HPE NonStop Servlets for JavaServer Pages 10.1 Software

HPE NonStop Servlets for JavaServer Pages (NSJSP) Software is a deep port of Apache Tomcat 10.1.30—a reference open-source implementation of Java Servlets and JSP technologies. HPE NSJSP 10.1 Update 1 is compliant with Jakarta Enterprise Edition (EE) version 10 for Servlet, JSP, Expression Language (EL), WebSocket and Jakarta Authentication Service Provider Interface for Container (JASPIC) functionalities.

HPE NSJSP Software incorporates the latest Java Servlet 6.0 and JSP 3.1 specifications, Tomcat features, and Tomcat code fixes. HPE NSJSP Software runs on HPE Integrity NonStop servers and within the HPE NSHTTP Server environments, extending their functionality. This integrated environment, which inherits the scalability, reliability, and fault tolerance of the HPE NonStop system, is built on top of HPE NonStop Transaction Services/Massively Parallel (HPE NonStop TS/MP) Software.

Key features and benefits

- Implements standards-based servlet container technology
- Supports asynchronous processing of requests; provides nonblocking I/O operations, web fragments, and annotations
- Includes single HPE NSJSP Manager to handle administrative tasks
- Supports role-based access security for HPE NSJSP Manager; provides multiple roles with different administrative capabilities
- Supports session management
- Supports multiple virtual hosts
- Provides improvements to the logging mechanism

HPE NSJSP Software offers compatibility with the Java Platform, Jakarta Enterprise Edition (EE) development, and run-time environment by supporting the Java Servlet 6.0, JSP 3.1 application programming interfaces (APIs), and EL 5.0, as well as directory structures and run-time management in a servlet container.

HPE NSJSP Software offers new features and enhancements over previous versions, such as Java Servlet 6.0 and JSP 3.1 APIs.

Installation, configuration, and deployment of applications are made easier with the servlet container. The container houses all resources (HTML, images, Java Servlet, and JSP) related to a specific application in a single protected location and manages the lifecycle of those resources, including context and multithreading.

Figure 1 shows the overall deployment architecture of HPE NSJSP in a data center with HPE NonStop.

