QSAN
Official Document

KSM

Software Manual

January 2026

ANNOUNCEMENT

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PREFACE

About This Manual

This manual provides technical guidance for QSAN container server management and is intended for system administrators, designers, MIS personnel, or anyone who has purchased these products and is familiar with servers and computer networks, network administration, storage system installation and configuration, storage area network management, and relevant protocols.

Related Documents

There are related documents which can be downloaded from the website.

- KSM Data Sheet

Technical Support

Do you have any questions or need help troubleshooting a problem? Please contact QSAN Support, we will reply to you as soon as possible.

- Via the Web: https://www.qsan.com/technical_support
- Via Telephone: +886-2-77206355
- (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
- Via Skype Chat, Skype ID: qsan.support
- (Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)
- Via Email: support@qsan.com

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Information, Tip, and Caution

This manual uses the following symbols to draw attention to important safety and operational information.



INFORMATION

INFORMATION provides useful knowledge, definition, or terminology for reference.



TIP

TIP provides helpful suggestions for performing tasks more effectively.



CAUTION

CAUTION indicates that failure to take a specified action could result in damage to the system.

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Conventions

The following table describes the typographic conventions used in this manual.

CONVENTIONS	DESCRIPTION
Bold	Indicates text on a window, other than the window title, including menus, menu options, buttons, fields, and labels. Example: Click the **OK** button.
<Italic>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: copy *<source-file> <target-file>*.
[ ] square brackets	Indicates optional values. Example: [a | b] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a | b } indicates that you must choose either a or b.
| vertical bar	Indicates that you have a choice between two or more options or arguments.
/ Slash	Indicates all options or arguments.
underline	Indicates the default value. Example: [a | b]

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1. GETTING STARTED

KSM (KS Series Management System) is a management platform designed for QSAN KS Series container servers.

It provides centralized monitoring, storage configuration, application lifecycle control, cluster management, and system settings through the XInsight web interface.

This chapter explains how to discover KS devices and how to access KSM for the first-time setup.

1.1. Discover the KSM System

The default setting for the management IP address is DHCP. For first-time installation, please install the XInsight, a QSAN originated centralized device management platform, to initialize the management user interface in first time setup.

To install XInsight please refer to XInsight Software manual

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2. User Interface

This chapter illustrates the graphical user interface and provides a brief introduction to the desktop function menus.

2.1. Web UI Overview

To access the management web user interface, open a supported web browser and enter the management IP address or Hostname of the system. When the password has been verified, the dashboard is displayed.

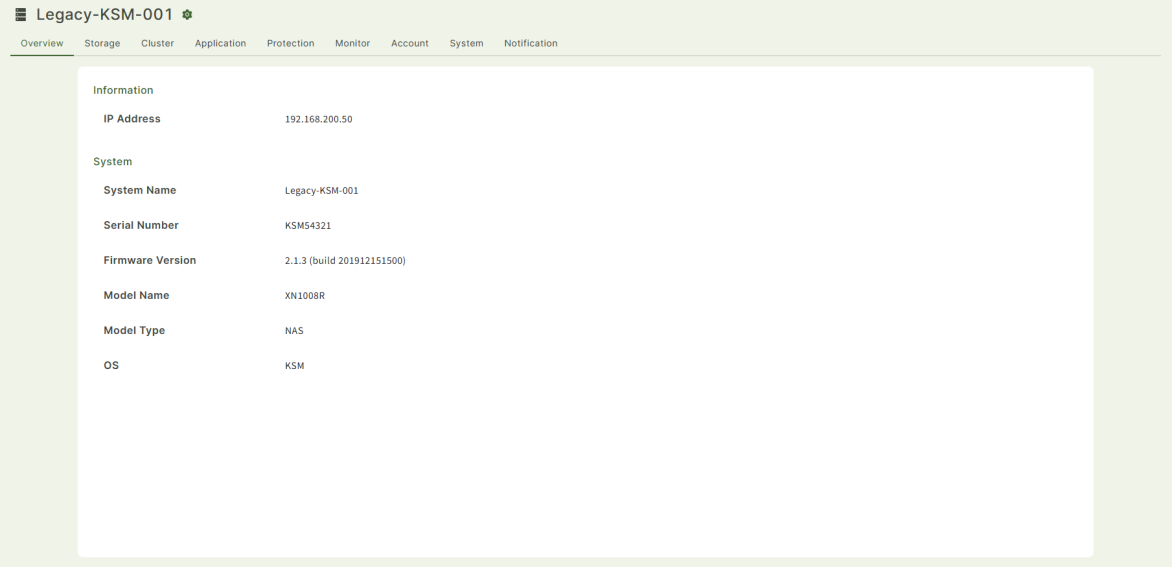


Figure 2-1 Dashboard View

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2.2. User Interface Overview

The system interface is divided into clearly defined functional areas to help users navigate, monitor, and manage system resources efficiently.

Each area has a specific role in the overall interaction flow and is designed to guide users from high-level navigation to detailed operations.

