Tracer Example

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Introduction

This example demonstrates the Tracer. Tracer is a tracing feature build in camel core to log snapshots of Exchanges while they are routed. This allows you to see:

- how a given Exchange was routed
- a snapshot of the content of the Exchange at any given node it passed in the route

When used Camel will by default log the snapshot at **`INFO`** level. This example demonstrates how to persist trace snapshots using JPA into a database. This allows you to store this information and query them from a SQL prompt, giving you full power to analyze the data.

Requirements

This requires Camel 2.0, the **`camel-jpa`** component and configuration of the target database.

Data Model

Camel uses the **`org.apache.camel.processor.interceptor.JpaTraceEventMessage`** JPA @Entity as data model. This class has been enhanced with JPA annotations.

The class has the following properties in the JPA model:

Property	Type	Description
`Body`	`String`	The Exchange **`IN`** body dumped as a **`String`**.
`BodyType`	`String`	The Exchange **`IN`** body java type such as **`String`**, **`org.w3c.Document`**, **`com.mycompany.MyOrder`** etc.
`CausedByException`	`String`	The Exchange exception (if any) dumped as a String including stacktrace.
`ExchangeId`	`String`	Unique id of the Exchange.
`ExchangePattern`	`String`	The Exchange Pattern such as **`InOnly`** or **`InOut`**.
`FromEndpoint`	`String`	the URI of the starting consumer the Exchange was created (usually a from in the route).
`Headers`	`String`	The Exchange **`IN`** headers dumped as a **`String`**.
`Id`	`Long`	Primary key that is generated by the database.
`OutBody`	`String`	The Exchange **`OUT`** body (if any) dumped as a **`String`**.
`OutBodyType`	`String`	The Exchange **`OUT`** body (if any) java type such as **`String`**, **`org.w3c.Document`**, **`com.mycompany.MyOrder`** etc.
`OutHeaders`	`String`	The Exchange **`OUT`** (if any) headers dumped as a **`String`**.
`PreviousNode`	`String`	**`id`** of the previous step in the route. Is **`null`** if there wasn't a previous node such as the start.
`Properties`	`String`	The Exchange properties dumped as a **`String`**.
`ShortExchangeId`	`String`	**`id`** of the Exchange without the machine name.
`Timestamp`	`Date`	Timestamp when the snapshot was generated. Is the system time of the JMV in which Camel is running.
`ToNode`	`String`	**`id`** of the next step in the route.

The table name for persisting trace events is: **`CAMEL_MESSAGETRACED`**

Configuration of the database

The Tracer uses standard JPA configuration for setting the database. In the **`META-INF/persistence.xml`** file we setup the service unit and the database configuration as:{snippet:id=e1|lang=xml|url=camel/trunk/examples/camel-example-tracer/src/main/resources/META-INF/persistence.xml}What is important is to add the **`JpaTraceEventMessage`** as a class in the **`persistence.xml`** file to register our data model:

xml<class>org.apache.camel.processor.interceptor.JpaTraceEventMessage</class>

In this example we use Hibernate JPA and a HSQLDB as database.

Running the Example

The **`README.txt`** states how to run the example from either ANT or Maven.

Here we show running with Maven:

mvn camel:run

When the application starts it start:

- in the console
- a GUI for browsing the SQL database

Select the console where the application should prompt you to enter some words. Try entering: **`Camel`**. The application should respond with a text quote.

You can also enter multiple quotes separate with space, and the response should be the best quote based on the list of words given. See the file **`src/main/resources/META-INF/spring/camel-context.xml`** to give you an idea how it works.

You can enter: **`Camel Beer`** and it should be smart enough to find a quote for the beer

Seeing the Trace Events

When the program was started a GUI application was started as well. Its a SQL prompt for the database. So try entering:

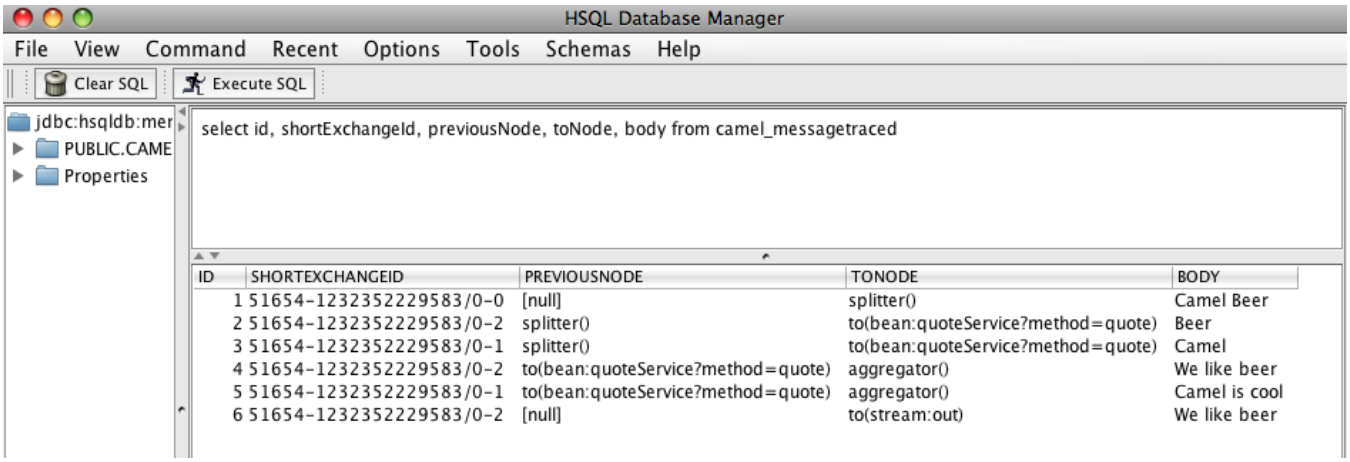
sqlselect * from camel_messagetraced

And it should return the list of trace events in the SQL.

