

SYSTEMS MANAGEMENT AND PROVISION

Assessment 2

**PowerShell and Cloud Scripting and Research**

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May 17, 2020

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## Part 1

# Windows 2016 Server PowerShell scripting

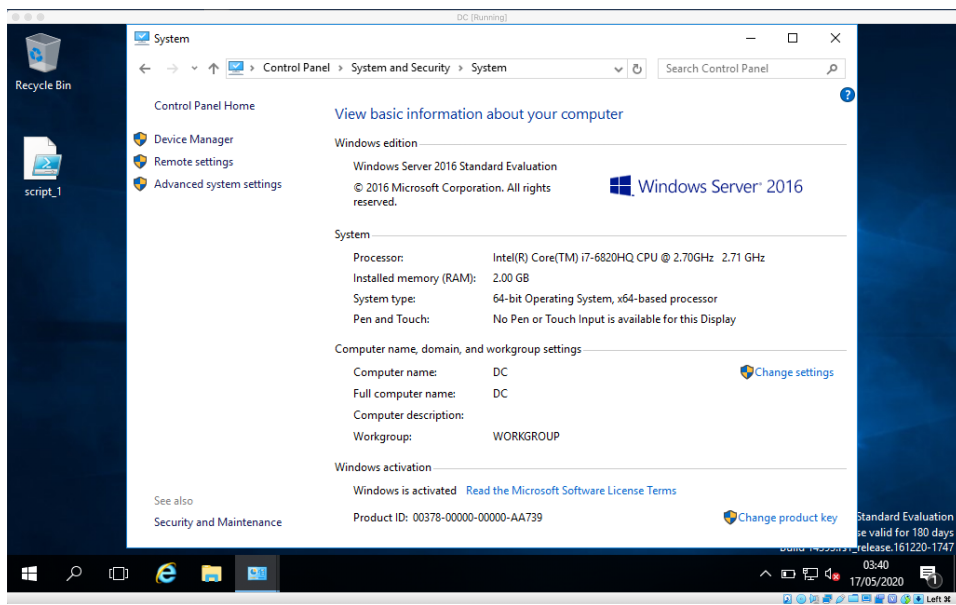
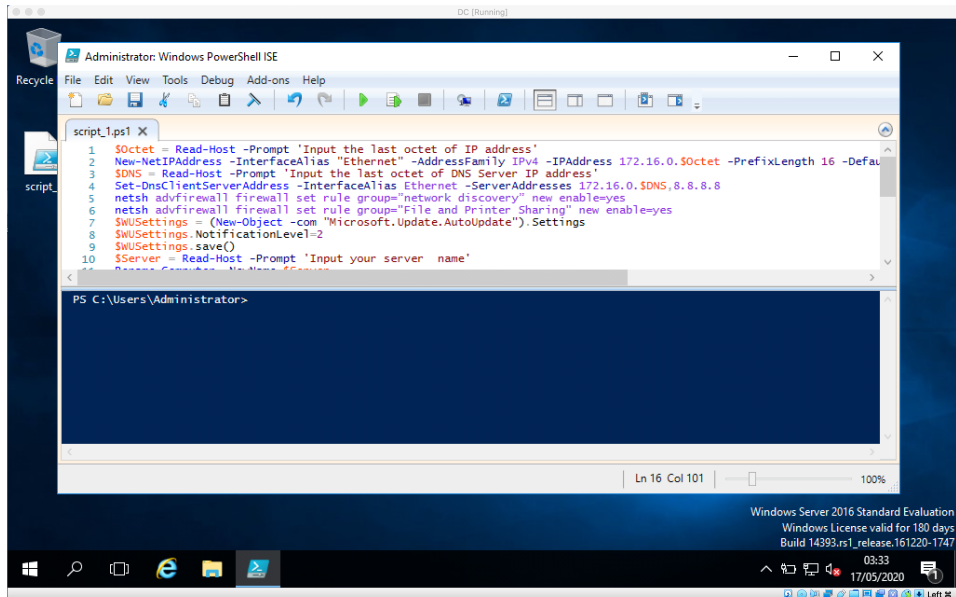
### 1.1 Rapidly provision DC with script 1

Create the PowerShell script from the text file provided.

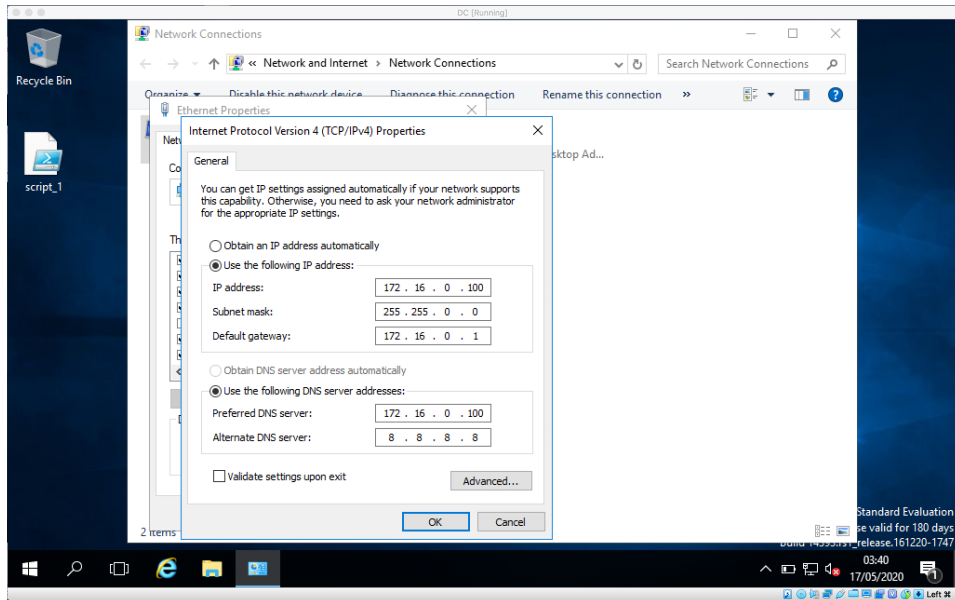
Note: you will need to modify the IP addressing settings inside the script.

For the NIC use:

- IP address: 172.16.0.100/16
- Default gateway: 172.16.0.1
- DNS: 172.16.0.100
- Server Name: DC

