ICNRG Meeting
Berlin, 29.09.2017
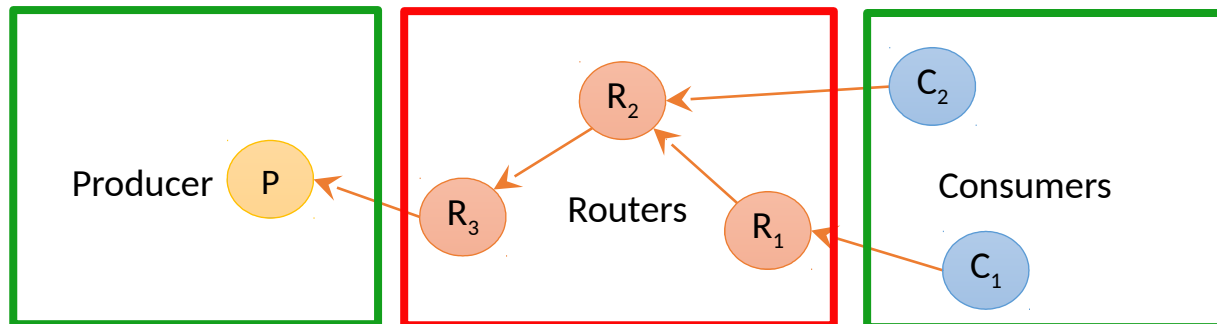
Interconnection of testbeds to enable better testing

Jacopo De Benedetto

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Existing emulated Testbeds (e.g. NDN Testbed)

- Modifiy sender/receiver behaviour ✓
- Modify routers forwarding mechanism ✗

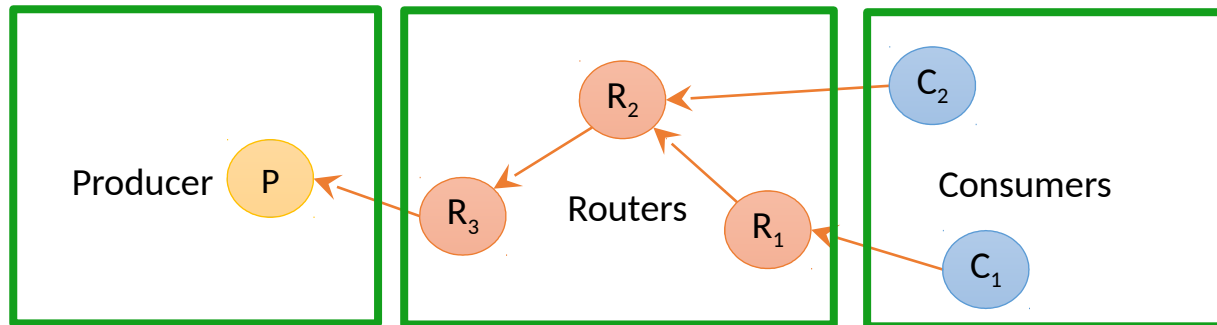# Experiments over GTS

GTS enables the opportunity to use **a real global testbed** in a **sandbox environment**

- Modifiy sender/receiver behaviour ✓
- Modify routers forwarding mechanism ✗

## COMPLETE CONTROL ON EACH DEPLOYED NODE!

GÉANT Testbed Service

The GÉANT Testbed Service (GTS) delivers integrated virtual environments as "testbeds" for the network research community

"The network testbed resources are dynamically allocated from a real e-infrastructure distributed throughout the GÉANT core service area allowing researchers to define, build, test and rebuild highly scalable, high capacity virtual networks quickly, easily and cost-effectively"

