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

MNE202

Cloud-based production for The Lord of the Rings: The Rings of Power

Katrina King

Global Strategy Leader – Content Production
AWS

Ron Ames

Producer
The Lord of the Rings: The Rings of Power

Weyron Henriques

SVP Product Development
Company 3

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Agenda

- Overview of AWS for content production
- Content production: A holistic strategy
- Technical deep dive
- The Lord of the Rings: The Rings of Power
- Company 3 and The Lord of the Rings: The Rings of Power

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Solution areas

The most purpose-built capabilities and partner solutions for reinventing content production, media supply chain, broadcast, direct-to-consumer and streaming, and analytics

Content production

Media supply chain and archive

Broadcast

Direct-to-consumer and streaming

Data science and analytics for media

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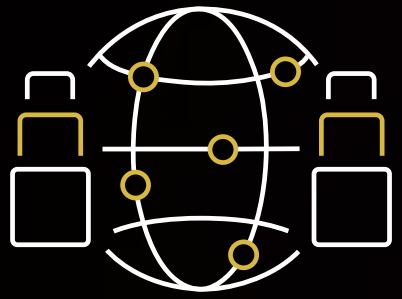
Content production: Trends



Distributed production

Global orchestration

Operational efficiencies

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Content production: AWS adoption benefits

Most functionality

Fastest pace of innovation

Most proven operational expertise

Most secure

Largest community of customers and partners

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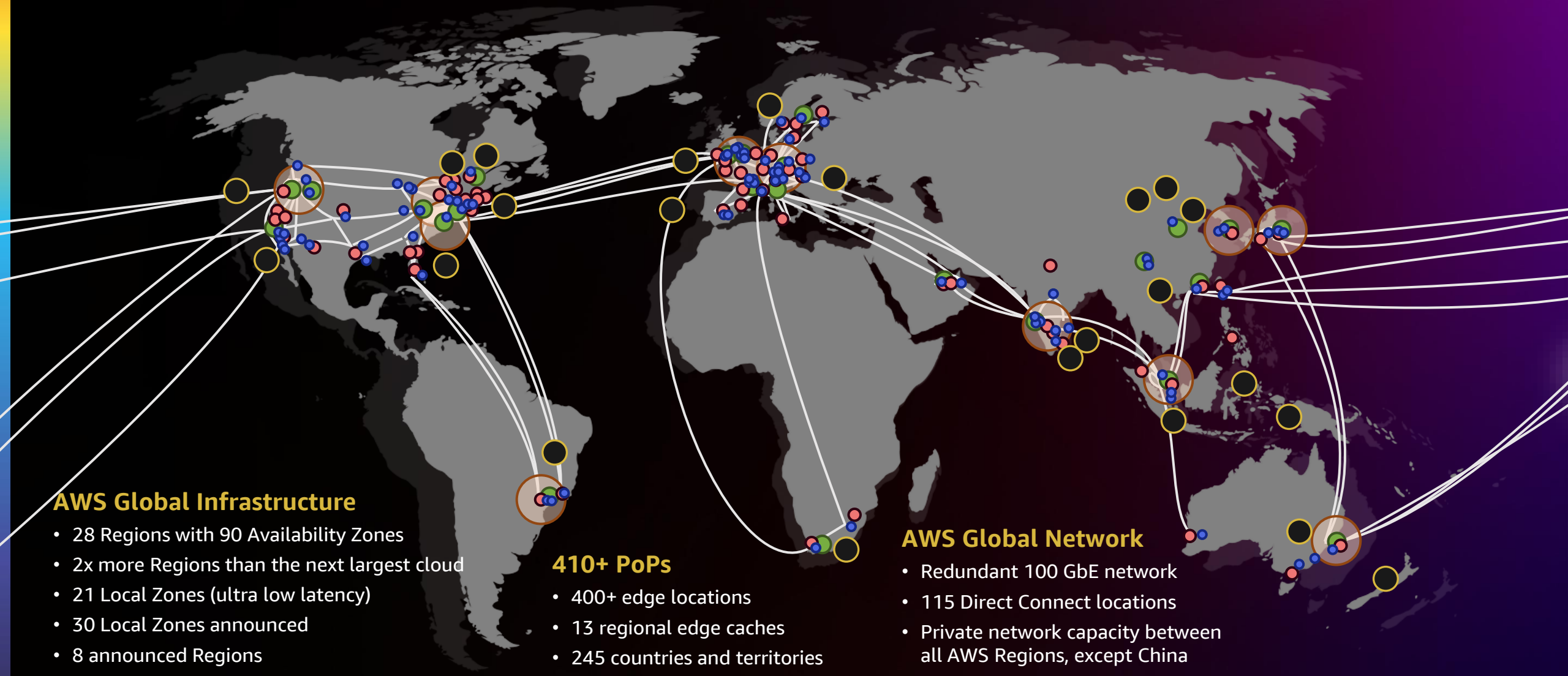
Access to the global talent pool



AWS Global Infrastructure

- 28 Regions with 90 Availability Zones
- 2x more Regions than the next largest cloud
- 21 Local Zones (ultra low latency)
- 30 Local Zones announced
- 8 announced Regions

410+ PoPs

- 400+ edge locations
- 13 regional edge caches
- 245 countries and territories

AWS Global Network

- Redundant 100 GbE network
- 115 Direct Connect locations
- Private network capacity between all AWS Regions, except China

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Content production on AWS: A holistic vision

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The backbone of a holistic workflow

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Studio content lake

- Purpose-built AWS and partner storage solutions from ingest to archive

Orchestration layer

- Applications and SaaS solutions come to the content, assets remain secure

Best practices

- Reduce data silos, improve interoperability, agnostic interconnectivity, API-driven architecture

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Holistic postproduction in the AWS Cloud

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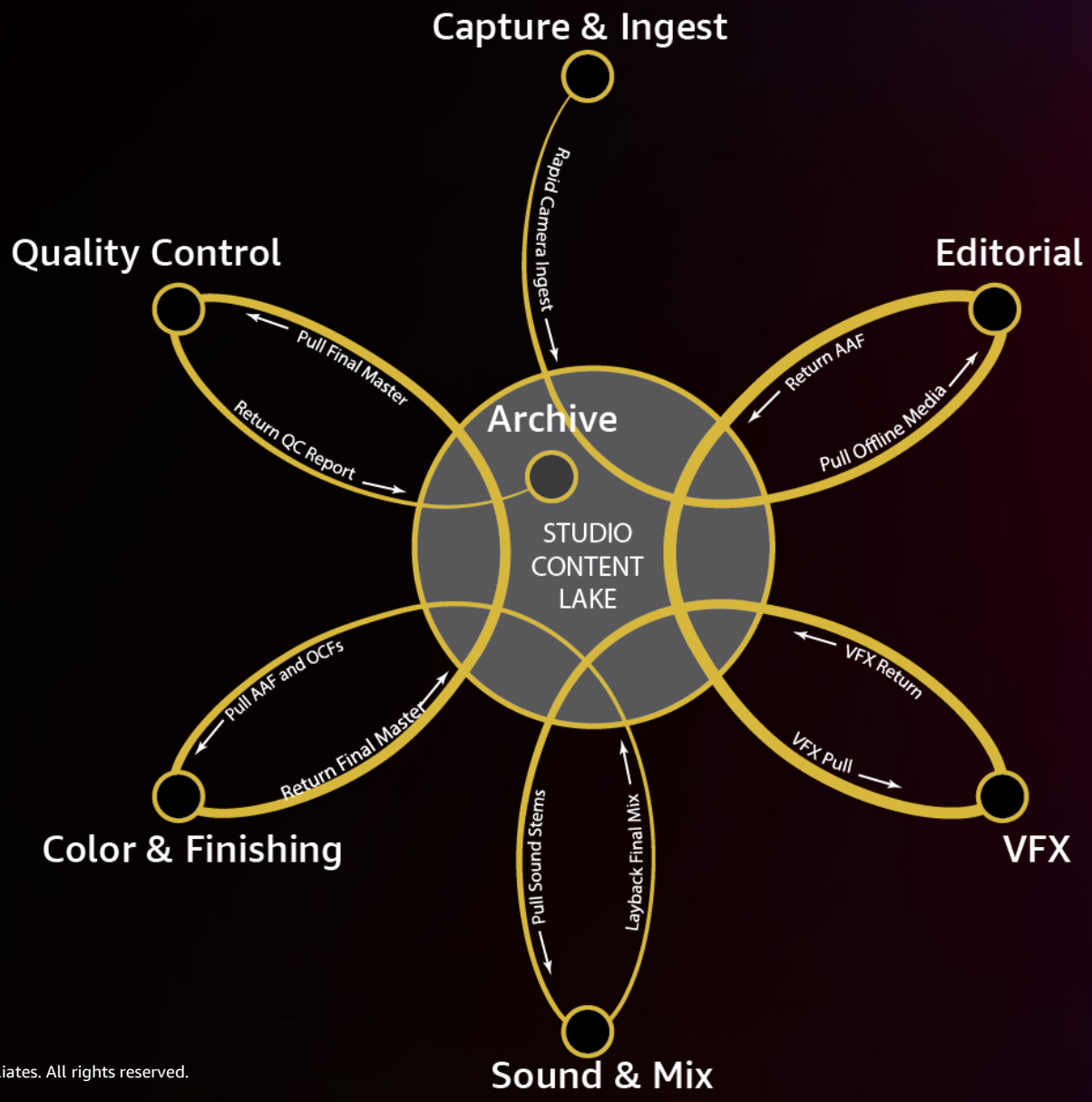
Holistic postproduction in the AWS Cloud



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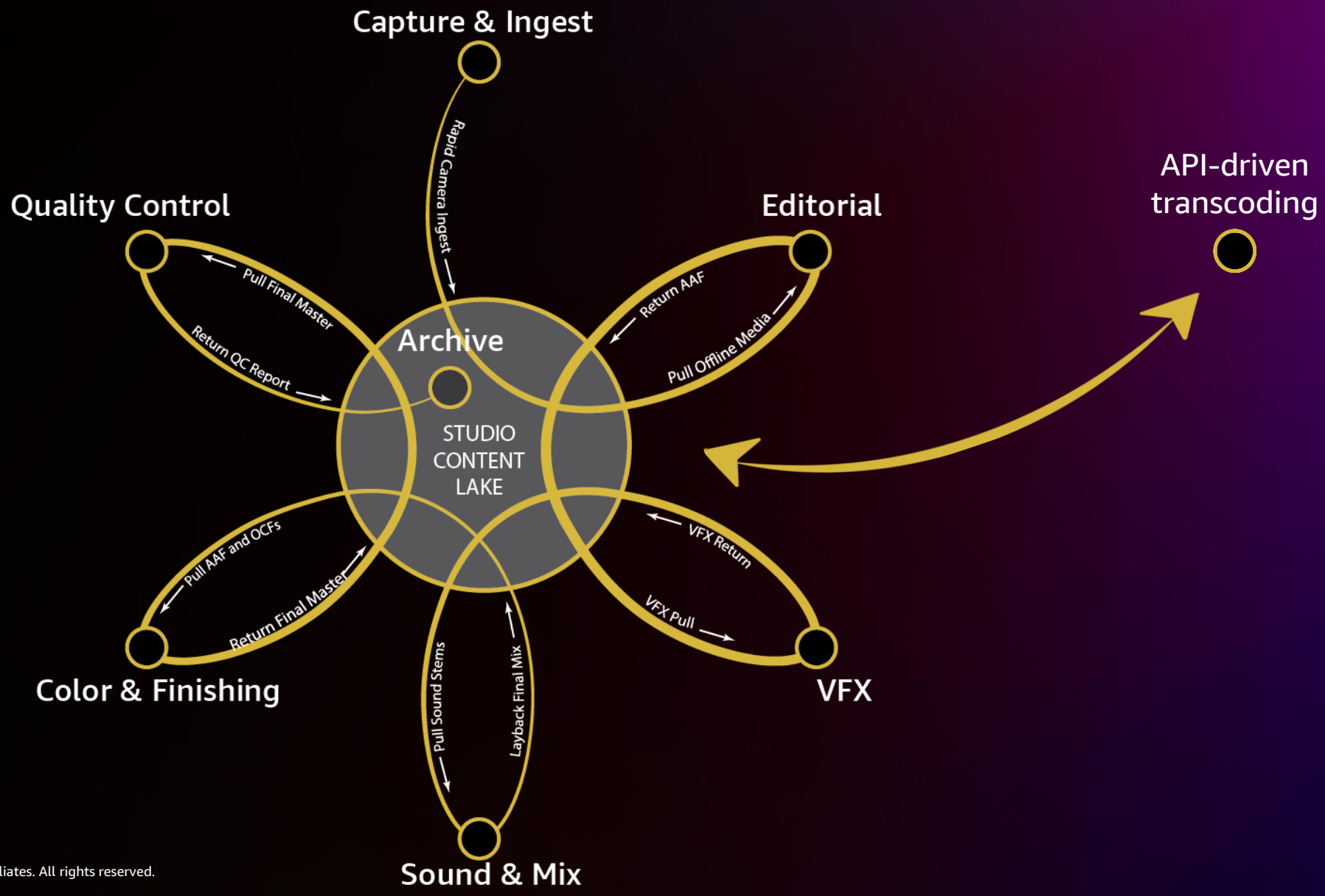
Holistic postproduction in the AWS Cloud



