

Mitsubishi FA Integrated Solution e-F@ctory
FA-IT Information Interface Product
<MESInterface IT>

A solution for advanced factories of the future

e-F@ctory

Direct Connection to IT Systems

The linkage between the shop floor and IT system powerfully promotes the operational efficiency.



**No need for
communication gateway
PCs or programs!**

Direct Connection to IT Systems



Shop floor



IT system

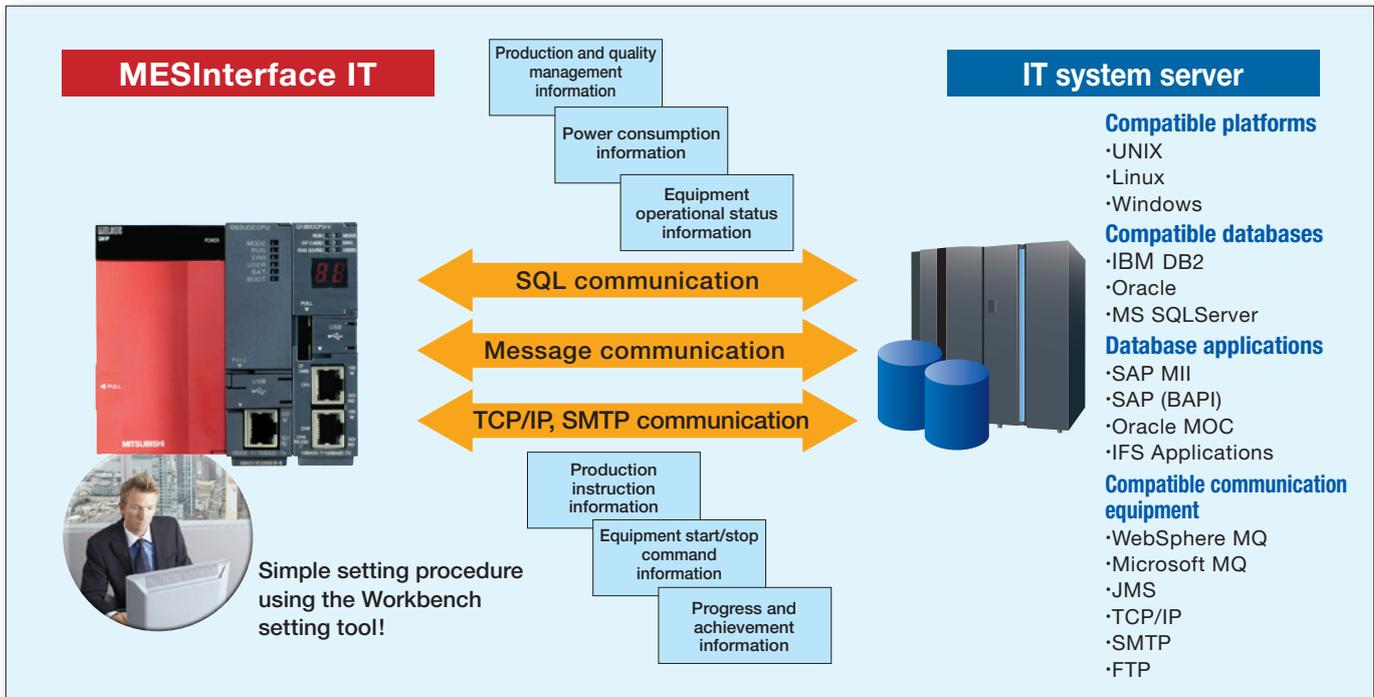
MESInterface IT

- ▶ The window to accurate and reliable production information
- ▶ Dramatically simplified system configuration
- ▶ Reduced system construction period and cost
- ▶ Achieves stable operation and continuous operation
- ▶ Long product life

Key *e-Factory* product for greater

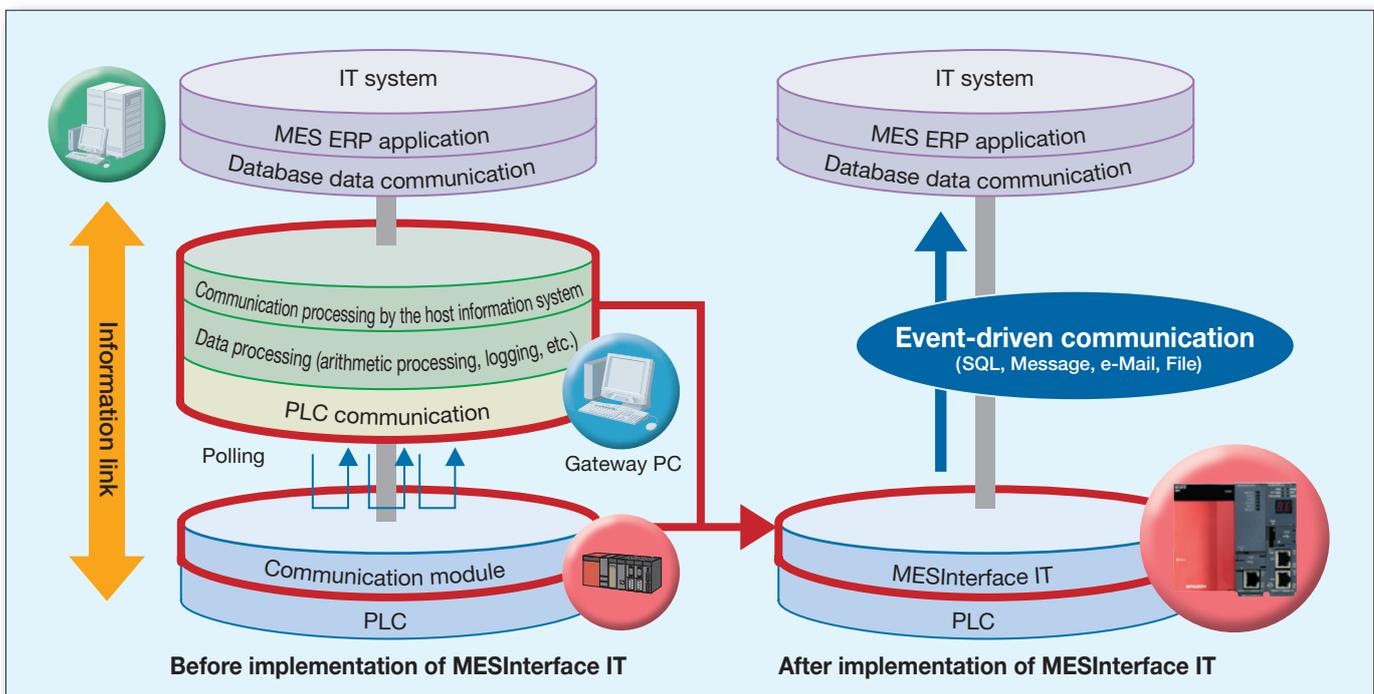
Provides easy connection to diverse information systems

