SOLUTION PARTNER FOR **SMART TECHNOLOGY**

LENA

Installation

LENA Support

Version 1.3.3.0

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Chapter 1. Overview

This document describes how to install LENA Server before operating it in production. For the complete feature set and operational guidance, refer to the separately provided Administrator Manual.

1.1. Components

LENA consists of a Web Server, a WAS (Web Application Server), a Node Agent that monitors and controls the status of Web Servers, an Advertiser installed on Application Servers that provides status information, and the Manager, an integrated management tool for administrators.

1.1.1. Server

LENA provides two types of servers: Web Server and Application Server. Their roles are as follows:

- Web Server: Provides web resources based on user requests. It acts as the front for application services provided by the Application Server and can optionally provide load balancing and a security layer (SSL).
- Application Server: Runs and serves applications written in Java.

1.1.2. Agent, Advertiser

Agents are installed on Nodes and Servers and are responsible for control and monitoring.

- Node Agent
  - Aggregates Web Server status monitoring data and provides it to the Manager.
- Advertiser
  - Aggregates Application Server status monitoring data and provides it to the Manager.

1.1.3. Manager

The Manager is a web application that provides control and monitoring of Nodes and Servers through the Node Agent and Advertiser. Representative features include the following.

Table 1. LENA Manager key features

Item	Description
Dashboard	• Server status • Notification checks
Server	• Register/modify/delete System (logical server groups)
Resource	• View and register/modify/delete resources Database / DataSource / Application • View and register/modify/delete the list of servers using a resource
Diagnostics	• Issue-status monitoring for servers

Item	Description
Topology	• View server composition by System
Admin	• User and permission management; mapping among user/role/menu • View user operation history • License management; status view and upload

1.2. Mechanism

LENA provides monitoring and centralized management of Web Servers and WAS through the Manager. To enable this, an Agent is installed per Node, called the Node Agent. The Node Agent receives user commands from the Manager to control the Web Server/WAS installed on the Node, and sends monitoring information for the host/VM where the Node is installed and for the Web Server back to the Manager.

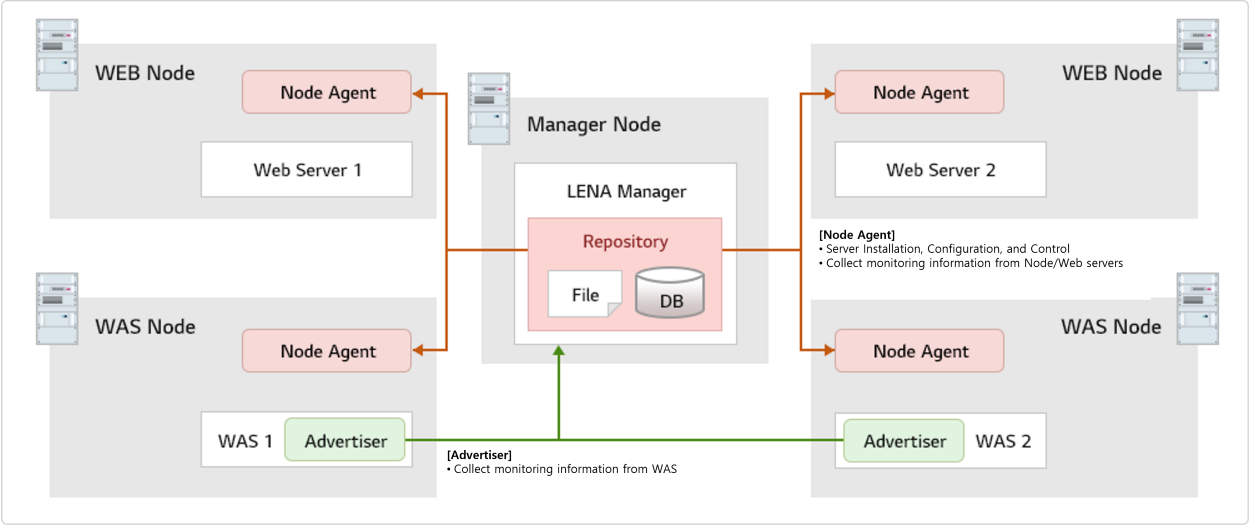

Figure 1. LENA Manager monitoring and centralized management workflow

In addition to LENA Manager, Web Server, and WAS, components such as the Manager Repository used for Manager operations and the Advertiser for collecting WAS monitoring information enable monitoring and centralized management via the Manager.

Item	Description
Manager	Manages configuration files deployed to servers and provides server monitoring
Manager Repository	File storage repository for Manager operations; includes various configuration and DB information
Node Agent	Aggregates Web Server monitoring data and sends it to the Manager, executes control/configuration commands received from the Manager
Application Server	Application Server instance
Web Server	Web Server instance
Advertiser	Aggregates monitoring data and sends it to the Manager (integrated into the Application Server)

Chapter 2. Installation Prerequisite

2.1. System Requirements

2.1.1. Hardware Resource

- **CPU**
  The CPU requirement entirely depends on the performance demanded by the web application to be run. For basic LENA services, we recommend at least 2 cores.
- **Memory**
  Refer to the table below for memory. Except for the Web Server, all modules run on the JVM and therefore use heap memory. LENA provides default heap memory values, which are applied during installation and can be modified if necessary. For stable operations, ensure that the sum of heap memory settings for all modules installed on a single physical server does not exceed the server's available physical memory.

The minimum requirements for LENA Manager and each server installation are as follows.

Component	JVM	Disk Space	Minimum Memory	Default Memory
Manager	JDK 1.8 +	Approx. 300 MB	512 MB	1 GB
Node Agent	JDK 1.8 +	-	64 MB	256 MB
Application Server	JDK 1.8 +	Approx. 100 MB	512 MB	2 GB
Web Server	JDK 1.8 +	Approx. 50 MB	512 MB	-

Each server is installed with the default memory settings. You can change the memory settings to any value equal to or greater than the minimum.

2.1.2. Operating System

- **Linux**
  Supports Red Hat (RHEL, CentOS) 6.5 or later and Ubuntu 12.04 or later, and is the most recommended operating system. Given typical x86 characteristics, we recommend distributing deployments across multiple low-capacity servers rather than a single large consolidated server.

LENA provides scripts to start modules.
If you need to register them as OS services, the server administrator must configure this according to the OS environment.

2.1.3. Account

Before installing LENA, you need an account to use for installation and startup. For security reasons, the root/Administrator account is not recommended and cannot be used to run LENA. Please create a separate account in advance.

While not recommended on x86 architectures, consider a scenario where multiple different business systems run on a single physical server, each managed by different operators, with access control enforced via account separation. In such cases, install/configure a separate Node per operator account (per business system), and we also recommend configuring a separate LENA Manager per system.

2.1.4. Directory

Before proceeding with LENA installation, prepare an installation directory that the account created in the previous step can access. The table below shows the directory layout recommended by LENA; you may adopt any layout that fits your policy.

Table 2. Directory Requirement

Item	Directory	Notes
LENA WAS Node (Binary)	/engn001/lena	
LENA WEB Node (Binary)	/engn001/lenaw	
Web Server, WAS Log	/logs001	Configure if you need a separate log path
Web Application Source	/sorc001	

A key consideration is whether to separate log files. If not configured separately, logs are created under the LENA Node installation path by default. For easier log checking and disk capacity management, we recommend separating the log directory.

If possible, mount separate external disk volumes for the Node, log, and source directories to isolate them from the OS system area.

2.1.5. JVM

Install the JDK separately as a binary or via your OS package manager before proceeding with LENA installation.

LENA Version	EN (Engine No)	JDK Version (LTS)	JAVA EE Spec	Servlet Spec
1.3.3.X	9 (Default)	JDK 8 (1.8.x+), 11, 17, 21	8	4.0
1.3.3.X	7	JDK 6 (1.6.x+), 7 (1.7.x+), 8 (1.8.x+)	6	3.0
1.3.3.X	8	JDK 8 (1.8.x+), 11	7	3.1
1.3.3.X	10	JDK 11, 17, 21	10 (Servlet)	6.0
1.3.2.X	8 (Default)	JDK 8 (1.8.x+), 11	7	3.1
1.3.2.X	7	JDK 6 (1.6.x+), 7 (1.7.x+), 8 (1.8.x+)	6	3.0
1.3.2.X	9	JDK 8 (1.8.x+), 11, 17	8	4.0
1.3.2.X	10	JDK 11, 17	10 (Servlet)	6.0

LENA Version	EN (Engine No)	JDK Version (LTS)	JAVA EE Spec	Servlet Spec
1.3.1.X	N/A	JDK 8 (1.8.x+), JDK 11	7	-
1.3.0.X	N/A	JDK 8 (1.8.x+), JDK 11	7	-

Oracle JDK is free to use only up to version 8u202.

2.1.6. Network

The diagram below shows the traffic flow among LENA modules. It details the LENA management path and the web service path.

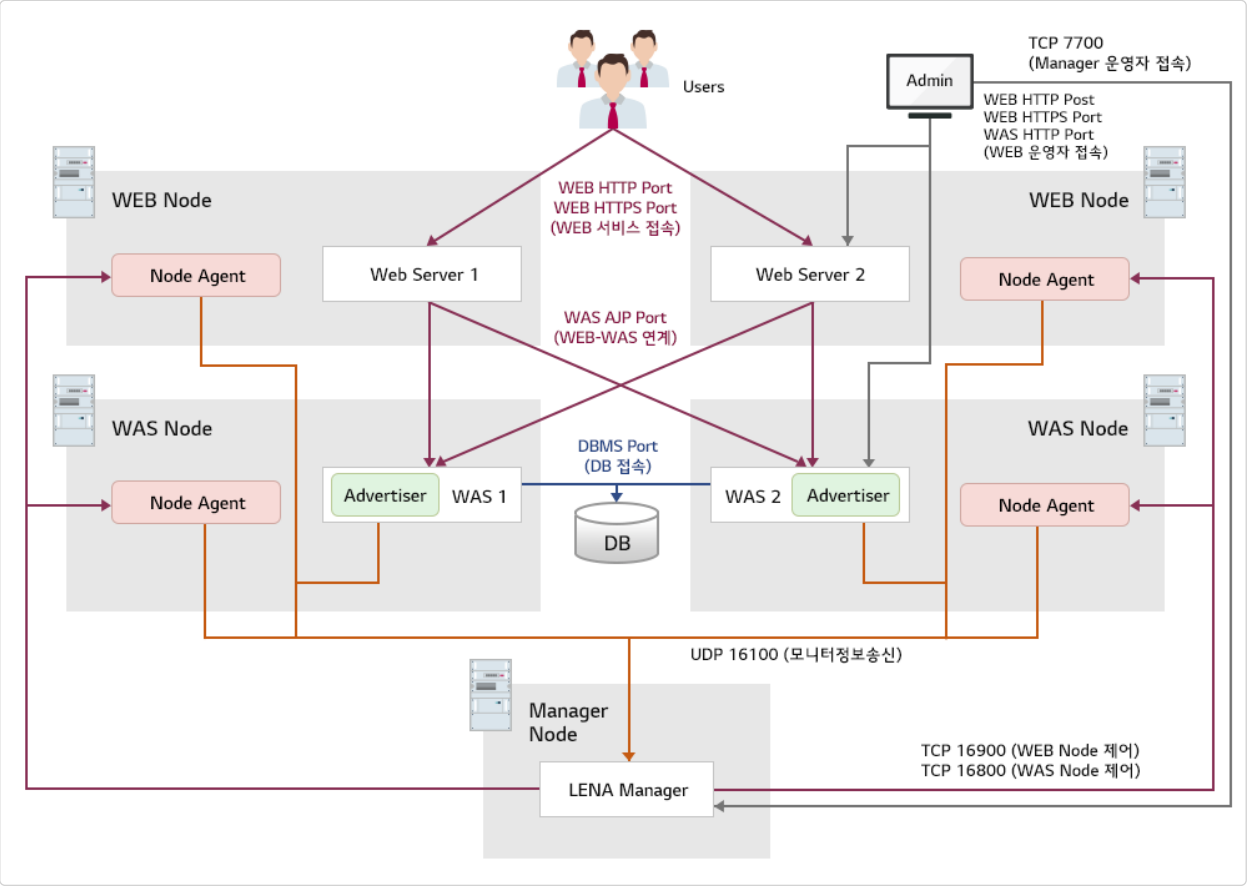

Figure 2. LENA Network Traffic

The traffic paths among LENA modules and the ports used are shown in the table below. The port numbers listed are predefined defaults and can be changed during module installation. Refer to the table, choose the ports, and open them on the firewall in advance.

For security reasons, LENA uses ports 1025 and above. If you must use a well-known port such as 80 for service, refer to the guide in the appendix for using port 80.

Table 3. LENA Firewall Open Rule

Src	Dest	Protocol	Port	Notes
Operator	LENA Manager	TCP	7700	Manager Web UI access

Src	Dest	Protocol	Port	Notes
LENA Manager	WEB Node Agent	TCP	16900	Control WEB Node
	WAS Node Agent	TCP	16800	Control WAS Node
WEB Node Agent	LENA Manager	UDP	16100	Send monitoring data
WAS Node Agent				
WAS Advertiser				
User/Operator	Web Server	HTTP	8000	Web service access
		HTTPS	**8363**	Secure (SSL) web service access (HTTP + 363 / configurable)
Operator	WAS	HTTP	8080	WAS service access
Web Server		AJP	**8009**	Web Server–WAS integration (HTTP - 71 / configurable)
WAS	DB	TCP	3306	WAS JDBC access

During Web Server/WAS installation, LENA requires you to specify the HTTP port. Based on this HTTP port, other ports required for server operations such as HTTPS are auto-calculated. Those ports are shown in italics in the table above. Therefore, when installing multiple Web Servers or WAS on the same host, to avoid conflicts with existing ports, we recommend keeping the ones and tens digits the same per Web Server/WAS and changing only the hundreds digit across instances.