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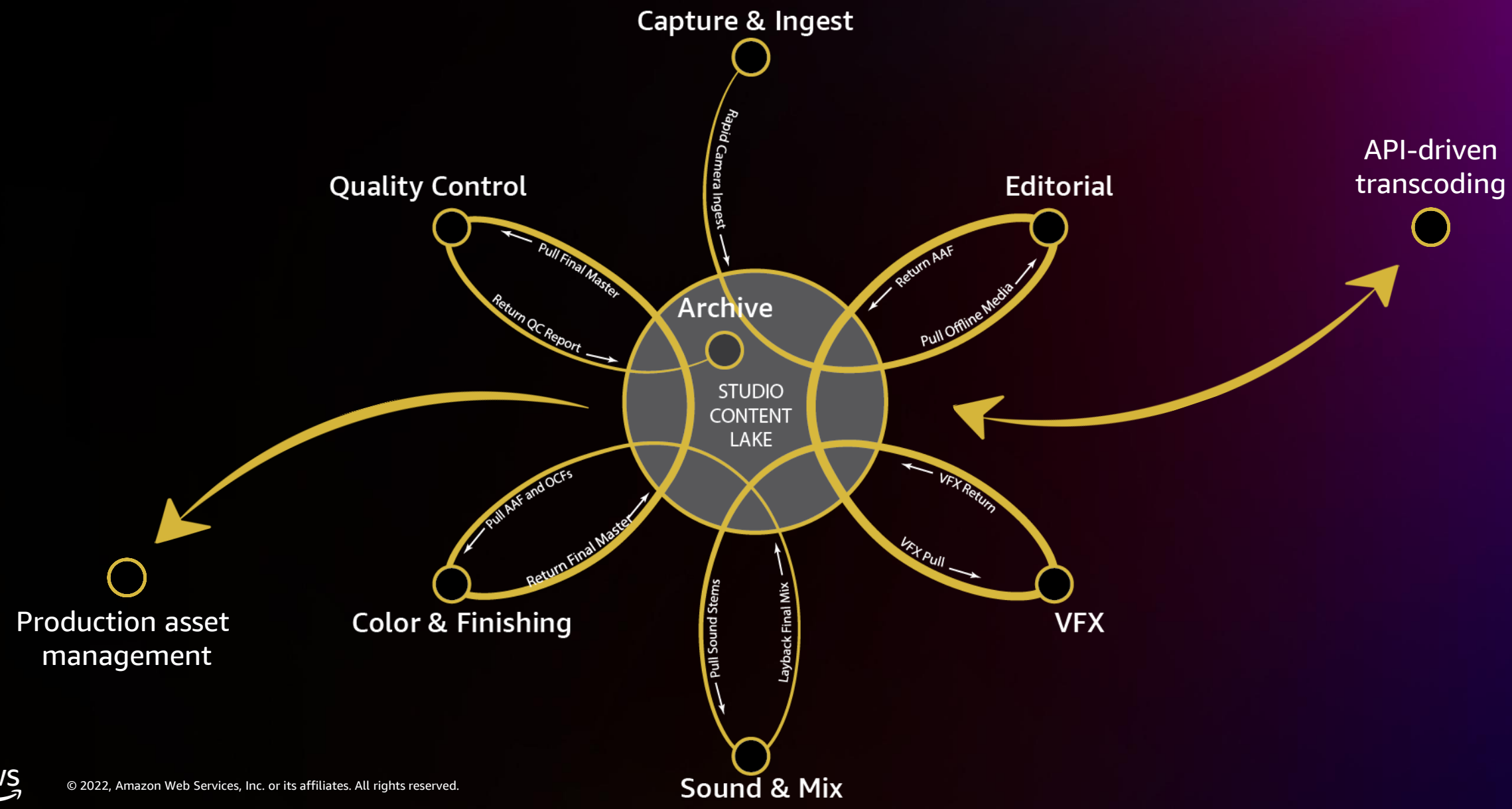
Holistic postproduction in the AWS Cloud



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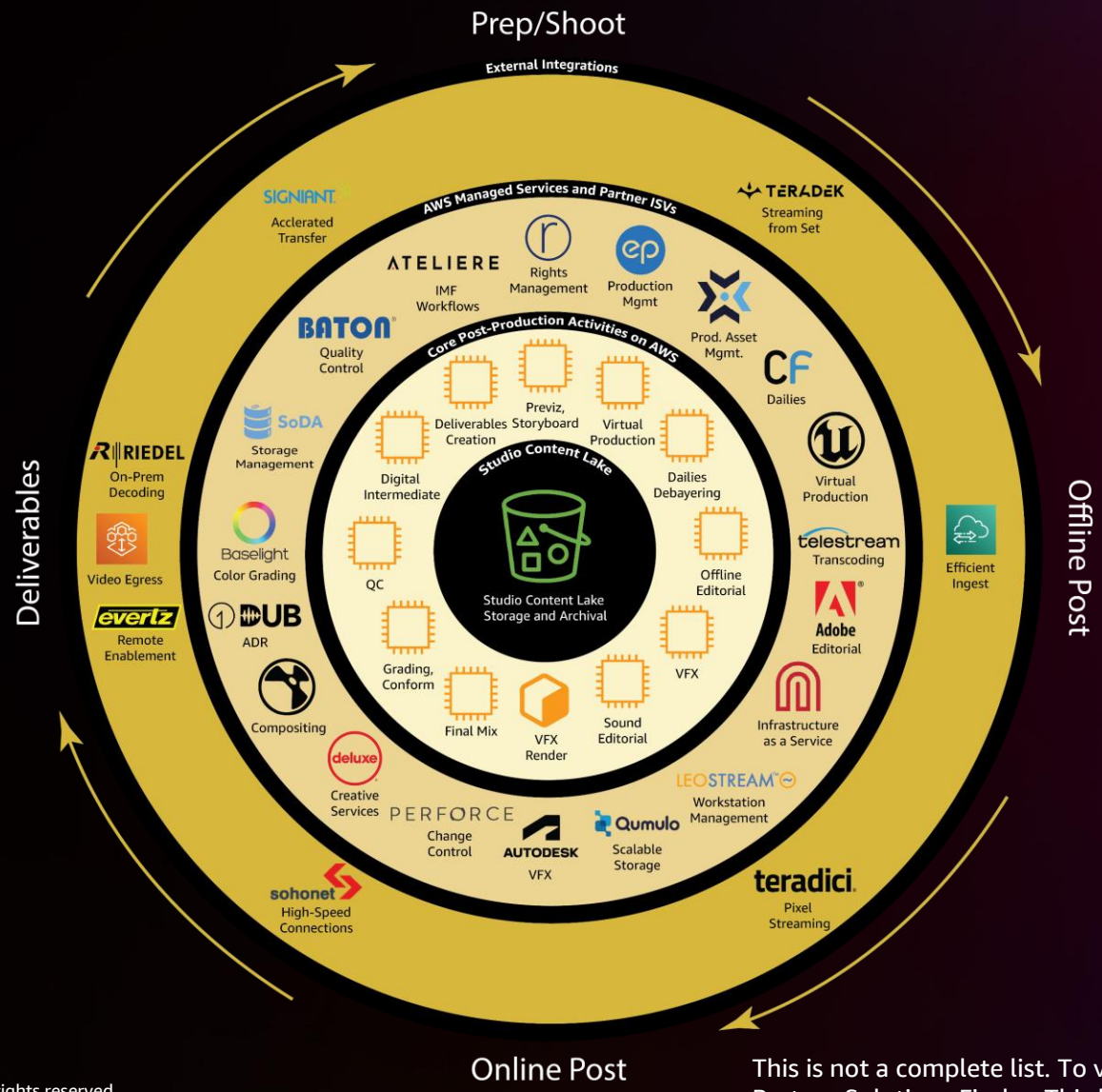
An integrated and interconnected solution



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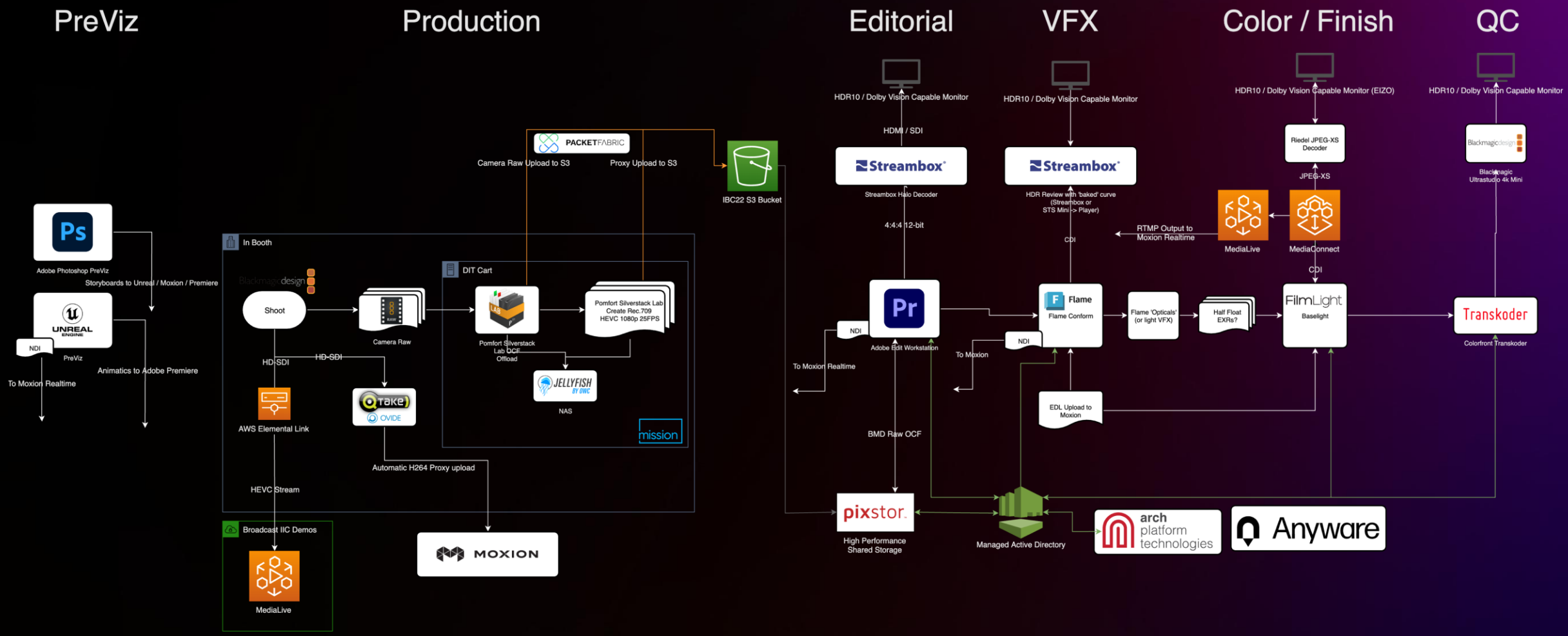
End-to-end content production in the cloud

