

CS 451

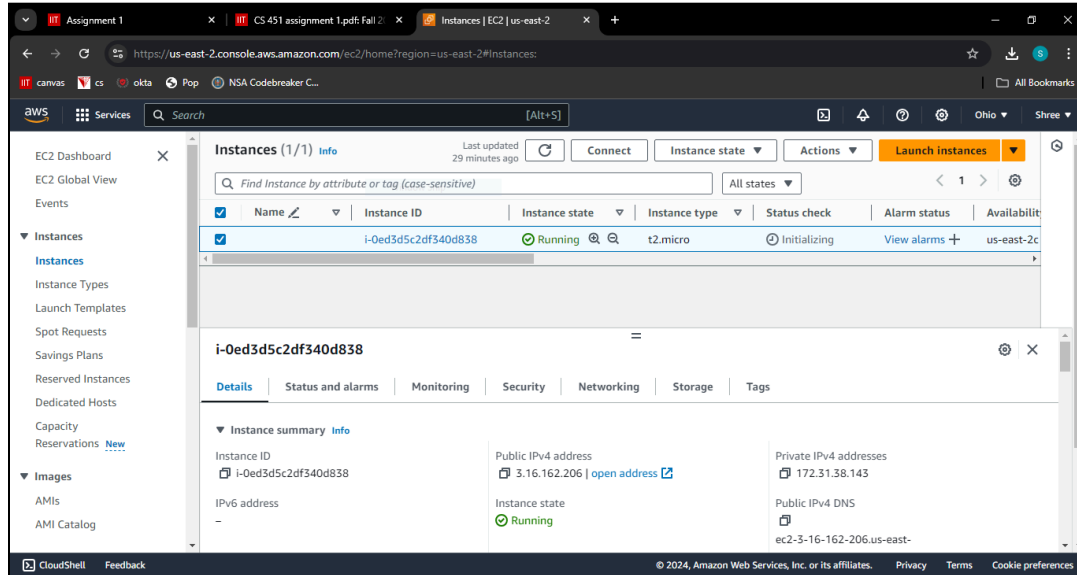
Fall 2024

Assignment 1

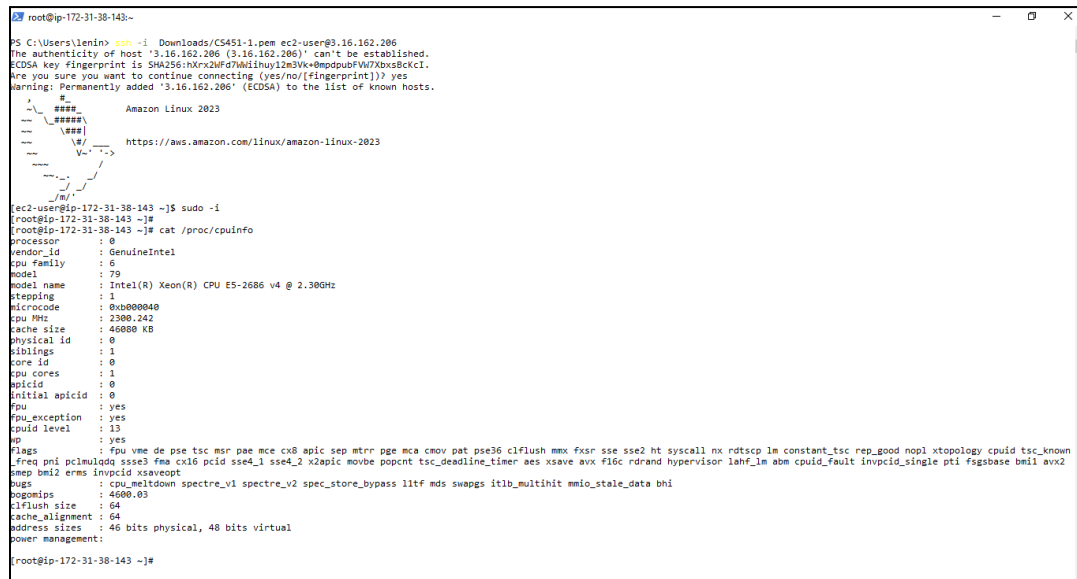
Part 1:

For steps 3-6 please take and submit screenshots. Also please answer the questions.