Table 4. Example of HTTP port settings when installing Web Server and WAS on the same host

Type	Server Name	HTTP Port	Notes
WAS	ee_01	8080	-
	ee_02	8180	HTTP Port of ee_01 + 100
Web	web_01	7180	-
	web_02	7280	HTTP Port of web_01 + 100

Also, do not set the Dynamic Port Range to cover the entire port range. Otherwise, OS services may occupy ports required by LENA as source ports.

Chapter 3. Installation

3.1. Install LENA

Upload the LENA installation files to the prepared directory on the target servers. Use the installation files to install LENA Manager on the server where you want to run it, install the Web Server Node on the server where the Web Server will run, and install the WAS Node on the server where the WAS will run.

Before proceeding with installation, refer to the JVM section of the Administrator Manual and preinstall the JDK.

After installing the Node, install the Web Server and WAS through the LENA Manager Web UI. LENA installation files are categorized by product and purpose as follows.

Table 5. LENA installation file types

Installation File	Notes
lena-standard-linux_na_x86_64-1.3.3.0.tar.gz	For installing LENA Manager and WAS
lena-web-linux_na_x86_64-1.3.3.0.tar.gz	For installing Web Server

3.1.1. Install/Run LENA Manager

The LENA installation package is an archive. Upload it to the server where you will install it and extract it. LENA Manager is included in the WAS Node installation file. Upload the installation file to the path where it will be installed (e.g., /engn001/lena) and extract it.

LENA Manager is included in the WAS Node installation file.

Verify installation path and uploaded file

```
[lena]# cd /engn001/lena
[lena]# ll
-rw-rw-r--  1 lena lena lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
```

When you extract the archive, a directory is created using the file name without the extension.
Rename that directory to the short name 1.3 for convenience.

Extract installation file / rename directory

```
[lena]# tar -xvzf lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
[lena]# mv lena-standard-linux_na_x86_64-1.3.3.0  1.3
[lena]# ll
drwxr-xr-x 12 lena lena 1.3
-rw-rw-r--  1 lena lena lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
```

Use the install.sh file (e.g., /engn001/lena/1.3/bin/install.sh) to install.
Run the following commands to install:

Install LENA Manager

```
[lena]# cd /engn001/lena/1.3/bin
[lena]# ./install.sh create lena-manager
*****************************
*  LENA Server Install !      *
*****************************
+-------------------------------------------------------------------------------
--------
| 1. SERVICE_PORT is the port number used by Manager.
|    ex : 7700
| 2. MONITORING_PORT is the port number used by Manager for monitoring.
|    ex : 16100
| 3. RUN_USER is user running LENA Manager.
|    ex : lena, wasadm
+-------------------------------------------------------------------------------
--------
Input SERVICE_PORT for execution. (q:quit)
Default value is '7700'
7700
```

After installation completes, the directory where you ran install.sh will contain script files related to LENA Manager.

Table 6. LENA Manager management scripts

Script name	Description
start-manager.sh	Starts LENA Manager
ps-manager.sh	Checks whether LENA Manager is running
stop-manager.sh	Stops LENA Manager

Run start-manager.sh to start LENA Manager.

```
[lena]# ./start-manager.sh
--------------------------------
          LENA Manager
--------------------------------
Using LENA_HOME     : /engn001/lena/jadeu3/1.3
Using JRE_HOME      : /engn001/java/jdk1.8.0_202
Using SERVER_PID    : /engn001/lena/jadeu3/1.3/modules/lena-manager/lena-
manager_solmanager.pid
Using SERVER_HOME   : /engn001/lena/jadeu3/1.3/modules/lena-manager
Using SERVER_ID     : lena-manager
Using INSTANCE_NAME : lena-manager_solmanager
LENA started.
```

Once LENA Manager is running, you can access Manager via its service port.
http://Server_IP:7700

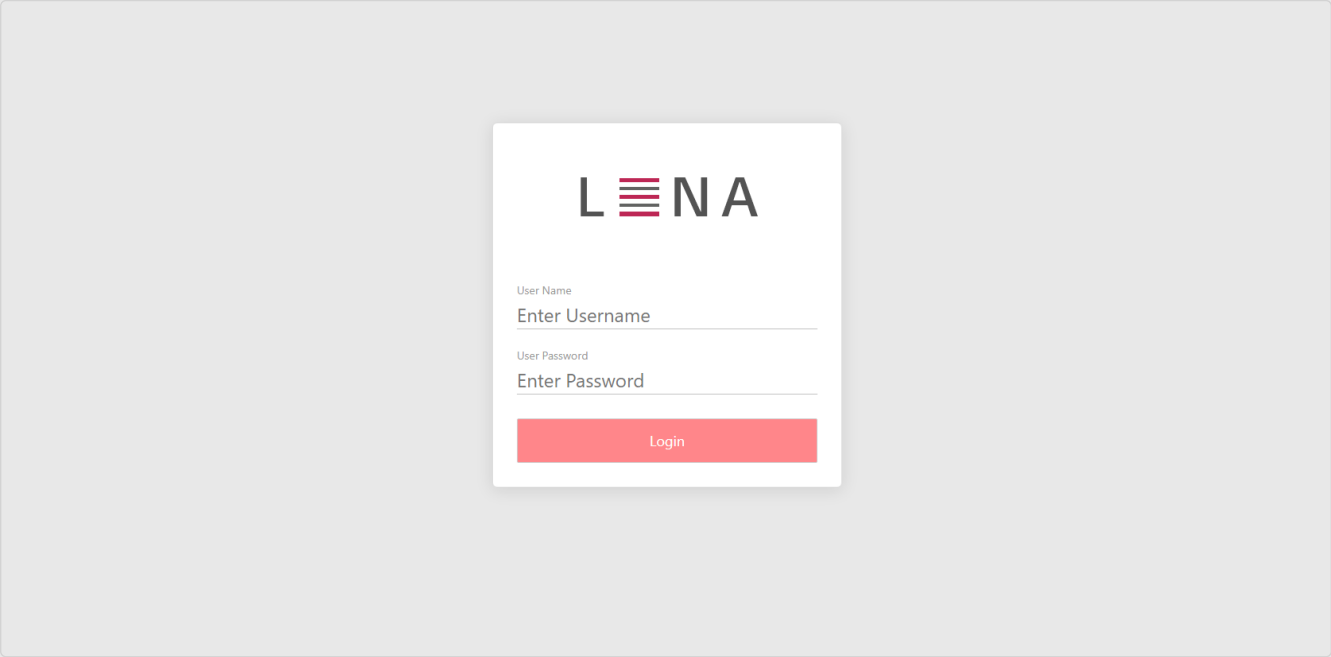

Figure 3. LENA login screen

Log in with the initial account/password below to view the dashboard.

Initial account/password

admin / !admin1234

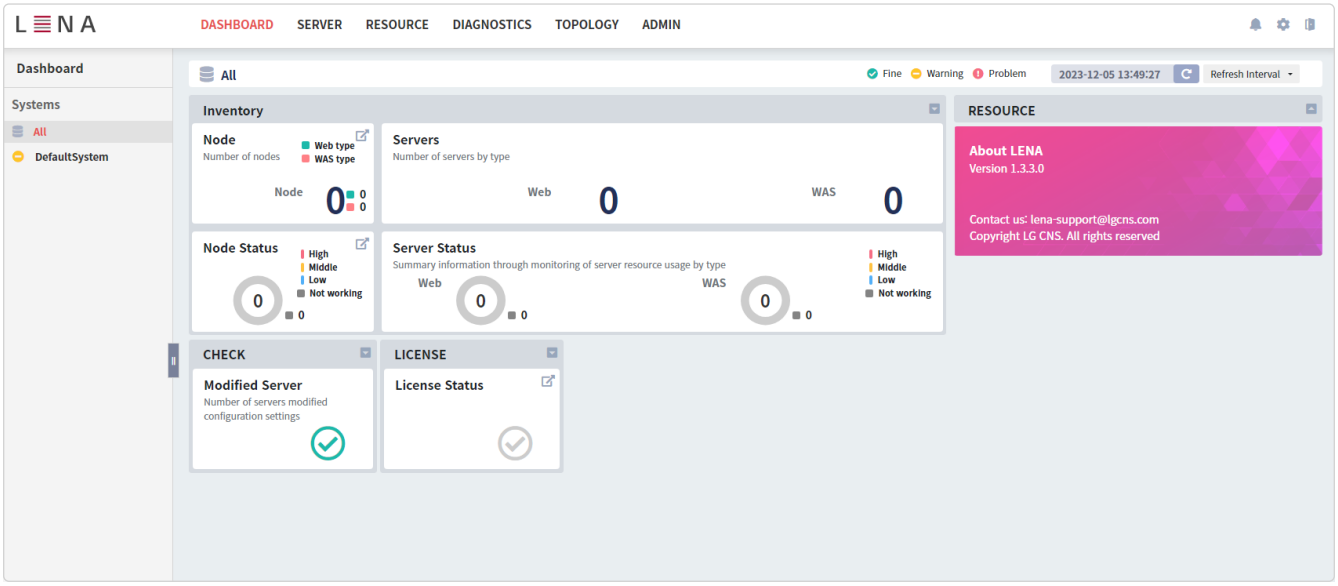

Figure 4. LENA Dashboard

3.1.2. Install Node (Command Line)

Installing a Node is the same as extracting the corresponding LENA installation package. Upload each installation package to the prepared path on the server where you will install WAS and Web Server (e.g., /engn001/lena or /engn001/lenaw), then extract it.
After installing a Node, scripts are available to start, stop, and check the status of the Node Agent as shown below.

Table 7. Node Agent management scripts

Script path	Script name	Notes
Under the Node installation path 'bin' (e.g., /engn001/lena/1.3/bin)	start-agent.sh	Start Node Agent
	ps-agent.sh	Check Node Agent process
	stop-agent.sh	Stop Node Agent

Install WAS Node

Consider the following options when installing a WAS Node:

1. Install LENA Manager and WAS Node on the same server
2. Install LENA Manager and WAS Node on different servers (Manager installed separately)

In case 1, you already extracted the WAS Node installation package when installing LENA Manager in Install/Run LENA Manager, so the WAS Node is already installed.

In case 2, upload the LENA WAS installation package to the prepared path (e.g., /engn001/lena) on the server where you will install the WAS Node, then extract it as follows.

Verify installation path and uploaded file

```
[lena]# cd /engn001/lena
[lena]# ll
-rw-rw-r--  1 lena lena lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
```


When you extract the archive, a directory is created using the file name without the extension.
Rename that directory to the short name 1.3 for convenience.

Extract installation file / rename directory

```
[lena]# tar -xvzf lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
[lena]# mv lena-standard-linux_na_x86_64-1.3.3.0 1.3
[lena]# ll
drwxr-xr-x 12 lena lena 1.3
-rw-rw-r--  1 lena lena lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
```

After installing the Node, start the Node Agent using start-agent.sh.

Start Node Agent

```
[lena]# cd /engn001/lena/1.3/bin
[lena]# ./start-agent.sh
Input JAVA_HOME path for LENA. ( q: quit )
JAVA_HOME PATH :
/engn001/java/jdk1.8.0_202                              ①
Input Agent port for LENA Agent. ( q: quit )
Agent port (Default : 16800):
16800                                                   ②
Input Agent user for LENA Agent. ( q: quit )
Agent user (Default : lena):
lena                                                    ③

--------------------------------
          LENA Agent
--------------------------------
Using LENA_HOME    : /engn001/lena/1.3
Using JAVA_HOME    : /engn001/java/jdk1.8.0_202/jre
Using CONF_FILE    : /engn001/lena/1.3/conf/agent.conf
Using LOG_HOME     : /engn001/lena/1.3/logs/lena-agent
Using RUN_USER     : lena
Using PORT         : 16800
Using UUID         : 98449860-0a9a-323b-9766-98c4292000df
LENA Agent is started.
```

When starting the Node Agent, you will be prompted for the following:

¬ Enter the JAVA HOME (JDK) path

¬ Enter the port to be used by the Node Agent

¬ Enter the OS account to run the Node Agent

Install Web Server Node

Upload the LENA Web Server installation package to the server where you will install the Web Server, then extract it.

Verify path / file

```
[lenaw]# cd /engn001/lenaw
[lenaw]# ll
-rw-rw-r--  1 lena lena lena-web-linux_na_x86_64-1.3.3.0.tar.gz
```

Extract installation file / rename directory

```
[lenaw]# tar -xvzf lena-web-linux_na_x86_64-1.3.3.0.tar.gz
[lenaw]# mv lena-web-linux_na_x86_64-1.3.3.0 1.3
[lenaw]# ll
drwxr-xr-x 12 lena lena 1.3
-rw-rw-r--  1 lena lena lena-web-linux_na_x86_64-1.3.3.0.tar.gz
```

When you extract the archive, a directory is created using the file name without the extension.
Rename that directory to the short name 1.3 for convenience.

After installing the Node, start the Node Agent using start-agent.sh.

