LUCAS-NUELLE

ERP LAB

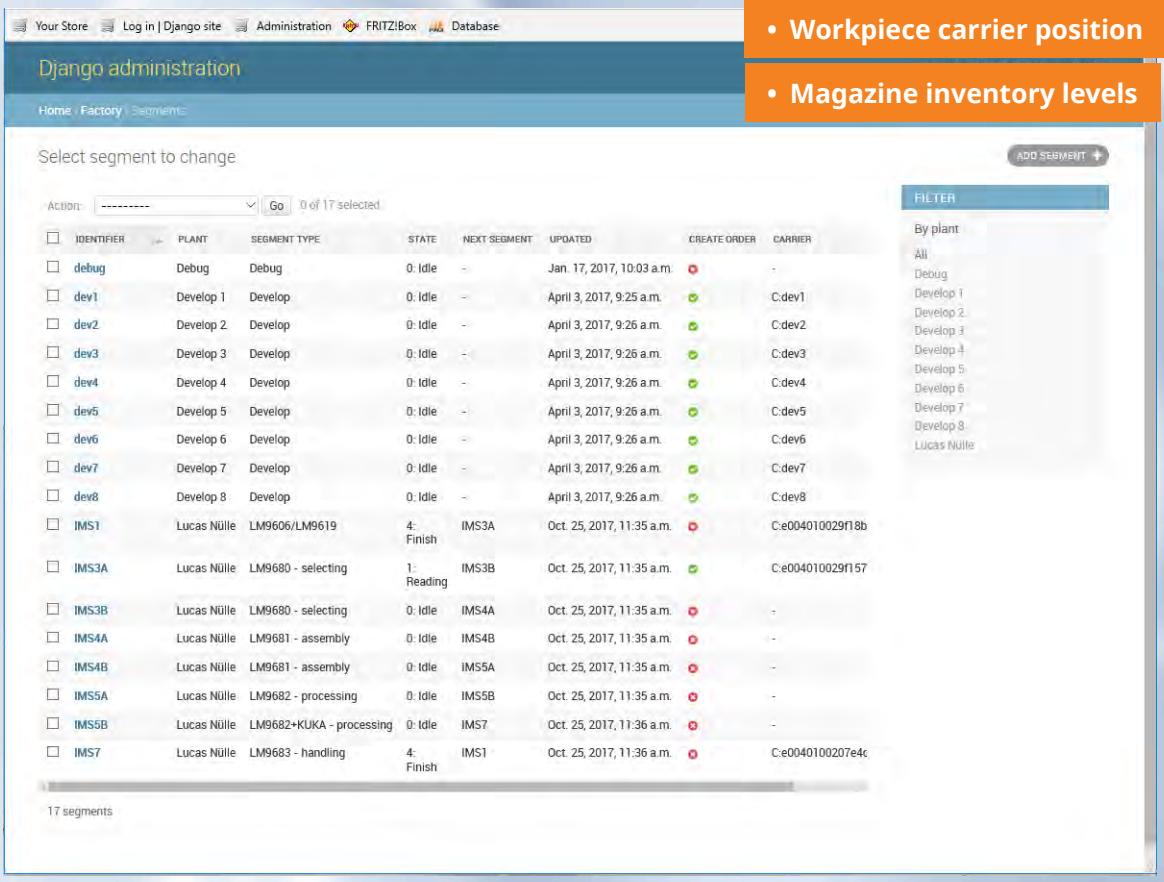
The educationally designed ERP system

01. Edition

PROGRAMMING AND SETTING UP

Live production data:

- **Station operating states**
- **Workpiece carrier position**
- **Magazine inventory levels**



