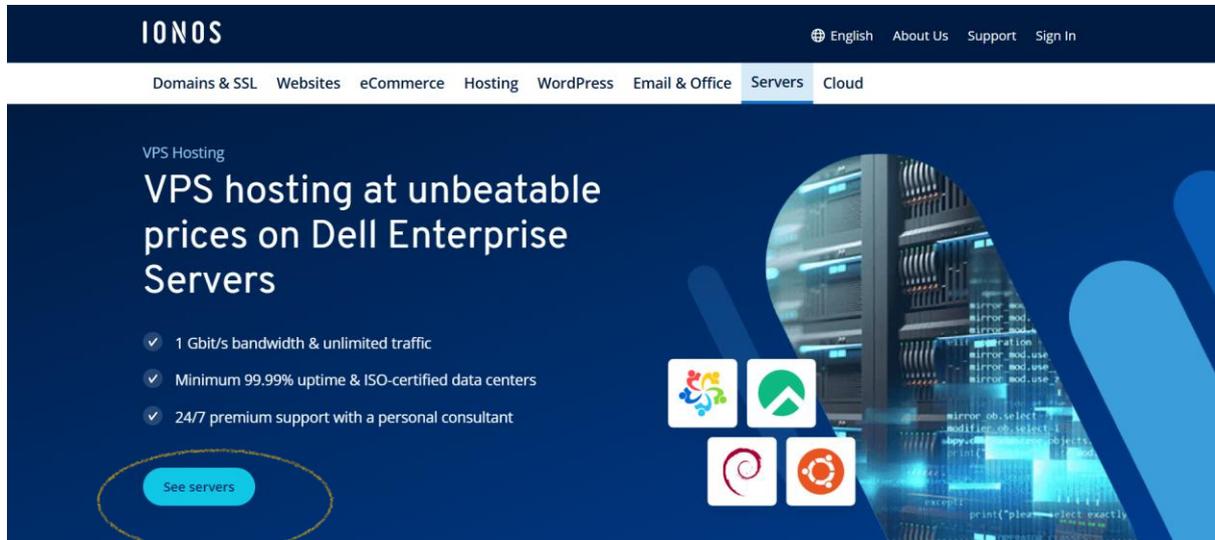


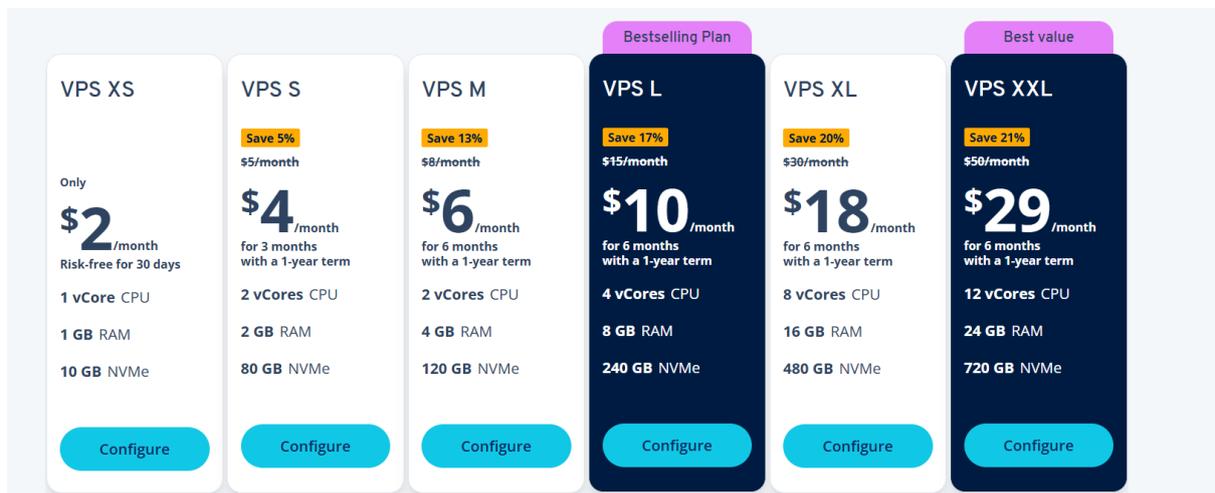
Document to build a node on Ionos

Step 1: Purchasing a plan

Website URL : <https://www.ionos.com/servers/vps>



Click on see servers to see the plans.

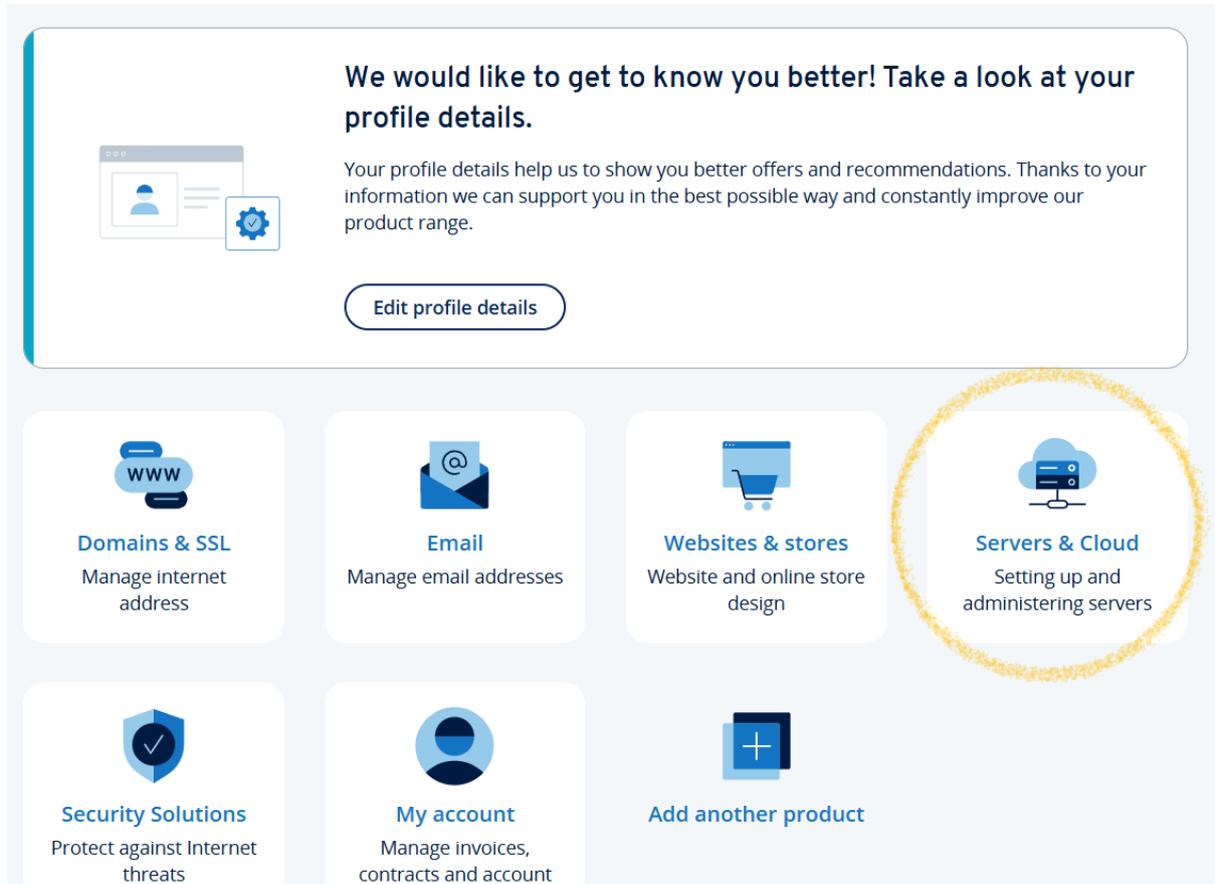


These are the plans available. The specifications for running a \$DAG node is 8 vCores CPU, 16 GB RAM and Disk space varies depending on the snapshots. We have to choose VPS XL here. Once you select this plan, you will be asked to fill in all your personal details and do the payment.

You can also place an order by calling to the customer support. Phone no - +1-484-254-5555
Once the payment is done, you will get the customer id details to your email id.

Step 2: Getting the details of root password

Go to my.ionos.com and give your customer id or email id and password to login to your account. Once you login you will see as below



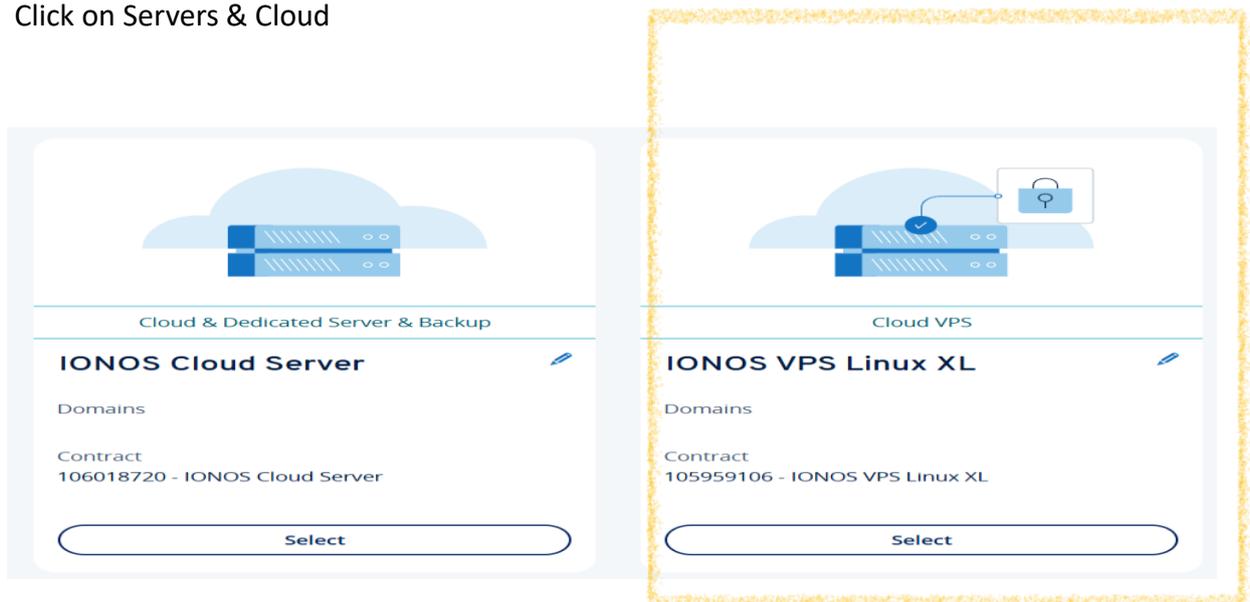
We would like to get to know you better! Take a look at your profile details.

Your profile details help us to show you better offers and recommendations. Thanks to your information we can support you in the best possible way and constantly improve our product range.

[Edit profile details](#)

- Domains & SSL**
Manage internet address
- Email**
Manage email addresses
- Websites & stores**
Website and online store design
- Servers & Cloud**
Setting up and administering servers
- Security Solutions**
Protect against Internet threats
- My account**
Manage invoices, contracts and account
- Add another product**

Click on Servers & Cloud



Cloud & Dedicated Server & Backup

IONOS Cloud Server

Domains

Contract
106018720 - IONOS Cloud Server

[Select](#)

Cloud VPS

IONOS VPS Linux XL

Domains

Contract
105959106 - IONOS VPS Linux XL

[Select](#)

Select IONOS VPS Linux XL

SS

IONOS MENU

Search for features, domains, and help

Last login: 04/02/2025 19:17:28 from 49.207.223.111 (India)

Recommended help topics

- > Overview: Server (VPS)
- > VPS: Getting Started
- > Using the Remote Console for Server Access (VPS Linux and VPS Windows)
- > Installing Plesk (VPS Windows and VPS Linux)
- > Important Security Information for Your Server

Object Storage

- ✓ ISO 27001-certified and GDPR-compliant
- ✓ Access via REST API, 3rd-party SDKs, Clients

Try for free now

Servers

Actions Network

Type	Name	Status	IP	Size	OS	Datacenter
<input type="radio"/>	My VPS	●	[REDACTED]	vps 8 16 480	Ubuntu 24.04	

Help

You can see your vps here

Type Name Status IP Size OS Datacenter

My VPS ● [REDACTED] vps 8 16 480 Ubuntu 24.04

My VPS

Enter a description

On

Features

Login Data:

Host: 65.38.96.90

User: root

Initial Password: [View password](#)

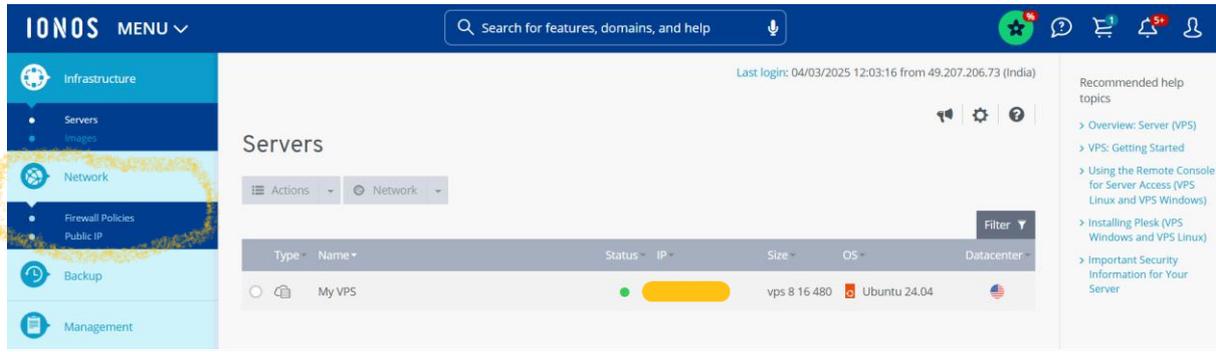
Image:

