Senju DevOperation Conductor 2016

Nomura Research Institute, Ltd.
Cloud Computing Service Division
Senju Family Roadmap

Senju / DC
Senju DevOperation Conductor
System Operation Management Products
System operation management tools with 20 years of performance

Senju / EN
Senju Enterprise Navigator
Enterprise Integrated Operation Management Products
Navigation of operation information focusing on "people"

Senju / SM
Senju Service Manager
Service Desk Products
Realizes operation processes in compliance with ITIL and ISO20000 (ITSMS)

Brand integration

SaaS services on AWS

Renewal of Web UI
Enhancement of job transition

Enhancement of ESP2 Self service

Collaboration with DevOps Global support Renewal of management UI

Start provision of SaaS version

Copyright(C) Nomura Research Institute, Ltd. All rights reserved.
List of Senju Family products

More than 40 years of know-how in system maintenance and operation at NRI are consolidated as “IT operation management products.”
Supports increased efficiency of operation in environments that include cloud technology and improved quality of IT services.
Overview of Senju DevOperation Conductor

Senju DevOperation Conductor is composed of shared functions and 5 sub-systems depending on the usage objective. Installation can be performed as necessary. Only the necessary detailed functions can be added as extensions. Function enhancement can be performed easily.

**Capacity**
- Accumulation of operation history
- Graph display (line, pie, bar, etc.)
- Display by day, week, and month
- History data output function
- Support for capacity planning / reporting
- Support for trend investigation / analysis during trouble

**Shared functions**
- Registration of management node
- Information management for managed resources
- Registration of user commands
- Registration of parameters
- Registration of calendar
- Registration of weekly schedule
- Remote maintenance of Senju Agent
- Registration of items
- Management of relation

**Job schedule**
- Automatic plan operation using a calendar
- Control of execution sequence for jobs/nets
- Operation status display for jobs/nets/frames
- Operations for jobs/nets/frames which are currently being executed
- Execution of jobs/nets/frames across several servers
- Specification of execution users/nodes via operating environment settings
- Setting of various triggers for starting jobs/nets
- Load balance function
- Execution of identical jobs on multiple nodes
- Accumulation of operation history
- Display of graphs/lists for operation history

**Configuration**
- Accumulation of configuration information
- Accumulation of Senju configuration management item
- Acquisition of file information
- Acquisition of file list information
- Accumulation of information via command execution
- Accumulation of SNMP items
- Accumulation of WMI information
- Accumulation of registry information
- Accumulation of event log information
- Change detection

**Event**
- Uniform management of messages
- Automatic actions for messages
- Automatic emails for messages
- Automatic telephone calls for messages
- Runbook automation (automatic execution of procedure manuals)
- Accumulation of log information
- Application response
- Message guide

**Monitoring**
- Monitoring of node alive
- Monitoring of system information
- Monitoring of disk capacity
- Monitoring of process operation status
- Monitoring of system detailed information
- Monitoring of web server
- Monitoring of DB server
- Monitoring of email server
- Monitoring of AP server
- Monitoring of ERP package
- Network monitoring
- Virtualization monitoring
- Cloud service monitoring
- Custom monitoring
- Log monitoring
- Trap collection
- Monitoring of threshold values by time period
Overview of Senju DevOperation Conductor

Easy operation via GUI
- Operation at an interface GUI screen where all functions are consolidated. Easy operation even by operators who are unfamiliar with the UNIX/Linux environment.

System for division of labor via multiple consoles
- System management can be performed from multiple operation management consoles.
- Realizes operation that considers division of labor for system administrators (person in charge of registration, change work, etc. of management targets) and operators (person in charge of operation and monitoring).

Integrated operation management from Senju Manager
- From a single Senju Manager, enables operation management for a server group of multiple business systems operated on the network.
- Performing intensive management from Senju Manager reduces the workload of administrators.

Operation management from diverse perspectives
- By using the Multi-Agent function, it is possible to independently operate multiple Senju Agent functions on a single server.
- Enables operation management which shifts the focus to individual business systems and divisions.

Realizes agentless monitoring
- Senju Sensor enables monitoring and job execution without the need to install agent software on the target server.
- Realizes smooth installation even at large-scale systems without affecting applications which are currently activated.

Configuration management via collection of configuration information
- Enables periodic acquisition of configuration information from the server targeted for management, and confirmation of the server configuration management and any changes that may have been made.

System relation management
- By defining IT devices and services which configure the system and by setting item relationships, it is possible to perform integrated management of configuration information for the entire system.
- In the event of trouble, enables fast identification of occurrence locations and the effected scope, as well as quick response.

Disclosure of information to System Maintenance Management Division
- Enables disclosure of system operation information to the System Maintenance Management Division via the web browser.
- When the person in charge of system maintenance management is investigating system trouble, enables remote investigation to be performed quickly.
System Configuration of Senju DevOperation Conductor

- Senju Offliser
  - Remote definitions by developers

- Senju Browser
  - Easy operation from the GUI screen
  - Division of labor via multiple consoles

- Senju Manager
  - Integrated operation management
  - Operation management from diverse perspectives
  - Monitoring of servers
  - Different models/OS/multi-vendors
  - Response for virtual environment
  - System relation management

- Senju Web Server
  - Management of virtual environment/cloud environment

- Senju Database Server
  - History information accumulated in database

- Senju Agent
  - Servers targeted for management

- Senju Sensor
  - Agentless monitoring using WMI/SNMP/TELNET/SSH, etc. (supports IPv6)

- DevOps portal
  - Reference/operation by using a web browser
  - Reference/operation from remote sites via smartphones

- Senju Configuration File Server
  - Collection and accumulation of configuration information files
Introduction of Main Sub-systems

Event
Introduction of Main Sub-systems

Event (Overview)

- Collects messages issued within the Senju system and performs uniform management of monitoring information.
- By setting actions for messages, enables automatic execution of actions for messages which match conditions.
- Also enables automatic execution of complex procedures.

Event overview

- Uniform management of messages
- Automatic actions for messages
- Automatic email for messages
- Automatic telephone calls for messages
- Automatic execution of procedures via runbook
- Accumulation of log information
- Application response
- Message guide

Senju Manager

- Administrator at remote site
  - Automatic emails for messages
  - Automatic telephone calls for messages
  - Provision of email template

Message action

- Automatic execution of actions

Runbook automation

- Automatic execution of procedures manual

Senju Browser

Senju Agent/Senju Sensor

- Automatic execution of procedures manual via runbook
- Automatic actions for messages
Introduction of Main Sub-systems

Event (Message)

Uniform management of messages

- Display of all monitoring information messages
- Messages are displayed in the 4 categories of “Normal messages,” “Warning messages,” “Trouble messages,” and “Response request messages.”

2016 New

Message customization

- Enables creation of new messages separate from existing messages, and modification of existing messages.
  - Message display: Specifies whether to display or hide on the message monitor.
  - Alarm: Specifies whether to sound the alarm when a message is output.
  - Automatic response: Automatically starts commands which have already been registered.
  - Display color of text and background: Specifies use of color-coding according to message type.
  - Send email: Sends the notified message via email.
Introduction of Main Sub-systems

Event (Message Send Command Extension)

Provides new extension message send command and extension message send API. With Senju Message, it is possible to send a maximum of 3,160 bytes of additional wording.

Even in the case of logs with long messages, display messages with all necessary information.

Log

Long filter

TRAP

Send messages with up to 3,160 bytes of given information.
**Event (Warning Level Message)**

In addition to “Normal” and “Trouble,” it is possible to specify “Warning” as a level for Senju Message.

