webMethods API Gateway Staging and Promotion

Version 10.11

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About this Documentation

This documentation describes how you manage Stages, asset promotions and required rollbacks in API Gateway.

Document Conventions

Convention	Description
Bold	Identifies elements on a screen.
Narrowfont	Identifies service names and locations in the format *folder.subfolder.service*, APIs, Java classes, methods, properties.
Italic	Identifies:
	Variables for which you must supply values specific to your own situation or environment. New terms the first time they occur in the text. References to other documentation sources.
Monospace font	Identifies:
	Text you must type in. Messages displayed by the system. Program code.
{ }	Indicates a set of choices from which you must choose one. Type only the information inside the curly braces. Do not type the { } symbols.
|	Separates two mutually exclusive choices in a syntax line. Type one of these choices. Do not type the | symbol.
[ ]	Indicates one or more options. Type only the information inside the square brackets. Do not type the [ ] symbols.
...	Indicates that you can type multiple options of the same type. Type only the information. Do not type the ellipsis (...).

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1 Stages

Stages, Promotions, and Rollbacks

API Gateway supports staging and promotion of assets. In a typical enterprise-level, solutions are separated according to the different stages of Software Development Lifecycle (SDLC) such as development, quality assurance (QA), and production stages. As each organization builds APIs for easy consumption and monetization, continuous integration (CI) and continuous delivery (CD) is an integral part of the solution. CI is a development practice that requires developers to integrate code into a shared repository several times a day and CD is a software engineering approach in which teams produce software in short cycles, ensuring that the software can be reliably released at any time. Development of assets starts at the development stage and once the assets are developed, they are promoted to the QA stage for testing, after testing of the assets is complete, the assets are promoted to the deployment stage.
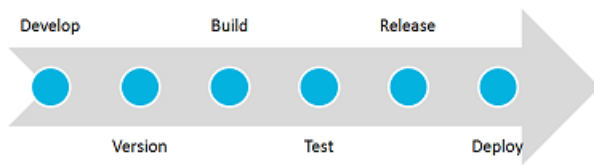
API Gateway provides tools and features to automate your CI and CD practices. Modifications made to the APIs, policies, and other assets can be efficiently delivered to the application developers with speed and agility. For example, When you publish new applications, the API definitions change. These changes are to be propagated to application developers. The API provider has to update the associated documentation for the API or application. In most cases this process is a tedious manual exercise. You can use API Gateway staging and promotion to address such cases to automate API and policy management that makes deployment faster, introduces continuous innovation with speed and agility. This ensures that new updates and capabilities are automatically, efficiently, and securely delivered to their developers and partners, in a timely fashion and without manual intervention.

API Gateway provides the staging and promotion feature to automate the CI and CD practices. Modifications made to the APIs, policies, and other assets can be efficiently delivered to the application developers with speed and agility.

Staging and promotion allows you to:

■ Promote all the run time assets such as API Gateway APIs, aliases, applications, policies, or admin configurations across different stages.

■ Select and promote a subset of assets from one stage to another stage. For example, you can promote a single API and its dependencies from one stage to another.

■ Optionally select the asset's dependencies during the promotion.

■ Create stage-specific aliases.

When promoting an alias from source stage to target stage, API Gateway checks if the target stage already has an alias. If so, then API Gateway replaces the existing alias in target stage with the alias that is promoted from source stage.

■ Roll back assets in case of incomplete information.

■ Repromote assets, if there are any recent changes, to the already promoted stages.

> **Note:**
> Software AG recommends you to have API Gateway instances across stages to be completely independent. For example, the API Gateway instances from the development stage and the API Gateway instances from the QA stage must not share any resources in common such as databases.

Manage Stages

The fundamental phases of assets starts with requirements or needs at the development stage and once the assets are developed, they are promoted to the QA stage for testing, after testing of the assets is complete, the assets are promoted to the production stage.

An asset's overall lifecycle can be split across two or more API Gateway instances. For example, assets that are in the development and test phases of their lifecycle can be maintained in one instance and assets that are deployed (that is, in production) can be maintained in a separate instance.

When the asset's lifecycle is split across multiple API Gateway instances, each participating instance is referred to as a stage. A stage definition in API Gateway describes an API Gateway instance by its name and configuration information.

> **Note:**
> Software AG recommends you to have API Gateway instances across stages to be completely independent. For example, the API Gateway instances from the Development stage and the API Gateway instances from the QA stage must not share any resources in common such as databases.

Adding a Stage

Pre-requisites:

You must have the Manage promotions functional privilege assigned to perform this task.

API Gateway can contain one or more stages. You define a stage to represent the asset's lifecycle such as development, test, and production.

≫ **To add a stage**

1. Expand the menu options icon , in the title bar, and select **Promotion management** > **Stages**.

2. Click **Add Stage**.

3. Provide the following information in the Basic information section:

Field	Description
Name	Mandatory. Name of the stage.
	Note: A stage name must be unique within API Gateway.
Description	Description of the stage.

