

## Degree Programme in Business Information Technology yearbook 2012 – 2013

Hämeenlinna, FINLAND



**Lasse Seppänen (ed.)**

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and Tommi Karppinen (photographer: Lasse Seppänen).

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## Foreword for exchange students

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### The Degree Programme in Business Information Technology, BIT, welcomes exchange students!

The studies described in this book are suitable to both IT and business related students coming from degree programmes like Business Information Technology/Systems, Information Technology, Business Administration or Business Economics. The studies are best for third year students.

#### **ICT Projects** 15 ECTS credits

ICT Project is a project based course of the Degree Programme in Business Information Technology of HAMK University of Applied Sciences. This course of 15 ECTS credits is held on the third year to make students learn in real projects from local companies. Though the name relates largely to ICT there is a lot of room for business related students in the projects.

The projects start in September. The students meet the client and they write a project plan to and familiarize the project and its environment. Several project management methods may be used in the project. In the project meetings agile SCRUM kind of method is used in order to have an opportunity for every student to express themselves. The projects end normally in February but can be scaled to exchange students for a shorter period of time. The outcome of the project is delivered to the client and a project report is written in a form of an article to this yearbook. In a common seminar day every project group demonstrates their results also in English.

The management language of the projects is English. The course is integrated to Professional English, 3 ECTS credits. The English teacher takes part in some of the project meetings. This way the students are prepared to future international projects. Students have given good feedback of this arrangement.

These projects have started 2000. During the year 2012-2013 25 students took part in the seven ICT Projects. Five of them were for local companies, two to the university IT Management. You can see their reports later in the book.

### **Digital Enterprise studies 5-20 ECTS credits**

In our Digital Enterprise minor studies in cooperation with the Degree Programme in Business Administration we have courses like Customer Relationship Management, Financial and Human Resource Management, eCommerce and Production Management. These courses are performed in a practice enterprise PE Amentia Design Ltd with Microsoft Dynamics AX ERP system, not with traditional courses.

### **Welcome to us for half a year and 30 credits!**

This means that we can offer 30 ECTS credits to our exchange students both for IT related and business related students!

Thank you to all our students and partners!

*Principal Lecturer Lasse Seppänen*

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# 1 Digital Enterprise minor subject studies

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Principal Lecturer Lasse Seppänen

The Digital Enterprise studies are in two minor subjects: Enterprise Resource Planning (ERP) Systems and e- and mBusiness each 15 ECTS credits.

ERP Systems consist of **Customer Relationship Management (CRM)**, **Financial and Human Resource Management**, and **Production Management** each 5 ECTS credits. These courses are available to exchange students along with the ICT Projects.

e- and mBusiness has also three courses Digital Marketing, **eCommerce** and Digital Service Development each 5 ECTS credits. Of these courses eCommerce dealing web shops is available to exchange students.

CRM and Financial and Human Resource Management deal with international sales. We have international partners in Austria (IMC University of Applied Sciences, Krems), Estonia (Tallinn University of Technology), the Netherlands (Avans University of Applied Sciences, 's-Hertogenbosch) and Norway (Molde University of Applied Sciences). With them students sell and buy with order-to-delivery process Finnish design. From the practice enterprises of our partners we buy their products. We simulate logistics with the Molde.

These studies are developed in cooperation by the degree programmes Business Administration and Business Information Technology. A team of teachers lead students while they work in PE Amientia Design Ltd performing various tasks related to their roles.

In these studies we use Microsoft Dynamics CRM and AX 2012 ERP system. We are part of the Microsoft Dynamics Academic Alliance.



PICTURE 1. Ambientia Design in action, from left Samu Hämäläinen, Nikolai Saraste (BA), Tommi Karppinen, Mio-Jon Asomäki, and Taneli Jauhainen (photographer: Lasse Seppänen)

Production Management during 2013 – 2014 will be performed in cooperation with a local factory, Paccor Oy. We will build the AX system's production to suit them.







PICTURE 2 & 3. The Paccor factory (photographer: Lasse Seppänen)



**ICT** PROJECTS

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From left: Principal Lecturer Tommi Lahti, students Jalmari Lähevirta, Miia Viljanen, and Tomi Mäkinen from Ambientia (photographer: Lasse Seppänen)

## 2 ICT Project: Ambientia and Ultimate challenge, functional training

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Principal Lecturer Tommi Lahti  
Student Jalmari Lähevirta, Project Manager  
Student Miia Viljanen

Ambientia is an IT software company that has one of their offices in Hämeenlinna. Ambientia was interested in further developing an application what was made by students in an earlier project. Also the new version was to be developed using the Spring Framework. The code required full rewrite and new functionality was needed. The students had no previous experience on Spring Framework.

There were two project member, Miia Viljanen and Jalmari Lähevirta (project manager). This group acted as a steering group for another IT project, which was done for CGI. The members of the steering group were Jarno Niemä, Toni Ilomäki and Niko Kuusinen. Our English teacher was Brian Joyce.

## Project started slowly

First few weeks of the project were confusing time, because at first there was no information about how many project members belonged to the project group. Shortly the amount of project members was confirmed to be two. Due to the size of the project group there was no special need for dividing roles: it was agreed who acted as the project manager and who took notes in the meetings. Tommi Lahti, who was also the steering group's supervisor, acted as the project supervisor. Project's customer was a company named Ambientia, which offices are located in InnoPark.

At the beginning of the project the project group started the search facilities for the project. At the same time the customer company was contacted regarding the first meeting by the project group. The search for facilities didn't take long as the project group got a workroom located on the 3rd floor of the C building in Visamäki campus. Therefore no resources were wasted in search due to the fast actions taken by the project group the workroom contained all the necessary equipment and fittings needed in the project. After a little bit of rearranging the workroom's fittings the project group started preparing the equipment for use. Preparing the equipment consisted installing the operating systems and necessary software to the computers. However all the necessary software could not be installed to the computers as the exact required software was not known at this point. For couple of weeks there was no one else, but the project group itself, in the workroom until the SharePoint group moved in.

Arranging the first meeting with the customer was a bit troublesome due to the different timetables of the involved parties and the first meeting had to be postponed once. In the meantime the project group didn't waste any time while waiting for the first meeting as the project group started to get acquainted to the new technologies to come. Postponing the first meeting was also a good thing because it gave the project group the chance of preparing a list of clarification questions about the project. The list of questions gave the project start the needed speed boost and the project group quickly learned how important it is to be prepared beforehand for meetings. In the first meeting learned an accurate subject for the project, project procedures and that there would be two people from the customer company helping with the project. One of the people helping would act as a project manager and the other one, helping with the programming side of the project, as a mentor. The project group also learned that the project would continue from the point where an earlier the same year ended project had got to. This meant that the project group was faced with already developed base of source code bringing even more challenge in learning the previously unknown Spring Framework. The project's subject was now defined to be a web-application that encourages people to do more functional exercise during the work day. Application's development would follow the principals of open source, which meant the source code would be available for everyone to use and edit. Steering the already ex-

isting source code to match the requirements of user stories better was revealed to be the first important task of the project.

Acquiring the exact subject for the project took longer than the project group had expected, which delayed writing a project plan for the project. Actual development of the software was delayed by a reasonable time because of the broadness of the project plan. The project got air under its wings actually after writing the project plan was completed.

## Project had many phases and challenges

In all of the project phases Scrum – the agile project management method – had a big role. Scrum fitted the project and especially the development of the software very well. Project's first phase however was to complete documents for the school. This included writing a risk analysis and the project plan. In the first meeting with the customer company the project group had already asked some definition questions which helped writing the project plan. For the few numbered project group writing the project plan proved to be a challenging and big task taking over hundreds of work time. Information asked from the customer and meetings with the supervisor helped a lot in the process of getting the project plan done so the project group didn't have to do it all by itself. The project group's inexperience in writing this extensive project plan was the biggest slowing factor to the writing process. Getting the risk analysis done however was pretty straightforward and was written with no problems.

After the project plan was done it was time to move to the next phase: developing the software. In this phase the chosen project management method Scrum got to its own role. The development proceeded in Sprints, typical to Scrum, which had start and ending meetings. Sprint starting meetings where tasks for the Sprint were assigned, where the ending meetings consisted of reviewing the ended Sprint's results. At first the length of the Sprints was agreed to be one week, but shortly after regular length was noticed to be impractical due to irregular times reserved for the project work in the students' schedule. This led to that Sprint's length was adjusted to the time available for the project work in the starting meeting. During the project there were four Sprints in total, which consisted of different tasks from steering the current functionality to match the user stories better and creating new functionality from them. Track of the project's planned, completed and current tasks was kept on a task wall, which located on the project workroom's wall. The whole development process of the software could be described as learning new things, because the old source code and whole development environment brought daily new challenges which took time while being very educative. The project group got the chance to see and learn real working life's working methods due to the help offered by the customer company. The project group held the chance in high value and thought it

was a big part of the project's learning curve to get to know how things are done in real working life.

Second to last phase in the project was tasks and meetings related to finalizing the project. Phase started from the final Sprint's ending meeting where – of course – the Sprint's results were reviewed, the task wall was disassembled and matters about the final seminar were discussed. The most important thing in the phase was to get the software ready for demonstration before the presentation in the seminar. For the software to be ready the project group had to fix mostly the user interface of the program and to create some test data. Preparing the software for the demonstration proved to be a relatively time consuming task because new things to fix surfaced as old ones were fixed. Creating test data and preparing for the seminar could start after the project group was satisfied with the fixes they had done.

Project's final phase was about documentation which this text is one of its results. The phase also included the project members writing personal summaries about the project. A single DVD disc was returned to the school after the required documentation was made along with all produced materials during the project.

### **Project ended without problems**

The biggest event regarding ending the project was the ending seminar, where all of the ICT Projects were introduced. In the seminar the presentation which was made earlier was presented by the project group. The presentation consisted of a slideshow and of course demonstrating the software and its' features.

At the ending of the project there was two deliverables to return: own deliverables for both the school and the customer company. Earlier at the start of the project the developed source code was agreed to be the only deliverable with the customer company. The ending meeting of the final Sprint acted also as ending meeting of the whole project for the customer company. The deliverable for the school was the DVD disc, which was made in the final phase of the project. The DVD disc held among other things the meeting agendas and minutes, the project plan, the risk analysis and also the same source code which was delivered to the customer company. Deliverable to the school was accepted by its receiver, the project's supervisor, Tommi Lahti.

### **New learned things about project working and software developing**

During the project students learnt a lot about project working and software developing.

