High-Performance
Computing Center
Stuttgart

EuroHyPerCon

2nd Workshop Feedback from HPC Users and Providers

Agenda

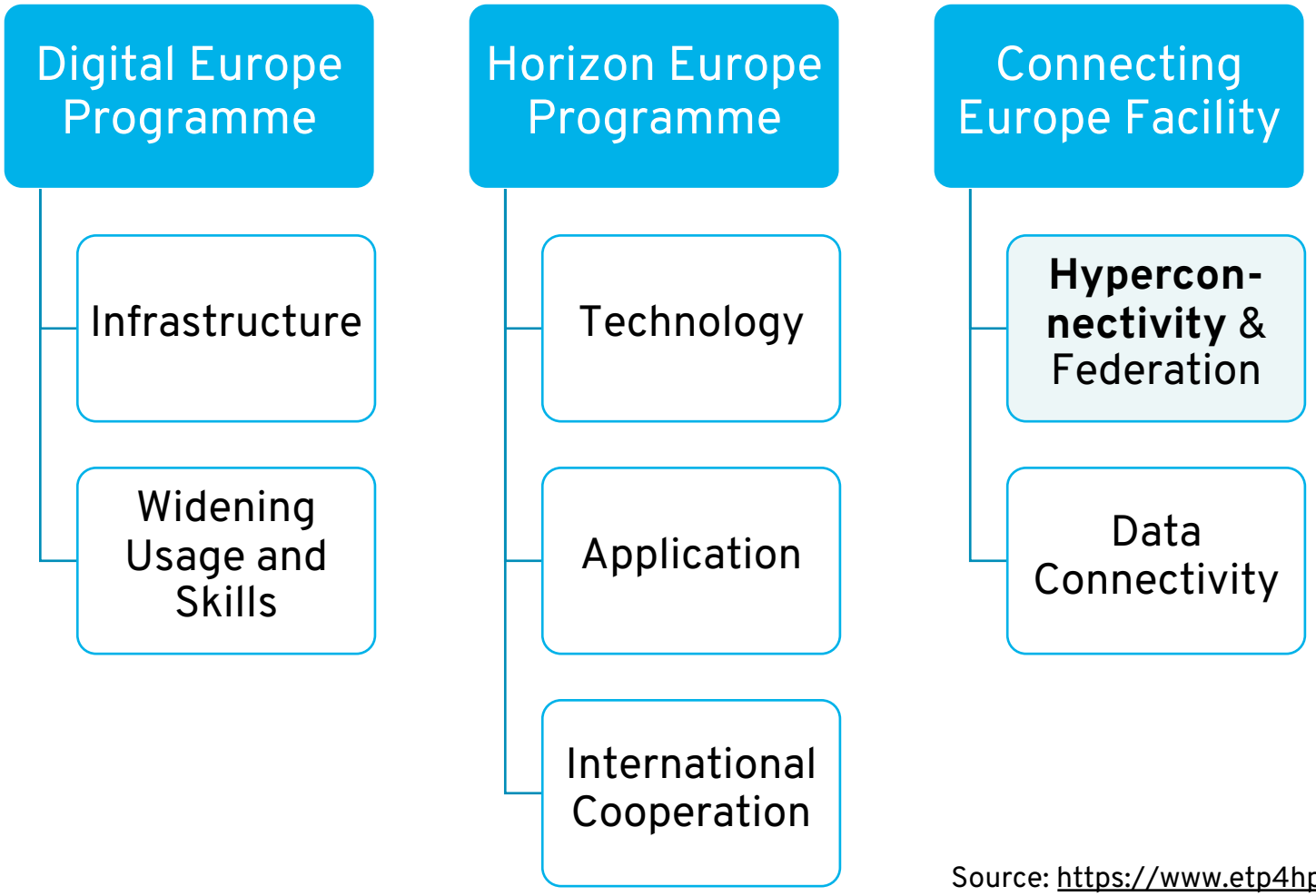
- Objectives of the meeting
- Overview of the EuroHPC JU strategy
- EuroHyPerCon study presentation
- Panel Discussion:
  - HPC connectivity needs: Current State and Future Vision
- Presentation of Questionnaires
- Breakout Sessions
- Action Planning and Next Steps

EuroHyPerCon

A Hyperconnectivity Study

EuroHPC JU's Strategy for 2024 and Beyond

EuroHyPerCon



Source: https://www.etp4hpc.eu/pujades/files/ETP4HPC_EuroHPC_slidedeck_20231013.pdf

