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shaping tomorrow with you

FUJITSU Software Systemwalker Runbook Automation V15

Introduction

April 2013
Fujitsu Limited

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- Product Overview
- Functions
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- Use Case
- Product Information

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Product Overview

FUJITSU Software Systemwalker

Data Centers: Background and Challenges

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Commercial data centers

Background

- Cloud services are expanding
- Service competition with other data center providers is intensifying
- Outsourced commerce is expanding

Challenges

- To provide a myriad of XaaS services
- To provide new services at a low cost
- To maintain/improve quality of service (quality of operations)

Enterprise data centers

Background

- Cloud services are used enterprise-wide
- Individual departmental servers are consolidated in data centers
- Various individual departmental business operations are centralized in data centers

Challenges

- To optimize operating costs by consolidating operational work in data centers (consolidation/cloud)
- To maintain/improve a level of service equivalent to departmental operations

The compatibility of "reduced operational costs" and "improved operation quality" is a challenge

What is Systemwalker Runbook Automation?

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Operation tasks that used to be performed manually are all automated, so it is possible to achieve reductions in operational costs and improved operation quality

Reduced operational costs

More efficient operations

- The operation procedure manual is defined as a process so that operations are automatic

By defining the operation procedure for each business system in the operation procedure manual as an operation process, automation of the operation is achieved.

Standardized operation tasks

- Platform differences are absorbed, so operation tasks are standardized

OS/middleware differences are absorbed, so operation tasks can be standardized even for different platforms and system configuration business systems.

Improved operation quality

Visible tasks

- Task history including human decisions is made visible

By defining human tasks (requests, approvals) as operation processes, task history can also be recorded, so visualization of operation quality and subsequent confirmation is easy.

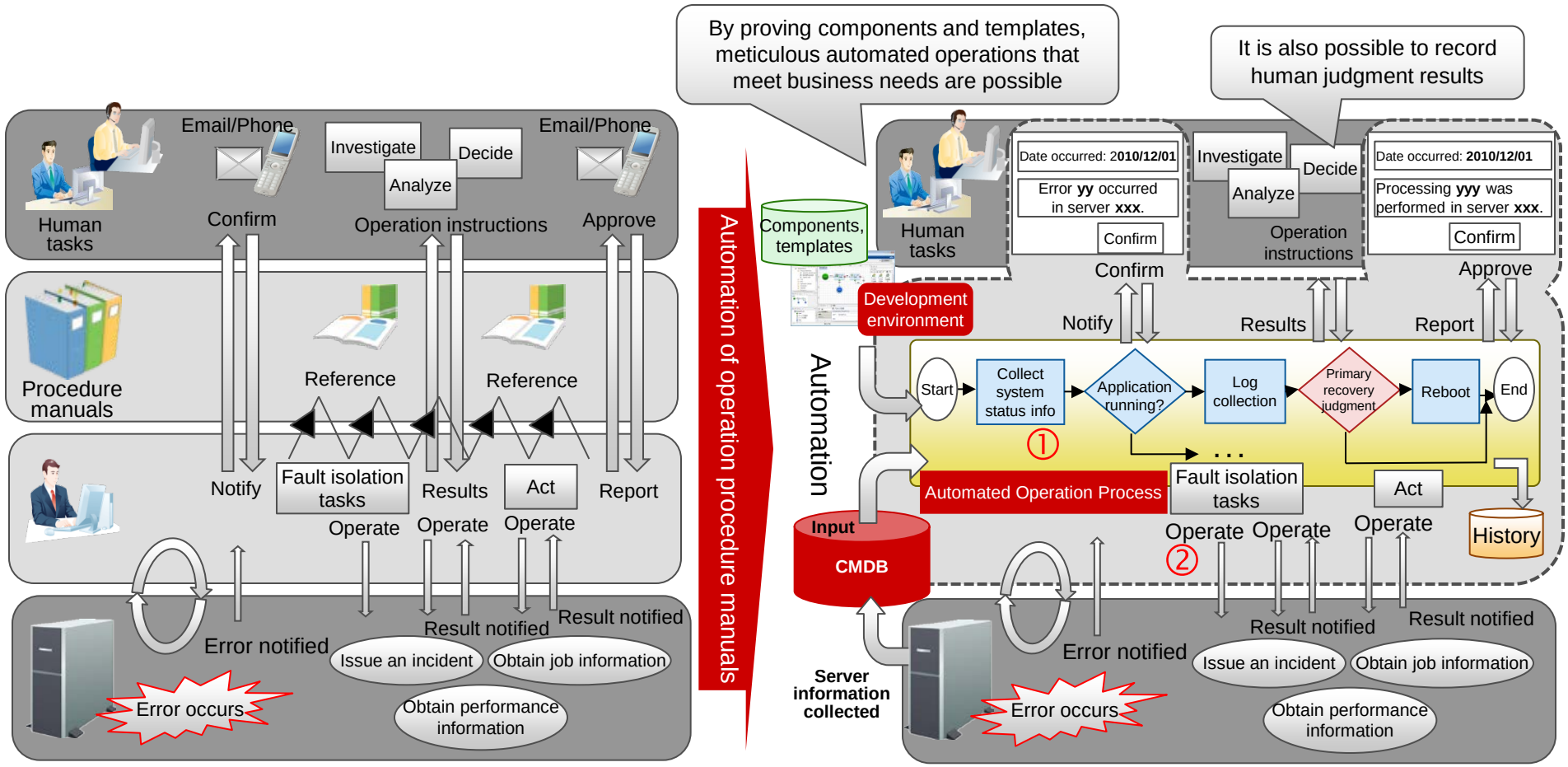
Standardized cloud operations

- Flexible support for cloud environments

Because the physical and virtual server information is collected automatically in CMDB, operation tasks can be performed without the burden of having to be aware of the number of server increases/decreases.

Reducing Operational Costs Through Systemwalker Runbook Automation

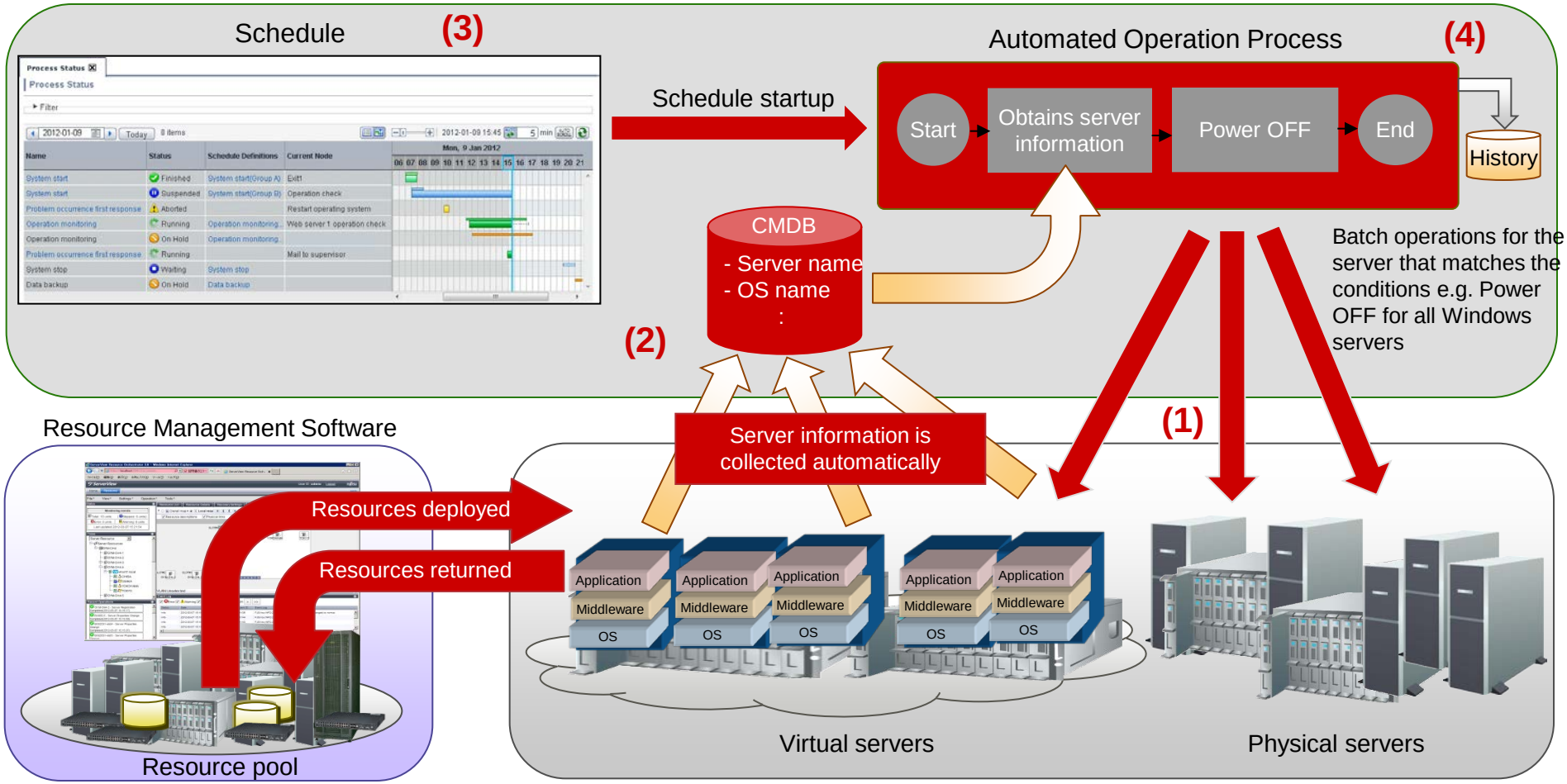
1. Operation tasks are automated by defining the operations procedure as an operation process
2. OS/middleware differences are absorbed, so standardization is achieved by consolidation of similar procedures



Improved Operation Quality Using Systemwalker Runbook Automation

1. Unified operability that does not depend on a physical or virtual environment
2. Operations that are not affected by the number of server increases/decreases in a cloud environment, for example, can be realized
3. Automatic execution of routine operation tasks using a schedule feature
4. The execution results, including the results of human judgment, are recorded as history