Students acquired especially group working and project managing skills. In this project group there wasn't as many possibilities to practice project group working methods as there was in some bigger groups. Still in this two-man project group students learnt basic project working methods quite well. During the project they participated in different kind of meetings with the project supervisor, steering group and representatives of customer company. Meetings were very different depending on whom the project group was having a meeting with and that's why students also learnt a lot about different meeting customs and practices. In this project they also had to fill many reports and documents about the project for the school. Those documents had to be created by using some basic project templates which were very similar to documents that people have to fill in real working life. Therefore filling those documents also prepared students for future working life. Project managing was also big part of the project which taught versatile skills for them about project working.

Students also learnt a lot about software developing including programming practices, tools, techniques, language and logic. They got to know the used tools quite well during the project. In previous programming school projects students hadn't learnt to use version control system or version control system tools at all but after this project they were almost professionals at using them. As a programming language students used Java. Java was a familiar language for them already, so there were hardly any problems with it during the project. They only learnt to use it more efficiently. The biggest thing students learnt about software developing was learning to use Spring Framework as an application framework and possibilities of it because it was a totally unknown framework for them. Programming tools that they used were Spring Tool Suite, MySQL Workbench and GitHub. They learnt to use these tools diversely and at the end of the project using these tools was easy and fluent.

Project was implemented completely in English and therefore all the documents, meetings with the supervisor and steering group, project practices and the project closing seminar were done in English. That's why students' English skills were growing considerably during the project. They learnt especially how to write project documents in English and learnt a lot of information technology and software vocabulary.

Project was done for the company named Ambientia which gave the actual project subject for the project group. During the project students participated in many meetings with the client himself and representatives of the client. They were contacting the customer mainly via email. These meeting practices and methods were increasing students' knowledge about customer oriented approach and customer service. Now students are feeling that they know how to work in customer oriented working environment smoothly and with good manners.



## Risks that realized during the project

At the beginning of the project students didn't know what things to list as probable risks because they thought there weren't many risks that would have a big influence on their project. Therefore many of the risks were listed as unlikely to happen.

Students listed their inadequate knowledge levels as a probable risk to happen. They started prevention of the risk already at beginning of the project by studying and gathering knowledge about the subject. At first the risk realized partly and the project was beginning slowly because of it. However students quickly learnt needed things and the risk was promptly prevented. Therefore the project continued as planned without any problems.

Later on students noticed that other school work was getting in the way of working with the project and that slowed down progress of the project considerably. As a result the risk was added to risk analysis. The risk was actually realizing during the whole project although students tried to prevent it with schedule planning. With good planning they were still able to minimize influences of the risk. Students were also studying different minor subjects and that was making planning the timetable difficult because they preferred to work with the project at the same time and place. Later students were able to plan their schedules better and that had also a positive influence on progress of the project. Therefore at the end of the project risk was almost non-existent so there were hardly any problems with the schedule.

During the whole project equipment and tools were overall in good condition and there weren't many problems with them. However at the end of the project version control system tool GitHub was developing some minor problems to the students while they tried to combine their work. Though the risk didn't interrupt the working process completely it still slowed down progress of the project by couple of hours. Students used that time in finding solution to the problem. Finally the problem was solved and they were able to continue working normally. The risk also didn't cause any problems as the project continued.

Too small group size wasn't added to the risk analysis until at the end of the project even though it caused problems to the project group during the whole project. The subject of the project was so extensive and there were so many documents to be filled that the small size of the group was slowing down the progress of the project and execution of the tasks considerably. Students tried to prevent the risk with good schedule planning but in the end they thought that the project would have proceeded better if there would have been more members in the project group. Goals of the project were still completed even though the project group was so small.



## Students were satisfied with the quality of the project

Main purpose of the specialization project was for students to learn project based working. Therefore students were thinking that project management and group working were the most important things they learnt during the whole project. They also learnt project practices during the past months and learning those was also good practice for future working life.

Altogether students were satisfied with the final outcome of the project and the implemented application. Supervising and instructions from the customer company were especially qualitative and the company was putting a lot of resources into the project. Customer company's representatives were also benefiting a lot during the project because they got to have versatile supervising practice. Supervising was really beneficial for students also and because the customer company put so much effort into the project it was also easier for them to work with the project. Therefore the project was also proceeding fluently as planned.

At beginning of the project students very doubting if the goals of the project could be completed in time because their knowledge levels were so low and project group size was so small. While the project advanced knowledge levels of the students grew and therefore they also started to trust in their own skills more. In the end students were very satisfied with the outcome of the project. Quality of the project also matched the requirements of the customer. Students think that they managed to do well with completing the project considering there were only two persons in the group. They were able to complete almost all of the signed tasks from the school and the customer company. As a final result there were a qualitative and working web application and comprehensive documents.

## Client feedback: Client was satisfied with the project results



PICTURE 1. Index page of UFTC application

Students were learning and getting acquainted with the given implementation quickly even though the used techniques weren't familiar to them. Implementation also contained many incomplete, broken and useless parts that students had to get to know and examine before they were able to start to develop the application. When the first mandatory documents were returned to the school developing the application started to proceed well. As a final result students were able to return a working application which matched the original user stories.

## Supervisor feedback

During the whole project the group was determined to carry out the project in best possible manner although there were many obstacles which were not even caused by the project in any way. The students got good experience on programming and project management skills as well as on working for bigger projects. It was nice to see how the students grew professionally during the project. The outcome of the project met the requirements well.

## Future development ideas of the software and the project

Project was very successful but students still think that it could be developed even further. The customer company also has expressed intentions of continuing to work with the application so it can later be used as a real product for people to use. Students weren't able to complete all the required tasks and customer company is probably going to implement those later on. Unfinished tasks were combining social media (facebook and twitter) and adding commenting and email invitation possibilities to the application. Customer company is probably going to change some things in user interface and make working unit tests of the application to help with the coding.

Students also think that the ICT Project has to be developed for the next year. First of all there shouldn't be so big differences between group sizes because this year there was 2 – 5 person groups. Group sizes were especially affecting students when they had to write many extensive documents for the school. In small groups like this students had to do a lot more work than other students had to do in bigger groups. In those groups the workload was divided more evenly between students. That way the workload of students who were working in smaller groups was unequal compared to those who were working in bigger groups. At beginning of the project it should also be told clearly what students have to do during the project to earn 15 credit points and what is required to get a good grade. Students also think that this year there were really big differences on implementations of the projects. Workloads of students differed a lot depending on the subject and which group they were in.



From left: Principal Lecturer Tommi Lahti, students Niko Kuusinen, Jarno Niemi, and Toni Ilomäki (photographer: Lasse Seppänen)

## 3 ICT Project: CGI / Logica with Windows Workflow Foundation technologies

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Principal Lecturer Tommi Lahti  
Student Jarno Niemi, Project Manager  
Student Toni Ilomäki  
Student Niko Kuusinen

### ICT-project on Windows Workflow Foundation -technology

CGI is a global IT company that provides IT services for different sized companies and for operators on public administration. CGI provided a project topic to build an example system based on Windows Workflow Foundation (WWF) technology. WWF is a relatively young technology and there are not too many experts yet on the job markets that can master WWF. This technology is also closely related to other commonly used .NET technologies such as Windows Communication Foundation -technology. The outcome of the project illustrates many essential aspects of these technologies and their common denominator is Windows Workflow Foundation.

The group members Toni Ilomäki, Niko Kuusinen and Jarno Niemi (project manager) developed an example system in the ICT-project that started on

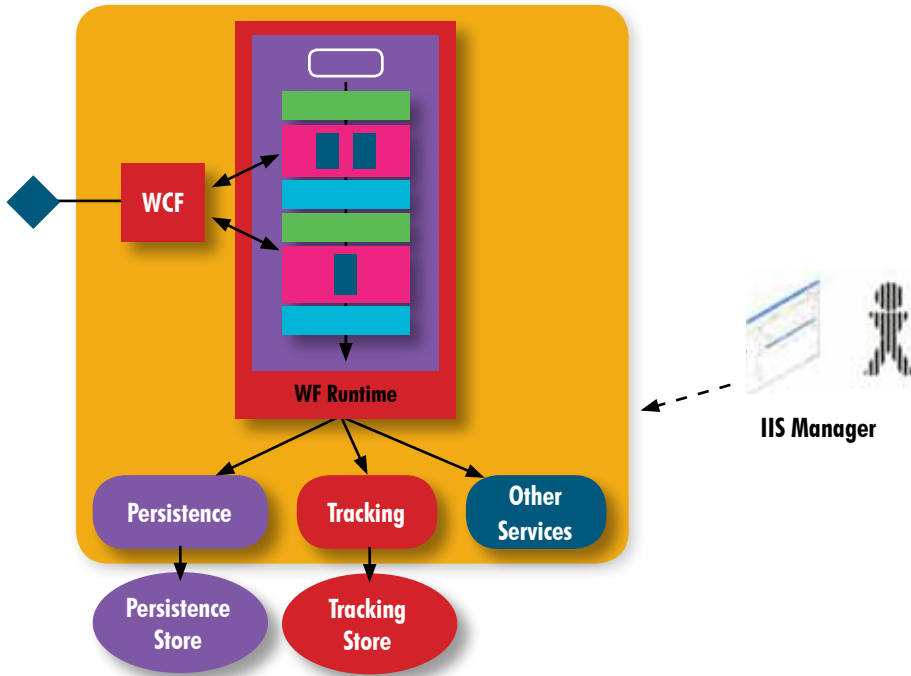
September 2012 and ended on February 2013. The main contacts of the client company were Business Manager Teemu Lahti, IT-consultant Jani Hassinen and IT-architect Joona Immonen. Hamk supervisor for the project was principal lecturer Tommi Lahti. Another ICT-project group, working for Ambientia, acted as a steering group for this project. Respectively, this project acted as a steering group for them. The members of the steering group were Jalmari Lähevirta and Miia Viljanen. The english teacher and the organizer of the Trade Fair, where all the ICT-projects were presented, was Brian Joyce.

