

ENGINEERING A LIVE STREAMING WORKFLOW FOR SUPER BOWL 53

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Agenda

- **Signal Acquisition & Encoding**
 - ◇ **Output Locking**
 - ◇ **QVBR**
- **Advertising / ESAM**
- **Multi-CDN / Delivery**
- **Monitoring / Visibility**
- **Testing**
- **Game Day**

Challenges

- **More Devices, More Viewers**
 - ◇ **How do we scale to meet audience demands for a quality experience?**
- **Ownership of our End to End Workflow**
 - ◇ **How can we monitor all these moving parts?**
- **Communication and collaboration across multiple teams and vendors**

Guiding Principles

- Do NOT Over Engineer
- Eliminate Single Points of Failure
- Plan for Failure

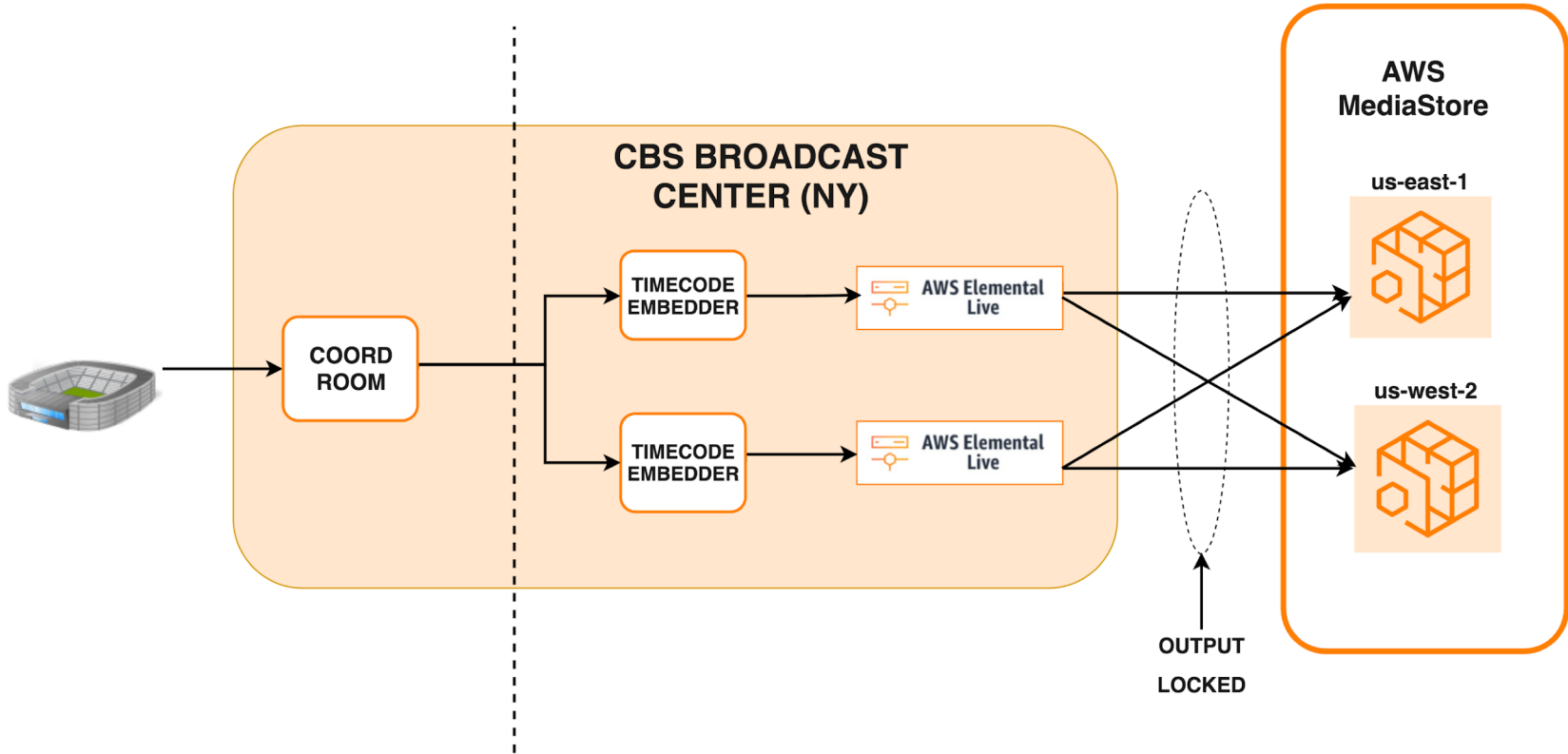
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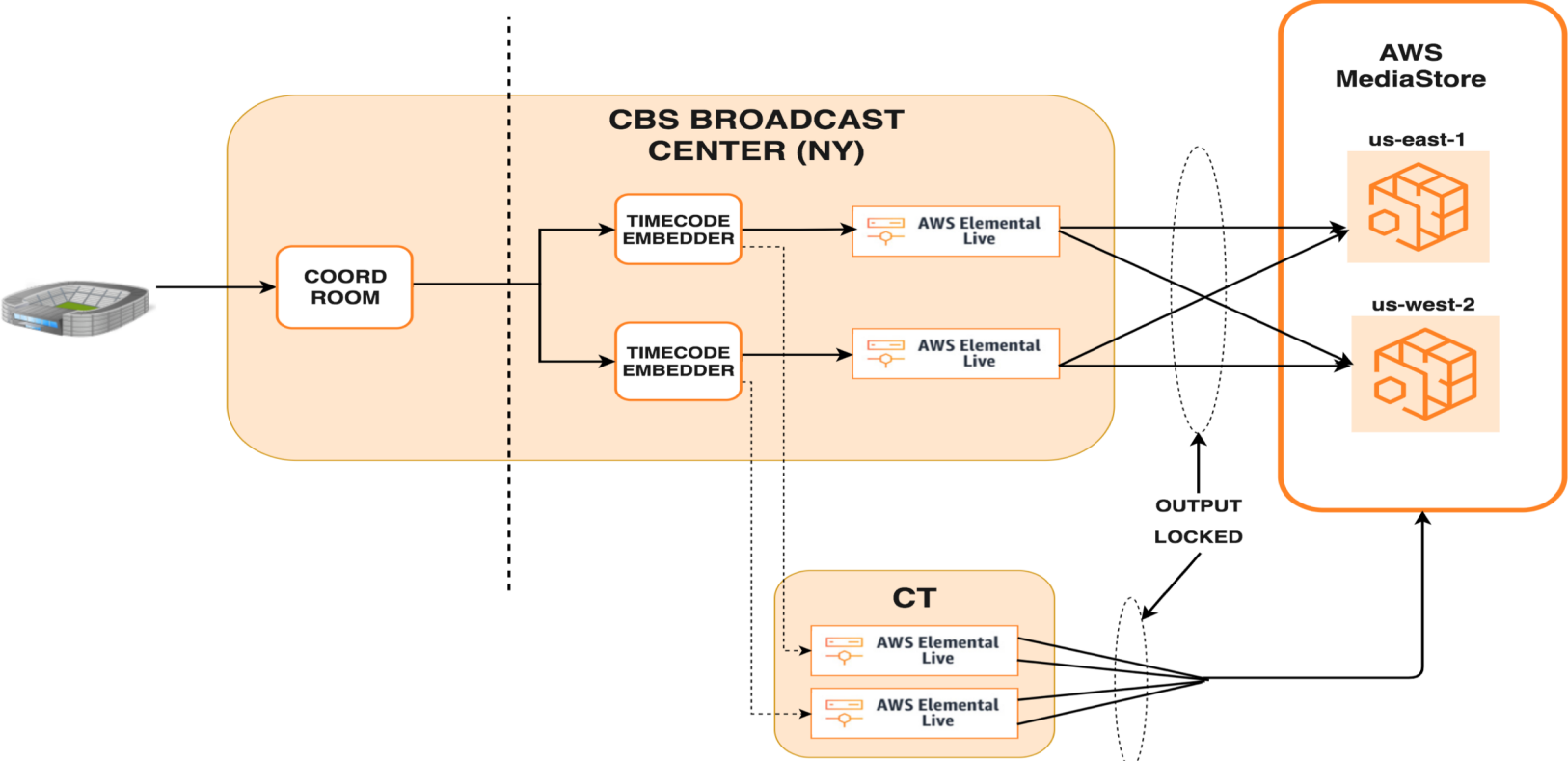
GOALS

