XRP Ledger Linux Validator Initialization Guide

Author

Otter Rock Validation Services

Editors

Ponderjaunt & 'Stifflips'

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All content in this guide is information of a general nature and does not address the circumstances of any particular individual or entity. Nothing in the guide constitutes professional and/or financial advice, nor does any information in the guide constitute a comprehensive or complete statement of the matters discussed or the law relating thereto.

If you did find this guide useful, have feedback, or would like to make an XRP donation please visit the 'About' or 'Contact us' section of my website at www.otterrock.live.

Resources

- https://xrpl.org/
- https://github.com/ripple/validator-keys-tool
- https://xrpl.org/overview.html
- https://xrpl.org/capacity-planning.html#amazon-web-services
- https://xrpl.org/xrp-ledger-toml.html#cors-setup

Introduction

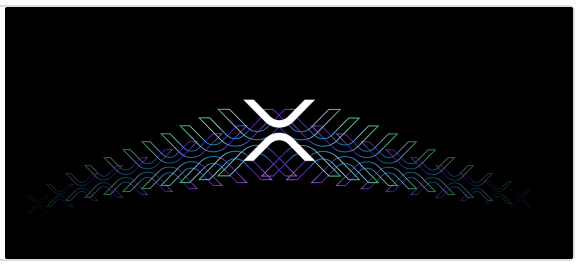
What is XRP?

XRP is a digital asset that's native to the XRP Ledger, an open-source, permission-less and decentralized block chain technology.

Learn | XRPL.org

XRP Overview XRP is a digital asset that's native to the XRP Ledger, an open-source, permissionless and decentralized blockchain technology. Created in 2012 specifically for payments, XRP can settle transactions on the ledger in 3-5 seconds. It was built to be a better

{×} https://xrpl.org/overview.html



How Does the XRP Ledger Work?

The XRP Ledger is a decentralized cryptographic ledger powered by a network of peer-to-peer servers. The XRP Ledger uses a novel Byzantine Fault Tolerant consensus algorithm to settle and record transactions in a secure distributed database without a central operator.

XRP is a public, counterparty-free asset native to the XRP Ledger, and is designed to bridge the many different currencies in use worldwide. XRP is traded on the open-market and is available for anyone to access.

The complete instructions to install the Rippled Server and use it's many features and functions including Validator operation is available on the XRPL website.

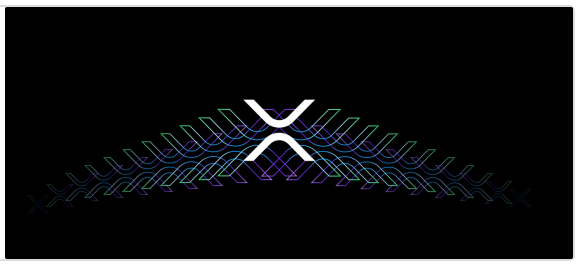
This guide ought to be helpful to those in need of support and/or additional understanding on the process of running nodes on the XRPL.

This XRPLD guide has been compiled for use on Fedora/RHEL/Centos OS variants may have different commands and can be translated to other Linux OS environments. This guide may be used for explanation in general for any use of the XRPL Validation process from test server to full production node.

Run rippled as a Validator | XRPL.org

A rippled server running in validator mode does everything a stock server does: What makes a validator different is that it also issues validation messages, which are sets of candidate transactions for evaluation by the XRP Ledger network during the consensus process.

{×} https://xrpl.org/run-rippled-as-a-validator.html



Meeting these standards ensures stability, decentralization and growth for the entire network:

- **Available**

  A good validator is always running and submitting validation votes for every proposed ledger. Strive for 100% uptime.

- **In agreement**

  A good validator's votes match the outcome of the consensus process as often as possible. To do otherwise could indicate that your validator's software is outdated, buggy, or intentionally biased. Always run the latest `rippled` release without modifications. Watch `rippled` releases to be notified of new releases.