### Start of project

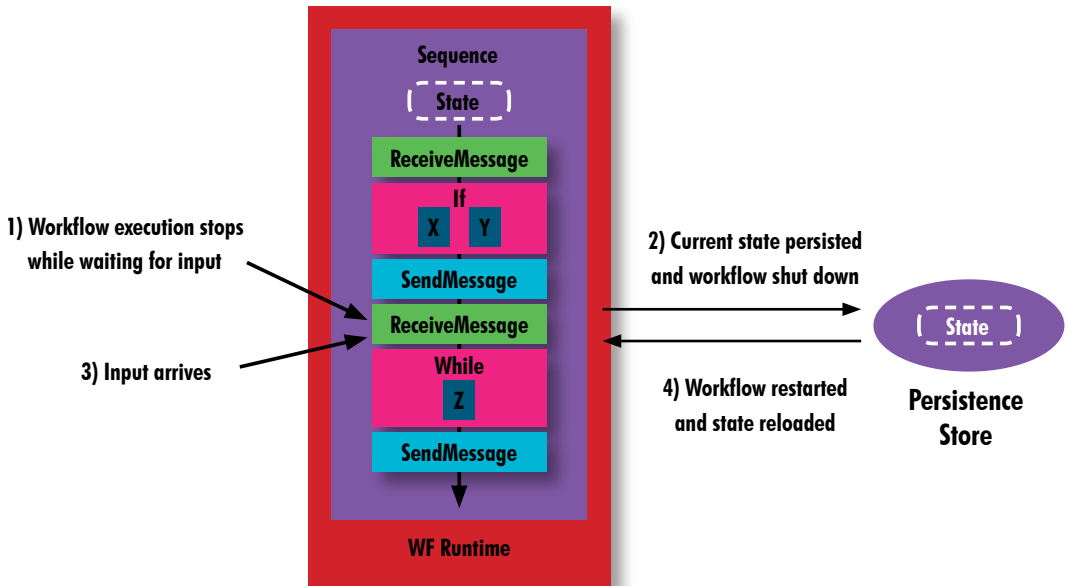
Our project group contacted the client immediately after the assignment. The first project meeting was scheduled to the following week. At first we got free hands to the implementation of the project. In the beginning we started to work on the project plan, as well as to learn new technologies. Responsibilities were defined, Jarno became the project manager, Toni's and Niko's main responsibility area became software development. After the second project meeting we were very aware of what you're going to do, we got a detailed description and requirements for future outputs.

### Project phases and challenges

Beginning of the project all the terms and techniques were new to us. Our group focused on Windows Communication Foundation and the Windows Workflow Foundation technologies, literature and we went through code samples from Microsoft Developer Network's website. Just published. NET version 4.5 helped us, because Windows Workflow Foundation's graphical side development code was Visual Basic. New .NET version also slowed us down, because up to date materials were hard to find. At the beginning, we realized that Windows Workflow Foundation knowledge wouldn't be enough and we would also have to work more on Windows Communication Foundation. We had Apress Beginning WF 4.0 book (M Collins, Beginning WF 4.0, Apress, 2010), which served as a good source for the initial stages of the project.



PICTURE 1. Windows Workflow Foundation environment, the base of our system.



PICTURE 2. Windows Workflow Foundation process, persistence and state reloading.

The demo system designing began a few weeks after. This phase also included the installation of the production machinery and the installation, initialization and configuration of Team Foundation version control service. At this point, we had not yet received the formal requirements of the project's client although our development was in right direction. Next project meeting was held in CGI's premises, we made a few minor changes to the original plan. Now the software development was officially launched.

We spent most of the time developing Windows Communication Foundation services. Windows Workflow Foundation development got less attention than we imagined in the beginning. In the middle of February 2013 got we finished the demo system. Windows Workflow Foundation development could have continued for a couple of months, because the more developed the more things we found that were still new at the time.

During the project, we met with the client about once a month. Meetings were held alternately in the customer's premises or ours. Meetings cleared things often and also a few times we were more confused at the time of leaving than arriving. However it was always a pleasure to listen professionals, we tried to learn as effectively as possible and take advices. We met the supervisor teacher about 2–4 times a month, as well as the steering group about once a month.

## Project closure

Ending the project culminated in a seminar organized in HAMK's auditorium we had a 20 minute presentation. We presented the outputs of project and told how our six months with the project went.

With the customer we had a final meeting, where we presented the demo system, as well as the technical documentation for Windows Workflow Foundation. We clarified the program logics of how the system works and how we came up with these solutions. We went through the Windows Workflow Foundation basic components and we discussed how we think it works. Completed outputs such as demo system software code and technical documentation Workflow Foundation was delivered to the customer after a meeting. In the final meeting the client expressed satisfaction with the progress of the project and completed outputs.

Finally, we gathered all the project outputs to a DVD disc for archiving.

## New learned

During the project came in almost every day new things, techniques or tools to use. Main issue the project ie Windows Workflow Foundation, was quite unknown to all members, of course, as well as the Windows Communication Foundation. It took a lot of time to learn new techniques and new tools.

Before the start of the software development we were introduced also for code version control service, Microsoft Team Foundation Service. It was the Preview stage, so its use was free of charge. In TFS we had programming codes saved, and also we manage our project.

The database is managed by Microsoft SQL Server. All WCF and WF services hosted by Internet Information Services. Service call recording and Persistence were treated with AppFabric. In these server side softwares we had no previous experience and along the way had some problems with their configuration.

Client gave us Windows Communication Foundation themed training. CGI organized training for their own employees, but we got the opportunity to follow and learn at the same time for yourself.

## Risks

The largest risk was the hardware and related problems. The risk materialized in the sense that the installation of the programs had problems and delays. The school network also gave its contribution, because we didn't get our mail service to work in production environment due to strict firewall settings.

In our server, we used one of our production machines. This machine was a normal Windows 7 workstation that was used same time to software development. When the same machine runs at same time Visual Studio and couple of services, its performance is a bottleneck in many occasions.

## Student opinions of the project and quality

In our opinion, project was very interesting and there was enough challenge to us. Project was a success, we got almost every required yields done. We encountered some scheduling problems during our project, but we managed those by modifying the outcome and delegating tasks. Learning new things was nice and learned techniques are certainly useful in the future.

## Client and supervisor feedback

Based on the client feedback there was a lot to be learned and the students got a good overall understanding on the topic. Students adopted fearlessly new tools into use, including TFS code versioning and project management tools. The results obtained and the tools used were documented well. Communication with the group was open and the encountered problems were discussed through in constructive manner. It was really about working together.



The project supervisor was principal lecturer Tommi Lahti. The standards of the project were set high right from the beginning. The goal was to push forward all the skills learned earlier on programming lectures and to get towards newest programming technologies and to carry the responsibility on the bigger software project in a professional manner. Although it was a student project it was somehow this professionalism that was always there. There has always been demand for experts mastering the latest technologies and the group had clearly understood that. All the group members were devoted to develop themselves toward there newest technologies and they all wrote excellent Thesis work on related topics after the ICT-project.

### **Future development ideas**

Our outcome goes to CGI and they investigate on this basis if Windows Workflow Foundation is useful to their work in smaller application integrations.



From left: Lecturer Erkki Laine, students Henri Jaakkola, Jari Juvonen, Teemu Nurmi, and Niko Rajala  
(photographer: Lasse Seppänen)

## 4 ICT Project: HD Sunrise and new web pages

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Lecturer Erkki Laine  
Student Niko Rajala, Project Manager  
Student Teemu Nurmi  
Student Henri Jaakkola  
Student Jari Juvonen

HD-Sunrise Oy is a Harley Davidson motorcycle importing and selling company, which also builds custom bikes, as well as maintains and rents them. The company was interested in upgrading current web sites in such a way that they will better serve the company and the customers. It was also researched about the possibility of e-commerce. HAMK's Business Information Technology student project team built a test environment of the new sites, and studied the possibility to add the e-commerce to web sites. Web site design, functionality and user interface was renewed. Customer's environment was too old to build e-commerce solution. The project started in September 2012 and ended in February 2013. The project manager was Niko Rajala, members of the group were Teemu Nurmi, Henri Jaakkola and Jari Juvonen. The supervisor was lecturer Erkki Laine. HD-Sunrise Oy's contact person was Tapio Rajapuro. This group was Sorviin.info project's steering group, in which the members were Erkka Wessman, Riikka Siukola

and Jussi Lundahl. The project Yoso worked on this project's steering group, in which the members were Joonas Kortemaa, Taneli Jauhiainen and Samu Hämäläinen. English teacher Brian Joyce was organized Trade Fair, where all the projects presented.

## Start of project

The project started immediately with problem. Our first project customer Herukka (Pedconsos Ltd.) wanted a Windows Phone 8 application but the group did not have the necessary skills. We had to have a crisis meeting with our supervising teacher Erkki Laine and with ICT project chief instructor Tommi Lahti. Teachers got us a new project for a company called HD-Sunrise Oy. The goal was to make a new website for them and possibly e-commerce capability. Herukka project was transferred to engineering students in Riihimäki.

Project manager was Niko Rajala and other members of the team were Teemu Nurmi, Jari Juvonen and Henri Jaakkola. Responsibilities were shared evenly between all members of the group. No pre-determined roles were given except project manager. All members of the group worked equally in order to achieve a common goal. When we got the HD-Sunrise project, we began to organize the first meeting with the client. We set out to write a project plan and other relevant documentation. In the beginning we held meetings more often because we sorted out which was the way to proceed with the project.

## Project phases and challenges

Grouping wasn't a challenge because groups were formed by the teachers. From the beginning group started to work with good spirits thanks to ground rules that we made.

The first client meeting was with Herukka. Biggest challenge in our case was that we did not have necessary skills to make the project that they wanted. Second meeting with the new client HD-Sunrise went well. Our timetables matched and updating their website was possible with our skills.

Throughout the project we made and updated project documents and made changes to the project plan if it was necessary. One of the most important document was the requirement analysis. It has all the information what client wanted us to do. The main thing was to have user friendly website.

When we finally got access to their server we had another problem. Critical document provided by client was outdated. We had to wait for several weeks before we got working username and password.

Our teacher Brian Joyce arranged us to participate into English-speaking TradeFair 2012 event. Project group got to show what we had done at that point to other students and visitors.

After completing design of the website we started to make the site itself. We made really good progress before Christmas holiday but starting from January we got occupied by other things. This prevented us from completing the website.

## Project closure

Project officially ended with the closing seminar where we presented our project result to other project groups and visitors. In the end we gave all required website codes and documents to the client. In addition to we delivered all required materials and documents to supervising teachers on DVD disc.

## New things learned

We learned that projects may fail and there may be unexpected problems along the way. We also learned what it is like to do the project for a real company. The project plan and requirement analysis must be done carefully and correctly. Good team and good team working will help to cope with various problems. Our technical know-how didn't improve very much but everyone learned a little more about PHP programming, databases and HTML. Making the project documents also gave us valuable experience for working life.