**By setting events with a low level of importance as “Warning” level, reduce the risk of overlooking important trouble events.**

<table>
<thead>
<tr>
<th>Level</th>
<th>Explanation</th>
<th>Usage scene</th>
</tr>
</thead>
</table>
| Normal  | Notification is sent as a checkpoint during daily operation, but no measures are required. | ● Execute operation  
● Normal completion of the job                              |
| Warning | Notification is sent for a problem which requires response before trouble occurs, although it is not a highly urgent problem such as system failure. | ● Increase the disk usage amount  
● Increase the network usage amount  
● Discontinuation associated with job delay                     |
| Trouble | Notification is sent for a status in which a service/system does not function normally, or a situation which affects the function. | ● Server failure  
● Incorrect completion of the job                              |
Introduction of Main Sub-systems

Event (Automatic Response: Message Action)

**Message action**
- Identifies messages (events) which have occurred and automatically executes actions based on results of identification.
- Identification conditions (schedule, message ID, message level, node / node group, source process, message body)
- Action (send email: specify address/email template, telephone call, execute command, execute runbook)

**Send template email**
- Automatically assembles the environmental variables when sending an email.
- The message information which caused the action to be executed can also be specified as an environmental variable.

**Contact by telephone**
- Telephone calls are made automatically to contact groups which have been registered in advance.

**Execute runbook**
- Automatically execute runbook (procedures manual) in cooperation with the Runbook Automation function.

Rules for message identification:

Message (Event) → Identify

(For holidays) → Action (response)

(If XX is contained) → Action (response)
Introduction of Main Sub-systems

Event (Enhanced Judgment for Duplicate Message Actions)

For message actions which perform automatic execution based on message identification, provides a function for setting judgment of duplicates by number of times and judgment of duplicates by rules.

Suppresses burst of automatic commands which increase due to automated implementation.

I don’t have time to view a large number of similar alerts sent automatically by email!

It looks like the same rule has been violated multiple times. I’ll set up a team to investigate the situation later.

Only the first 2 instances are reported.

Duplicate Judgment
- No report required when duplicate judgment is reached 3 or more times within 10-minute intervals.
Introduction of Main Sub-systems

Event (Automatic Response: Runbook Automation)

- Automates direct-operation tasks (portions requiring human judgment) which are executed in accordance with procedure manuals. For example, diagnosis/recovery tasks during system failure, server maintenance and operation tasks, etc.
- Enables automatic execution from message actions, and manual execution or execution via commands from the Senju Browser.

Runbook automation (Extension)

- Execute an arbitrary command at the specified node.
- The execution node can also be specified in a virtual environment. Also enables flexible specification. For example, specification for the node which issues a message, at the time of book execution, etc.

Execute command

- The execution results (standard output) of the preceding section can be confirmed from the Senju Browser. The execution results file can also be used at the subsequent section.

Refer to execution results

- Even for agentless Senju Sensors, it is possible to connect and execute via ssh or telnet.

Sensor execution

- It is possible to branch the execution processing of subsequent sections based on the completion results of the preceding section.
- Completion code branching, standard output branching, environmental variable branching, schedule branching, manual branching

Branch section

System procedure manuals

Chapter

Section

Book

Procedures manual

Investigate

Make telephone call

df, grep commands

Combine and register

Refer to execution results

Sensor execution

Branch section

Completion code branching, standard output branching, environmental variable branching, schedule branching, manual branching

Refer to execution results
Introduction of Main Sub-systems

Event (Monitoring Information Acquisition Function: Runbook Automation)

Freely acquire monitoring information (values and status for each monitoring target) held by Senju/DC within runbook automation.

Automatically acquire Senju monitoring information, etc. through additional investigation at the time of trouble occurrence during runbook automation.

- I want monitoring information after a short amount of time has passed!
- The status returned to normal after 10 minutes passed, so it was just temporary consumption of resources. I’ll check the details tomorrow.

Possible to extract monitoring information held by Senju Manager
Introduction of Main Sub-systems

Event (Parallel Processing, Book Call: Runbook Automation)

Parallel chapter function

- Reduces operating time by specifying multiple sections for simultaneous startup and executing parallel processing.
- Via runbook, supports patterns in which similar procedures are executed by division among multiple operators.

Book link section

- At sections inside the executing book, calls another book and waits until startup/completion.
- Runbook can handle execution patterns in which a certain procedure refers to a different procedure. Not necessary to create a similar book.
Introduction of Main Sub-systems

Event (VMware Virtual Machine Deploy Command)

Deploy a virtual machine from the VMware template
Via vCenterServer, it is possible to deploy (change settings for) a virtual machine from the VMware template. Utilizes without modification “vSphere SDK for Perl,” which is used in the existing virtualization function.

- Detailed changes to settings can be made.
- Differences for each template are absorbed via switching of setting file parameters.
- Execute deployment via a uniform method from a single command.
- No special settings required for template (only installation of VMware Tools).
Introduction of Main Sub-systems

Event (Auto Scale)

Automatic registration of Senju Agent and Senju Sensor through combination with runbook automation

Automatically start operation using Senju via runbook automation

To start operation, I have to install the Senju Agent and perform registration!

I have to assign a responsible staff member...

I have to wait for the development staff to complete the release, so I can’t start work for operation!

I’m going to add 3 virtual machines in a new system.

I want operation to start tomorrow.

Everything can be handled by using a virtual machine template.

I don’t need to assign a staff member.

Operation starts automatically once the release is complete and the machine has been restarted.
Introduction of Main Sub-systems

Event (Auto Scale)

**Automatic registration of nodes**

- Machine image is copied; automatically registered as a management-target node when the OS is started.
- Registration/deletion as a management-target node is possible simply by executing the command at the management-target node.
- Reduces the load of initial configuration for cloud and virtual machine environments.
- Also supports operation in which authority for infrastructure staff and operation staff is separated due to internal controls.

1. Copy image, start machine.
2. Start the Senju Agent and the node registration command is automatically executed only when performing initial startup.
3. Accept node registration command, start runbook, create node definition.
4. Set node properties in runbook, update (node definition), execute update (monitoring attributes).
5. Start monitoring as a management-target node.

Book definitions are prepared in advance.
Introduction of Main Sub-systems

Monitoring
Introduction of Main Sub-systems

Monitoring (Overview)

- Monitoring of system information
- Disk management
- Monitoring of process
- Detailed information monitoring
- Monitoring of web server
- Monitoring of DB server
- Monitoring of email server
- Monitoring of AP server
- Monitoring of ERP package
- Network monitoring
- Custom monitoring
- Virtualization monitoring
- Cloud service monitoring
- Log monitoring
- Trap collection
- Monitoring of time period
- Automatic operation
- Monitoring of threshold values by time period

Overview of monitoring

- Monitoring of system information
- Disk management
- Monitoring of process
- Detailed information monitoring
- Monitoring of web server
- Monitoring of DB server
- Monitoring of email server
- Monitoring of AP server
- Monitoring of ERP package
- Network monitoring
- Custom monitoring
- Virtualization monitoring
- Cloud service monitoring
- Log monitoring
- Trap collection
- Monitoring of time period
- Automatic operation
- Monitoring of threshold values by time period

Increases the monitoring efficiency for integrated monitoring/control business systems and enables stable operation for the multiple servers on the network and for application groups operated on the server.
Monitoring (Monitoring Settings, Monitoring Console)

### Monitoring settings

- Set items to be monitored, "warning threshold values," monitoring schedules, etc.
- In addition to notifying on the message monitor, settings can also be specified to send email notifications and execute commands when trouble is detected.
- For when Telnet/SSH is used to perform monitoring and when omitting all parameters for connection information of the monitoring task, added a function to perform monitoring by using connection settings information for the specified node.
  (When copying monitoring settings to multiple nodes, it is no longer necessary to change connection information for all monitoring tasks for each node. This makes it possible to efficiently specify settings for monitoring.)

### Global node monitor

- Summarizes and lists the operation status for multiple nodes.
- Displayed by level (currently operating—normal, currently operating—error, stopped, not being monitored).
- List contents can be written to a file and sent by email.
- If a virtual machine is used for the Senju Sensor or Senju Agent, it is possible to refer to information of the virtual server host which is being operated by that virtual machine.
- For the node of a virtual server host, refer to the virtual server information which is operated by that host.

### Node monitor

- Display detailed information for nodes which are currently operating.
- In addition to system information, disk, process, and detailed information, the displayed monitoring information also includes the extension function (Extension) customization and log monitoring.
- List contents can be written to a file and sent by email.
Introduction of Main Sub-systems

Monitoring (Log Monitoring/Event Log Monitoring)

Use advanced filter settings to monitor the text logs and event logs which are output by the application and OS.

