RabbitMQ

Introduction

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Henry Potsangbam

IT Architect & Corporate trainer
22 +Year of IT Experience

- TOGAF Enterprise Architect
- Cassandra Administrator
- Mapr Certified Hadoop Administrator
- IBM Certified Application and Solution Designer
- SAP Certified EP & ABAP Development Consultant .
- CIPM – Certificate in Project Management.

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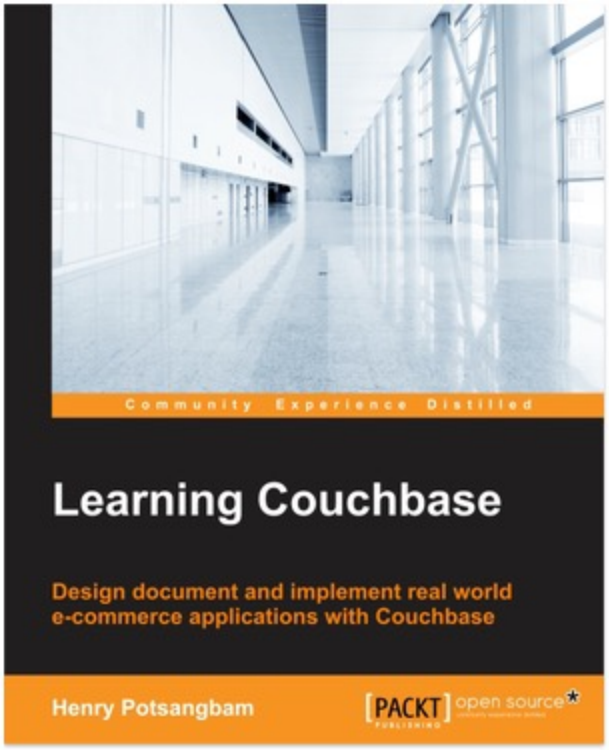
Training & Consulting on:

- **Messaging & EAI** :- RabbitMQ /Mule / Fuse ESB /Spring Integration/ JBI / Apache Camel /Talend/ Apache Service Mix
- **NOSQL & Bigdata** – Hadoop, Couchbase, Cassandra, MongoDB,CDH, BigInsight
- **Application server**:- WAS, Tomcat , WebLogic, Jboss
- **Architecture**: EA, TOGAF, CoBIT etc.
- **OSGI** - Eclipse PDE/Equinox/Virgo/Spring DM/ Felix / Karaf



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Clientele

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Introduce Yourself.

- Name
- Year of Experience.
- Skills Level
  - Messaging
  - RabitMQ/AMQP
- Expectation, if any.

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Mantra of Learning

Ask the right and relevant questions if you're going to find the right answers!

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RabbitMQ

May 2014

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Outline

Introduction to Messaging and AMQP
RabbitMQ Overview
Plugins
Web management console
CLI administration
Clustering
High Availability – Queue
Federation & Shovels
Performance
Security and Access Control
Monitoring and troubleshooting
Client API – Java & Spring Boot

Business Scenarios

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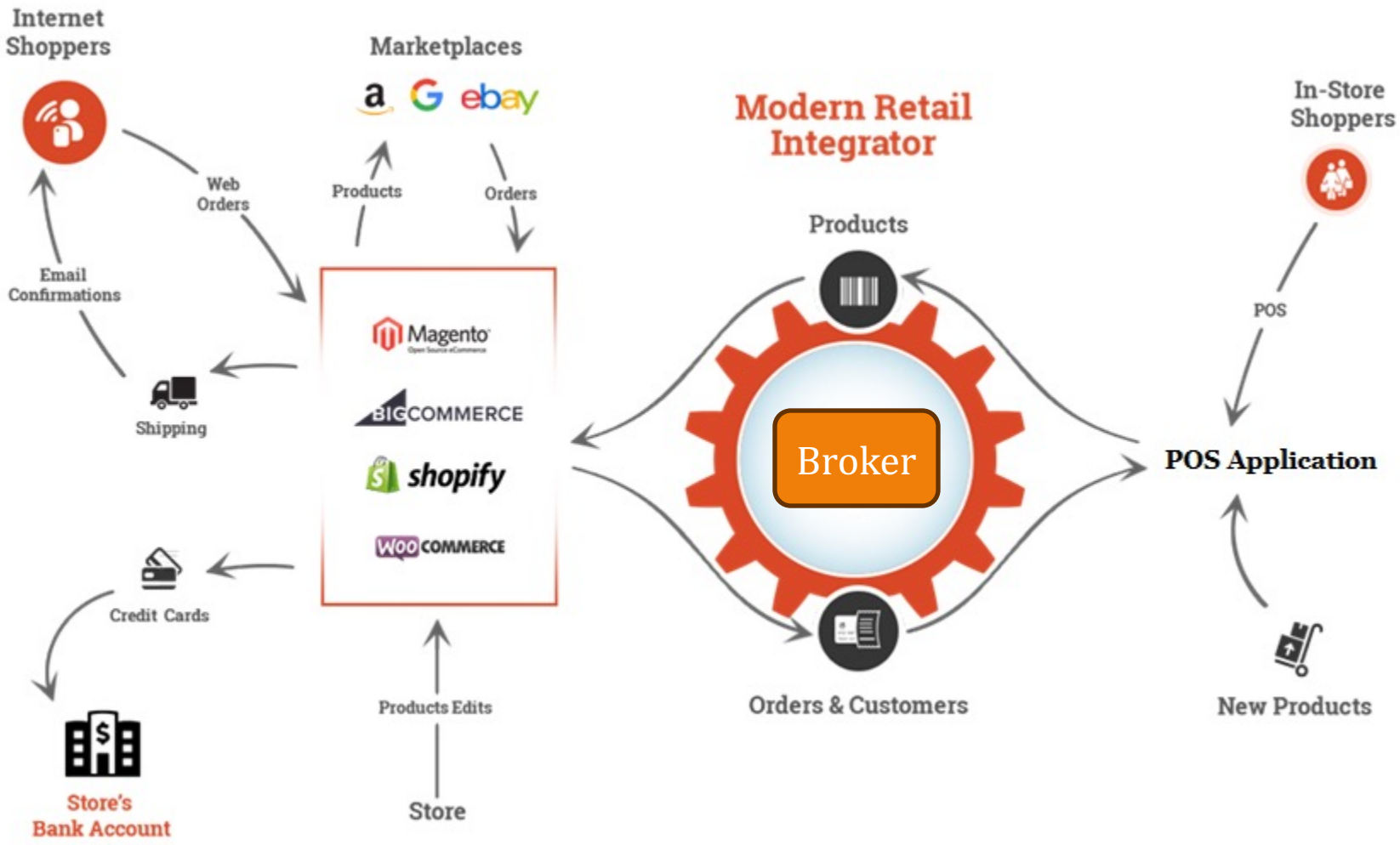
e-commerce business