- **Issuing timely votes**

  A good validator's votes arrive quickly and not after a consensus round has already finished. To keep your votes timely, make sure your validator meets the recommended system requirements, which include a fast internet connection.

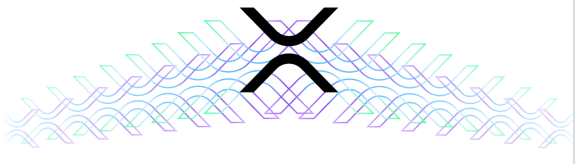
- **Identified**

  A good validator has a clearly identified owner. Providing domain verification is a good start. Ideally, XRP Ledger network UNLs include validators run by different owners in multiple legal jurisdictions and geographic areas. This reduces the chance that any localized events could interfere with the impartial operations of trusted validators.

ripple/rippled

The XRP Ledger is a decentralized cryptographic ledger powered by a network of peer-to-peer servers. The XRP Ledger uses a novel Byzantine Fault Tolerant consensus algorithm to settle and record transactions in a secure distributed database without a central operator.

https://github.com/ripple/rippled



Why Run rippled as a Validator?

1. Structures a live connect to a distributed network of peers
2. Validates cryptographically signed transactions with consensus
3. Maintain a localized copy of the public global ledger

Capacity Planning

It is important to plan now what size Validator you plan to run and how much capacity you are willing to allot for utility. In general, the size of the ledger will grow and minimum requirements will change as optimizations, ledger size, and network capacity change. Here's an overview of some of the technical specifications for XRPL network resources:

https://xrpl.org/capacity-planning.html#amazon-web-services

Domain Setup

Please keep in mind that you may be exposing your IP address to the world when operating a Validator!

Locally operating an XRPL Node may reveal information about your network to the entire ledger, take steps to ensure you understand network security operational standards.

Assigning a domain to your node provides clarity of your intent in operating a Validator on the XRPL. Assigning a domain is not a requirement, but it is recommended to increase decentralization and awareness around which entities are acting as validators.

Please bear in mind that failure to understand what your validator is doing may result in errors, and failure to constantly maintain operation and storage requirements may result in the network degrading you as a servicer. You may see 'error code 73' as a result of not keeping the validator running efficiently or consistently. A list of validators ranked by their agreement, or consensus, on transactions over a period of time can be found below:

> XRP Ledger Explorer - XRPSCAN
> Explore XRP Ledger, accounts, addresses, balances, transactions, validators, nodes, amendments, metrics and charts.
> https://xrpscan.com/validators

Now onto setup!

1. **Install Rippled–** The full instructions to install rippled can be found below for your unique operating system, or 'OS'. The steps below are subject to change and the link below would have the most updated commands for this guide's OS: https://xrpl.org/install-rippled-on-centos-rhel-with-yum.html

   1.1- Install the Ripple RPM repository: we are using 'stable for the latest production release (master branch)'

```
$ cat << REPOFILE | sudo tee /etc/yum.repos.d/ripple.repo
[ripple-stable]
name=XRP Ledger Packages
baseurl=https://repos.ripple.com/repos/rippled-rpm/stable/
enabled=1
gpgcheck=0
gpgkey=https://repos.ripple.com/repos/rippled-rpm/stable/repodata/repomd.xml.key
repo_gpgcheck=1
REPOFILE
```

   1.2 - Fetch the latest Repo updates:

```
$ sudo dnf -y update
```

   1.3 - Install the new Rippled package:

```
$ sudo dnf install rippled
```

   1.4 - Reload systemd unit files:

```
$ sudo systemctl daemon-reload
```

   1.5 - Configure the rippled service to start on boot:

```
$ sudo systemctl enable rippled.service
```

   1.6 - Start the rippled service:

```
$ sudo systemctl start rippled.service
```

The instructions below are not from xrpl.org.