- Minimize User Impact
- Optimize User Experience

Signal Acquisition & Encoding

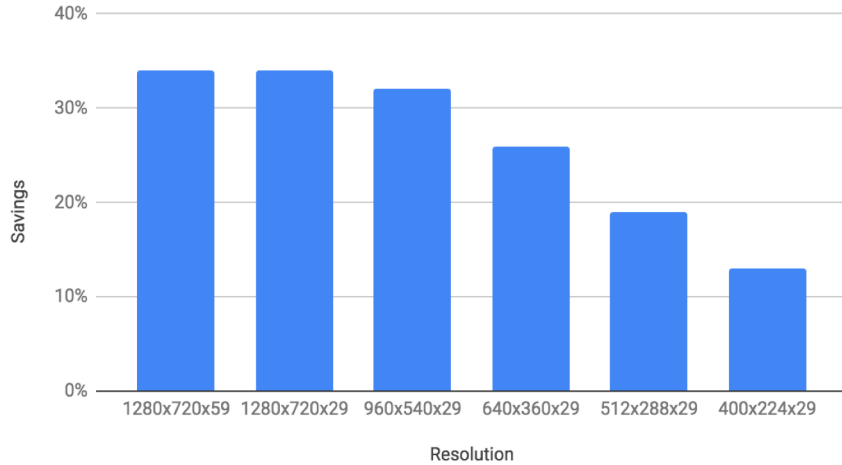


Signal Acquisition & Encoding

