ARC211: Building a Next-Generation Streaming Platform With Sky

Google Cloud

Presenters

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Google Cloud Media

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Principal Streaming
Architect

sky

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Director
Product Architecture

harmonic

Google Cloud

What you will hear in this session

1 Media trends and cloud disruption
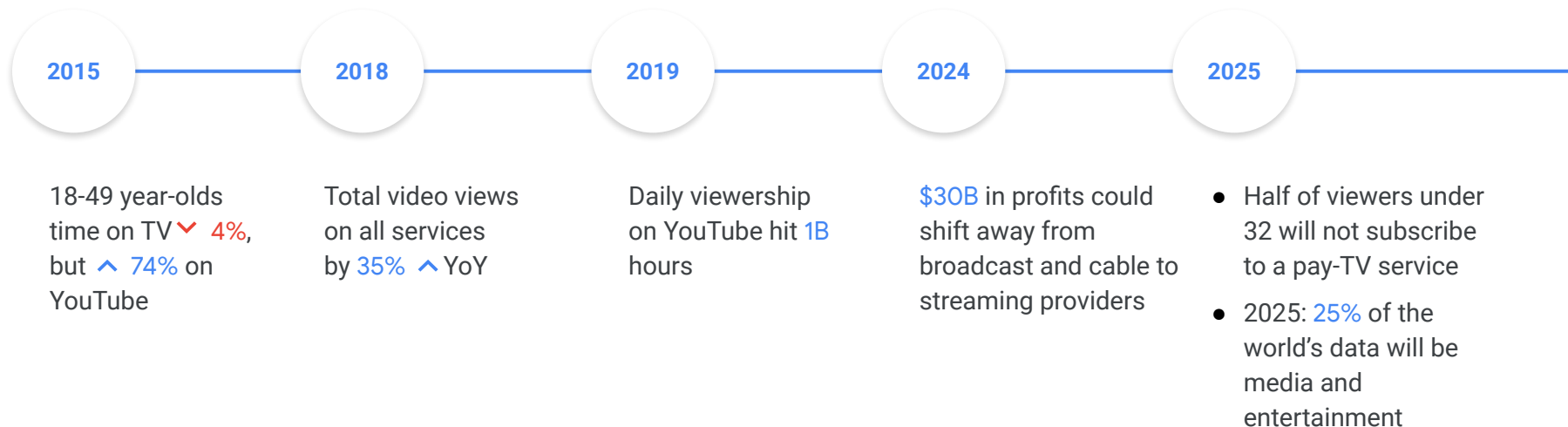
2 GCP review of 2018 and updates in 2019

3 Sky Embracing the Cloud for Live Sports Streaming

4 Harmonic Enabling Sky build a Better Stream Experience

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Industry Trends

2015 — **2018** — **2019** — **2024** — **2025**

2015
18-49 year-olds time on TV ⌄ 4%, but ⌃ 74% on YouTube

2018
Total video views on all services by 35% ⌃ YoY

2019
Daily viewership on YouTube hit 1B hours

2024
$30B in profits could shift away from broadcast and cable to streaming providers

2025
- Half of viewers under 32 will not subscribe to a pay-TV service
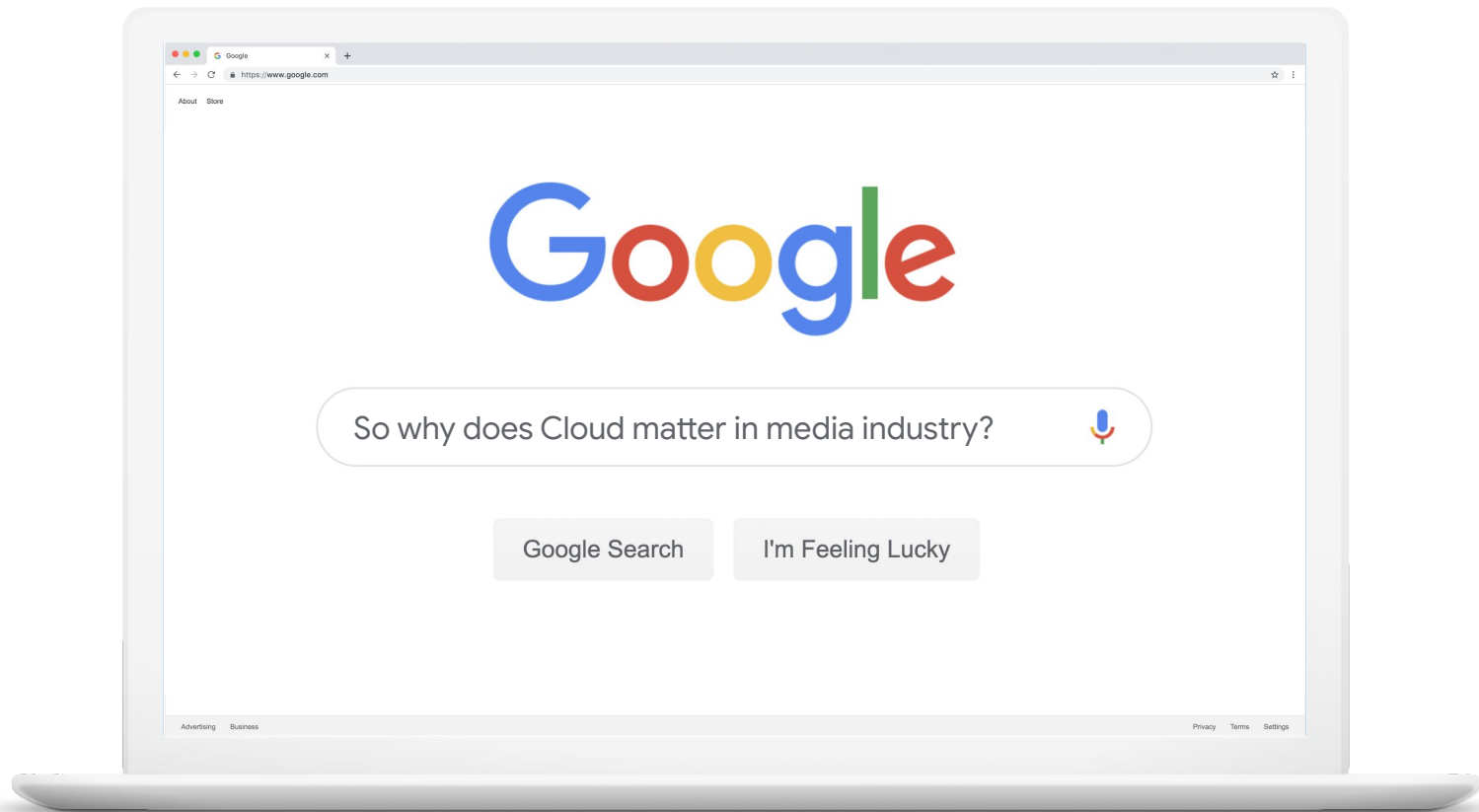- 2025: 25% of the world's data will be media and entertainment