- Connectivity is bi-directional and occurs by mapping data using the Workbench Software (MESInterface IT setting tool).
- Corresponding to a wide range of platform and database, and direct communication with various IT systems from small to large-scale is possible.
- The correspondence of diverse communication functions makes the data communication to IT system easy and required information can be communicated when needed.



Achieves simple information-gathering system with low cost

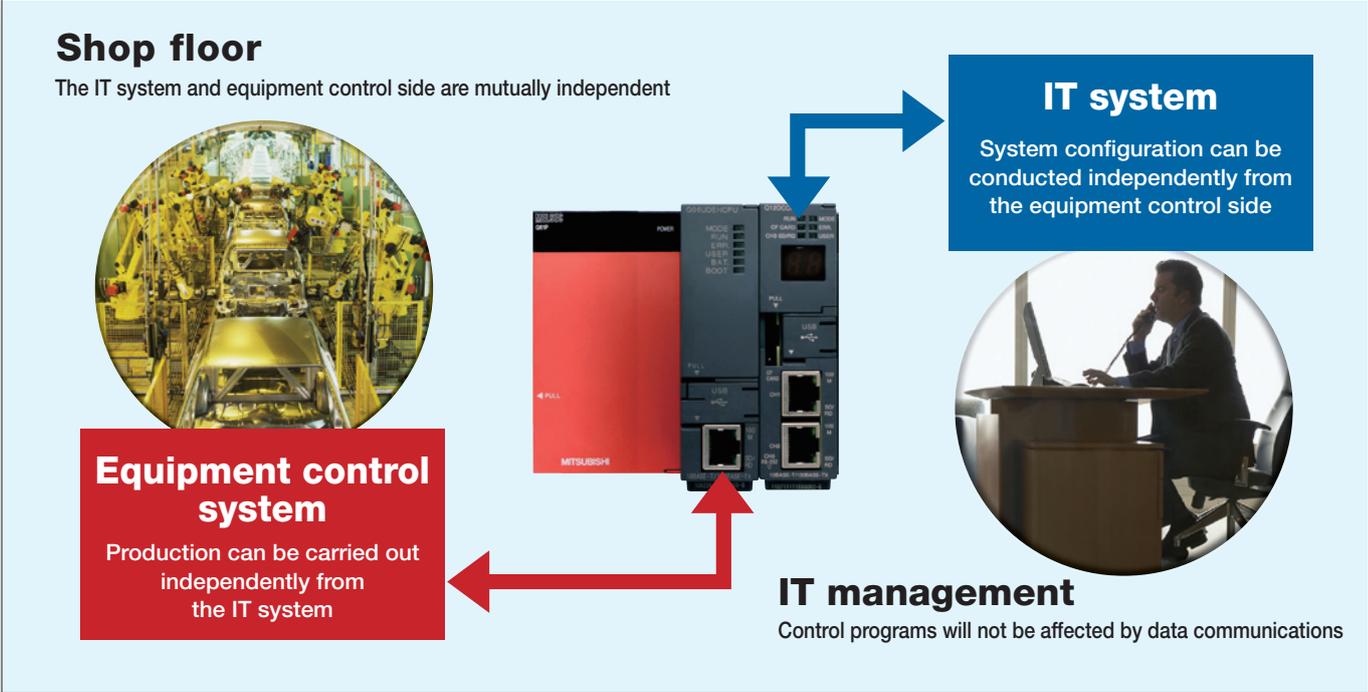
- System configuration is dramatically improved by eliminating gateway PCs or communication programs required for information link.
- Monitoring the data by unit side and when the triggering condition is satisfied, the data can be sent directly to IT system.
- Event transmission dramatically reduces network loading, relative to the data communication with gateway PCs.



