
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

PRT225

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What can you do with on-demand networking and the AWS Cloud?

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Lumen

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VP Field Ops & Engineering
FOX Sports

Evan Statton
Sr. Principal Architect, M&E
AWS

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Agenda

What is on-demand networking?

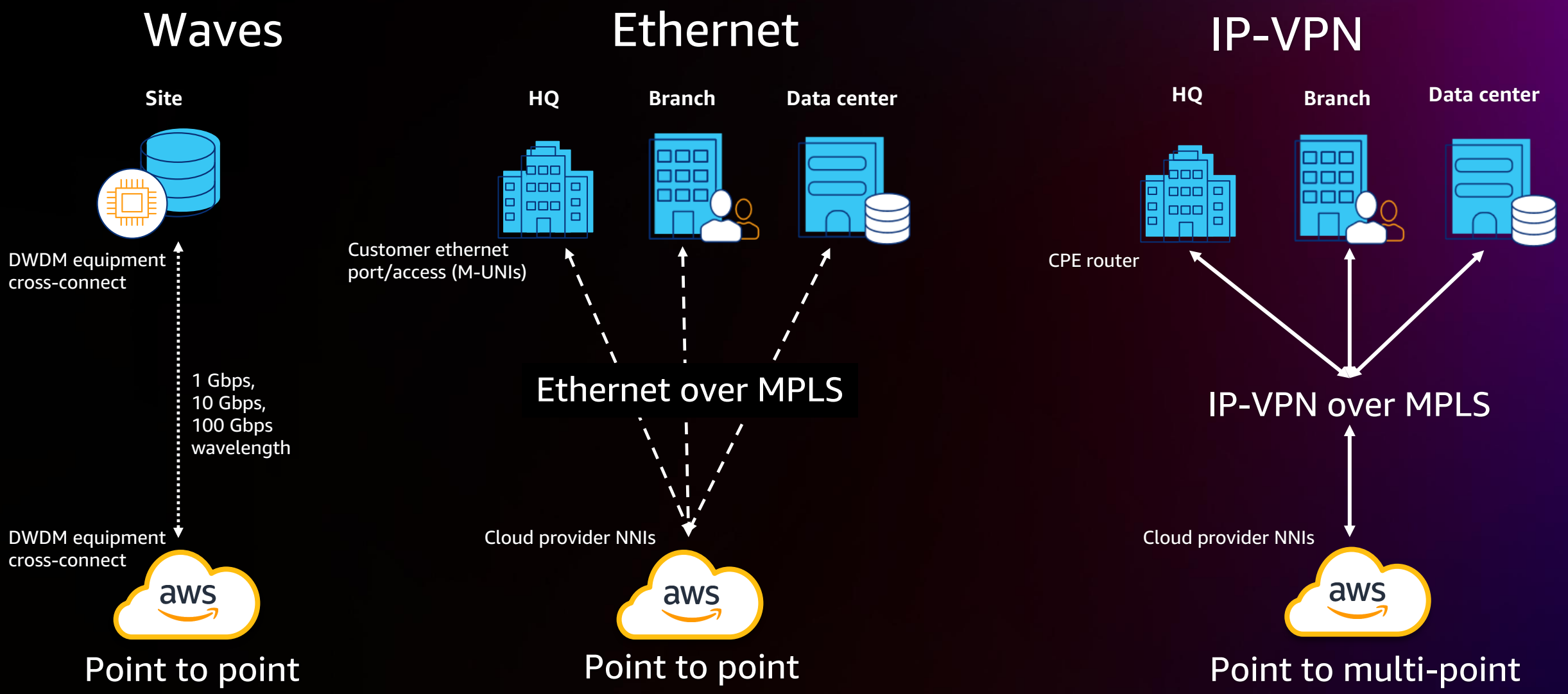
What did we accomplish together?

What are some potential impacts?

What else could somebody do?

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Lumen Cloud Connect (without on-demand)

