DTN tests using the Géant Testbed Service (GTS)

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GÉANT Infoshare - Data Transfer Nodes: How Fast can your Data Travel?

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The GÉANT Testbeds Service

- "Testbed as a Service" (TaaS) GEANT3plus - April 2013

- Virtualization framework to expedite the deployment of novel network services and networked applications

- Intended for short term proof of concept testing and experimentation purpose only, and any usage related to production operations, business critical or otherwise is not supported

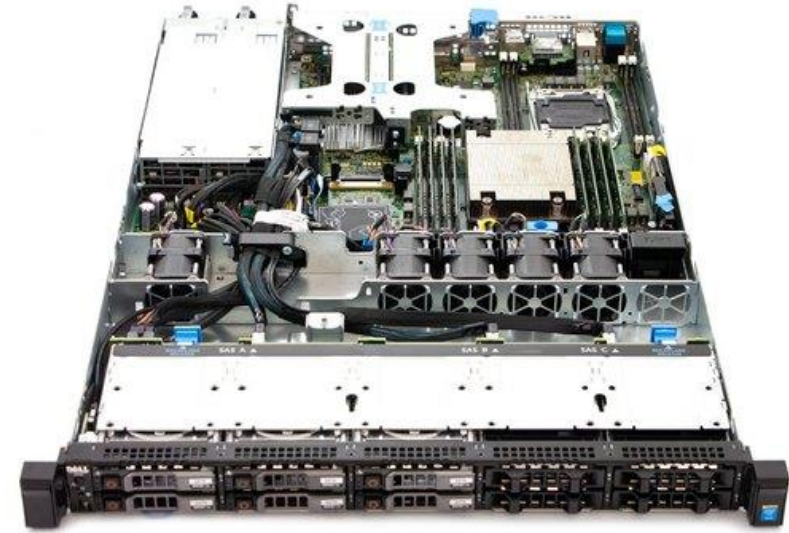- Web based "Point-n-Click" GUI with script configuration options
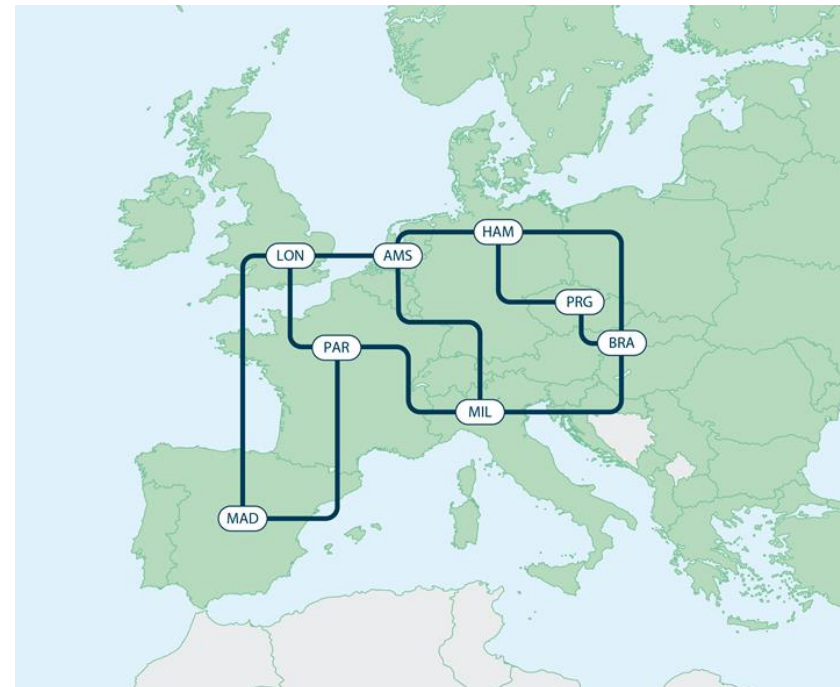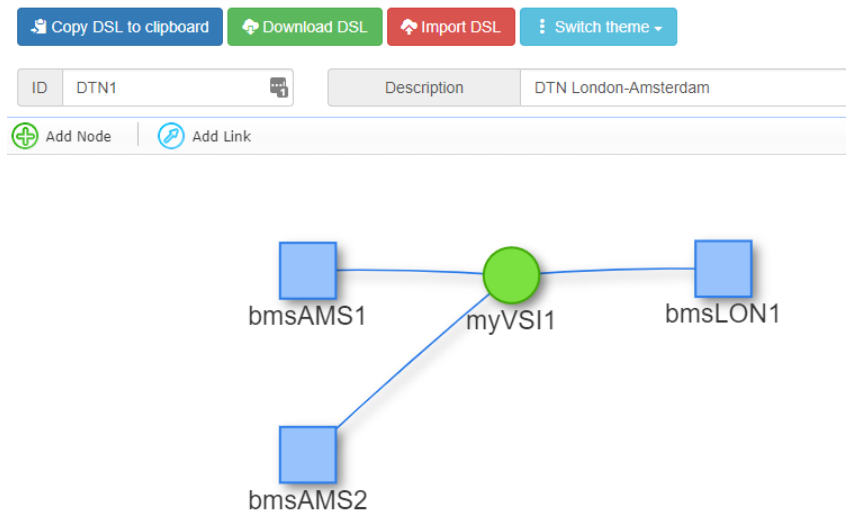
GTS resurses

