



VMware vCloud® Architecture Toolkit™
for Service Providers

Extending VMware vCloud Director® User Interface Using Portal Extensibility

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Introduction

The 9.0 release of vCloud Director® offered tenants a new HTML5 User Interface (UI). This interface provides tenants access to simplified workflows and provides self-service management capabilities. As vCloud Director continues to mature, the HTML5 client will become the primary UI that tenants use to manage cloud environments.

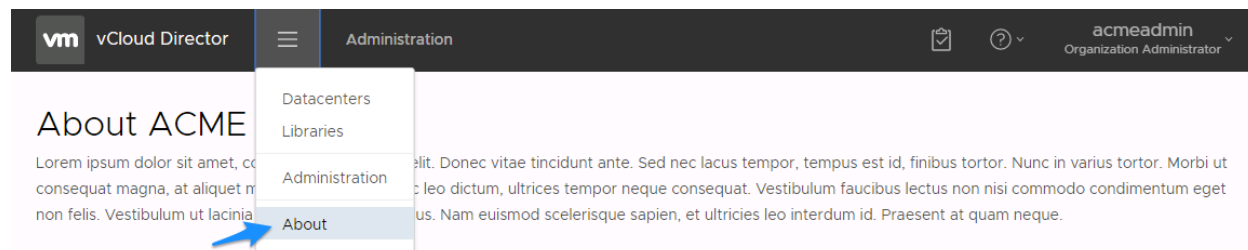
vCloud Director enables Service Providers to customize the product to fit their needs and to differentiate themselves to better serve their customers. Some example customization methods that vCloud Director offers include:

- **Blocking Tasks and Notifications:** Monitors tasks and performs various operations before task execution.
- **vCloud Director Extension Services:** Adds API operations directly into the vCloud Director API.
- **vCloud Director Object Extensions:** Influences or overrides vCloud Director workflow logic.

Each of these methods provides Service Providers the flexibility in designing their offering, however, all of these customization methods work only on the backend. If Service Providers do not use a custom portal, they cannot add content or interact with any customer backend APIs from inside the vCloud Director UI.

The 9.0 release of vCloud Director breaks through this limit by including a new technical preview of what is called “Portal Extensibility”. vCloud Director Portal Extensibility provides the ability to create and integrate top-level custom extensions directly into the vCloud Director HTML5 UI.

Figure 1: Sample Extension



Service Providers have complete control over creating almost anything desired. Some potential extensions that you can implement and use include:

- **Static Pages:** Screens that display corporate information, contact information, offering information, and so on.
- **Ticketing:** Enables tenants to view and manage all their tickets.
- **Ordering:** Enables tenants to order new services.
- **Monitoring:** Display monitoring information collected from various sources.
- **Consolidation:** Enables tenants to manage non-vCloud Director assets in a single pane of glass.
- **3rd party plugins:** Manages third-party technologies.

This white paper provides information about how portal extensions work, how you create new extensions, and how you publish the new extensions into the vCloud Director HTML5 UI application.

Portal Extensibility Information

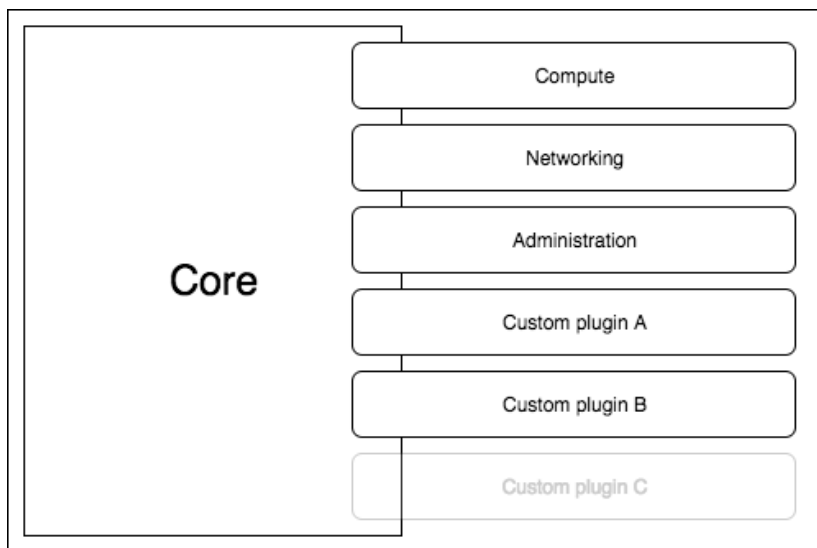
The vCloud Director HTML5 UI application consists of the following technologies:

- Angular 4: Used for routing, dependency injection and component support.
- NGRX (Reactive Extensions for Angular): Used for redux application state management.
- Clarity Design System: Used for UI support.

The vCloud Director HTML5 UI application is designed to use a pluggable architecture. The application core is responsible for bootstrapping modules including Angular, NGRX, Clarity, and the extension modules. The core is also responsible for enabling login.

Custom extension modules that you create via Portal Extensibility are the same as the native modules delivered as part of the vCloud Director UI. Custom modules are just as powerful and functional. In fact, the native modules are really just extension modules that are compiled to reduce load time.

Figure 2: vCloud Director Core with Extensions



All API communication from the vCloud Director UI must go through the vCloud API. The vCloud API is the only API that Portal Extensibility developers can interact with. To access non-vCloud APIs, you must extend the vCloud API using vCloud Director Extension Services.

2.1 Prerequisites

VMware recommends that you have knowledge of the following technologies and concepts:

- NodeJS development
- npm (Node Package Manager) usage
- Module formats (UMD (Universal Module Definition), AMD (Asynchronous Module Definition), CommonJS) and bundling strategies (especially AMD and SystemJS)
- Advanced Angular 4.x coding, including modules and component resolution
- Redux development including side-effects (especially NGRX)

2.2 Preparing Development Environment

To develop a vCloud Director extension, the following items are required:

- vCloud Director 9+ environment accessible from the development machine
- vCloud Director user account with system administrator privileges
- vCloud Director organization
- vCloud Director organization user account

- vCloud Director public addresses properly set (System > Administration > Public Addresses)
- Yarn installed
- HTML5 compatible browser with developer tools available
- Terminal window and command prompt
- Curl, Postman or other REST API client

Portal Extensibility Example – About Page

In this section, you create a new sample portal extension that displays a simple static About Page directly inside the vCloud Director HTML5 web client. This section provides information about creating the About Page; including retrieving the seed project that VMware provides and creating all the necessary Angular components.

