

**GÉANT**



**HP-SEE**

High-Performance Computing Infrastructure  
for South East Europe's Research Communities



« *networking the networkers* »

# Regional Connections implementation in Eastern Europe

# Extension of GEANT to the East (“Porta Optica Study” project output)

*Various solutions for extension of GEANT to the East were developed, discussed and proposed for realization. Very roughly, the topology of the East European part of the global Trans-European Academic network can be pictured as multiple ring and arc structure. Some of these rings and arcs, that arise more or less naturally, are:*

- **Central arc:** Poland–Belarus and further to the industrial cities of Russia, then to St. Petersburg and back into Scandinavia.
- **Southern arc:** Poland–Ukraine–Moldova–Romania and further through Ukraine to the industrial cities of the Central Russia then to Moscow and further to cities of Ural and other regions of Russia.
- **Caucasus arc:** Ukraine–Georgia–Armenia–Azerbaijan–Turkey, etc. and then to the Far East in cooperation with Silk Highway and other projects.
- **Central and Eastern Europe:** partners’ NRENs CBF connections – RO-MD; RO-UA; PL-BY; PL-UA; BY-UA

# Implementation of the EaP regional infrastructure

*Approaches of the regional European Eastern Partnership networking Infrastructure development and its integration to GEANT were discussed during preparation of the event “Infrastructures in Eastern Partnership Countries” held in December 2012 in Chisinau. The visions discussed by regional experts are:*

- (1) Build Eastern Europe arc – realize CBF connections that will cover PL-BY-UA-MD-RO
- (2) Create Caucasian CBF links like GE-AM, GE-AZ;
- (3) Realize submarine fiber connection of the Caucasian optical hub to Odessa, UA (or alternative – to Varna, Bulgaria);
- (4) Implement terrestrial connection through Turkey of Caucasian optical hub to the regional EaP infrastructure as an second solution;
- (5) Upgrade of each NREN critical Points of Presence (PoPs) to 10 Gbps (update communication equipment of the principal PoPs in all EaP countries);
- (6) To ensure connection of the EaP Eastern Europe arc and the whole EaP infrastructure through to at least 2-3 existing points of presence of GEANT.

