IE

NetBrain® Integrated Edition 8.0

Embedded Map Development Guide (SSO)

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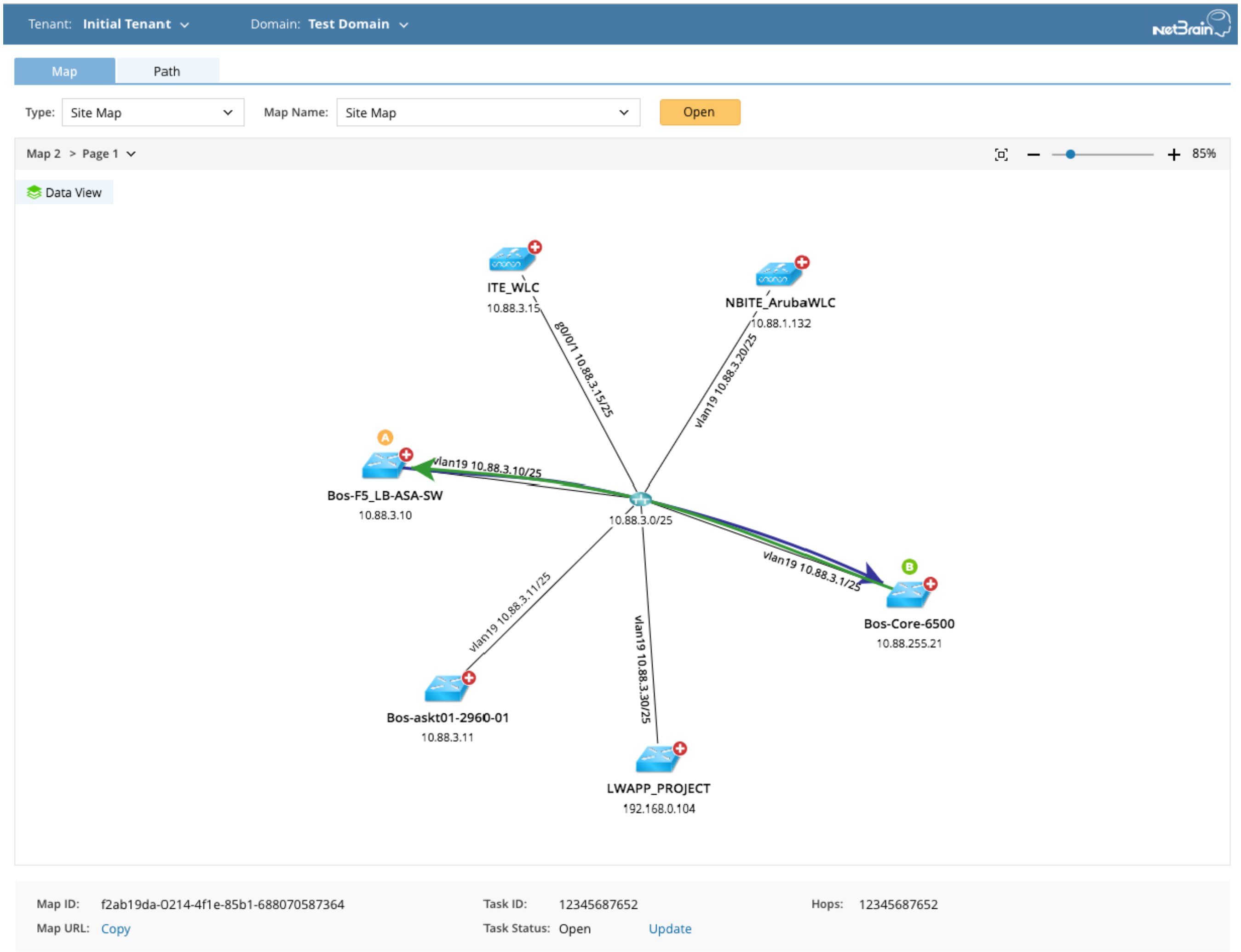
Contents

1. Introduction

NetBrain Embedded Map feature enables you to embed NetBrain maps within a third-party portal page using an iframe. An embedded map provides a limited view of a regular NetBrain map, which only shows the map itself along with the detailed information within the data view.

Figure: a site map embedded in a portal page



Tenant: Initial Tenant

Domain: Test Domain

Type: Site Map

Map Name: Site Map

Map ID: f2ab19da-0214-4f1e-85b1-688070587364

Map URL: Copy

Task ID: 12345687652

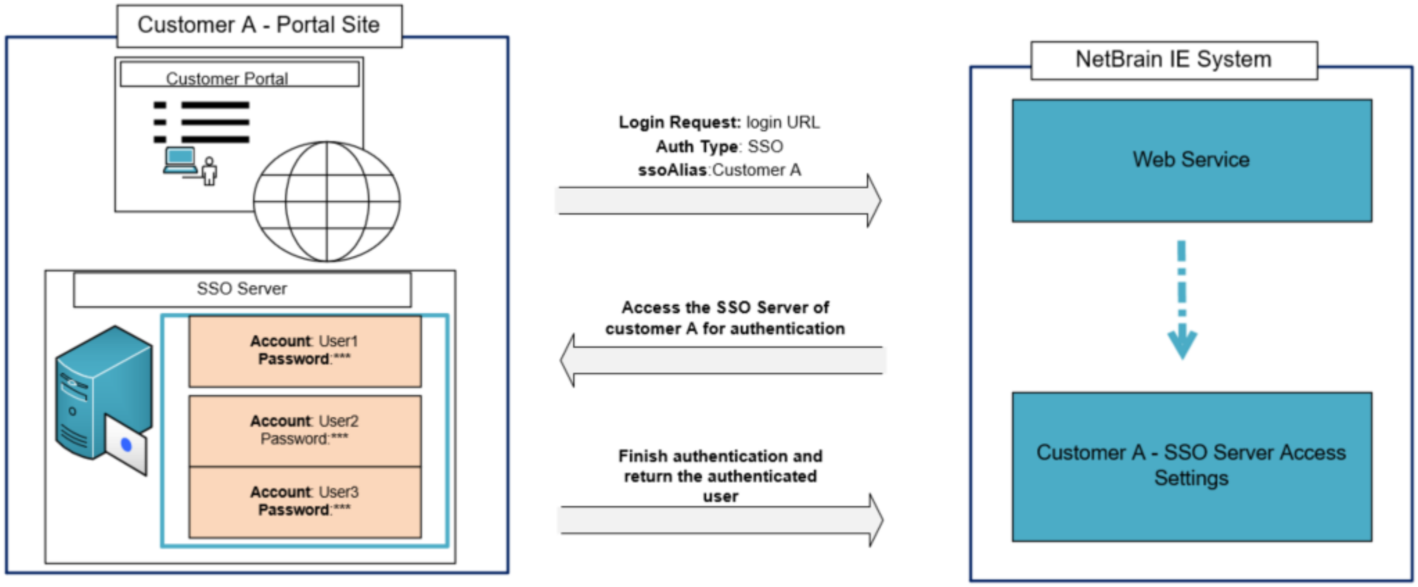
Task Status: Open

Hops: 12345687652

This guide introduces how to deploy NetBrain embedded-map function on an existing portal site that using SSO authentication.

2. Embedded-Map Architecture

The architecture diagram below describes a standard embedded-map deployment mode. In this mode, one embedded-map portal is developed with direct requests to the NetBrain IE system.



Three main components are involved in this deployment mode:

Component	Description
Customer Portal (Embedded-Map Portal)	The customer portal is where you will embed NetBrain maps. The embedded-map login is launched at the customer portal with a login URL and SSO authentication type.
NetBrain IE System	NetBrain system provides web services and APIs to a third-party portal to embed the NetBrain map. When it detects that the authentication type is SSO, it will access the SSO server with configured SSO settings and ask for authentication. It also controls tenant and domain access to SSO accounts.
SSO Server	SSO Server receives the authentication request from the NetBrain system, authenticates the user currently logged on the portal site and sends the authenticated user to the NetBrain system.

To get more deployment modes, see Advanced Deployment Modes for details.

3. Deployment Requirements

The embedded-map feature allows a highly customized development on a web portal to embed NetBrain maps based on APIs. And this characteristic of this feature demands that deploying this feature needs the involvement of technical personnel with specific skills.

If you want to develop a customized page without using the built-in embedded-map template files, the development requires the involvement of web developers. The following capabilities are expected:

- Web development
- Knowledge of HTML/JavaScript/CSS
- Knowledge of asynchronous calls and AJAX calls

4. Developing a Standard Embedded-Map Portal

You can build a standard embedded-map portal based on your needs by selecting either of the following ways:

- Developing a portal with built-in portal templates. Through this method, you can build a portal quickly by modifying several parameters.
- Developing a customized portal. NetBrain provides essential elements, such as APIs and function libraries, and you can highly customize an embedded-map portal using these essential elements.

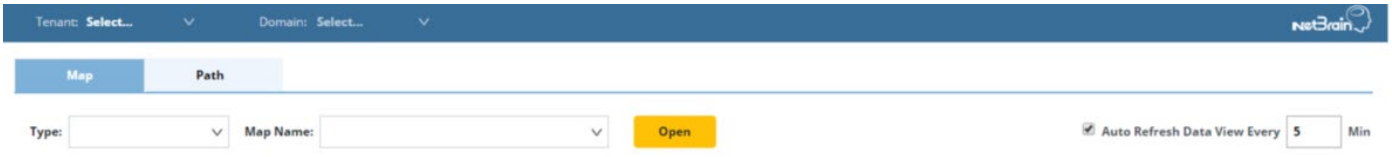
4.1. Developing a Portal with Built-in Portal Templates

NetBrain provides built-in portal templates and you can use the templates to quickly create an embedded-map portal by modifying a few parameters.

The portal created via built-in templates contains two ways to open a map and a function about data view.

- **Open a site/device group/public map**
- **Open a map by calculating a path**
- **Automatically refresh data view applied on an embedded map**

Figure: A sample portal created with built-in templates.

