# ROBERT BOSCH ENGINEERING AND BUSINESS SOLUTIONS

# DIGITAL SUPPLY CHAIN

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# Digital Supply Chain
## Pain points in the industry



Manual Barcode Scanning during Goods Receipt is consuming time and man effort

Manual Entry for Request from production for Replenishment or indicating process confirmation takes time and man effort

No real time visibility of the number of pallets owned / used by the plant

WIP and Production tracking

Manual tracking of Right part , Right quantity to Right customer

Yard management and tracking Finished goods

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# Digital Supply Chain
## Solutions

### Warehouse Management



❖ **Goods Receipt**
(Enabling Traceability from Supplier or during Good Receipt.)

❖ **Digital Confirmation of Location**
(Conforming Storage Location during Put)

❖ **Digital Pick List**
(Enabling FIFO & Validating Storage Location during Pick)

❖ **Delivery**
(Dispatch Validation / Digital confirmation of delivery of goods issued to production)

### Work-In-Progress Traceability



❖ **Order Status Tracking**
(Real time tracking of current order status process / station wise)

❖ **Enabling Traceability of parts**
(Tracking Batch / Item Level for the sub components added to the main SKU)

❖ **Alerts & Analysis**
(Tracking movement of material & providing alerts for deviations in time for Process / Movement from standard KPI's in real time).

### Real Time Location Systems



❖ **Automotive Yard Management**
(Tracking the exact location where a vehicle is parked.)

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# Digital Supply Chain
## Products

### Internal Milk Run Tracking System



❖ Tracking the time of arrival at a station by the milk-runner.

❖ Intimating the milk runner the next station for delivery.

❖ Capturing the issue due to which the milk runner has reached a station early or late.

### Asset Tracking System



❖ **Admin Assets**
(Tracking Furniture & Fittings and Office Equipment's for Audit.)

❖ **IT Assets**
(Tracking User / Infrastructure & Data Center Assets for Audit.)

❖ **Machinery**
(Tracking plant machinery assets for Audit.)

### Returnable Pallet Tracking System



❖ Real time visibility of the number of pallets available in the plant, at client site & in transit.

❖ Real time visibility of the number of pallets at client site with ageing information.

❖ Monitor the Life Cycle and the Duty Cycle of the Pallets.

❖ Monitor whether all pallets are optimally used.

❖ Mapping the repair charges for damaged pallets against that pallet and can also monitor repair history for the same.

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# Digital Supply Chain
## Benefits - ROI Achieved in less than 24 months in most implementations

### Improvement in Quality



❖ **Automatic Posting of Entries**
(Reduces human errors and provides Real Time Data)

❖ **Improves Overall Efficiency**
Bulk & Automatic Scanning increases the overall efficiency of the process.

