

CAMEL EXTENSIONS FOR QUARKUS REFERENCE

CAMEL EXTENSIONS FOR QUARKUS PROVIDED BY RED HAT

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Abstract

Camel Extensions for Quarkus provides Quarkus extensions for many of the Camel components. This reference describes the settings for each of the extensions supported by Red Hat.

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PREFACE

MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see [our CTO Chris Wright's message](#).

CHAPTER 1. EXTENSIONS OVERVIEW

1.1. SUPPORT LEVEL DEFINITIONS

New features, services, and components go through a number of support levels before inclusion in Camel Extensions for Quarkus as fully supported for production use. This is to ensure the right balance between providing the enterprise stability expected of our offerings with the need to allow our customers and partners to experiment with new Camel Extensions for Quarkus technologies while providing feedback to help guide future development activities.

Table 1.1. Camel Extensions for Quarkus support levels

Type	Description
Community Support	<p>As part of Red Hat's commitment to upstream first, integration of new extensions into our Camel Extensions for Quarkus distribution begins in the upstream community. While these extensions have been tested and documented upstream, we have not reviewed the maturity of these extensions and they may not be formally supported by Red Hat in future product releases.</p> <p>Note</p> <p>Community extensions are listed on the extensions reference page of the Camel Quarkus community project.</p>

Type	Description
Technology Preview	Technology Preview features provide early access to upcoming product innovations, enabling you to test functionality and provide feedback during the development process. However, these features are not fully supported under Red Hat Subscription Level Agreements, may not be functionally complete, and are not intended for production use. As Red Hat considers making future iterations of Technology Preview features generally available, we will attempt to resolve any issues that customers experience when using these features.
Production Support	Production Support extensions are shipped in a formal Red Hat release and are fully supported. There are no documentation gaps and extensions have been tested on all supported configurations.

1.2. SUPPORTED EXTENSIONS

There are 48 extensions.

Table 1.2. Camel Extensions for Quarkus Support Matrix

Extension	Artifact	JVM Support Level	Native Support Level	Description
Attachments	camel-quarkus-attachments	Production Support	Production Support	Support for attachments on Camel messages.

Extension	Artifact	JVM Support Level	Native Support Level	Description
AWS 2 DynamoDB	camel-quarkus-aws2-ddb	Production Support	Production Support	Store and retrieve data from AWS DynamoDB service or receive messages from AWS DynamoDB Stream using AWS SDK version 2.x.
AWS 2 Kinesis	camel-quarkus-aws2-kinesis	Production Support	Production Support	Consume and produce records from AWS Kinesis Streams using AWS SDK version 2.x.
AWS 2 Lambda	camel-quarkus-aws2-lambda	Production Support	Production Support	Manage and invoke AWS Lambda functions using AWS SDK version 2.x.
AWS 2 S3 Storage Service	camel-quarkus-aws2-s3	Production Support	Production Support	Store and retrieve objects from AWS S3 Storage Service using AWS SDK version 2.x.
AWS 2 Simple Notification System (SNS)	camel-quarkus-aws2-sns	Production Support	Production Support	Send messages to an AWS Simple Notification Topic using AWS SDK version 2.x.

Extension	Artifact	JVM Support Level	Native Support Level	Description
AWS 2 Simple Queue Service (SQS)	camel-quarkus-aws2-sqs	Production Support	Production Support	Sending and receive messages to/from AWS SQS service using AWS SDK version 2.x.
Azure Storage Blob	camel-quarkus-azure-storage-blob	Production Support	Production Support	Store and retrieve blobs from Azure Storage Blob Service using SDK v12.
Azure Storage Queue	camel-quarkus-azure-storage-queue	Production Support	Production Support	The azure-storage-queue component is used for storing and retrieving the messages to/from Azure Storage Queue using Azure SDK v12.
Bean	camel-quarkus-bean	Production Support	Production Support	Invoke methods of Java beans
Bean Validator	camel-quarkus-bean-validator	Production Support	Production Support	Validate the message body using the Java Bean Validation API.
Cassandra CQL	camel-quarkus-cassandraql	Production Support	Production Support	Integrate with Cassandra 2.0 using the CQL3 API (not the Thrift API). Based on Cassandra Java Driver provided by DataStax.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Core	camel-quarkus-core	Production Support	Production Support	Camel core functionality and basic Camel languages: Constant, ExchangeProperty, Header, Ref, Ref, Simple and Tokenize
Cron	camel-quarkus-cron	Production Support	Production Support	A generic interface for triggering events at times specified through the Unix cron syntax.
Direct	camel-quarkus-direct	Production Support	Production Support	Call another endpoint from the same Camel Context synchronously.
FHIR	camel-quarkus-fhir	Production Support	Production Support	Exchange information in the healthcare domain using the FHIR (Fast Healthcare Interoperability Resources) standard.
File	camel-quarkus-file	Production Support	Production Support	Read and write files.
FTP	camel-quarkus-ftp	Production Support	Production Support	Upload and download files to/from FTP or SFTP servers.

Extension	Artifact	JVM Support Level	Native Support Level	Description
HTTP	camel-quarkus-http	Production Support	Production Support	Send requests to external HTTP servers using Apache HTTP Client 4.x.
Infinispan	camel-quarkus-infinispan	Technology Preview	Technology Preview	Read and write from/to Infinispan distributed key/value store and data grid.
Jira	camel-quarkus-jira	Production Support	Production Support	Interact with JIRA issue tracker.
JMS	camel-quarkus-jms	Production Support	Production Support	Send and receive messages to/from a JMS Queue or Topic.
JTA	camel-quarkus-jta	Production Support	Production Support	Enclose Camel routes in the transactions using Java Transaction API (JTA) and Narayana transaction manager
Kafka	camel-quarkus-kafka	Production Support	Production Support	Sent and receive messages to/from an Apache Kafka broker.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Kamelet	camel-quarkus-kamelet	Production Support	Production Support	The Kamelet Component provides support for interacting with the Camel Route Template engine.
Log	camel-quarkus-log	Production Support	Production Support	Log messages to the underlying logging mechanism.
Mail	camel-quarkus-mail	Production Support	Production Support	Send and receive emails using imap, pop3 and smtp protocols.
MicroProfile Fault Tolerance	camel-quarkus-microprofile-fault-tolerance	Production Support	Production Support	Circuit Breaker EIP using MicroProfile Fault Tolerance.
MicroProfile Health	camel-quarkus-microprofile-health	Production Support	Production Support	Bridging Eclipse MicroProfile Health with Camel health checks.
MicroProfile Metrics	camel-quarkus-microprofile-metrics	Production Support	Production Support	Expose metrics from Camel routes.
MLLP	camel-quarkus-mllp	Production Support	Production Support	Communicate with external systems using the MLLP protocol.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Mock	camel-quarkus-mock	Production Support	Production Support	Test routes and mediation rules using mocks.
MongoDB	camel-quarkus-mongodb	Technology Preview	Technology Preview	Perform operations on MongoDB documents and collections.
Netty	camel-quarkus-netty	Production Support	Production Support	Socket level networking using TCP or UDP with the Netty 4.x.
OpenAPI Java	camel-quarkus-openapi-java	Production Support	Production Support	Rest-dsl support for using OpenAPI doc
Paho	camel-quarkus-paho	Production Support	Production Support	Communicate with MQTT message brokers using Eclipse Paho MQTT Client.
Paho MQTT 5	camel-quarkus-paho-mqtt5	Production Support	Production Support	Communicate with MQTT message brokers using Eclipse Paho MQTT v5 Client.
Platform HTTP	camel-quarkus-platform-http	Production Support	Production Support	Expose HTTP endpoints using the HTTP server available in the current platform.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Quartz	camel-quarkus-quartz	Production Support	Production Support	Schedule sending of messages using the Quartz 2.x scheduler.
Rest	camel-quarkus-rest	Production Support	Production Support	Expose REST services and their OpenAPI Specification or call external REST services.
Salesforce	camel-quarkus-salesforce	Production Support	Production Support	Communicate with Salesforce using Java DTOs.
SEDA	camel-quarkus-seda	Production Support	Production Support	Asynchronously call another endpoint from any Camel Context in the same JVM.
Slack	camel-quarkus-slack	Production Support	Production Support	Send and receive messages to/from Slack.
SQL	camel-quarkus-sql	Production Support	Production Support	Perform SQL queries using Spring JDBC.
Telegram	camel-quarkus-telegram	Technology Preview	Technology Preview	Send and receive messages acting as a Telegram Bot API.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Timer	camel-quarkus-timer	Production Support	Production Support	Generate messages in specified intervals using <code>java.util.Timer</code> .
XQuery	camel-quarkus-saxon	Production Support	Production Support	Query and/or transform XML payloads using XQuery and Saxon.
Zip File	camel-quarkus-zipfile	Production Support	Production Support	Generate messages in specified intervals using <code>java.util.Timer</code> .

1.3. SUPPORTED DATA FORMATS

There are 9 data formats.

Table 1.3. Camel Extensions for Quarkus Support Matrix

Extension	Artifact	JVM Support Level	Native Support Level	Description
Avro	camel-quarkus-avro	Production Support	Production Support	Serialize and deserialize messages using Apache Avro binary data format.
Avro Jackson	camel-quarkus-jackson-avro	Production Support	Production Support	Marshal POJOs to Avro and back using Jackson.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Bindy	camel-quarkus-bindy	Production Support	Production Support	Marshal and unmarshal between POJOs and Comma separated values (CSV) format using Camel Bindy Marshal and unmarshal between POJOs and fixed field length format using Camel Bindy Marshal and unmarshal between POJOs and key-value pair (KVP) format using Camel Bindy
HL7	camel-quarkus-hl7	Production Support	Production Support	Marshal and unmarshal HL7 (Health Care) model objects using the HL7 MLLP codec.
Jackson	camel-quarkus-jackson	Production Support	Production Support	Marshal POJOs to JSON and back using Jackson
JacksonXML	camel-quarkus-jacksonxml	Production Support	Production Support	Unmarshal a XML payloads to POJOs and back using XMLMapper extension of Jackson.
JSON Gson	camel-quarkus-gson	Production Support	Production Support	Marshal POJOs to JSON and back using Gson.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Protobuf Jackson	camel-quarkus-jackson-protobuf	Production Support	Production Support	Marshal POJOs to Protobuf and back using Jackson.
SOAP dataformat	camel-quarkus-soap	Production Support	Production Support	Marshal Java objects to SOAP messages and back.