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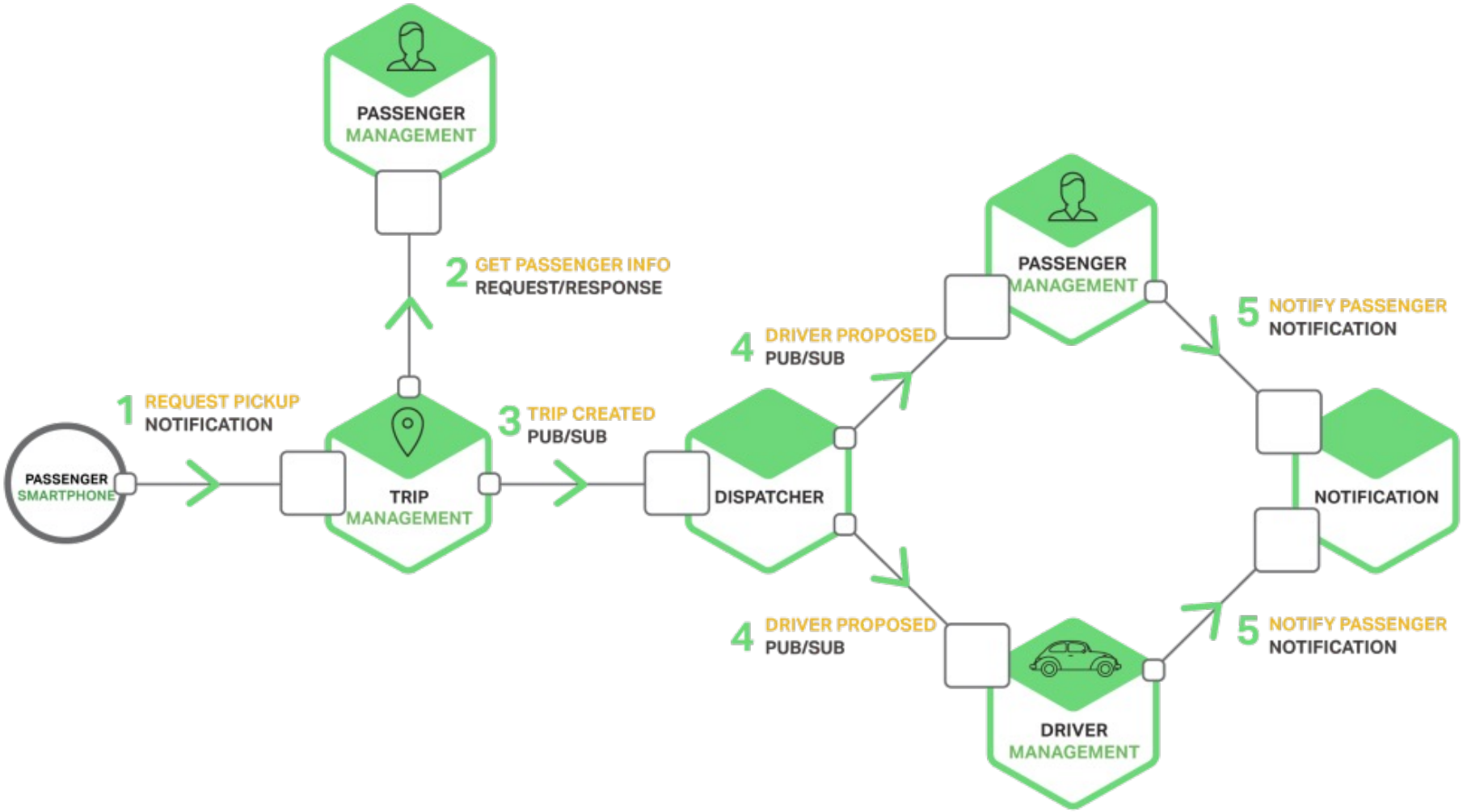
Taxi-hailing application - Microservices



