

■ The 8th International Conference
"Distributed Computing and Grid-
technologies in Science and Education"
(GRID 2018)



MODERN E - INFRASTRUCTURE FOR SCIENCE AND EDUCATION IN MOLDOVA, BASED ON THE RENAM-GEANT PLATFORM

Современная E - инфраструктура для науки и
образования в Молдове основанная на платформе
RENAM-GEANT

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General objectives

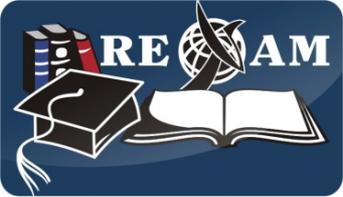
- Evolution and current trends in the development of electronic infrastructure and services in the RENAM network.
- The prospects of creating new optical CBF (Cross Border Fibers) links and other components of the electronic platform RENAM-GEANT on the basis of the EU funded EaPConnect project.
- Development of modern regional e-Infrastructure resources and the provision of services that are focused on support of scientific and educational communities in the European Eastern Partnership Programme countries.



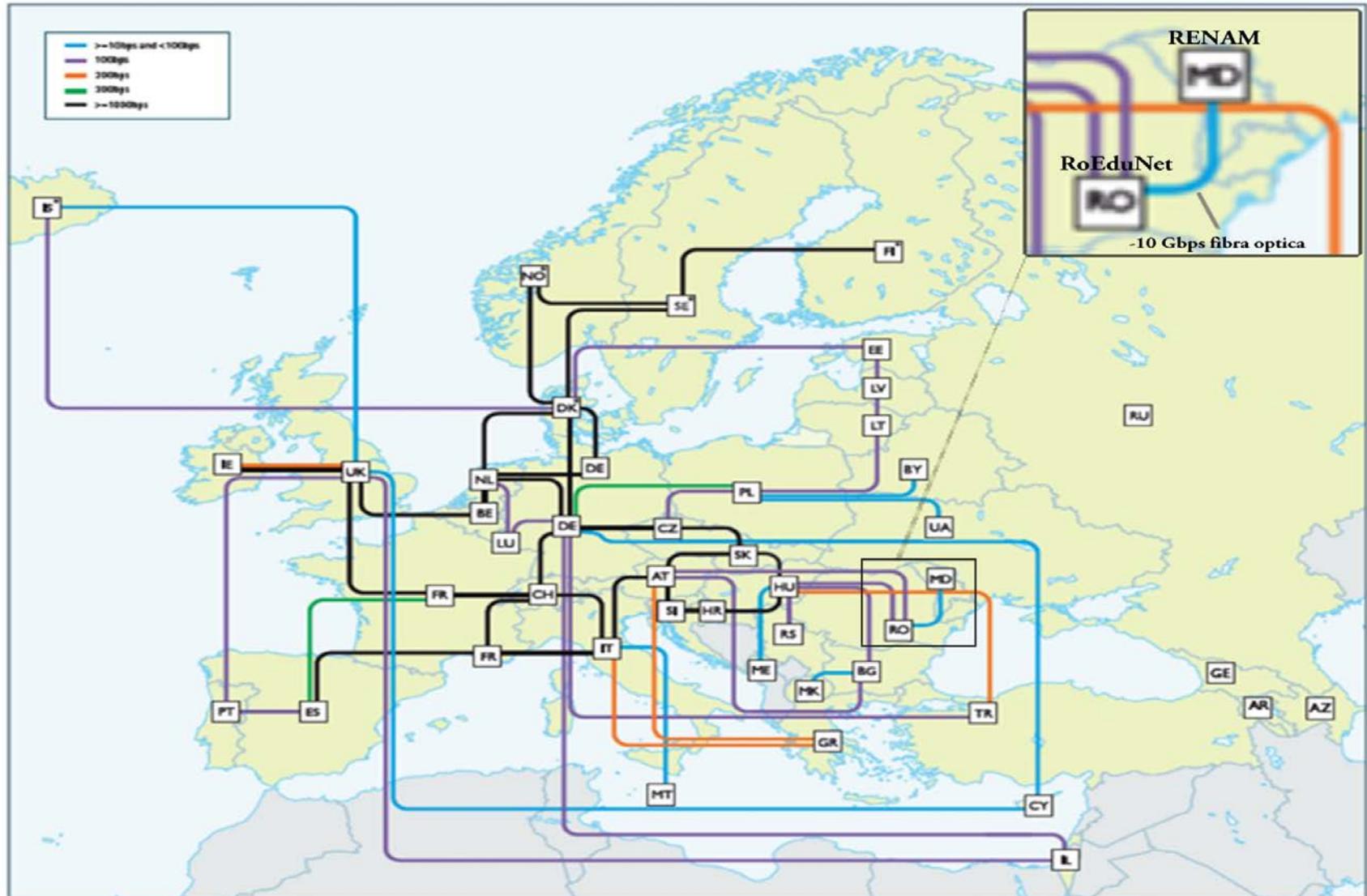
E-Infrastructure for research and education

