Live/Event Streaming

- **How can be scalable?**

- **Success Design factor?**

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I have more than 20 years of experiences in the area of media and broadcast, networking, and cloud security.
Prior the Akamai, I has worked in PCCW Global, Cisco, Harmonic, Terayon and SONY on consulting and presales position

I'm big fan of Liverpool.

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Live / Event Streaming

- Market Status on Traffic
- Live Streaming Brief Definition
- Delivery chain
- Measurement Index
- What Akamai can help

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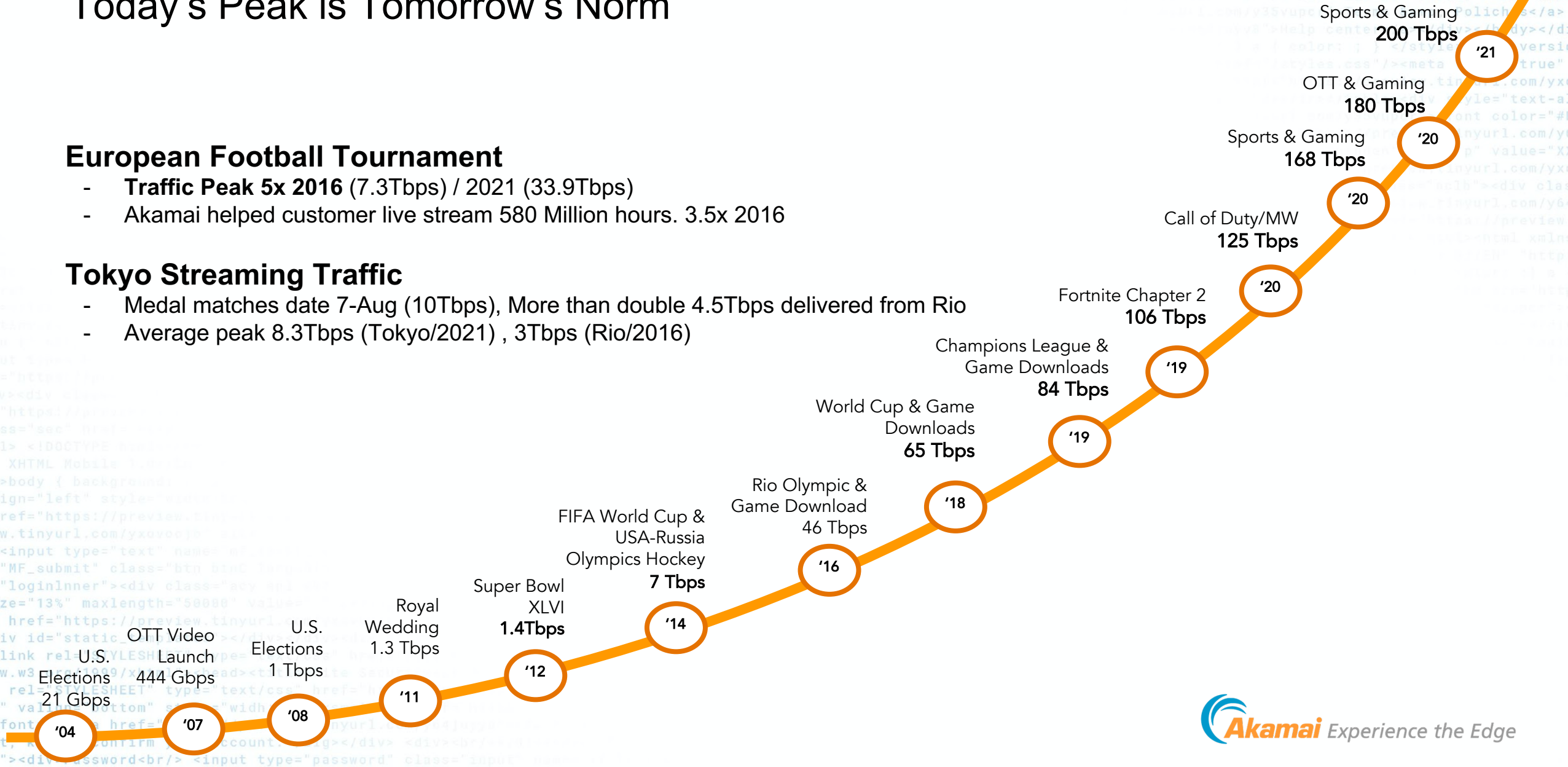
Media Traffic Continues to Break Records
Today's Peak is Tomorrow's Norm

