Mobile Network Solutions
Akamai's Emerging Mobile Business Unit

Will Law – Chief Architect, Media Division, Akamai.
Video Over 5G Workshop, August 2015, San Diego
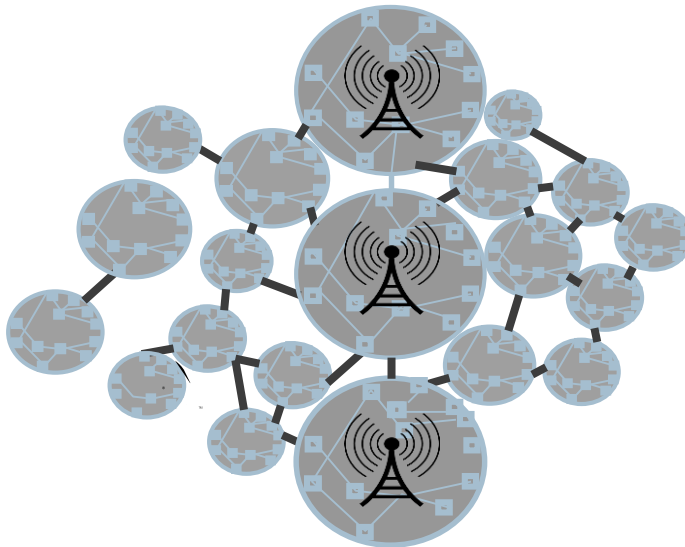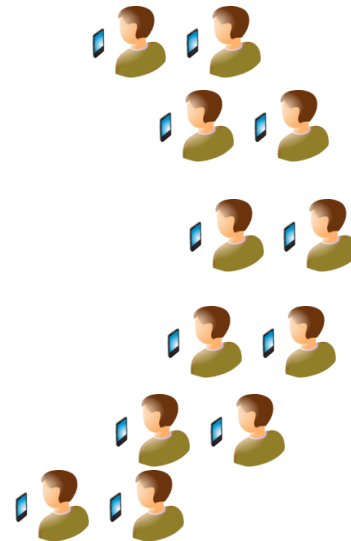
The Many-to-Many World of CPs and MNOs
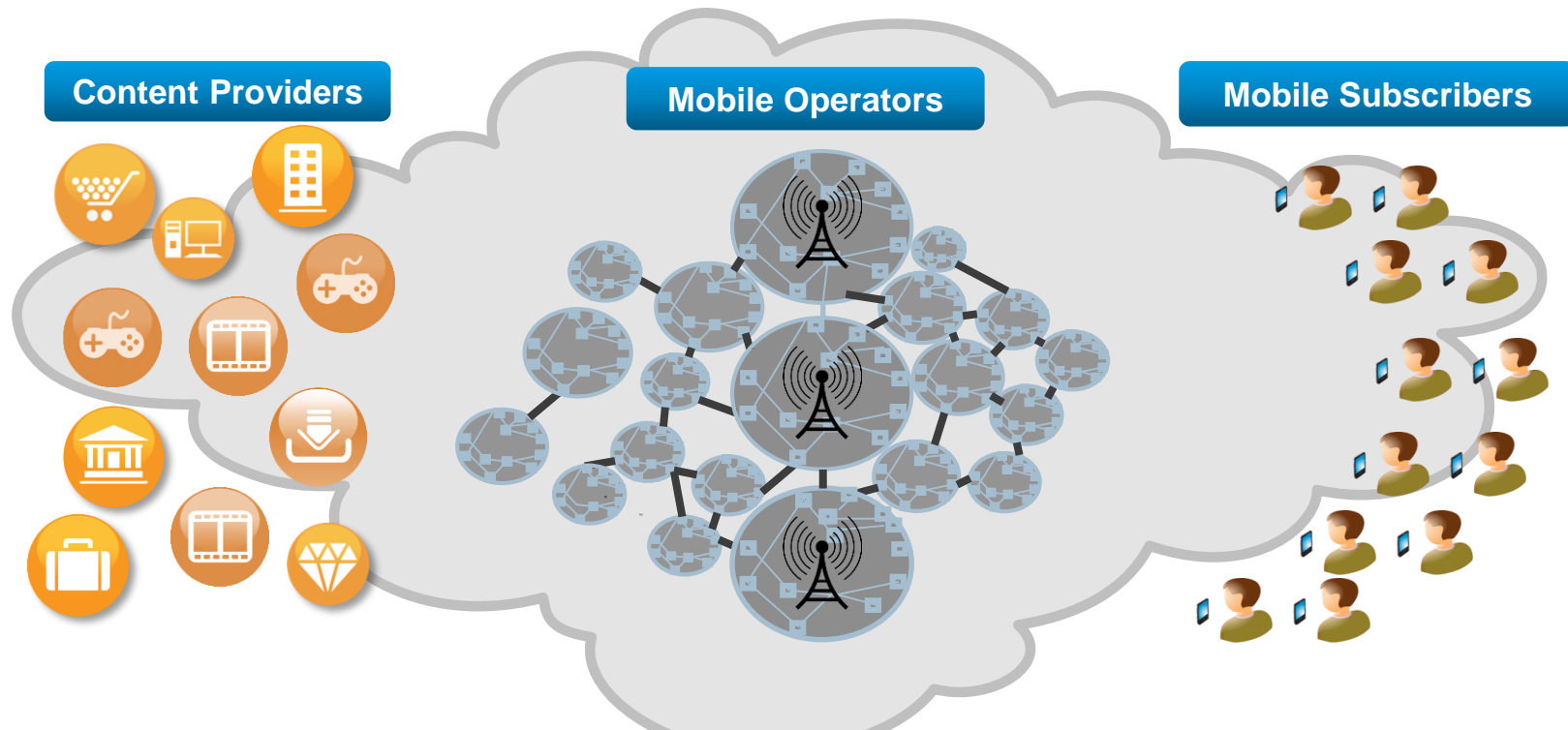

