

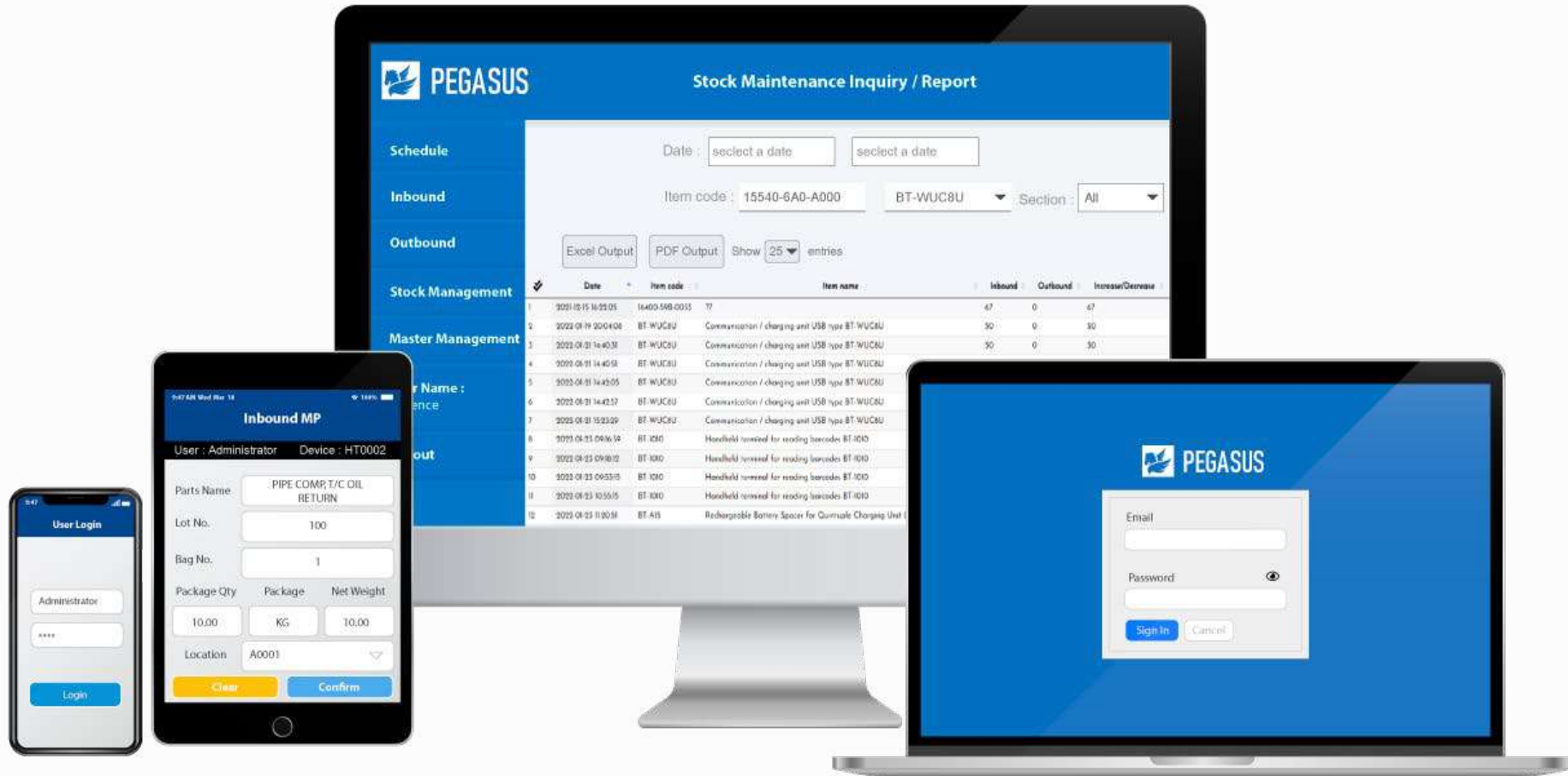
Operation monitoring & Traceability system

TOMAS TECH CO., LTD.

Introducing Operation monitoring system

What is an operation monitoring system?

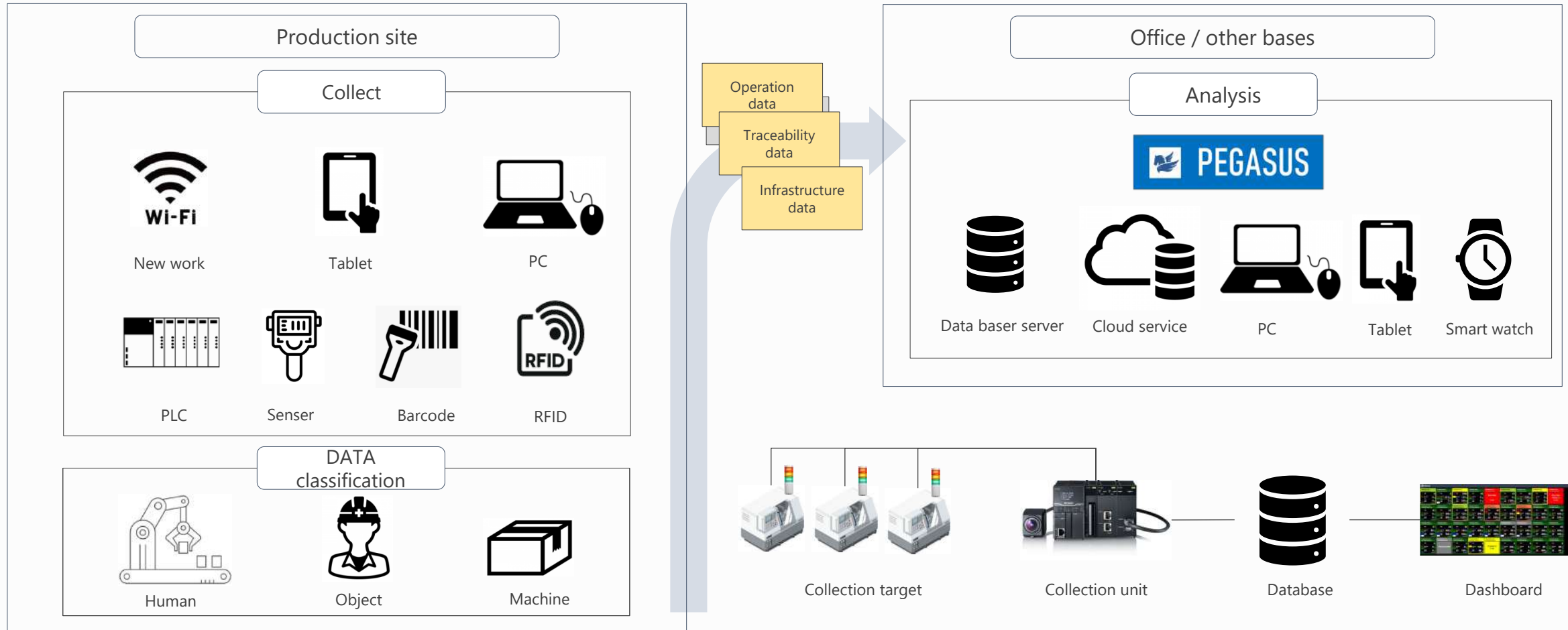
It is one of the modules of the package system PEGASUS. By collecting site information as data, it is possible to collect traceability data such as equipment operation information, abnormal ALARM, and measured values. **In addition to operation management, by installing various measuring instruments, it is possible to manage various information such as equipment frequency, temperature and humidity control, cutting oil and water management, and power consumption management.** The PEGASUS operation management system visualizes the **situation at the site and visualizes the "Black box".**



Function of Operation monitoring system

Operation monitoring system configuration diagram

The operation monitoring system can collect various current information. In addition, since it is compatible with both on-premises and cloud, it is possible to access data from inside and outside the factory with PC, smartphone, and tablet devices.