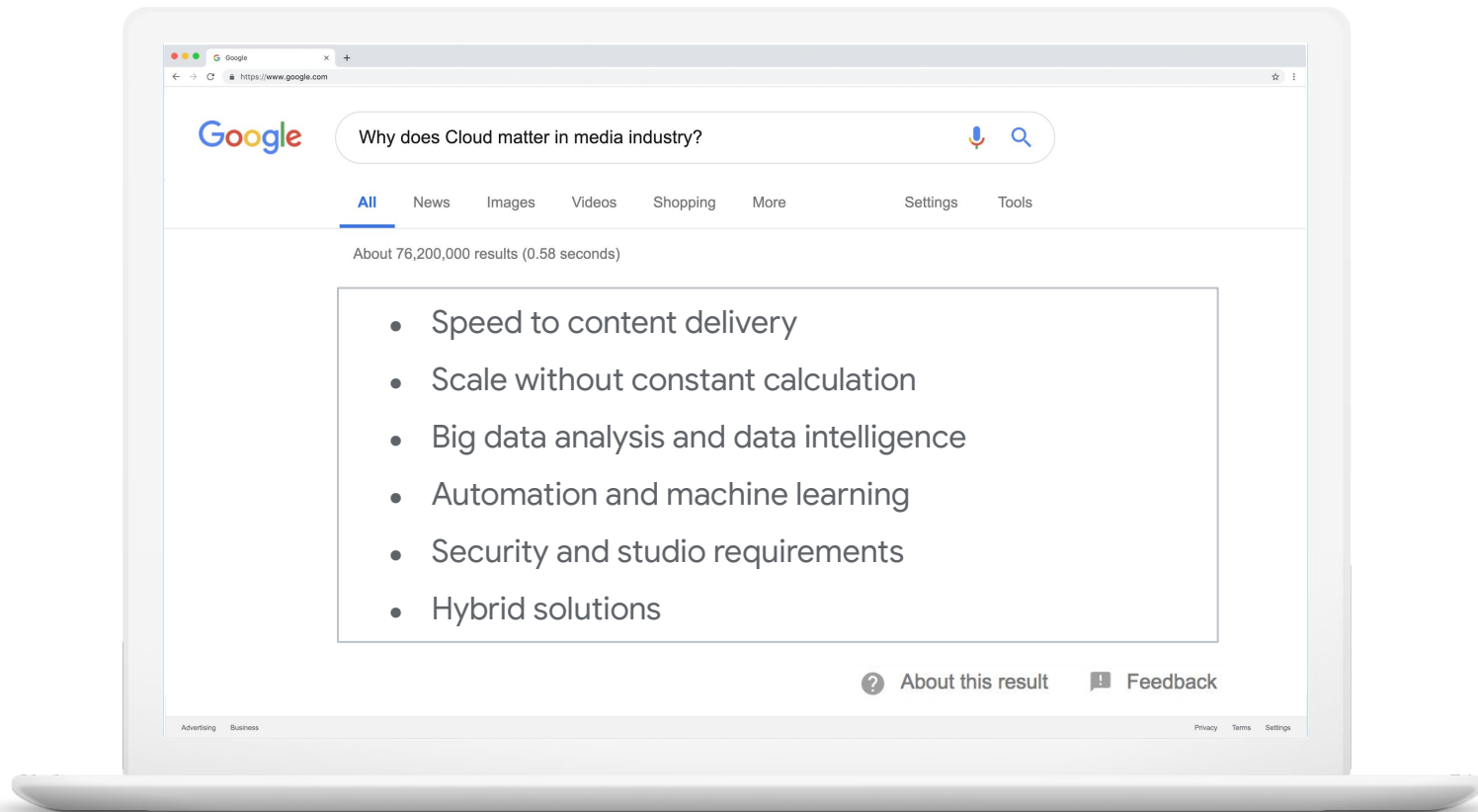Source 1: How Netflix Reverse-Engineered Hollywood, By: Alexis Madrigal, The Atlantic, January 2, 2014
Source 2: Television's $30 Billion Battlefield, By Sushmita Banerjee , Val Elbert , and John Rose, Boston Consulting Group, August 14, 2018
Source 3: Medianations: UK- July 2018
Source 4: 46 Fascinating and Incredible YouTube Statistics