> ⚠ Please note ‘dnf’ should be replaced with ‘apt’ for Debian/Ubuntu and their derivatives!

```
Terminal - sudo reboot
```

```
Terminal - sudo dnf update –refresh
```

```
Terminal -  sudo systemctl status rippled.service
```

2. **Run Rippled as a Validator**

   https://xrpl.org/run-rippled-as-a-validator.html

   > ⚠ **Because this guide uses Fedora for this setup example, commands may be different depending on OS versions and custom directory structures!**

3. **Install the Validator Keys Tool** *(It is recommended to use a separate machine to do so.)*

   The validator keys tool is pre-installed with rippled. Generally, it is located in:

   ```
   /opt/ripple/bin/validator-keys
   ```

   Enable the Validator Keys Tools to generate your keys.

   ```
   /opt/ripple/bin/validator-keys create_token –keyfile /home/~USER/.ripple/validator-keys.json
   ```

   Validator keys are stored in the following directory:

   ```
   /.ripple/validator-keys.json
   ```

   This file should be stored securely and not shared!

   > ⚠ Take note of this file location. Once we remove our secret key and save to a secure drive it would need to go back to the same file location if/when the key needs to be revoked or for changes that require a secret keys permission.

   Next, create a token and then update the rippled cfg:

   ```
   /opt/ripple/bin/validator-keys create_token --keyfile /home/~USER/.ripple/validator-keys.json
   ```

   (See the token example on the validator steps)

   > Example Validator Public Key:
   > nHDsEoUzRsLcdw65B1aVUkkRfhohxk2FALJXJNHapDD8PrxLnvnb

   Open the rippled cfg. Using your favorite text editor as root, edit /etc/opt/ripple/rippled.cfg. Copy the Validator public key and token and paste at the bottom of this document. Save and exit. I used:

   ```
   sudo gedit /etc/opt/ripple/rippled.cfg
   ```

   Copy and paste the Validator public key and token and paste at the bottom of the ripple cfg file; save the document and close.

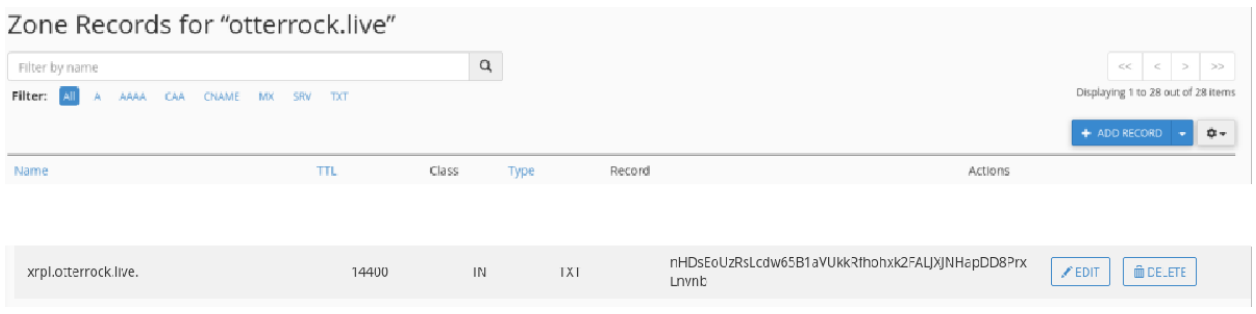
4. **Create TOML.**
   I am using Namecheap as host, server, domain, etc.. There are several options out there and I know others use Namecheap but with their own or different hosting.

   A TOML file uses the following format:

   ```
   # This is a TOML document
   [METADATA]
   modified = 2021-02-28T08:12:00.000Z
   expires = 2022-03-01T08:12:00.000Z
   [[VALIDATORS]]
   public_key = "
   attestation = ""
   owner_country = "us"
   server_country = "us"
   ```

```
[[ACCOUNTS]]
address = ""
network = "main"
desc = "XRP Wallet"
[[SERVERS]]
domain = "website"
[[PRINCIPALS]]
name = "Name
email = "email"
Twitter = "social media"
# End of file
```

To show additional ownership that the Domain is the owner of the Validator and vice versa we will also update the zone editor to reflect this. What you will actual type in is shown below as an additional example. The file needs to show as _xrpl.website.com and the action is the Public Validator key. Different hosting services will differ vastly and there are resources online to help you navigate this. Note: this may take some time to update!

