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this talk via the
mobile app!



Controlling Physical Devices on the Real-Time Web

Enterprise-Grade WebSocket for the Internet of Things

Jonas Jacobi
Co-Founder & President

A Bright New World

2013

9 Billion
Connected Things

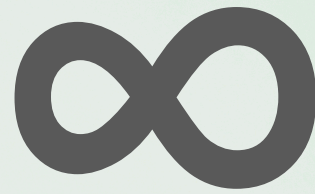
2020

50 Billion
Connected Things

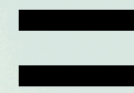


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Things



Decisions



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Hype

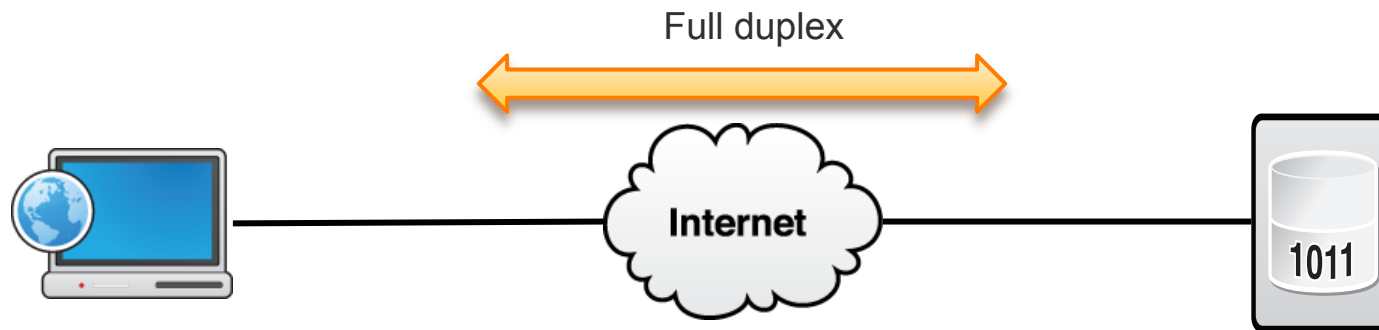


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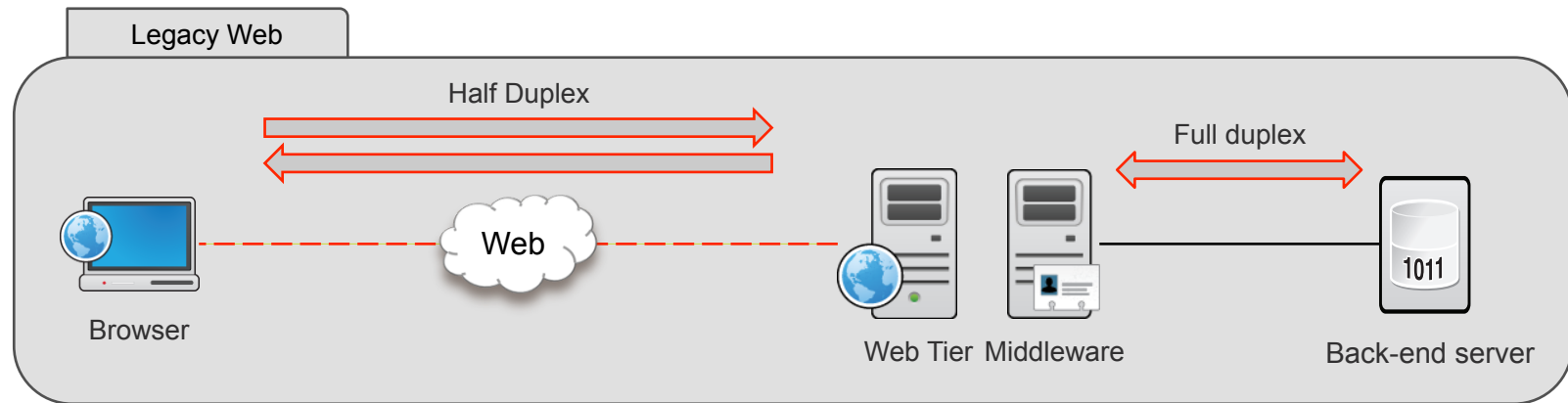


HTML5 WebSocket: TCP for the Web

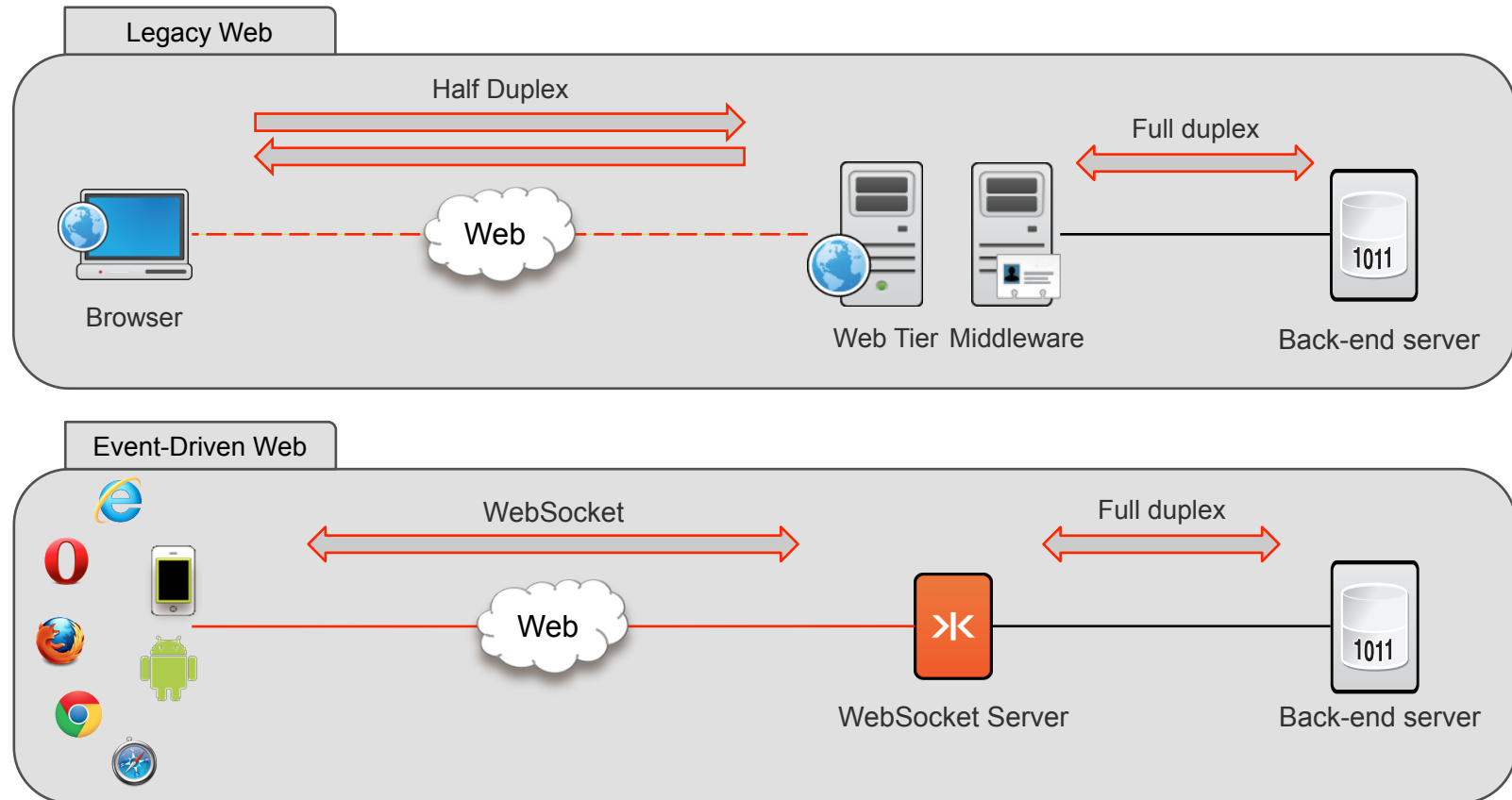
- Standard Protocol (IETF): RFC-6455
- Standard API (W3C): JavaScript
- Single socket, full-duplex
- Low overhead: <1% of HTTP
- Low latency: low milliseconds
- SSL support



