

Sharing of the Mulesoft LTS and JDK17 Upgrade

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1 Local Development Environment

As references: Here is my development environment.

Items	version	Note
Anypoint Studio	7.19.0	Anypoint Studio 7.17 is better

Mule Server	4.6.8	Must be 4.6.8:x
JDK	17.0.10	Must be 17.x.x

1.1 Anypoint studio: 7.19.0

In fact , the compatible version of Anypoint Studio is 7.17, but we cannot download the 7.17 version.

We can install the "Mule Server 4.6" in anypoint studio 7.19 or any latest version.

1.1.1 download the latest Anypoint Studio

step1 : go to the mule official website to download :

<https://www.mulesoft.com/lp/dl/anypoint-mule-studio>

Just fill the form and submit it , then you'll receive an email that embeds the download link.

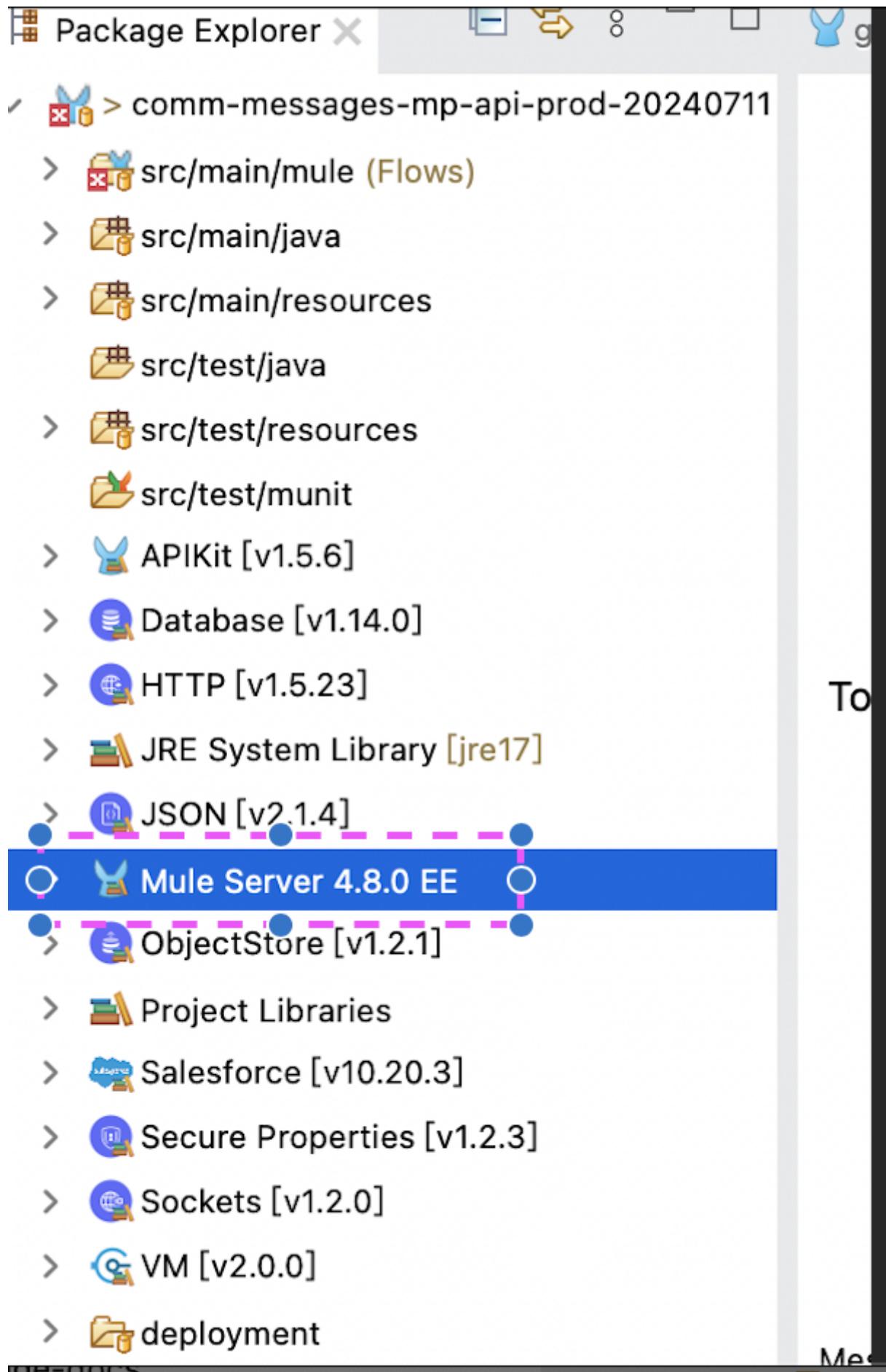
Click the link and download.

You select the version of "Anypoint Studio and Mule" as "Latest". So far the latest version is 7.19.

If you already get Anypoint Studio , just skip this step.

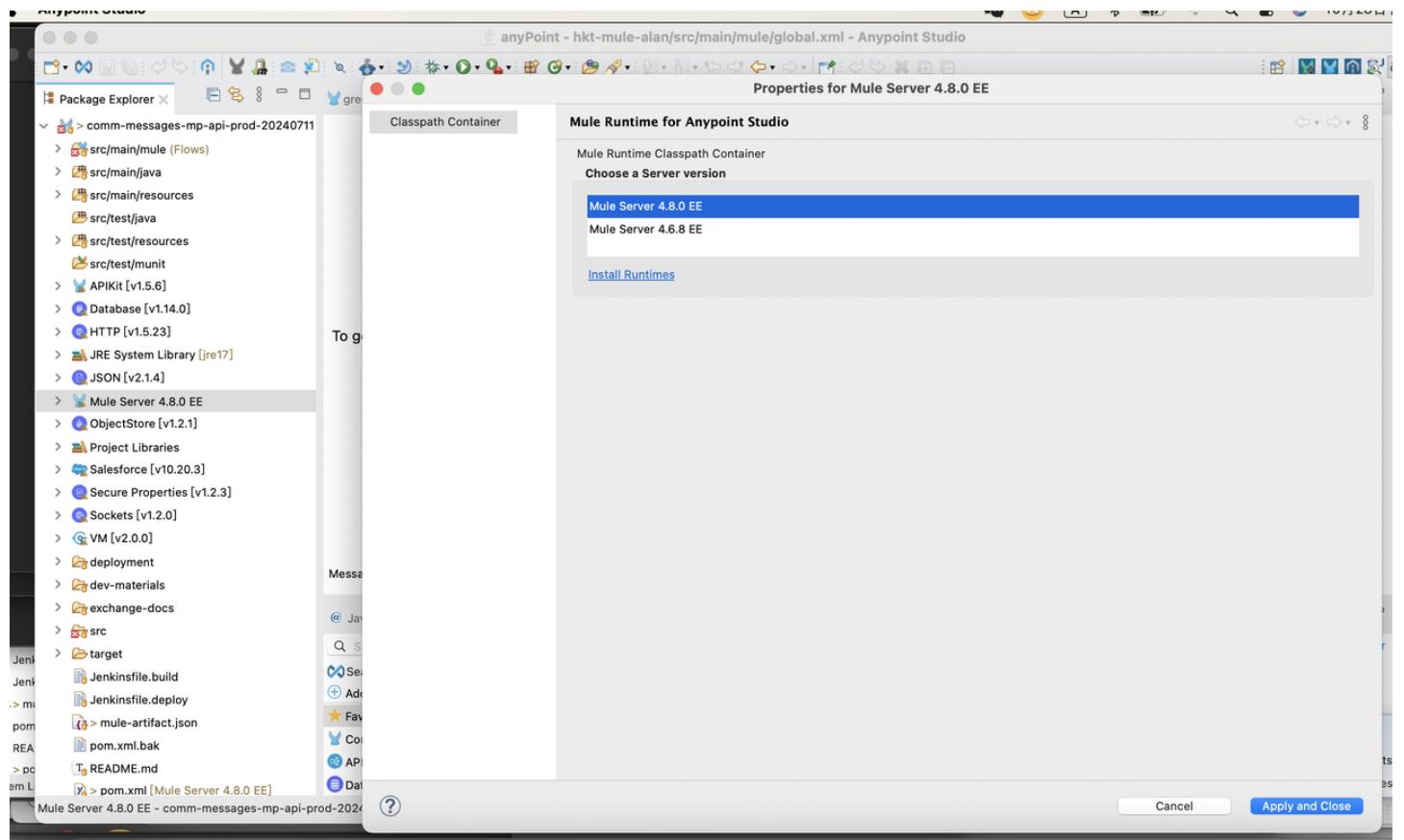
1.1.2 Install the Mule Server 4.6.8

Check the version of Mule Server in Anypoint Studio.