1.4. SUPPORTED LANGUAGES

There are 12 languages.

Table 1.4. Camel Extensions for Quarkus Support Matrix

Extension	Artifact	JVM Support Level	Native Support Level	Description
Bean method	camel-quarkus-bean	Production Support	Production Support	Invoke methods of Java beans
Constant	camel-quarkus-core	Production Support	Production Support	A fixed value set only once during the route startup.
ExchangeProperty	camel-quarkus-core	Production Support	Production Support	Get the value of named Camel Exchange property.
File	camel-quarkus-core	Production Support	Production Support	For expressions and predicates using the file/simple language.

Extension	Artifact	JVM Support Level	Native Support Level	Description
Header	camel-quarkus-core	Production Support	Production Support	Get the value of the named Camel Message header.
HL7 Terser	camel-quarkus-hl7	Production Support	Production Support	Marshal and unmarshal HL7 (Health Care) model objects using the HL7 MLLP codec.
Ref	camel-quarkus-core	Production Support	Production Support	Look up an expression in the Camel Registry and evaluate it.
Simple	camel-quarkus-core	Production Support	Production Support	Evaluate Camel's built-in Simple language expression against the Camel Exchange.
Tokenize	camel-quarkus-core	Production Support	Production Support	Tokenize text payloads using the specified delimiter patterns.
JSON Path	camel-quarkus-jsonpath	Production Support	Production Support	Evaluate a JsonPath expression against a JSON message body.
XPath	camel-quarkus-xpath	Production Support	Production Support	Evaluate an XPath expression against an XML payload.

Extension	Artifact	JVM Support Level	Native Support Level	Description
XQuery	camel-quarkus-saxon	Production Support	Production Support	Query and/or transform XML payloads using XQuery and Saxon.

CHAPTER 2. EXTENSIONS REFERENCE

This chapter provides reference information about Camel Extensions for Quarkus.

Important

This Technology Preview release includes a targeted subset of the available Camel Quarkus extensions. Additional extensions will be added to our Camel Extensions for Quarkus distribution in future releases.

2.1. ATTACHMENTS

Support for attachments on Camel messages

2.1.1. What's inside

► [Attachments](#)

Please refer to the above link for usage and configuration details.

2.1.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-attachments</artifactId>
</dependency>
```

2.2. AVRO

Serialize and deserialize messages using Apache Avro binary data format.

2.2.1. What's inside

» [Avro data format](#)

Please refer to the above link for usage and configuration details.

2.2.2. Maven coordinates

Create a new project with [this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-avro</artifactId>
</dependency>
```

2.2.3. Additional Camel Quarkus configuration

Beyond standard usages known from vanilla Camel, Camel Quarkus adds the possibility to parse the Avro schema at build time both in JVM and Native mode.

The approach to generate Avro classes from Avro schema files is the one coined by the **quarkus-avro** extension. It requires the following:

1. Store ***.avsc** files in a folder named **src/main/avro** or **src/test/avro**
2. In addition to the usual **build** goal of **quarkus-maven-plugin**, add the **generate-code** goal:

```
<plugin>
  <groupId>io.quarkus</groupId>
  <artifactId>quarkus-maven-plugin</artifactId>
  <executions>
    <execution>
      <id>generate-code-and-build</id>
      <goals>
        <goal>generate-code</goal>
        <goal>build</goal>
      </goals>
    </execution>
  </executions>
</plugin>
```

Please see a working configuration in [Camel Quarkus Avro integration test](#) and [Quarkus Avro integration test](#).

2.3. AWS 2 DYNAMODB

Store and retrieve data from AWS DynamoDB service or receive messages from AWS DynamoDB Stream using AWS SDK version 2.x.

2.3.1. What's inside

- ▶ [AWS DynamoDB component](#), URI syntax: **aws2-ddb:tableName**
- ▶ [AWS DynamoDB Streams component](#), URI syntax: **aws2-ddbstream:tableName**

Please refer to the above links for usage and configuration details.

2.3.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-aws2-ddb</artifactId>
</dependency>
```

2.3.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add `quarkus.ssl.native=true` to your `application.properties` yourself. See also [Quarkus SSL guide](#).

2.3.4. Additional Camel Quarkus configuration

2.3.4.1. Optional integration with Quarkus Amazon DynamoDB

If desired, it is possible to use the Quarkus Amazon DynamoDB extension in conjunction with Camel Quarkus AWS 2 DynamoDB. Note that this is fully optional and not mandatory at all. Please follow the [Quarkus documentation](#) but beware of the following caveats:

1. The client type **apache** has to be selected by configuring the following property:

```
quarkus.dynamodb.sync-client.type=apache
```

2. The **DynamoDbClient** has to be "unremovable" in the sense of [Quarkus CDI reference](#) so that Camel Quarkus is able to look it up at runtime. You can reach that, for example, by adding a dummy bean injecting **DynamoDbClient**:

```
import javax.enterprise.context.ApplicationScoped;
import io.quarkus.arc.Unremovable;
import software.amazon.awssdk.services.dynamodb.DynamoDbClient;

@ApplicationScoped
@Unremovable
class UnremovableDynamoDbClient {
    @Inject
    DynamoDbClient dynamoDbClient;
}
```

2.4. AWS 2 KINESIS

Consume and produce records from AWS Kinesis Streams using AWS SDK version 2.x.

2.4.1. What's inside

- ▶ [AWS Kinesis component](#), URI syntax: **aws2-kinesis:streamName**
- ▶ [AWS Kinesis Firehose component](#), URI syntax: **aws2-kinesis-firehose:streamName**

Please refer to the above links for usage and configuration details.

2.4.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>  
  <groupId>org.apache.camel.quarkus</groupId>  
  <artifactId>camel-quarkus-aws2-kinesis</artifactId>  
</dependency>
```

2.4.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.5. AWS 2 LAMBDA

Manage and invoke AWS Lambda functions using AWS SDK version 2.x.

2.5.1. What's inside

- ▶ [AWS Lambda component](#), URI syntax: **aws2-lambda:function**

Please refer to the above link for usage and configuration details.

2.5.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:


```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-aws2-lambda</artifactId>
</dependency>
```

2.5.3. Camel Quarkus limitations

The **getAlias** and **listAliases** operations need to be used with **pojoRequest** in order to work. It implies that the request for those operations should be explicitly constructed by hand as shown below.

Example of creating a **getAlias** request by hand:

```
.process(new Processor() {
    public void process(Exchange exchange) {
        GetAliasRequest getAliasRequest =
        GetAliasRequest.builder().functionName(functionName).name(aliasName).build();
        ;
        exchange.getIn().setBody(getAliasRequest);
    }})
.to("aws2-lambda:functionName?operation=getAlias&pojoRequest=true");
```

Example of creating a **listAliases** request by hand:

```
.process(new Processor() {
    public void process(Exchange exchange) {
        ListAliasesRequest listAliasesRequest =
        ListAliasesRequest.builder().functionName(functionName).build();
        exchange.getIn().setBody(listAliasesRequest);
    }})
.to("aws2-lambda:functionName?operation=listAliases&pojoRequest=true");
```

2.5.4. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add

quarkus.ssl.native=true to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.5.5. Additional Camel Quarkus configuration

2.5.5.1. Not possible to leverage quarkus-amazon-lambda by Camel aws2-lambda extension

The **quarkus-amazon-lambda** extension allows you to use Quarkus to build your AWS Lambdas, whereas Camel component manages (deploy, undeploy, ...) existing functions. Therefore, it is not possible to use **quarkus-amazon-lambda** as a client for Camel **aws2-lambda** extension.

2.6. AWS 2 S3 STORAGE SERVICE

Store and retrieve objects from AWS S3 Storage Service using AWS SDK version 2.x.

2.6.1. What's inside

- ▶ [AWS S3 Storage Service component](#), URI syntax: **aws2-s3://bucketNameOrArn**

Please refer to the above link for usage and configuration details.

2.6.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-aws2-s3</artifactId>
</dependency>
```

2.6.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.6.4. Additional Camel Quarkus configuration

2.6.4.1. Optional integration with Quarkus Amazon S3

If desired, it is possible to use the Quarkus Amazon S3 extension in conjunction with Camel Quarkus AWS 2 S3 Storage Service. Note that this is fully optional and not mandatory at all. Please follow the [Quarkus documentation](#) but beware of the following caveats:

1. The client type **apache** has to be selected by configuring the following property:

```
quarkus.s3.sync-client.type=apache
```

2. The **S3Client** has to be "unremovable" in the sense of [Quarkus CDI reference](#) so that Camel Quarkus is able to look it up at runtime. You can reach that, for example, by adding a dummy bean injecting **S3Client**:

```
import javax.enterprise.context.ApplicationScoped;
import io.quarkus.arc.Unremovable;
import software.amazon.awssdk.services.s3.S3Client;

@ApplicationScoped
@Unremovable
class UnremovableS3Client {
    @Inject
    S3Client s3Client;
}
```

2.7. AWS 2 SIMPLE NOTIFICATION SYSTEM (SNS)

Send messages to an AWS Simple Notification Topic using AWS SDK version 2.x.

2.7.1. What's inside

- » [AWS Simple Notification System \(SNS\) component](#), URI syntax: **aws2-sns:topicNameOrArn**

Please refer to the above link for usage and configuration details.

2.7.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-aws2-sns</artifactId>
</dependency>
```

2.7.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add `quarkus.ssl.native=true` to your `application.properties` yourself. See also [Quarkus SSL guide](#).

