**1. What is OpenStack & Its Applications**

**OpenStack is an open-source cloud platform that helps you build and manage your own private or hybrid cloud — similar to AWS, but hosted on your own servers.**

**🌐 Main Applications / Use Cases**

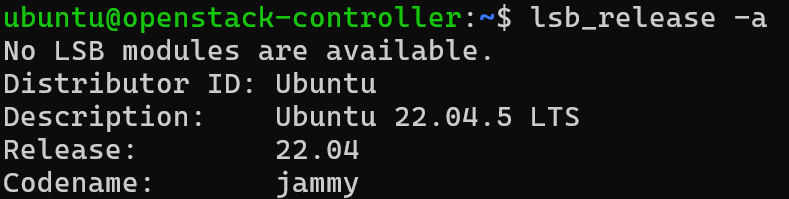
| **Use Case** | **Description** | **Example** |
| --- | --- | --- |
| **🏢 Private Cloud** | **Companies use OpenStack to create their own AWS-like cloud in their data center.** | **A bank hosts its own internal cloud to run secure apps.** |
| **🧪 Development & Testing** | **Developers create virtual servers on demand for testing new applications.** | **A DevOps team spins up multiple test environments daily.** |
| **🖥️ Data Center Virtualization** | **Replaces expensive virtualization products like VMware.** | **IT teams manage thousands of VMs using OpenStack.** |
| **☁️ Hybrid Cloud** | **Combines on-prem OpenStack cloud with public clouds like AWS or Azure.** | **An enterprise runs sensitive data in OpenStack and other workloads in AWS.** |
| **🧠 Research & Education** | **Universities use it to teach cloud concepts and run experiments.** | **Students learn cloud provisioning and orchestration.** |
| **🧰 Automation & CI/CD** | **Integrates with tools like Jenkins, Ansible, Terraform for automated deployments.** | **CI/CD pipelines launch VMs for testing builds.** |

**2. Basic Configuration on Ubuntu Server**

You can install OpenStack in different ways.  
For beginners, the easiest is **DevStack** (good for lab / testing).

**🧑‍💻 Minimum Requirements**

* Ubuntu Server 22.04 LTS (or 20.04)
* 8 GB RAM (minimum for DevStack)
* 4 vCPUs
* 50+ GB disk
* Internet connection
* Sudo access





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A screenshot of a computer screen

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A screen shot of a computer

AI-generated content may be incorrect.





Step-by-Step (DevStack Installation Example)

# 1️⃣ Update your Ubuntu system

sudo apt update && sudo apt upgrade -y

# 2️⃣ Install Git

sudo apt install -y git

# 3️⃣ Clone DevStack repository

git clone https://opendev.org/openstack/devstack

cd devstack

# 4️⃣ Create local.conf file

cat <<EOF > local.conf

[[local|localrc]]

ADMIN\_PASSWORD=admin

DATABASE\_PASSWORD=admin

RABBIT\_PASSWORD=admin

SERVICE\_PASSWORD=admin

HOST\_IP=your\_server\_ip

EOF

# 5️⃣ Start the installation

./stack.sh

**🌍 After Successful Installation**

* Dashboard URL → http://<your\_server\_ip>/dashboard
* Username → admin
* Password → admin (as per the config)

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**4. Check Services Individually**

Run:

