**Project Initiation Document**

Client Company: Plaintech

Project VIRT team 6

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Summary

ITopia took on a project offered to them by Plaintech UK called ‘Project Virtualisation’. Plaintech UK gave ITopia a Request for Proposal (RfP), in which they ask if ITopia can make a virtualised platform for their company which Plaintech UK’s clients can use to create and use their own virtual servers. Plaintech UK wishes to use physical servers in combination with virtualization technology to achieve this goal.

The requirements to the virtualisation technology set by Plaintech UK are as follows;

* The software used should be familiar to Plaintech UK’s employees. This should reduce education costs and make it easier for them to understand and implement the software.
* A customer must be able to change their server’s resources, for example through a graphical user interface. If the customer wishes for more resources they should be able to change it and have access to this in a short time span.
* The virtualization software must be easy to work with. This can be achieved through a user-friendly graphical user interface for the (technical) staff and customers of Plaintech.

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# Introduction

In this chapter we will give an introduction to Project Virtualisation is, what the purpose of this document is and the method we will use throughout the project.

## ITopia

ITopia is a company with fast experience in the System & Network Engineering field. They often particularly specialise in Open Source and UNIX based solutions.

ITopia is part of the Hogeschool van Amsterdam which allows them to keep up to date with the latest developments in technology.

ITopia’s Team 6 is one of the teams currently working on projects for different companies, in their case Plaintech UK.

## Project Virtualisation

Project Virtualisation is the result of a proposal made by Plaintech UK to ITopia. We were given the task to create a virtualisation platform for Plaintech UK. The purpose of the virtualisation platform is to make it easier for the customer to work with their (virtual) server. Plaintech UK also requested for more than one operating system for the virtual servers so that their clients can choose between a couple of Windows and Linux versions. The result of this project should be a working virtualisation platform which is both flexible and user-friendly with a graphical user interface.

## Purpose of this Document

This document should provide ITopia’s client, Plaintech UK, insight in what we are doing to bring them their requested product in every stage of the project. This will also allow them to review and judge their plans if needed. Once approved by Plaintech UK, this will also be our guideline throughout the project.

## Prince2 Method

Within this project we use the Prince2 method. Prince2 stands for Projects IN Controlled Environments 2. This method allows us to build up a project in a certain structure. Prince2 consists of 7 principles, themes and processes, which we will use as a guidline from the start-up untill the end with a roadmap.

# Project Goals

In this chapter we will discuss the goals of Project Virtualisation. This includes several different deliverables which are due in different stages of the process.

## Project Deliverables

The main goal of Project Virtualisation is creating a working virtualisation environment for Plaintech UK which complies with the requirements set by Plaintech UK in the Request for Proposal. Beside the final product, Plaintech UK also has requested the following products that should be delivered at different stages during the project:

* Project Initiation Document (PID)
* Functional Design (FD)
* Technical Design (TD)
* System Documentation
* Implementation Plan (IP)
* The product itself
* Installation guide
* Prototype(s)
* System management guide

Everything we deliver to Plaintech UK will first be reviewed by the ITopia quality assurance (QA) board.

## Details of the Documentation

During the project we will write several documents on the project itself and the final product. Plaintech UK requested that we will deliver the documents with the product during different stages of the project.

1. Project Initiation Document
   * In this document many general aspects about the project are explained such as the cost of the entire project and agreements that were made with Plaintech UK.
2. Functional Design
   * The Functional design should give Plaintech UK insight how the system works when it comes to functionality.
3. Technical Design
   * This should allow Plaintech UK to see how the system works technically. Information such as used protocols and network design will be available in this document.
4. Implementation plan
   * The implementation plan will describe how the platform will be implanted in the future and the results of the implementation of the final product.

## MoSCoW

The platform we are working on must give the customer the ability to create a virtual machine with a user-friendly environment. A customer should also be able to check on the system statuses of the servers. The platform should obviously run in the Plaintech UK environment. An automatized system should be available to send management reports of all ordered virtual servers together with the basic customer information and the order date.

Some of the important things a customer should be able to do is having the ability to choose from at least 2 different Linux versions and one Windows version. They should be able to choose their own amount of RAM and disk space if they see the need for it. And there should be three service levels with the Medium and High service levels supporting daily backups.

|  |  |  |  |
| --- | --- | --- | --- |
| Must | Should | | Could |
| Must haves | **Should haves** | | **Could haves** |
| * Backup system * Fast and simplified * Documentation * Able to change the amount of RAM and disk space * Choice between 3 different operating systems * Choice between 3 different service levels * A tool to monitor the server/system status * Automatized system that updates the ordering system * Works with the required technologies and products | | * High availability * An easy to understand   GUI for customers | * Mail system that sends an e-mail concerning the server |

