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Requirements Definition and Project Plan in Windows 7 Deployment Project CASE: Valio Ltd.

Heikkilä, Juha

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Laurea-ammattikorkeakoulu
Laurea Kerava

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Juha Heikkilä
Business Information Technology
Bachelor's Thesis
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Laurea University of Applied Sciences Abstract
Laurea Kerava
Business Information Technology

Heikkilä, Juha

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The subject of this Bachelor's thesis is about the importance of requirements definition and the project plan in an IT project. The aim is to identify the steps taken during the process to find the reasoning and effect they have on the success of the project. This thesis identifies these phases individually explaining the actions included in each phase and their purpose in the project. The end goal of this thesis is to build a framework of actions that are required in deployment process. The framework will help similar projects to become more efficient and to recognize arising challenges faster.

This thesis is a case study of Windows 7 deployment project in Valio Ltd. The primary method of gathering information is detailed and in-depth observing of actions and decisions made during the project. A secondary method of data gathering is interviewing handpicked personnel connected to the project to find out information about the project background and reasons behind the decisions made during the project.

The Study revealed the importance of defining project goals and challenges. Operating Environment in companies such as Valio is very complex. Adjustments made to operating environment needs to be carefully planned before execution. Being aware of the goals and the challenges in the project will help making efficient and accurate decisions. This allows molding a process that yields the wanted results every time and can be replicated elsewhere. In addition the findings of this study will help similar projects in future to identify necessary steps faster while also offering a model how start solving or working around arising challenges.

In this project creation of a deployment process allowed the project team to produce a repeatable method of an efficient and safe operating system deployment. The steps taken by the project team was documented in this thesis. The study revealed the need for more accurate device, application and license registry in Valio to provide information about operating environment more systematically.

Key words: Windows 7 deployment, Requirements definition, Project plan

Laurea-ammattikorkeakoulu **Tiivistelmä**
Laurea Kerava
Tietojenkäsittelyn koulutusohjelma

Heikkilä, Juha

Vaatimusmäärittely ja projekti suunnitelma Windows 7 -käyttöönottoprojektissa
Vuosi 2015 Sivut 45

Tämän opinnäytetyön aiheena oli vaatimusmäärittelyn ja projektisuunnitelman tärkeys IT-projektissa. Tarkoituksena on tuoda esille prosessin vaiheet sekä tutkia niiden syitä ja vaikutuksia projektin onnistumiseen. Opinnäytetyössä käydään projektin vaiheet läpi yksitellen tarkastellen vaiheen aikana suoritettuja toimia sekä niiden vaikutusta projektiin. Opinnäytetyön tarkoituksena oli muodostaa käyttöönottoprojektissa tehdyistä toimista runkorakenne auttamaan vastaavia projekteja tulevaisuudessa olemaan tehokkaampia ja tunnistamaan nousevia haasteita nopeammin.

Tämä opinnäytetyö on toteutettu tapaustutkimuksena Valio Oy:n Windows 7 –käyttöönotto-projektista. Ensisijaisena tiedonkeruumetodina on syvällinen ja yksityiskohtainen päätösten sekä tehdyn työn tutkinta projektissa. Toissijaisena tiedonkeruumetodina on projektia toteuttamassa olevan henkilöstön haastattelu, jonka avulla on pyritty kartoittamaan projektin taustoja sekä syitä projektin aikana tehdyille päätöksille.

Tutkimus paljasti projektin tavoitteiden ja haasteiden määrittelyn tärkeyden. Tavoitteiden ja haasteiden tunteminen auttaa tekemään tehokkaita päätöksiä ja luomaan metodeita, joita noudattamalla päästään asetettuun tavoitteeseen joka kerta. Tämä mahdollistaa metodien muuttamisen yhtenäiseksi prosessimalliksi, jota noudattamalla päästään haluttuun lopputulokseen myös muualla. Seuraamalla luotua prosessimallia kuka tahansa voi saavuttaa määritellyt tavoitteet ilman suuria vastoinkäymisiä. Prosessimallin luominen mahdollistaa käyttöjärjestelmän tehokkaan ja turvallisen käyttöönoton, jonka voidaan suorittaa myös ilman prosessimallin luojia.

Tehty tutkimus auttaa vastaavia projekteja tulevaisuudessa tunnistamaan projektille tyypillisiä haasteita nopeammin ja tehokkaammin sekä tarjoaa samalla mallin, jonka pohjalta on mahdollista aloittaa selvittämään vastaantulevia haasteita. Tutkimus paljasti myös tarpeen tarkemmalle laite-, sovellus- ja lisenssirekisterille, jonka avulla saadaan tietoa toimintaympäristöstä systemaattisemmin.

Asiasanat: Windows 7 käyttöönotto, vaatimusmäärittely, projektisuunnitelma

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1 Introduction

Deploying a new operating system and changing operating environment in a big company consists of many phases. Every phase needs to be carefully planned before altering current operating environment to prevent possible interferences in production and to minimize complications or harm caused by operating system deployment process. Dividing the process into concrete phases, planning the steps taken during the phase, testing the steps before applying them and finally executing steps in intended way takes a lot of knowledge, skill and experience.

Big companies have complex IT infrastructures with many critical systems running integrated to each other. Operating system works as a layer between computers hardware and application allowing applications to make requests for services like provide memory for application to run itself or provide access to hard drive for data storing. When updating such an important part of the operating environment one has to take many things into consideration because the change affects every application and processes run on it.

Typically major operating environment changes in big companies are handled by projects built around them. Projects have a team of people with different skills sets working together towards a common goal. The Project team analyzes situation and does necessary research to develop the best possible solution for how to reach the set goal while maintaining the set level of functionality.

The author of this thesis was a part of the project team responsible for deploying Windows 7 64-bit operating system to existing operating environment in Valio Ltd. Finland. The aim of the project was to replace the old Windows XP operating system used in Valio's computers with newer Windows 7 operating system in a controlled fashion minimizing hardships and interferences in production.

The aim of this thesis is to research the project phases and the actions taken in the project to achieve the set goals. This thesis aims to figure out the reasons behind those steps take in order to build a framework of project phases for future deployment cases. Special focus will be on requirements definitions and project planning phases because the success of massive projects such as this heavily depends on solid ground work.

2 Valio Ltd.

This chapter consists of company information of Valio Ltd (Finnish: Valio Oy) and description of their IT infrastructure. This chapter's purpose is to give the reader understanding of basic circumstances where and how the project took place.

2.1 Valio Ltd - the company

Valio Ltd. is the biggest milk processor in Finland. It produces total of 86% of the milk produced in Finland. Valio Ltd. focuses on milk, dairy products and food products of high quality that promotes health and well-being. (Valio Ltd., 2012)

2.1.1 Valio today

Valio Ltd. is owned by 18 Finnish dairy co-operatives with close to 8500 Valio dairy farmers as a members who produce milk for the company. The Valio Group comprises the Finnish parent company and subsidiaries in Belgium, China, Estonia, Russia, Sweden and the United States. Net turnover of Valio Group was 1.8 billion Euros in 2010, one third of it coming from the international operations.

Valio Ltd has 18 production plants in total, 15 of those in Finland and rest abroad. It employs in total about 4200 people in Finland and its subsidiaries. Valio has around thousand different products that are being sold in 60 different countries around the world. (Valio Ltd., 2012)

2.1.2 History of Valio

Valio was founded in 1905 as a butter export co-operative for Finnish dairies by 17 different Finnish dairy co-operatives. Year later business operations started in Hanko. England was Valio's most important target country and soon after Valio expanded from butter to other dairy products as well. By 1920 the domestic marketing was bigger than exportation.

Valio is known at for its scientific intervention in the field of biochemistry. Valio Laboratory was the center biochemical research in Finland and has enjoyed international reputation. At 1945 the manager of Valio laboratory, A.I.Virtanen, received a Nobel Prize in chemistry for creation of AIV-fodder, a fodder preservation method.

Valio remained co-operative till 1992 when it changed to private limited company. Still today Valio Ltd. exists to promote the business of Valio dairy farmers by paying them the highest possible price for raw milk.

2.2 Valio’s IT Policy

Valio operates in large field of industry, which for example includes dairy farming and milk production, research and development, automation, product design and creation, marketing and logistics. This creates a need for high level of integration in different applications, devices and equipment to co-exists and work with other applications to provide necessary information.

In Valio information technology serves as support activity for all primary activities such as in- and outbound logistics, production, marketing & sales and service. All primary activities are being managed and enhanced through IT solutions. As today there are over one hundred different business critical solutions that are being used daily.