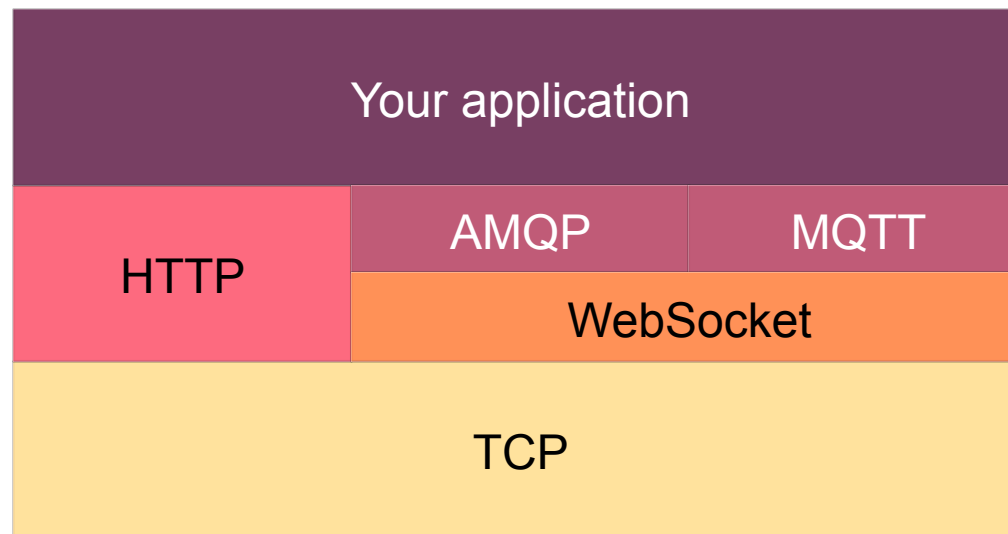
The Event-Driven Web



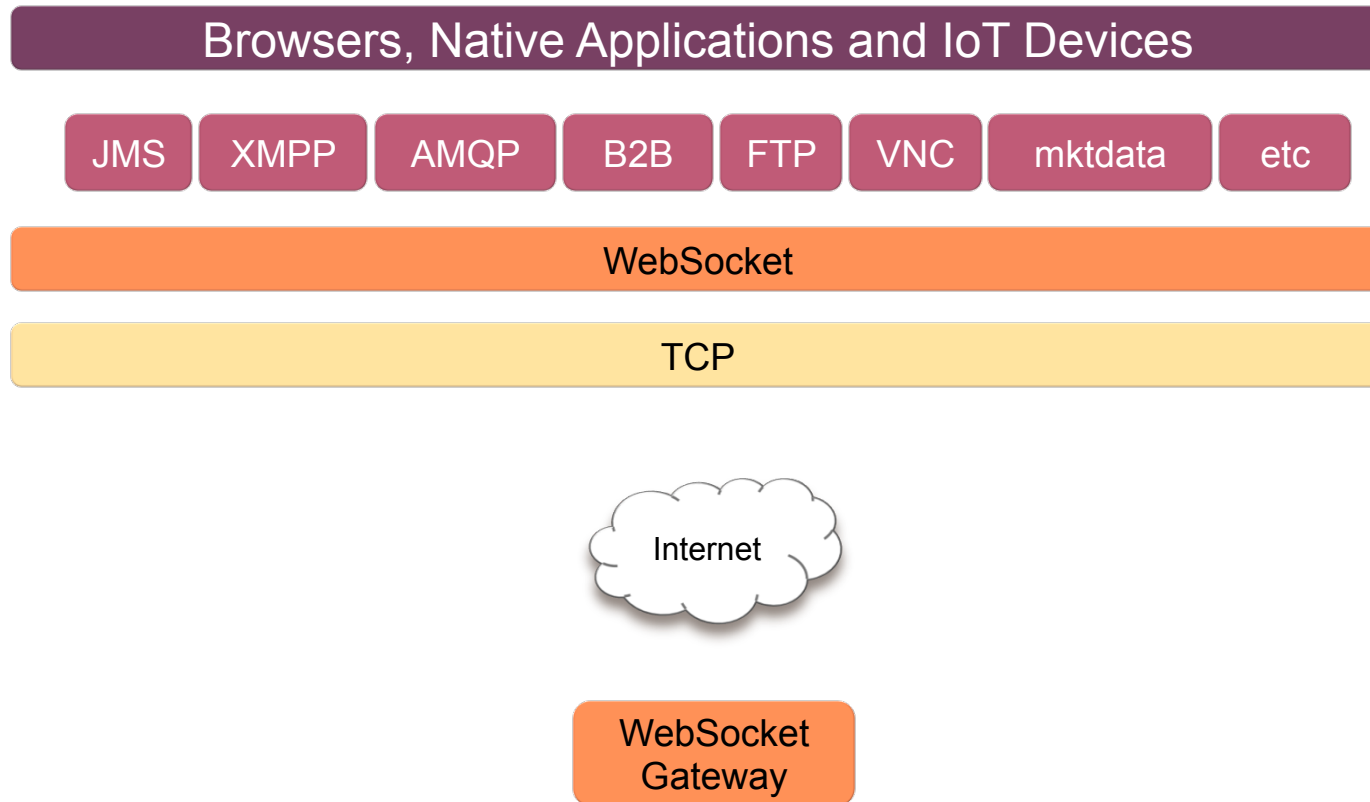
The Event-Driven Web



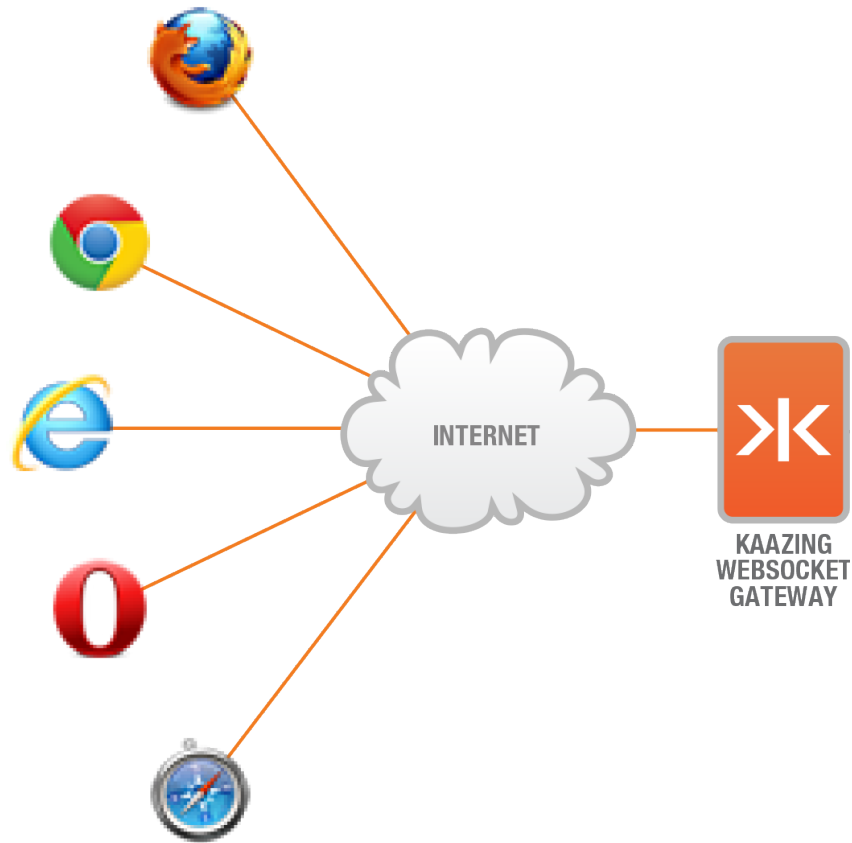
Protocol Layering



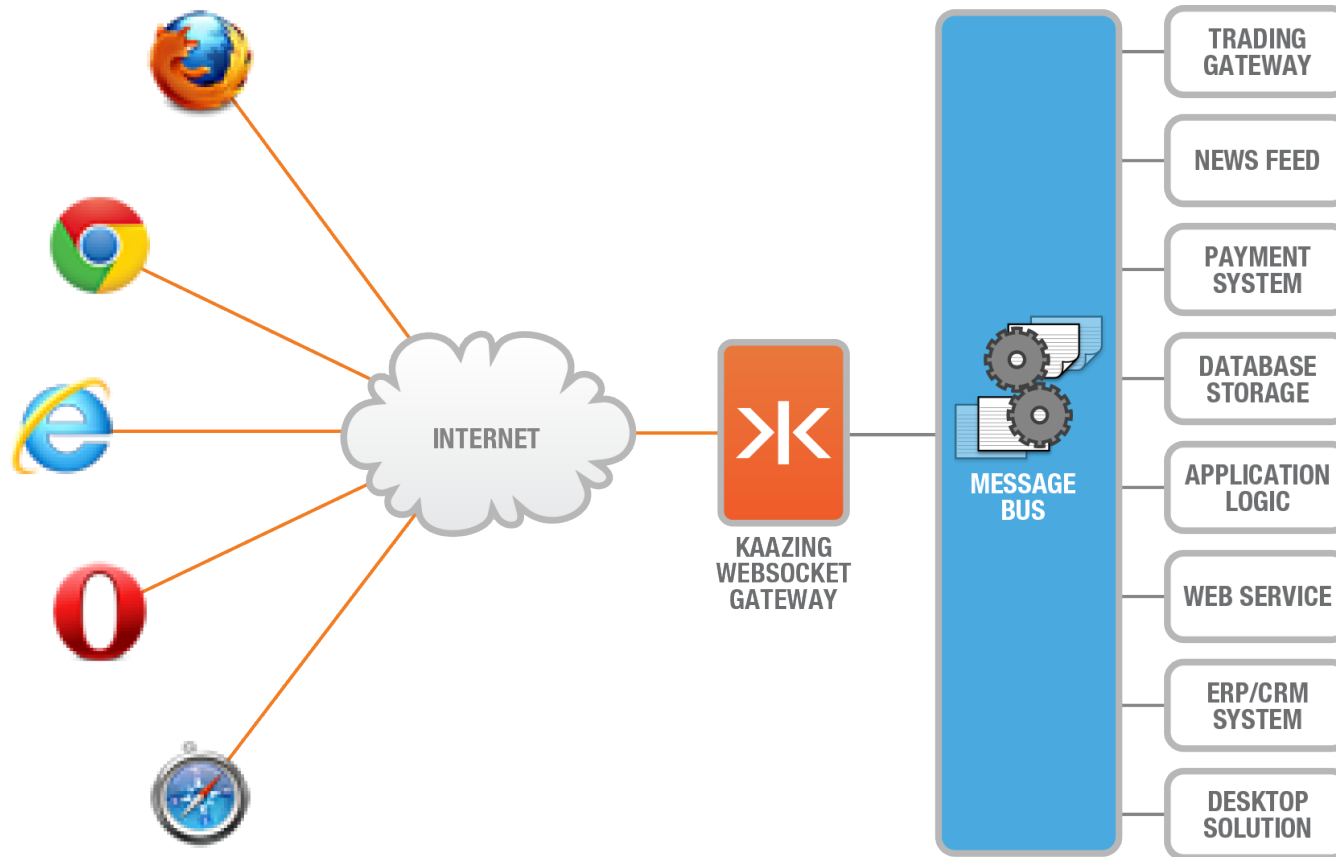
Protocol Layering