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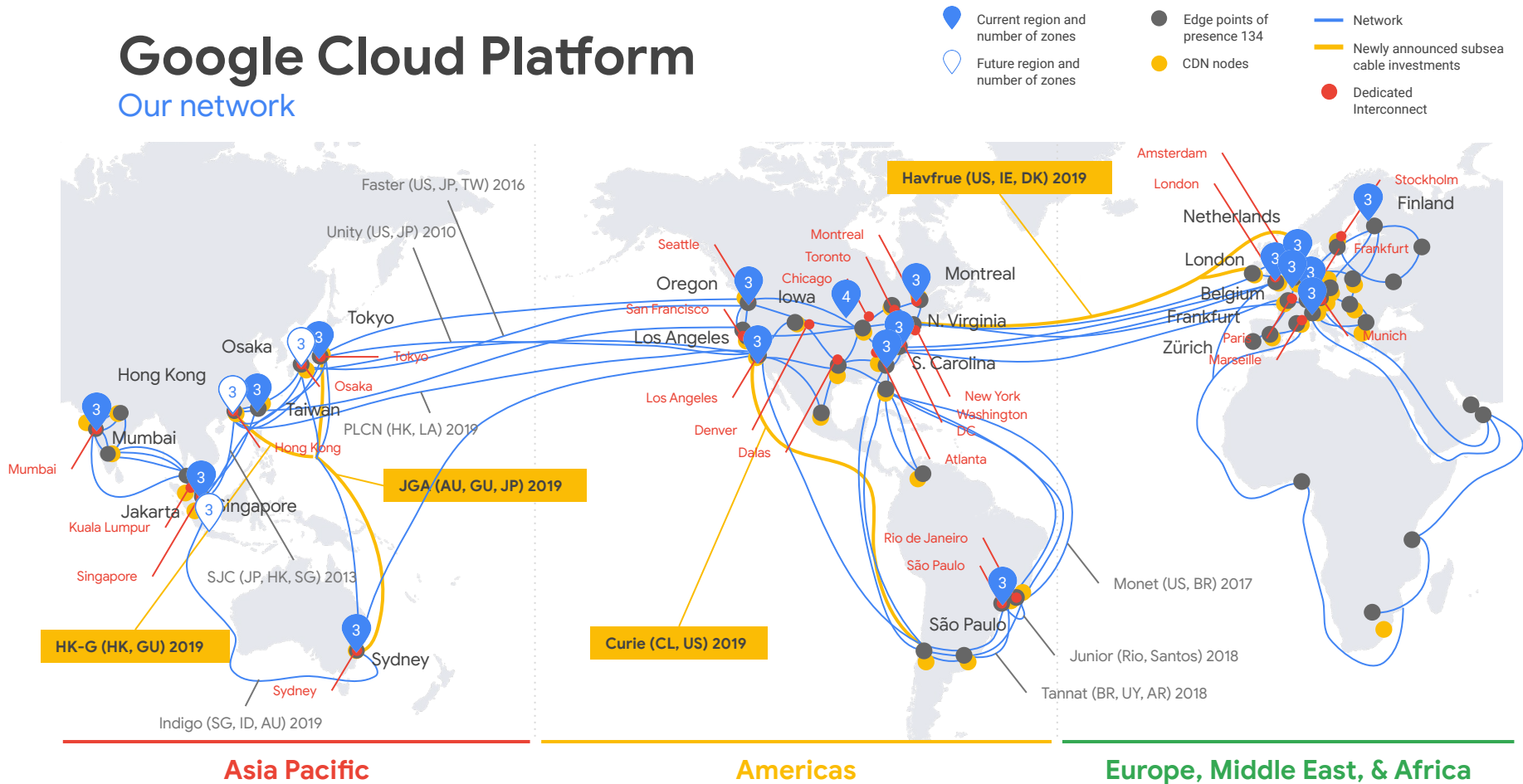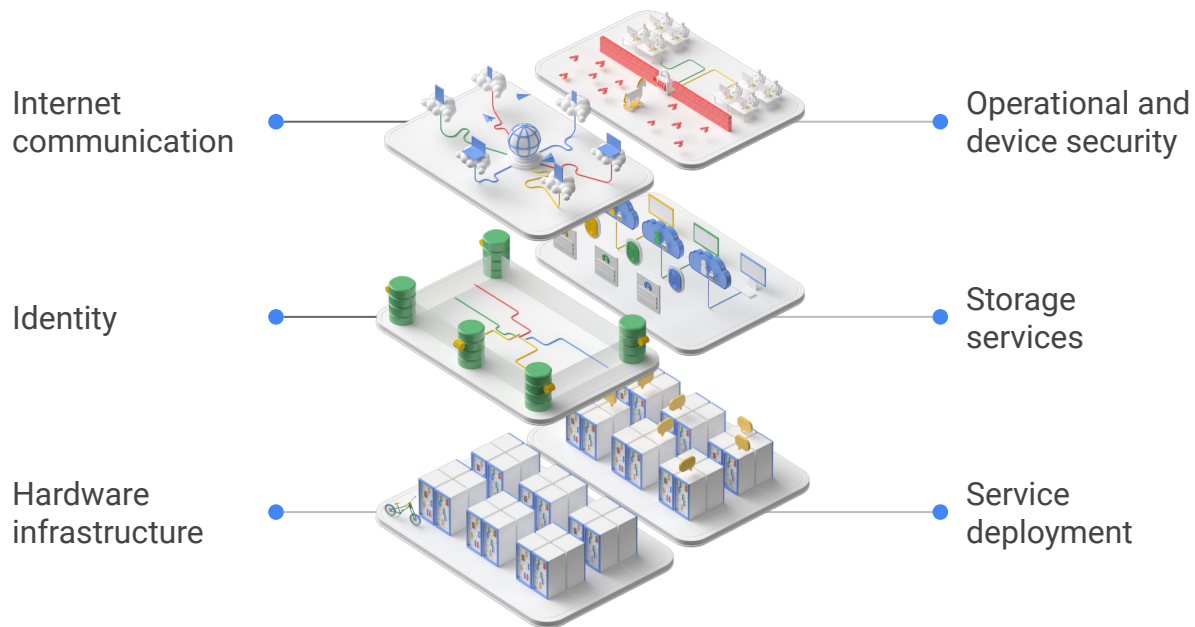
So why does Cloud matter in media industry?