Start Node Agent

```
[lena]# cd /engn001/lenaw/1.3/bin
[lena]# ./start-agent.sh
Input JAVA_HOME path for LENA. ( q: quit )
JAVA_HOME PATH :
/engn001/java/jdk1.8.0_202                                  ①
Input Agent port for LENA Agent. ( q: quit )
Agent port (Default : 16900):
16900                                                       ②
Input Agent user for LENA Agent. ( q: quit )
Agent user (Default : lena):
lena                                                        ③
Input Web Agent Engine type for LENA Agent. ( q: quit )
Agent Engine type [EN-A, EN-N] (Default : EN-A):
EN-A                                                        ④
Openssl version 1.1.1 detected.
Input your openssl version(1.0.1, 1.0.2, 1.1.1 or 3.0) (Default : 1.1.1,
q:quit):
1.1.1                                                       ⑤
Do you want to select the module for the openssl version 1.1.1? Make sure all
of your instances are shut down(Y/N, Default:Y)
Y                                                           ⑥

The modules have been copied successfully.
--------------------------------
          LENA Agent
--------------------------------
Using LENA_HOME    : /engn001/lenaw/1.3
Using JAVA_HOME    : /engn001/java/jdk1.8.0_202/jre
Using CONF_FILE    : /engn001/lena/1.3/conf/agent.conf
Using LOG_HOME     : /engn001/lena/1.3/logs/lena-agent
Using RUN_USER     : lena
Using PORT         : 16900
Using UUID         : 98449860-0a9a-323b-9766-98c4292000df
LENA Agent is started.
```

When starting the Node Agent, you will be prompted for the following:

¬ Enter the JAVA HOME (JDK) path

¬ Enter the port to be used by the Node Agent

¬ Enter the OS account to run the Node Agent

¬ Enter the Web Server Engine Type to be used by the Node Agent

- Default: EN-A
- Engine Type: EN-A (Apache-based), EN-N (Nginx-based)
- The engine type is decided on the Agent's first start; mixed engines (EN-A, EN-N) cannot be used within a single Agent

¬ Enter your OpenSSL version

¬ Confirm the selected OpenSSL version

Link (Register) LENA Manager and Node

After installing and starting the WAS Node and Web Server Node agents, you can register Nodes via LENA Manager.

Click the 'SERVER' menu at the top of LENA Manager to view the Node List.
Click the 'Register' button to add an empty row for registration and fill in each field as shown below.

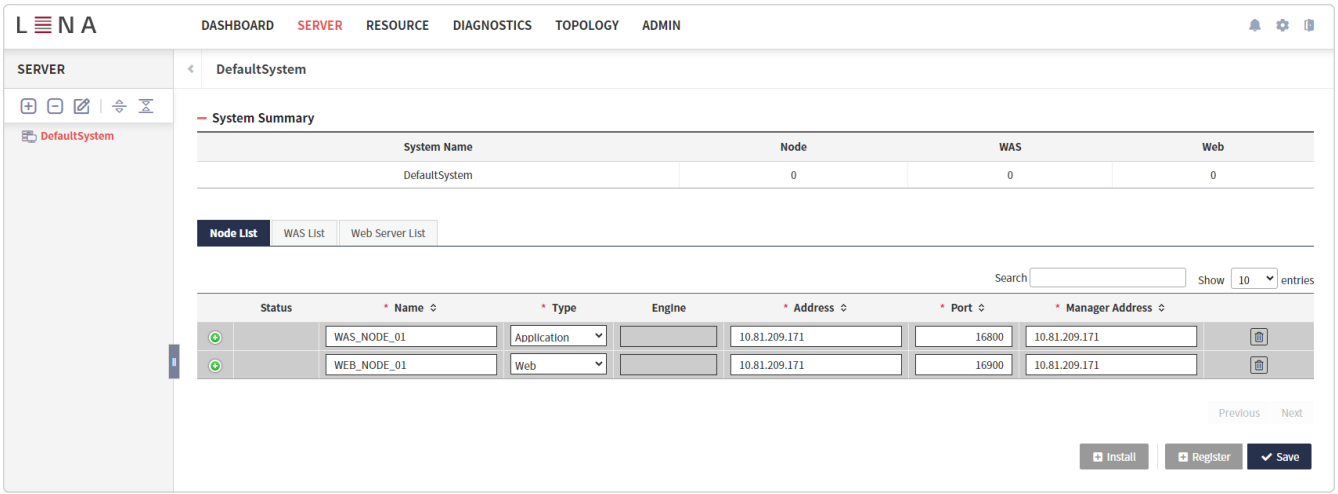

Figure 5. SERVER menu initial screen

Enter the following when registering a Node:

1. Node Name: Name of the Node to register
2. Node Type: Choose Application or Web
3. Node IP: IP address of the server where the Node is installed
4. Node Port: Node port entered during Node installation

The Manager Address field is auto-filled with the IP of the server where LENA Manager is installed, so there is no need to enter it manually.

After entering all fields, click 'Save' to complete registration. If successful, you'll see the following screen.

You can identify the engine type via the Engine field.

- EN-A: Apache-based Web Server Engine
- EN-N: Nginx-based Web Server Engine

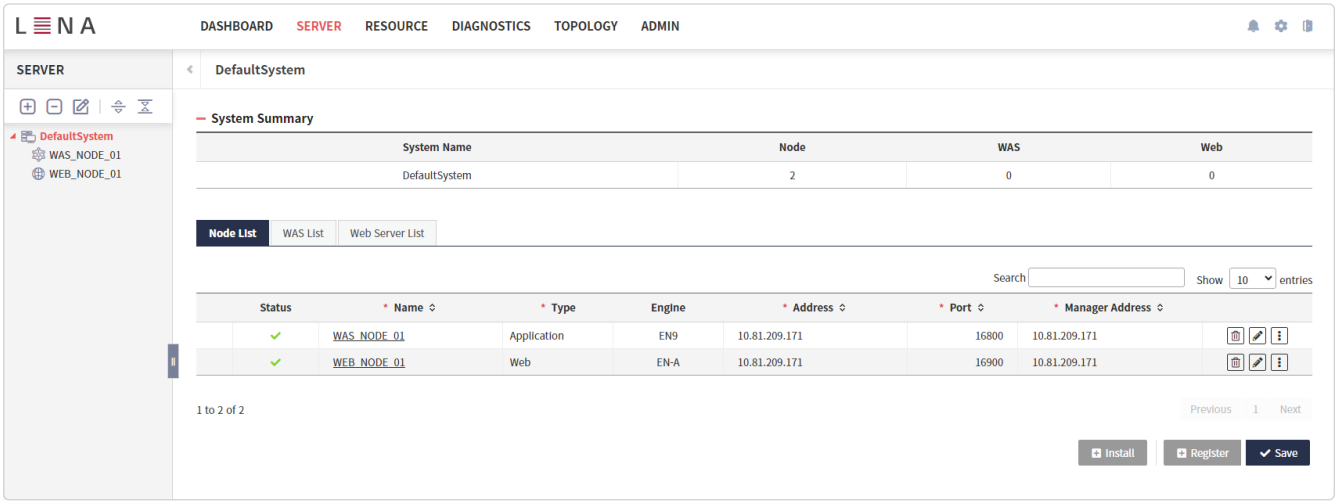

Figure 6. Node registered successfully

3.1.3. Install Node Remotely (LENA Manager Web UI)

In addition to the method described in Install Node (Command Line), you can also install Nodes remotely via LENA Manager. To do so, upload the LENA installation files (WAS, Web Server) into a specific directory under the server where LENA (Manager) is installed. An example path is shown below.

Table 8. Upload path for remote Node installation files (example)

LENA installation path	Upload path for LENA installation packages
/engn001/lena/1.3 (LENA_HOME)	[LENA_HOME]/repository/install-files/default

Upload the WAS and Web Server installation files used earlier to this path.

Verify installation packages for remote installation

```
[lena]# cd /engn001/lena/1.3/repository/install-files/default
[lena]# ll
-rw-rw-r--. 1 lena lena lena-standard-linux_na_x86_64-1.3.3.0.tar.gz
-rw-rw-r--. 1 lena lena lena-web-linux_na_x86_64-1.3.3.0.tar.gz
```

Once the packages are in place, open the 'SERVER' menu in LENA Manager and click the 'Install' button at the bottom.

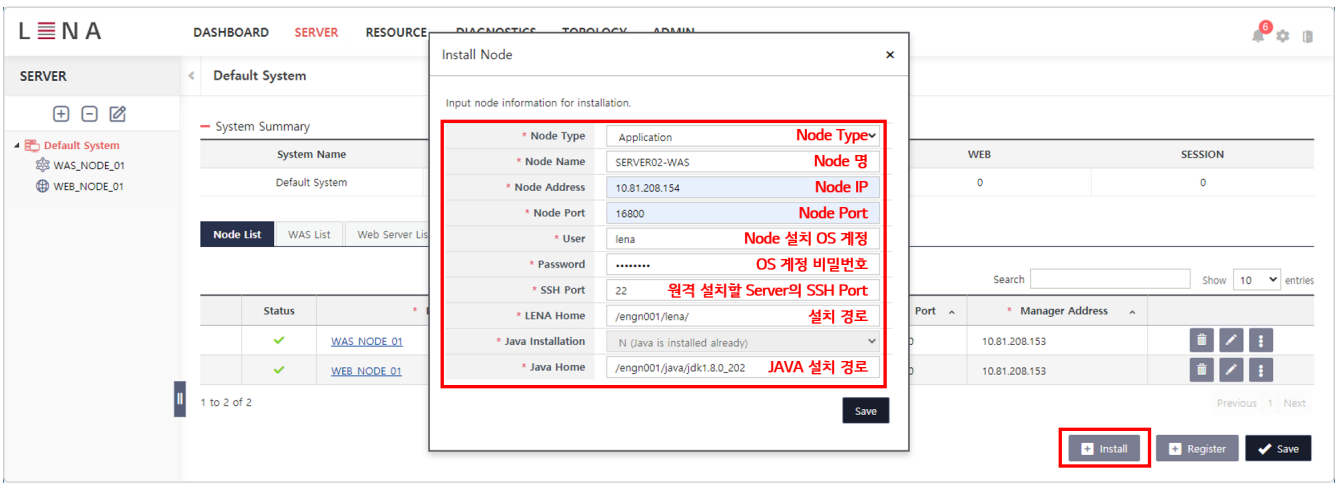

Figure 7. Remote installation of a WAS Node (example)

Enter the following values for remote installation:

1. Node Type: Choose Application or Web
2. Node Name: Name of the Node to install on the remote server
3. Node Address: IP address of the remote server where the Node will be installed
4. Node Port: Port to be used by the Node on the remote server
5. User: OS account on the remote server
6. Password: Password for the OS account on the remote server
7. SSH Port: SSH port of the remote server
8. LENA Home: Path where the Node will be installed on the remote server
9. Java Home: JAVA home path installed on the remote server

Based on the values entered, LENA Manager transfers the prepared installation package files to the remote server, installs the Node, and automatically starts the Node Agent. You can track progress in a popup window.

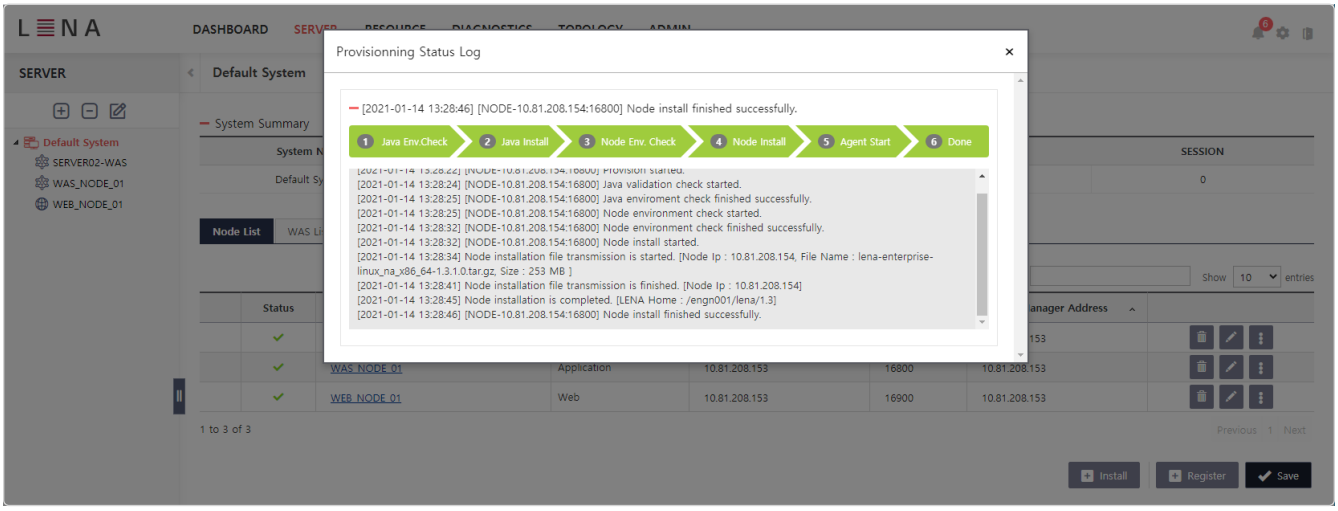

Figure 8. Remote installation progress for a WAS Node (example)

When installation completes successfully, the remotely installed Node is automatically registered in LENA Manager.