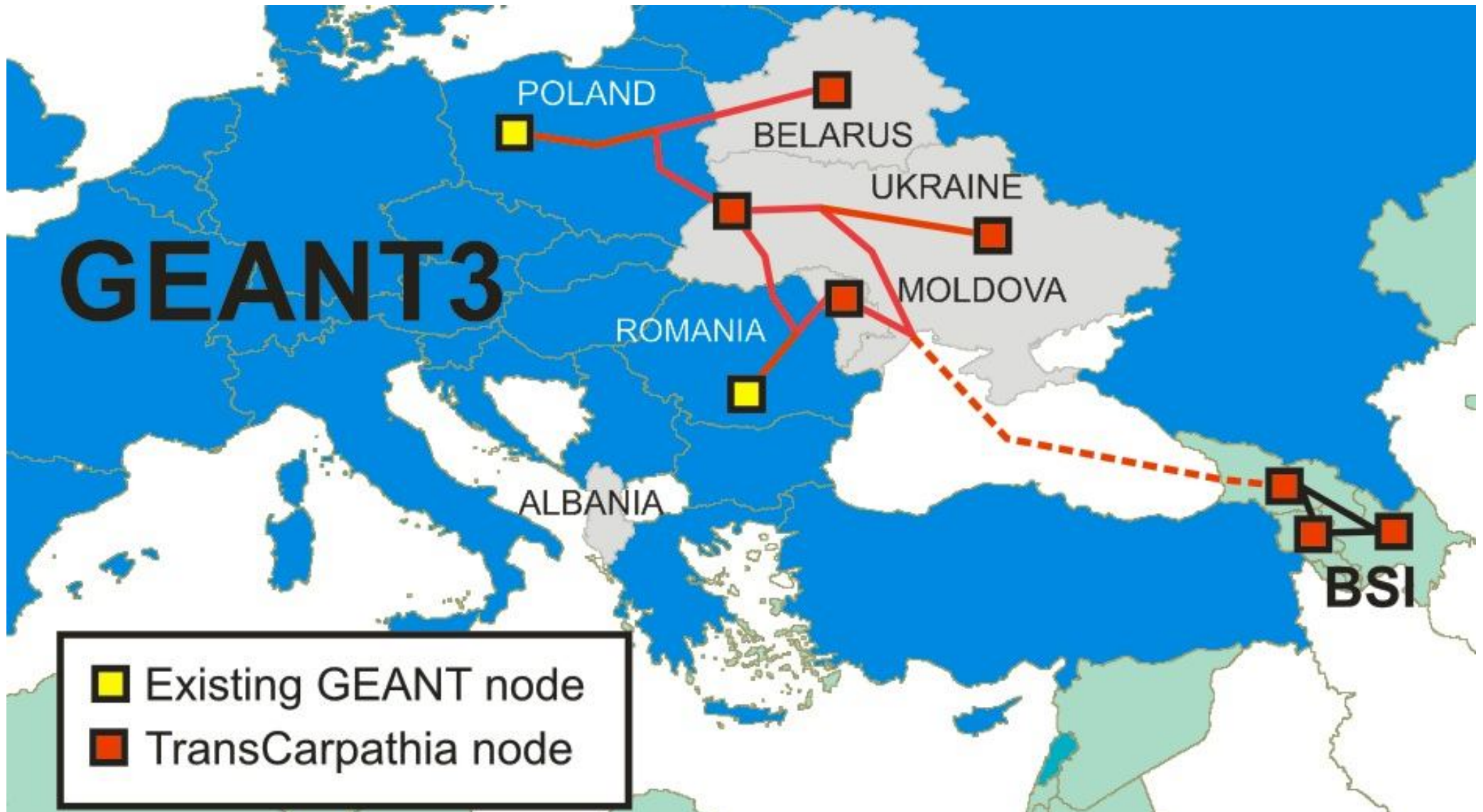
# Integration of the EaP regional infrastructure to GEANT

*As approaches for integration of the EaP regional infrastructure to GEANT were negotiated and proposed:*

- Optimal solution for the integration of the EaP regional infrastructure to GEANT - realization of the DF connections to the existing GEANT PoPs:
  - ✓ CBF connections of MD and UA NRENs to the PoP in Bucharest (through RoEduNet infrastructure);
  - ✓ CBF connections of BY and UA NRENs to the PoP in Poznan (Poland) using PIONIER facilities.
  - ✓ Creation of CBF peering and alternative GEANT access connections – MD-UA; UA-BY
  - ✓ Integration of the Caucasian optical segment with Eastern Europe part of EaP regional infrastructure and ensure its connection to GEANT