European Football Tournament
- **Traffic Peak 5x 2016** (7.3Tbps) / 2021 (33.9Tbps)
- Akamai helped customer live stream 580 Million hours. 3.5x 2016

Tokyo Streaming Traffic
- Medal matches date 7-Aug (10Tbps), More than double 4.5Tbps delivered from Rio
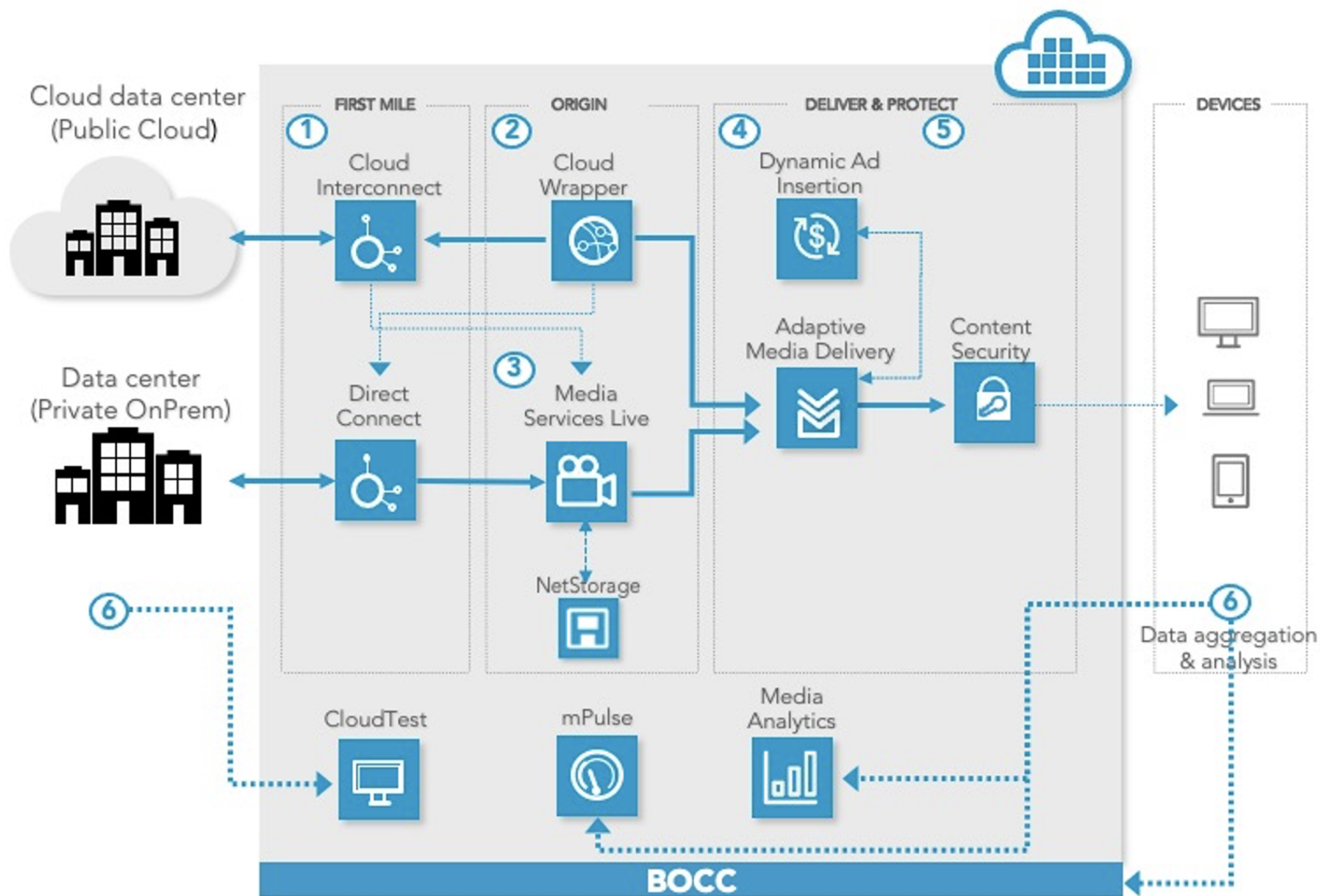- Average peak 8.3Tbps (Tokyo/2021) , 3Tbps (Rio/2016)