Google Search   I'm Feeling Lucky

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But success doesn't only come from wealth..

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Great technology made us a leader

Internet communication

Identity

Hardware infrastructure

Operational and device security

Storage services

Service deployment

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Google Global Network for Media

- Proven Delivery
- Global Access
- Simpler Operations
- Lower Latency
- Premium Routing
- Multi-Cloud Ready
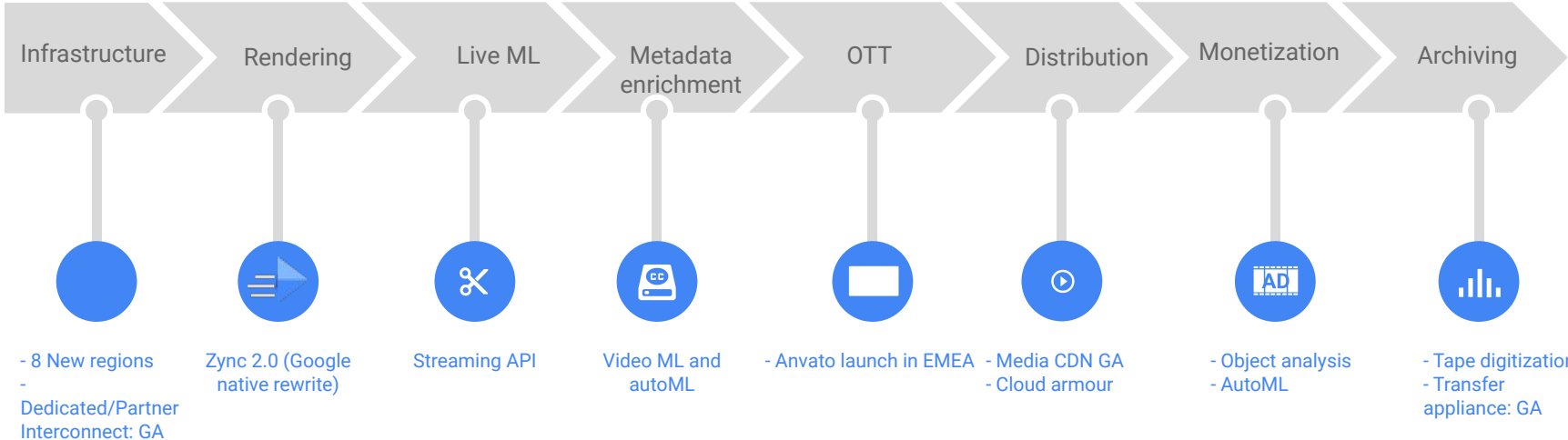- Global Availability
- DDoS Protected

PRODUCTION STUDIO
Los Angles, CA
| 10 Gbps Interconnect | Asset Production |

SPORTS FACILITY
Dallas, TX
| 40 Gbps Interconnect | Live Signal Acquisition |

LIVE PRODUCTION FACILITY
New York, NY
| 100 Gbps Interconnect | Linear Distribution |

CARNIVAL TEMP FACILITY
Rio De Janero, Brazil
| 10 Gbps Interconnect | Live Signal Acquisition |

SPORTS FACILITY
London, UK
| 10 Gbps Interconnect | Live Signal Acquisition |

SPORTS FACILITY
Berlin, Germany
| 10 Gbps Interconnect | Live Signal Acquisition |

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There might be similarity, but..

- Hybrid approach is key for broadcasters
- Cloud Storage is a full stack of storage solutions
- Cloud CDN offers a fast and easy way of content delivery
- Auto ML approach is tuned for flexibility
- The faster the distribution, the faster you get to the audience

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2018 in a glance

Infrastructure	Rendering	Live ML	Metadata enrichment	OTT	Distribution	Monetization	Archiving

- 8 New regions
- Dedicated/Partner Interconnect: GA

Zync 2.0 (Google native rewrite)

Streaming API

Video ML and autoML

- Anvato launch in EMEA

- Media CDN GA
- Cloud armour

- Object analysis
- AutoML

- Tape digitization
- Transfer appliance: GA

HYBRID

Google Cloud

Look at GCP in 2019

- 5 new sea cables become operational
- Hybrid Platforms initiative
- TPN compliance
- CDN enhancements
- Media APIs
- OpenCue Release
- More Video AI services scheduled for GA
- Edge TPU progress

Embracing the Cloud for Live Sports Streaming

Jeff Webb, Principal Streaming Architect, Sky UK

UEFA Nations League

sky sports football

Agenda

1 About Sky

2 Believe in Better Streaming

3 Success formula for a live sports streaming service

4 Software Defined Streaming

5 How Cloud benefits Live Sports Streaming

6 Comparison of On-Premise and Cloud Streaming

7 Single Channel Fault Domain

8 Self Healing in action

9 Collaborating with our Partners

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About Sky

- **23.6m** customers across 7 European countries and is now part of the Comcast Group.

- **Sky Q** is in over 5.5m homes (up 3.4m YoY) making it easier to watch what you want, when you want.

- Increasing investment in original drama **by 25%** in 2018/19.