optimization of plant management

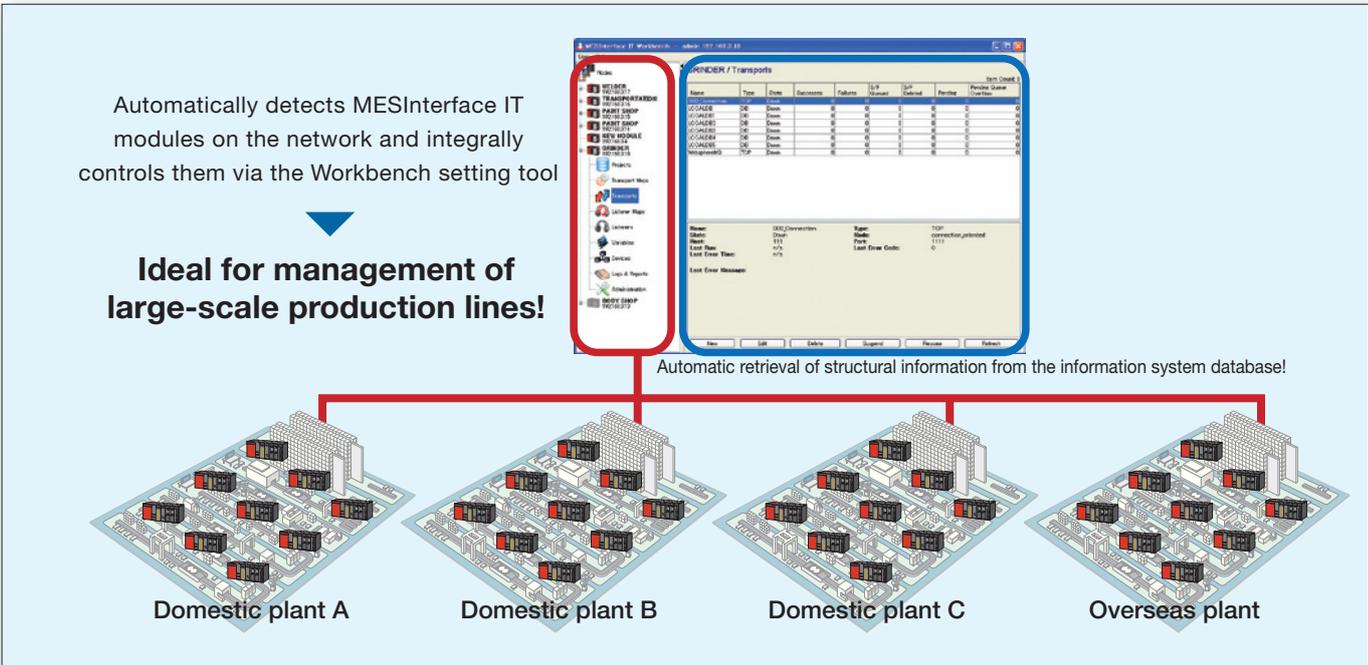
Allows changes in setting with minimum influence on existing systems

- MESInterface IT, which performs data communication with IT system, is separate and independent from equipment control system. So it can be added without any influence of data communication process on the equipment control process.



Optimize the setup and management of large scale production lines

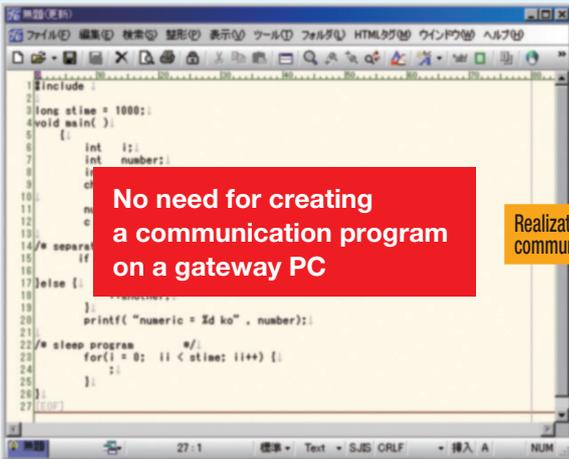
- The MESInterface IT Workbench software (setting tool) automatically enumerates all devices present on the network and provides comprehensive performance diagnostics.
- MESInterface IT automatically enumerates available database elements such as table and it promotes the efficiency of engineering and maintenance.



Allows data transport with the IT system without the need of programs

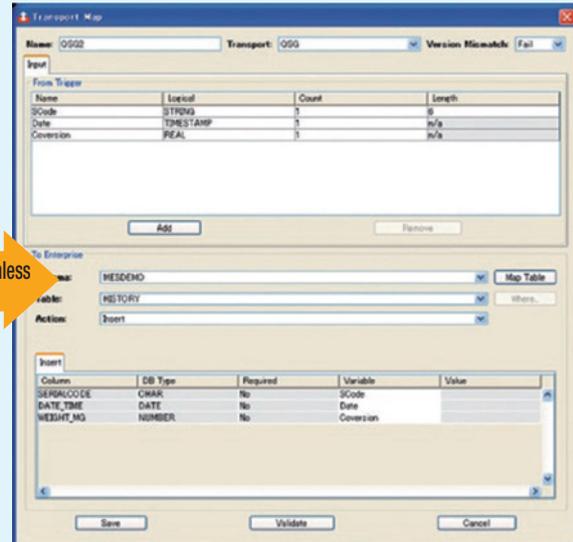
- For IT system and equipment communication, it only needs to set the necessary items in the setting screen (Workbench). The Workbench setting tool eliminates the need to run communication programs on a conventional gateway PC.
- In the setting screen, transport data (database, messages) is mapped and trigger conditions are set to enable data communications.
- The costs of initial engineering and maintenance after the facilities are put into operation are dramatically minimized.

Transport data mapping screen



No need for creating a communication program on a gateway PC

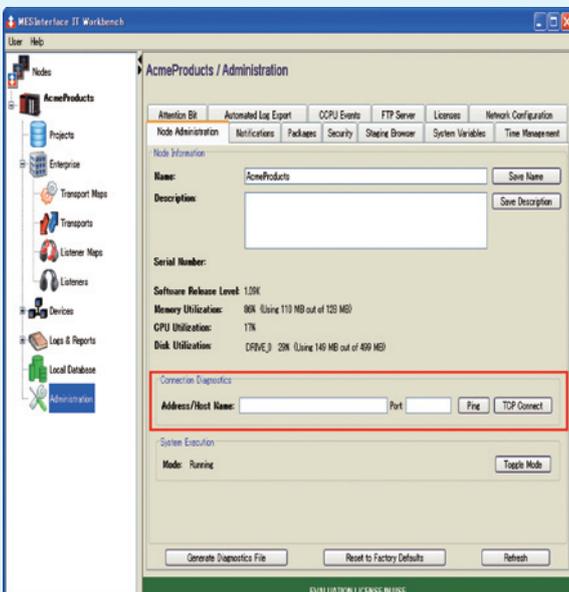
Realization of programless communication