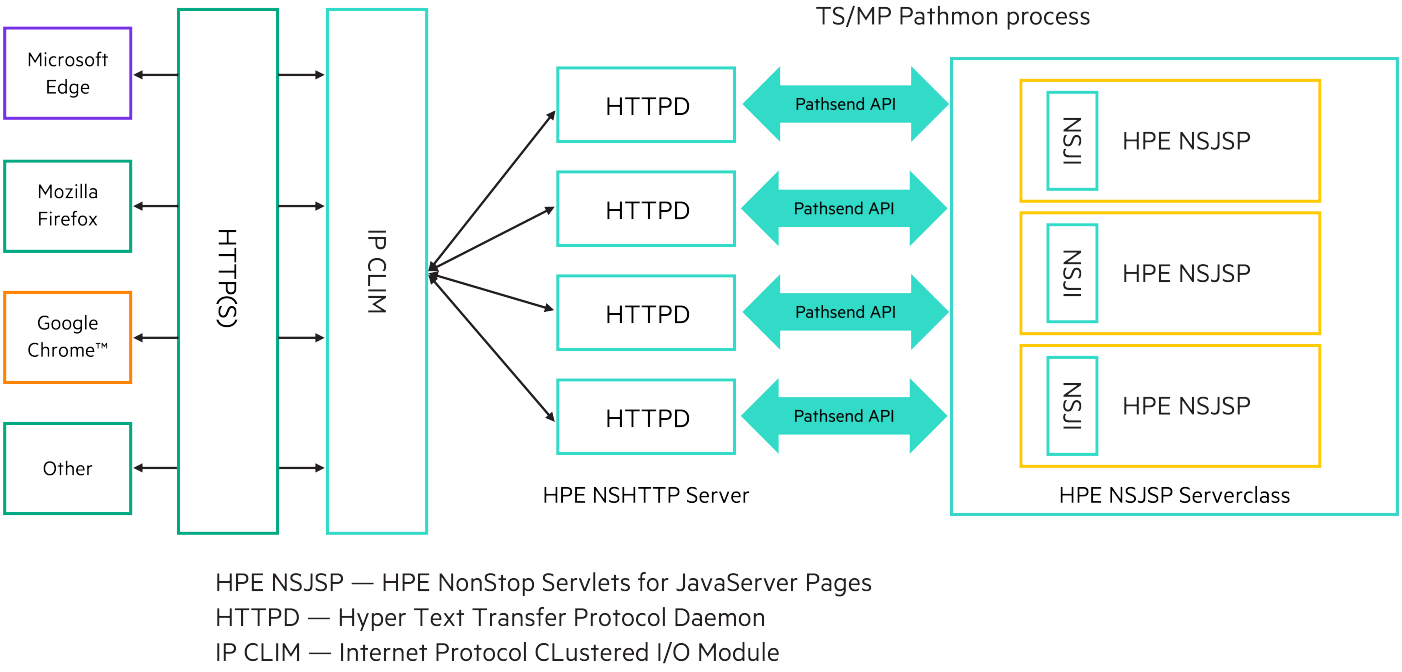

Figure 1. Deployment architecture of HPE NSJSP

New key features in NSJSP 10.1 Update 1 (NSJSP 10.1 U1)

Released in November 2024

- Safeguard based login into NSJSP Manager
- Multi-Factor Authentication (MFA) login into NSJSP Manager
- HPE NonStop Transport Provider is now configurable

New key features in HPE NSJSP 10.1

Released in September 2023

- Jakarta Servlet 6.0
- Jakarta WebSocket 2.1 API
- Java Authentication 3.0 (formerly JASPIC)
- New CLI to manage NSJSP deployments

New key features in HPE NSJSP 8.5

HPE NSJ 11 compatibility
The HPE NSJSP 8.5 Software Product Revision (SPR) namely, T1222 L85 ^ABS supports both HPE NSJ 8 and HPE NSJ 11. This means that the SPR can be deployed on both HPE NSJ 8 and HPE NSJ 11 Java virtual machines (VMs) within the same HPE NonStop system. This SPR is only available on HPE NonStop X systems.

Integration with HPE NonStop HTTP Server
The T1222 L85 ^ABS SPR has one more feature to offer. This SPR has been integrated and tested with the HPE NonStop HTTP (NSHTTP) Server version 2.4. From this SPR onward, HPE NSJSP can work with both iTP Secure WebServer as well as the HPE NSHTTP Server.

JASPIC
This Jakarta EE feature allows you to realize a customized authentication process as part of a servlet implementation. Application developers can implement the desired authentication interface and plug it into the HPE NSJSP Servlet as a Server Authentication Module (SAM). The servlet invokes the SAM at run time and takes action according to the result returned by the SAM. This is useful to implement single sign-on (SSO) functionality across multiple services.

Jakarta Servlet 3.1
This Jakarta EE7 specification defines how applications can leverage non-blocking I/O operations to scale better. Servlet 3.1 also supports the HTTP 1.1 protocol upgrade mechanism.

HPE NSJSP 8.5 also offers enhancements brought in by JSP 2.3 and EL 2.2 compliant functions.

Other features continuing from earlier HPE NSJSP Software versions

Persistent sessions—Enscribe sessions store
Web applications can store their session data in HPE NonStop Enscribe. Session information can be optionally flushed at run time to the Enscribe nonvolatile store. Hence, any process within the HPE NSJSP Serverclass can resume a session following a process or CPU failure or other system failure. Thus, this feature improves fault tolerance. Configuration of the Enscribe-based store is described in the HPE NonStop Servlets for JavaServer Pages (NSJSP) 8.5 Administrator's Guide, which can be found in the HPE NonStop Support Center.

HPE NSJSP Manager changes
External clients can now access HPE NSJSP Manager directly without going via iTP Secure WebServer. An independent port other than that used by the iTP Secure WebServer can be configured for the web clients to access the HPE NSJSP Manager directly.