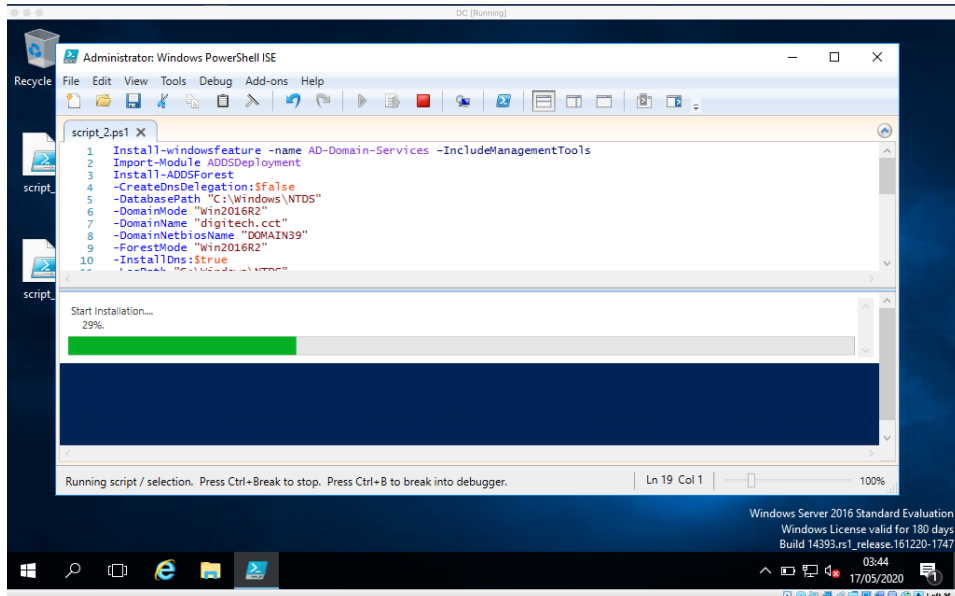


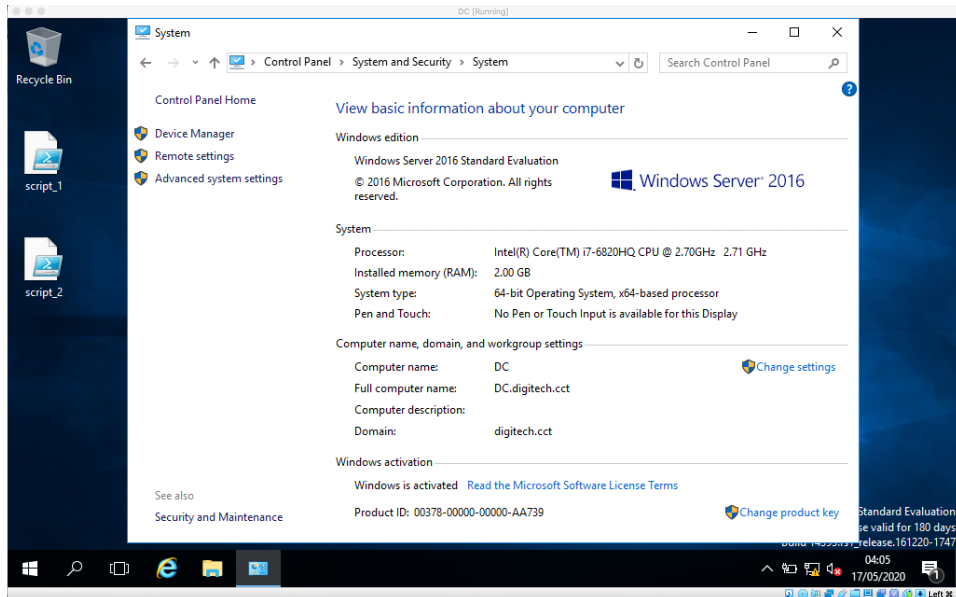




## 1.2 Rapidly convert DC to a Domain controller with script 2

- Set the Domain and Forest modes to Win2016R2 (inside script2)
- Use the Domain name digitech.cct for the domain.
- Let the script run to reboot the server



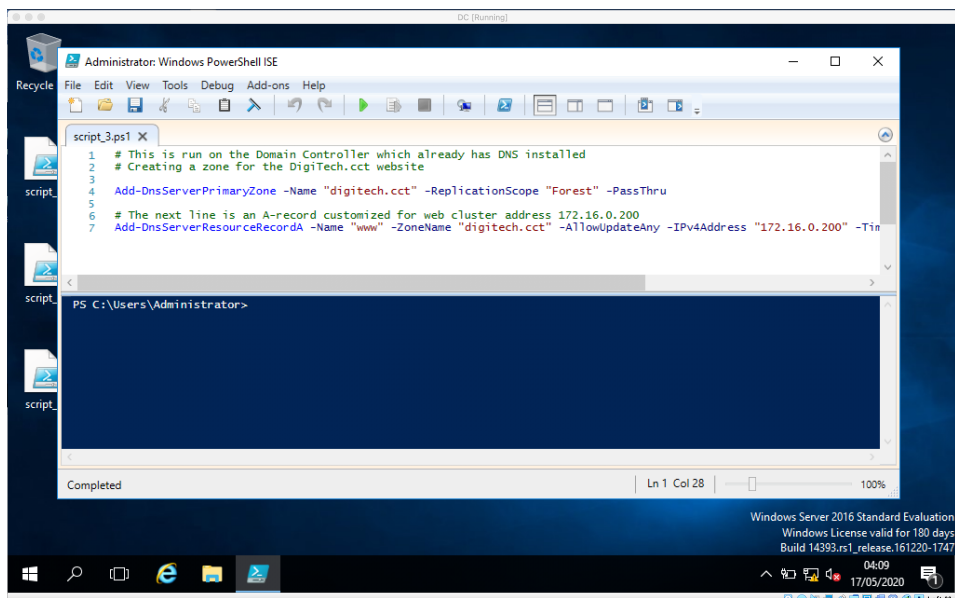


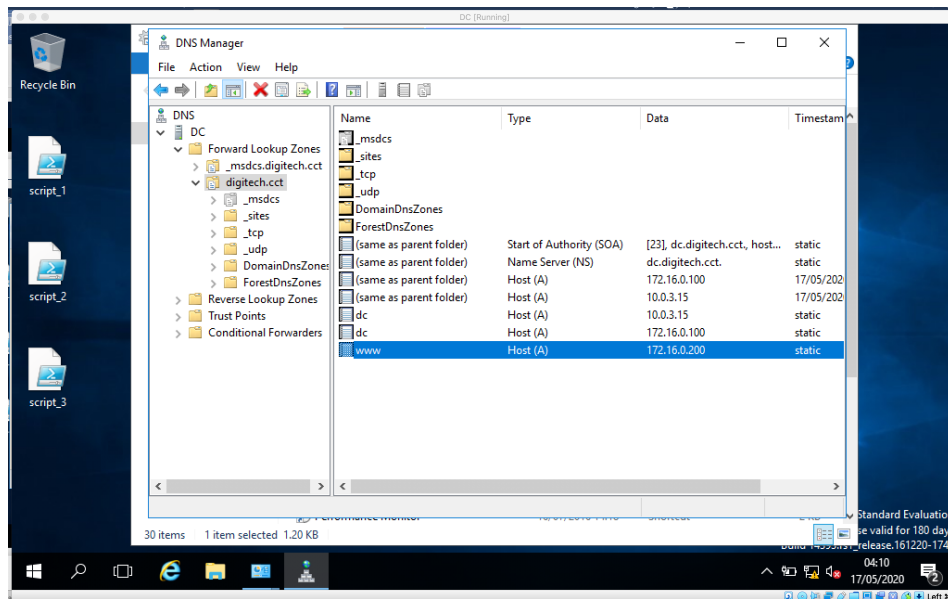
### 1.3 Log in to DigiTech domain on the domain controller

Use script3 to set up DNS settings on DC for the digitech.cct website.

Use the DNS console in Administrative Tools to verify that www now exists in the DigiTech

Forward lookup zone.





## 1.4 Rapidly provision WebServer

Like what you did with DC (modify the script1 text file):

- For the NIC use the IP address: 172.16.0.200/16
- Default gateway: 172.16.0.1
- DNS: 172.16.0.100Server
- Name: WebServer (now let the script run and provision this server)

Do not make WebServer into a domain controller... you will join it to the DigiTech.abc domain.

```
Administrator: Windows PowerShell ISE
file Edit View Tools Debug Add-ons Help
script_1.ps1 X
1 $Octet = Read-Host -Prompt 'Input the last octet of IP address'
2 New-NetIPAddress -InterfaceAlias "Ethernet" -AddressFamily IPv4 -IPAddress 172.16.0.$Octet -PrefixLength 16 -DefaultIP
3 $DNS = Read-Host -Prompt 'Input the last octet of DNS Server IP address'
4 Set-DnsClientServerAddress -InterfaceAlias Ethernet -ServerAddresses 172.16.0.$DNS,8.8.8.8
5 netsh advfirewall firewall set rule group="network discovery" new enable=yes
6 netsh advfirewall firewall set rule group="File and Printer Sharing" new enable=yes
7 $WUSettings = (New-Object -com "Microsoft.Update.AutoUpdate").Settings
8 $WUSettings.NotificationLevel=2
9 $WUSettings.save()
10 $Server = Read-Host -Prompt 'Input your server name'
11 $Name = Read-Host -Prompt 'Input your server name'

PS C:\Users\Administrator>
```

Windows Server 2016 Standard Evaluation  
Windows License valid for 180 days  
Build 14393.rs1\_release.161220-1747  
04:16  
17/05/2020

System

Control Panel Home

- Device Manager
- Remote settings
- Advanced system settings

View basic information about your computer

Windows edition

Windows Server 2016 Standard Evaluation  
© 2016 Microsoft Corporation. All rights reserved.

System

Processor:	Intel(R) Core(TM) i7-6820HQ CPU @ 2.70GHz 2.71 GHz
Installed memory (RAM):	2.00 GB
System type:	64-bit Operating System, x64-based processor
Pen and Touch:	No Pen or Touch Input is available for this Display

Computer name, domain, and workgroup settings

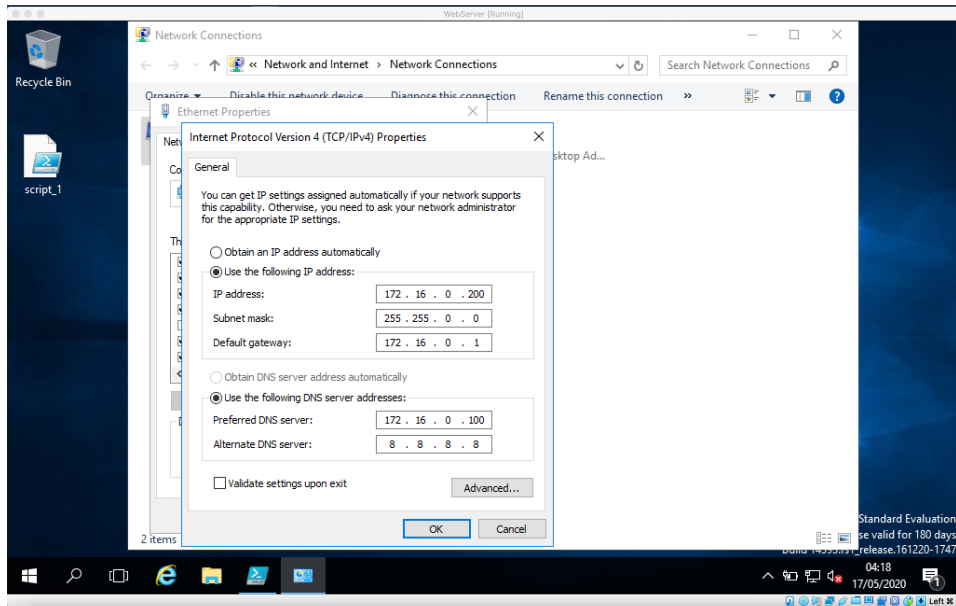
Computer name:	WebServer	<a href="#">Change settings</a>
Full computer name:	WebServer	
Computer description:		
Workgroup:	WORKGROUP	

