2021

enSOF Technology

MC*CUBE 3.5 Enterprise SMART Suite

We will change the world with the information technology

MCI(Multi Channel Integration) solution that integrates internal and external customer channels in financial and non-financial sectors.
We reduce the internal cost of customers such as increase of channel operation cost, duplication of channel management and increase of inefficiency, and provide efficient management system.

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Various Problems with MCI and External Products

- **Is there a fundamental solution to DBMS delays or failures?**
  - Can't multiple organizations with same business be managed as a single group?
  - Is it possible to fail over without interrupting other channel transactions?
  - Can't you manage batch processes and scheduling through the UI?
  - Due to the nature of the interface business, can you not only understand the connection of each organization but also each session connection at a glance?
- **Can't we reflect only the services of specific affiliates?**
  - Isn't it easy to just apply a new channel when adding a new channel?
    - Can the same business, service organization share or reuse the business component?
  - Can't we hold it before reflecting the unused text?
- **Is there an easy way to find a problem that is time consuming to track down?**
  - Can't register for the type of event you want and receive it during work or meetings?

MC*CUBE 3.5 Enterprise SMART Suite Solution fundamentally solves a variety of problems.

- Implement micro service system that is hot-deployed to minimum unit
- 100% independent performance without DBMS
- Provides Profiling Data to trace the root cause of failures
- Integrated dashboard for real-time monitoring of throughput (TPS)
- Client management tool that controls communication session (Work-Bench)
- Logic-Workflow function for batch management

- Equipped with on-line help function for each screen for easy access to customer service environment

Features of MC*CUBE 3.5 Enterprise SMART Suite

2. Ensure efficiency of development / operational management (1/2)

Key features	Explanation	Apply
▪ Multi-Instance Configuration ▪ Simplify registration / modification / deletion of affiliated institutions	✓ Group alliance agencies (channels) of the same business into groups (instance configuration) to secure the efficiency of management and to prevent the source of failures between instances ✓ Provide rule-based packet processing method ✓ Reuse all environmental information including packet information registered in one adapter ✓ Provides export / import of adapter and packet information including instance (easily provides test, verification, and operation transfer work) ✓ Packet hold function: Hold onto unused part of packet accordingly for transaction handling	▪ Controlled by Work-Bench Client Tool
▪ Improvement of packet management system	✓ Increase packet reuse rate by eliminating institutional / packet relationships (multi-organization / single specialist) ✓ Eliminates external / internal duplicated packets, reducing the number of required packets by one-third of the previous version ✓ Packet consistency check allows the user to check packet consistency through GUI ✓ If the same packet is used repeatedly, the packet can be registered and reused by including it in other packets ✓ Provides automatic definition of the packet by importing/exporting excel packet file ✓ Easily replicates packets, adapters between Instances. ✓ GUI provided to directly compare detailed settings between production and test/dev environments.	
▪ Simulator function	✓ Provide administrative UI to copy / paste the packet used in test / production environment and retransmit it ✓ Configure virtual environment (server / client) to create realistic test simulation	

Features of MC*CUBE 3.5 Enterprise SMART Suite

2. Ensure efficiency of development / operational management(2/2)

Key features	Explanation	apply
▪ Accommodating Diverse Business Needs	✓ Improved to define palette-based business logic without program development, by providing Logic-workflow (* 2) engine and designing tool ✓ Apply verification function before reflecting business logic created using simulation function ✓ Immediately reflect the configured business logic without compiling / restarting	▪ Controlled by Work-Bench Client Tool
▪ Provides easy instance control (startup / shutdown)	✓ Controlled via Workbench's configuration manager without telnet access	
▪ Security features	✓ packet encryption / decryption handled using commercial or public encryption library (SEED / ARIA / 3DES / LEA / etc.) ✓ Provide encryption and UI masking function for each personal information field ✓ Encryption and compression storage in DB, decryption and masking of personal information items in case of DB query ✓ Telnet access function within Work-Bench without Telnet connection through a separate window	
▪ **Batch Process Management**	✓ Batch job registration, automatic scheduling, execution status inquiry (inbound, outbound batch packet scheduling) ✓ Provides multi-process capability to handle large files through automatic scheduling of batch jobs ✓ Provides execution status and history inquiry screen for batch job and manual redo function in case of error ✓ Batch File layout can be registered in the same way as online packet so that file validation such as layout check, type check, and length check can be performed when receiving and processing files.	