Also supports agentless monitoring.

Filter items for log monitoring/event log monitoring

- For the log monitoring filter, provides a wide range of functions which support various formats.
- (extension of target fields, enhancement of division settings, segmentation of regular expression targets, easy settings for conditions, etc.)

Filter switch function for log monitoring/event log monitoring

- From the command line, immediately switch the filter used for log monitoring.

For a variety of application logs, enables extraction and monitoring for only the required information using the log filter.
**Introduction of Main Sub-systems**

**Monitoring (Log Monitoring Origin Conversion, Support for Extended Regular Expressions)**

---

### Log monitoring origin node conversion

- Treat the specified column within the log file as a node ID, replace with the Senju Message origin node ID, and send the message.

#### Monitoring target log file

<table>
<thead>
<tr>
<th>1st column</th>
<th>2nd column</th>
<th>3rd column</th>
</tr>
</thead>
<tbody>
<tr>
<td>000001</td>
<td>Network is down</td>
<td>Server A</td>
</tr>
<tr>
<td>000002</td>
<td>Network is down</td>
<td>Server B</td>
</tr>
<tr>
<td>000003</td>
<td>Network is Up</td>
<td>Server A</td>
</tr>
</tbody>
</table>

---

### Support for extended regular expressions

- In addition to basic regular expressions for log monitoring, message actions, etc., also supports extended regular expressions.
- Enable correct judgment for target character strings which include multi-byte characters.
Introduction of Main Sub-systems

Monitoring (Warning Status/Setting of Warning Threshold Values)

Added a “Warning” status to the monitoring task and added a function for setting the warning threshold value in the monitoring definition. For 1 monitoring task, enables monitoring using 2 levels.

2 levels of monitoring can be performed depending on the level of urgency and the necessity of response.
Introduction of Main Sub-systems

Monitoring (Support for Virtualization)

Virtualization monitoring (Extension)
- Monitoring of resource information for the virtual server host and virtual machine of VMware and Hyper-V (CPU utilization of ESX server host, memory utilization of virtual machine, etc.)
- Monitoring results are displayed on the global node monitor/node monitor, and a message is sent in the event of trouble.

Immediate acquisition of virtual platform relation information
- Enables updating of managed information to the latest information via operation of the Senju Browser.
- Enables immediate confirmation for any changes to the link between the virtual server and virtual machine (for example, live migration, etc.)

Refer to virtual information at the global node monitor
- At the global node monitor, refer to information of the virtual server host on which the virtual machine is operating.
- For the node of a virtual server host, enables reference to the virtual server information which is operated by that host.
- In the event of trouble at the virtual platform, the scope of effect can be ascertained immediately at the global node monitor.
- Even more detailed judgment is possible at the node monitor.
Introduction of Main Sub-systems

Monitoring (Support for Virtualization)

Virtual node monitor (virtual platform relation management)

- Manage the relationship between the host OS and guest OS for each component.
- For VMware and Hyper-V, displays a view which enables comprehensive management of the operation status and relationship between components configuring the virtual platform (data store, network adapter, virtual machine, etc.) and the Senju Agent/Sensor.
- Display can be performed including the data stores which configure the virtual platform and the nodes related to the network adapter. Supports judgment of which virtual servers are affected by trouble such as insufficient available space in the data store or physical trouble in the network adapter.

From the node at which the trouble message occurred, enables detailed refinement via resource pools, data stores, networks, etc.
# Introduction of Main Sub-systems

## Monitoring

(List of VMware Virtualization Environment Monitoring Items/Management Commands)

<table>
<thead>
<tr>
<th>VMware Monitoring Items</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESX Server CPU utilization rate (%)</td>
<td>Monitoring of CPU load for ESX server hosts</td>
</tr>
<tr>
<td>ESX Server memory utilization rate (%)</td>
<td>Monitoring of memory utilization status for ESX server host</td>
</tr>
<tr>
<td>Memory capacity used by ESX Server vmkernel (KB)</td>
<td>Monitoring of memory capacity used by vmkernel of ESX server host</td>
</tr>
<tr>
<td>ESX Server disk command wait time (milliseconds)</td>
<td>Monitoring of average command wait time from the guest OS in the ESX server host</td>
</tr>
<tr>
<td>ESX Server network utilization rate (KBps)</td>
<td>Monitoring of network utilization rate (total amount of all NIC sent/received data) of ESX server host</td>
</tr>
<tr>
<td>Virtual machine CPU utilization rate (%)</td>
<td>Monitoring of CPU load for virtual machine</td>
</tr>
<tr>
<td>Virtual machine memory utilization rate (KB)</td>
<td>Monitoring of memory utilization status for virtual machine</td>
</tr>
<tr>
<td>Virtual machine disk command wait time (milliseconds)</td>
<td>Monitoring of average command wait time from virtual machine</td>
</tr>
<tr>
<td>Virtual machine network utilization rate (KBps)</td>
<td>Monitoring of network utilization rate (total amount of all NIC sent/received data) of virtual machine</td>
</tr>
<tr>
<td>Number of heartbeats for virtual machine</td>
<td>Monitoring of number of system heartbeats for virtual machine</td>
</tr>
<tr>
<td>Resource pool CPU utilization amount (MHz)</td>
<td>Monitoring of CPU load for resource pool</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monitoring Items</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource pool memory utilization rate (%)</td>
<td>Monitoring of memory utilization status for resource pool</td>
</tr>
<tr>
<td>Data store utilization rate</td>
<td>Monitoring of utilization status for data store</td>
</tr>
<tr>
<td>Available data store capacity</td>
<td>Monitoring of usable capacity for data store</td>
</tr>
<tr>
<td>Number of disk I/O bytes for ESX Server (KBps)</td>
<td>Monitoring of disk I/O for ESX server host</td>
</tr>
<tr>
<td>Number of received bytes for ESX Server network (KBps)</td>
<td>Monitoring of data amount received by the network interface of the ESX server host</td>
</tr>
<tr>
<td>Number of sent bytes for ESX Server network (KBps)</td>
<td>Monitoring of data amount sent by the network interface of the ESX server host</td>
</tr>
<tr>
<td>Number of disk I/O bytes for virtual machine (KBps)</td>
<td>Monitoring of disk I/O for virtual machine</td>
</tr>
<tr>
<td>Number of received bytes for virtual machine (KBps)</td>
<td>Monitoring of data amount received by the network interface of the virtual machine</td>
</tr>
<tr>
<td>Number of sent bytes for virtual machine (KBps)</td>
<td>Monitoring of data amount sent by the network interface of the virtual machine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VMware Control Commands</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore virtual machine snapshot</td>
<td>Restore certain snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Create list of virtual machine snapshots</td>
<td>Display list of snapshots for a specified virtual machine.</td>
</tr>
<tr>
<td>Shift to online virtual machine</td>
<td>During execution of an action, dynamically re-register a virtual machine which has been registered to a specified ESX server host to a different ESX server.</td>
</tr>
<tr>
<td>Delete virtual machine snapshot</td>
<td>Delete certain snapshot or descendant snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Restore virtual machine current snapshot</td>
<td>Restore current snapshot of a specified virtual machine.</td>
</tr>
<tr>
<td>Start virtual machine</td>
<td>Turn on power for a virtual machine which has been registered to a specified ESX server host.</td>
</tr>
<tr>
<td>Stop virtual machine</td>
<td>Turn off power for a virtual machine which has been registered to a specified ESX server host.</td>
</tr>
<tr>
<td>Create virtual machine snapshot</td>
<td>Create snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Restore virtual machine snapshot</td>
<td>Restore snapshot for a specified virtual machine.</td>
</tr>
</tbody>
</table>
### Introduction of Main Sub-systems

**Monitoring**

(List of Hyper-V Virtualization Environment Monitoring Items/Management Commands)

