

Branch Application To Cloud Application Connectivity

Overview

This quickstart guide will provide all the steps to create a secure service between a branch application and/or user and an application hosted in Azure Cloud using NetFoundry Overlay Fabric (NFOF).



Important

Assumption is that the NF Fabric is already up.

Through NF Web Console UI

Create and Deploy NF Gateway in Branch Datacenter

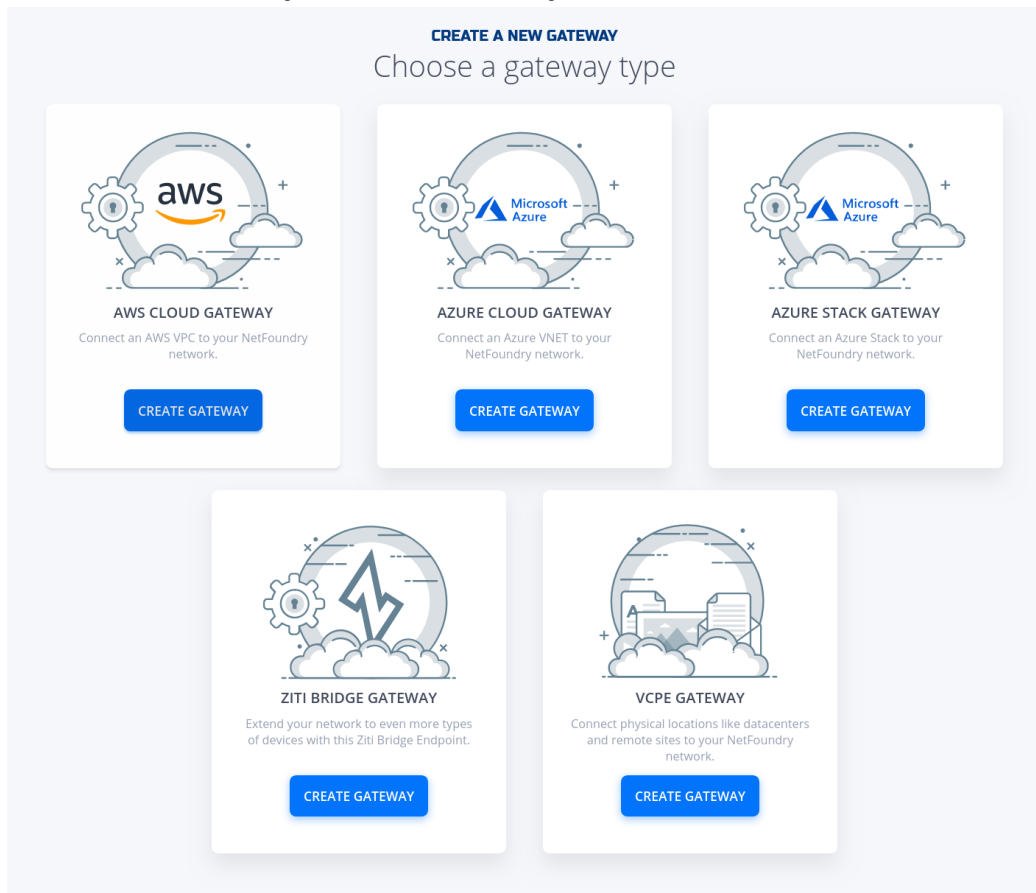
This section will guide a user through the steps on how to create a NF Manage Gateway in the NF Console UI and install it in the Branch Datacenter.



1. Navigate to Manage Gateways Page
2. Click on + sign in the top right corner.



3. Click on "Create Gateway" on the VCPE Gateway Card



4. Fill in the required information and click on "Create"

CREATE A NEW GATEWAY

Enter your Gateway attributes

GATEWAY NAME

REQUIRED

YourBranchGatewayName

CLOUD REGION

REQUIRED

US East

ENABLE HIGH AVAILABILITY

ENABLE TO EDIT DETAILS

HA

ENABLE HIGH AVAILABILITY
FOR ULTIMATE REDUNDANCY

OFF


DISABLED

CREATE

5. Copy the Client Registration Key

CONGRATULATIONS

Your Gateway has been created

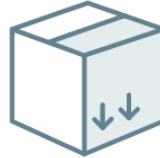


YOURBRANCHGATEWAYNAME REGISTRATION KEY

CLICK TO COPY

FB18C6EBEAD65B723E9C86B6882A3298ED77DBBF


Download and install instructions



DOWNLOAD INSTALL PACKAGE

vCPE Gateway to connect to private networks, branches, & data centers using this customer-managed virtual gateway.

DOWNLOAD



VIEW INSTALL INSTRUCTIONS

Connect public or private IP space inside your vCPE using a customer-managed cloud gateway.

VIEW

6. Click on "Download" button on the Installation Package Card

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AWS Cloud Gateway

Deploy secure, high performance, global networks as easily and effectively as you spin up your AWS instances. Download it now from the AWS Marketplace. Not sure how to install it? [Click Here](#) to read our simple install instructions.

[VISIT MARKETPLACE](#)

Azure Cloud Gateway

Improve the agility, security and performance of your cloud applications in Azure. Download it now from the Azure Marketplace. Not sure how to install it? [Click Here](#) to read our simple install instructions.

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OVA for VMWare ESXi 5.0 or greater

This is a V-CPE Gateway to connect to private networks, branches, & datacenters using this customer-managed virtual gateway. Not sure how to install it? [Click Here](#) to read our simple install instructions.

[DOWNLOAD](#)

Microsoft Hyper-V VHD Image

This is a V-CPE Gateway to connect to private networks, branches, & datacenters using this customer-managed virtual gateway. Not sure how to install it? [Click Here](#) to read our simple install instructions.

KVM QCOW2 Image

This is a V-CPE Gateway to connect to private networks, branches, & datacenters using this customer-managed virtual gateway. Not sure how to install it? [Click Here](#) to read our simple install instructions.

OVA for Virtual Box

This is a V-CPE Gateway to connect to private networks, branches, & datacenters using this customer-managed virtual gateway. Not sure how to install it? [Click Here](#) to read our simple install instructions.

7. Download the correct image for the desired Hypervisor.

8. Follow the installation procedure linked in the description of each image type (i.e. "Click Here").

9. Once installed, login into it locally with ssh and register it using the key copied in the previous step. Run the following command `sudo nfnreg "reg key"`

```
Infadmin@yourBranchGatewayName ~]$ sudo nfnreg 368FD32C7F09883BA4C0C3D0991D3BB013D89EA87
Created symlink from /etc/systemd/system/multi-user.target.wants/dvn-driver.service to /usr/lib/systemd/system/dvn-driver.service.
Created symlink from /etc/systemd/system/multi-user.target.wants/dvn.service to /usr/lib/systemd/system/dvn.service.
Registration complete
Infadmin@yourBranchGatewayName ~]$
```

10. Once registered, one should see the gateway status turn to green in NF Console UI

MANAGE GATEWAYS

[Manage Gateways](#) [Manage Clients](#) [Manage Azure Virtual WAN Sites](#) [Manage Endpoint Groups](#)

| Type to Filter | |
|---|---------------------|
| Gateway Label | Status |
| <input type="radio"/> YourBranchGatewayName | Online |

11. Done

Create and Deploy NF Azure Gateway

This section will guide a user through the steps on how to create a NF Manage Gateway in the NF Console UI and install it in the Azure vNet.

