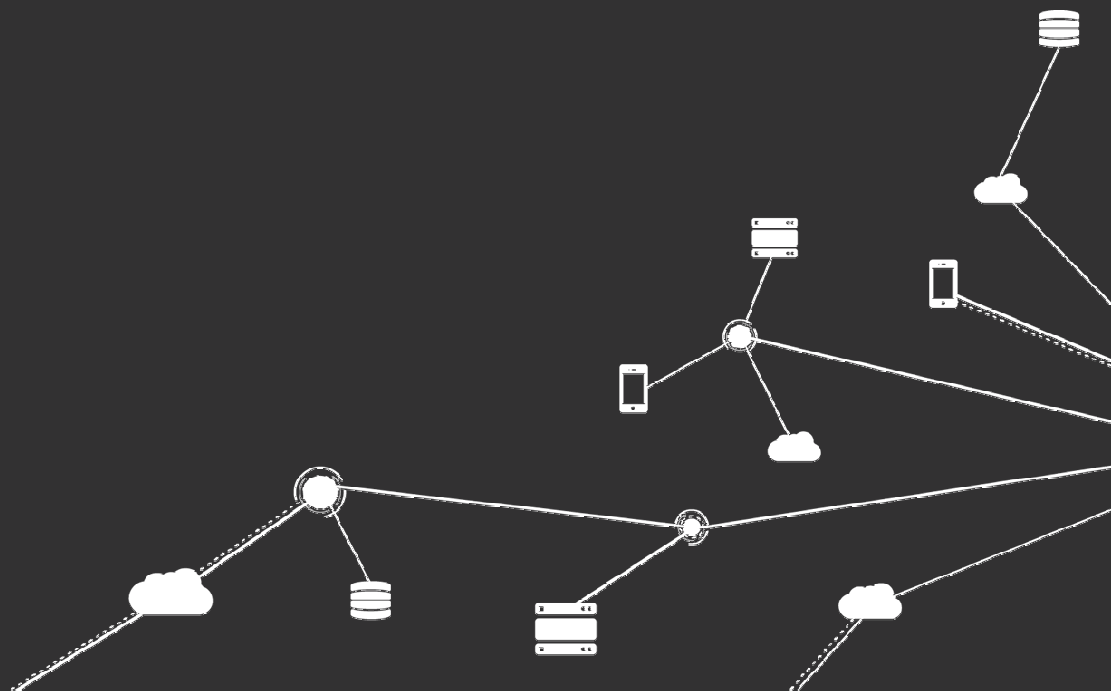
Module 7: Handling Errors



Objectives

- In this module, you will learn:
  - About the different types of exceptions and exception strategies
  - To handle messaging exceptions in flows
  - To create and use global exception handlers
  - To specify a global default exception strategy

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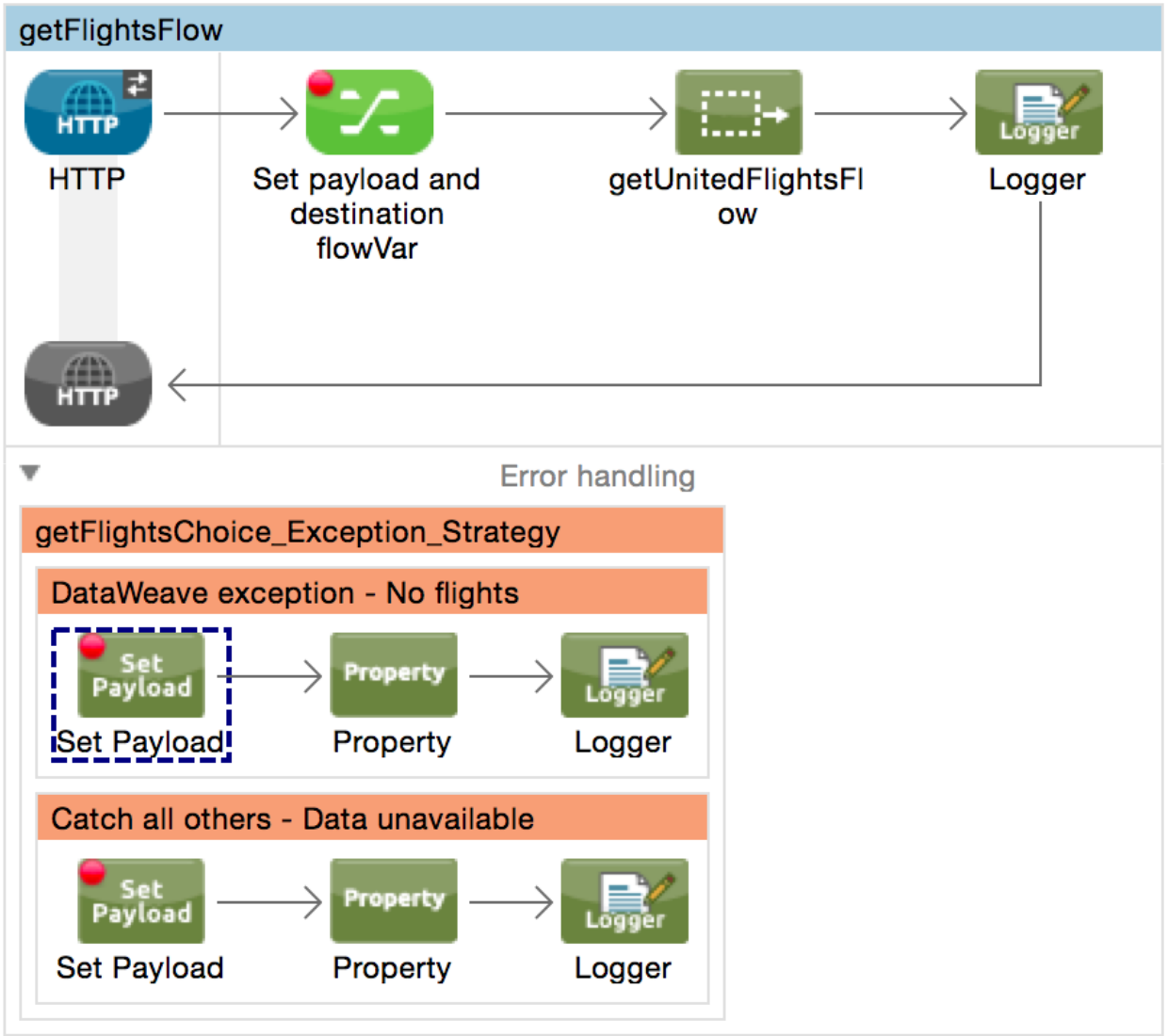
Goal



