SOLUTION PARTNER FOR **SMART TECHNOLOGY**

LENA

User Guide

LENA Support

Version 1.3.4.2

Table of Contents

Chapter 1. Overview

1.1. What is LENA?

LENA is a web middleware solution that includes all components necessary for serving Web Applications.

LENA consists of Server products that provide actual web services and a Web UI-based Manager Console for integrated management. Users can easily perform Server installation, Parameter configuration, and inter-product integration through the Manager Console, and with LENA's user-friendly UX/UI design, even users unfamiliar with web middleware solutions can quickly learn how to use them and acquire web middleware-related knowledge.

LENA provides various convenience features by consolidating years of operational know-how from web middleware operators in data center/cloud environments.

1.2. LENA Features

High Efficiency

LENA Web Application Server has achieved improvements in startup performance and Application Deploy performance compared to third-party WAS, and resource usage efficiency such as CPU/Memory has been improved.

Open Source Compatibility Guarantee

LENA Web Server and LENA WAS are implemented on Open Source Base, ensuring perfect Open Source compatibility. Web Applications written on Open Source basis can be applied to LENA without separate modifications, greatly reducing transition effort. Additionally, using standard technologies for libraries and configuration resolves vendor dependency and strengthens users' IT ownership.

Multi-Server Management and Centralized Operation

Multiple LENA Web Servers and LENA WAS can be grouped into a single Cluster, allowing control of multiple servers simultaneously through single operation.

Operational Differentiation Features

Provides various convenience features for easy operation of web middleware solutions. Using template-based simple and fast Server installation and Server replication features, desired configuration sets can be built in a short time. Through Topology View, configuration and integration information between Server modules can be checked at a glance, improving visibility. Through Dashboard, performance status of operating systems can be checked. Additionally, through Multi Account management, menu/resource access permission settings are possible, and operator Action Tracing, configuration update information History tracking, and Restore functionality are provided.

1.3. LENA Components and Key Concepts

LENA is provided through Binary Package and includes all necessary components. Components are broadly divided into two categories.

- Management Module for operating and managing LENA, including LENA Manager Console and LENA Node Agent.

- Server Module responsible for actual Web Service, including LENA Web Server and LENA WAS (Web Application Server).

The following covers detailed descriptions of each component along with key concepts.

1.3.1. Management Module

LENA Manager

LENA Manager is a Web Application designed to configure and control all resources/functions of LENA through Web UI. Installation and start can be performed through scripts prepared in the LENA Package. To perform Server installation/management through LENA Manager, integration with Node Agent and Advertiser must be configured.

The following explains representative functions and concepts provided by LENA Manager. For detailed information not described below, refer to the manual content for each menu.

- **Dashboard**
  Check resource status and Events of LENA Node and Server
- **Server**
  Register LENA Node, install servers by type, manage configuration, and control start/stop
  - **System**
    Minimum unit for managing LENA Node and Server. Multiple Nodes can be registered under one System, but one Node cannot be registered in multiple Systems.
  - **Node**
    Concept corresponding 1:1 with Node Agent. To execute commands on remote Servers from Manager, it must be done through Node Agent.
- **Resource**
  While not a Module provided by LENA, it defines specifications for resources that are closely integrated with LENA Server, using them as Resources. Resources can be set locally for each LENA WAS, but through the Resource menu, they can be set globally and imported by WAS, avoiding duplicate work.
  - **Database**
    Defines physical specifications such as IP, Port, Driver of DBMS. Corresponds 1:1 with one DBMS.
  - **Datasource**
    Specifies JNDI Name, Url, User ID/Password for configuring DB Connection Pool in LENA WAS. Multiple Datasources can be configured under one Database.
  - **Application**
    Specifies the location and Context Path of the Application to be executed through LENA WAS.
- **Topology**
  Expresses the configuration status of LENA Web Server, LENA WAS, etc. installed and integrated on LENA Manager in Topology Diagram format. Through this function, simple Server installation and start/stop control are also possible.
- **Diagnostics**
  Equipped with resource monitoring for LENA Node and Server and various related functions.

LENA Node Agent

LENA Node Agent corresponds 1:1 with Node when registering Node in LENA Manager, and is installed by default in LENA Package, so it can be started through prepared scripts. Main roles are processing commands for Servers under Node commanded through LENA Manager and transmitting monitoring and status data to LENA Manager. One Node Agent per physical server

is the default, but multiple Node Agents can be configured as needed. LENA Web Server and LENA WAS are configured under LENA Node, and LENA Node is configured under one System.

1.3.2. Server Module

LENA Web Server

LENA Web Server can transmit static content and integrates with LENA WAS in Reverse Proxy form, performing the front-end role for Web Application services provided by LENA WAS. Additionally, various optional additional functions can be used, with Domain/URI-based branching and Load Balancing functions and security layer (SSL) being representative.

LENA WAS (Web Application Server)

LENA WAS executes Java Web Applications to provide Web Application services. It includes Datasource integration functionality for using DB Connection Pool. It consists only of Servlet Engine for processing Java Class files and JSP Engine for processing JSP files, and can only execute WAR Type Web Applications.

LENA WAS internally mounts Advertiser Module, which collects LENA WAS's JVM internal monitoring results through JMX and transmits them to LENA Manager.

1.4. LENA Operation Method

Node Agent is installed on Nodes registered in Manager, and Advertiser is installed on Application Server.

Operators send control requests for Server (e.g., Start, Stop, Reload, Dump, configuration changes, etc.) to each Node Agent through Manager's UI, and Node Agent receives and executes the control.

Node Agent and Advertiser periodically transmit monitoring data to Manager, and operators can check resource status of each server through Manager's UI such as Monitoring Dashboard.

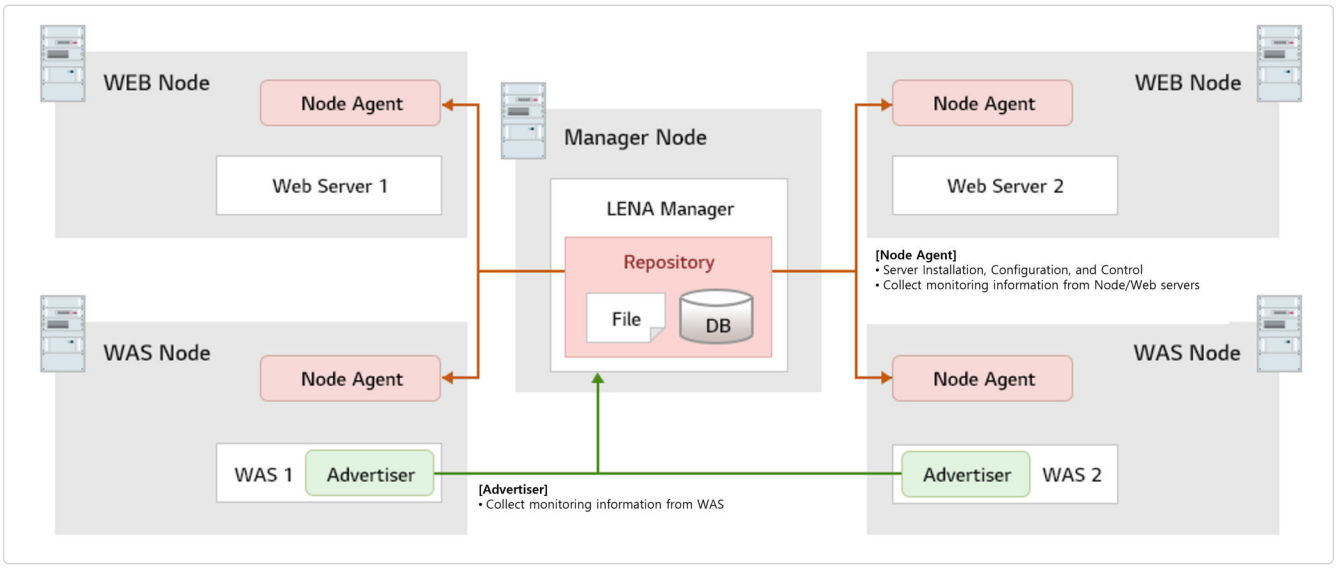


Figure 1. LENA Mechanism

Table 1. LENA Component Descriptions

Component	Description
Manager	Provides Server control through Agent and monitoring functionality

Component	Description
Repository	Mounts File/DB for Manager operation
Node	Mounts Node Agent. Server Module is installed under Node
Node Agent	- Server installation/replication/patch - Server start/stop control - Server configuration management - Node, Web Server, WAS status information - Node, Web Server resource monitoring data provision
Advertiser	Provides WAS resource monitoring data
WAS	Provides Java Web Application services
Web Server	Integrates with WAS in Reverse Proxy form, performing front-end role for Web services

1.5. Provided Specifications

Functions or specifications provided by LENA are as follows.

Table 2. Provided Functions and Specifications

Function/Spec (LENA-Manager Standard)		Provision
Server	Web Server	●
	Web Application Server	●
Resource	Database	●
	DataSource (General)	●
	Application (WAR)	●
Topology		●
Security		●
Diagnostics	Monitoring	●
	Diagnostics/Response	-
Patch		●

Chapter 2. Log In/Out

Provides functionality for logging in and out of the Manager.

2.1. Log In

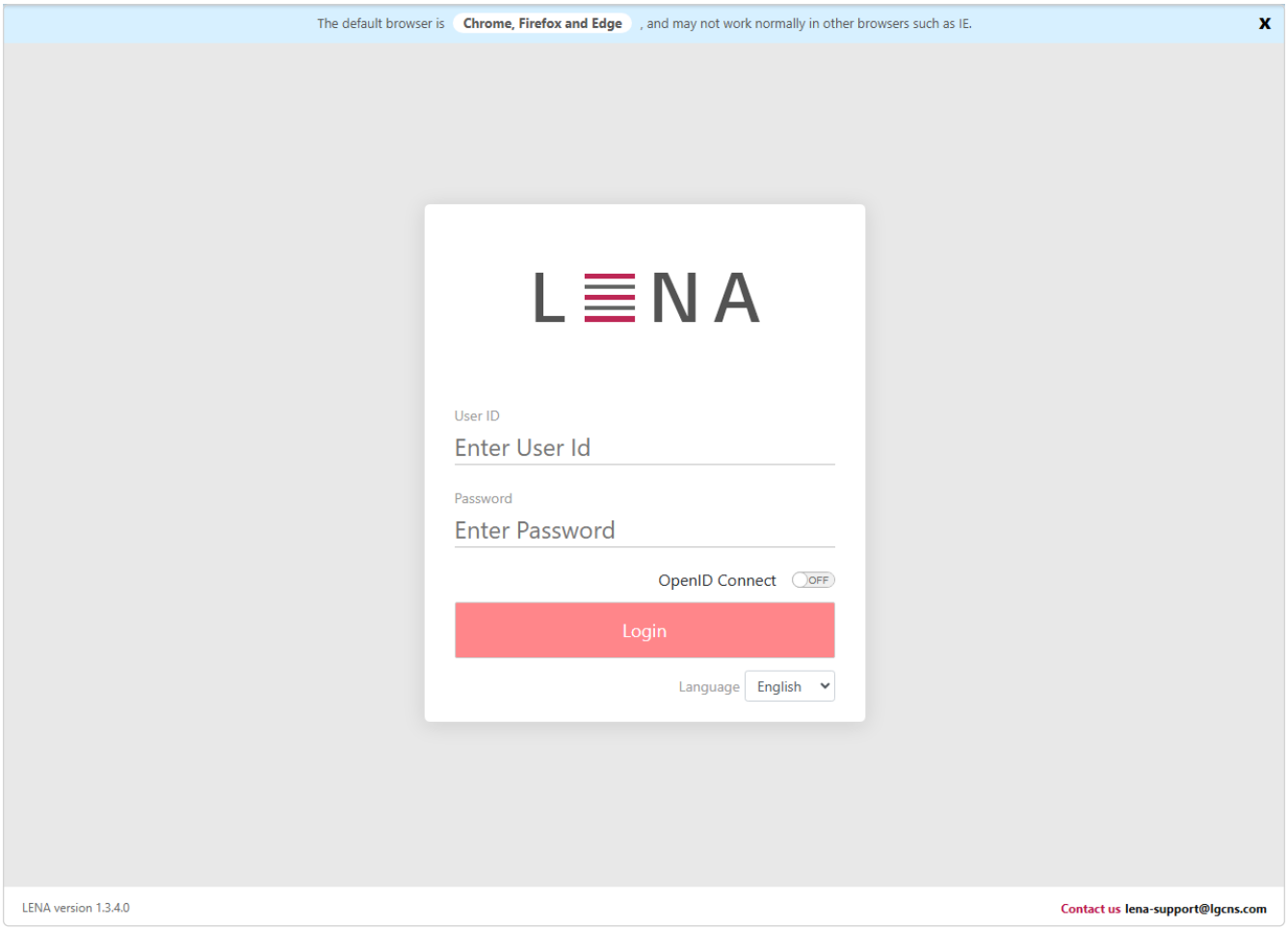


Figure 2. Manager Access Screen

The installed version is displayed on the bottom left of the login page, and technical support contact information is displayed on the right.

When attempting to log in, if there are 7 or more password errors, you cannot log in with that user. In such cases, the password must be reset through the console. (For detailed information, refer to the 'Manager admin password reset' section in the Appendix.)

2.2. Log Out

You can log out using the **door icon** on the top right of the Manager.

2.3. Theme Change

You can set the theme through the Dark Theme menu in the **gear icon** menu on the top right of the Manager. You can choose between light mode and dark mode.

Chapter 3. Dashboard

Provides a summary of system configuration information, resource monitoring, events, licenses, and other information managed by the Manager.

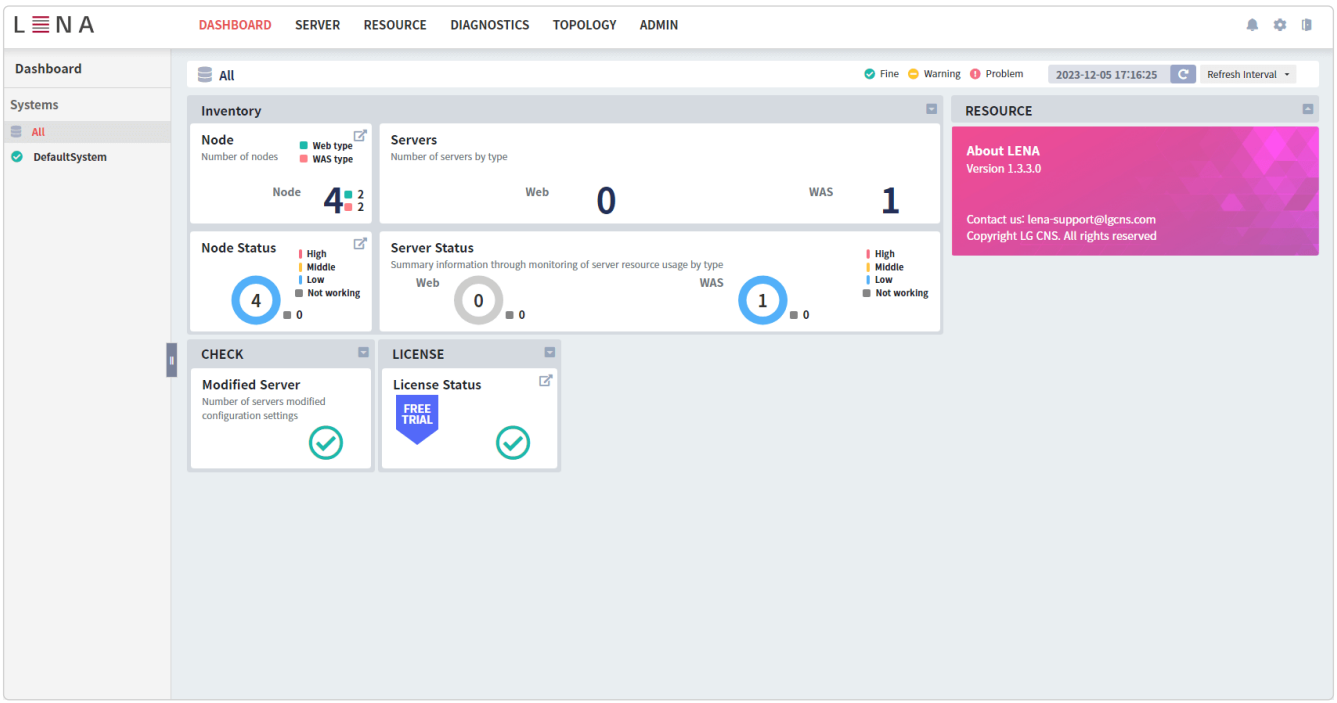


Figure 3. Dashboard

The system list on the left side of the screen provides a list of systems that the logged-in user has permissions for. All shows integrated information from all systems the user has permissions for.

Table 3. Dashboard Items

Item		Description	Notes
INVENTORY	Node	Number of Nodes included in the System	Legend: Count by Node type • Web type : Number of nodes where Web Server can be installed • WAS type : Number of nodes where WAS can be installed
	Server	Count by Server type included in the System	
	Node Status	Resource usage (CPU, Memory, DISK) status of Nodes included in the System	Legend • High / Middle / Low • Not working : Number of stopped Nodes (Agent)
	Server Status	Resource usage status of Servers included in the System • Web : CPU, Memory, Thread check • WAS : Heap Memory, Thread Pool check	Legend • High / Middle / Low • Not working : Number of stopped or hung servers
CHECK	Modified Server	Whether servers requiring restart exist among Servers included in the System	

Item		Description	Notes
RESOURCE	DB Resource	Number of Databases and Datasources registered and managed in the RESOURCE menu	Datasource legend • Used : Number of Datasources currently in use by WAS • Not Used : Number of Datasources not currently in use by WAS
LICENSE	License Status	License status of nodes (displays valid days for Trial license or valid days for commercial license (from 15 days before expiration date))	

Chapter 4. Server

Provides a screen for managing Node, WAS, and Web Server.

You can check the number of Nodes and each Server within a specific System, and manage Node and Server status comprehensively in real-time.

4.1. System

System is a logical group that contains multiple Servers. "DefaultSystem" is provided by default, and users can create, modify, and delete Systems.

4.1.1. List

System list is provided in tree format on the left side of the screen.

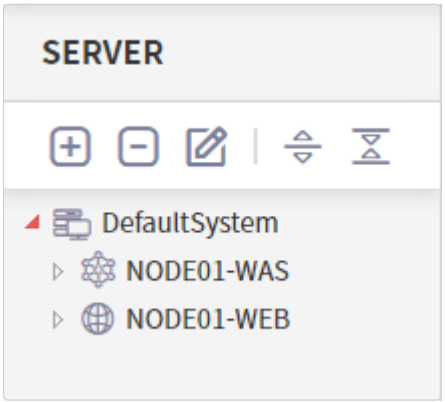


Figure 4. System List

4.1.2. Registration

1. Click the **Register(+) button** to create "Create System" in the list.
2. Enter the name of the system to create and press Enter.
3. Click the **OK button** to save.

The permissions of the currently logged-in user are mapped to that System. That is, only users with the same permissions as the logged-in user can view that System. (Same applies to Node, Server, Resource)

4.1.3. Modification

1. Select the System to modify.
2. Click the **Edit(pencil) button** to change the name of the selected System, then press Enter.
3. Click the **OK button** to save.

4.1.4. Deletion

1. Select the System to delete.
2. Click the **Delete(-) button**.

3. Click the **OK button** to save.

Systems with Nodes underneath cannot be deleted. That is, only empty Systems can be deleted.

4.2. Node

Node is a physical Server that contains multiple WAS, Web Server, and Session Server instances.

4.2.1. List

You can manage each Node through the Node List.

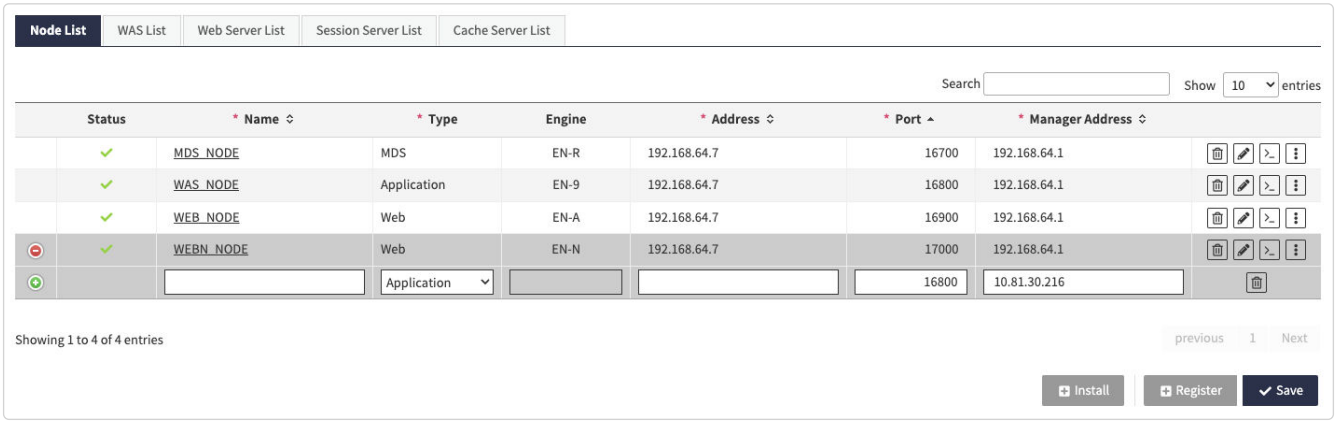


Figure 5. Node List

The properties of Node are as follows.

Table 4. Node Properties

Item (* indicates required value)	Description	Notes
Node information change status	New/Modified/Deleted status of Node data	**+ icon** - Display change status when **Register** / **Edit(pencil)** button is clicked **- icon** - Display deletion pending when **Delete(trash can)** is clicked
Status	Current status of Node	• Started(v) • Stop(□)
Name(*)	Node name	

Item (* indicates required value)	Description	Notes
Type(*)	Node Type	All - Can install all types of Servers Application - Can install WAS and Session Server Web - Can install Web Server MDS - Can install Cache Server
Engine	Engine type according to Node Type	Application - EN-7: Java EE 6 / Servlet 3.0 support - EN-8: Java EE 7 / Servlet 3.1 support - EN-9: Java EE 8 / Servlet 4.0 support - EN-10: Servlet 6.0 support Web - EN-A: JK, Proxy support - EN-N: Proxy, Net-Gateway support MDS - EN-R: Memory Cache support
Address(*)	Node IP address	
Port(*)	Node Agent port number	Default - 16800 (when Node Type is All or Application) - 16900 (when Node Type is Web) - 16700 (when Node Type is MDS)
Manager Address(*)	Manager IP address	
Button area	Displays Node information change and related function buttons	**Trash can icon** - Delete Node information **Pen icon** - Modify Node information **Terminal icon** - Provides SSH terminal functionality to the server where Node is installed **More icon** - Provides menu for JAVA Home setting and Start/Stop

4.2.2. Install

1. Click the **Install button** to prepare Node information registration.
2. Enter Node property values.
3. Click the **Save button** to save.

Table 5. Properties set during Install

Item (* indicates required value)	Description	Notes
Node Type	Node Type	Provides the following types: • Application: Can install WAS and Session Server • Web: Can install Web Server
Node Name(*)	Node name	
Node Address(*)	Node IP address	
Node Port(*)	Node Agent port number	Default : 16800 (when Node Type is All or Application), 16900 (when Node Type is Web)
User(*)	Node execution user account	For Node Type Application, cannot run with root account. For Node Type Web, use root only when Web Server Port must be 1024 or below.
Password(*)	Node execution user account password	
SSH Port	SSH port to access the corresponding Server	
LENA Home	Location where Node Agent will be installed	
JAVA Installation	Whether Java is installed	
JAVA Home	Installed Java path	

Install functionality is only supported in Linux environment.

4.2.3. Register

1. Click the **Register button** to change Node information to registrable state.
2. Enter Node's Name, Type, Address, Port, and Manager Address (default value is provided).

3. Click the **Save button** to save.

- Manager IP is automatically entered as Node's host IP.
- Depending on network configuration, automatically entered IP may differ from actual network IP.
- In this case, you must modify and enter the Manager IP.

4.2.4. Modification

1. Click the **Edit(pencil) button** to change Node information to modifiable state.
2. Modify Node properties.
3. Click the **Save button** to save.

- When Node's Address or Port needs to be changed due to port policy or firewall policy changes, modify agent.conf settings and restart Node Agent.
- At this time, modify and enter Node's Address and Port information so that Manager can also know the changed information.

When saving modified information, if 'Occured Read Timeout' message occurs, check the following cases:

- Port is being used by something other than Node Agent
- Node Agent is hung
- Network problem exists

4.2.5. Deletion

1. Click the **Trash can button** to change Node information to deletable state.
2. Click the **Save button**.

If Servers are registered under a Node, that Node cannot be deleted.

Uninstall is only supported in Linux environment, and is possible only when selecting one node to delete.

4.2.6. Start

Can start nodes that are in stopped state.

1. Select the Start menu provided when selecting the **... button** in the rightmost column of the Node list, then a popup window appears.
2. Enter User, Password, and SSH Port number, then press the **Start button**.

4.2.7. Stop

Can stop nodes that are in running state.

1. Select the Stop menu provided when selecting the **... button** in the rightmost column of the

Node list, then a popup window appears.

2. Enter User, Password, and SSH Port number, then press the **Stop button**.

4.2.8. Change Java Home

Can modify JAVA Home path for Node and Servers installed on Node.

1. Modify JAVA Home Path.
   - Node Java Home Path : Edit Node Java Home Path.
   - Server Java Home Path : Edit JAVA Home path for selected servers. (Not supported in Web Node)
2. Press the **Save button**.

4.2.9. Node Terminal

Can access VM where target Node is installed through LENA Manager and use SSH terminal functionality.

To use this functionality, you must meet the following requirements:

- Node must be running and able to communicate with LENA Manager.
- OS where Node is installed must be Linux-based (Windows-based not supported).
- OS account for Node installation/execution must allow SSH access through password authentication.

This functionality reuses the connection between LENA Manager and Node, so no separate port work is necessary to use this terminal functionality.

Clicking the **terminal icon** in the Node list will show a popup screen for using the functionality, and entering the password of the OS account running Node Agent will execute the SSH terminal.

For detailed settings of Node Terminal functionality, refer to the following Manager Configuration settings.

Table 6. Manager Configuration(manager.conf) Node Terminal functionality setting options

Option key	Default value	Description
ssh.cmdCheck.mode.isWhiteList	true	- When true, controls commands using whitelist method. - When false, controls commands using blacklist method.
ssh.cmdCheck.idleTimeout	600 (second)	Disconnects connection after this time if no action is taken after terminal connection. (Minimum configurable value: 30)
ssh.cmdCheck.whitelist.view	view	Set 'view' or 'vi' commands to allow when using whitelist method, separated by ','
ssh.cmdCheck.whitelist	cd,clear,echo,ll,ls,ps,tail,exit	Set commands to allow when using whitelist method. (view, vi excluded)

Option key	Default value	Description
ssh.cmdCheck.blacklist	alias,chmod,chown,cp,dd,export,rm,mkdir,mv,kill,sed,source,sudo,touch,vi	Set commands to prohibit when using blacklist method, separated by ','

Regardless of Manager Configuration settings, the following expressions cannot be used:

```
'|' cannot be used except for '| grep' case
```

```
'&&' cannot be used
```

```
'>' or '>>' cannot be used
```

```
'()'(sub shell) and $(), and ``(backtick) cannot be used
```

4.3. WAS

Provides screens for managing WAS. Performs registration, modification, and deletion of Servers installed on Nodes, and can also install, remove, and clone Servers.

4.3.1. List

WAS can be managed through the WAS List.

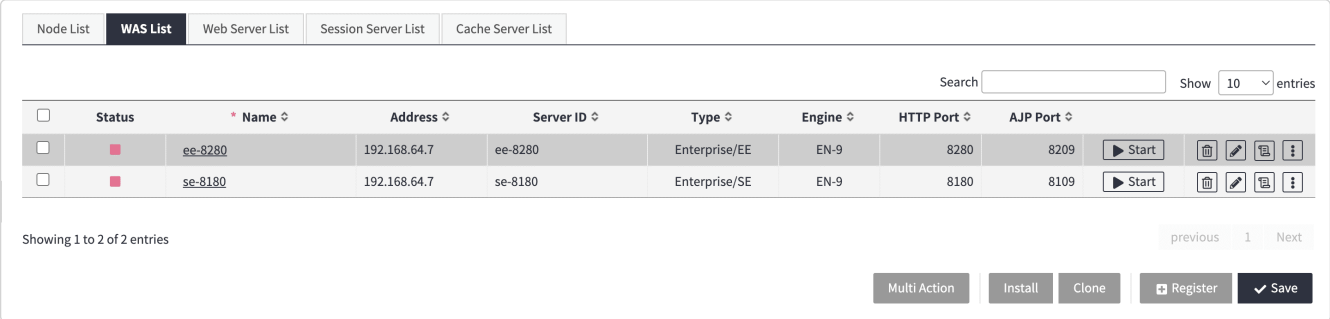


Figure 6. Web Application Server List

WAS attributes are as follows.

Table 7. WAS Attributes

Item (* indicates required values)	Description	Notes
Server information change status	WAS data new/change/delete status and CheckBox for selection	
+ icon - Displays change status when **Register** / **Edit(pencil)** button is clicked	**- icon** - Displays scheduled for deletion when **Delete(trash)** is clicked	Status
Server status	Started (v) Stop (□) Error (!)	Name(*)
Server name		Address
Server IP address		Server ID
Server ID		Type
Server type	Standard Enterprise/EE Enterprise/SE	Engine
Server engine type	Engine refers to LENA's engine type and differs by WAS Java Spec version. - EN-7: Java EE 6 / Servlet 3.0 support - EN-8: Java EE 7 / Servlet 3.1 support - EN-9: Java EE 8 / Servlet 4.0 support - EN-10: Servlet 6.0 support	HTTP Port
HTTP port number		AJP Port
AJP port number		Start/Stop button

Item (* indicates required values)	Description	Notes
Server start and stop		Button area
Displays server information change and related function buttons		**Trash icon** - Delete server information
Pen icon - Edit server information	**Log file icon** - Provides Server Log Viewer functionality	**More icon** - Provides menu for performing Start/Stop

4.3.2. Install

1. Click the **Install button** to prepare for Server installation.
2. Enter Server Type, Server ID, etc.
3. Click the **Save button** to save.

- There may be differences between Servers actually installed on Nodes and Server information managed by Manager. (when installed via console)
- If Server ID duplication error occurs, use Register function to check additional information of installed Servers.

4.3.3. Clone

1. Click the **Clone button** to prepare for Server cloning.
2. Select the Server to clone from Node List. Clone Server ID and Clone Service Port are automatically entered.
3. Modify Clone Server ID and Service Port to desired values.

   (Include External Source is available when cloning servers to other nodes and sets whether to clone application files deployed on the server to be cloned.)

4. Click the **Save button** to save.

- There may be differences between Servers actually installed on Nodes and Server information managed by Manager. (when installed via console)
- If Server ID duplication error occurs, use register function to check additional information of previously installed Servers.
- When remotely cloning WAS servers, Node's Engine No. must be the same to clone WAS servers.

4.3.4. Register

1. Click the **Register button**.
2. Select the Server to register.
3. Click the **Save button** to save.

Installation is also possible from System > Application Server List Tab. However, the Node to install must be selected from Node List.

4.3.5. Modification

1. Click the **Edit(pencil) button** to change Server information to modifiable state.
2. Modify Server attributes.
3. Click the **Save button** to save.

4.3.6. Deletion

1. Click the **Delete(trash) button** to change Server information to deletable state.
2. Click the **Save button**.
3. Press the **OK button** to display a window for selecting deletion type.
   - Deregister : Delete Server information only from Manager DB and maintain physical Server engine (can be re-registered later via **Register button**)
   - Uninstall : Delete Server information from Manager DB and also delete physical Server engine
4. When Uninstall is selected, a window asking about log directory deletion is displayed.

When deleting WAS, the corresponding Server is deleted from the target list of service control (ADMIN > Security > Rule Applying menu).

Servers bound to Server Cluster cannot be deleted.

When use Server Delete Protection value is set to true in Manager Configuration area of ADMIN > Preference > Manager Environment menu, it can prevent servers from being uninstalled from Manager.

4.3.7. Start/Stop

Single Start/Stop

1. Click the **Stop button** to stop the Server.
2. Click the **Start button** to start the Server.

- When stopping Server, WAS stops after all tasks being serviced are completed.
- If tasks are not completed even after Shutdown Timeout time in General tab, it is forcibly stopped.

When Server is started, a popup for viewing log files is executed. You can check whether Server started normally through the popup.

Start button is activated only when in startable state.

Multi Start/Stop

1. Select multiple Servers to start or stop.
2. Click the **Multi Action button** at the bottom of Server list.
3. Select Action Type in popup window and click **Action button** to perform start or stop operations for multiple Servers.

After Start / Stop commands in popup screen, the requested command is not stopped even if popup is closed.

Forced Stop/Restart

1. Click the **Additional function(...) button** at the far right of Server list.
2. Perform forced stop or forced restart.

When performing forced stop or restart, all currently serviced tasks are immediately stopped, so caution is required.

4.3.8. Configuration Information Management

Provides functionality to change Server configuration information. Select the Server name to change from Server list. For Standard Edition, General, Session, Logging, Web Configuration, Environment, Properties, Audit, Configuration Tree, History, TunA tabs are provided, and backup is performed when modifying configuration information for restoration. Enterprise Edition additionally provides Container tab.

When changing Server configuration, Server restart is required to reflect modified items

General

Manages general configuration information of Server. Port information, Connector information, and Stuck Thread related settings can be modified and saved.

Detailed contents of configuration information are as follows.

1. Server Info

Represents main configuration values of Server.

Table 8. Main Configuration

Item (* indicates required values)	Description	Notes
HTTP Port(*)	HTTP port number	
AJP Port	AJP port number	HTTP port number - 71 (auto-calculated)

Item (* indicates required values)	Description	Notes
HTTPS Port	HTTPS port number	HTTP port number + 363 (auto-calculated)
Shutdown Port	Port for receiving Shutdown command string	HTTP port number - 75 (auto-calculated)
Install Path	Server installation path	
Java Home Path	Java Home path	
Minimum Heap Size(MB)(*)	Minimum Heap size to set in WAS (Megabyte)	Default : 2048
Maximum Heap Size(MB)(*)	Maximum Heap size to set in WAS (Megabyte)	Default : 2048
AppBase	Application Base directory	Modification is possible only when Server is in stop state or when no Application is deployed in appBase.
Jvm Route	Server's Unique Identifier	Values set in System Property take priority. If not available, server.xml value is used (Generated by combination of Hostname + Port)
Auto Deploy	Whether to automatically Deploy when application changes	Default : false Detected when war file is re-uploaded to DocBase for each Application
Deploy On Startup	Whether to Deploy Application when WAS starts	Default : true
Shutdown Timeout(s)	Time to wait when tasks are running during Server shutdown (seconds)	Default : 86400

2. Connector

Represents Connector configuration values used by Server.

Table 9. Main Configuration

Item (* indicates required values)	Description	Default Value
Protocol	Protocol type	HTTP/1.1, AJP/1.3

Item (* indicates required values)	Description	Default Value
port	Port number	
Redirect Port	Redirect port	Same as HTTPS Port
Connection Timeout(ms)	Time to wait for Request URI reception after Connector allows connection (ms)	HTTP : 20000, AJP : 60000
URI Encoding	Character Encoding for converting URI bytes	UTF-8
Server	Redefines Server Header for Http Response to prevent Server information exposure	Server
Max Threads	Maximum number of Threads that Connector can create	256
Min Spare Threads	Minimum number of Threads secured when creating Connector	10
Max Queue Size	Maximum length of Request Queue	Integer.MAX_VALUE
Packet Size	AJP packet size	8192
Enable Lookups	Whether to use DNS LookUp. Not using is advantageous for performance	false
Compression	Whether to compress HTTP message Body (off, on:Text only, force:all)	off
Tcp No Delay	Send TCP packets without delay	true

3. Stuck Thread

Represents Stuck Thread configuration values.

Table 10. Main Configuration

Item (* indicates required values)	Description	Notes
Threshold(s)	Minimum time for identifying Stuck Thread (s)	
Interrupt Thread Threshold	Minimum time for interrupting Stuck Thread (s)	To terminate n seconds after Stuck Thread identification, enter "Threshold+n" value

4. Service Endpoint

Represents Endpoint Address configuration values.

Table 11. Main Configuration

Item (* indicates required values)	Description	Notes
Service Endpoint Address	Representative service domain address of WAS	

Session

Sets whether to use Session Cluster functionality.