## Risks

Originally Herukka project changed because client's demands were unrealistic. Client wanted Windows Phone application in two months time. We didn't have necessary time and skills to complete the assignment, so we agreed with the project supervising teacher that we would change the project. Project changed to website updating for HD-Sunrise company.

Mentioned in the risk analysis that our skills weren't enough partially happened here. Group's PHP programming skill were too low to begin with. Every group member's experience were limited to courses done in school. So problems were in the programming of functionality to the website especially the admin side database and PHP programming.

Group getting sick were probable risk and it came true almost instantly. End of 2012 group members were getting sick in turns that made working harder. Sometimes group had only half the members.

Lack of time proved to be one of the biggest realized risks. At the beginning due to the change of the project, we had to wait over four weeks before old project was changed to new one. That took instantly one month of work time. Next in the new project we had to wait for about eight weeks before we got required documents to begin the actual work. Because of these two things we got to work three months late, so almost half of the time reserved were wasted. Lack of time was also affected by other school courses and assignments. This took time away from the project working.

Communication problems were put in a risk analysis and marked as a low risk. However it also proved to be one of the biggest problems at the beginning of the project. Because of the communication problems it took a long time to get the important and necessary documents from the client. All these documents were critical for our team. We couldn't get a hold of the client for several weeks. However communication improved between the client and the group towards end of the project. We held couple of important meetings with the client but the communication problems had already affected the course of the project.

Technical problems also turned out to be a problem. After finally getting the necessary documents from the client, we encountered a new problem. We could not get access to their server, even though we tried different programs in different locations. In the university firewall blocked access to the server and in home there seemed to be a problem with clients account and password. We sent a query to the client and the client contacted their service provider. Service provider had to reset account passwords. After this we were able to get access to their server. There was also a problem with client current database and PHP engine. They were both outdated and didn't work at all with newer versions. We were able to modify the database after we installed a older version of phpMyAdmin management tool to virtual machine. Because we did not want to touch clients already existing system.

### Student opinions of the project and quality

The group was satisfied with the project topic, client, and especially the work of the group. Each student received a new expertise on project planning and implementation, as well as PHP programming. One important thing was the fact that the project may fail even if the project planning and other preparations are done properly. Not all the problems can be predicted. We also got valuable experience of making the project to a real company.

A group opinion during project became desperate when a half of the project time was gone when group got actually to work with web page. We made good progress before Christmas holiday and the opinion of the project changed more positive. After all, the group realized that the project can not be completed within the given time. The group worked to the very end to get the best possible result, even though the actual web pages were not fully implemented.

## Client and supervisor feedback

The client was satisfied with the new look of the website and clearer layout, as well as other results what group had done. They also were satisfied with the fact that all our PHP programming and documents are given to their use. So some other group can continue the project more easily with using already prepared documents. Client slightly fretted result of the project, but understood our difficulties and lack of time.

The group was forced to change project at the outset. Team reacted quickly and started a new project, this took a bit of time. The targets were achieved and the customer was satisfied. Project management could have been more visible.

## Future development ideas

Webhotel hosting system should be reformed because of security risks, in order to introduce new features. Using content management system (Joomla for example) would help a possible continuation of the project and ultimately the customer. This would require teaching the content management system and providing assistance to the client but at the end would prove to be a better alternative for both parties. HTML should be upgraded to a newer version and the pages should be brought to this decade visually. For example exploit the features of HTML5. With new features and updates it would be easier to build some kind of ecommerce, which is both secure and reliable.



From left: students Erkka Wessman, Jussi Lundahl, Riikka Siukola, and Principal Lecturer Lasse Seppänen  
(photographer: Tommi Lahti)

## 5 ICT Project: Sorviin.info v.2 and web site

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Principal Lecturer Lasse Seppänen  
Student Erkka Wessman, Project Manager  
Student Riikka Siukola  
Student Jussi Lundahl

Sorviin.info is a portal for thesis and work practice positions. The portal is owned by Kehittämiskeskus Oy Häme. Sorviin.info service won the Annual Good Deed 2012 of SEKES. There were five finalists. Sorviin.info assured the judges, who claimed the service was convincing, sensible and functional – the kind every other service can take a look at. Sorviin.info is used by the employers and students themselves 24/7. The judges found the students as target group important. The service has been cost effective to build and use.

Sorviin.info was also rewarded with the 3rd prize in the Finnish national competition of Municipal Marketing Recruitment series. This competition was arranged the 7th time with 48 services in four categories which were Tourism, Recruitment, Competitiveness and The Marketing Product of the year. Judges evaluated that a lot of positions have been offered to the students with Sorviin.info. Practice and thesis positions are especially impor-

tant, because they are rarely public. It is important to get the students into companies while they are still studying for the job. In addition of recruiting, it can prevent young people's exclusion from society at the same time. Exemplary practice, which is easily applicable to other places locally.

Though being quite functional the portal needed usability development, new look and functions. A student group of the degree programme in Business Information Technology of HAMK university of applied sciences developed the new portal version in a project September 2012 – February 2013. The group consisted of project manager Erik Mänty and Erkka Wessman with members Jussi Lundahl and Riikka Siukola. The contact person for Kehittämiskeskus Oy Häme was Project Manager Keijo Piilola. The actual producer of the Sorviin.info portal is software house Opiferum with representatives project manager Tommi Hellgren and web programmer Lisa Karvonen. Opiferum provided the development system and functioned as consultant and quality manager. The supervisor was principal lecturer Lasse Seppänen. This group functioned as a steering group to the Yoso project consisting of students Taneli Jauhiainen, Samu Hämäläinen, and Joonas Kortemaa. The HD Sunrise group of students Niko Rajala, Jari Juvonen, Teemu Nurmi and Henri Jaakkola was the steering group to this project. The English teacher was Brian Joyce. He also organized the Trade Fair where all the projects were presented.

In the project the user interface of the Sorviin.info portal was developed. The project group did also many things that can be used in future projects as basis.

### Start of project

The project topic, Sorviin.info was not exactly at the forefront of the group members' wishes, and led the team to begin with doubts. There was doubt as to how the team would be able to deal with the project without the proper knowledge of programming. The first meetings with Opiferumin and Kehityskeskus with the team, however, changed the perception of the project for the better, and the project started to look really useful. The project went smoothly and was running good, although the team was still surprised to get a fourth member, Riikka Siukola. Help, however, was welcome, as it became clear that Riikka had some good experience in web design.

The first meetings were held on time in late September. The first was at Opiferumin with Lisa Karvonen, from whom we got a good perspective about the Sorviin.info development and the necessary reforms. On September 20th was the first meeting with supervisor Lasse Seppänen. One week after the meeting, the team went for the first time to the Kehityskeskus Oy Häme premises.

The project plan was started a little behind schedule, in early October, though other groups were also behind schedule at this point. The plan was completed in early October, and at that time it was decided to contact the steering



groups. The team met with the Yoso group soon after, but the HD Sunrise's first meeting was postponed to November.

Erik Mänty, who was working as the project manager at the time, took responsibility over the making of the multimedia side, (a video tutorial), and the design and implementation of the ad window. Erkka Wessman had a little programming experience, and thus took over the making of the database changes and new features in programming. Jussi Lundahl and Riikka Siukola shared responsibility for web design.

## Project phases and challenges

Once the project plan was complete, the progress was slow, and the project manager's motivation for the project began to disappear. In November, the team got the credentials for the Sorviin.info development environment, but using them on the computers at school caused some problems at first. Also contact with Opiferumiin was slow by the project manager. Soon, however, the team met with the rest of the people involved with the project at the Kehityskeskus premises, and gave a presentation on the planned changes to the site. That was the last time all four members of the group were together.

In December, the team encountered a problem. The original project manager decided to withdraw from the project due to a new job, and the group had to organize themselves again. During the holiday season, both sides of the project were at a halt, slowing the development of the project. Erkka Wessman started as the new project manager, and only after that the actual development of the site could begin.

This process is, however quite straightforward. For the databases, the team was not able to make changes immediately, but first required specific plan changes. The code was at times difficult to understand, and some of the code snippets that needed to be found among the various files was challenging. Also, the different schools' training and project times were still a little unclear in January.

Meetings of the project were conducted largely according to plan. The team met with Lasse Seppänen almost every week, and only two of these meetings had to be cancelled. At these meetings, Wessman was the chairman after the regime change, and the other members of the group acted as a secretary. The whole group was rarely present at the same time. Kehityskeskus and Opiferum were always met when needed.

## Project closure

Wiki pages were made as the last project related literary work.

The project came to closure with the return of the DVD that contained all the data and information concerning the project.

### What did the team learn?

The team learned to work on a project for a real company, and to keep weekly development meetings, in which minutes were kept. The team members also learned that unforeseen things can happen during a project, and that all projects do not always work perfectly or finish on time. The importance of keeping in contact was particularly highlighted, as it is what kept the project on track.

Techniques that were learned and used during the project:

- Modification of .ini files for translations
- Modification and understanding of .tpl files in Smarty Template
- The structure of PHP coding in an extensive system
- Handling a larger MySQL database with PhpMyAdmin
- TeamWorkPM web application and how it can be used to aid in organizing a project

### Risks that occurred during the project, and how they affected the outcome

Erik Mänty, who had served as the project manager, withdrew from the project in December, which slowed down the progress of the project considerably. The whole group's motivation was relatively weak throughout the project, which eventually led to the fact that the group had to eliminate some of the planned features. The motivation reached lowest point in December, when Mänty left the project. After that, motivation was really difficult to keep up, when none of the team members weren't entirely interested in continuing the project. However, in January the team picked up the pace and the project continued on. Various problems with the schedule also gave some problems: all the team members had other classes to attend to during the project, and only very rarely were all team members available at the same time. Finally it became clear that not everything that had been initially planned would fit into the already tight schedule.

Implementation of the project was more difficult than expected, and as a result many of the things produced were slightly incomplete, or were left as nothing more than theoretical deliberations. After Erik's withdrawal, his areas of responsibility of the front-page educational and promotional video win-

dow were not carried out. Repeated declarations implementation proved to be so challenging that its implementation was also abandoned. As it is, the system already in place didn't allow repeated declarations, and it would've required massive changes in the databases. The schools' training time listing was initiated, but it wasn't entirely integrated into the website, and as such remained little more than an information page. It was planned to also have the training times from Koulutuskeskus Tavastia listed, but getting that information would have been too much of a hassle for the team.