AT IBC 2022



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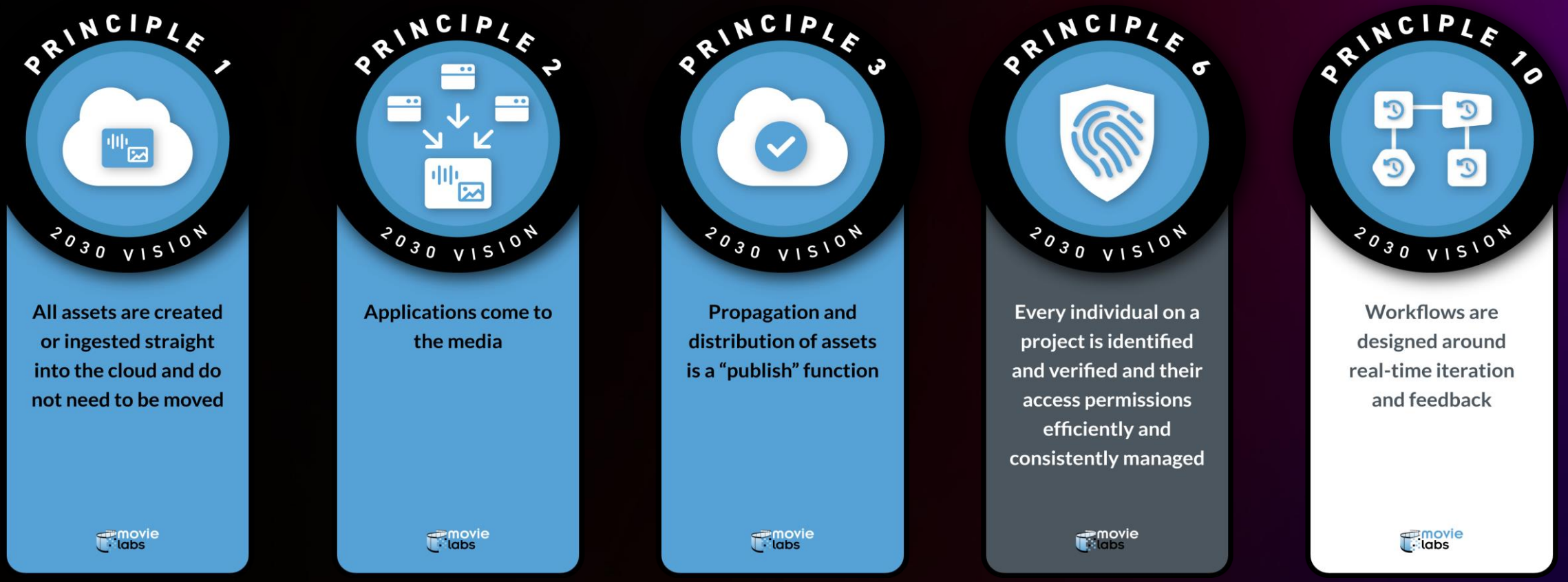
AWS and the MovieLabs 2030 Vision

This “Studio in the Cloud” at IBC 2022 is a demonstration of the MovieLabs 2030 Vision for the Future of Media Creation; MovieLabs has recognized this case study demonstrates the following 2030 Vision Principles



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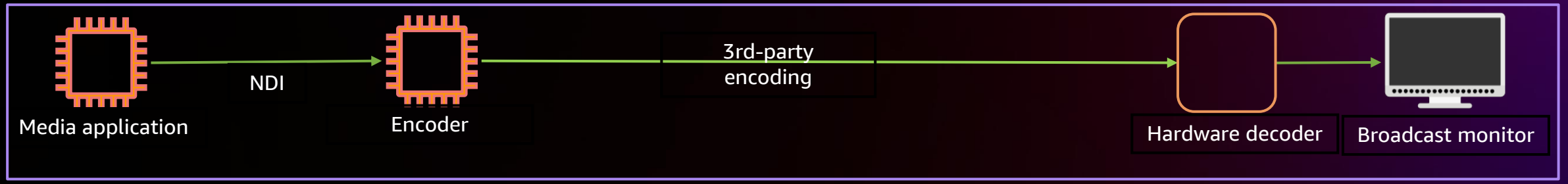
Over-the-shoulder view

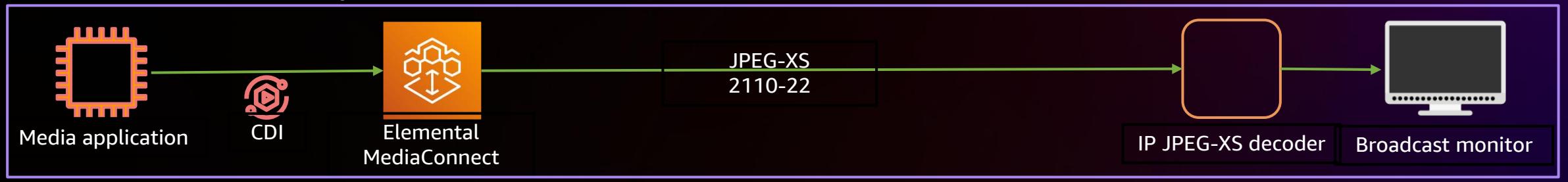
VIDEO SIGNAL OUT

Application encoding

3rd-party encode/decode



Uncompromised quality



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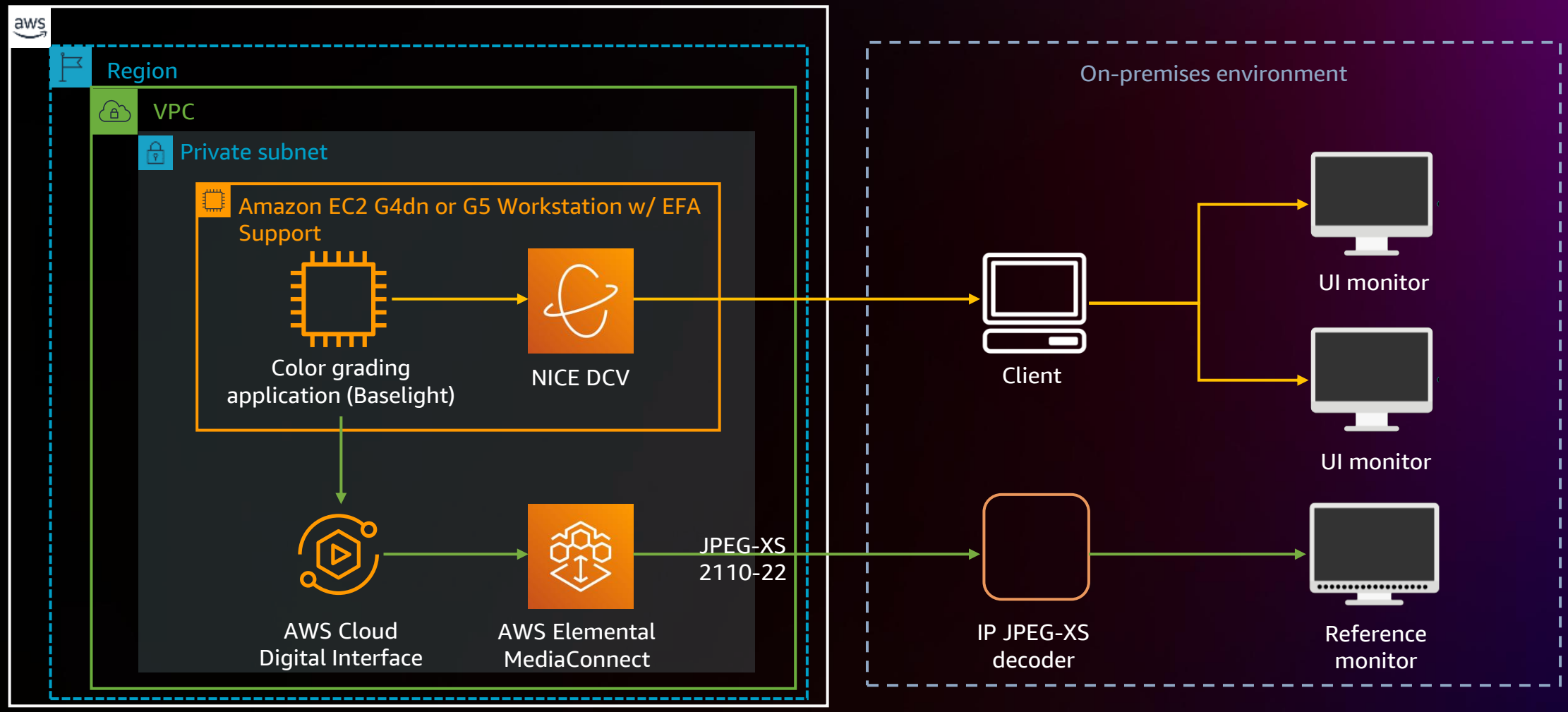
Color in the cloud

WITH BASELIGHT

HPA WINNER
Engineering Excellence Award



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The Lord of the Rings: The Rings of Power A case study on AWS

Ron Ames

Producer
The Lord of the Rings: The Rings of Power

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786 hours of 4K camera dailies

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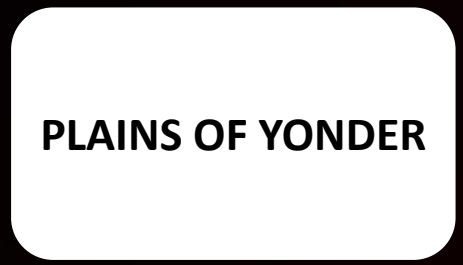

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Starting with a map

"I wisely started with a map, and made the story fit.
The other way about lands one in confusions and impossibilities,
and in any case it is weary work to compose a map from a story."
~ J.R.R. Tolkien

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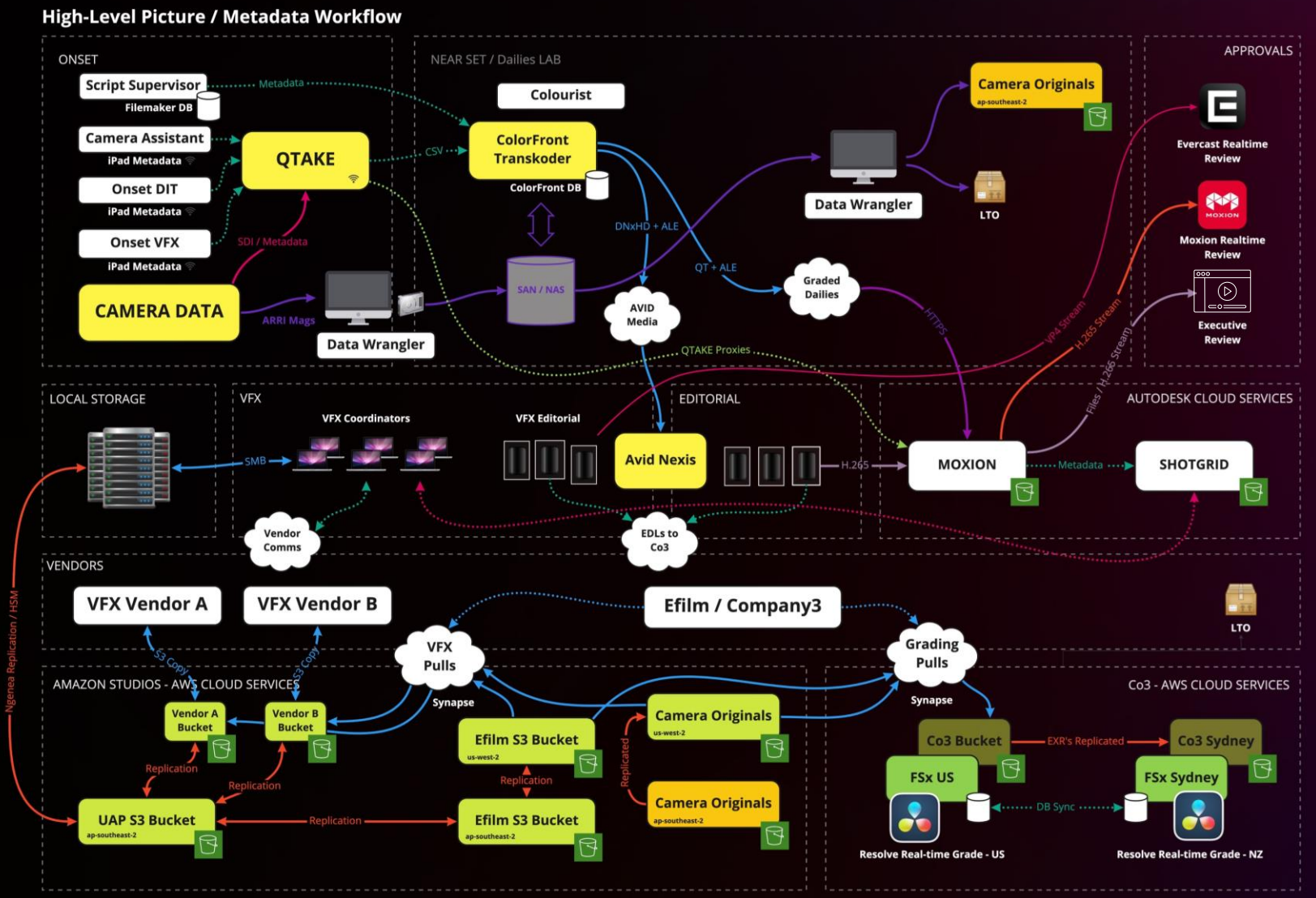
Season 1 cloud production map