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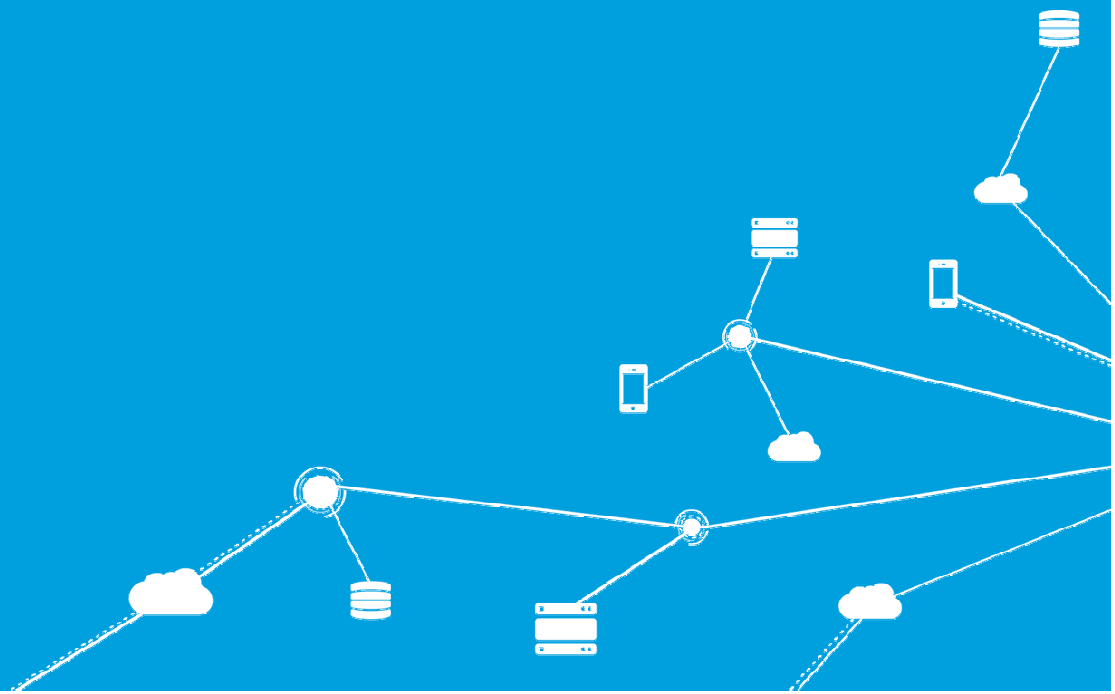
Types of exceptions

- System exceptions
  - Thrown at the system-level when *no* message is involved
  - Exceptions that occur
    - During application start-up
    - When a connection to an external system fails
- Message exceptions
  - Thrown within a flow whenever a message is involved

Handling system exceptions



Handling system exceptions

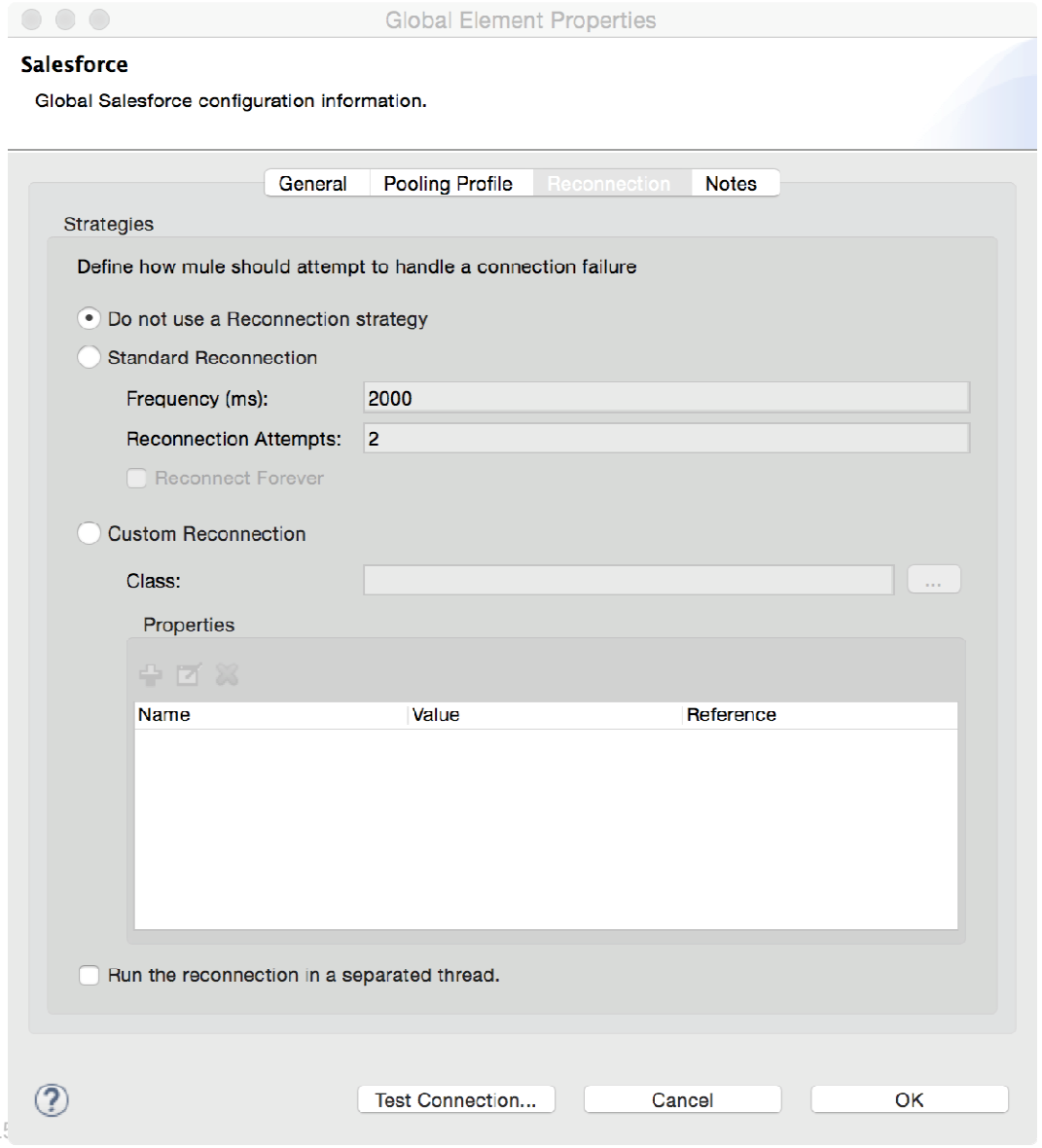
- When a system exception occurs, a system exception strategy is invoked
  - Non configurable
  - Logs the exception
  - If the exception was caused by a connection failure, executes the reconnection strategy