WebSocket Clients and Server



Enterprise Messaging Extended to the Web



Connected Devices

Bridging the Gap Between Hardware and Software

Raspberry Pi

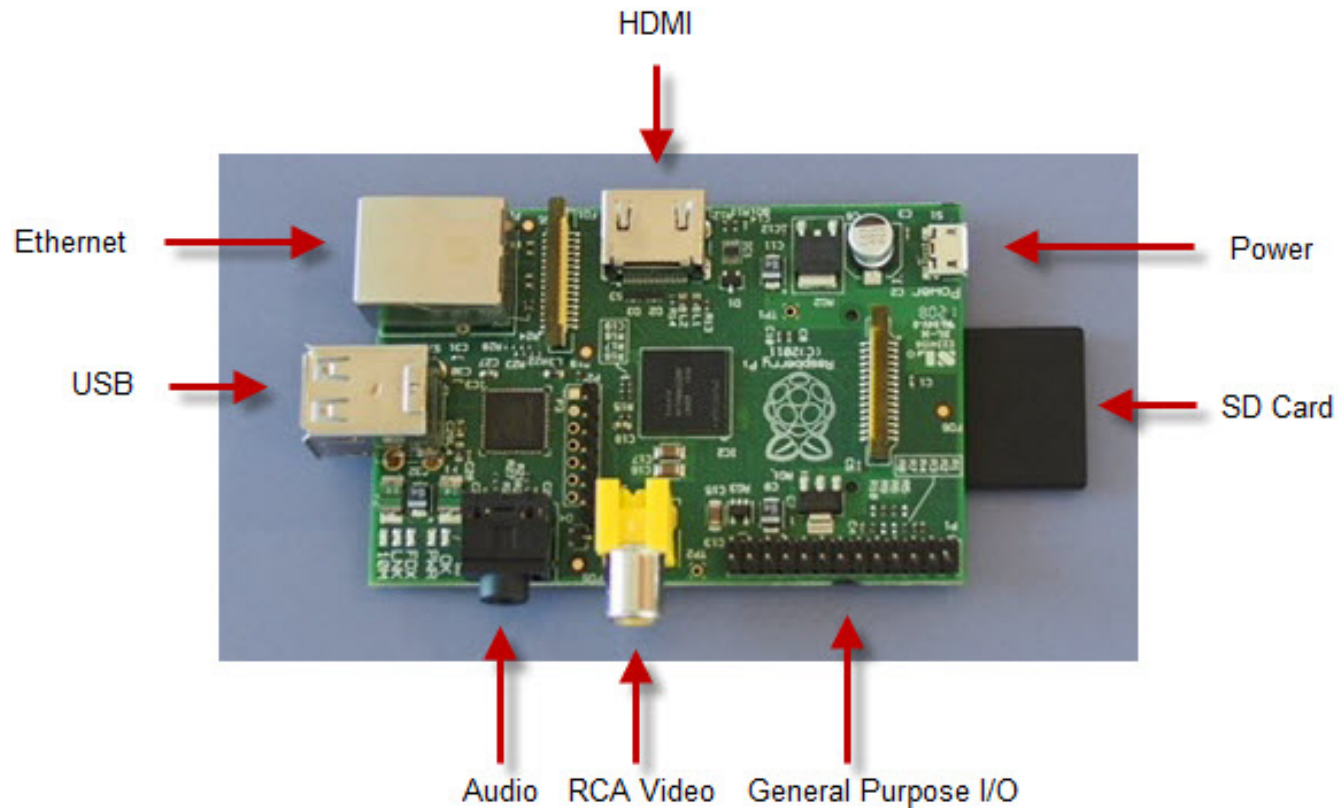
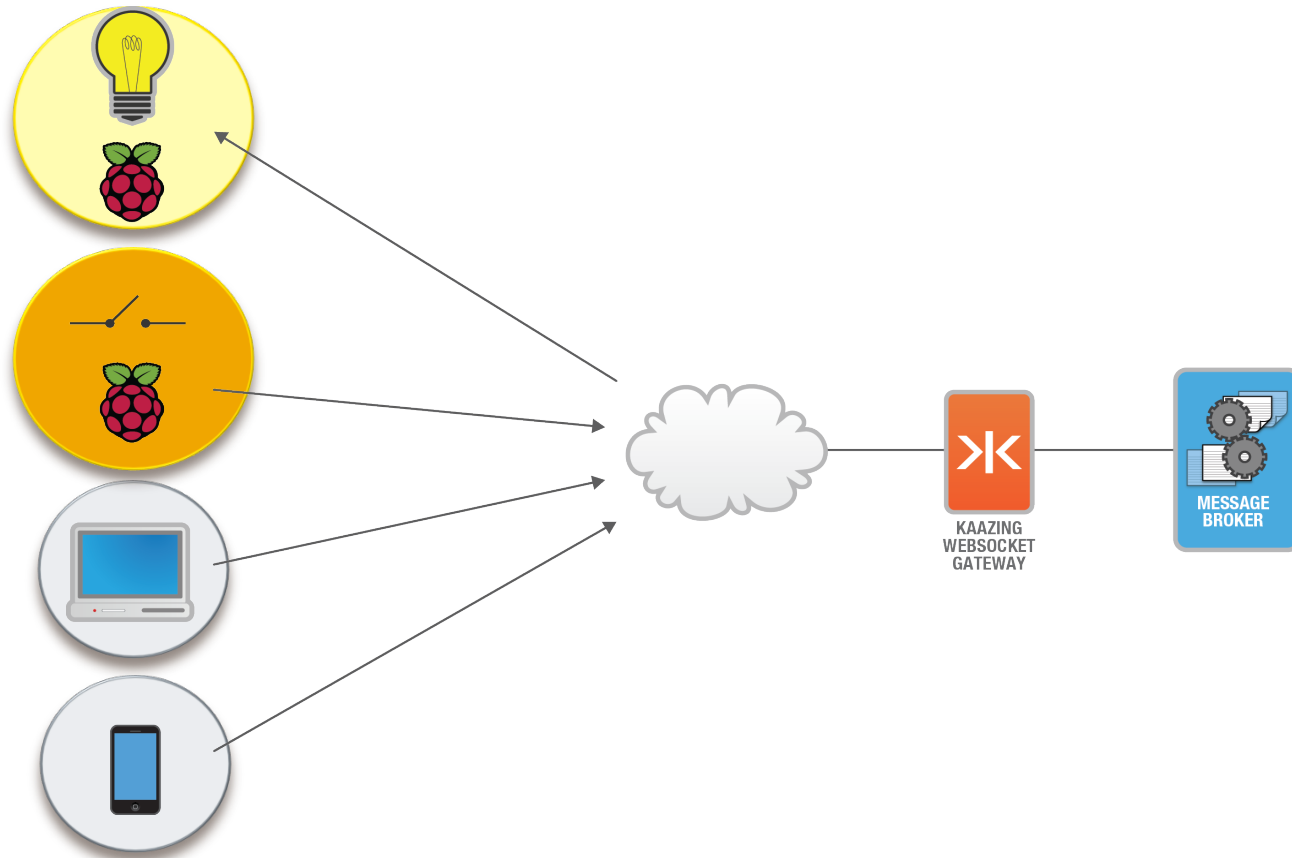


