

**Hewlett Packard**  
Enterprise

# **NonStop Technical Boot Camp 2023**

## **TBC23-TB52 Driving innovation with NonStop Middleware: What's new in 2023**

John Zimsky  
September 12, 2023

# Forward-looking statements

This is a rolling (up to three year) Roadmap and is subject to change without notice

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This document contains forward looking statements regarding future operations, product development, product capabilities and availability dates. This information is subject to substantial uncertainties and is subject to change at any time without prior notification. Statements contained in this document concerning these matters only reflect Hewlett Packard Enterprise's predictions and / or expectations as of the date of this document and actual results and future plans of Hewlett Packard Enterprise may differ significantly as a result of, among other things, changes in product strategy resulting from technological, internal corporate, market and other changes. This is not a commitment to deliver any material, code or functionality and should not be relied upon in making purchasing decisions.



# Agenda

**NonStop Middleware vision & mission**

**A cross-sectional view**

**API Gateway 1.3 and API Gateway 1.4**

**NSHTTP Server 2.4 Update 3**

**NSIMC 7.0**

**NSJ 11 Update 3**

**NSJSP 10.1**

**TS/MP 2.8 Update 5**

**Python 3**

**NSMF 2.0**

**Futures – Middleware**

APPLICATIONS

**Middleware and Java based**

Modern Applications  
Development Environment

Database

Enterprise Data Protection

System Management & Control

NonStop Security

NonStop OS

Languages



# NonStop Partnership– It’s a Beautiful Thing!



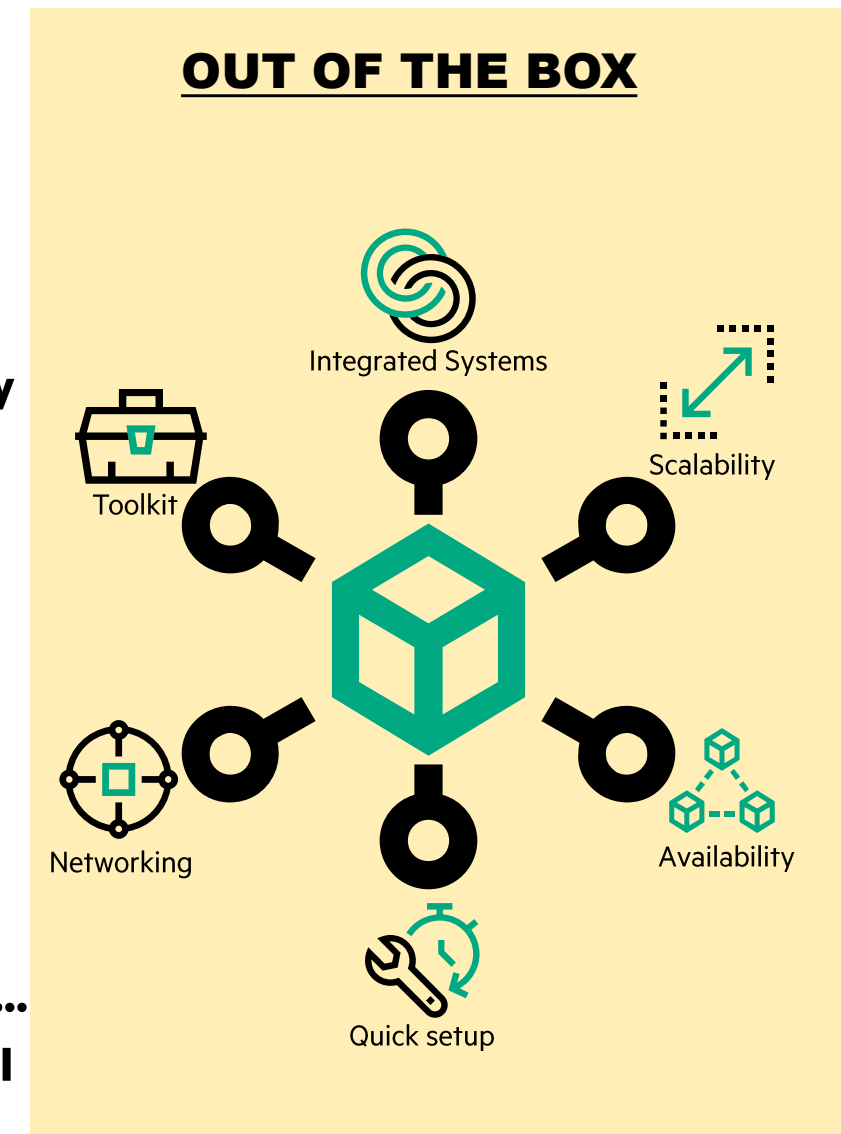
# NonStop Middleware vision & mission

## VISION

- **Make** App development – Easy, Straightforward, Quick and Modern
- Even **those not familiar** with NonStop **shall create** Apps fast
- **No compromise** on the unique NonStop **ruggedness, scalability & data integrity**
- Offer NonStop Fundamentals “**out of the box**” to applications
- **Maintain** NonStop as a **preferred platform** for mission critical solutions

## MISSION

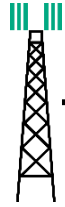
- **Hide** platform and OS specificities; offer **easy, standard APIs**
- Make **no assumption** about the App developer’s NonStop knowledge
- Create tools – even a **fresh college grad** can develop on & for NonStop
- Offer popular **open source** products in ready-to-use state
- Provide the latest **programming paradigms, frameworks, interfaces, protocols...**
- Provide as much **help** as possible to developers & end users to **derive substantial benefits** out of the NonStop fundamentals



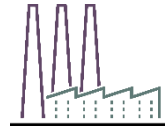
# A cross-sectional view of NonStop Middleware



Financial Services



Telco



Manufacturing



Utilities



Healthcare



Retail



Transportation

**Middleware Tools & JToolkit**

**NSASJ**

**NSJSP**

Apache Tomcat

**NSMQ**

**Java-based Open Sources**

**API Gateway & LightWave**

**NSIMC & NSFTI**

Interfaces and tools

**NSDEE**

**Language Compilers**

**NSDevEnv in Cloud**

**NSGit**

Standards

**NSJ [Ported & Certified Java Platform - JDK and JVM] + NSJI**

**NSHTTP Server**

**Continuous Availability Near Linear Scalability Transactional Integrity (Data Consistency)**

NonStop Fundamentals

**NonStop TS/MP**

**NonStop TMF**

**NonStop OS**

**SQL/MX**

CORBA is a trademark of Object Management Group

Java is a registered trademark of Oracle and/or its affiliates.

OpenJDK (the "Name") is a trademark of Oracle America, Inc. ("Oracle") (the "Trademark Owner")



## HPE NonStop API Gateway 1.3 and 1.4

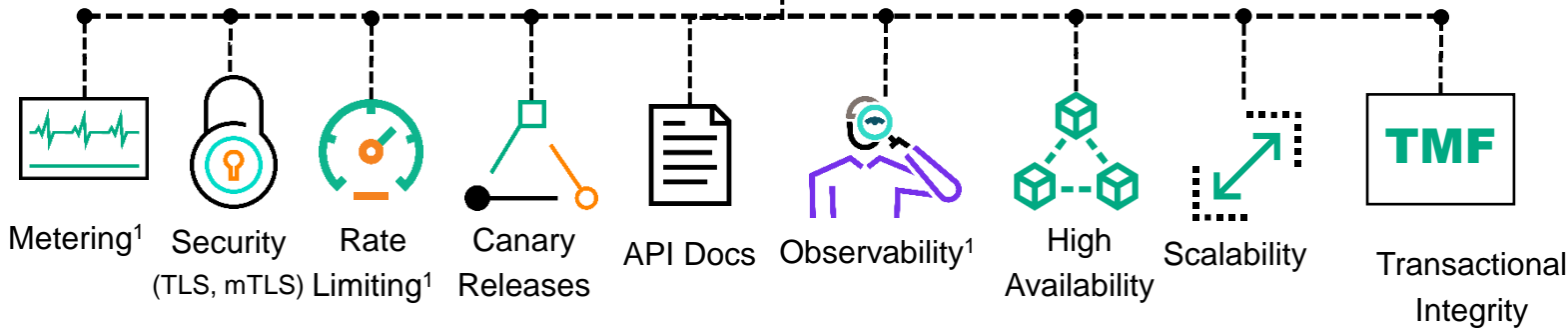
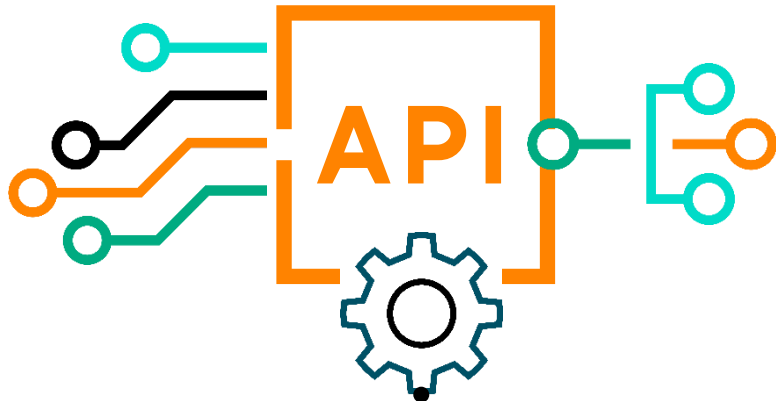
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### Connectivity, Customizability, Security, Versatility

- New product 1.0 via L21.06 in 2021
- Update 1.1 via L21.11 in FEB '22
- Update 1.2 via L22.09 in SEP '22
- Update 1.3 via L23.08
- Update 1.4 as an SPR in SEP '23



