Getting Started with API Extensions

API Extensions enable Kibo to run custom functions whenever certain actions occur on the platform. In this tutorial, you learn how to create an application that displays custom shipping rates to shoppers during the checkout process. After completing this tutorial, you will know how to use API Extensions and the actions it provides to add custom functionality to your site.

> All API extensions run with full trust at the SuperAdmin level, which means they are allowed all permissions and behaviors available on the platform by default. You do not have to manage behaviors for individual functions.

This guide will show you how to perform the below steps:

1. Create an application to contain the action files—hereby referred to as the*API Extension application*.
2. Set up the framework for the API Extension application using the ActionPack Generator for Yeoman, which generates the necessary project assets on your local machine.
3. Modify the JavaScript files generated by Yeoman to add your custom functionality to the appropriate action. In this case, the action is `http.commerce.catalog.storefront.shipping.requestRates.before`, which occurs when shipping rates are requested in Kibo.
4. Use Grunt to build the project assets on your local machine and upload them to the API Extension application.
5. With the assets uploaded, install the application to a sandbox.
6. From within the sandbox, use the Action Management JSON editor to enable the functionality of the application's action(s).

Once you are satisfied with an application, you certify it and deploy it to production just as you would any other application.

Before You Begin

Install the following software on your local machine.

- **Command Line Interface**: Provides a console or terminal environment in which to execute commands. If you are developing on a Windows machine, Kibo recommends you use the Windows command prompt. However, due to known Windows compatibility issues in Node.js, you may encounter issues when using the API Extension tools (for example, the tools may not register your keystrokes). If you encounter such issues, Kibo recommends you use a third-party console emulator, such as cmder, which plays nicer with Node.js.
- **Node.js**: Provides a platform for creating scalable network applications. Includes the npm package manager, which you use in this tutorial to install additional tools.
- **Grunt.js**: Provides a task manager that automates repetitive tasks. In this tutorial, you use Grunt to build your project files and upload them to the Dev Center.

- **Git (optional)**: Provides a version control system to manage your project files. When you set up your project files during the tutorial, you have the option of creating a Git repository for those files.

In addition to the listed software, you need access to aAdmin Account that:

- Is configured with API Extensions. Contact your Kibo representative to configure your tenant with the API Extension framework.
- Contains a sandbox configured with a working catalog. To test your application, you will view the live site on the sandbox, add items to the cart, and initiate the checkout process.

1. Create the Application in Dev Center

The first step is to create an API Extension application. This application will contain the custom function associated with the `request shipping rates` action. Later in this tutorial, you upload code to this application. After that, any sandbox to which you install this application benefits from the custom functionality.

To create the application:

1. In the Dev Center Console, click **Develop** > **Applications**.
2. Click **Create Application**.
3. Enter a **Name** and **Application ID** to identify your application. To keep your applications clearly organized, it is a best practice to use the same name for both fields.
4. Click **Save**.
5. Double-click your new application to edit it.
6. Note the **Application Key**. You will need this value later in the tutorial.

You just finished setting up the necessary application in Dev Center. In the next part of the tutorial, you set up the project files on your local machine.

2. Set Up the Framework for the Application

Now that you created the API Extension application in Dev Center, you can begin coding the actions for the application on your local machine. To save time, you use a tool called Yeoman, and its associated extension, to scaffold the project files quickly and efficiently. The Yeoman tool generates a directory structure, a set of JavaScript templates that correspond to the actions you choose to install, and a test framework that helps you validate your code before uploading it to Dev Center.

Install the Yeoman Generator

Use npm to install the Yeoman tool on your local machine:

1. Open a command prompt.
2. Enter `npm install -g yo@4.3.0` to install the Yeoman tool.

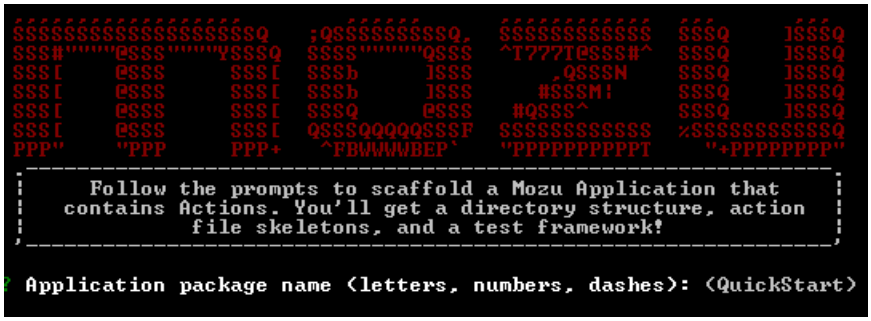
3. Enter `npm install -g generator-mozu-actions grunt-cli` to install the extension for Yeoman.

> Yeoman versions 5.0.0 and up are not supported and will cause crashes in later steps, so be sure to specify a lower version (such as 4.3.0) when installing.

Scaffold the Project Files

Decide where you want to store the project files on your local machine, and then run the Yeoman Generator to generate the necessary assets in your project folder:

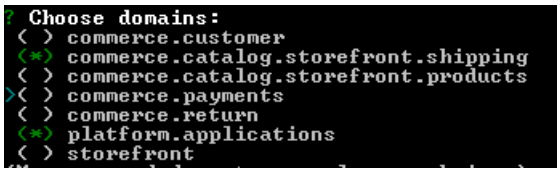
1. Create or navigate to the directory on your local machine that you intend to use as your project folder during development.
2. Open a command prompt in this directory.
3. Enter `yo mozu-actions` to run the Yeoman Generator.



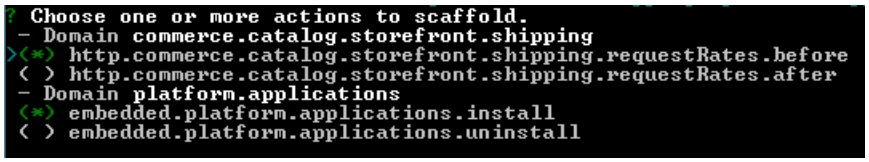
    1. Enter a name for your project. If you publish your application on npm for public consumption, this is the package name that other people will see.
    2. Enter a description of your application.
    3. Enter an initial version for your project or accept the default value in parentheses.
    4. Enter the Application Key for your application.
    5. Enter the email address you use to log in to Dev Center.
    6. Enter the password you use to log in to Dev Center.
    7. Select your developer account.
    8. Choose whether to create a Git repository for your project folder, if applicable.
    9. Specify a repository URL, if applicable.
    10. Choose a test framework. For this tutorial, choose **Mocha**.
    11. Enter **Y** to enable actions on install. This option saves you time by automatically enabling actions in the Action Management JSON Editor each time you install or update the application. If you don't enable this option, you will have to manually configure the JSON code before your application takes effect on a sandbox.
    12. Choose which domains to add to your project. Use the arrow keys to scroll up and down and use the spacebar to enable or disable a specific domain. Press the `Enter` key when you are done choosing. For this

tutorial, enable the following domains:

- **commerce.catalog.storefront.shipping**
- **platform.applications**

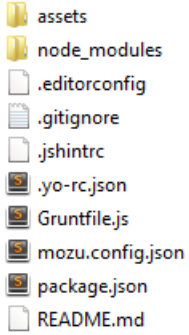


4. For each domain you selected, choose which actions to add to your project. For this tutorial, enable the following actions:
   - **http.commerce.catalog.storefront.shipping.requestRates.before**
   - **embedded.platform.applications.install**



5. Select **One (simple mode)** when prompted. This option specifies that you only want to create one action file for actions that can run more than one custom function. If you ever want to take advantage of the ability of certain actions to run more than one custom function, select **Multiple (advanced mode)**. You can then provide unique names for any number of functions attached to the action, separated by commas. For example, for an action that supports multiple custom functions, such as `http.storefront.routes`, selecting **Multiple (advanced mode)** and typing `functionA, functionB, functionC` creates three action files instead of one. The generator names the action files based on the function names you provide (ex: `functionA.js`) instead of defaulting to the name of the action (ex: `http.storefront.routes.js`) that the functions are attached to. In addition, the unique function names are automatically updated in the appropriate manifest file in the `src` directory.