Image source: <http://www.oracle.com/technetwork/articles/java/raspberrypi-1704896.html>

Demo Setup



Controlling the Light Remotely Using Pub-Sub Over the Web



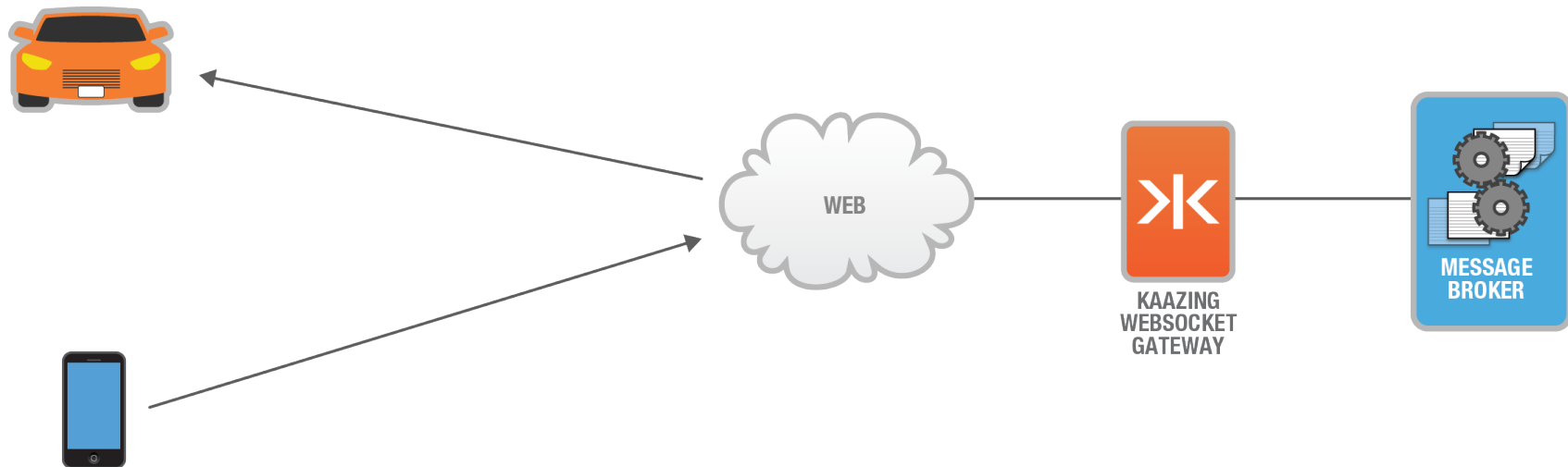
Light Switch: Range Extended to the Web



