THE ONLY EUROPEAN COUNTRY WITHOUT A NREN

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RIPE NCC
RIPE NETWORK COORDINATION CENTRE

THE ONLY EUROPEAN COUNTRY WITHOUT A NREN

- Bosnia and Herzegovina remained the only European country without a NREN.

- This presentation will give a critical review of failed attempts to establish NREN, and try to identify the obstacles and reasons for their failure.

- The challenges varied from political and administrative to technological.

- As one of the participants in the establishment of Biharnet in 1998 and connecting public universities into a fiber-optic WAN in 2008, I would like to share the experiences, to analyze the reasons why these infrastructures failed to succeed, and what is needed to establish a NREN in Bosnia and Herzegovina.

NREN

- A National Research and Education Network (NREN) is a dedicated Internet infrastructure and service provider to the research and educational communities within a country (definition from www.geant.org).

- NRENs provide connectivity and services to universities and research institutes, but can also support schools, libraries, museums and other public institutes.

- In some cases, services are provided to other sectors: government, healthcare.

- The primary focus of all NRENs is to connect research and educational institutions.

- The most famous service: eduroam (global academic single-account connectivity)

TYPES OF INSTITUTIONS CONNECTED

source: www.geant.org
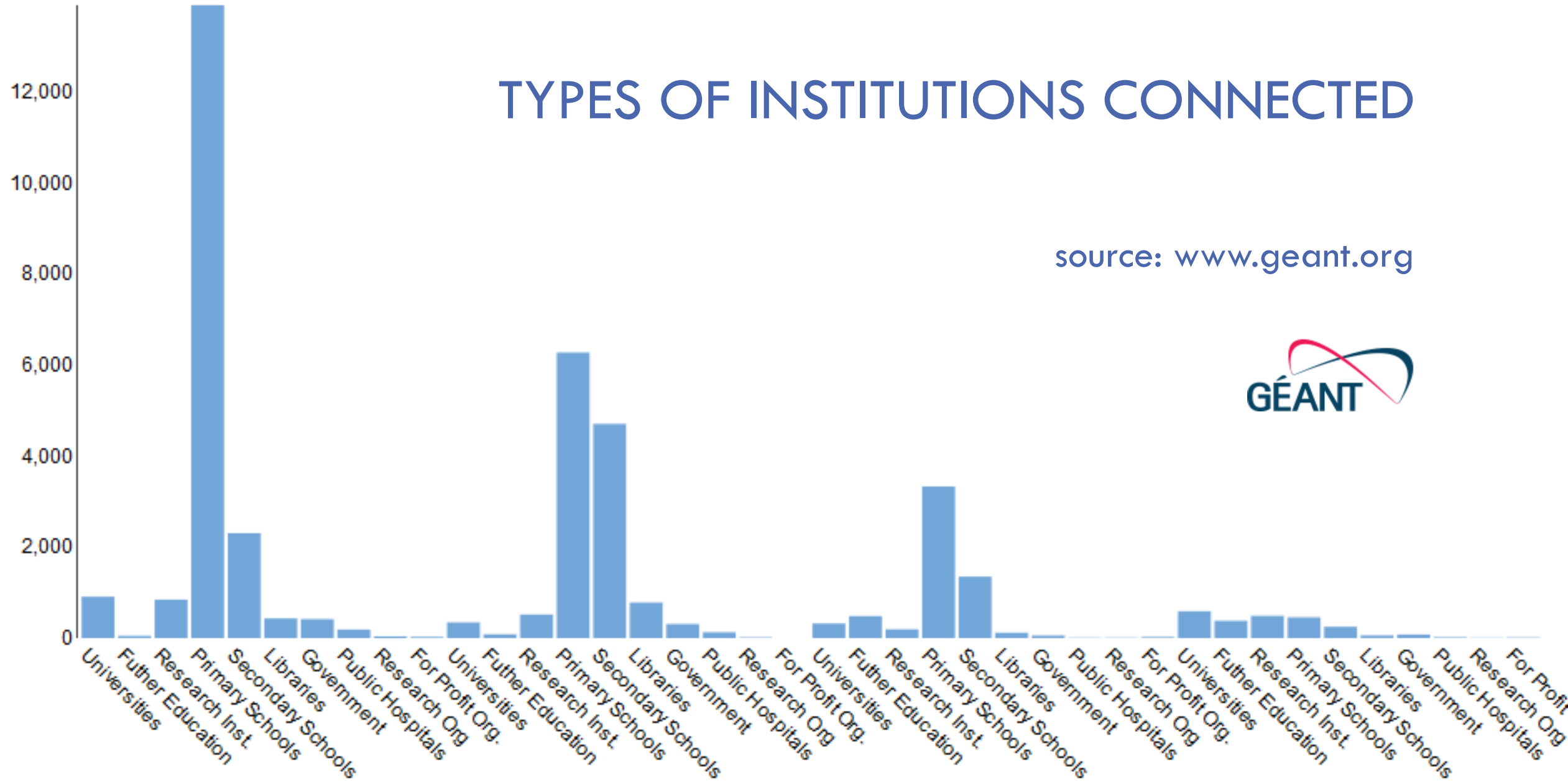
GÉANT membership

NATIONAL MEMBERS

1 per country

REPRESENTATIVE MEMBER

NORDUnet

RHnet (Iceland)

SUNET (Sweden)

UNINETT (Norway)

CSC (Finland)

DeIC (Denmark)