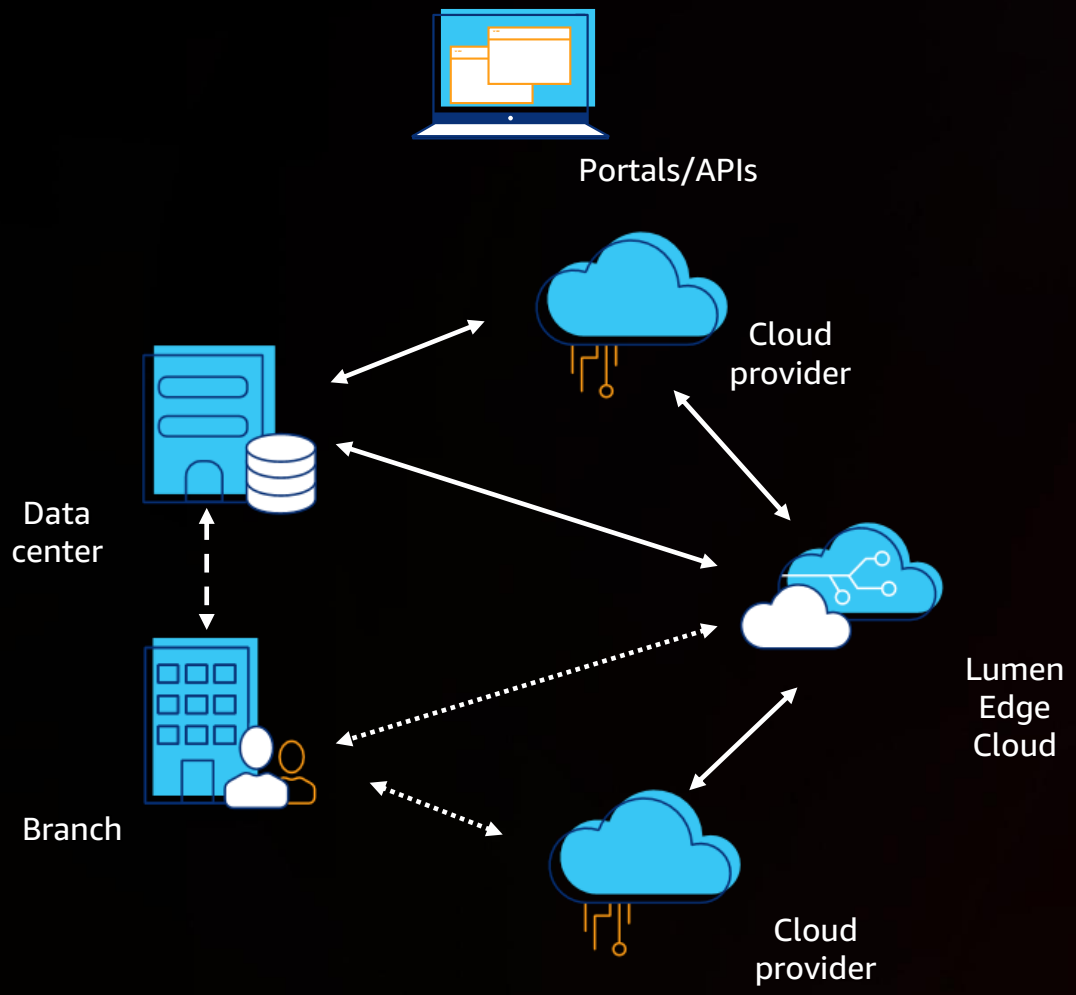


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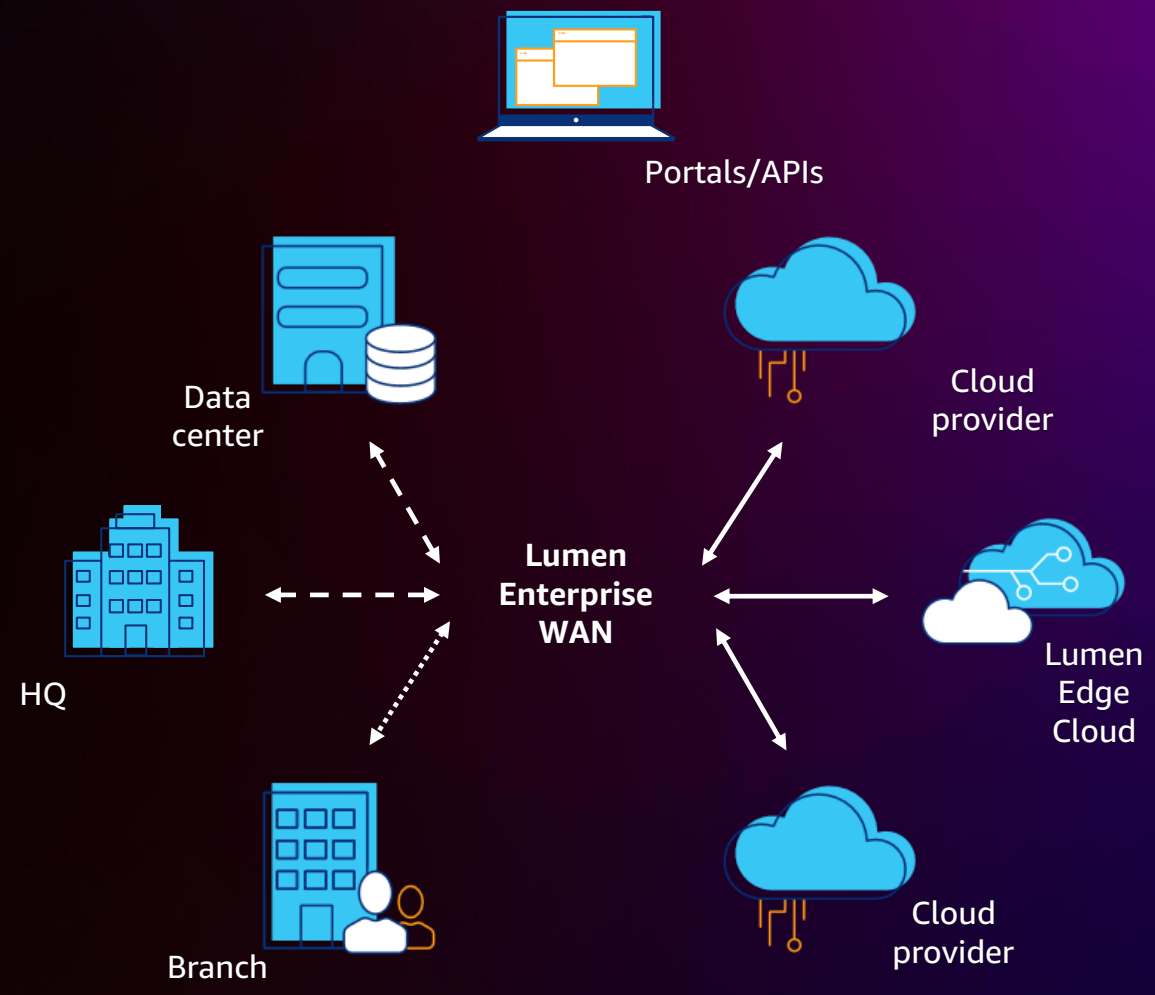
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On-demand networking

Ethernet

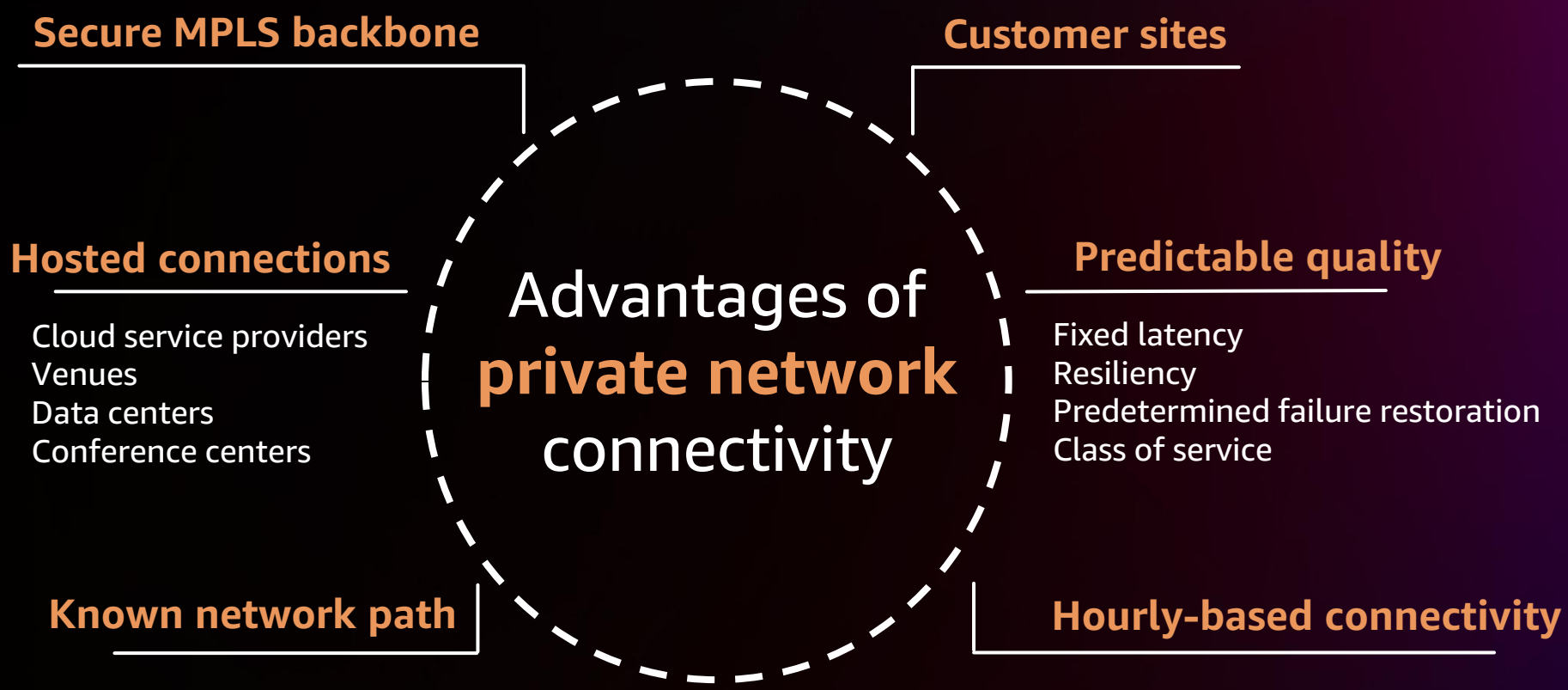


IP-VPN



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Cost-effective connection in minutes



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Lumen Dynamic Connections and Global Connectivity

Linking data center and cloud environments in real time for a fast, secure, and flexible connection.

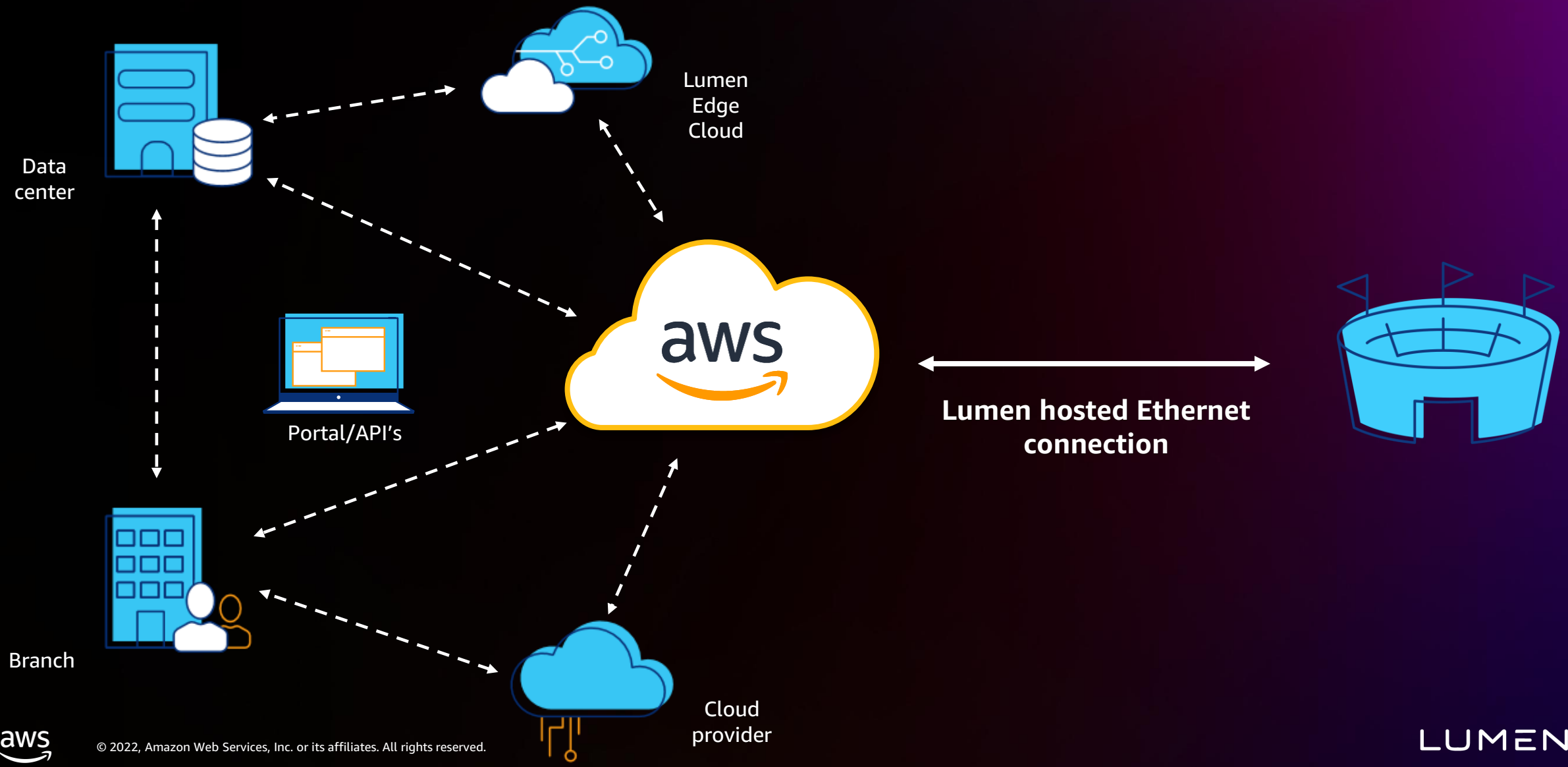
160K
fiber-enabled, on-net buildings

2,200
third-party data centers

~30G
connection speeds

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On-demand networking for Busch Stadium

