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IBM Bluemix
Development & Certification

Summary decks for a course that covers the A to Z of IBM Bluemix.

For more information visit:
http://www.acloudfan.com

raj@acloudfan.com

1. MQLight
2. Message Hub
3. Consumer Groups
4. MQLight & Message Hub

PS: Certification practice test questions NOT included in the summary decks

Discounted access to the courses:

https://www.udemy.com/ibm-bluemix/?couponCode=BLUE100

Coupon Code = **BLUE100**

https://www.udemy.com/rest-api/?couponCode=REST100

Coupon Code = **REST100**

PS:

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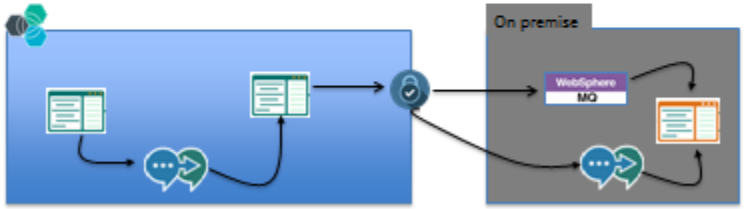
MQ Light

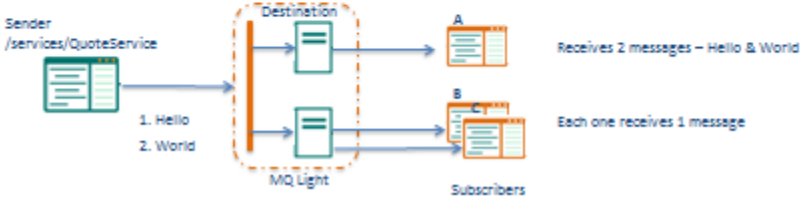
MQ Light

- Designed to allow applications to exchange discrete pieces of information in the form of messages
- Built on top of *Advanced Messaging Queing Protocol (AMQP)*



MQ Light - Concepts

- Data = **Messages** (Text, Name value pairs, binary, empty)
- Messages are sent to **Topics** e.g., Services/*QuoteGenerationService*
- Applications use **Destination** to receive messages. A destination may be **Shared** by multiple applications



MQ Light - Concepts

- Delivery assurance models
  - At **most** once – Message loss is Acceptable
  - At **least** once – Message loss in unacceptable; App handles Duplicates
- Message - Time To Live (TTL) Default = 7 days Max = 30 days
  - How long the message will be retained in the destination
  - Set at the time of send
- Destination - Time To Live (TTL) Default = 0 Max = 30 days
  - Destination removed if no subscribers for a duration >= TTL
  - Set at the time of subscribe and unsubscribe calls

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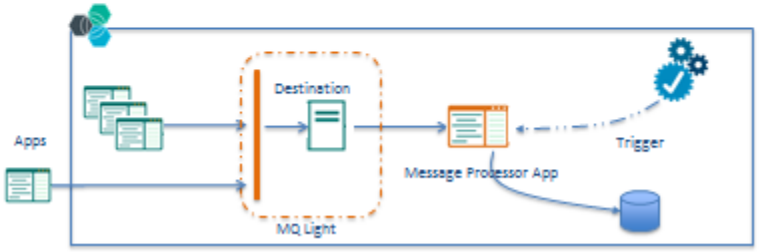
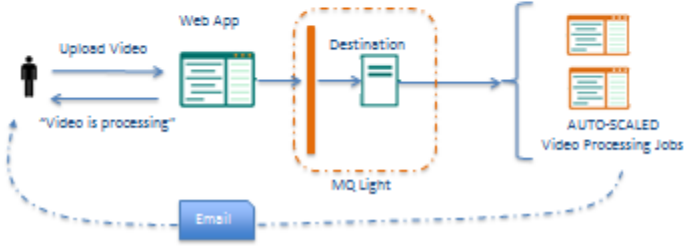
Use Case – Batch | Store & Forward