Source: IONOS Images

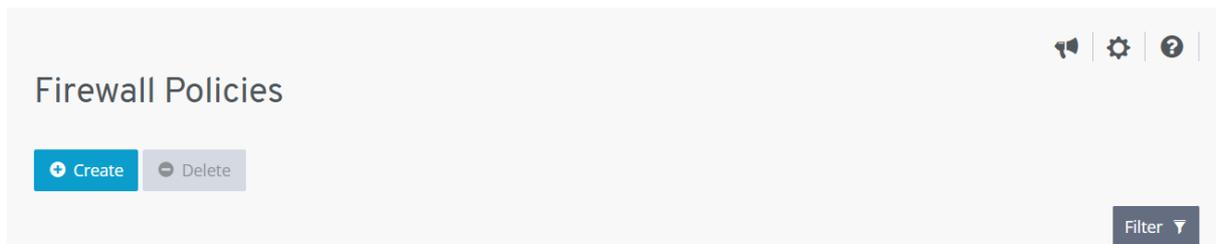
Operating System: Ubuntu 24.04

Click on the Radio button beside My VPS so that you can view User which is root and click on view password for password

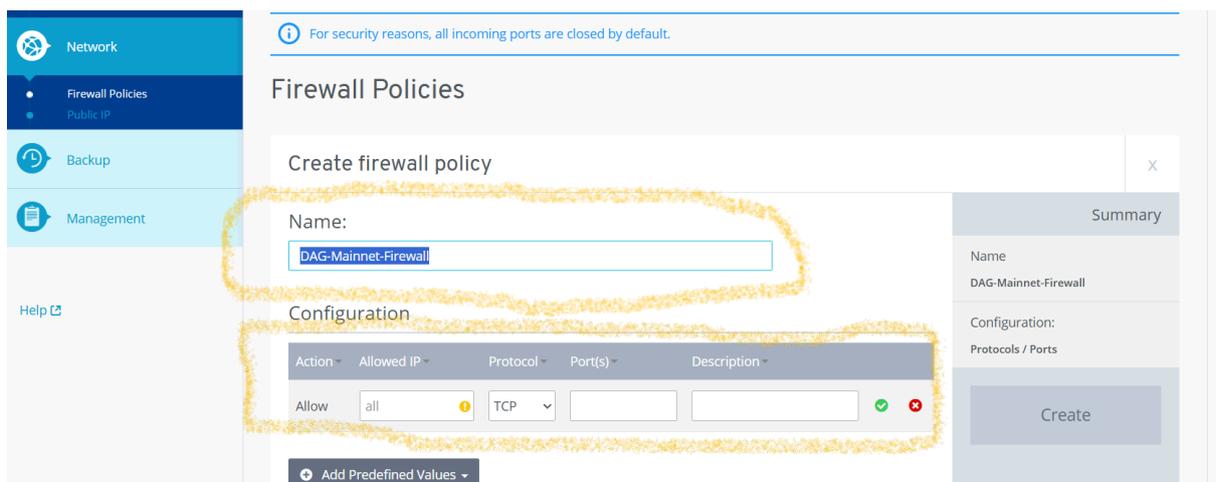
Step3: Create a Firewall



On the left side click on Firewall policies



Click on firewall to create a firewall



Give the name of your choice and add the rules

Configuration

Incoming

Action	Allowed IP	Protocol	Port(s)	Description
Allow	All	TCP	9000 - 9001	
Allow	All	TCP	9010 - 9011	
Allow	49.207.206.73	TCP	22	

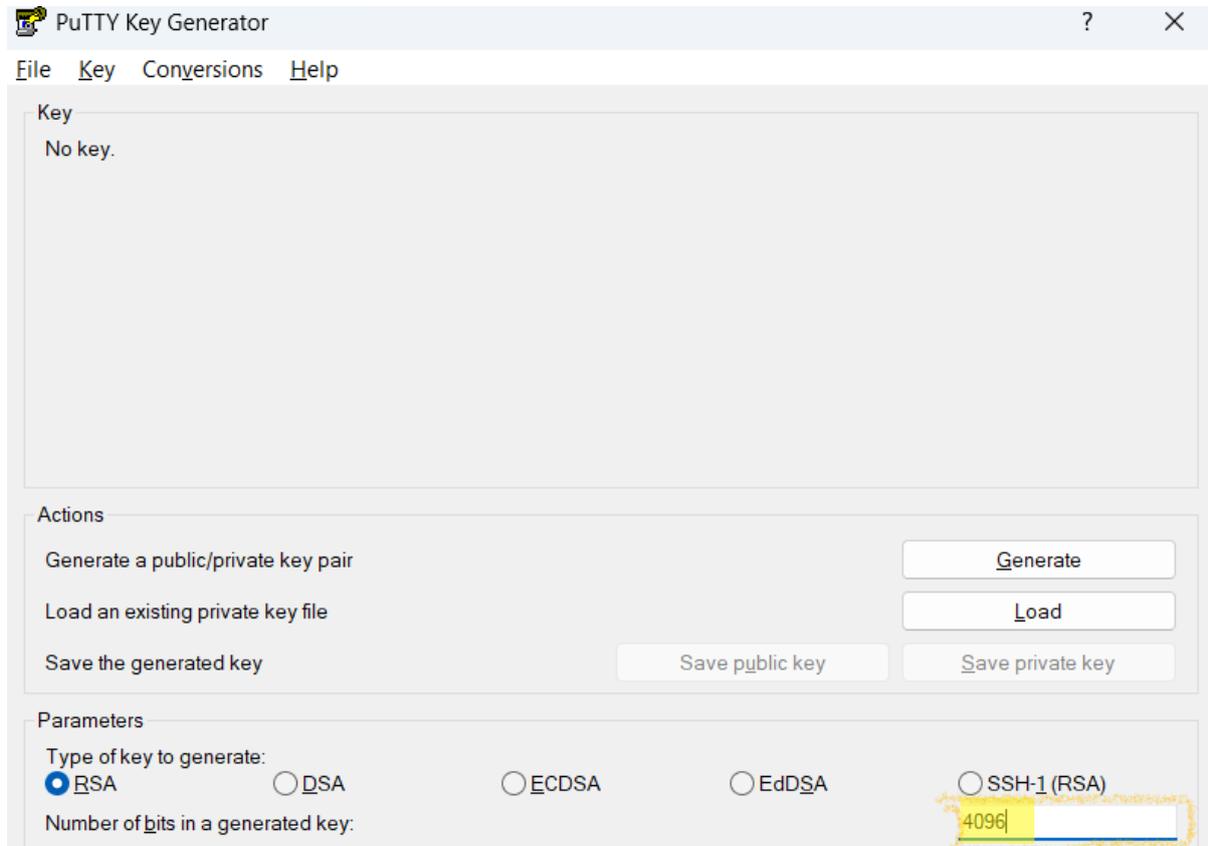
These are the rules to be added. To get your local ip address, go to whatismyip.com and paste your ip address

The screenshot shows a configuration interface with two main sections: 'Properties' and 'Assigned IP'. The 'Properties' section includes a 'Created on' field with the value '04/02/2025 13:16:32'. The 'Assigned IP' section shows a card for 'My VPS' with a yellow bar representing the IP address. Below this, there is a dark button with a plus sign and the text 'Assign', which is circled in yellow.

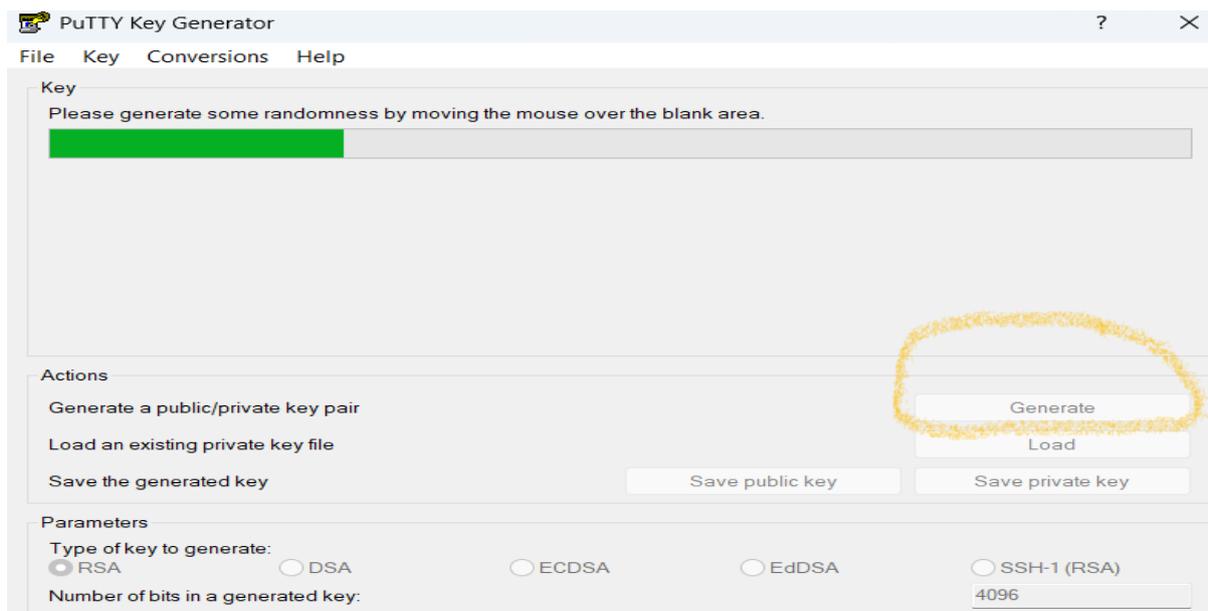
Click on Assign to add firewall to the vps

Step 4: Create an SSH Key pair using PuTTYgen

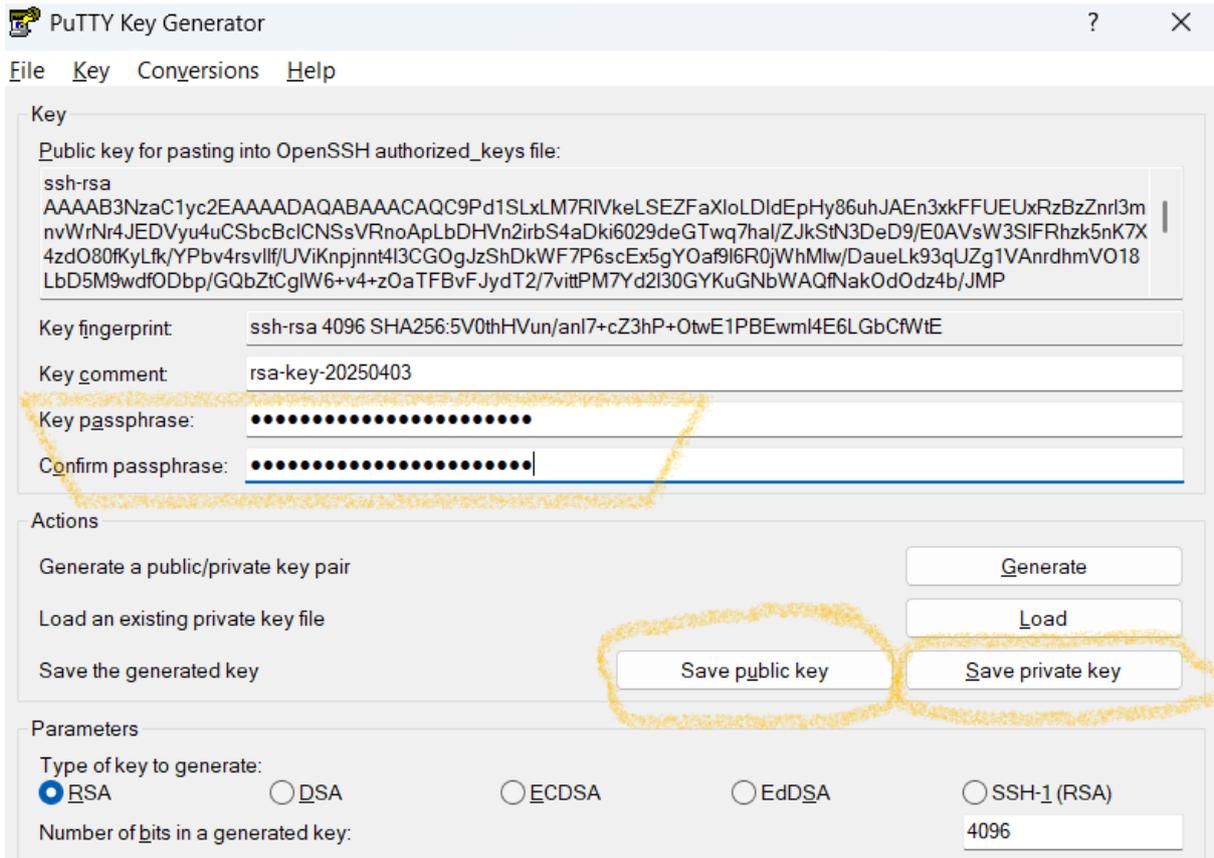
Open PuTTYgen



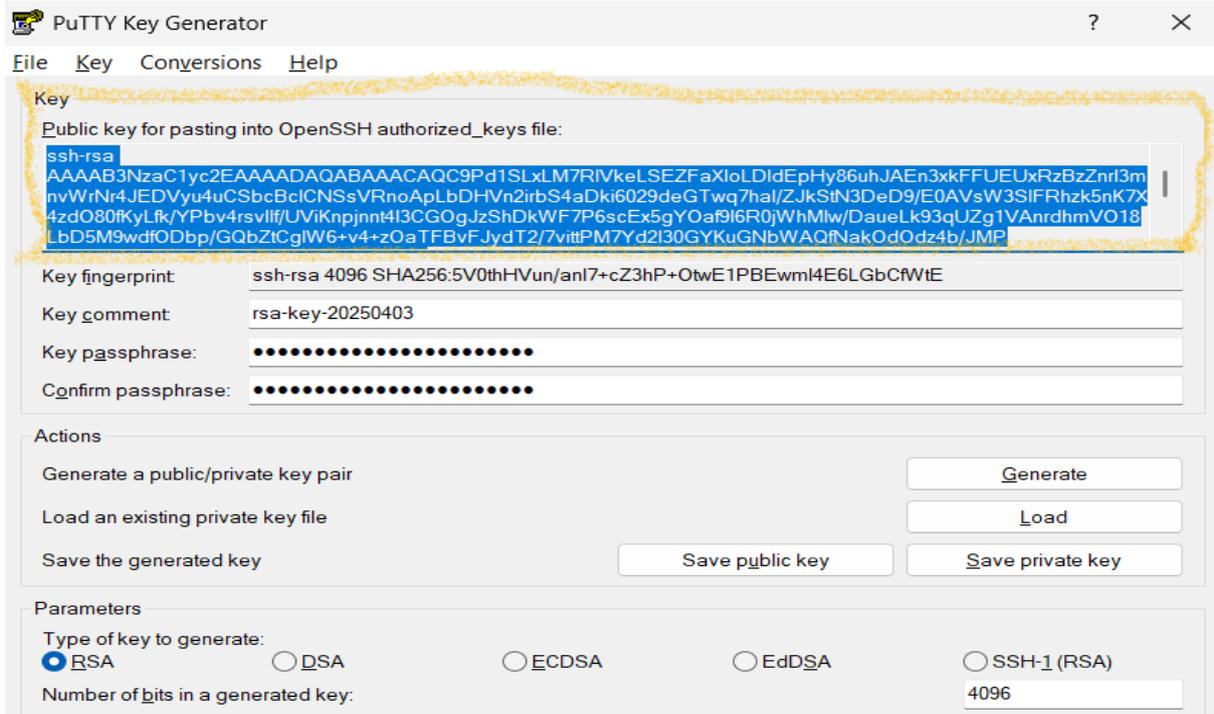
By default it will be 2048. Change the Number of bits in a generated key to 4096.



