Orchestrating a brighter world

NEC

MasterScope JobCenter White Paper

June, 2017

NEC Corporation

Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.
We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

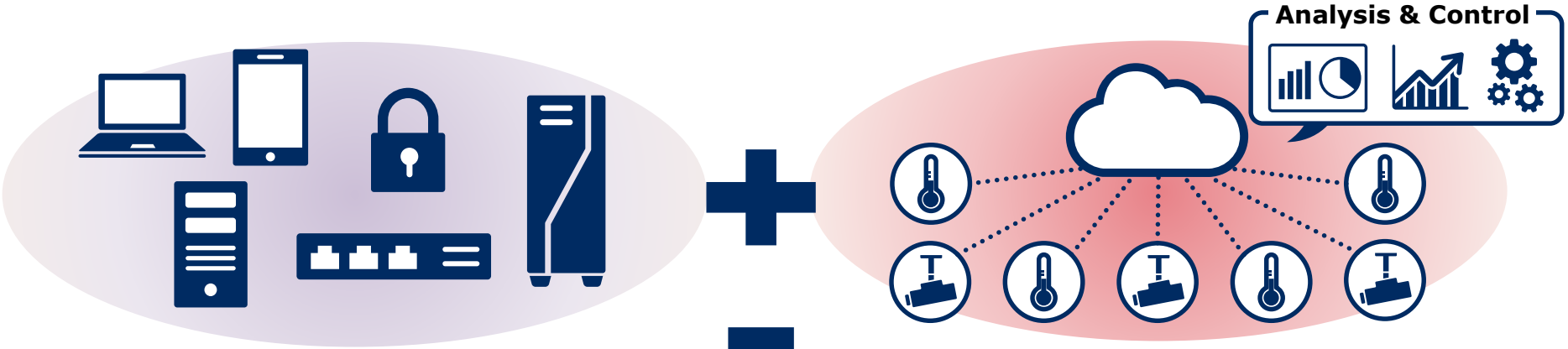
Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.

Outline

1. *Introduction*
2. *Challenges*
3. *Solution*
4. *MasterScope JobCenter*
5. *Use Case*

1. Introduction

Manpower Shortage in IT System Division leads IT to get effected



PC, Mobile, Server, Storage, Network, Security, etc.

IoT, Big data, Cloud, etc.

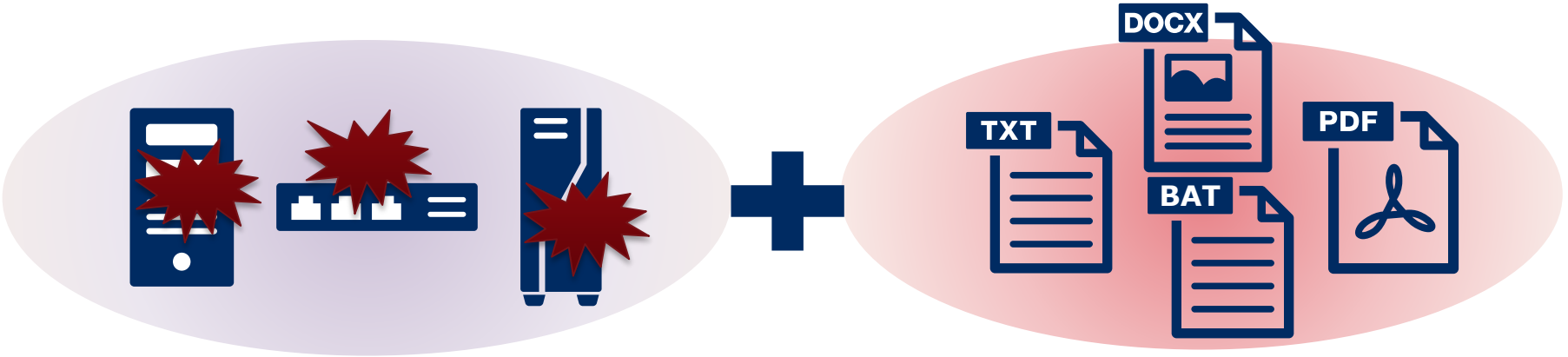
Utilizing existing IT to streamline operations and improve productivity

IT system division

Divergence of IT utilization such as production and new service creation to increase enterprise competitiveness

Manpower Shortage in IT System Division

Many cases happen in IT system division



Human mistakes stop services

Many manual operations cause low level of productivity

Lose customer trust and satisfaction

Solution to deal with problems in IT system division

Large

Scale of Number of employees

Small

Big Company
Having many projects
Human resources with high mobility
(such as subsidiary companies specialized for IT system)

Mid-sized enterprises/ SMEs
Human and Financial Resources for IT are limited
(such as local government, local bank, hospital, factory, etc.)

Needs differs based on its company scale… Common needs are…

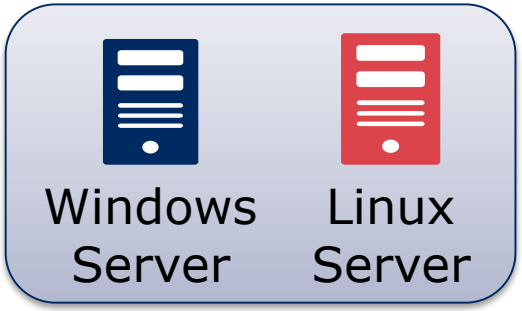
More reduction in succession task
More make work productive
More progress in service level
More reduction on human mistake on failure

To realize Customer's needs "more", "Automation" is a key factor!!

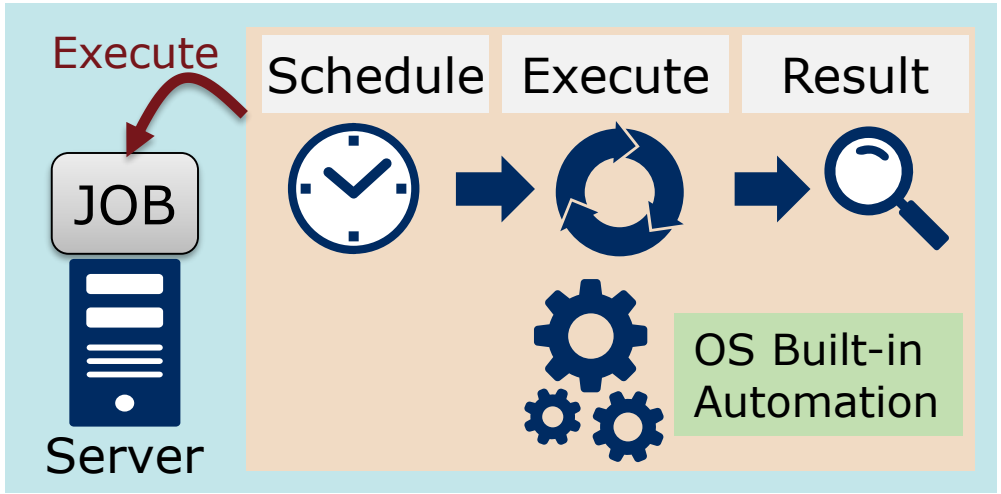
2. Challenges

OS built-in automation function

JOB is the unit of work such as service start, copy file, power off and so on.



has a built-in automation functions such as “task scheduler”, “cron”, and “at”.



OS Built-in automation executes Job on schedule and return the result.
The automation is applicable *within the server*.

But, field staff has Pains to adapt it in operation site…

Separately Managed Platform (1/3)

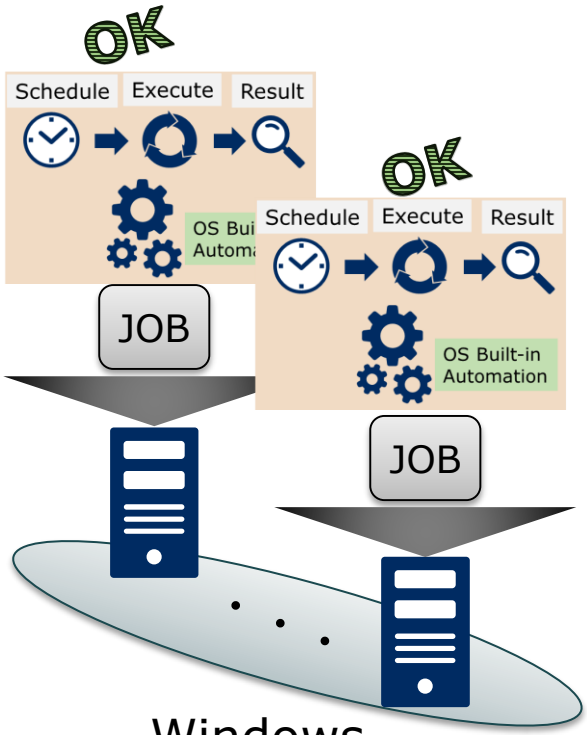
Pain

OS Built-in Function

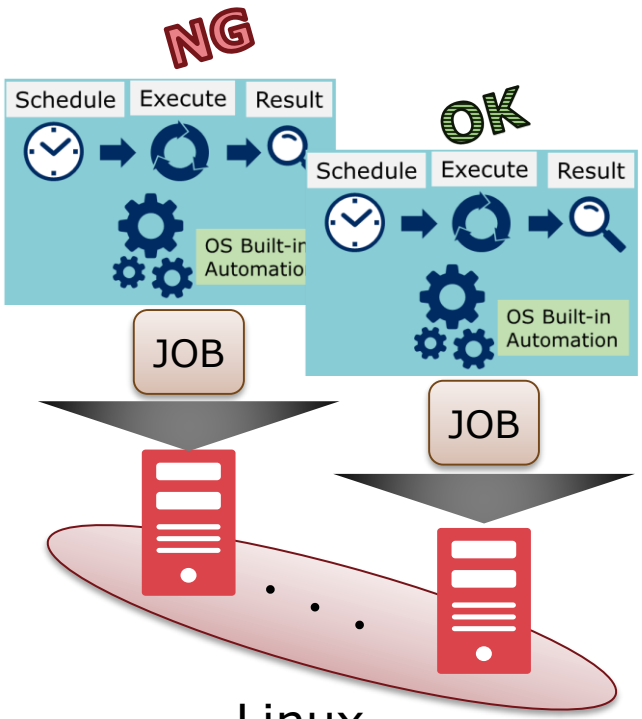
Not applicable…

Field staff

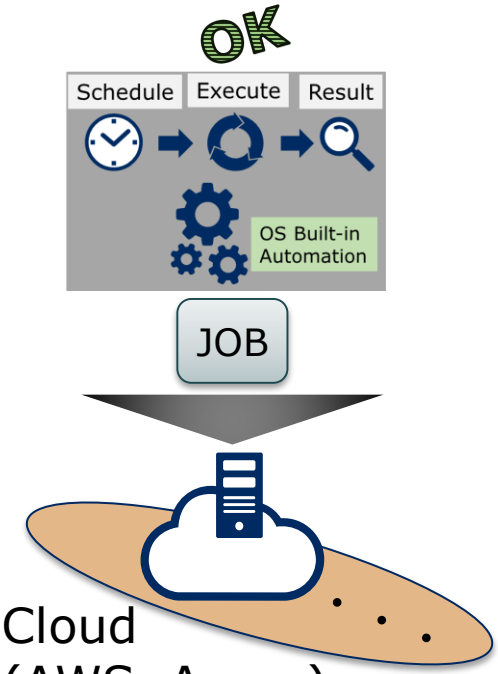
There are tens or hundreds of Jobs in various platforms. *It is impossible to set automation function in each servers and check all the result*.