- Available resources in Version 7.0.0 of GTS include:
  - **Hosts** (VMs with data ports and integrated monitoring in the GTS GUI; implemented using OpenStack
  - Virtual circuits (Ethernet pipe with data ports; implemented using Network Service Interface (NSI) with 10 GE connectivity)
  - Virtual Switch Instances (VSIs) (fully virtualized OpenFlow switch instances (OpenFlow Specification 1.3 with data ports);
  - **BMS** (Bare Metal Servers. A BMS cannot have more than 1 port in current setup).

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GTS hardware in testbed

Dell PowerEdge R430

- Dell PowerEdge R430
  - 2x20C/40T Intel Xeon E5-2660v3 @ 2,6 GHz,
  - 128 Gb ECC DDR4 2133 MHz RAM,
  - 6xSSD, 372 GB, 6,0 Gb/s HDD)

- Dell PowerEdge R520
  - 1x8C/16T Intel Xeon E5-2450 v2 @ 2,5 GHz,
  - 32 Gb ECC DDR3 1600 MHz RAM,
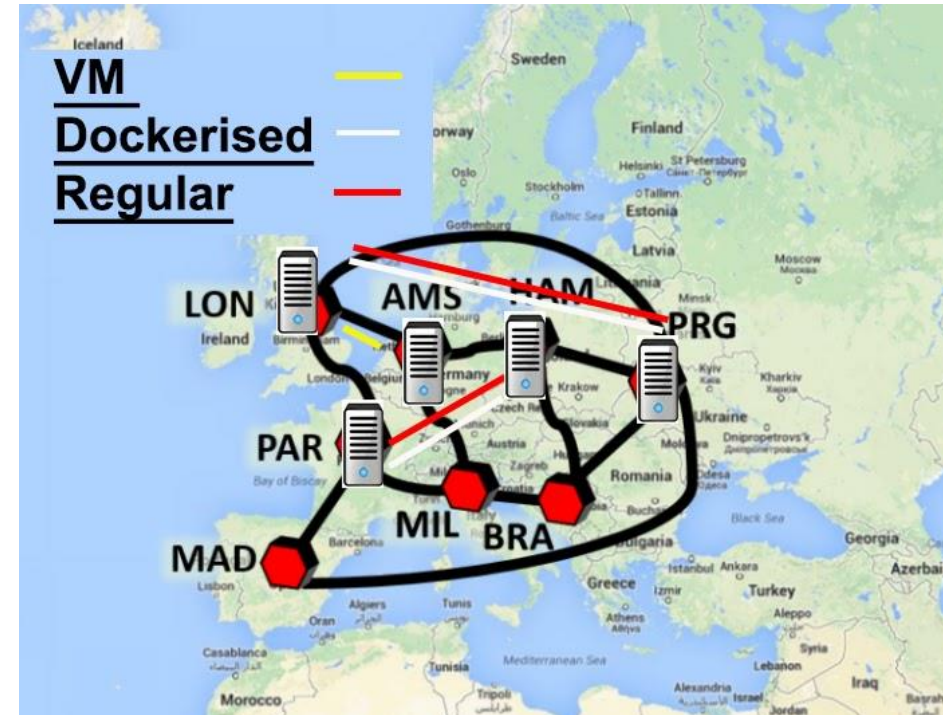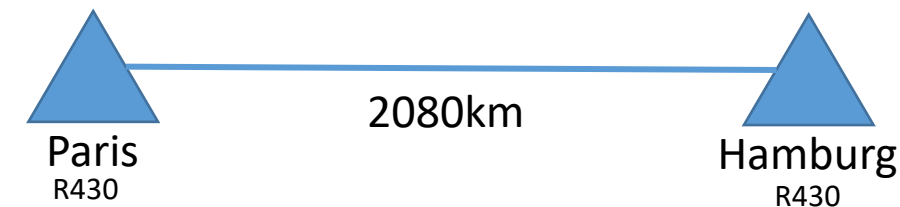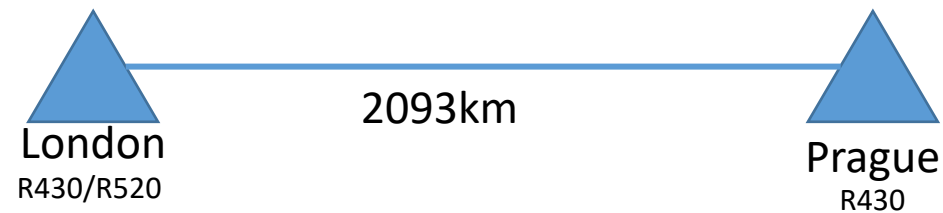 - 2xSSD, 372 GB, 6,0 Gb/s HDD
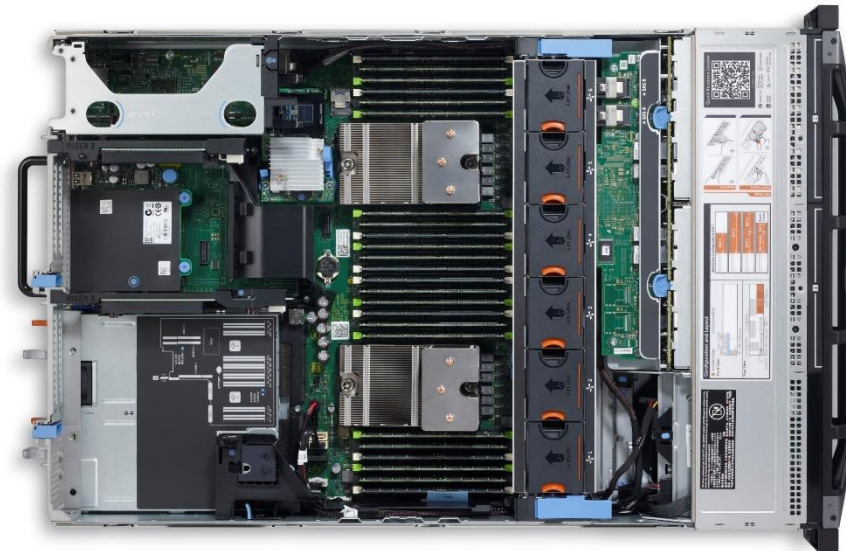
Dell PowerEdge 520
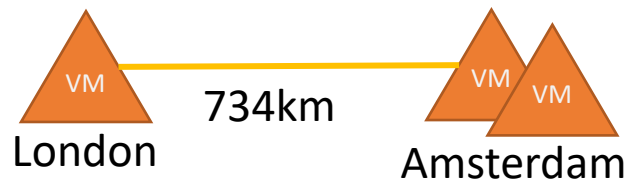
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GTS testbed tools