Click on Generate and move the mouse around to complete the process

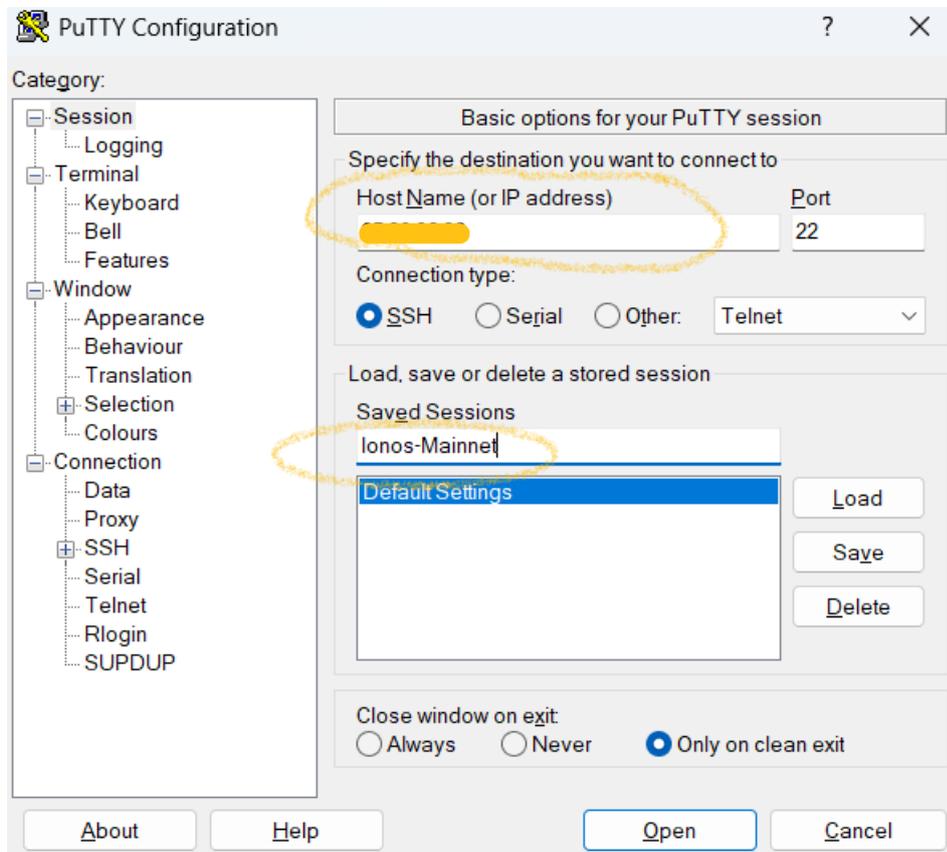


Give the Key Passphrase of your own choice and Confirm Passphrase. After that save public key with name **id_rsa.pub** and private key with name **id_rsa** to your local computer.

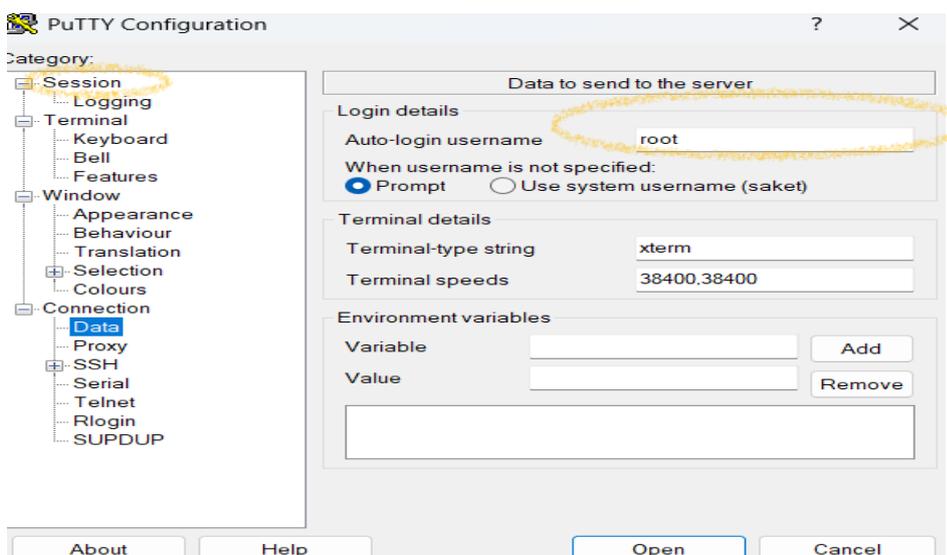


Copy the Public key to paste it in the authorized_keys file in your vps server

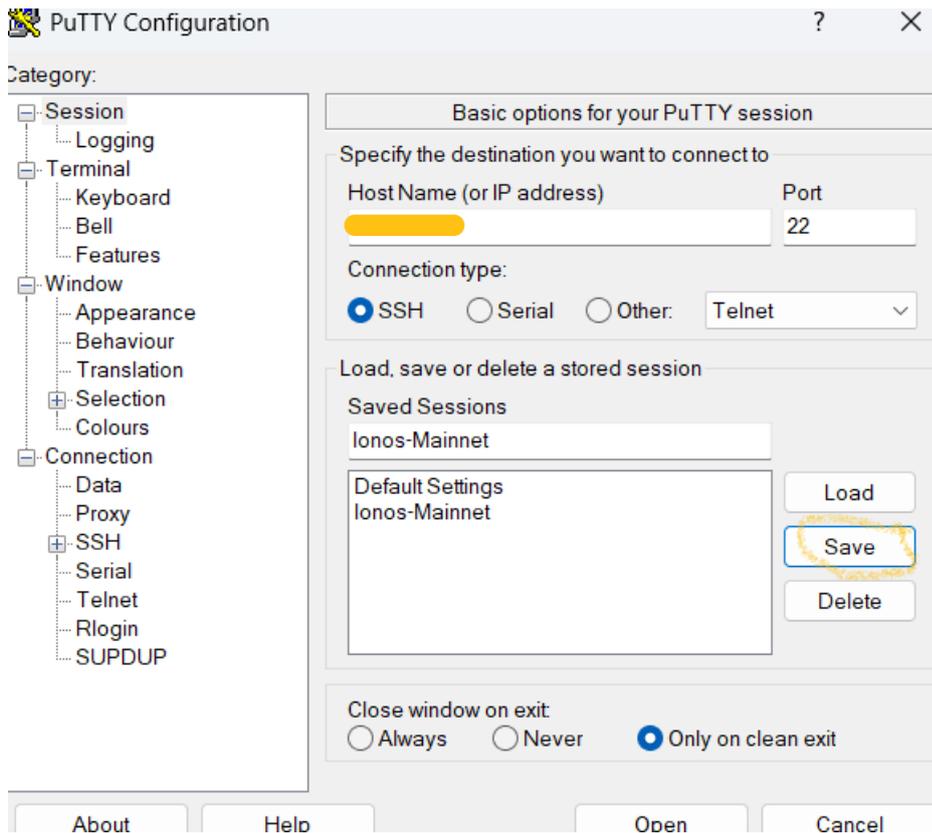
Step 5: Log-in to vps from root user and root password and paste the public key in authorized keys file



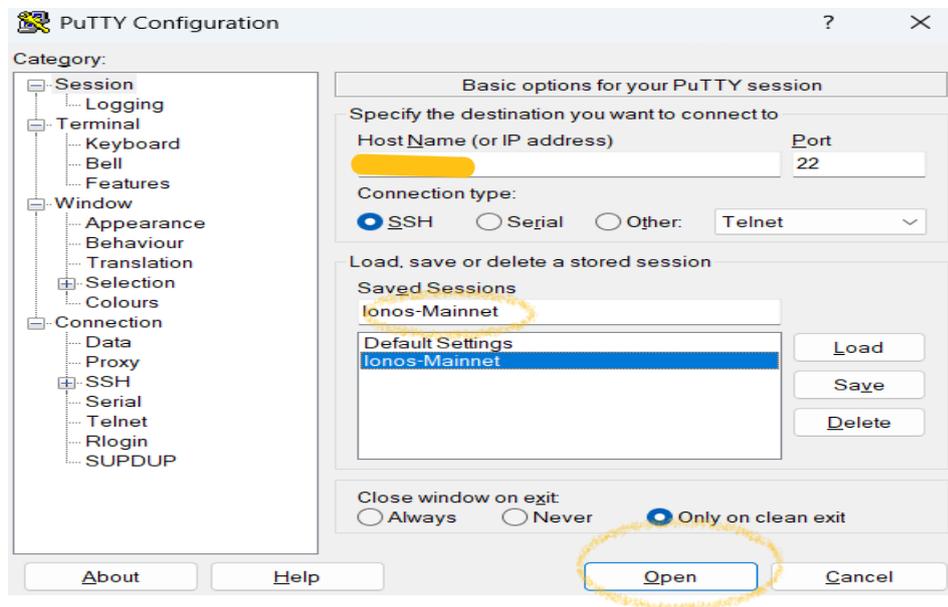
Give the ip address and name, save it



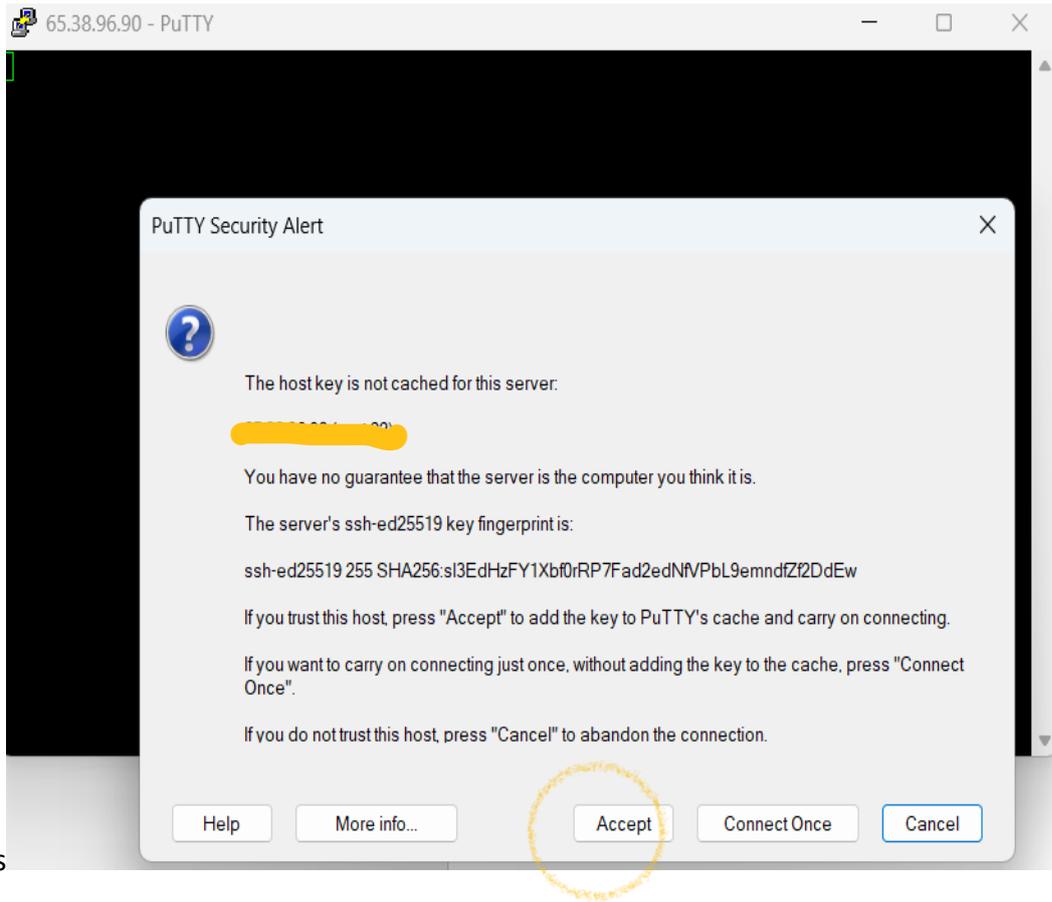
Go to Connection->Data and give Auto-login username as root. After that click on session