Windows



Linux



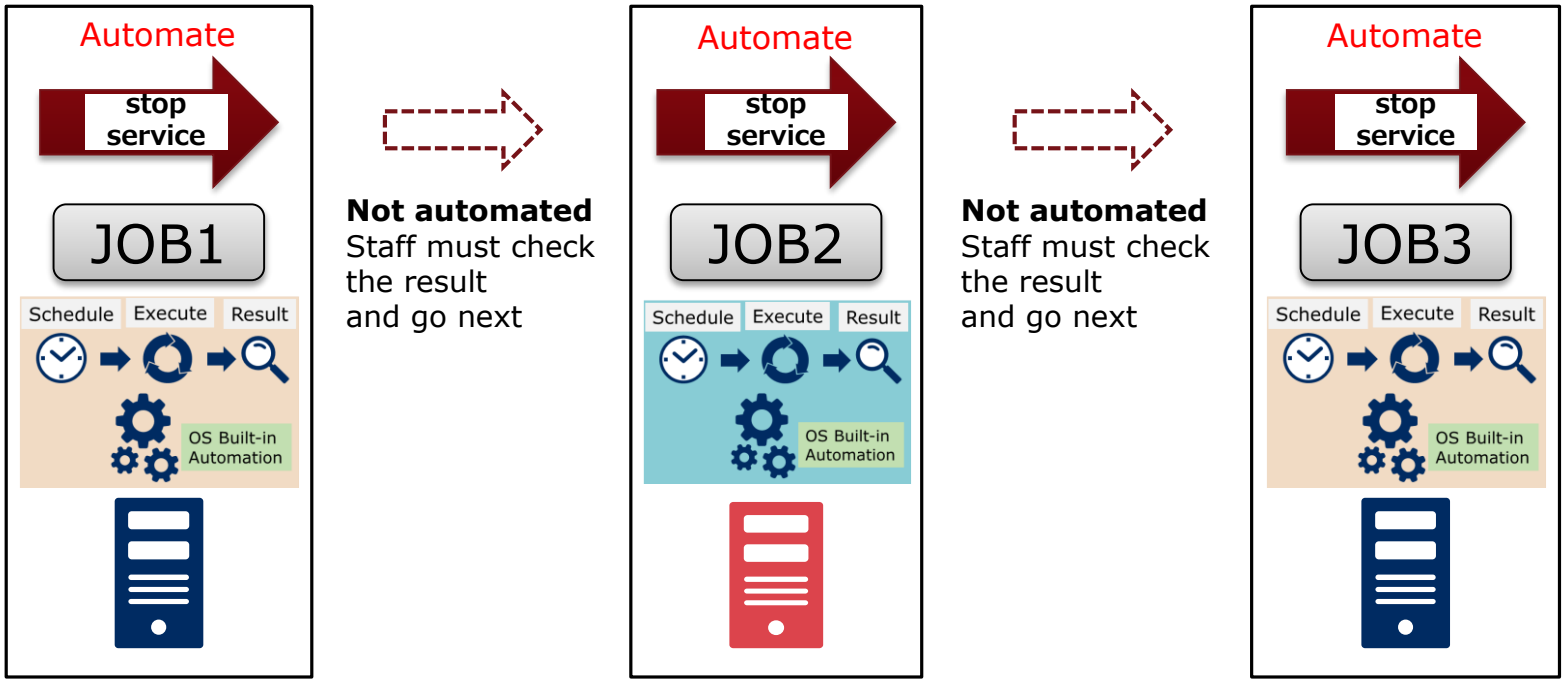
Cloud (AWS, Azure)

Partial Automation (2/3)

Pain

Not applicable…

Operation e.g. "stop web service" composes many jobs and they run on various servers. *Partial automation does not contribute to reduce human cost*.
Not partial automation but full automation is necessary.



Web Server | Application Server | DB Server

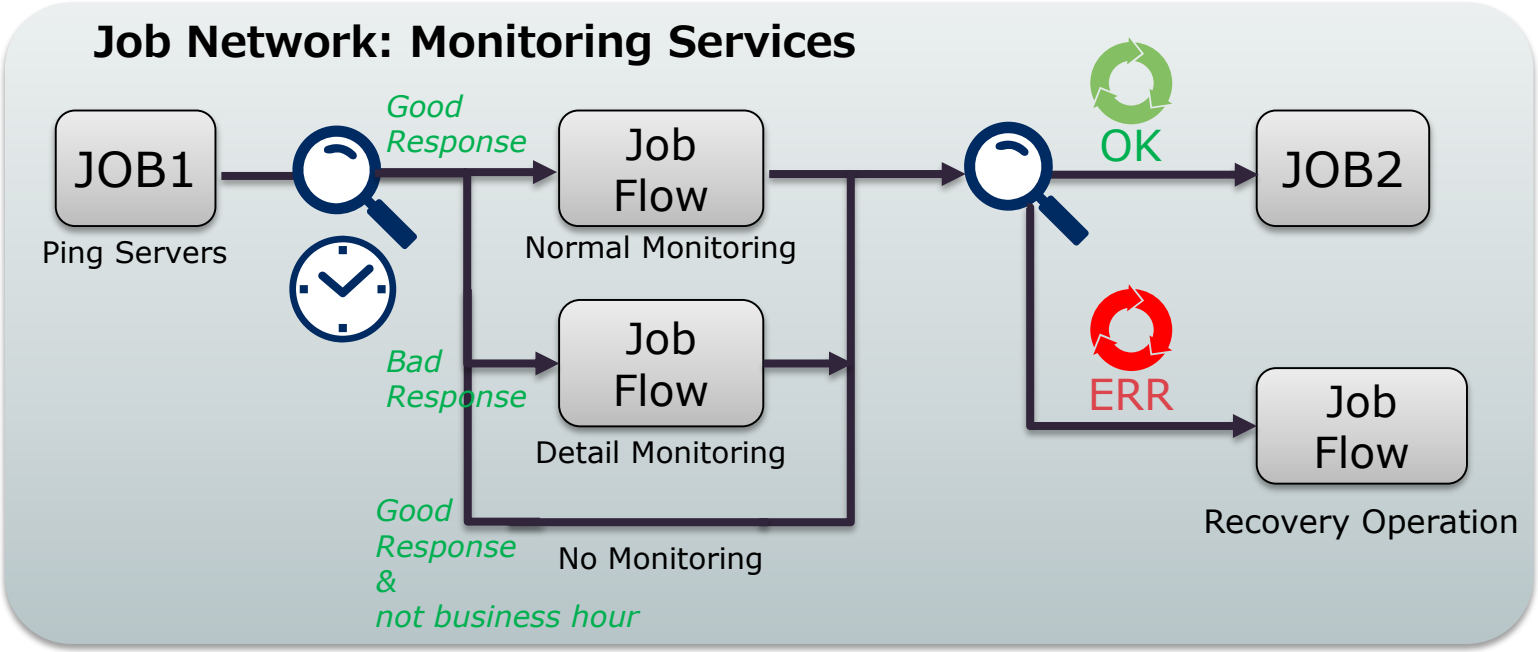
Complicated Job Flow (3/3)

Pain

OS Built-in Function

Not applicable…

There are regular and irregular operations. *The execution is depending on complex conditions*. Error handle is also necessary.