1. Embedded Session Server mode

   Select when Session Server module is embedded in WAS and operates. When Embedded Mode is selected in Session Server Mode item, it is displayed as Embedded Type in Session Server list in Server management screen.

Table 12. Main Configuration

Item (* indicates required values)	Description	Default Value
Embedded Host	Refers to the WAS	Own IP (cannot be changed)
Embedded Port(*)	Port information for Embedded Session Server to be used in the WAS	
Secondary Server Host(*)	Slave Server host IP	
Secondary Server Port(*)	Slave Server Port	
Multi Login Control	Whether to prevent dual login	false (when true, 3 items below are provided)
Logout Page when Multi Login check(Multi Login)	Screen to provide after terminating session of user who logged in first during dual login	
Logout Message when Multi Login check(Multi Login)	Message to show after terminating session of user who logged in first during dual login	
Excepted Page When Multi Login Check(Multi Login)	Exception URL for dual login check	

2. Standalone mode

   Method of operating by connecting to separate Session Server. Select Standalone in Mode item.

   When setting Primary Server and Secondary Server in Standalone mode, Session Server must be configured in advance.

Table 13. Main Configuration

Item (* indicates required values)	Description	Default Value
Primary Server Host(*)	Primary Session Server host	Enter manually selection allows setting external session server outside system
Primary Server Port(*)	Primary Session Server port	
Secondary Server Host(*)	Secondary Session Server host Used only when connection with PrimaryServer is lost	Enter manually selection allows setting external session server outside system
Secondary Server Port(*)	Secondary Session Server port Used only when connection with PrimaryServer is lost	
External Stored Session	Store Session objects in Session Server instead of local WAS	false
Share session in applications	Share Session objects between Multi Applications Configurable only in Standalone Mode	false
Multi Login Control	Whether to prevent dual login	false (when true, 3 items below are provided)
Logout Page when Multi Login check(Multi Login)	Screen to provide after terminating session of user who logged in first during dual login	
Logout Message when Multi Login check(Multi Login)	Message to show after terminating session of user who logged in first during dual login	
Excepted Page When Multi Login Check(Multi Login)	Exception URL for dual login check	

Session functionality is provided in Enterprise Edition.

Logging

Manages Server's Logging configuration information.

1. Log Home

Table 14. Main Configuration

Item (* indicates required values)	Description	Notes
Log Home(*)	Log Home path	When default is selected, set to logs folder under server installation directory, when Enter manually is selected Log Home Prefix item allows input of log directory home path
Retention Days(*)	Maximum retention days for logs	Default : 0(unlimited)

2. Access Log

Represents configuration values for Access logs for Requests.

Table 15. Main Configuration

Item (* indicates required values)	Description	Notes
Logging Directory	Log directory	Can be specified as absolute path or relative path of
Pattern	Layout of Logging field	
Prefix	Prefix of Log file	
Suffix	Suffix of Log file	

3. Handler List

Detailed contents of Handler configuration information are as follows.

Table 16. Main Configuration

Item (* indicates required values)	Description	Notes
Name(*)	Handler class name	
Type	Handler type	ConsoleHandler and FileHandler can be selected
Level	Handler log level	
Filter	Implementation of java.util.logging.Filter	
Formatter	Implementation of java.util.logging.Formatter	Default : java.util.logging.SimpleFormatter
Encoding	Handler Character Encoding	

Item (* indicates required values)	Description	Notes
Root Handler	Whether Root Logger	

4. Logger List

Detailed contents of Logger configuration information are as follows.

Table 17. Main Configuration

Item (* indicates required values)	Description	Notes
Name(*)	Specify Logger name	
Level(*)	Logger log level	
Handler(*)	Select which Handler Logger will use	ConsoleHandler is selected by default

Server's log configuration file is ()/conf/logging.properties.

Web Configuration

Provides screen for managing Global web.xml configuration. Modify necessary items and click **Save button** at the bottom to save.

Detailed contents of configuration information are as follows.

1. Default Servlet

Table 18. Main Configuration

Item (* indicates required values)	Description	Default Value
Directory Listing	Whether to allow Directory Listing when Welcome file is not present	false
Readonly	Do not allow HTTP methods such as PUT, DELETE	true
Input Buffer Size	Input buffer size (bytes)	2048
Output Buffer Size	Output buffer size (bytes)	2048
File Encoding	File encoding	platform default
Show Server Info	Whether to display Server information when Directory Listing is allowed	true
Load On Startup(*)	Specify Servlet loading order when WAS starts	1 (negative: disable / 0: last)

2. JSP Engine

Table 19. Main Configuration

Item (* indicates required values)	Description	Default Value
Check Interval(s)	When Development is false, cycle for checking jsp changes and recompilation (s)	0 (0: disabled / positive: enabled with that cycle)
Development	Whether Development. When Development is true, changes are checked with modificationTestInterval value as cycle	true
Generate String As Character Array	Whether to generate String as Char Array	false
Modification Test Interval(s)	Cycle for jsp change check when Development is true	4 (when 0: check every access)
Trim Spaces	Remove unnecessary whitespace from response to reduce response bytes	false
Java Encoding	Encoding when generating Java source	UTF8
Load On Startup(*)	Specify Servlet loading order when WAS starts	3

3. JSP Page Encoding

Table 20. Main Configuration

Item (* indicates required values)	Description	Notes
URL Pattern	URL Pattern of JSP Page to apply Page Encoding	
JSP Page Encoding	Specify Page Encoding to apply	

4. Session

Table 21. Main Configuration

Item (* indicates required values)	Description	Notes
Session Timeout(m)	Session timeout time (minutes)	Default : 30

5. Welcome File List

Table 22. Main Configuration

Item (* indicates required values)	Description	Notes
File(*)	Specify files to service in order when Directory index is called	

Environment

Provides screen for managing JVM options, Start Shell configuration, and System Properties (provided only in Enterprise Edition). Modify through file editor and click **Save button** to save.

- JVM Env (/bin/setenv.sh): JVM options for Server execution

- Custom Env (/bin/customenv.sh): User custom environment variable configuration
- Base Env (/env.sh): Shell Script for Server startup

Do not modify JVM_ROUTE value directly here, but use **Load button** in JvmRoute item in Server Info area of General tab to modify. If modified directly here, Manager DB information is not updated, causing DB value mismatch.

- System.properties(/conf/system.properties) (This item can only be checked in Enterprise Edition)
- Catalina.properties (/conf/catalina.properties): Server's Catalina configuration

```
is WAS's default installation directory.
is originally used when creating directories to use multiple
Instances for one WAS and specifying directories for each
Instance, but in LENA, WAS and Instance have 1:1 relationship, so
is used as .
```

By default, configuration cannot be modified as it is Disabled, but if you want to modify, click **Configuration button** in ADMIN > Manager Environment > Manager Configuration item and change the following configuration to false.

```
server.environment.envshell.readonly=false
```

Properties

Provides screen for checking Server's System Properties and System Environments. Key Properties among System Properties are provided separately to check main information such as Server path, JAVA version, etc. Information can only be checked when Server is running.

Container

For Enterprise Edition, provides functionality to change EJB Container configuration. If Server is started without container configuration, EJB required container is created with default configuration. If configuration changes other than default are needed, container must be created to change configuration.

1. Basic Configuration

Table 23. Basic Configuration

Item (* indicates required values)	Description	Notes
ID(*)	Container identifier	
Type(*)	Container type	

2. CMP_ENTITY Configuration

Table 24. CMP_ENTITY Configuration

Item (* indicates required values)	Description	Notes
CmpEngineFactory	Factory class name	Default : org.apache.openejb.core.cmp.jpa.JpaCmpEngineFactory

3. BMP_ENTITY Configuration

Table 25. BMP_ENTITY Configuration

Item (* indicates required values)	Description	Notes
PoolSize	Specify Bean pool size	Default : 10

4. STATELESS Configuration

Table 26. STATELESS Configuration

Item (* indicates required values)	Description	Notes
AccessTimeOut	Wait time between invocations (Specifies the time to wait between invocations)	Default : 0 (means no timeout)
MaxSize	Maximum number of Bean pool	Default : 10
MinSize	Minimum number of Bean pool	Default : 0
StrictPooling	Specify operation method when Pool reaches maximum. StrictPooling waits without increasing pool size	Default : true
MaxAge	Maximum time until removal from Pool (h)	Default : -1
ReplaceAged	Whether to Replace when MaxAge is reached	Default : true
ReplaceFlushed	Whether to Replace when flushed from pool	Default : false
MaxAgeOffset	MaxAge usage	Default : -1
IdleTimeout	Maximum time instance can be in idle state in pool (m)	Default : 0
GarbageCollection	Whether to allow garbage collection as mechanism to reduce pool	Default : false
SweepInterval	Cycle for container to clean pool and remove expired instances (m)	Default : 5
CallbackThreads	Thread Pool size. This value is shared by all Beans deployed in container	Default : 5
CloseTimeout	Maximum time to wait until pool closes and PostConstruct method is called (m)	Default : 5

5. SINGLETON Configuration

Table 27. SINGLETON Configuration

Item (* indicates required values)	Description	Notes
AccessTimeout	Wait time between invocations (Specifies the time to wait between invocations)	Default : 0 (means no timeout)

6. STATEFUL Configuration

Table 28. STATEFUL Configuration

Item (* indicates required values)	Description	Notes
AccessTimeout	Wait time between invocations (Specifies the time to wait between invocations)	Default : 0 (means no timeout)
Cache	Cache to manage Stateful bean instances	
Default : org.apache.openejb.core.stateful.SimpleCache	Passivator	Specify Passivator class
Default : org.apache.openejb.core.stateful.SimplePassivater	TimeOut(m)	Wait time between invocations (Specifies the time to wait between invocations)
Default : 20	Frequency	Cycle for bean cache to check idle beans (s)
Default : 60	Capacity	Bean pool size for Stateful SessionBean container
Default : 1000	BulkPassivate	Number of instances to passivate at once

7. MESSAGE Configuration

Table 29. MESSAGE Configuration

Item (* indicates required values)	Description	Notes
ResourceAdapter	Specify Resource Adapter	Default : Default JMS Resource Adapter
MessageListenerInterface	Specify MessageListener	Default : Javax.jms.MessageListener

Item (* indicates required values)	Description	Notes
ActivationSpecClass	Specify Activation Spec Class	Default : org.apache.activemq.ra.ActiveMQActivationSpec
InstanceLimit	Maximum number of Instances	Default : 10

Audit

Function for collecting/managing events occurring in WAS.

Collected event information can be checked in event dashboard. For event dashboard related content, refer to Event Dashboard.

Four types of Detection Rules can be set to collect events.

Table 30. OOM Detection Rule

Item	Description	Notes
Enable	Detects Out Of Memory Error occurrence	Default : true

Table 31. Stuck Thread Detection Rule

Item	Description	Notes
Enable	Detects Stuck Thread occurrence	Default : false

LenaStuckThreadDetectionValve is basically configured in server.xml, and LenaStuckThreadDetectionValve related configuration can be done in Stuck Thread item of SERVER > Server selection > General tab screen.

When user request processing time exceeds Threshold configuration value, event occurs and is sent to Manager.

Table 32. Full GC Detection Rule

Item	Description	Notes
Enable	Detects Full GC occurrence	Default : false

Table 33. Exception Detection Rule

Item	Description	Notes
Enable	Detects Exception occurrence by pattern	Default : false
Exception Class Pattern	Specify Exception pattern to detect. Exceptions inheriting the pattern are also detected. Maximum 10 can be specified, * pattern cannot be used. ex) abc.dbc.ExampleException	
Exclude Exception Class Pattern	Specify Exception pattern to exclude from detection. Maximum 10 can be specified, * pattern cannot be used. ex) abc.dbc.ExampleException	

Item	Description	Notes
Enable Full Stack	When Exception has multiple Causes, whether to display entire content instead of summary information	Default : true
Max Line of Stack's Cause	Number of Lines to express in Exception Stack Trace. Lines are collected for each Cause by the set number. Setting too large a number can cause load in collection and storage management	Default : 3

Exception classes that can be detected are not Exceptions included in Java's own library, but Exceptions of Application or Framework. Exception patterns must be defined to prevent too many events from occurring.

Audit functionality is provided in Enterprise Edition.

Configuration Tree

Configuration files under /conf folder under WAS installation path can be managed through file editor.

User running Node Agent must have access permission to WAS configuration information files for modification. If access permission is not available, message that file cannot be edited due to no Write permission is displayed.

History

Provides backup and restore functionality for configuration information. When configuration information is modified and saved, History is managed by type. Search by entering modification date and configuration file Type.

Click **View(magnifying glass) button** to view information of selected file, and click **Restore button** to restore to that configuration file.

4.3.9. Resource Management

When Resources menu under Server menu is selected, screen for managing Resource information related to that Server is displayed. By default, information for DataSource, JMS, JTA Resources can be managed. (JMS, JTA Resources are supported only for Enterprise Server)

Methods for setting Resources in WAS are as follows.

- Add : Click **New button** to add Resource. (Datasource, JMS possible)
- Delete : Click **Delete button** to delete Resource. (Datasource, JMS possible)
- Import : Click **Import button** to import Resources registered in RESOURCE menu. (Datasource, JMS, JTA possible)

DataSource

Provides functionality to manage JNDI DataSource that can be used by WAS Applications. JNDI can be set so all Applications running on Server can share and use, or JNDI can be set for each Application for use. For Enterprise Edition, JTA is supported so additional attributes are added.

1. Server DataSource Configuration

Set DataSource shared by all Applications running on Server. List of DataSources available on Server can be queried, and DataSource registration, modification, deletion is possible.

Connection test can also be performed to check DataSource status.

DataSource attributes are as follows. Attributes not visible on initial screen are displayed when **Expand all button** is clicked.

Table 34. DataSource Attributes

Item (* indicates required values)	Description	Notes
Scope	Scope for using DataSource	Provides following scopes • Context: Datasource information is set in common context area so all Applications can share. • Global: Datasource information is set in GlobalNamingResource area, and each application individually sets and uses in DataSource Link List. • Global+ResourceLink: Datasource information is set in GlobalNamingResource area and Datasource link is set in common context area.
JNDI Name(*)	JNDI name of Global DataSource	
Databases(*)	Set information of datasource to be used commonly	
Resource Name(*)	Name of Databases	
Address(Host/Port)(*)	IP and port to be used commonly	
Driver Class Name(*)	JDBC Driver class name	
URL(*)	JDBC URL	
User Name(*)	Connection username	

Item (* indicates required values)	Description	Notes
Password(*)	Connection password	when encryption is checked, password is encrypted and stored. Encryption is recommended for security.
Encryption Level	Specify encryption scope for authentication information	Default : Password only
DefaultAutoCommit	Auto Commit status of Connections created from Pool	Default : JDBC driver default value
Auto Reconnection	Used when setting TestOnBorrow and TestWhileIdle values. When true/false, both values are set the same. When User Defined is selected, both values can be set directly by user	
InitialSize	Initial number of Pool Connections	Default : 10
MaxActive	Maximum number of Pool Connections	Default : 100
MinIdle	Minimum number of Idle Connections	Default : 10
MaxIdle	Maximum number of Idle Connections	Default : 100
MaxWait(ms)	Maximum time to wait when no available Connection in Pool (ms)	Default : 30000
MinEvictableIdleTimeMillis(ms)	Connections existing in Pool in idle state for longer than this time become removal targets (ms)	Default : 60000 (60s) (1800000 (30m) when XaDataSource = true)
ValidationQuery	Connection validity verification query	Default : null
ValidationInterval	Connection validity verification cycle (ms)	Default : 3000
TestOnBorrow	Before taking connection from Pool, perform query set in validationQuery to check connection validity	Default : default
TestOnReturn	Before returning connection to Pool, perform query set in validationQuery to check connection validity	Default : default
TestWhileIdle	For idle connections, perform query set in validationQuery to check connection validity	Default : default
LogValidationErrors	Whether to output errors when errors occur after validation query execution	Default : default(false)

Item (* indicates required values)	Description	Notes
TimeBetweenEvictionRunsMillis(ms)	Thread execution cycle for extracting unused Connections (ms)	Default : 5000
RemoveAbandoned	Whether to detect Connection loss	Default : default
RemoveAbandonedTimeout(s)	Timeout value for determining lost Connection (s)	Default : 60
LogAbandoned	Whether to log when processing Connection loss	Default : default
AbandonWhenPercentageFull	Abandon is performed only when Connection pool exceeds set occupancy rate	Default : 100
JdbcInterceptors	User-defined functionality can be added using flexible and pluggable interceptors	When setting QueryTimeout, enter QueryTimeoutInterceptor(queryTimeout=time(seconds))

When Default value is default instead of true or false, JDBC Driver's default value is used.

Additional attributes for Enterprise Edition are as follows.

Table 35. Enterprise Edition Additional Attributes

Item (* indicates required values)	Description	Notes
JtaManaged	Whether to use JTA	Default : false
XaDataSource	Whether to use XA	Default : false

- XADataSource configuration can only be used when JTA is configured, and when XADataSource is configured, validationInterval, logValidationErrors, abandonWhenPercentageFull attributes cannot be used.
- When DataSource is set to Context scope, all Applications share it.
- In EnterpriseServer, DataSource can also be set to Context scope, but Lookup is not possible in EJB. Setting to Global + ResourceLink scope is recommended for EnterpriseServer.
- Password encryption algorithm uses AES. Key value for encryption is managed as "datasource.key=keyvalue" in Manager LENA Home sub /repository/conf/manager.conf file and each WAS Home sub /conf/advertiser.conf.

2. Databases

When setting URL, register by creating Databases with information to be used commonly.

Click **Add(+) button** to create popup window.

a. Enter Resource Name to distinguish Databases.

b. Check automatically filled DriverClassName. Change if necessary.

c. Enter Address (IP and port) and save.

3. JDBC driver Upload

JDBC Driver library can be uploaded through Manager.

Click **Upload button** under DataSource detailed information to display upload screen as follows.

a. Select file to upload through Search button. File to upload is JDBC Driver library, so only JAR format files can be selected.
b. Click Upload button to upload selected file to target directory.
c. Path where JDBC Driver file is uploaded is ${SERVER_HOME}/lib/datasource.

4. Connection Test

Click **Connection Test button** in DataSource detailed screen to perform connection test for configured DataSource. When connection is successful, "JDBC Connection is successfully tested" message is displayed.

If "Driver Class[class name] does not exist." error message is displayed, check if corresponding driver class is properly uploaded and classpath is configured.

classpath is added in WAS details > Environment > JVM Settings.

Configuration Example

```
CLASSPATH="$\{CLASSPATH}:$\{CATALINA_HOME}/lib/datasource/ojdbc6.
jar"
```

JMS

For Enterprise Edition, JMS related Resources can be defined. Active MQ Resource Adapter, JMS Connection Factory, Queue, Topic configurations can be added, modified, deleted respectively.

Table 36. Main Configuration

Item (* indicates required values)	Description	Notes
ID(*)	Resource identifier	
Type(*)	Resource type	Provides following types • ActiveMQResource Adapter • JMSConnectionFactory • Queue • Topic

2. Active MQ Resource Adapter Configuration

Table 37. Main Configuration

Item (* indicates required values)	Description	Notes
BrokerXmlConfig	Broker configuration	Default : broker:(tcp://localhost:61616)?useJmx=false
ServerUrl	Broker address	Default : vm://localhost?waitForStart=20000&async=true
DataSource	Datasource for persistence messages	
StartupTimeout	Maximum startup wait time (s)	Default : 10

3. JMS Connection Factory Configuration

Table 38. Main Configuration

Item (* indicates required values)	Description	Notes
ResourceAdapter	Specify Resource Adapter to use	
TransactionSupport	Specify Global Transaction	Provides following types • XA • LOCAL • NONE
PoolMaxSize	Maximum number of physical connections to ActiveMQ broker	Default : 10
PoolMinSize	Minimum number of physical connections to ActiveMQ broker	Default : 0
ConnectionMaxWaitTime	Maximum connection wait time	Default : 5 Seconds
ConnectionMaxIdleTime	Maximum idle time before return	Default : 15 Minutes

4. Queue Configuration

Table 39. Main Configuration

Item (* indicates required values)	Description	Notes
Destination	Specify Queue name	

5. Topic Configuration

Table 40. Main Configuration

Item (* indicates required values)	Description	Notes
Destination	Specify Topic name	

JMS functionality is provided in Enterprise Edition and is available when Enterprise version WAS is installed.

JTA

For Enterprise Edition, provides functionality to change Transaction Manager configuration.

To use Transaction Manager configuration with default settings, select Auto for Managed Type. (default during installation)

To change Transaction Manager configuration, select User Defined. (When User Defined is selected, Recovery option is defaulted to "No")

1. Main Configuration

Table 41. Main Configuration

Item (* indicates required values)	Description	Notes
Managed Type	Select whether User Defined Transaction Manager	Default : Auto
ID(*)	Transaction Manager name	
Default TimeOut(min)	Specify Timeout	Default : 10 minutes
Type	JTA Type	
Recovery	Set whether to recover when Transaction error occurs	Logging configuration opens when Yes is selected

2. Transaction Recovery Logging(howl) Option

Table 42. Logging configuration for recovery when Transaction error occurs

Item (* indicates required values)	Description	Notes
Directory	Directory location to create log files	Default : txlog
File Name	Log file name	Default : howl
File Extension	Log file extension	Default : log
Max Log Files	Maximum number of log files to create	Default : 2
Max Block Per File	Maximum number of blocks per file	Default : -1
Buffer Size	Buffer size (kb)	Default : 32
Max Buffers	Maximum buffer value	Default : 0
Min Buffers	Minimum buffer value	Default : 4

Item (* indicates required values)	Description	Notes
Adler32 Checksum	When both Adler32 Checksum and Checksum Enabled settings are "Yes", calculate checksum using Adler32 algorithm	Default : Yes
Checksum Enabled	Check Buffer Contents before recording to Disk	Default : Yes
Threads Waiting	Maximum number of waiting threads	Default : -1
Flush SleepTime	Total sleep time of ForceManager	Default : 50 Milliseconds

JTA functionality is provided in Enterprise Edition and is available when Enterprise version WAS is installed.

4.3.10. Application Deployment

List

Select SERVER menu at top of screen to query Server status. Select Application of Server to deploy from left menu. Provides screen for querying list of deployed Applications.

Application list items are as follows.

Table 43. Application List Items

Item	Description	Notes
Type	Form of Application to deploy	Only Enterprise WAS Type provides following types • EJB • EAR • WAR
Base Name	Base name	
Context Path	Context path	
DocBase	Application location	
Status	Application status	Provides following statuses • Started(v) • Stop(□) • Error(!)

Item	Description	Notes
	Action button	Provides following functionalities • **Undeploy(trash) button** • **Application Start button** • **Application Stop button** • **Application Reload button**
	View button	Provides following functionalities • **web.xml View(document) button**

Deploy

Attributes for deploying Application are as follows.

Table 44. Application Deployment Attributes

Item (* indicates required values)	Description	Notes
Application Type	Form of Application to deploy	Only Enterprise WAS Type provides following types • EJB • EAR • WAR
Context Path(*)	Context path	
unpackWAR	Whether to execute after expanding WAR file. When value is false, deploy without expanding WAR file compression	Default : true
DocBase(*)	Application location	File can be uploaded through **Upload select(file) button**

Application Upload

When there is no separate deployment system, applications can be uploaded through Manager.

1. After selecting server, select Applications to move to Application screen.
2. In Application Deploy area at bottom of Applications screen, click **Upload select(file) button** at right end of DocBase item to display file system screen.
3. Select target directory (Server side Host) to upload.
4. Click **Upload button** to create popup for selecting application files.
5. Select application file to deploy and click **Upload button** to upload selected file to target directory.

Import

Click **Import button** to import and deploy Application information registered in [Resource] menu.

Configuration Information Management

When Application Name is selected from Application list query screen, Application configuration management screen can be queried. Provides configuration and management functionality for Application Descriptor and DataSource.

Application configuration changes are possible only for selected Server.

Application Settings

Manages information configured in Application Descriptor.

Click **Back(←) button** to return to Application list screen. Click **Expand all button** to configure additional Context attributes.

DocBase and ContextPath cannot be modified, and detailed information of attributes is as follows. Attributes not visible on initial screen can be checked by clicking **Expand all button**.

Table 45. Application Setting

Item (* indicates required values)	Description	Notes
DocBase(*)	Application's Document Base	
Context Path(*)	Context path	
unpackWAR	Whether to execute after expanding WAR file. When value is false, WAR file compression is not expanded, and web application is just redeployed in compressed state	Default : true
reloadable	Whether to re-reflect when Application changes (Class File)	
privileged	Whether to use Container Servlet	

Item (* indicates required values)	Description	Notes
cookies	Whether to use cookie for session identifier communication	
useHttpOnly	Whether to block access to session ID using scripts on client side	
session Cookie Domain	When set, overwrites all domains set in web application. When not set, domain distinguished by web application is used	
session Cookie Name	When set, all session cookies are created with that name	Default : JSESSIONID
session Cookie Path	When set, web application uses that path	
useNaming	Set to use JNDI InitialContext for J2EE platform	Default : true

Add Attribute button can be used to add attribute values.

DataSource Link List

Provides functionality to set Global DataSource to be used in Application.

DataSource link management attributes are as follows.

Table 46. DataSource Link Management Attributes

Item (* indicates required values)	Description
Name(*)	JNDI name to use in Application
JNDI Name(*)	JNDI name of Global DataSource
User Name	DataSource connection username
URL	JDBC URL
Description	Description of DataSource
+ icon	Click **New button**, **Edit(pencil) button** to display that selected DataSource information is being changed
- icon	Click **Delete(trash) button** to display that selected DataSource information is deleted

Click **New button** to add new configuration, and click **Save button** to save changed configuration.

Among Datasources configured in WAS, Datasources with Scope of Global or Global + ResourceLink appear as JNDI Name selection items when setting new configuration.

4.3.11. Server Log Viewer

Log Viewer button on right side of server list allows browsing log file contents under target server's Log Home path.

To use this functionality, the following must be satisfied.

- Node to which target server belongs must be running.

Click Log Viewer button in server list to check directories and files in tree structure based on target server's Log Home path.

When file is selected, file contents are queried, and when first selected, file contents from end of file up to predetermined size can be checked.

Use Load More, Load Previous buttons to query and check log file contents by predetermined size.

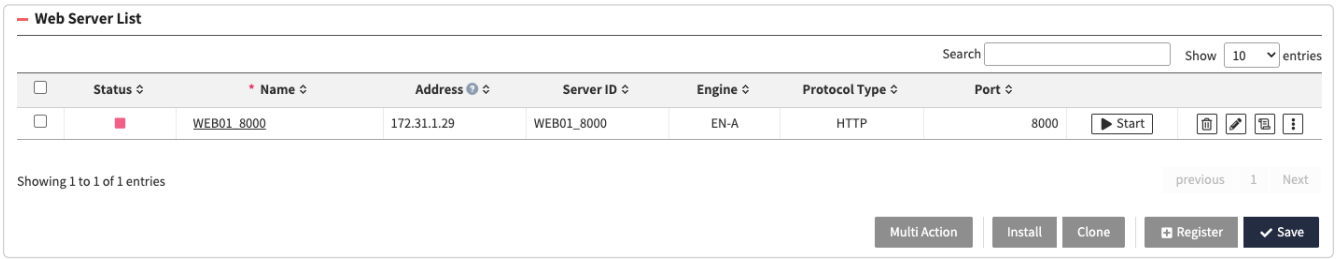
- When using Load Previous button and no more content to query (eg. beginning of file), Alert message that no more data can be read is displayed.
- When using Load More button and no more content to query (eg. end of file), message that no more data can be read is displayed at bottom of screen.

4.4. WEB

Provides screens for managing Web Servers with NODE Engine EN-A and EN-N. Registration, modification, and deletion of Web Servers installed on Nodes is possible, and start and stop operations can be performed.

4.4.1. List

Web Servers can be managed through the Web Server List.



Web Server attributes are as follows.

Table 47. Web Server Attributes

Item (* indicates required values)	Description	Notes
Status	Server status	Provides following statuses • Started(v) • Stop(□) • Error(!)

Item (* indicates required values)	Description	Notes
Name(*)	Server name	
Address	Server IP address	
Server ID	Server ID	
Engine	Node Engine type	• EN-A • EN-N
Protocol Type	Active protocol type	• HTTP • HTTPS
Port	HTTP/HTTPS port number	
Start/Stop button	Server start and stop	
Button area	Displays server information change and related function buttons	
Trash icon - Delete server information	**Pen icon** - Edit server information	**Log file icon** - Provides Server Log Viewer functionality

4.4.2. Install

1. Click the **Install button** to prepare for Server installation.
2. Enter Server ID and Service Port.
3. Click the **Save button** to save.

There may be differences between Servers actually installed on Nodes and Server information managed by Manager. (when installed via console)

If Server ID duplication error occurs, use Register function to check additional information of installed Servers.

4.4.3. Clone

1. Click the **Clone button** to prepare for Web Server cloning.

2. Select Node List to select Server to clone.
3. Enter Clone Server ID and Service Port.

   (Include External Source is available when cloning servers to other nodes and sets whether to clone files in Document Root directory of server to be cloned.)

4. Click the **Save button** to save.

There may be differences between Servers actually installed on Nodes and Server information managed by Manager. (when installed via console)

If Server ID duplication error occurs, use Register function to check additional information of installed Servers.

4.4.4. Register

1. Click the **Register button**.
2. Select the Server to register.
3. Click the **Save button** to save.

4.4.5. Modification

1. Click the **Edit(pencil) button** to change Server information to modifiable state.
2. Modify Server attributes.
3. Click the **Save button** to save.

4.4.6. Deletion

1. Click the **Delete(trash) button** to change Server information to deletable state.
2. Click the **Save button**.
3. Press the **OK button** to display a window for selecting deletion type.
   - Deregister : Delete Server information only from Manager DB and maintain physical Server engine (can be re-registered later via **Register button**)
   - Uninstall : Delete Server information from Manager DB and also delete physical Server engine
4. When Uninstall is selected, a window asking about log directory deletion is displayed.

Servers bound to Server Cluster cannot be deleted.

When use Server Delete Protection value is set to true in Manager Configuration area of ADMIN > Preference > Manager Environment menu, it can prevent servers from being uninstalled from Manager.

4.4.7. Start/Stop

Single Start/Stop

1. Click the **Stop button** to stop the Server.

2. Click the **Start button** to start the Server.

When stopping Server, shutdown method varies according to Stop Mode in General tab.

Stop : Basic shutdown option that does not guarantee currently serviced tasks.
Graceful Stop : Shuts down after completing currently serviced tasks. (Service not guaranteed on Windows)

Start button is activated only when in startable state.

Multi Server Start/Stop

1. Select multiple Servers to start or stop.
2. Click the **Multi Action button** at the bottom of Server list.
3. Select Action Type in popup window and click **Action button** to perform start or stop operations for multiple Servers.

Forced Stop/Restart

1. Click the **... button** at the far right of Server list.
2. Perform forced stop or forced restart.

4.4.8. Configuration Information Management (EN-A)

Provides functionality to change configuration information of Web Server's EN-A engine. When Server is selected from Web Server list, it moves to screen for managing configuration information.

General

General configuration values and Connection, Process information of Web Server can be edited.

Web Server's configuration information performs Validation on configuration files when saving, minimizing Server startup failures due to configuration file errors.

When configuration file error occurs, file is not saved and error message is displayed

Error message example

```
AH00526: Syntax error on line 253  Argument for 'Require all'
must be 'granted' or 'denied'
```

Detailed contents of configuration information are as follows.

1. Server Info (env.sh and /conf/httpd.conf file management)

Table 48. Server Info

Item (* indicates required values)	Description	Notes
HTTP Port(*)	HTTP Port	

Item (* indicates required values)	Description	Notes
HTTPS Port(*)	HTTPS Port	
Staging HTTP Port	Service port used when starting in Staging mode	Used during Graceful restart LENA uses basic nostage mode
Staging HTTPS Port	HTTPS port used when starting in Staging mode	Used during Graceful restart LENA uses basic nostage mode
Install Path	Server installation path	
Document Root(*)	Basic folder path where documents provided by Web Server are stored	
Welcome Page	Define which file to use as initial page document of website	
Stop Mode	Option referenced when Web Server shuts down	Stop : Basic shutdown option that does not guarantee currently serviced tasks. Graceful Stop : Shuts down after completing currently serviced tasks. (Service not guaranteed on Windows)
Directory/Path	Directory path where web documents are located to set which services and functions to allow/deny	
Directory/Options	Access control settings to apply to all files and directories under specified directory	Indexes : Prevents showing file list under Document Root when welcome page cannot be found FollowSymLinks : Prevents accessing file system other than existing web documents under Document Root via symbolic links

Item (* indicates required values)	Description	Notes
Directory/Allow Override	Set which directives to allow for resource access control configuration files for each subdirectory under Document Root (generally AccessFileName : .htaccess)	Provides following types * None : Do not allow any directives * All : All directives available * AuthConfig : Allow user authentication directives * FileInfo : Allow document type control directives * Indexes : Allow directory indexing control directives * Limit : Allow host access control directives
Directory/Require	Verify whether authenticated users perform allowed Actions	

2. Connection Info (/conf/extra/httpd-default.conf file management)

Table 49. Connection Info

Item (* indicates required values)	Description	Notes
Timeout(s)(*)	Time for Server to wait and disconnect connection when no event occurs for certain time after connection between client and Server (s)	Default : 60
Keep Alive(*)	Whether specific process continues to handle specific user's request tasks	Default : On
Max Keep Alive Requests(*)	Valid value when KeepAlive is On, process handles specific user's requests for specified number of times When this value is exceeded, that process dies and another process handles requests	Default : 100
Keep Alive Timeout(s)(*)	Valid value when KeepAlive is On, timeout to disconnect connection when no request for set time (s)	Default : 5

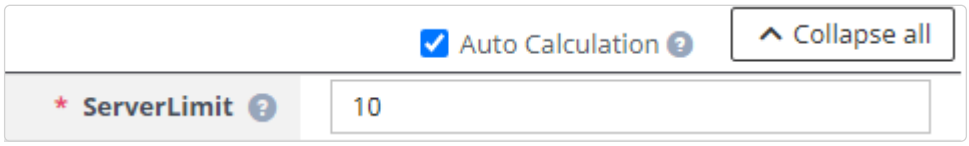
Item (* indicates required values)	Description	Notes
Request Read Timeout(s)(*)	Time to wait for receiving request header and body from user If not received within set time, sends 408 REQUEST TIME OUT error	Default : header=20-40,MinRate=500 body=20,MinRate=500

3. Process Info (/conf/extra/httpd-mpm.conf file management)

Table 50. Process Info

Item (* indicates required values)	Description	Notes
Start Servers(*)	Number of Server processes initialized when Web Server starts	Default : 2
Server Limit(*)	Maximum process value that MaxClients can create	Default : 8
Threads Per Child(*)	Number of Threads created by each child process	Default : 128
Thread Limit(*)	Maximum configurable value for ThreadsPerChild	Default : 128
Min Spare Threads(*)	When number of Idle Threads in Idle state is less than this value, Threads increase to this value and maintain	Default : 128
Max Spare Threads(*)	When number of Idle Threads in Idle state is more than this value, Threads decrease to this value and maintain	Default : 256
Max Request Workers(*)	Maximum number of Threads that all child processes can create	Default : 1024
Max Connection Per Child(*)	Maximum number of requests that child process can service. After processing this many requests, it terminates.	Default : 0 (0: unlimited)

When Web Server can use mpm event method, functionality to easily configure Process Info settings is provided.



When configuring Web Server's Process Info, checking Auto Calculation at top right provides convenient auto-calculation functionality in addition to validation of basic provided configuration values.

