PLUGIN node guide

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
   ```

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 Whitelisting

If you are behind a firewall, you need to whitelist the following domains:

- **DHD docker registry**:
  - https://drplugindhdprd.azurecr.io
  - https://drplugindhdprd.westeurope.data.azurecr.io
- **DHD blob storage**
  - https://storage.plugin.dhd.nl
- **DHD Vantage6 server**
  - https://plugin.dhd.nl
- **Container registry voor vantage6 nodes**
  - https://harbor2.vantage6.ai/

2. Installing Vantage6 node

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

2.1 Optional: Setup a new 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 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
```

2.3 Vantage6 node

Before creating a new vantage6 node, make sure the organization was created on the vantage6 server and added to the collaboration(s). For instructions read the section on setting up an organization on a vantage6 server.

Both the account credentials of the vantage6 organization admin and the collaboration api key for the node are needed to setup a node. For more information on how to setup a vantage6 organization and collaboration check the vantage6 server documentation

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

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

2. Create a node config folder if not already created

```
mkdir ~/.config
```

3. Create a new vantage6 node

```
vnode new --user --name [NODE_NAME]
```

4. Follow the instructions to setup the node. The following information is needed to setup the node:

```
Enter given api-key: INSERT KEY
The base-URL of the server: https://plugin.dhd.nl
Enter port to which the server listens: 443
Path of the api: /api
Task directory path: keep suggested path
Do you want to add a database: No
Which level of logging: INFO
Do you want to connect to a VPN server?: No
Do you want to add limit the algorithms allowed to run on your node?:
Yes
Enter your algorithm expression: ^drplugindhdprd\.azurecr\.io/.*
Do you want to add another algorithm?: No
Encryption is enabled for this collaboration. Accept? Yes
```

> In case you do want to add a database, you can follow the instructions in the vantage6 node documentation

5. Add the private organisation key through either of the following methods:

   a. If organization key already created on another device or for another node. Create a private organisation key and login with the organization admin credentials:

   ```bash
   vnode create-private-key
   ```

   b. Copy or create the private key in the node configuration folder:

   ```bash
   cp ~/.local/share/vantage6/InstanceType.NODE/KEY_NAME_HERE.pem
   ```
   or
   ```bash
   touch ~/.local/share/vantage6/InstanceType.NODE/KEY_NAME_HERE.pem
   ```

6. Adjust the node config yaml file to your needs. The current node configuration file as used in the context of plugin and aioc is as follows:

```
api_key: V6_API_KEY
api_path: /api
databases:
- label: default
type: csv
uri: /path/to/database/file.csv
enabled: true
```

```
  private_key:
  [/PATH/TO/USER]/.local/share/vantage6/InstanceType.NODE/KEY_NAME_HERE.
  pem
  logging:
    backup_count: 5
    datefmt: '%Y-%m-%d %H:%M:%S'
    format: '%(asctime)s - %(name)-14s - %(levelname)-8s - %(message)s'
    level: INFO
    loggers:
      - level: warning
          name: urllib3
      - level: warning
          name: requests
      - level: warning
          name: engineio.client
      - level: warning
          name: docker.utils.config
      - level: warning
          name: docker.auth
      max_size: 1024
      use_console: true
  port: '443'
  server_url: https://plugin.dhd.nl
  task_dir: [/PATH/TO/USER]/.local/share/vantage6/node/[NODE_NAME]
  algorithm_device_requests:
    gpu: true #false if organization does not have gpu
  docker_registries:
  - registry: DOCKER_REGISTRY_URL
  username: DOCKER_REGISTRY_USERNAME
  password: DOCKER_REGISTRY_PASSWORD
```

> For more information on the node configuration file check the vantage6 node documentation

2.3 Automatic startup script

follow startup script instructions

2.4 Accessing local network resources

The vantage6 nodes uses a proxy to connect to other internal and external resources like database servers and other containers. To access resources either on the local network or on the internet, you need to add a route to the vantage6 node. The route can be added by adding or updating the whitelist section in the node configuration file:

```
whitelist:
  domains:
    - yoururlhere.com # add your custom url here
  ips:
    - your.ip.here # add you custom ip here
```

```
  ports:
    - 1234 # add you custom port here
```

> for more information on the whitelist configuration check the vantage6 node documentation

To access other docker containers you can add the docker container as a service in the node configuration file:

```
docker_services:
    container_label: container_name
```

3. FAQ

`vnode: command not found`

If you get the error `vnode: command not found` you need to install the vantage6 package in the python environment. Make sure the python environment is activated and run `pip install vantage6`.

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node connection error

In case the node is not able to connect to the server:

- Check if the server is running by logging in to the server and check if the container is running. For more information on how to health check the server check the vantage6 server documentation
- If the server is running, check if the server is reachable from the node. You can check this by running `ping plugin.dhd.nl` or `curl https://plugin.dhd.nl/api/version` from the node. If the server is not reachable, check the firewall settings and the network settings of the node.

The node quits unexpectedly or won't come online

In case of unexpected node behavior, make sure to set the node log level to debug by adding or adjusting the log level in the node configuration file:

```
log_level: debug
```

Then restart the node in attached mode:

```
vnode start --user --name NODE-NAME --attach
```

This will show the logs of the node and can give more information on why the node is not able to connect to the server.

I found a bug or have a feature request

Create an issue in the vantage6 repository or create a pull request with the fix or feature.