

# Going Real-time:

## How to Build a Streaming API

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# About Me



# Agenda

- What the heck is Real-time APIs
- The technology and trends
- Demos

# What is real-time?

- Real-time: the ability to react to something as soon as it happens
- Web real-time: Same but slower (about 900ms delay is ok)



# What is a real-time API?

- Real-time API: Allows an app to only register for events that it is interested in
  - Give me new customers as they are added
  - Tell me when the stock price changes
  - Tell me in 4 weeks to send an email to Bob

# Why Real-time?

- User experience: Don't make *people* wait
- Accuracy: Don't make *things* wait
- Because life happens in real-time



# Why Real-time?

Speed



# What do most API consumers do?

- Polling
  - Make a request every 60 seconds
  - 61.672% of calls yield no result
  - New data can be available and waiting for 59.9 seconds
  - Need to work within the boundaries of API rate limits
    - How many calls per hour
    - Total calls per day
    - Time between calls



# Why Real-time?

Broadcast



# Why Real-time?



Engagement

# Push vs Streaming

## Push (aka WebHooks)

- I'll call you back
- Asynchronous
- Drawbacks
  - Need to have a reply channel setup
  - Considered a security risk by some
  - Reliability complicated – did the data arrive

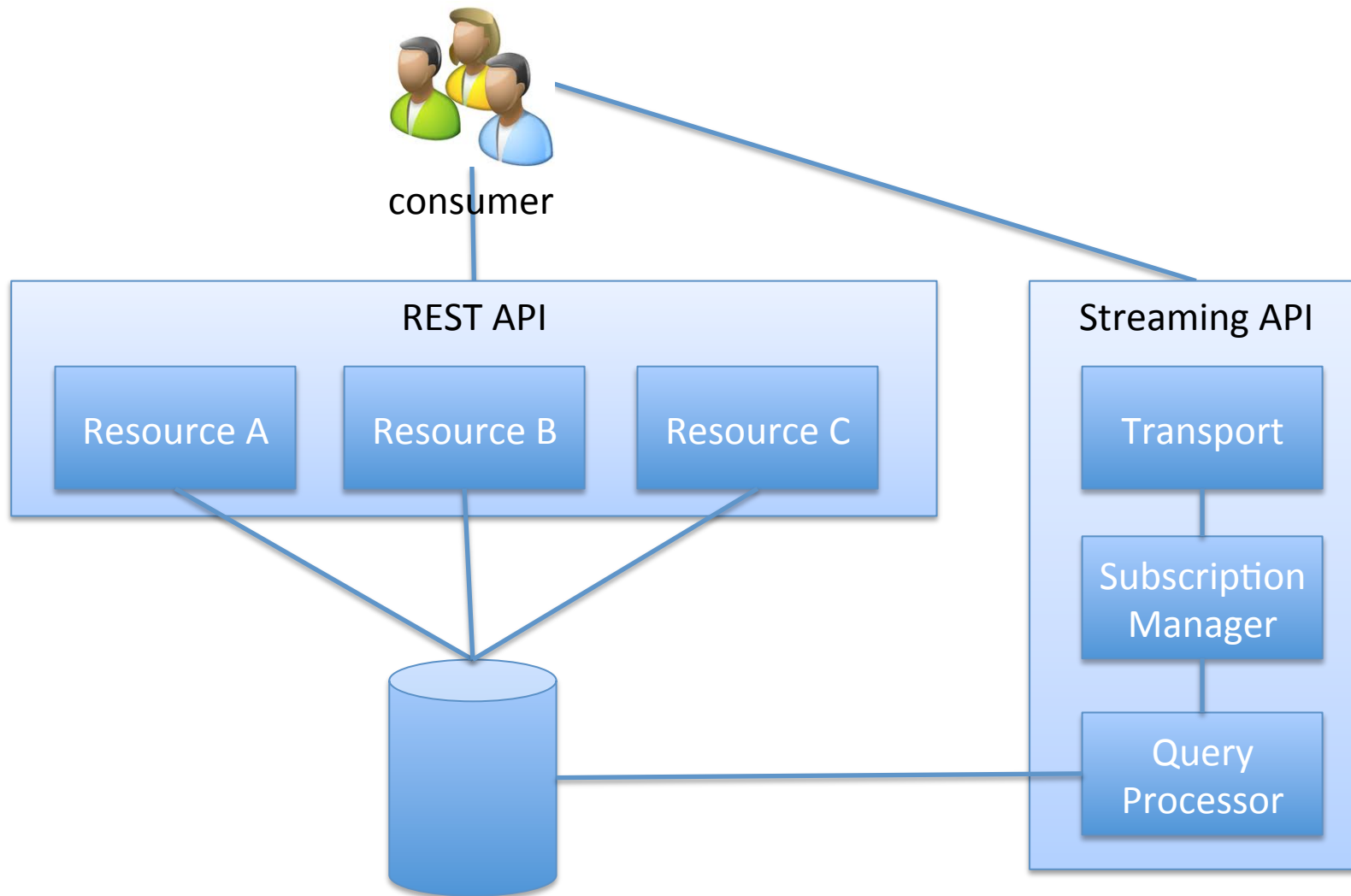
## Streaming

- Keep the line open
- Request Response
- Drawbacks
  - Holds a socket connection open – Continuations can be used
  - Harder to implement durable connections

