



Cloud Computing Fundamentals.

Cloud Based Working Enviroment

Lecturer: Michael Weiss.

Work by: Juan Martin.

Student ID: 2016435.

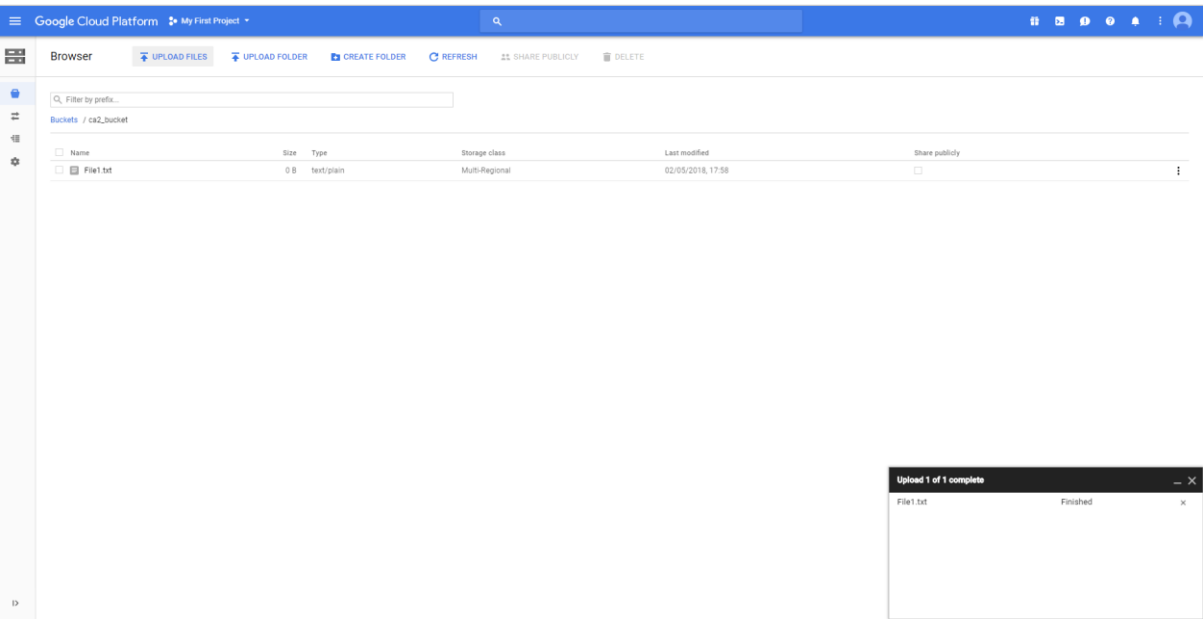
Date: 07 of May 2018.

Contents

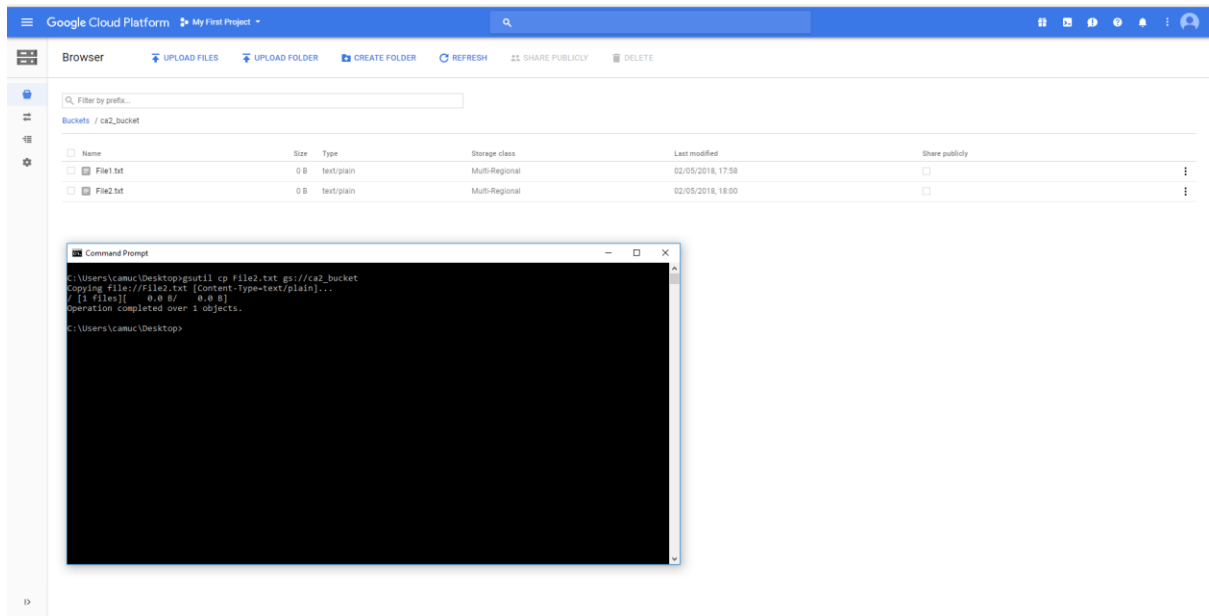
Storage Bucket.	3
DigiTech on Apache.	6
DigiTech on ISS.	8
DigiTech on NGINX.	9
Live Migration.	10
What is live migration?	12
Google Cloud Partner Services.....	12
Trend Micro (Deep Security for Google Cloud).....	12
Understanding What Trend Micro offers.	14
GCSFUSE.....	15
Step 1: GCSFUSE distribution URL, import its public key.....	15
Step 2: Updating list of packages, install GCSFUSE and create credentials.....	15
Step 3: Create a directory to mount the bucket.....	16
Step 4: Using cloud storage fuse to mount the bucket on the machine.	16
Step 6: Working with the mounted bucket.	17
Final result.....	17
References.	18

Storage Bucket.