Reconnection strategies

- Set for each connector
- Some connectors have reconnection options in the Global Element properties GUI
- For most others, you set connector properties in XML
  - Set attempt count and frequency in ms
  - Set it to blocking or non-blocking
  - Notify registered listeners

```
<jms:activemq-connector name="AMQConnector″>
  <reconnect count="5″ frequency="1000"/>
</jms:activemq-connector>
```


Setting reconnection properties



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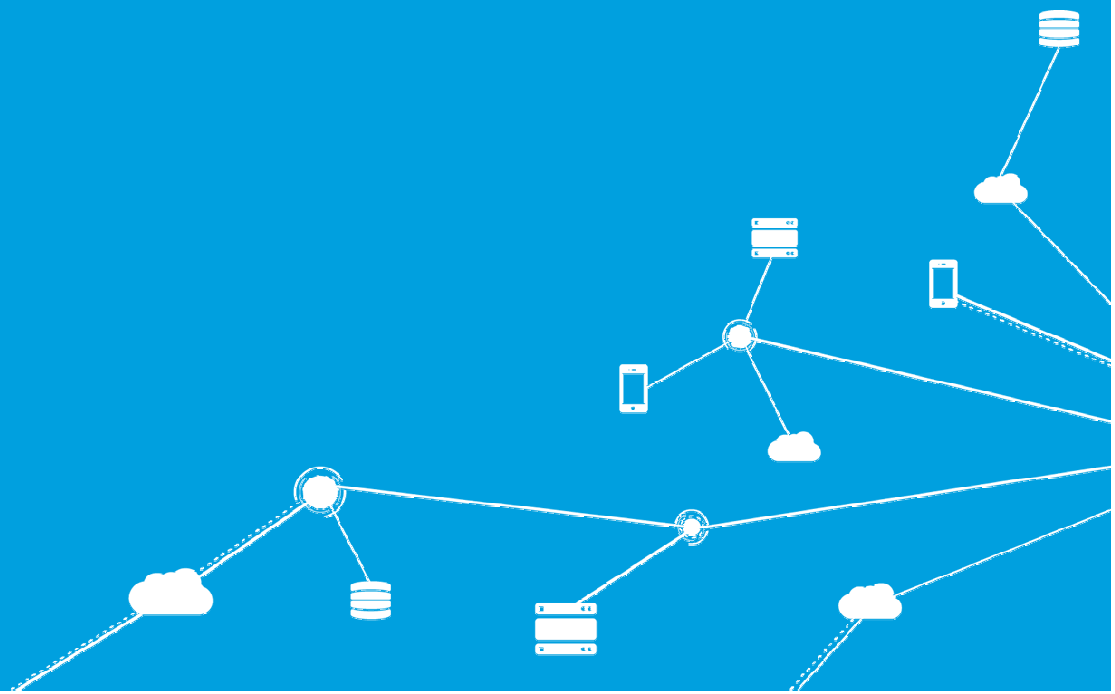
Handling messaging exceptions



The default exception strategy

- If there is no exception strategy explicitly defined, Mule's default exception strategy is used
- The default exception strategy
  - Implicitly and globally handles all messaging exceptions thrown in Mule applications
  - Stops execution of the flow and logs the exception
  - Cannot be configured
  - Can be replaced with your own global default exception strategy
    - We will do this later this module

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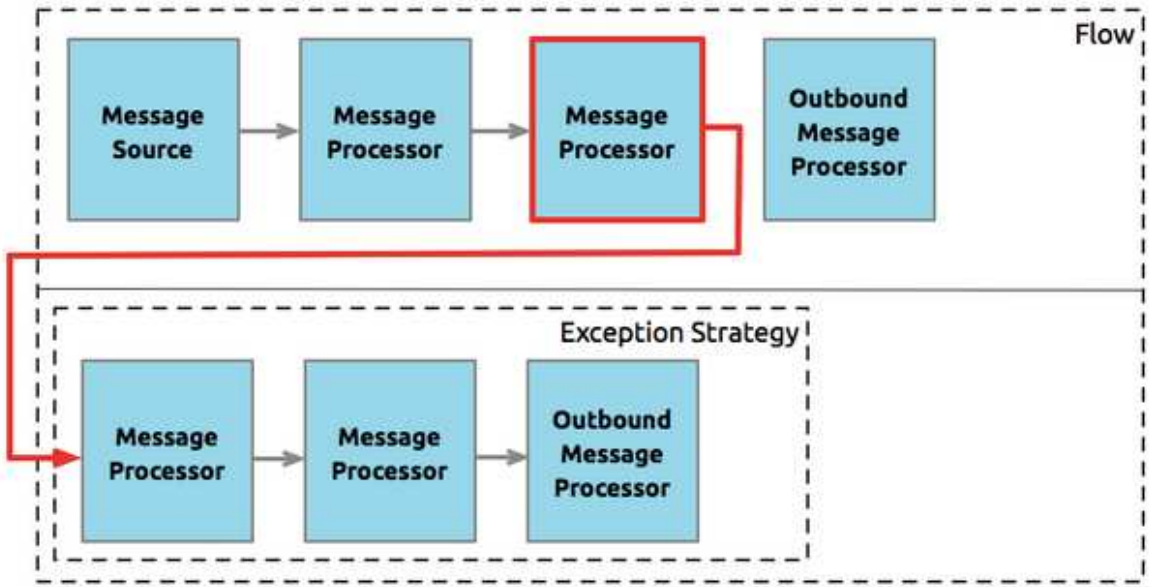
Handling messaging exceptions