4. Provide the following information in the Technical information section:

Field	Description
Stage URL	The URL of the host machine where the stage is deployed on an API Gateway installation.
	The **Stage URL** value is specified in the format, `scheme://host:port`. The scheme is `http` or `https`. The `host` is the host name of the machine on which the target API Gateway instance is running. The `port` is the port number of the target API Gateway instance.
Username	The username of a registered API Gateway user who has the Manage promotions or Manage assets functional privilege in the target API Gateway instance.
Password	A valid password of the API Gateway user identified by the attribute **Username**.
Keystore alias	The alias of the keystore containing the private key that is used for performing asset promotion from one (source) stage to another (target) stage.
	The **Keystore alias** field contains a list of the available keystore aliases in API Gateway. If there are no configured keystore aliases, this field lists the default Integration Server keystore, `DEFAULT_IS_KEYSTORE`.
	Note: This field is required when the **Stage URL** scheme is set to `https` with Two-way SSL.
Key alias (signing)	The alias of the private key that is stored in the keystore specified by the keystore alias.
	The **Key alias** field contains a list of the available aliases in the selected keystore. If there are no configured keystores, this field is empty.
	Note: This field is required when the **Stage URL** scheme is set to `https` with Two-way SSL.

5. Click **Save**.

   The stage gets created and is displayed in the stages list on the Promotion Management > Stages screen. You can click **Test** to test the configuration before saving the details for creating a stage.

Viewing Stage List and Stage Details

The **Stages** tab displays a list of the available stages in API Gateway.

In addition to viewing the list of stages, you can also examine the details of a stage and delete a stage in the **Stages** tab.

> **To view the stage list and stage details**

1. Expand the menu options icon , in the title bar, and select **Promotion management** > **Stages**.

   The **Stages** tab displays a list of available stages.

   This tab displays the following information about each stage:

Column	Description
Name	Name of the stage.
Description	The description for the stage.

2. Click the required stage whose details you want to examine.

   The Stage details page appears. The stage details are displayed in the following sections:

   ■ **Basic information**: This section contains the stage name and description.

   ■ **Technical information**: This section contains the stage specific URL, authentication credentials to access the stage, and the keystore configurations.

Modifying Stage Details

Pre-requisites:

You must have the Manage promotions functional privilege assigned to perform this task.

You can modify the basic or the technical information of a stage at any time.

> **To modify the stage details**

1. Expand the menu options icon , in the title bar, and select **Promotion management** > **Stages** .

   The **Stages** tab displays a list of available stages.

2. Click the required stage whose details you want to modify.

   The Stage details page appears.

3. Click **Edit**.

   This opens the basic information of the stage.

4. Modify the basic information as required.

5. Click **Technical information**.

   This opens the technical information of the stage.

6. Modify the technical information as required.

7. Click **Save**.

Deleting a Stage

Pre-requisites:

You must have the Manage promotions functional privilege assigned to perform this task.

You delete a stage to remove it from API Gateway permanently. You can remove a stage at any time.

> **To delete a stage**

1. Expand the menu options icon , in the title bar, and select **Promotion management** > **Stages**.

   The **Stages** tab displays a list of available stages.

2. Click the **Delete** icon for the stage that you want to delete.

3. Click **Yes** in the confirmation dialog.

2 Promotion

Manage Promotions

Promotion refers to moving API Gateway assets from the source stage to one or more target stages. When you promote an asset from one stage to another, the asset's metadata is copied from the source instance to the target instance. For the list of assets and configuration settings that can be promoted, see the Export and Import of Assets and Configurations section in *webMethods API Gateway User's Guide* .

When you have three stages namely *Dev, QA*, and *Prod*, you can promote assets in the given sequence. That is, you can promote assets from stage 1 to stage 2, and from there to stage 3.