❖ **Alerts And Validations**
(Real Time Alerts and Validations will ensure Quality in the operations process.)
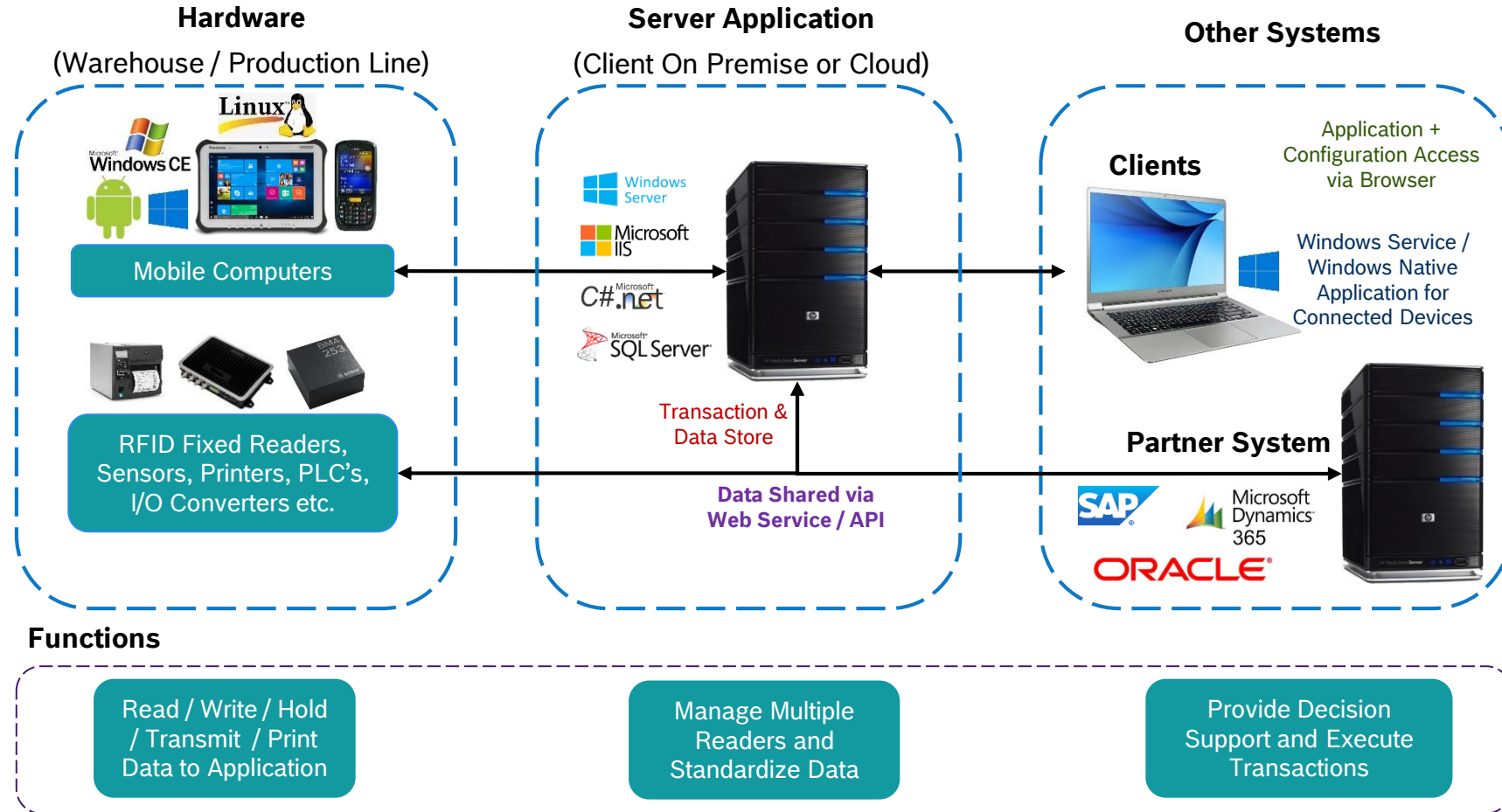
### Reduction in Cost



❖ **Reduction in Manpower**
(Automatic Posting of Entries assists in eliminating manpower required for posting)

❖ **Lean Inventory**
(Real Time Visibility of Assets at every stage in the supply chain would assist in reduction of inventory levels.)

❖ **Increase in Throughput**
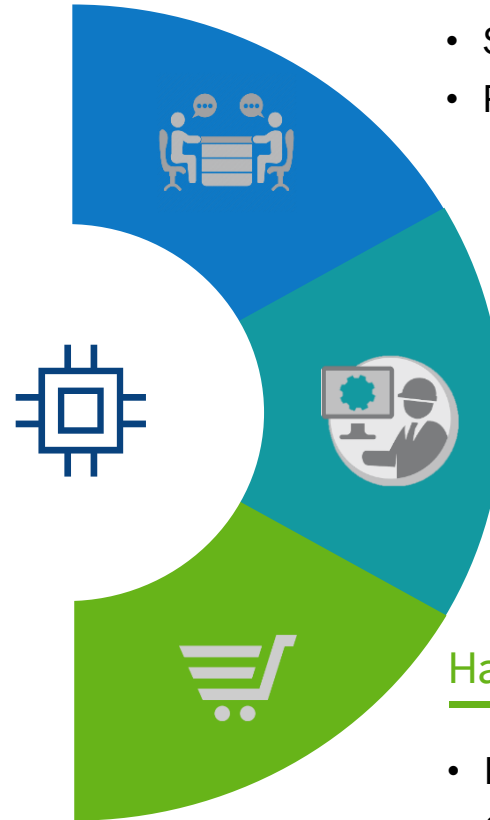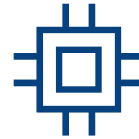(Improved overall efficiency means more work can be done in the same time.)