# NonStop API Gateway



Common Features

Uncommon Advantages

- Common Features
  - **Standard REST and JSON to outside**
  - **DDL & Java Objects inside NonStop**
  - **Pathsend towards Apps with DDL data**
  - **Pathsend towards Apps with HTTP body**
  - **Standard HTTP inside NonStop too!**
  - **Data validation, translation – multiple options**
  - **Dynamic routing – multiple channels**
  - **Route to services outside NonStop too!**
  - **Monitoring, Security, Canary releases, etc.**
  - **Ability to plug custom user routines**
- Uncommon advantages
  - **NonStop characteristic features**
    - **Availability**
    - **Scalability**
    - **Transaction integrity**
  - **Integrated with NonStop Measure for detailed performance analysis<sup>1</sup>**
  - **mTLS protocol support**
  - **Out of the box MFA support with NSHTTP**

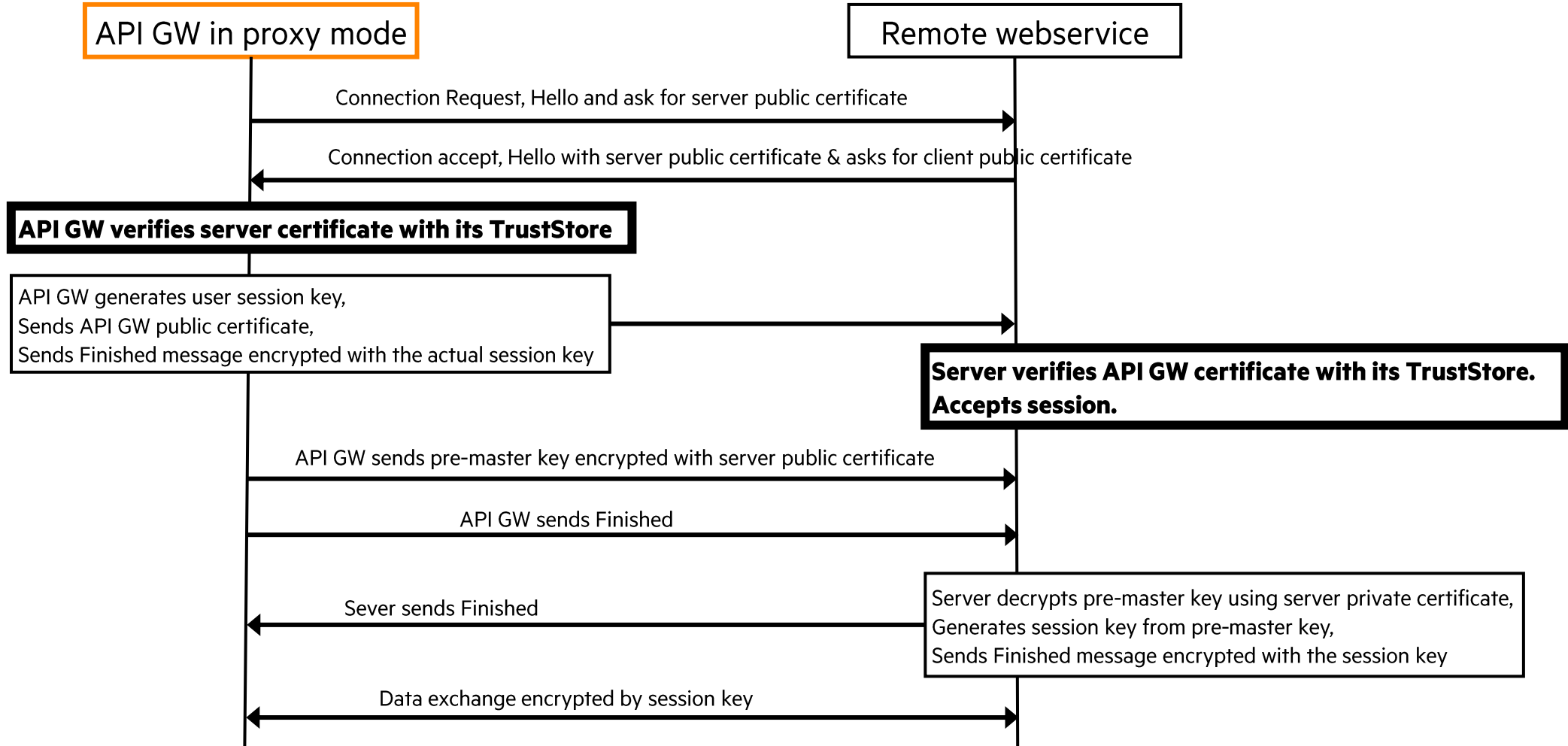
Note 1 = Will be made available in future



Java and Oracle are registered trademarks of Oracle and/or its affiliates.



# mTLS – Mutual TLS support



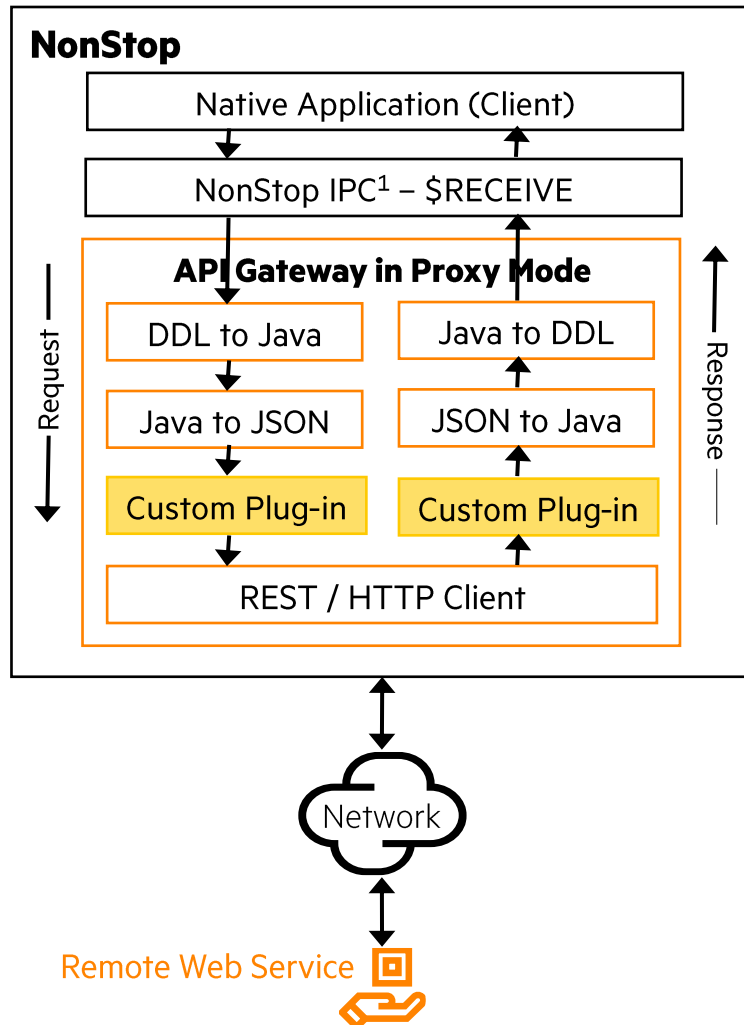
- mTLS is available in both gateway and the proxy modes

Note 1 = Inter-Process Communication

Note 2 = Java is a registered trademark of Oracle and/or its affiliates.



# Custom Plug-in Routines – Proxy Mode



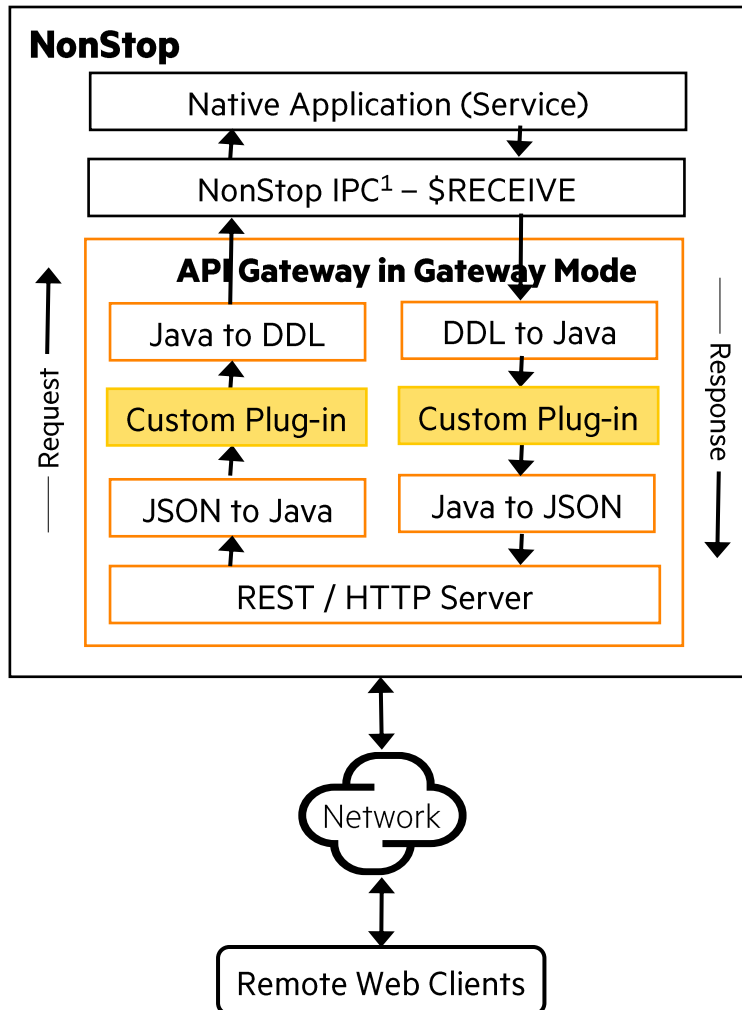
- You can write **your own routines** and plug it in to the proxy mode request-response flow
- What the routine does is as **per the user / use case** designer needs
- Proxy mode plug-ins can be classified in to 3 types (below)
- Plug-ins can be located in **both request & response** directions
- Plug-ins can be **placed anywhere** in the request & response flows
- Sample code snippet for custom plug-ins is available

**Processor plug-in** – Can be used to alter/enhance or just monitor the payload data, peg statistics or any other operation the user wants to do run

**Decorator plug-in** – Works before or around or after the processor plug-in. Can do extra jobs like time taken to peg stats or log an error etc.