2.7.4. Additional Camel Quarkus configuration

2.7.4.1. Optional integration with Quarkus Amazon SNS

If desired, it is possible to use the Quarkus Amazon SNS extension in conjunction with Camel Quarkus AWS 2 Simple Notification System (SNS). Note that this is fully optional and not mandatory at all. Please follow the [Quarkus documentation](#) but beware of the following caveats:

1. The client type `apache` has to be selected by configuring the following property:

```
quarkus.sns.sync-client.type=apache
```

2. The `SnsClient` has to be made "unremovable" in the sense of [Quarkus CDI reference](#) so that Camel Quarkus is able to look it up at runtime. You can reach that e.g. by adding a dummy bean injecting `SnsClient`:

```
import javax.enterprise.context.ApplicationScoped;
import io.quarkus.arc.Unremovable;
import software.amazon.awssdk.services.sns.SnsClient;

@ApplicationScoped
@Unremovable
class UnremovableSnsClient {
    @Inject
    SnsClient snsClient;
}
```

2.8. AWS 2 SIMPLE QUEUE SERVICE (SQS)

Sending and receive messages to/from AWS SQS service using AWS SDK version 2.x.

2.8.1. What's inside

➤ [AWS Simple Queue Service \(SQS\) component](#), URI syntax: **aws2-sqs:queueNameOrArn**

Please refer to the above link for usage and configuration details.

2.8.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-aws2-sqs</artifactId>
</dependency>
```

2.8.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.8.4. Additional Camel Quarkus configuration

2.8.4.1. Optional integration with Quarkus Amazon SQS

If desired, it is possible to use the Quarkus Amazon SQS extension in conjunction with Camel Quarkus AWS 2 Simple Queue Service (SQS). Note that this is fully optional and not mandatory at all. Please follow the [Quarkus documentation](#) but beware of the following caveats:

1. The client type **apache** has to be selected by configuring the following property:

```
quarkus.sqs.sync-client.type=apache
```

- The **SqsClient** has to be made "unremovable" in the sense of [Quarkus CDI reference](#) so that Camel Quarkus is able to look it up at runtime. You can reach that e.g. by adding a dummy bean injecting **SqsClient**:

```
import javax.enterprise.context.ApplicationScoped;
import io.quarkus.arc.Unremovable;
import software.amazon.awssdk.services.sqs.SqsClient;

@ApplicationScoped
@Unremovable
class UnremovableSqsClient {
    @Inject
    SqsClient sqsClient;
}
```

2.9. AZURE STORAGE BLOB SERVICE

Store and retrieve blobs from Azure Storage Blob Service using SDK v12.

2.9.1. What's inside

- [Azure Storage Blob Service component](#), URI syntax: **azure-storage-blob:accountName/containerName**

Please refer to the above link for usage and configuration details.

2.9.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-azure-storage-blob</artifactId>
</dependency>
```

2.9.3. Usage

2.9.3.1. Micrometer metrics support

If you wish to enable the collection of Micrometer metrics for the Reactor Netty transports, then you should declare a dependency on **quarkus-micrometer** to ensure that they are available via the Quarkus metrics HTTP endpoint.

```
<dependency>
  <groupId>io.quarkus</groupId>
  <artifactId>quarkus-micrometer</artifactId>
</dependency>
```

2.9.4. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.10. AZURE STORAGE QUEUE SERVICE

The `azure-storage-queue` component is used for storing and retrieving the messages to/from Azure Storage Queue using Azure SDK v12.

2.10.1. What's inside

- [Azure Storage Queue Service component](#), URI syntax: **azure-storage-queue:accountName/queueName**

Please refer to the above link for usage and configuration details.

2.10.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-azure-storage-queue</artifactId>
</dependency>
```

2.10.3. Usage

2.10.3.1. Micrometer metrics support

If you wish to enable the collection of Micrometer metrics for the Reactor Netty transports, then you should declare a dependency on **quarkus-micrometer** to ensure that they are available via the Quarkus metrics HTTP endpoint.

```
<dependency>
  <groupId>io.quarkus</groupId>
  <artifactId>quarkus-micrometer</artifactId>
</dependency>
```

2.10.4. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.11. BEAN VALIDATOR

Validate the message body using the Java Bean Validation API.

2.11.1. What's inside

- » [Bean Validator component](#), URI syntax: **bean-validator:label**

Please refer to the above link for usage and configuration details.

2.11.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-bean-validator</artifactId>
</dependency>
```

2.11.3. Usage

2.11.3.1. Configuring the ValidatorFactory

Implementation of this extension leverages the [Quarkus Hibernate Validator extension](#).

Therefore it is not possible to configure the **ValidatorFactory** by Camel's properties (**constraintValidatorFactory**, **messageInterpolator**, **traversableResolver**, **validationProviderResolver** and **validatorFactory**).

You can configure the **ValidatorFactory** by the creation of beans which will be injected into the default **ValidatorFactory** (created by Quarkus). See the [Quarkus CDI documentation](#) for more information.

2.11.3.2. Custom validation groups in native mode

When using custom validation groups in native mode, all the interfaces need to be registered for reflection (see the [documentation](#)).

Example:

```
@RegisterForReflection
public interface OptionalChecks {
}
```

2.11.4. Camel Quarkus limitations

It is not possible to describe your constraints as XML (by providing the file META-INF/validation.xml), only Java annotations are supported. This is caused by the limitation of the Quarkus Hibernate Validator extension (see the [issue](#)).

2.12. BEAN

Invoke methods of Java beans

2.12.1. What's inside

- » [Bean component](#), URI syntax: **bean:beanName**
- » [Bean Method language](#)
- » [Class component](#), URI syntax: **class:beanName**

Please refer to the above links for usage and configuration details.

2.12.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-bean</artifactId>
</dependency>
```

2.12.3. Usage

Except for invoking methods of beans available in Camel registry, Bean component and Bean method language can also invoke Quarkus CDI beans.

2.13. BINDY

Marshal and unmarshal between POJOs on one side and Comma separated values (CSV), fixed field length or key-value pair (KVP) formats on the other side using Camel Bindy

2.13.1. What's inside

- » [Bindy CSV data format](#)
- » [Bindy Fixed Length data format](#)
- » [Bindy Key Value Pair data format](#)

Please refer to the above links for usage and configuration details.

2.13.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-bindy</artifactId>
</dependency>
```

2.13.3. Camel Quarkus limitations

When using camel-quarkus-bindy in native mode, only the build machine's locale is supported.

For instance, on build machines with french locale, the code below:

```
BindyDataFormat dataFormat = new BindyDataFormat();
dataFormat.setLocale("ar");
```

formats numbers the arabic way in JVM mode as expected. However, it formats numbers the french way in native mode.

Without further tuning, the build machine's default locale would be used. Another locale could be specified with the [quarkus.native.user-language](#) and [quarkus.native.user-country](#) configuration properties.

2.14. CASSANDRA CQL

Integrate with Cassandra 2.0 using the CQL3 API (not the Thrift API). Based on Cassandra Java Driver provided by DataStax.

2.14.1. What's inside

- » [Cassandra CQL component](#), URI syntax: `cql:beanRef:hosts:port/keyspace`

Please refer to the above link for usage and configuration details.

2.14.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-cassandraql</artifactId>
</dependency>
```

2.14.3. Additional Camel Quarkus configuration

2.14.3.1. Cassandra aggregation repository in native mode

In order to use Cassandra aggregation repositories like **CassandraAggregationRepository** in native mode, you must [enable native serialization support](#).

In addition, if your exchange bodies are custom types, then they must be registered for serialization by annotating their class declaration with **@RegisterForReflection(serialization = true)**.

2.15. CORE

Camel core functionality and basic Camel languages/ Constant, ExchangeProperty, Header, Ref, Simple and Tokenize

2.15.1. What's inside

- » [Constant language](#)
- » [ExchangeProperty language](#)
- » [File language](#)
- » [Header language](#)

- » [Ref language](#)
- » [Simple language](#)
- » [Tokenize language](#)

Please refer to the above links for usage and configuration details.

2.15.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-core</artifactId>
</dependency>
```

2.15.3. Additional Camel Quarkus configuration

2.15.3.1. Simple language

2.15.3.1.1. Using the OGNL notation

When using the OGNL notation from the simple language, the **camel-quarkus-bean** extension should be used.

For instance, the simple expression below is accessing the **getAddress()** method on the message body of type **Client**.

```
---
simple("${body.address}")
---
```

In such a situation, one should take an additional dependency on the camel-quarkus-bean extension as [described here](#).

Note that in native mode, some classes may need to be registered for reflection. In the example above, the **Client** class needs to be [registered for reflection](#).

2.15.3.1.2. Using dynamic type resolution in native mode

When dynamically resolving a type from simple expressions like:

- ▶ `simple("${mandatoryBodyAs (TYPE)}")`
- ▶ `simple("${type:package.Enum.CONSTANT}")`
- ▶ `from("...").split(bodyAs (TYPE.class))`
- ▶ `simple("${body} is TYPE")`

It may be needed to register some classes for reflection manually.

For instance, the simple expression below is dynamically resolving the type `java.nio.ByteBuffer` at runtime:

```
---
simple("${body} is 'java.nio.ByteBuffer'")
---
```

As such, the class `java.nio.ByteBuffer` needs to be [registered for reflection](#).

2.15.3.1.3. Using the simple language with classpath resources in native mode

If your route is supposed to load a Simple script from classpath, like in the following example

```
from("direct:start").transform().simple("resource:classpath:mysimple.txt");
```

then you need to use Quarkus `quarkus.native.resources.includes` property to include the resource in the native executable as demonstrated below:

```
quarkus.native.resources.includes = mysimple.txt
```




2.15.3.1.4. Configuring a custom bean via properties in native mode




When specifying a custom bean via properties in native mode with configuration like `#class:*` or `#type:*`, it may be needed to register some classes for reflection manually.





For instance, the custom bean definition below involves the use of reflection for bean instantiation and setter invocation:





```
---
camel.beans.customBeanWithSetterInjection =
#class:org.example.PropertiesCustomBeanWithSetterInjection
camel.beans.customBeanWithSetterInjection.counter = 123
---
```




As such, the class **PropertiesCustomBeanWithSetterInjection** needs to be [registered for reflection](#), note that field access could be omitted in this case.