(* 1) One-stop Management: manages everything in one place without moving around.
(* 2) Logic-workflow: Feature that composes work logic by expressing workflow (DB work, file I / O, FTP, sFTP, CMS batch transfer, etc.) as a picture

Features of MC*CUBE 3.5 Enterprise SMART Suite

3. Effective and powerful integrated monitoring including control

Key features	Explanation	apply
▪ **Comprehensive Dashboard Function**	✓ Improved to extract, trace and diagnose detailed profiling data information at the APM level beyond the limit of tracking the root cause of failures that are always pointed out in external linkage and MCI solutions only with generated transaction log information. ✓ Provides management function to immediately and intuitively recognize institutional connection / communication / transaction status	▪ Profiling Data Generation ▪ Provide communication adapter thread dump
▪ **Proactive Failure Response**	✓ **Pause services and restart only those services in case of service (organizational) failure** ✓ **In the event of a process issue, only the process is immediately restarted in the Work-Bench Administrator UI.** ✓ **Provides automatic verification and manual action for various obstacles (network error, process error, expert error, etc.)** ✓ **In addition to processing for line fault detection (Polling, etc.), it also monitors communication sessions, and provides a close function that cleans up sessions immediately when a problem occurs.**	▪ Controlled by Work-Bench Client Tool ▪ (* 3) TTS: Text To Speech, system to read text by voice
▪ Provide management function for transactions	✓ Provides monitoring and immediate management of current transactions (response response / error handling / etc.) ✓ Intuitive monitoring and fault diagnosis by applying schematic and numerical real-time dashboard ✓ Provides various APM-level analysis of the transactions performed ✓ Automatic creation and management of Transaction Call Tree	
▪ **Provide a powerful and flexible event system**	✓ Improved function to express on the workbench screen at the same time of event occurrence according to event and severity setting for failure type by using server push method (SMS, E-Mail interworking method provided) ✓ Built-in TTS (* 3) engine reads the events generated by voice ✓ Improved to display the set event information and history in various forms using the event browser ✓ Push notification service for various event information through Mc * CUBE's own app (Android / iPhone)	

Features of MC*CUBE 3.5 Enterprise SMART Suite

4. Guaranteed performance and user convenience

Key features	Explanation	apply
▪ **Real-time statistics and trend analysis**	✓ Detect error in real time services ✓ Institution, Throughput (TPS), Normal, Error, Delayed, No Response, Session Status ✓ Automatic support for multiple grids when the number of related adapters increases ✓ Real time interface trend analysis ✓ Analysis of response time trend compared to previous month, last week, and previous day (throughput analysis) ✓ Timeout, Error, Delay	▪ Work-Bench Client Tool
▪ **Provide serial number caching**	✓ Improved the serial number caching, using memory instead of database, thus decreasing DB IO	▪ Customer selective application
▪ Improved mapping speed	✓ Improve performance by reducing the number of packet mappings to half of the previous version ✓ Simplify mapping by eliminating the concept of In / Out mapping ✓ Simplify Array Processing	▪ MC*CUBE Engine
▪ Solution Version and Patch Management	✓ Easily update the solution and license using Workbench ✓ Provide patch version control	▪ Work-Bench Client Tool
▪ Smart Viewer (Custom Screen Authoring Tool)	✓ Integrate external data into MC * CUBE effectively using the custom screen authoring tool “Smart Viewer” ✓ In addition, “MyPage” function is provided to create new screen and menu by combining basic function screen (Work-Bench) and user-defined screen using Smart Viewer. ✓ Integrate / search external data in MC * CUBE Workbench in various forms such as tables, charts, and gauges by connecting to data sources such as external DBMS or JMX and setting up data search.	▪ Work-Bench Client Tool