European Hyperconnectivity Objectives

EuroHyPerCon

Establish a World-Leading Ecosystem

- Develop a hyper-connected, federated, and secure High-Performance Computing (HPC) and quantum computing service and data infrastructure across Europe

Infrastructure Connection

- Initial focus on connecting the EuroHPC infrastructure

Widespread Accessibility

- Further integration with national supercomputers and data infrastructures via state-of-the-art networking technologies

Hyperconnectivity Study

EuroHyPerCon

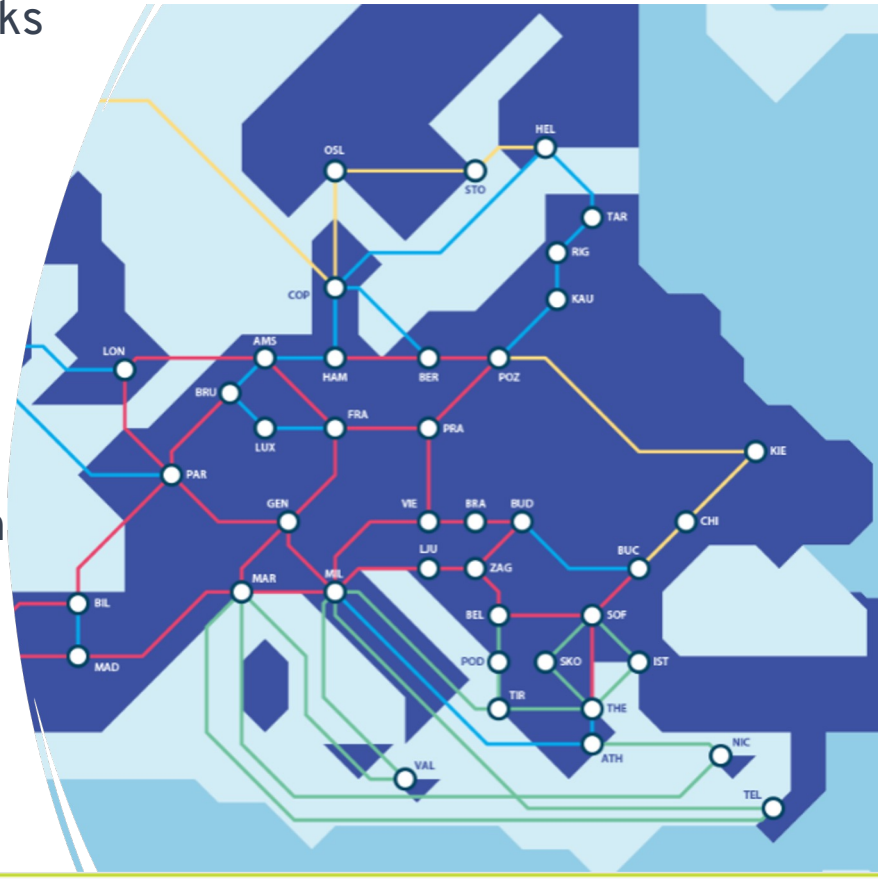
- **Focus:** Analysis and specification of HPC connectivity requirements in Europe
- **Objective:** Define the long-term specifications for hyper-connectivity services for EuroHPC, laying out an implementation roadmap for a secure, federated, and hyper-connected European HPC and data infrastructure accessible via the cloud

Comprehensive Analysis	Forward-Looking Solutions
• Covering various facets such as traffic, capacity, availability, network architectures, security/privacy, and the evolution of technology	• Aim to accommodate new usages related to scientific instruments, urgent computing, and AI, with progressive and flexible solutions to adapt to evolving data traffic needs and changing use cases

Proposed Solutions for HPC Hyper-Connectivity

EuroHyPerCon

- **Leveraging GÉANT & NRENs Networks**
  - Leveraging GÉANT and National Research and Education Networks (NRENs) for HPC hyper-connectivity solutions
- **Complementary Connectivity**
  - Align with ongoing European activities, like the GN5-FPA, to address untargeted HPC-specific needs without redundancy
- **Federation Interoperability**
  - Ensure compatibility and interoperability for future HPC infrastructure federation, considering ties to EU initiatives (e.g., Cloud Federation, DestinE, Human Brain Project, EOSC, European Common Data Spaces)
- **Collaborative Study Approach:**
  - Conduct the study closely with EuroHPC hosting sites, HPC stakeholders (including connectivity players), and GÉANT for comprehensive insights and seamless coordination