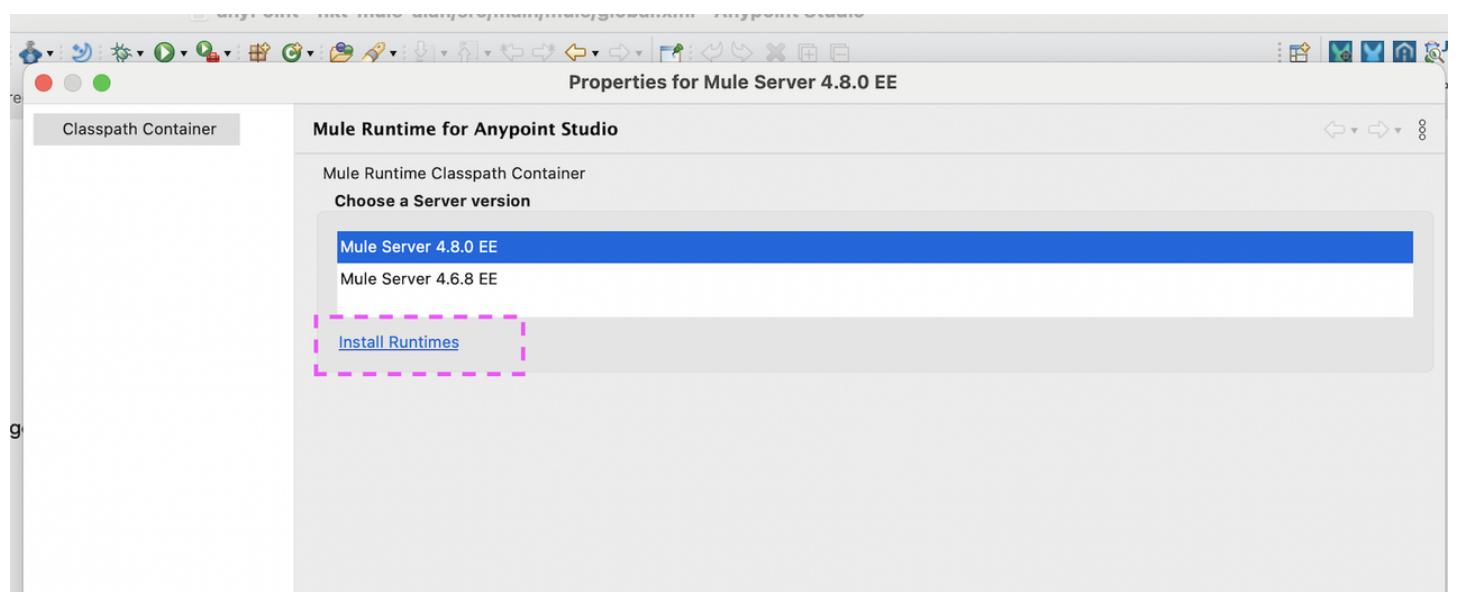


As you see, my Mule Server's version is 4.8.0 , and we need to install the Mule Server 4.6 .

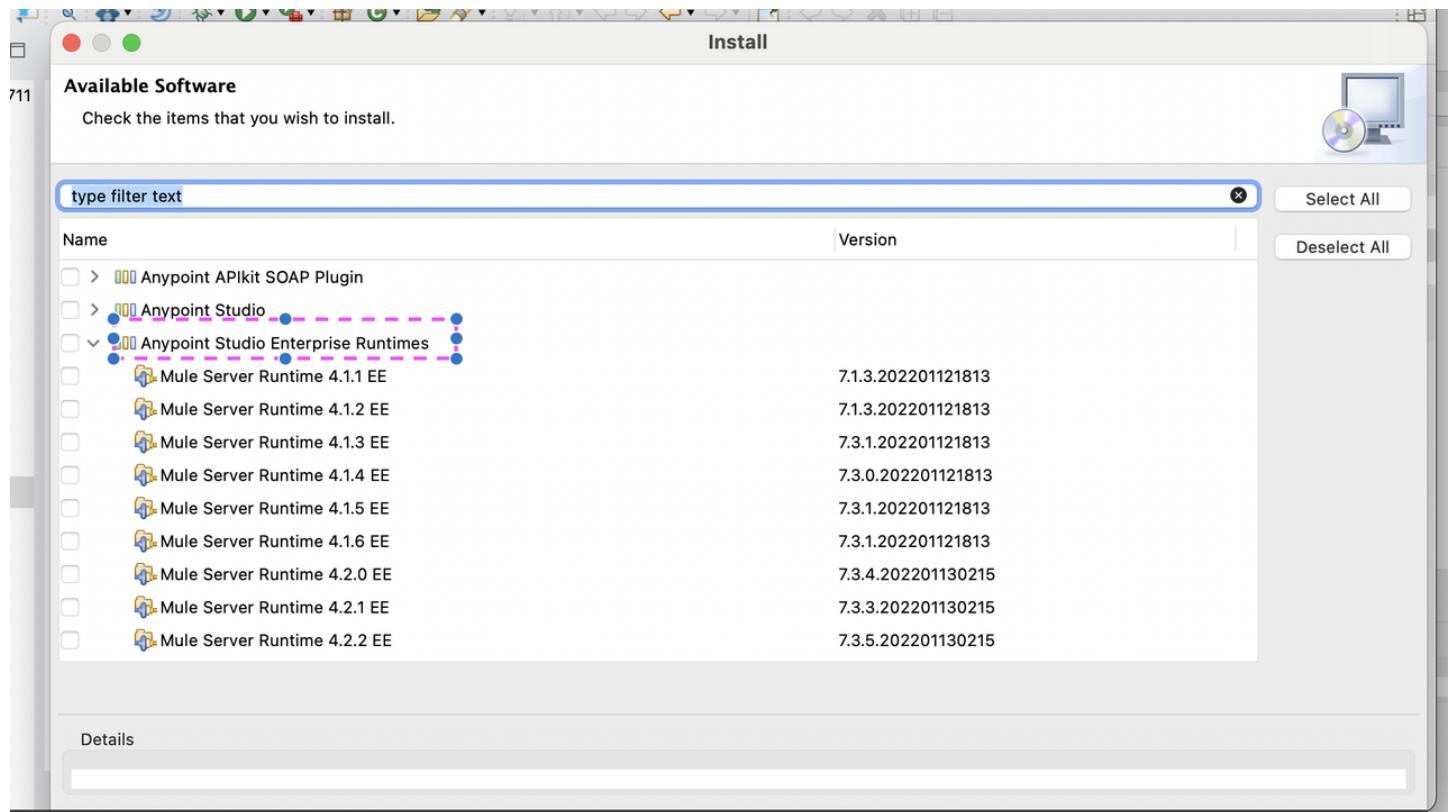
Right click the "Mule Server's version is 4.8.0 EE" and you can choose a server version . If you already installed the Mule Server 4.6.6 , you will see the "Mule Server 4.6.8 EE" option. If you see it , just change it and click "Apply and Close".



Otherwise, you must install it. You can click "Install Runtimes" as below.



In the "Available Softwares" panel , choose the "Anypoint Studio Enterprise Runtimes" and unfold the list items as below:



You can choose the "Mule Server Runtime 4.6.8 EE" and click "Next" and click "Finish".

- Package Explorer X
 - comm-messages-mp-api-prod-20240711
 - src/main/mule (Flows)
 - src/main/java
 - src/main/resources
 - src/test/java
 - src/test/resources
 - src/test/munit
 - APIKit [v1.5.6]
 - Database [v1.14.0]
 - HTTP [v1.5.23]
 - JRE System Library [jre17]
 - JSON [v2.1.4]
- Mule Server 4.6.8 EE
- ObjectStore [v1.2.1]
 - Project Libraries
 - Salesforce [v10.20.3]
 - Secure Properties [v1.2.3]
 - Sockets [v1.2.0]
 - VM [v2.0.0]
 - deployment

As you see, "Mule Server 4.6.8 EE" is already my new Mule Serfer .

