

Approaches in building of Cloud base scientific computing infrastructure (SCI)



JINR 26th Symposium on Nuclear Electronics and
Computing – NEC'2017
Montenegro, Budva, Becici, 25-29 September 2017
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www.renam.md

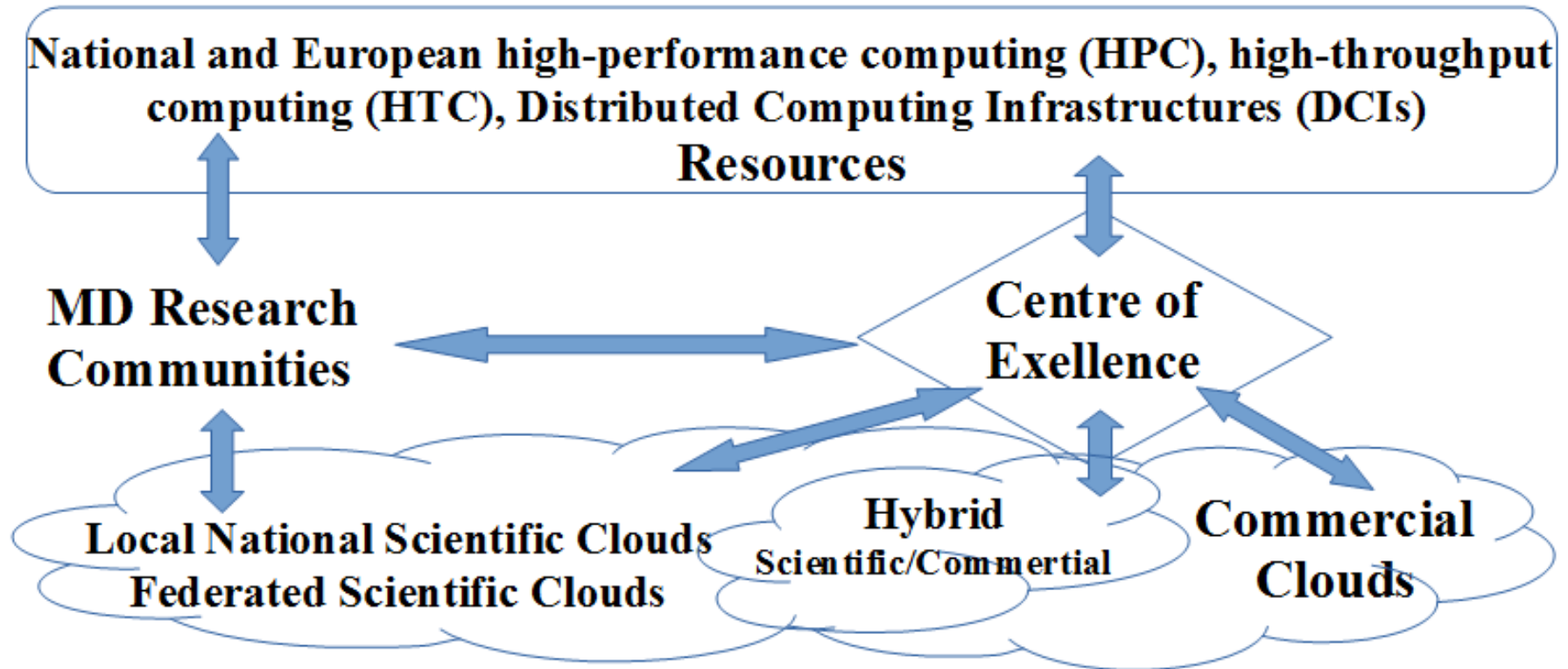
RENAM mission is: **On top of the GEANT network to provide for research community useful services.**

Also:

- investigate and deploy actual and innovative IT technologies;
- provide to researchers access to various local, national and regional computing infrastructures;
- organize workshops and trainings with online participation;
- create Testbeds or provide on-demand computational resources for experiments.

One of our strategy is to train researchers, PhD students and university students getting started with parallel clusters' systems, educate them how to create and run applications using different programming technologies and parallel computing facilities.