Sports & Gaming
200 Tbps '21

OTT & Gaming
180 Tbps '20

Sports & Gaming
168 Tbps '20

Call of Duty/MW
125 Tbps '20

Fortnite Chapter 2
106 Tbps '20

Champions League &
Game Downloads
84 Tbps '19

World Cup & Game
Downloads
65 Tbps '19

Rio Olympic &
Game Download
46 Tbps '18

FIFA World Cup &
USA-Russia
Olympics Hockey
7 Tbps '16

Super Bowl
XLVI
1.4Tbps '14

Royal
Wedding
1.3 Tbps '12

U.S.
Elections
1 Tbps '11

OTT Video
Launch
444 Gbps '08

U.S.
Elections
21 Gbps '07

U.S. Elections
21 Gbps '04

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Streaming Video – Key Questions

How many concurrent stream can support? And what's happen capacity is not enough?	Cloud Base Delivery Service and proof record Can the capacity can be reserved?
What happen too many login in the same time?	Can consider visitor prioritization or waiting Room kind functionality
What is the success measurement matrix?	Based on social media, technical index or what
How to do a load testing?	Speed: Test quickly and efficiently with real user scenarios Scale: Spin up larger loads with broad geographic reach Control: Test in production safely with realtime results

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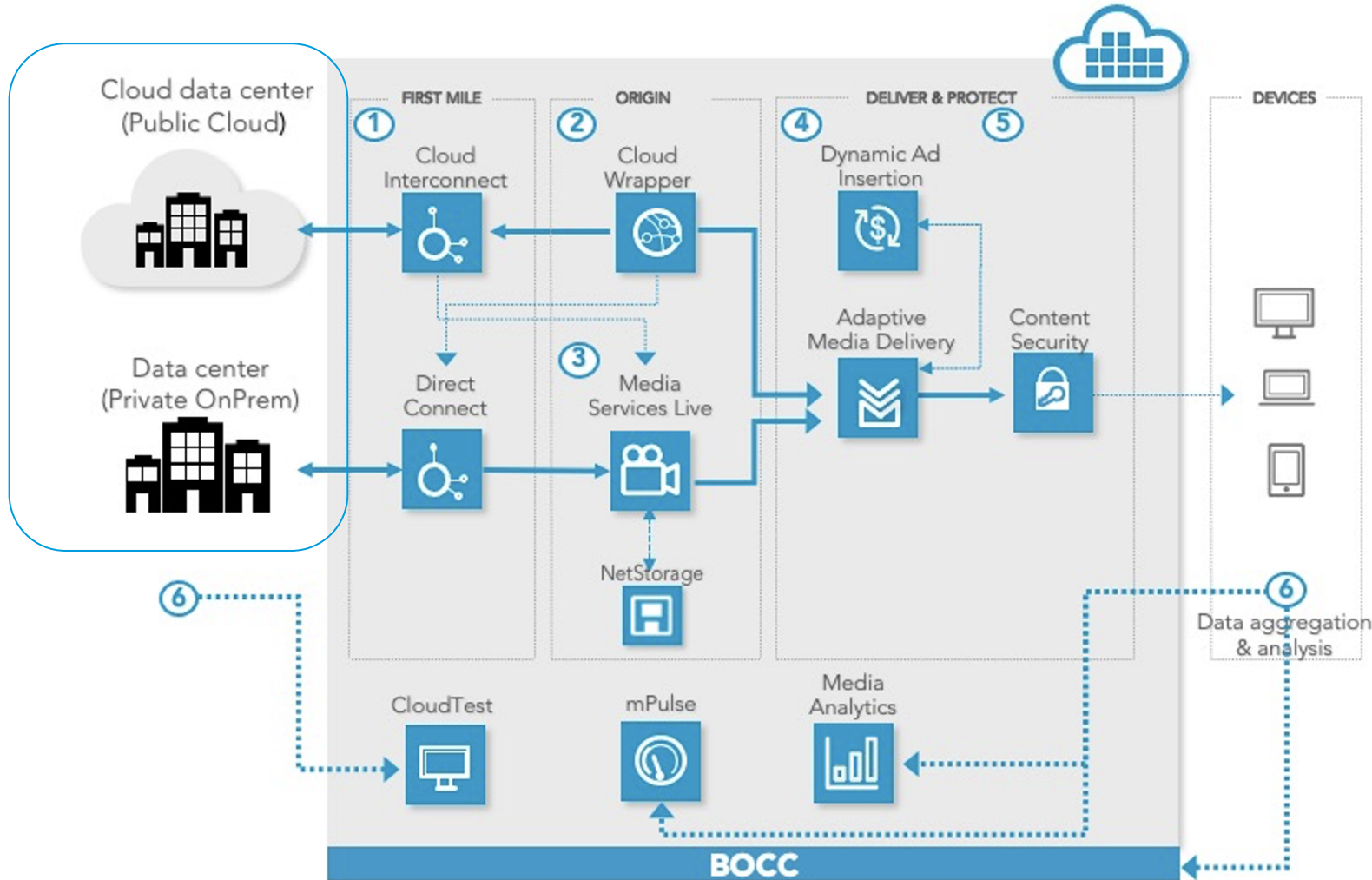
LIVE/LINEAR & EVENT STREAMING
Reference architecture