- e-Infrastructures for research and education are oriented to support distributed medium based on
 - high-bandwidth networks;
 - Computing resources (Grid, HPC, etc.) and services;
 - respective data repositories.

- All these facilities are forming new research environment enabling shared access to unique or distributed scientific facilities (including data, research instruments, computing resources and networks).



GEANT network topology and RENAM connectivity



GEANT connectivity as at January 2014. GEANT is operated by DANTE on behalf of Europe's NRENs.

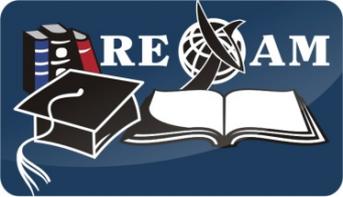


RENAM Network Concept

The launch of the common electronic space in the Moldovan E & C sector is marked by the creation of the RENAM network in 1999. RENAM's goal: to integrate the networks of education and research institutions into a common electronic space and the development of ICT services.

The topology of the RENAM network based on a three-level architecture:

- The first level includes the central communication node and external optical channels like RENAM (Moldova) - RoEduNet (Romania) and broadband connection to GEANT;
- The second level is the national backbone of the RENAM network to which universities and research institutions connected;
- The third level includes local networks in campuses and buildings of universities and research institutions.

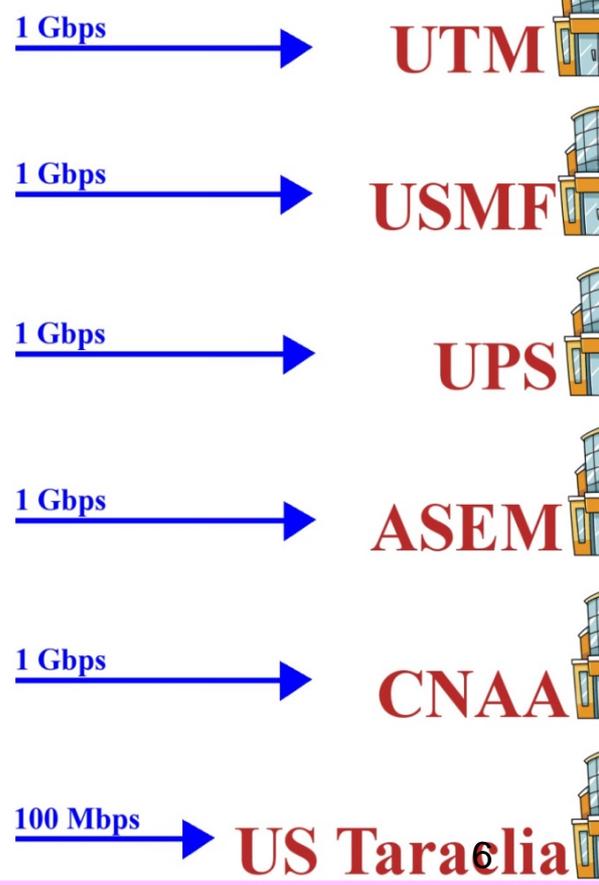
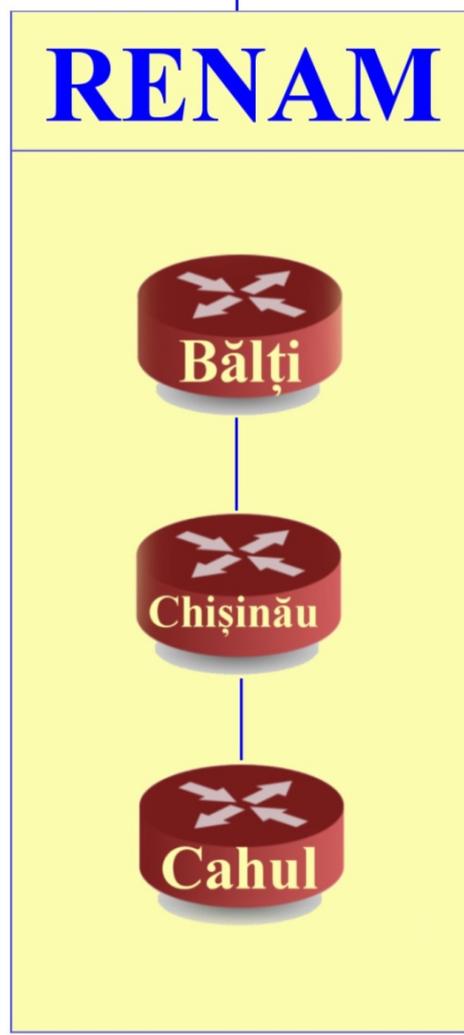
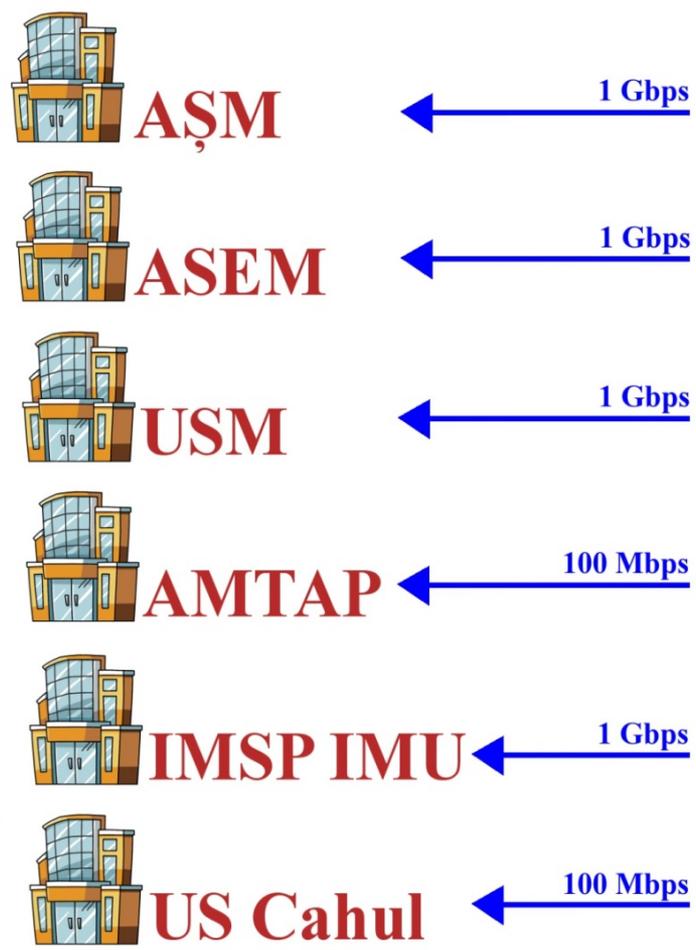


RENAM: National Connectivity



10 Gbps

RENAM





Optical channel RENAM-RoEduNet

The first RENAM – RoEduNet - GEANT Optical Channel was created in 2008-2009 in partnership with RoEduNet and local company StarNet. The channel was officially launched in May 2010.

This achievement marked the shift to over 1 Gbps speeds and, as a result, a significant improvement in the connectivity for universities and research institutions of Moldova.

