

GEANT testbed service (GTS) for R&E community

Based on cloud technologies



Nicolai ILIUHA, nicolai.iliuha@renam.md

Task 3 participant, GEANT4-2, JRA2 “Network Services Development”

Leading specialist, Research and Educational Networking Association of Moldova (RENAM)



RENAM,
www.renam.md



BELNET,
www.belnet.be

2018-10-29/30, Brussels, Belgium,

“4th GTS Tech and Futures Forum”

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

that start in Production State from Q4 of 2018 year.

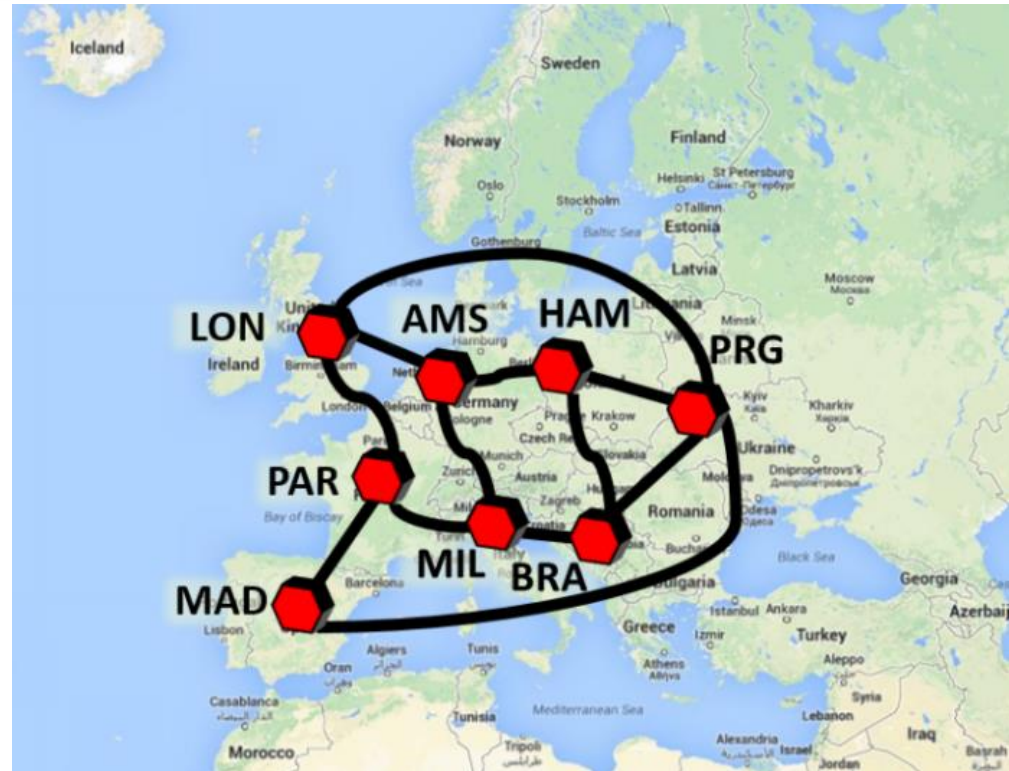
Till the end of Q4 of 2018 year GTS is accessible for users in
testing mode.

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).



Geant Testbed Service (GTS)

GTS Main goal. Tool for network research community.



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 Corsica 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 represents an endpoint in some facility that is outside the GTS service area;

Geant Testbed Service (GTS)