Like many other big companies Valio has outsourced hardware, software and data communication maintenance. Valio has different partners, one handling telecommunications, other focusing into software and third for hardware leasing. Additionally Valio is working with many other operators usually focusing on delivering one service.

Hardware used in Valio are typically leased in masses for better cost efficiency. The other benefits of hardware leasing are continuous support and easy way to keep hardware up to date. Not all hardware is being leased, especially not the server-side hardware.

2.2.1 IT history

A team specializing in data handling, computers and technical infrastructure was at first established in 1970's in Valio. Before establishment of the central IT unit the decision making about IT systems was left to individual organization units.

During the years IT unit has undergone many changes and organization models where the IT decision making has not always been central lead. This has left Valio with an IT infrastructure that have lot of different systems that were not natively working with each other. Later on with system integrations these have been altered to function together.

2.2.2 Role of a IT management unit

Valio’s IT department is located in Helsinki Pitäjänmäki headquarter of Valio Ltd. Valio’s subsidiaries have their own local IT department or IT personnel that functions independently. IT personnel in subsidiaries focus more on local situations while parent company's IT department

is responsible for laying down the major guidelines. Also technical needs of Valio's co-operatives being handled by IT department in Pitäjänmäki.

The job of Valio's IT department is to monitor the IT services and develop IT infrastructure according to their IT strategy. IT department is present through whole decision, implementation and upkeep process. Typical tasks handled by IT department starts from identifying the problem or the need for future development, then moving to defining the needs of the situation. Once needs are clear everything get represented to chosen partner who comes up with solutions to situation and man-hours needed to get it done. Rarely the IT implantations are also done in-house.

When implementing new system to existing operating environment tendering is a possibility but generally one of the Valio's partners are selected to avoid future difficulties of integration. The implementation process of a new system is always carried out by solution deliver with the help of Valio's IT department.

2.2.3 Previous experiences

Valio has been using IT technology a long time to enhance and improve efficiency of various daily activities from warehouse automation to logistics and from laboratory technologies to management, also various reporting tools have been in use in Valio since the early days when those techniques became available.

All these previously mentioned areas have undergone many cycles of version updates or even whole IT architecture changes, this has left Valio broad understanding and know-how how to deal with changes and undergo these processes. Many users whom are responsible for testing the newer versions of software already have the know-how to find occurring problems on new installations. This helps the deployment process because project workers can rely on test results and use them as base when planning execution.

Long history has also left bunch of problematic software, systems and equipment, which cannot be brought up to date on every update cycle without huge investments. Additionally when prolonging lifecycle of some aspect it is getting harder and harder to get rid of it when the time forces to move on to more modern solution. Typically these problems are encountered when dealing with high cost process tailored equipment like devices used laboratory to analyze various set of samples.

2.3 IT Infrastructure

The desktop and server infrastructure in Valio Ltd. is formed from Microsoft products aimed for enterprise uses. Microsoft offers variety of tools from productivity suites to administration tools that can be used to maintain an enterprise network.

Valio Ltd. has chosen Microsoft's product family to be used in their IT infrastructure. Microsoft software offers Valio a versatile software platform with great integration with other Microsoft products making the basic use smooth and linear for end users.

2.3.1 Active Directory

Active Directory, AD, is a directory service, software system that is responsible for storing and organizing data while also granting access privileges to it, used in Windows Servers. Programs basic function is enable possibility of controlling the whole network from one computer. (Microsoft 2012)

Active Directory is used to create different types of user or computer groups with individual configuration setups. These configuration setups are called Group Policies. Group Policies are used to enforce a specified set of rules for selected AD group. These rules can contain many different kind of information like network communication protocols or minimum requirements for passwords set by users. Users or computers can be moved from one group to another one and thus changing assigned variables that affect computer behavior or usage experience. Users and computers can be part of several different groups simultaneously.

In Valio Active Directory is used to control the Valio Network access privileges and general information flow like network printing. Additionally Valio is using AD divide computers and users into different groups, for example each production plant has their own AD group determined for their computers. Amongst many other things this group is set in AD to tell the computers about nearby printers and grant possibility to use them.

2.3.2 System Center Configuration Manager, SCCM

System Center Configuration Manager, SCCM, is a system management suite for managing large Windows-based computer network by Microsoft. SCCM has several different tools that help the administrator to maintain and control their IT system, including:

- Asset Intelligence,
- Desired Configuration management,

- Metering software usage,
- Operating system deployment,
- Power management,
- Remote computer administration,
- Software distribution and update management. (Microsoft 2012)

Specific software or whole operating systems distributed via SCCM are packaged into image file that represents the complete contents and structure of a distributable software or operating system. After making an image file the contents of that image file can be cloned to other machines without bothering the end-user or having to go through installation process every time. This helps by saving considerable amount time and makes software distribution easier and more reliable.

Valio is using SCCM to manage Valio Network computers by keeping them up to date with latest software updates, by installing software or updates into computers without disturbing the end-user and by supplying computers with location and intended use based configuration set-ups. Additionally whole operating system images can be deployed via SCCM.

2.3.3 Current software environment

Valio is currently using **Windows XP SP3** as operating system in their PCs. Windows XP is over 10 years old operating system made my Microsoft. It was released 25.9.2001 and in April 2008 Windows XP got its latest service pack, which included for example support for Blue-ray discs. (Microsoft, 2012)

Microsoft Office 2007 is a productivity suite, which contains productivity programs for knowledge workers. Initial release was in January 2007 and its latest service pack, SP 3, was released in October 2011. Microsoft Office 2007 comprises word process application, Microsoft Word, a spreadsheet application, Microsoft Excel, a personal information manager application, Microsoft Outlook, a presentation helper application, Microsoft PowerPoint, a database management system, Microsoft Access, project management software, Microsoft Project, a notebook application, Microsoft OneNote, and few less known application for office environment. (Wikipedia, 2012)

Most commonly used web browser in Valio is **Internet Explorer 8**. IE 8 was released in March 2009, it is developed by Microsoft. Internet Explorer 8 is one of the most used web browsers in the world, in December 2011 estimations of usage was 30 percent of all Internet users (w3counter, Wikipedia. 2012). Internet Explorer 8 is most recent Microsoft made web browser

supported in Windows XP. In addition IE 8 most of the computers in Valio have secondary browser, Mozilla, installed.

Microsoft Lync is an instant messaging client for developed by Microsoft. It was formerly known as Microsoft Office Communicator but upon introduction of live Video streaming the name was changed to Microsoft Lync. Lync was purchased as part of Valio's strategy to reduce the amount of business trips necessary. Microsoft Lync was tested in Valio IT department for few months before whole company distribution.

Valio is using **SAP** as their enterprise resource planning system. ERP systems integrates important tools for business information management such as finance and accounting, human resource management, manufacturing, supply chain management, project management, customer relationship management, access control, etc. In Valio SAP has database of all business activities, which allows to for example to forecast sales and optimize inventory, track orders and revenues and so.

Security will be handled by **F-Secure Client Security** an anti-virus and computer security software produced by F-Secure Corporation. F-Secure is Finnish company who focuses on computer security products of different kind. F-Secure Client Security contains both anti-virus and firewall services.

Server computers are running with **Windows Server 2003** and few newer servers already have the latest Window Server 2008 R2. Almost all printers are network printers and printing is controlled by server computers. Even though in theory Windows server enables possibility for user to pick any printer connected to the Valio-network it is not very practical solution. To make things easier for the end user, Valio computers have small software that tells Windows server computers where in the Valio-network that computer is located; however the user can change the location manually. The location information is used to choose the nearest printers to be shown on the printer list.

2.3.4 Future environment

Future environment differs considerably from the current one with couple exceptions; security software and Lync. In addition to operating system upgrade several other programs will be upgraded to the latest versions. These changes will include new version of the current productivity suite and browser also ERP system will receive new GUI (Graphical user interface) and a minor patch.

Windows 7 Enterprise Service pack 1 64-bit operating system will replace the current one. Windows 7 is Microsoft's operating system for personal computers and it is aimed for companies. It was released on July 22nd, 2009. Windows 7 is based on its predecessor Windows Vista.

In addition currently used productivity suite will be upgraded to its latest version **Microsoft Office 2010**. Office 2010 differs from its predecessor, now it includes extended file format support and improved user interface. Also Microsoft Office 2010 is first Microsoft's productivity suite that is available in 64-bit version. Like operating systems also productivity suite will be upgraded to 64-bit version in Valio.

During the operating system upgrade web browsers will also receive and upgrade. **Internet Explorer 9** will replace its previous version. Newer version improves JavaScript performance and features hardware -accelerated graphic rendering in order to provide better user experience.

