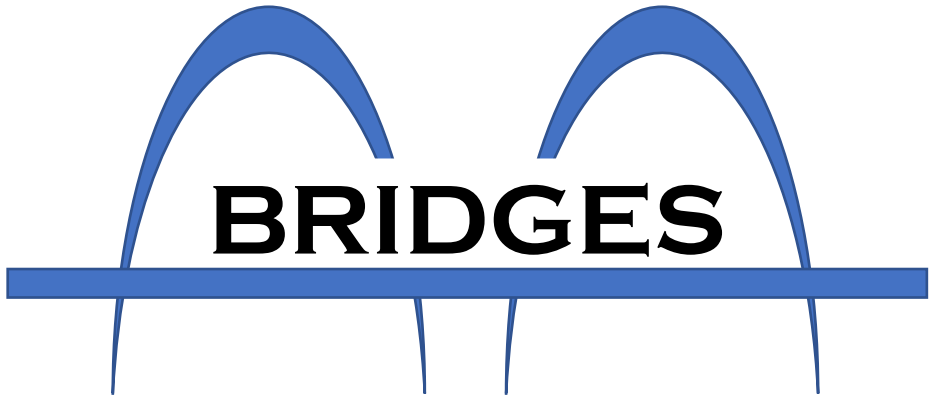
The BRIDGES Project- Building a Global Cyber-Infrastructure Canvas Supporting Networked Applications Experimentation and Evolution

Introduction and Overview of the Project

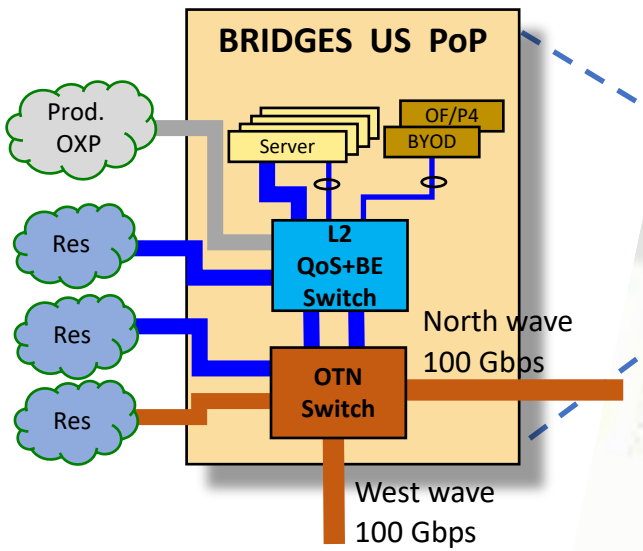


What is "BRIDGES" ?

- "Binding Research Infrastructures for the Deployment of Global Experimental Science"
- Funded by the US National Science Foundation (NSF)
  - $2.5M USD, 3 years
- Part of the Int'l Research Network Connections Program (IRNC) Testbeds program