- Messages are held in the destination
  - Processing app wakesup periodically and reads all messages
  - Processing app may get triggered by an external scheduler



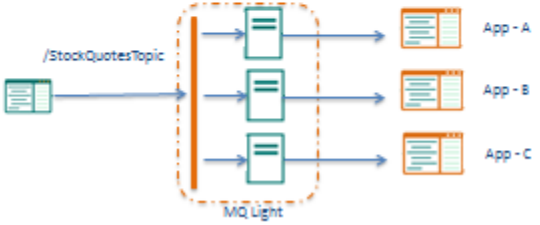
Use Case – Worker offload

- Web application needs to process long running task but need to be responsive e.g., video processing may take few mins
- Need to decouple the user interface from the processing



Use Case – Event Notification | Pub Sub model

- Messages are published by an application
  - Interested applications may subscribe to listen to the messages
  - Addition of new applications does not require any change in app



Messaging patterns

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Apache Kafka = Message Hub

Apache Kafka

http://kafka.apache.org/

- Apache Kafka is an open-source, publish-subscribe messaging system

High-Throughput

Durable & Real-time

Highly Scalable

High Performance

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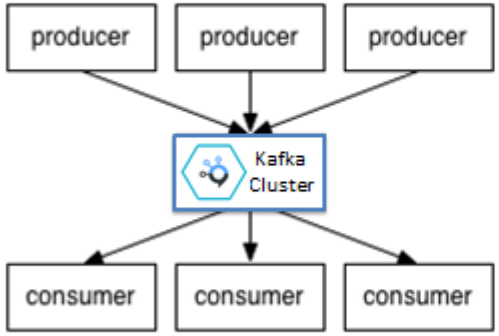
Kafka Use Cases

- Wire micro services; Application component integration
- Streaming processing/analytics
- Website activity tracking
- Operational metrics
- Log aggregation

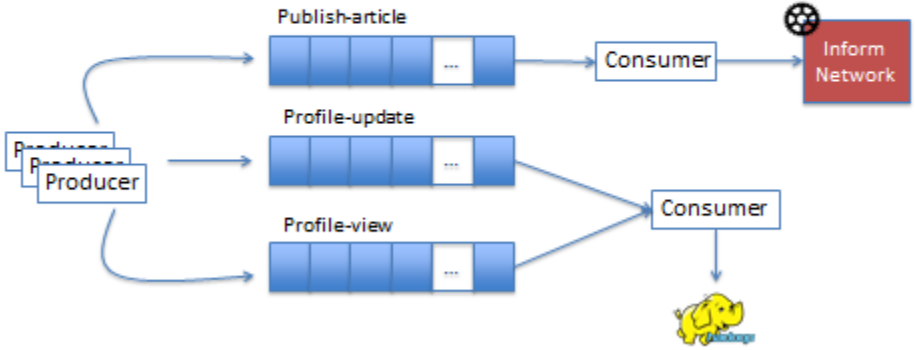
High Level View of Hub



Producers & Consumers may be on Bluemix or outside Bluemix platform

Topics & Messages

LinkedIn



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Message Retention & Offsets

- Messages are appended to the end of the file as they are received
- Each message is assigned the *offset* = Unique Identifier for message
- Consumers need to track the offset up to which the messages are consumed
- Messages are NOT removed when they are read or consumed
- Messages are retained for the specified period of time

Topic Names

- Topics names can have the characters **[a-zA-Z0-9\\._\\-]**

  Letters Numbers Period (.) Underscore (_) Minus (-)