<table>
<thead>
<tr>
<th>Hyper-V Monitoring Items</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host CPU utilization rate</td>
<td>Monitoring of load for host CPU (Hypervisor CPU and guest OS CPU)</td>
</tr>
<tr>
<td>Hypervisor CPU utilization rate</td>
<td>Monitoring of load for Hypervisor CPU</td>
</tr>
<tr>
<td>Parent partition CPU utilization rate</td>
<td>Monitoring of load for parent partition CPU (parent partition Hypervisor CPU and parent partition guest OS CPU)</td>
</tr>
<tr>
<td>Virtual machine CPU utilization rate</td>
<td>Monitoring of load for virtual machine CPU (virtual machine Hypervisor CPU and virtual machine guest OS CPU)</td>
</tr>
<tr>
<td>Virtual machine health status</td>
<td>Monitoring of virtual machine health status</td>
</tr>
<tr>
<td>Number of read bytes for memory device of virtual machine</td>
<td>Monitoring of number of read bytes for memory device of virtual machine</td>
</tr>
<tr>
<td>Number of written bytes for memory device of virtual machine</td>
<td>Monitoring of number of written bytes for memory device of virtual machine</td>
</tr>
<tr>
<td>Virtual network adapter utilization amount</td>
<td>Monitoring of virtual network adapter utilization amount</td>
</tr>
<tr>
<td>Virtual switch utilization amount</td>
<td>Monitoring of virtual switch utilization amount</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyper-V Control Commands</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refer to list of virtual machine snapshots</td>
<td>Restore the latest snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Create virtual machine snapshot</td>
<td>Create snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Restore virtual machine snapshot</td>
<td>Delete snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Restore virtual machine snapshot (latest)</td>
<td>Restore snapshot for a specified virtual machine.</td>
</tr>
<tr>
<td>Delete virtual machine snapshot</td>
<td>Refer to list of snapshots for a specified virtual machine.</td>
</tr>
<tr>
<td>Start virtual machine</td>
<td>Refer to virtual switch list of specified HyperV Server.</td>
</tr>
<tr>
<td>Shutdown virtual machine</td>
<td>Refer to list of virtual network adapters for a specified HyperV Server.</td>
</tr>
<tr>
<td>Acquire list of virtual machines</td>
<td>Shutdown all virtual machines which satisfy the specified conditions.</td>
</tr>
<tr>
<td>Acquire list of virtual network adapters</td>
<td>Start all virtual machines which satisfy the specified conditions.</td>
</tr>
<tr>
<td>Acquire list of virtual switches</td>
<td>Refer to virtual machine list of specified HyperV Server.</td>
</tr>
<tr>
<td>Temporarily stop virtual machine</td>
<td></td>
</tr>
</tbody>
</table>
Introduction of Main Sub-systems

Monitoring (List of Virtualization Environment Monitoring Items/Management Commands)

- VMware: Resource pool memory consumption amount (KB)
- VMware: Resource pool data store utilization rate (%)
- VMware: Resource pool data store utilization amount (GB)

- VMware: Temporarily stop virtual machine
- Hyper-V: Temporarily stop virtual machine
Introduction of Main Sub-systems Monitoring
(List of Cloud Services [AWS Monitoring] and Management Commands)

Supports tag specification for Amazon Web Services monitoring
For monitoring items which monitor information of EC2 and EBS for Amazon Web Services, it is possible to monitor only information of tagged instances by specifying tags as parameters.

Supports Assume Role for Amazon Web Services monitoring
For monitoring items which monitor information of Amazon Web Services, Assume Role can be used to monitor instance information of different accounts from the management account.

Support for profile of Amazon Web Services monitoring
For monitoring items which monitor information of Amazon Web Services, by specifying profiles, monitoring can be performed using connection information based on profiles.

<table>
<thead>
<tr>
<th>AWS Monitoring Items</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWS: EC2 CPU utilization rate (%)</td>
<td>Monitoring of CPU load for EC2 instance</td>
</tr>
<tr>
<td>AWS: Number of read bytes for EC2 disk (KB)</td>
<td>Monitoring of reading amount for EC2 instance disk</td>
</tr>
<tr>
<td>AWS: Number of written bytes for EC2 disk (KB)</td>
<td>Monitoring of writing amount for EC2 instance disk</td>
</tr>
<tr>
<td>AWS: Number of disk processed readings for EC2 (/secs)</td>
<td>Monitoring of number of disk processed readings per 1 second for EC2 instance</td>
</tr>
<tr>
<td>AWS: Number of processed writings for EC2 disk (/secs)</td>
<td>Monitoring of number of disk processed writings per 1 second for EC2 instance</td>
</tr>
<tr>
<td>AWS: Number of received bytes for EC2 network (KB)</td>
<td>Monitoring of CPU load for EC2 instance</td>
</tr>
<tr>
<td>AWS: EC2 CPU utilization rate (%)</td>
<td>Monitoring of reading amount for EC2 instance disk</td>
</tr>
<tr>
<td>AWS: Number of read bytes for EC2 disk (KB)</td>
<td>Monitoring of writing amount for EC2 instance disk</td>
</tr>
<tr>
<td>AWS: Number of written bytes for EC2 disk (KB)</td>
<td>Monitoring of number of disk processed readings per 1 second for EC2 instance</td>
</tr>
</tbody>
</table>

* A large number of other monitoring items for AWS monitoring are also available. For details, refer to the attached list of monitoring items.
**Introduction of Main Sub-systems**

**Monitoring (Cloud Support)**

**Operation support in hybrid cloud environment**
- Through various combinations of on-premise/AWS, supports the operation of components for Senju DevOperation Conductor.
- Enables operation in freely assembled environments, without restrictions associated with on-premise or cloud.

**AWS monitoring**
- Added monitoring items which monitor resource information of Amazon Web Services.
- Integrated monitoring of on-premise/cloud servers and service operation status.
- Enables AWS resource monitoring through combinations with functions such as message actions, capacity, etc.

**Usage Case 1**
*Email notification sent when the monthly AWS usage fees exceed a certain amount.*

**Usage Case 2**
*Refer to a graph showing the resource history for EC2 instances.*

---

Copyright(C) Nomura Research Institute, Ltd. All rights reserved.
Introduction of Main Sub-systems

**Monitoring (IT Relation Management)**

**Issues with virtual platforms**

- In the case of a virtual platform, the same platform is used by multiple users.
- Large scope of effect in the event of trouble.

Not possible to link the application and subordinate platform information; the effect on service is unclear.

**Overview of “IT relation management” function**

- Set elements (services, middleware, OS, network devices, etc.) as items with a hierarchical relationship.
- Easily assess the superior/subordinate relationship for each item, and quickly identify the causes and scope of effect in the event of trouble.
- Automatic configuration of relationships and configuration information in virtual environments. Latest information can be used to confirm virtual environments which change dynamically.

- Possible to manage only the scope which you are provided.
- Establish relationships for information from the managed services to the OS.
- Link between status and relationship display of each item.
- Filtering by system.

Batch display of monitoring status, job execution results, and configuration information.

The relationship between the OS and HW changes dynamically in a virtual environment. Management of configuration usage and physical information is complex.

Integrated management of entire cloud environment by establishing relationships from the virtual machine to data center information.
Introduction of Main Sub-systems

Monitoring (IT Relation Management)

Confirm information from relation monitor

- When specifying a relation definition from the relation monitor, from that definition, it is possible to check the occurrence of trouble messages, the progress of the job schedule, etc. for the actual relation tree and its selected configuration items.
Introduction of Main Sub-systems

Monitoring (Trap Collection)

Trap collection (Extension)

- Collect traps from each node via the SNMP collector (Senju Agent).
- Ascertain the device status by analyzing/monitoring the collected trap information.
- Ascertain device information by converting/analyzing/monitoring the character code for collected trap information.