- Viewing to **original drama** has more than **doubled in the last three years**.

- We are taking action on plastic pollution, investing £25m to find solutions via Sky Ocean Ventures.

Believe in Better Streaming

- We have been on a ten year journey, spanning three generations of streaming architecture.

Gen1: Hardware Appliances   **Gen2: Virtual Machines**   **Gen3: Embracing the Cloud**

Success formula for a live sports streaming service

Content   **+ Developers**   **+ Network**   **+ Customers**   **= Quality**

Software Defined Streaming

A reimagining of live streaming using Streaming DevOps to deliver

- **Resilience**

  – Single Channel Fault Domain.

  – Self healing to avoid single points of failure using Kubernetes based platform.

  – Geographic resilience of live channels between data centers.

  – Highly available synchronised live streams from transcode to origin.

- **Speed to Market**

  – Live channel software upgrades without impacting customers.

  – Automated pipeline - Continuous Integration and Continuous Deployment (CI/CD).

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Software Defined Streaming Continued

- **Observability**

  – Automated video and audio quality monitoring.

  – Centralised monitoring and reporting using open source Elasticsearch, Logstash and Kibana.

  – Realtime dashboards with Grafana and Prometheus.

- **Transportability**

  – Infrastructure agnostic architecture so we can deploy channels anywhere (on-premise and cloud). GKE may be a future consideration.

All whilst maintaining existing high quality streaming for customers.

How Cloud benefits Live Sports Streaming

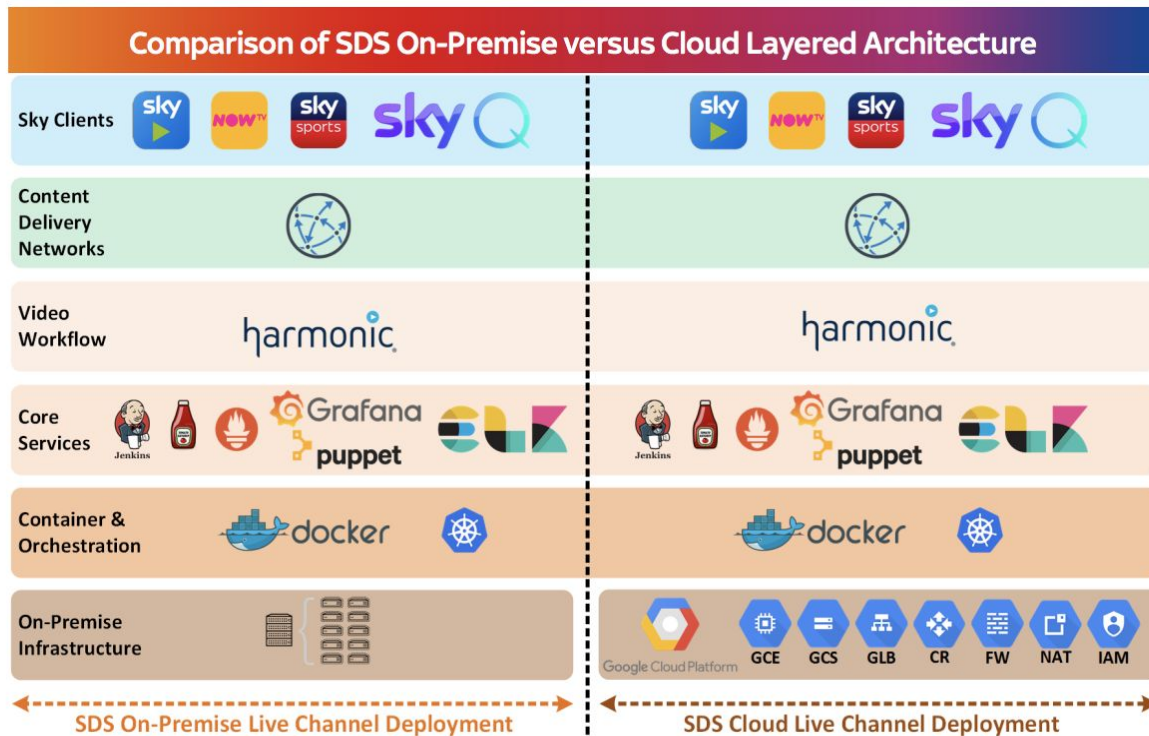## Live Streaming in the cloud provides many benefits

- Shortens the development cycle by not having to wait for infrastructure.

- Spin up new event based live sports channels in minutes.

- Each channel is consistently built using templates.

- Modular SDS architecture provides flexibility to adapt to future needs.

- Cost effective delivery of event-based sports content.

- Speed to market, to meet changes in business requirements.

- End to End automation pipeline to deploy event based channels in minutes and recover from disaster.

- Increase reliability and protection of live channels with Single Channel Fault Domain.

- A/B multi-variant testing capabilities.

