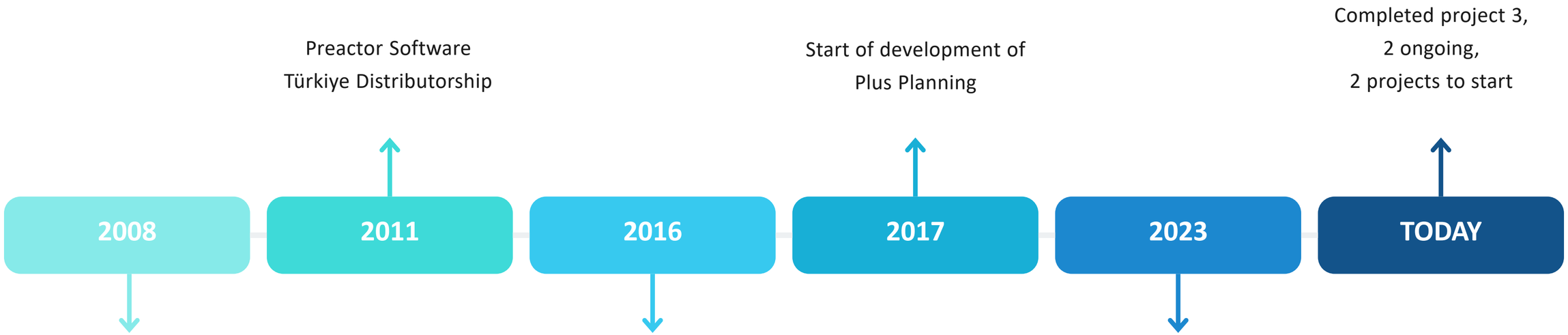
PLUS PLANNING

Advanced Planning and Scheduling

RUT
WISER SOLUTIONS
2025

HISTORY


2008
DinamoERP finite capacity planning
2011
Preactor Software Türkiye Distributorship
2016
More detailed examination of foreign solutions
2017
Start of development of Plus Planning
2023
Plus Planning's first commercial project start
TODAY
Completed project 3, 2 ongoing, 2 projects to start

SOLUTIONS

- Detailed Planning and Scheduling Applicable to All Production Types
- Just-in-Time MRP
- Advanced Capacity Planning
- Planning According to Bottlenecks
- Multi-Site Synchronization
- Supply Chain Synchronization
- Workload Balancing
- Capacity - Demand Matching
- Resource Usage Maximization
- Setup Time Optimization

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Plus Planning – Literature Comparison

	LB	Plus Planning			2022 Genetic			NEH [9]			2009 Hybrid Genetic		
		CMAX	Deviation %	CPU	CMAX	Deviation %	CPU	CMAX	Deviation %	CPU	CMAX	Deviation %	CPU
T_20_5_1	1278	1297	1,49		1297	1,49	2,8	1286	0,68		1278	0	1
T_20_10_1	1582	1624	2,65		1649	4,74	4,5	1680	6,19		1582	0	10
T_50_5_1	2724	2752	1,03		2745	0,77	22,1	2733	0,33		2724	0	6
T_50_10_1	2991	3231	8,02		3184	6,45	40,1	3135	4,81		3022	1,04	38
T_50_20_1	3771	4142	9,84		4164	10,42	82,4	4082	8,25		3880	2,89	22

Scheduling Instances

Published in E. Taillard, "Benchmarks for basic scheduling problems", EJOR 64(2):278-285, 1993.

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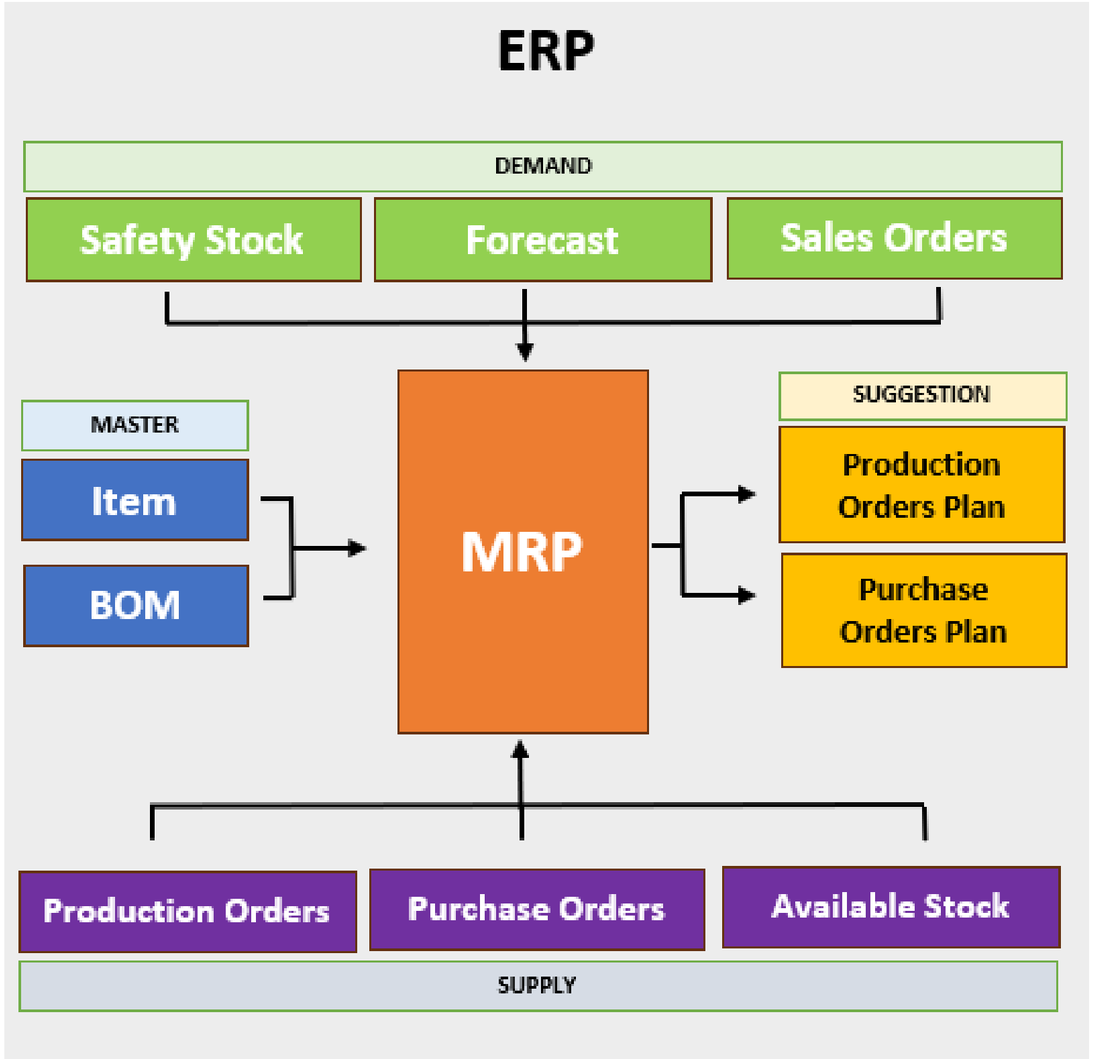