To promote assets from first stage, you create aliases of those assets that you want to promote to the second stage and promote them. Similarly, from the second stage you create aliases of assets that you want to promote to the third stage and promote them. The following illustration shows the flow:
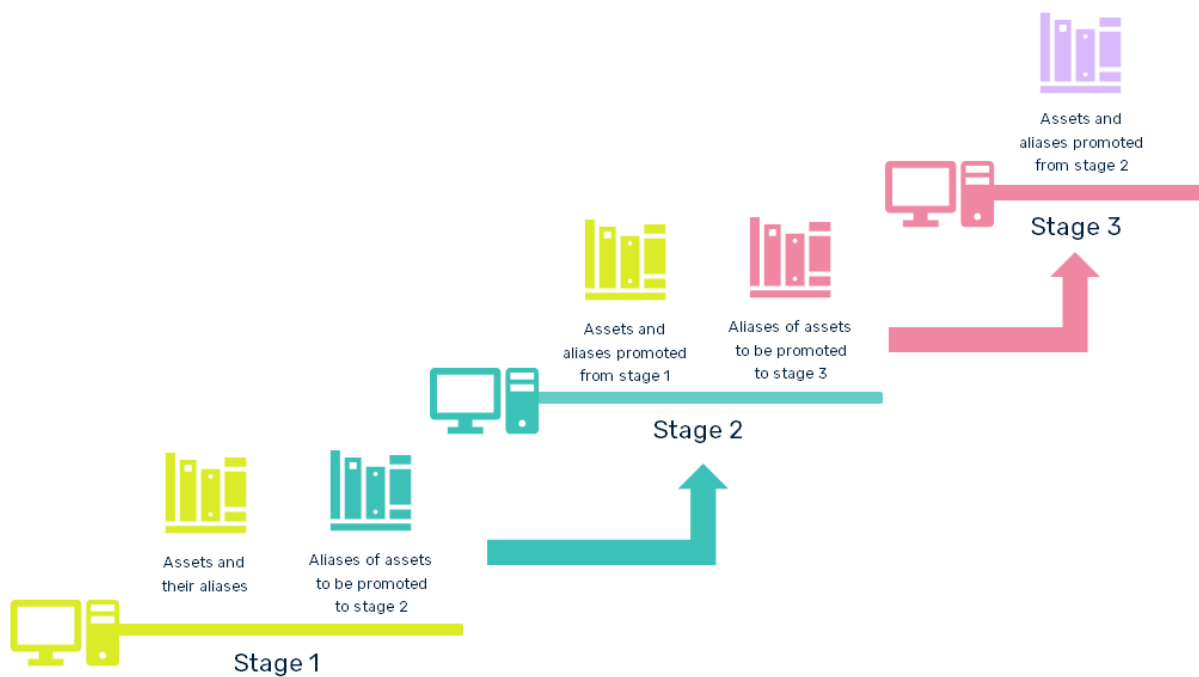
Assets can have aliases that are associated to a target stage and aliases without a target stage. When you promote to a target stage, the aliases associated to the particular target stage are promoted to the target stage. If an asset has no alias that is created for the target stage, then aliases that are not associated are included in the promotion.

> **Note:**
> During the promotion process ensure that both the source and the target system have the same master password. For more information on promoting assets using the API Gateway, see "Promoting Assets from API Gateway User Interface" on page 17.

Assets that are dependencies for the asset are also promoted. The required dependencies of an asset are always promoted with the asset. However, you can choose which optional dependencies are promoted at the time of promoting the asset. For example, at the time of promoting an API,

the policies and aliases used by the API are always promoted. However, you can choose which dependent applications are promoted as applications an optional dependency for APIs. You can choose to promote all or no application, or select specific applications that you want to included with the API in the promotion.

The following table lists the required and optional dependencies of assets that are supported by promotion management.

Asset	Dependencies (Required)	Dependencies (Optional)
APIs	Policies, Aliases	Applications
Applications	APIs	---
Packages	APIs, Plans, Policies, Subscriptions	---
Plans	Policies	---
Subscriptions	Packages, Plans	Applications
Teams	---	Group
Approval configurations	Teams	---
Configuration > Keystore	Keystore, Truststore	---
Email destination	---	Truststore
Group	---	User
JMS Connection alias	JNDI provider alias	---
LDAP configuration	Group	---
Password expiry settings	---	User
Port (https)	Keystore, Truststore	---
Service Registry	Keystore, Truststore	---
Web service endpoint alias	Teams, JMS, JNDI, JMS trigger, Keystore, Truststore	---
Custom destinations	Keystore, Truststore, Aliases	---

Note:
Till API Gateway version 10.3, promotion management supported only the simple and endpoint types of aliases. Starting from API Gateway version 10.4, all types of aliases are supported.

Promoting Assets from API Gateway User Interface

Pre-requisites:

You must have the Manage promotions functional privilege assigned to perform this task.

Promoting assets from one (source) stage to another (target) stage includes the following high-level steps:

1. **Authorization server promotion:** Promote Authorization server in one of the following ways:

   ■ Export the authorization server from one environment and import it into another, if you want to use the same authorization server across multiple environments.

   ■ Create the authorization server with the same name as in the current environment, if you want to use a different authorization server instance.

   Proceed to the next step once the authorization server is ready.

2. **Select assets for promotion:** During this step, you search for assets by using a keyword and by performing a type search that sorts and filters the results.

   ■ **Search using a keyword**: You can search for all assets whose string attributes (asset name, description, and so on) contain a certain keyword (character string).

   ■ **Search using a Type**: You can search for assets on the basis of types.

   You may use the **Search by type** filter to restrict the types on which the search is conducted. In the **Search by type** panel, API Gateway shows you a list of supported asset types.

   ■ **Search by team**: You can search for assets assigned to team(s). Click the team(s) to view the assets that are assigned tot he selected team(s).