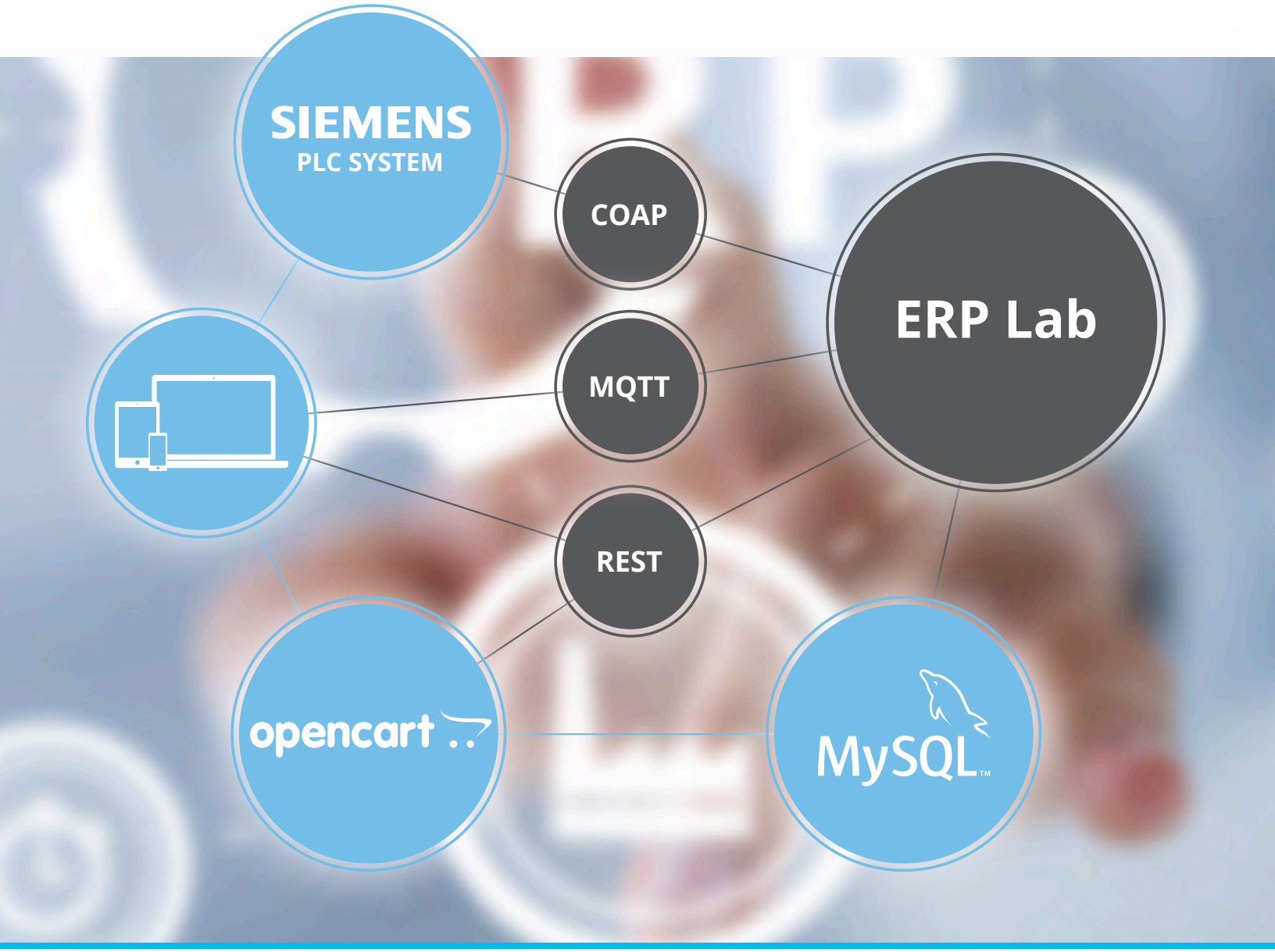
IDENTIFIER	PLANT	SEGMENT TYPE	STATE	NEXT SEGMENT	UPDATED	CREATE ORDER	CARRIER
debug	Debug	Debug	0: Idle	-	Jan. 17, 2017, 10:03 a.m.		-
dev1	Develop 1	Develop	0: Idle	-	April 3, 2017, 9:25 a.m.		C:dev1
dev2	Develop 2	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev2
dev3	Develop 3	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev3
dev4	Develop 4	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev4
dev5	Develop 5	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev5
dev6	Develop 6	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev6
dev7	Develop 7	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev7
dev8	Develop 8	Develop	0: Idle	-	April 3, 2017, 9:26 a.m.		C:dev8
IMS1	Lucas Nülle	LM9606/LM9619	4: Finish	IMS3A	Oct. 25, 2017, 11:35 a.m.		C:e004010029f18b
IMS3A	Lucas Nülle	LM9680 - selecting	1: Reading	IMS3B	Oct. 25, 2017, 11:35 a.m.		C:e004010029f157
IMS3B	Lucas Nülle	LM9680 - selecting	0: Idle	IMS4A	Oct. 25, 2017, 11:35 a.m.		-
IMS4A	Lucas Nülle	LM9681 - assembly	0: Idle	IMS4B	Oct. 25, 2017, 11:35 a.m.		-
IMS4B	Lucas Nülle	LM9681 - assembly	0: Idle	IMS5A	Oct. 25, 2017, 11:35 a.m.		-
IMS5A	Lucas Nülle	LM9682 - processing	0: Idle	IMS5B	Oct. 25, 2017, 11:35 a.m.		-
IMS5B	Lucas Nülle	LM9682+KUKA - processing	0: Idle	IMS7	Oct. 25, 2017, 11:36 a.m.		-
IMS7	Lucas Nülle	LM9683 - handling	4: Finish	IMS1	Oct. 25, 2017, 11:36 a.m.		C:e0040100207e4c

