

GEANT testbed service (GTS) for R&E community

Based on cloud technologies



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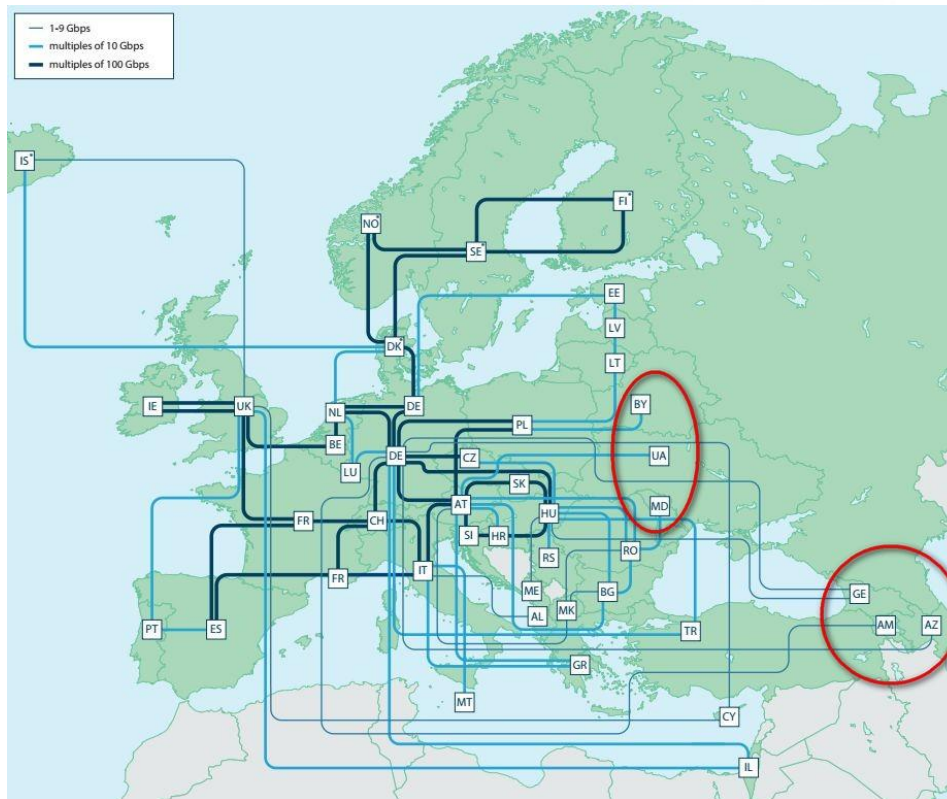
RENAM,

www.renam.md

2018-10-18, Chisinau, Moldova, EaPEC Workshop

The GÉANT Pan-European Network

RENAM is one of 42 european NRENs.



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

GÉANT unite European NRENs –
National Research and Education Networks

- 42 European countries connected, reaches 65 countries outside Europe;
- Connect over 50 000 000 users at 10,000 institutions
- More than 1,000 terabytes of data across network per day.
- **Connectivity to the Eastern Partnership countries (AM, AZ, BY, GE, MD, UA) is provided through the EaPConnect project.**

The “GEANT Testbeds Service” (GTS) is
completely new
GEANT Service,

that start in Production State from 2019 year.

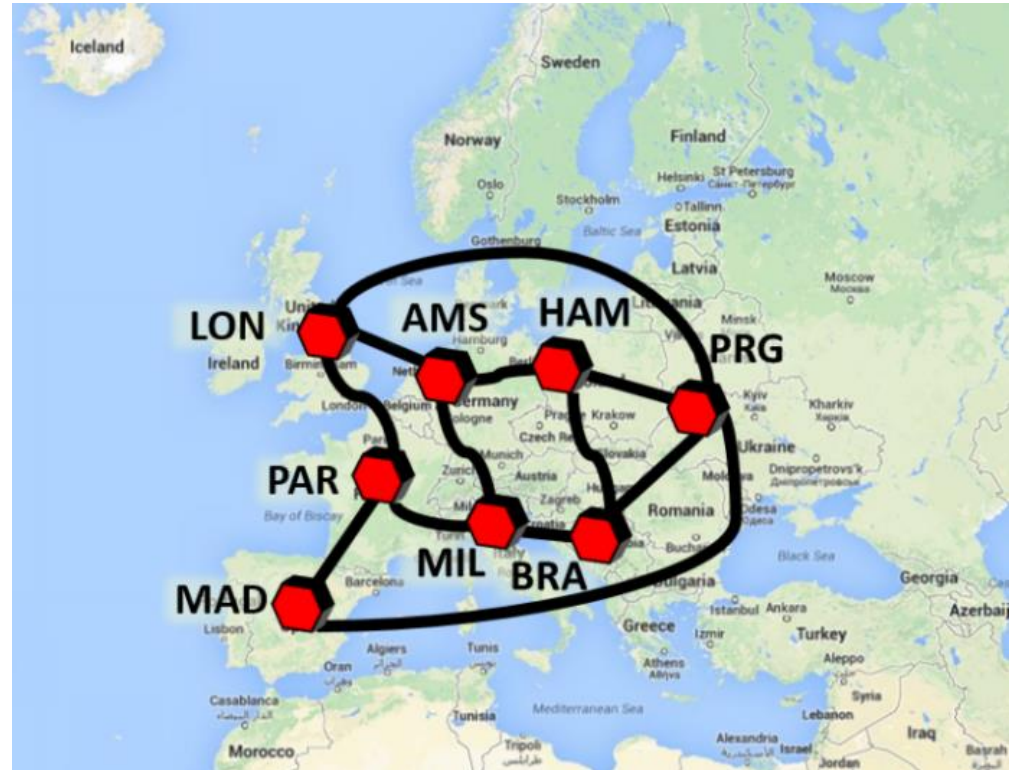
Till the end of 2018 year GTS is accessible for users in
testing mode.