Thousands of Content Providers

Hundreds of Mobile Operators

Billions of Mobile Subscribers

A CDN Can Bring API's and Relationships

Content Providers

Mobile Operators

Mobile Subscribers
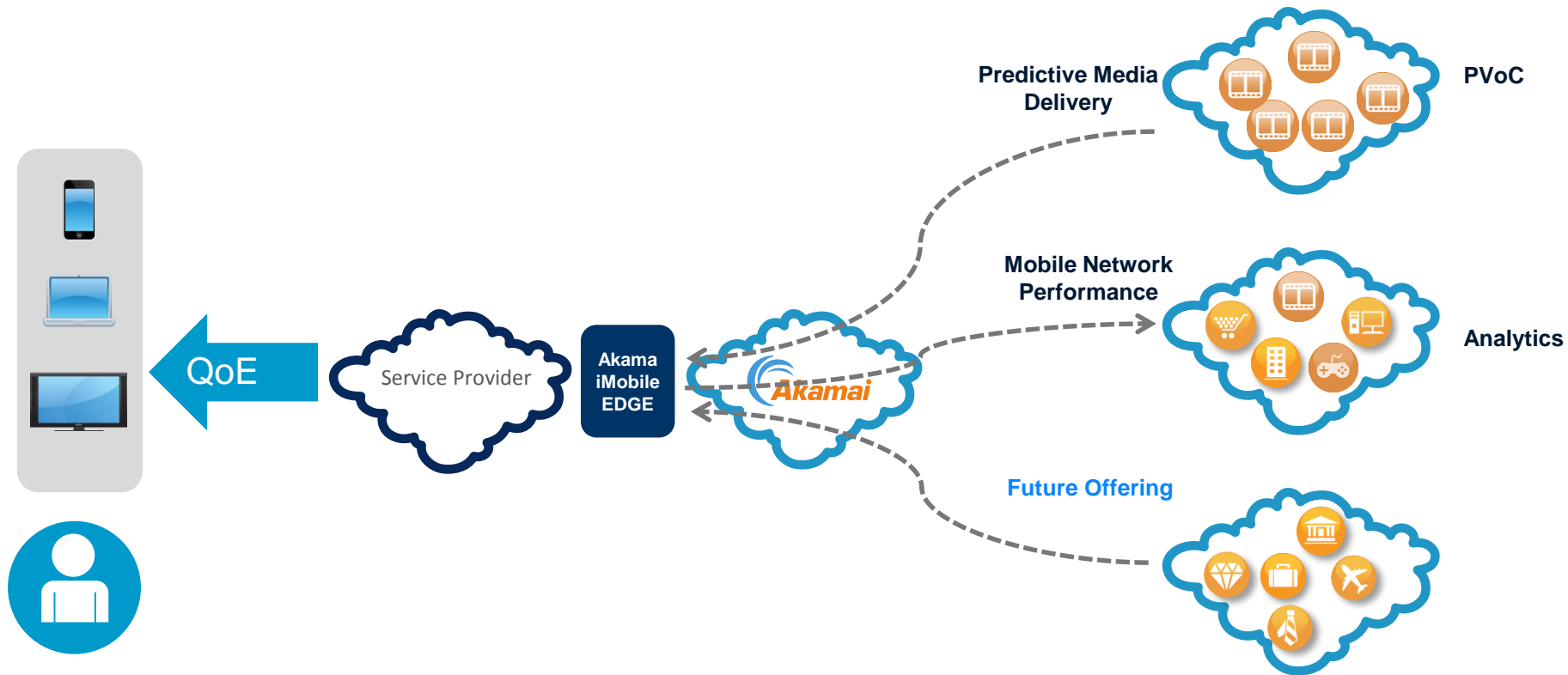
A CDN provides one API for thousands of brands to access mobile network services in order to provide new and improved functionality for mobile subscribers