Configuration property	Type	Default
<p> quarkus.camel.bootstrap.enabled</p> <p>When set to true, the CamelRuntime will be started automatically.</p>	boolean	true
<p> quarkus.camel.service.discovery.exclude-patterns</p> <p>A comma-separated list of Ant-path style patterns to match Camel service definition files in the classpath. The services defined in the matching files will not be discoverable via the org.apache.camel.spi.FactoryFinder mechanism. The excludes have higher precedence than includes. The excludes defined here can also be used to veto the discoverability of services included by Camel Quarkus extensions. Example values: META-INF/services/org/apache/camel/foo/*, META-INF/services/org/apache/camel/foo/**/bar</p>	string	
<p> quarkus.camel.service.discovery.include-patterns</p> <p>A comma-separated list of Ant-path style patterns to match Camel service definition files in the classpath. The services defined in the matching files will be discoverable via the org.apache.camel.spi.FactoryFinder mechanism unless the given file is excluded via exclude-patterns. Note that Camel Quarkus extensions may include some services by default. The services selected here added to those services and the exclusions defined in exclude-patterns are applied to the union set. Example values: META-INF/services/org/apache/camel/foo/*, META-INF/services/org/apache/camel/foo/**/bar</p>	string	

Configuration property	T	Default
 <code>quarkus.camel.service.registry.exclude-patterns</code>	s t r i n g	
<p>A comma-separated list of Ant-path style patterns to match Camel service definition files in the classpath. The services defined in the matching files will not be added to Camel registry during application's static initialization. The excludes have higher precedence than includes. The excludes defined here can also be used to veto the registration of services included by Camel Quarkus extensions. Example values: META-INF/services/org/apache/camel/foo/*, META-INF/services/org/apache/camel/foo/**/bar</p>		
 <code>quarkus.camel.service.registry.include-patterns</code>	s t r i n g	
<p>A comma-separated list of Ant-path style patterns to match Camel service definition files in the classpath. The services defined in the matching files will be added to Camel registry during application's static initialization unless the given file is excluded via exclude-patterns. Note that Camel Quarkus extensions may include some services by default. The services selected here added to those services and the exclusions defined in exclude-patterns are applied to the union set. Example values: META-INF/services/org/apache/camel/foo/*, META-INF/services/org/apache/camel/foo/**/bar</p>		
 <code>quarkus.camel.runtime-catalog.components</code>	b o o l e a n	true
<p>If true the Runtime Camel Catalog embedded in the application will contain JSON schemas of Camel components available in the application; otherwise component JSON schemas will not be available in the Runtime Camel Catalog and any attempt to access those will result in a RuntimeException. Setting this to false helps to reduce the size of the native image. In JVM mode, there is no real benefit of setting this flag to false except for making the behavior consistent with native mode.</p>		

Configuration property	Type	Default
<p> quarkus.camel.runtime-catalog.languages</p> <p>If true the Runtime Camel Catalog embedded in the application will contain JSON schemas of Camel languages available in the application; otherwise language JSON schemas will not be available in the Runtime Camel Catalog and any attempt to access those will result in a RuntimeException. Setting this to false helps to reduce the size of the native image. In JVM mode, there is no real benefit of setting this flag to false except for making the behavior consistent with native mode.</p>	boolean	true
<p> quarkus.camel.runtime-catalog.dataformats</p> <p>If true the Runtime Camel Catalog embedded in the application will contain JSON schemas of Camel data formats available in the application; otherwise data format JSON schemas will not be available in the Runtime Camel Catalog and any attempt to access those will result in a RuntimeException. Setting this to false helps to reduce the size of the native image. In JVM mode, there is no real benefit of setting this flag to false except for making the behavior consistent with native mode.</p>	boolean	true
<p> quarkus.camel.runtime-catalog-models</p> <p>If true the Runtime Camel Catalog embedded in the application will contain JSON schemas of Camel EIP models available in the application; otherwise EIP model JSON schemas will not be available in the Runtime Camel Catalog and any attempt to access those will result in a RuntimeException. Setting this to false helps to reduce the size of the native image. In JVM mode, there is no real benefit of setting this flag to false except for making the behavior consistent with native mode.</p>	boolean	true
<p> quarkus.camel.routes-discovery.enabled</p> <p>Enable automatic discovery of routes during static initialization.</p>	boolean	true

Configuration property	Type	Default
<p> quarkus.camel.routes-discovery.exclude-patterns</p> <p>Used for exclusive filtering scanning of RouteBuilder classes. The exclusive filtering takes precedence over inclusive filtering. The pattern is using Ant-path style pattern. Multiple patterns can be specified separated by comma. For example to exclude all classes starting with Bar use: <code>**/Bar*</code> To exclude all routes form a specific package use: <code>com/mycompany/bar/*</code> To exclude all routes form a specific package and its sub-packages use double wildcards: <code>com/mycompany/bar/**</code> And to exclude all routes from two specific packages use: <code>com/mycompany/bar/*,com/mycompany/stuff/*</code></p>	string	
<p> quarkus.camel.routes-discovery.include-patterns</p> <p>Used for inclusive filtering scanning of RouteBuilder classes. The exclusive filtering takes precedence over inclusive filtering. The pattern is using Ant-path style pattern. Multiple patterns can be specified separated by comma. For example to include all classes starting with Foo use: <code>**/Foo*</code> To include all routes form a specific package use: <code>com/mycompany/foo/*</code> To include all routes form a specific package and its sub-packages use double wildcards: <code>com/mycompany/foo/**</code> And to include all routes from two specific packages use: <code>com/mycompany/foo/*,com/mycompany/stuff/*</code></p>	string	
<p> quarkus.camel.native.resources.exclude-patterns</p> <p>Replaced by quarkus.native.resources.excludes in Camel Quarkus 2.0.0. Using this property throws an exception at build time.</p>	string	
<p> quarkus.camel.native.resources.include-patterns</p> <p>Replaced by quarkus.native.resources.includes in Camel Quarkus 2.0.0. Using this property throws an exception at build time.</p>	string	

Configuration property	Type	Default
<p> quarkus.camel.native.reflection.exclude-patterns</p> <p>A comma separated list of Ant-path style patterns to match class names that should be excluded from registering for reflection. Use the class name format as returned by the <code>java.lang.Class.getName()</code> method: package segments delimited by period <code>.</code> and inner classes by dollar sign <code>\$</code>. This option narrows down the set selected by <code>include-patterns</code>. By default, no classes are excluded. This option cannot be used to unregister classes which have been registered internally by Quarkus extensions.</p>	string	
<p> quarkus.camel.native.reflection.include-patterns</p> <p>A comma separated list of Ant-path style patterns to match class names that should be registered for reflection. Use the class name format as returned by the <code>java.lang.Class.getName()</code> method: package segments delimited by period <code>.</code> and inner classes by dollar sign <code>\$</code>. By default, no classes are included. The set selected by this option can be narrowed down by <code>exclude-patterns</code>. Note that Quarkus extensions typically register the required classes for reflection by themselves. This option is useful in situations when the built in functionality is not sufficient. Note that this option enables the full reflective access for constructors, fields and methods. If you need a finer grained control, consider using <code>io.quarkus.runtime.annotations.RegisterForReflection</code> annotation in your Java code. For this option to work properly, at least one of the following conditions must be satisfied: - There are no wildcards (<code>*</code> or <code>/</code>) in the patterns - The artifacts containing the selected classes contain a Jandex index (<code>META-INF/jandex.idx</code>) - The artifacts containing the selected classes are registered for indexing using the <code>quarkus.index-dependency.*</code> family of options in <code>application.properties</code> - e.g. <code>quarkus.index-dependency.my-dep.group-id = org.my-group</code> <code>quarkus.index-dependency.my-dep.artifact-id = my-artifact</code> where <code>my-dep</code> is a label of your choice to tell Quarkus that <code>org.my-group</code> and with <code>my-artifact</code> belong together.</p>	string	
<p> quarkus.camel.native.reflection.serialization-enabled</p> <p>If <code>true</code>, basic classes are registered for serialization; otherwise basic classes won't be registered automatically for serialization in native mode. The list of classes automatically registered for serialization can be found in <code>CamelSerializationProcessor.BASE_SERIALIZATION_CLASSES</code>. Setting this to <code>false</code> helps to reduce the size of the native image. In JVM mode, there is no real benefit of setting this flag to <code>true</code> except for making the behavior consistent with native mode.</p>	boolean	false

Configuration property


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 [quarkus.camel.csimple.on-build-time-analysis-failure](#)

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What to do if it is not possible to extract CSimple expressions from a route definition at build time.

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Configuration property	Type	Default
	Boolean	
<p> quarkus.camel.event-bridge.enabled</p> <p>Whether to enable the bridging of Camel events to CDI events. This allows CDI observers to be configured for Camel events. E.g. those belonging to the org.apache.camel.quarkus.core.events, org.apache.camel.quarkus.main.events & org.apache.camel.impl.event packages. Note that this configuration item only has any effect when observers configured for Camel events are present in the application.</p>	Boolean	true

Configuration property	Type	Default
<p> quarkus.camel.main.shutdown.timeout</p> <p>A timeout (with millisecond precision) to wait for CamelMain#stop() to finish</p>	java.time.Duration	PT3S
<p> quarkus.camel.main.arguments.on-unknown</p> <p>The action to take when CamelMain encounters an unknown argument. fail - Prints the CamelMain usage statement and throws a RuntimeException ignore - Suppresses any warnings and the application startup proceeds as normal warn - Prints the CamelMain usage statement but allows the application startup to proceed as normal</p>	org.apache.camel	warn


Configuration property

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Configuration property	T y p e	Default
	m e d y	

 Configuration property fixed at build time. All other configuration properties are overridable at runtime.

2.16. CRON

A generic interface for triggering events at times specified through the Unix cron syntax.

2.16.1. What's inside

► [Cron component](#), URI syntax: **cron:name**

Please refer to the above link for usage and configuration details.

2.16.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-cron</artifactId>
</dependency>
```

2.16.3. Additional Camel Quarkus configuration

The cron component is a generic interface component, as such Camel Quarkus users will need to use the cron extension together with another extension offering an implementation.

For instance, one can use the [Quartz Extension](#) and cron extension together in its project.

2.17. DIRECT

Call another endpoint from the same Camel Context synchronously.

2.17.1. What's inside

- » [Direct component](#), URI syntax: **direct:name**

Please refer to the above link for usage and configuration details.

2.17.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-direct</artifactId>
</dependency>
```

2.18. FHIR

Exchange information in the healthcare domain using the FHIR (Fast Healthcare Interoperability Resources) standard. Marshall and unmarshall FHIR objects to/from JSON. Marshall and unmarshall FHIR objects to/from XML.