### Faster Delivery



❖ **Automatic Validation of Dispatches**
(Reduces human errors and ensures no wrong shipment is dispatched)

❖ **Automatic Scanning of Materials**
Bulk & Automatic Scanning ensures less time taken for loading the materials.

❖ **Real Time Data**
(For process were invoicing is done after completion of loading, the data is updated in the system real time and hence no delay in shipment due to invoice preparation.)

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# Digital Supply Chain
## Technical Architecture



**Hardware**

(Warehouse / Production Line)

**Server Application**

(Client On Premise or Cloud)

**Other Systems**

Mobile Computers

RFID Fixed Readers, Sensors, Printers, PLC's, I/O Converters etc.

Windows Server

Microsoft IIS

C#.net

SQL Server

Transaction & Data Store

Data Shared via Web Service / API

Clients

Application + Configuration Access via Browser

Windows Service / Windows Native Application for Connected Devices

Partner System

SAP

Microsoft Dynamics 365

ORACLE

**Functions**

| Read / Write / Hold / Transmit / Print Data to Application | Manage Multiple Readers and Standardize Data | Provide Decision Support and Execute Transactions |
|---|---|---|

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# Digital Supply Chain
## Turnkey Approach

**DSC**



### Consulting
- Study
- Project Blue Printing

### Implementation
- Project Management
- Application Development

### Hardware Procurement
- Hardware Identification
- Supply of Hardware & Consumables

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# Digital Supply Chain
## Use Case

**Client:** Automotive OEM

Project – **RFID based Pallet Tracking within the Plant**



A Total of 23 check points are monitored with RFID Readers.



A Total of 8 Fork Lifts are Mounted with RFID Readers.



Our Middleware Application filter data to make them friendly usable or public and send it to the client application
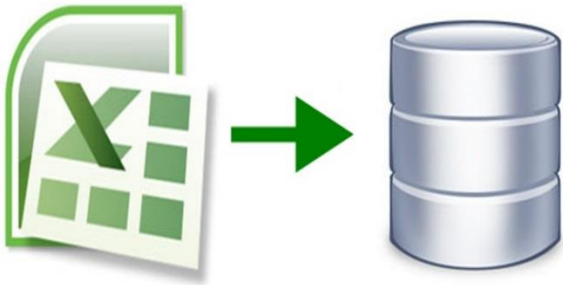
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# Digital Supply Chain
## Use Case

**DSC**

**Client:** Automotive OEM

Project - **Data Acquisition from Supplier End for Faster GR at Plant using RFID**



Supplier Prepares the Invoice & its placed in a shared folder from which our system automatically uploads the same in our Database.



During loading the materials, the user would scan the invoice no, the system would display the no of materials to be loaded for that invoice, the user then scans each material and the pallet ID of the same to map it.



Similarly the total number of invoices that are sent along with the truck is scanned.  Once the invoices are completed, the truck's RFID Tag is also scanned and this information is updated in the DB

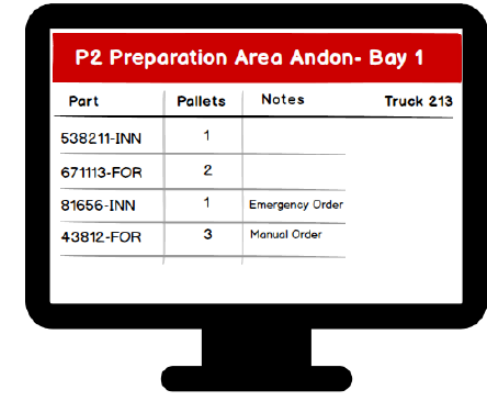**BOSCH**

# Digital Supply Chain
## Use Case

**Client:** Automotive OEM

Project - **External Milk Run Tracking – eKanban (From Plant 2 to Plant 1)**







P2 Preparation Area Andon- Bay 1

| Part | Pallets | Notes | Truck 213 |
|------|---------|-------|-----------|
| 538211-INN | 1 | | |
| 671113-FOR | 2 | | |
| 81656-INN | 1 | Emergency Order | |
| 43812-FOR | 3 | Manual Order | |

