



IoT and Akamai

For PlusServer

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Akamai IoT Services

What is available by today?

IoT Management Solutions



OTA Updates

Launched 2017

High-performance, global platform improves owner convenience and decreases warranty, recall, and maintenance costs through the delivery of secure software updates to connected vehicles, devices, or equipment.

IoT Edge Connect

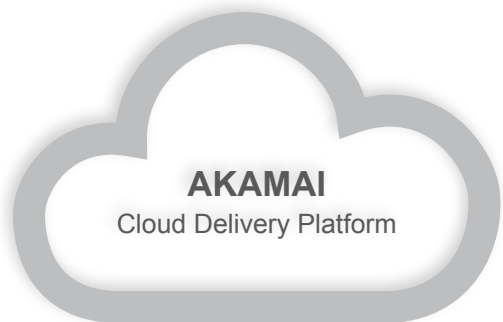
Launching late 2018

Hosted and fully managed on the Akamai Intelligent Platform™, IoT Edge Connect seamlessly and securely connects IoT devices for data collection and real-time messaging. With more than 2,500 data centers peered directly with carriers and ISPs around the world, IoT Edge Connect provides a high-performing, secure, and reliable messaging infrastructure for IoT devices and the cloud.

Product XXX

Future Product

Figures



130+
Countries



+240,000
Servers



2400+
Data
centers



Self-healing
Network
architecture



1000+
Online
organizations



15-30%
Global
web traffic



3 trillion
Internet
interactions
/ day



1.3 billion
Client devices
/ day

Akamai Big Data

EXABYTES

30% of World's
Internet Traffic

113 DELIVERED

2.7 PROCESSED
every year

ON THE AKAMAI PLATFORM...

Trillions of deliveries

Interacting with more than 1.3 billion unique client devices

Processing 7.5 PB of real time telemetry data / day

IoT Edge Connect

by Akamai

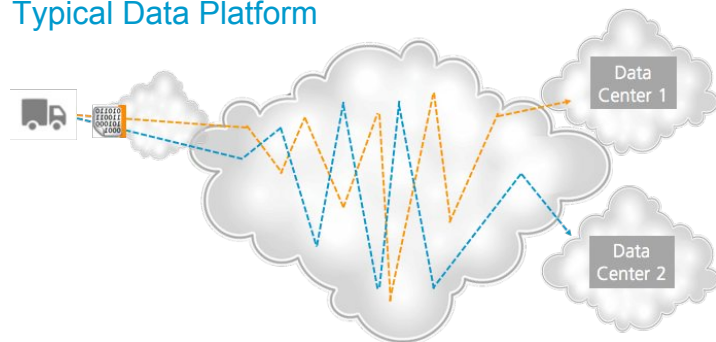
Akamai IoT Edge Connect

- Akamai's Data Platform for Sensor Data Collection and Real-time Messaging between devices and data centers
- Fully managed service for MQTT & HTTPS messaging, hosted on The Akamai Intelligent Platform™ with end-to-end mutual authentication
 - Fast & Reliable: Each device is served by the nearest edge server.
 - Scalable: Unique topic per device, for millions of devices is supported globally.
 - Secure & Compliant (legal): Data is preserved in separate geographical jurisdictions for any privacy regulations.
- Truly distributed, global service that fully manages auto-scaling, failover, and data synchronization

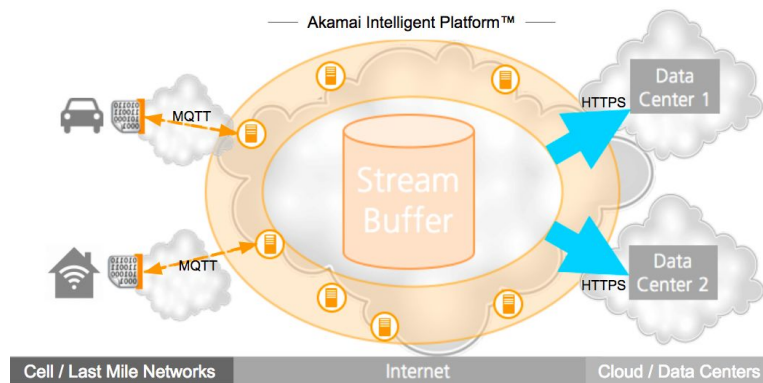
Source:

<https://ac.akamai.com/community/teams/marketing/product-central/web-performance/projects/iot-products>

Typical Data Platform



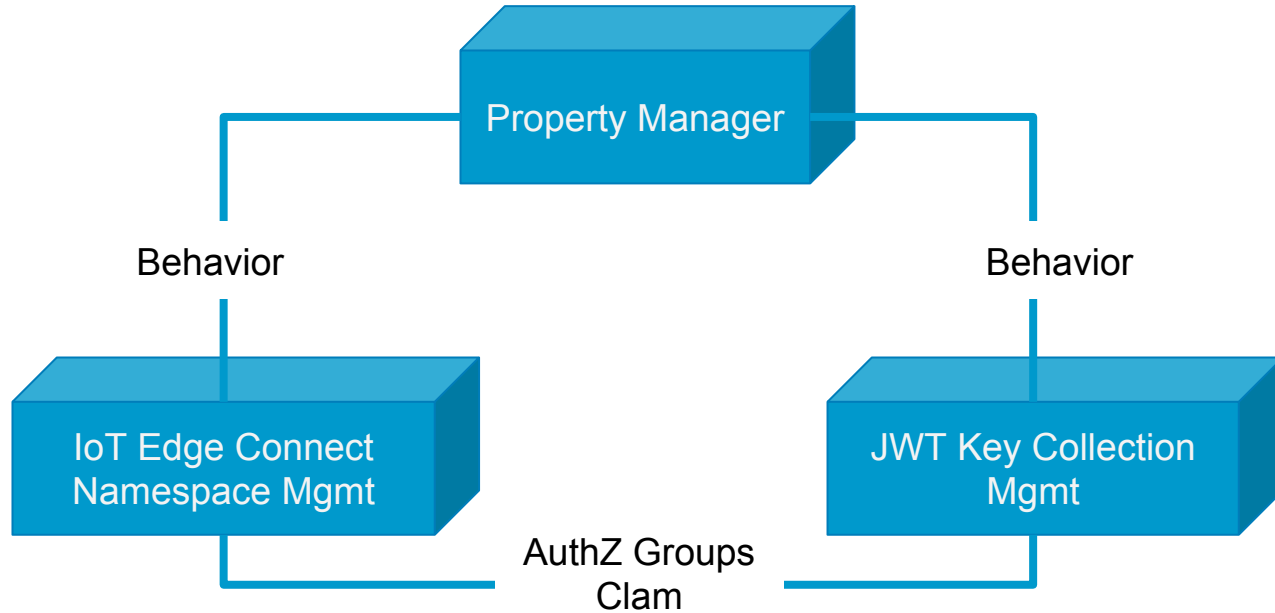
Akamai Approach



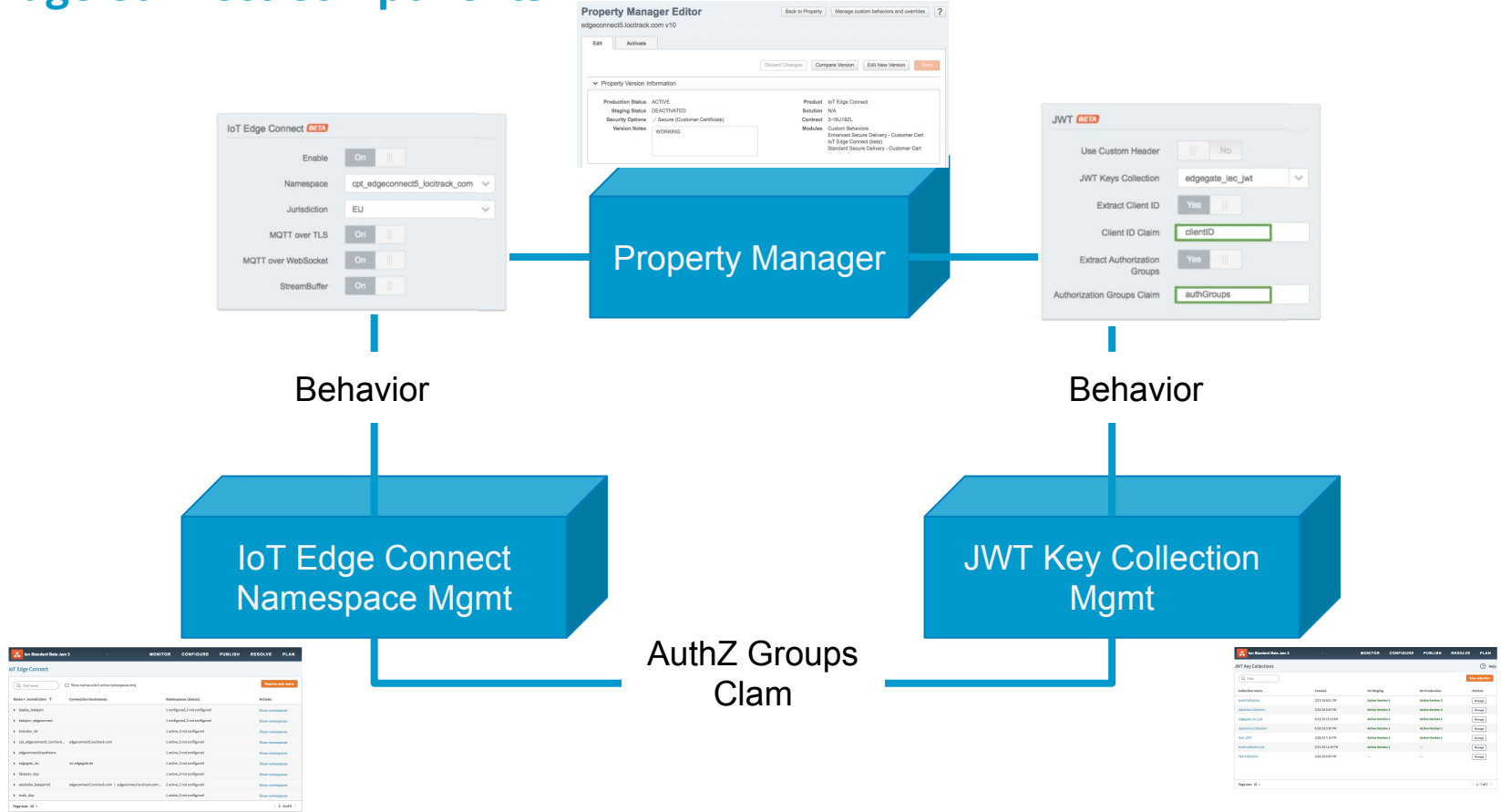
Show!