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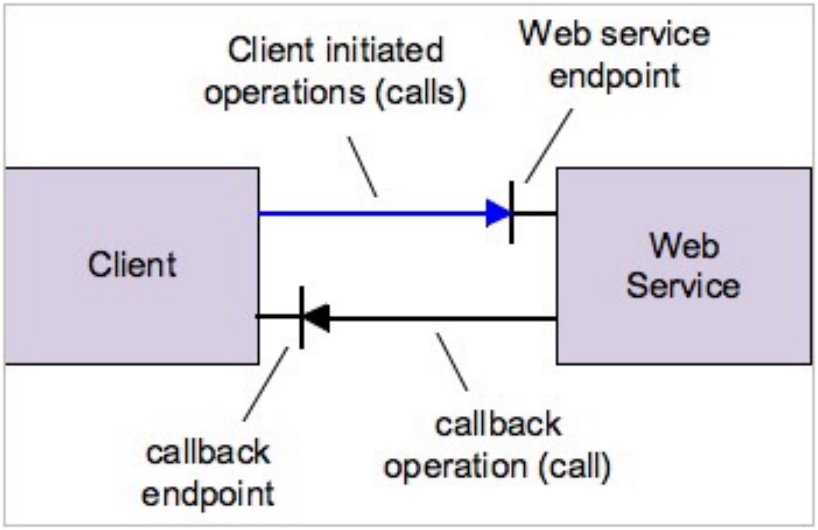
Traditional - System Communication

- Method of communication between different applications or software components between distributed systems.
- The predominant approaches

  RMI, CORBA, SOAP web services

  Calls remote methods with parameters …. And waits for response



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Integration Challenges

- Networks are unreliable.
- Networks are slow
- Any two applications are different
- Applications change over time

Messaging and AMQP

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Messaging

- Overcome challenges through asynchronous, program-to-program communication.
- enables software applications to connect and scale by separating the sending and receiving of data.

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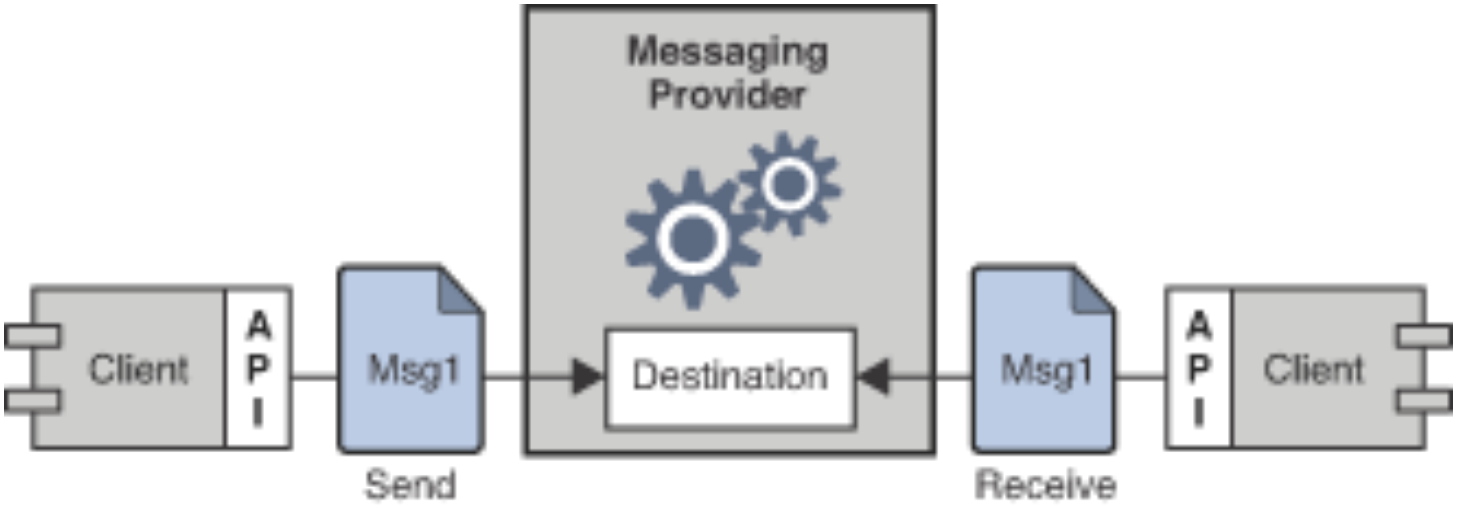
Message Oriented Middleware Architecture

- Allows interaction of software components
  - developed independently
  - run on different networked platforms



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Async V Sync

- While asynchronous communications does not wait around for a reply
- synchronous execution requires parties or components to work simultaneously in real time.