Geant Testbed Service (GTS)

GTS physical infrastructure topology, 2018 year

GÉANT Testbeds Service has been deployed within the GÉANT core network at 8 Points of Distribution (PoDs).

At each POD are compute nodes, baremetal servers, OpenFlow switches connected over dataplane router (Juniper MX). Router links towards other PoDs over L2 (WAN or LAN).



The “GÉANT Testbeds Service” (GTS) offers user defined experimental networks to the network research community for the purpose of testing novel networking and telecommunications concepts, at scale, and across a geographically realistic European footprint.

GÉANT Testbeds Service (GTS) provides dynamically created, fully isolated, production-grade, packet testbeds as a service for the research and education community worldwide.

Geant Testbed Service (GTS)

Resources, available for users in Testbeds



Host: A virtual machine on compute node at one of 8 locations;

BMS: Bare Metal Server Represents a physical server that is controlled by the testbed user. Also can be in one of 8 locations;

VSI: (Virtual Switch Instance) is the new OpenFlow resource, which can be backed by either a OVS instance or by a hardware switch. GTS currently uses Corsa DP 2100 Series switches which support OpenFlow specification 1.3. Also can be in one of 8 locations;

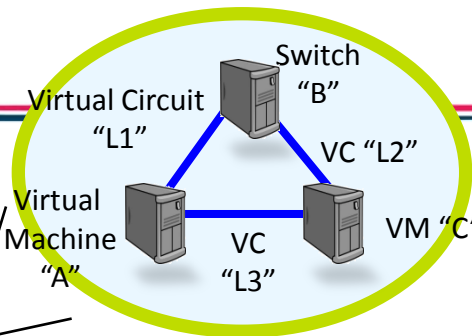
Link: Represents a virtual circuit between 2 resources. Always has exactly two ports for source (src) and destination (dst). 10Gbit;

External Domain: The External Domain resource [SOB-2015] represents an endpoint in some facility that is outside the GTS service area;

Geant Testbed Service (GTS)

How it works

2. Need to create network with special topology to test this idea



4. Researcher send document with Testbed to GTS



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

```
Resource A
port p0, p1;
Resource B
port out1,
out2;
Adj
B/out1=A/p0
```

Reserve()

GTS API

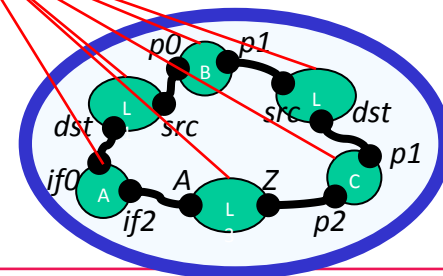
Reserve.Resp()

PA

5. The GTS Provider Agent parses the doc and allocates resources to the testbed

1. Researcher has a brilliant idea

6. Resource ID information is returned to the user and user controls the testbed via the User GUI and other GTS API primitives



Geant Testbed Service (GTS)

How to start using GTS?