Windows activation

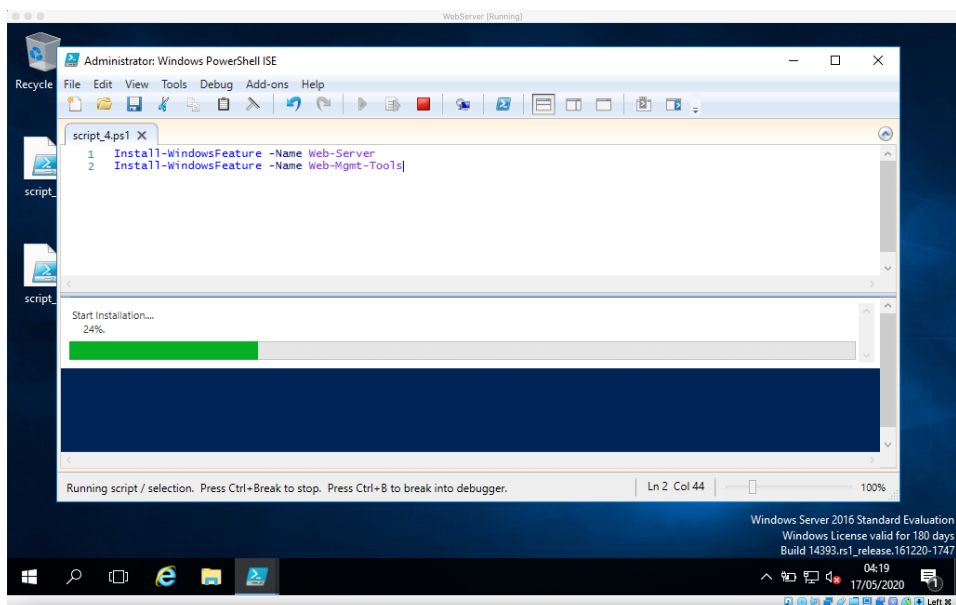
Windows is activated [Read the Microsoft Software License Terms](#)

Product ID: 00378-00000-00000-AA739 [Change product key](#)

Standard Evaluation  
Windows License valid for 180 days  
Build 14393.rs1\_release.161220-1747  
04:17  
17/05/2020

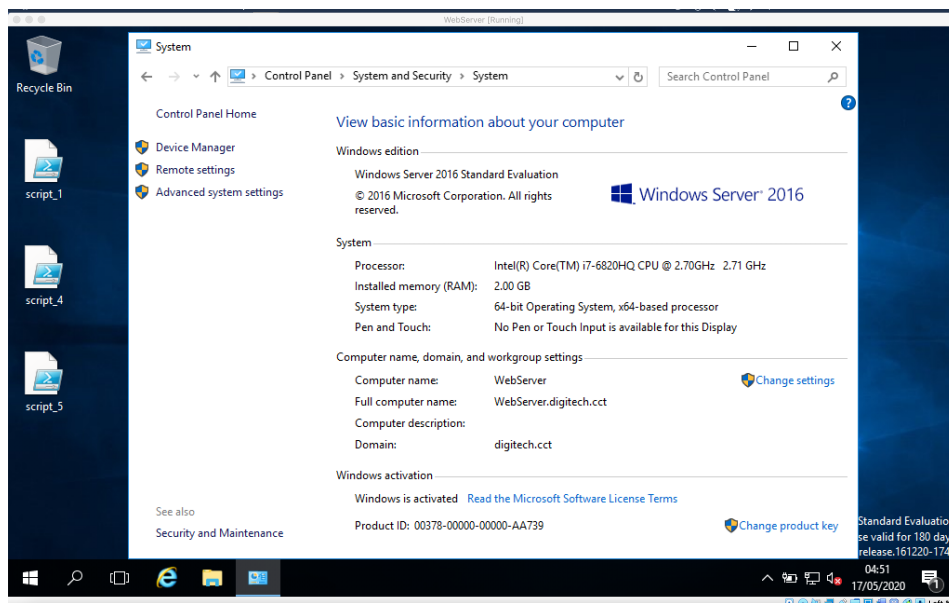
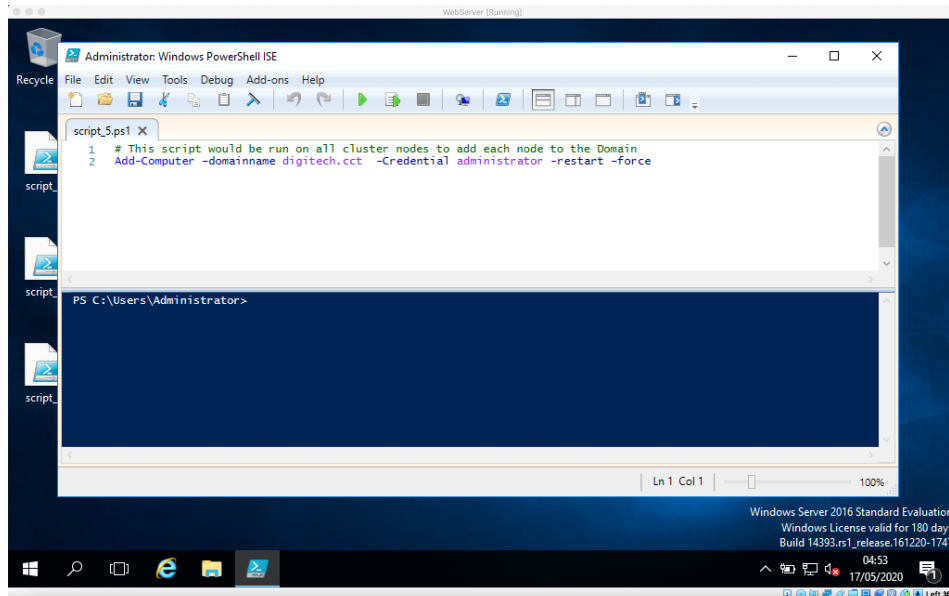


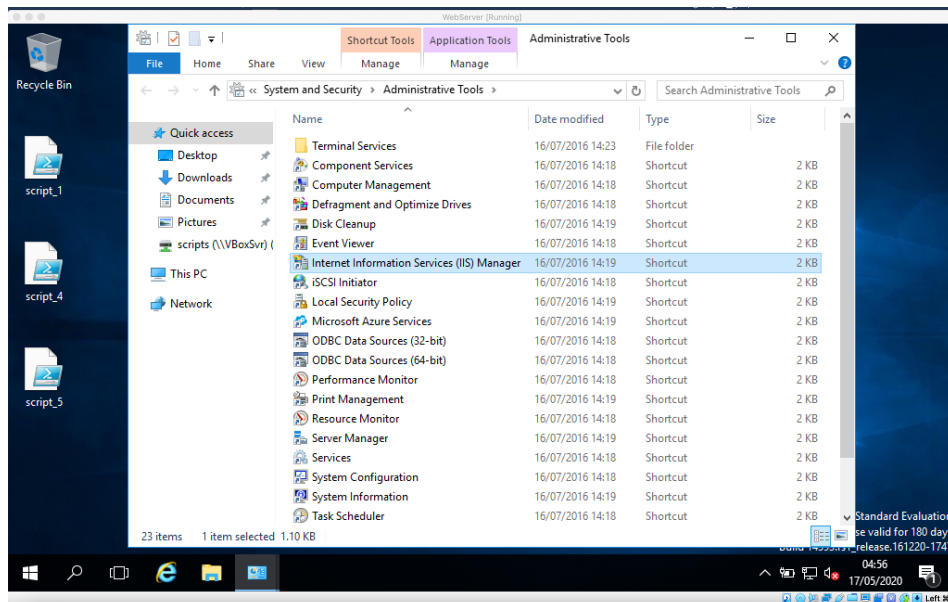
Next, join WebServer to the digitech.cct Domain using PowerShell script 4



