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Liability-Aware Service Management for 5G*

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Presentation at WAL5Gplus Workshop [Link]

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Introduction

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- 5G is a technological revolution
  - flexible & dynamic network
  - enriched business cases with multiple layers & multiple parties
  - opening 5G infrastructure to third parties (e.g. IoT devices, VNF providers)
  - Slicing is an important technology enabler for 5G provided services
- Slice Provider is legally bound by contract to provide a QoS
  - financial & legal impact in case of fraud or mischief
  - security issues can have impacts on safety issues
- Managing liabilities and responsibilities in autonomous 5G infrastructure is key for its development and practical use

Introduction

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- Example : operator offer enriched by partner[1]

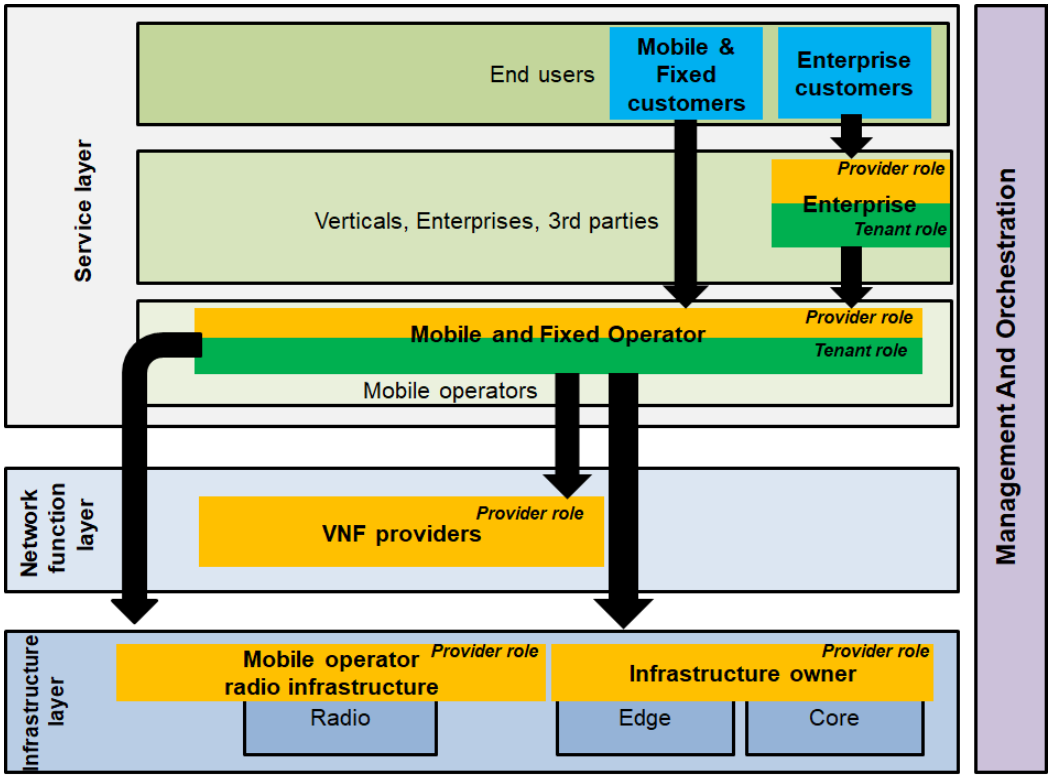

Fig. 1. Multi-party & multi-layer 5G infrastructure for service delivery

1- NGMN Alliance, "5G White Paper," Next generation mobile networks, white paper, vol. 1, 2015.

Introduction

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- Challenges
  - worldwide deployment
  - multiple stakeholders
  - complex interconnections of hardware and software at different levels
  - orchestration across layers

- Our proposal : integration of liability as foundational element into the security management framework of 5G networks
  - **Liability-Aware Security Manager**