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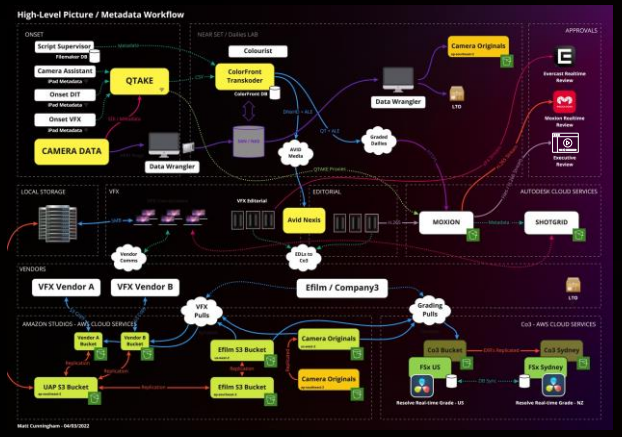
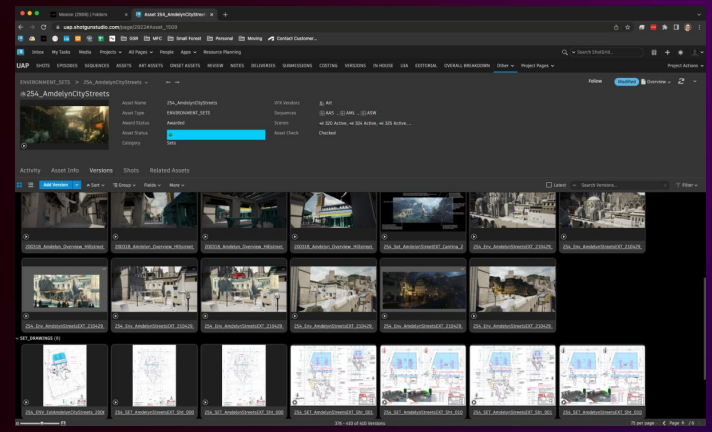
Identifying key values



CENTRALIZED METADATA
From camera capture to exhibition

COLLABORATIVE PRODUCTION
Nonlinear production in the cloud



ASSET MANAGEMENT AS WORKFLOW
Cloud based | Moxion and ShotGrid

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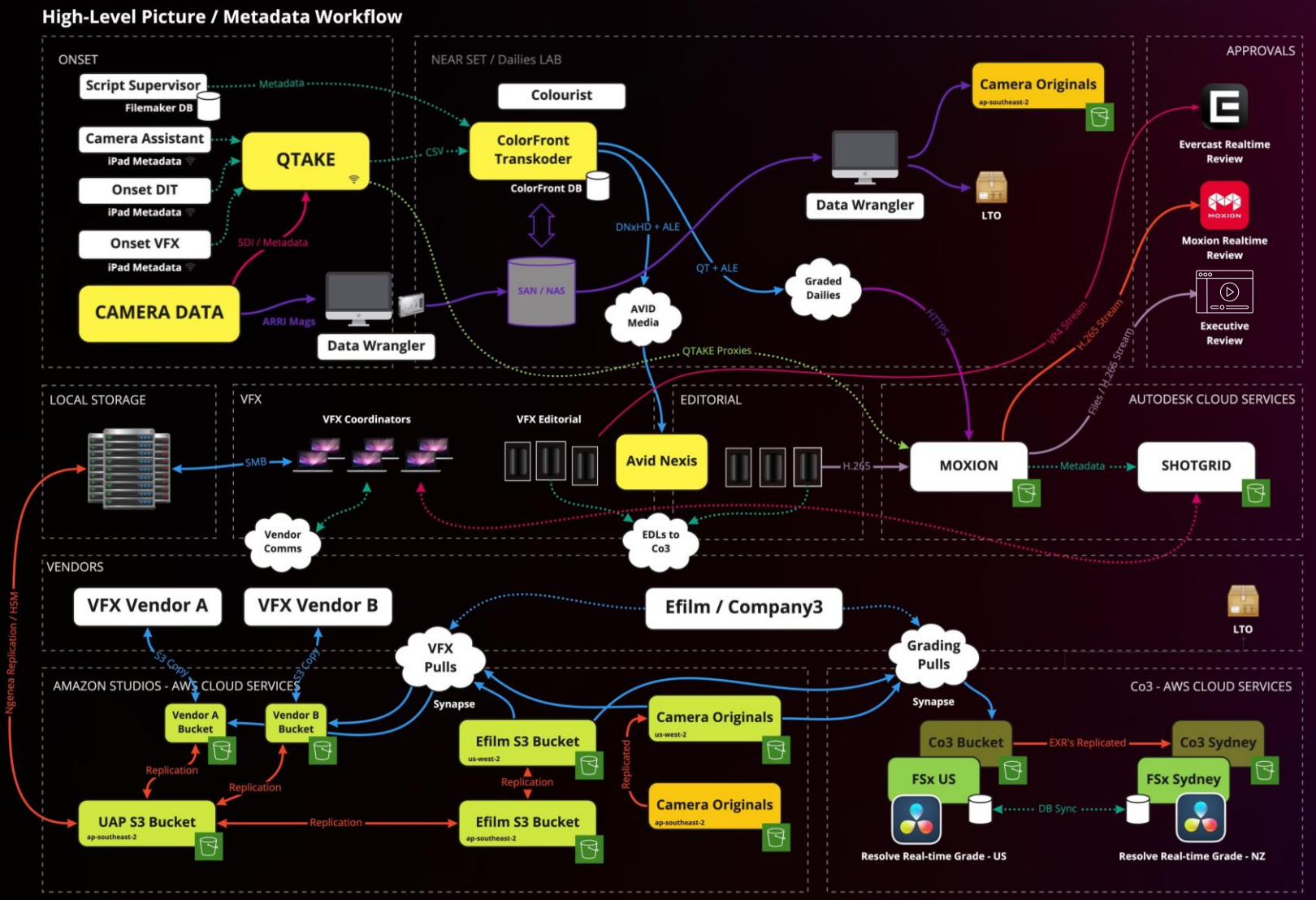
Centralized metadata



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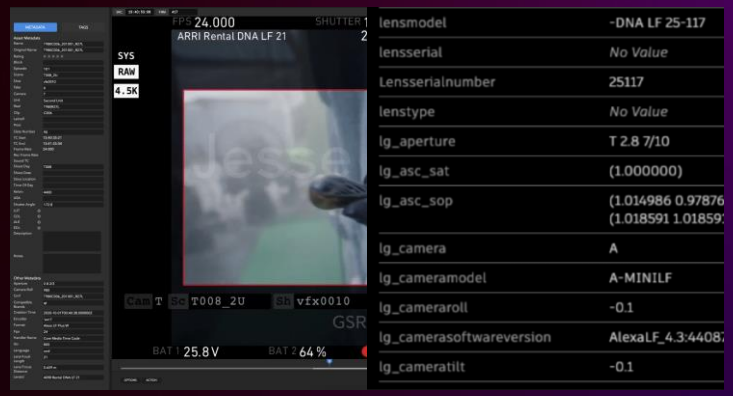
Centralized metadata

ARRI DNA LENSES
ARRI Lens Data System LDS-2

ON-SET PERSONNEL
Consolidated database



MOXION/SHOTGRID
Metadata capture/consolidation

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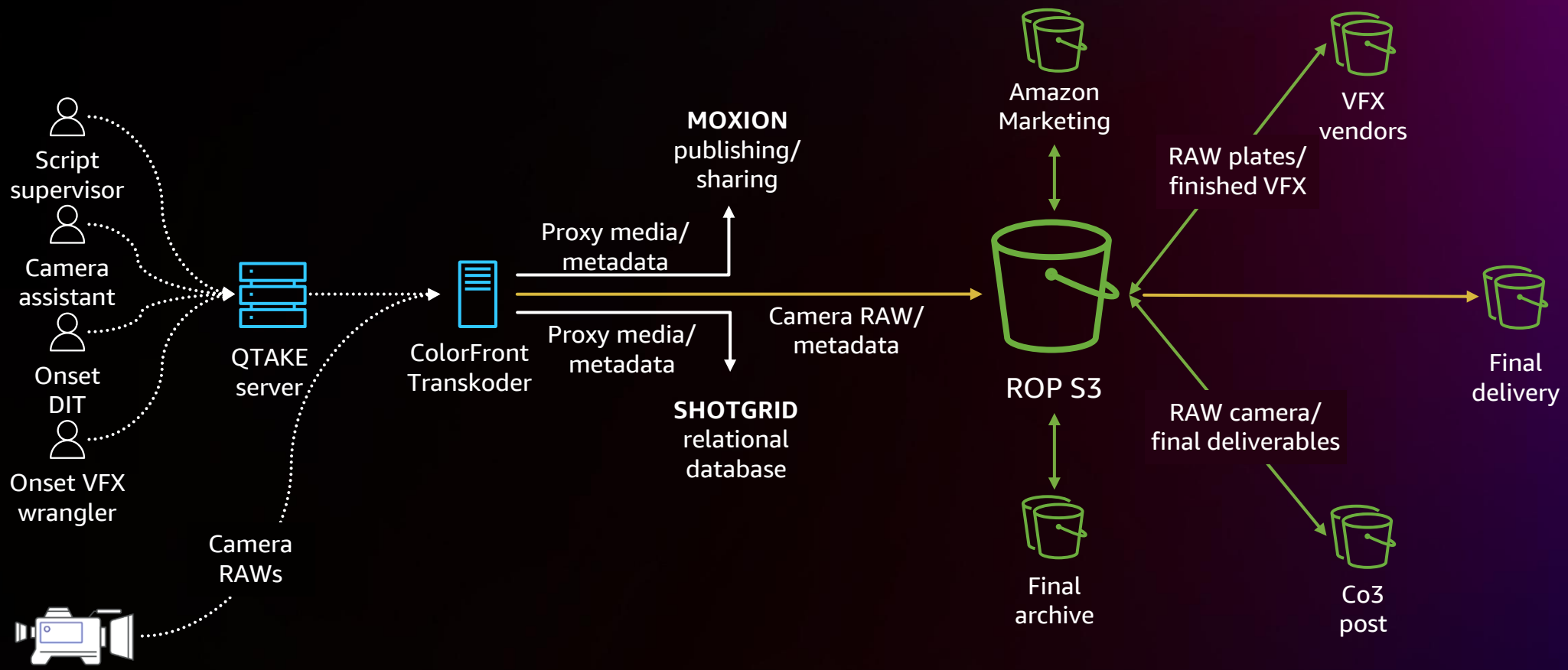
Centralized metadata



