



NetBrain® R 12.1

NetBrain Azure Quick Setup Guide

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1. Setup Azure API Access

1.1. Overview

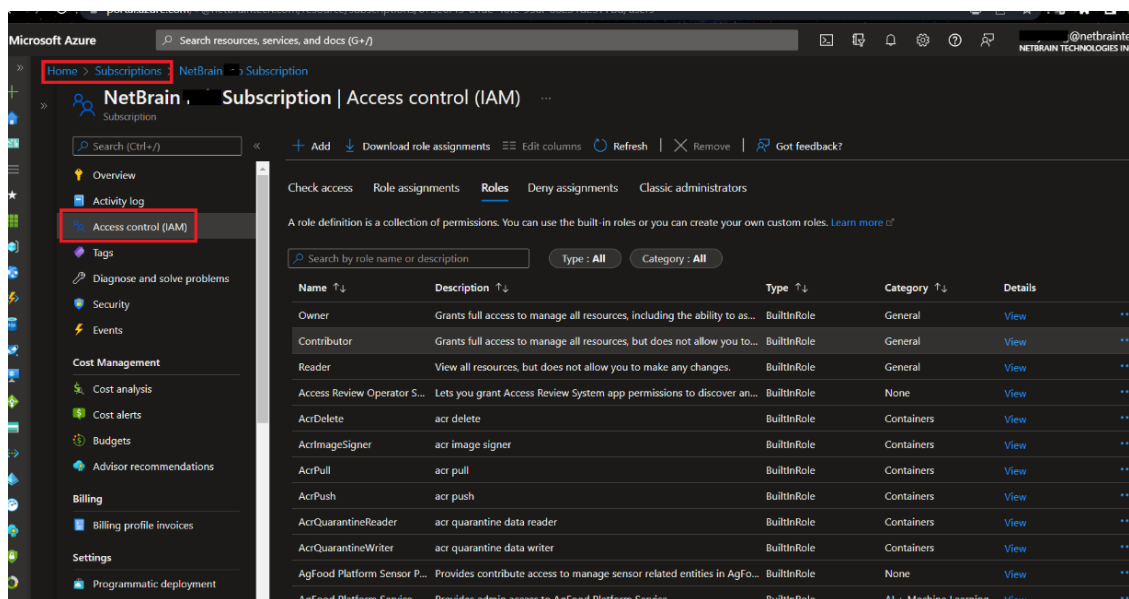
NetBrain accesses Azure through either Managed Identity or Service Principle and uses Rest APIs to retrieve the data from Azure. To enable the NetBrain IE system to retrieve the Azure data, you need to:

1. Create a Custom IAM Role
2. Access APIs (you can select option a or b)
 - a) Set Up VM Identity (for Managed Identity)
 - b) Register App (for Service Principle)
3. Assign Subscription Role
4. Set up API Server

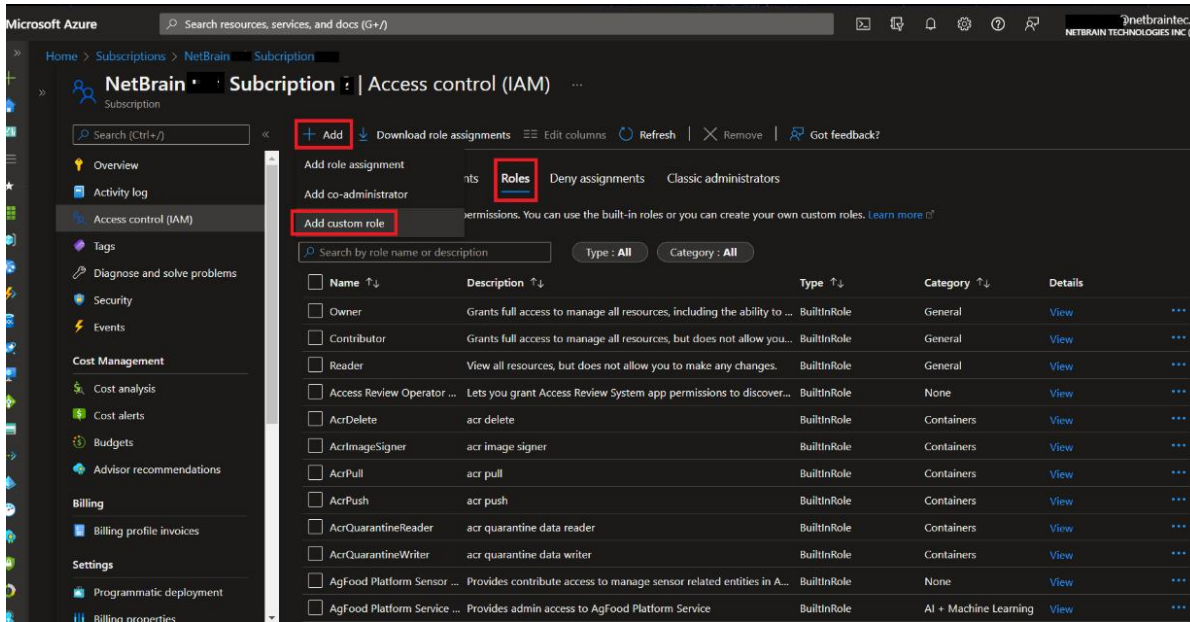
1.2. Create a Custom IAM Role

Azure provides role-based access control (RBAC) to manage access to Azure resources. Follow these steps to create a custom IAM (Identity and Access Management) role for the NetBrain IE system to access Azure APIs:

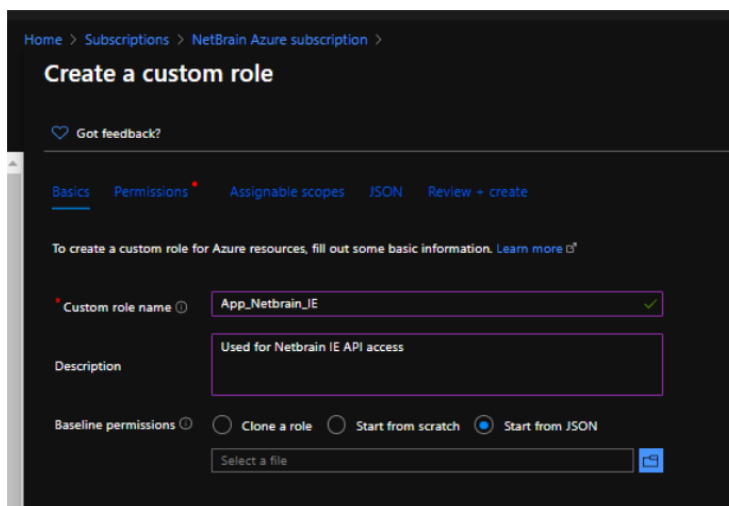
1. Go to **Access control (IAM)** under **Subscriptions** in Azure Portal.



- Go to **Roles** and click **+Add** and click **New custom role** to create a custom IAM role.



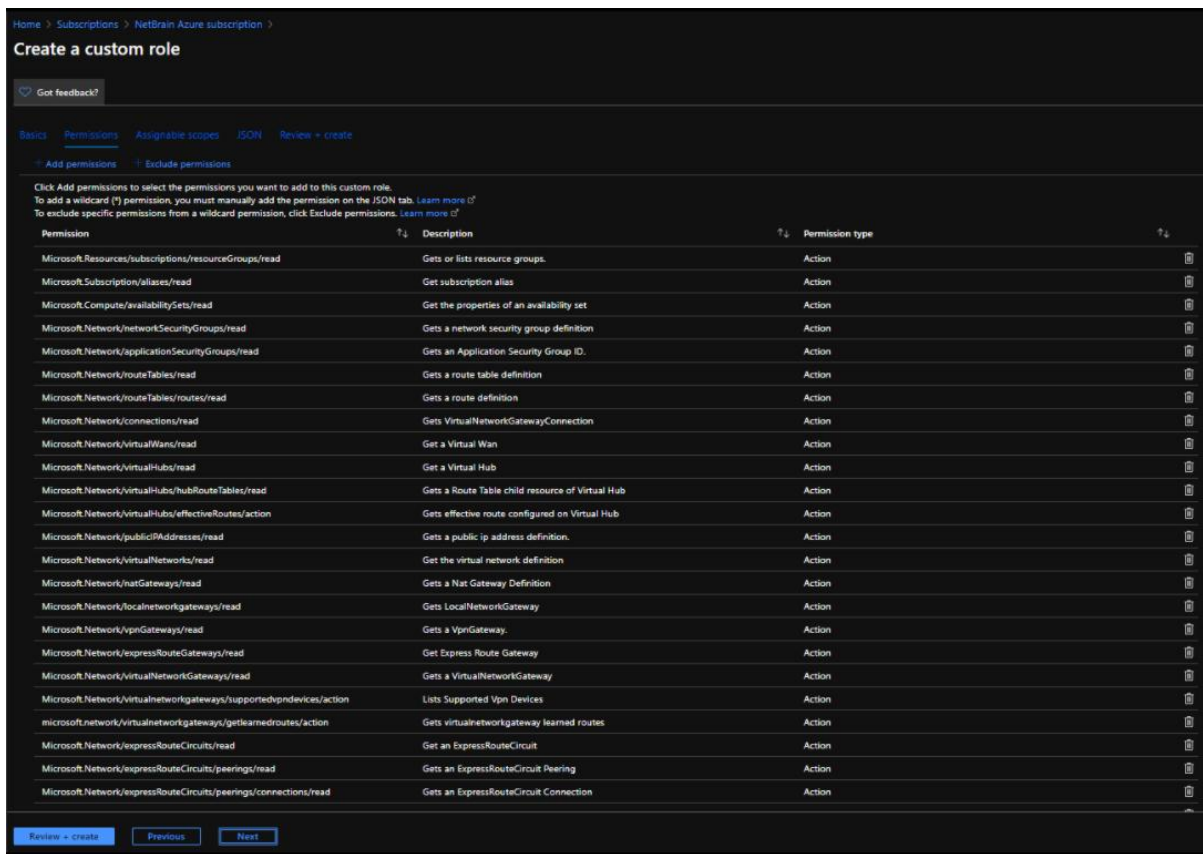
- Define **Basics** Configuration.