Unlike industrial ERP solutions, the ERP system from Lucas-Nuelle can be set up and programmed without any prolonged introductory phase. The corresponding course software describes how the ERP system works and assists the student in programming and configuration. In addition to handling basic questions, the course also covers communication with the IoT device.

Training content

- Manufacturing process
- Configuration of the ERP system
- Programming the programmable logic controls
- Communication with the IoT device
- Manufacturing two different products in twelve variations
- Merchandising system (thanks to fully integrated pricing model)

THE ERP LAB WITH FULLY INTEGRATED MES



In its function as a **Manufacturing Execution System** (MES) the ERP Lab monitors the entire process. As a server-based system it provides all production-relevant data within the Edge Cloud (Cloud services in the intranet) – ranging from the Webshop to the production process all the way to warehousing. The system also communicates with the programmable logic controls of the production line via the network.

Advantages
- Total process control
- Automatic filling level control (fill levels can be automatically updated via the IO link)
- Flexible: The production line can be re-configured and adapted to the ERP system with just a few hand movements

MySQL database
- Convenient access via default user interface
- Data export possible in a variety of data formats

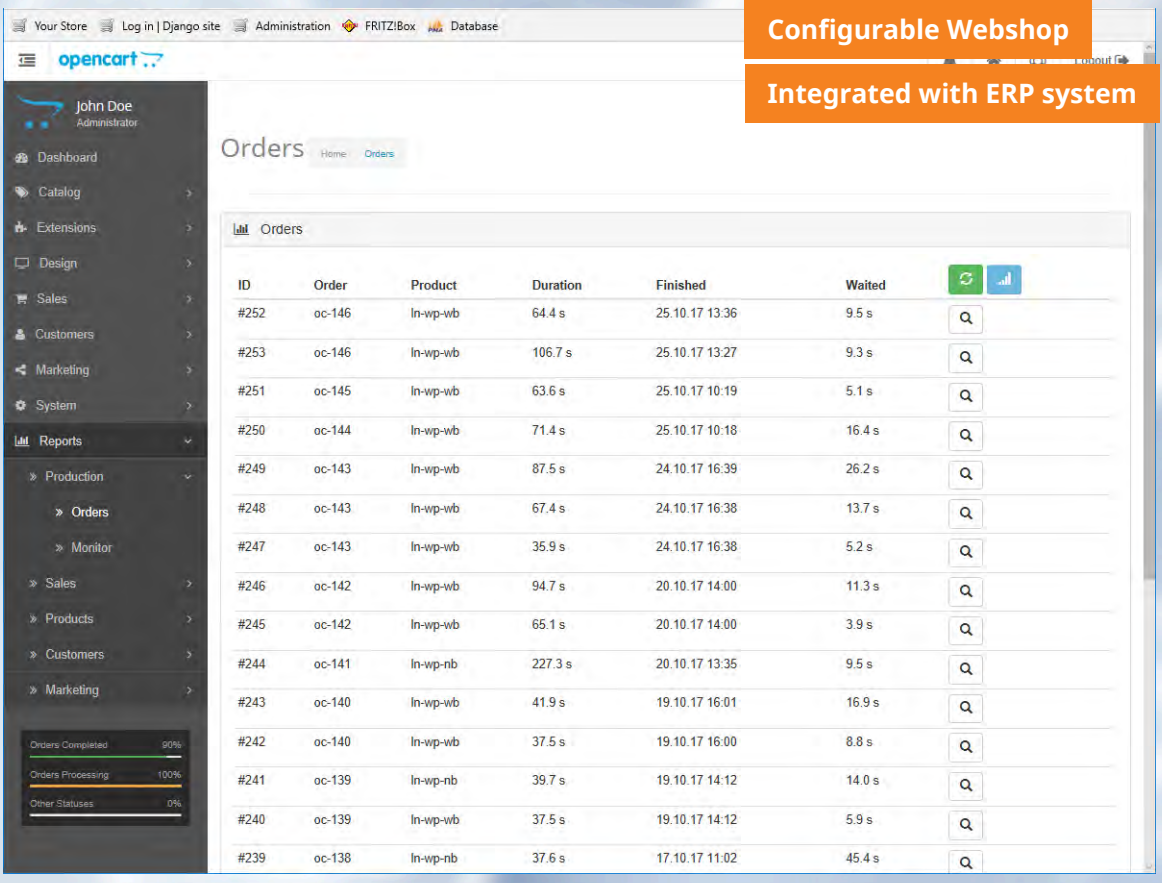
Interface description
- CoAP: protocol for communication between control unit (client) and ERP Lab (Server)
- MQTT: PubSub service updates data automatically on the user interface
- REST: makes data available via http in machine-readable form

