NICIS
NATIONAL INTEGRATED
CYBERINFRASTRUCTURE SYSTEM
DIRISA

Contribution ID: **10**   Type: **Talk**

Designing an Adaptive Privacy-Preserving Access Control Framework for Ensuring Data Confidentiality Across Complex Regulatory Environments

Amidst a proliferation of stringent privacy regulations—such as the European GDPR, California's CCPA, and South Africa's POPIA—organisations struggle to maintain data confidentiality without fragmenting their compliance efforts. This study introduces a Conceptual Governance Framework for Data Confidentiality that guides entities in systematically translating diverse regulatory requirements into cohesive policies, assigning clear accountability, and embedding continuous oversight. Grounded in qualitative framework development, our approach draws on thematic analysis of regulatory texts, semi-structured interviews with privacy and compliance experts, and iterative Delphi validation.

The proposed framework comprises four interlocking components:

Policy Alignment Layer, which maps organisational data practices to specific regulatory clauses;

Roles & Responsibilities Matrix, clarifying duties among executive leaders, data protection officers, legal counsel, IT managers, and end users;

Control & Oversight Mechanisms, incorporating audit trails, exception workflows, and compliance reporting channels;

Continuous Improvement Cycle, embedding ongoing monitoring, stakeholder feedback, and policy revision loops.

To demonstrate real-world applicability, we present three sectoral case studies:

Government: A national revenue agency adopting the framework to unify legacy data-sharing procedures with emerging privacy mandates;

Fintech: A digital payments startup aligning agile product iterations with cross-border data-transfer rules;

Healthcare: A multi-hospital network standardises patient information policies to satisfy HIPAA and regional health-data protections.

Expert feedback from a three-round Delphi survey affirms the framework's clarity and adaptability, prompting refinements that enhance its scalability across organisational sizes. By foregrounding governance over point solutions, this blueprint empowers practitioners and policymakers to navigate complex regulatory landscapes confidently, ensuring robust data confidentiality as regulations evolve. Future work will explore quantitative maturity metrics and extend the model to emerging domains such as IoT data streams and global data-flow architectures.

Primary author: OGUNLEYE, Olalekan Samuel (University of Mpumalanga)

Presenter: OGUNLEYE, Olalekan Samuel (University of Mpumalanga)