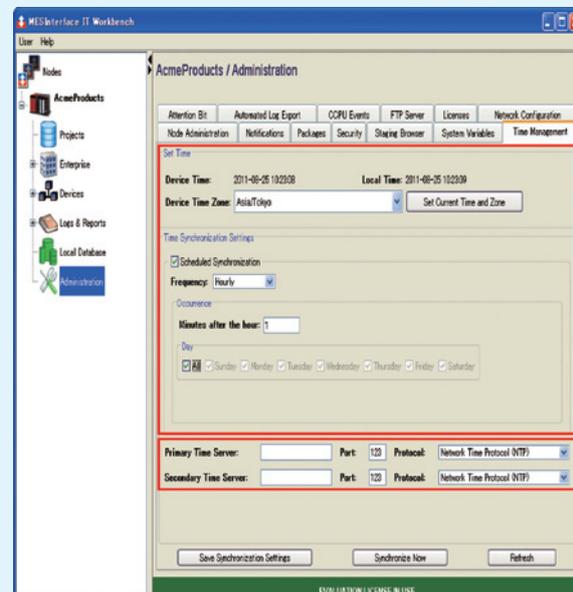
Convenient functions of MESInterface IT

- MESInterface IT Workbench offers a host of convenient functions.
- NTP automatically synchronizes the clock of MESInterface IT. Time zone is set almost just as easily.
- The Workbench eliminates any use of commands to verify the status of other nodes.

Management screen (Node Administration tab)



Management screen (Time Management tab)



Store & Forward function ensures reliable data collection

- Simply by placing a check in the “Store & Forward” option box in the setting screen of the host IT system server, MESInterface IT automatically buffers the data from the shop floor on a CompactFlash card. This ensures full transport of data even when a communication error occurs, because the buffered data is automatically forwarded to the IT system after the connection is restored.

Host information setting screen

Edit Transport

Name: LocalTest(WM) Transport Type: WMQ

Host: 192.168.1.4 Manager: MTEST

Port: 1415 Queue Name: TESTQUEUE

User: Channel: TESTCHANNEL

Password: Extended Attributes...