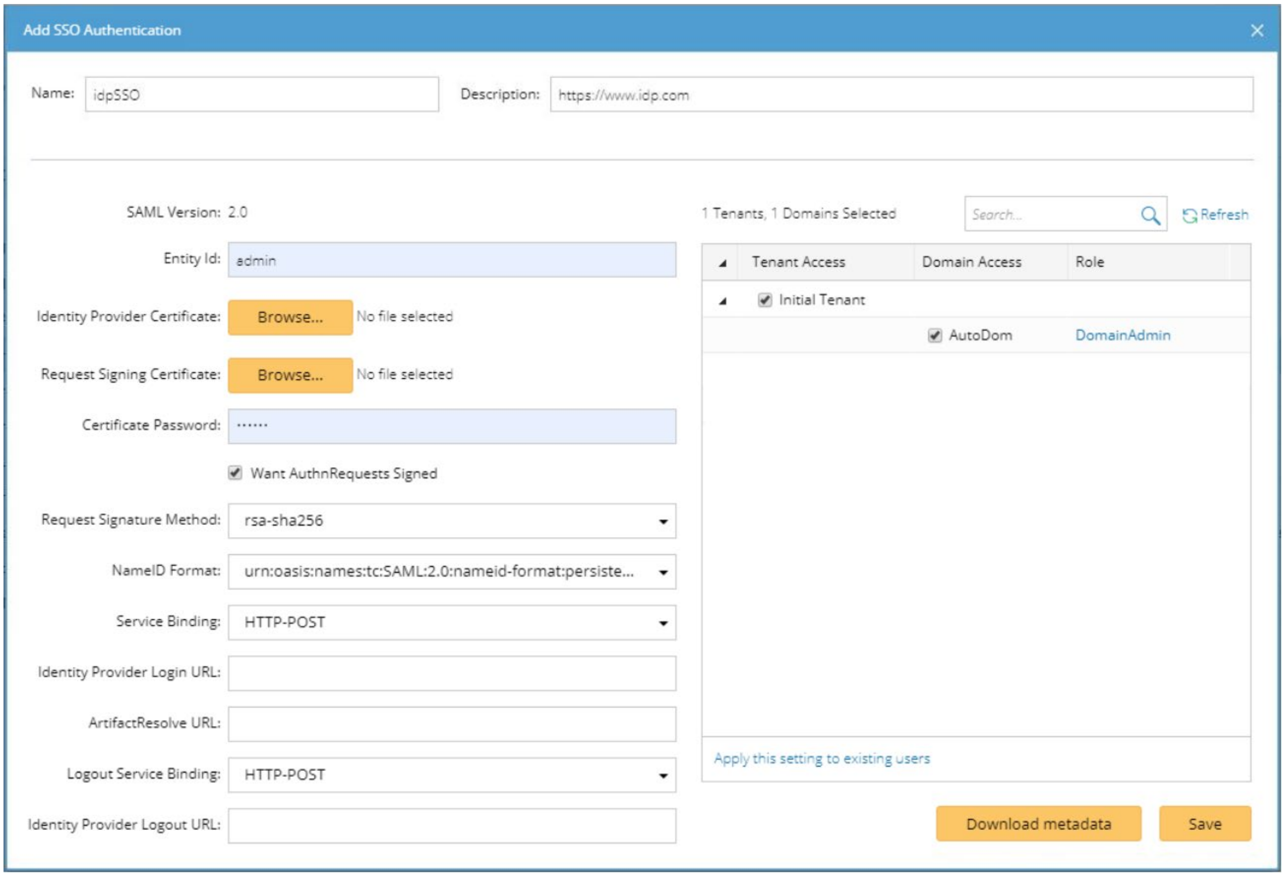


☑ Auto Refresh Data View Every 5 Min

The pseudo-code below describes a high-level workflow to build a portal to embed NetBrain maps with a built-in portal template.

```
1. Configure SSO authentication in your NetBbrain system.

2. Modify web.config file to enable Iframe.

3. Build a portal with the built-in port template.

4. Create a site for the portal.
```

1. Configure the settings to access your SSO server in your NetBrain system. See Configure SSO authentication for details.



Name: idpSSO

Description: https://www.idp.com

SAML Version: 2.0

Entity Id: admin

Identity Provider Certificate: No file selected

Request Signing Certificate: No file selected

Certificate Password: ······

☑ Want AuthnRequests Signed

Request Signature Method: rsa-sha256

NameID Format: urn:oasis:names:tc:SAML:2.0:nameid-format:persiste...

Service Binding: HTTP-POST

Identity Provider Login URL:

ArtifactResolve URL:

Logout Service Binding: HTTP-POST

Identity Provider Logout URL:

1 Tenants, 1 Domains Selected

Tenant Access	Domain Access	Role
☑ Initial Tenant		
	☑ AutoDom	DomainAdmin

2. Modify the **web.config** file of your NetBrain Web Server to enable iframe. An iframe is used to embed another document within the current HTML page.

   1) Locate the **web.config** file under ***../Program Files\NetBrain\Web Server\nb_publish_client/web.config***.

   2) Edit the file, append the **Content-Security-Policy configuration** to the bottom of the <httpProtocol> <customHeaders> section, and replace the value highlighted below with the actual address of the portal that will embed your NetBrain maps.

Sample Web.config File:

```
<httpProtocol>
  <customHeaders>
    <remove name="X-Frame-Options"/>
    <remove name="X-Content-Type-Options"/>
    <remove name="X-XSS-Protection"/>
    <remove name="Strict-Transport-Security"/>

    <add name="X-Frame-Options" value="SAMEORIGIN"/>
    <add name="X-Content-Type-Options" value="nosniff"/>
    <add name="X-XSS-Protection" value="1; mode=block"/>
    <add name="Strict-Transport-Security" value="max-age=31536000; includeSubDomains;
preload"/>
```

```
  <add name="Content-Security-Policy" value="frame-ancestors http://10.10.10.1:801"/>
</customHeaders>
```

> **Tip:** To learn more about the HTTP Content-Security-Policy response header, click here.

3) Restart the Windows WWW service.

3. Modify the built-in port templates to create an embedded-map portal.

1) Copy the built-in embedded-map template folder to the server where you will build the embedded-map portal. On the server where your NetBrain system is installed, locate the built-in template folder named **embedmapdemo** under the directory ***<../Program Files\NetBrain\Web Server\nb_publish_client >***, and copy the folder to the server where your portal will be built.

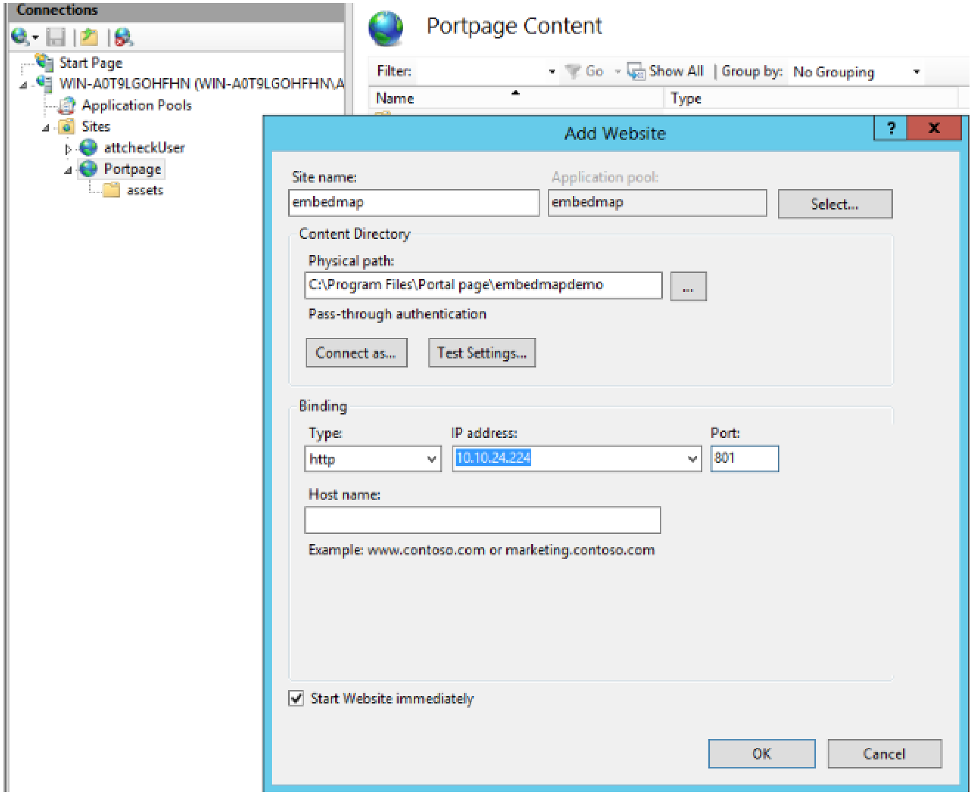
2) Edit any demo file in the **embedmapdemo** folder (for example, **demo2.html**) and update the parameters highlighted below with the actual values:

```
<script>
    // init the param for netbrainTools, virtualDir is option, virtualDir: '/' or virtualDir: '/NG', and default is '/' if no this field.
    // 'https://www.netbrain-az.com'
    netbrainInstanceOption = { netbrainURL: 'http://10.10.0.18', authentication: { type: 'sso', ssoAlias: 'idpSSO' }, virtualDir: '/',
            mapOption: {
                dataViewRefresh: {
                    enable: true,
                    frequency: 5
                }
            }
        };
```

Parameter	Description
netbrainUrl	The login address of your NetBrain IE.
authentication	It contains two fields: ▪ type: The authentication type for embedded map login. There are two types: **sso** and **portalUser**. In this case, fill in with **sso**. ▪ ssoAlias: The name of the SSO authentication you have configured in the NetBrain system. NetBrain system relies on this name to determine the SSO server to access.

4. Create a site for the modified embedded-map file and bind the site with the IP of the portal server.

   Example: Create a portal site with IIS.



Site name: embedmap

Application pool: embedmap

Content Directory

Physical path: C:\Program Files\Portal page\embedmapdemo

Pass-through authentication

Binding

Type: http

IP address: 10.10.24.224

Port: 801

Host name:

Example: www.contoso.com or marketing.contoso.com

☑ Start Website immediately

5. Enter **http(s)://<binding address:Port**>/<**specific demo filename>.html** in your web address bar. For example, http://10.10.24.224:801/demo2.html.

6. Select a Tenant/Domain and open a map

4.2. Developing a Customized Portal

Combining with the APIs and functions provided by NetBrain, you can build an embedded-map portal with high customization.

The pseudo-code below describes a high-level workflow to deploy a customized embedded-map portal.

```
1. Configure SSO authentication in your NetBrain system.

2. Modify the web.config file in NetBrain system to enable Iframe.

3. Create an HTML file for the Embedded-Map portal.

4. Reference NetBrain script library in the portal HTML file.

5. Configure the basic parameters of embedded-map login in the portal HTML file.
```

```
6. Initialize NetBrain instance in the portal HTML file.

7. Construct the drop-down menu for Tenant selection in the portal HTML file.

8. Construct the drop-down menu for Domain selection in the portal HTML file.

9. Initialize map instances in the portal HTML file.

10. Open Site/Device Group/Public Map in the portal HTML file.

11. Open a path map in the portal HTML file.

12. Open a map created via Qapp in the portal HTML file.

13. Add the Data View Auto Refresh function in the portal HTML file.
```

1. Configure the settings to access your SSO server in your NetBrain IE system. See Configure SSO authentication for details.

