

The Authored Reality Pipeline™

A closed-loop methodology for hybrid virtual production.

EXECUTIVE SUMMARY

The Authored Reality Pipeline™ (ARP) is the production methodology operated by Anomaly X Productions. It replaces the linear chain of conventional virtual production with a five-stage closed loop — **Sketch, Generate, Composite, Convert, Activate** — that integrates AI environment generation, neural relighting, Gaussian splat reconstruction, and real-time engine deployment. This paper describes the methodology, the production failures it addresses, and the design principles that distinguish it.

01 — BACKGROUND

Linear Pipelines in a Closed-Loop World

Virtual production grew up inside a linear paradigm inherited from VFX: model, texture, light, render. Each stage produces a static asset for the next. The model has worked for decades, but the constraints have changed. Productions now require outputs across cinematic, XR, interactive, and installation formats simultaneously. AI tools allow environment iteration in minutes rather than days. Live-action footage can now be re-lit in post via neural PBR extraction. The linear pipeline cannot accommodate these capabilities — its outputs are too rigid to be revisited, and its stages too coupled to be regenerated independently.

02 — THE PROBLEM

The Failure of the Asset Paradigm

The core failure is treating environments as assets. An asset is a finished thing — a model, a texture, a render — that downstream consumers must accept as-is. Once a virtual environment is committed to assets, every subsequent change requires rebuilding upstream. Lighting changes require re-rendering. Camera changes require re-blocking. Scene changes require remodeling. AI tools have made the cost of generating new environments collapse, but linear pipelines cannot exploit this — they treat each generation as another asset to lock down. The result is a pipeline that fights its own tools.

03 — THE METHODOLOGY

Author → Capture → Encode → Activate

ARP replaces the asset paradigm with a perceptual one. Five stages form a reversible loop. **Sketch** (Luma): generative tools establish concept and tone. **Generate** (Marble): a procedural environment is produced with embedded **Authored Anomalies™**. **Composite** (Beeble): SwitchLight extracts PBR passes from live-action footage and performance is integrated into the world's lighting via **Contextual Cohesion Mapping (CCM)**. **Convert** (Postshot): the unified scene is encoded as a Gaussian splat field, governed by the studio's **Perceptual Encoding Strategy (PES)**. **Activate** (Unreal): the splat field deploys for real-time output across cinematic, interactive, XR, or installation contexts.

Critically, the loop is reversible. Lighting iteration happens in Beeble. Splat budget iteration happens in Postshot. Environment iteration happens in Marble. Unreal becomes an Activation Layer, not a creation tool — a shift that lets the engine focus on what real-time engines do best: camera, gameplay, audio, networking, output.

04 — CONCLUSION

Perceptual Fields, Not Static Assets

The Authored Reality Pipeline is built for a production environment in which AI tools have made generation cheap but pipelines have failed to keep pace. By closing the loop and treating environments as perceptual fields rather than assets, ARP allows studios to deliver reusable, format-flexible work at production scale.

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