Systemwalker Runbook Automation



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Functions

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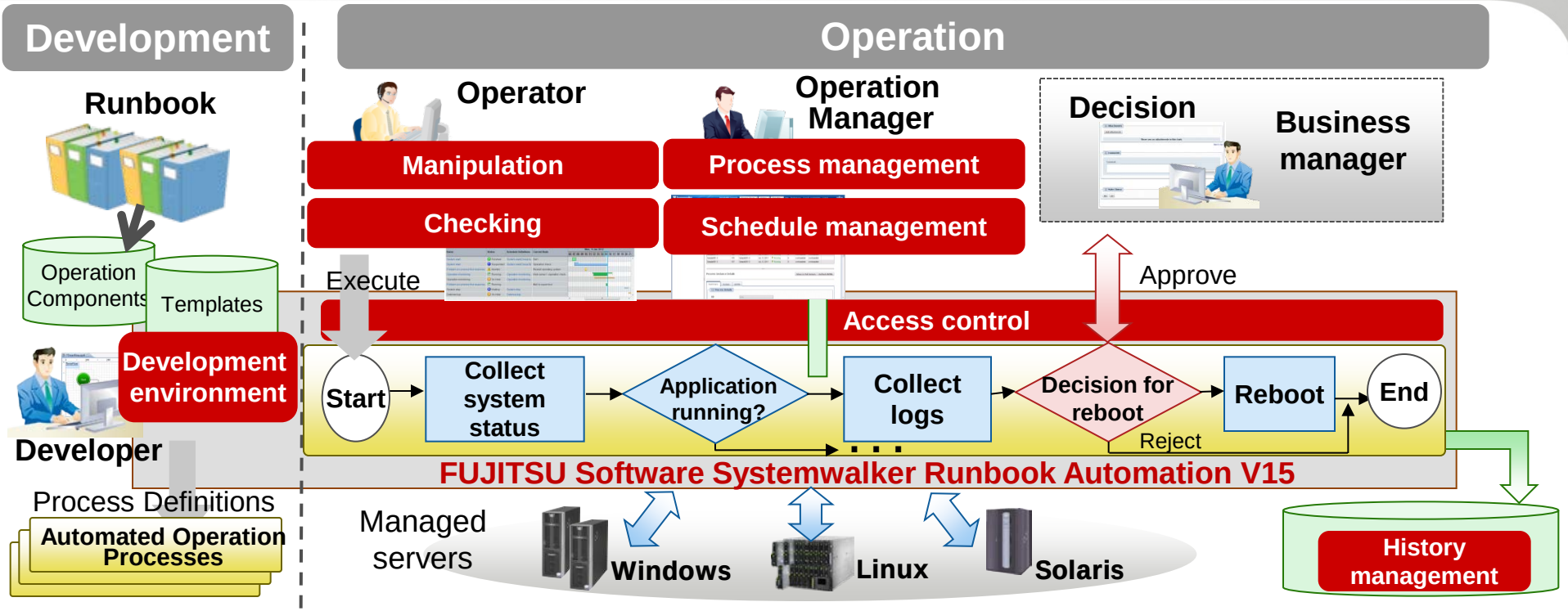
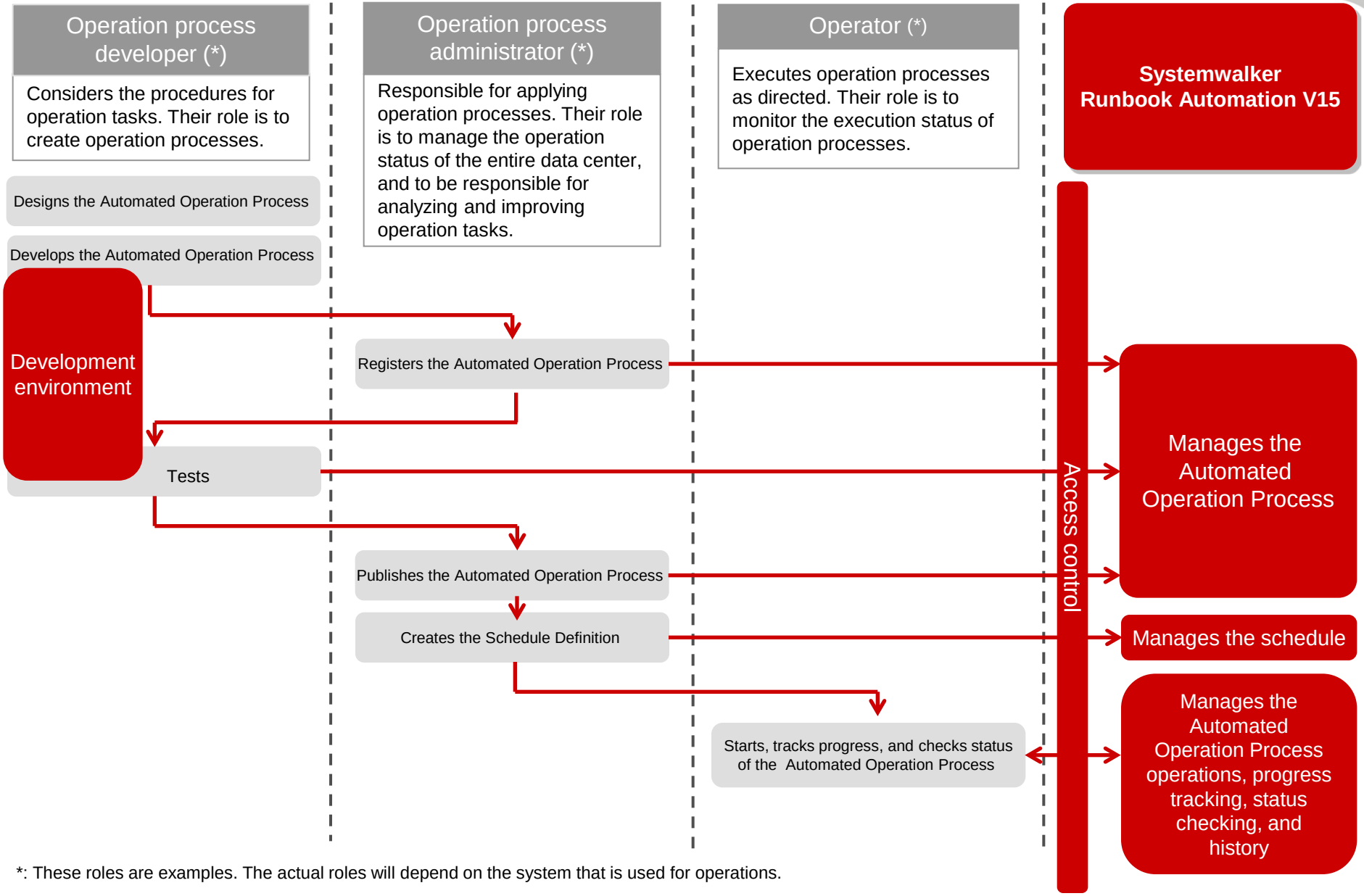
Development/Operation of Automated Operation Processes



Development	Environment to create and edit Automated Operation Processes. Automated Operation Process templates that are included within the product can be utilized or customized.
Manipulation	Execute / Suspend / Abort Automated Operation Processes.
Checking	Check the status and progress of Automated Operation Processes.
Process management	Manage Automated Operation Process Groups and Operation Components which are utilized in Automated Operation Processes.
Schedule management	Schedule Automated Operation Processes and confirm their status and execution results using Gant Chart views.
History management	Manage the administrative information of Automated Operation Processes, system configuration information and execution history.
Access control	Control user access rights for each process.

Flow of Required Tasks: From Design of the Automated Operation Process to Operation



*: These roles are examples. The actual roles will depend on the system that is used for operations.

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Automated Operation Process Development

- Create an Automated Operation Process
- Debug the Automated Operation Process
- Automated Operation Process template

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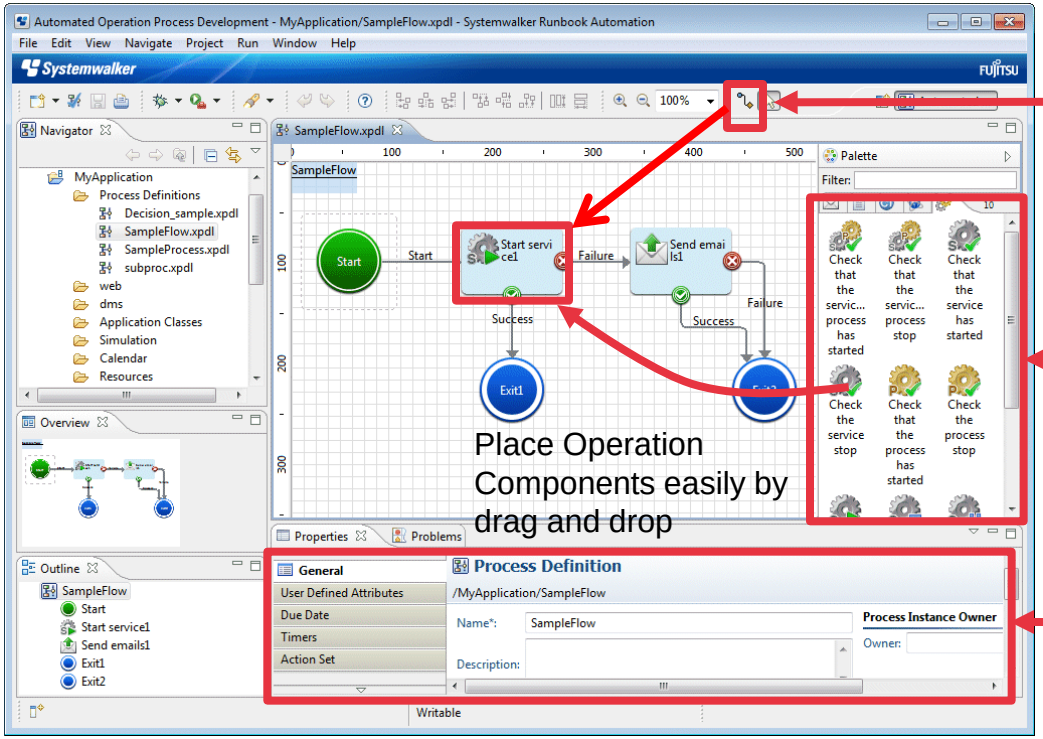
Create (1/4)

Predefined Operation Components simplify creating Automated Operation Processes

- In the development environment, processes can be created by utilizing ICT specific Operation Components
- Processes can be created without connecting to the Management Server



Place Operation Components easily by drag and drop

Development screen

Create processing flow
Connect Operation Components specifying the flow of operations

Operation Components
Drag and drop Operation Components from the palette

Operation Components properties
Enter action details for Operation Components

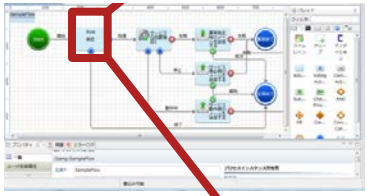
Create (2/4)

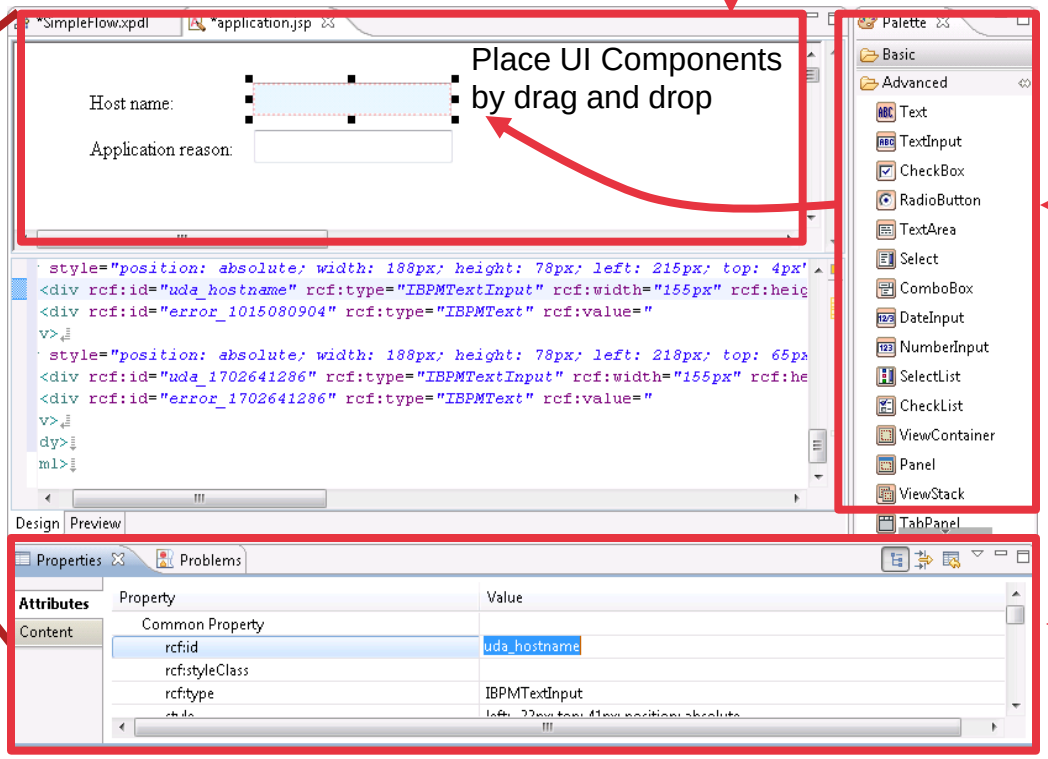
Forms for data entry with human interaction