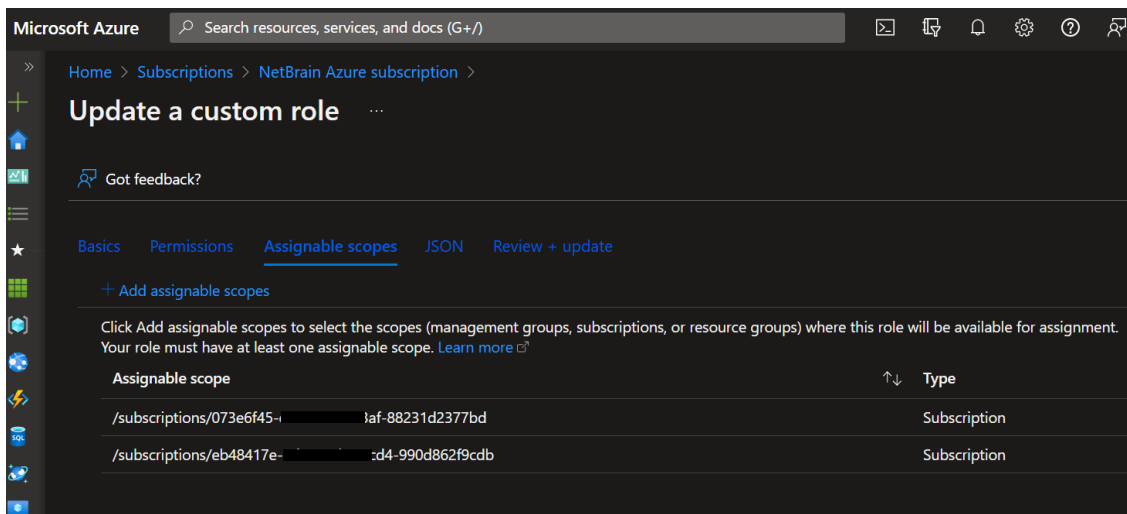
Select **Start from JSON** in the **Baseline permissions** field and import the JSON file below to customize the role with the minimal permissions required for NetBrain IE system discovery and data retrieval.

To get the latest JSON file, refer to NetBrain Online Help: [NetBrain Required Azure IAM Permissions](#)

- Review **Permissions**.



5. Select proper subscription or management groups as **Assignable Scopes**.



6. Review Custom Role in JSON Format. Finally, click **Create** button after reviewing the **Review + create** page.

NetBrain supports both **Managed Identity** and **Service Principal** types to access Azure APIs.

- If you select Managed Identity, follow the steps in [section 1.3](#);
- If you select Service Principal, follow the steps in [section 1.4](#).

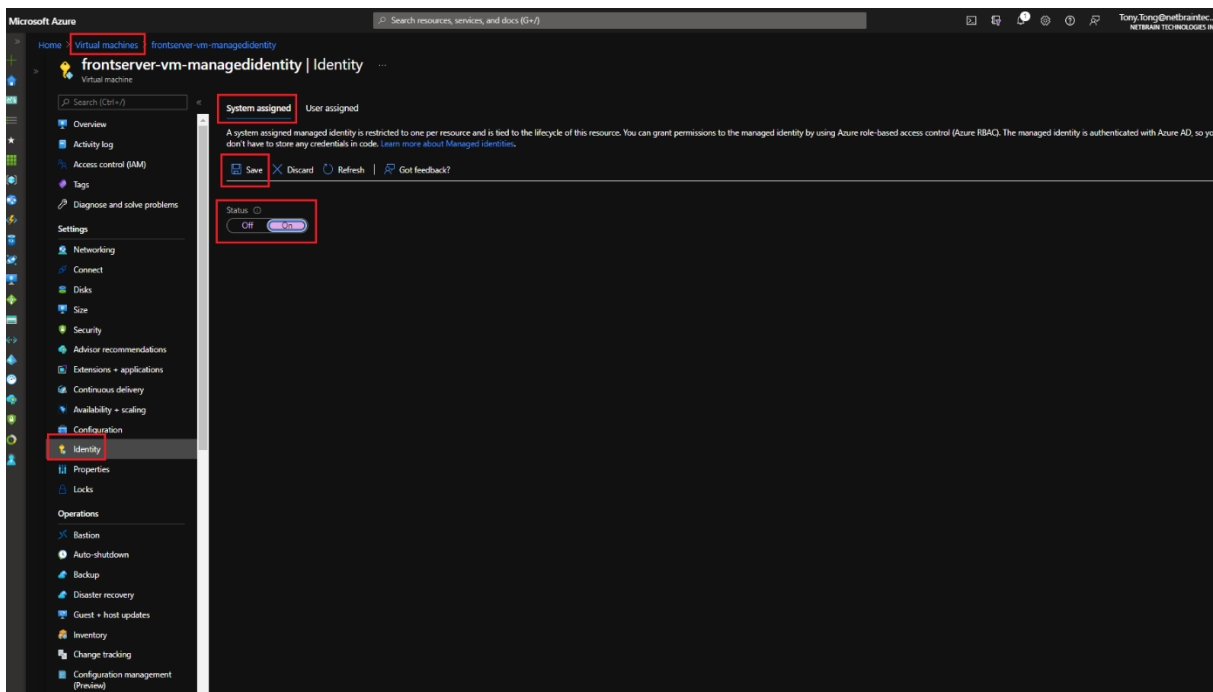
1.3. Access APIs With Managed Identity (Option 1)

1.3.1. Set Up VM Identity

NetBrain supports both Azure-system-assigned and user-assigned Identity for VM, which acts as an application server to access APIs. You only need to choose either one of the following methods below.

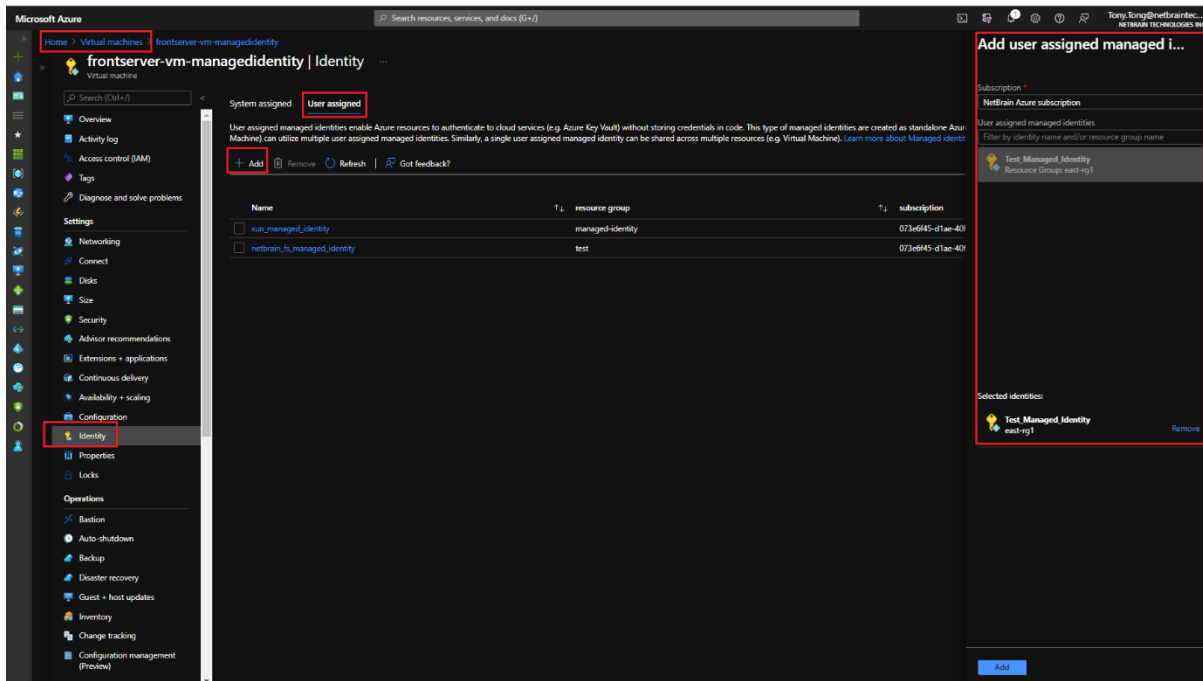
Set Up Azure-system-assigned Identity

1. Go to the **Identity** page of Virtual Machine, which will be used as a NetBrain server from Azure Portal.
2. Select **System assigned** menu, switch to **On** for **Status** and click the **Save** button.