Using the GUI.



Using the command line.



Uploading a folder “apache” from the bucket to a linux VM.

```
camuchin_jm@ca2linux: ~ - Google Chrome
Secure | https://ssh.cloud.google.com/projects/spring-banner-196513/zones/europe-west4-a/instances/ca2linux?authuser=0&hl=en_GB&...
Connected, host fingerprint: ssh-rsa 2048 66:16:B0:09:67:59:CA:41:8D:9C:5C:73:ED:48:F5:E2:91:D0:6F:11:D9:31:95:00:7
A:8E:FA:7C:FB:D4:F0:31
Linux ca2linux 4.9.0-6-amd64 #1 SMP Debian 4.9.88-1 (2018-04-29) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed May  2 17:18:57 2018 from 74.125.73.100
camuchin_jm@ca2linux:~$ sudo su
root@ca2linux:/home/camuchin_jm# gsutil cp -r gs://ca2_bucket/apache/ .
Copying gs://ca2_bucket/apache/index.html...
/ [1 files][ 182.0 B/ 182.0 B]
Operation completed over 1 objects/182.0 B.
root@ca2linux:/home/camuchin_jm# ls -al
total 32
drwxr-xr-x 4 camuchin_jm camuchin_jm 4096 May  2 17:42 .
drwxr-xr-x 3 root      root      4096 May  2 17:07 ..
drwxr-xr-x 2 root      root      4096 May  2 17:42 apache
-rw----- 1 camuchin_jm camuchin_jm 149 May  2 17:28 .bash_history
-rw-r--r-- 1 camuchin_jm camuchin_jm 220 May 15  2017 .bash_logout
-rw-r--r-- 1 camuchin_jm camuchin_jm 3526 May 15  2017 .bashrc
-rw-r--r-- 1 root      root          0 May  2 17:14 File1.txt
-rw-r--r-- 1 root      root          0 May  2 17:15 File2.txt
-rw-r--r-- 1 camuchin_jm camuchin_jm 675 May 15  2017 .profile
drwx----- 2 camuchin_jm camuchin_jm 4096 May  2 17:40 .ssh
root@ca2linux:/home/camuchin_jm#
```

DigiTech on Apache.

Installing apache on linux

The screenshot displays the Google Cloud Platform (GCP) console interface. On the left, the 'VM instances' page is active, showing a list of instances. The 'ca2linux' instance is selected, located in the 'europe-west4-a' zone. The main panel shows a terminal window with the following commands and output:

```
Processing triggers for systemd (232-25-deb9u3) ...
Processing triggers for man-db (2.7.4-1+b2) ...
Setting up liblua5.2-0:amd64 (5.2.4-1+b2) ...
Setting up mail-core (0.19) ...
Setting up libaprutil1-ldap:amd64 (1.5.4-3) ...
Setting up libaprutil1-dbd-sqlite3:amd64 (1.5.4-3) ...
Setting up rename (0.20-4) ...
update-alternatives: using /usr/bin/file-rename to provide /usr/bin/rename (rename) in auto mode
Setting up apache2-ssl (2.4.25-3+deb9u4) ...
Setting up apache2-bin (2.4.25-3+deb9u4) ...
Setting up apache2 (2.4.25-3+deb9u4) ...
Enabling module mpm_event.
Enabling module auth_core.
Enabling module auth_basic.
Enabling module auth_compat.
Enabling module auth_file.
Enabling module auth_user.
Enabling module alias.
Enabling module dir.
Enabling module autoindex.
Enabling module env.
Enabling module mime.
Enabling module negotiation.
Enabling module setenvif.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-headers-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service - /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service - /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for libc-bin (2.24-11+deb9u3) ...
Processing triggers for ssl-base (1.29) ...
Processing triggers for systemd (232-25-deb9u3) ...
```

On the right side of the console, the 'ca2linux' instance details are shown, including a 'LABELS' section with an 'Add label' button and a 'MONITORING' section with a 'Save' button.



The screenshot shows a web browser window with two tabs: 'Compute Engine - My File X' and 'This is the apache website X'. The address bar displays '35.204.213.73'. The page content includes the text 'This is the apache website.' and a large '404 Not Found' error message.

By Juan Martin 2016435

```

camuchin_jm@ca2linux: ~ - Google Chrome
Secure | https://ssh.cloud.google.com/projects/spring-banner-196513/zones/europe-west4-a/instances/ca2linux?authuser=0&hl=en_GB&...
Connected, host fingerprint: ssh-rsa 2048 66:16:B0:09:67:59:CA:41:8D:9C:5C:73:ED:48:F5:E2:91:D0:6F:11:D9:31:28:00:
A:9E:FA:7C:FB:D4:F0:31
Linux ca2linux 4.9.0-6-amd64 #1 SMP Debian 4.9.88-1 (2018-04-29) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Wed May 2 17:18:57 2018 from 74.125.73.100
camuchin_jm@ca2linux:~$ sudo su
root@ca2linux:/home/camuchin_jm# gsutil cp -r gs://ca2_bucket/apache/ .
Copying gs://ca2_bucket/apache/index.html...
/ [1 files][ 182.0 B/ 182.0 B]
Operation completed over 1 objects/182.0 B.
root@ca2linux:/home/camuchin_jm# ls -al
total 32
drwxr-xr-x 4 camuchin_jm camuchin_jm 4096 May 2 17:42 .
drwxr-xr-x 3 root      root          4096 May 2 17:07 ..
drwxr-xr-x 2 root      root          4096 May 2 17:42 apache
-rp--r--r-- 1 camuchin_jm camuchin_jm 149 May 2 17:28 .bash_history
-rw-r--r-- 1 camuchin_jm camuchin_jm 220 May 15 2017 .bash_logout
-rw-r--r-- 1 camuchin_jm camuchin_jm 3526 May 15 2017 .bashrc
-rw-r--r-- 1 root      root           0 May 2 17:14 File1.txt
-rw-r--r-- 1 root      root           0 May 2 17:15 File2.txt
-rw-r--r-- 1 camuchin_jm camuchin_jm 675 May 15 2017 .profile
drwx----- 2 camuchin_jm camuchin_jm 4096 May 2 17:40 .ssh
root@ca2linux:/home/camuchin_jm# cp -r apache /var/www/html
root@ca2linux:/home/camuchin_jm# cp -r apache/* /var/www/html
root@ca2linux:/home/camuchin_jm# gsutil cp -r gs://ca2_bucket/apache/ .
Copying gs://ca2_bucket/apache/index.html...
/ [1 files][ 174.0 B/ 174.0 B]
Operation completed over 1 objects/174.0 B.
root@ca2linux:/home/camuchin_jm# cp -r apache /var/www/html
root@ca2linux:/home/camuchin_jm# cp -r apache/* /var/www/html
root@ca2linux:/home/camuchin_jm#