All sample code associated with this example is available for reference at https://github.com/vmware/vcd-ext-sdk/tree/master/ui/samples/about_page.

3.1 Retrieving Plug-In Seed

1. Download or clone the GitHub repo at <https://github.com/vmware/vcd-ext-sdk/>. The `/ui/vcd-plugin-seed` directory contains the plug-in seed.
2. Duplicate the `/ui/vcd-plugin-seed` directory and rename it to match your project name.

For example, duplicate the `/ui/vcd-plugin-seed` directory to a new directory labeled `"about_page"`. You complete all development for this extension in this new directory.

```
git clone https://github.com/vmware/vcd-ext-sdk.git
cp -r vcd-ext-sdk/ui/vcd-plugin-seed about_page
rm -rf vcd-ext-sdk
cd about_page
```

3.2 Deleting Example Files

The seed project includes an example that you do not need. You can delete the following files from the `"about_page"` directory:

- `./src/main/*`
- `./src/public/assets/*`
- `./src/public/i18n.json`

```
rm -rf ./src/main/*
rm -rf ./src/public/assets/*
rm -f ./src/public/i18n.json
```

3.3 Creating the About Page Package

You can define the packages required for your extension, including the name, description and version.

Warning Do not change any pre-existing package versions in the `package.json` file, because vCloud Director ignores all changes to package versions. However, you can add new packages here.

Edit the `package.json` file with extension information.

Sample Code 1: `./package.json`

```
1 {
2   "name": "vcd-ui-about-page-extension",
3   "version": "0.0.1",
4   "description": "VCD UI About Page Extension",
5   "scripts": {
6     "clean": "rimraf dist",
7     "lint-fix": "tslint --fix \"src/**/*.ts\" || exit 0",
8     "build": "rollup -c && ncp src/public dist && cd dist && bestzip plugin.zip bundle.js\nmanifest.json i18n.json assets/ && cd ..",
9   },
10  "license": "BSD-3-Clause",
11  "dependencies": {
12    "@angular/animations": "4.4.4",
13    "@angular/common": "4.4.4",
14    "@angular/compiler": "4.4.4",
15    "@angular/core": "4.4.4",
16    "@angular/forms": "4.4.4",
17    "@angular/http": "4.4.4",
```



```

18   "@angular/platform-browser": "4.4.4",
19   "@angular/platform-browser-dynamic": "4.4.4",
20   "@angular/router": "4.4.4",
21   "@ngrx/core": "1.2.0",
22   "@ngrx/effects": "2.0.3",
23   "@ngrx/store": "2.2.2",
24   "@webcomponents/custom-elements": "1.0.0",
25   "clarity-angular": "0.10.15",
26   "clarity-icons": "0.10.15",
27   "clarity-ui": "0.10.15",
28   "core-js": "2.5.1",
29   "mutationobserver-shim": "0.3.2",
30   "reflect-metadata": "0.1.10",
31   "reselect": "3.0.0",
32   "rxjs": "5.5.2",
33   "web-animations-js": "2.3.1",
34   "zone.js": "0.8.18",
35   "es6-shim": "0.35.3",
36
37   "@vcd-ui/common": "file:vcd-ui/common"
38 },
39 "devDependencies": {
40   "@types/jasmine": "2.5.47",
41   "@types/node": "7.0.12",
42   "bestzip": "1.1.4",
43   "body-parser": "1.17.1",
44   "express": "4.15.2",
45   "express-history-api-fallback": "2.1.0",
46   "http-proxy": "1.16.2",
47   "ncp": "2.0.0",
48   "node-sass": "4.5.2",
49   "npm": "3.10.10",
50   "open": "0.0.5",
51   "rimraf": "2.6.1",
52   "rollup": "0.41.6",
53   "rollup-plugin-angular": "0.4.4",
54   "rollup-plugin-typescript": "0.8.1",
55   "ts-helpers": "1.1.2",
56   "ts-node": "3.0.2",
57   "tslint": "4.5.1",
58   "typescript": "2.2.2",
59   "typings": "2.1.0"
60 }
61 }

```

- **Line 2:** Enters the name for the extension.
- **Line 3:** Enters the extension version.
- **Line 4:** Enters the description for the extension.

3.4 Creating the About Page Manifest

Configure the extension metadata in the manifest.json file.

Sample Code 2: ./src/public/manifest.json

```

1  {
2    "urn": "vmware:vcloud:aboutpage",
3    "name": "About Page extension",
4    "containerVersion": "9.1.0",
5    "version": "0.0.1",
6    "scope": ["tenant"],
7    "permissions": [],
8    "description": "An example About Page extension",
9    "vendor": "VMware",
10   "license": "SPDX-License-Identifier: BSD-2-Clause; Copyright (C) VMware 2018. All
rights reserved.",
11   "link": "http://www.vmware.com/support",
12   "module": "AboutModule",
13   "route": "about"
14 }

```

- **urn:** Unique URN-style ID for the extension
- **name:** Human readable name for the extension
- **containerVersion:** Minimum version number of the vCloud Director UI Host required for this extension
- **version:** Extension version

- **scope:** Determines where to place the extension. Valid values include "tenant" and "service-provider"
- **permissions:** Minimum RBAC permissions that are required for the host to load the extension. Brackets ([]) indicate no permissions are required. Currently, only brackets ([]) are allowed
- **description:** Human readable description for the extension
- **vendor:** Human readable name of the vendor of the extension
- **license:** License for usage of the extension
- **link:** Support link for the extension
- **module:** Name of the exported Angular module that the application loads dynamically
- **route:** Top level URL route for the module

3.5 Creating About Page Internationalization

End users can view the vCloud Director UI in multiple languages. The i18n.json file stores the locale specific translations for the extension. Create an i18n.json file with the About Page translations.