Set Up User-assigned Identity

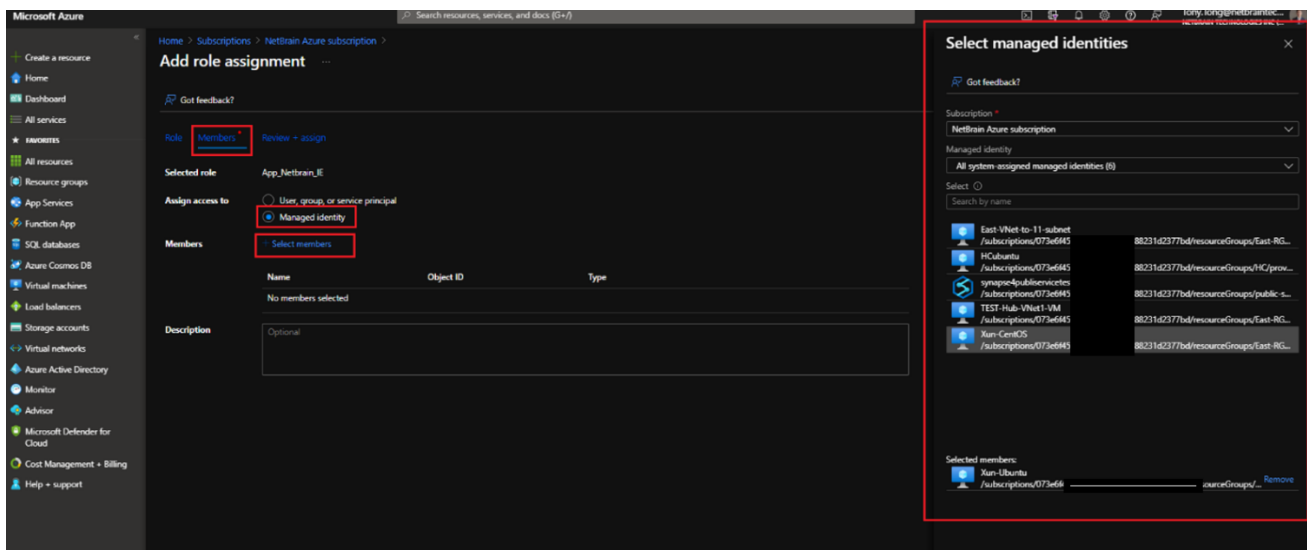
1. Go to the **Identity** page of Virtual Machine, which will be used as a NetBrain server from Azure Portal.
2. Select the **User assigned** menu and click **+ Add** button. Refer to [Azure's official guide](#) to create a managed identity and select it.



1.3.2. Assign Subscription Role

NetBrain supports both service principal and managed identity as role assignment types. Follow these steps to assign the previously created custom role to managed identity for the NetBrain IE system to access Azure APIs:

1. Go to **Access control (IAM)** within the subscription.
2. Select the previously created custom IAM role, add the new role assignment, and click **+ Select members** to select the previously created VM with managed identity for the NetBrain IE system.

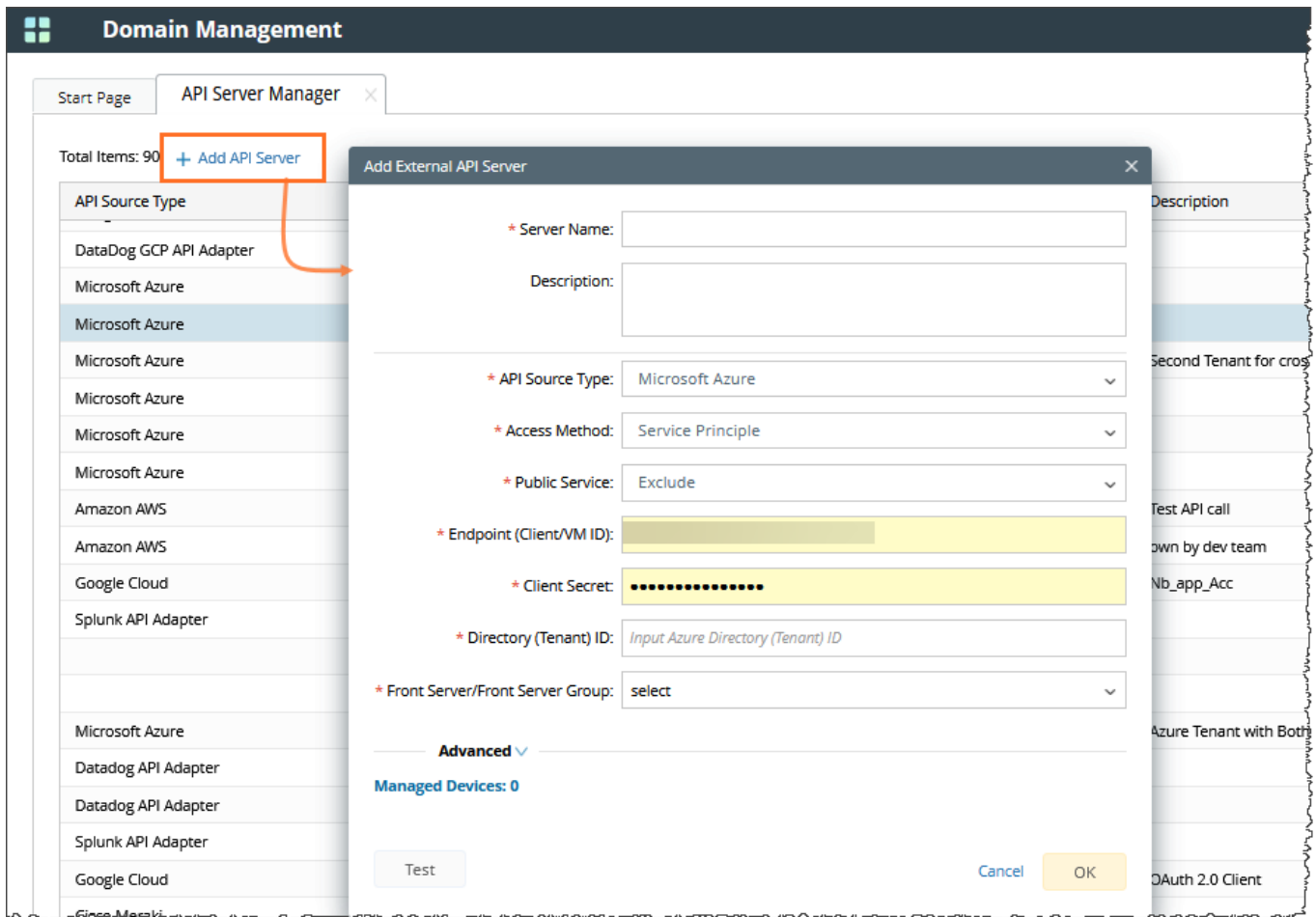


1.3.3. Set Up API Server

Note: Before setting up your API server, read NetBrain Requirements for API Server Setup first.

Follow these steps to set up a NetBrain API server:

1. Open the **Domain Management** page in the NetBrain IE System. Locate the Quick Access tab, select **API Server Manager**, then click **+ Add API Server** to initiate the addition of a new API server.



2. Add a new external API Server for Azure access.

Add External API Server

* Server Name:
App_NetBrain_IE

Description:
Fo App_NetBrain_IE

* API Source Type:
Microsoft Azure

* Access Method:
Managed Identity

* Public Service:
Include

* Endpoint (Client/VM ID):
s
m

* Directory (Tenant) ID:
e2

* Front Server/Front Server Group:
FS

Advanced

Managed Devices: 0

Test
Cancel
OK

- **Server Name:** a unique name.
- **Description:** an optional field to describe this server.
- **API Source Type:** select **Microsoft Azure**.
- **Access Method:** select **Managed Identity**.
- **Public Service:** Include or Exclude
- **Endpoint (Client/VM ID):** copy/paste the **VM ID** value from the JSON format data in Azure Virtual Machine (VM) portal.

Home

frontserver-vm-managedidentity

Virtual machine

Search (Cmd+/)