2. Modify the **web.config** file of your NetBrain Web Server to enable iframe. An iframe is used to embed another document within the current HTML page.

   1) Locate the **web.config** file under ***../Program Files\NetBrain\Web Server\nb_publish_client/web.config***.

   2) Edit the file, append the **Content-Security-Policy configuration** to the bottom of the <httpProtocol> <customHeaders> section, and replace the value highlighted below with the actual address of the portal that will embed your NetBrain maps.

   Sample Web.config File:

```
<httpProtocol>
  <customHeaders>
    <remove name="X-Frame-Options"/>
    <remove name="X-Content-Type-Options"/>
    <remove name="X-XSS-Protection"/>
    <remove name="Strict-Transport-Security"/>

    <add name="X-Frame-Options" value="SAMEORIGIN"/>
    <add name="X-Content-Type-Options" value="nosniff"/>
    <add name="X-XSS-Protection" value="1; mode=block"/>
    <add name="Strict-Transport-Security" value="max-age=31536000; includeSubDomains;
preload"/>
    <add name="Content-Security-Policy" value="frame-ancestors http://10.10.10.1:801"/>
  </customHeaders>
```

> **Tip:** To learn more about the HTTP Content-Security-Policy response header, click here.

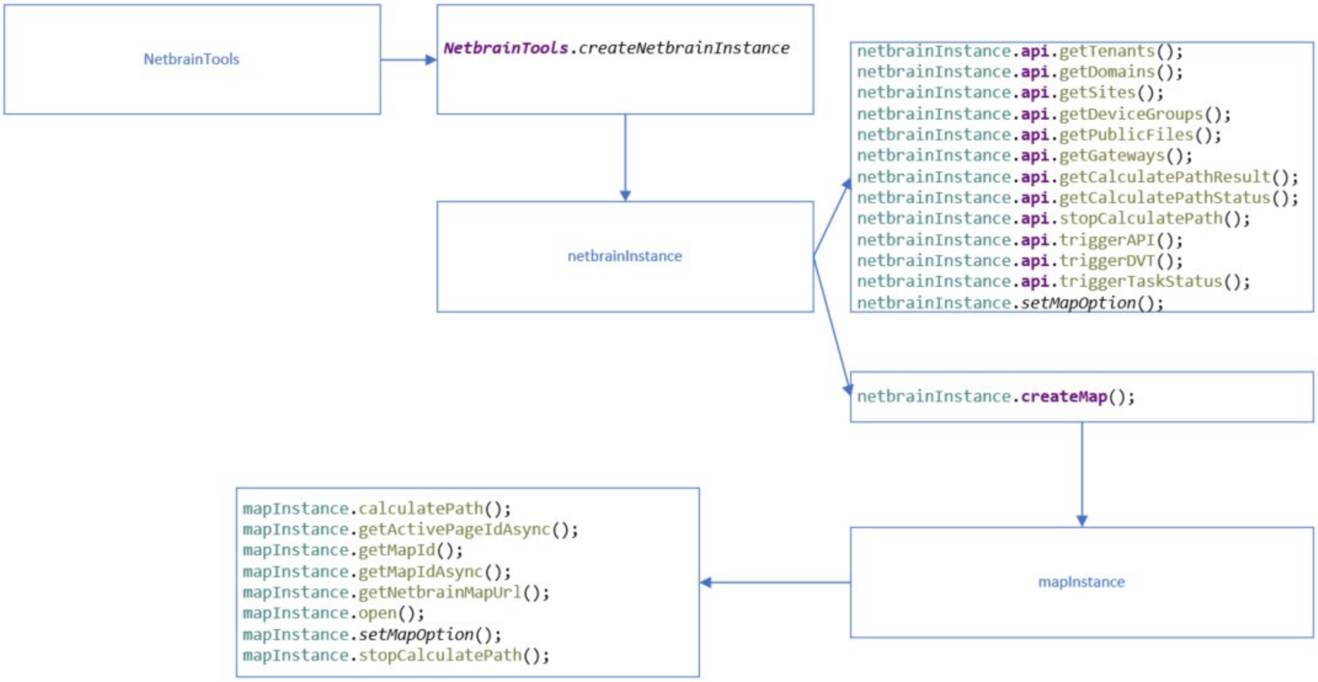
   3) Restart the Windows WWW service.

3. Create an HTML file for the embedded-map portal.

4. Reference the following script in the HTML file. The script is to call the script library (named after `NetbrainTools`) of your NetBrain web server, which provides an interface to NetBrain APIs.

```
<html>
<head>
    <script src="http(s)://<your NetBrain Web Server
address>/js/nb.embedmap.netbraintools.min.js"></script>
</head>
<body>
</body>
</html>
```

Figure: APIs in NetbrainTools Structure



```
netbrainInstance.api.getTenants();
netbrainInstance.api.getDomains();
netbrainInstance.api.getSites();
netbrainInstance.api.getDeviceGroups();
netbrainInstance.api.getPublicFiles();
netbrainInstance.api.getGateways();
netbrainInstance.api.getCalculatePathResult();
netbrainInstance.api.getCalculatePathStatus();
netbrainInstance.api.stopCalculatePath();
netbrainInstance.api.triggerAPI();
netbrainInstance.api.triggerDVT();
netbrainInstance.api.triggerTaskStatus();
netbrainInstance.setMapOption();
```

```
netbrainInstance.createMap();
```

```
mapInstance.calculatePath();
mapInstance.getActivePageIdAsync();
mapInstance.getMapId();
mapInstance.getMapIdAsync();
mapInstance.getNetbrainMapUrl();
mapInstance.open();
mapInstance.setMapOption();
mapInstance.stopCalculatePath();
```

5. Configure the basic parameters of embedded-map login.

```
 var netbrainOptions = {
    netbrainUrl: “http://10.10.3.18”,   //required
    authentication: {
        type: 'sso',            // required
        ssoAlias: 'idpSSO'    // required
    },
    virtualDir: '/',      //optional. The path of the virtual directory where NetBrain is
deployed.
};
```

Parameter	Description
netbrainUrl	The login address of your NetBrain IE.
authentication	It contains two fields: ▪ type: The authentication type for embedded map login. There are two types: **sso** and **portalUser**. In this case, fill in with **sso**. ▪ ssoAlias: The name of the SSO authentication you have configured in NetBrain IE system. NetBrain IE system relies on this name to determine the SSO server to access.
virtualDir	The path of the virtual directory where NetBrain is deployed. Fill in '/' if you don't know the specific virtual directory.

6. Initialize NetBrain instance.

```
var netbrainInstance, mapInstance;   // define and introduce global variables netbrain and map.

NetbrainTools.createNetbrainInstance(netbrainOptions)

    .then(function(_netbrainInstance) {

        netbrainInstance = _netbrainInstance;

    })

    .then(initBinds)

    .catch(logError);
```

netbrainInstance contains NetBrain APIs encapsulated via JS functions for Embedded Map deployment. After initializing NetBrain instance, These APIs encapsulated via JS functions are available to call to construct embedded-map elements.

Sample <netbrainInstance>

```
{

  api: object,

  createMap: function,

  relogin: function

}
```

> **Note:** Before proceeding to initialize NetBrain instance, please ensure `netbrainInstance` is accessible. Failing to fetch netbrainInstance will cause error prompt indicating 'create netbrain instance failed'.

7. Use the `netbrainInstance.api.getTenants()` function to get all tenants accessible to a user. This function can be used to construct the drop-down list for the **Tenant Section** field.

```
netbrainInstance.api
    .getTenants({})
    .then(function(result) {
        var tenants = result.tenants;
        console.log(tenants);
    });

//output example:

{
  "tenants": [
    {
      "tenantId": "6b2ac0ce-5817-831f-4d79-acfc62aa2920",
      "tenantName": "xxf_tenant"
    },
    {
      "tenantId": "e58f795c-8262-126f-fa04-90210bfcbe6c",
      "tenantName": "xxf_sdn_tenant"
    },
    {
      "tenantId": "fc29f127-35af-20cc-797e-0caec793cc26",
      "tenantName": "rwang_tenant"
    },
    {
      "tenantId": "06b63b6c-698e-f5fb-c249-082036df95e1",
      "tenantName": "MIMIC"
    },
    {
      "tenantId": "42a296d4-d8ca-5a6c-5e0c-ecdc393f0ff7",
      "tenantName": "gcui_test"
    }
  ],
  "statusCode": 790200,
  "statusDescription": "Success."
}
```

> **Tip:** For more details about how to leverage NetBrain APIs to retrieve the tenant list, see Get all accessible tenants.

8. Use the `netbrainInstance.api.getDomains()` function to get all domains accessible to a user. This function can be used to construct the drop-down list for the **Domain Section** field.

> **Note:** Make sure to replace the highlighted values with the desired `tenantId` value.

```
netbrainInstance.api
    .getDomains({
        tenantId: '6b2ac0ce-5817-831f-4d79-acfc62aa2920'
    })
    .then(function(result) {
        var Domains = result.domains;
        console.log(Domains);
    });

// output example:

{
  "domains": [
    {
      "domainId": "debfbef3-fa56-45f0-82b1-a90e20154454",
      "domainName": "xxf_domain"
    },
    {
      "domainId": "10c05674-0b3b-4b4e-b672-87ae32eace98",
      "domainName": "normaluser"
    },
    {
      "domainId": "b9e6e637-eab0-4024-905f-3906756f2fb9",
      "domainName": "ertret"
    }
  ],
  "statusCode": 790200,
  "statusDescription": "Success."
}
```

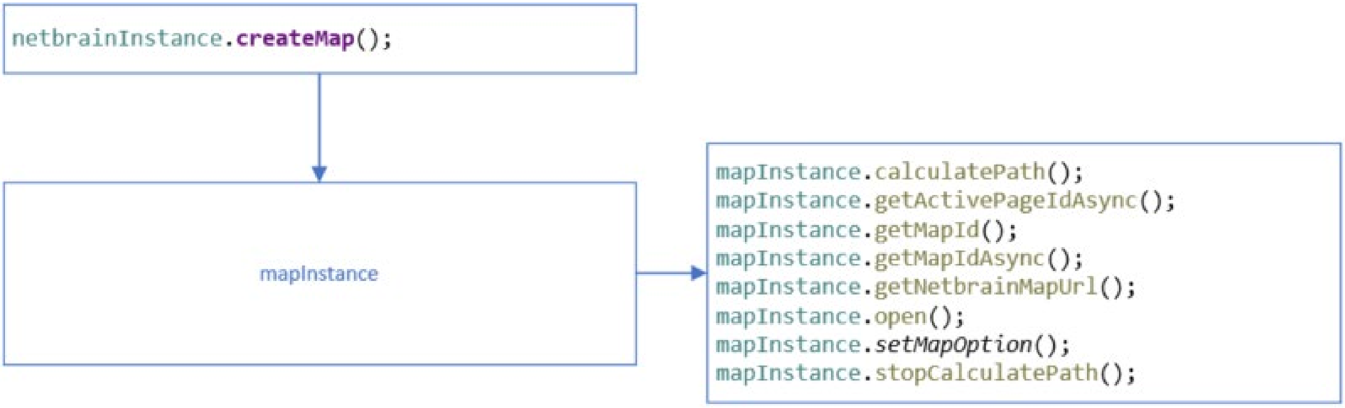
> **Tip:** For more details about how to leverage NetBrain API to retrieve the domain list from one of your NetBrain tenants, see Get all accessible domains of a tenant.