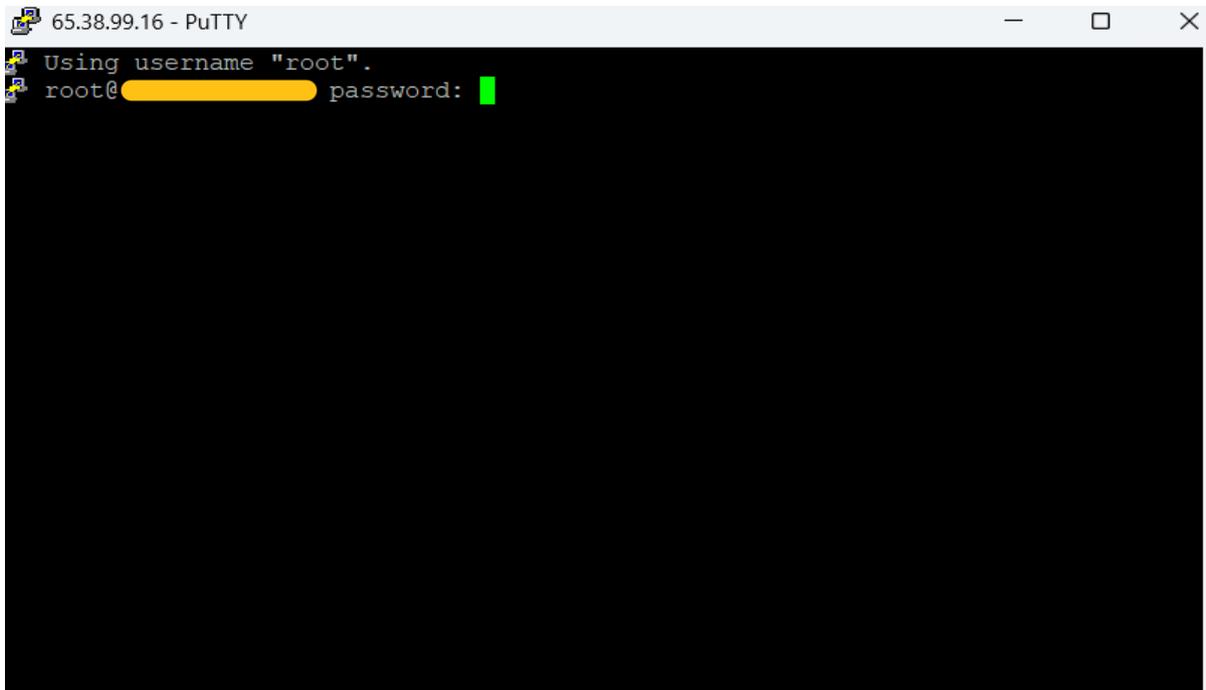
Now click on save



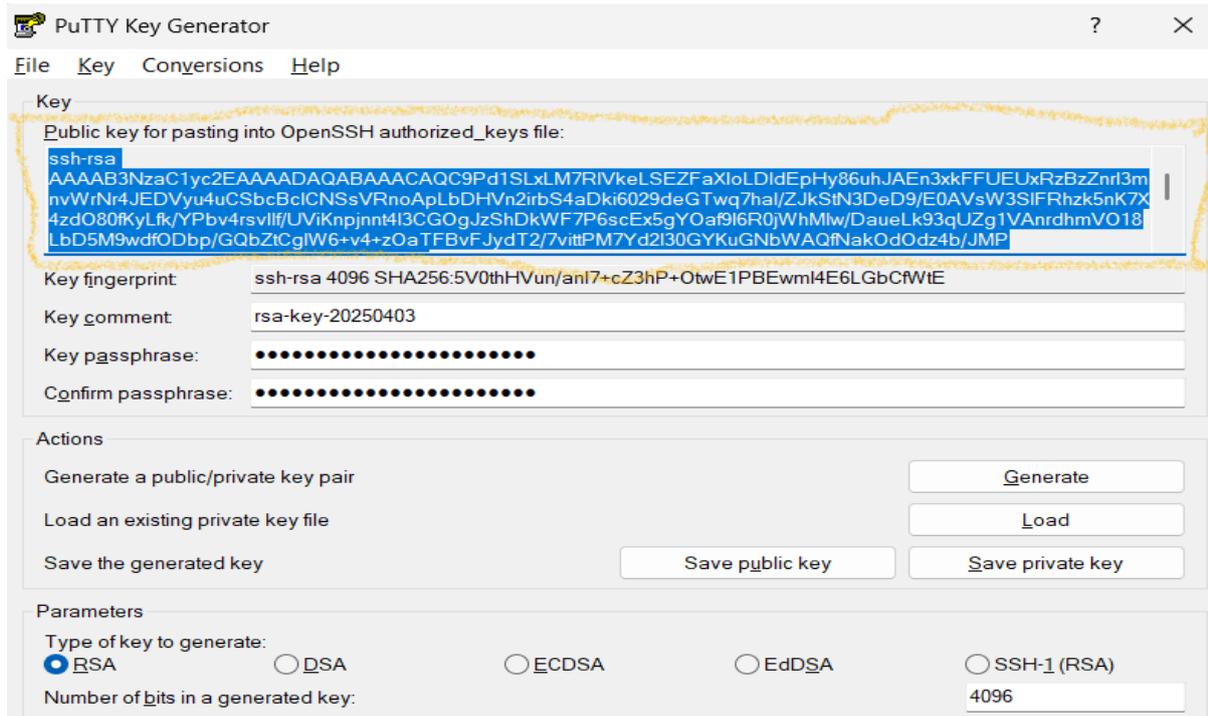
Now Select lonos-Mainnet and open it



Click on Accept



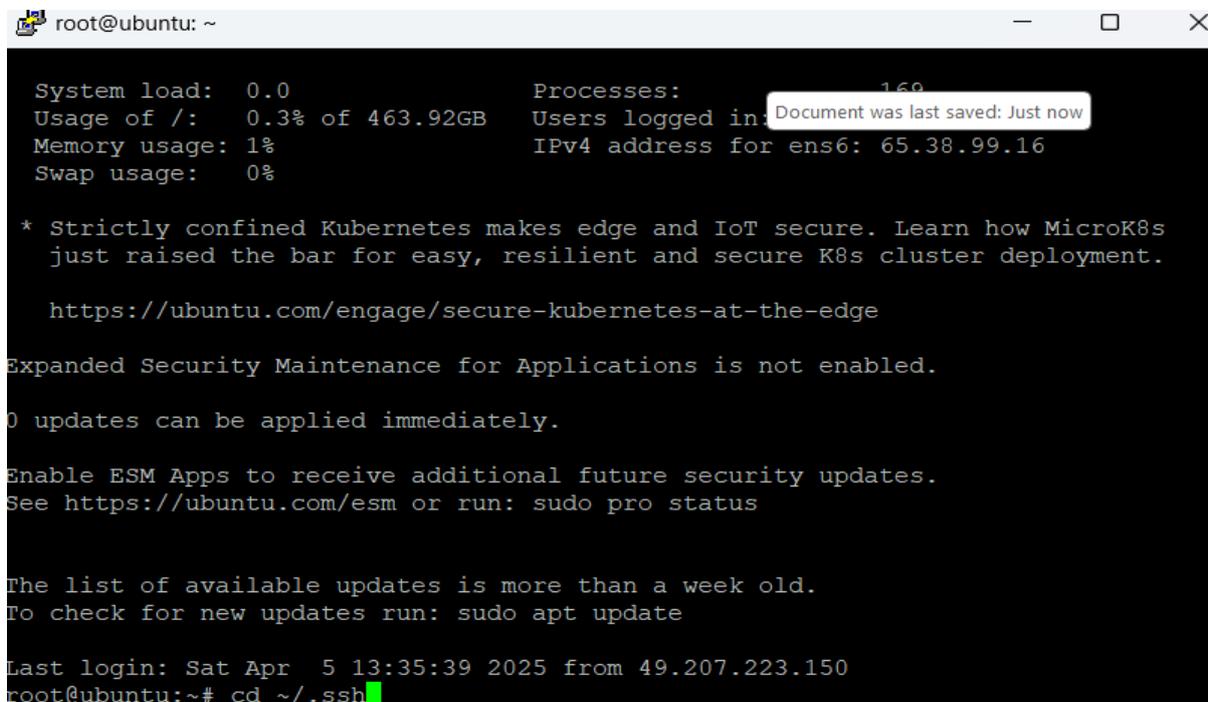
Give the root password which is in the Ionos My VPS section. Please refer Step 2 to get the password



Copy the public key from PuttyGen and paste it in the authorized_keys file on the VPS

How to access authorized keys file and paste the ssh public key

On putty, go to the directory .ssh



Command: **cd ~/.ssh**

After that open the authorized_keys file

```
root@ubuntu: ~/.ssh
root@ubuntu:~/.ssh# cd ~/.ssh
root@ubuntu:~/.ssh# nano authorized_keys
```

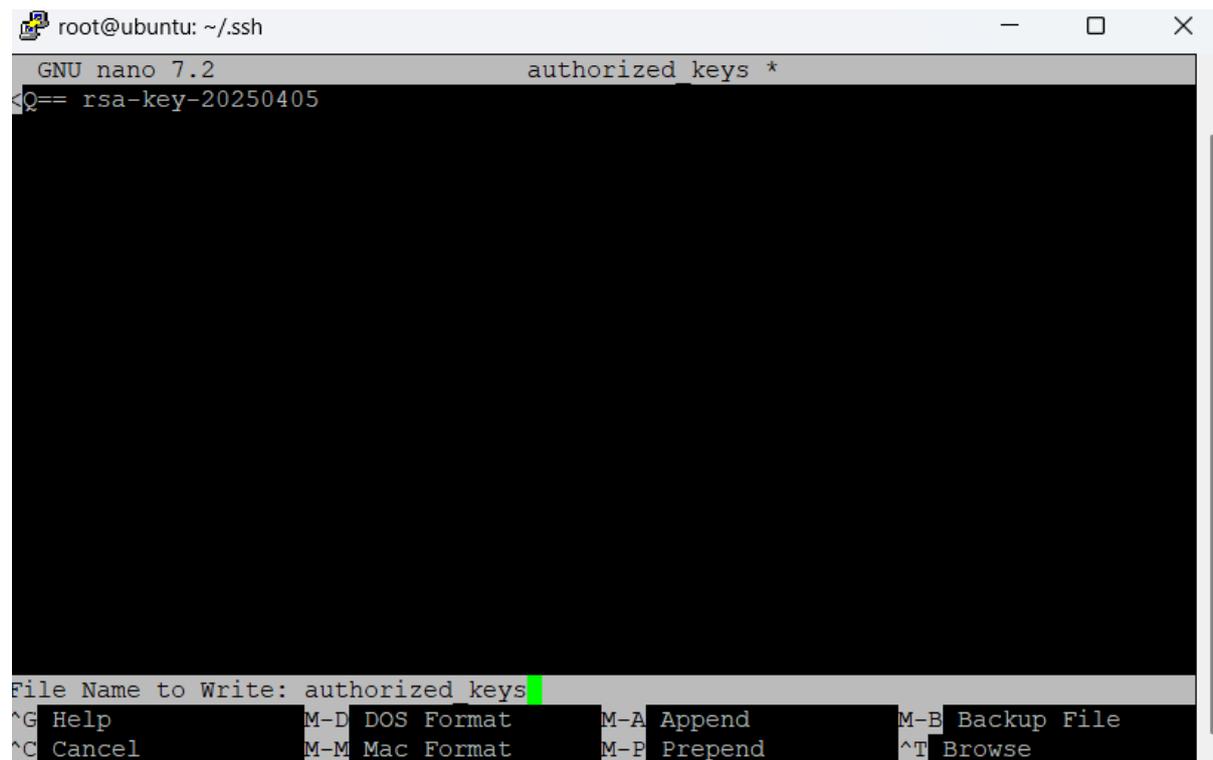
Command: **nano authorized_keys** and press **<ENTER>**

```
GNU nano 7.2 authorized keys *
Q== rsa-key-20250405
```

^G Help	^O Write Out	^W Where Is	^K Cut	^T Execute	^C Location
^X Exit	^R Read File	^_ Replace	^U Paste	^J Justify	^/ Go To Line

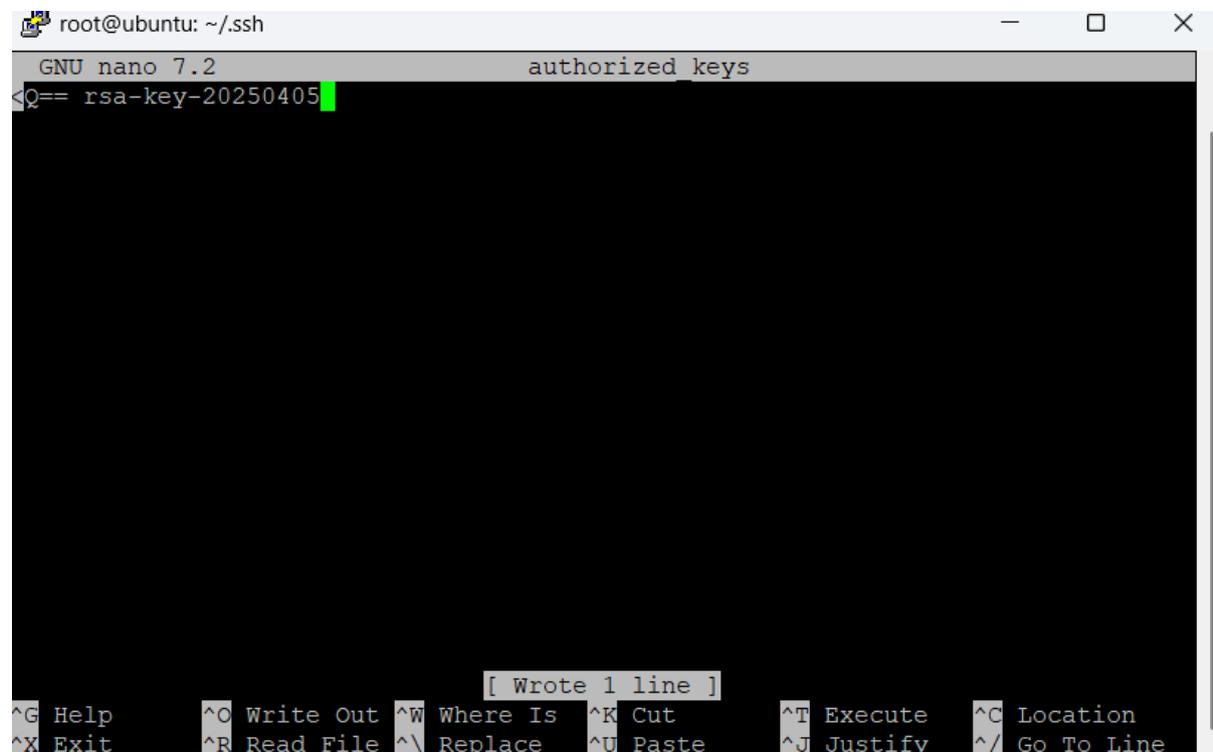
Now right click on the mouse to paste the public key which is already copied previously, so that it will be pasted in the `authorized_keys` file

Command to save and Exit from the Nano Editor:



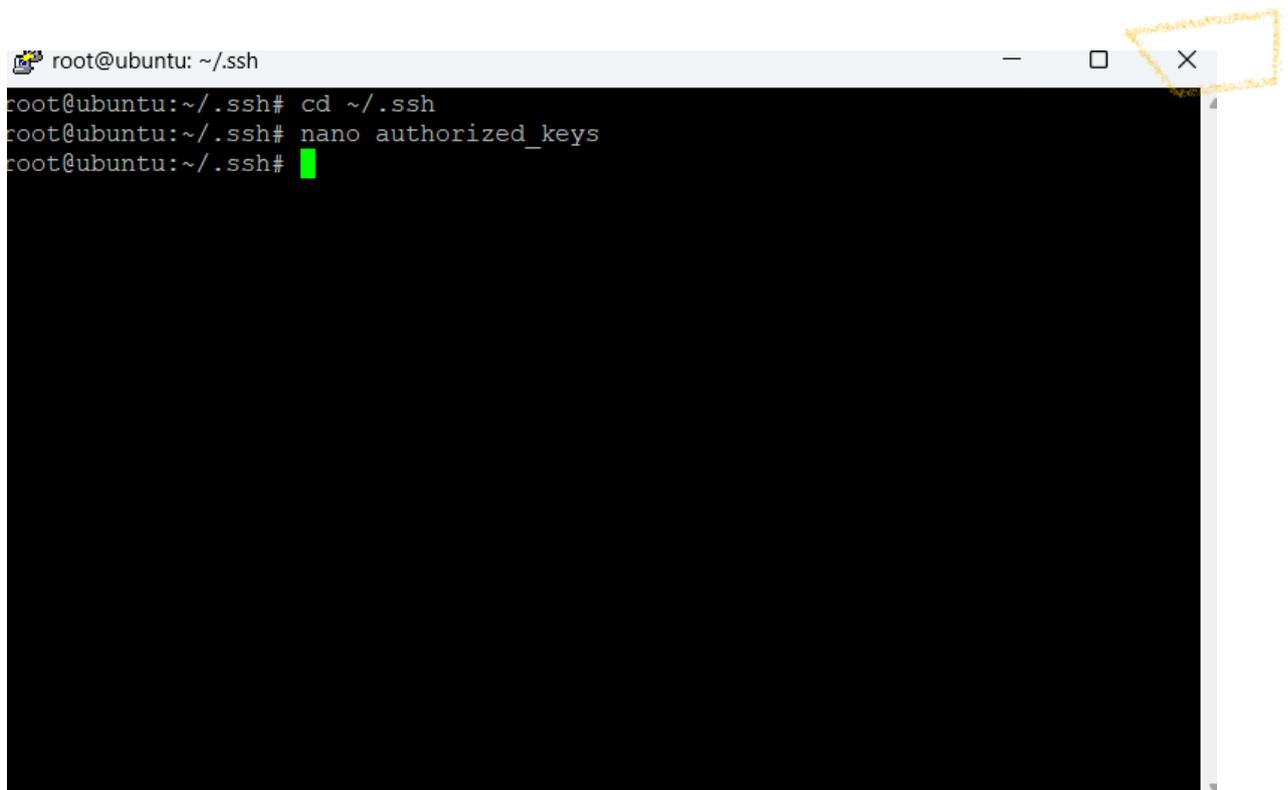
```
root@ubuntu: ~/.ssh
GNU nano 7.2 authorized keys *
<Q== rsa-key-20250405
File Name to Write: authorized keys
^G Help      M-D DOS Format  M-A Append    M-B Backup File
^C Cancel    M-M Mac Format  M-P Prepend   ^T Browse
```

Command to Save: **Ctrl+O**



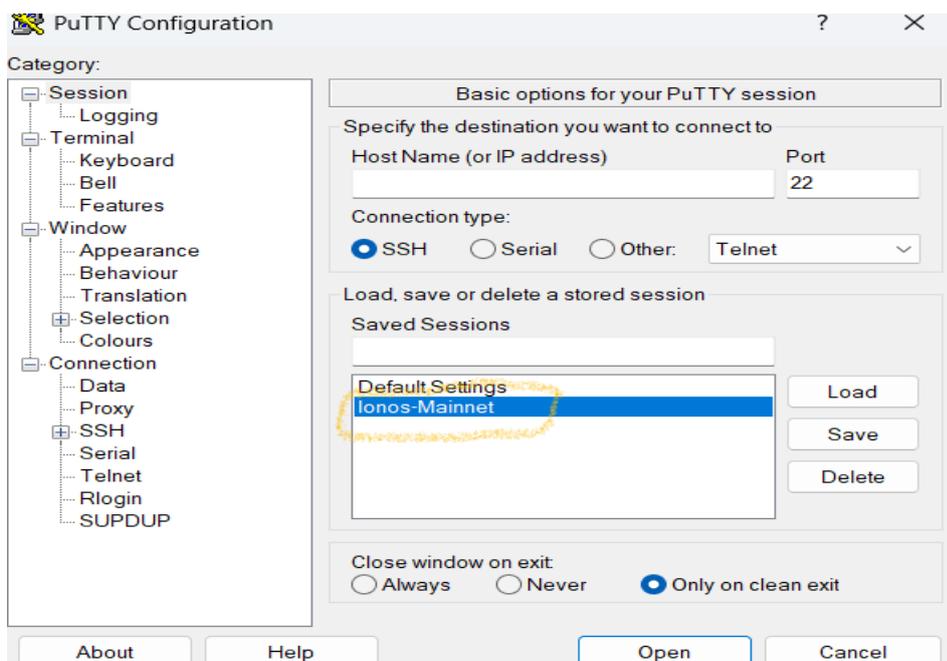
```
root@ubuntu: ~/.ssh
GNU nano 7.2 authorized keys
<Q== rsa-key-20250405
[ Wrote 1 line ]
^G Help      ^O Write Out   ^W Where Is   ^K Cut        ^T Execute    ^C Location
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^/ Go To Line
```

Press <ENTER>

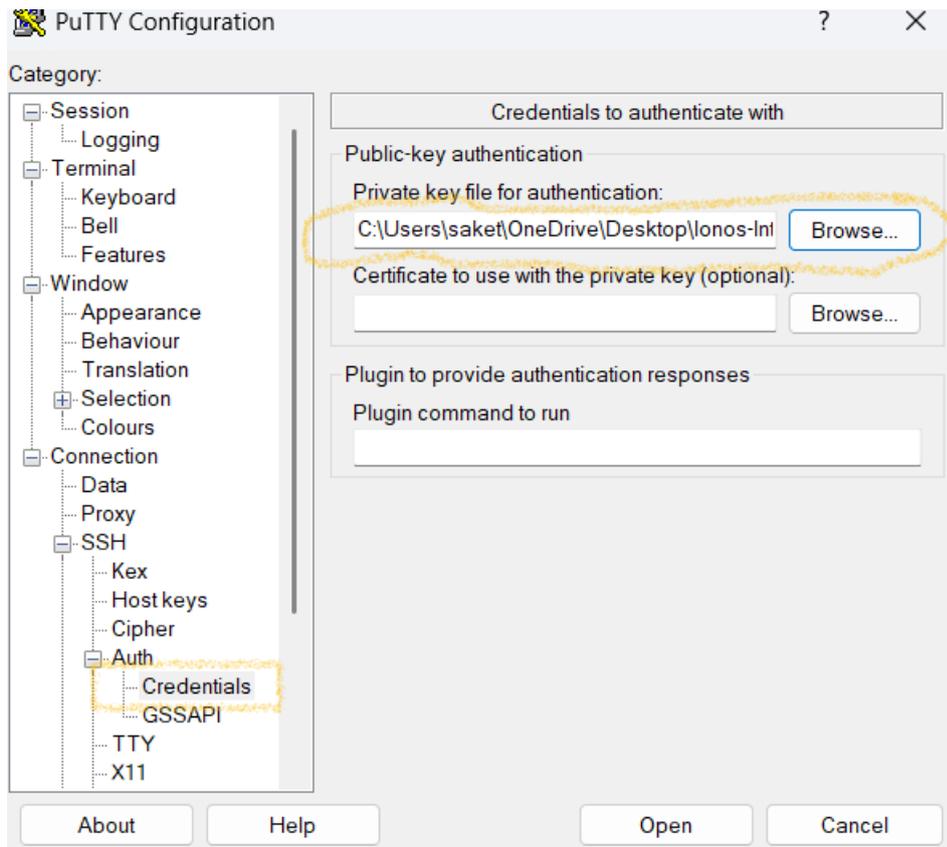


Ctrl+X will bring back the screen to the terminal. Please close this session.

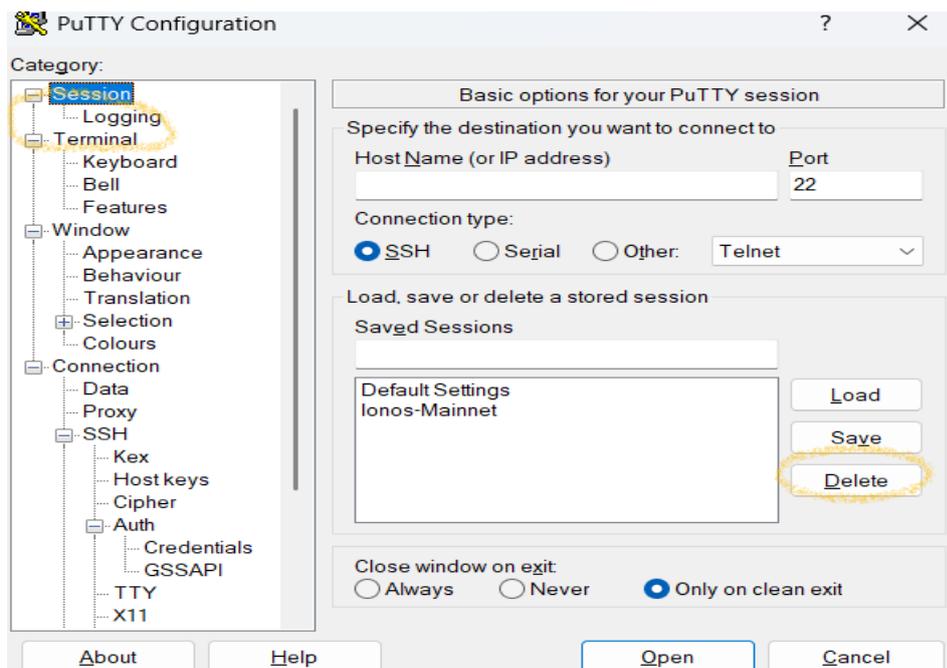
Step 6: Access the node from putty with ssh keys



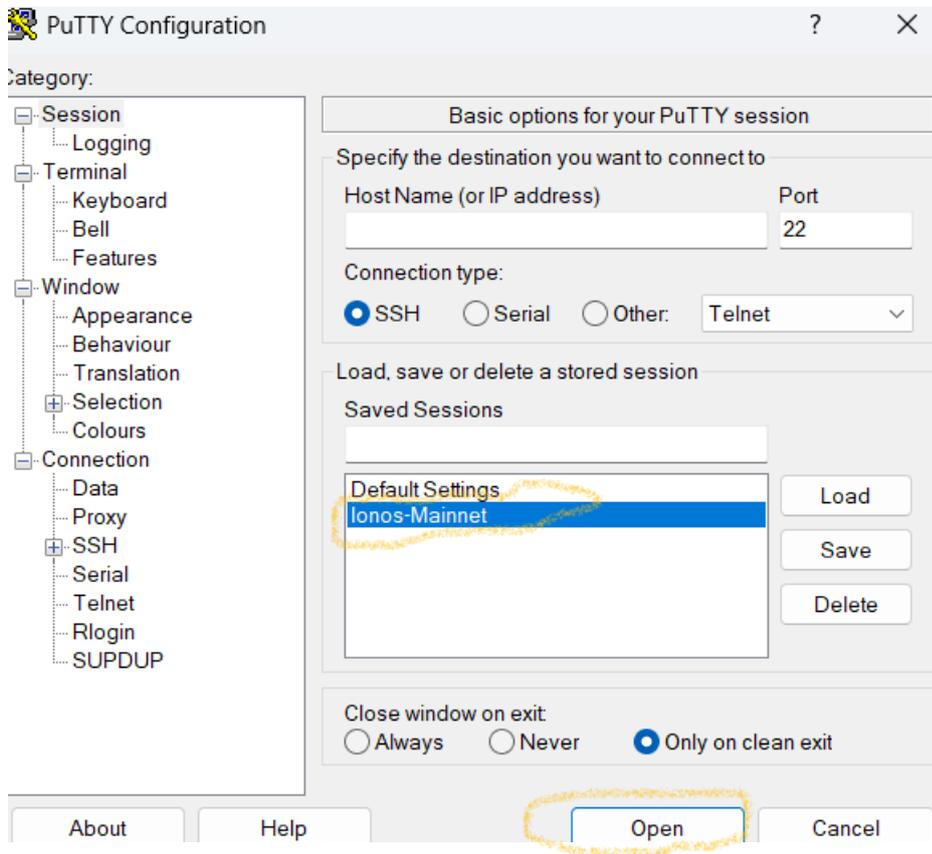
Click on lonos-Mainnet



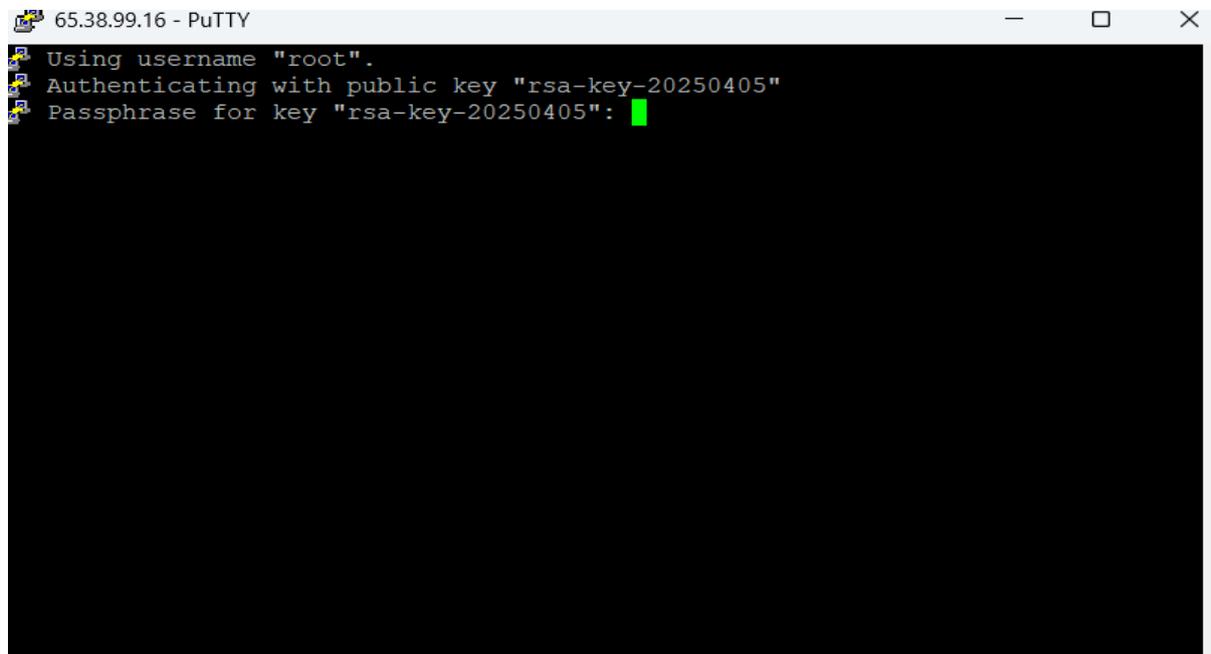
Go to Connection->SSH->Auth->Credentials and Browse the ssh private key file(id_rsa) which is stored in your local computer



Click on Session and Save.



