nexbe+

Integrated Automation and Control Solution

Our smart factory platform offers a range of packaged solutions for optimized factory automation, ensuring a smooth and reliable experience from installation to operation.
By harnessing data from individual equipment and inter-equipment processes, our integrated solution streamlines production management, equipment maintenance, and real-time monitoring. With instant processing capabilities, it helps customers make better use of their resources and achieve maximum operational efficiency.

DSP

Dispatching System

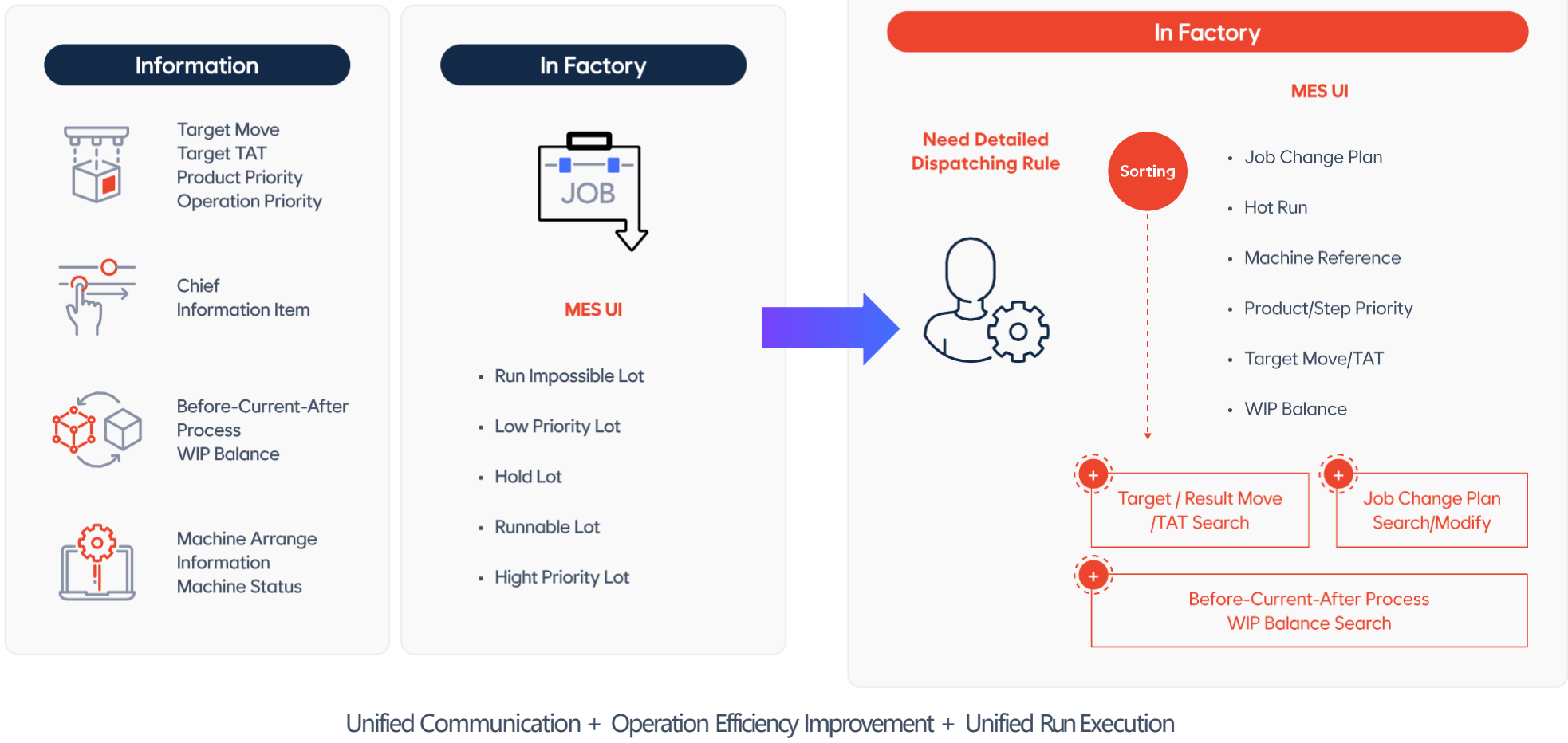
Field-oriented Optimized service

What does it do?

nexBe+ DSP is a powerful dispatching solution designed to create and implement rules for managing the dispatch of materials and equipment.