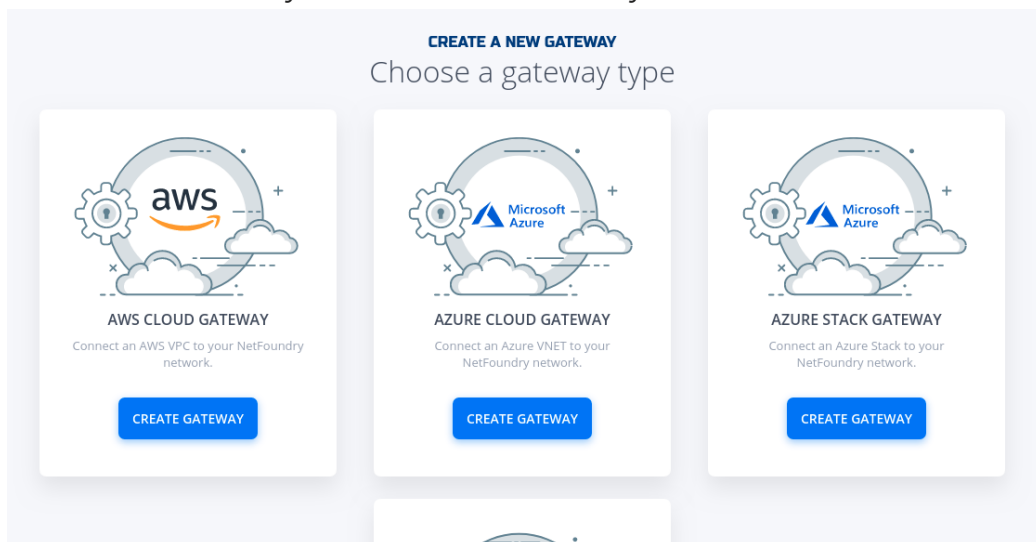


Console UI

1. Navigate to Manage Gateways Page
2. Click on + sign in the top right corner.

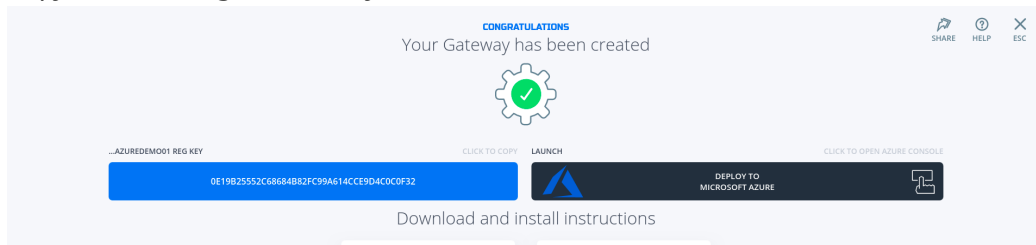


3. Click on "Create Gateway" on the Azure Cloud Gateway Card



4. Fill in the required information and click on "Create"

5. Copy the Client Registration Key



6. Click on "Deploy to Microsoft Azure". It will take you to the Azure Portal and ask you for your login credentials.

7. You will be presented with the template that needs to be filled. The first section is the Basics regarding your Subscription and Resource Group this gateway will be deployed in.

BASICS

| | |
|------------------|---|
| Subscription * | <input type="text" value="Your Subscription Name"/> |
| Resource group * | <input type="text" value="Your Resource Group Name"/> Create new |
| Location * | <input type="text" value="(US) East US"/> |

8. The second section related to resources associated with this gateway. e.g. vm name, ip address space, security groups, etc. you will paste the registration key copied in step 5. You will also need the public ssh key to use for access to this gateway remotely.

SETTINGS

| | |
|------------------------|--|
| Location | <input type="text" value="Your Region"/> |
| Network Interface Name | <input type="text" value="azuredemo01-if"/> |
| Security Group Name | <input type="text" value="azuredemo01-sg"/> |
| Virtual Network Name | <input type="text" value="azuredemo01-vnet"/> |
| Address Prefix | <input type="text" value="10.0.8.0/24"/> |
| Subnet Name | <input type="text" value="default"/> |
| Subnet Prefix | <input type="text" value="10.0.8.0/24"/> |
| Public Ip Address Name | <input type="text" value="azuredemo01-ip"/> |
| Public Ip Address Type | <input type="text" value="Dynamic"/> |
| Public Ip Address Sku | <input type="text" value="Basic"/> |
| Virtual Machine Name | <input type="text" value="azuredemo01"/> ✓ |
| Virtual Machine RG | <input type="text" value="nf-sandbox"/> |
| Os Disk Type | <input type="text" value="Premium_LRS"/> |
| Virtual Machine Size | <input type="text" value="Standard_B1ms"/> |
| Nfreg Key * ⓘ | <input type="text" value="....."/> ✓ |
| Admin Username ⓘ | <input type="text" value="nfadmin"/> |
| Ssh Key Data * ⓘ | <input type="text" value="ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQJCjga67wcoISXaD1bswknLrejRYtZ..."/> ✓ |

9. You will need to agree to Azure Marketplace Terms and Conditions and click to "Purchase" to continue.

TERMS AND CONDITIONS

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By clicking "Purchase," I (a) agree to the applicable legal terms associated with the offering; (b) authorize Microsoft to charge or bill my current payment method for the fees associated the offering(s), including applicable taxes, with the same billing frequency as my Azure subscription, until I discontinue use of the offering(s); and (c) agree that, if the deployment involves 3rd party offerings, Microsoft may share my contact information and other details of such deployment with the publisher of that offering.

☒ I agree to the terms and conditions stated above

Purchase

10. If the NF Gateway was deployed successfully. Here is the view of the Resource Group and NF Console UI.

The screenshot displays the Azure portal interface for the 'nf-sandbox' resource group. The left sidebar shows navigation options like Overview, Activity log, Access control (IAM), Tags, Events, Settings, Quickstart, Deployments, Policies, Properties, and Locks. The main area shows the 'nf-sandbox' resource group with details such as Subscription (NefFoundry Non-Prod), Subscription ID (8699c8d4-4d25-48fa-85ef-c9b299ba64f), and Tags (change). Below this, a table lists resources: azuredemo01, azuredemo01-if, azuredemo01-ip, azuredemo01-sg, and azuredemo01-vnet. The right sidebar shows a notification: 'Deployment succeeded' for 'Microsoft.Template' to resource group 'nf-sandbox'.

The bottom section shows the 'MANAGE GATEWAYS' interface. It includes a search bar, a filter dropdown, and a table with columns: Gateway Label, Status, Type, Location, and Cloud Provider. The table lists 'AzureDemo01' with status 'Online', type 'Azure Private Gateway', and location 'Your Region'.

11. Done

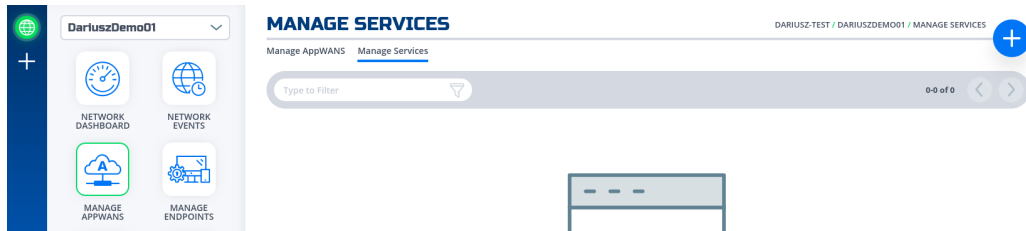
Create IP Host Service

This section will guide a user through the steps on how to create a NF Service.