systemctl list-units | grep devstack@

or

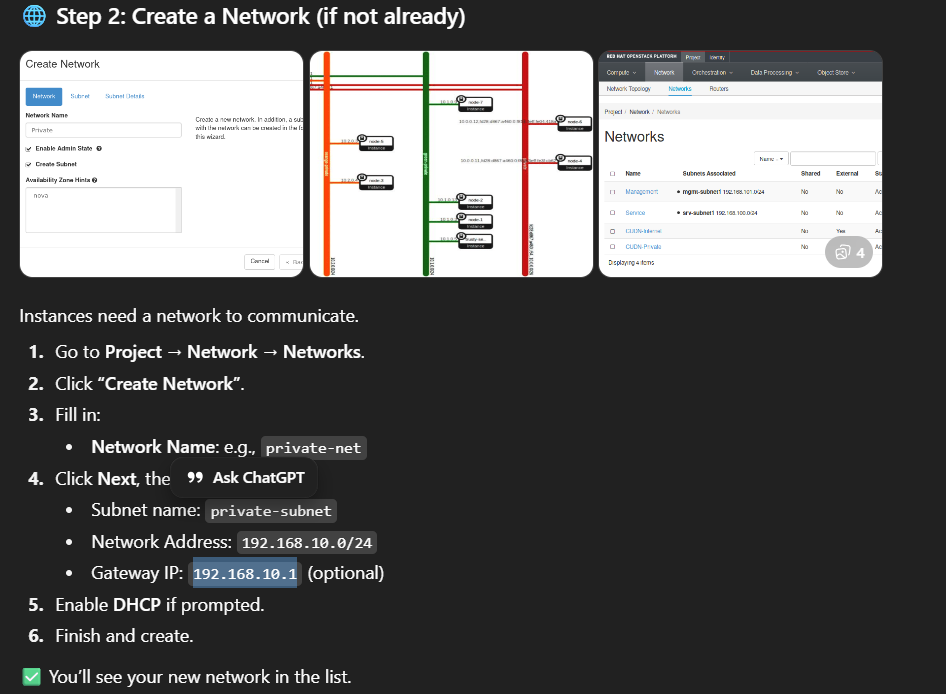
sudo systemctl status devstack@n-cpu.service

sudo systemctl status devstack@n-api.service

✅ If services show as “active (running)”, it’s good.  
❌ If they show “failed” or “inactive”, some components didn’t install properly.

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ubuntu@openstack-controller:~/devstack$ source openrc admin admin

openstack network agent list

+--------------------------------------+------------------------------+----------------------+-------------------+-------+-------+-------------------+

| ID | Agent Type | Host | Availability Zone | Alive | State | Binary |

+--------------------------------------+------------------------------+----------------------+-------------------+-------+-------+-------------------+

| 597a62d4-f240-5ce0-b114-4127e13ee72a | OVN Neutron agent | openstack-controller | | :-) | UP | neutron-ovn-agent |

| 950f6561-7f03-46a9-bd25-76092e6b386e | OVN Controller Gateway agent | openstack-controller | | :-) | UP | ovn-controller |

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ubuntu@openstack-controller:~/devstack$ sudo systemctl status neutron-server

sudo systemctl status neutron-dhcp-agent

sudo systemctl status neutron-l3-agent

sudo systemctl status openvswitch-switch

Unit neutron-server.service could not be found.

Unit neutron-dhcp-agent.service could not be found.

Unit neutron-l3-agent.service could not be found.

● openvswitch-switch.service - Open vSwitch

Loaded: loaded (/lib/systemd/system/openvswitch-switch.service; enabled; vendor preset: enabled)

Active: active (exited) since Wed 2025-10-15 13:21:02 UTC; 1h 29min ago

Main PID: 207474 (code=exited, status=0/SUCCESS)

CPU: 1ms

Oct 15 13:21:02 openstack-controller systemd[1]: Starting Open vSwitch...

Oct 15 13:21:02 openstack-controller systemd[1]: Finished Open vSwitch.

ubuntu@openstack-controller:~/devstack$ sudo systemctl status neutron-ovn-metadata-agent

sudo systemctl status neutron-ovn-controller

sudo systemctl status ovn-northd

Unit neutron-ovn-metadata-agent.service could not be found.

Unit neutron-ovn-controller.service could not be found.

● ovn-northd.service - Open Virtual Network central control daemon

Loaded: loaded (/lib/systemd/system/ovn-northd.service; static)

Active: active (running) since Wed 2025-10-15 13:21:03 UTC; 1h 31min ago

Main PID: 207944 (ovn-northd)

Tasks: 3 (limit: 9478)

Memory: 2.4M

CPU: 33ms

CGroup: /system.slice/ovn-northd.service

└─207944 ovn-northd -vconsole:emer -vsyslog:err -vfile:info --ovnnb-db=unix:/var/run/ovn/ovnnb\_db.sock --ovnsb-db=unix:/var/run/ovn/ovnsb\_db.s>

Oct 15 13:21:03 openstack-controller systemd[1]: Starting Open Virtual Network central control daemon...