Sample Code 3: ./src/public/i18n.json

```
1 {
2   "en": {
3     "nav.about": "About",
4     "nav.about.description": "About ACME Hosting"
5   }
6 }
```

- **Line 2:** The locale. If English is the current language, the subentries under a specific locale are used. You can add other locales as needed.
- **Lines 3-4:** Each key is translated into the specific translation value for the current locale.

Note If there are any missing translations, vCloud Director displays the “en” translation value. If the “en” translation key is also missing, vCloud Director displays the translation key prefixed with a question mark.

3.6 Creating the About Page HTML File

You can create the About Page screen by using the about.component.html file.

Sample Code 4: ./src/main/about.component.html

```
1 <div class="content-area">
2   <h1>About ACME Hosting</h1>
3
4   Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec vitae tincidunt ante. Sed
nec lacus tempor, tempus est id, finibus tortor. Nunc in varius tortor. Morbi ut consequat
magna, at aliquet mi. Nullam varius ex nec leo dictum, ultrices tempor neque consequat.
Vestibulum faucibus lectus non nisi commodo condimentum eget non felis. Vestibulum ut lacinia
justo, a consequat tellus. Nam euismod scelerisque sapien, et ultricies leo interdum id.
Praesent at quam neque.
5   <p>
6   Suspendisse lacinia tortor sed mattis accumsan. Nulla fringilla arcu id velit ornare, non
pellentesque risus efficitur. Quisque commodo lectus et purus tristique volutpat. Donec in
lorem cursus, molestie nisi in, efficitur eros. Etiam non risus libero. Praesent odio urna,
consectetur et bibendum et, pretium at nulla. Nunc ac faucibus erat, sed iaculis ligula.
Nullam in magna quis enim imperdiet rutrum et at libero. Etiam ac magna a purus aliquet
varius in ac tellus. Cras a viverra ex. Curabitur mollis vestibulum lectus vitae congue.
Mauris placerat at augue et aliquam. Donec vitae turpis sagittis elit lobortis malesuada
placerat vitae erat.
7   <p>
8   Aliquam erat volutpat. Duis in eros at enim lobortis gravida convallis quis turpis. Vivamus
facilisis neque vel est vehicula, nec varius erat tristique. Etiam cursus quam orci, eu
molestie risus pharetra sed. Donec in ante iaculis, pharetra purus sit amet, auctor purus.
Praesent eu bibendum magna. Duis molestie egestas dui eget interdum. Maecenas libero felis,
tincidunt ac nibh nec, venenatis rhoncus mauris. Cras molestie ultrices tempus.
9   <p>
10  Fusce euismod nisi eu erat condimentum, scelerisque tristique ante placerat. Integer urna
diam, iaculis sit amet dolor vel, pharetra elementum tortor. Aenean vel nunc libero. Nunc
rutrum nisi quis imperdiet volutpat. Nunc ut vestibulum ante. Duis fermentum mauris felis,
vel mattis massa tincidunt non. Nullam lorem dolor, efficitur id odio vel, fermentum
porttitor ex. Cras blandit mi nulla, a bibendum lacus ultricies sit amet.
```

```

11 <p>
12
13 <h2>Services Available</h2>
14 <li>Shared Hosting</li>
15 <li>Dedicated Hosting</li>
16 <li>Managed Hosting</li>
17 <li>Disaster Recovery as a Service</li>
18
19 <h2>Contact Information</h2>
20 <li>Phone: 1-800-555-0199</li>
21 <li>Email: support@acmehosting.com</li>
22 </div>

```

- **Line 1:** Division with the class value set to “content-area”.
- **Lines 2-21:** Defines the texts and their format that you want to see on the About Page screen.

3.7 Creating the About Page Component

Components define an application by using a simple configuration structure. Create a new `about.component.ts` file that defines the `AboutComponent`.

Sample Code 5: `./src/main/about.component.ts`

```

1 import {Component} from "@angular/core";
2
3 @Component({
4   selector: 'about-component',
5   templateUrl: './about.component.html',
6   host: {'class': 'content-container'}
7 })
8
9 export class AboutComponent {}

```

- **Line 4:** The selector for the component must be unique.
- **Line 5:** Uses the HTML found in the external `about.component.html` file.
- **Line 6:** Specifies the host class.
- **Line 8:** Exports `AboutComponent` so that other modules can use it.

3.8 Creating About Page Routes

Routes enable navigation between various views when tenants perform various tasks. Create a new `about.routes.ts` file that defines the necessary routes.

Sample Code 6: `./src/main/about.routes.ts`

```

1 import {Route} from '@angular/router';
2 import {AboutComponent} from './about.component';
3
4 export const ROUTES: Route[] = [
5   {
6     path: '',
7     component: AboutComponent
8   }
9 ];

```

- **Line 2:** Imports the `AboutComponent`.
- **Lines 5-8:** By default, sends all traffic to the `AboutComponent`.

3.9 Creating the About Page Module

`NgModules` organizes applications into cohesive function blocks. Create a new `about.module.ts` file that defines the `AboutModule`.

Sample Code 7: `./src/main/about.module.ts`

```

1 import {CommonModule} from '@angular/common';
2 import {Inject, NgModule} from '@angular/core';
3 import {RouterModule} from '@angular/router';
4 import {Store} from '@ngrx/store';
5 import {EXTENSION_ROUTE, ExtensionNavRegistration, ExtensionNavRegistrationAction} from
  '@vcd-ui/common';
6 import {AboutComponent} from './about.component';

```

```

7  import {ROUTES} from './about.routes';
8
9  @NgModule({
10     imports: [
11         CommonModule,
12         RouterModule.forChild(ROUTES)
13     ],
14     declarations: [
15         AboutComponent
16     ],
17     bootstrap: [
18         AboutComponent
19     ]
20 })
21 export class AboutModule {
22     constructor(private appStore: Store<any>, @Inject(EXTENSION_ROUTE) extensionRoute: string)
23     {
24         const registration: ExtensionNavRegistration = {
25             path: extensionRoute,
26             nameCode: 'nav.about',
27             descriptionCode: 'nav.about.description'
28         };
29         appStore.dispatch(new ExtensionNavRegistrationAction(registration));
30     }
31 }

```

- **Lines 1-7:** Imports modules.
- **Lines 14-16:** Adds AboutComponent to the declarations.
- **Lines 17-19:** Adds AboutComponent to bootstrap.
- **Lines 22-30:** Registers the extension.
- **Line 25:** Uses "nav.about" entry in i18n. Used to specify the label in the main navigation.
- **Line 26:** Uses "nav.about.description" entry in i18n. Displays description when you hover over the label in the main navigation.