Operation monitoring system Function list

ERP cooperation
It is assumed to be automatically linked with the ERP system. The file formats are EXCEL, CSV, TXT, XML.

Cloud environment operation
We support various cloud environments such as AMAZON AWS and Google Cloud Platform.

Data collection function
Data can be collected by various methods such as control panels, sensors, PLCs, cameras, RFIDs, and barcodes.

Standard time calculation function
Data collection allows it to collect uptime, downtime, setup, and idle time. Since OK count and NG count can be collected, the actual standard time can be calculated.

Form issuing function
It is possible to output the data items that the user wants to analyze in a form. Output is possible in Excel and PDF formats.

Camera shooting function
It is possible to use the camera function to convert the data that it want to keep as an image, such as on-site troubles and NG products.

Progress management
By inputting the plan data, it is possible to manage the progress against the plan. By managing the status of each schedule, it can grasp the overall progress.

Management of other bases
By linking data with other bases, the system can be used at multiple bases.

Operation management system function list

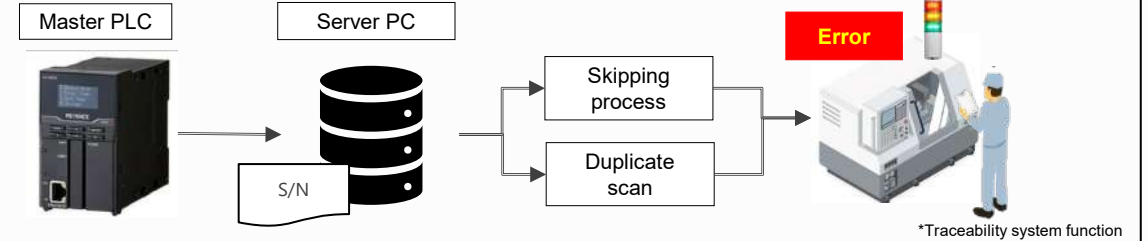
Traceability data collection function

Based on the workpiece S/N, we collect processing, inspection, and assembly results from each facility. The collection method uses PLC Keyence to acquire data. The acquired data is reflected and stored on the DB side in real time. Since backup data can be stored on an SD card by the collection PLC, data integrity can be ensured even in the event of a server failure or network failure between the collection PLC and the server. * A DB request is required for processes such as skipping.



Operator careless mistake prevention function

Based on workpiece S/N, processing, inspection, and assembly results are collected from each facility and stored in a database. Work S/N information is linked from equipment, and each time an inquiry is made to the DB, checks for "process skipping" and "duplicate scanning" are carried out. If there is an error corresponding to the above, an error signal is returned to the machine side, and the machine side can stop the operation to the next process after receiving the error. By shaking hands with the equipment side, it is possible to prevent careless mistakes by workers.



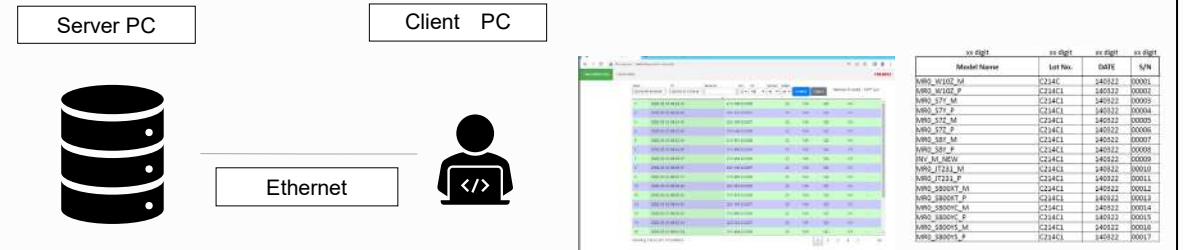
Notification function

It is possible to link the notification system using smart watches and LINE. By linking with the operation information of equipment (machine tools, robots, PLC, etc.), it is possible to catch signals such as momentary stoppages and send notifications to the person in charge. It is possible to realize "reduction of rush loss" and "visualization and analysis of on-site work".



Data reference function

Based on workpiece S/N, processing, inspection, and assembly results are collected from each facility and stored in a database. If it can access the DB from within the same network, it can refer to the data from the browser application. In addition to processing, inspection, and assembly result information, report output is also possible. It is possible to output graph information that changes with processing time and elapsed time of quality information.



Information acquisition method

Collection method 1 PLC linkage

Information can be collected by linking the master PLC and the equipment PLC.

It is possible to obtain detailed information such as equipment information, operation signals, stop signals, production quantities, and error signals. Since it is possible to collect the data held by the PLC on the equipment side, it is possible to incorporate improvement measures into concrete measures and take countermeasures to improve the operating rate.



Collection method 2 I/O linkage

Use remote I/O units to get information from electrical signals in them facility.

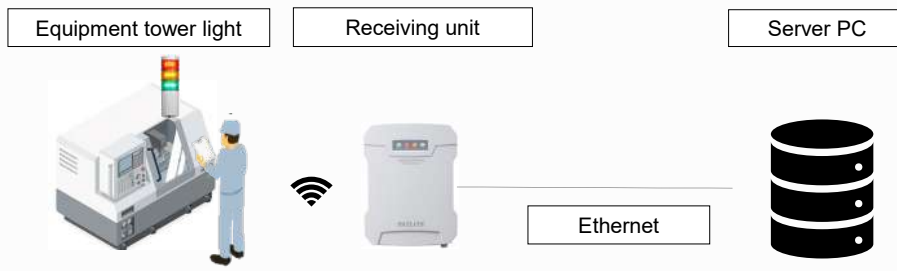
Information such as operation signals, stop signals, and production quantities can be collected. If it is possible to collect information such as equipment model information using analog signals, more advanced analysis will be possible. By combining with a tablet system, detailed information such as error details can be collected.



Collection method 3 Tower light cooperation

By using PALITE's signal lights, operation management can be easily achieved.

By attaching an information collection unit to an existing signal light, information on the signal light can be obtained. Because of the simple settings, the system can be used immediately.



Collection method 4 Device linkage

Operation status can be visualized by linking with devices such as handy terminals.

By scanning the item slip in each process, it is possible to manage work time, IN/OUT time, and cycle time.



Operation monitoring system Function

Andon display board

Displays the operation status of each facility in ANDON. In addition to understanding the status of each facility, it can display the production quantity, operating time, total stop time, and number of times. Workers and managers can check the data on the TV display or PC.