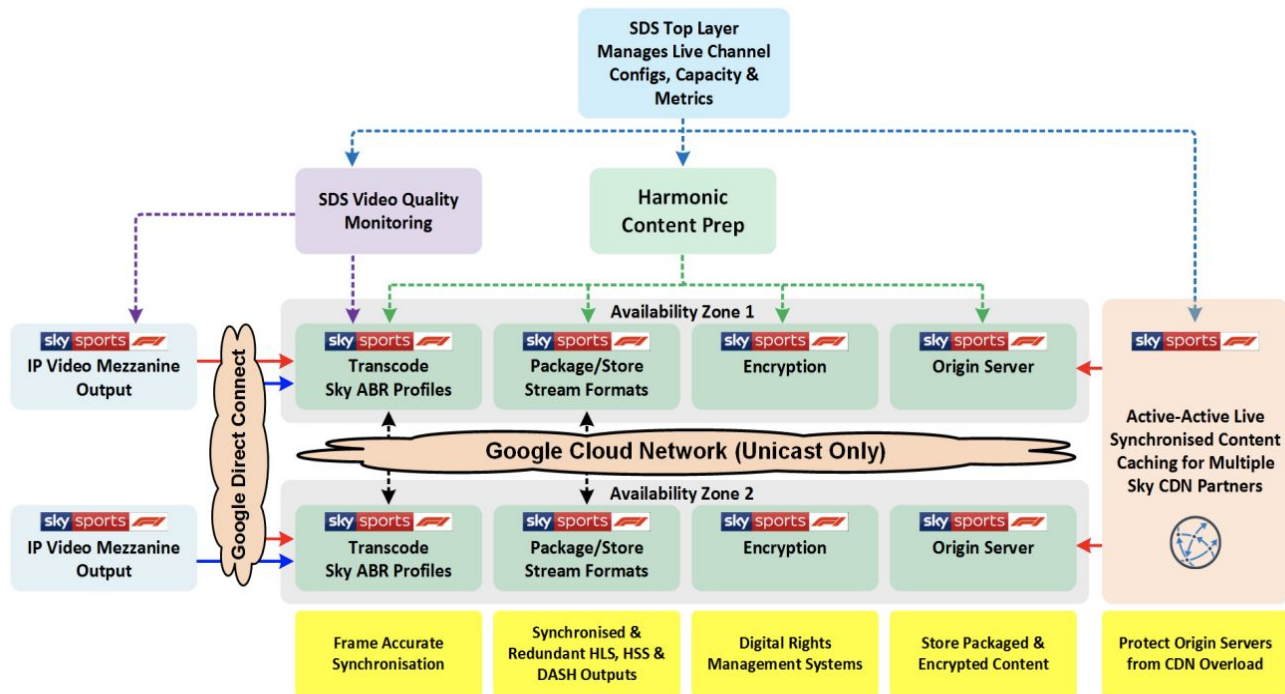## Software Defined Streaming allows us to maximize channel uptime.

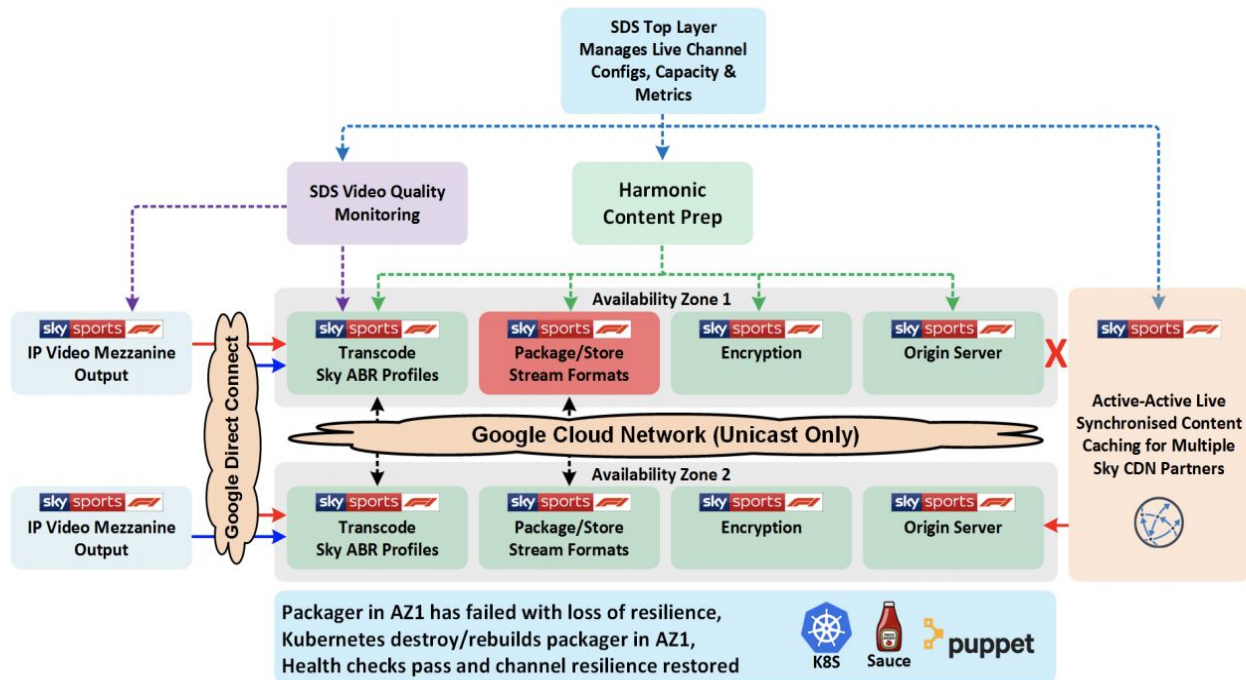# SDS Infrastructure Agnostic Architecture

On Premise and in the Cloud

Comparison of SDS On-Premise versus Cloud Layered Architecture

SDS On-Premise Live Channel Deployment

SDS Cloud Live Channel Deployment

9

Single Channel Fault Domain

Sky Sports F1 channel in the cloud

SDS Top Layer Manages Live Channel Configs, Capacity & Metrics

SDS Video Quality Monitoring

Harmonic Content Prep

IP Video Mezzanine Output

Google Direct Connect

Availability Zone 1

Transcode Sky ABR Profiles

Package/Store Stream Formats

Encryption

Origin Server

Active-Active Live Synchronised Content Caching for Multiple Sky CDN Partners

Google Cloud Network (Unicast Only)