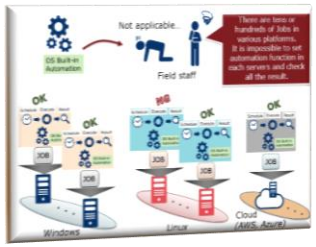
3. Solution

Pains & Pain Relievers

Pain ← Reliever

Pain

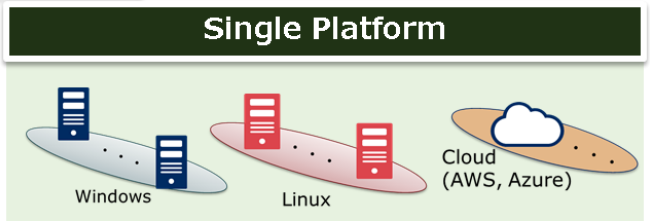
Separately Managed Platform



Reliever

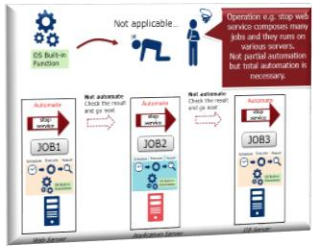
Single Job Platform

Don't need to care platform



Pain

Partial Automation



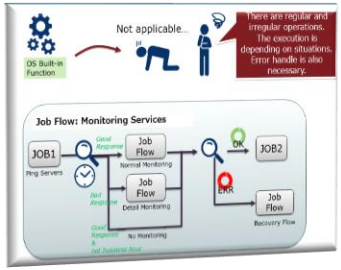
Reliever

Full Automation

Job flow management

Pain

Complicated Job Flow

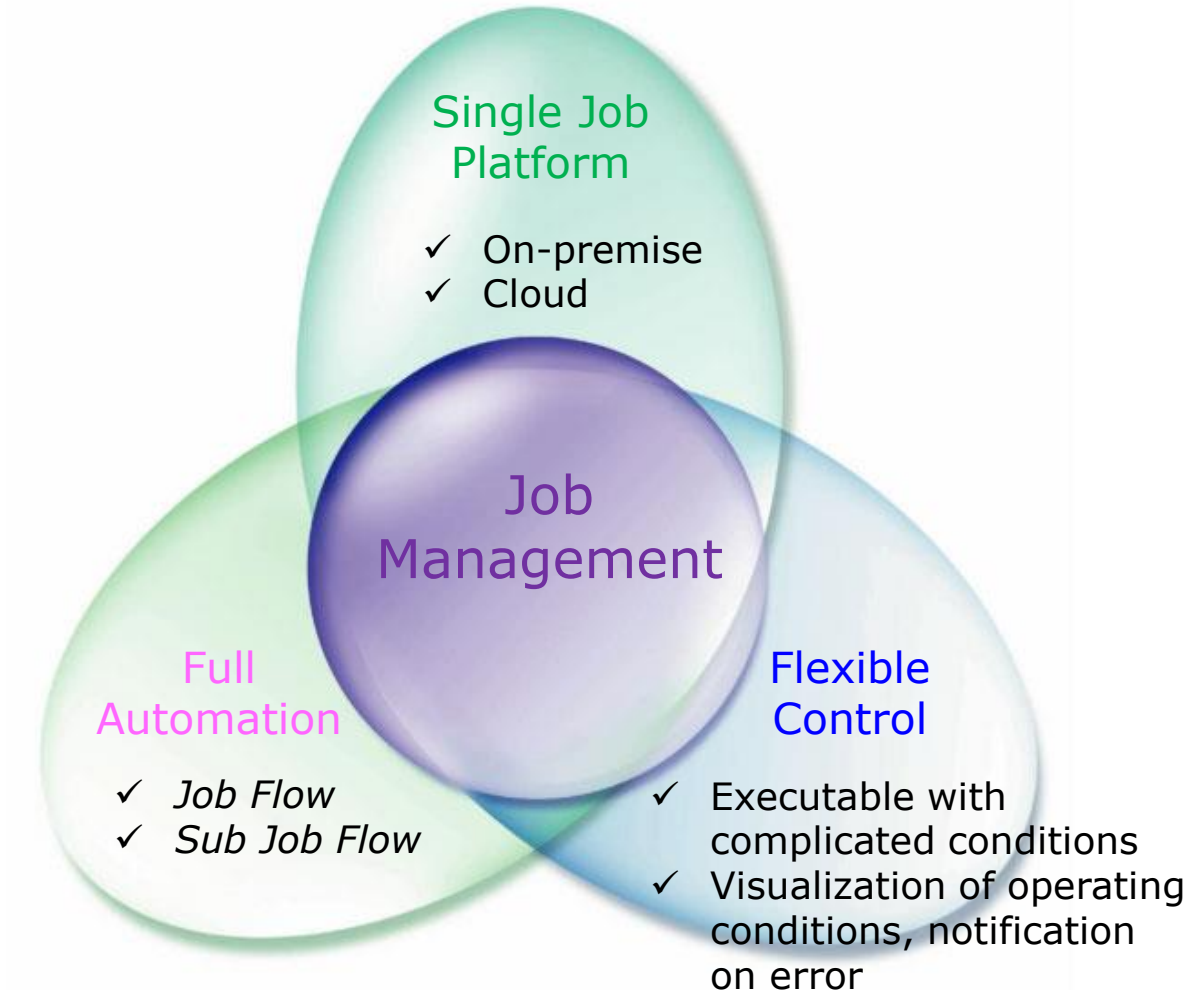


Reliever

Flexible Control

Waiting items	Parallel Branch	Condition Branch	Schedule Branch
			

Features required on site



Field staff

Job Management Product List

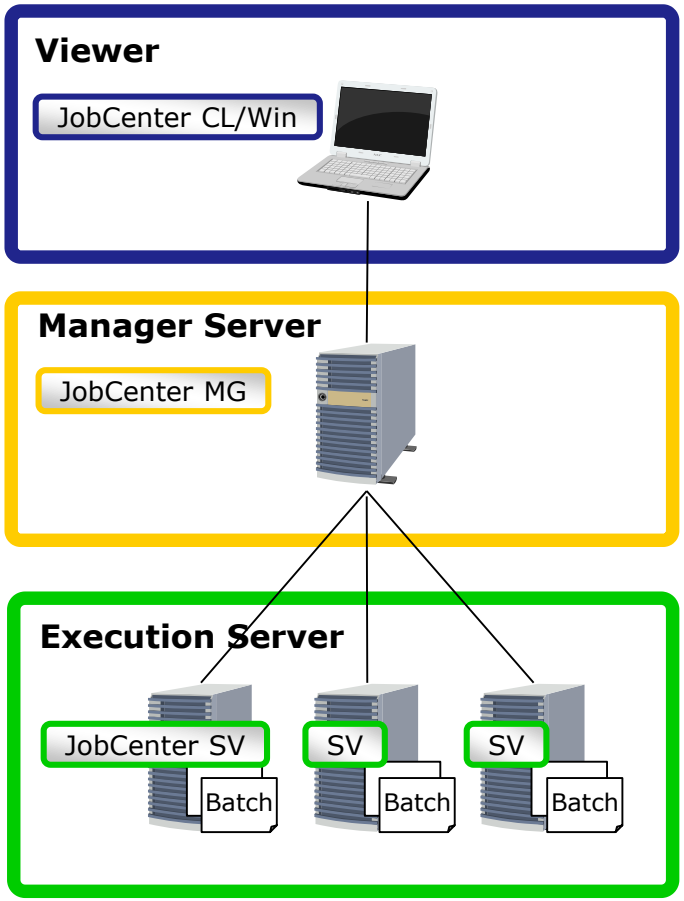
	Item	MasterScope JobCenter		Product A		OS standard (Cron, task scheduler)		OSS Job Scheduler		Product B	
Job management Basic function	By GUI Flow definition	◎	Flexible flow can be created using various parts.	○	Flexible flow creation is possible. The visibility of the flow depends on the person who made it.	×	None	×	Flow creation with GUI is not possible. (Definition editing is text based, it can be visually confirmed with GUI only when confirming)	△	In the case of the standard function, visibility is poor only with tree display. Paid option is required for flow display. Operability is not good.
	Calendar and schedule definition	○	Fine setting such as business day, repetition, shift before and after the holiday, 36 hour schedule is possible Easy to change on the day	○	A general schedule is possible. 48 hour schedule is possible. Job repetition is possible, but there will be enormous number of rules	×	Scheduling of specific day, daily, weekly, or monthly operation is possible. There is no calendar function.	○	A general schedule is possible. Possible to suspend job execution on holiday Possible to shift job execution on holiday to other day	△	A general schedule is possible. Suppression of job execution by designating a pause date Operability such as change on the day is not good
	Execution monitoring	○	Possible to monitor with GUI. Re-execution operation is also flexible.	○	Possible to monitor with GUI. Re-execution operation is also flexible.	×	Unable to monitor execution status and result.	○	Possible to monitor with GUI. Re-execution operation is also flexible.	△	Possible to monitor with GUI Since flow is not visible, poor operability (paid option)
	Multiplicity control	○	Multiple execution of queue execution multiplicity and flow are possible. It can be set from the GUI.	○	Execution multiplicity can be set, but only setting and checking commands. Multiple activation control of flow is possible.	×	No	△	You can set the execution multiplicity in the setting file, but you need to restart to reflect it	△	You can set the execution multiplicity in the setting file, but you need to restart to reflect it
	Load distribution	○	Round robin, load balancing by waiting status of queue is possible	○	Equal load balancing, load balancing that considers the upper limit of the queue is possible.	×	Impossible (standalone execution)	△	Absolute possibility of load balancing configuration that considers task number	?	unknown
Support function	Bulk edit definitions	◎	Batch edit of definition defined by Excel (flow, schedule). Flow can also be referred.	○	Excel definition function available (flow only). Flow reference not allowed.	△	Can be independently implemented by editing text etc.	△	Definition editing by XML	○	Paid options
	Report function	△	Definition information and setting information can be output to Excel report (free of charge).	◎	It is possible to output with a paid option.	×	None	×	None	×	None
Other	Operability	○	It can be used intuitively. Operation restriction for each user is also acceptable.	○	Intuitively available.	○	It is easy to use because it has few functions.	×	Basically, it is necessary to repeat setting and input on the GUI, and it is impossible to create a job definition on a flow base like JobCenter or A company, so much cost is required for creating job definition	△	Since the job flow can not be seen in the GUI within the normal range, it is difficult to set the control order (difficult to understand)
	Availability	○	HA cluster configuration possible (job inheritance is also possible)	○	HA cluster configuration possible (job inheritance is also possible)	×	Standalone	×	Note that redundancy by a failover cluster can not be performed (job inheritance is impossible)	○	Paid option (Yearly support fee is expensive so that total cost may be higher than commercial products)
	Price	◎	Target node license. It does not depend on the number of CPU/Cores	×	It is expensive as it depends on the number of CPU/Cores.	◎	Free	?	If you receive support such as troubleshooting and bug fixes, you need to purchase a separate support license (details unknown)	×	If you add cluster support and GUI options, support costs are expensive.

This white paper pick up MasterScope JobCenter

4. MasterScope JobCenter

JobCenter Product Basic Configuration

MasterScope JobCenter offers 3 tier product configuration i.e. Viewer, Manager Server and Execution Server, to flexibly support various size of systems.



◆ MasterScope JobCenter CL/Win

- Client GUI to create job and schedule and to confirm execution results.
- Also includes reporting function(Report Helper), analysis function(Analysis Helper)

◆ MasterScope JobCenter MG

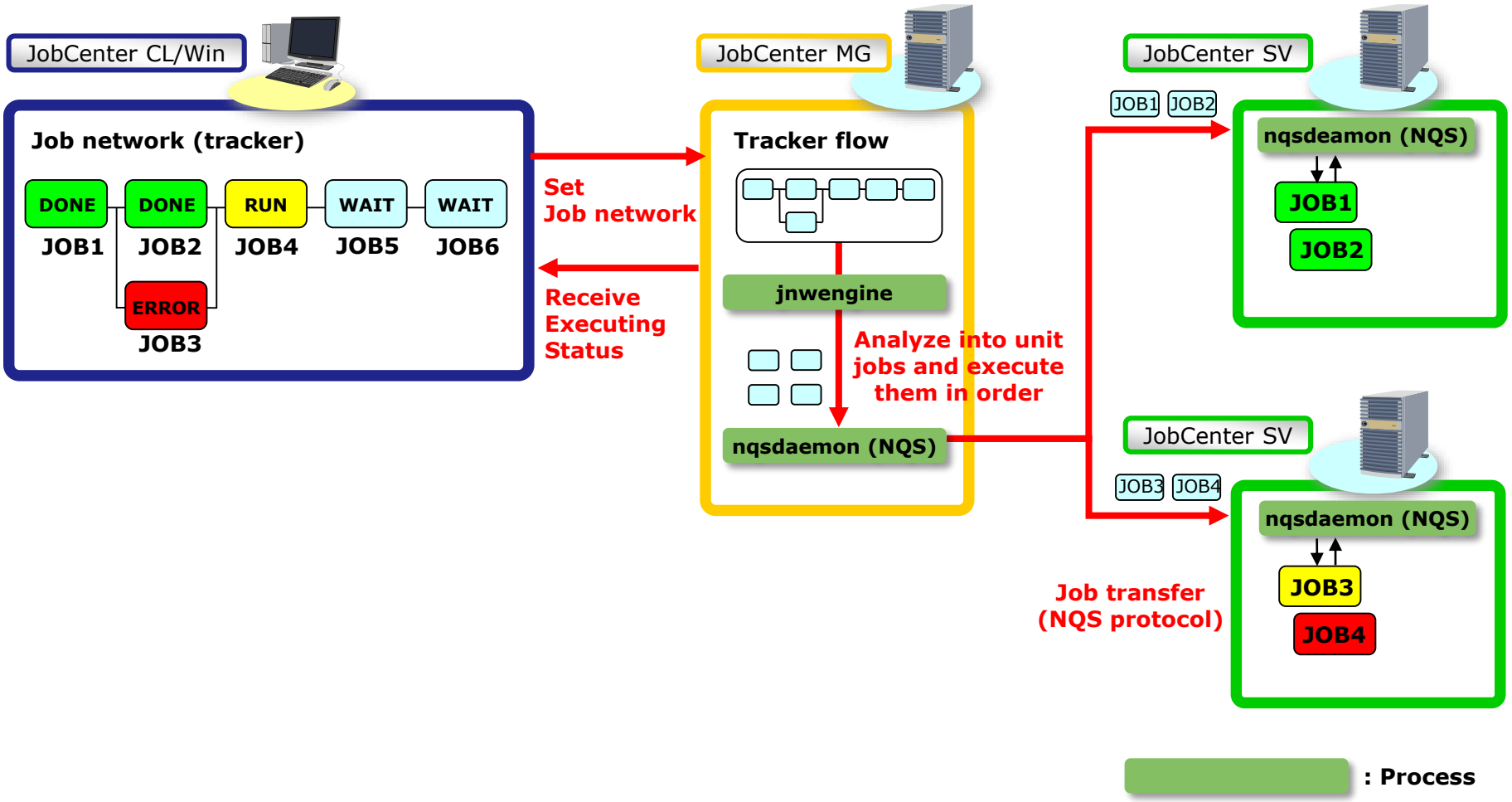
- Installed in Manager Server, to build job execution environment and to centrally monitor the job execution statuses

◆ MasterScope JobCenter SV

- Installed on each server, to execute jobs submitted by MG

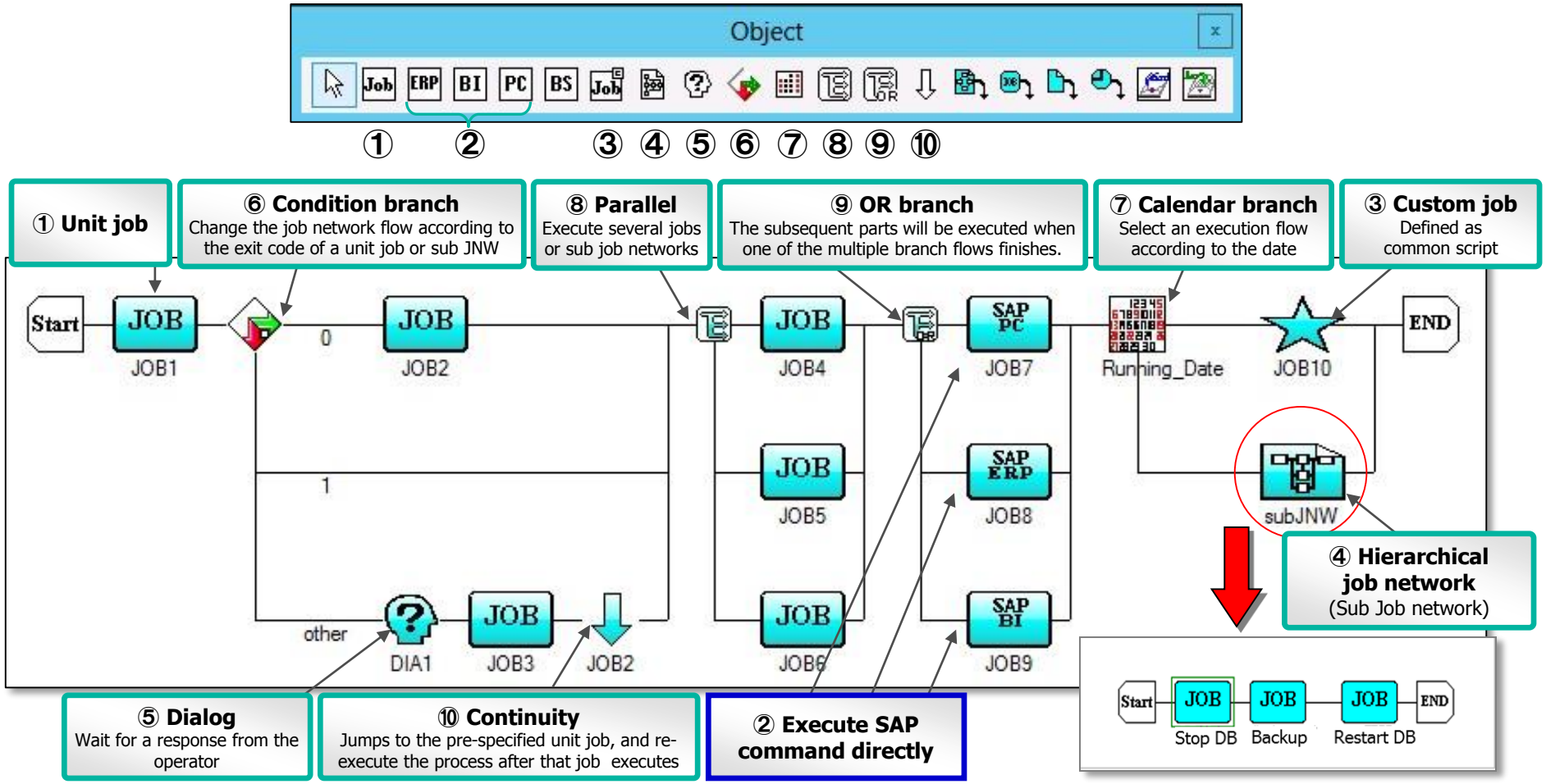
NQS - Network Queuing System

Two processes works internally when submitting a job network and running each job or control part in the tracker flow. “jnwengine” controls job networks. “NQS (Network Queuing System)” controls run of unit jobs.