**Error handler plug-in** – A special type of processor plug-in which only modifies or adds error codes & descriptions & source of errors to create appropriate DDL structures

# Custom Plug-in Routines – Gateway Mode



- You can write **your own routines** and plug it in to the gateway mode request-response flow
- What the routine does is as **per the user / use case** designer needs
- Proxy mode plug-ins can be classified in to 2 types (below)
- Plug-ins can be located in **both request & response** directions
- Plug-ins can be **placed anywhere** in the request & response flows
- Sample code snippet for custom plug-ins is available

**Processor plug-in** – Can be used to alter/enhance or just monitor the payload data, peg statistics or any other operation the user wants to do run

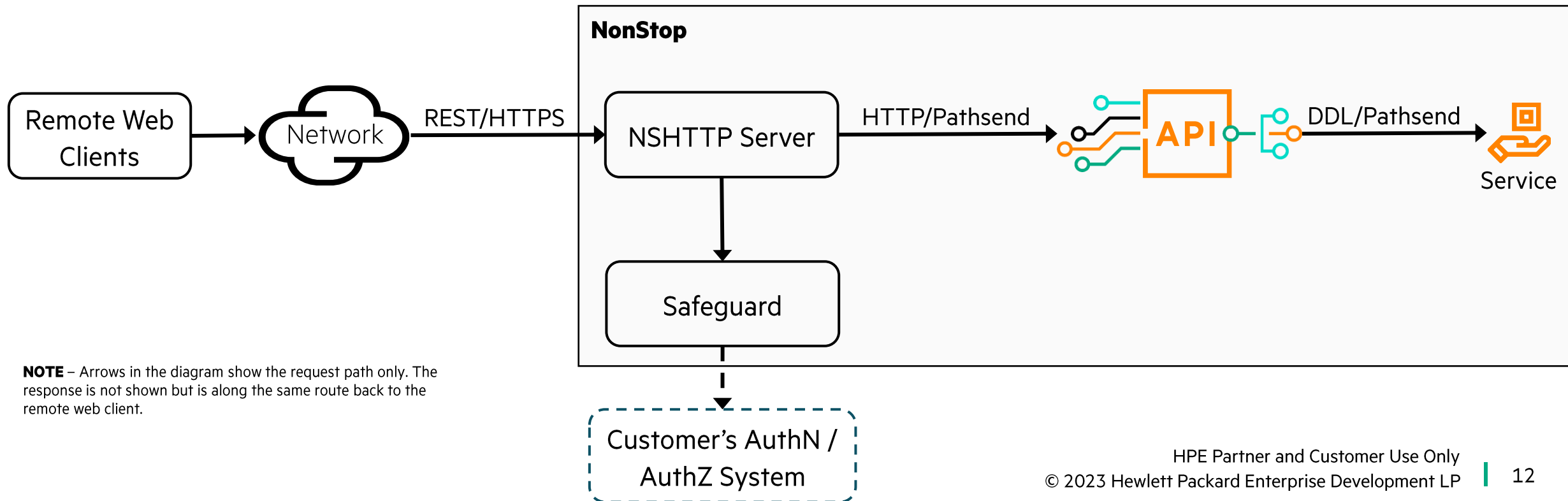
**Decorator plug-in** – Works before or around or after the processor plug-in. Can do extra jobs like time taken to peg stats or log an error etc.

Error handler plug-in is not required in gateway mode

# API Gateway with NSHTTP Server – Gateway mode

## API Gateway works with NSHTTP Server 2.4 Update 3 as the front end connector

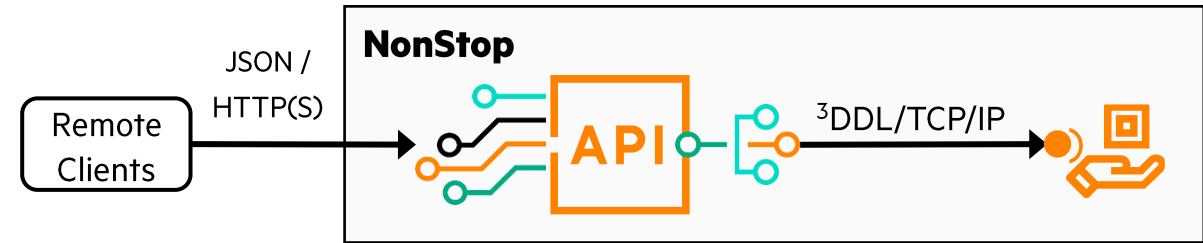
- NSHTTP terminates TLS protocol
- NSHTTP can execute authentication of remote web clients including Multi-Factor Authentication (MFA)
- It can do certificate management
- NSHTTP passes on the full HTTP message to the API Gateway through a Pathsend tunnel



# Routing enhancements – Gateway mode

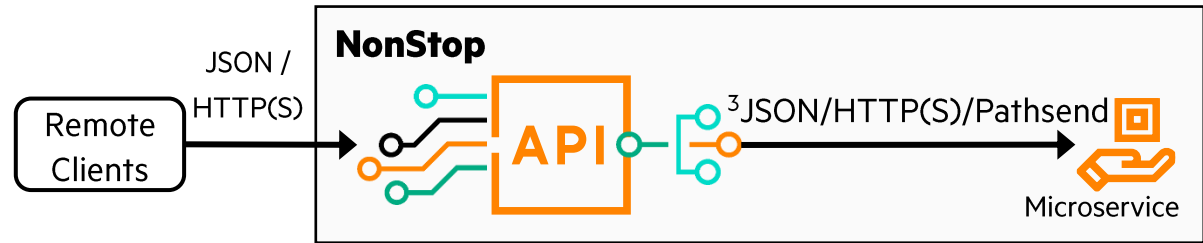
- **TCP/IP sockets**

- Incoming requests from remote clients are processed and routed to backend applications on the NonStop via TCP/IP sockets



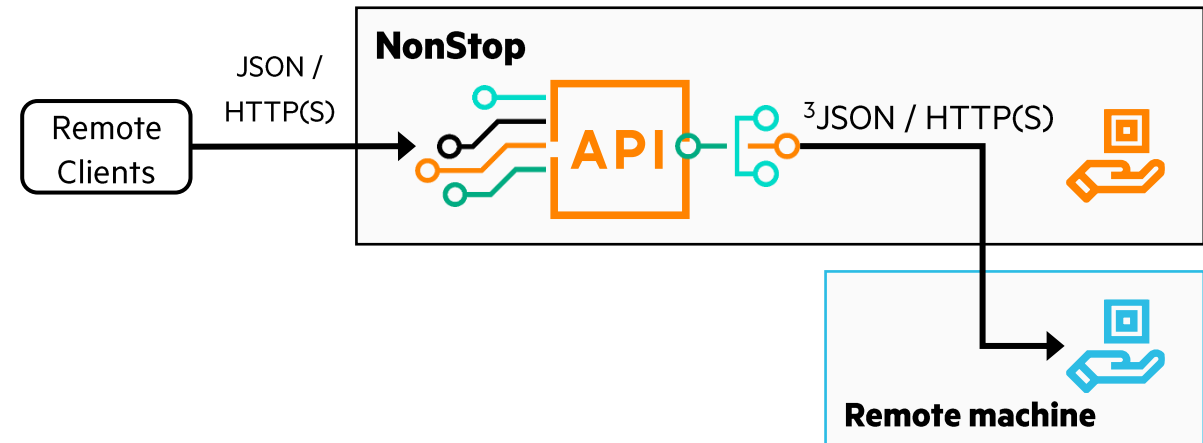
- **HTTP Egress over Pathsend or TCP/IP**

- This is a key feature to deploy microservices on NonStop
- Incoming HTTP(S) requests are processed and then routed to the backend microservices, again over HTTP(S) over Pathsend or TCP/IP sockets



- **Routing to services on other hosts**

- Incoming requests from remote clients are processed and routed to applications running on other machines/servers
- HTTP(S) or TCP/IP can be the transport protocol



Note 3 = Data formats shown in the diagrams are examples. They are configurable as per the need in deployment.

## Other new features

### **Error Handler in Proxy Mode – global definition that can be invoked by any endpoint**

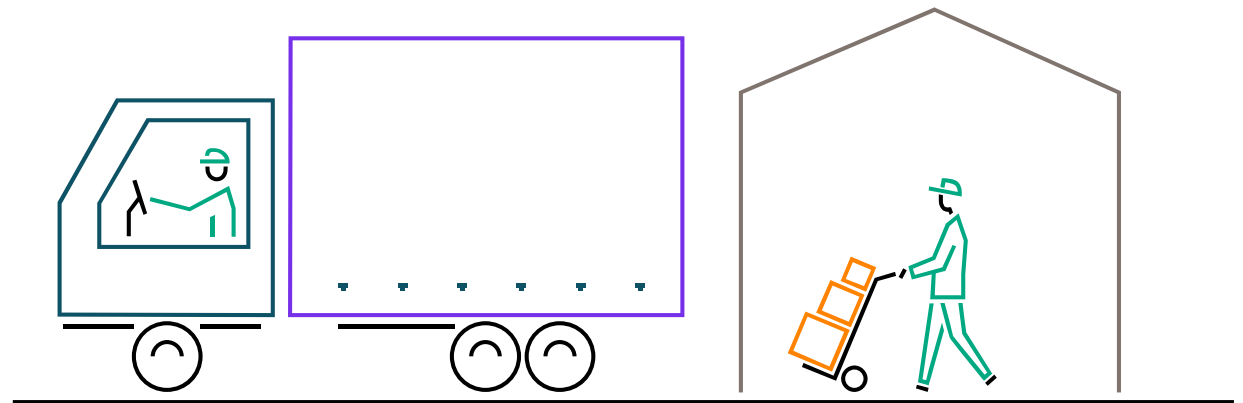
- Release 1.4 includes a default Error Handler that constructs an appropriate error DDL Response which is sent back to the client application in NonStop
  - There may be situations where the API Gateway has to respond negatively & unilaterally to the backend client without contacting the remote web service
- The included error handler can be used by any configured endpoint
- If an endpoint requires its own error handler then it is possible to define a custom plug-in for that endpoint in its definition/configuration

### **Log4j2 framework for logging**

- Logging now uses Log4j2 framework
  - Changed from Java Util Logging (JUL)
- Log4j2 is feature rich and is continuously enhanced
- New Log4j2 appenders have been added in this release to publish Log4j2 messages via NonStop EMS
- You can easily send log messages of appropriate levels to the desired EMS collector
  - EMSTextHandler, EMSTokensHandler and EMSEventIdsTokensHandler

## More Info

- API Gateway 1.3 has been released via L23.08. SPR = T1199 L01 ^AAN.
- API Gateway 1.4 has been released as an SPR T1199 L01 ^AAQ in NonStop Scout in September 2023.
- Product ID = **BE089AC**.
- The software ships in the SUT as **T1199** in the SUT when BE089AC is ordered.
  - After installing the SUT, customers can download the SPR T1199 L01 ^AAQ and install
- [HPE NONSTOP API GATEWAY datasheet](#) (Lists all the features of API Gateway; not only of 1.3 and 1.4)
- [NonStop API Gateway 1.4 User Guide](#)



## HPE NonStop HTTP Server 2.4 Update 3

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### A Web Server that remains modern!