At web page gts.geant.net user register Project and User (owner of the project):



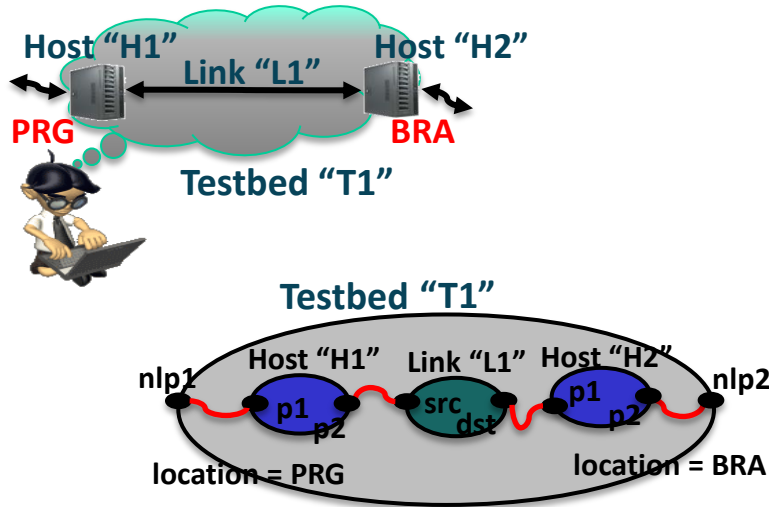
Log in	Register
* User ID	
<input type="text" value="gtstester"/>	
* Name	
<input type="text" value="Nicolai Iliuha"/>	
* Institution	
<input type="text" value="RENAM"/>	
* E-mail	
<input type="text" value="nicolai.iliuha@renam.md"/>	
* Password and confirmation	
<input type="text" value="Password"/>	<input type="text" value="Confirm Password"/>
<input checked="" type="radio"/> Create new project <input type="radio"/> Join existing project	

* Project name
<input type="text" value="GTSMD"/>
* Project start and end
<input type="text" value="26-9-2018"/> <input type="text" value="27-9-2019"/>
* Project description
<input type="text" value="For testing GTS facilities by research and education community of Moldova"/>
* Project requirements
<input type="text" value="Op to 20 VMs, 2-3 BMSs, 2-3 VSI switches"/>
Project extra comments
<input type="text"/>
* VPN user
<input type="text" value="vpnuser"/>

Geant Testbed Service (GTS)

A domain specific language tailored for testbeds

Describes resources, testbed topology and attributes
object-oriented and scalable, Groovy-based
Iterative sequences to facilitate complex topologies



```
Type Testbed {  
  host {  
    id = "H1"  
    location = "PRG"  
    port { id = "p1" }  
    port { id = "p2" }  
  }  
  
  host {  
    id = "H2"  
    location = "BRA"  
    port { id = "p1" }  
    port { id = "p2" }  
  }  
  
  link {  
    id = "L1"  
    port { id = "src" }  
    port { id = "dst" }  
  }  
  
  adjacency H1.p2, L1.src  
  adjacency H2.p1, L1.dst  
  
  // adjacency nlp1, H1.p1  
  // adjacency nlp2, H2.p2  
}
```

Geant Testbed Service (GTS)