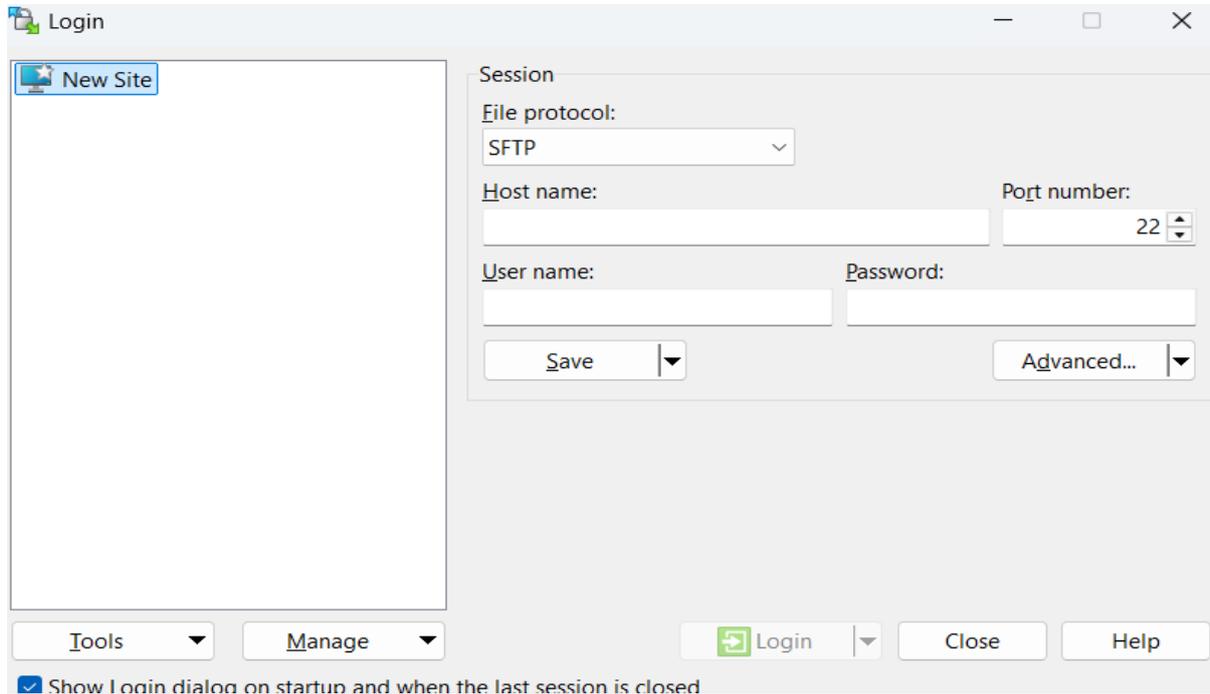
Click on lonos-Mainnet and click on Open



Give the passphrase and login

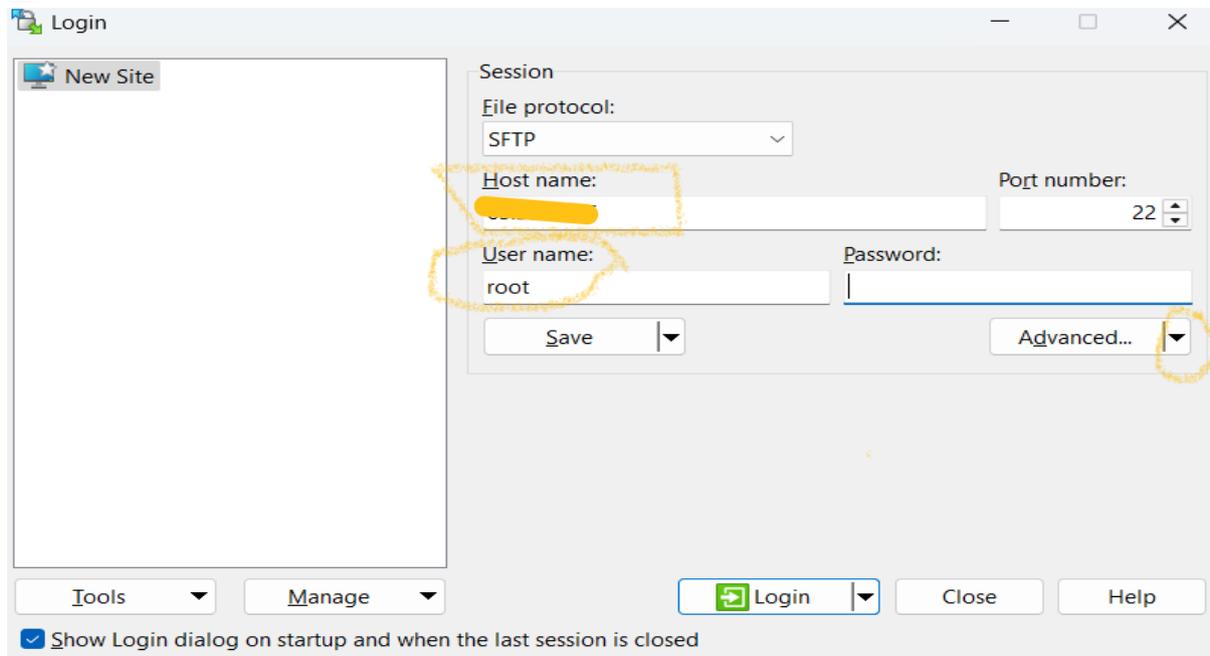
NOTE: No need of Step 7, if you are building a node first time as you don't have p12 file

Step 7: Configuring WinSCP and copying the p12 file to VPS

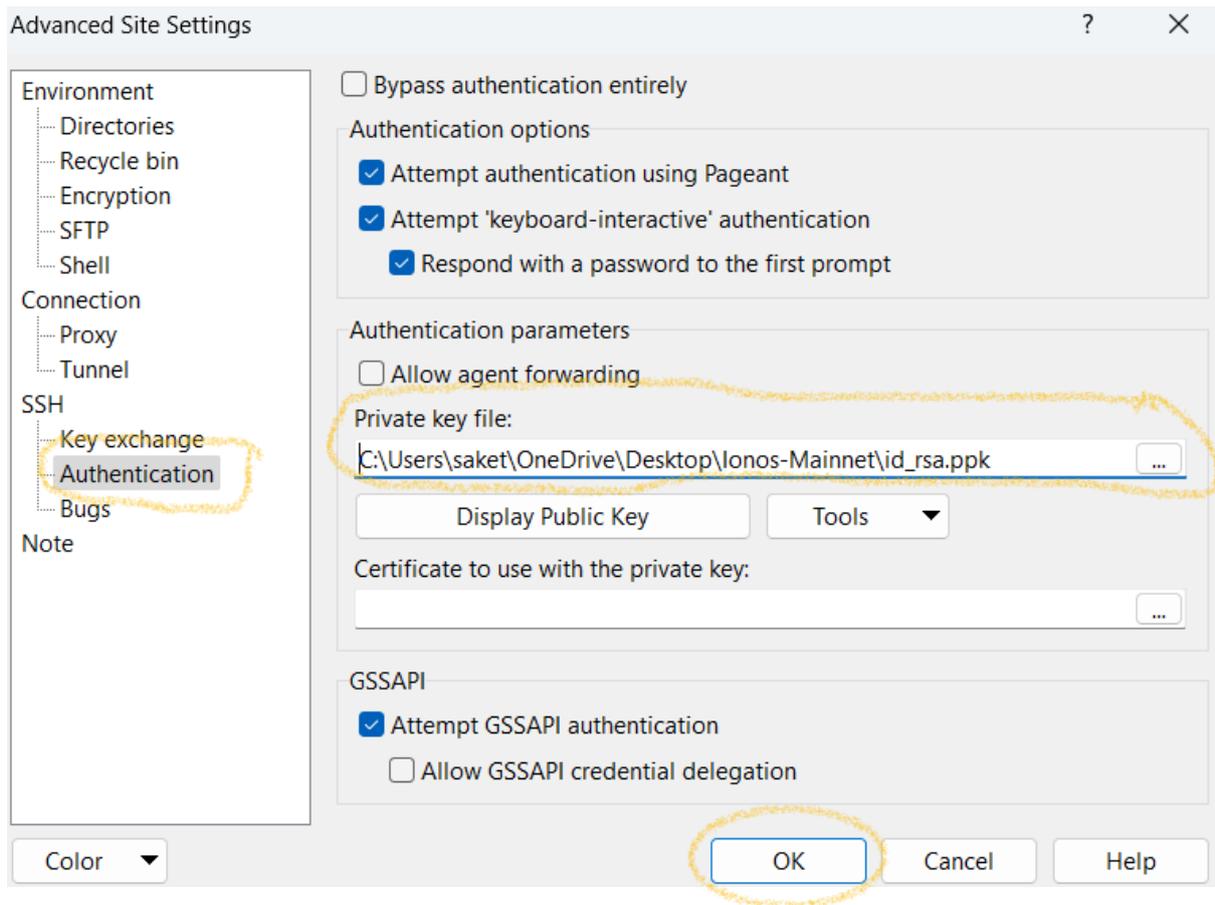


Open Winscp

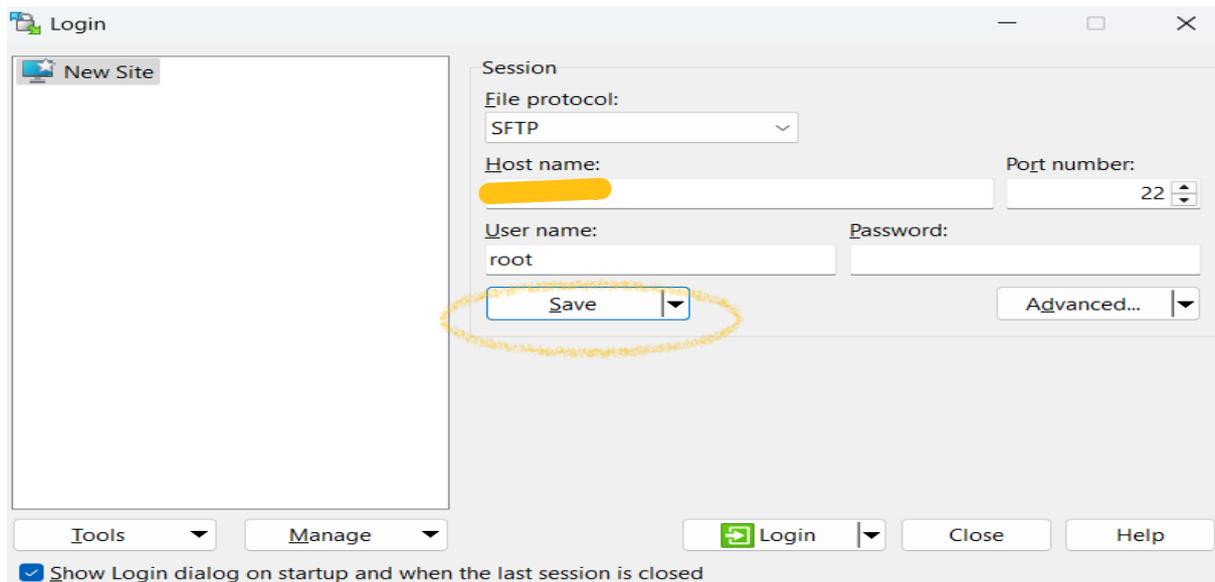
SS



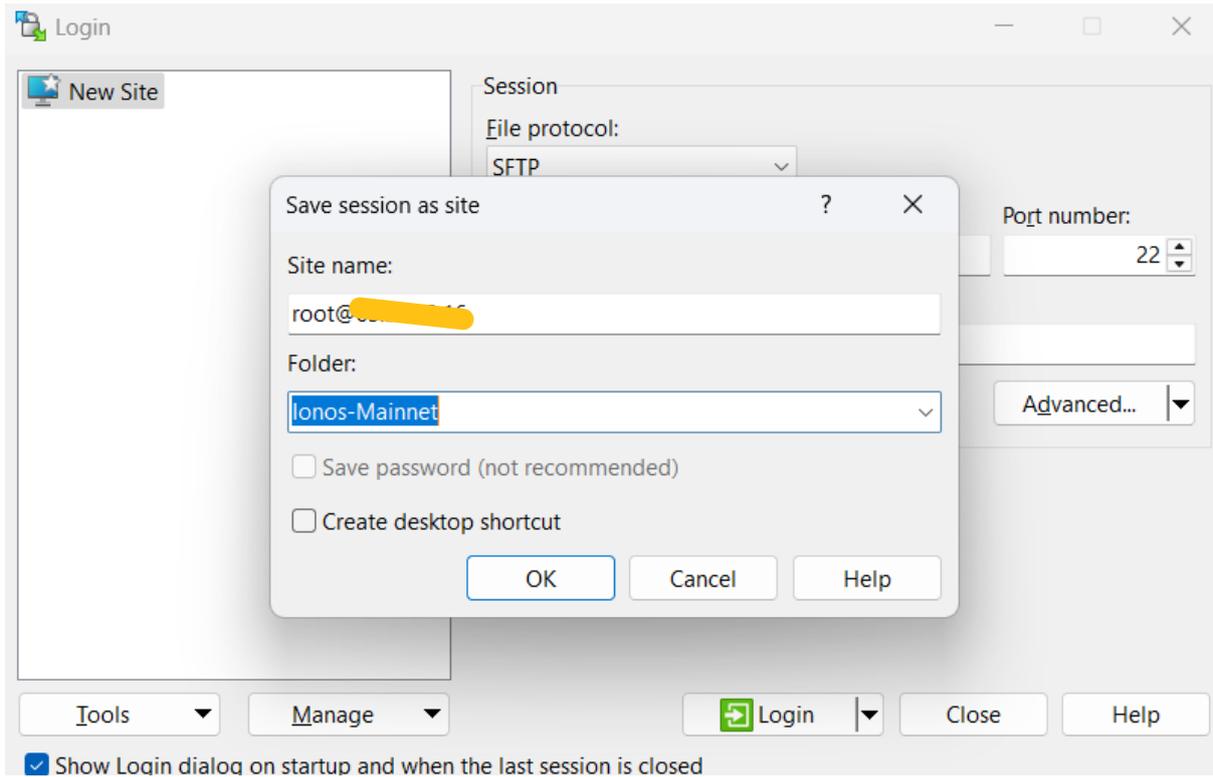
Give your VPS ip address in Host name and User name as root and click on Advanced drop down symbol