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Message Oriented Middleware Architecture

- Used for
  - Scalability and load balancing
  - Decoupling
  - Reliability
  - Availability
  - Asynchronous hand off
  - Queuing and buffering
  - Monitoring and management

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Message Oriented Middleware Architecture

- The benefits of messaging include:
    1. Remote communication
    2. Asynchronous communication
    3. Platform/language integration
    4. Variable timing
    5. Topic-based messages
    6. Reliable communication.

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Advanced Message Queuing Protocol

- Why should you care ?
  - Many significant IT efforts include a messaging and integration component (10%-30% of project cost) .

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Limitations of exiting MOMs

- Proprietary middleware has been a source of lock-in.
  - IBM MQ, Tibco Rendezvous , Sonic MQ.
- Interoperability is more difficult than it need be.
  - MQ Series and Tibco RV cannot natively interoperate with each other or other middleware products.
- Language and platform independence is still an issue.
  - JMS is not technology agnostic and only legitimately supports Java platforms.

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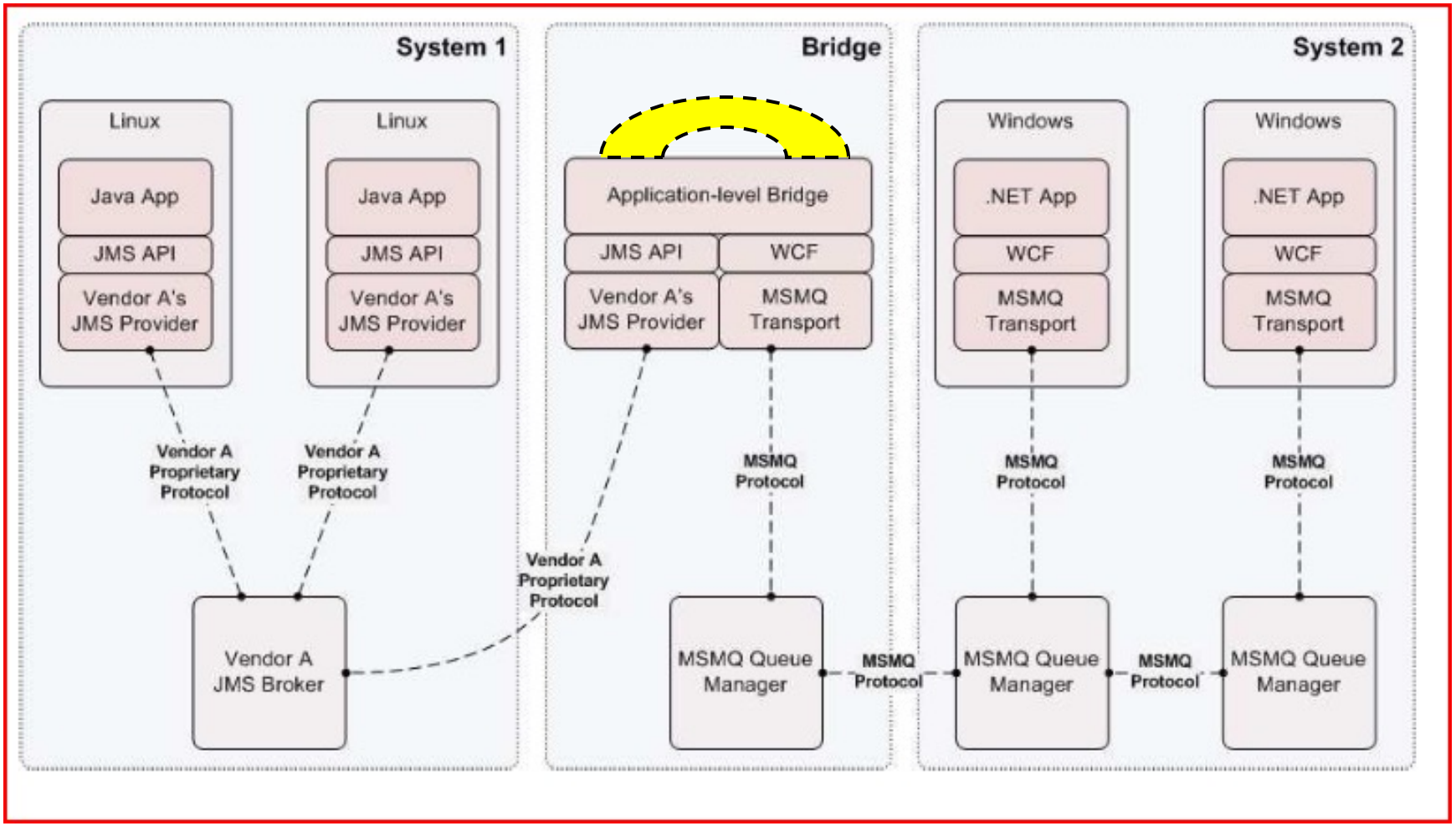
Application Level Bridging



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AMQP Motivation

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AMQP

- Goal was to provide a vendor-neutral protocol for managing the flow of messages across enterprise's business systems.
- **wire-level protocol**
  - define the conversational byte sequences that pass over a network to make things happen.