Connect Start Restart Stop Capture Delete Refresh

Advisor (1 of 1) Enable Backups on your Virtual Machines →

Essentials

Resource group (Move) : main

Status : Stop

Location : East

Subscription (Move) : Net

Subscription ID : 0734

Tags (Edit) : Click here to add tags

Properties Monitoring Capabilities (7) Recommendations (1) Tutorials

Virtual machine

Computer name : frontserver-vm-managedidentity

Health state : -

Operating system : Linux

Publisher : OpenLogic

Offer : CentOS

Plan : 7.9-gen2

Resource JSON

Resource ID : /subscriptions/0734e645-d1ae-487d-8231-62377bd/ressour

Copy to clipboard

JSON

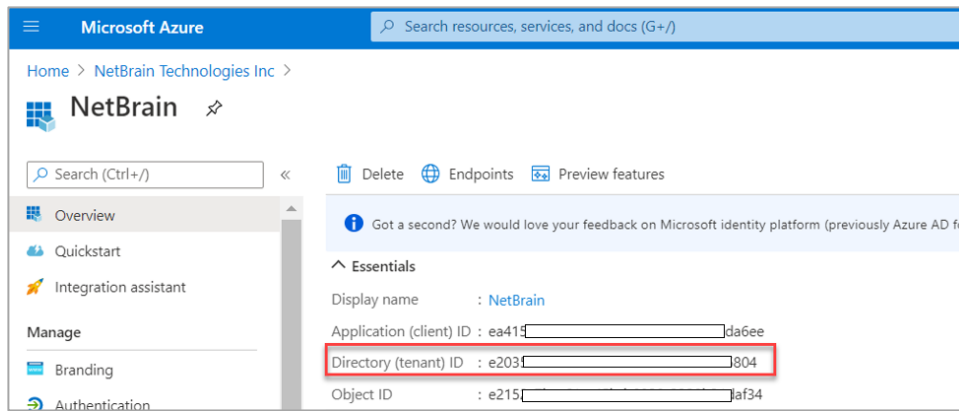
2017-03-30

```

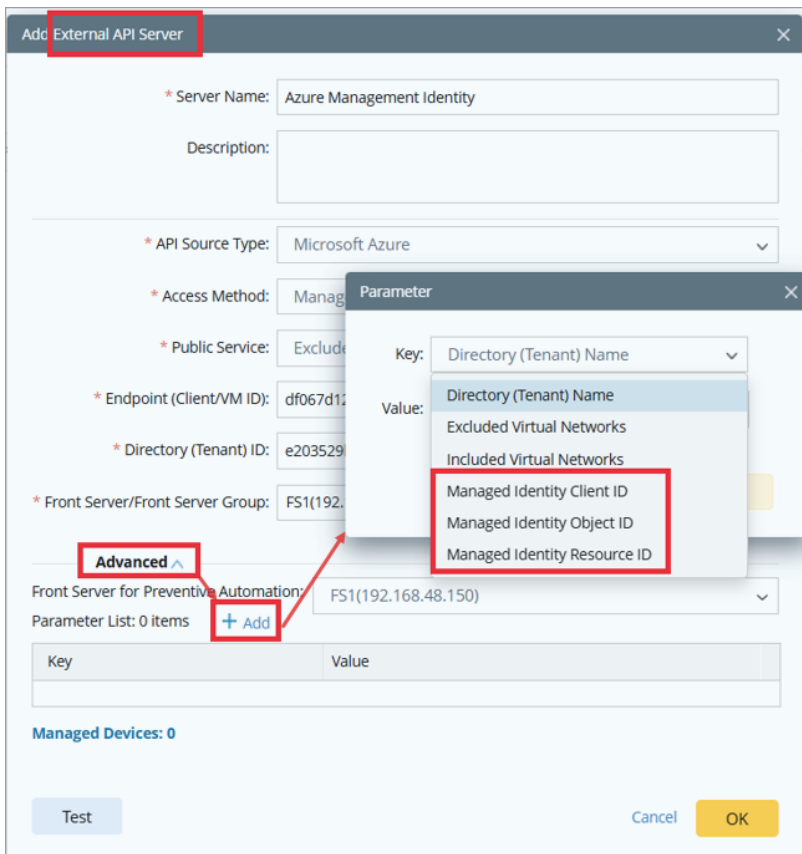
1 {
2   "name": "fr
3   "id": "/sub
4   "type": "Microsoft.Compute/virtualMachines",
5   "location": "eastus",
6   "properties": {
7     "vmId": "fe5
8     "hardwareProfile": {
9       "vmSize": "Standard_B4ms"
10    },
11    "storageProfile": {
12      "imageReference": {
13        "publisher": "OpenLogic",
14        "offer": "CentOS",
15        "sku": "7.9-gen2",
16        "version": "latest"
17      },
18      "osDisk": {
19        "osType": "Linux",
20        "name": "frontserver-vm-man
21        "createOption": "FromImage",
22        "caching": "ReadWrite",
23        "managedDisk": {
24          "id": "/subscriptions/07
25        }
26      },
27      "dataDisks": []

```

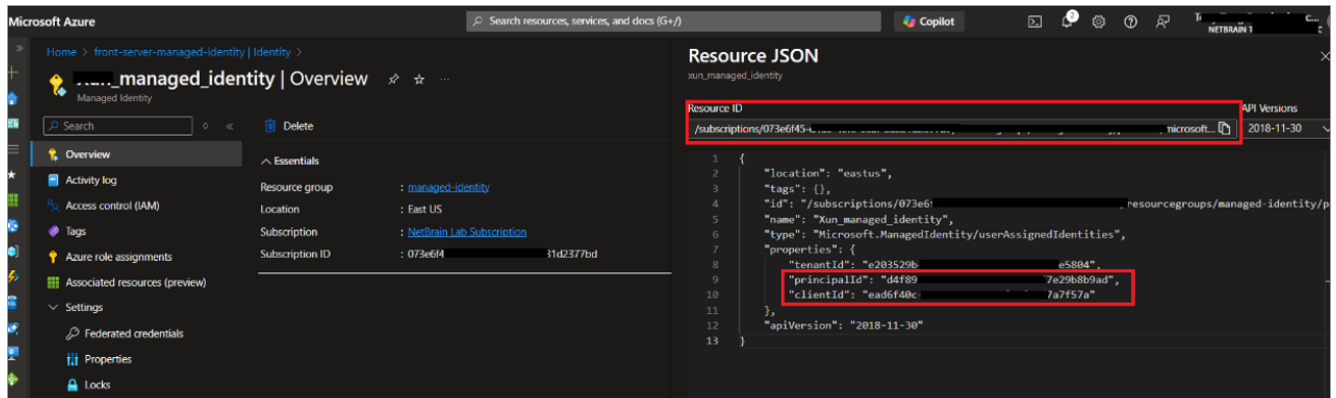
- **Directory (Tenant) ID:** copy/paste the Tenant ID.



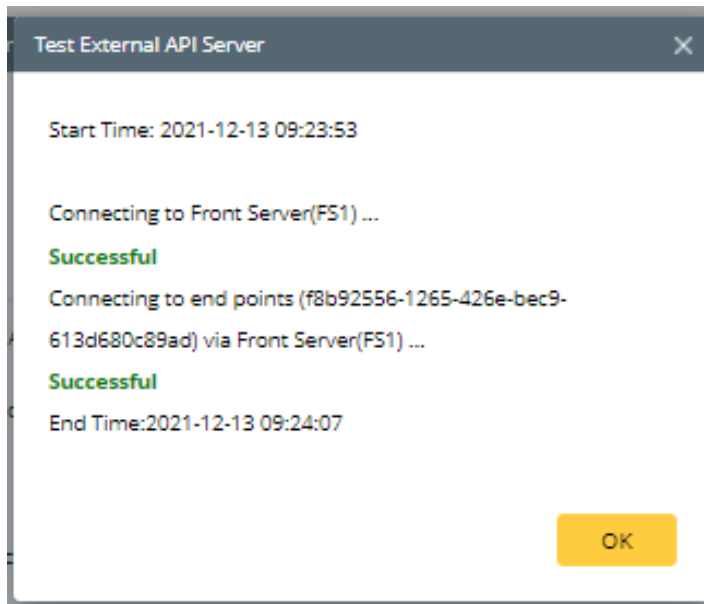
- **Front Server/Front Server Group:** select one front server VM with managed identity to access Azure.
- **Management Identity Client ID/Object ID/Resource ID:** In the **Advanced** settings, you can specify which VM management identity will be used for NetBrain IE discovery.
 - If the VM is configured with only a **system-assigned identity** or if the VM has only **one user-assigned identity** configured, no additional configuration is required.
 - If both identity types are configured and you prefer to use the **user-assigned identity** (note: Azure defaults to the **system-assigned identity**). To override the default **system-assigned identity** and use a **user-assigned identity**, you must explicitly define the **management identity** using one of the following parameters: **Client ID**, **Object ID**, and **Resource ID**.



- Find the management Client ID, Object ID(PrincipalId) or Resource ID from Json view of Azure Portal.



- Click **Test** to verify that this API server works.



Once the API server is successfully verified and saved, you can proceed to [Discover Azure resources](#).

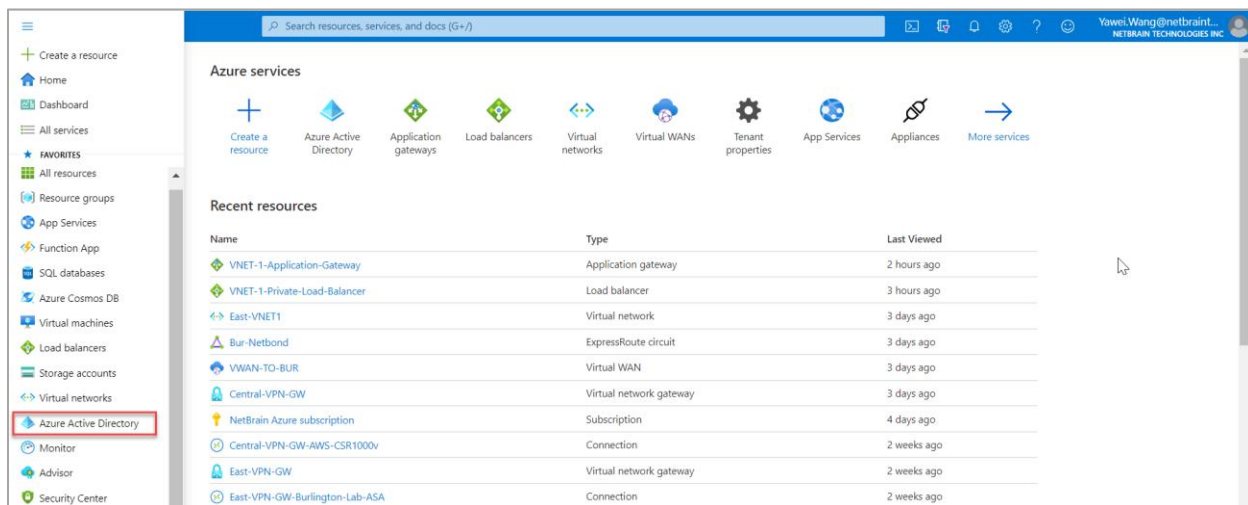
1.4. Access APIs With Service Principal (Option 2)