Developer Console: Job Network Overview (1/2)

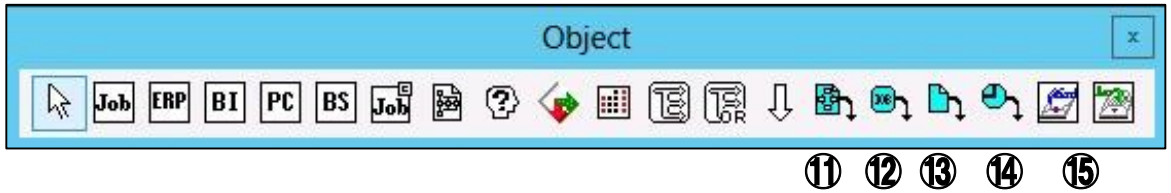
JobCenter offers various convenient execution controlling parts such as condition branch, continuity, parallel, dialog, etc., to create job flows easily.



※ indicates option functions

Developer Console: Job Network Overview (2/2)

Waiting control parts (file waiting, time waiting, event waiting) enables to make jobs wait and start at random point.



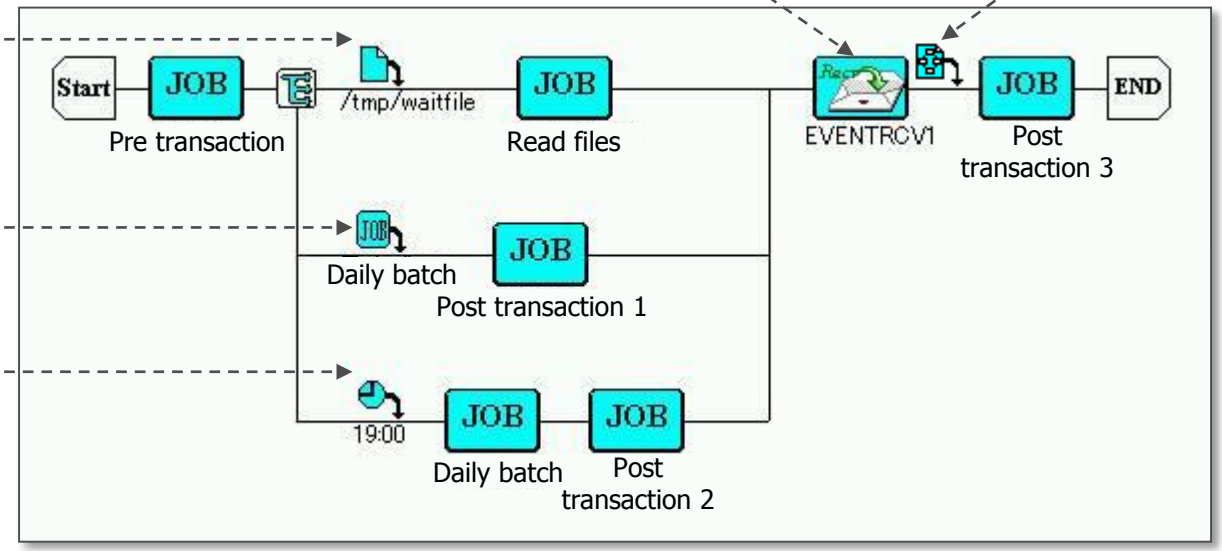
⑮ Event transmission / reception
Transmit/receive an event from/at one job network to/from another job network

⑪ Job network waiting
Wait till end of a specified job network

⑬ File waiting
Wait for a specified file to be created, deleted or updated

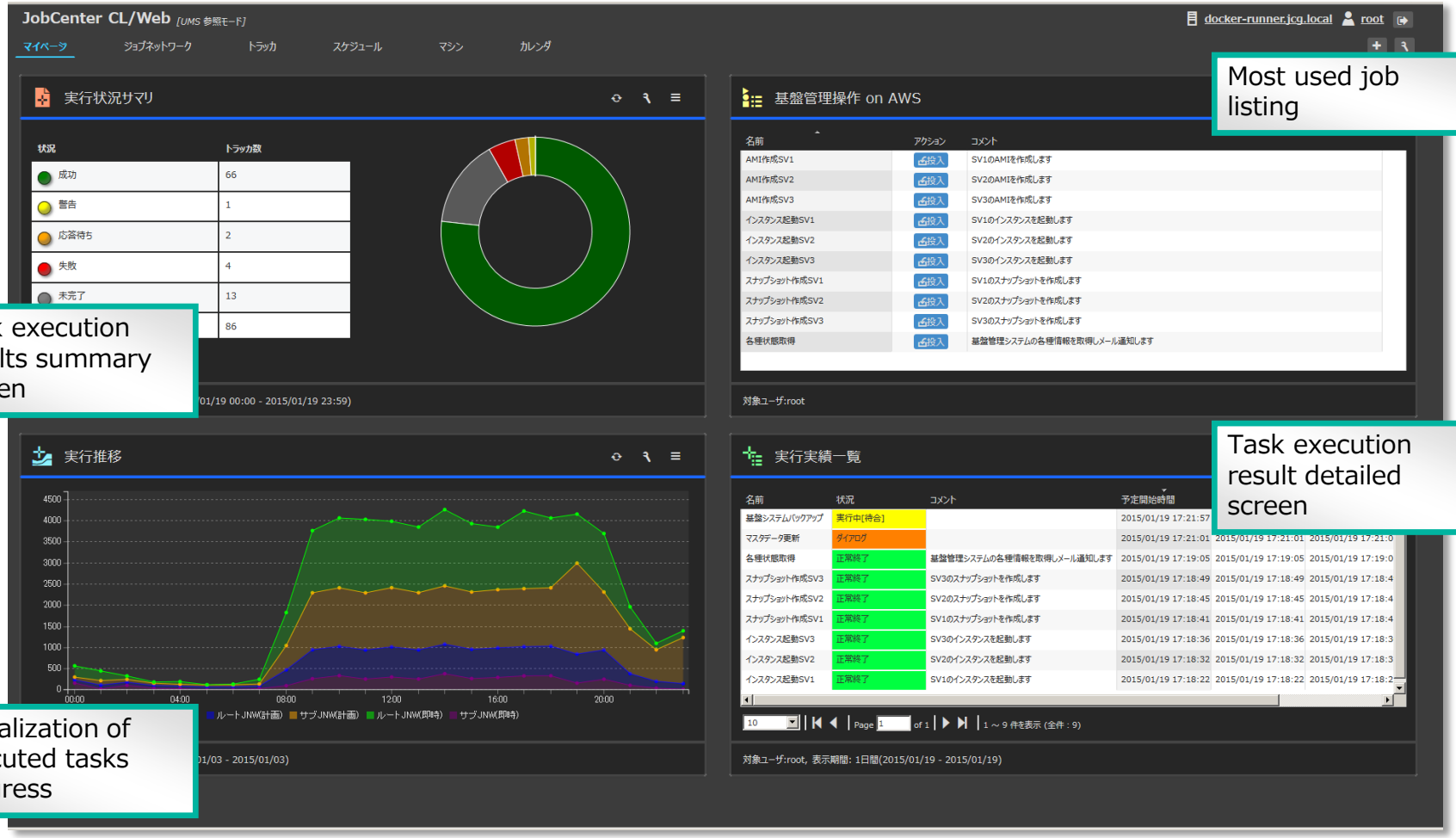
⑫ Job waiting
Wait till end of a specified job

⑭ Time waiting
Wait for a specified time to be reached



Operator Console: Job Management Dashboard

It is possible to execute Job network, confirm the result, and re-execution in graphical dashboard.



Most used job listing

Task execution results summary screen

Task execution result detailed screen

Visualization of executed tasks progress

5. Use Case

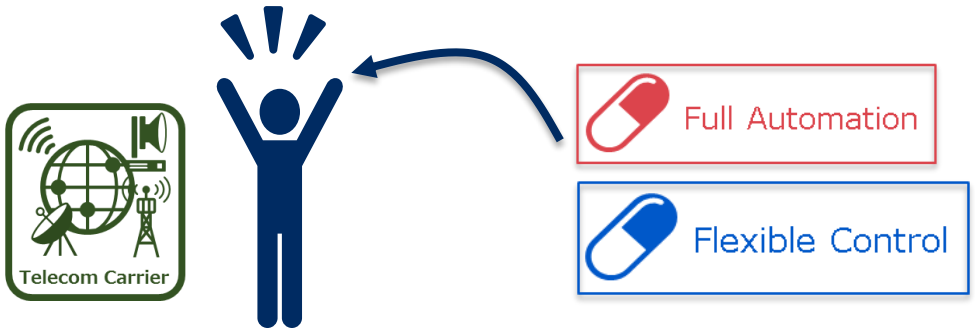
Use Case Lists

	Use Case	Application area	Routine/ Non-routine	Pain reliever worked well
1	Monthly Backup	Telecom Carrier	Routine	Full Automation, Flexible Control
2	Service Control in Daily Operation	Enterprise	Routine	Full Automation
3	Controlling Managed Service	Enterprise	Routine	Single Job Platform
4	Improve Support Systems	System Vendor	Non-routine	Flexible Control
5	Automate Creating Sales Report	System Vendor	Routine	Flexible Control