- When a message being processed through a Mule flow throws an exception
  - Normal flow execution stops
  - The message is passed to the first processor in the exception strategy



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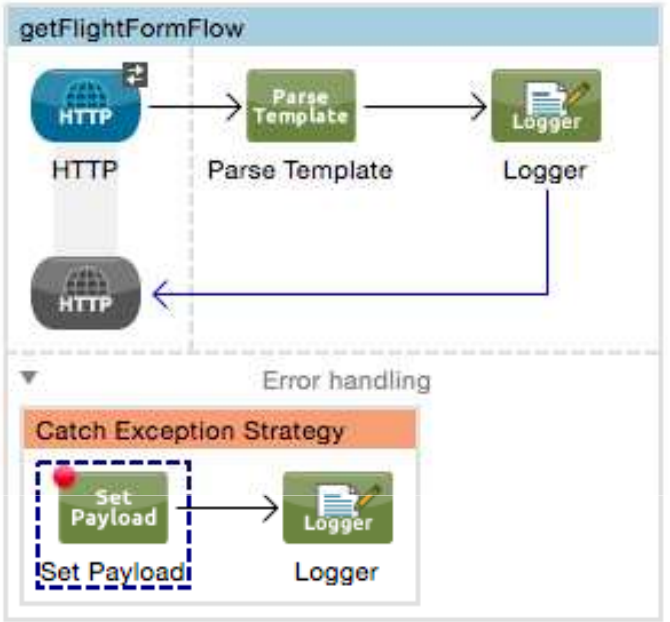
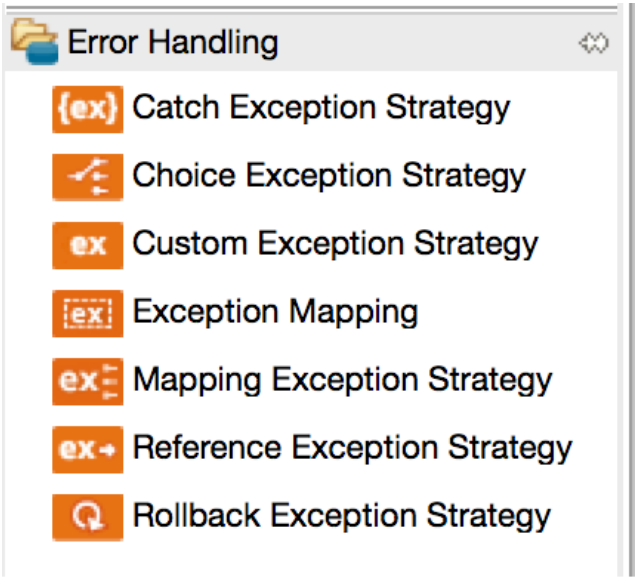
Defining messaging exception strategies

- Exception strategies are added to the error handling section of a flow
- Each flow can contain only one exception strategy
  - Choice exception strategies can contain one or more catch and/or rollback exception strategies
- Each exception strategy can contain any number of message processors





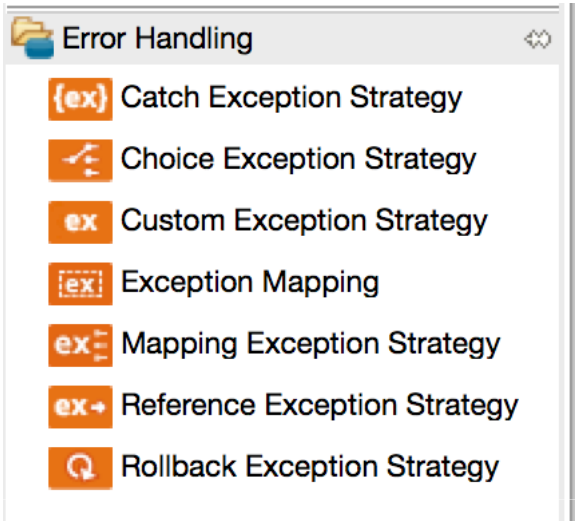
Referencing the exception inside the strategy

- Inside an exception strategy, you can reference the exception object
  - <logger level="ERROR" message="#[exception]"/>

- Use methods to get different amounts of detail about it
  - exception.getSummaryMessage()
  - exception.getVerboseMessage()
  - exception.getMessageCode()
  - exception.getDetailedMessage()

Exception strategies

- Catch
  - Catches exceptions based on conditions
- Rollback
  - Rolls back message for reprocessing
- Choice
  - Selects one of multiple catch and/or rollback strategies based on conditions
- Reference
  - Lets you reference globally defined strategies
- Mapping
  - Sets HTTP status codes based on exception type
- Custom
  - Lets you specify a custom class for handling the exception