1. First Mile Connectivity
2. Connect Secure to Cloud Storage, improve origin offload
3. Ingest and prepare live stream using purpose-built architecture
4. Ensure high-quality, scalable live stream regardless of location, device or network, with low latency
5. Secure content, prevent theft and protect access against piracy
6. Monitor the quality of video performance and viewer experiences insight. Enhanced proactive support on end to end workflows

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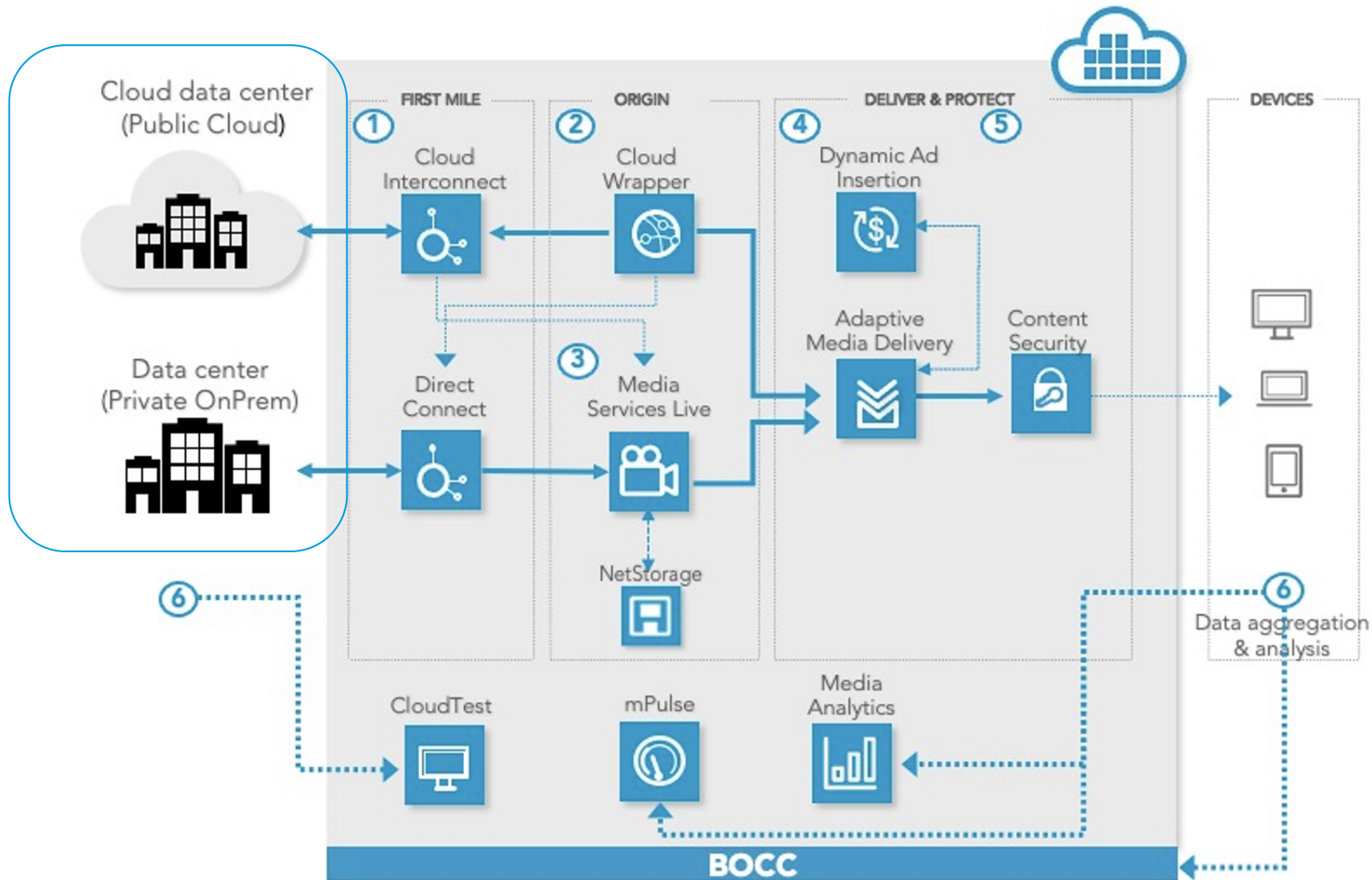# LIVE/LINEAR & EVENT STREAMING
Reference architecture

