



Yannick zum Hingste

geboren am 08. Dezember 1995, Abitur am Gymnasium Langenberg in 2014. Anschließend begann er sein duales Studium der Wirtschaftsinformatik an der Berufsakademie Glauchau. Er engagierte sich unter anderem als Studiengangssprecher und als Administrator des studentischen Wohnheims. Bei seinem Praxispartner, der Vaillant Group, arbeitete er drei Praxissemester in Frankreich, wo er auch seine Bachelorarbeit verfasste. In 2017 schloss er das Studium mit Auszeichnung ab. Derzeit fundiert er seine Kenntnisse mit dem Master der Wirtschaftsinformatik an der Hochschule Karlsruhe. Parallel arbeitet er im Bereich Business Administration bei der Vaillant Group Business Services GmbH.

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Analysis conception and realization of a web based application allowing to manage the tests of different endurance rooms of the Vaillant Group

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Das Ziel der Bachelorarbeit bestand in der Optimierung der Transparenz und Effizienz von Ausdauertests der Vaillant Group. Dies wurde durch die Implementierung des Workflows in einer Webapplikation realisiert, welche ebenfalls mit weiterer analytischer Software sowie dem Active Directory interagiert.

Alle relevanten Prozesse wurden mit den Stakeholdern diskutiert und in einer Spezifikation festgehalten. Die Applikation wurde gemäß den Werten von SCRUM entwickelt.

Die Webapplikation wurde in ASP.NET entwickelt und interagiert mit einer Microsoft SQL Datenbank. Sie bietet drei Hauptkategorien an: Einen neuen Test beauftragen, bestehende Tests und Anfragen einsehen sowie Administration. Relevante Daten anderer Systeme werden mithilfe von Dateien im Intranet geteilt. Der Nutzer hat die Möglichkeit diese per Drop-Down Menü einem bestimmten Test zuzuweisen. Da die Applikation im Intranet des Unternehmens agiert, sind alle Nutzer automatisch identifiziert. Nichtsdestotrotz sind Operationen durch ein Gruppen-Berechtigungssystem nur autorisierten Mitarbeitern möglich. Gruppenzuweisungen und weitere administrative Einstellungen können in der Kategorie Administration der Software vorgenommen werden.

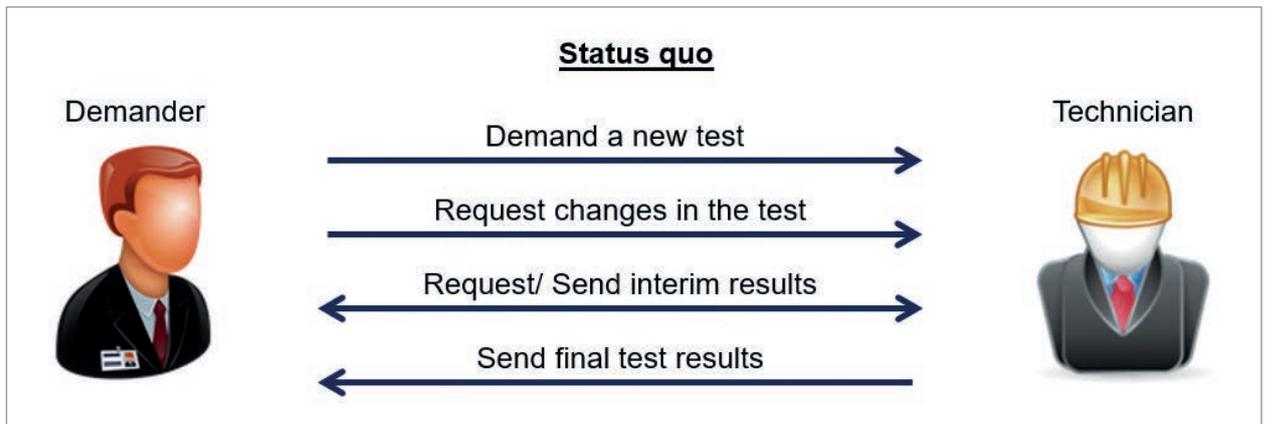
Die Digitalisierung des Workflows verbesserte die Transparenz der Ausdauertests. Testparameter und Fortschritte können jederzeit in der Applikation eingesehen werden. Dadurch geschehen Interaktionen in Echtzeit und benötigen nicht zwangsmäßig ein Handeln anderer Parteien. Dies erhöht die Effizienz des Workflows, wodurch alle ursprünglichen Ziele erreicht wurden.