9. Initialize a map instance.

> **Note:** `mapContainer` is a container div used to render returned map instance.

```
netbrainInstance.createMap($('#mapContainer').get(0) ).then(function(Instance) {
    mapInstance = Instance;
});

//Verify mapInstance has been generated:

if (mapInstance) {
    openMap(param);
} else {
    netbrainInstance.createMap(mapOption.container).then(function (instance) {
        mapInstance = instance;
        openMap(param);
    });
}
```

mapInstance contains NetBrain APIs (encapsulated via JS functions) to open a map. After initiating the map instance, These APIs encapsulated via JS functions are available to call to build map-related elements.



```
netbrainInstance.createMap();
```

```
mapInstance.calculatePath();
mapInstance.getActivePageIdAsync();
mapInstance.getMapId();
mapInstance.getMapIdAsync();
mapInstance.getNetbrainMapUrl();
mapInstance.open();
mapInstance.setMapOption();
mapInstance.stopCalculatePath();
```

10. Open a Site Map/Device Group Map/Public Map.

    1) Construct a map type drop-down list for the **Site Map/Device Group Map/Public Map**.

> **Note:** Site Map/Device Group Map/Public Map are hard-coded map types. The following APIs are designed for the purposes of rendering a map list when the corresponding map type is selected.

▾ Site Map Type

> **Note:** Make sure to replace the highlighted values with your specific request parameters.

```
netbrainInstance.api
    .getSites({
        tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
        domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480',
        sitePath: 'My Network'
    })
    .then(function(result) {
        var sites = result.sites;
        console.log(sites);
    });

//result example:

{
  "sites": [
    {
      "siteId": "13e91c22-ffc8-4a31-82ad-786ae976c31e",
      "sitePath": "My Network/USXACanada",
      "isContainer": true,
      "children": [
        "e2eaad3f-b829-4715-87c0-72eb1f038274",
        "718a69b0-448b-4645-b0de-466adf88423d"
      ],
      "siteType": 1
    },
    {
      "siteId": "97a22e99-a042-4366-8ecc-d69bd32adc42",
      "sitePath": "My Network/USXACanada/United States of
America/MASSACHUSETTS/CANTON/Canton_NB1",
      "isContainer": false,
      "siteType": 2
    },
    {
      "siteId": "8ea30269-b348-4ca4-86fc-79557881a6f3",
      "sitePath": "My Network/USXACanada/United States of
America/MASSACHUSETTS/CANTON/Canton_NB2",
      "isContainer": false,
      "siteType": 2
    },
    // ...
    {
      "siteId": "732e8ab6-6b69-417d-ad03-2cc447100166",
      "sitePath": "My Network",
      "isContainer": true,
      "children": [
        "13e91c22-ffc8-4a31-82ad-786ae976c31e",
        "a3a9d329-fcdd-49d9-9669-9ec205d587c2",
        "74a72061-0412-428d-8448-6cbd3f9c70b1",
        "d2628098-be31-49b5-befc-167e9f1e9d88"
      ],
      "siteType": 0
    }
  ],
  "statusCode": 790200,
  "statusDescription": "Success."
}
```

> **Tip:** For more details about Site API parameters, refer to Get Site.

Device Group Type

> **Note:** Make sure to replace the highlighted values with your specific request parameters.

```
netbrainInstance.api
    .getDeviceGroups({
        tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
        domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480'
    })
    .then(function(result) {
        var deviceGroups = result.deviceGroups;
        console.log(deviceGroups);
    });

//result example:
```

```
{
  "deviceGroups": [
    {
    "id": "8196020b-b223-4bc8-8178-ac4da95b1695",
    "name": "#BGP 64512",
    "type": 2
  },
  {
    "id": "fbd027f2-24c9-4616-a6bd-62b7613b07e1",
    "name": "#BGP 65000",
    "type": 2
  },
  {
    "id": "f84008dd-a406-4b30-b71a-18e66b4a7d68",
    "name": "#BGP 65012",
    "type": 2
  }
  ],
  "statusCode": 790200,
  "statusDescription": "Success."
}
```

Tip: For more details about Device Group API parameters, refer to Get Device Group.

Public Map Type

Note: Make sure to replace the highlighted values with your specific request parameters.

```
netbrainInstance.api
    .getPublicFiles({
        tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
        domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480',
        folderId: '',
        fileTypes: [ 0, 11 ]
    })
    .then(function(result) {
        var files = result.Items;
        console.log(files);
    });

//result example:

{
    "items":[

        {
            "originalId":"267752c5-c01b-8ee3-d5aa-8fec88da8927",
            "id":"28337b50-25a0-40df-a0c8-20b79dce3f42",
            "name":"Public/test",
            "type":0
        },
        {
            "originalId":"267752c5-c01b-8ee3-d5aa-8fec88da8927",
            "id":"ff4e2847-2692-4a55-932c-b58978baaf2a",
            "name":"Public/Map3",
            "type":11
        },
        {
            "originalId":"7a249ae9-8dab-435d-88fa-5c698356c069",
            "id":"4a6cd1a3-558f-4288-acf3-e13825ea28af",
            "name":"Public/test/Map1cgc",
            "type":11
        }
    ],
    "statusCode":790200,
    "statusDescription":"Success."
}
```

> **Tip:** For more details about Public Map API parameters, refer to Get File.

2) Open a specific map. This step defines how to open a selected map.

> **Note:** Make sure to replace the highlighted values with your specific request parameters.

Open a site map

```
mapInstance.open({
    siteId: siteId,
    tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
    domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480'
}).then(function () {
    // ...
});
```

Open a device group map

```
mapInstance.open({
    deviceGroupId: deviceGroupId,
    tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
    domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480'
}).then(function () {
    // ...
});
```

Open a map in the Public file

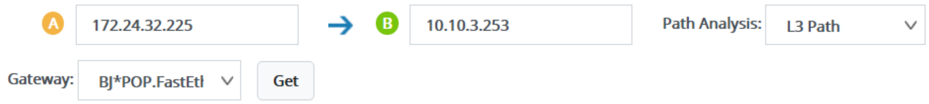
```
mapInstance.open({
    mapId: mapId,
    tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
    domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480'
}).then(function () {
    // ...
});
```

3) Refresh a map.

```
mapInstance.refresh();
```

11. Open a path map. In the portal, you can define options related to path calculation and open the path map by calculating a path.

Figure: example options of path calculation in an embedded-map portal



A 172.24.32.225 → B 10.10.3.253 Path Analysis: L3 Path

Gateway: BJ*POP.FastEtl

1) Calculate a path. Replace the highlighted values with your specific request parameters.

```
mapInstance.calculatePath({
    tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c', //required
    domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480', //required
    sourceIP: '10.10.3.253', //required
    sourcePort: 0,
    sourceGwIP: '10.10.3.253',
    sourceGwDev: 'GW2Lab',
    sourceGwIntf: 'GigabitEthernet0/0.10',
    destIP: '172.24.32.225', //required
    destPort: 0,
    pathAnalysisSet: 1,
    protocol: 4,
    isLive: 1
}).then(function (result) {
    var taskId =result.taskId
    // ...
});
```

2) View the path result.

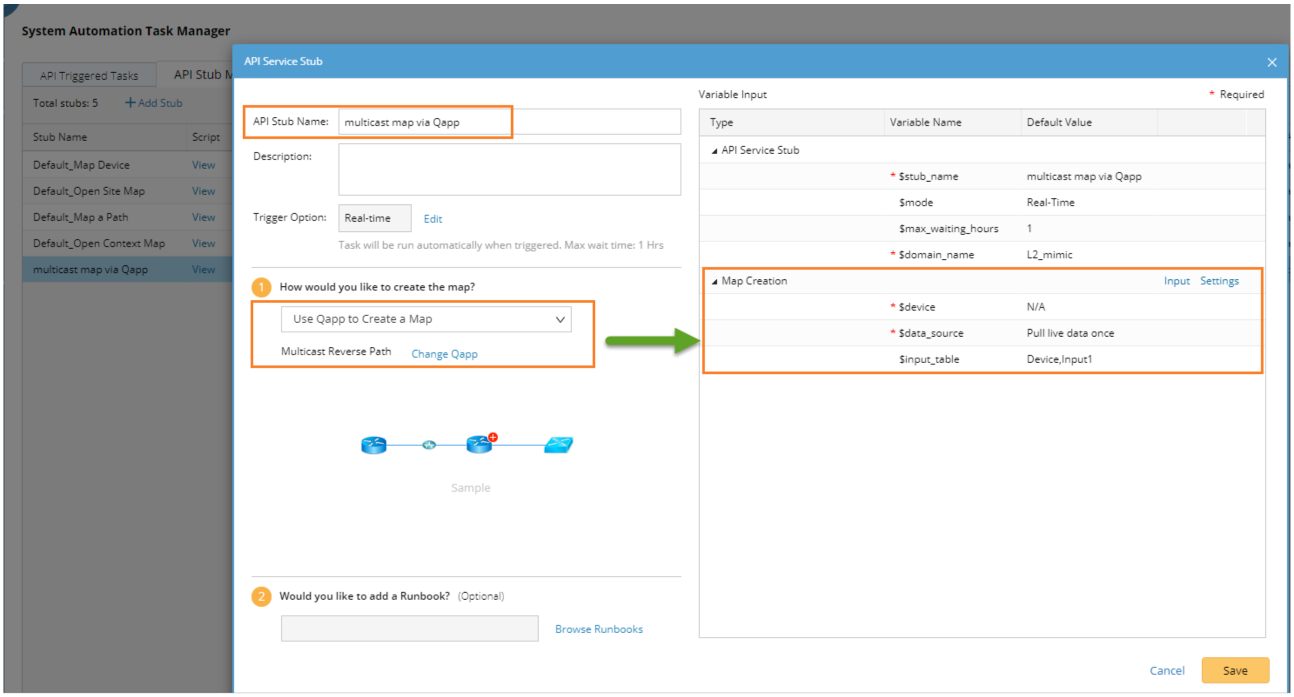
```
netbrainInstance.api.getCalculatePathResult ({
    tenantId: 'e58f795c-8262-126f-fa04-90210bfcbe6c',
    domainId: 'b3752773-f37f-4a3e-b547-062d2c0a0480',
    taskId: 'b69c0af1-73ce-49e7-8cc7-59ce8ce5eb37'
}).then(function (result) {
    var hoplist =result.hopList
    // ...
});

// Result Example:

{
  "hopList": [
    {
      "hopId": "b1612e9f-491f-4edf-9e40-156052b0f708",
      "srcDeviceName": "GW2Lab",
      "inboundInterface": "GigabitEthernet0/1",
      "mediaName": "172.24.30.0/30",
      "dstDeviceName": "NY_Router",
      "outboundInterface": "FastEthernet0/0",
      "nextHopIdList": [
        "97f40ee6-dee0-4b1f-a723-fec130292aa0"
      ]
    },
    {
      "hopId": "97f40ee6-dee0-4b1f-a723-fec130292aa0",
      "srcDeviceName": "NY_Router",
      "inboundInterface": "Vlan100",
      "mediaName": "172.24.30.4/30",
      "dstDeviceName": "NY_POPP",
      "outboundInterface": "Ethernet0/1",
      "nextHopIdList": [
        "6846b938-a666-412c-99b8-9e400a80b6b7"
      ]
    },
    {
      "hopId": "6846b938-a666-412c-99b8-9e400a80b6b7",
      "srcDeviceName": "NY_POPP",
      "inboundInterface": "Ethernet0/0",
      "mediaName": "172.24.31.64/26",
      "dstDeviceName": "NY-core-bak",
      "outboundInterface": "FastEthernet0/0",
      "nextHopIdList": [
        "63d88b57-201e-41e3-85f3-a5965c450d52"
      ]
    },
    {
      "hopId": "63d88b57-201e-41e3-85f3-a5965c450d52",
      "srcDeviceName": "NY-core-bak",
      "inboundInterface": "FastEthernet0/1.1",
      "mediaName": "172.24.31.192/26",
      "dstDeviceName": "BJ*POP",
      "outboundInterface": "FastEthernet0/1",
      "nextHopIdList": []
    }
  ],
  "statusCode": 790200,
  "statusDescription": "Success."
}
```