HPE NSJSP 8.5, similar to the HPE NSJSP 7.1, runs on HPE NonStop X and HPE NonStop i environment. HPE NSJSP offers two installation types, namely (a) a 32-bit HPE NSJSP installation and (b) a 64-bit HPE NSJSP installation.

Before HPE NSJSP 7.1, the maximum heap size was limited to approximately 1 GB. When deployed in 64-bit configuration, web applications can have a larger heap of memory allocated—even hundreds of GB is possible. This 64-bit addressing ability provided in HPE NSJSP is applicable for the native heap and flat segments only. The rest of the virtual address space containing code and static data will remain in the 32-bit space.

- Jakarta Servlet 3.0 features
  - Asynchronous processing of requests: This is one of the most important features of Jakarta Servlet 3.0. In Servlet 3.0, a servlet no longer has to wait for a response from a resource such as a database or a web service before its thread can continue processing other requests.
  - Web fragments: This feature allows the deployment configuration and description of a container application to be distributed over more than one configuration files. It is thus possible to add new resources to web applications without disturbing the main deployment descriptor web.xml file.
  - Jakarta Servlet 3.0 allows resources such as servlets to be configured using annotations instead of those explicitly defined in the deployment descriptor.
- **Unified interface:** HPE NSJSP Software, from version 7.1, provides one unified interface for handling administrative functions. Operations previously provided by HPE NSJSP Admin application have been integrated into the HPE NSJSP Manager application. From the HPE NSJSP Manager, one can invoke various operations allowed on the container elements such as server, service, engine, host, and connector. The single HPE NSJSP Manager can access and manage container instances that are installed within one HPE NSHTTP Server environment.

The HPE NSJSP 8.5 Manager connects to the Jakarta EE Servlet container using HTTPS by default.

- **Role-based security:** HPE NSJSP Software now provides a flexible mechanism to create administrators and control what each of them is able to do. The unified HPE NSJSP Manager improves security by associating each administrator with a predefined role and hence a set of permitted operations. The security restrictions and permissions are implemented for both user-interface-level (UI-level) and URL-level accesses.
- **Enhanced installation script:** HPE NSJSP Software installation script now allows the container's configurable parameters to be reset back to their default factory settings. It also repairs situations where one or more required configuration or binary files have been accidentally deleted. The installation script also allows multiple HPE NSJSP Software installations to be completed at once without exiting the installation process.
- **Simplified management:** Management features of HPE NSJSP container include bringing the log information previously recorded by HPE NSJSP Admin application and Tomcat Manager application into the HPE NSJSP Manager application's log file. Users of HPE NSJSP Software no longer need to study multiple log files to find the information of interest.

The servlet container
For building and running web-based applications, the Jakarta EE platform provides a servlet container, a Java run-time environment with the following content:

- Java Servlets and JSP objects, class libraries, and resources such as HTML or XML documents and images
- The Java Servlet 3.1 API and run-time management, which includes initialization, invocation, and management of the servlet and JSP lifecycles
- Deployment descriptors (web.xml file) that contain resource definitions such as Multipurpose Internet Mail Extensions (MIME) types, mapping of requests to servlets, access control, and servlet initialization parameters

The servlet container is responsible for providing communication between the iTP Secure WebServer and the servlet using the HPE NSJI library. The container provides the following services:

- Instantiates the servlet
- Invokes the init method to initialize a servlet
- Invokes the service method to respond to requests from the user
- Invokes the destroy method to destroy the servlet
- Manages a similar lifecycle for JSP files
- Deploys and creates web archive (WAR) files

JSP technology
JSP, a presentation layer technology that sits on top of the Jakarta Servlet model, allows web developers and designers to rapidly develop and easily maintain information-rich, dynamic webpages that leverage existing business applications.

The technology's approach to development is component based rather than page based. With page-based design, the webpage combines the presentation material usually created by designers with the business logic usually created by programmers. By separating the UI from content generation, JSP technology allows page designers to change the page layout without altering the underlying programmable dynamic content. Also, the programmable content or business logic can be written in the form of reusable components such as JavaBeans. JSP technology uses XML-like tags and scriptlets written in the Java programming language to encapsulate the logic that generates the content for the page. This separation of the page logic from its display and the support for a reusable component-based design make JSP faster and easier than servlets for building web-based applications.