- **nexBe+ DSP**assists operators in determining "What-next" and "Where-next" decisions.
  By providing detailed information and process priorities, **nexBe+ DSP** enables operators to schedule the next material or process efficiently.
- If the operator does not assign the next material or process, **nexBe+ DSP** can make these decisions autonomously.
- **nexBe+ DSP** offers an integrated environment with Rule Logic components (activities) and a Rule Deploy module to support the creation, modeling, and mapping of dispatching rules.

The dispatcher analyzes various information to determine the priority of lots and runs. It also assigns machines to specific products or lots, enhancing machine utilization, minimizing lot wait times and optimizing the entire manufacturing process.



Unified Communication + Operation Efficiency Improvement + Unified Run Execution

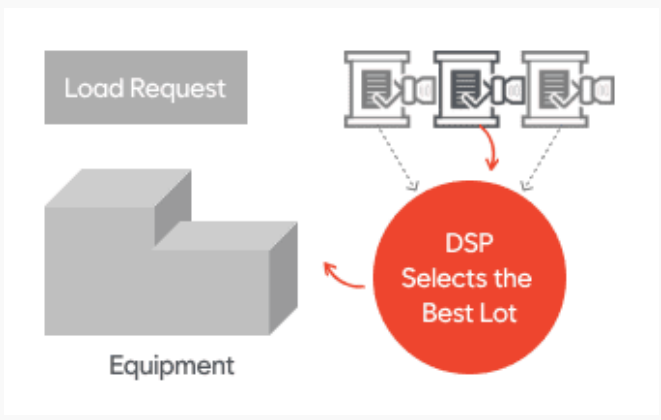
What does the Dispatcher do?

Lot Sorting

- Lot List Sorting :
  Generates a sorted list of lots based on dispatching rules, available upon user request.
- Lot Reservation :
  Initiates production for reserved lots when requested by a machine.

What-Next

- Auto Selection :
  Automatically selects the most suitable lot for production using dispatching rules if no reserved lots are available.
- Auto Transfer :
  If a reserved lot cannot be processed, the dispatcher selects and processes the next best.

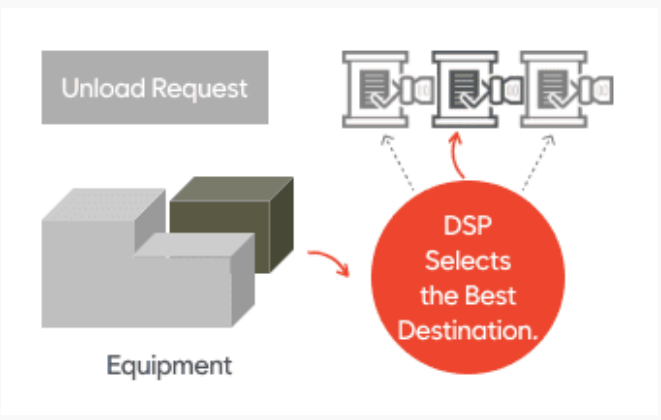


Where-Next

- Next Machine Auto Selection :
  Automatically determines the next equipment or stocker when an unload request is received.

  → Example : Transferring from equipment to equipment or from equipment to stocker

  → Factors Considered : Scheduling priorities, Stocker priority levels, Travel distance, Port status, Stocker utilization, etc.



Advantages and Features

Icon-based Visual Modeling

- Supports visual rule modeling, making it easy for both IT engineers and domain knowledge engineers to understand.
- Drag-and-drop functionality allows for the effortless creation and modification of dispatching rules.

Workflow-based Solution

- Built on a workflow framework, offering exceptional flexibility for development and customization.
- Easy to customize: Customize through policy modeling or configuration adjustments.
  Add rule logic activities to the rule modeler palette.
  Eliminate dependency on MES vendors for updates or customizations.

Rule Tracking

- Includes a rule-tracking feature to test created rules.
- Enables developers to trace the execution results of individual rules.