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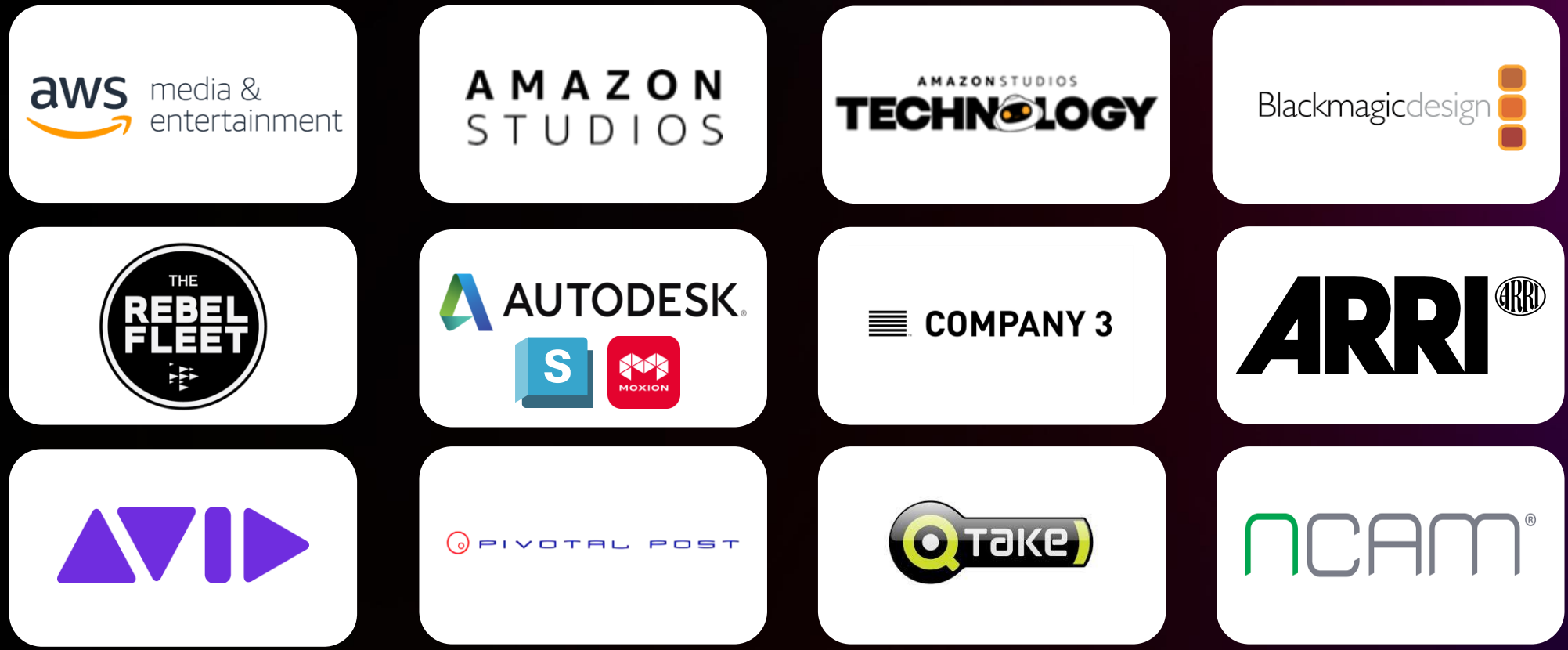
Technology partners



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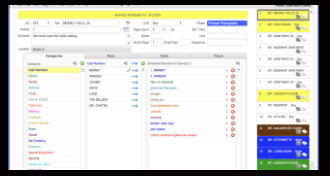
Collaborative production

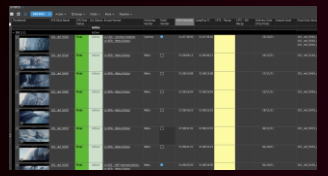
Script

Concept



Production

Post



VFX

Marketing

Archive

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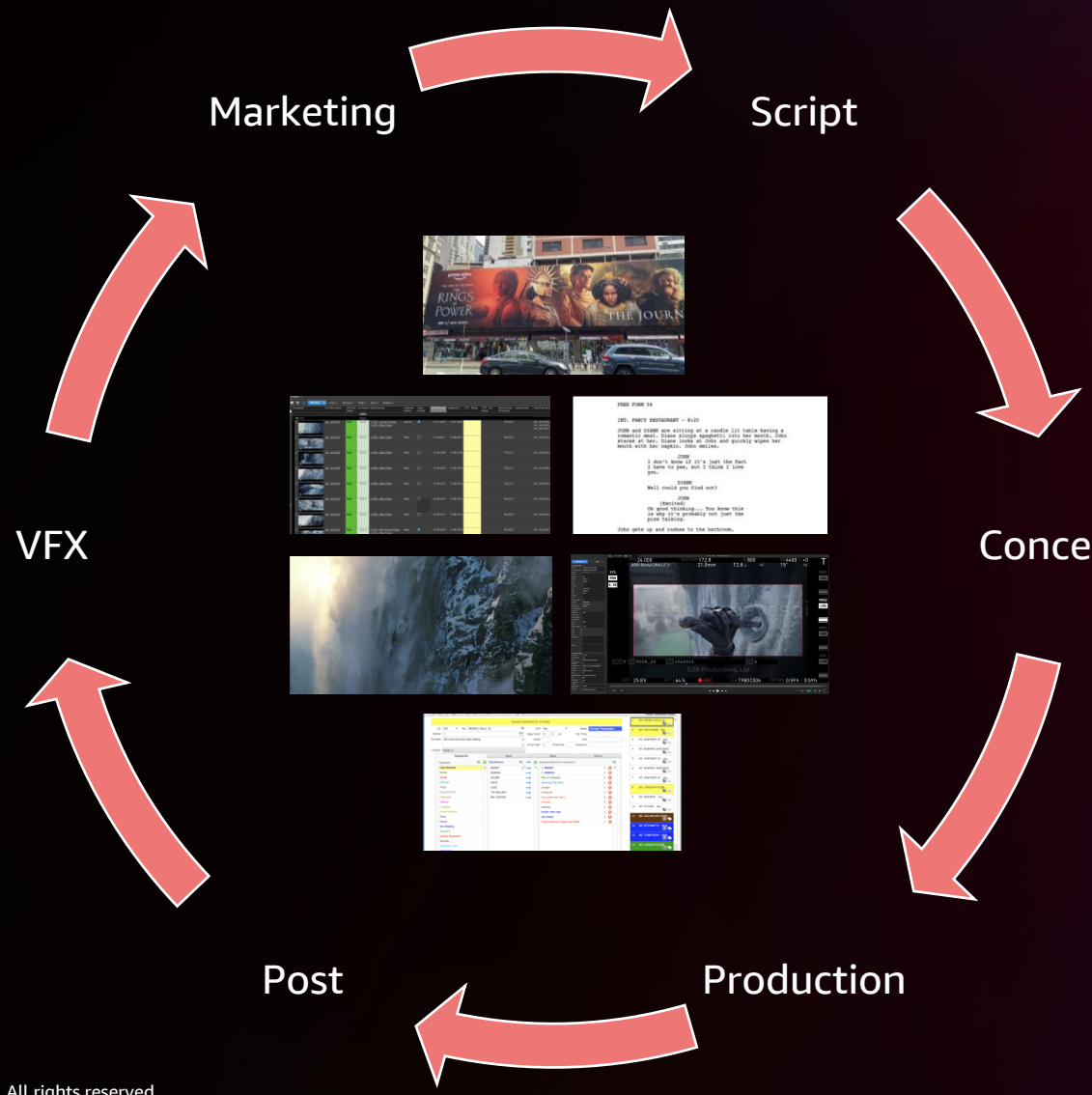
Nonlinear production model



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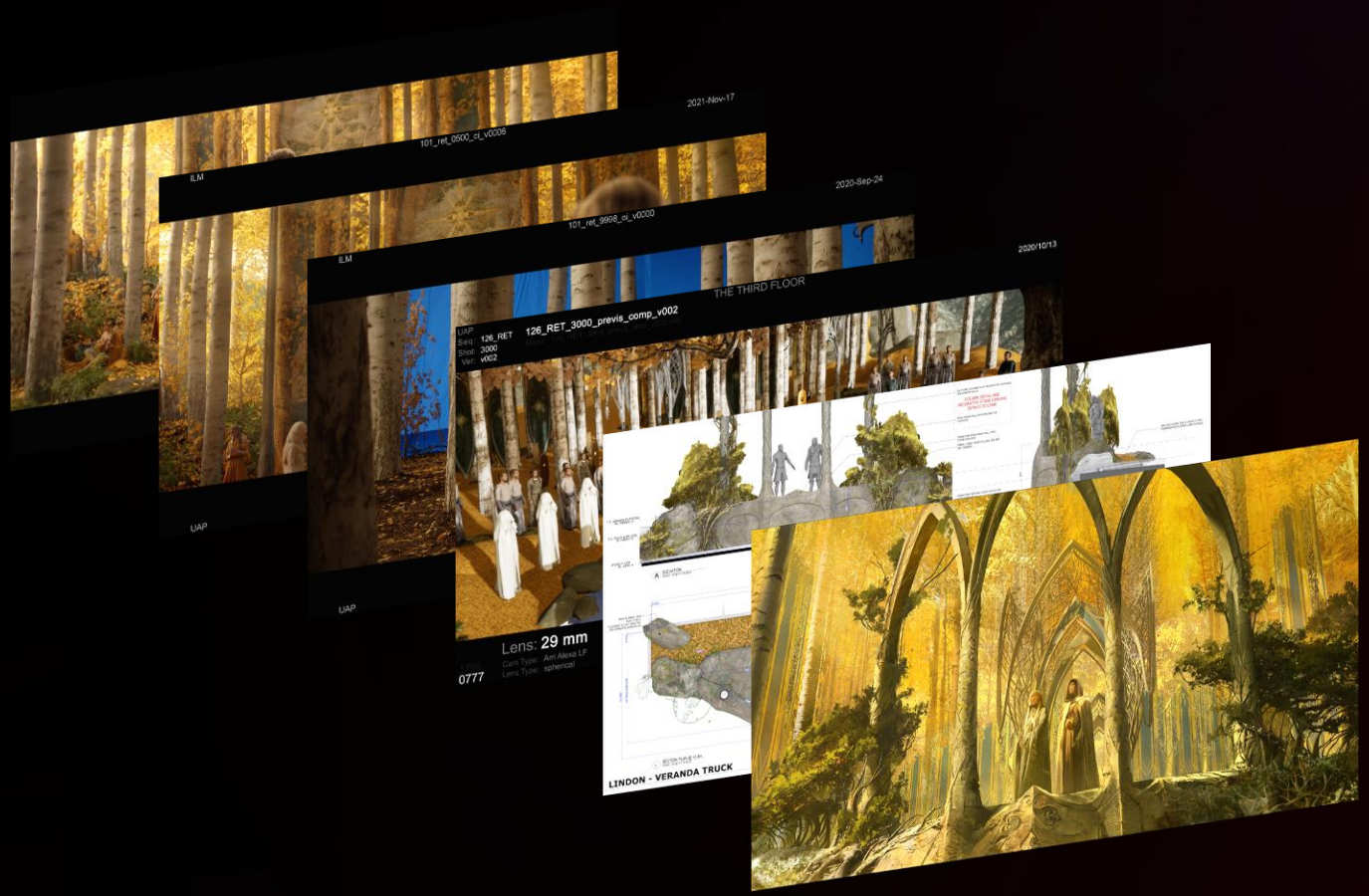
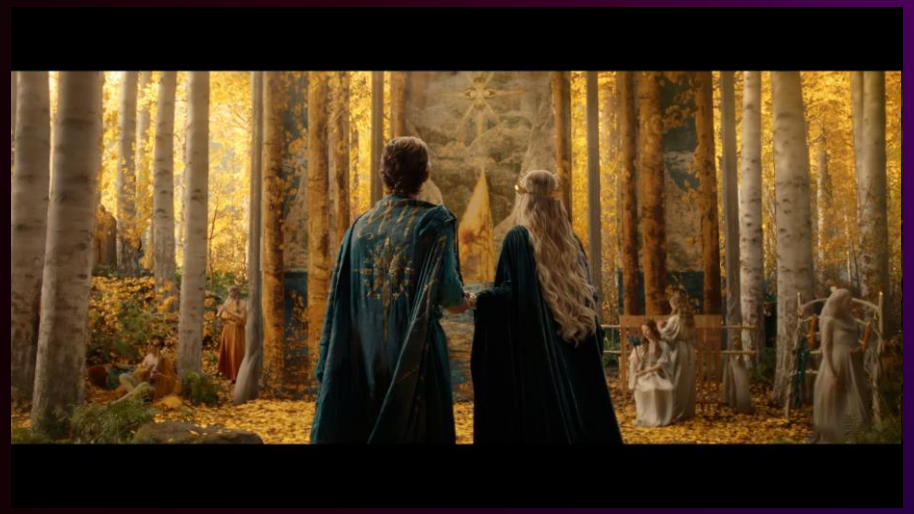
Nonlinear production model





PR[redacted]ON

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What is an asset?