   ■ **Search using two keywords**.You can provide more than one keyword by separating the keywords using a pipe symbol (|). For example, to search for assets whose names contain *pet* and *test*, you can provide `pet|test` in the search field.

   ■ **Search using wild card characters**. You can use wild card characters in your search keyword. For example, to list all assets that start with *graph*, you can provide `graph*`.

3. **Optionally select assets' dependencies for promotion:** During this step, you specify whether the dependencies (for example, a list of applications that are registered for an API, subscriptions for a package, and so on) of the selected assets will be included for the promotion.

   > **Note:**
   > As groups and users are part of the team, if you want to promote the Groups and Users (optional dependencies) of the team that the selected asset belongs to, you have to set the **enableTeamWork** extended setting to `true`. Only then the **Groups** and **Users** sections appear.

4. **Select the stages to promote:** During this step, you specify one or more target stages to which you want to promote the selected assets and their dependencies.

5. **Configure the promotion details:** During this step, you provide the promotion-specific information.

6. Ensure that you are promoting the assets from an lower version of API Gateway to a higher version of API Gateway. You cannot promote assets from a higher version to a lower version

of API Gateway. For example, if you are using API Gateway v10.11, you can promote the assets from this version to v10,15 and other higher versions. You cannot promote assets back to the v10.7, v10.5, and so on.

Important:
If you plan to perform bulk promotion of assets from a source stage to a target stage, Software AG recommends you to perform the following:

■ Increase the value of **maxRegexLengthInSearchQuery** setting on the **Extended Settings** page under `Administration > General` in both the source and target stages, considering that the generated RegEx search query length may become longer during bulk promotion of assets. The default value of this property is `37000`. When you increase the value, it can lead to higher memory and CPU utilization, particularly when dealing with complex regular expressions. Therefore, Software AG recommends to closely monitor any spike in memory and CPU usage while promoting assets. For example, if your RegEx search query's length is more than `37000`, asset promotion fails indicating that the length of RegEx used in RegEx Query request has exceeded the allowed maximum. In such case, you must increase the value of maxRegexLengthInSearchQuery setting to more than the value specified in the error message.

■ Increase the value of the **pg.gateway.elasticsearch.http.socketTimeout** property, located at *SAG_Install_Directory*/IntegrationServer/instances/*IS_Instance_Name*/ `packages/WmAPIGateway/config/resources/elasticsearch/config.properties`. The default value of this property is `3000`. To bulk promote assets, for example, 50 numbers, you would set the value of this property to `60000`. Depending on the number of assets you want to promote, increment the value as `70000`, `80000`, and so on. You must restart API Gateway for changes to this property to take effect.

≫ **To promote assets**

1. Expand the menu options icon , in the title bar, and select **Promotion management**.

2. Select **Promotions**.

   The Promotions page appears.

3. Click **+ Promote**.

4. In the **Search by keyword** text box, type the keyword to search for assets. You can use one or more wildcards to specify the keywords.

Note:
You can search multiple times for the same type while retaining the previous search results.

API Gateway returns the assets that match the specified keyword.

5. In the **Search by type** drop-down list, select the required type(s). Select the **All** check box to search across all asset types.

Important:
Authorization server, External Authorization server, and Providers are listed under the Aliases category. To select any of these assets, select the Aliases check box and then choose the required asset.
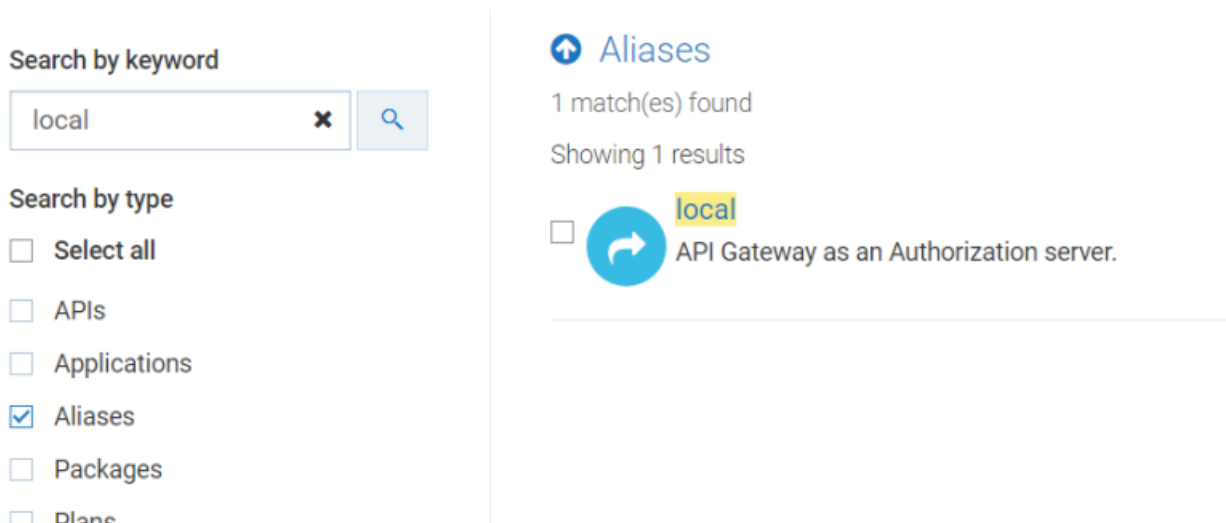
API Gateway returns the assets that match the selected type(s). The number of search results is displayed in the results area, for example, Showing 10 results. If no results are found, the results area is displays a blank page.