3)



4b)



[illegible][illegible]

```

4e) root@hp-172-31-38-143:~#
infating: phoronix-test-suite-master/pts-core/static/dynamic-result-viewer.htaccess
extracting: phoronix-test-suite-master/pts-core/static/dynamic-result-viewer/favicon.png
infating: phoronix-test-suite-master/pts-core/static/dynamic-result-viewer/index.php
infating: phoronix-test-suite-master/pts-core/static/dynamic-result-viewer/result-viewer.css
infating: phoronix-test-suite-master/pts-core/static/dynamic-result-viewer/result-viewer.js
infating: phoronix-test-suite-master/pts-core/static/dynamic-result-viewer/result-viewer_config.php.configure
creating: phoronix-test-suite-master/pts-core/static/images/
extracting: phoronix-test-suite-master/pts-core/static/images/openonchekmark.png
extracting: phoronix-test-suite-master/pts-core/static/images/phoronix-test-suite.png
infating: phoronix-test-suite-master/pts-core/static/images/pts-180x82.jpg
infating: phoronix-test-suite-master/pts-core/static/images/pts-300x160.png
infating: phoronix-test-suite-master/pts-core/static/phoronix-client.desktop
infating: phoronix-test-suite-master/pts-core/static/phoronix-test-suite-launcher.desktop
infating: phoronix-test-suite-master/pts-core/static/phoronix-test-suite.desktop
infating: phoronix-test-suite-master/pts-core/static/root-access.sh
infating: phoronix-test-suite-master/pts-core/static/sample-pts-client-update-script.sh
infating: phoronix-test-suite-master/pts-core/static/short-description.txt
infating: phoronix-test-suite-master/pts-core/static/user-config-defaults.xml
infating: phoronix-test-suite-master/pts-core/user-agreement.txt
creating: phoronix-test-suite-master/pts-core/web-interface/
creating: phoronix-test-suite-master/pts-core/web-interface/assets/
infating: phoronix-test-suite-master/pts-core/web-interface/assets/background.png
infating: phoronix-test-suite-master/pts-core/web-interface/assets/pts-mobile-interface.css
infating: phoronix-test-suite-master/pts-core/web-interface/assets/pts-web-interface.css
extracting: phoronix-test-suite-master/pts-core/web-interface/assets/pts-web-logo.png
infating: phoronix-test-suite-master/pts-core/web-interface/assets/Phoronix.ico
creating: phoronix-test-suite-master/pts-core/web-interface/html/about.html
infating: phoronix-test-suite-master/pts-core/web-interface/html/benchmark.html
infating: phoronix-test-suite-master/pts-core/web-interface/html/early.html
infating: phoronix-test-suite-master/pts-core/web-interface/html/settings.html
infating: phoronix-test-suite-master/pts-core/web-interface/html/test_queue.html
infating: phoronix-test-suite-master/pts-core/web-interface/index.php
creating: phoronix-test-suite-master/pts-core/web-interface/js/
infating: phoronix-test-suite-master/pts-core/web-interface/js/pts-web-functions.js
infating: phoronix-test-suite-master/pts-core/web-interface/js/pts-web-interface.js
infating: phoronix-test-suite-master/pts-core/web-interface/js/pts-web-socket.js
creating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_component.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_intro.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_loader.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_main.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_result.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_setup.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_search.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_system.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_test.php
infating: phoronix-test-suite-master/pts-core/web-interface/web-interfaces/pts_webui_tests.php
infating: phoronix-test-suite-master/release-highlights.md
[root@hp-172-31-38-143 ~]# cd phoronix-test-suite-master/ ; ./install.sh