> **Tip:** For more details about the path APIs, refer to the following API documentation:
>
> - Calculate a path
> - Get the gateway of a device
> - Get the status of a path

12. Open a map created via Qapp. In the portal, you can call NetBrain triggered APIs to create a map using the Qapp added in an API-triggered task.

1) Define an API-triggered task in your NetBrain IE system. In the task, select to create a map via Qapp.

Figure: Define an API-triggered task to create a map via Qapp



System Automation Task Manager

API Triggered Tasks | API Stub M

Total stubs: 5 + Add Stub

Stub Name	Script
Default_Map Device	View
Default_Open Site Map	View
Default_Map a Path	View
Default_Open Context Map	View
multicast map via Qapp	View

API Service Stub

API Stub Name: multicast map via Qapp

Description:

Trigger Option: Real-time Edit

Task will be run automatically when triggered. Max wait time: 1 Hrs

1 How would you like to create the map?

Use Qapp to Create a Map

Multicast Reverse Path Change Qapp

Sample

2 Would you like to add a Runbook? (Optional)

Browse Runbooks

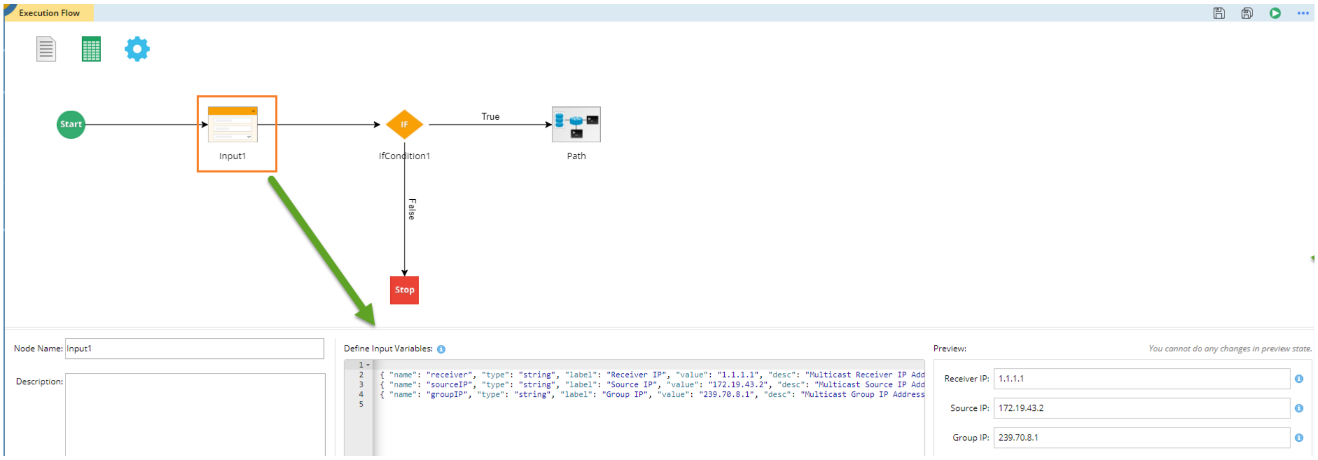
Variable Input * Required

Type	Variable Name	Default Value
API Service Stub		
	* $stub_name	multicast map via Qapp
	$mode	Real-Time
	$max_waiting_hours	1
	* $domain_name	L2_mimic
Map Creation (Input Settings)		
	* $device	N/A
	* $data_source	Pull live data once
	$input_table	Device,Input1

Cancel Save

A Qapp to create a map can contains input variables and you can create different maps via a Qapp by entering variable values.

Figure: Qapp with input variables



Node Name: Input1

Description:

Define Input Variables:

```
{ "name": "receiver", "type": "string", "label": "Receiver IP", "value": "1.1.1.1", "desc": "Multicast Receiver IP Add
{ "name": "sourceIP", "type": "string", "label": "Source IP", "value": "172.19.43.2", "desc": "Multicast Source IP Add
{ "name": "groupIP", "type": "string", "label": "Group IP", "value": "239.70.8.1", "desc": "Multicast Group IP Address
```

Preview: *You cannot do any changes in preview state.*

Receiver IP: 1.1.1.1

Source IP: 172.19.43.2

Group IP: 239.70.8.1

2) Call the API-triggered task to create a map via the Qapp in the API-triggered task.

a) Call the API-triggered function and construct elements of creating a map via the Qapp**.** Replace the highlighted parameters with the actual values.

```
var param = {
    "tenantId": tenantId,
    "domainId": domainId,
    "basic_setting": {
        "user": $triggerAPIConfig.userName, //required, input a portal user name
        "device": $triggerAPIConfig.deviceName,//required, any device in your NetBrain
system
        "stub_name": $triggerAPIConfig.stubName//required, must be same with the API stub
name in your NetBrain system
    },
    "domain_setting": {
        "tenant_id": tenantId,
        "domain_id": domainId
    },
    "map_setting": {
        "map_create_mode": 7,
        "map_qapp_para": {
            "dataSource": {
                "type": 1 //required 1:Pull live data once, 2:Current baseline
            },
            "frequency": {
                "type": 1,
                "times" : 10,
                "interval": {
                    "unit": 2,
                    "duration": 2
                }
            },
            "input_variable_parameters": [{  // The parameters must be the same with
those you have defined in the input variables of a Qapp. If no input variables,set it as
"input_variable_parameters": []
                "desc": "Multicast Receiver IP Address",
                "label": "Receiver IP",
                "name": "receiver",
                "value": "172.24.30.2"
            }, {
                "desc": "Multicast Source IP Address",
                "label": "Source IP",
                "name": "sourceIP",
                "value": "172.19.43.2"
                }]
        }
     }
};
netbrainInstance.api.triggerAPI(param).then(function(data) {
    if (data.error) {
        alert(data.error);
        return;
    }
    netbrainInstance.createMap(mapOption.container).then(function (instance) {
        mapInstance = instance;
        triggerTaskStatus(data, instance);
    });
});
```

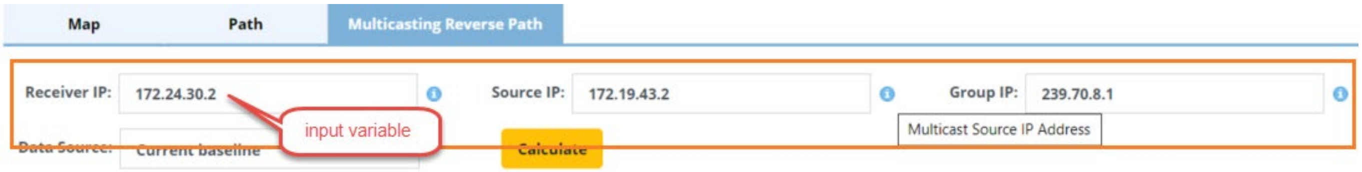
b) Call the `netbrainInstance.api.triggerTaskStatus` function to get the status of the API-triggered task. The call ends when the task fails or is finished.

```
function triggerTaskStatus(data, instance) {
    netbrainInstance.api.triggerTaskStatus({
        "taskId": data.taskId,
        "tenantId": tenantId,
        "domainId": domainId //
    }).then(function(res) {
        if(res == 2 || res == 3) {
            setTimeout(function() {
                triggerTaskStatus(data, instance)
            }, 5000);
        }
        else {
            triggerDVT(data, instance);
        }
    });
}
```

c) Call the `netbrainInstance.api.triggerDVT` function to apply the data view generated via running the Qapp to the map.

```
function triggerDVT(data, instance) {
    netbrainInstance.api.triggerDVT({
        "taskId": data.taskId,

        "tenantId": tenantId,

        "domainId": domainId

    }).then(function(res) {

        var param = {

            tenantId: tenantId,

            domainId: domainId,

            mapId: data.mapId

        };

        if (res && res.length > 0) {

            param.dataViewId = res[0].dataViewGroupId;

        }

        // open map

        mapInstance.open(param).then(function () {

              /*

                 ...

                 success code

                 ...

              */

        }).catch(function(err) {

            console.log(err);

        });

    });

}
```

Figure: Sample UI of map creation via a Qapp with input variables



Receiver IP: 172.24.30.2

Source IP: 172.19.43.2

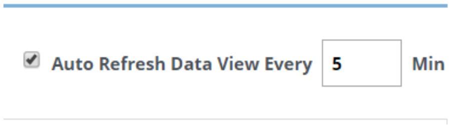
Group IP: 239.70.8.1

Data Source: Current baseline

13. Refresh data views applied to an embedded map automatically using the `mapInstance.setMapOption()` function.

```
netbrainInstance.setMapOption({
    dataViewRefresh: {
        enable: true,
        frequency: 5
    }
});
```

Figure: Sample UI of Auto Refresh Data View.