FULLY INTEGRATED WEBSHOP

Production starts automatically upon order arrival

Configurable Webshop

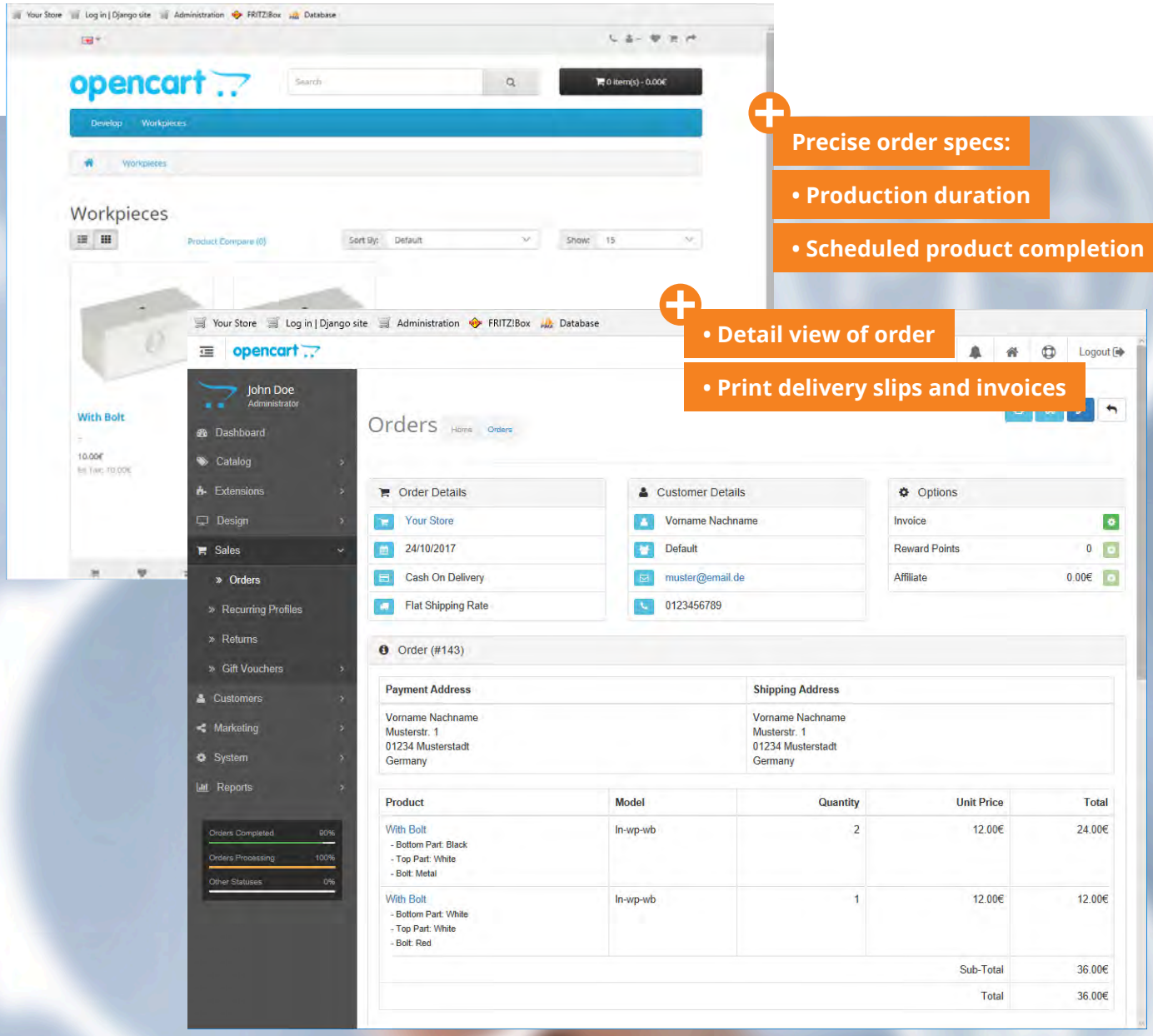
Integrated with ERP system



Only a browser is needed to order from any mobile device. During the purchase the customer can directly view the costs inside the basket. Also the individual part prices of products are managed by the ERP system. Thanks to the itemised price data stored in the system, production and material costs can be monitored and evaluated. Data export is also possible.

Advantages

- Monitors the entire internal process of production
- SCADA function: malfunction alarms and production problem localisation
- Warehouse inventory monitoring: signalling whether orders have been or can be completed
- Automated order process possible when inventory is too low



In the backend of the ERP system there is a host of statistics – for example on the duration of production, down times, the number of manufactured variants and customer evaluations

