HHBK-Chemicals

Specifications

Version: 30.8.2022

Introduction

In the first half of year 11, work was done on the project as part of the SOFT lessons. In the process, the specifications were analysed and further developed into requirements specifications. The present document is intended to represent the unified joint result of this work and at the same time be the starting point for the following work in the 12th school year in the subject SOFT.

INITIAL SITUATION AND OBJECTIVES

The company HHBK-Chemicals sells flavourings. In the future, this should be possible via a website or a backend. Up to now, sales have been purely paper-based and in part quite unstructured with Excel tables and e-mails. In addition, mainly large customers and not end customers were served.

The software is intended to open up a new business model. With the help of the ERP, the processes should become transparent and economically evaluable.

Through automation, the use of personnel should be kept low and the time between order and delivery should be as short as possible. At the same time, the product should be adapted as flexibly as possible to the customer's requirements.

ERP software is required.

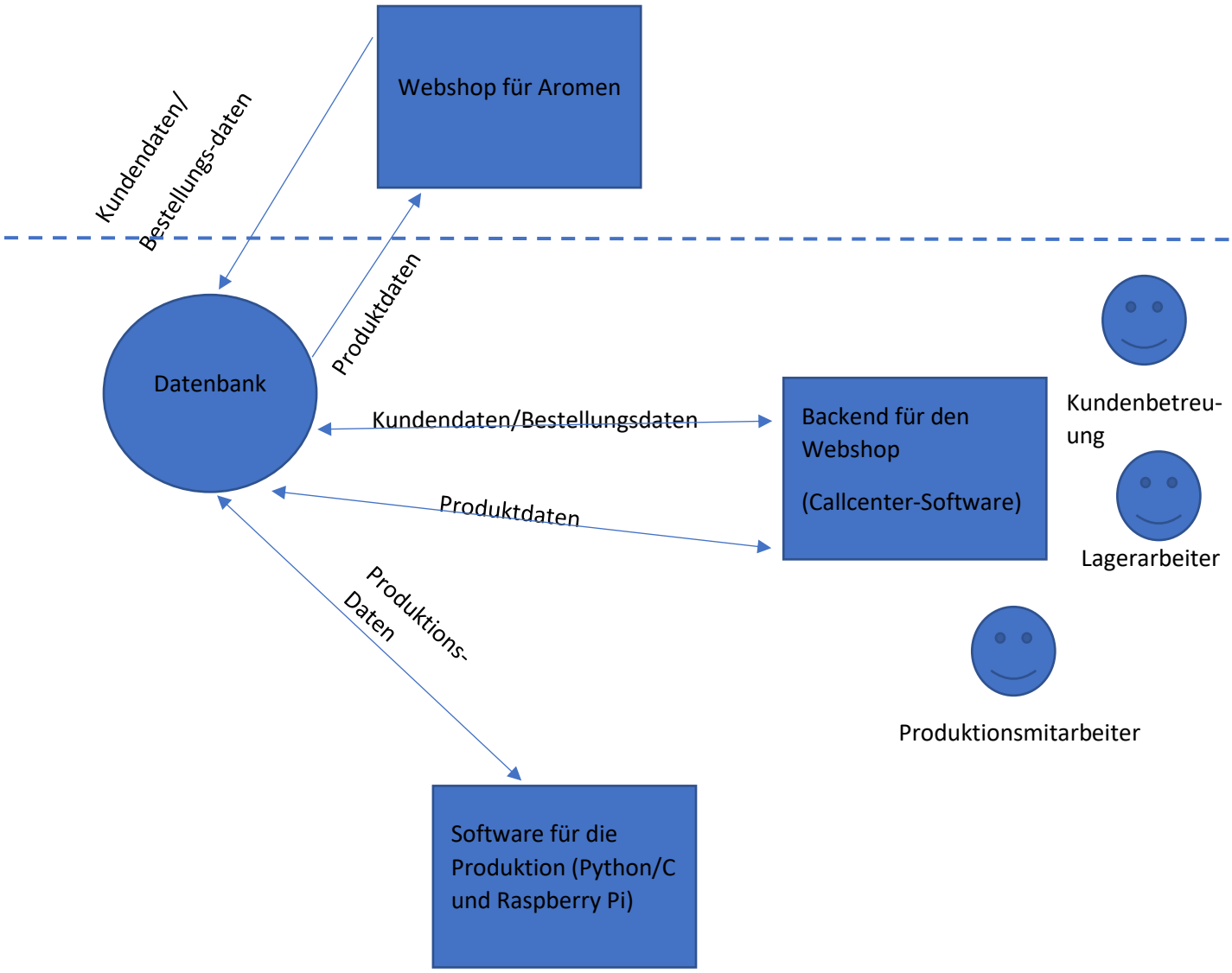

Abbildung 1: Dekomposition des Gesamtsystems

The overall system should consist of three parts:

1. A PHP script for plant control, which takes the data for production from a database and enters manufactured products into the database.
2. A WindowsForms application that runs on an office PC where
    a. Customer data can be managed,
    b. Orders can be displayed and manually created, changed and deleted,
    c. Invoices can be created on the basis of existing orders,
    d. Incoming payments can be entered and changed,
    e. Production orders of paid purchase orders can be released,
    f. Finished products are released for shipment,
    g. Address label printing
    h. Shipping company selection
    i. Shipping company assignment
    j. Personnel can be managed,
    k. Personnel can be scheduled for production,
    l. schedules for manufacturing personnel can be created,
    m. production costs can be calculated,
    n. Stocks can be managed
3. A MySQL database for all required data

The following architecture documents and implementation, integration and testing concepts are to be created:

1. use case diagrams

2. class diagrams

3. sequence diagrams

4. programme flow diagrams

5. test plans

INTERFACE OVERVIEW

The php script for operating the system should initially have no graphical user interface. The system is operated via hardware that is controlled and evaluated via the GPIOs.