Rule	Validation	Auto Calculation
StartServer ServerLimit		-
ThreadsPerChild ThreadLimit		-
ThreadsPerChild + MinSpareThreads MaxSpareTheads		Auto-calculate MinSpareThreads, MaxSpareThreads when ThreadsPerChild changes
ServerLimit ThreadLimit MaxRequestWorkers		Auto-calculate MaxRequestWorkers when ServerLimit, ThreadLimit change

4. Pagespeed Info

Table 51. Pagespeed Info

Item (* indicates required values)	Description	Notes
Enabled(*)	Whether to improve site speed by performing optimization on Resources provided by Web Server by applying mod_pagespeed	Default : off Provides following options • on : Allow optimization for Resources • off : Stop additional optimization but allow access to already optimized Resources • unplugged : Stop optimization and deny access
Rewrite Level(*)	Set Level of filters that module will rewrite	

Item (* indicates required values)	Description	Notes
Default : default(CoreFilters) Provides following options * CoreFilters : Contains filters considered safe for most websites in advance * OptimizeForBandwidth : Enhanced safety, suitable for use on sites that do not recognize Pagespeed * PassThrough : Enter all filters manually	File Cache Path(*)	Path of directory where cached Files are stored
	LogDirPath(*)	Path of directory to record Logs
	Enable Filters	List of filters to use
	Disable Filters	List of filters not to use
	Allow URI	URI including wildcard(*) for Resources to allow rewrite
ex) **/**.js	Disallow URI	URI including wildcard(*) for Resources not to allow rewrite

5. SSL/TLS Security Info (/conf/extra/httpd-ssl.conf file management)

Table 52. SSL/TLS Security Info

Item (* indicates required values)	Description	Notes
Client TLS Protocol(*)	Configuration value defining protocol to use in SSL/TLS connection	Default : all -SSLv3 -TLSv1 -TLSv1.1
Client Cipher Suite(*)	Configuration value defining set of encryption algorithms to use in SSL/TLS connection	Default : HIGH:MEDIUM:!MD5:!RC4:!3DES

Item (* indicates required values)	Description	Notes
Proxy TLS Protocol(*)	Configuration defining protocol for proxy server to use in SSL/TLS connection	Default : all -SSLv3 -TLSv1 -TLSv1.1
Proxy Cipher Suite(*)	Configuration value defining set of encryption algorithms for proxy server to use in SSL/TLS connection	Default : HIGH:MEDIUM:!MD5:!RC4:!3DES

6. Enable Custom

Table 53. Custom Configuration

Item (* indicates required values)	Description	Notes
Custom Configuration	Add configurations that users want to add arbitrarily.	Stored separately in custom-httpd.conf file and managed.

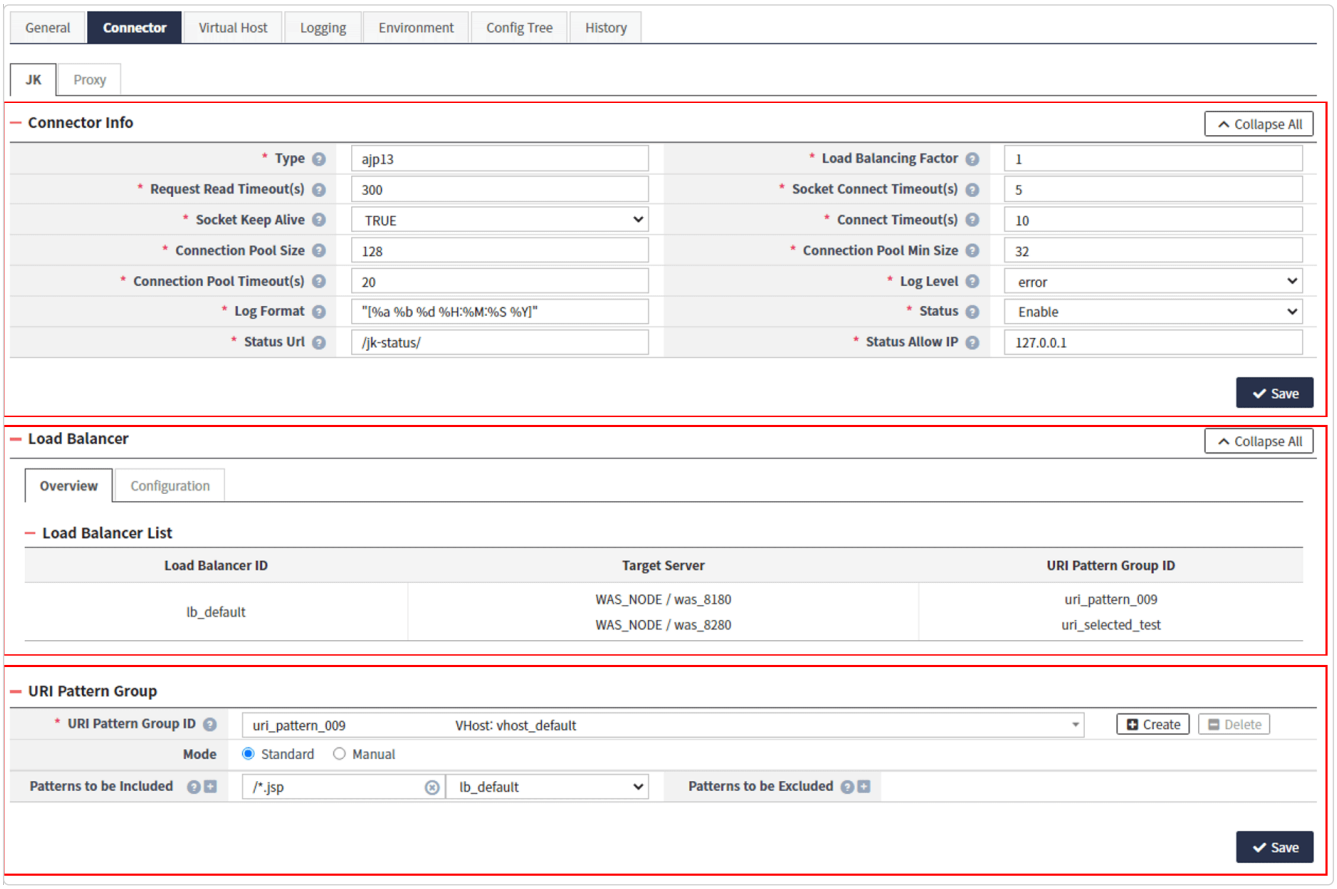
When changing configuration, Server restart is required to reflect modified items.

Connector

Manages information for linking Web Server and WAS.
Connector page is divided into JK and Proxy tabs according to linking method, and Connector configuration information according to module can be edited in each tab.

JK

Edits configuration information when using JK(mod_jk).



JK tab configuration is divided into three areas: Connector Info, Load Balancer, and URI Pattern Group as shown in the above screen.

1. Connector Info
   Manages basic configuration values of JK.

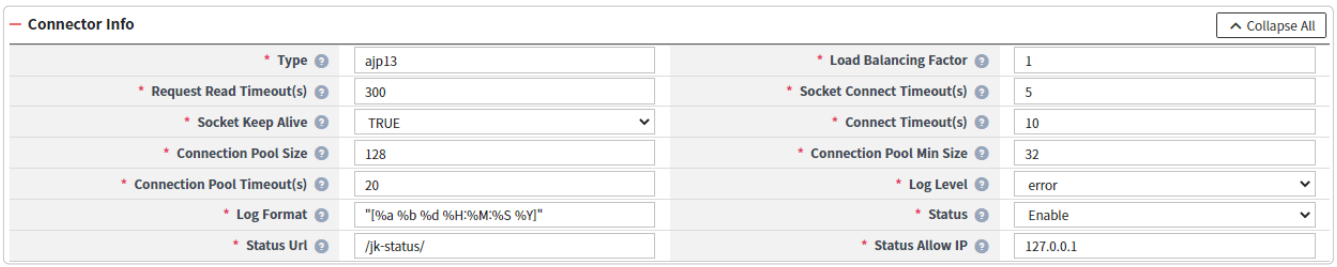


Table 54. Connector Info (JK)

Item (* indicates required values)	Description	Notes
Type(*)	Protocol used when Web Server and WAS communicate. (ajp12, ajp13, ajp14, jni, lb and status can be used, but ajp13, lb, status are recommended.)	Default: ajp13
Load Balancing Factor(*)	Load balancing index of WAS. That is, work allocation ratio.	Default: 1

Item (* indicates required values)	Description	Notes
Request Read Timeout(s)(*)	Timeout(seconds) used for communication channel between JK and remote host. If remote host does not respond within specified timeout, JK generates error and retries. When set to 0(default), JK continues to wait for response in all socket operations.	Default: 300
Socket Connect Timeout(s)(*)	Threshold for time(seconds) taken to configure socket connection between JK and remote host. If socket connection cannot be configured within specified time, JK generates error and attempts reconnection.	Default: 5
Socket Keep Alive(*)	When firewall exists between Web Server and WAS, inactive connections are discarded, but when this attribute is TRUE, sends KEEP_ALIVE message to operating system to prevent firewall from disconnecting inactive connections.	Default: TRUE
Connect Timeout(*)	connectTimeout: Wait time(s) for cpong respond to cping request in ajp13 protocol after connection between JK and WAS is completed.	Default: 10
Connection Pool Size(*)	Number of connections maintained as connection pool between JK and WAS.	Default: 128
Connection Pool Min Size(*)	Minimum number of connections maintained as connection pool between JK and WAS.	Default: 32
Connection Pool Timeout(s)(*)	Specifies time(seconds) that JK must maintain before closing inactive sockets. When set to 0, disables socket closing.	Used together with WAS's connectionTimeout option. Default: 20
Log Level(*)	Specifies log level to be recorded in log file.	Default: error
Log Format(*)	Sets format for recording logs in log file.	Default: "[%a %b %d %H:%M:%S %Y]"
Status(*)	Whether to set Server status monitoring configuration value, Status Url and Allow IP can be configured when Enable is selected.	Default: Enable
Status Url(*)	URL for Server status monitoring.	Default: /jk-status/
Status Allow IP(*)	IP that can access Server status monitoring URL.	Default: 127.0.0.1

2. Load Balancer
   Manages basic configuration and Workers of Load Balancer for load balancing.
   Load Balancer area has Overview tab and Configuration tab. Overview tab can check overall information of currently created Load Balancer, and Configuration tab can configure detailed contents of Load Balancer.

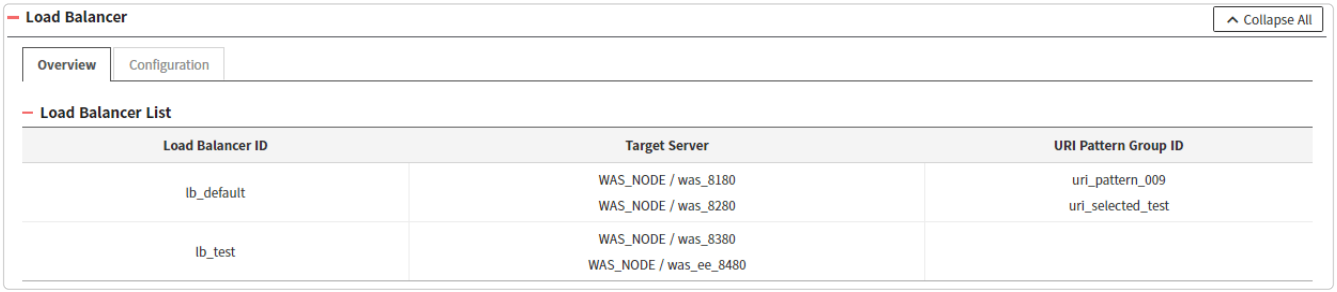


Table 55. Load Balancer Info - Overview (JK)

Item (* indicates required values)	Description	Notes
Load Balancer ID	ID of currently created Load Balancer.	
Target Server	Basic information of Workers registered in Load Balancer. Displayed in 'Node Name/Server Name' format.	
URI Pattern Group ID	When Load Balancer is specified for specific URI Pattern, URI Pattern Group ID that the URI Pattern belongs to is displayed.	

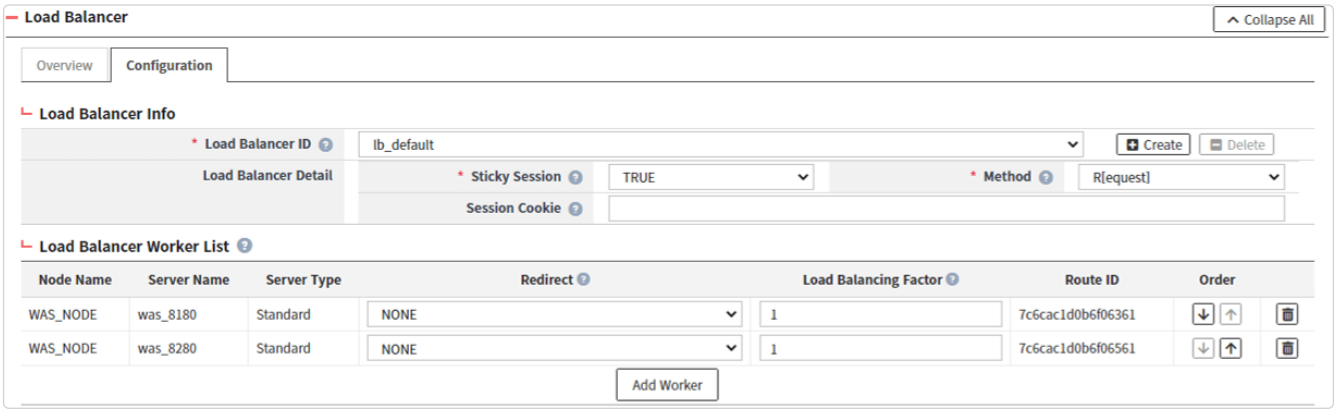


Table 56. Load Balancer Info - Configuration (JK)

Item (* indicates required values)	Description	Notes
Load Balancer ID(*)	Name of Load Balancer.	'lb_' prefix is added.
Sticky Session(*)	Whether to support routing based on Session ID.	
Method(*)	Specifies method used by Load Balancer to determine appropriate Worker for load balancing.	
* R[equest] : Selects Worker with least requests. (Default)	* S[ession] : Selects Worker with least connected sessions.	* N[ext] : Similar to S[ession] but select when fewer Sessions need to be distributed.
* T[raffic] : Selects Worker with least network traffic between JK and AJP connector.	* B[usyness] : Selects Worker with least load based on number of requests.	Session Cookie

Workers are added with Add Worker button in Load Balancer Worker List table.
When Add Worker button is pressed, window for adding Worker is displayed on screen, and users can select servers managed by LENA Manager as Workers in this window. Added Workers are managed through following information.

Table 57. Load Balancer Worker List

Item (* indicates required values)	Description	Notes
Node Name	Node name of server that Worker points to.	
Server Name	Name of server that Worker points to.	
Server Type	Type of server that Worker points to.	Standard or Enterprise is displayed as value.
Redirect	When this Worker is in error state, sets Failover Worker to handle requests received by this Worker.	Default: NONE
Load Balancing Factor	Work allocation ratio, defines how much work this Worker will do compared to other Workers.	Default: 1
Route ID	Route ID of Worker.	
Order	Can change order between Workers.	

3. URI Pattern Group
   Defines URI Mapping to pass requests coming to Web Server to WAS by checking URI patterns.

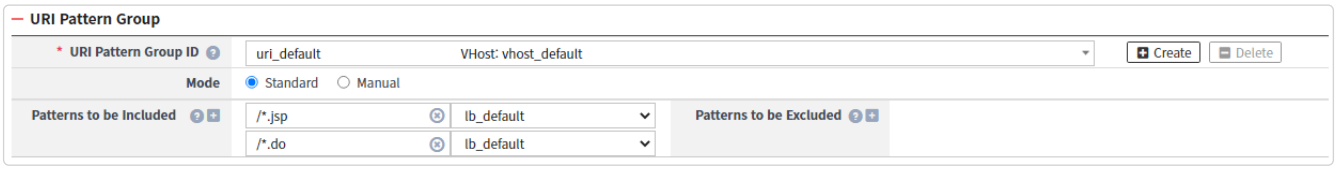


Table 58. URI Pattern Group (JK)

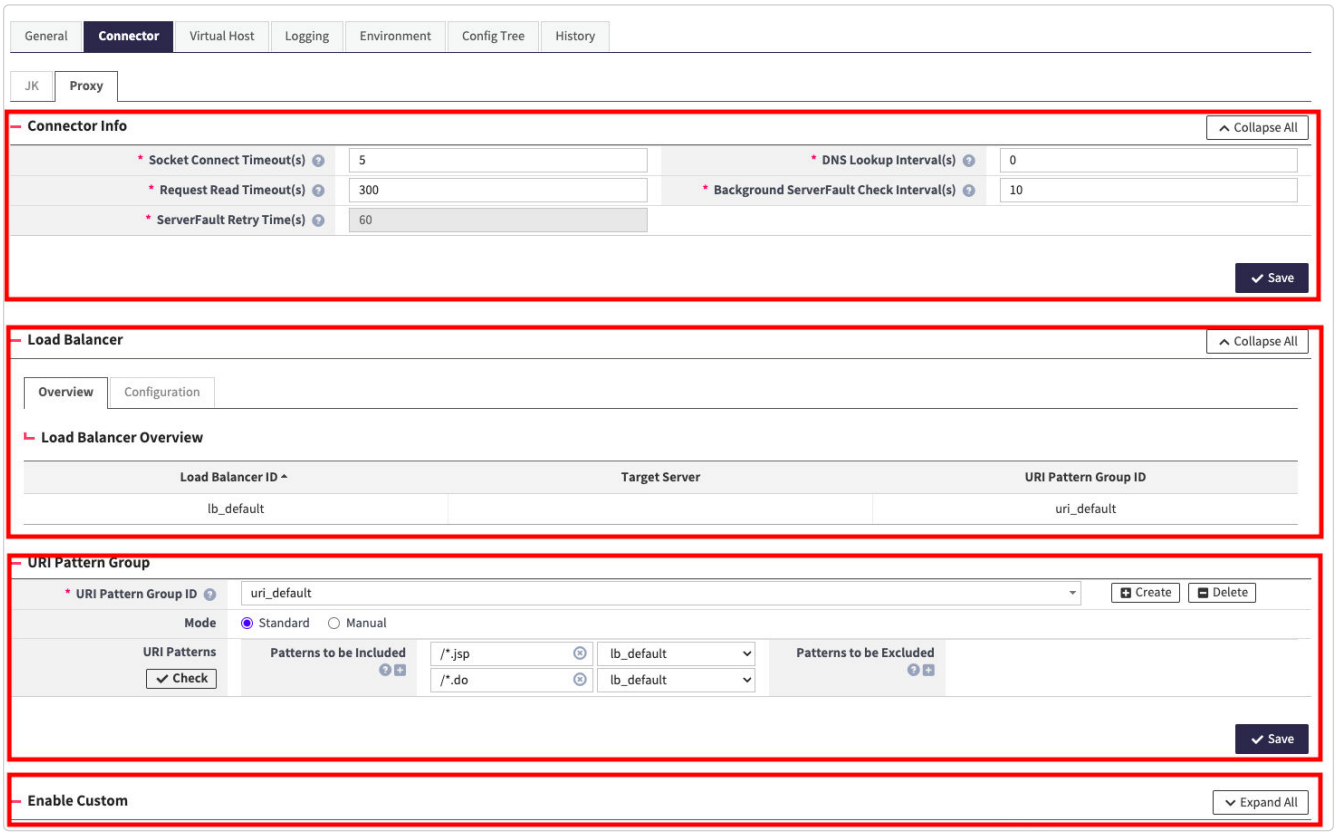
Item (* indicates required values)	Description	Notes
URI Pattern Group ID(*)	Name used for grouping and managing URI patterns. When URI Pattern Group used in Virtual Host, information about which Virtual Host is using it is displayed next to ID.	'uri_' prefix is added when Group is created.
Mode	Specifies whether to input URI patterns in format managed by LENA Manager or in user arbitrary format. Screen for inputting Patterns to be Included/Excluded or URI Patterns is displayed according to this item. If already saved pattern is in format managed by LENA Manager, it is automatically set to Standard, if in user arbitrary format, it is automatically set to Manual.	Standard: Input method according to LENA Manager URI Rule Manual: User arbitrary input method

Item (* indicates required values)	Description	Notes
Patterns to be Included	Input URI patterns to pass to WAS. Must select Load Balancer through right Select box to save. Can delete patterns through button.	Asterisk(*) meaning to allow all characters can be used, Hash(#), Equal(=) are not allowed.
Patterns to be Excluded	Input URI patterns not to pass to WAS. Can delete patterns through button.	Asterisk(*) meaning to allow all characters can be used.
URI Patterns	Used when inputting user arbitrary patterns.	

When changing configuration, Server restart is required to reflect modified items

Proxy

Edits configuration information when using Proxy(mod_proxy).



Proxy tab configuration is divided into four areas: Connector Info, Load Balancer, URI Pattern Group, and Enable Custom.

1. Connector Info
   Manages basic configuration values of Proxy.

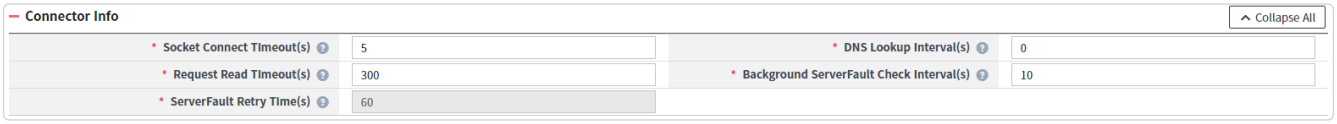


Table 59. Connector Info (Proxy)

Item (* indicates required values)	Description	Notes
Socket Connect Timeout(s)(*)	Time(s) for Apache httpd to wait until connection creation to backend is completed.	Default: 5
DNS Lookup Interval(s)(*)	DNS lookup interval. Set to 0 to disable function.	Default: 10
Request Read Timeout(s)(*)	Time(seconds) for Apache httpd to wait for transmitted data sent and received from backend.	Default: 300
Background ServerFault Check Interval(s)(*)	When Member connected to backend server is in error state, checks server at interval(seconds) set in this item and retransmits requests when server operates normally. Set to 0 to disable function.	Default: 10
ServerFault Retry Time(s)(*)	When Member connected to backend server is in error state, does not transmit any requests to that server until Apache httpd timeout(seconds) expires.	Background ServerFault Check Interval item is modifiable when 0. Default: 60

2. Load Balancer
   Manages basic configuration and Members of Load Balancer for load balancing.
   Load Balancer area has Overview tab and Configuration tab. Overview tab can check overall information of currently created Load Balancer, and Configuration tab can configure detailed contents of Load Balancer.

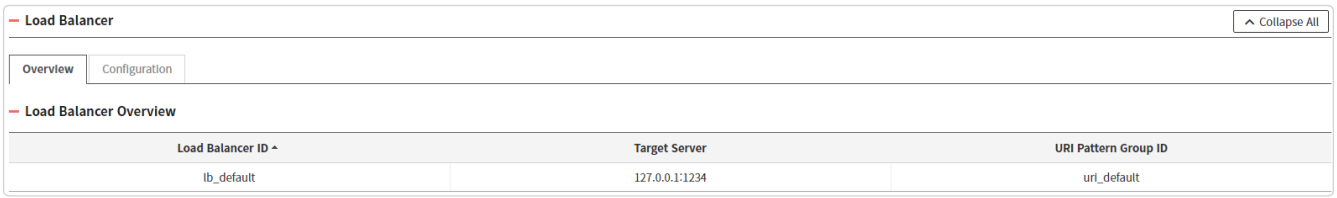


Table 60. Load Balancer Info - Overview (Proxy)

Item (* indicates required values)	Description	Notes
Load Balancer ID	ID of currently created Load Balancer.	
Target Server	Basic information of Members registered in Load Balancer. Displayed in 'Node Name/Server Name' or 'Address:Port' format.	
URI Pattern Group ID	When Load Balancer is specified for specific URI Pattern, URI Pattern Group ID that the URI Pattern belongs to is displayed.	

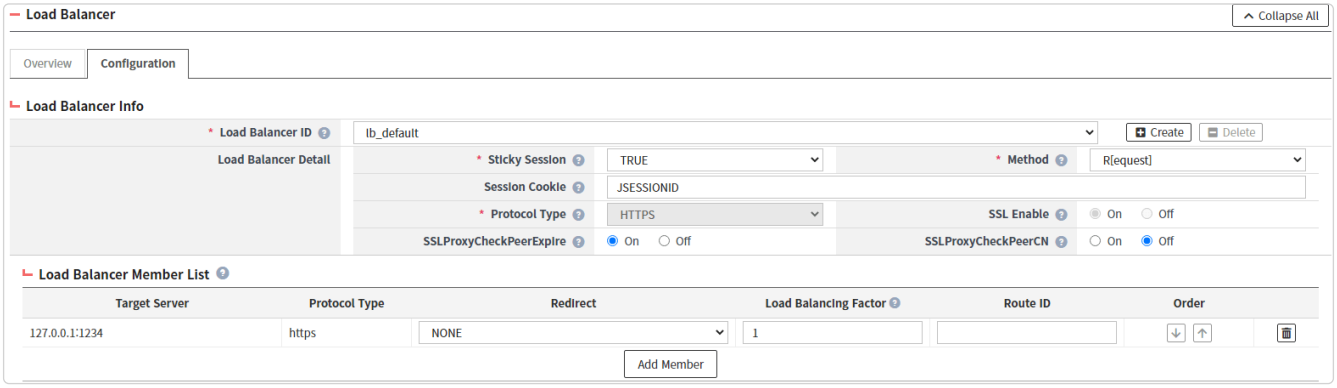


Table 61. Load Balancer Info - Configuration (Proxy)

Item (* indicates required values)	Description	Notes
Load Balancer ID(*)	Name of Load Balancer.	'lb_' prefix is added.
Sticky Session(*)	Whether to support routing based on Session ID.	
Method(*)	Specifies method used by Load Balancer to determine appropriate Member for load balancing.	
* R[equest] : Selects Member with least requests. (Default)	* T[raffic] : Selects Member with least network traffic.	* B[usyness] : Selects Member with least load based on number of requests.
Session Cookie	Set when wanting to change Session Cookie name.	
Protocol Type(*)	Specifies protocol type of Member. Can only be changed when Member is not specified.	Default: HTTP
SSL Enable	Uses SSL/TLS protocol engine for Proxy.	This option cannot be configured and operates only according to Protocol configuration. Default: Off when HTTP, On when HTTPS
SSLProxyCheckPeerExpire	Checks if remote server certificate has expired.	Default: On
SSLProxyCheckPeerCN	Checks CN field of remote server certificate.	Default: Off

Members are added with Add Member button in Load Balancer Member List table.
When Add Member button is pressed, window for adding Member is displayed on screen, and users can select servers managed by LENA Manager as Members in this window or directly input Member information to add.

Added Members are managed through following information.

Table 62. Load Balancer Member List

Item (* indicates required values)	Description	Notes
Target Server	Basic information of server that Member points to. Displayed in Node Name/Server Name format for Members managed by LENA Manager, Address:Port format for Members not managed by LENA Manager.	
Protocol Type	Protocol type used by Member.	
Redirect	When this Member is in error state, sets Failover Member to handle requests received by this Member.	Default: NONE
Load Balancing Factor	Work allocation ratio, defines how much work this Member will do compared to other Members.	Default: 1
Route ID	Route ID of Member.	Must be input when using Sticky Session.
Order	Can change order between Members.	

3. URI Pattern Group
   Defines URI Mapping to pass requests coming to Web Server to WAS by checking URI patterns.

Table 63. URI Pattern Group (Proxy)

Item (* indicates required values)	Description	Notes
URI Pattern Group ID(*)	Name used for grouping and managing URI patterns. When URI Pattern Group used in Virtual Host, information about which Virtual Host is using it is displayed next to ID.	'uri_' prefix is added when Group is created.
Mode	Specifies whether to input URI patterns in format managed by LENA Manager or in user arbitrary format. Screen for inputting Patterns to be Included/Excluded or URI Patterns is displayed according to this item. If already saved pattern is in format managed by LENA Manager, it is automatically set to Standard, if in user arbitrary format, it is automatically set to Manual.	Standard: Input method according to LENA Manager URI Rule Manual: User arbitrary input method
Patterns to be Included	Input URI patterns to pass to WAS. Must select Load Balancer through right Select box to save. Can delete patterns through button.	Asterisk(*) meaning to allow all characters can be used, Hash(#), Equal(=) are not allowed.

Item (* indicates required values)	Description	Notes
Patterns to be Excluded	Input URI patterns not to pass to WAS. Can delete patterns through button.	Asterisk(*) meaning to allow all characters can be used.
URI Patterns	Used when inputting user arbitrary patterns.	

Table 64. Enable Custom (Proxy)

Item (* indicates required values)	Description	Notes
Custom Configuration	Add configurations that users want to add arbitrarily.	Stored separately in custom-proxy.conf file and managed.

When changing configuration, Server restart is required to reflect modified items

Virtual Host

Web Server's Virtual Host information can be registered/modified/cloned/deleted.

Create button, **Delete button** can register/delete Virtual Host, **Clone button** can clone, **Rename button** can change name.

Virtual Hosts with one or more Load Balancers applied cannot be deleted. If you want to delete that Virtual Host, first change Virtual Host ID of Load Balancer to different Virtual Host ID through Connector tab.

When SSL Enabled and Rewrite Enabled are checked, detailed item areas are additionally displayed as follows.

Detailed contents of configuration information are as follows.

Managed files

- /conf/extra/vhost/{Virtual Host ID}.conf
- /conf/extra/rewrite/rewrite_{Virtual Host ID}.conf
- /conf/extra/ssl/ssl_{Virtual Host ID}.conf
- /conf/extra/vhost/custom_{Virtual Host ID}.conf

Table 65. Virtual Host Info Configuration Information

Item (* indicates required values)	Description	Notes
Virtual Host ID(*)	Virtual Host name	
Port(*)	HTTP Port used by that virtual host	

Item (* indicates required values)	Description	Notes
Document Root(*)	Homepage directory location of that virtual host	Can be specified to same or subdirectory using Server's DocumentRoot variable ${DOC_ROOT}
Domain Name(*)	Domain name to identify virtual host	
Server Alias	ServerAlias used by virtual host	Can include wildcard characters (*.example.com)
Custom Log(*)	Web log file location of virtual host	
Directory/Path	Path from DocumentRoot	
Directory/Options	Access control settings to apply to all files and directories under specified directory	-Indexes prevents showing file list under Document Root when welcome page cannot be found -FollowSymLinks prevents accessing file system other than existing web documents under Document Root via symbolic links

Item (* indicates required values)	Description	Notes
Directory/Allow Override	Set which directives to allow for resource access control configuration files for each subdirectory under Document Root (generally AccessFileName : .htaccess)	Provides following types • None : Do not allow any directives • All : All directives available • AuthConfig : Allow user authentication directives • FileInfo : Allow document type control directives • Indexes : Allow directory indexing control directives • Limit : Allow host access control directives
Directory/Require	Verify whether authenticated users perform allowed Actions	
Connector Enable	Whether to configure virtual host Connector	
Connector Type/ID	When configuring virtual host Connector, select according to Jk/Proxy type	Displays Connector list created in Connector Tab.
Rewrite Enable	Whether to use Rewrite	
Rewrite Configuration	Detailed Rewrite configuration. Rewrites according to rules set in Rewrite Rule according to specified Rewrite Condition	
Enable Custom	Add configurations that users want to add to Vhost arbitrarily	Contents are generated and stored in separate file (/conf/http/vhost/custom/custom_default.conf).
SSL Enabled	Whether to use SSL	
SSL Port(*)	HTTPS Port	

Item (* indicates required values)	Description	Notes
SSL Certificate File(*)	SSL certificate path	
SSL Certificate Key File(*)	SSL certificate Key file path	
SSL Certificate Chain File	PEM-encoded server CA certificate file path	
SSL CA Certificate File	ROOT certificate path	
SSL Password	ROOT certificate password	
Https Redirect Enabled	Whether to use Http→Https Redirect	
SSL Log Separation	Whether to use SSL Log configuration separation	
SSL Custom Log(*)	SSL Custom Log configuration	
Enable SSL/TLS Security	SSL security configuration per VirtualHost	Instead of using General SSL/TLS security configuration, SSL/TLS security configuration is applied per VirtualHost.

When changing configuration, Server restart is required to reflect modified items

Logging

Web Server's log configuration information can be edited.

Detailed contents of configuration information are as follows.

1. Log Home

Table 66. Log Home

Item (* indicates required values)	Description	Notes
Log Home(*)	Log Home path	When default is selected, set to logs folder under server installation directory, when custom is selected Log Home Prefix item allows input of log directory home path
Retention Days(*)	Maximum retention days for logs	Default : 0(unlimited)

2. Error Log

Used when Web Server records errors that occur while processing diagnostic information and requests. When problems occur during Server startup or operation, check files at location set here first.

Table 67. Error Log

Item (* indicates required values)	Description	Notes
Location(file/pipe)(*)	Specify Web Server's error log file location	
Log Level(*)	Specify how detailed to record error log file contents	

3. Log Format

Sets format to use for log files.

Table 68. Log Format

Item (* indicates required values)	Description	Notes
Format(*)	Sets format for recording logs in log file	
Nickname(*)	Name of log format to use	

4. Log Format with logio

Table 69. Log Format with logio

Item (* indicates required values)	Description	Notes
Format(*)	Sets format for recording logs in log file	Can measure bytes sent and received including request and head using %I and %O variables

Item (* indicates required values)	Description	Notes
Nickname(*)	Name of log format to use	combinedio requires mod_logio_module to be loaded

5. Log Env

Used when setting environment variables according to Request conditions.

Table 70. Log Env

Item (* indicates required values)	Description	Notes
Attribute(*)	HTTP request header (ex: Host, User-Agent, Referer, Accept-Language), one of request attributes (Remote_Host, Remote_Addr, Server_Addr, Request_Method, Request_Protocol, Request_RUI) or environment variable name associated with request	
Regex(*)	Perl compatible regular expression	
Env-variable name(*)	Variable name and value to set (optional) Varname, !varname or varname=value	
Case	Whether to distinguish case for Env-variable	With case : Distinguish case No case : No case distinction

When changing configuration, Server restart is required to reflect modified items

Environment

Provides screen for managing JVM options, Start Shell configuration, etc. Modify through file editor and click **Save button** to save.

- Custom Env (/bin/customenv.sh): User custom environment variable configuration
- Base Env (/env.sh) - Shell Script for Server startup

By default, configuration cannot be modified. If you want to modify, click **Configuration button** in ADMIN > Manager Environment > Manager Configuration item and change the following configuration to false.

```
server.environment.envshell.readonly=false
```

Configuration Tree

Web Server's ${SERVER_HOME}/conf directory sub configuration files can be managed through file editor.

User running Node Agent must have access permission to Web Server configuration information files for modification. If access permission is not available, message that file cannot be edited due to no Write permission is displayed.

History

Provides backup and restore functionality for configuration information. When configuration information is modified and saved, History is managed. Search by entering modification date.

Click **View(magnifying glass) button** to view information of selected file, and click **Restore button** to restore to that configuration file.

4.4.9. Configuration Information Management (EN-N)

Provides functionality to change engine configuration information of EN-N type Web Server. When Server is selected from Web Server list, it moves to screen for managing configuration information.

General

General configuration values and Connection, Process information of Web Server can be edited.

Web Server's configuration information performs Validation on configuration files when saving, minimizing Server startup failures due to configuration file errors.

When configuration file error occurs, file is not saved and error message is displayed

Error message example

```
AH00526: Syntax error on line 253  Argument for 'Require all'
must be 'granted' or 'denied'
```

Detailed contents of configuration information are as follows.

1. Server Info (/var/common_value.env file management)

Table 71. Server Info

Item (* indicates required values)	Description	Notes
Install Path	Server installation path	
Base Port(*)	Port Type information and Port Number set during installation	Port Type cannot be changed, Port Number can be changed
Welcome Page	Define which file to use as initial page document of website	
Stop Mode	Server stop Mode	• Stop • Graceful Stop
Directory Root Path	Basic folder path where documents provided by Web Server are stored	
Disable Symbolic Links	Whether to not use Symbolic Link	Default : on (not used)
Diasble Auto Index	Enable or disable directory listing output.	Default : on (disabled)

2. Additional Port Info (/var/tcp_port.env, /var/udp_port.env file management)

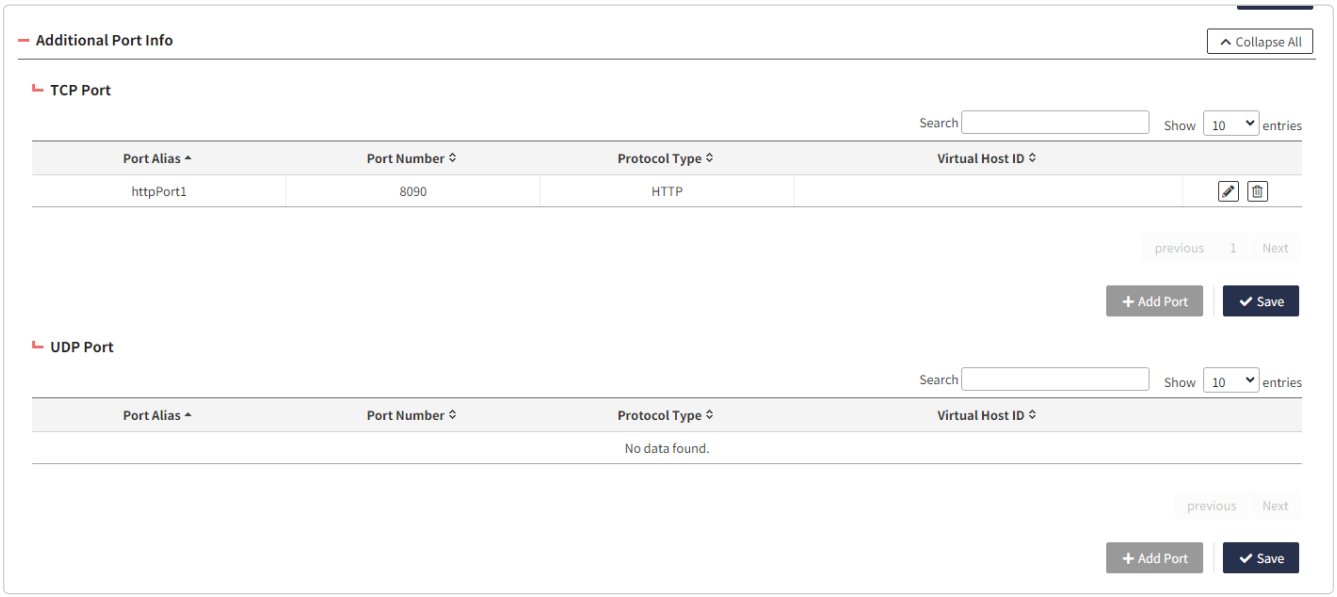


Table 72. TCP Port

Item (* indicates required values)	Description	Notes
Port Alias(*)	Set Alias of port.	
Port Number	Specify port number.	