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What is AMQP? – Above 10,000 Miles

- AMQP (Advanced Message Queuing Protocol) is a networking protocol that enables conforming client applications to communicate with conforming messaging middleware brokers.
- Brokers and Their Role
  - Messaging brokers receive messages from *publishers* (producers : applications that publish them) and route them to *consumers* (applications that process them).
  - Since AMQP is a network protocol, the publishers, consumers and the broker can all reside on different machines.

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AMQP (Advanced Messaging Queue Protocol)

- AMQP is not JMS.
- Open internet protocols like TCP, SMTP, HTTP.
- Open wire protocol standard for message-queuing communication.
- Enables conforming client applications to communicate with conforming messaging middleware services (aka message brokers)

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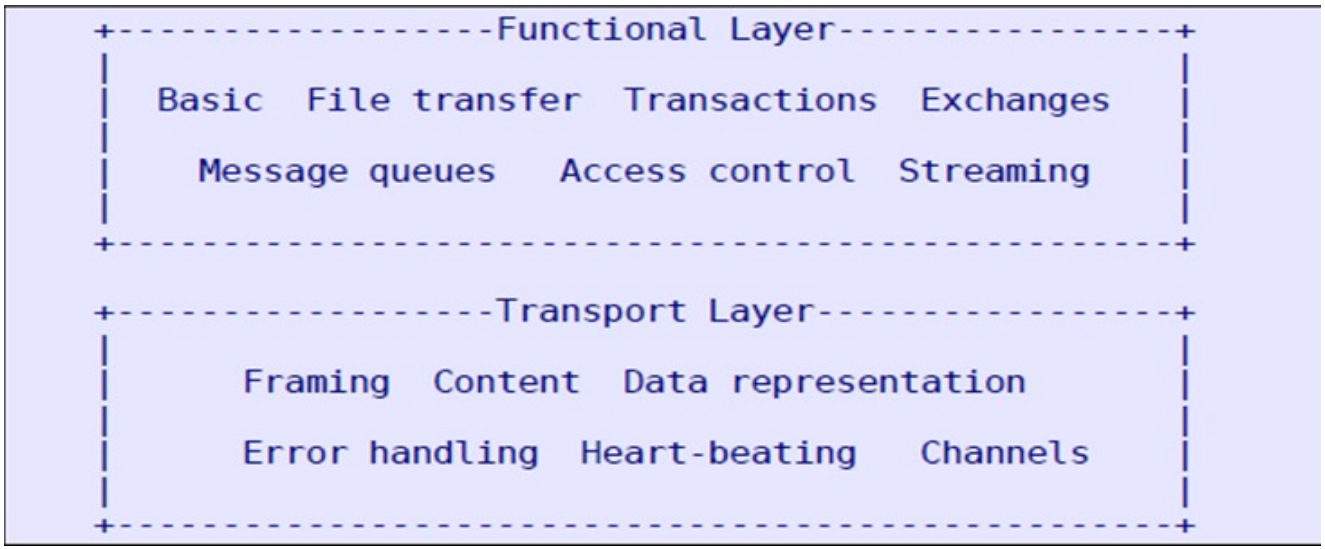
AMQP Models



- Functional layer defines sets of commands
- Transport layer carries these methods from application to server, handles channel multiplexing, framing, content encoding, heart-beating, data representation and error handling