IP Video Mezzanine Output

Availability Zone 2

Transcode Sky ABR Profiles

Package/Store Stream Formats

Encryption

Origin Server

Frame Accurate Synchronisation

Synchronised & Redundant HLS, HSS & DASH Outputs

Digital Rights Management Systems

Store Packaged & Encrypted Content

Protect Origin Servers from CDN Overload

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Self healing streams in action

How we avoid impacting the customer experience

SDS Top Layer
Manages Live Channel
Configs, Capacity &
Metrics

SDS Video Quality
Monitoring

Harmonic
Content Prep

Availability Zone 1

sky sports F1 — IP Video Mezzanine Output

Google Direct Connect

sky sports F1 — Transcode Sky ABR Profiles

sky sports F1 — Package/Store Stream Formats

sky sports F1 — Encryption

sky sports F1 — Origin Server

X

sky sports F1

Active-Active Live
Synchronised Content
Caching for Multiple
Sky CDN Partners

Google Cloud Network (Unicast Only)

Availability Zone 2

sky sports F1 — IP Video Mezzanine Output

sky sports F1 — Transcode Sky ABR Profiles

sky sports F1 — Package/Store Stream Formats

sky sports F1 — Encryption

sky sports F1 — Origin Server

Packager in AZ1 has failed with loss of resilience,
Kubernetes destroy/rebuilds packager in AZ1,
Health checks pass and channel resilience restored

K8S   Sauce   puppet

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Believe in Smarter, Faster, Simpler Video Streaming

Moore Macauley

Google Next Conference 2019 San Francisco

harmonic

Harmonic-at-a-Glance

SILICON VALLEY

Headquarters

>5,000

Media & Service Provider Global Customers

>38,000

Live OTT Channels Deployed Globally

>6.5 million

Subscribers managed by VOS Video SaaS

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harmonic
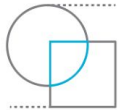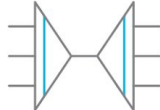
VOS®

All the 'usual' things

- Multiple devices, HLS and DASH
- Subtitles
- Timed metadata
- Ease of installation, monitoring and recovery

Making it better

- No single point of failure
- No additional delay to my sports
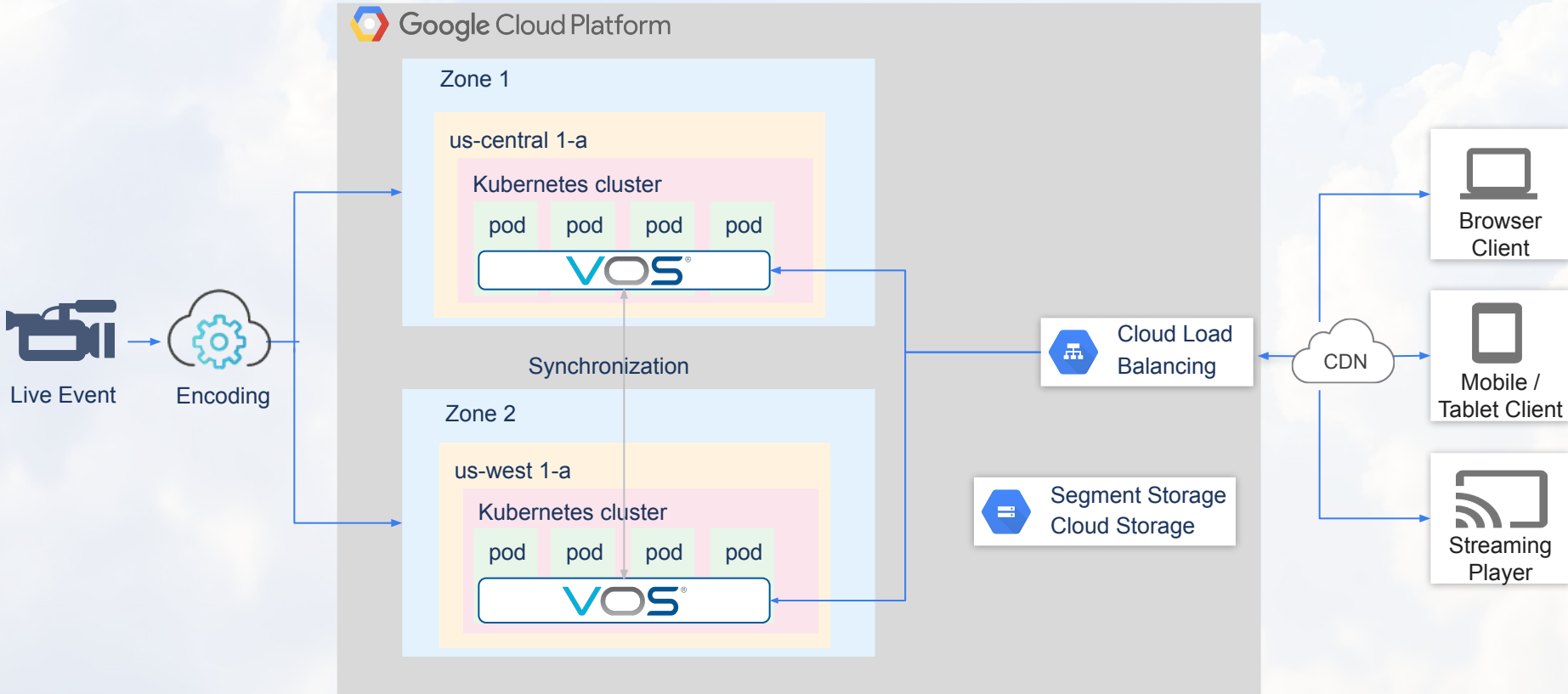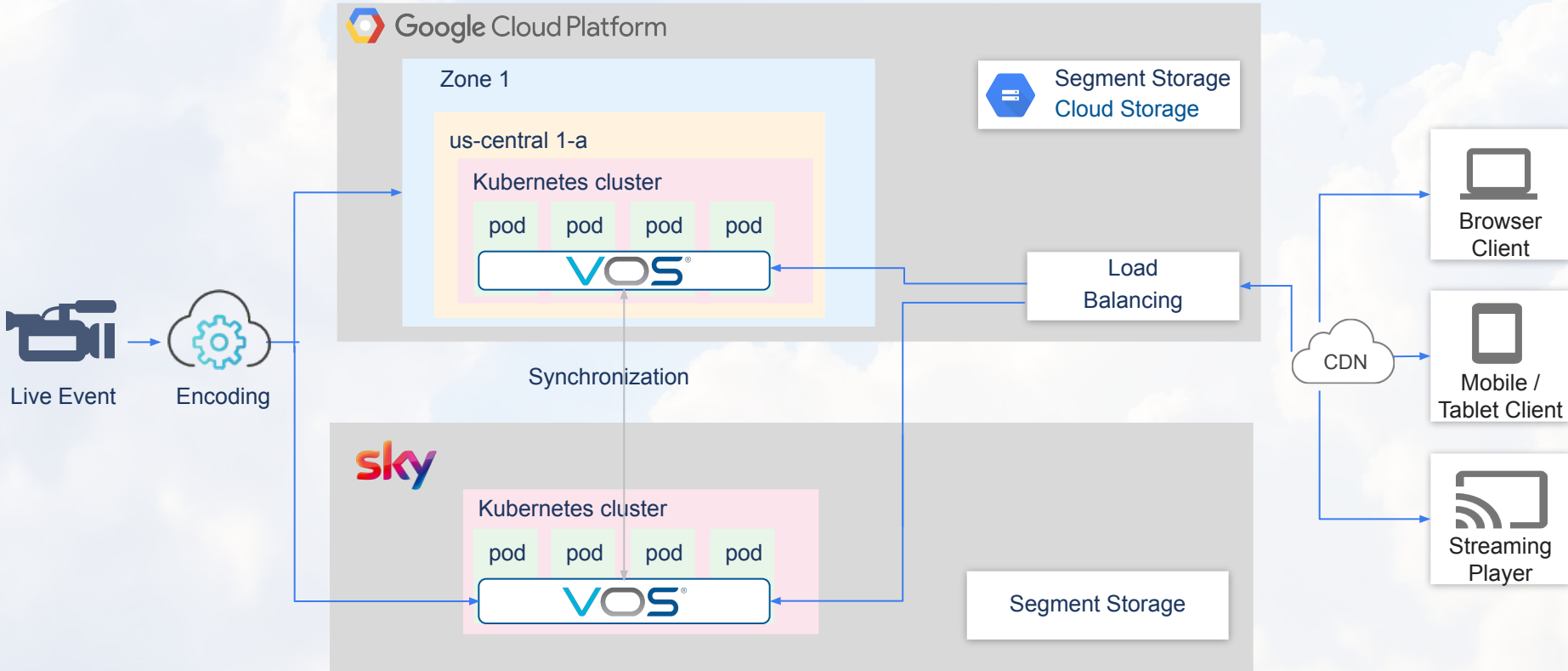
Looking Ahead
Smarter. Faster. Simpler.