After you select your actions, Yeoman generates the necessary files in your project folder.



If at a later point you want to add more actions to your project, open a command prompt in your project root and enter `yo mozu-actions:action`. This command lets you add additional actions to your existing project files without having to go through the rest of the setup prompts. Note that for the new actions to take effect, you have to either reinstall the application to your sandbox (if you chose to automatically enable actions on install when you ran the

Yeoman Generator the first time) or manually update the Action Management JSON editor with the new actions.

Also note that if Kibo adds new API Extension actions at a later date, you need to update the Yeoman Generator before you can scaffold the newly released actions. To update the Yeoman generator, use the `npm update -g generator-mozu-actions` command.

In the next part of the tutorial, you add code to the JavaScript files in the `assets` folder in order to provide custom shipping rates to shoppers.

3. Code the Action

Now that you have the necessary project files in place, add the code to return custom shipping rates any time a shopper goes through the checkout process. For the purposes of this tutorial, the custom shipping rates are retrieved by making an API call to an external random number generator and by accessing configuration data from the Action Management JSON Editor. These methods of retrieving shipping rates are not very practical but are useful for educational purposes, illustrating how you can utilize external services within API Extension applications as well as obtain JSON configuration data from within your sandbox. The tutorial also demonstrates how you can leverage an external npm library to manipulate one of the shipping method labels.

Locate the JavaScript File

Yeoman generates JavaScript files for every action you selected during configuration. The JavaScript files are organized by the domain the action belongs to. For this tutorial, locate the `http.commerce.catalog.storefront.shipping.requestRates.before.js` file:

1. Within your project folder, navigate to the `assets/src/domains` directory to view the domain folders that Yeoman generated.
2. Open the `commerce.catalog.storefront.shipping` folder, and then open `http.commerce.catalog.storefront.shipping.requestRates.before.js` for editing. This file corresponds to the action that manipulates the HTTP request and response when a shipping rate request occurs on your site.

   The following image shows the default code included in the file.

```
module.exports = function(context, callback) {
  callback();
};
```

Add the Custom Code to the Action

Edit the JavaScript file to add custom functionality:

1. Add code to match the following code block:

```
// Require the https library, which is already installed with API Extensions
var https = require('https');

// Require the flip-text library, which you must then install using 'npm install --save flip-text'. T
his command adds the library as a dependency in your package.json file.
var flipText = require('flip-text');
```

```
module.exports = function(context, callback) {


// Request an array of one random number from an online generator
https.get("https://qrng.anu.edu.au:443/API/jsonI.php?length=1&type=uint8", function(respon
se) {

  // Process the response from the random number generator and place the 'data' value in 're
sult'
  var buf = '';

  response.on('data', function(chunk) {
    buf += chunk.toString();
  });

  response.on('error', callback);

  response.on('end', function() {

    var result = JSON.parse(buf);


    // Access the context of the 'http.commerce.catalog.storefront.shipping.requestRates.befor
e' action to modify the shipping rates for the site
    context.response.body = {
        "resolvedShippingZoneCode": "United States",
        "shippingZoneCodes": [
          "United States",
          "Americas"
        ],
        "rates": [
          {
          "carrierId": "custom",
          "shippingRates": [
              {
                "code": "Rate1",
                "content": {
                  "localeCode": "usd",
                  "name": "Random Number"
                },
                // Use the random number (divided by 10 to filter larger numbers) as the first shippi
ng amount
                "amount": result.data[0] / 10,
                "shippingItemRates": [],
                "customAttributes": [],
                "messages": [],
                "data":{test:"random", prop2:"object data"}
              },
              {
                "code": "Rate2",
                "content": {
                  "localeCode": "usd",
                  "name": "Number from Configuration"
                },
                // Use the 'shippingAmount' value from the action-level configuration data as the se
cond shipping amount
                "amount": context.configuration.shippingAmount,
                "shippingItemRates": [],
                "customAttributes": [],
```

```
            "customAttributes": [],
            "messages": [],
            "data":{test:"random", prop2:"object data"}
          },
           {
            "code": "Rate3",
            "content": {
              "localeCode": "usd",
              // Use the flip-text library to display shipping method label upside down
              "name": flipText("Upside Down Number from Configuration")
            },
            // Use the 'shippingAmount2' value from the application-level configuration data as
the third shipping amount
            "amount": context.configuration.shippingAmount2,
            "shippingItemRates": [],
            "customAttributes": [],
            "messages": [],
            "data":{test:"random", prop2:"object data"}
          }
        ],
        "customAttributes": []
      }
    ]
  };


  context.response.end();

  callback();
 });
});
};
```

