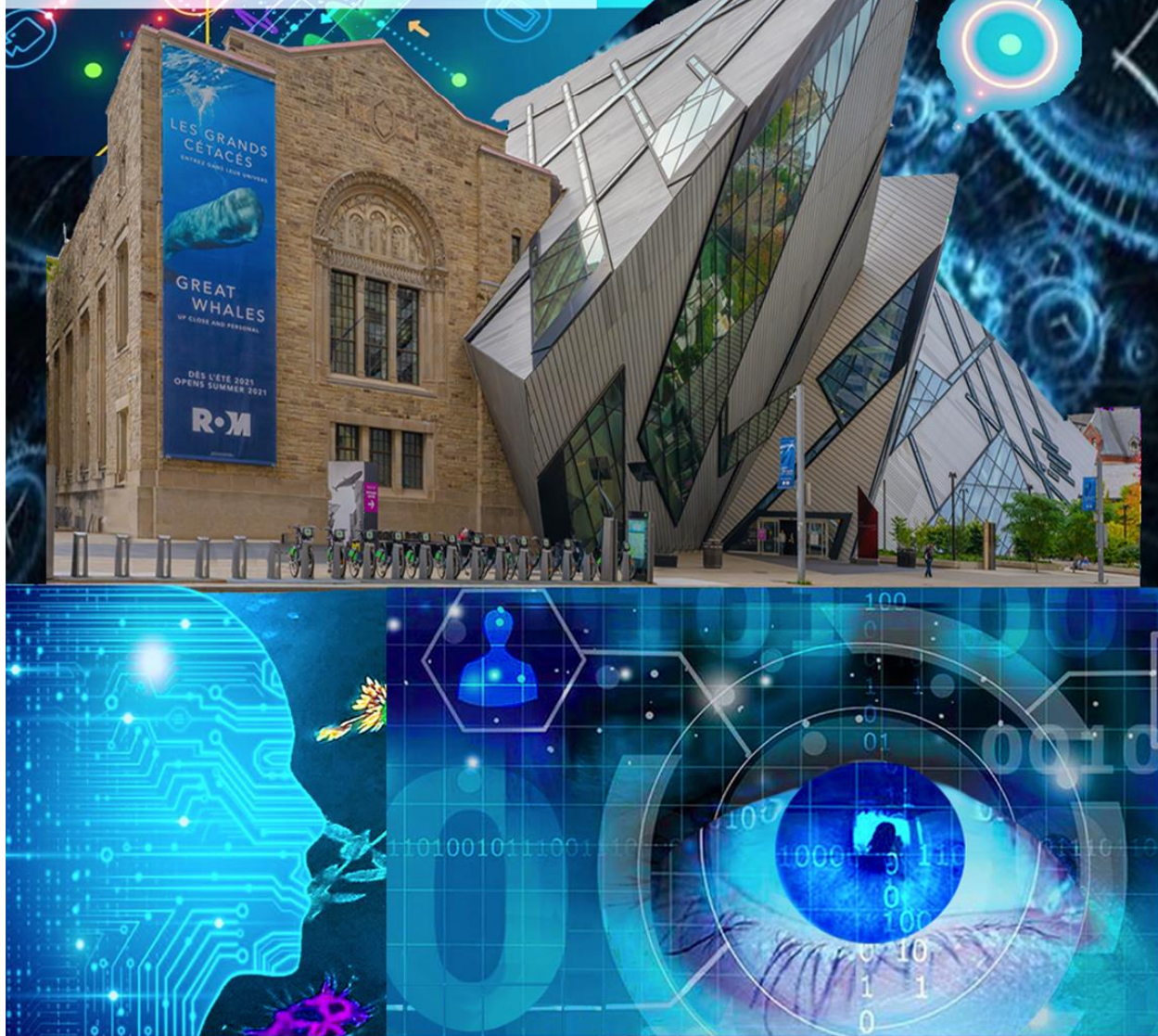


**Institutional Memory:
a coordinated multi-phase
metadata migration project
using Evergreen Digital Strategy**
with the
Royal Ontario Museum,
Nicolina Gallo, 2023



Institutional Memory and Metadata Migration: a coordinated multi-phase metadata migration project with the Royal Ontario Museum

Institutional Memory is the systematic preservation of knowledge, records, and processes that sustain a cultural heritage institution's continuity, decision-making, and public engagement. At the Royal Ontario Museum (ROM), with its collection of more than 13 million cultural, artistic, and natural history objects, maintaining integrity and accessibility of digital records is not only essential to operational efficiency but also to heritage stewardship. To strengthen these workflows, our team partnered with the ROM on a multi-phase metadata migration project, moving from Gallery Systems TMS to Axiell DAMS integrated with Microsoft Azure Cloud.