Related works

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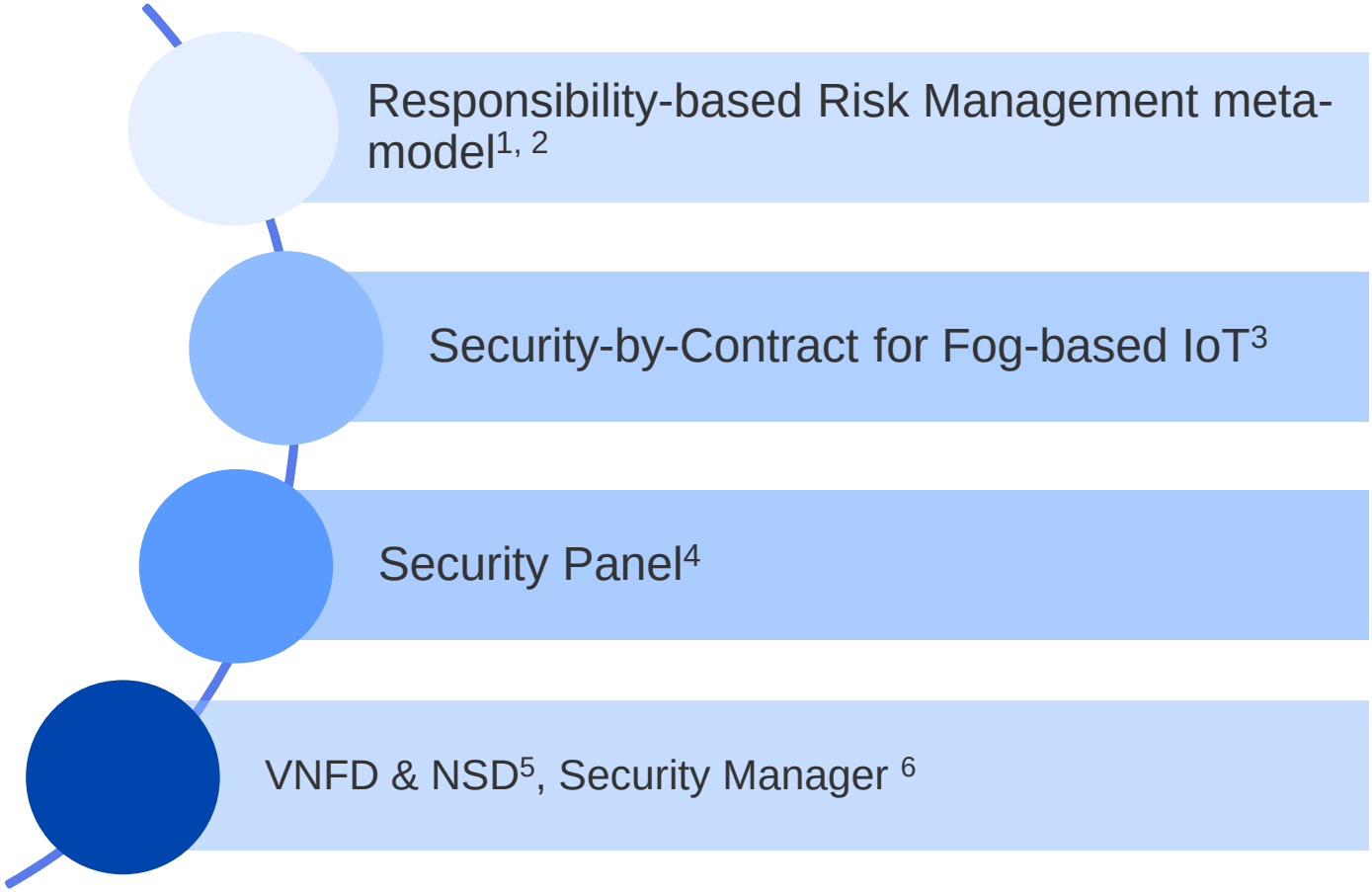
LASM for 5G Slice Management

Ajouter standard accountabilit y manager ETSI



1- G. Guemkam, C. Feltus, C.Bonhomme, D. Kahdraoui and Z. Guessoum, "*Reputation Based Dynamic Responsibility to Agent Assignment for Critical Infrastructure*", in 2011 IEE/WIC/ACM International Conferences on Web Intelligence and Intelligent Agent Technology
2- C. Bonhomme, C. Feltus and D. Khadraoui, "*A multi-agent based decision mechanism for incident reaction in telecommunication network*", in ACS/IEEE International Conference on Computer Systems and Applications – AICCSA 2010
3- A. Giaretta, N. Dragoni and F. Massacci "*IoT Security Configurability with Security-by-Contract*", Sensors, vol.19, no.19, 2019
4- C. Gaber, JL. Grimault, C. Loiseaux, M. Hajj, L.Coureau and J.P. Wary "*How increasing the confidence in the eSIM ecosystem is essential for its adoption*", Online, Available : https://hellofuture.orange.com/en/how-increasing-the-confidence-in-the-esim-ecosystem-is-essential-for-its-adoption/
5- ETSI GS NFV-IFA 011 & 14
6- ETSI NFV SEC 024

