Mule 4 - Mule Server Notifications

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Context

Performance - A Non Functional Requirement

- Key factor for efficient and optimal API implementation
- NFR Testing Phase
- Defining Response Time SLAs for an API
- Response Time :
    - Base metric to define performance

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Mule Server Notifications

Mechanism of accessing the mule server to get notified with access changes that occur on Mule Server. These Notifications are disabled by default.

- Message Processor Notifications:
  - A notification is sent before and after a message processor is invoked

Use Case

As a developer I want to debug across all the Mule flows in my application and log the response times of each and every message processor.

Functional Scenario:

- Response time of an API largely depend on external API invocations and Message Processors present in Mule Flows.
- External APIS' response time cannot be controlled by a developer and so for any performance improvements to be done on the API, optimisations had to be around message processors.

Implementation Steps

- Create a Mule Project
- Create a Class - *MuleComponentProcessListener* in src/main/java folder.
    - This class implements MessageProcessorNotificationListener Interface where we will be using onNotification() method to log and notify.

- Create beans.xml file in src/main/resources folder
- Create a bean as below in beans.xml specifying the class created in step 2 for the type of notification we want to receive.

```
<bean name="messageProcessorNotifications"
                class="message_processor_notifications.MuleComponentProcessListener" />
```

- Add beans.xml reference to Spring Configuration as below

```
<spring:config name="springConfig"
        doc:name="Spring Config" files="beans.xml" />
```

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Implementation Steps

- Then we have to specify notifications we want to receive using <notification> element and have to register the listener class bean using <notification-listener> as below:
    - *Note: Listener Class is the Spring bean which we created in beans.xml at step 4*

```
<notifications>
        <notification event="MESSAGE-PROCESSOR" />
        <notification-listener
                ref="messageProcessorNotifications" />
</notifications>
```

- Update pom.xml with required dependencies and shared libraries respective to mule-spring modules.
    - *Please refer to the pom file in the codebase in GitHub link shared at the end.*
- Now build the mule flow with required message processors.

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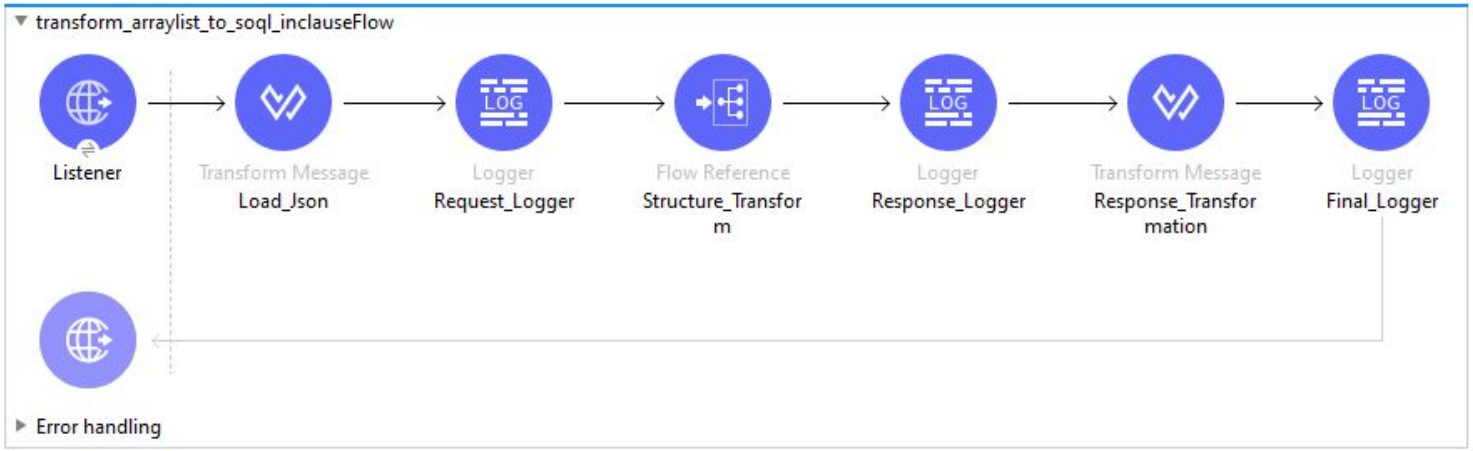
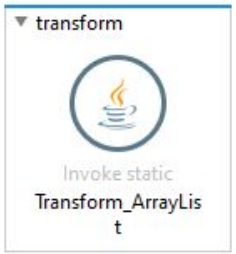
Mule flow





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Working

- In the above mule flow, as soon as the request is received by the Http Listener, as in when the message is passed through the message processors like
    - Transform Message
    - Logger
    - Invoke-Static
    - Flow-Reference

- Mule Server Notification class log the information which is set in MessageProcessorNotificationListener.onNotification() method

Deploy and Run

- Deploy the Mule Application
- Invoke the Http Listener
- We will then see the information related to each message processor in the runtime console.
- Format of the message processor information logged:

    flow = <Flow Name>

    module in flow = <Module # in the flow>

    module name = <Name of the Module>

    line in file = <Line Number in XML>

    component took: <Response Time in Milli Seconds>

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Console Output

```
WARN  2020-09-22 18:59:30,734 [[MuleRuntime].uber.02: [message_processor_notifications].transform_arraylist_to_soql_inclauseFlow.BLOCKING @4df57dc5] [process
message_processor_notifications.MuleComponentProcessListener:
flow = transform
kind processors
module in flow = 0
module name = java:invoke-static
line in file = Optional[79]
component took: 71ms response time.
WARN  2020-09-22 18:59:30,734 [[MuleRuntime].uber.02: [message_processor_notifications].transform_arraylist_to_soql_inclauseFlow.BLOCKING @4df57dc5] [process
message_processor_notifications.MuleComponentProcessListener:
flow = transform_arraylist_to_soql_inclauseFlow
kind processors
module in flow = 2
module name = flow-ref
line in file = Optional[56]
component took: 71ms response time.
INFO  2020-09-22 18:59:30,735 [[MuleRuntime].uber.02: [message_processor_notifications].transform_arraylist_to_soql_inclauseFlow.BLOCKING @4df57dc5] [process
org.mule.runtime.core.internal.processor.LoggerMessageProcessor: ('0012w00000M8mUSAAZ','0012w00000M8mUKAAU','0012w00000M8mUAEEU')
WARN  2020-09-22 18:59:30,735 [[MuleRuntime].uber.02: [message_processor_notifications].transform_arraylist_to_soql_inclauseFlow.BLOCKING @4df57dc5] [process
message_processor_notifications.MuleComponentProcessListener:
flow = transform_arraylist_to_soql_inclauseFlow
kind processors
module in flow = 3
module name = logger
line in file = Optional[58]
component took: 1ms response time.
WARN  2020-09-22 18:59:30,758 [[MuleRuntime].uber.01: [message_processor_notifications].transform_arraylist_to_soql_inclauseFlow.CPU_INTENSIVE @4c5c5d38] [pr
message_processor_notifications.MuleComponentProcessListener:
flow = transform_arraylist_to_soql_inclauseFlow
kind processors
module in flow = 4
module name = ee:transform
line in file = Optional[60]
component took: 23ms response time.
```

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Additional Information

Codebase Location :

https://github.com/praneethveni/mule-artifacts/tree/master/message_processor_notifications

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