Item (* indicates required values)	Description	Notes
Protocol Type	Select protocol type.	
Virtual Host ID	Display Virtual Host ID using that Port.	Cannot change Port Alias when specific Virtual Host is using that Port.

TCP Protocol dedicated usage ports (Proxy(HTTP, HTTPS), Net Gateway(TCP))

Table 73. UDP Port

Item (* indicates required values)	Description	Notes
Port Alias(*)	Set Alias of port.	
Port Number	Specify port number.	
Protocol Type	Select protocol type.	
Virtual Host ID	Display Virtual Host ID using that Port.	Cannot change Port Alias when specific Virtual Host is using that Port.

UDP Protocol dedicated usage ports (Net Gateway)

3. Connection Info (/var/common_value.env file management - related file /conf/http/lenan-http.conf)

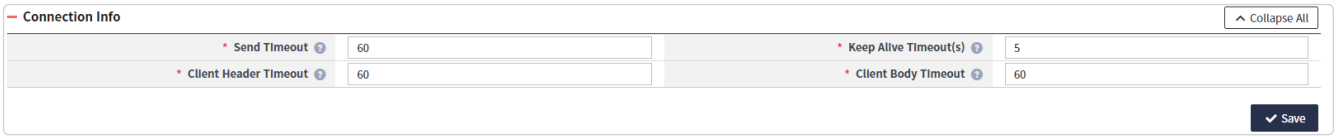


Table 74. Connection Info

Item (* indicates required values)	Description	Notes
Send Timeout(*)	Timeout time set for sending response to client. **This is timeout time between two consecutive write operations, not total response transmission timeout time.** If client receives nothing within time specified in send_timeout, connection is closed.	Default : 60
Keep Alive Timeout(s) (*)	Timeout time set for keeping connection between server and client open.	Default : 5

Item (* indicates required values)	Description	Notes
Client Header Timeout(*)	Time to read request header information, if **client does not send header within specified time**, request ends with 408(Request Time-out).	Default: 60
Client Body Timeout(*)	Time to read request body information, **this is timeout time between two consecutive read operations, not total request body transmission timeout time.** If client sends nothing within time specified in client_body_timeout, request ends with 408(Request Time-out).	Default: 60

4. Process Info (/var/common_value.env file management - related file /conf/lenan.conf)

Table 75. Process Info

Item (* indicates required values)	Description	Notes
Worker Process(*)	Define number of worker processes.	Default : 2
Worker Connection(*)	Set maximum number of simultaneous connections.	Maximum Request allowance: worker_processes * worker_connections

When changing configuration, Server restart is required to reflect modified items.

5. Enable Custom (/conf/custom/custom.conf file management - related file /conf/lenan.conf)

Table 76. Enable Custom

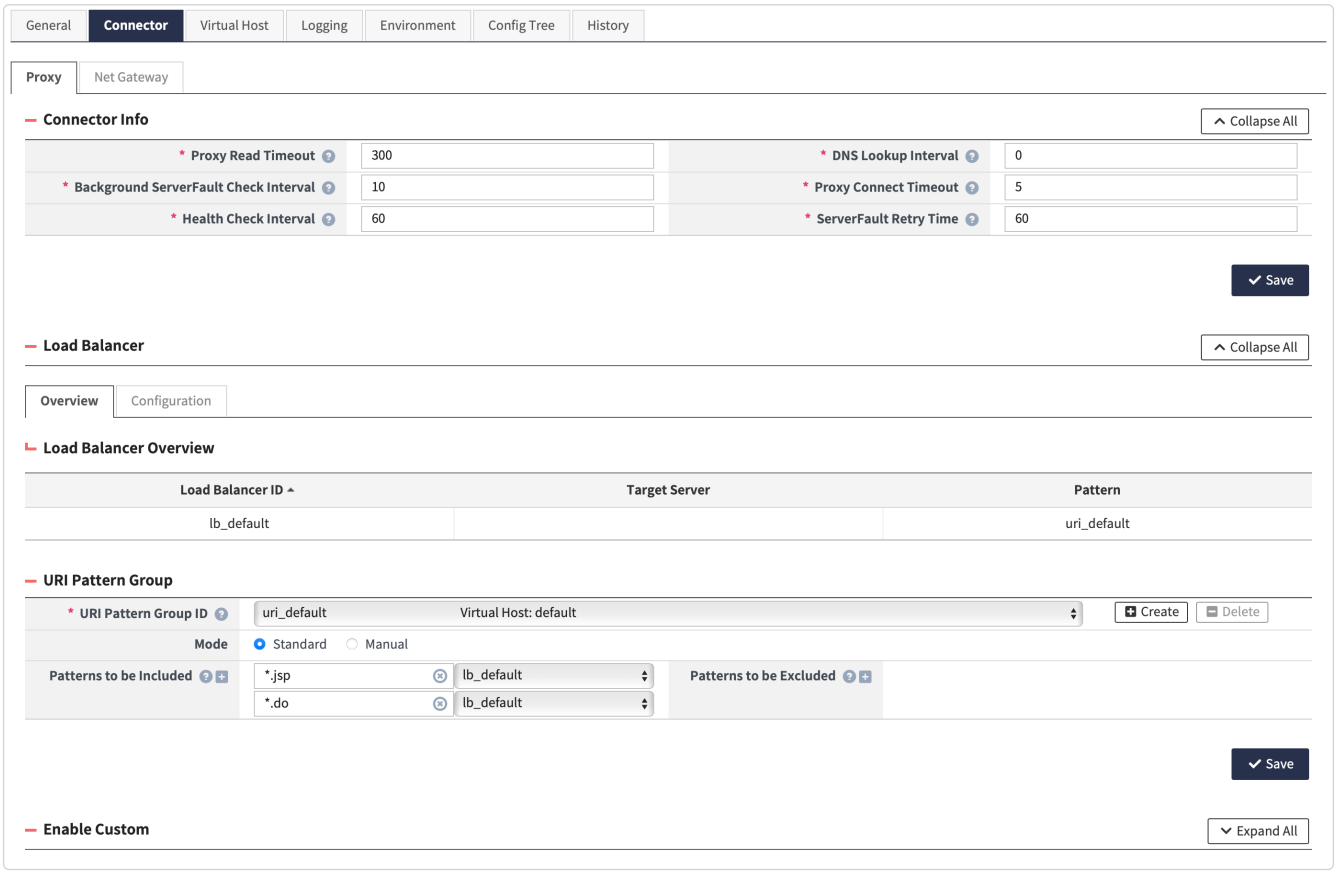
Item (* indicates required values)	Description	Notes
Custom Configuration	Input content that users can freely insert through custom.conf included in lenan.conf.	

Connector

Manages information for linking Web Server and WAS(Backend).
Connector page is divided into Proxy and Net Gateway tabs according to protocol, and Connector configuration information according to module can be edited in each tab.

Proxy

Edits configuration information when using Proxy(ngx_http_upstream_module).



Proxy tab configuration is divided into three areas: Connector Info, Load Balancer, and URI Pattern Group as shown in the above screen.

1. Connector Info
   Manages basic configuration values of Proxy.

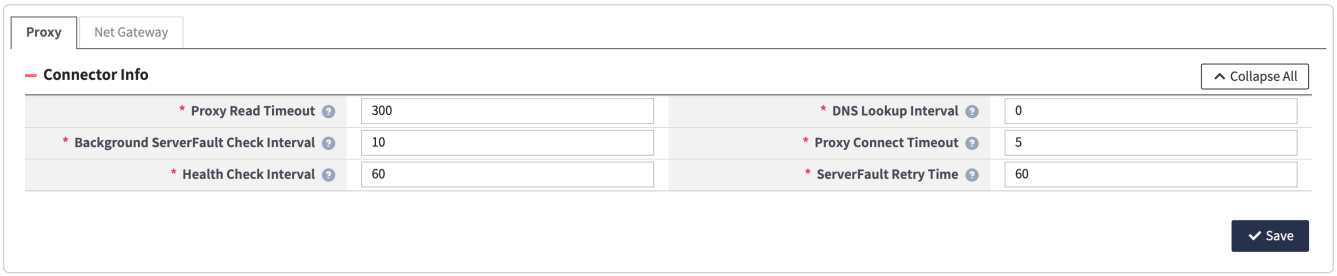


Table 77. Connector Info (Proxy)

Item (* indicates required values)	Description	Notes
Proxy Read Timeout(*)	Timeout time set for reading response from backend server. This is timeout time between two consecutive read operations, not total response transmission timeout time. If backend server sends nothing within time specified in proxy_read_timeout, connection is closed.	Default: 300
Proxy Connect Timeout(*)	Define time limit for establishing connection with backend server. This time limit generally cannot exceed 75 seconds.	Default: 5
Background ServerFault Check Interval(*)	When Member connected to backend server is in error state, checks server at interval(seconds) set in this item and retransmits requests when server operates normally. Set to 0 to disable function.	Default: 10
Server Fault Retry Time(*)	When Member connected to backend server is in error state, does not transmit any requests to that server until timeout(seconds) expires.	Default: 60
Health Check Interval(*)	Checks server at interval(seconds) set for checking backend server status. Set to 0 to disable function.	Default: 60
DNS Lookup Interval(*)	DNS lookup interval. Set to 0 to disable function.	Default: 10

When Background ServerFault Check Interval and Health Check Interval are saved as 0
All LoadBalancer's Auto Server Fault Recovery values change to off, and new creation values are also fixed to off.

2. Load Balancer
   Manages basic configuration and Members of Load Balancer for load balancing.
   Load Balancer area has Overview tab and Configuration tab. Overview tab can check overall information of currently created Load Balancer, and Configuration tab can configure detailed contents of Load Balancer.

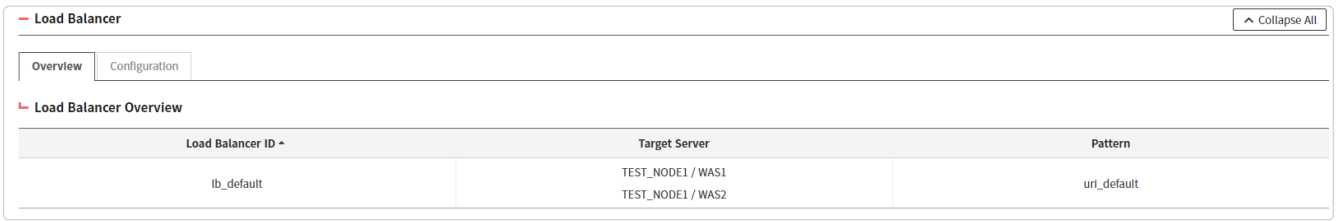


Table 78. Load Balancer Info - Overview (Proxy)

Item (* indicates required values)	Description	Notes
Load Balancer ID	ID of currently created Load Balancer.	
Target Server	Basic information of Workers registered in Load Balancer. Displayed in 'Node Name/Server Name' format.	

Item (* indicates required values)	Description	Notes
Pattern	When Load Balancer is specified for specific URI Pattern, URI Pattern Group ID that the URI Pattern belongs to is displayed.	

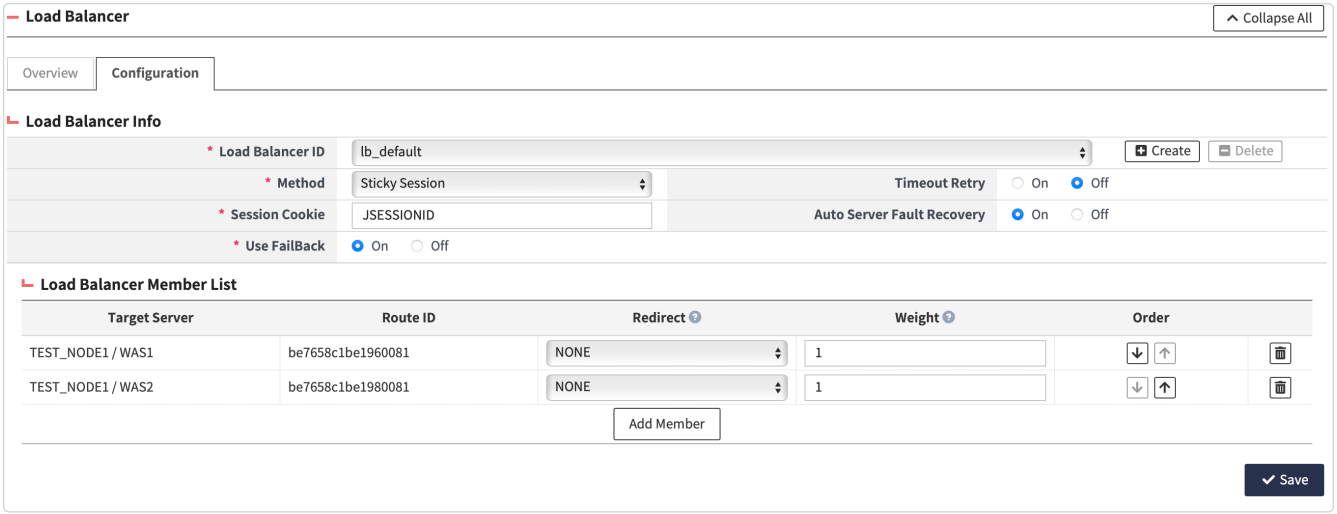


Table 79. Load Balancer Info - Configuration (Proxy)

Item (* indicates required values)	Description	Notes
Load Balancer ID(*)	Name of Load Balancer.	'lb_' prefix is added.
Method(*)	Specifies method used by Load Balancer to determine appropriate Worker for load balancing.	
* Sticky Session : Route based on Session Cookie	* RoundRobin : Route in order of registered members	• IP Hash : Route based on Client's IP
* Least Connection : Route to side with fewer connections	Session Cookie(*)	Set when wanting to change Session Cookie name.
Default: JSESSIONID	Timeout Retry	Set when wanting to change Session Cookie name.
Default:Off When On is set, retransmits when Gateway Timeout occurs.	Auto Server Fault Recovery	Whether to use fox Directive

Members are added with Add Member button in Load Balancer MemberList table.
When Add Member button is pressed, window for adding Member is displayed on screen, and users can select servers managed by LENA Manager as Members in this window. Added Members are managed through following information.

Table 80. Load Balancer Member List

Item (* indicates required values)	Description	Notes
Target Server	Node name and server name of server that Member points to.	
Route ID	Route ID of Member	
Weight	Work allocation ratio, defines how much work this Worker will do compared to other Workers.	Default: 1

3. URI Pattern Group
   Defines URI Mapping to pass requests coming to Web Server to WAS by checking URI patterns.

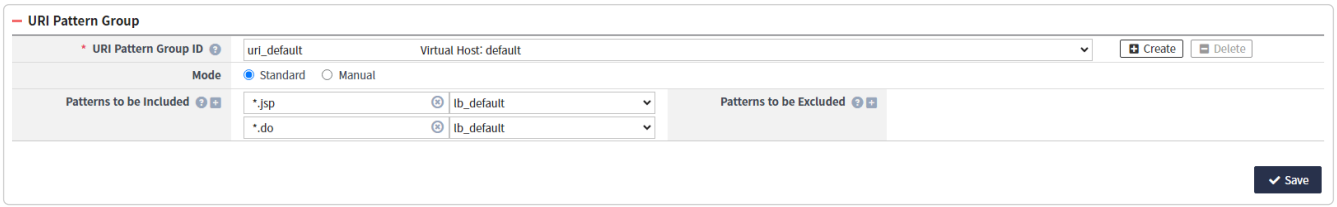


Table 81. URI Pattern Group (Proxy)

Item (* indicates required values)	Description	Notes
URI Pattern Group ID(*)	Name used for grouping and managing URI patterns. When URI Pattern Group used in Virtual Host, information about which Virtual Host is using it is displayed next to ID.	Group creation adds 'uri_' prefix.
Mode	Specifies whether to input URI patterns in format managed by LENA Manager or in user arbitrary format. Screen for inputting Patterns to be Included/Excluded or URI Patterns is displayed according to this item. If already saved pattern is in format managed by LENA Manager, it is automatically set to Standard, if in user arbitrary format, it is automatically set to Manual.	• Standard: Input method according to LENA Manager URI Rule • Manual: User arbitrary input method
Patterns to be Included	Input URI patterns to pass to WAS. Must select Load Balancer through right Select box to save. Can delete patterns through button.	Asterisk(*) meaning to allow all characters can be used, Hash(#), Equal(=) are not allowed.
Patterns to be Excluded	Input URI patterns not to pass to WAS. Can delete patterns through button.	Asterisk(*) meaning to allow all characters can be used.
URI Patterns	Used when inputting user arbitrary patterns.	

4. Enable Custom
   /conf/http/custom/custom_http.conf file management - related file /conf/http/lenan-http.conf)

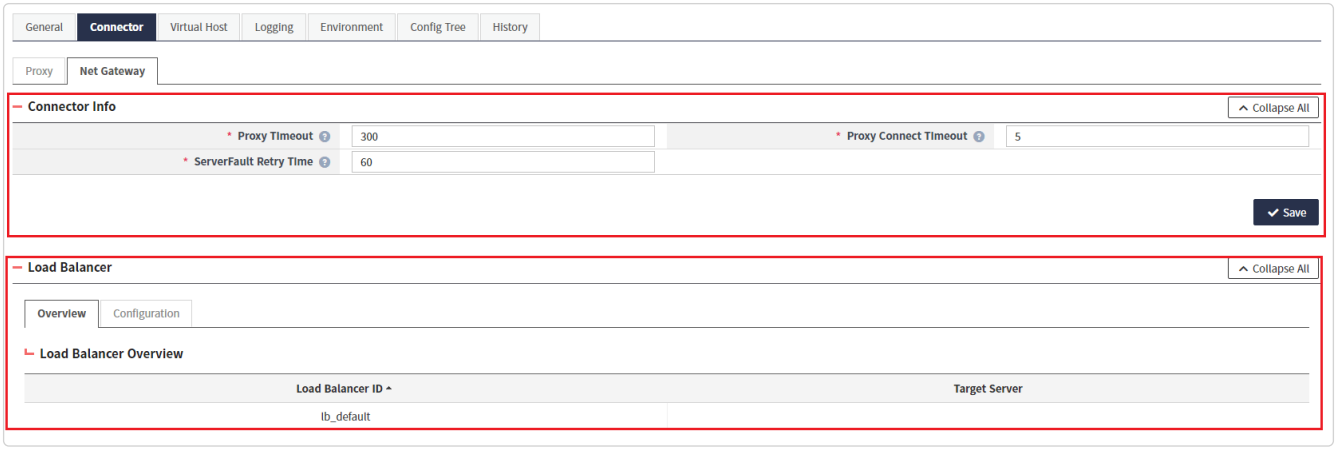
Table 82. Enable Custom (Proxy)

Item (* indicates required values)	Description	Notes
Custom Configuration	Input content that users can freely insert through custom_http.conf included in lenan-http.conf.	

When changing configuration, Server restart is required to reflect modified items

Net Gateway

Edits configuration information when using Net Gateway(ngx_stream_upstream_module).



Net Gateway tab configuration is divided into two areas: Connector Info and Load Balancer.

1. Connector Info
   Manages basic configuration values of Net Gateway.

Table 83. Connector Info (Net Gateway)

Item (* indicates required values)	Description	Notes
Proxy Timeout(s)(*)	Set time limit between two consecutive read or write operations in client or proxy server connection. If data is not transmitted within this time, connection is closed.	Default: 5
Proxy Connect Timeout(s)(*)	Define timeout for establishing connection with proxy server	Default: 10

Item (* indicates required values)	Description	Notes
ServerFault Retry Time(s)(*)	Time period during which server is considered unavailable after specified number of server communication failures occur, period during which server is considered unavailable.	Default: 60

2. Load Balancer
   Manages basic configuration and Members of Load Balancer for load balancing.
   Load Balancer area has Overview tab and Configuration tab. Overview tab can check overall information of currently created Load Balancer, and Configuration tab can configure detailed contents of Load Balancer.

Table 84. Load Balancer Info - Overview (Net Gateway)

Item (* indicates required values)	Description	Notes
Load Balancer ID	ID of currently created Load Balancer.	
Target Server	Basic information of Members registered in Load Balancer. Displayed in 'Address:Port' format.	

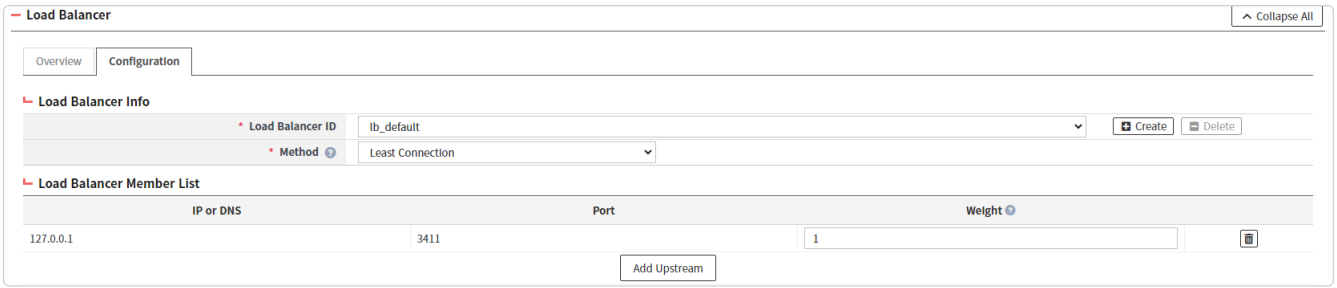


Table 85. Load Balancer Info - Configuration (Net Gateway)

Item (* indicates required values)	Description	Notes
Load Balancer ID(*)	Name of Load Balancer.	'lb_' prefix is added.
Method(*)	Specifies method used by Load Balancer to determine appropriate Member for load balancing.	
* Round Robin : Route sequentially through registered member list	* IP Hash : Route based on Client IP	• Least Connection : Route to side with fewer connections based on Connection

Members are added with Add Upstream button in Load Balancer Member List table.

When Add Upstream button is pressed, window for adding Upstream is displayed on screen, and users can directly input Upstream information to add in this window.

Added Upstreams are managed through following information.

Table 86. Load Balancer Member List

Item (* indicates required values)	Description	Notes
IP or DNS	Basic information of server that Upstream points to. Basically displayed in Address:Port format.	DNS can also be input.
Port	Port information used by Upstream.	
Weight	Work allocation ratio, defines how much work this Upstream will do compared to other Upstreams.	Default: 1 Cannot input 0 for work allocation (changes to default 1)

3. Enable Custom /conf/stream/custom/custom_stream.conf file management - related file /conf/stream/lenan-stream.conf)

Table 87. Enable Custom (Net Gateway)

Item (* indicates required values)	Description	Notes
Custom Configuration	Input content that users can freely insert through custom_stream.conf included in lenan-stream.conf.	

When changing configuration, Server restart is required to reflect modified items

Virtual Host

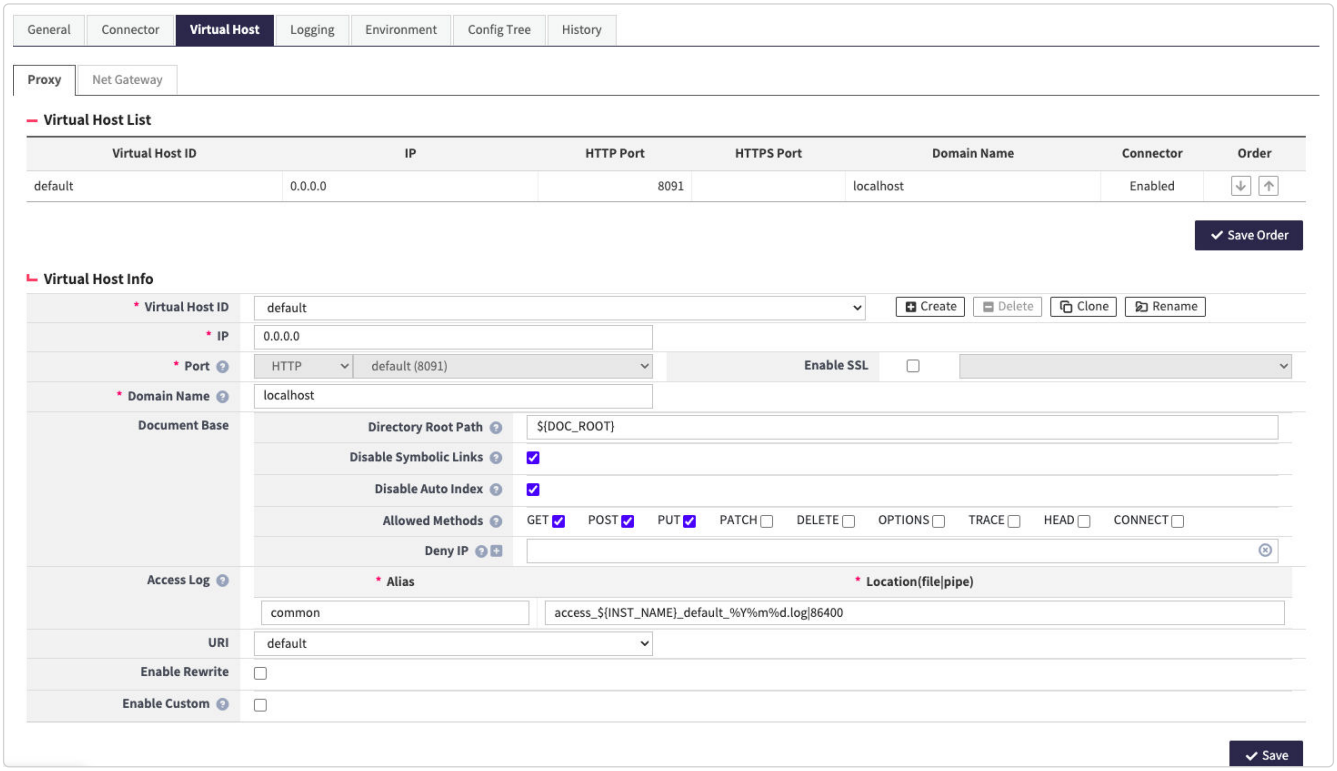
Proxy

Proxy Web Server's Virtual Host information can be registered/modified/cloned/deleted.

Create button, **Delete button** can register/delete Virtual Host, **Clone button** can clone, **Rename button** can change name.

Virtual Hosts with one or more Load Balancers applied cannot be deleted. If you want to delete that Virtual Host, first change Virtual Host ID of Load Balancer to different Virtual Host ID through Connector tab.

When Enable SSL and Enable Rewrite and Enable Custom are checked, detailed item areas are additionally displayed.



Detailed contents of configuration information are as follows.

Managed files

- /conf/http/vhost/vhost_{Virtual Host ID}.conf
- /conf/http/vhost/vhost.list
- /conf/http/vhost/rewrite/rewrite_{Virtual Host ID}.conf
- /conf/http/vhost/custom/custom_{Virtual Host ID}.conf

Table 88. Virtual Host Info Configuration Information

Item (* indicates required values)	Description	Notes
Virtual Host ID(*)	Virtual Host name	
Domain Name	Domain name to identify virtual host	
IP(*)	Select protocol to be used by that virtual host (HTTP, HTTPS) IP used by that virtual host	
Port(*)	Port used by that virtual host	

Item (* indicates required values)	Description	Notes
SSL Enable	Whether to additionally use SSL, HTTPS service port to be used by that virtual host	When checked, need to use port from combo box for HTTPS service port (port information to use must be pre-registered as HTTPS port in General tab's Port Info)
SSL/SSLCertificateFile	SSL certificate path	
SSL/SSLCertificateKeyFile	SSL certificate Key file path	
SSL/SSLPassword	SSL Password	When password is input, managed through AES256 encryption
SSL/Use HTTPS Redirect	Whether to use HttpHttps Redirect	
Document base/Directory Root Path	Homepage directory location of that virtual host	Can be specified to same or subdirectory using Server's DocumentRoot variable ${DOC_ROOT}
Document base/Disable Symbolic Links	Prevent accessing file system other than existing web documents under Document Root via symbolic links	
Document base/Disable Auto Index	Prevent showing file list under Document Root when welcome page cannot be found	
Document base/Allowed Methods	Allow access for specified http methods	
Document base/Deny IP	Deny access for specified networks or addresses	
Access Log/Alias	Set format for recording logs in log file	
Access Log/Location	Set location and name for log files	
URI	Select URI Pattern Group set in Connector Proxy Tab	Not required selection

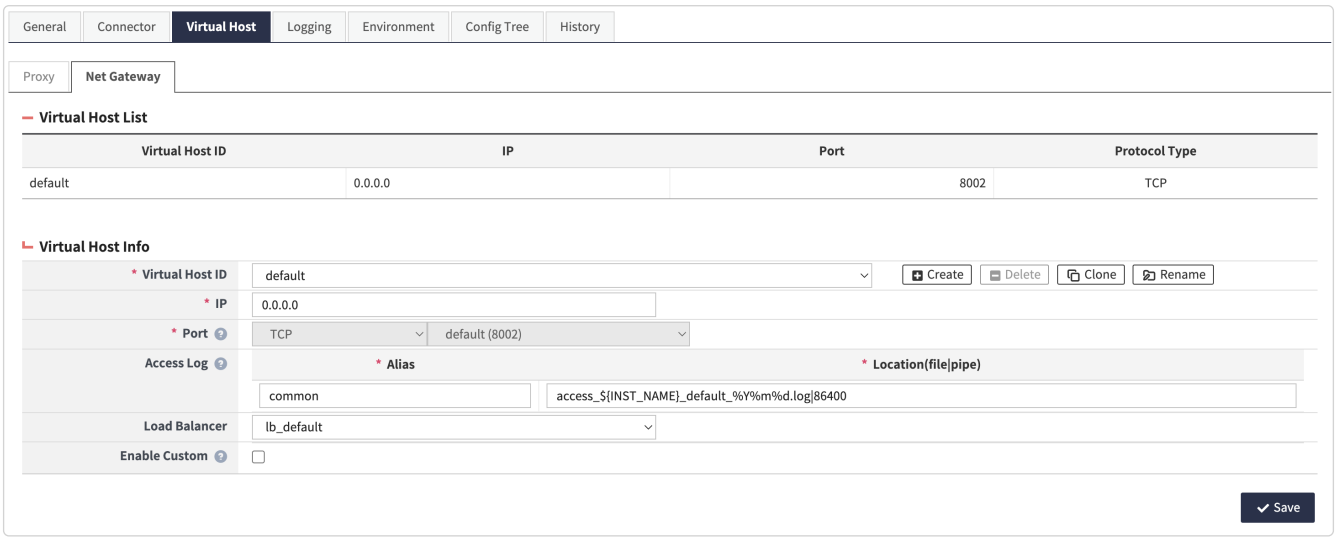
Item (* indicates required values)	Description	Notes
Enable Rewrite	Whether to use Rewrite function, creates input window below when checked	Input content is generated and stored in separate file
Enable Custom	Whether to use Custom Configuration, creates input window below when checked	Input content is generated and stored in separate file (/conf/http/vhost/custom/custom_default.conf)

Net Gateway

Net Gateway Web Server's Virtual Host information can be registered/modified/cloned/deleted.

Create button, **Delete button** can register/delete Virtual Host, **Clone button** can clone, **Rename button** can change name.

Virtual Hosts with one or more Load Balancers applied cannot be deleted. If you want to delete that Virtual Host, first change Virtual Host ID of Load Balancer to different Virtual Host ID through Connector tab.



Detailed contents of configuration information are as follows.

Managed files

- /conf/stream/vhost/vhost_{Virtual Host ID}.conf
- /conf/stream/vhost/vhost.list
- /conf/stream/vhost/custom_{Virtual Host ID}.conf

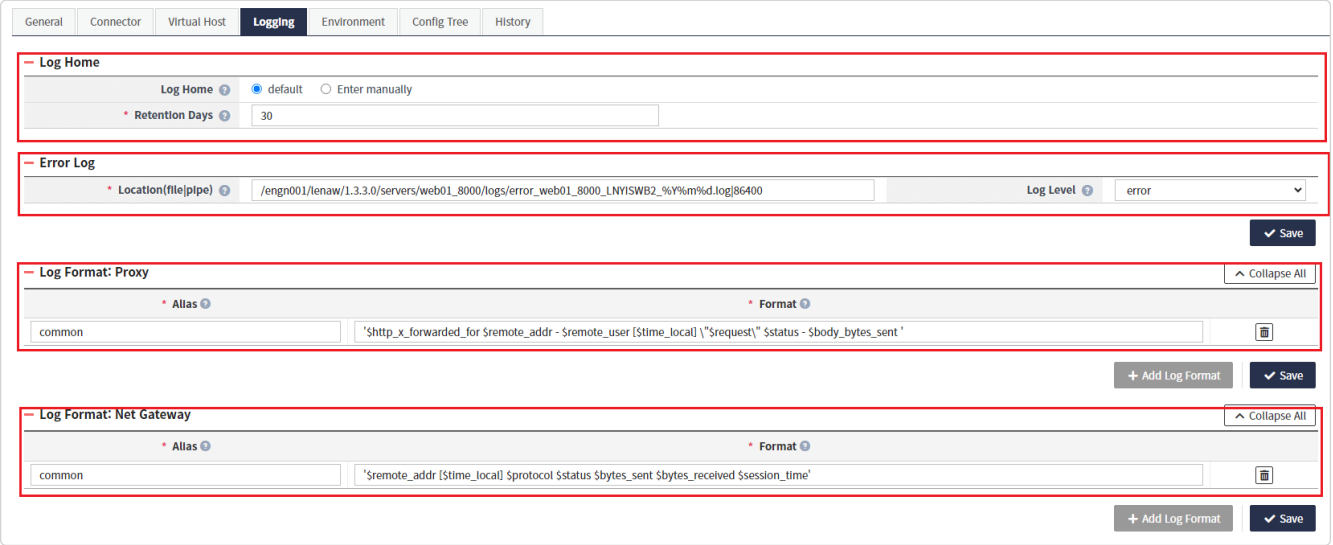
Table 89. Virtual Host Info Configuration Information

Item (* indicates required values)	Description	Notes
Virtual Host ID(*)	Virtual Host name	

Item (* indicates required values)	Description	Notes
IP(*)	Select protocol to be used by that virtual host (HTTP, HTTPS) IP used by that virtual host	
Port(*)	Port used by that virtual host	
Access Log/Alias	Set format for recording logs in log file	
Access Log/Location	Set location and name for log files	
Load Balancer	Select Load Balancer Group set in Connector Net Gateway Tab	
Enable Custom	Whether to use Custom Configuration, creates input window below when checked	Input content is generated and stored in separate file (/conf/stream/vhost/custom/custom_default.conf)

Logging

Web Server's log configuration information can be edited.



Detailed contents of configuration information are as follows.

1. Log Home

Table 90. Log Home

Item (* indicates required values)	Description	Notes
Log Home(*)	Log Home path	When default is selected, set to logs folder under server installation directory, when custom is selected Log Home Prefix item allows input of log directory home path
Retention Days(*)	Maximum retention days for logs	Default : 0(unlimited)

2. Error Log

Used when Web Server records errors that occur while processing diagnostic information and requests. When problems occur during Server startup or operation, check files at location set here first.

Table 91. Error Log

Item (* indicates required values)	Description	Notes
Location(file/pipe)(*)	Specify Web Server's error log file location	
Log Level(*)	Specify how detailed to record error log file contents	

3. Log Format : Proxy

Sets format to use for Proxy log files.

Table 92. Log Format : Proxy

Item (* indicates required values)	Description	Notes
Alias(*)	Name of log format to use	
Format(*)	Sets format for recording logs in log file	

4. Log Format : Net Gateway

Sets format to use for Net Gateway log files.

Table 93. Log Format : Net Gateway

Item (* indicates required values)	Description	Notes
Alias(*)	Name of log format to use	
Format(*)	Sets format for recording logs in log file	

When changing configuration, Server restart is required to reflect modified items

Environment

Provides screen for managing JVM options, Start Shell configuration, etc. Modify through file editor and click **Save button** to save.