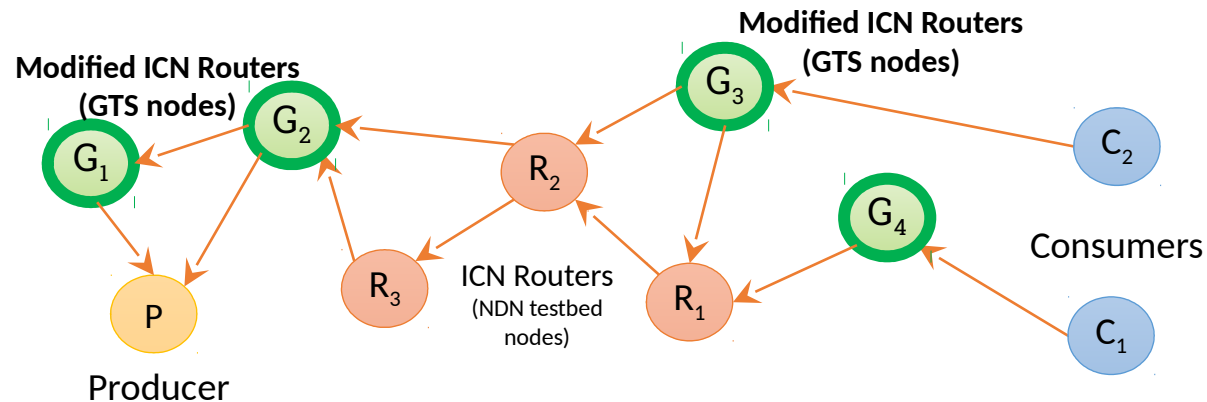https://www.geant.org/Services/Connectivity_and_network/GTS

GÉANT Testbed Service
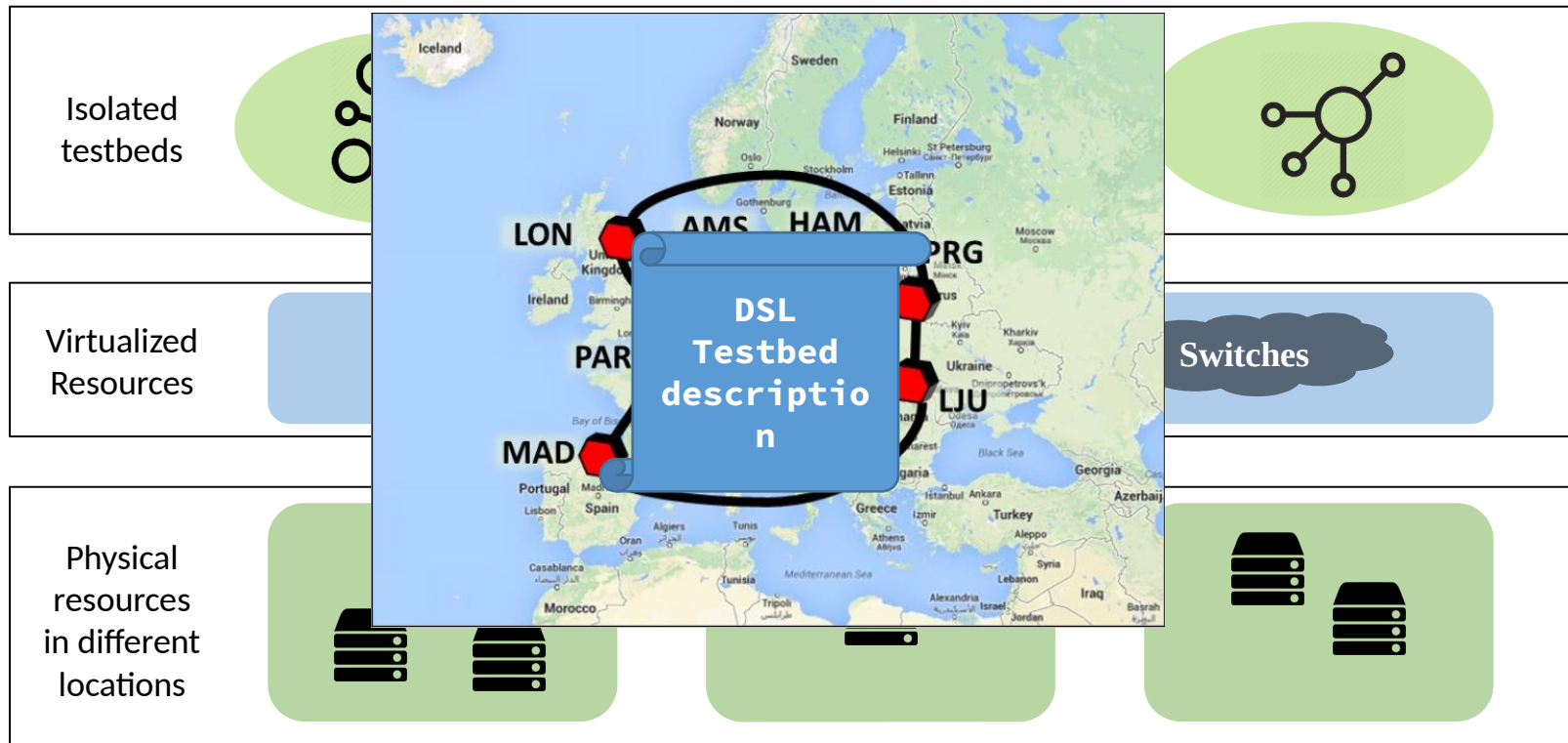
GÉANT Testbed Service