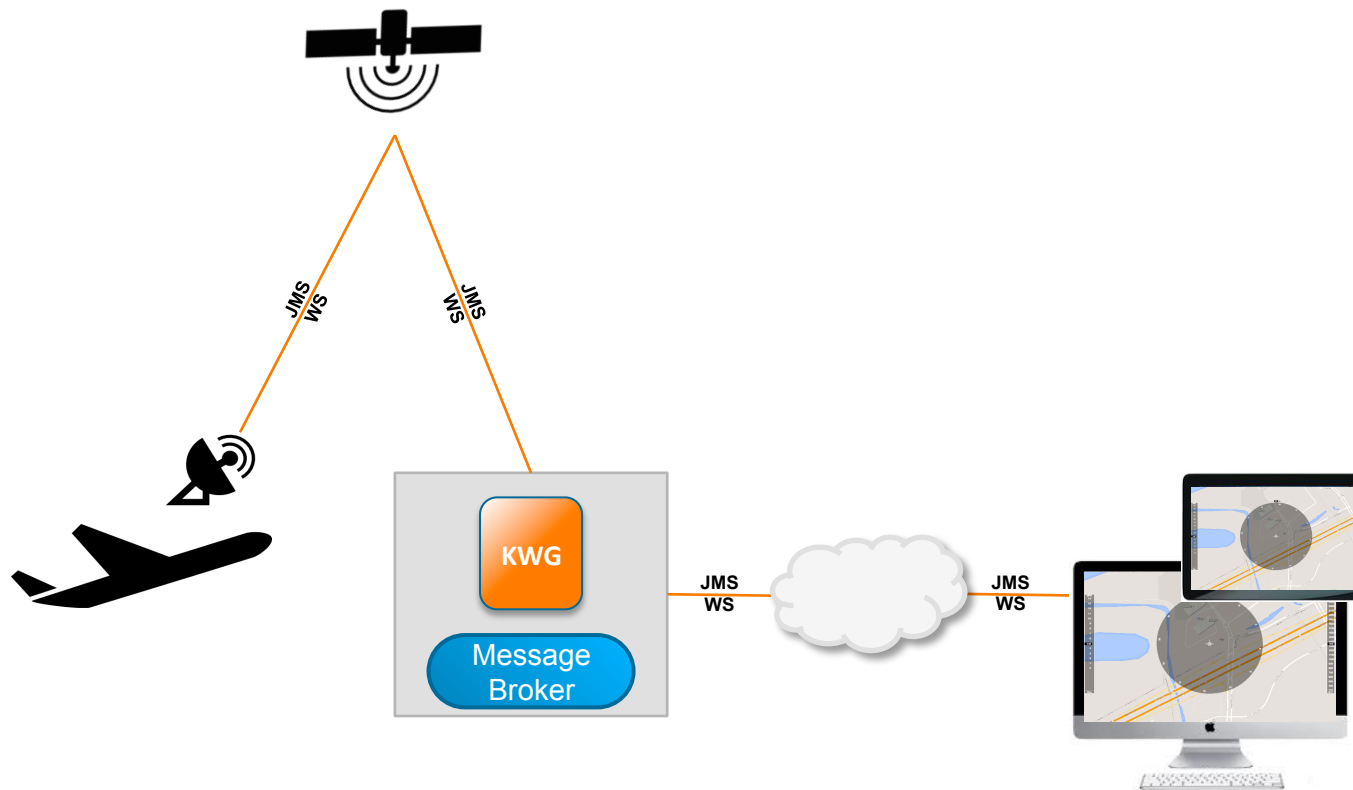
Demo



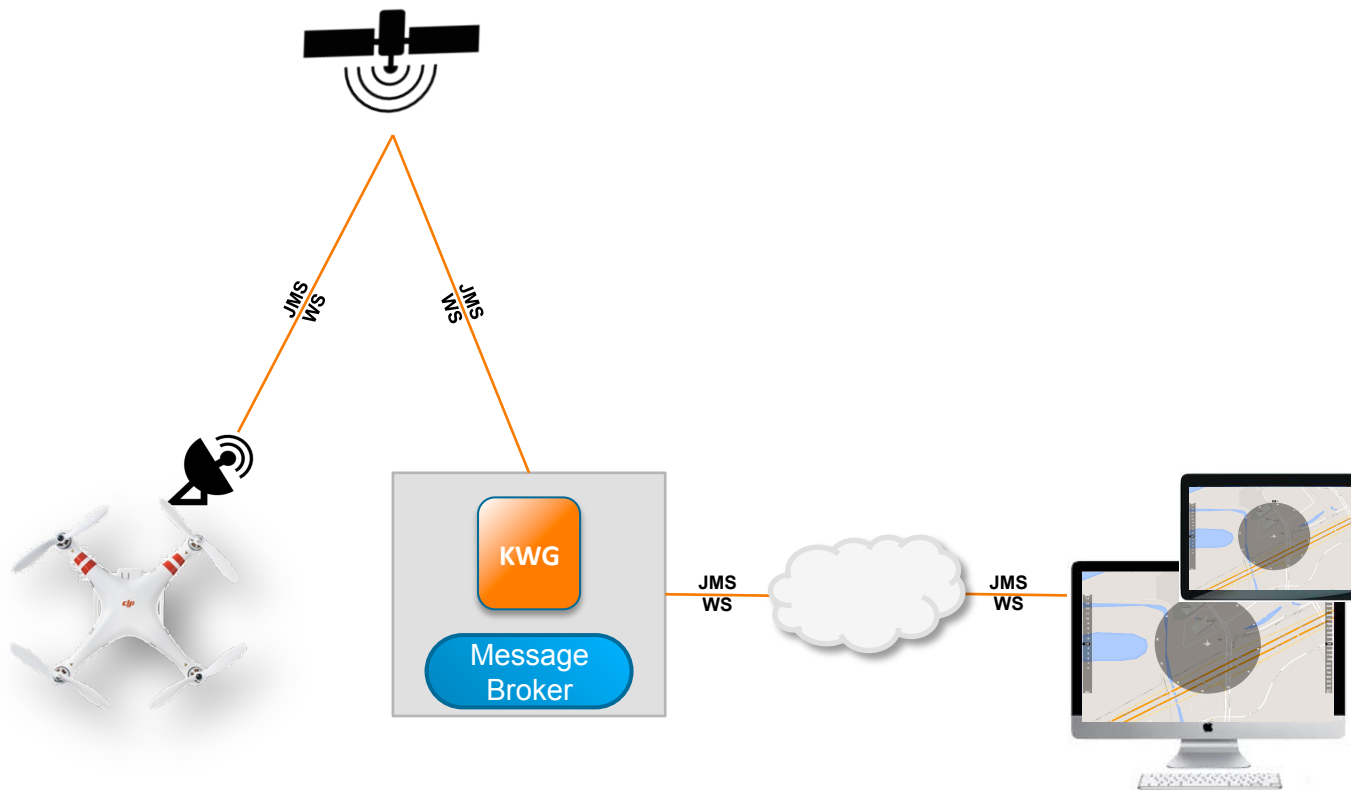
Remote Controlling Car Over the Web - The Architecture



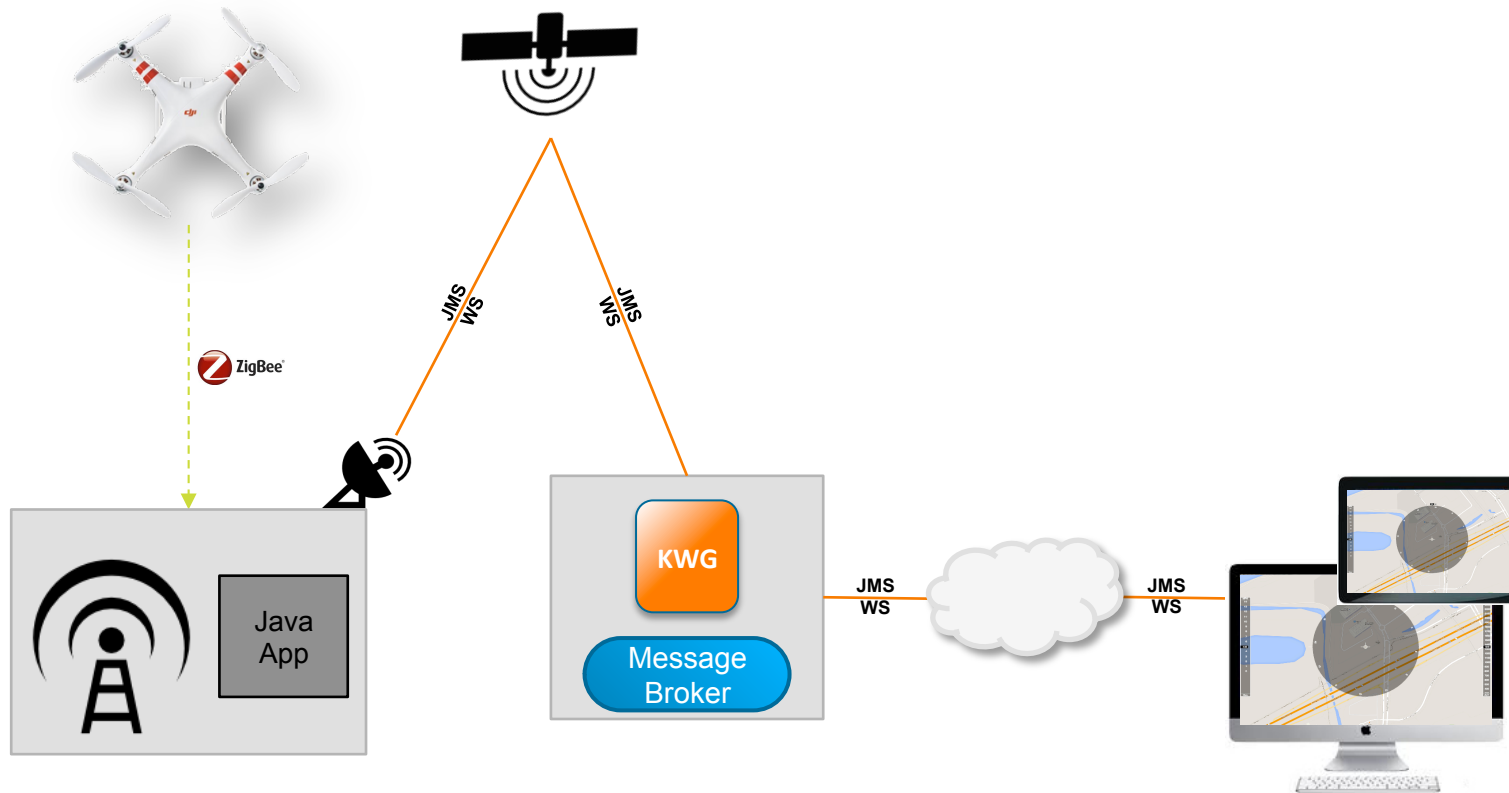
Telemetry Data Distributed to the Web Over Satellite Network