- Data entry can be performed by humans with the use of Forms, or decision making confirmations can be created and built into the processes

Design view
Create labels and fields for data entry

Development screen





UI Components
Drag and drop User Interface Components available from palette

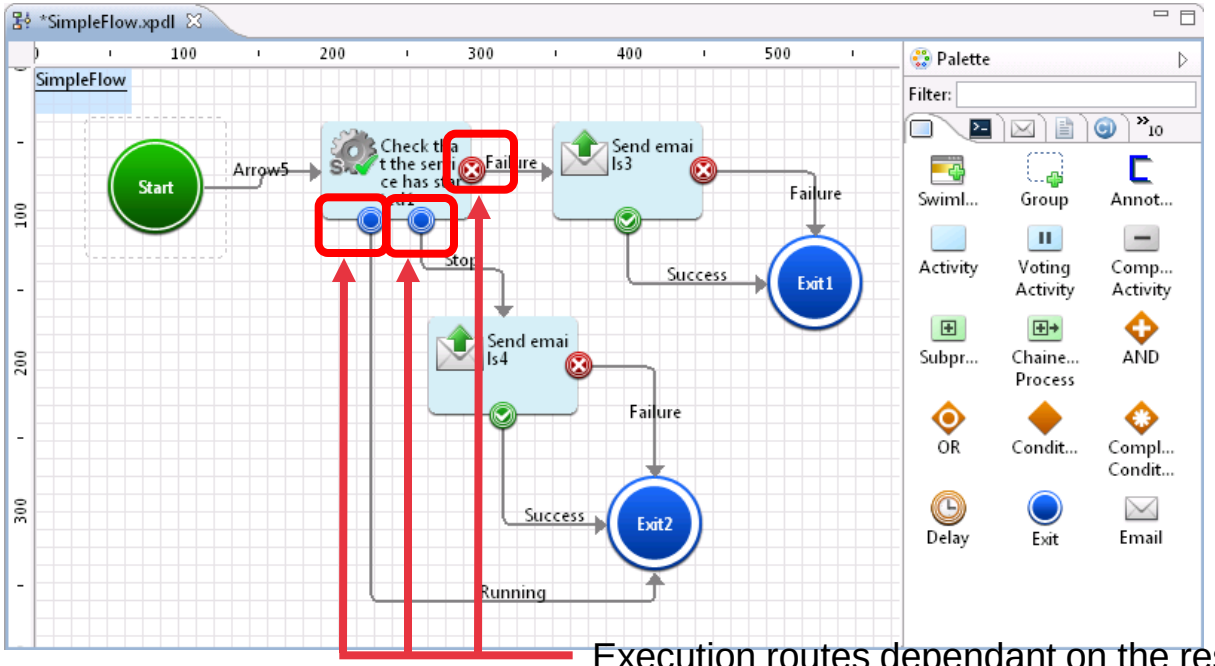
Properties
Enter action details for UI Component

Form design

Create (3/4)

Defining Normal / Abnormal routes that are visually recognizable

- Alternate execution routes can be defined that are represented by success or fail icons for each Operation Component when placed in the editor
- Processes are easier to develop as the execution result routes are easy to recognize at a glance



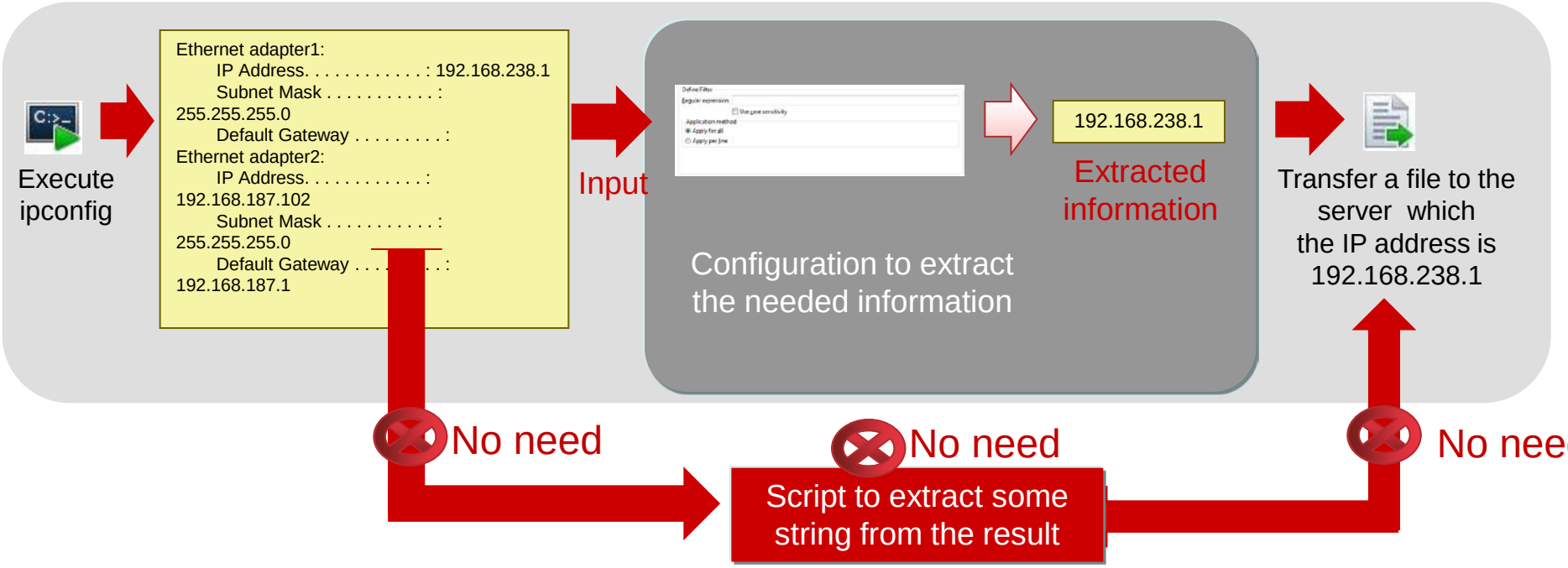
Execution routes dependant on the result

Create (4/4)

Customizing output result of Operation Components with pre-defined filters

- The output of components can be customized using 15 types of filtering features like "Extract string" or "Convert into upper case or lower case"
- The customized output can then be input to the next component easily without scripting

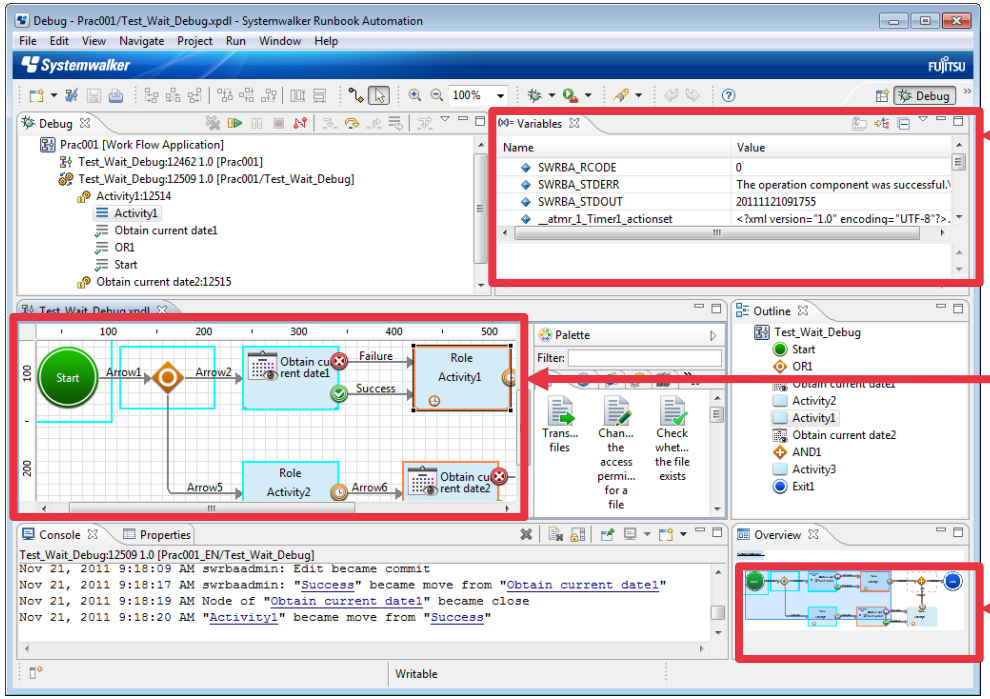
E.g.) Extract the IP address of local host from the result of ***ipconfig*** command



Debug

Step by step debugging function

- The action of each Operation Component defined in the process can be graphically confirmed during debug mode
- The variable values can be viewed and checked during the execution of each component while the process is running



Debugging screen

Variable information
Display values of variables at each step

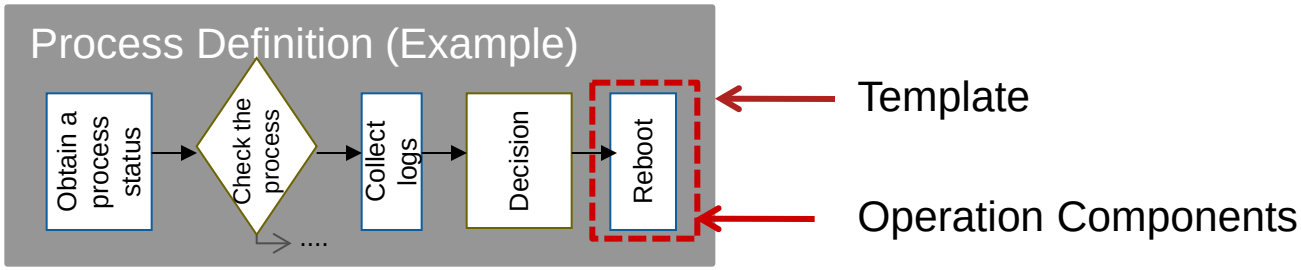
Automated Operation Process
Confirm the transition of flow

Overview
Display the whole process

Pre-defined Templates

Templates based on Fujitsu's Data Center Management Knowledge

- A template consists of Process Definitions and Operation Components



Pre-defined templates	Overview
Checking operation status	Periodically (3 times a day) confirm if the target server is operating normally by: - Checking the server power supply status (hardware) - Checking the connectivity status of the server - Checking related events collected by event monitoring tools
Problem detection and initial handling of certain server types	Perform a sequence of checks to identify server type. Perform email notification for certain types of server. Perform primary recovery tasks dependant on events from event monitoring tool.
Starting and stopping Web 3-Tier systems	Starts and stops the entire Web 3-tier system consisting of database, application and web server including load balancers. This template also sends notifications automatically when faults are detected in the process.
Starting, deploying and restoring virtual servers	Starts, stops, restarts, deploys and returns virtual servers resources. This template has the ability to take snapshots and restore virtual servers.
Release automation	Automates the application release tasks. By specifying the release date/time beforehand, it is possible to release at a predetermined date/time.
VMware HA operations management	Automatically stops ESX servers in the appropriate order when a power failure occurs.