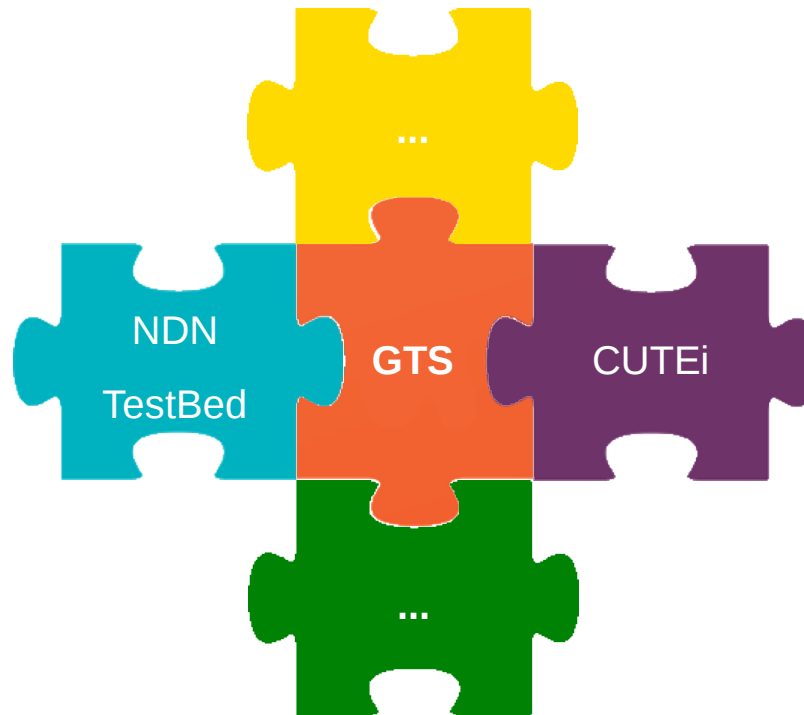**External Domain Ports** are a special type of GTS resources to communicate with the external world