```

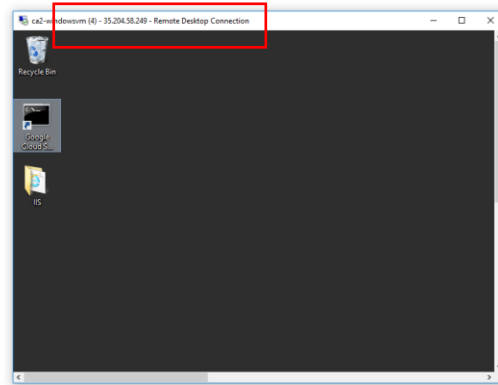
DigiTech on ISS.

Screenshot of the windows VM and the we page.



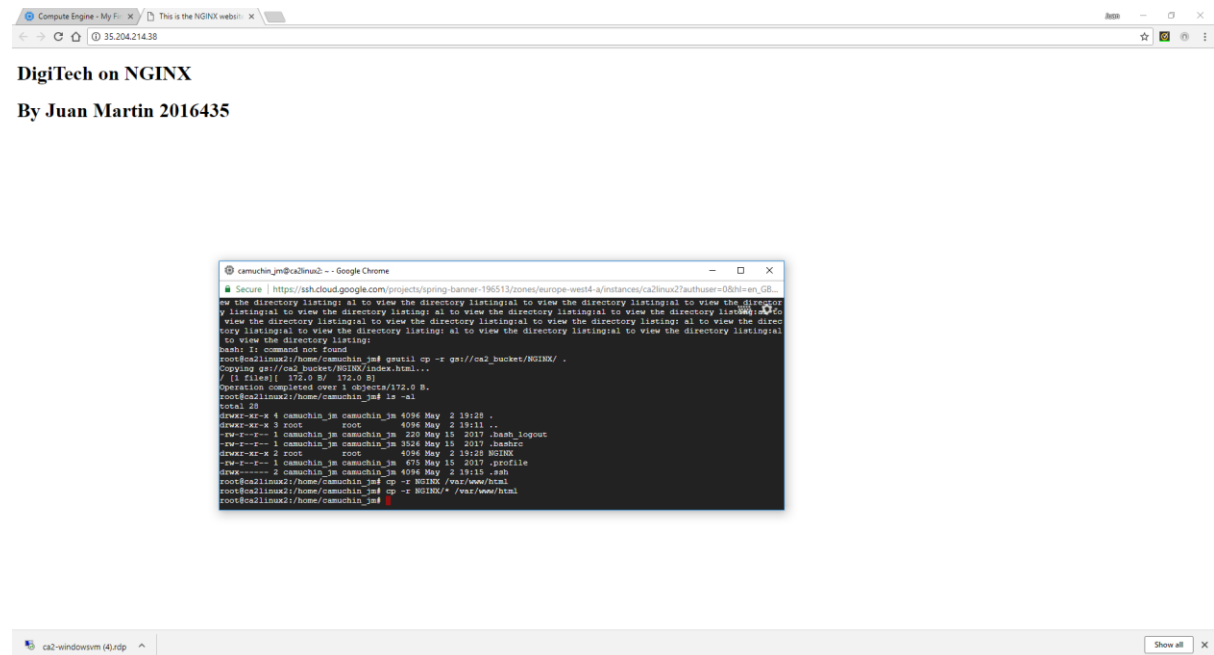
DigiTech on IIS

By Juan Martin 2016435

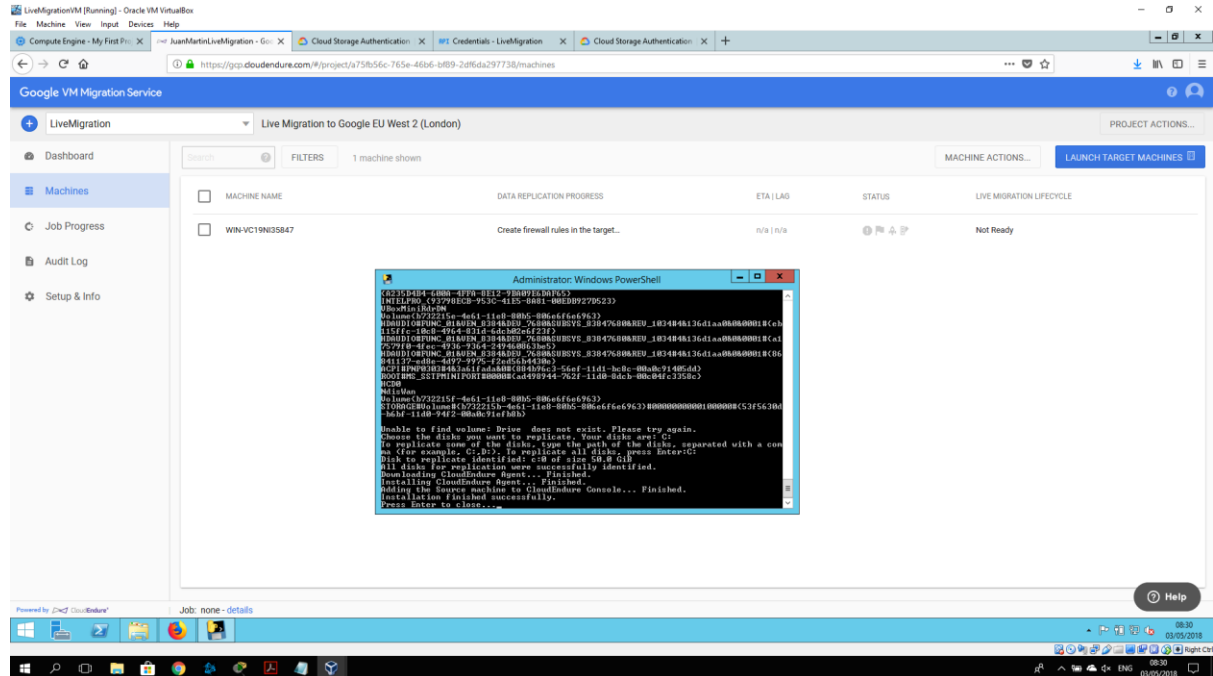
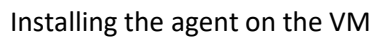


DigiTech on NGINX.

Screenshot of the linux VM and the web page using NGINX



Getting things ready for the migration



Live migration proceses.

The screenshot shows the Google VM Migration Service console. The main heading is "Live Migration to Google EU West 2 (London)". On the left, there is a sidebar with navigation options: Dashboard, Machines, Job Progress, Audit Log, and Setup & Info. The "Machines" section is selected, showing a table with one machine listed:

MACHINE NAME	DATA REPLICATION PROGRESS	ETA LAG	STATUS	LIVE MIGRATION LIFECYCLE
WIN-VC19N835847	2.45%	>1 GB 7 Hours N/A	Not Ready	