1.2 JDK: 17.0.10

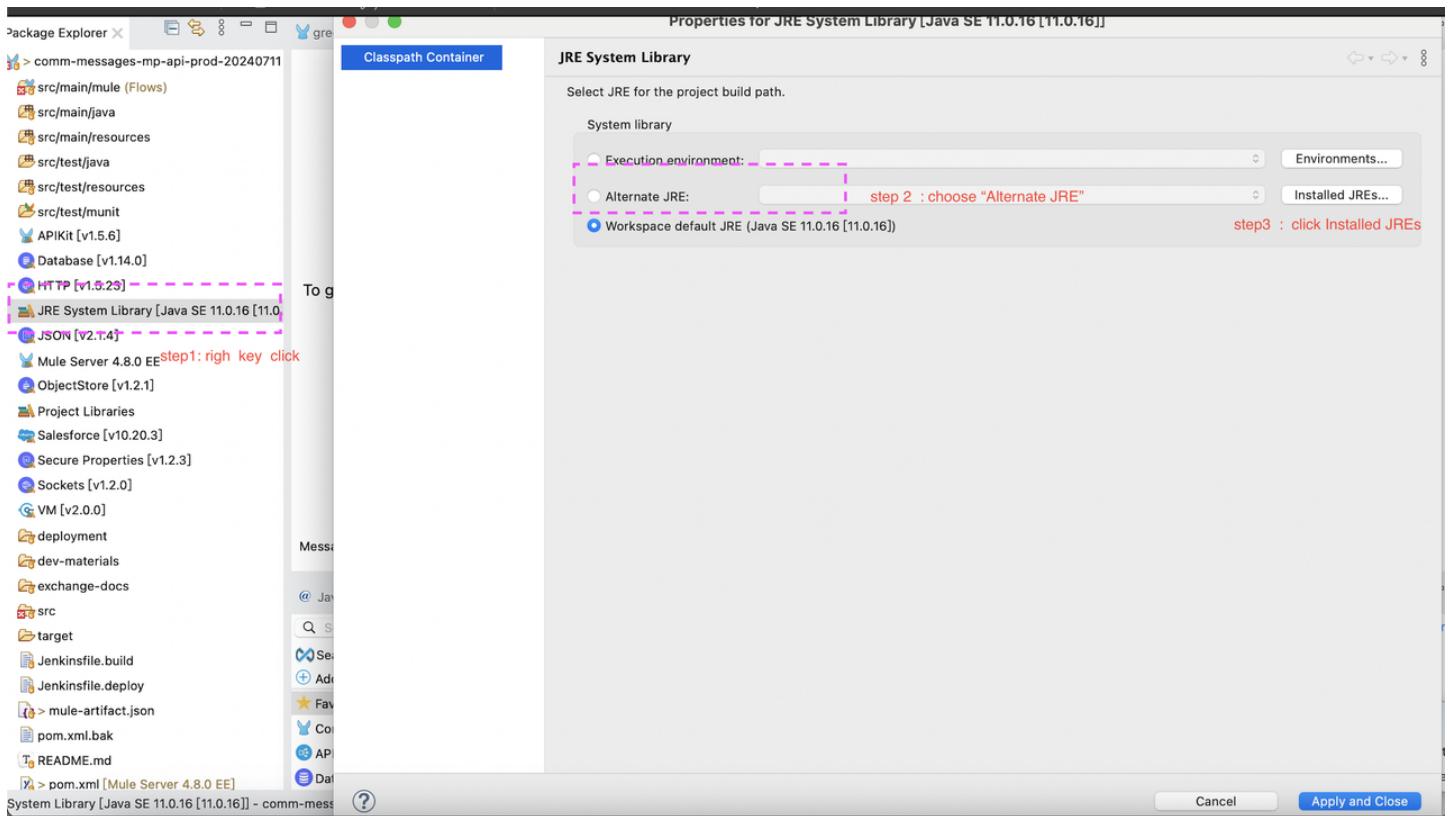
You can see the article at :

Runtime LTS

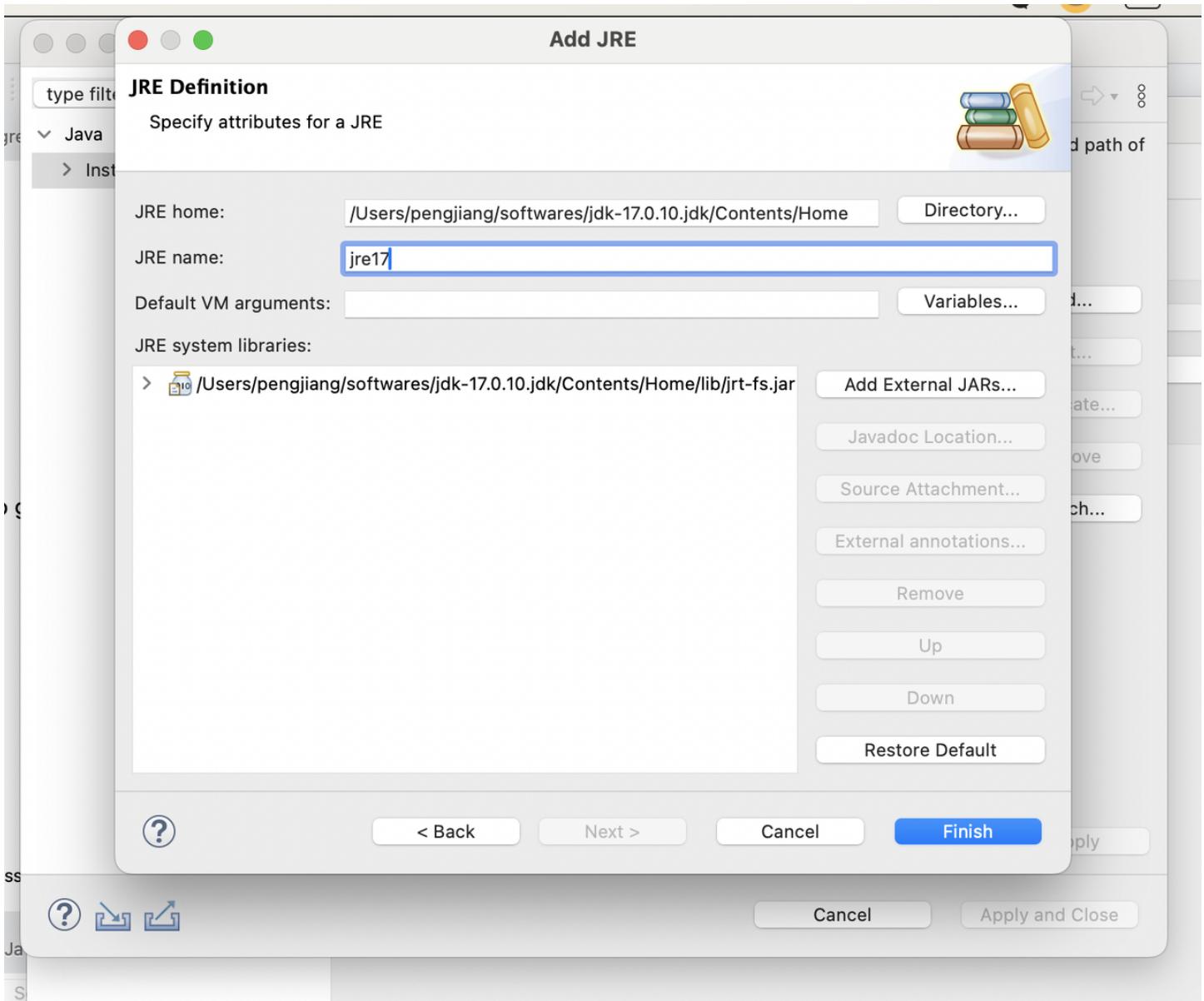
<https://docs.mulesoft.com/release-notes/runtime-fabric/runtime-fabric-runtimes-release-notes#patch-4-6-8-4-java17>

