Get it to the Cloud

Evolving Your Edit Pipeline

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Why Edit in the Cloud?

TPN is coming for you

- Security criteria based on use-cases (workloads + applications), not on cloud infrastructure
- Compliance depends on user configuration and admin policies / practices
- Editorial workflows can't really be air-gapped anymore

Scale is getting away from you

- More channels, more clients, more shows
- Volume of content is eclipsing teams' abilities to manage and understand
- Archives reaching into the tens-of-petabytes (or more)

Artists are nowhere near you

- Dealing with dailies and fast edit turnaround
- VFX workflows
- Production reviews

Before = On-premises

Not terrifically cloud-friendly workflows …

Processes

- Hasn't changed much in 20+ years
- Last major innovation was film->tape->DLE

Location

- Physical edit bays, locked rooms
- On PC / local server + NAS: Media Composer, ProTools, MediaCentral, Nexus

Workstations

- PC: Adobe Premiere Pro, Audition, …
- Mac: Final Cut, …
- Local storage / LTO
- Secure? Not really …

Today's Challenges: Internet-Connected

In order to move to the cloud you need …

- Content protection / integrity along the workflow
- Anti-piracy during production – e.g., (forensic) watermarking
- Secure remote access and control for creators and IT
- Scalability of resources and talent
- File sizes / data volume – need fast-access to current work files

  Periodic access to archives
- High throughput, low latency, frame accuracy, audio sync, …

  Workstation-level performance

Tomorrow (is today): in the Cloud

Increase access and scale now, securely

New Capabilities

- AI processing -> high-performance, intelligent storage with metadata and analytics
- Virtual browser-based workstations w/HDR, 4K, HFR
- Tiered-storage with addressable archive, accessible anywhere
- High-throughput networking for data ingest / (virtual and physical) appliances

Distributed Production

- New locations and (remote) reporting, securely and seamlessly (e.g., field editing)
- Features / episodic / unscripted – understand what you have and where, create content faster, leverage (older) assets
- Collaborate from anywhere, with anyone