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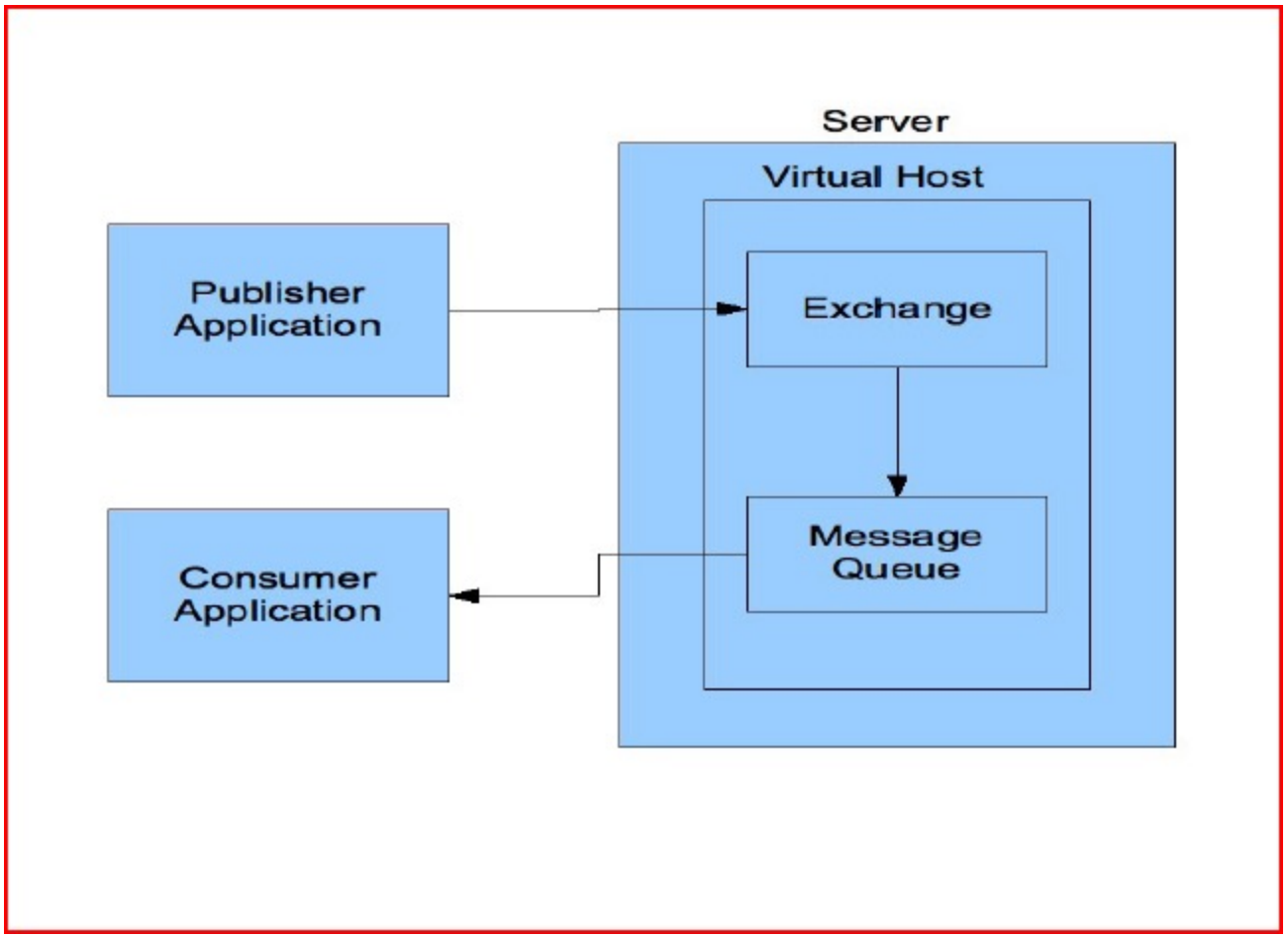
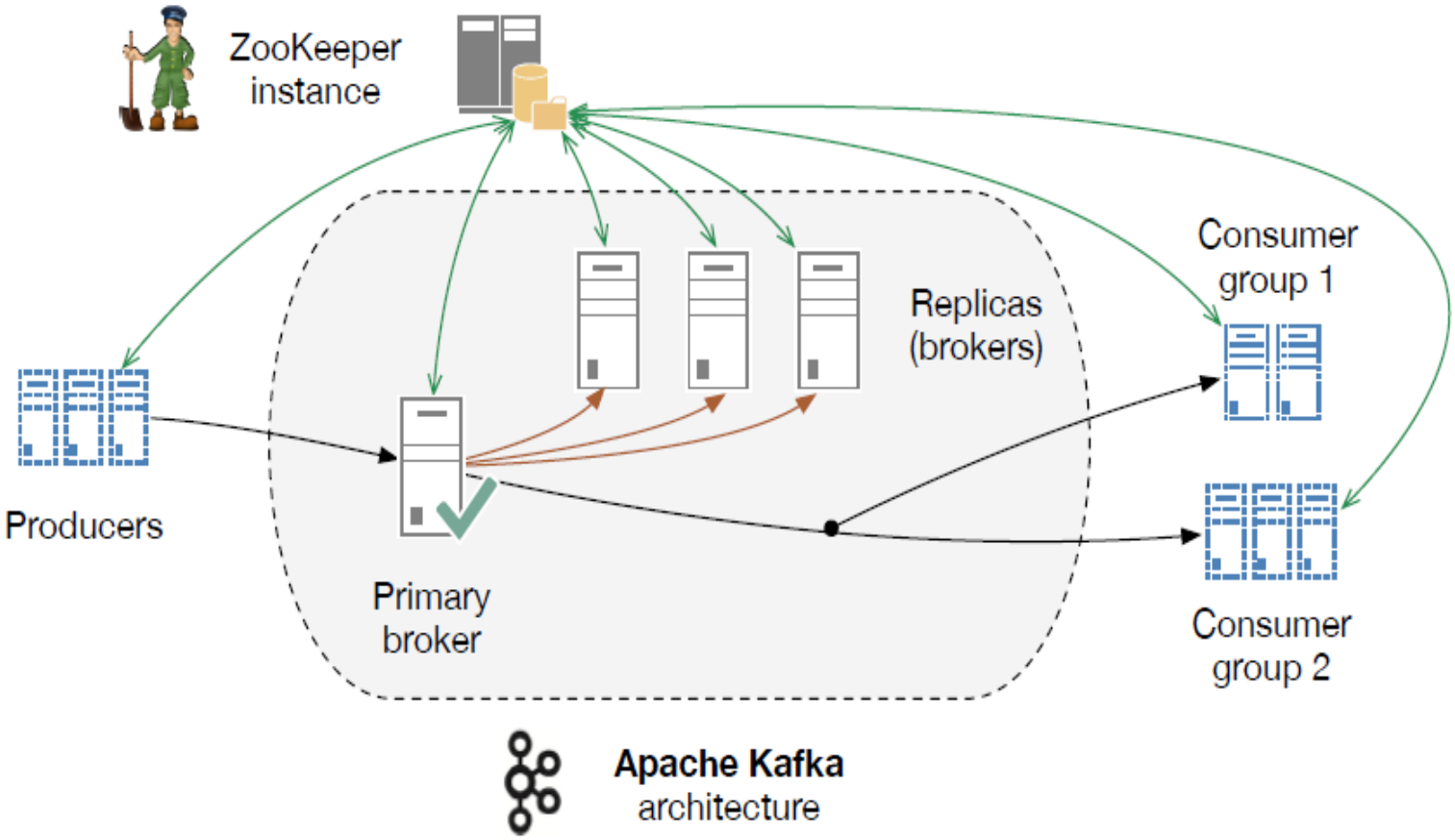
AMQP Concepts