# Possible solution of EaP regional infrastructure deployment and its integration to GEANT

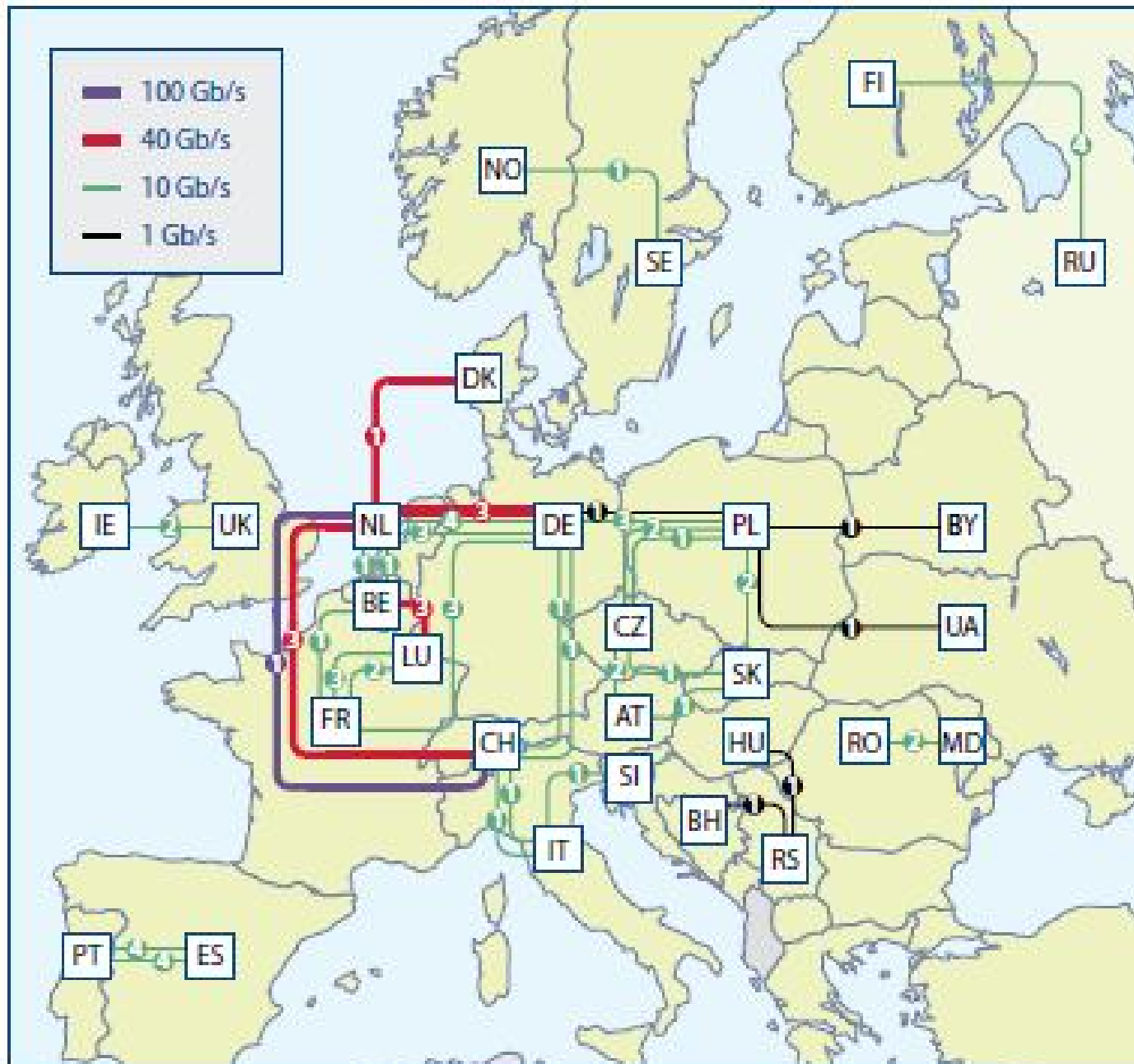
Possible scheme of regional connections implementation negotiated during 11th RoEduNet Conference (January 2013)



# Organizational support of the EaP NRENs regional connectivity project development

- One of the Decisions of the “eInfrastructures in Eastern Partnership Countries” event was creation of working group for elaboration of the detail technical and economical proposal for the EaP regional infrastructure implementation and its connection to the common infrastructure of the Trans-European network GEANT.
- DANTE was proposed as a Coordinator of this working group activity.