Store & Forward

TTL (Sec): 65400 Max Storage (MB): 20

On overflow: Discard new message

Timeout

Connection (Sec): 10 Transport map (Sec): 5

Mapping Log

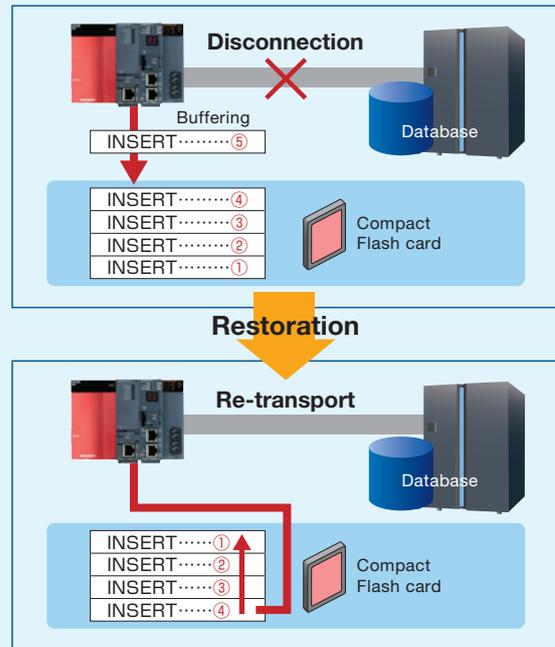
Log Size (MB): 1 Number of Log Files: 1

Message Size (bytes): Entire Message Copy rolled log to staging

Load transport at initialization

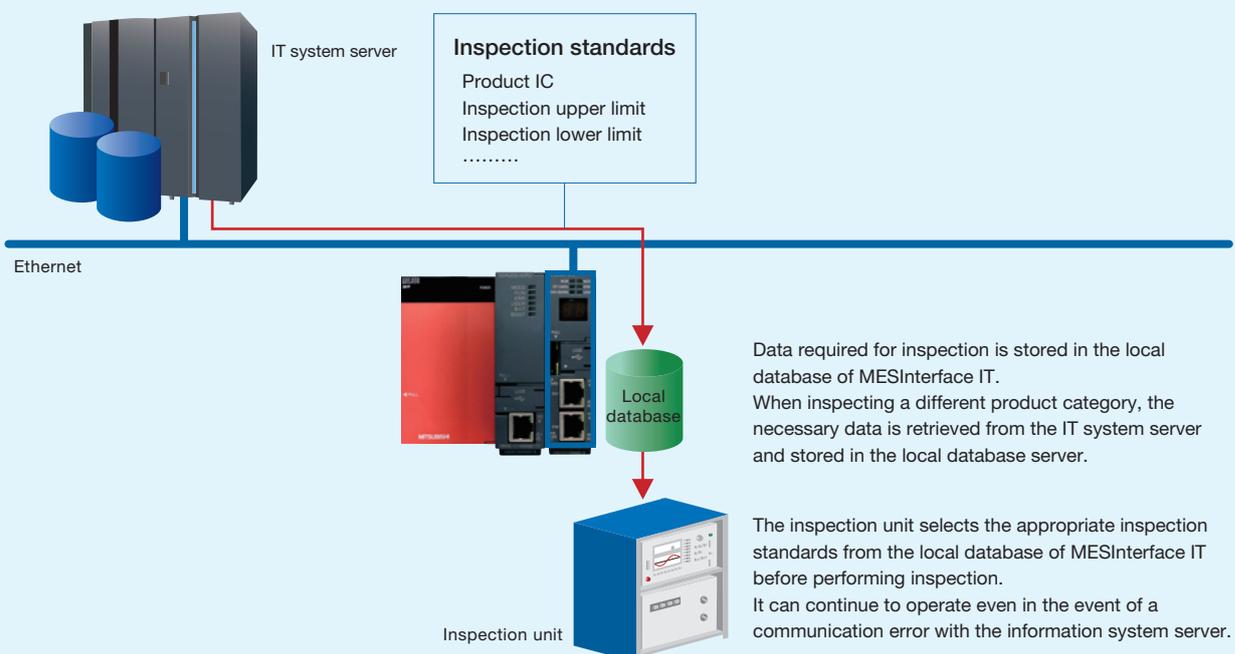
Inactivity Timeout (Sec): 0

Save Validate Cancel



Local database function ensures stable operations

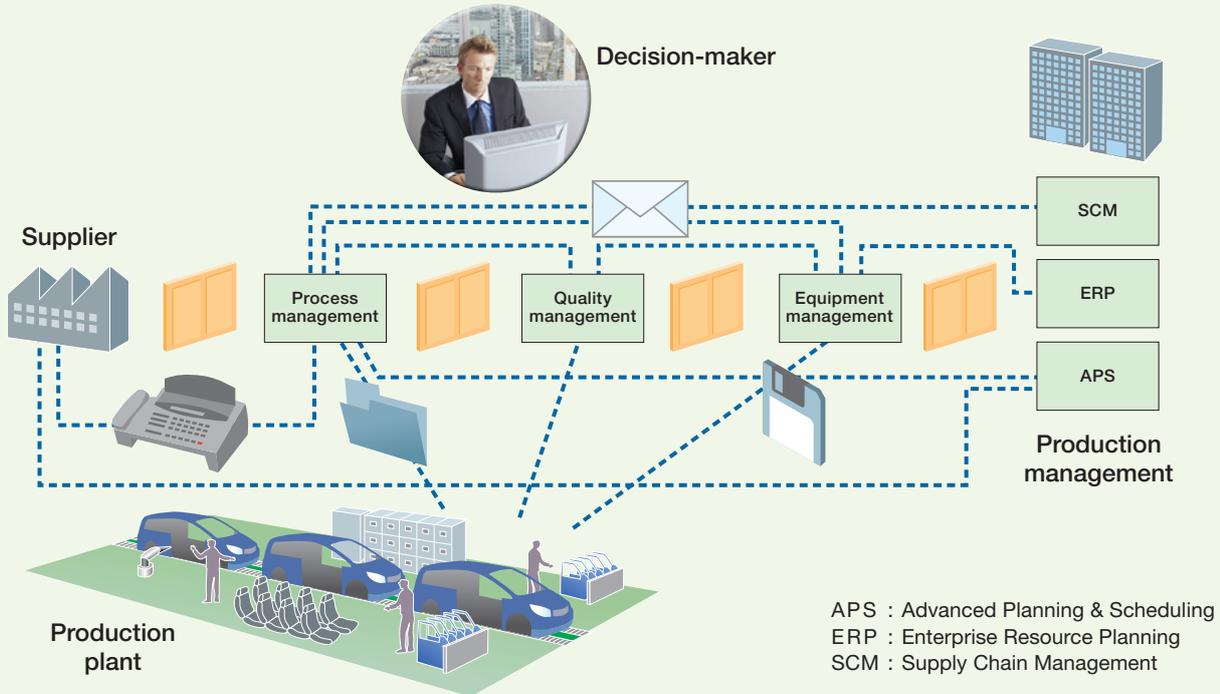
- MESInterface IT can store a copy of a part of an information system database, such as production instruction data, so that the shop floor can continue operating even in the event of a communication error.



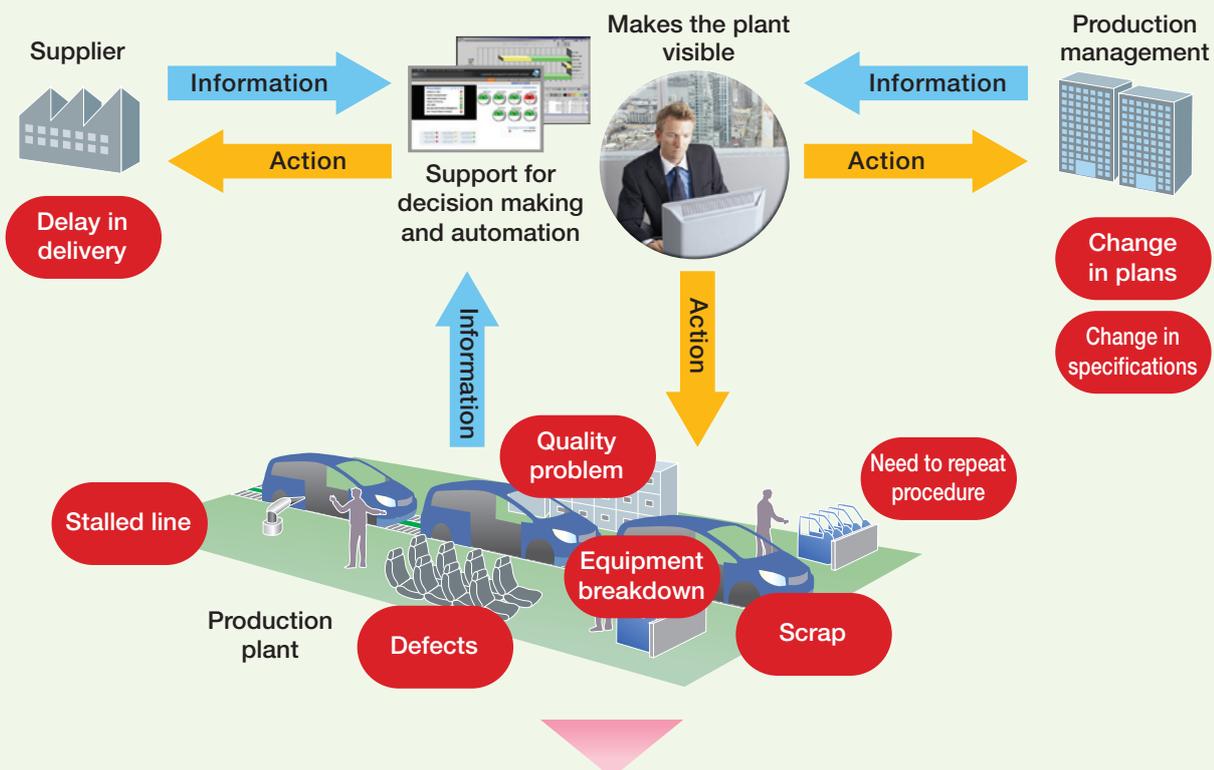
Increase productivity by sharing shop floor information among departments.