Architecture
(RabbitMQ , Kafka & ActiveMQ) - Overview

Kafka Architecture



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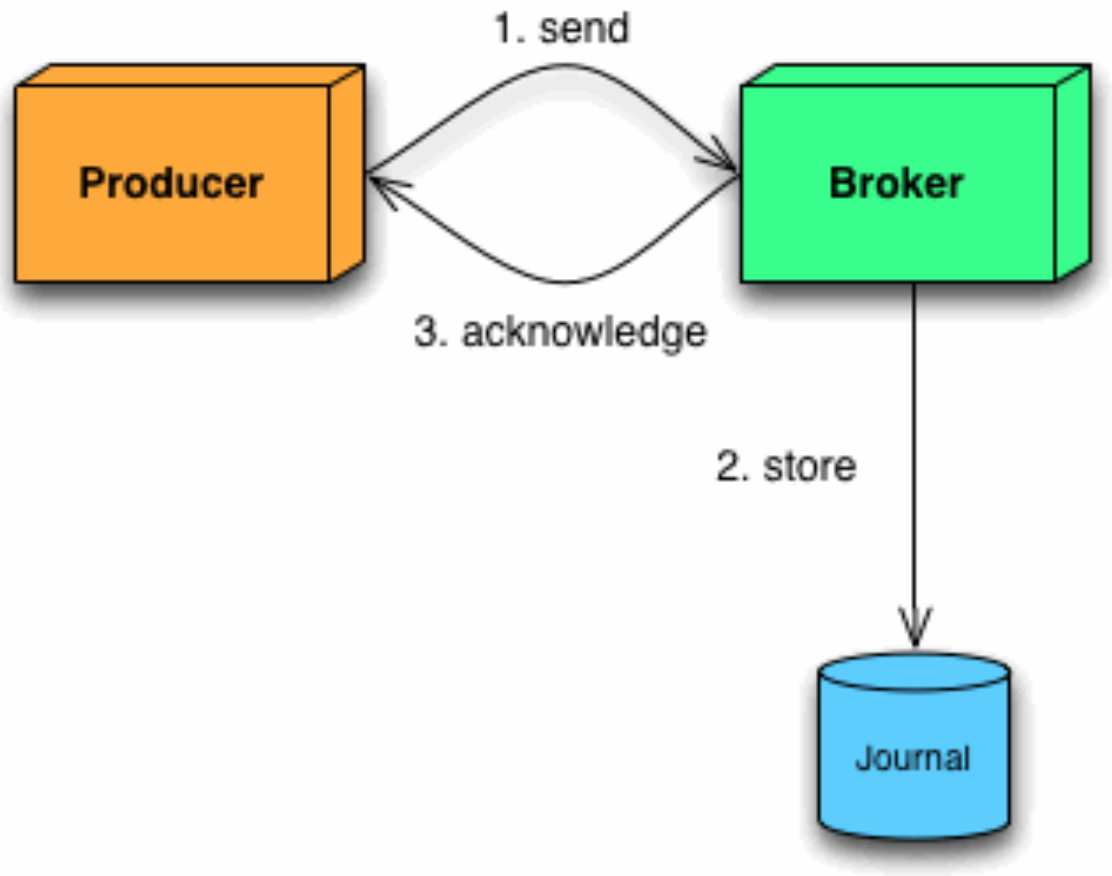
ActiveMQ Architecture