- In short = **NSHTTP 2.4 U3**
- First released via L20.05
- Update 1 via L21.06
- Update 2 via L22.09
- Update 3 via L23.08





# NSHTTP Features Summary – Previous Releases



## NSHTTP is a deep port of Apache HTTP Server

### • NonStop Fundamentals

- Continuously available – a TS/MP Serverclass
- Closed loop feedback system – near-linear horizontal scaling
- Readily works with Pathway CGI applications
- Secure with modern ciphers – TLS 1.3, 1.2, SHA256 & 384
- Integrated with Safeguard
- ITP2NSHTTP migration tool

## About Apache HTTP Server



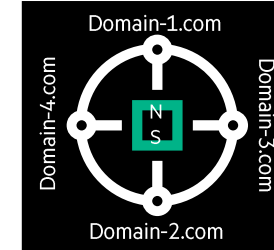
- One of the most popular web servers – 25% of all web sites
- Large & very active community
- Continuously enhanced and updated
- Highly customizable with dynamically loadable, extensible plug-in modules
- Support for many protocols (HTTP2, WebSocket, TLS 1.3, Virtual Hosts, MFA.....more



Pathway CGI



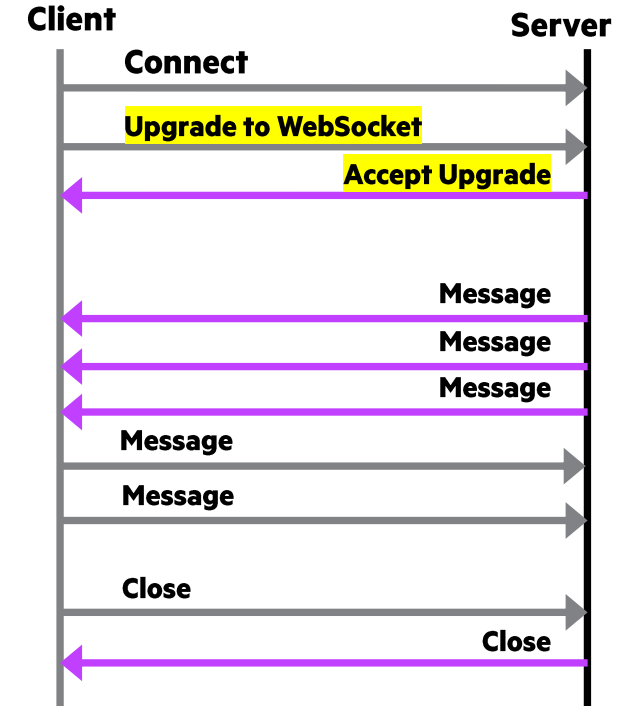
Virtual Hosts



Clickable images



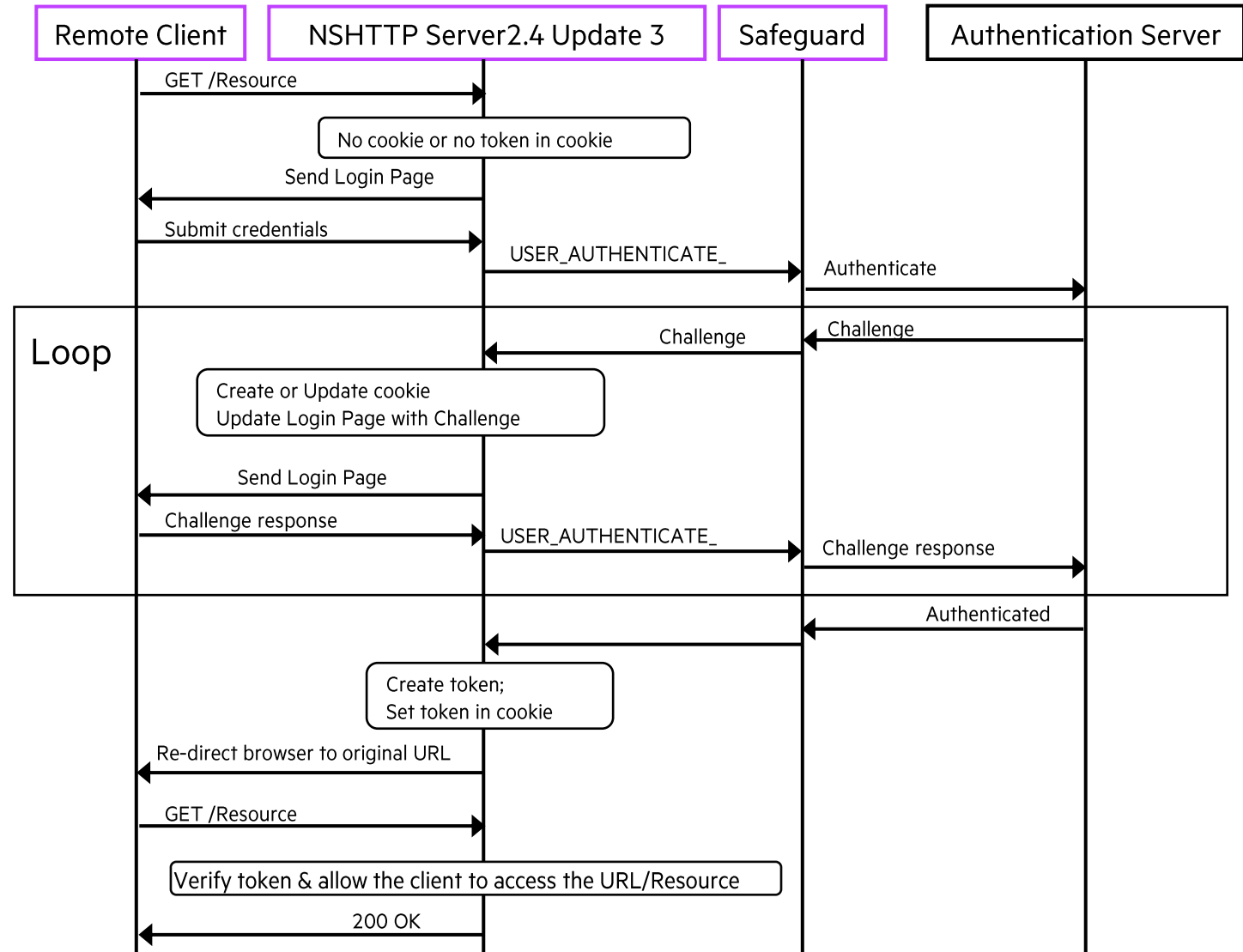
CLIENT-CERT authentication



WebSocket example flow

# Multi-Factor Authentication (MFA)

- Based on Apache HTTP Server 2.4.55
- **Multi-Factor Authentication (MFA)**
  - Mechanism by which Clients are mandated to provide multiple factors for authentication
  - NSHTTP is integrated with Safeguard to realize this functionality
  - NSHTTP is governed, i.e. the “loop” shown in diagram is controlled by the “authentication server” via Safeguard
- **Backend service/applications need not be changed for MFA**
  - They need not be even aware that MFA is happening before client requests are forwarded to them.
  - It is all done just by configuring the NSHTTP Server.