We enter this SQL:

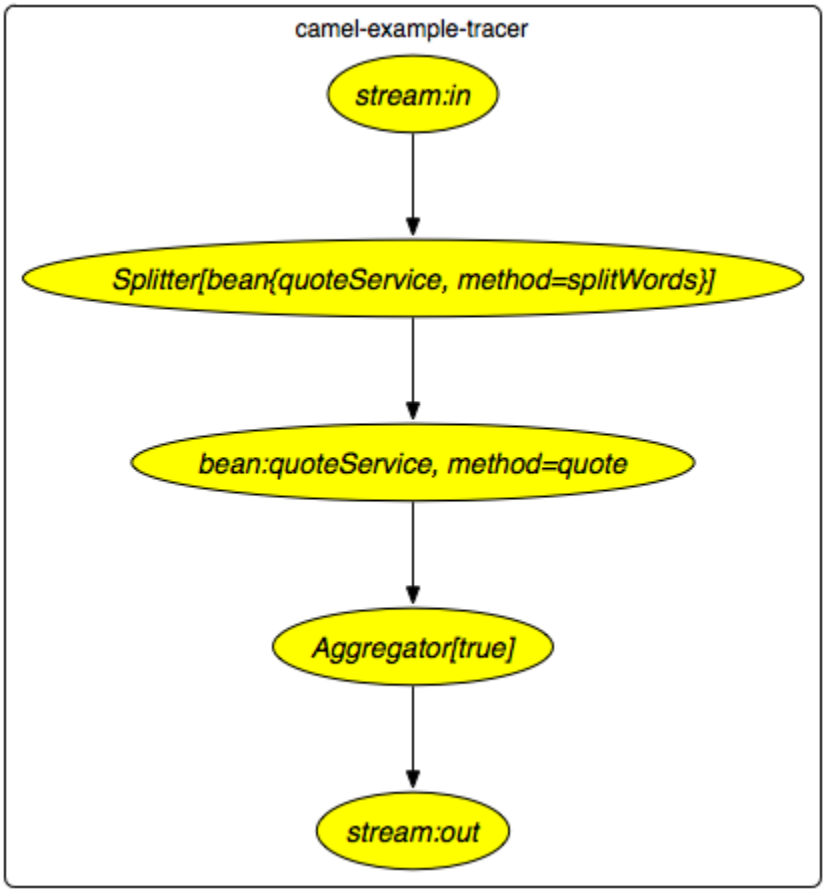
sqlselect id, shortExchangeId, previousNode, toNode, body from camel_messagetraced

and get the output as the picture below:



Routing

The diagram below illustrates the route diagram generated using Visualisation.



We receive an Exchange from the in stream, then its split using the **`splitWords`** method. Then the quote method is invoked before it's aggregated and finally sent to the stream out to be printed in the console.

Trace the Routing

If we look at the 6 rows from the traced SQL (the first picture) and with the route diagram in mind we can get a better understand how the Exchange was routed.

1. The Exchange does not have a previousNode so its the first step where its consumed from the input stream and that its going to the splitter.
2. The exchange id has changed and this is the output of the splitter as it creates a new Exchange. We can also see this one has one word in the body. This Exchange is being routed to the quote bean next.
3. This is the 2nd output from the splitter containing the 2nd word. This Exchange is being routed to the quote bean next.
4. This is the Beer Exchange where we can see the output from the quote server and that its being routed to the aggregator.
5. This is the Camel Exchange where we can see the output from the quote server and that its being routed to the aggregator.
6. This is the result of the aggregator where the Exchange ending with id **`0-2`** "was the winner" and is being routed as the aggregated result to the stream out.

Configuration of JPA Tracing in Camel

In Camel you need to configure it to use JPA for tracing. We do this as by adding a tracer in the **`META-INF/camel-context.mxl`** file:{snippet:id=e1|lang=xml|url=camel/trunk/examples/camel-example-tracer/src/main/resources/META-INF/spring/camel-context.xml}To properly configure JPA for tracing we must complete these two steps:

1. Enable the JPA tracing by setting the property **`useJpa=true`**.
2. Set the destination or **`destinationUri`** to a JPA producer endpoint.

In this example we set the destintation to refer to an endpoint defined in the camel context:{snippet:id=e3|lang=xml|url=camel/trunk/examples/camel-example-tracer/src/main/resources/META-INF/spring/camel-context.xml}Here it's important that the endpoint is configure with the **`org.apache.camel.processor.interceptor.JpaTraceEventMessage`** as entity name and the **`persistenceUnit`** as an option. In out example we use tracer.

Then the following is standard Spring JPA configuration:{snippet:id=e2|lang=xml|url=camel/trunk/examples/camel-example-tracer/src/main/resources/META-INF/spring/camel-context.xml}However we must set the **`persistenceUnitName`** to the same unit name we defined in **`persistence.xml`**, such as **`tracer`** as we are using in this example.

And if you are wondering how the Camel route is defined then its here:{snippet:id=e4|lang=xml|url=camel/trunk/examples/camel-example-tracer/src/main/resources/META-INF/spring/camel-context.xml}

See also

- Tracer
- Examples
- Tutorials
- User Guide