Use the accumulated log files to set trap monitoring.
## Introduction of Main Sub-systems

### Monitoring (Main Monitoring Items)
*For details, refer to the monitoring item list*

<table>
<thead>
<tr>
<th>Monitoring items (Base)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring of system information</td>
<td>Monitoring of utilization rate for CPU and virtual memory, monitoring for resources of the operating process number</td>
</tr>
<tr>
<td>Monitoring of disk</td>
<td>Monitoring of disk utilization rate, utilization amount, and available space</td>
</tr>
<tr>
<td>Monitoring of process</td>
<td>Monitoring of resource utilization status, error stoppage, etc. for processes of applications and middleware being operated on the system</td>
</tr>
</tbody>
</table>
| Monitoring of detailed information | - Physical memory utilization rate  
|                                  | - CPU utilization rate/memory utilization amount for each parent process  
|                                  | - CPU utilization rate/memory utilization amount by n superior processes  
|                                  | - Operation status of Windows services  
|                                  | - Number of processes and threads awaiting execution  
|                                  | - File  
|                                  | - Disk I/O status  
|                                  | - Monitoring of number of operations for processes with the same name  
|                                  | - Status of time alteration required for command execution  
|                                  | - System port operation status |
| Monitoring of network           | Monitoring of packet reachability and response time using ICMP; network monitoring such as information related to sending/receiving data using SNMP |
| Monitoring of customization     | User monitors information by creating arbitrary monitoring items using commands, WMI, SNMP, JMX, etc. |
| Monitoring of log               | Monitoring of Windows event log and text-format log files which are created by other applications on the management-target node |
| Monitoring of time period       | Using the time period monitoring function, define the monitoring schedule for the management-target node by day and time period, and then monitor |
| Monitoring of threshold values by time period | For each monitoring item, automatically switch the stop/start of monitoring for each time period, change the threshold value, and change the inspection interval |

<table>
<thead>
<tr>
<th>Monitoring items (Extension)</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring of web server</td>
<td>Monitoring of web servers, including confirmation of URL response/URL response time, monitoring of Apache, monitoring of IIS, etc.</td>
</tr>
<tr>
<td>Monitoring of DB server</td>
<td>Monitoring of database servers for Oracle, SQL Server, DB2 UDB, and PostgreSQL</td>
</tr>
<tr>
<td>Monitoring of email server</td>
<td>Monitoring of time required for response confirmation at ports and sending/receiving email for SMTP, POP3, IMAP; monitoring of email server for Exchange Server</td>
</tr>
<tr>
<td>Monitoring of AP server</td>
<td>Monitoring of application servers for WebLogic, WebSphere, JBoss, .and NET Framework</td>
</tr>
<tr>
<td>Monitoring of ERP package</td>
<td>Monitoring of mySAP</td>
</tr>
<tr>
<td>Virtualization monitoring</td>
<td>Monitoring of VMware/ Hyper-V</td>
</tr>
<tr>
<td>Trap collection (SNMP collector)</td>
<td>Trap information is collected from the management-target node by the Senju Agent which has been specified as an SNMP collector.</td>
</tr>
</tbody>
</table>
Introduction of Main Sub-systems

Monitoring (Enhancement of URL Response Monitoring, OS Operation Date Monitoring)

Enhancement of URL Response Monitoring

- For the response code from the connection destination web server, enables judgment as normal using an arbitrary number.

Support for OS Operation Date Monitoring

- Added a monitoring item for judging the status based on the number of days of OS operation.
Introduction of Main Sub-systems

Job schedule
Introduction of Main Sub-systems

Job Schedule (Overview)

Overview of job schedule

- Performs uniform management of jobs operated by the business system and controls execution.
- Enables planned operation of jobs by creating a calendar with defined operation dates.

Senju Manager
- Planned operation using a calendar
- Monitoring from a work flow perspective
- Control of execution sequence
- Provide jobs for controlling jobs/nets

Senju Browser
- Display operation status
- Operations for jobs/nets/frames currently being executed
- Refer to operation history
- Use job checker to check the effect

Senju Agent
- Execute jobs/nets which span multiple nodes

Senju Agent
- Job execution at agentless Senju Sensors

Senju Sensor
- TELNET
- SSH
- Agentless

Probe
Introduction of Main Sub-systems

Job Schedule (Flexible Job Scheduling)

Monitoring of delays
- Enables flexible monitoring of delays, including start/stop time, required time, etc.

Start conditions
- Flexible settings such as calendars, triggers, time specifications, resources, etc.
- Depending on the completion code, it is possible to branch by judging starting/skipping for subsequent nets
- Possible to set the conditions “XX or greater,” “greater than XX,” “smaller than XX,” “equal to XX,” or “different than XX” as judgment conditions for the job completion threshold value
- By using the job start command, possible to apply environmental variables and start

Branch net during errors
- Automatic recovery at time of error completion

Operating day calendar
- Calendar for specifying business days and non-business days for each day

Specification of start time
- Function for starting jobs/nets at the specified time.
- Even when start conditions (other previous jobs/nets, triggers, etc.) have already been satisfied, the target jobs and nets are not started until the specified time.

Business day calendar
- Calendar for specifying business days and non-business days for each day

Automatic monitoring of delays
- Past operating results used in automatic detection of delays for long-run jobs
- If the start time for jobs/nets waiting to be skipped has been delayed, a message is sent to notify that the jobs/nets have not been skipped
- When a job delay has been detected via monitoring for delays, it is possible to automatically execute actions for that job and subsequent jobs

Monitoring of required time
- Monitoring to check that the job, net, or frame has been completed within the specified required time. When not completed, a trouble message is sent.
- Possible to enhance monitoring of required time for repeat nets, and to set monitoring for each repeat

Copyright(C) Nomura Research Institute, Ltd. All rights reserved.
Introduction of Main Sub-systems

Job Schedule (Server Virtualization, Configuration Management, Change History)

Operating environment

- Possible to create virtual groups of nodes and to perform load balancing for jobs
- By specifying the node group, automatic allocation is performed so that the number of operating jobs within groups is equal
- By specifying the probe (Senju Agent), it is possible to execute jobs at Senju Sensor

Create list of related items

- Ascertaining the scope of effect due to definition data which has not yet been used and to configuration changes
- Added a function for jumping from the related items list screen to a copy of the target item and to the target item

Confirm update history for job definitions

- Possible to track the change history for definitions

Confirm operation information

- Possible to track invalid/mistaken information for operation

Create list of job operation dates and list of job differences

- Load data from the job operation date list into spreadsheet software and create a list.
- Create a list of differences for two dates specified from the definition data.
Job Schedule (Operation Control)

**Resource**
- Defined to control operation of jobs and nets
- By waiting until resources can be acquired when starting jobs and nets, control jobs and nets which operate exclusively or simultaneously
- Possible to change consumption values for each resources in jobs and nets. Also, within the maximum value for resources, possible to make multiple jobs and nets acquire resources before starting

**Commands during normal completion/commands during errors**
- Start the specified command when the frame, net, or job is completed normally, or when an error occur

**Automatic skipping during an error/automatic re-running during an error**
- When a job ends in an error, this function is used to automatically skip the job and end the operation, or to automatically re-run the job

**File wait trigger**
- Trigger for which start conditions are satisfied (trigger which turns on) when a certain file has been generated
- Used in cases such as when you want to start the subsequent job/net after file generation
- For file wait triggers, a regular expression can be used to specify a file

**Event wait trigger**
- Trigger which waits to start the subsequent job/net until the trigger send command has been issued
- Used in cases such as when you want to start the subsequent job/net after a specific event has been issued

**Frame relation trigger**
- Trigger for which start conditions are satisfied (trigger which turns on) when a certain frame/net/job has been completed normally (or has been skipped and completed).
- Used in cases such as when you want to start the subsequent job/net after a different frame/net/job has been completed normally (or has been skipped and completed).
Introduction of Main Sub-systems

Job Schedule (Enhancement of Trigger Function)

**Function for associating event wait/file wait triggers**
- Preceding frames/nets/jobs can be associated with the trigger definition and jumping is possible from the link source display.
- Clarifies the related job net and the preceding relationship, and improves the efficiency of job operation management.

**Function for related trigger reference from the link source job/net**
- At job editor, possible to refer to trigger information used as the link destination from the job net.
- A warning can be displayed when deleting a job net definition. This prevents accidents in which the link destination trigger does not turn on.

**Function for checking the trigger reference destination**
- Added a presence check function for the job net definition which is set in the trigger reference destination.