☑ Auto Refresh Data View Every 5 Min

5. Advanced Deployment Modes

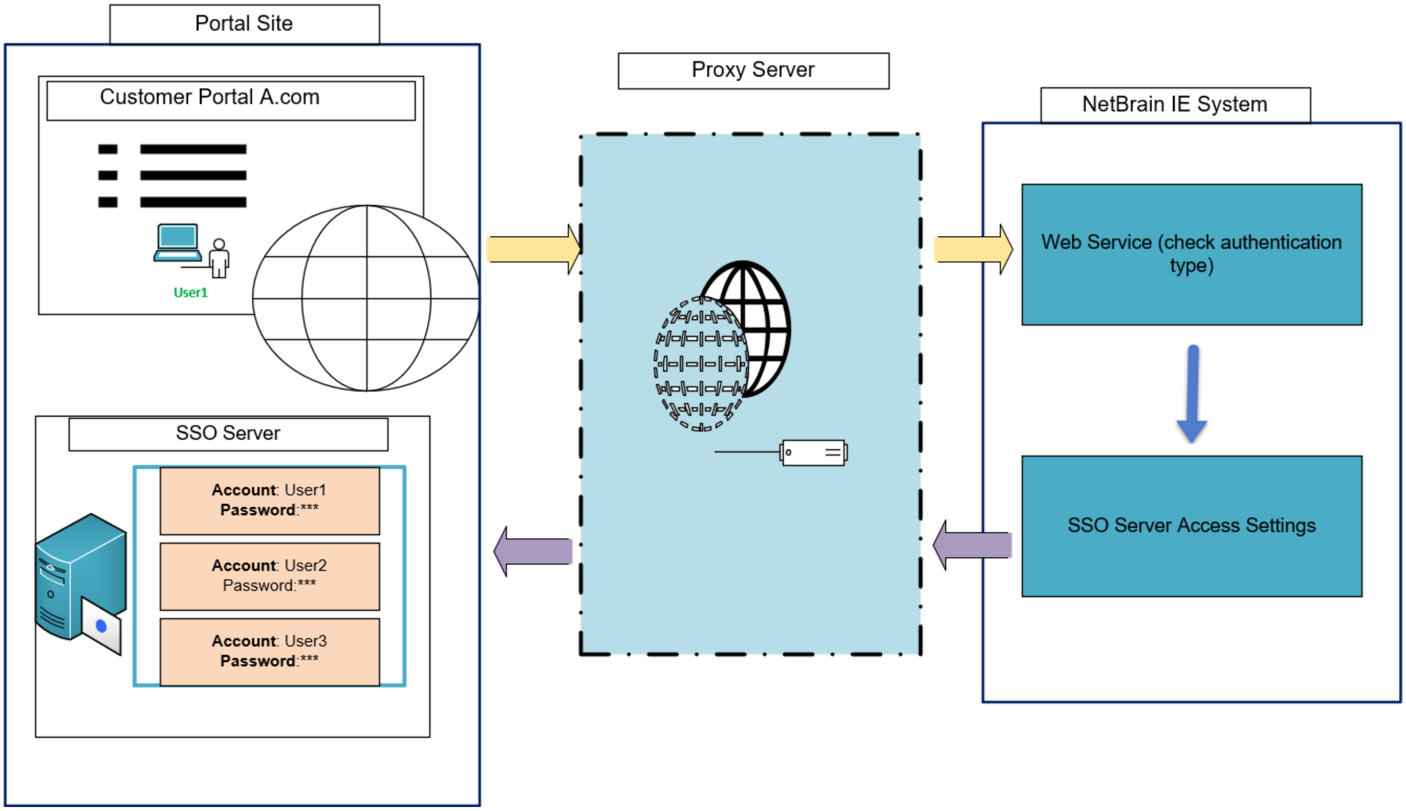
Besides the standard deployment mode, the embedded-map feature also supports the following deployment modes:

- Proxy Deployment
- Multi-tenant Deployment

5.1. Proxy Deployment

In the **Proxy Deployment** mode, a proxy server is deployed to forward requests and responses between the embedded-map portal and the NetBrain IE system.

Figure: Sample architecture of proxy development



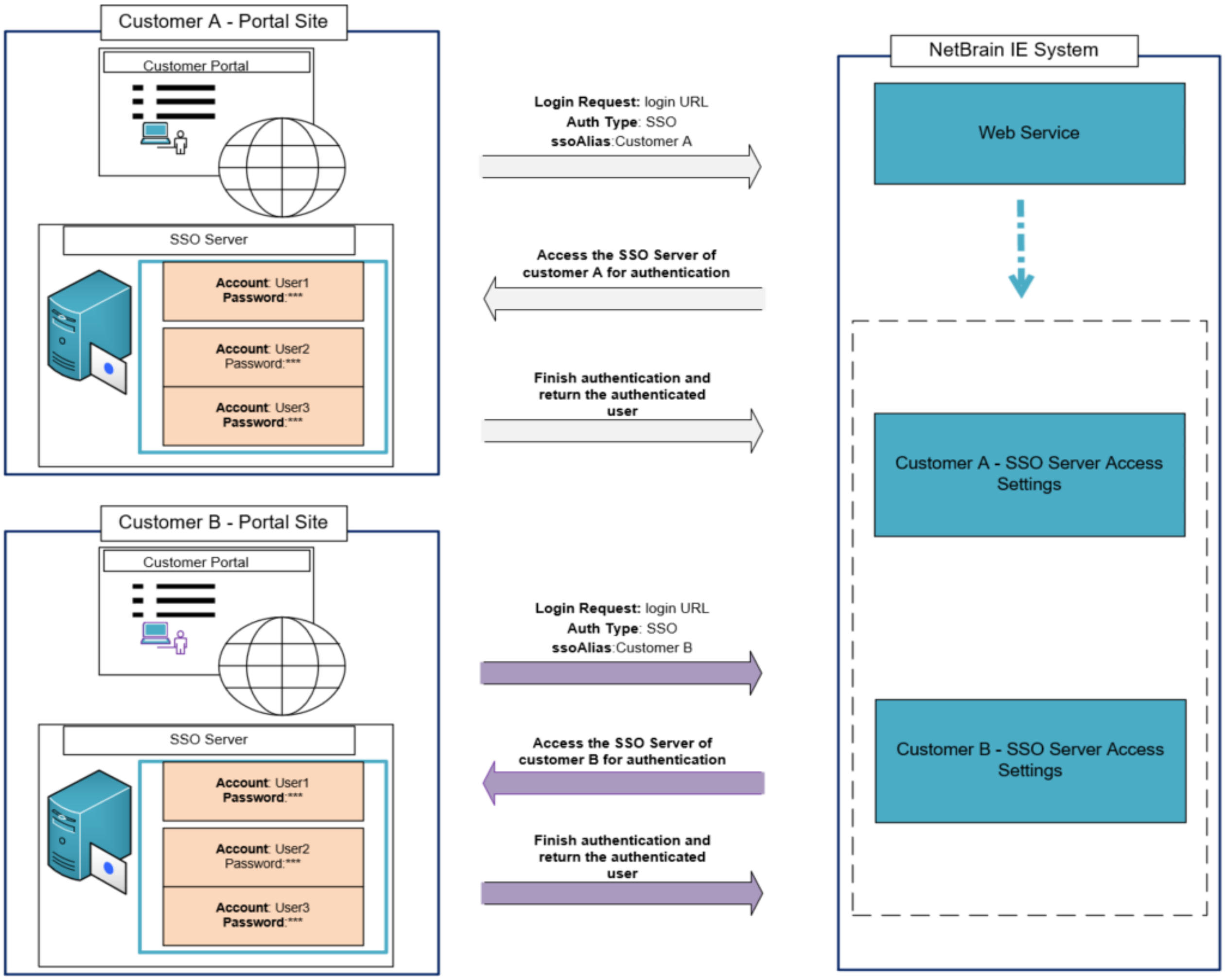
The detailed solution varies from your existing network deployment architecture and requires knowledge of NetBrain protocols, embedded-map requests, and other information. And if you consider this deployment mode, contact NetBrain Support Team to get technical support.

5.2. Multi-tenant Deployment

When you manage different customer networks based on tenants in your NetBrain system, it will be a good practice to deploy the embedded-map feature in the multi-tenant mode.

In this mode, different portals are created for customer networks with requests sent to the same one IE system and authentication done on different SSO servers.

The solution of this mode is to configure different SSO authentication settings for different SSO servers in the NetBrain IE system.

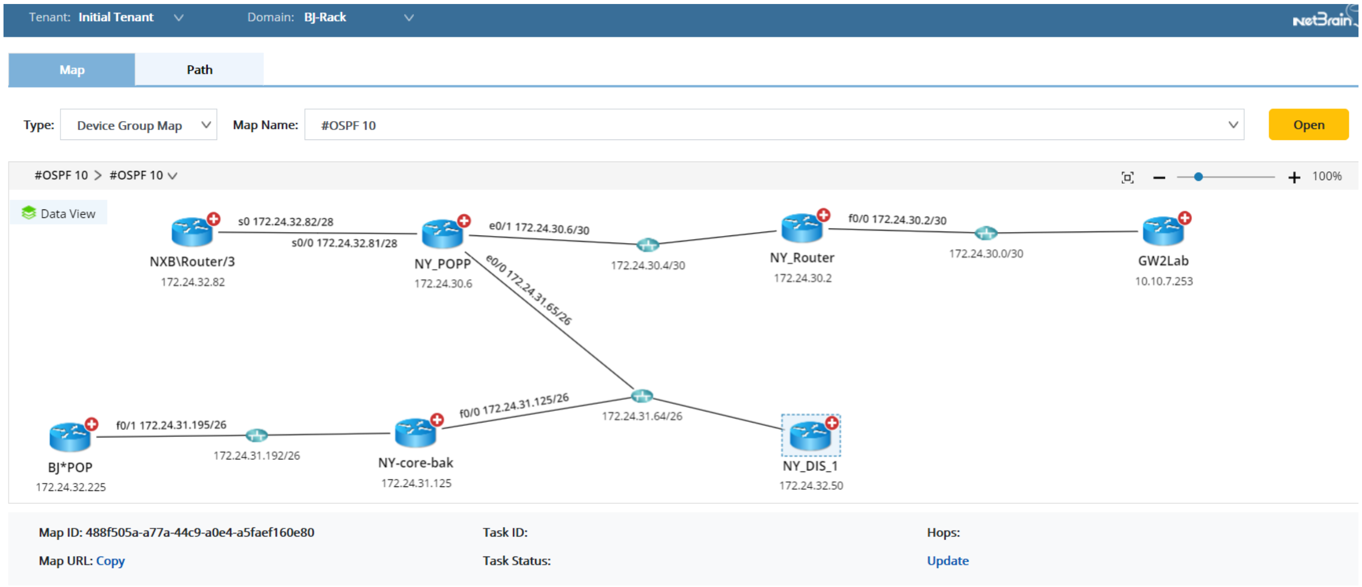


6. Working with Embedded Map Portal

Follow the steps below to view an embedded map in your portal.

