

Video Encoding and Quality Assessment
@ Netflix
Anne Aaron

Netflix and Our Team



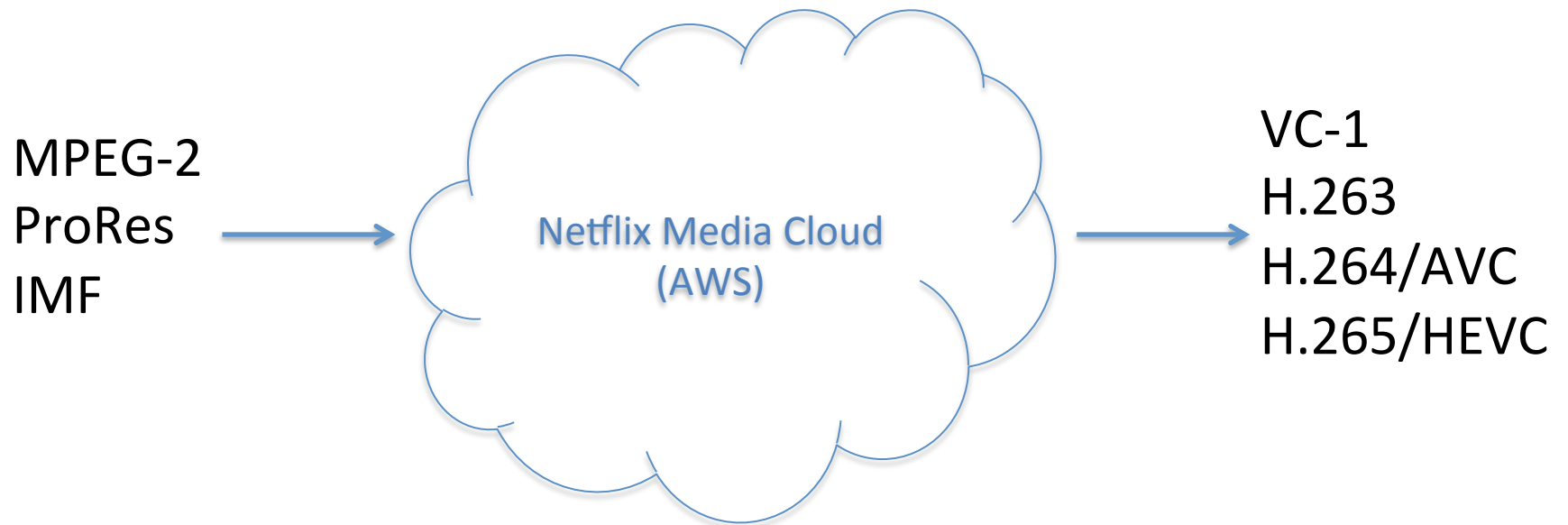
Netflix, a global video streaming service

Digital Supply Chain

Encoding Technologies

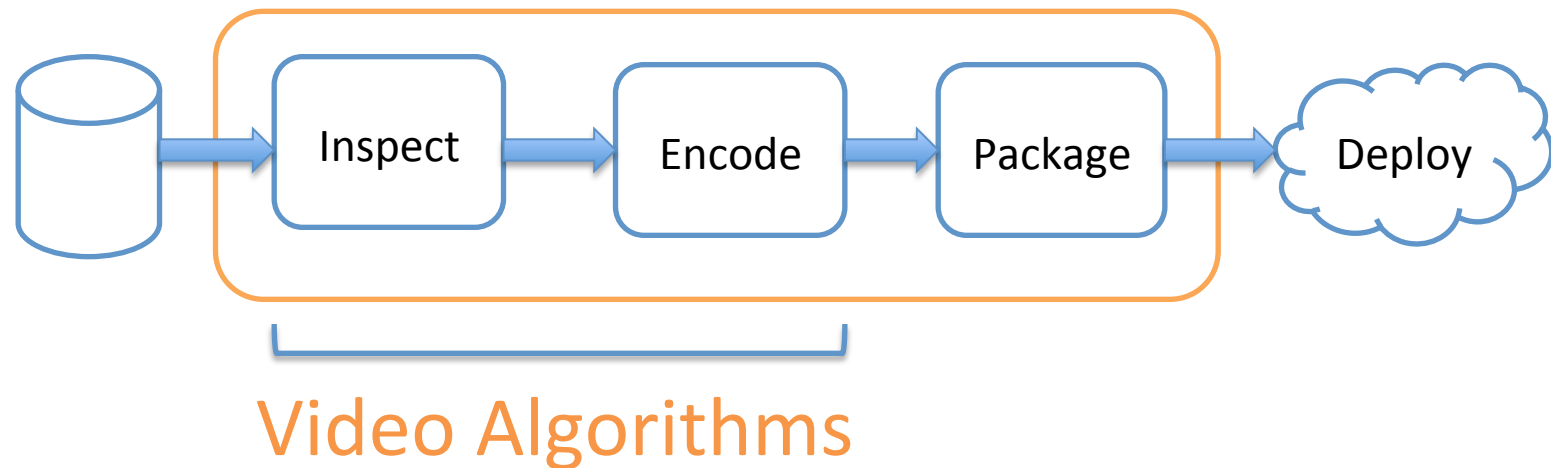
Server-side processing of
video, audio, timed-text and images