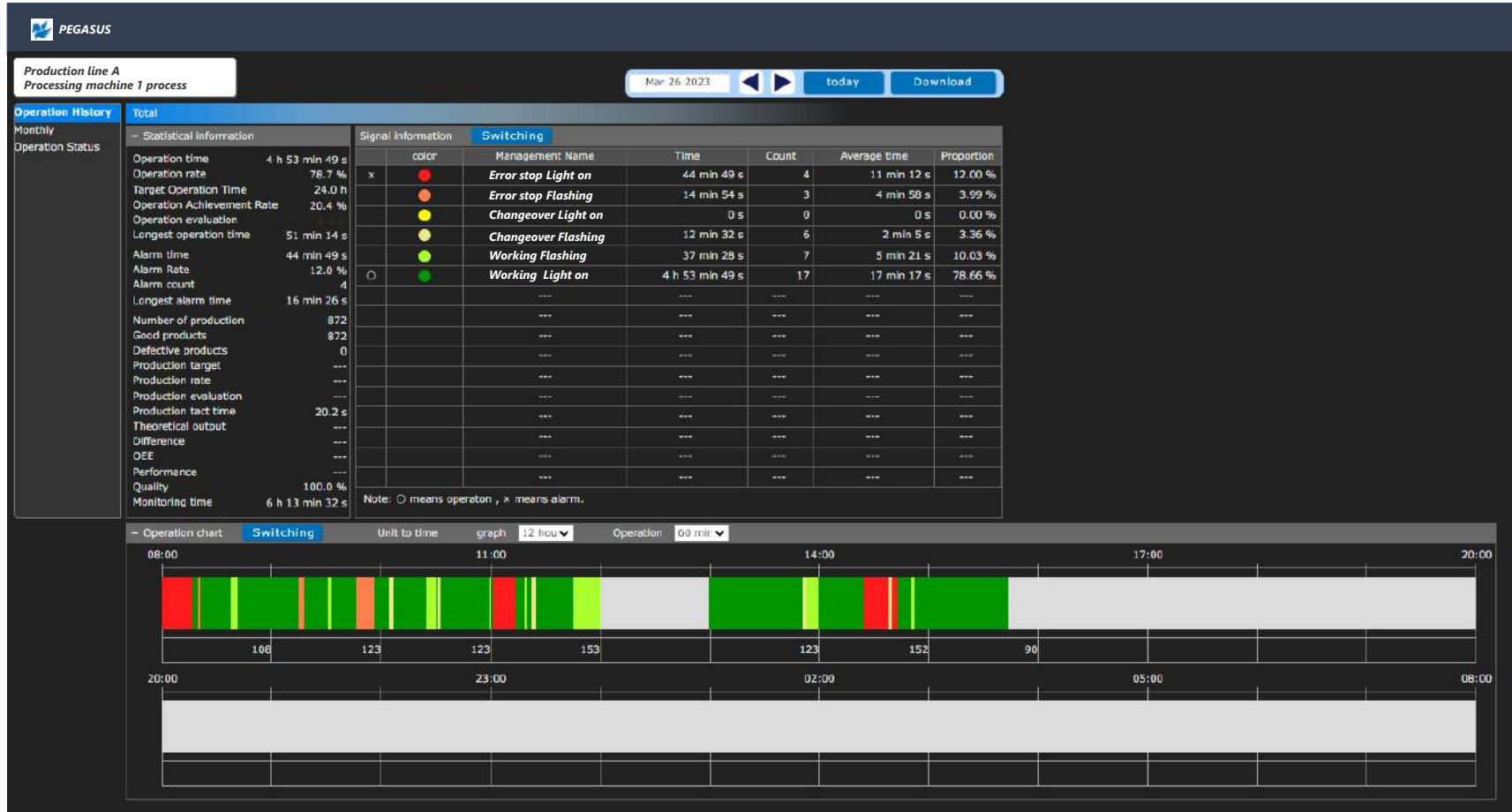


HOME PAGE TOP

Operation monitoring system Function

Detailed equipment operation information

It can check the detailed data by clicking the information of each facility on the Andon display board. It can analyze the lighting time and the number of lighting times for each lamp unit. By selecting the target date, it can check the past data.



Operation monitoring system Function

Status graph

It can check the past operation status in a bar graph with the percentage of each color. It can be displayed in units of hours, days, and months. Since the completed quantity can be expressed in a bar graph, the usage of data can be expanded.



Operation monitoring system Function

Progress management

By inputting the plan data, it is possible to manage the progress against the plan. By managing the status of each schedule, it can grasp the overall progress.

#	Production Date Plan	P-ID	Item code	Model	Item Name	M/C	P	Processing time	Amount Plan	Amount Act	Amount Diff	Production Time Plan	Production Time Act	Production Time Diff	Status
1	2022-05-23	220323-0010	HT1765	HT-R45C	BOBBIN COVER (HT-R45C)	6	1	120.00	3200	0	3200	0.00	0.00	0.00	CANCELED 26 May 2022
2	2022-05-23	220323-0009	CN37335	CN70	Arm Cover	5	4	120.00	576	0	576	0.00	0.00	0.00	CONFIRMED 22 May 2022
3	2022-05-23	220323-0008	HDI7838	HD-10FL3	Clincher Arm Cover LG	5	3	20.00	2000	0	2000	0.00	0.00	0.00	CONFIRMED 22 May 2022
4	2022-05-23	220323-0007	HDI7835	HD-10FL3	Handle Cover LG	5	2	30.00	2000	0	2000	0.00	0.00	0.00	CONFIRMED 22 May 2022
5	2022-05-23	220323-0006	HDI7836	HD-10FL3	Handle Cover W	5	1	30.00	2000	0	2000	0.00	0.00	0.00	CONFIRMED 22 May 2022
6	2022-05-23	220323-0005	HD81144	HD-10FL3	Plastic Staple Cover Assy	4	1	15.00	4800	1	4799	20.00	0.15	19.00	CONFIRMED 02 Jun 2022
7	2022-05-23	220323-0004	TA17001	TA551/6-11(USA)	ARM GUIDE	2	2	120.00	400	0	400	0.00	0.00	0.00	CONFIRMED 22 May 2022
8	2022-05-23	220323-0003	HDI7829	HD-10FL3	Clincher Guide	2	1	20.00	1800	3	1797	10.00	0.16	9.00	CONFIRMED 02 Jun 2022
9	2022-05-23	220323-0002	HT11815	HT-R45C	PUSHER	1	2	36.00	4600	0	4600	0.00	0.00	0.00	CONFIRMED 26 May 2022
10	2022-05-23	220323-0001	HT11778	HT-R45C	B CASE 52	1	1	60.00	3000	6	2994	50.00	0.01	49.00	COMPLETED 02 Jun 2022

Operation monitoring system Function

Data collection function

Data can be collected by various methods such as control panels, sensors, PLCs, cameras, RFIDs, and barcodes. Since it is possible to collect time and factors for NG information and STOP information, analysis for improvement is possible.

No.	P-ID	Itemcode	Model	Item Name	M/C	P	Processing time	Amount Plan	Status
1	220323-0013	23047655	640A	OUTER LENS SID...	7	2	70	1656	CONFIRMED
2	220323-0001	HT11778	HT-R45C	B CASE S2	1	1	60	3000	CONFIRMED
3	220323-0002	HT11815	HT-R45C	PUSHER	1	2	100	4600	CONFIRMED
4	220323-0003	HD17829	HD-10FL3	Clincher Guide	2	1	180	1800	CONFIRMED
5	220323-0004	TA17001	TA551/16-11(US...	ARM GUIDE	2	2	30	400	CONFIRMED
6	220323-0005	HD81144	HD-10FL3	Plastic Staple Co...	4	1	240	4800	CONFIRMED
7	220323-0006	HD17836	HD-10FL3	Handle Cover W	5	1	120	2000	CONFIRMED
8	220323-0007	HD17835	HD-10FL3	Handle Cover LG	5	2	120	2000	CONFIRMED
9	220323-0008	HD17838	HD-10FL3	Clincher Arm Co...	5	3	180	2000	CONFIRMED
10	220323-0009	CN37535	CN70	Arm Cover	5	4	30	576	CONFIRMED
11	220323-0010	HT11765	HT-R45C	BOBBIN COVER (...	6	1	30	3200	CANCELED
12	220323-0011	HT11733	HT-S45E	TAPE HOLDER B...	6	2	60	2000	CONFIRMED
13	220323-0012	23047654	640A	OUTER LENS SID...	7	1	60	1656	CONFIRMED

Operation monitoring system Function

Standard time calculation

Data collection allows it to collect uptime, downtime, setup, and idle time. Since OK count and NG count can be collected, the actual standard time can be calculated.