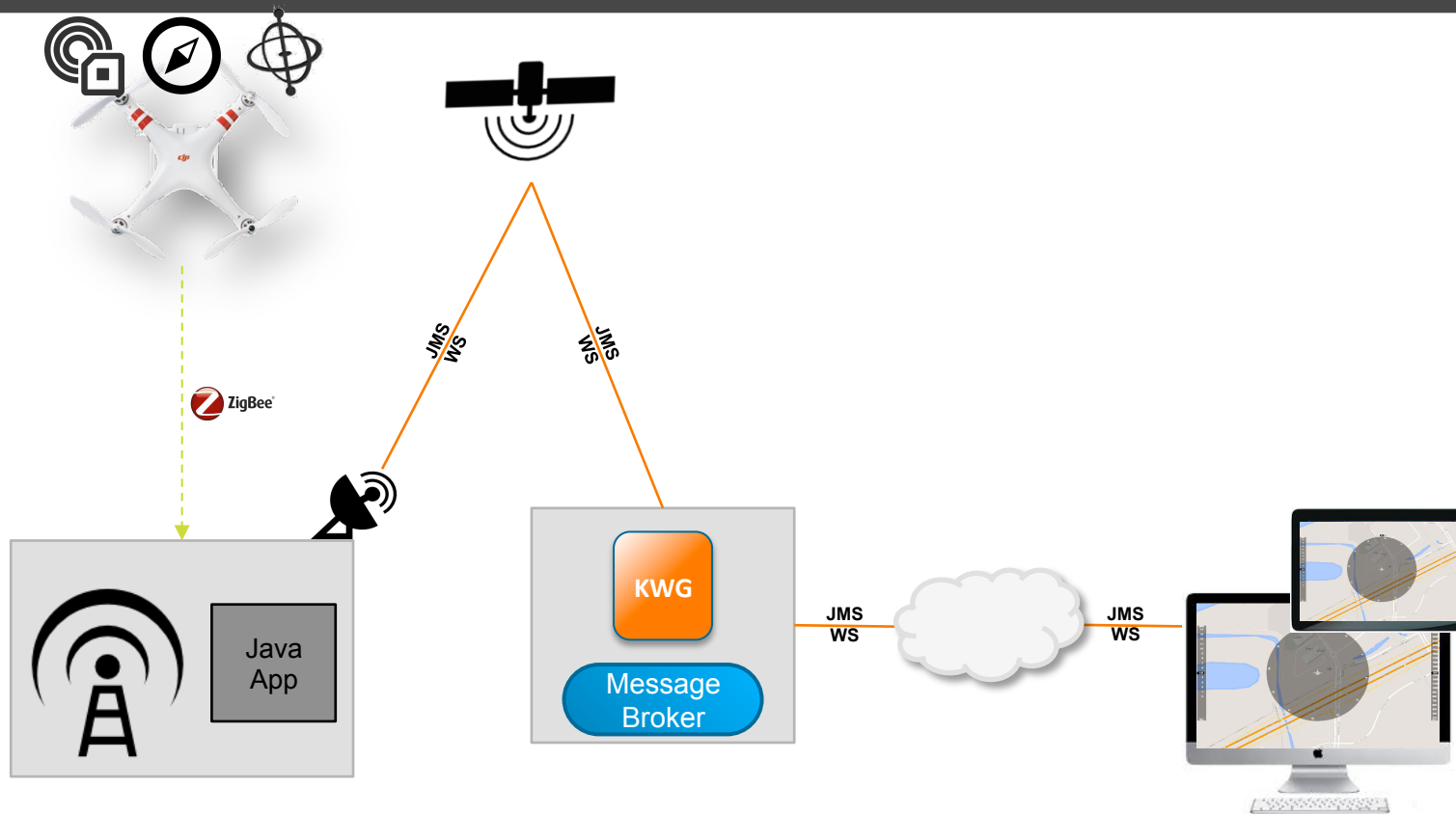
Telemetry Data Distributed to the Web Over Satellite Network



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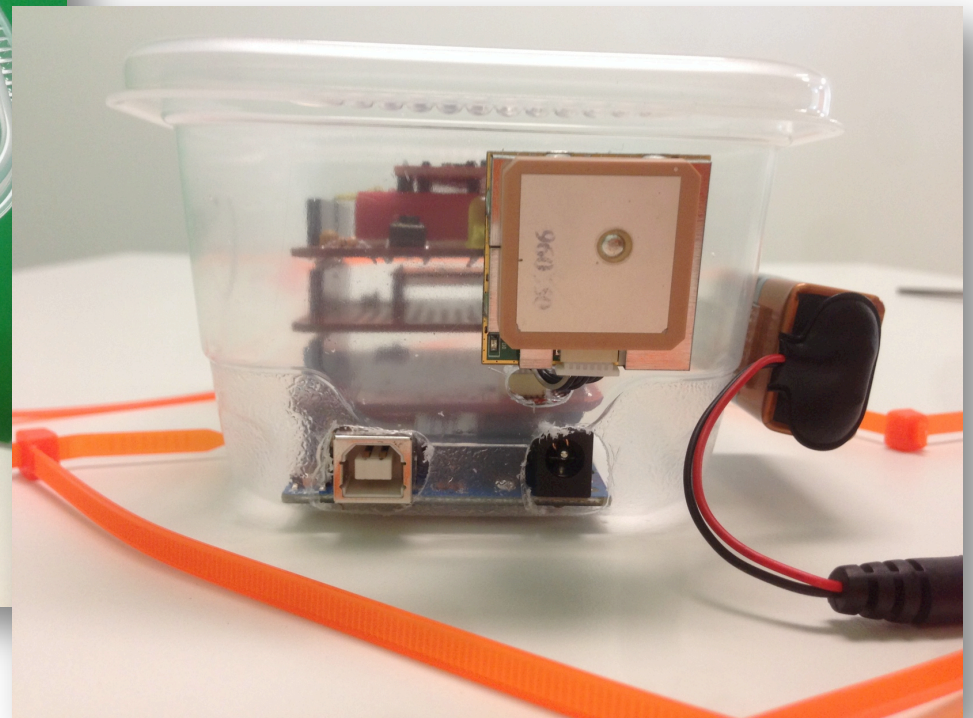
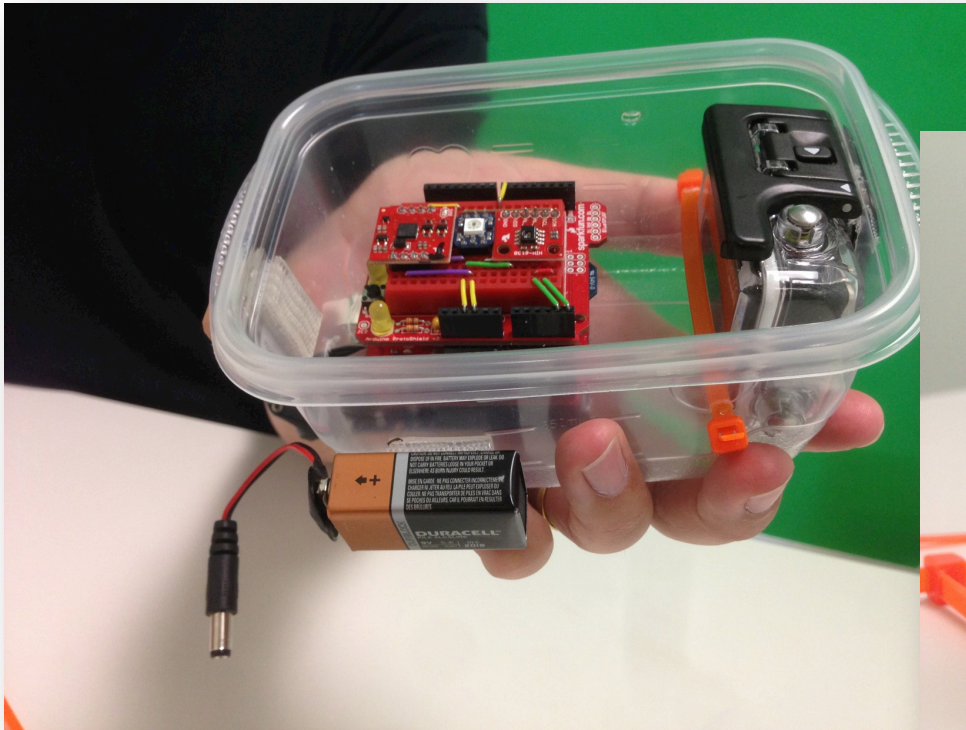
About the Quadcopter: DJI Phantom 2