A website based on php and html is to be created for the web frontend. The website serves as a graphical user interface for customers. A standard PHP-MySQL driver/plugin is to be used as the interface to the MySQL database. Possible options are: mysqli or PDO_MYSQL.

For the backend, there should be a graphical user interface based on Windows Forms or WPF. The backend should have an interface to the database via the MySQL connector. The use of LINQ would also be possible here.

LIFE CYCLE ANALYSIS

Initially, only the development phase, including troubleshooting after introduction, is to be provided by the contractor within the scope of a one-year trial run. Maintenance and, if necessary, decommissioning shall be commissioned separately.

FUNCTIONAL REQUIREMENTS

Business processes of HHBK_Chemicals

Order

1. create customer account
2. login
3. search product
4. add product to shopping cart
5. payment method
6. confirm billing and delivery address
7. confirm purchase
8. e-mail with order confirmation

Production

1. order entry
    a. Check for orders
    b. Filter out articles
    c. Check stocks
        i. Pre-produced product
        ii. Check the stock positions of the required raw materials on the basis of the recipe
2. generate production item
    a. Check customer data for completeness
    b. Check receipt of payment
    c. Determine producer
    d. Release for production
3. integrate production item into the production plan
    a. Set target start time
    b. Specify recipe number
    c. Determine production position
4. production
    a. Enter the ACTUAL start time in the production plan
    b. After production, enter production date in production item
5. labelling
    a. Company name
    b. Product name
    c. Best before date (calculate from production date)
    d. Filling quantity
    e. Article number
    f. Ingredients/ingredients (declaration)
    g. Warnings, if applicable

Delivery

1. compile delivery from delivery items
2. carry out a dispatch check
3. select forwarding agent
4. hand over goods and enter date of dispatch
5. in case of delivery confirmation by forwarding agent, enter delivery date

Stock receipt

1. increase basic material quantities

Manage recipes

1. enter, change, delete recipes

Manage products

1. enter, change, delete product

Complaint

1. enter complaint
    a. Customer data
    b. Order data
    c. Reason for complaint
2. select procedure
    a. Exchange/return and refund of purchase price
    b. Determine receipt of goods
    c. New production/delivery via "Order
    d. Or initiate payment with invoice and customer data.

Post receipt of payment

The software should work with a database in order to be able to save important data centrally and to be able to access the data in a distributed manner.

Automation of the production plant via a Raspberry Pi

The chemistry departments are involved.

The backend software is to run from Windows Office PCs with Windows 10. The database as well.

<use-case-diagrams>

NON-FUNCTIONAL REQUIREMENTS

Performance
The system should be able to serve ten users simultaneously without delays.

Usability
The software should be usable by office and production staff without extensive training.

Scalability
The new line of business is expected to grow, so that it should be possible to scale it in the short term.

Security
Data should be protected from external access and need regular back-up. Database server is located in DMZ, access rights are adapted to different users, e.g. script for the webshop, backend user, production machine, maintenance, etc.. In addition, measures are to be taken against code injection.

REQUIREMENT TRACKING TO THE SPECIFICATIONS

<...>

ACCEPTANCE CRITERIA AND EXIT REVIEW PROCEDURE

1. full access to the github project.
2. Source code is complete and executable.
3. a test concept is developed with the client that has been implemented with the software.
4. the tests run without errors. This must be documented.

SCOPE OF DELIVERY

1. python script for machine control, executable on Raspberry Pi
2. installation and test of the script on Raspberry Pi of the HHBK
3. C# project for backend provided via github
4. database for MySQL ready with test data sets
5. installation of the database on a student PC and configuration of the necessary DBMS users
6. training of the system operators
7. training on the backend
8. training on maintenance of the database

GLOSSARY

End customer

An end customer is a person who enters into a transaction with a company as a buyer. In doing so, they act as the last buyer/consumer of a product or service on the way from the manufacturer or service provider to the buyer. Often end customers are also private customers. Special rules apply here (see consumer protection). Furthermore, the term end customer also refers to a small buyer.

We distinguish between

1. private customer/business customer
2. producer/intermediary/end customer
3. small buyer/ wholesale customer (large buyer)

ERP

Enterprise Resource Planning (software). Is a software that manages resources, such as money, products, working time, etc., according to the needs of the customer.

Wholesale customer

(see end customer)

Protection needs assessment

The aim of the protection needs assessment is to determine the security requirements and to control the selection of appropriate security measures for the individual target objects of the information network under consideration.

The bases for this are, among others:

- DSGVo (Basic Data Protection Regulation) (Europe)

- Federal Data Protection Act (Germany)

- State Data Protection Act (NRW)