6. Optional. Select the **Include admin configurations** check box if you want to include administrative configurations in the promotion.

    API Gateway displays the administrative configurations that are supported for promotion.

    Important:
    Before you configure API Gateway to promote an administrative configuration, make sure that the corresponding administrative settings are already configured in API Gateway. For example, to include the Load balancer configuration in the asset promotion set, the required Load balancer URLs should be configured.

7. Select the assets and the administrative configurations that you want to promote.

8. Click **Next**.

    The Assets and dependencies page appears.

9. Select the referenced assets that you want to promote.

10. Click **Next**.

    The Stages page appears.

11. Select the target stages to which you want to promote the assets, dependencies, and administrative configurations to.

12. Click **Next**.

    The Promote page appears.

13. Provide the following information:

Field	Description
Name	Name of the promotion.
Description	Description of the promotion.
Overwrites assets except alias that already exist on the selected target stages	If you set this field to True, all the assets except for aliases are overwritten.
Overwrites aliases that already exist on the selected target stages.	If you set this field to True, even the aliases are overwritten.
Fix missing version	Select the check box to fix the API version history. The discrepancy between the asset versions in the source and target stages, if any, are fixed. For example, consider that you have created an API and have five versions of the API from 1 to 5, in the source. If you select versions 1,2,4, and, 5 for promotion to the target, and if this check box is not selected, versions 1 and 2 are linked separately and versions 4 and 5 are linked separately. However, if you select this check box, version 2 is linked to version 4 and hence all versions 1,2,4, and 5 are now linked in the target.
Include application registrations	Select the checkbox to include the application registrations when you promote an API.

14. Click **Promote**.

The selected assets, dependencies, and administrative configurations are promoted to the selected stages.

The Stage-specific promotion status page displays the status of the asset promotion in each of the selected stages. The available values are:

■ Success

■ Failure

The page also displays the reason if the promotion fails.

Viewing Promotion List and Promotion Details

The **Promotions** tab displays a list of the available asset promotions in API Gateway. The asset promotions are listed alphabetically by name.

In addition, you can examine the details of an asset promotion history, repromote assets to the configured stages, and delete the promotion history from API Gateway database in the **Promotions** tab.

> **To view the promotion list and promotion details**

1. Expand the menu options icon , in the title bar, and select **Promotion management**.

2. Select **Promotions**.

   The **Promotions** tab displays a list of available asset promotions.

   This tab provides the following information about each promotion:

Column	Description
Name	Name of the promotion.
Description	Description of the promotion.
Promoted by	Name of the user who initiated the asset promotion.
Promotion time	The time at which the asset promotion occurred.
Status	The status report on the asset promotion.

3. Examine the **Report** link in the **Status** column and check for any errors that occurred during the asset promotion.

   The Promotion status report displays the following information:

Column	Description
Asset type	Name of the asset type that was promoted from the source instance.
Name	Name of the asset that was promoted from the source instance.
Status	The status of the asset promotion.
Comments	A descriptive comment on the asset promotion status.

4. Click the required promotion whose details you want to examine.

The Promote page appears.

Repromoting Assets

Pre-requisites:

You must have the Manage promotions functional privilege assigned to perform this task.

If you have made recent changes to an asset's information, you can repromote the updated asset to the already promoted target stages.

If you have to update an asset, for example, you want to correct an attribute setting, modify the asset's description, that has already been promoted to a target stage, you can simply make the change directly to the asset in the source target and then repromote the updated asset to the target stage just as you did with the previous version of the asset. In a multi-stage environment, you have to repromote the updated assets in each of the participating API Gateway instances.

> ⟫ **To repromote assets**

1. Expand the menu options icon , in the title bar, and select **Promotion management**.

2. Select **Promotions**.

The **Promotions** tab displays a list of available promotion histories in API Gateway.

3. Click the **Repromote** icon for the required assets' promotion history.

The Stages page appears.

4. Select the target stages to that you want to repromote the assets, dependencies, and administrative configurations.

5. Click **Next**.

The Promote page appears.

6. Provide the following information:

Field	Description
Name	Name of the promotion.
Description	Description of the promotion.