Mobile Solutions

Predictive Media Delivery

PVoC

Mobile Network Performance

Analytics

Future Offering

QoE

Service Provider

Akama iMobile EDGE

Challenge: How to Deliver High Quality Video in a Profitable Way?
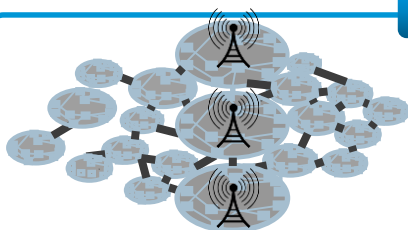
Mobile Subscribers

- Want access to more video on the go
- Want better and more consistent experience
- Don't want to think of their data limits or overage charges

Internet Services
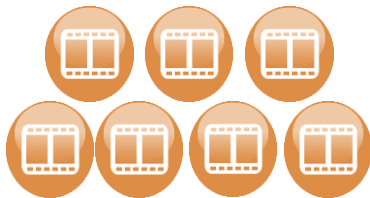
- Expect better QoE
- Need to improve content discovery
- New revenue streams from mobile
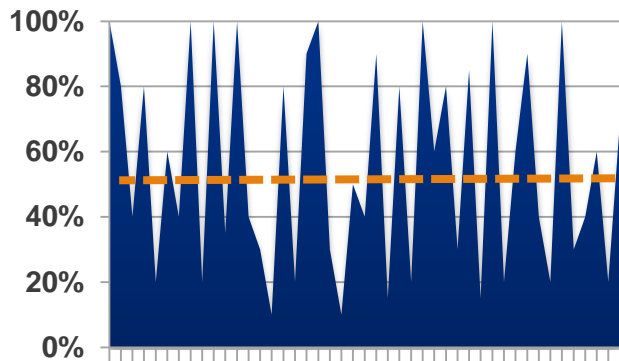- Increase video viewership & buzz

Mobile Network Operators

- Efficiently deliver data heavy video traffic
- Differentiate mobile services
- Provide a high quality video experience
- Better network utilization
- Launch new revenue generating services

Predictive Video over Cellular – A Better Delivery Model

Underutilized cellular network

50% utilized during peak times

Device storage

At least 1GB unused

Predictive Analytics

Viewership Behavior Data
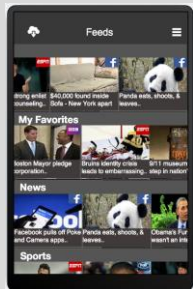
Use Cases:

1. Standalone application
2. Integration with TV offering
3. Sell data to media providers
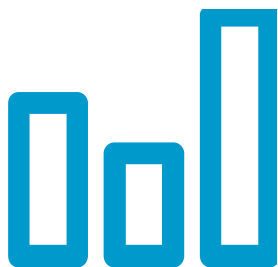
Off-Peak Cellular Capacity & Wi-Fi + Device Storage + Predictive Analytics + Smart Battery Management
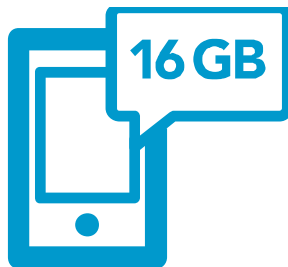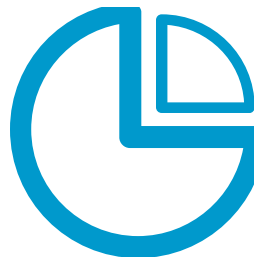
Mobile Network Operator Trials

6 Months, 5 Trials, 500 Users, 15 Device Types (iOS & Android)

Perception was an increase in quality for ALL mobile video

Increased mobile video consumption by 44%

Value in no buffering and constant availability of videos

Challenge: How Network Capabilities Translate to Mobile Experience and Competitive Intelligence?