1.4.1. Register App

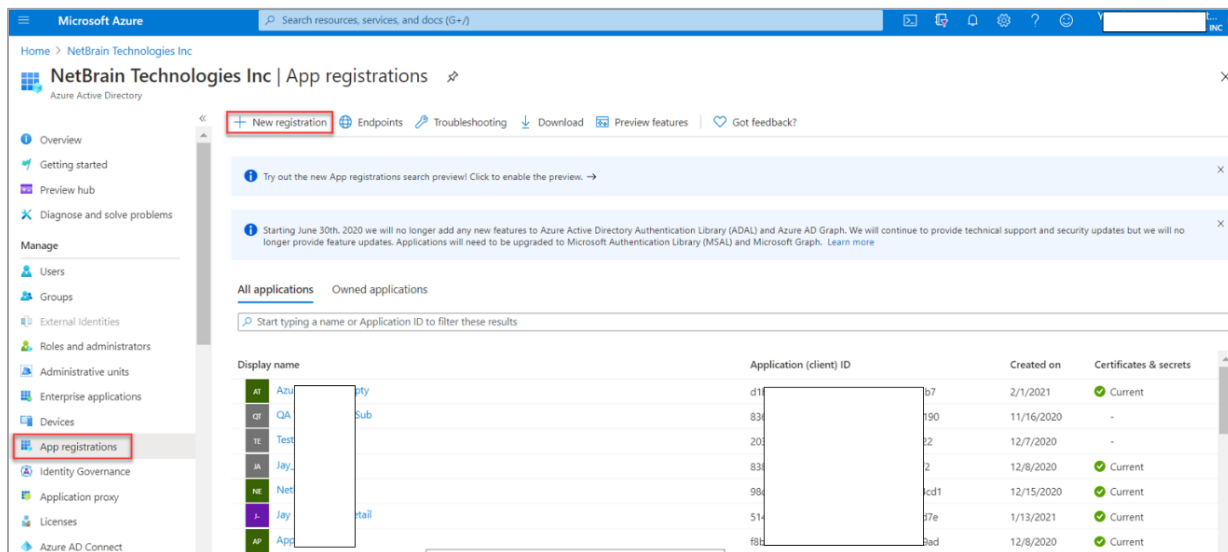
The Microsoft identity platform performs IAM only for registered applications. Therefore, an App must be registered in the Azure portal to establish a trusting relationship between NetBrain IE and Azure.

Follow these steps to register an App for the NetBrain IE system:

1. Go to **Azure Active Directory** in Azure Portal.



2. Go to **App registrations** and click **New registration**.



3. Define an App **name**, select the account type Accounts in this organizational directory only (Single tenant), and then click **register**.

Microsoft Azure

Search resources, services, and docs (G+)

Home > NetBrain Technologies Inc >

Register an application

* Name

The user-facing display name for this application (this can be changed later).

NetBrain

Supported account types

Who can use this application or access this API?

- ☒ Accounts in this organizational directory only (NetBrain Technologies Inc only - Single tenant)
- ☐ Accounts in any organizational directory (Any Azure AD directory - Multitenant)
- ☐ Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)
- ☐ Personal Microsoft accounts only

[Help me choose...](#)

Redirect URI (optional)

We'll return the authentication response to this URI after successfully authenticating the user. Providing this now is optional and it can be changed later, but a value is required for most authentication scenarios.

By proceeding, you agree to the [Microsoft Platform Policies](#)

[Register](#)

Note: NetBrain only fully supports the “Single Tenant” account type.

4. Go to the **Overview** page of the newly registered App. The **Application (Client) ID** and **Directory (Tenant) ID** information will be used to set up the NetBrain external API server later.

Search (Ctrl+/)

Overview

Quickstart

Integration assistant

Manage

- Branding
- Authentication
- Certificates & secrets
- Token configuration
- API permissions
- Expose an API
- App roles
- Owners
- Roles and administrators | Preview
- Manifest

Support + Troubleshooting

- Troubleshooting
- New support request

Delete Endpoints Preview features

Essentials

Display name : App_Netbrain_IE

Application (client) ID : f8b62...

Object ID : 34b7f...

Directory (tenant) ID : e2031...

Supported account types : Multiple organizations

Client credentials : 0 certificate, 2 secret

Redirect URIs : Add a Redirect URI

Application ID URI : Add an Application ID URI

Managed application in L : App_Netbrain_IE

Starting June 30th, 2020 we will no longer add any new features to Azure Active Directory Authentication Library (ADAL) and Azure AD Graph. We will continue to provide technical support and security updates but we will no longer provide feature updates. Applications will need to be upgraded to Microsoft Authentication Library (MSAL) and Microsoft Graph. [Learn more](#)

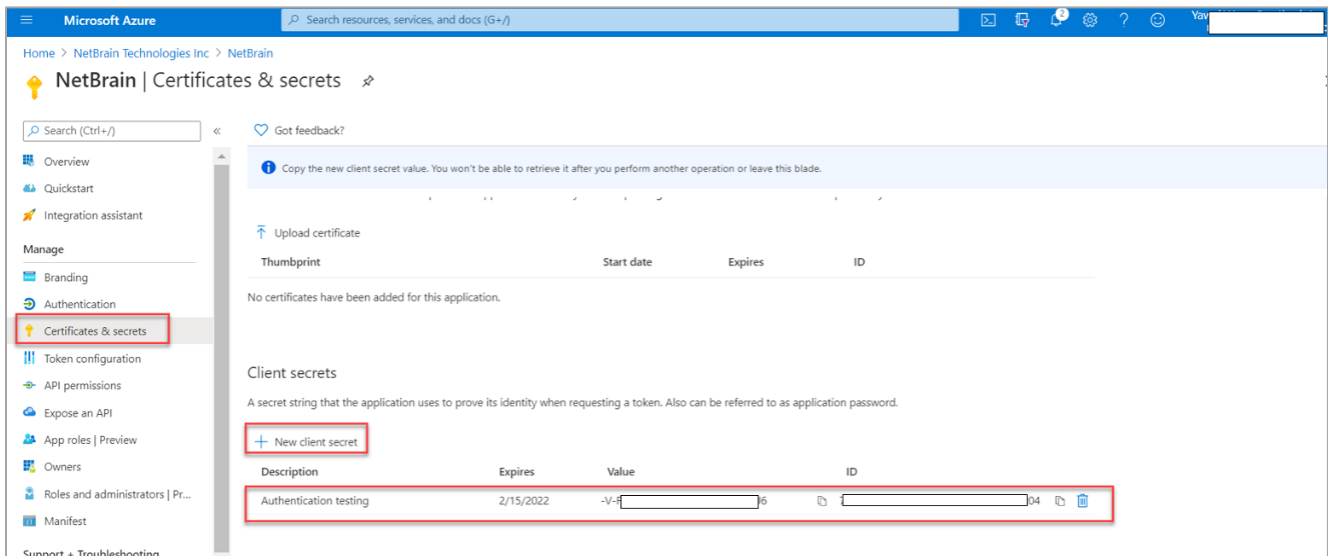
Starting November 9th, 2020 end users will no longer be able to grant consent to newly registered multitenant apps without verified publishers. [Add MPN ID to verify publisher](#)

[Get Started](#) [Documentation](#)

Build your application with the Microsoft identity platform

The Microsoft identity platform is an authentication service, open-source libraries, and application management tools. You can create modern, standards-based authentication solutions, access and protect APIs, and add sign-in for your users and customers. [Learn more](#)

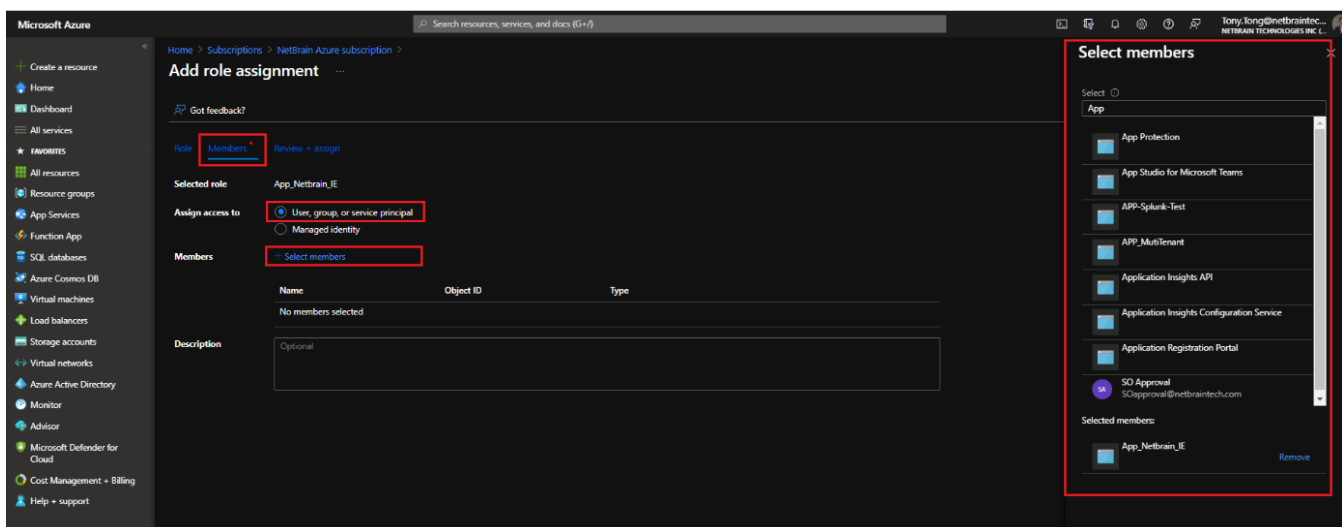
5. Go to **Certificate & secrets** within the created App to add a new **client secret**. The value of the newly created client secrets will be used to set up the NetBrain external API server later.