Note:

> The **Overwrite assets if exists on selected stages** option allows you to overwrite assets that exist on the target stages. If you do not want to overwrite assets in the target stages, clear this check box.

7. Click **Promote**.

   The selected assets, dependencies, and administrative configurations are repromoted to the selected stages.

   The Stage-specific promotion status page displays the status of the asset repromotion in each of the selected stages. The available values are:

   ■ Success

   ■ Failure

   The page also displays the reason if the repromotion fails.

Promoting Assets Using Deployer

You can promote API Gateway assets from one stage to the other using webMethods Deployer. webMethods Deployer is a tool you use to deploy user-created assets that reside on source webMethods runtimes or repositories to target webMethods runtime components (runtimes). For example, you might want to deploy assets you have developed on servers in a development environment (the source) to servers in a test or production environment (the target).

The high level steps involved are as follows:
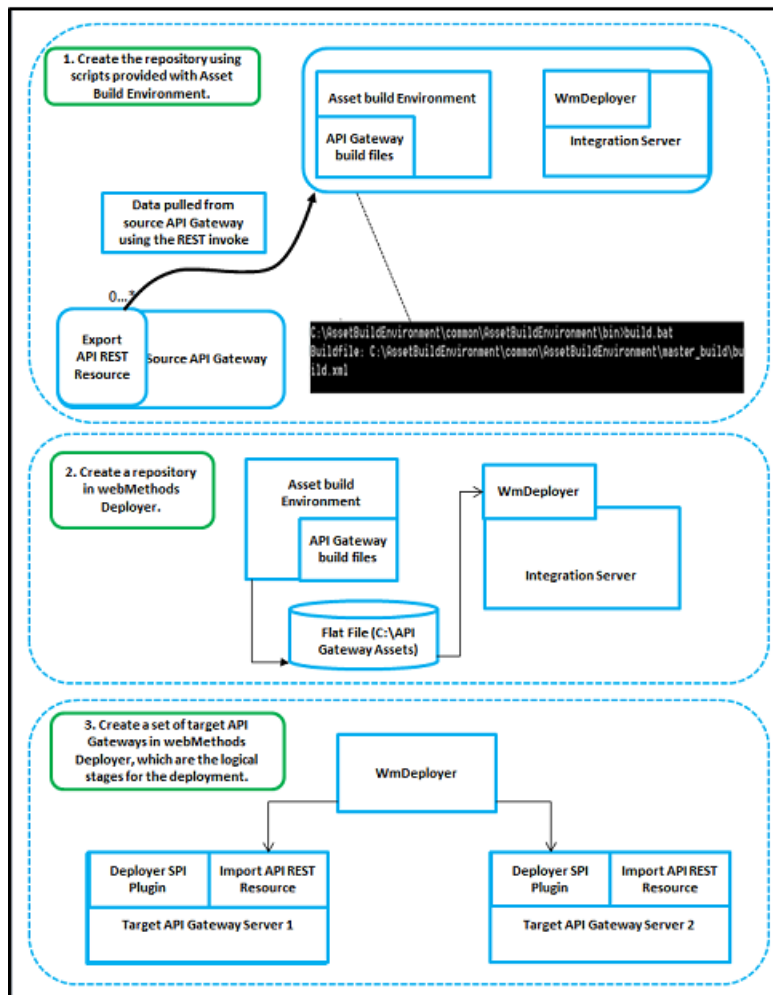
For more information on promoting assets using webMethods Deployer , see *webMethods Deployer User's Guide*.

For details about the automation scripts provided by ABE and Deployer and their usage to promote assets from one stage to another, see http://techcommunity.softwareag.com/pwiki/-/wiki/Main/Staging%2C%20Promotion%20and%20DevOps%20of%20API%20Gateway%20assets

DevOps Use Case using Asset Build Environment and webMethods Deployer

The API Gateway specific scripts that are provided as part of the Asset Build Environment and webMethods Deployer can be used by continuous integration tools like Jenkins. The sample flow is as follows:

1. The developer makes changes to a development API Gateway instance.

2. A Jenkins job then uses the build script to pull data from this development instance and push it to a version control system such as GIT.

3. Another job is used to pull it from a version control system and then use the webMethods Deployer scripts to directly push it to the test instance. In this way, the test instance always have the APIs.