**Description**

**Must haves:**

* It should be possible to make backups of existing servers
* The system has to be fast and simplified, a customer should not have to go through many pages just to change an element on the server
* Documentation is available for Plaintech UK and its employees so they know how the system has been built and works.
* A customer should have the ability to change the amount of RAM and disk space on their server by just changing some values in the GUI.
* A tool should be available in a customer’s control panel in the GUI that can show the current system and server statuses.
* A customer should be able to choose from at least 2 Linux versions and a Windows version as operating system.
* A system that automatically updates the ordering system and then creates a management report consisting: Customer information with all ordered virtual servers and order dates/status.
* The platform built should work with the in the Request of Proposal specified technologies and products.

**Should haves:**

* The system should be available at all times.
* A graphical user interface (GUI) that has to be simple for any user.

**Could haves:**

* An e-mail system that could send e-mails to customers when something has gone wrong in the server. This way they will be notified when they haven’t checked their server for a while (for example when the server is attacked or is/has been down).

**Want to have but not now:**

# Finance

In this chapter we will discuss the financial aspects of the project and what impact it might have on the finances Plaintech UK. The financial aspects that will be discussed in this chapter are the costs that will be generated by the project, the benefits Plaintech UK will get in terms of finance by starting the project and the Return Of Investment.

## Costs

During our research of the costs that Plaintech UK will have for the project we looked at different options in terms of servers, storage and operating systems to make sure we can consider different options and pick the one that is most suitable for Plaintech UK.

### Servers

Since we do not have any accurate information about what kind of servers Plaintech UK uses or wants to use, we take rack-servers as an example in the price. It is difficult to determine an average price of a server since there are so many different companies that sell them, but in an attempt to determine the average we looked at several different servers that might be possibilities for Plaintech UK.

We determined that the average server that Plaintech UK might use will cost between €1000 and €8000.

An example of a server that costs about €1000 is the [Dell PowerEdge R220](http://configure.euro.dell.com/dellstore/config.aspx?oc=svr220a&model_id=poweredge-r220&c=nl&l=nl&s=bsd&cs=nlbsdt1), and an example of a server that costs about €7000 is the [PowerEdge R630.](http://configure.euro.dell.com/dellstore/config.aspx?oc=per630&model_id=poweredge-r630&c=nl&l=nl&s=bsd&cs=nlbsdt1)

### Storage

The exact amount of disk space needed for the servers depends on the amount of clients Plaintech UK has and how much each client uses, and needs to be changeable whenever they want. Luckily, hard drives are easily changeable and/or easy to install in the servers. The average price of a 500 GB hard drive is €100 and the average price of an 1TB hard drive is €200. Since most servers found in the research have only 500 GB or 1 TB, with few exceptions, We assume that this is the average amount of GB a rack-servers have.

### Operating Systems

The operating systems that Plaintech UK wants to use are mostly variants of Linux and thus free, however since the option to use at least one version of Windows needs to be available for clients there will be costs tied to this as well. The most recent version of Windows Server, Windows Server 2012 R2 Datacenter, will cost ($6155) €4762. We chose the Datacenter version because it has an unlimited amount of virtual instances according to [Microsoft](http://www.microsoft.com/licensing/about-licensing/virtualization.aspx). The servers themselves will have Linux Debian as operating system because this is widely used as server operating system and most likely will be easiest to implement.

### Total Costs

The amount of storage used per client completely depends on the clients and the limits set by Plaintech UK. If clients would only use low amount of storage (e.g. 1 GB to 5 GB p.p.), the total amount of hard drive space would be less than if the clients would use a higher amount of storage (e.g. 50 GB to 100 GB p.p.). To calculate roughly how much storage would be used in total, we assume that every client will get 30 GB of disk space on their virtual machine. The amount of clients is roughly 50000; 50000 x 30 = 1500000 GB (= 1500000 / 1000 = 1500 TB). Since the average rack-server can contain two hard drives of about 1 TB each, we will divide the amount of used space over the hard drives; 1500 / 2 = 750 Servers

Please refer to the table below for the rough estimate of the total costs.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Amount | Cost Low | Cost High |
| Servers | 750 | € 750000 | € 5250000 |
| Hard Drives | 1500 | € 300000 | € 300000 |
| Operating System | ~ | € 4762 | € 4762 |
| Total |  | € 1054762 | € 5554762 |
| Average Total |  | € 3304762 | |

## Costs

During our research of the competition of Plaintech UK we discovered that different companies offer varying options for very different prices. Since the competition is so diverse, we looked closer at companies that seem most comparable to Plaintech UK in order to discover what price we should put on the virtual servers to have a competitive place in the market, but still make money on the virtual servers.