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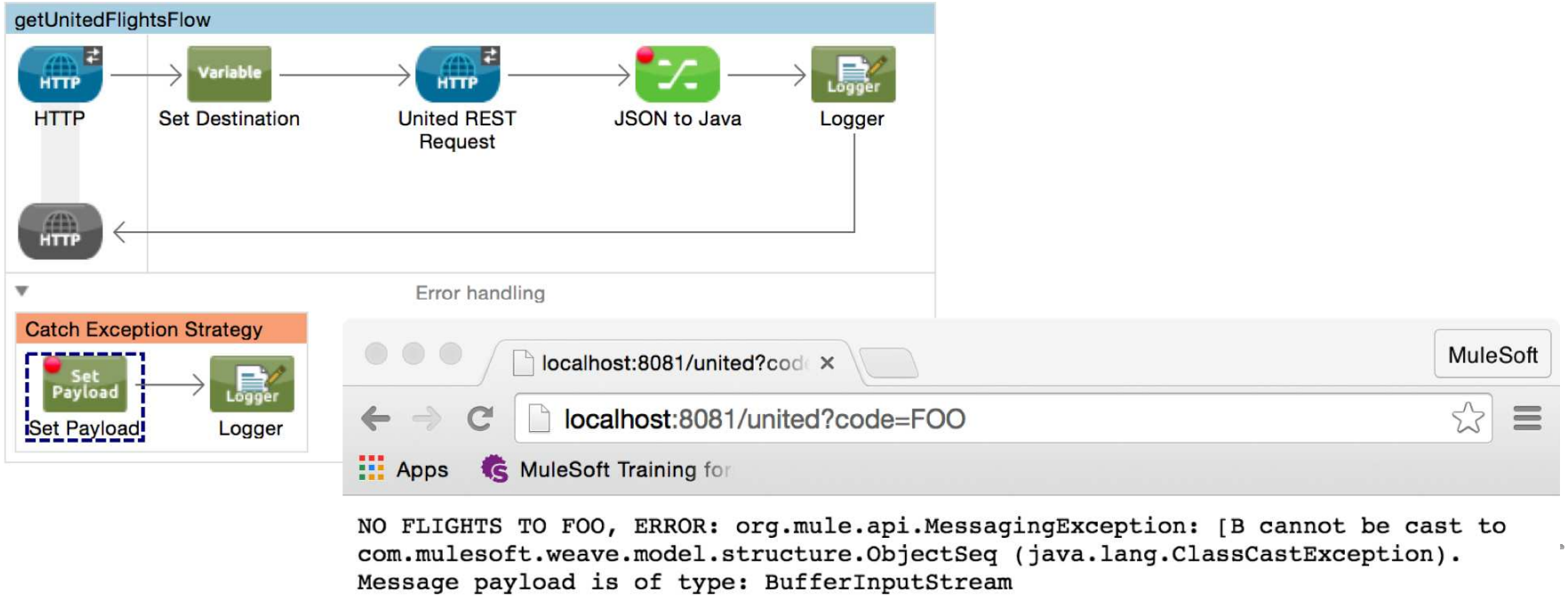
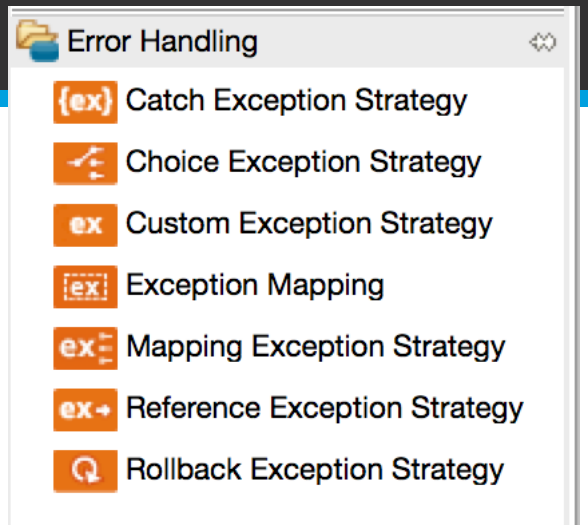
Walkthrough 7-1: Handle a messaging exception

- In this walkthrough, you will:
  - Add a Catch Exception Strategy to a flow
  - Catch the exception and send an error message back
  - Reference the exception object inside an exception handler
  - Create and catch a web service request error



The Choice Exception Strategy



- The choice exception strategy must contain two or more catch and/or rollback strategies

- The individual catch and/or rollback strategies specify a condition for when they should be evaluated
- The choice strategy routes the message to the *first* exception strategy whose condition evaluates to true
- If none of its exception strategies can handle the error, the message is routed to Mule's default exception strategy

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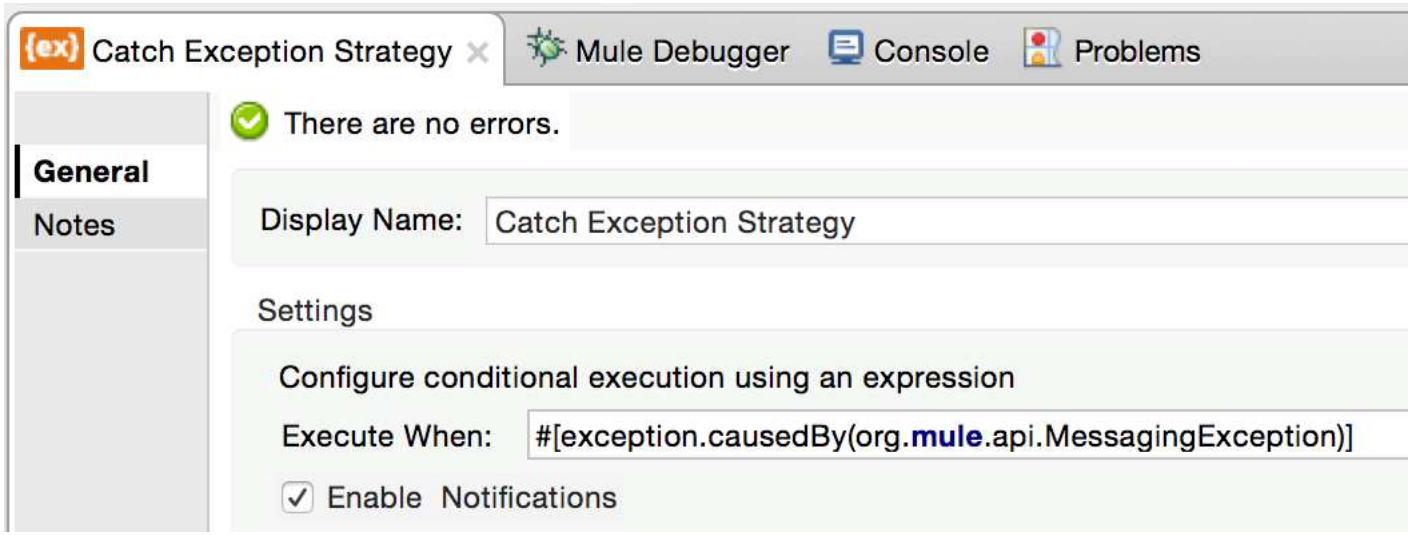
Setting exception strategy conditions

