

# SLICES

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



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Bridges

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# *Research Infrastructures as a Scientific Instrument*



## **MAKING SCIENCE HAPPEN**

A new ambition for Research Infrastructures in the European Research Area

<http://www.esfri.eu/>



# From mid-Scale (~100M€) to Large-Scale (~B€)



ESFRI

## MAKING SCIENCE HAPPEN

A new ambition for Research Infrastructures in the European Research Area



## The European ESFRI framework

European Strategy Forum on Research Infrastructures

Supporting a scientific methodology

Joint investment strategy between EU and Member States

<http://www.esfri.eu/>



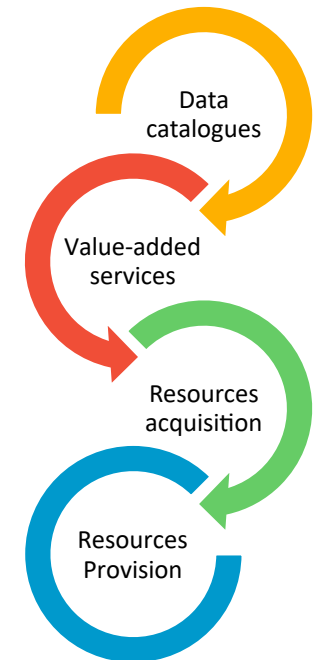
# SLICES, first in digital sciences to entered the ESFRI Roadmap 2021



## what we offer

- Launched in 2017, **SLICES** is an **RI** to support the **academic and industrial research community** that will design, develop and deploy the **Next Generation of Digital Infrastructures**:
  - **SLICES-RI** is a **distributed RI** providing several **specialized instruments** on challenging research areas of Digital Infrastructures, by **aggregating** networking, computing and storage **resources** across countries, nodes and sites.
  - **Scientific domains**: networking protocols, radio technologies, services, data collection, parallel and distributed computing and in particular cloud and edge-based computing architectures and services.

[www.slices-ri.eu](http://www.slices-ri.eu)



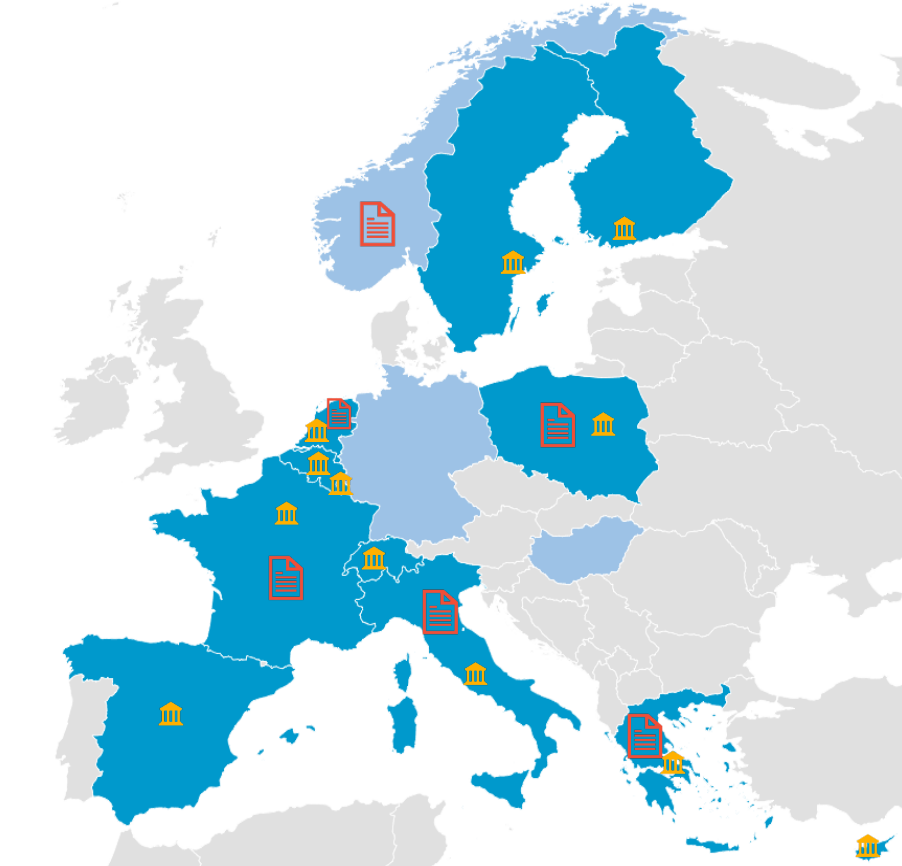
# SLICES for research on Digital Infrastructures