*: The latest templates will be published on the FUJITSU Software Systemwalker technical information website as soon as they are available.

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Automated Operation Process Operations

- Starting Automated Operation Processes
- Checking the Status of Automated Operation Processes
- Human Decisions and Approvals using the Automated Operation Process
- Other Management Features

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Process Start Methods

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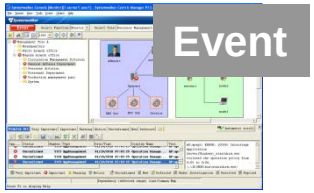
Automated Operation Processes can be started by various methods

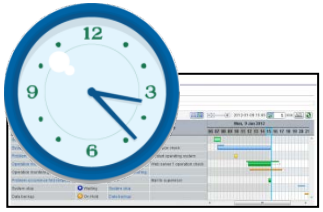
- Operator can manually start the processes
- Collaborating with a system monitoring tool enables processes to start when specific events occur
- Processes can be started according to defined schedules

Manual start
Non-regular work
E.g. Applying patches



System monitoring tool

Event-triggered start
Problem detection and initial handling of event



Schedule-triggered start
Regular work
E.g. Regular backup

Automated Operation Process

FUJITSU Software Systemwalker Runbook Automation

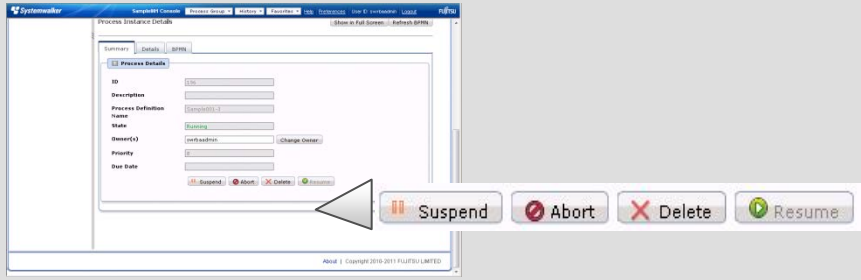
Managed servers

Start Manually

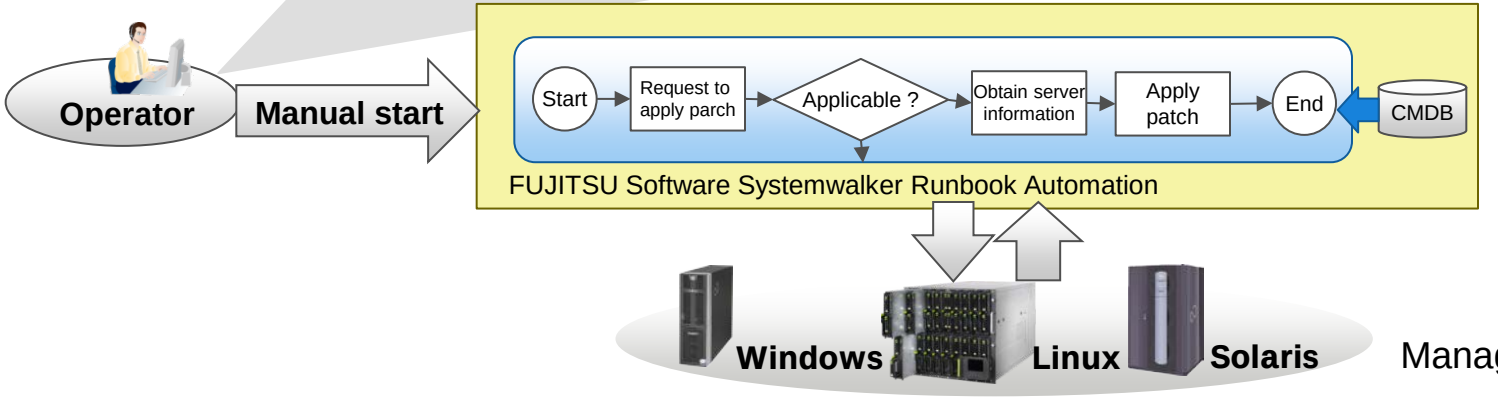
Manual start and operation of Automated Operation Processes

- Operator can manually start processes for unscheduled maintenance work
- Operator has control to suspend or abort processes in case an unexpected problem occurred (e.g. An unknown error occurred)

Screen for starting



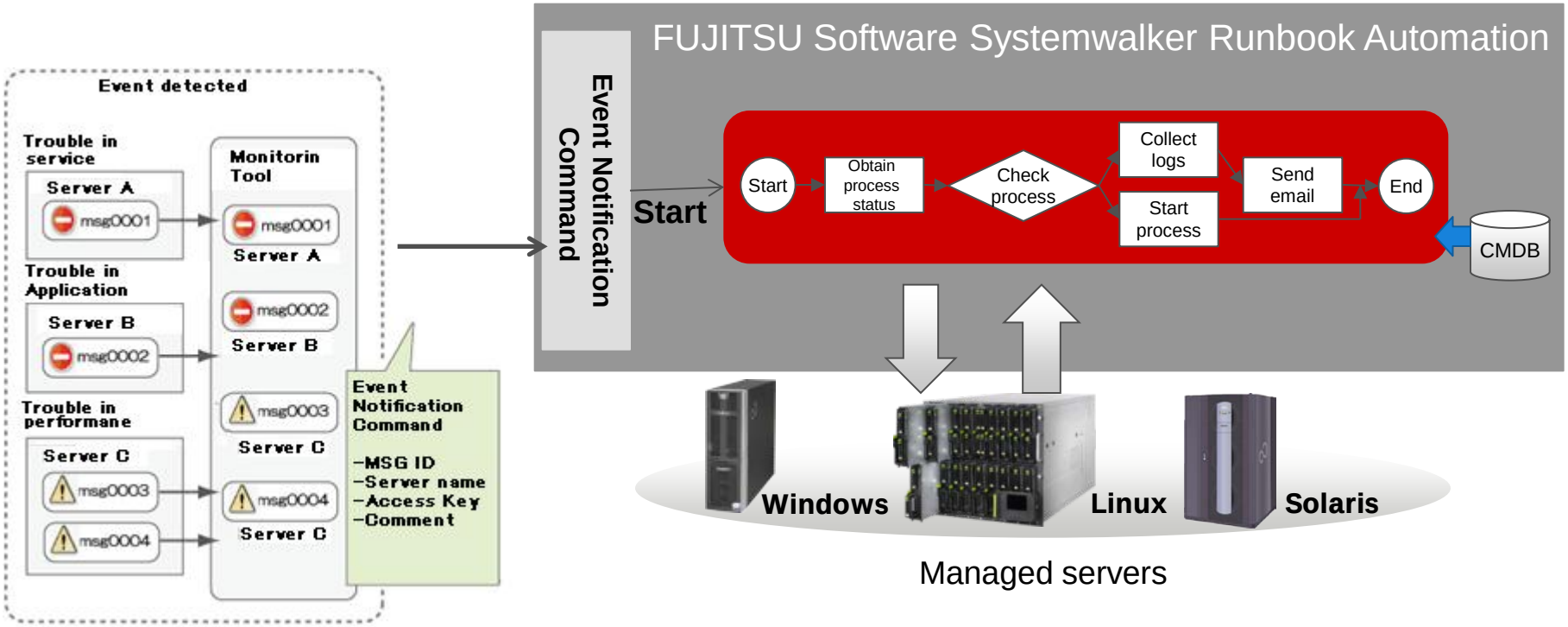
Screen for suspending/aborting/resuming



Start by Event

Automated Operation Processes triggered by events

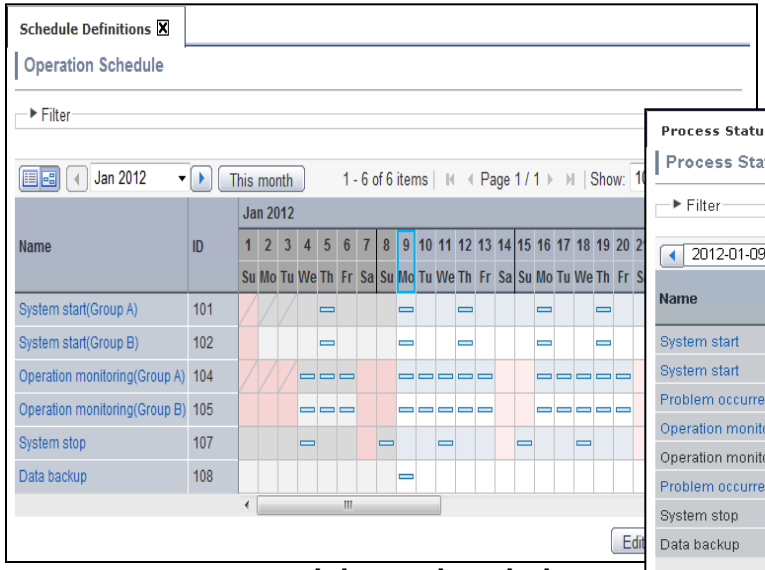
- Processes can be triggered to start on detection of specific events using a system monitoring tool like Systemwalker Centric Manager
- Allows for initial handling of problems by sending email notifications or collecting data logs automatically for investigation



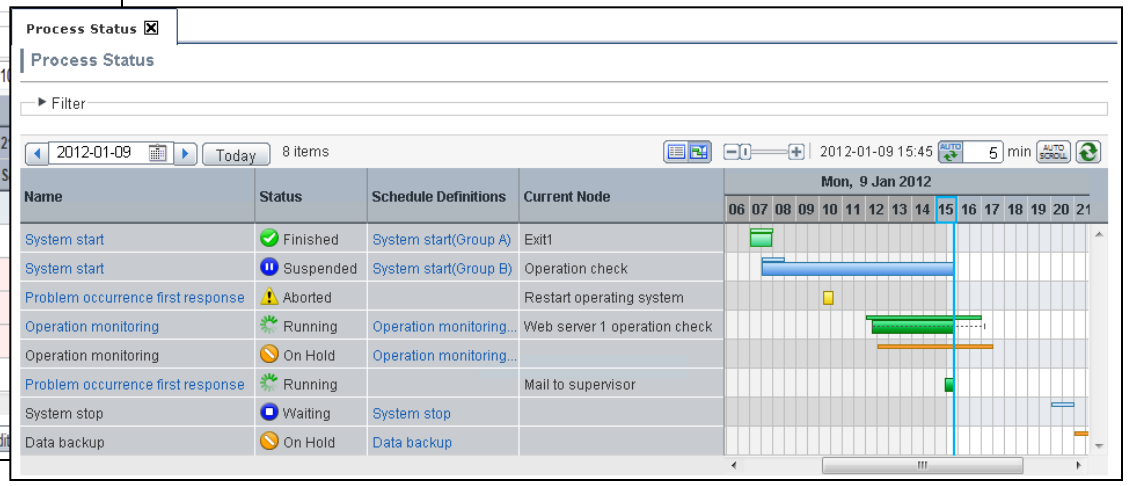
Process Status Check (Start by Schedule)