3.10 Creating the About Page Index

You can define the top most entry point for the tree of code. Create an index.ts file with the exported AboutModule.

Sample Code 8: ./src/main/index.ts

```

1  export {AboutModule} from './about.module';

```

Publishing Extensions

To publish the extension into the actual vCloud Director environment, you use the vCloud API to register and upload the extension.

4.1 Setting Environment Variable for the vCloud Director Host

To simplify copy-and-paste operations, you can set an environment variable to define the vCloud Director host.

```
VCDHOST=<host>
```

4.2 Retrieving a Session Token

To use the vCloud Director API, you need to retrieve a session token.

The `x-vcloud-authorization` response header is the session token.

```
curl -v -k -X POST -H 'Accept: application/*+xml;version=29.0;multisite=global' --
basic -u 'administrator@System' https://$VCDHOST/api/sessions

< HTTP/1.1 200 OK
< Date: Wed, 11 Oct 2017 17:55:55 GMT
< X-VMWARE-VCLOUD-REQUEST-ID: 29860e80-6d45-4d2f-a0d0-070a494abf80
< x-vcloud-authorization: 59a3348327d944f6a2d0f1350f72debc
< Set-Cookie: vcloud-token=59a3348327d944f6a2d0f1350f72debc; Secure; Path=/
< Content-Type:
application/vnd.vmware.vcloud.session+xml;multisite=global;version=29.0
< X-VMWARE-VCLOUD-REQUEST-EXECUTION-TIME: 1677
< Content-Length: 2147
<
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Session xmlns="http://www.vmware.com/vcloud/v1.5"
xmlns:ovf="http://schemas.dmtf.org/ovf/envelope/1"
xmlns:vssd="http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/CIM_VirtualSystemSettingData"
xmlns:common="http://schemas.dmtf.org/wbem/wscim/1/common"
xmlns:rasd="http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/CIM_ResourceAllocationSettingData"
xmlns:vmw="http://www.vmware.com/schema/ovf"
xmlns:ovfenv="http://schemas.dmtf.org/ovf/environment/1"
xmlns:vmext="http://www.vmware.com/vcloud/extension/v1.5"
xmlns:ns9="http://www.vmware.com/vcloud/networkservice/1.0"
xmlns:ns10="http://www.vmware.com/vcloud/networkservice/ipam/1.0"
xmlns:ns11="http://www.vmware.com/vcloud/networkservice/common/1.0"
xmlns:ns12="http://www.vmware.com/vcloud/versions" org="System" roles="System
Administrator" user="administrator" userId="urn:vcloud:user:71b05a05-bc45-489e-85d6-
5d3b2106c52a" href="https://vcd-01a.corp.local/api/session"
type="application/vnd.vmware.vcloud.session+xml">
  <Link rel="down" href="https://vcd-01a.corp.local/api/org/"
type="application/vnd.vmware.vcloud.orgList+xml"/>
  <Link rel="remove" href="https://vcd-01a.corp.local/api/session"/>
  <Link rel="down" href="https://vcd-01a.corp.local/api/admin/"
type="application/vnd.vmware.admin.vcloud+xml"/>
  <Link rel="down" href="https://vcd-01a.corp.local/api/admin/extension"
type="application/vnd.vmware.admin.vmwExtension+xml"/>
  <Link rel="down" href="https://vcd-01a.corp.local/api/org/a93c9db9-7471-3192-8d09-
a8f7eeda85f9" name="System" type="application/vnd.vmware.vcloud.org+xml"/>
  <Link rel="down" href="https://vcd-01a.corp.local/api/query"
type="application/vnd.vmware.vcloud.query.queryList+xml"/>
  <Link rel="entityResolver" href="https://vcd-01a.corp.local/api/entity/"
type="application/vnd.vmware.vcloud.entity+xml"/>
  <Link rel="down:extensibility" href="https://vcd-01a.corp.local/api/extensibility"
type="application/vnd.vmware.vcloud.apiextensibility+xml"/>
  <Link rel="nsx" href="https://vcd-01a.corp.local/network" type="application/xml"/>
  <AuthorizedLocations/>
</Session>
```

4.3 Setting an Environment Variable for a vCloud Director Session

Store the session token in an environment variable so that all future calls can include the session token.

```
VCDSESSION=59a3348327d944f6a2d0f1350f72debc
```

4.4 Registering the Extension

Define the extension that you want to register. Modify the post data to match details about the extension.

The response includes the <plugin-id> labeled as "id" that is required for future calls.

```
curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: $VCDSESSION" --data '{"pluginName":"AboutPage", "vendor":"VMware", "description":"An example About Page extension", "version":"1.0.0", "license":"Proprietary", "link":"http://www.vmware.com", "tenant scoped":true, "provider scoped":false, "enabled":true}' https://$VCDHOST/cloudapi/extensions/ui

< HTTP/1.1 201 Created
< Date: Tue, 20 Feb 2018 15:53:45 GMT
< X-VMWARE-VCLLOUD-REQUEST-ID: 5f70de3d-d5ab-40a7-a9ee-c340700decd5
< Content-Type: application/json
< Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b
< Allow: HEAD,DELETE,GET,OPTIONS,PUT
< Transfer-Encoding: chunked
<
* Connection #0 to host vcd-01a.corp.local left intact
{"pluginName":"AboutPage","vendor":"VMware","description":"An example About Page extension","version":"1.0.0","license":"Proprietary","link":"http://www.vmware.com","tenant scoped":true,"provider scoped":false,"enabled":true,"id":"urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b","plugin_status":"unavailable","resourcePath":""}
```

- For more information, see Appendix A.1 - Registering Extension

4.5 Building the Code

To install all project dependencies, go to the project directory by using the cd command and run the following command:

```
yarn
```

To build the plug-in, run the following command:

```
yarn run build
```

This creates a plugin.zip file in the ./dist directory, which contains the entire plug-in.