Migrating metadata in this way involved multiple strategic elements, including Iterative Refresh Cycles, Scalable Taxonomy/Ontology Design, Automated Trend Monitoring, Continuous Knowledge Transfer, an Evergreen Preservation Pipeline, Cross-Platform Longevity, and Mission-Linked Resilience. This project was a collaborative effort, beginning with the implementation of standardized metadata crosswalks, to ensure alignment with DACS, MARC, and OAIS frameworks. Using SHA-256 fixity verification across all digital assets, the project prioritized long-term data integrity, while implementing a 3-tier backup strategy—local, off-site, and cloud-based—to safeguard against data loss and disaster scenarios. Additionally, we developed a scalable and repeatable ingest QA framework designed to monitor metadata normalization, detect anomalies, and ensure reliable access for researchers, staff, and the public. By embedding Evergreen Digital Strategy principles, these technical safeguards were designed not as one-off solutions but as part of a cyclical framework that anticipates future migrations, integrates continuous improvement, and remains adaptable to evolving digital preservation standards.

Additionally, we developed a scalable and repeatable ingest QA framework designed to monitor metadata normalization, detect anomalies, and ensure reliable access for researchers, staff, and the public. Here the Evergreen Digital Strategy was applied through periodic assessment checkpoints and automated monitoring tools, ensuring that workflows remained resilient and updated in response to shifting metadata practices and discovery technologies.

Beyond the technical infrastructure, the project captured institutional knowledge through the digitization of fragile legacy media, prioritizing time-based works and accessioned objects in obsolete formats. These workflows were documented in ways that balance provenance, preservation, and accessibility. Evergreen Strategy informed this documentation process by establishing “living documents” and adaptable playbooks—resources designed to evolve with staff practices and future technology adoptions, thereby extending the longevity of institutional memory. The project further enhanced user access through APIs and responsive design integrations, enabling consistent discovery across multiple platforms. By integrating Evergreen Strategy, these access pathways were built with scalability in mind, anticipating shifts in user search behavior (e.g., LLM-based discovery, AI-assisted search engines), and ensuring interoperability frameworks such as FAIR remain actionable across future systems.

Working closely with ROM's Chief Digital Officer, Shyam Oberoi, the project leveraged his experience in digital engagement strategies and DAMS administration to scale the museum's

digital capacity. By the conclusion of the project, more than 75,000 assets had been successfully migrated and restructured, ensuring compliance with COPE, GDPR, and Canadian heritage preservation guidelines, with the CHIN framework. The Evergreen Digital Strategy provided the guiding methodology for ongoing governance, embedding evaluation cycles, future-proofing the DAMS infrastructure, and ensuring that asset accessibility will not plateau but remain responsive to technological and cultural shifts.

Ultimately, this project captured a look into how institutional memory workflows, when combined with rigorous metadata management, Evergreen Digital Strategy, and cutting-edge preservation practices, create a resilient framework for cultural stewardship. The coordinated migration not only safeguarded the ROM's vast holdings but also established repeatable, evolving best practices for future digital preservation initiatives within Canada's wider National Heritage Digitization Strategy.

Objectives

1. OAIS Reference Model (ISO 14721)

The project aligns with the Open Archival Information System (OAIS) model, emphasizing Ingest, Archival Storage, Data Management, Preservation Planning, and Access.

The ingest QA framework can be positioned as a direct operationalization of OAIS principles: normalizing Submission Information Packages (SIPs) into standardized Archival Information Packages (AIPs), with fixity checks ensuring the authenticity and reliability of preserved materials.

2. PREMIS Data Dictionary

Incorporating Preservation Metadata: Implementation Strategies (PREMIS) ensures all digital assets migrated to Axiell DAMS carry forward documentation of provenance, authenticity, fixity, and rights.

The SHA-256 fixity checks directly embody PREMIS "event" and "object" entities, while the 3-tier backup reflects PREMIS "environment" considerations.

3. Chain of Custody and Provenance Integrity

By documenting crosswalks between TMS and Axiell DAMS, the project created a chain of custody framework. This ensures that metadata transformations do not disrupt provenance, a principle emphasized in archival diplomatics and reinforced in ISO 15489 standards for records management.