At the bottom of the console, there is a status bar indicating "Job: none - details" and a "Help" button.

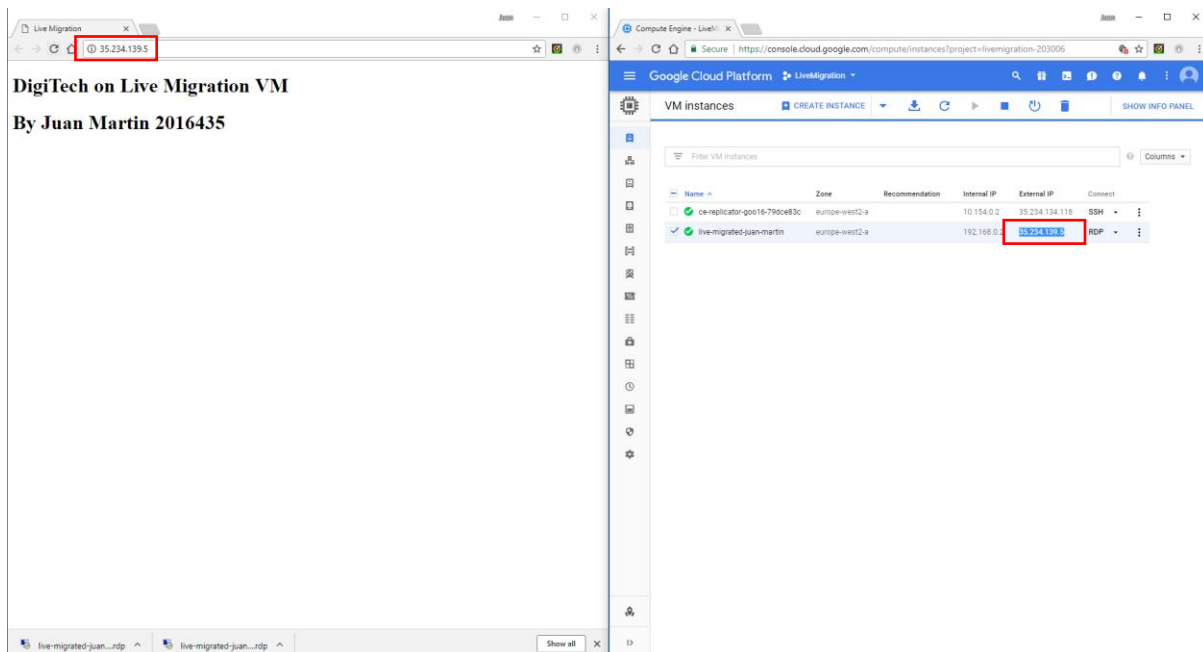
Live migration completed, VM up and running on the cloud.

The screenshot shows the Google Cloud Platform console. The main heading is "VM instances". On the left, there is a sidebar with navigation options: VM instances, CREATE INSTANCE, IMPORT VM, REFRESH, START, STOP, RESET, and DELETE. The "VM instances" section is selected, showing a table with two VM instances listed:

Name	Zone	Recommendation	Internal IP	External IP	Connect
ce-replicator-goo16-79dce83c	europe-west2-a		10.154.0.2	35.234.134.118	SSH
live-migrated-juan-martin	europe-west2-a		192.168.0.2	35.234.139.5	RDP

At the bottom of the console, there is a status bar indicating "No ins" and a "Labels help" button.

Screenshot of the web page that has been set on the live migration VM.



What is live migration?