Consideration and functions for "Origination"

1. Source Origination
   a. Source Feed (Satellite / IP)
2. Encoder
   a. Encode/Transcode (Raw Video > H.264/H.265/VVC/AV1 etc)
3. Origin Infrastructure
   a. Packaging and Encryption
   b. Origin protection
4. Network Path
   a. Dual ISP
   b. Direct Connect

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LIVE/LINEAR & EVENT STREAMING
Reference architecture

Consideration and functions for "Client"

1. Player
   a. Device (Web / App)
2. Client Analytics

Let's go deeper in the client analytics

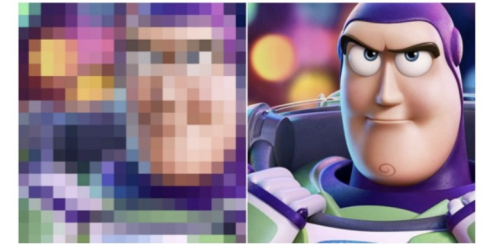Did the stream result in error before starting up?
> Video Startup Failure (VSF)

As the video playback continues, what was the overall playback quality like for the end user?
> Average Bitrate

If there isn't startup failure, how much time did the user spend waiting for the playback to start?
> Video Start Time (VST)

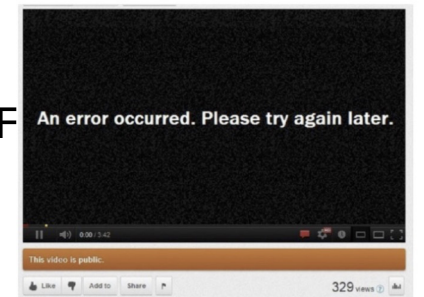Between the playback, did the video suddenly stop playing due to error or playback failure
> Video playback Failure (VPF

An error occurred. Please try again later.

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What is the factor define the success?

Key Measurement Index

Performance index
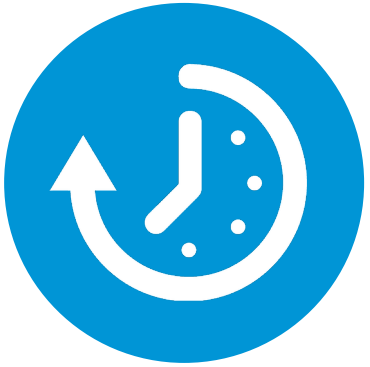- Availability
- Throughput
- Latency
- Edge Hit
- Offload
- etc

User Experience Index
- Startup Time
- Rebuffering
- UX Latency

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Factors Impacting Live Streaming Experience Online

Optimizing for Latency, Scale, Performance and Efficiency

Latency

Bridging the latency gap between Broadcast and Online streaming to improve end user viewing experience
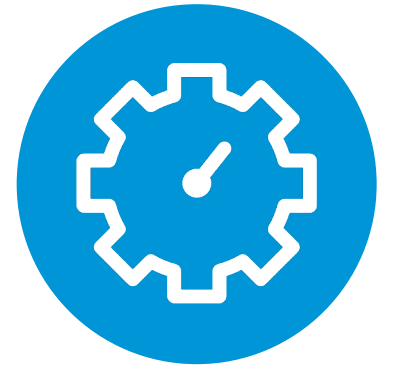
Scale