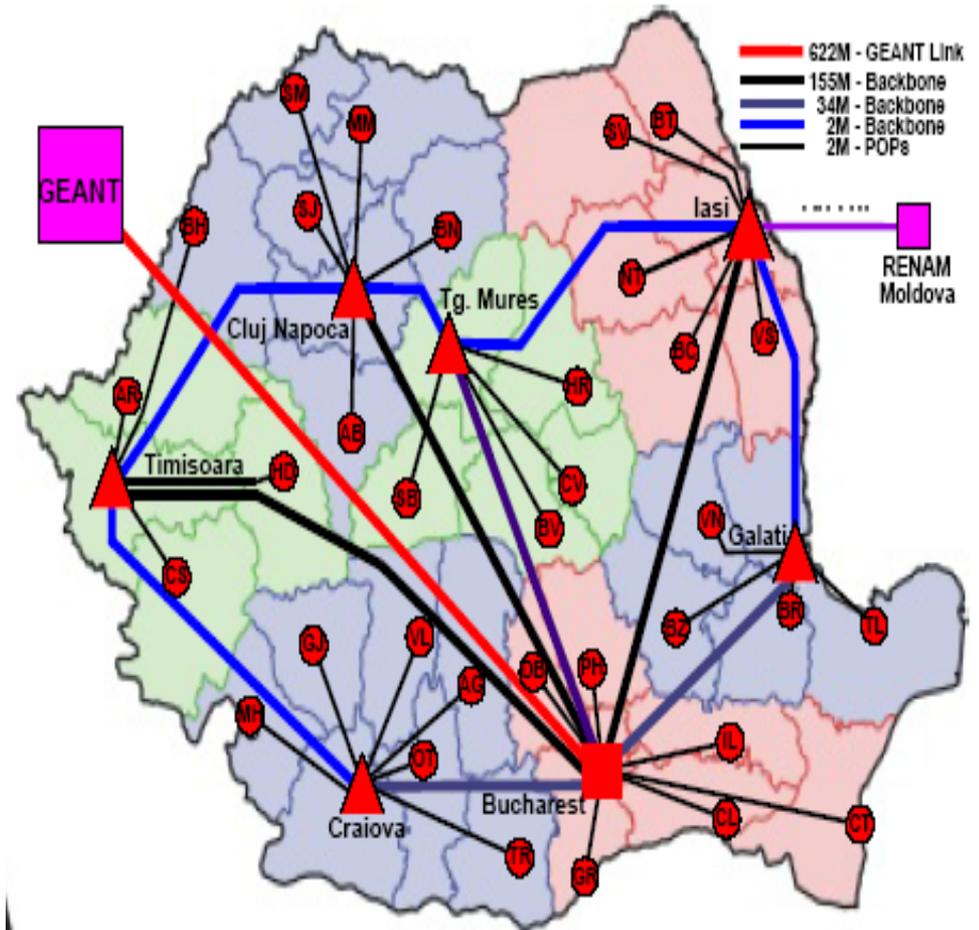
The creation and implementation of the Optical Channel has been carried out within two international projects: SEE-GRID-SCI (EC-funded) and NIG 982702 - (NATO-funded).





RENAM – RoEduNet Fiber Optic connection

Fiber link project was successfully implemented and the link operation was officially inaugurated in May 2010





RENAM Development Perspectives

Main directions:

- Upgrading of the central communication node and RENAM external connection channels to GEANT;
- Develop National Backbone to increase institution connectivity capabilities (10 Gbps as typical access speed);
- Elaboration, adaptation and implementation of modern ICT services.

Current perspectives and opportunities for national eInfrastructure development are based on EC-funded international projects in which RENAM participates.



EaPConnect Project

(EC, EaPConnect, External Actions EU: Grant Nr. 2015/356-353 / 11.06.2015 2015-2020)

The main goal of the EaPConnect project is the development of cross-border infrastructure and modern eInfrastructure in the European Eastern Partnership countries (Belarus, Ukraine, Moldova, Armenia, Georgia, Azerbaijan)

The expected result for RENAM (R.M.) is the development of broadband networking infrastructure (over 10 Gbps). It envisages creation of new internal optical channels and external optical channels, oriented to Romania and Ukraine.