Robust Security

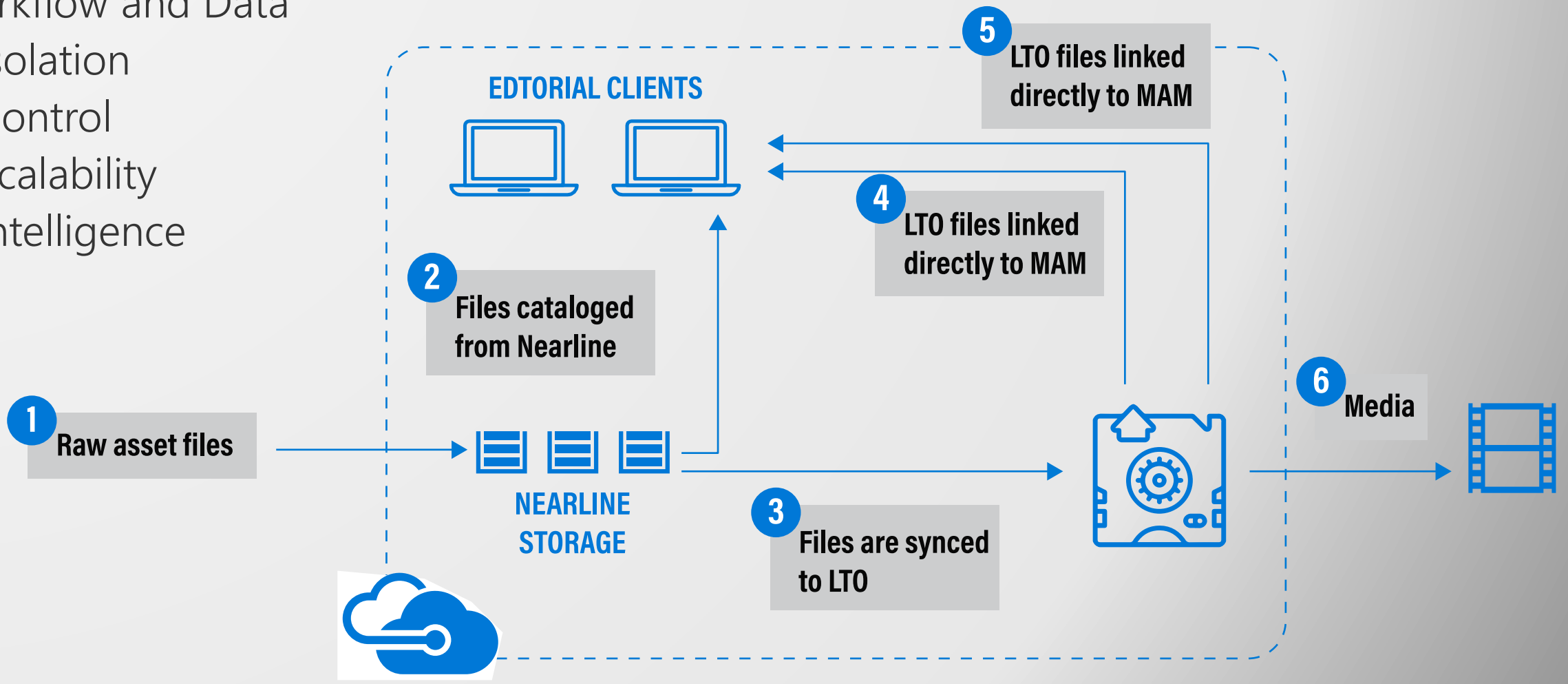
- Authenticated, encrypted storage and isolated networks over private links
- Role-based authorization, multi-factor auth, defense-in-depth
- Watermarks across all assets in the pipeline
- MAM/DAM, secure distribution/access of sensitive pre-release content

