24th January 2024

SNS Projects /Ideas

Looking for partners for

1. SNS-2024-STREAM-B-01-07:Sustainability Lighthouse

And

2. SNS-2024-STREAM-B-01-01: System Architecture

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Sustainability 6G Enablements

1. To elaborate, validate and orchestrate an optimized, multi-domain, sustainable 6G Network architectural fabric spanning the edge-to-network infrastructures.

2. Large-scale integrability of 6G Enablers and interworking between multi-domain and multi-stakeholder systems with dispersed intelligence applicable to the 6G ecosystem.

3. Exposing 6G capabilities and guarantees for KPIs to integrate 6G services and Verticals on the same infrastructure and/or 6G slices.

4. The deployability approach for the architectural fabric: an overlay of service nodes that include 6G APIs and service components. Service nodes are on top of the network OSI layer and would be geographically spread across different segments of the edge-to-networks continuum. This paradigm hides the underlying protocols and would ensure deployability at the hyperscale Internet level.

5. Sustainability includes improved efficiency for Energy consumption, Opex costs, DevOps, societal, economic, and environmental benefits.

6. Sustainability includes transitioning to Green and Greener Networking with the management and lowering with approx. 75% energy consumption.

7. Sustainability also includes enablements for integration with KPIs guarantees, with verticals and 6G services.

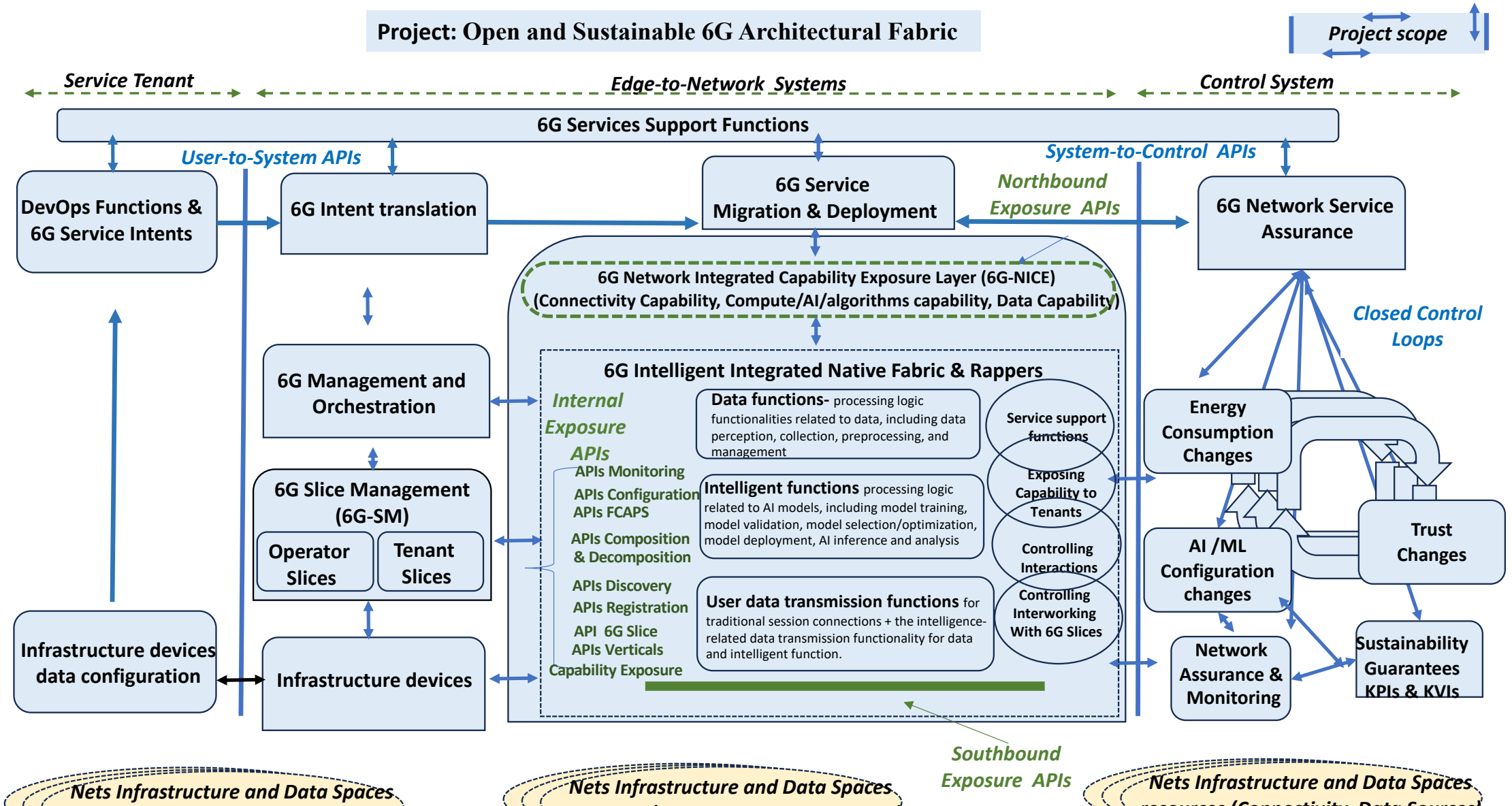
8. Sustainability also includes enablements managing Cybersecurity and Economic Security.