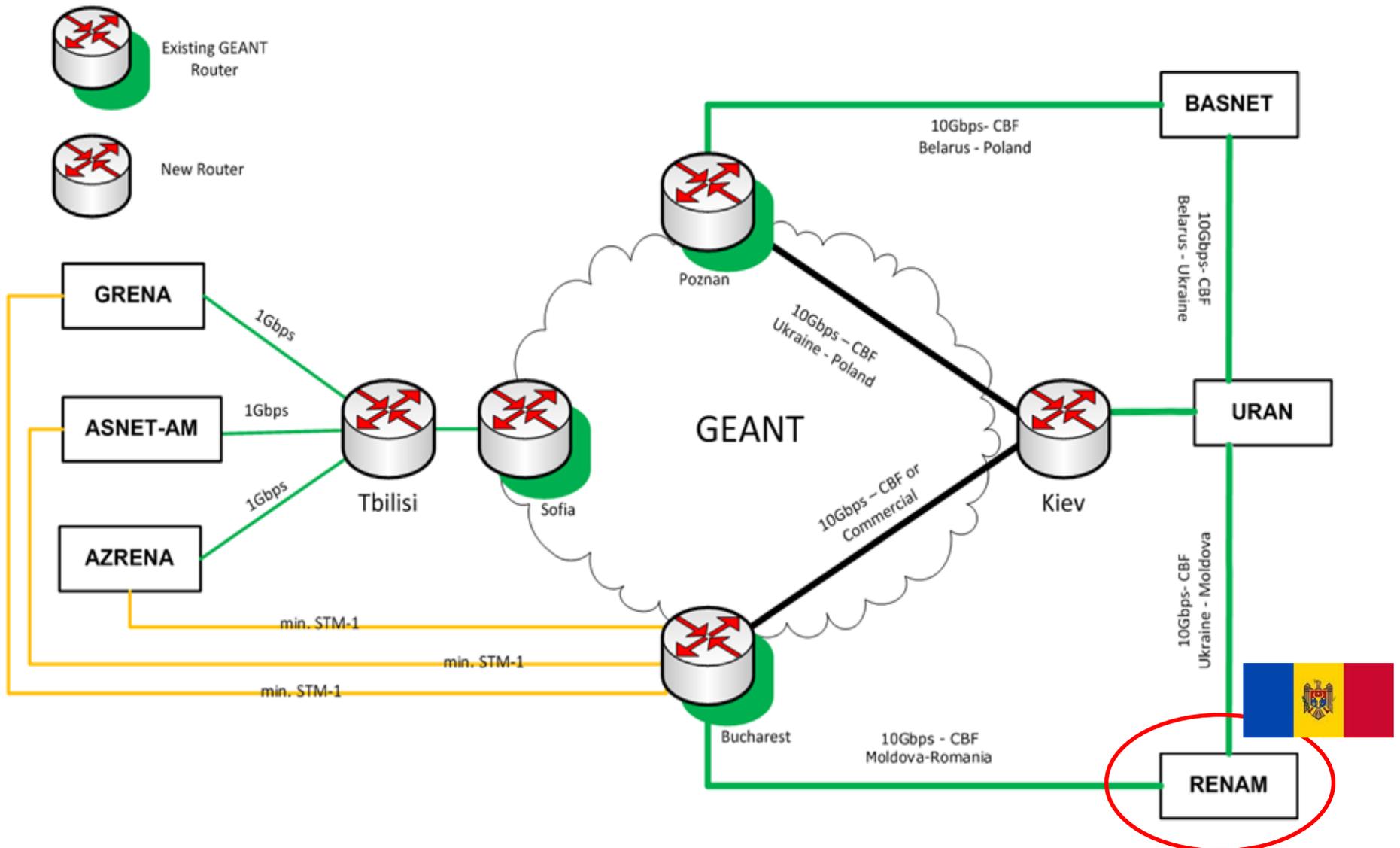


EaP NRENs' connections and basic services (www.geant.org/activities/compendium, 2016)

	Number of Users	Universities + Research Institutes	International Connectivity Mbit/s	Backbone Capacity Gbit/s	Eduroam	Digital Certificate
Armenia ASNET-AM	48	37	45 GÉANT + 200	1	yes	CA
Azerbaijan AzRENA, AzScience Net	49	45	45 GÉANT + 150	1	yes	
Belarus BASNET	99	69	1000 GÉANT PIONIER	10	yes	CA
Georgia GRENA	45	18	200	1		RA
Moldova RENAM	52	43	10000 GÉANT RoEduNet	1	yes	CA
Ukraine URAN	169	103	500 GÉANT PIONIER +6000	10		CA