1.2.1 Configure the JDK17 in Anypoint Studio

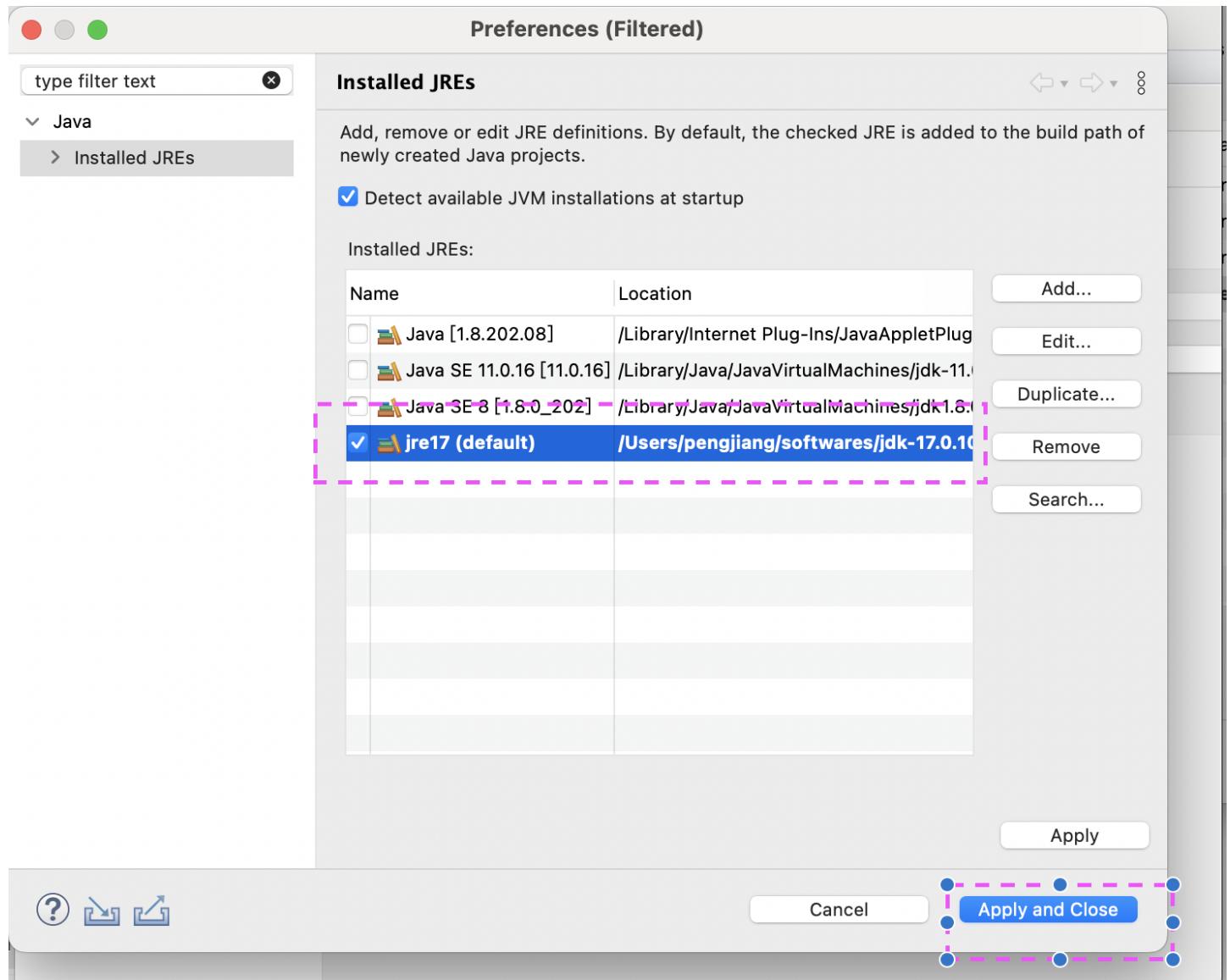
We need to use the JDK17 in Anypoint Studio. According to the guidance As below.



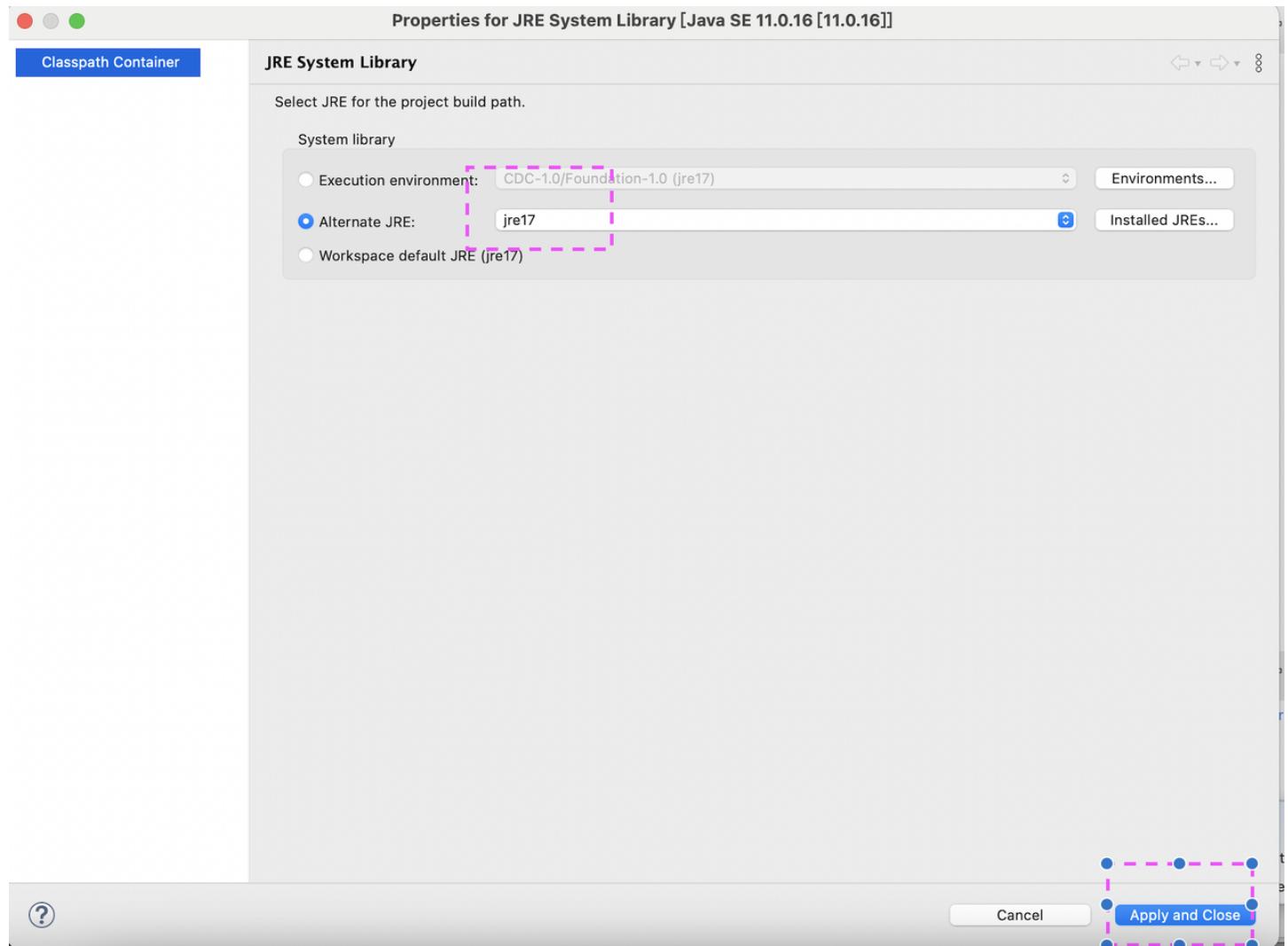
When click the "Installed JREs".



When you finish the JDK info as above , just click the button "Finish".