4. Trusted Digital Repositories (TDR) & CoreTrustSeal

The project embeds the CoreTrustSeal trustworthiness criteria, emphasizing transparency, replicability, and long-term sustainability.

Migrating ROM's assets into a cloud-backed DAMS with QA workflows supports external auditability, aligning with the TRAC (Trustworthy Repositories Audit & Certification) checklist.

5. User-Centered Access & UX Theory

Grounded in HCI (Human-Computer Interaction) principles, the responsive access layer reflects Donald Norman's affordances theory, ensuring intuitive discovery.

By employing APIs and standardized metadata schemas, the project aligns with interoperability frameworks (e.g., FAIR principles – Findable, Accessible, Interoperable, Reusable).

6. Fixity and Authenticity as Theoretical Anchors

The reliance on SHA-256 checksums is not merely technical; it connects to Jeff Rothenberg's writings on digital object authenticity and the philosophical requirement of "bitstream fixity" for preservation validity.

Fixity verification and redundancy strategies reinforce concepts of post-custodial archiving, where preservation relies less on physical custody and more on ensuring digital integrity.

7. Knowledge Transfer and Institutional Memory Theory

By embedding institutional workflows into migration protocols, the project draws from Nonaka & Takeuchi's SECI model (Socialization, Externalization, Combination, Internalization), emphasizing that staff expertise, tacit knowledge, and practices are preserved alongside collections data.

This coordinated effort was grounded in the OAIS Reference Model (ISO 14721), which provided the conceptual backbone for designing workflows that ensured long-term accessibility and reliability of digital assets. The ingest QA framework was developed in direct alignment with OAIS functions, transforming Submission Information Packages (SIPs) into Archival Information Packages (AIPs) while incorporating SHA-256 fixity checks to verify authenticity and mitigate data corruption. These measures extended beyond technical safeguards, embedding Jeff Rothenberg's theoretical emphasis on authenticity and the necessity of bitstream fixity as a cornerstone of digital preservation.

The project also drew upon PREMIS metadata standards to ensure the preservation of provenance, rights, and integrity information throughout the migration from TMS to Axiell DAMS and Azure Cloud. Every checksum event, metadata crosswalk, and object transformation was documented as a PREMIS event, ensuring that the chain of custody and provenance integrity remained intact. In tandem, the implementation of a 3-tier backup strategy—local, off-site, and cloud-based—aligned with CoreTrustSeal and TRAC criteria for Trusted Digital Repositories, reinforcing transparency, replicability, and sustainable access.

Finally, the project framed access through the dual lenses of FAIR principles (Findable, Accessible, Interoperable, Reusable) and Human-Computer Interaction theory. By leveraging APIs, responsive design, and interoperable metadata schemas, the migration was not simply a technical upgrade but a user-centered restructuring that prioritized accessibility across devices and platforms. In parallel, the project embedded Nonaka & Takeuchi's SECI model of knowledge transfer,

ensuring that tacit expertise of staff and curators was externalized and integrated into repeatable workflows.

In an age where digital assets and digital records are becoming increasingly centralized to long-term legacy and museum operations, tools and practices that are instrumental in the management and utilization of Institutional Memory are critically important. The intricate tapestry of digital workflows within institutional memory preservation is an indispensable component of modern heritage stewardship. To direct the cultural and historical treasures through the evolving landscape of digitization, the principles of provenance, fixity, and access are pivotal guiding lights. To safeguard heritage materials for future generations, the detailed choreography of metadata management, preservation strategies, and access controls must continually adapt to technological advancements and evolving standards. As “documentary heritage is (the) cornerstone of all democratic societies and...an essential resource for supporting economic, social, legal and cultural domains, as well as fostering innovation,” (Gov. of Canada, 2022, p. 3) the union of traditional archival wisdom and cutting-edge digital tools ensures our collective memory transcends the limitations of time. As institutions and societies grapple with the complexities of preserving the tangible and intangible legacies of our past, it is through carefully orchestrated digital workflows that our heritage will remain accessible to a global audience. The resilience and creativity within cultural preservation reflect the unique record of humanity's enduring story and the infinite indomitable spirit within. This endeavor transcended technical preservation, transforming into a model of practical institutional memory theory—safeguarding not just the ROM's digital assets but also the methodologies and insights that give those assets meaning.