ASSOCIATES

ADVA Optical Networking

Alcatel-Lucent

Ciena Corporation

CERN

Cisco Systems

Coriant GmbH

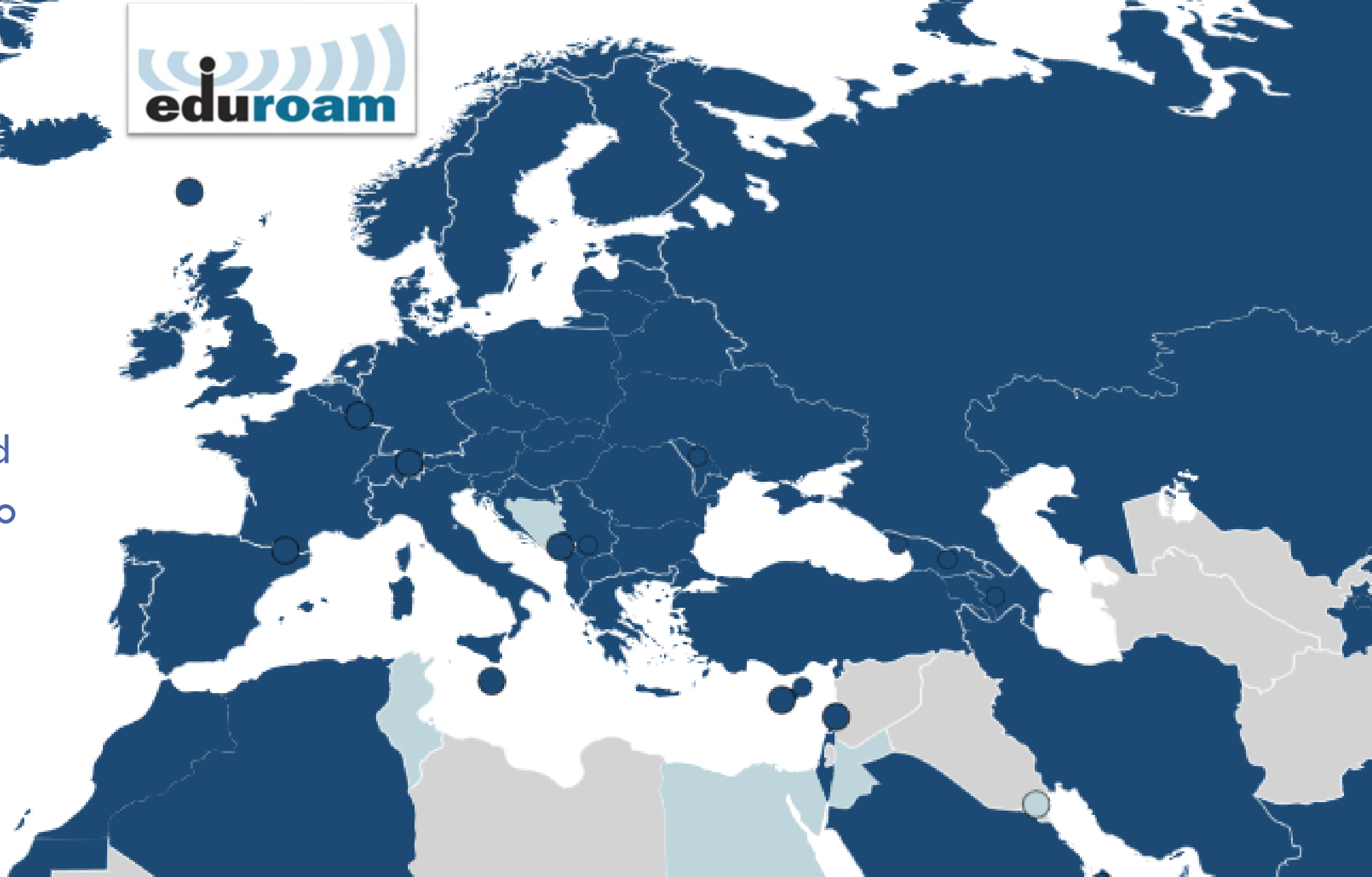ECI Telecom GmbH

EMBL

European Space Agency

Google UK Ltd

Level 3 Communications

ownCloud

NORWAY
UNINETT

SWEDEN
SUNET

FINLAND
CSC

ESTONIA
EENet

LATVIA
Ministry of Science and Education

LITHUANIA
LITNET

BELARUS
UIIP NASB

DENMARK
DeIC

IRELAND
HEAnet

NETHERLANDS
SURFnet

GERMANY
DFN

POLAND
PCSS

UNITED KINGDOM
Jisc

BELGIUM
Belnet

LUXEMBOURG
RESTENA

CZECH REPUBLIC
CESNET

UKRAINE
URAN

SLOVAKIA
SANET

AUSTRIA
ACOnet

HUNGARY
KIFÜ

MOLDOVA
RENAM

FRANCE
RENATER

SWITZERLAND
SWITCH

SLOVENIA
ARNES

ROMANIA
RoEduNet

CROATIA
CARNet

SERBIA
AMRES

ITALY
GARR

MONTENEGRO
MREN

BULGARIA
BREN

GEORGIA
GRENA

ALBANIA
RASH

MACEDONIA
MARnet

SPAIN
RedIRIS/RED.ES

ARMENIA
ASNET-AM

AZERBAIJAN
ANAS

PORTUGAL
FCT|FCCN

TURKEY
ULAKBİM

GREECE
GRNET

Pilots only in Mostar (FIT) and Sarajevo (UTIC)

BOSNIA AND HERZEGOVINA

- Extremely complex government structure: 13 ministries for education?!?

- There is no national R&D authority – ministry, agency, council,...

- Strategies suggested establishment of National Agency for information society - there was no political will; agency established in RS.

- 50 higher education institutions (9 public, 41 private)

- Internet penetration rate: 75% (Digital Global 2018) EU: 77%, worldwide: 53%

- No national research and education network (NREN).

ATTEMPT 1.0: BIHARNET

- In 1998, Slovenian government provided 1.5M EUR to establish a NREN in Bosnia and Herzegovina: BIHARNET (BIH Academic and Research Network).

- The project was implemented by IZUM (Institute of Information Science) from Maribor, Slovenia.

- A governing body was established jointly by 5 public universities.

- 2 Mbps HDSL leased-line links connected universities in Sarajevo, Tuzla, Banja Luka, Mostar (2 universities), Zenica and Bihać, connected to Slovenian ARNES.

- After the initial funding was spent, the founders should have continue to finance the project.

ATTEMPT 1.0: BIHARNET

- Obstacles came from the founding universities – there was no will to fund NREN, universities expected the government(s) to support the project.

- University of Sarajevo considered BIHARNET as a "competition" to their academic network, established by UTIC (University TeleInformatic Center).

- Dispute over the authority for .ba domain: UTIC vs. BIHARNET.