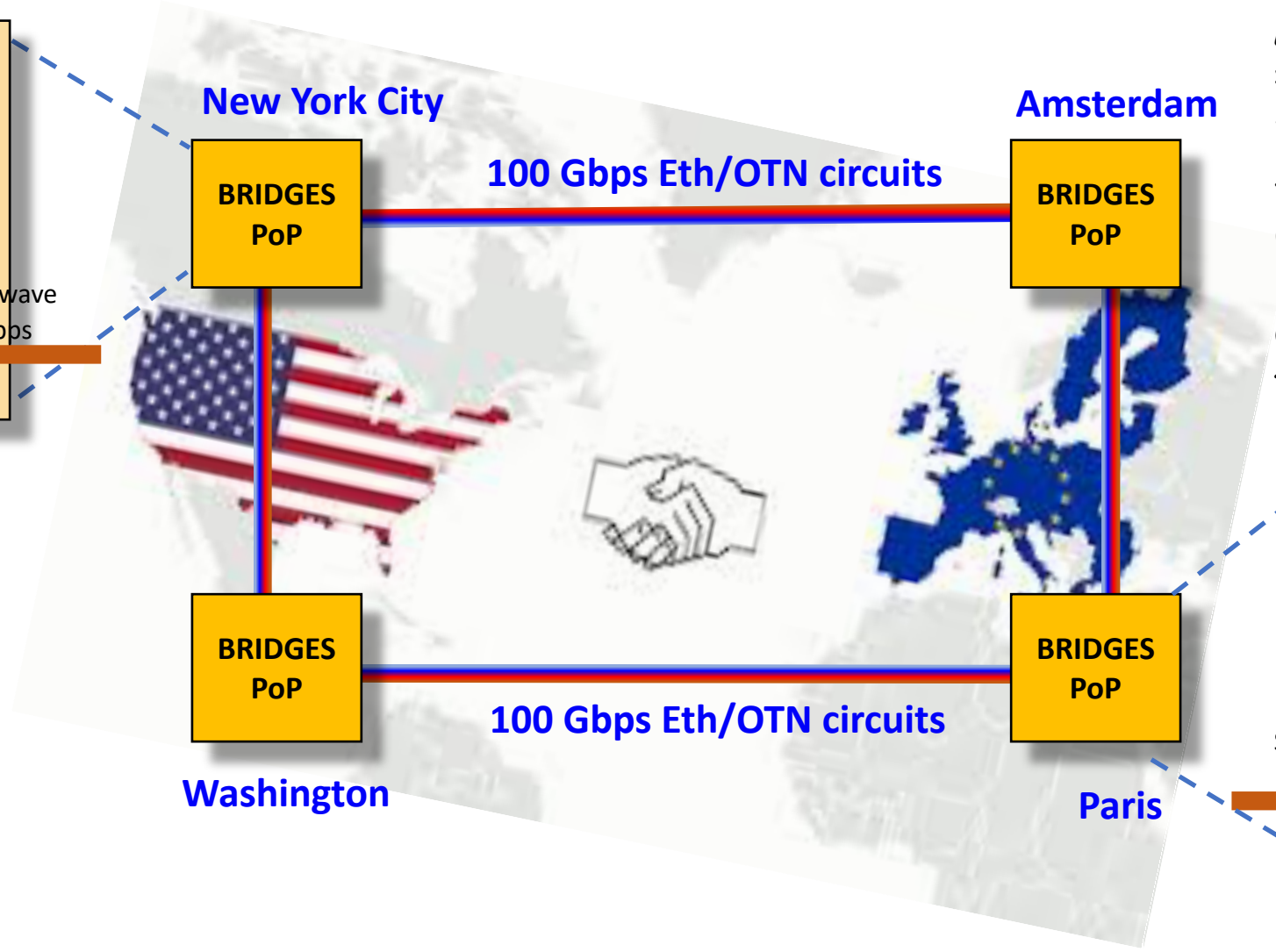
- BRIDGES goal is to make customized deterministic cyber-infrastructure resources available to applications globally
  - Predictable, deterministic performance – anywhere/everywhere
  - Agile and customizable to meet changing usage or application requirements
  - Globally scalable and globally secure architecture

BRIDGES- Binding Research Infrastructures for the Deployment of Global Experimental Science



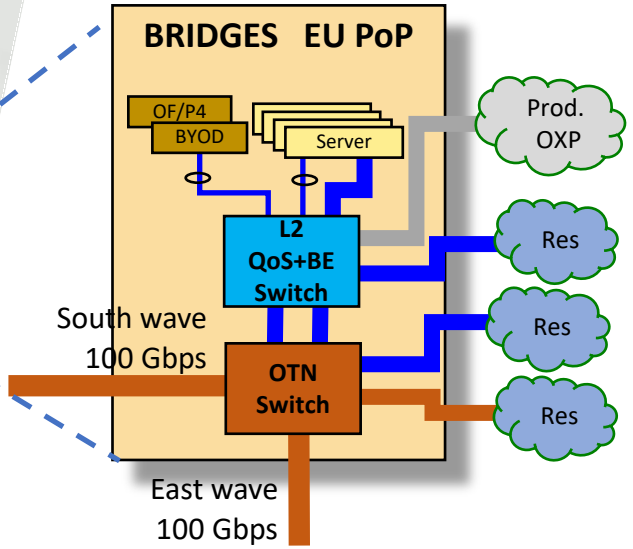
US Research Anchor Tenants

FABRIC
COSMOS
Chameleon
CloudLab
Internet2
StarLight
…

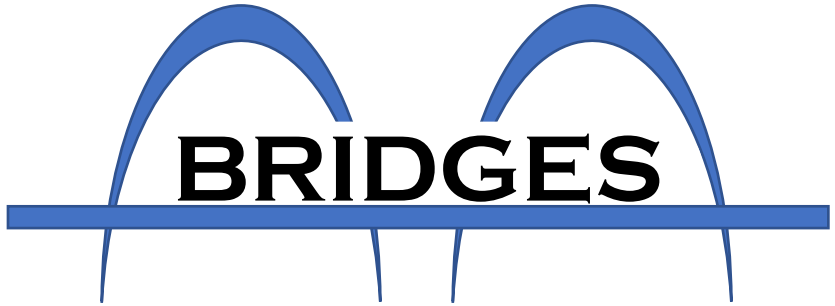


EU Research Anchor Tenants

Fed4FIRE (15+ testbeds)
EU EMPOWER
PlanetLab-EU
OneLab
SLICES
GEANT Testbeds Service
DFN-GVS, CESNET-GVS
…



