

ASNET
.am

ACADEMIC
SCIENTIFIC RESEARCH
COMPUTER NETWORK
OF ARMENIA

Networking & Cloud Services

Distributed Computing Infrastructure

Federated Identity Service

Multimedia Services

e-Learning

Scientific Databases Development

Academic Scientific Research Computer Network of Armenia (ASNET-AM)

is the National Research and Education Network (NREN) of Armenia. **ASNET-AM** was created in 1994 and since then is engaged in active and productive activities in the area of Networking and Information Technologies.

The main aim of **ASNET-AM** is to provide state-of-the-art networking, computing and data solutions to the Academic, Scientific, Research, Educational, Cultural and other organizations of Armenia and beyond, which are preliminary engaged in scientific and educational activity.

Nowadays **ASNET-AM** network interconnects 65 academic, scientific, research, educational, cultural and other organisations in 5 cities and locations of Armenia, integrating them with **GÉANT** pan-European network.

The structure and policy of **ASNET-AM** operation was developed and implemented by the **Institute for Informatics and Automation Problems (IIAP) of the National Academy of Sciences of the Republic of Armenia (NAS RA)**.

IIAP NAS RA is responsible for administration and the development of **ASNET-AM** since 1998 by decision of the Presidium of **NAS RA**. **ASNET-AM** network operates on the basis of **IIAP NAS RA** as a joint structure of several scientific centers and departments within **IIAP NAS RA**. **ASNET-AM** staff members at the same time are scientists and engineers of **IIAP NAS RA**.

ASNET-AM provides services to the users (scientists, scientific and technical associates, postgraduates, students, etc) from 50 Scientific Research Organizations, 5 State Structures and 10 major Universities of Armenia. **ASNET-AM** is equipped with technical and information resources to provide users with high quality and high-speed connection and services.

ACTIVITIES

The activities of **ASNET-AM** cover such aspects as:

- Scientific Investigations in ICT
- Distributed Computing Infrastructures (DCI)
- Scientific Computations
- Database Development and Processing for Scientific Calculations
- Participation and Support of Scientific, Educational, Technical, Cultural and other projects
- Development and implementation of network management and security technologies
- IT Training and Distance Learning