PRODUCTION

Concept art
Set drawings
Storyboards
Location photos
Costume
Props

ORIGINAL MEDIA

Camera negative
Production audio
On-set photography

3D FILES

VFX models*
ART models
3D set plans
Processed LiDAR
*shareable in USD format

DELIVERABLES

Final audio/video files
EXR shot finals
Text elements
White papers
Wrap documentation

The above list is just an example list – in truth, nearly any file generated throughout a production lifecycle should be catalogued, tracked and stored

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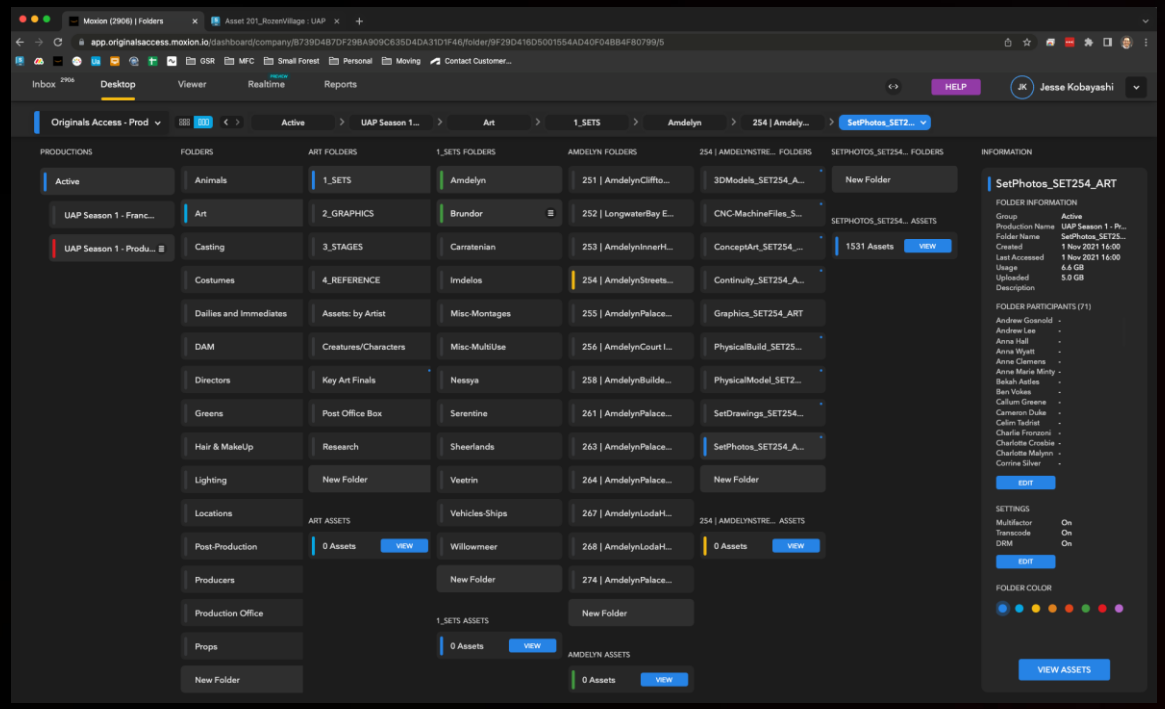
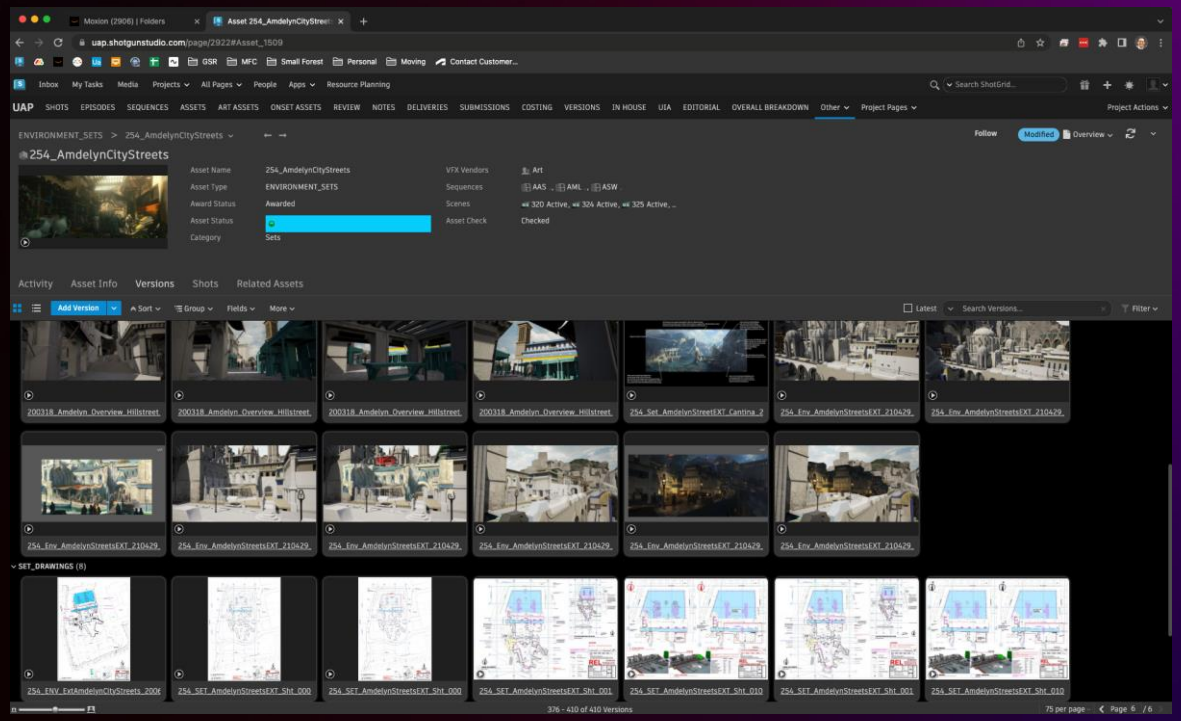
Asset management as workflow



MOXION



SHOTGRID

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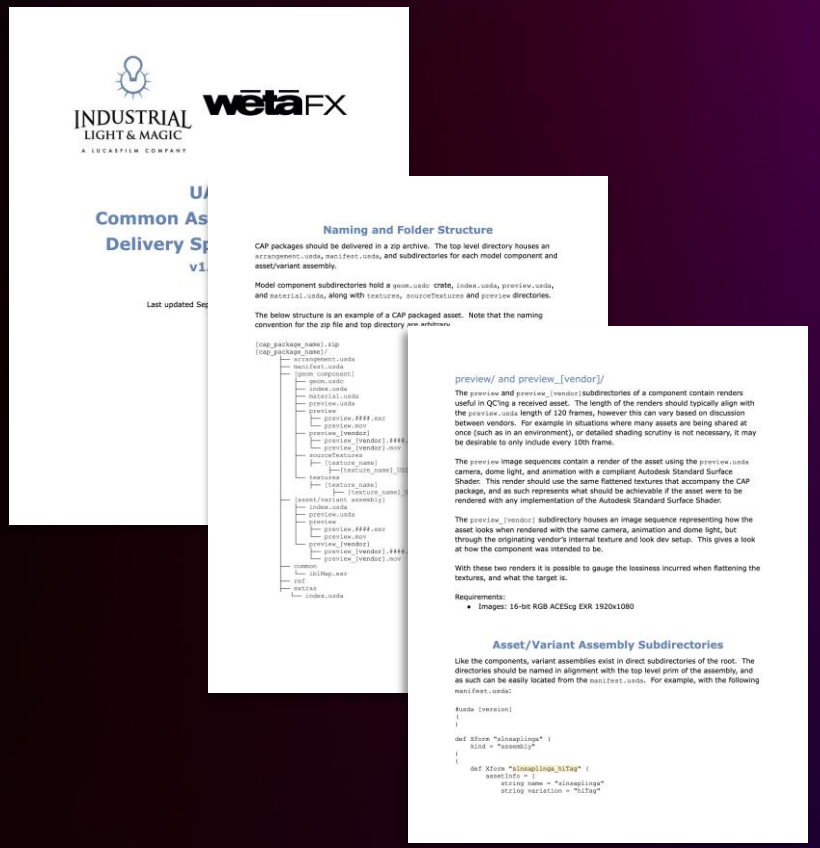
Digital assets/common asset packages



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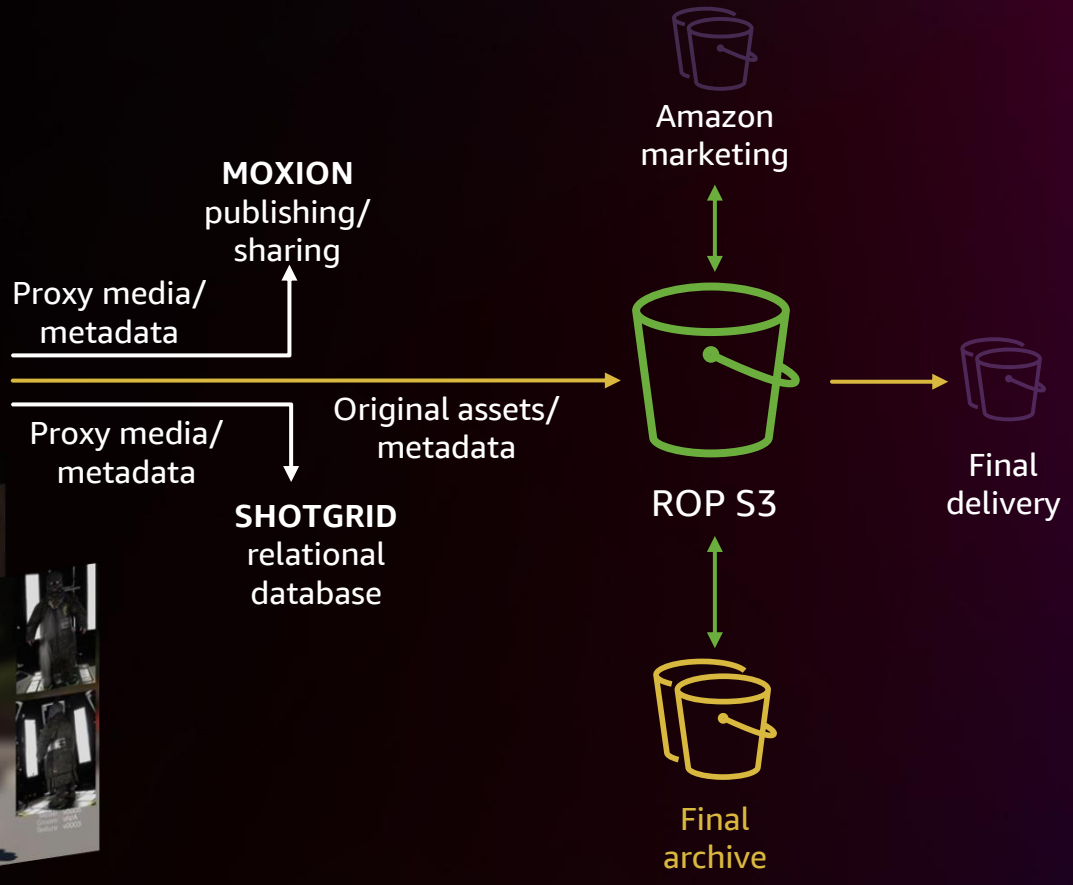
Archive as workflow