2. Save the file.
3. Note that the code references an external library, 'flip-text'. To install this library, open a command prompt and enter `npm install --save flip-text`. This command installs the flip-text library on your local machine and lists the library as a dependency in your project's `package.json` file.

Configure the Testing Framework

API Extensions provide a testing framework that simulates running applications by providing a mock context. You can use this testing framework to verify that your code works as expected before uploading it to Dev Center. The testing framework checks the files in your project for errors and runs the simulations that you configure in the test files. For this tutorial, complete the following steps to configure the testing simulation for your application:

1. Within your project folder, navigate to the `assets/test` directory to view the test files that Yeoman generated.
2. Open the `http.commerce.catalog.storefront.shipping.requestRates.before.t.js` file for editing. This file runs tests for the `http.commerce.catalog.storefront.shipping.requestRates.before` action.
3. Add code to match the following code block:

```
'use strict';

// Require the 'mozu-action-simulator', which provides a mock context to test your application
```

```
 before you upload it to Platform Manager
var Simulator = require('mozu-action-simulator');
var assert = Simulator.assert;

describe('http.commerce.catalog.storefront.shipping.requestRates.before', function () {

  var action;

  before(function () {
    action = require('../src/domains/commerce.catalog.storefront.shipping/http.commerce.cata
log.storefront.shipping.requestRates.before');
  });

  it('runs successfully', function(done) {

    // Specify a sufficient timeout for the random number generator to return a response
    this.timeout(10000);

    var responseEndCalled = false;

    // For testing purposes, provide the configuration data that you will set in the Action Manag
ement JSON editor
    var context = Simulator.context('http.commerce.catalog.storefront.shipping.requestRates.
before', callback);
    context.configuration = { shippingAmount : 17};
    context.configuration = { shippingAmount2 : 25};

    var callback = function(err) {

      // Confirm that the data you access through the context argument matches your assumed
 structure
      assert(!err, "Callback was called with an error: " + err);
      assert(responseEndCalled, "The action never called context.response.end() as we expect
ed.");
      assert(context.response.body, "No body set on context.response.");

      var body = context.response.body;

      assert(Array.isArray(body.rates), "body.rates is not an array");

      assert.equal(body.rates.length, 1, 'body.rates was supposed to have 1 entries, it had ' +
body.rates.length);

      body.rates.forEach(function(rate) {
        assert(Array.isArray(rate.shippingRates), "rate.shippingRates is not an array");
      assert.equal(rate.shippingRates.length, 3, 'rate.shippingRates was supposed to have 3 en
tries, it had ' + rate.shippingRates.length);
        assert(rate.shippingRates[0].amount > 0 && rate.shippingRates[0].amount < 65535, "R
andom number is out of range: " + rate.shippingRates[0].amount)
      });

      done();
    };



    context.response.end = function() {
      responseEndCalled = true;
    };
```

```
    // modify context as necessary

    /*
     the request/response pair will be a static mock.
     if you need an actual stream, use http!
     example:

     var http = require('http');
     var server = http.createServer(function(req, res) {
      context.request = req;
      context.response = res;
      assert(Simulator.simulate('http.commerce.catalog.storefront.shipping.requestRates.befor
e', action, context, callback));
     }).listen(9000);
     http.get('http://localhost:9000/', function(req, res) {
      // add the request body here
     });
    */

    Simulator.simulate('http.commerce.catalog.storefront.shipping.requestRates.before', actio
n, context, callback);
  });
});
```

4. Save the file.
5. In your project folder, navigate to the `assets/test` directory and then open the `embedded.platform.applications.install.t.js` file for editing. This file runs tests for the action that occurs whenever you install the application to a sandbox.
6. For this tutorial, you instruct the testing framework to skip over tests for this action (which is only active to enable the `request shipping rates` action when you install the application to a sandbox). Locate the `describe` function and change it to `xdescribe`, as shown in the following code block:

   ```
   xdescribe('embedded.platform.applications.install', function () {...
   ```

7. Save the file.

Now it's time to build and upload the project assets to Dev Center.