Telecom Carrier Enterprise System Vendor

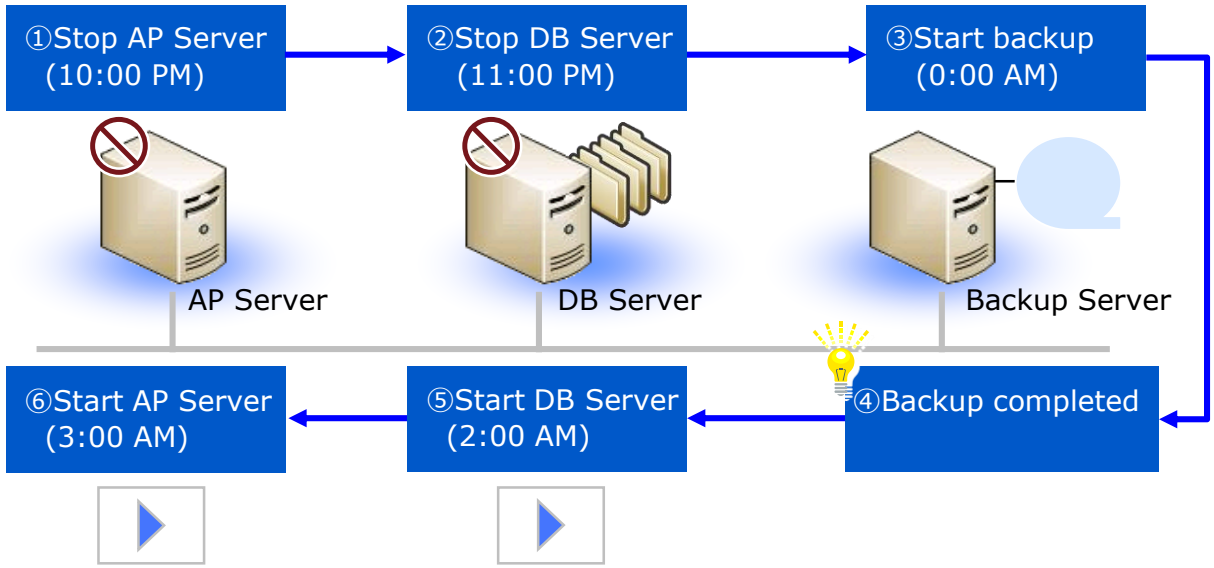
01. Monthly Backup

Automated complicated backup rules to reduce total cost for operation



Introduction

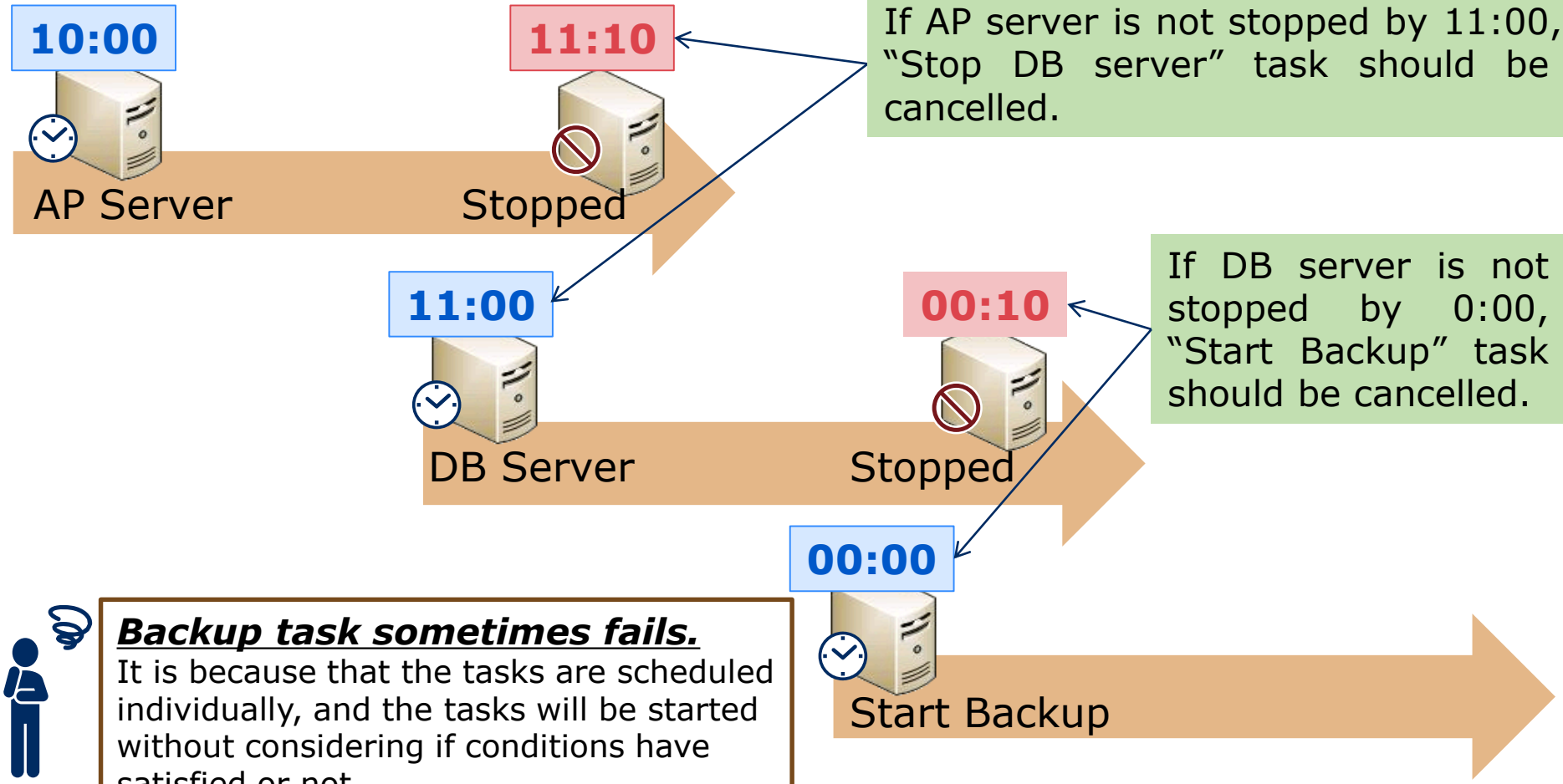
Many systems has manual operations in which its detailed operation procedures are defined manually. How to implement these operation procedures is most difficult part of system automation.



- The system consist with Application Server, Database Server, and Backup Server and monthly system backup is scheduled.
- There is detailed system backup rule which defines specific time and order of actions to each servers.
- If there is any error, system backup is cancelled and system will go back to normal operation.

Challenges

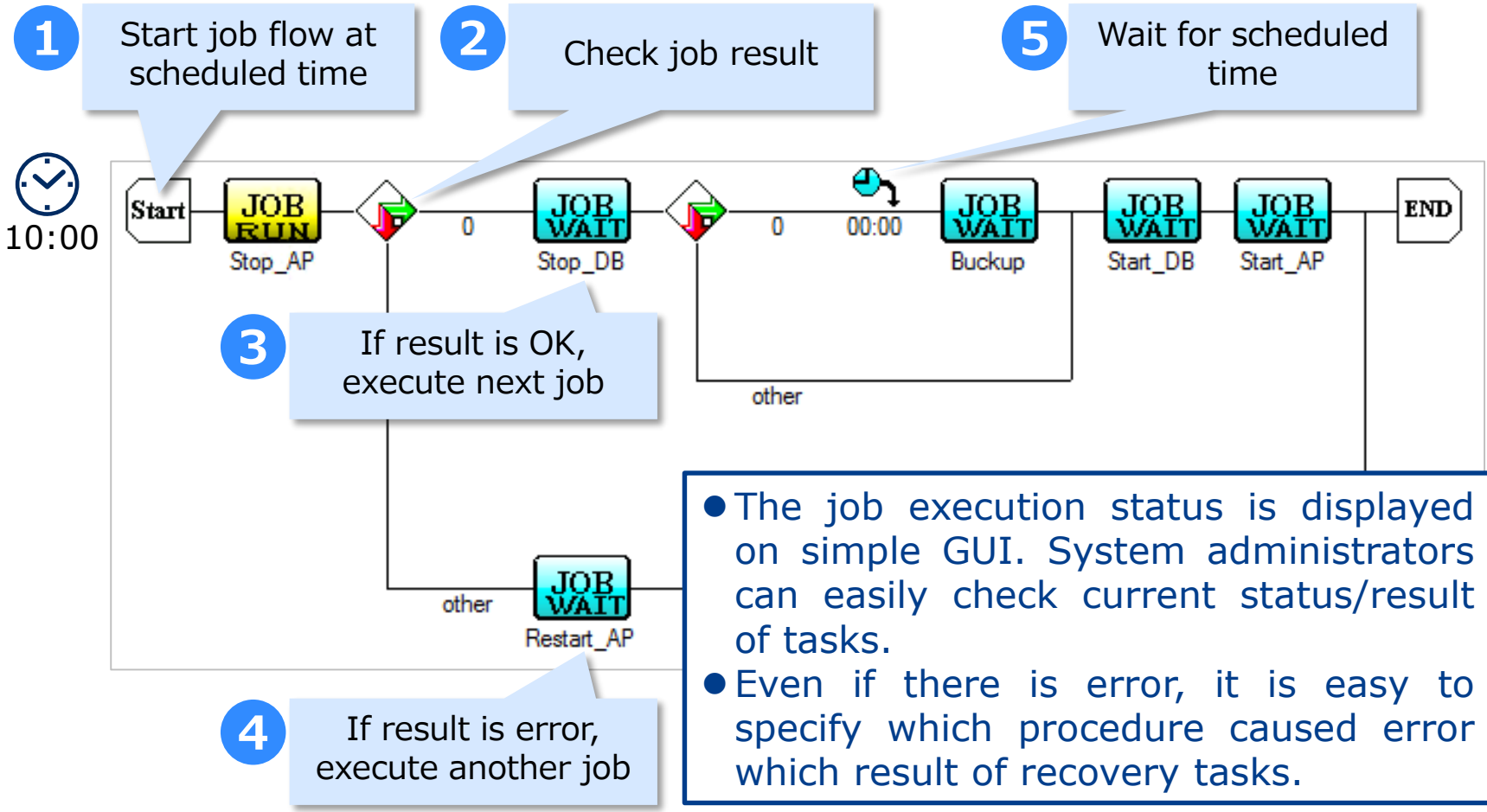
1. The tasks must be executed at defined time, and in defined order.
2. If there is some error, following tasks must be cancelled and recovery tasks must be started.



Backup task sometimes fails.
It is because that the tasks are scheduled individually, and the tasks will be started without considering if conditions have satisfied or not.

Solution & Result

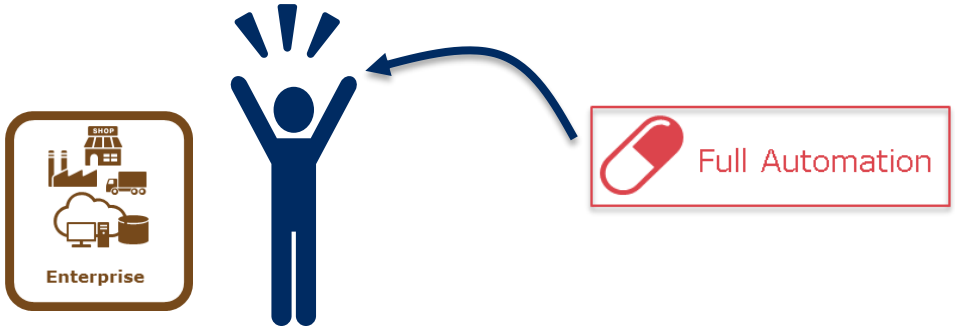
Not only executing normal backup procedures, error handling procedures are also automated by using conditional branch parts. It excluded manual operations from backup task and reduced operation cost and errors.



- The job execution status is displayed on simple GUI. System administrators can easily check current status/result of tasks.
- Even if there is error, it is easy to specify which procedure caused error which result of recovery tasks.

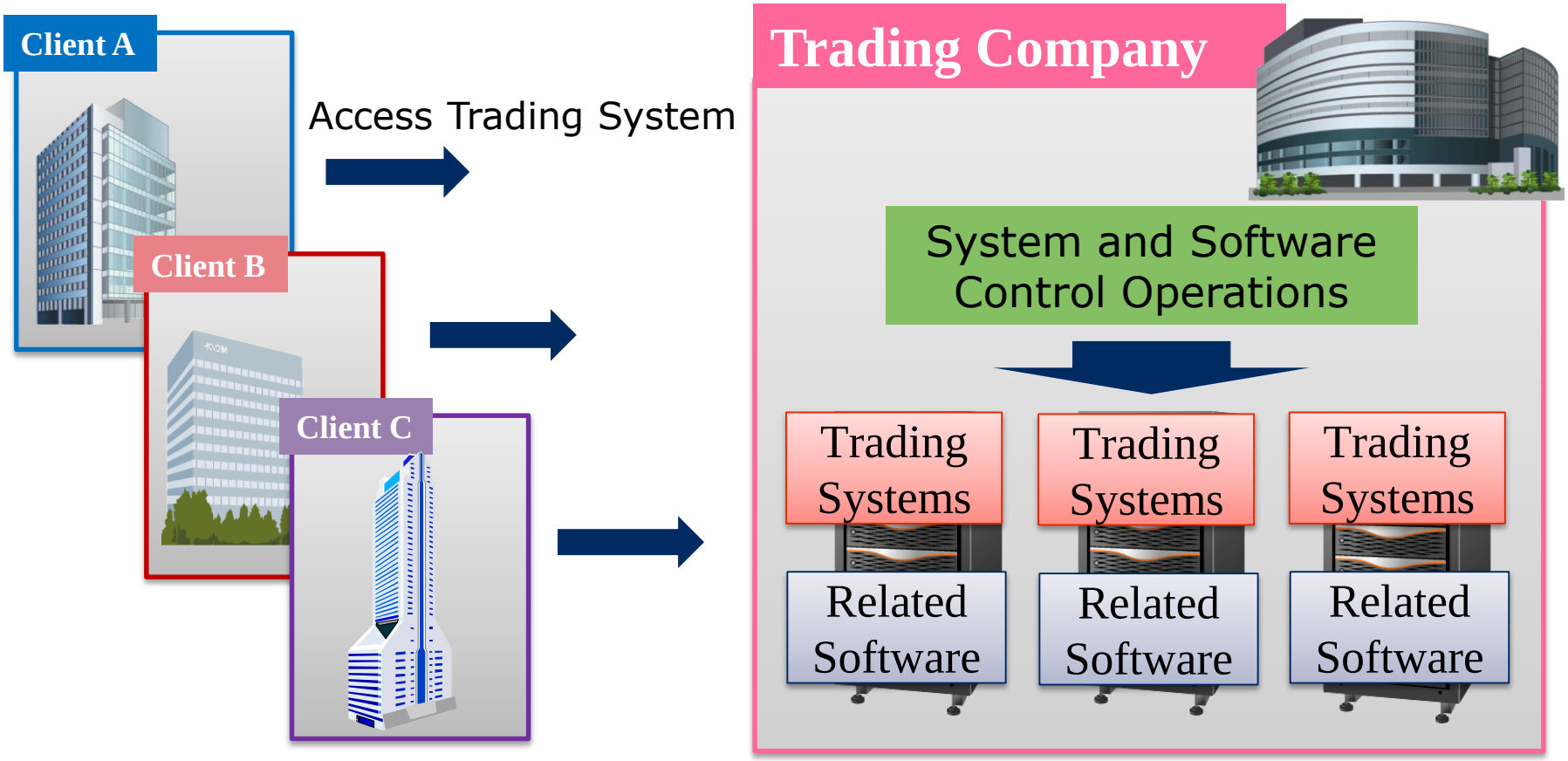
02. Service Control in Daily Operation

Improve the stability of the system and reduce the work load.