### Price Comparison

Out of the seven companies that we deemed most comparable to Plaintech UK, [Tilaa](https://www.tilaa.com/?gclid=CjwKEAjwv9-gBRD5ofn2jd2N0UUSJACcdilsXzkS1x8VtF8KDKKGEYny_Xn0V8ERcoWjDbWXNnU66hoC3lHw_wcB) and [iXL Hosting](https://www.ixlhosting.nl/servers/vps/) have the most varied options. They offer their clients to pick the amount of storage space and the amount of ram that they want.

To be able to determine the price Tilaa and iXL Hosting ask per GB we need to look at their different options and calculate average prices (see tables on the next page).

However Tialaa has more options for their clients, the options themselves are more limited and less powerful than the servers of iXL Hosting hence the difference in price.

**Tilaa:**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RAM  v | Storage  -> | 20 GB | 60 GB | 160 GB | 320 GB | | | 480 GB | | 1280 GB | average |
| 1 GB | **total** | € 8.80 | € 10.60 | € 14.20 | € 27.40 | | | € 28.60 | | € 64.60 | € 25.70 |
| 4 GB | **total** | € 19.80 | € 21.80 | € 25.20 | € 32.40 | | | € 39.60 | | € 75.60 | € 35.73 |
| 8 GB | **total** | € 37.80 | € 39.80 | € 43.20 | € 50.40 | | | € 57.60 | | € 93.60 | € 53.73 |
|  |  |  |  |  |  | | |  | Total average: | | **€ 38.39** |
| 1 GB | **Per GB** | € 0.44 | € 0.18 | € 0.09 | € 0.09 | | | € 0.06 | | € 0.05 | € 0.15 |
| 4 GB | **Per GB** | € 0.99 | € 0.36 | € 0.16 | € 0.10 | | | € 0.08 | | € 0.06 | € 0.29 |
| 8 GB | **Per GB** | € 1.89 | € 0.66 | € 0.27 | € 0.16 | | | € 0.12 | | € 0.07 | € 0.53 |
|  |  |  |  |  |  |  | Average per GB: | | | | **€ 0,32** |

**iXL Hosting:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| RAM  v | Storage  -> | 20 GB | | | 60 GB | 100 GB | average |
| 1 GB | **total** | € 17.75 | | | € 33.25 | € 49.25 | € 33.42 |
| 4 GB | **total** | € 32.25 | | | € 48.25 | € 64.25 | € 48.25 |
| 8 GB | **total** | € 52.25 | | | € 68.25 | € 84.25 | € 68.25 |
|  |  |  |  | Total average: | | | **€ 49,97** |
| 1 GB | **Per GB** | € 0.89 | | | € 0.55 | € 0.49 | € 0.64 |
| 4 GB | **Per GB** | € 1.61 | | | € 0.80 | € 0.64 | € 1.02 |
| 8 GB | **Per GB** | € 2.61 | | | € 1.14 | € 0.84 | € 1.53 |
|  |  |  |  | Average price per GB: | | | **€ 1.06** |

Other companies that we compared have fewer options for their clients, and/or fixed options. These companies are [Versio](http://www.versio.nl/cloudbox.php), [Hostnet](https://www.hostnet.nl/virtual-private-servers/vps-prijzen-en-bestellen), and [TransIP](https://www.transip.nl/vps/?gclid=CjwKEAjwv9-gBRD5ofn2jd2N0UUSJACcdilscxnoS4bv19vX1GKBEGg8sRe_YGn8_omBECB-YWT9FRoCXlTw_wcB#specificaties). Out of those companies Version has the most options for their client. What stands out in their options is that the amount of RAM is roughly the same as the amount of storage and with every GB you go up, you pay ten extra euros (see the first table below). Hostnet has only five options for their clients in terms of VPS’s. The price of their VPS’s doubles as the amount of storage doubles (see the second table below). TransIP has only three options for their clients, but the difference between them and every other hosting company we looked at is that they offer SSD’s (Solid State Drives) instead of HDD (Hard Disk Drives). Their prices are therefore a bit different as well (see the third table below).

1. **Versio:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Storage  -> | 100 GB | 500 GB | 1000 GB | 1500 GB | average |
| RAM | 1 GB | 5 GB | 10 GB | 15 GB |  |
| price | € 9.99 | € 49.99 | € 99.99 | € 149.99 |  |
| p.p. GB | € 0,10 | € 0,10 | € 0,10 | € 0,10 | € 0,10 |

1. **Hostnet:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Storage  -> | 25 GB | 50 GB | 75 GB | 150 GB | 300 GB | average |
| RAM | 1 GB | 2 GB | 4 GB | 8 GB | 16 GB |  |
| price | € 10 | € 15 | € 30 | € 60 | € 120 |  |
| p.p. GB | € 0,40 | € 0,30 | € 0,40 | € 0,40 | € 0,40 | € 0,38 |

1. **TransIP:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Storage  -> | 50 GB | 150 GB | 300 GB | average |
| RAM | 1 GB | 4 GB | 8 GB |  |
| price | € 10 | € 20 | € 50 |  |
| p.p. GB | € 0,20 | € 0,13 | € 0,17 | € 0,17 |

As we can see the prices vary per company from €0,10 to €1,06. The difference between the prices is caused by the hardware used for the servers. Stronger servers cost more money and thus also cost more money for the clients.