## 1.5 Convert WebServer into a web server by using script 5 to add the IIS web hosting to the server

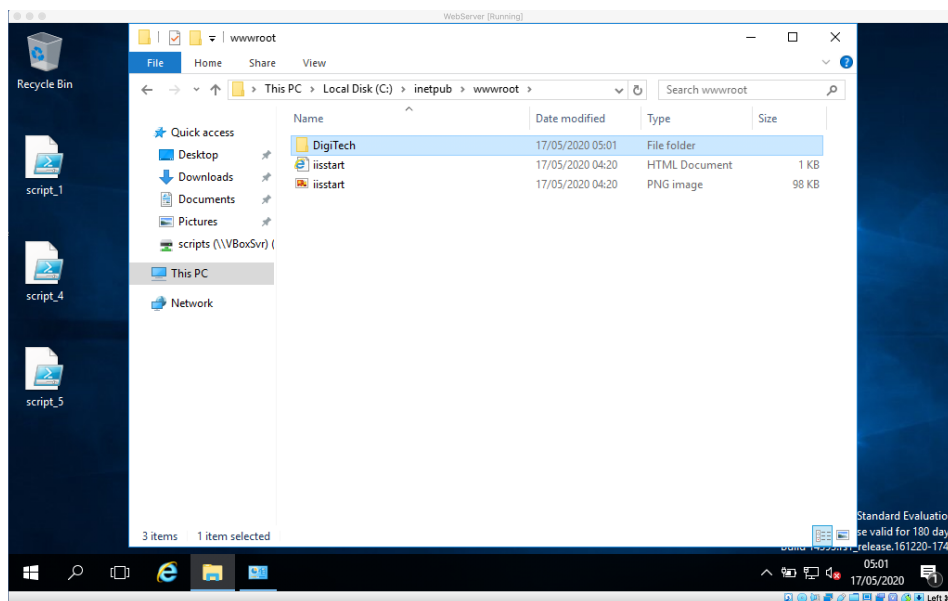
Use Server Manager and Administrative Tools to verify that the IIS web service has been added.

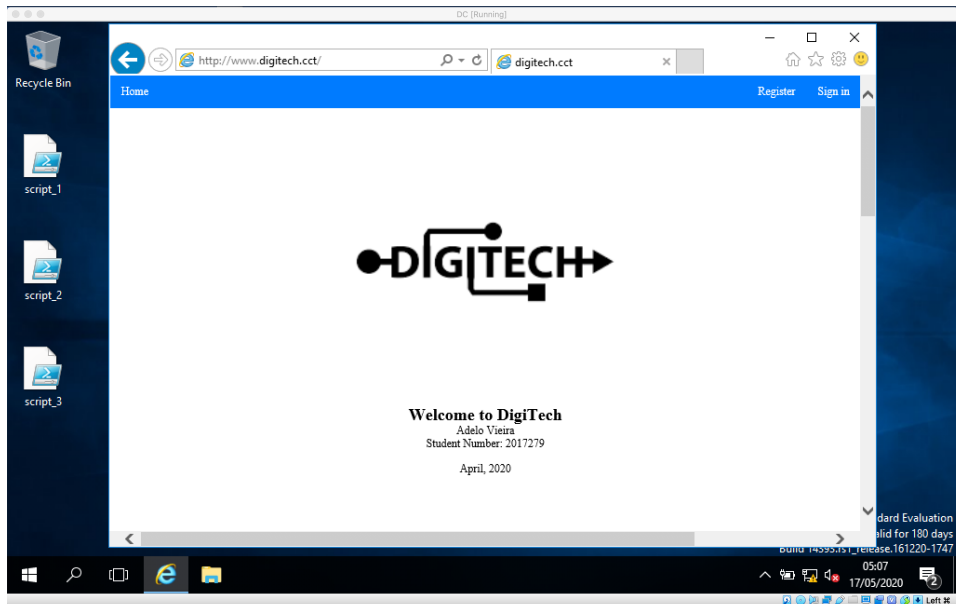
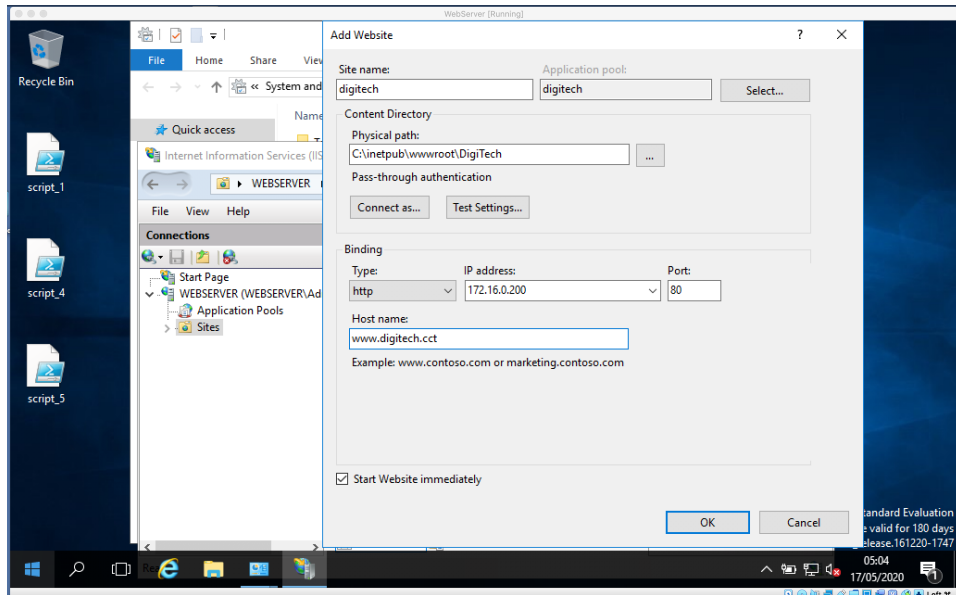




## 1.6 Set up a Digitech.abc website on WebServer using the Digitech web page that you created earlier

Demonstrate that the web site works by using the web browser on the domain controller to access the [www.digitech.cct](http://www.digitech.cct) website.