RFID Readers were fixed to capture the truck that has arrived at the bay. The truck movement time between plants, material loading / unloading time is tracked and compared with default KPI's. Alerts would be provided in case of deviations

Fork Lifts Readers were provided to identify the materials that are being unloaded from the truck and update the empty pallets loaded.

Andon's were planned at both P1 & P2 to display the following: -

P1 - Materials being Unloaded & Empty Pallets Loaded.

P2 – Materials being loaded & Empty Pallets Unloaded
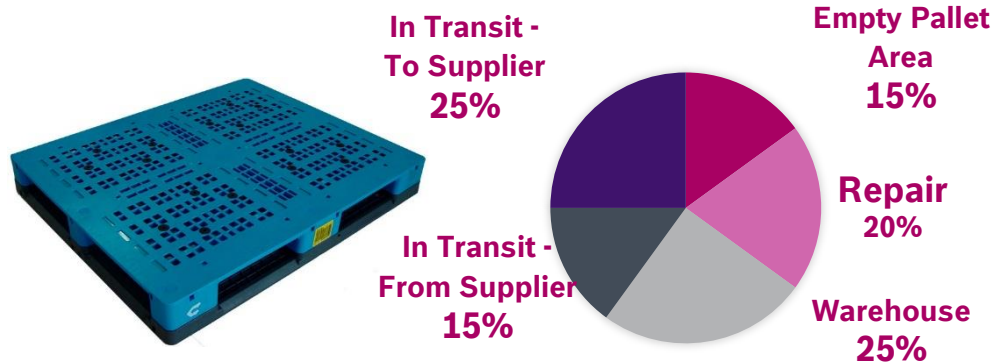
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# Digital Supply Chain
## Use Case

**Client:** Automotive OEM

POC's Completed

**PALLETS DASHBOARD**

In Transit - To Supplier 25%

Empty Pallet Area 15%

Repair 20%

In Transit - From Supplier 15%

Warehouse 25%



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**Tracking the Movement of Supplier Pallets in their Main Assembly Inward Area**

- No of Pallets Available in the Plant (Assigned / Free)
- No of Pallets Available in the Supplier Site
- No of Pallets in Transit

**Tracking the Movement of Vehicle in the Repair Area & Parking Yard Receiving Area**

- No of Vehicles Services by a Bay,
- Total Repair Stock
- No of Stations Visited by the Vehicle
- Current Status of the Vehicle Repair

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# Digital Supply Chain
## Use Case

**Client:** Automotive OEM

Validating & Tracking the Movement of Truck at Plant Exit Gate − **Dispatch Validation**

- **Native Application** for **Windows CE** Based Micro Kiosk

- **Web Application** for Reports & Other Configurations.

- **Windows Based Middleware Web Application** for Capturing Data from Multiple RFID Fixed Readers

Validating the Trucks that are dispatched at the Plant Exit Gate via RFID against the supply order.

Solution is Integrated with SAP

**POC Completed Successfully**

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# Digital Supply Chain
## Use Case

**Client:** Pipes & Fittings Manufacturer

Enabling Traceability on Bundles (CPVC & Column) & Fittings



- **Android Application** for Cross Selling Validation – for Sales / Audit Teams.
- **Android Application** for Capturing Consumption Data & Royalty / Info.
- **Native Application** for **Windows CE** Based Hand Held Barcode Readers
- **Web Application** for Reports & Other Configurations

Enabling Traceability in the CPVC / Column Pipes and Fittings to the Distributor Channel where they are billed to validate cross selling e.g. a Distributor billing to Dealers belonging to other region / distribution channel.

Also providing a Mobile Application to Capture the Consumption of the Pipes and Fittings by End-Users.

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THANK YOU

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