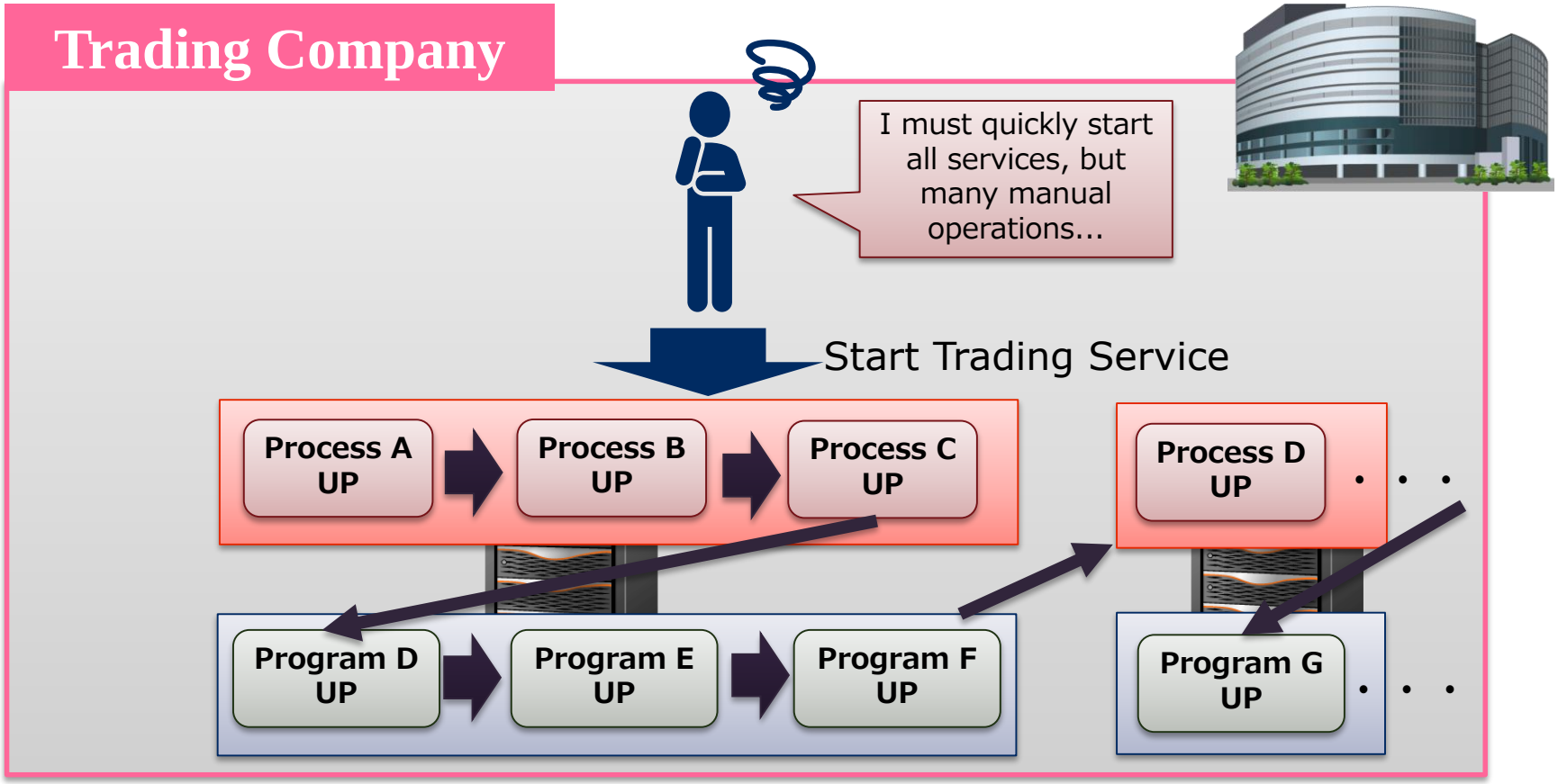
Introduction

The most important task in Trading Company is to provide stable business services to many Clients. It is necessary to start and terminate a large number of trading systems and related software in order to be synchronized from beginning (Opening market) and ending (Close) of daily trade, which can provide improvement, stability and efficiency.



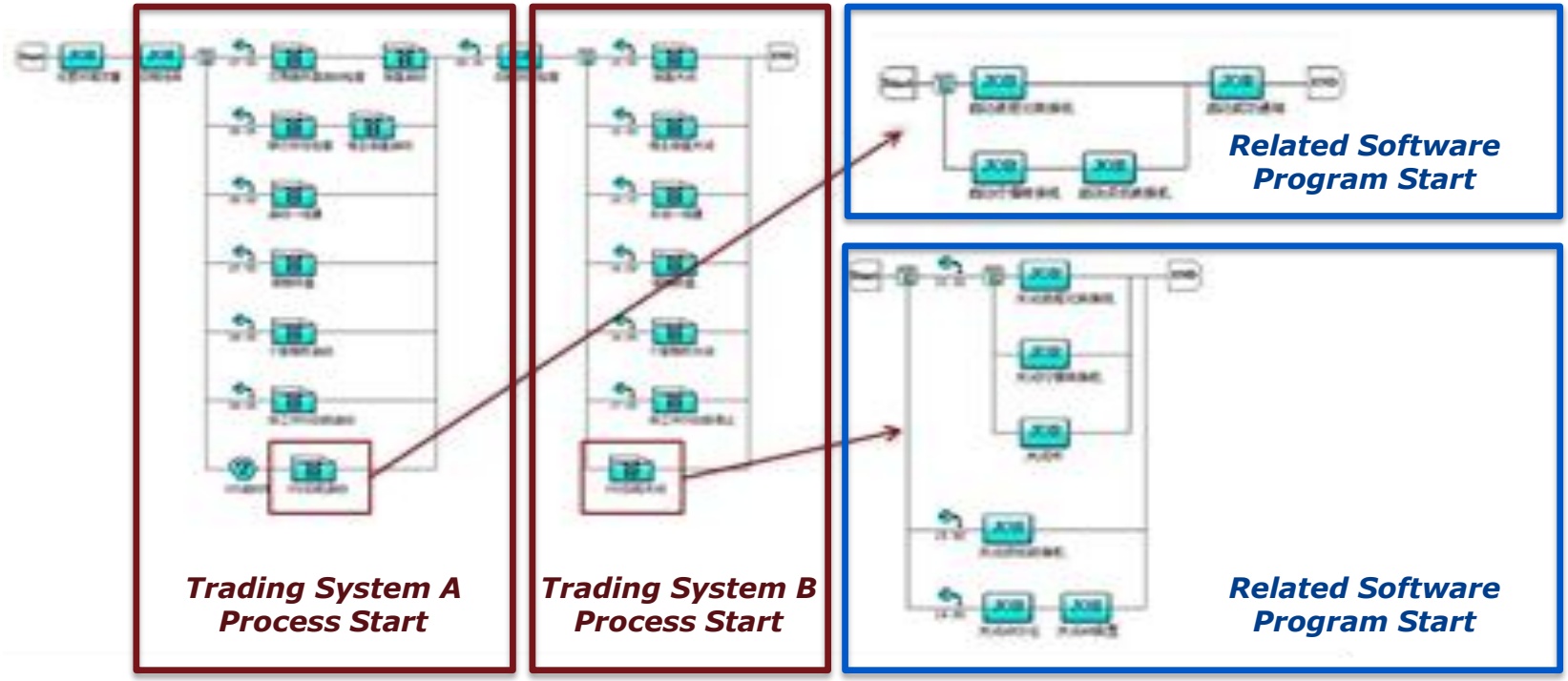
Challenges

At the time before the beginning and close of each exchange, *it is necessary to start and stop many operations (programs, processes) accurately in a short period of time*. When a human operation error occurred, there was no effective method to understand the state of the business system. It took long time to deal with the situation.



Solution & Result

By automating the process of starting and stopping, it is possible to significantly reduce work man-hours, improve the stability of the system, and reduce the work load at the time of trouble by grasping the status of work in real time.



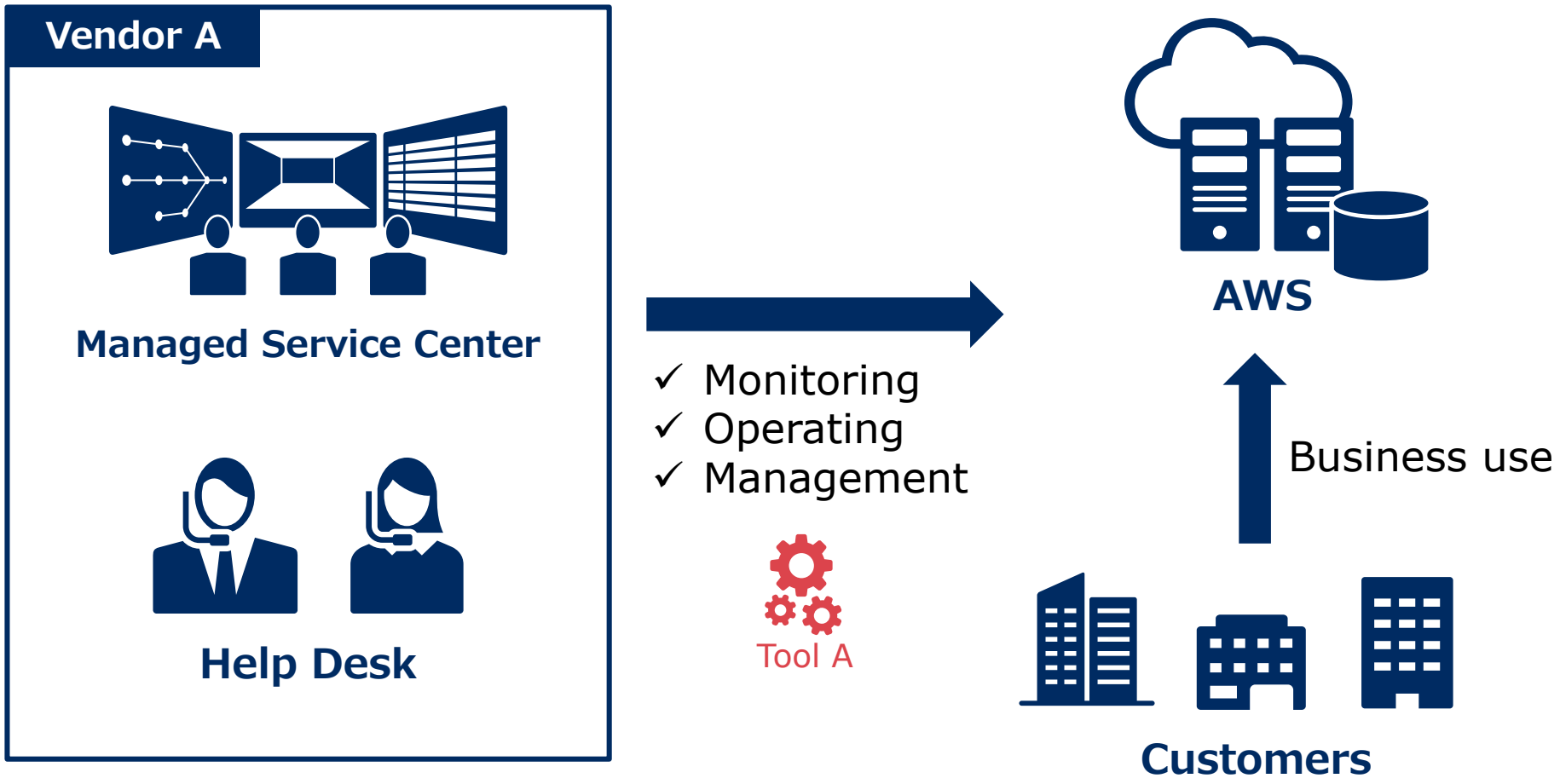
- It became possible to forcibly terminate, skip, re-execute some work processes (jobs) by GUI operation according to the situation. Flexible operations became possible.
- It became possible to integrally manage and control business processes operating on many servers.

