# Personal Development Plan

## Software Factory Group 1

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# 1 Introduction

This document defines the development of personal skills during the Software Factory (SoFa) module. During this module some learning goals should be met which contributes to the final skills of the Informatics study. Section 2 provides an overview over the current skill level (see Table 1) according to the HBO-I matrix as defined in „HBO-I Domain Description Bachelor of ICT".

The next section deals with the target skill level (see Table 2) and how this level will be accomplished. The concrete improvements are marked in red.

The third section explains how the target skills will be reached in detail. It defines how the progress will be measured and when at which point the target will be reached.

As part of the learning goals, a topic has to researched. This research topic will be described in section 5.

## 1.1 Roles during the Project

During the project, I have to fulfill some roles inside the team. These roles are described here:

**DevOps Engineer**   As a DevOps Engineer I am responsible to set up a fully automated continuous integration pipeline, which automatically tests all parts of the software. After a successful test, the software should automatically be delivered to the customers, which means deployment on a server (continuous delivery).

Neither continuous integration nor continuous delivery have been taught during our study, but is a current development in software development leading to shorter development cycles, better tested software, and reduced bug costs.

**Backend Developer**   As a backend developer I am responsible for implementing the necessary API endpoints into the backend. The endpoints are defined by the software architect who also defines the data structure which has to be sent to the client. The backend then takes care of a request, loads the needed data from the database and convert the data to the correct structure.

**Database Engineer**   As a database engineer I take care of the database and the data inside. I am responsible for the table structure and the constraints which will be enforced on database level (for example: foreign keys).

The database structure and data need to be stored inside the repository to archive them. Furthermore they should be importable to the other group members so everybody can have his local development database.

# 2 Current Skill Level

The following table describes the current skill level.

| | Manage | Analyse | Advice | Design | Implement | Professional Behaviour | Research Skills |
|---|---|---|---|---|---|---|---|
| User-Interface | | | | | | | |
| Business Processes | | | | | | | |
| Infrastructure | 2 | 2 | 2 | 2 | 2 | | |
| Software | 2 | 2 | 3 | 3 | 2 | | |
| Hardware Interfacing | | | | | | | |
| Professional Skills | | | | | | 2 | 2 |

Table 1: Current Skills Level

# 3 Target Skill Level

The following table shows which skill levels I want to accomplish during this project.

| | Manage | Analyse | Advice | Design | Implement | Professional Behaviour | Research Skills |
|---|---|---|---|---|---|---|---|
| User-Interface | | | | | | | |
| Business Processes | | | | | | | |
| Infrastructure | 2 | 3 | 2 | 2 | 3 | | |
| Software | 2 | 2 | 3 | 3 | 3 | | |
| Hardware Interfacing | | | | | | | |
| Professional Skills | | | | | | 3 | 3 |

Table 2: Target Skill Level

# 4 Development Plan

This section describes how I want to reach the targeted skill levels and how I want to measure or prove that I reached them. The definition of each level and an example as stated in the HBO-I domain description is included in each sub section.

## 4.1 Analyse Infrastructure Level 3

Analyzing Infrastructure on level 3 will be achieved by defining requirements for a continuous integration and deployment infrastructure. This requirement should reflect the customer's needs regarding deployment but should also include test automation for all layers of our software architecture.

Continuous integration and deployment is a technique which is currently not taught during our study course. Therefore this is a new technology for me. Nevertheless, this technology is an upcoming trend in software development, which currently is used more and more especially in combination with small container (docker, vagrant, etc.).

**Satisfaction criteria:** The requirements should meet the needs of the customer and the group. Therefore the requirements will be discussed with the group and the customer. The discussion will be written down in a minute to track the remarks. In the end the customer and the group should agree to all requirements.