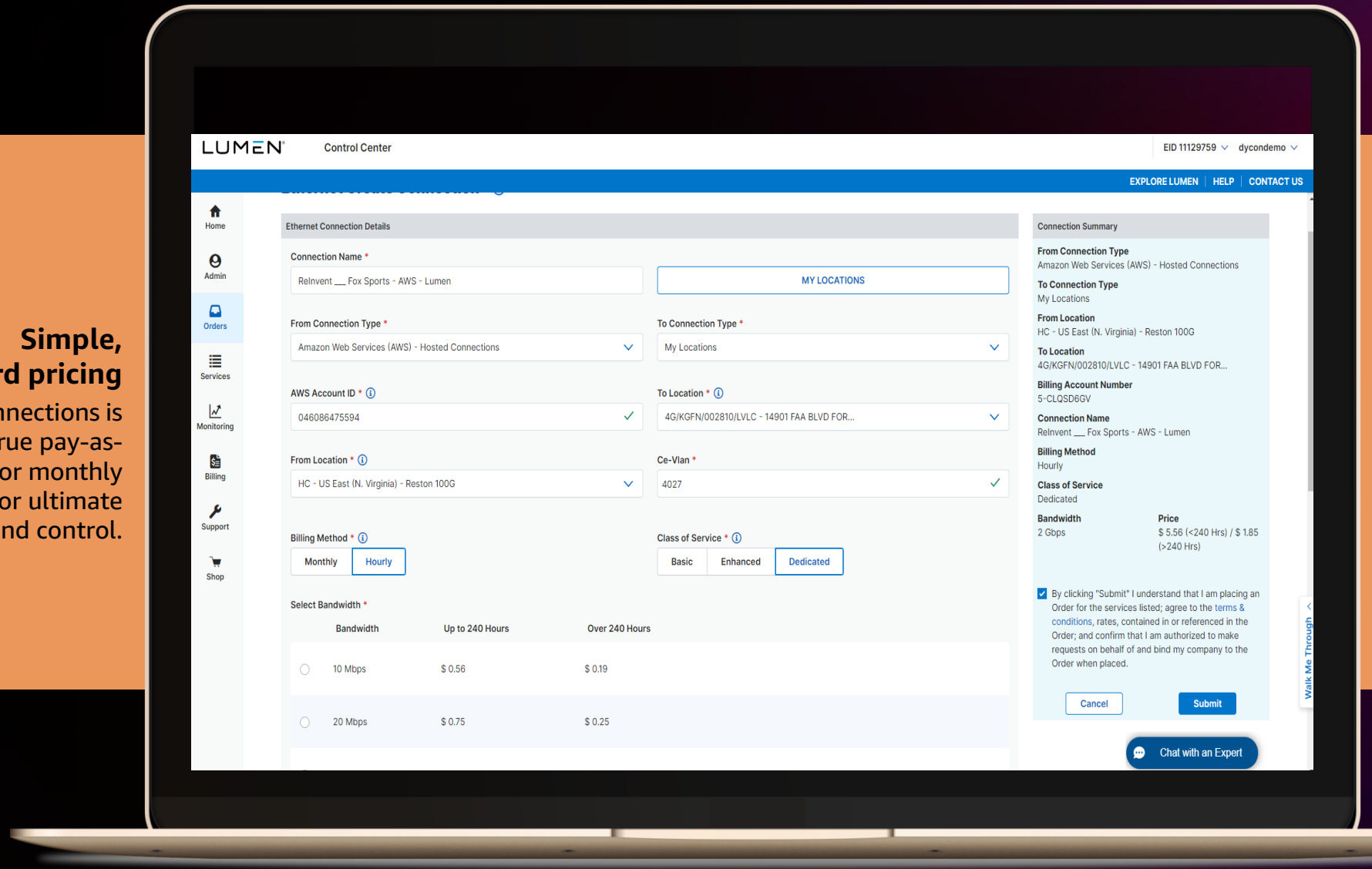


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Dynamic Connections Portal

Simple, straightforward pricing

Dynamic Connections is available with true pay-as-you-go hourly or monthly pricing – for ultimate efficiency and control.



Connect in minutes

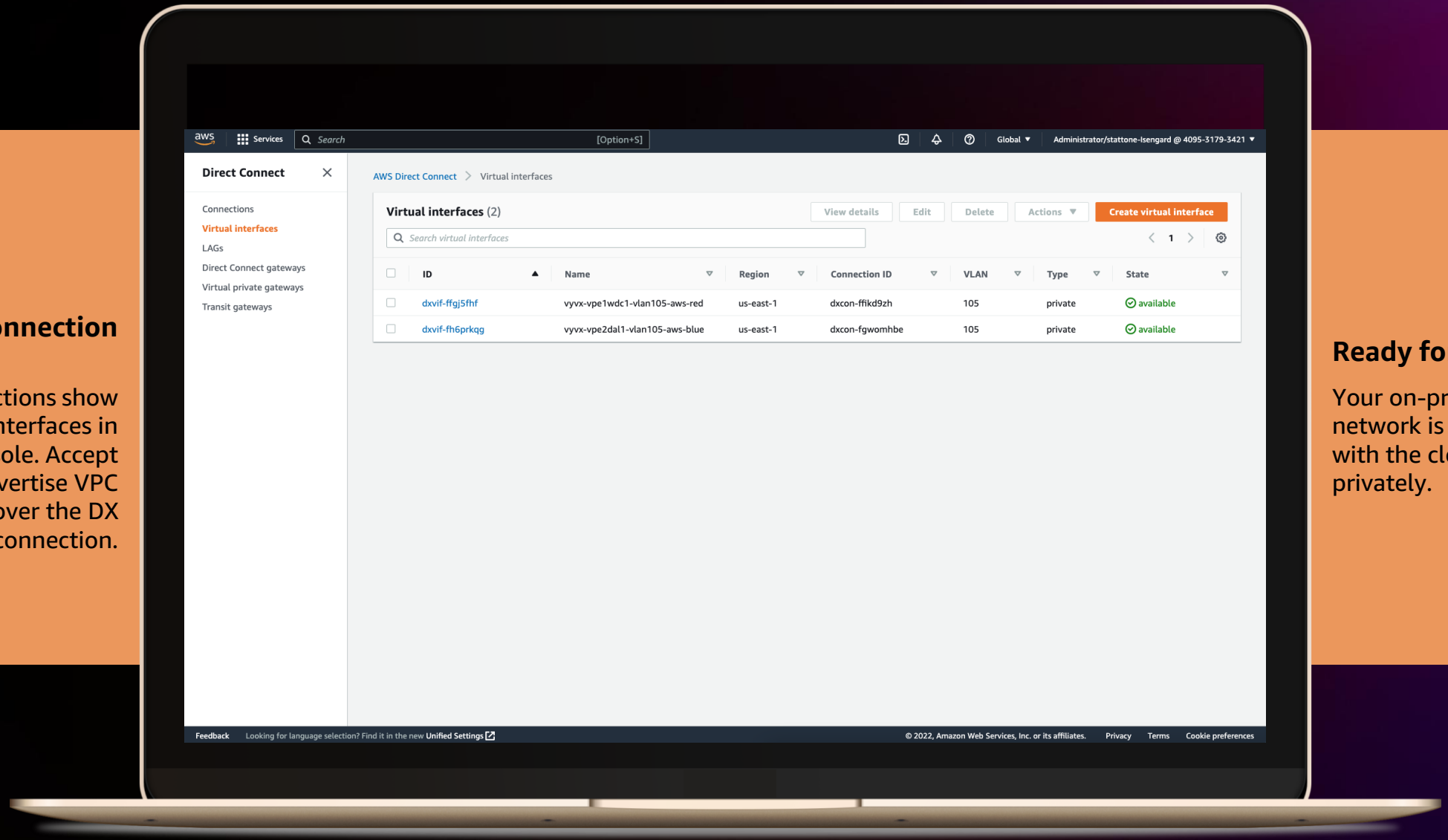
Customers can create and delete their own connections to cloud providers in minutes using Lumen's self-service portal.

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AWS Direct Connect Console

Accept Connection

Dynamic Connections show up as virtual interfaces in AWS Console. Accept routes and advertise VPC routes over the DX connection.



Ready for Production

Your on-premises network is now routed with the cloud network privately.