The screenshot displays a mobile application interface for an operation monitoring system. The top status bar shows the time as 11:42. The main interface consists of several data entry fields arranged in a grid. At the bottom, there is a navigation bar with various function buttons.

MC No.	1	Date	09-Jun-2022	Time	11:42 AM		
P-ID	220323-0001	Model	HT-R45C				
Item code	HT11778	Item Name	B CASE S2				
Plan Qty	3000	OK	0	NG	0	Difference	-3000
Start time	09-Jun-2022 11:33:18		Plan end time	11-Jun-2022 01:33:18			
Cycle time/ 1shot(sec)	60.0		Pcs / 1h	60			
Status	Stop		Stop Total time	0 min			
Actual Cycle time	0		Estimated end	-			

Bottom navigation bar buttons: QR Scan, Kanban : OK, Label : OK, Production Start, Production Finish, QA PDF, Camera icon, Main Menu.

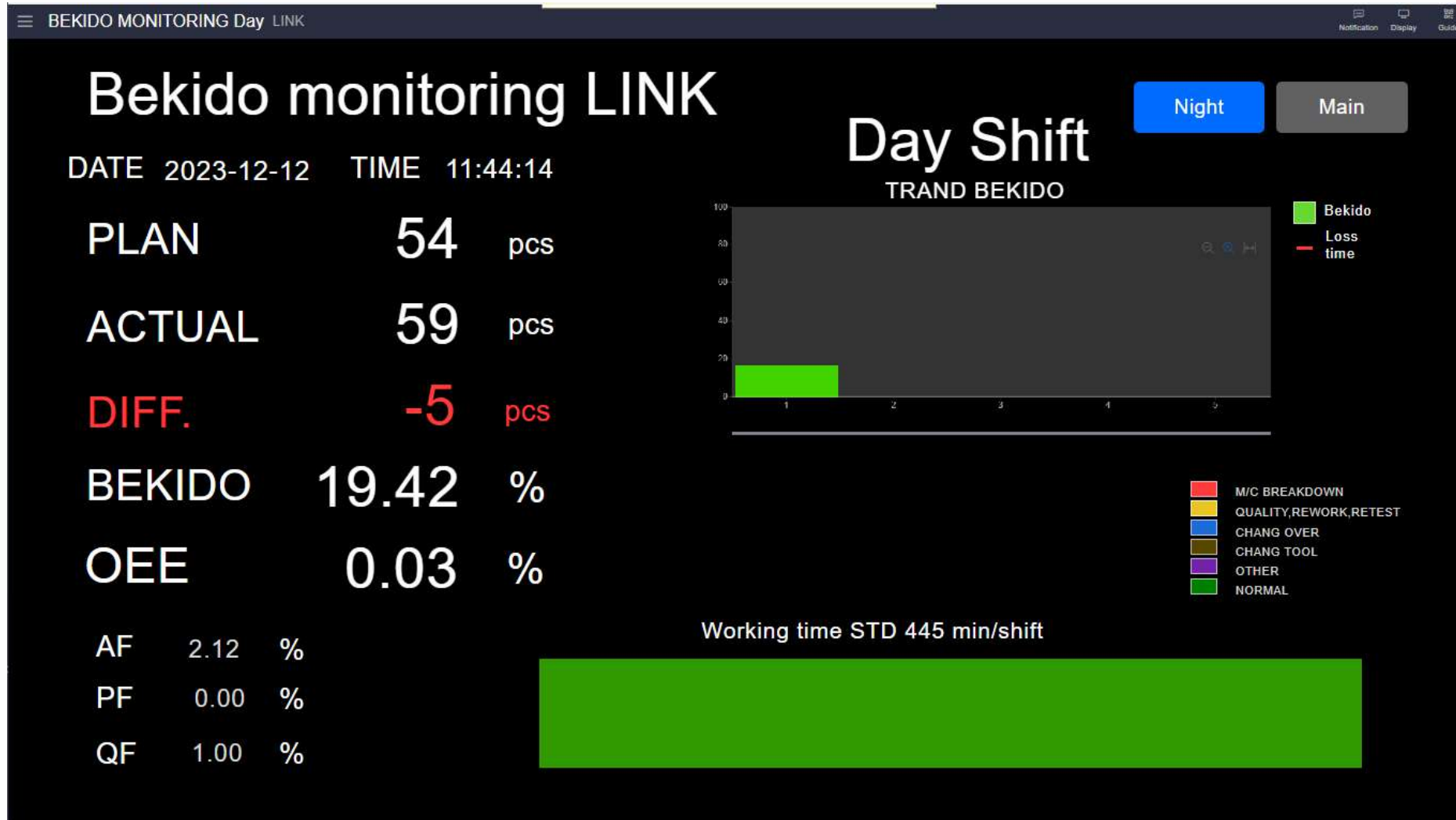
Operation monitoring system Function

Production overall screen



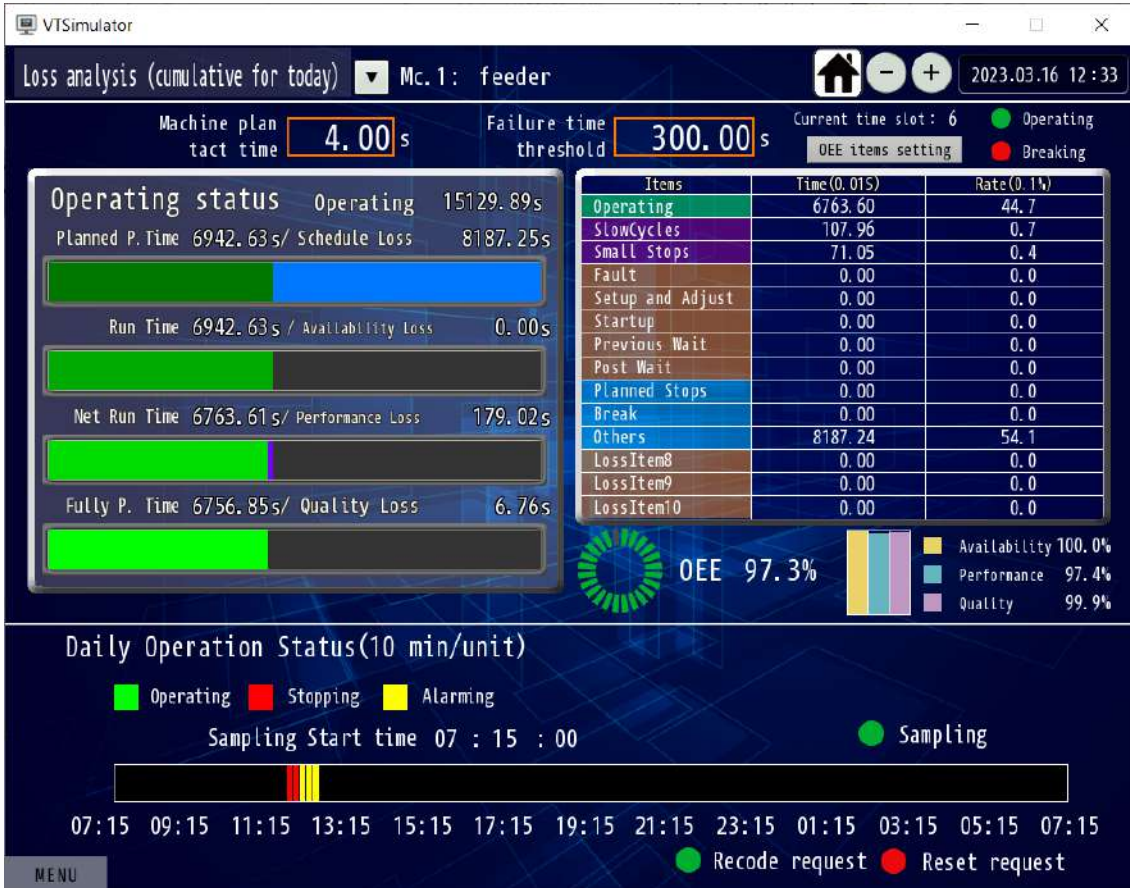
Operation monitoring system Function

Production Bekido screen

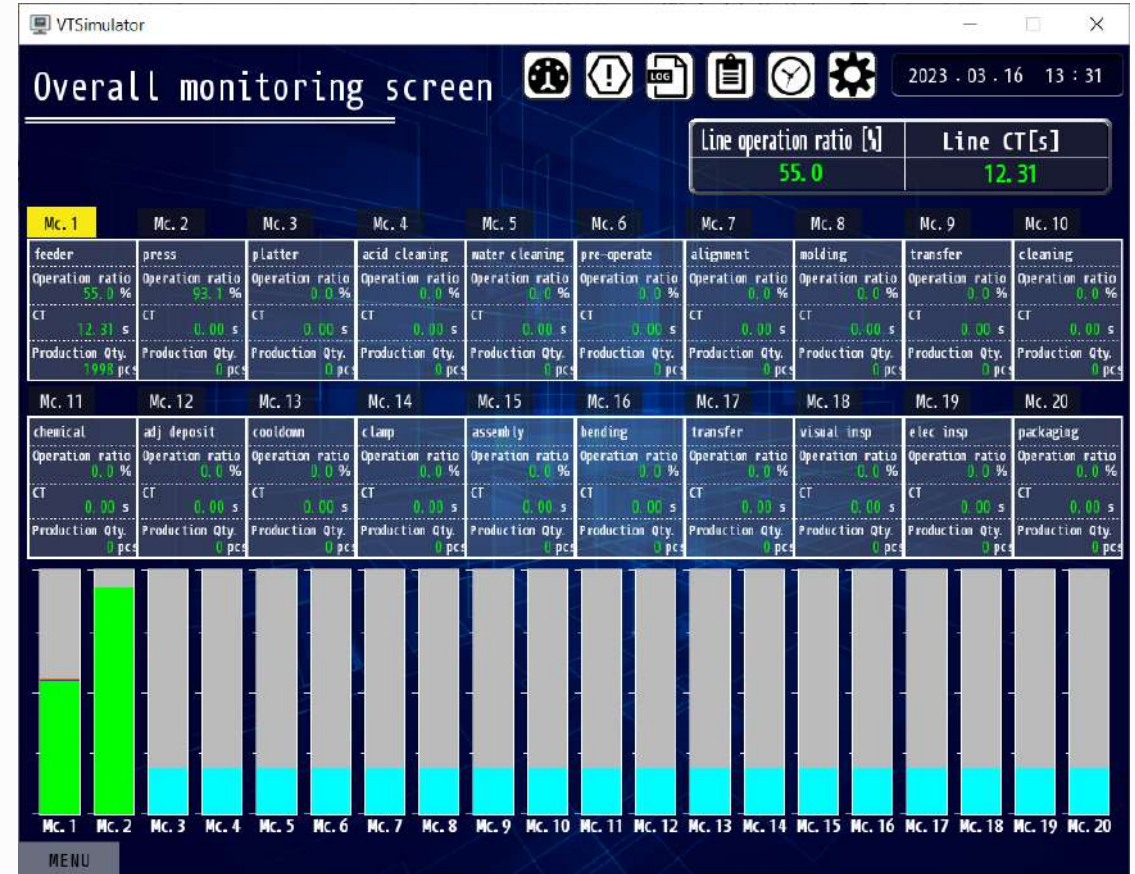


Operation monitoring system Function

Gantt Chart

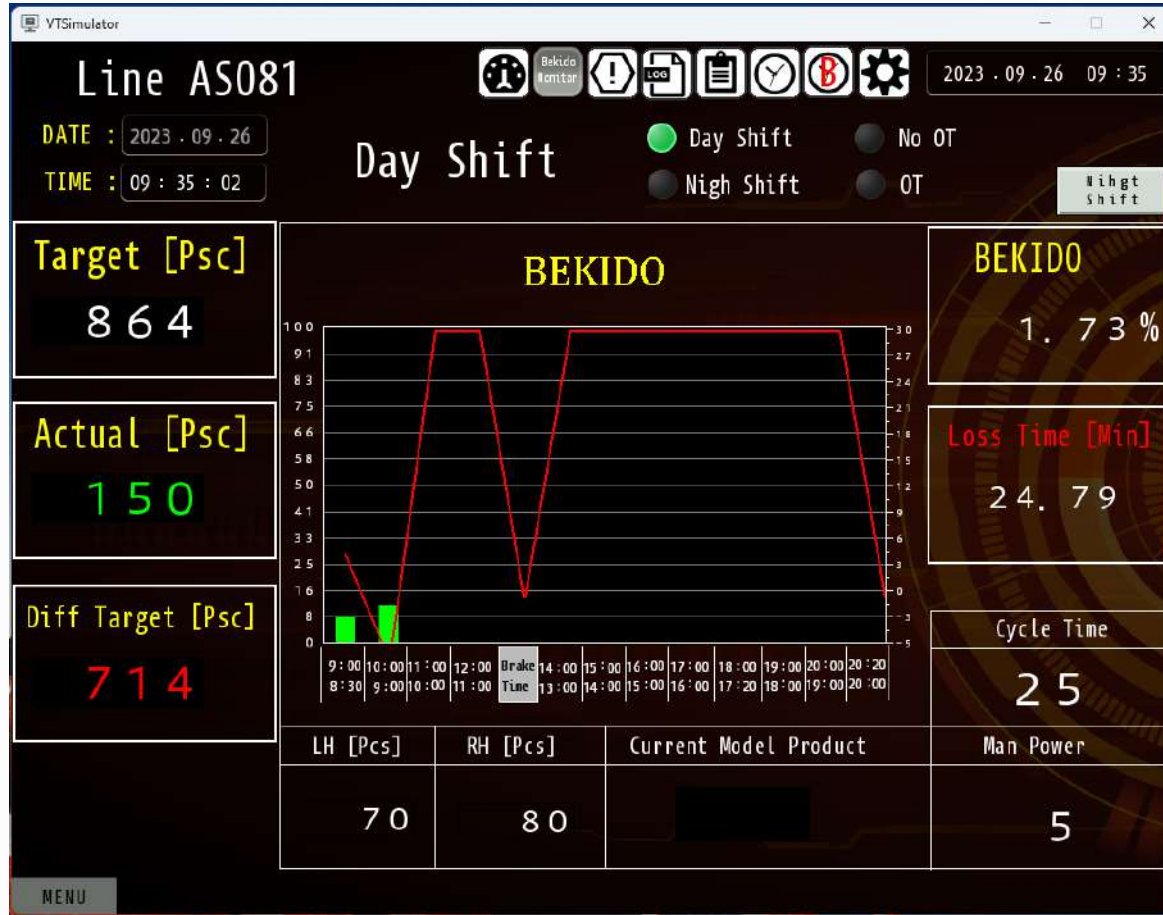


Overall monitoring screen

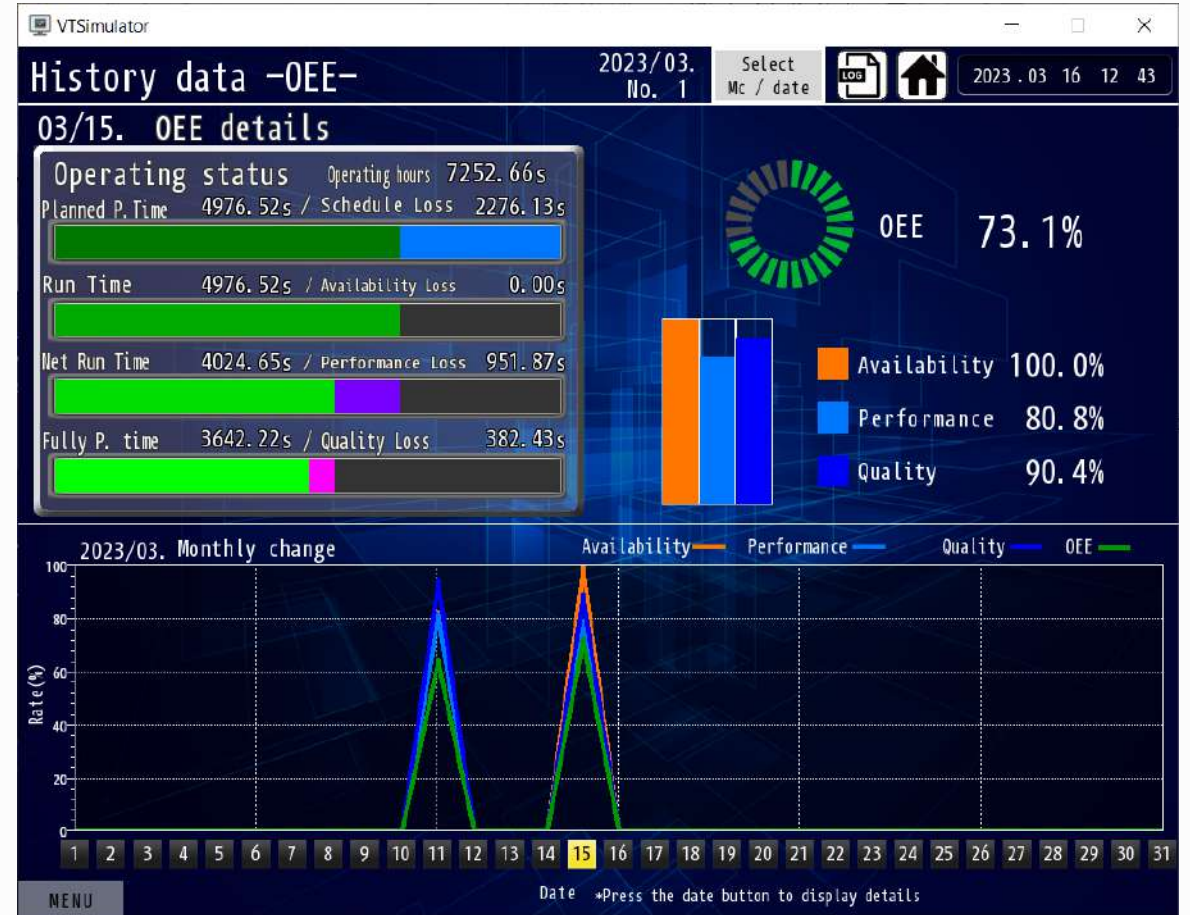


Operation monitoring system Function

BEKIDO screen



OEE



Operation monitoring system Function

Alarm Analysis