4. Build the Project Assets

After coding the action's custom functionality, use Grunt to validate and build the project assets. If there are no errors, Grunt uploads the assets to Dev Center. To learn more about the available Grunt commands, click here.

1. Open a command prompt in the root of your project folder.
2. Enter `grunt`.
3. When prompted, enter the password you use to log in to Dev Center.
4. Verify that the build is successful and that the files upload without errors.

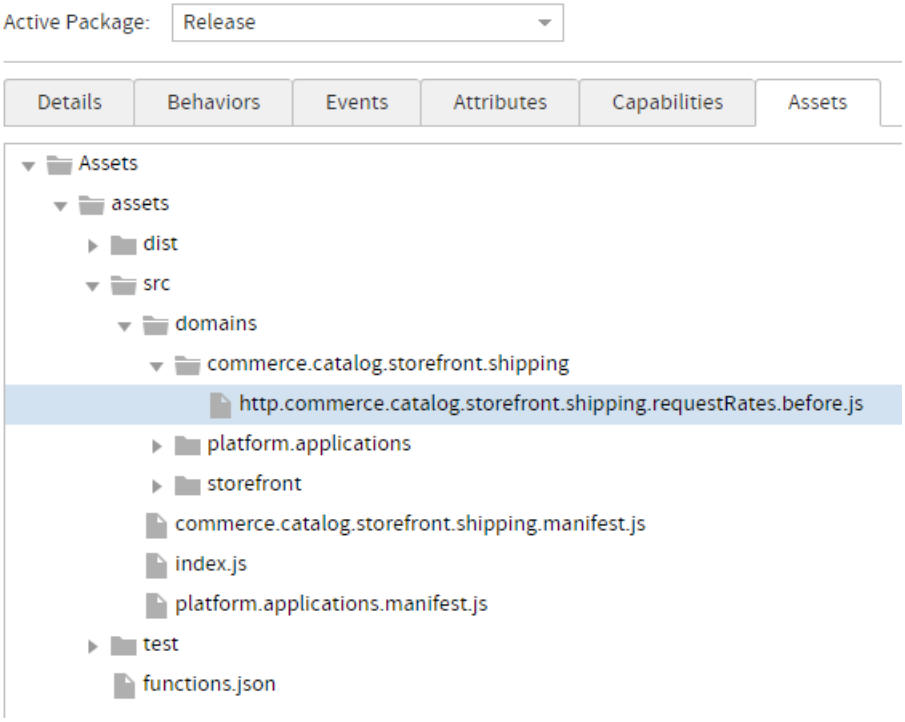
```
>> Uploaded 5 files for a total of 5.80 KB in application
>> "ib31324.javieropenaction.1.0.0.release"
>> 2 files were omitted because Developer Center has an identical file. Set the
>> option `ignoreChecksum` to true to override.

Done, without errors.
```

