Content-aware encoding playbook

Per-title, per-scene, ROI, context-aware — one page

Companion to article 6.4 of Block 6. Print on A4. Fora Soft Learn · v1.0 · 2026-05-17

1. The two ideas

Family	Input	Output	Typical saving
Content-aware	Source video	Bit allocation	20-50% per title
Context-aware	Audience stats	Ladder rung set	30-50% storage

2. Three depths of content-aware encoding

Depth	Granularity	Tech	Pioneer	Saving
Per-title	Whole video	Convex hull, VMAF	Netflix 2015	20-50%
Per-scene	Per shot (4 s)	Lagrangian opt.	Netflix 2018	+15-30%
ROI	Per region	Face/object QP	Hikvision/Axis	+3-5 dB face

3. Which to add first — decision tree

Step 1.	Still shipping Apple HLS default ladder? -> add per-title first.
Step 2.	Catalogue has big complexity swings inside titles? -> add per-scene next.
Step 3.	Face / object reliably in frame (conferencing, surveillance)? -> add ROI.
Step 4.	More than 100k monthly viewers? -> add context-aware ladder design.
Step 5.	Re-measure audience mix quarterly and rebuild the ladder.

4. The four questions for any CAE vendor pitch

1. Content-aware or context-aware? Input is video frames or audience stats?
2. Per-title, per-scene, or ROI? Which granularity is the saving measured at?
3. What is the perceptual metric - VMAF, SSIMULACRA2, or PSNR? Never trust PSNR for CAE.
4. What is the baseline - Apple HLS default, a tuned fixed ladder, or per-title?

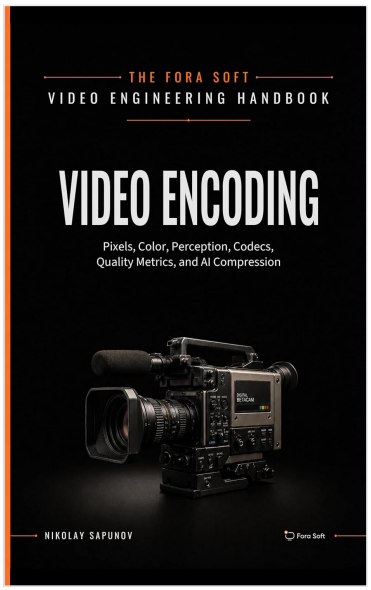
5. Ladder-design checklist (context-aware)

- [ ] Measured device class distribution (mobile / tablet / PC / TV).
- [ ] Bandwidth CDF from real player logs, not from a CDN estimate.
- [ ] Codec capability matrix per device class (H.264 / HEVC / AV1).
- [ ] Target rung count 4-6 (down from Apple-default 10-12).
- [ ] Rungs concentrated near audience-bandwidth modes.
- [ ] Feature-flag rollout with a fallback path to the old ladder.
- [ ] Quarterly re-measurement and ladder rebuild scheduled.

6. Rules of thumb

- Per-title saves money on your top 10% of titles by viewership.
- Per-scene is wasted on talking-head content with uniform complexity.
- ROI assumes the viewer's eye is in a known region - validate per vertical.
- Context-aware ladders only pay off above ~100k monthly viewers.
- AI helps content-aware (saliency, complexity), not context-aware (classical opt).

Companion to: 'Content-Aware and Context-Aware Encoding'
www.forasoft.com/learn/video-encoding/articles/content-aware-context-aware-encoding



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This playbook helps you decide between per-title, per-scene, ROI and context-aware encoding and question vendor claims. Volume 1 covers the encoding science behind each option: rate-distortion and convex hulls, perceptual metrics such as VMAF, region-of-interest quantization, and where AI already helps the encoder.

WHAT YOU WILL FIND INSIDE

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- VMAF and other perceptual metrics for ladder decisions
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