MC*CUBE Solution Diagram

MC*CUBE SMART Server

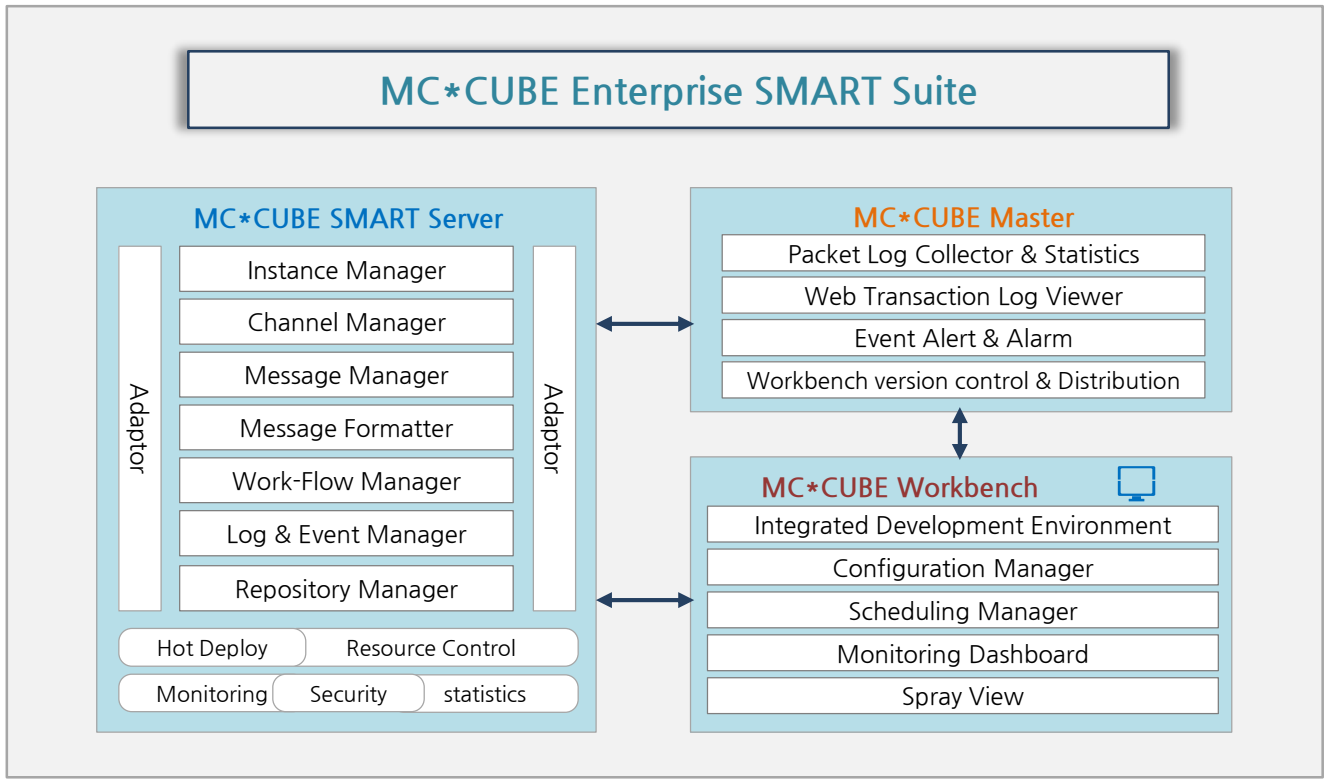
- ✓ Instance Service Architecture
- ✓ Creates service components with the smallest set of elements as possible, thus allowing easy scale-up and recovery of service unit failures

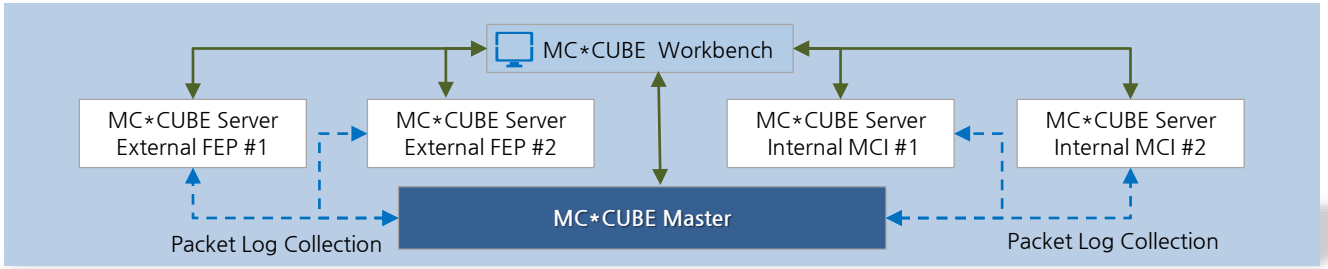
MC*CUBE Workbench

- Integrate managements of multiple MC*CUBE SMART Servers into one IDE Tool
- Service configuration management, application, control, monitoring, update and etc.

