



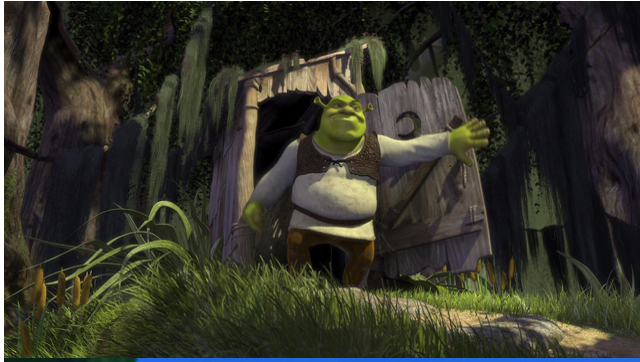
DREAMWORKS



DREAMWORKS

SCOTT MILLER

Technology Fellow, Engineering and Infrastructure
DreamWorks Animation



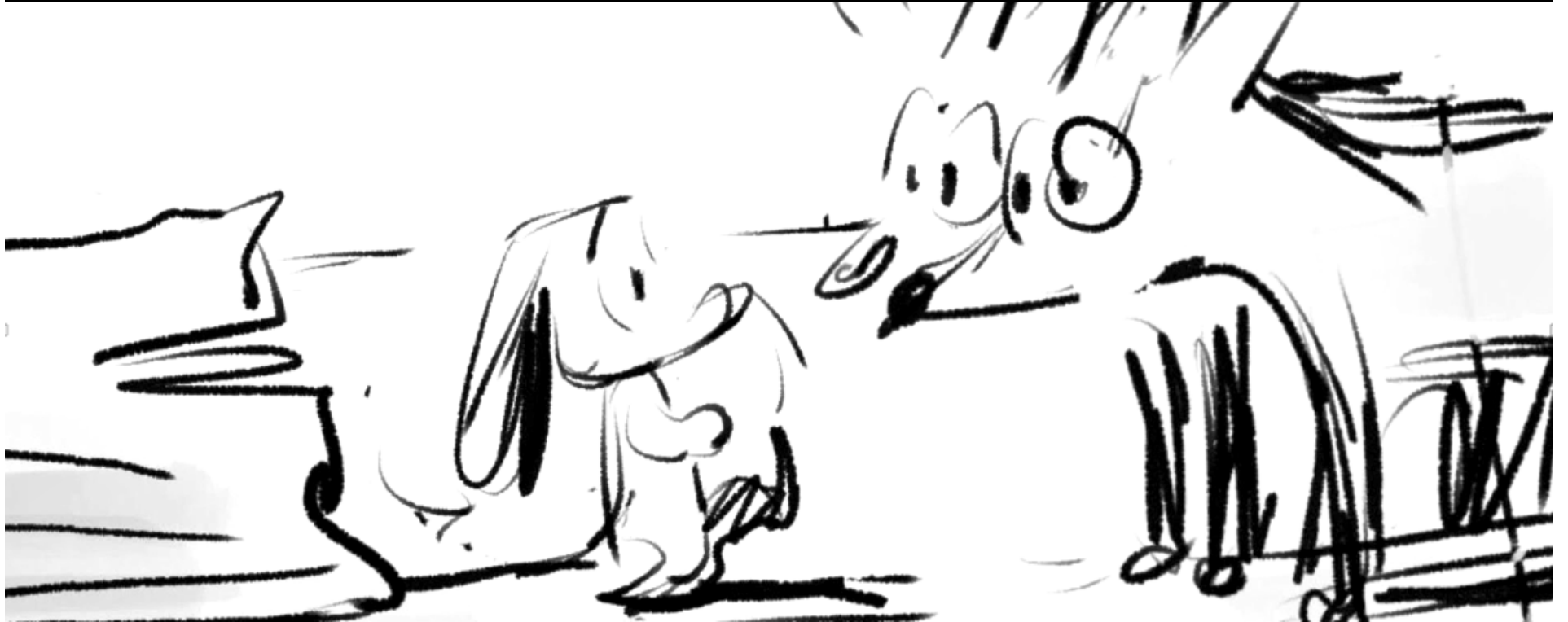


STORYBOARDS



PROPERTY OF DREAMWORKS ANIMATION - KS
DO NOT DUPLICATE

STORYBOARDS



VISUAL DEVELOPMENT



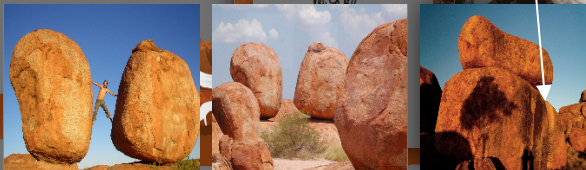
ROOT DECAY

ROCK TYPE

BACK VIEW

BARK EROSION

CHARACTER SCALE



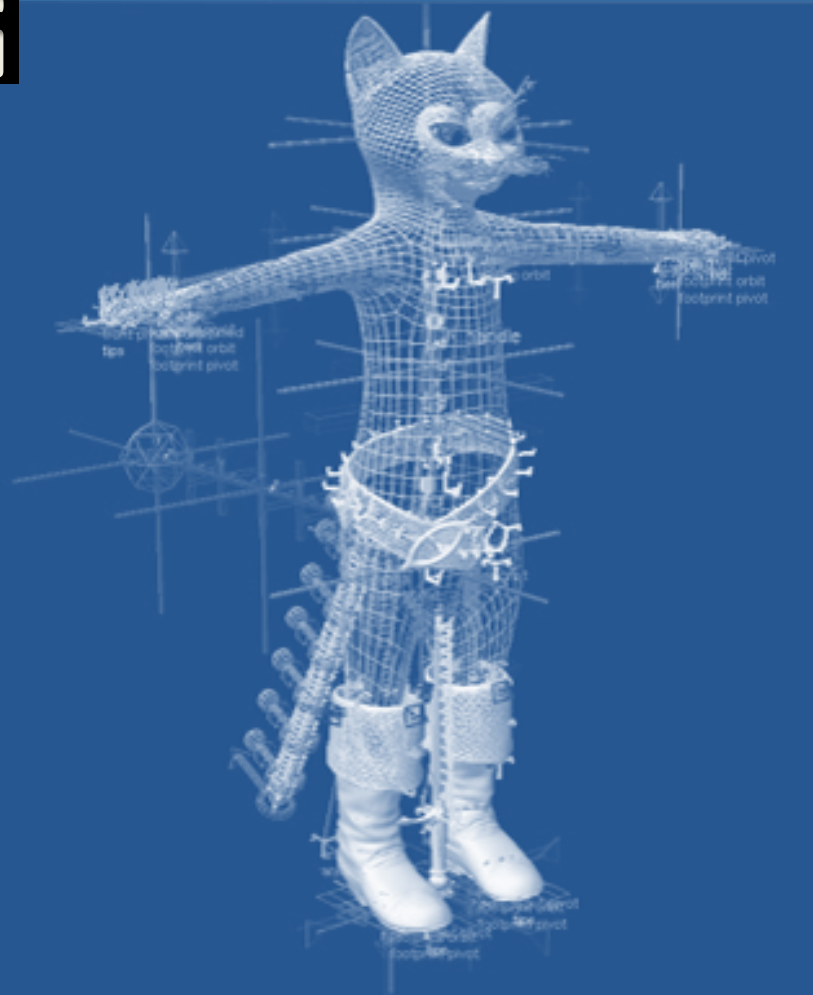
VIEW



MODELING



RIGGING



LAYOUT



ANIMATION



CHARACTER FX



ENVIRONMENTAL FX



LIGHTING



PROPERTY OF DREAMWORKS ANIMATION - KS
DO NOT DUPLICATE

IN ONE FILM

600

terabytes
of data

20,000

cor

es

120,000,000

CPU

hours

500,000,000

file

s

250,000,000,000

pix

els



The world knows us as a creator
of quality family entertainment,
in actuality.

DREAMWORKS ANIMATION
is **DIGITAL MANUFACTURER**
creating digital product that is
distributed
and consumed worldwide



Why Remote Persistent Memory?

- Many small items in a large working set
- Substantial re-use and repeat file I/O
- Expensive to compute and convert
- Persist in a directly consumable layout
- Distributed clients doing similar things
- Writes are immutable; lockless updates

PMEM in Artist Workstations?