6.1. Open a device group map

1. Log into your portal and navigate to the NetBrain page.
2. Select the desired tenant and domain.
3. Select **Device Group Map** from the **Type** drop-down menu.
4. Select a map from the **Map Name** drop-down menu.
5. Click **Open**.



Tenant: Initial Tenant

Domain: BJ-Rack

Type: Device Group Map

Map Name: #OSPF 10

Map ID: 488f505a-a77a-44c9-a0e4-a5faef160e80

Map URL: Copy

Task ID:

Task Status:

Hops:

Update

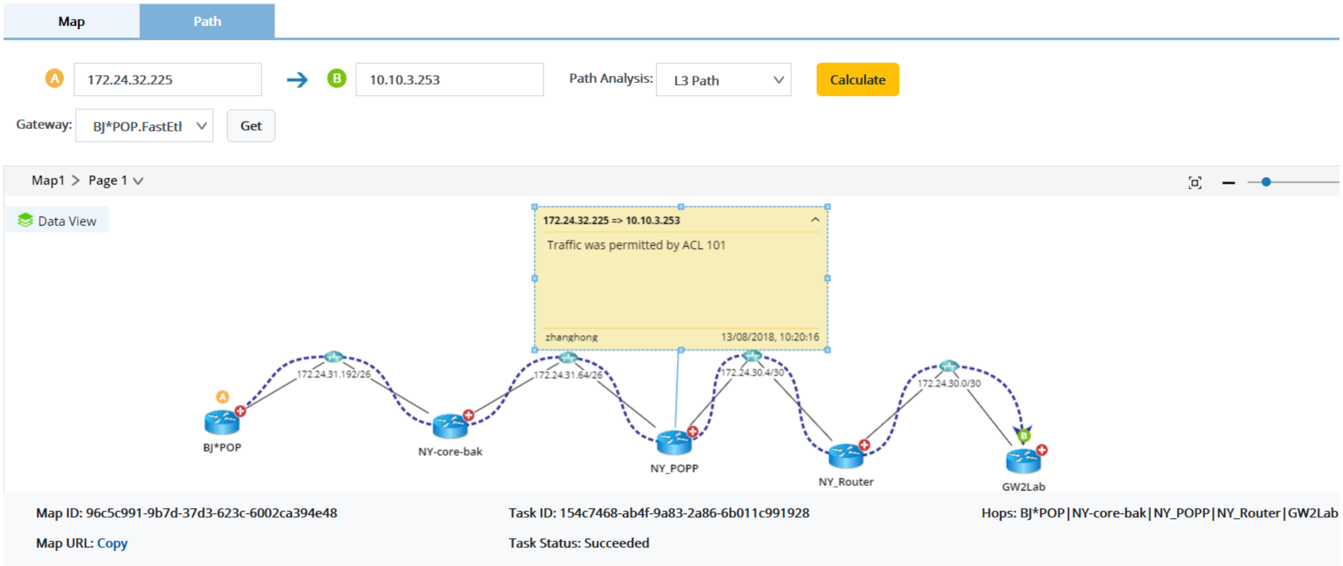
6.2. Calculate a path

1. Log into your portal and navigate to the NetBrain page.
2. Select the desired tenant and domain.
3. Create a map by calculating a path.

1) Enter the source IP and click **Get** to obtain the gateway list of the source device.

2) Enter the destination IP and select a path analysis method.

3) Click **Calculate** to start the path calculation.



A 172.24.32.225 → B 10.10.3.253 Path Analysis: L3 Path

Gateway: BJ*POP.FastEtl

172.24.32.225 => 10.10.3.253

Traffic was permitted by ACL 101

zhanghong 13/08/2018, 10:20:16

Map ID: 96c5c991-9b7d-37d3-623c-6002ca394e48

Map URL: Copy

Task ID: 154c7468-ab4f-9a83-2a86-6b011c991928

Task Status: Succeeded

Hops: BJ*POP|NY-core-bak|NY_POPP|NY_Router|GW2Lab

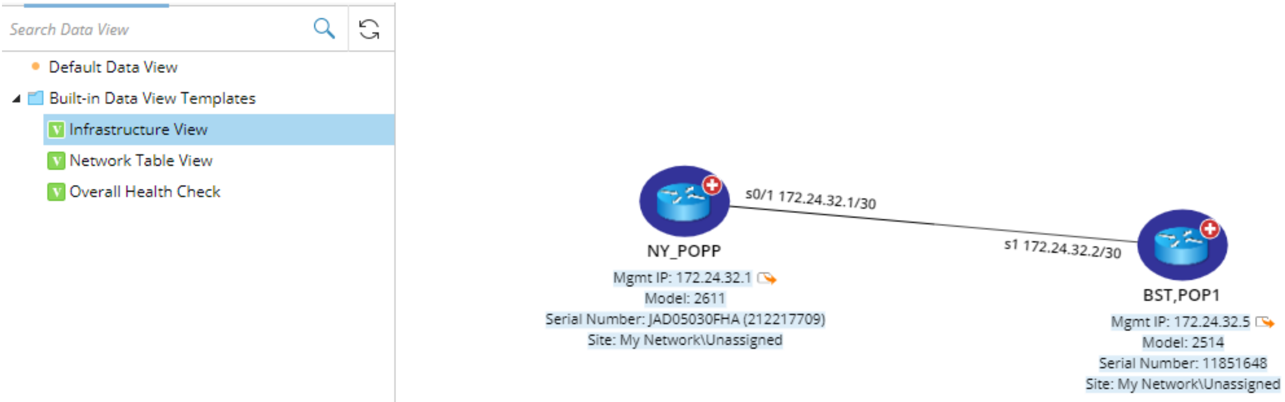
6.3. Embedded Map Operation

You can perform the following operations on an embedded map.

Applying data views

1. On the map page, click the **Data View** tab. It lists all the data views applicable to the current map page.

2. On the **Data View** tab, select a data view to apply. Data units in this data view are highlighted with different background colors.



Mgmt IP: 172.24.32.1
Model: 2611
Serial Number: JAD05030FHA (212217709)
Site: My Network\Unassigned

Mgmt IP: 172.24.32.5
Model: 2514
Serial Number: 11851648
Site: My Network\Unassigned

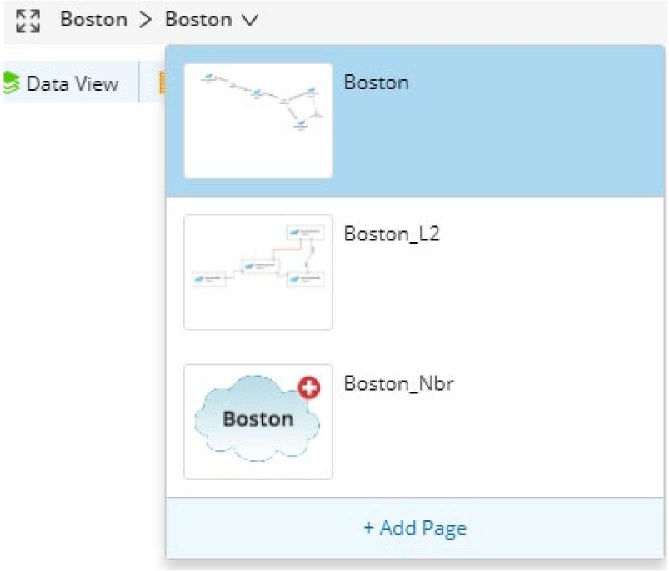
> **Tip:** You can switch between different data views in the Data View pane to suit your specific project needs.

Fitting to Screen

On the upper-right corner of a map, you can click the ⌗ icon to adjust the display ratio of your map to fit your screen.

Browsing more map pages

Click the map name and select more maps from the drop-down menu.



Zooming to view more data details

In an embedded map, you can zoom in the map to show more data details over an interface link.

> **Note:** The following functionalities are currently not supported by Embedded Map.
>
> - Executing a Runbook
> - Running a Qapp
> - Extending Neighbor
> - Operations in the right-click menu
> - Pointing to a link or data to show the corresponding configuration in a tip window

Appendix: NetBrain APIs for Embedded Map Deployment

The table below lists the NetBrain APIs you may use to deploy the NetBrain Embedded Map.

Category	APIs
Tenant and Domain List	▪ Get all accessible tenants ▪ Get all accessible domains of a tenant
Site	▪ Get child sites of a specific site
Device Group	▪ Get device group list
File	▪ Get file list
Path	▪ Calculate a path ▪ Get path calculation result ▪ Get path calculation status ▪ Get the gateway information of a device ▪ Stop a path
Authentication	▪ Generate authentication node

Get all accessible tenants

This function returns a list of accessible tenants (including tenant ID and names). The returned tenant list varies by the user privileges you use to log in. To retrieve a full list of all available tenants, you must log in with admin permissions.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Tenants	Yes

Parameters

Name	Description

Token*required
(header)
	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
	Example:
	`{`
	`  "token": "301ebdd8-0045-429d-8807-c51b8db7f5f0"`
	`}`

Response

Parameter	Type	Description	Example

tenants	array	A list of all accessible tenants.	`{`
			`  "tenants": [`
			`    {`
			`      "tenantId": "3e75247a-309c-4231-96a5-823b6cb1e78d",`
			`      "tenantName": "bos_office"`
			`    },`
			`    {`
			`      "tenantId": "5a75247a-309c-4231-96a5-823b6cb1e78d",`
			`      "tenantName": "ny_office"`
			`    }`
			`  ]`
			`}`

tenantId	string	The tenant ID.	
tenantName	string	The tenant name.	
statusCode	integer	Code issued by NetBrain server indicating the execution result.	
statusDescription	string	The explanation of the status code.	

Get all accessible domains of a tenant

This function returns a list of accessible domains in a specific tenant. The returned accessible domains vary by the user privileges you use to log in. To retrieve a full list of domains in a specified tenant, you must log in with system admin or tenant admin permissions.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API//V1/CMDB/Domains	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
tenantId *(query)*	Unique identifier for the tenant from which you desire to retrieve the domain information. tenantId can be retrieved from get all accessible tenants.

Response

Parameter	Type	Description	Example

domains	array	A list of all accessible domains.	{
			"domains": [
			{
			"domainId": "4e75247a-309c-4231-96a5-823b6cb1e78d",
			"domainName": "domain1"
			},
			{
			"domainId": "5e75247a-309c-4231-96a5-823b6cb1e78d",
			"domainName": "domain2"
			}
			]
			}

domainId	string	The domain ID.	
domainName	string	The domain name.	
statusCode	integer	Code issued by NetBrain server indicating the execution result.	
statusDescription	string	The explanation of the status code.	