MC*CUBE Master

- Real-time transaction details of each MC*CUBE SMART Server are automatically collected and integrated into one view
- SMART Server optimizes resources for real-time transaction processing and separates work and performance by collecting and retrieving packet logs through master

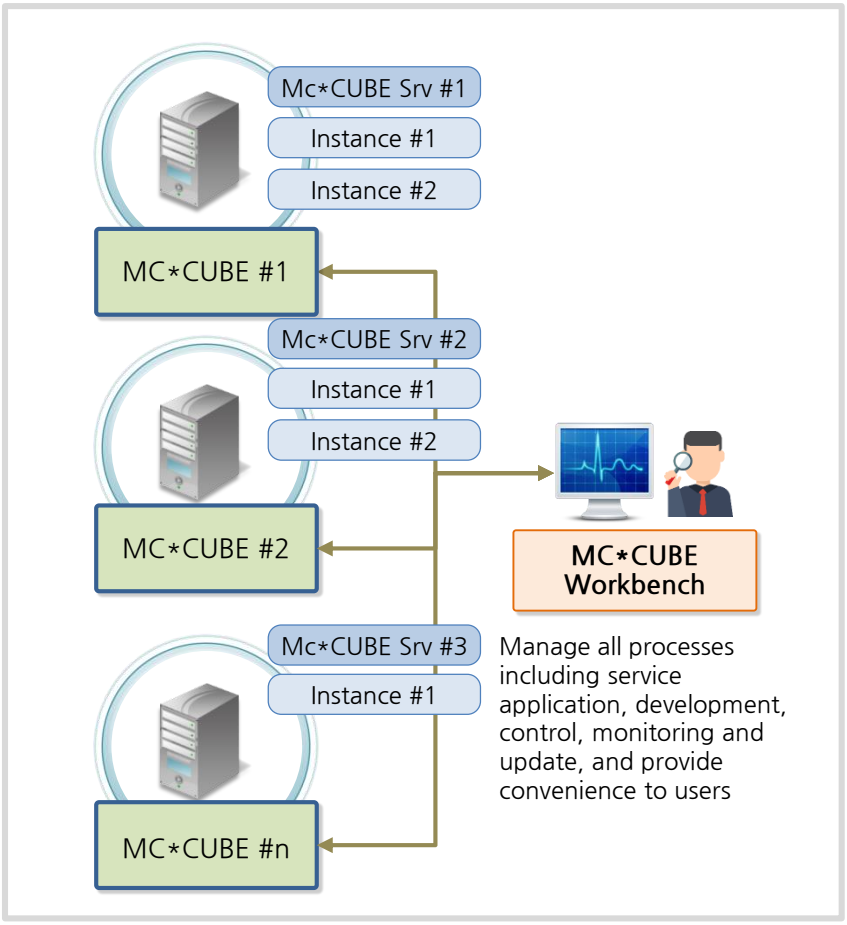


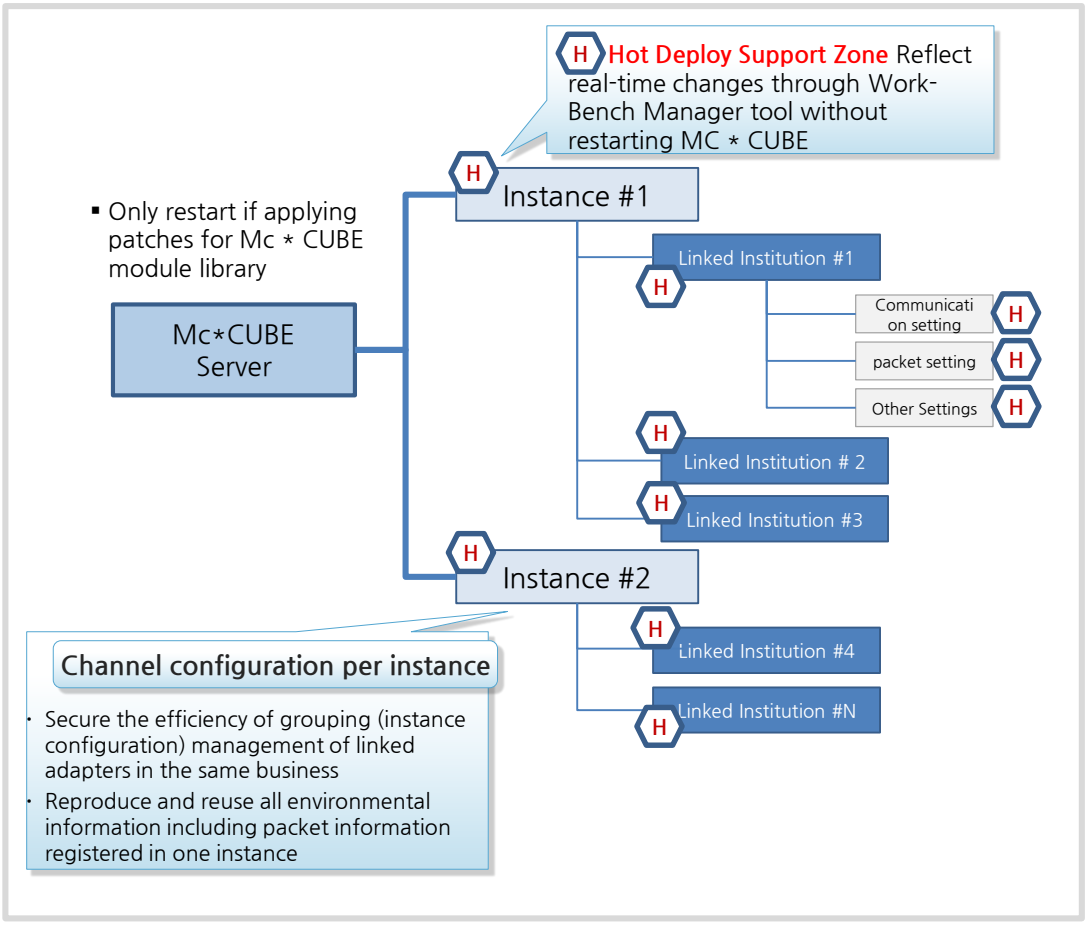


MC*CUBE Architecture

Mc*CUBE has been implemented in an instance-based architecture to support shorter work schedules, flexible response and expansion as changes are made. Each instance operates as a separate process, and through the administrator UI Workbench, you can easily edit and duplicate the configuration such as packet and interface. Changes are applied in real time without restarting the system to ensure maximum system availability.

Instance-based architecture provides flexible scalability for immediate response to institutional additions / changes





MC*CUBE Specification

Mc * CUBE 3.5 Enterprise Smart Suite is a standalone solution based on JAVA and runs alone without WAS or DBMS. Compared to other WAS-based MCI solutions, it is free from the dependencies of the WAS environment and the system establishment cost is relatively economical.

MC*CUBE Technical Specification

	Specification
JAVA	• Oracle JDK 1.7 or Open JDK 1.8 higher
WAS	• N/A (not needed)
DBMS	• N/A (not needed) • DBMS can be used to save packet transaction log(optional)
Extended API Development Environment	• MC * CUBE Eclipse IDE Plug-In provided for API development(For Eclipse project and Build script) • The developed API is dynamically applied to MC * CUBE in the form of .jar.
Provide external API embedding	• MC*CUBE Communication Adapter • packet CLASS (Provide packet layout, getter / setter method) • Available in JAVA Package (.jar)
Server OS	• Any OS supporting JAVA
Client PC	• Manager and Monitoring PC (Workbench driven) • Window XP or later version

Integration Monitoring (2/4)