- Can reference the message or the exception
  - exception.causedBy(org.mule.example.ExceptionType)
  - exception.causedExactlyBy(org.mule.example.ExceptionType)
  - exception.causeMatches('org.mule.example.*')



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Return status codes

- By default, when a message is handled, an http status code of 200 is set and returned
- You can change this by setting outbound property
  - `message.outboundProperties.'http.status'`
- You can also use the Mapping Exception Strategy

Bubbling exceptions

- All flows can have their own exception strategies
- If a flow does not have an exception strategy, the strategy of the calling flow is used

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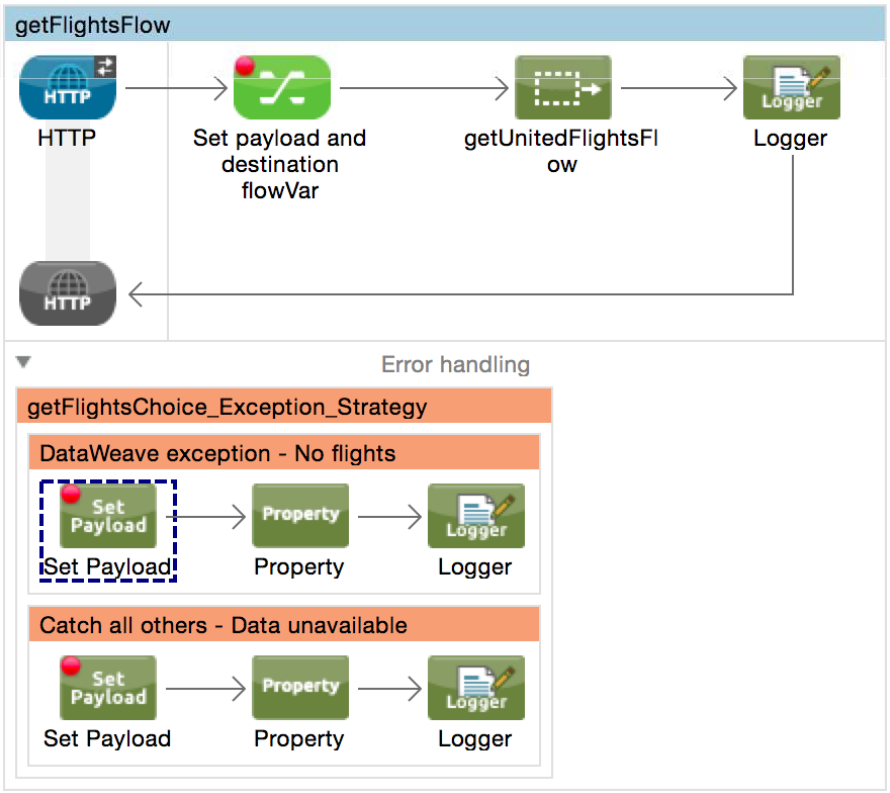
Walkthrough 7-2: Handle a messaging exception

- In this walkthrough, you will:
  - Add and configure a Choice Exception Strategy
  - Set HTTP status codes in the exception handler
  - Let an exception bubble up and be handled by the calling flow



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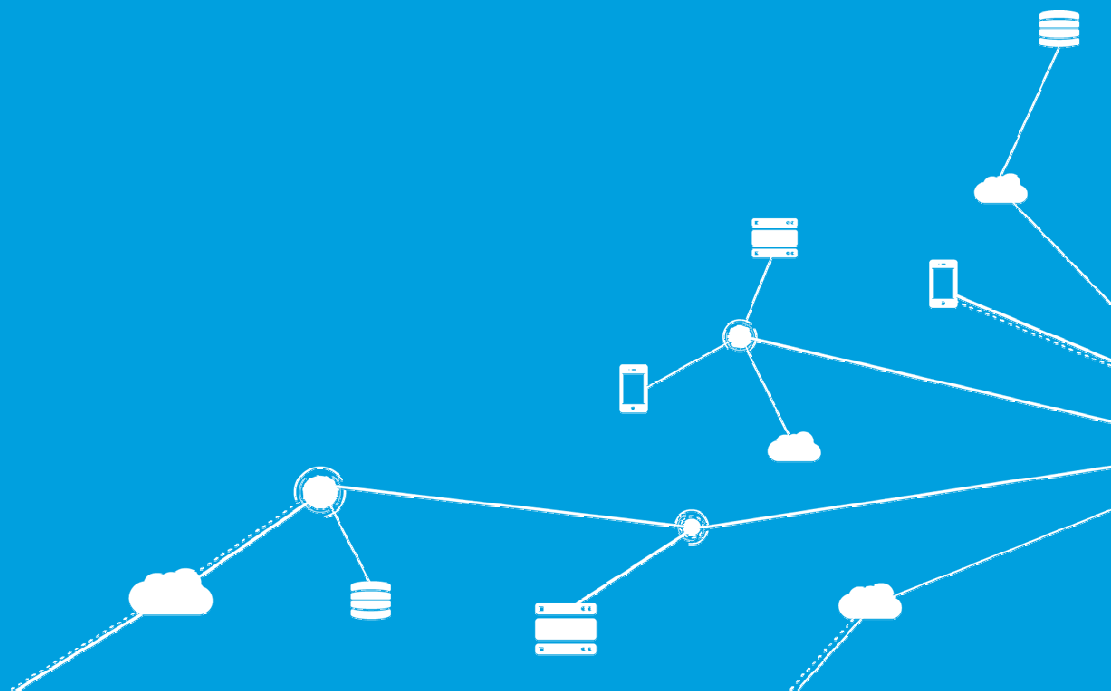
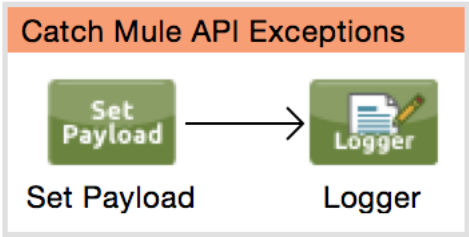
Defining global exception strategies

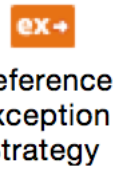


Defining global exception strategies

- You can reuse exception handling strategies by defining them outside a flow
  - You can drag them out and drop them outside any flow
  - Typically, put them in your global configuration file