Scheduling Automated Operation Processes

- Regular maintenance work can be automatically started by the Schedule Definition
- The schedule and execution status on the day can be seen at a glance on the screen in the form of a Gant chart
- User can easily change or disable the defined schedule in the event of an operational change



Monthly schedule

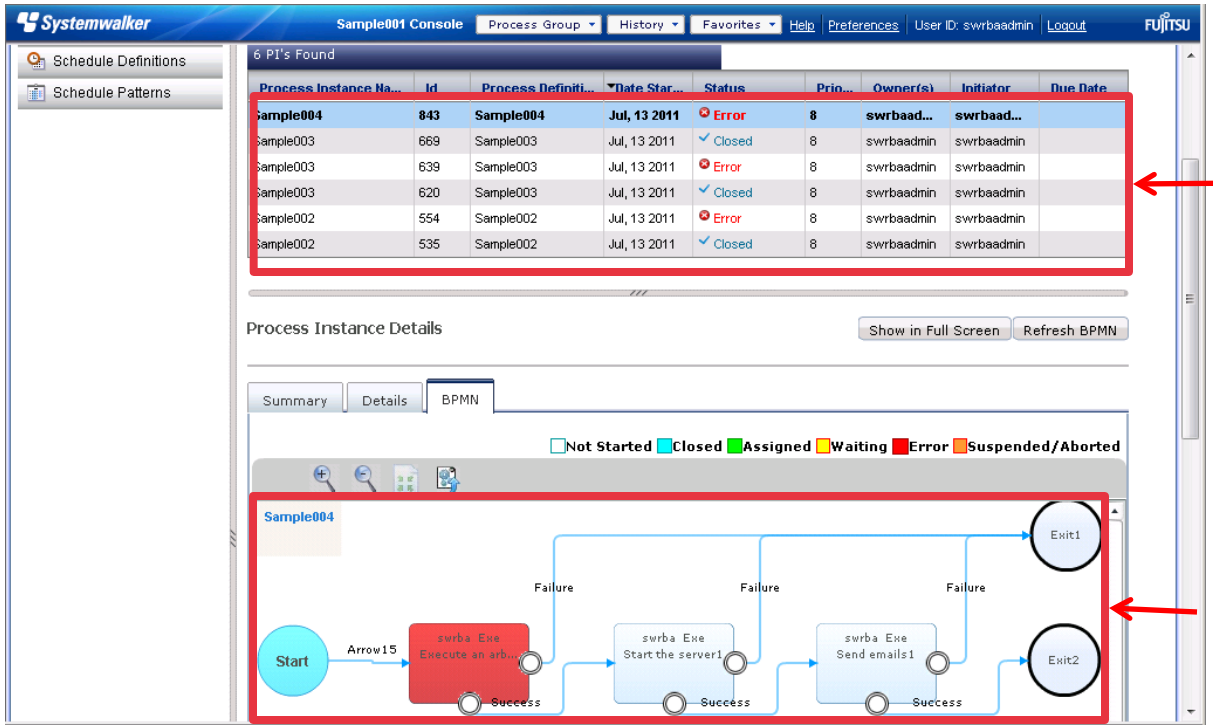


Daily schedule and result

Status Check

The flow diagram of the Automated Operation Processes can be checked for its progress

- The status of running processes can be confirmed from the process list
- The progress can be checked from the flow diagram in the Process Instance list



The Process List displays the execution status

A selected Process is displayed as a flow diagram

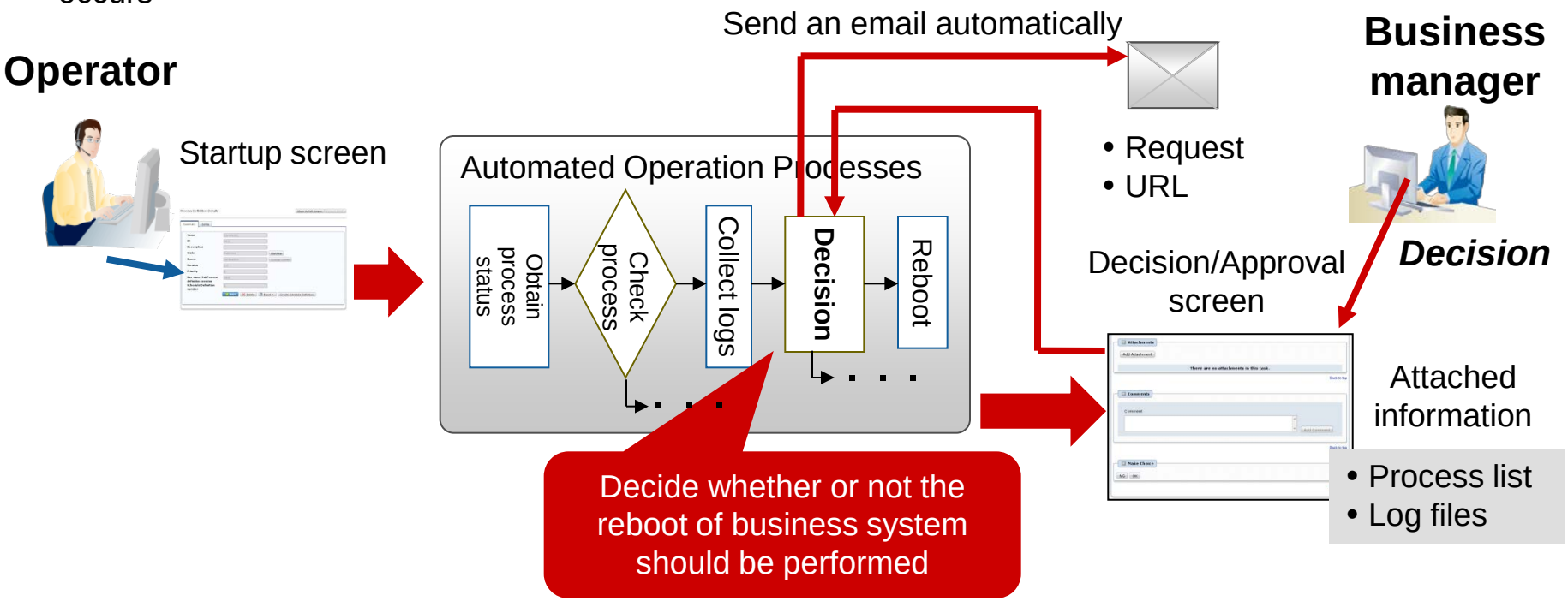
Web Console screen

Human Interaction

Automated Operation Processes can also be controlled by human decision making

- Processes can be designed to include an approval process. The process will continue based on an approve or reject decision
- The web forms allow data input or data to be checked

E.g. Ask the business manager whether or not the business system can be rebooted when a problem occurs



Other management functions

Management	Category	Overview
History Management	History of registering/deleting Automated Operation Processes	Outputs operation information based on registering / deleting Automated Operation Processes to the Management Server : "Name of Automated Operation Process", "Operator", "Operating date"
	History of executing Automated Operation Processes	Outputs the following information when Automated Operation Processes are executed: "Name of Automated Operation Process", "Start/End time of Automated Operation Process", "Initiator of Automated Operation Process", "Input parameters of Automated Operation Process", "Attached documents" "Start/End time, Input / Output parameters, Execution result (Success or Error) and execution time of each Operation Component in Automated Operation Process"
User Management / Access Control	Role Management	Manages users according to the role of an operation. Role: Automated Operation Processes Developer, Automated Operation Processes Administrator, Operator
	User Control	Registers/Updates/Deletes users
	Access Authority	Configures rights to "register/delete", "execute", "refer" Automated Operation Processes for each user
	Access Control	Restricts user access for each Automated Operation Process

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Benefits

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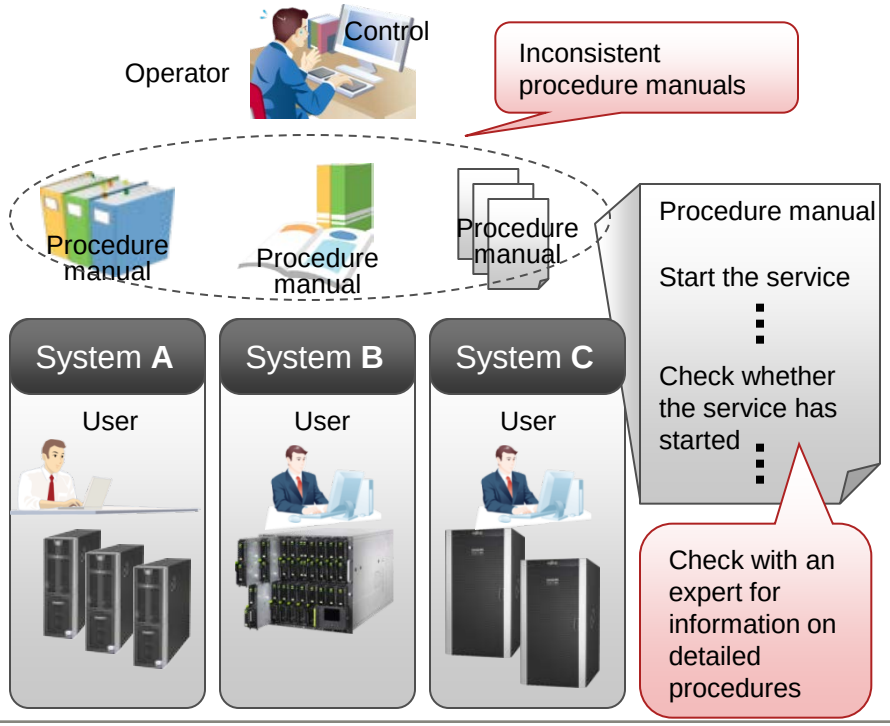
Benefit 1: Reduced Costs (More Efficient Operations)

Procedure manuals and human know-how are defined as operation processes, so operations can be made more efficient through unified control

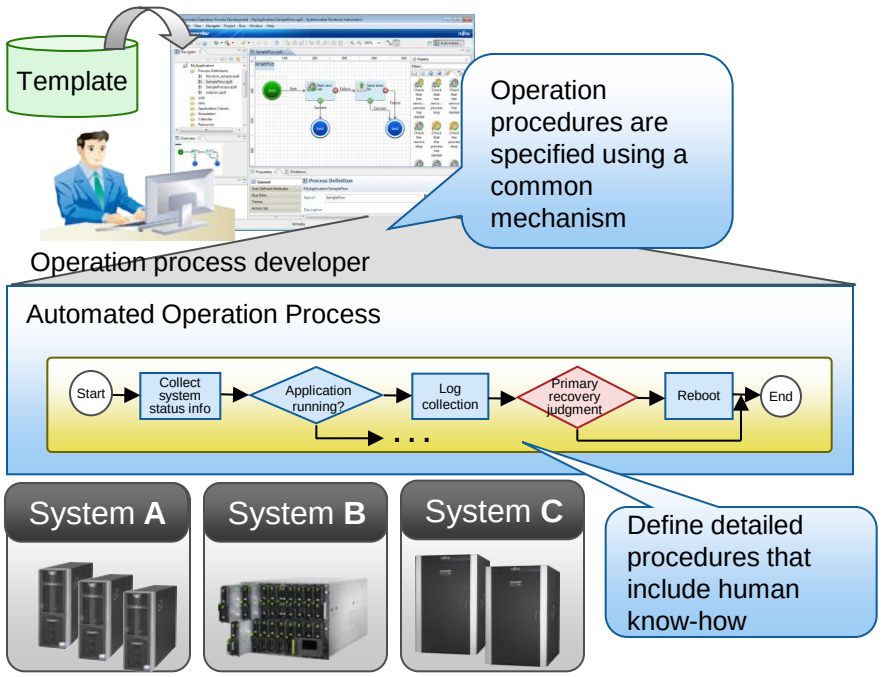
Before

- Inconsistent procedure manual formats and operating procedures
- Parts not covered in the procedure manuals are compensated for with human know-how (operation dependent on individual expertise)