- University of Banja Luka insisted on establishment of .rs.ba subdomain.

- Telecom operators jumped in as internet providers for universities.

- Despite numerous attempts to make it work, BIHARNET ceased to exist in 2000.

ATTEMPT 1.1: SARNET

- When the government of RS decided to sell the telecom operator, a set of leased-line inter-city links was excluded and given to regional REN – SARNET.

- Intitially, SARNET offered the registration of the domain .rs.sr (Republika Srpska – Surinam), since .rs.ba was unavailable until 2001.

- SARNET is connected to SEEREN - GEANT over Serbian NREN AMRES.

- www.akademska.net   78.28.128.0/18
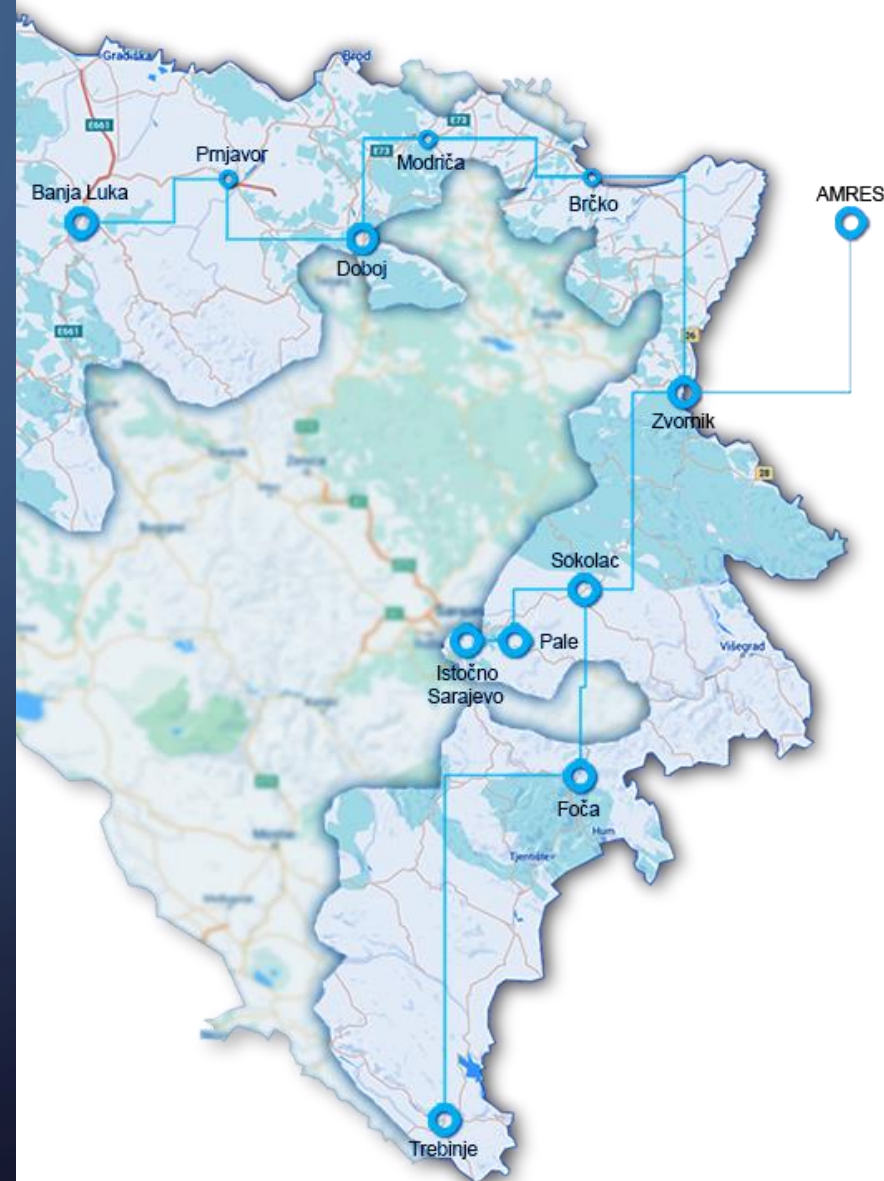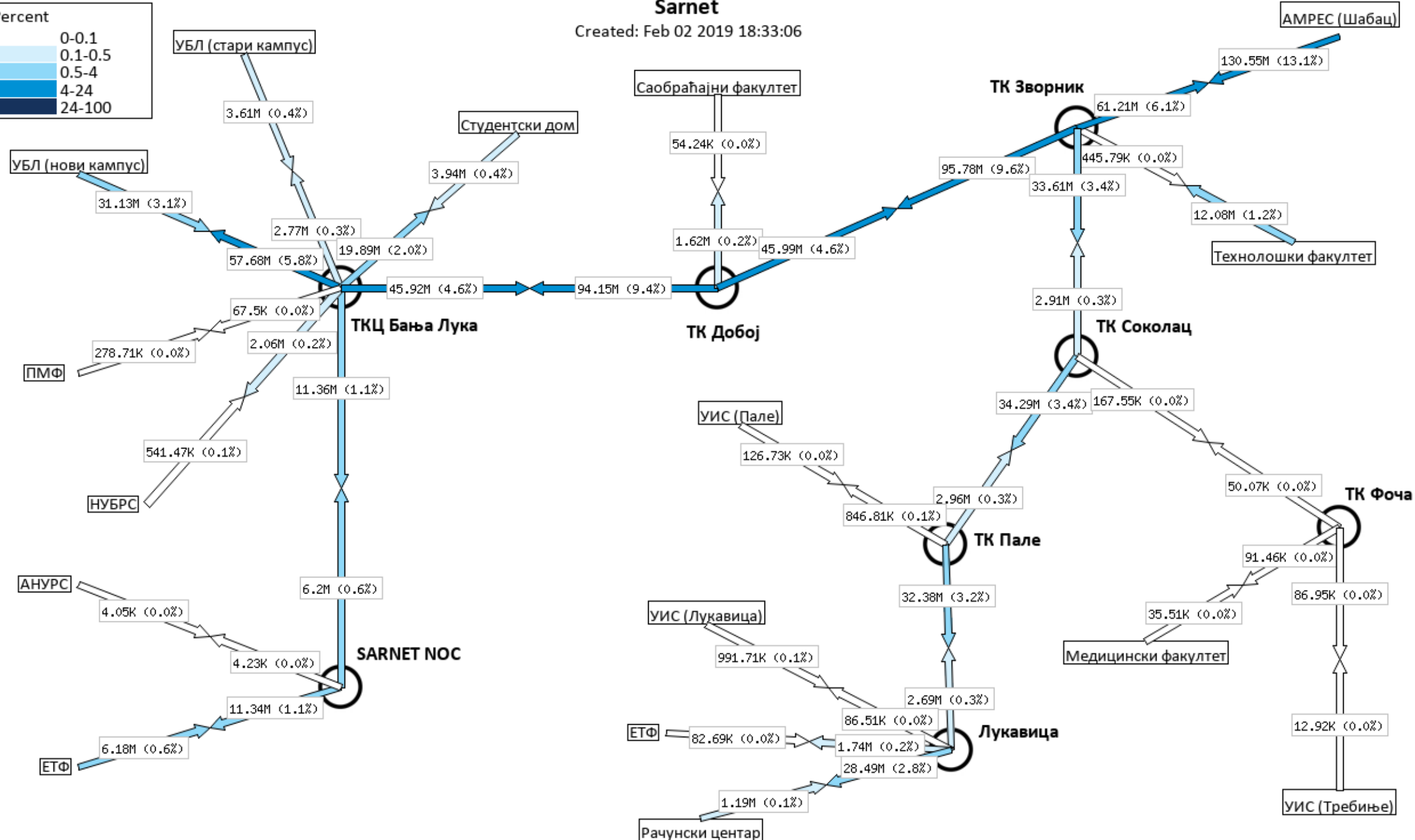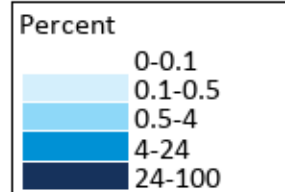
ATTEMPT 1.2: UTIC