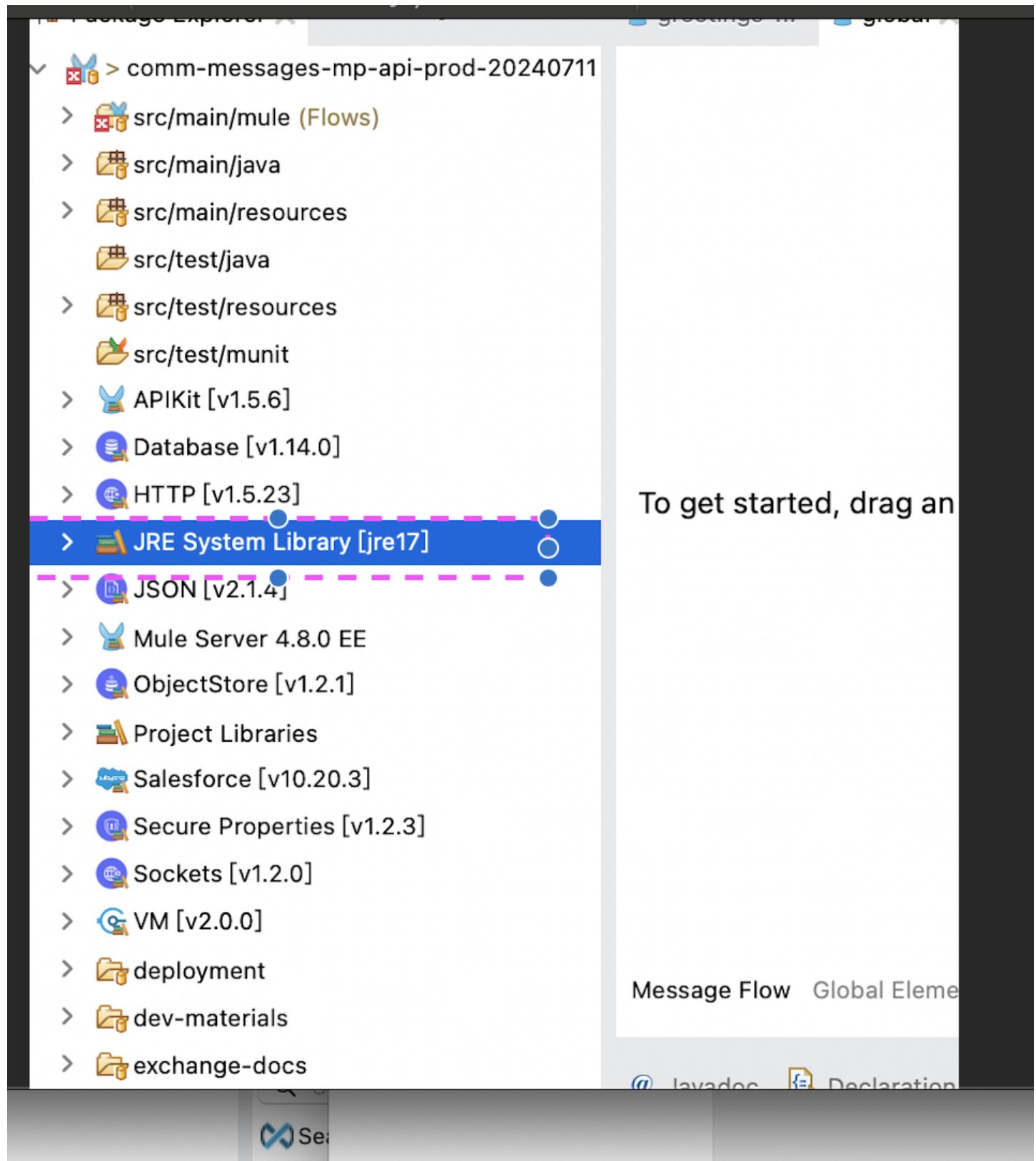


Choose the "jre17" in the previous step we added , and click "Apply and Close".



Choose the "jre17" added in the previous step and Click "Apply and Close" .

Then , you'll see the new JDK17 works.



1.3 Get Ready for The Mule Project for Upgrade

It's strongly recommend you to clone source code of mule projects to local and launch the projects in Anypoint Studio.

Here is my mule project, just for reference.

1. Gitlab source code : ft-jdk17 (checkout the branch based on ft)



```
e95b4cb..b8014a1  ft-jdk17 -> ft-jdk17
pengjiang@pengdeMBP comm-messages-mp-api-prod-20240711 %
ft
* ft-jdk17
  master
```

<https://egit.btu.pccw.com/ruby/communication-engine/mule/comm-messages-mp-api/-/tree/ft-jdk17>

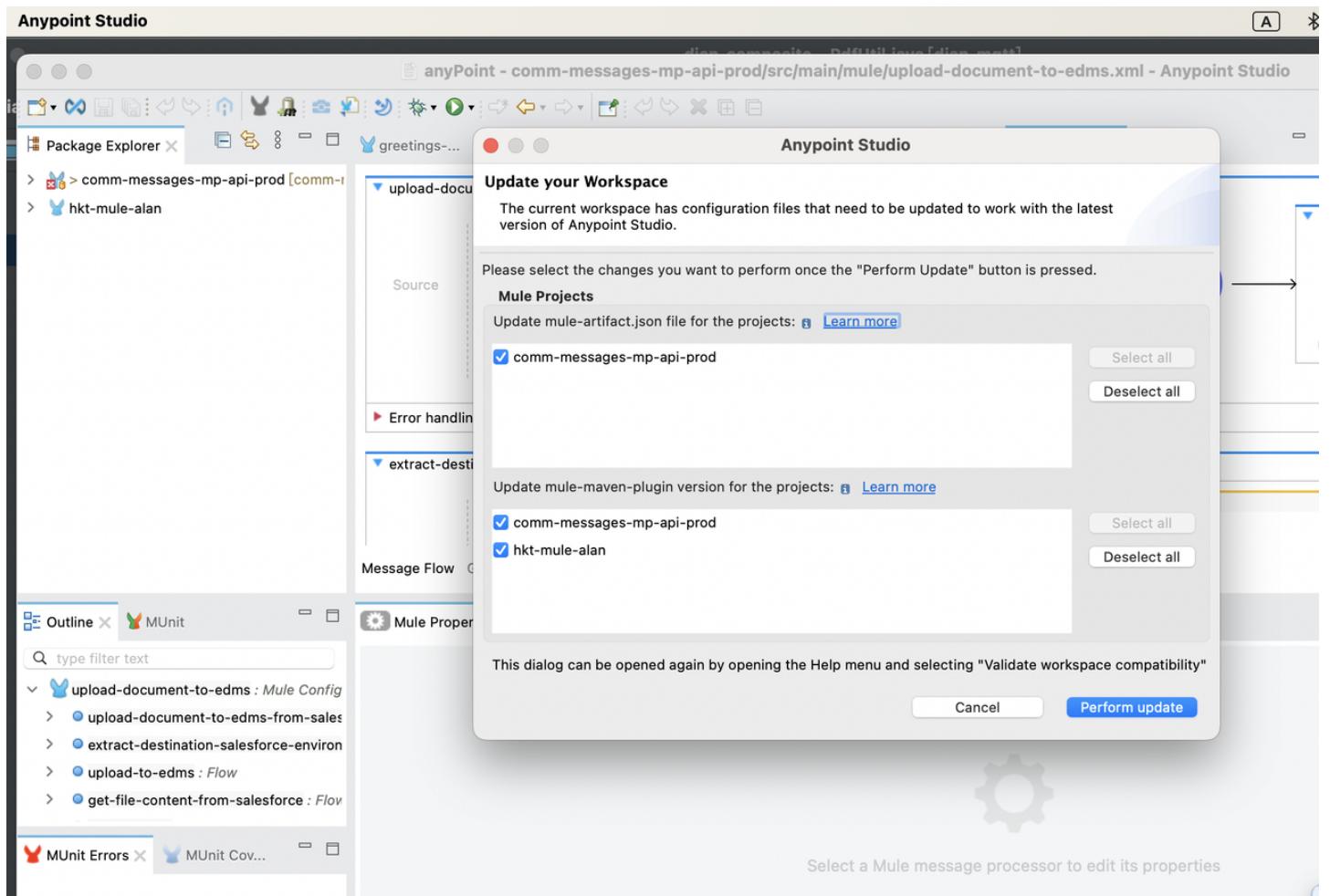
After all the functions are tested ok in the new branch .