4.6 Preparing to Upload an Extension Source File

Use the <plugin-id> from the register call and add "/plugin" after the <plugin-id> in the URL. Pass the file name and the file size as part of the post data to vCloud Director.

The response headers include a Link to use to upload the file.

```
curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: $VCDSESSION" --data '{"fileName":"plugin.zip", "size":3018}' https://$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/plugin

< HTTP/1.1 204 No Content
< Date: Tue, 20 Feb 2018 16:17:48 GMT
< X-VMWARE-VCLLOUD-REQUEST-ID: f2886e19-3c35-4ad4-b0d0-6fbf67b6152c
< Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/plugin
< Allow: DELETE,POST,OPTIONS
< Link: <https://vcd-01a.corp.local/transfer/464c7edd-2904-48ac-a670-4dec37064951/plugin.zip>;rel="upload:default";type="application/octet-stream"
```

- For more information, see Appendix A.6 - Preparing to Upload Extension.

4.7 Uploading the Extension File

You can upload the extension to vCloud Director by using the link that returns in the request of Section 4.6 Preparing to Upload an Extension Source File. For example, < Link: <<https://vcd-01a.corp.local/transfer/464c7edd-2904-48ac-a670-4dec37064951/plugin.zip>>;rel="upload:default";type="application/octet-stream"

```
curl -v -k -X PUT -H 'Content-Type: application/zip' -H "x-vcloud-authorization: $VCDSESSION" --data-binary @plugin.zip https://$VCDHOST/transfer/464c7edd-2904-48ac-a670-4dec37064951/plugin.zip

< HTTP/1.1 100 Continue
* We are completely uploaded and fine
< HTTP/1.1 200 OK
< Date: Tue, 20 Feb 2018 16:25:44 GMT
< X-VMWARE-VCLOUD-REQUEST-ID: 097ea911-2a95-4a7c-925e-3f0cc9483b88
< Content-Length: 0
```

- For more information, see Appendix A.7 - Uploading Extension Source.

Warning Uploaded extensions are placed in a web accessible location. Service providers and tenant administrators must be cautious about offering, reviewing, or installing extensions. In addition, careful management of allowed extensions and use of appropriate safeguards can prevent plug-ins from loading malicious content.

4.8 Publishing the Extension

vCloud Director is prepared to display the extension. You need to define the organizations that have access to the extension.

4.8.1 All Organizations

To allow all organizations to access the extension, use the publishAll endpoint.

```
curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: $VCDSESSION" https://$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publishAll

< HTTP/1.1 200 OK
< Date: Tue, 20 Feb 2018 16:30:41 GMT
< X-VMWARE-VCLOUD-REQUEST-ID: 6fd79232-d7be-40f1-9238-48f1ff70ff9a
< Content-Type: application/json
< Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants
< Allow: HEAD,GET,OPTIONS
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model="List"
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";model="List"
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/json"
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json"
< Transfer-Encoding: chunked
<
* Connection #0 to host vcd-01a.corp.local left intact
[{"name":"System","id":"urn:vcloud:org:a93c9db9-7471-3192-8d09-a8f7eeda85f9"}, {"name":"ACME","id":"urn:vcloud:org:e46b03d6-46bc-4c95-94fc-27a6c78737a9"}]
```

- For more information, see Appendix A.10 - Publishing Extension to All Tenants.

4.8.2 Designated Organizations

To allow only designated organizations to access the extension, use the publish endpoint and pass in a list of organization names in the post data.

```
curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vccloud-authorization: $VCDSESSION" --data '[{"name":"Acme"}]' https://$VCDHOST/cloudapi/extensions/ui/urn:vccloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish

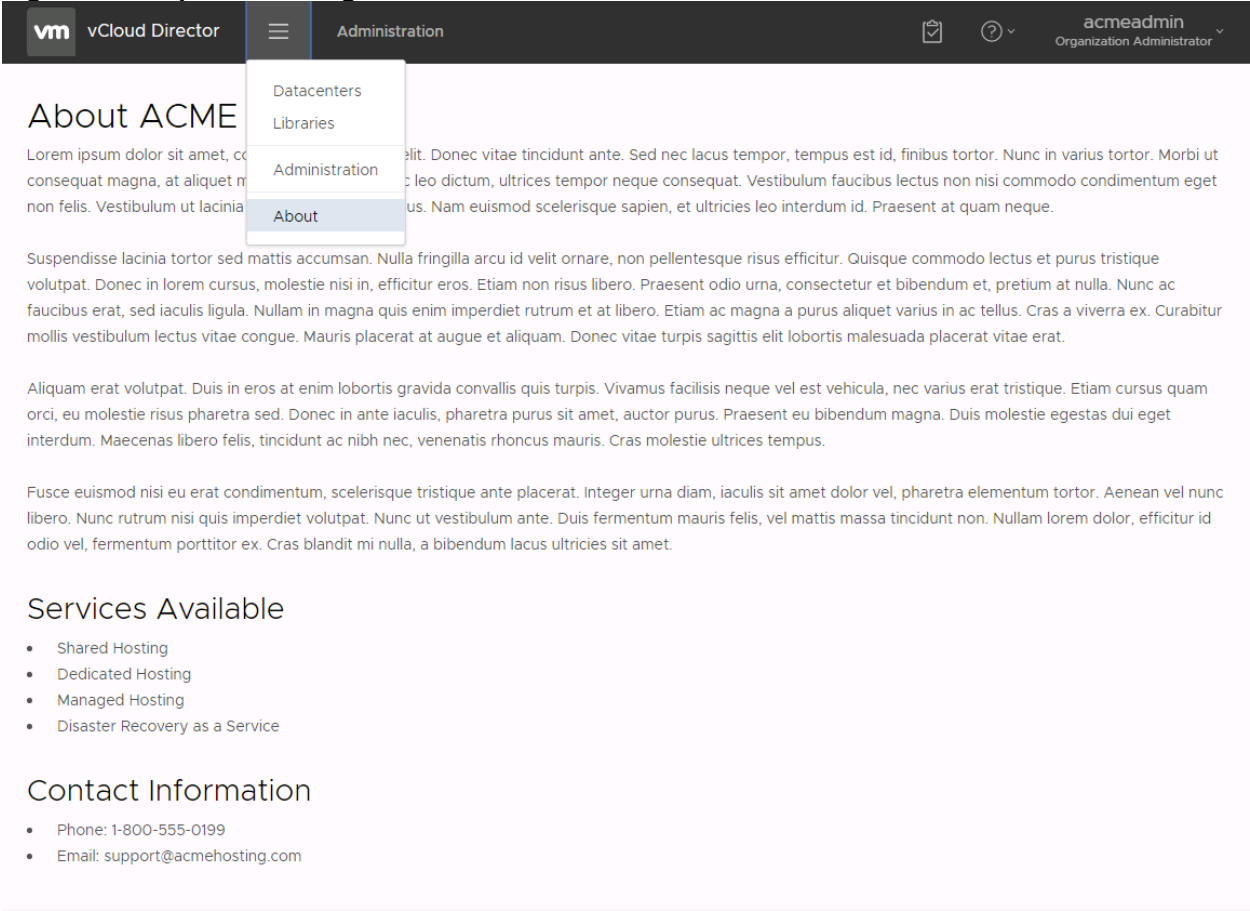
< HTTP/1.1 200 OK
< Date: Tue, 20 Feb 2018 16:34:29 GMT
< X-VMWARE-VCLLOUD-REQUEST-ID: 87d0466d-0def-418e-99b0-5e2cc7405d53
< Content-Type: application/json
< Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants
< Allow: HEAD,GET,OPTIONS
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model="List"
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";model="List"
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/json"
< Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json"
< Transfer-Encoding: chunked
<
* Connection #0 to host vcd-01a.corp.local left intact
[{"name":"ACME","id":"urn:vccloud:org:e46b03d6-46bc-4c95-94fc-27a6c78737a9"}]%
```