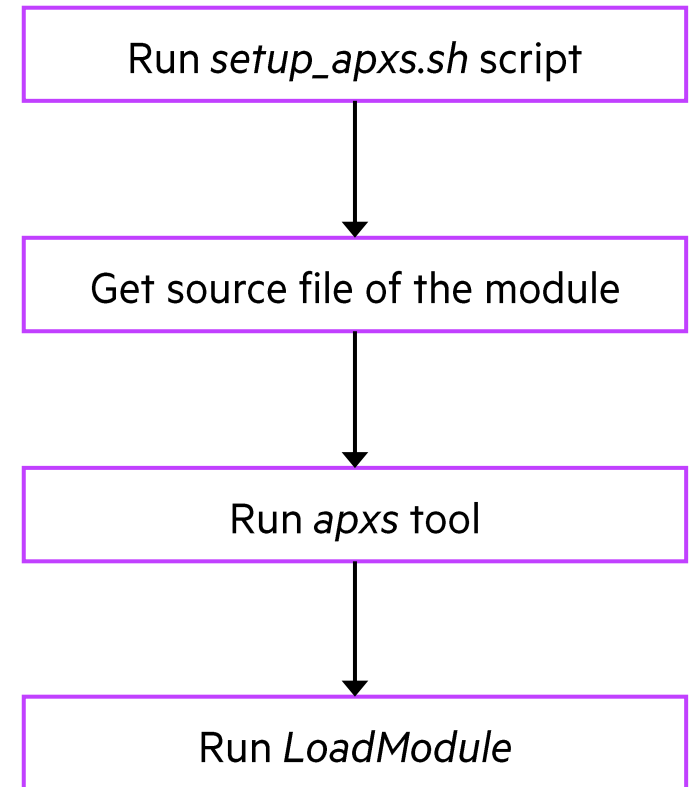


# Pluggable modules (DSO) using APXS

## Add custom functions to NSHTTP Server

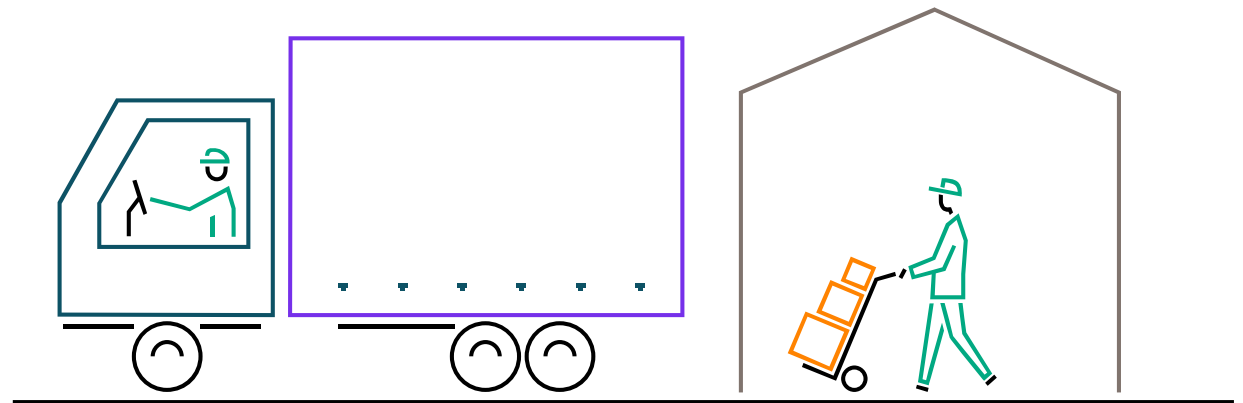
- Dynamic Shared Object (DSO)
  - Pluggable modules can add custom functions to the base NSHTTP Server.
  - **There are quite a few modules available both from Apache community as well as from others.**
    - You can write your own module too.
  - Build your source code into a DSO module.
- APache eXtenSion tool (**apxs**) helps build the module and plug it in.
- This release brings `setup_apxs.sh` that helps set up the environment to run the `apxs` tool.
- Once the environment is set up, `apxs` can be run to create a DSO.
- Once the DSO is ready, `LoadModule` directive can be used to load it into the NSHTTP Server runtime environment.

This feature brings a tremendous advantage! Try it!!



## More Info

- NSHTTP Server 2.4 Update 3 has been released via L23.08. SPR = T1144 L24 ^AAG.
- The software ships in the SUT as **T1144** in all SUTs.
- [NSHTTP Server 2.4 Update 3 data sheet](#) (Lists all the features of NSHTTP Server; not only of Update 3)
- [NSHTTP Server 2.4 Reference Manual](#)



## HPE NonStop In-Memory Cache 7.0

### Cache shared across CPUs with NonStop Fundamentals

- In short = **NSIMC 7.0**
- First release NSIMC 2.8 as SPR and later included in L17.08
- NSIMC 4.0 via L19.03
- NSIMC 7.0 via L23.08



# NSIMC 7.0 New Features

## Deep port of Redis 7.0.8 on NonStop

- **New data structure – Streams**

- Extremely innovative – it is like a linearly growing log but with random access
- Very useful for use cases like:
  - Tracking events, monitoring sensors, store users' notifications/actions individually

- **RESP protocol version 3 (RESP3)**

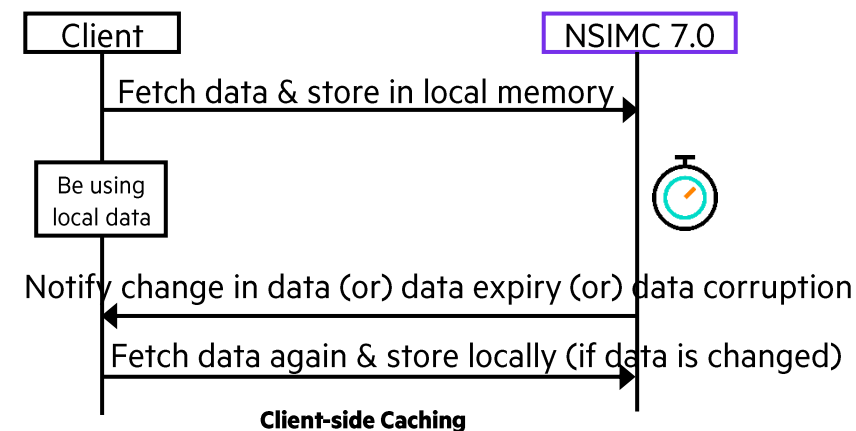
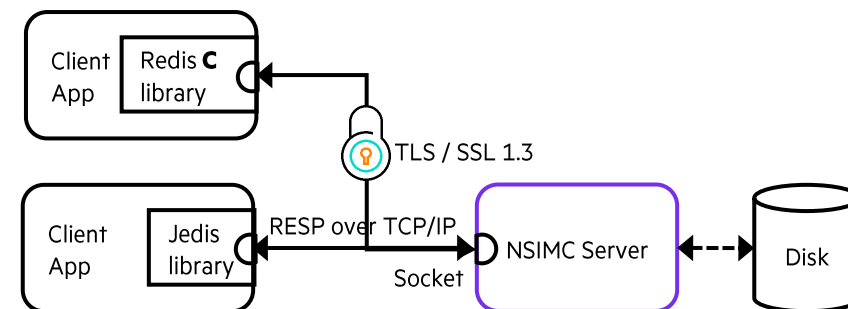
- Improved semantics, new data types, binary safe for error codes

- **Security enhancements**

- TLS/SSL protection for Client App $\leftrightarrow$ IMC Server TCP/IP connection
  - Avoids the need to run the Client inside the same NonStop system as the NSIMC
- Access Control List v2 (ACLv2)
  - Lets you define a set of capabilities for each user

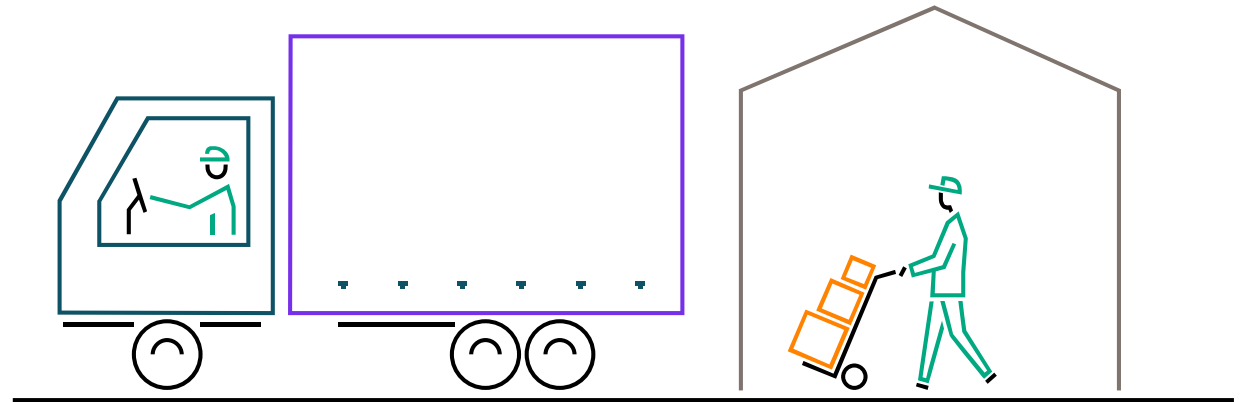
- **Client-side Caching**

- Improves performance
- Reduces the number of times a client App needs to fetch data from the IMC server



## More Info

- NSIMC 7.0 has been released via L23.08. SPR = T1300 L01 ^AAL.
- The software ships in the SUT as **T1300** in all SUTs.
- [NSIMC 7.0 data sheet](#) (Lists all the features of NSIMC; not only of NSIMC 7.0)
- [NonStop In-Memory Cache 7.0 User Guide](#)



## HPE NSJ 11 Update 3

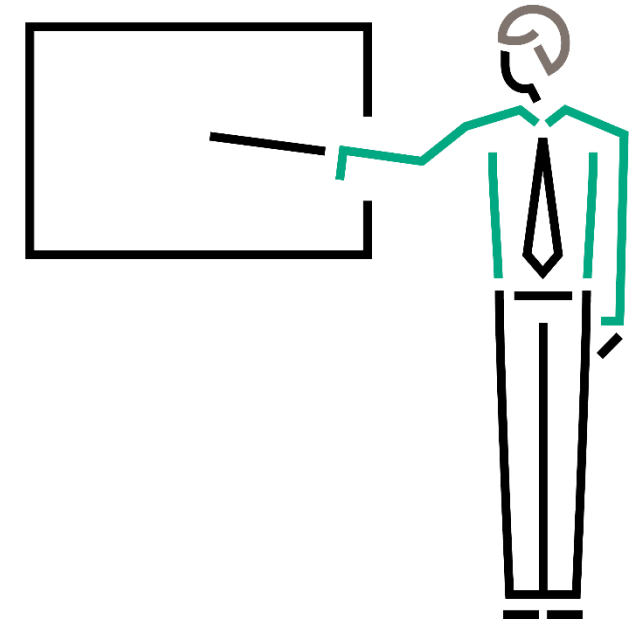
- **Ported Binaries on HPE NonStop Servers, based on OpenJDK 11.0.18**

- In short= **NSJ 11 U3**
- NSJ 11 was first released via L20.05
- NSJ 11 Update 1 via L21.06
- NSJ 11 Update 2 via L22.09
- NSJ 11 Update 3 via L23.08