Production Result Analysis

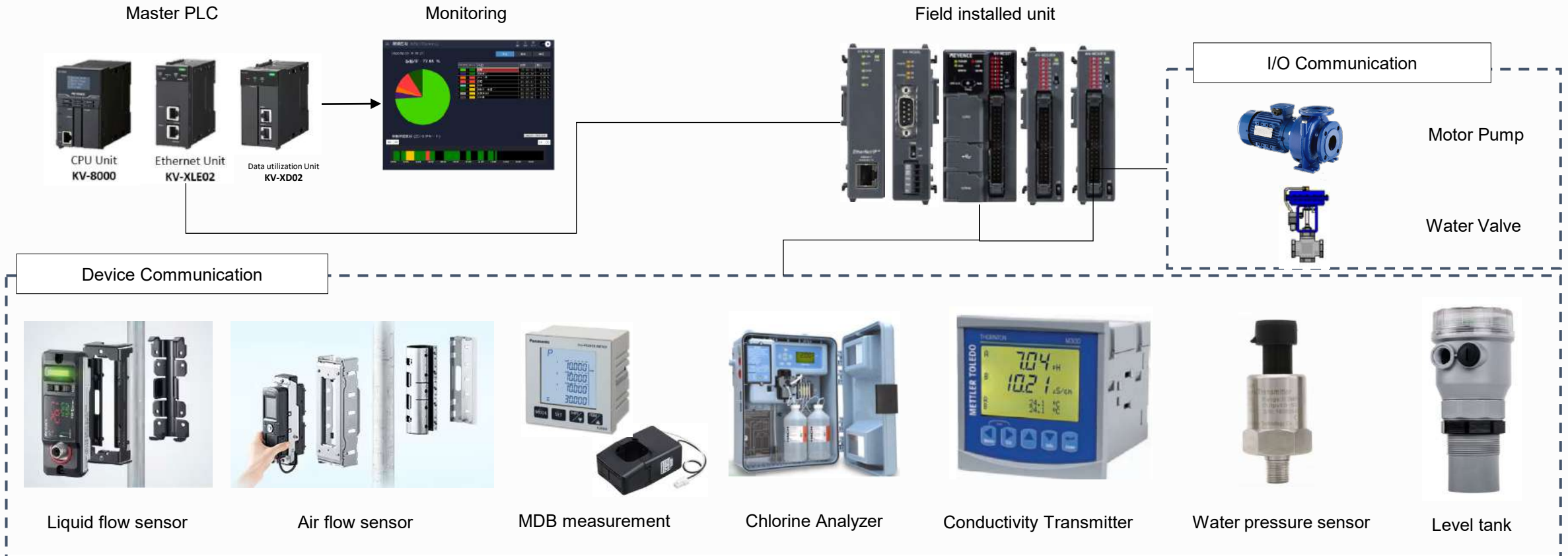


Function of Infrastructure monitoring system

Infrastructure monitoring system

Infrastructure monitoring system

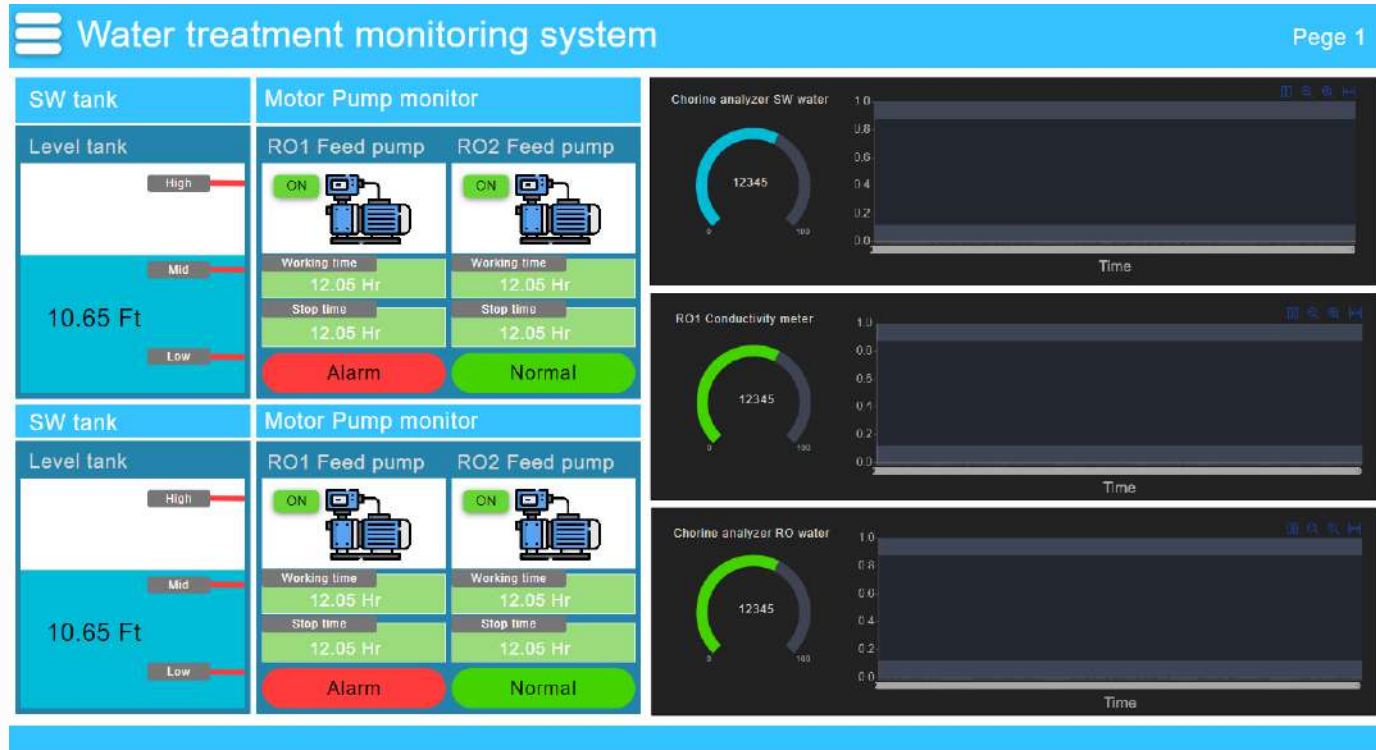
By installing various sensors, it is possible to digitize all kinds of information in the factory. It is possible to comprehensively collect and analyze information related to factory facilities, such as flow rate, air volume, power/voltage volume, water pressure, and water volume.



Infrastructure monitoring system

Infrastructure monitoring system

By using the dashboard screen, you can view and analyze data from all perspectives. At the same time, data can be output in CSV, so it can be used for further analysis.



Infrastructure monitoring system

Carbon neutral

Emission carbon can be calculated from power consumption. It can calculate carbon emissions by scope or category. It is possible to display the amount of carbon emissions in a single month, cumulative transition, comparison with last year, etc.



Infrastructure monitoring system

Carbon neutral

Emission carbon can be calculated from power consumption. It can calculate carbon emissions by scope or category. Also, if customer's company is generating power, etc., it is possible to display the overall plus or minus based on the reduction amount.