EuroHyPerCon In A Nutshell (1/2)

- **Study for Hyper-Connectivity** for High-Performance Computing Resources
- Analysing and Defining **HPC Connectivity Needs** in Europe while collaborating closely with EuroHPC JU and All EuroHPC Sites
- Formulating **Specifications** for the Hyper-Connectivity Service
- Developing a **Roadmap for Implementing** a Federated, Secure, and Hyper-Connected European HPC and Data Infrastructure Accessible via the Cloud

EuroHyPerCon In A Nutshell (2/2)

- **Funding:** EuroHPC JU
- **Runtime:** October 2023 – June 2024
- **Partners**
  - Innov-Acts
  - HLRS
  - Enomix
- **Website:** https://eurohypercon.eu/

Partner: Innov-Acts (Coordinator)

Innov-acts

EuroHyPerCon

- **Location:** Based in Nicosia, Cyprus (https://innov-acts.com/)
- **Founded in:** 2016
- **Business Profile:** Boutique ICT & Business Consulting Firm
- **Specialization in:** Cutting-edge Digital Technologies
  - AI and Big Data
  - Cloud Computing
  - Cybersecurity and Blockchain
- **Main Sectors & Areas of Expertise:**
  - Finance, Security, Industry
  - Research/e-Infrastructures

"*We help organizations implement ambitious and innovative digital transformation journeys based on leading-edge technological solutions.*"