1.4.2. Assign Subscription Role

NetBrain supports both service principal and Managed identity as role assignment targets. Follow these steps to assign the previously created custom role to the service principal for the NetBrain IE system to access Azure APIs:

1. Go to **Access control (IAM)** within the subscription.
2. Select the previously created custom IAM role, add a new role assignment, and click **+ Select members** to select the previously registered Application for the NetBrain IE system.

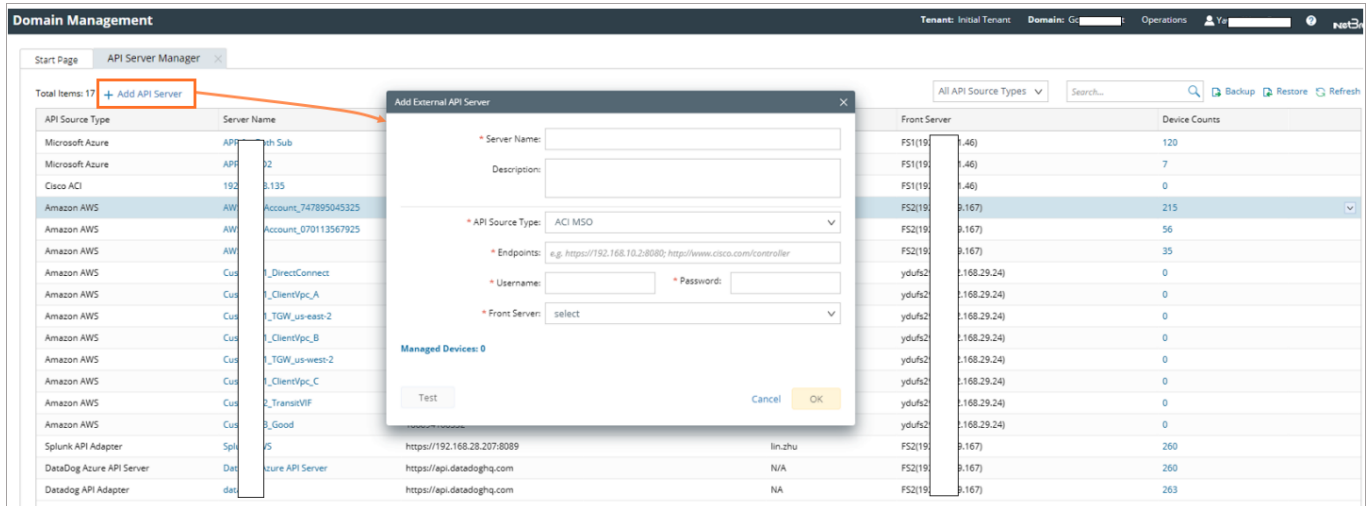


1.4.3. Set Up API Server

Note: Before setting up your API server, read NetBrain Requirements for API Server Setup first.

Once you have completed the steps above, follow these steps to set up a NetBrain API Server:

1. Open the **Domain Management** page of the NetBrain IE system, select **Operations > Discover Settings > API Server Manager** from the quick access tab, and click **Add API server**.



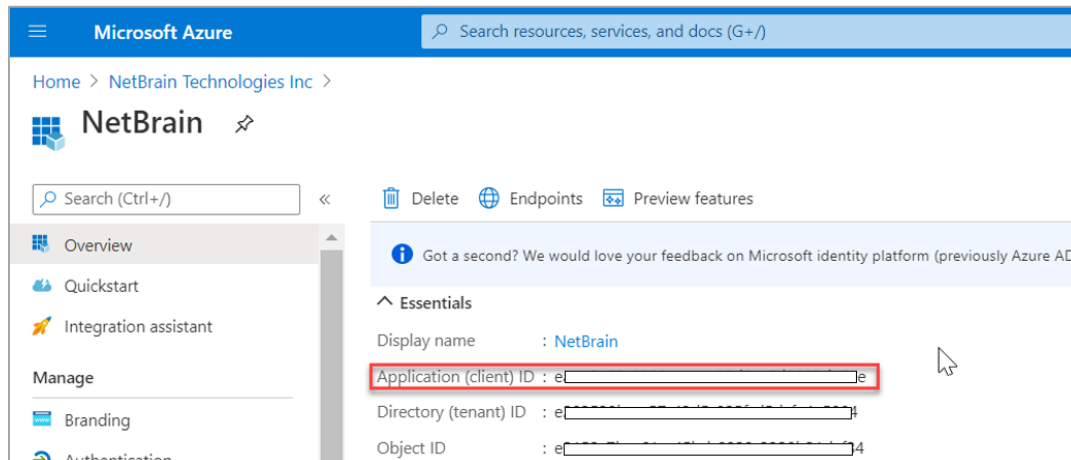
2. Add a new external API Server for Azure access.

The 'Edit External API Server' modal window is shown with the following configuration:

- Server Name:** App_NetBrain_JE
- Description:** For App_NetBrain_JE
- API Source Type:** Microsoft Azure
- Access Method:** Service Principle
- Endpoint (Client/VM ID):** e2d8
- Client Secret:** *****
- Directory (Tenant ID):** e2d4
- Front Server:** F5

The 'Advanced' section is expanded, showing 'Managed Devices: 113'. At the bottom, there are buttons for 'Test', 'Cancel', and 'OK'.

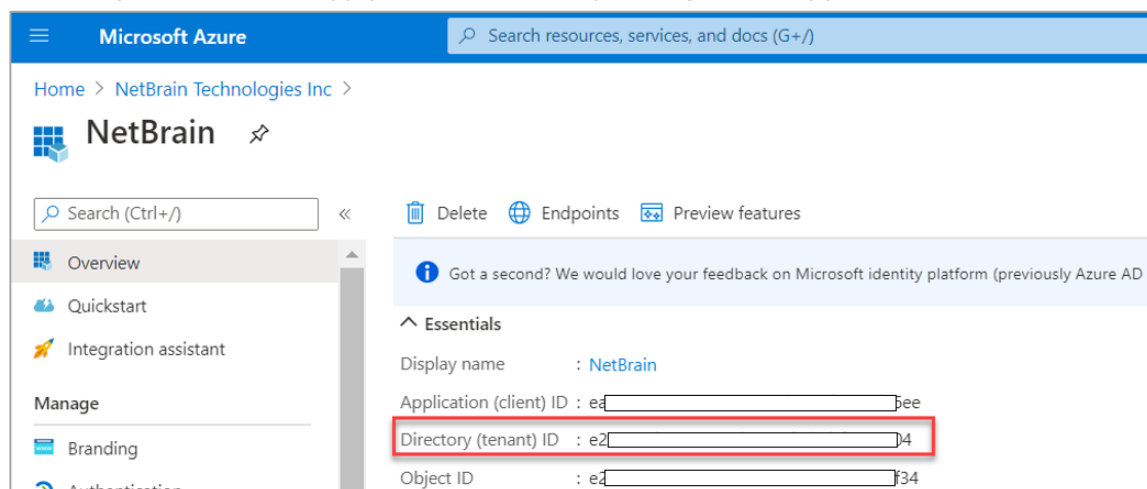
- **Server Name:** a unique name.
- **Description:** an optional field to describe this server.
- **API Source Type:** select **Microsoft Azure**.
- **Access Method:** select **Service Principle**.
- **Endpoint (Client/VM ID):** copy/paste the ID from your registered App.



- **Client Secret:** copy/paste the value from created client secret within your registered App.

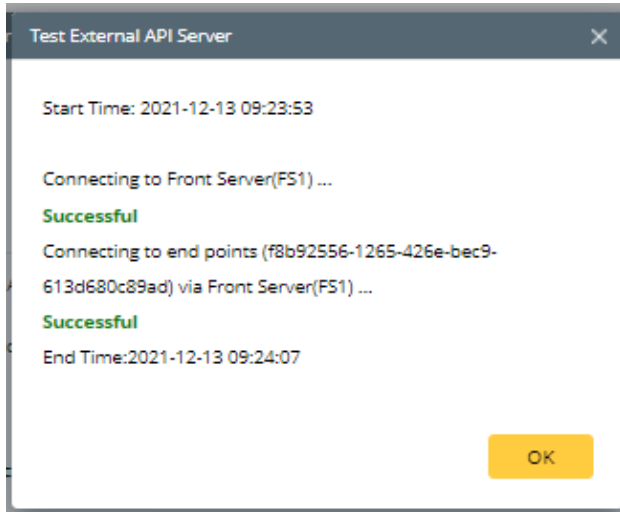


- **Directory (Tenant) ID:** copy/paste the ID from your registered App.



- **Front Server:** select one front server which can access Azure.