# Cross-border dark fibre in Europe



# Expanding of regional connectivity (case for Moldova)

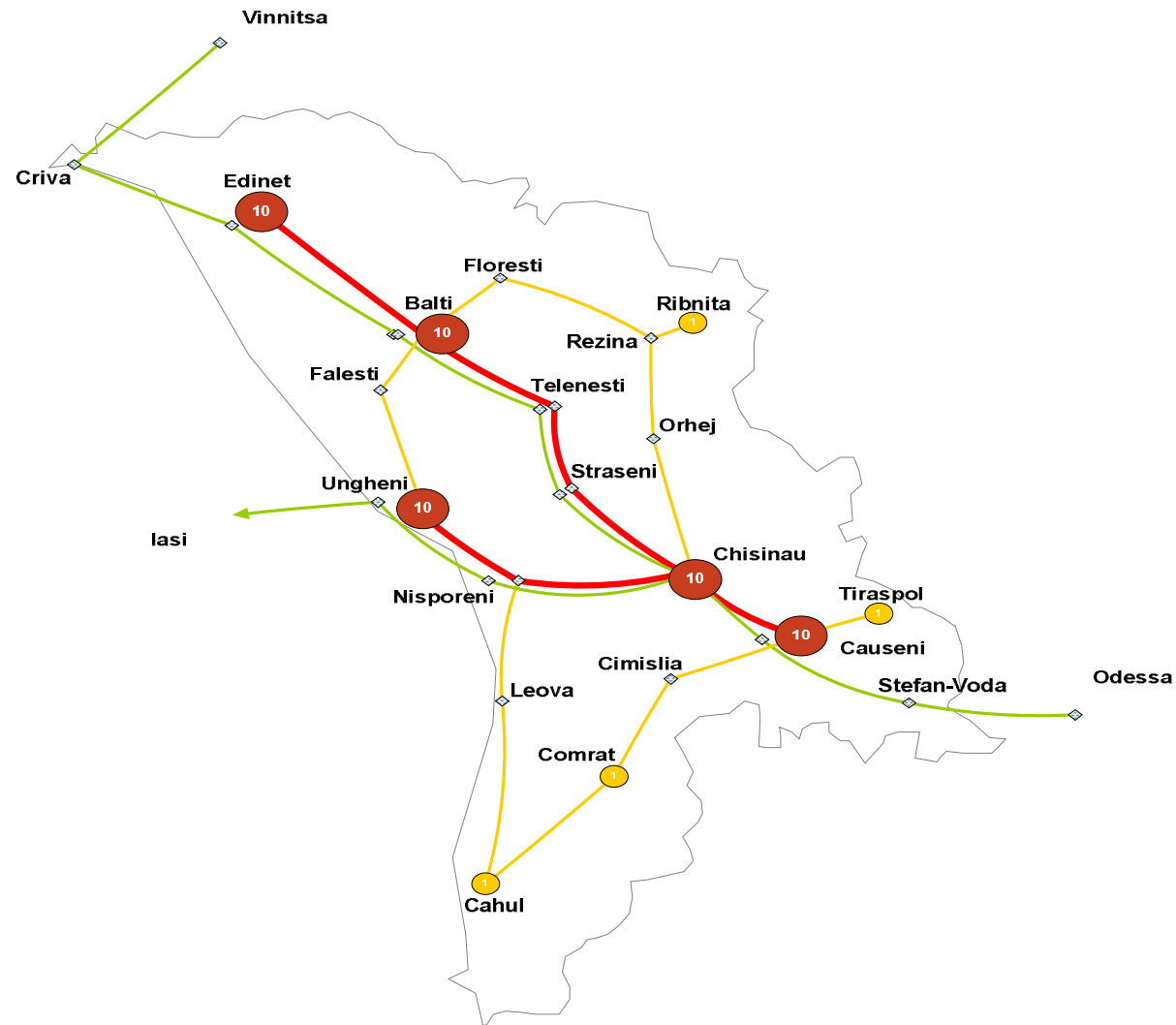
## Participation in the regional R&E networks development projects:

- Project of RENAM-RoEduNet Fiber Optic Channel Construction
  - *Construction of Fiber Optic connection between two neighbor NRENs and implementation of new high capacity communication technologies – finalized in 2010*
  
- Participation of Eastern Europe NRENs in EC “Porta Optica Study” project:
  - *Examination of the possibilities and the best approached to the regional fiber based networking infrastructure deployment in the East Europe region; Moldova as a member of the regional sub-group that has perspectives of DF interconnections (cross-border fiber connections) implementation that will unite in Southern arc Moldova, Romania and also the Ukraine, Republic of Belarus and Poland – the elaborated recommendations actual at present.*
  
- Close cooperation with partner NRENs:
  - from Romania - RoEduNet
  - from Ukraine – URAN and UARNet