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

- **12 political support** from National Ministries 🏛️
- included in **7 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.





# SLICES is a distributed RI

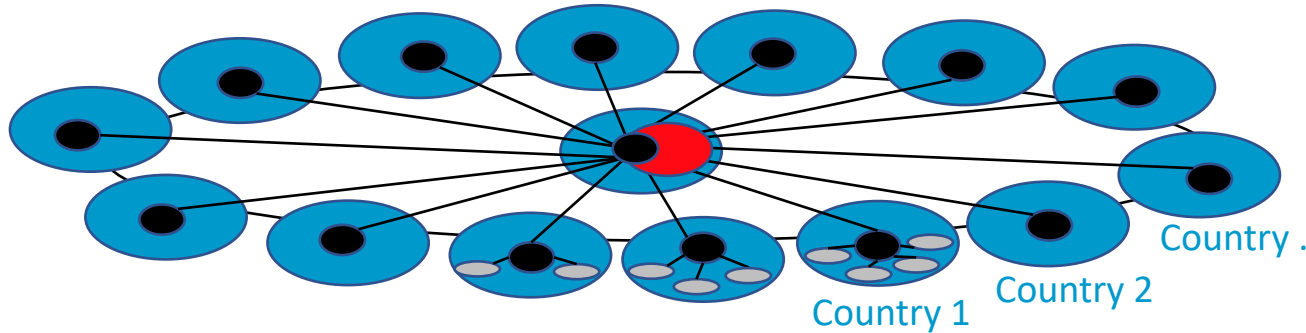
Centralised governance

Supervisory Board

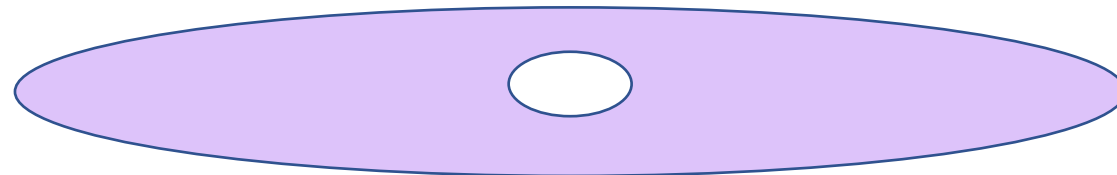
CMO

Management Committee

Distributed Infrastructure



Single entry point, single access policy



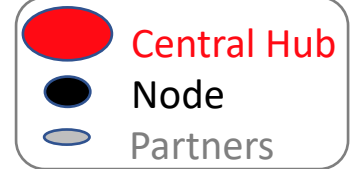
Users



Joint investment strategy

Decisions on new nodes

Decisions on core functions and data centre



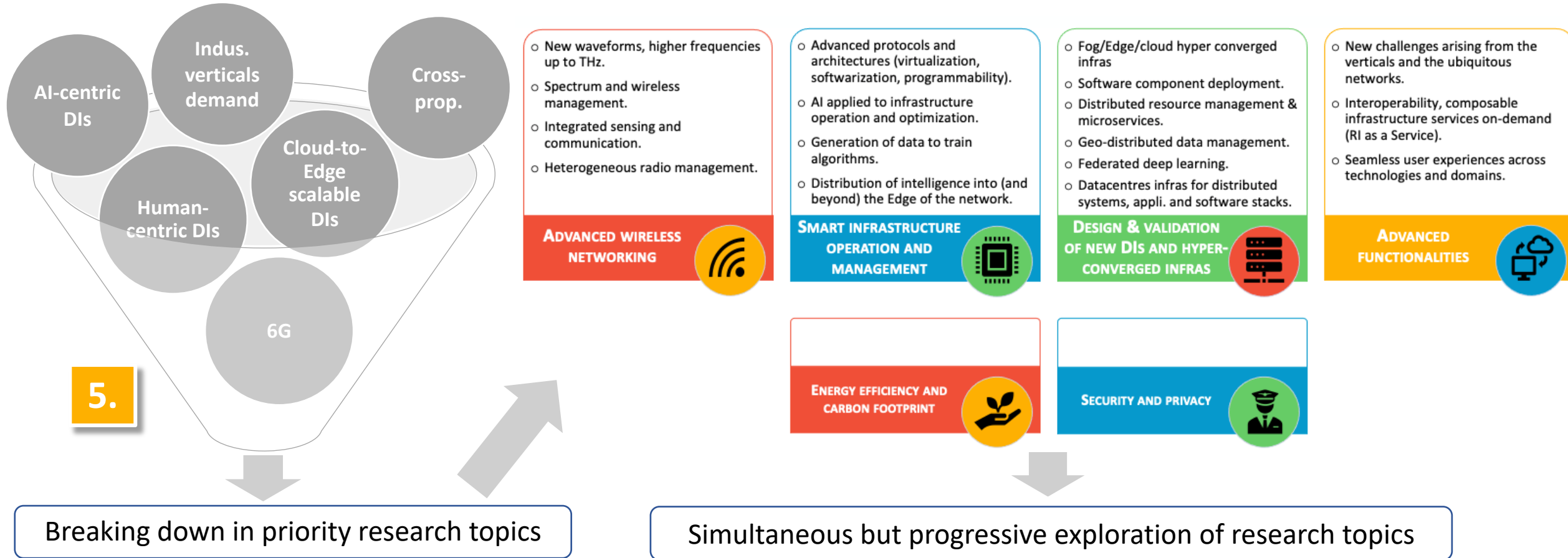