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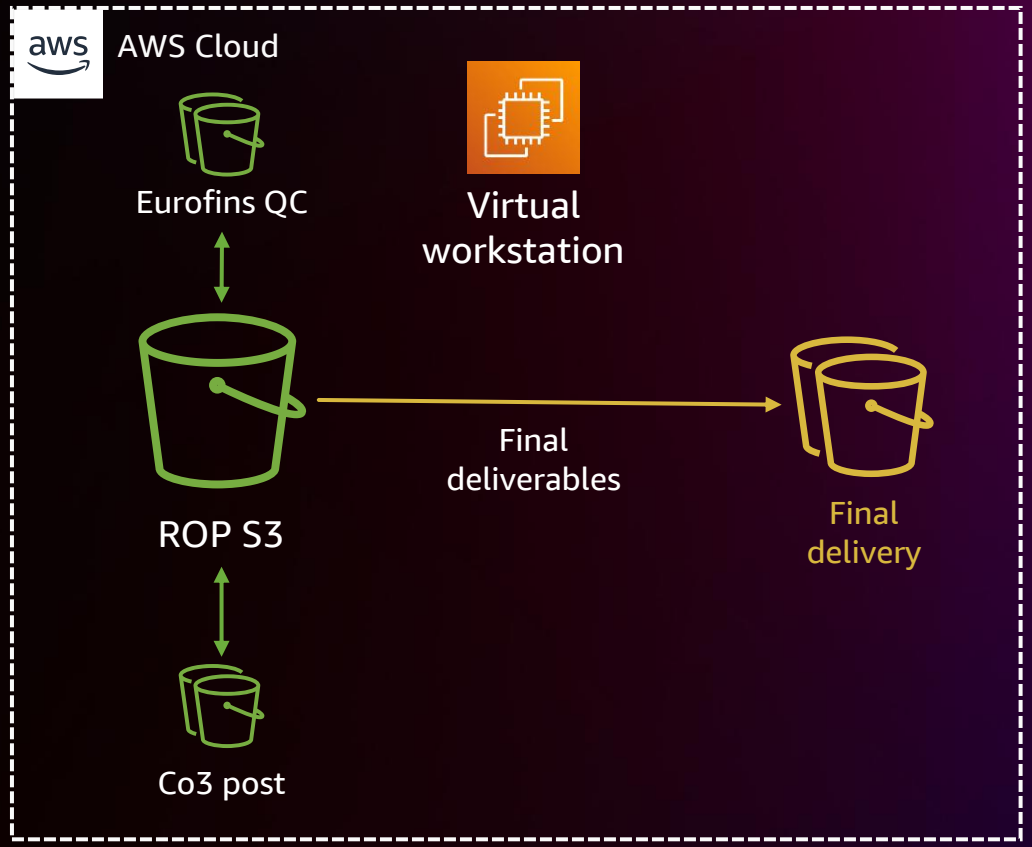
Final delivery through the cloud

All final episodes
delivered via virtual workstation



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The team

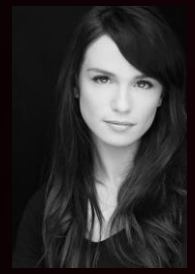
RON AMES
Producer

JASON SMITH
VFX Supervisor

JAKE RICE
Associate Producer

JESSE KOBAYASHI
VFX Producer

ELENI ROUSSOS
Digital Asset Supervisor



GWENDOLINE TAYLOR
Post Production Supervisor

APRIL LOUGHEED
VFX Production Manager

SAM SCOTT
VFX Senior Pipeline Manager

MATT CUNNINGHAM
Principal Technology Architect

CHETAN PATEL
VFX Data Supervisor

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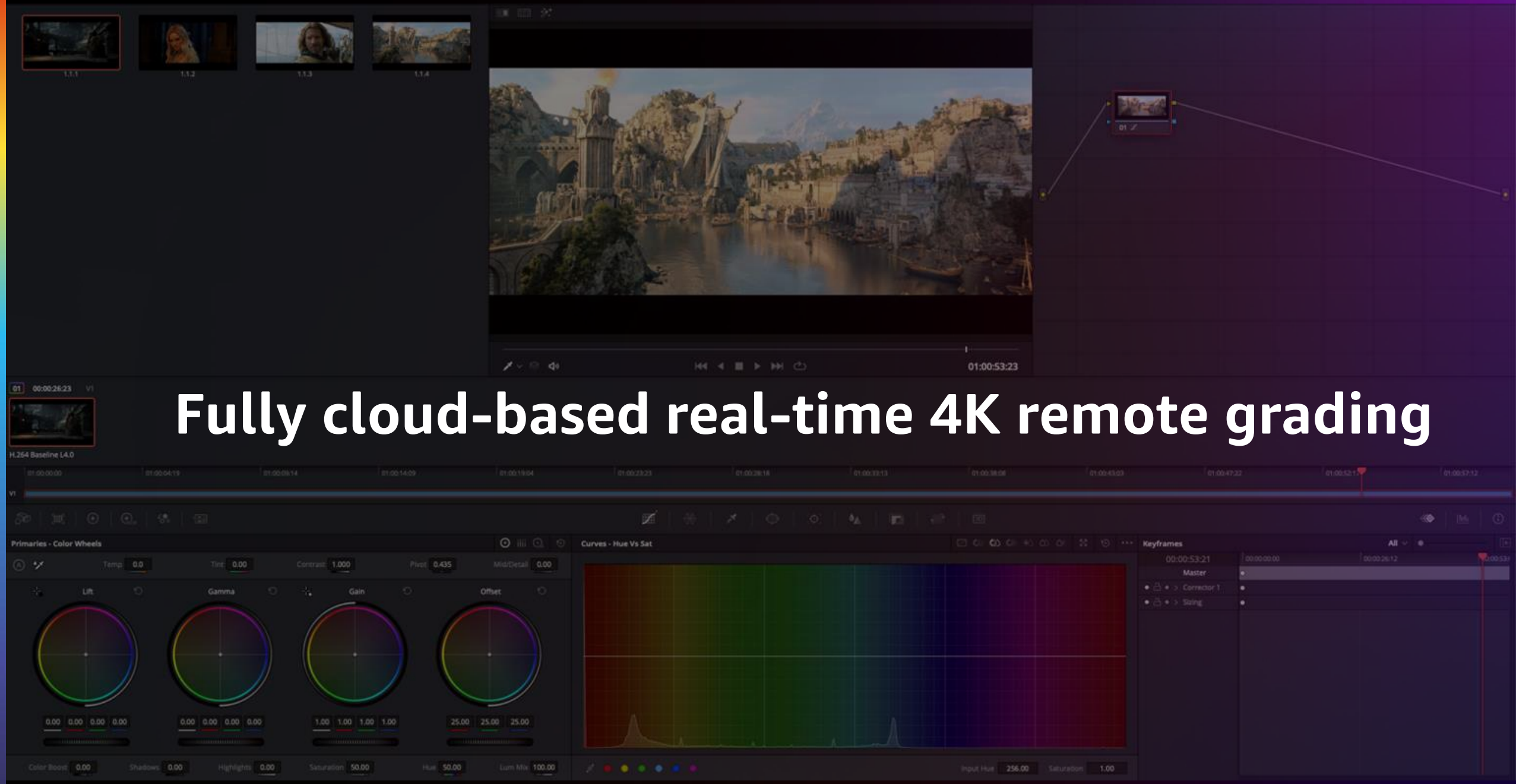

Fully cloud-based real-time 4K remote grading

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Company 3
Synapse and Cloud Studio on “The Rings of Power”

Weyron Henriques

SVP Product Development
Company 3

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Company 3: Premier artist-led creative company driven by technology and innovation

- Santa Monica, Hollywood, New York, London, Atlanta, Toronto, Vancouver, and AWS
- Specializing in all aspects of postproduction
- Feature film, episodic, documentary, and commercials

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Company 3 and The Rings of Power

- AWS based post-production environment built by Company 3
- Camera raw, dailies, image science, VFX pulls and returns, conform, finishing and deliverables
- AWS Multi-region US-West, US-East, AP Southeast2, and EU West 2
- CPU, GPU, storage, networking, databases, and security
- HDR/SDR reference-quality stream distributed over AWS secured global network
- US West to Idaho, LA, NY, Auckland, and London

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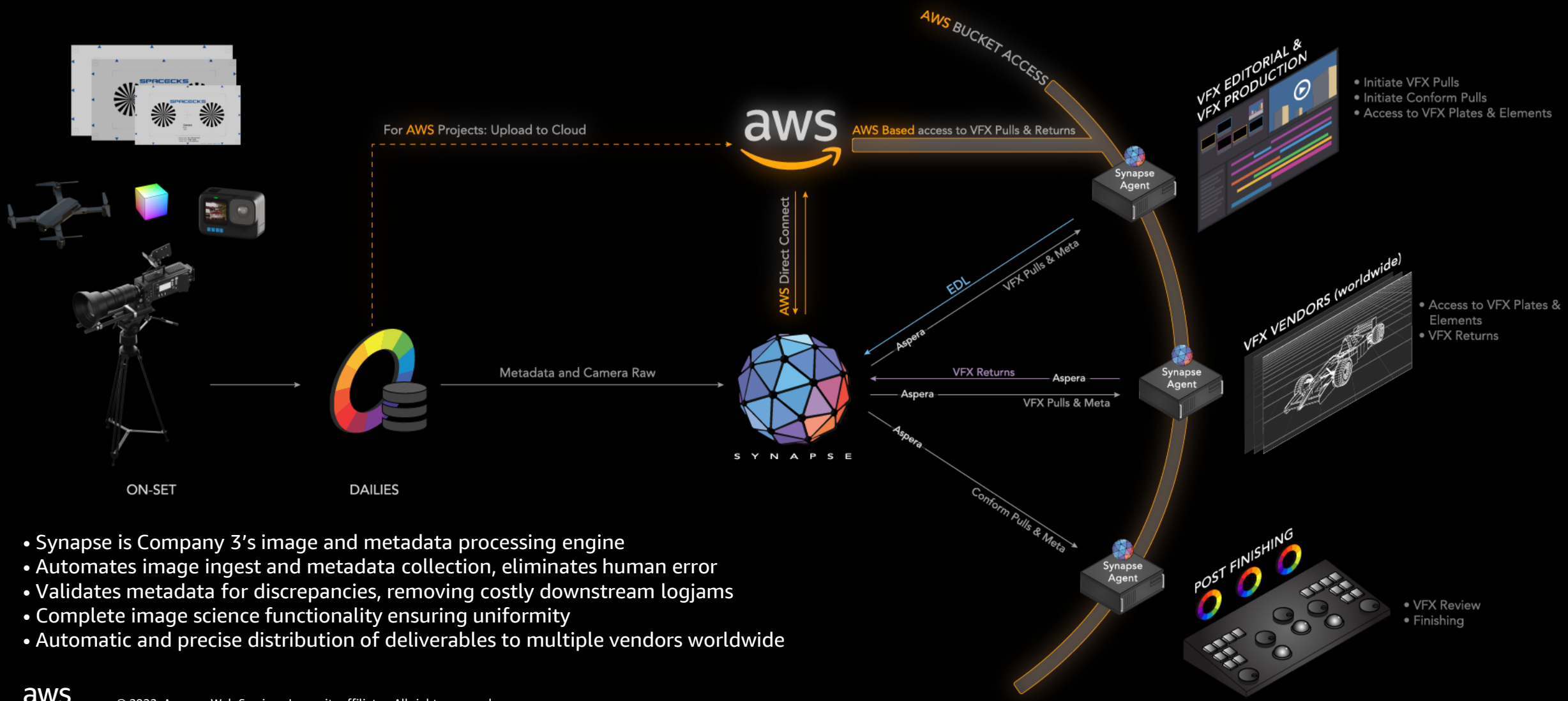
Synapse + AWS environment