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FOX Sports

MORE 4K HDR PRODUCTION AND DISTRIBUTION THAN ANY OTHER US SPORTS NETWORK



FOX Sports produced over 1,500 live events and over 4,000 hours of live programming in 2021

> 500+ college sports
> 250+ soccer events – MLS, Gold Cup, and US National Team
> 200+ horse racing
> 100+ each of MLB, NFL, and NASCAR
> Bowling, boxing, and fishing round out our coverage
> Over 50 hrs of live studio programming per week

We distribute live events online as both PPV and free via FOXSports.com, FOXNOW, BTN.com, and the BIG EAST DIGITAL NETWORK

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Designing a live sports use case

EVENT	DAYTONA 500	WORLD SERIES	NFC CHAMPIONSHIP	BIG EAST CHAMPIONSHIP	PPV BOXING	GAME
CAMERAS	64	61	39	28	21	8
REPLAY	78	82	68	70	38	12
CREW	390	325	270	114	78	28
ITEMS OF NOTE	20+ robotic cameras	Crew works 28+ days straight, averaging 14 hrs per day	Crew will have worked the last 18 weekends together	Show is built and ready to go in less than 12 hrs	All distributed from site	Start to finish in 10 hrs

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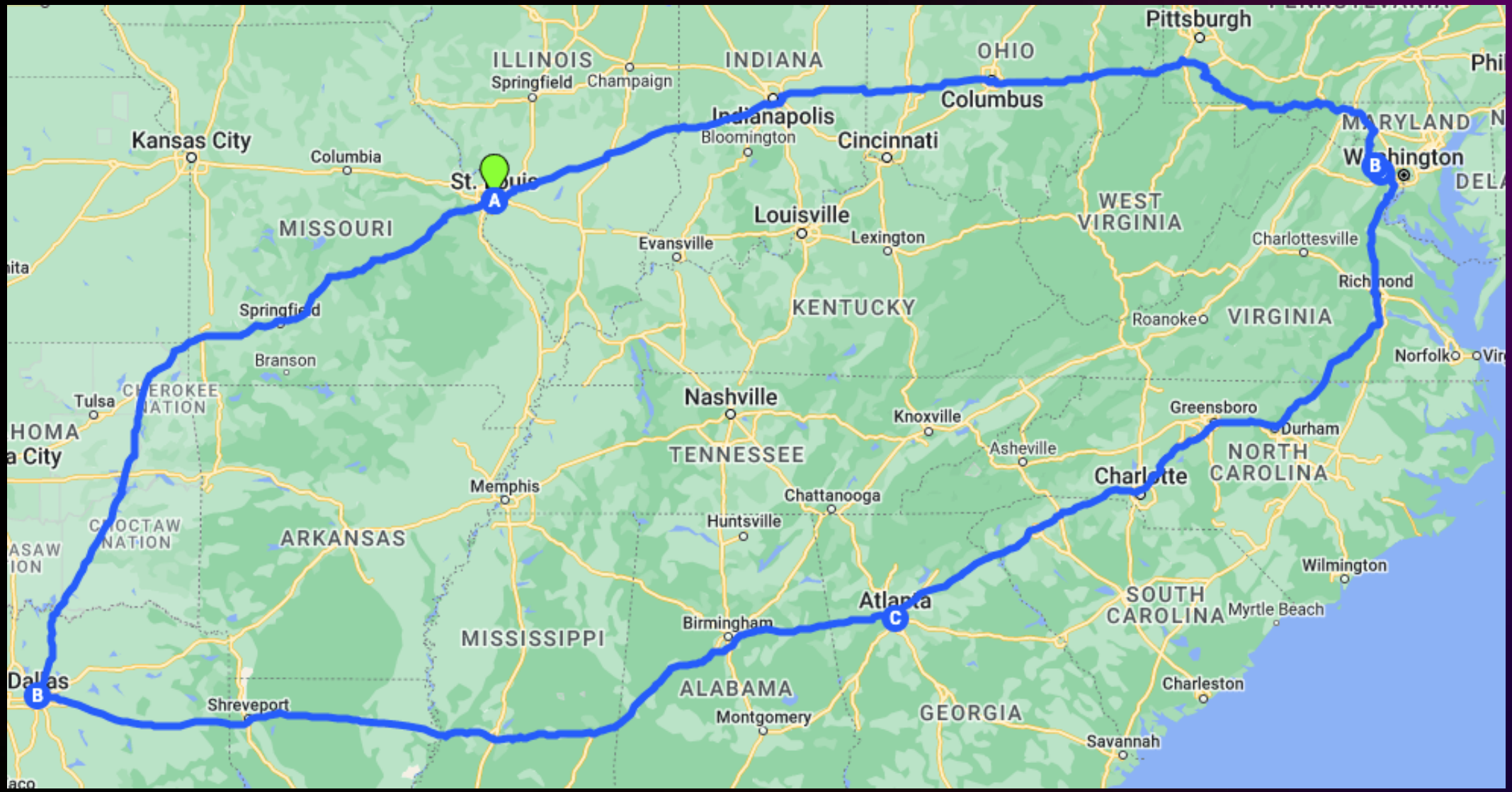
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A cloud reality



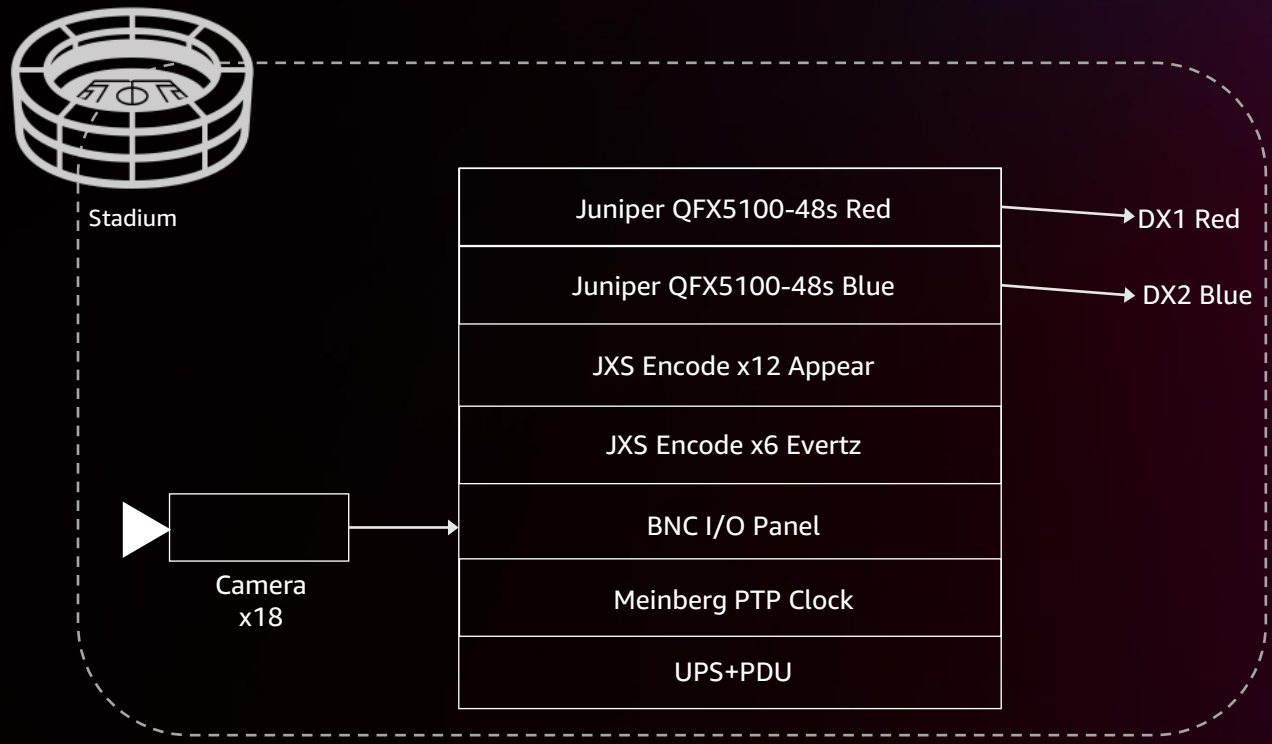
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The Lumen Network



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On-Prem 10RU Case



*Fox Sports uses 5:1 JPEG-XS Compression. At 720p this is 300Mbps per signal.