Optimize the distribution of resources according to needs and competences: control plane, edge computing and slicing, terahertz, MIMO, ...





# Prioritisation of research topics

What's the methodology behind it?





# Open source software and network disaggregation



# SLICES and EOSC Interoperability and Integration

EOSC: European Open Science Cloud

<https://eosc-portal.eu/>

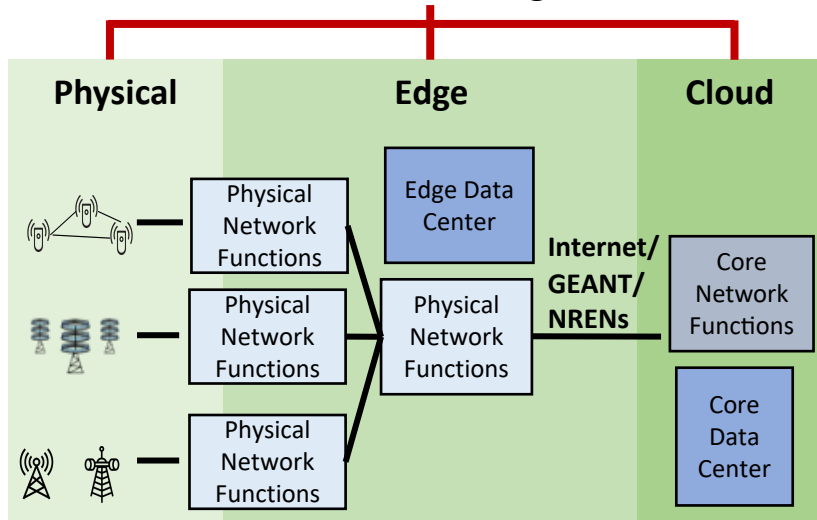


# SLICES contribution to the development of the EOSC



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

## #1 Enable experimentation at multiple network levels through SLICES RI



Allow experimentation with future/emerging digital, IT and network technologies (e.g., 6G, IoT, Edge, AI, hyper-converged infrastructure).

