



# Perodua Automotive

The Shop Floor Control System provided by GE Digital has been well received by the operators, supervisors, and management of Perodua for its ease of use and for the up-to-date, extensive production information they receive.



# Keeping production on track

## GE Digital gives automaker and suppliers real-time window into production status

To help improve the productivity of their manufacturing operation, the management of Perodua (Perusahaan Otomobil Kedua Sdn Bhd), Malaysia's second largest car manufacturer, decided to implement a method for "just-in-time" ordering of part supplies based on vehicle orders. The team envisioned a solution that would integrate distributor and supplier systems with Perodua's ERP system to access plant floor data in real-time. Distributors would be able to track the progress of their orders vehicle-by-vehicle, and vendors would have the ability to coordinate their part supplies to the facility on a just-in-time basis.

Perodua turned to GE Digital for assistance in making their vision a reality. Perodua Information Technology personnel were impressed with GE Digital's proven experience in implementing these types of solutions and felt confident that GE Digital would be able to create an automatic data collection and product tracking solution that would enable them to meet their productivity goals.

GE Digital teamed with local system integrator, Temigas Sdn Bhd in Malaysia, to implement a phased approach solution, the first of which is a Shop Floor Control System (SFCS) in Perodua's body, paint, and assembly shops. GE Digital did

most of the system design and implementation on-site with local systems integrators working closely with Perodua to ensure that the system met their requirements.

### **The specific objectives for the SFCS in improving Perodua's manufacturing operations are:**

- Reducing work in process (WIP) inventory
- Identifying quality problems as quickly as possible
- Reducing rework time and volume
- Identifying production bottlenecks
- Reducing operator errors

### **To meet these objectives, the automation team created a reliable, state-of-the-art system based on CIMPLICITY industrial automation software with a Tracker module to satisfy the following key requirements:**

- Track WIP
- Capture quality defect and rework information
- Automatically generate part-supply triggers from the production lines to logistics and other subassembly areas
- Generate production and quality-related reports on the fly
- Generate tax and delivery documentation automatically
- Automatically route bodies inside the paint shop through various processes
- Ensure data integrity of the vehicle production information
- Make all the above information readily available on the desktops of management to enable real-time decision making

The system architecture consists of two high-end servers. The CIMPLICITY Tracker server implements the process logic, including WIP tracking, routing, and quality data capture. This server, which interlocks and serves data to all viewer nodes, is configured as the domain controller to which all shop floor computer nodes and PLCs are interfaced. The SFCS database, running on another server, contains such production information as schedules, model description, color code, tax ID generation, engine description, logged WIP data, quality defects, and much more.

---

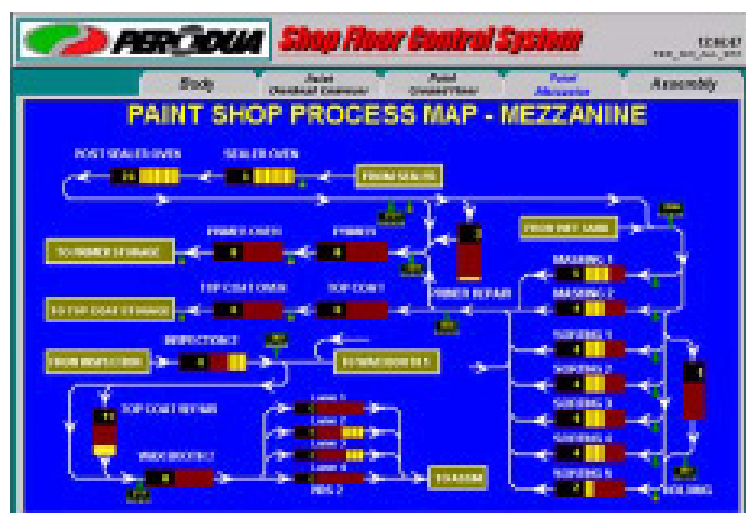
*The automation team created a reliable, state-of-the-art system based on CIMPLICITY industrial automation software with a Tracker module.*

---

More than 30 GE Digital display stations, preloaded with CIMPLICITY software, are stationed in the body, assembly, and paint shop. The display stations are automatically updated with vehicle data as each new vehicle arrives at the station. Operators log defect data into the SFCS by clicking on the graphical image of the body parts shown on the display station screen.

### **Results**

- Reduced work in process (WIP) inventory
- Faster identification of quality problems and production bottlenecks
- Decreased rework time and volume
- Fewer operator errors



To implement tracking, the shop floor is mapped into 120 regions, based on the process carried out at that region. Triggers for tracking in the body and assembly shops are received from 15 bar code readers located at key transition points. The bar code scanners are interfaced to PLCs. The PLCs are directly interfaced to the plant's Ethernet network and communicate with the Tracker server. In the paint shop, operators can determine the location of each vehicle by tracking the carriers (hangers and dollies) that carry the vehicle using Smarteye bar code readers and limit switch signals received from the paint shop conveyor system.

To receive vehicle tracking trigger signals from the paint shop and assembly shop conveyor systems, the CIMPLICITY Tracker Server interfaces with two PLCs via Ethernet. Tracker also sends the various interlock signals and routing control signals to these PLCs. Trigger sensors indicate the vehicle ID, time stamp of the entry of the vehicle into the region,

and time stamp of exit of the vehicle from the region. As the vehicle moves through each region, attributes such as chassis number, color, model type, customer information, defects, and engine number are also tracked. With this information, it is possible to determine in real-time how many vehicles are at a particular region, when each vehicle arrived at that region, or how long it spent in that region. Routing control is implemented at 13 locations in the paint shop. Using routing control, the SFCS automatically batches jobs based on model, color, and other parameters. Routing control also enables the SFCS to detect a defective body on the conveyor and routes it to rework areas.

Not only does the SFCS generate extensive reports based on current production status and historical data, it also continuously calculates the productivity of each shop based on the production status and line speed. CIMPLICITY viewer nodes are installed on the desktops of production engineers and management, enabling them to monitor and control production status in real-time and generate reports on-the-fly.

After going live, the Shop Floor Control System was successfully integrated into Perodua's production system. The SFCS solution provided by GE Digital has been well received by the operators, supervisors, and management of Perodua for its ease of use and for the up-to-date, extensive production information they receive. As a mission-critical application for the plant, Perodua's SFCS is envisaged to eventually be fully integrated into their Computer Integrated Manufacturing (CIM) environment as the next phase of the project.





## About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

## Contact Information

[www.ge.com/digital](http://www.ge.com/digital)

