GÉANT Interconnection Policy

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This document sets out GÉANT policy for interconnecting with non-European NRENs and with commercial networks including cloud service providers. It aims to maximise the connectedness of the GÉANT network with the external R&E community and with commercial entities who directly support or offer services to GÉANT's Members[1] and their users, whilst building in as much flexibility as possible for Members to customise their use of the available interconnections.

Non-European R&E Entities

The main categories of non-European R&E peering partners are:

- **Associates:** where there are broadly similar levels of benefit for the networks' user communities such as regional R&E network groups or infrastructures, or the interconnection assists address the digital divide between the global R&E communities.
- **Other:** where the entity is serving an R&E community in countries eligible for EU Horizon 2020 funding or other interconnections of benefit to the GÉANT community. These are considered case by case and would normally be via the country's NREN.

The connections may take place, preferably, at a GÉANT or NREN owned Global Exchange Point, GXP (previously referred to as Open exchange), or otherwise at a GÉANT PoP or via a GÉANT Member's network. Where the benefits are judged to be broadly similar the peerings are deemed settlement free, though GÉANT reserves the right to charge for transit over the GÉANT network and/or its external connections.

Commercial Entities

GÉANT Peering Service

Where it is in the interest of its Members, GÉANT seeks to peer with non-R&E networks on a settlement-free basis through the GÉANT Peering Service which is available to all Members at no additional cost. Such peerings are normally (but not necessarily) in neutral carrier houses. Depending on expected volumes of traffic the peering may be through a shared public Internet Exchange, or over a direct, dedicated, private connection. These peerings reduce the cost of Internet transit for NRENs and may improve performance, if the peering shortens the path between the NREN and the peer network.

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[1] 'Members' means the NRENs that are full members of the GÉANT Association and part of the cost share for GN4, including NORDUnet on behalf of the Nordic NRENs

Using BGP communities, NRENs have the ability to select or reject which GÉANT peers, and/or which Internet Exchanges, they wish to use. Distinct from its R&E transit network, GÉANT uses a different network called the 'Internet Access System' (IAS), with a different Autonomous System Number, for the Peering Service.

GÉANT seeks to peer with networks with which a large volume of traffic is exchanged, or which are considered strategically valuable (for example, networks hosting significant resources such as root-servers, R&E service providers like magister, blackboard, zoom, etc.), or which an NREN has specifically requested GÉANT peers with. All candidate peers are subject to an NREN approval process administered in conjunction with the NREN APMs before any peering is activated - an overview of the approval process is shown in Annex 1.

In certain rare circumstances it may be desirable to cease an active peering (e.g. that peer has become a direct competitor to a Member) de-selection of a peer follows the same process as selection.

GÉANT World Service

GÉANT also offers an upstream Internet transit service called GÉANT World Service. This is an opt-in, chargeable service which also uses the IAS network.

GÉANT Cloud Peering Service

Due to the growing demand for cloud services in the European R&E community GÉANT's Cloud Peering Service (CPS) delivers a high-quality service to minimise or remove the data transport related costs being placed on R&E end users of Cloud Services. To recognise the benefit that the Cloud providers get in being able to reach R&E customers over NREN and GÉANT infrastructure there is normally some form of charge levied on the Cloud Provider by the NRENs or GEANT – this may be a port-based charge or a traffic volume based charge.

CPS covers the following use cases:

1.   Cloud service providers selected by GÉANT-led procurements or by procurements led by international research organisations such as CERN, EBI and ESA;
2.   Cloud Service providers involved in research projects/collaborations with multiple NRENs or end-user organisations. Examples are: Helix Nebula, Indigo-Datacloud, and HNiSciCloud. Again in close collaboration with GÉANT.

For use case 1 above, the nature and conditions for connecting to GÉANT and the NRENs are specified in the appropriate procurement documentation. For use cases 2 and 3, the CPS established a policy to ensure clarity and consistency when GÉANT and NRENs deal with requests from users and providers; in summary;

• CPS is an opt-in service to a discrete Virtual Routing and Forwarding instance (VRF)
• NRENs can choose to connect the cloud provider nationally and then engineer the traffic to the GÉANT network, alternatively;
• Eligible Cloud providers can connect directly to the GÉANT network by preference via GÉANT Open or an NREN owned Global Exchange Point (GXP), or otherwise at Internet Exchanges where GÉANT already has a presence or a GÉANT PoP (at the request of the relevant NREN).

GÉANT Open Exchanges

GÉANT applies the policies described in the preceding sections for transit traffic over the GÉANT network. This section deals with GÉANT Open (= GÉANT owned) GXP. According to the Global Network Architecture (GNA) definition: An (intercontinental) link coming in at a GXP gives any party the possibility to peer with any other party without any approval of a governance body. It only requires a peering agreement with the party it wants to exchange traffic with. This makes it possible for e.g. UbuntuNet to connect with GEANT, but also with SINET. This strengthens the usability and the position of the link

GÉANT Open offers a neutral interconnection facility between research and education networks, users and commercial operators and connectivity to the GÉANT network. The entities that can connect are:

- GÉANT and other international research and education network providers;
- National and regional research and education networks;
- Commercial entities that directly support or offer services to GÉANT's Members and their users;
- International research organisations (where connection is supported by the NREN).

Once an organisation is connected to a GÉANT Open GXP it is entitled to inter-connect with any other connectors at that GXP where mutually agreed. (Connection to a GÉANT Open GXP does NOT constitute any permission for transit over the GÉANT network, for that the peering policy documented in the previous sections will be applied). The GÉANT Open Exchange has only one policy rule: All traffic needs to be R&E related. No other policies apply. This means that commercial operators connected to the same GÉANT Open GXP are permitted to exchange R&E related traffic at that GXP.

Further GÉANT Open GXP's are foreseen at strategic locations, subject to the agreement of the local NREN and the approval of the Board.

Policy Administration

Responsibility for executing the policy rests with GÉANT's CEO supported by his management team, with periodic reporting and, where necessary, policy interpretation and review by the GÉANT Board.

For matters relating to R&E interconnections please contact GÉANT's International Relations team at ir@geant.org

For matters relating to commercial interconnections please contact ops-sm@geant.org

Annex 1 GÉANT Peering Service peer approval process

- A list of new candidate networks for peering and/or de-peering is e-mailed to the NREN APMs.
- The NREN APMs, in consultation with whichever of their colleagues they deem appropriate, have a minimum of 10 working days to review the list and identify any concerns.
- Any NREN which has an objection to any of the peers should reply to the original mail (either privately to GÉANT staff, or copying in other NRENs, as per their wish).
  - If 3 or more NRENs object to a given candidate peer, and no NREN has explicitly requested that peer, then the peer will be removed from consideration.
  - If any NREN objects on the grounds that the candidate peer is a customer, or is a national network which is a direct competitor to it, then the peer will be removed from consideration.
  - Where there is a conflict of interest between multiple NRENs then the candidate peer will be temporarily removed from consideration, pending a decision by the Board
- Once a new peering has been activated it is added to the list of peerings held on the Partner Portal