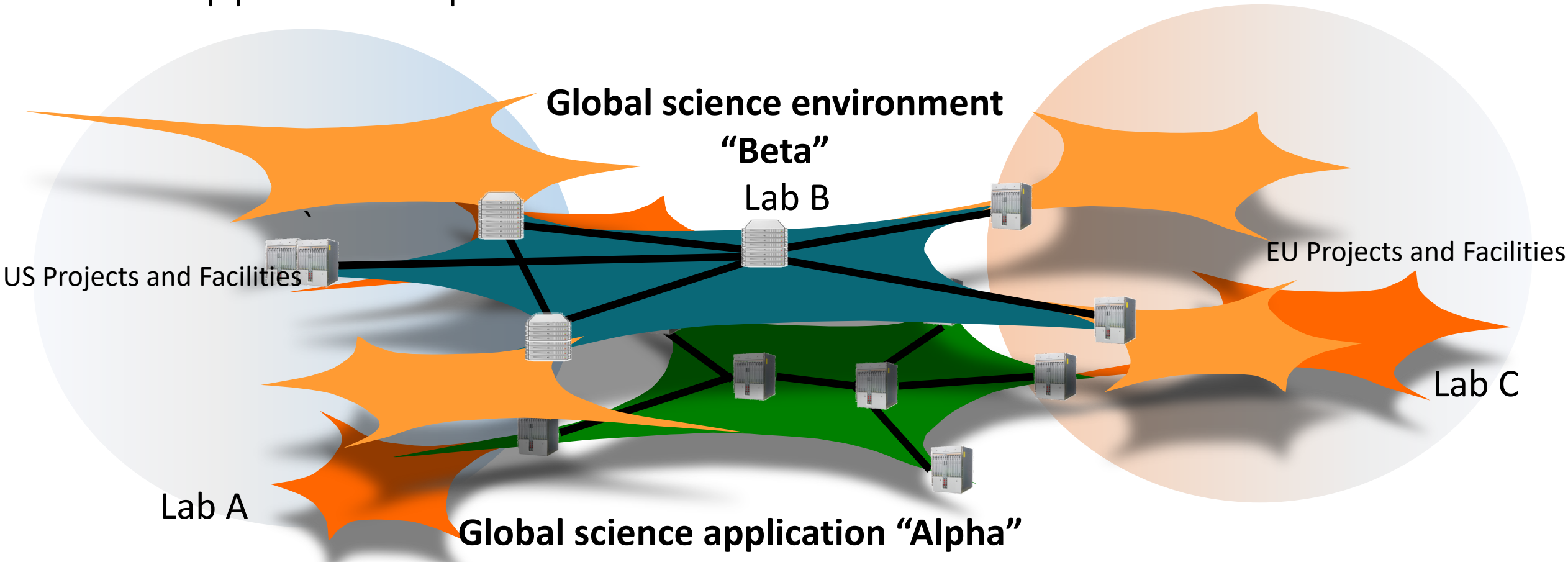
Key BRIDGES Concepts



- Network research and global applications require a very flexible, agile, and deterministic cyber-infrastructure environment in order to innovate, evaluate, and evolve.
- Cyber-infrastructure is going virtual and software processes are critical to managing these CI resources. But automation and orchestration of CI, and the integration of different CI elements is dependent upon a common model for defining and manipulating these virtual resources.
- BRIDGES supports the notion that networks and applications can be dynamically constructed from virtual CI resources – IFF those CI resources are defined and implemented rigorously, and a common grammar exists for manipulating such resources via software driven processes.
- In order to develop dynamic *global* applications and application specific service environments, a generic virtualization model is needed, and a facility that can fully implement that virtualized resource model is required.
- BRIDGES provides the infrastructure and the virtualization layer software to do this.

BRIDGES Virtual Network Architecture

Application specific networked environments



A customized WAN infrastrcuture consisting of a broad range of dynamically allocated resources that are controlled by the client using SDN principles

Timeline. BRIDGES is a 3 yr Project.

- Year 1 Oct 2020 – Sep 2021
  - Build out Washington and Paris nodes and Trans-Atlantic wave
  - Deploy GVS software
  - First connectors Q2/Q3 2021. (tbd: I2, GEANT, COSMOS, FABRIC, GTS, Grid5000, EUWireless,…)
- Year 2. Oct 2021 – Sep 2022
  - Build out Amsterdam and New York pops and terrestrial optical links
  - Deploy second 100 Gbps wave. NYC-AMS
  - More connectors
  - More Key software features
- Year 3 Oct 2022 – Sep 2023
  - Software focus – new features
  - Follow on challenges

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- Web site under construction – tba very soon.