2.18.1. What's inside

- » [FHIR component](#), URI syntax: **fhir:apiName/methodName**
- » [FHIR JSon data format](#)
- » [FHIR XML data format](#)

Please refer to the above links for usage and configuration details.

2.18.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-fhir</artifactId>
</dependency>
```


2.18.3. SSL in native mode




This extension auto-enables SSL support in native mode. Hence you do not need to add

quarkus.ssl.native=true to your **application.properties** yourself. See also [Quarkus SSL guide](#).


2.18.4. Additional Camel Quarkus configuration

By default, only FHIR versions **R4** & **DSTU3** are enabled in native mode, since they are the default values on the FHIR component and DataFormat.

Configuration property	Type	Default
 quarkus.camel.fhir.enable-dstu2	boolean	false
Enable FHIR DSTU2 Specs in native mode.		

Configuration property	Type	Default
 quarkus.camel.fhir.enable-dstu2_hl7org Enable FHIR DSTU2_HL7ORG Specs in native mode.	boolean	false
 quarkus.camel.fhir.enable-dstu2_1 Enable FHIR DSTU2_1 Specs in native mode.	boolean	false
 quarkus.camel.fhir.enable-dstu3 Enable FHIR DSTU3 Specs in native mode.	boolean	true
 quarkus.camel.fhir.enable-r4 Enable FHIR R4 Specs in native mode.	boolean	true

Configuration property	Type	Default
 <code>quarkus.camel.fhir.enable-r5</code>	boolean	false
Enable FHIR R5 Specs in native mode.		

 Configuration property fixed at build time. All other configuration properties are overridable at runtime.

2.19. FILE

Read and write files.

2.19.1. What's inside

» [File component](#), URI syntax: `file:directoryName`

Please refer to the above link for usage and configuration details.

2.19.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-file</artifactId>
</dependency>
```

2.20. FTP

Upload and download files to/from SFTP, FTP or SFTP servers

2.20.1. What's inside

- › [FTP component](#), URI syntax: **ftp:host:port/directoryName**
- › [FTPS component](#), URI syntax: **ftps:host:port/directoryName**
- › [SFTP component](#), URI syntax: **sftp:host:port/directoryName**

Please refer to the above links for usage and configuration details.

2.20.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-ftp</artifactId>
</dependency>
```

2.21. GSON

Marshal POJOs to JSON and back using Gson

2.21.1. What's inside

- › [JSON Gson data format](#)

Please refer to the above link for usage and configuration details.

2.21.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-gson</artifactId>
</dependency>
```

2.21.3. Additional Camel Quarkus configuration

2.21.3.1. Marshaling/Unmarshaling objects in native mode

When marshaling/unmarshaling objects in native mode, all the serialized classes need to be [registered for reflection](#). As such, when using `GsonDataFormat.setUnmarshalType(...)`, `GsonDataFormat.setUnmarshalTypeName(...)` and even `GsonDataFormat.setUnmarshalGenericType(...)`, the unmarshal type as well as sub field types should be registered for reflection. See a working example in this [integration test](#).

2.22. HL7

Marshal and unmarshal HL7 (Health Care) model objects using the HL7 MLLP codec.

2.22.1. What's inside

- ▶ [HL7 data format](#)
- ▶ [HL7 Terser language](#)

Please refer to the above links for usage and configuration details.

2.22.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-hl7</artifactId>
</dependency>
```

2.22.3. Camel Quarkus limitations

For MLLP with TCP, Netty is the only supported means of running an HL7 MLLP listener. Mina is not supported since it has no GraalVM native support at present.

Optional support for **HL7MLLPNettyEncoderFactory** & **HL7MLLPNettyDecoderFactory** codecs can be obtained by adding a dependency in your project **pom.xml** to **camel-quarkus-netty**.

2.23. HTTP

Send requests to external HTTP servers using Apache HTTP Client 4.x.

2.23.1. What's inside

- » [HTTP component](#), URI syntax: **[http://httpUri](#)**
- » [HTTPS \(Secure\) component](#), URI syntax: **[https://httpUri](#)**

Please refer to the above links for usage and configuration details.

2.23.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-http</artifactId>
</dependency>
```

2.23.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add `quarkus.ssl.native=true` to your `application.properties` yourself. See also [Quarkus SSL guide](#).

2.23.4. transferException option in native mode

To use the `transferException` option in native mode, you must enable support for object serialization. For more information, refer to the [Registering Classes for Serialization](#) section in the *Developing Applications with Camel Extensions for Quarkus* guide.

You will also need to enable serialization for the exception classes that you intend to serialize. For example.

```
@RegisterForReflection(targets = { IllegalStateException.class,  
MyCustomException.class }, serialization = true)
```

2.23.5. Additional Camel Quarkus configuration

your application to send or receive requests using non-default encodings.

2.24. INFINISPAN

Read and write from/to Infinispan distributed key/value store and data grid.

2.24.1. What's inside

» [Infinispan component](#), URI syntax: `infinispan:cacheName`

Please refer to the above link for usage and configuration details.

2.24.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:


```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-infinispan</artifactId>
</dependency>
```

2.24.3. Camel Quarkus limitations

2.24.3.1. InfinispanRemoteAggregationRepository is unsupported

At present the **InfinispanRemoteAggregationRepository** is not supported. There are some planned [future enhancements](#) to make this possible.

2.24.4. Additional Camel Quarkus configuration

You can either configure the Infinispan client via the relevant Camel Infinispan component & endpoint options, or you may use the [Quarkus Infinispan extension configuration properties](#).

2.25. AVRO JACKSON

Marshal POJOs to Avro and back using Jackson.

2.25.1. What's inside

- ▶ [Avro Jackson data format](#)

Please refer to the above link for usage and configuration details.

2.25.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jackson-avro</artifactId>
</dependency>
```

2.26. PROTOBUF JACKSON

Marshal POJOs to Protobuf and back using Jackson.

2.26.1. What's inside

» [Protobuf Jackson data format](#)

Please refer to the above link for usage and configuration details.

2.26.2. Maven coordinates

Create a new project with [this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jackson-protobuf</artifactId>
</dependency>
```

2.27. JACKSON

Marshal POJOs to JSON and back using Jackson

2.27.1. What's inside

» [JSON Jackson data format](#)

Please refer to the above link for usage and configuration details.

2.27.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jackson</artifactId>
</dependency>
```

2.28. JACKSONXML

Unmarshal a XML payloads to POJOs and back using XMLMapper extension of Jackson.

2.28.1. What's inside

» [JacksonXML data format](#)

Please refer to the above link for usage and configuration details.

2.28.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jacksonxml</artifactId>
</dependency>
```

2.29. JIRA

Interact with JIRA issue tracker.

2.29.1. What's inside

- ▶ [Jira component](#), URI syntax: **jira:type**

Please refer to the above link for usage and configuration details.

2.29.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jira</artifactId>
</dependency>
```

2.29.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add

quarkus.ssl.native=true to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.30. JMS

Sent and receive messages to/from a JMS Queue or Topic.

2.30.1. What's inside

- ▶ [JMS component](#), URI syntax: **jms:destinationType:destinationName**

Please refer to the above link for usage and configuration details.

2.30.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jms</artifactId>
</dependency>
```

2.30.3. Usage

2.30.3.1. Message mapping with `org.w3c.dom.Node`

The Camel JMS component supports message mapping between `javax.jms.Message` and `org.apache.camel.Message`. When wanting to convert a Camel message body type of `org.w3c.dom.Node`, you must ensure that the `camel-quarkus-jaxp` extension is present on the classpath.

2.30.3.2. Native mode support for `javax.jms.ObjectMessage`

When sending JMS message payloads as `javax.jms.ObjectMessage`, you must annotate the relevant classes to be registered for serialization with `@RegisterForReflection(serialization = true)`. Note that this extension automatically sets `quarkus.camel.native.reflection.serialization-enabled = true` for you.

For more information, refer to the [Registering Classes for Serialization](#) section in the *Developing Applications with Camel Extensions for Quarkus* guide.

2.30.4. `transferException` option in native mode

To use the `transferException` option in native mode, you must enable support for object serialization. For more information, refer to the [Registering Classes for Serialization](#) section in the *Developing Applications with Camel Extensions for Quarkus* guide.

You will also need to enable serialization for the exception classes that you intend to serialize. For example.

```
@RegisterForReflection(targets = { IllegalStateException.class,
MyCustomException.class }, serialization = true)
```

2.31. JSON PATH

Evaluate a JSONPath expression against a JSON message body

2.31.1. What's inside

► [JSONPath language](#)

Please refer to the above link for usage and configuration details.

2.31.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jsonpath</artifactId>
</dependency>
```

2.32. JTA

Enclose Camel routes in transactions using Java Transaction API (JTA) and Narayana transaction manager

2.32.1. What's inside

► [JTA](#)

Please refer to the above link for usage and configuration details.

2.32.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-jta</artifactId>
</dependency>
```

2.32.3. Usage

This extension should be added when you need to use the **transacted()** EIP in the router. It leverages the transaction capabilities provided by the `narayana-jta` extension in Quarkus.

Refer to the [Quarkus Transaction guide](#) for the more details about transaction support. For a simple usage:

```
from("direct:transaction")
    .transacted()
    .to("sql:INSERT INTO A TABLE ...?dataSource=ds1")
    .to("sql:INSERT INTO A TABLE ...?dataSource=ds2")
    .log("all data are in the ds1 and ds2")
```

Support is provided for various transaction policies.

Policy	Description
PROPAGATION_MANDATORY	Support a current transaction; throw an exception if no current transaction exists.
PROPAGATION_NEVER	Do not support a current transaction; throw an exception if a current transaction exists.
PROPAGATION_NOT_SUPPORTED	Do not support a current transaction; rather always execute non-transactionally.
PROPAGATION_REQUIRED	Support a current transaction; create a new one if none exists.
PROPAGATION_REQUIRES_NEW	Create a new transaction, suspending the current transaction if one exists.
PROPAGATION_SUPPORTS	Support a current transaction; execute non-transactionally if none exists.

2.33. KAFKA

Sent and receive messages to/from an Apache Kafka broker.

2.33.1. What's inside

» [Kafka component](#), URI syntax: **kafka:topic**

Please refer to the above link for usage and configuration details.