FINANCIAL SUPPORT

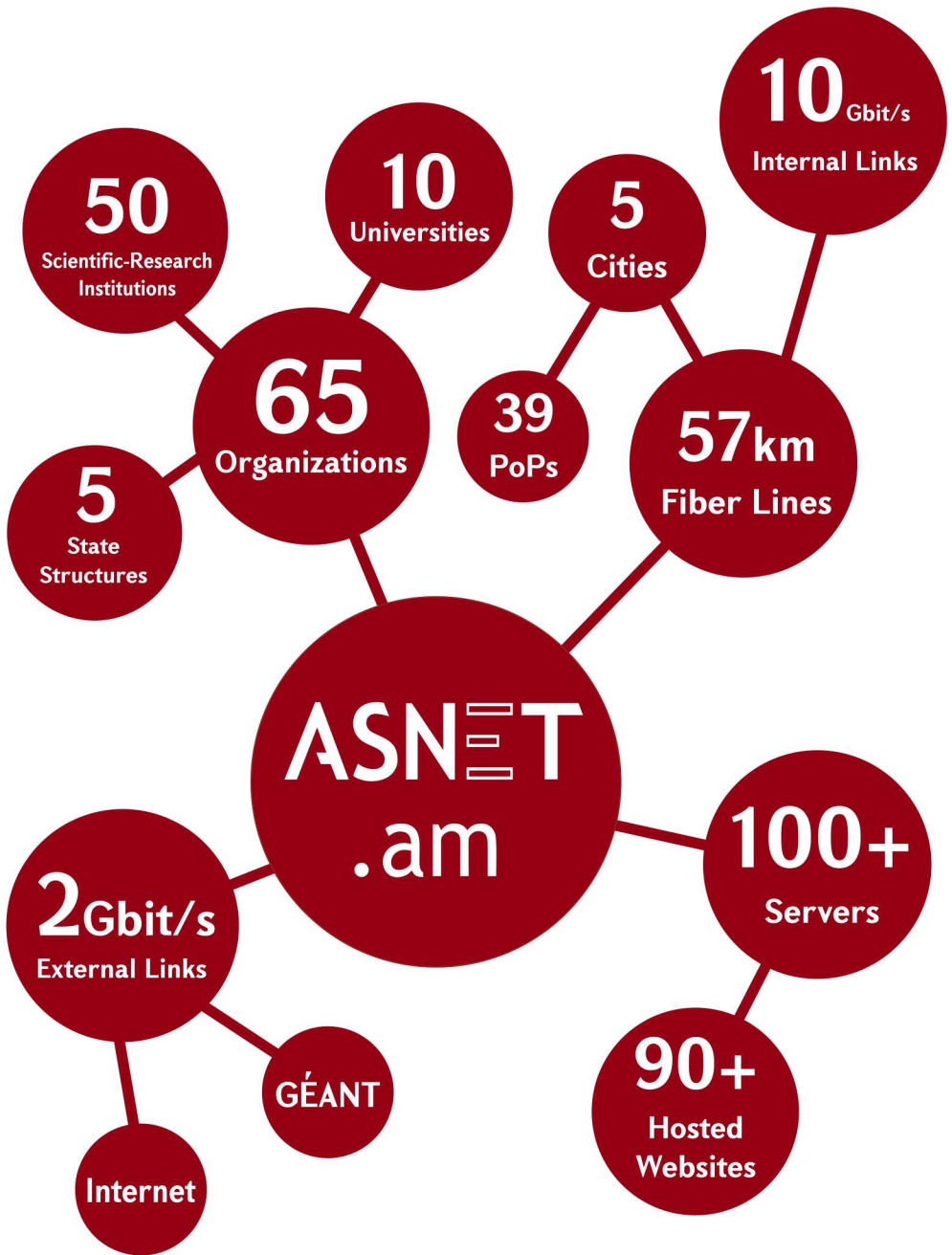
ASNET-AM network structure and services have been implemented due to the financial support from:

- The Government of the Republic of Armenia
- G. Gulbenkian Foundation
- Armenian General Benevolent Union (AGBU)
- Hayastan All Armenian Fund

and many other international Projects.

Recognizing the role of **ASNET-AM** as Armenian NREN the **State Committee of Science of the Ministry of Education and Science of Armenia** provides permanent financial support for **ASNET-AM** operation.





SERVICES

Distributed Computing Infrastructure

- ArmCluster
- ArmGRID

Multimedia Services

- Streaming
- Videoconferencing
- VoIP

Federated Identity Service

- AFIRE Federation

Training & Software Development

- e-Learning
- Specialized training and consulting
- Scientific research tools development
- Distributed parallel computing
- software packages development

Networking & Cloud Services

- DNS
- VPN
- Proxy
- Filesender
- Eduroam.am
- Cloud Storage
- Web Hosting
- Web Resources Mirroring
- E-mail, Webmail, Mailing Lists
- Scientific Publications Resources
- Mobile Broadband 3G Access
- SMS Notification Services
- Network Time Services
- Network Monitoring
- Speedtest

FEDERATED IDENTITY MANAGEMENT

Armenian Federation Identity for Research and Education (AFIRE) is an Identity Federation for the research and education community of Armenia. Through AFIRE users keep their identity information at the home institution and can access services offered by the institutions participating in the Federation.

Since 2015, AFIRE is a member of GÉANT eduGAIN Interfederation Service, as well as of REFEDS Initiative, which interconnect identity federations around the world, simplifying access to content, services and resources for the global research and education community.



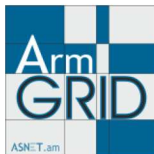
afire.asnet.am

HIGH-PERFORMANCE COMPUTING (ArmGRID)

ArmGRID service provides the Armenian scientific community with a High-Performance Computing Clusters located in the leading research institutions and educational organizations, enabling research in various areas of e-Science.

