

The Flowing Grid: A Cross-Temporal Visual Archive of Calligraphy

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● **Abstract:** Using 5.35M images from the "Yiguan Shufa" dataset, this project builds a generative archive. We reconstruct the "Nine-Square Grid" via Flask and Hybrid Storage. This millisecond-level system generates unique, non-repeatable visual flows, offering a decentralized "Generative Archive" paradigm for Digital Humanities.

1. ORIGIN: From Static Retrieval to Dynamic Viewing

- **Problem :** Traditional "Search-Display" modes turn heritage into isolated data islands, obscuring macro-aesthetic logic.
- **Strategy :** We adopt "Media Translation," repurposing the social media "Grid Layout" to transform static history into a daily visual stream.
- **Goal :** To dismantle art hierarchies, giving data a "fluid" life within a decentralized flow.

2. TECHNICAL ARCHITECTURE

We built a 3-layer architecture (Storage, Cache, Interaction) for high-fidelity presentation.

➤ Data Layer (Hybrid Storage)

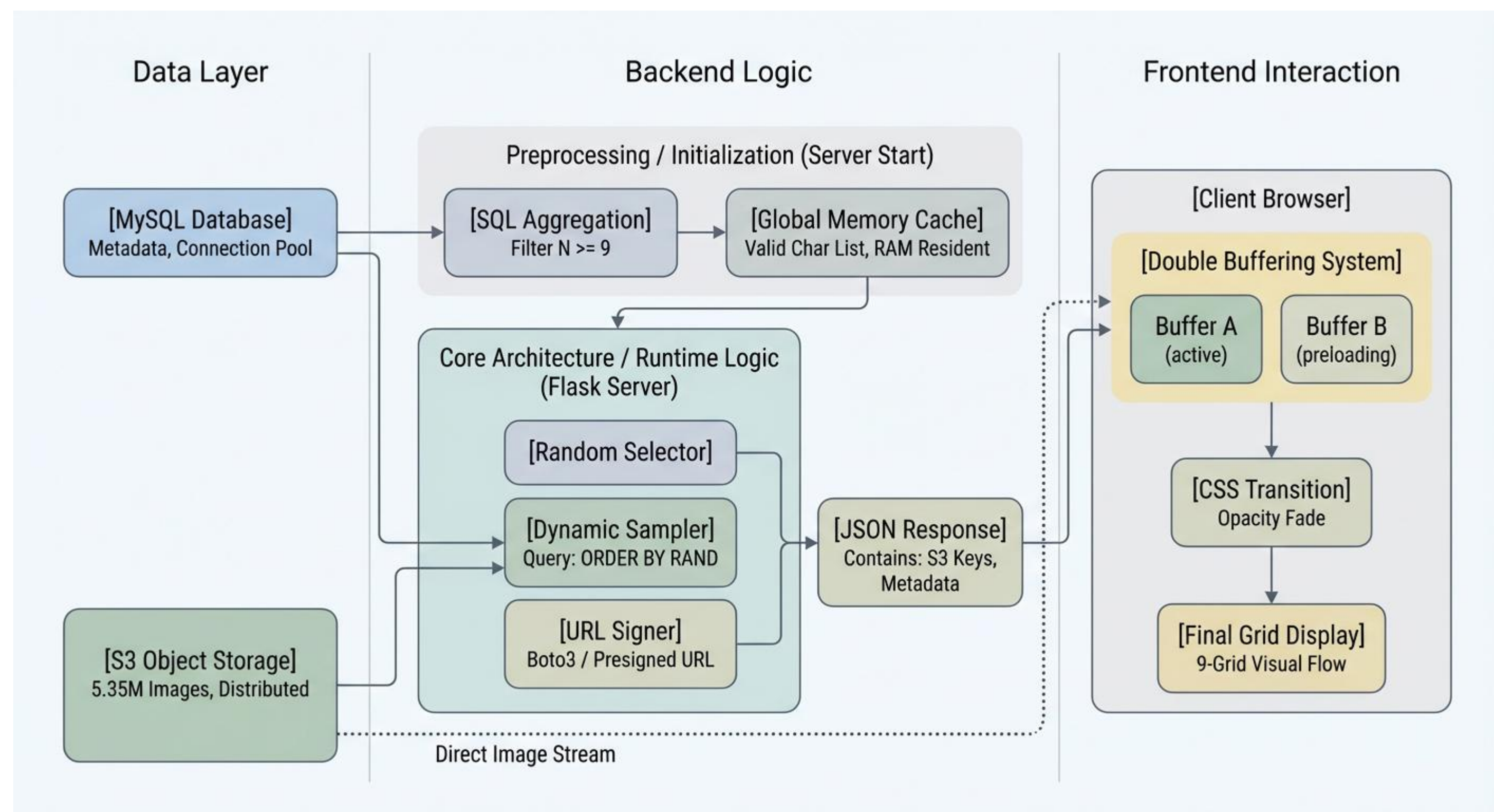
- **MySQL :** Manages metadata for millions of characters.
- **S3 Storage :** Stores TB-level images. Separating indexing from object retrieval eliminates I/O bottlenecks.

➤ Logic Layer (Global Cache)

- **Flask Backend :** Implements Global Memory Cache.
- **O(1) Retrieval :** Pre-loading 14k high-frequency characters into memory ensures ultra-low latency.