2.33.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-kafka</artifactId>
</dependency>
```

2.33.3. Usage

2.33.3.1. Quarkus Kafka Dev Services


Camel Quarkus Kafka can take advantage of [Quarkus Kafka Dev services](#) to simplify development and testing with a local containerized Kafka broker.

Kafka Dev Services is enabled by default in dev & test mode. The Camel Kafka component is automatically configured so that the **brokers** component option is set to point at the local containerized Kafka broker. Meaning that there's no need to configure this option yourself.

This functionality can be disabled with the configuration property **quarkus.kafka.devservices.enabled=false**.

2.33.4. Additional Camel Quarkus configuration

Configuration property	Type	Default
quarkus.camel.kafka.kubernetes-service-binding.merge-configuration If true then any Kafka configuration properties discovered by the Quarkus Kubernetes Service Binding extension (if configured) will be merged with those set via Camel Kafka component or endpoint options. If false then any Kafka configuration properties discovered by the Quarkus Kubernetes Service Binding extension are ignored, and all of the Kafka component configuration is driven by Camel.	boolean	true

 Configuration property fixed at build time. All other configuration properties are overridable at runtime.

2.34. KAMELET

Materialize route templates

2.34.1. What's inside

► [Kamelet component](#), URI syntax: **kamelet:templateId/routeId**

Please refer to the above link for usage and configuration details.

2.34.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-kamelet</artifactId>
</dependency>
```

2.34.3. Usage

2.34.3.1. Pre-load Kamelets at build-time

This extension allows to pre-load a set of Kamelets at build time using the `quarkus.camel.kamelet.identifiers` property.


2.34.3.2. Using the Kamelet Catalog


A set of pre-made Kamelets can be found on the `/camel-kamelets/latest`[Kamelet Catalog]. To use the Kamelet from the catalog you need to copy their yaml definition (that you can find [in the camel-kamelet repo](#)) on your project in the classpath. Alternatively you can add the `camel-kamelets-catalog` artifact to your `pom.xml`:

```
<dependency>
  <groupId>org.apache.camel.kamelets</groupId>
  <artifactId>camel-kamelets-catalog</artifactId>
</dependency>
```

This artifact add all the kamelets available in the catalog to your Camel Quarkus application for build time processing. If you include it with the scope **provided** the artifact should not be part of the runtime classpath, but at build time, all the kamelets listed via `quarkus.camel.kamelet.identifiers` property should be preloaded.

2.34.4. Additional Camel Quarkus configuration

Configuration property	T	Default
	y	
	p	
	e	
 <code>quarkus.camel.kamelet.identifiers</code>	s	
List of kamelets identifiers to pre-load at build time. Each individual identifier is used to set the related <code>org.apache.camel.model.RouteTemplateDefinition</code> id.	t	
	r	
	i	
	n	
	g	

 Configuration property fixed at build time. All other configuration properties are overridable at runtime.

2.35. LOG

Log messages to the underlying logging mechanism.

2.35.1. What's inside

- » [Log component](#), URI syntax: **log:loggerName**

Please refer to the above link for usage and configuration details.

2.35.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-log</artifactId>
</dependency>
```

2.36. MAIL

Send and receive emails using imap, pop3 and smtp protocols. Marshal Camel messages with attachments into MIME-Multipart messages and back.

2.36.1. What's inside

- » [IMAP component](#), URI syntax: **imap:host:port**
- » [IMAPS \(Secure\) component](#), URI syntax: **imaps:host:port**
- » [MIME Multipart data format](#)
- » [POP3 component](#), URI syntax: **pop3:host:port**
- » [POP3S component](#), URI syntax: **pop3s:host:port**
- » [SMTP component](#), URI syntax: **smtp:host:port**

» [SMTPS component](#), URI syntax: **smtps: host : port**

Please refer to the above links for usage and configuration details.

2.36.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-mail</artifactId>
</dependency>
```

2.37. MICROPROFILE FAULT TOLERANCE

Circuit Breaker EIP using Microprofile Fault Tolerance

2.37.1. What's inside

» [Microprofile Fault Tolerance](#)

Please refer to the above link for usage and configuration details.

2.37.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-microprofile-fault-tolerance</artifactId>
</dependency>
```

2.38. MICROPROFILE HEALTH

Expose Camel health checks via MicroProfile Health

2.38.1. What's inside

» [Microprofile Health](#)

Please refer to the above link for usage and configuration details.

2.38.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-microprofile-health</artifactId>
</dependency>
```

2.38.3. Usage

By default, classes extending **AbstractHealthCheck** are registered as both liveness and readiness checks. You can override the **isReadiness** method to control this behaviour.

Any checks provided by your application are automatically discovered and bound to the Camel registry. They will be available via the Quarkus health endpoints **/q/health/live** and **/q/health/ready**.

You can also provide custom **HealthCheckRepository** implementations and these are also automatically discovered and bound to the Camel registry for you.

Refer to the [Quarkus health guide](#) for further information.

2.38.3.1. Provided health checks

Some checks are automatically registered for your application.


2.38.3.1.1. Camel Context Health


Inspects the Camel Context status and causes the health check status to be **DOWN** if the status is anything other than 'Started'.

2.38.3.1.2. Camel Route Health

Inspects the status of each route and causes the health check status to be **DOWN** if any route status is not 'Started'.

2.38.4. Additional Camel Quarkus configuration

Configuration property	Type	Default
 <code>quarkus.camel.health.enabled</code>	boolean	true
Set whether to enable Camel health checks		

 Configuration property fixed at build time. All other configuration properties are overridable at runtime.

2.39. MICROPROFILE METRICS

Expose metrics from Camel routes.

2.39.1. What's inside

► [MicroProfile Metrics component](#), URI syntax: `microprofile-metrics:metricType:metricName`

Please refer to the above link for usage and configuration details.

2.39.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-microprofile-metrics</artifactId>
</dependency>
```

2.39.3. Usage

The `microprofile-metrics` component automatically exposes a set of Camel application metrics. Some of these include:

2.39.3.1. Camel Context metrics

Metric Name	Type
camel.context.status The status of the Camel Context represented by the ServiceStatus enum ordinal	Gauge
camel.context.uptime The Camel Context uptime in milliseconds	Gauge
camel.context.exchanges.completed.total The total number of completed exchanges	Counter
camel.context.exchanges.failed.total The total number of failed exchanges	Counter
camel.context.exchanges.inflight.total The total number of inflight exchanges	Gauge

Metric Name	Type
camel.context.exchanges.total The total number of all exchanges	Counter
camel.context.externalRedeliveries.total The total number of all external redeliveries	Counter
camel.context.failuresHandled.total The total number of all failures handled	Counter

2.39.3.2. Camel Route metrics

Metric Name	Type
camel.route.count The number of routes	Gauge
camel.route.running.count The number of running routes	Gauge
camel.route.exchanges.completed.total The total number of completed exchanges for the route	Counter
camel.route.exchanges.failed.total The total number of failed exchanges for the route	Counter

Metric Name	Type
camel.route.exchanges.inflight.total	Gauge
The total number of inflight exchanges for the route	
camel.route.exchanges.total	Counter
The total number of all exchanges for the route	
camel.route.externalRedeliveries.total	Counter
The total number of all external redeliveries for the route	
camel.route.failuresHandled.total	Counter
The total number of all failures handled for the route	





All metrics are tagged with the name of the Camel Context and the id of the route where applicable.


You can also produce your own customized metrics in your Camel routes. For more information, refer to the [microprofile-metrics](#) component documentation.


Metrics are exposed to Quarkus as application metrics and they can be browsed at <http://localhost:8080/q/metrics/application>.

2.39.4. Additional Camel Quarkus configuration

Configuration property	Type	Default
	Y	
	P	
	E	

Configuration property	Type	Default
 quarkus.camel.metrics.enable-route-policy Set whether to enable the MicroProfileMetricsRoutePolicyFactory for capturing metrics on route processing times.	boolean	true
 quarkus.camel.metrics.enable-message-history Set whether to enable the MicroProfileMetricsMessageHistoryFactory for capturing metrics on individual route node processing times. Depending on the number of configured route nodes, there is the potential to create a large volume of metrics. Therefore, this option is disabled by default.	boolean	false
 quarkus.camel.metrics.enable-exchange-event-notifier Set whether to enable the MicroProfileMetricsExchangeEventNotifier for capturing metrics on exchange processing times.	boolean	true
 quarkus.camel.metrics.enable-route-event-notifier Set whether to enable the MicroProfileMetricsRouteEventNotifier for capturing metrics on the total number of routes and total number of routes running.	boolean	true

Configuration property	Type	Default
 <code>quarkus.camel.metrics.enable-camel-context-event-notifier</code>	boolean	true
Set whether to enable the <code>MicroProfileMetricsCamelContextEventNotifier</code> for capturing metrics about the <code>CamelContext</code> , such as status and uptime.		

 Configuration property fixed at build time. All other configuration properties are overridable at runtime.

2.40. MLLP

Communicate with external systems using the MLLP protocol.

2.40.1. What's inside

» [MLLP component](#), URI syntax: `mllp:hostname:port`

Please refer to the above link for usage and configuration details.

2.40.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-mllp</artifactId>
</dependency>
```

2.40.3. Additional Camel Quarkus configuration

2.41. MOCK

Test routes and mediation rules using mocks.

2.41.1. What's inside

» [Mock component](#), URI syntax: `mock:name`

Please refer to the above link for usage and configuration details.