Since Plaintech UK wants to take a competitive place in the market, it would be advisable to ask a price per GB that would just be below the average price other providers ask per GB.

In the table below we will calculate the average price per GB other providers ask.

**Average price per GB:**

|  |  |
| --- | --- |
| Company: | Price per GB: |
| iXL Hosting | € 1, 06 |
| Hostnet | € 0,38 |
| Tilaa | € 0,32 |
| TransIP | € 0,17 |
| Versio | € 0,10 |
| Average per GB | € 0,41 |

### Proposed Asking Price

As calculated above, the average price per GB of the companies that we researched is € 0,41 per month. To take a competitive place in the current market, Plaintech UK should ask a price just underneath the average per GB.

Some companies ask different prices per GB for different operating systems. This might be because a Linux license is free and for a Windows license costs some money. This might be a good idea for Plaintech UK as well, considering that they want to make profit as soon as possible.

Our proposal for the price per GB Plaintech UK should ask for is € 0,30 per month for Linux operating systems and € 0,35 per month for Windows operating systems. This way Plaintech UK take a competitive place in the market, but still make enough money to earn back the costs made and eventually profit from it.

## Return of Investment

To calculate a return of investment, we need to ask ourselves a few questions.

* To what extend is the investment effective?
  + The effectiveness of the investment is yet to be decided.
* What are the direct costs?
  + The direct costs are € 3304762 in total (see Chapter 3.1.4)
* What are the indirect costs (personnel, power, etcetera)?
  + The indirect costs are yet to be decided, it mostly depends on the costs of the personnel.
* What are the possible ‘opportunity costs’ (incomes that might be missed due to choosing a different method)?
  + The ‘opportunity costs’ are yet to be decided.
* To what extend is the investment efficient (or could we have done something more efficient for the same amount of money?
  + The efficiency of the investment is yet to be decided.
* Is the investment justified (does it generate enough money for the company)?
  + If the investment is justified is yet to be decided.

The € 3304762 that are invested by Plaintech UK can be earned back by receiving money from their clients for making use of the servers. 50000 clients we assume they all use an average of 30 GB per person; 50000 x 30 = 1500000 GB. We also assume that the GBs are divided equally over Windows and Linux operating systems. 1500000/2=750000 GB per operating system.

750000 x 0,35 = € 262500 for Windows operating systems.

750000 x 0,30 = € 225000 for Linux operating systems.

262500 + 225000 = € 487500 total per month.

The following graph and table show how much time it would take to earn back the invested money using our proposed asking price per GB.

|  |  |  |
| --- | --- | --- |
| Month | Money earned | Still needed to break even |
| 0 | 0 | 3304762 |
| 1 | 487500 | 2817262 |
| 2 | 975000 | 2329762 |
| 3 | 1462500 | 1842262 |
| 4 | 1950000 | 1354762 |
| 5 | 2437500 | 867262 |
| 6 | 2925000 | 379762 |
| 7 | 3412500 | -107738 |
| 8 | 3900000 | -595238 |

In the graph and in the table we can see that it would take less than 7 months to earn back the money invested in the project. From 7 months on profit will be made from the project.

Solely based on the information we have, we can predict the return of investment for the upcoming four years. This does not, however, contain wages, storage of the servers, electricity and/or other costs.

In the third year, the servers and all the hardware will be replaced. We assume that the costs of the new hardware are roughly the same as the costs of the hardware in the beginning.

|  |  |  |
| --- | --- | --- |
| Year | Money earned | Money invested |
| 0 | 0 | 5554762 |
| 0.5 | 2925000 | 5554762 |
| 1 | 5850000 | 5554762 |
| 1.5 | 8775000 | 5554762 |
| 2 | 14625000 | 5554762 |
| 2.5 | 23400000 | 5554762 |
| 3 | 38025000 | 11109524 |
| 3.5 | 61425000 | 11109524 |
| 4 | 99450000 | 11109524 |

Here we used the “more expensive” servers (see chapter 3.1.4.) to show that the money that will be invested will be earned back rather quickly.

Also, you can see that in year 3 the servers are replaced and the invested money is therefore doubled.