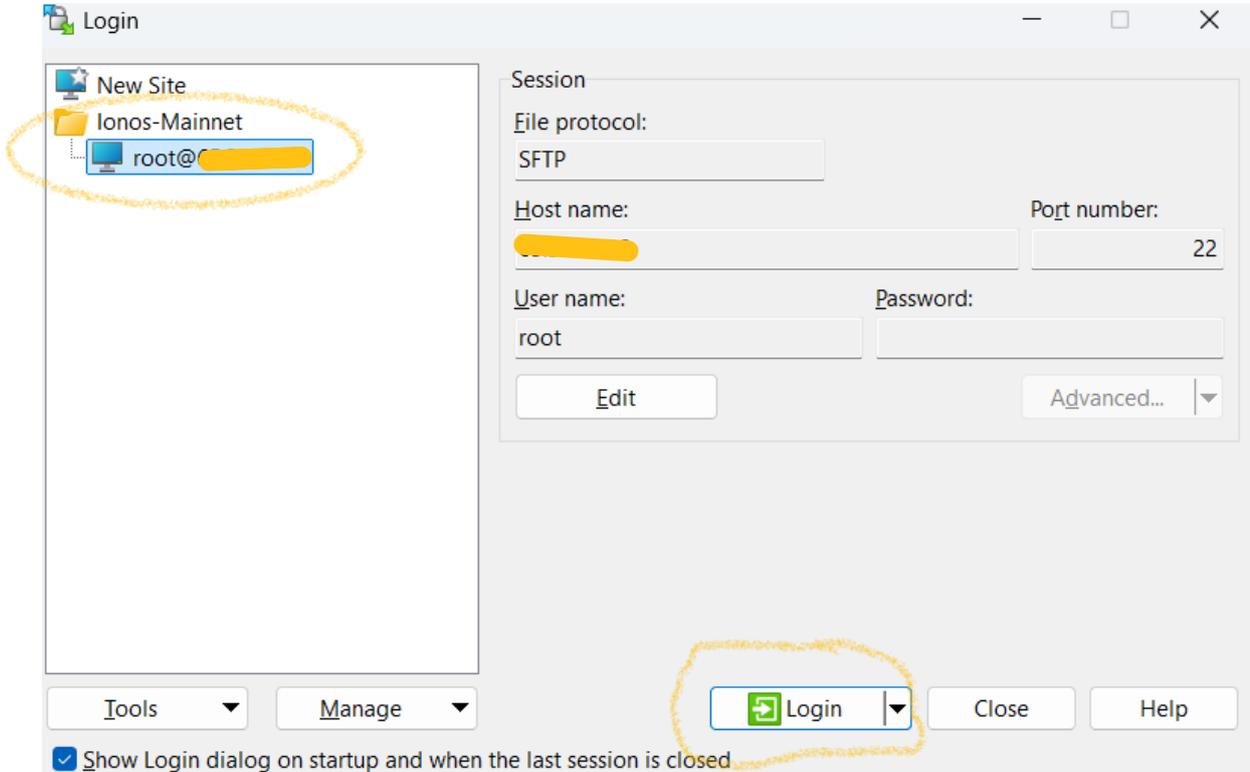
Click on Authentication and browse the private key file(id_rsa) which is saved in your local computer and click on OK



Click on Save



Give folder name of your choice. I have given lonos-Mainnet



You can see in the left as above. Now click on Login

Warning ? X

 Continue connecting to an unknown server and add its host key to a cache?

The host key is not cached for this server:
 (port 22)

You have no guarantee that the server is the computer you think it is.

The ssh-ed25519 key fingerprint is:
ssh-ed25519 255 OneHmZqWfITeNY+CNORRagc/ZhxqGqNMBXsnQzvNLHc

If you trust this host, select Accept to add the key to WinSCP's cache and carry on connecting.
If you want to carry on connecting just once, without adding the key to the cache, select Connect Once.
If you do not trust this host, select Cancel to abandon the connection.

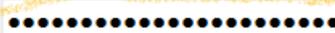
[Copy key fingerprints to clipboard](#)

Accept | Cancel | Help

Click on Accept

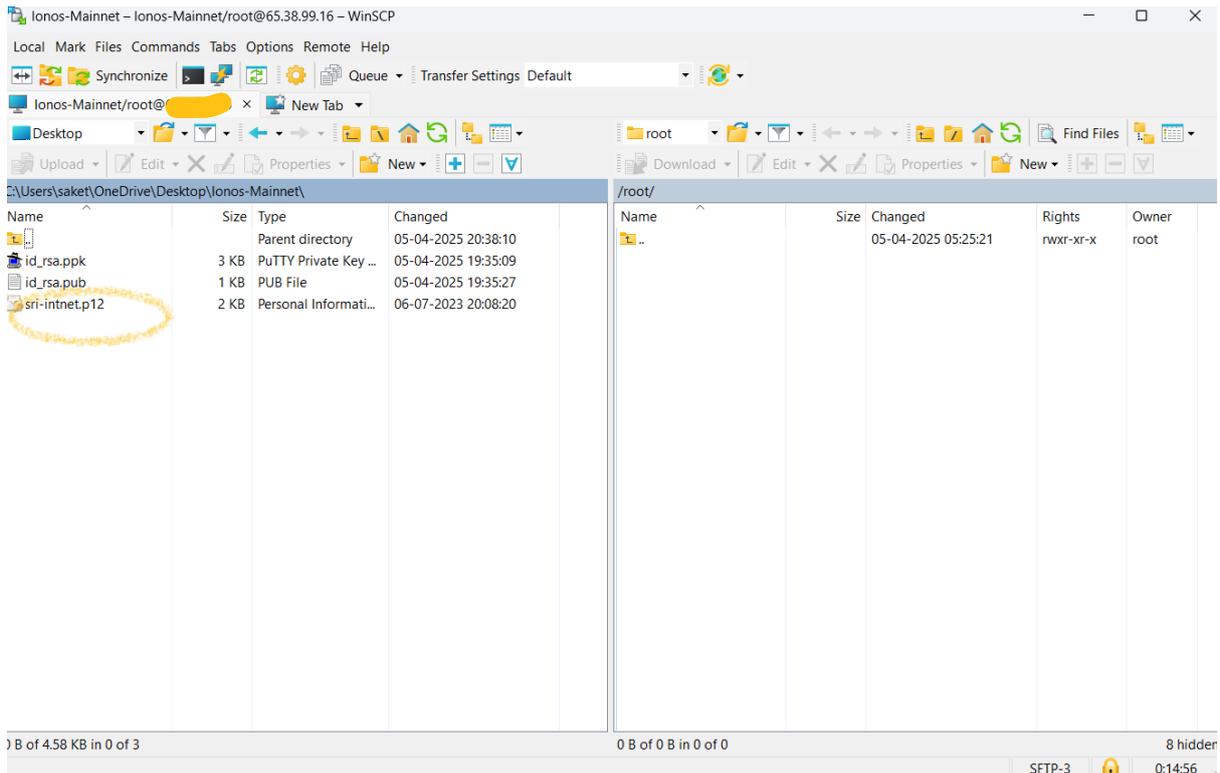
Key passphrase – lonos-Mainnet/root@ X

 Searching for host...
Connecting to host...
Authenticating...
Using username "root".
Authenticating with public key "rsa-key-20250405".

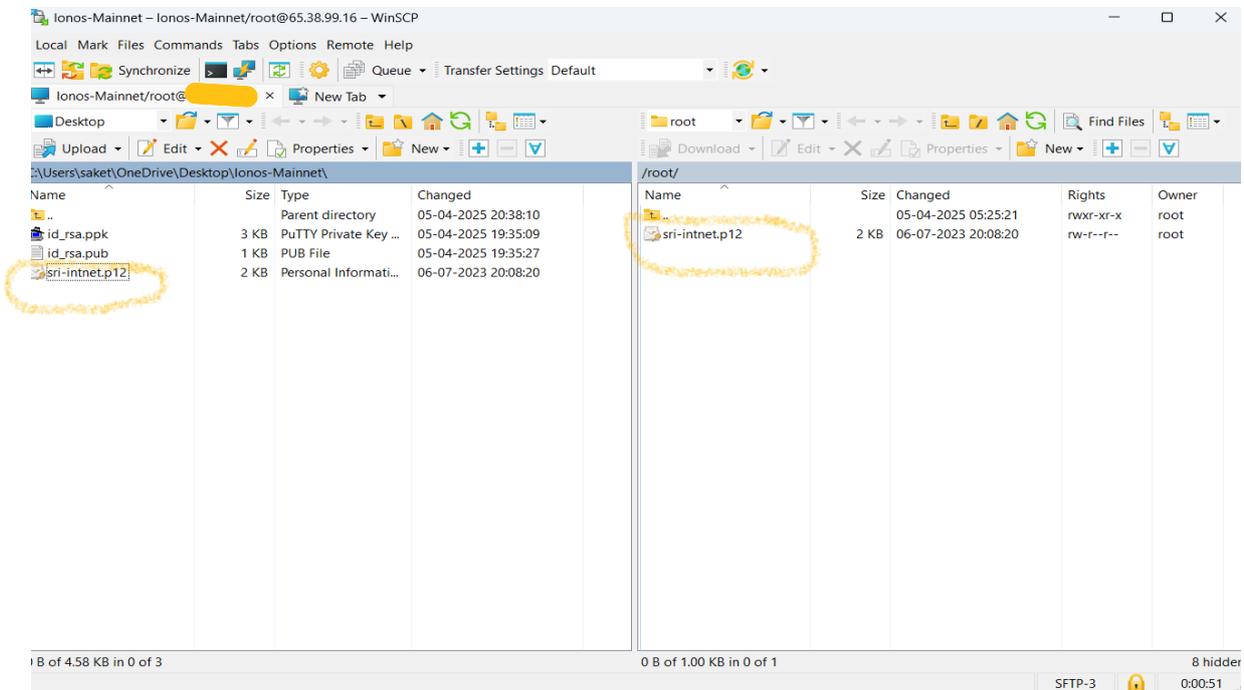
Passphrase for key 'rsa-key-20250405':


OK | Cancel | Help

Give Passphrase and click OK



Left side pane shows folders of your local computer, right side shows the directories of your VPS. Drag and drop your p12 file if you are rebuilding your node with existing p12 file.



Copied p12 file from local computer to `/root/` directory on VPS

Step 8: Install nodectl

You can get the latest release of nodectl from

<https://github.com/StardustCollective/nodectl/releases>

```
root@ubuntu: ~
Memory usage: 1%
Swap usage: 0%
address for ens6: 65.38.99.16

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
  just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sat Apr 5 14:23:13 2025 from 49.207.223.150
root@ubuntu:~# sudo nodectl auto restart disable; sudo wget -N https://github.com/StardustCollective/nodectl/releases/download/v2.16.0/nodectl_x86_64_2404 -P /usr/local/bin -O /usr/local/bin/nodectl; sudo chmod +x /usr/local/bin/nodectl; sudo nodectl -v
```

Copy the latest nodectl from the above link and run on putty

```
root@ubuntu: ~
No installation found or log path not found.
Creating log directory for nodectl
VERSION MAJOR MINOR PATCH CONFIG
v2.16.0 2 16 0 v2.1.1

root@ubuntu:~#
```

Nodectl installed

Step 9: Install tessellation

Command to install tessellation: **sudo nodectl install**

```
root@ubuntu: ~
12]
No installation found or log path not found.
Creating log directory for nodectl
VERSION      MAJOR      MINOR      PATCH      CONFIG
v2.16.0      2          16         0          v2.1.1
root@ubuntu:~# sudo nodectl install

Before we begin the installation process, let's
verify our VPS meets the necessary requirements.

=====
=   CONSTELLATION NETWORK HYPERGRAPH   =
=           VERIFY NODECTL SPECS       =
=           PRE-INSTALLATION TOOL      =
=====
Code Name: Princess Warrior

Please choose node type to test:
H)ybrid Dual Layer
D)or Validator
Q)uit

KEY PRESS an option
```

Select node type

```
root@ubuntu: ~
the <enter> key to accept said value.

n stands for no
y stands for yes

IMPORTANT nodectl was designed to run on a
terminal session with a black background setting.
Default terminal emulators with a white background may
experience some 'hard to see' contrasts. It is recommended to
change the preferences on your terminal [of choice] to run with a
black background.

QUICK INSTALL nodectl's installer provides a
quick install option that utilizes all the
recommended default settings. This allows for a
streamlined process, requiring minimal input from the future Node
Operator.

Alternatively, you can choose a customization mode, step-
by-step installation, where nodectl will ask you questions and provide
explanations for the necessary elements to customize the
installation of your node.

Install using quick install option? [y]: █
```