- Custom Env (/bin/customenv.sh): User custom environment variable configuration
- Base Env (/env.sh) - Shell Script for Server startup

By default, configuration cannot be modified. If you want to modify, click **Configuration button** in ADMIN > Manager Environment > Manager Configuration item and change the following configuration to false.

```
server.environment.envshell.readonly=false
```

Configuration Tree

Web Server's ${SERVER_HOME}/conf directory sub configuration files can be managed through file editor.

User running Node Agent must have access permission to Web Server configuration information files for modification. If access permission is not available, message that file cannot be edited due to no Write permission is displayed.

History

Provides backup and restore functionality for configuration information. When configuration information is modified and saved, History is managed. Search by entering modification date.

Click **View(magnifying glass) button** to view information of selected file, and click **Restore button** to restore to that configuration file.

4.4.10. Server Log Viewer

Log Viewer button on right side of server list allows browsing log file contents under target server's Log Home path.

To use this functionality, the following must be satisfied.

- Node to which target server belongs must be running.

Click Log Viewer button in server list to check directories and files in tree structure based on target server's Log Home path.

When file is selected, file contents are queried, and when first selected, file contents from end of file up to predetermined size can be checked.

Use Load More, Load Previous buttons to query and check log file contents by predetermined size.

- When using Load Previous button and no more content to query (eg. beginning of file), Alert message that no more data can be read is displayed.
- When using Load More button and no more content to query (eg. end of file), message that no more data can be read is displayed at bottom of screen.

Chapter 5. Resource

5.1. Database

When you select Database from the left menu, the Database Resource list is displayed.

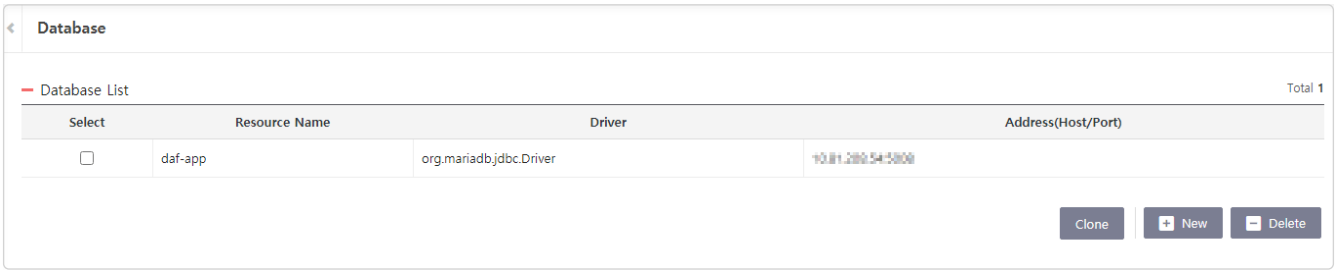


Figure 7. Database List Screen

5.1.1. Database Registration

1. Click the **New button** in the Database Resource list to display the new registration screen.
2. Enter the input fields.
   - Enter the Resource Name.
   - Check the DriverClassName and select the driver for your desired vendor.
   - Enter the Address (host/Port) information.
3. Click the **Save button** to save.

5.1.2. Database Modification

1. Select the checkbox of the Database Resource you want to modify from the Database Resource list.
2. Modify the Database Resource items and save.

When content is modified, it propagates to the DataSource Resource and WAS configuration connected to that Database Resource, so if there are DataSource Resources connected under that Database Resource, the input fields are disabled by default. Click the **Edit button** to enable modification.

5.2. DataSource

When you select DataSource from the left menu, the DataSource Resource list is displayed.

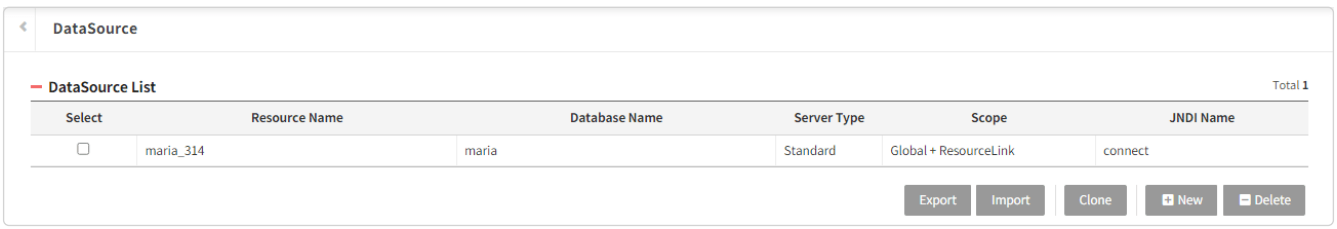


Figure 8. DataSource List Screen

5.2.1. DataSource Export

The Export function is a feature to download information of previously registered DataSources to the Local Server. DataSource information exported through this function can be reloaded to LENA Manager using the Import function when needed.

Performing DataSource Export

1. In the DataSource list screen, select one or more DataSources to export through the Checkbox in the Select column.
2. Click the Export button.
3. A compressed file is downloaded.

5.2.2. DataSource Import

The Import function is a feature to re-register exported DataSource information to LENA Manager.

Performing DataSource Import

1. Click the Import button to display the DataSource Dialog on screen.
2. Click the magnifying glass button in the Upload File Input field to load the exported compressed file.
3. Click the Scan button to read the information from the compressed file.
4. Verify that DataSource information is displayed in the table below.
5. Select the DataSource information to perform Import function with Checkbox, then click the Import button below.
6. Verify that the selected DataSource has been added to the DataSource list.

[resource datasource import] | manual/resource_datasource_import.png

Figure 9. Import DataSource Dialog Screen

Understanding Import Status

- When re-importing an already registered DataSource, the Import operation is performed normally.
- When the Database information managed by LENA Manager differs from the Database information the DataSource had at Export time (or if the information doesn't exist), the Import operation is not performed and the Checkbox is in a disabled state.

This is a different function from DataSource Import in the DataSource detail information screen.

5.2.3. DataSource Registration

1. Click the **New button** in the DataSource Resource list to display the new registration screen.
2. Enter a logical name in the Resource Name field.
3. Configure the detailed settings for DataSource (refer to the detailed item descriptions in [Server DataSource Settings])
4. Click the **Upload button** to register the Driver for that DataSource on the Manager server. Pre-registered Drivers are transmitted to the corresponding server when operators import them to the

server.

5. Click the **Save button** to save.

JDBC Drivers uploaded to the Manager are transmitted to the corresponding server when operators import that DataSource Resource to the server. Transmitted JDBC Drivers are located in the {server home path}/lib/datasource directory and are automatically registered in the Classpath.

5.2.4. DataSource Modification

1. When you select a row you want to modify from the DataSource Resource list, the DataSource Resource modification screen is displayed.
2. Change the configuration you want to modify.
3. Click the **Save button** to save.

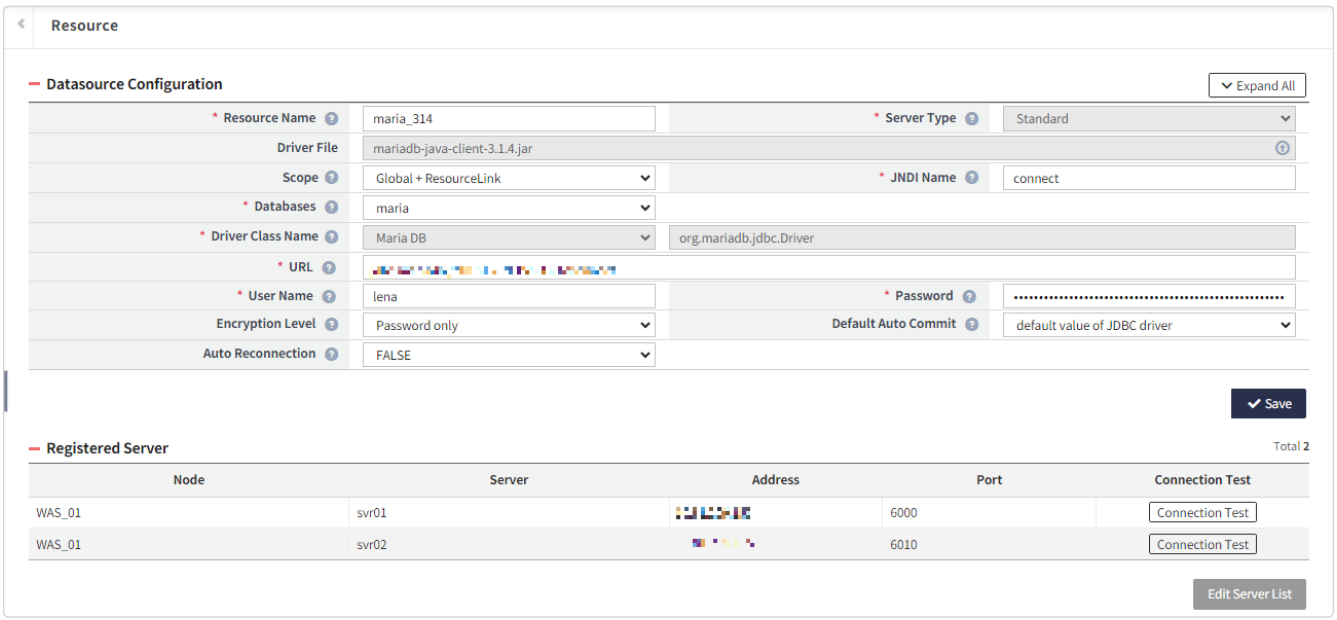


Figure 10. DataSource Detail Information Screen

When you save after modifying DataSource Resource information, the changed configuration propagates to the server where that DataSource Resource is used. When you restart the server where the configuration has propagated, that configuration is applied.

Note that when deleting a DataSource Resource after Classpath registration, the Classpath is not deleted.

5.2.5. DataSource Deletion

1. Select the checkbox of the DataSource Resource you want to delete from the DataSource Resource list.
2. Click the **Delete button** to delete.

If there are Registered Servers or Registered Applications that have imported from the Server or Application, that DataSource Resource cannot be deleted.

5.2.6. JDBC Driver Upload

1. Click the **Upload button** in the DataSource Resource registration or edit screen to display a screen where you can upload Driver Files.
2. Click the **File Selection button** to select the Driver File you want to upload from your local PC.
3. Click the **Upload button** to upload the Driver File to the Manager.

5.2.7. DataSource Import

The list of Servers using the created DataSource Resource by importing it (when Scope is Context, Global, Global + Link) or the list of Applications (when Scope is Application) is displayed in the lower area when viewing DataSource Resource details.

Importing DataSource from DataSource Detail Screen

DataSource Resources with Scope Context, Global, or Global + Link can register servers that import them.

1. In the DataSource management screen, select a specific DataSource Resource to navigate to the detail information screen.
2. Click the **Edit Server List button** to display a window where you can register and manage servers.
3. Specify the server to import that DataSource and move it to the right area.
4. Click the **Save button** to import the DataSource Resource to that server.

To delete an imported DataSource Resource from a server, move the target server to the left area and click the **Save button**.

Importing DataSource from Individual Server

1. Select the Servers menu from the top of LENA Manager.
2. Click on the left side: Individual Web Application Server > Resources > DataSource tab to display a screen where you can view the DataSource Resource list for that server and add DataSource Resources.
3. Click the **Import button** to display a list of predefined DataSource Resources in a popup window.
4. Select the DataSource Resource you want to import.
5. Click the **OK button** to import that DataSource Resource.

When you import a DataSource Resource, connection information between that DataSource Resource and the server is internally created. Based on this connection information, configuration updates are delivered to that server when the DataSource Resource is modified. Connection information can be viewed in the Resource > DataSource screen.

Imported DataSource Resource settings cannot be edited in server settings. (Configuration information can be viewed but not modified) To change the configuration, go to the Resource > DataSource screen to make changes.

5.3. Application

When you select Application from the left menu, the Application Resource list is displayed.

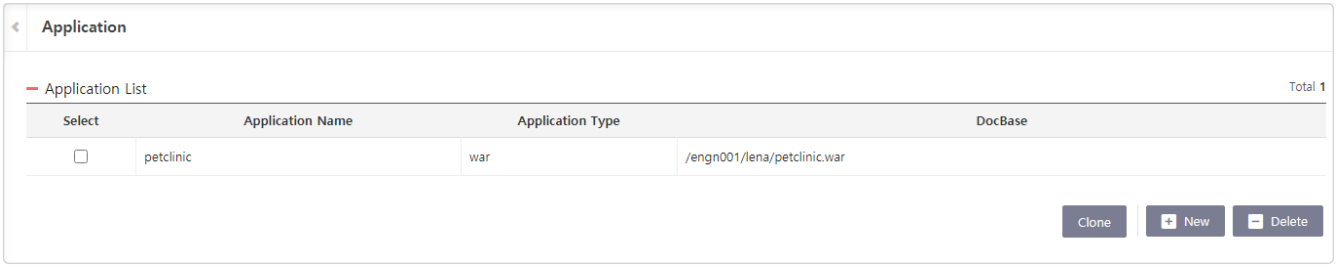


Figure 11. Application List Screen

5.3.1. Application Registration

1. Click the **New button** in the Application list to display the new registration screen.
2. Enter the values you want to configure.
   - If Application Type is WAR, additional configurable items are displayed. (For detailed settings, refer to Application Settings)
3. Click the **Save button** to save.

5.3.2. Application Modification

1. When you select a row you want to modify from the Application Resource list, the modification screen is displayed.
2. Enter the configuration you want to change.
3. Click the **Save button** to save.

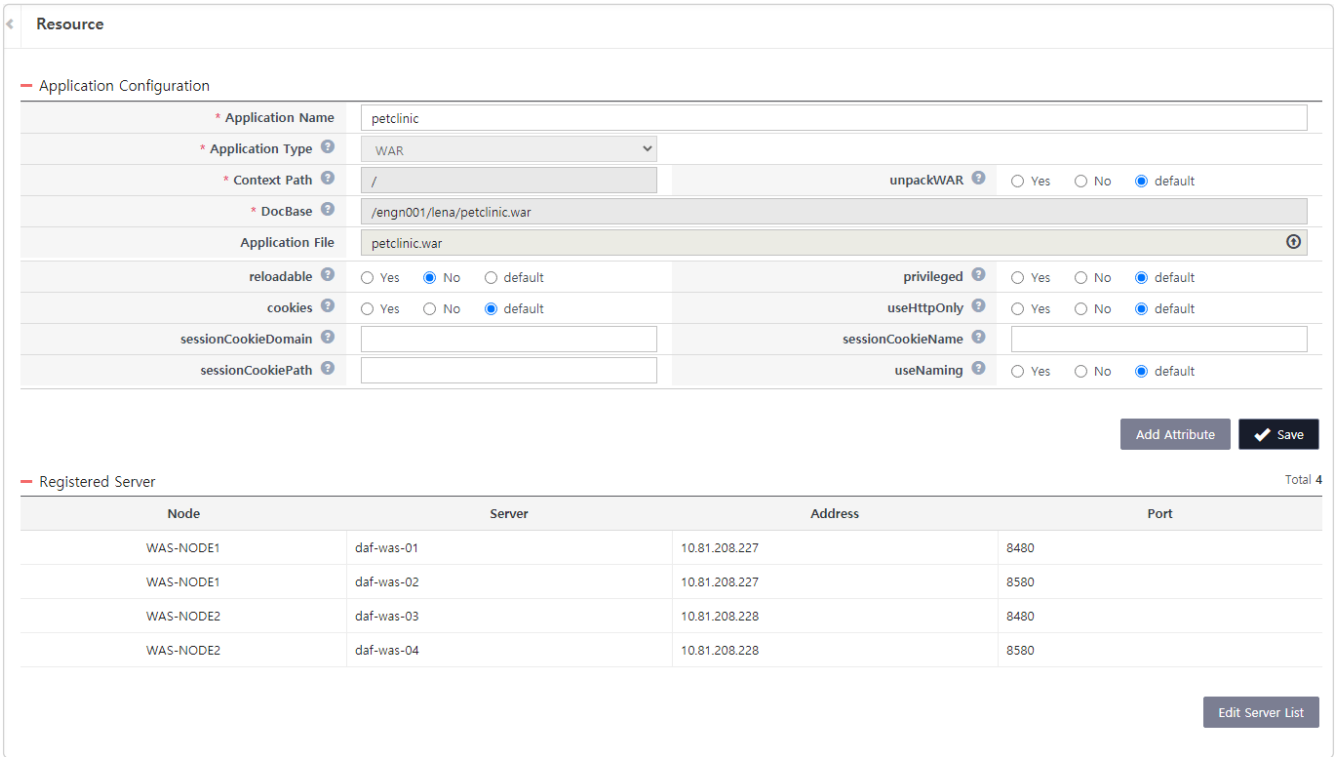


Figure 12. Application Detail Information Screen

When you save after modifying Application Resource information, the changed configuration propagates to the Server where that Resource is used. The Server where the configuration has propagated will apply that configuration when restarted.

5.3.3. Application Deletion

1. Select the checkbox of the Application Resource you want to delete from the Application list.
2. Click the **Delete button** to delete.

If there are Registered Servers that have imported from the Server, that Application Resource cannot be deleted.

5.3.4. Application Upload

1. Click the **Upload button** in the Application Resource registration or edit screen to display a screen where you can upload Application Files.
2. Click the **File Selection button** to select the Application File you want to upload from your local PC.
3. Click the **Upload button** to upload the Application File to the Manager.

Application Import

The list of Servers that are using the created Application Resource by importing it is displayed in the lower area of the Application Resource detail view.

Importing Application from Application Detail Screen

In the Application detail screen, you can modify the list of Servers that are importing and using it.

1. In the Application management screen, select a specific Application Resource to navigate to the detail information screen.
2. Click the **Edit Server List button** to display a window where you can register and manage Servers.
3. Specify the Server to import that Application and move it to the right area.
4. Click the **Save button** to import the Application Resource to that Server.

To delete an imported Application Resource from a Server, move the target Server to the left area and click the **Save button**.

Importing Application from Individual Server

1. Select the Servers menu from the top of LENA Manager.
2. Click on the left side: Individual Web Application Server > Applications menu to display a screen where you can view the Application Resource list for that Server and add Application Resources.
3. Click the **Import button** to display a list of predefined Application Resources in a popup window.
4. Select the Application Resource you want to import.
5. Click the **OK button** to import that Application Resource.

When you import an Application Resource, connection information between that Application Resource and the Server is internally created. Based on this connection information, configuration updates are delivered to that Server when the Application Resource is modified. Connection information can be viewed in the Resource > Application screen.

Imported Application Resource settings cannot be edited in Server settings. (Configuration information can be viewed but not modified) To change the configuration, go to the Resource > Application screen to make changes.

Chapter 6. Diagnostics

6.1. Monitoring Dashboard

6.1.1. Status Summary

The Monitoring Dashboard provides three tabs at the bottom, and the summary information shown at the top changes depending on the selected tab.

Information by tab is as follows.

Node tab

Provides server monitoring information by registered Node

You can set the refresh interval for each view. For WAS, click the **popup button** in the Function column to move to the detailed monitoring view.

The Monitoring Dashboard screens are as follows.

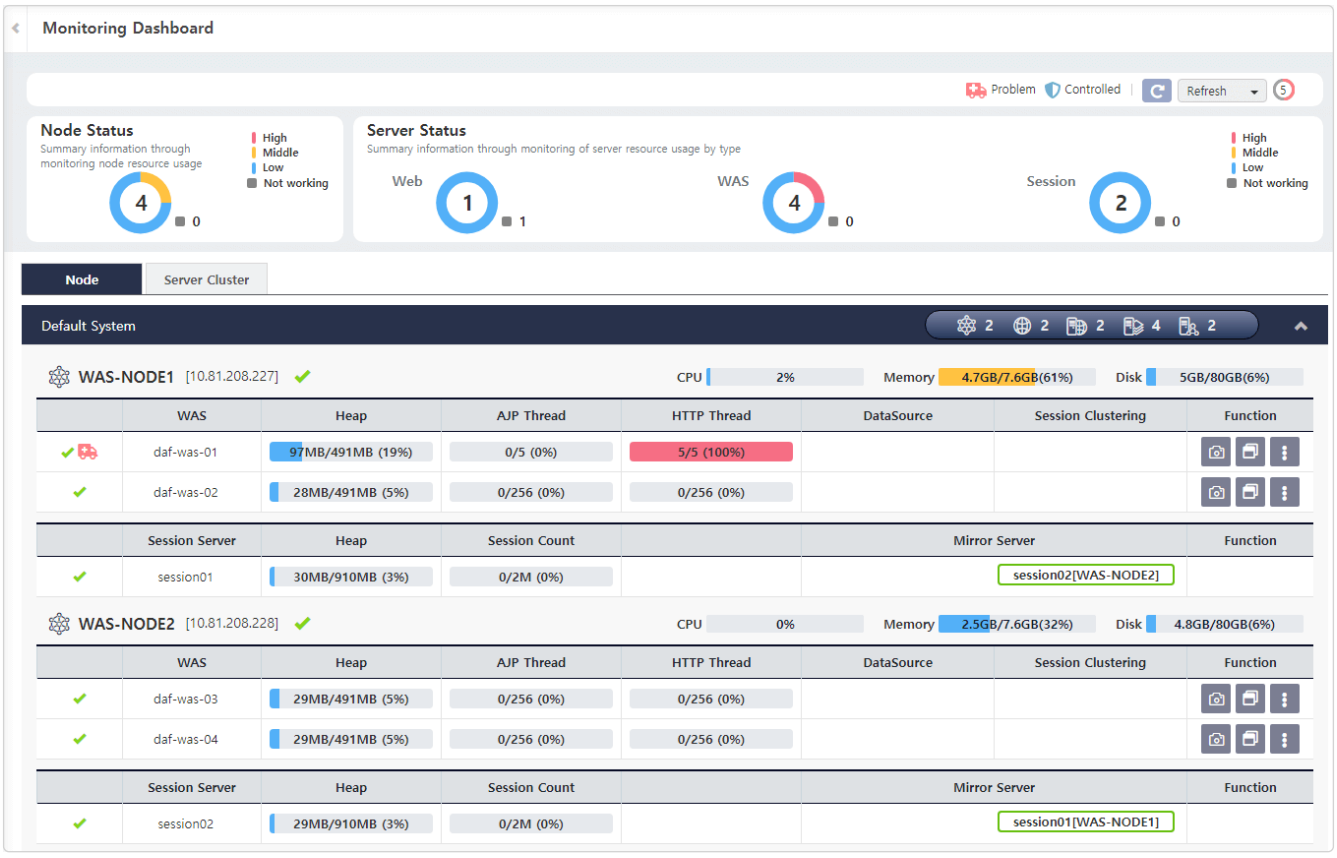


Figure 13. Monitoring Dashboard - Node tab

The properties used in the Monitoring Dashboard are as follows. For utilization values, you can change the color thresholds using the Status Range property. (See the Monitoring Settings subsection in this chapter.)

Table 94. Node status

Field	Description	Note
CPU	Node CPU usage rate	Default thresholds: Low if below 60%, High if 80% or above
Memory	Node memory usage rate	Default thresholds: Low if below 60%, High if 80% or above
Disk	Node disk usage rate	Usage of the disk where the Engine is installed. Default thresholds: Low if below 60%, High if 80% or above

Table 95. Application Server status

Field	Description	Note
Status	Server running status, whether diagnostics results are being published (**ambulance icon**), and whether auto-actions are enabled (**shield icon**)	Unknown is shown when the server state cannot be retrieved via the Node Agent
Server Name	Server name	
Heap Memory	Heap memory usage rate used by the Application Server	
Thread Pool	Usage of the Request Thread pool managed by the Application Server, shown per Connector (Ajp, Http)	
DataSource	Usage of the DataSource Connections managed by the Application Server	

Table 96. Web Server status

Field	Description	Note
Status	Server running status	Unknown is shown when the server state cannot be retrieved via the Node Agent
Server Name	Server name	
CPU	CPU usage rate of the Web Server process	
Memory	Memory usage rate of the Web Server process	
Thread	Number of Web Server threads (Active / Max)	
Connected WAS	Information and running status of WAS connected to the Web Server	Red: stopped, Green: running, Black: servers outside the system

The following actions are provided to immediately control each server.

Table 97. Application Server control actions

Field	Description	Note
Thread Dump	Generate a Thread Dump	Click **left button (Server Snapshot(dump))** > Dump List to download the dump file
Active Service Dump	Generate an Active Service Dump	Click **left button (Server Snapshot(dump))** > Dump List to download the dump file
Heap Dump	Generate a Heap Dump	Click **left button (Server Snapshot(dump))** > Dump List to download the dump file
Forced Stop	Force stop the server	Immediate termination without wait time
Forced Restart	Force restart the server	Immediate restart without wait time

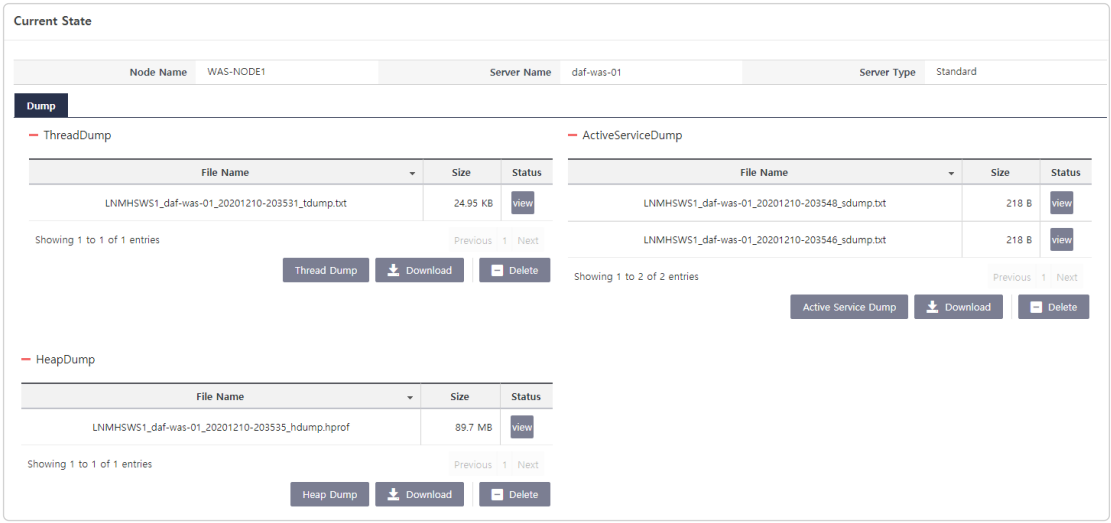


Figure 14. Dump window

You can generate and download Heap Dump, Thread Dump, and Active Service Dump. In general, dumps are created to investigate root causes when errors such as Out Of Memory, excessive Thread Pool usage, or service delays occur on a server.

Depending on the dump type you want to generate, click **Thread Dump button**, **Active Service Dump button**, or **Heap Dump button** to create the dump. Generated dumps are stored on the Host where the Web Application Server runs: Thread Dump at {log_home}/logs/tdump, Active Service Dump at {log_home}/logs/sdump, and Heap Dump at {log_home}/logs/hdump.

Click the **Delete button** to delete dump files. Click the **Download button** to download dump files. When downloading, the dump file is downloaded as a zip along with the system status dump file.

The items in the dump management screen are as follows.

Table 98. Dump screen items

Field	Description	Note
File Name	Name of the generated file	Automatically generated string including the date
Size	Size of the generated file	
Status	System and Server status at the time of dump creation	CPU and Memory information of the system at the time of dump creation and key resource usage of the Web Application Server are also captured together when generating the dump. Click the **View button** to check the captured Status values

Table 99. Web Server control actions

Field	Description	Note
Forced Stop	Force stop the server	Immediate termination without wait time
Graceful Stop	Gracefully stop the server	

If monitoring information is not displayed, check whether the registered Node/Server actually exists and whether communication with the Node/Server is working properly.

6.1.2. Detailed Status Monitoring

In the Monitoring Dashboard, select the **middle button (View Detail Chart)** in the Function column to monitor detailed Thread, Memory, and service information.

System tab

You can check the Web Application Server's Memory, Thread, and Service information.

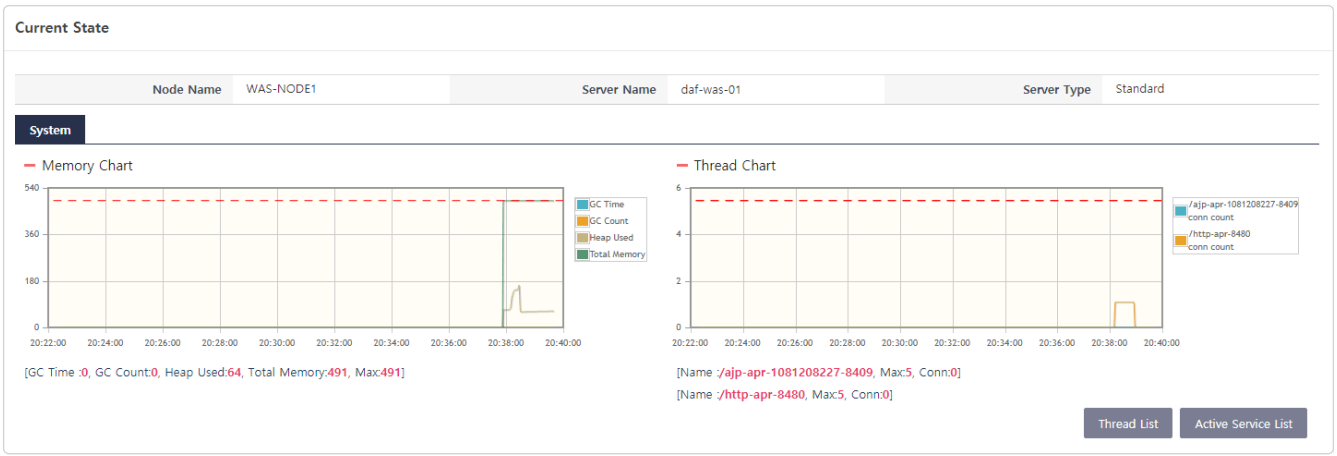


Figure 15. System tab

Memory Chart

Real-time memory usage is displayed. The provided metrics are GC Time (time spent in Garbage Collection), GC Count, Heap Used (Total Memory - Free Memory), and Total Memory (total memory used by the server). The red dashed line on the chart indicates the maximum available Heap Memory. Therefore, pay attention if Heap Memory usage stays near the red dashed line for a long time without a normal GC pattern.

The maximum number of Request Threads can be changed from the Server menu via the maxThreads property of the Web Application Server.

Thread Chart

This line chart shows the usage of Request Threads that the Web Application Server manages as a pool to handle user requests. The red dashed line indicates the maximum number of Request Threads available. Pay attention if the number of Request Threads approaches the red dashed line.

The maximum number of Request Threads can be changed from the Server menu via the maxThreads property of the Web Application Server.

Thread List

You can view all Threads in the Web Application Server. You can filter by the printed Thread name or Thread state. The Thread List fields are as follows.

Table 100. Thread List fields

Field	Description	Note
Thread ID	Unique Thread ID	
Name	Thread name	
Stat	Thread state	There are three states: • RUNNABLE: runnable thread • WAITING: waiting for a specific action of another thread • TIMED_WAITING: waiting with a specified timeout
CPU	CPU time used by the specified Thread	
Tx Id	Transaction ID	
Elapsed	Elapsed time the Thread has been running	
Service Name	Name of the service executed by the Thread	

Click the **+ button** to view the following detailed information.

Table 101. Thread detail fields

Field	Description	Note
threadId	Unique Thread ID	
threadName	Thread name	
State	Thread state	There are three states: • RUNNABLE: runnable thread • WAITING: waiting for a specific action of another thread • TIMED_WAITING: waiting with a specified timeout
threadCpuTime	CPU time of all Threads including the current Thread	
threadUserTime	CPU time of the current Thread	

Field	Description	Note
blockedCount	Total number of times blocked	
blockedTime	Cumulative blocked elapsed time	
waitedCount	Total number of waits	
waitedTime	Cumulative waited elapsed time	
lockOwnerId	ID of the Thread owning the locked object	
lockName	Name of the locked object	
lockOwnerName	Name of the Thread owning the locked object	
stackTrace	stackTrace	

Active Service List

You can view service information and the Thread processing the service. The fields are similar to the Thread List, with the following additional field.

Table 102. Active Service List fields

Field	Description	Note
Sql	SQL statement currently being executed	

DataSource tab

You can view the DataSource information configured on the Application Server.

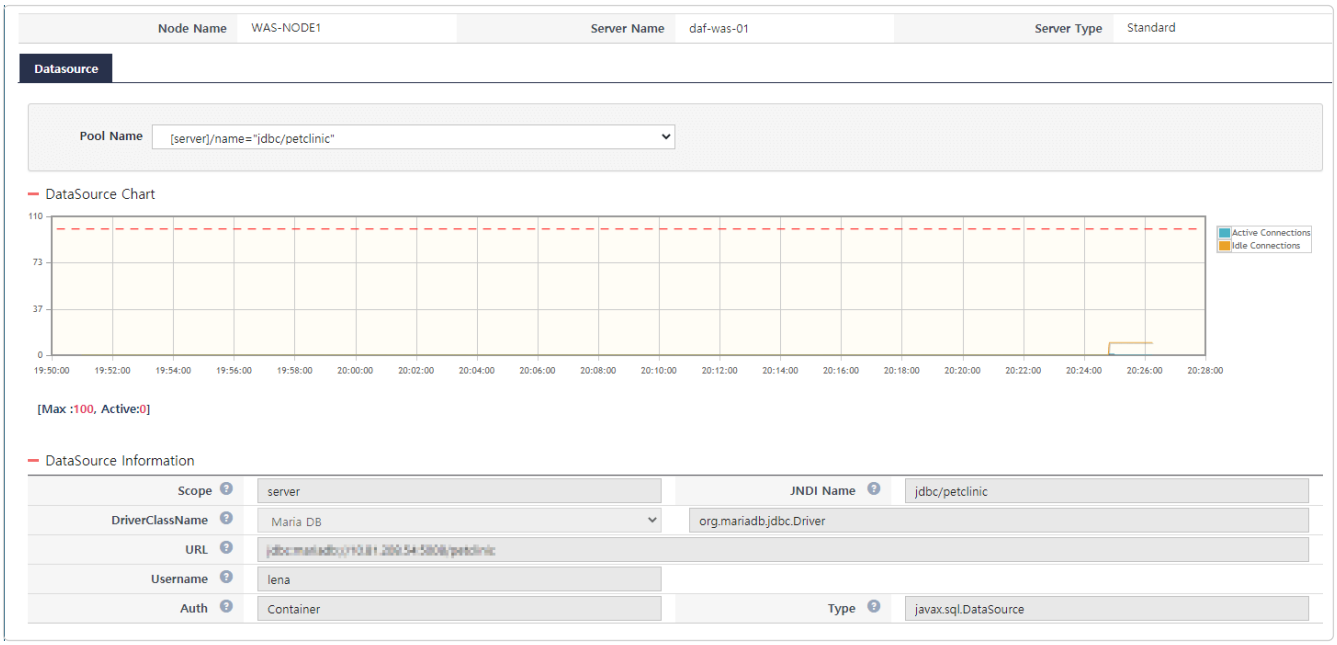


Figure 16. DataSource tab

DataSource Chart

The numbers of Active Connections and Idle Connections are displayed on the chart in real time. The red dashed line indicates the configured maximum number of connections. Be careful when Active Connections approach the red dashed line. Use the combo box to select and monitor other

DataSources.

The maximum number of connections can be changed via the maxConnection property on the DataSource registration screen.

DataSource Information

You can check the configuration information for the selected DataSource.

6.1.3. Monitoring Settings

You can set basic monitoring configurations in DIAGNOSTICS > Policy > Common Rule Setting. The settings are as follows.

Table 103. Monitoring-related default settings

Field	Description	Default
Status Range	Configure thresholds for Resource Low, Middle, and High in the Monitoring Dashboard.	Low if below 60%, Middle if 60% or above, High if 80% or above
Diagnostics Interval	Set the diagnostics interval.	10000 (ms)
Dump Limit	Per-server dump count limit for each dump directory (Thread/ActiveService/Heap). 0 means unlimited.	200 (files)

Chapter 7. Topology

You can see the configuration status of each system at a glance, and it provides installation and configuration functions, as well as resource monitoring and start/stop control.