It enables the possibility to carry out scientific research and experiments based on simulations and large-scale calculations using the computational resources, as well as convenient access to distributed computing resources.

Since 2012 the ArmGRID Infrastructure has been a part of a pan-European infrastructure built in the framework of the EGI (European Grid Initiative) Project.



www.grid.am



INFRASTRUCTURE

Major **ASNET-AM** PoPs:

Presidium of NAS RA /Yerevan/
Institute for Informatics and Automation Problems of NAS RA /Yerevan/
Scientific Research Institute of Radio Measurements /Yerevan/
Yerevan TV Tower /Yerevan/
Byurakan Astrophysical Observatory of NAS RA /Byurakan/
Institute of Radiophysics and Electronics of NAS RA /Ashtarak/

Over its history **ASNET-AM** always implemented external connectivity to other networks and Internet via multiple connections, providing connectivity redundancy and reliability as well as the improved accessibility for core services.

Current external connections and peerings are:

Armenia-GÉANT Link
AMNIC
ARMIX
Arminco
ArmenTel
Ucom
Rostelecom
Level 3

Current total capacity of all connections to other networks used by **ASNET-AM** is more than 2Gbit/s (including connections to Armenian Internet eXchange, direct peerings with ISPs and connection to **GÉANT**). Fiber-optic connection is used in all the above connections.

NETWORK OPERATIONS CENTER (NOC)

ASNET-AM Network Operations Center (NOC) manages and maintains the backbone data network, external network links & peerings and related services, including network diagrams and traffic statistics.

