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Implementation of Energy Management System at Global Zipper Company

The global zipper company has been monitoring energy, especially in terms of electricity, water, gas, and steam, but it is still done locally using power meters or so-called smart metering. Each piece of equipment or machine that generates energy in the factory has a power meter. In addition, the company also conducts local monitoring for utility processes, such as reading temperature, pressure, flow, and level. Employees who record data must go to each location of the equipment or machine to record data based on the predetermined time by the company. Furthermore, they create a summary to inform authorized parties. This is considered inefficient and ineffective from a management perspective, and it also generates a lot of hardcopy waste.

In anticipation of Industry 4.0, especially in the fields of Smart Factory and Green Company, there is a need for innovation to replace inefficient and ineffective daily activities while reducing waste. Waste reduction has a broad scope, with two main points being highlighted: Hardcopy and Energy. In terms of hardcopy, digital transformation can be implemented, replacing manual monitoring with IoT technology. The implementation of IoT in the OT division has been massive lately, especially in monitoring end devices (such as sensors, transmitters, and PLC) with the addition of IoT Gateway modules, allowing data to be sent to the server.

Regarding Energy Management, the initial step is "Measure," as there is a saying, "If you can't measure it, you can't manage it." The company has been measuring or reading data for each equipment and machine used in a local area, but collective and centralized integration has not been implemented yet. When the company implements Energy Management, the management can determine whether the energy used in each area or department aligns with the set targets (KPI) or exceeds the predetermined targets (KPI).

The results from the OT layer are all stored in the Data Connector, and then the Data Connector sends data using the MQTT protocol to IFS-RTM. IFS-RTM already provides many dashboards (in web-based form) and animations. In addition, in the implementation example in this company, **Efortech** also customizes some dashboards according to the company's standards. Several people in the company can access the FEMS server simultaneously, which is also an advantage of the Web-Based system. The visualization results can be integrated with the customer's ERP system using the Restful API protocol; moreover, **Efortech** also provides data in the form of a Database stored in the company's MySQL.

What is needed in this case?

Using the IoT Gateway (**ECU-1051**), Power Meters and Gas Meters from each equipment or machine in the company are connected to the IoT Gateway using serial communication (RS-485) in a daisy chain configuration. In the Boiler room, an IoT Gateway with an I/O Module, namely ADAM-3600, is used to read Flow sensors with a 4-20mA output. In addition to Sensors and Transmitters, several PLC brands such as Azbil, Omron, and Schneider retrieve data using **WebAccess/SCADA**. This is done because the number of Tags read is more than 300 tags or I/O Points. Another concern is that all these PLCs are already connected to the company's network, unlike the sensors and transmitters that are scattered at various points.

Does it require integration? How?

Certainly, integration is carried out because the company has various brands, including sensors, transmitters, and PLCs. As a partner for digital transformation, **Efortech** provides services for data collection and subsequent visualization. Data collection is done by standardizing the protocols used. The standardized data is stored in the IoT Gateway and SCADA Server modules, referred to as the Data Connector. Visualization of measurement results or data readings from the OT layer is done using a bundled solution for hardware and software (IFS-RTM). This solution product greatly facilitates the implementing company because the system used is a "Plug and Play" Solution or "No coding required."

Initial Steps in Digital Transformation, Specifically in Energy Management System

The first steps to prepare for digital transformation, especially in the Energy Management System (EMS), involve acquiring devices to monitor the energy consumption of each equipment or machine, such as Power Meters or Smart Meters. If the company already possesses these devices, the digital transformation process can be swiftly implemented. The applied concept revolves around the 4C framework: Connect, Collect, Compute, and Create.

- **Connect**: Utilize Power Meters or Smart Meters to read energy consumption data.

- **Collect**: Gather data from multiple Power Meters or Smart Meters distributed across various locations.

- **Compute**: Process and standardize the collected data to ensure protocol uniformity for interoperability.

- **Create**: Visualize the transformed data in real-time, historical perspectives, and reports for effective monitoring and decision-making.

Unique point or selling point dari Product Solution Efortech

- Ready to use
- Low Investment and Rapid Deployment
- Plug and Play
- No Coding Required

Features Obtained from Efortech's Product Solution, Especially Related to Energy Management Solution:

There are many default dashboards ready to use; for example, there is an Overview by Area dashboard. In this dashboard, there is a summary of energy consumption, both daily and monthly. Additionally, real-time energy information for "energy demand" is available, which is also compared to Key Performance Indicator (KPI) values (the company's targets). In the same dashboard, there is information to understand the usage patterns of energy from each equipment or machine from specific energy sources (electricity, water, gas, steam) historically.

In the Trends by Department dashboard, the historical energy consumption of each department in the company can be understood, supported by informative visualizations. There is also a Period Comparisons Dashboard, allowing a comparison of current energy usage with previous periods, such as the last 7 days, a month ago, or even a year ago. An important section for management is the KPI Analysis by Area or Department in that dashboard, providing information on whether sections or divisions are using excessive energy and triggering notifications.

Furthermore, regardless of these features, all product solutions provided by **Efortech** can be integrated with the customer's ERP or MES system. This integration can be achieved through databases (ODBC) or by using the Restful API protocol, making it extremely convenient for the company to conduct future analyses.

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