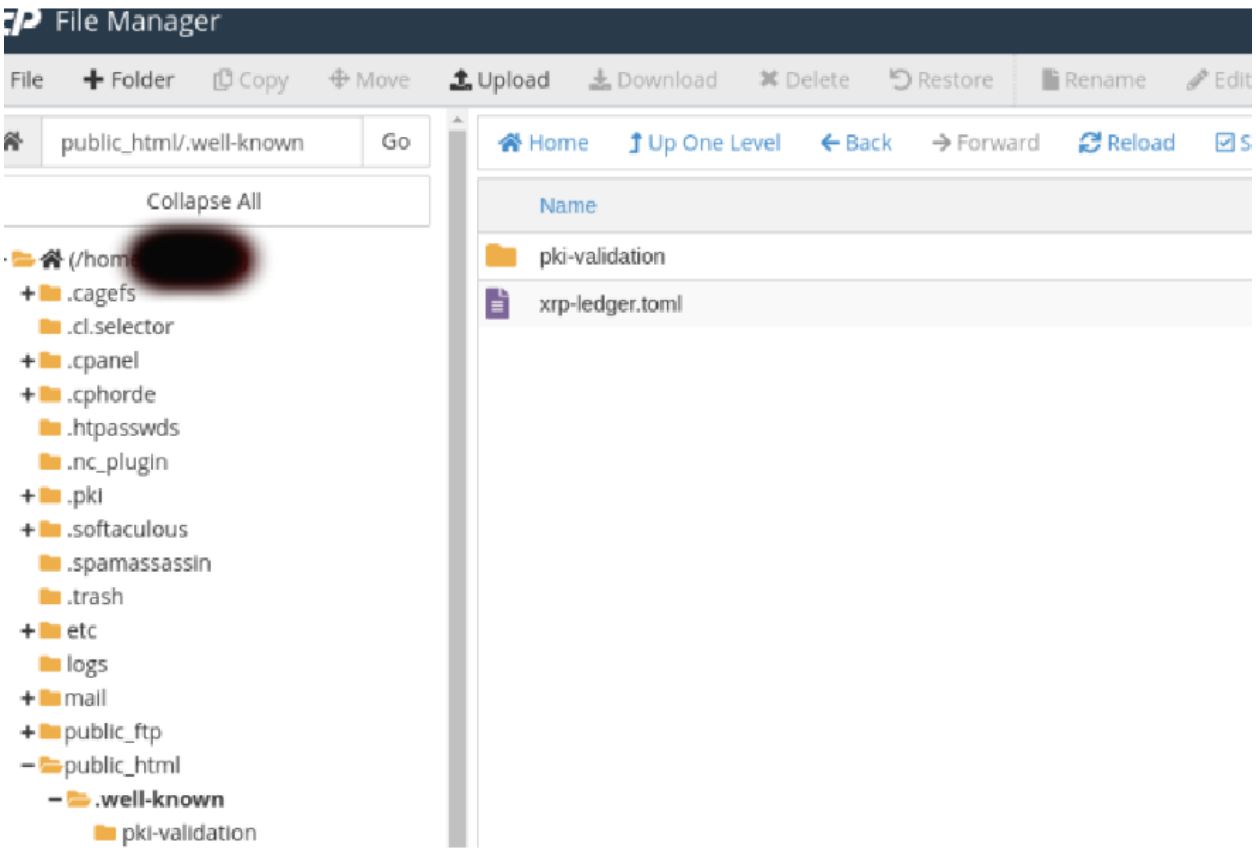


Next you will need to create and save a .toml file into the correct folder: https://xrpl.org/xrp-ledger-toml.html#xrp-ledgertoml-file

TOML Sample: https://otterrock.live/.well-known/xrp-ledger.toml

Now navigate back to cPanel and go to 'File Manager', Select 'public_html' and '.well-known-'.