ASNET-AM NOC Contact Email: noc@asnet.am



ASNET-AM 2018

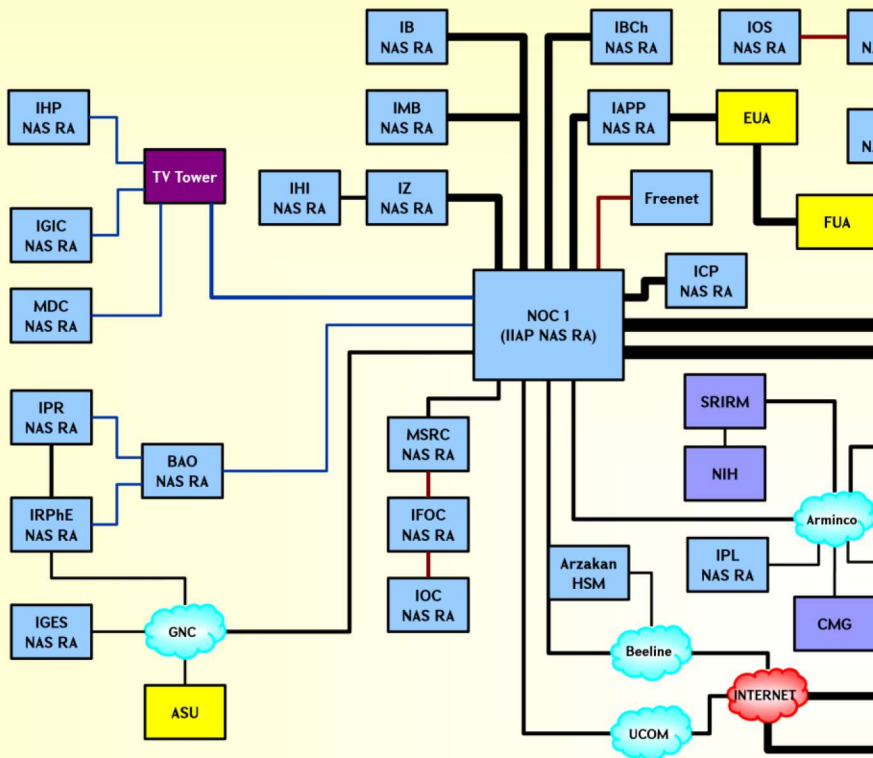
Bandwidth



Connection

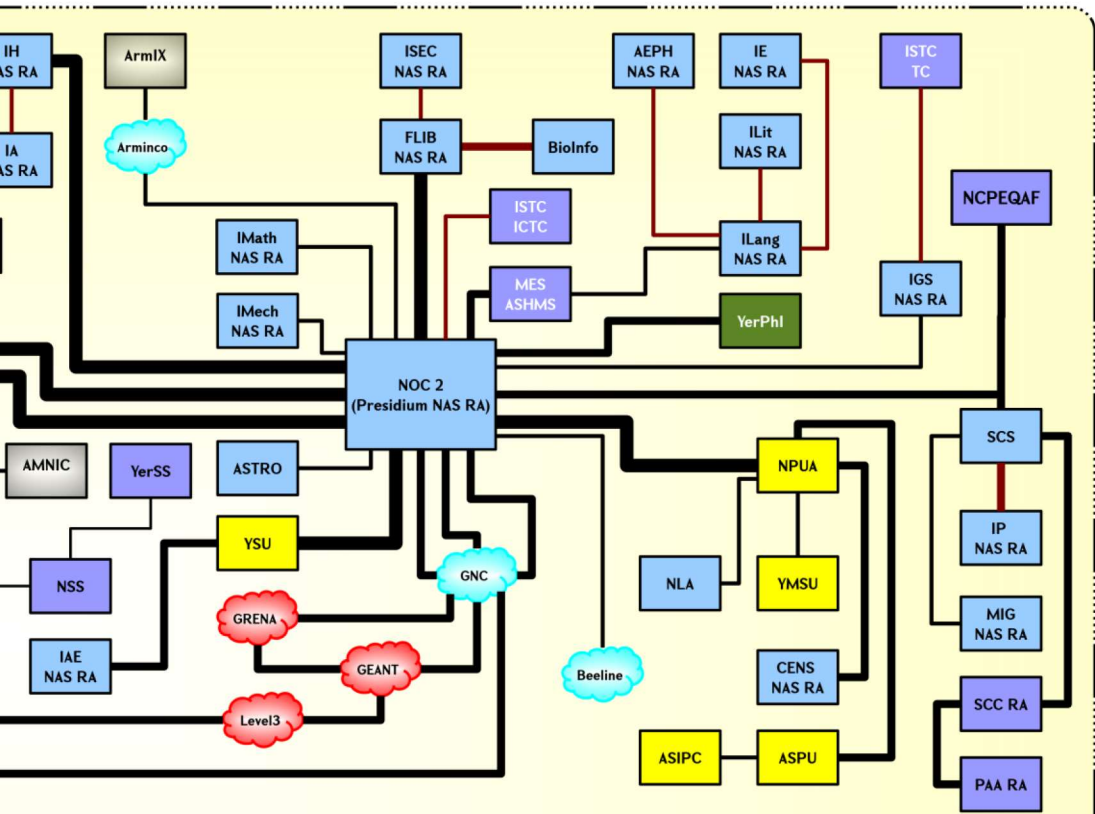


PoP Type



- Presidium of NAS RA
- IMath NAS RA - Institute of Mathematics
- IMech NAS RA - Institute of Mechanics
- IIAP NAS RA - Institute for Informatics and Automation Problems
- BAO NAS RA - Byurakan Astrophysical Observatory
- IRPhE NAS RA - Institute of Radiophysics & Electronics
- IAPP NAS RA - Institute of Applied Problems of Physics
- IPR NAS RA - Institute for Physical Research
- CENS NAS RA - Center for Ecological Noosphere Studies
- IBCh NAS RA - Institute of Biochemistry
- IB NAS RA - Institute of Botany
- IHP NAS RA - G.S.Davtyan Institute of Hydroponics Problems
- MDC NAS RA - Microbial Depository Center
- IMB NAS RA - Institute of Molecular Biology
- IP NAS RA - Institute of Physiology
- IZ NAS RA - Institute of Zoology
- IHI NAS RA - Institute of Hydroecology and Ichthyology
- IFOC NAS RA - Institute of Fine Organic Chemistry of Scientific
- IOC NAS RA - Institute of Organic Chemistry of Scientific
- MSRC NAS RA - Molecular Structure Research Center of Scientific
- ICP NAS RA - Institute of Chemical Physics
- IGIC NAS RA - Institute of General and Inorganic Chemistry
- IGS NAS RA - Institute of Geological Sciences
- IGES NAS RA - Institute of Geophysics and Engineering Seismology
- IH NAS RA - Institute of History
- IPL NAS RA - Institute of Philosophy and Law
- IE NAS RA - Institute of Economics
- IAE NAS RA - Institute of Archaeology and Ethnography
- IOS NAS RA - Institute of Oriental Studies
- ILang NAS RA - Institute of Language
- ILit NAS RA - Institute of Literature
- IA NAS RA - Institute of Art
- MIG NAS RA - Museum-Institute of Genocide
- AEPH NAS RA - Armenian Encyclopaedia Publishing House





- NSS – National Statistical Service
- Arzakan HSM – House of Scientific Meetings “Arzakan”
- ASU – Artsakh State University
- Freenet.am - Armenian Freenet
- CMG – Center of Medical Genetics and Primary Health Care
- SRIRM – Scientific Research Institute of Radio Measurements
- ISEC NAS RA - International Scientific-Educational Center
- BioInfo – BioInformatics Center
- FLIB NAS RA – Fundamental Library
- NLA – National Library of Armenia
- YMSU – Yerevan State Medical University
- NPUA – National Politechnic University of Armenia
- ASPU – Armenian State Pedagogical University