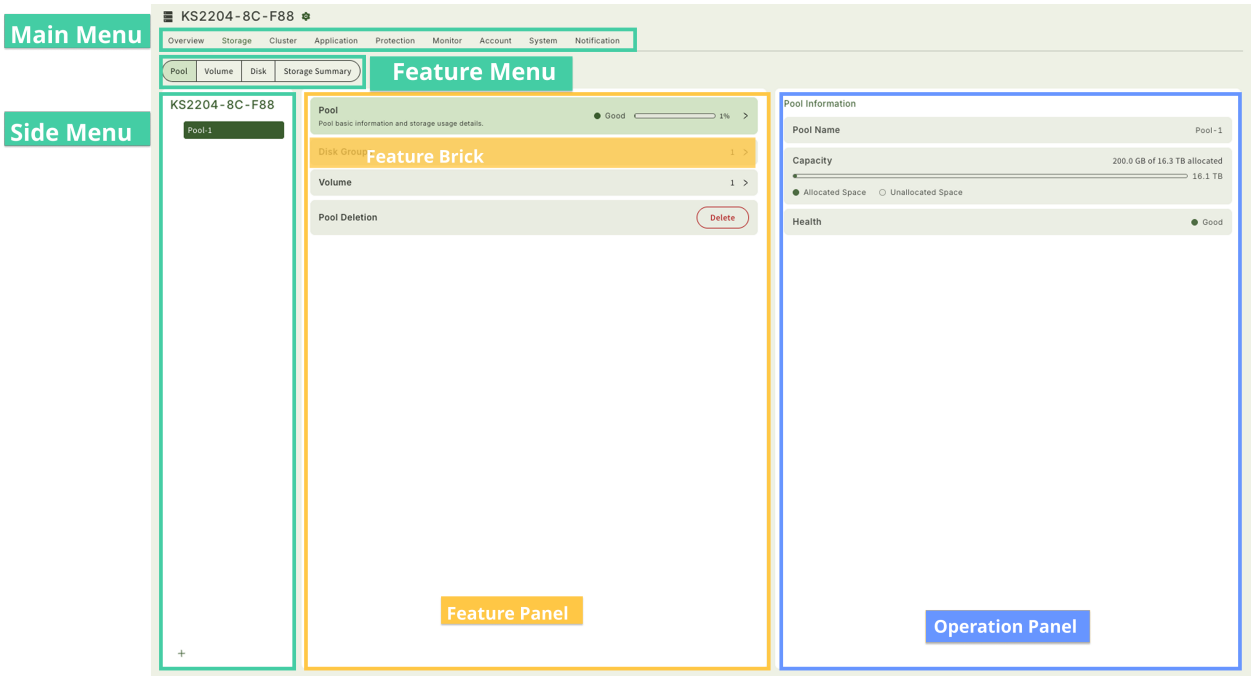


Figure 2-2 User Interface Overview

2.2.1. Main Menu

The **Main Menu** is located at the top of the interface.

It is used to switch between major feature groups, such as Overview, Storage, Cluster, Application, Protection, and System.

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2.2.2. Feature Menu

The **Feature Menu** appears below the Main Menu when a functional group contains multiple sub-features.

It allows users to switch between related features within the same feature group.

2.2.3. Side Menu

The **Side Menu** is displayed on the left side of the interface.

It lists manageable objects or views related to the selected feature, such as clusters, volumes, nodes, or services.

2.2.4. Feature Panel

The **Feature Panel** is the main working area in the center of the interface.

It displays the primary content of the selected feature, such as lists, dashboards, or configuration summaries.

2.2.5. Feature Brick

A **Feature Brick** is a modular section within the Feature Panel.

Each Feature Brick represents a specific function or category of information, such as Status, Usage, Scale, Storage, or Configuration.

Feature Bricks often include a **Quick View**, which provides a concise summary of the current state.

2.2.6. Operation Panel

The **Operation Panel** appears on the right side when a Feature Brick is selected.

It displays detailed information, settings, and available actions related to the selected Feature Brick.

The Operation Panel is used for both viewing details and performing configuration tasks.

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2.3. Main Menu Overview

The Main Menu contains the following feature groups:

- **Overview**
  Provides a high-level summary of system status and key operational information at a glance.
- **Storage**
  Allows users to monitor and manage storage resources, including pools, volumes, disks, and cluster-wide storage usage.
- **Cluster**
  Enables management of cluster structure and node membership, including viewing cluster status and adding or removing nodes.
- **Application**
  Used to deploy and manage applications and microservices running on the cluster.
- **Protection**
  Provides data protection features such as snapshots, backup servers, backup tasks, and restore operations.
- **Monitor**
  Displays system health, performance metrics, logs, and events for monitoring system activity.
- **Notification**
  Allows users to configure alert and email notification settings for system events.
- **Account**
  Used to manage user accounts, roles, and access permissions.
- **System**
  Provides system-level configuration options, including network settings, time settings, and system maintenance.

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3. System Overview

The Overview page displays essential system and device information, including:

- **System Name**
  Displays the name of the current system or device.
- **IP Address**
  Displays the management IP address used to access the system.
- **Serial Number**
  Displays the unique serial number of the device.
- **Model Name**
  Displays the device model name.
- **Model Type**
  Displays the system category, such as KS.
- **Operating System**
  Displays the operating system currently running on the device.
- **Firmware Version**
  Displays the installed firmware version and build information.

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4. STORAGE CONFIGURATION

The Storage menu manages storage pools. It displays the Pool status and configures the Pool. This chapter describes the details of storage management operations.

4.1. Pool

To manage a storage pool, please refer to the QSM4 software manual.

4.2. Volume

To manage a volume, please refer to the QSM4 software manual.

4.3. Disk

To manage a disk, please refer to the QSM4 software manual.

4.4. Storage Summary

The **Storage Summary** page provides a cluster-wide overview of all volumes by using the standard **Side Menu + Operation Panel** interaction model.

Cluster Volume List

When **Storage Summary** is selected from the **Side Menu**, the system switches the storage view from object-level management (Pool, Volume, Disk) to a **cluster-level summary mode**.

In this mode, the Side Menu is used only for **view switching** and does not represent individual storage objects.

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4.4.1. Volume List

The Feature Panel displays a **Volume List**, which aggregates all volumes from all nodes in the cluster.

For each volume, the list provides high-level status information such as:

- Volume name
- Health status
- State
- Capacity usage

This list is used for **selection and inspection**, not for configuration.

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5. CLUSTER

The **Cluster** feature is used to view and manage cluster-level information and node membership within the system.

This section allows administrators to review cluster status, monitor node health, and manage cluster expansion by adding or removing nodes.

5.1. Cluster List

The **Cluster List** is displayed in the Side Menu when the Cluster feature is selected.