Providing the required scale based on traffic surges, device & network variations, for uniform experience

Performance

Meeting the Performance expectations of users regarding a high quality of experience and seamless viewing experience
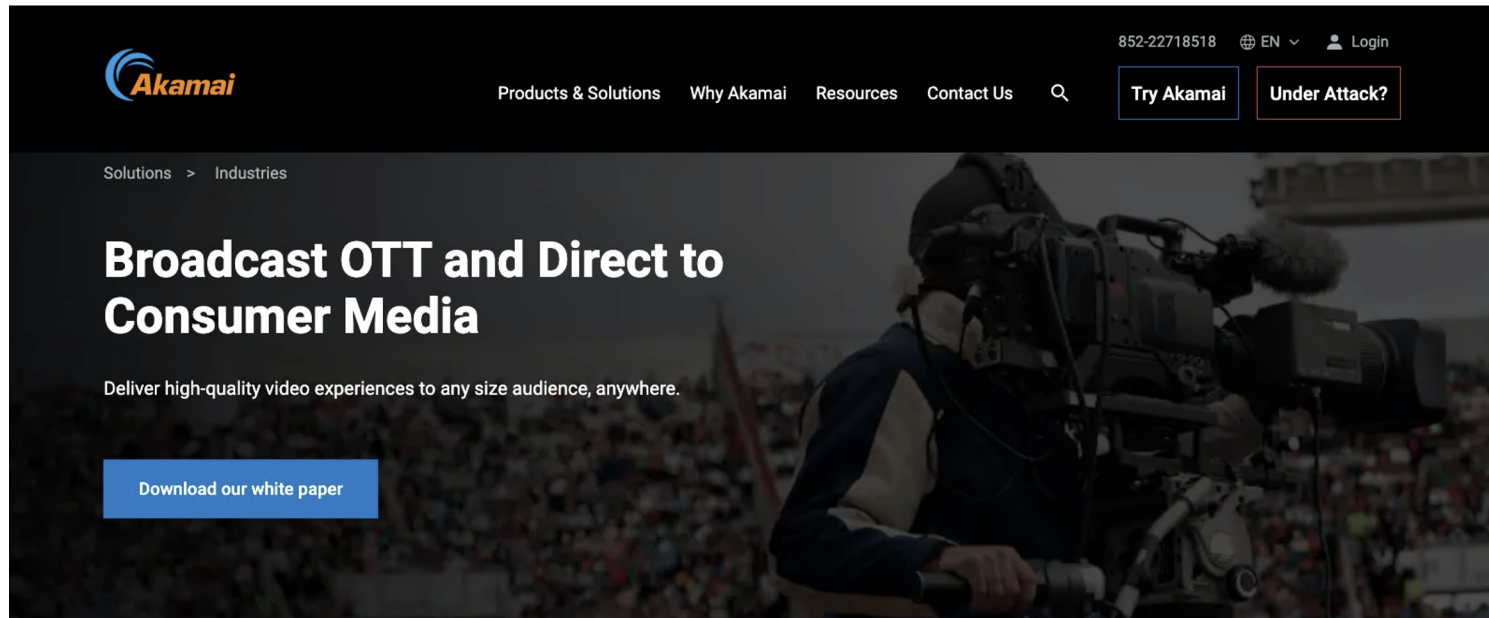
Readiness

Identifying variables, use cases and mitigating scenarios that can impact the event availability and experience

Operational Success Factor

1. Managing Large Streaming Project - Global Event
   a. Mock Event - End to End
   b. Project Scope - Expected Concurrent, Region
   c. Communication Channel - Instant response
   d. Method of Procedure

1. Scaling
   a. Reserved capacity for peak

1. Monitoring
   a. Proactive Monitoring on platform
   b. Real time log
   c. Ingest monitoring

How Akamai Help - Akamai Media and Security Solution

Media
-   Adaptive Media Delivery
-   Media Service Live
-   Cloud Wrapper
-   Media Analytics
-   Netstorage
-   Event Support

Web and Infrastructure Security
-   DDoS Protection Service
-   Web Application Protection

https://www.akamai.com/solutions/industries/media

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