Effortless Development

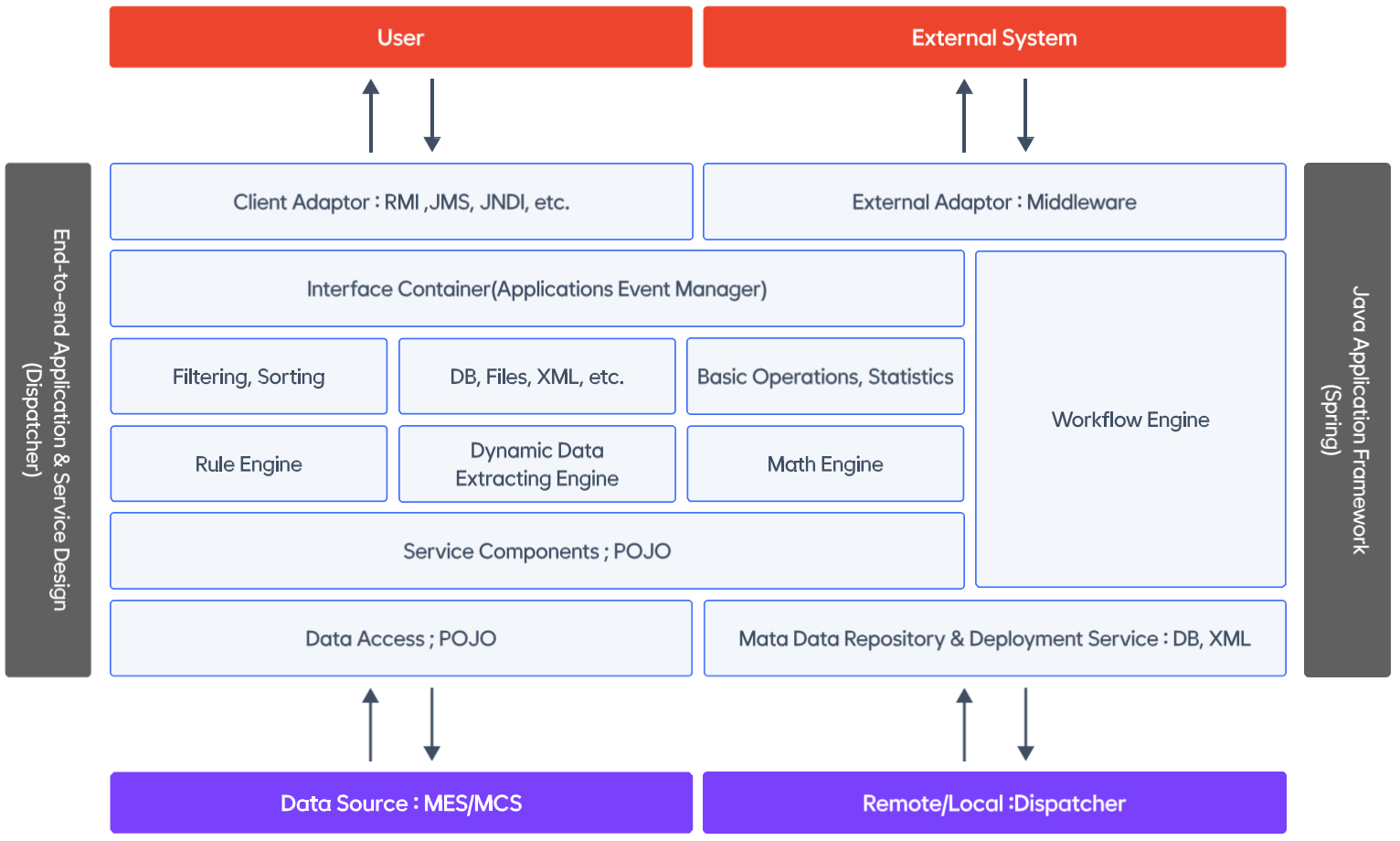
- Streamlined development process focused on leveraging domain knowledge.
- Predefined rule sets available to accelerate development.

Powerful Monitoring

- Offers visual monitoring for messages, rule execution, and commands.
- Provides real-time monitoring.
- Supports rule performance monitoring.