# REST or Real-time?

- Real-time APIs are additive to an existing REST or SOAP API
- Invocation semantics are different
  - Client needs to handle two invocation models
- Real-time APIs are mostly used to query data
  - Usually not to perform CRUD operations
- Have different SLA and reliability requirements

# REST or Real-time?



# Real-time Technologies

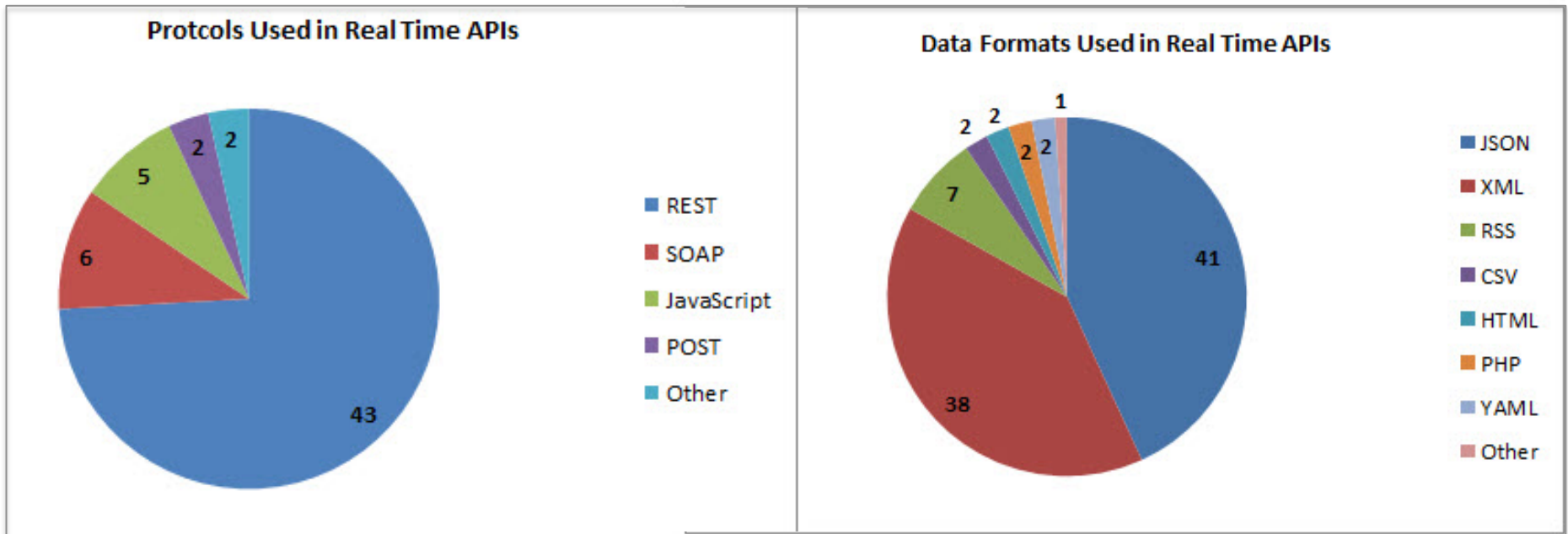
- Transport
  - Comet (HTTP)
  - WebSocket (HTTP)
- Protocols
  - With formal pub/sub semantics:
    - XMPP
    - Bayeux
    - STOMP
  - Ad hoc, ie "subscription" expressed in the request:
    - JSON
- Push
  - PubSubHubbub
  - Web Hooks

# Real-time APIs are real

API	Real-time technology/protocol
Salesforce	Comet
Facebook	PubSubHubbub
Instagram	Ah Hoc (WebHooks/PubSubHubbub)
Twitter	Ad Hoc (Comet)
PubNub	Ad Hoc
SuperFeedr	XMPP
Pusher	Ad Hoc (WebSockets)