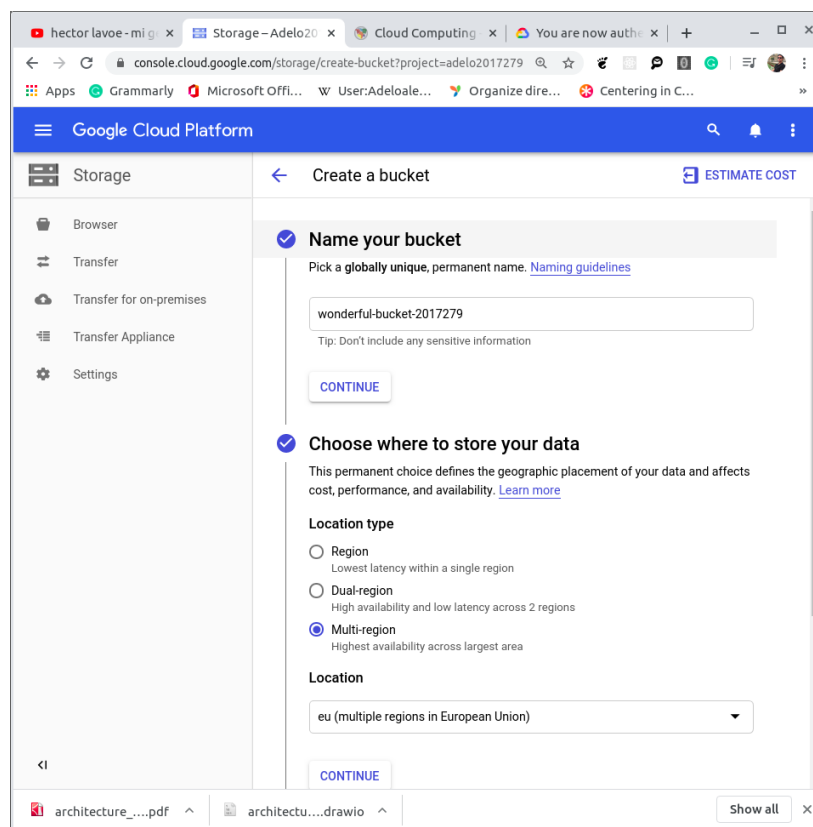




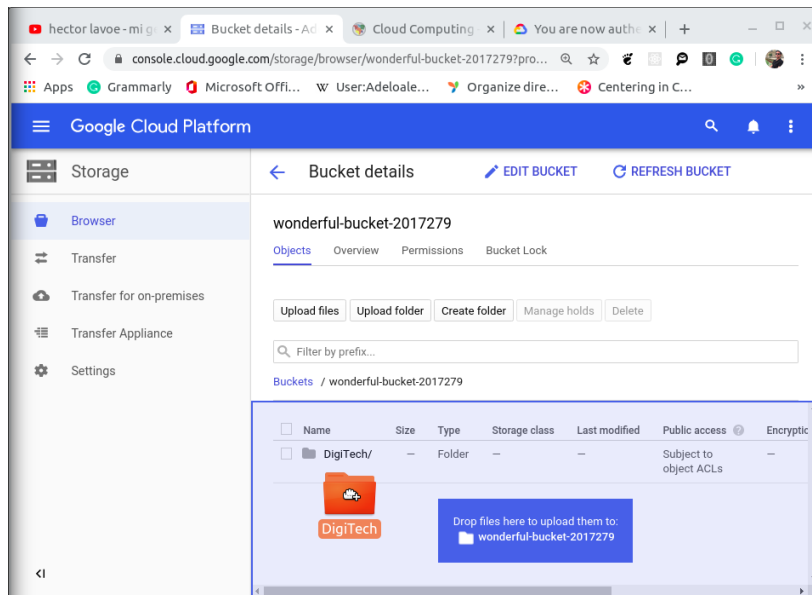
## Part 2

# Web servers and storage in the cloud

## 2.1 Creating a storage bucket

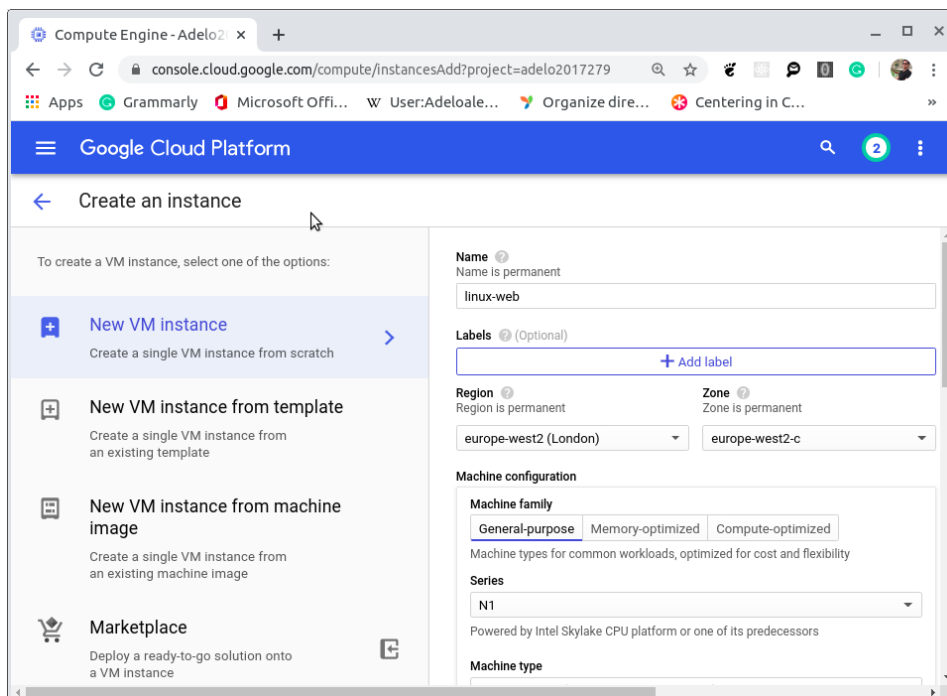


## 2.2 Uploading the Digitech web site on the storage bucket

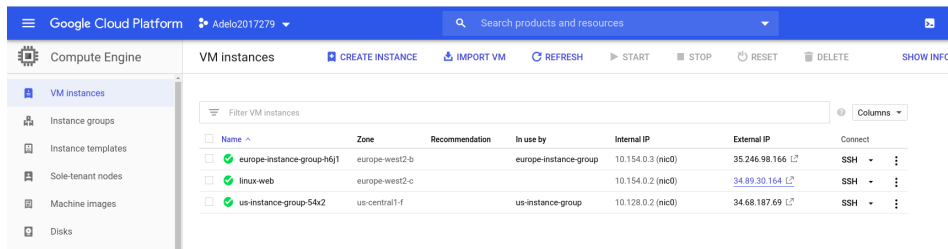
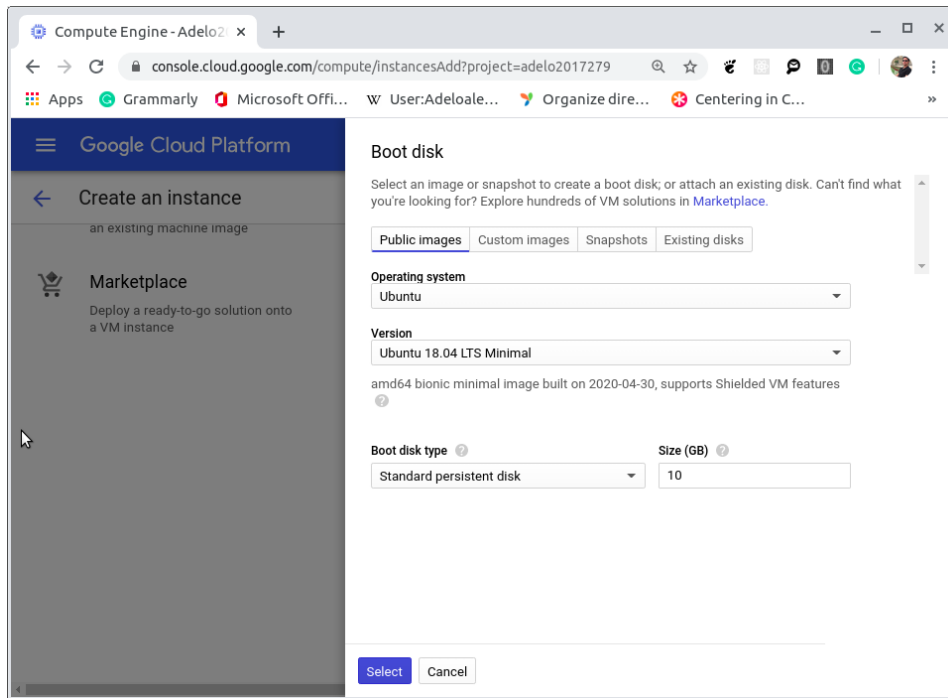


## 2.3 Hosting the DigiTech Website in a Linux Server instance

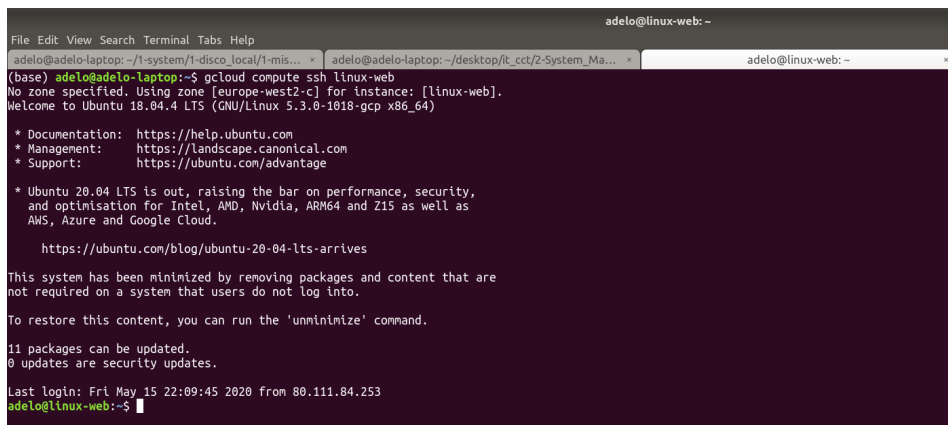
Creating a new Linux Instance:



We have created an Ubuntu 18.04 server:



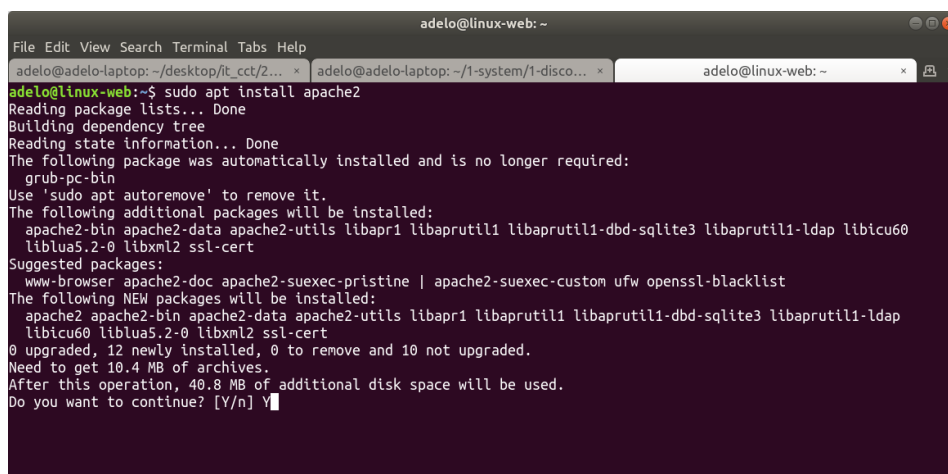
Remotely accessing the linux-web instances using gcloud:



After updating the Ubuntu repositories (sudo apt update), we have installed the necessities packages:

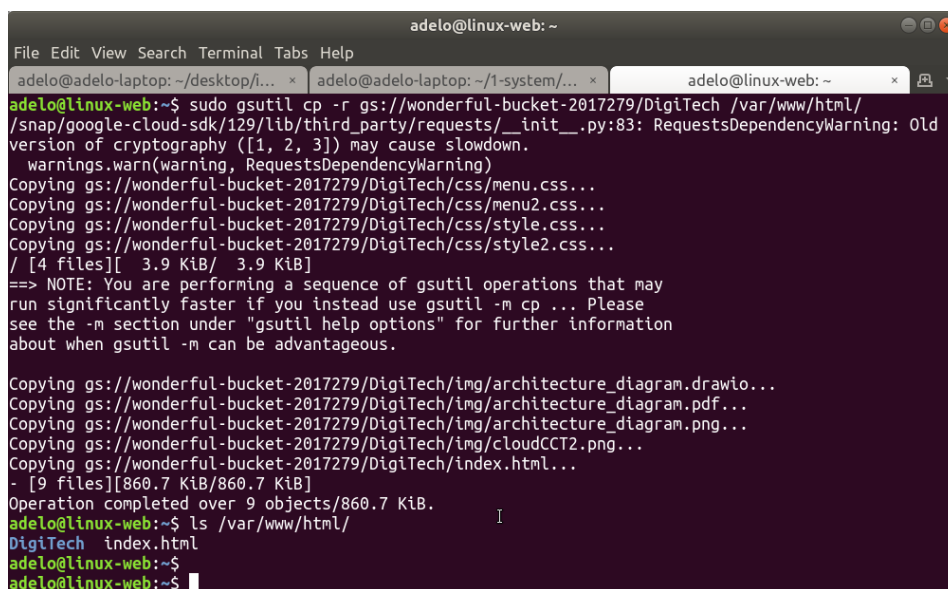
- apache2
- php

In the following Figure, we show the installation of the apache webserver.



```
adelo@linux-web: ~  
File Edit View Search Terminal Tabs Help  
adelo@adelo-laptop: ~/desktop/it_cct/2... x adelo@adelo-laptop: ~/1-system/1-disco... x adelo@linux-web: ~  
adelo@linux-web:~$ sudo apt install apache2  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following package was automatically installed and is no longer required:  
  grub-pc-bin  
Use 'sudo apt autoremove' to remove it.  
The following additional packages will be installed:  
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libicu60  
  liblua5.2-0 libxml2 ssl-cert  
Suggested packages:  
  www-browser apache2-doc apache2-suexec-pristine | apache2-suexec-custom ufw openssl-blacklist  
The following NEW packages will be installed:  
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap  
  libicu60 liblua5.2-0 libxml2 ssl-cert  
0 upgraded, 12 newly installed, 0 to remove and 10 not upgraded.  
Need to get 10.4 MB of archives.  
After this operation, 40.8 MB of additional disk space will be used.  
Do you want to continue? [Y/n] Y
```

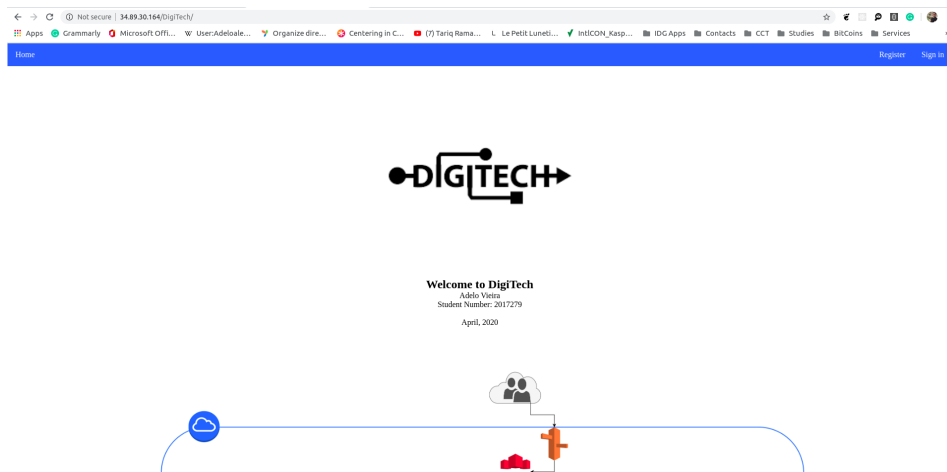
Now, we can use gsutil to transfer our web page from our wonderful bucket to the /var/www/html directory of the linux-web instance:



```
adelo@linux-web: ~  
File Edit View Search Terminal Tabs Help  
adelo@adelo-laptop: ~/desktop/... x adelo@adelo-laptop: ~/1-system/... x adelo@linux-web: ~  
adelo@linux-web:~$ sudo gsutil cp -r gs://wonderful-bucket-2017279/DigiTech /var/www/html/  
/snap/google-cloud-sdk/129/lib/third_party/requests/__init__.py:83: RequestsDependencyWarning: Old  
version of cryptography ([1, 2, 3]) may cause slowdown.  
  warnings.warn(warning, RequestsDependencyWarning)  
Copying gs://wonderful-bucket-2017279/DigiTech/css/menu.css...  
Copying gs://wonderful-bucket-2017279/DigiTech/css/menu2.css...  
Copying gs://wonderful-bucket-2017279/DigiTech/css/style.css...  
Copying gs://wonderful-bucket-2017279/DigiTech/css/style2.css...  
/ [4 files][ 3.9 KiB/ 3.9 KiB]  
==> NOTE: You are performing a sequence of gsutil operations that may  
run significantly faster if you instead use gsutil -m cp ... Please  
see the -m section under "gsutil help options" for further information  
about when gsutil -m can be advantageous.  
Copying gs://wonderful-bucket-2017279/DigiTech/img/architecture_diagram.drawio...  
Copying gs://wonderful-bucket-2017279/DigiTech/img/architecture_diagram.pdf...  
Copying gs://wonderful-bucket-2017279/DigiTech/img/architecture_diagram.png...  
Copying gs://wonderful-bucket-2017279/DigiTech/img/cloudCCT2.png...  
Copying gs://wonderful-bucket-2017279/DigiTech/index.html...  
- [9 files][860.7 KiB/860.7 KiB]  
Operation completed over 9 objects/860.7 KiB.  
adelo@linux-web:~$ ls /var/www/html/  
DigiTech index.html  
adelo@linux-web:~$  
adelo@linux-web:~$
```

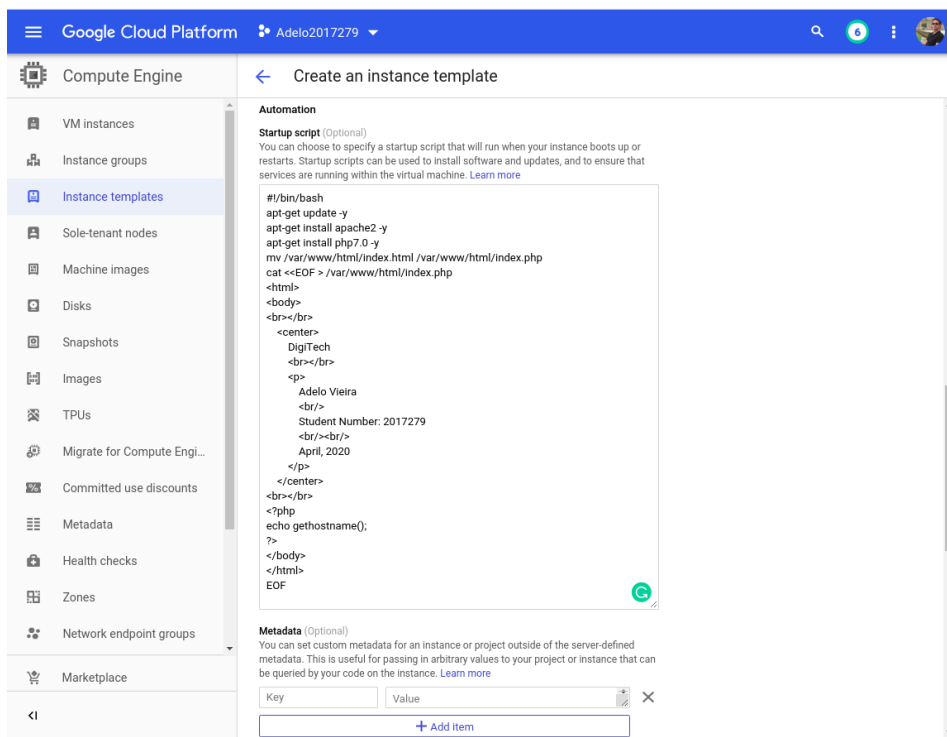
When accessing the Digatech website hosted in linux-web, through the public IP address, we can see our website has