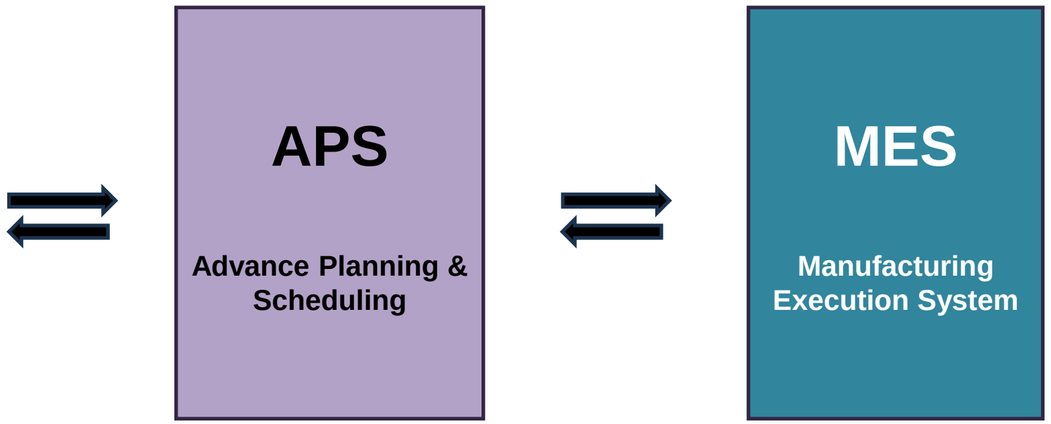

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Plus Planning
Main Parts

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PLANT DEFINITION

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PLANT

Capacity

- Shifts
- Machine Availibility
- Non Working Calendar
- Labor Availibility

Resource Items

- Labors
- Machines
- Labor or Machine Groups
- Materials
- Tools & Dies
- Capabilities

Master Data

- Jobs
- Available Materials
- Available Tools
- Machine Availability
- Labor Availability

Definitons >

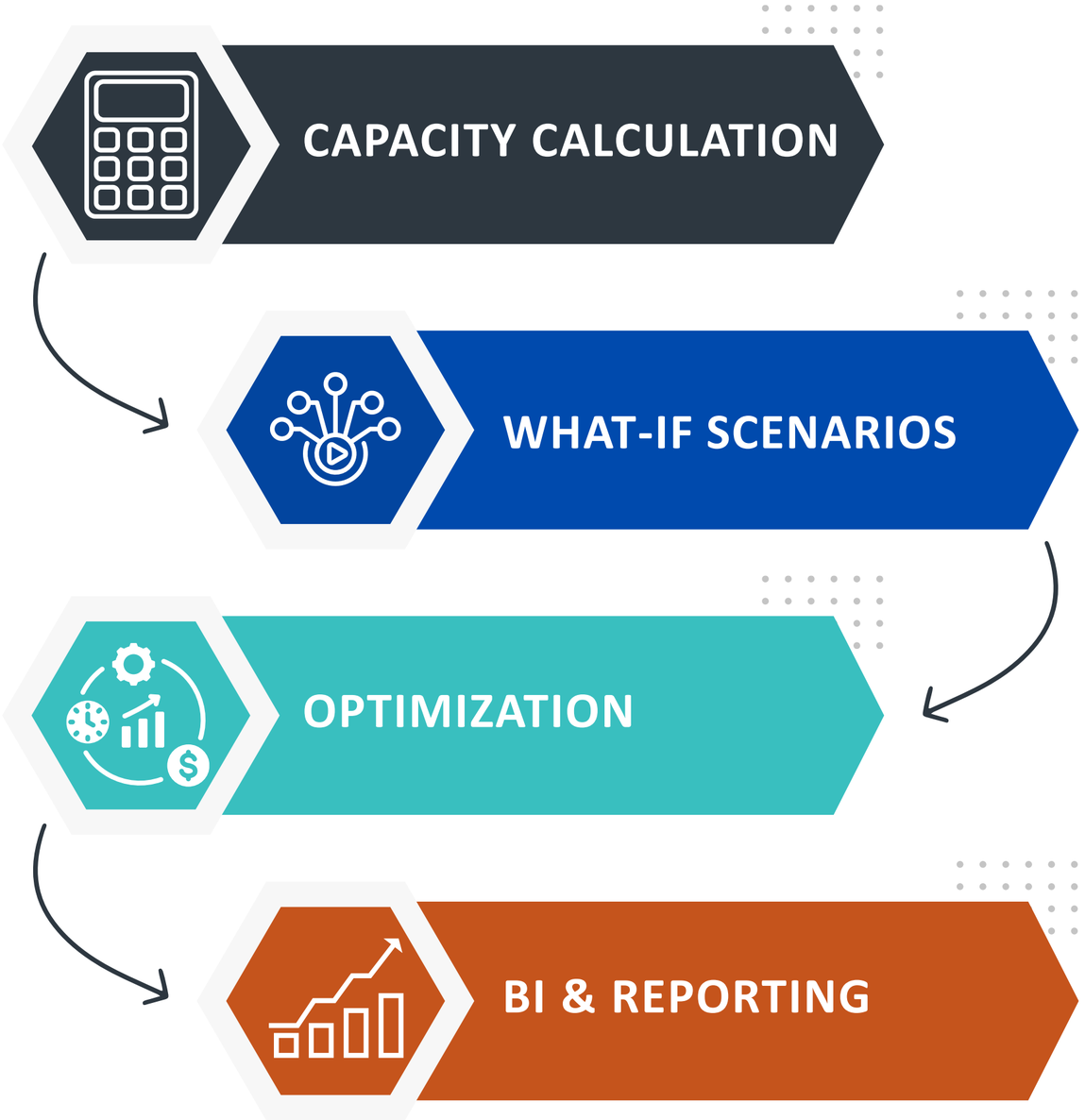
- Alternative Machine / Labor Transition Matrix
- Sequence Dependet Setup Setting
- Job & Resource Relation Rules
- Job Color Rules
- Job Priority Coefficent

Integrations

(ERP / MES / MRP) (API, Macro, Wizard)

- Jobs
- Machine Avail.
- Available Materials
- Available Tools & Dies
- Non Working Calendar
- Labor Avail.