Oct 15 13:21:03 openstack-controller ovn-ctl[207894]: \* Starting ovn-northd

Oct 15 13:21:03 openstack-controller systemd[1]: Started Open Virtual Network central control daemon.

ubuntu@openstack-controller:~/devstack$ ovn-nbctl show

ovn-sbctl show

ovn-nbctl: unix:/var/run/ovn/ovnnb\_db.sock: database connection failed (Permission denied)

ovn-sbctl: unix:/var/run/ovn/ovnsb\_db.sock: database connection failed (Permission denied)

ubuntu@openstack-controller:~/devstack$ ps -ef | grep ovn

ubuntu 114135 1 0 13:11 ? 00:00:01 neutron-ovn-agent: master process [/opt/stack/data/venv/bin/neutron-ovn-agent --config-file /etc/neutron/plugins/ml2/ovn\_agent.ini]

ubuntu 115403 114135 0 13:11 ? 00:00:01 neutron-ovn-agent: ServiceWrapper worker(0)

root 115648 1 0 13:11 ? 00:00:00 /opt/stack/data/venv/bin/python3.10 /usr/local/bin/privsep-helper --config-file /etc/neutron/plugins/ml2/ovn\_agent.ini --privsep\_context neutron.privileged.namespace\_cmd --privsep\_sock\_path /tmp/tmp78pfekir/privsep.sock

ubuntu 117913 1 0 13:11 ? 00:00:02 neutron-ovn-maintenance-worker: master process [/opt/stack/data/venv/bin/neutron-ovn-maintenance-worker --config-file /etc/neutron/neutron.conf --config-file /etc/neutron/plugins/ml2/ml2\_conf.ini]

ubuntu 119121 117913 0 13:11 ? 00:00:04 neutron-server: maintenance worker (/opt/stack/data/venv/bin/python3.10 /opt/stack/data/venv/bin/neutron-ovn-maintenance-worker --config-file /etc/neutron/neutron.conf --config-file /etc/neutron/plugins/ml2/ml2\_conf.ini)

root 120578 1 0 13:11 ? 00:00:00 /opt/stack/data/venv/bin/python3.10 /usr/local/bin/privsep-helper --config-file /etc/neutron/plugins/ml2/ovn\_agent.ini --privsep\_context neutron.privileged.default --privsep\_sock\_path /tmp/tmpk3w5n3tc/privsep.sock

ubuntu 124523 1 0 13:12 ? 00:00:02 /opt/stack/data/venv/bin/python3.10 /opt/stack/data/venv/bin/nova-novncproxy --config-file /etc/nova/nova\_cell1.conf --web /opt/stack/novnc

root 207336 1 0 13:21 ? 00:00:00 ovn-controller-vtep -vconsole:emer -vsyslog:err -vfile:info --vtep-db=/var/run/openvswitch/db.sock --ovsb-db=/var/run/ovn/ovnsb\_db.sock --no-chdir --log-file=/var/log/ovn/ovn-controller-vtep.log --pidfile=/var/run/ovn/ovn-controller-vtep.pid --detach

root 207884 1 0 13:21 ? 00:00:00 ovsdb-server -vconsole:off -vfile:info --log-file=/var/log/ovn/ovsdb-server-nb.log --remote=punix:/var/run/ovn/ovnnb\_db.sock --pidfile=/var/run/ovn/ovnnb\_db.pid --unixctl=/var/run/ovn/ovnnb\_db.ctl --remote=db:OVN\_Northbound,NB\_Global,connections --private-key=db:OVN\_Northbound,SSL,private\_key --certificate=db:OVN\_Northbound,SSL,certificate --ca-cert=db:OVN\_Northbound,SSL,ca\_cert --ssl-protocols=db:OVN\_Northbound,SSL,ssl\_protocols --ssl-ciphers=db:OVN\_Northbound,SSL,ssl\_ciphers /var/lib/ovn/ovnnb\_db.db

root 207888 1 0 13:21 ? 00:00:00 ovsdb-server -vconsole:off -vfile:info --log-file=/var/log/ovn/ovsdb-server-sb.log --remote=punix:/var/run/ovn/ovnsb\_db.sock --pidfile=/var/run/ovn/ovnsb\_db.pid --unixctl=/var/run/ovn/ovnsb\_db.ctl --remote=db:OVN\_Southbound,SB\_Global,connections --private-key=db:OVN\_Southbound,SSL,private\_key --certificate=db:OVN\_Southbound,SSL,certificate --ca-cert=db:OVN\_Southbound,SSL,ca\_cert --ssl-protocols=db:OVN\_Southbound,SSL,ssl\_protocols --ssl-ciphers=db:OVN\_Southbound,SSL,ssl\_ciphers /var/lib/ovn/ovnsb\_db.db