DAILIES INGEST – VFX TURNOVER – CONFORM PREP



- Synapse is Company 3's image and metadata processing engine
- Automates image ingest and metadata collection, eliminates human error
- Validates metadata for discrepancies, removing costly downstream logjams
- Complete image science functionality ensuring uniformity
- Automatic and precise distribution of deliverables to multiple vendors worldwide

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Synapse: On-set production

38,090	860TB	1648	12	5
SHOTS CAPTURED	TOTAL DATA	CONTENT HOURS	COMPANIES	COUNTRIES

ON-SET PRODUCTION

- 68 days of content captured
- Content lives in AWS Southwest Sydney
- Hybrid initially
- In collaboration with AWS Professional Services, Synapse is fully AWS based

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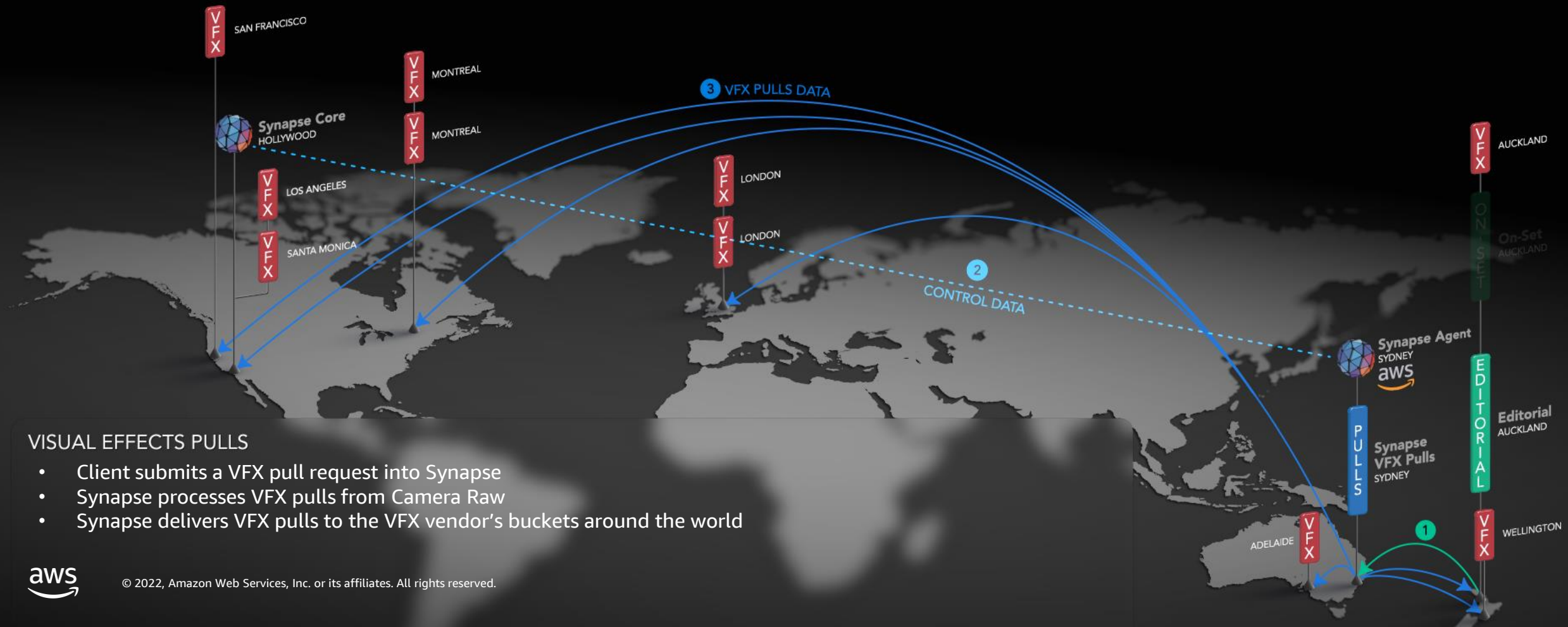
Synapse: VFX pulls



VISUAL EFFECTS PULLS

- Client submits a VFX pull request into Synapse
- Synapse processes VFX pulls from Camera Raw
- Synapse delivers VFX pulls to the VFX vendor's buckets around the world

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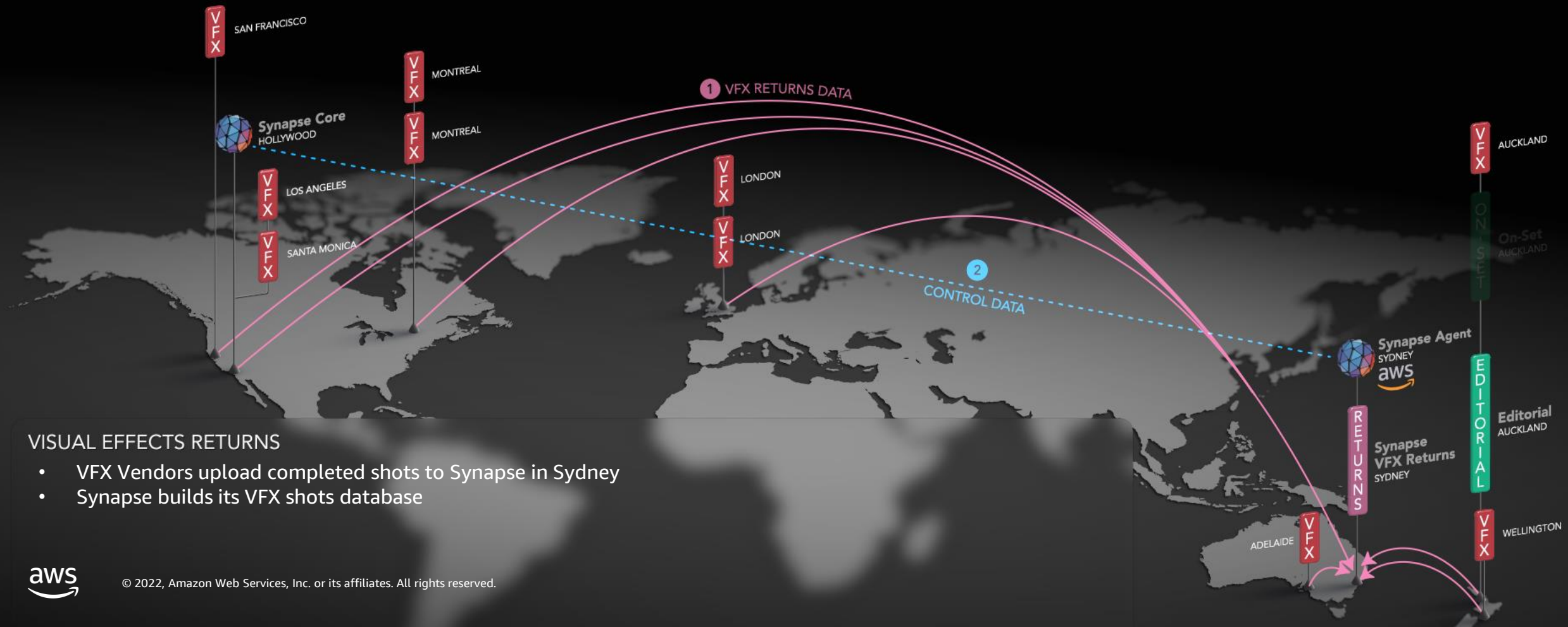
Synapse: VFX returns



VISUAL EFFECTS RETURNS

- VFX Vendors upload completed shots to Synapse in Sydney
- Synapse builds its VFX shots database

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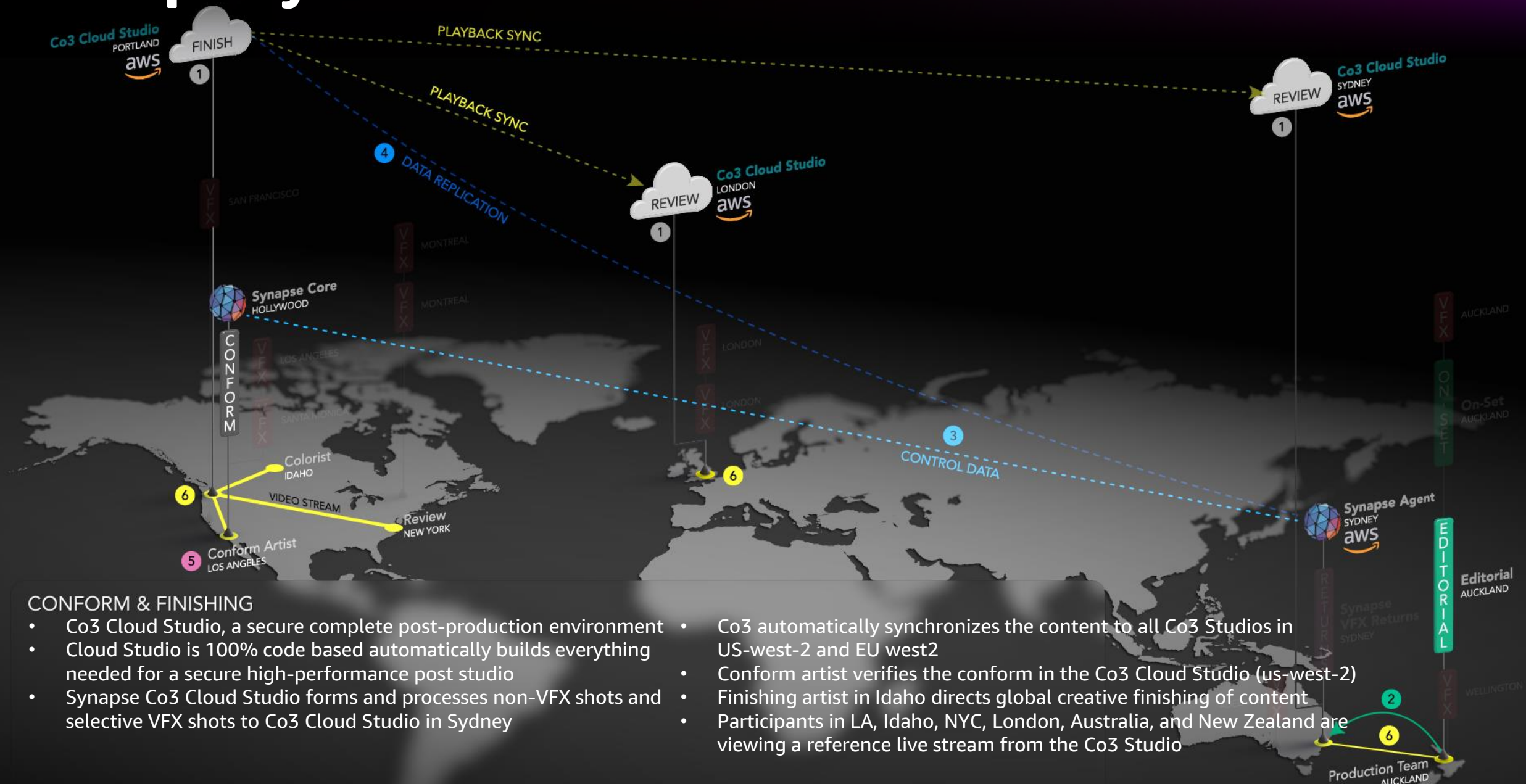
Company 3: Cloud Studio



CONFORM & FINISHING

- Co3 Cloud Studio, a secure complete post-production environment
- Cloud Studio is 100% code based automatically builds everything needed for a secure high-performance post studio
- Synapse Co3 Cloud Studio forms and processes non-VFX shots and selective VFX shots to Co3 Cloud Studio in Sydney
- Co3 automatically synchronizes the content to all Co3 Studios in US-west-2 and EU west2
- Conform artist verifies the conform in the Co3 Cloud Studio (us-west-2)
- Finishing artist in Idaho directs global creative finishing of content
- Participants in LA, Idaho, NYC, London, Australia, and New Zealand are viewing a reference live stream from the Co3 Studio

Takeaways

- Let your imagination define your solutions
- Understand AWS tools available to build your solution

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Q&A

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Thank you!

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