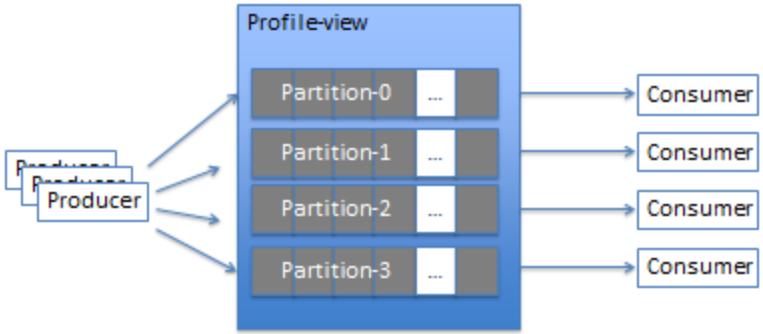
- Maximum size of topic name = 100 characters

  ✓ Profile.View Profile-View AREA-90210 ZipCode10111

  ✗ Profile\View Profile/Update ProfileViews#

Partitions

Too much data sent to the topic may cause write delays and other issues



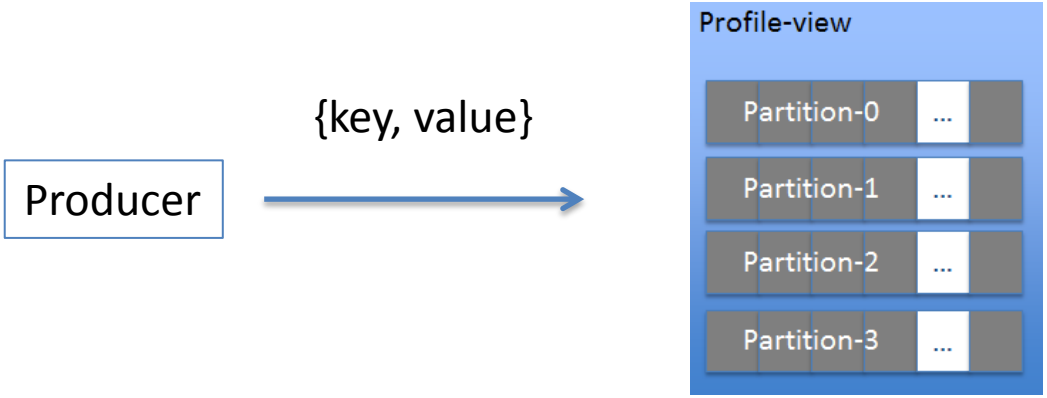
Message Hub Partition Restrictions

- 100 per Instance
- Capped at 1 GB
- Message Retention – 24 Hour by default

  Minimum = 1 Hour

  Maximum = 30 Days

Message Distribution



1. Can be random

2. Can be to a specific partition

3. Based on the message key provided for the message

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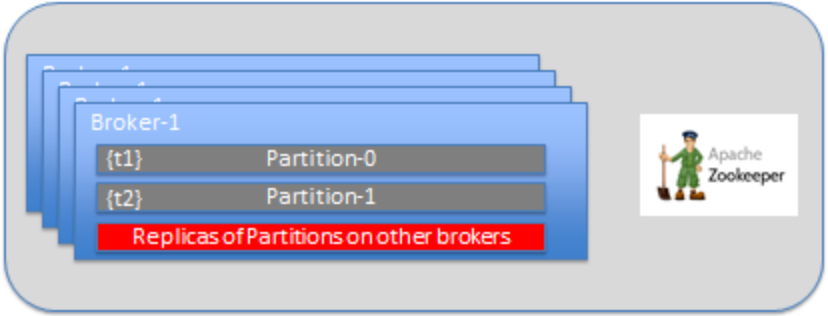
Kafka Cluster

https://zookeeper.apache.org/



- Bluemix Message Hub does NOT provide access to Zookeeper

Kafka Broker & Cluster

- Broker is stateless
- Multiple broker instances may be created on the same server
- Apache Zookeeper provides centralized group services
  - Configuration
  - Distributed synchronization