Problems of conventional systems

Conventional IT systems were established on a department-by-department basis and provide poor connectivity between multiple systems. This made it difficult to share information between departments, and users were unable to bring together information from each of the information systems.



To create an IT system that has enough flexibility to adapt for changing business and market requirements, it is needed to assess the condition of production plant in real time and take a quick action which is required for the changing condition.



MESInterface IT provides quick and flexible solutions to these issues.

Applications

Equipment maintenance in conjunction with IBM Maximo

MESInterface IT directly feeds production site data to IBM Maximo Asset Management software (via message communication) to enable more effective equipment maintenance management.

A solution for optimizing equipment maintenance

Solution Benefits

Maximo equipment maintenance

- Optimized support transforms multi-site, multi-year equipment maintenance costs into strategic investments
- Visualization of equipment maintenance management tasks allows easy assessment of work cycles, work methods and costs
- Accurate and effective visualization of inventory management, manufacturing procurement and device warranty periods
- Strong support for human resource efforts to convey maintenance techniques and capabilities

Synergy with e-F@ctory

- MESInterface IT** allows asset management systems to utilize site equipment performance data in real time. The actual condition of equipment is taken into account to optimize maintenance planning. Maintenance costs and production losses are reduced by preventing unnecessary and unforeseen maintenance.
- Required equipment data and real-time performance data is integrated and visually displayed via dashboards tailored to each user's needs.

Maximo
Comprehensive management of corporate assets

Corporate asset information

SOA ESB (Enterprise Service Bus)

MESInterface IT
Production output
Quality information
Equipment condition, etc.

CC-Link IE Control

Quantifiable results of implementing Maximo (for reference only)

- Improved worker operating rate: 10-20%
- Improved equipment operating rate: 3-5%
- Reduced spending on new equipment: 3-5%
- Effective use of warranty period: 10-50%
- Reduced inventory: 20-30%
- Reduced material costs: 5-10%
- Fewer working hours for procurement personnel: 10-50%

*This value varies depending on the customer. This value is not guaranteed.

*Maximo is a registered trademark of IBM Corporation.

Visualization of production site data in conjunction with Oracle MOC

MESInterface IT directly connects with Oracle MOC (Manufacturing Operations Center) to enable visual representation of production site data.

Visualization of FA equipment operating data for more effective use of production resources

Benefits of Solution

- Real-time sharing of plant operating data**
 - Includes numerous universal KPIs useful to all types of businesses
 - Simple dashboard presets and customization for each employee
- Consolidated management of plant data repository**
 - Provides consistent manufacturing data for all users
 - Transforms equipment data to business data that is useful on a company-wide basis
- Simple coordination with on-site equipment via MESInterface IT**
 - MELSEC data is easily transmitted to Oracle MOC
- Quick implementation through abundant pre-defined content**

Results

- Improved site productivity and cycle time
- Optimization of asset operating rate and throughput
- Eliminates discrepancies between device, ERP, MES and manual entry data

Oracle MOC (Manufacturing Operations Center)
Dashboard displays individual KPIs tailored to each employee

Operating rate
Product quality
Compliance rate for deliveries
Cost percentage
Other

Oracle MOC server (contextualization engine + data model)
Conversion
Contextualization
Manufacture Operation Data model

Oracle MOC transport

MESInterface IT
Production output
Quality information
Equipment condition, etc.

CC-Link IE Control

Oracle's solution for improved manufacturing processes

Oracle MOC (Manufacturing Operations Center) acquires various data generated by production equipment in real time and converts it to information useful for business purposes. It detects issues that directly affect management and supports quick decision-making.

Solution components

- Oracle Manufacturing Operations Center**
 - Oracle Business Intelligence Enterprise Edition
 - Oracle Database & Oracle Warehouse Builder
- MESInterface IT**
- Oracle MOC transport***

*Oracle certification acquired

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25% reduction in production process inefficiency

Performance specifications

Database	<ul style="list-style-type: none"> • Oracle 10g, 11g • Microsoft SQL Server 2000, 2005, 2008 • IBM DB2 Version8, Version9 • Local DB
Messages	<ul style="list-style-type: none"> • WebSphere MQ • Microsoft MQ • JMS • SMTP (e-mail) • TCP
Information applications	<ul style="list-style-type: none"> • SAP (BAPI) • SAP MII • IFS Applications • Oracle MOC
SQL commands supported by the database interface function	<ul style="list-style-type: none"> • Insert • Batch Insert • Update • Select • Delete • Select with Delete • Select with Update • Stored Procedure • CountRows
Message formats	<ul style="list-style-type: none"> • ASCII (delimited format, free format) • XML
Character code	UTF-8
Store & Forward maximum capacity	Within the capacity of the CompactFlash card
Trigger conditions	<ul style="list-style-type: none"> • Fixed cycle • Fixed time • Value monitoring • Listener • Manual operation • Boot from separate trigger • Internal event • Higher communication event • Event from a separate system with multiple CPUs (GINT command)
Actions	<ul style="list-style-type: none"> • Arithmetic processing (referencing arithmetic operations) • Standby • Device writing (Set) • Array operation • Bit operation (Bit) • Device control • Higher communication • Display setting • Internal data correction • Network operation • Job control • File operation • Character string operation • Boot trigger • Binary operation • Date/time operation • Random number generation • System value acquisition
Trigger conditions	<ul style="list-style-type: none"> • Four arithmetic operations (+, -, ×, ÷) • Absolute value (abs) • Maximum value (max) • Minimum value (min) • Average value (ave) • Total (sum) • Square root (sqrt) • Exponential function (exp) • Logarithmic function (log) • Natural logarithm (ln) • Common logarithm (log10) • Sine function (sin) • Cosine function (cos) • Tangent function (tan) • Hyperbolic sine function (sinh) • Hyperbolic cosine function (cosh) • Hyperbolic tangent function (tanh) • Inverse sine function (asin) • Inverse cosine function (acos) • Inverse tangent function (atan)