Components and Architecture – 1/2

What's built and validated today for content creation

Workflow and Data

- Isolation
- Control
- Scalability
- Intelligence



Components and Architecture – 2/2

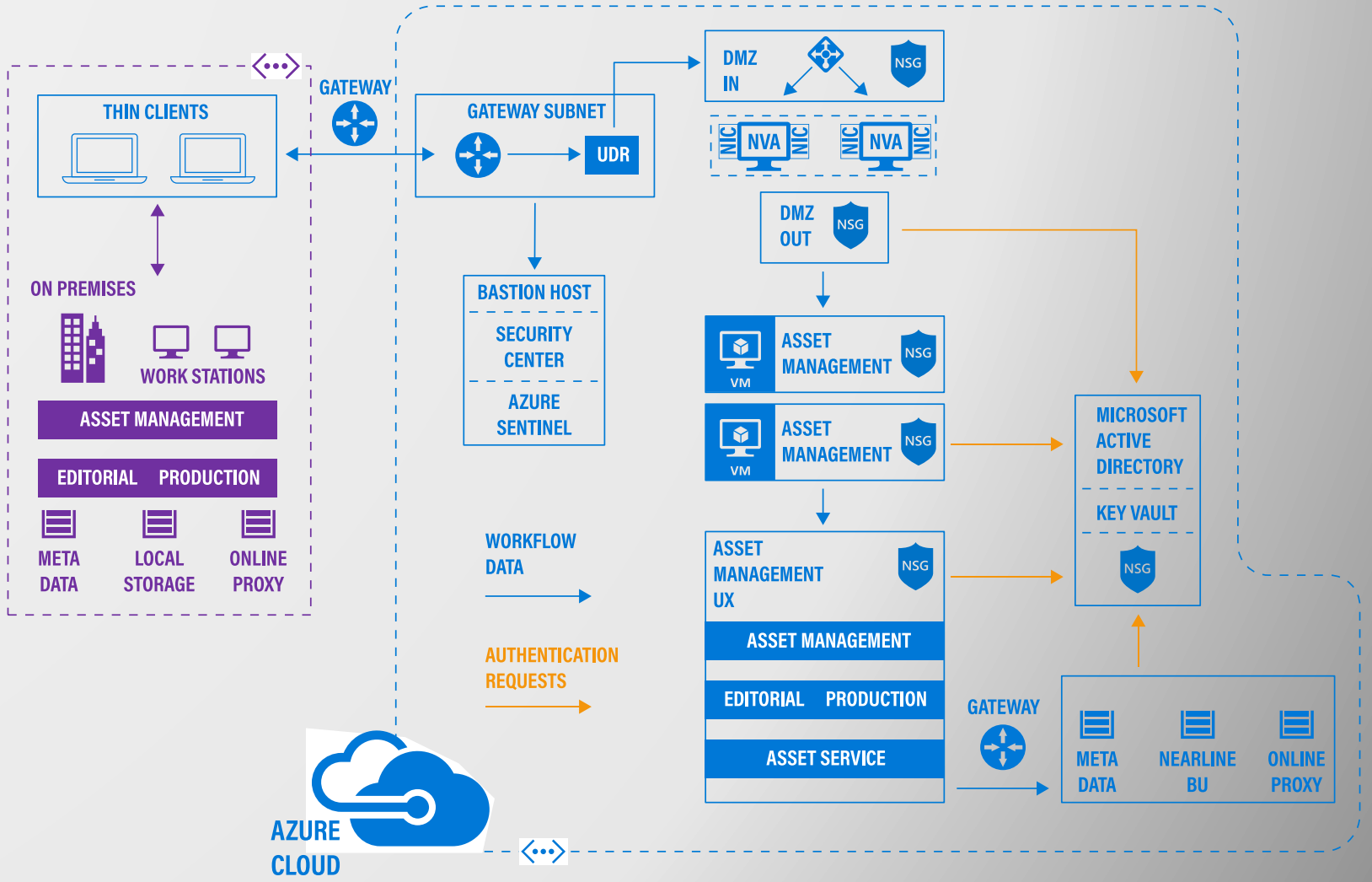
What studios and production companies are using right now

Services

Firewall, gateways, ER, VPN, threat management, monitoring, security management

Deployment

- Cloud-native
- Hybrid
- SaaS and IaaS



Controls for Secure Workflows

Meet the Trusted Partner Network

Best Practices in TPN – What you'll be audited against	
Editing in Azure (cloud and application security)	
Storage	• AES-256, MFA, AD policy controls
Networking	• TLS 1.3, IPsec for VPNs, isolated / dedicated connections (ExpressRoute) • Separate subscriptions
Virtual Machines	• Secure boot, standardized hardened configuration • Host firewall + AV enabled, network routing rules
Asset Management	
Information security policies / processes	• Use alias temporary titles (security titles) • Restrict open internet access to editorial networks handling pre-release content • Segregate between production networks
Standard operating procedures and incident responses	• Capture and report info regarding anomaly and incident reporting • Create incident scoring and prioritization schema • Test incident response plan yearly
Containers / libraries, secure access, auto-storage tiering	• Confidential information must be encrypted at rest • Credentials must be authenticated at the same time during the logon process
Hybrid and Cloud-Native	
Objectives and settings	• Encrypt confidential data before transferring between or within datacenters • Content transfer system must use encryption that meets or exceeds FIPS 140-2 standards
IAM / permissions	• Account ID must identify an individual, group, role, or device • Authentication must be done using an approved centralized authentication method • Grant permissions based solely upon intended function for the role
Use-cases / deployments	• Content transfer system should be integrated into centralized identity provider • Restrict transfer system access on a project basis, to individual users with business needs