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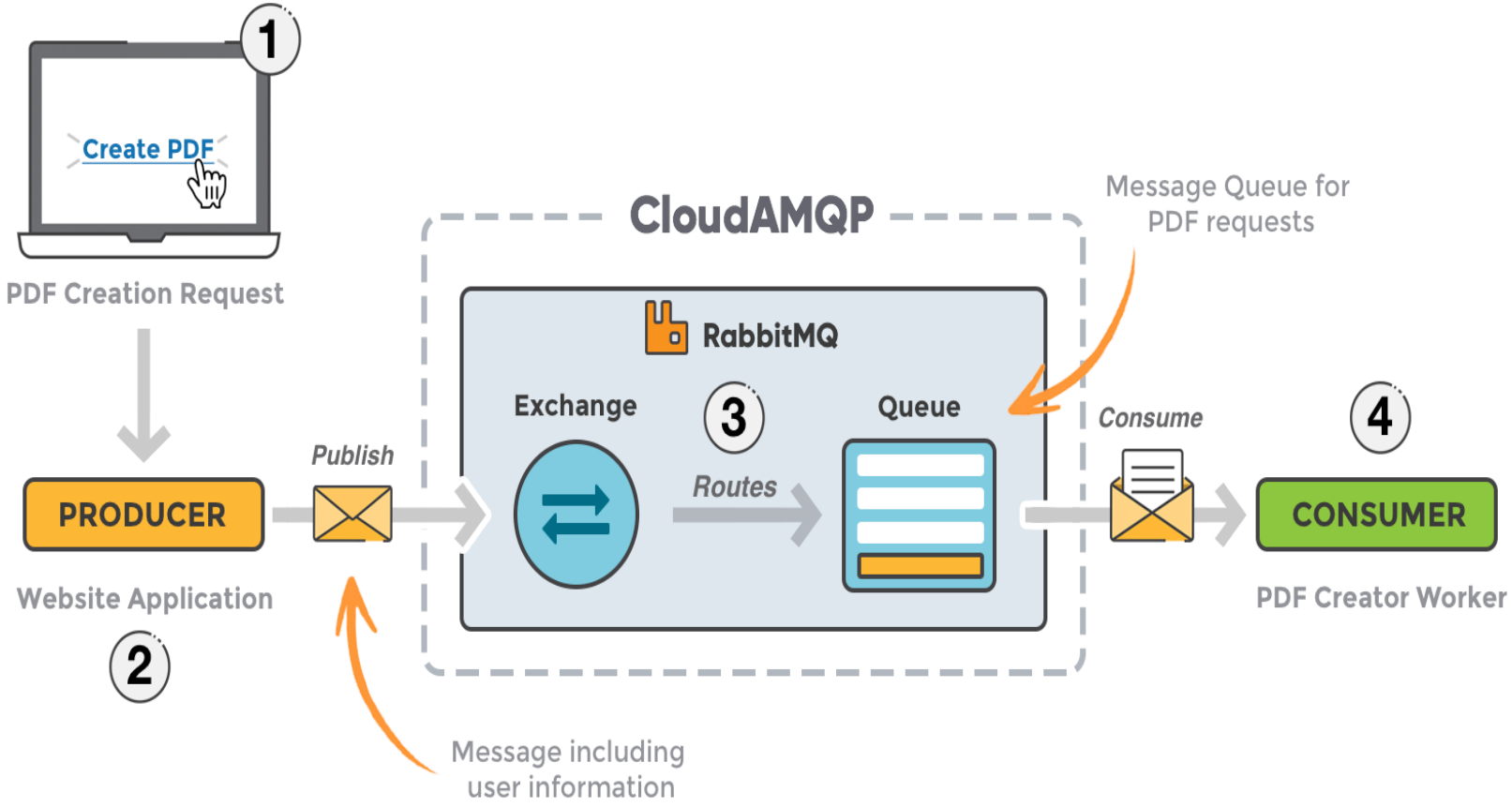
RabbitMQ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Create PDF
PDF Creation Request
PRODUCER
Website Application
2
Publish
CloudAMQP
RabbitMQ
Exchange
3
Routes
Queue
Message Queue for
PDF requests
Consume
4
CONSUMER
PDF Creator Worker
Message including
user information

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Comparison - MOM

	Kafka	RabbitMQ	ActiveMQ
Year	2011	2007	2004/2007
Enterprise support Available	✓	✓	✓
Programming Language	Scala/java	Erlang	Java
Protocol	Binary TCP	AMQP	JMS / AMQP Optional
Officially supported Clients In	Java	Java, .NET/C#, Erlang	Java
Other available Clients In	~ 10 languages (incl. Python And Node.js)	~ 13 Languages (incl. Python, PHP And Node.js)	14+ .NET C (defunct) C++ Erlang Go

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Comparison - MOM

	Kafka	RabbitMQ	ActiveMQ
Main storage Space	Disk	RAM	DISK
Queue content Persistence	Complete and mandatory	Temporary and optional	Complete
Message deletion	After reaching Size or time limit	Immediately After confirmed consumption	After confirmed consumption
Clustering support	✓	✓	✓
Management And monitoring interface	JMX and CLI---based	Web and CLI---based	Web & JMX
Benefits	High-Throughput, KSQL + Streaming API (1.5 Lps)	Ease of Use (1.2 lps)	EAI Patterns (70k ps)