Live migration is the process of moving a running virtual machine or app from one physical machine to another while keeping all clients connected. In cloud technology live migration is to move a VM (running) from your server to a cloud environment.

Live migration will keep all attributes of the instance as they are on the original host, including external and internal IP address.

This technology offers the opportunity for companies to upload any machine they have got working to a cloud environment which represents a major advantage since the need of recreating VM is reduce to 0. If you or your company have spent some time getting all working you will not want to go the configuration process again, using life migration allow you to clone your VM and send to the cloud with no down time.

Also, bare in mind is always easier and best practice to get VMs working on your server on "earth" and then once all is up and running as desired you can use live migration to get your machine to the cloud.

Google Cloud Partner Services.

Trend Micro (Deep Security for Google Cloud).

Deep security is a suit of different cloud security means that is integrated into the development process and scale with your cloud needs. This suit includes IPS/IDS (intrusion prevention system/ intrusion detection system), firewall, anti-malware, integrity monitoring, log

inspection and application control. This is a smart technology that is simple to deploy and manage and is useful for mobile devices, endpoints, gateways, servers and the cloud.

Trend Micro offers all the security your project might need in any environment physical, virtual or cloud.

Trend Micro can work on Windows, Linux, Solaris and Unix operating system and is supported by Citrix and Hyper-V hypervisors.

This product offers a comprehensive GUI that will make it easy to manage all configurations.



On the dash board you can see a general view of the system.

On the alerts tab will display a log of all trends that has been detected by Trend Micro and you will be able to choose an action such as deletion of the file, quarantine and others.

Events and reports will build a full report of any significant event that occurs on your system, he you can get detailed information of when something happened and other things as what kind of tread was detected and from where the attack or file came from.

The computers tab gives you an overview of how your resources are being used.

Policies allows you to manage how different parts of the security tool, as firewall will work.

Administration keeps the general information about the account and allow the user to modify it or update it if needed.

Understanding What Trend Micro offers.

IPS/IDS: This tool monitors traffic and scans packages for suspicious data, these technologies are based on signatures that have been detected before.

Firewall: is a network security technology that monitors incoming and outgoing data and decides if it is secure, allowing or blocking that specific traffic.

Anti-malware: software that protects against malware in general, including viruses, rootkits, ransomware, and spyware.

Integrity monitoring: a system that detects and reacts to critical system changes.

Log inspection: is a module that provides the ability to collect and analyze operating systems and application logs for security events.

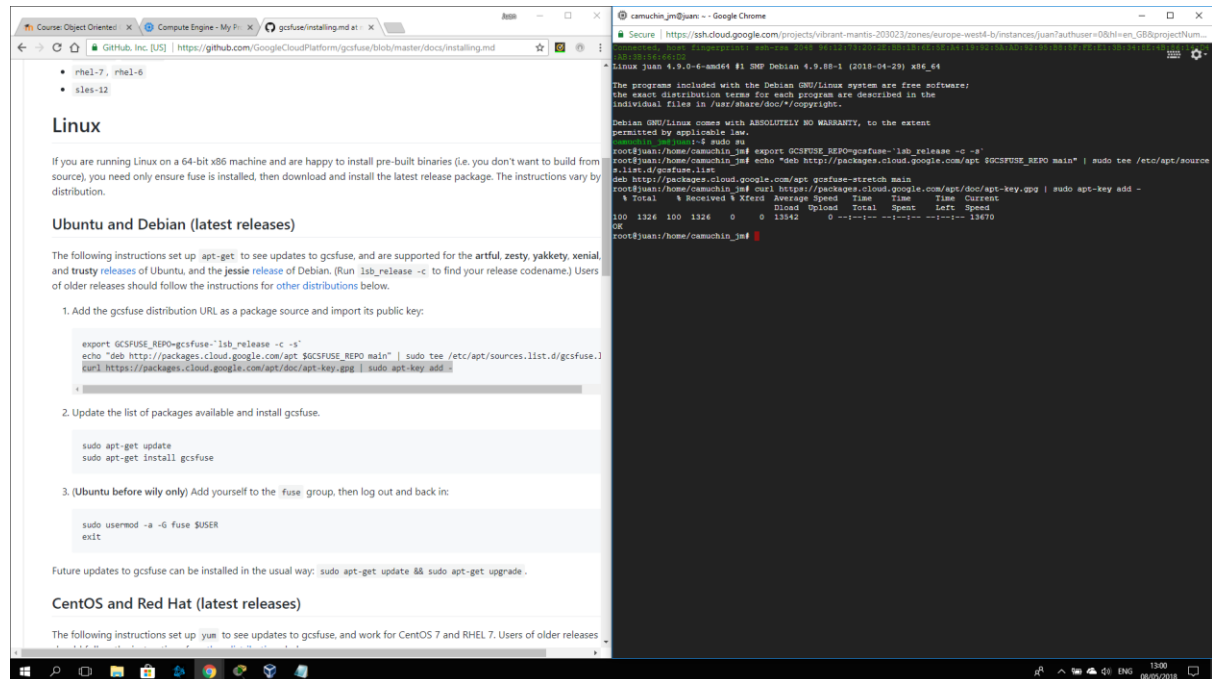
Application control: is a security measure that prevents unauthorized applications from executing in any way that could put at risk your system.

GCSFUSE

Is an open source fuse adapter that allows you to mount Cloud Storage buckets as file systems on Linux or OS X systems. It is also a way for applications to upload and download Cloud storage objects using standard file system.