After installation

- The method for describing operating procedures is unified, and progress has also been made towards standardizing procedures
- Establishment of operating procedures
- Reduction in development man-hours though the use of templates

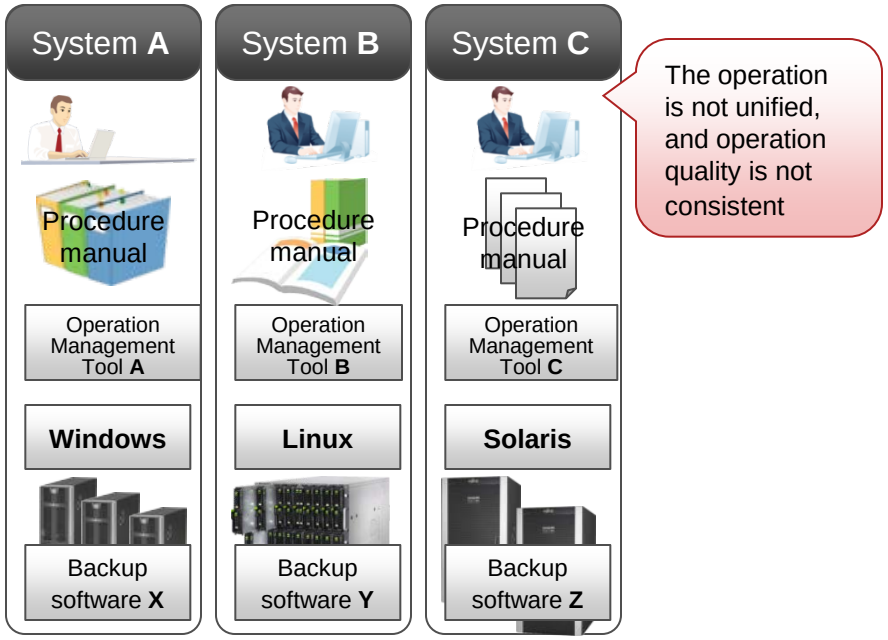


Benefit 2: Reduced Costs (Standardized Operation Tasks)

OS/middleware differences are absorbed, so operation tasks can be standardized so that procedures/time required/results will be the same regardless of who has performed the task

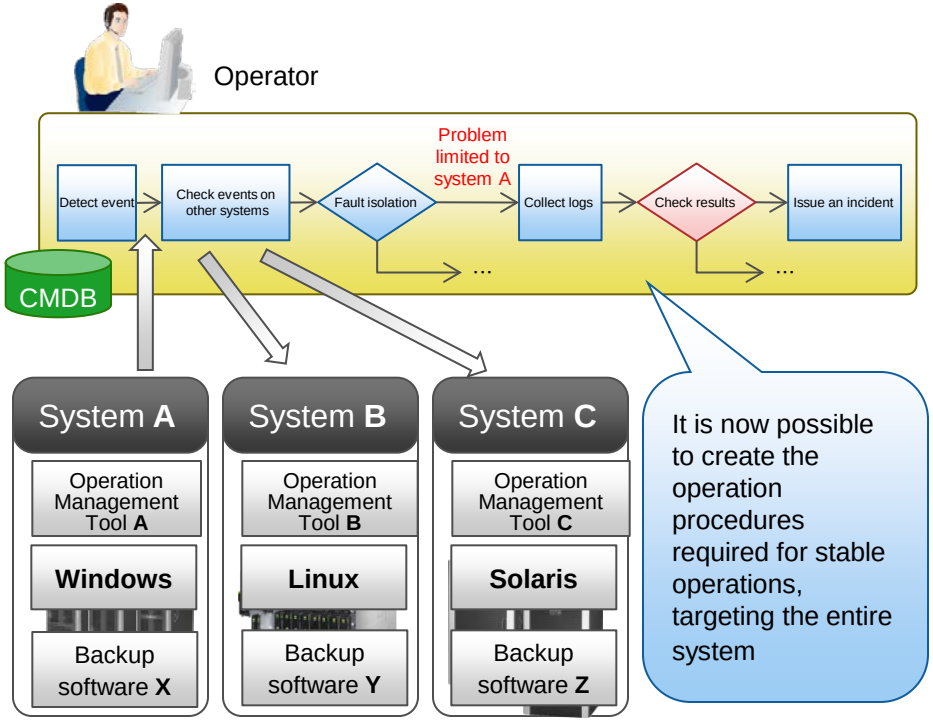
Before

- Systems operated by creating different operation management procedures for each range managed by each operation management tool



After installation

- Overall operation management procedures can now be automated over multiple systems, without having to be aware of differences in operation management tools

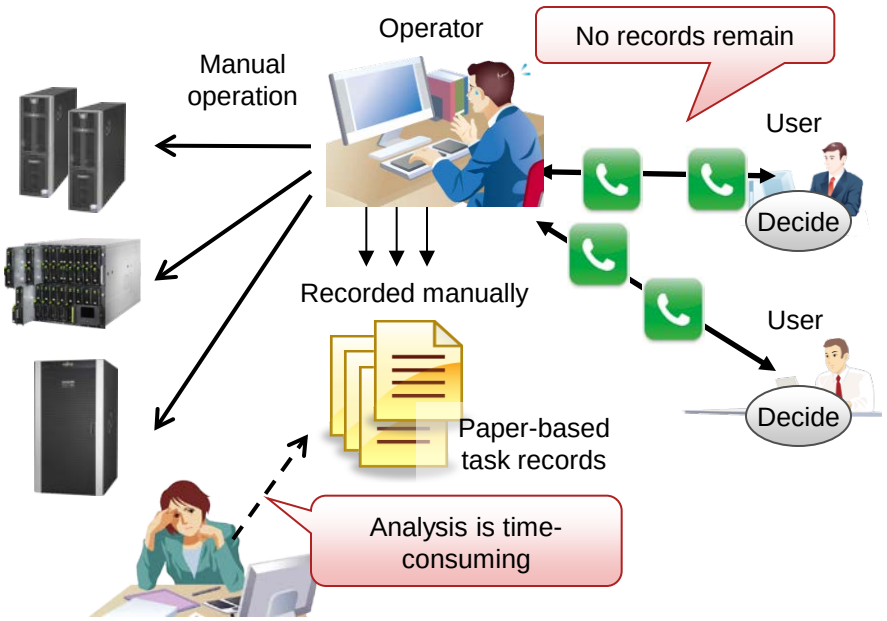


Benefit 3: Improved Operation Quality (Tasks are Visible)

By recording tasks that include the results of human judgments, all the operation tasks are made visible so that operations can be improved

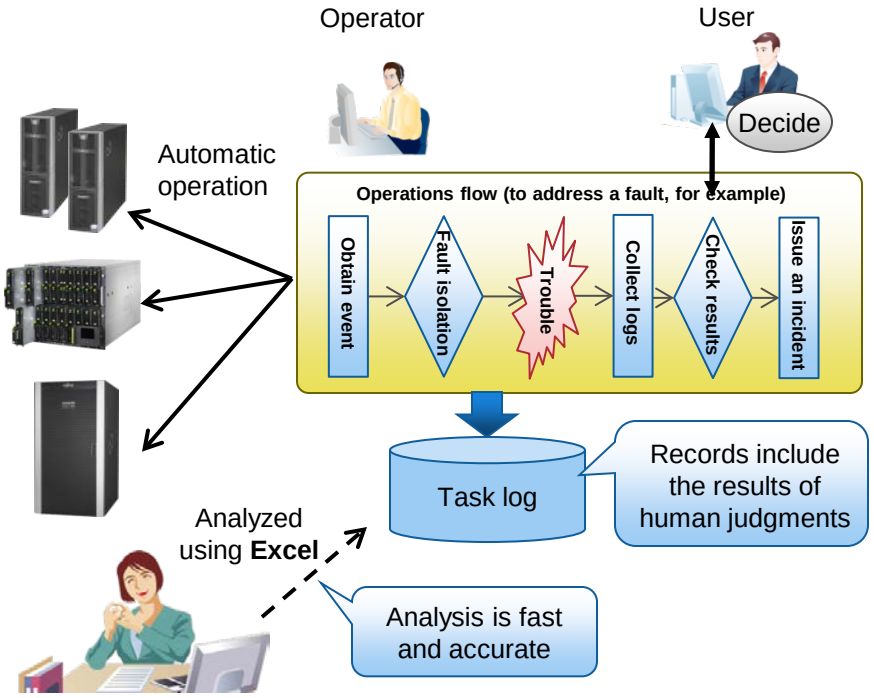
Before

- No records indicating who decided what or when
- Analysis work using task reports and other information is time-consuming



After installation

- Reliable task logs, including who decided what, and when
- Analysis can be performed quickly and reliably based on task logs



Benefit 4: Improved Operation Quality (Standardized Cloud Operations)

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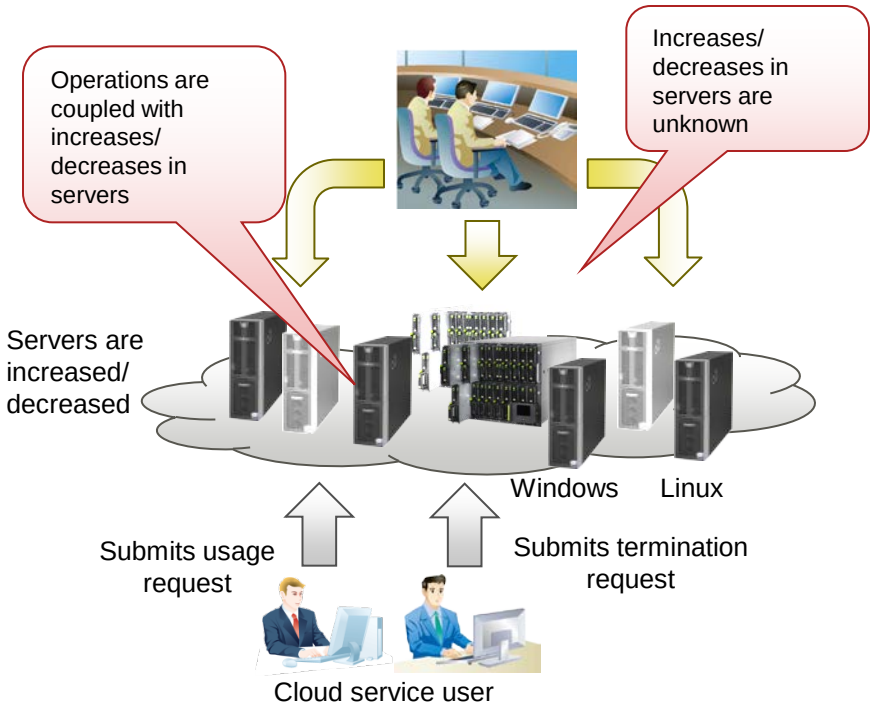
Enables operations without the need to consider daily increases or decreases in the number of servers