9. Sustainability also includes enablements managing the digital trustworthiness represented by trade-offs between flexibility, resilience, controllability, adaptability, stability, security and openness.

Sustainability 6G Enablements

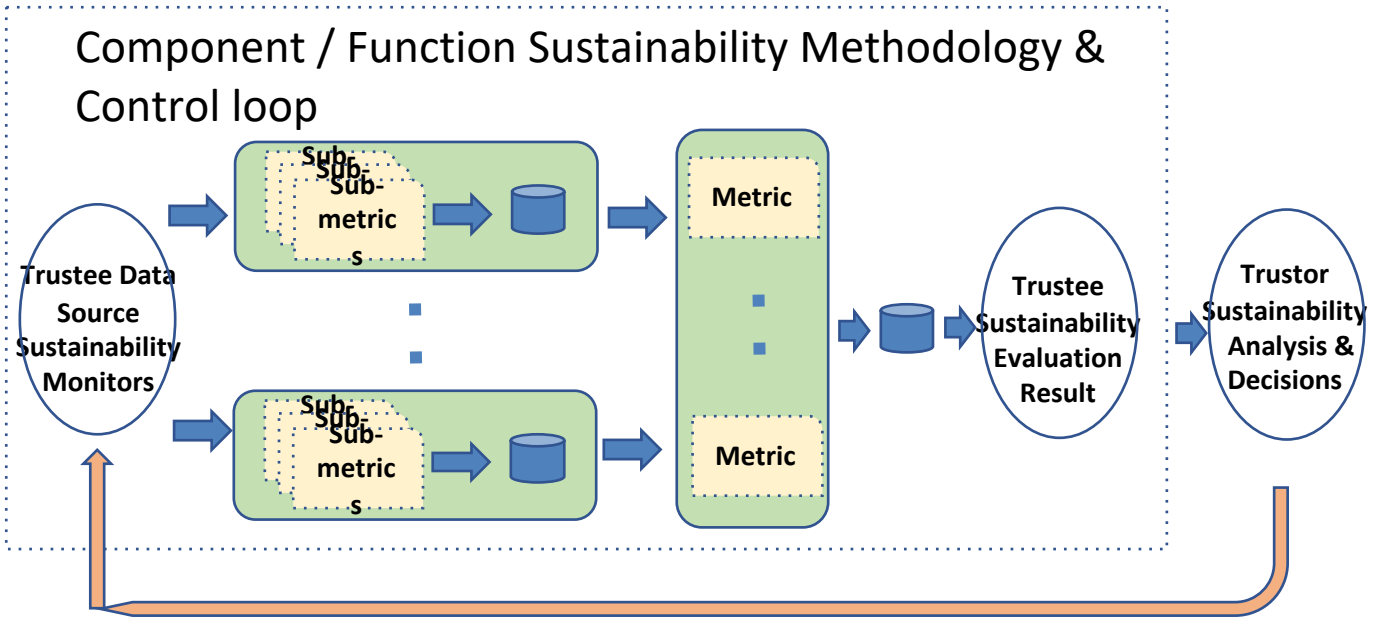
- **Energy Consumption: focus on energy measurement, metrics and management (e.g. 40 energy consumption measures → reference https://doi.org/10.3390/fi16010023; https://www.mdpi.com/1999-5903/16/1/23)**
- **Opex: an ongoing cost for running a system.**
- **DevOps: focus on economic value-driven development DevOps.**
- **Digital Trustworthiness – focuses on the qualities of an entity to perform actions including:**
  - **Reliability: maintain an acceptable level of service in the face of faults and challenges to normal operation.**
  - **Flexibility: the degree of dealing with future changes in requirements.**
  - **Resilience: the degree to which the 6G Systems can automatically fall back and maintain an acceptable operating state from failures or abnormal events.**
  - **Controllability: the degree to which the 6G Systems can support human intervention under any conditions.**
  - **Adaptability: the degree to which the mechanisms of the 6G Systems can maintain metrics in various scenarios.**
  - **Stability: the degree of fluctuation the 6G Systems execution imposes on system performance and service QoE.**
  - **Security: the degree to which the 6G Systems can guarantee networked service safety under any conditions.**