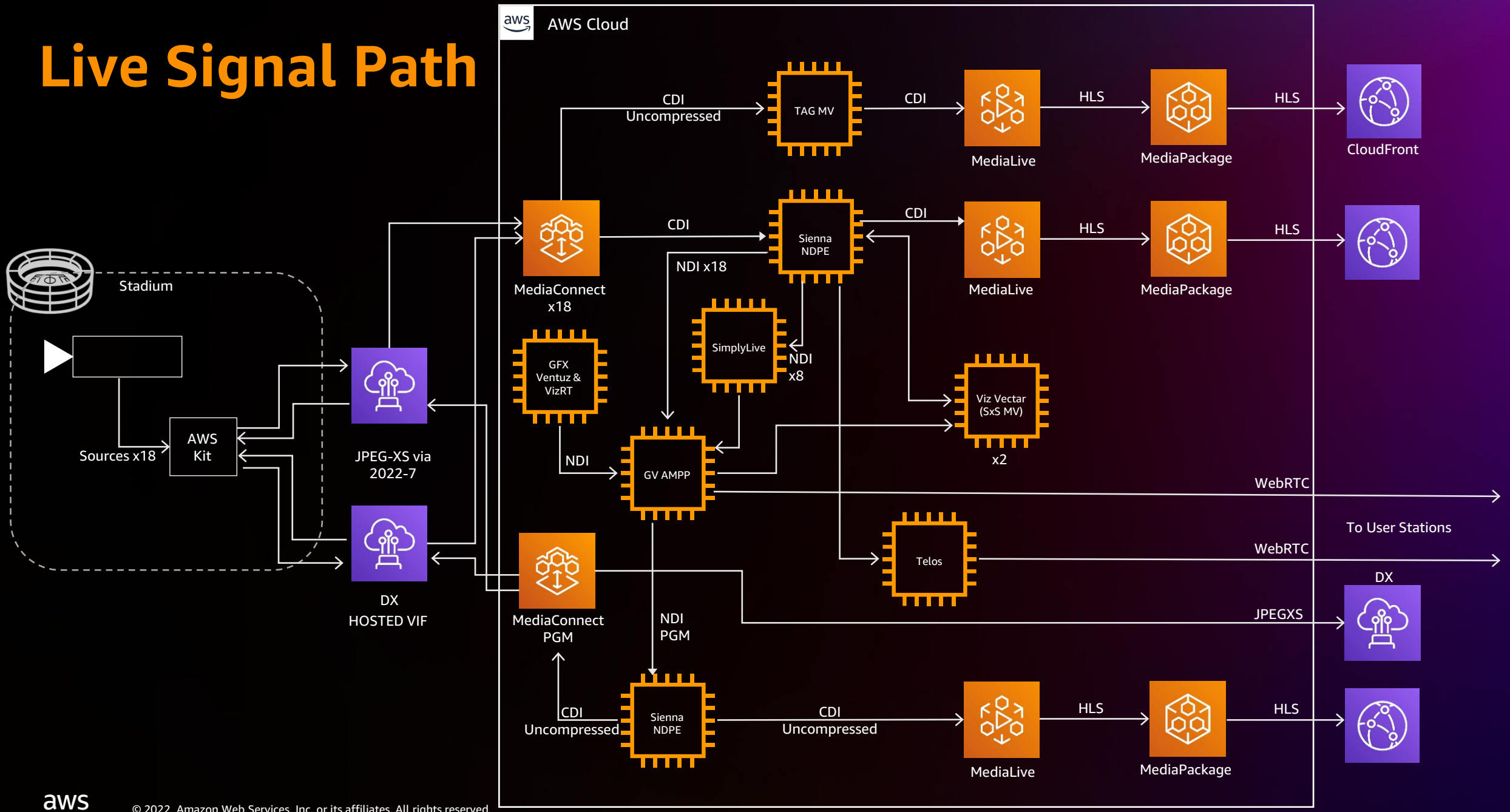
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On-Prem 10RU Case



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Live Signal Path



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CH01


CH02


CH03


CH04


CH05


CH06


CH07


CH08


CH09


CH010
Black Frame


CH011

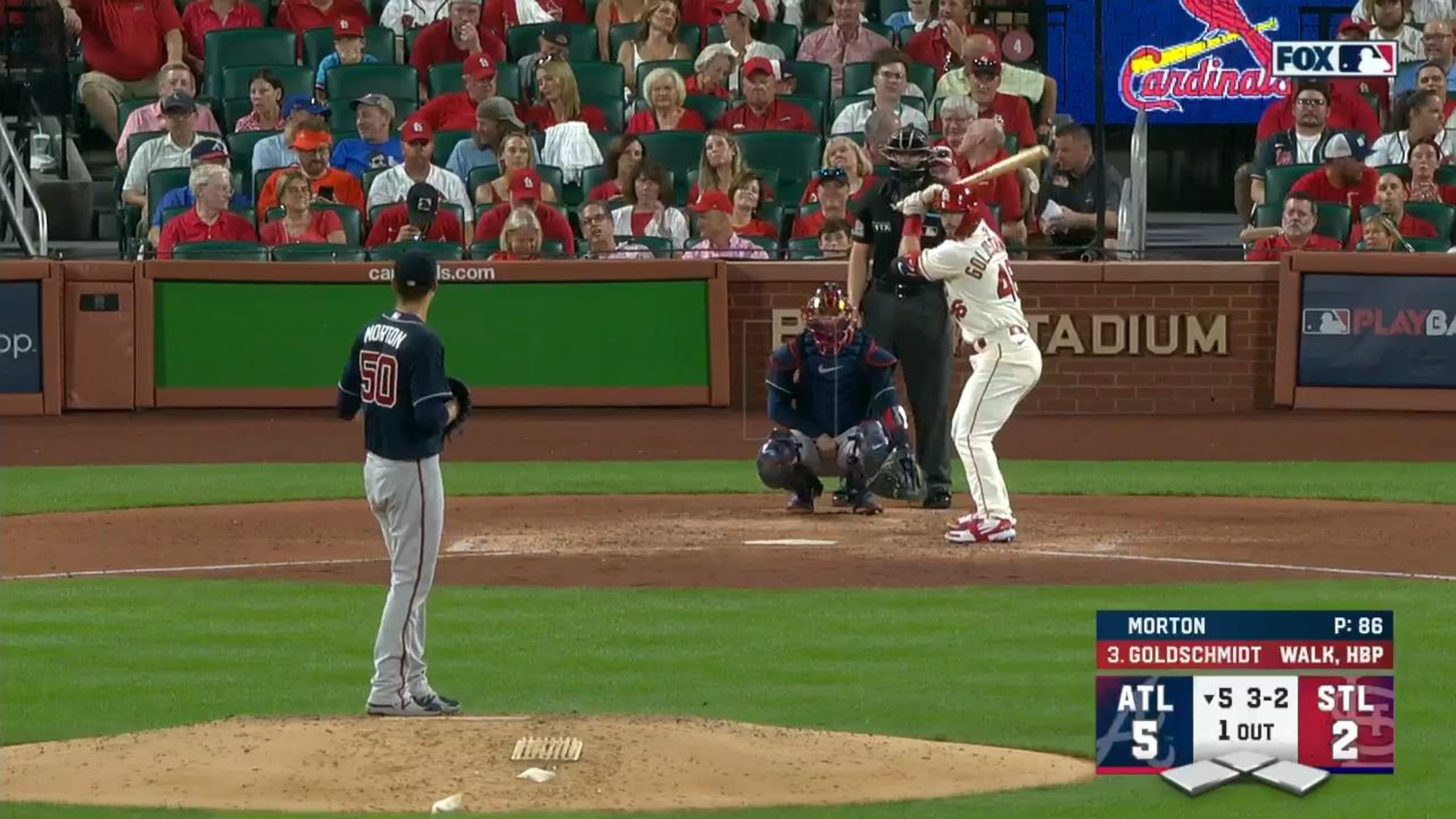

CH012
MORTON P: 86
3. GOLDSCHMIDT HBP
ATL 5
•S 3-2
1 OUT
STL 2


CH013


CH014
Freeze Frame
Braves
79-48
SS Swanson .290
1B Olson .257
3B Riley .285
C d'Arnaud .262
DH Contreras .277
2B Grissom .355
CF Harris II .290
LF Grossman .213
RF Heredia .130
Morton 4.00 | 6-5
0:00
Cardinals
72-54
RF Nootbaar .247
DH Donovan 4-3
1B Goldschmidt .338
3B Arenado .303
LF Dickerson .276
CF O'Neill .229
2B Gorman .240
C Knizner .231
SS Edman .253
Montgomery 1.76 | 4-0
HALL of FAME WEEKEND
BRAVES 0 0 0 4 1 5 8 0 2
CARDINALS 0 0 0 2 2 3 1 5
BALLS 3 STRIKES 2 OUTS 1
WELCOME TO BUSCH STADIUM