- **Iperf** - active measurements of the maximum achievable bandwidth on IP networks

- **GridFTP** - extension of the File Transfer Protocol (FTP) for grid computing, tool developed by Open Grid Forum (widely used tool for data transfers in science projects and supercomputer centers)

- **FDT** (Fast Data Transfer) - open source application; in basic using numerous TCP streams (managed pool of buffers through one or more TCP sockets)

- **XrootD** - open source application, extension of ROOT daemon; using load balancing for clients between servers

- Ubuntu 18.04 LTS (some test were also done with CentOS 7)

- Network:
  - 10Gbit/s dedicated fiber/lambda links
 - No QoS (best effort), no control over routing

Topology/Tests scenarios

- 512Gbyte file transfer
- VM Testbed:
  - Local test between servers in Amsterdam
  - Test between servers in Amsterdam and London
  - 1xCPU, 2xCPU, 4xCPU VMs
- BMS Testbed:
  - Hamburg <-> Paris (R430)
  - London <-> Prague (R430 and R520)

VM
Dockerised
Regular

VM — London — 734km — VM VM Amsterdam

London
R430/R520 — 2093km — Prague
R430

Paris
R430 — 2080km — Hamburg
R430

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Test results

- Comments:
  - No control over routing, no QoS…
  - BMS test -> disk to disk transfer
  - VM test -> memory to memory transfer (due to low disk space available on VMs)
  - Test were done on 10Gbps NIC (100Gbps NiCs were not available)
  - GTS servers are NOT DTN "hi-end hardware"

- Better results on BMS R430

- Poor results on BMS R520 *(issues at London node?)*

- VM tests – „the same" (memory to memory)