3. Click **Test** to verify that the API server works.

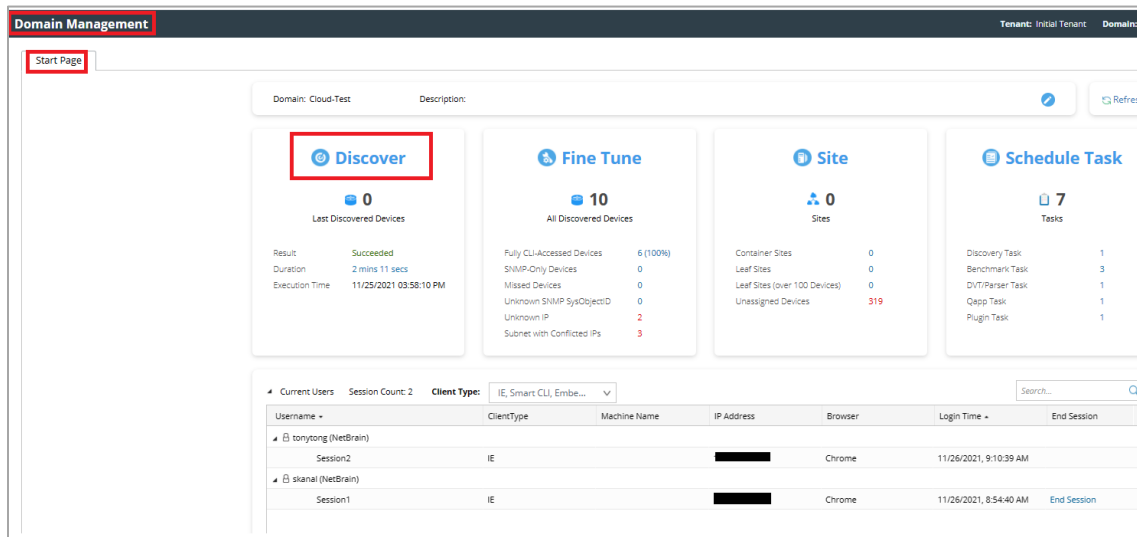


Once the API server is successfully verified and saved, you can proceed to [Discover Azure resources](#).

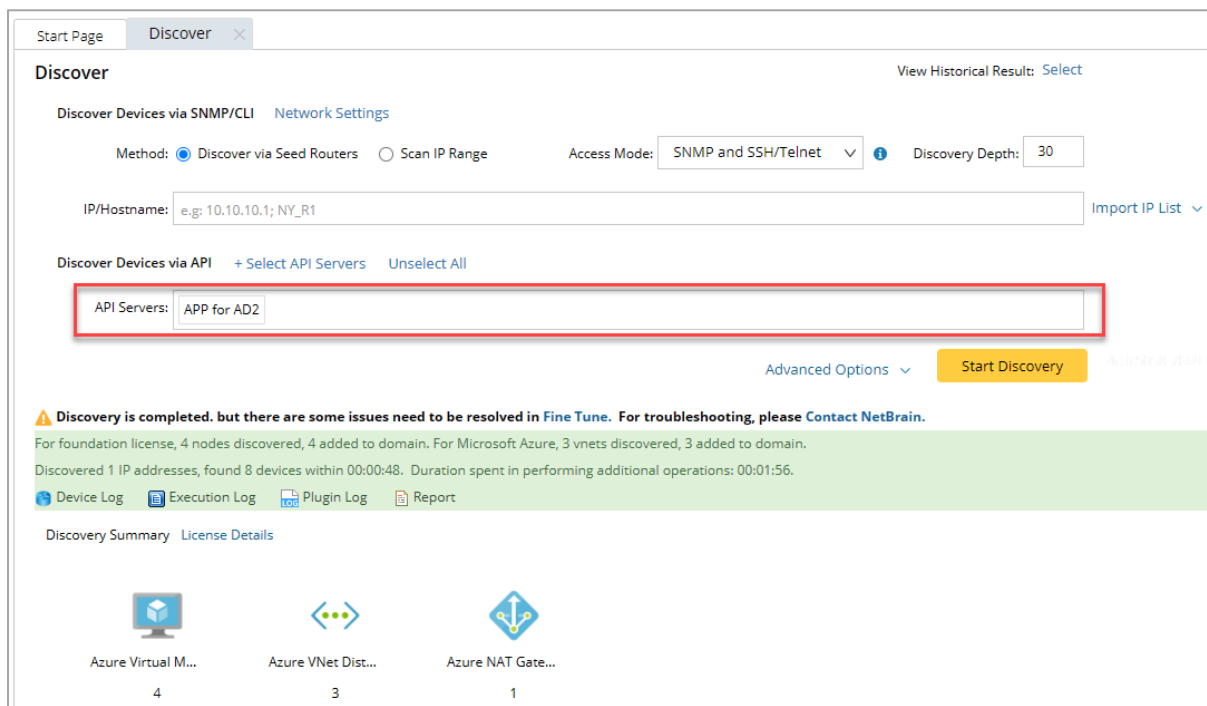
2. Discover Azure Resources

Follow these steps to discover Azure networking resources via APIs:

1. Log in to your NetBrain IE system.
2. Click the **Discover** link from the **Domain Management** page.



3. Click **+ Select API Servers** and select the Azure API Server you just created.
4. Click **Start Discovery** to start the Azure discovery. Run the discovery task manually or schedule a discovery task to discover Azure resources.



5. Wait till the discovery finishes. The number of discovered objects will be displayed.

Domain Management

Tenant: Initial Tenant Dom

Start Page Discover

Discover

View Historical Result: 11/19/2021, 2:00:29 PM

Discover

Discover Devices via SNMP/CLI Network Settings

Method: Discover via Seed Routers Scan IP Range

Access Mode: SNMP and SSH/Telnet

Discovery Depth: 0

IP/Hostname: e.g. 10.10.10.1; NY_R1

Import IP List

Discover Devices via API Select API Servers Unselect All

API Servers: 03-Azure Tenant with Two Subs 04-Azure Tenant for CrossTenant Test

Advanced Options

Start Discovery

Discovery task is completed! but there are some issues need to be resolved in Fine Tune. For troubleshooting, please Contact NetBrain.

For foundation license, 8 nodes discovered, 8 added to domain. For Microsoft Azure, 41 vnets discovered, 41 added to domain.

Discovered 2 IP addresses, found 144 devices within 00:02:42. Duration spent in performing additional operations: 00:02:54.

[Device Log](#)
[Execution Log](#)
[Plugin Log](#)
[Report](#)

Discovery Summary License Details

Azure Virtual M...

61

Azure VNet Dist...

41

Azure VPN Gate...

2

Azure ExpressR...

2

Azure NAT Gate...

8

Azure Firewall

2

Azure Load Bela...

10

Azure Virtual Hub

4

Azure Applicatio...

2

Azure MSEE

2

Azure Virtual Ne...

10

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3. Auto-Update and Enrich Azure Data

The discovery process only retrieves the basic data of your Azure network and builds L3 topology. After the discovery, you need to set up a NetBrain benchmark task to retrieve all data, including visual spaces and data views.

To create a benchmark for Azure resources, complete the following steps.

1. On the Start Page, click the **Schedule Task** link.
2. On the **Schedule Discovery/Benchmark** tab, click **Add Benchmark Task**.
3. On the **Frequency** tab, define the task frequency.
4. On the **Device Scope** tab, check the **Select external API servers to retrieve data** check box and select the API server for Azure.

Edit Benchmark Task

Task Name: Azure Retrieve Basic Info Description:

Frequency **Device Scope** Retrieve Live Data CLI Commands Additional Operations after Benchmark Plugins Summary

☐ Select Device

☐ All Devices ☐ Device Group ☐ Site

Load Balancer(1)
Router(26)
End System(157)
Firewall(10)
Cloud(12)
L3 Switch(8)

☒ Select external API servers to retrieve data of SDN nodes

Total Items: 5 All API Source Types Search...

<input type="checkbox"/>	API Source Type	Server Name	EndPoints	Description
<input checked="" type="checkbox"/>	Microsoft Azure	APP for Both Sub	85914d98-0e74-495f-98...	
<input checked="" type="checkbox"/>	Microsoft Azure	APP for AD2	c6afdece-c96f-4924-82b...	
<input type="checkbox"/>	Amazon AWS	AWS_Lab_Account_7478...	747895045325	The Lab account ...
<input type="checkbox"/>	Amazon AWS	AWS_Lab_Account_0701...	070113567925	
<input type="checkbox"/>	Amazon AWS	AWS Lab	041444721655	

Exclude Device Groups: <Please Select>

Cancel Submit

Note: It's highly recommended to re-use the "Basic System Benchmark" with a full benchmark task to ensure all Azure-connected physical or virtual devices are selected within the device scope.

5. On the **Retrieve Live Data** tab, select the **Microsoft Azure Basic Data** check box, keep the default selected NCT tables as they are, and select **BGP Advertised Route Table**.

The screenshot shows the 'Edit Benchmark Task' window with the 'Retrieve Live Data' tab selected. The 'Task Name' is 'Azure Retrieve Basic Info' and the 'Description' is empty. The 'Frequency' tab is also visible. The 'Stop retrieving after' section shows 'Hours' as 0 and 'Minutes' as 0. The 'NCT Tables' list includes 'Basic Data' (unchecked), 'Ruckus SmartZone' (checked), 'Basic Data' (unchecked), 'Microsoft Azure' (checked), 'Basic Data' (checked), 'Big Switch' (checked), 'Basic Data' (unchecked), 'Cisco Meraki' (checked), 'Basic Data' (unchecked), 'Cisco FMC' (checked), 'Basic Data' (unchecked), 'AudioCodes API' (checked), 'Basic Data' (unchecked), 'CheckPoint R80 API' (checked), 'Basic Data' (unchecked), and 'CloudGenix SD-WAN' (checked). The 'Basic Data' checkbox under 'Microsoft Azure' is selected. The 'Cancel' and 'Submit' buttons are at the bottom right.