Java Servlet technology
Java Servlet technology provides web developers with a simple, consistent mechanism for extending the functionality of a web server and for accessing existing business applications. A servlet can be thought of as an applet that runs on the server side. The servlet technology provides a component-based, platform-independent method for building web-based applications, without the performance limitations of conventional UNIX® Common Gateway Interface (CGI) programs. Servlets have access to the entire family of Java APIs, including the Java Database Connectivity (JDBC) API, to access enterprise databases. Servlets can also access a library of HTTP-specific calls and receive the benefits of the mature Java language, including portability, performance, reusability, and recovery.

Jakarta EE compliance
This implementation of the Tomcat servlet container adheres to the Java Servlet 3.1 APIs, JSP 2.3, and EL 3.0 standards.

New key features in HPE NSJSP 10.1

Important Jakarta EE Servlet 6.0 features (including Jakarta EE Servlet 4.0 and 5.0 features)

Server push

Jakarta Servlet 4.0 brought HTTP/2 readiness to web applications. HTTP/2 capable web applications can push multiple likely-to-be-used resources before the web clients (such as web browsers) explicitly request them. This saves time as the browsers need not send additional requests and wait for responses. Jakarta Servlet 4.0 exposes server push through the PushBuilder interface.

Jakarta Servlet 5.0: Namespace change

There is a significant change between Java Servlet 4.0 and 5.0 (and hence 6.0), which is the change of namespace of Java packages from "javax" to "jakartax". This necessitates code changes in applications and their recompilation. Apache Tomcat has provided a command for assisting this migration. **HPE NSJSP includes this command in an easy-to-run script. See the HPE NSJSP User Guide to know how this script is to be used**.

Jakarta Servlet 6.0

Jakarta Servlet 6.0 allows developers to add new attributes to cookies without creating any API dependency. Version 6.0 has also greatly improved server implementations to be faster and more scalable. In addition, the URL security protections, such as handling semicolons, spaces, and escape characters, are now defined as part of the servlet API specifications themselves and are available readily.

Jakarta WebSocket 2.1 API

Jakarta WebSocket defines an API for Server and Client Endpoints for the WebSocket Protocol (RFC 6455). Traditional HTTP messages are always client initiated. WebSocket protocol enables a server also to unilaterally send messages to a client. This ability has widespread use cases in the online world.

HPE NSJSP 10.1 works only with HPE NSJ 11 and HPE NSHTTP Server 2.4

The HPE NSJSP software from the version 10.1 onward will work **only** with HPE NSJ 11 and later HPE NSJ versions. It also requires HPE NSHTTP Server 2.4 and its later versions as its front-end connector to the network. HPE NSJSP 10.1 and later versions will not work with HPE NSJ 8 and iTP WebServer.

Java Authentication 3.0 (formerly JASPIC)

JASPIC 3.0 is supported in HPE NSJSP 10.1. See Jakarta Authentication Service Provider Interface for Container for a brief introduction to JASPIC.

New CLI to manage NSJSP deployments

A new CLI based management tool has been added in NSJSP 10.1 This provides functions such as Create a new deployment, Start, Stop, Restart, Update, Status check, Restore and Manage the SSL certificate for NSJSP Manager. This CLI utility uses configuration files written YAML (YAML Ain't a Markup Language). For the sake of users who are not familiar with YAML, the NSJSP 10.1 also includes the usual setup script using which you can install & deploy the NSJSP 10.1 as you did with NSJSP 8.5 and earlier versions.

Please see the HPE NonStop Servlets for JavaServer Pages (NSJSP) 10.1 System Administrator's Guide for detailed information on how to use the new CLI feature.

New key features in NSJSP 10.1 Update 1 (NSJSP 10.1 U1)

Safeguard based login into NSJSP Manager

Previously the NSJSP Manager was able to authenticate the user via a simple HTML form. The credentials were stored in the NSJSP Manager itself.