- For more information, see Appendix A.11 - Publishing Extension to Designated Tenants.

4.9 Loading the vCloud Director HTML5 UI

Log in to the vCloud Director HTML5 UI using an account associated with one of the published organizations. You can see the new extension appears directly on the vCloud Director interface. Verify that everything works properly.

Figure 3: Sample About Page



Editing Extensions

You can edit an extension and publish the modified extension source code.

1. Unpublish the extension from all tenants.
 - See Appendix A.12 - Unpublishing Extension from All Tenants
2. Delete the extension source file.
 - See Appendix A.8 - Deleting Extension Source File
3. Modify the code.
4. Upload and publish the new extension.
 - See Section 4.5 - Building the Code
 - See Section 4.7 - Uploading the Extension File
 - See Section 4.8 - Publishing the Extension
 - See Section 4.9 - Loading the vCloud Director HTML5 UI

Deleting Extensions

You can delete an extension.

1. Un-publish the extension from all tenants.
 - See Appendix A.12 - Unpublishing Extension from All Tenants
2. Delete the extension source file.
 - See Appendix A.8 - Deleting Extension Source File
3. Unregister the extension.
 - See Appendix A.5 - Unregistering Extension

Conclusion

This white paper describes how vCloud Director Portal Extensions works. This document also provides information about creating the static About Page directly inside the vCloud Director HTML5 portal, publishing new extensions, editing and deleting existing extensions.

From simple static web pages to complex web applications, vCloud Director Portal Extensions enable developers to create almost anything. It also enables Service Providers to enhance their offerings and differentiate themselves from the competition.

References

This section provides additional information pertinent to this document and its topics.

Document title	Link or URL
<i>VMware vCloud® Architecture Toolkit™ for Service Providers</i>	https://www.vmware.com/cloud-computing/cloud-architecture/vcat-sp.html
<i>VMware vCloud® Architecture Toolkit (vCAT) Blog</i>	https://blogs.vmware.com/vcat/
<i>VMware vCloud® API Programming Guide for Service Providers</i>	https://vdc-download.vmware.com/vmwb-repository/dcr-public/1b6cf07d-adb3-4dba-8c47-9c1c92b04857/9f039b76-fcc5-456f-9e6a-2fc41a46dded/vcloud_sp_api_guide_30_0.pdf
<i>Extending VMware vCloud® API with vCloud Extensibility Framework</i>	https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/vcat/vmware-vcloud-api-extension-whitepaper.pdf
<i>Portal Extensibility About Page Sample Code</i>	https://github.com/vmware/vcd-ext-sdk/tree/master/ui/samples/about_page
<i>vCloud Director UI Extensibility Plug-In Seed</i>	https://github.com/vmware/vcd-ext-sdk/tree/master/ui/vcd-plugin-seed
<i>Clarity Design System</i>	https://vmware.github.io/clarity/
<i>Node.JS®</i>	https://nodejs.org/
<i>Yarn</i>	https://yarnpkg.com/en/

Appendix A: API Endpoint Definitions

This section provides a list of all relevant API endpoints and sample return values.

A.1 Registering Extension

Endpoint	<code>https://<host>/cloudapi/extensions/ui</code>
Method	POST
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Sample Data	<code>{"pluginName":"AboutPage", "vendor":"VMware", "description":"An example About Page extension", "version":"1.0.0", "license":"Proprietary", "link":"http://www.vmware.com", "tenant_scoped": true, "provider_scoped": false, "enabled":true}</code>
Data Notes	pluginName: Name of plugin vendor: Vendor who developed the plugin description: Description of plugin version: Version of the plugin license: Free-form text field describing licensing information. link: Link to developer website tenant_scoped: Plugin only available to tenants provider_scoped: Plugin only available to Service Providers enabled: Global switch determining whether to load the plugin
Curl	<code>curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H 'x-vcloud-authorization: \$VCDSESSION' --data '{"pluginName":"AboutPage", "vendor":"VMware", "description":"An example About Page extension", "version":"1.0.0", "license":"Proprietary", "link":"http://www.vmware.com", "tenant_scoped": true, "provider_scoped": false, "enabled":true}' https://\$VCDHOST/cloudapi/extensions/ui</code>
Sample Response	<pre>< HTTP/1.1 201 Created < Date: Tue, 20 Feb 2018 15:53:45 GMT < X-VMWARE-VCLOUD-REQUEST-ID: 5f70de3d-d5ab-40a7-a9ee-c340700decd5 < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b < Allow: HEAD,DELETE,GET,OPTIONS,PUT < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact {"pluginName":"AboutPage","vendor":"VMware","description":"An example About Page extension","version":"1.0.0","license":"Proprietary","link":"http://www.vmware.com","tenant_scoped":true,"provider_scoped":false,"enabled":true,"id":"urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b","plugin_status":"unavailable","resourcePath":""}%</pre>