2. Other Variables of Mule App Environment :

```
1 twilio.senders.85228830634.accountSid   : XXX
2 twilio.senders.85228830634.authToken    : XXXX
3 twilio.senders.85294600014.accountSid   : XXXX
4 twilio.senders.85294600014.authToken    : XXXXX
```

2 Import the mule projects and update your workspace

Use the new Anypoint Studio to import the mule projects



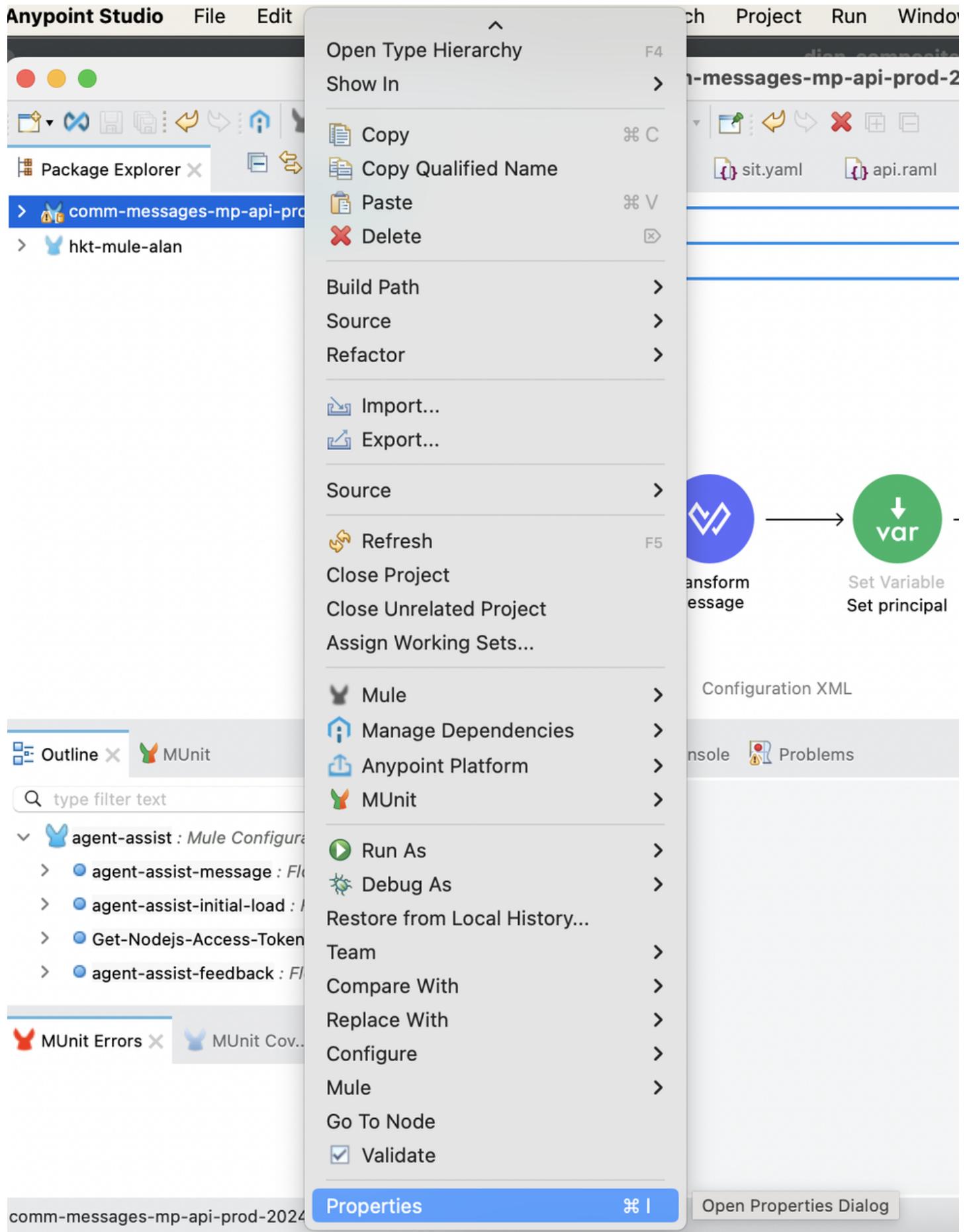
When opening the mule projects with the new Anypoint studio , the window as above shows you to update your workspace . Just click the "Perform update". Then pom.xml of your mule projects will be changed.

3 Upgrade the Modules

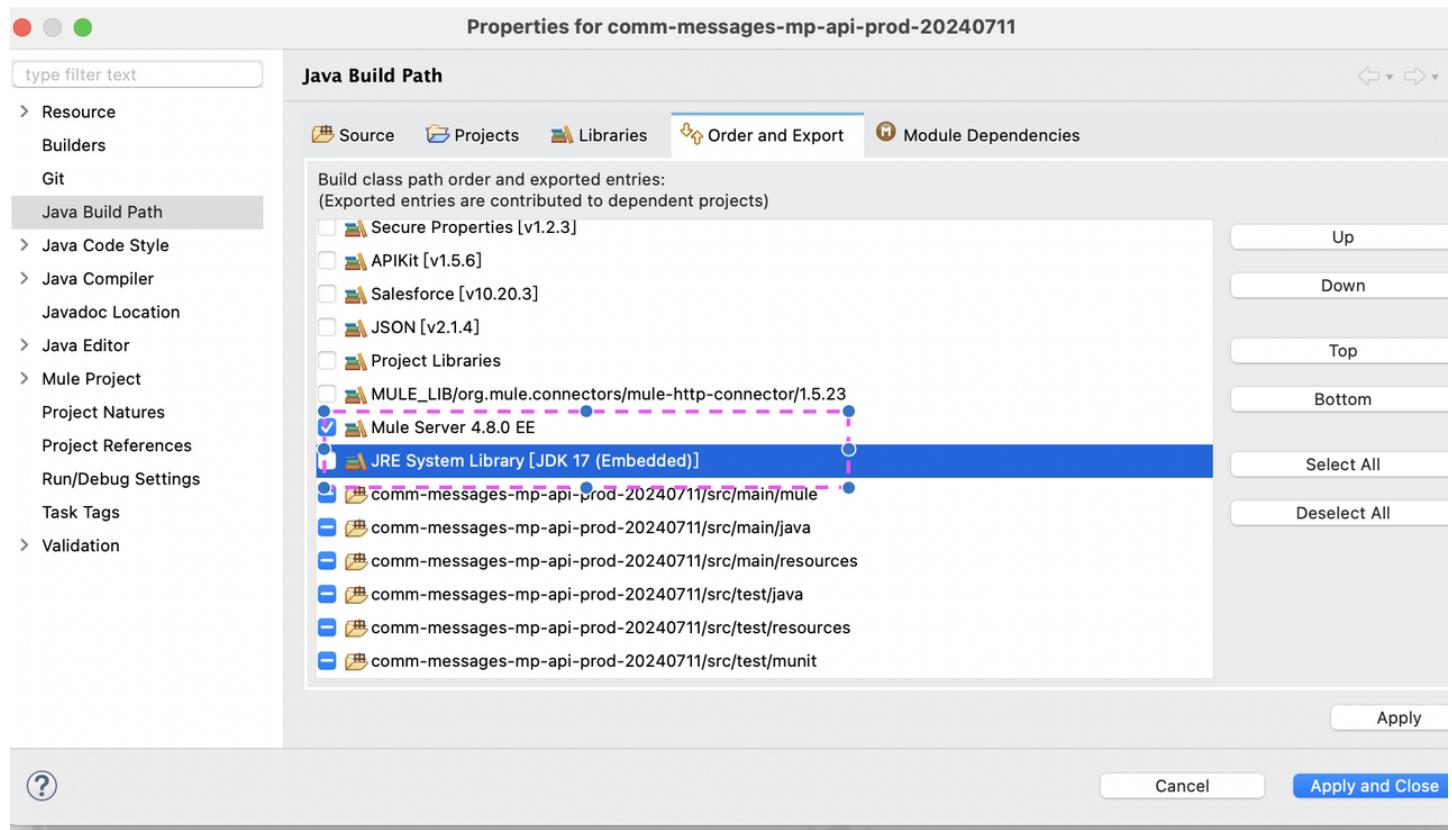
After upgrading the modules , you will notice that the pom.xml file under the mule project changed.

When you use Anypoint Studio 7.19 , the default JDK is JDK17.