As for the planned improvements to the login system, there was a slight misunderstanding between the team members and Opiferum. Kehityskeskus wished to have the login process simplified so that the user wouldn't have to pick their role by hand when logging in, and the team agreed with this. Opiferum, however, had something very different in mind. Instead of simplifying the login, they were hoping to see the whole website divided into two separate sides; the employer and the student, and have both sides have their own separate login. As for KehKe's suggestion, while Opiferum liked it, they also thought it would not be possible at this time. As it turns out, Opiferum was right, and the login remained unchanged.

### Student opinions of the project and quality

The subject of the project was not initially the most desirable. Lundahl and Siukola were semi-forced into the group. The first meetings with the client, however, increased the interest of the team. Kehityskeskus Oy Häme was enthusiastic about the project, and Opiferum was happy to help where necessary. Kehityskeskus had a lot of ideas for website development, and the group was given a very wide range of tasks. The project began to feel useful, when the team plans really interested the customer. Kehityskeskus held a presentation event on their premises in Hämeenlinna to the representatives of different schools in Hämeenlinna, in which the future reforms of Sorviin.info were presented.

The group work moral fluctuated throughout the project dangerously. Different courses at the same time disrupted work greatly. Group work was difficult to coordinate between the team members because of schedule differences and a lack of motivation. Especially in December, when the first project manager withdrew from the project, the entire team's motivation to continue was really bad. However, the Group pulled itself together again, and in January a lot of work was done. Then, the stress began to build up towards the end, when the team discovered that nearly all planned changes can not be done. Despite the pile up of stress, in February, the team worked really hard and was able to come together more often.

Professional project work is important to learn in our industry, and the project was carried out under an good training program. The project would have been more workable in abbreviated form, and if other courses would

have had less work. For example, four months to the project would have been a good amount of time, if one course would have been left out of the period. In this case, teachers could have been able to control the start of the project more in order to give a good head start to the project and get it running faster.

## Client feedback

Further development of Sorviin.info portal is one of the main goals of Kehittämiskeskus Oy Häme's "From Knowledge to Action" project. HAMK Business Information Technology branch's ICT Project felt like a good idea to get young users' point of view and development ideas for the service.

The project plan focus was improving the user interface of Sorviin.info and implement yearly renewable job announcements. The aim was also to produce an advertisement window which would show the latest announcements from desired field of work. Purpose was to increase students' awareness of the service among students of HAMK University in events (Trade Fair and BitFest). Hopes of improving the user interface of the site, such as separating the UI, the possible language change to English, info page upgrade and the annual training times were clearly challenging areas of development. There was a press conference in Kehittämiskeskus facilities on 28/11/2012 for the teachers and guidance counselors of the area. The project team was there introducing its development ideas to the participants.

Development project meetings went well and Kehittämiskeskus had a feeling that the outcome of development ideas would be better than it turned out to be. Unfortunately, development ideas were largely not materialized, and they were disappointed that the long-awaited development didn't quite pay off as expected. Even the reporting did not go entirely according to their wishes. The feedback received from Opiferum suggested that the students' programming skills were not yet sufficient making the most challenging features. It's a shame that the project team size was reduced due to the departure of the original project manager. As a workplace representative, Kehittämiskeskus hopes that from now on, students will show better motivation, commitment, attitude and accountability in the implementation of the agreed work. They also hope that in the future, HAMK will ensure that the projects are suitable for students' knowledge and that motivated students who want to learn more are chosen to correct projects.

From now on, the customer will take better into account the students' capacity to develop features, and they can break down development into smaller units if necessary. However, they gave thanks to the project team for a good attempt and participating in development, and wishes them success in the future. They hope that the participants learned their own industry-specific skills in the project, and also professionalism in project work.

### **Supervisor feedback**

The supervisor found the project interesting and versatile from the start. Luckily the studentss realized that also after meeting the client. For a moment the project seemed to start well but the disappearance of the first project manager without communication stopped the project for some time. Luckily again the group pulled itself together and completed the project as well as they could in the available time frame and their skills.

### **Future development ideas**

The project could be continued by development of the started translation to english, and possibly adding other schools training times to the site. Also, renewable notifications would require further development.



From left: Lecturer Erkki Laine, students Tomi Kraft, Joonas Lopenen, Tuomas Toivola, and Tommi Karppinen  
(photographer: Tommi Lahti)

## 6 ICT Project: HAMK Information Management and new Helpdesk

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Lecturer Erkki Laine

Student Joonas Lopenen, Project Manager

Student Tomi Kraft

Student Tuomas Toivola

Student Tommi Karppinen

HAMK's Information Management unit had the need to change the old helpdesk system to the new system, called Microsoft System Center Service Manager 2012. The project compared differences between the old and the new system. The new system was modified to work like the old system. Configuration and testing documents were drawn up on client's Wiki platform. The aim was that the new system could be taken into operation in 2013.

HAMK's Business Information Technology students configured the System Center Service Manager 2012 system, collected experiences of the system, tested the material functions and built documents to client's wiki platform during the project that began in September 2012 and ended in February 2013. Group members were project manager Joonas Lopenen and members Tuomas Toivola, Tomi Kraft and Tommi Karppinen. The project manager had some previous experience of the old system, because he had been a

member of the helpdesk team. The supervisor was lecturer Erkki Laine. This project was a steering group for the SharePoint project, which included members Kimmo Kava, Matti Myllyniemi, Veli-Matti Mustonen, Anna-Kaisa Huotari, and Ville Niskanen. SharePoint Project was steering group to this project. The project was carried out in addition to English and English teacher Brian Joyce organized TradeFair, where all the projects were presented. Information management customers were Jari Kivelä (IT Service Leader) and Lotta Oksanen (Helpdesk Administrator).

### Project started fast

Actually our project started already in summer 2012 when the future Project Manager Joonas Loponen was hired to HAMK ICT. He worked with the old helpdesk system and also other IT department tasks. After three months Joonas Loponen became familiar with the old Helpdesk system. Because of his experience during summer time he was appointed as Project Manager in the upcoming project. With the assistance of lecturer Tommi Lahti our project took its first steps in August 2012. When the school started in September 2012 we started to build our project group. Project personnel consisted of four Business Information Technology students, who were Joonas Loponen, Tommi Karppinen, Tomi Kraft and Tuomas Toivola.

In the beginning of the project we decided to give everyone a task which is equivalent for their skills:

Joonas Loponen, Project Manager  
Tomi Kraft, Task Manager  
Tuomas Toivola, Contact Person  
Tommi Karppinen, Secretary

Each project member had some experience in projects and how to manage them. This experience was gained during university courses and working life. Project Manager Joonas Loponen and secretary Tommi Karppinen had previous working experience from this area. Both of them had working experience with helpdesk systems. Tuomas Toivola also had experience with projects because of his earlier work career. His experience was, however, mostly customer service and sales experience. Because of his skills in customer service, Toivola was appointed as our project Contact Person. As soon as the project started, we noticed that Tomi Kraft is great organizer of people and tasks. Because of his skills he was granted the honour to be a project Task Manager. Kraft ensured that the project stayed on schedule. He was also making sure that every project member had something to do during the project time.

Soon when the project began, project group managed to acquire a well equipped office room. Room was located at Visamäki Campus, C-building. Office had two working computers and enough space to work effectively. As

the project progressed we were lucky to get third computer, which was a nice surprise.

The first meetings with the customer were interesting experiences. In the first meetings we decided mainly to plan our project in general, and we didn't make important decisions. In that time we and our client had no experience and information about our basic project system, Microsoft System Center Service Manager 2012, which had just been published. Because of that there was not enough information and our client couldn't provide us so fluent start we had hoped.

We agreed with client that they will build the new system to their test environment. Inside of this test environment would happen our actual testing and configuring of the Service Manager 2012 system. Project proceeded through winter, and when the spring was coming our project was near completion. During the project time we had a number of meetings with customer, supervisor and steering group. Our supervisor during the project was lecturer Erkki Laine. We were also steering the SharePoint project group. Steering other groups means simple that we give them feedback and help them with their problems, so they can be more efficient and make their product perfect.

Acting as a SharePoint group steering group gave us a good perspective on the progress of other projects. This gave us good ideas how to develop our own project. We had some valuable experience how important the feedback can be. Feedback of the SharePoint group was useful to us and we used it to make our project even better.

## Project phases and challenges

Project started slower than what we had hoped for because the customer had a problem in setting up the system. Main reason for that is the holidays and sick leaves of their responsible persons. However this was a good practice for our project group. It is good to know that when doing projects everything can happen and it is not always going as planned. The early days of the project we had plenty of time to write our project plan and risk analysis. During the project progress we noticed that those documents were very useful because we knew what to do when we faced difficulties and problems.

When we finally had the main system in our hands, we noticed that there will be a lot of studying about the Service Manager 2012 system and how to manage it. First few weeks we basically just read tutorials and Microsoft Technet instructions.

Service Manager 2012 consists of three parts. One of them is the Management side, used to manage the program in general. Second part is the Self-Service Portal (SM portal) used by end users. This is the page what the nor-



mal user sees when making incident requests. The third one is the Data warehouse, which simply stores all the data that the program is using.

Day after day the Service Manager 2012 program became more familiar. We decided to divide our project group into two parts. Joonas Loponen and Tomi Kraft studied the management side of the system. Tuomas Toivola and Tommi Karppinen became familiar with the end users user experience, in other words, the SM portal. After knowing the system more deeply, more and more tasks began to occur. The project tool called Teamworkpm turned out to be very useful tool. With the help of Teamworkpm it was easy to give tasks to different persons and monitor how the project was progressing. Biggest challenge in this part of the project was that Tommi Karppinen decided to start his working career reducing his part of the project. Also some little challenges and problems were encountered, but we managed them pretty well, thanks for our risk analysis.

Towards the end of project there appeared some more things that the customer wanted us to research. Sadly we could not fulfill all their hopes. We decided to drop off some less important tasks. For example, automation possibilities of Service Manager 2012 were not researched. Still we decided to research the Authoring tool features. The Authoring tool is used to modify the SM portal view.

In the early steps of the project it was unclear what kind of work and final product the customer wants from us. Lot after the halfway of the project we finally got some answers, but it was still a bit unclear. We started to write a wiki article about the system, as the client had hoped for. Quality and particularity of our product left room for improvement. Nonetheless we can say the same for the preparation and information what we get from our customer. After all, we have a feeling that we could have done better.