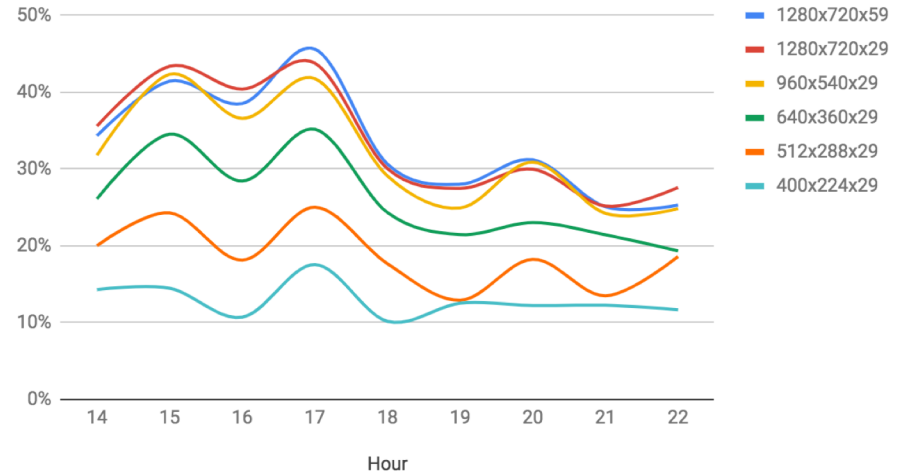


QVBR

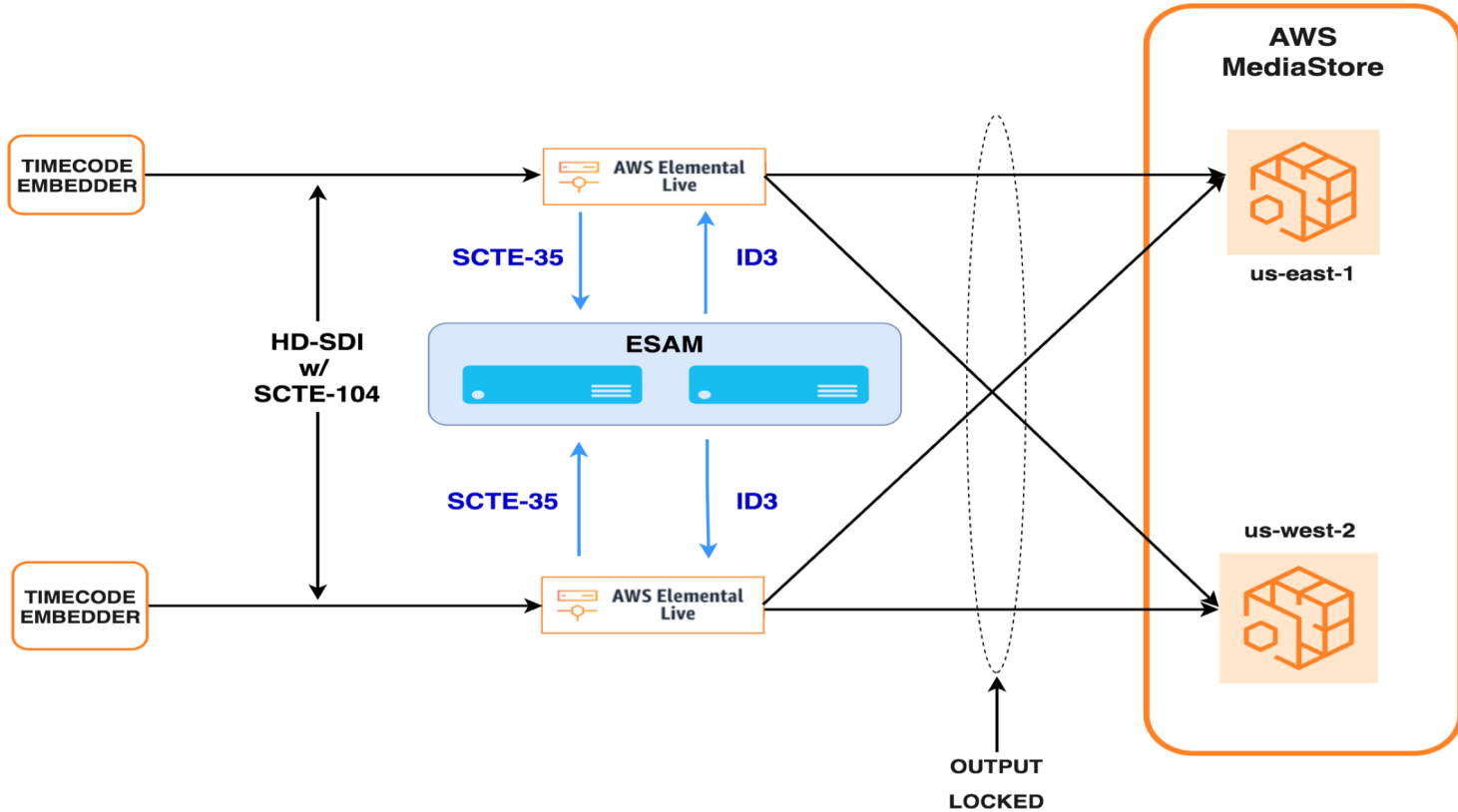
Avg Savings / Rendition



Avg Bitrate Savings / Hour



Advertising



Output Locking