Get child sites of a specific site

This function returns a list of child sites of a specified site.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Sites/ChildSites	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
sitePath*required *(query)*	The full path of a site, for example, My Network/NA/US.

Response

Parameter	Type	Description	Example
sites	array	A list of all child sites.	{ "sites": [{ "siteId": "47e5d1c1-5ddc-4e5f-b37c-21616193dd36", "sitePath": "My Network/C0/L4", "isContainer": false, "siteType": 2 }, { "siteId": "020cb2a2-d192-4c29-a9bd-53787d866f85", "sitePath": "My Network/C0", "isContainer": true, "children": ["47e5d1c1-5ddc-4e5f-b37c-21616193dd36", "16d1cd8e-eb8e-42ca-a19d-54d7a7fbd2a2", "c36eb043-a30f-4b58-b05f-957f845c40e3", "688bc6b2-3b34-42ff-96a2-c06687d2c03a", "6348e733-1c6b-4d76-8926-2d20622cf164",
siteId	string	The site ID.	
sitePath	string	The full path of a site.	
siteType	integer	The type of a site. ▪ 0: root site ▪ 1: container site ▪ 2: leaf site	
isContainer	bool	Whether it is a container site.	
children	array	List of child sites of the specified container site.	
statusCode	integer	Code issued by NetBrain server indicating the execution result.	
statusDescription	string	The explanation of the status code.	

Parameter	Type	Description	Example
			"3ed2ccba-9a00-48d7-9af0-a17e9aa8ccfb"], "siteType": 1 }], "statusCode": 790200, "statusDescription": "Success." }

Calculate a Path

This function is used to calculate a path between two endpoints. The result will be returned in the form of a path ID, and you can use the path ID in the Get Path Calculation Result as the request parameter to get each hop information of the path.

Resource Information

Method	URL	Required authentication
POST	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Path/Calculation	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.

body*required
(body)
	The request body contains the following parameters:
	▪ sourceIP*(string): IP address of the source device.
	▪ sourcePort (integer): Source protocol port, for example, 23 for telnet. This parameter can be null.
	▪ sourceGwIP* (string): Gateway for path calculation.
	▪ sourceGwDevice* (string): Hostname of the gateway device.
	▪ sourceGwIntf* (string): Name of the gateway interface.
	▪ destIP*(string): IP address of the destination device.
	▪ destPort (integer): Destination protocol port, for example, 23 for telnet. This parameter can be null.
	▪ pathAnalysisSet* (integer): Path type used to calculate.
	○ 1: L3 Path
	○ 2: L2 Path
	○ 3: L3 Active Path
	▪ protocol* (integer): Application protocol, for example, 4 for IPv4, and 6 for TCP.
	▪ isLive (integer): Data source used to calculate the path.
	○ 0: use data from the current baseline.
	○ 1: use data via live access.
	Example:
	`{`
	`  "sourceIP": "10.10.3.253",`
	`  "sourcePort": 0,`
	`  "sourceGwIP": "10.10.3.253",`
	`  "sourceGwDev": "GW2Lab",`
	`  "sourceGwIntf": "GigabitEthernet0/0.10",`
	`  "destIP": "172.24.32.225",`

Name	Description

	`  "destPort": 0,`
	`  "pathAnalysisSet": 1,`
	`  "protocol": 4,`
	`  "isLive": 1`
	`}`

Response

Parameter	Type	Description	Example

taskId	string	The ID of the task.	`{`
			`  "taskId": "string",`
			`  "statusCode": 790200,`
			`  "statusDescription": "success"`
			`}`

statusCode	integer	Code issued by NetBrain server indicating the execution result.	
statusDescription	string	The explanation of the status code.	

Get the gateway information of a device

This function returns the gateway information of a device based on its IP or hostname.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Path/Gateways	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
ipOrHost*required *(query)*	The IP or hostname of a device.

Response

Parameter	Type	Description	Example

gatewayList	array	A list of returned gateway devices. The list contains the following parameters:
		- ip (string): the IP address of a gateway.
		- devName (string): the hostname of a gateway.
		- intfName (string): the name of the gateway interface.
			{
			"statusCode": 790200,
			"statusDescription": "success",
			"gatewayList": [
			{
			"ip": "string",
			"devName": "string",
			"intfName": "string"
			}
			]
			}

statusCode	integer	Code issued by NetBrain server indicating the execution result.	
statusDescription	string	The explanation of the status code.	

Get path calculation status

This function returns the path status.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Path/Calculation/{taskID}/Status	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
taskId*required *(query)*	The task ID retrieved from Calculate a Path.

Response

Parameter	Type	Description	Example

statusCode	integer	Code issued by NetBrain server indicating the execution result.	{
			"statusCode":790200,
			"statusDescription":"success",
			"result":{
			"resultCode":1,
			"resultDescription":"Running"
			}
			}

statusDescription	string	The explanation of the status code.	
resultCode	integer	The status code of the specified path. ▪ 0: Initialized ▪ 1: Running ▪ 2: Succeeded ▪ 3: Failed ▪ 4: Canceled	
resultDescription	string	The explanation of the result code.	

Get path calculation result

This function returns the hop information of a path calculated through the Calculate a Path API.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Path/Calculation/{taskID}/Result	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
taskID*required *(query)*	The task ID retrieved from Calculate a Path.

Response

Parameter	Type	Description	Example

statusCode	integer	Code issued by NetBrain server indicating the execution result.	{
			"statusCode": 790200,
			"statusDescription": "success",
			"hopList": [
			{
			"hopId": "string",
			"srcDeviceName": "string",
			"inboundInterface": "string",
			"mediaName": "string",
			"dstDeviceName": "string",
			"outboundInterface": "string",
			"nextHopIdList": [
			"7a09854d-1d87-4656-8556-a7b142fccb75"
			]
			}
			]
			}

statusDescription	string	The explanation of the status code.	
hopList	array	A list of hops along a path.	
hopId	string	The ID of a hop.	
srcDeviceName	string	The hostname of the source device.	
inboundInterface	string	The name of the inbound interface.	
mediaName	string	The media name.	
dstDeviceName	string	The hostname of the destination device.	
outboundInterface	string	The name of the outbound interface.	
nextHopIdList	array	A list of the IDs of next hops.	

Get device group list

This function returns a list of device groups.

Resource Information

Method	URL	Required authentication
GET	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/DeviceGroups	Yes

Parameters

Name	Description
Token*required *(header)*	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.

Response

Parameter	Type	Description	Example

deviceGroups	array	A list of all accessible domains.	{
			    "deviceGroups": [
			        {
			            "id":"8196020b-b223-4bc8-8178-ac4da95b1695",
			            "name":"#BGP 64512",
			            "type":2
			        },
			        {
			            "id":"fbd027f2-24c9-4616-a6bd-62b7613b07e1",
			            "name":"#BGP 65000",
			            "type":2
			        },
			        {
			            "id":"fcdb1b8b-bffd-478f-a914-e867f6a87f86",
			            "name":"retest",
			            "type":0
			        }
			    ],
			    "statusCode":790200,
			    "statusDescription":"Success."
			}

id	string	The ID of a device group	
name	string	The name of a device group	
type	integer	The type of a device group. - 0: Public - 1: Private - 2: System	

Get file list

This function returns a list of files contained in a specified folder.

Resource Information

Method	URL	Required authentication
POST	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Files/	Yes

Parameters

Name	Description
Token*required (header)	The token can be obtained by sending a POST request to the log in session endpoint and provide valid credentials.

Body*required (body)	The request body contains the following parameters:
	▪ folderId (string): The ID of the folder from which you want to get the files. Root folder (public folder) will be returned if folderId is null.
	▪ fileTypes*(array): the file types you want to retrieve. There are three file types:
	  ▪ 0: Folder
	  ▪ 11: Map
	  ▪ 21: Dashboard
	Example:
	`{`
	`"folderId": "",`
	`"fileTypes": [ 0, 11 ,21]`
	`}`

Response

Parameter	Type	Description	Example

items	array	A list of folders and files.	`{`
			`    "items": [`
			`        {`
			`            "originalId":"75ff3cdf-dff4-48c6-a736-7a86e4374a29",`
			`            "id":"ad09aa07-b31d-4f42-a0aa-319697825b09",`
			`            "name":"Public/Site Maps",`
			`            "type":0`
			`        },`

id	string	The ID of a folder in the file tree.	
name	string	The name of a file.	
originalId	string	The ID of a specific dashboard or file. (Used for Map or Dashboard type only.)	
type	integer	The type of a file.	

Parameter	Type	Description	Example

		▪ 0: Folder
		▪ 11: Map
		▪ 21: Dashboard
			{
			"originalId":"75ff3cdf-dff4-48c6-a736-7a86e4374a29",
			"id":"2a19165f-a4a5-4488-ac5d-acdf9e287ed6",
			"name":"Public/New Folder/New Folder/New Map",
			"type":11
			},
			{
			"originalId":"d2650deb-5276-44cb-be21-43e2b129380a",
			"id":"a84cdca3-3710-47b1-b037-665e38fd6d08",
			"name":"Public/New Folder(1)/New Map",
			"type":11
			}
			],
			"statusCode":790200,
			"statusDescription":"Success."
			}

Stop a path

This API is used to force stop a path calculation process.

Resource Information

Method	URL	Required authentication
Post	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/API/V1/CMDB/Path/Calculation/Stop	Yes

Parameters

Name	Description
Token*required (header)	The token can be obtained by sending a POST request to the login session endpoint and provide valid credentials.
taskId*required (query)	The task ID retrieved from Calculate a Path.

Response

Parameter	Type	Description	Example

statusCode	integer	Code issued by NetBrain server indicating the execution result.	`{ "result": true,`
			`"statusCode": 790200,`
			`"statusDescription": "Success." }`

statusDescription	string	The explanation of the status code.	
result	bool	The execution (force stop) result.	

Generate Authentication Code

This function returns an authentication code based on username and password.

Resource Information

Method	URL
Post	http(s)://<IP address of your NetBrain Web API Server>/ServicesAPI/EmbedMap/GenerateAuthenticationCode

Parameters

Name	Description
userName*required *(body)*	The name of an Embed-Map user received from the authentication server.
password*required *(body)*	The password that received from the authentication server.

Response

Parameter	Type	Description
ResultCode	integer	Code issued by NetBrain server indicating the execution result.
ResultDesc	String	The result description. ▪ 0: Operation Successful ▪ 480301: Invalid user. ▪ 480302: Incorrect username or password ▪ 480303: Empty username or password ▪ 480304: Exception
authenticationCode	string	The returned authentication code.