## #2 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

## #3 Interoperability with Open and FAIR data

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

## #4 Integration of the SLICES communities to EOSC

- SLICES community building
  - More than 120 participants to the 1<sup>st</sup> SLICES workshop;
  - Thousands of users of existing infrastructures.
- Training services





# SLICES Reproducible Experiment Workflow

# Testbed-driven Experiments

The plain orchestrating service (pos) [3], a framework for reproducible experiments:

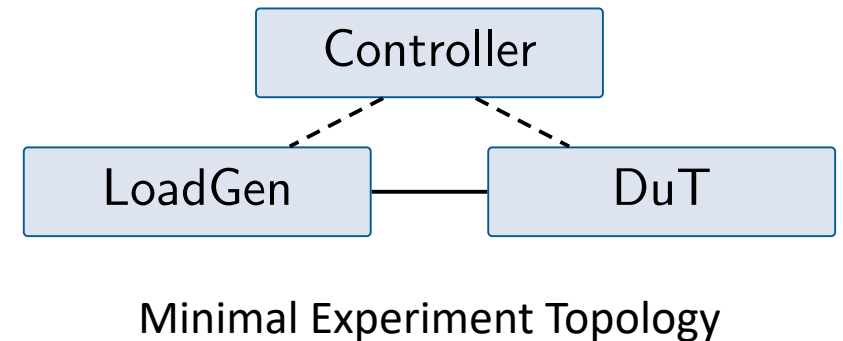
1. A testbed management system
2. A well-defined experiment workflow

## Achieving Repeatability

- Automation & Linux Live Images
  - Researchers **must** automate configuration
  - No residual state between reboots
- Experiments become **repeatable**

## Achieving Reproducibility

- Providing access to experiment infrastructure
- Other researchers can easily (re-)run experiment
- Experiments become **reproducible**



[3] S. Gallenmüller, D. Scholz, H. Stubbe and G. Carle, “The pos Framework: a Methodology and Toolchain for Reproducible Network Experiments,” in ACM CoNEXT’21, <https://dl.acm.org/doi/10.1145/3485983.3494841>