Each entry in the Cluster List represents an available cluster and is displayed by its **Cluster Name**.

Selecting a cluster from the list loads the cluster management view.

5.1.1. Cluster Information

When a cluster is selected from the Cluster List, the system automatically displays the **Cluster Information** feature brick.

The Cluster Information feature brick provides basic identification and status information for the selected cluster.

The Operation Panel displays the following information:

- **Cluster Name**
  Displays the name of the selected cluster.
  This field is editable and allows administrators to rename the cluster.
- **Cluster Status**
  Displays the current operational status of the cluster.
  A *Normal* status indicates that the cluster is operating correctly.

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5.1.2. Nodes Management

The **Nodes Management** feature brick is used to view and manage nodes within the selected cluster.

This page provides visibility into node roles, status, and connectivity.

The Nodes Management feature brick displays all nodes that belong to the selected cluster.

A **Quick View** summary is displayed at the top of the feature brick:

- **Nodes**
  Displays the total number of nodes in the cluster.

When a node is selected from the list, the Operation Panel displays detailed node information:

- **Host Name**
  Displays the hostname of the node.
- **Role**
  Displays the node role, such as **Master** or **Worker**.
- **Status**
  Displays the current operational status of the node.
- **Connection Quality**
  Displays the communication quality between the node and the cluster.
- **Firmware Version**
  Displays the firmware version running on the node.
- **Node IP**
  Displays the IP address assigned to the node.

All fields in the Node Information panel are read-only.

5.1.3. Add New Node

The **Add New Node** function is used to expand the cluster by adding a new node.

Nodes are added to the cluster by providing the network and authentication information of the target node.

To add a new node:

1. Select a cluster from the Cluster List.

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2. Open **Nodes Management** from the **Feature Panel**.
3. Click **Add New Node**.
4. Enter the target node's **IP address**, **user name**, and **password**.
5. Click **Add**.

The system attempts to connect to the specified node and add it to the cluster.

5.1.4. Remove a Node

When a **Worker Node** is selected, an additional **Remove Node** action is available.

This action allows administrators to remove a Worker Node from the cluster.

Removing a Worker Node

To remove a Worker Node:

1. Select the Worker Node from the node list.
2. Click **Remove**.
3. Confirm the removal when prompted.

The **Application** feature group is designed to help administrators organize, deploy, and manage **container-based microservices** in a structured and user-friendly way.

An Application represents a **logical service group** that contains one or more microservices working together to deliver a complete solution, such as a CRM system, web application, database-backed service, or AI workload.

By grouping related microservices into an application, administrators can manage complex service architectures more easily and maintain clear service boundaries.

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6. APPLICATION

6.1. Application List

The Application List organizes all applications and serves as the entry point for managing microservices.

6.1.1. Create an Application

An Application is the first step for deploying microservices in QSAN KSM.
Before creating any microservice, administrators must create an application to serve as a logical container for related services.

To create a new application:

1. In the KSM interface, locate the **Side Menu**.
2. Click the **"＋" icon** at the bottom of the **Side Menu**.
3. The **Create Application** creation panel appears.
4. Enter an **Application Name**.
5. Click **Create** to confirm.

6.2. Manage Applications

The **Applications** management feature panel provides an overview of existing applications and allows administrators to perform application-level operations.

From this page, administrators can:

- View application information and status
- Access application details
- Manage microservices associated with the application
- Delete applications when they are no longer required

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6.2.1. Application Overview

The Application Overview page displays key information about the selected application, including:

- Application name

6.2.2. Manage Microservices in an Application

Within an application, administrators can deploy and maintain multiple microservices.

The **Manage Microservices** section allows administrators to:

- Deploy new microservices into the application
- View existing microservices
- Access detailed microservice configuration and status

6.2.3. Delete the Application

Press the Delete button to process the deletion of the Application with wizard guides.

6.3. Deploy a Microservice

Deploying a microservice is the primary operation performed within an Application.
All microservices must be deployed **inside an existing application**.

This section describes the standard process for deploying a microservice using the **Creation Panel**.

6.3.1. Steps to Deploy a Microservice

1. **Select an Application**
   From the **Main Menu**, select **Application**, then choose the target application from the **Side Menu**.
2. **Start the Creation Process**
   Click **Create** or the ＋ icon to deploy a new microservice.
   The **Creation Panel** opens to guide the deployment process.

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3. **Select Deployment Mode**
   Choose one of the following deployment modes:
   - **Basic Mode** – Simplified deployment with essential settings.
   - **Advanced Mode** – Full, step-by-step deployment with detailed configuration options.
4. **Configure Microservice Settings**
   Depending on the selected mode, configure the required settings, including:
   - Microservice name
   - Container image
   - Resource allocation
   - Storage configuration
   - Network settings
   - Configuration files
   - Environment variables



TIP

When deploying container-based microservices, the required configuration differs from each container image. Ensure the required setup variables and configuration are well prepared before microservice deployment.

5. **Review Deployment Summary**
   In the final step, review all configuration settings in the **Ready to Complete** page.
6. **Deploy the Microservice**
   Click **Finish** to deploy the microservice.
   The system creates and starts the microservice based on the specified configuration.

6.4. Microservice Management

Microservices are the core execution units in KSM.
Each microservice represents a container-based service with its own runtime configuration, resources, and lifecycle.

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6.4.1. Microservice Overview

When a microservice is selected, the **Microservice Overview** feature brick is displayed by default. At the top of this feature brick, a summary section shows the microservice's **lifetime status**.

Microservice Overview Quick View

The Quick View displays the microservice **Life Time** status, allowing users to quickly confirm that the service is running properly.

The Operation Panel provides essential information about the selected microservice and allows basic administrative actions.