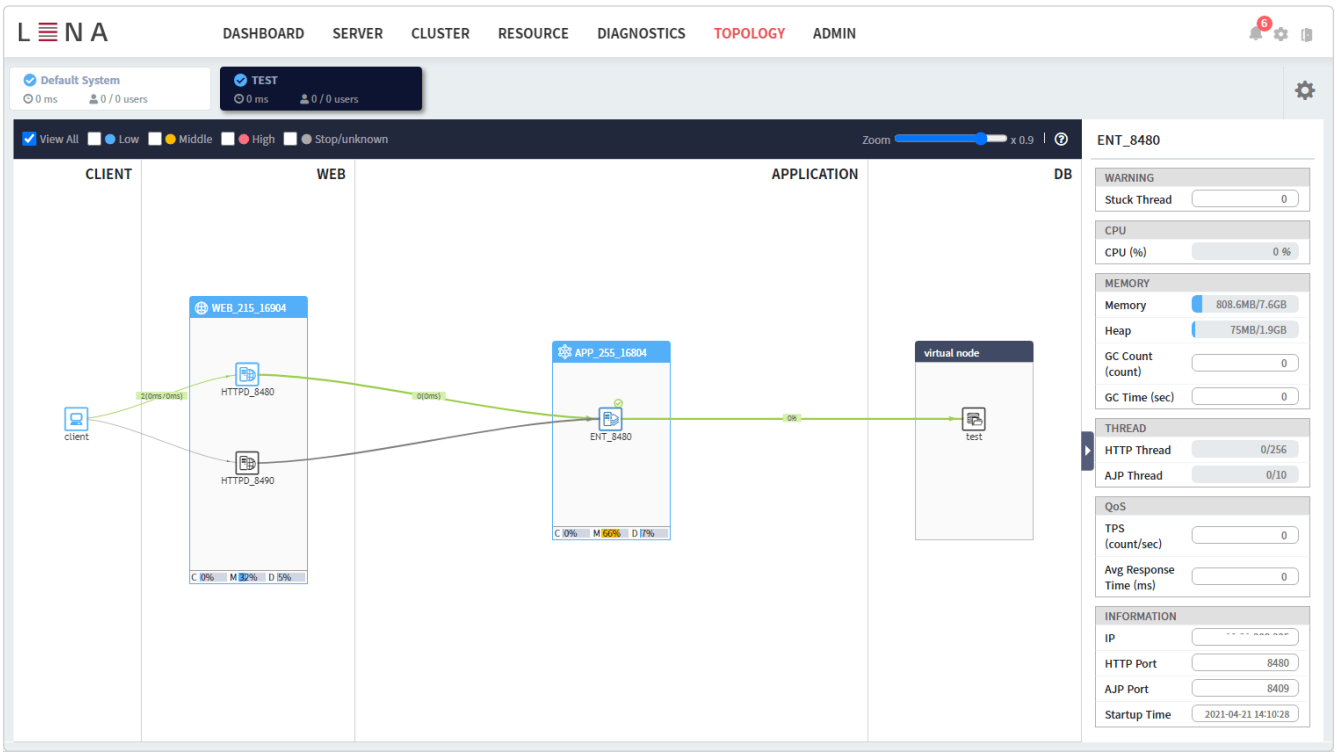


Figure 17. Topology Screen

7.1. Screen Configuration

It is divided into System area, Topology area, and Resource monitoring area.

- System Area

  Provides a list of registered Systems in card format.

  The icon to the left of the system name in the card represents the system status, which is displayed in 3 levels based on the Resources constituting the system and diagnostic results.

  - **Blue circle icon** : When all servers constituting the system have Low resource usage
  - **Orange circle icon** : When all servers constituting the system have Middle resource usage
  - **Red circle icon** : When some servers constituting the system have High resource usage

  The **clock icon** below the system name represents the average response time of WASs within the system, and the **user icon** represents the current number of users (in the last 5 minutes) / total users today.

  The criteria for Low, Middle, and High resource usage can be changed in DIAGNOSTICS > Policy > Common Rule Setting > Dashboard items.

- Topology Area

  Shows the configuration status of nodes and server instances by system in topology chart format. You can run WEB Server and WAS installed on each Node, and check server status information.

- Resource Monitoring Area

  Provides detailed resource monitoring information such as CPU and Memory of Nodes and Servers.

Through the **Settings button** on the right side of the system list, you can change the following items:

Chart

- Refresh Interval : Data retrieval cycle for the topology area
- Refresh Topology Chart : Metadata consistency verification and restoration for drawing charts in the topology area

System List

- Selection of Systems to display in the System list and order change

Elements

- Show Endpoint : Setting for displaying the Endpoint area
- Show Edge Info : Setting for displaying detailed information on Edges
- Show Server Name : Setting for displaying server names

Transparency

- Node : Setting transparency for Nodes in the topology area
- Edge : Setting transparency for Edges in the topology area

7.2. Topology Area Details

In topology, information is displayed differently according to the view mode.

- View All : Shows all information.
- Low : Shows only instances with Low resource usage on servers.
- Middle : Shows only instances with Middle resource usage on servers.
- High : Shows only instances with High resource usage on servers.
- Stop/unknown : Shows only stopped instances.

7.2.1. Control

Provides detailed monitoring information and control functions from Client to Database from an E2E (End to End) perspective.

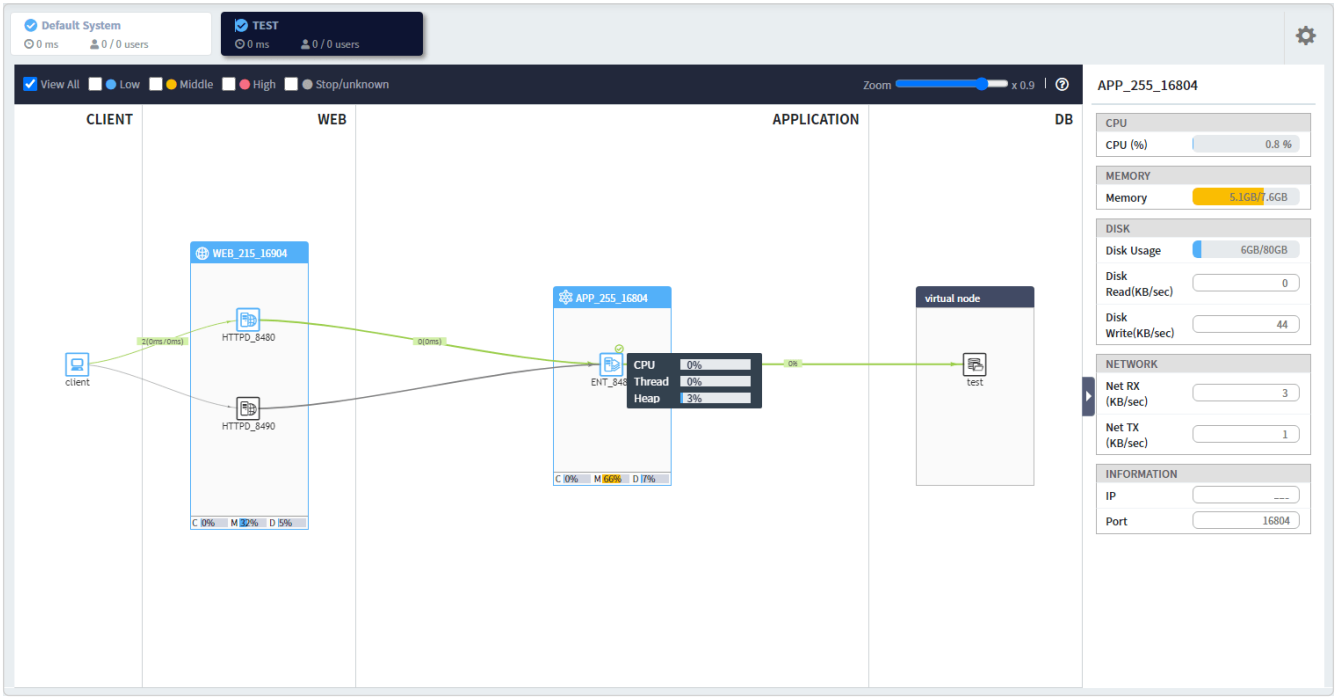


Figure 18. Topology Control

CLIENT Area

Client refers to users, and you can check the browser screen rendering time when users make requests to the web server and the content of script errors.

WEB Area

The WEB area provides information about installed WEB Nodes and WEB servers and allows server control.

- Configuration Information

  Web Node is the area where Web servers are installed, and you can check the server installation status by node.

- Monitoring Information

  Web Node basically provides CPU, Memory, and Disk status information.

  When you hover over a Web Server, it provides server CPU, Memory, and Thread status information in popup format.

  When you select a Web Node and Server, real-time detailed monitoring information is provided in the resource monitoring area on the right side of the topology area.

  - Node : CPU, Memory, Disk, Network and basic information
  - Server : CPU, Memory, Thread, QoS and basic information

  The background color of the title area at the top of the node (area where the node name is displayed) appears in the most critical color among the statuses of servers within the node.

- Control Functions

  Provides three main control functions for Servers.

1. Server Control : Start, Stop, Service Control

Service Control provides zero-downtime timely deployment functionality. This is a method where when an error service occurs, the corrected source is urgently deployed to WAS, and a Web server (timely server) to call this WAS is configured, then Web servers that received requests for the error service forward the service to the timely server to ensure the service is provided normally.

After defining the control time, control conditions (Header, Cookie, URL), and the server to forward requests to, and saving, according to the defined content, incoming requests in real-time are connected to the corresponding server to provide service without server restart.

2. Move to : Configuration

APPLICATION Area

The APPLICATION area provides information about installed WAS Nodes and WAS and allows server control.

- Configuration Information

  WAS Node is the area where WAS is installed, and you can check the server installation status by node.

- Monitoring Information

  WAS Node basically provides CPU, Memory, and Disk status information.

  When you hover over a WAS Server, it provides server CPU, Thread, and Heap status information in popup format.

  When you select a WAS Node and Server, real-time detailed monitoring information is provided in the resource monitoring area on the right side of the topology area.

  - Node : CPU, Memory, Disk, Network and basic information
  - Server : Warning, CPU, Memory, Thread, QoS and basic information

The background color of the title area at the top of the node (area where the node name is displayed) appears in the most critical color among the statuses of servers within the node. For example, if there are 3 servers in a node and one of them is in High status (other servers are in Middle or Low status), the node's title background color is displayed in the color representing High.

- Control Functions

  Provides four main control functions for Servers.

  1. Server Control : Start, Stop, Forced Stop
  2. Manual Check : Thread Dump, Active Service Dump, Heap Dump, Dump List
  3. Move to : Configuration, System, Datasource

DB Area

The DB area provides Database information connected to WAS. Database must be registered in the RESOURCE menu. Nodes are represented as virtual nodes to maintain consistency with other areas. No monitoring information or control functions are provided for each DB.

Edge Information

Connection lines represent connections between each instance, or between instances and Database, and show the number of connected Connections.

- Client-WEB : Number of Connections
- WEB-APPLICATION : Number of Active Connections
- APPLICATION-DB : Active Datasource usage rate (%)

The End to End monitoring functionality is set to off by default.

Therefore, to view the browser rendering average response time between Client-WEB, WEB-APPLICATION, or the server's average response time, you must configure the following in order.

1. Set diagnostics.e2e.enable=true in the manager.conf file
2. Uncomment the httpd-eum.conf file in the web server's httpd.conf file

```
<IfDefine MOD_EUM>
  #LENA E2E Monitoring Extension settings
  Include ${INSTALL_PATH}/conf/extra/httpd-eum.conf <--
Uncomment this part
</IfDefine>
```

3. Modify the agent_enable value to true in the web server's eum/eum.properties file

After enabling E2E settings, the information provided on connection lines is as follows:

- Client-WEB : Number of Connections (Client browser rendering average completion time (ms) / Web Server average response time (ms))
- WEB-APPLICATION : Number of Active Connections (WAS average response time (ms))
- APPLICATION-DB : Active Datasource usage rate (%)

7.3. TunA APM

TunA APM provides an easy way to integrate LENA with the TunA APM tool so you can conveniently monitor the performance of your application. As of LENA 1.3.2, it is available on Linux/Unix OS and VM installation versions.

You can configure the integration and environment from the submenus under DIAGNOSTICS > TunA APM. The TunA APM menu consists of the following:

- Connection Management
- Module Management
- Install Management
- Host Management

7.3.1. Connection Management

Manage the IP Address and Port information for the TunA collector server and the Web Server. Based on the IP Address and Port entered by the user, a test is performed to check if a connection to the TunA collector server is possible.

Enter TunA connection information

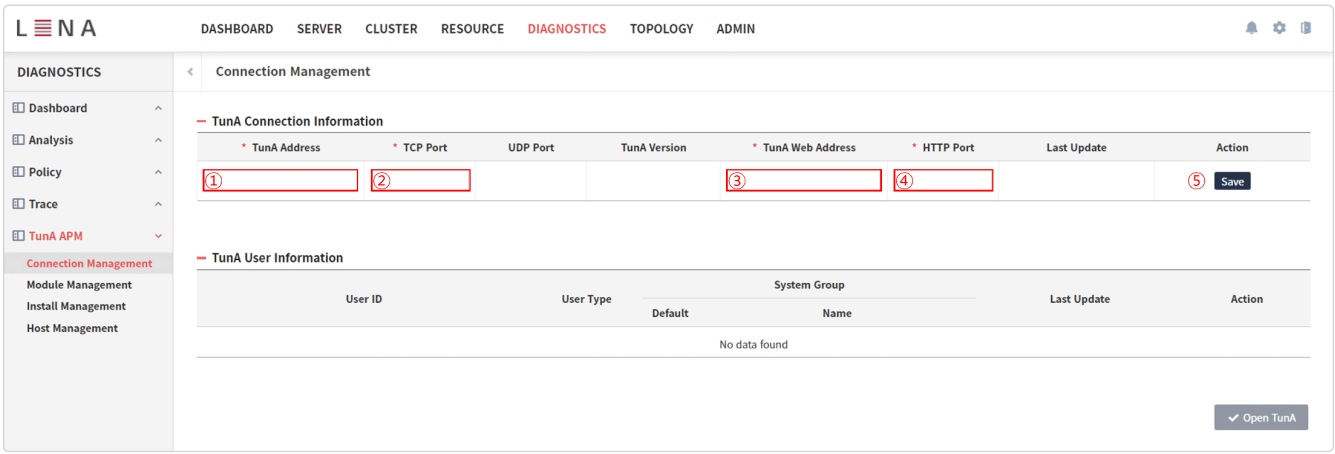


Figure 19. TunA connection information input screen

#	Item	Description
①	TunA Address	Enter the IP Address of the TunA collector server.
②	TCP Port	Enter the TCP Port of the TunA collector server.
③	TunA Web Address	Enter the IP Address of the TunA Web Server.
④	HTTP Port	Enter the HTTP Port of the TunA Web Server.
⑤	**Save button**	Runs connection tests for items ①–④ and saves the information to LENA Manager.

When the TunA connection is successfully completed, the Save button is replaced by the buttons shown below, allowing you to edit or delete the previously entered TunA connection information.

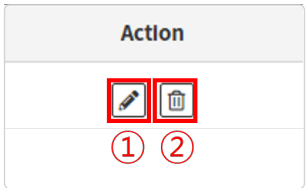


Figure 20. Action column after entering TunA connection information

#	Item	Description
①	**Edit button**	Edit the TunA connection information.

#	Item	Description
②	**Delete button**	Delete the TunA connection information.

Enter TunA user information

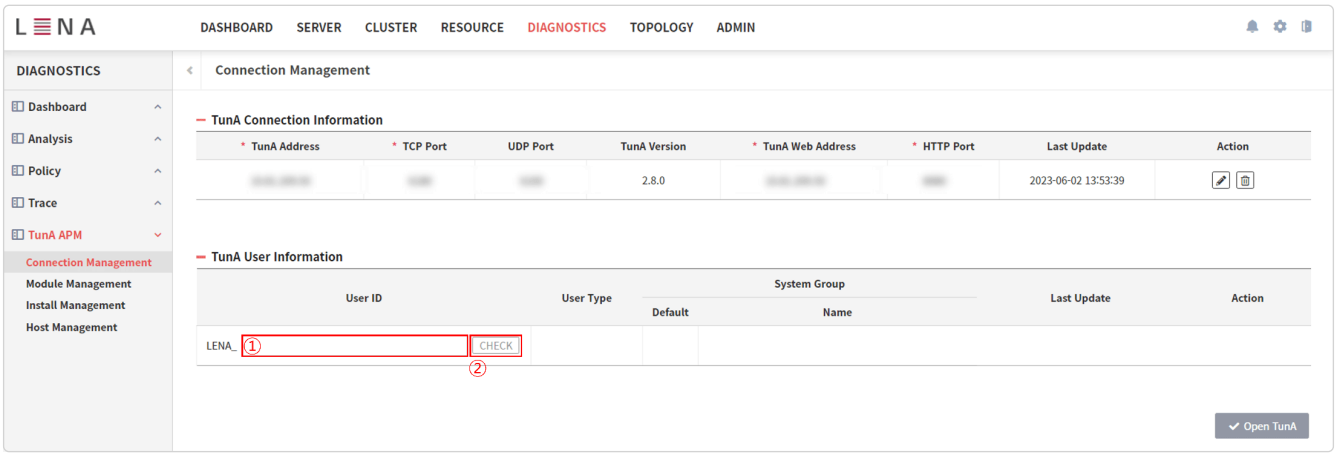


Figure 21. TunA user information input screen

#	Item	Description
①	User ID	Enter the account to be created in TunA. The prefix 'LENA_' is added to the entered account. • Account name rules: Account names may consist of letters, numbers, dashes (-), and underscores (_).
②	**Check button**	Verify whether the entered account is valid and whether it is already registered in TunA. If it is a new account to be registered in TunA, Owner is displayed in the User Type column; if it is already registered in TunA, Guest is displayed. After this verification, you can enter or specify a System Group. System Group is a concept used from TunA v2.6.0 to manage monitoring targets by group. A System Group is the basic unit of monitoring.

Figure 22. Input screen for the TunA System Group of a new user

#	Item	Description
①	User ID	The ID entered in the user information section.

#	Item	Description
②	User Type	User types are divided into Owner and Guest. New users are displayed as Owner. Users of type Owner are granted permissions to create, delete, and modify the System Group list.
③	Default	Set the System Group to use by default. The System Group set here is used as the default System Group when installing the Agent.
④	Name	Enter the name of the System Group you want to use. • System Group name rules: System Group names may consist of letters, numbers, dashes (-), and underscores (_).
⑤	Add System Group	Add a System Group.
⑥	Save	Save the specified System Groups and Default System Group.
⑦	Cancel	Discard unsaved changes and revert to the previous state.

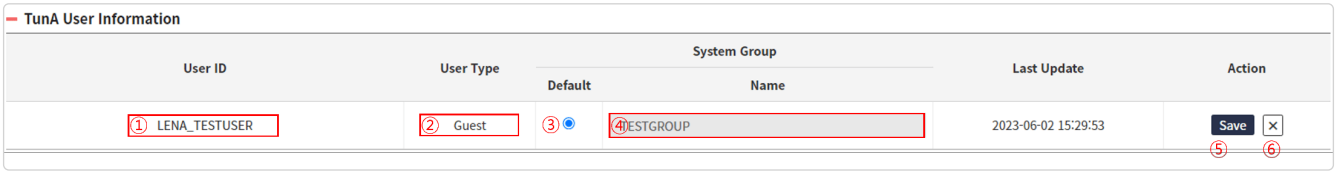


Figure 23. Input screen for the TunA System Group of an existing user

#	Item	Description
①	User ID	The ID entered in the user information section.
②	User Type	User types are divided into Owner and Guest. Existing users are displayed as Guest. Unlike Owner users, Guest users are not granted permissions to create, delete, or modify System Group lists. They can only select the Default System Group.
③	Default	Set the System Group to use by default. The System Group set here is used as the default System Group when installing the Agent.
④	Name	System Groups associated with the already registered user.

#	Item	Description
⑤	Save	Save the specified Default System Group.
⑥	Cancel	Discard unsaved changes and revert to the previous state.

Verify TunA connection

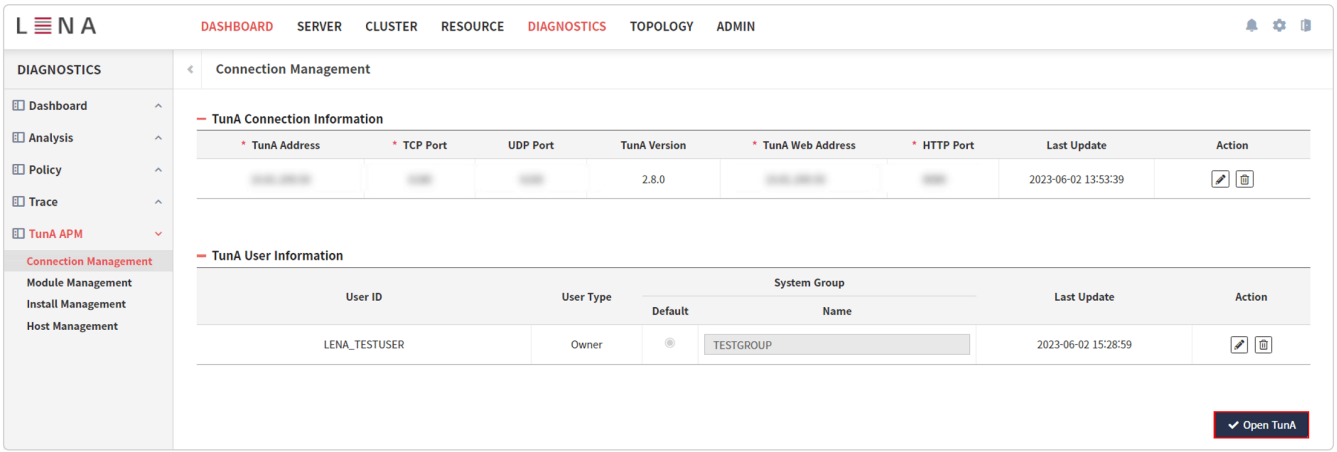


Figure 24. State with the Open TunA button enabled

When both TunA Connection Information and TunA User Information have been entered, the button that connects to TunA becomes available as shown.
Clicking the button opens the TunA screen in a new browser window.

7.3.2. Module Management

Upload TunA Agent files to LENA Manager and manage configuration for the TunA Agents.
TunA provides two agent files: TunA Host Agent and TunA Java Agent, each provided as a tar archive.

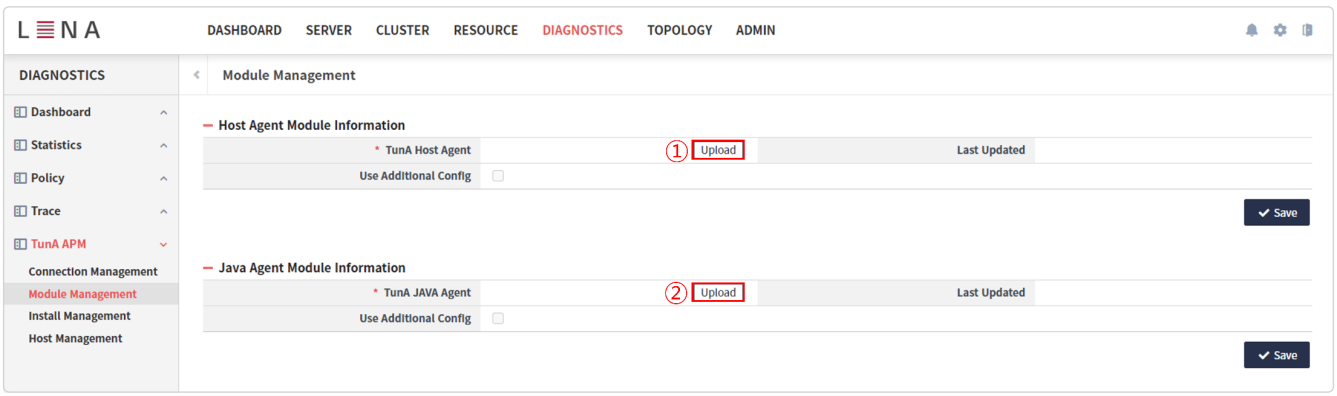


Figure 25. Agent Module Upload buttons

#	Item	Description
①	**Host Agent Upload button**	Open the Upload File dialog to upload the TunA Host Agent file. Uploading a file again overwrites the previously uploaded file.

#	Item	Description
②	**Java Agent Upload button**	Open the Upload File dialog to upload the TunA Java Agent file. Uploading a file again overwrites the previously uploaded file.

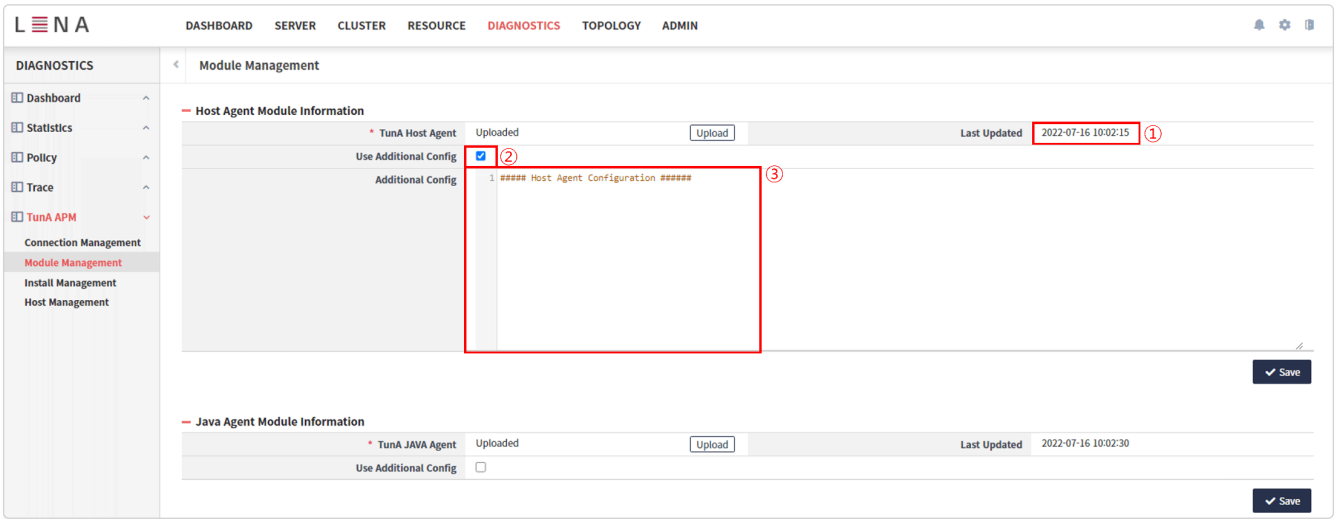


Figure 26. Screen after uploading Agent Modules

#	Item	Description
①	Last Updated	Displays the time the agent files were uploaded.
②	Use Additional Config	Check if there are configuration items to be commonly applied to each agent. When checked, the Additional Config field appears below; when unchecked, the field is hidden.
③	Additional Config	A text box that becomes active when Use Additional Config is checked. Enter configuration items to be commonly applied to each agent. During the Install Management step, when installing the agents, the content entered here is included in the configuration file.

7.3.3. Install Management

Manage the target servers where TunA Host Agent and TunA Java Agent will be installed, and install the agent files on the servers.

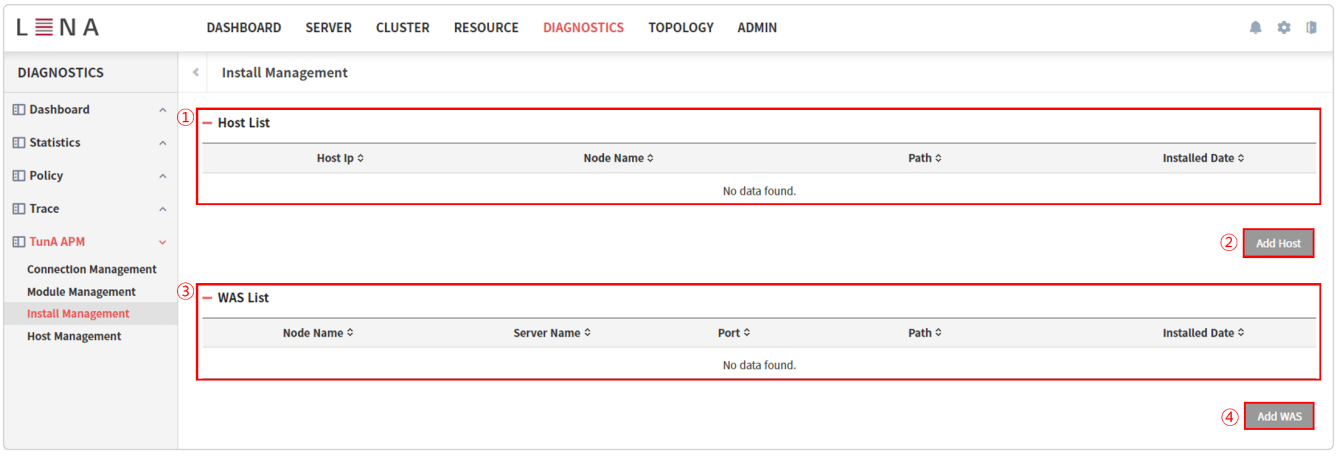


Figure 27. Install Management screen

#	Item	Description
①	Host List	List for managing TunA Host Agent installation. Shows both installable and installed Host Agents.
②	**Add Host button**	Open a dialog to search and specify the list to be managed in the Host List.
③	WAS List	List for managing TunA Java Agent installation. Shows both installable and installed Java Agents.
④	**Add WAS button**	Open a dialog to search and specify the list to be managed in the WAS List.

In Install Management, first select the Host or WAS where the TunA Agent will be installed and add it to the list (Host List, WAS List).

Add / Remove / Modify in Host List

Only one TunA Host Agent can be installed per Host. Therefore, in a multi-node environment, select one specific Node to install it on.
To install, add the Host to the Host List. Click the Add Host button at the bottom of the Host List table.

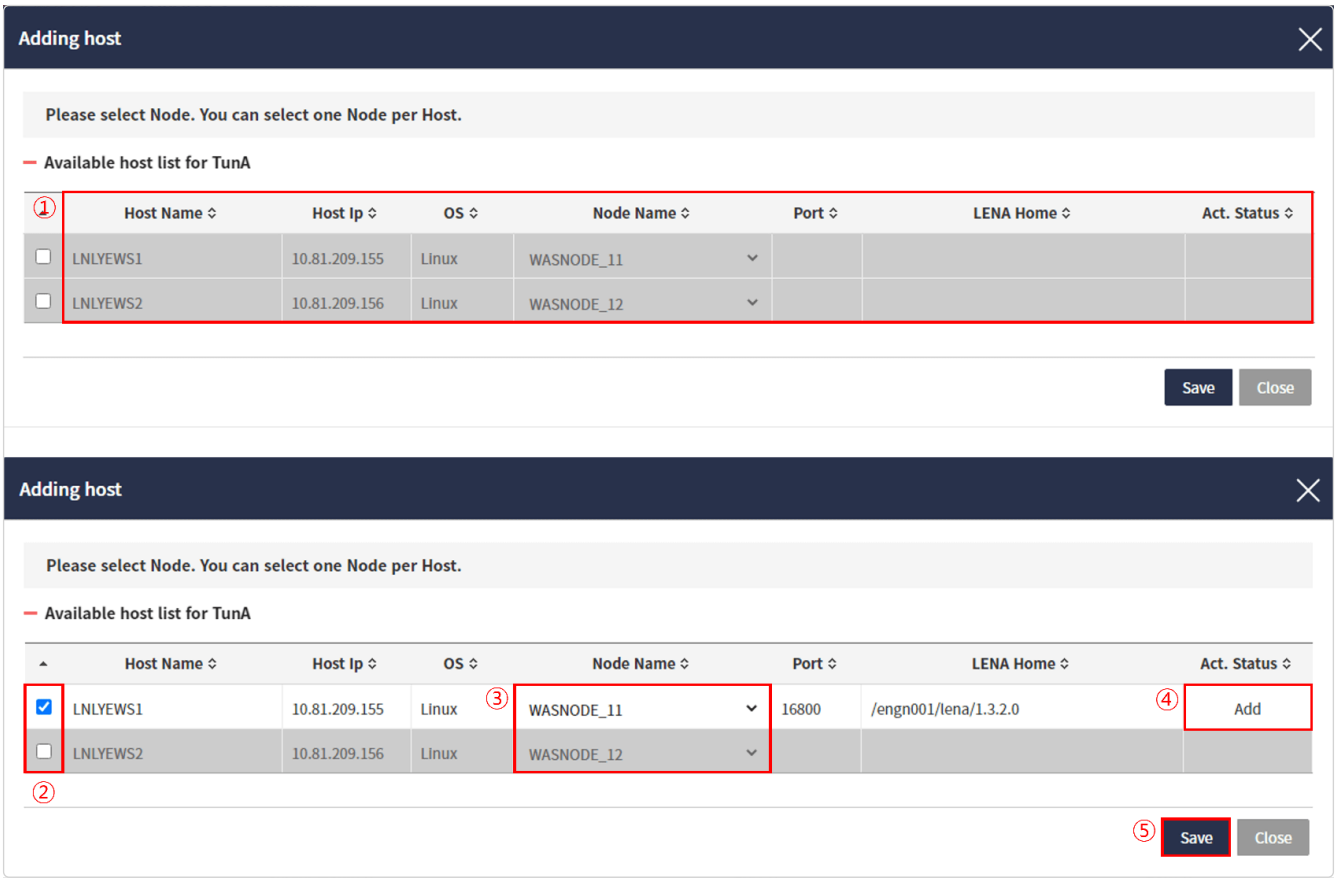


Figure 28. Add Host dialog

#	Item	Description
①	Avaliable host list for TunA	List of Hosts on which the Host Agent can be installed. Only Hosts containing Nodes registered or installed in LENA Manager are shown.

#	Item	Description
②	Action Checkbox	Checkbox to select Hosts.
③	Node Selectbox	Select the Node on which to perform Add / Remove / Modify.
④	Action Status	Shows which action will be performed on the Node selected in the Node Selectbox. Available actions are: • Add: Assign a Node to the Host and add it to the Host List. • Modify: Change the previously assigned Node to a different Node. • Remove: Remove the Node from the list.
⑤	**Save button**	Perform the selected action on the selected Node(s).

Add / Remove in WAS List

Only one TunA Java Agent can be installed per WAS. To install, add the WAS to the WAS List. Proceed by clicking the Add WAS button at the bottom of the WAS List table.

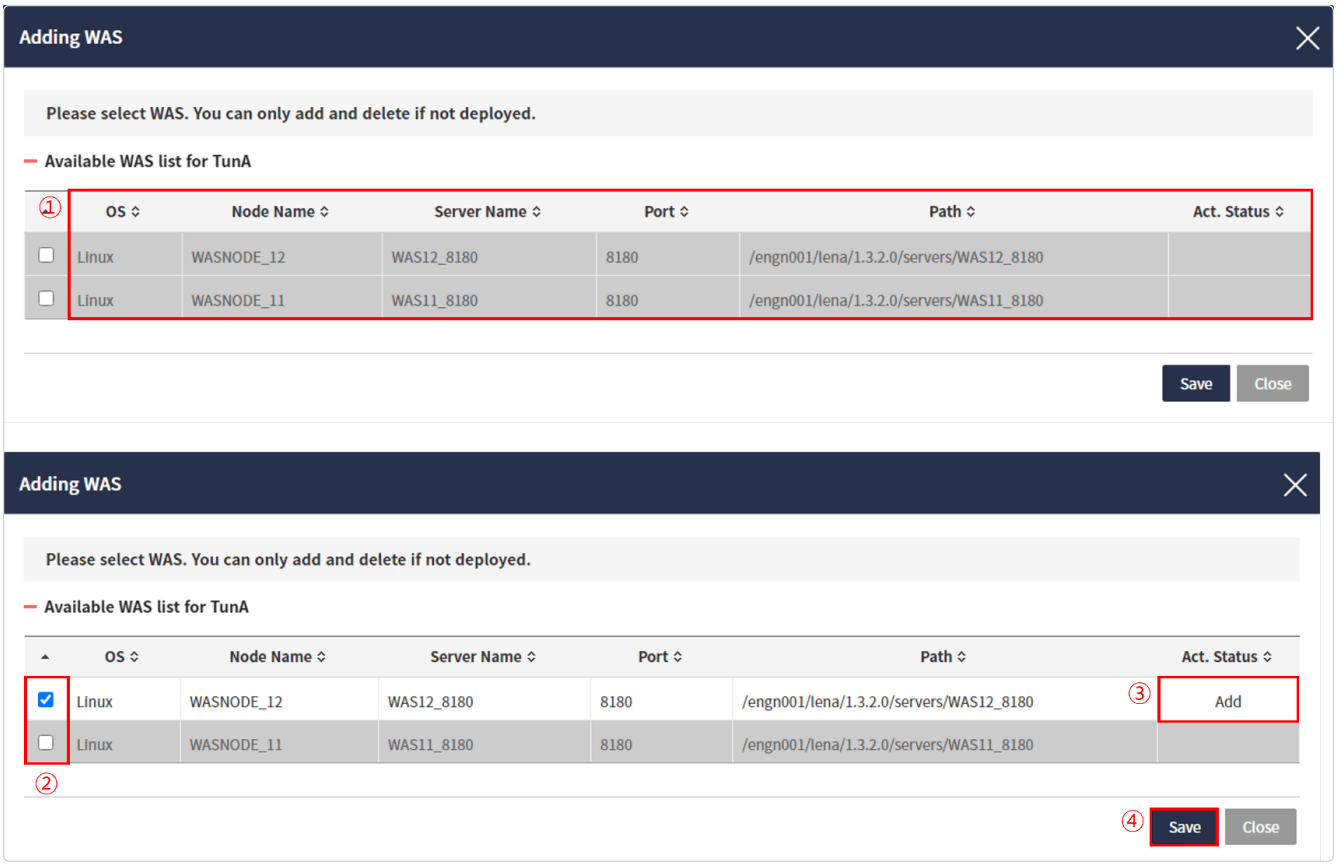


Figure 29. Add WAS dialog

#	Item	Description
①	Available WAS list for TunA	List of WAS on which the Java Agent can be installed. Only WASs that are registered or installed in LENA Manager are shown.
②	Action Checkbox	Checkbox to select WASs.
③	Action Status	Shows which action will be performed on the selected WAS. Available actions are: • Add: Add the WAS to the WAS List. • Remove: Remove the WAS from the list.
④	**Save button**	Perform the selected action on the selected WAS(s).