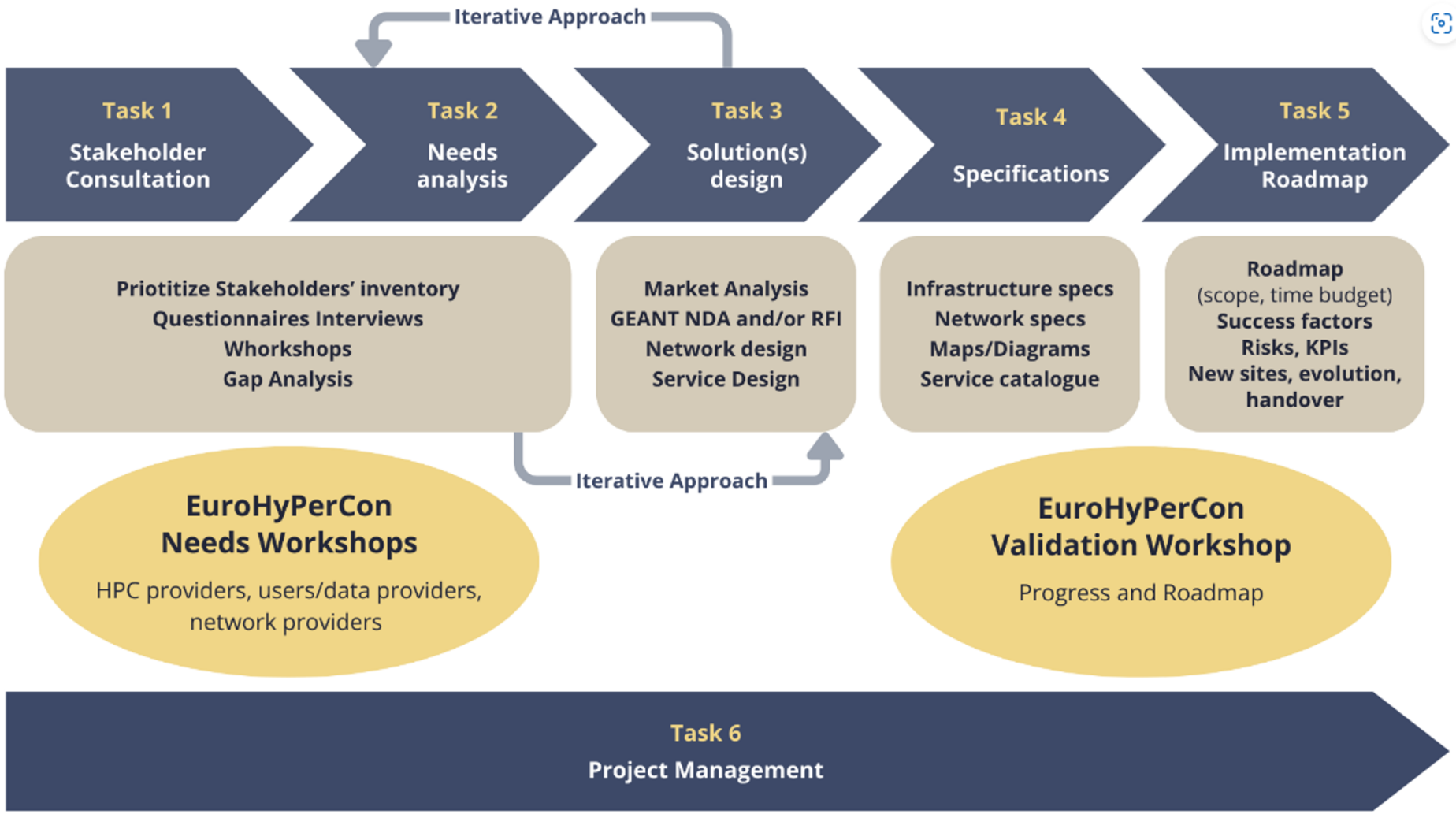
Partner: HLRS

- The **High-Performance Computing Center Stuttgart** (HLRS) is a facility of the University of Stuttgart (https://www.hlrs.de)
- **Supercomputing** since 1996
- **Scientific** as well as **industrial use** of computing infrastructures
- Focus on **engineering** and **applied sciences**
- Coordination and participation in many **national and international research projects**

Partner: Enomix

- **Company Name:** Enomix (https://enomix.gr/)
- **Business Focus:**
  - Consulting & Engineering Firm specializing in Electronic Communications
- **Core Competencies:**
  - **Technical Expertise:** Our experts possess a deep understanding of technical aspects and the market dynamics within the Electronic Communications Industry.
  - **Policy & Strategy Influence:** We have actively contributed to critical policy and strategy projects, including National Broadband Plans, Digital Strategies, and significant EU-funded next-generation broadband initiatives.
  - **Adaptive Approach:** Known for our flexibility and innovative nature, we customize and offer tailor-made solutions to meet the unique needs of our clients.

Scope of the Study



Your Questions, Our Answers

EuroHyPerCon

- Please feel free to ask any questions you have, and our team is here to provide the answers

Stakeholder Identification and User Journeys

Overview and Feedback from 1st Workshop

Stakeholders Consultation: Methodology

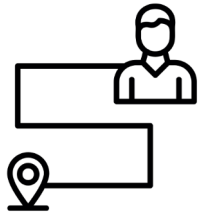
EuroHyPerCon

Stakeholder Database

Questionnaires

Focus Groups & Interviews

User Journeys



Workshops

Stakeholders Consultation: Methodology (cont'd)

EuroHyPerCon

- **Phase 1**
  - Compile an initial list of relevant stakeholders
  - Select representative and geographically balanced stakeholders
  - Address additional stakeholders through an open call
- **Phase 2**
  - Generate individual user journeys for those stakeholder groups
  - Compile questionnaires for HPC providers, large-scale users, and network providers
  - Organise a series of workshops with the identified stakeholders
- **Phase 3**
  - Set up focus groups if needed
  - Conduct bilateral interviews

Phase 1: Stakeholder Identification

EuroHyPerCon

HPC Providers

- EuroHPC Supercomputers
- National HPC centers

Large-Scale HPC Users and Data Providers

- Thematic users of the HPC system (e.g., DestinE, Human Brain Project)
- Data providers (e.g., EOSC, European Common Data Spaces)

Network Providers

- GÉANT
- NRENs and regional research networks
- Other connectivity providers in the market

Further Interested Stakeholders

- Open Call (= online forms)
- Reaching out to AI and quantum communities, too

1st Workshop on Stakeholder Identification (30.10)

EuroHyPerCon

- Target Group: EuroCC Members, NCCs, CoEs, Hosting Provider
- Participation: 22 out of 36 countries participated

Selected Feedback from the 1st Workshop (1/3)

EuroHyPerCon

Overall Solution

- "Hyperconnectivity has to be **integrated with storage, federation/authentication and security**; (2) consider **user communities**, their data sources and capabilities; (3) **rely on existing knowledge and solutions** such as NREN/GÉANT, CERN/LCG, ESFRI federations and knowledge at HPC centres."
- "NRENs and GÉANT are **perfectly capable** of delivering the connectivity that EuroHPC needs."
- "Currently, apart from academia, **how SMEs connect to academic networks** will vary according to country regulations. We need to discuss this."
- "The real focus on this should be on **services on top of the network**. The network speed will only take you so long. There is a need to be using the network smarter. The study should keep up with moving data in a smart way."