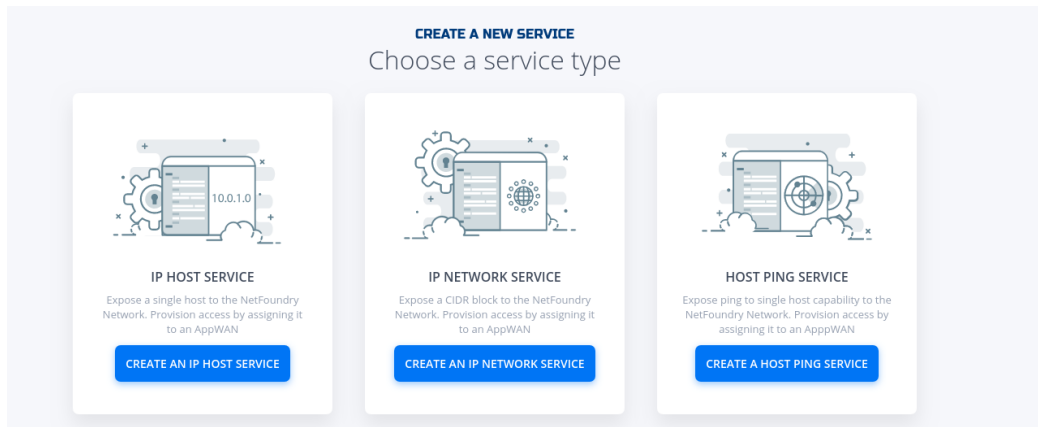


Console UI

1. Navigate to Manage Services Page under Manage Appwans
2. Click on + sign in the top right corner.



3. Click on "Create an IP Host Service"



4. Fill in the required information for SSH and click on "Create"

CREATE A NEW IP HOST SERVICE

Enter your service attributes

| | |
|---|----------------------|
| SERVICE NAME | REQUIRED |
| <input type="text" value="DemoServiceSsh"/> | |
| GATEWAY | REQUIRED |
| <input type="text" value="AzureDemo01"/> | |
| IP ADDRESS | REQUIRED |
| <input type="text" value="10.0.8.5"/> | |
| PORT/RANGE | REQUIRED |
| <input type="text" value="22"/> | |
| INTERCEPT IP ADDRESS | |
| <input type="text" value="10.0.8.5"/> | |
| INTERCEPT PORT/RANGE | |
| <input type="text" value="22"/> | |
| PROTOCOL TYPE | REQUIRED |
| <input type="text" value="TCP"/> | |
| ADVANCED OPTIONS | OPEN TO EDIT DETAILS |
| <input type="checkbox"/> | |
| ADVANCED OPTIONS | |
| <input type="button" value="CREATE"/> | |

5. If successfully, the service is green.

The screenshot displays the 'MANAGE SERVICES' interface. On the left, a sidebar contains a green status indicator and a '+' button. The main panel shows a table with one service, 'DemoServiceSsh', which is marked as successful with a green dot. The table columns include Service Name, Type, Protocol, IP Address, Intercept IP, and Port Range.

| Service Name | Type | Protocol | IP Address | Intercept IP | Port Range |
|----------------|---------|----------|------------|--------------|------------|
| DemoServiceSsh | IP Host | TCP | 10.0.8.5 | 10.0.8.5 | 22 - 22 |

6. Done

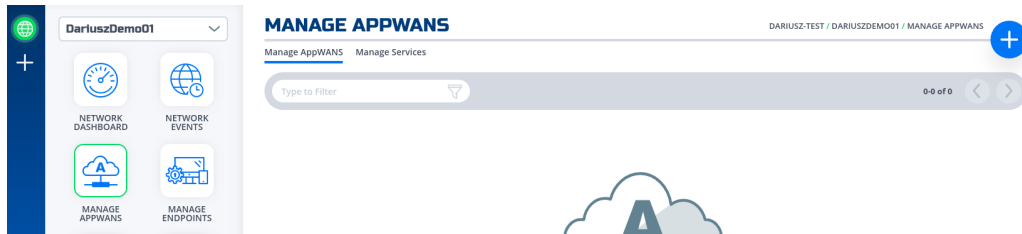
Create AppWan

This section will guide a user through the steps on how to enable service connectivity to users by creating an appwan.

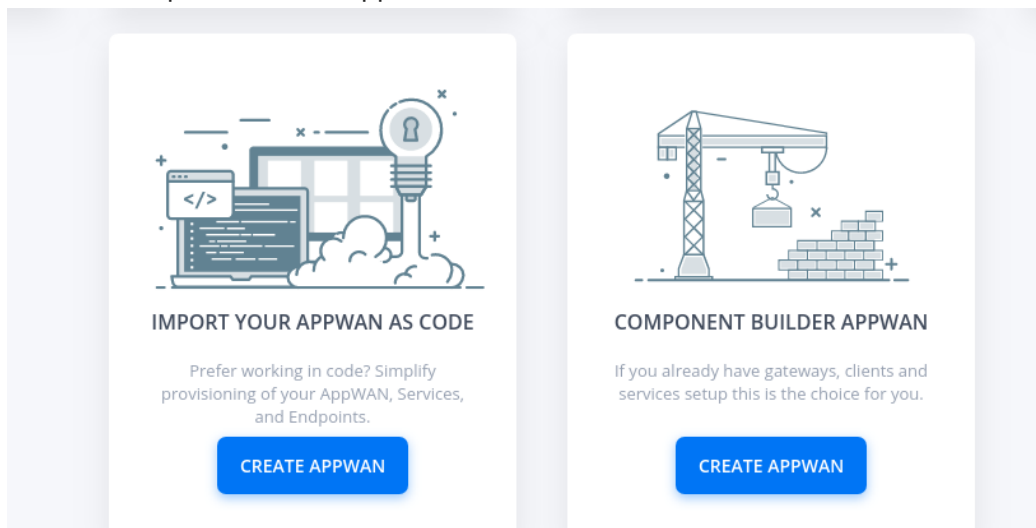


Console UI

1. Navigate to Manage AppWANS Page under Manage Appwans
2. Click on + sign in the top right corner.



3. Click on "Component Builder Appwan"



4. Move the desired gateway (e.g. DemoGateway01) from "Available" Gateways to "Selected" Endpoints. Move the desired service (e.g. DemoServiceSsh) from "Available" to "Selected"

Services.

CREATE A NEW APPWAN

Choose from existing components, or add new ones

1 APPWAN NAME REQUIRED

DemoAppWan

2 ADD CLIENTS, GATEWAYS, OR ENDPOINT GROUPS

Search for Endpoints

AVAILABLE GROUPS ADD NEW +

AVAILABLE CLIENTS ADD NEW +

AVAILABLE GATEWAYS ADD NEW +

AzureDemo01

SELECTED ENDPOINTS

YourBranchGatewayName

3 ADD SERVICES

Search for a Service

AVAILABLE SERVICES ADD NEW +

SELECTED SERVICES

DemoServiceSsh

CREATE

5. Click on "Create".

YOUR APPWAN SUMMARY

Your AppWAN has been created! A network summary is below.

What's next? Finish connecting your network by registering new clients and gateways.

HINT NEW CLIENTS
Share Client Registration Info

HINT NEW GATEWAYS
Tap to Launch and Register

1 APPWAN NAME
DemoAppWan

2 ENDPOINTS
CLIENTS SHARE NEW CLIENTS
GATEWAYS REGISTER NEW GATEWAYS
● YOURBRANCHGATEWAYNAME

3 SERVICES
SERVICE DEFINITIONS
● DemoServiceSsh

4 ENDPOINT GROUPS
GROUPS

6. Done

Test Connectivity to Application Server



Route to vNet

The private IP of NF Gateway (e.g. YourBranchGatewayName) needs to be the next hop to reach the vNet in Azure (e.g. 10.0.8.0/24). Thus, a static route will need to be configured in one of the branch routers. NF Gateway can support dynamic routing if needed (e.g.bgp, ospf)



Steps

1. Log in to a Client App Host in Branch DataCenter
2. Run `ssh username@privatelPOfServerAppHostInAzure`

```
nfadmin@azuredemoapp:~  
PS C:\>  
PS C:\>  
PS C:\> ssh nfadmin@10.0.8.5  
[nfadmin@azuredemoapp ~]$  
[nfadmin@azuredemoapp ~]$ ls  
[nfadmin@azuredemoapp ~]$ pwd  
/home/nfadmin  
[nfadmin@azuredemoapp ~]$  
[nfadmin@azuredemoapp ~]$
```

Programmatically

via Python and Terraform



Python Modules

For the code clarity, we have broken down the code into multiple Python modules

1. NF REST CRUD (Create,Read, Update and Delete) operations
2. Get MOP Session Token
3. Create NF Network
4. Create NF Gateway(s)
5. Create NF Service(s)
6. Create NF AppWan(s)
7. Wrapper Script to Create NF Resources based on Resource yaml file



Environment Setup Requirements

1. `~/env` to store NF Credentials in (e.g. `clientId`, `clientSecret`) to obtain a session token for NF API
2. Export Azure Credentials (e.g, `export ARM_TENANT_ID, ARM_CLIENT_ID, ARM_CLIENT_SECRET, ARM_SUBSCRIPTION_ID`) to enable resource gateway creation in Azure Resource Group via Terraform.
3. Terraform and Python3 installed in path.