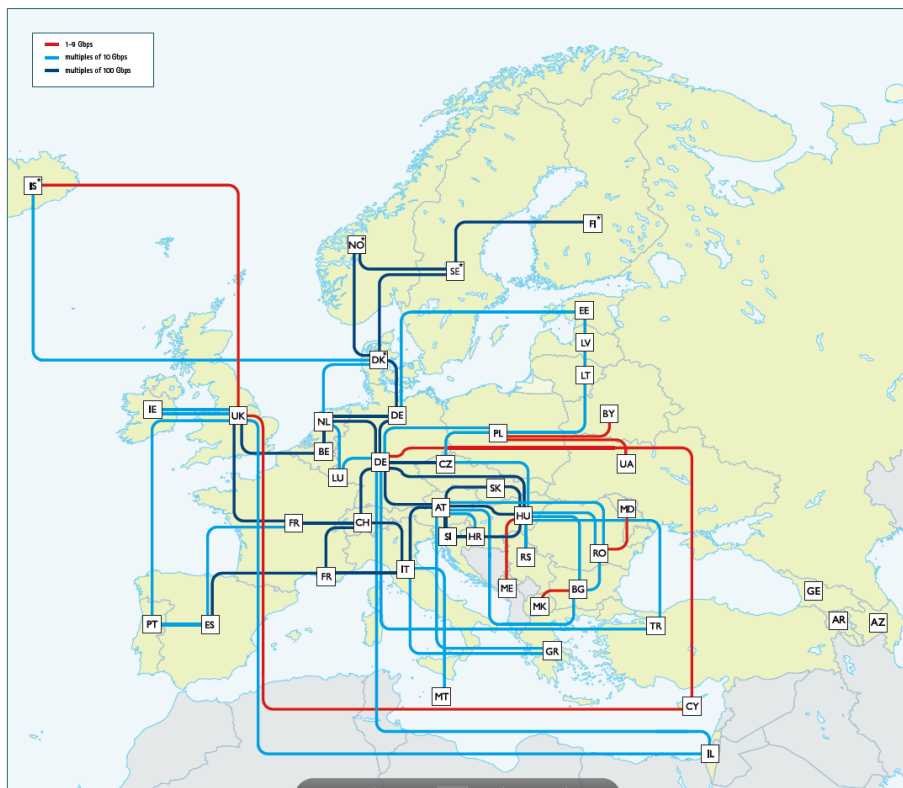
www.eapconnect.eu



We started creation of the Centre of Excellence (ICELEN).
ICELEN planned as a complex of “learn-test-use-with-support” technologies.



SCI basement is: The GÉANT Pan-European Network



GÉANT is one organization incorporating all previous TERENA and DANTE staff and activities

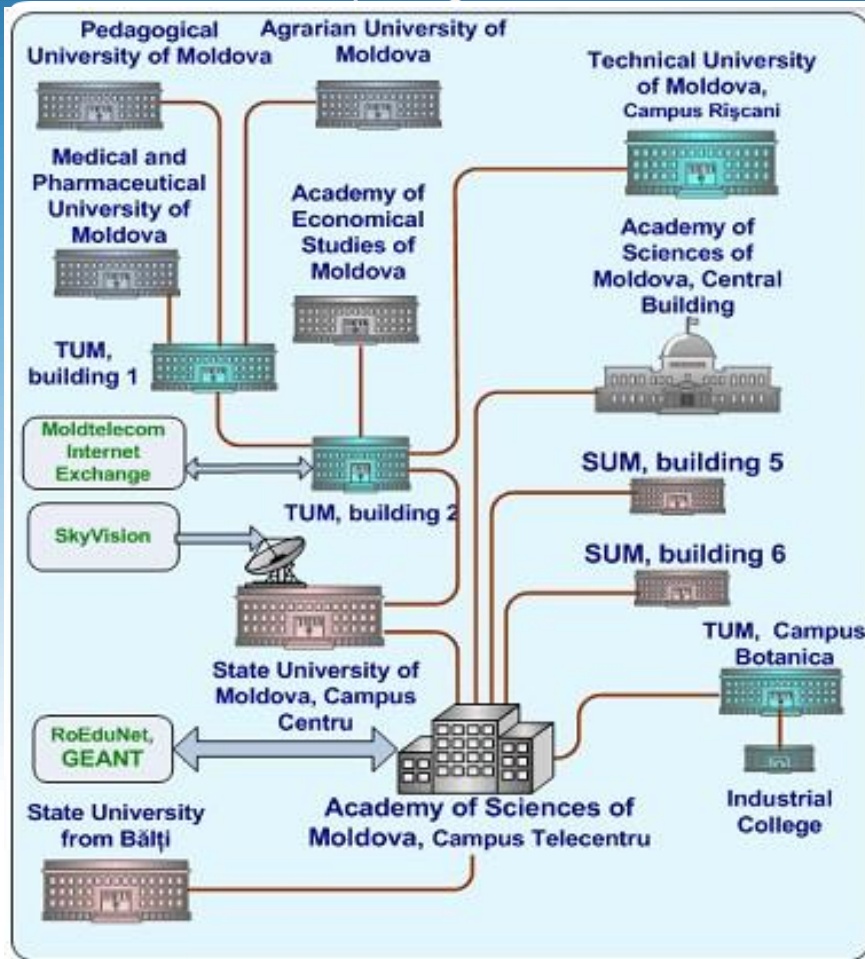
GÉANT unite European NRENs – **National Research and Education Networks**