```

4f)

```
root@ip-172-31-38-143:~/phorona-test-suite-master
Inflating: phorona-test-suite-master/pts-core/static/images/pts-158x82.jpg
Inflating: phorona-test-suite-master/pts-core/static/images/pts-380x160.png
Inflating: phorona-test-suite-master/pts-core/static/phorona-test-client_desktop
Inflating: phorona-test-suite-master/pts-core/static/phorona-test-suite-launcher_desktop
Inflating: phorona-test-suite-master/pts-core/static/phorona-test-suite_desktop
Inflating: phorona-test-suite-master/pts-core/static/root-access.sh
Inflating: phorona-test-suite-master/pts-core/static/sample-pts-client-update-script.sh
Inflating: phorona-test-suite-master/pts-core/static/short-description.txt
Inflating: phorona-test-suite-master/pts-core/static/user-config-defaults.xml
Inflating: phorona-test-suite-master/pts-core/user-agreement.txt
creating: phorona-test-suite-master/pts-core/web-interface/
creating: phorona-test-suite-master/pts-core/web-interface/assets/
Inflating: phorona-test-suite-master/pts-core/web-interface/assets/background.png
Inflating: phorona-test-suite-master/pts-core/web-interface/assets/pts-mobile-interface.css
Inflating: phorona-test-suite-master/pts-core/web-interface/assets/pts-web-interface.css
extracting: phorona-test-suite-master/pts-core/web-interface/assets/pts-web-logo.png
Inflating: phorona-test-suite-master/pts-core/web-interface/favicon.ico
creating: phorona-test-suite-master/pts-core/web-interface/html/
Inflating: phorona-test-suite-master/pts-core/web-interface/html/about.html
Inflating: phorona-test-suite-master/pts-core/web-interface/html/benchmark.html
Inflating: phorona-test-suite-master/pts-core/web-interface/html/early.html
Inflating: phorona-test-suite-master/pts-core/web-interface/html/settings.html
Inflating: phorona-test-suite-master/pts-core/web-interface/html/test_queue.html
Inflating: phorona-test-suite-master/pts-core/web-interface/index.php
creating: phorona-test-suite-master/pts-core/web-interface/js/
Inflating: phorona-test-suite-master/pts-core/web-interface/js/pts-web-functions.js
Inflating: phorona-test-suite-master/pts-core/web-interface/js/pts-web-interface.js
Inflating: phorona-test-suite-master/pts-core/web-interface/js/pts-web-socket.js
creating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_component.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_intro.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_loader.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_main.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_result.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_results.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_search.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_system.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_test.php
Inflating: phorona-test-suite-master/pts-core/web-interface/web-interfacs/pts_webui_test.php
Inflating: phorona-test-suite-master/release-highlights.md
root@ip-172-31-38-143:~/cd phorona-test-suite-master/ ./install.sh
usr/bin/which: no xdg-mime in (/root/.local/bin:/root/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/var/lib/snap/snap/bin)

Phorona Test Suite Installation Completed

Executable File: /usr/bin/phorona-test-suite/
Documentation: /usr/share/doc/phorona-test-suite/
Phorona Test Suite Files: /usr/share/phorona-test-suite/

root@ip-172-31-38-143: phorona-test-suite-master#
```

4g)

```
root@ip-172-31-38-143:~/phorona-test-suite-master
Downloading Packages:
(1/3): emacs-filesystem-128-2-3.amzn2023.0.8.noa 66 kB/s | 10 kB 00:00
(2/3): ninja-build-1.10.2-2.amzn2023.0.2.x86_64 675 kB/s | 145 kB 00:00
(3/3): meson-0.63.3-1.amzn2023.0.2.noarch.rpm 7.1 MB/s | 1.3 MB 00:00
.....
Total 5.8 MB/s | 1.5 MB 00:00

Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
Preparing : 1
Installing : emacs-filesystem-128-2-3.amzn2023.0.8.noarch 1/1
Installing : ninja-build-1.10.2-2.amzn2023.0.2.x86_64 2/3
Installing : meson-0.63.3-1.amzn2023.0.2.noarch 3/3
Running scriptlet: meson-0.63.3-1.amzn2023.0.2.noarch 3/3
Verifying : emacs-filesystem-128-2-3.amzn2023.0.8.noarch 1/1
Verifying : meson-0.63.3-1.amzn2023.0.2.noarch 2/3
Verifying : ninja-build-1.10.2-2.amzn2023.0.2.x86_64 3/3

Installed:
  emacs-filesystem-1:28-2-3.amzn2023.0.8.noarch
  meson-0.63.3-1.amzn2023.0.2.noarch
  ninja-build-1.10.2-2.amzn2023.0.2.x86_64

Complete!

Phorona Test Suite v10.8.5

To Install: pts/osbench-1.0.2

Determining File Requirements .....
Searching Download Caches .....

1 Test To Install
1 File To Download (0.01MB)
1MB Of Disk Space Is Needed
3 Seconds Estimated Install Time

pts/osbench-1.0.2:
Test Installation 1 of 1
1 File Needed (0.01 MB)
Downloading: osbench-master-1.zip ..... [0.01MB]
Approximate Install Size: 1 MB
Estimated Install Time: 3 Seconds
Installing Test @ 02:40:33

[root@ip-172-31-38-143: phorona-test-suite-master]#
```