Right key on the project and guide to properties as below:

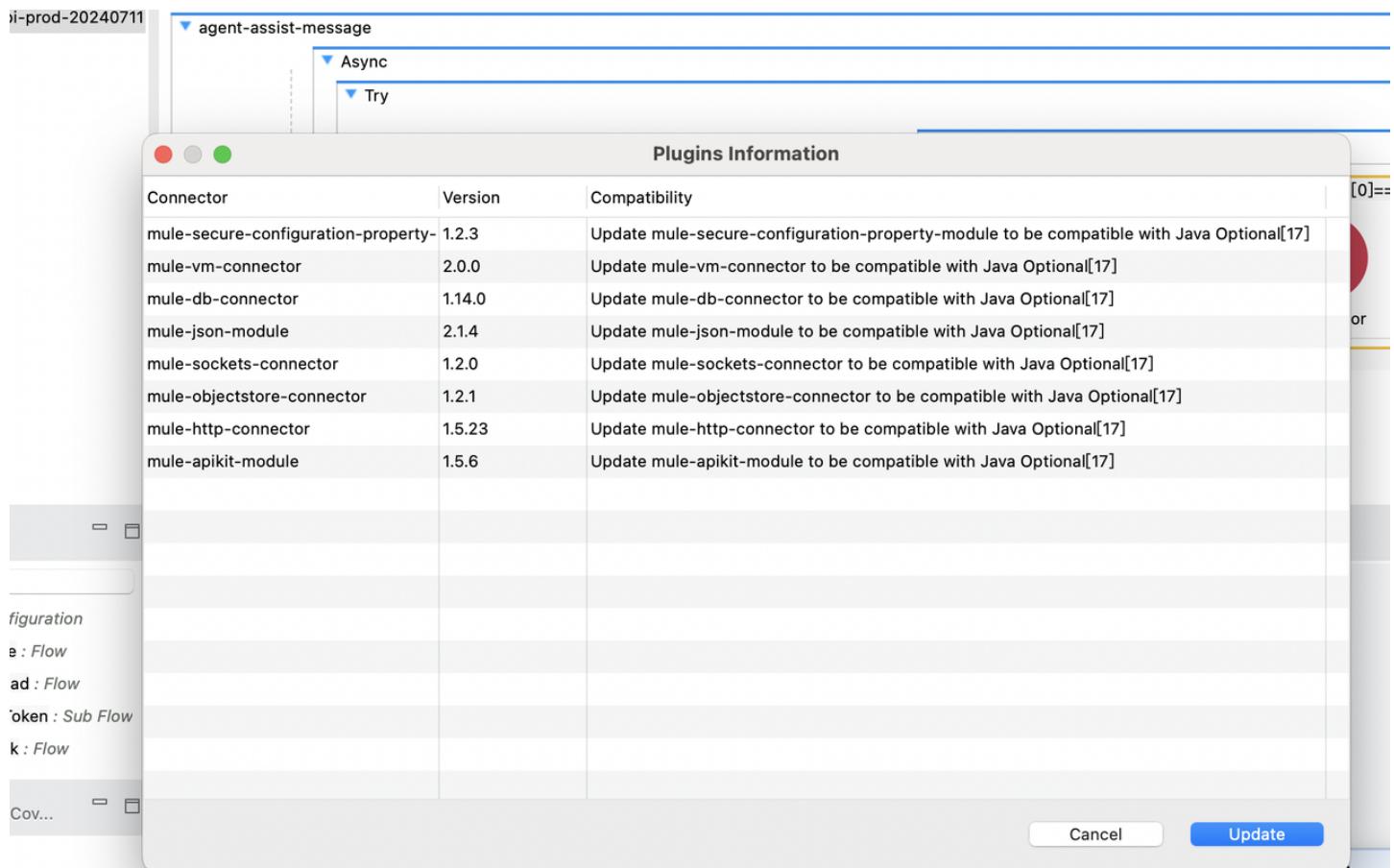


Click the properties , you can find that JDK17 already as embeded JRE system library .



Just select all , and click "Apply and Close ".

And then , the upgrade window will show as below:



Just click the "Update" button to let anypoint studio update the components .

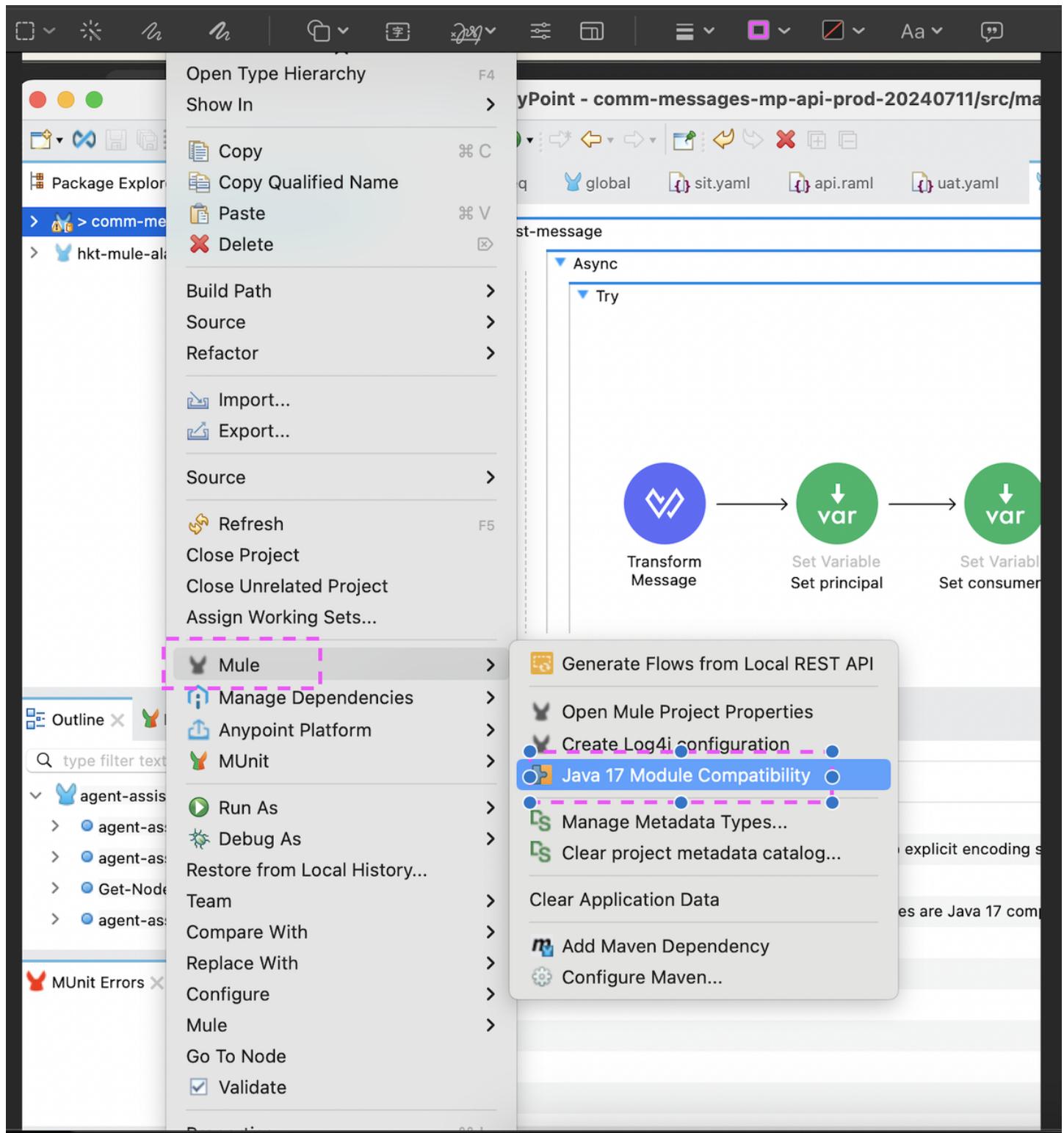
The screenshot shows the 'Manage Modules' dialog in Anypoint Studio. The table lists project modules and their current versions, along with checkboxes for selecting latest versions in major and latest versions.