- XRootd is highly dependent on hardware resources

- BMS vs Docker BMS (R430):
  - 2-4% in iperf results
  - 5-7% difference for FDT
  - Same results for gridFTP and Xrootd
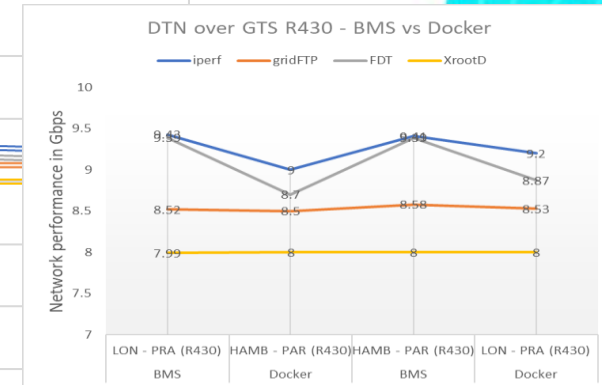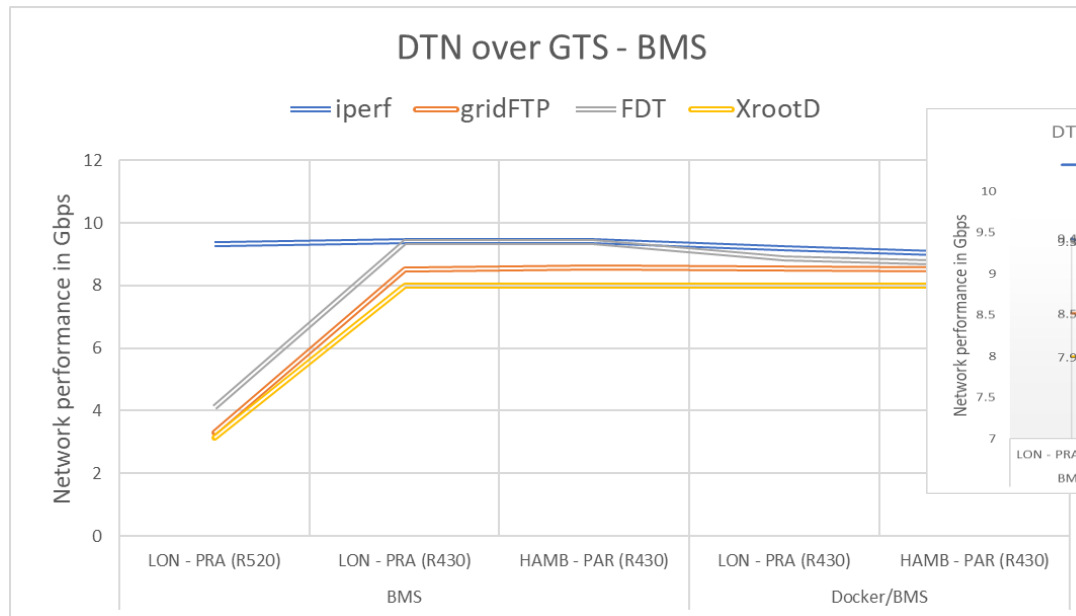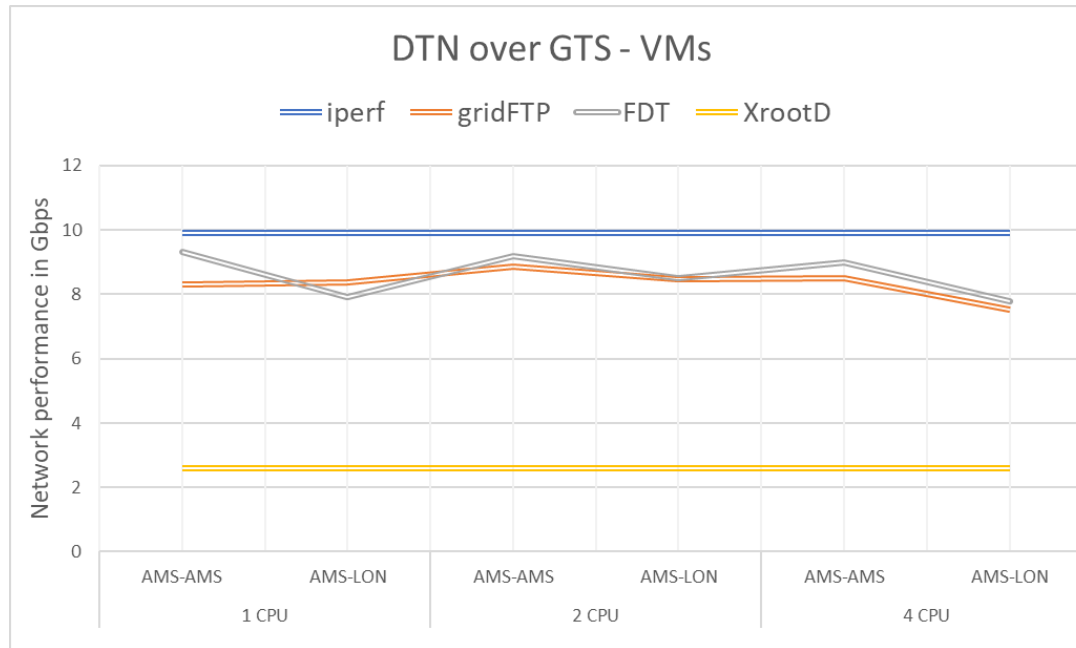
Thank you

Any questions?

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DTN over GTS test results (all in one)

DTN over GTS R430 - BMS vs Docker