APS SESSION



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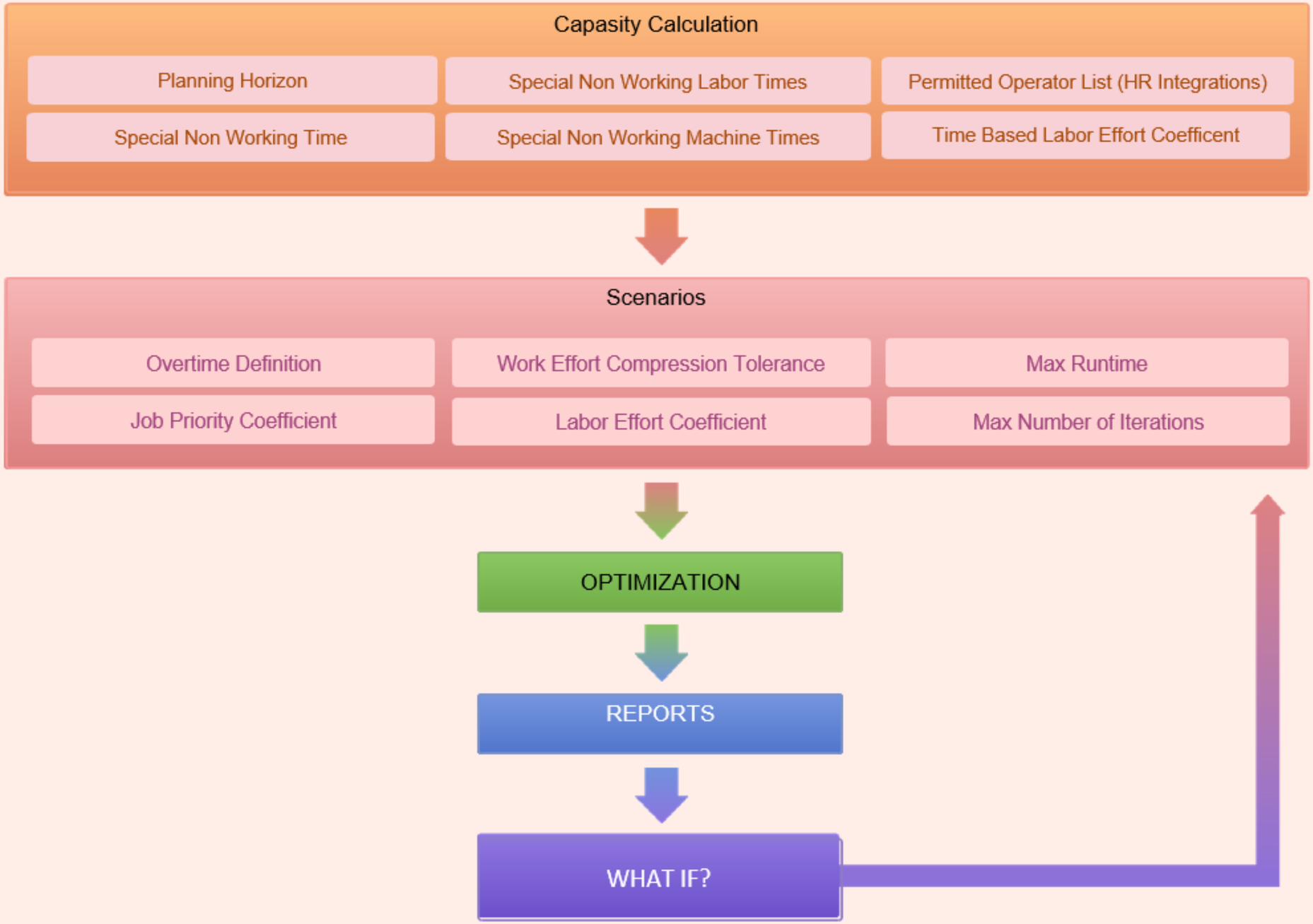
APS SESSION


Capasity Calculation
Planning Horizon
Special Non Working Labor Times
Permitted Operator List (HR Integrations)
Special Non Working Time
Special Non Working Machine Times
Time Based Labor Effort Coefficent
Scenarios
Overtime Definition
Work Effort Compression Tolerance
Max Runtime
Job Priority Coefficient
Labor Effort Coefficient
Max Number of Iterations
OPTIMIZATION
REPORTS
WHAT IF?

APS Features

- Capacity Calculation
- Optimized Finite Scheduling
- Material Driven Scheduling
- Tool & Die Driven Scheduling
- Scheduling with Operator Constraints
- Reducing In-Workshop WIP Stocks
- Scheduling with Mold Change Constraints
- Scheduling with Resource Constraints that Can Work Concurrently
- Sequence Dependent Setup Definitions
- Advanced Priority Management : Macro Rules
- Job & Resource Relation Rules
- OEE Based Resource Workflow Optimization
- Alternative Resource Migration with Rules or Capabilities
- Resource Grouping & Load Balancing
- Planning of Jobs By Automatic Division Into Batch Sizes
- Detailed Material & Tools Usage Analysis
- Visually Identify Production Bottlenecks
- Defining Flexible Rules with C# Script
- Optimization Step by Step
- Hybrid Optimization
- Integration
- Machine / Die Maintenance Integration
- HR Integration
- Bottleneck Job Fixing Module
- Job Fixing
- Forward / Backward Scheduling
- What-If Scenarios
- Overtime Management
- Work Compression Tolerance
- Advanced Visual Filtering
- Drag & Drop Scheduling
- Extensible Reporting
- Extensible Dashboards
- Audit of Operational Data Quality

1-) Capacity Calculation

➔ Plus Planning is capable of flexible, adaptive finite capacity planning that takes into account real-life requirements of the production site. Some constraints considered in finite capacity planning are presented below;

- **Holiday Calendar Setting:** Official holidays or facility-specific holidays can be defined.
- **Resource-Based Downtimes:** Downtimes covering a specific time interval of the shift can be defined for resources.
- **Scenario-Based Finite Capacity Planning;**
  - **Scenario-Specific Downtimes:** General downtimes for the entire facility or scenario-specific downtimes for individual resources can be defined within a scenario. For example, downtimes due to fire drills or inspections.
  - **Overtime Approval:** Overtime can be enabled or disabled depending on approval within the scenario. With parametric control of this feature, finite capacity considers the overtime capacity defined for each scenario.
  - **Skill-Based Resource Efficiency:** Finite capacity planning can be made more realistic by considering personnel experience (competency). For example, the skills of a master and an apprentice can be evaluated differently, taking into account their ability to perform tasks in capacity calculations.

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- **Operation During Standard Downtimes:** It can be specified whether resources will operate during standard downtimes.
- **Shift-Based Planning Horizon:** The planning for each facility can be segmented as desired. These segments, referred to as shifts, can be customized and linked to the resources within the facility. These customizations can be listed as follows;
  - **Shift-Based Work/Overtime Definition:** Work hours and overtime hours can be defined separately for each shift created for each facility.
  - **Shift-Based Standard Downtime Definitions:** Standard downtimes such as lunch and tea breaks can be defined for each shift.
  - **Resources Working/Not Working During Shifts:** It can be determined in which shifts a resource will work.
- **Integration with ERP Software for Finite Capacity Planning:** Some integration items are as follows;
  - Machine and mold maintenance plan integration and
  - With the integration of the personnel tracking system, it is possible to plan finite capacity according to the personnel who are on leave or absent.

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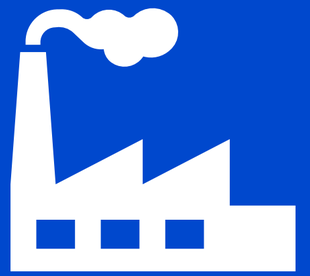
2-) Optimized Finite Scheduling

➔ Finite Capacity Planning and Scheduling (FFP) is a method that optimizes production processes by taking into account the limited capacity of available resources (such as labor, machines, materials). This feature aims to increase efficiency and reduce costs in production processes.

- **Resource Optimization and Flexible Scheduling:** It minimizes waiting times by ensuring effective use of resources and ensures that production plans adapt to changing demands.
- **Real-Time Monitoring and Conflict Management:** It monitors the production process in real time, prevents resource conflicts and offers immediate intervention.
- **Data Integration and Performance Analysis:** It works integrated with ERP and MRP systems to ensure data accuracy, analyze production performance and create reports.



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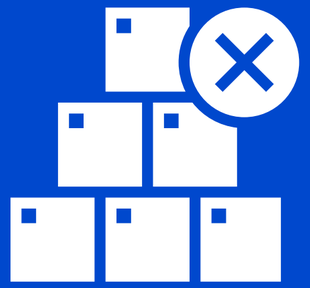
3-) Material Driven Scheduling

➔**Available Stocks:** Consumption of existing stocks is planned according to the priority order defined for work orders.

➔**Purchase Orders:** According to the delivery date of purchase orders, material consumption can be planned and work delays caused by purchasing can be reported.

➔**Batch Semi-finished Work Orders:** Work orders are multi-level and may not have the possibility to be integrated in relation to ERP. When scheduling a multi-level job, the predecessor-successor relationship between the levels is automatically created by the software and the jobs are scheduled. In this case, planning can be done by dividing and associating sub-work orders as much as needed for the upper level work order or as much as the batch size. No matter how high the BOM levels are, the association can be calculated quickly.