Additional Information:

1. The new Resource Group in Azure is created based on then name provided in `Resource.yml`, if one does not exist already in the same region (e.g. `centralus`). The action `delete gateway` will delete the RG as well even if it was an existing RG. If one does not want to delete the RG, the command `terraform state rm "{tf resource name for RG}"` needs to be run before running the gateway delete step. This will ensure that the RG is not deleted.
2. A new vNet will be created and NF Gateway will be placed in it.
3. Environment means the NF Console Environment used (e.g. `production`), not Azure.



Steps

1. Clone this repo (git clone <https://github.com/netfoundry/mop.git>)
2. Update Resource yaml file with the desired options to feed into the wrapper script as described in the following code snippet. All Resource.yml Options
3. Run this from the root folder to create GW in NF Console UI and Azure.

```
python3 quickstarts/docs/api/python/source/netfoundry/nf_resources.py --file quickstarts/docs/api/python/etc/nf_resources.yml
```

Required Configuration Parameters for Gateway Creation

```
environment: production
network_action: get
network_name: DemoNet01
gateway_list:
- action: create
  cloud: azure
  count: 1
  names: []
  region: westus
  regionalCidr: [10.20.10.0/24]
  regkeys: []
  resourceGroup:
    name: demoPythonTerraform01
    region: centralus
  tag: TerraformDemo
terraform:
  bin: terraform
  output: 'no'
  source: ./quickstarts/docs/terraform
  work_dir: .
```

4. After the script is run successfully, one can see that the gateway name and registration key were saved in Resource.yml file. The name is created automatically based on region and gateway type joined with x and gateway count (AZCPEGW means an azure type gateway in NF console). One can create more than one gateway in the same region by increasing the count to more than 1.

```
environment: production
gateway_list:
- action: create
  cloud: azure
  count: 1
  names:
  - AZCPEGWx0xWESTUS
  region: westus
  regionalCidr:
  - 10.20.10.0/24
  regkeys:
  - 21DB86724EC3F31C11C1C9D68CE5ECD6A06F057E
  resourceGroup:
    name: demoPythonTerraform01
```



```

region: centralus
tag: TerraformDemo
network_action: get
network_name: DemoNet01
terraform:
  bin: terraform
  output: 'no'
  source: ./quickstarts/docs/terraform
  work_dir: .

```

MANAGE GATEWAYS

Manage Gateways | Manage Clients | Manage Azure Virtual WAN Sites | Manage Endpoint Groups

1-1 of 1

| Gateway Label | Status | Type | Location | Cloud Provider |
|------------------|--------|-----------------------|----------|----------------|
| AZCPEGW-0-WESTUS | Online | Azure Private Gateway | West US | |

Home > Resource groups > demoPythonTerraform01

demoPythonTerraform01

Subscription (change) : NetFoundry Non-Prod
Subscription ID : 8699c8dd-4425-46fa-85ef-cefe299aeb4f
Tags (change) : environment : TerraformDemo

Deployments : No deployments

Filter by name... Type == all Location == all Add filter

Showing 1 to 8 of 8 records. Show hidden types

| Name | Type | Location |
|--------------------------------|------------------------|----------|
| AZCPEGW-0-WESTUS | Virtual machine | West US |
| AZCPEGW-0-WESTUS-nic | Network interface | West US |
| AZCPEGW-0-WESTUS-publicip | Public IP address | West US |
| AZCPEGW-0-WESTUS-routeTable | Route table | West US |
| AZCPEGW-0-WESTUS-securityGroup | Network security group | West US |
| AZCPEGW-0-WESTUS-vNet | Virtual network | West US |
| AZCPEGW-0-WESTUSOsDisk | Disk | West US |
| storage974e569b7cc2b56 | Storage account | West US |

5. Create a test server vm on the same vNet if not already present.

Home > CreateVm-Canonical UbuntuServer-18.04-LTS-20191216113538 - Overview > DemoTestServer01

DemoTestServer01

Virtual machine

Connect Start Restart Stop Capture Delete Refresh

Resource group (change) : demoPythonTerraform01

Status : Running

Location : West US

Subscription (change) : NetFoundry Non-Prod

Subscription ID : 8699c8dd-4425-46fa-85ef-cefe299aeb4f

Computer name : DemoTestServer01

Operating system : Linux (ubuntu 18.04)

Size : Standard B1ms (1 vcpu, 2 GiB memory)

Tags (change) : Click here to add tags

Azure Spot : N/A

Public IP address : 40.118.150.170

Private IP address : 10.20.10.5

Public IP address (IPv6) : -

Private IP address (IPv6) : -

Virtual network/subnet : AZCPEGW-0-WESTUS-vNet/AZCPEGW-0-WESTUS-subnet

DNS name : Configure

Scale Set : N/A

6. Update the Resoure.yaml file to include the Service option to create the NF service on the gateway create in the previous step. Don't forget to change the action on the gateway to "get".

```

environment: production
gateway_list:
- action: get
  cloud: azure
  count: 1
  names:
  - AZCPEGWx0xWESTUS
  region: westus
  regionalCidr:
  - 10.20.10.0/24
  regkeys:
  - 21DB86724EC3F31C11C1C9D68CE5ECD6A06F057E
  resourceGroup:
    name: demoPythonTerraform01

```

```

    region: centralus
    tag: TerraformDemo
    network_action: get
    network_name: DemoNet01
    terraform:
      bin: terraform
      output: 'no'
      source: ./quickstarts/docs/terraform
      work_dir: .
    services:
      - action: create
        gateway: AZCPEGWx0xWESTUS
        ip: 10.20.10.5
        port: 22
        name:
        type: host

```

7. After the script run again successfully, the service section should have been populated with the service name as so.

```

services:
- action: create
  gateway: AZCPEGWx0xWESTUS
  ip: 10.20.10.5
  name: AZCPEGWx0xWESTUS--10.20.10.5--22
  port: 22
  type: host

```

MANAGE SERVICES / MANAGE SERVICES +

Manage AppWANs Manage Services

Type to Filter 1-1 of 1 < >

| <input type="radio"/> Service Name | <input type="radio"/> Type | Protocol | IP Address | Intercept IP | Port Range | |
|--|----------------------------|----------|------------|--------------|------------|-----|
| <input checked="" type="radio"/> AZCPEGWx0xWESTUS--10.20.10.5-22 | IP Host | TCP | 10.20.10.5 | 10.20.10.5 | 22 - 22 | ... |

8. Create a gateway in the branch as the steps in the UI section indicated. We will provide code snippets for private hypervisors deployment through python in later releases (e.g. vSphere)

MANAGE GATEWAYS

Manage Gateways Manage Clients Manage Azure Virtual WAN Sites Manage Endpoint Groups

Type to Filter 🔍

| <input type="radio"/> Gateway Label | <input type="radio"/> Status | Type | Location |
|---|---|--|----------|
| <input type="radio"/> YourBranchGatewayName | ● Online | S V-CPE Gateway | US East |

9. Update the Resoure.yaml file to include the AppWan option to create the NF AppWan tying the gateway, client and service created in the previous steps. Don't forget to change the action on the service option to "get".

```

environment: production
gateway_list:
- action: get
  cloud: azure
  count: 1
  names:

```

```
- AZCPEGWx0xWESTUS
region: westus
regionalCidr:
- 10.20.10.0/24
regkeys:
- 21DB86724EC3F31C11C1C9D68CE5ECD6A06F057E
resourceGroup:
  name: demoPythonTerraform01
  region: centralus
tag: TerraformDemo
network_action: get
network_name: DemoNet01
services:
- action: get
  gateway: AZCPEGWx0xWESTUS
  ip: 10.20.10.5
  name: AZCPEGWx0xWESTUS--10.20.10.5--22
  port: 22
  type: host
terraform:
  bin: terraform
  output: 'no'
  source: ./quickstarts/docs/terraform
  work_dir: .
appwans:
- action: create
  endpoints:
  - BranchGatewayName
  - ClientName
  name: appwan-ssh-22
  services:
  - AZCPEGWx0xWESTUS--10.20.10.5--22
```

10. After the script ran again successfully, the connectivity should have been up.

YOUR APPWAN SUMMARY

Your AppWAN's details are below. Looking to make some changes?
Follow the hints below to edit your AppWAN, Endpoints, and or Services.