Workbench operating environment

Computer	CPU	PC/AT-compatible computer that runs the operating system listed below PC/AT-compatible CPU that runs the operatingsystem listed below In the case of Windows XP: 1.0GHz or higher Intel Pentium4/Celeron series CPU In the case of Windows Vista: 1.5GHz or higher Intel Pentium4/Celeron series CPU In the case of Windows 7: 1.5GHz or higher Intel Pentium4/Celeron series CPU
	Required memory	In the case of Windows XP: 1.0GB or more / In the case of Windows Vista: 1.5GB or more/ In the case of Windows 7: 1.5GB or more (32-bit version) , 3.0GB or more (64-bit version)
Hard disk space		256MB or more
Disk drive		CD-ROM
Display		1024 × 768 dpi or higher
Operating system (OS)		Microsoft Windows XP Professional Operating System*1 (English or Japanese version) SP2 or higher Microsoft Windows Vista Ultimate Operating System*1 (English or Japanese version) Microsoft Windows Vista Business Operating System*1 (English or Japanese version) Microsoft Windows 7 Ultimate Operating System*2 (English or Japanese version) Microsoft Windows 7 Professional Operating System*2 (English or Japanese version)
Network interface		Ethernet

*1 : 64-bit versions is not available.

*2 : 32-bit versions and 64-bit versions are available.

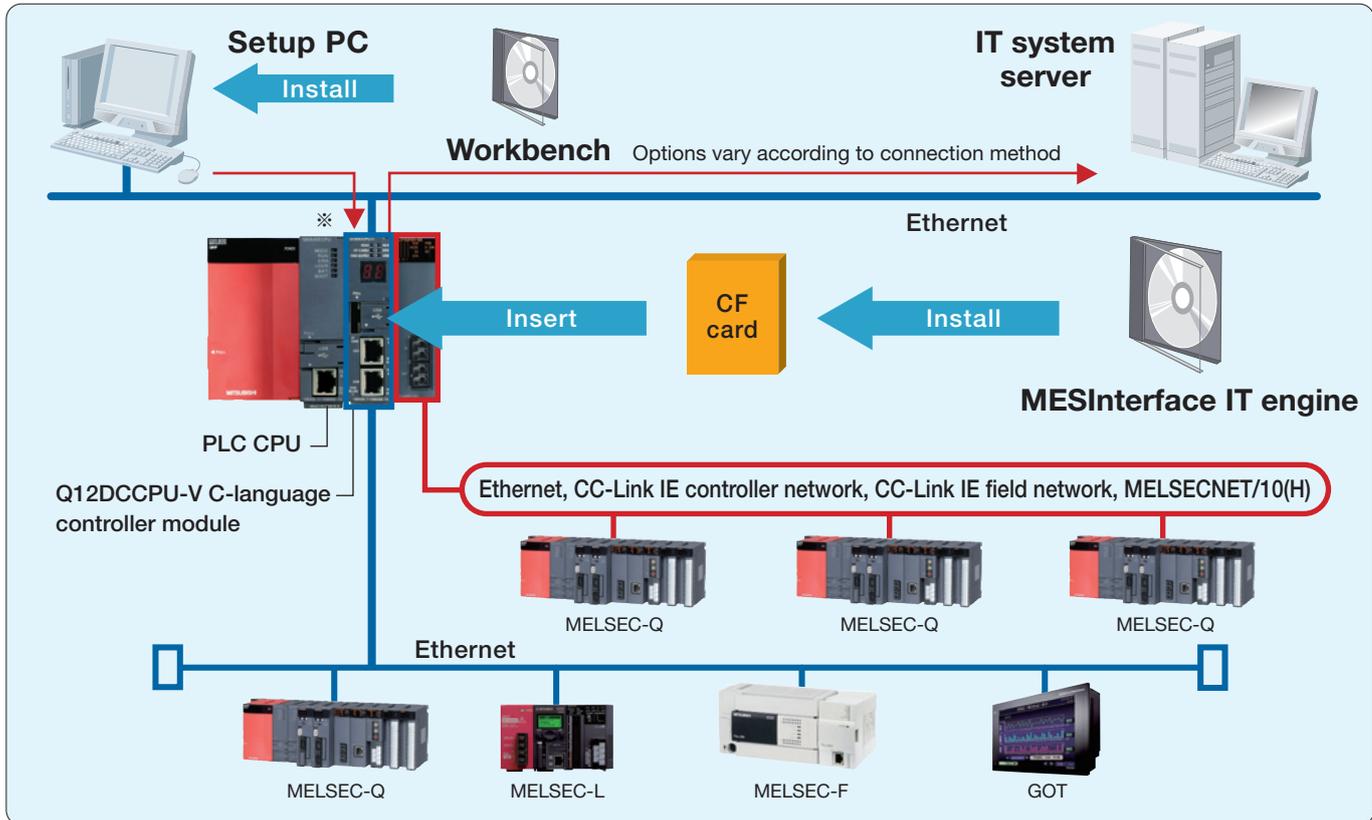
Functions

Tag information collection		Collects tag information such as PLC device data <ul style="list-style-type: none"> • PLC devices (including aliases) • Local variable (internal variable effective only during trigger-based execution) • Static variable (variable that retains data even after trigger-based execution) • Macro (system-defined values) • Constant
Transport setting (method of communication with host IT system)	Database	Settings for accessing the database
	Message	Settings for accessing the message queue in the IT system
Database interface		Allows access to the database of the IT system
	SQL message generation	Automatically generates SQL messages and communicates with the database. The following SQL messages can be generated: • Insert • Batch Insert (inserts multiple lines collectively) • Update • Select • Delete • Select with Delete (deletes a selected line) • Select with Update (performs Select and Update as a single task) • Stored Procedure • CountRows (selects the relevant number of rows)
Message communication		Sends and receives message to and from the IT system
	Sending	Sends messages to the IT system
	Receiving (listener)	Receives messages from the IT system
Trigger monitoring		Monitors time and tag information, and activates the database interface and message communication functions in accordance with trigger conditions
Arithmetic processing		Arithmetically processes the data to be sent/received using the database interface and message communication functions
Buffering		Buffers data to be received from or sent to the IT system
	Local database	Creates a local database in the MESInterface IT
	Transport data recovery (Store & Forward)	Temporarily stores data in the CompactFlash card of MESInterface IT (time-stamped with the trigger time) in the event of a communication error in the IT system, and forwards it to the IT system after error recovery
Security		Specifies the information that can be accessed and functions that can be used by each user. Secures a proper level of security when configuring systems between different departments or different companies.
Time synchronization		Synchronizes the clock of MESInterface IT with the clock of the network SNTP server

System configuration

The MESInterface IT is a software product that runs on the Q12DCCPU-V C-language Controller Module and consists of execution engine and Workbench (setting management tool).