Simple Testbeds DEMO, One Host only

Lab Setup

DSL


Import/Export Project


ID


ExampleTestbed

Description

One VM

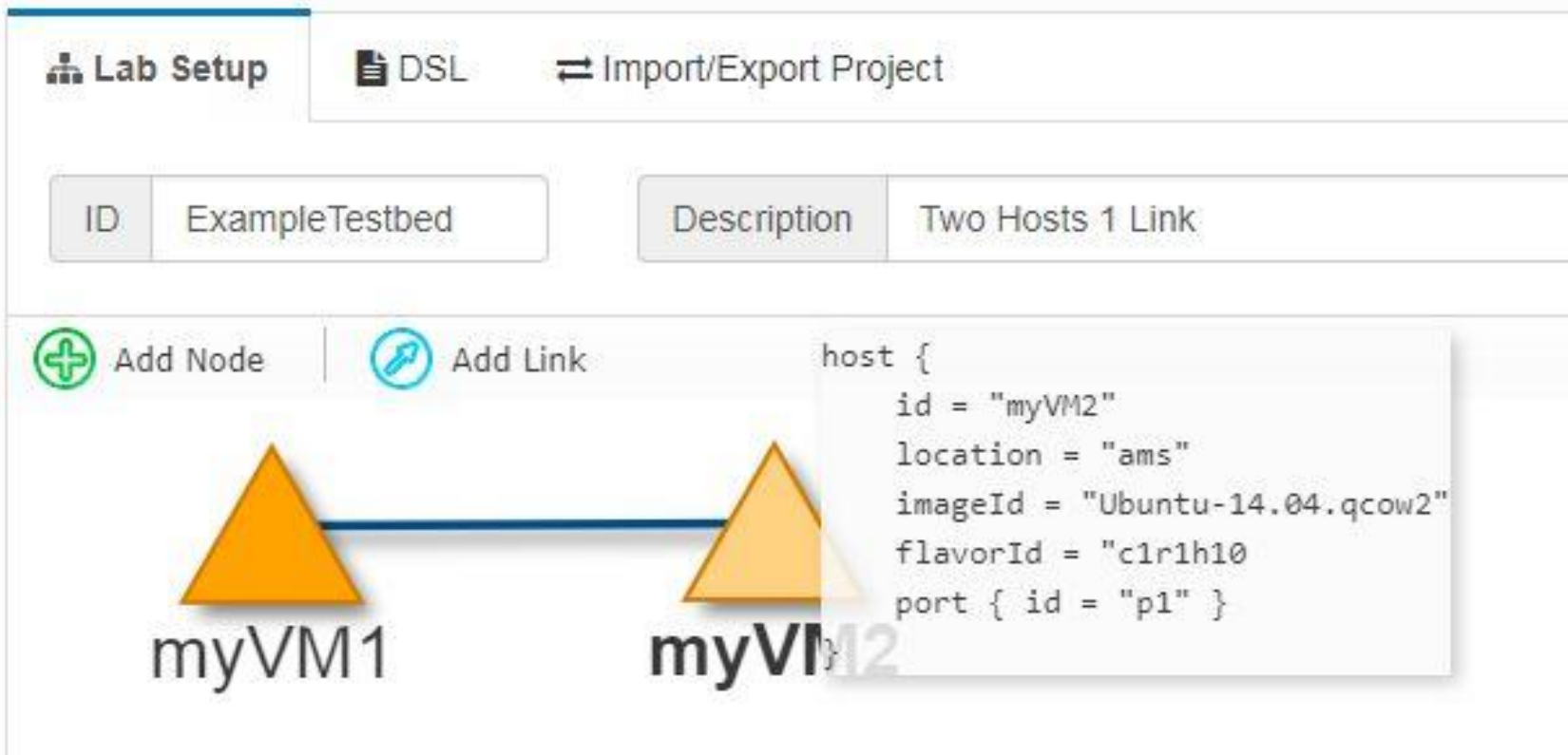
 Add Node

 Add Link


myVM1

Geant Testbed Service (GTS)