Install Agents

To install TunA Agents, the targets must be added to the Host List and WAS List as shown below.

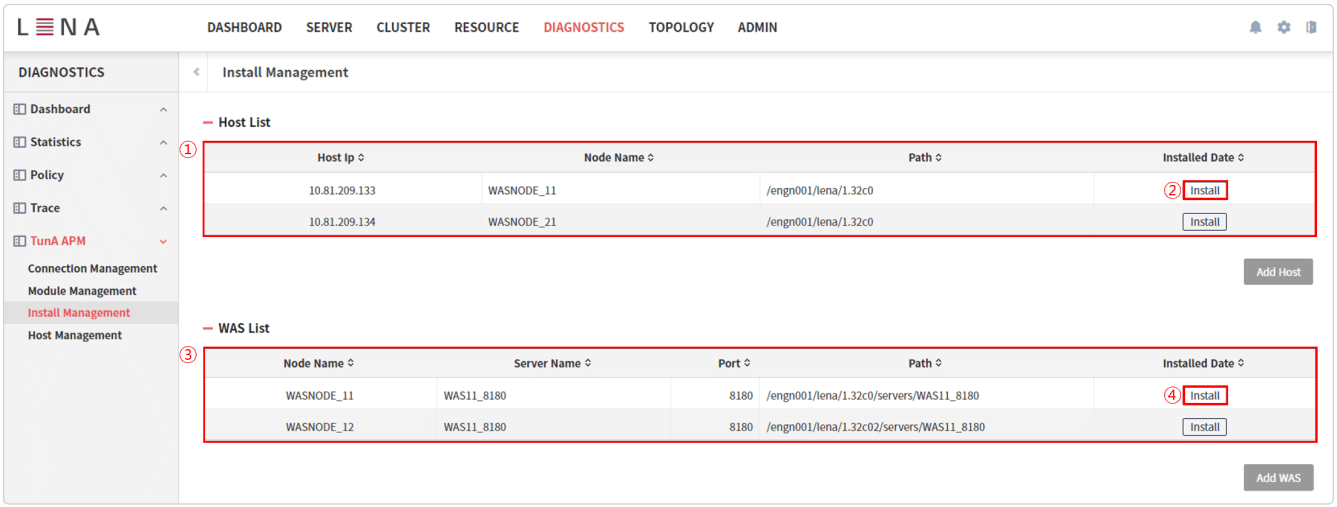


Figure 30. Install Management screen with Host and WAS added as installation targets

#	Item	Description
①	Host List	List for managing TunA Host Agent installation. Shows both installable and installed Host Agents.
②	**Install button**	Install the TunA Host Agent on the Host. If the installation completes successfully, the installation time is displayed.
③	WAS List	List for managing TunA Java Agent installation. Shows both installable and installed Java Agents.
④	**Install button**	Install the TunA Java Agent on the WAS. If the installation completes successfully, the installation time is displayed.

7.3.4. Host Management

Control and per-host configuration management for TunA Host Agents installed via Install Management is performed from Host Management.

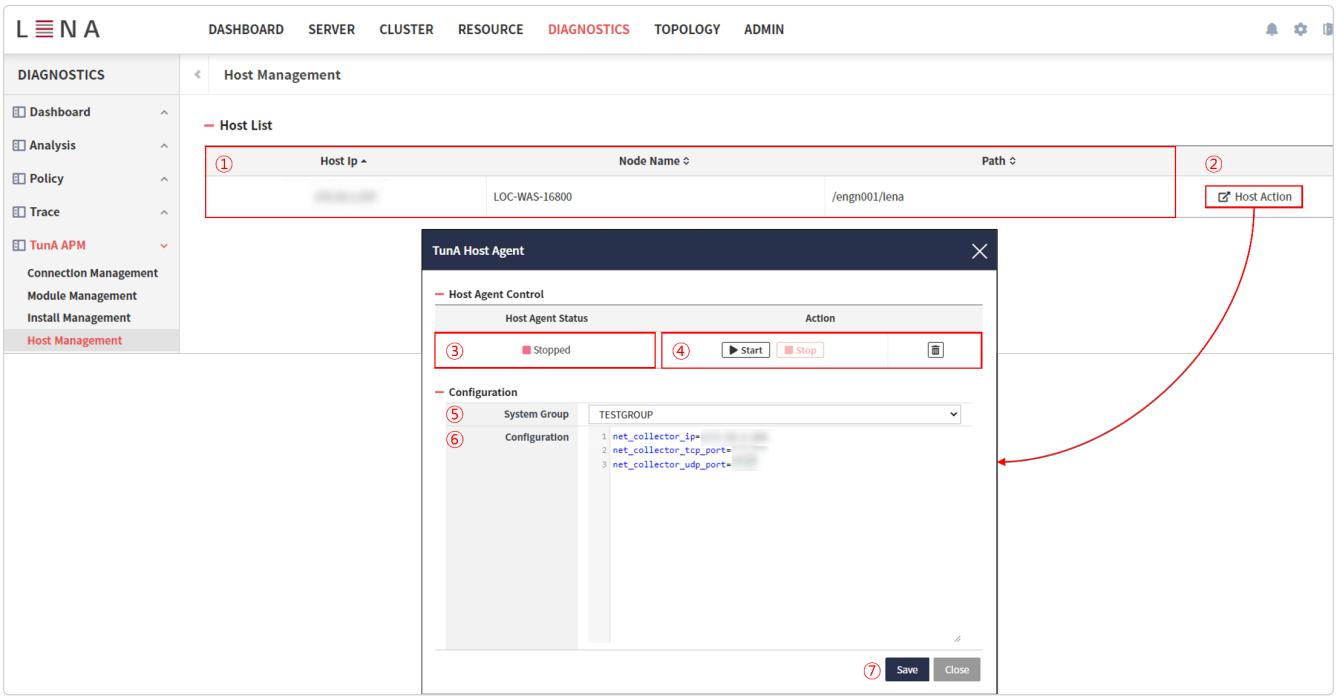


Figure 31. Host Management screen

#	Item	Description
①	Host List	Displays the list of Hosts with TunA Host Agent installed.
②	**Host Action button**	Open a dialog to check status and control the TunA Host Agent.
③	Host Agent Status	Displays the status of the TunA Host Agent. Possible statuses are: • Started: TunA Host Agent is running. • Stopped: TunA Host Agent is stopped.
④	**Action button**	Start, stop, or delete the TunA Host Agent. Delete is enabled only when the TunA Host Agent is stopped.
⑤	System Group	Select the System Group that the Host Agent belongs to.
⑥	Configuration	Modify the Host Agent configuration.
⑦	**Save button**	Save the modified Host Agent configuration.

7.3.5. TunA settings in WAS

Control and per-instance configuration management for TunA Java Agents installed via Install Management is performed in the TunA tab of the WAS settings screen.

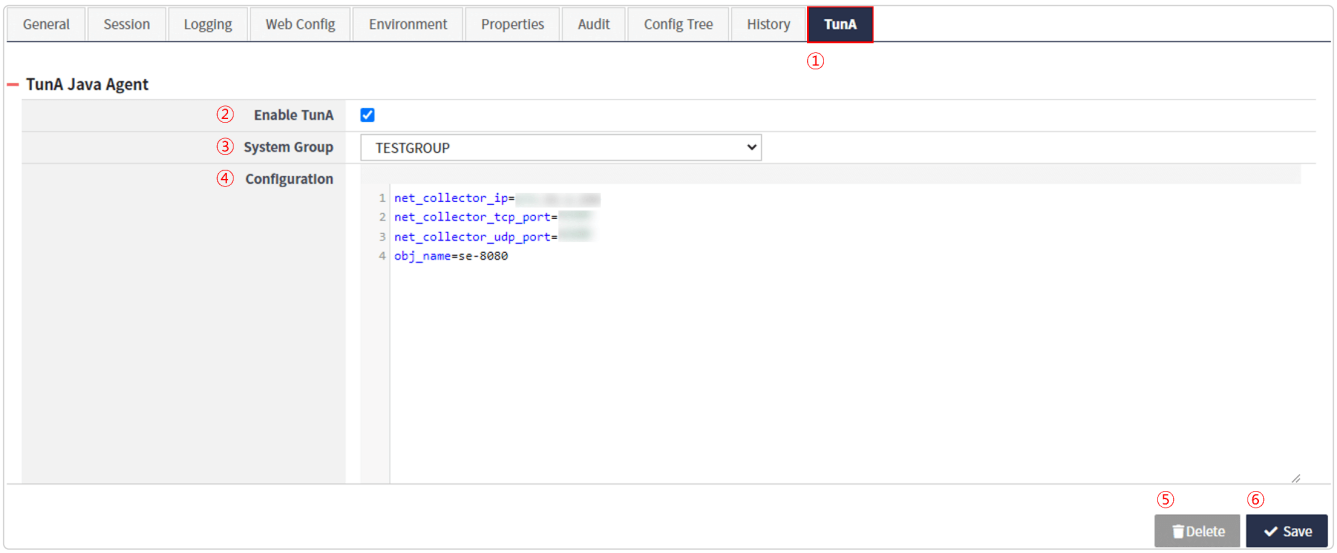


Figure 32. WAS - TunA Tab

#	Item	Description
①	TunA Tab	Manage the TunA Java Agent from the TunA Tab. If a user is not registered or the TunA Java Agent is not installed on the WAS when the tab is opened, a message prompting user registration and agent installation is displayed.
②	Enable TunA Checkbox	Check whether to enable the TunA Java Agent. This setting is applied when the WAS starts.
③	System Group	Select the System Group that the Java Agent belongs to.
④	Java Agent Config	Provides functions to view and modify the TunA Java Agent configuration.
⑤	**Delete button**	Delete the TunA Java Agent. Enabled only when the WAS is stopped.
⑥	**Save button**	Save the TunA Java Agent configuration.

Chapter 8. Admin

8.1. IAM

Provides user management and per-user menu permission management for Manager.

8.1.1. Users (User Management)

User List

From ADMIN > Users, you can create, edit, and delete Manager users.

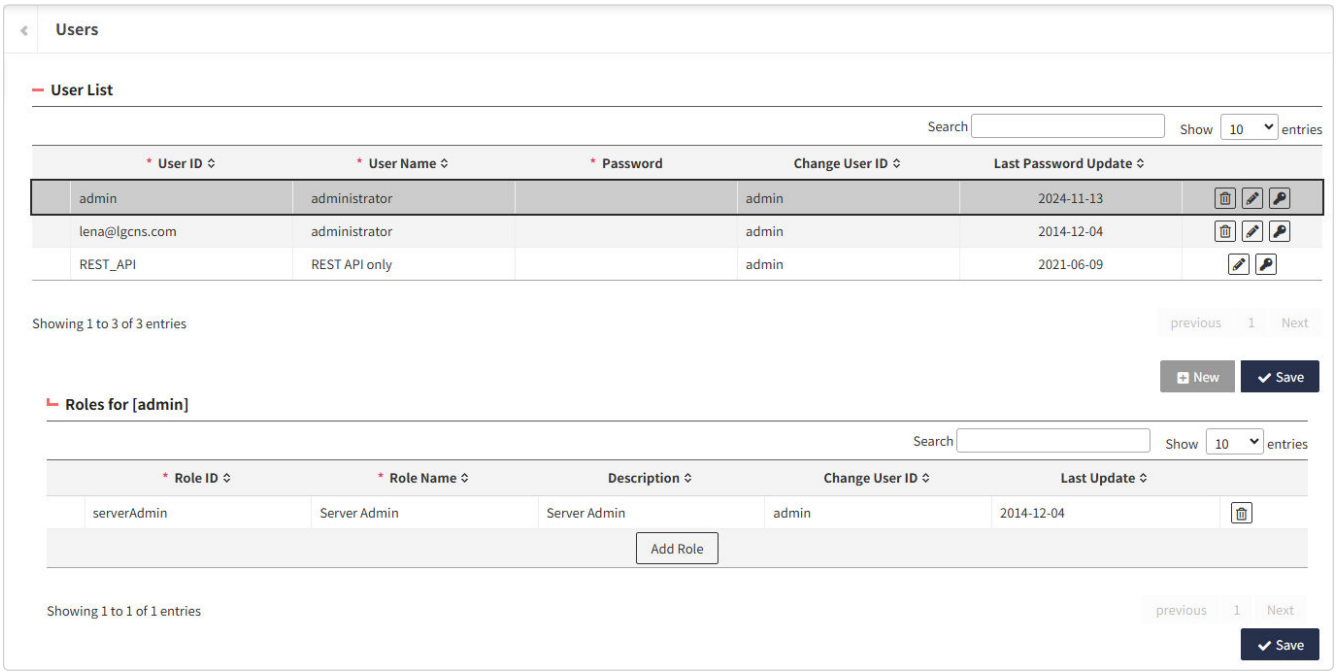


Figure 33. Users screen

The user management fields are as follows.

Table 104. User management fields

Field (* = required)	Description	Note
Use ID(*)	User identifier	
User Name(*)	User name	
Password(*)	User password	Must be at least 8 characters with a mix of special characters, numbers, and letters
Updater	Who created/updated the user data	
Last Update	When the user data was created/updated	
+ icon	Indicates that the selected permission info is being changed when clicking **New** or **Edit**	

Field (* = required)	Description	Note
- icon	Indicates that the selected permission info is marked for deletion when clicking **Delete**	

Two administrator accounts are provided by default (for emergency use). We recommend adding additional users besides the provided accounts.

Create User

1. Click the **New** button to prepare to register a new user.
2. Enter user ID, user name, and user password.
   - The user password is stored in encrypted form.
   - Password must be 8–20 characters and include upper/lowercase letters, numbers, and special characters (!@#$%^*+=-).
3. Click **Save** to store the user information.

- Password encryption uses the SHA-512 hash algorithm.

Edit User

1. Select the user to edit.
2. Click **Edit** to change the user name and user password.
   - The user password is stored in encrypted form.
3. Click **Save** to store the user information.

- If login fails 7 or more times, the account is locked and cannot be used.
- To unlock, change the password for the account from the user management screen.
- If there is no account currently logged in to Manager to change the password, run $LENA_HOME/bin/reset-manager-pw.sh to change it.

Delete User

1. Select the user to delete.
2. Click **Delete** to mark the user as deletable.
3. Click **Save** to store the changes.

If only one user remains, that user cannot be deleted.

8.1.2. Auths (Permission Management)

To manage permissions per menu, you must create permission groups. From ADMIN > Auths you can create, edit, and delete permission groups.

Permission List

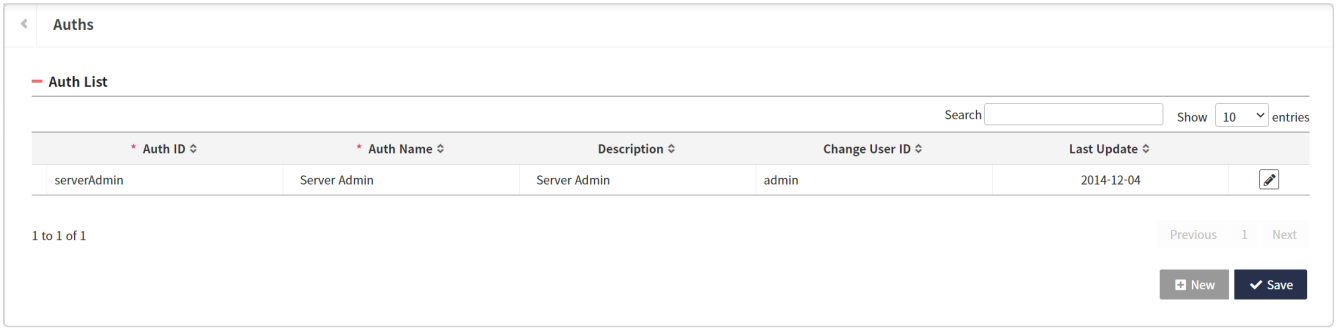


Figure 34. Auths screen

The permission management fields are as follows.

Table 105. Permission management fields

Field (* = required)	Description	Note
Auth ID(*)	Permission identifier	
Auth Name(*)	Permission name	
Description	Description of the registered permission	
Updater	Who created/updated the permission data	
Last Update	When the permission data was created/updated	
+ icon	Indicates that the selected permission info is being changed when clicking **New** or **Edit**	
- icon	Indicates that the selected permission info is marked for deletion when clicking **Delete**	

Create Permission

1. Click the **New** button to prepare to register a new permission.
2. Enter permission ID, permission name, and description.
3. Click **Save** to store the permission information.

Edit Permission

1. Select the permission to edit.
2. Click **Edit** to change the permission name and description.
3. Click **Save** to store the permission information.

Delete Permission

1. Select the permission to delete.
2. Click **Delete** to mark the permission as deletable.
3. Click **Save** to store the changes.

8.1.3. User-Auth Mapping (User Permission Management)

Manager users must belong to at least one group to gain menu usage permissions. Administrators can select permission groups and assign users. Use the shuffle buttons to control user permissions by

selecting one of the permissions registered via the "Permission Management" screen.

View User Permissions

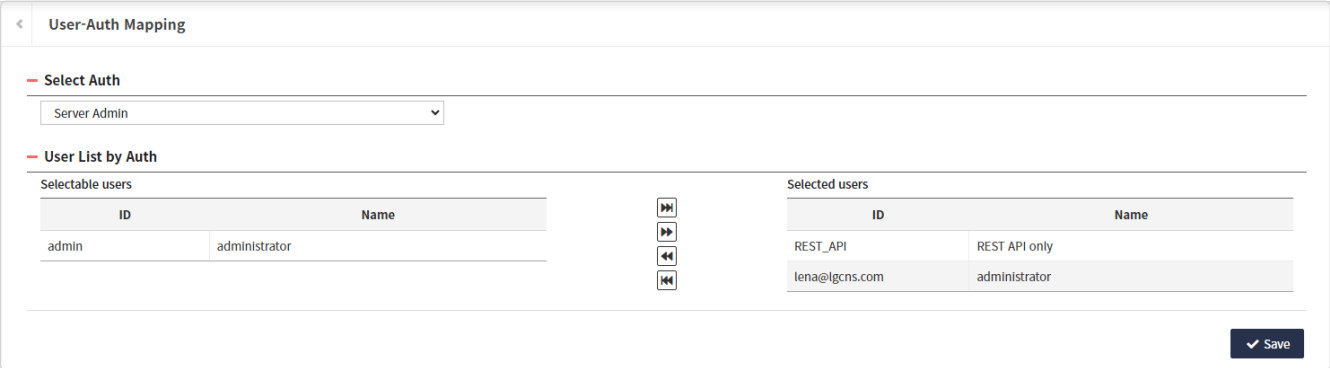


Figure 35. User-Auth Mapping screen

The fields for user permission management are as follows.

Table 106. Fields for user permission management

Field	Description	Note
Select Permission Name	Combo box listing permissions registered via the "Permission Management" screen	
ID	User identifier	
Name	User name	

Map User Permissions

1. Select the permission to which users will be assigned.
   - When you select a permission, both selectable users and currently selected users are displayed.
2. Select the selectable users.
3. Assign or remove users.
   - Click the **Single right shuffle** to assign the selected users.
   - Click the **All right shuffle** to assign all users.
   - Click the **Single left shuffle** to remove the selected users.
   - Click the **All left shuffle** to remove all users.
4. Click **Save** to store user-permission mapping information.

8.1.4. Menu-Auth Mapping (Menu Permission Management)

You can configure accessible menus for each permission created in LENA Manager. Select one permission to configure menus for from the created permissions. From the list of all menus registered in LENA Manager, select the menus to control access for and set the menu permissions.

View Menu Permissions

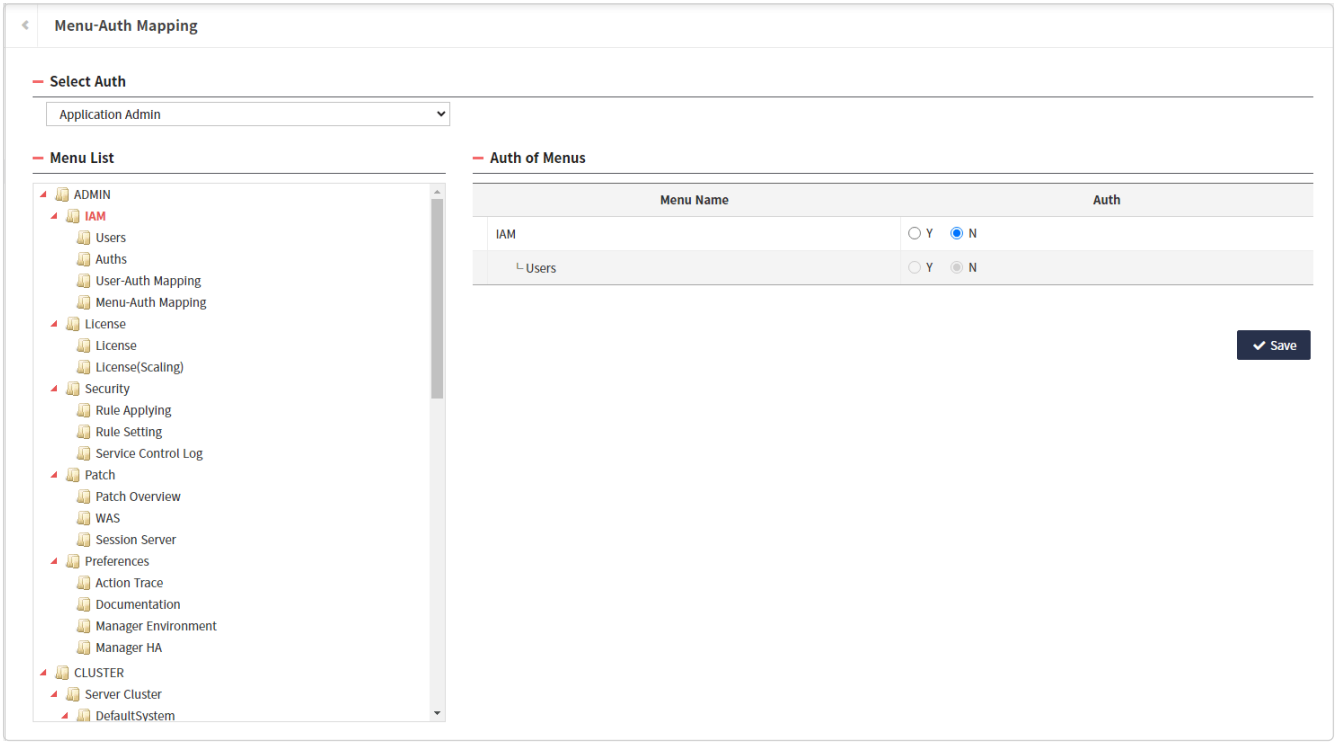


Figure 36. Menu-Auth Mapping screen

The fields for menu permission management are as follows.

Table 107. Fields for menu permission management

Field	Description	Note
Select Permission Name	Combo box listing permissions registered via the "Permission Management" screen	
Menu Name	Name of the menu selected from the left menu list registered in LENA Manager	
Auth	Whether the selected permission can access the menu	Default "N"

When Node, Server, or Resource items are added from the submenus of "SERVER" and "RESOURCE", those items are automatically added and shown in the menu list of the "Menu Permission Management" screen.

Therefore, to add a new menu, register and create each item from the submenus under "SERVER" and "RESOURCE".

Map Menu Permissions

1. Select the menu for which to configure permissions.
   - When a permission is selected, permissions for the menu are also retrieved.
2. Select the menu to configure from the menu list.
   - When a menu is selected, menu permissions are displayed in the permissions list.
3. Select Y or N to change permissions if needed.
4. Click **Save** to store the menu permission information.

8.2. License

Provides functions to view and update the currently applied license per Node via Manager.

8.2.1. License List

When you open the License screen, you can view the list of currently applied Licenses per Node.

You can check the license status in the Status field.

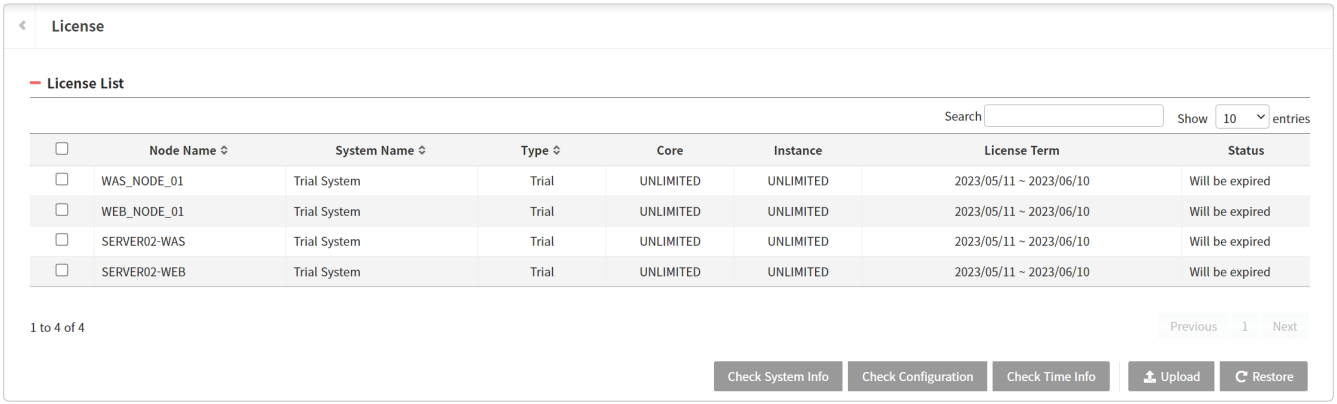


Figure 37. License list screen

8.2.2. License Details

Click a License in the list to view its details.

The detail fields are as follows.

Table 108. License detail fields

Field	Description	Note
Node Name	Node name	
Type	License type	Trial, Standard
Customer Name	Name of the purchasing customer	
System Name	Name of the installed system	
Issue No	License issue number	
Issue Date	License issue date	
License Term	License validity period	
Lena Home	Lena Home path	
IP Address	IP address of the Node	
Hardware ID	ID identifying the H/W	MAC Address or Host name
Contract CPU Core Limit	Maximum number of contracted cores	
CPU Core Limit	Actual measured number of cores	

Field	Description	Note
Contract Instance Limit	Maximum number of contracted instances	
Instance Limit	Actual measured number of instances	
Status	Whether the license is valid	

A notification is provided starting 15 days before license expiration. You can check notifications from the **bell icon** at the top-right of the Manager.

8.2.3. Upload/Restore License

Upload

Select the node(s) to which you want to apply a new License from the node list and click the **Upload** button at the bottom. Clicking the button opens the License Upload popup. Select the issued License file and upload it to apply the License to the selected nodes.

Restore

Select the node(s) whose License you want to restore from the node list and click the **Restore** button at the bottom. Clicking the button restores the License from the backed-up file.

8.2.4. Check System Information related to License

In the License list screen, select a Node and click the **Check System Info** button to view system information required for issuing a License.

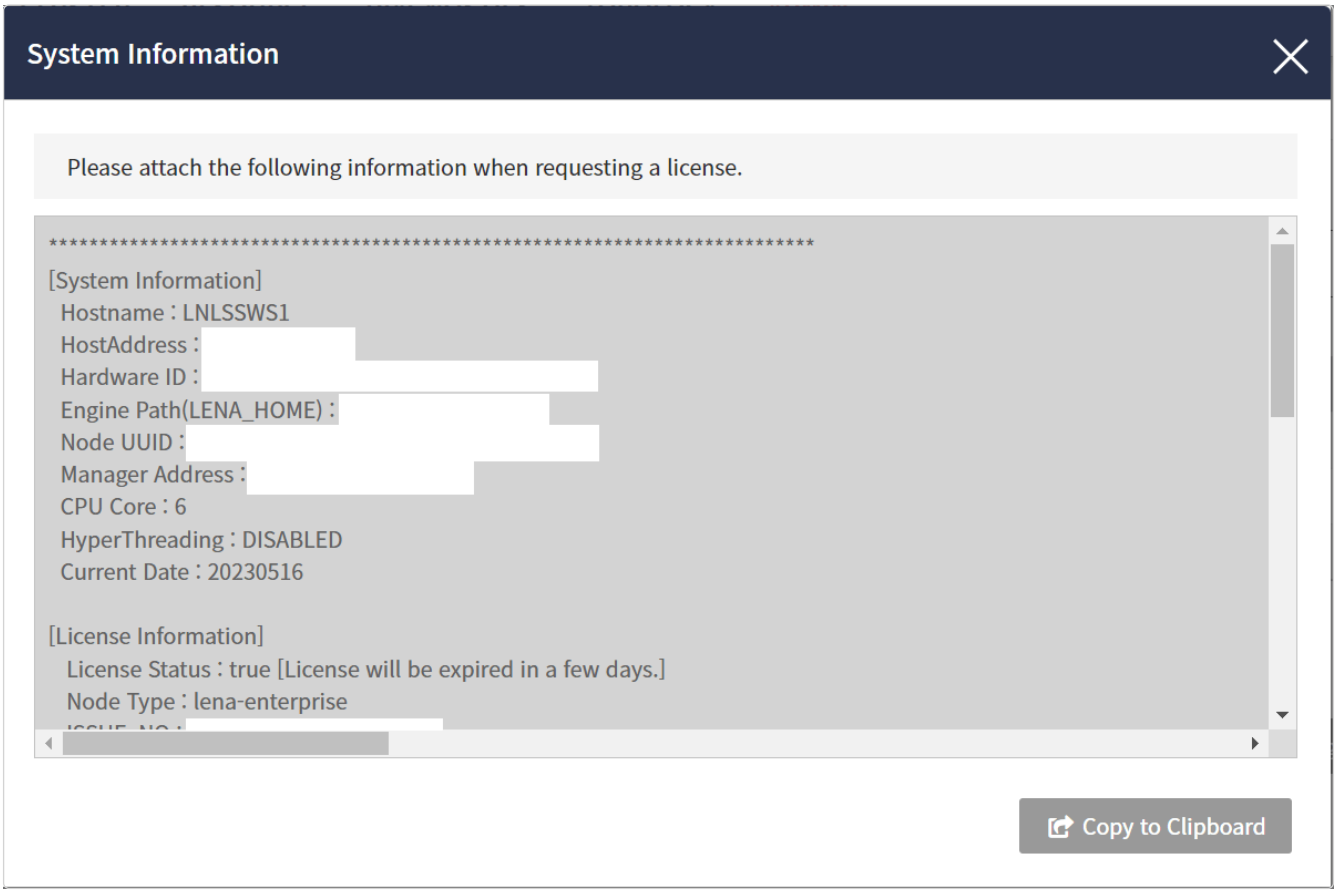


Figure 38. System Information

A shell script is also provided in the CLI environment to view License status per Node. The shell file is ${LENA_HOME}/bin/check-license.sh. An example result from running this script is shown below.

check-license.sh example

```
[bin]$ ./check-license.sh
*************************************************************************
[System Information]
  Hostname : solweb2
  HostAddress : 127.0.0.1
  Hardware ID : 52:54:00:E9:AC:A1 ( 52:54:00:E9:AC:A1 )
  Engine Path(LENA_HOME) : /engn001/lena/dev
  Node UUID : e46da220-db50-3854-84a0-7b61e1b6e7cd
  Manager Address : 127.0.0.1:7700
  CPU Core : 4
  HyperThreading : DISABLED
  Current Date : 20180705

[License Information]
  License Status : true [License is valid.]
  Node Type : lena-enterprise
  ISSUE_NO : 201807041532438300001
  TYPE : Standard
  CUSTOMER_NAME : LG
  SYSTEM_NAME : CNS
  SYSTEM_TYPE : PROD
  HARDWARE_ID : 52:54:00:E9:AC:A1
  LENA_HOME : /engn001/lena/dev
  CONTRACT_CPU_CORE_LIMIT : 8
  CPU_CORE_LIMIT : 8
  CONTRACT_INSTANCE_LIMIT : 8
  INSTANCE_LIMIT : 8
  MANAGER_ADDRESS : UNLIMITED
  WEB_CONTRACT_CPUCOREDAY_LIMIT :
  WEB_CPUCOREDAY_LIMIT : N
  WAS_CONTRACT_CPUCOREDAY_LIMIT :
  WAS_CPUCOREDAY_LIMIT : N
  RE_ISSUEANCE :
  USE_POSTPAID :
  START_DATE : 20180501
  END_DATE : 20190531
  LICENSE_KEY :
H2VaDEE9fjFlvHBRsQeGXasYT5l4tBc6ebayNIdtVZ5/lj4/EM0mYf38karMTKgcLLmPMMFa8BOEFt
5zRfBc/IiOxlmDgy
j0+iq30ABfJoyAhY3nWBVJhBy7h0U3hzJWr1hyCuZMFAHquL4dinwWAqmJeL+jntJKFufD38vdF2Yw
KEoRNH9dGQnqXZHO
U8wQZmN4UHk5YB5/O6YIUfFNGU3wyzjfKCfF9Golu9zQAsSZ358ptjC/TBUy+ccvLa75H32XPxiNSS
xytn0hGFbcVc61kv
zi7YMNUgnuEyDEQ/dhFKxJ17ijUQBZj5xbFQ9qUTzL1QKGLl+cbYVsr6kvZg==
*************************************************************************
```

The fields printed are the same as described above and provide basic information required for license issuance, which can be used when requesting a license.

Among the output fields, "HyperThreading" checks whether HyperThreading is used. If HyperThreading is enabled, the number of cores is counted as double the number of physical cores.

8.2.5. Host-based License Check Setting

Depending on the contract, the License checks the target H/W by MAC Address or Host name. The default setting is based on MAC Address. To perform license checks based on Host name (on Linux/Unix OS), open the following files located under ${LENA_HOME}/bin and in each Application Server's setenv.sh and modify as below.

start-agent.sh settings (add to $JAVA_OPTS)

```
JAVA_OPTS="${JAVA_OPTS} -Dlicense.check-type=hostname"
```

check-license.sh settings (uncomment the following)

```
_JAVA_OPTS="${_JAVA_OPTS} -Dlicense.check-type=hostname"
```

Each Application Server's setenv.sh settings (uncomment the following)

```
CATALINA_OPTS=" ${CATALINA_OPTS} -Dlicense.check-type=hostname"
```

8.2.6. Time Information

In the license list, select the node(s) for which you want to check time information and click the **Check Time Info** button to view time and timezone information for the selected nodes.

8.3. Security (Service Control)

This feature restricts user requests to Application Servers based on IP or URL.

8.3.1. Rule Setting

If you want to control requests from specific IPs or URLs, configure a new Rule via the screen. For convenience in adding and deleting Rules, a search function is provided. Server-wide properties that apply to all Applications can be handled via an error page.