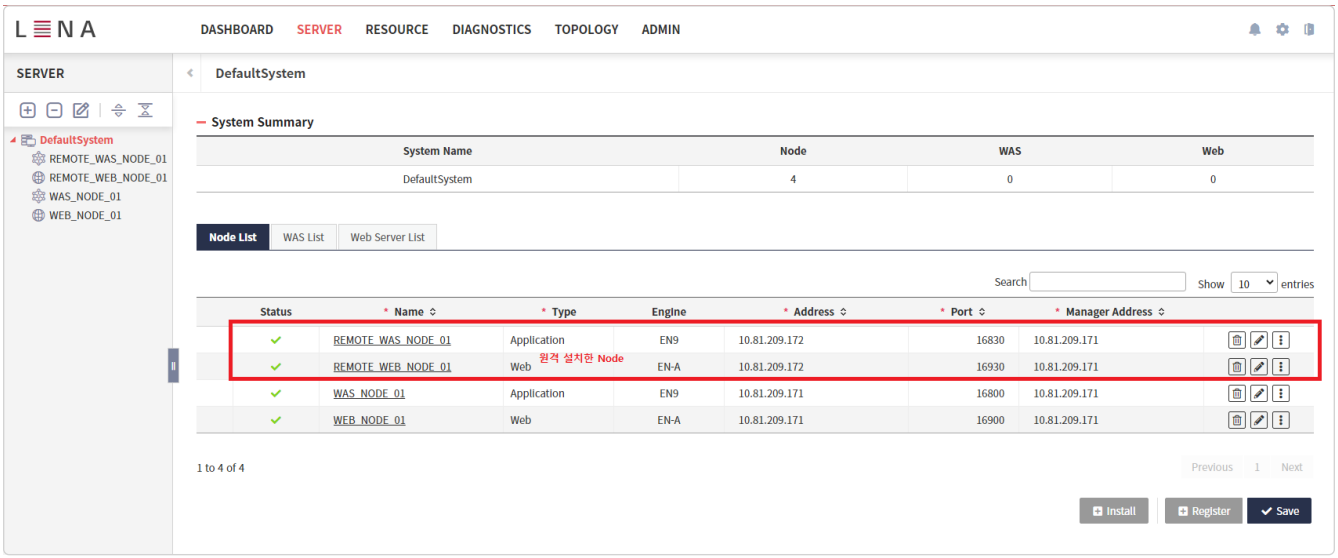

Figure 9. After remote installation, node appears as registered (example)

To install Nodes remotely, the SSH port must be open between the server where LENA Manager is installed and the remote server to be installed.

3.1.4. Install/Run WAS

After installing and registering the WAS Node, you can install a WAS through the LENA Manager Web UI. Click the 'SERVER' menu at the top of LENA Manager, select the WAS Node on the left where you'll install the WAS, and click the 'Install' button on the WAS List screen.

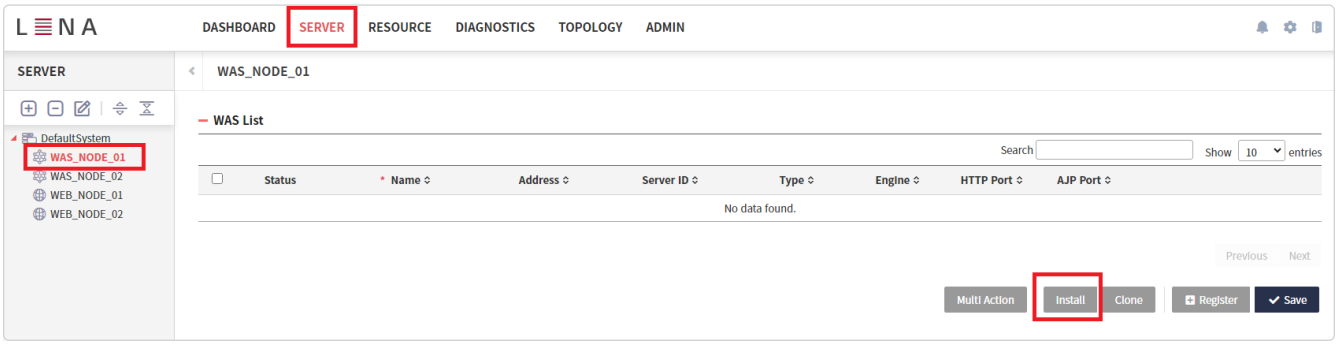

Figure 10. View WAS List

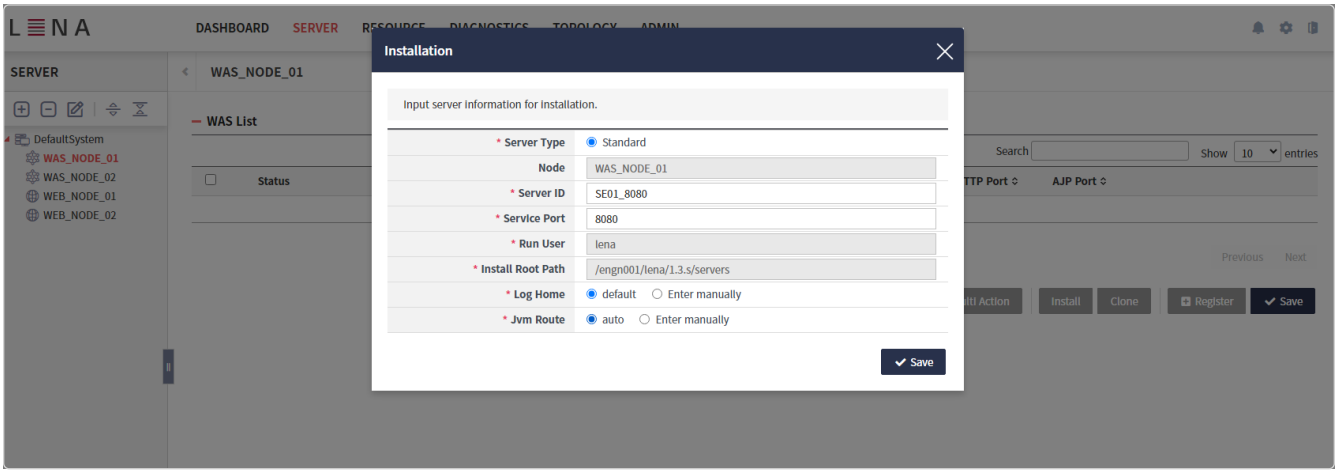

Figure 11. WAS installation popup and example values

Click 'Install' to open a popup where you enter information for installing the WAS. Each field is as follows:

1. Server Type: Standard
2. Node: The Node where the WAS will be installed (read-only)
3. Server ID: Name that LENA Manager will use to identify the WAS
4. Service Port: The HTTP port used as the basis during WAS installation
5. Run User: OS account used to start the WAS (read-only)
6. Install Root Path: Path where the WAS will be installed (read-only)
7. Log Home: Path for WAS logs
    a. default: [Install Root Path]/logs
    b. custom: User-defined path
8. JVM Route: Value used by the Web Server to identify the WAS when integrated
    a. auto: Automatically generated by LENA
    b. manual: User-defined

A WAS uses multiple ports such as HTTP, HTTPS, AJP at runtime. For convenience, LENA only asks for the HTTP port during installation and auto-calculates the other ports based on it.

After entering all WAS installation information, click 'Save' to install the WAS. You can then see the installed WAS in the WAS List.

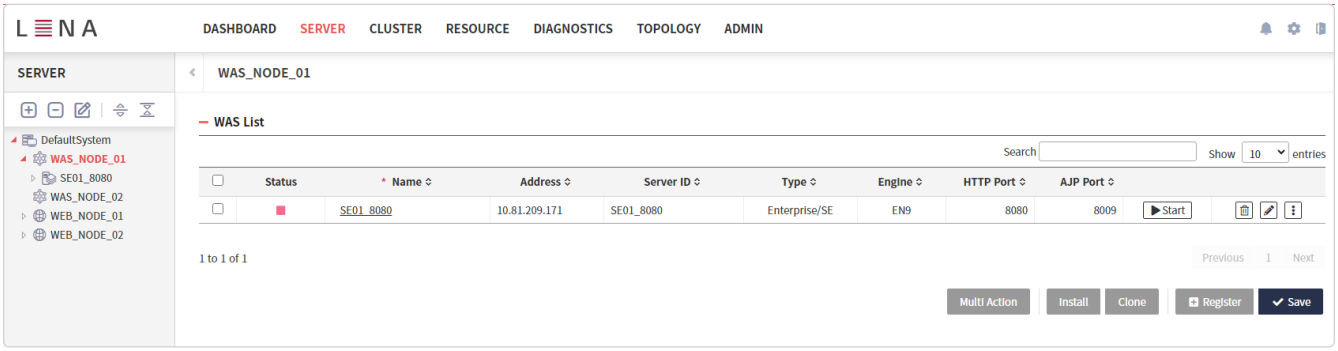

Figure 12. WAS List after successful installation

To start a stopped WAS, click the 'Start' button on the right of the WAS List. To stop a running WAS, the same button changes to 'Stop'; click it.

When a WAS starts, its startup log (and application startup logs if an application is deployed) is shown in a popup.

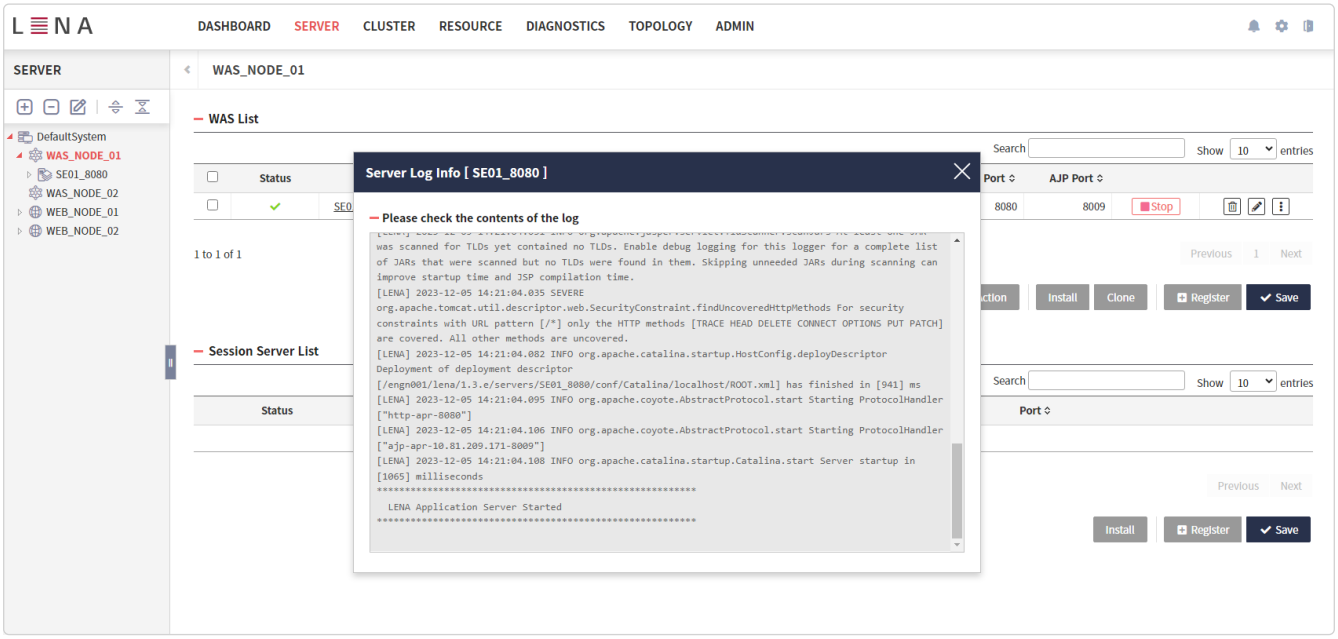

Figure 13. WAS startup and logs

3.1.5. Install/Run WebA Server

Similar to installing a WAS, you can install a Web Server via the LENA Manager Web UI. Select a Web Server Node with engine type EN-A, then install a WebA Server.

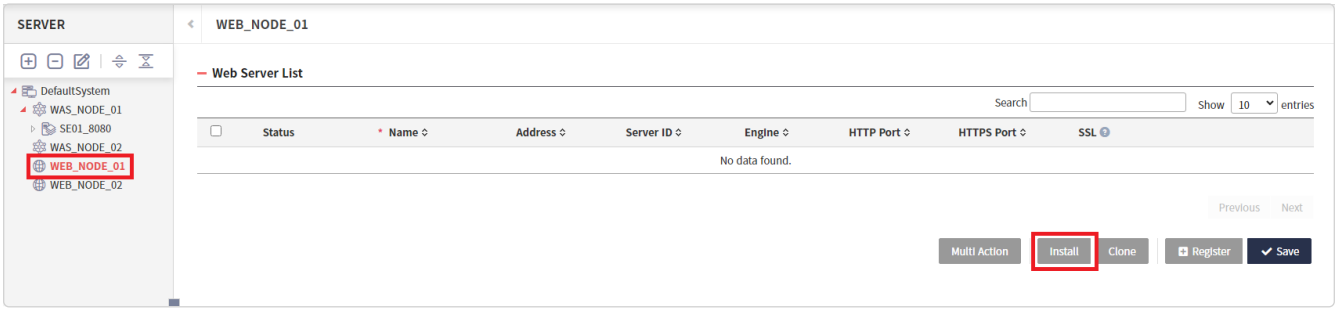

Figure 14. View Web Server List

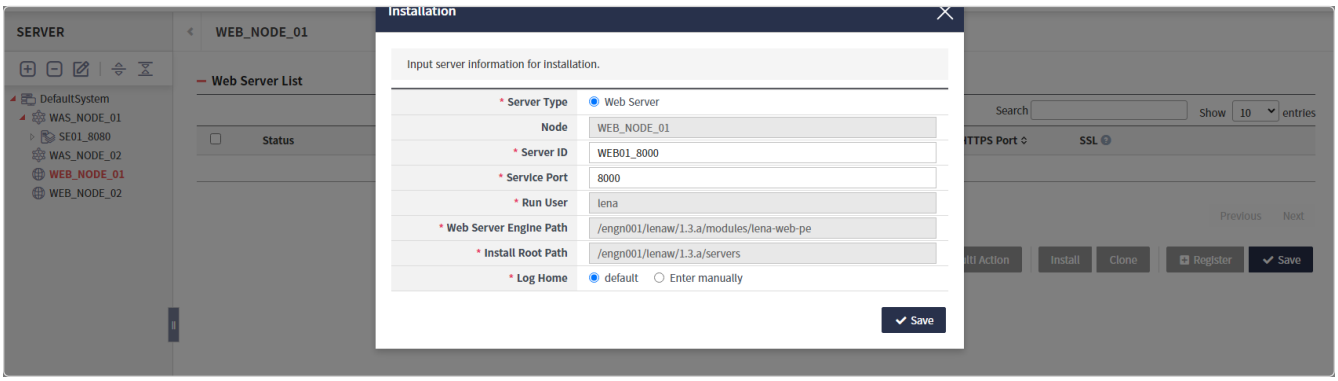

Figure 15. Web Server installation popup and example values

Click 'Install' to open a popup for installing the Web Server. Each field is as follows:

1. Server Type: Web Server (fixed)
2. Node: The Node where the Web Server will be installed (read-only)
3. Server ID: Name that LENA Manager will use to identify the Web Server
4. Service Port: HTTP port used by the Web Server
5. Run User: OS account used to start the Web Server (read-only)
6. Web Server Engine Path: Engine path used during Web Server installation (read-only)
7. Install Root Path: Path where the Web Server will be installed (read-only)
8. Log Home: Path for Web Server logs
    a. default: [Install Root Path]/logs
    b. custom: User-defined path

A Web Server uses multiple ports such as HTTP and HTTPS at runtime. For convenience, LENA only asks for the HTTP port during installation and auto-calculates the other ports based on it.