- **Microservice Name**
  Displays the current name of the microservice.
  This field is editable and can be updated to better reflect the service role.
- **Description**
  Allows administrators to enter descriptive information for management reference.
  This field is optional and does not affect service behavior.
- **Port**
  Displays the service port configuration.
- **Internal IP**
  Displays the internal IP address assigned to the microservice.
- **Replica**
  Displays the number of currently running replicas for the microservice.
- **Uptime**
  Indicates how long the microservice has been running since it was last started.

6.4.2. Microservice Health Status

The **Status** feature brick allows administrators to view the current operational state of a microservice and perform basic service control actions.

This feature brick is commonly used to verify service health and to control the runtime state of the microservice.

Status Quick View

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Operation Panel:

When the **Status** feature brick is displayed in the Feature Panel, it provides a quick summary of the microservice state, including:

- **Current Status**
  Displays the current operational state of the microservice.
  Example: Normal
- **Service Control Hint**
  Indicates that service control actions are available for this microservice.

This overview allows administrators to quickly confirm whether the microservice is running as expected before accessing detailed controls.

6.4.3. Microservice Image Information

The **Image** feature brick allows administrators to view and manage the container image used by a microservice.

This feature brick is used to verify the currently deployed image and to update the microservice image when required.

Image Quick View

This quick view allows administrators to quickly confirm the **image version** in use without accessing detailed settings.

Operation Panel – Image Management

When the **Image** feature brick is selected, the **Operation Panel** on the right side of the screen displays detailed image information and image management options.

Current Image Information

The Operation Panel displays the following information about the current container image:

- **File Name**
  Displays the file name of the container image, if applicable.
  If no local image file is associated, this field is left blank.
- **Tag**
  Displays the full container image tag currently used by the microservice.

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- **Version**
  Displays the image version or tag currently in use.
- **Image Source**
  Indicates the source type of the container image.

6.4.4. Manage the Node Preference

The **Preferred Node** feature brick allows administrators to define and review preferred execution nodes for a microservice.

By configuring preferred nodes, administrators can influence where a microservice is scheduled to run within the cluster.

Preferred Node – Quick View

In the Feature Panel, the **Quick View** section of the Preferred Node feature brick displays a summary of the current preference of nodes.

Operation Panel – Preferred Node Information

When the **Preferred Node** feature brick is selected, the **Operation Panel** on the right side of the screen displays detailed information about the preferred nodes assigned to the microservice.

Preferred Node List

The Operation Panel lists all preferred nodes with the following information:

- **Node Name**
  Displays the name of the node.
- **Node Role**
  Indicates the role of the node within the cluster, such as master or standalone.
- **Status**
  Displays the current operational state of the node.
- **Node IP**
  Displays the IP address assigned to the node.
- **Firmware Version**
  Displays the firmware version currently running on the node.

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- **Connection Quality**
  Displays the current connection status between the node and the cluster.

This information allows administrators to evaluate node availability and suitability before assigning or modifying preferred nodes.

Node Preference Edit Panel

The **Preferred Node Edit Panel** allows administrators to select and manage preferred execution nodes for a microservice.

This panel is opened by selecting **Edit** or **Select Preferred Node** from the Preferred Node feature brick and is presented as a separate editing interface.

Node List and Information

The Edit Panel displays a list of available nodes in the cluster, along with detailed information for each node.

For each node, the following information is provided:

- **Name**
  Displays the node name.
- **Role**
  Indicates the node role within the cluster.
- **Status**
  Displays the current operational status of the node.
- **IP Address**
  Displays the node's IP address.

Node Selection

Administrators can select one or more nodes using the checkbox provided for each node.

The Edit Panel displays:

- The number of currently selected nodes
- The total number of available nodes

This selection determines which nodes are preferred targets for microservice execution.

The following actions are available at the bottom of the Edit Panel:

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- **Cancel**
  Closes the Edit Panel without saving any changes.
- **Apply**
  Applies the selected node preferences to the microservice.

Changes take effect only after clicking **Apply**.

6.4.5. Microservice Usage Status

The **Usage** feature brick provides real-time resource monitoring and resource limit configuration for a microservice.

This feature brick allows administrators to observe current resource consumption and define usage limits to ensure stable service operation within the cluster.

Usage – Quick View

The **Quick View** in the Usage feature brick displays a concise summary of the microservice's current resource consumption.

The Quick View shows:

- **CPU Usage**
- **Memory Usage**

This read-only summary allows administrators to quickly assess whether the microservice is operating within expected resource boundaries.

Operation Panel – Resource Usage and Limits

When the **Usage** feature brick is selected, the **Operation Panel** on the right side of the screen displays detailed resource usage information and configuration options.

CPU Usage

The Operation Panel displays the current CPU usage and allows administrators to configure CPU usage limits.

- **CPU Usage**
  Displays the current CPU utilization of the microservice as a percentage.

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- **CPU Usage Limit**
  Defines the maximum CPU resources that the microservice is allowed to consume.
- Administrators can choose one of the following options:
- **Recommended Usage Limit**
  Applies a predefined CPU limit based on system recommendations.
- **Customized Usage Limit**
  Allows administrators to manually specify a CPU limit in millicores.

After configuring the desired option, click **Apply** to save the setting.

Memory Usage

The Operation Panel also displays current memory usage and allows administrators to configure memory usage limits.

- **Memory Usage**
  Displays the current memory utilization of the microservice as a percentage.
- **Memory Usage Limit**
  Defines the maximum memory resources that the microservice is allowed to consume.

Administrators can choose one of the following options:

- **Recommended Usage Limit**
  Applies a predefined memory limit based on system recommendations.
- **Customized Usage Limit**
  Allows administrators to manually specify a memory limit in megabytes (MB).

After configuring the desired option, click **Apply** to save the setting.

6.4.6. Microservice Scale Management

The **Scale** feature brick allows administrators to control how a microservice adjusts its number of replicas in response to workload demand.

Scaling helps ensure service availability while optimizing resource utilization within the cluster.