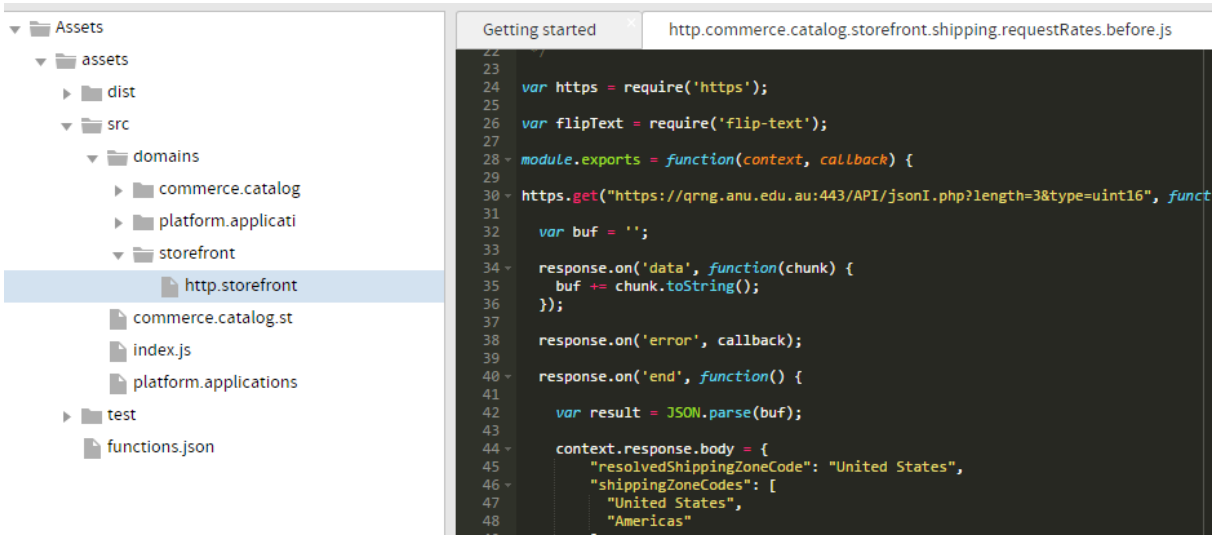
View the Assets in Dev Center

After you run Grunt, you can view the uploaded assets in Dev Center:

1. Log in to Dev Center.
2. Click **Develop** > **Applications**.
3. Open your application.
4. Open the **Packages** tab.
5. Click **Assets**.
6. Expand the folders to view the uploaded files, which should match the assets on your local machine.



7. Double-click a file to confirm any edits you have made.

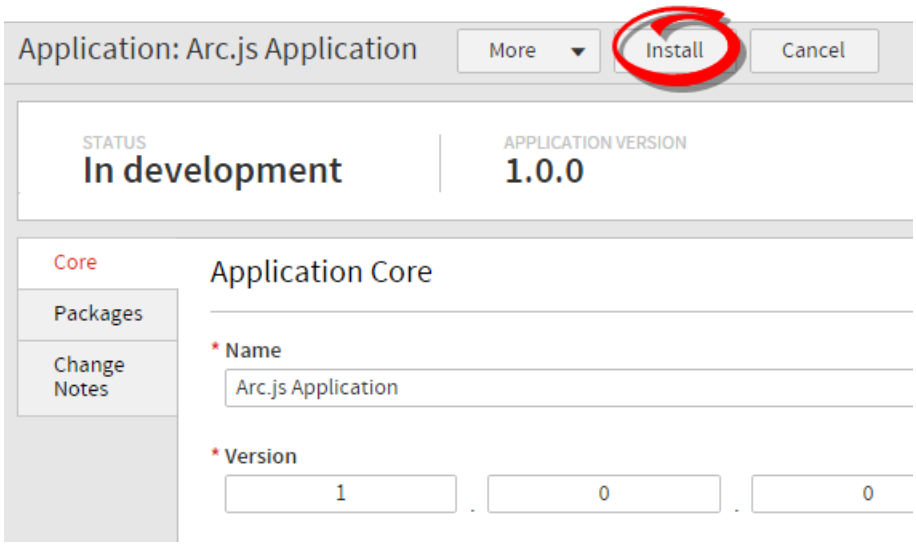


With your assets uploaded to Dev Center, you can now install them to the sandbox of your choice.

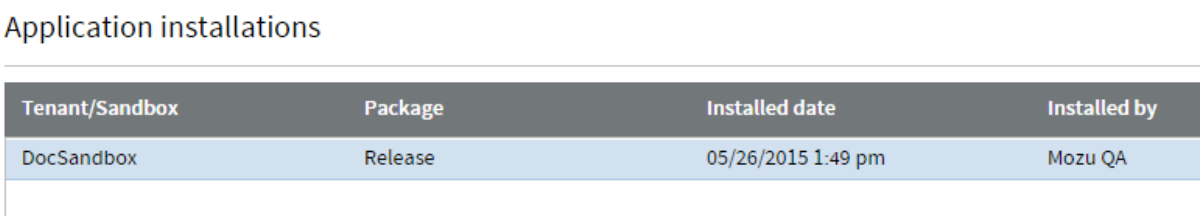
5. Install the Application to a Sandbox

In this part of the tutorial, you install the application to the sandbox of your choice, making the custom shipping functionality available to that sandbox:

1. In Dev Center, open your application to view its details.
2. Click **Install**.



3. Select a sandbox to install the application to.
4. Click **OK**.
5. After a successful installation, open the **Core** tab. You can view which sandboxes you've installed the application to under **Application installations**.