- Reference global exception handlers using the Reference Exception Strategy



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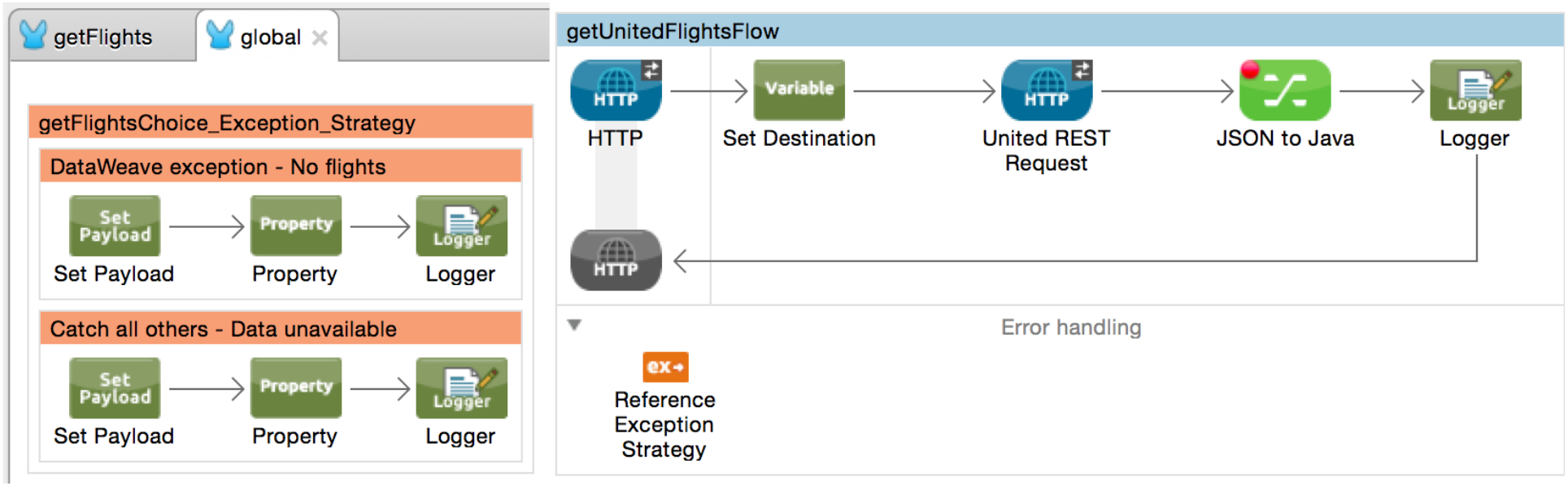
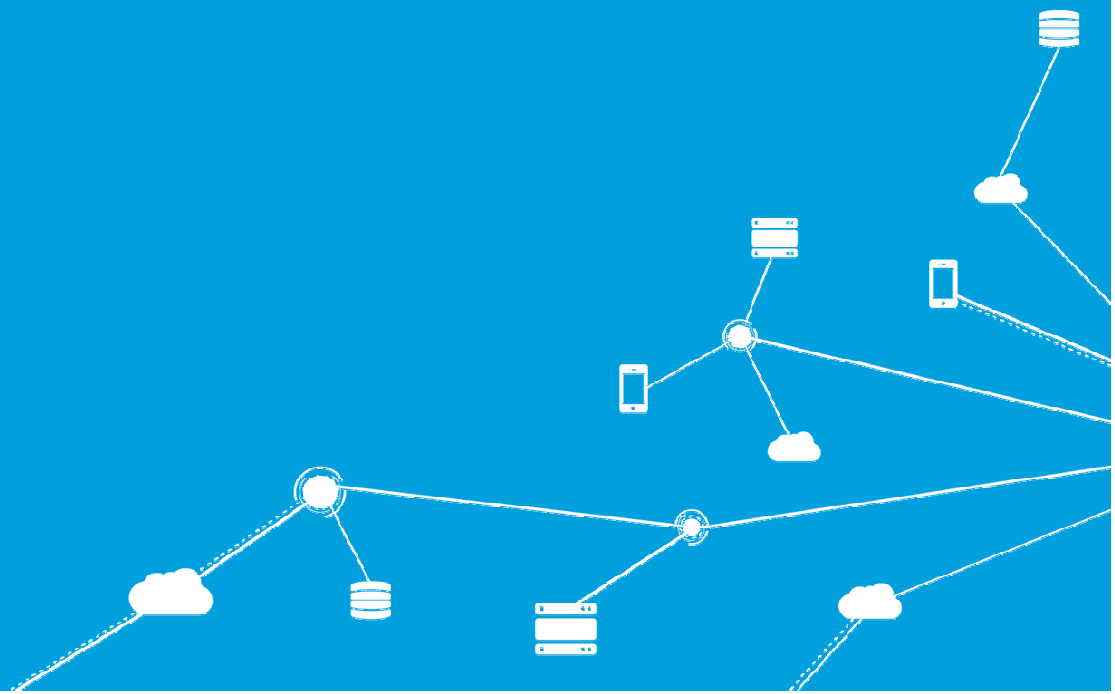
Walkthrough 7-3: Create and use global exception handlers

- In this walkthrough, you will:
  - Create a global exception handler
  - Reference and use the global exception handler in flows



Defining a default exception strategy



The default exception strategy

- Recall there is a default exception strategy
  - Implicitly handles all unhandled messaging exceptions
  - Simply logs the exception
  - Cannot be configured
- Can be replaced with your own global default exception strategy
  - Create a global configuration element
  - Specify a default exception strategy in the global configuration element