IoT Edge Connect

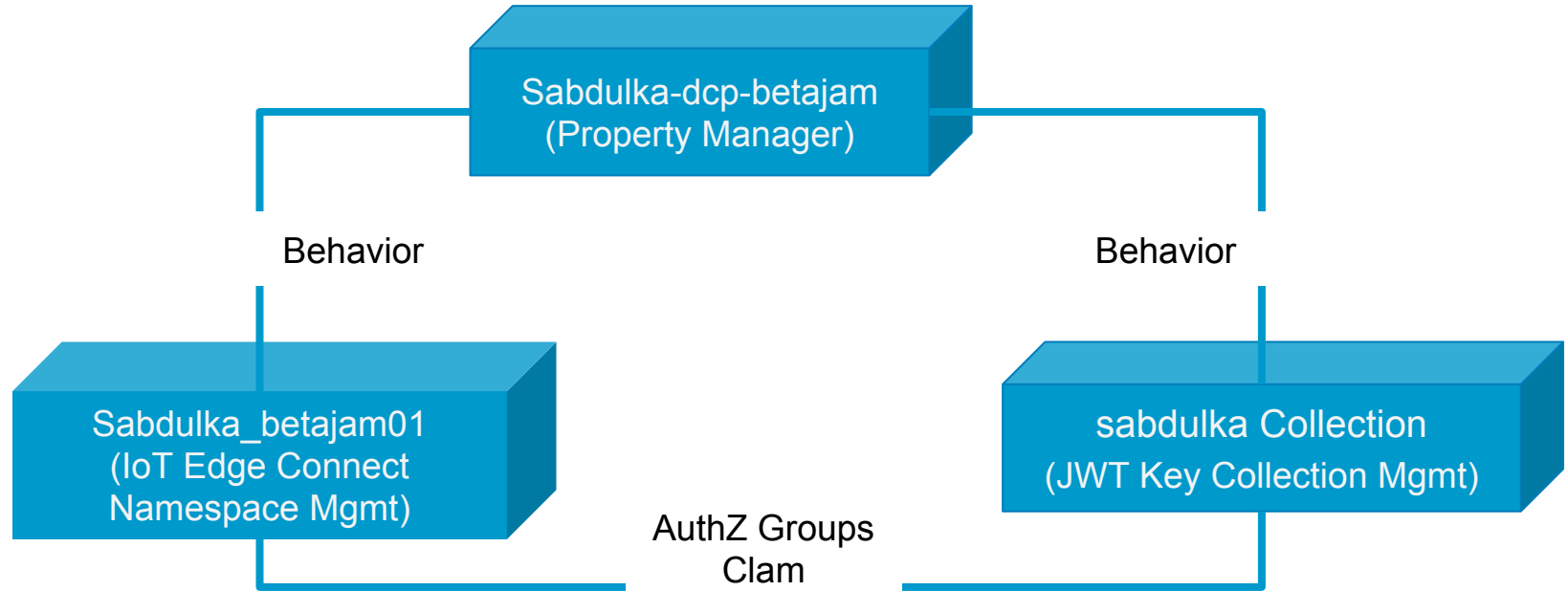
IoT Edge Connect Components



IoT Edge Connect Components



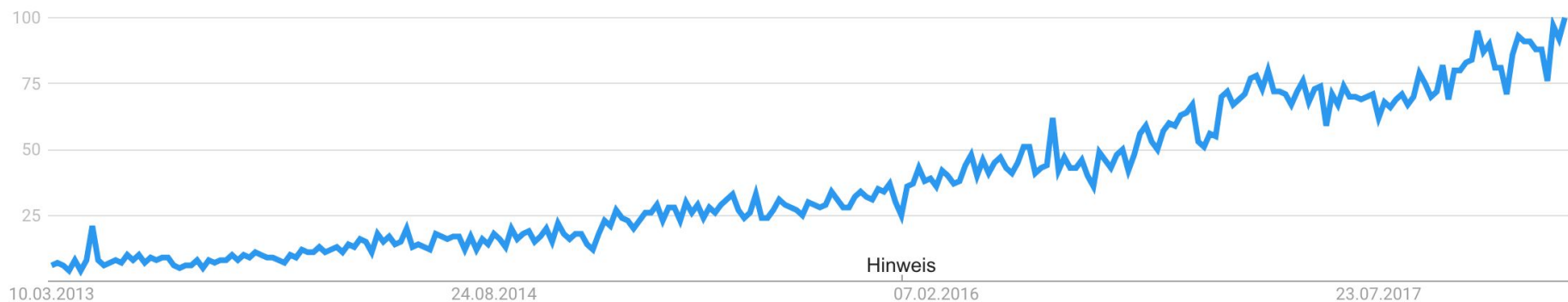
IoT Edge Connect Components



Why MQTT?

Isn't HTTP good enough?

Google Trends: MQTT last 5 years



Why MQTT?

Delay from flespi to client, seconds	REST API python module	Mosquitto MQTT client
Average	0.768	0.0322
Max	1.274	0.0346
Min	0.379	0.0315

Secure session	Outcoming bytes	Incoming bytes	Number of packets
HTTPS	1734	4186	20
MQTT over SSL (WiFi)	1274	4159	20
MQTT over SSL (Ethernet)	1186	4075	18

<https://flespi.com/blog/http-vs-mqtt-performance-tests>

Why MQTT?

IBM
Hursley
Lab



Scenario	HTTP	MQTT
1. Get a single piece of data from the server	302 bytes	69 bytes (~4 times)
2. Put a single piece of data to the server	320 bytes	47 bytes (~7 times)
3. Get 100 pieces of data from the server	12600 bytes	2445 bytes (~5 times)
4. Put 100 pieces of data to the server	14100 bytes	2126 bytes (~7 times)



European
automobile
manufacturer

Vehicle Telematics

Mobile Network Estimated
Data Costs/Vehicle/Year*

HTTP

MQTT

220€/vehicle
/year

23€/vehicle
/year

*Comparison based on 100 messages/day, 200Bytes/Msg payload, 1-2€ /100MB TCP transfer costs.



Latency

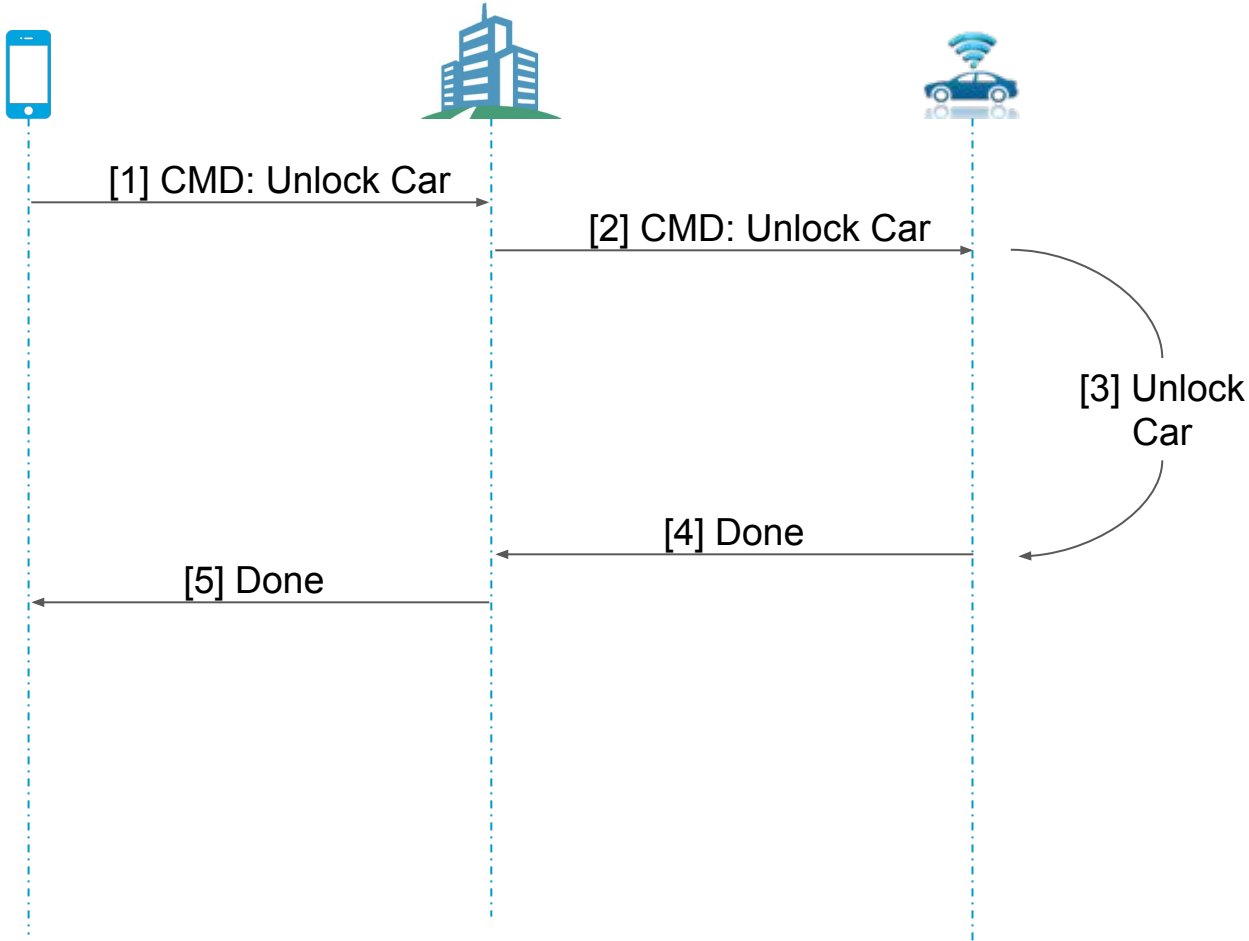
Time	Case
?	Sensors send sporadic data (elevator doors - predict slowly-worsening mechanical problems).
1 Week	Car download Firmware updates once a week.
1 Day	Car upload traffic observations and engine-performance data once a day.
1 Hour	Oil storage tank send status once an hour.
10 min	Temperature sensor and thermostat control messages every 10 minutes. Room temperatures change only slowly.
10 sec	Shared bicycle might report its position every minute – and unlock in under 10 seconds.
2 sec	Security-access check identity and open a door in a second or two.
1/10 sec	Networked video-surveillance system send a facial image, and get a response in a tenth of a second, before they move out of camera-shot.
10 ms	A doctor's endoscope or microsurgery tool - send haptic feedback every 10ms.
1 ms	A rapidly-moving drone react in a millisecond.
1/100 ms	A sensitive industrial process-control system respond in 10s or 100s of microseconds to avoid damage to finely-calibrated machinery.
1 ns	Image sensors and various network sync mechanisms may require response times measured in nanoseconds.