CH015
TUMS
HYATT REGENCY
HEARTBURN RELIEF


CH016
TUMS
HYATT REGENCY
HEARTBURN RELIEF


MORTON
50
MORTON P: 86
3. GOLDSCHMIDT WALK, HBP
ATL 5
▼5 3-2
1 OUT
STL 2

aws media & entertainment

FOX



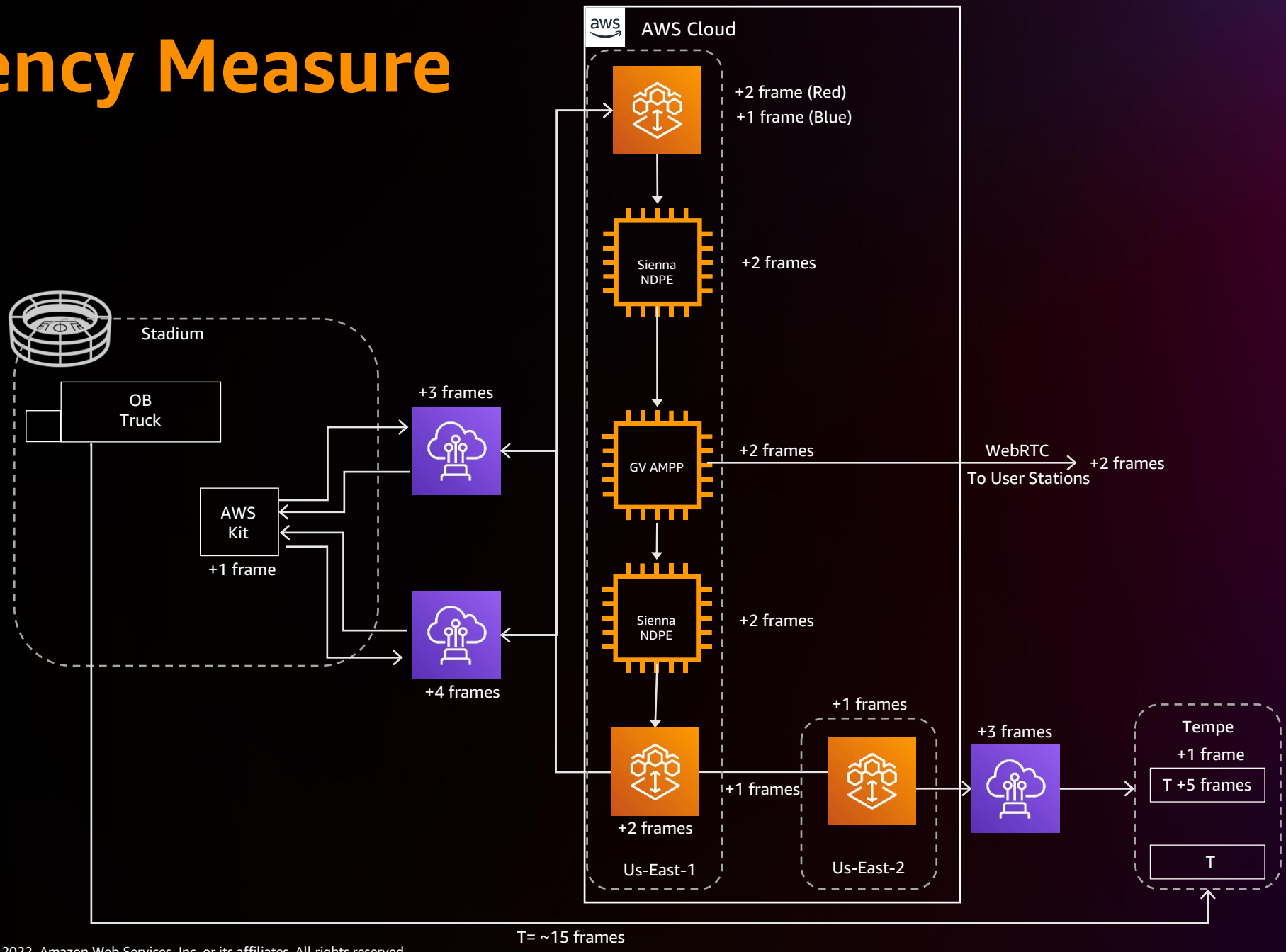
AWS Program ●



Broadcast Program

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Latency Measure



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Technical Director



Audio



Replay

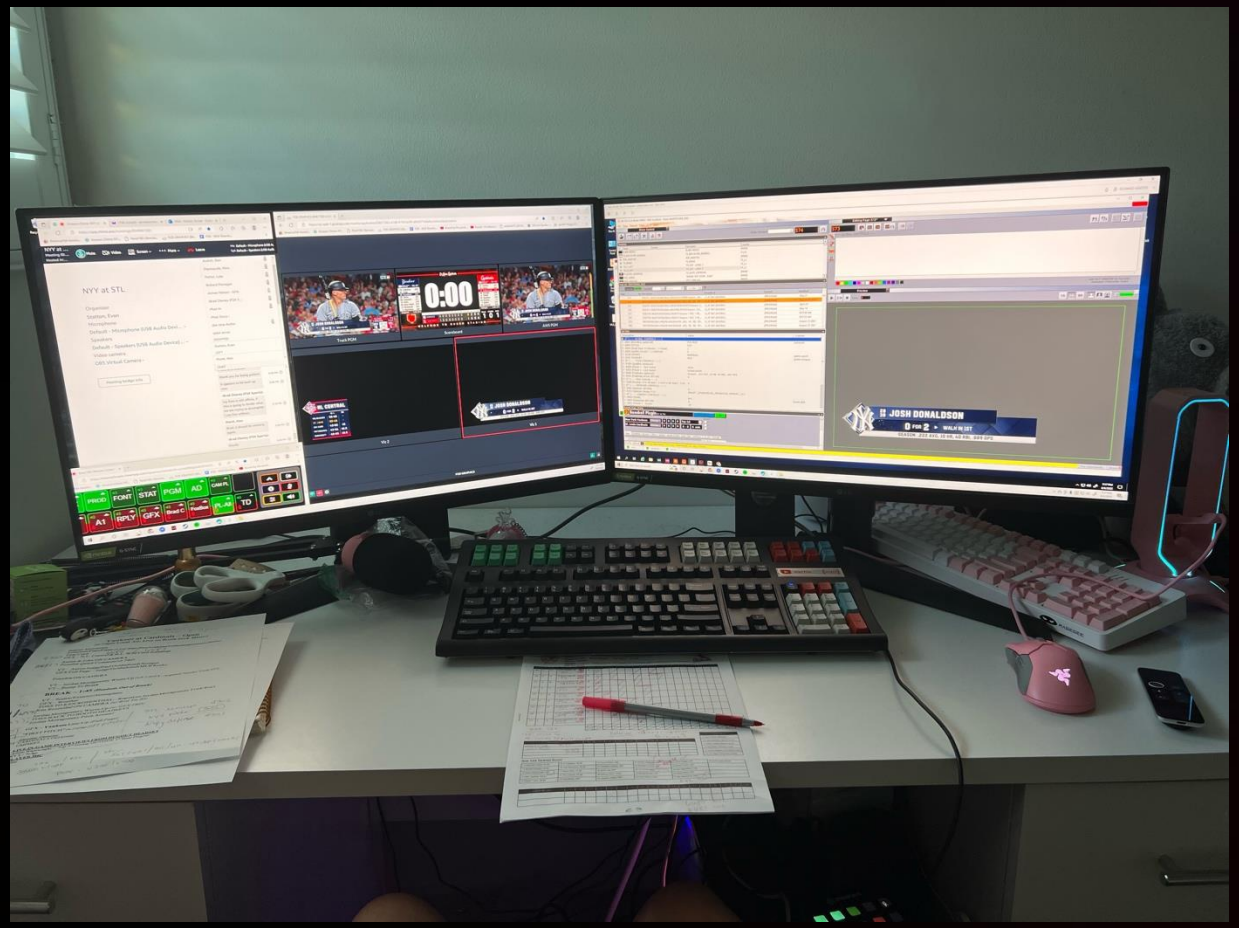






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Graphics



Viz Graphics



FOXBOX

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AWS Engineering



AWS Engineering Station



Mobile Kit



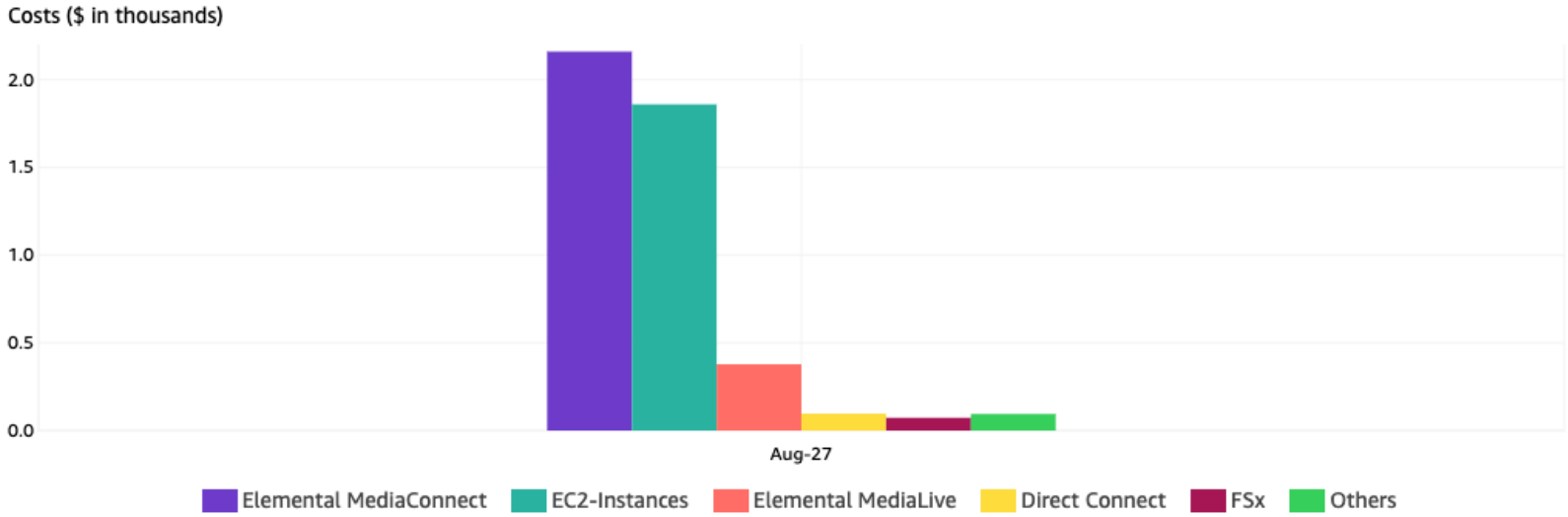


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Aug 27, 2022 - Aug 27, 2022 | Daily | Bar