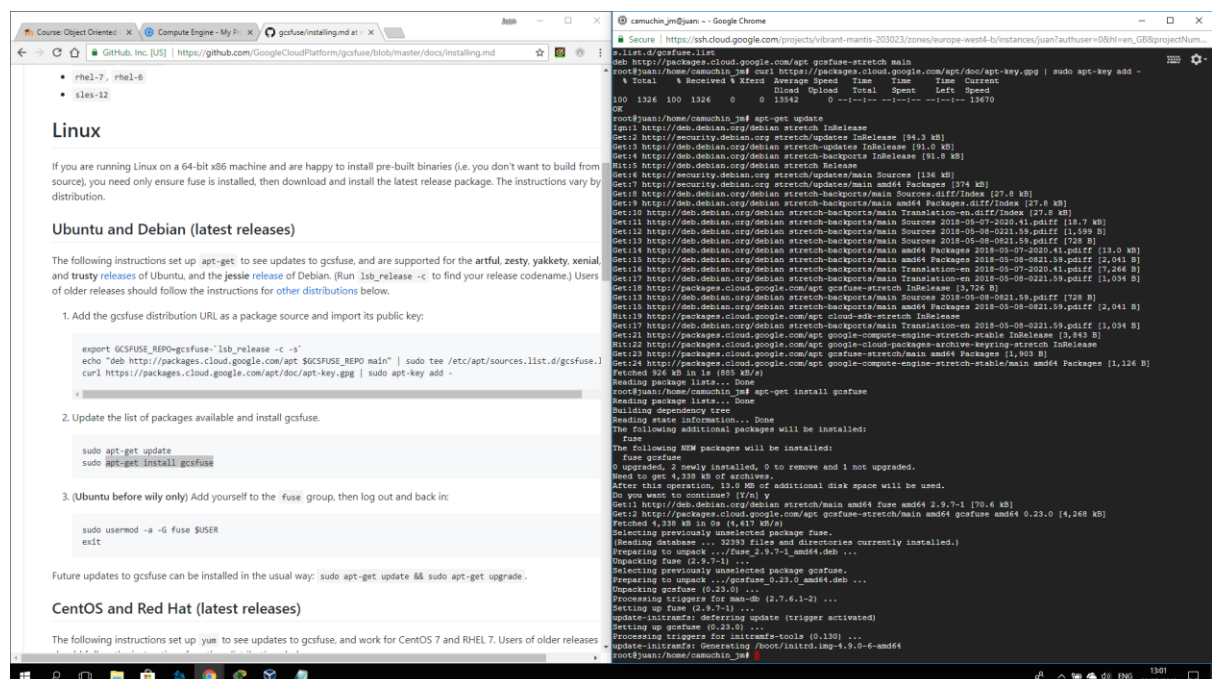
To install and run GCSFUSE we must follow the steps below:

Step 1: GCSFUSE distribution URL, import its public key



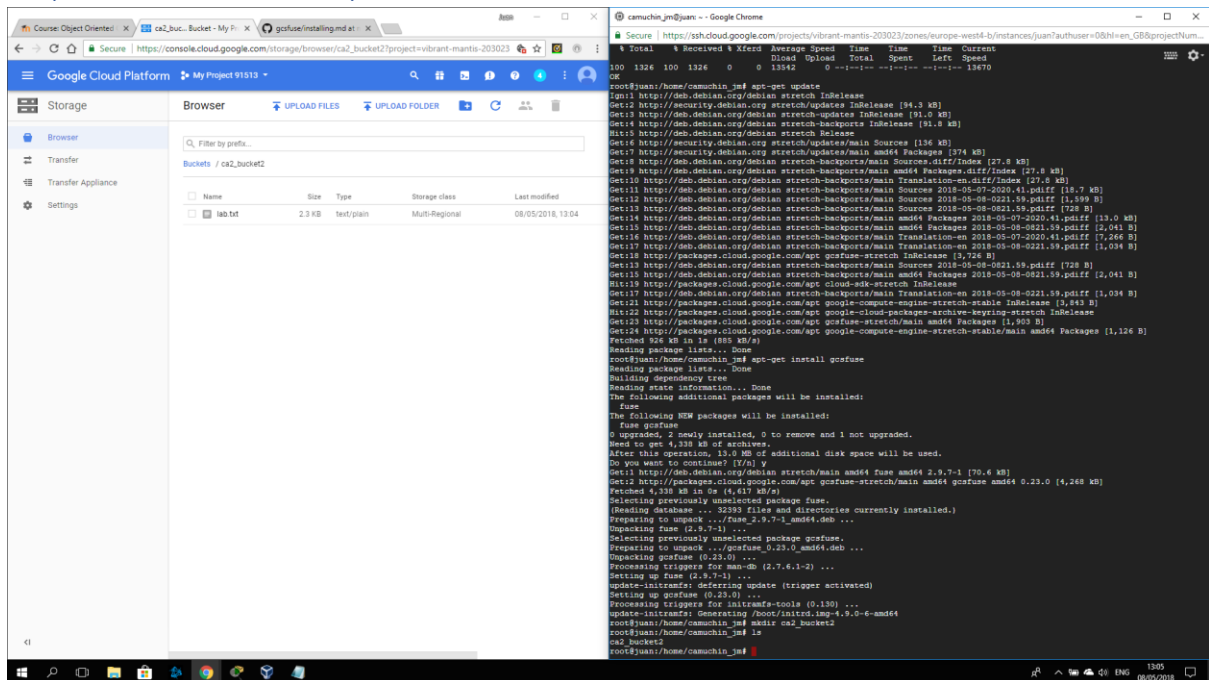
```
root@juan:/home/camuchin_jm# export GCSFUSE_REPO=gcsfuse-'lsb_release -c -s'
root@juan:/home/camuchin_jm# echo "deb http://packages.cloud.google.com/apt GCSFUSE_REPO main" | sudo tee /etc/apt/sources.list.d/gcsfuse.list
root@juan:/home/camuchin_jm# curl https://packages.cloud.google.com/apt/doc/apt-key.gpg | sudo apt-key add -
100 1326 100 1326 0 0 13542 0 --:--:-- --:--:-- --:--:-- 13670
root@juan:/home/camuchin_jm# sudo apt-get update
root@juan:/home/camuchin_jm# sudo apt-get install gcsfuse
```

Step 2: Updating list of packages, install GCSFUSE and create credentials.