Challenge
The CAP Theorem

Benefits
Improved fault tolerance
Green / Blue Upgrades
A / B Testing

Harmonic Brings the Promise of
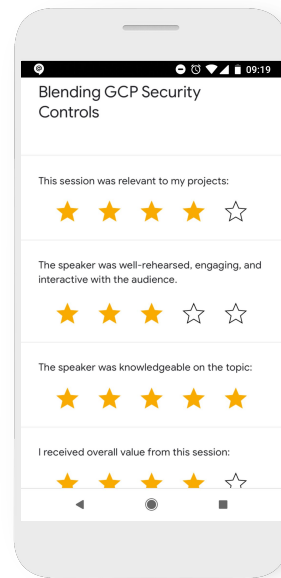**Smarter. Faster. Simpler.**
Video Streaming to Life
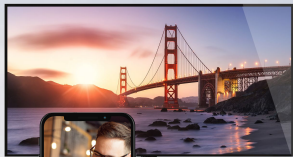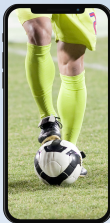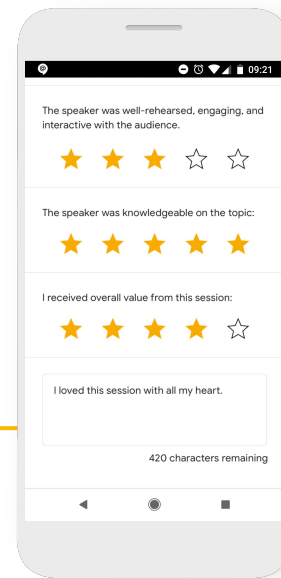
Your Feedback is Greatly Appreciated!

Complete the
session survey
in mobile app
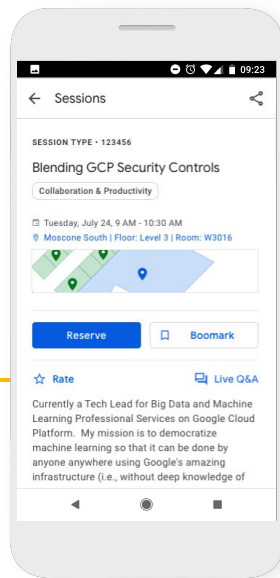
Rate icon in status bar

1-5 star rating system

Open field for comments

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