A.2 Retrieving All Extension Information

Endpoint	<code>https://<host>/cloudapi/extensions/ui</code>
Method	GET
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Curl	<code>curl -v -k -X GET -H 'Accept: application/json' -H 'Content-Type: application/json' -H 'x-vcloud-authorization: \$VCDSESSION' https://\$VCDHOST/cloudapi/extensions/ui/</code>

Sample Response	<pre>< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 15:57:13 GMT < X-VMWARE-VCLOUD-REQUEST-ID: 5ad01129-3a89-4cef-9dee-fd513bc4ef85 < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui < Allow: HEAD,POST,GET,OPTIONS < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui>;rel="add";type="application/json";model="UiPluginMetadata" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b>;rel="down";type="application/json";model="UiPluginMetadataResponse" < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact [{"pluginName":"AboutPage","vendor":"VMware","description":"An example About Page extension","version":"1.0.0","license":"Proprietary","link":"http://www.vmware.com","tenant_scoped":true,"provider_scoped":false,"enabled":true,"id":"urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b","plugin_status":"unavailable","resourcePath":""}]%</pre>
-----------------	--

A.3 Retrieving Individual Extension Information

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>
Method	GET
Headers	<pre>Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token></pre>
Curl	<pre>curl -v -k -X GET -H 'Accept: application/json' -H 'Content-Type: application/json' -H 'x-vcloud-authorization: \$VCDSESSION' https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b</pre>
Sample Response	<pre>< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:03:14 GMT < X-VMWARE-VCLOUD-REQUEST-ID: 18256f30-8dc6-4ebd-a9ad-048b36ff00e0 < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b < Allow: HEAD,DELETE,GET,OPTIONS,PUT < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui>;rel="up";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b>;rel="edit";type="application/json";model="UiPluginMetadata" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b>;rel="remove" < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact {"pluginName":"AboutPage","vendor":"VMware","description":"An example About Page extension","version":"1.0.0","license":"Proprietary","link":"http://www.vmware.com","tenant_scoped":true,"provider_scoped":false,"enabled":true,"id":"urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b","plugin_status":"unavailable","resourcePath":""}]%</pre>

A.4 Editing Extension Information

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>
Method	PUT
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Sample Data	{ "pluginName": "AboutPage", "vendor": "VMware", "description": "An example About Page extension", "version": "1.0.1", "license": "Proprietary", "link": "http://www.vmware.com", "tenant_scoped": true, "provider_scoped": false, "enabled": true }
Data Notes	pluginName: Name of plugin vendor: Vendor who developed the plugin description: Description of plugin version: Version of the plugin license: Free-form text field describing licensing information. link: Link to developer website tenant_scoped: Plugin only available to tenants provider_scoped: Plugin only available to Service Providers enabled: Global switch determining whether to load the plugin
Curl	curl -v -k -X PUT -H 'Accept: application/json' -H 'Content-Type: application/json' -H 'x-vcloud-authorization: \$VCDSESSSION' --data '{ "pluginName": "AboutPage", "vendor": "VMware", "description": "An example About Page extension", "version": "1.0.1", "license": "Proprietary", "link": "http://www.vmware.com", "tenant_scoped": true, "provider_scoped": false, "enabled": true }' https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b
Sample Response	< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:06:05 GMT < X-VMWARE-VCLOUD-REQUEST-ID: 0cffd31f-9048-4aca-923b-a3200fc5ce86 < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b < Allow: HEAD,DELETE,GET,OPTIONS,PUT < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b>;rel="down";type="application/json";model="UiPluginMetadataResponse" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b>;rel="remove" < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact { "pluginName": "AboutPage", "vendor": "VMware", "description": "An example About Page extension", "version": "1.0.1", "license": "Proprietary", "link": "http://www.vmware.com", "tenant_scoped": true, "provider_scoped": false, "enabled": true, "id": "urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b", "plugin_status": "unavailable", "resourcePath": "" }%

A.5 Unregistering Extension

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>
Method	DELETE
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>

Curl	<pre>curl -v -k -X DELETE -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b</pre>
Sample Response	<pre>< HTTP/1.1 204 No Content < Date: Tue, 20 Feb 2018 16:46:39 GMT < X-VMWARE-VCLOUD-REQUEST-ID: c6e8e726-bald-4afa-b58b-94e44dc377ad < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b < Allow: HEAD,DELETE,GET,OPTIONS,PUT</pre>

A.6 Preparing to Upload Extension Source Files

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>/plugin
Method	POST
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Sample Data	<pre>{"fileName":"plugin.zip", "size":3018}</pre>
Data Notes	fileName: Name of file size: Size of file
Curl	<pre>curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" --data '{"fileName":"plugin.zip", "size": 3018}' https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/plugin</pre>
Sample Response	<pre>< HTTP/1.1 204 No Content < Date: Tue, 20 Feb 2018 16:17:48 GMT < X-VMWARE-VCLOUD-REQUEST-ID: f2886e19-3c35-4ad4-b0d0-6fbf67b6152c < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/plugin < Allow: DELETE,POST,OPTIONS < Link: <https://vcd-01a.corp.local/transfer/464c7edd-2904-48ac-a670-4dec37064951/plugin.zip>;rel="upload:default";type="application/octet-stream"</pre>

A.7 Uploading Extension Source Files

Endpoint	https://<host>/transfer/<transfer-id>/<plugin-filename>
Method	PUT
Headers	Content-Type: application/zip x-vcloud-authorization: <session token>
Sample Data	data-binary of plugin.zip. Make sure the plugin has been recently built, using "npm run build"
Curl	<pre>curl -v -k -X PUT -H 'Content-Type: application/zip' -H "x-vcloud-authorization: \$VCDSESSION" --data-binary @plugin.zip https://\$VCDHOST/transfer/464c7edd-2904-48ac-a670-4dec37064951/plugin.zip</pre>
Sample Response	<pre>< HTTP/1.1 100 Continue * We are completely uploaded and fine < HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:25:44 GMT < X-VMWARE-VCLOUD-REQUEST-ID: 097ea911-2a95-4a7c-925e-3f0cc9483b88 < Content-Length: 0</pre>

Note The plugin.zip content is available on the vCloud Director cells at /opt/vmware/vcloud-director/tmp/uiPlugins.

