Migrating Moderate and Complex WebSphere Application to IBM Cloud Private Using Transformation Advisor and Microclimate

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Overview

IBM Transformation Advisor can be used to migrate your WebSphere applications to Liberty running on IBM Cloud Private. The application binary file and other dependency files, such as DB2 or MQ drivers, are needed for the application IBM Cloud Private image build process. There are two ways to get access to those necessary binaries:

- Upload into IBM Transformation Advisor
- Provide the Maven artifact location information

The first approach accelerates a simple application migration when no code changes are needed by allowing Transformation Advisor to quickly move your application into IBM Cloud Private.

However, the best practice is to get the binaries from a binary repository rather than a source repository. Toward that end, Transformation Advisor now supports Maven repositories for binary artifacts. Transformation Advisor continues to use GIT for the source files it generates to build your ICP image. Now, you can use Transformation Advisor to define your binary files' Maven repository locations so that the build uses the application binaries directly from your build systems.

For an application that requires code changes, Transformation Advisor provides the code modification recommendations and effort estimation. If you use Eclipse, we recommend you use the WebSphere Application Migration Toolkit (WAMT) Eclipse plugin to help accelerate the process of modifying the application code. After you build your new application archive, you will be able to publish your application to your Maven repository and have the result integrated with the Microclimate build that Transformation Advisor creates.

It's worth mentioning that the repository types we support by default are:

- HTTP server backed Maven repository
- Artifactory repository manager that allows anonymous user access

At the moment of the current release, authentication is not supported. The Nexus repository is not supported by default, but you may manually modify the build files such as Jenkinsfile or pom.xml to use Nexus.

Also, the repository type is not limited to a Maven repository only. You can manually modify the build files in the migration bundle to pull files from other types of repositories. For example, you can change the pom.xml to download from a remote HTTP server, or you can change the Dockerfile to move the downloaded artifacts to some customized file location other than the default.

This document describes how to plug in the use's Maven build system to Transformation Advisor by default.

Prerequisites

Prerequisites are listed at the beginning of each step. The following is the complete set of installation prerequisites required to get started.

- An instance of IBM Cloud Private
- An installation of Transformation Advisor in IBM Cloud Private
- An installation of Microclimate in IBM Cloud Private
- The data collector results loaded into IBM Transformation Advisor with migration recommendations
- Eclipse with the WebSphere Application Migration Toolkit (WAMT) plugin to make the necessary code modifications. WAMT can be obtained from *https://developer.ibm.com/wasdev/downloads/#asset/tools-WebSphere_Application_Server_Migration_Toolkit*. If you prefer a different IDE, use the detailed analysis report from Transformation Advisor to make your code changes.
- An implementation of Git (GitHub/GitLab) or access to a public implementation (GitHub/GitLab)
    - A user with permissions to create a repository, clone a repository & update a repository in the above implementation
- A Maven repository where the application binary and other dependencies can be downloaded from. Make sure the repositories are accessible from Microclimate.
- A Liberty server to test the modified applications

Step 1: Modify application based on migration recommendations

In this step, you will modify your application based on the migration recommendations provided by Transformation Advisor.

Prerequisites

1. The application's scanned data collector results are loaded into IBM Transformation Advisor and migration recommendations are suggested

2. Eclipse with WebSphere Application Migration Toolkit (WAMT) plugin to make the necessary code modification
3. A Liberty server to test the modified application
4. A Maven repository where the newly built application binary and other dependencies can be published. Make sure the repository is accessible from Microclimate so that the binaries can be downloaded during the Microclimate build.

Tasks

1. Modify application code according to the migration recommendations. It's suggested to use IBM® WebSphere® Application Server Migration Toolkit (WAMT). The Eclipse tool has the same migration advice provided by the binary scanner used by Transformation Advisor except that it operates on the source code, making updates easier. More information about the tool can be found on the site: *https://developer.ibm.com/wasdev/downloads/#asset/tools-WebSphere_Application_Server_Migration_Toolkit*.
2. Deploy your modified application to a local Liberty server for testing and make sure the application works as expected.
3. You might need several iterations of above steps to get the final version of the modified application.
4. Publish the modified application binary files to the Maven repository. If other dependency files such as DB2 or MQ drivers are needed to run your application, make sure they are available in the same or other accessible Maven repository.

Step 2: Generate the migration bundle that will download the dependency files from the Maven repository

In this step, you will provide the Maven repository information for the application and other required dependency binary files. Transformation Advisor will generate the migration bundle using the Maven information you provide.

Prerequisites

- Step1 is complete.
- The application and other dependency files are available in the Maven repository that Microclimate can access.

Tasks

1. In the Transformation Advisor UI, go to the *Recommendations* page, click the *Migration Plan* button for your application. This opens the Migration page.

   The Migration page lists the artifacts that Transformation creates, as well as the application binary or other dependencies.

2. Select “Use maven repository” in the **Application Dependencies** section.

3. Enter the Maven repository URL. For example, an Artifactory Maven repository file URL may look like: *http://<REPO_IP>:8081/artifactory/libs-release-local.*

4. For the application and each of its dependencies, enter the Maven coordinates for the file in the Maven repository. For example:

```
<dependency>
  <groupId>com.ibm.ta</groupId>
  <artifactId>modresorts</artifactId>
  <version>1.0</version>
  <type>war</type>
</dependency>
```

5. Select “Test connection” to confirm that Transformation Advisor can reach all of the files in the Maven repository.

6. Transformation Advisor generates the migration bundle when coordinates for all of the files have been confirmed. Transformation Advisor adds the Maven repository coordinates to the pom.xml that will be used by the Microclimate Jenkins pipeline and generates the build commands to download the dependency binaries from your Maven repository. Those binary files will be used to build your application’s Docker image.

Step 3: Deploy the application to IBM Cloud Private

In this Step you will push the Migration bundle to your GIT repository, create a Microclimate project with a Jenkins pipeline links to it.

Prerequisites

1. Completed step 2
2. An implementation of Git (GitHub/GitLab) or access to a public implementation (GitHub/GitLab)
    - A user with permissions to create a repository, clone a repository & update a repository in the above implementation
3. An instance of IBM Cloud Private
4. An installation of Microclimate in IBM Cloud Private

Tasks

1. In the Application Migration page, click *Deploy Bundle* and fill in the GIT repository and Microclimate URL information.
2. Transformation advisor will upload the migration bundle into the GIT repository, then create a Microclimate build project with a Jenkins pipeline linked to your GIT repository.
3. The pom.xml generated by Transformation Advisor in the migration bundle includes the steps to:
    - Include repository access to your provided Maven repository

- Download the application binary and other dependency files
- Move the files to the required location so that they will be copied to the required location in the Docker image build process.