**Enhanced function for trigger detection**
- At job editor, detect triggers used in the net from the run chart.

Similar to frame relation triggers, it is possible to set event wait triggers and file wait triggers in the preceding job. Visualization of preceding relationships which cannot be seen.

Display a list of triggers which refer to below the frame/net/job.
Introduction of Main Sub-systems

Job Schedule (Create Job, Schedule)

Job editor
- Function for visual confirmation and creation of job, net, and trigger configuration.
- Even complex nets can be easily edited on the visual screen.

Automatic cycle operation
- Automatically executes a series of daily tasks.
- The automatic cycle operation check function automatically checks at fixed intervals whether or not the automatic cycle operation is functioning properly. A trouble message is sent if scheduling has not been performed properly or if the required processing is not performed at the specified time.

Net definition effective date
- Enables creation of multiple nets which have the same name but different definition effective dates.
- The operated net definition can be changed by setting the definition effective date.

Execution system creation check
- Displays the number of jobs/nets within 1 frame in the check results. If the upper limit has been exceeded and it is not possible to create an execution system, a warning is displayed.
- Enables advance response prior to errors in the execution system.

Job checker
- Performs an operation test for the registered job/net/frame. Prevents definitions mistakes and other errors during actual operation.
- Uses color-coding to display subsequent jobs/nets which are affected by changes to the start/finish time and execution time. Enables visual confirmation of the influence path.
- Estimates the predicted start/finish time based on past operation performance and displays the estimate.
Introduction of Main Sub-systems

Job Schedule (Ascertain Job Operation Status)

Job monitor
- The operation status is graphically displayed and the status can be ascertained at a single glance.

Job service
- The job operation monitoring results are displayed in lists for each service group.
- Enables monitoring from the perspective of work flow/service, and makes it easy to ascertain the scope of affected work in the event of trouble.

Job report (Extension)
- Makes it possible to accumulate job operation performance and refer to operation history.
- Increases the efficiency of comparison with past operation performance and identifies bottleneck processing.
- The accumulation of operation performance makes it possible to output files as a list and supports the creation of reports.
Introduction of Main Sub-systems

Job Schedule (Display Timeline)

In a timeline format, display the operation performance for a specified operation date and the current status of a certain frame.

Job monitor extension

- Added a timeline display field to job monitor.
  Compare operation history information for the current operation date and a past operation date.

Job activity

- For two specified past operation dates, compare the operation history information for frames/nets/jobs.
- The activity information written at the Senju Browser can be displayed at Senju Officer.

Job monitor screen

For nets/jobs of the run chart, displays past performance and current status in chronological order.

Job activity screen

Refine the display target by selecting display conditions (comparison and delayed completion, long running, etc.)
Introduction of Main Sub-systems

Job Schedule (Action Mode Switch, Recovery Action Skip)

Function for switching job action mode
- Added a mode switch function for switching actions of the entire job schedule. When the production environment definition is synchronized with a DR environment or comprehensive test environment, it is not necessary to change settings due to environmental differences.

Switching for skip processing and automatic cycle operation
- Use environmental variable settings for batch switching of on/off for job net skipping and on/off for automatic cycle operation.

Function to skip recovery action
- Added an action mode to skip job recovery processing of Senju Manager. Skips communication retry processing at the time of large-scale trouble such as stoppage of multiple agents and restores Senju Manager as fast as possible. Makes it possible to quickly confirm the job status at the time of trouble and improves the speed of recovery from trouble.

Improvement of recovery processing function
- Made improvements to realize recovery of job status which had been excluded from the recovery target, and made improvements to match the status before/after recovery.

The DR environment definition can be exactly the same as the production environment, so synchronization is easy.

During execution, enables definition for operating in the production environment and skipping in the DR environment.
Job Schedule (Job Condition Branching)

Function for job condition branching

- Added a function for branching based on start/skip judgment for the subsequent net depending on the job completion code.

Makes it easier to understand a correspondence between job flow design and run chart definition. Also makes it possible to visually ascertain what processing has been performed.

When the subsequently executed content of job configuration varies due to the preceding processing.

Branched job design can also be specified as a Senju definition, and the processing flow is visualized.

File creation processing → Branching

- rc=0: File loading processing net
- rc=1: Net for 0 item notification
- rc=9: Recovery processing net

Senju Browser run chart definition
Job Schedule (Actions at Time of Job Delay)

Function for action at time of job delay

- Added a function to automatically execute actions for a job and subsequent jobs when a job delay has been detected via monitoring for delays.

When a delay has occurred, if you want to skip processing for a certain job, delay monitoring settings can be used to forcibly stop that job and activate a subsequent job.

Conventional job operation

When a delay occurs, it is necessary for the person in charge to perform operations or create operations.

Job operation in Senju/DC 2016

By defining actions at the time of delay, it is possible to discontinue processing or forcibly start processing at the time of delay.

- DB back up processing
- DB restart processing
- Start online service
- Operation
  - Forced stop
  - Specify skip
  - Re-running

- DB back up processing
- DB restart processing
- Start online service
- Operation
  - Forced start
  - Specify skip

Person in charge of operation

Restart Trigger

Alert

Operation procedures manual

Notification only

Automatic skip

Automatic skip + Forced start of subsequent action

- Long run
- Delayed start

Capacity
Job schedule
Configuration
Monitoring
Event
Introduction of Main Sub-systems

Capacity
Introduction of Main Sub-systems

Capacity (Overview)

Overview of capacity

- Accumulate the acquired monitoring status as history data and display as a graph.
- Support for capacity planning and operation status reporting
- Can also be used for trend analysis at the time of trouble, thus realizing maintenance and improvement of the service level.

Accumulation of operation status history data

- History data (minute, hour, day) for each inspection interval
- Monitoring task history data (average value, minimum value, maximum value, total value, latest value)

Graphical display of accumulated data

- (bar graph, line graph, stacked graph, stacked line graph, pie graph)

Writing of graph data

- (text, CSV, HTML)

Printing of graph monitor
Introduction of Main Sub-systems

Capacity (Capacity Analysis)

**Prediction of increasing/decreasing trends**
- Displays increasing/decreasing trends of acquired history data and predicts the date and time on which the threshold value will be reached.
- Enables smooth confirmation in cases such as when it is necessary to systematically increase resources due to capacity management for a virtual platform, etc.

**Calculation of ratios for judgment conditions**
- For the acquired history data, displays ratios which exceed the threshold value by time period.
- Enables analysis of service level for each time period.
- In info-search (web browser), enables identification of trends and prediction of future trends based on the monitoring results history.

**Prediction of increasing/decreasing trends**
- Disk utilization rate (%) [WMI]
- Displays a prediction graph for increasing/decreasing trends
- Calculates the date and time on which 90% is reached

**Calculation of ratios for judgment conditions**
- CPU utilization rate (%) [WMI]
- Calculates ratios greater than 90% at 30-minute intervals
Introduction of Main Sub-systems

Capacity (Analysis of Data, Display of Configuration Information)

Analysis of capacity data
- Accumulates monitoring data, displays a graph of analysis results, and utilizes for capacity planning and trend analysis

Display a list of details for capacity data analysis
- Displays a list for capacity trends and predicted dates and times on which threshold values will be reached, and enables checking of areas which require response

Display configuration information
- Automatic periodic collection and accumulation of information targeted for management such as configuration/setting information, logs, command execution results, etc.

Ascertain capacity trends for the entire system
Ascertain the latest configuration information for the entire system
Introduction of Main Sub-systems

Capacity (Simple Graphical Display)

Provides a function for graphical display of changes in values until the most recent monitoring task from the node monitor.

Efficient visualization of the monitoring status

- Enables simple graphical display at specified periods without the need to create a graph definition in advance.
- Visually ascertain the time passed until reaching the threshold value

Conventional

Although the CPU utilization rate at the time of trouble was high, it is necessary to specify settings in advance in order to check the time from which the rate was high

Enhanced function

User simply selects the monitoring task and specifies the period

Changes in the CPU utilization rate around the time of trouble occurrence can be checked simply through selection, without the need to create a graph definition in advance.