Sap will receive new GUI and a minor patch to fix small problems which were causing trouble on its previous version. Upgrades to ERP systems are very risky and must be thoroughly tested before applying them to production environment. Falsely working ERP system can cause serious damage and result big losses and general instability.

Laptop hard drives will be encrypted with **BitLocker Drive Encryption** which comes with Windows 7 Enterprise. BitLocker is full disk encryption that uses Trusted Platform Module (TPM), a cryptographic processor, to store and protect the keys used to encrypt hard drive. Upon boot TPM-chip relays the encryption keys to operating system loader code for hard drive access if the boot files appear unmodified. BitLocker comes with pre-boot PIN questioning that allows accessing the computer. BitLocker encryption will be administered by Microsoft BitLocker Administration and Monitoring (MBAM) service and the recovery keys are stored into Valio’s Active Directory for remote computer unlocking.

Also some new servers will come to support the new Windows environment. This server hardware will host **Windows Server 2008 R2** system. Windows Server 2008 R2 has the same core operating system than the client-oriented Windows 7. Windows Server 2008 R2 will be used to handle the network printing and will need 64-bit printer drivers. A Program for locating nearby network printers will be updated to function with Windows Server 2008 R2. Additionally System Center Configuration Manager will be updated to its latest revision for smoother Windows 7 deployment.

3 Project challenges

Valio's Windows 7 project is facing many difficulties from time schedule to software testing management. Windows 7 operating system itself is very different from its predecessor Windows XP, specially the change from 32-bit environment to 64-bit can cause major compatibility problems amongst the older applications.

In order to succeed in this tightly scheduled project careful planning is a necessity. Project resources are limited which means they cannot be wasted into low priority targets in expense of more important things.

3.1 Project Targets

Upgrading Windows XP to Windows 7 was first time discussed 3 years ago in Valio, but due budget reason the project got postponed few times. Now that Windows XPs support is ending in April 2014 taking an action was a necessity.

One year for project like this in a company that has very broad field of activity is not much and there is not much time for unnecessary mistakes. All planning, application testing, piloting, distribution management and intense testing phases need to be done before launching full distribution of the new operating system. Malfunctioning in one of the business critical software could end up causing total mess.

Many Valio's computers will undergo a lease exchange during the project; this will make planning a software testing, piloting and distribution management more difficult. Distributing the new pre-installed Windows 7 computers is happening before the major update cycle and it might cause problems because maintaining two different operating systems will both require unique maintaining services.

3.2 Environment from 32-bit to 64-bit

The term 64-bit refers to the architecture of the computer processor and the way processor handles the information. Compared to older 32-bit architecture, the 64-bit processors are able to take advantage of larger amount computers random access memory (RAM) and use it more efficiently, specially encoding, decoding and encryption software benefits from 64-bit architecture. Even though 64-bit architecture has just recently become the new mainstream, it is not new invention. First properly functioning 64-bit processors were used in 1970's supercomputers. (Intel, Wikipedia. 2012)

Some older software are tailored for 32-bit environment which might end causing problems. Most of the programs will run normally because 64-bit Windows 7 can emulate 32-bit environment to an extent. However, for some programs the emulation is not enough and which means all critical software must be tested.

More severe problems come with older hardware. 64-bit operating system requires 64-bit device drivers in order them to work. Especially older printers used for special task, like printing a certain type blueprints or a special stickers for goods, might not have 64-bit drivers available.

3.3 Windows 7 environment

Windows 7 environment can be troublesome for certain older software engineered to work in Windows XP. Usually the problem results from lack of rights to access certain Windows system folders or registry. Generally Windows 7 does not permit software to access previously mentioned areas unless they are run with administrator privileges. These changes in access rights are problematic for some older software that are designed to access and change some register values frequently. Usually newer software designed for Windows 7 environment are able to run normally even with these restrictions, however some limitations in usage may apply.

In Valio's case this means that critical software must be tested with the type of access rights the software is normally used in order find out if the software requires something special to be done. If bigger issues come up the decision must be made whether to scrap the program completely and look for alternative solutions or to make special arrangements to ensure program will run in future environment.

3.4 Organizing software testing

Valio is using many different software from the massive ERP system to software used with laboratory analyzer. IT people can do the basic test to see if the software opens and runs normally but the more thorough tests needs to be done by the people using the software in their daily work because they are the experts of using these software. They know how the programs should work, what kind of problems to expect and how to report the functionality onwards.

Organizing the software testing with this many people, who all have their individual work rushes, timetables and vacation days, is a major challenge for the project. Strict schedule does not allow sloppy attitude or time management if all business critical software is to be tested thoroughly before deployment.

3.5 Smooth transition

Software testing is only one portion of the work that needs to be done prior large scale distribution. Lot of the production computers cannot be taken down for long time periods without harming product manufacturing, logistics or the order and delivery process. Updating these computers requires planning individual update strategies.

Some more complex systems do exist in Valio and mostly these systems deal with warehouse automation and logistics. Typically these systems come with unique servers that are accessed by client software. None of the previously mentioned components can be updated separately without causing severe problems on other parts. This result a need for carefully planned and executed updating plan which takes account the special needs of the system and the process they are used to run.

3.6 Rollout challenges

Most of the Valio's laptops are protected by drive lock system that prevents unauthorized access by not allowing the computer to access hard drive without correct PIN; this drive lock protection method is to be replaced by Microsoft BitLocker hard drive encryption system. Microsoft BitLocker offers better protection by adding hard drive encryption and enables the possibility of remotely controlling the protection via MBAM-server. This will help IT support to access the computer if maintenance work needs to be done.

Possibility to encounter computers with malfunctioning System Configuration Management client software during the deployment exists. If the computer's SCCM-Client is not working properly it will not be possible to deploy Windows 7 planned way using the SCCM. The challenge will be detecting these computers and finding the best way to handle the situation.

In addition to Valio production plant computers, the project has to take care of the computers used by Valio's co-operatives whom are closely tied to the parent company. Many of the computers used by the co-operatives are not located in production plants but in small branch offices around the country. Usually the network connection between the closest distribution point and these small offices is not fast and stable enough for safe deployment. This results a need for an alternative method to distribute the installation images.

3.7 Lease exchanges

Most of the desktops and laptops used in Valio are leased; meaning quite few will go under lease exchange during the project. Lease exchange cycle in computers used in Valio is typically three years. Lease exchanges are one mean of Windows 7 distribution used in the deployment process. Old Windows XP computers get replaced by new computers running with Windows 7 operating system.

Managing Windows 7 distribution through lease exchanges alongside with normal method requires a lot more planning up head. Since there are different methods how Windows 7 is being distributed in Valio the project team needs to be aware how individual computers are being handled in order to avoid conflicts. However using different methods of distribution can reduce the amount time and work compared to single distribution method strategy.

4 Research strategies overview

This study is focusing Windows 7 Deployment project executed in Valio Ltd. in 2012. This study aims to bring out the key factors the project consists of and situations it deals with along with methods of execution used in the project and to weigh the pros and cons of the chosen approaches.

This case study keens in the projects requirements definition and project planning phases. Requirement definition and project planning takes place before the actual implementation of the project. Both of phases are critical preliminary steps that maps out the project goals and the methods used reaching these goals. This case study will attempt to bring out difficulties the project is facing during the project lifespan and the solutions they came up with to deal with those. Results of this study can be used in other similar projects to help dealing with arising problems.

4.1 Project

A Project should consist of definite starting and ending points, a budget, a clearly defined scope and the coverage of the work that needs to be done plus the specific performance requirements that must be met. Project Management Institute defines a project as “a temporary endeavor undertaken to produce a unique product, service or result” (Heagney, J. 2011. 2). Meaning a project is executed once; if it is executed repetitively it is not a project. (Heagney, J., 2011.)

The goal of every project is to find a solution for a problem. Word problem can be understood in many different ways, not only negatively. This problem can be many things; a need for a new service that produces better results and serves its user better or excessive overtime working in a factory.

4.2 Study method; Case Study

The method of this research was selected to be case study. A Case study is a form of research that keenly focuses on subject of analysis providing an intensive analysis of individual unit. Subject can be a person, event, period, project, policy, institution or other system that is studied holistically by one or more methods. (Thomas, G. 2011)

Case study does not follow rigid protocol or use samples to examine the subject of analysis, instead it consists long period in-depth examination of the case whether it is an instance or event. Researched conducting case study tends to gain better understanding why the instance happened as it did and gives researcher better understanding where to focus more intensively next time. Case studies are used for both generating and testing hypotheses. Case studies are used to produce a detailed report of instance aiming to give the reader as much background information as possible for the decision made in the research design and for the conclusions drawn.