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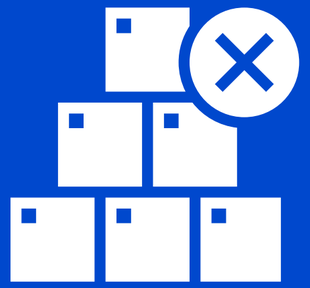
➔**Multi-Plant APS Integration:** The production plan of more than one facility can be planned separately. The product produced by one facility can be defined as raw material input in another facility and a connection between facilities can be established.

➔**Phantom Inventory Solution:** The inclusion of materials that are not in stock (Phantom) and for which no production work order has been opened can be controlled parametrically. If there is no material required for the production of the finished product / semi-finished product on the work order, the program can offer two different solutions. The work order can either not be scheduled and reported due to lack of material or it can be scheduled and reported on which date the relevant material is required. This can also be called scheduling-based MRP, and a purchase or production work order recommendation report can be generated.



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4-) Tool & Die Driven Scheduling

➔ The use of tools and molds is always necessary for production environments. This requirement ensures that production processes are efficient, uninterrupted and of high quality. Correctly defining and managing tools and molds plays a critical role in optimizing processes.

- **Resource Efficiency:** Accurate definition of tool and mold quantities ensures the most effective use of production resources. This reduces production costs by reducing the idle time of resources.
- **Uninterrupted Production:** By entering the dates when tools and molds can be used, waiting times on the production line are minimized and uninterrupted production is ensured. This ensures that production plans are more reliable and consistent.
- **Operation Matching:** Associating tools and molds with specific operations ensures that the right resource is used at each production stage. This speeds up the production process and improves product quality.

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5-) Scheduling with Operator Constraints

➔ Defining operator constraints and managing them correctly in production processes increases the reliability of production plans. This feature allows scheduling based on operator skills, working hours and availability. Considering operator constraints directly affects production efficiency and operational continuity.

- **Skill Based Scheduling:** Work assignments are made according to the competencies the operators have. In this way, it is ensured that operations are carried out by people with the right skills and the rate of faulty production decreases.
- **Management of Working Hours:** Planning is made taking into account the operators' shift hours and days off. This minimizes overtime costs along with efficient use of workforce.
- **Compliance Check:** Appropriate operators are checked and assigned for certain operations. Thus, unplanned downtimes are prevented and production continuity is maintained.

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6-) Reducing In-Workshop WIP Stocks

➔ In modern manufacturing processes, managing Work In Progress (WIP) stocks within the workshop is crucial for increasing efficiency and reducing costs. WIP stocks refer to products that are being processed on a production line but are not yet complete. These stocks can accumulate due to imbalances in the production line, machine failures or maintenance periods, delays in material supply, operator shortages, or insufficient workforce skills. The Plus Planning software offers various strategies and tools to reduce WIP stocks.

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- **Production Planning and Scheduling:** Determines when and in what order each job will be processed. Balanced planning prevents bottlenecks and excessive stock accumulation on the production line.
- **Real-Time Monitoring and Control:** Any imbalance or issue can be detected and quickly addressed. Real-time data flow provides flexibility in the production process.
- **Resource Optimization:** Determines when and for how long each resource will be used, ensuring resources are utilized most efficiently. This prevents the accumulation of WIP stocks.
- **Order Prioritization:** Urgent and important orders are processed first, while low-priority orders are deferred. This ensures timely responses to customer demands while minimizing stock accumulations on the production line.
- **Simulation and Scenario Analyzes:** Analyzes performed on different production scenarios enable possible blockages and stock accumulations to be detected in advance and preventive measures to be taken.

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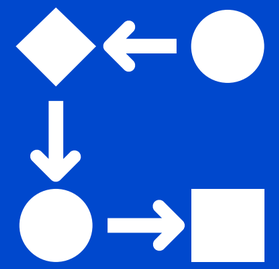
7-) Scheduling with Mold Change Constraints

➔ This feature allows for the specification of production lines and the application of mold change constraints. Mold change constraints enable scheduling within finite capacity.

- **Specification of Production Lines:** Determining the production lines regulates the lines on which mold changes will be made and thus reduces disruptions in the production process. This feature better manages production line complexity and simultaneous mold change applications.
- **Shift-Based Mold Change Constraint:** For example, a maximum of 6 mold changes per shift can be applied. This constraint limits the number of mold changes to 6 during a shift and does not allow a 7th mold change before the shift ends.
- **Simultaneous Mold Change Restriction on Line Basis:** For instance, a constraint of a maximum of 3 simultaneous mold changes can be applied. This constraint does not allow a 4th mold change before the 3rd simultaneous mold change is completed, ensuring that finite capacity is not exceeded.



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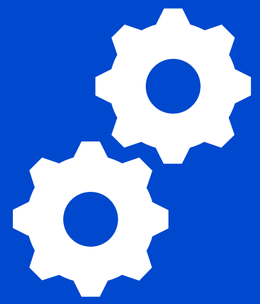
8-) Scheduling with Resource Constraints that Can Work Concurrently

➔ Controlling the number of workers/machines that can work simultaneously on production lines optimizes resource utilization and increases the consistency of production plans. This feature takes into account the simultaneous work constraints of resources with line-based definitions, ensuring that operations are carried out more efficiently and smoothly.



- **Line Based Source Identification:** The resources that will work on a specific production line are defined and the simultaneous operation constraints on this line are determined. In this way, operations are ensured to take place within appropriate capacity limits.
- **Concurrent Operation Restriction:** Resource usage is optimized by limiting the number of resources that can work simultaneously, thus preventing overloading and over-capacity on the line.
- **Production Continuity:** With defined constraints, operations proceed in a more orderly and planned manner, and unplanned stoppages are prevented by ensuring that resources are activated in the appropriate order on a line basis.

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9-) Sequence Dependent Setup Definitions

➔ Sequence Dependent Setup Definitions are a feature used to manage situations in production processes where each job or process needs different setup times depending on its order. This feature allows production line changeovers and set-up times to be optimized.

- **Setup Time Optimization:** It determines the adjustment times required for each job or process in production processes and optimizes these times. This increases efficiency in machine and labor usage.
- **Order Dependent Transitions:** It minimizes setup times that occur during transitions between different jobs or processes. Sequence-dependent transitions ensure uninterrupted and efficient operation of the production line.

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10-) Advanced Priority Management: Macro Rules

➔ With advanced priority management, priorities are set and managed among operations to be scheduled, ensuring that critical tasks are completed on time. In comparative scenarios, these rates can be adjusted in the APS session to interpret optimization outputs. In addition to variables such as job priority, delivery date, and setup time minimization, 12 additional customer-defined priority features can be defined. For example, optimization can be carried out by giving priority according to the percentage determined by the following 3 variables.

- According to Customer Priority Value: 40%
- Minimizing Setup Times: 20%
- Avoiding Late Delivery Dates: 40%

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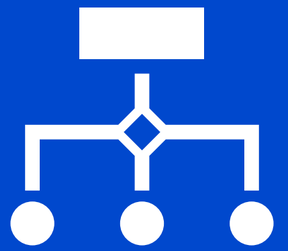
11-) Job & Resource Relation Rules

➔ Rules can be defined regarding which work can be done by which resource, according to the characteristics and capabilities of the resources. Here, rules for solving the problem in unlimited scenarios can be defined and associated with the facility plan. To give some examples;



- In the production of AA customer's orders, it may be desired to use resource Z0 as the default resource.
- For 3 mm thick raw material, CNC3 machine can be defined as the default source.
- If the customer is AA, the product is BB and the raw material to be used is CC, it can be modeled that this work should be done at source Z2.