Network Centric Measurement:

1. Throughput
2. Latency
3. Congestion
4. ….

Service Provider

Outcome:

1. Disconnect with subscribers
2. Marketing to Network disagreements

User Centric Measurement:

1. Page load time
2. Time to playback
3. # of rebuffering
4. ….
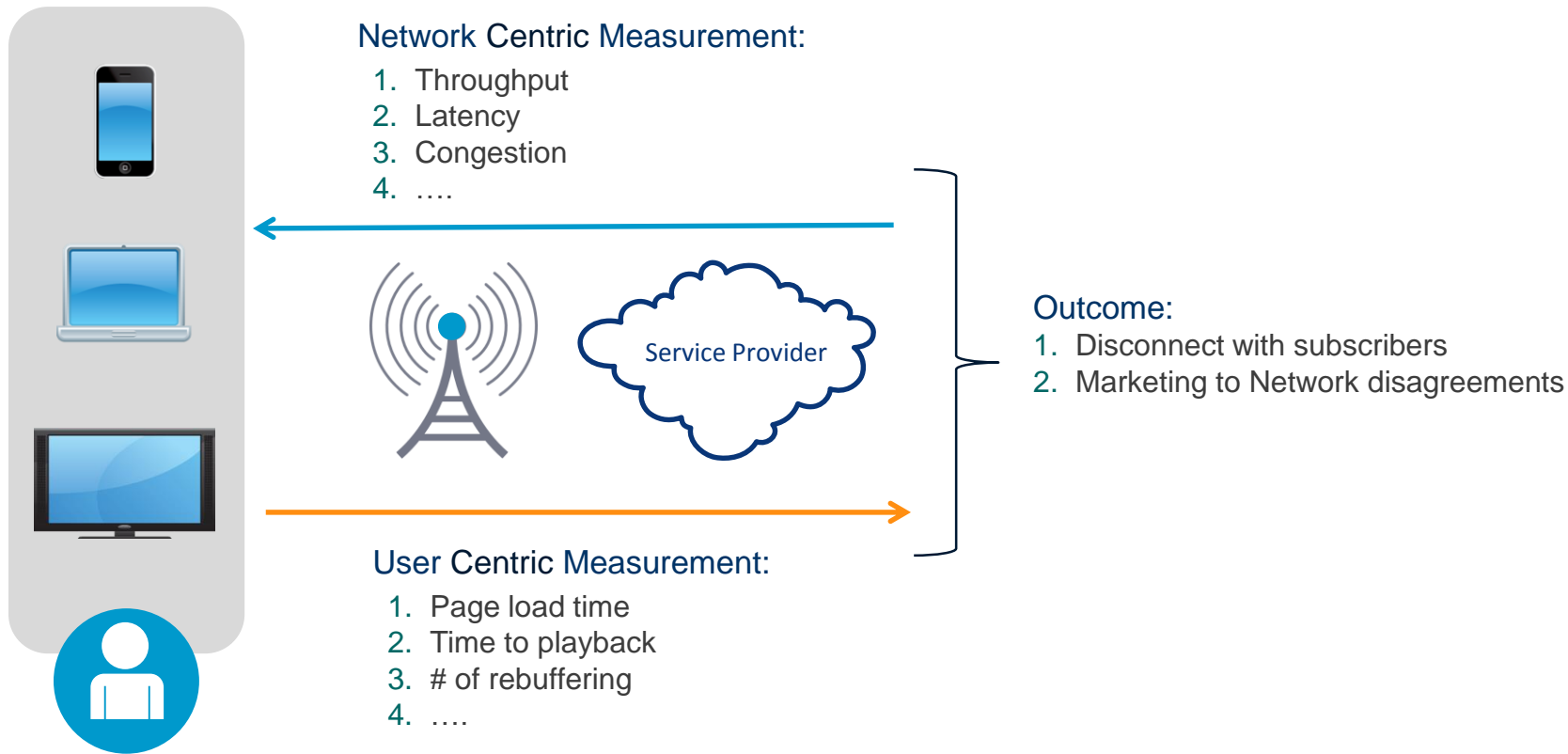
Solution: Mobile Performance Analytics
Better Network Visibility and Competitive Benchmarking