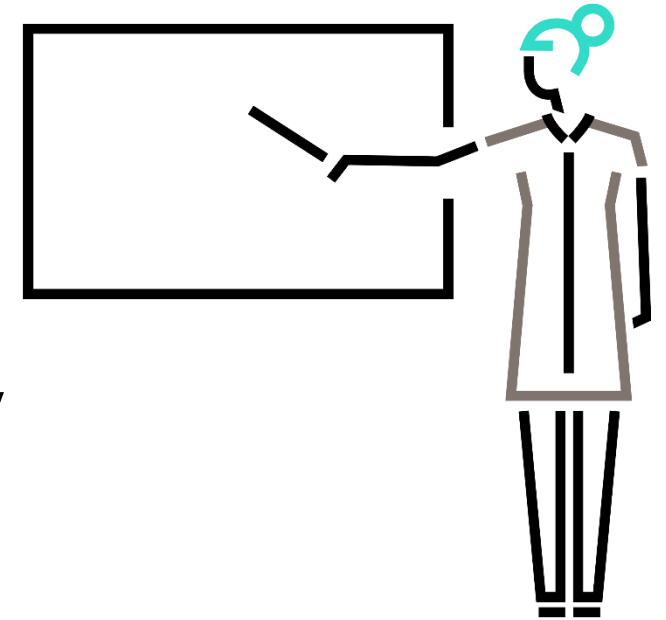


- A critical part of the NonStop modernization & standardization
- Our mission is to offer a variety of open-source s/w with all NonStop fundamentals intact
  - Built-in availability, scalability & data integrity
- Based on **OpenJDK 11.0.18** community version
- 4th release in the NSJ 11 lifecycle
- Fully tested & certified headless implementation of the Java SE specifications



# Salient points of NSJ 11 U3

- **AES- NI instructions are executed in hardware**
  - Cryptographic calculations are performed faster.
  - Needs support from the underlying x86 processor.
- **Carry-Less Multiplication (CLMUL) – OpenJDK functionality**
  - CRC calculations are executed faster using this method.
- **Background compilation is disabled by default – OpenJDK functionality**
  - This is envisaged to improve performance of CPU intensive applications.
  - User can enable if necessary.
- **SHA-1 algorithm is not favored – OpenJDK functionality**
  - JAR files signed with SHA-1 are considered as unsigned.
- **NSJ 11 U3 can coexist with other supported NSJ versions on the same CPU**



## Important!!

### • **Those still using NSJ 8 (Ported Binaries on HPE NonStop Servers, Java SE 8)**

- Start upgrading to NSJ 11 Update 3 or NSJ 11 Update 3 now!!.
- **Support for NSJ 8 stops in July 2025. There will be no more patches.**
  - No defect, including critical security defects, shall be patched
- All releases of NSJ 8 will enter LIMITED<sup>1</sup> support status in July 2025.
  - As announced in SPML February 2022
- NSJ 11 and updates offer only a 64-bit JVM
  - NSJ8 Applications may be using 32-bit JVM!!!
- **Hence, NSJ 8 Users must start now!!!**
- Move directly to NSJ11 U2 (or) NSJ 11 U3 instead of prior NSJ11 versions.

### **Customers using NSJ 11 and NSJ 11 Update 1**

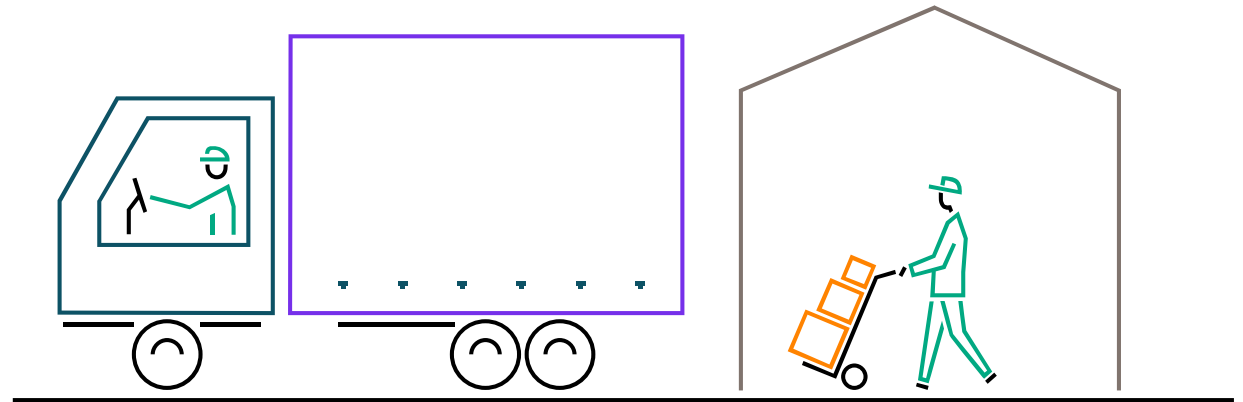
- All users are advised to move to NSJ 11 U2 (or) NSJ 11 U3 at the earliest.
- T3066 L11 ^AAC & prior SPRs are in MATURE state now. Will go to LIMITED in July 2025.
- T3066 L11 ^AAD & later SPRs will go to MATURE in August 2024.
- HPE will not ship any defect fixes, including security fixes, after July 2025.



<sup>1</sup> – Definition of LIMITED is given in Software Products Maintenance List (SPML). It is available at [NonStop e-Service Portal](#).

# More Info

- NSJ 11 Update 3 has been released via L23.08. SPR = T3066 L11 ^AAF.
- The software ships in the SUT as **T3066** in all SUTs.
- [NSJ 11 Update 3 data sheet](#) (Lists all the features of NSJ 11; not only of Update 3)
- [NSJ 11 User Guide](#)
- [NSJ 11 Tools Reference Pages](#)



## HPE NonStop Servlets for JavaServer Pages 10.1

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### JEE Servlet container for hosting Web Apps

- In short = **NSJSP 10.1**
- Has been offered for many years on Nonstop
- Previous release NSJSP 8.5
- NSJSP 10.1 is released in 2023 September



# NSJSP 10.1 new features



NSJSP 10.1

NSJSP is a deep port of Apache Tomcat 10.1.7 on NonStop

## • Salient points of Servlet 4.0, 5.0 and 6.0 specifications

### Servlet 4.0

HTTP/2 Server Push

New **PushBuilder** interface

### Servlet 5.0

Namespace change



- Necessitates code changes in applications & recompilation
- A script is provided along with NSJSP 10.1 that helps easily migrate Apps from NSJSP 8.5 to NSJSP 10.1

### Servlet 6.0

- Add attributes to cookies with no API dependency
- Handling semi-colons, spaces & escape characters standardized as part of Servlet specs
- Faster, more scalable Servlets

## • Jakarta WebSocket 2.1 API

- APIs for Server and Client Endpoints for the WebSocket Protocol (RFC 6455)

## • Jakarta Authentication 3.0

- Formerly called JASPIC - Java Authentication Service Provider Interface for Container



# NSJSP 10.1 new features



NSJSP 10.1

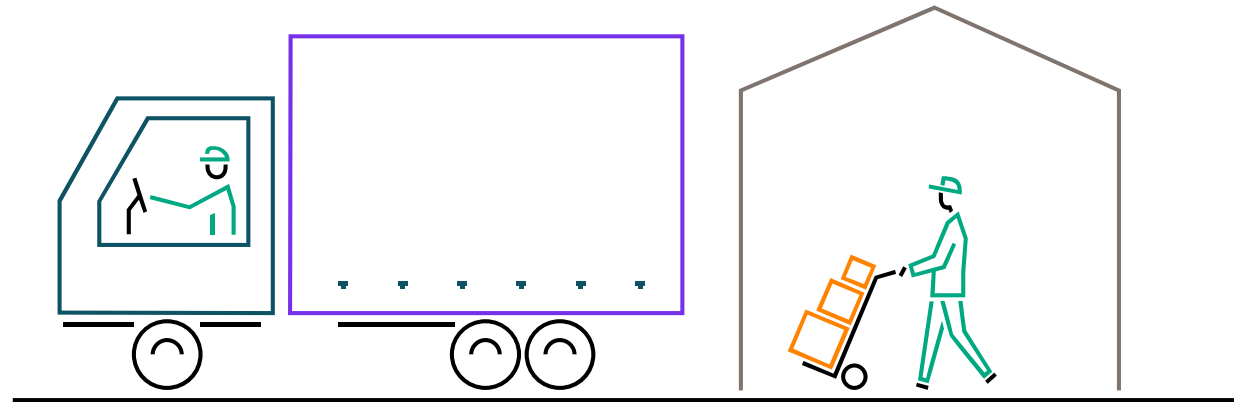
New CLI to manage NSJSP deployments

- **Uses YML files to define the deployment configuration**

- Create – Create a new NSJSP deployment
  - Start – Start the NSJSP
  - Stop – Stops the NSJSP
  - Restart – Stops and starts the NSJSP
  - Update – Updates NSJSP with Changes
  - Status – Provides Status information
  - Restore – This will restore the deployment to the original Deployed State.
  - SSL Certificate Manager for NSJSP Manager – Certificate Management for NSJSP manager SSL configuration
- For those who are not familiar with YAML, the NSJP 10.1 also includes the traditional set-up script which installs NSJSP 10.1
  - **NSJSP 10.1 can only be deployed with NSHTTP Server.** It does not work with iTP (Secure) WebServer.
    - NSHTTP Server start & stop scripts will also start & stop NSJSP 10.1 installations that are under its control.