Warning Uploaded extensions are placed in a web accessible location. Service Providers and tenant administrators must be cautious about offering, reviewing, or installing extensions. In addition, careful management of allowed extensions and use of appropriate safeguards can prevent plug-ins from loading malicious content.

A.8 Deleting Extension Source Files

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>/plugin
Method	DELETE
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Curl	curl -v -k -X DELETE -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/plugin
Sample Response	< HTTP/1.1 204 No Content < Date: Tue, 20 Feb 2018 16:45:14 GMT < X-VMWARE-VCLOUD-REQUEST-ID: d3b4d532-d085-4dfe-933b-ce01215183ce < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/plugin < Allow: DELETE,POST,OPTIONS < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui>;rel="up";type="application/json";model="List"

A.9 Retrieving a List of Tenants Associated with Extensions

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>/tenants
Method	GET
Request Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Curl	curl -v -k -X GET -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:62b18c79-57cb-4c31-aab4-cdf28cd8d9b4/tenants
Sample Response	< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:42:30 GMT < X-VMWARE-VCLOUD-REQUEST-ID: e117f167-6c50-4d72-841a-26fd9f92376e < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants < Allow: HEAD,GET,OPTIONS < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-

	<pre> 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/ json" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json " < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact [{"name":"System","id":"urn:vcloud:org:a93c9db9-7471-3192-8d09- a8f7eeda85f9"}, {"name":"ACME","id":"urn:vcloud:org:e46b03d6-46bc-4c95- 94fc-27a6c78737a9"}]]% </pre>
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A.10 Publishing Extension to All Tenants

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>/tenants/publishAll
Method	POST
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Curl	<pre> curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e- 2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publishAll </pre>
Sample Response	<pre> < HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:30:41 GMT < X-VMWARE-VCLLOUD-REQUEST-ID: 6fd79232-d7be-40f1-9238-48f1ff70ff9a < Content-Type: application/json < Location: https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d-3a2c7c8ff78b/tenants < Allow: HEAD,GET,OPTIONS < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model ="List" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";m odel="List" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/ json" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json " < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact [{"name":"System","id":"urn:vcloud:org:a93c9db9-7471-3192-8d09- a8f7eeda85f9"}, {"name":"ACME","id":"urn:vcloud:org:e46b03d6-46bc-4c95- 94fc-27a6c78737a9"}]]% </pre>

A.11 Publishing Extension to Designated Tenants

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>/tenants/publish
Method	POST
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>
Sample Data	[{"name": "Acme"}]
Data Notes	JSON containing a list of associative arrays, with the name as the key and the organization name as the value.
Curl	curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" --data '[{"name": "Acme"}]' https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish
Sample Response	< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:34:29 GMT < X-VMWARE-VCLLOUD-REQUEST-ID: 87d0466d-0def-418e-99b0-5e2cc7405d53 < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants < Allow: HEAD,GET,OPTIONS < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/json" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json" < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact [{"name": "ACME", "id": "urn:vcloud:org:e46b03d6-46bc-4c95-94fc-27a6c78737a9"}]]%

A.12 Unpublishing Extension from All Tenants

Endpoint	https://<host>/cloudapi/extensions/ui/<plugin-id>/tenants/unpublishAll
Method	POST
Headers	Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token>

Curl	<pre>curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublishAll</pre>
Sample Response	<pre>< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:31:46 GMT < X-VMWARE-VCLOUD-REQUEST-ID: e9e3ccf0-0f22-44fb-a8ff-c0e6263f4d62 < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants < Allow: HEAD,GET,OPTIONS < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";model="List" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/json" < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json" < Transfer-Encoding: chunked * Connection #0 to host vcd-01a.corp.local left intact []%</pre>

A.13 Unpublishing Extension from Designated Tenants

Endpoint	<code>https://<host>/cloudapi/extensions/ui/<plugin-id>/tenants/unpublish</code>
Method	POST
Headers	<code>Accept: application/json Content-Type: application/json x-vcloud-authorization: <session token></code>
Sample Data	<code>[{"name": "Acme"}]</code>
Data Notes	JSON containing a list of associative arrays, with the name as the key and the organization name as the value.
Curl	<pre>curl -v -k -X POST -H 'Accept: application/json' -H 'Content-Type: application/json' -H "x-vcloud-authorization: \$VCDSESSION" --data '{"name": "Acme"}' https://\$VCDHOST/cloudapi/extensions/ui/urn:vcloud:uiPlugin:ba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants/unpublish</pre>
Sample Response	<pre>< HTTP/1.1 200 OK < Date: Tue, 20 Feb 2018 16:40:51 GMT < X-VMWARE-VCLOUD-REQUEST-ID: 078845f4-280b-4cea-a215-d7800325b5dd < Content-Type: application/json < Location: https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-3a2c7c8ff78b/tenants < Allow: HEAD,GET,OPTIONS < Link: <https://vcd-01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e-2e5d-4e5f-867d-</pre>

	<pre> 3a2c7c8ff78b/tenants/publish>;rel="publish";type="application/json";model ="List" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/unpublish>;rel="unpublish";type="application/json";m odel="List" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/unpublishAll>;rel="unpublish:all";type="application/ json" < Link: <https://vcd- 01a.corp.local/cloudapi/extensions/ui/urn%3Avcloud%3AuiPlugin%3Aba3fad2e- 2e5d-4e5f-867d- 3a2c7c8ff78b/tenants/publishAll>;rel="publish:all";type="application/json " < Transfer-Encoding: chunked < * Connection #0 to host vcd-01a.corp.local left intact []% </pre>
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