REMOTE CAR LOCK/UNLOCK

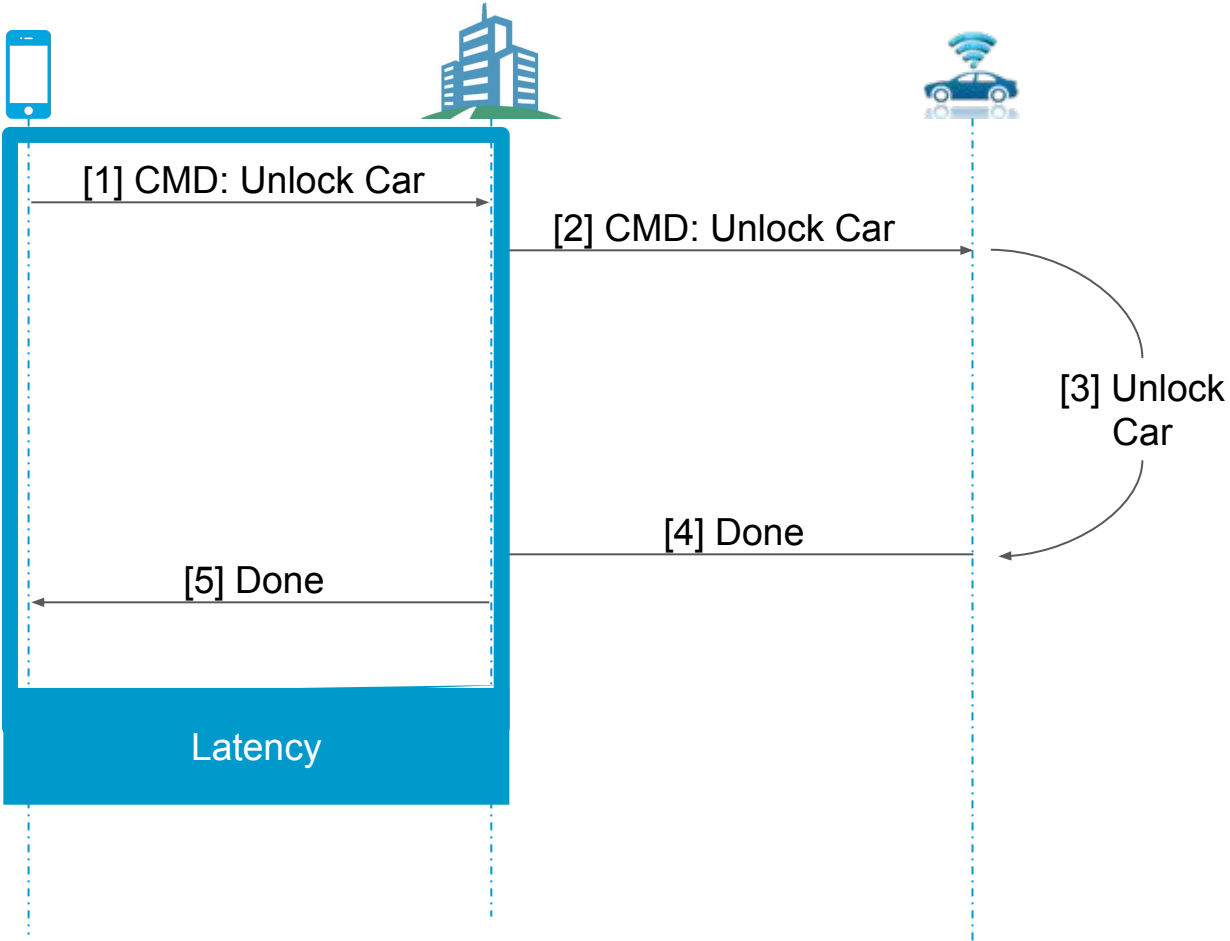


Image Source: <http://nickconlow.com/>

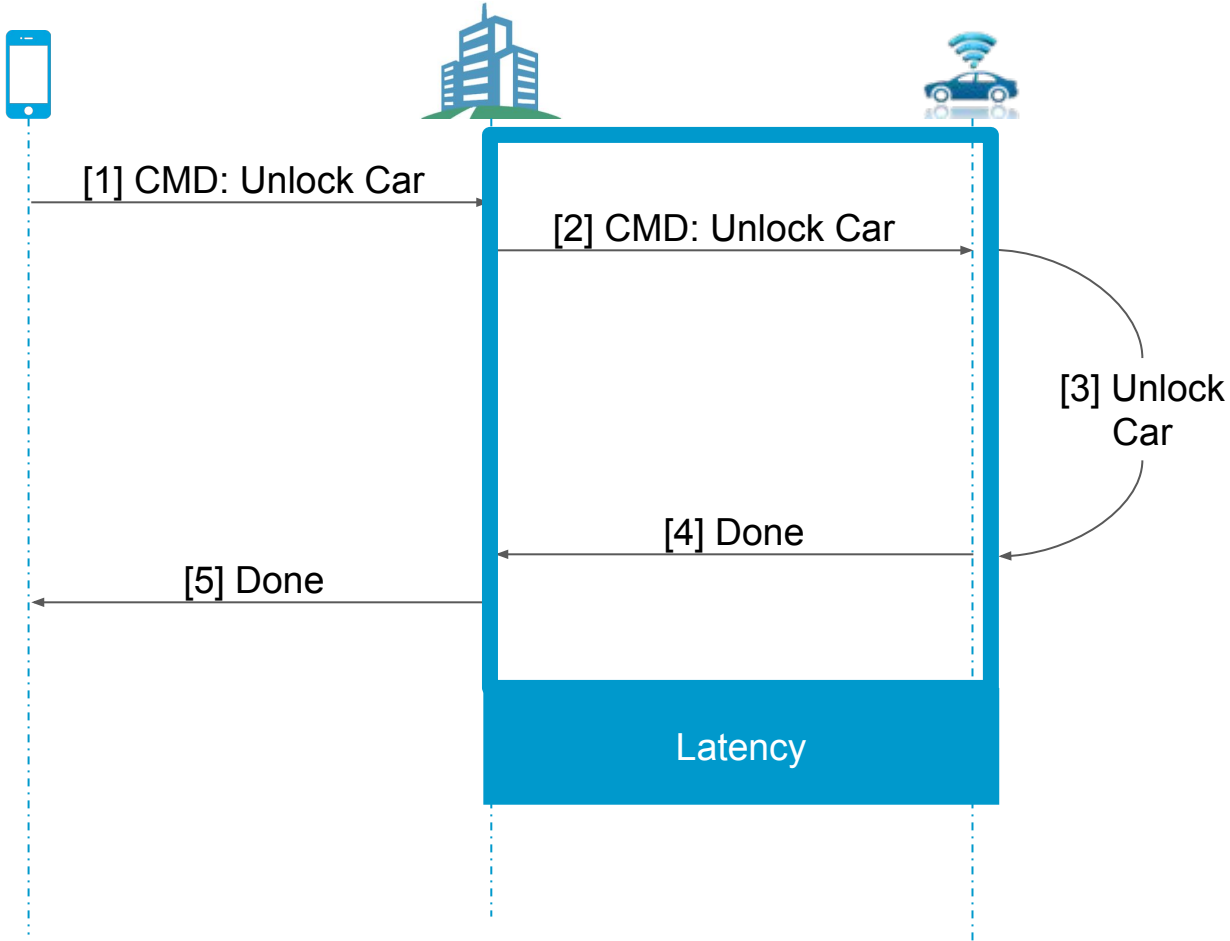
Latency: Use Case



Latency: Use Case



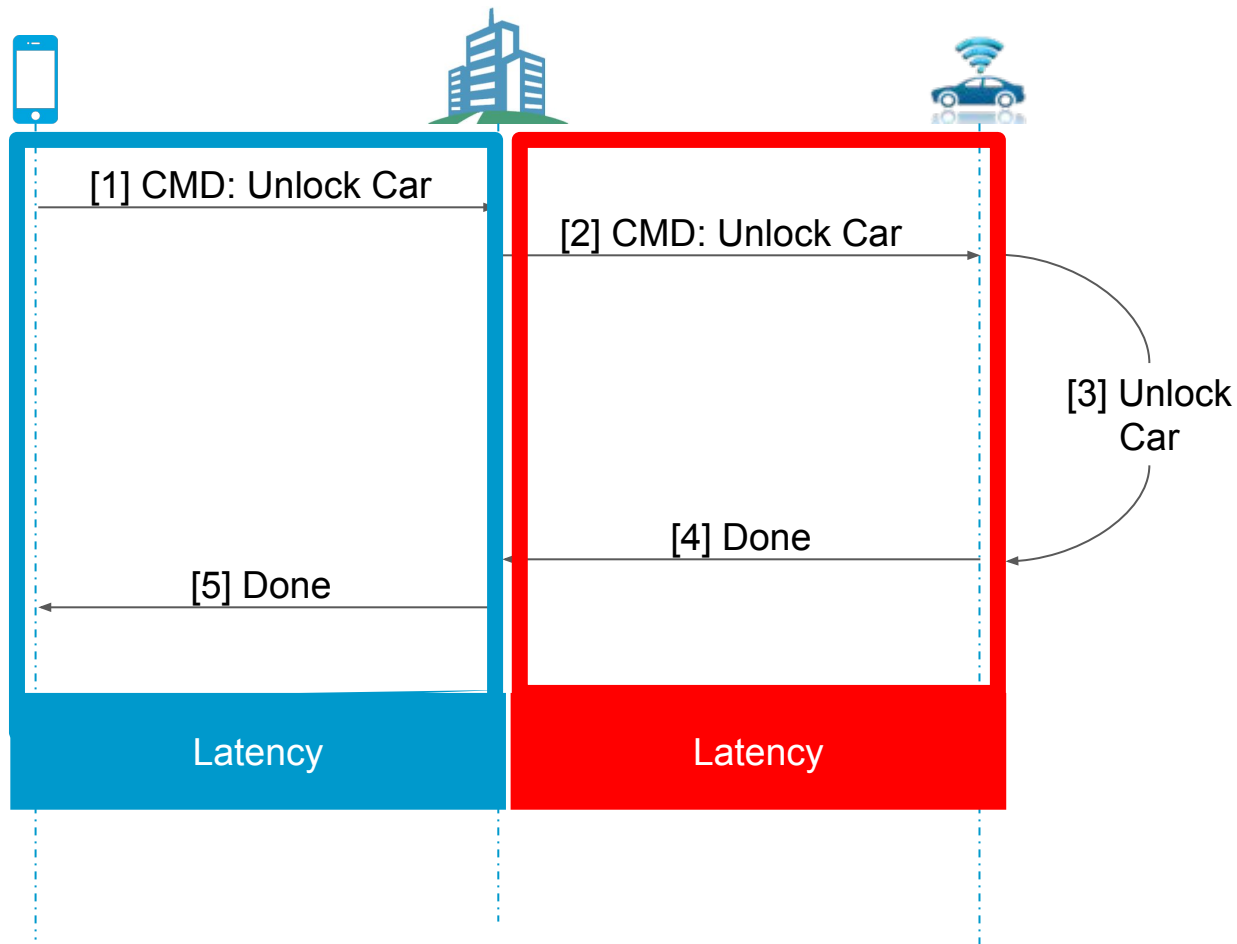
Latency: Use Case



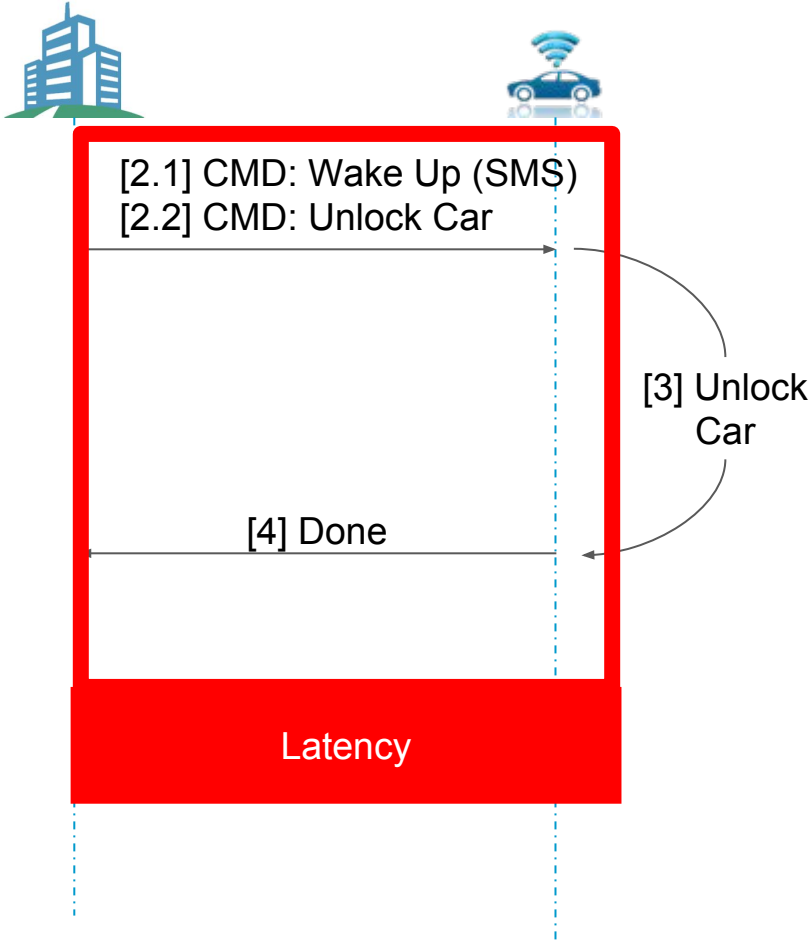


>2sec

Latency: Use Case

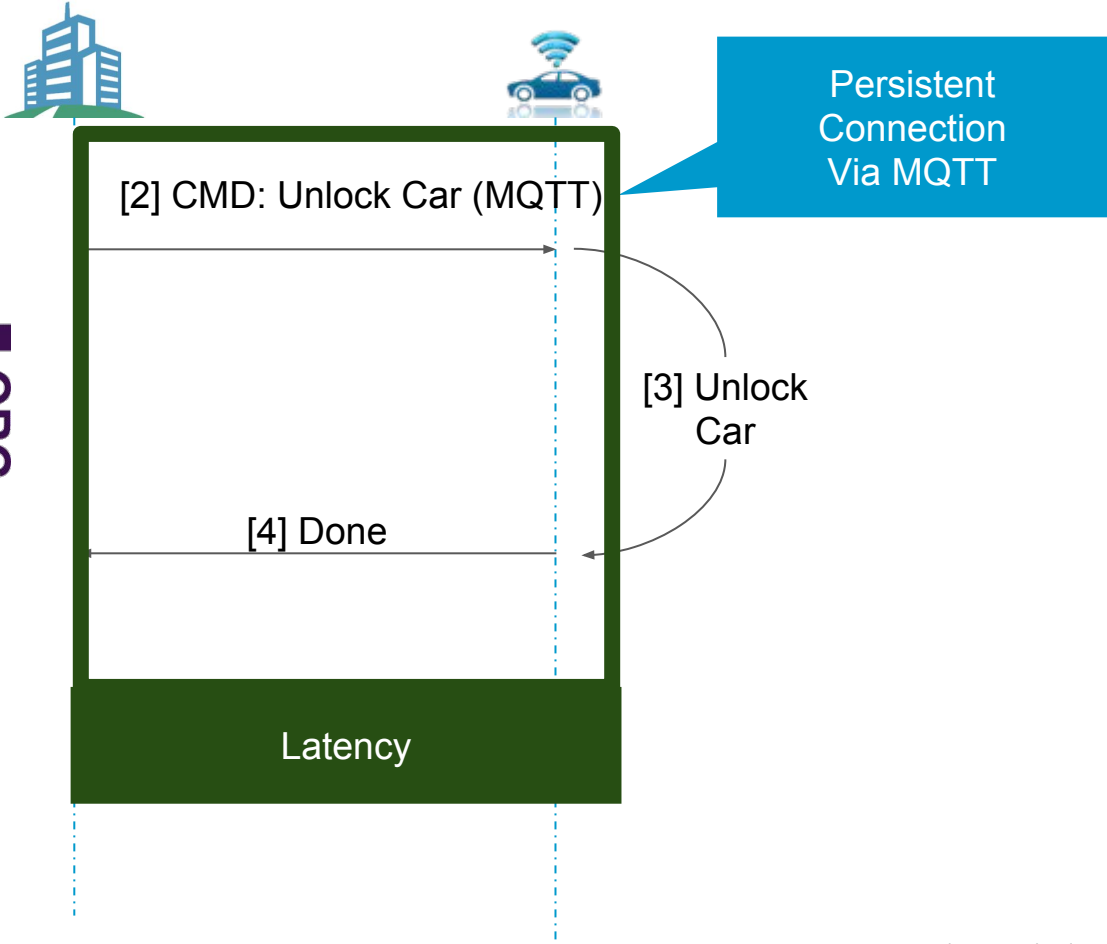


