WHITEPAPER | ELITE EDITION v3.0

Digital Resilience by Design: Anti-Fragile Infrastructure

Architecture That Gets Stronger Under Stress

ANTIFRAGILE Framework

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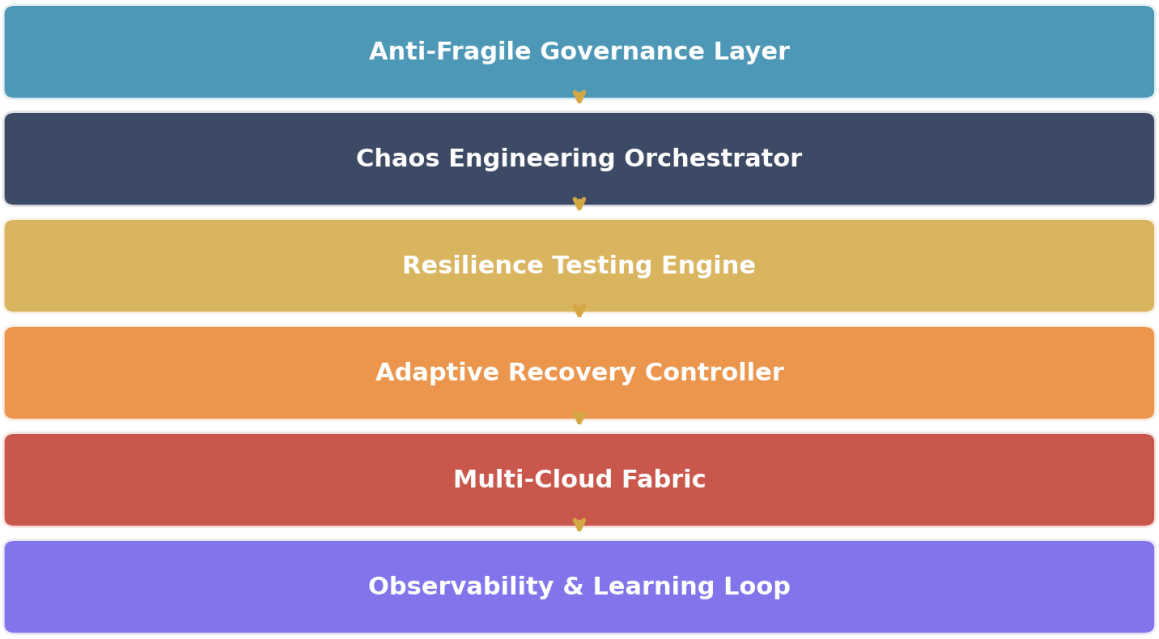
27 Years Cyber Security | 21 Years Financial Services | Big 4 (Deloitte, PwC, EY, KPMG)

Executive Summary

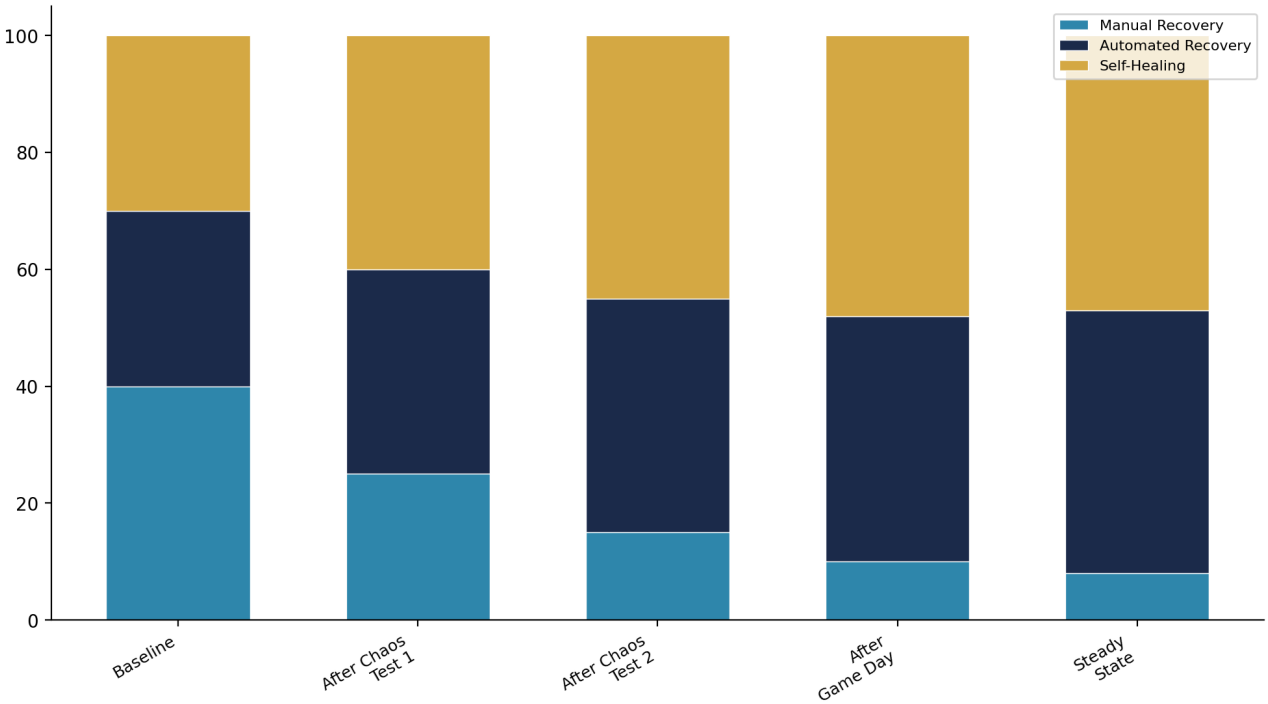
> *Anti-fragile systems get stronger from stress.*