This release supports authenticating an NSJSP user via the HPE NonStop Safeguard subsystem. Credentials (user name and password) are collected from the user and supplied to HPE NonStop Safeguard. Depending on the response from Safeguard, the user is either allowed to continue or the login attempt is rejected. NSJSP 10.1 Update 1 has been integrated with Safeguard such that the user's credentials are stored securely in Safeguard and are used when a login attempt is made.

Multi-Factor Authentication (MFA) login into NSJSP Manager

In this method, users are required to provide more than one credential to verify their identity. NSJSP 10.1 Update 1 uses Safeguard for this purpose also. Depending on the response from Safeguard for the submission of the first credential, NSJSP 10.1 Update 1 prompts for additional credentials. It then depends on the final response from Safeguard to decide if the login is successful. Note that an MFA capable authentication server such as the HPE NonStop XYGATE User Authentication (XUA) is required to be attached to Safeguard to implement this feature.

HPE NonStop Transport Provider is now configurable

It is possible to configure the name of the transport_provider from the NSJSP 10.1 Update 1 release. Note that the value for this parameter (transport_provider) must be same as that set in NSHTTP Server that front-ends the NSJSP.

Technical specifications

System requirements

Hardware	HPE NonStop X, HPE Virtualized NonStop, and HPE Virtualized Converged NonStop
Network configuration support	Ethernet adapters for HPE NonStop X, HPE Virtualized NonStop, and HPE Virtualized Converged NonStop
Software	• HPE NonStop RVU L21.11 or later • Ported binaries on HPE NonStop servers, OpenJDK 11 (NSJ 11), Ported binaries on HPE NonStop servers, OpenJDK 17 (NSJ 17) or their update releases that are supplied as part of the SUTs • HPE NonStop TS/MP 2.5 or Pathway with HPE NonStop TS/MP 2.5 or later (for online upgrade support) • HPE NonStop SQL/MX 3.2.1 or later (optional) • JDBC type 2 driver for HPE NonStop SQL/MX (optional) • HPE NSJI (T2966 L80 ^ABS) • HPE NonStop PathSockets (T1009) • Python Modules / Toolkit T1156) • JDBC Type 2 Driver for SQL/MX (T1275) • HPE NSHTTP Server 2.4 (T1144 L24) • HPE NonStop Middleware Tools (T1150 L01 ^AAI) • HPE NonStop OS Release Version Update (RVU) J06.20 or later for HPE NSJSP 8.5 on HPE NonStop i servers running J-series software **Note 1:** See the latest edition of the Software Products Maintenance List (SPML) to know the support status for different RVU versions. **Note 2:** Please refer to the Softdoc of a particular NSJSP SPR to get the exact versions and SPRs of the prerequisites listed above.

Ordering information

Part number	Product name
HPE NonStop X, HPE Virtualized NonStop servers, and HPE Virtualized Converged NonStop	
BE314AC for HPE NonStop X BE314ACE for HPE Virtualized NonStop **BE314AY for HPE NonStop X Dynamic Capacity (NSDC) license** **BE314AY for HPE Virtualized NonStop NSDC license**	• HPE NonStop Servlets for JSP 10.1 Update 1, 2–16 processors • Ordering example: For a 4-processor system, order four of BE314AC • Customers who are already holding licenses for an earlier version of HPE NSJSP can place an order for NSJSP 10.1 in the HPE NonStop Scout via HPE NonStop eServices Portal and specify the Media Format to be DVD or e-delivery • Customers can then install NSJSP 10.1 Update 1 SPR which is available in Scout • Customers can also directly upgrade from NSJSP 8.5 to NSJSP 10.1 Update 1
HPE Integrity NonStop i servers	
QSJ88V6	• HPE NonStop Servlets for JSP 8.5, 2–16 processors. **Note:** HPE NSJSP 8.5 is the last release of HPE NSJSP for HPE NonStop i servers running the J-series software. • Ordering example: For a 4-processor system, order four of QSJ88V6 • Customers who are already holding licenses for an earlier version of HPE NSJSP can place an order for HPE NSJSP 8.5 in the HPE NonStop Scout via HPE NonStop eServices Portal and specify the media format to be DVD or e-delivery

Note: As an independent product, HPE NSJSP is shipped on a DVD when purchased for the first time.