Netflix Media Processing on the Cloud



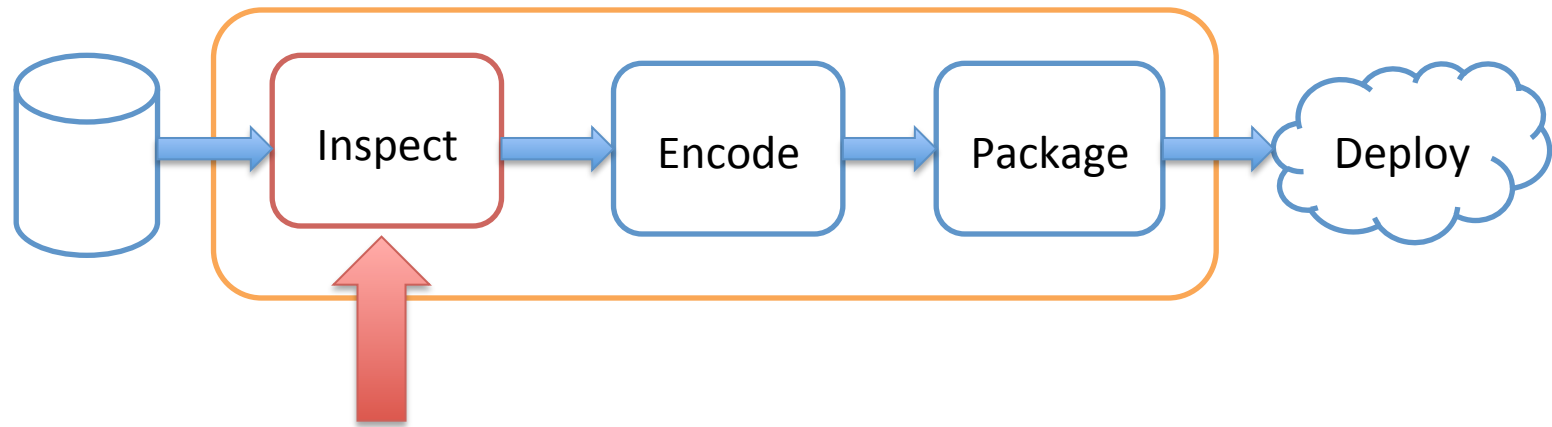
- Highly robust and scalable
 - Support more titles, more customers
 - 100% cloud, thousands of instances
- High quality of experience for subscribers