- University TeleInformatic Centre (UTIC) was established in 1996 within the University of Sarajevo as a first Bosnian ISP.
- Acting as the official registrar for domain .ba
- Connecting educational institutions (faculties, schools, libraries, institutes) in canton Sarajevo.
- Providing services such as ISSS (Student Information System), web/mail hosting,...
- Connected to two commercial ISPs.
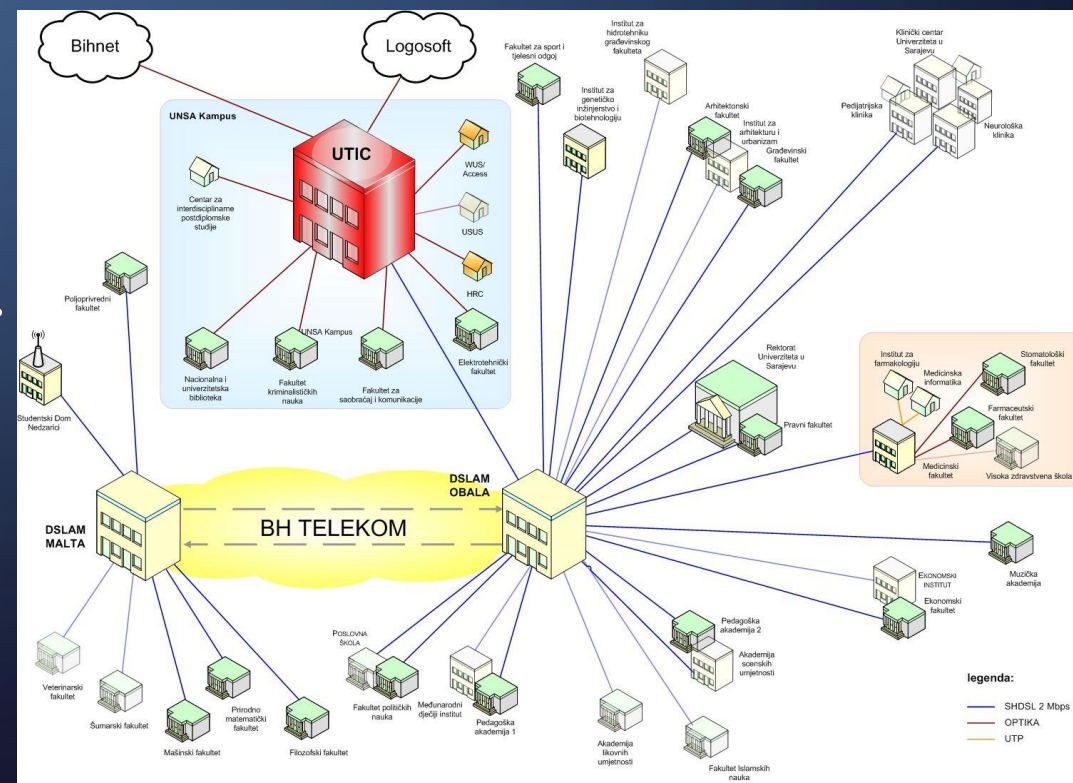
ATTEMPT 2.0: FARNET
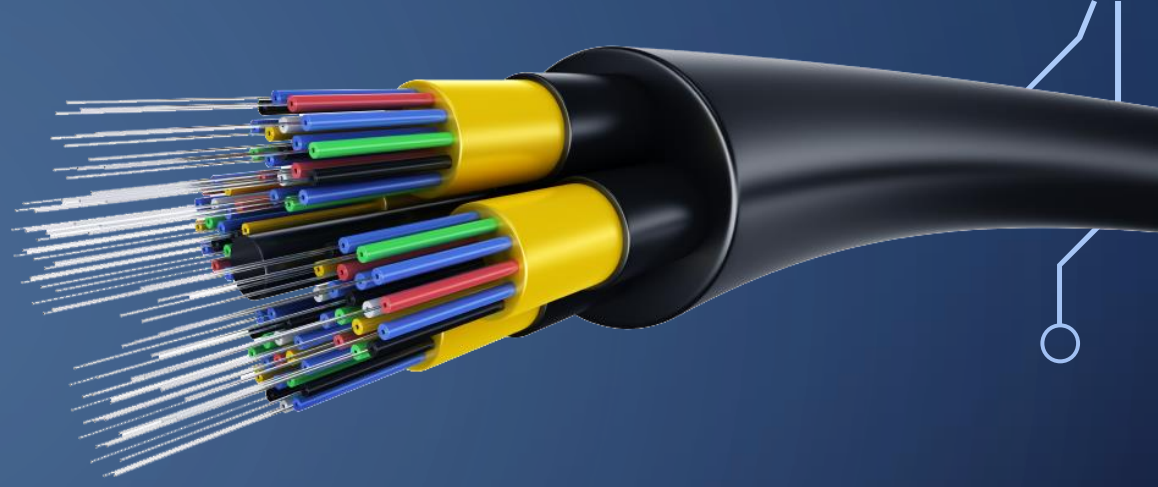
- In 2008, federal ministry for education and and science provided funding to connect 5 public universities in the FBiH with 100 Mbps optical cables.