Case study of introduction effect & Summary

Introduction of case studies Part 1

The analog business centered on "Paper forms" has been renewed with an operation management system.

Since it was mainly managed by paper, it was a lot of analog work, and it took a lot of man-hours. By automating the collection of operation data and converting the form into data, we were able to realize a significant reduction in man-hours.



Task

- The work time varied depending on the maturity of the worker, which affected the delivery date calculation.
- Paper was lost, rework occurred, and it took a lot of man-hours to deal with it.
- The situation became a black box due to paper management, and the progress could not be grasped.

Solution

- All business work related to the site situation can now be realized within the system.
- All the forms used in business have been converted into data so that they can be converted to PDF from the system.
- Collect OK, NG, operation / stop time from equipment, and input NG / stop factor from tablet did. The progress is managed by changing the status.

Effect

- By using the system, we were able to grasp the work time for each worker, analyze and review the work, and improved workability.
- Since the input quantity, manufacturing quantity, and NG quantity of materials could all be converted into data, waste of materials could be reduced.
- Since the status can be monitored in real time, the work status can be visualized.

Country	Thailand
Scale	51-500 people
Industry	Molding company
Purpose / Effect	Visualization of work Reduction of work man-hours

Introduction of case studies Part 2

Strengthen product risk management and improve reliability through traceability management

Instructed to realize trace forward and trace back against the background of quality improvement by the intention of the Japanese head office.

Trace forward: Identify the route by which the shipped product is on the market and make it recoverable.

Traceback: Retroactively investigate the manufacturing process and machinery of products for which defects have been found. If it know the lot and process, it can identify the cause and improve it.



Country	Thailand
Scale	501-1000 people
Industry	Auto engine manufacturer
Purpose / Effect	Quality improvement Improved workability

Task

- The quality record was kept in the machine and could not be used.
- The work serial number was recorded on paper for each shipping lot, and there were many omission mistakes.
- It was not possible to make improvements using the recording results of the processing machine.