# Real-time APIs: REST + JSON or XML

1% of all APIs support real-time interaction



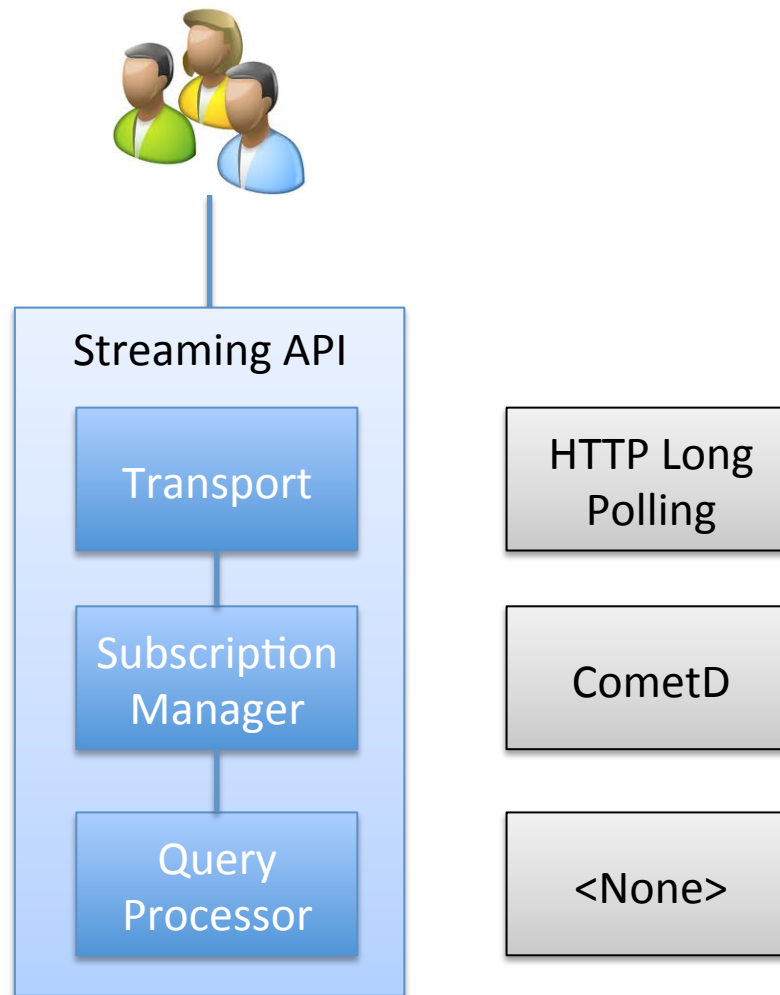
source: ProgrammableWeb.com



Stop. Demo time!

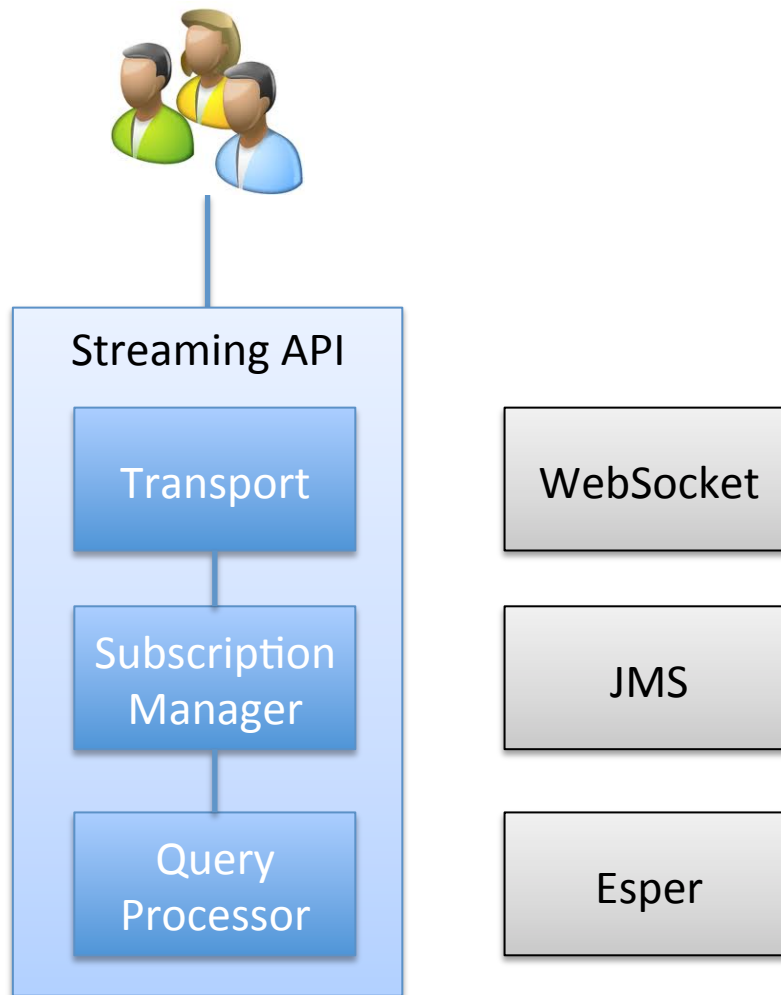


# Demo 1: AJAX



<https://github.com/rossmason/mule-streaming-api-demo>

# Demo 2: WebSockets



<https://github.com/rossmason/mule-streaming-api-demo>

# Mule real-time API support

## **Technologies**

- CometD
- Web Sockets
- Ad Hoc
- PubSubHubbub
- XMPP
- STOMP
- WebHooks

## **3<sup>rd</sup> Party APIs**

- Salesforce Streaming API
- Facebook real-time API
- Twitter Firehose
- PubNub

# Real-time Web SotN

- Still in early adopter territory
  - But some major APIs use this approach
- Limitations
  - No discovery protocol (i.e. WADL)
  - Many different methods
    - Some hampered by older browser technology (i.e. Web Sockets)

# Thank You!

- Twitter: @rossmason, @mulesoft
- Slides: <http://slideshare.net/rossmason>
- Code: <https://github.com/rossmason/mule-streaming-api-demo>
- Blog: <http://blogs.mulesoft.org>
- We are hiring: <http://mulesoft.com.careers>