Vantage6 server guide

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1. Prerequisites

To setup a vantage6 node or server you need to install Docker and python. The first part is the same for installation of a node and a server. All steps were tested on ubuntu 22.04 and need sudo permissions. After installation sudo permissions are not needed. You can setup a node or server in a separate vantage6 user or any other user. It is important that the user that will maintain vantage6 will have access to the account with vantage6 installed.

1.1 Installing Python

1. Install python 3.11 with venv

    ```
    sudo apt install python3.11-venv
    ```

    you can check the path where python is installed with

    ```
    which python3.11
    ```

To check the python version of the current installation use

```
python3 -v
```

If the python version is not 3.11 you can create a symlink to the python3.11 installation

```
sudo ln -s /usr/bin/python3.11 /usr/bin/python3
```

> 💡 **Note:** Python is only needed for the vantage6 CLI. If you are using docker-compose to setup the vantage6 server, you do not need to install python.

1.2 Installing Docker

1. Install Docker engine

> ⚠️ Do not install docker desktop! If you install docker desktop, docker will run in an VM and will cause virtualization problems.

Official docker installation guide for docker engine on linux

▶ Ubuntu

```
# Add Docker's official GPG key:
sudo apt-get update
sudo apt-get install ca-certificates curl gnupg
sudo install -m 0755 -d /etc/apt/keyrings
curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --
dearmor -o /etc/apt/keyrings/docker.gpg
sudo chmod a+r /etc/apt/keyrings/docker.gpg

# Add the repository to Apt sources:
echo \
"deb [arch=$(dpkg --print-architecture) signed-
by=/etc/apt/keyrings/docker.gpg]
https://download.docker.com/linux/ubuntu \
$(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update
sudo apt-get -y install docker-ce docker-ce-cli containerd.io docker-
buildx-plugin docker-compose-plugin
```

▶ Debian

```
# Add Docker's official GPG key:
sudo apt-get update
sudo apt-get install ca-certificates curl gnupg
```

```
sudo install -m 0755 -d /etc/apt/keyrings
curl -fsSL https://download.docker.com/linux/debian/gpg | sudo gpg --
dearmor -o /etc/apt/keyrings/docker.gpg
sudo chmod a+r /etc/apt/keyrings/docker.gpg

# Add the repository to Apt sources:
echo \
"deb [arch=$(dpkg --print-architecture) signed-
by=/etc/apt/keyrings/docker.gpg]
https://download.docker.com/linux/debian \
$(. /etc/os-release && echo "$VERSION_CODENAME") stable" | \
sudo tee /etc/apt/sources.list.d/docker.list > /dev/null
sudo apt-get update
sudo apt-get -y install docker-ce docker-ce-cli containerd.io docker-
buildx-plugin docker-compose-plugin
```

2. If not already created by docker installation, create a docker group

```
sudo groupadd docker
```

3. Add the current user to the docker group

```
sudo usermod -aG docker $USER
```

4. Log out and log back in so that your group membership is re-evaluated.

5. Verify that you can run docker commands without sudo

```
docker run hello-world
```

1.3 Setting up a Postgres Database

The vantage6 server needs a database to store data. Postgres is the recommended database for vantage6. There are multiple options to setup a postgres database. The following steps will guide you through the process of setting up a postgres database in Azure and locally.

> ⚠️ **Important Note:** The vantage6 server is currently using an Azure postgres database. If you want to use a local postgres database, you can follow the steps in the Setting up a local postgres database section.

1.3.1 Setup postgres: Azure

1. Setup a postgresql database in Azure
2. Configure Azure AD authentication
3. Get connection endpoints and connection strings

1.3.2 Setup postgres: Local

The vantage6 server needs a postgres database to store the data. These instructions can be used to setup a local postgres database on the same server hosting the vantage6 server node. The following steps will guide you through the process of setting up a postgres database with docker.

1. Create a directory for the postgres database

```
mkdir -p /path/to/postgres/data
```

2. Setup docker compose instruction by updating or creating `docker-compose.yaml`

```
services:
  postgres:
    image: postgres
    environment:
      - POSTGRES_DB=vantage6-db
      - POSTGRES_USER=USERNAME
      - POSTGRES_PASSWORD=PASSWORD
    volumes:
      - [/path/to/postgres/data]:/var/lib/postgresql/data
    ports:
      - "5432:5432"
    restart: always
```

4. Start the postgres database

```
docker-compose up -d
```

5. Check if the postgres database is running

```
docker ps
```

6. Check if postgres database is accessible from the host

```
psql -h localhost -U USERNAME -d vantage6-db
```

1.4 Nginx Reverse Proxy for Vantage6 Server

To set up a secure connection to the Vantage6 server, we will use Nginx as a reverse proxy. The following steps will guide you through the process of installing and configuring Nginx.