Towards 6G Sustainable Networks 2030-2035



Examples of Sustainability Measures

The general process for orchestration of sustainability KPIs



Trust Metric	Sub-metric	Unit	Description
Energy Consumption	Measurability	Level (num)	Degree (Low, Medium, High) of average energy consumption of ESA within specific test time duration. https://doi.org/10.3390/fi16010023; https://www.mdpi.com/1999-59(
Value-driven DevOps	Measurability	Level (num)	Degree (Low, Medium, High) of value-driven DevOps of ESA functi specific test time duration.
Service Accuracy	*Reproducibility*	%	Percentage of trustee(s) to reproduce the same results using the same n within some specific test time duration.
	Precision	%	Percentage of the accurate results executed by the trustee(s) in the sam configurations and environments within some specific test time duratic
Service Stability	*Rate of interruption*	number / mins, or hours	The number of action interruptions during the trustee working / execut within some specific (simulation or test) time duration.
	Rate of accident	score / mins or hours	The number of accidents occurs during the operation of the ESA funct the execution of the decision made by the trustee within some specific (simulation or test) time duration.
	Maturity	Level (num)	Degree of trustee's technologies evolution in terms of process, support resources, life cycle and intelligence level.
Service Controllability	*Predictability*	%	Percentage of ESA function's decisions or actions to be predicted or w expected results within some specific test time duration.
	Ability to be supervised	%	Percentage of trustee(s) to be supervised by the trustor(s) in any situati some specific test time duration.
	Ability of fallback	%	Percentage of trustee(s) fallback to the right essential back points wher necessary, within some specific test time duration.
	Ability of reset	%	Percentage of trustee(s) fallback to the original condition when it is ne within some specific test time duration.
Service Adaptability	*Flexibility*	%	Flexibility refers to designs that can adapt when external changes occu Percentage of the external changes triggering results changes in the sar configurations and environments within some specific test time duratic
	Change acceptance	%	Percentage of the result & changes executed by the trustee(s), in the sa configurations and environments within some specific test time duratic
Service Security	*Privacy Protection*	%	Protection of the information of trustor(s) and relevant user(s), i.e., pas information, data, messages, and files over without leaking to anyone, permitted.
	Data source security	Score	The practice of protecting digital information from unauthorized acces corruption, or theft throughout its entire life cycle It encompasses ever information security, from the physical security of hardware and storag to administrative and access controls, as well as the logical security of applications. Achieving higher-grade data security involves (1) A risk-approach to protecting data across the entire ESA; (2) Identify some da containing the most sensitive information and establish clear and tight protect these limited sources; (3) the process could be extended.
	Regulation Compliance	Score	Act of trustees obeying the relevant laws, standards, rules, or requests.

Sustainability Score = Energy Consumption* Value-driven DevOps*Digital Trustworthiness (*Accuracy * Stability * Controllability * Resilience * Adaptability * Security)*

Looking for partners for

1.SNS-2024-STREAM-B-01-07:Sustainability Lighthouse

2.SNS-2024-STREAM-B-01-01: System Architecture - Standardisation and Follow-up/PoCs

- UCL has more than 50 years in Internet and Networking research
- UCL has been consistently ranked as one of the top universities in the world and is currently 9th ranked university in the QS World Rankings (https://www.topuniversities.com/university-rankings/world-university-rankings/2024), 17th rank in the Shanghai Jiao Tong University's Academic Ranking of World Universities (https://www.shanghairanking.com/rankings/arwu/2023).

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