We feel that biggest challenge of our project was the size of the Service Manager 2012 system and that we had not experience about that kind of program. It was hard to learn the system properly but we can say proudly that we managed it after all. In the middle of the project time we had some good news. The customer had a book, which tells about the system, for us. However we never got the book, so we had to continue the data search using mostly internet.

Because the size of the system and continuous learning process of the new things, we had to reduce our previous plan and use our resources to the most important parts only. Most of the project time we were testing and researching the system. We had to get familiar with it, otherwise we could not have made the wikipages about the program. This was however meaningful learning process and every group member thought that it was good way to learn new things. Because of the learning process we had, now we have a feeling that we have mastered the program and we can use it well. Instead of that the configuring of program produced some problems from time to time. We tried to solve these problems between us and sometimes with the help of custom-

er. Most of the problems we encountered we also managed to solve, but still there were some problems that were never solved.

## Something new we learned

Project seemed to be very interesting challenge for all of us. The main challenge was the extent of project, but we believe that it is also one of our strengths. We saw the size of project in bright light because we believed that in the end it will turn to be a very good for all of us. We really had to learn something new and become familiar with the program. Members of the project group grew mentally during the project. Project members also learned to delegate workloads to each other and to share work load for every week equally. Problem solving skills experienced a soaring improvement because we had to manage many different problems during the project.

Meeting practices, report writing and group working were the main improvement areas. We had a lot of experience of all these practices. We believe that those are very important skills to have nowadays. Also almost everything in the project were made in English. Every group member noticed improvement in their language skills.

Service Manager 2012, the main program we were testing and using, became very familiar. This information and experience about the system is important and useful in the future.

Whole project group learned a lot of project working. Although this kind of working is not new for the group, we experienced and learned a lot of new things and how to work with other personnel. We evolved a lot during the project, for example communication skills were improved.

## Risks

Before we started working on the project we thought about all the possible risks for this project. We ranked "Server problems" as the biggest and most likely problem. The progress of the project would have drastically slowed down if some of the servers or computers we would be using would have broken down all of a sudden.

Some of the risks that we had prepared for did actually happen. At these times it was a good thing that we had done a risk analysis and made up plans for different situations. Eventhough we didn't survive perfectly from all the complications we still managed to work at a decent level. As a funny detail we were prepared for all kinds of natural disasters that are not common in Finland. As a coincidence there was a storm on the other side of the world that paralyzed some of the Google's servers that we were using and we couldn't get to our documents for a day. Luckily we had prepared for

this kind of situation and we had saved our documents to two different locations. Therefore this little crash on Google didn't paralyze us completely during that day.

Mostly we had absence because of sickness and other similar reasons, which we had also prepared for. Preparing for these basic situations is easy, but unfortunately you can't prevent them. In cases of sick leave our project continued to work shorthanded but with regular efficiency.

Like in every project, there happened a lot of things that we could not prepare for when filling out the risk analysis. Biggest problem of all was the premature transition to the working life by two of our project members. The second transition happened in the last month of the project so it was not such a big deal and we didn't get any grey hair over it.

### **Our opinion of the Project**

The project seemed to be lucrative for all project personnel. We learned a lot as a group and on individual levels. While working on this project we learned a lot of important points when working on larger projects. During our time working the project we had many challenges, which some of needed us to forget some of the planned tasks. We needed to come up with some sort of solution that would provide our project with similar content and would teach us something useful as well. Project meetings held with the client were highly productive and we thought that they made working easier. At some point, though, the project seemed to be at a stand still, since we would get stuck on some tasks that took a big chunk of our time than some other tasks.

As a hindsight we would have wanted a little more guidance, especially when we battled with big problems. On the other hand it was productive to learn to solve these problems. It feels like we didn't get to the same frequency with the client. The reason for this is in both us and the client. With better preparation the client could have gotten a better research of the system.

Our opinions of the project stayed pretty much the same throughout the project, since every member of the project team was eager to work and get the research done. We feel like the project was fun to do and we learned a lot.

### **Client was satisfied**

The installation of SCSM 2012 -system was delayed in autumn and caused some serious idle on students work. Installation of the system was HAMK ICT's responsibility. They did not orientate themselves fast enough with the different stages of installation. Although we could have been more active in the early stages of the project and press the client in the installation process.

When the actual research began, the client was satisfied from our plan which parts of the system we were going to sift through. These functionalities were documented to the HAMK wiki with sufficient accuracy. Client had some hopes that we could have researched the system more deeply. But there were not enough time and spontaneity from our side.

All in all the client was satisfied and our research was useful to HAMK, even though the results could have been more precise. The things we did were done good enough. Client reminded also that the starting of projects is important and it should be done more specifically. Also the timetables are important and should be planned well. Students need more guidance in these parts of the project working since they don't have enough experience in these kind of matters.

### Positive feedback from the supervisor

The project team was active and the members of the group had own practical roles in the project. The group proceeded very independent and customer-oriented. It was possible to distribute the workload among the members, and the project was completed well. Weekly meetings were at first a little rarely with the supervisor, but they thickened nicely towards the end. Project manager Joonas Loponen was a great success and lead a group to inform the customers in different situations. A risk assessment was carried out immediately at the beginning of the project and the actual risk also was reacting. The project was technically supposed wider, but the documentation of the objectives and results were achieved and the project was completed well. The project team worked well in the steering group, and made a number of suggestions for improvement. Presentation of this project was well prepared for the seminar and it was presented in a professional touch.

### Development ideas for the project

The project could still be taken forward, since we have only scratched the surface with our research. System Service Center Manager as a whole is so comprehensive that studying everything in it would take so much more time to orientate ourselves with it than we have. Another problem with the software was that in implementation projects like this professionals use consultants to help with the implementation process. The goal of our project in the end was just to get to know the software generally and what features it has, also we compared the new system to the current help desk system and we wrote up the main differences.



From left: Lecturer Erkki Laine, students Veli-Matti Mustonen, Matti Myllyniemi, Kimmo Kava, and Anna-Kaisa Huotari (photographer: Lasse Seppänen)

## 7 ICT Project: HAMK Information Management and Sharepoint

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Lecturer Erkki Laine

Student Kimmo Kava, Project Manager

Student Matti Myllyniemi

Student Veli-Matti Mustonen

Student Anna-Kaisa Huotari

HAMK University of Applied Sciences Information Management unit needed an information system that could be combined with Microsoft products and solutions on a common base as intranet as extranet side. In the future, the SharePoint system will be implemented as part of Office365 service, for example, to replace the existing Oracle based portal, e-mail, calendars, conference applications, and file sharing. The degree programme in Business Information Technology needed a five credit SharePoint Moodle course. SharePoint professionals are in demand in the labor market.

Business Information Technology student project team built a SharePoint system virtual platform, the system experiences collected, tested and built features of learning material Moodle platform, which began in September 2012 and February 2013 ended the project. The group consisted of a project manager Kimmo Kava and Matti Myllyniemi, Veli-Matti Mustonen, and An-

na-Kaisa Huotari. The supervisor was lecturer Erkki Laine. This project was a steering group for the project Helpdesk, which were members of Joonas Lopenen, Tommi Karppinen, Tom Kraft and Thomas Toivola. Helpdesk project worked on the project steering group to this group. The project was carried out in English and English teacher Brian Joyce organized a tradefair, where all the projects were presented. The HAMK Information management customers were Mika Rintala (architecture and applications) and Mirlinda Kosova-Alija (SharePoint sites and content management system). The Business Information Technology client was Lecturer Tapio Kilpeläinen (Microsoft products, training).

### Start of project

The project started in the beginning of September 2012 in an event where all the ICT projects and their designated project groups and project managers were chosen. Participants included all Business Information Technology students from TRTKNU10A3 class and all the degree programme teachers, among which also were project supervisor Erkki Laine and project client Tapio Kilpeläinen. Soon after this event the project group held their first group meeting, where they started planning the guidelines and set up common rules for the project. They also set up a project management environment at team-workpm.net. At the same day the group also held the first supervisor meeting, where they went through all the procedures involved in the beginning of the project and project member responsibilities and their roles.

The responsibilities in the project were divided as follows:

- Kimmo Kava was chosen as the project manager and he was also responsible for testing, documenting and compiling the study material for the virtual environment and software installations, and other SharePoint server configurations including User Profile Services and Active Directory user integration to SharePoint, Search Service, My Site Service and Workflows.
- Veli-Matti Mustonen was responsible for testing, documenting and compiling the study material for SharePoint Sites and Site templates, making a presentation about SharePoint (What is SharePoint?), and also the visual image and presentation of our project group.
- Matti Myllyniemi was responsible for testing, documenting and compiling the study material for Users, Groups and their rights, and virtual environment installation (LabManager setup and virtual Domain Controller computer configuration).
- Anna-Kaisa Huotari was responsible for testing, documenting and compiling the study material for SharePoint List and Libraries and Content types.

Right after the first supervisor meeting, the group scheduled their first client meeting with Tapio Kilpeläinen. At this meeting they went through in more detail the basis and purpose for the project and what the client wanted the group to do. The main goal was to produce study material (5 credit units) about SharePoint 2010 for future Business Information Technology students. Furthermore the platform, that the group would be using and configuring for this project, was also planned to be used (and in the future, possibly further modified) for this planned SharePoint course. During this meeting it became clear, that the project subject scope was going to be so large, that it would become very difficult to limit it so that it would be entirely finished in just 6 months. Because of this, it took quite some time before the final project plan was finished. The project contract was signed sometime after this meeting on 28th of September 2012.

The first few weeks of our project went mostly in writing the initial project plan and gathering material about SharePoint. Because most of our group members were not familiar with SharePoint before the start of this project, they also had to independently look for and study the system from books and various internet articles and web sites about SharePoint software for understanding it's many features and capabilities, and most importantly to get a view of what the system was all about. The HAMK Information services were also kind enough to provide group members with some old course material and exercises, which were a great help at the start of the project.

The final project plan was completed in late October 2012. The project phases were divided into seven parts:

1. Group learns and familiarizes themselves with SharePoint 2010 and its components.
2. Creation and configuration of a virtual workspace and machines for testing the software and creating the study material
3. Installation of the needed software on the virtual platform
4. Planning and designing the layout and content for project site collection
5. Creating the study material based on software testing
6. Compiling the study material
7. Presenting and delivering the final study material and the configured virtual platform to the client

The main parts of the project plan also described the methods for managing the project (including project meeting and documentation practices) and the timetables for all the planned deliverables that the group was going to carry out in this project.