1.4.1 Installing Nginx

1. Install Nginx:

```
sudo apt update
sudo apt install nginx
```

2. Start and enable Nginx:

```
sudo systemctl start nginx
sudo systemctl enable nginx
```

3. Check if Nginx is running:

```
sudo systemctl status nginx
```

4. Open the firewall for Nginx and check if firewall rules are set correctly:

```
sudo ufw allow 'Nginx Full'
sudo ufw reload
sudo ufw status
```

5. Check if Nginx is running by visiting the IP address of the server in a browser:

```
curl http://ip.address.of.server
```

6. 🎉 **If you see the Nginx welcome page, Nginx is running correctly.**

1.4.2 SSL Certificate Setup

1. **Extract PEM Files from `.pfx`:**
   - Extract private key:

```
openssl pkcs12 -in yourfile.pfx -nocerts -out privkey.pem
```

   - Extract certificate:

```
openssl pkcs12 -in yourfile.pfx -clcerts -nokeys -out
fullchain.pem
```

2. **Optionally Remove Key Password:**

```
openssl rsa -in privkey.pem -out privkey.key
```

3. **Retrieve Intermediate Certificate:**
   - Download the GoDaddy Secure Certificate Authority - G2: GoDaddy G2 Intermediate Certificate

4. **Concatenate Certificates:**

```
cat fullchain.pem /etc/ssl/certs/gdig2.crt.pem > /etc/ssl/certs/dhd-
fullchain.pem
```

5. **Update Nginx Configuration:**
   - Edit the configuration file in `/etc/nginx/sites-available/default`:

```
server {
    listen 443 ssl;
    server_name your_domain.com;

    ssl_certificate /etc/ssl/certs/dhd-fullchain.pem;
    ssl_certificate_key /etc/ssl/certs/privkey.key;

    # Other configurations...
}
```

6. **Enable the Site and Reload Nginx:**

```
sudo nginx -t
sudo systemctl reload nginx
```

By following these steps, you will have a secure Nginx reverse proxy setup for your Vantage6 server.

1.4.3 Configuring Nginx

Example Nginx configuration for plugin.dhd.nl in `/etc/nginx/sites-available/default`:

```
# Default server configuration
server {
    listen 80 default_server;
    listen [::]:80 default_server;

    # SSL configuration
    listen 443 ssl default_server;
    listen [::]:443 ssl default_server;

    root /var/www/html;

    # Add index.php to the list if you are using PHP
    index index.html index.htm index.nginx-debian.html;

    server_name _;

    ssl_certificate /etc/ssl/certs/dhd-fullchain.pem;
    ssl_certificate_key /etc/ssl/certs/dhd-privkey.key;
    client_max_body_size 1024M;
}

# Virtual Host for plugin.dhd.nl
server {
    client_max_body_size 1024M;
    # SSL configuration
    listen 443 ssl;
    listen [::]:443 ssl;

    server_name plugin.dhd.nl;

    location /api {
        include proxy_params;

        # internal IP and port
        proxy_pass http://localhost:5000/api;
    }

    # Allow the websocket traffic
    location /socket.io {
        include proxy_params;

        proxy_http_version 1.1;
        proxy_buffering off;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection "Upgrade";
        proxy_pass http://localhost:5000/socket.io;
    }

    ssl_certificate /etc/ssl/certs/dhd-fullchain.pem;
    ssl_certificate_key /etc/ssl/certs/dhd-privkey.key;
}
```

2. Setting up the vantage6 server

2.1 Installing vantage6 server: docker-compose

The vantage6 server can be setup with docker-compose. The following steps will guide you through the process of setting up the vantage6 server with docker-compose.

1. Create or adjust the `docker-compose.yaml` file (`nano docker-compose.yaml`) and add the following configuration:

```
vantage6-server:
    image: harbor2.vantage6.ai/infrastructure/server:cotopaxi
    container_name: v6-server
    ports:
    - "5000:80"
    volumes:
    - /path/to/config.yaml:/mnt/config.yaml
    command: ["/bin/bash", "-c", "/vantage6/vantage6-
server/server.sh"]
    restart: unless-stopped
```

For more information on what to put in the `config.yaml` file, check the vantage6 server documentation more information on our configuration can be found in section 2.1.3 Vantage6 server

2.2 Installing vantage6 server: CLI

Vantage6 is installed userbased and not systemwide. Therefore if multiple users need to access the same vantage6 server it is recommended to install vantage6 in a separate linux user and give access to the vantage6 user to the other users.

2.2.1 Optional: Setup a new linux user for vantage6

1. Create a new user for vantage6

```
sudo adduser vantage6
```

2. Set a password for the new user

```
sudo passwd vantage6
```

3. Switch to the new user

```
su - vantage6
```

2.2.2 Vantage6 python environment

The vantage6 environment only needs to be setup once. The vantage6 environment can be used for multiple vantage6 nodes and servers.

1. Setup a new python environment for vantage6

```
python3 -m venv vantage6-venv
```

2. Activate the python environment

```
source vantage6-venv/bin/activate
```

3. Install vantage6 in the python environment

```
pip install vantage6
```

> 💡 **Note:** If you want to update the vantage6 package, you can do so by running `pip install --upgrade vantage6`.