You will save the file name as xrp-ledger.toml and can simply use 'text editor' to create this:



Now to sign your domain name for the attestation number:

```
[[USER]@localhost ~]$ /opt/ripple/bin/validator-keys sign 'https://otterrock.live/'
A912D2F6A210D8C3E83E59C263DAA18762AF15A3E3802C8BE54C9CD856EF55CAEAA252BF013720BFCD8541A8D1464A9A33809113F812ADC9627206E2D6200E
03
```

Update attestation line with attestation on your TOML file and save.

Use this to set your domain, this will be unique to each user!

```
/opt/ripple/bin/validator-keys set_domain 'otterrock.live'
```

Re open the cfg file:

```
sudo gedit /etc/opt/ripple/rippled.cfg
```

Next, add the updated token and public key. Yes, you are deleting the previous one and adding the new token. The validator key should be the same. Save and close the ripple.cfg file.

Now it’s time to restart the rippled server and validator with the changes!

Access your secondary drive - move your private key to your secure drive.

Delete the 'validator.keys' json after you have saved it and verified. Ensure you securely store this hardware. You may need to re-access this drive to revoke your keys if ever there is a need.

Now that everything is done complete a reboot on your PC, after reboot we will check status of our server and Validator.

If your Validator is not running after restart then you missed a step, or made an erroneous input; check your server status:

```
sudo systemctl restart rippled.service
```

Example server status commands:

```
sudo systemctl status rippled.service
sudo rippled validator_info
sudo rippled server_info
```

Your validator may take some time to change from connected to proposing. Please take note that there is now a public and ephemeral key after assigning domain. We can now see our validator running by running an additional command.

This command is exclusive to validator enabled servers:

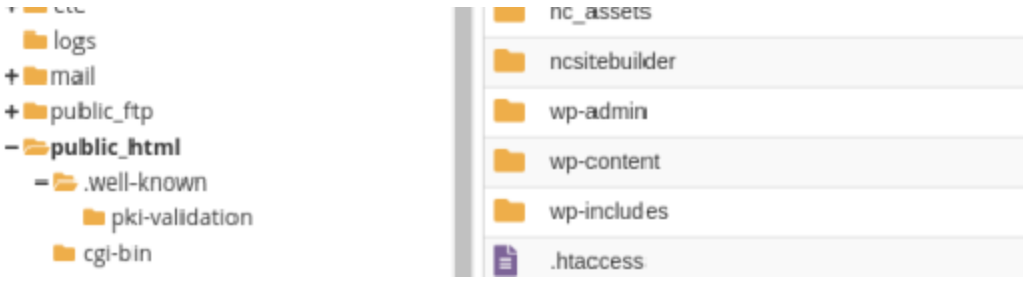
```
sudo rippled validators
```

Our Validator shows as a signing key. After a few days pass the Validator can be tracked on XRPScan and other locations. Until completing domain verification it may not show as registered to the assigned domain.

5. **Update CORS Header**

https://xrpl.org/xrp-ledger-toml.html#cors-setup

Navigate to Zone Editor - public_html and look for htaccess. Right-click to edit the doc and add the following under 'Persistent content':




```
<Files "xrp-ledger.toml">
Header set Access-Control-Allow-Origin "*"
</Files>
```

```
#### PERSISTENT CONTENT ####

<Files "xrp-ledger.toml">
    Header set Access-Control-Allow-Origin "*"
</Files>

AddType application/toml .toml -in your /.well-known/.htaccess

#### PERSISTENT CONTENT END ####
```

Save and close after updating the CORS Header.

The following link may help you understand the server outputs better:

https://xrpl.org/server_state.html

That's it! Congratulations, you're now participating in Consensus on the XRP Ledger. This guide may be updated periodically with tips and other optimizations. Including more commentary in between steps, and highlighting other services that enable quick deployment and maintenance of XRPL nodes.