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Output Locking

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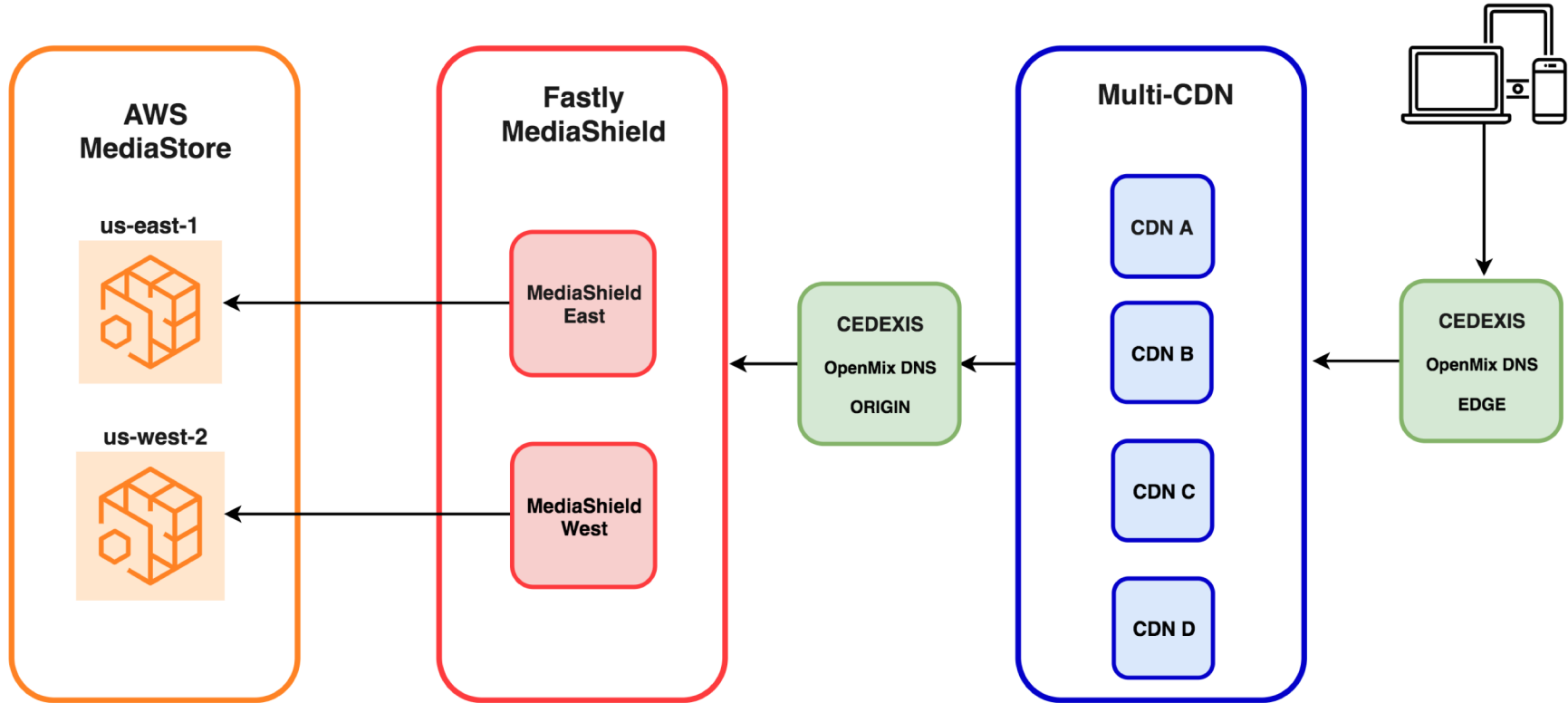