The Sensor Stack



Arduino: GPS, thermometer, humidity, compass, accelerometer + Go Pro



Satellite Terminal: InmarSat – Geostationary Satellites



Satellite Terminal: InmarSat – Geostationary Satellites



Warning: Microwave radiation
Minimum safe distance: 0.6 metres

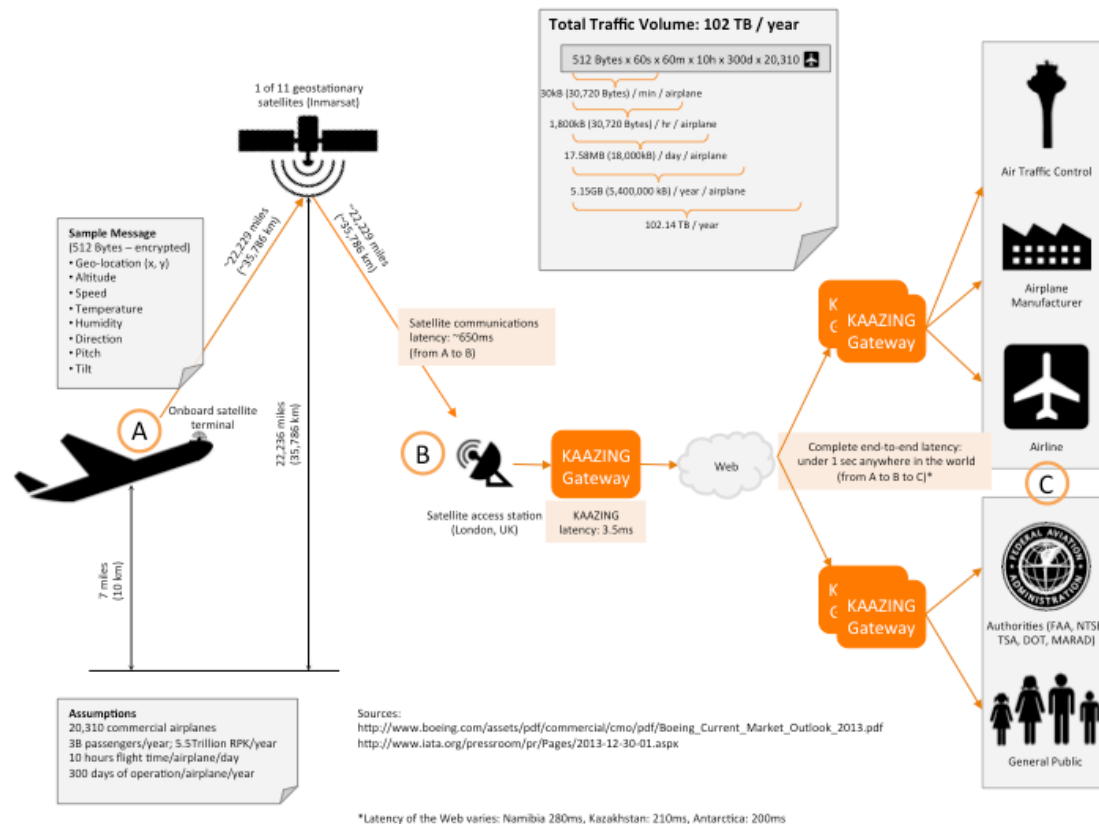
The Team



DEMO



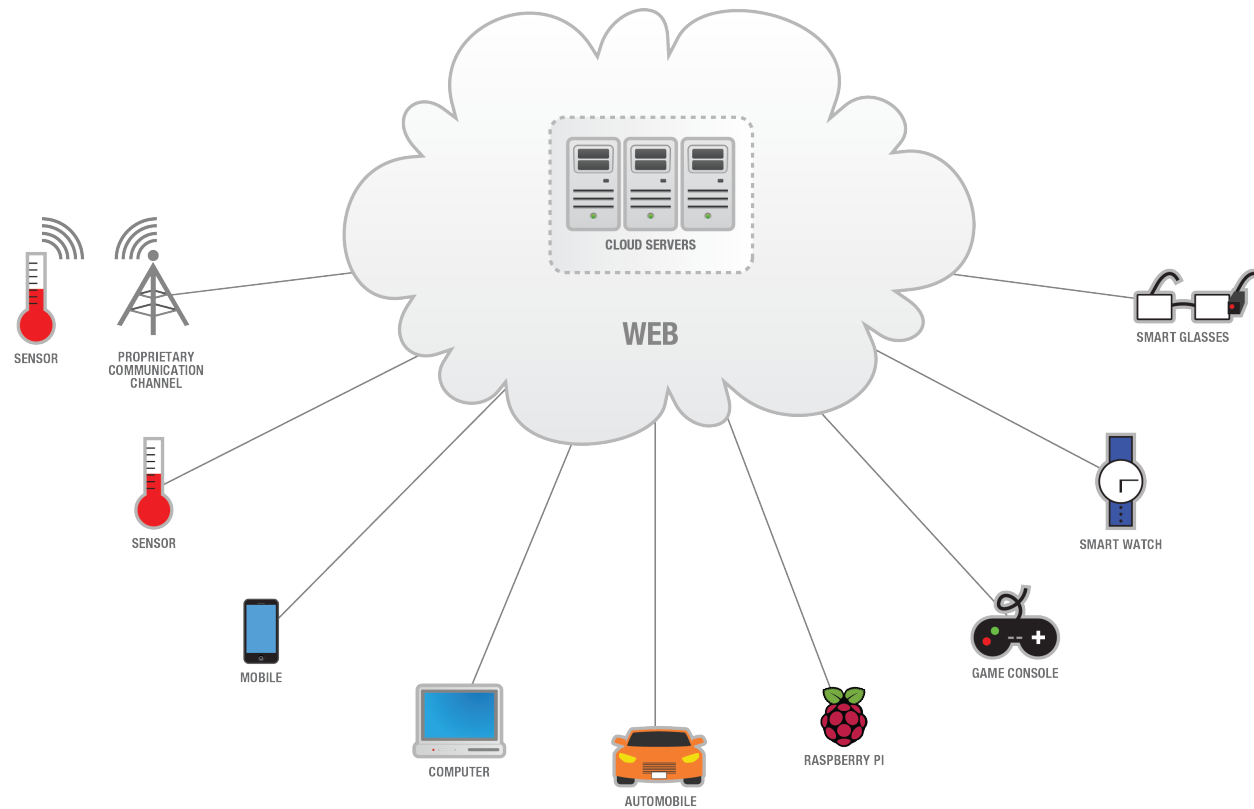
End-to-end latency: under 1 second



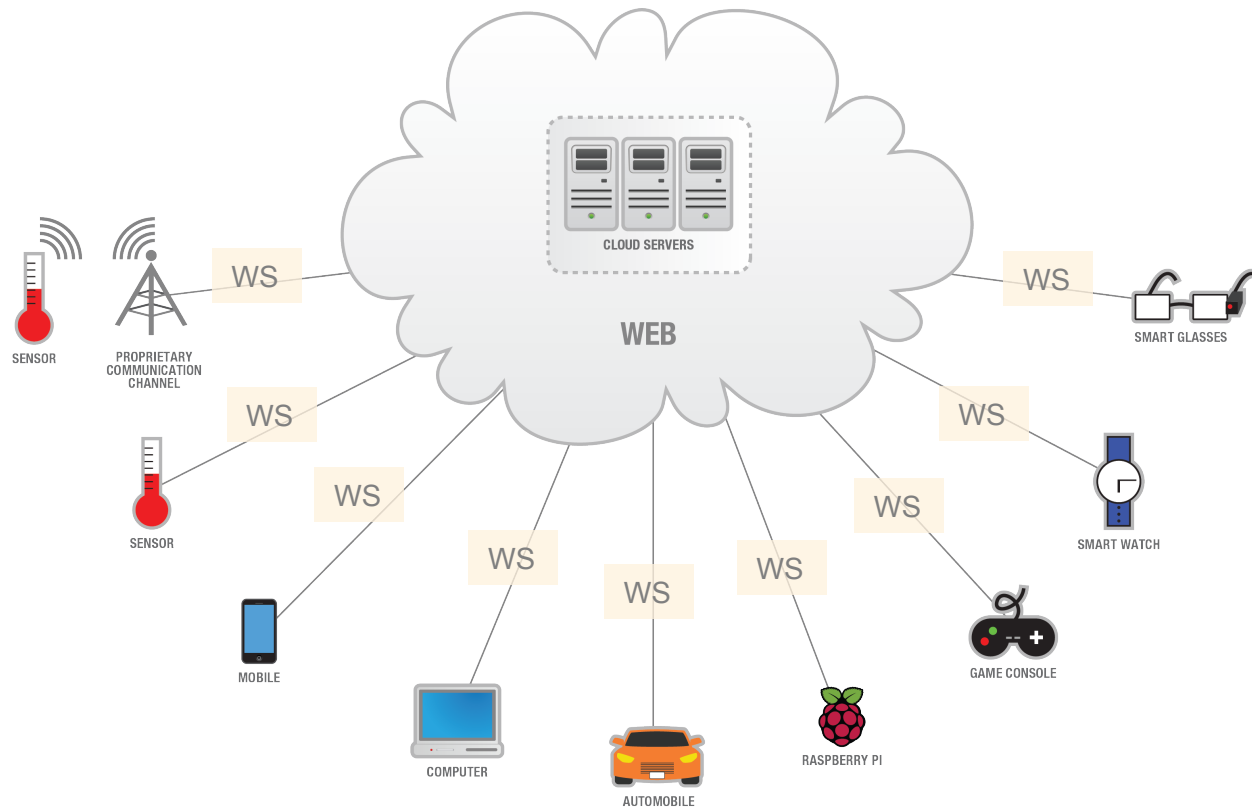
It's More Than “Just” the Web



