Nautobot Integration with Prometheus through service script

1. Install the dependencies for the service with the below commands
2. sudo apt install python3-pip -y
3. pip config set global.target /home/NautoPromo
4. sudo pip install pynautobot
5. pip config unset global.target
6. highlighted should be checked to see if its even necessary
7. Exit out of the home directory, and create the directory and file specified in the prometheus.yml file. This file will be managed by a custom service we will create to grab device targets from our nautobot server.
8. cd ..
9. sudo mkdir NautoPromo
10. sudo nano NautobotTargets.yml

A screenshot of a computer

Description automatically generated

1. Enter an example target to the file such as “- targets [172.100.100.101:8080]” into the file. This will be changed by the service later, but this is to show the formatting file\_sd\_configs uses.

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1. Make a python file called NautoPromo.py under /home/NautoPromo using “sudo nano NautoPromo.py”and copy the below script to it.
2. Use the IP address of Nautobot as the URL and get the API target key from Nautobot under **Admin > API Tokens**
3. Essentially, what this script does is query nautobot for targets using GraphQL, and then writing them to the target file we created earlier

#### Imports ####

import pynautobot

import json

#### Query to Nautobot for list of Management0 addresses ####

query = """

query {

  devices {

    name

    interfaces {

      name

      ip\_addresses {

        address

      }

    }

  }

}

"""

#### Nautobot API Connection stuff. verify=False for self signed certs ###

nb = pynautobot.api(

    url = "https://IP\_ADDRESS",

    token = "API\_NAUTOBOT\_TOKEN",

    verify = False

)

print("Querying")

#### GraphQL Query to Nautobot, turn to json ####

gql = nb.graphql.query(query=query)

gqljson = (json.dumps(gql.json, indent=2))

data = json.loads(gqljson)

#### Parsing through each line in json for management0 address ####

## Create empty array to be filled with target addresses ##

arrayOfTargets = []

## iterate through the json data with the keys and values to obtain ip addresses

for device in data['data']['devices']:

  for interface in device['interfaces']:

    if interface['name'] == 'Management0':

      for ip\_address in interface['ip\_addresses']:

         address = ip\_address['address']

         address = address[:address.find("/")]

         arrayOfTargets.append(address+":8080")

# an idea could be to also have it run through a blacklist file and remove any non wanted devices. could be useful if you need to take a device down for a while #

#### Create a string that has the one line of yaml that the file\_sd\_config target file needs. basically, "- targets:" and then a string array of the targets+port ####

prometheusTargets = "- targets: ["

for target in arrayOfTargets:

  prometheusTargets = prometheusTargets + "'" + target + "', "

prometheusTargets = prometheusTargets[:-2]

prometheusTargets = prometheusTargets + "]"

print(f"Targets found:\n{prometheusTargets}")

#### Read target file on machine, if it has not changed, do not write over it, if it has, write over it ####

writeOver = False

with open("/home/NautoPromo/NautobotTargets.yml", "r") as targetFile:

  for line in targetFile:

    if line != prometheusTargets:

      writeOver = True

if writeOver:

  with open("/home/NautoPromo/NautobotTargets.yml", "w") as file:

    file.write(prometheusTargets)

else:

  print("no differences found since last query, no changes made to target file")

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Description automatically generated

1. Ensure you give the text files the permissions to be read, written, and executed such as with the below commands
2. sudo chmod 777 NautobotTargets.yml
3. sudo chmod 777 NautoPromo.py



1. Create a service file called NautoPromo.service with the command “sudo nano /etc/systemd/system/NautoPromo.service”
2. Add the below text to the file. This establishes it as a service that executes the script when called

[Unit]

Description=Script that queries nautobot for Prometheus file\_sd targets

After=network.target

[Service]

Type=simple

ExecStart=/usr/bin/python3 /home/NautoPromo/NautoPromo.py

[Install]

WantedBy=multi-user.target

A computer screen with white text

Description automatically generated

1. Now, make a service timer in the same location using “sudo nano /etc/systemd/system/NautoPromo.timer”
2. Use the below text to establish a timer that will run the NautoPromo service every 5 minutes

[Unit]

Description=Run NautoPromo every 5 minutes

[Timer]

OnUnitActiveSec=5m

Unit=NautoPromo.service

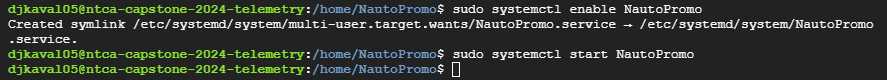
[Install]

WantedBy=timers.target

1. Run the below commands to allow the machine to see the changes in services, and enable the timer to run on startup
2. sudo systemctl daemon-reload
3. sudo systemctl enable NautoPromo.timer
4. sudo systemctl start NautoPromo.timer
5. sudo systemctl enable NautoPromo
6. sudo systemctl start Nautopromo

A screen shot of a computer

Description automatically generated



1. Check the NautobotTargets.yml file and view the changes
2. You can also view the logs of the script running with the command “journalctl -u NautoPromo”, and see the next time it will run using “systemctl status NautoPromo.timer”

A computer screen with a number and numbers

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A screen shot of a computer

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A screen shot of a computer program

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1. As a reminder, Prometheus wont be able to scrape its targets until the exporters are running on the target switches