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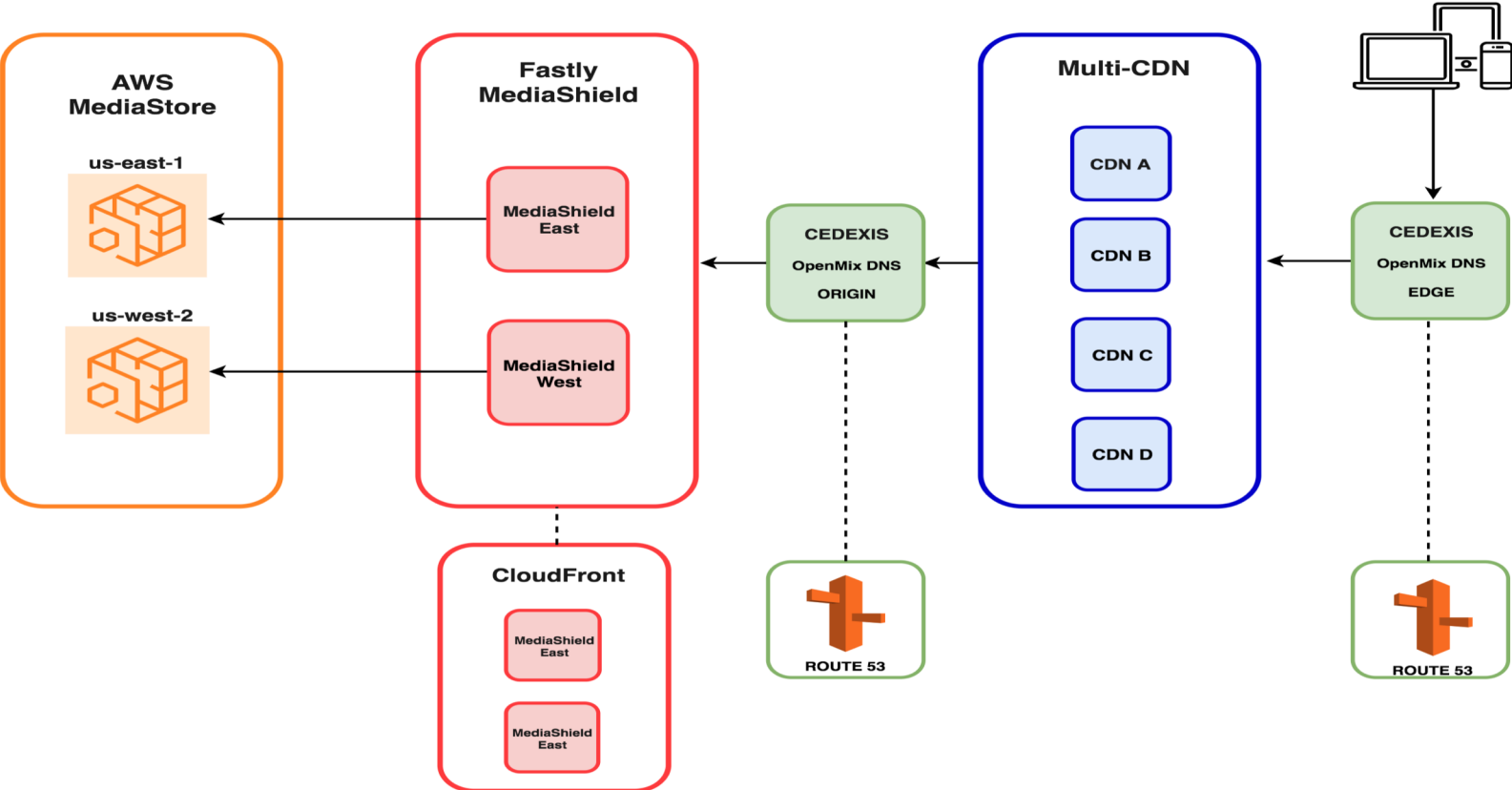
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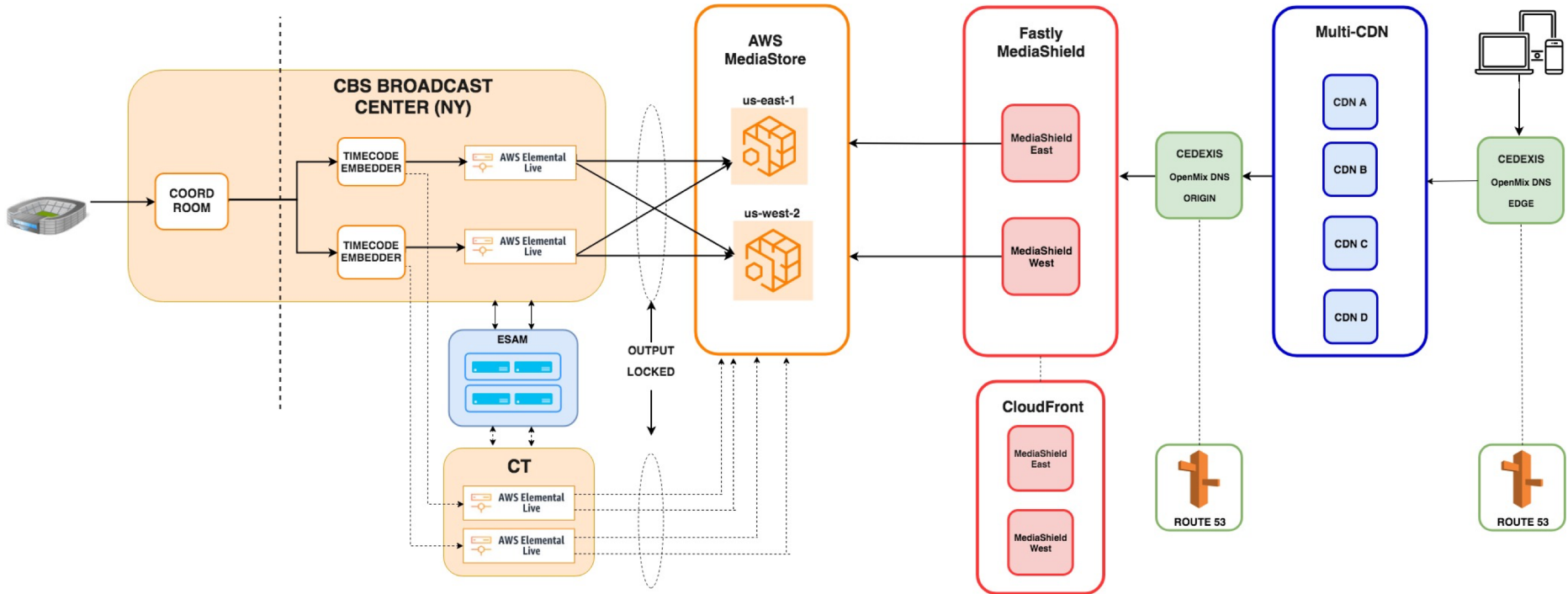
Delivery