## Project phases and challenges

As the project progressed group had as challenging as the easier steps. In our group there were four students and areas sharing were important right at the beginning of the project because Microsoft's SharePoint system is very wide. We started planning the progress of the project with the client Tapio Kilpeläinen and a group supervisor Erkki Laine in the beginning of the project in September 2012. In addition, a steering group was assigned to us, which was HelpDesk group working in next-door. We got also information about SharePoint system from HAMK's information management persons Mika Rintala and Mirlinda Kosova-Alija.

After the first client meeting, the group began to organize their own work space with teachers. Group received a common workspace from HAMK building C class 301 were also was working another project team called Ambientia. Group needed workstations for executing the project. We got two working computers and a bunch of old IBM laptops. After all, two members of the group used the school's machines, and the other two used their own machines in the project. We reinstalled Windows 7 operating system to workstations so that we got "empty" machines to our use. We had HAMK's WLAN network in use at first, before we got wired connection to our workspace. The purpose was to get also faster connection and Microsoft Office package for writing documentation as well as testing SharePoint and Office software between features. However we got Office software later in the fall when it was divided into a network for virtual machines.

Installing physical workspace as well as software installing took a lot of time at the beginning of the project. Installing and configuring working environment took until mid-October, after which we were able to properly access the SharePoint features. While the project progressed we also noticed that the group dynamics and communication didn't necessarily work on the effective way as it should for all group members. This issue was considered separately in the group meetings with the customer and the group supervisor. We settled the issue so that it had little effect on the group's activities in the future. To follow the project group's common ground rules was important so that the tasks required and succeeded project closing were achieved.

Project meeting practices were clear. Project Manager Kimmo Kava arranged meetings and organized a meeting room. Each member of the group in turn prepared the minutes of the meeting and worked as secretary in meetings. We looked over the project progress as well as planned future tasks in the meetings between group members. In the steering group meetings we went through a steering group project's progress and looked at their project details. The purpose was also to guide and advice on how the group should proceed in the project, if there was something to comment. In addition, meetings were held with the client Tapio Kilpeläinen, as well as the project supervisor Erkki Laine. With the customer group considered and refined the requirements of



the project and what are dealt areas of the SharePoint system. With the supervisor group discussed more likely progress of the project.

At the beginning of the project each member of the group studied SharePoint features and functions from books and internet material. We started with the installation of the SharePoint environment when we were divided responsibilities among group members. We installed the system as group so that all had some idea of the SharePoint environment. SharePoint system was installed on VMware virtual machines on Labmanager environment. We configured virtual machines and installed the necessary Windows operating systems, and we also made the necessary configuration and installation to use the computers as servers. We used instructions mainly from Microsoft in the installation. After the installation we were able for the first time to explore the user interface and its features. Each member of the group made a SharePoint exercises to learn the basics of the system.

Trade fair was held in HAMK in early November. There were invited students from different study programs to present ongoing projects. Business Information Technology projects were real work-based projects. Students were given a task to design a small stand where was information of the project. Our group made a PowerPoint presentation, business cards and posters to the fairs. The fair was in English and business English course was a part of it. After the fair we started working on the interim report, which was an updated version of the project plan. We went through the current state of the project in the interim report meeting with the supervisor and the steering group and took noticed if there were things to be corrected to complete the project.

We were able to complete the first study materials to the Moodle platform in early December. Compiling study material was resumed independently. One of the challenges of the project was to find a common way to make study material. At first we were supposed to do one test environment to SharePoint but we felt it time-consuming and too big entirety when the project was about half of the time remaining. So we decided that everyone does their own study materials with own web application by modifying templates and default settings for their own needs. This also made it possible that each had their own environment to test the settings of their choice without breaking another student exercises.

After holidays the progress of the project slowed down in January 2013. Most of the group was ill which took a lot out of working hours. January's work load was minimized but compiling of study material went ahead after that. The group held meetings with the customer, supervisor and with the steering group where we went through again the progress of the project and we started to plan end of the project. In early February a meeting was held where was present all groups and teachers.

The meeting took place where teachers presented how the project final report is made and also explained how the presentation of the projects is carried out in a closing seminar at the end of February. The group was in a rush to implement all planned materials. Number of hours elapsed on other school projects and the group's own personal things affected to workload. At the end of the project group managed to produce the necessary study materials and hand them over to the client. At the end of the project group and client went through all the materials and project group also got feedback from the client.

### Project closure

The finished study material was submitted to Moodle according to project plan and the client's wishes. After this we focused on writing the final report and getting ready for closing seminar, which was held on February 19th 2013. In the seminar, we presented the goals and phases of our project and explained how SharePoint works. After the seminar we spent a few more days finishing the final report.

### New learned

Working as a project group was a new experience for most of the group. Group's project work skills increased as expected during the project. Most common project work roles and practices were learned during the project.

The challenges of the project work were found to be different from those in traditional work. In project work, various problems are not predictable. In future we know to prepare for unexpected problems.

We also learn that motivation is one of the most important things for the success of the project. Motivation seems to be very difficult to maintain when there is tensions within the group or the working conditions area affected by continuous serious weaknesses.

Our group members said that they have learned during the project basic knowledge and skills for using SharePoint system. At the same time the system was found to be so large and difficult that none of us would dare to begin to build a real SharePoint operating environments thus far acquired experience. However, we have enough courage to seek companies specializing in SharePoint to work and study the matter further.

Technologies and things learned:

- SharePoint Server 2010, a three-tier farm environment

- SQL Server 2008 R2 & SharePoint 2010 installation and configuration in LabManager Virtual Environment
- Active Directory and DNS service configuration
- User profiles synchronization AD-Server (User Profile Synchronization)
- Enterprise Search Center service installation and configuration
- My Sites & Configuration of user profiles
- Health Analyzer service and error control and the search for solutions
- Web applications, Site Collections, Master files, Team Sites, SharePoint & CSS, web parts, Content management, Work Flows
- Team viewer, Sky Drive, Google docs
- User and group administration and privileges

## Risks

Risk management began at the beginning of the project. The first risk analysis was carried out very soon after the start of the project.

In the first analysis we found at the greatest risk on our project were possibility of SharePoint system could be incompatible with virtual environment. This would have meant the end of a project before it even had properly begun. However the virtual environment was successfully built and later it was found to be an excellent test environment for the SharePoint system.

Early stage of the project workload was found to be much larger than any of the participants had predicted. Learning and familiarizing SharePoint system was considered extremely difficult. Scale of the system and its multi-dimensional nature caused headaches for the project participants. Efficient testing of the system on time was found to be impossible.

Efficient testing would require a very extensive knowledge of Windows operating environments and how SharePoint takes advantage of the Windows Domain.

Various risks appeared at a steady pace and the most important of them were written down. Problems with workspace computers and lack of physical network caused us major problems at beginning of the project.

The school provided us old laptops but after a two-week battle we found them way too old to operate on wireless environment there was no necessary drivers for old components for Windows 7. To solve this network problem Information Management promised us a physical network. We waited for this network to be established proximately about one and half months. Finally when the promised network was installed we found those old laptops useless caused by severe activation problems. Finally problem was solved when two our group members started to bring their own laptops at school.

As the project progresses workload of other studies started to reduce opportunities to work on the project. Many times it turned out that the hours that were intended working for the project was used by completing other studies. The participants had to be absent due to illness also.

This wide range of problems caused for some group members began to suffer from mild stress and lack of motivation. At a very early stage of the project was found the completion of the project to be very unlikely, this recorded on a risk analysis the most likely and the biggest risk.

The project will not be completed, even though we have progressed in spite of conditions that existed in the project and we were almost ready with the project.

### Student opinions of the project and quality

Students` opinions about the project and its quality were mostly similar. The theme of the project was interesting and challenging, and it offered a good chance to learn something new. Wide scope of SharePoint system allows students to become familiar areas in which they were interested in. Specialization is a good thing because the SharePoint system`s overall management is almost impossible for one person.

The workload of other studies disrupted the group during the project. Especially fall was a busy time. The project theme was new for all members of the group which slowed down the progress of the project. Getting to know a new subject took a lot of time and the group would have wanted some kind of orientation of SharePoint. The project should have been defined clearer at the beginning so that division of labor between group members could have been divided effectively and thereby a good start of project would have been possible. The group also spent much time of organizing the physical work environment. It was important to get own workspace to our group because obtaining focus of the project, although organizing workspace took time.

This kind of project is a good to be executed before students goes in to practical training, so that they have some knowledge of the project-work. The project goal should be clear and work space should be operational before the project begins so that students would be motivated to continue the project, according to given instructions.

## Positive feedback from the client

The client's overall feedback on the project and the project outcome and results was mostly positive. The client praised the project group for their accomplishments in the project by saying that, even though the group members started the project with practically no previous knowledge of SharePoint system, they still quite quickly managed to learn about the capabilities of the system and what it could be used for, and only in this brief time went on as a group to independently build their own testing environment and study material. Also considering the tight project schedule and the fact that originally the project did not exclude any part of the SharePoint system, the project group eventually managed to create a very comprehensive set of test documentation and study materials about the target system and its main features.

According to the client, all of the delivered documentation and study material that was produced by the project group during the project, was written in very detailed level. Some of the material was in fact so high quality, that it would not be necessary to further modify it besides of possible version changes in future. Also all of the documentation based on the system installations and configuration instructions are repeatable and can be further modified to be included as a part of the planned SharePoint course material for HAMK University of Applied Sciences.

## Positive feedback from the supervisor

The project team was active and the members of the group had own practical roles in the project. It was possible to distribute the workload among the members, and a challenging project ended well. Weekly Meetings were brilliantly organized and held often enough. Project Manager Kimmo Kava was excellent to lead a large group and informing customers and instructors in different situations. A risk assessment was carried out immediately at the beginning of the project and the actual risk also was reacting. The project was technically challenging and wide, but the documentation of the objectives and results achieved brilliantly, and the project was completed well. The project team worked well in the steering group, and made a number of suggestions for improvement. Presentation of this project was well prepared for the seminar and it was presented in a professional touch.

## Future development ideas

Considering the future development projects based on the groups work, all of the group members unanimously agreed that the future project participants should have gone through some kind of background studies about SharePoint before they can begin to further develop the system. In the future HAMK also has to make sure that all the necessary workspaces, tools

and software is available to the students right at the beginning of the project, so that they can start working right away. This also helps to keep up the motivation of the group members, which is an extremely important factor for a successful project.