✓ GTS nodes can be ''integrated'' in another testbed for extended features
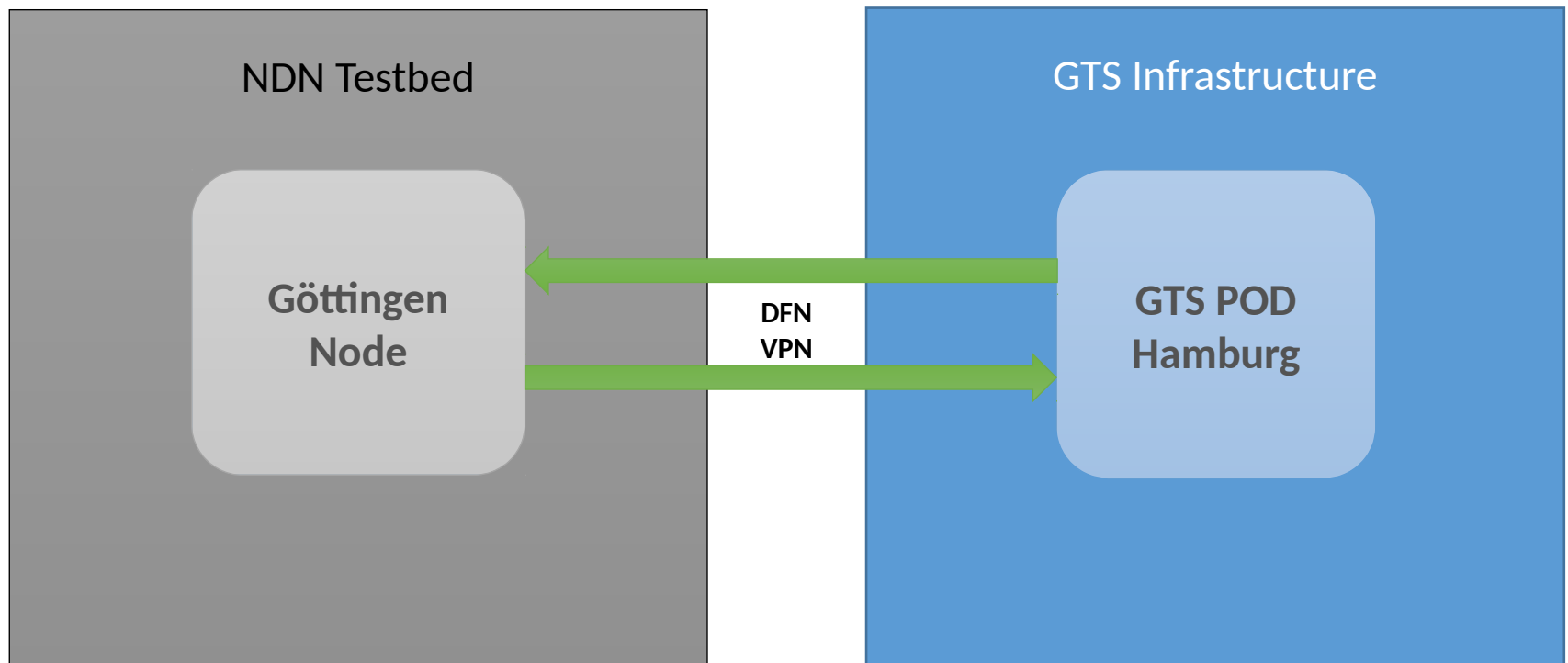
Federated Testbed

External Domain Ports are a special type of GTS resources to communicate with the external world

✓ GTS nodes can act as gateways between different ICN testbeds/applications

GÉANT Testbed Service

For a fast and stable connection, External Domain Ports require a VPN interconnection to one of the GTS facilities (paid service ⌐⌐).

GÉANT Testbed Service

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**Workaround**: use the Internet Access Gateway (IAGW)

From GTS v2.0 Architecture Guide:
*"The IAGW is a **'best-effort' service** and is implemented using a virtual routing forwarding table (VRF) across the GÉANT IP core. This is essentially a VLAN that appears in each Pod and is bridged to appropriate VMs during activation. The interfaces of the individual devices attached to the subnet typically are limited to **1 Gbps or less**. Further, as in conventional IP net works, the interface linking the IAGW subnet to the outside world is **shared by all projects** – i.e. all IAGWs for all the projects managed by a GTS domain will typically share the same total capacity to the Internet (this is not an architectural requirement, but is typical, and currently all IAGWs share a single 1Gbps port)."*