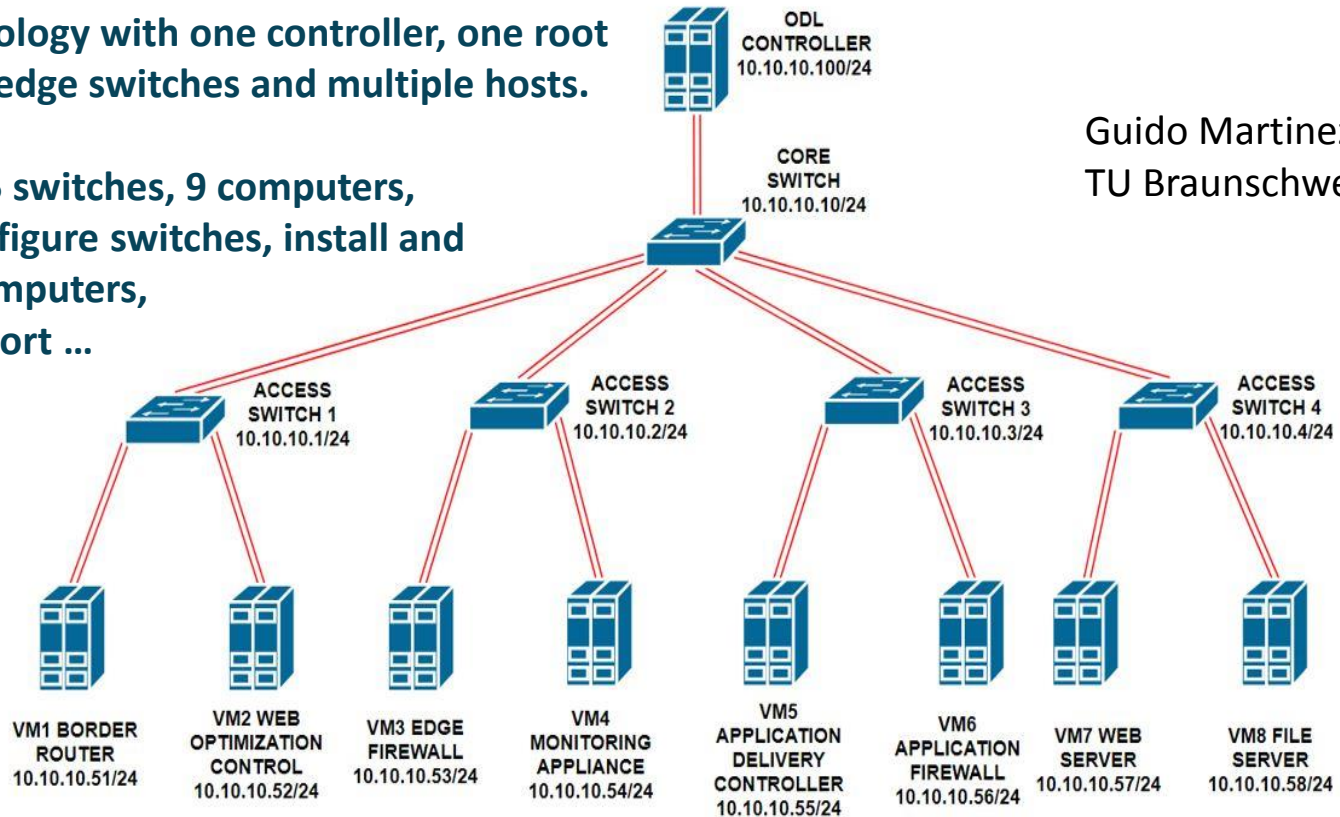
Example of user testbed topology. Benefits of using GTS .



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

It will cost to buy 5 switches, 9 computers, connect them, configure switches, install and configure OS at computers, place, power, support ...

Guido Martinez,
TU Braunschweig



Geant Testbed Service (GTS)



Who are GTS users that tested GTS in 2017-2018 years?

- *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

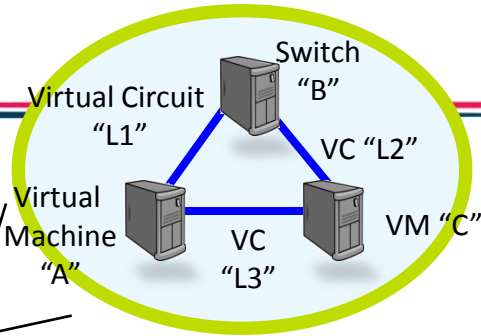


	2017 (6 monts)	2018 (9 months)	Total (15 monts)
Amount of Projects created	22	54	76
Amount of Users, registered in Projects	34	86	120
Amount of Testbeds, created by users in Projects	63	384	447
Amount of Hosts, reserved and activated in Testbeds	200	1322	1522
Amount of Links in Testbeds	228	973	1201
Amount of Virtual Switch Instances in Testbeds	15	100	115
Amount of Bare Metal Servers activated in Testbeds	43	261	304

Geant Testbed Service (GTS)

How it works ?

