Smart Networks in context of Next Geneeration Internet Strategic Research and Innovation Agenda

Network and Service Security

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THALES

Based on Networld2020 SRIAv3.0

Security Transformation

- Technology changes
  - securing the techno, use the techno for security: AI, QKD,…
- Architecture changes
  - distribution, complexity, IoT, Edge
- Usages changes
  - Dynamics, SW life Cycle
- Usages changes
  - Expectations, diversity

➔Not business as usual

➔Concomitant evolution

➔New paradigms

- SecaaS, MTD,…

From Tech angle (1)

- Virtualization
  - Secured hyperware
  - Security function virtualization
  - Slicing (CIA, IAM,…)
- Softwarization
  - Orchestration, chaining
  - Smart policy deployement (protection, detection)
  - Deception, MTD,…
  - Continuous assesment
  - Control & management workflows security (OTA,…)
- Cloudification
  - Using benefits of cloud approach (latest CTI, pure player expertise,…)

From Tech angle (2)

- Data Centric: CIA & Privacy
  - SNS data using cryptographic tech. for data protection/sharing (FHE, MPC, ZKP,…)
  - AI applied to SNS (adversarial ML, biaised data ,…)
  - Anonymisation/pseudonymisation
- Quantum related technologies
  - QKD
  - Real QCI
  - Post Quantum crypto
  - Q-based sensors integration
- DLT
  - Applicability checked
- AI
  - All forms

From Tech angle (3)

- Matching: expectations<>solutions
  - Security level exposure/request/monitoring SSLA
  - QoSec
  - Assesment technologies, evlauation, composition, incremental,…
  - Matching ICT & verticals regulation
  - Autonomy & sovereignty considerations based on EU values

- Interworking across stakeholder ecosystem
  - From CTI towards response to incident

Challenges

PROTECT

- **Physical layers:** protection against eavesdropping (IMSI-catchers,…) and jamming are two areas of renewed challenges
- **Data Confidentiality:** including control, monitoring, management data handled by the systems. Although, issues related to Lawful Interception remain in the scope of SNS and may be antagonist to the measures for data confidentiality.
- **Identity and Access**: challenges related to the transitivity of rights across domains and services. Including performances issues raised by high speed mobility.
- **Smart orchestration**: challenges related to the smart time and space distribution of security functions across the systems and means to ensure compliance with security policies.
- **Security strategies**: Risk assessment, and risk management strategies, potentially involving AI/reasoning taking into account limited visibility of the global system.

Challenges

Efficient Detection (time, false positive, ratios,...)

- **Distributed Denial of Service**: mainly due to the low level of security and control over termination points with no hopes of significant enhancements. Local and distributed (correlated, cooperative) detection is still a challenge as well as appropriate counter measures.
- **Smart Orchestration**: As for protection, there are open challenges to optimize the time and space distribution of EDR, probes and means to detect known attacks or anomalies in case of zero days attacks.
- **AI-based** attack pattern recognition & anomaly detection

Response/Recover

- Usage of SNS flexibility/programmability for the benefits of robustness and resilience

Operational Security Research Directions

- Security quantification
  - Evaluation/certification, QoSec, SSLA, continuous monitoring
- Green Security
  - As ICT in general: end of unlimited replication ? Optimized and profiled deployement
- Security as a Service
  - From CTI to intrusive monitoring within the architecture
- Security orchestration
  - Concomitant & smart
- Disruptive Security Strategies
  - At least Deception & MTD
- Distributed Ledger Technologies
  - In particular when no central authority is required
- Artificial Intelligence
  - Monitoring, CPS models, securing AI/xAI, Security in black,…smart orchestration, CTI, OSINT,…
- Human-centric privacy
  - Beyond GDPR, facing technology capabilities with respect to individual rights

Thanks

The European Technology Platform for communications networks and services