Project	Module	Current version	<input type="checkbox"/> Latest version in major	<input checked="" type="checkbox"/> Latest version
comm-messages-mp-api-prod-20240711	APIKit	1.5.6	<input type="checkbox"/> 1.11.1	<input checked="" type="checkbox"/> 1.11.1
comm-messages-mp-api-prod-20240711	Database	1.14.0	<input type="checkbox"/> 1.14.12	<input checked="" type="checkbox"/> 1.14.12
comm-messages-mp-api-prod-20240711	HTTP	1.5.23	<input type="checkbox"/> 1.10.1	<input checked="" type="checkbox"/> 1.10.1
comm-messages-mp-api-prod-20240711	JSON	2.1.4	<input type="checkbox"/> 2.5.3	<input checked="" type="checkbox"/> 2.5.3
comm-messages-mp-api-prod-20240711	ObjectStore	1.2.1	<input type="checkbox"/> 1.2.2	<input checked="" type="checkbox"/> 1.2.2
comm-messages-mp-api-prod-20240711	Secure Properties	1.2.3	<input type="checkbox"/> 1.2.7	<input checked="" type="checkbox"/> 1.2.7
comm-messages-mp-api-prod-20240711	Sockets	1.2.0	<input type="checkbox"/> 1.2.4	<input checked="" type="checkbox"/> 1.2.4
comm-messages-mp-api-prod-20240711	VM	2.0.0	<input type="checkbox"/> 2.0.1	<input checked="" type="checkbox"/> 2.0.1

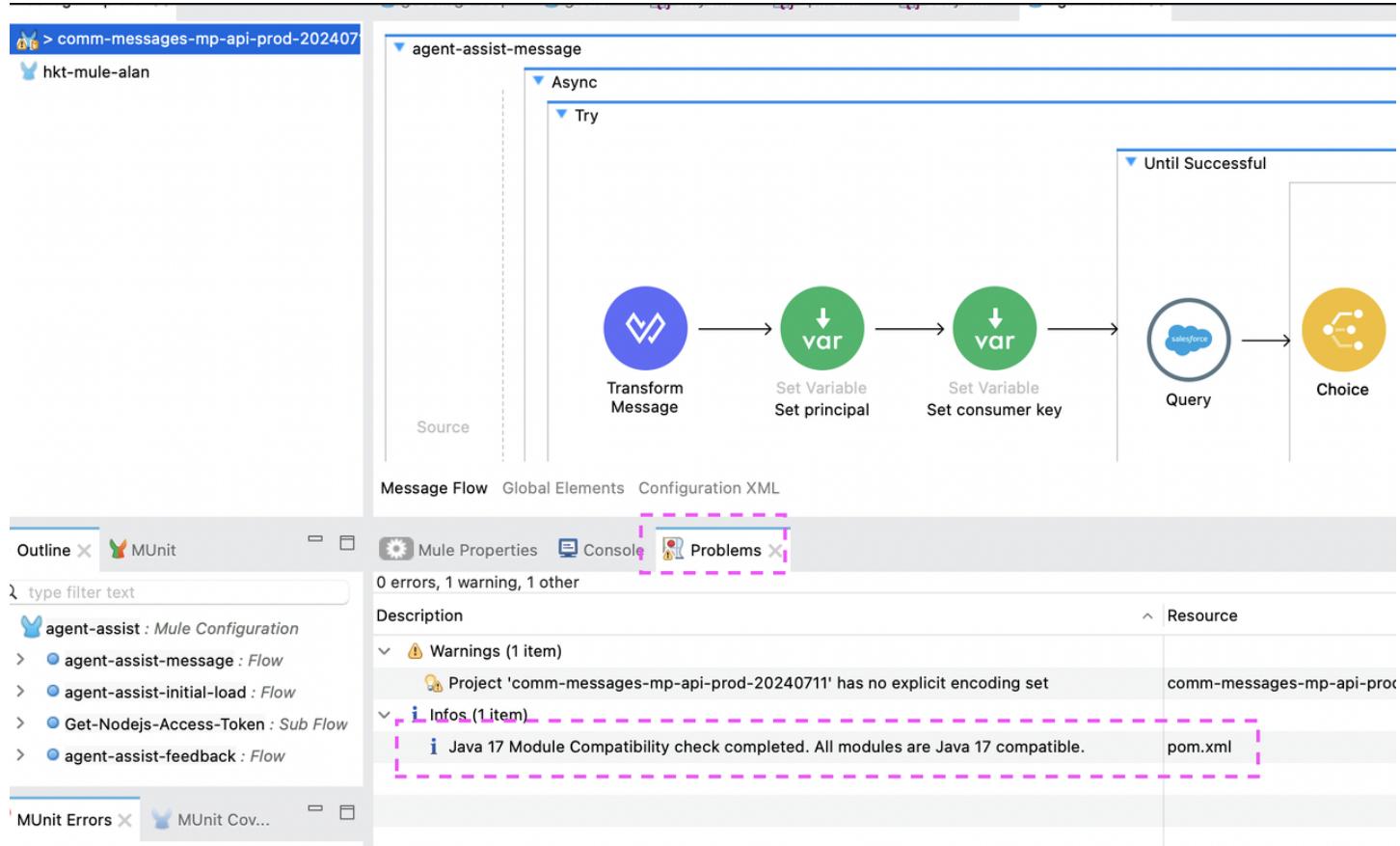
Below the table, there is a note: "You can update your project modules later doing right click over the project > Manage Dependencies > Manage Modules". There are also links to "Notifications Preference Page" and "See the Notifications Preference Page to configure the table order and check other related preferences". At the bottom right are "Cancel" and "Apply and close" buttons.

Choose the latest version for the modules and continue to click the "Apply and Close"

4 Java17 Compatibility Check



Right key on the project and guide to Mule / Java 17 Module Compatibility , and click the "Java 17 Module Compatibility ". After compatibility check done , switch the table panel to Problems . We can see the result of compatibility check. If we see "Java 17 Module Compatibility check completed. All modules are Java 17 compatible. ", then congratulations, you have already finished the JDK17 compatibility upgrade.



5 DataWave

5.1 POJOs

You must ensure that the POJOs have:

- A default constructor
- Getters for all properties
- Setters for all properties

5.2 API changes

Verify that predefined variables are accessed through their proper API.

Variables like `attributes`, `message`, and `error` have specific access APIs. Using the proper fields is required when using Java 17 because internal fields are no longer accessible. For example:

- `error.muleMessage` needs to be replaced by the proper Mule error field `error.errorMessage`.
- `error.errors` needs to be replaced by the proper Mule error field

Please see the guidance at:

<https://docs.mulesoft.com/dataweave/latest/dataweave-formats-java#java-support>

<https://docs.mulesoft.com/dataweave/latest/dataweave-variables-context>

6 Upgrading Automated Policies

Please see the guidance at :

<https://docs.mulesoft.com/general/upgrade-policies-proxies>

7 Upgrading API-Level Policies

When you deploy the mule app to cloudHub, if any api-policies not compatible with the new JDK17 , in the API manager dashboard you will see the errors and tips for how to fix them , then you can do the upgrade according to the guidance.

8 Anypoint Studio Runtime Set

When deploy the mule app to cloudHub, in Runtime version options, just select the "Release Channel" as "Long-Term-Support" and mulesoft Runtime version automatically switch to 4.6.8:4.

And the java version just choose "Java 17" as below:

Here just for reference , maybe you can deploy it in another way.

Overwrite Existing Application

Deployment Target: CloudHub

Application File: comm-messages-mp-api-prod-20240711.jar

Runtime	Properties	Insight	Logging	Static IPs
Runtime version	Release Channel New Long-Term-Support <p>This channel releases a new minor version once a year. Learn more</p>		Runtime version 4.6.8:4 <p>Mule Runtime uses semantic versioning. Each versions ends with a build number. Versions in the Edge channel are indicated with "e" at the end. Learn more</p>	
			To use Monitoring and Visualizer with this version, enable the agent by checking the box below. Learn more	
	Java version New Upgrade to Java 17 based on application compatibility. Learn more			
	<input type="radio"/> Java 8 <input checked="" type="radio"/> Java 17			

9 Deploy your new mule app to clouduhub

Since the mule project with the ft-jdk17 branch has been done with the "Java17 Compatibility Check" and modules upgrade. We built it and deployed it to anypoint studio.

Deploy application: comm-messages

Any Deployment Model: Any Release Channel

Name	Target Name	Target Type	Status	Runtime Version	Update Available	Date Modified
comm-messages-mp-...	CloudHub	CloudHub	Started	4.6.8:4	None	2024-10-24 11:01:16

In Runtime Manager , we can find the mule app deployed successfully with the Runtime version "4.6.8:4".

If you see it , then congratulations, your upgrade already leaps forward one closer step to success.

After testing all the functions in the SIT/UAT environment. If every function gets passed, you can arrange production deployment.

10 References

<https://issues.salesforce.com/#q=java%2017>