Media Pipeline Overview



Parallel inspections and
Parallel encoding of video segments

Video Source Inspections

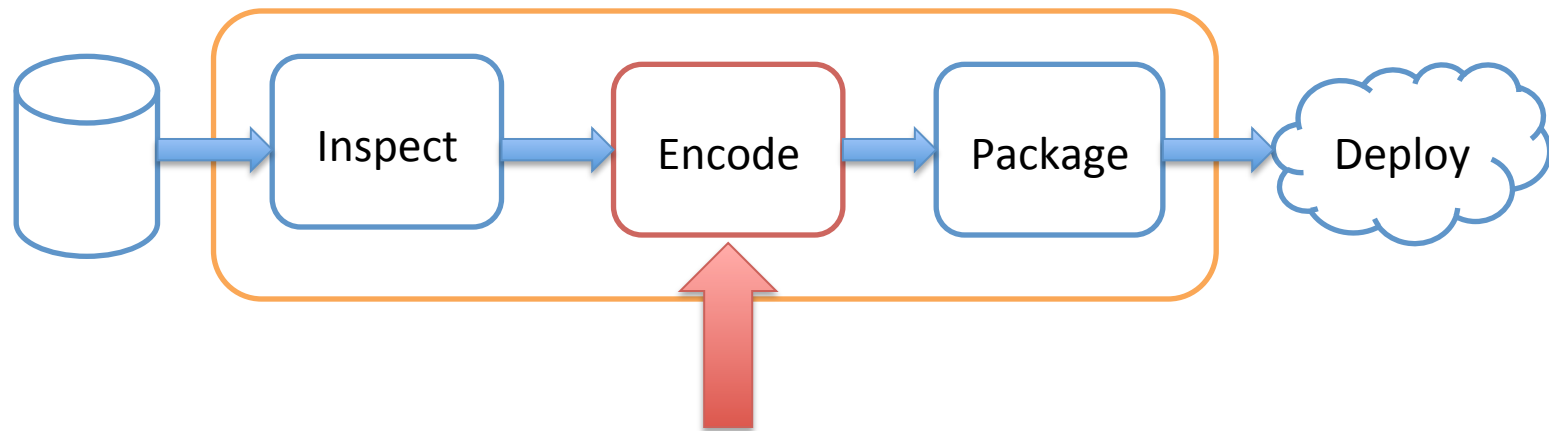


- 1) Is this a good source?
- 2) Generate metadata for encoding

No-Reference Quality Assessment

- Scaling artifacts
- Compression artifacts
- Corrupted frames
- Non-native frame rates
- Insertion of extra content

Video Encoding



- 1) Encode video at different bitrates (varying resolutions and quality levels) – VC1, H.263, H.264/AVC, H.265/HEVC
- 2) Validate correctness of encode and assess quality

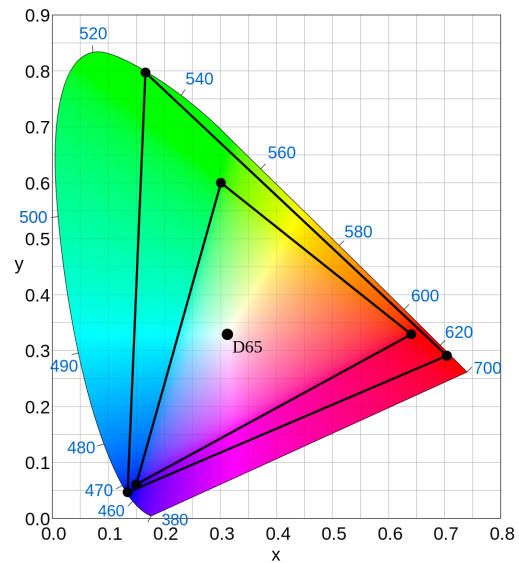
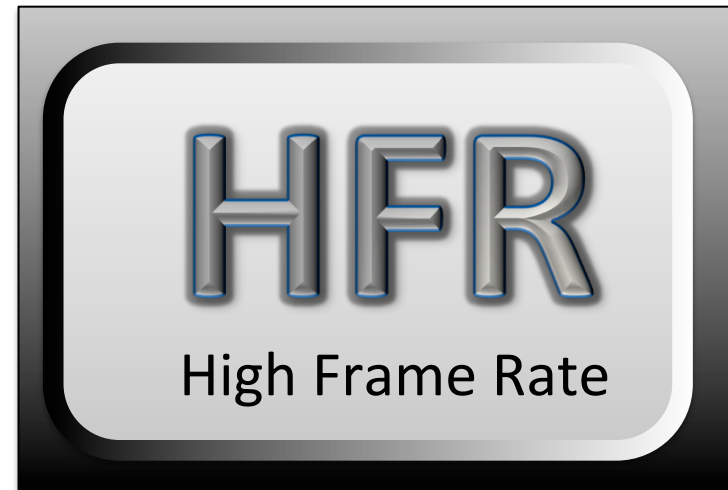
Full reference and reduced-reference quality assessment

- Scaling artifacts
- Compression artifacts
- System Bugs

Encoding Quality Assessment

- Quality monitoring – Perceptual quality and not just signal fidelity
- Quality assurance
- Optimize encoding parameters
- Codec and processing technology evaluation
- Possibly, optimize client adaptive streaming algorithm

Our use case: High-end content



Our use case: Video over cellular

- For markets with developing broadband infrastructure
- Low bitrate VOD – around 200 kbps

Roadmap on Video Quality

- Open to collaborate with research institutes or industry partners on research related to our practical problems
- Starting involvement in standardization, especially on the next video codec standard
- Our goal: Best video quality for our customers

Video Algorithms Team

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