Group by: Service | Linked Account | Region | Instance Type | Usage Type | Resource | Cost Category | Tag | API Operation | More



To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

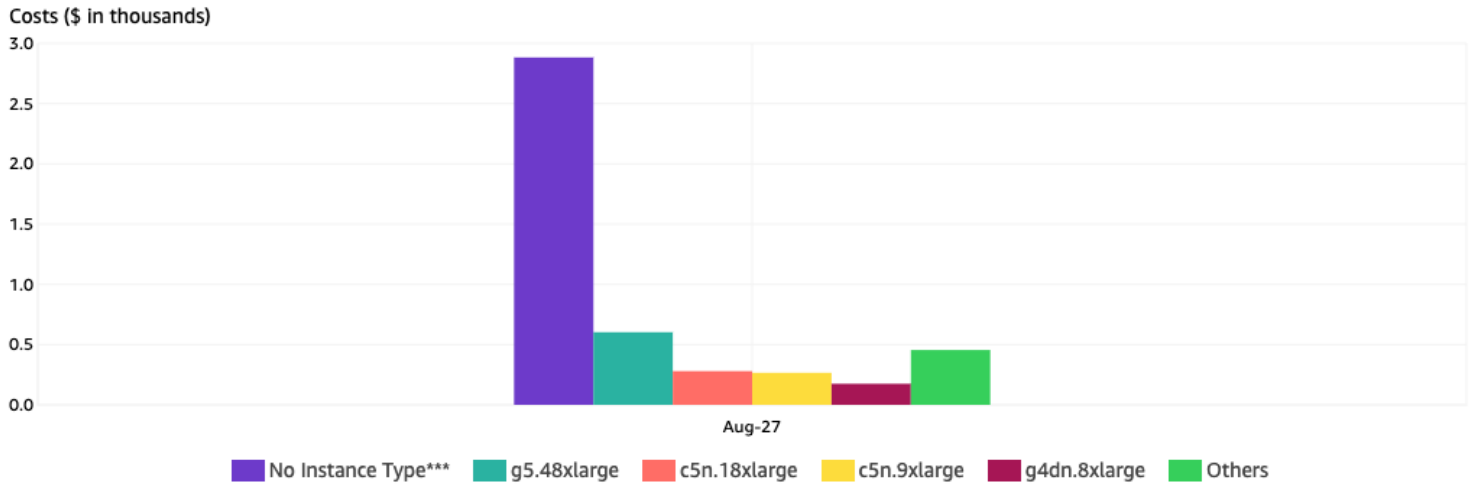
Download CSV

Service	Aug-27	Service Total
Total cost ($)	4,661.86	4,661.86
Elemental MediaCo... ($)	2,160.20	2,160.20
EC2-Instances ($)	1,859.48	1,859.48
Elemental MediaLive ($)	378.02	378.02
Direct Connect ($)	96.90	96.90
FSx ($)	72.58	72.58

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Group by: Instance Type | Service | Linked Account | Region | Usage Type | Resource | Cost Category | Tag | API Operation | More



To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Instance Type	Aug-27	Instance Type Total
Total cost ($)	4,661.86	4,661.86
g5.48xlarge ($)	602.88	602.88
c5n.18xlarge ($)	279.94	279.94
c5n.9xlarge ($)	266.11	266.11
g4dn.8xlarge ($)	175.10	175.10
g4dn.4xlarge ($)	168.58	168.58
g4dn.12xlarge ($)	146.88	146.88

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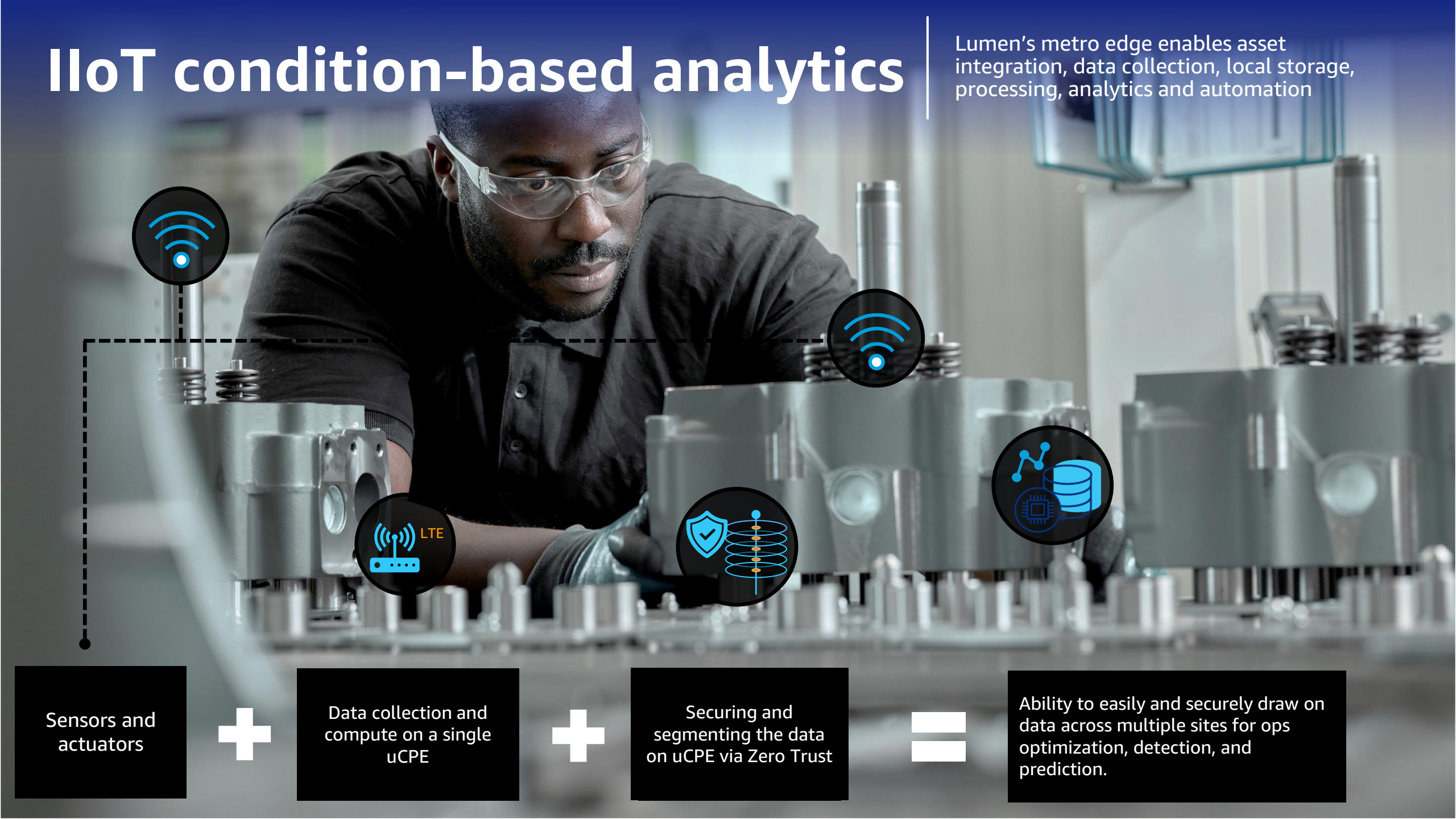
What’s Next for Live TV Production?

- Automation/API
- Highly available design patterns
- Even higher quality video
- Greater technology availability
- Lower carbon footprint
- More content production capacity

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IIoT condition-based analytics

Lumen's metro edge enables asset integration, data collection, local storage, processing, analytics and automation



Sensors and actuators

+

Data collection and compute on a single uCPE

+

Securing and segmenting the data on uCPE via Zero Trust

=

Ability to easily and securely draw on data across multiple sites for ops optimization, detection, and prediction.