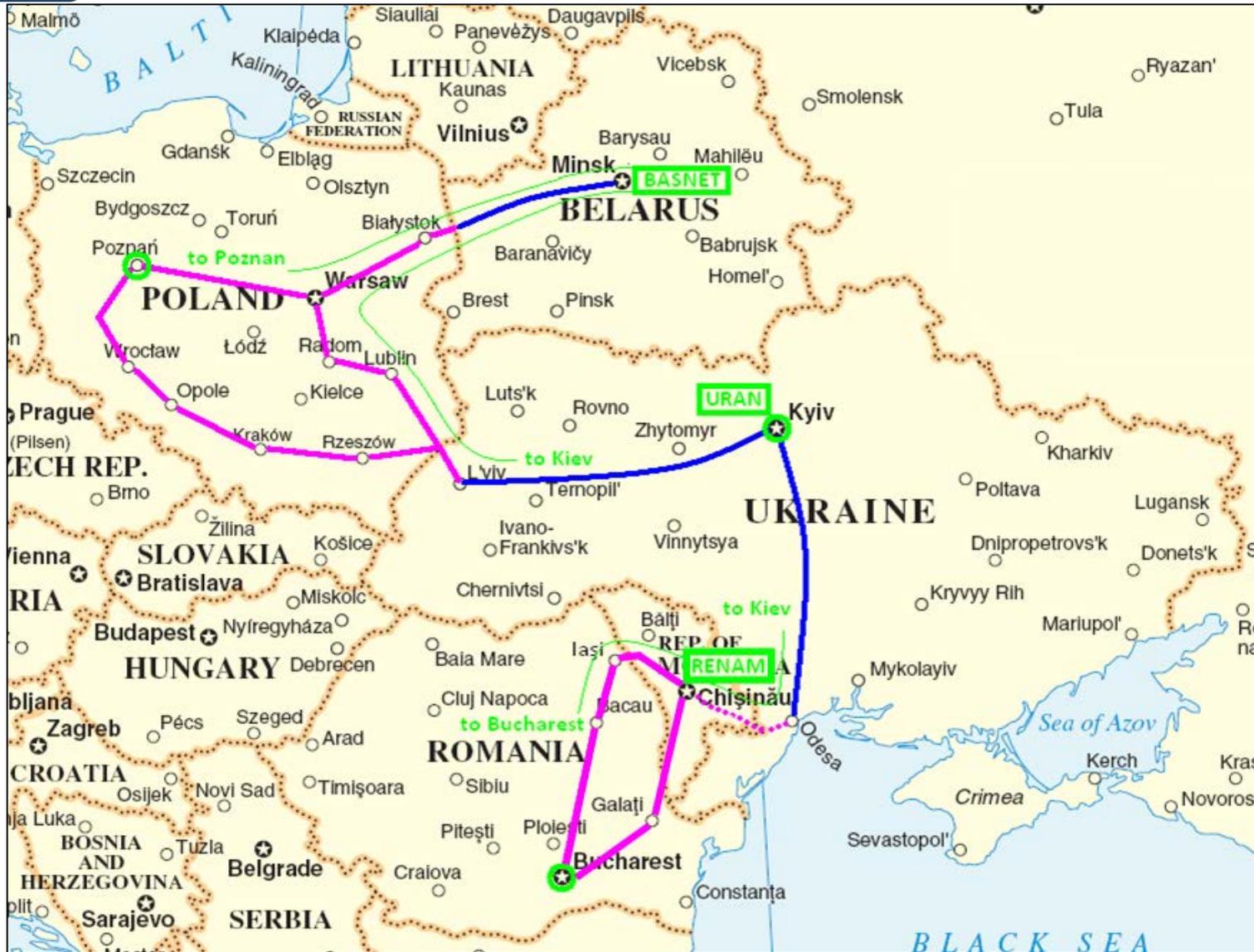


Developing regional connectivity to GEANT (EaPConnect project)