Delivery



Outcome



Testing

- **Streaming in Production prior to Game Day**
- **Identifying Potential Points of Failure**
 - ◇ **Simulating Chaos**
- **Runbooks / Playbooks**
- **Tooling for Quickly Making Changes**
 - ◇ **Must be well tested**
 - ◇ **Behavior known / predictable**

Monitoring & Visibility

- **Client Side QoE**

 - ◇ **Conviva**

 - ◇ **MUX**

- **Synthetic Monitoring**

 - ◇ **TouchStream**

- **SumoLogic**

 - ◇ **Log Collection**

 - ◇ **Dashboards**

- **Internal Tools**

 - ◇ **Manifest Alignment Check**

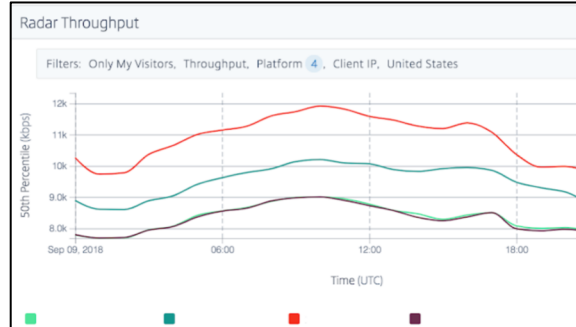
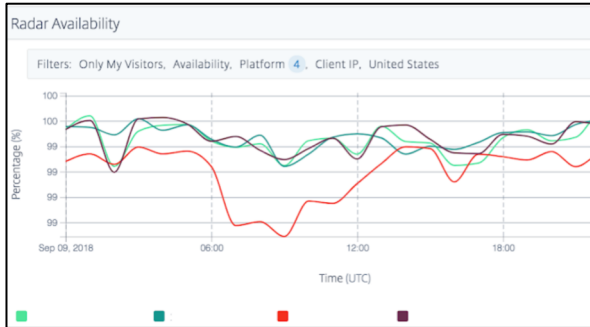
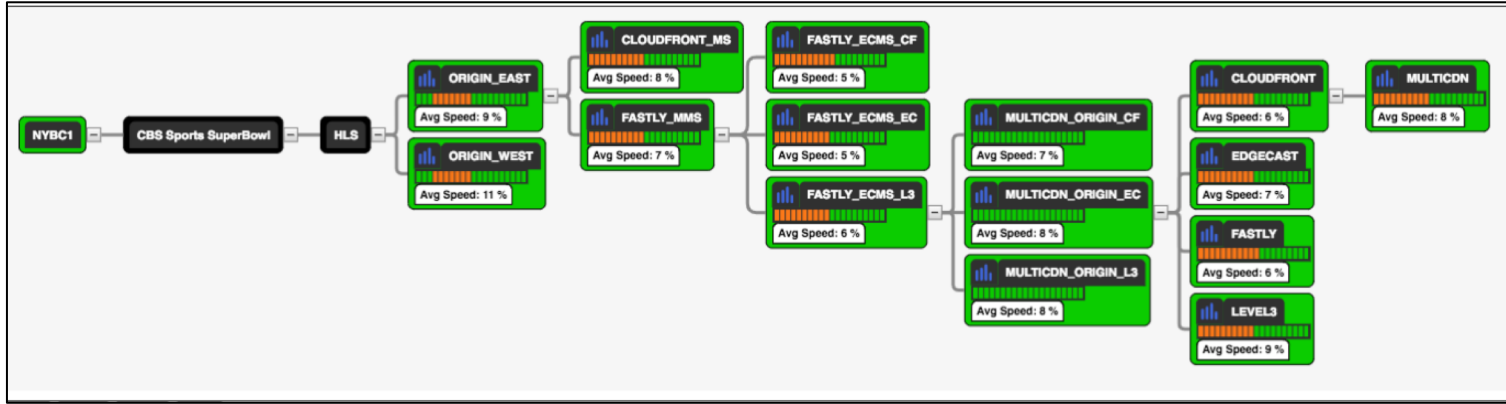
 - **based on HLSpider**