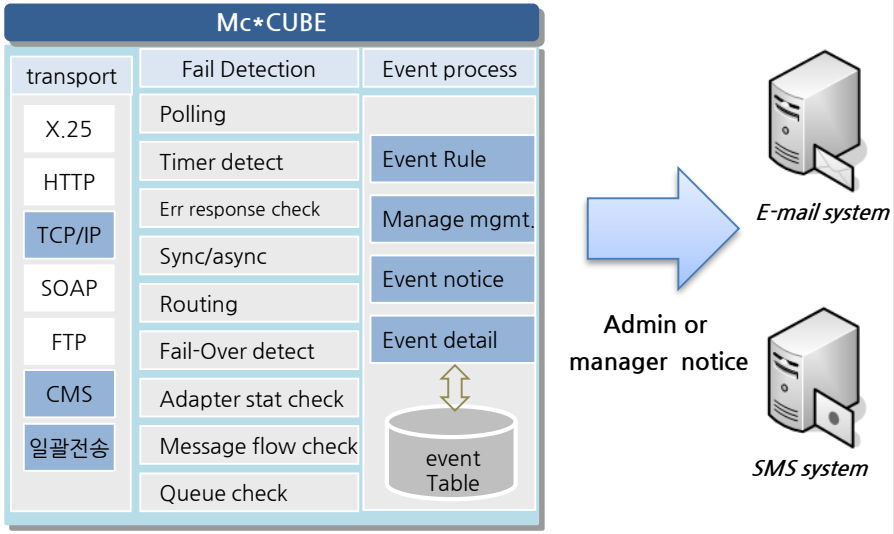
Fault detection and event occurrence when there is no transaction for a certain time

- Event triggered when no transaction happens over specified interval

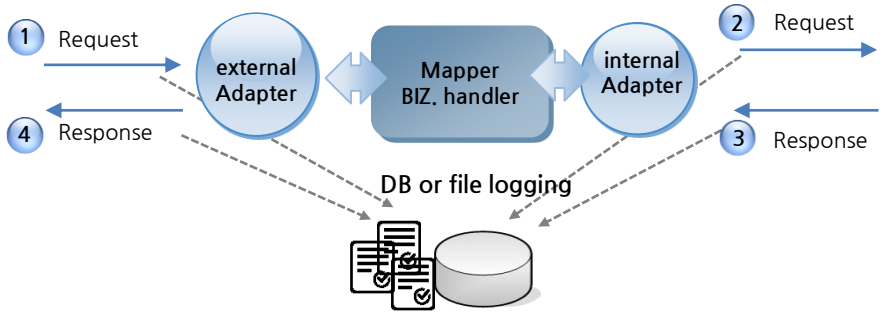
Proactive Failure Prediction

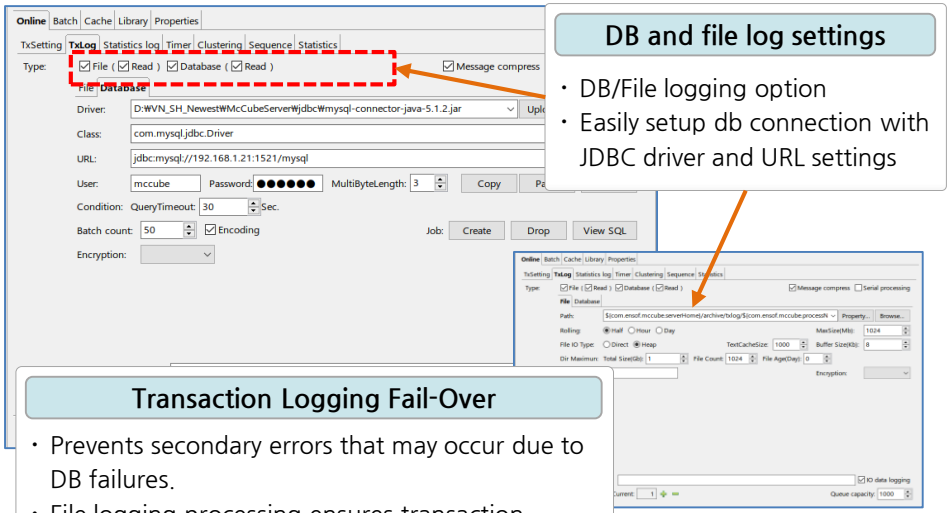
- Identify the inflow patterns of linked institutions (ex) Holiday transactions over a certain amount / below the interval for a certain time
- Event occurs when condition is met
- Check for network and Business Failures