2.41.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-mock</artifactId>
</dependency>
```

2.41.3. Usage

To use camel-mock capabilities in tests it is required to get access to MockEndpoint instances.

CDI injection could be used for accessing instances (see [Quarkus documentation](#)). You can inject camelContext into test using **@Inject** annotation. Camel context can be then used for obtaining mock endpoints. See the following example:

```
import javax.inject.Inject;

import org.apache.camel.CamelContext;
import org.apache.camel.ProducerTemplate;
import org.apache.camel.component.mock.MockEndpoint;
import org.junit.jupiter.api.Test;
```

```

import io.quarkus.test.junit.QuarkusTest;

@QuarkusTest
public class MockJvmTest {

    @Inject
    CamelContext camelContext;

    @Inject
    ProducerTemplate producerTemplate;

    @Test
    public void test() throws InterruptedException {

        producerTemplate.sendBody("direct:start", "Hello World");

        MockEndpoint mockEndpoint =
camelContext.getEndpoint("mock:result", MockEndpoint.class);
        mockEndpoint.expectedBodiesReceived("Hello World");

        mockEndpoint.assertIsSatisfied();
    }
}

```

Route used for the example test:

```

import javax.enterprise.context.ApplicationScoped;

import org.apache.camel.builder.RouteBuilder;

@ApplicationScoped
public class MockRoute extends RouteBuilder {

    @Override
    public void configure() throws Exception {
        from("direct:start").to("mock:result");
    }
}

```

2.41.4. Camel Quarkus limitations

Injection of CDI beans (described in Usage) does not work in native mode.

In the native mode the test and the application under test are running in two different processes and it is not possible to share a mock bean between them (see [Quarkus documentation](#)).

2.42. MONGODB

Perform operations on MongoDB documents and collections.

2.42.1. What's inside

➤ [MongoDB component](#), URI syntax: **mongodb:connectionBean**

Please refer to the above link for usage and configuration details.

2.42.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-mongodb</artifactId>
</dependency>
```

2.42.3. Additional Camel Quarkus configuration

The extension leverages the [Quarkus MongoDB Client](#) extension. The Mongo client can be configured via the Quarkus MongoDB Client [configuration options](#).

The Camel Quarkus MongoDB extension automatically registers a MongoDB client bean named **camelMongoClient**. This can be referenced in the mongodb endpoint URI **connectionBean** path parameter. For example:

```
from("direct:start")
.to("mongodb:camelMongoClient?
database=myDb&collection=myCollection&operation=findAll")
```

If your application needs to work with multiple MongoDB servers, you can create a "named" client and reference in your route by injecting a client and the related configuration as explained in the [Quarkus MongoDB extension client injection](#). For example:

```
//application.properties
quarkus.mongodb.mongoClient1.connection-string =
mongodb://root:example@localhost:27017/

//Routes.java

@ApplicationScoped
public class Routes extends RouteBuilder {
    @Inject
    @MongoClientName("mongoClient1")
    MongoClient mongoClient1;

    @Override
    public void configure() throws Exception {
        from("direct:defaultServer")
            .to("mongodb:camelMongoClient?
database=myDb&collection=myCollection&operation=findAll")

        from("direct:otherServer")
            .to("mongodb:mongoClient1?
database=myOtherDb&collection=myOtherCollection&operation=findAll");
    }
}
```

Note that when using named clients, the "default" **camelMongoClient** bean will still be produced. Refer to the Quarkus documentation on [Multiple MongoDB Clients](#) for more information.

2.43. NETTY

Socket level networking using TCP or UDP with Netty 4.x.

2.43.1. What's inside

► [Netty component](#), URI syntax: **netty:protocol://host:port**

Please refer to the above link for usage and configuration details.

2.43.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-netty</artifactId>
</dependency>
```

2.44. OPENAPI JAVA

Expose OpenAPI resources defined in Camel REST DSL

2.44.1. What's inside

» [Openapi Java](#)

Please refer to the above link for usage and configuration details.

2.44.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-openapi-java</artifactId>
</dependency>
```

2.44.3. Camel Quarkus limitations

The **apiContextIdListing** configuration option is not supported. Since multiple **CamelContext`s are not supported and Quarkus applications run standalone, there is no scenario where attempting to resolve OpenApi specifications for a specific `CamelContext** would be useful. It also introduces some additional overhead of requiring JMX (which is not supported in native mode) & additional Camel

Quarkus extensions for processing XML.

2.45. PAHO

Communicate with MQTT message brokers using Eclipse Paho MQTT Client.

2.45.1. What's inside

» [Paho component](#), URI syntax: **paho:topic**

Please refer to the above link for usage and configuration details.

2.45.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-paho</artifactId>
</dependency>
```

2.46. PAHO MQTT5

Communicate with MQTT message brokers using Eclipse Paho MQTT v5 Client.

2.46.1. What's inside

» [Paho MQTT 5 component](#), URI syntax: **paho-mqtt5:topic**

Please refer to the above link for usage and configuration details.

2.46.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-paho-mqtt5</artifactId>
</dependency>
```

2.47. PLATFORM HTTP

This extension allows for creating HTTP endpoints for consuming HTTP requests.

It is built on top of the Eclipse Vert.x HTTP server provided by the **quarkus-vertx-http** extension.

2.47.1. What's inside

» [Platform HTTP component](#), URI syntax: **platform-http:path**

Please refer to the above link for usage and configuration details.

2.47.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-platform-http</artifactId>
</dependency>
```

2.47.3. Usage

2.47.3.1. Basic Usage

Serve all HTTP methods on the **/hello** endpoint:

```
from("platform-http:/hello").setBody(simple("Hello ${header.name}"));
```

Serve only GET requests on the **/hello** endpoint:

```
from("platform-http:/hello?httpMethodRestrict=GET").setBody(simple("Hello  
${header.name}"));
```

2.47.3.2. Using `platform-http` via Camel REST DSL

To be able to use Camel REST DSL with the **platform-http** component, add **camel-quarkus-rest** in addition to **camel-quarkus-platform-http** to your **pom.xml**:

```
<dependency>  
  <groupId>org.apache.camel.quarkus</groupId>  
  <artifactId>camel-quarkus-rest</artifactId>  
</dependency>
```

Then you can use the Camel REST DSL:

```
rest()  
  .get("/my-get-endpoint")  
    .route()  
    .setBody(constant("Hello from /my-get-endpoint"))  
    .endRest()  
  .post("/my-post-endpoint")  
    .route()  
    .setBody(constant("Hello from /my-post-endpoint"))  
    .endRest();
```

2.47.3.3. Handling `multipart/form-data` file uploads

You can restrict the uploads to certain file extensions by white listing them:

```
from("platform-http:/upload/multipart?  
fileNameExtWhitelist=html,txt&httpMethodRestrict=POST")  
  .to("log:multipart")  
  .process(e -> {  
    final AttachmentMessage am = e.getMessage(AttachmentMessage.class);  
    if (am.hasAttachments()) {  
      am.getAttachments().forEach((fileName, dataHandler) -> {
```

```

        try (InputStream in = dataHandler.getInputStream()) {
            // do something with the input stream
        } catch (IOException ioe) {
            throw new RuntimeException(ioe);
        }
    });
}
});

```

2.47.3.4. Securing platform-http endpoints

Quarkus provides a variety of security and authentication mechanisms which can be used to secure **platform-http** endpoints. Refer to the [Quarkus Security documentation](#) for further details.

Within a route, it is possible to obtain the authenticated user and its associated **SecurityIdentity** and **Principal**:

```

from("platform-http:/secure")
    .process(e -> {
        Message message = e.getMessage();
        QuarkusHttpUser user =
message.getHeader(VertxPlatformHttpConstants.AUTHENTICATED_USER,
QuarkusHttpUser.class);
        SecurityIdentity securityIdentity = user.getSecurityIdentity();
        Principal principal = securityIdentity.getPrincipal();
        // Do something useful with SecurityIdentity / Principal. E.g check
user roles etc.
    });

```

Also check the **quarkus.http.body.*** configuration options in [Quarkus documentation](#), esp.

quarkus.http.body.handle-file-uploads, **quarkus.http.body.uploads-directory** and **quarkus.http.body.delete-uploaded-files-on-end**.

2.47.4. Additional Camel Quarkus configuration

2.47.4.1. Platform HTTP server configuration

Configuration of the platform HTTP server is managed by Quarkus. Refer to the [Quarkus HTTP configuration guide](#) for the full list of configuration options.

To configure SSL for the Platform HTTP server, follow the [secure connections with SSL guide](#). Note that configuring the server for SSL with **SSLContextParameters** is not currently supported.

2.47.4.2. Character encodings

- » Check the [Character Encodings section](#) of the *Developing Applications with Camel Extensions for Quarkus* guide if you expect your application to send or receive requests using non-default encodings.

2.48. QUARTZ

Schedule sending of messages using the Quartz 2.x scheduler.

2.48.1. What's inside

- » [Quartz component](#), URI syntax: **quartz:groupName/triggerName**

Please refer to the above link for usage and configuration details.

2.48.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-quartz</artifactId>
</dependency>
```

2.48.3. Usage

2.48.3.1. Clustering

There are two options how to run Quartz in clustered mode:

2.48.3.1.1. Quarkus based

This is the preferred option. Follow the [scheduling periodic tasks quartz guide](#).

- ▶ Define database configuration in **application.properties**.
- ▶ Use for example **flyway** to create database tables required for **Quartz**.

2.48.3.1.1.1. Quartz based with an Agroal datasource

Follow the [Configure Clustering with JDBC-JobStore Guide](#) with different DS configuration:

- ▶ Use **quartz.properties** to configure the **JobStore**.
- ▶ Define datasource via quarkus (see the [Quarkus datasource documentation](#)) and use **CamelQuarkusQuartzConnectionProvider** as the **ConnectionProvider** in **quartz.properties**:

```
...
org.quartz.jobStore.dataSource = myDS

# datasource configuration
org.quartz.dataSource.myDS.connectionProvider.class =
org.apache.camel.quarkus.component.quartz.CamelQuarkusQuartzConnectionProv
ider
org.quartz.dataSource.myDSB.dataSourceName =
ds_name_if_not_set_default_ds_will_be_used
```

- ▶ You can use for example **flyway** to create database tables required for **Quartz**.

2.48.3.1.1.2. Quartz based

You can follow the [Configure Clustering with JDBC-JobStore Guide](#) without any modification:

```
...
org.quartz.jobStore.dataSource = myDS

# datasource configuration
org.quartz.dataSource.myDS.driver = org.postgresql.Driver

# datasource configuration
org.quartz.dataSource.myDS.URL=jdbc:postgresql://localhost:5432/default
org.quartz.dataSource.myDS.user = quarkus
org.quartz.dataSource.myDS.password = quarkus
```

2.48.4. Camel Quarkus limitations

2.48.4.1. JDBC Job Store

Quartz's property `org.quartz.jobStore.useProperties` is set to `true` and can not be modified. The value is forced by the Quarkus Quartz extension. See the Quartz documentation for more information about `org.quartz.jobStore.useProperties`.