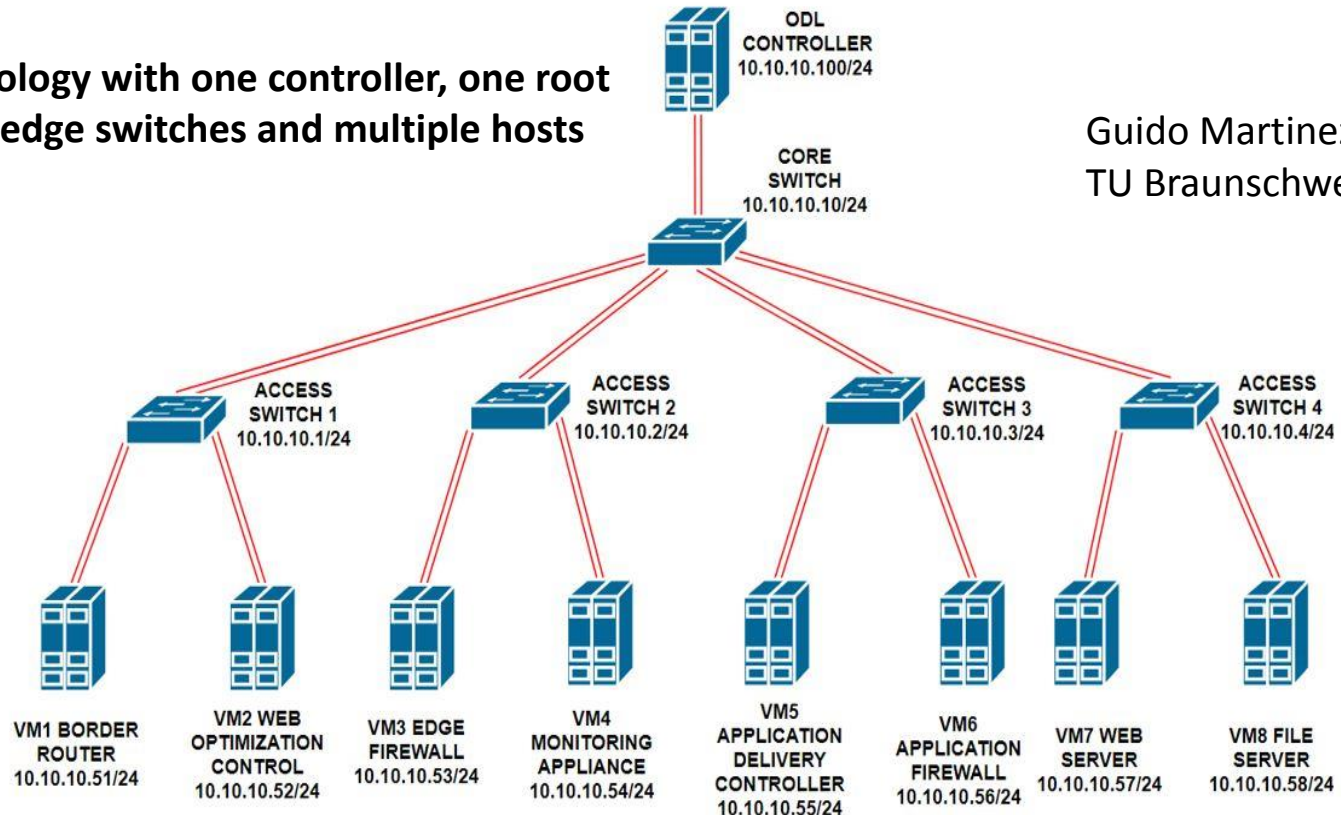
Simple Testbeds DEMO, Two Hosts linked



DEMO of different Testbed creation in Visual Editor
Editing in Text editor.
Send it to GTS, reserve and activate

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

Guido Martinez,
TU Braunschweig



- *GEANT staff members;*
- *NRENs staff members:* NORDUnet, PSNC, DFN, CESNET, AMRES, RENAM, RENATER, RNP, etc.;
- *Universities:* Gottingen University at Cisco, Universite de Lorraine, TU Braunschweig , University Pierre and Marie CURIE, University of Perugia, University of Vienna, Otto-von-Guericke-Universität Magdeburg, Howard Community College, University Paris Est, Technical University of Cluj-Napoca, University of Massachusetts Lowell, University of Malaga, University of Rome, etc.;
- *Projects:* ICN2020, Fed4FIRE, PlanetLab, perfSONAR, SCION, NIIF/HUNGARNET, etc.;
- *Research centers:* i2CAT, etc;

Geant Testbed Service (GTS)

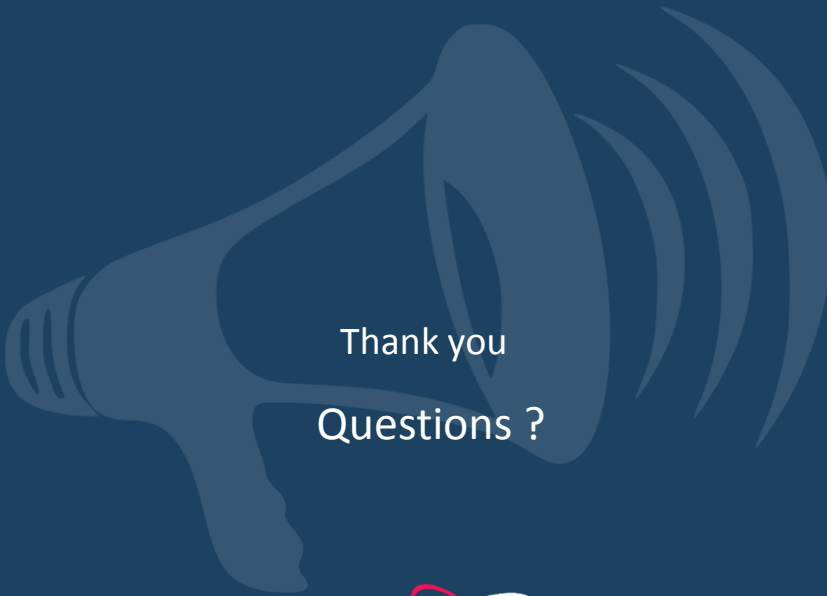
Statistic of GTS using: July, 2017 – September 2018



	2017 (6 monts)	2018 (9 months)	Total (15 monts)
Amount of Projects created	22	54	76
Amount of Users, registered in Projects	34	86	120
Amount of Testbeds, created by users in Projects	63	384	447
Amount of Hosts, reserved and activated in Testbeds	200	1322	1522
Amount of Links in Testbeds	228	973	1201
Amount of Virtual Switch Instances in Testbeds	15	100	115
Amount of Bare Metal Servers activated in Testbeds	42	261	304

Demo

Testbed reservation and activation.
Access to resources.
Deactivation/Activation.
Releasing.



Thank you
Questions ?



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