Case studies produce far more detailed information about the researched instance than available through a statistical analysis. It also accounts variation, creativity and innovation better and more accurately thank statistical studies. However, results gotten from case study may be difficult to generalize because all the subjectivity and qualitative subjective data thus making generalizations made from it only suit to particular context.

4.2.1 Methods of data collection

In case study methods of data accumulation may differ. Common data collection methods in case study are documentary, archival records, interviews, direct observation and participant observation. Researcher may choose to use only one of the methods or use as many as they like. However, going with more than one data collection method will more likely make research more accurate and convincing.

In this study meeting drafts, project documentary, direct observation and interviewing were used as source material for data collection. Verifying collected sate and cross-checking between sources was done to improve the data accuracy. Meeting drafts, project plan, require-

ments definition documentary produced by the project team was classified as confidential information by project subscribers and could not directly be added as research appendix.

4.3 Study method; Semi-structured Interview

Semi-structured interviewing model allows interviewer to deviate from set interview plan unlike structured interview to focus on important aspects while still being based on the use of an interview guide. Interview guide consists of list of questions or topics that are covered during the interview helping the interviewer produce comparable qualitative data. (Bernard, HR. 2011)

In this study interview was used to find information about the reasons why project was initiated, what kind of a background information and know-how was already available before the project launch. The three Interview respondents were chosen from the project team and management team by research conductor. The chosen interview respondents were each professionals on their field of work and had large knowledgebase centering on their area of expertise.

Semi-structured interview was the chosen method how the interview was conducted. This was done to gain comparable information about the chosen subjects while allowing the research conductor to focus on certain areas that came up during interviewing process. Interviewing process took 30 minutes per respondent.

The information gained from interviewing was analyzed by research conductor. With the information from analysis the research conductor was able to form clear picture about the reasons of conducting the project and gain better understanding about project team member selection process. Interview gave important of information about roles of project team members to interviewer allowing better understanding about stages and tasks during the project.

Interview respondents wished to remain anonymous making interview memos confidential information. Small size of project team made person giving interview too easily recognizable and only questionnaire used in interview process was added as research appendix.

5 Project Initiation

Valio's IT management management unit decided that the time would be right for launching Windows 7 deployment project and made the preliminary budget reservation for it. The Projects scope boundaries and the magnitude of the work was established by the management to

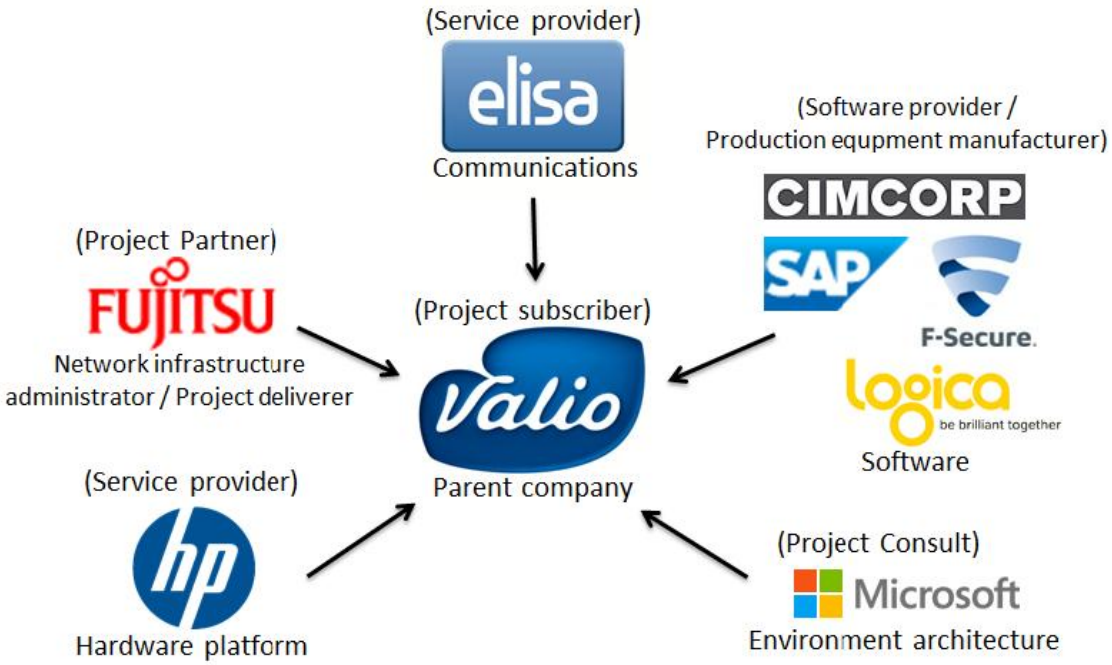
guide the requirements definition. Authorizing project was done after assessing the current situation and recognizing the needs of it.

Based on situation evaluation timeframe was decided and project partner was chosen. The partner's role was delivering technical know-how and necessary resources for technical implementation. After project deliverer partner selection was done the project team had to be assembled to fulfill the deployment within the given timeframe.

5.1 External Influence

Operating system change in Valio Ltd. affected into all software and services provided by partners and service delivers. Valio's complex multi-partner IT infrastructure resulted a need for thorough investigation of a whole environment. Different software integrations had to be reviewed and noted to avoid possible future problems caused by hardware and software conflicts.

Figurine bellow represents partner and service provider roles in Valio during the time the project took place. The figurine shows the complexity of an IT environment typical for bigger corporations. The system has to fill the need of several different software and usage purposes while still maintaining system reliability and certain performance level along with adaptability for future actions.



Picture 1. Partners and external influence involved in the Project

Changes planned to operating system resulted changes in software used to run on top of the operating system. In some cases software updates changed the requirements for background services like network or hardware resulting complex situations where Project team had to contact service providers for feedback and to solve arising complexes. Project consult was present in several meetings where critical software or service alterations where discussed to avoid possible complexes.

5.2 Project team

Project team consists of individual people striving together towards a common goal and shares responsibility for reaching wanted outcome. Normally the project team is founded at start of the project and gets disbanded once the project is over. Project manager begins laying the foundation of the project usually even before the project team members meet each other for the first time. One of the key figures of a project team is the right to do the kind of decisions the project team finds the most suitable for reaching the given goals. When working inside the given frame and budget the decisions or work methods are not being regulated by the organization. (Suchan J, Microsoft 2012)

In bigger companies major projects usually go beyond normal organization structure and instead of working in familiar groups there are usually different kind of specialists taken into the project team for more in depth knowledge and know-how for certain aspects of the project. Bringing people with different skills into project team will make the team more capable of handling the difficulties and challenges of the project.

5.3 The Project team in Valio’s Win7 deployment project

After Valio came to an agreement internally that they needed to upgrade their systems to Windows 7 age, they started to look for a partner that has the necessary expertise to handle the demands of operating system update. Selecting the partner was very straight forward choice as their longtime partner corporation, Fujitsu, had thorough understanding of systems and software environment used in Valio IT infrastructure as they already were on charge of maintaining most of the Valio’s IT services. One of the big contributors to electing the partner was Fujitsu's in depth knowledge how to handle big scale operating system deployments.

Fujitsu chose one person amongst their people to act as a project team leader. Team leader who got chosen had previous experience from similar project operating system deployment project; however that project was carried out in smaller company. Valio nominated few people to be a part of the project team, their job was to provide information and help the project team to produce quality results that would meet the set standards. Having few Valio

employees as part of the project team also ensured fast and accurate communication inside client organization resulting a lot shorter reaction time to arising problems.

three people from Valio actively working on the project as part of the project team and few experts that stepped in occasionally when their expertise was needed. Fujitsu provided the manpower to execute the necessary actions like installation image creation to make things happen. The project team had nine people actively working on it from planning to organizing the testing and later on monitoring how the deployment would play out depending on their field of expertise.

Even though the project team was responsible for the project outcome, a lot necessary resources for relevant tasks are came from outside of the project team. Project had reserved a lot of work hours from Fujitsu's other team whom were responsible for upkeep and maintenance of existing systems and solutions. With their help many simple, but yet problematic, issues were addressed and solved.

Project team members had clear roles and every one of them were focusing on their own area and then contributing their share to others. This method allowed keeping on track what were other team members doing and additionally this served as tool for distributing project team resources to execute given tasks. Also when outside information reached the project, the team members already knew the team member who would take action on it if it was found necessary.

The project team was accountable to project management team for producing results wanted. The role of management team was to set the direction where the project was headed to ensure the project subscriber, Valio Ltd., got what they ordered and to handle the financial side of the project like how much Fujitsu was charging Valio about different project tasks.

6 Defining the project requirements and creating a project plan

Requirements definition phase is about identifying and clarifying the goals and the problems encountered in the project. Piecing problems into smaller sections will help tracking project progression and assessing the workloads. Understanding the workload of a certain aspect of the project is helpful when tying it to preliminary schedule.

