Global Patterns in Research Data Management and Storage

Regional contrasts and trends emerging from multi-year benchmarking at UNSW

Tom Honeyman, Project Manager,
Research Data Experience Program, UNSW

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Timeline of Prior Work

Year	Focus	Key Outcome
2022	Research Data Culture Conversation	Holdings large (100s PB), unmanaged, and growing exponentially
2023	Research Data Reference Architecture	Dimensions of good practice


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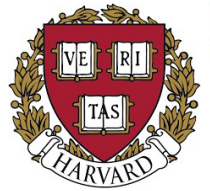
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Why Regional Comparison Matters

Governance, law, and funding conditions define service logic.

Comparing systems reveals design logics, not rankings.

Regional contrasts expose what each system optimises for:

- compliance,
- openness,
- performance, or
- scale.

Australia: Baseline Characterisation

Regulatory anchor:	• State Records Acts → GA47 (NSW) / PROS 16/07 (VIC) / etc.
Lifecycle automation:	• metadata triggers migration across storage tiers.
Federated national fabric:	• Nectar Research Cloud, NCRIS Commons, AARNet FileSender, institutional repositories and RDS.
Common tool spine:	• LabArchives, REDCap, Figshare, M365, FileSender.
Distinctive strength:	• compliance encoded in technology and cost models.

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Europe / UK Contrast — FAIR by Design

Governance:	• via GDPR and FAIR principles, not statutory record law.
Infrastructure:	• SURF & EUDAT federations using Ceph / OpenStack.
Typical stack:	• DSpace, Invenio RDM, openBIS, RSpace.
Integration excellence:	• retention less formalised.
Focus:	• metadata interoperability • open science alignment.

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North America Contrast — Automation and Autonomy at Scale

Institution-centric:	• minimal national coordination.
Stack:	• Globus, Dataverse, Benchling, Flywheel, Box.
Strengths:	• automation, HPC integration, rapid data transfer.
Gaps:	• limited retention frameworks, opaque cost recovery.

Asia Contrast — Cloud-Led Expansion and Consolidation

Rapid growth:	• through AWS / Azure / Alibaba partnerships.
Stack:	• LabArchives, REDCap, Figshare, cloud object store.
Governance:	• still forming; emphasis on capacity over policy.
Examples:	• NII RDM Platform (GakuNin) • Tsinghua Research Data Cloud • NUS Figshare.

Regional Comparative Snapshot

Region	Governance Driver	Technical Model	Strength	Gap
Australia	Statutory record law (GA47)	Federated, policy-aware	Compliance + automation	Limited openness
Europe / UK	GDPR + FAIR policy	Federated object storage	Interoperability	Hard retention rules
North America	Institutional autonomy	HPC + Globus fabric	Performance + automation	Policy linkage
Asia	Rapid cloud growth	Commercial clouds	Scale and capacity	Governance maturity

Global Trend Lines

Automation & APIs:	Policy encoding:	Metadata continuity:	Hybrid cloud normalisation:
• lifecycle transitions triggered by metadata.	• retention and compliance machine-readable (e.g., GA47 metadata schemas).	• persistent identifiers maintained end-to-end.	• on-prem object stores + cloud tiers by policy.

Emerging Differentiators

Cost and carbon intelligence:	Federated national backbones:	Trusted Research Environments:	Integrated identity and consent:
• dashboards integrate power, storage, and budget metrics.	• ARDC, SURF, EUDAT as shared capacity.	• secure analysis for sensitive data.	• IAM and data ethics converging.

Conclusion & Take-Aways

Australia anchors policy-aware compliance.

Europe advances FAIR interoperability.

North America and Asia drive automation and scale.

Closing message: metadata-linked, policy-encoded, lifecycle-aware infrastructure.