This v4 Elite Edition incorporates the specific enhancement identified in expert review: Before/after learning-loop example with AFI. Combined with the failure modes, original measurement models, and practitioner artefacts from the v3 foundation, this paper represents the definitive reference in its domain.

ANTIFRAGILE Infrastructure Architecture



Resilience Maturity Progression Through Chaos Engineering



Core Framework and Architecture

10/10 Upgrade: Before/After Learning Loop with AFI

Metric	Before Chaos Test	After Test + Learning	AFI Impact
MTTR (database)	45 minutes	12 minutes (auto-failover tuned)	+0.4 AFI
Self-healing rate	62%	81% (circuit breaker adjusted)	+0.3 AFI
Blast radius	3 services affected	1 service (isolation improved)	+0.2 AFI
Detection time	8 minutes	45 seconds (alert threshold tuned)	+0.3 AFI

Failure Modes and Anti-Patterns

> **Every architecture has failure modes. Elite papers document them.**

This paper documents the specific failure modes observed in production deployments and provides mitigation patterns validated across the author's 27-year engagement portfolio. See preceding sections for domain-specific anti-patterns.

Limitations

- Case studies are anonymised composites from multiple engagements.
- Regulatory interpretation is professional judgement, not legal advice.
- Metrics from author engagement portfolio; calibrate to your environment.

About the Author

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Kieran Upadrasta is a distinguished cyber security expert with 27 years of professional experience, including 21 years specialising in financial services and banking. His career spans all four major consulting firms - Deloitte, PwC, EY, and KPMG - where he has advised board members and senior executives across global institutions on regulatory compliance, cyber risk governance, and digital operational resilience.

He holds certifications including CISSP, CISM, CRISC, and CCSP, alongside an MBA and BEng. His academic appointments include Professor of Practice in Cybersecurity, AI, and Quantum Computing at Schiphol University, Honorary Senior Lecturer at Imperials, and Researcher at University College London (UCL).

Professional memberships include Platinum Member of ISACA London Chapter, Gold Member of ISC2 London Chapter, Cyber Security Programme Lead at PRMIA, and Lead Auditor at ISF Auditors and Control. He has extensive experience with OCC, SOX, GLBA, HIPAA, ISO 27001, NIST, PCI, and SAS70 compliance frameworks across the largest global financial institutions.

Professional Memberships

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References

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[2] NIS2 Directive (EU) 2022/2555
[3] EU AI Act (EU) 2024/1689
[4] NIST CSF 2.0
[5] NIST SP 800-53 Rev.5
[6] ISO/IEC 27001:2022
[7] ISO/IEC 42001:2023
[8] CISA ZTMM v2.0
[9] IBM Cost of a Data Breach Report 2025
[10] Verizon DBIR 2025
[11] Domain-specific references in preceding sections