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12-) OEE Based Resource Workflow Optimization

➔ OEE (Overall Equipment Effectiveness) based resource workflow optimization enhances the efficiency and effectiveness of your production processes. This feature adjusts the production speed based on the availability and capacity of resources using the resource-based performance factor in OEE calculations, thereby optimizing workflow efficiency.

- **Monitoring Resource Performance:** OEE-based optimization continuously monitors the availability and performance of resources. This allows for necessary adjustments to ensure a seamless flow in production processes.
- **Adjusting Production Speed:** The resource-based performance factor adjusts the production speed according to the available capacity. This ensures that production lines operate at optimal speed and resources are utilized in the most efficient manner.
- **Efficiency Improvement:** OEE calculations provide comprehensive data to enhance workflow efficiency. This minimizes bottlenecks in production processes and increases overall efficiency.

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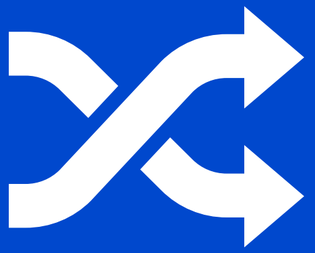
13-) Alternative Resource Migration with Rules or Capabilities

➔The resource transition matrix with rules or capabilities optimizes transitions between different resources and alternative resources based on the rule with variables such as resource capabilities, material properties, order, customer characteristics.



- Transitions can be made by determining the performance between alternative resources according to the capabilities of the resources.
- Source selection can be made according to the material to be used or the detailed constraints in the work order.
- For example, the cycle time on the 0.5 mm Sheet CNC1 machine may be 10 minutes, and the cycle time on the CNC2 machine may be 15 minutes. Based on the material rule, the constraint can be easily defined.

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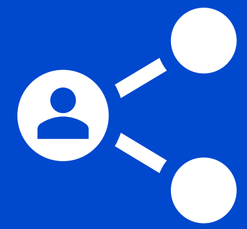
14-) Resource Grouping & Load Balancing

➔ Resource Grouping and Load Balancing is a feature that ensures effective management of resources and equal distribution of loads in production processes. This feature is designed to increase production efficiency and optimize resource usage.

- **Resource Grouping:** It organizes production resources into groups with similar characteristics. Resource grouping brings together elements such as machines and labor according to certain criteria. This allows resources to be managed and optimized more effectively. Coexistence of resources of the same type simplifies maintenance and management processes.
- **Load Balancing:** It prevents overloads and imbalances by distributing workloads equally among resources in production processes. Load balancing ensures efficient use of resources and ensures a continuous flow in production processes. This prevents resources from being overloaded and increases production efficiency.



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15-) Planning of Jobs By Automatic Division Into Batch Sizes

➔ In order to shorten the completion time of a job in production processes and optimize resource usage, jobs are automatically divided and scheduled among defined alternative machines. This feature allows the same job to be processed in parallel on multiple machines at the same time, significantly improving production times.

- **Division with Alternative Machines:** A job is automatically divided into batch sizes among the alternative machines defined for that job. This allows the job to be executed in parallel on multiple machines at the same time, reducing processing time.
- **Production Time Optimization:** By splitting jobs and processing them simultaneously on different machines, the total production time is significantly reduced. This saves time, especially with large batch sizes.
- **Enabling Resource Usage:** By using alternative machines, the workload is balanced and the idle times of the machines are minimized. Thus, capacity utilization is maximized.

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16-) Detailed Material & Tools Usage Analysis

➔ Detailed Material and Tool Usage Analysis is a feature that comprehensively evaluates the use of materials and tools in production processes. This analysis was developed to increase material and tool efficiency, reduce costs and optimize processes.

- **Material Usage Monitoring:** Monitors in detail how and how much materials are used in the production process. This enables accurate assessment of raw material consumption, waste and stock levels. Material usage data helps identify which materials are overused in production processes or areas where savings can be made.
- **Tool Use Efficiency:** Analyzes the use of production tools (machines, equipment). This analysis evaluates the vehicles' usage time, maintenance needs and performance. Using vehicles efficiently helps reduce breakdowns and optimize maintenance times.
- **Performance Reporting:** Creates detailed reports on material and tool usage. These reports provide managers and decision makers with a comprehensive view of how processes are working and inform strategic decisions.
- **Inventory and Supply Management:** Material usage analyzes help manage stock levels and the supply chain. Situations such as material shortages or overstock accumulations are optimized with timely intervention.

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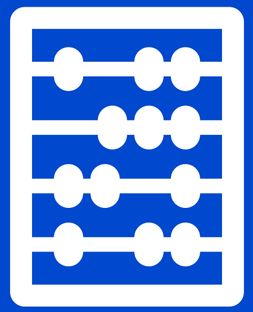
17-) Visually Identify Production Bottlenecks

➔ The visual identification of production bottlenecks feature enhances your ability to manage and streamline your production processes. This feature provides clear visual indicators of where bottlenecks occur, allowing for more effective problem-solving and optimization of workflows.



- **Clear Visualization:** This feature offers graphical representations of production bottlenecks, making it easy to pinpoint areas where processes are slowing down. Visual tools such as charts and diagrams help quickly identify and address issues.
- **Improved Decision-Making:** By visually mapping out bottlenecks, you gain insights into the root causes of production delays. This facilitates more informed decision-making and targeted interventions to improve efficiency.
- **Enhanced Process Optimization:** Visual indicators enable continuous monitoring and adjustment of production processes. This helps in proactively managing bottlenecks and optimizing workflow to maintain smooth operations.

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18-) Defining Flexible Rules with C# Script

➔ In complex production scenarios where standard rules are insufficient, flexible and special rules can be defined with C# script support. This feature allows users to easily create unthinkable constraints and conditions specific to production processes. Thus, production planning is fully compatible with needs.

- **Defining a Custom Rule:** Users can define special restrictions and conditions beyond standard rules by writing C# scripts. For example, scenarios such as “If the pattern of the resource to which a job will be assigned is the same as the pattern used in the previous job, do not assign it” can be implemented.
- **Managing Complex Scenarios:** Thanks to C# script support, conditional and detailed rule sets that depend on many variables can be easily defined and integrated into production processes.
- **Complete Flexibility and Control:** Users are provided with all kinds of control mechanisms they need in the processes, making production planning more flexible and precise.

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19-) Optimization Step by Step

➔ The step-by-step optimization feature enhances efficiency by fixing certain critical jobs in the production schedule and then optimizing the remaining jobs incrementally. This approach excludes critical jobs from the optimization process initially and allows for a more precise optimization of other tasks.

- **Fixing Critical Jobs:** Certain critical jobs are fixed in the production schedule. This ensures that these jobs are excluded from the initial optimization phase and prioritized as the first step.
- **Incremental Optimization:** Jobs that are not fixed are optimized step-by-step. This process allows for more effective and efficient scheduling by focusing on one step at a time, thereby improving overall production efficiency.
- **Precise Planning:** Fixing critical jobs and incrementally optimizing other tasks provides more precise planning. This helps achieve results closer to planning goals.
- **Increased Efficiency:** Step-by-step optimization improves efficiency at every stage of the production process. This feature ensures better management of all tasks and facilitates achieving production goals.

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20-) Hybrid Optimization

➔ The Hybrid Scheduling feature enables more effective and efficient management of your production and planning processes. This feature optimizes resource utilization and improves delivery times by defining project start and end dates.