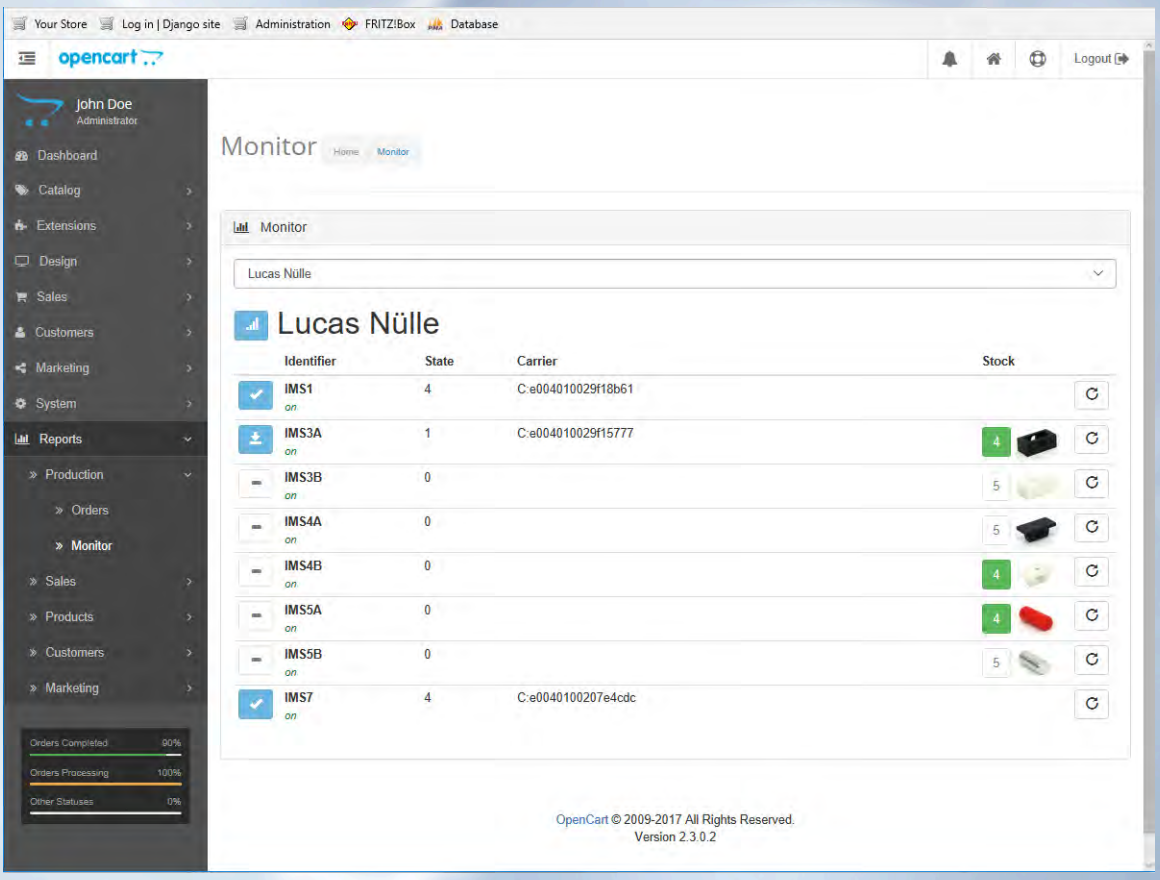
Orders are depicted in detail. Filter functions make it easy to find the order processes of a particular client in certain time frames. Order slips and invoices can be created and printed out for each order.

Benefits

- Freely configurable Webshop
- Order via Internet
- Personalised ordering
- Different prices for product variants
- Display of delivery times
- Live view of the production process
- Live view of the order list

SEVERAL PRODUCTION LINES

Configure variants



Universal application: Add new processing station? Configure parts, products and variants? The ERP Lab is flexible and can control several production lines at the same time.

Benefits

- Produce different products on different production lines
- Order all the products via the Webshop
- Each new product can be configured for the Webshop
- The ERP Lab starts production on the right production line facility

AT A GLANCE

Benefits of the ERP Lab
- Provides both ERP and MES
- SCADA function
- Operating data acquisition (BDE)
- Machine data acquisition (MDE)
- Production and manufacturing planning
- Energy audits of production
- Network communication
- Cloud-based data exchange
- Automatic teach mode
- Merchandising system and warehouse inventory management
- Intelligent control and monitoring of production in real time
- Parallel control of several production line systems
- Server equipped with ERP system
- Communication between ERP Lab and control
- Adaptation of ERP system to the hardware
- Individual product design possible
- Print out of delivery slips and invoices
- Large compilation of statistics, including:
  - Number of workpieces used
  - Number of products completed
  - Production costs
  - Deliveries per country overview

Benefits of an integrated Webshop
- Freely configurable Webshop
- Ordering via Internet
- Customised ordering
- Different prices for variants
- Delivery times indicated
- Live view of the production process
- Live view of the order lists