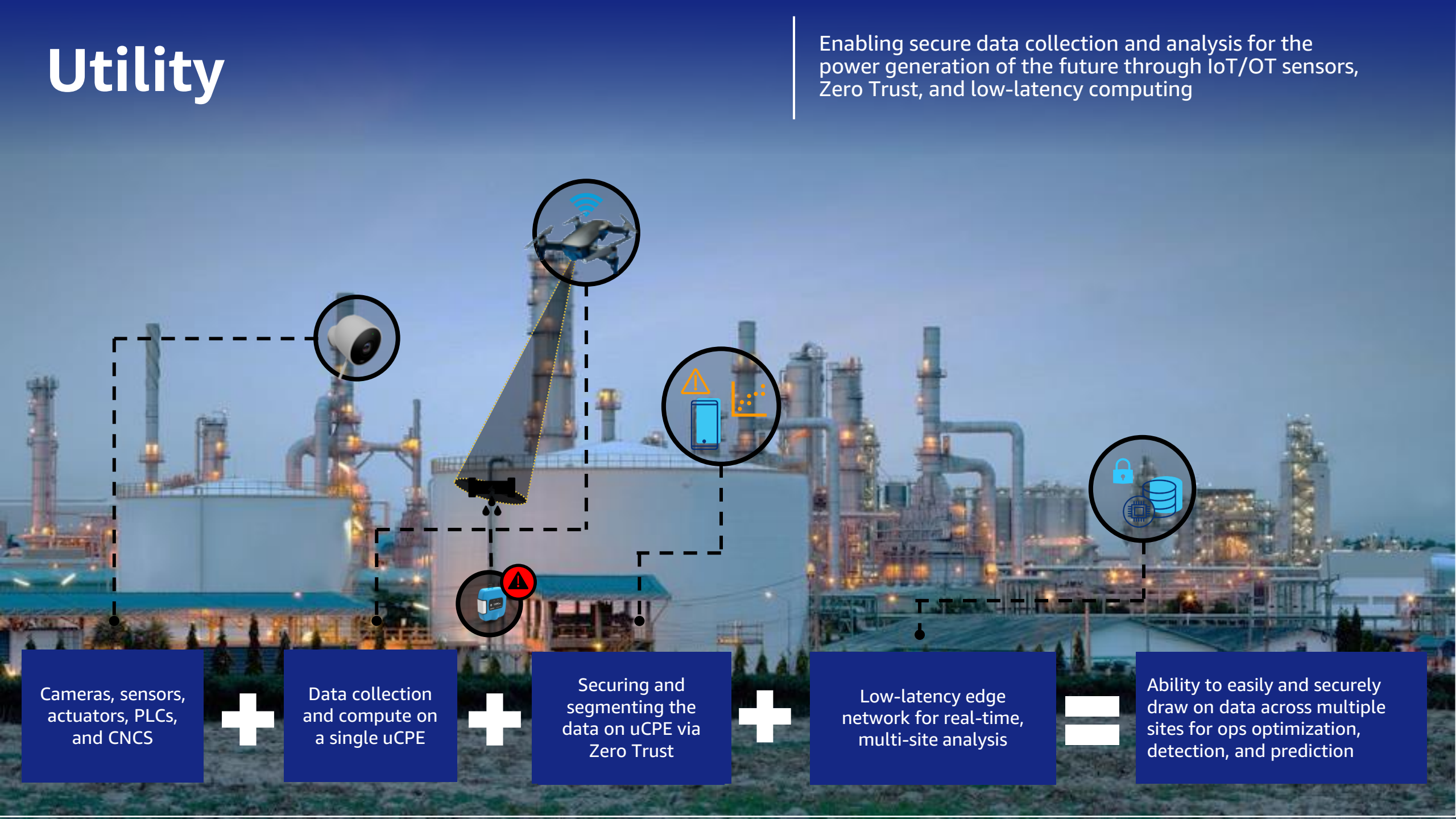
Retail and hospitality

Delivering a safer, customer-centric experience by aiding in decision-making based on habits and needs



Utility

Enabling secure data collection and analysis for the power generation of the future through IoT/OT sensors, Zero Trust, and low-latency computing



Cameras, sensors, actuators, PLCs, and CNCS

+

Data collection and compute on a single uCPE

+

Securing and segmenting the data on uCPE via Zero Trust

+

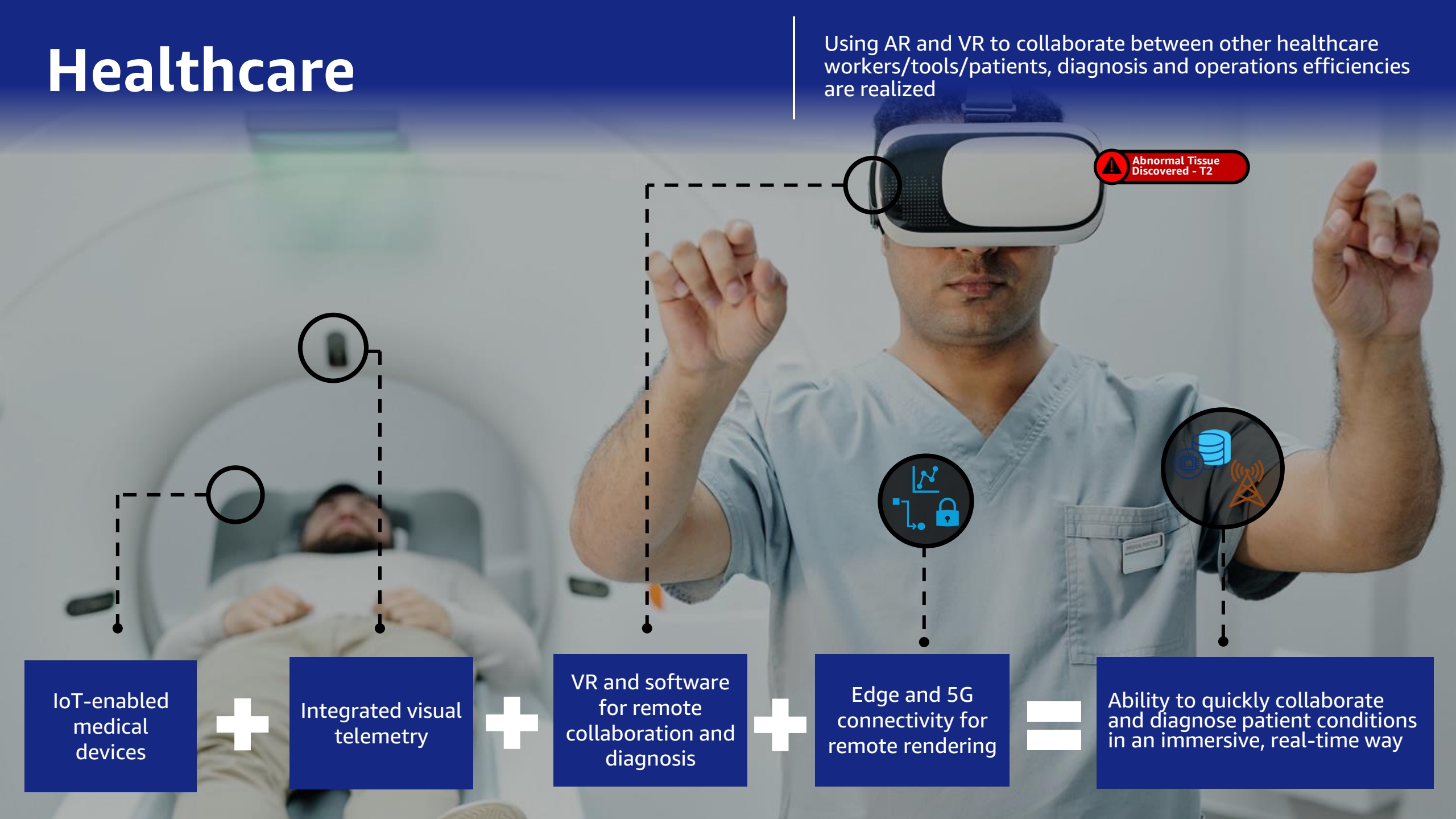
Low-latency edge network for real-time, multi-site analysis

=

Ability to easily and securely draw on data across multiple sites for ops optimization, detection, and prediction

Healthcare

Using AR and VR to collaborate between other healthcare workers/tools/patients, diagnosis and operations efficiencies are realized



IoT-enabled medical devices + Integrated visual telemetry + VR and software for remote collaboration and diagnosis + Edge and 5G connectivity for remote rendering = Ability to quickly collaborate and diagnose patient conditions in an immersive, real-time way

Studio sessions

Through the power of the Lumen Edge platform and T-Mobile's 5G partnership, customers can now experience studio-quality collaboration across geo-disperse distances









Outerbands

Enabling real-time music collaboration, live recording, and broadcasting across geographic distances by using the Outerbands application and Lumen Edge to resolve latency impacts to the service.

Outerbands
Music collaboration service from TikiLIVE

Edge Compute
Game servers running on Lumen Edge network

5G Infrastructure
Scaling real-time broadcasting on devices through the Lumen and T-Mobile partnership to offer greater sync/collaboration

Outerbands powered by TikiLIVE + Reduced latency with Lumen Edge Compute + Single-platform and multi-cloud capable = Seamless live collaboration and recording, in sync with musicians across the US

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Questions?

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Thank you!



Please complete the session survey in the **mobile app**

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