After entering all Web Server installation information, click 'Save' to install the Web Server. You can then see it in the Web Server List.

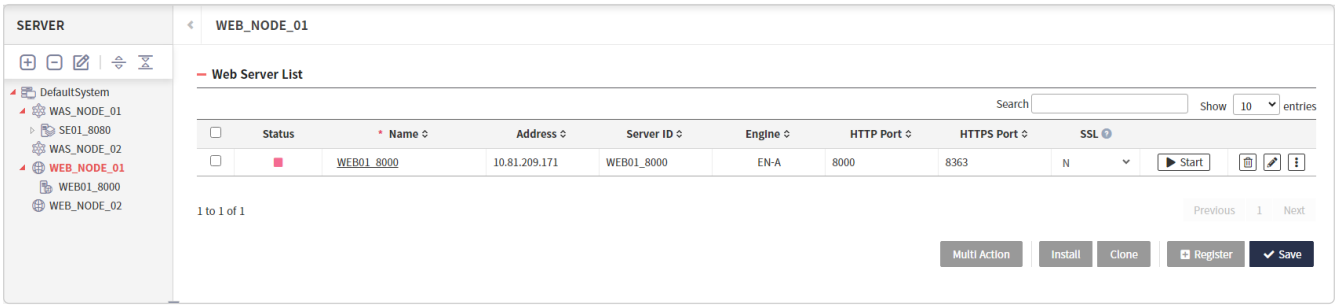

Figure 16. Web Server List after successful installation

To start a stopped Web Server, click the 'Start' button on the right of the Web Server List. To stop a running Web Server, the same button changes to 'Stop'; click it.

When a Web Server starts, its startup log is shown in a popup.

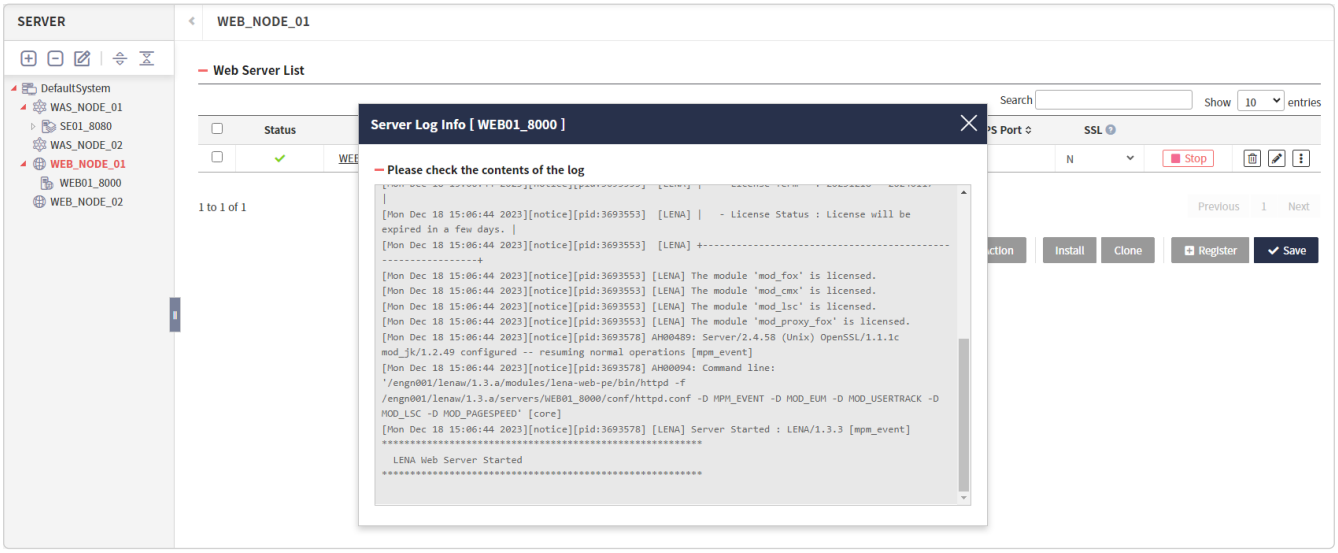

Figure 17. Web Server startup and logs

3.1.6. WebA Server - WAS Integration

This section describes how to integrate a WebA Server with a WAS. Integration is performed on the Web Server settings screen. In the 'SERVER' menu of LENA Manager, select the installed Web Server to open its settings screen, then select the 'Connector' tab at the top.

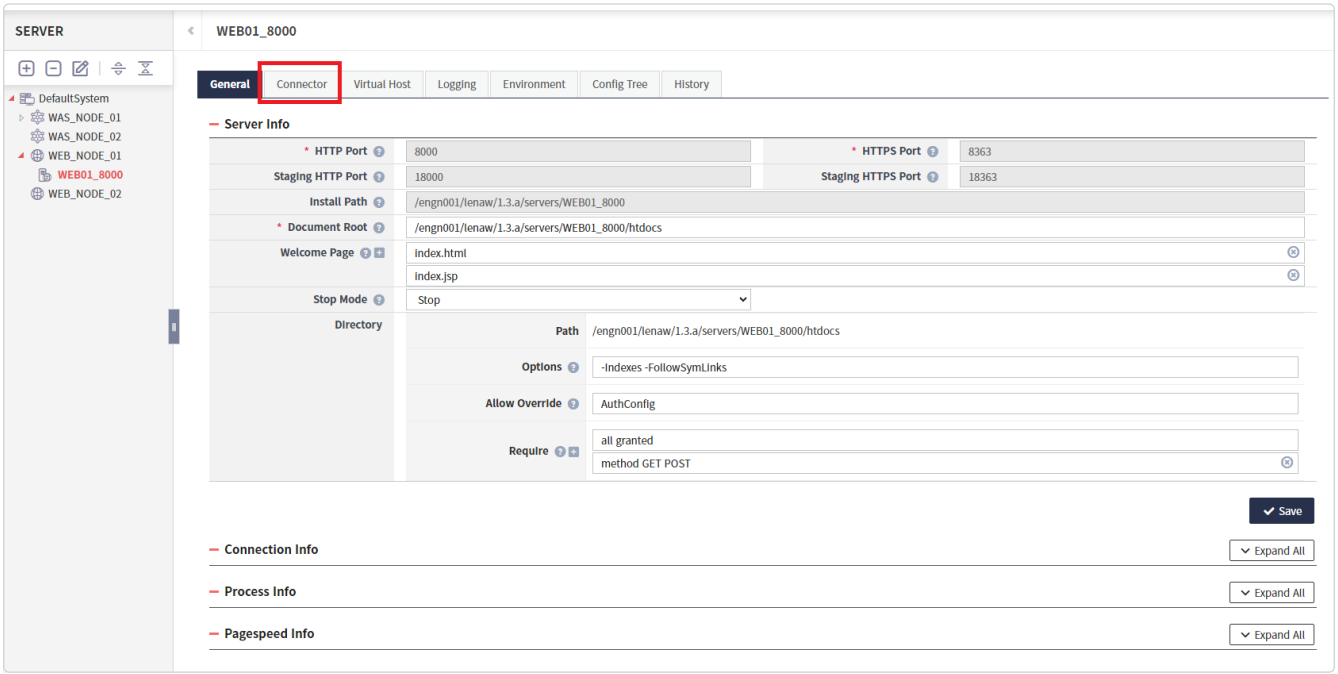

Figure 18. Initial Web Server settings screen

On the Web Server 'Connector' tab, you manage settings for connections between the Web Server and WAS.
Add the WAS to integrate under the Load Balancer Worker List at the bottom of the 'Connector' tab screen to complete the basic integration between the Web Server and WAS.

To add a WAS to integrate, click 'Add Worker' in the Configuration tab under the Load Balancer section. In the popup, select a WAS that has been installed and click 'Save'.

The popup lists WASs by WAS Node registered in LENA Manager. WASs already registered in the 'Connector' are not displayed.

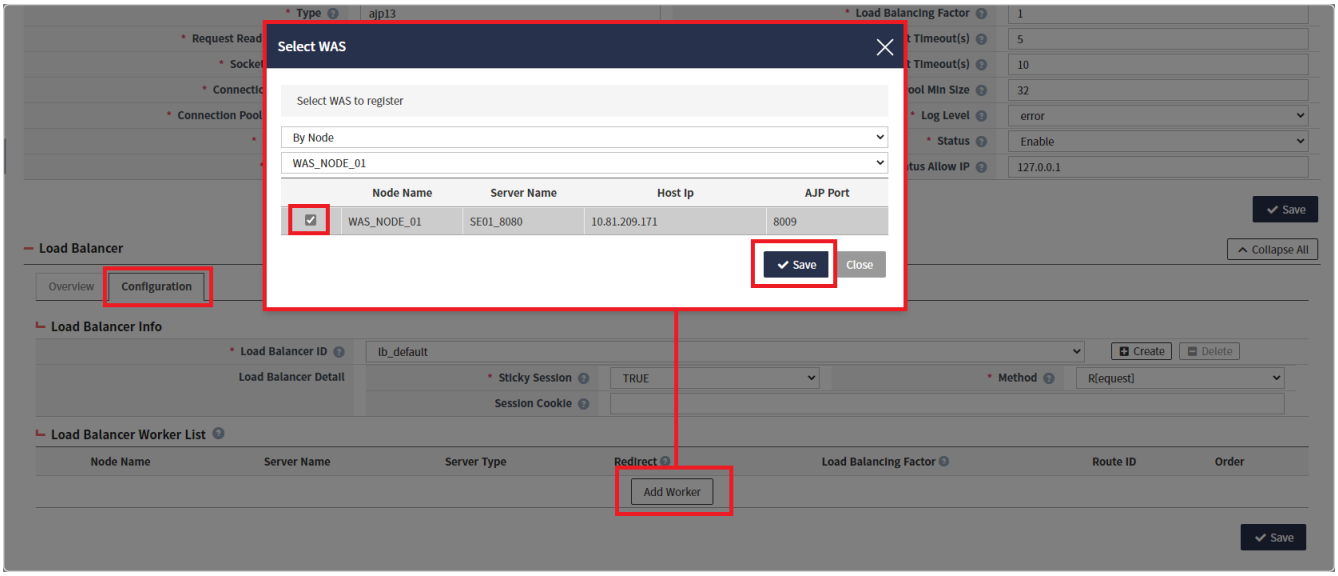

Figure 19. Add WAS to integrate

After adding the WAS to the list, click 'Save' at the bottom right to save the configuration.

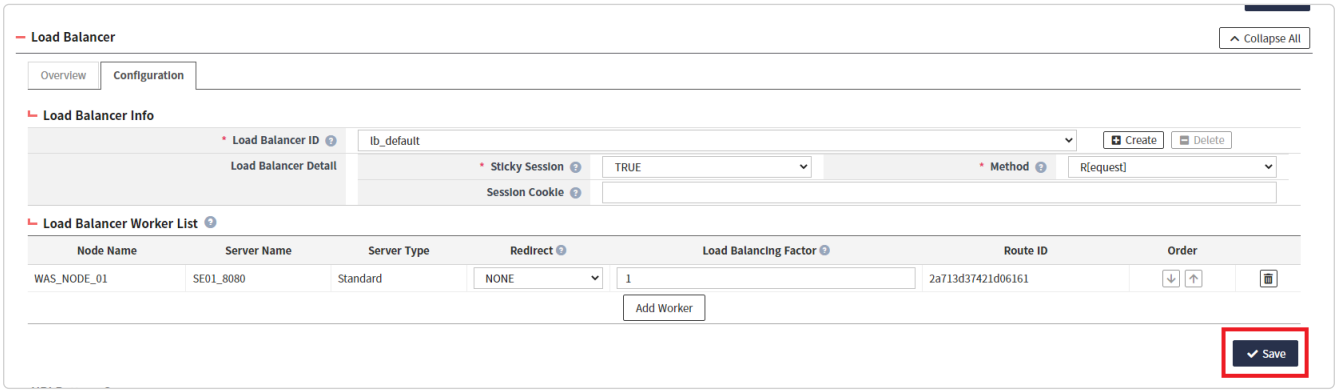

Figure 20. Save the list of WAS to integrate

3.1.7. Install/Run WebN Server

Like installing a WebA Server, you can install a Web Server via the LENA Manager Web UI. Select a Web Server Node with engine type EN-N, then install a WebN Server.