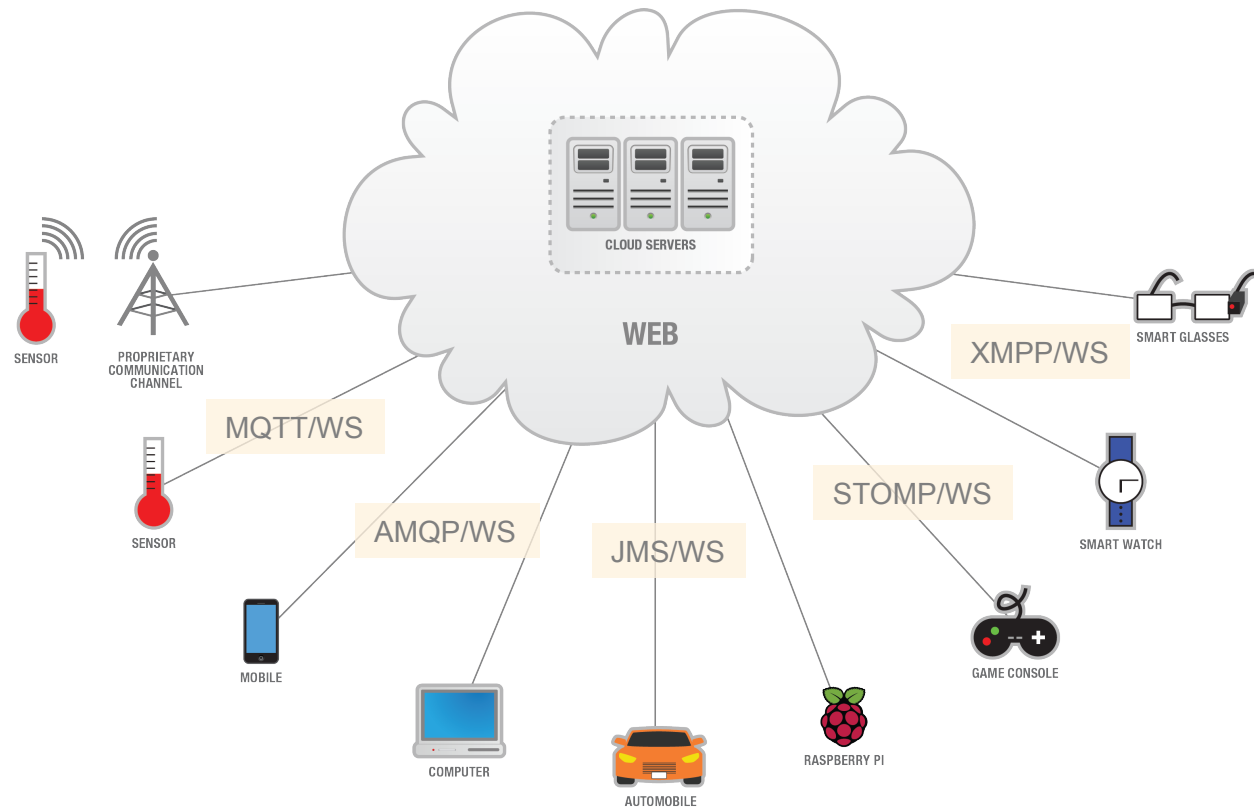
Connected Devices



Connected Devices Communicating with WebSocket



Connected Devices Communicating with Proprietary Protocols over WS



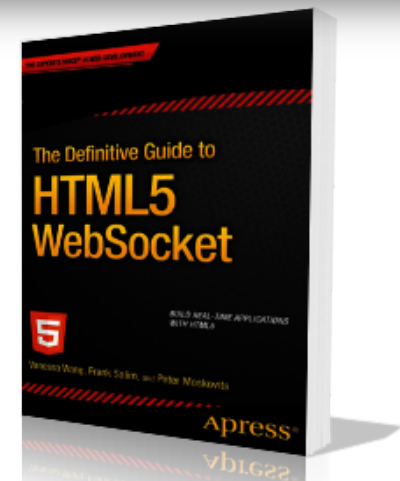
What Does KAAZING do?

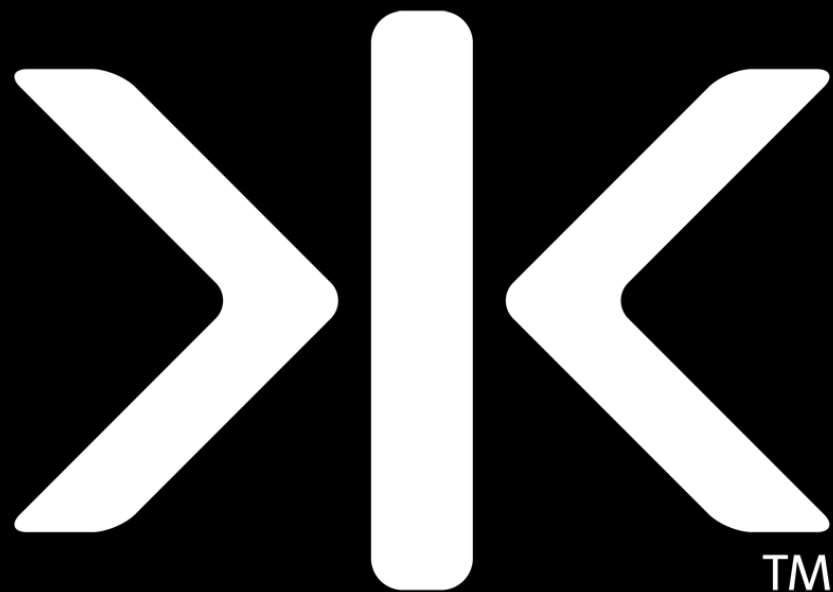


Learn More

- <http://kaazing.com>
- <http://tutorial.kaazing.com>
- <http://kaazing.com/telemetry>

- The Definitive Guide to HTML5 WebSocket





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