Refer to as graph when necessary

Reduces load and improves operation quality during operation work
Introduction of Main Sub-systems

Capacity (Utilization of History Data)

Management of history data

- History data acquired for each inspection interval is accumulated in 3 types of summary tables and is managed in the DB.
- Enables setting of the upper limit value for the history data save period.

<table>
<thead>
<tr>
<th>Summary Table</th>
<th>Save Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minute summary table</td>
<td>7 days of data</td>
</tr>
<tr>
<td>Hour summary table</td>
<td>30 days of data</td>
</tr>
<tr>
<td>Day summary table</td>
<td>365 days of data</td>
</tr>
</tbody>
</table>

Amount of history data

- Estimate for 1 day's worth of history data in the minute summary table at which the greatest amount of history data is saved.

\[
\text{Amount of history data for 1 monitoring task} = 500 \text{ bytes} \times 60 \text{ min} / \text{Monitoring interval} \times 24 \text{ hours} \times \text{Number of monitoring targets} \times \text{Number of summary methods}
\]

Example) Monitoring at 10-minute intervals, monitoring target = 1, summary methods = 3

\[
\approx 500 \times 6 \times 24 \times 1 \times 3 = 216,000 \text{ bytes (approx. 216 KB)}
\]

Analysis of history data

- Makes it possible to specify the data target period and to process history data.
- Specification of data target period: Supports trend analysis for past data and current data.
- Processing of history data: For each time period, displays the ratio of exceeding the acquired threshold value in the time period, thus supporting analysis of the service level.
Introduction of Main Sub-systems

Configuration
Introduction of Main Sub-systems

Configuration (Overview)

Overview of configuration

- Defines configuration information/setting information, log, and arbitrary command execution results of the management target (server, network device) as configuration management items.
- Collects, accumulates, and performs uniform management for this information.

Senju Browser
- Define configuration
- Refer to acquisition/change status
- Refer to acquisition results for configuration information

Senju Agent
- Acquisition of configuration information for Senju Sensor

Senju Agent
- Acquisition of configuration information
- Acquisition of difference results

Senju Agent
- Periodic collection/saving of configuration information acquired according to the schedule

Senju configuration file server

Senju Manager
- Configuration management items and collection
- Management of schedule

Senju Sensor
- WMI
- SNMP
- TELNET
- SSH
- SMTP
- FTP
- FTU

Probe

- Agentless

- Senju basic information
- Senju patch information
- Host information
- Disk information
- Network information
- Software/patch information
- Service information
- Login information
- File
- File list
- Command execution results
- SNMP information
- WMI information
- Registry information
- Even log information
Introduction of Main Sub-systems

Configuration (Definition/Registration of Configuration Management)

Template for configuration management item

- Representative commands and files for managing OS configuration information are prepared as templates. This supports registration of management items.
- Templates are classified and sorted by category.
(OS start settings information, system settings information, system operation information, host information, disk information, network information, software/patch information, service information, user information, login information)

Detection of collection and change

- Possible to set whether or not to detect collection and changes for individual Senju configuration management items.
- When a difference occurs in change detection, it is possible to display an arbitrarily created message at the browser.

History display settings

- Settings can be specified for display/reference at the configuration monitor for collection status and change detect status of Senju configuration management items, file information of configuration management items, command items, SNMP items, and Windows items.
  - Display period: Select either "specify relative date" or "specify absolute date."
  - Specify display date: Select "every month," "every week," or "every day."
- Displays the acquisition/change status for items set for each node.

File size of Senju configuration file server

- File size required when setting the save format during creation of definition
- \[ F \times n \times S \times D \times r \text{ (bytes)} \]
  - \( F \): File size (bytes)
  - \( N \): Number of acquisitions per 1 day (times/day)
  - \( S \): Number of servers targeted for collection (machines)
  - \( D \): Number of save days (days)
  - \( R \): Reduction rate

When 10,000 bytes of text are collected from 100 nodes once per day and data is stored for 100 days (file reduction rate = 0.05)
- When not reducing/encrypting: \( 10 \text{ (Kbytes) } \times 1 \text{ (time/day) } \times 100 \text{ (machines) } \times 100 \text{ (days) } = 100 \text{ (Mbytes) } \)
- When reducing/encrypting: \( 10 \text{ (Kbyte) } \times 1 \text{ (time/day) } \times 100 \text{ (machines) } \times 100 \text{ (days) } \times 0.05 = 5 \text{ (Mbytes) } \)
Introduction of Main Sub-systems

Configuration (Confirmation of Configuration Management Information)

**Configuration monitor**

- Checks the acquisition/collection status and change detection status of Senju configuration management items and configuration management information for each configuration management node as the latest condition / history information.
- Confirms detailed status for each item during implementation of configuration monitor items.
- Makes it possible to search by refining the collected information, extract only nodes which satisfy conditions, and display those nodes in a list.
Introduction of Main Sub-systems

Configuration (Automatic Registration of Configuration Information)

Automatic registration of configuration items to Senju Service Manager (service desk)

- Utilizes the job schedule to automatically register the acquired configuration information to configuration items of Senju Service Manager (service desk).
- Enables usage plan management, change management, and reference of history information as configuration items in Senju Service Manager.

(*) Senju Service Manager (available separately) is required to use this function.
Operation Console for Senju DevOperation Conductor
Senju Browser

Provides a graphical display for all management items of the system, thus supporting operation

**Design which is visually easy-to-understand**

Realizes a functional feeling of use through intuitive icons and screen configuration

**Screen display change using Senju domain**

Prevents connection to a mistaken Senju domain by changing the display name and background color for each Senju domain

Realizes advanced operation through intuitive feeling of use and measures to reduce operation mistakes
List of Operation Consoles (1)

- **Message monitor**: Displays messages occurring at each node by sorting into the 4 categories of “Normal,” “Trouble,” “Warning,” and “Response Request”

- **Global node monitor**: Displays a list of monitoring nodes

- **Node monitor**: CPU utilization rate and virtual memory for each node. Displays monitoring results such as the number of operating processes, etc.

- **AWS resource monitoring**

- **Job monitor**: Displays the job operation status

- **Runbook monitor**: Displays the execution results for runbook
List of Operation Consoles (2)

**Relation monitor**

(Monitoring console for relationships of configuration items)

- Uniform management of relationship for items configuring systems of IT devices, services, etc.

**Virtual node monitor**

(Detailed monitoring console of virtual environment)

- Displays detailed monitoring information for the virtual server host and virtual machine
List of Operation Consoles (3) Confirmation of Service Effect from the Message Monitor

Jump from the message monitor to items related to origin nodes (Open the relation monitor from the message monitor and jump to origin node information)

① Detect trouble message at message monitor
② Select the relation monitor from the context menu
③ Select the relation from the relation selection dialog box
④ At the relation monitor, the item linked to origin node is automatically opened and the applicable message is selected. At the same time, it is possible to check the status of upper-level services at the tree.
List of Operation Consoles (4) Web Console

Renewal of UI for Senju web connection
- Integrated the Senju InfoView Screen and the Senju InfoSearch Screen
- It is possible to use English language for theSenju web label display
- For the network rotary warning light notification function, performs uniform management of warning devices connected to the network. For monitoring which used Senju InfoView, warning devices which were connected to the network can be used easily

Search history
- The execution history of messages and message actions is accumulated in the database, and it is possible to search/refer to required information from the web console
- Supports multi-devices

Summary report makes it possible to ascertain operating information and trends by week/month

Senju operating statistics display
- From the web screen, easily view statistical information for operation and ascertain the operating status
- Search statistical information by specifying time periods and display a graph of operation status by week or month

Perform deep statistical searches such as detailed information on the number of reports and specific content
Renewal of UI for Senju Web Connection (DevOps portal)

Renewed the Senju web connection UI, and integrated responsive design support and the Senju InfoView / Senju InfoSearch screens.

Integration of Senju InfoView / Senju InfoSearch improves usability and enables support for multi-devices via responsive design.

**Conventional Web connection**

When using Senju InfoView / Senju InfoSearch separately, it is necessary to log in again.