raj@acloudfan.com
http://www.acloudfan.com

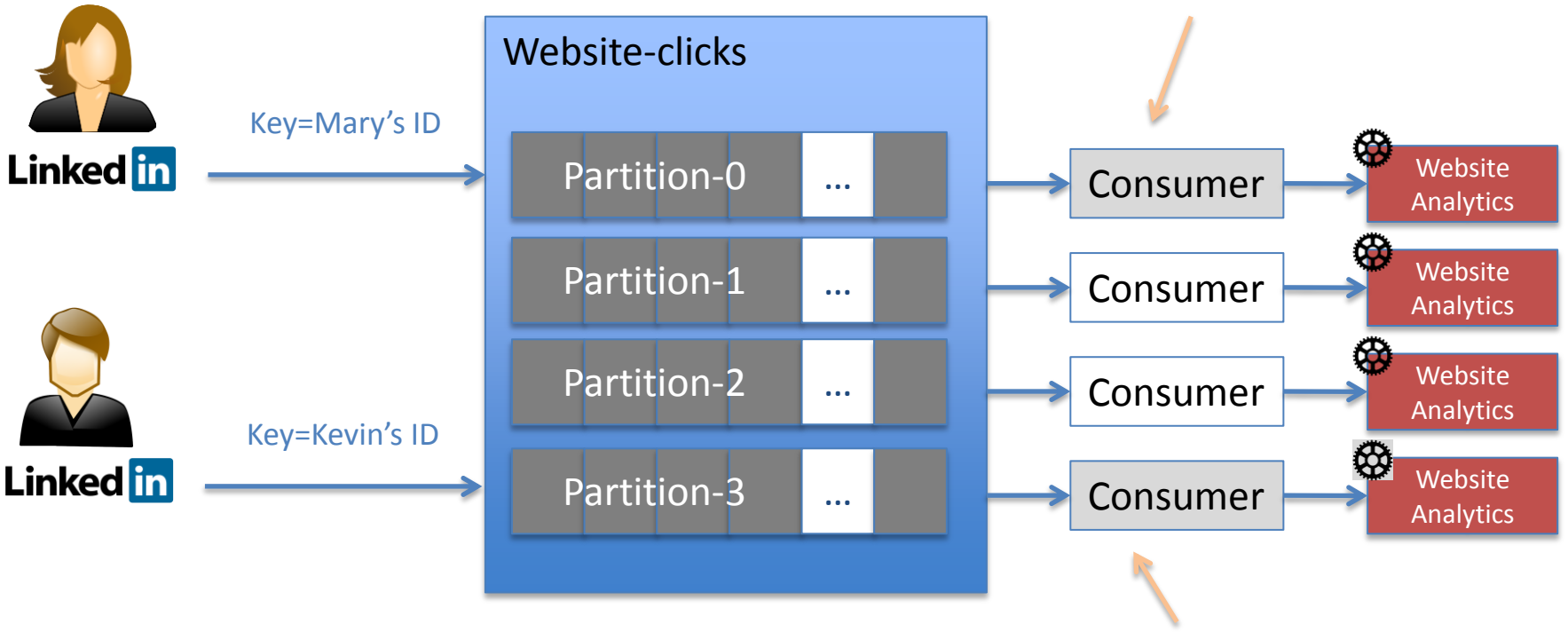
Consumer Groups

Consumer Group

Consumers label themselves with a consumer group name, and each message published to a topic is delivered to one consumer instance within each subscribing consumer group.

Message is Received by only ONE instance of the consumer in the group

Message Distribution by Key



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Summary - Consumer Group

- High latency message processing may cause delay in reading of messages
  - Solution is to increase rate of consumption by creating multiple partitions & consumers within the same “Consumer Group”
  - Load balancing and failure recovery is Automatic
  - If there are *N* partitions the *(N+1)th* consumer in the group will NOT receive any message
  - Exactly once processing within the consumer group

raj@acloudfan.com
http://www.acloudfan.com

MQLight Apps and Message Hub

- MQLight applications using the MQLight API can connect to the Message hub instance without needing any changes

- Assurance model supported:
  1. At least once
  2. At most once

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