Scale – Quick View

The **Quick View** in the Scale feature brick displays a summary of the current scaling configuration.

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It shows:

- **Scaling Mode** (Auto Scale or Manual Scale)
- **Replica Range** (Minimum and Maximum replicas)

This read-only summary allows administrators to quickly understand how the microservice is currently scaled without entering detailed settings.

Operation Panel – Scale Configuration

When the **Scale** feature brick is selected, the **Operation Panel** on the right side of the screen displays detailed scaling options.

Auto Scale

When Auto Scale is selected, the system automatically adjusts the number of replicas based on resource usage.

Auto Scale settings include:

- **Usage Threshold**
  Defines the CPU or memory usage level that triggers scaling behavior.
- **Maximum Replicas**
  Defines the maximum number of replicas that the microservice can scale up to.
- **Minimum Replicas**
  Defines the minimum number of replicas that the microservice maintains.

Auto scaling dynamically increases or decreases replicas within the defined range to match workload demand.

Manual Scale

When **Manual Scale** is selected, the number of replicas is fixed and no automatic scaling occurs.

Manual Scale settings include:

- **Replica**
  Defines the exact number of replicas to run for the microservice.

This mode is suitable for predictable workloads or testing scenarios.

Apply Scaling Settings

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After configuring the desired scaling mode and parameters, click **Apply** to save the settings.

6.4.7. Storage Configuration of the Microservice

The **Config** feature brick is used to manage configuration files and mount paths for a microservice.

Configuration files allow administrators to externalize application settings and inject them into the container at runtime.

Config – Quick View

The **Quick View** in the Config feature brick displays the total number of configurations currently defined for the microservice.

When no configuration exists, the Quick View displays `0 config(s)`, indicating that no configuration files have been created.

6.4.8. Create Configuration

When no configuration is present, selecting the **Config** feature brick displays the **Create Configuration** interface directly.

Clicking **Create configuration** opens the **Creation Panel**, which guides administrators through the process of creating a new configuration file.

Config – Creation Panel

The **Config Creation Panel** allows administrators to create and define a configuration file that will be mounted into the microservice container.

This panel is presented as a step-by-step creation form.

Configuration Information

The following fields are required to create a configuration:

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- **Configuration Name**
  Specifies a unique name to identify the configuration.
- **File Name**
  Defines the file name of the configuration as it will appear inside the container.
- **Mount Path**
  Specifies the directory path inside the container where the configuration file will be mounted.
- **Configuration Body**
  Defines the content of the configuration file.
  This field supports multi-line text input and is limited to 10,000 characters.

Action Buttons

The following actions are available at the bottom of the Creation Panel:

- **Cancel**
  Closes the Creation Panel without saving the configuration.
- **Add**
  Creates the configuration and attaches it to the microservice.

Remove Configuration

When one or more configurations already exist, the **Config** feature brick provides a **Remove** function, represented by the **minus (–) icon**, to delete existing configuration files from the microservice.

This function allows administrators to safely remove configuration files that are no longer required.

Remove Configuration Action

To remove a configuration:

1. Select the configuration from the configuration list in the Config feature brick.
2. Click the **minus (–) icon**.
3. A confirmation dialog is displayed to prevent accidental deletion.

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6.4.9. Network Configuration of the Microservice

The **Network** feature brick is used to configure service ports and expose a microservice to internal or external network traffic.

Network settings define how the microservice can be accessed within the cluster or from outside the cluster.

Network – Quick View

The **Quick View** in the Network feature brick displays a summary of the current network configuration.

It shows:

- **Number of Network Configurations**

When no network configuration exists, the Quick View displays 0, indicating that the microservice is not currently exposed to any cluster or external network.

Create Network Configuration

When no network configuration exists, selecting the **Network** feature brick opens the **Creation Panel** directly.

The Creation Panel allows administrators to create a new network configuration by defining service ports for the microservice.

Network – Creation Panel

The **Network Creation Panel** provides options to expose the microservice through cluster or external network access.

Network Configuration Status

- **Network Configs Amount**
  Displays the current number of network configurations.
- **Connection Status**
  Indicates whether the microservice is connected to any cluster IPs.
  When no configuration exists, the system indicates that the microservice is not connected.

Add Network Port

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Administrators can create a new network configuration by defining the following fields:

- Service Port
  Defines the external access port for the microservice using NodePort.
  Valid range: 30001–32767.
  External access is performed using the node IP address and this port.
- Internal Port
  Defines the internal container port used for cluster communication.
  Valid range: 1–65535.
  Internal access is performed using the Cluster IP or service name and this port.

Action Buttons

The following actions are available at the bottom of the Creation Panel:

- **Cancel**
  Closes the Creation Panel without creating a network configuration.
- **Add**
  Creates the network configuration and exposes the microservice using the defined ports.

Remove Network Configuration

When one or more network configurations already exist, the **Network** feature brick provides a **Remove** function, represented by the **minus (–) icon**, to delete existing service port mappings from the microservice.

This function allows administrators to stop exposing a microservice through specific network ports.

Remove Network Configuration Action

To remove a network configuration:

1. Select the network configuration to be removed from the Network list.
2. Click the **minus (–) icon**.
3. A confirmation dialog is displayed to verify the removal action.

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6.4.10. Edit Environment Variable of the Microservice

The **Environment** feature brick is used to define runtime environment variables for a microservice.

Environment variables allow administrators to pass configuration values, credentials, or runtime parameters to the container without modifying the container image.

Add Environment Parameter

When no environment variable exists, selecting the **Environment** feature brick opens the **Creation Panel** directly.

Clicking **Add Environment Parameter** allows administrators to create a new environment variable for the microservice.

Environment – Creation Panel

The **Environment Creation Panel** provides a simple form for defining a key–value pair as a runtime environment variable.