- The MESInterface IT is able to access installed PLC No. 1 and PLCs in a network.
 - By installing the Workbench (setting management tool) in the PC, settings can be made/managed via Ethernet.
 - The Workbench automatically detects MESInterface IT modules on the same network.
- It also automatically retrieves the configuration information (schema) of the host information system database.



* MESInterface IT can be used in combination with a PLC CPU as shown above, or with the C-language controller alone.

■ PLC CPUs that can be used as CPU No. 1

MELSEC-Q (Q mode)	Basic models	Q00CPU, Q01CPU
	High-performance models	Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU
	Process CPUs	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU
	Universal models	Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU

■ Accessible PLC CPUs and GOTs

MELSEC-Q (Q mode)	Basic models	Q00CPU, Q01CPU, Q00JCPU
	High-performance models	Q02(H)CPU, Q06HCPU, Q12HCPU, Q25HCPU
	Process CPUs	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU
	Redundant CPUs	Q12PRHCPU, Q25PRHCPU
	Universal models	Q00JCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, Q100UDEHCPU

MELSEC-F (FXCPU)	FX3U	FX3U-16M, FX3U-32M, FX3U-48M, FX3U-64M, FX3U-80M, FX3U-128M
	FX3UC	FX3UC-16M, FX3UC-32M, FX3UC-64M, FX3UC-96M
	FX3G	FX3G-14M, FX3G-24M, FX3G-40M, FX3G-60M
GOT 1000 series	GT16	GT1695M-XTBA, GT1695M-XTBD, GT1685M-STBA, GT1685M-STBD, GT1675M-STBA, GT1675M-STBD, GT1675M-VTBA, GT1675M-VTBD, GT1675-VNBA, GT1675-VNBD, GT1672-VNBA, GT1672-VNBD, GT1665M-STBA, GT1665M-STBD, GT1665M-VTBA, GT1665M-VTBD, GT1662-VNBA, GT1662-VNBD, GT1665HS-VTBD
	GT15	GT1595-XTBA, GT1595-XTBD, GT1585V-STBA, GT1585V-STBD, GT1585-STBA, GT1585-STBD, GT1575V-STBA, GT1575V-STBD, GT1575-STBA, GT1575-STBD, GT1575-VTBA, GT1575-VTBD, GT1575-VNBA, GT1575-VNBD, GT1572-VNBA, GT1572-VNBD, GT1565-VTBA, GT1565-VTBD, GT1562-VNBA, GT1562-VNBD, GT1555-VTBD, GT1555-QTBD, GT1555-QSBD, GT1550-QLBD
LCPU		L02CPU, L26CPU-BT

■ Networks supported

Ethernet, CC-Link IE controller network, CC-Link IE field network, MELSECNET/10(H)

Product components

■ Basic setup

Product	Model	Installation location	Description	Standard price
MESInterface IT	VN-SWMIT1-E	PC for making settings	<ul style="list-style-type: none"> ·Workbench (English version) ·Set up MESInterface IT communication ·Operating Instructions (English version) (PDF) 	Open Price
		C-language Controller Module	·Engine Connection of up to 5 Devices	

The Q12DCCPU-V C-language controller module must be purchased separately.

■ Options

Product	Model	Installation location	Description	Standard price
Additional license	PLC additional connection license	VN-SWMIT1-LIC-PC5	Allows connection of up to 5 additional PLCs	Open Price
Application transport license	SAP transport license	VN-SWMIT1-LIC-SAP	Allows data transport with SAP® ERP	
	Oracle MOC transport license	VN-SWMIT1-LIC-OMC	Allows data transport with Oracle MOC	
	IFS transport license	VN-SWMIT1-LIC-IFS	Allows data transport with IFS Applications	
DB access license	IBM DB2 transport license	VN-SWMIT1-LIC-DB2	Allows data transport with the IBM DB2 database	
	Microsoft SQL Server transport license	VN-SWMIT1-LIC-SQL	Allows data transport with the Microsoft SQL Server database	
	Oracle transport license	VN-SWMIT1-LIC-ORC	Allows data transport with the Oracle database	
Message communication license	MQ transport license	VN-SWMIT1-LIC-MQ	Allows message communication with WebSphere MQ	
	JMS transport license	VN-SWMIT1-LIC-JMS	Allows message communication with JMS	
	Microsoft MQ transport license	VN-SWMIT1-LIC-MMQ	Allows message communication with Microsoft MQ	

This product is available in the English version only. Please inquire separately for details about SAP transports.

■ CompactFlash card

A CompactFlash card is required. For information on selecting a commercial CompactFlash card, please see the following.

- Technical News No.FA-A-0023

We recommend you work with a Mitsubishi Electric SI partner to set up your MESInterface IT.

For information about SI Partner, please refer to the e-F@ctory concept catalog.

Mitsubishi FA Integrated Solution e-F@ctory FA-IT Information Interface Product <MESInterface IT>

Contact the following offices for more information.

- “e-F@ctory” is a registered trademark of Mitsubishi Electric Corporation.
- All other company names and production names in this document are trademarks or registered trademarks of their respective owners.



Safety Precaution

To ensure proper use of the products presented in this catalog, be sure to read the “Operating Instructions” prior to use.

Mitsubishi Electric Nagoya Works has acquired ISO14001 certification for environmental management system and ISO9001 certification for quality management system.

