

# **SLICES**

European Scientific Large-Scale Infrastructure for Computing/Communication Experimental Studies



Serge Fdida Sorbonne Université, France

Aether community meeting
September 22, 2022

## **6G Research Infrastructures?**



# Important stakeholders























# Research Infrastructures as a Scientific Instrument



### MAKING SCIENCE HAPPEN

A new ambition for Research Infrastructures in the European Research Area

http://www.esfri.eu/





September 22, 2022

# From mid-Scale to Large-Scale funding





## The European ESFRI framework

European Strategy Forum on Research Infrastructures

### MAKING SCIENCE HAPPEN

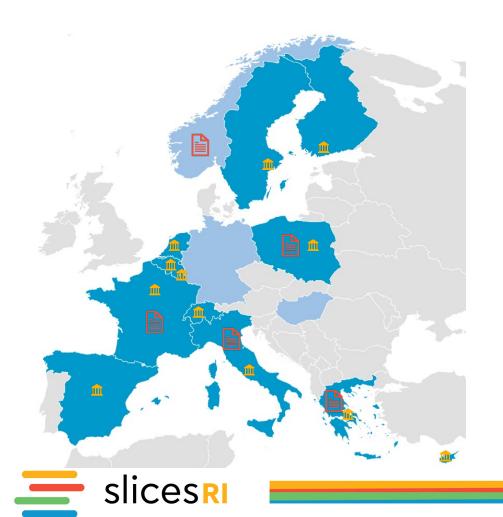
A new ambition for Research Infrastructures in the European Research Area

Supporting a scientific methodology

http://www.esfri.eu/



## SLICES for research on Digital Infrastructures





Initiated in 2017, **25 partners** from 15 countries:

- 12 political support from National Ministries
- included in **5 national roadmaps**

SLICES will enable scientific excellence and breakthrough and will foster innovation in the ICT domain, strengthening the impact of European research, while contributing to European agenda to address societal challenges, and in particular, the twin transition to a sustainable and digital economy.

## Current status of the partnership

	Countries	Government	Research and Academia		Industry		Clusters, networks and	NRENs	Worldwide
	Countries	National support	Partners	Support	muustry		others	INNEINS	support
Core partners		MINISTRE DE L'ENERGEMENT SUPÉRIUR, DE L'ENERGEMENT SUPÉRIUR, DE L'ENERGEMENT SUPÉRIUR SUPERIUR SUPERIU	S SORBONNE CIVICA INTERNATIONAL MARIANTE CONTO		ALEATICA	altran	-		
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	+	Swedish Research Council	(KIH)			JMA			
	•	Schweizerische Eidgenossenschaft Confederation swisse Confederazione Svizzera Confederazion svizza	Crowdsource The Future	ETH zürich  Hes-so  Lauren aus					

# "The Network is the Computer" John Gage, Sun Microsystems, 1984

"We will think of a network as a programmable platform" ...
"We will no longer think in terms of protocols. Instead, we will think in terms of software.

Nick McKeown, ONF Connect, 2020

"The network will be programmed by many and operated by a few ».

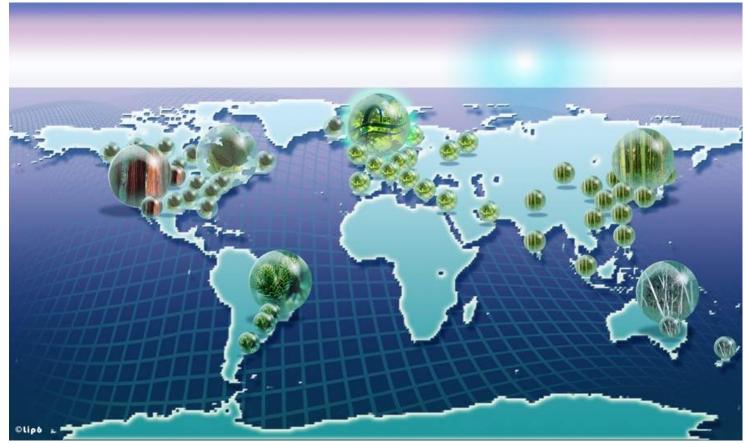
Nick McKeown, NetworkingChannel, March 2021



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# Fully Controllable, programmable Virtualized Digital Infrastructure Test Platform Openness, International