Configurable logging mechanism

- Logging uses open standards such as Apache commons logging and java.util.logging, which results in a highly configurable logging mechanism.
- Logging can be configured per web application.
- Logging has the ability to log messages to EMS, which results in better log management and allows the event management subsystem to be used to scan huge log files spanning multiple days.

Enhanced security options

The security manager function enables a Java application to run an applet **9** to prevent untrusted code from accessing files on the local file system, connecting to a host other than the one the application was loaded from.

Single sign-on
The single sign-on feature allows users to authenticate themselves once across the entire set of web applications associated with a virtual host.

Security realms
A **Realm** Element represents a database of user names, passwords, and roles that are allowed to access the container's applications. The following types of storage may be used to contain the realm database:

- MemoryRealm, an in-process, RAM-based information store
- JDBCRealm, a JDBC-accessed database information store
- JNDIRealm, a Java Naming and Directory Interface (JNDI)—accessed information store

HPE NSJSP Software, by virtue of running within the iTP Secure WebServer environment, supports the following SSL 3.0 security attributes:

- Cipher suite
- Key size
- X.509 certificate

There are four authentication strings supported: basic, digest, client certification, and form.

Virtual host support

Multiple virtual hosts, representing destination server addresses (IP addresses), can be utilized within one web container. Each virtual host can have its own set of web applications.

Additional features

JNDI resources
HPE NSJSP supports a JNDI. Included are the following standard resource factories that can provide services to web applications:

- Generic JavaBeans resources
- JavaMail session
- JDBC data sources
- User transactions

Supported standards

HPE NSJSP Software supports the following standards:

- Jakarta Servlet 6.0, JSP 3.1, EL 5.0, WebSocket 2.1, and JASPIC 3.0
- Compatibility and interoperability with Jakarta EE
- Apache Tomcat 10.1.7 Java Servlet and JSP open-source reference implementation, which is available on the web at tomcat.apache.org.

Related HPE offerings

Customer technical training
Gain the skills you need with training from Hewlett Packard Enterprise. Accelerate your technology transition, improve operational performance, and get the best return on your HPE investment. Training is available when and where you need it, through flexible delivery options and a global training capability. hpe.com/ww/learnnonstop.

HPE Services

HPE Services leverages our strength in infrastructure, partner ecosystems, and the end-to-end lifecycle experience, to accelerate powerful, scalable IT solutions to provide you the assistance for faster time to value. HPE Services provides a comprehensive portfolio including advisory and transformational, professional, and operational services to help accelerate your digital transformation.

Operational services
HPE Complete Care Service: It provides a comprehensive support solution tailored to meet your specific data center support requirements. It offers a wide choice of proactive and reactive service levels to cover requirements ranging from basic to business-critical environments. HPE Complete Care Service is designed to scale to any size and type of data center environment while providing a single point of contact for your support needs for HPE as well as selected multivendor products.

HPE Critical Service: High performance reactive and proactive support designed to help minimize downtime. It offers an assigned support team, which includes an account support manager (ASM). This service offers access to the HPE Global NonStop Solution Center, 24x7 hardware and software support, 6-hour call-to-repair commitment, enhanced parts inventory, and accelerated escalation management.

HPE Proactive 24: It provides proactive and reactive support delivered under the direction of an ASM. It offers 24x7 hardware support with 4-hour on-site response, 24x7 software support with 2-hour response, and flexible call submittal.

HPE Foundation Care: Support for HPE servers, storage, networking, hardware, and software to meet your availability requirements with a variety of coverage levels and response times.

Advisory and transformation services: HPE Services designs the transformation and builds a road map tuned to your unique challenges including hybrid cloud, workload and application migration, Big Data, and the edge. HPE leverages proven architectures and blueprints, integrates the hybrid cloud and partner products and solutions, and engages Professional and Operational Services teams of HPE Services as needed.

Professional services: HPE Services creates and integrates configurations that get the most out of software and hardware and works with your preferred technologies to deliver an efficient solution.

Java COMPATIBLE

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