set forth in the express limited warranty statements accompanying such products. Nothing herein should be construed as constituting an additional warranty.

Printed in the U.S.A. 02-0509

©2002 Hewlett-Packard Company