The scope of the future projects should be defined clearly and accurately from the very start, so everyone involved in the project would know exactly what he or she is supposed to do. Considering the arrangements and planning of the future projects, the amount of time used for the project should be divided in longer time periods. Also the workload of other studies mixed with the project hours should be thought out more rationally in the future projects.

Because of the vast scale of the SharePoint system, the possibilities for future development projects are almost endless. Starting from a basic course about SharePoint and its functionalities, and expanding from there to more advanced studies for BIT students focusing on different specialization themes such as C#-ASP.net coding or web development SharePoint, for example. Arranging a collaborative project about SharePoint which would include both BIT and Business Administration students could also be possible in the future.

- Other possible follow-up projects themes:
- Installing, testing and configuration, such as SMTP server / Microsoft Exchange in the current system
- Office365 integration with SharePoint Server 2010 and how it can be used as a tool for studying and especially project work
- Internet publishing pages (Publishing site), and publication system design, creation and testing of a SharePoint environment
- FAST Search Engine testing
- SharePoint branding (MasterPages, sites and site layouts, CSS) by utilizing SharePoint Designer
- Coding SharePoint web applications, site collections, and other functionalities with Microsoft Visual Studio



From left: students Samu Hämäläinen, Taneli Jauhiainen, Joonas Kortemaa, and Lecturer Marko Grönfors  
(photographer: Lasse Seppänen)

## 8 ICT Project: Yoso and virtual housing stock trading

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Lecturer Marko Grönfors  
Student Taneli Jauhiainen, Project Manager  
Student Joonas Kortemaa  
Student Samu Hämäläinen

In this project we started to build architecture and user interface to virtualize housing stock trading. Yoso Oy is company located in Espoo and Forssa and provides systems, architecture and integration solutions for companies. Yoso was the client in this project.

Three students who studied business information technology in HAMK University of Applied Sciences started to develop the architecture and an user interface of housing stock trading system in September 2012. Project ended in February 2013. Taneli Jauhiainen worked as project manager and project members were Joonas Kortemaa and Samu Hämäläinen. Marko Grönfors was project supervisor and the contact person of Yoso Oy was Olli Nieminen. Sorviin.info group worked as steering group of this project. Our english teacher, Brian Joyce, was also involved in this project as he signed us in Trade fair to present our project.

We created process flowchart, domain model, system map, triangle, use case diagram, user interface map and demo user interface for housing stock trading system.

## Starting the project

Project started as we nominated Taneli Jauhiainen to our project manager. Next step was to arrange a meeting with our supervising teacher, Marko Grönfors. Our first meeting with the supervisor was really meaningless because we hadn't met with our client yet. So we didn't know anything about the project at that moment. After that we arranged a meeting with our client.

We had a meeting with the client two weeks after the project started, so it wasn't really quick start. Our client was Olli Niemi from Yoso Oy. In that meeting client gave us some demands about the project. Project subject was designing an architecture of housing stock trading system and if we had enough time, a prototype of the user interface. After the meeting we decided that in order to proceed with the project we need to interview actual real estate agents to get some information about housing stock trading.

First task was to create project plan. We reserved few weeks for that and stayed in schedule. We had some problems because of the project plan template. Template had a lot of sections which weren't so relevant for our project. At the end we managed to finish the project plan and started to work with our deliverables.

## Working with the deliverables

We decided that we would meet our supervisor once a week and client whenever we need more information. We also decided that we would inform our client about everything we have achieved and made sure that all our finished documents could be found from Google Drive.

First phase of this project was to get enough data about housing stock trading. We created some questions which we thought would help us to designing this housing stock trading system. We send those questions to about twenty real estate agents via email. Unfortunately we hardly got any answers so we decided to go interview them face to face. These interviews gave us the result we wanted and we got many good answers from many real estate agents. We assembled those answers together and started to work with our process flow chart.

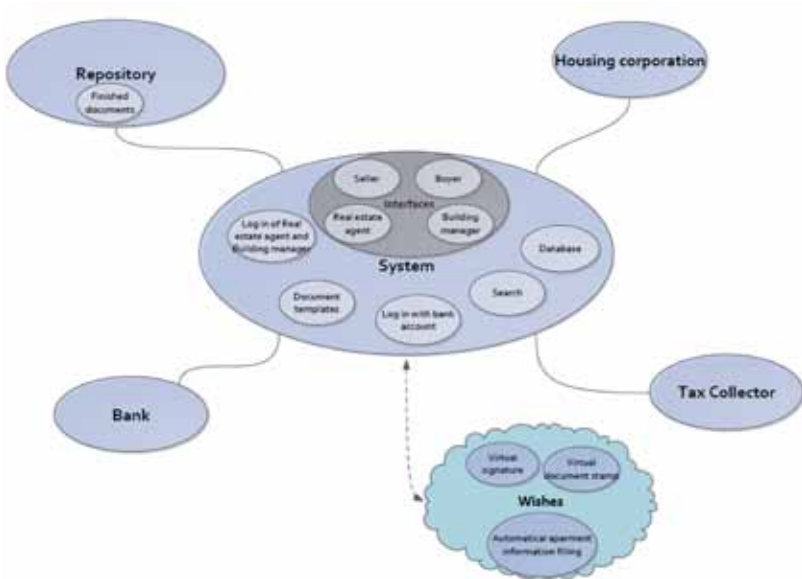
Process flow chart was meant to describe the whole process in housing stock trading system including which parties and documents are involved. At first we created prototype in Google Drive, which took about a week to create. Then we made a better version with MS Visio. We also tested a program named En-



terprise Architech, but we noticed that Visio was easier to use and was a superior tool for this project.

Next we had to build a domain model so first we had to think which relations there were. But at this point we met Olli again and he recommended that we should make a triangle and a big picture first. We decided to put the domain model aside and started to work with the triangle. The triangle meant a chart which would show what actions, datas and solutions are involved in this system. We also made this with MS Visio.

The big picture was a summary of the whole system, which would show what tasks and views there are in this system. In addition to the description we made some kind of a chart which showed us the different charts and parties in this system. It was really useful to make this big picture because it made us to think entirety of this system.



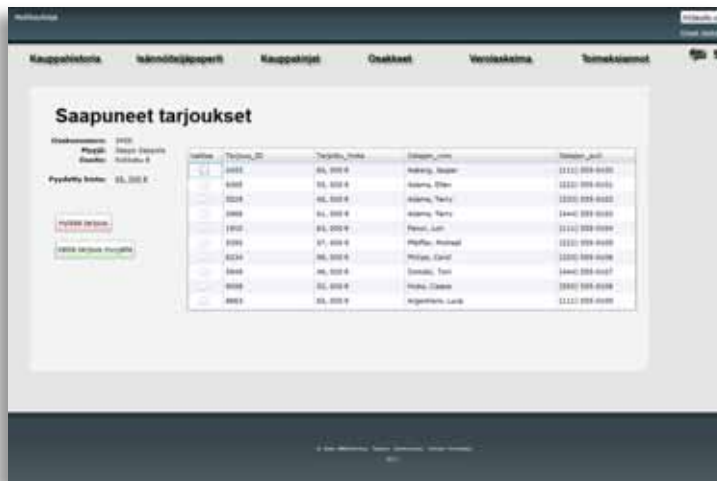
PICTURE 1. Picture of the whole system

After we finished the big picture and the triangle, we started to work again with our domain model. We finished our relation formulas which was a hard task for us because we didn't have that much of experience about domain models. First we made our domain model with MS Access but it was so unclear that we changed to MS Visio. The domain model made with Visio was good and clear enough.

Then we moved on to create a system map. It was very challenging because our project group didn't have any experience in this field. System map went

little deeper to the views of different users. We had to think what different options users have visible and what they need for the search option. Based on this system map it was easy to move on to the use case diagram. We ended up with a solution where building manager, real estate agent and client have their own use case diagrams. In this diagram we went even deeper in to the user actions. For example we designed what different searches there would be.

Our last phase was designing the user interface. Our idea was to create prototypes for few views. Views didn't have much of functionality because they were only prototypes. We used Microsoft Expression Blend and it worked out really well.



PICTURE 2. User interface.

## Ending the project

When deliverables were ready it was time to focus on ending seminar and giving the deliverables to our client. We also held a meeting with our supervisor, where we discussed what we should present in the final seminar. We created a powerpoint show and also translated process flow chart, big picture and triangle from Finnish to English. Presentation went really well.

We gave our deliverables to our client through Dropbox and at the same time we had a meeting via Skype. The client was very satisfied with our result and gave us great feedback.

## What we learned

All members in our project learned a lot in this project. We learned how housing stock trading works and how documents move during the buying process. We didn't have any previous experience in housing stock trading so everything about the subject was new to us. We also gain a great knowledge of how to design system architecture and how much work doing so was required.

We now know how to execute a project and what different phases there are. We learned that there can be a lot of documents to fill. Taneli also gained valuable information of how to lead a project and how much it contains work.

There were few softwares we during the project used and the most important one was MS Visio. We learned how to use different charts and when. We also tested a program called Enterprise architect but we didn't really use that. When we designed the user interface we used Microsoft Expression Blend 4, which was also a new experience to all of us.

We also understand now how project content and schedules can change during the process and how we should react to them.

## Unpredictable risks

None of the risks that we thought would occur never happened. Instead the only crucial risks that happened were communication problems between us and client/supervisor. The reason for that was the distance between us and that the client was very busy.

## Opinions about the project

The project was very interesting but at the same time challenging. The outcome satisfies us and we hope that all what we learned will provide us something useful in the future.

## The satisfied client tells

Yoso Oy gave a quite challenging assignment to the project group. The main idea was to create an architectural description for housing stock trading system.

Despite the fact that the group had never done anything like this before they were very interested and eager about architectural description. The group managed to figure the main idea of the whole housing stock trading process quite quickly and successfully.

Group members were able to communicate and give improvement ideas even for technical requirements.

My opinion as a client is that the group did an excellent job

### Supervisor's feedback

At the beginning of the project the idea of what should be done was unclear, because before meeting the client there was not that much given information about the assignment.

Without hesitation the group started working and contacted the client. After meeting the client and being informed about what should be done the group began the first task.

From the supervisor's point of view the project was successful. I took great pleasure in steering this group, because the project team was very independent. Everything they did was on schedule and the workload was evenly divided among the members. Project meetings and checkpoints were organised with a professional touch.

The client was also very satisfied with final outcome so that means that the project was a success. This project got into a state that will most likely help others to continue work on making the final product.

### Future ideas

We believe that the outcome of this project will provide a great baseline for creating the housing stock trading system in the future.

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