- **Forward Scheduling:** For make-to-order production, operations are scheduled forward from the beginning of the planning horizon. This method ensures a quick and efficient response to customer orders.
- **Backward Scheduling:** For make-to-stock production, operations are scheduled backward from delivery dates. This approach optimizes inventory levels, reduces costs, and streamlines production processes.
- **Hybrid Scheduling:** Enables both forward and backward scheduling within the same session, effectively coordinating production processes for both current orders and future requirements.

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21-) Integration

➔ The integration feature allows you to manage your business processes more efficiently. This feature fits seamlessly with your existing systems and optimizes data flow. Thus, it increases operational efficiency by establishing a seamless connection between all parts of your business.

- **Data Synchronization:** Integration provides real-time data synchronization with ERP, CRM and other business applications. This increases data consistency and accuracy between different systems, minimizing data entry errors.
- **Automatic Information Flow:** Information is automatically updated and shared. This speeds up decision-making processes and enables working with up-to-date data.
- **Compatible System Integration:** It works compatible with various software and hardware systems and integrates without damaging your existing infrastructure. This simplifies transitions between systems and optimizes the workforce.

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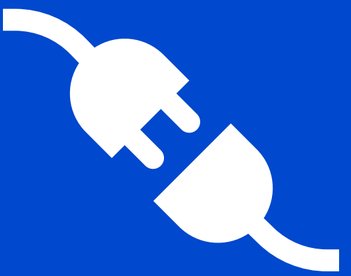
22-) Machine / Die Maintenance Integration

➔ Machine Mold Maintenance Integration coordinates maintenance operations with production schedules and provides the following benefits:

- **Continuous Production:** Maintenance needs are synchronized with production schedules. This ensures that maintenance operations are carried out without causing disruptions in the production process and prevents unexpected breakdowns.
- **Efficient Resource Management:** Maintenance processes are planned according to the production schedule, ensuring that the necessary resources (personnel, spare parts) are available. This leads to more organized and effective maintenance operations.
- **Enhanced Data Monitoring:** Maintenance and production data are tracked in an integrated manner. This enables more informed decision-making in maintenance strategies through data analysis, increasing maintenance efficiency.



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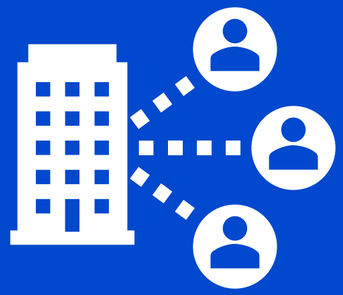
23-) HR Integration

➔ Human Resources Integration coordinates personnel management processes with production and other business processes and provides the following benefits:

- **Optimized Workforce Utilization:** Personnel needs are synchronized with production plans and workloads. This ensures more efficient use of the workforce and assigns employees to suitable tasks.
- **Enhanced Personnel Planning:** Employee competencies and performance data are monitored to ensure the right people are assigned to the right positions. This increases workforce efficiency and employee satisfaction.
- **Data-Driven Decision Making:** Human resources and production data are tracked and analyzed in an integrated manner. This supports data-based decision-making processes and ensures more effective implementation of HR strategies.



PLUS PLANNING

24-) Bottleneck Job Fixing Module

➔ The bottleneck planning module aims to enhance efficiency by identifying and managing bottlenecks in the production process. This module analyzes production line limitations and optimizes them to improve resource utilization and streamline production processes.

- **Identification of Bottlenecks:** The module identifies and analyzes bottlenecks in the production process, pinpointing areas where resources or processes constrain the workflow.
- **Optimization of Resource Utilization:** It optimizes resource usage to minimize the impact of bottlenecks. This ensures more effective use of resources and increases productivity.
- **Increased Efficiency:** By managing bottlenecks, the module enhances overall production efficiency, reducing delays and disruptions in the production process.

PLUS PLANNING

25-) Job Fixing

➔ The job fixing feature ensures that specific jobs are assigned to particular resources or scheduled for specific time slots in the production planning process. This feature guarantees that jobs are executed as planned and resources are used efficiently.

- **Resource Fixing:** Jobs can be fixed to specific machines or workstations. This ensures that critical tasks are performed with the appropriate resources, enhancing production flexibility.
- **Time Fixing:** Job can be scheduled for specific time periods. This facilitates adherence to production schedules and delivery deadlines.

PLUS PLANNING

26-) Forward / Backward Scheduling

➔ The forward-backward scheduling feature provides flexibility in production planning processes, allowing you to plan operations both forward and backward from the current date. This feature allows the production process to be managed more effectively.

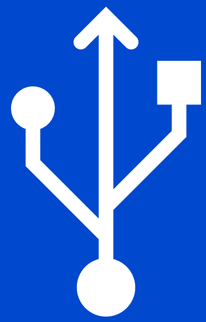
- **Forward Scheduling:** The forward scheduling method plans operations from the current date into the future, ensuring alignment with future dates. This approach facilitates effective management of the production process within a specified time frame and helps organize the scheduling process.
- **Backward Scheduling:** The backward scheduling method plans operations from the current date into the past, allowing for alignment with past dates. This approach ensures that production processes are in line with delivery deadlines or completion times.

PLUS PLANNING

27-) What-If Scenarios

➔ Advanced Scenario Management enables the determination of the most effective strategies by analyzing various scenarios in production processes. This feature gives businesses powerful tools to achieve optimal performance in different conditions.

- **Various Scenario Analyzes:** Analyzes how production processes will perform under different conditions. This covers scenarios such as changes in production demands, material supply issues, machine malfunctions, and other unexpected situations. These analyzes help businesses determine which strategies will be most effective.
- **Risk and Opportunity Management:** Anticipates potential risks and opportunities. Risk management ensures preparation for possible problems that may be encountered in production processes, so that the negative effects of these problems are minimized. At the same time, opportunity management evaluates the situations where the business has an advantage and aims to make the most of these opportunities.
- **Flexible Planning and Decision Support:** It adapts quickly to changing conditions and supports making strategic decisions. Flexible planning enables adaptation to sudden changes, while analysis results help develop long-term strategic decisions.



PLUS PLANNING

28-) Overtime Management

➔ Overtime capacity management allows you to define and effectively utilize overtime capacity within production processes. This feature helps optimize your planning by determining how much overtime your workforce can handle.

- **Defining Overtime Capacity:** The module defines the overtime capacity for each employee or production unit. This ensures that overtime limits are understood and capacity is aligned with workforce resources.
- **Utilizing Overtime:** By using the defined overtime capacity, you can adjust production processes according to needs. This helps in better managing workloads and meeting delivery deadlines.
- **Optimizing Capacities:** Effective management of overtime capacities ensures efficient use of workforce resources. This facilitates achieving production goals more effectively.

PLUS PLANNING

29-) Work Compression Tolerance

➔ The job compression tolerance feature provides flexibility in production and planning processes. This feature allows for the definition of a flexible time frame within which tasks can be completed, helping manage operations more efficiently in the face of planning changes and disruptions.

- **Flexible Time Management:** Job compression tolerance offers a degree of flexibility beyond the set time limits. This optimizes production plans in response to emergencies or unexpected delays.
- **Improved Resource Utilization:** The tolerance period allows for more efficient use of resources. Even under time pressure, resources are utilized optimally, preventing disruptions in workflow.
- **Planning Flexibility:** This feature enables a quick response to changing workloads and customer demands. Flexibility in planning enhances operational efficiency and reduces costs.

PLUS PLANNING

30-) Advanced Visual Filtering

➔ Advanced Visual Filtering optimizes the processes of processing and analyzing visual data and provides the following benefits:

- **Efficient Data Processing:** Advanced filtering algorithms enable the rapid and effective processing of large amounts of visual data. This accelerates data analysis processes.
- **High Precision:** Filtering visual data yields more precise and accurate results. This provides more reliable outcomes in image analysis.
- **Enhanced Data Visualization:** Filtering operations help present visual data more clearly and comprehensibly. This improves data visualization and reporting processes.