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



4. The User Agent sends the testbed description to GTS using the GTS API



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/OUCL=A/p0
```

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

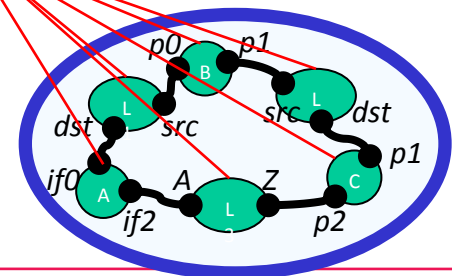
Reserve()

GTS API

Reserve.Resp()



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



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

* Name

* Institution

* E-mail

* Password and confirmation

Create new project Join existing project

* Project name

* Project start and end

* Project description

* Project requirements

Project extra comments

* VPN user

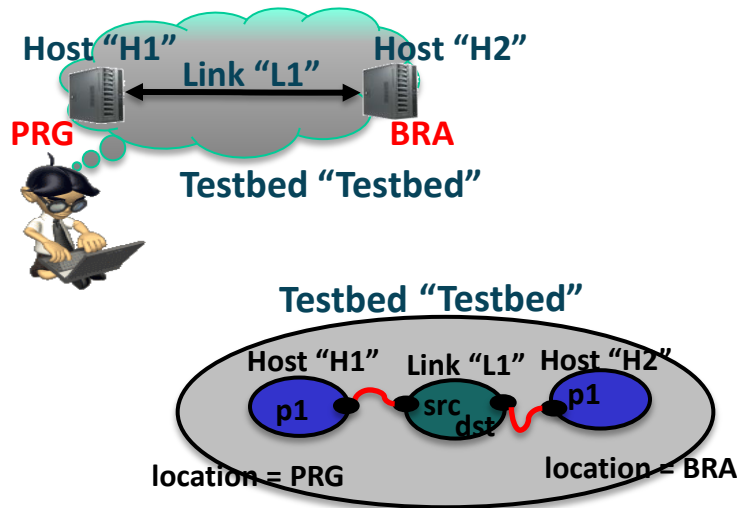
Geant Testbed Service (GTS)

A domain specific language for testbeds description



Domain Specific Language (DSL) based on Groovy -
an object-oriented language for the Java platform.

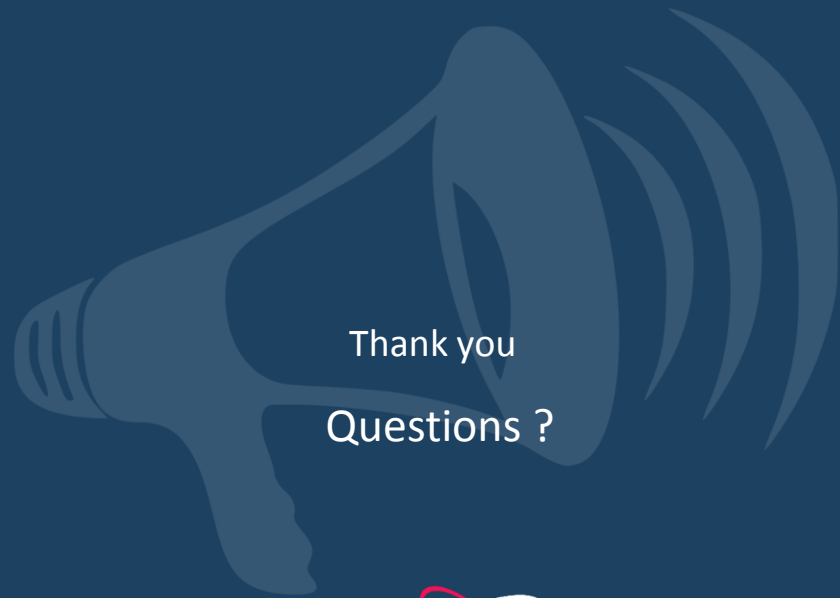
Using the DSL language, the user describes resources,
testbed topology and attributes.



```
Testbed {
  description = "Testbed with 2 hosts and 1 link"
  id = "dslType"
  host {
    id = "H1"
    location = "PRG"
    imageId = "Ubuntu-18.04.qcow2"
    flavorId = "c1r1h10"
    //x = "299"
    //y = "127"
    port { id = "p1" }
  }
  host {
    id = "H2"
    location = "BRA"
    imageId = "CentOS-7.x.qcow2"
    flavorId = "c1r1h10"
    //x = "548"
    //y = "120"
    port { id = "p1" }
  }
  link {
    id = "H1H2num1"
    port { id = "src" }
    port { id = "dst" }
  }
  adjacency H1.p1, H1H2num1.src
  adjacency H2.p1, H1H2num1.dst
}
```

Demo

Different Testbeds creation, using Drag'n'DrED
(drag and drop editor)
Export/Import of Types,
Testbed reservation and activation,
Access to resources,
Deactivation/Activation/Releasing.



Thank you
Questions ?



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