03. Controlling Managed Service

Cost cuts of approximately 20%, improved services, and expansion of cloud business achieved through improved efficiency of cloud services for customers

Introduction

Vendor A offers "Managed Service for AWS" to customers. Vendor executes power control and backup for the customer servers on AWS. When alert has occurred, help desk supports.



Challenges

The costs of developing, operating, and managing internally developed management tools for the AWS environment were *becoming a growing burden.*

Problems

- Because internally developed tool was installed on the servers of each customer, operational costs were borne by the customers.
- In addition, management processes increased linearly with an increase in the number of servers. This added to the operational burden.
- Notifications of job execution results from the tool were also difficult to decipher and required highly skilled staff to handle them.

Solution & Result: Streamline operations without unnecessary alerts

- Automate alert check by sight when booting instances every morning (20 incidents per user)
- Stop monitoring to eliminate unnecessary alerts and streamline manual operations when booting instances

before

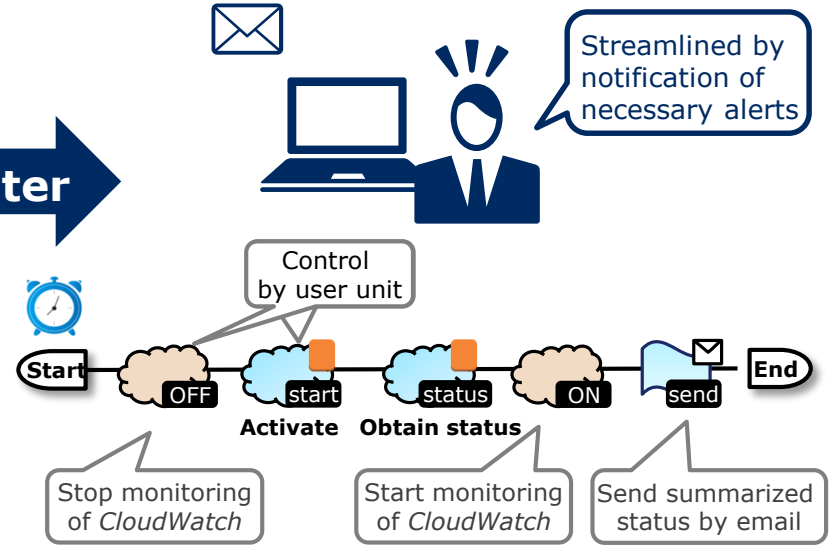
Every morning, IT staff has to check performance monitoring results and alerts (20 incidents per user) by sight notified when booting instances, and judge if there is no error by manual operations

Check massive alerts by sight
Heavy workload & risk of oversight

JobCenter

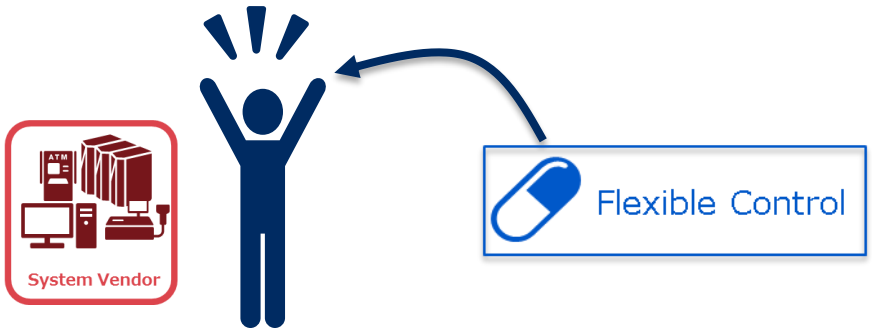
after

Comprehensively notify instances' status by user unit



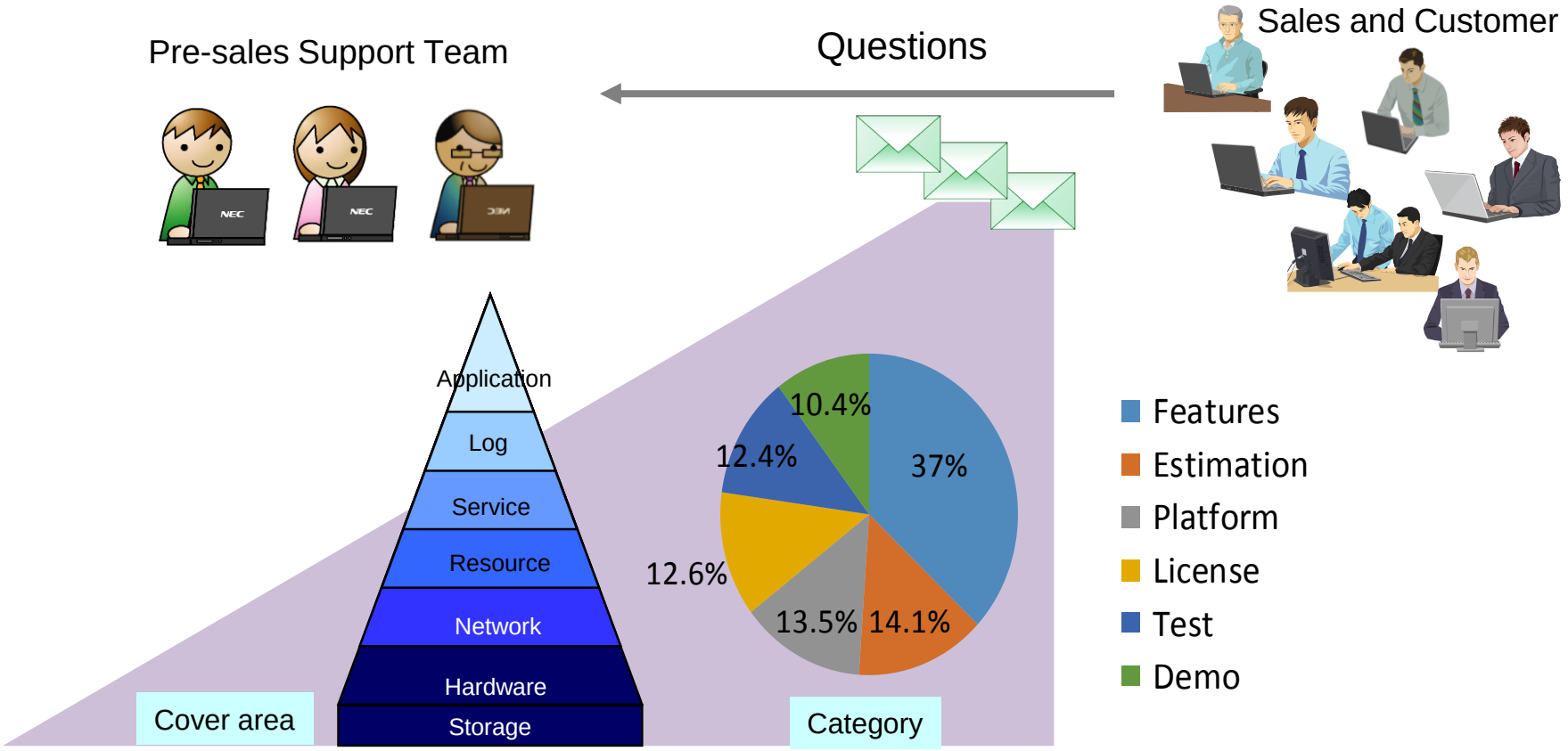
Avoid causing unnecessary alerts
Streamlining & reduction of oversight

04. Improve Support Systems



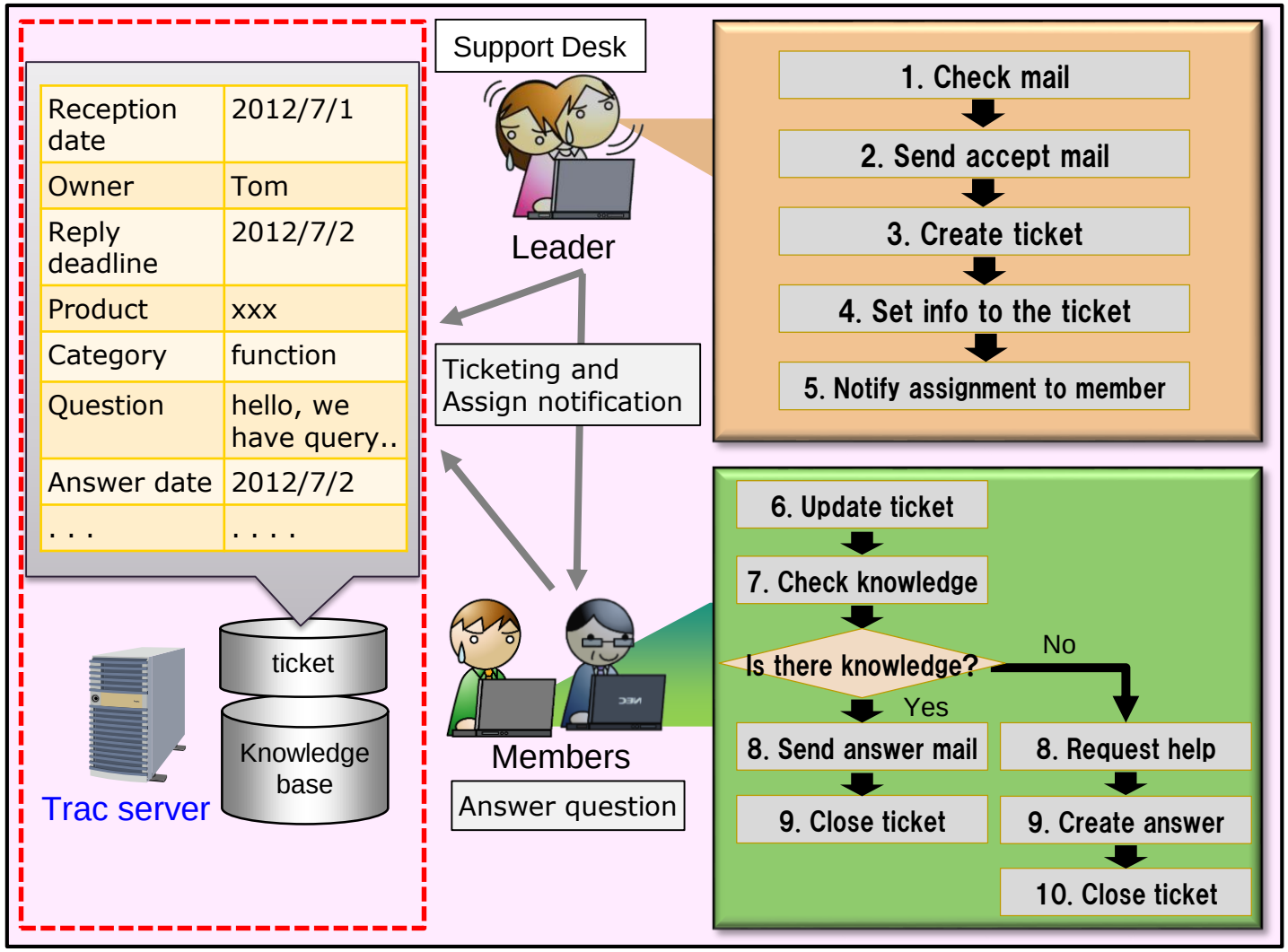
Introduction

Pre-sales support team answers questions about software products. The software products covers from platform to application and there are more than 100 software products. The number of inquiries in the quarter exceeded 1,000.



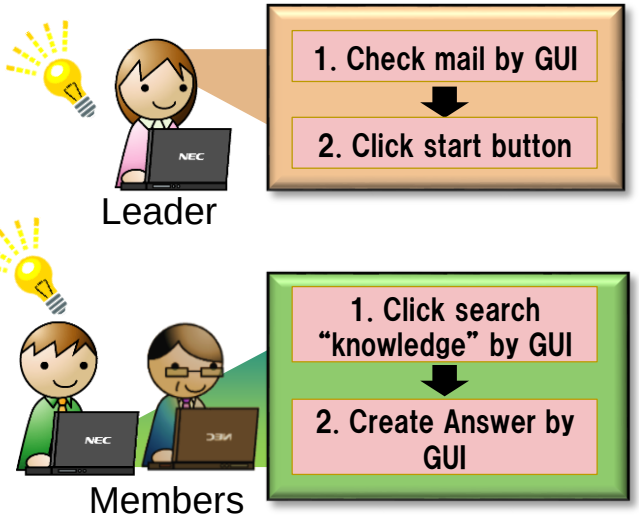
Challenges

There are many manual operations in support process.