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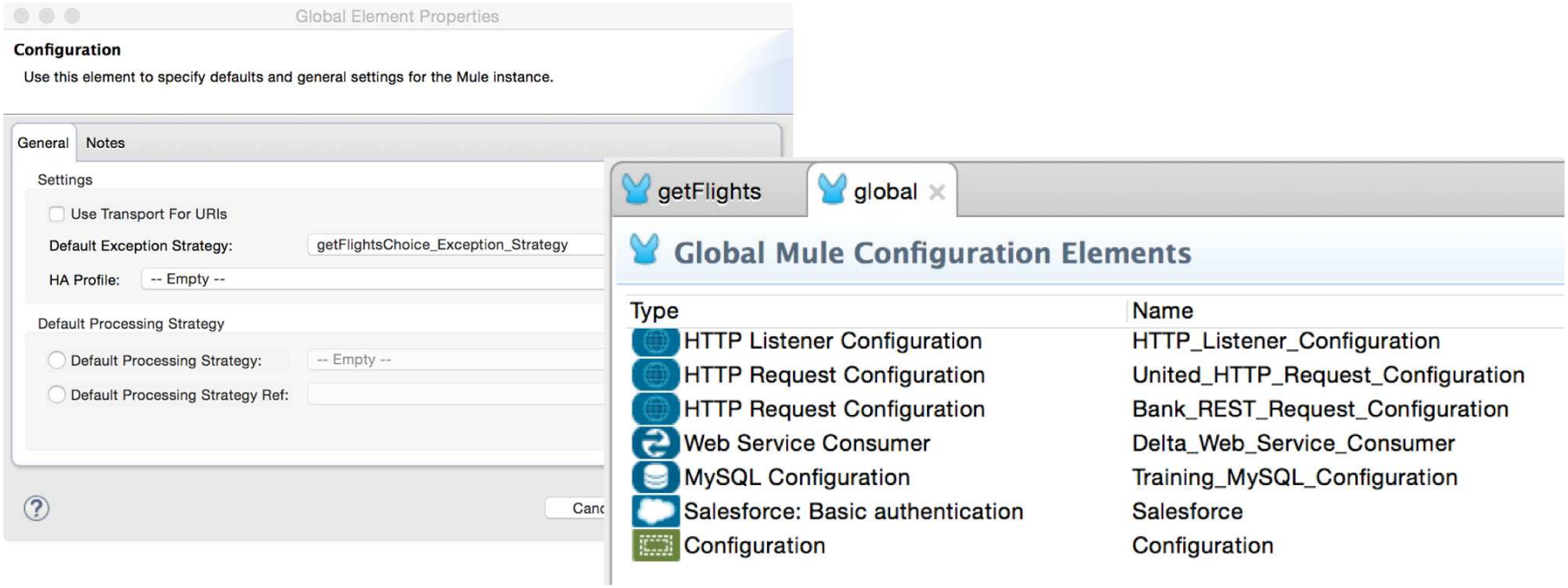
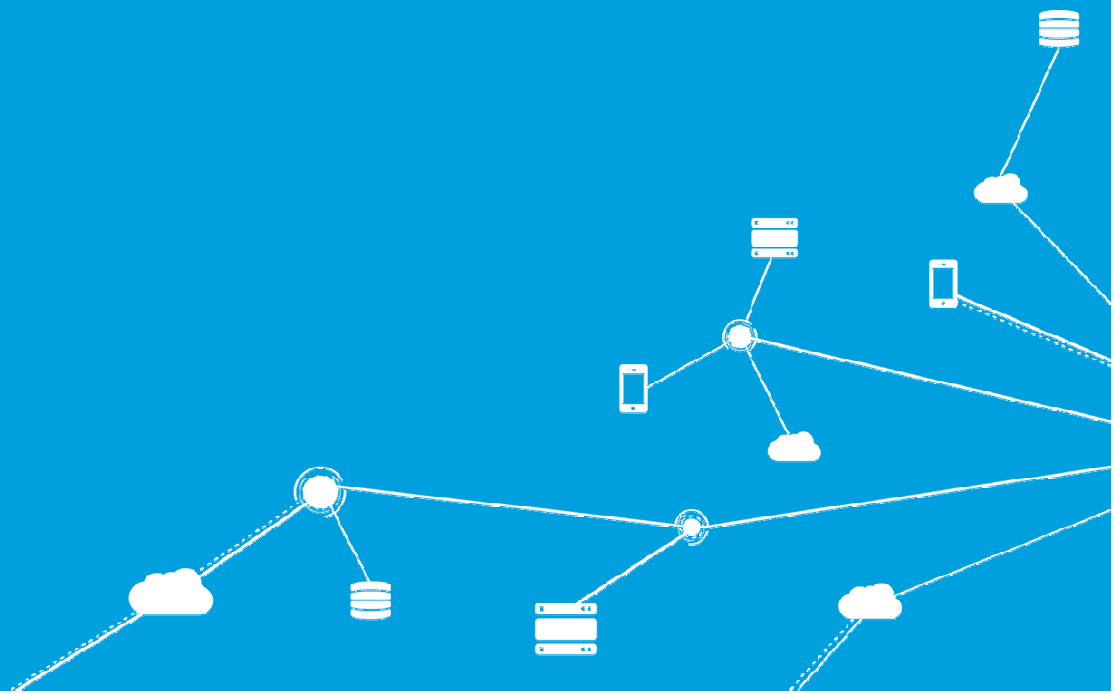
Walkthrough 7-4: Specify a global default exception strategy

- In this walkthrough, you will:
  - Create a global configuration element in the global.xml file
  - Specify a default exception strategy in the global configuration element
  - Remove the existing exception handling strategies
  - Use the default exception handling strategy



Summary



Summary

- In this module, you learned to handle errors
- An application may have system or message exceptions
- System exceptions are thrown at the system level and involve no message
  - Occur during application start-up or when a connection to an external system fails
  - Non-configurable, but logs the exception and for connections, executes any connector reconnection strategy
- Message exceptions are thrown within a flow whenever a message is involved

Summary

- If there is no exception strategy defined, the default exception strategy is used
  - Stops execution of the flow and logs the exception
  - Cannot be configured but can be replaced with your own global default exception strategy
- If there is an exception strategy, normal flow execution stops and the message is passed to the exception strategy
  - Catch strategy catches exceptions based on conditions
  - Choice strategy selects one of multiple catch and/or rollback strategies based on conditions

Summary

- All flows can have their own exception strategies
  - If a flow does not have an exception strategy, the strategy of the calling flow is used
  - Subflows cannot have their own exception strategies
- Create global exception strategies by defining them outside a flow (typically in global.xml)
- Reference global exception handlers using the Reference Exception Strategy
- Set a default global exception strategy by creating a global configuration element and setting its default exception strategy to a global exception strategy

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