Sample: Staging workflow
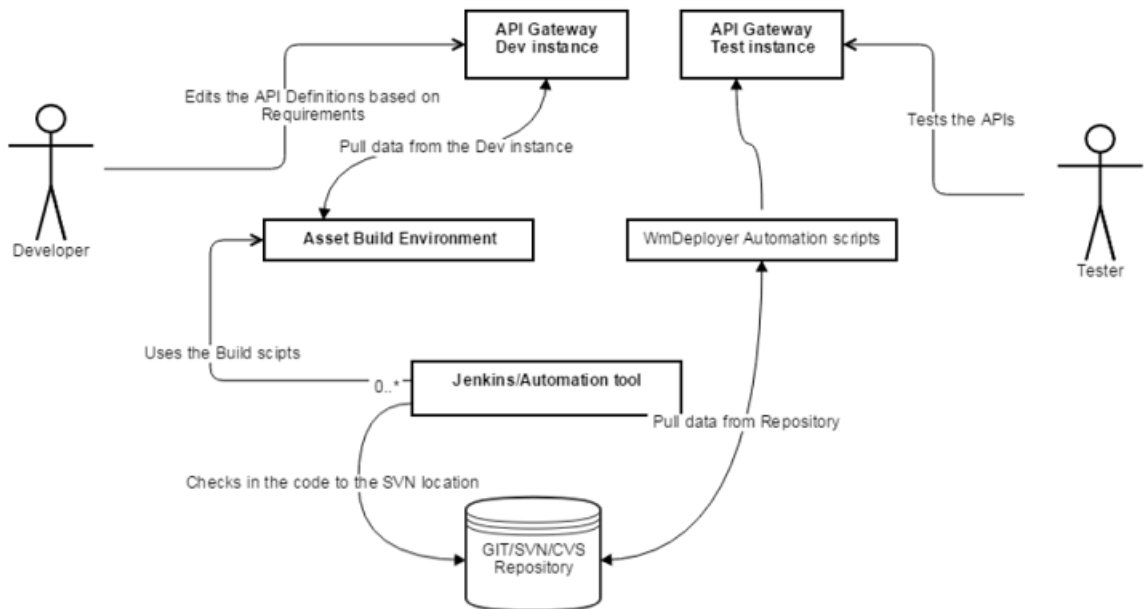
Sample: Staging call flow
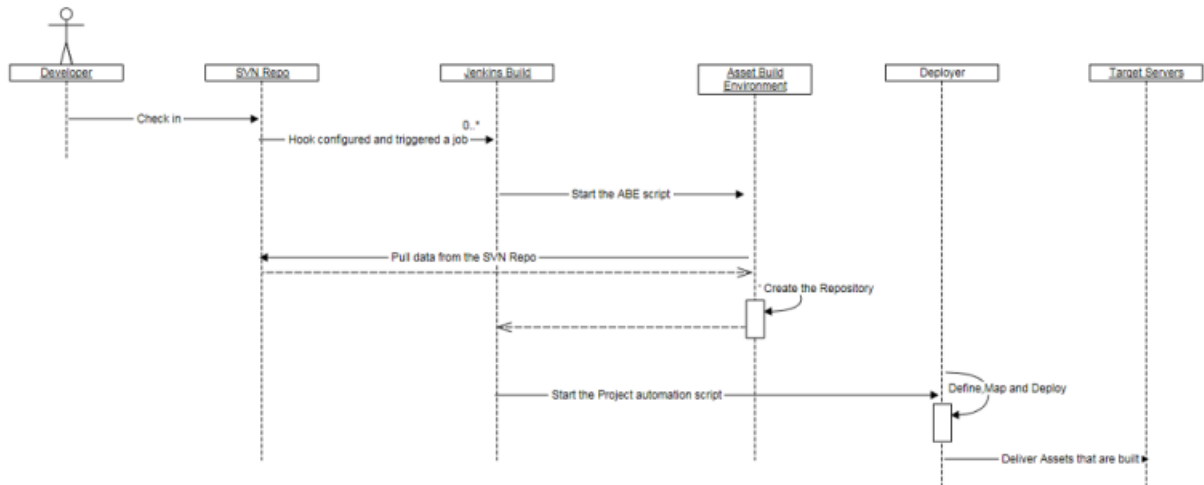
For detailed information about promoting assets using webMethods Deployer , see *webMethods Deployer User's Guide*.

Promoting Assets Using Promotion Management API

The promotion management capabilities allows for moving assets from lower to higher environments. For details, see " Stages, Promotions, and Rollbacks" on page 10

API Gateway enables continuous integration (CI) and continuous delivery (CD) practices to be used for development, deployment, and promotion of the APIs, applications, other related assets,

and for supporting the use of DevOps tooling. There are different ways in which API Gateway enables continuous integration (CI) and continuous delivery (CD).

The promotion management REST APIs allow for automation for CI/CD. For detail about the promotion management API, see *webMethods API Gateway User's Guide*.

DevOps Use Case using Promotion Management APIs

This example explains a sample DevOps use case using the promotion management APIs. You can promote API Gateway assets from one stage to the other using API Gateway specific scripts provided in GitHub. You can use the continuous integration tools like Jenkins and Azure to deploy user-created assets that reside on source API Gateway instance or repositories to a target API Gateway instance. For example, you might want to deploy assets you have developed on an API Gateway instance in a development environment (the source) to an API Gateway instance in a test or production environment (the target).