PLUS PLANNING

31-) Drag & Drop Scheduling

➔ The Drag and Drop Method allows users to intuitively move and place objects, offering the following benefits:

- **Ease of Use:** Users can perform tasks by simply dragging and dropping objects. This improves user experience and shortens the learning curve.
- **Time Saving:** Allows for quick movement and placement of objects, reducing operation times. This enhances work efficiency.
- **Better Visual Feedback:** Users receive instant visual feedback while dragging and dropping objects. This helps users perform tasks more accurately and confidently.

PLUS PLANNING

32-) Extensible Reporting

➔ The Advanced Reporting Feature enables the creation of flexible and dynamic reports tailored to specific planning needs and offers the following benefits:

- **Flexible and Dynamic Reports:** Users can create customized reports based on their specific needs and goals. This provides detailed and meaningful data suitable for each planning scenario.
- **Scenario Comparisons:** Allows for comparisons between different planning scenarios to determine the best solution. This facilitates the evaluation of various alternatives and the selection of the most effective strategy.
- **Detailed Information Provision:** Reports offer information at various levels of detail, enabling users to conduct in-depth analyses. This supports decision-making processes and helps develop more informed strategies.

PLUS PLANNING

33-) Extensible Dashboards

➔ The Advanced Dashboards feature enables the creation of visually effective analysis tables based on defined KPIs and offers the following benefits:

- **Visually Effective Table Display:** User-friendly and visually impactful tables can be created based on defined KPIs. These tables ensure that data is easily understood and analyzed quickly.
- **Real-Time Performance Monitoring:** Performance metrics can be continuously monitored with real-time data updates based on KPIs. This allows organizations to assess performance swiftly and make necessary adjustments in a timely manner.
- **Customizable Reporting:** Users can customize dashboards according to personal preferences and analytical needs. This provides a comprehensive view of various performance indicators on a single screen and delivers the necessary data for strategic decision-making.

PLUS PLANNING

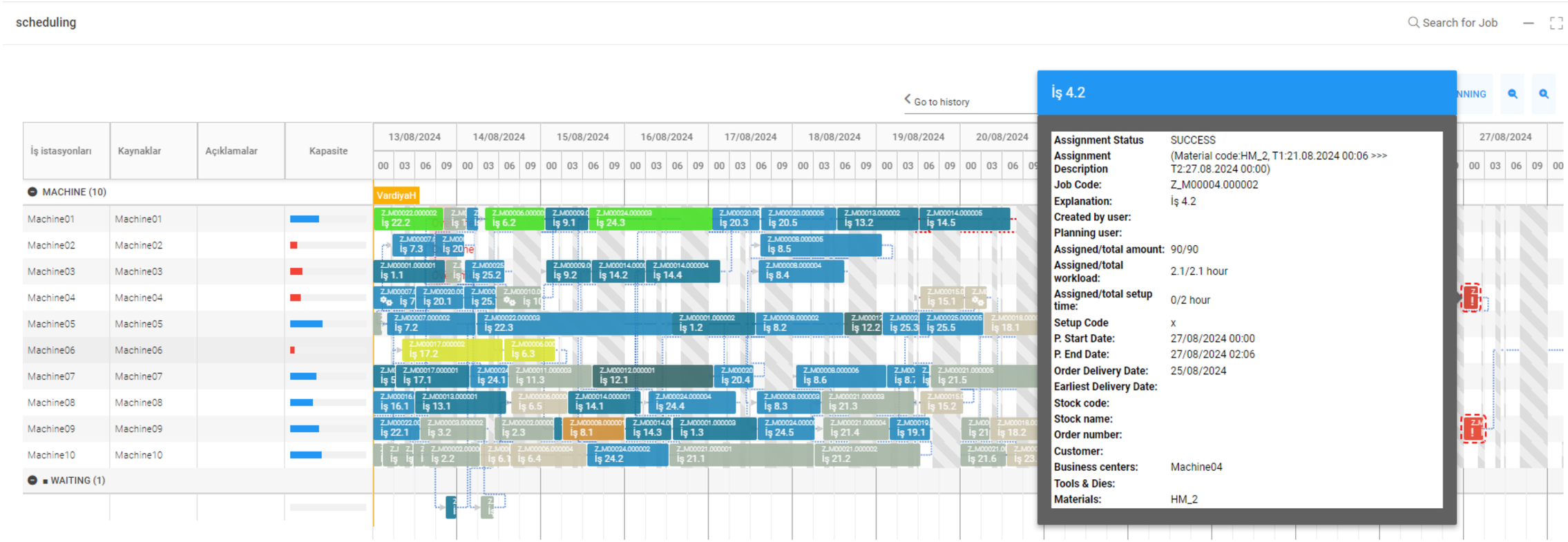
34-) Audit of Operational Data Quality

➔ The Operational Data Quality Monitoring feature helps Plus Planning effectively manage data quality through clear and purpose-driven alerts, offering the following benefits:

- **Real-Time Alerts:** Plus Planning provides instant notifications to users about data quality issues. For example, if a required job-resource link is missing for a product, the system alerts the user. This enables quick detection and correction of data errors.
- **Time Savings:** Users receive direct information about missing or erroneous data without needing to manually scan the data pool. This prevents time wastage and enhances efficiency.
- **Data Accuracy and Reliability:** Continuous monitoring of operational data quality improves data accuracy and reliability. This ensures that decisions are made based on accurate and dependable data.
- **Proactive Issue Resolution:** Alert messages enable users to address potential data quality issues proactively. This helps prevent operational disruptions and ensures smoother processes.

PLUS PLANNING

GANTT CHART



PLUS PLANNING

GENERAL STATISTICS

Gantt Start-End

Makespan	26,008	
Plan Start	13/08/2024	00:00:00
Plan End	31/08/2024	01:28:00

Numbers Regarding Assigned Jobs

Number of Late Product/Semi-Product/Order Level Jobs	
Number of Jobs at Total Product/Semi-Product/Order Level	
Total Number of Single Jobs	100

Setting Times

Total Defined Setting Time (hours)	13
Total Assigned Setting Time (hours)	3
Saved Setting Time (hours)	10

Hour Based Values

Total/Balance Workload(hours)	502.41
Total Assigned Workload(hours)	494.31
Varying Workload with Alternative Machine (hours)	

Unassigned Jobs

Number of Unassigned Jobs	1
Unassigned Workload(hours)	8.1

PLUS PLANNING

ADVANCED RAPORTING

Planned Job List

2024/09/17

Assigned job list in AF_EMBROIDERY resource on 2024/07/26

Job No	Description	Start	End	Setup Time	Total / Assign. Amount	Assigned Workload (h)
WO56270_0020	Embroidery	09:34	09:39	0	7 / 7	0.083

Assigned job list in AF_QUALITY resource on 2024/07/26

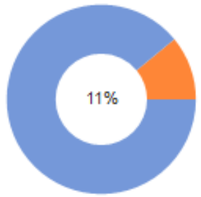
Job No	Description	Start	End	Setup Time	Total / Assign. Amount	Assigned Workload (h)
WO56379_0020	Quality Control	08:09	08:11	0	40 / 40	0.033
WO56380_0020	Quality Control	08:19	08:21	0	35 / 35	0.033
WO56381_0020	Quality Control	08:29	08:31	0	35 / 35	0.033
WO55757_0030	Quality Control	08:44	08:49	0	25 / 25	0.083
WO56270_0030	Quality Control	09:39	09:44	0	7 / 7	0.083