HINT EDIT YOUR APPWAN
Tap the Edit icon to make changes


HINT ENDPOINTS & SERVICES
Tap to Edit Advanced Options

1 APPWAN NAME
appwan-ssh-22


2 ENDPOINTS
CLIENTS
ClientName
GATEWAYS
BRANCHGATEWAYNAME

3 SERVICES
SERVICE DEFINITIONS
AZCPEGWx0xWESTUS--10.20.10.5-22

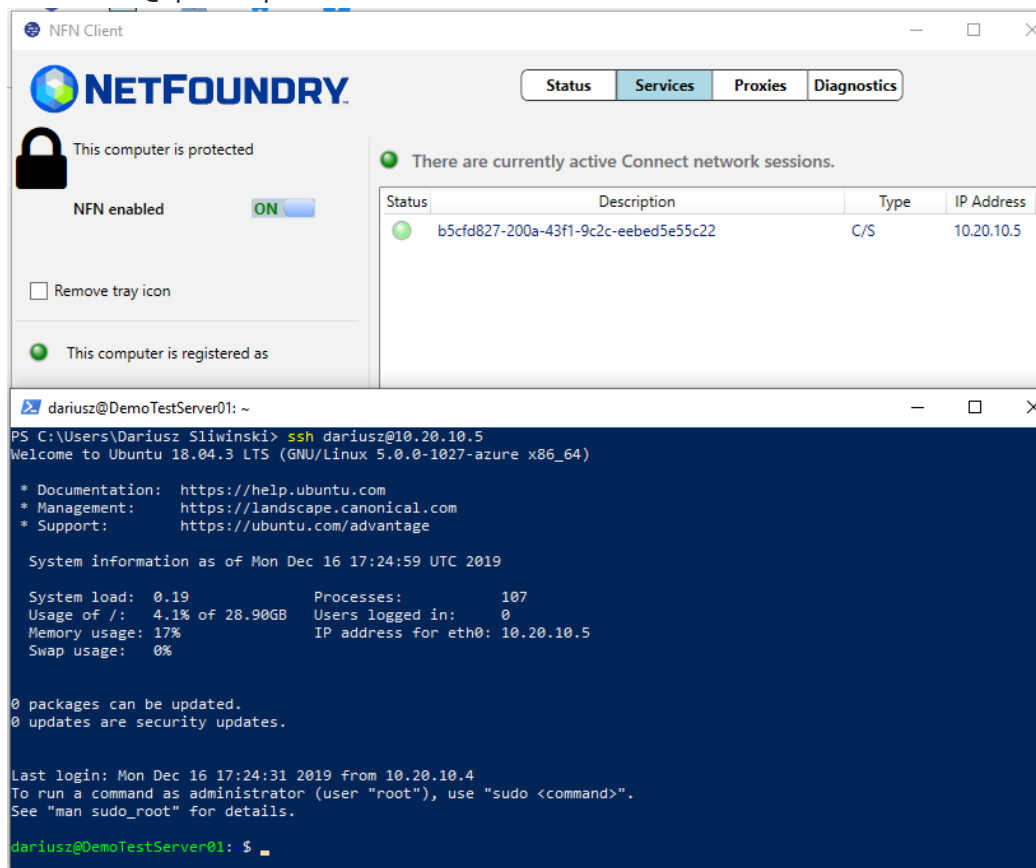
4 ENDPOINT GROUPS
GROUPS

 Want to add another environment
with the same services or endpoints?

TAP TO CLONE



11. To test connectivity, log in to the Remote Client or Branch App Server and run ssh "username"@ "privatelp"



The screenshot shows the NFN Client application window. The 'Status' tab is active, displaying 'This computer is protected' and 'NFN enabled' with a green 'ON' indicator. Below this, there is a checkbox for 'Remove tray icon' and a message 'This computer is registered as'. To the right, a table lists active Connect network sessions:

| Status | Description | Type | IP Address |
|--------|--------------------------------------|------|------------|
| ● | b5cfd827-200a-43f1-9c2c-eebed5e55c22 | C/S | 10.20.10.5 |

Below the NFN Client window, a terminal window shows an SSH session from a Windows PowerShell prompt to an Ubuntu 18.04.3 LTS server. The terminal output includes system information, package updates, and the last login time.

```
PS C:\Users\Dariusz Sliwinski> ssh dariusz@10.20.10.5
Welcome to Ubuntu 18.04.3 LTS (GNU/Linux 5.0.0-1027-azure x86_64)

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

System information as of Mon Dec 16 17:24:59 UTC 2019

System load:  0.19           Processes:    107
Usage of /:   4.1% of 28.9GB Users logged in:  0
Memory usage: 17%           IP address for eth0: 10.20.10.5
Swap usage:   0%

0 packages can be updated.
0 updates are security updates.

Last login: Mon Dec 16 17:24:31 2019 from 10.20.10.4
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

dariusz@DemoTestServer01: $
```

12. To delete resources created, just follow the reverse order. Change the action to delete for AppWans first, then other resources as indicated in the code snippets.

```
appwans:
- action: delete
endpoints:
- BranchGatewayName
- ClientName
name: null
services:
- AZCPEGWx0xWESTUS--10.20.10.5--22
```

13. Services

```
services:
- action: delete
gateway: AZCPEGWx0xWESTUS
ip: 10.20.10.5
name: null
port: 22
type: host
```

14. Endpoints - will delete all resources in Azure as well.

- a. terraform state rm "{tf resource name for RG}" // run this before the python script if Resource Group needs to be preserved 1.

```
gateway_list:
- action: delete
  cloud: azure
  count: 1
  names: []
  region: westus
  regionalCidr:
  - 10.20.10.0/24
  regkeys: []
  resourceGroup:
    name: demoPythonTerraform01
    region: centralus
  tag: TerraformDemo
```

15. Network

```
environment: production
network_action: delete
network_name: DemoNet01
```

16. Done

via Jenkins

In this section, we will use `Resource yml` along with `Jenkinsfile` to show how to automate the steps further by creating the Jenkins Job



Jenkins Requirements

1. java
2. docker

Then follow jenkins installation using docker to install Jenkins on the localhost and choose "Install suggested plugins". After successful installation, one should be able to reach the Jenkins Dashboard (8080 is default port).



The screenshot shows the Jenkins Dashboard in a web browser at localhost:8080. The interface includes a top navigation bar with the Jenkins logo, a search bar, and links for "Jenkins Admin" and "log out". Below the navigation bar is a sidebar with various links: "New Item", "People", "Build History", "Manage Jenkins", "My Views", "Open Blue Ocean", "Credentials", "Lockable Resources", and "New View". The main content area displays two sections: "Build Queue" and "Build Executor Status". The "Build Queue" section shows "No builds in the queue." The "Build Executor Status" section shows two executors, both in an "Idle" state. At the bottom right, there is a link to "add description". A large "Welcome to Jenkins!" message is displayed at the bottom, with a light blue box containing the text "Please **create new jobs** to get started."