Selected Feedback from the 1st Workshop (2/3)

EuroHyPerCon

Data Services

- “For **public shared data** (a prominent example being AI models), a **CDN** (content delivery network) service to speed up access across the EU would be beneficial.”
- “Leveraging Cloud and ensuring that **data-related fees** (ingress, egress, storage) are considered/addressed in any model that includes Cloud.”
- “**Data staging services** across EuroHPC sites. Passive services that stage data transfer are critical for users who must transition workloads between EuroHPC sites.”
- “Connectivity and coordination (**federation) with large repositories and data providers** (EOSC, but also national institutions, ESA for earth observation data and similar) both for data gathering as well as storing processed data from HPC.”

Selected Feedback from the 1st Workshop (3/3)

EuroHyPerCon

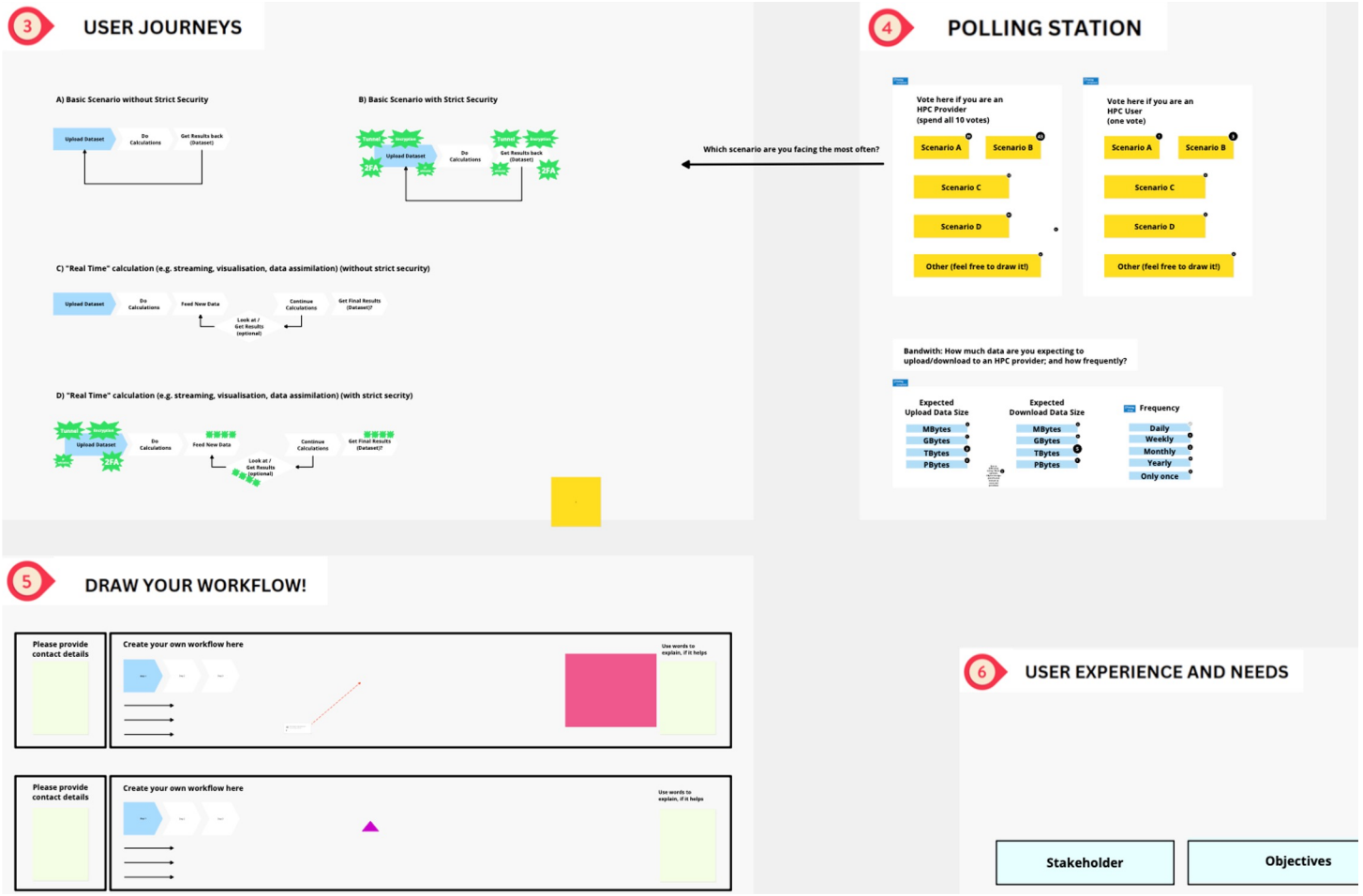
User communities and novel technologies

- “Discuss with the **AI community** the needs and availability of large data sets on HPC.”
- “Consider **novel technologies**, e.g., the work done by HellasQCI, the Quantum Communication Infrastructure for Greece.”