The documentary produced from requirements definition tells what are the goals of the project and how the end-result should look like. This documentary has to be accepted by the management team or project subscriber before the project deliverer can start working based on definition. The accepted specification document is a result of an agreement with product

or service deliverer and subscriber and it set the frame and the scope for upcoming project plan.

In Valio's Windows 7 deployment project the role of requirements definition was to define and plan Windows 7 environment to be used, scan and analyze all software and printers and design next step to be taken after creating specification documentary. This work was done as a part of laying the foundation for upcoming operating system deployment.

6.1 Project goals

The project goal was to update all personal computers, desktops and laptops, used in Valio to run with Valio tailored Windows 7 operating system in Finland and abroad. The set goal was to be achieved during the year 2012. Computers used to run critical software that did not work in Windows 7 environment could be excluded from Windows 7 deployment until finding the solution; however this had to be the last resort. Project tracking was used to monitor the project progress and to identify any possible slippage or time delay. Tracking was done by looking at the number of installed Windows 7 computer in all Valio product plants. (Valio Ltd 2012)

Second goal was to increase the level of security by encrypting all laptop hard drives with full disk encryption using BitLocker Drive Encryption. Controlling this system was decided to be done by Microsoft BitLocker Administration and Monitoring (MBAM) service. The recovery keys will be stored in Active Directory. Encrypting hard drives was found necessary step to protect the company information from unauthorized personnel. (Valio Ltd 2012)

Server side will also undergo version update. SCCM 2007 Service Pack 2 R2 will get updated to its latest revision SCCM 2007 R3. This has to be done before launching Windows 7 operating system deployment.

Software that was to be used on ten or more Windows 7 computers and was distributable via SCCM was decided to be packaged into SCCM distributable software packages and tested for its functionality. Software that was to be used in less than ten computers should be manually installed into Windows 7 computers by IT support person.

6.2 Software evaluation

Before conducting any software tests all existing software had to be checked. This process was initiated early on the project. The aim of this step was to find out all software used on Valio's computers to serve as knowledge base for compatibility evaluation. The check was

done using Application Compatibility Toolkit, ACT, made by Microsoft. The check resulted a list of software that needed further processing in order to ensure their proper functionality in future Valio Windows 7 environment.
ACT is a toolkit used for identifying application compatibility situation when deploying Windows-based operating systems. The toolkit contains application compatibility analyzer that is used to mark possible compatibility issues.

Software list gotten from ACT scans went under evaluation where the software was divided into different groups based on their purpose of use and the scale software was used. The groups used in dividing were SCCM packaged software, software with small user base, technical or device oriented software and discarded software that were not to be installed into Windows 7 computers. During the evaluation the scanned software that needed testing was also placed in rough order of importance for later testing priorities.

After software evaluation the project team listed mandatory software that should be found from all the computers used in Valio environment, these software were to be installed on all computers during operating system distribution. Software to be installed alongside Valio Windows 7 images were productivity suite, ERP system, additional web browser, PDF-reader and creator, communicator software, graphics software, security software, player for media files, file archive software, Java software platform, Flash player, software for remote access, software for IT support and software for network printing and few program support software. Other programs were not included into Windows 7 distribution but were packaged for to be delivered via SCCM when needed.

Installing the software alongside the operating system image was done to ensure possibility to do the basic work on the computer right after installation. This decision also done to reduce the amount work needed to be done by IT support after installations.

6.3 The Methods of dealing with Software compatibility issues

All known software used in Valio was to be tested for its Windows 7 compatibility before launching the operating system deployment. To avoid randomness in testing that would jeopardize correctness of test results a clear test pattern was set.

Before doing any tests software used was checked for its latest version. In many cases the latest versions had innate Windows 7 compatibility that allowed them to be installed into Windows 7 environment without extra configuration or Windows registry changes. If desired version of the software was already in use, the first step was checking existing SCCM software

packages for its Windows 7 compatibility. In many cases the software had to be repackaged due the difference of the two environments.

Second step was to check Windows 7 innate compatibility mode. A Compatibility mode is a method of getting older software run in new operating system architecture by emulating conditions and commands of the older operating system. Compatibility mode differs from full-scale emulator by not making full virtual architecture but instead it just translates software system function calls into style that the operating system can understand. (Microsoft 2012; Wikipedia 2012)

In certain cases Compatibility Shims were to be used but the usage of compatibility shims were to be avoided in business critical software due its nature of emulating previous operating system architecture. Compatibility shim functions like compatibility mode but offers wider range of options of handling issues.

In few cases the software was set to run in a server and it was used via remote desktop connection. This method allowed updating most of the computers that would otherwise had to be left run on older operating system. However usage of this method was heavily dependent on type and usage purpose of the software used. This method was found not suitable or convenient for software that was actively used or needed close moderation; also software that was tied to computers hardware was not usable remotely.

On cases where irreplaceable business critical software was not able to run properly in new Windows 7 environment the machine could be left to run Windows XP, however this was considered as a last resort that should not be chosen if any other possibility existed. The usage of Windows XP-mode included in Windows 7 Enterprise edition in larger scale was founded too laborious to be created and maintained in addition to the existing two environments and thus the idea was discarded.

Once solution had been found how to get software running properly; the software was sent to Fujitsu's SCCM packaging team with instructions telling necessary tweaks that had to be made into software packages. Fujitsu's team then installed the software adding the noted tweaks into it and then packaged it into SCCM distributable software package that could be effortlessly installed into any Valio computer with few clicks without going through the normal installation process.

Project team felt that making fully prepared software environment that was to be cloned on all computers was the only realistic choice of distributing Windows 7 in a company size of a Valio. Individual installation of operating systems, software and configuring them to match

Valio's environment would have consumed too much time to be even considered as an option and would also have susceptible for human error.

6.4 Distribution methods

Windows 7 distribution was handled by two major methods, replacement installation or lease exchange. The method of deployment applied was dependent on time left on computers lease contract. If a computer had its leasing contract ending during the current year no Windows 7 installation was made on it. Instead the user would receive a new computer that already had Valio's Windows 7 image installed on it. Replacement installations were to be done on computers that have their leasing ending date on next year earliest. In addition to the two methods mentioned previously the project team wanted standalone install media for smaller side offices that do not have fast enough network connection for deploying the Windows 7 image safely and reliably.

Replacement installations were distributed via SCCM as SCCM advertisement. SCCM sent a message to users' task bar that allowing user to start the Windows 7. The prerequisite of starting Windows 7 installation was receiving SCCM advertisement and being connected to Valio's network. The SCCM advertisement had four day margin where the user could start the operating system deployment on any given time, after those four days were expired the installation started automatically.

For replacement installations users' personal data was to be secured before doing Windows 7 installation and restored after finishing installation. This was to be done automatically as part installation sequence. The project team decided that the personal data would contain the users profile folders in existing operating system in addition with PST-files used Microsoft Outlook archives.

Lease exchange computers were excluded from the replacement installations to ease the amount work to be done and to prevent causing unnecessary frustration to end users by altering work instruments often. This effectively cut down the number of computers to be installed in Finland close to 1900. The number of computers going under lease exchange during the installations was around 1000 in total.

For deploying Windows 7 to small side offices with poor Internet connection standalone media installation was chosen as a method of installation. Another option was to make a small distribution points to the branch offices that would slowly download the image over the internet during the off-hours and then distribute the image in local network to branch office computers. However standalone media installation was chosen over creation of small distribution

point because the project team wanted to have an IT support nearby to step in if something would go wrong during the image deployment.

6.5 Access rights

In principle all users were set with user level access right. This was done to increase security by not granting the user the rights to install any software into the computers. Due the nature of architecture in Windows 7 operating systems this method was found an effective way to reduce amount of malware that could infect the computer.

The possibility of granting local administration rights to user was created via Active Directory. This was decided to be done by moving the users AD-id to specific group made for it. However granting administration rights to user was decided to be evaluated case by case and only granted on cases that deemed necessary.

6.6 Informing end user about installation

Users were notified beforehand about the operating system change. Notification they received depended on the method used to upgrade their computer to Windows 7 operating system. All notification sent also contained small manual how to get started with Windows 7 and information about the new features included in Windows 7.

If the computer was about to go under lease exchange, received the users a notification about the computer switch. Notification contained information about the architecture change in Valio and clarified that users will receive new operating system after lease exchange.

Users whose computer was to be installed by advertisement installation received notification about the installation prior getting the SCCM advertisement. The notification included information about installation process and how it would fold out. Also the notification was emphasizing the importance of user taking backup copies of the important files regardless of the built-in automatic backup system.