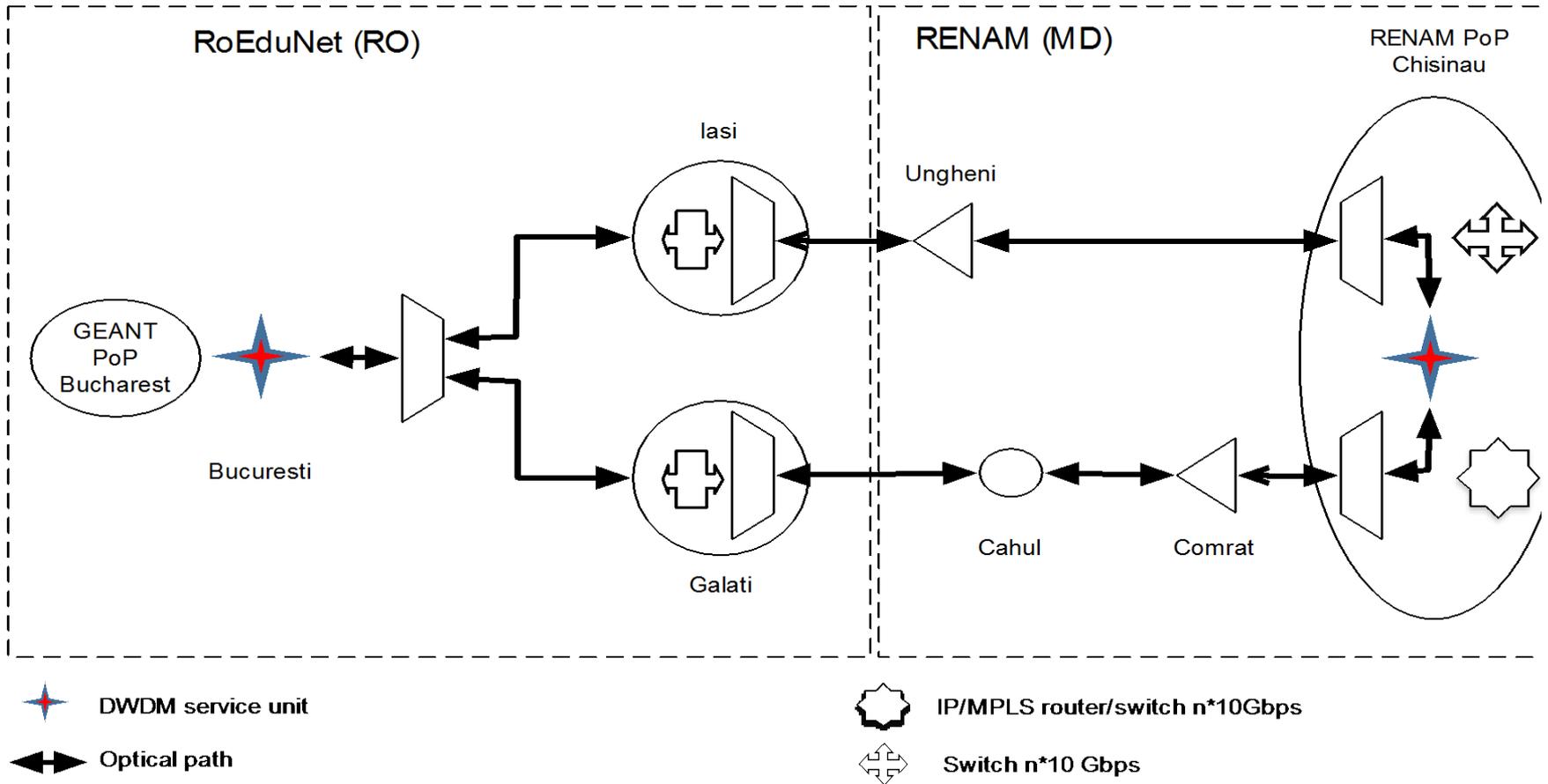
Geographical scheme of EaPConnect CBF connections