Phase 2: User Journeys

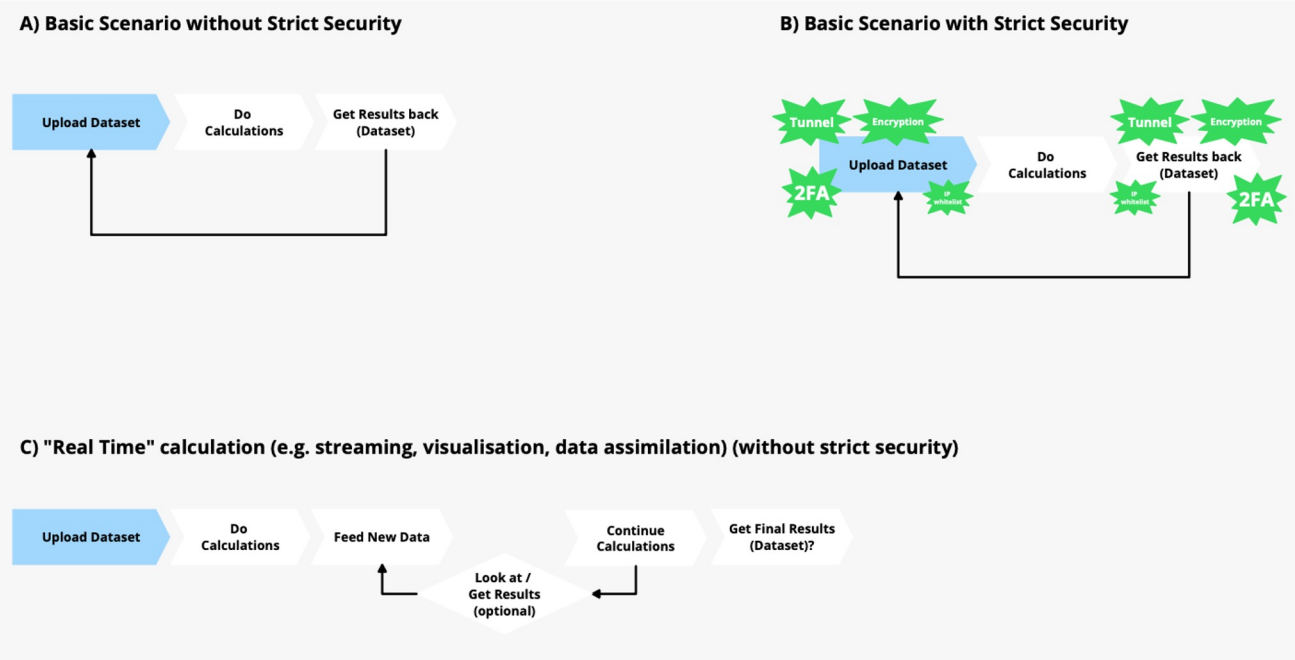
- The overall objective is to understand better the **stakeholder needs** to fine-tune questionnaires, workshops and interviews
- Identifying different **user personas** (e.g., industrial CFD user) and their specific requirements when it comes to HPC usage, data transfer, and network requirements

1st Workshop on User Journeys (30.10)



Selected Feedback from the 1st Workshop

- Typical HPC scenario (upload data -> run simulation -> download data) was generally accepted to be the most important one
- Will this change in the next years?



… and today?

EuroHyPerCon

- Bring together HPC users and HPC providers to discuss current and future requirements when it comes to hyperconnectivity
  - Panel discussion during the morning
- Present questionnaires to capture detailed requirements and discuss them
  - Breakout rooms during the afternoon

Your Questions, Our Answers

- Please feel free to ask any questions you have, and our team is here to provide the answers

Thank you!