6. On the **Additional Operation After Benchmark** tab, select the check boxes for:
- Update MPLS Cloud
 - Update Public Cloud (Recalculate Azure Virtual Route Table)

- Update Build Topology

Task Name: Basic System Benchmark Description: Default system benchmark task

Frequency Device Scope Retrieve Live Data CLI Commands **Additional Operations after Benchmark** Plugins Summary

Update MPLS Cloud

Enable	Operation Name
<input checked="" type="checkbox"/>	Recalculate Cloud
<input checked="" type="checkbox"/>	Recalculate Cloud NCT

Update Public Cloud

Enable	Operation Name
<input checked="" type="checkbox"/>	Recalculate AWS Virtual Route Table
<input checked="" type="checkbox"/>	Recalculate Azure Virtual Route Table
<input checked="" type="checkbox"/>	Recalculate Google Cloud Virtual Route Table

Build Topology

Enable	Operation Name
<input checked="" type="checkbox"/>	IPv4 L3 Topology
<input checked="" type="checkbox"/>	IPv6 L3 Topology
<input checked="" type="checkbox"/>	L2 Topology
<input checked="" type="checkbox"/>	L3 VPN Tunnel

Cancel Submit

7. Click **Submit**.

8. Trigger the benchmark task by clicking **Run Now**.

Domain Management

Tenant: Initial Tenant Domain: Cloud-Test skanal

Start Page Discover Schedule Task

Schedule Discovery/Benchmark Schedule Data View Template/Parser Schedule Qapp Schedule Plugin Schedule Platform Validation

+ Add Benchmark Task + Add Discovery Task Refresh

Enabl...	Task Name	Type	Last Run Time	Duration	Last Result	Current Status	Next Run Time	Device Scope	Frequency	Author	
<input checked="" type="checkbox"/>	Basic System Benchmark	Benchmark Task	3/15/2022, 7:07:26 PM	49 mins 20 secs	Succeeded with warnings	Idle		All Devices(03-App_Net...	Once	NetBrain	
<input checked="" type="checkbox"/>	Scheduled System Discovery	Discovery Task						All Live Network	Once	NetBrain	Edit
<input type="checkbox"/>	benchmark	Benchmark Task	1/25/2022, 12:18:35 AM	2 mins 5 secs	Manually Stopped	Idle		All Devices(03-App_Net...	Once	tonytong	Run Now
<input checked="" type="checkbox"/>	Jay Test - Azure Topo	Benchmark Task	1/25/2022, 7:06:42 PM	6 mins 10 secs	Succeeded	Idle			Once	jwei	View Result
<input checked="" type="checkbox"/>	build_GCP_topo	Benchmark Task	3/8/2022, 11:06:26 AM	3 mins 50 secs	Succeeded with warnings	Idle		03-App_NetBrain_IE07...	Once	admin	Delete

9. Open the network tree and select **Azure** in the **Category** field to view the Azure resource. Select **Network View** in the View field.

netBrain Search for device, configuration text...

Network

Category View

Azure Network View

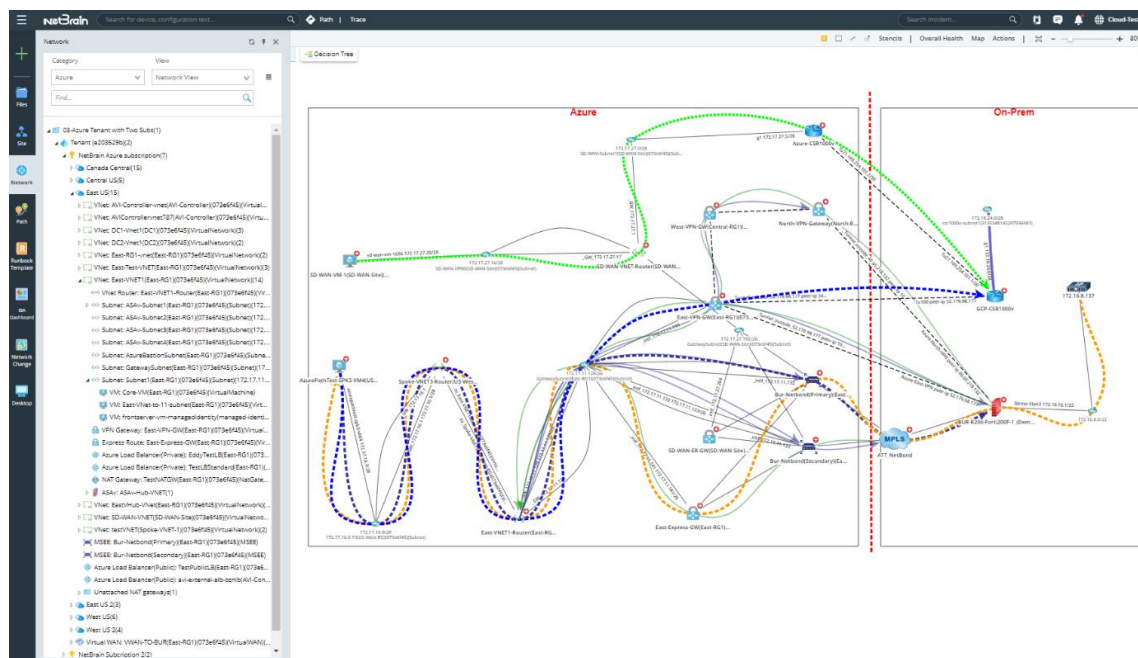
Built-in

- AWS
- Azure
- BigSwitch
- Cisco ACI
- ESXi
- Google Cloud
- MERAKI
- NSX-V
- Physical Network

Net(AVI-Controller)(073e6f45)(VirtualNet...

VNet: AVIControllervnet787(AVI-Controller)(073e6f45)(VirtualN...

All Azure resources discovered are displayed on the network tree. In addition, you can click a resource to open its context map.



4. Appendix

4.1. NetBrain Requirements for API Server Setup

- The minimum resource unit for an API Server scope is a subscription that includes all the resources under it. Therefore, NetBrain does not recommend separating resources under one subscription to a different API Server.
- The API Server is associated with an AD Tenant. Use IAM to control the subscription level of resources API discovery. If you have multiple AD Tenants, set up at least one API Server for each AD Tenant.
- NetBrain does not retrieve tenant details (including tenant name) using Azure Management APIs but instead creates a random tenant name. However, as below, you can manually define your Tenant Name in the API server manager:

The screenshot shows the 'Add External API Server' dialog box. It has a 'Parameter' tab. The main form has fields for 'Key' (set to 'Directory (Tenant) Name'), 'Value' (empty), 'Endpoint (Application/Client ID)' (with a dropdown), 'Client Secret' (masked), 'Directory (Tenant) ID' (with a dropdown), and 'Front Server' (with a dropdown). Below these is an 'Advanced' section with a '+ Add' button highlighted by a red box and a red arrow. The 'Parameter List' shows 0 items. At the bottom, there are 'Test', 'Cancel', and 'OK' buttons.

- To collect data from Azure successfully, NetBrain Front Server must have access to ***.core.windows.net**, ***.azure.com**, ***.microsoft.com**, and ***.microsoftonline.com**.

4.2.NetBrain Required Azure IAM Permissions

```
{
  "properties": {
    "roleName": "Role_App_Netbrain_IE",
    "description": "Used for Netbrain IE API access. /action permissions are used due
to Azure design for some processes like downloading some tables which are generated at
run-time.",
    "assignableScopes": [
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      "/subscriptions/modifytoyoursubscription2"
    ]
  },
  "permissions": [
    {
      "actions": [
        "Microsoft.Resources/tenants/*/read",
        "Microsoft.Resources/subscriptions/*/read",
        "Microsoft.Subscription/*/read",
        "Microsoft.Network/*/read",
        "Microsoft.Compute/*/read",
        "Microsoft.Insights/Metrics/*/Read",
        "Microsoft.DocumentDB/databaseAccounts/*/Read",
        "Microsoft.DBforMariaDB/servers/*/Read",
        "Microsoft.DBforMySQL/servers/*/Read",
        "Microsoft.DBforPostgreSQL/servers/*/Read",
        "Microsoft.Sql/servers/*/Read",
        "Microsoft.Storage/storageAccounts/*/read",
        "Microsoft.CostManagement/*/read",
        "PaloAltoNetworks.Cloudngfw/*/read",
        "Microsoft.ResourceHealth/*/read"

        "Microsoft.Network/applicationGateways/backendhealth/action",
        "Microsoft.Network/applicationGateways/getBackendHealthOnDemand/action",
        "Microsoft.Network/applicationGateways/effectiveNetworkSecurityGroups/action",
        "Microsoft.Network/applicationGateways/effectiveRouteTable/action",
        "Microsoft.Network/networkInterfaces/effectiveRouteTable/action",
        "Microsoft.Network/networkInterfaces/effectiveNetworkSecurityGroups/action",
        "Microsoft.Network/virtualHubs/effectiveRoutes/action",
        "Microsoft.Network/virtualNetworkGateways/getadvertisedroutes/action",
        "Microsoft.Network/virtualNetworkGateways/getbgppeerstatus/action",
        "Microsoft.Network/virtualNetworkGateways/getlearnedroutes/action",
        "Microsoft.Network/virtualNetworkGateways/supportedvpndevices/action",
        "Microsoft.Network/virtualwans/vpnconfiguration/action",
        "Microsoft.Network/vpnGateways/getLearnedRoutes/action",
        "Microsoft.Network/vpnGateways/getAdvertisedRoutes/action",
        "Microsoft.Network/virtualNetworkGateways/read",
        "Microsoft.Network/virtualHubs/bgpConnections/advertisedRoutes/action",
        "Microsoft.Network/virtualHubs/bgpConnections/learnedRoutes/action"
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      "notActions": [],
      "dataActions": [],
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    }
  ]
}
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