- 39 European countries connected;
- reaches 65 countries outside Europe;
- 10,000 institutions;
- Serves 50m users;
- 50,000km network infrastructure on 44 routes;
- **1,000+ terabytes of data across network per day.**



SCI RENAM network

Scientific Computing Infrastructure



RENAM connect:

- 40 research institutes;
- 10 universities and 5 colleges;
- about 5000 scientists and professors, 1000 Ph.D. students;
- more than 80 000 university students.

Network bandwidth now:

Backbone capacity is 10 Gbps

Institutes are connected by 1 Gbps



RENAM network enhancement

- **EaPConnect 5-year project 1 July 2015 – 30 June 2020 – € 13M EC Funding**
- Partnership between the European Union and **Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine**
- Creates a regional e-infrastructure – **high capacity** and **very reliable** internet network **dedicated to research & education (R&E)**
- Connection to pan-European GÉANT network aims:
 - Collaborate more effectively with European researchers;
 - Access research instruments across Europe;
 - Work on high-profile projects which require high bandwidth;
 - Receive and offer expertise in networking

**Project is coordinated by GÉANT in collaboration with
EU National Research and Education Networks (NRENs)**

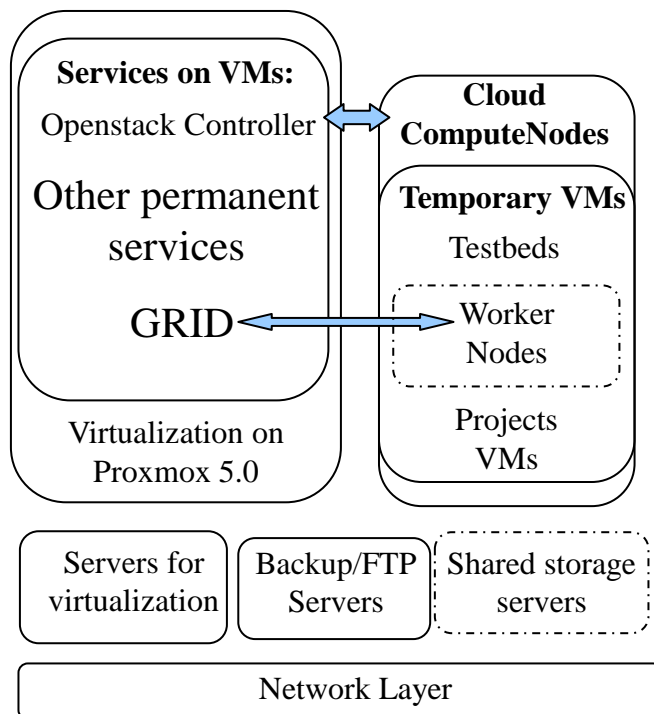


RENAM network enhancement



RENAM datacenter architecture

**For Virtual Machines we use Replication and HA facilities.
Inside each datacenter and between datacenters. Availability 99,9%.**



Other services:

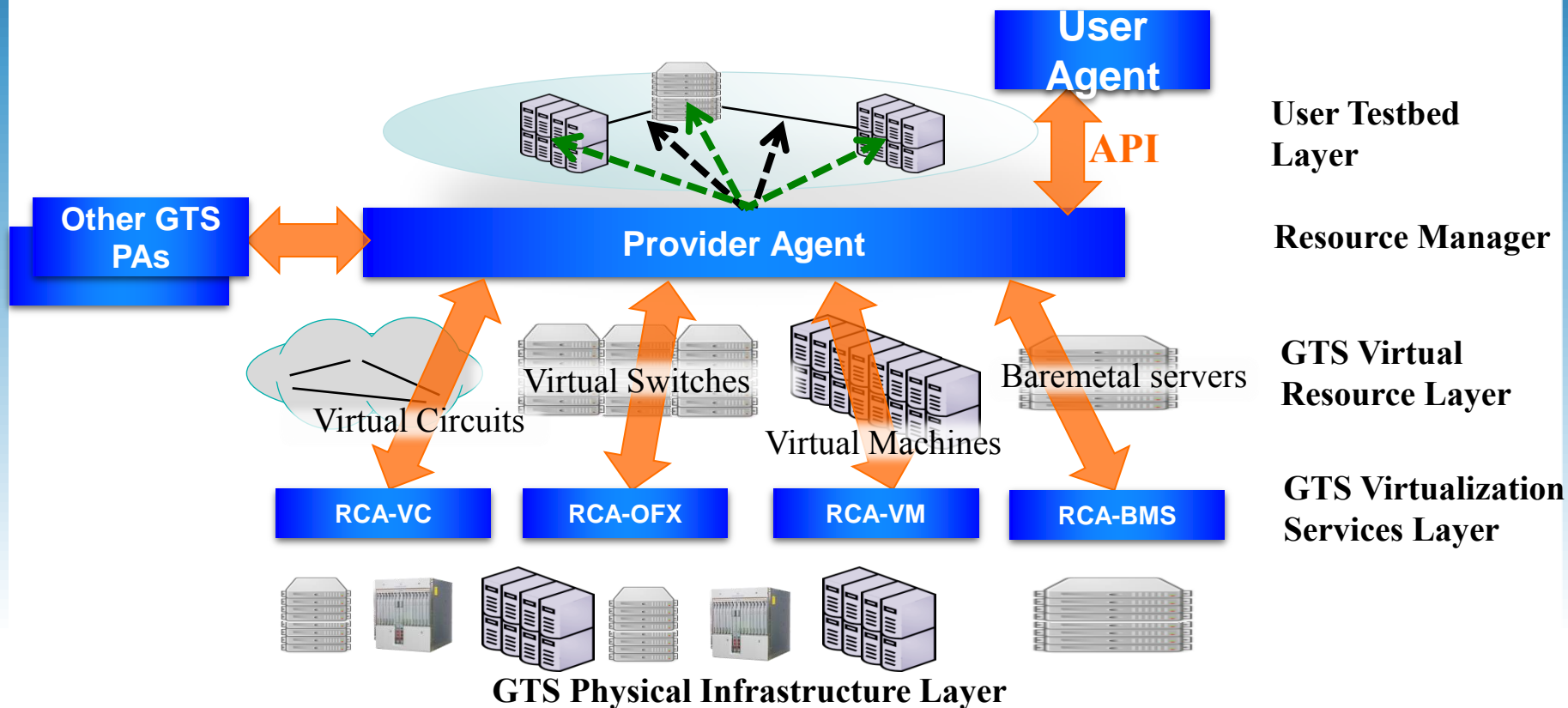
- DNS, Mail, Wiki;
- Service Desk, Monitoring;
- Network operational tools;
- Hosting of RENAM Sites (RENAM.md, GRID, Eduroam, CERT, ...);
- Other sites hosting;
- Videoconference, E-learning;
- Eduroam, Edugain;
- Frontends, Software frameworks;
- Etc.

Armenia, Belarus, Moldova and Ukraine support CERN related VO's (ALICE, ATLAS, CMS, LHCb)



Geant Testbed Service (GTS)

Virtualization, Management, and User Control Layers



Geant Testbed Service (GTS)

GTS physical infrastructure topology

GÉANT Testbeds Service has been deployed within the GÉANT core network at 9 Points of Distribution (PODs).