6.7 Estimating time consummation

Before starting the actual project plan or getting requirements definition documentary accepted the team members had to sort out work tasks to function as base for project plan. The idea behind this was to find an estimate how long each step would take and how it would impact future tasks. The project team then went through each step estimating time and the amount work that would have to be invested to complete all the steps.

After the assessments project team was able to form the projects preliminary schedule. The schedule had to be fitted into the timeframe. Having preliminary schedule meant the project was able shape requirements definition documentary into a state where it could viewed as project timeline.

6.8 Approving definition phase

Approving the project definition was done in smaller pieces. The necessary modifications like upgrading SCCM environment to latest version were initiated before getting the final acceptance from management team. This was done because the upgrading was necessary action to be done and thoroughly tested before the software testing and deployment process. After the outline and workloads of the projects tasks began to clarify, the project team started keen on project plan.

Before getting the final acceptance from the management team the requirement definition documentary and the info of technical implementation methods were sent to a Microsoft consult for a review. Microsoft approved the plans and also offered an input from software developer point of view how to make the deployment process smoother. Few small changes were made in the definitions according advices gotten from Microsoft. Input from Microsoft gave the project subscriber confirmation about the viability of plan. With the recommendation from Microsoft Valio's project management approved the transition to the next phase of the deployment project.

The requirements definition documentary was accepted three months after the project was initiated. The requirements definition phase had now defined the issues the project was aiming to solve. The project team could now fully focus on finding the solution to these issues and forming the project plan out of it.

6.9 Project plan

After the project outcomes were defined in detail planning how to execute project started. The Project team formed project plan and documented it to put the framework to the steps project would have to take to yield sought after results and also to build a schedule for these steps so the project could be completed in set timeframe. In project plan two aspects rose above else, testing and how to conduct it and distribution and the challenges it poses.

Previous experiences on software testing gave the Project team solid ground work how to conduct the test. The method of software testing was altered a bit to match the project needs but overall the old format and testers were used when conducting tests.

Plans how to distribute finished image and how to time it was discussed and documented into project plan. The method of distributing via SCCM image was chosen and plans how to advertise it to users formed. Offices, side offices and off-site computers were given their individual time periods when distribution would take place if all would go as planned.

Project plan gave the team overall schedule when each aspect of the process should be started and finished. It also allowed the schedule planning in more detail when distribution framework was made and different goals received the target-date. Once the initial schedule was formed the project team sent bulletin containing dates and general information about deployment process to every production plant to inform local users about upcoming changes.

7 Creating the Windows 7 Environment

The first operating system disk image was created rabidly to start the initial SCCM distribution tests. The first disk images only contained the operating system Sand driver pack without major tweaks. All the initial testing was done by Fujitsu alone.

Group policies for Windows 7 environment were made and matched ready for future purposes. Unique policies had to be made to match the configuration needs of different computers types and regional locations. Creating localized group policy objects required thorough understanding of current and future systems.

7.1 Building the disk image

Windows 7 operating system was installed manually on reference computer, the latest security updates were added to it and the reference computer was configured to have the specified configuration setups. Once the reference computer was found ready it was used to build and capture operating system image that could be deployed to other computers without having to go through the whole installation and configuration tweaking process again.

Each computer model needed matching drivers to ensure flawless communication between the computer hardware and the operating system. Drivers were mainly downloaded from manufacturer’s websites and then tested for its compatibility. Once appropriate drivers were found they were packaged model based driver packages and uploaded for SCCM distribution usage.

After operating system image and the driver packages were created and found working was time for first deployment tests. Based on the test results the operating system image and the distribution configurations were tweaked to match the needs of the systems. All altering resulted a working, deployable, Windows 7 platform where mandatory software was to be executed and later on formed to be a part of the new Valio computer environment.

Mandatory software was added to the process to be a part of the deployment. They were packaged into software packages that could easily be integrated into the system. Packaging the software was done by manually installing them into the Windows 7 reference computer and then capturing and building a SCCM deployable software package out it.

In the end the image consisted of Valio setup tailored Windows 7 Enterprise operating system, operating system updates that were released after the operating system was packed, the computer model based driver packages and all the software with specified configuration setups that had been decided to be added.

7.2 Testing the Windows 7 image

First tests during the creation of the reference computer and the early distribution were technical tests being conducted by Fujitsu internally in lab environment with computers dedicated for image testing. The purpose of these early tests was to create working environment to function as base for later content testing and eventually deployment. During the early testing phase many things had to be adjusted which meant that at this phase thorough software testing could not yet be conducted due changes and lacking environment. Based on discoveries made on the early testing phase both the image and the distribution were accordingly altered.

Lab tests were conducted on four chosen computers of different kind. The image was built in a way that it was to recognize the computer model to be installed and choose correct set of drivers for the computers. Different types of computers were used in the lab test so the team could make sure the same installation package would work on different kind of computers despite the difference in hardware.

After the initial operating system image was created, tested, modified and finally found adequate for other operations was time to start testing the mandatory software on it. At early phase only the basic support software like Java, Flash player, Silverlight, web browser and productivity suite were added and the more complex mandatory software like ERP system that needed extremely thorough testing was left for later. This was done in order to ensure that the necessary components needed by other programs were available if needed.

7.3 Setting up content testing and conducting it

Once the Windows 7 image along with basic components to support the other software was set the content testing could be initialized. Content testing differed from technical tests and its focus was on how programs work while in real work usage and how they matched the needs of a Valio employee.

Fujitsu's team set up two physical machines and deployed the freshly created Windows 7 image to those computers via SCCM. Additionally four virtual machines were created and set up with the same Windows 7 image. Physical computers were made for testing special software that had direct dependency on hardware like programs using 3D-modeling. The normal software like archives could be tested on any computer and for those virtual machines were used. Physical test machines were located in Fujitsu's office in Valio premises.

Project team stared by creating software testing schedule. Valio's people in the project team talked with testers trying to find a time when the appointed tester could conduct their tests. Once the schedule was made Fujitsu's people made sure that the software to be tested was functional and found in the appointed computer at given time.

The tester used a remote desktop connection from another computer to gain control of test computer. Upon conducting the tests the testers took notes how software worked and relayed those back to the project team who tweaked the software configurations and registry entries based on the test results. After the tweaking the tests were conducted again for ensure full functionality of the software. Once testers found software working properly the software was sent to packaging team where it was modified into SCCM distributable software package that could installed into any computer.

Software that was not functioning properly and would not work as intended in new environment was added to list for later usage. The list of malfunctioning software was to be used when making computer specific installation schedule to exclude computers used to run them from installation schedule.

Software testing and packing continued throughout the rest of the process. The most important software was tested early so they could be applied to the installation sequence and to installation image. Most of the less used software had their testing set for later. For example not every employee in Valio needed 3D-modling software so it was separately packed into SCCM distributable package that would only be installed into computers where the software was needed.

7.4 Preparing for deployment

After thorough Windows 7 image testing and ongoing software content testing Fujitsu's team made first very first SCCM command sequences that allowed the user to start Windows 7 installation on their computer. The first version of sequence had following steps built into it user notification of upcoming Windows 7 installation and method to start it, user data back-up, booting and initializing the installation process, clearing the unwanted data, installing Windows 7, installing portion of the software belonging to Valio's new desktop environment, user data restore and finally launching the computer with the new operating system.

Later on when the packaging team was able to produce rest of the software part of the new software environment where they added to the sequence along with Microsoft latest security updates. Minor improvements to the installation sequence were made thru out the whole deployment process to keep up with new security updates and to deal with rising issues.

The installation sequence was tested once again in a lab before pilot testing. Lab testing yield promising results and knowledge gained from testing was used to do minor tweaking the sequence. Once the process was polish to the point it could be reliably piloted in real production environment the pilot testing phase was initiated.

8 Pilot-phase

"Piloting' of an ICT project is defined as the implementation of an ICT technology, software, or related project on a small controlled scale to allow for its full impact, benefits and weaknesses to be evaluated before implementation." (Bassi, R., 2010. 6)

Pilot testing in Valio's Windows 7 deployment project started at May when very first two user computers got their Windows 7 deployment advertisements. Pilot testers initiated deployment process from operating system deployment advertisement that was sent to their computers via SCCM. Installation process was to be initiated once the user decided that now would be good time for it. First pilot testers found deployment process working and the team decided that more pilot testers could be taken into pilot testing.

As soon as the first two pilot deployments were conducted first wave of pilot testers were taken into the pilot. Windows 7 SCCM advertisement was sent to most of the IT management unit in Valio along with handpicked Valio employees from every production plant. The number of pilot testers in the first testing wave was 25. Some of IT management unit workers were

left out because their computers were used to run software that still was not compatible with Windows 7.