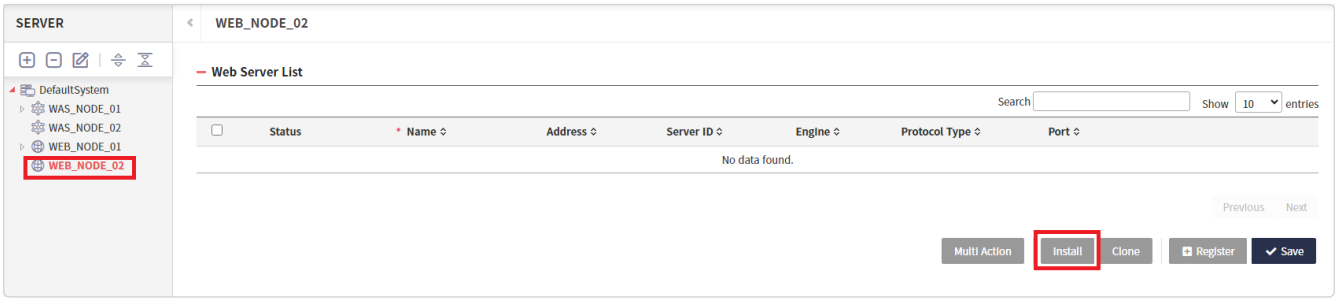

Figure 21. View Web Server List

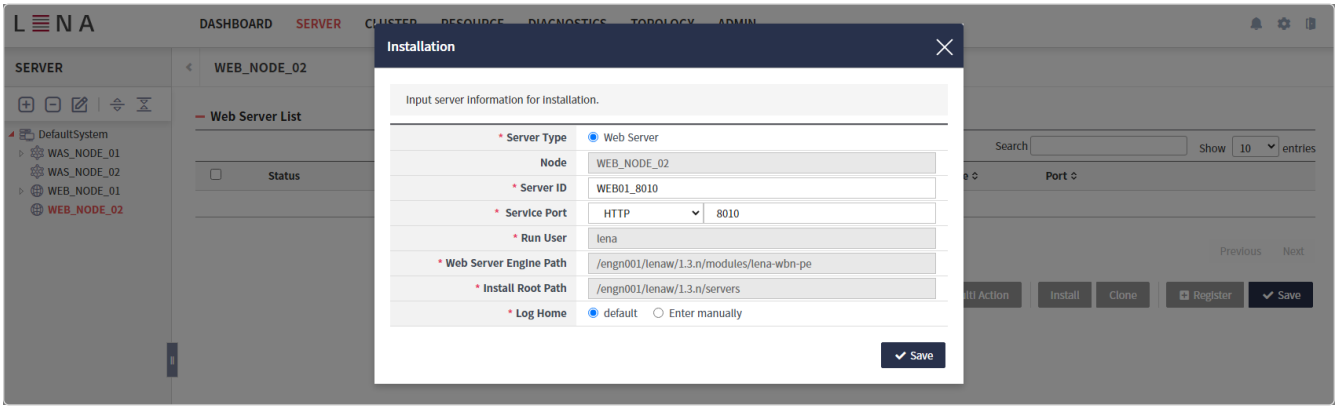

Figure 22. Web Server installation popup and example values

Click 'Install' to open a popup for installing the Web Server. Each field is as follows:

1. Node: The Node where the Web Server will be installed (read-only)
2. Server ID: Name that LENA Manager will use to identify the Web Server
3. Service Port: Port Type and Port Number to be used by the Web Server
    a. Port Type: There are four types. The default type set at installation cannot be changed (the port number can be changed).
    b. HTTP: HTTP protocol-based Web Server (can start immediately after installation)
    c. HTTPS: HTTPS protocol-based Web Server (requires adding an SSL certificate before it can start)
    d. TCP: Net Gateway based on a TCP port (can start immediately after installation)
    e. UDP: Net Gateway based on a UDP port (can start immediately after installation)
4. Run User: OS account used to start the Web Server (read-only)
5. Web Server Engine Path: Engine path used during Web Server installation (read-only)
6. Install Root Path: Path where the Web Server will be installed (read-only)
7. Log Home: Path for Web Server logs
    a. default: [Install Root Path]/logs
    b. custom: User-defined path

A Web Server uses multiple ports such as HTTP and HTTPS at runtime. For LENA N-type Web Servers, only the base port is entered during installation, and installation proceeds using that type. You can add other types later, but the base type selected at installation cannot be deleted.

After entering all Web Server installation information, click 'Save' to install the Web Server. You can then see it in the Web Server List.

Figure 23. Web Server List after successful installation

To start a stopped Web Server, click the 'Start' button on the right of the Web Server List. To stop a running Web Server, the same button changes to 'Stop'; click it.

When a Web Server starts, its startup log is shown in a popup.

Figure 24. Web Server startup and logs

3.1.8. WebN Server - WAS Integration (Proxy)

This section describes how to integrate a WebN Server with a WAS. Integration is performed on the WebN Server settings screen. In the 'SERVER' menu of LENA Manager, select the installed WebN Server to open its settings screen, then select the 'Connector' tab at the top.

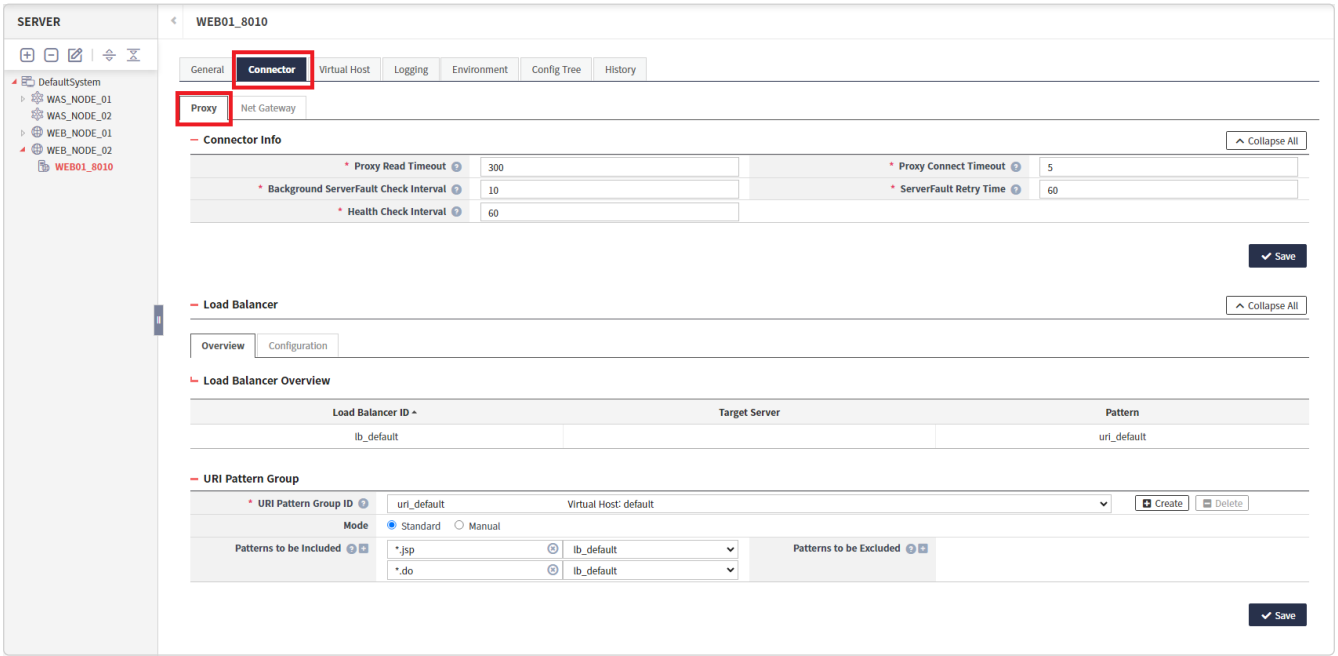

Figure 25. Initial Web Server settings screen

On the WebN Server 'Connector' tab, you manage settings for connections between the WebN Server and WAS. In the 'Connector' tab screen, go to the Proxy tab > Load Balancer > Configuration tab and add the WAS to the Load Balancer Member List to complete the basic integration between the WebN Server and WAS.

To add a WAS to integrate, click 'Add Member' in the Configuration tab under the Load Balancer section. In the popup, select an installed WAS and click 'Save'. The popup lists WASs by WAS Node registered in LENA Manager. WASs already registered in the 'Connector' are not displayed.

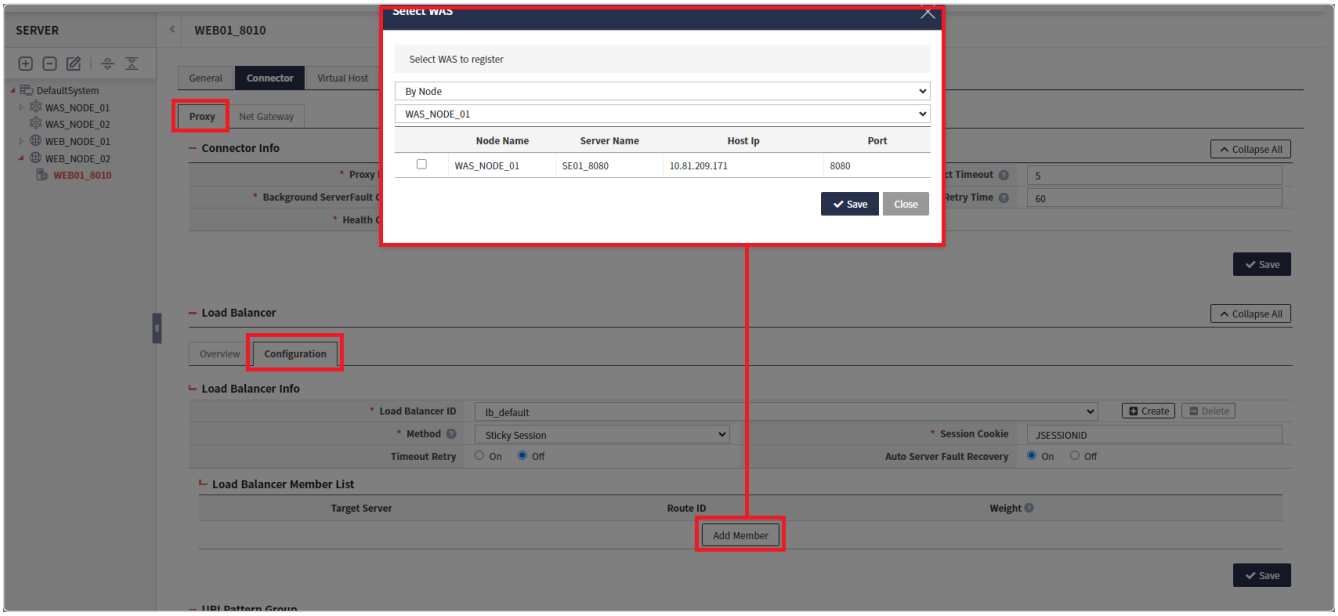

Figure 26. Add WAS to integrate

After adding the WAS to the Member List, click 'Save' at the bottom right to save the configuration.

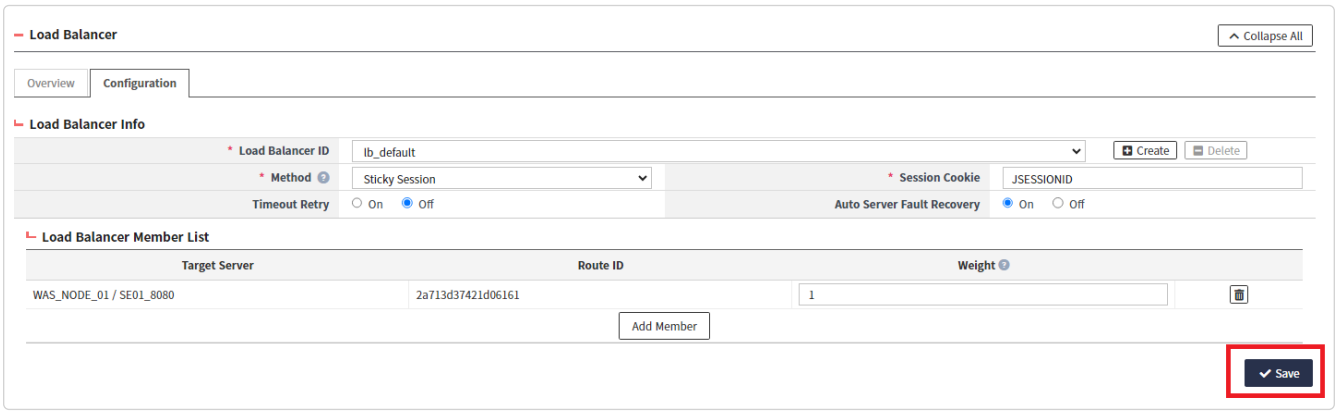

Figure 27. Save the list of WAS to integrate

3.1.9. WebN Server - WAS Integration (Net Gateway)

This section describes how to integrate a WebN Server with a backend server. Integration is performed on the WebN Server settings screen. In the 'SERVER' menu of LENA Manager, select the installed WebN Server to open its settings screen, then select the 'Connector' tab at the top. Next, choose the 'Net Gateway' tab below.