GTS physical infrastructure topology 



Geant Testbed Service (GTS)

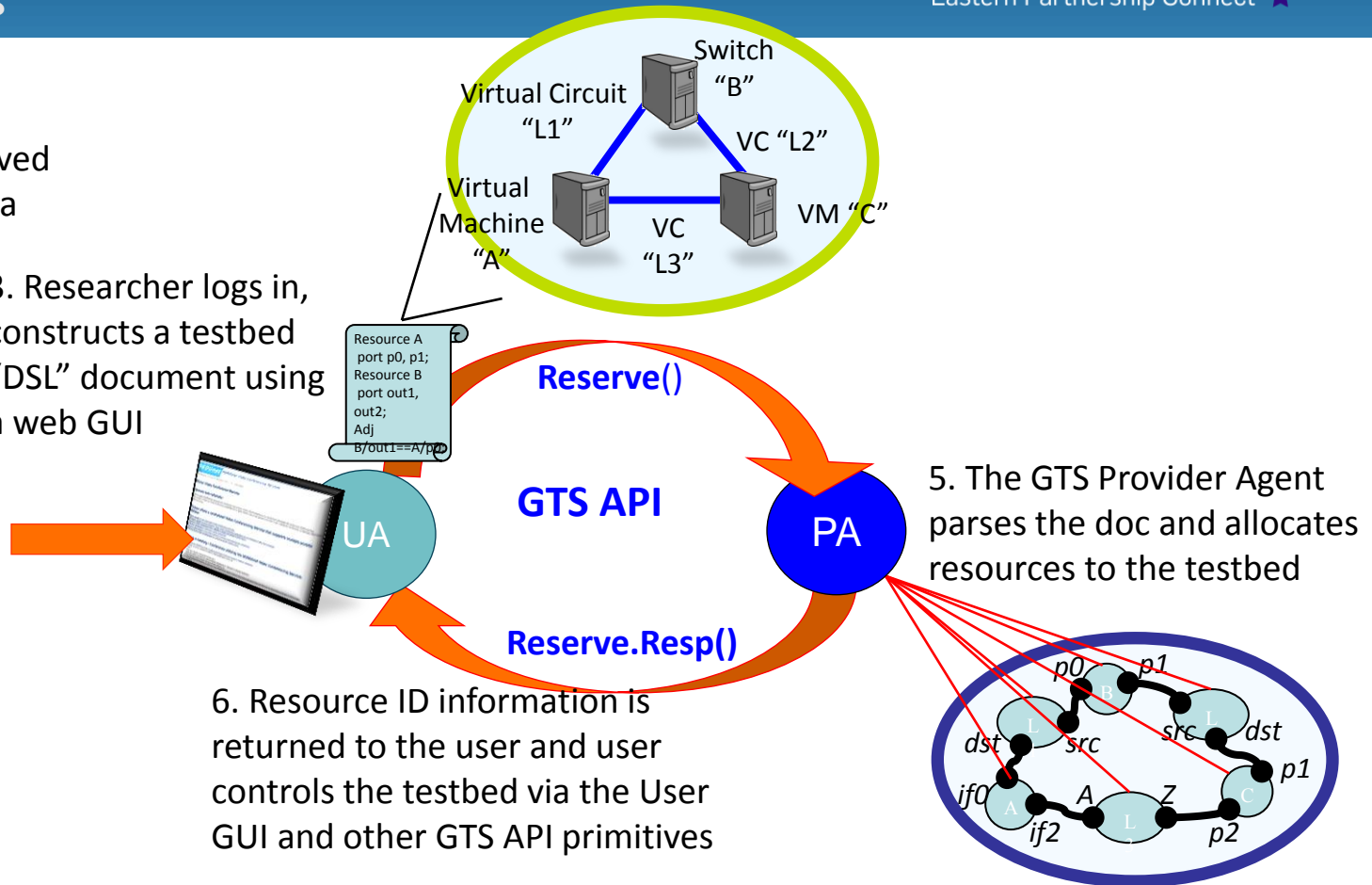
How it works

2. Network conceived
to test brilliant idea

3. Researcher logs in,
constructs a testbed
"DSL" document using
a web GUI



1. Researcher
has a brilliant
idea



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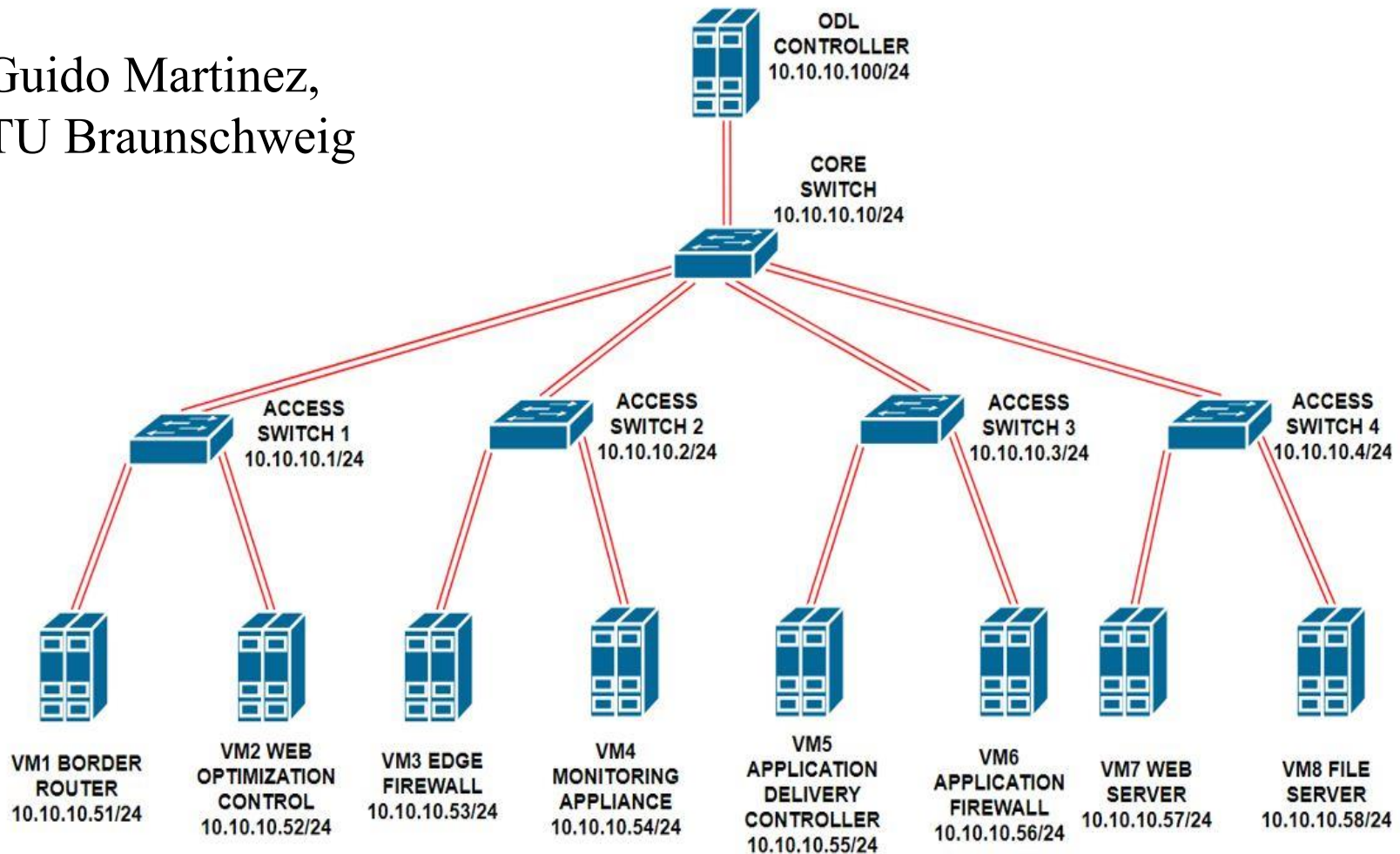


Geant Testbed Service (GTS)

Example of user testbed topology

Tree Network Topology with one controller, one root switch, multiple edge switches and multiple hosts

Guido Martinez,
TU Braunschweig



Flying Gurnard, fish at the start

Becici, 2017



Flying Gurnard, fish start swimming

Becici, 2017





Thank you for your attention!

Questions?

Becici 2017

Beach Cat, walking at sand tray

Becici, 2017

Thank you for your attention!

Questions?

Welcome to
Montenegro