8.1 Testing the user notification

Pilot testers received an email from the project team telling them about the Windows 7 deployment advertisement and an information about the necessary steps they needed to take to initiate the installation process. The pilot testing phase was not only aiming to test the deployment process but also to test the advisory notifications sent to end users. The project team had to make sure that the information the end user would receive about the Windows 7 deployment was to be as clear and informative as possible while focusing to the steps that the user would have to take and how it all would affect the user.

After the pilot testers had received the SCCM advertisement, the advisory notification and began the deployment process a member of the project team consulted the pilot tester about the process. The consulting revealed few changes that had to be made to the notifying practice. More in depth reasoning for necessity of the change was added to the notification and steps that the user would have to take were clarified to make them more easily understandable.

8.2 Monitoring the pilot phase

Pilot phase was monitored by Fujitsu's team throughout the whole pilot phase. They checked the logs of installation process to see possible errors and also monitor the network traffic and its influence on deployment process. Network traffic monitoring was conducted to estimate network requirements when deploying the image to side offices or off-site computers.

The project team sent email to all pilot testers asking about the installation process, how it folded out and was there any hardships during the installation or first usage. The project team also conducted small interview with the pilot testers to hear what they were thinking about the new operating systems after they had used the new operating system two weeks.

8.3 Approving the pilot phase

The project team put together the information received from pilot tests and made the last adjustments to distribution plans before launching a large-scale distribution. Once the knowledge gained from the pilot was integrated into the distribution plan, the pilot test phase was concluded.

Before the actual distribution could begin the plan had to be presented in detail to Valio's management team to get the approval for moving the project into distribution phase. Project team created technical documentation about the upcoming distribution phase which included upcoming installation schedule, copy of the advertisement message that was to be sent to user of the computer via email before sending the installation advertisement and information of back-up plan and plan what to if project would have to restore computer back to old operating system. In addition project team had to decide how they would address situation with individual users if problems would arise.

9 Distribution Phase

The Goal of distribution phase is to apply system made operational in production environment. The Phase takes place after it has been tested and accepted by the user. Activities in deployment phase includes end user notification, execution of previously generated deployment plan, installation of new system and post deployment review. (Dobryzcki, R. 2014)

All planning, testing and work done so far was to create as smooth transition from old environment to new one. The work put into the project was made to ensure that there would not be unexpected situations during the deployment and also to plan a process to handle exceptions as efficiently as possible if they would occur.

9.1 Creating computer specific schedule for Windows 7 distribution

Once data from firsts pilot installations started to roll in project team was able to start planning distribution in more detail. The framework for distribution was made earlier during project definition but many small aspects had to be taken into consideration while making computer specific distribution list.

The First distribution draft only included the order of production plants when they would undergo installation process and a week number when it would take place. Computer specific order was created only few weeks before the actual installation so the feedback gotten from the tests and previous installations could be taken into consideration before launching it to another wave of computers.

First scheduled and advertised Windows 7 distributions outside the pilot were carried out in Helsinki. The location was chosen first because Fujitsu's IT support was present everyday there and it was the biggest location where installations were to happen.

9.2 Excluding computers from windows 7 deployment

Before deploying Windows 7 to computers Project team had separate those computers which could not be included into Windows 7 mass deployment. These computers were typically running software that would not function in new environment, they could not receive the installation advertisement through normal means due network or location issues or computer was assigned to handle a task that could not be interrupted and the installation had to be done during scheduled maintenance.

The project team sent inquiry of information to chosen personnel on every production plant and side office to go through the list of computers included in inquiry and asked them to give feedback regarding listed computers. In the inquiry the project team asked could those computers be brought down for an installation process normally or should they receive a special attention during or after the installations. Most of the personnel getting the inquiry about the computers were also part of the pilot and already had seen the installation process and knew the effects of it. The inquiry was done to locate the rest of the production computers that might have been missed by project team in their listings.

The project team used SCCM to make a computer specific a software inventory and then used automatic comparing tool to match computers software inventory with the list of software that was found not working in new environment. If match was found the computers asset number was flagged to be manually checked. Using automated tools Project team was able to create another list of computers that were not running any previously blacklisted software.

The List of flagged computers was then manually examined and sorted into two categories, to computers that could be installed regardless them running non-functioning software and to computers that could not be installed through advertisement procedure. Typically for the computers that were categorized as receiving installation advertisement regardless of presence of blacklisted software, the blacklisted software played little or no role of importance in the everyday use of that computer.

With the information received from production plant personnel, SCCM computer specific listing of software inventory, asset management tool and knowledge of production environment computers and machinery the project team was able to list computers into categories that could be installed with user initiated deployment advertisement, that could be installed under supervision during scheduled maintenance and to computers that would be installed later after a solution to program compatibility with new environment was found.

9.3 Creating computer specific deployment order and advertising it

List of computer asset numbers was then used in creation of schedule for computers that were about to receive deployment advertisement. Project team while making the deployment order had to make sure that installation process would not cripple any critical process by forcing simultaneous installation to computers assigned to same task and effectively forcing unwanted a break by doing so. Using the knowledge gathered by inquiries and detailed work during definition phase the project team pieced installations to different dates that would minimize harm done by a service break or equipment installations.

Advertisement was delivered to computers before seven days before the computers forced installation would begin. Advertisement made possible for the user manually start the installation on any moment after that allowing user pick the best time for installation process.

Every user also received two notification emails about the deployment. First one was delivered a week before the actual installation advertisement was sent to their computer. Purpose of the first email was notify user about the deployment, the date when hers/his computer would receive the installation advertisement and the procedures the user had to take before initiating the installation. This was done to help the end-user to understand what was going to happen and how it would affect her/him. The second email was a reminder sent to user the day advertisement was delivered to user's computer.

Project team added a suggestion to notification emails that end-users should start the installation process when they were done for the day and heading home. Installation would complete itself during off-hours without wasting end-users time during the work hours.

9.4 Exceptions and Special installations

Not all Valio's computers could be installed using SCCM advertisement and project team needed to figure out working installation method for several different computers assigned to various tasks. Reasons for performing non-standard installation varied from challenges to deliver necessary installation packages to installation location to critical nature of the task assigned to computer preventing it from undergoing lengthy installation process.

In some extremely critical cases the computers could not be brought down for regular scheduled maintenance. In these cases installations were performed with a help of substitute devices which kept the critical process running the process during the time the original computer went through installation and testing process

Group of people whom were excluded from standard SCCM advertisement installation procedure were sales representatives. Project team found normal installation procedure unsuitable due the travelling nature of their job description because deployment couldn't be done to home offices via VPN. Instead the installations were done simultaneously to all of their computers during their yearly training seminar by Fujitsu's IT personnel.
Distributing Windows 7 to small branch offices that had no local server and network speed was not high enough or connection was not reliable enough was excluded from SCCM advertisement deployments. Instead Windows 7 distribution was done as standalone media installation in these locations. Project team scheduled a date when local IT support personnel did a trip to the branch office and performed Windows 7 installations in that location.

9.4.1 Lease exchange computers

Valio's computers leasing cycle was three years and Project team wanted to deliver new lease exchange computers directly with new Windows 7 image to minimize the annoyance to end-users and also to reduce the amount work needed to be done during deployment. Once the Windows 7 image was tested and found functioning it was used new lease exchange computers ready for end-users.

New lease exchange computers were the first end-user computers running Windows 7 outside project teams test or pilot computers. First wave of Windows 7 lease exchange computers were delivered about two months before launching distribution via SCCM advertisements.

9.5 Approving distribution plan

The Project team formed a report from all the gathered knowledge to present it to management team. In the report where going through the technical aspects of deployment process and also the intended methods how deployment would be done. Report was also made to get approval for planned deployment schedule and installation order of computers for production plants.

With mandate from the management team project team was ready to launch the distribution of Windows 7 where it was to be installed to all Valio's computers that were capable running it and had no special restrictions preventing it.

9.6 Conducting distribution

Before launching the distribution of Windows 7 images the project team had the necessary files copied to all servers used in local image distributions. This was done to ensure that the

installation process could be performed in local network that was fast and safe enough for successful installation. Local network also helped to avoid possible connection issues that might endanger the deployment process. Knowledge gained from the Pilot deployments helped the project team estimate the average local network capability to determine how many computers could be installed simultaneously without complications.
First scheduled installations were done in Valio Pitäjänmäki under close surveillance of the project team. The first advertisements were delivered to users and they initiated installations. After receiving feedback about successful installations the project team was able to start installations in other production plants. First scheduled installation took place early semester and installation process via scheduled installations were done early next year.