4h)

```
root@ip-172-31-38-143:~/phorona-test-suite-master
PROCESSOR:
Core Count: 1
Extensions: SSE 4.2 + AVX2 + AVX + RDRAND + FPU05BSTATE
Cache Size: 45 MB
Microcode: 0x00000040
Core Family: Broadwell

GRAPHICS:
Vendor: Cirrus Logic GD 5446

MOTHERBOARD:
BIOS Version: 4.11.amazon
Chipset: Intel 440FX 82441FX PNC

MEMORY:
943MB

DISK:
File-System: xfs
Mount Options: attr2 inode64 logbsize=32k logbufs=8 noatime noquota rw seclabel sumit=1024 swiotlb=1024
Disk Scheduler: mq-deadline
Disk Details: 4096
Block Size: 4096

OPERATING SYSTEM:
Amazon Linux 2023.3.20240809
Kernel: 6.1.106-116.108.amzn2023.x86_64 (x86_64)
Compiler: GCC 11.4.1 20230605
System Layer: Xeon MVM domU 4.11.amazon
Security:
gather_data_sampling: Not affected
+ ipte_multitit: KVM: Mitigation of VMX unsupported
+ ittf: Mitigation of PTE Inversion
+ mds: Vulnerable: Clear buffers attempted no microcode; SMT Host state unknown
+ meltdown: Mitigation of PTI
+ mmiio_state_data: Vulnerable: Clear buffers attempted no microcode; SMT Host state unknown
+ reg_file_data_sampling: Not affected
+ retbleed: Not affected
+ spec_rstack_overflow: Not affected
+ spec_store_bypass: Vulnerable
+ spectre_v1: Mitigation of usercopy/swaggs barriers and user pointer sanitization
+ spectre_v2: Mitigation of Retpolines; STIBP: disabled; RSB Filling; PBRSS-eIBRS: Not affected; BHI: Retpoline
+ srbds: Not affected
+ tsx_async_abort: Not affected

Would you like to save these test results (Y/n): n

$Bench:
pts/osbench-1.0.2 [Test: Create Files]
Test 1 of 5
Estimated Trial Run Count: 3
Estimated Test Run-Time: 3 Minute
Estimated Time To Completion: 3 Minutes (02:44 UTC)
Started Run 1 @ 02:42:12
Started Run 2 @ 02:42:21
```

4i) Notice the results, were there functioning? Why?

The results vary across the five tests because each test measures different aspects of system performance, such as process creation, memory allocation, or file handling, and these tasks have different resource demands. The slight differences in the measured times across multiple runs (e.g., for process creation or memory allocation) are likely due to fluctuations in resource availability on the virtual machine. In a cloud environment, VMs share physical hardware with other instances, leading to variability in CPU, memory, and I/O performance, especially during resource contention from other users.

Additionally, factors such as CPU clock speeds, memory bandwidth, and the efficiency of the VM's operating system can cause differences in execution time. The deviations observed between test runs are small, suggesting the system's performance is relatively stable, but even minor variations in background tasks or resource scheduling can cause these changes.

5)

```
root@ip-172-31-38-143:~/phoronix-test-suite-master
GNU nano 5.8
#include <stdio.h>
#include <time.h>

int main() {
    time_t = current_time;
    time(&current_time);
    printf("Current system time: %s", ctime(&current_time));
    return 0;
}
```


Part 2:

In your words, what did we do today in this assignment? What IP address was the VM assigned? What did `sudo` do? What did `yum` do? Was deploying the vm easier to deploy then installing an OS on a physical machine? What was the purpose of the SSH key you generated? Why do you think you got a random IP address? What did the test suite do?

In today's assignment, we explored the process of deploying a virtual machine on AWS using the EC2 service. We started by signing into AWS, launched our first VM, and generated an RSA key(.pem file) to securely connect to the instance using SSH. Once the VM was running, we logged in through SSH, installed several packages including Java, GCC, and the Phoronix Test Suite, and then ran performance benchmarks using the *osbench* test suite. Finally, we compiled and ran a simple C program to display the system time and terminated the VM after completing our tests.

The VM was assigned an IP address, which was dynamically generated by AWS. This address is how we connected to the VM over the internet. AWS uses dynamic IP allocation to provide flexibility and scalability for cloud resources. The IP address that my VM was assigned to was 3.16.162.206

The `sudo` command allowed us to execute commands as the root/administrative user, giving us the necessary privileges to install software and modify system settings. The `yum` package manager was responsible for installing the software packages we needed on the VM, such as `java`, `gcc`, and `php`. It simplifies the process of managing software dependencies on a Linux system.

Compared to installing an operating system on a physical machine, deploying a VM on AWS was significantly easier and faster. There was no need to deal with physical hardware setup or manually downloading and configuring an OS. AWS automates most of the setup, making it quicker to deploy and access a fully functional system in the cloud.

The SSH key we generated served as a secure method to access the VM. It ensured that only someone with the private key could log in to the VM, providing a secure authentication method. The VM was assigned a random IP address because AWS allocates resources dynamically, and each time a VM is launched, it gets an available address from the pool. This is part of how cloud infrastructure ensures that IPs are efficiently managed.

Finally, the Phoronix Test Suite we installed was used to benchmark the VM's performance. It ran a series of tests to evaluate the system's capabilities in tasks like process creation, memory allocation, and file handling, giving us a clearer understanding of the system's resource limitations and overall performance.