Admin notice function



Normal service guarantee even in case of DB failure





DB and file log settings

- DB/File logging option
- Easily setup db connection with JDBC driver and URL settings

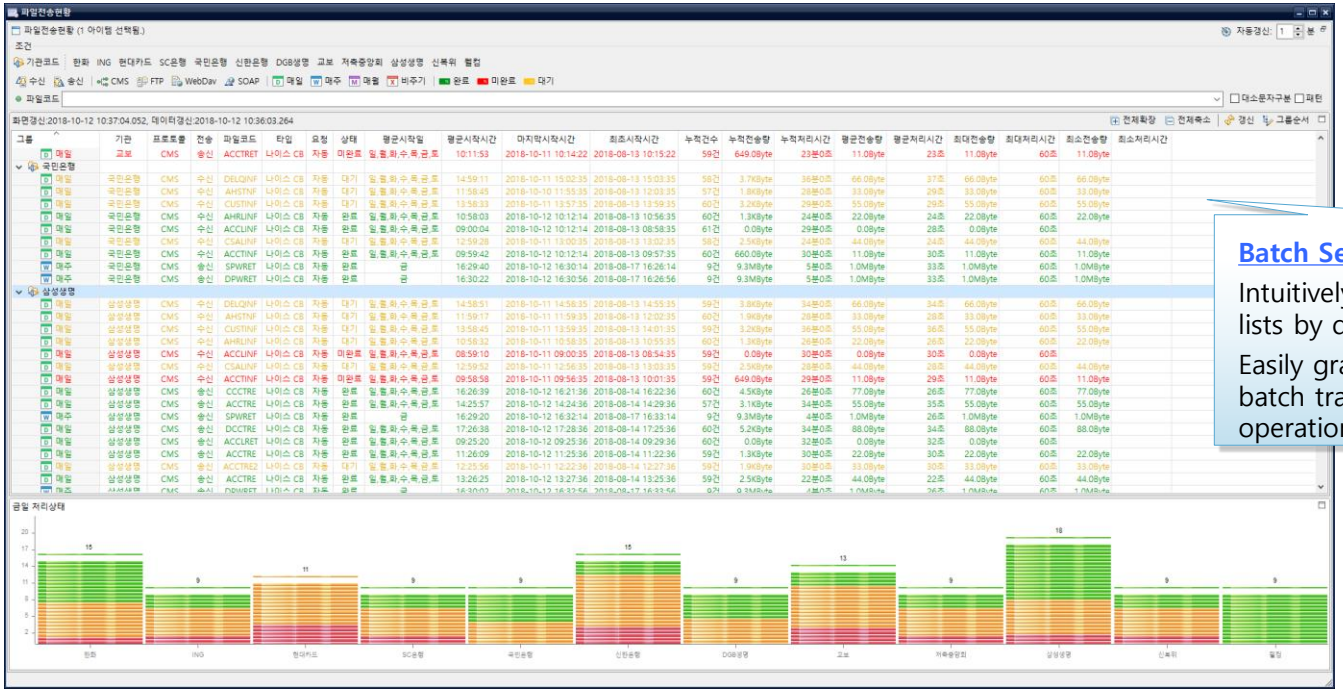
Transaction Logging Fail-Over

- Prevents secondary errors that may occur due to DB failures.
- File logging processing ensures transaction logging 24/7
- Ensure normal MCI operation and performance

Integration Monitoring (3/4)

You can monitor batch job files that are sent and received on a periodic basis (day, week, month) more easily and intuitively. This enables the operator to intuitively identify the status of the transmission on going, able to operate with efficiency and convenience.