Build Queue

No builds in the queue.

Build Executor Status

1 Idle

2 Idle

[add description](#)

Welcome to Jenkins!

Please **create new jobs** to get started.



Note

If one wants to add the gateway deployed in the Private DataCenter and/or NF Client, it must be created prior to running the next steps. Otherwise the options of APPWAN_PRIVATE_GATEWAY and APPWAN_PRIVATE_CLIENT can be left blank and added after the appwan is created using the steps described in the Console UI section above. GATEWAY_NAME and SERVICE_NAME are automatically generated by the scripts in this version. GATEWAY_NAME = "GW TYPE"+x0x+"LOCATION OF AZURE GW", e.g. AZCPEGWx0xWESTUS; SERVICE_NAME = "GW NAME"--"SERVICE IP"--"SERVICE PORT", e.g. AZCPEGWx0xWESTUS--10.20.10.5--22.



Setting Up Jenkins Pipeline

1. Login to Jenkins

2.



Click on "New Item"

3. Name your Project, select pipeline option and click "Ok"

Enter an item name

» Required field

Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining something other than software build.

Pipeline

Orchestrates long-running activities that can span multiple build agents. Suitable for organizing complex activities that do not easily fit in free-style job type.

Multi-configuration project

Suitable for projects that need a large number of different configurations, such as...

4. In the pipeline details, fill in the scm details as seen in the image below and click "Save".

Everything default apart from:

a. Repository Url: <https://github.com/netfoundry/mop.git>

b. Script Path: pipeline/netfoundrydeploy2cloud.jenkinsfile

Pipeline

Definition: Pipeline script from SCM

SCM: Git

Repositories

Repository URL:

Credentials: [Add](#)

[Advanced...](#)

[Add Repository](#)

Branches to build

Branch Specifier (blank for 'any'):

[Add Branch](#)

Repository browser: (Auto)

Additional Behaviours: [Add](#)


Script Path:

Lightweight checkout: ☒

[Pipeline Syntax](#)

[Save](#) [Apply](#)

5. Set up users for Azure API and NF MOP API access -- More on Credentials setup



Jenkins

Jenkins > Credentials

- New Item
- People
- Build History
- Manage Jenkins
- My Views
- Open Blue Ocean
- Lockable Resources
- Credentials**
- System
- New View

Build Queue

No builds in the queue.

Credentials

| T | P | Store | Domain | ID |
|---|---|-------------------------|----------|---------------------------------------|
| | | Jenkins | (global) | azure_user_creds 164b |
| | | Jenkins | (global) | sandbox-mop-user QJ9K |

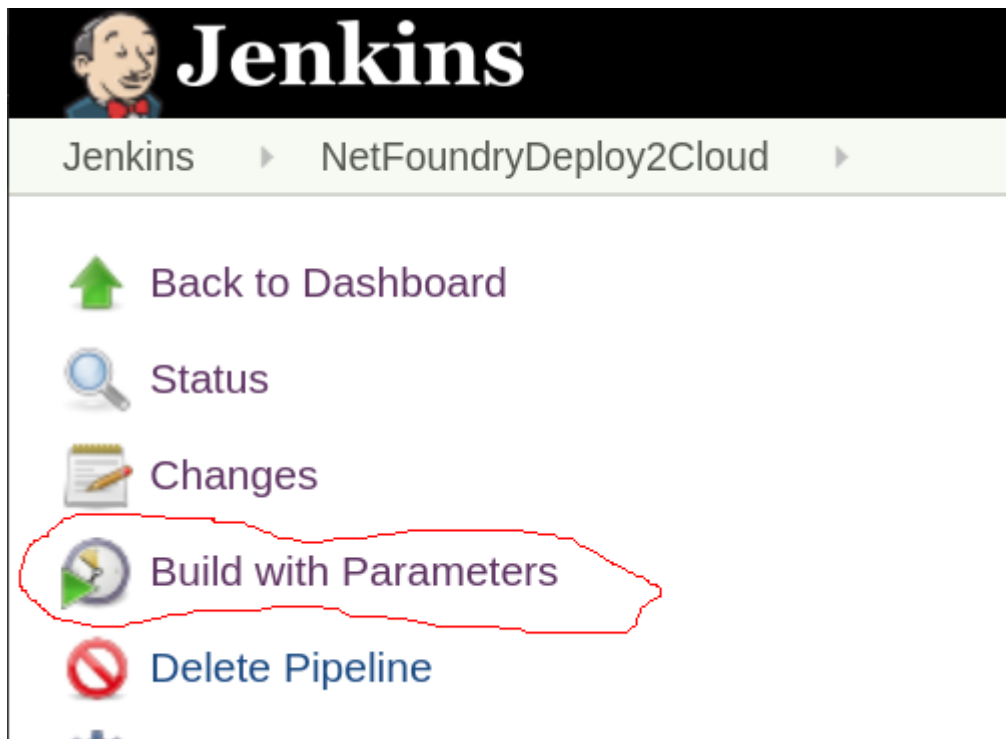
Icon: [S](#) [M](#) [L](#)

Stores scoped to [Jenkins](#)

| P | Store |
|---|----------------------------------|
| | Jenkins (global) |

[Add credentials](#)

6. Run Jenkinsjob by selecting on the pipeline created in the previous step. Click on "Build with Parameters"





To create the resources

1. Fill in the Azure Details (e.g. RG, Tenant Id, etc) and select the following:
 - a. NF Environment, e.g. production
 - b. NETWORK_ACTION - create
 - c. NETWORK_NAME, e.g. DEMONET
 - d. GATEWAY_ACTION - create
 - e. If Azure RG needs to be preserved, then KEEP_RG option must be left checked.
 - f. LOCATION, e.g. westus - location where the Azure GW will be deployed in
 - g. SUBNET_PREFIX, e.g. 10.20.10.0/24 - the subnet used for the vNet in the location of the Azure GW deployment.

← → ↻ ⓘ localhost:8080/job/NetFoundryDeploy2Cloud/build?delay=0sec

Jenkins » NetFoundryDeploy2Cloud »

Build with Parameters
Delete Pipeline
Configure
Full Stage View
Open Blue Ocean
Rename
Pipeline Syntax

Build History trend
Atom feed for all Atom feed for failures

| | |
|------------------------|---|
| AZURE_TENANT_ID | <input type="text"/> |
| | Tenant ID in Azure |
| AZURE_SUBSCRIPTION_ID | <input type="text"/> |
| | Subscription ID in Azure |
| RESOURCE_GROUP_NAME | <input type="text"/> |
| | RG Name in Azure |
| RESOURCE_GROUP_LOC | centralus |
| | RG Location in Azure |
| | <input checked="" type="checkbox"/> KEEP_RG Not to check this if RG can be deleted |
| ENVIRONMENT | sandbox |
| | Select NF Console Environment to spin the network and gateways in |
| NETWORK_ACTION | create |
| | Select an action to perform on the network in NF |
| NETWORK_NAME | DEMONET |
| | Name to be used to create a network with |
| GATEWAY_ACTION | create |
| | Select an action to perform on the gateway in NF Network |
| GATEWAY_NAME | <input type="text"/> |
| | Name of NF Gateway generated in NF Console |
| SERVICE_ACTION | get |
| | Select an action to perform on the service in NF Network |
| SERVICE_NAME | <input type="text"/> |
| | Name of NF Service generated in NF Console |
| SERVICE_IP | <input type="text"/> |
| | IP of NF Service App |
| SERVICE_PORT | <input type="text"/> |
| | IP of NF Service App |
| APPWAN_ACTION | get |
| | Select an action to perform on the appwan in NF Network |
| APPWAN_NAME | <input type="text"/> |
| | Name of NF APPWAN to be used in NF Console |
| APPWAN_PRIVATE_GATEWAY | <input type="text"/> |
| | Endpoint Name in Private Datacenter Gateway to be included in AppWan |
| APPWAN_PRIVATE_CLIENT | <input type="text"/> |
| | Endpoint Name for Client to be included in AppWan |
| APPWAN_SERVICE | <input type="text"/> |
| | Service Name to be included in AppWan |
| LOCATION | westus |
| | Azure Cloud DC Location where to deploy GW |
| SUBNET_PREFIX | 10.20.10.0/24 |
| | Subnet CIDR in Azure Cloud DC Location where to deploy GW |