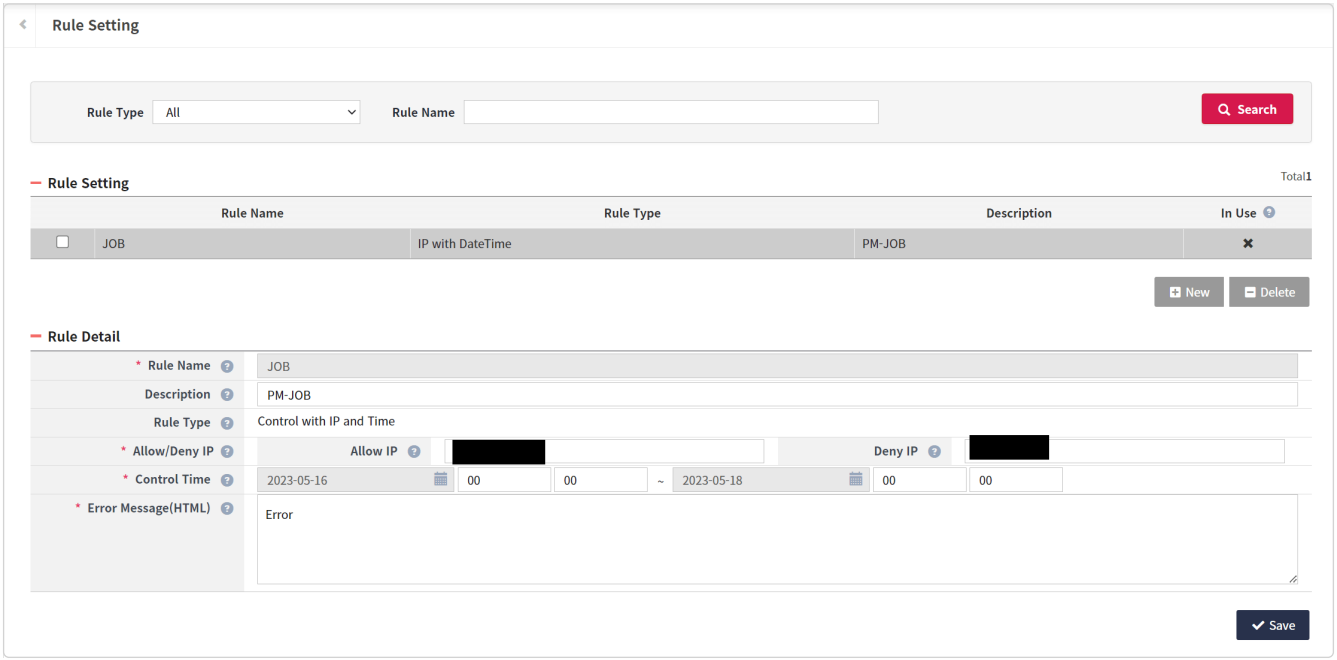


Figure 39. Rule Setting screen

The Use column in the Rule list indicates whether the Rule is applied to the Application Server.

When adding a Rule, the configurable fields are as follows.

Table 109. Configurable fields when adding a Rule

Field (* = required)	Description	Note
Rule Name(*)	Name of the Rule to add	
Description	Description of the Rule to add	
Rule Type	Unit to control	IP, URL
Allow IP(*)	Request IPs to allow	Regular expressions supported
Deny IP(*)	Request IPs to deny	Regular expressions supported
Control Time(*)	Time unit to apply the Rule	
Error Message(HTML)(*)	Error page to output for requests filtered by control	

If you apply a Rule of type "IP with DateTime" to an Application Server behind a Proxy Server, Rule application may fail because, due to the security characteristics of the Proxy Server, the user's IP may not be obtainable.

Applied Rules cannot be deleted.

8.3.2. Rule Applying

Select one of the added Rules to apply it to an Application Server. For convenience, search is provided by Rule type, application unit, and Rule name.

Select a Rule from the list, then in Rule Applying use the **shuffle buttons** to choose targets, then click the **On/Off** button to apply and save. To exclude a target, use the **shuffle buttons** to remove it from the applied list.

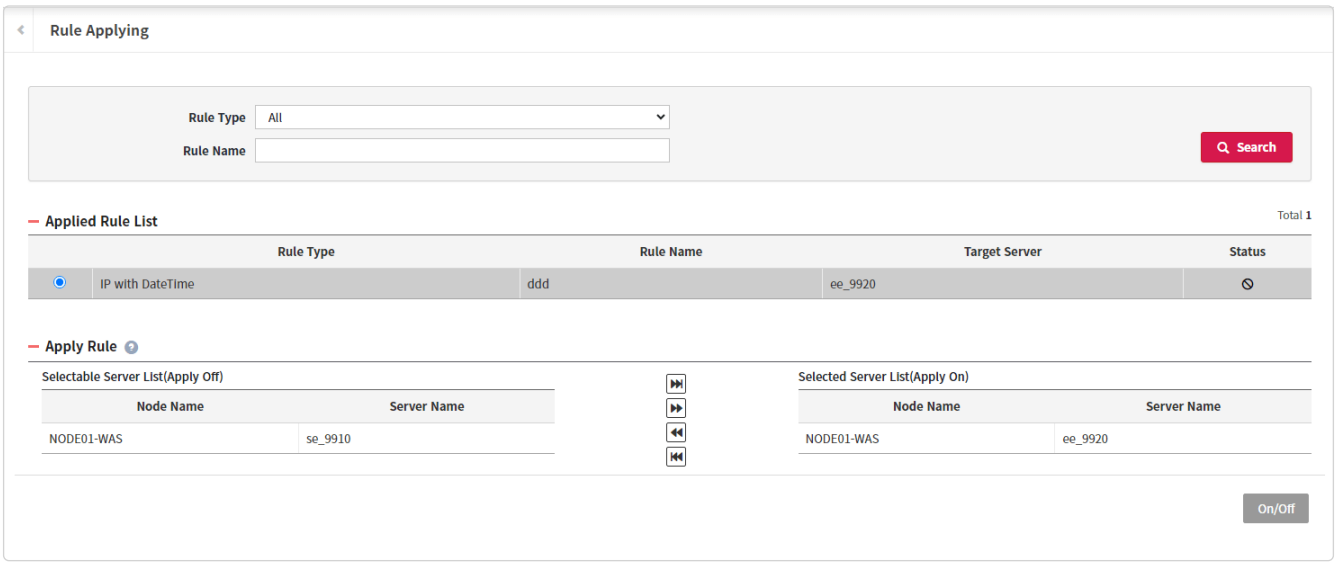


Figure 40. Rule Applying screen

The fields used in the Rule status and application screen are similar to those in the Rule Setting screen, with the following additional fields.

Table 110. Additional fields

Field	Description	Note
Node Name	Name of the Node under the registered System	
Server Name	Name of the Server under the registered Node	

When a new target is added to the selected Rule, depending on the application unit, entries are added to server.xml or context.xml. When a target is excluded, the Rule settings added to the above configuration files are removed.

8.3.3. Service Control Log (View Rule Application Results)

Processing results for items to which Rules have been applied are displayed as a list. For convenience, search is provided by Rule type, application unit, Rule name, and log time.

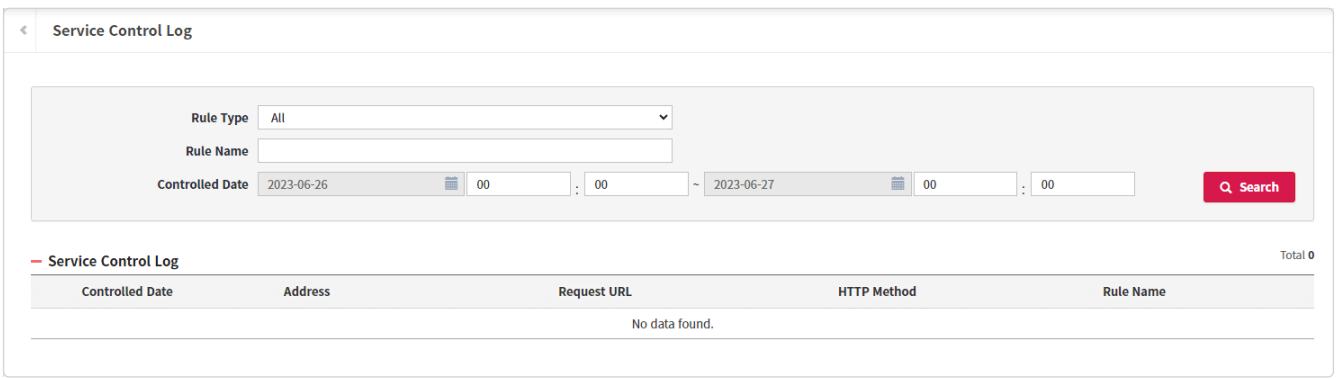


Figure 41. Service Control Log screen

The fields used in the processing list are as follows.

Table 111. Log information fields

Field	Description	Note
Controlled Date	Processing time of the request to which the Rule setting was applied	
Address	Processed remote address	
Request URL	URL of the processed request	
HTTP Method	HTTP method of the processed request	
Rule Name	Name of the Rule applied to process the request	

For Rule history, set the access filter log aggregation listener to true in Manager's /conf/manager.conf. Logs are written to access_filter.log."date".txt in each server's logs folder, and Manager periodically aggregates each server's logs into the Database. (At this time, the aggregated logs are backed up to access_filter_log."date".txt.gathered.) Logs aggregated into the Database can be viewed in the processing list screen.

An example of the settings in the manager.conf file is shown below.

```
# Whether to use the access filter log aggregation listener and
its interval (seconds). Defaults: false, 60
accessfilter.listener=false
accessfilter.interval=60
```

8.4. Notification Settings

You can configure the Notifications shown in Manager and the SNS information to integrate those Notifications.

8.4.1. Manager Notification

When you open the Manager Notification menu, you can see which Notifications are currently enabled. Levels are categorized as Critical, Warning, and Info.

If you uncheck a Notification and click Save, that Notification will not be shown in the bell icon even when it occurs.

Notifications not shown in the icon can still be viewed by clicking the bell icon and then clicking the Notification Detail button at the top-right of the popup.

8.4.2. SNS Notification

You can manage SNS integration information for Notifications generated by the Manager.

It works based on WebHook, and integration can be configured per System.

Table 112. Details for the SNS integration target

Item	Description
Name	A name specified by the user
System	Name of the System to integrate with
DuplicateTime(s)	If the same Notification occurs repeatedly within DuplicateTime(s), it will not be sent to SNS.
Request	HTTP method to send
Encoding	Encoding of the request
Header	Headers to include in the request. If multiple headers are used, separate them with new lines.
Body	Body of the request. Substitution parameters are as follows: ${alarmLevel} - level of the occurred alarm, ${message} - message content
Webhook URL	URL to send the request to
SSL	Whether to use SSL verification

Table 113. Types of Notifications to integrate to SNS

Item	Description
AUDIT	When a Notification occurs for the items specified in the server's Audit settings
DIAGNOSTICS	When a Notification occurs that violates a DIAGNOSTICS Rule configured on the server
LICENSE	When a license-related Notification occurs
INFO	When an information-related Notification occurs for the server

After entering the configuration fields, you can use the Test button to check whether the request works correctly.

If the test succeeds, save the configuration and toggle the on/off switch to on to enable the integration.

8.5. Patch

Provides patches for feature improvements and bug fixes for installed LENA.

Patches are provided as compressed files and run as an independent Java process.

Patch operations can be executed via CLI and Management UI. If any service issues occur during patching, you can restore the previous state via the Restore function.

The patch order is as follows.

1. Upload patch file
2. Apply Manager patch

3. Apply Node patch
4. Apply Server (Application Server, Session Server) patch
5. Commit patch

The restore order is as follows.

1. Restore Server patch
2. Restore Node patch
3. Restore Manager patch
4. Commit restore

For CLI-based patching, see the Appendix.

8.5.1. Overview

Provides patch file upload and shows the patch reflection status for Manager and each Node's Node Agent.

Upload Patch File

The Patch Info area displays details of the highest version among the patch files uploaded to the Manager.

Table 114. Patch Info fields

Field	Description	Note
Patch File Ver.	Version of the patch file	
Release Date	Distribution date of the patch file	
Patch Note	Click the **Detail(Note)** button to view the detailed patch notes.	Shows patch note popup

The process to upload a patch file is as follows.

1. Click the **Upload** button.
2. After checking whether patching is possible, if normal, a popup for uploading the patch file is displayed

Patch-possible conditions

1. All Nodes registered in Manager must be running.
2. patch must be in the committed state.
3. Node and server versions must match the manager version.
4. No servers unregistered from Manager must exist.
    a. If there are unregistered servers, register them to Manager
    b. If servers exist under the servers folder in the node engine, delete the corresponding folders

3. Select the patch file to upload; the upload will start automatically.

Uploadable files are zip and tar.gz. Uploading other file types will display an error message.

Manager Patch

The Manager Info area shows the Manager's patch status and allows you to execute patching and restoring of the Manager.

The fields shown are as follows.

Table 115. Manager Info fields

Field	Description	Note
Patch Status	Patch application status of the Manager • **sun icon** : Manager is up to date • **cloud icon** : A patch is available for the Manager	
Current Ver.	Current version of the Manager	
Patch Ver.	Patch version	
History	Button to view patch history	When handwork is required, the **Detail(Note)** button is shown in red.

Clicking the **Detail(Note)** button in the History item of the Manager Info screen opens a popup to check the patch execution history.

The fields shown are as follows.

Table 116. History fields

Field	Description	Note
Action	Shows patch/restore history	
Patch Ver.	Version of the patch file used for patch/restore	
Pervious Ver.	Server version prior to applying patch/restore	
Timestamp	Time when patch/restore was applied	
Log/Handwork	Clicking the **Detail(Note)** button shows execution logs. Clicking the **Handwork (wrench)** button shows required manual steps (Handwork). When Handwork is required, the button is displayed in red.	

Patch

Click the **Patch** button at the bottom of the Manager Info area to apply the latest patch.

Items described in Handwork are manual steps required after patch execution, so you must execute and reflect them. After completing Handwork, uncheck the checkbox at the bottom of the popup, and the **Handwork** button in the Manager Patch Info screen will change to white.

After applying the Manager patch, until you click **Commit** after applying patches to Nodes and Servers, you cannot perform operations such as installing/registering Nodes or installing/registering/duplicating Servers.

After patching, be sure to clear the browser cache to use the Manager of the patched version.

Restore

Click the **Restore** button at the bottom of the Manager Info area to revert to the previous version before the patch.

Restoring is performed when the patch status of all nodes registered with Manager is Patch Available.

Commit

After applying all patches for Manager, Nodes, and Servers, click the Commit button to finalize. After confirmation, you cannot revert to the previous version.

Node Patch

The Node Patch Status area summarizes, for nodes registered to the manager, the number of servers with the latest patch applied and the number of servers without the patch.

The fields shown are as follows

Table 117. Node Patch Status fields

Field	Description	Note
Status	Patch application status of the node • **sun icon** : All servers are up to date • **cloud icon** : The Node Agent is not up to date • **hemisphere icon** : The Node Agent is up to date, but Servers installed on the Node are not • **exclamation icon** : The Node agent is incompatible with lena-manager.	
Node name	Node name	
Address	Node IP	

Field	Description	Note
Node Version	Current version of the Node	
History	Button to view patch history	When handwork is required, the **Detail(Note)** button is shown in red.
WAS	Patch status information for Web Application Servers • Up To Date: number of servers with the latest patch applied • Patch Available: number of servers without the latest patch	

Click the **Node Patch** button to open a popup where you can choose Nodes and perform patch or restore for the selected Node(s).

Nodes installed on Windows OS perform patching via CLI, not via Manager.

8.5.2. Application Server

For Application Servers included in a Node, patching is performed with the latest patch file uploaded to the manager, and a function is provided to restore to the state immediately before the patch in case of problems.

List

Search for servers to patch by group conditions (node unit).

Table 118. Application Server Patch Status fields

Field	Description	Note
Patch Status	Patch application status of the Application Server • **sun icon** : Up to date • **cloud icon** : Patch available	
Node	Name of the Node where the Application Server is installed	
Name	Application Server name	
Type	Application Server type	

Field	Description	Note
IP	IP of the Node where the Application Server is installed	
HTTP Port	HTTP Connector port of the Application Server	
AJP Port	AJP Connector port of the Application Server	
Start/Stop	Start/Stop operations for the Application Server	
Current Ver.	Currently installed version of the Application Server	
Patch Ver.	Version to apply patch to. If up to date, shows 'N/A'.	Latest patch version uploaded to manager
History	View patch/restore history applied to the Server	

If the Node Agent process is killed or otherwise not functioning normally, Server information for that node will not be retrieved.

Patch

1. Before applying the patch, ensure the server is stopped (**Start** button enabled). If not stopped, click the **Stop** button to stop the server.
2. Check the checkbox(es) for the server(s) to patch (multiple selection allowed).
3. Click the **Patch** button to proceed. A log popup appears. If manual steps are required after patch completion, the **Handwork (wrench)** button in the Handwork column is shown in red.
4. After closing the log popup, the server's patch status icon changes to **sun icon**, and current ver. and patch ver. display the applied patch version and N/A respectively.
5. Validation
   a. Cannot apply a patch when the server is running
   b. Cannot re-apply a patch to a server that already has the latest patch

When applying a patch to a server for the first time for that Node, the Node patch is performed internally first, followed by the server patch.

Restore

1. Before restoring, ensure the server is stopped (**Start** button enabled). If not stopped, click the **Stop** button to stop the server.
2. Check the checkbox(es) for the server(s) to restore (multiple selection allowed).
3. Click the **Restore** button to proceed. A log popup appears.
4. After closing the log popup, the server's patch status icon changes to **cloud icon**, and current ver. and patch ver. display the previous version and the patch file version respectively.

5. Validation
    a. Cannot apply restore when the server is running
    b. After a restore, you cannot restore again (only one-stage restore is supported via Manager)

If, after restoring on servers, no servers on the Node have the patch applied, the Node restore is also performed internally.

History

Click the **Detail(Note)** button to view the 5 most recent patch/restore histories.

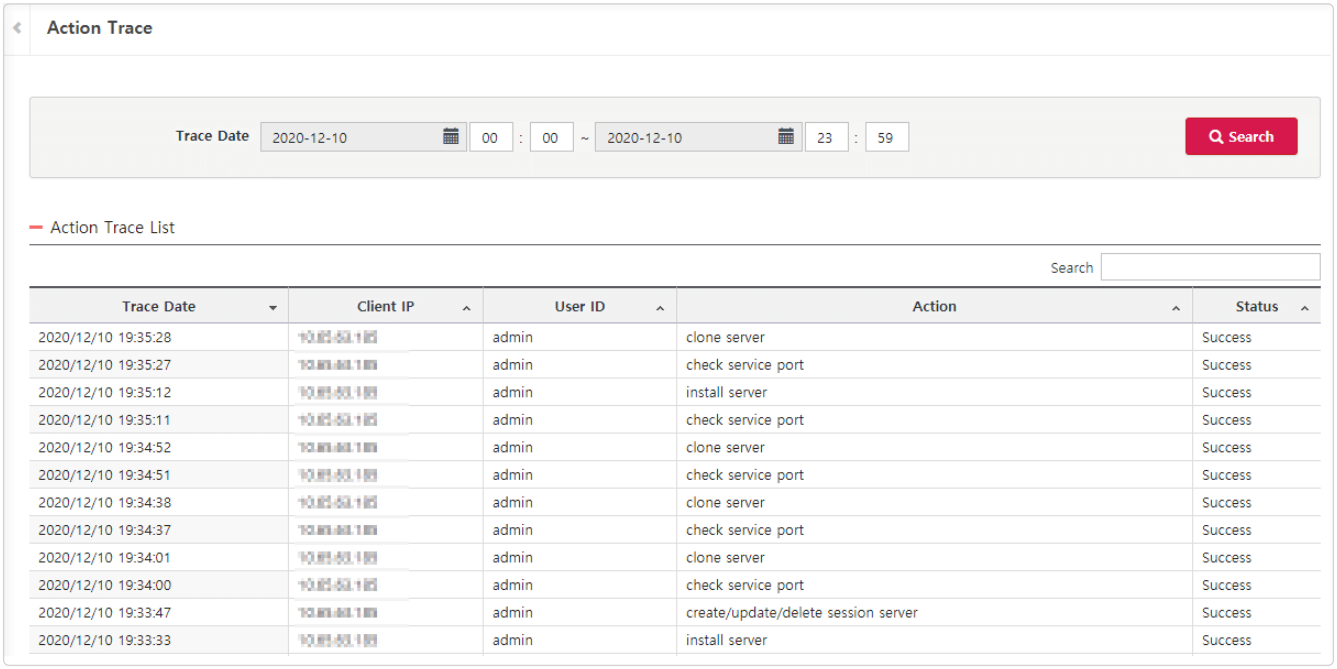
Table 119. History fields

Field	Description	Note
Action	Shows patch/restore history	
Patch Ver.	Version of the patch file used for patch/restore	
Previous Ver.	Server version prior to applying patch/restore	
Timestamp	Time when patch/restore was applied	
Log/Handwork	Clicking the **Detail(Note)** button shows execution logs. Clicking the **Handwork (wrench)** button shows required manual steps (Handwork). When Handwork is required, the button is displayed in red.	

8.6. Preferences

8.6.1. Action Trace

The history of add/modify/delete operations performed by each user through Manager is recorded in logs. Action Trace provides functions to query/trace these histories.



Trace Date	Client IP	User ID	Action	Status
2020/12/10 19:35:28	[redacted]	admin	clone server	Success
2020/12/10 19:35:27	[redacted]	admin	check service port	Success
2020/12/10 19:35:12	[redacted]	admin	install server	Success
2020/12/10 19:35:11	[redacted]	admin	check service port	Success
2020/12/10 19:34:52	[redacted]	admin	clone server	Success
2020/12/10 19:34:51	[redacted]	admin	check service port	Success
2020/12/10 19:34:38	[redacted]	admin	clone server	Success
2020/12/10 19:34:37	[redacted]	admin	check service port	Success
2020/12/10 19:34:01	[redacted]	admin	clone server	Success
2020/12/10 19:34:00	[redacted]	admin	check service port	Success
2020/12/10 19:33:47	[redacted]	admin	create/update/delete session server	Success
2020/12/10 19:33:33	[redacted]	admin	install server	Success

Figure 42. Action Trace screen

History Search

Enter the search conditions and click to retrieve the history. Select a row in the list to view its details.

The fields shown in the search screen are as follows.

Table 120. History detail fields

Field	Description	Note
Trace Date	Time when the Action was performed	
Status	Result of the Action	Success / Fail
Client IP	IP address of the user who performed the Action	
User ID	ID of the user who performed the Action	
Action	Name of the action performed	
Method	Name of the method used for the Action	
Request	LENA Manager Http Request URL	
Input	Http Request Input parameters	

Among the above, "Input" stores the request parameters as-is, so Server ID, Node ID, and Server Cluster ID appear as data-management key values (serial numbers, e.g., "serverID=31" in the screenshot). To view details of the corresponding Server/Node/Cluster, use the "Search ID" function at the bottom of the "Action Trace Detail" information. The I/O fields for this function are as follows.

Table 121. I/O fields for the Search ID function

Field	Description	Note
ID	• Left combo: choose one of serverId / nodeId • Right: enter the ID value from Input	Input field

Field	Description	Note
Data	Retrieved Server/Node information	Output field

8.6.2. Documentation

You can download LENA introduction material and manuals.

8.6.3. Manager Environment

Provides information for Manager environment settings.

Manager Environment

Among Manager environment settings, provides information saved to env-manager.sh/bat.

- Manager Allow IPs: Set IPs allowed to access Manager.
- Java Home Path: Set the java home path used by Manager.

Manager Configuration

Among Manager environment settings, provides information saved to manager.conf.

Two items are provided by default:

- use Server Delete Protection: Whether to disable server deletion in Manager (default: false)
- use JMX for Server Status: Whether to retrieve server status via JMX (default: false)

Click the **Settings button** on the right of the screen to view and modify details.

Table 122. When JMX for Server Status is true, WAS Status is displayed

Status	Status name	Description
image::manual/server_3_application_server_status_green.png[]	Started	WAS and Application are both running normally
image::manual/server_3_application_server_status_yellow.png[]	Started(Warning)	WAS is running, but some (or all) Applications are not started
image::manual/server_3_application_server_status_stopped.png[]	Stopped	WAS is stopped
image::manual/server_3_application_server_status_error.png[]	Error	WAS status cannot be determined

Metadata Refresh

Performs verification and restoration of metadata consistency used to draw the topology chart of each system in the Topology menu.

Reset manager address of all registered nodes

Provides a function to batch update the Manager Address for nodes registered with Manager.

Chapter 9. Appendix

9.1. LENA System Requirements

The minimum requirements to install and use LENA are as follows.

Category	JVM	CPU	Memory	Disk	Support OS	Note
Base installation package	JDK 1.8 or higher	2 cores or more	4 GB or more	10 GB or more excluding root	Linux (CentOS 7 or higher)	Installation files for each component provided

9.2. Supported Browsers for Manager

The types of browsers that can be used with Manager features are as follows.

Since some features may not work properly in IE, use of other browsers is recommended.

Type	Version	Note
Chrome	81	

9.3. Manager DB File Backup

HSQL DB files for managing Manager's internal data are backed up periodically (daily). The backup location is ${LENA_HOME}/etc./backup/lena-manager/script.

By default, backup information older than 30 days is deleted. If you want to change the retention period, open the manager.conf file under ${LENA_HOME}/repository/conf and set dbbackup.size=<retention_days>, then restart Manager to apply.

9.4. Deleting Manager Internal History

Manager periodically deletes internal histories via scheduling. The data deleted are Action Trace history and Server History.

By default, Action Trace history is retained for 30 days and Server History for 90 days. If you want to change these retention periods, open the manager.conf file under ${LENA_HOME}/repository/conf and set actiontrace.size=<retention_days>, serverhistory.size=<retention_days>, then restart Manager to apply.

9.5. Initialize Manager admin Password

If the Manager admin user password is lost or the number of failed password attempts is exceeded, you need to initialize the password via console.

1. Access the machine where Manager is installed via console (telnet or ssh).
2. Run $LENA_HOME/bin/reset_manager_pw.sh.
3. Enter admin as the user whose password will be reset.
4. Enter the new password. The password must be at least 8 characters and be a combination of letters/numbers/special characters. For security, the password is not displayed on the console.

```
[bin]$ ./reset-manager-pw.sh

 ******************************
* LENA Server Install ! *
 ******************************

+-------------------------------------------------------------------------------
--
| 1. USER_ID is the user id to reset
| ex : admin
| 2. NEW_PASSWORD is the password to change
| - password rule #1 : more than 8 length
| - password rule #2 : inclusion of one or more alphabet characters
| - password rule #3 : inclusion of one or more numerical digits
| - password rule #4 : inclusion of one or more special characters
+-------------------------------------------------------------------------------
--

Input USER_ID for installation. (q:quit)
administrator

Input NEW_PASSWORD for installation. (q:quit)

The password has been changed successfully.

Execution is completed.!!
```

9.6. Recommended OS Parameters for LENA Installation (CentOS)

When installing LENA, it is recommended to set the OS parameter max user processes to 8192 or more.

parameter	Recommended	Default
max user processes	8192	1024
open files	8192	1024

On CentOS, you can check the max user processes setting by running the command 'ulimit -a' as follows.

```
$ ulimit -a
core file size          (blocks, -c) 0
data seg size           (kbytes, -d) unlimited
scheduling priority             (-e) 0
file size               (blocks, -f) 8192
pending signals                 (-i) 14891
max locked memory       (kbytes, -l) 64
max memory size         (kbytes, -m) unlimited
open files                      (-n) 1024
pipe size            (512 bytes, -p) 8
POSIX message queues     (bytes, -q) 819200
real-time priority              (-r) 0
stack size              (kbytes, -s) 10240
cpu time               (seconds, -t) unlimited
*max user processes             (-u) 1024*
virtual memory          (kbytes, -v) unlimited
file locks                      (-x) unlimited
```

On CentOS, you can set the number of processes and open files with 'ulimit -u' and 'ulimit -n'. To persist these changes, add the ulimit commands to each user's profile (.profile, .bash_profile), or enforce via system configuration (CentOS).

```
*$ cat $HOME/.bash_profile*

*.. (omitted)*

*ulimit -u 8192*

*ulimit -n 8192*
```

Another way is to open /etc/security/limits.conf (CentOS) and set the maximum number of processes (nproc) and open files (nofile).

```
*$ cat /etc/security/limits.conf*

*.. (omitted)*

** soft nproc 8192*

** hard nproc 8192*

** soft nofile 8192*

** hard nofile 8192*
```

9.7. Files That Grow Periodically in LENA

Item	Path	Deletion Cycle	Expected Monthly Growth	Note
Manager maintenance logging	LENA_HOME/repository/monitoringDB/maintenance	6 months	10 MB	Estimated for 6 servers Auto-delete
Manager monitoring, diagnostic reports	LENA_HOME/repository/monitoringDB/{yyyyMMdd}	7 days	N/A	Auto-delete
Manager diagnostics statistics	LENA_HOME/repository/monitoringDB/statistics	Permanent	≤ 1 MB	
Manager DB backup files	LENA_HOME/repository/backup/database	30 days	≤ 100 MB	Auto-delete
Manager logs	LENA_HOME/logs/lena-manager	30 days	≤ 100 MB	Auto-delete
Agent logs	LENA_HOME/logs/lena-agent	30 days	N/A	Auto-delete
Installer logs	LENA_HOME/logs/lena-installer	Permanent	≤ 1 MB	
Patch applied files	LENA_HOME/etc/patch	Permanent	N/A	Created only during patching Can be deleted after patch completes
Patch backup files	LENA_HOME/etc/backup/lena-patcher	Permanent	N/A	Created during patching Can be deleted after patch completes
Patch logs	LENA_HOME/logs/lena-patcher	Permanent	N/A	Created during patching Can be deleted after patch completes
Server instance logs	Server instance install path LENA_HOME/servers/server_id/logs	Permanent	Depends on load	Path can be changed

Item	Path	Deletion Cycle	Expected Monthly Growth	Note
Server instance history	Server instance install path LENA_HOME/servers/server_id/history	Permanent	N/A	Only diffs of config files are generated when changing server settings via Manager

9.8. Change Manager Language Setting

You can change the language setting of LENA Manager.

Table 123. LENA Manager available languages

Language	Default
English (US)	O
Korean (KR)	

9.8.1. How to Change Language Setting

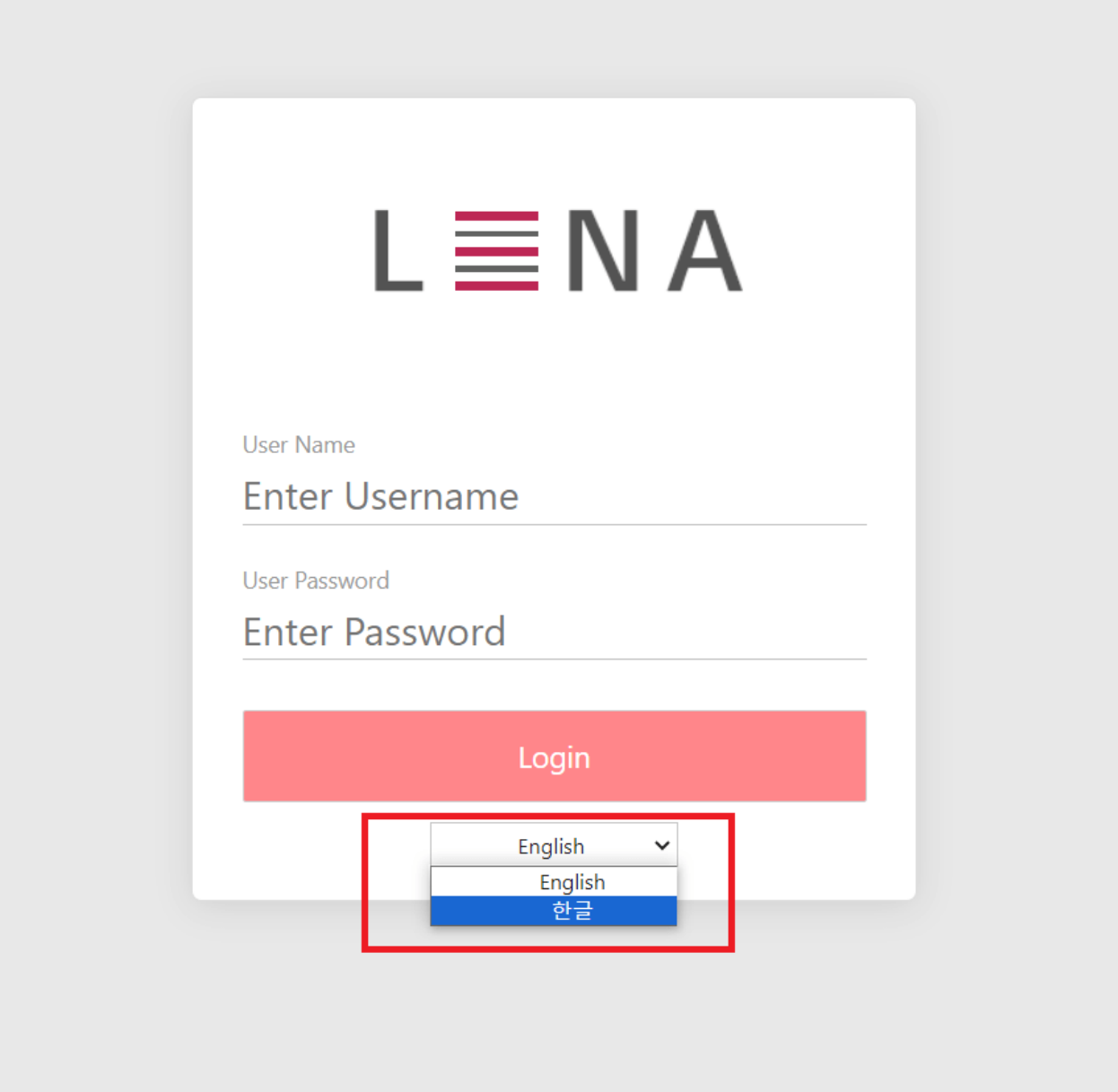
To enable language setting changes, first navigate to:

ADMIN > Preference > Manager Environment
(based on default English setting)

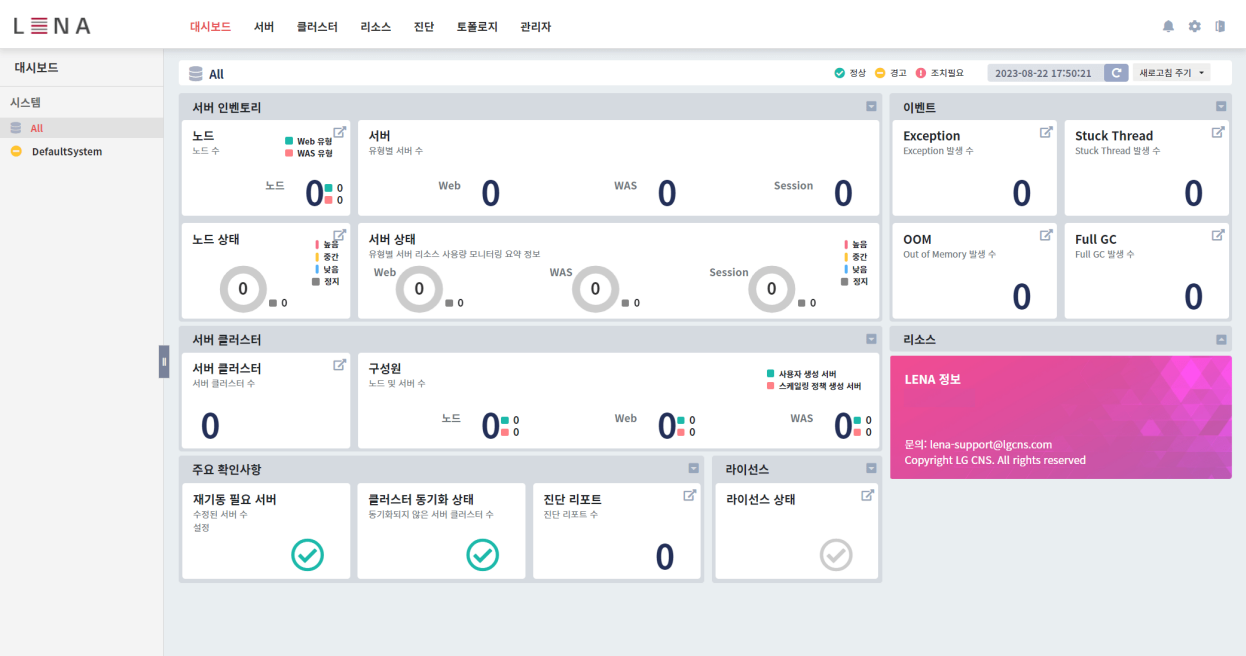
Click the gear button under Manager Configuration to open the details and modify as follows.

```
...
 9  # i18n On/off
10  lena.i18n.enable=true # false -> true
...
```

Now you can change the language on the Login page. If you are logged in, log out to go to the Login page.



After selecting the language and logging in, you can use LENA Manager in the changed language.



9.9. About LENA

For inquiries regarding LENA products, please contact via the following:

- Email: lena-support@lgcns.com
- Website: https://soltech.lgcns.com/
- Location: LG Science Park E13, E14, 71 Magokjungang 8-ro, Gangseo-gu, Seoul