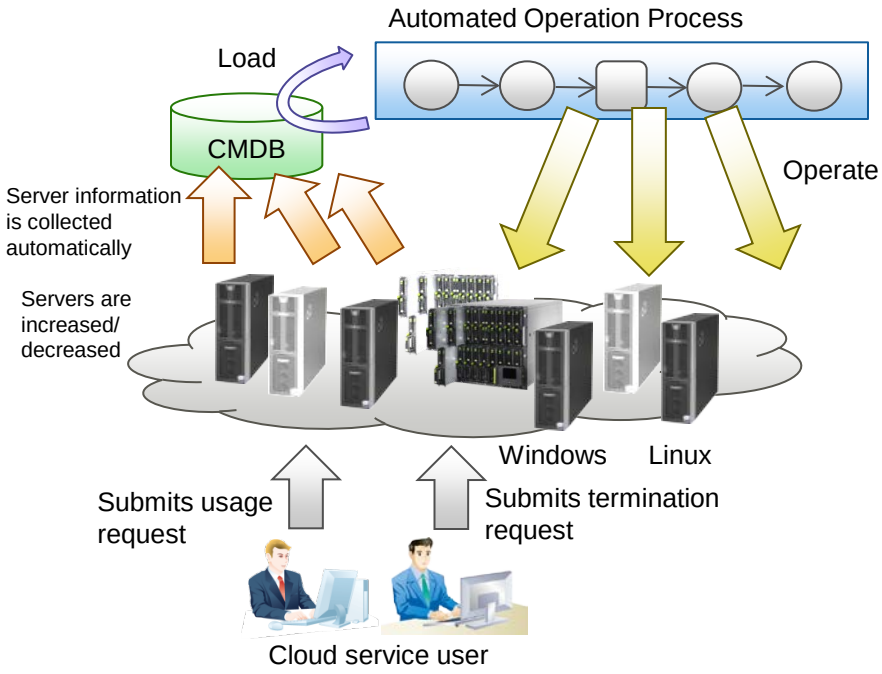
Before

- Operations are complex because of daily increases/decreases in number of servers
- Cannot control which servers are increased/decreased



After installation

- Uniform operations without the burden of having to be aware of the number of server increases/decreases
- Number of server increases/decreases, including virtual servers, are managed using CMDB



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Use Case

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Checking hardware Status

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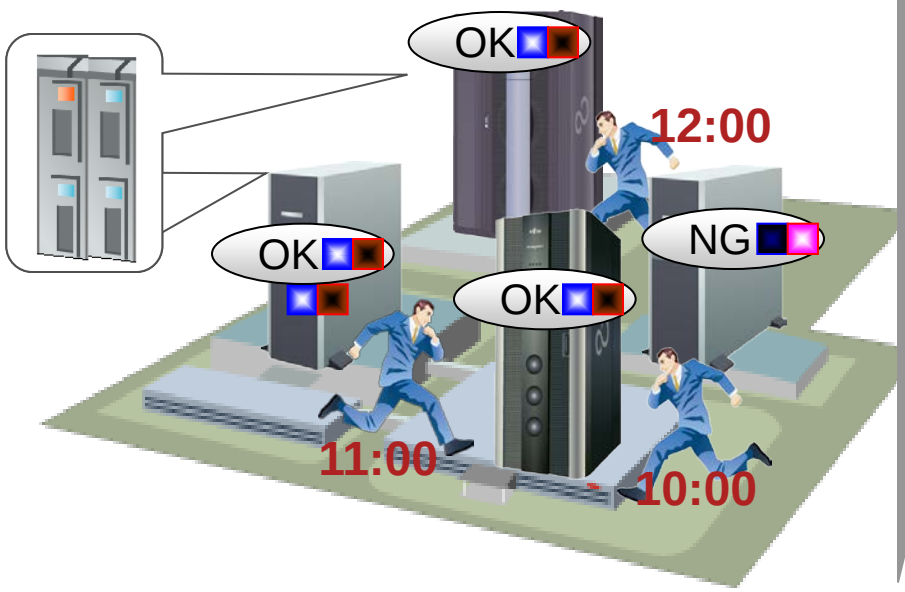
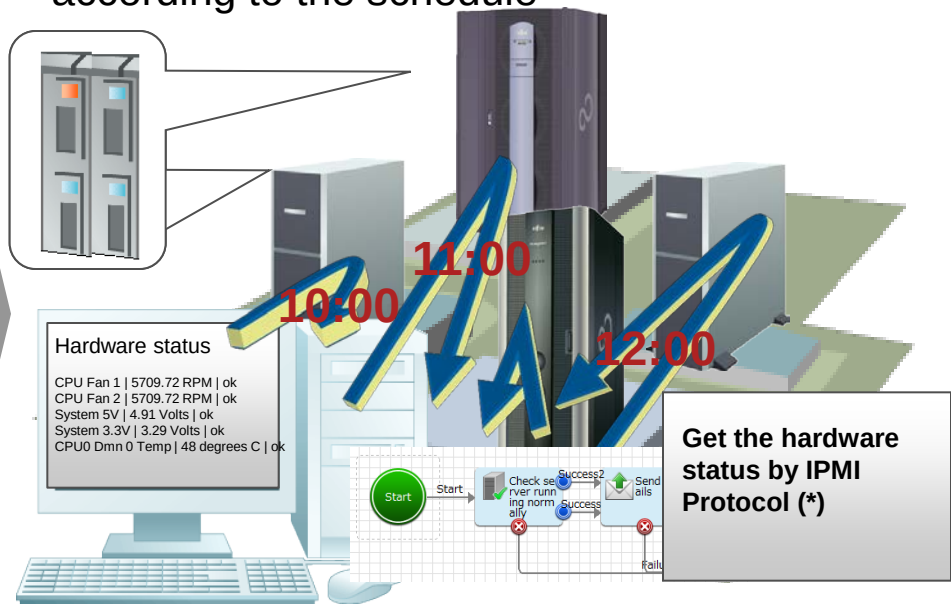
Before Time-consuming, low quality of service

Need to check the status of hardware on site at specified times



After Instant alerts, high quality of service

Status of hardware checked automatically according to the schedule



*: Information to be collected is dependent on hardware

✗ Time and man-power consuming

- Need to check the hardware status LED's(*) directly at specified time
- Can't check the status simultaneously

*: Hardware devices detect internal issues i.e. CPU temperature high, fan failure, which show the status by changing LED colors to alert engineers.

✓ Status checked automatically

- Check the status of multiple servers from a single site
- Operator knows status of servers at a glance from the Web Console

Controlled Server startup/shutdown

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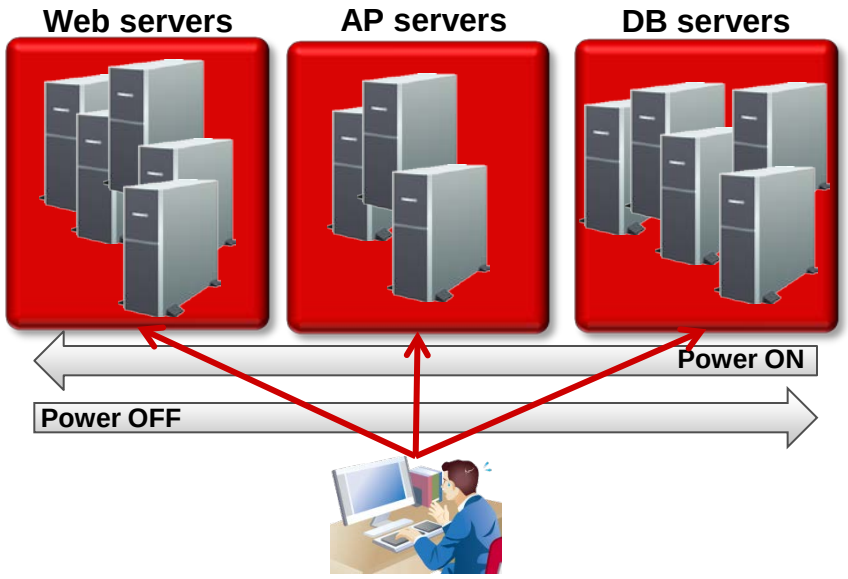
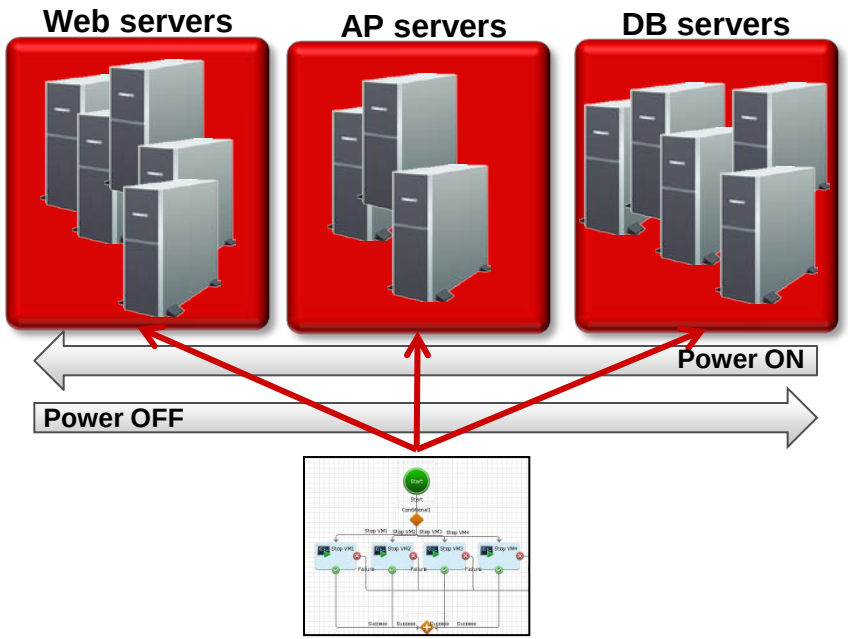
Before
Long manual sequence to Start/Stop servers

Need to comply with specified procedure to start/stop servers manually



After
Automated sequence to Start/Stop servers

Just execute the defined process to start/stop servers



✗ Must follow exact sequence to start/stop

- Complicated manual procedures tend to involve human error
- Time consuming to perform manual status checks of every server

✓ Not required to remember start/stop process

- The executed process starts/stops servers in the defined order, so human error is avoided
- Time saving as processes automatically check the status of servers