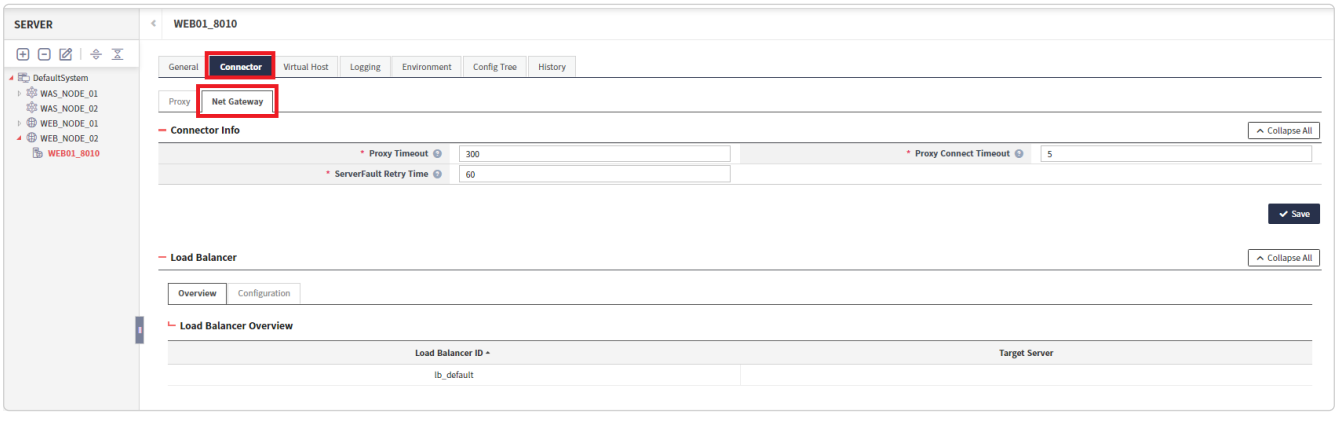

Figure 28. Initial Web Server settings screen

On the 'Net Gateway' tab under the WebN Server 'Connector' tab, you manage settings for

connections between the WebN Server and backend servers.
Add the backend servers to integrate under the Load Balancer Worker List at the bottom of the 'Connector' tab screen to complete the basic integration between the Web Server and backend servers.

To add a backend server, click 'Add Upstream' in the Configuration tab under the Load Balancer section and directly enter IP or DNS and Port, then click 'Save'.

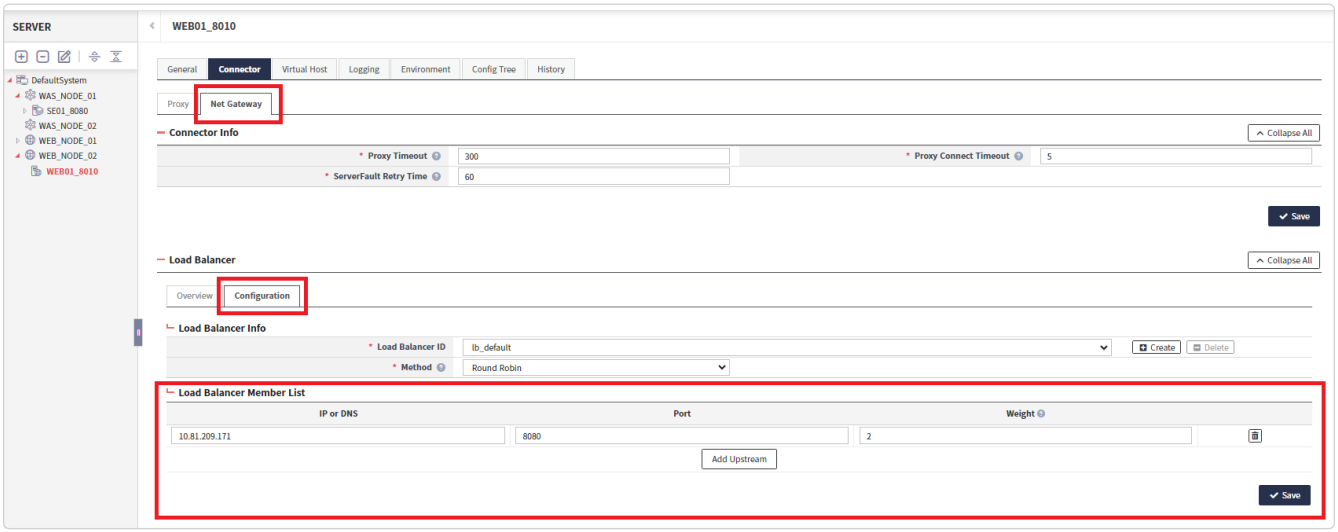

Figure 29. Add backend servers to integrate

After adding the backend servers to the Member List, click 'Save' at the bottom right to save the configuration.

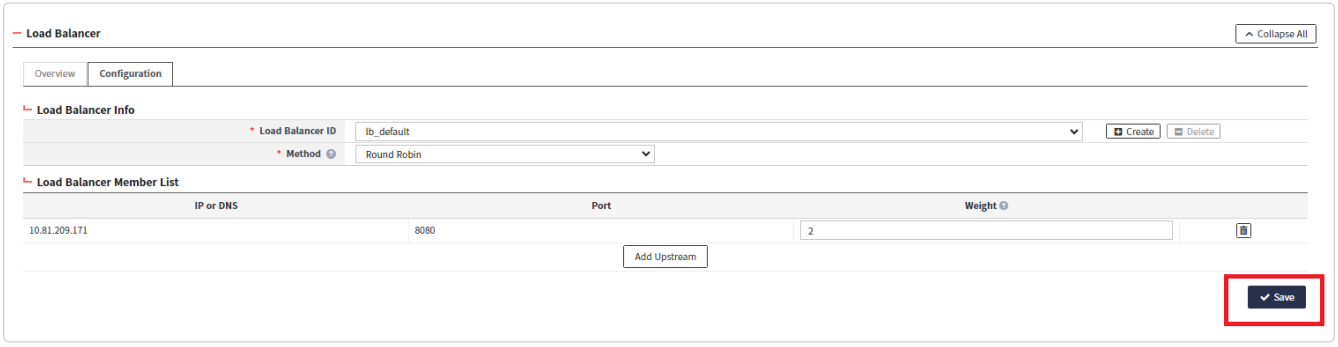

Figure 30. Save the list of backend servers to integrate

3.1.10. Install and Integrate Session Server

Install a Session Server when applying session clustering. There are two installation methods:

1. Standalone mode: Install the Session Server on a separate server
2. Embedded mode: Do not install the Session Server on a separate server, instead, install it in embedded mode inside an existing WAS

Standalone Mode Installation and WAS Integration

You can install a Session Server on a WAS Node. Click the 'SERVER' menu at the top of LENA Manager, then select the WAS Node where you will install the Session Server. At the bottom of the WAS List, you can find the Session Server List, which shows installed Session Servers.

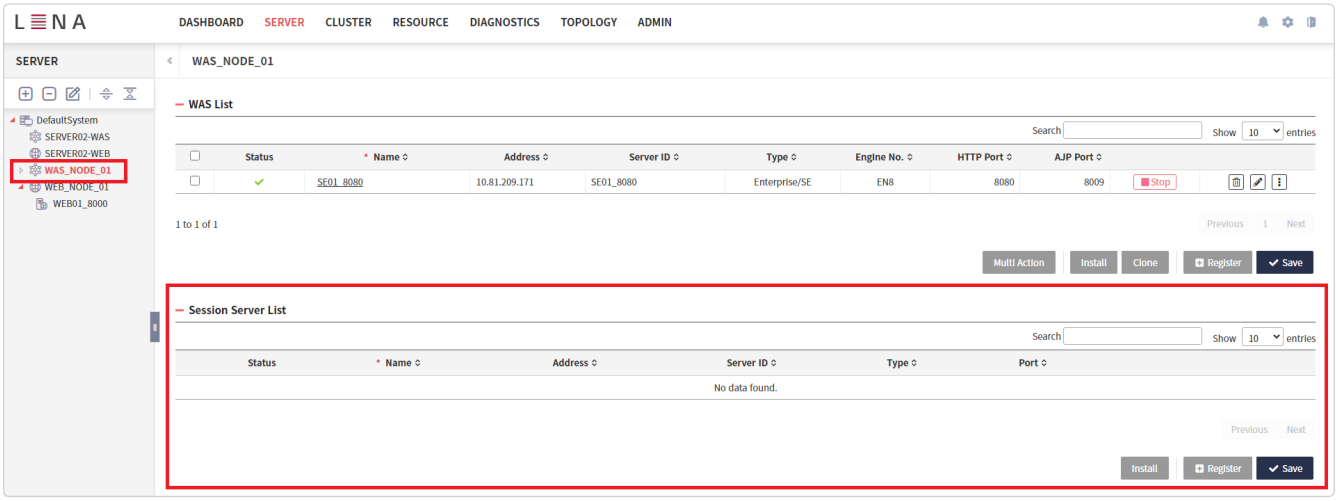

Figure 31. View Session Server List

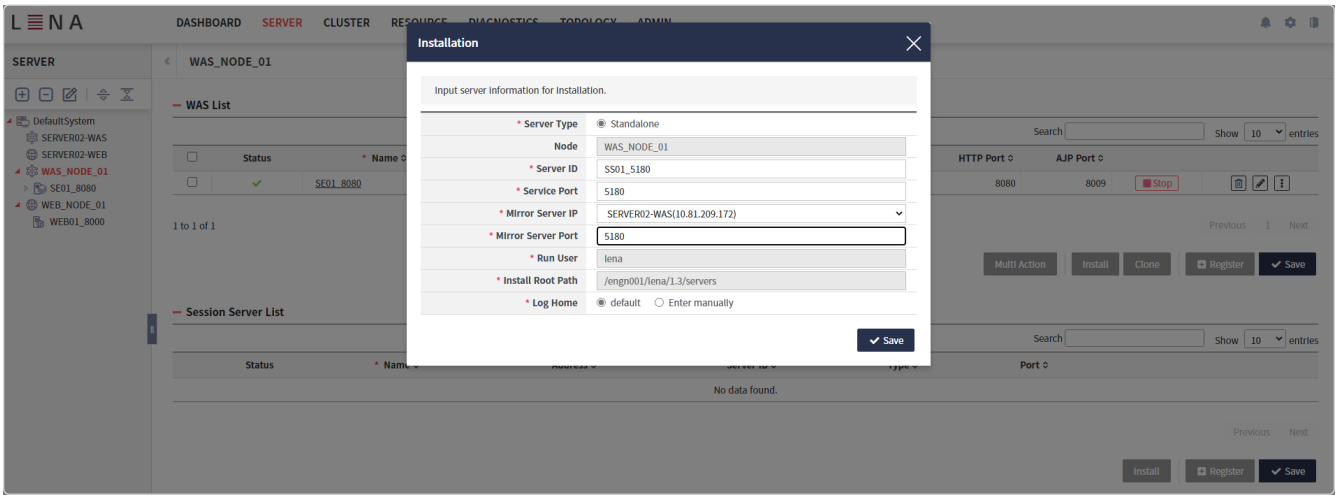

Figure 32. Session Server installation popup and example values

Click 'Install' to open a popup for installing the Session Server. Each field is as follows:

1. Server Type: Standalone (fixed)
2. Node: The Node where the Session Server will be installed (read-only)
3. Server ID: Name that LENA Manager will use to identify the Session Server
4. Service Port: Port to be used by the Session Server
5. Mirror Server IP: The other Session Server's Node (choose from registered Nodes)
6. Mirror Server Port: Port used by the Session Server on the other Node
7. Run User: OS account used to start the Session Server (read-only)
8. Install Root Path: Path where the Session Server will be installed (read-only)
9. Log Home: Path for Session Server logs
    a. default: [Install Root Path]/logs
    b. Enter manually: User-defined path

After entering all Session Server installation information, click 'Save' to install the Session Server. You can then see it in the Session Server List.

When configuring session clustering, install two Session Servers and configure them as Primary and Secondary for high availability.

In the example above, 'Mirror Server IP' points to the other WAS Node, and you also install a Session Server on that other WAS Node as shown below.

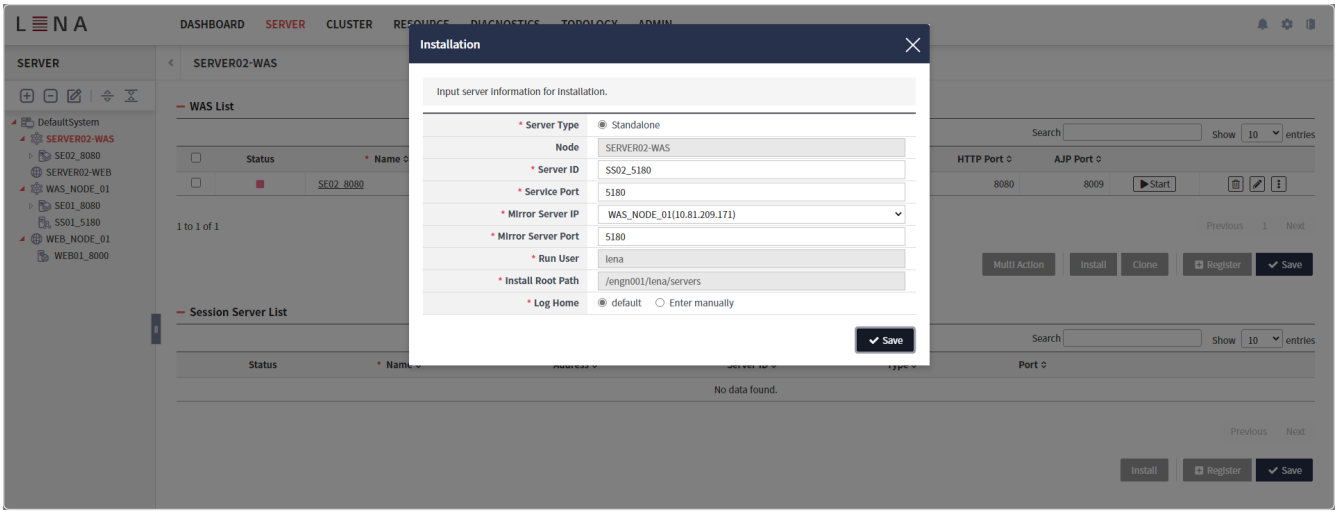

Figure 33. Install the other Session Server

After installing both Session Servers, to integrate with a WAS, open the WAS settings screen and select the 'Session' tab.
On the 'Session' tab, you manage the settings for integrating WAS with Session Servers to apply session clustering. Change the 'Session Clustering Enable' setting to 'Yes' to reveal detailed settings. In Standalone mode, you enable session clustering by starting the separately installed Session Servers and integrating them with the WAS.