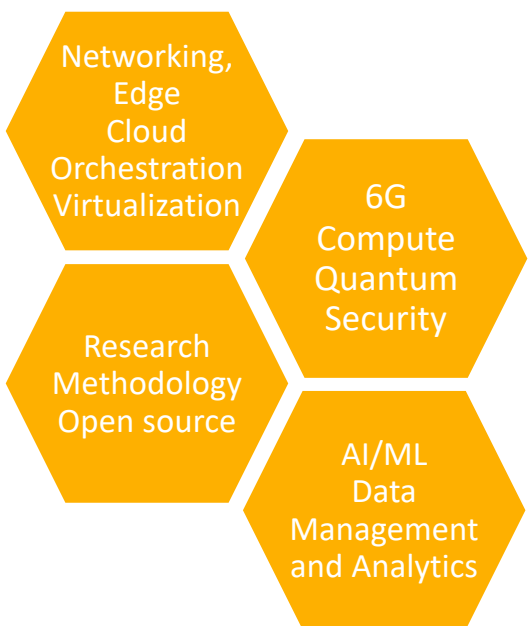


# SLICES Academy

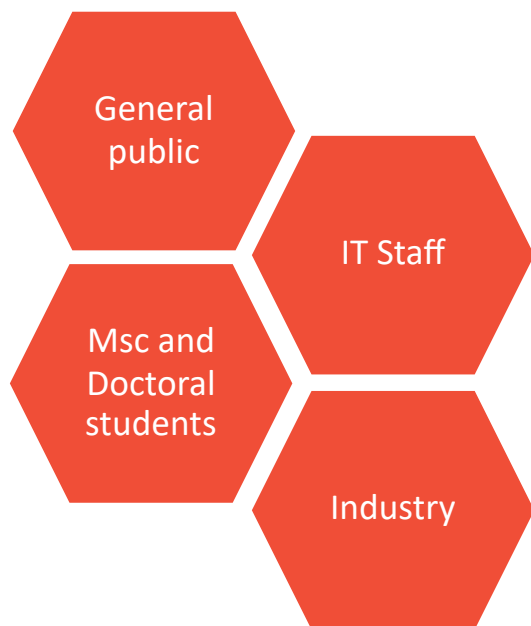


# SLICES Academy

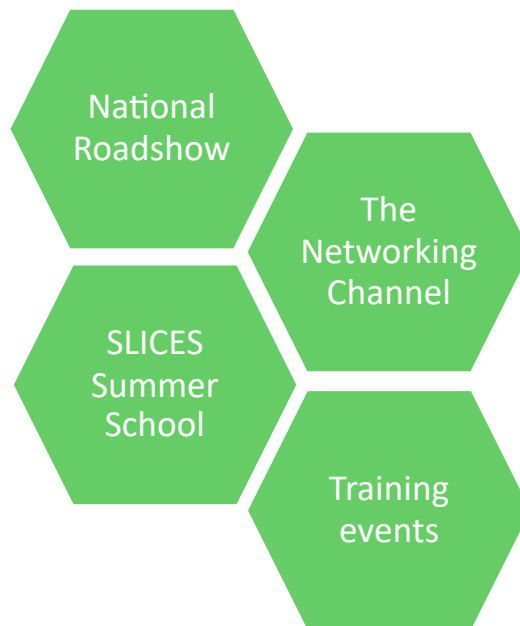
## Skills



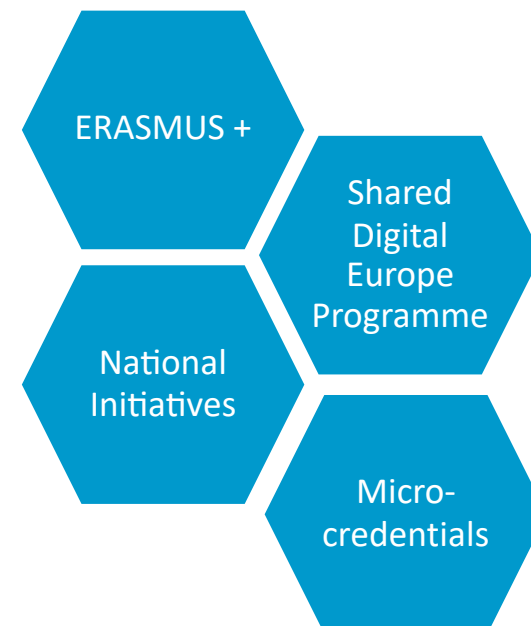
## Audience



## Tools



## Funding



# SLICES USP and partnerships

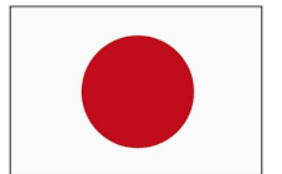
***SLICES able to engage a large community***

*SLICES Infrastructure and open data*

*SLICES Academy*

***Stimulate cooperation with important stakeholders***

- *EU:* SNS program (Stream C)
- *USA:* NSF PAWR, ONF/Aether/OAI
- *Brazil:* RNP
- *Japan:* NICT BY5G/6G



Thanks for your attention

Questions?

For more information, please contact:

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