Environment Parameter Fields

The following fields are required to add an environment parameter:

- **Key**
  Specifies the name of the environment variable.
- **Value**
  Specifies the value assigned to the environment variable.

Both fields are required to create a valid environment parameter.

Action Buttons

The following actions are available at the bottom of the Creation Panel:

- **Cancel**
  Closes the Creation Panel without adding the environment parameter.
- **Add**
  Creates the environment parameter and attaches it to the microservice.

The environment variable becomes effective according to the microservice runtime behavior.

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Remove Environment Parameter

When one or more environment parameters already exist, the **Environment** feature brick provides a **Remove** function, represented by the **minus (–) icon**, to delete existing environment variables.

Remove Environment Parameter Action

To remove an environment parameter:

1. Select the environment parameter from the list.
2. Click the **minus (–) icon**.
3. A confirmation dialog is displayed to prevent accidental removal.

6.4.11. Microservice Priority Configuration

The **Priority** feature brick is used to define the scheduling priority of a microservice within the cluster.

Priority determines how the system allocates resources and schedules the microservice when cluster resources are constrained.

Priority – Quick View

The **Quick View** in the Priority feature brick displays the currently assigned priority level of the microservice.

This allows administrators to quickly identify the service's scheduling importance within the cluster.

Operation Panel – Priority Selection

When the **Priority** feature brick is selected, the **Operation Panel** displays a list of available priority levels.

Administrators can select one priority level to define how the microservice is scheduled relative to other workloads.

Priority Levels

The following priority levels are available:

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- **Critical**
  Highest priority level.
  Ensures maximum scheduling preference and resource allocation within the cluster.
- **High**
  High priority level.
  Receives scheduling preference over Medium, Low, and Background workloads.
- **Medium**
  Default priority level.
  Provides balanced resource allocation and scheduling behavior.
- **Low**
  Lower priority level.
  May experience scheduling delays when higher-priority workloads require resources.
- **Background**
  Lowest priority level.
  Runs only when cluster resources are available.

Applying Priority Settings

Select the desired priority level from the list to apply it to the microservice.

The selected priority takes effect immediately and influences future scheduling decisions.

6.4.12. Monitor Microservice Log

The **Log** feature brick is used to view runtime logs generated by a microservice.

Logs provide visibility into service startup, execution behavior, and runtime messages, helping administrators troubleshoot and verify service status.

Log Viewer

When the **Log** feature brick is selected, the **Operation Panel** displays the **Log Viewer**, which shows real-time and historical log output from the microservice.

Replica Selection

At the top of the Log Viewer, administrators can select a specific **Replica** from the drop-down list.

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This allows users to:

- View logs from an individual replica
- Compare behavior across different replicas in scaled deployments

Log Message Area

The **Log Message** area displays log output in chronological order, including:

- Container startup messages
- Runtime status information
- Application-level log output

Logs are displayed as plain text to reflect the original output generated by the container.

6.4.13. Microservice Events

The **Events** feature brick is used to view system-generated events and activity records related to a microservice.

Events provide a chronological record of important actions and state changes, helping administrators understand service behavior and operational history.

Operation Panel – Events Viewer

When the **Events** feature brick is selected, the **Operation Panel** displays the **Events Viewer**, which lists system events associated with the microservice.

Event Table

The Events Viewer presents event records in a tabular format with the following columns:

- **Time**
  Displays the timestamp when the event occurred.
- **Content**
  Describes the event message, such as container lifecycle changes, scaling actions, or system notifications.

Each row represents a single event generated by the system.

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6.4.14. Delete the Microservice

The **Microservice Deletion** feature allows administrators to permanently remove a microservice from an application.

This operation deletes the microservice and all associated runtime resources.
Once deleted, the microservice **cannot be recovered**.

Microservice Deletion – Quick View

The Microservice Deletion feature is located at the bottom of the microservice feature list.

It provides access to the delete operation for the selected microservice.

Initiating Microservice Deletion

To delete a microservice:

1. Navigate to the target microservice within an application.
2. Scroll to the **Microservice Deletion** section.
3. Click **Delete**.

Clicking **Delete** opens a deletion confirmation dialog to prevent accidental removal.

Deletion Confirmation Dialog

After selecting **Delete**, the system displays a confirmation dialog with a clear warning message.

The dialog informs the user that:

The microservice and all its contained data will be permanently deleted.

The deletion action cannot be undone.

Users should ensure all required data has been backed up before proceeding.

Final Confirmation (Type DELETE)

To proceed with deletion, the user must manually enter the following confirmation text:

DELETE

This additional confirmation step ensures that the user fully understands the impact of the operation.

The **Delete** button becomes available only after the correct confirmation text is entered.

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7. PROTECTION

The **Protection** main menu provides data protection and recovery features to help administrators safeguard system data and respond to data loss scenarios.

This section focuses on protecting stored data through snapshots and backups, enabling point-in-time recovery, long-term retention, and operational resilience.

7.1. Enable Snapshot

The **Snapshot** feature under the **Protection** main menu provides point-in-time data protection for volumes.

Snapshots allow administrators to capture the state of a volume at a specific moment, enabling fast recovery, rollback, and data inspection without interrupting normal operations.

7.1.1. Snapshot – Page Structure Overview

When **Snapshot** is selected from the Protection Feature Menu, the page is organized into two primary areas:

- **Side Menu (Volume List)**
  Used to select the target volume for snapshot management.
- **Operation Panel**
  Used to configure snapshot settings and manage snapshot records for the selected volume.

This layout guides users to first select a volume and then perform snapshot-related operations.

7.1.2. Volume Selection

The **Side Menu** displays a list of available volumes and their snapshot status.

For each volume, the following information is shown:

- **Volume Name**
- **Storage Pool**

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- **Snapshot Space Usage**
- **Last Snapshot Time**

Selecting a volume updates the snapshot management view in the Operation Panel.

