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# SIMATIC IT for Automotive Suppliers

Answers for industry.

# Automotive suppliers: A continuously changing environment

A solution for effective  
manufacturing of automotive  
components

Automotive suppliers provide components or assemblies to OEM's (Original Equipment Manufacturers) in order to manufacture cars. The complexity of these components and assemblies has grown exponentially and the level of integration among OEM's and suppliers has grown in a similar fashion.

As a consequence, the share of automotive value created by suppliers (and in particular first tier) markedly rose in these years and this trend will continue in the near future. Suppliers and manufacturers will need to be increasingly and more efficiently interlinked both logistically and technologically.

This supplier to OEM relationship becomes even more complex by the geographic dispersion of supplier, while still requiring execution at the speed of light in this highly competitive world. Information has to be exchanged in real-time in order to take prompt decisions on where best to schedule production or how best to respond to JIT (just-in-time) requests. On the other hand, timely material delivery and synchronization of the supply chain is paramount to manufacturing success. The condition of the global market, the continuous cost pressure and the high level of quality required are leading

OEM's to rely on fewer but more reliable suppliers. Therefore, OEM's require closer collaboration across the entire supply chain, while maintaining competitive cost targets and complex manufacturing requirements in terms of volumes, time and quality. Also, automotive industry legislation is becoming more and more stringent. For efficient risk management, both OEM's and suppliers need to precisely trace their production and the information from suppliers to OEM's must be passed efficiently and dependably, to actively face and manage any recall campaign.

Perhaps the biggest challenge for the evolving automotive OEM to supplier relationship is based on the consumer's appetite for more customized vehicles in shorter intervals, resulting in shorter product lifecycles. To respond to this growing challenge, OEM's and suppliers must collaborate to efficiently produce an integrated design of parts and assemblies that can be reused in many vehicle lines and in any globally positioned design or manufacturing center. Moreover, these components and assemblies must be engineered in such a manner to seamlessly transition into a production phase with minimal effort, low cost, and a high degree of quality.



# Automotive suppliers: Strong challenges for IT infrastructures

The complexity of the automotive supplier niche is leading manufacturers to establish and deploy reliable and flexible IT systems for managing their activities in their distributed network of plants.

Connection with corporate IT may not be available or reliable at all times, nonetheless information needs to be exchanged continuously and in real-time between MES and the shop floor and reaction to production events must be ensured in a timely manner.

Often a supplier's IT system is integrated within an OEM's environment, which extends the level of sophistication via the use of very flexible, open and performance tuned systems.

Therefore plant IT systems represent a mission critical and vital part of the entire corporate business process and must be technologically capable of timely responses and coordination with complex environments, regardless of geographic positioning and ensure productivity also in case of unavailability of higher level systems.

The close collaboration among different systems requires suppliers to be very effective in defining plant IT environments. Plant IT systems must be able to react to events coming from disparate sources (business oriented or even shop floor oriented) and coordinate the various actions necessary for reaching the manufacturing targets. Plant IT systems need a high level of flexibility and an up-to-date technology infrastructure.

Plant IT systems for the automotive supplier industry must be able to properly and consistently trace products during their construction. Parts, components, raw materials, process parameters and quality data must be traced and the result must be properly communicated to OEM's, who in turn must associate this information with every single vehicle.

Capability, performance and good integration are key tasks for a plant IT system. Integrating growing technology enables plant IT systems to be more effective and consistent. The ability to manage data originating from engineering systems and PLM applications enables a seamless transition from the design phase to production.



# Benefits

SIMATIC IT for Automotive Suppliers generates time and cost savings:

- Improvement in utilization of plant assets
- Improvement in the quality of products produced
- Improvement in the agility of production processes
- Reduction in manufacturing costs
- Increased shop floor productivity
- Elimination of multiplicity of legacy shop floor applications
- Strategic packaged solution from a single vendor
- Integration capability to SAP
- Support global corporate initiatives for the elimination of Legacy Systems (reduction of TCO)
- Support JIS/JIT production
- Maximum IT availability

# SIMATIC IT for Automotive Suppliers

SIMATIC IT for Automotive Suppliers provides an exclusive application component for handling the integration to the business level, standardizing the type of messages and harmonizing all interfaces, thus making the system very effective when integrating into an existing IT infrastructure.

Additionally a similar application component is dedicated to the integration of existing or new shop floor devices, enabling easy data acquisition from the shop floor and the ability to react to manufacturing events in real time. A common database for reporting completes basic structure of SIMATIC IT for Automotive Suppliers. It provides all the basic operational functionalities, including order management, genealogy management, integrated non-conformance detection and analysis capabilities.

As a special feature, an interlocking system facilitates process enforcement to ensure best practice adherence.

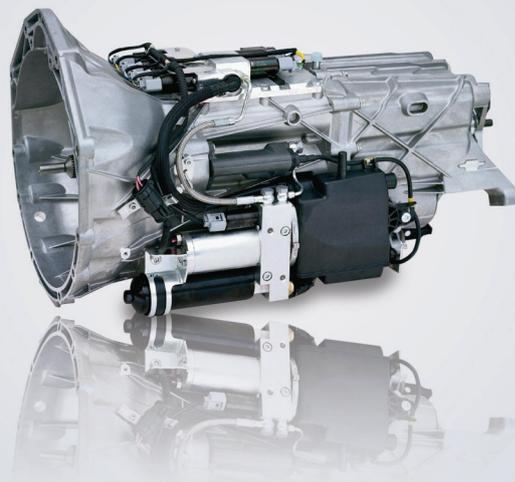
SIMATIC IT for Automotive Suppliers has been designed to provide extremely high performance. As a result, it is able to handle millions of orders per day while simultaneously managing interlocking events in less than 100 milliseconds, combining the typical features of a shop floor system with the flexibility of a business system.