Product Configuration

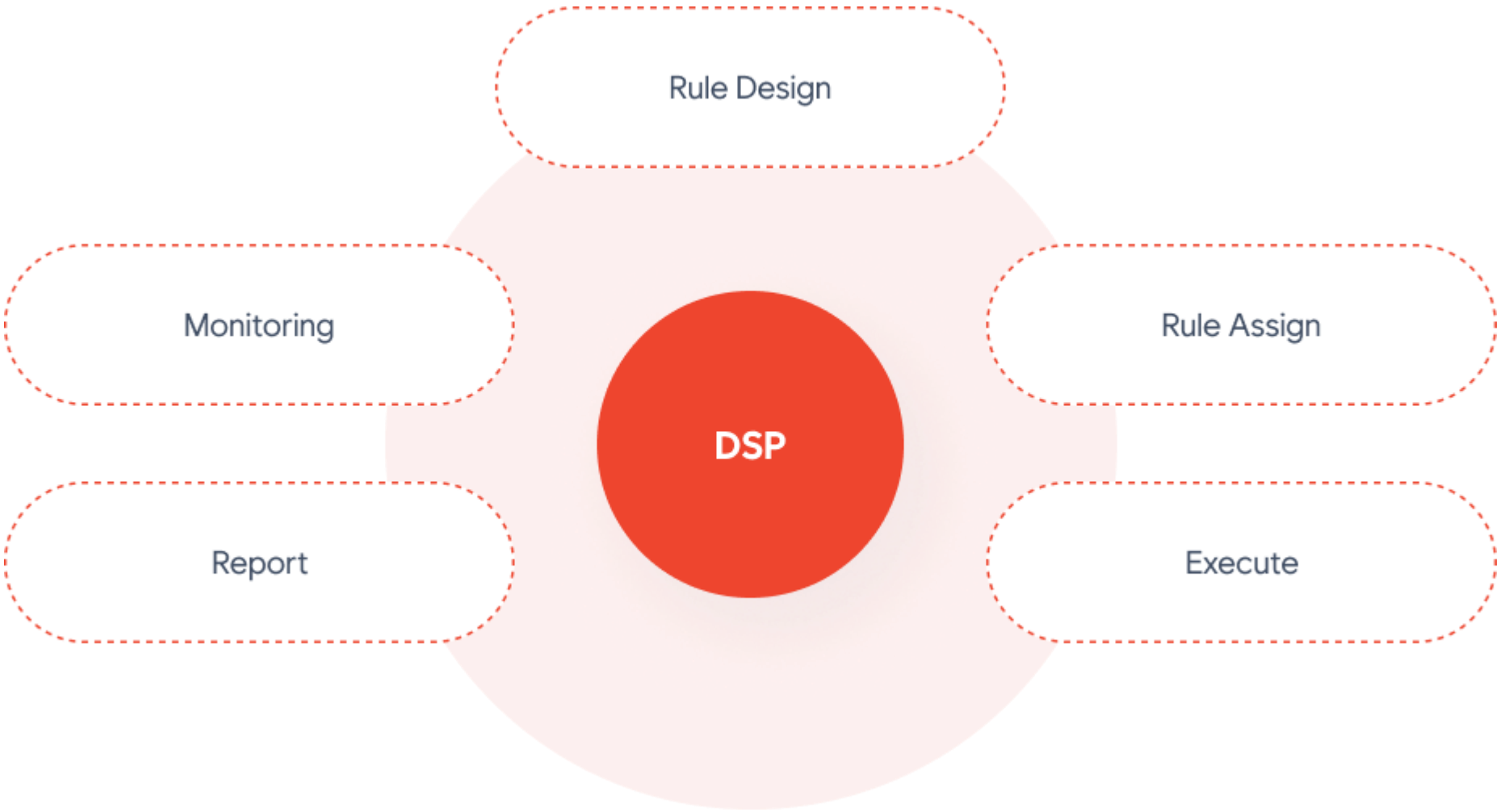
System Structure



IT Technology

1. Component Management Through Spring Framework
2. Protocol Adaptor via RMI,JMS and JNDI Service
3. BPEL based Workflow
4. XML Configuration
5. Object Related Mapping
6. Log4J Configuration
7. Java Interpreted Script
8. Connection Pool Service
9. Thread Pool Service
10. Generates SQL
11. Edipse Plug-in : SWT
12. Edipse Plug-in : GMF