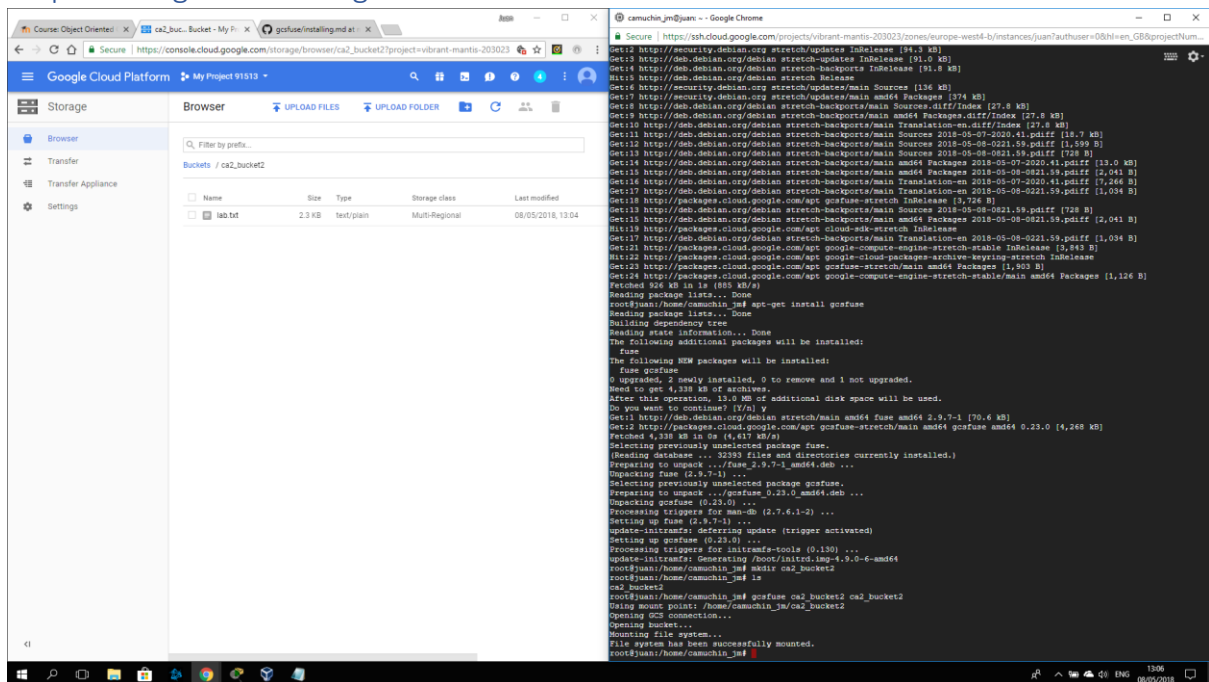


```
root@juan:/home/camuchin_jm# export GCSFUSE_REPO=gcsfuse-'lsb_release -c -s'
root@juan:/home/camuchin_jm# echo "deb http://packages.cloud.google.com/apt GCSFUSE_REPO main" | sudo tee /etc/apt/sources.list.d/gcsfuse.list
root@juan:/home/camuchin_jm# curl https://packages.cloud.google.com/apt/doc/apt-key.gpg | sudo apt-key add -
100 1326 100 1326 0 0 13542 0 --:--:-- --:--:-- --:--:-- 13670
root@juan:/home/camuchin_jm# sudo apt-get update
root@juan:/home/camuchin_jm# sudo apt-get install gcsfuse
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  fuse
The following NEW packages will be installed:
  fuse gcsfuse
0 upgraded, 2 newly installed, 0 to remove and 1 not upgraded.
Need to get 4,338 kB of archives.
After this operation, 13.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://deb.debian.org/debian stretch/main amd64 fuse amd64 2.9.7-1 [70.6 kB]
Get:2 http://packages.cloud.google.com/apt GCSFUSE_REPO stretch/main amd64 gcsfuse amd64 0.23.0 (4,268 kB)
Fetched 4,338 kB in 1s (4,617 kB/s)
Selecting previously unselected package fuse.
(Reading database ... 3030 files and directories currently installed.)
Preparing to unpack .../fuse_2.9.7-1_amd64.deb ...
Unpacking fuse (2.9.7-1) ...
Selecting previously unselected package gcsfuse.
Preparing to unpack .../gcsfuse_0.23.0_amd64.deb ...
Unpacking gcsfuse (0.23.0) ...
Processing triggers for man-db (2.7.6.1-2) ...
update-initramfs: deferring update (trigger activated)
Setting up gcsfuse (0.23.0) ...
Processing triggers for initramfs-tools (0.130) ...
update-initramfs: Generating /boot/initrd.img-4.9.0-6-amd64
root@juan:/home/camuchin_jm#
```