Build

2. Run Jenkins job again by selecting on the pipeline created in the previous step. Click on "Build with Parameters"

3. Fill in service and appwan details by selecting the following:

- a. KEEP_RG - not selected
- b. NF Environment, e.g. production
- c. SERVICE_ACTION - create
- d. APPWAN_ACTION - create
- e. GATEWAY_NAME, e.g. AZCPEGWx0xWESTUS (this is created in the previous step automatically)
- f. SERVICE_NAME, e.g. AZCPEGWx0xWESTUS--10.20.10.5--22 (this is created automatically during this step)
- g. SERVICE_IP, e.g. 10.20.10.5
- h. SERVICE_PORT, e.g. 22
- i. APPWAN_NAME, e.g. appwan-ssh-22
- j. APPWAN_PRIVATE_GATEWAY, e.g. private-gateway-name (this is created outside of the jenkins job, prior to running this step)
- k. APPWAN_PRIVATE_CLIENT, e.g. client-name (this is created outside of the jenkins job, prior to running this step)

I. APPWAN_SERVICE, e.g. AZCPEGWx0xWESTUS--10.20.10.5--22

Jenkins

localhost:8080/job/NetFoundryDeploy2Cloud/build?delay=0sec

Jenkins

NetFoundryDeploy2Cloud

Build with Parameters

Delete Pipeline

Configure

Full Stage View

Open Blue Ocean

Rename

Pipeline Syntax

Build History

trend

Atom feed for all

Atom feed for failures

AZURE_TENANT_ID

AZURE_SUBSCRIPTION_ID

RESOURCE_GROUP_NAME

RESOURCE_GROUP_LOC

ENVIRONMENT

NETWORK_ACTION

NETWORK_NAME

GATEWAY_ACTION

GATEWAY_NAME

SERVICE_ACTION

SERVICE_NAME

SERVICE_IP

SERVICE_PORT

APPWAN_ACTION

APPWAN_NAME

APPWAN_PRIVATE_GATEWAY

APPWAN_PRIVATE_CLIENT

APPWAN_SERVICE

LOCATION

SUBNET_PREFIX

Build

Tenant ID in Azure

Subscription ID in Azure

RG Name in Azure

RG Location in Azure

KEEP_RG

Not to check this if RG can be deleted

sandbox

Select NF Console Environment to spin the network and gateways in

get

Select an action to perform on the network in NF

DEMONET

Name to be used to create a network with

get

Select an action to perform on the gateway in NF Network

AZCPEGWx0xWESTUS

Name of NF Gateway generated in NF Console

create

Select an action to perform on the service in NF Network

AZCPEGWx0xWESTUS--10.20.10.5--22

Name of NF Service generated in NF Console

10.20.10.5

IP of NF Service App

22

IP of NF Service App

create

Select an action to perform on the appwan in NF Network

appwan-ssh-22

Name of NF APPWAN to be used in NF Console

private-gateway-name

Endpoint Name in Private Datacenter Gateway to be included in AppWan

client-name

Endpoint Name for Client to be included in AppWan

AZCPEGWx0xWESTUS--10.20.10.5--22

Service Name to be included in AppWan

westus

Azure Cloud DC Location where to deploy GW

10.20.10.0/24


Subnet CIDR in Azure Cloud DC Location where to deploy GW



To delete the resources

1. Run Jenkins job again by selecting on the pipeline created in the previous step. Click on "Build with Parameters"
2. Fill in the Azure Details (e.g. RG, Tenant Id, etc) and select the following:
 - a. NF Environment, e.g. production
 - b. NETWORK_ACTION - delete
 - c. NETWORK_NAME, e.g. DEMONET
 - d. GATEWAY_ACTION - delete

Pipeline View

**Jenkins**

Jenkins > NetFoundryDeploy2Cloud >

[Back to Dashboard](#)
[Status](#)
[Changes](#)
[Build with Parameters](#)
[Delete Pipeline](#)
[Configure](#)
[Full Stage View](#)
[Open Blue Ocean](#)
[Rename](#)
[Pipeline Syntax](#)

Build History [trend](#)
[Atom feed for all](#) [Atom feed for failures](#)

Pipeline NetFoundryDeploy2Cloud

This build requires parameters:

| | | |
|------------------------|--|--|
| AZURE_TENANT_ID | <input type="text" value="REDACTED"/> | Tenant ID in Azure |
| AZURE_SUBSCRIPTION_ID | <input type="text" value="REDACTED"/> | Subscription ID in Azure |
| RESOURCE_GROUP_NAME | <input type="text" value="REDACTED"/> | RG Name in Azure |
| RESOURCE_GROUP_LOC | <input type="text" value="centralus"/> | RG Location in Azure |
| | <input type="checkbox"/> KEEP_RG | Not to check this if RG can be deleted |
| ENVIRONMENT | <input type="text" value="sandbox"/> | Select NF Console Environment to spin the network and gateways in |
| NETWORK_ACTION | <input type="text" value="delete"/> | Selection an action to perform on the network in NF |
| NETWORK_NAME | <input type="text" value="DEMONET"/> | Name to be used to create a network with |
| GATEWAY_ACTION | <input type="text" value="delete"/> | Selection an action to perform on the gateway in NF Network |
| GATEWAY_NAME | <input type="text"/> | Name of NF Gateway generated in NF Console |
| SERVICE_ACTION | <input type="text" value="get"/> | Selection an action to perform on the service in NF Network |
| SERVICE_NAME | <input type="text"/> | Name of NF Service generated in NF Console |
| SERVICE_IP | <input type="text"/> | IP of NF Service App |
| SERVICE_PORT | <input type="text"/> | IP of NF Service App |
| APPWAN_ACTION | <input type="text" value="get"/> | Selection an action to perform on the appwan in NF Network |
| APPWAN_NAME | <input type="text"/> | Name of NF APPWAN to be used in NF Console |
| APPWAN_PRIVATE_GATEWAY | <input type="text"/> | Endpoint Name in Private Datacenter Gateway to be included in AppWan |
| APPWAN_PRIVATE_CLIENT | <input type="text"/> | Endpoint Name for Client to be included in AppWan |
| APPWAN_SERVICE | <input type="text"/> | Service Name to be included in AppWan |
| LOCATION | <input type="text" value="westus"/> | Azure Cloud DC Location where to deploy GW |
| SUBNET_PREFIX | <input type="text" value="10.20.10.0/24"/> | Subnet CIDR in Azure Cloud DC Location where to deploy GW |

Build

3. Done

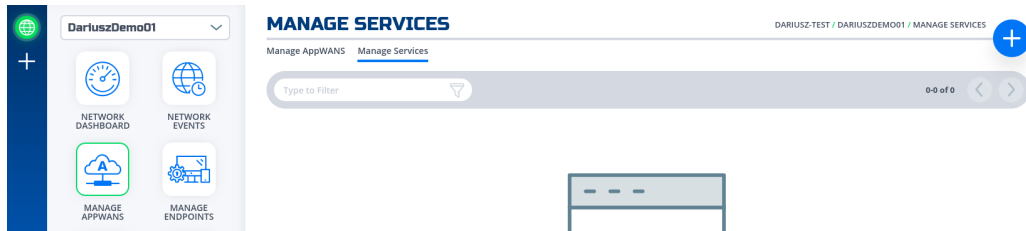
Create IP Host Service

This section will guide a user through the steps on how to create a NF Service.