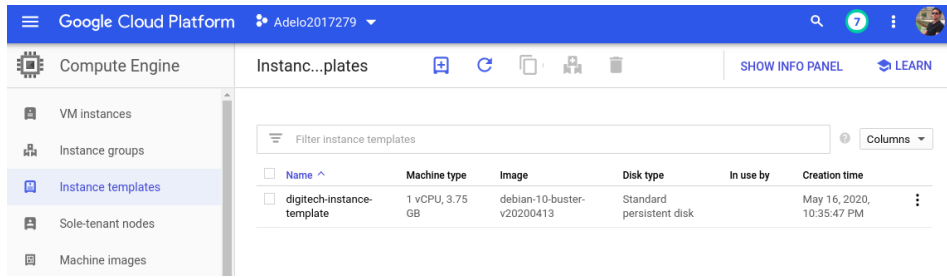
been deployed:



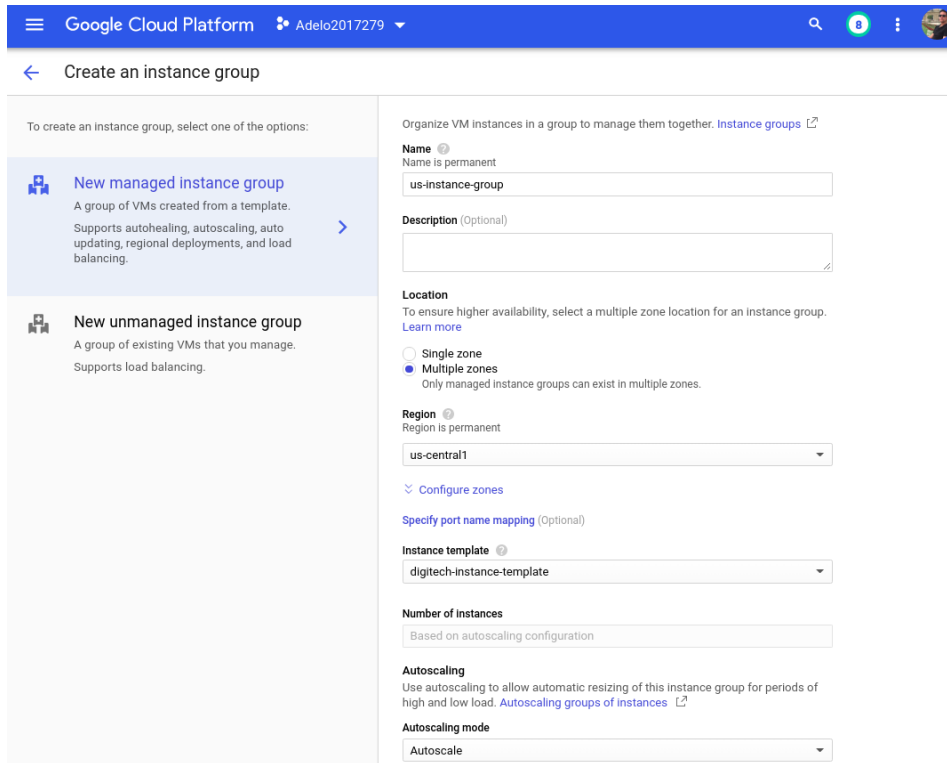
## 2.4 Autoscaling

I first created an instance template. I modified the startup script so it deploys a page with my Name and Student number:





Then, I created 2 instance groups. One in a Europe region and another in a US region:



The corresponding Health checks have been created:

Google Cloud Platform

← Create an instance group

**Name** <sup>?</sup>  
Name is permanent  
us-instance-health-check

**Description** (Optional)

**Protocol** HTTP **Port** 80

**Proxy protocol** NONE

**Request path** /

More

**Health criteria**  
Define how health is determined: how often to check, how long to wait for a response, and how many successful or failed attempts are decisive

**Check interval** 10 seconds **Timeout** 5 seconds

**Healthy threshold** 2 consecutive successes **Unhealthy threshold** 3 consecutive failures

Save and continue Cancel

Google Cloud Platform Adeilo2017279

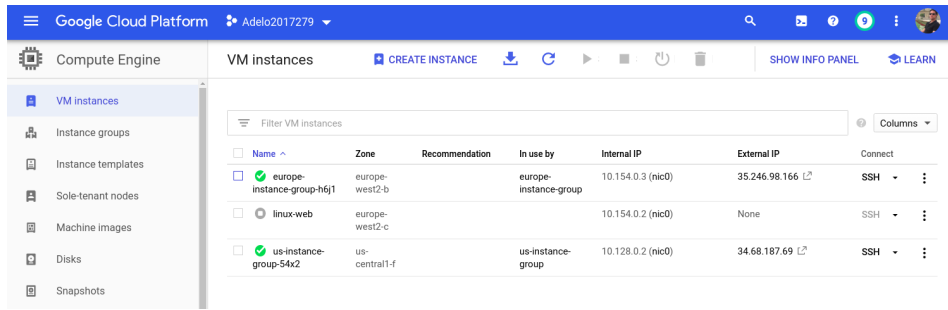
Compute Engine Instance groups CREATE INSTANCE GROUP REFRESH DELETE LEARN

Instance groups are collections of VM instances that use load balancing and automated services, like autoscaling and autohealing. [Learn more](#)

Filter resources Columns

Name	Zone	Instances	Template	Creation time	Recommendation	Autoscaling	In use by
<input type="checkbox"/> europe-instance-group	europe-west2 (3/3 zones)	1	digitech-instance-template	May 16, 2020, 10:44:18 PM		On: Target CPU utilization 60%	
<input type="checkbox"/> us-instance-group	us-central1 (3/4 zones)	1	digitech-instance-template	May 16, 2020, 10:49:18 PM		On: Target CPU utilization 60%	

In the following image we can see that new Instances have been launched in by the instance groups:



We can finally access the deployed websites using the IP addresses:

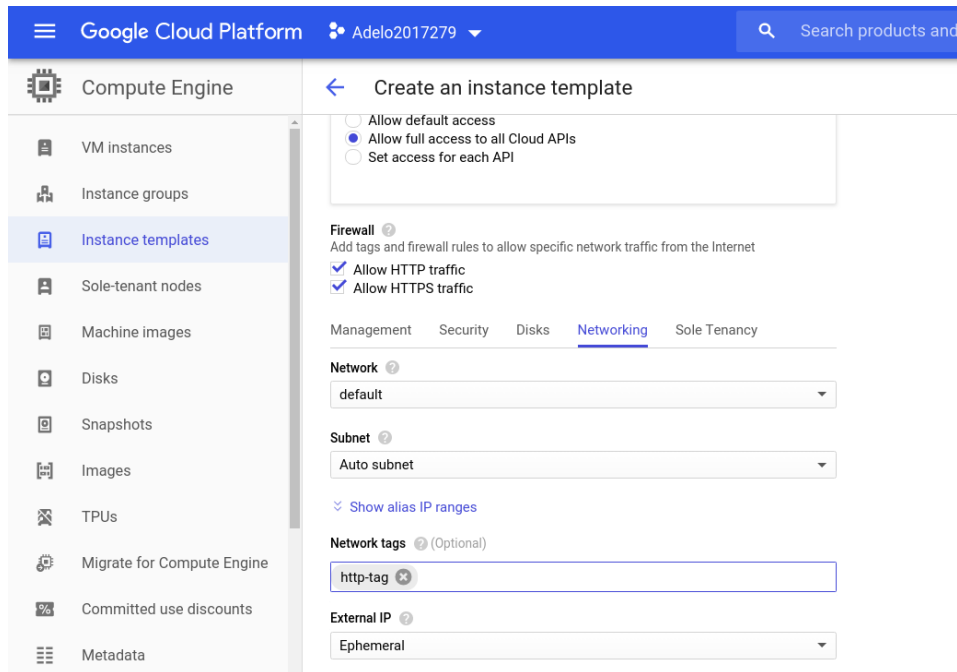




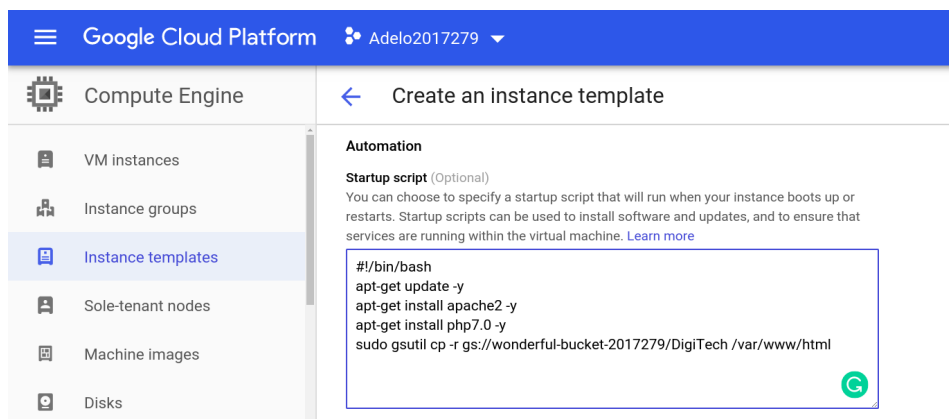
## 2.5 Modifying Instance templates and Autoscaling

Modify the start-up script in the Instance template (*Startup – script.sh*) so that the script pulls the DigiTech website from your wonderful bucket. Use the external IP address of the *linux – web* to demonstrate that your DigiTech web page shows in a browser tab.