**Senju/DC 2016 Web connection**

It is no longer necessary to select the connection domain or authentication method when logging in. Use is possible without logging in again for Senju InfoView / Senju InfoSearch.

By using responsive design, supports multi-devices by displaying images according to the window size.
Added a function to manage user information at Senju web connection

When using multiple Senju domains in Senju web, it is possible to perform batch management of user information on the web. Usable menus can be specified for each user.

**Conventional user management**

- Domain 01
- Domain 02
- Domain 03
  - Job schedule
  - Monitoring
  - Event
  - Account 01
  - Account 02
  - Account 03
  - Menu (fixed)

**Senju/DC 2016 user management**

- Domain list (editing possible)
- Domain 01
- Domain 02
- Domain 03
  - Job schedule
  - Monitoring
  - Event
  - Menu (editing possible)

The login user is different for each Senju domain and the menu is fixed. Each user has a single web account. Possible to flexibly control the Senju domain for connection and the functions which can be used.

Copyright(C) Nomura Research Institute, Ltd. All rights reserved.
Senju Web Connection (Login Function for When Senju Manager is Stopped)

Provides a function for linking to an external authentication server and logging in even when Senju Manager is stopped.

Makes it possible to quickly ascertain the latest operation status even in the event of large-scale trouble, and enables efficient system recovery.

If the operations management server is not restored first, it is impossible to determine what processing has already been performed.

The operation history of the DB server can be quickly checked from the web. This makes it possible to implement measures quickly.

Even when Senju Manager is stopped, data accumulated in the DB can be referred to from the web.
Other Functions of Senju DevOperation Conductor
Event (Automatic Response: Senju Service Automation)

Senju Service Automation

- As service requests from Senju Service Manager, “accept” and “approve” operation requests. Supports workflow management and control.
- After the application contents have been approved, automatically executed by Senju DevOperation Conductor. Reduces operating load and operating mistakes.
Secondary Managers

Manage the Senju Agent from multiple Senju Managers which are separate from the main manager

Added sensor types for secondary nodes

- For Senju Sensors, by registering secondary sensors of new node types, management is performed at the secondary manager and message information / monitoring information is linked to the secondary manager.

Even when the main manager is stopped, it is possible to check the operation status for Senju Agents and Senju Sensors from the secondary manager.

Refer to information for Senju Agent and subordinate Senju Sensors
Large-Scale Support (Multi-Domain)

Search for information across multiple domains

- Accumulate information for multiple Senju domains in a single DB/configuration file server (Senju Agent)
- Searches can be performed across accumulated information at the web console (InfoSearch)
- Search for operation information by focusing on the server which you manage
- Increases the efficiency of operation management performed using multiple teams and multiple systems

Person in charge of operation

Senju Browser

Senju Manager for system A
Server 1
Server 2
Server 3
Server 4
Server 5
Server 6

Senju Manager for system B
Server 1
Server 2
Server 3
Server 4
Server 5
Server 6

Senju Manager for system C
Server 1
Server 2
Server 3
Server 4
Server 5
Server 6

Check only information for the server which you manage

Senju Web
Senju DB

Developer
Developer
Infrastructure staff

Accumulate information for multiple Senju domains in a single DB/configuration file server (Senju Agent)
Searches can be performed across accumulated information at the web console (InfoSearch)
Search for operation information by focusing on the server which you manage
Increases the efficiency of operation management performed using multiple teams and multiple systems
Agentless Monitoring/Jobs (Senju Sensor)

Transition from other tools is possible through a small number of man-hours

- Telnet/SSH connection is possible: Monitoring, runbook automation (remote execution), job schedule (sensor job execution), configuration.
- Supports IPv6 for Windows/Linux devices (monitoring*, configuration, job schedule, runbook automation)
  (*Please contact us for details on response to extension options for monitoring.)
- Supports SSH monitoring from Windows probe node. (supports system information monitoring, disk monitoring, process monitoring, and detailed information monitoring)
- Custom monitoring for the Unix version of Senju Sensor (added connection command used for executing a script in the Unix version of Senju Sensor and performing custom monitoring)
Offline Solutions (Senju Offliser)

Senju Offliser

- Enables user of a GUI similar to Senju Browser in an offline environment without connection to the Senju system.
- Based on data created by the development staff, the operation staff can load data in the production environment without modification. This reduces mistakes during manual registration work.
- Definable data (monitoring, configuration, event, job schedule)
- Added a function to output a file containing difference information for current settings and import settings when importing a definition (same for Senju Browser)
Offline Solutions (Senju Job Chart)

Senju Job Chart

- Possible to read Senju job definition data and output a job chart as Visio image data.
- For the created Visio image chart, it is possible to change/save position information, add comments, and print. This supports reporting and document creation.
Naming Policy Function

Filters objects in the Senju Browser by name and controls reference/addition/deletion.

Naming filter

- Controls whether to display or hide objects for each user (filter settings for regular expressions)
- Prevents creation/editing of definitions which do not comply with naming rules

Enhances internal controls through refined display
Encourages standardization of operation via thorough compliance of naming rules
Enhanced the command for restoring definition data of Senju Manager. Increases the efficiency of restoration.

**Increases the efficiency of restoration work**

- When restoring Senju definition data, it is no longer necessary to use Senju Manager in the default installation status. Initialization of definitions and restoration of backup files for the existing Senju Manager can be performed using just a single command.

Use the current Senju Manager without modification by making copies, etc. of the virtual machine.

Perform initialization and restoration simply by executing the command.

Increases the efficiency of restoration and significantly shortens restoration time.
Other (Improvement of Infrastructure, Performance, and Definition Control)

Support for UTF-8 character code for Linux version Senju Agent
- UTF-8 can be selected as a character code for Senju Agents (Senju operation account) of Linux version Senju Agents

Csh is not needed for Linux version Senju Manager and Senju Agent
- The script used for Linux version Senju Manager and Senju Agent can be changed from csh to sh and Perl, thus enabling operation even in environments where csh is not installed

Improvement of processing performance
- Increased speed of updating (node definitions / monitoring attributes), enabled exclusive control
- Increased speed of file forwarding (FTU), added a compression method

Standard support for English-language version
- Simultaneous release of English and Japanese versions

Increased upper limit for name length of node definition
- Senju Manager node ID: 8 → 15 bytes
- Senju Agent node ID: 8 → 63 bytes
- Senju Sensor node ID: 25 → 63 bytes
- Node name: 32 → 255 bytes
- Long host name: 63 → 255 bytes

Increased upper limit for name length of job definition
- Job/net/system/trigger name: 14 bytes → 32 bytes
- Operating environment name: 14 bytes → 64 bytes
- User name: 8 bytes → 64 bytes
- Start command: 126 bytes → 2048 bytes

Increased types of characters which can be used in node ID
- Job/net/system/trigger name: 14 bytes → 32 bytes
- Operating environment name: 14 bytes → 64 bytes
- User name: 8 bytes → 64 bytes
- Start command: 126 bytes → 2048 bytes
Other (Improvement of Infrastructure, Performance, and Definition Control)

- **Monitoring in 1-minute intervals**
  - The minimum monitoring interval was changed from 2 minutes to 1 minute.
    *If 1 minute is specified as the monitoring interval, the number of tasks which can be monitored at 1 machine is reduced by half.*

- **Changed the upper limit for log monitoring per 1 machine**
  - The number of logs which can be monitored at 1 node was changed from 16 to 20.

- **Fixed monitoring task ID when loading**
  - Added a mode in which the monitoring task ID cannot be changed when loading a monitoring task

- **Search for unmonitored messages at the web connection**
  - Added a function to search for unmonitored messages at the web connection
Information on Senju Family

● Two-Day Senju Training Course: Held monthly (fee required)
  http://senjufamily.NRI.co.jp/service/benju_course.html

● Senju DevOperation Conductor Hands-On Seminar: Held monthly (free)

● Senju Tips Homepage
  https://senjufamily.NRI.co.jp/tips/

FOR INQUIRIES REGARDING PRODUCTS,
Please contact the Senju Information Center.

senjuinfo@nri.co.jp

URL: http://senjufamily.NRI.co.jp/
Dream up the future.