7.1.3. Snapshot Management Views

After a volume is selected, snapshot management is performed through multiple views in the **Operation Panel**:

- **Settings**
  Used to configure snapshot behavior for the selected volume.
- **Snapshot List**
  Used to view and manage existing snapshot records.
- **Recycle Bin**
  Used to review, recover, or permanently delete removed snapshots.

Each view represents a different stage in the snapshot lifecycle.

7.1.4. Manage Snapshot Setting

When a volume is selected from the **Side Menu**, selecting **Settings** displays the **Snapshot Settings** in the **Operation Panel in default**.

The Operation Panel is used to configure snapshot behavior for the selected volume.

Volume Information

At the top of the Operation Panel, the system displays the selected volume information:

- **Volume Name / Storage Pool**
  Identifies the volume currently being configured.

Enable Snapshot

The **Enable Snapshot** toggle controls whether snapshot functionality is active for the selected volume.

- When enabled, the system allows snapshot creation according to the defined settings.

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- When disabled, snapshot creation is stopped for the volume.

Snapshot Space

The **Snapshot Space** section displays snapshot storage allocation and usage information.

It includes the following fields:

- **Snapshot Space**
  Displays the maximum snapshot space allocated to the volume.
- **Allocated Space**
  Displays the total snapshot space currently allocated.
- **Unallocated Space**
  Displays the remaining available snapshot space.

Extend Snapshot Space

Administrators can increase snapshot space by allocating additional capacity.

To extend snapshot space:

1. Enter the additional capacity in **GB**.
2. Click **Extend**.

The snapshot space is expanded immediately after confirmation.

Snapshot Lock

The **Snapshot Lock** option controls whether snapshots can be deleted and whether a password is required to unlock them.

- When enabled, snapshots are protected from deletion.
  Administrators can optionally set a **Snapshot Lock Password** to prevent unauthorized unlocking or modification.
  When a password is configured, it must be entered to disable the lock or delete snapshots.
- When disabled, snapshots can be removed according to retention and user actions, and no password verification is required.

Snapshot Retention

The **Snapshot Retention** section defines how snapshots are handled when the maximum snapshot limit is reached.

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Available retention policies include:

- **Stop when reach maximum**
  Stops creating new snapshots when the maximum limit is reached.
- **Replace the oldest one**
  Automatically deletes the oldest snapshot to allow new snapshots to be created.

Max Snapshot Limit

The **Max Snapshot Limit** field defines the maximum number of snapshots that can be retained for the selected volume.

Once the limit is reached, snapshot behavior follows the selected retention policy.

Schedule Settings

The **Schedule Settings** section allows administrators to configure automated snapshot schedules.

When scheduling is enabled, snapshots are created automatically based on the defined schedule.

7.1.5. Manage Snapshot List

The **Snapshot List** view allows administrators to review, manage, and perform operations on existing snapshots for a selected volume.

This view provides visibility into snapshot history and supports snapshot lifecycle operations such as creation, exposure, rollback, and deletion.

Snapshot List

When **Snapshot List** is selected, the Operation Panel displays all snapshot records associated with the selected volume.

Snapshot Table

The snapshot table lists snapshot records with the following columns:

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- **Name**
  Displays the snapshot name.
- **Size**
  Displays the snapshot size.
- **Created Time**
  Displays the timestamp when the snapshot was created.
- **Exposure**
  Indicates whether the snapshot is currently exposed.
  Possible states include *Enabled* or *Disabled*.

Each row represents a single snapshot record.

Snapshot Operations

The following actions are available at the top of the Snapshot List:

Create Snapshot

- **Create**
  Creates a new snapshot for the selected volume.

Snapshots are created immediately after confirmation and appear in the Snapshot List.

Expose Snapshot

- **Expose**
  Makes the selected snapshot accessible for external use, such as data inspection or recovery operations.

Rollback Snapshot

- **Rollback**
  Restores the selected volume to the state captured by the snapshot.

This operation replaces the current volume data with snapshot data and should be used with caution.

Move to Recycle Bin

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- **Move to Recycle Bin**
  Moves the selected snapshot to the Recycle Bin.

Snapshots moved to the Recycle Bin are no longer active but can be recovered until they are permanently deleted.

Snapshot Recycle Bin

The **Recycle Bin** view allows administrators to manage snapshots that have been deleted from the Snapshot List but are still temporarily retained by the system.

This view provides a safety mechanism to recover snapshots that were removed accidentally before they are permanently deleted.

Page Structure Overview

The Recycle Bin page is organized into two primary areas:

- **Side Menu (Volume List)**
  Used to select the target volume.
- **Operation Panel (Recycle Bin)**
  Displays deleted snapshot records and available recovery or deletion actions for the selected volume.

Users must select a volume from the Side Menu to view its recycle bin contents.

Recycle Bin – Operation Panel

When **Recycle Bin** is selected, the Operation Panel displays snapshots that have been moved to the recycle bin for the selected volume.

Recycle Bin Snapshot Table

The recycle bin snapshot table lists deleted snapshot records with the following columns:

- **Name**
  Displays the snapshot name.
- **Size**
  Displays the snapshot size.
- **Create Time**
  Displays the original snapshot creation time.

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- **Deleted Time**
  Displays the time when the snapshot was moved to the recycle bin.

Each row represents one deleted snapshot.

Recycle Bin Operations

The following actions are available at the top of the Recycle Bin view:

Restore Snapshot

- **Restore**
  Restores the selected snapshot from the recycle bin back to the Snapshot List.

After restoration, the snapshot becomes active again and can be managed from the Snapshot List.

Permanently Delete Snapshot

When **Permanently Delete** is selected in the Recycle Bin, the system displays a final confirmation dialog to prevent accidental and irreversible data loss.

This dialog requires explicit user confirmation before the snapshot is permanently deleted.

The confirmation dialog clearly states that the selected snapshot will be permanently removed.