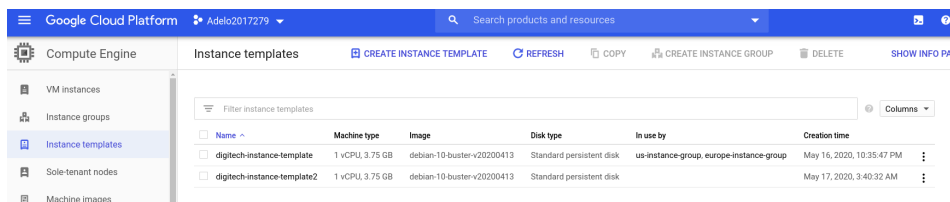
We had to create a new Instance template because they are immutable: [Diwaakar (2017)]



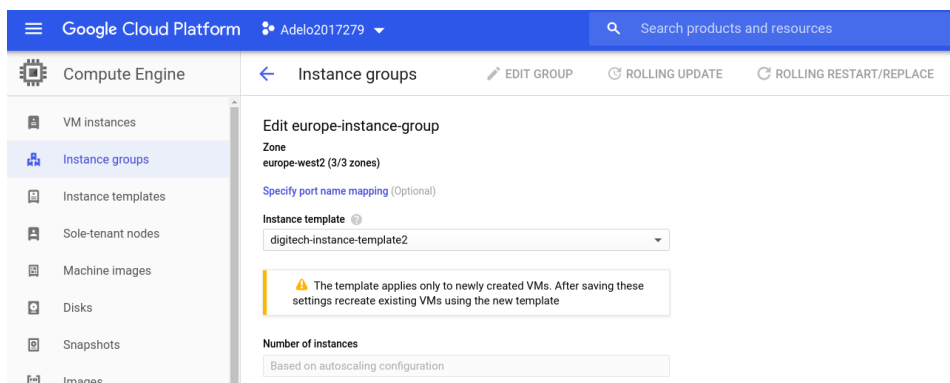
We add the new *Startup – script.sh* so it will pull the DigiTech website from our wonderful bucket:



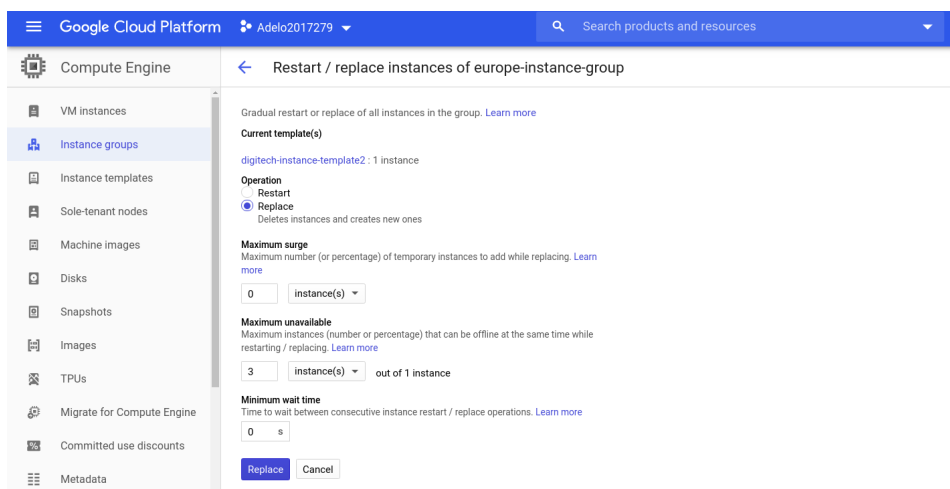
Here we show that a new Instance template has been created:



Then, we need to edit both Instance groups so the Instance template is the new one:



Finally, we had to restart/replace instance of both Instance groups:



After that, we can see that new instances have been created. For one of them, the IP address has been changed:

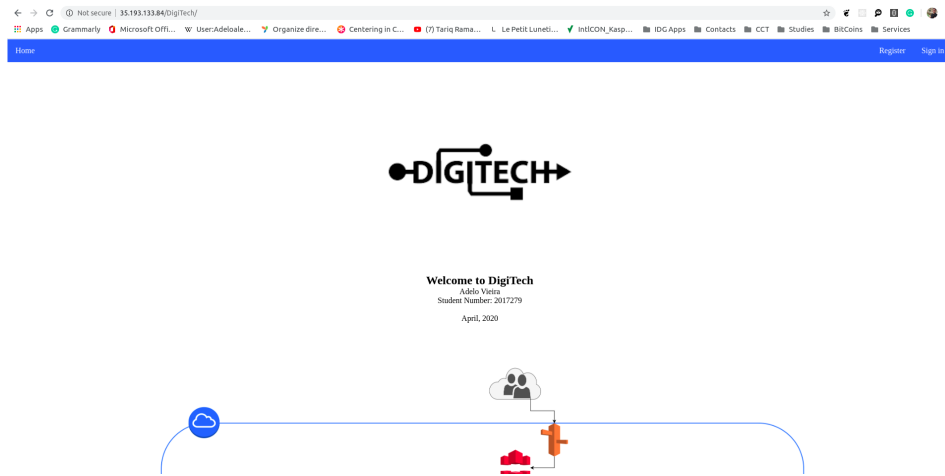
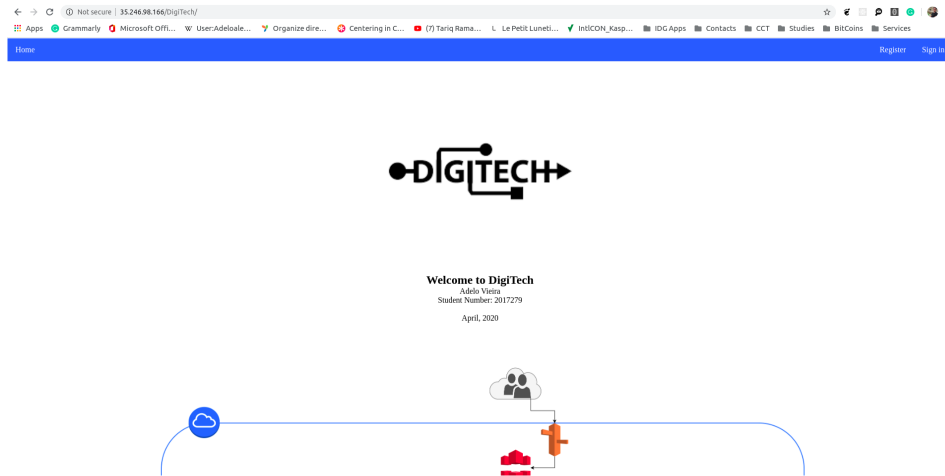
Google Cloud Platform | Adelo2017279 | Search products and resources

Compute Engine | VM instances | CREATE INSTANCE | IMPORT VM | REFRESH | START | STOP | RESET | DELETE | SHOW INFO

Filter VM instances

Name	Zone	Recommendation	In use by	Internal IP	External IP	Connect
europa-instance-group-8sdf	europe-west2-b		europa-instance-group	10.154.0.4 (nic0)	35.246.98.166 L	SSH
linux-web	europe-west2-c			10.154.0.2 (nic0)	34.89.30.164 L	SSH
us-instance-group-rml	us-central1-f		us-instance-group	10.128.0.3 (nic0)	35.193.133.84 L	SSH

When accessing the Digttech website from the new Instances created by the modified Instance groups, we can see our website has been deployed by the *Startup – script.sh*:



# Bibliography

Lakshman DIWAAKAR : Google compute engine: How to change instance template, 2017. URL <https://stackoverflow.com/questions/41622489/google-compute-engine-how-to-change-instance-template>. 19

GOOGLE DOCUMENTATION : Cloud sdk - quickstart for debian and ubuntu, 2020. URL <https://cloud.google.com/sdk/docs/quickstart-debian-ubuntu>.