Batch file send/receive Daily monitoring **(Forecast occurrence situation on the day)**



Batch Send / Receive Status

Intuitively view complete and incomplete lists by deployment cycle

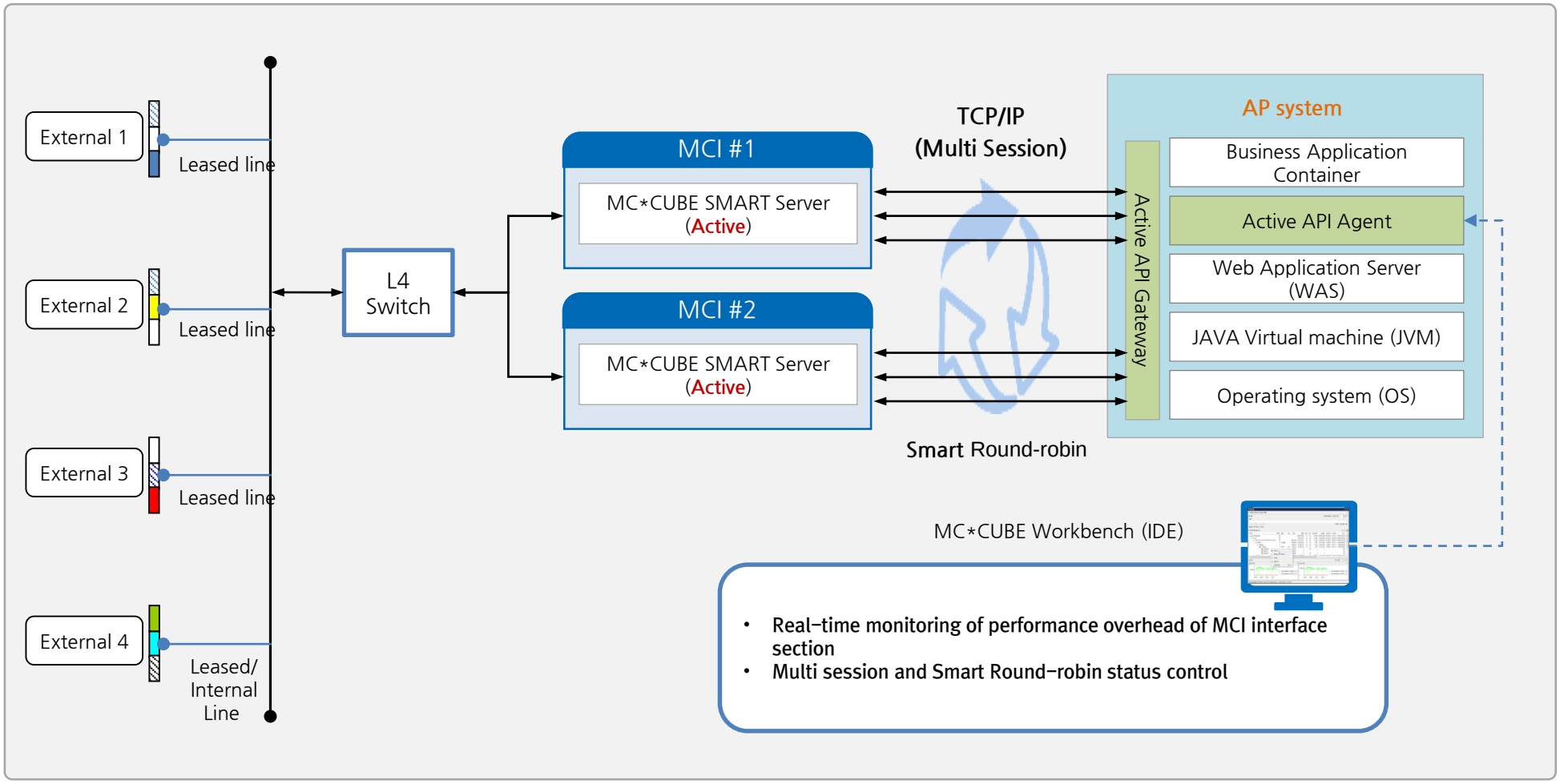
Easily grasp the status of uncompleted batch transmission and reception during operation and take proactive measures

특징

- Troubleshoot and manage Batch File transmission and reception from the operator side
- Automatic analysis of file sending / receiving transaction pattern (daily / weekly / monthly / non-period) to monitor file sending / receiving information to occur on the day
- Recognizes that the file was not delivered within a certain time at the file origin (first scheduling system) to prevent the source of failure

Active API Gateway

By plugging in Active API Agent to WAS system, Mc*CUBE can control and monitor MCI interface in real time for outbound transactions. Smart Round-robin feature also optimizes interface performance by distributing equal loads throughout multiple connections between business systems and MCI.



Thank you.

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