Azure	Meeting Control Objectives – Editorial Configuration
Portal	• Prohibit use of personal Microsoft accounts for administration • Use separate Azure subscriptions to segregate work • Logically relate and manage deployments with resource groups • Avoid concurrent access from multiple locations • Enforce custom session inactivity termination • Enforce two-factor authentication for portal access
Network	• Use network security groups • Isolate virtual appliances in their own subnet • Apply a multi-tiered architecture using VNets • Create separate VNets for production • Limit default Network Security Group VNet communications • Tightly configure endpoints • Do not use deprecated cryptography when configuring IPSec VPN
RBAC	• Employ custom Role-Based Access roles to manage user access • Extend on-premises identity management for access control • Do not use the deprecated Azure Access Control service (ACS)
Key Vault	• Use a separate Azure Key Vault for each production • Use Key Vault permissions to manage access • Segregate data and key/secret owners • Manage access to keys and secrets on a per key/secret case • Audit all key management activity • Periodically rotate keys
CLI	• Avoid caching session information
Batch	• Periodically update access keys • Sanitize and destroy Batch accounts when no longer needed • Create storage exclusively for specific Batch workflows • Use security-validated application packages for Batch workflow • Use integrity checks on application packages for Batch workflow • Hold workflow if Batch applications fail • Log Batch events for monitoring and diagnostics
Compute	• Use public key authentication for virtual machines • Use only hardened OS images for VM instantiation
Storage	• Use Shared Access Signatures to access storage account resources • Periodically update access keys
Cache	• Disable non-SSL connections • Monitor cache performance
SQL	• Use separate Azure database instances for production and clients
Media	• Use separate Azure storage accounts for media service accounts • Encrypt assets • Configure Live Media archiving policy

Summary: Security-in-Practice

New security configuration guidance is now available!

Understanding data flow and requirements – not simple, but absolutely necessary

Keep data safe wherever it is and wherever it goes

- Encryption-at-rest, IAM / RBAC-based access, TLS on connections, keys in an HSM
- Not on externally-facing server without a secured topology, even in a virtual network
- Rights management, forensic watermarking along the workflow
- Don't put it on portable media if at all possible (or double-encrypt it)

Connecting to the internet is new for editorial / asset management

- Remote editors need to use secure workstations (a.k.a. "SAW"s) + VPN for creative work, or …
- Browser-based virtual workstations (e.g., GPU virtual machine w/PCoIP client), thin-clients
- Restrict network ports, use IP filtering, anti-virus, client firewalls, security groups
- DDoS protection, WAF, etc. … good to add in the virtual-appliance plane of the environment

Implement appropriate defense-in-depth strategies

- Security monitoring / logging, regular reporting, review access and usage – threat analytics
- Security automation and response (e.g., Azure Security Center), VM hardening
- Penetration-testing and Red Teaming for sensitive studio content
- Use M&E ISAC, FBI threat feeds, assign a security champion