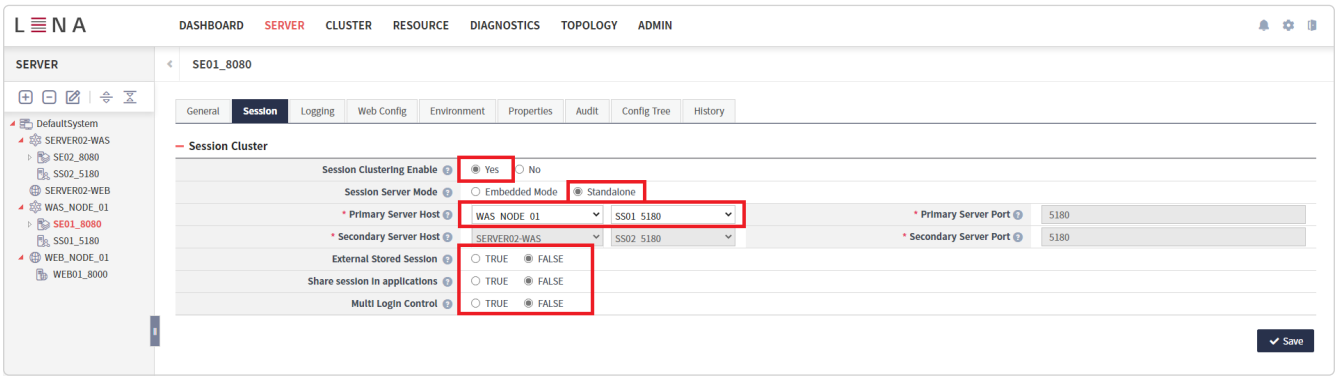

Figure 34. WAS settings for Standalone mode Session Server

For Standalone mode Session Servers, configure the following settings:

1. Primary Server Host: Select the Node where the Session Server designated as Primary is installed and choose the Session Server
2. Secondary Server Host: Select the Node and Session Server for the Secondary. When two Session Servers are installed and you choose the Primary Server Host, the other Session Server is automatically designated as Secondary
3. External Stored Session: When applying session clustering, choose whether session data managed by the two Session Servers and WAS is stored only in the Session Servers. Primarily used in cloud or container environments (Default false)
4. Share session in applications: If multiple applications are deployed on a WAS, choose whether to share session data among those applications (Default false)
5. Multi Login Control: Choose whether to enable duplicate login control (Default false)

For Standalone mode Session Servers, apply the above settings to each WAS where you want to enable the feature.

You must restart the WAS after changing session settings.

Embedded Mode Installation and WAS Integration

Select the WAS that will use the Session Server feature in Embedded mode, open its settings screen, and select the 'Session' tab at the top.
On the 'Session' tab, you manage the settings for integrating WAS with Session Servers to apply session clustering. Change the 'Session Clustering Enable' setting to 'Yes' to reveal detailed settings. In Embedded mode, the Session Server feature runs embedded inside the WAS when the WAS starts.

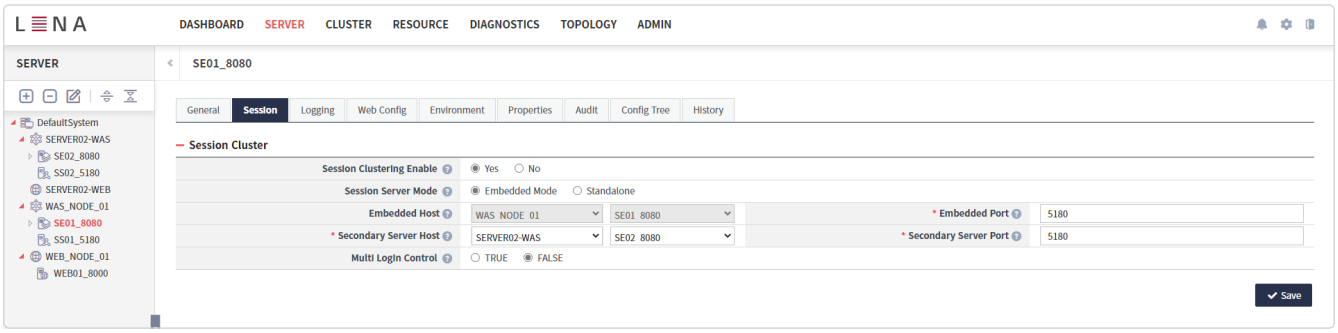

Figure 35. WAS settings for Embedded mode Session Server

For Embedded mode Session Servers, configure the following settings:

1. Embedded Host: Fixed to the current WAS when Embedded mode is selected
2. Embedded Port: Enter the port used by the Embedded Session Server
3. Secondary Server Host: Select the WAS that will host the other Embedded Session Server. Select the Node where WAS is installed, then choose the WAS
4. Secondary Server Port: Enter the port used by the other Embedded Session Server
5. Multi Login Contorl: Choose whether to enable duplicate login control (Default false)

After entering and selecting values, click 'Save' to complete the Embedded Session configuration. When you configure Embedded Session on one WAS, the same settings are applied to the other WAS.

You must restart the WAS after changing session settings.

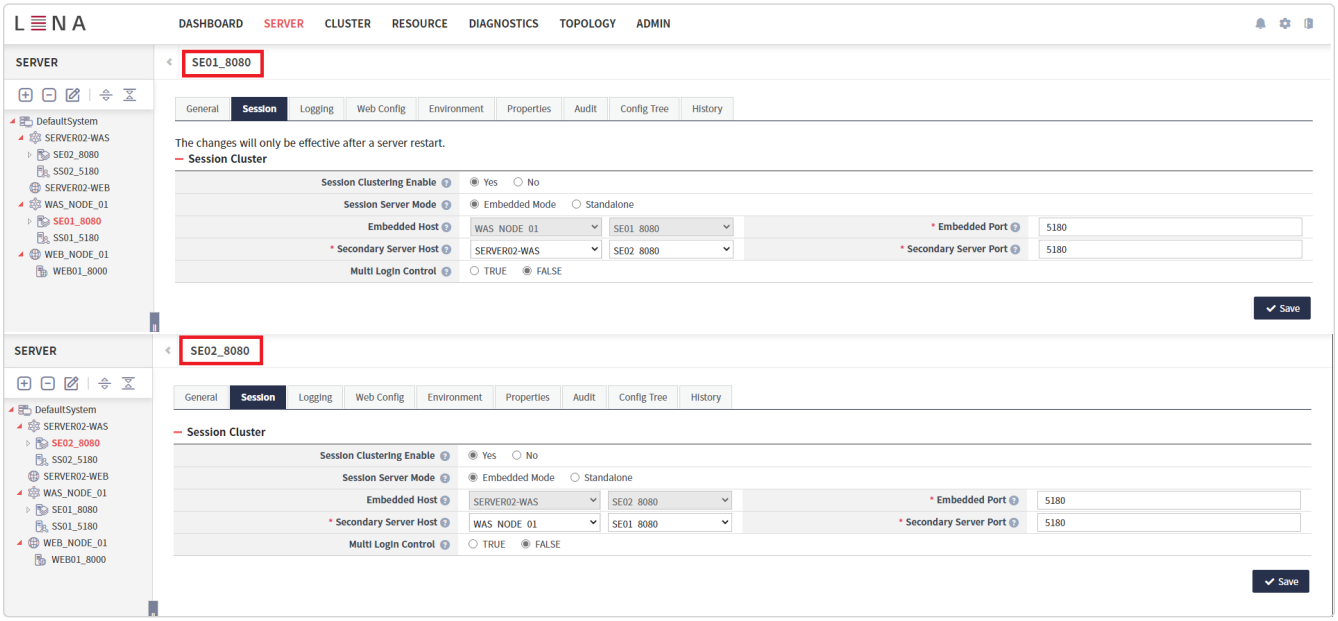

Figure 36. Completion of WAS Embedded mode Session Server settings

3.1.11. Verify Integration Between Servers

This section explains how to verify the integration settings performed in WebA Server - WAS Integration, WebN Server - WAS Integration (Proxy), and WebN Server - WAS Integration (Net Gateway).
LENA Manager provides a Topology view that makes it easy to check the configuration of installed servers. Using this feature, you can verify that integration is normal, and you can also verify it using the LENA sample page bundled with Web Server and WAS at install time.

Verify via Topology

Click the 'Topology' menu at the top of LENA Manager.

Topology View displays the currently registered Nodes and the servers installed per Node along with integration information.
Integration between the Web Server and WAS is represented by connecting lines, which lets you confirm the servers are properly integrated.

Verify by calling the Sample Page

LENA Web Server and WAS include a bundled sample page and sample application. These can also be used to verify integration after initial installation.

First, check the IP and port of the Web Server and enter the following in your web browser.

http://[Web Server IP]:[Web Server Port]/index.html

You should see the index.html page provided by LENA, confirming the Web Server is responding normally.

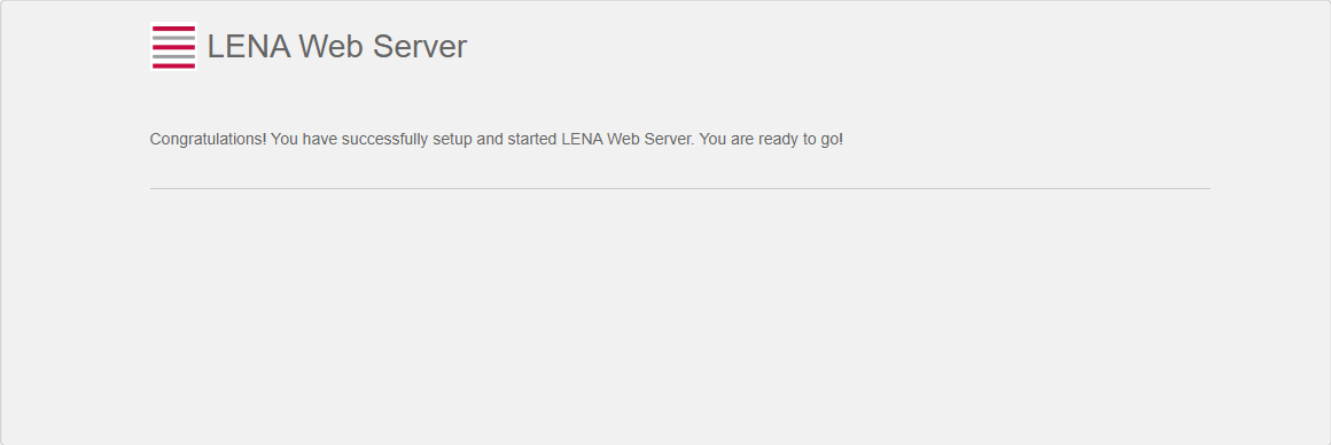

Figure 37. Web Server call test

Verify by calling the Sample Application

When you install LENA WAS, a default application provided by LENA is bundled. Calling index.jsp in this application lets you test a WAS call.

Assuming the Web Server and WAS are in their initial configuration state, enter the following in your web browser.

http://[Web Server IP]:[Web Server Port]/index.jsp

If the Web Server and WAS are properly connected, the above request to the Web Server IP and port is forwarded to the WAS to request the index.jsp page, and the index.jsp page provided by the LENA sample application is displayed as follows.

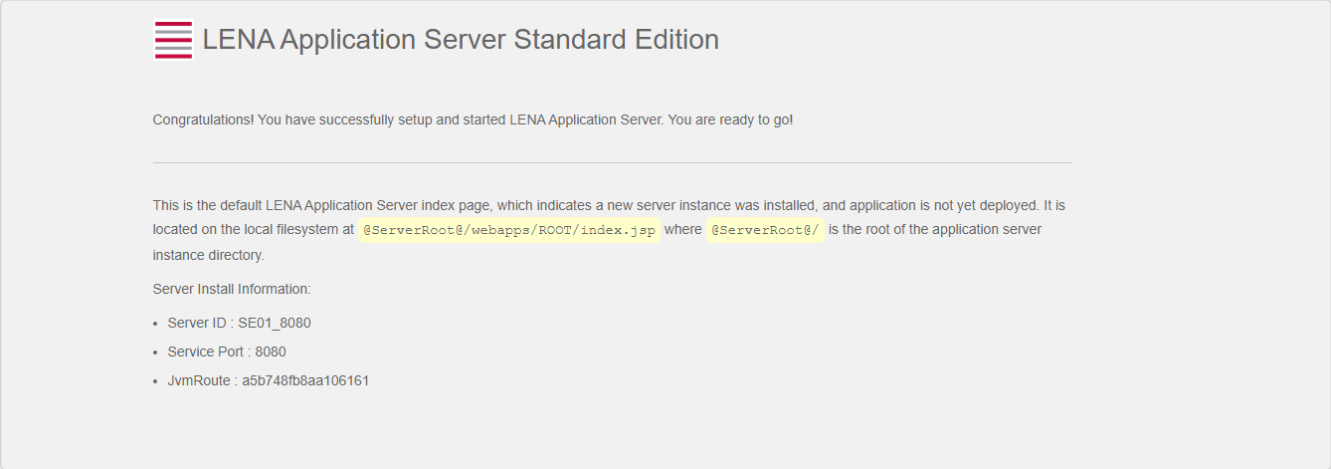

Figure 38. index.jsp call test

When you call the index.jsp page, you can see which WAS processed the request by the Server ID, Service Port, and JvmRoute values.