Operator	Rank	Score
Z	1	81.3
X	2	74.8
Y	3	73.1

Operator X
Operator Y
Operator Z

Web

Metrics

- Backend latency
- DNS lookup time
- DOM load time
- DOM interactive time
- DOM processing time
- First byte download
- First paint byte
- Page load time
- SSL start time
- TCP connection time

Dimensions

- Browser
- Continent
- Country
- IP Address
- Network Name
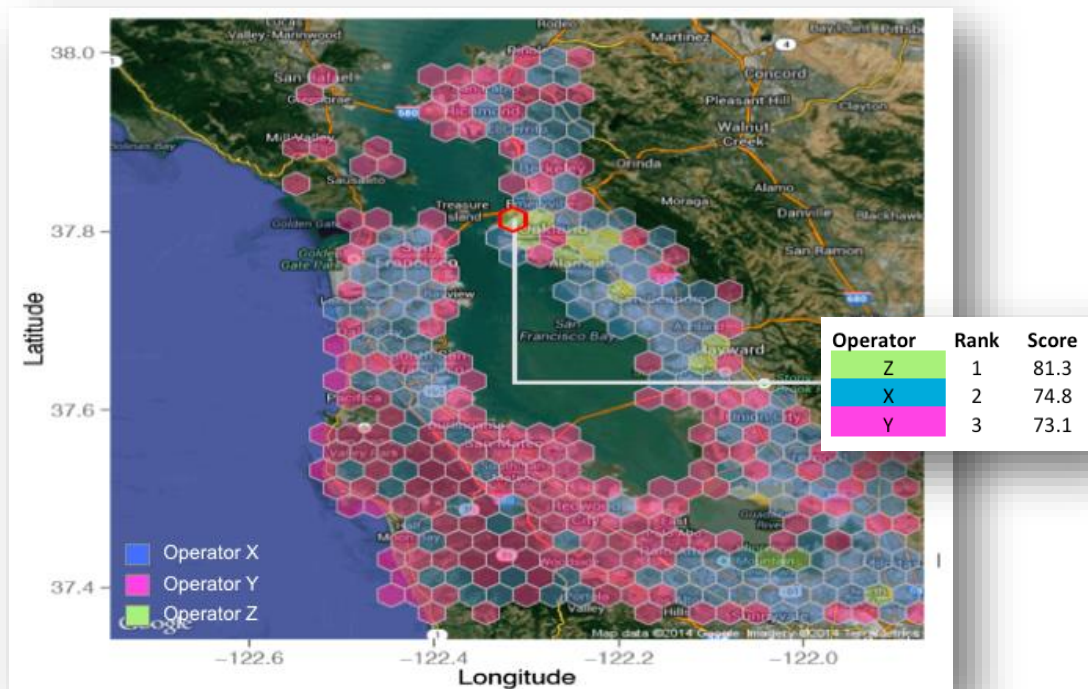- Network type
- Timestamp
- OS

Media

Quality

- Play Attempts
- Video Startup Time
- Video Availability
- Average Bitrate
- Re-buffering
- Dropped Frames
- Errors
- Connection Speed

Engagement

- Viewers
- Visits
- Plays
- Play Duration
- Play Percentage
- Completion Rate
- Plays Abandoned

Challenge Optimizing content delivery of encrypted content

SSL growth - The volume of secure SSL content is increasing very fast

Networks have no visibility into encrypted content

Content servers have no direct 'network condition' feedback for encrypted data flows

Without visibility into the content, the network CANNOT optimize delivery on its own

Without the network feedback, content servers CANNOT adapt content according to network conditions

Existing systems for network optimization CANNOT work with SSL content

Disclaimer: encrypted content optimization will only be done with content provider approval