## More Info

- NSJSP 10.1 has been released as an Independent Product (IP) outside of the NonStop OS SUT in September 2023.
- Product ID = **BE314AC**.
- It is shipped in its own DVD when BE314AC is ordered. You may choose electronic download option too.
- [NSJSP 10.1 data sheet](#) (Lists all the features of NSHTTP Server; not only of NSIMC 7.0)
- [NonStop Servlets for JavaServer Pages \(NSJSP\) 10.1 System Administrator's Guide](#)





## HPE NonStop TS/MP 2.8 Update 5

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### The brain & heart of NonStop fundamentals

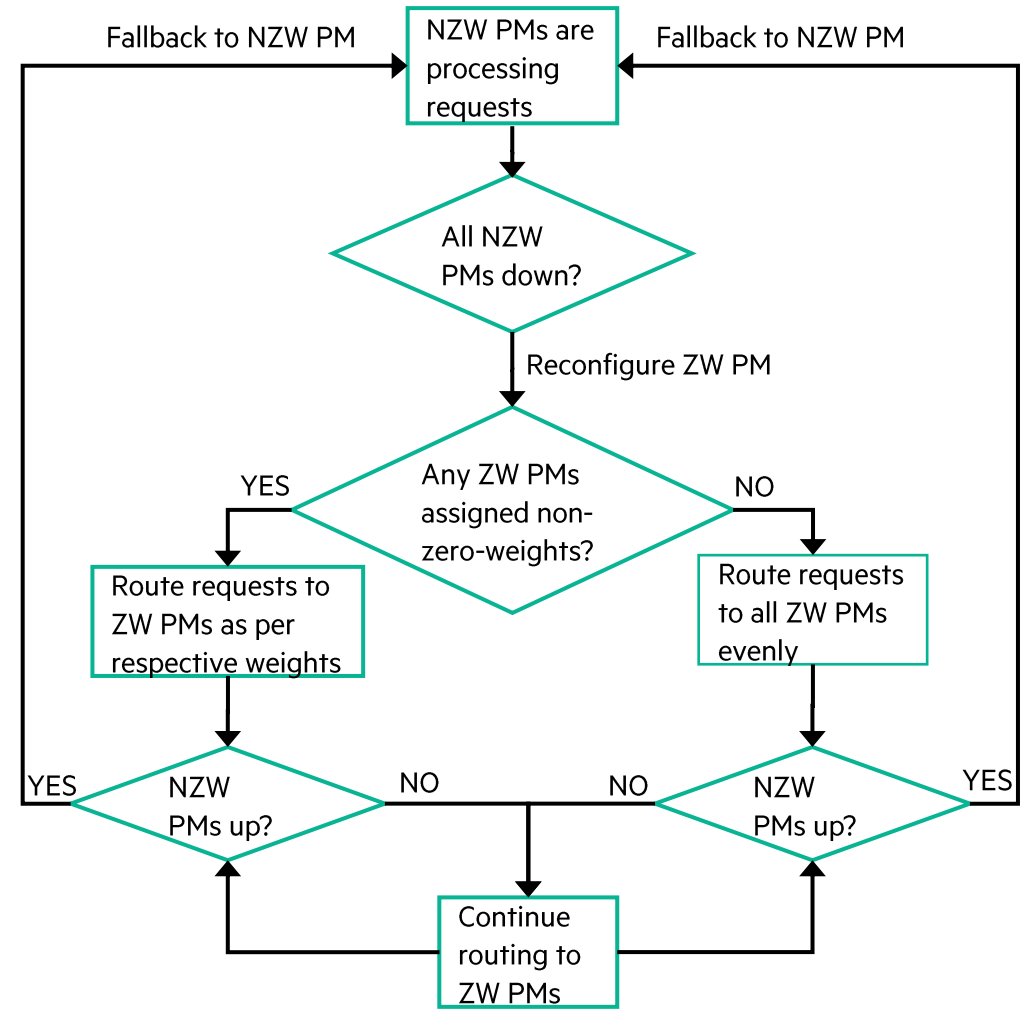
- In short = **TS/MP 2.8 U5**
- TS/MP 2.8 was first released via L18.08
- Update 1 via L19.08
- Update 2 via L20.05
- Update 3 via L21.06
- Update 4 via L22.09
- Update 5 via L23.08



# TS/MP 2.8 Update 5

## Automatic Weights Reconfiguration (AWR) Enhancement

- In a TS/MP domain with multiple Pathmons, there may be a need to assign 0% weight to certain Pathmons. Requests will not be routed to those Pathmons.
  - Maintenance of nodes, Disaster recovery from an outage and others
- And, it may so happen that all the non-zero weighted Pathmons go down
  - This means there is a total outage of the end user business application. But this can't be.
- For those cases Domain Weight Distribution Algorithm (DWDA) can be configured to route requests to zero-weighted Pathmons (Yes!)
- Until this 2.8 Update 5 release, when all the non-zero-weighted Pathmons were down, requests were routed among the zero-weighted Pathmons evenly.
  - If there are 4 zero-weighted Pathmons configured then 25% of requests were routed to each
- **Now, you can assign “weights” to zero-weighted Pathmons!!**
  - No, it is not an oxymoron!! It is true.
  - You decide the fraction of the total load to be handled by any zero-weighted Pathmon.
- Not only maintains application availability but *allows you to balance loads as you wish* even in extreme cases
  - Even in the case of all weighted Pathmons being down! Vintage NonStop!!
- **This feature extends the** already available weight-based link utilization and domain rebalancing functionalities.



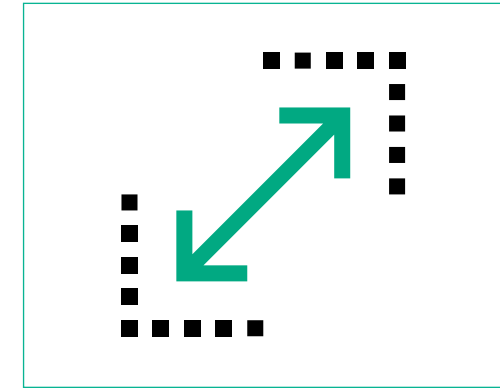
**ZW PMs** = Zero-weighted Pathmons.

**NZW PMs** = Non-zero-weighted Pathmons.

# TS/MP 2.8 Update 5

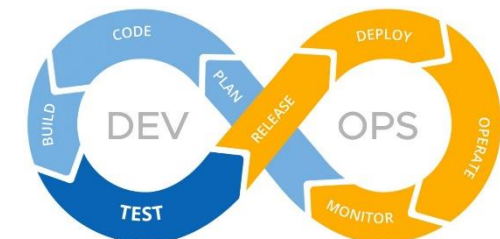
## Capacity increase – Server process limit doubled from 4095 to 8190!

- MAXSERVERPROCESSES, MAXSERVERS and NUMSTATIC
- PATHCTL file is enhanced to accommodate the above
  - It is assigned a new version number
- Two new commands UPGRADE and DOWNGRADE added
  - Use them to migrate from one version to another of the PATHCTL file



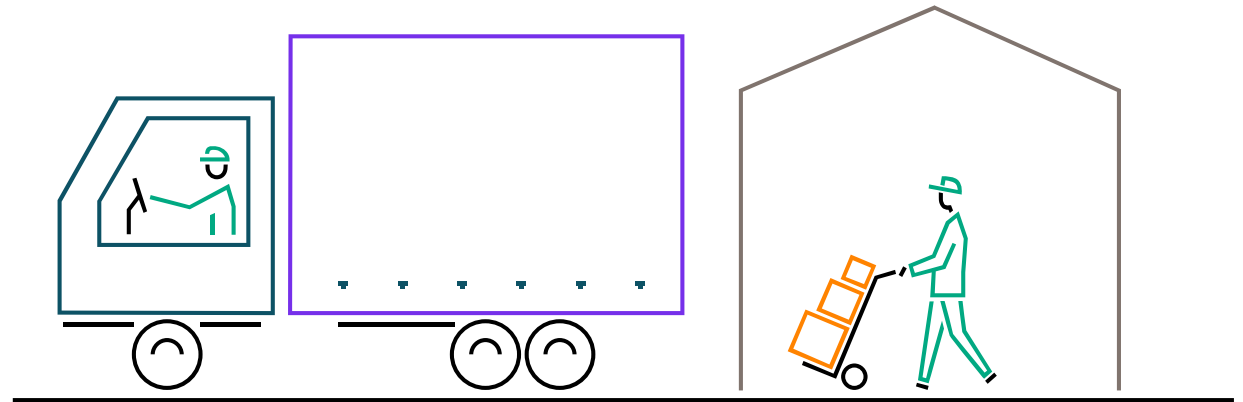
## NSMPT can now manage NSMEF! – Part of NSMF 1.1

- As part of the NSMF 1.1, the NSMPT now includes YAML manifest file, Python modules to install, configure & deploy NSMEF.
- Thus, NSMPT is now able to manage all 3 subsystems – ACS, PDMI and NSMEF
  - According to DevOps principles & best practices
  - Using common DevOps tools such as Ansible



## More Info

- TS/MP 2.8 Update 5 has been released via L23.08. Following are the SPRs with enhancements:
  - T0620 L01 ^ADH, T0845 L01 ^ACA, T0977 L01 ^AAQ
- Product IDs / SKUs
  - **BE052AC** – HPE NonStop TS/MP (ACS) SW
  - **BE059AC** – HPE NonStop Pathway with TS/MP ACS SW
- TS/MP ships in the SUT when its Product ID is ordered.
- [HPE NonStop Pathway with TS/MP software datasheet](#) (Lists all the features of TS/MP; not only of TS/MP 2.8 U5)
- [TS/MP 2.8 ACS User Guide](#)
- [TS/MP 2.8 System Administrator Guide](#)
- [TS/MP 2.8 Utilities Guide](#)



## Python 3

### Extremely popular & topical language

- HPE has released Python 3.11.3 on NonStop in 2023 August
- Included in L23.08
- The support note describing this release is embedded below.