- ASIPC – Armenian State Institute of Physical Culture
- NCPEQAF – National Center for Professional Education Quality Assurance foundation
- YSU – Yerevan State University
- SCS – State Committee of Science
- SCC – Supreme Certifying Committee of RA
- ISTC TC – ISTC Training Center
- ISTC ICTC - ISTC ICT Center
- MES ASHMS – Ministry of Emergency Situations Armenian State Hydrometeorological and Monitoring Service
- YerPhl – Yerevan Physics Institute
- ASTRO – Regional Center for Relativistic Astrophysics Research
- ArmiX - Armenian Internet Traffic Exchange Foundation
- AMNIC - AM Network Information Centre
- GEANT – pan-European data network for the research and education community
- NIH – National Institute of Health
- PAA RA – Public Administration Academy of RA
- EUA – European University of Armenia
- FUA – French University in Armenia



ASNET-AM KEY PERSONNEL



**Vladimir
Sahakyan**

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- > IIAP NAS RA Director
- > ASNET-AM Manager



**Hrachya
Astsatryan**

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- > AFIRE AAI Federation
- > e-Learning
- > ArmCluster/ArmGRID
- > Eduroam.am Service



**Artashes
Mirzoyan**

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- > Hardware Support
- > Backup Storage
- > Cloud Services



**Robert
Tadevosyan**

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- > VoIP & IP-PBX
- > VPN
- > Access Port



**Sergey
Abrahamyan**

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- > Network Security





**Nana
Manukyan**

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> User Support



**Ashot
Baskayants**

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> Broadband Radio Access
> Hardware Procurement



**Eugene
Prokhorenko**

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> Network Connectivity
> Network Routing
> Network Monitoring



**Arthur
Petrosyan**

arthur@sci.am

> Domain Name Service
> E-mail Services
> Proxy Service
> Scientific Publications Access
> Streaming & Conferencing



**Gurgen
Petrosyan**

gurgen@sci.am

> Web Hosting



CONNECTIVITY & ROUTING

ASNET-AM currently uses the following communication technologies for physical connectivity:

Fiber-optic - core and backbone connections

Copper Ethernet - inside buildings

Virtual Tunneling - on top of leased 3rd-party links in case of own link absence.