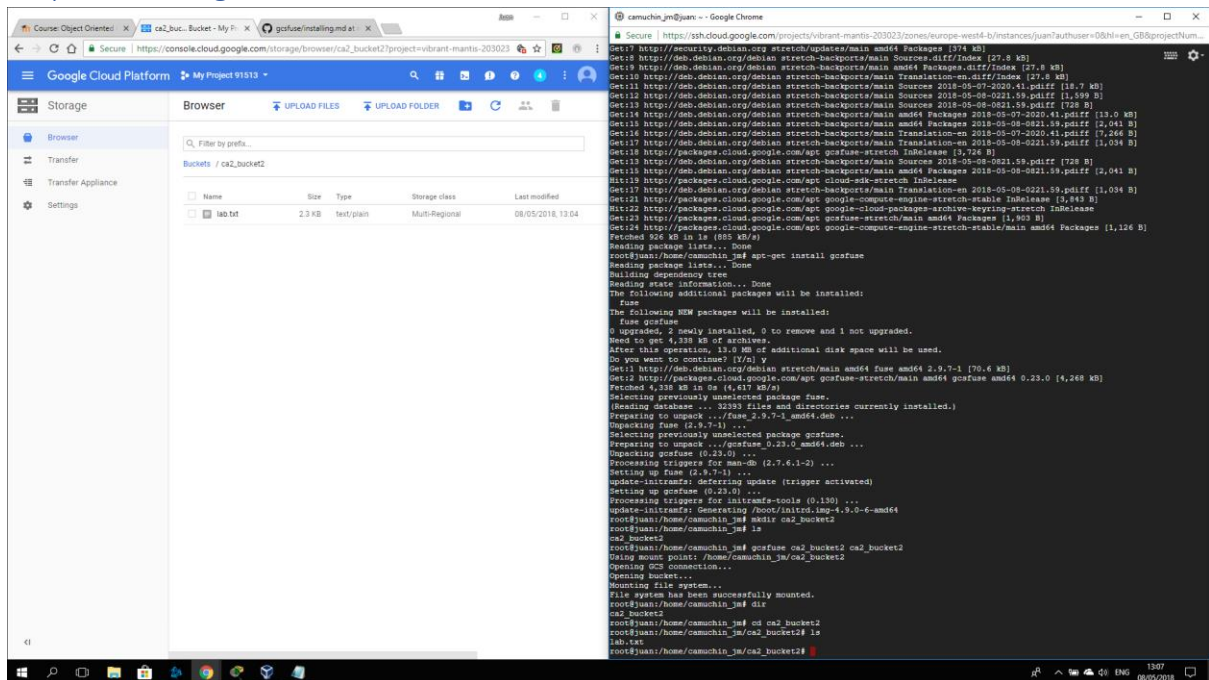
Step 3: Create a directory to mount the bucket.



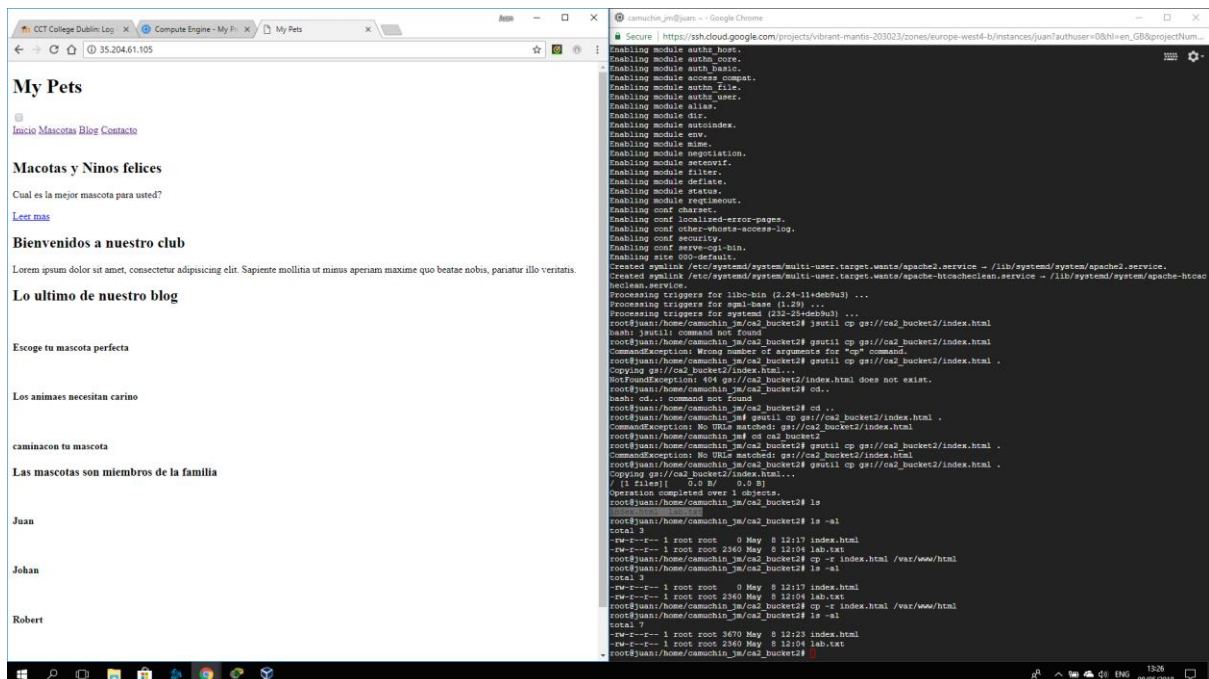
Step 4: Using cloud storage fuse to mount the bucket on the machine.



Step 6: Working with the mounted bucket.



Final result.



References.

What are come applications controls? (2010)

Available at: <http://www.isaca.org/Groups/Professional-English/application-controls/Pages/ViewDiscussion.aspx?PostID=3>

Security.

Available at: <https://www.cisco.com/c/en/us/products/security/index.html>

<https://www.pandasecurity.com/usa/support/card?id=31463>

Integrity monitoring.

Available at: https://www.trendmicro.com/en_ie/business/capabilities/integrity-monitoring.html

Anti-malware.

Available at: <https://searchsecurity.techtarget.com/definition/antimalware>

Log Inspection- The Most Misunderstood Control.

Available at: <https://www.trendmicro.com/aws/log-inspection-misunderstood-control/>

Deep security for the cloud.

Available at: https://www.trendmicro.com/en_us/business/products/hybrid-cloud/deep-security-for-cloud.html