Python 3.11.3  
ise\_Support Note\_5



## NonStop Manageability Framework 2.0

### Cloud Ready NonStop Workload Manageability

- In short = **NSMF 2.0**
- A framework with clearly defined endpoints, standard & modern interfaces
- With a common security framework
- Can reuse existing management components of the managed entities



# Manageability

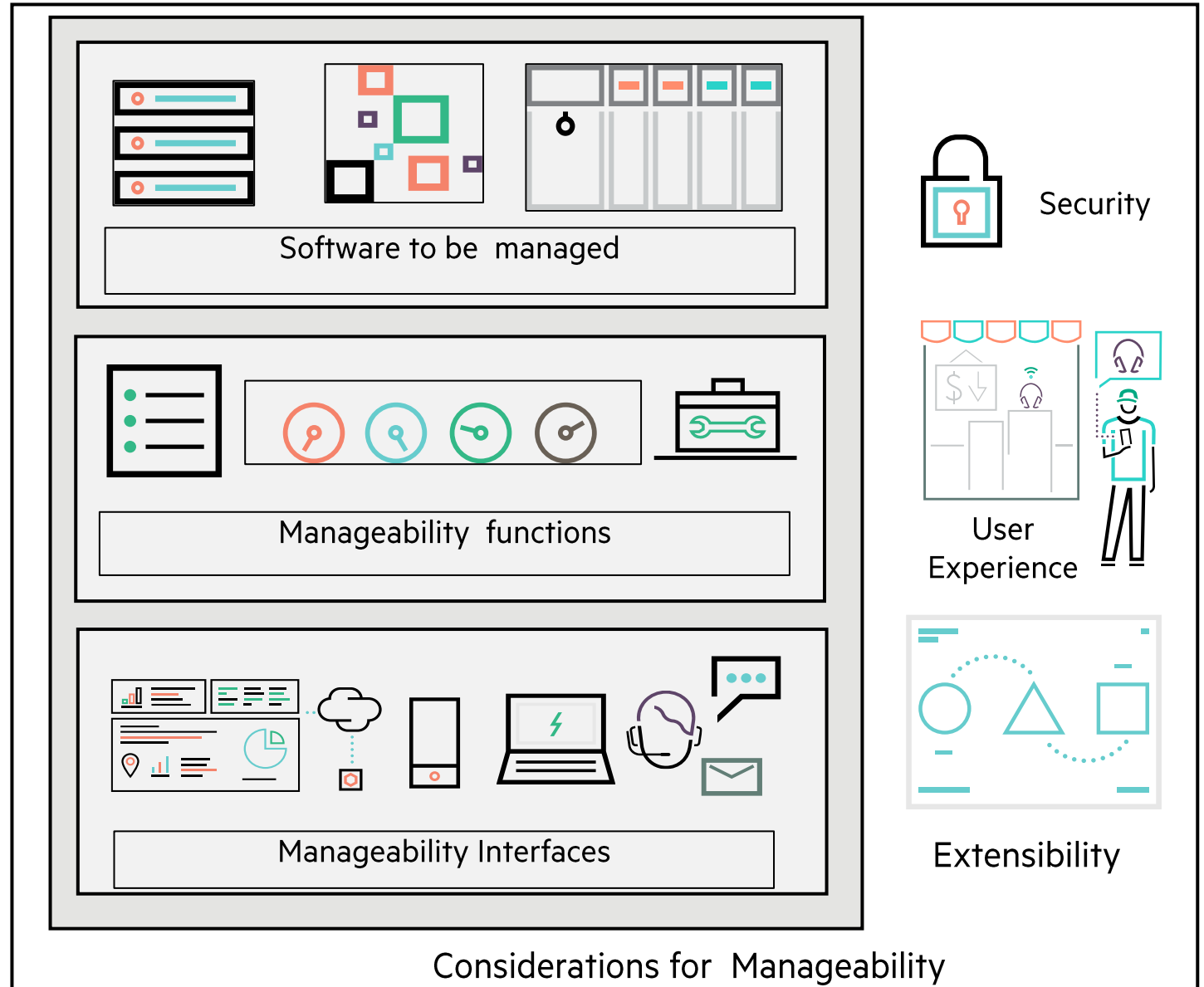
Future

## What is manageability?

Manageability is used to describe the set of functions that allow the discovery, configuration, deployment, update and monitoring of software.

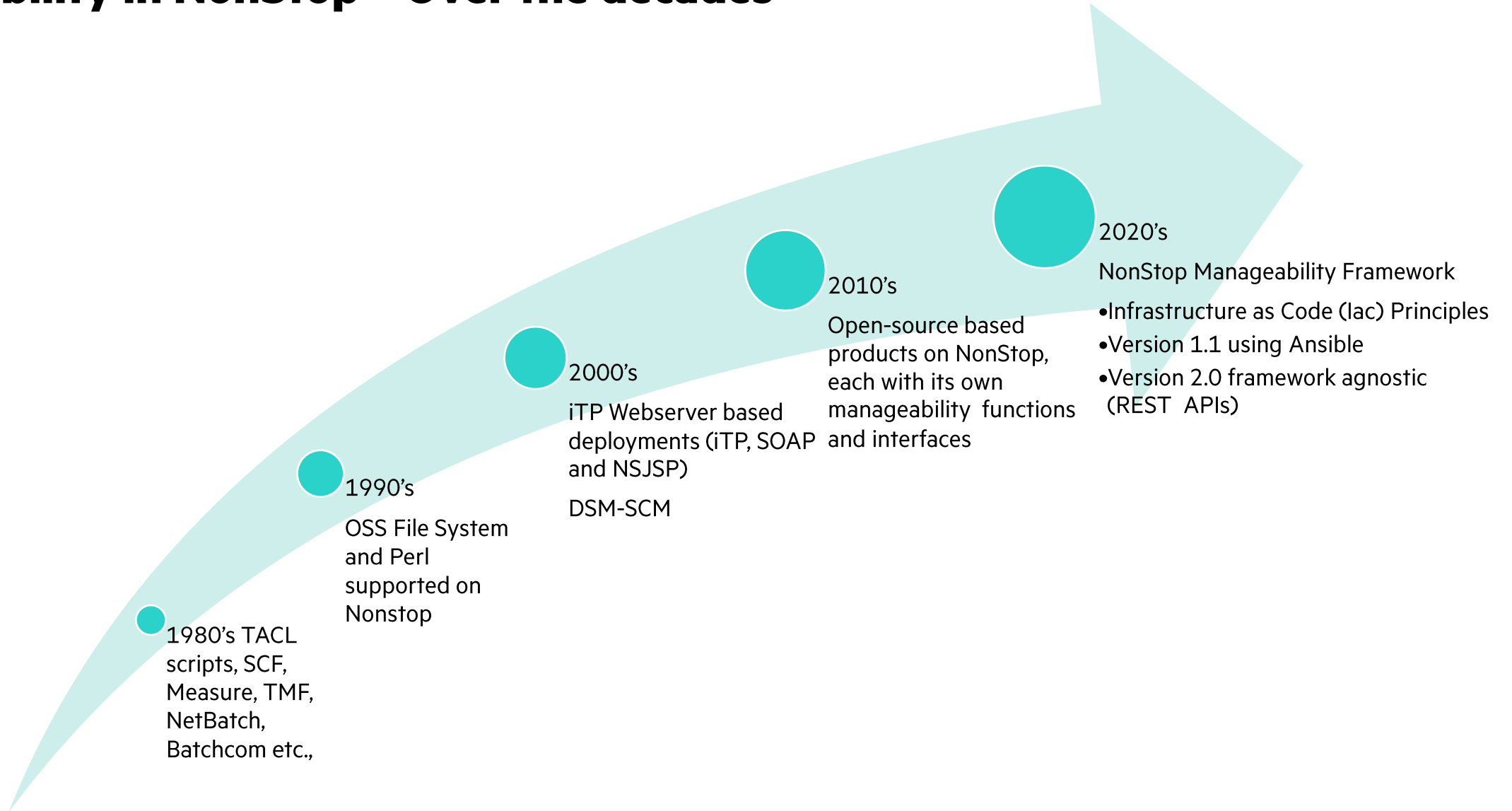
## Why is manageability important?

Lack of proper manageability could compromise reliability, availability & scalability of the software



# Manageability in NonStop – Over the decades

Future





# Why NSMF 2.0

## WHO?



### System Administrator

- Manages NonStop and other hybrid enterprise infrastructure
- Mostly likely manages multiple products and workloads on NonStop

## WHERE & WHEN?



### Production

- Software Upgrades
- Application Migration
- New Application or Services Deployment



### Dev/Test Environment

- Software Upgrades
- Environment setup for entire software release lifecycle

## WHAT?



### Challenges

- Different interfaces & technology to manage NonStop subsystems
- What, Where and How of Configuration is complex
- Managing NonStop is very different from managing rest of the other enterprise infrastructure

## WHY?



### Benefits for System Administrator

- Seamless integration with the enterprise
- Easy/Automated software upgrades
- Better User Experience

### Benefits for NonStop Customers

- Cohesive unified view of Enterprise
- Aids NonStop's Cloud Journey



# NSMF2.0 – Functional Components

Future

**NSMF Interfaces**



**Ansible**



**REST API**



**GUI**

**NSMF Core Infrastructure**



**Data Model**



**Security**



**Orchestration**

**Managed Components (Existing management functionality)**



**Middleware**



Storage



DBaaS



Partner/customer products

**NonStop Resources**

**Customer Workloads**

NSMF1.1

**NSMF2.0**

- Provides well defined data models to manage the underlying software components such as Middleware and Database. Data models play a key role in automation
- Well defined interfaces such as Ansible Roles and REST API help integrate into automation frameworks
- Provides a common security framework that implements standard security protocols. Implements centralized auditing
- Reuses existing manageability applications and scripts that encapsulate the actual manageability functionality

# Futures

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# Futures – Middleware

- API Gateway



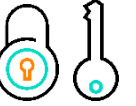
Intuitive UI to expose DDL based services as REST APIs



Service Aggregation

- NSHTTP Server

- Security enhancement – OpenID and OAUTH2



- NSJ **OpenJDK**

- NSJ 17 based on PUT
- Ported from OpenJDK 17
- Headless APIs as previous versions
- NonStop specific improvements
- POSIX threads based

- NSMF 2.0 

- Infrastructure as Code (IaC) based framework
- Cloud readiness
- Well defined REST APIs
- OpenAPI compatible data format
- Samples, config examples

- TS/MP

- ROUT Capacity increase
- Performance improvement

# Thank you for attending this talk

## TBC23-TB52 Driving innovation with NonStop Middleware: What's new in 2023

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John Zimsky  
[john.zimsky@hpe.com](mailto:john.zimsky@hpe.com)

### **You may also attend the relevant talks given below:**

TBC23-TB61 - NonStop API Gateway as a single entry point for REST microservices

TBC23-TB60 - Build a REpresentational State Transfer (REST) API microservice on NonStop in 15 minutes



# HPE Slides and Materials Usage

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