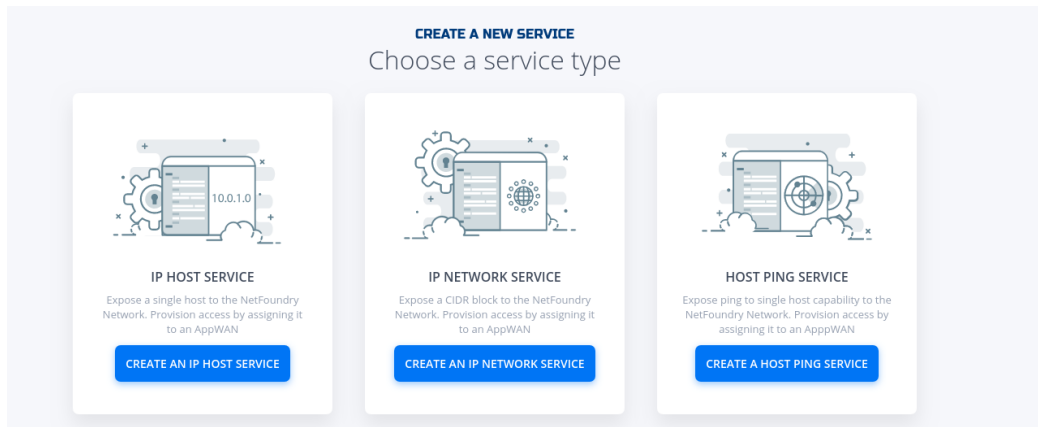


Console UI

1. Navigate to Manage Services Page under Manage Appwans
2. Click on + sign in the top right corner.



3. Click on "Create an IP Host Service"



4. Fill in the required information for SSH and click on "Create"

CREATE A NEW IP HOST SERVICE

Enter your service attributes

| | |
|---|----------------------|
| SERVICE NAME | REQUIRED |
| <input type="text" value="DemoServiceSsh"/> | |
| GATEWAY | REQUIRED |
| <input type="text" value="AzureDemo01"/> | |
| IP ADDRESS | REQUIRED |
| <input type="text" value="10.0.8.5"/> | |
| PORT/RANGE | REQUIRED |
| <input type="text" value="22"/> | |
| INTERCEPT IP ADDRESS | |
| <input type="text" value="10.0.8.5"/> | |
| INTERCEPT PORT/RANGE | |
| <input type="text" value="22"/> | |
| PROTOCOL TYPE | REQUIRED |
| <input type="text" value="TCP"/> | |
| ADVANCED OPTIONS | OPEN TO EDIT DETAILS |
| <input type="checkbox"/> | |
| ADVANCED OPTIONS | |
| <input type="button" value="CREATE"/> | |

5. If successfully, the service is green.

The screenshot displays the 'MANAGE SERVICES' interface. On the left, a sidebar contains a green status indicator and a '+' button. The main panel shows a table with one service, 'DemoServiceSsh', which is marked as successful with a green dot. The table columns are Service Name, Type, Protocol, IP Address, Intercept IP, and Port Range.

| Service Name | Type | Protocol | IP Address | Intercept IP | Port Range |
|----------------|---------|----------|------------|--------------|------------|
| DemoServiceSsh | IP Host | TCP | 10.0.8.5 | 10.0.8.5 | 22 - 22 |

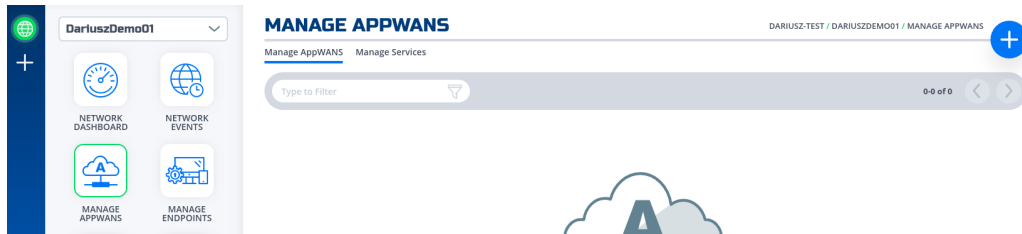
6. Done

Create AppWan

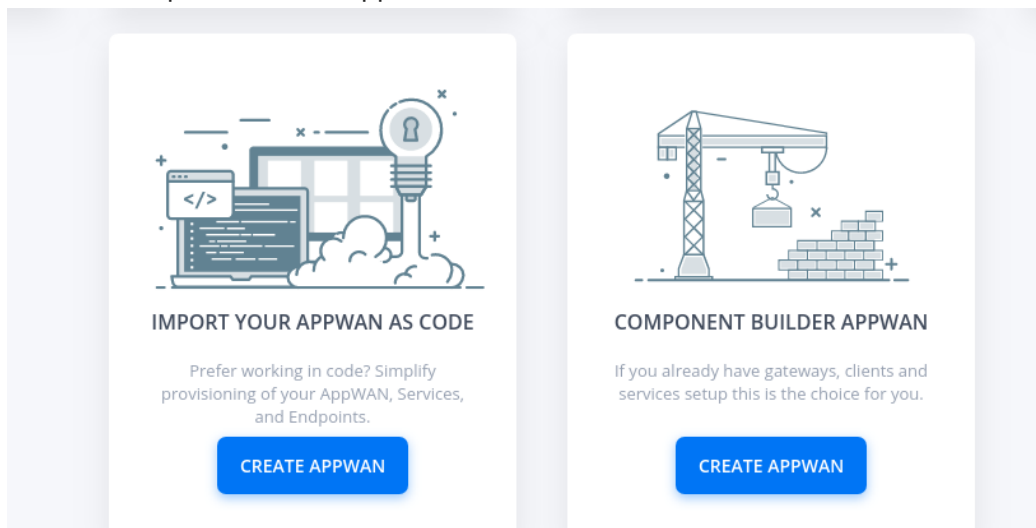
This section will guide a user through the steps on how to enable service connectivity to users by creating an appwan.



1. Navigate to Manage AppWANS Page under Manage Appwans
2. Click on + sign in the top right corner.



3. Click on "Component Builder Appwan"



4. Move the desired gateway (e.g. DemoGateway01) from "Available" Gateways to "Selected" Endpoints. Move the desired service (e.g. DemoServiceSsh) from "Available" to "Selected"

Services.

CREATE A NEW APPWAN

Choose from existing components, or add new ones

1 APPWAN NAME REQUIRED

DemoAppWan

2 ADD CLIENTS, GATEWAYS, OR ENDPOINT GROUPS

Search for Endpoints

AVAILABLE GROUPS ADD NEW +

AVAILABLE CLIENTS ADD NEW +

AVAILABLE GATEWAYS ADD NEW +

AzureDemo01

SELECTED ENDPOINTS

YourBranchGatewayName

3 ADD SERVICES

Search for a Service

AVAILABLE SERVICES ADD NEW +

SELECTED SERVICES

DemoServiceSsh

CREATE

5. Click on "Create".

YOUR APPWAN SUMMARY

Your AppWAN has been created! A network summary is below.

What's next? Finish connecting your network by registering new clients and gateways.

HINT **NEW CLIENTS** Share Client Registration Info  **HINT** **NEW GATEWAYS** Tap to Launch and Register 

- ## 1 APPWAN NAME

DemoAppWan

- ## 2 ENDPOINTS

CLIENTS

SHARE NEW CLIENTS

GATEWAYS

[REGISTER NEW GATEWAYS](#)

● YOURBRANCHGATEWAYNAME

- ### 3 SERVICES

SERVICE DEFINITIONS

● DemoServiceSsh 

- #### 4 ENDPOINT GROUPS

GROUPS

6. Done