root 207944 1 0 13:21 ? 00:00:00 ovn-northd -vconsole:emer -vsyslog:err -vfile:info --ovnnb-db=unix:/var/run/ovn/ovnnb\_db.sock --ovnsb-db=unix:/var/run/ovn/ovnsb\_db.sock --no-chdir --log-file=/var/log/ovn/ovn-northd.log --pidfile=/var/run/ovn/ovn-northd.pid --detach

root 208227 1 0 13:21 ? 00:00:01 ovn-controller unix:/var/run/openvswitch/db.sock -vconsole:emer -vsyslog:err -vfile:info --no-chdir --log-file=/var/log/ovn/ovn-controller.log --pidfile=/var/run/ovn/ovn-controller.pid --detach

ubuntu 222366 219980 0 14:54 pts/7 00:00:00 grep --color=auto ovn

ubuntu@openstack-controller:~/devstack$ sudo ovn-sbctl show

Chassis "950f6561-7f03-46a9-bd25-76092e6b386e"

hostname: openstack-controller

Encap geneve

ip: "157.119.43.38"

options: {csum="true"}

ubuntu@openstack-controller:~/devstack$ sudo ovn-nbctl show

ubuntu@openstack-controller:~/devstack$ source openrc admin admin

ubuntu@openstack-controller:~/devstack$ openstack network create private-net

Error while executing command: HttpException: 503, Unable to create the network. No project network is available for allocation.

ubuntu@openstack-controller:~/devstack$ openstack network create public --external --provider-network-type flat --provider-physical-network public

