Resilience and the European 6G Flagship Hexa-X-II

Panel 3 6G Resilience: The Foundation of Future Connectivity
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Hexa-X-II

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Summary of design principles: Top priorities

Principle 1
Support and exposure of 6G services and capabilities

Principle 2
Full automation and optimization

Principle 3
Flexibility to different network scenarios

Principle 4
Network Scalability

Principle 5
Resilience and availability

Principle 6
Persistent security and privacy

Principle 7
Internal interfaces are cloud optimized

Principle 8
Separation of concerns of network functions

Principle 9
Network simplification in comparison to previous generations

Principle 10
Minimizing environmental footprint and enabling sustainable networks

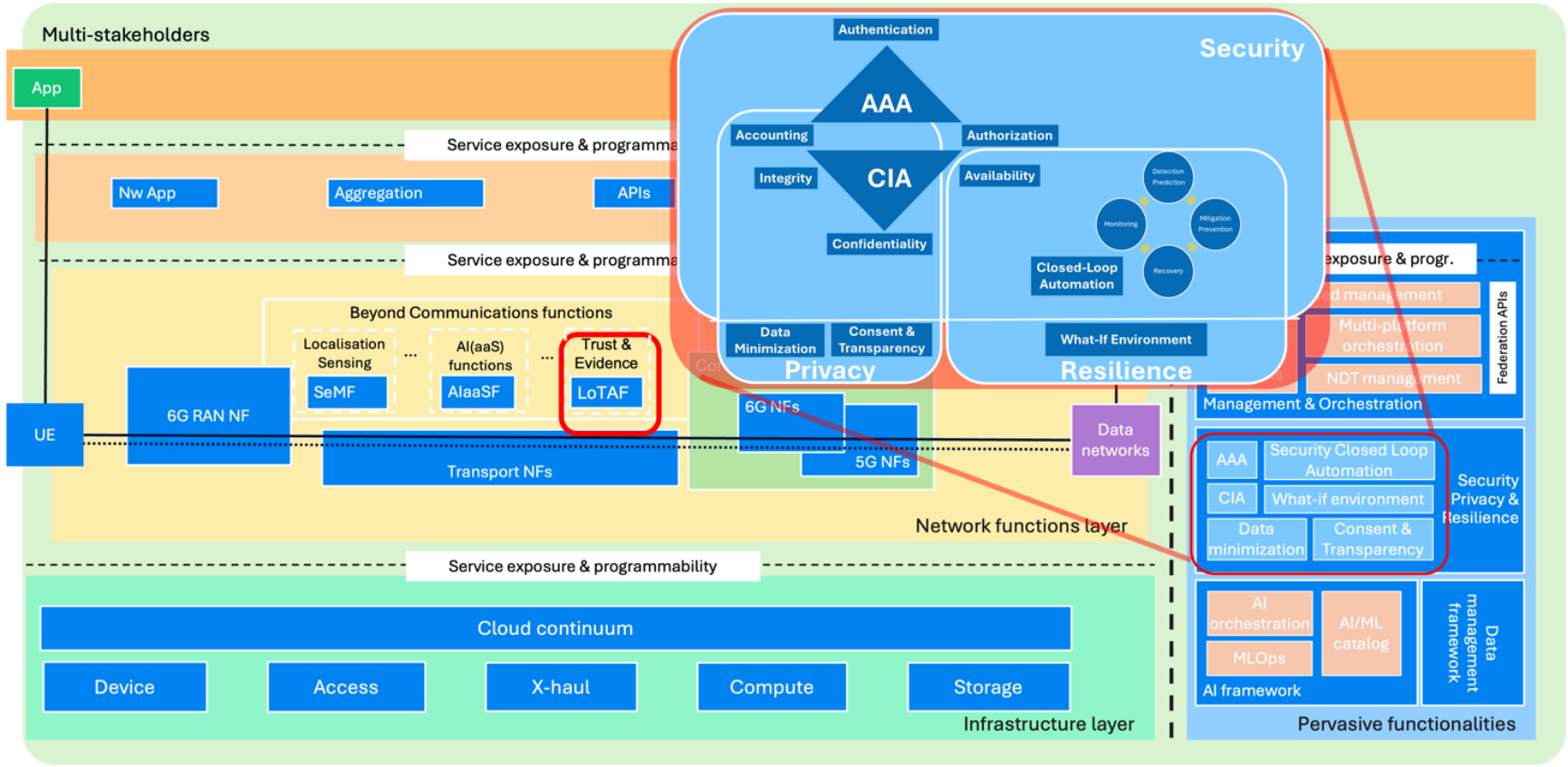
- System requirements: Resilience and Security: include redundancy, self-healing mechanisms, cryptographic protocols, confidential computing, and AI-enabled automated responses to enhance resilience and security

System view on Security, Privacy & Resilience (SPR)

SPR controls featuring confidentiality, integrity, availability, authentication, authorization, privacy and resilience.

Applied across different layers of the 6G system

- **System-level resilience:** Ensuring closed-loop automation for security management.
- **Multi-stakeholder ecosystem:** Addressing security challenges with proper isolation and trust mechanisms.
- **New 6G services:** Securely exposing services and capabilities provided by the 6G platform with strong authentication, authorization, and quantum-safe cryptography.
- **LoTAF and notary services**



AAA: Authentication, Authorisation and Accounting
CIA: Confidentiality, Integrity and Availability

Assessment on Security Considerations for 6G Enablers

- Bidirectional relationship between Hexa-X-II enablers and SPR controls

Enablers support SPR objectives (Security, Privacy, and Resilience)

WP	ENABLERS
WP2	Data recovery mechanisms; Ciphering & integrity protection; Enhanced Special Cell (SpCell) change with UE initiation; Pcell recovery; Data-driven mobility Intent and TLA management LoTAF; Notary service;Trustworthy AI
WP3	MLOps; DataOps; Intent-based management (Zero Touch) Multi-connectivity JCAS protocols, signalling, and procedures
WP4	Trustworthy radio solutions Security and privacy (jamming attack detection, key generation for encryption, etc.)
WP5	Secure and scalable SoC architecture tailored for trustworthy AI/ML
WP6	3rd-Party resource control separation system; User-centric service provisioning system; Trust management functionalities Secure AI/ML-based control for intent-based management system Real-time zero-touch control loops governance and coordination (for recovery & security); Privacy protection for data analytics system

Enablers rely on SPR controls for their functionality

WP	ENABLERS
WP2	Radio protocols for beyond communication; Data fusion mechanisms based on telemetry data; Intent Conflict Administration; Human-machine intent interface design; Declarative Intent Reconciliation; Intent Reporting; 3rd party services
WP3	AIaaS; Architectural means and protocols 6G Network modularization E2E service design in modular 6G network of networks Exposure and data management, integration and orchestration of extreme edge resources in the computing continuum multi-domain/multi-cloud federation
WP4	RIS-assisted transmission
WP5	RIS system integration; Energy-aware protocols RAN scope dedicated connectionless design Energy-aware tinyML applications
WP6	Multi-agent system for multi-cluster orchestration Decentralised orchestration All the overall functionalities in the smart management framework [HEX225-D65]. Network programmability system

Collectively, a unified framework for enhancing privacy, security, and resilience

HEXA-X-II.EU //

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