Infrastructure Project Design Document



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# Agreements – made with tutor

1. Present what we have done from week 2 to 5 in week 6.
2. Present what we have done from week 7 to 9 in week 10.
3. If there are any issues regarding the server or hardware, contact Bart van der Zanden or Andrius Kuprys.

# Requirements

## What should the system be able to do?

We have been tasked with developing an infrastructure for one of their clients by the company 'Make IT Work4U.' Our business client is a small business with part-time employees. Our client will use the infrastructure we develop to serve their own clients.

The customer is supposed to access the Windows virtual machines via Thin clients. One of the virtual machines hosts an active directory, DHCP server, and database server, while the other hosts a Windows client.

Each user should have access to his or her own home folder on the server.

Each file must be backed up to an external server to ensure that no data is lost in the event of a disaster.

Employees who travel abroad should have the ability to read and edit files while away from the office.

Remote desktop should be used to synchronize desktop files.

Make IT Work4U would like to monitor the operation of all systems.

As a result, we must establish a management application for their infrastructure and that of their clients.

Our client anticipates that we will eventually create an environment in which everyone can connect to the server and have their own workstation.

Management should establish a personal connection to active directory.

Our backup policy will be developed to safeguard all servers and their associated data in the event of a significant incident.

Additionally, a real-time dashboard with server and client statistics and key performance indicators (KPIs) will be used to manage and improve existing infrastructures and processes.

## Group them by

**Inner configuration:**

1. Every room has their own LAN.
2. Tenants should be able to connect with cable.
3. The infrastructure should have a working DHCP server.
4. The infrastructure should have a working DNS.
5. The infrastructure should have a working NAT.

**Outer configuration**

1. Set up the Raspberry Pi
2. Set up the Pi-hole to block ads
3. Connect IoT devices
4. Crimp our own ethernet cables

## Prioritize them

1. Infrastructure/Architecture diagram, define its communication.
2. Install Windows server with Hyper-V.

Add AD and DHCP to the host.

Configure AD Group Policies:

\* Enable Folder Redirection for user’s “Desktop”

\* Prevent changes to proxy settings on Internet Explorer

on every user’s machine.

Create multiple new users to test the system.

Create one custom Group (for sales users) and add few

employees to it.

1. Install one Windows desktop machine and connect it to AD.
2. Create backup policy to backup all servers and their data, using host and
3. agent-based backup strategies
4. Configure Firewall (gateway) to connect local private network to the Internet.
5. Set up VPN connection for remote employee
6. A management dashboard for all real-time statistics of server and
7. system’s KPI
8. A management dashboard to check all logs of system’s state
9. Security management analysis

Not mandatory:

1. A management dashboard for virtual clients

2. A database management CRUD application

3. An event and incident management system to alert in case of infrastructure component failure

4. In every client host use SCP to send monitoring activity log files (SQLite DBs) to the server

5. Self-signed certificates for web servers

# System setup

## Describe the architecture of your system

Our first task was to install Hyper-V. After successful enabling of the software for virtualization, we had to restart our server. And this is when the first problem came. The IP for the server changed and we could not connect to it via the Remote Desktop Connection application. After researching the problem, we learned that this is a random bug from Microsoft. The next step was creating a VM with the Hyper-V and installing Windows Server on it. We configured our first VM to be an AD/DC. Our only issue with it was navigating through its options, as this was new for us. Continuing o

After careful research of the physical ports in the building, we found which ports are working. Because of the limited working ports, we used a switch so that the other groups can work parallel with us. We swapped 3 routers until finding a working one. Then we changed the IP of the router so that we can connect to the LANs of the other groups. Also, we configured the DHCP pool of IP addresses in the router to our desired, 192.168.218.80-89 with a netmask of 255.255.255.0. After connecting the Raspberry Pi to our LAN, we set its IP address to be static, because we are using it as a DNS and a webserver. We installed the adblocker software, Pi-Hole, on the Raspberry Pi. The Pi-Hole manages to block inside our LAN most of the annoying advertisements on the internet. Another piece of software that we installed is the one that makes the Raspberry into a web server, Apache. With Apache, we are hosting our own website, which contains information about ourselves. And we connected an IoT device, the Philips Hue lightbulb, to our LAN. This lightbulb can be controlled from a preinstalled application on our phones. Also, when you set up the location of your home in the app, the lights will automatically turn on when own website, which contains information about ourselves. And we connected an IoT device, the Philips Hue lightbulb, to our LAN. This lightbulb can be controlled from a preinstalled application on our phones. Also, when you set up the location of your home in the app, the lights will automatically turn on when you're almost home.

# Network configuration

## Network drawing and description

Diagram

Description automatically generated

## Description of the services

Our LAN has 3 PCs connected wirelessly/wired to our router. The router has NAT and DHCP. We have Raspberry that we use as webserver and Ad blocker (Pi-Hole). The Webserver contains website with a brief information of us. The Pi-hole acts as our DNS server to filter the ads from the Internet. Also, we have an IoT devices, the Philips Hue Lightbulb. This device can be controlled from all other devices on the network. The gateway of all LANs is the router of the uni with IP of 192.168.218.1. We are connected to the LANs of the other groups, and we have access to their webservers.

# GUI

## Image and description

Graphical user interface

Description automatically generated

The main dashboard gui of pihole shows some statistics and a wide range of settings buttons

Graphical user interface, text, application, email

Description automatically generated

There is a query log where it shows you all the query’s being send and also a option to whitelist or blacklist them

Graphical user interface, text, application, email

Description automatically generated

In the settings tab under blocklists you can find the lists that need to be updated in order for the pi hole to block ads

Graphical user interface, text, application, email

Description automatically generated

Here we have the network of the router in a list with name connection and ip address

Graphical user interface, text, application, email

Description automatically generated

Timeline

Description automatically generatedHere we have the main dashboard of the router interface with various settings buttons and a overview of the router

Here we have a online monitor showing network traffic in a simple way