Liability-Aware Security Management

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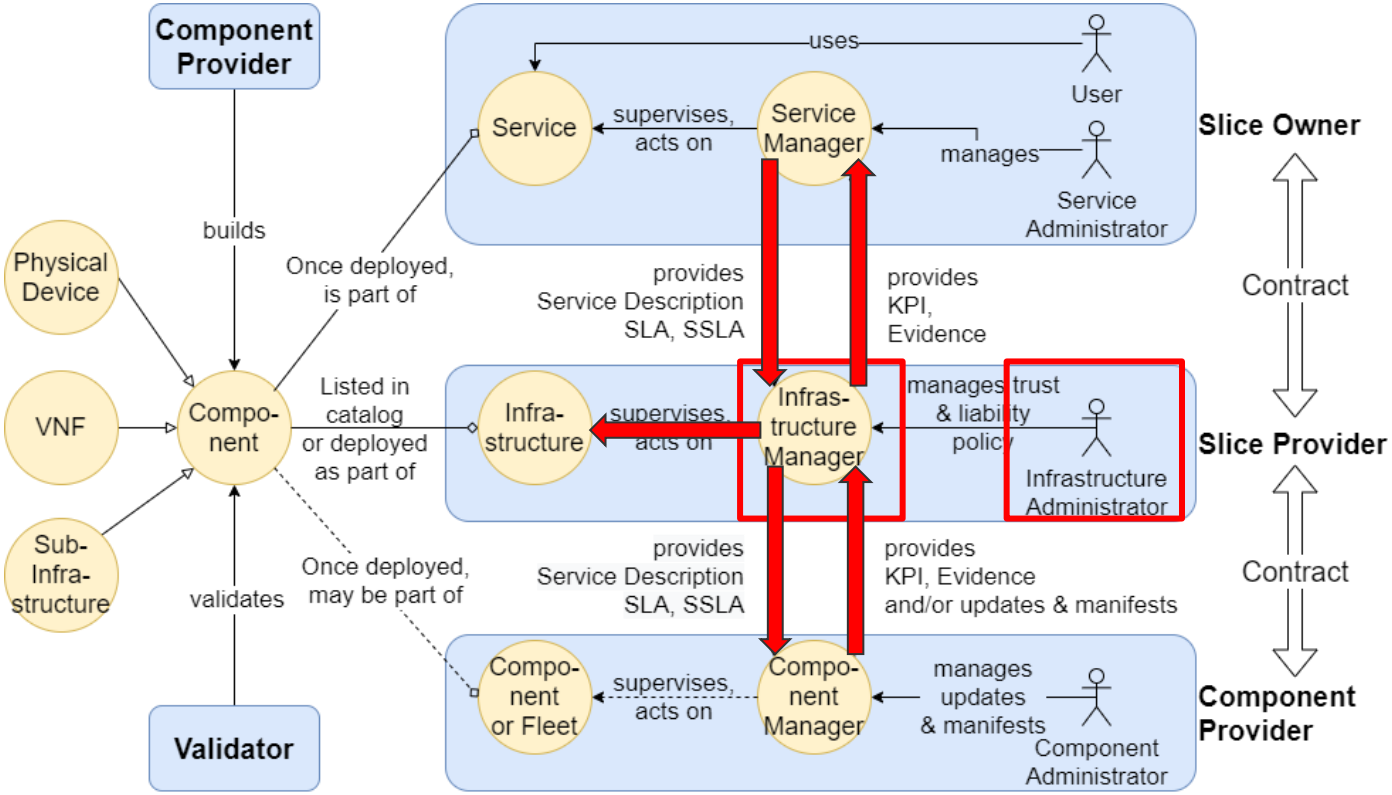
- Requirements for a LASM Infrastructure Manager



Liability-Aware Security Management

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- Strategic alliance between independent partners[1]
  - each entity is independent
  - interaction of heterogeneous orchestration of each domain
  - unpredictable & uncertain impact on end-to-end service quality level
- Liability perspective
  - Identify domains or partners responsible for fault or outage
  - Encourage cooperation with penalties or incentives

1- Final publish summary report, May 2013, Online, Available: https://www.laquadrature.net/files/ETICS_final_publishable_summary.pdf