2.2.3 Vantage6 server

1. If not activated yet, activate the vantage6 python environment

```
source vantage6-venv/bin/activate
```

2. Create a vantage6 config folder if not already created

```
mkdir ~/.config
```

3. Create a new vantage6 server

```
vserver new --user --name [SERVER_NAME]
```

2.3 Configuration of the vantage6 server

To configure the vantage6 server, you need to create a `config.yaml` file. The following configuration is an example of a `config.yaml` file for the vantage6 server. When using the CLI

to create a new server, the `config.yaml` file is created automatically in `~/.config/vantage6/server/`.

```bash
allow_drop_all: 'True'
api_path: /api
description: INSERT_DESCRIPTION
ip: 0.0.0.0
jwt_secret_key: ADD_JWT_SECRET_KEY
logging:
    backup_count: 5
    datefmt: '%Y-%m-%d %H:%M:%S'
    file: default.log
    format: '%(asctime)s - %(name)-14s - %(levelname)-8s - %(message)s'
    level: DEBUG
    loggers:
    - level: warning
      name: urllib3
    - level: warning
      name: socketIO-client
    - level: warning
      name: socketio.server
    - level: warning
      name: engineio.server
    - level: warning
      name: sqlalchemy.engine
    - level: warning
      name: requests_oauthlib.oauth2_session
    max_size: 1024
    use_console: true
port: '5000'
uri: postgresql://USERNAME:PASSWORD@localhost:5432/DB_NAME
```

The vantage6 server is initialized with a default root user with password `root`. It is important to change the password of the root user after the server is initialized. This can be done either by using the vantage6 cli or by using the vantage6 ui.

To start the vantage6 server through CLI, you can use the following command:

```
vserver start --user --name [SERVER_NAME]
```

add the `--attach` flag to run the server in the foreground and inspect the logs.

Or when using docker-compose, you can start the server with the following command:

```
docker-compose up -d
```

> 💡 **Note:** For more information about the different deployment methods, check the vantage6 server documentation

2.3 Automatic startup script

In case you started the vantage6 server through CLI the v6 server node won't automatically start after restarting the VM or server it is hosted on. To setup v6 auto startup at login/restart you can follow startup script instructions and replace the `vnode` commands with `vserver` commands.

2.2 Setup vantage6 ui

The ui can be setup through docker-compose. The following steps will guide you through the process of setting up the vantage6 ui on localhost.

> 💡 **Note:** If you want to expose the vantage6 ui to the internet, you can do so by adjusting the `docker-compose.yaml` file and the nginx configuration.

1. Create or adjust the `docker-compose.yaml` (for instance together with the postgres database)

```
services:
  v6ui2:
    image: harbor2.vantage6.ai/infrastructure/ui:cotopaxi
    ports:
      - "8888:80"
    environment:
      - SERVER_URL=http://localhost:5000
      - API_PATH=/api
    depends_on:
      - postgres
    restart: always
```

2. Start the vantage6 ui

```
docker-compose up -d
```

3. Check if the vantage6 ui is running

```
docker ps
```

4. Check if the vantage6 ui is accessible from the host

```
curl http://localhost:8888
```

5. 🎉 **If you see the vantage6 ui, the vantage6 ui is running correctly.**

> 💡 **Note:** If you want to update the vantage6 ui, you can do so by running `docker-compose pull` and `docker-compose up -d`.

3. Usage

Vantage6 uses a collaboration and organisation structure to manage both users and nodes. The following steps will guide you through the process of creating a new organisation and collaboration. All steps are done through the vantage6 ui.

For more information on how to use the vantage6 ui, check the vantage6 ui documentation.

3.1 Onboarding a new organisation

In the following steps, we will walk you through the process of onboarding a new organisation on the vantage6 server.

1. Create a new organization
    - Go to the vantage6 ui and login with your user with admin rights
    - click on the 'Administration' tab
    - Click on the `Organizations` tab
    - Click on the `Create organization` button
    - Fill in the organization details and click on the `Submit` button
2. Create an organization admin user
    - Go to the `User` tab
    - Click on the `Create user` button
    - Fill in the user details and select the organization
    - Give the user `Organization Admin` role
    - Click on the `Submit` button
3. Create a new collaboration (If not already created)
    - Go to the `Collaborations` tab
    - Click on the `Create collaboration` button
    - Fill in the collaboration details and check the Encrypted box (mandatory in plugin context)
    - Add the organization(s) to the Organizations list
    - You will receive a popup to download a file with the key(s). Save these for the node setup

      > 💡 **Note:** If you lost the key, you can remove and add the organization to generate a new key.

    - Click on the `Submit` button

4. FAQ

SSL certificate expired

If the SSL certificate of the vantage6 server has expired, you can renew the certificate by requesting a new certificate through IT and follow the steps in the SSL certificate setup section.

UI not loading while containers are running

Check if you have tunneled the port of the vantage6 server ui to your local machine. If you have not done this, you can tunnel the port with the following command:

```
ssh -L 8080:localhost:8080 user@vantage6-server
```

if the problems persist, check the logs of the vantage6 server:

```
vserver attach
```

and the logs of the vantage6 ui container:

```
docker logs vantage6-ui-container
```