➤ Interaction (Double Buffering)

- **Smooth Flow :** Uses Double Buffering & Pre-signed URLs.
- **Rendering :** Background loading + CSS opacity transitions create a seamless, breathing visual experience.



3. VISUAL EXPERIMENTS

➤ Deep Flow & Digital Sublime

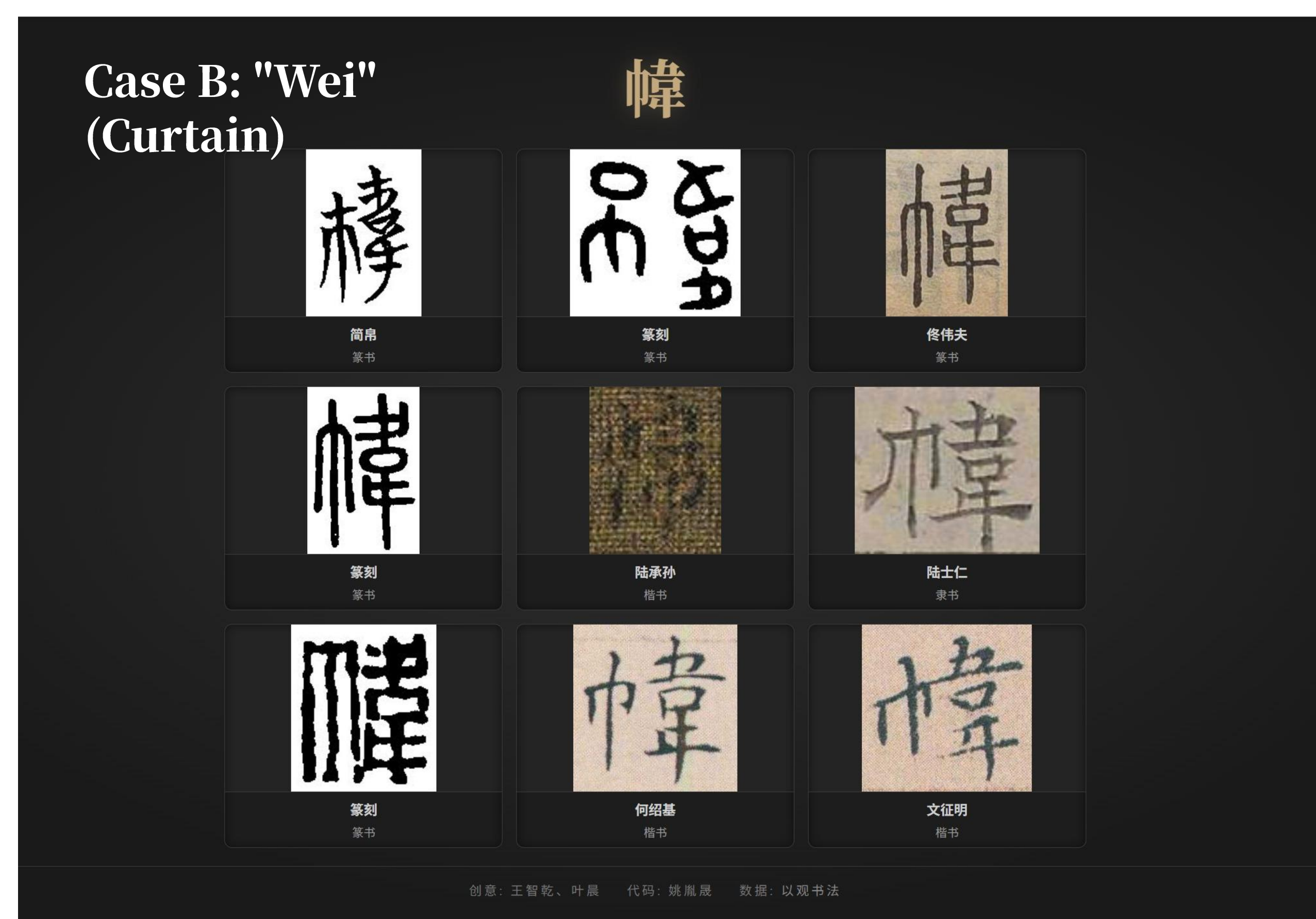
- **Time :** Viewing 5.35M images (20 fps) takes 3.4 years.
- **Infinity :** 3.5×10^{39} grid combinations—far exceeding atoms in the universe.
- **Irreversibility :** Each frame is a unique "orphan." Once scrolled, it vanishes, creating a "Digital Sublime."

➤ Flattened Micro-Gaze

Random algorithms flatten authority. Different eras and classes meet on one plane:



Mao Zedong's wild cursive meets Yan Zhenqing's solemn script. Elite and folk styles collide, dissolving original aesthetic hierarchies.



Literati elegance meets anonymous stone fragments. The decentralized cloud forces viewers to focus on structural lines rather than author fame.

4. DISCUSSION & VALUE

- **Generative Archive :** Not a static warehouse, but an algorithmic "Event Site." Code replaces curators, reconstructing dynamic data associations.
- **Classless Coexistence :** Mandatory randomness breaks historical narratives. Masterpieces and folk notes gain equal "presence" in the field.
- **Ephemeral Aesthetics :** The "20-second logic" stimulates a gaze at tradition. It offers an alternative for cultural transmission in the information age.