Latency: Use Case

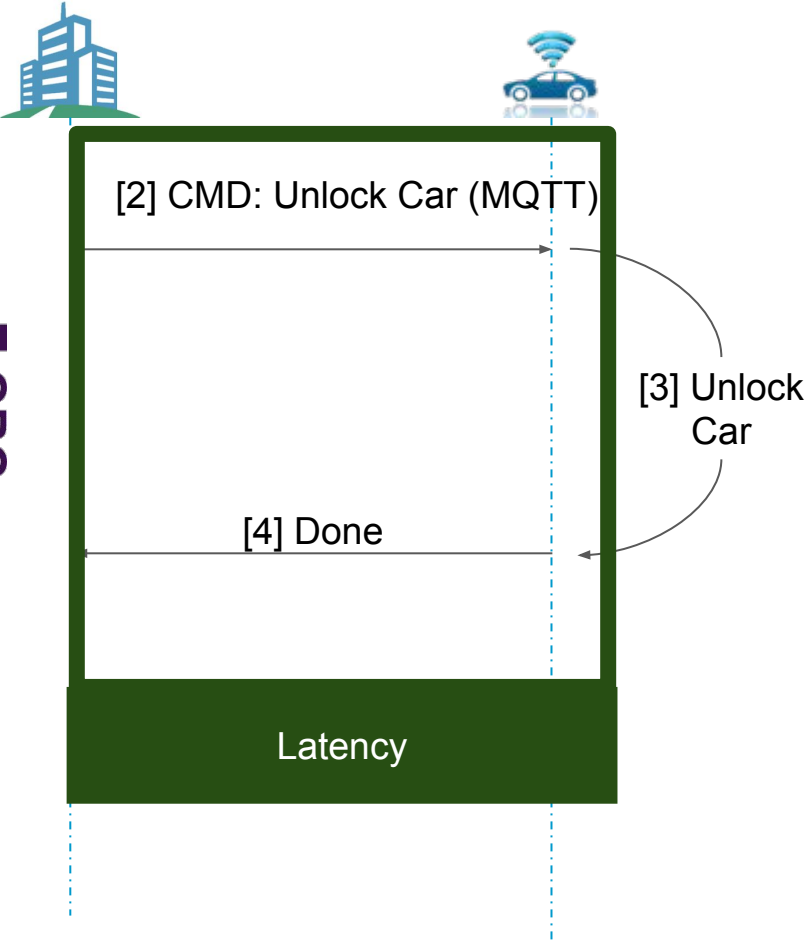




Latency: Use Case



Latency: Use Case



Latency: Use Case

The latency in Japan is significantly lower than 1s. Here's me publishing from Florida to Japan and subscribing from Florida at QoS0 with a 5KB payload. The ESSL node I connect to is 7 hops away in downtown Orlando:

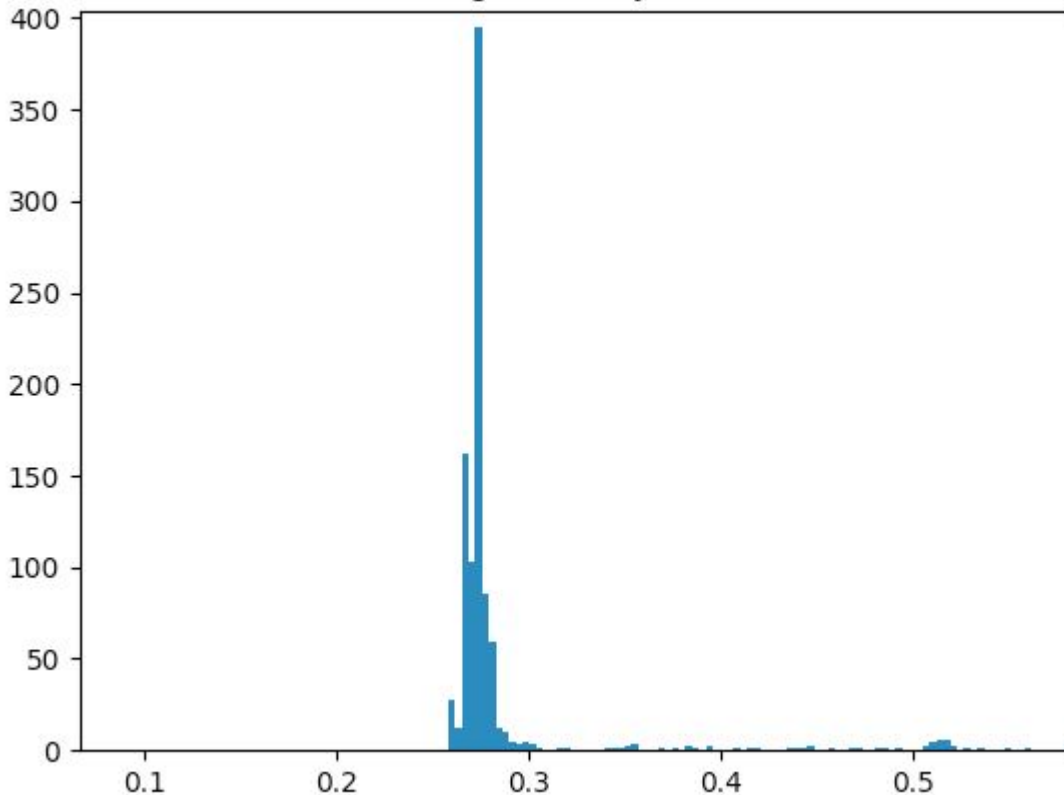
latency

- *median: 0.2737*
- *75%: 0.2766*
- *95%: 0.6745*
- *Max: 3.5320*

For comparison, I'm getting 0.21s RTT to xe-0-0-22-3.a01.osakjp02.jp.ce.gin.ntt.net. I'd say we're doing pretty well ☺.

Rob Bird

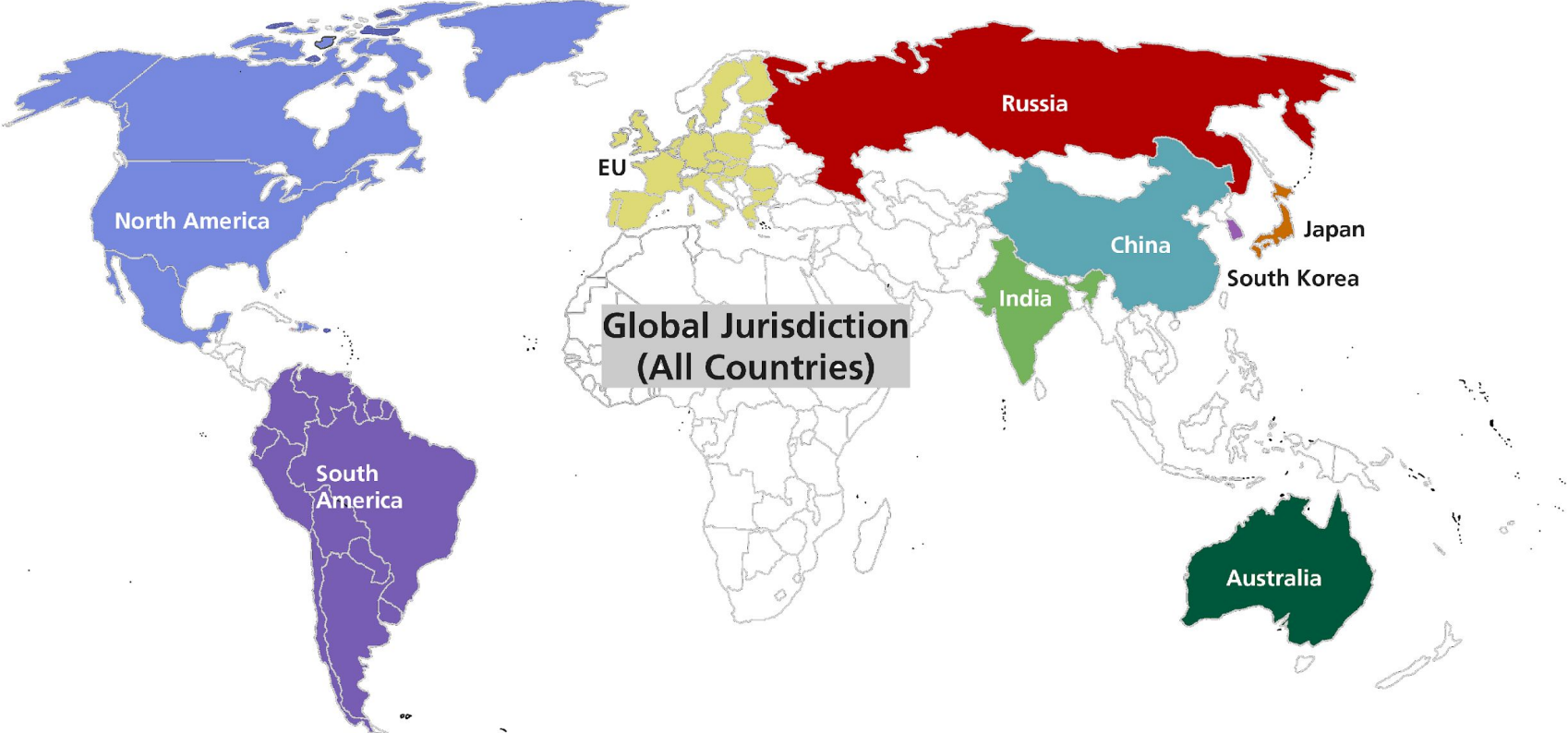
Per-message Latency Distribution



Global

Use Case

Data Jurisdictional Isolation Model



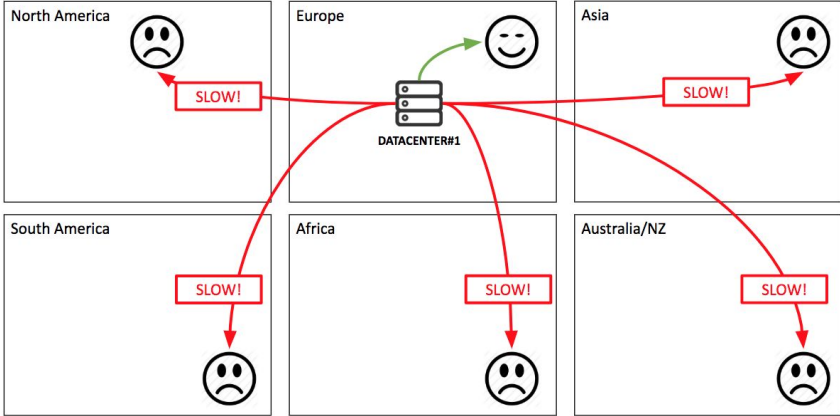
Distributed Data

Use Case

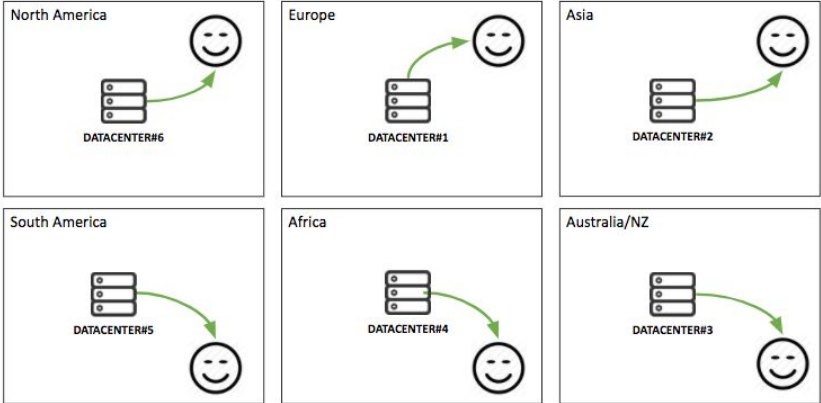
Distributed Data Solutions

Use Case:

- Client are globally distributed (Latency).



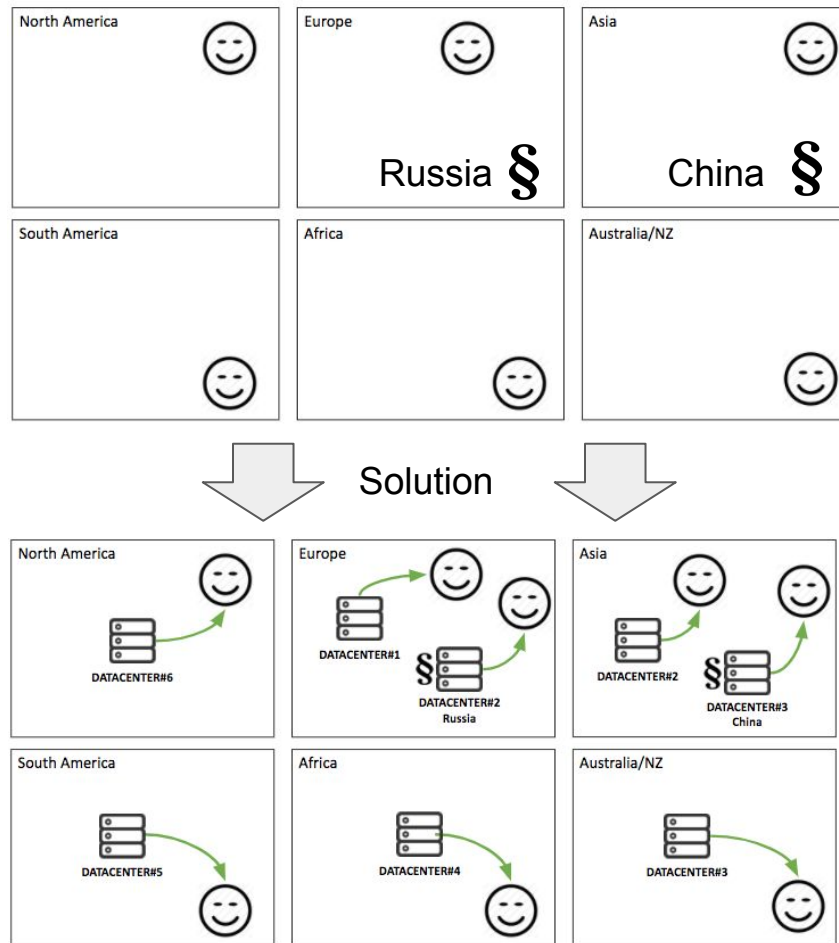
Solution



Distributed Data Solutions

Use Case:

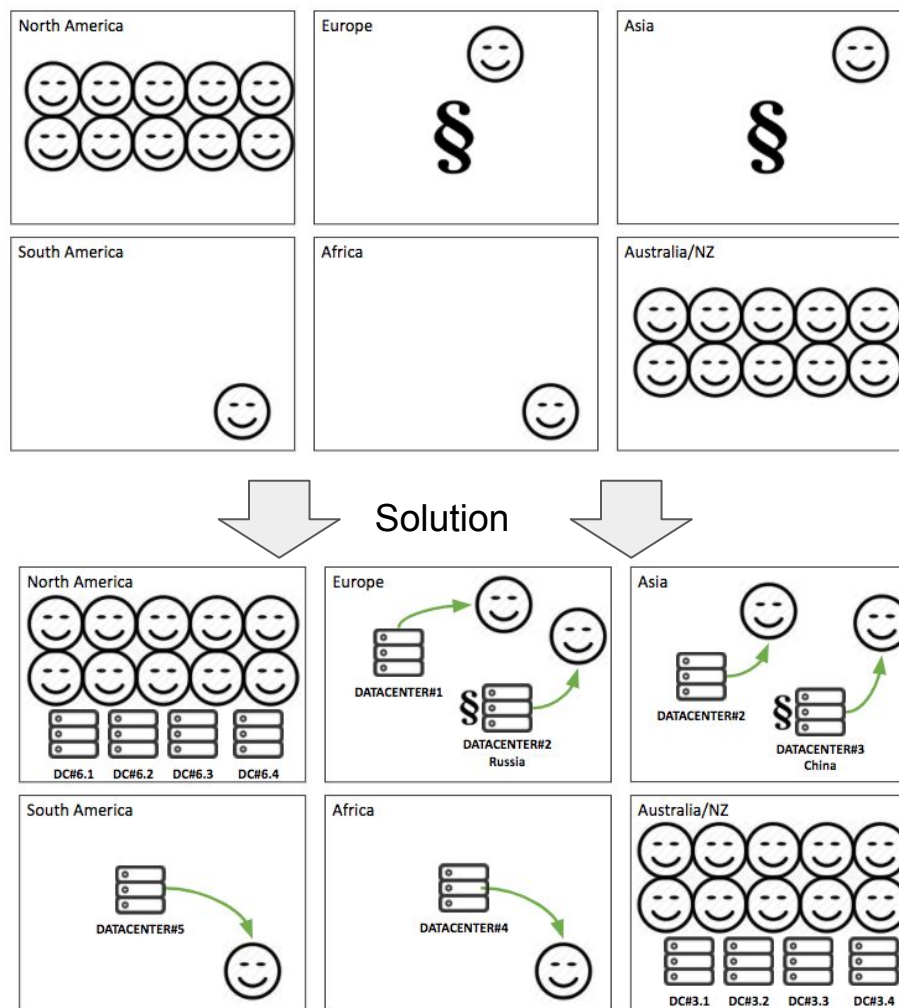
- Client are globally distributed (Latency).
- Certain data needs to be collected and transformed inside certain country borders (Legal).



Distributed Data Solutions

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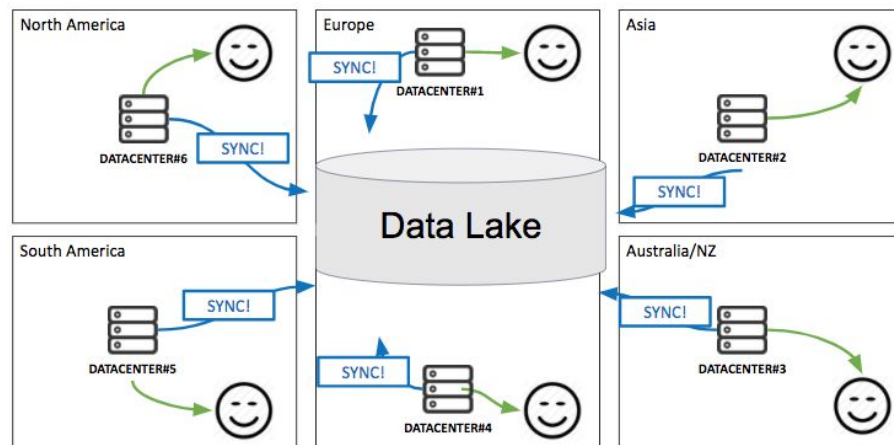
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- High data throughput of data writes and read (Scalability).



Distributed Data Solutions

Use Case:

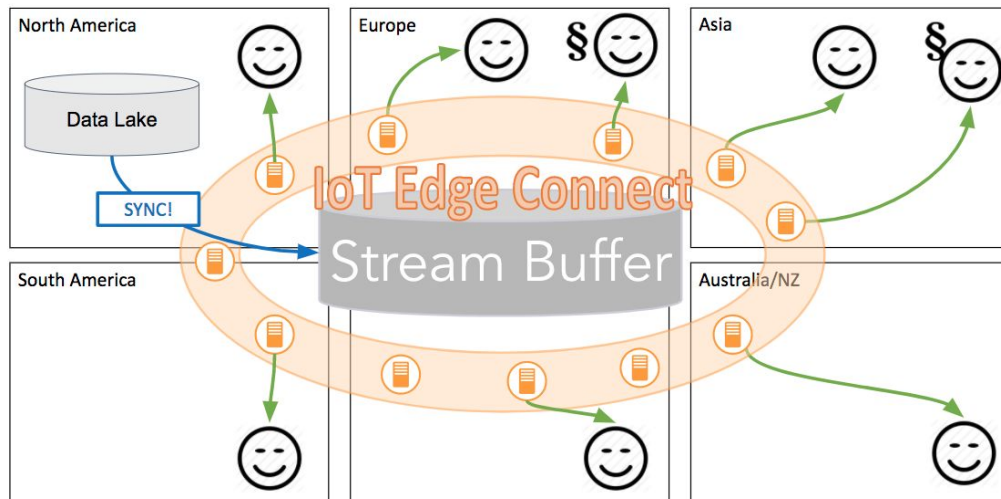
- Client are globally distributed (Latency).
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- High data throughput of data writes and read (Scalability).
- Ensure data is made available for consumers (central Data Lake) for further analyzes.



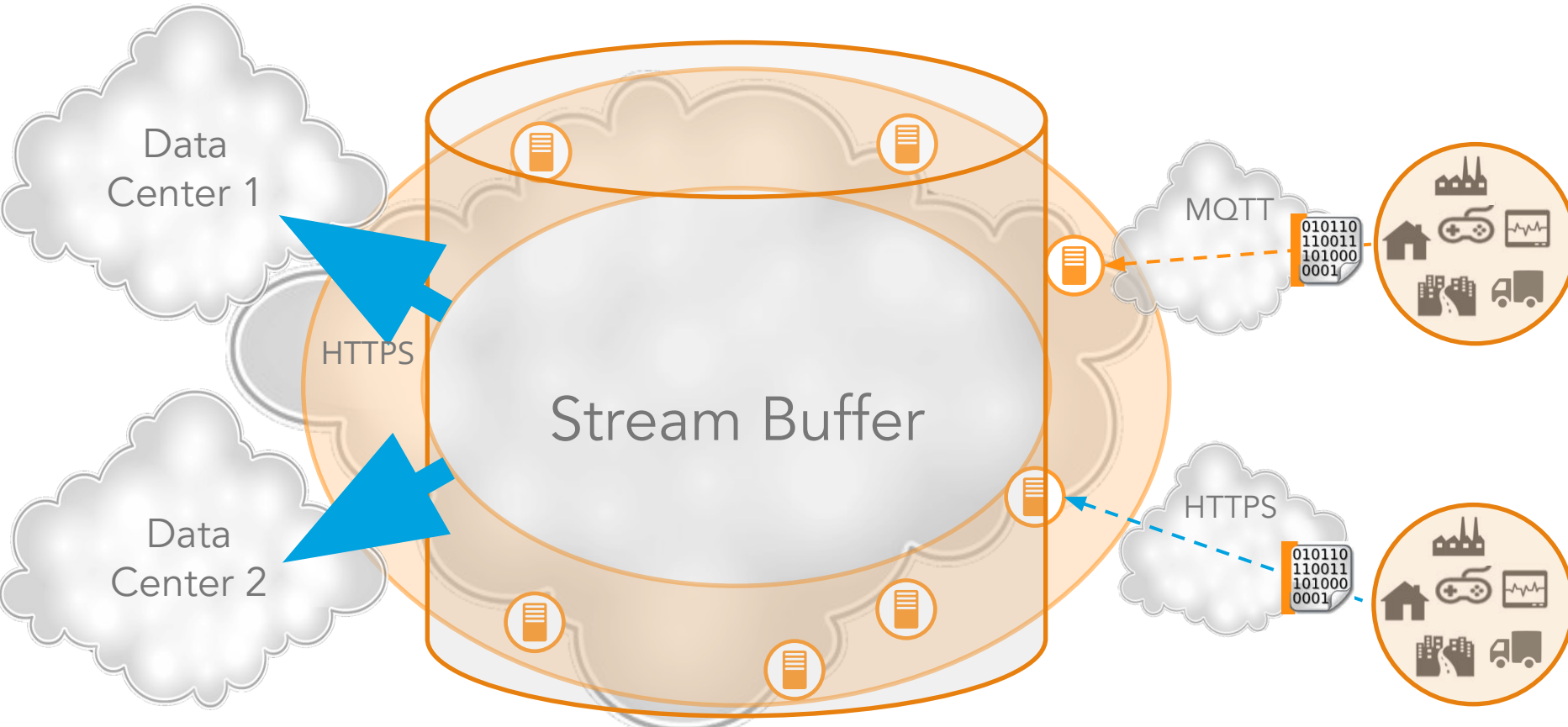
Akamai IoT Edge Connect

Use Case:

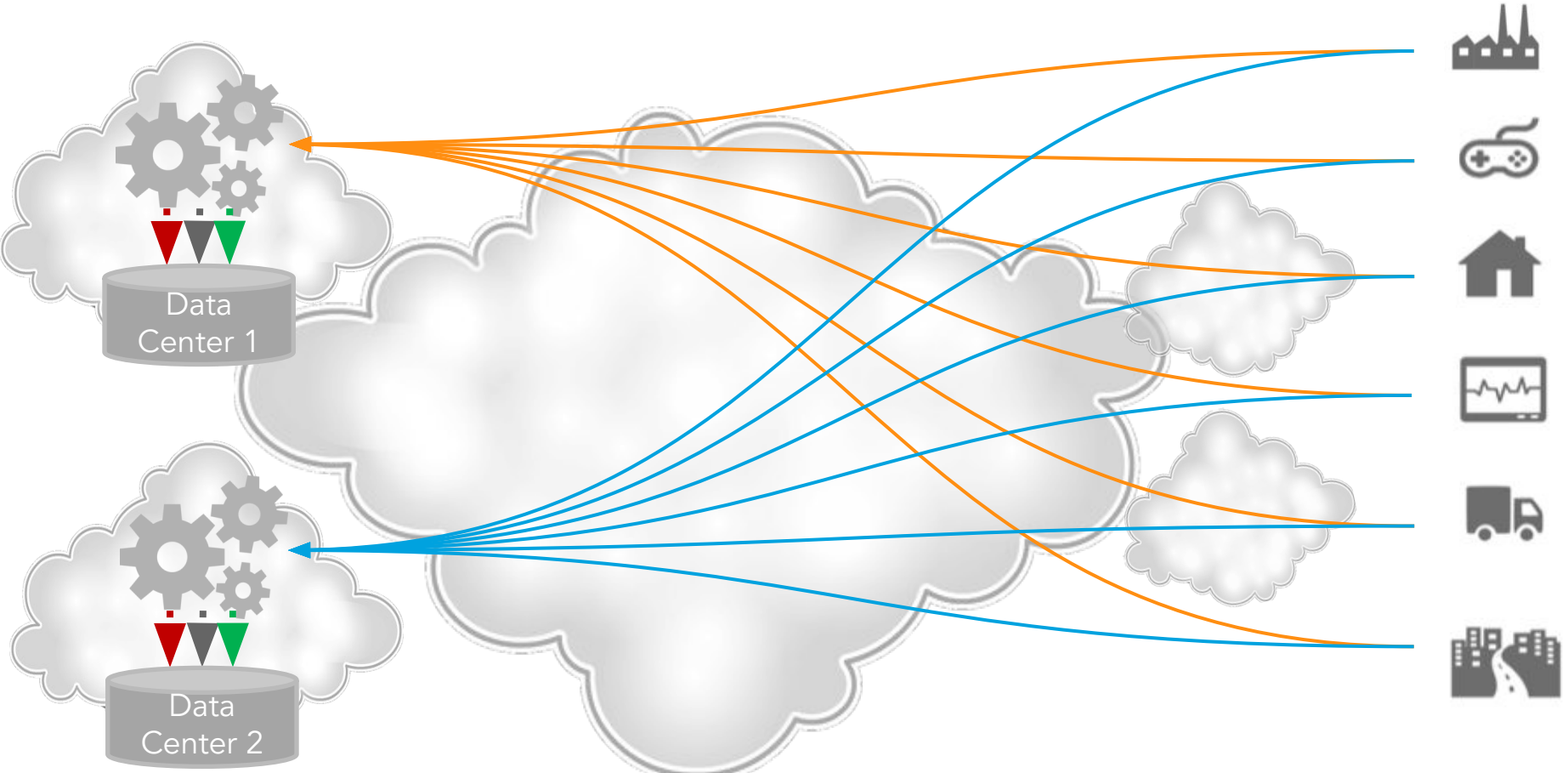
- ✓ Client are globally distributed (Latency).
- ✓ Certain Data needs to be collected and transformed inside certain country borders (Legal).
- ✓ High data throughput of Data writes and read (Scalability).
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Multiple Data Center



Use Case: Multiple Consumer



Data Center

Internet

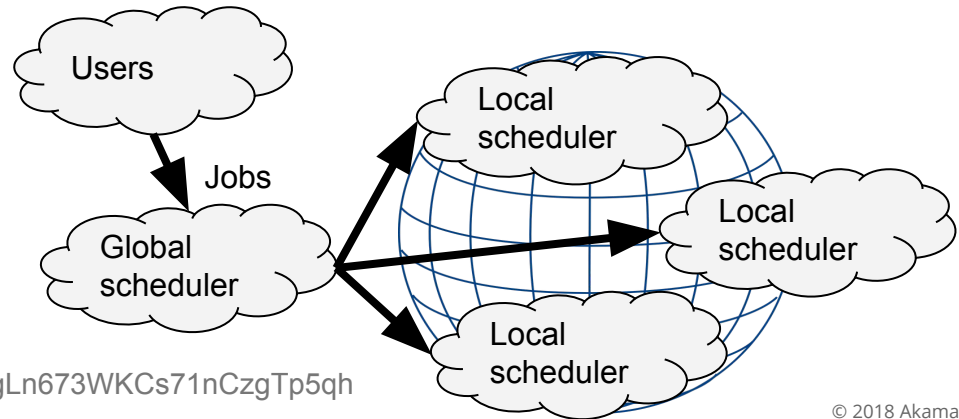
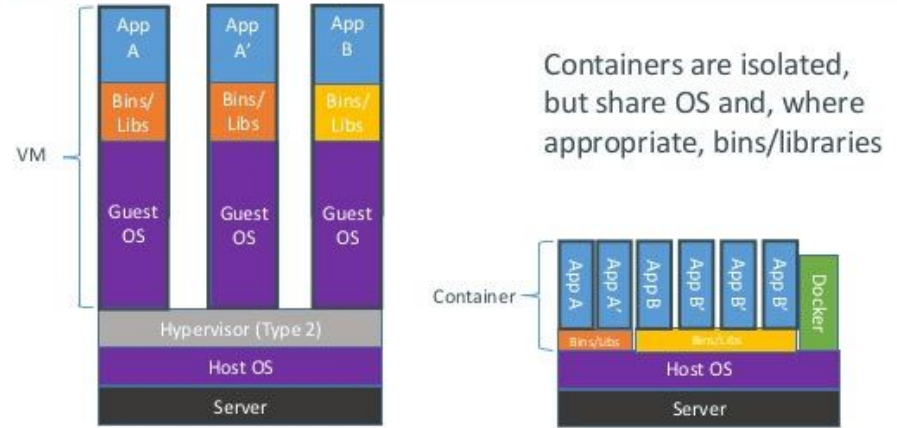
Cell Networks

Edge Computing

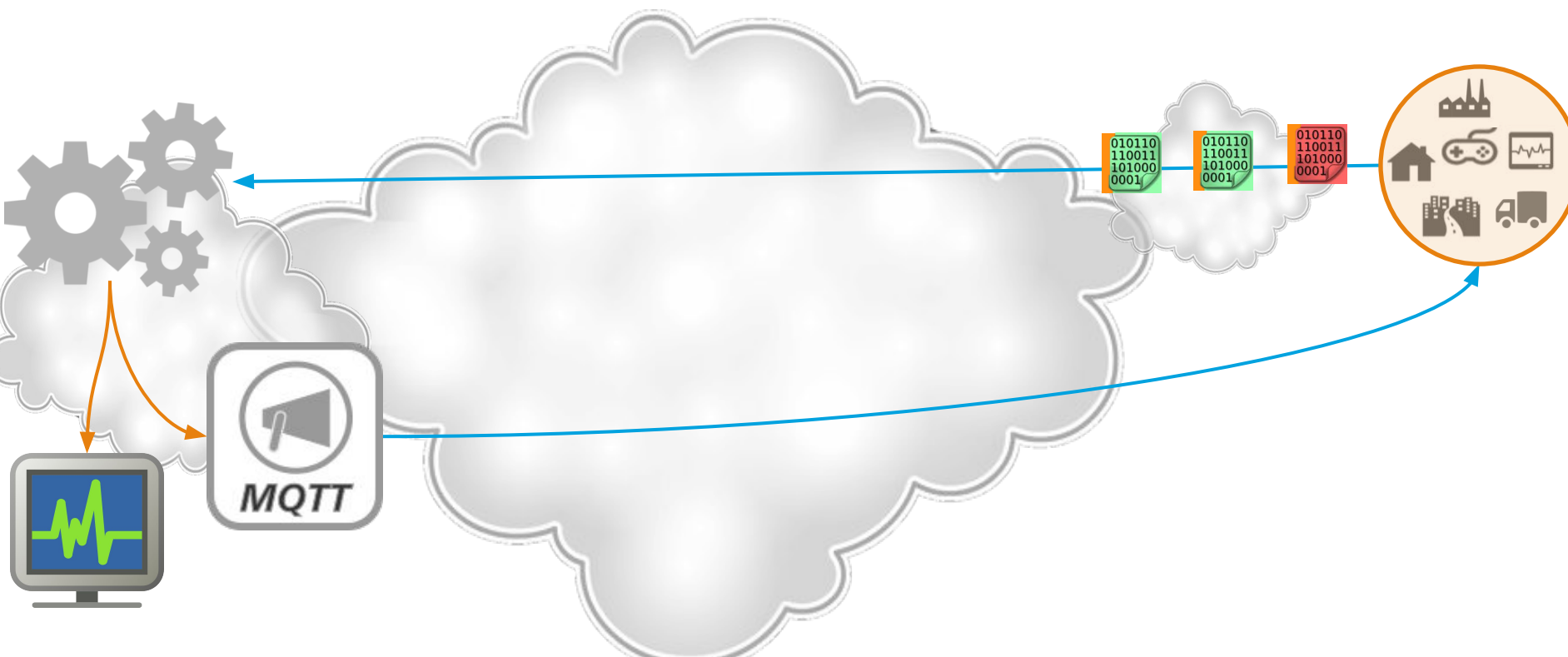
@Akamai

Edge Cloud Platform (Edge Computing 2.0)

- Lightweight virtualization (Linux Containers)
 - Optimized performance
 - Lower overhead
- Automated orchestration
 - Mapper, Kubernetes, Mesos
- Applications in addition to virtual servers
 - Docker



Edge Computing 2.0: App w/ Centralized Processing



Data Center

Internet

Cell Networks

Edge Computing 2.0: App w/ Edge Processing

- Run your code on Akamai's edge for the fastest customer experiences
- Ultra low latency processing for the most demanding applications
- Containerized execution for safety & security
- Dynamic, local elasticity based on budget constrains
- Chain together processing workflows, messaging & buffering