+---------------------------+--------------------------------------+

| Field | Value |

+---------------------------+--------------------------------------+

| admin\_state\_up | UP |

| availability\_zone\_hints | |

| availability\_zones | |

| created\_at | 2025-10-15T15:01:03Z |

| description | |

| dns\_domain | None |

| id | 34d8c381-6c78-4e61-9931-72a0ad4593ae |

| ipv4\_address\_scope | None |

| ipv6\_address\_scope | None |

| is\_default | False |

| is\_vlan\_qinq | None |

| is\_vlan\_transparent | False |

| mtu | 1500 |

| name | public |

| port\_security\_enabled | True |

| project\_id | 250fc94c4f704307b224e9c900dd274e |

| provider:network\_type | flat |

| provider:physical\_network | public |

| provider:segmentation\_id | None |

| qinq | False |

| qos\_policy\_id | None |

| revision\_number | 1 |

| router:external | External |

| segments | None |

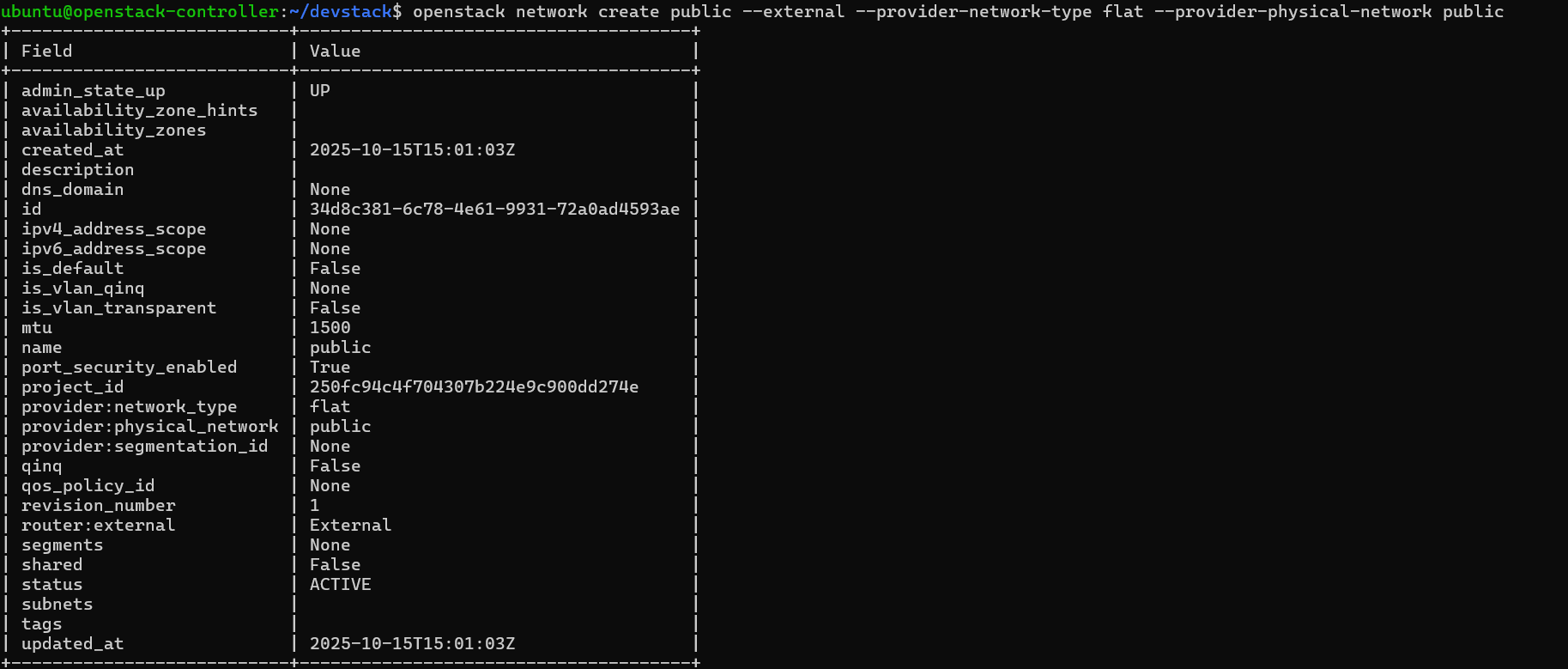
| shared | False |

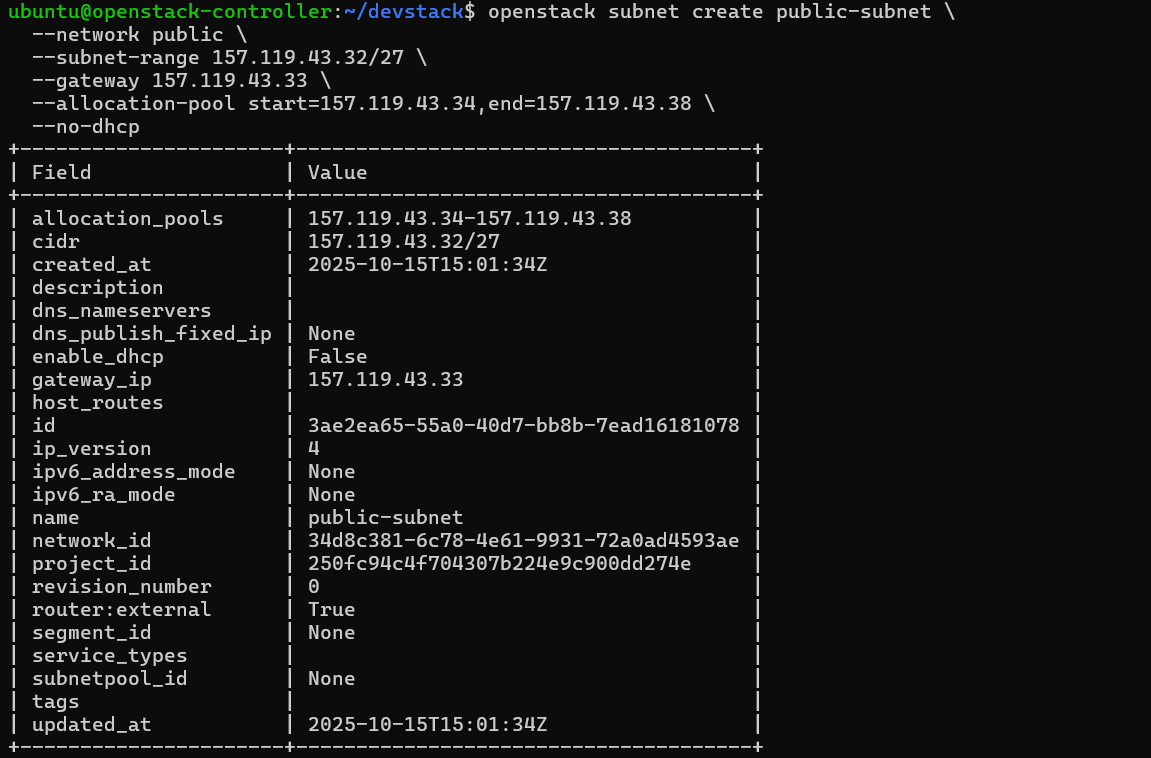
| status | ACTIVE |

| subnets | |

| tags | |

| updated\_at | 2025-10-15T15:01:03Z |





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