Field-oriented Optimized service



Rule Design

Rule Modeler

- Workflow based Rule Design
- Rule Simulation

Rule Assign

Assign Manager

- Reference data migration
- Policy Modeling
- Simulation Mode / Execution

Execute

aimDSP Engine

- Full-Auto Mode
- Semi-Auto Mode

Report

Execution Summary

- Report
- Monitoring dispatching event, message, rule, executions

Coverage

nexBe+ DSP function component

Dispatching Condition

- UI-based dispatching
- Event-based dispatching
- Interval-based dispatching

Rule modeler

- Create and modify rules using a workflow-driven framework.
- Includes integrated simulation tools and instant testing function.
- Features BUT (Bottom-Up Tracing) for reverse tracing of rule logic components (activities).

Rule assign manager

- Manage and assign dispatching rules tailored to specific equipment or processes.
- Tools for reference data migration, policy modeling, rule assignment, execution, and debugging.

Rule monitoring

- Provides real-time insights into the outcomes of dispatching rules being executed.
- Monitors the performance of individual dispatcher applications in distributed environments.

Rule execution summary

- Reporting features

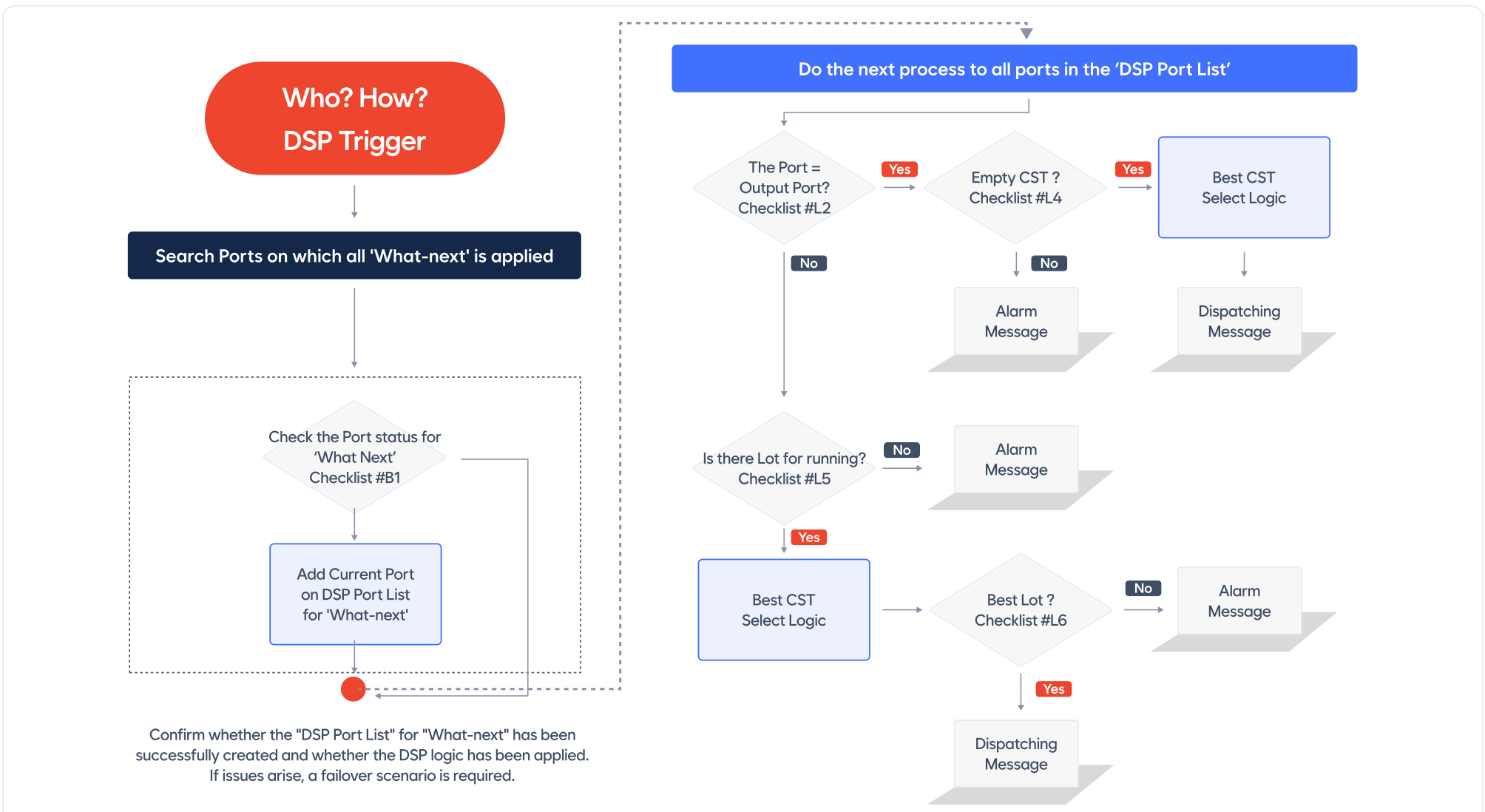
01 Dispatching Condition

Event based(Auto) dispatching

- When an LR or UR occurs in ECS (MES), the dispatcher automatically selects the optimal lot and equipment, then sends a dispatching command to the MCS.

Interval based (Auto: Batch service) Dispatching

- Periodically detects equipment or CST (Control System Transfer) in the waiting list of abnormal cases (e.g., pending tasks, equipment under regular maintenance, full stockers), and reallocates the command accordingly.



※ WIP: Work In Process
PM: Pre Maintenance

UI based (SEMI-AUTO) Dispatching

- The semi-automatic dispatching feature provides decision support for users selecting "What next?" or "Where next?" in the lot process.