D™

Radio Aware SSL Enrichment

1 Collect **real-time radio status** information, per cell.

2 Send the data using **SSL Enrichment,** as part of the SSL connection, to the CDN

3 Continually optimize the content for mobile delivery in the CDN. And send.

Benefits

Superior mobile user experience

Higher network utilization

Lower network congestion

SSL Enrichment

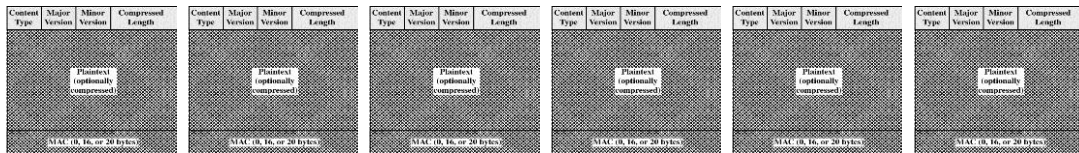**SSL communication is arranged in a series of SSL Records**

SSL Records cannot be altered

SSL Record payload is inaccessible

Meta data enrichment

Application layer library and APIs: no modifications in standard kernel, TCP or SSL layers

Inject   Insert an enrichment record into the SSL connection

Retrieve   Remove the enrichment record and send the original record flow to the SSL layer

Network-based Bitrate Adaptation

Tower knows throughput available

Response makes it way back to the client

Client receives response, reads header and uses information for accurate bitrate adaptation, avoiding rebuffering

Akamai edge server receives guidance from tower and embeds it as a custom header in the response.