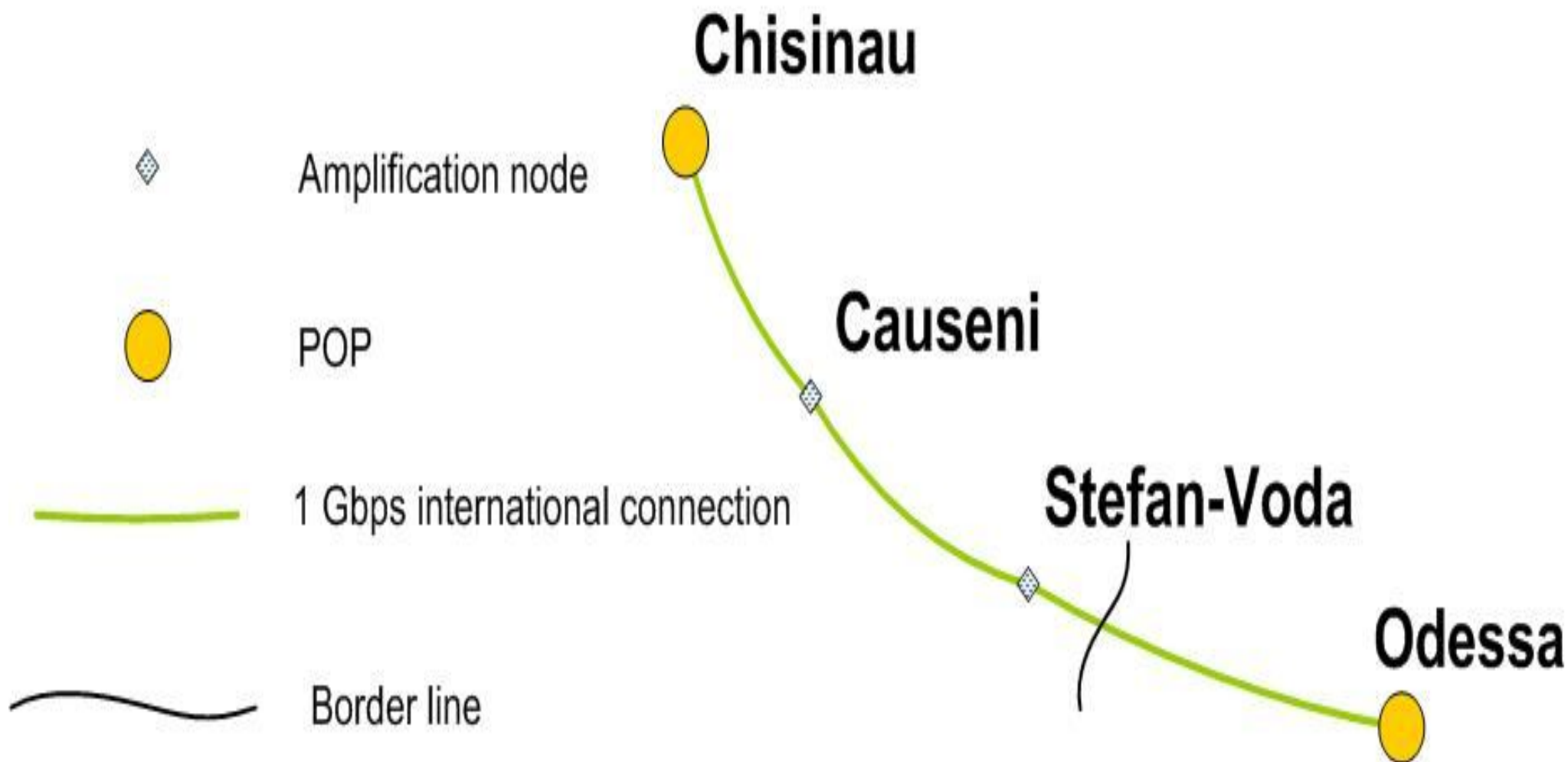




# Scheme of fiber gateways organization between Moldova, Romania and Ukraine



# RENAM – Ukrainian NREN Connection, Sought route



# RENAM – Ukrainian NREN Connection, North route