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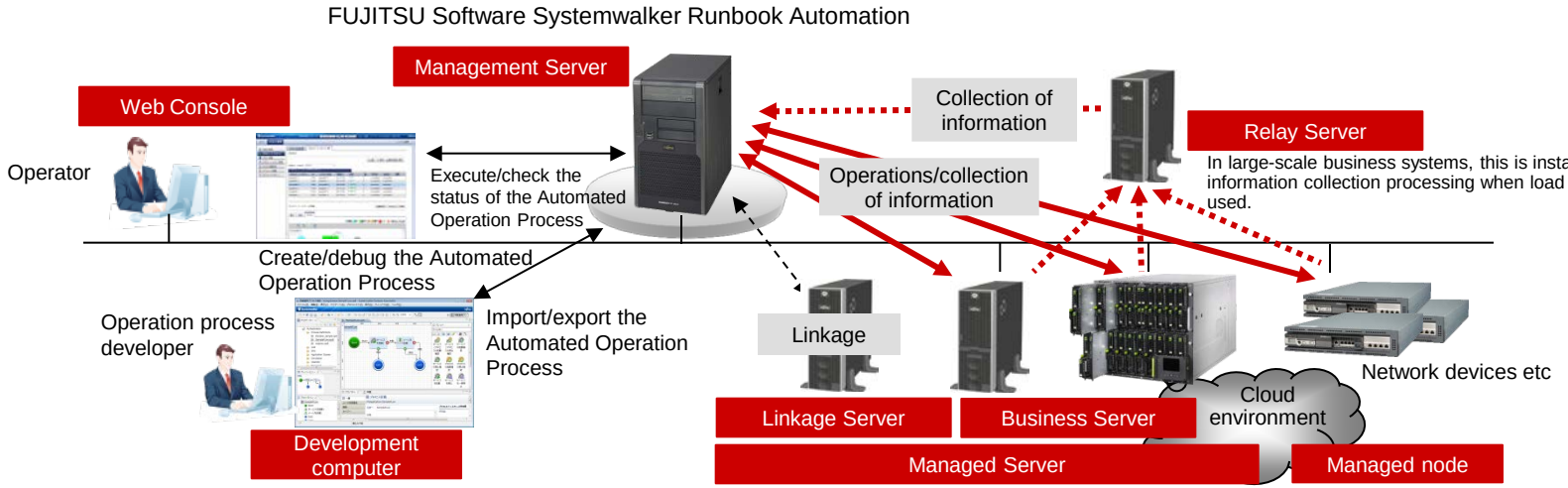
Product Information

FUJITSU Software Systemwalker

System Configuration

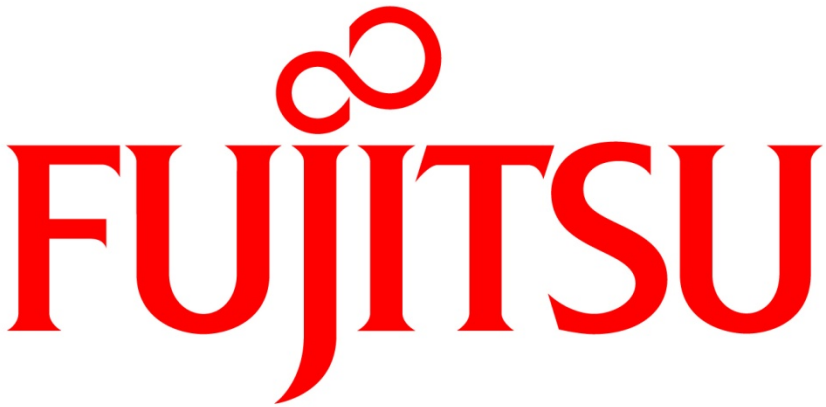


- **Management Server**
  This is the server that manages the execution of the Automated Operation Process, automates the operation tasks, and the execution results. Systemwalker Runbook Automation Manager runs on this server.
- **Managed Server/Managed node**
  The Managed Server is the server on which the actual operations from the Management Server are performed by the execution of the Automated Operation Process. The Systemwalker Runbook Automation Agent can also be installed on this server.
  The managed node is a node such as a network device. It also performs operations and obtains information from the Management Server.
- **Relay Server**
  This is the server that is installed to balance the automatic collection processing load for configuration information to the Systemwalker Runbook Automation Management Server.
  It is installed to manage large-scale systems.
- **Linkage Server**
  The products that link with Systemwalker Runbook Automation run on this server. Depending on the linkage method, it will not always be necessary to install the Agents of this product.
  FUJITSU Software Systemwalker Centric Manager or FUJITSU Software ServerView Resource Orchestrator are examples of linked products.
- **Business Server**
  This is the server that is the target of operations from the Management Server.
- **Development computer**
  This is the computer that is used to create Automated Operation Processes.
- **Web Console**
  This can be used to execute, operate, and check the operational status of Systemwalker Runbook Automation Automated Operation Processes.

Operating Environment

Type/usage	OS	
Management Server	Microsoft® Windows Server® 2012 Microsoft® Windows® Small Business Server 2011 Essentials Microsoft® Windows Server® 2008 R2 Microsoft® Windows Server® 2008 Microsoft® Windows Server® 2003 R2	Red Hat Enterprise Linux 6 Red Hat Enterprise Linux 5
Managed Server Linkage Server Relay Server	Microsoft® Windows Server® 2012 Microsoft® Windows® Small Business Server 2011 Essentials Microsoft® Windows Server® 2008 R2 Microsoft® Windows Server® 2008 Microsoft® Windows Server® 2003 R2 Microsoft® Windows Server® 2003	Red Hat Enterprise Linux 6 Red Hat Enterprise Linux 5 Japanese Solaris(TM) 11 Operating System *3 Japanese Solaris(TM) 10 Operating System *3
Managed node	-*1	
Development computer	Microsoft® Windows 8 Microsoft® Windows 7 Microsoft Windows® Vista Microsoft® Windows XP	Microsoft® Windows Server® 2012 Microsoft® Windows® Small Business Server 2011 Essentials Microsoft® Windows Server® 2008 R2 Microsoft® Windows Server® 2008 Microsoft® Windows Server® 2003 R2
Web client	Windows® Internet Explorer 10*4 Windows® Internet Explorer 9 Windows® Internet Explorer 8 Windows® Internet Explorer 7	
Virtualization software*2	VMware vSphere 5 VMware vSphere 4 Hyper-V 2.0 Red Hat Enterprise Linux 6 Virtual Machine (KVM) Red Hat Enterprise Linux 5 Virtual Machine (Xen)	

***1** Managed nodes are devices whose IP address on the network can be identified, and which can be operated on using remote access protocols (such as **telnet**, **ftp**, **ssh**, and **PowerShell**).
***2** "Virtualization software" refers to the virtual environment for both the Management Server and the Managed Server.
***3** Only the Business Server is supported.
***4** Only Internet Explorer 10 present in Windows Server 2012 or Windows(R) 8 is supported.



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Appendix

FUJITSU Software Systemwalker

List of functions to customize the output of Operation Components

15 filtering features for customizing the output of a component that can be passed as the input to the next Operation Component without programming

Filter Name	Function
Convert to upper case or lower case	Converts all the characters to upper case or lower case.
Count the number of lines	Counts the number of lines.
Add a string	Adds an arbitrary text or values of the variables.
Extract a string	Extracts any string which matches the pattern of a defined regular expression.
Format	Divides the result of Operation Components or the output of filtering by a defined delimiter and puts it into the specified format string.
Delete the overlapped lines	Detects the overlapped lines and then deletes all but one line. This filter can also delete only the sequential overlapped lines.
Replace	Searches a specified string and then replaces it with another string.
Extract lines	Extracts lines which match the specified condition.
Sort	Sorts the result of Operation Components or the output of filtering by lines.
Delete lines	Deletes the forward or backward lines with reference to the specified line. This filter can delete all the empty lines as well. This also can keep only *n* lines from the top or bottom and deletes all the other lines.
Delete spaces	Deletes one-byte and two-byte blanks, tabs, line feed characters (CRLF/CR/LF) from the head or end.
Extract CSV format data	Treats the result of Operation Components or the output of filtering as a table by sorting or selecting the column, row and block.
Extract attributes of XML	Extracts attributes from the XML format.
Change the format of date	Changes the format of a date.
Calculate	Adds / Subtracts the fixed value or value of a variable or the execution result (Integer) to (from).

List of pre-defined Operation Components (1/3)

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The default operation components of the development environment

- Operation Components which perform basic operation to ICT systems

Standard Components*	Overview			
Command Execution	Execute an arbitrary command	Issue WMI query	Execute multiple commands	Multi-Operation flow set execution
Email Operation	Send emails			
File Operation	Transfer files Change the access permission for a file Check whether the file exists Check whether the file/directory exists Create files Delete files	Copy files/directory Move files/directory Obtain the list of files/directory Obtain the size of files/directory Check the access permission of files/directory Obtain the modified date of files/directory	Create directory Delete directory Change the access permissions for the directory Compress files Compress directory Decompress files	Read files Print files Search string in file Add string in file Replace string in file Get Finger Print
Configuration Information Operation	Obtain configuration information	Update configuration information	Delete configuration information	Register a logical node
Communication Components	Perform REST-based communications Obtain value by using SNMP	Set value by using SNMP	Issue SNMP trap	Execute web service
Service/Process Operation	Check that the service/process has started Check that the service/process has stopped Check that the service has started Check that the service has stopped	Check that the process has started Check that the process has stopped Start service Stop service Suspend service Change the account of service	Change the startup type of service Obtain the service status Stop process	Stop virtual server on the VM host Set maintenance mode of VM host Forcibly stop VM host
Load Balancing and Cluster Operation	Remove as a load balancing target	Include as a load balancing target	Obtain resource status of cluster system	Switch resource of cluster system

*: Operation Components can be customized and also newly created.

List of pre-defined Operation Components (2/3)

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The default operation components of the development environment

- Operation Components which perform basic operation to ICT systems

Standard Components*	Overview			
Server Operation	Start the server Stop the server Stop OS Restart OS Start Workunit	Stop Workunit Restart Wprlimot Start virtual server Stop virtual server Restart virtual server	Build virtual server Delete virtual server Change virtual server system Obtain a list of virtual servers	Obtain detailed information about the virtual server Create snapshot of virtual server Restore snapshot of virtual server Change host name
Monitoring Operation	Check for hardware abnormalities Obtain server power status Check whether the server is running normally	Notify event Check occurrence of event Change status of event	Obtain event at specified time Disable server monitoring Enable server monitoring	Obtain Event Log Create Event Log Obtain Performance Counters
Job Operation	Obtain Job Nets status	Start Job Nets		
Network Operation	Check operating status of node	Check whether connection to the port is possible		
System Operation	Obtain current date Compare dates	Set the operating system network	Install software	Apply operating system patch
Automated Operation Process Control	Check if the cycling time elapsed	Sort string	Store the data in the execution result	Register schedule Delete schedule
ITIL Operation	Issue incident			

*: Operation Components can be customized and also newly created.

List of pre-defined Operation Components (3/3)

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The default operation components of the development environment

- Operation Components which perform basic operation to ICT systems

Standard Components*	Overview	
Linked Product Monitoring, Startup and Stop	Notify/Confirm the event Change the status of event Obtain the event Enable/Disable the server monitoring	FUJITSU Software Systemwalker Centric Manager
	Start Job Nets Obtain Job Net status	FUJITSU Software Systemwalker Operation Manager
	Obtain resource status of cluster system Which resource of cluster system	FUJITSU Software PRIMECLUSTER
	Start / Stop / Restart Workunit	FUJITSU Software Interstage Application Server
	Remove as a load balancing target Include as a load balancing target	FUJITSU Network System IPCOM
	Issue the incident	FUJITSU Software Systemwalker IT Service Management
Virtual Sever Operation	Start / Stop / Restart virtual servers Build / Delete / Change virtual server system Obtain the list of virtual servers / detailed information about the virtual server Create / Restore snapshot of virtual server	FUJITSU Software ServerView Resource Orchestrator
	Stop virtual servers at a time Start / Stop ESX maintenance mode	VMware vCenter

*: The latest operation components will also be published on the Fujitsu Systemwalker software technical information website as soon as they are available.

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