Liability-Aware Security Management

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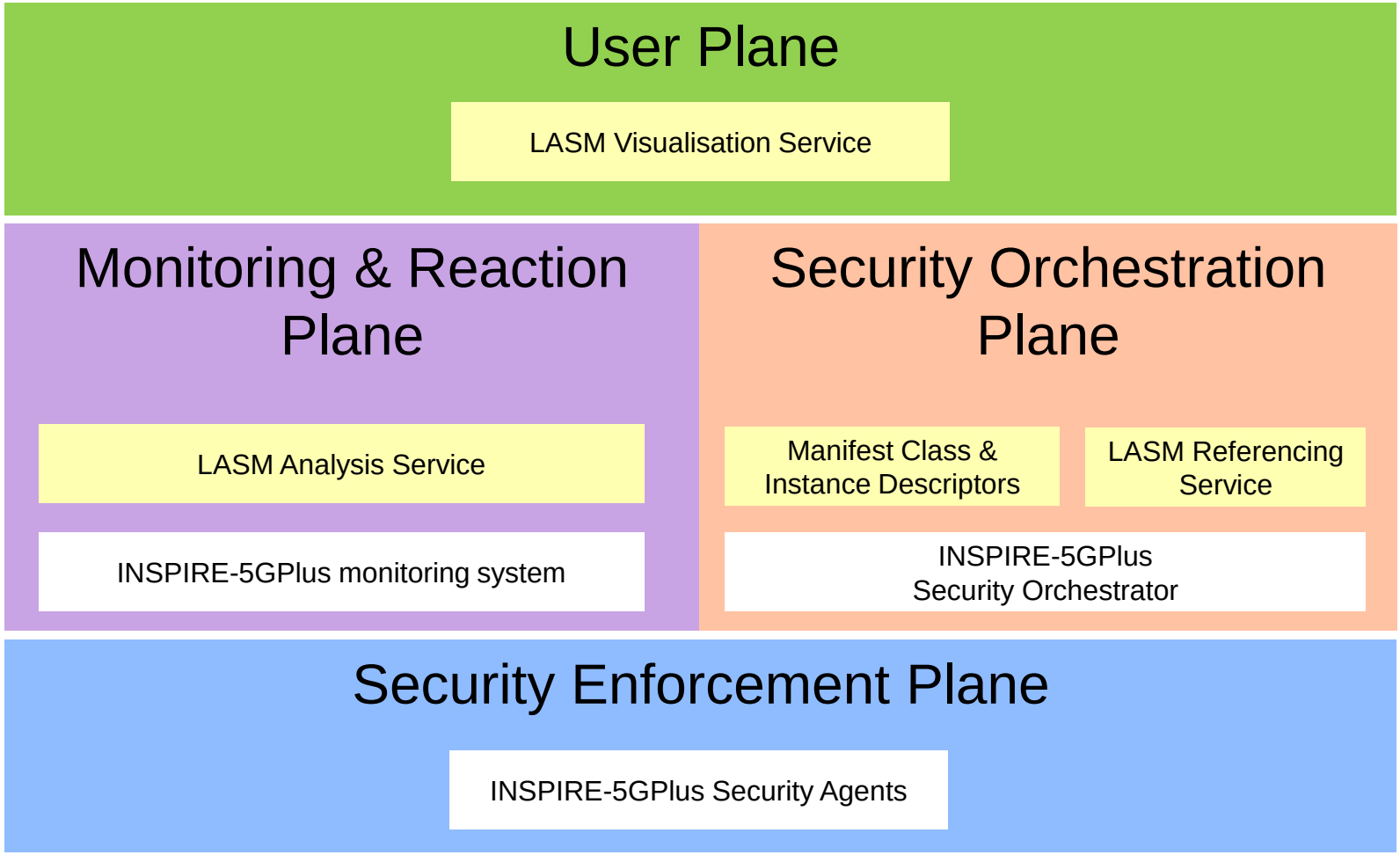