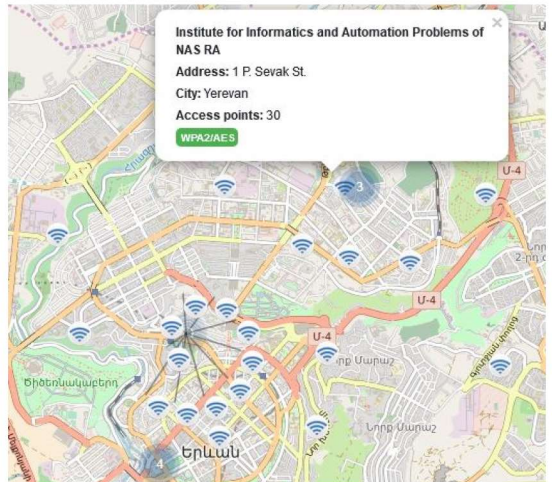
Wireless Radio - in case of wired link absence

WiFi - as a local wireless link inside buildings, conference halls, etc.

eduroam in Armenia is provided as ASNET-AM Service.



www.eduroam.am



ASNET-AM is the Member of **RIPE NCC** (<https://ripe.net>) and as the Local Internet Registry (LIR) manages several IPv4/IPv6 network ranges, as well as Autonomous System (AS) Number. IPv4/IPv6 (dual-stack) routing is implemented. Members are provided with network addresses depending on their needs and requirements.

Member Connectivity & Routing Principles:

Public and Private IP address ranges from /30 to /24.

Public IP addresses for direct Internet connection.

Private IP addresses for internal services and outside link via proxy or specific NAT rules.

OSPF protocol for internal routing

BGP protocol for external connections



INSTITUTE FOR INFORMATICS AND AUTOMATION PROBLEMS
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF ARMENIA

PROJECTS

Projects are grouped by source of main funding:

Ministry of Education and Science

Deployment of **ArmGRID** - Armenian National Grid Infrastructure (2009-2011)
Creation of Armenian State Computing System (2003-2006)

European Commission Framework Programmes (EU FP)

EaPConnect - Eastern Partnership Connect (2015-2020)
GEANT Project's GN4 (2015-2022)
GN3plus-Multi-Gigabit European Academic Network (2013-2015)
EGI-InSPIRE (2010-2014)
HP-SEE (2010-2012)
SEE-GRID-SCI (2008-2010)
BSI-Black Sea Interconnection (2008 -2010)
Porta Optica Study (2006-2007)
NewAdonis ProjectCentre (2004-2005)

Swiss National Science Foundation (SNSF)

ARPEGEO (2009-2012)

Internet Society (ISOC) Community Grants Programmes

Upgrade of Armenia academic (research) network to **IPv6** readiness (2011-2012)

International Scientific Technology Center (ISTC)

Development of **Armenian-Georgian Grid Infrastructure**
and applications in the Fields of High Energy Physics, Astrophysics
and Quantum Physics (A-1606) (2008-2010)
Computing Grid for South Caucasus Region (A-1451) (2007-2009)
ArmCluster-Creation of High-Performance
Computation Cluster in Armenia(A-823) (2003-2006)

United Nations Development Programme (UNDP) and Gulbenkian Foundation

Universal Networking Language (**UNL**) - Armenian Language Server Creation (2002-2006)

National Foundation of Science and Advanced Technologies (NFSAT)

Networking Program for Scientific Infrastructure (2003)

Open Society Foundation (OSI AF) Armenia

NAS RA Libraries Automation and Bibliographic Databases of Publications (2000-2003)
Enrichment of the **National Gallery of Armenia website**(2001)

INTAS

Creation of **Automated System for Data Processing** and
Provision of Access to the Databases of the Fundamental Library of NAS RA
for Armenian scientific organizations (1999)

Armenian General Benevolent Union (AGBU)

Creation of internodal IP-telephony network within **ASNET-AM** (1995-1996)





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