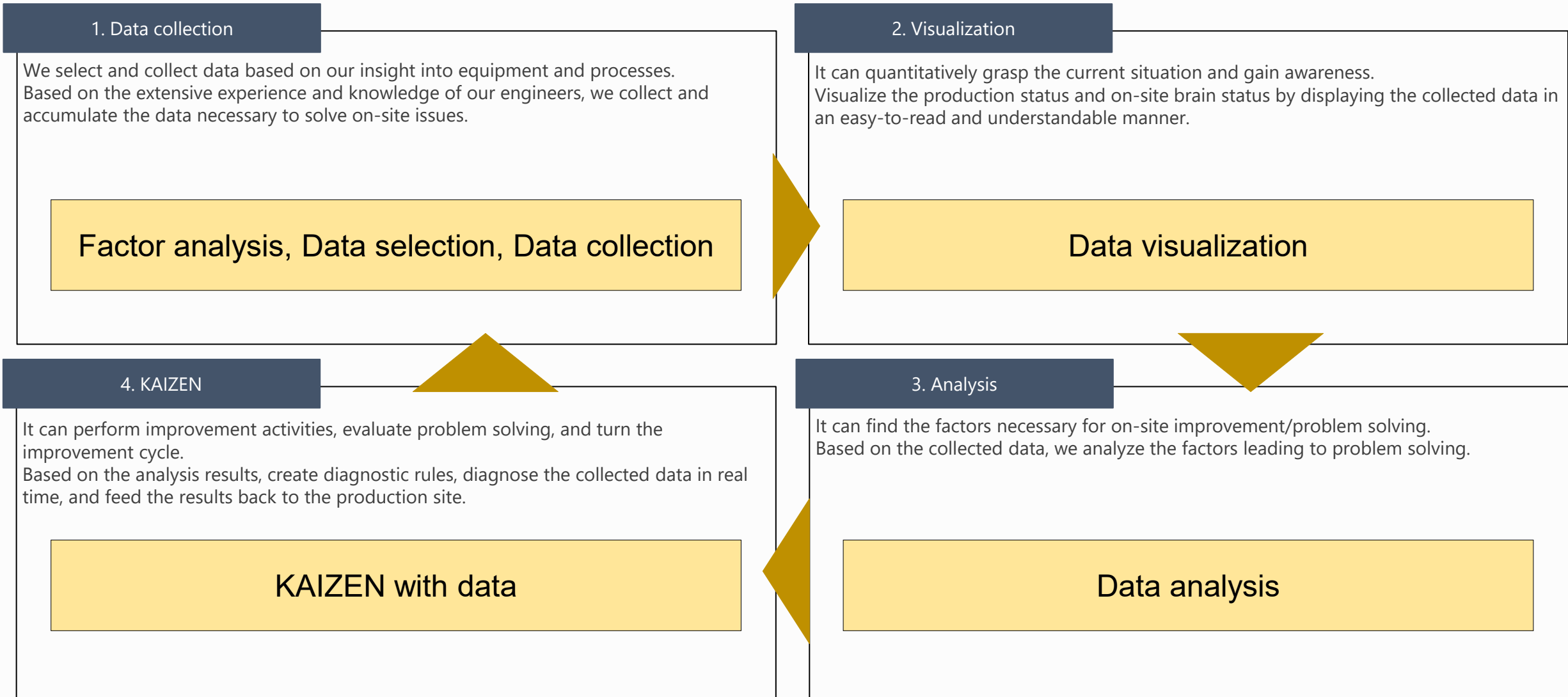
Solution

- Data is collected from about 250 machines (200 processing machines and 50 measuring machines).
- Processing results, operating time, stop time, and stop factors are collected from the processing machine.
- Measurement results and measurement information are collected from the measuring machine.

Effect

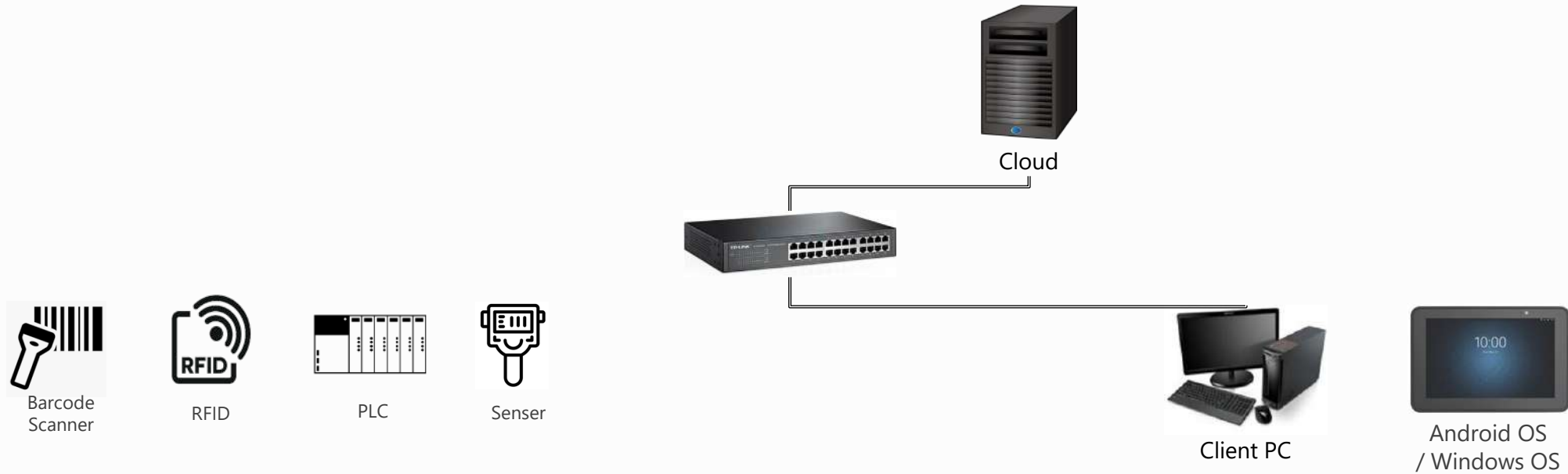
- Strengthen product risk management and improve reliability through trace forward / back.
- Realization of quality improvement by being able to analyze quality trends.
- Realization of improved operating rate by visualizing the operating status. (Machine maintenance support by ABC analysis)

Benefits obtained by introducing the system



Appendix

System configuration



No	Item	Recommended specifications and models
1	On-premises / Cloud Server for AWS, Google	OS: Windows Server 2019R2 Standard / Memory: 8GB or more / Hard disk: Free space 50GB or more / Display: Resolution 1366 x 768 or more / Browser: Google Chrome (latest Ver) * Server machine with recommended model specifications or more
2	Client PC	OS: Windows 10 / Memory: 4GB or more / Display: Resolution 1366 x 768 or more / Browser: Google Chrome (latest version) * PC machine with recommended model specifications or higher
3	Tablet	Android OS type / Windows OS type

Maintenance

#	Software maintenance		Standard / Option
1	Operation support / recovery support	We will open a support window and provide operational support by phone and email, and recovery support in the event of a software failure.	Standard*1
2	Upgraded software provided	We will provide an upgraded version when the software functions are improved. We provide the latest software compatible with the latest OS free of charge. It can reduce its life cycle cost by eliminating the need to purchase software when updating the server.	Standard*1
#	Software re-setup		
1	Software re-setup	If it need to re-set up the software after repairing a server failure Perform restoration work. (Repair of inventory data is not included in software re-setup)	Standard*1

* 1) Service is provided at the system purchase fee in the first year of the contract. Contract on a yearly basis from the second year onwards

Schedule | Go live schedule

1. Current situation analysis	We will inspection the current business and the system being used, confirm the requirements, and analyze the customer's current situation. And will make an estimate based on customer requirements.	Within sales
2. Requirement definition	Detailed requirement definition will be performed based on the analysis result. Check the detailed requirements so that the system can be implemented in a manner that matches actual operation.	1-4 weeks
3. Design	While a process meeting, we will perform basic design, detailed design, and preparation for transfer based on the requirements.	1-3 weeks
4. Development / Test	Perform the test that fits with customer work and start the test. We will consider a transfer every method for let smooth working process.	1-20 weeks
5. Introduction support	We will have an operation training to introduce the system that is currently being used or work in parallel with the work, and after confirming the usability, etc., And the final acceptance will be continue to process.	1 week
6. Production operation	When start operation. We will provide a long-term support for safe and comfortable system by providing operation maintenance support, information provision, and revision edition.	Min : 4 weeks Max : 28 weeks