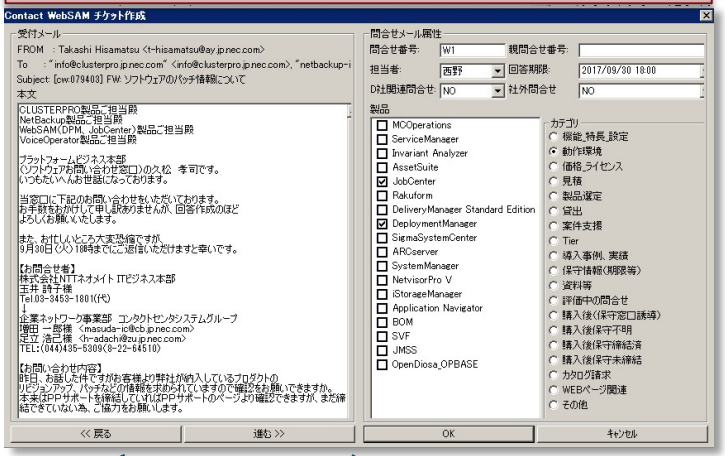


Solution & Result

Support operation improved 40% (from 10 steps to 4 steps) and TAT.

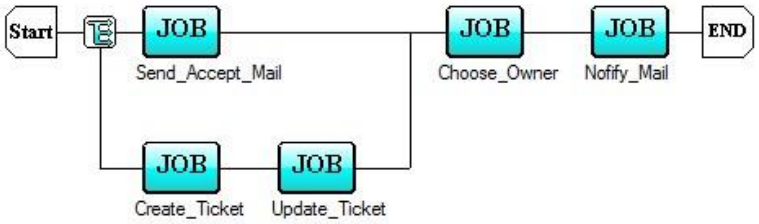


Support Desk Operation GUI

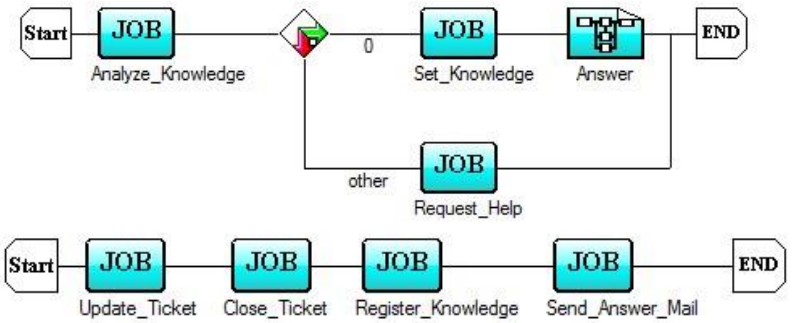


Call JobCenter

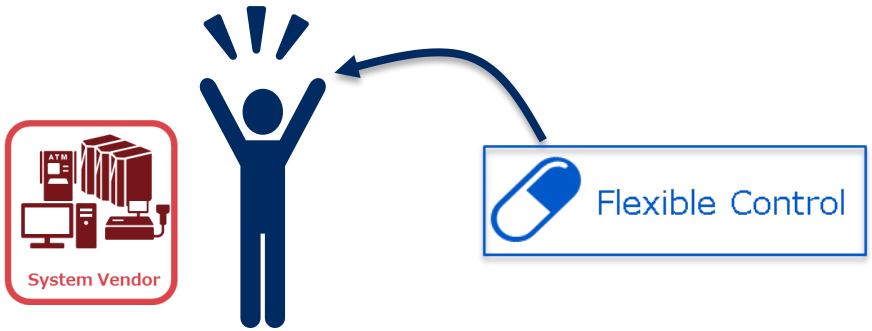
Job Network: Leader Operation



Job Network: Member Operation



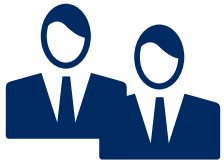
05. Automate Creating Sales Report



Introduction

Sales promotion team in H/W and S/W Vendor needs to check the sales information for analysis of user demand trend, creating promotion plan, and performing to check the current situation.

Current Situation

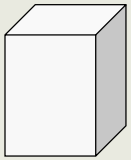


H/W and S/W Sales

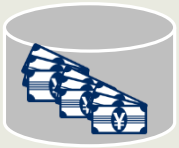
H/W division members

Input sales/order data

Get sales/order data



S/W and H/W Sales order management system



Sales and order database

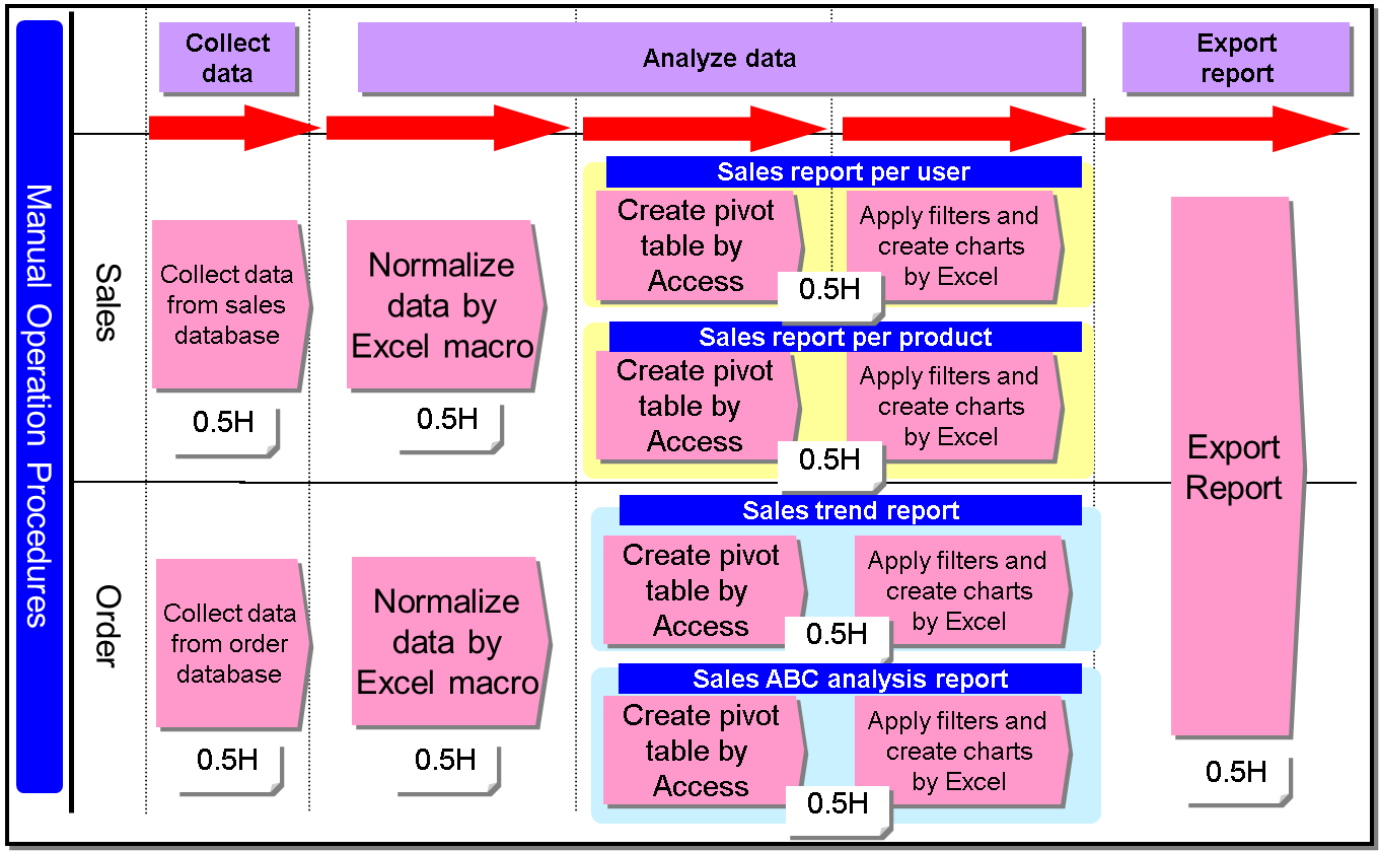
Get sales/order data and create report

S/W Sales members

Sales Report (weekly updated)

Challenges

Collecting sales data and creating report are time consuming task



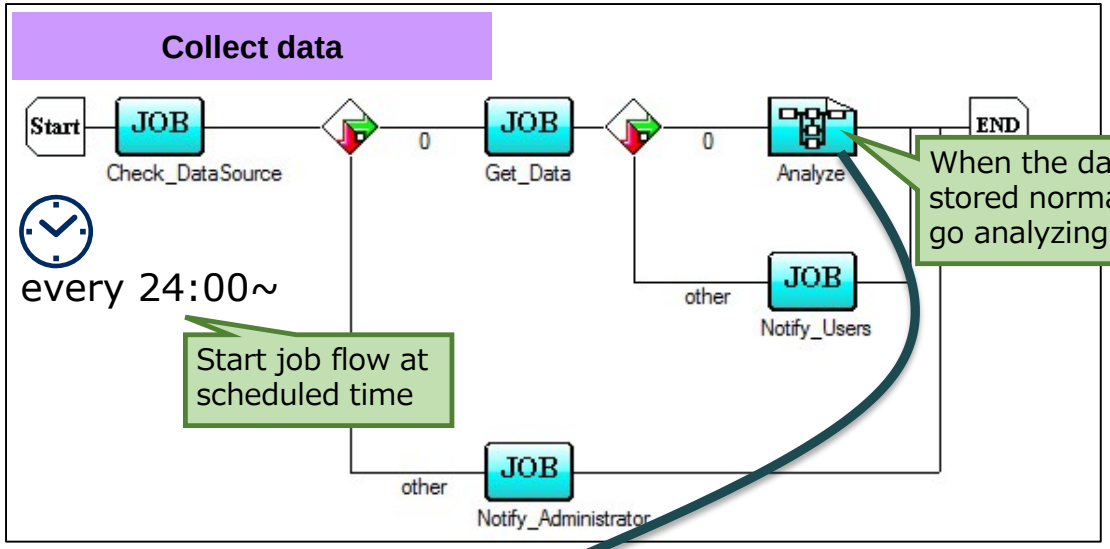
Sales Report
(weekly updated)

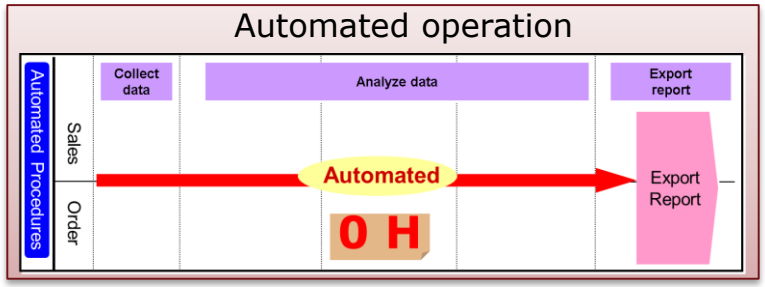
It takes *4.5H* to create report in *every week*

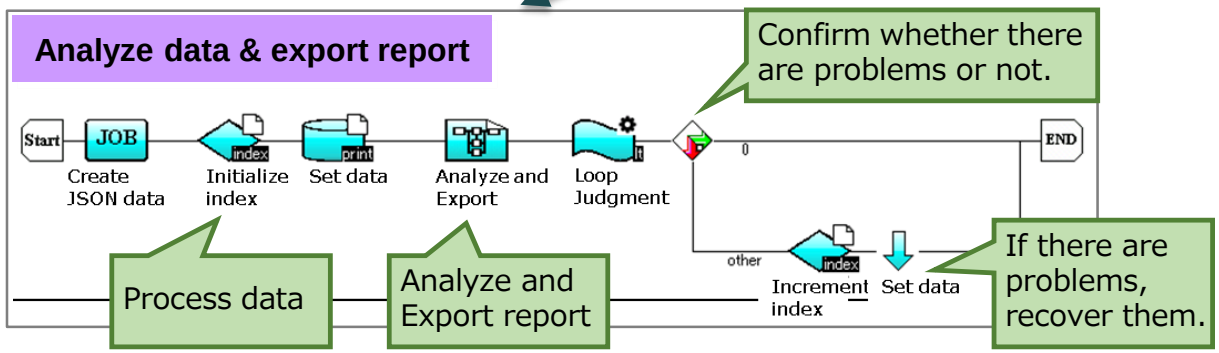
S/W Sales members

Solution & Result

Procedures for creating sales report are fully automated and operation times in weekly work become from **4.5H to 0H**.
Additionally, the report was **updated daily**.







S/W Sales members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