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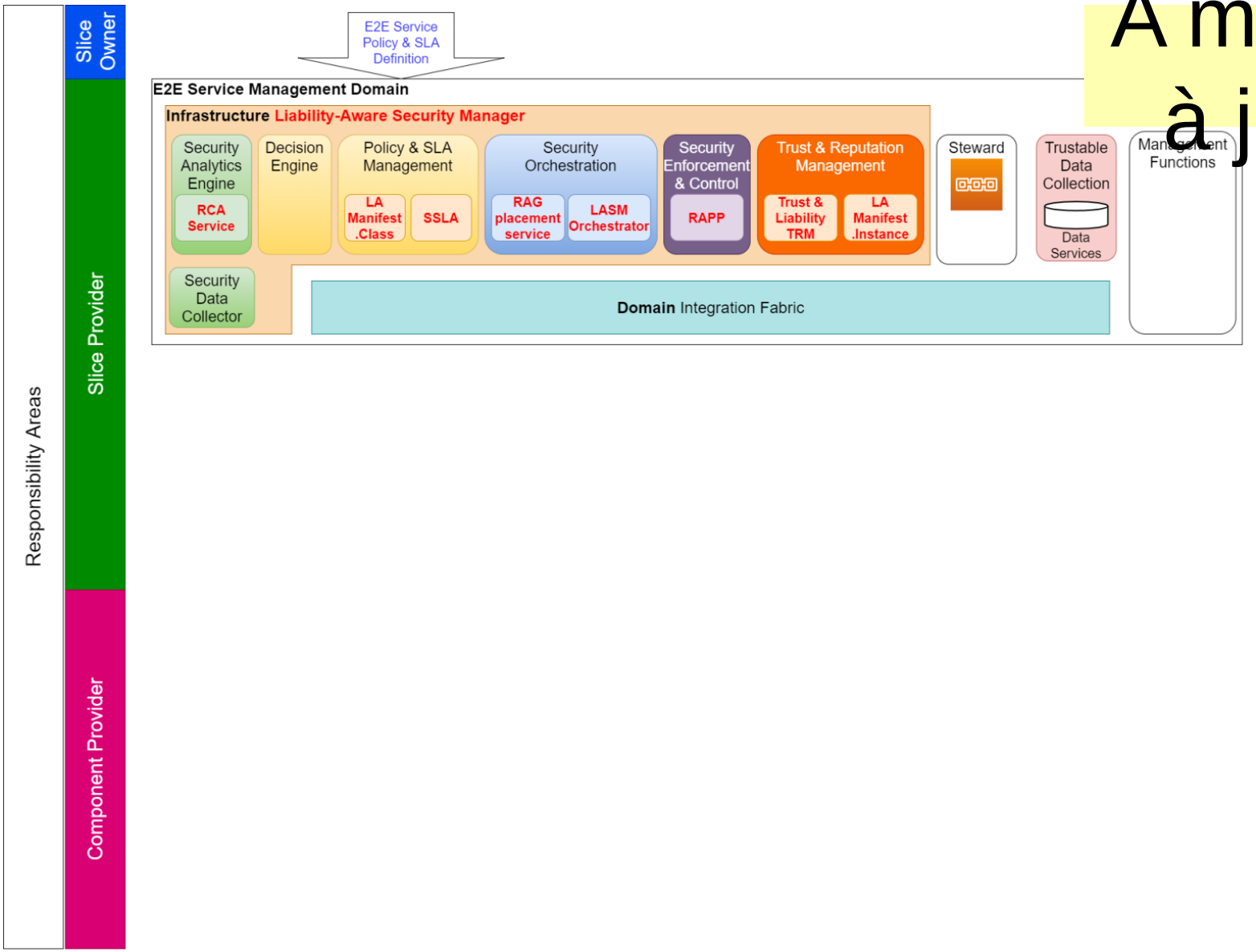
A mettre à jour



Quelques captures d’écran de la démo

Challenges to achieve vision

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- Accountability-related metrics
- Manifests
  - Distinguish levels of responsibilities : properties vs recommendations
  - Modular structure endorsed by multiple authors (Component Provider, Validators, Slice Provider)
  - *Manifest.Class* vs *Manifest.Instance*
- SLAs
  - Security SLAs for Slicing
  - Publicly-verifiable proofs of compliance
  - Automated incentives and penalties

Conclusion & future works

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- Current work
  - Concept of Liability-Aware Security Management
  - Proposal Architecture for 5G slicing context

- Next steps:
  - Investigate identified challenges for each module
  - LASM Proof of Concept
  - Proposals related to manifests & security manager functional blocks to relevant IETF specification (IETF NFV-SEC 024, ETSI GS NFV-IFA 011 & 14))

Thank you for your attention!

Find us at www.inspire-5gplus.eu

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