GÉANT Testbed Service

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Workaround: use the Internet Access Gateway (IAGW)
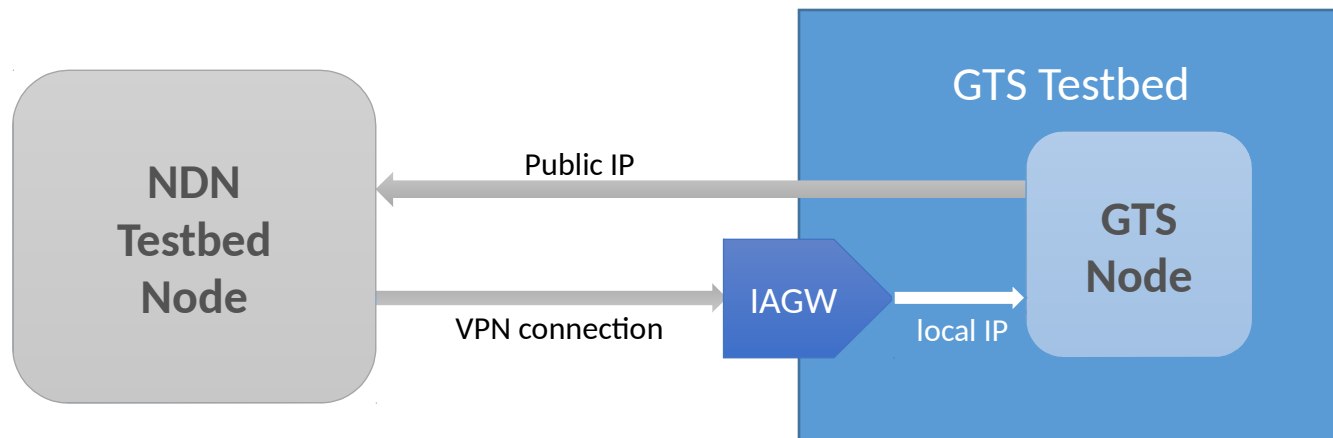
GTSv4

The new GTS version introduces Bare Metal Server as a resource:

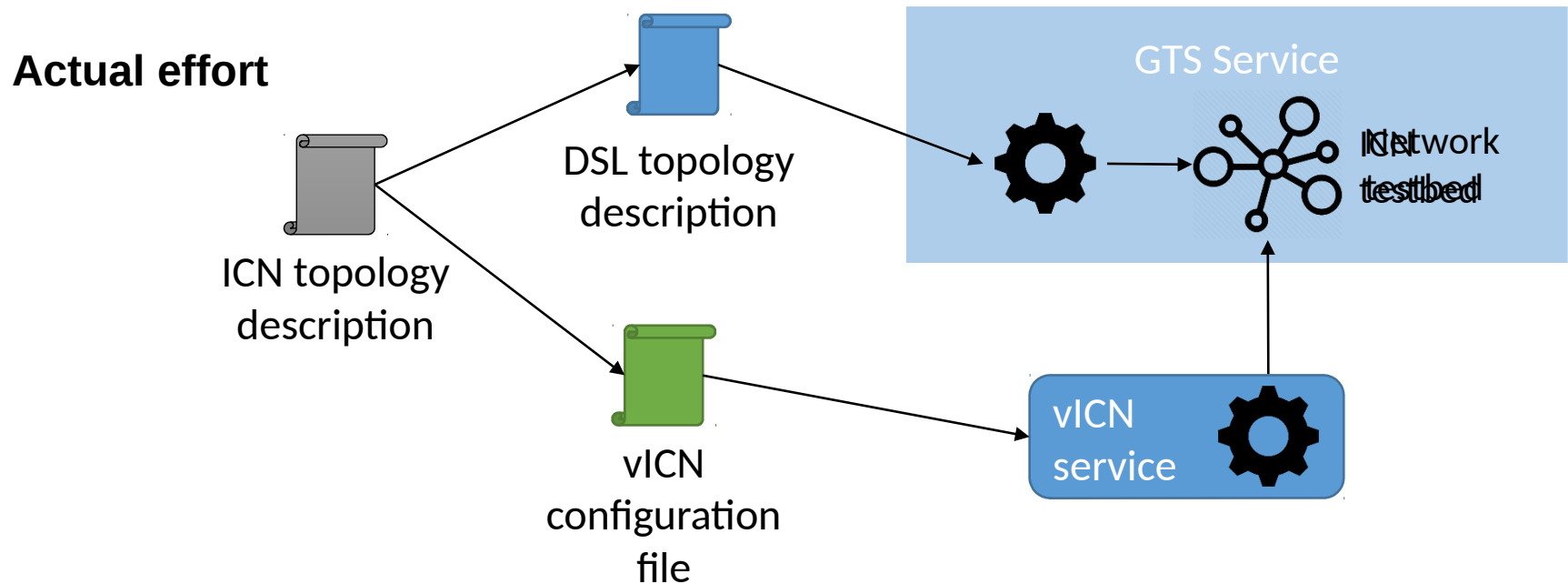- dedicated server(s) available instead of virtual machines