Azure: Industry-Leading Security and Governance for Media

Audit

CDSA Content Protection & Security Program

MOTION PICTURE ASSOCIATION OF AMERICA

TPN TRUSTED PARTNER NETWORK

FACT

CSA cloud security alliance SM

COMMITTED TO SECURITY dpp

Media

ISO 27001 Certified

AICPA SERVICE ORGANIZATIONS SOC aicpa.org/soc Formerly SAS 70 Reports

PCI

+70 others

Industry

Security / Privacy

Encryption-at-Rest

Tenant Isolation

Global Resiliency

Threat Protection

Architecture

Monitoring & Analytics

Control

Transparency

Strong legal protections

GDPR

Trust

Services

Security Center

Application Gateway

Azure Active Directory

Azure DDoS Protection

Key Vault

Azure Information Protection

Platform

Intelligent Security Graph

HSE Independent security evaluators

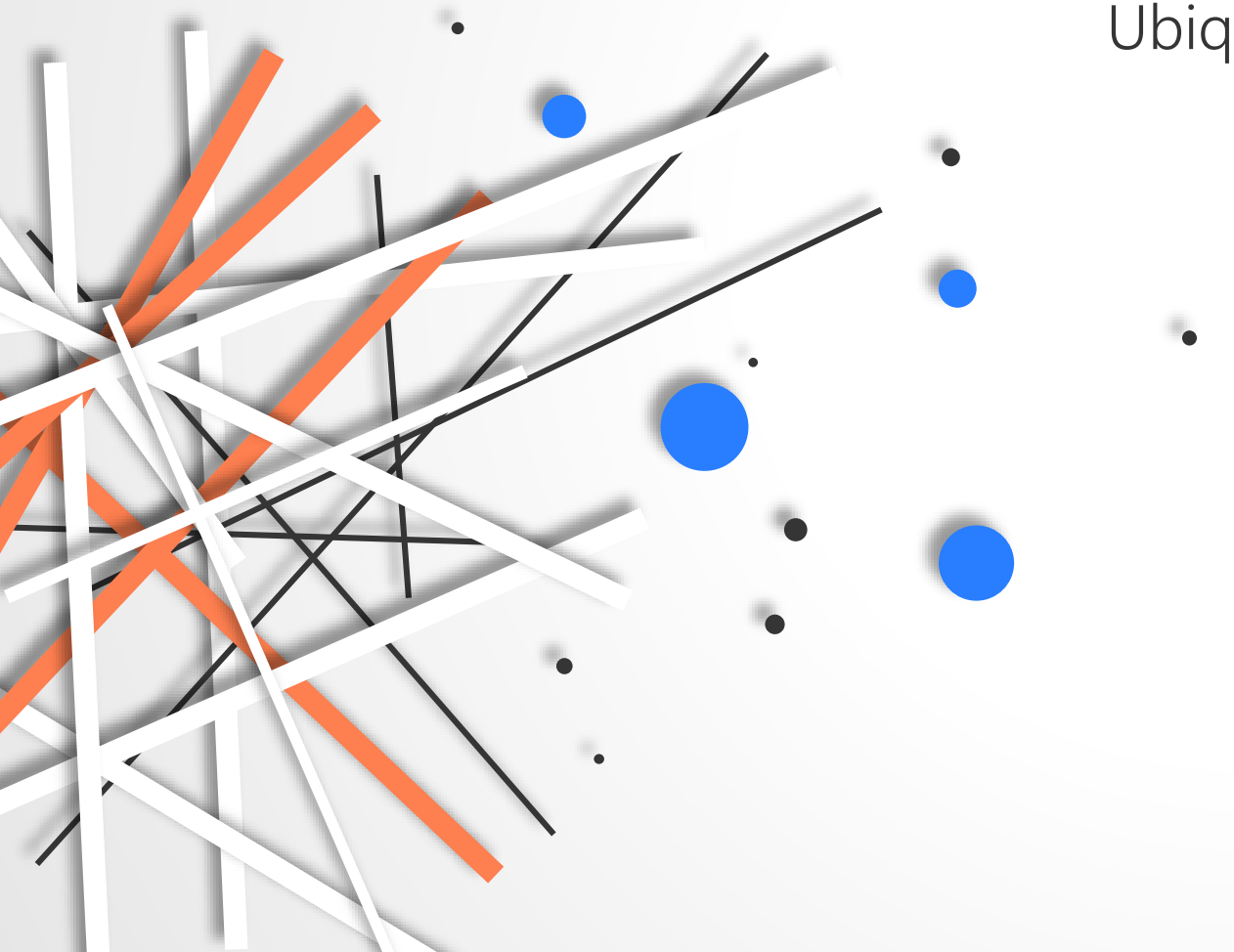
Media-specific security qualifications & best practices

Azure Compliance Manager

Azure Blueprints

Tools & Guidance

Fix it in Post …



Cloud will be the only way to get secure:

Ubiquitous collaboration on high-density content

Scale and performance across regions

Comprehensive content protection

Support for artists everywhere

“Enrichment” from metadata

Thank You!