After installing the application, you need to enable its functionality from within the sandbox itself. You complete this task in the next part of the tutorial.

Note: Setting Up Enable Actions on Install

When setting up your API Extensions application, you can install the function automatically without manually changing the Action Management Definition JSON. This `Enable actions on install?` option will add a custom function to the embedded.platform.applications.install action when set to Yes. This option is first encountered during the project scaffolding process of Step #2.

If enabling this option does not work, make sure that these lines are included in any one of your manifest files (e.g. `assets/src/storefront.manifest.js`):

```
'embedded.platform.applications.install': {
  actionName: 'embedded.platform.applications.install',
  customFunction: require('./domains/platform.applications/embedded.platform.applications.install.
js')
}
```

This will make sure that the manifest includes the auto enable code when installing your application to a sandbox.

6. Enable the Action

After you install the application to a sandbox, enable its functionality from within the sandbox using Kibo'sbuilt-in JSON editor. In short, this editor is where you specify which installed actions to enable, which configuration parameters the actions use, and which log level the actions write to.

To open the Action Management JSON editor:

1. Under **Application installations** in your application's **Core** tab, double-click the sandbox to which you installed the application. The sandbox opens to the Admin dashboard.
2. Got to **System** > **Customization** > **API Extensions** to bring up the JSON editor.

Because you chose to automatically enable actions when you ran the Yeoman Generator, the JSON editor should be prepopulated with the code required to enable the action (as shown in the following image) so you don't have to take additional steps to enable the action. However, you do have to specify the custom configuration data for your shipping rates, as detailed in the next section.

```
{
    "actions": [
        {
            "actionId": "http.storefront.pages.global.request.after",
            "contexts": [
                {
                    "customFunctions": [
                        {
                            "applicationKey": "TYPE YOUR APPLICATION KEY HERE",
                            "functionId": "http.storefront.pages.global.request.after"
                        }
                    ]
                }
            ]
        }
    ],
    "configurations": [],
    "defaultLogLevel": "info"
}
```

Add Custom Configuration Data

The example in this tutorial obtains a random shipping rate from an online service, but it also obtains shipping rates from configuration data that you set in the Action Management JSON Editor. Complete the following steps to add this configuration data:

1. Add a `"configuration"` array to the `"customFunctions"` array. This array provides configuration data to a specific function. If the data from this configuration conflicts with the application-level configuration data, the data from this configuration takes precedence.
2. Add a `"shippingAmount": 17` key-value pair to the array you created.
3. Add an `"applicationKey"` field and a `"configuration"` array to the `"configurations"` array. This array provides configuration data to the entire application.
4. In the array you created, enter the application key for your application and add a `"shippingAmount2": 25` key-value pair.

Your JSON should match the following code block:

```
{
  "actions": [
    {
      "actionId": "http.storefront.pages.global.request.after",
      "contexts": [
        {
          "customFunctions": [
            {
              "applicationKey": "YOUR APPLICATION KEY HERE",
              "functionId": "http.storefront.pages.global.request.after",
              "enabled": true,
              "configuration": {
                "shippingAmount": 17
              }
            }
          ]
        }
      ]
    }
  ],
  "configurations": [
    {
      "applicationKey": "YOUR APPLICATION KEY HERE",
      "configuration": {
        "shippingAmount2": 25
      }
    }
  ],
  "defaultLogLevel": "info"
}
```

You added configuration data that the `request shipping rates` action can access and are now ready to test the custom functionality of your API Extension application.

Next Steps

You should now be ready to create more advanced functionality using actions. Remember to leverage thereference help as you create your own API Extension application.