The dialog includes the following warning message:

Deletion Warning
Informs the user that deleting the snapshot will permanently remove the selected snapshot and all related snapshot data, and that the operation cannot be undone.

Backup Reminder
Reminds the user to confirm that all necessary data has been backed up before proceeding.

To proceed with permanent deletion, the user is required to manually enter a confirmation text in the input field.

DELETE

Entering the correct text confirms that the user understands the scope and impact of the deletion.

This action deletes the snapshot and frees the associated snapshot space.
Once permanently deleted, the snapshot **cannot be recovered**.

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7.2. Mount Backup Server

The **Backup Server** feature under the **Protection** main menu is used to define and manage backup target servers.

A Backup Server represents a remote destination where backup data is stored.
Before creating any backup jobs, at least one Backup Server must be configured.

7.2.1. Create Backup Server

Selecting **Create** opens the **Backup Server Creation Panel**, which is used to define a new backup target.

The Creation Panel allows administrators to configure:

- Backup server name
- Network address and port
- Authentication credentials

All required fields must be completed before the backup server can be created.

After creation, the backup server becomes available for use in backup jobs.

Backup Server List

After one or more backup servers are created, the Backup Server page displays a list of configured backup servers.

The list provides the following information for each backup server:

- **Target Name**
  Displays the name of the backup server.
- **Status**
  Displays the current connection status of the backup server.
- **Address**
  Displays the IP address and port of the backup server.
- **User**
  Displays the user account used for authentication.

Administrators can select one or more backup servers from the list for management actions.

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Delete Backup Server

Administrators can remove backup server targets that are no longer required.

To delete a backup server:

1. Select one or more backup servers from the list.
2. Click **Delete**.
3. Confirm the deletion in the confirmation dialog.

Deleting a backup server removes the configuration from the system.

Delete Confirmation Dialog

Before deletion is completed, a confirmation dialog is displayed to prevent accidental removal.

The dialog asks the user to confirm deletion of the selected backup server targets.

- **Cancel**
  Cancels the deletion process.
- **Confirm**
  Deletes the selected backup server targets.

The deletion takes effect immediately after confirmation.

7.3. Manage the Backups

The **Backup & Restore** feature under the **Protection** main menu is used to protect data and recover it when needed.

This feature allows administrators to create backup tasks, store backup data on remote backup servers, and restore data from existing backups.

Backup & Restore covers the **entire data protection lifecycle**, including:

- Defining what data should be backed up
- Storing backup data on a backup server
- Restoring data from backups when recovery is required

Before using Backup & Restore, at least one **Backup Server** must be configured.

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7.3.1. Backup Task List

When selecting **Protection → Backup**, the system displays the **Backup Task List** in the Feature Panel.

This list shows all configured backup tasks.

If no backup tasks exist, the system displays:

No backup tasks are found.

Backup Task Information

Each backup task in the list displays the following information:

- **Task Name**
  Displays the name of the backup task.
- **Backup Type**
  Indicates whether the task is configured as **Backup System** or **Backup Service**.
- **Status**
  Displays the current status of the backup task.
- **Last Run Time**
  Displays the most recent execution time of the backup task.

Backup Task Actions

From the Backup Task List, administrators can perform the following actions:

- **Create Backup Task**
  Opens the Creation Panel to define a new backup task.
- **Delete**
  Removes the selected backup task from the system.

Create Backup Task (Creation Panel)

Creating a backup task is performed through a step-by-step Creation Panel.

The creation workflow consists of the following steps:

1. Select Backup Type
2. Task Information

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3. Select Services *(Backup Service only)*
4. Backup to Backup Server
5. Ready to Complete

Backup Types

Administrators can choose one of the following backup types:

- **Backup System**
  Protects system-level data for full system recovery.
- **Backup Service**
  Protects selected services for granular, service-level data protection.

Task Information

Administrators must specify a **Task Name** to identify the backup task.

The task name is required before proceeding to the next step.

Select Services (Backup Service Only)

When **Backup Service** is selected, administrators choose which microservices will be included in the backup.

Services are displayed in a hierarchical list organized by application.

Backup to Backup Server

Administrators select:

- A backup server
- A remote path on the backup server

Both selections are required to proceed.

Ready to Complete

The final step displays a read-only summary of the backup task configuration.

Administrators review all settings and click **Finish** to create the backup task.

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7.3.2. Restore from Backup Server

The **Restore from Backup Server** function allows administrators to recover data from existing backups.

This function uses a Creation Panel to guide administrators through the restore process.

Restore Workflow (Creation Panel)

The restore workflow consists of the following steps:

1. Select Backup Server
2. Select Path
3. Ready to Restore

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8. MONITOR

For more information for monitoring KSM device, please refer to the QSM4 software manual.

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9. ACCOUNT

For more information for creating accounts on KSM device, please refer to the QSM4 software manual.

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10. SYSTEM

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11. NOTIFICATION

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12. SUPPORT AND OTHER RESOURCES

12.1. Getting Technical Support

After installing your device, locate the serial number on the sticker located on the side of the chassis or from the **QSM** -> **System** -> **General** -> **Information** and use it to register your product at https://www.qsan.com/business_partnership. We recommend registering your product in QSAN partner website for firmware updates, document download, and latest news in eDM. To contact QSAN Support, please use the following information.

- Via the Web: https://www.qsan.com/technical_support
- Via Telephone: +886-2-77206355
- (Service hours: 09:30 - 18:00, Monday - Friday, UTC+8)
- Via Skype Chat, Skype ID: qsan.support
- (Service hours: 09:30 - 02:00, Monday - Friday, UTC+8, Summer time: 09:30 - 01:00)
- Via Email: support@qsan.com

Information to Collect

- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages or capture screenshots
- Product-specific reports and logs
- Add-on products or components installed
- Third-party products or components installed

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12.2. Documentation Feedback

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APPENDIX

Applies to

- KSM firmware 1.0.0 or later

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