The project's target was to improve the transparency and efficiency of the management of endurance tests of Vaillant Group. This was to be achieved by implementing the workflow into an application which also had to interact with analytical software and the company's Active Directory.

All relevant processes were discussed with the stakeholders and written down in a specification. The application was developed according to the values of SCRUM.

The web application was developed in ASP.NET and interacts with a Microsoft SQL database. It provides three main categories: Demand a new test, view and modify tests and administration. Relevant data of other systems is obtained from files within the network and selectable from a drop-down menu by the users to link it to a certain test. Since the application is running within the company's intranet, all users are automatically identified. However, a role-based access control authorizes defined groups to perform specific actions. Group assignments and further settings can be maintained in the application's category administration

Digitizing the workflow improved the transparency of the endurance tests. Tests' settings and progresses can always be reviewed in the application. Thus, interactions happen immediately and do not necessarily require actions of further parties, improving the workflow's efficiency. Therefore the initial targets have been achieved.



Presentation of the topic

Industry 4.0 is an important challenge of today's business environment. Workflows have to be optimized in order to remain competitive. While many processes are yet still done manually between interacting individuals, they are being digitalized to reduce interhuman interfaces. This thesis describes the digitalization of the management of endurance tests within Vaillant Group. The project was processed in Saunier Duval in Nantes which is a French subsidiary of Vaillant Group.

Problem analysis (Status quo)

Vaillant Group internationally operates several endurance rooms with multiple test benches. Tests of new components or heatings have to be demanded by talking to a technician. This is often done personally. However, there exists no list showing all technicians. Hence, a manager might have to be consulted to figure out which technician has to be asked.

Apart from demanding a test, all interim interactions like change requests, status reports or final outcomes have to be demanded from the technician. Currently there exists no centralized overview of all tests made internationally. Therefore the management of tests is currently nontransparent and difficult.

Target state

The goal of the project is to achieve an efficient and transparent management of endurance tests. This should be done by developing an application where all necessary processes and information are provided. Having the possibility to demand a new test is the first relevant process. When demanded, technicians should be able to modify and approve them. Demanders should always be able to keep track of their demands and their tests' progresses.

As Vaillant Group uses the principle of least privilege, which means that a user only has access to information he needs for his work, a permission system also has to be implemented to the application.

To sum up, all actions should be processed on a central application. Due to its availability, actions take place immediately and do not require interaction of another person. When an action has been done on the application, the other party is automatically informed via e-mail.

Environment

The application is running on a Windows server within the company's network. Only authorized employees are able to access the software wherefore the needed security standard was rated as low. In discussions with the stakeholders, it was agreed to develop an ASP.NET web application which interacts with the relational database management system Microsoft SQL-Server. However, further possibilities of realizations have been evaluated in the thesis and might be more useful in similar cases.

Approach

To achieve maximum efficiency and security, Vaillant Group performs field tests at certain people's houses before a product is published. A field test is an "Experiment, research, or trial conducted under actual use of conditions, instead of under controlled conditions in a laboratory". Results of those tests are accessible in a web application which is similarly structured as the one needed. Therefore it was decided to use the field tests' management software as the template for the endurance test management application. Similar functionalities have been redesigned to fulfill the new requirements. Irrelevant features were removed from the template and new functions accordingly added. Due to this procedure, only the user interface to create a new test demand had to be invented. It was also possible to adapt the field test management's database concept including its interaction layer.

Methodology

All relevant progresses were discussed with the stakeholders and written down in a specification. The application was developed according to the values of SCRUM, an agile development methodology. Hence it was regularly presented to and redesigned according to the wishes of the stakeholders. In case of unexpected challenges, solutions were discussed and supplemented into the specification.

Results

The web application provides three categories: Demand a new test, view and modify tests, and administration. User authentication is done automatically by integrating the software into the intranet. Actions are secured by a role-based access control which is managed by the application's administrators. To grant a user access to the software, he must be searched by name or e-mail address in a user interface. The search query is executed in Vaillant Group's Active Directory. Thus, no registration process is needed within the software and a user is always uniquely identifiable.

Evaluation

Due to the Lifetime Manager's transparency, the target goal has been achieved. It still has to be rolled out into the company. However, since it was developed commonly with the customers and users, a high acceptance rate of the users is expected.

Since the developed software automates an internal process and mainly improves the transparency, it is not possible to measure the resulted profit. Nevertheless, it will constantly save time of technicians and demanders. The project's costs which were calculated to be approximately 13.050 € should therefore be amortized within a few months.