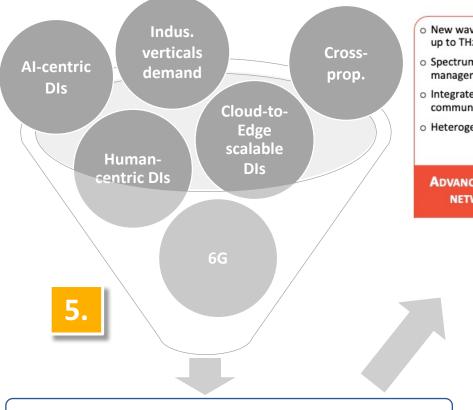




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# Prioritisation of research topics

What's the methodology behind it?



- New waveforms, higher frequencies up to THz.
- Spectrum and wireless management.
- Integrated sensing and communication.
- Heterogeneous radio management.

ADVANCED WIRELESS
NETWORKING



- Advanced protocols and architectures (virtualization, softwarization, programmability).
- Al applied to infrastructure operation and optimization.
- Generation of data to train algorithms.
- Distribution of intelligence into (and beyond) the Edge of the network.

SMART INFRASTRUCTURE
OPERATION AND
MANAGEMENT



- o Fog/Edge/cloud hyper converged infras
- o Software component deployment.
- Distributed resource management & microservices.
- o Geo-distributed data management.
- Federated deep learning.
- Datacentres infras for distributed systems, appli. and software stacks.

Design & validation of new DIs and hyperconverged infras

- New challenges arising from the verticals and the ubiquitous networks.
- Interoperability, composable infrastructure services on-demand (RI as a Service).
- Seamless user experiences across technologies and domains.

ADVANCED FUNCTIONALITIES



ENERGY EFFICIENCY AND CARBON FOOTPRINT



SECURITY AND PRIVACY



Breaking down in priority research topics

Simultaneous but progressive exploration of research topics



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## SLICES contribution to the development of the EOSC

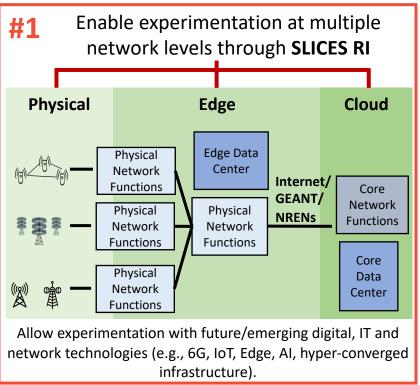






EUROPEAN OPEN SCIENCE CLOUD

Objectives: federate existing research data infrastructures in Europe and realise a web of FAIR data and related services for science.



### EU-wide availability of unique Software and App Repositories

- ICT research-related services (e.g., testing new infrastructure and network solutions);
- Applications deployed within SLICES:
- Simulation tools;
- Data analysis tools.

Published in the EOSC Catalog and Marketplace and accessible with different access options.









open access

Orderable via provider channel Orderable via **EOSC** hub

### Interoperability with #3 **Open and FAIR data**

- Producers of unique data;
- Maximize data reuse by adopting of data principles Data Management and Governance;
- Processing of sensitive and personal information.

#### Integration of the #4 **SLICES** communities to EOSC

- SLICES community building
  - More than 120 participants to the 1st SLICES
- Thousands of users of existing infrastructures.
- Training services



### SLICES timeline

2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 S1 S2 **DESIGN IMPLEMENTATION CONTINUOUS UPGRADE OPERATION TERMINATION** MoU-1 MdU-2 Legal structure established Govern. Full operation funding secured and full staff in place 100% Services opened No 15% 30% 50% 80% 80% No



## SLICES reference architecture

- Baseline software components that will form the backbone of SLICES
- We offer a large footprint for deploying and testing
  - OAI/Aether blueprints?
    - Aether Core + UPF, OAI disaggregated RANs
    - Support for SD-Fabric + UPF
    - Testing various O-RU, frequency bands (regulation)
  - Joint strategy regarding O-RAN?
  - Experimental plane
  - Portal and APIs



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# Thank you

www.slices-ri.eu

### On behalf of SLICES consortium





For more information, please contact:

Serge Fdida

serge.fdida@sorbonneguniversité.fr