> **Infrastructure / Analyse / Level 3**:
> Conduct trend research in the field of ICT infrastructure, based on (international) technological, economic en social developments and innovations. Execute a company infrastructure requirements analysis in order to identify functional and non-functional requirements.
> *(HBO-I Domain Description, p22)*

## 4.2 Implement Infrastructure Level 3

To achieve Implementing Infrastructure level 3 I will implement the continuous integration and deployment infrastructure which I got as a result during my research (see Section 5). The research will include a concrete proposal which will be adopted and implemented for our project.

**Satisfaction criteria:** The infrastructure is satisfying if it contributes to our project by improving the software quality or decreasing time spent with testing and deployment. This will be assessed by the other group members. The feedback of the customer will be taken into account.

> **Infrastructure / Analyse / Level 3**:
> Implement public or private cloud-based infrastructure and services, in compliance with all requirements. Set up an integrated multilevel ICT environment in order to implement central monitoring of the quality and security of ICT services.
> *(HBO-I Domain Description, p23)*

## 4.3   Implement Software Level 3

Implementing Software on level 3 will be achieved by creating unit tests for the database layer. Normally during development, all parts of code will be tested using automated unit tests and the test coverage is considered as a quality metric. Regardless of all this testing, the database and the logic and constraints on database layer are usually not tested at all. Only when it comes to integration or acceptance tests, a database will be used and hopefully it works. Therefore, implementing automated database is a innovation for software development. By making the tests as easy as possible hopefully more projects will adopt database testing.

For our project I want to implement a unit tests for database constraints similar to the tests for the backend and the frontend. The tests should be run automatically and will be included into the continuous integration infrastructure.

Because performing database tests is not famous, there is a lack of test frameworks and best practices. Therefore I need to find a proper framework or write a new one by incorporating different sources of information.

**Satisfaction criteria:** The database unit tests should cover at least 80% of all database constraints as defined in the database documentation. Constraints also includes foreign keys or "not null" values.

> **Software / Manage / Level 3**:
> Build and make available a software system in line with existing systems and on the basis of the designed architecture, using existing frameworks. Using test automation when performing tests.
> *(HBO-I Domain Description, p25)*

## 4.4 Professional Behavior Level 3

For our project I took the initiative to write minutes of all meetings. This includes not only the customer and coach meetings, but also the different scrum meetings. By continuously writing minutes I want to improve my skills in writing down important information during a meeting. Furthermore the minutes will contribute to an understandable development process and can be used in the end to state who did what. Also all important decision are written down including the most important arguments. Therefore everybody can reread it in the future if something is unclear and the customer and the coach can comprehend our decisions.

To measure improvements our group coach will review my minutes during the modules three times. Firstly at the beginning of October, then roughly at mid November and finally sometime before the assessments. The feedback given my the coach should state, that I took the previous feedback and the minutes I wrote improved over time.

# 5 Research Topic

As research topic I will research on different approaches how to set up a continuous integration and continuous delivery infrastructure.

Therefore I need to research current industry standards as well as bleeding edge technology approaches for example infrastructure as a service or containerization. Continuous integration as a concept, exists for quite a while now. Continuous delivery is a rather new concept which reduces development cycles and simplifies the software roll-out process. The implementation of this concepts was rather complex and error-prone and often did deliver what was expected.

One of the most interesting upcoming technologies, containerization (i.e. Docker) allows now to implement the concepts in a very easy and reproducible way. Setting up the whole development environment can now be automatically done by a container tool, which allows to test and deploy software wherever the container tool works, without being dependent on specific framework requirements.

For our project I want to incorporate the concepts of continuous integration and deployment by researching about the newest concepts and approaches in using containerization and automation for software development. Therefore at first I will conduct a trend research about virtualization and containerization. After that I will look up the current industrial standards for software development. Industry companies are usually more conservative when it comes to new technologies, so they normally adopt the technology at a later point in the

hype cycle. Finally I will have a look at upcoming developments and what can be possible in the future.

Prior to the research, I will define requirements which should be met by this infrastructure (see Section 4.1). The results of the research will be composed into a report. Part of this report will be a proposal for a concrete infrastructure which meets the predefined requirements and can be implemented in our project (see Section 4.2).