Interface description
- CoAP: protocol for communication between control (Client) and ERP Lab (Server)
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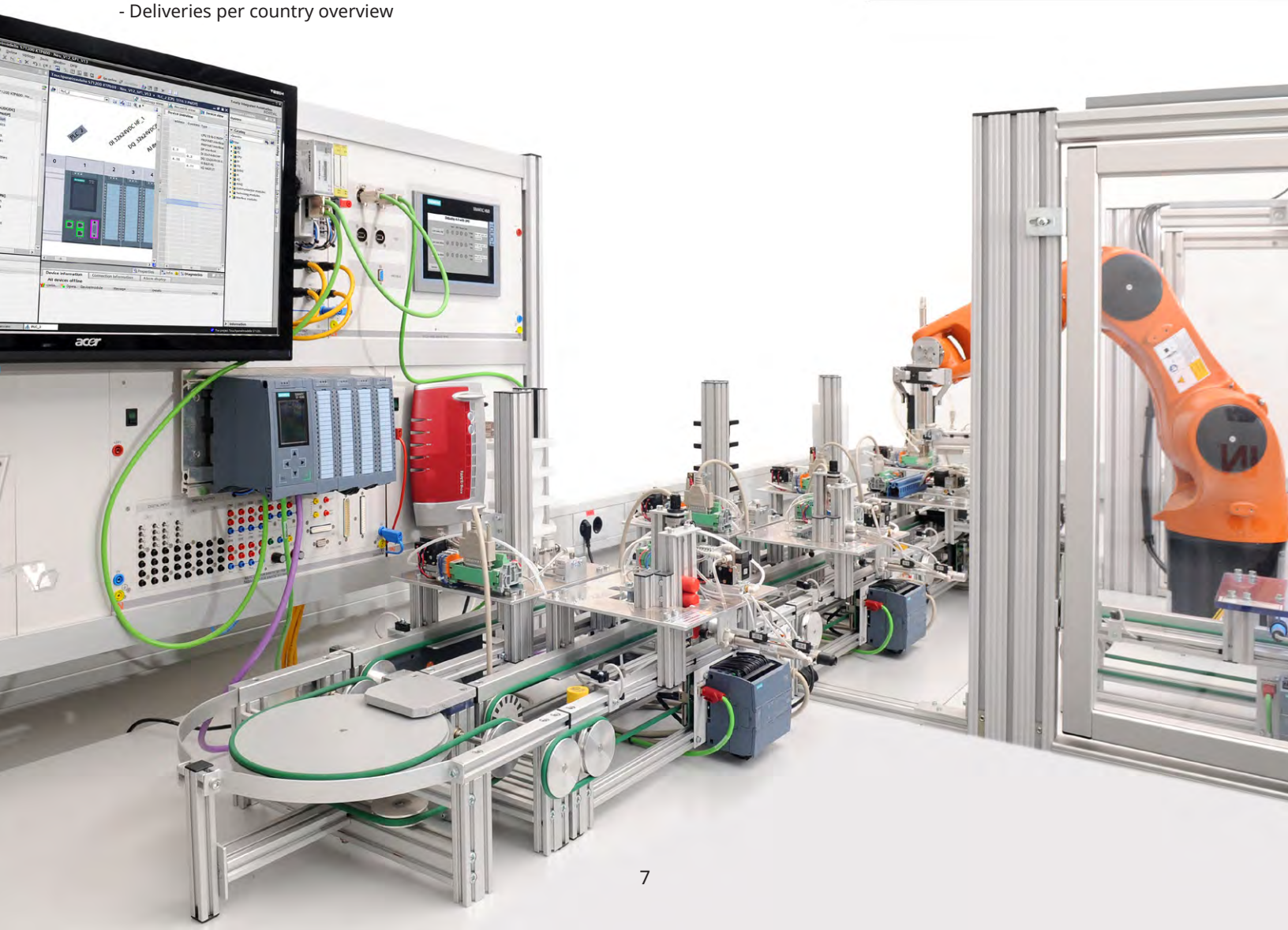

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