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TITLE:

To create a cluster of machines

AIM:

To create a cluster of machines and achieve a password less access

OBJECTIVE:

To understand the importance of clusters in distributed computing

THEORY:

Cluster Computing:

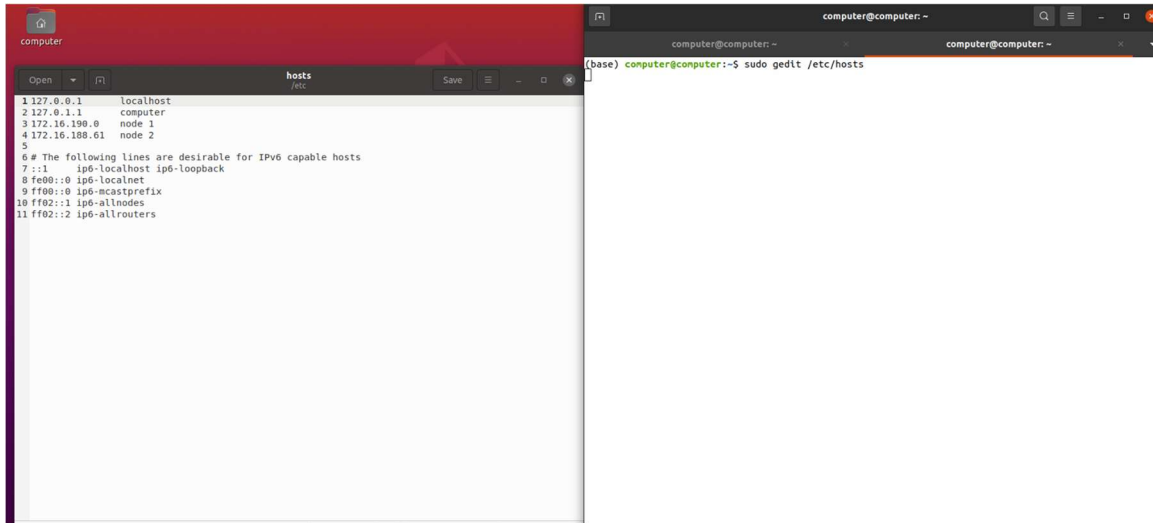
Cluster computing involves multiple interconnected computers (nodes) working together to solve computational problems, enhancing processing power. It's used for complex tasks and applications.

Steps to Create Clusters:

1. Define Purpose: Identify tasks and applications for the cluster.
2. Select Hardware: Choose compatible hardware for each node.
3. Install OS: Install an operating system on each node.
4. Set Up Network: Establish a reliable, high-speed network connection.
5. Install Middleware: Install cluster middleware for communication.
6. Configure Node Communication: Configure nodes to communicate effectively.
7. Set Up Shared Storage: Establish shared storage for all nodes.
8. Install Applications: Install and configure applications for parallel processing.
9. Testing: Conduct thorough testing of the cluster.
10. Monitoring and Management: Implement monitoring tools for performance tracking.
11. Documentation: Document cluster configuration and specifications.
12. Scale as Needed: Add more nodes if necessary, maintaining compatibility.

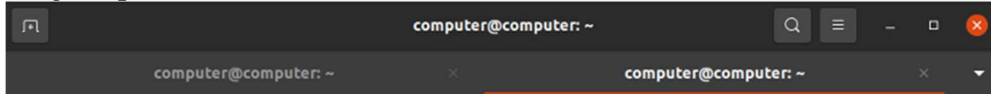
INPUT:

Creation of clusters



OUTPUT:

To get a password-less access to machines on the created cluster



```
(base) computer@computer:~$ sudo gedit /etc/hosts
```

```
(gedit:8066): Tepl-WARNING **: 14:35:43.736: GVfs metadata is not supported. Fallback to TeplMetadataManager. Either GVfs is not correctly installed or GVfs metadata are not supported on this platform. In the latter case, you should configure Tepl with --disable-gvfs-metadata.
```

```
(base) computer@computer:~$ ssh-copy-id node2
```

```
The authenticity of host 'node2 (172.16.188.61)' can't be established.
```

```
ECDSA key fingerprint is SHA256:UPUwajvCAJZtrjp0fX4PtsirZ/Q4WZkD0CYIS3BVn6s.
```

```
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
```

```
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
```

```
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install all the new keys
```

```
computer@node2's password:
```

```
Number of key(s) added: 1
```

```
Now try logging into the machine, with: "ssh 'node2'"
and check to make sure that only the key(s) you wanted were added.
```

```
(base) computer@computer:~$ ssh 'node2'
```

```
Welcome to Ubuntu 20.04.6 LTS (GNU/Linux 5.15.0-89-generic x86_64)
```

```
* Documentation:  https://help.ubuntu.com
* Management:    https://landscape.canonical.com
* Support:        https://ubuntu.com/advantage
```

```
1 device has a firmware upgrade available.
Run 'fwupdmgtr get-upgrades' for more information.
```

```
Expanded Security Maintenance for Applications is not enabled.
```

```
90 updates can be applied immediately.
25 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable
```

```
4 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm
```

```
New release '22.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
```

```
Your Hardware Enablement Stack (HWE) is supported until April 2025.
```

```
(base) computer@computer:~$ ssh-copy-id node2
```

```
/usr/bin/ssh-copy-id: ERROR: No identities found
```

```
(base) computer@computer:~$
```

CONCLUSION:

The cluster of machines was accomplished

PLATFORM:

Linux

LANGUAGE:

C language.

FAQs

1. What is a cluster of machines ?
2. What is a grid of machines ?
3. Give applications of Cluster Computing

FAQ:

Q1 What is a cluster of machine?

Ans A cluster of machines refers to a group of interconnected computers or servers that work together to perform tasks collaboratively. These clusters often function as a single system to enhance performance, reliability, and scalability.

Q2 What is grid of machines?

Ans A grid of machines is a distributed computing infrastructure that connects geographically dispersed resources to work together on a common task. Unlike clusters, grids may involve heterogeneous machines and can span multiple organizations or locations.

Q3 Give applications of cluster computing.

Ans Applications of cluster computing include:

- High-Performance Computing (HPC): Solving complex scientific and engineering problems that require significant computational power.
- Load Balancing: Distributing computing tasks efficiently across a cluster to optimize resource utilization.
- Parallel Processing: Dividing a task into subtasks processed concurrently on multiple machines for faster results.
- Fault Tolerance: Ensuring system reliability by having redundant nodes that can take over in case of failures.
- Data Analysis: Processing large datasets by distributing tasks across a cluster for faster analytics.