<APPLICATION CODE>

action = push msg to device
action = push msg to
backend

010110
110011
101000
0001

010110
110011
101000
0001

010110
110011
101000
0001

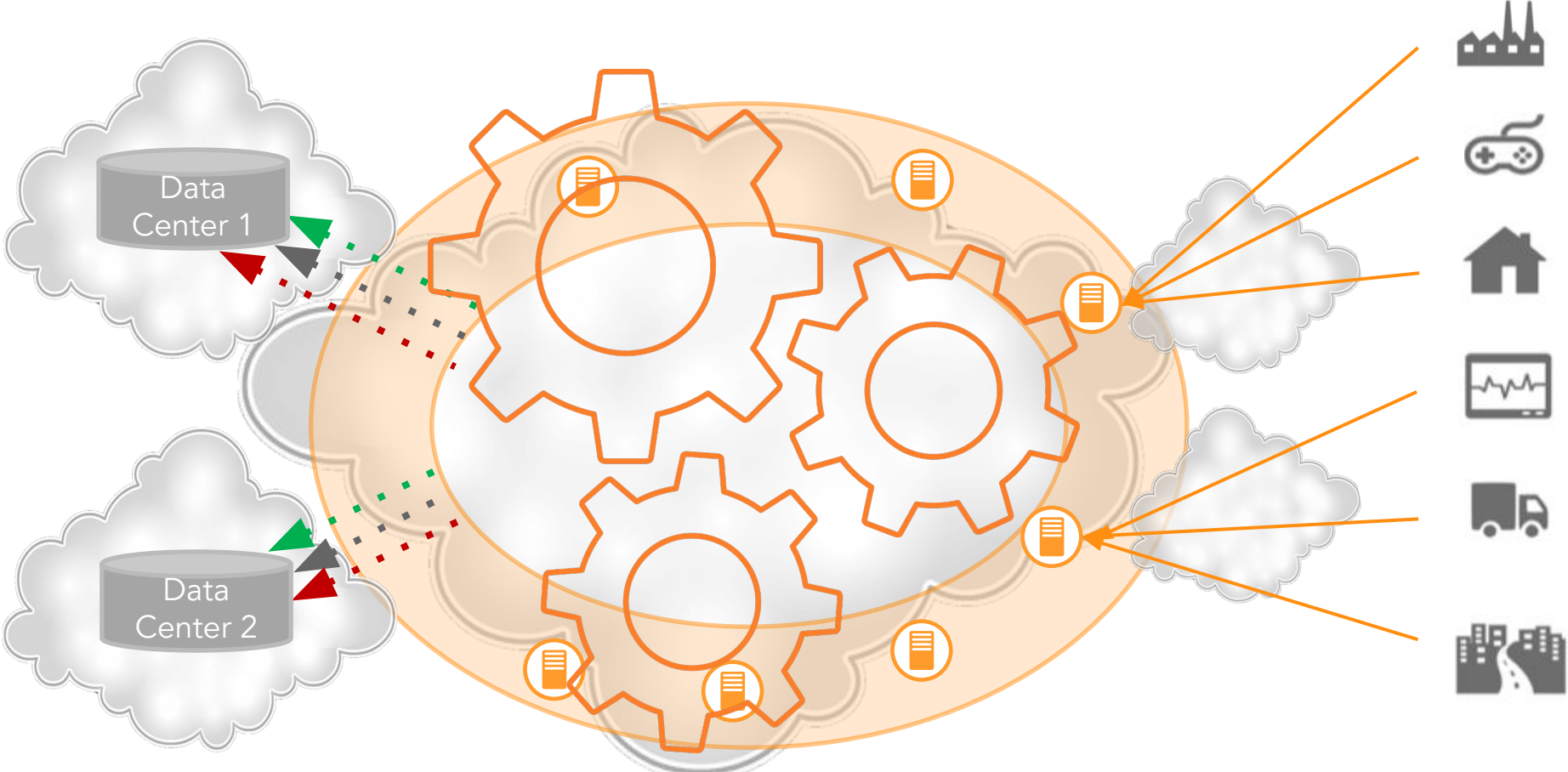


Data Center

Internet

Cell Networks

Edge Computing 2.0: Edge Stream Processing



Data Center

Internet

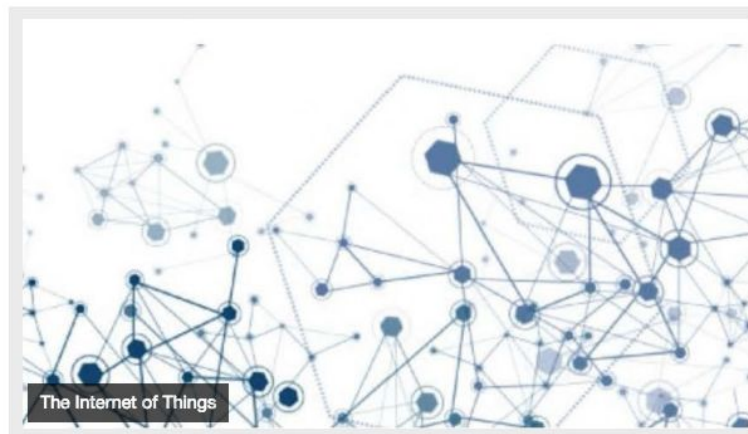
Cell Networks

IoT Security

@Akamai

[Home](#) » [Events](#) » The "S" in "IOT" stands for Security

The "S" in "IOT" stands for Security



We hear many positive stories about the transformation of our world with the Internet of Things - from home assistants, clever gadgets through to automated mines and self-organised factories. But at the same time, the reports of Internet malware continue to get more disturbing. The attacks we see in the Internet are getting larger and the impacts more destructive. How will the Internet of Things affect the Internet? Are we talking about achieving a digital Utopia or having to live with a fractured Dystopia?

Speaker Biography: Geoff Huston B.Sc., M.Sc., is a graduate of the ANU, where he dropped an unpromising degree in mathematics to pursue a new found passion for computing and

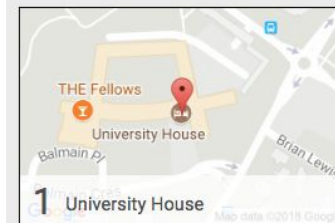


Dates & times



Wed 29 Nov 2017, 5.15–6.15pm

Location



Room: Common Room

Speakers

Geoff Huston B.Sc. M.Sc.



↑ c00yt825 201 points · 1 year ago

↓ This is more truth than funny.

Share Save

↑ redwall_hp 139 points · 1 year ago

↓ How about a Secure Hypertext Internet of Things?

Share Save

↑ [deleted] 44 points · 1 year ago

↓ SHIoT?

Share Save

↑ Xtremegamor 21 points · 1 year ago

↓ Just drop the o and you're good,

SHIT

Share Save

↑ mrjiels 30 points · 1 year ago

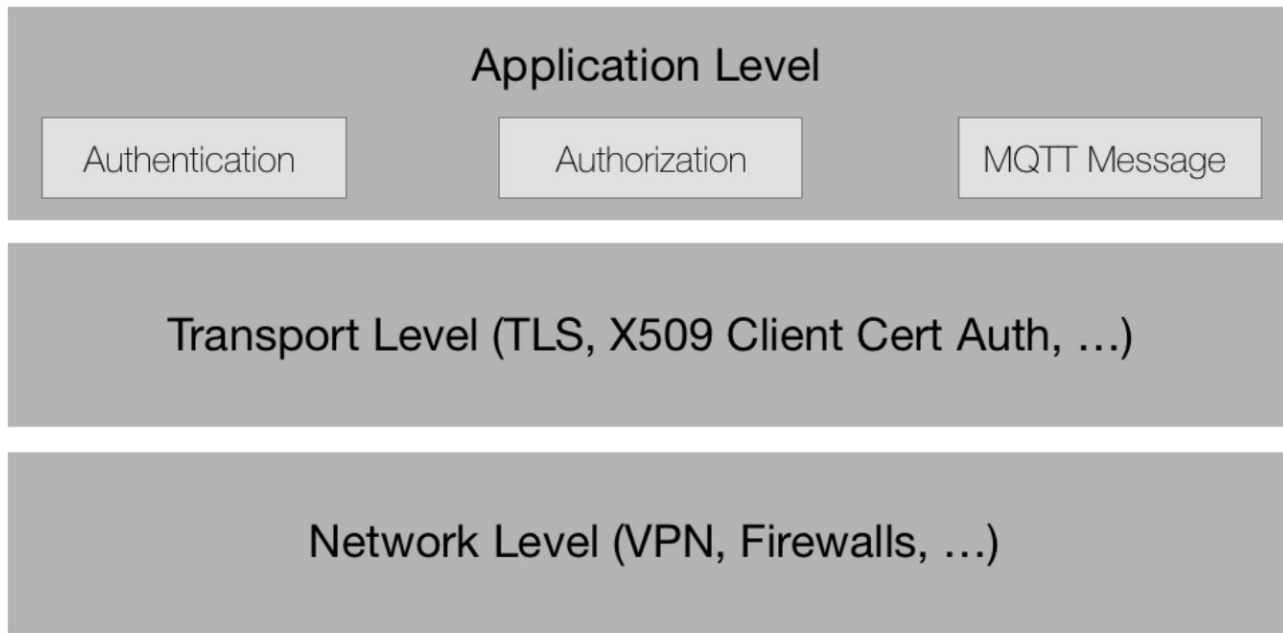
↓ Thanks for clarifying that!

Share Save

Security in the context of IoT Edge Connect

Security

MQTT uses the standard TCP/IP stack, which means common security mechanisms for OSI Layers 1-6 can be used in conjunction with MQTT. The following picture shows 3 layers of security, which are possible with MQTT.



Security

LAYER		SECURITY MECHANISM	Security Measure	Location
Network		Firewall / Edge Network	DDoS Prevention	Firewall / Edge Network
Transport		TLS	Firewall Rules	Firewall / Edge Network
Application		JWT, x509	TLS	Edge Network
Application		Application based Throttling	X509 client certificate authentication	Edge MQTT Broker
Denial of Service Attacks on Network Level				
<ul style="list-style-type: none"> • SYN-Floods • Connection Floods • Fake Sessions • UDP Floods • PUSH and ACK Floods • ICMP Floods and ICMP related attacks (like ICMP Ping of Death) 			Authentication (x509;JWT)	Edge MQTT Broker
			Authorization / Topic Permissions	Edge MQTT Broker
			Throttling on a per-client basis	Edge MQTT Broker

SUMMARY

IoT Akamai Values for our Customers



RELIABILITY

Message optimization in one continuous global service that provides consistent, uncompromised experiences.



SCALABILITY

The global cloud network scales with connected device counts and message size.



SECURITY

Secured connection and transmission of data across the globe, easily.



MANAGABILITY

Fully managed services that reduce operational complexity and provide business insights.

Why we need Distributed Data?

- **Scalability**

If your data volume, read load, or write load grows bigger than a single machine can handle.

- **Fault tolerance/high availability**

If your application needs to continue working even if one machine (or several machines, or the network, or an entire datacenter) goes down.

- **Latency**

If you have users around the world, you might want to have servers at various locations worldwide so that each user can be served from a datacenter that is geographically close to them.

- **Legal Requirements**

Certain countries do have regulations in place which requires to collect the data inside the country borders.