- The idea was to make the network which would be connected to SARNET and further to AMRES in Serbia, CARNET in Croatia and GEANT.

- The universities installed the equipment, national telecom provided the optical inter-city links (Sarajevo-Mostar-Zenica-Tuzla-Bihać), and the network was tested: result PING between Mostar and Zenica was 2ms.

- Unfortunately, the Ministry forgot to establish the governing body, which would be in charge of netwrok maintenance and IP address allocation.

WHAT SERVICES COULD NREN OFFER?

- Connection to GEANT

- Eduroam

- Library information system (www.cobiss.ba)

- Research registries and databases (www.registar.nub.ba, e-cris.bh.cobiss.net, e-cris.rs.cobiss.net)

- National CERT (Computer Emergency Response Team)

- IPv6 implementation

- National domain .ba registration and DNS

POLITICAL OBSTACLES

- Science and research were excluded from jurisdiction distribution in Dayton; RS and cantons are in charge of education.

- There is an unconstitutional ministry in FBiH (Ministry for education and science)

- Despite common attitudes, political obstacles come from both Federation B&H and Republika Srpska.

- Official politics in RS: there is no way to establish any institution on national level which was not mentioned in Dayton Peace Accord.

- Official politics in FBiH: blame RS for everything, no compromise, avoid financing on Federal level, transfer all financial burdens to cantons.

ADMINISTRATIVE OBSTACLES

- BIHARNET failed because its official founders (5 public universities) refused to co-finance that institution.

- There is a gap between the public and the private universities (private universities are even excluded from the national Rector's conference).

- FARNET failed because only OSI level 1 was established – physical connection, without designated IP addresses nor governing body.

- Commercial ISPs would like to remain the only providers for educational and research institutions.

TECHNOLOGICAL OBSTACLES

Paket Eduka (isključivo za obrazovne institucije)		
Pretplata za pristupnu brzinu:		
a) 512/512 kb/s	mjesečno	106,47
b) 1024/1024 kb/s		183,69
c) 2048/2048 kb/s		343,98
d) 512/128 kb/s (*)		17,55
e) 1024/256 kb/s (*)		31,59
f) 2048/256 kb/s (*)		46,80
g) 4096/512 kb/s (*)		87,75
h) 10/10 Mb/s		1.409,85

- Commercial ISPs offer limited connectivity.

- Telecoms offer fixed IP addresses, but the costs are insanely high.

- Cable TV providers offer high speed at low cost, but no fixed IP addresses

- Implementation of 4G and 5G is still lagging

- Cloud computing (virtualization) reduces need for dedicated on-site servers, thus reducing the needed address space.

- IPv6 is considered a "distant future".

FUTURE CHALENGES

- To overcome political obstacles,
  only a strong attitude from the international actors is needed.

- To overcome administrative obstacles, the regulatory bodies should act (RAK)

- It is important to use what's already there – services, databases, infrastructure, people, expertise, contents,...

- It is essential to overcome the lack of expertise and to raise awareness, primarily in academic community.

- Current actors should cooperate, not compete.