PLUS PLANNING

ADVANCED RAPORTING

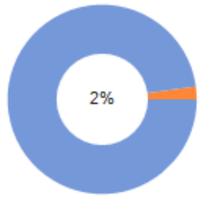
General Capacity Report

2024/09/17



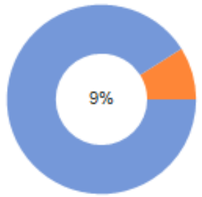
AF_EMBROIDERY

Total Capacity	189
Used Capacity	20.72
Assigned Job Count	229
Queue Wait Time	0



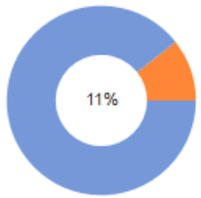
AF_HEAT TRANSFER

Total Capacity	189
Used Capacity	4.17
Assigned Job Count	10
Queue Wait Time	0



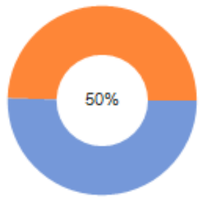
AF_QUALITY

Total Capacity	189
Used Capacity	16.96
Assigned Job Count	408
Queue Wait Time	0



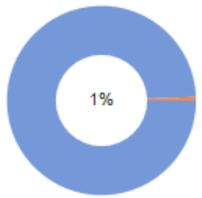
AF_SCREENPRINT

Total Capacity	189
Used Capacity	20.1
Assigned Job Count	166
Queue Wait Time	0



AF_SEWING

Total Capacity	189
Used Capacity	93.77
Assigned Job Count	121
Queue Wait Time	0

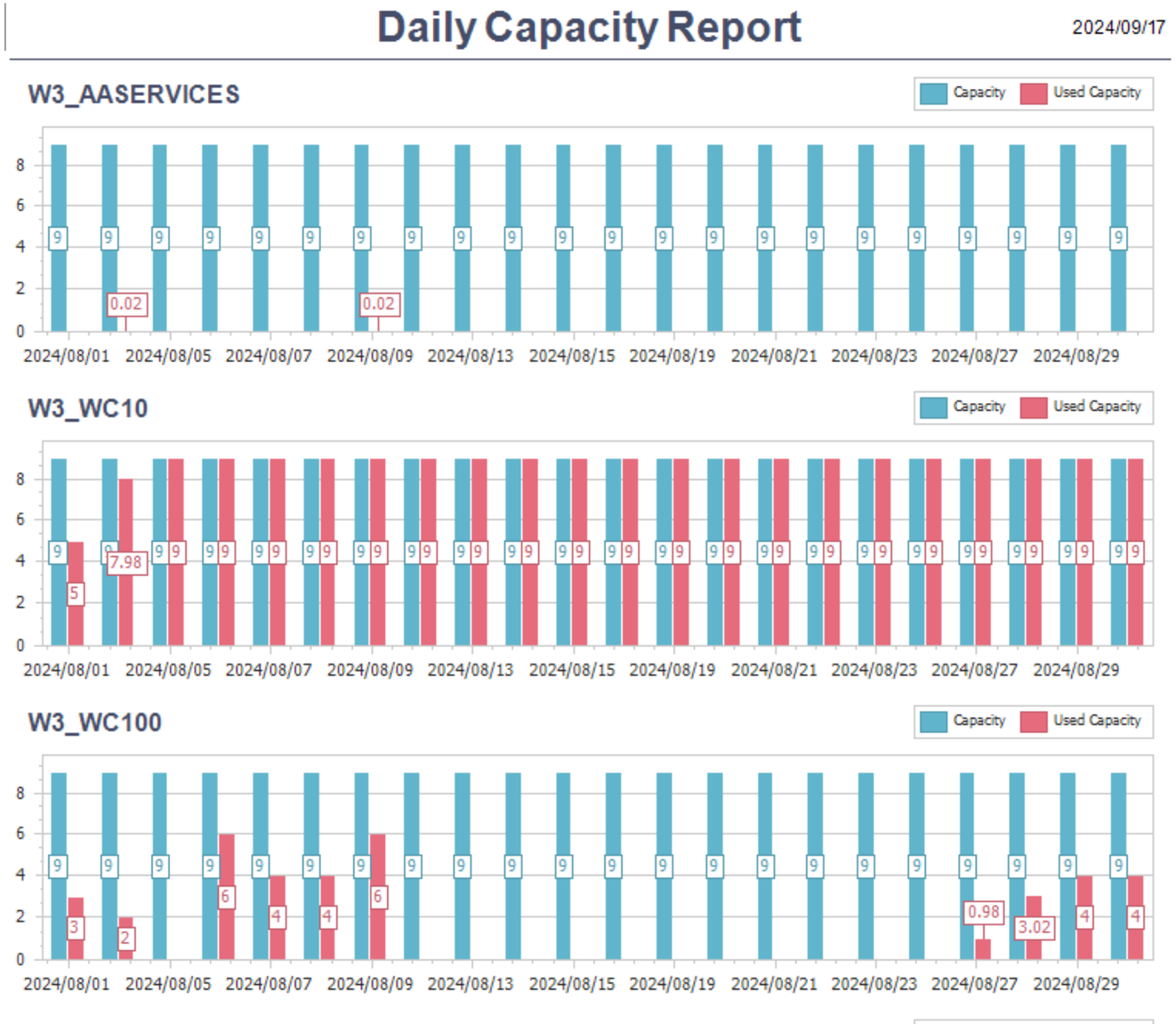


AF_SHIPPING

Total Capacity	189
Used Capacity	1.16
Assigned Job Count	24
Queue Wait Time	0

PLUS PLANNING

ADVANCED RAPORTING



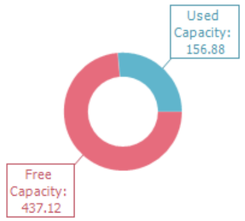
ADVANCED RAPORTING

APS Plan Summary

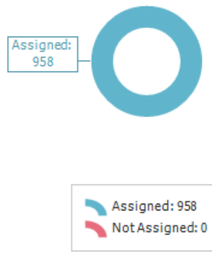
2024/09/17

2024/07/24 08:00:00 Plan Start	2024/08/07 17:00:00 Plan End	20392 Makespan (min)
431 Total Produced Job Order	28 Late Job Order	958 / 0 Total Job Count / Not Assigned Job Count
0 hour Total Setup Time (h)	0 hour Total Assigned Setup Time (h)	0 hour Total Saved Setup Time (h)

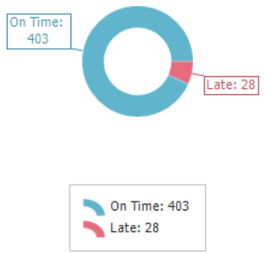
Used Capacity / Free Capacity



Assigned Job / Not Assigned Job



On-Time Jos / Late Jobs



Resources	Capacity	Used	Free	Usage (%)	Queue Wait Time
AF_SEWING	99 hour	93.77 hour	5.23 hour	94.72 %	0
AF_EMBROIDERY	99 hour	20.72 hour	78.28 hour	20.93 %	0
AF_SCREENPRINT	99 hour	20.1 hour	78.9 hour	20.3 %	0
AF_QUALITY	99 hour	16.96 hour	82.04 hour	17.13 %	0
AF_HEAT TRANSFER	99 hour	4.17 hour	94.83 hour	4.21 %	0
AF_SHIPPING	99 hour	1.16 hour	97.84 hour	1.17 %	0

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