It adds throughput information via SSL enrichment as it forwards the packets

HTTPS REQUEST

HTTPS REQUEST
ENRICHED
1009 kbps throughput

HTTPS RESPONSE
Cell-Radio-Throughput-Guidance: 1009

Akamai
Edge Server

Saguna
RAN platform

Saguna
Core Node

Winner - Mobile World Congress 2015

Network Intelligence Awards 2015 - MWC 2015
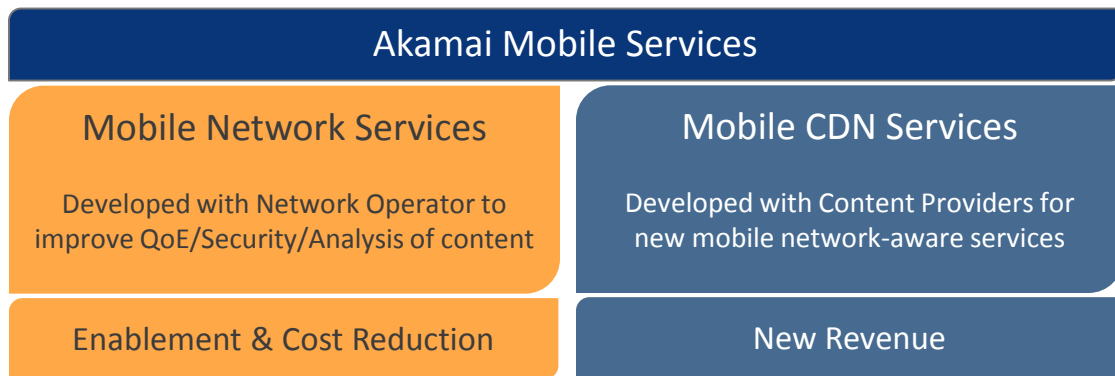
http://www.nialliance.org/news-nialliance/the-network-intelligence-alliance-announces-network-intelligence-awards-2015-winners-at-mobile-world-congress-in-barcelona/
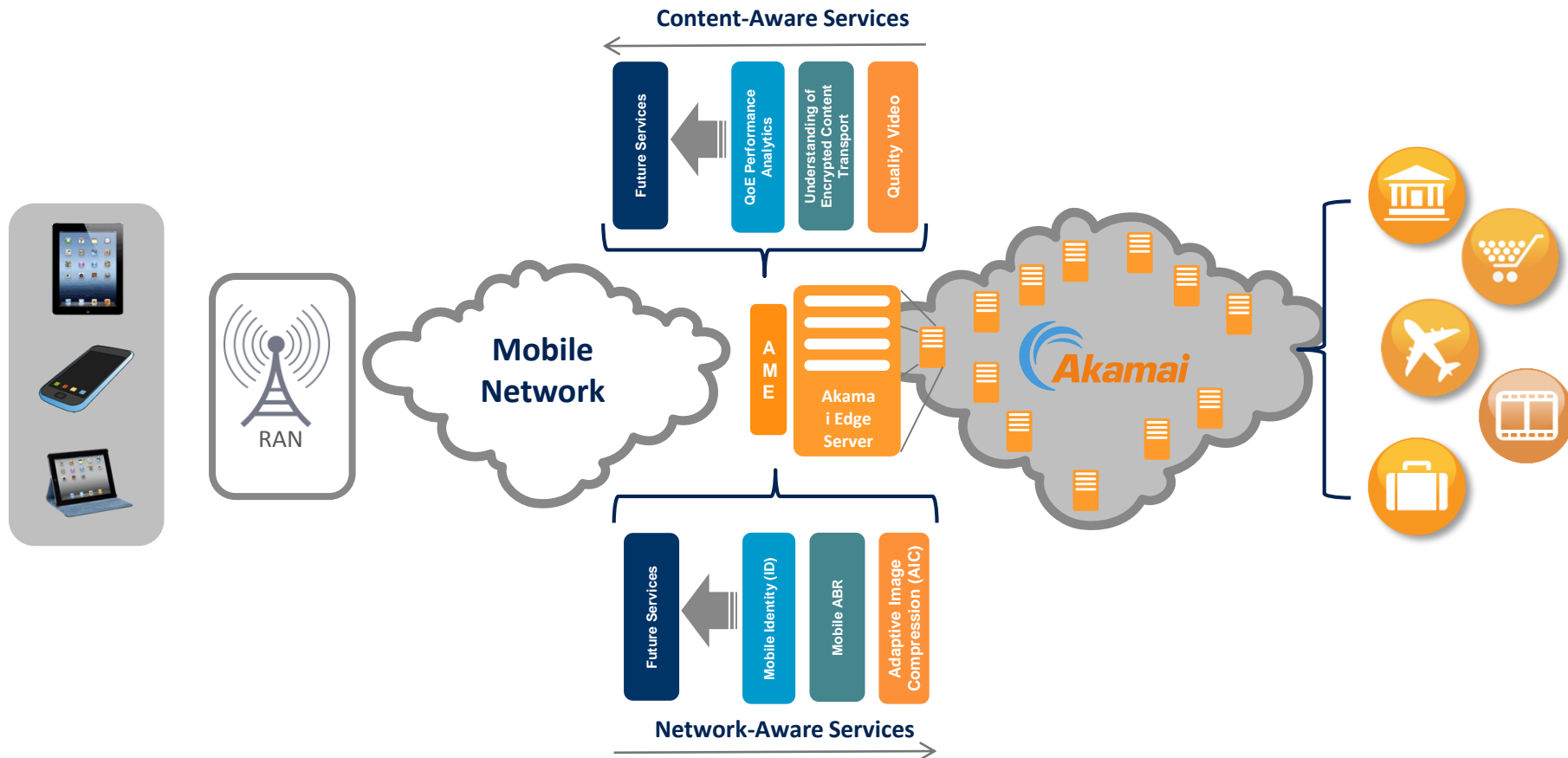
Akamai Mobile Vision

Collaborate with Mobile Operators to develop unique solutions for operators while leveraging Akamai's

- Intelligent Platform Scale (+170,000 servers globally)

- Content delivered (15%-30% of web traffic daily)

- Content provider relationships (over 5,000 of the worlds top brands)

Akamai Mobile Services	
Mobile Network Services Developed with Network Operator to improve QoE/Security/Analysis of content	**Mobile CDN Services** Developed with Content Providers for new mobile network-aware services
Enablement & Cost Reduction	New Revenue

Akamai Mobile Edge (AME) Architecture

Akamai Mobile Vision

Akamai Mobile Edge

- An NFV Platform

- Based on industry standard building blocks

- Builds on Akamai's global infrastructure

In order to deliver three classes of services:

1. MNO Services (Content-Aware Services)
   1. Ex: Low latency live stream delivery
2. MNO Services (Subscriber-Aware Services)
   1. Ex: Enforce lowest quality video, apply age gating
3. Mobile CDN Services (Network-Aware Services)
   1. Ex: Throughput hinting and congestion avoidance

Smart Clients and Multi-Sourced Delivery

DVB-X, ATSC3.0 datacast

UDP delivery from edge servers

IP Multicast enabled network

AMT tunnel

TCP delivery from edge servers

YOU

Peer delivery

LTE Broadcast