The high level steps to achieve this are as follows and are depicted in the illustration:

1. Create a stage-specific API Gateway environment.

2. Develop APIs.

3. Test the APIs.
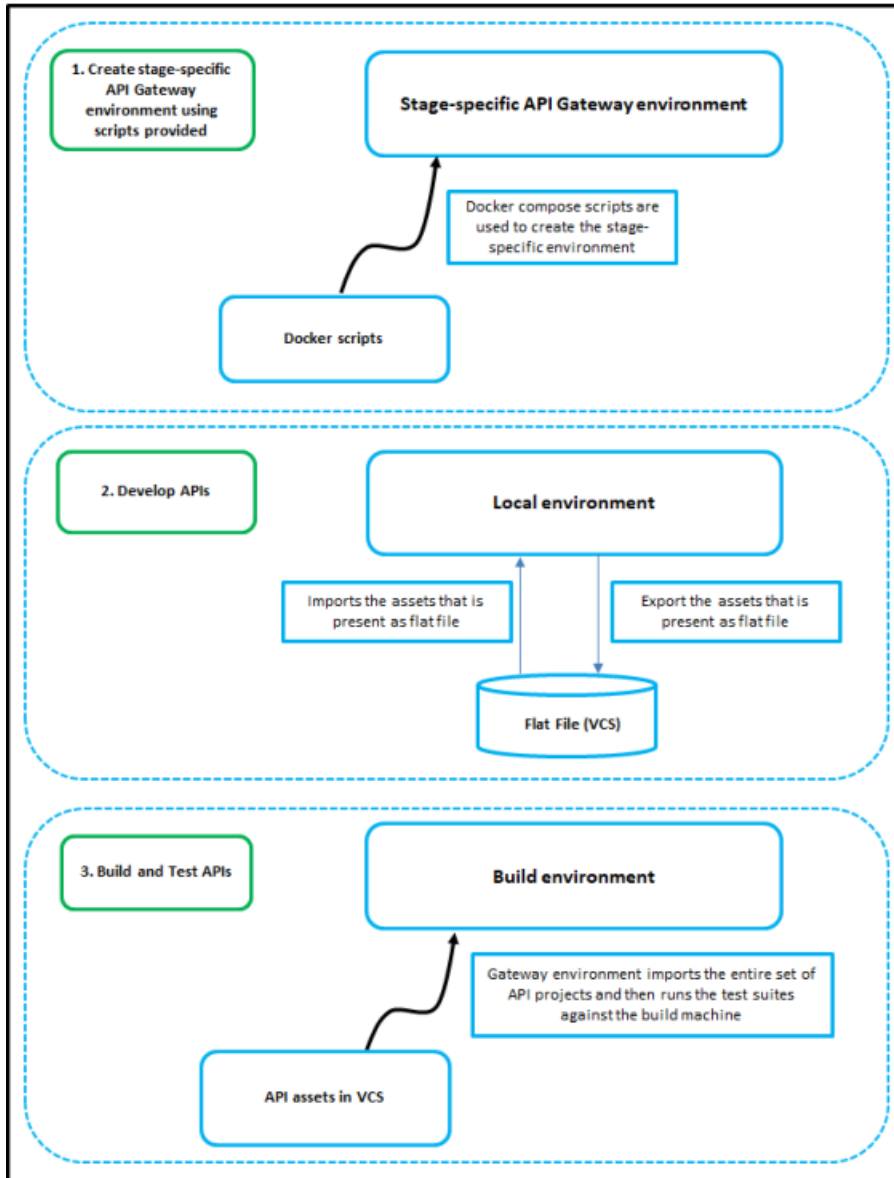
For details about various API Gateway-specific scripts and their usage, see https://github.com/SoftwareAG/webmethods-api-gateway-devops.

3 Rollbacks

Manage Rollbacks

Rollback is the process of restoring the asset's metadata in the target API Gateway instance to a previous state.

You might need to rollback assets to revert any promotional data changes being made in the target API Gateway instance.

Viewing Rollback List and Rollback Details

The **Rollbacks** tab displays a list of the available asset promotion rollbacks in API Gateway. The rollbacks are listed alphabetically by name.

In addition, you can also examine the details of a rollback, and delete the rollback history in the **Rollbacks** tab.

> **To view the rollback list and rollback details**

1. Expand the menu options icon ![icon], in the title bar, and select **Promotion management**.

2. Select **Rollbacks**.

   The **Rollbacks** tab displays a list of available asset promotion rollbacks.

   This tab provides the following information about each rollback:

Column	Description
Name	Name of the rollback.
Promotion time	The time at which the asset was promoted.
Rollback time	The time at which the asset promotion was rolled back.
Status	The status report on the rollback operation.

3. Examine the **Report** link in the **Status** column and check for any errors that occurred during the rollback process.

   The Promotion status report displays the following information:

Column	Description
Asset Type	Name of the asset type that was promoted from the source instance.
Asset Name	Name of the asset that was promoted from the source instance.