Container-based deployments
- ✓ CUTEi
- ✓ vICN (CICN project)
- ✓ Unikernels

GTS for ICN − Future works

Extend the DSL to support ICN entities:

Include an orchestration framework (e.g.: vICN https://wiki.fd.io/view/Vicn) to automatize the management and deployment of ICN nodes

Actual effort

ICN topology description

DSL topology description

GTS Service

Network testbed

vICN configuration file

vICN service

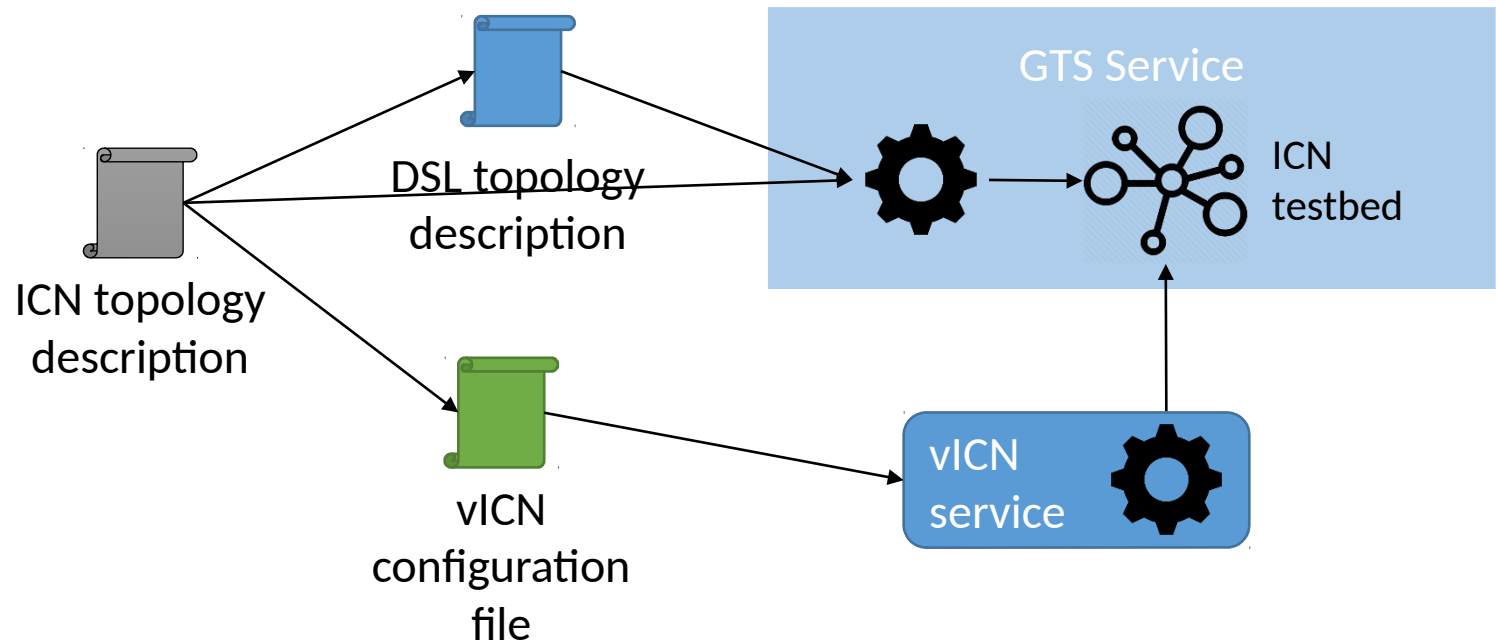# GTS for ICN − Future works

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Ideally

ICN topology description

DSL topology description

GTS Service

ICN testbed

vICN configuration file

vICN service

Thank You
Questions?

ICN2020 webpage: www.icn2020.org