During the scheduled installation process the project team kept working on flagged computers trying to solve the issue preventing Windows 7 installations and adding computers with solved issues to the list of computers to receive installation advertisement. Project team managed to narrow the amount of computers could not be installed.

9.7 Project closing

After finishing scheduled installations on all production plants the project was kept going for three months before it relinquished the responsibility of Valio's Windows 7 deployments. During that time the project kept trying to reduce the number of flagged computers and recreated the Windows 7 installation images to include all new security fixes and updates to make the installation image have up to date contents and services.

The project team conducted a survey to end users to measure their rate of success and user satisfaction. The result of the survey was added to final report for the management team in order to measure the success of the project. The Project team then relinquished the responsibility of Windows 7 deployment to Valio's IT management unit leaving less than five percent of the computers on their original state.

10 Conclusions

The requirements definition and the project plan phases are extremely crucial parts of projects success, more than the actual execution phase. Defining the requirements of the project create understanding what does the project exists for and what are the goals for the project. A Project plan is an answer to question how the project will reach to set goal. Together these two phases creates the groundwork to whole project by defining the starting and ending point and describing the steps the project needs to take to get from starting point to wanted outcome.

This case study showed how setting the goal and planning in detail the steps to take helps the project team reach it as efficiently as possible. A solid plan reduces the amount of mistakes and bad decisions by hasty judgments, making the actual work more cost-efficient and results more satisfactory. In big companies small mistakes can result big expenses in a form of lost time and reduced efficiency. In the worst case these problems can have a direct impact on a supply chain reducing customer satisfaction or creating sales loss.

10.1 Actions suggested for future

In Valio Ltd. solid ground work done by the project will help future projects by clarifying the aspects needing special attention on designing process. To make other big scale project like this Windows 7 deployment project more efficient the environment, devices, applications and software licenses needs to be thoroughly documented to reduce the consumption of time and other resources spent uncovering it. Up to date device, application and license registry can greatly reduce the time consumed on acquiring the necessary information on big projects as well as in daily work activities.

Detailed registry of devices, applications and active licenses will make finding information more effective and also decrease the amount of unnecessary interruptions caused by IT service contacting end-user to inquire some detail about the devices. It will also help when doing device or software inventory of used devices or applications in use.

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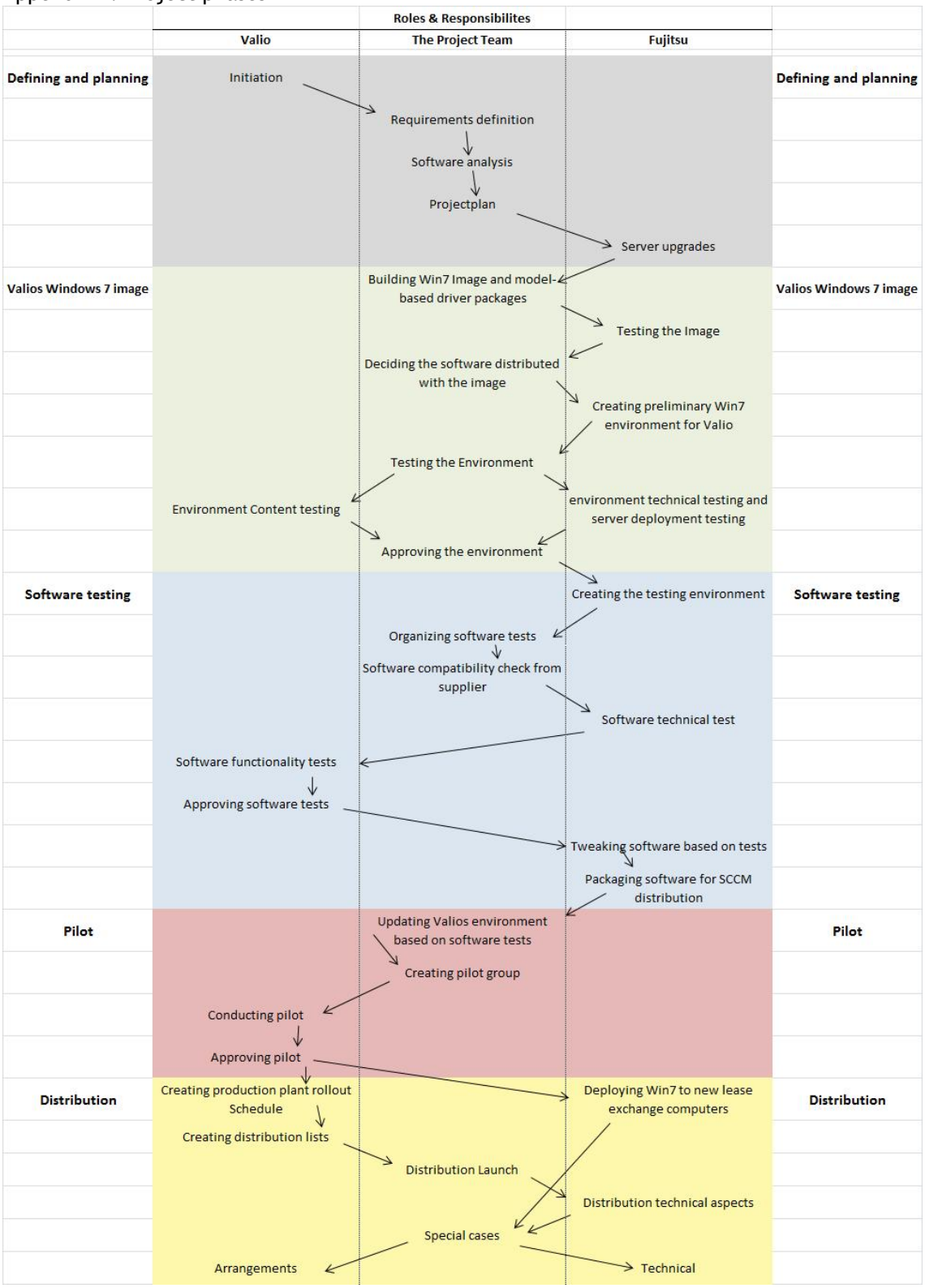
Appendixes

Appendix 1: Project phases



Appendix 2: Interview Questionnaire
Appendix 3. Interview questionnaire in English

Appendix 1: Project phases

Appendix 2. Interview questionnaire in Finnish

1. Perustiedot

- Vastaajan rooli projektissa?
- Aikaisempi kokemus vastaavista projekteista?

2. Projektin taustat

- Miksi päädyttiin päivittämään nykyinen käyttöjärjestelmä?
- Kuka asiasta päätti?
- Oliko asia kauan vireillä ennen kuin se laitettiin toteutukseen?
- Kuinka uusi käyttöjärjestelmä valittiin? Miksi päädyttiin Windows 7 käyttöjärjestelmään?
- Oma näkemys projektitiimin koostamisesta.

3.Projektin toteutus

- Mitä projektilla tavoitellaan? Mitä muuta käyttöjärjestelmäpäivityksen lisäksi projektilla tavoitellaan?
- Mikä on Windows 7 hankkeen merkitys vastaajalle?
- Mietittiinkö muita vaihtoehtoja? Mitä ne olivat?
- Mitenkä projektia lähdettiin toteuttamaan? Ketä konsultoitiin asiassa?
- Minkälaisia työkaluja projektin toteuttamiseen käytettiin ja mietittiinkö muita vaihtoehtoja?

4.Projektin päätös

- Täyttyivätkö Projektille asetut oletukset?
- Poikkesiko lopputulos alkuperäisestä näkemyksestä?
- Jäikö jotain alkuperäisestä ideasta toteuttamatta?
- Mikä on vastaajan oma arvio projektin onnistumisesta?
- Mitä tekisit nyt toisin? Miksi?
- Vastaajan palaute

Appendix 3. Interview questionnaire in English

1. Basic information
- Interview respondents role in project?
- Previous experience about similar projects?

2. Project Backgrounds
- Why was current operating system in need of update?
- Who did decide about updating current operating system?
- When was the idea of updating current operating system discussed first time?
- How the new operating system was chosen? And why Windows7?
- Interview respondents' personal opinion about project team

3. Project execution
- What was the goal of the project? Where there any other goal besides operating system update?
- What was the significance of the project to respondent?
- Were other possible options considered? If so what they were?
- What were the first steps when project was launched? What parties were consulted?
- What kind of tools were used during project execution and where there other options that were considered?

4. Project conclusion
- Did project manage to fill the expectations set to it?
- Did the results gained from the project deviate from original vision?
- Was there part of original vision that was not fulfilled?
- Interview respondents' personal opinion about the success of the project
- What would you do differently now? Why?
- Interview respondents' feedback