2.49. REST

Expose REST services and their OpenAPI Specification or call external REST services.

2.49.1. What's inside

- ▶ [REST component](#), URI syntax: `rest:method:path:uriTemplate`
- ▶ [REST API component](#), URI syntax: `rest-api:path`

Please refer to the above links for usage and configuration details.

2.49.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-rest</artifactId>
</dependency>
```

2.49.3. Additional Camel Quarkus configuration

This extension depends on the [Platform HTTP](#) extension and configures it as the component that provides the REST transport.

2.49.3.1. Path parameters containing special characters with platform-http

When using the **platform-http** REST transport, some characters are not allowed within path parameter names. This includes the '-' and '\$' characters.

In order to make the below example REST **/dashed/param** route work correctly, a system property is required **io.vertx.web.route.param.extended-pattern=true**.

```
import org.apache.camel.builder.RouteBuilder;

public class CamelRoute extends RouteBuilder {

    @Override
    public void configure() {
        rest("/api")
            // Dash '-' is not allowed by default
            .get("/dashed/param/{my-param}")
            .route()
                .setBody(constant("Hello World"))
            .endRest()

            // The non-dashed path parameter works by default
            .get("/undashed/param/{myParam}")
            .route()
                .setBody(constant("Hello World"))
            .endRest();
    }
}
```

There is some more background to this in the [Vert.x Web documentation](#).

2.49.3.2. Configuring alternate REST transport providers

To use another REST transport provider, such as **netty-http** or **servlet**, you need to add the respective extension as a dependency to your project and set the provider in your **RouteBuilder**. E.g. for **servlet**, you'd have to add the **org.apache.camel.quarkus:camel-quarkus-servlet** dependency and then set the provider as follows:

```
import org.apache.camel.builder.RouteBuilder;

public class CamelRoute extends RouteBuilder {

    @Override
```



```
public void configure() {
    restConfiguration()
        .component("servlet");
    ...
}
}
```

2.50. SALESFORCE

Communicate with Salesforce using Java DTOs.

2.50.1. What's inside

► [Salesforce component](#), URI syntax: **salesforce:operationName:topicName**

Please refer to the above link for usage and configuration details.

2.50.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-salesforce</artifactId>
</dependency>
```

2.50.3. Usage

2.50.3.1. Generating Salesforce DTOs with the `salesforce-maven-plugin`

Note

The **camel-salesforce-maven-plugin** is only covered by community support.

To generate Salesforce DTOs for your project, use the **salesforce-maven-plugin**. The example code snippet below creates a single DTO for the **Account** object.

```
<plugin>
  <groupId>org.apache.camel.maven</groupId>
  <artifactId>camel-salesforce-maven-plugin</artifactId>
  <version>3.14.1</version>
  <executions>
    <execution>
      <goals>
        <goal>generate</goal>
      </goals>
      <configuration>
        <clientId>${env.SALESFORCE_CLIENTID}</clientId>
        <clientSecret>${env.SALESFORCE_CLIENTSECRET}</clientSecret>
        <userName>${env.SALESFORCE_USERNAME}</userName>
        <password>${env.SALESFORCE_PASSWORD}</password>
        <loginUrl>https://login.salesforce.com</loginUrl>
      </configuration>
    </execution>
  </executions>
  <packageName>org.apache.camel.quarkus.component.salesforce.generated</packageName>
  <outputDirectory>src/main/java</outputDirectory>
  <includes>
    <include>Account</include>
  </includes>
</plugin>
```

2.50.3.2. Register additional Salesforce classes for reflection in native mode

For native mode, it is necessary to register some additional classes for reflection.

1. Classes in package **org.apache.camel.component.salesforce.api.dto**
2. DTO classes generated by the **camel-salesforce-maven-plugin**

To do this, add the following configuration property to **application.properties**. Replace **org.my.custom.dto.package** with your custom DTO package (if applicable, otherwise it can be removed).

```
quarkus.camel.native.reflection.include-  
patterns=org.apache.camel.component.salesforce.api.dto.*,org.my.custom.dto.  
ackage.*
```

2.50.4. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add `quarkus.ssl.native=true` to your `application.properties` yourself. See also [Quarkus SSL guide](#).

2.51. XQUERY

Query and/or transform XML payloads using XQuery and Saxon.

2.51.1. What's inside

- [XQuery component](#), URI syntax: `xquery:resourceUri`
- [XQuery language](#)

Please refer to the above links for usage and configuration details.

2.51.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>  
  <groupId>org.apache.camel.quarkus</groupId>  
  <artifactId>camel-quarkus-saxon</artifactId>  
</dependency>
```

2.51.3. Additional Camel Quarkus configuration

This component is able to load XQuery definitions from classpath. To make it work also in native mode, you need to explicitly embed the queries in the native executable by using the `quarkus.native.resources.includes` property.

For instance, the two routes below load an XQuery script from two classpath resources named `myxquery.txt` and `another-xquery.txt` respectively:

```
from("direct:start").transform().xquery("resource:classpath:myxquery.txt",
String.class);
from("direct:start").to("xquery:another-xquery.txt");
```

To include these (and possibly other queries stored in `.txt` files) in the native image, you would have to add something like the following to your `application.properties` file:

```
quarkus.native.resources.includes = *.txt
```

2.52. SEDA

Asynchronously call another endpoint from any Camel Context in the same JVM.

2.52.1. What's inside

► [SEDA component](#), URI syntax: `seda:name`

Please refer to the above link for usage and configuration details.

2.52.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-seda</artifactId>
</dependency>
```

2.53. SLACK

Send and receive messages to/from Slack.

2.53.1. What's inside

» [Slack component](#), URI syntax: **slack:channel**

Please refer to the above link for usage and configuration details.

2.53.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-slack</artifactId>
</dependency>
```

2.53.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.54. SOAP DATAFORMAT

Marshal Java objects to SOAP messages and back.

2.54.1. What's inside

» [SOAP data format](#)

Please refer to the above link for usage and configuration details.

2.54.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-soap</artifactId>
</dependency>
```

2.55. SQL

Perform SQL queries.

2.55.1. What's inside

- » [SQL component](#), URI syntax: **sql:query**
- » [SQL Stored Procedure component](#), URI syntax: **sql-stored:template**

Please refer to the above links for usage and configuration details.

2.55.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-sql</artifactId>
</dependency>
```

2.55.3. Camel Quarkus limitations

Oracle JDBC driver brings some GraalVM native-image configuration that breaks the serialization support in Camel Quarkus and Quarkus in general. See this [quarkus issue](#) for more details.

[Aggregation repository](#) does not work in native mode with Oracle db, because of this issue.

2.55.4. Additional Camel Quarkus configuration

2.55.4.1. Configuring a DataSource

This extension leverages [Quarkus Agroal](#) for **DataSource** support. Setting up a **DataSource** can be achieved via configuration properties.

```
quarkus.datasource.db-kind=postgresql
quarkus.datasource.username=your-username
quarkus.datasource.password=your-password
quarkus.datasource.jdbc.url=jdbc:postgresql://localhost:5432/your-database
quarkus.datasource.jdbc.max-size=16
```

The Camel SQL component will automatically resolve the **DataSource** bean from the registry. When configuring multiple datasources, you can specify which one is to be used on an SQL endpoint via the URI options **datasource** or **datasourceRef**. Refer to the SQL component documentation for more details.

2.55.4.1.1. Zero configuration with Quarkus Dev Services

In dev and test mode you can take advantage of [Configuration Free Databases](#). The Camel SQL component will be automatically configured to use a **DataSource** that points to a local containerized instance of the database matching the JDBC driver type that you have selected.

2.55.4.2. SQL scripts

When configuring **sql** or **sql-stored** endpoints to reference script files from the classpath, set the following configuration property to ensure that they are available in native mode.

```
quarkus.native.resources.includes = queries.sql, sql/*.sql
```

2.55.4.3. SQL aggregation repository in native mode

In order to use SQL aggregation repositories like **JdbcAggregationRepository** in native mode, you must [enable native serialization support](#).

In addition, if your exchange bodies are custom types, they must be registered for serialization by annotating their class declaration with `@RegisterForReflection(serialization = true)`.

2.56. TELEGRAM

Send and receive messages acting as a Telegram Bot Telegram Bot API.

2.56.1. What's inside

» [Telegram component](#), URI syntax: **telegram:type**

Please refer to the above link for usage and configuration details.

2.56.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-telegram</artifactId>
</dependency>
```

2.56.3. SSL in native mode

This extension auto-enables SSL support in native mode. Hence you do not need to add **quarkus.ssl.native=true** to your **application.properties** yourself. See also [Quarkus SSL guide](#).

2.57. TIMER

Generate messages in specified intervals using `java.util.Timer`.

2.57.1. What's inside

» [Timer component](#), URI syntax: **timer:timerName**

Please refer to the above link for usage and configuration details.

2.57.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-timer</artifactId>
</dependency>
```

2.58. XPATH

Evaluates an XPath expression against an XML payload.

2.58.1. What's inside

» [XPath language](#)

Please refer to the above link for usage and configuration details.

2.58.2. Maven coordinates

Create a new project with this extension on code.quarkus.redhat.com

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-xpath</artifactId>
</dependency>
```

2.58.3. Additional Camel Quarkus configuration

This component is able to load xpath expressions from classpath resources. To make it work also in native mode, you need to explicitly embed the expression files in the native executable by using the **quarkus.native.resources.includes** property.

For instance, the route below would load an XPath expression from a classpath resource named **myxpath.txt**:

```
from("direct:start").transform().xpath("resource:classpath:myxpath.txt");
```

To include this (and possibly other expressions stored in **.txt** files) in the native image, you would have to add something like the following to your **application.properties** file:

```
quarkus.native.resources.includes = *.txt
```

2.59. ZIP FILE

Compression and decompress streams using `java.util.zip.ZipStream`.

2.59.1. What's inside

» [Zip File data format](#)

Please refer to the above link for usage and configuration details.

2.59.2. Maven coordinates

[Create a new project with this extension on code.quarkus.redhat.com](#)

Or add the coordinates to your existing project:

```
<dependency>
  <groupId>org.apache.camel.quarkus</groupId>
  <artifactId>camel-quarkus-zipfile</artifactId>
</dependency>
```

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