- NVDIMMs in each workstation and server
- Accelerate local workflows
- A stranded resource / adds state
- Federate & share? What about protection?
- East/West traffic and RDMA capable NICs

Our Studio's Vision

- Cluster of Persistent Memory servers
- Software stack that provides RPM-as-a-Service
- Via RDMA over Ethernet; fallback to TCP
- A way for apps to persist things
- A way for apps to find and get things
- That behaves like named shared memory

Additional Goals



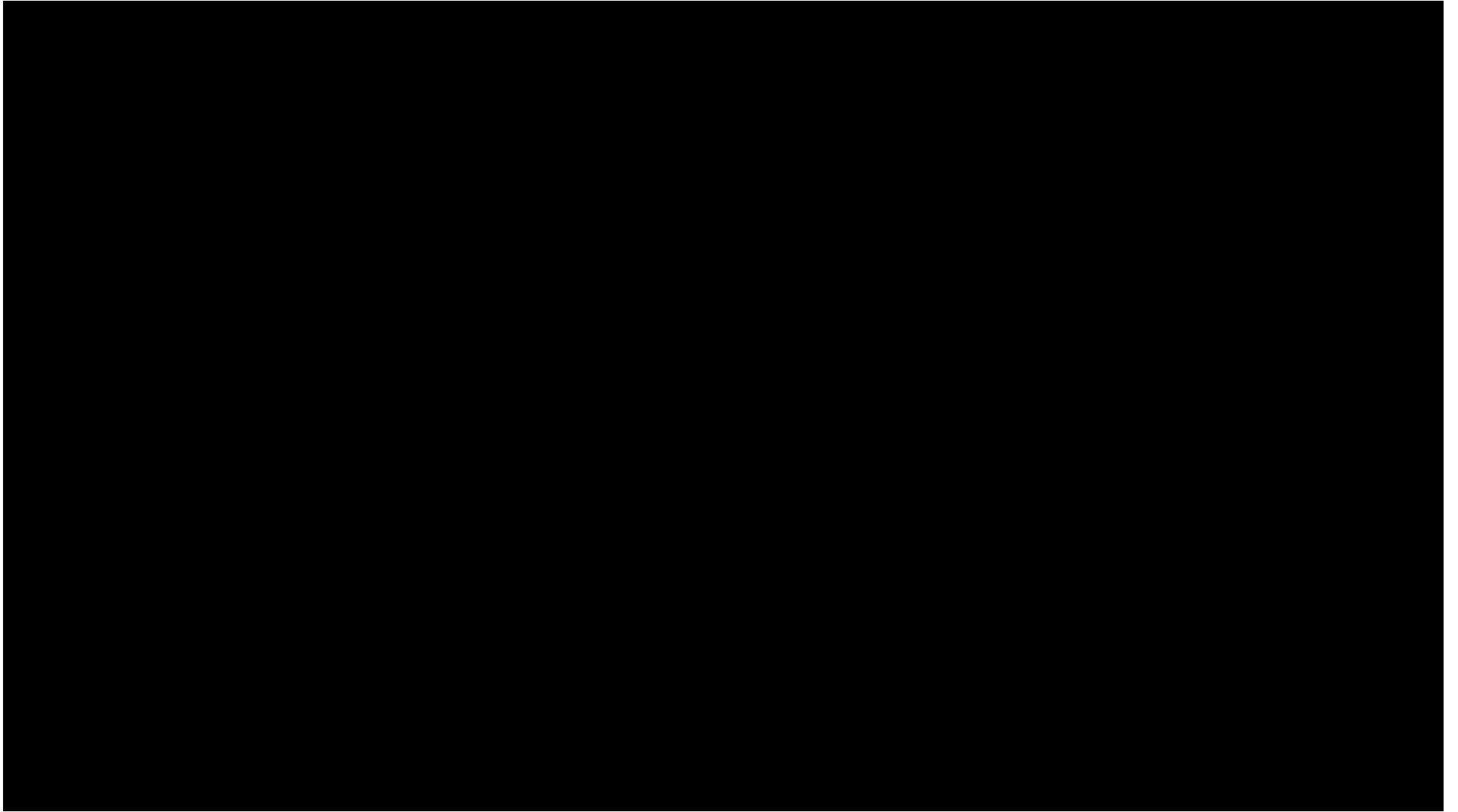
- User space / minimal (zero?) copies
- Reduce trips through the storage stack
- Reduce de-serialization / re-serialization
- Faster iteration on a larger working set
- Dynamic Compute Framework attach/detach



Points to Ponder

- Client API and client memory layout
- A Namespace with versioning
- Workflows for publish and invalidation
- Multi-tenant isolation
- BC/DR protection and production restart







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