Give y

```
root@ubuntu: ~
=====
= CONSTITUTION NETWORK HYPERGRAPH =
= INSTALLATION REQUEST =
= TESSELLATION VALIDATOR NODE =
=====
Code Name: Princess Warrior

NOTICE
Default options will be enclosed in [] (brackets). If you want to use the value defined in the brackets, simply hit the <enter> key to
accept said value.

n stands for no
y stands for yes

IMPORTANT nodectl was designed to run on a terminal session with a black background setting. Default terminal emulators with a

QUICK INSTALL REQUESTED

WARNING
Even though this is the recommended options, nodectl will use all recommended settings without prompting for confirmations, be sure this is acceptable before continuing
with this setting.

*****
This includes removal of existing Tesseellation and nodectl service, pi2, and other configuration files if present.
*****

A few mandatory entries may be necessary; hence, nodectl will now prompt a series of questions before proceeding with the installation. If these options were already
entered through the command line interface (CLI), the corresponding questions will be skipped.

nodectl quick install will not offer detailed explanation for various prompt requests, please use the normal installation or read the
documentation.
https://docs.constellationnetwork.io/validate/
WARNING You about to turn this VPS or Server into a
Constellation Network validator node
Are you sure you want to continue this installation? [y]:
```

Give y

```
root@ubuntu: ~
=====
= CONSTITUTION NETWORK HYPERGRAPH =
= INSTALLATION REQUEST =
= TESSELLATION VALIDATOR NODE =
=====
Code Name: Princess Warrior

nodectl installing [ preparing ]
Obtain Install Parameters ..... preparing

Please choose which Hypergraph or metagraph you would like to install on this server:

HYPERGRAPH or METAGRAPH
predefined choices
-----
1) mainnet [HyperGraph]
2) integrationnet [HyperGraph]
3) testnet [HyperGraph]
4) dor-metagraph-mainnet [metagraph]

Q)uit
KEY PRESS an option
```

Select your choice

```
root@ubuntu: ~
=====
=   CONSTELLATION NETWORK HYPERGRAPH   =
=         INSTALLATION REQUEST         =
=   TESSELLATION VALIDATOR NODE       =
=====
Code Name: Princess Warrior

nodectl installing [ preparing ]
Obtain Install Parameters ..... preparing

Please choose which Hypergraph or metagraph you would like to install on this server:

HYPERGRAPH or METAGRAPH
predefined choices
-----
1) mainnet [HyperGraph]
2) integrationnet [HyperGraph]
3) testnet [HyperGraph]
4) dor-metagraph-mainnet [metagraph]

Q u i t

KEY PRESS an option

Chosen hypergraph/metagraph ..... integrationnet
Generated Admin user ..... nodeadmin
Are you migrating an existing p12 private key to this node? [n]: █
```

If you are building your node for first time, it should be n, else y

```
Chosen hypergraph/metagraph ..... integrationnet
Generated Admin user ..... nodeadmin

1) /root/sri-intnet.p12
2) input manual entry

█ KEY PRESS an option
```

If you are rebuilding your node with existing p12 file, It will show as above. Else this is not shown

```
1) /root/sri-intnet.p12
2) input manual entry

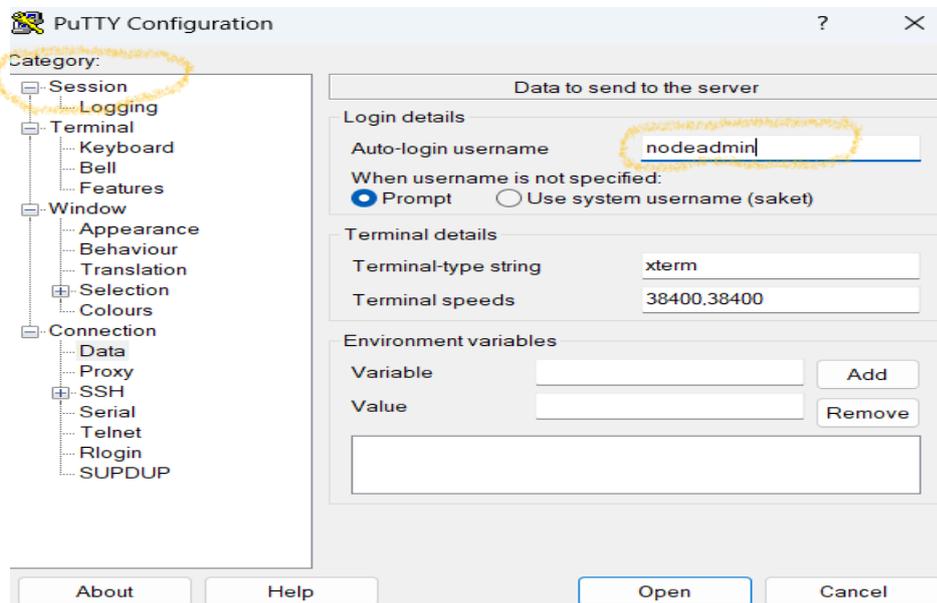
KEY PRESS an option

We need to create a password for nodeadmin user:
>> Please enter a 10 character minimum
>> password for nodeadmin: █
```

Enter nodeadmin password of your choice with minimum 10 characters

Step 10: Accessing the server after installation of tessellation

After installation of tessellation, root access will be disabled. We can access the node only with **nodeadmin**



Got to putty and change the Auto-login username to nodeadmin, Click on session and save it. Login to the server.

```
65.38.99.16 - PuTTY
Using username "nodeadmin".
Authenticating with public key "rsa-key-20250405"
Passphrase for key "rsa-key-20250405":
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.8.0-51-generic x86_64)

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

System information as of Mon Apr  7 05:31:09 UTC 2025

System load:  0.14          Processes:    186
Usage of /:   2.4% of 463.92GB   Users logged in:  1
Memory usage: 2%           IPv4 address for ens6: 65.38.99.16
Swap usage:   0%

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
  just raised the bar for easy, resilient and secure K8s cluster deployment.

  https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

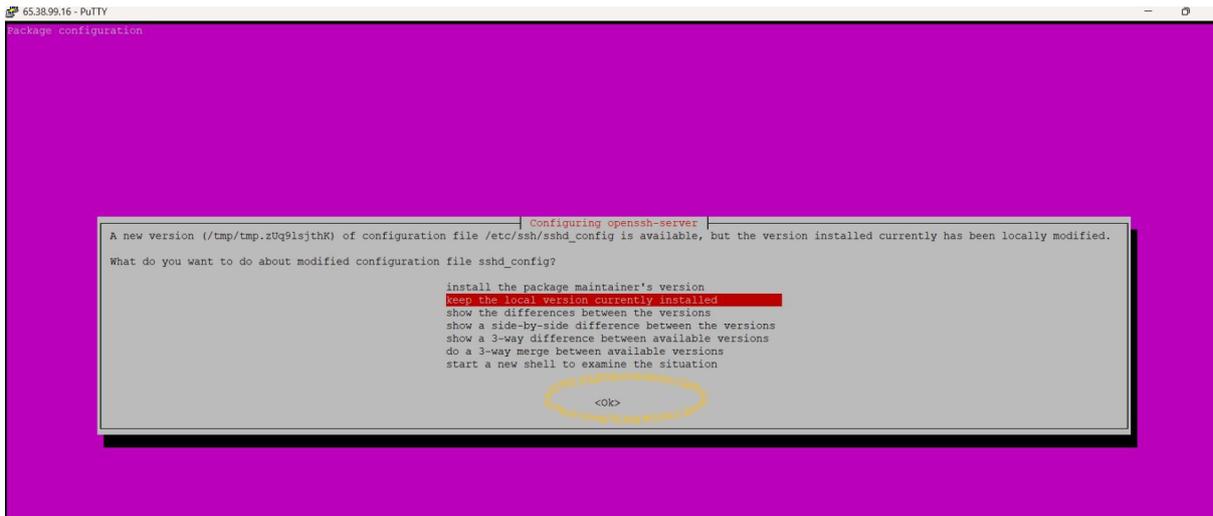
160 updates can be applied immediately.
60 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

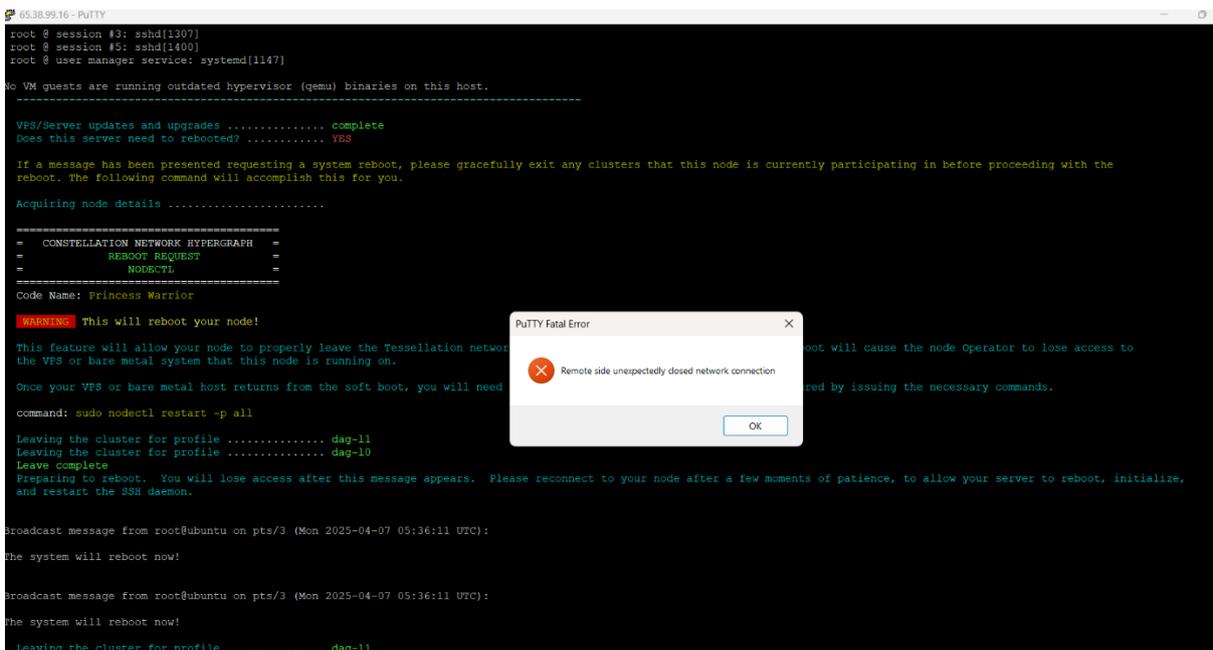
Last login: Mon Apr  7 05:31:10 2025 from 49.207.232.241
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

nodeadmin@ubuntu:~$ sudo nodedctl upgrade_vps --ni
```

After logging in to the server, do security updates with the nodedctl command “**sudo nodedctl upgrade_vps -ni**”



While the security updates are running, if this screen pops up, then press <Tab> key on your laptop, so that <Ok> will be highlighted on the screen, then press <ENTER>



When security updates complete, sometimes it will reboot the server if needed. You can see this screen. The session gets disconnected. Wait for 2-3 mins and login back using Putty.

Step 11: Run Starchiver script to download all the snapshots and do a restart to join the cluster

Login back to the server from putty

```
65.38.99.16 - PuTTY
Using username "nodeadmin".
Authenticating with public key "rsa-key-20250405"
Passphrase for key "rsa-key-20250405":
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.8.0-57-generic x86_64)

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

System information as of Mon Apr  7 05:38:55 UTC 2025

System load:  0.38          Processes:            188
Usage of /:   2.4% of 463.92GB   Users logged in:    0
Memory usage: 2%           IPv4 address for ens6: 65.38.99.16
Swap usage:   0%

* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s
  just raised the bar for easy, resilient and secure K8s cluster deployment.

https://ubuntu.com/engage/secure-kubernetes-at-the-edge

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Mon Apr  7 05:38:56 2025 from 49.207.232.241
nodeadmin@ubuntu:~$ sudo nodectl execute_starchiver -p dag-10 --restart
```

Command: **sudo nodectl execute_starchiver -p dag-10 --restart**

- The session should be connected until the execution of this script completes
- After execution of the above script, all the snapshots will be downloaded and the node gets restarted to join the cluster. L0 will initially go to DownloadInProgress state followed by Ready state on L0 and L1
- Check the status after few mins using the command **sudo nodectl status** , the node should show Ready/Ready state

```
PROFILE          SERVICE          JOIN STATE
dag-10           active           Ready
PUBLIC API TCP   P2P API TCP     CLI API TCP
9000             9001             9002
LATEST ORDINAL   LAST Dled       BLK EXP ORDINAL
4131556          4125632         4131556
CURRENT SESSION  FOUND SESSION   ON NETWORK
1743461557432   1743461557432   True
CLUSTER START    NODE START      SYSTEM START
2025-03-31-22:52:37Z 2025-04-02-13:58:16Z 2025-04-02 13:34:13
CLUSTER UPTIME   NODE UPTIME     SYSTEM UPTIME:
~3D 13H 40M 23S   ~1D 22H 34M 44S   ~1D 22H 58M 47S
NODE ID          IN CONSENSUS
6ab81cdb...426251a8 True

PROFILE          SERVICE          JOIN STATE
dag-11           active           Ready
PUBLIC API TCP   P2P API TCP     CLI API TCP
9010             9011             9012
CURRENT SESSION  FOUND SESSION   ON NETWORK
1743461587682   1743461587682   True
CLUSTER START    NODE START      SYSTEM START
2025-03-31-22:53:07Z 2025-04-02-14:31:36Z 2025-04-02 13:34:13
CLUSTER UPTIME   NODE UPTIME     SYSTEM UPTIME:
~3D 13H 39M 58S   ~1D 22H 1M 29S   ~1D 22H 58M 52S
NODE ID          IN CONSENSUS
6ab81cdb...426251a8 True
```

If L1 is in ReadyToJoin state, issue the command **sudo nodectl join -p dag-11** on the terminal

Congratulations!!!

You can always refer the constellation docs for granular level information on running a node created by our one and only great Netmet

<https://docs.constellationnetwork.io/run-a-node>