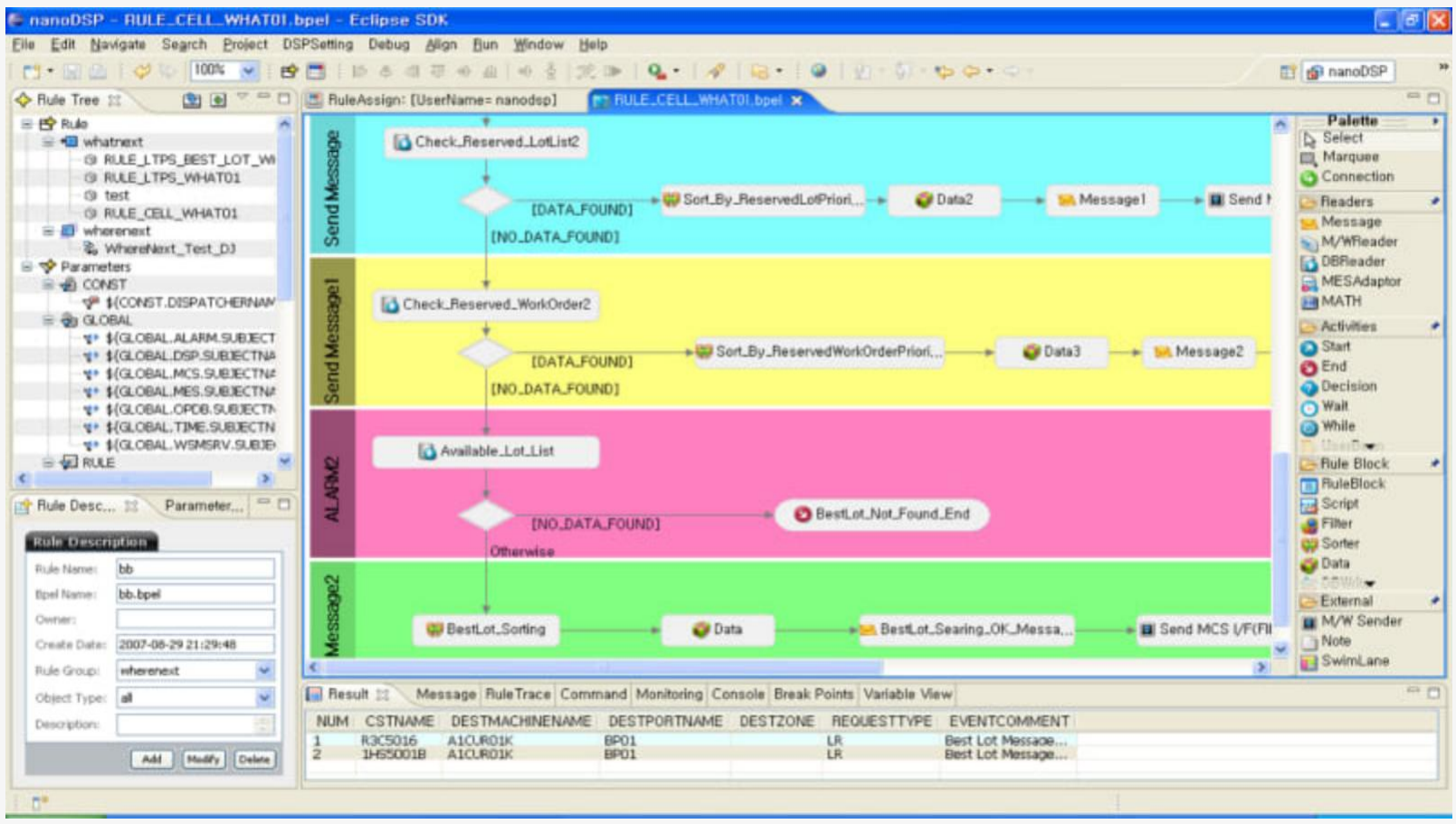
Equipment Click > Dispatcher Trigger

Priority	Target Lot	Sorting Method
1	A lot currently running on equipment A lot with its cassette located at the current equipment and a status of “Run”	Log-in time in ascending order
2	A lot currently loading on equipment A lot with its cassette located at the current equipment and a status of “Wait”	Port arrival time in ascending order
3	A lot en route to equipment A lot in the reservation list and listed in the dispatching queue table, where the “Target” is the current equipment’s port	Dispatching Message sent time in ascending order
4	A lot reserved for the current equipment A lot in another reservation list	Operator’s Lot reservation time in ascending order at equipment
5	A lot in the “What-next” list	Sorting order by the Sorting Logic of the Dispatcher
6	Abnormal Lot, such as Hold, etc.	Arrival time in ascending order to process
7	Others, such as dummy, empty cassette, etc.	–

02 Rule Modeler

Rule Modeling : Workflow-based dispatching rule design - intuitive and straightforward.

- The semi-automatic dispatching feature provides decision support for users selecting "What next?" or "Where next?" in the lot process.



Rule Modeling

- Rule Trance: Verifies the logic of the rule before deploying it.
- Displays the flow of developed activities graphically for easier visual tracing.
- Debugging: Supports step-by-step logic validation by enabling breakpoints within activities.

03 Rule Assign Manager

Rule Assign Manager

- Management features (dispatching rules, rule assignment data, policies, and more)

Reference data migration

- Automatically transfers reference data about equipment and tasks from the MES to efficiently assign rules.

Policy modeling

- Rules are categorized based on events like Load_Request (What-next) or Unload_Request (Where-next). A "Rule Assignment Policy" must be defined for each rule group. When an event occurs, the system decides which rule to execute based on the policy..

Rule assign

- To assign a rule, select 1) the rule group and 2) the appropriate category based on the policy. Execute rule assignment and operations according to the rule policy.

Run/Debug

- Choose simulation modes to run simulations. For example, choose the auto-dispatching mode or the UI mode. To generate events, the system selects equipment and ports for "What-next," and equipment, ports, and cassettes for "Where-next."

04 Rule Execute Summary

Report

- Provides reports on dispatching results, including equipment events, rule execution, and final dispatch commands. Integrated with MES, this allows users to retrieve reports directly from the MES system.

05 Monitoring Manger

Monitoring

- Users can monitor data within a specified timeframe and view results in chart or table formats. The Wizard tool makes the modeling process simple.

Monitoring modeling

- Users can set specific time intervals to monitor key data and access results in their preferred format, either in charts or tables. The Wizard feature provides a quick and easy way to create monitoring models.