 - ◇ **Multi-Screen Viewer**

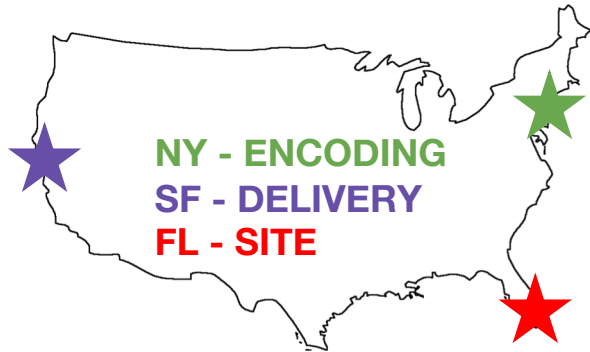
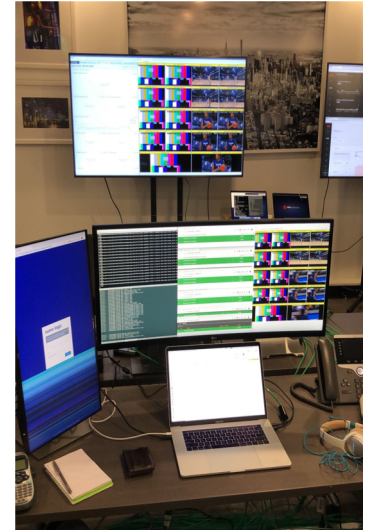
 - **using Clappr**

 - ◇ **Slack Alerts**

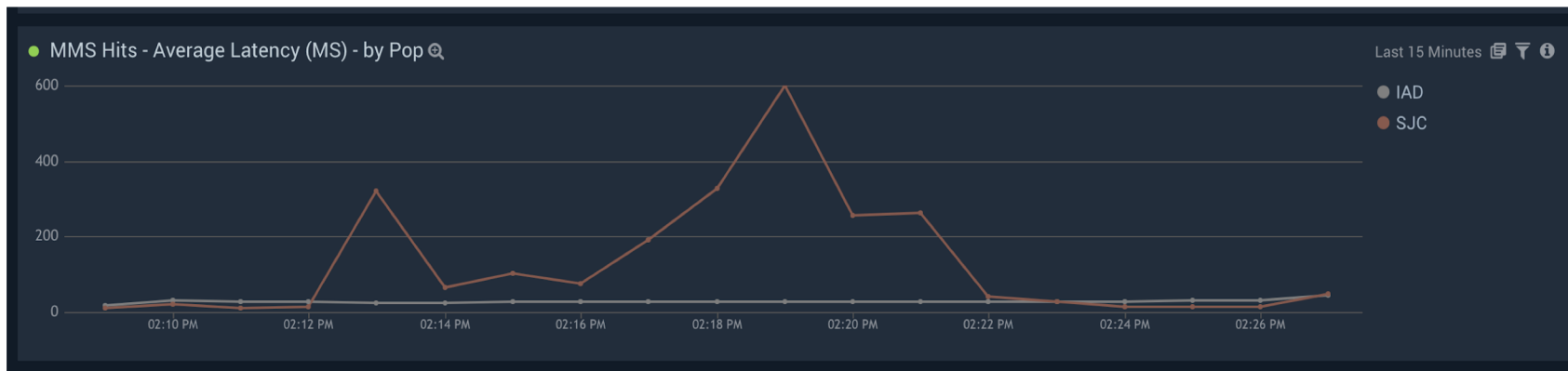
Monitoring & Visibility



Game Day War Rooms



Game Day Deep Dive



- Increased Latency from Fastly SJC to MediaStore us-west-2
- Immediate Failover to Fastly IAD Only & MediaStore us-east-1
- AWS & Fastly Network Team Engaged
- Issue Identified - Some Traffic over Public Transit instead of PNI
- Issue Resolved - Traffic Switched Back to Both SJC & IAD

THANK YOU