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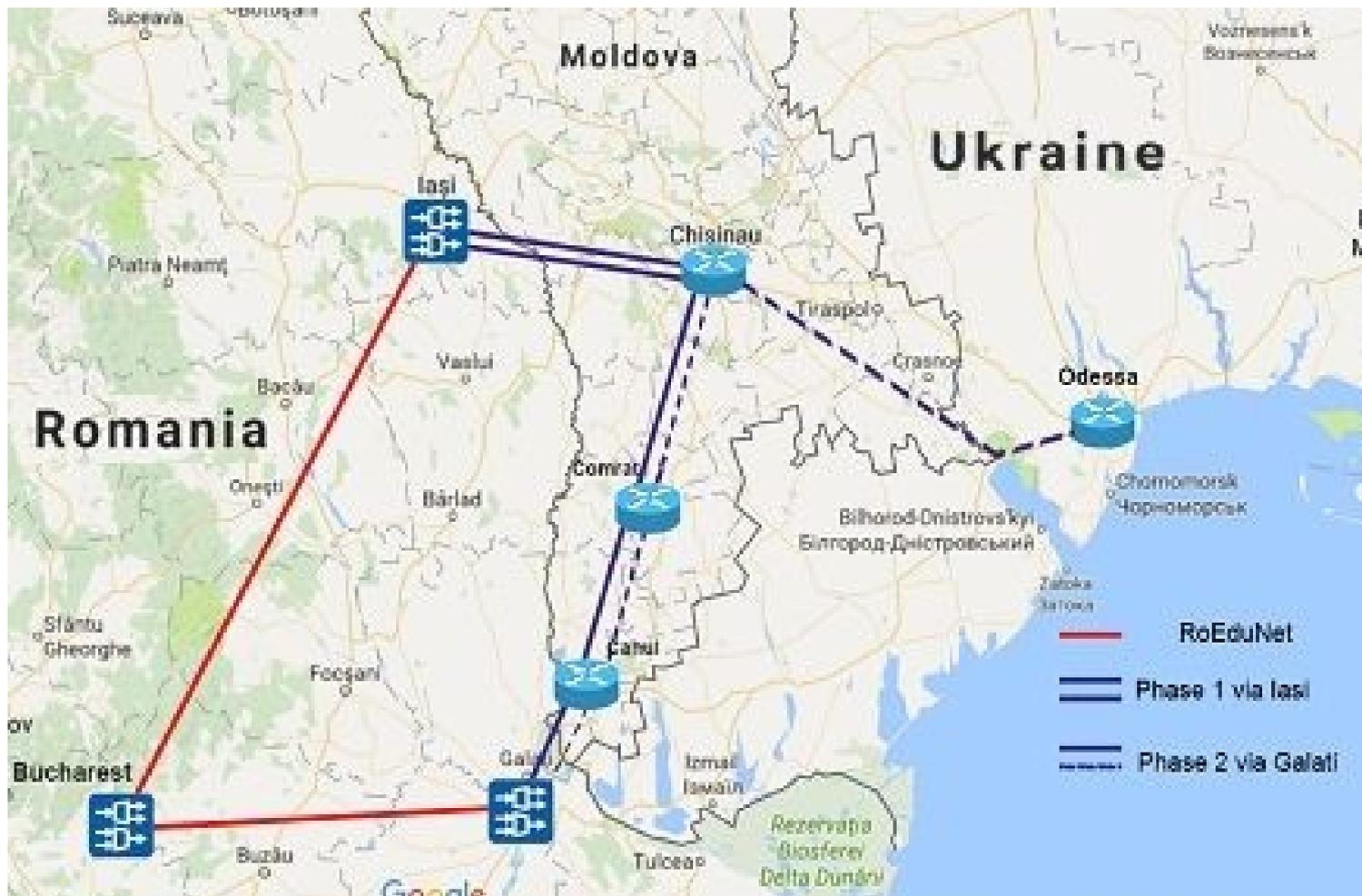


Logical structure of MD – RO connections as a part EaPConnect





Development of regional connections for Moldova (according to EaPConnect project)





RENAM services at national level

- Access to European and worldwide academic networks and global Internet through the GEANT network;
- Provision of broadband (high-speed) connections for national R & E institutions;
- Interconnection of national E & R institutions: UTM, ASEM, ASM, USM, UPSC, USMF "N.Testimițianu", USEM, State University in Taraclia, State University in Cahul, AMTAP, USPEE and others;



Computing resources and services

- **HPC** - High-Performance Computing: National level – HPC clusters in USM and IMI ASM; regional level – via regional Calls for access to regional HPC resources (Bulgaria, Greece, Hungary, Romania);
- **Cloud** resources:
 - National – provided by RENAM;
 - Regional – creating by support of EaPConnect project;
 - Global – provided via GEANT Framework Agreement with leading Cloud providers.
- **GRID** - access to regional distributed computing infrastructure;



Access to GEANT and other internationally available services

- EDUGAIN - Federated Identity Management Service, using the global inter-federation mechanism;
- EDUROAM (WiFi network mobility service) - Secure Wi-Fi network access worldwide;
- Access to HPC resources of European computing infrastructures that available via regional or/and specific Calls organized by EaPConnect project for porting and running of applications for connected to RENAM institutions;
- Access to world-class cloud infrastructure resources (Amazon, Microsoft, CloudSigma, etc.) through the GEANT Framework Agreement to get different cloud resources using Federated Access.



Conclusions

The development of the e-Infrastructure of the RENAM network, which marks a new generation of integrated resources and services, and also forms a new environment for research and education in Moldova. (Реализация проекта EaPConnect означает: Развитие e-Инфраструктуры сети RENAM и формирование новой среды для научных исследований и образования в Молдове, которое знаменует собой новое поколение интегрированных ресурсов и услуг.)



Announcement

- In Chisinau, from October 17 to October 18, 2018, the International Conference "The 3rd Eastern Partnership E-Infrastructures Conference EaPEC 2018" will be held, organized under the EaPConnect project, by GEANT and RENAM.
- For more information, please visit the conference website:

<https://www.eapconference.org/eapec2018>



Спасибо!

Thank you!



RENAM Association, Chisinau, Moldova

www.renam.md