SIMATIC IT for Automotive Suppliers provides:

- Seamless, standards based interoperability with Business Systems
- Integrated quality management including visual inspection
- Robust integration with shop floor automation devices
- Backward/forward traceability and genealogy.
- Real-time high performance interlocking functionality
- Out of the box reporting system
- Sophisticated KPI management
- Pre-defined Web based GUI

SIMATIC IT provides a tailored, yet configurable, solution for Automotive Suppliers.

Fully based on the SIMATIC IT offering, SIMATIC IT for Automotive Suppliers deploys the most critical functions of this industry vertical, in an easy and user-friendly way.



# SIMATIC IT for Automotive Suppliers Solution Description

A solution for effective manufacturing of automotive components

## ERP Interoperability

Enables continuous synchronization of Master Data, download of production orders when ready and prompt feedback of performance. It ensures:

- Latest product and process specifications are applied during production
- Updated list of production orders is executed
- Manufacturing performance is promptly transferred back to business level for:
  - Quality assurance and certification
  - Customer relationship management
  - Resource planning and Orders

Messages from and to the ERP system supports standard B2MML messages and most common standard formats.

## Order Management

Supports Planned Order download, sequencing and dispatching, providing real time re-prioritization for each downloaded list of orders.

Planned orders are downloaded from ERP whenever available. It then enables the application of specific business logic to the order list for sequencing or reprioritizing.

In this way a real time mechanism is maintained and orders are properly managed whenever an update in the ERP occurs. Users can manually operate on the order list for sequencing and dispatching while the online GUI keeps operators informed of the order status and parameters.

## Genealogy

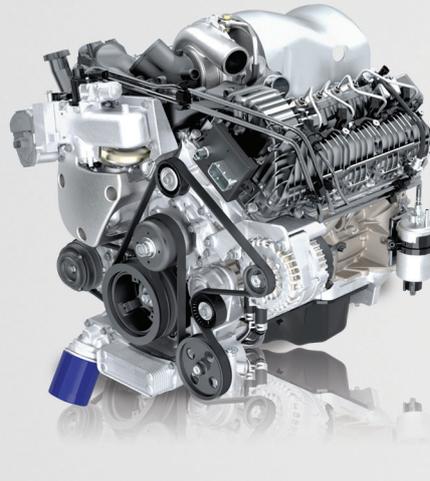
Genealogy is the source of information for interlocking, decision support, product recalls and production reporting.

Quality data is combined with execution history, personnel, equipment, and raw materials used and maintained in an efficient data store.

Retrieved information includes:

- The workplace or workstation where the product is processed
- All incoming materials
- Material movement between lines and/or inside buffers
- Lots splitting or merging
- Packaging

This entire set of information can be retrieved manually, through a standard GUI screen, or automatically, through a barcode or an RFID tag.



## Master Data Management

Several messages form disparate business systems and a continuous flow from different field devices: the challenge of the Automotive Supplier industry.

Data is acquired from:

- Business level (material master data, BoM, planned order, routings, incoming materials...)
- Shop floor level (status, events, quality measures...)

Standard messages from the Business Level are managed directly while custom messages are managed via dedicated and configurable transformation files.

Shop Floor data is characterized by high volumes, disparate sources and high speed. Data is contextualized with manufacturing events to generate genealogy records.

## Integrated failure detection and analysis

An integrated GUI shows the product currently processed at the workstation for visual inspection:

- Select from a Defect Catalog to log defects on subassemblies, components and specific positions
- Attach repair instructions and rework notes

The visual detection system enables the following features:

- Defects position selection by just clicking on the Item picture
- Easy selection of the defect type by using a pre-filtered tree view control
- Interlocking verification
- Traceability messages delivery

## Common Database for Reporting

All reports and analysis screens are based on an abstraction layer representing runtime data in a business entity model (SIMATIC IT Reporting Framework)

Predefined KPI's and reports include:

- Serial Number report
- Component Traceability reports
- Defect Pareto report and DPM report
- FPY on materials and production orders
- Process capability indices

## Product Process Interlocking

Process interlocking provides the assurance of a part's production process according to the defined product routing. Interlocking prevents the execution of a costly process step when the prerequisites are not satisfied. Each machine can receive a Go / No-Go decision from SIMATIC IT for every component that is entering the equipment.

## Standard Interface with Shop Floor devices

It is a set of basic communication interfaces between SIMATIC IT and the production environment. This function is deployed with three different interfaces:

- Transactional: Asynchronous file based communication protocol (via a common network share) leveraging SIMATIC IT DIS (Data Integration Service)
- IPC: Synchronous IPC messages communication protocol (via a communication DLL) directly integrating SIMATIC IT Production Modeler
- Process: Synchronous communication based on OPC standard

## KPI Management

Based on SIMATIC IT Intelligence Suite, it provides quantitative visibility and transparency into manufacturing operations and business processes. When manufacturing profitability is involved, organized data available directly from the plant is mandatory. The real benefit is the possibility to aggregate and compare data from different production plants/locations and to define custom KPIs.

## Analysis Client

It allows the Operator to track each serial number produced and each possible defect against a Defect Catalogue:

- Analyze item tests
- Analyze previous reports
- Insert Rework steps
- Deliver Traceability messages

## Online GUI

As soon as some parameter does not match with the expected values, an Alarm is raised. The machine monitor is an up-to the minute production status cockpit chart, which contains manufacturing related KPI information like quality and performance.



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