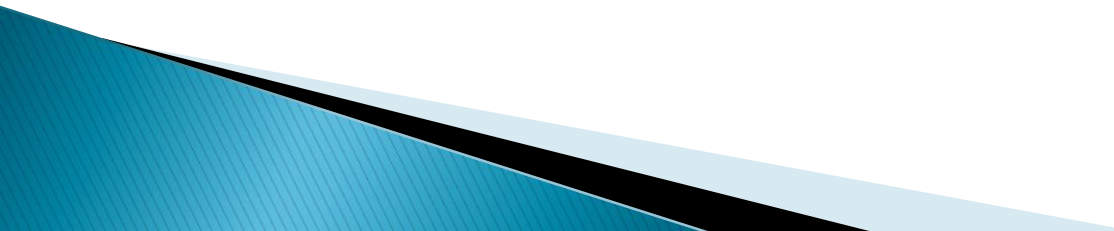


Prerequisites Establishment of a HPDA Centre of Excellence in Armenia

Yuri Shoukourian, Vladimir Sahakyan, Hrachya Astsatryan

3 May, 2018
Yerevan, Armenia

Overview

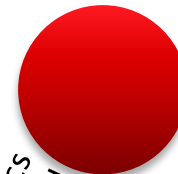
- ▶ History
 - ▶ ICT Sector in Armenia
 - ▶ IIAP
 - ▶ Prerequisites Establishment of a HPDA Centre of Excellence
- 

History: main organizations

1956 (Yerevan Computer
R&D Institute)

1957 (Institute for
Informatics and
Automation Problems of
the National Academy
of Sciences of Armenia)

1957–1979 (Yerevan
State University,
Yerevan Polytechnic
Institute)

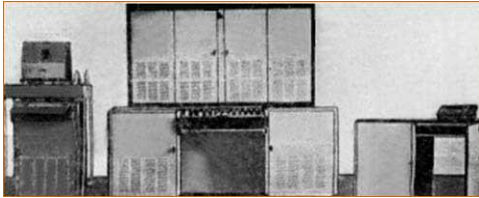


Faculty of cybernetics
and applied
mathematics

Faculty of computer
engineering and
telematics



History: general purpose computers & systems



First Computers
(1958–1961)

- Nairi computers for engineering calculation,
- Family EC ЭBM mainframe IBM compatible systems and middle performance computers

Soft Systems
(1971–1986)

- The Lamp computer (M3, Aragats, 1958–1960)
- The Razdan (first semiconductor chips), 1966
- Razdan–3 machines (>1966).

Small Computers
(1963–1987)



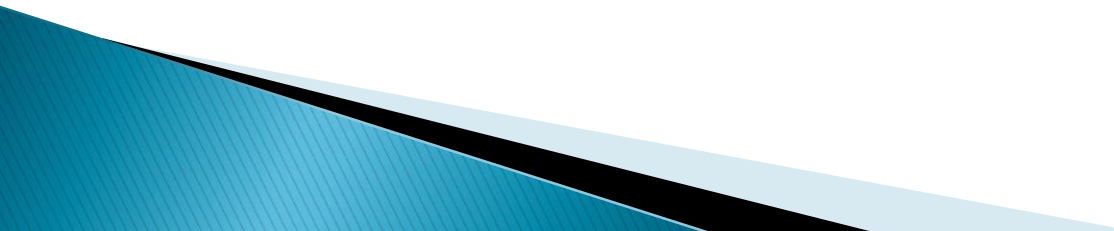
- Development of software systems for NAIRI and EC ЭBM families.
- Development Computer Aided Design System “Autoproekt” for projects of YCRDI.

ICT sector in Armenia: policy

The Information and Communication Technology and the high-tech is one of the rapidly branches of Armenian economy. In 2000, the growing importance of IT industry led the Government to declare ICT one of the priority sectors of Armenian economy:

- 20% annual growth in the past decade.
- About 650 companies operating in ICT enabling Armenia to be a regional leader in IT and high-tech industry.
- 140 companies have been established during 2015–2017.

As a consequence, in 2017, the Armenian Government decided to establish a “Digital Armenia” foundation aiming at deployment of a united digital environment in all the spheres of state administration and providing a favourable IT-assisted environment to businesses.



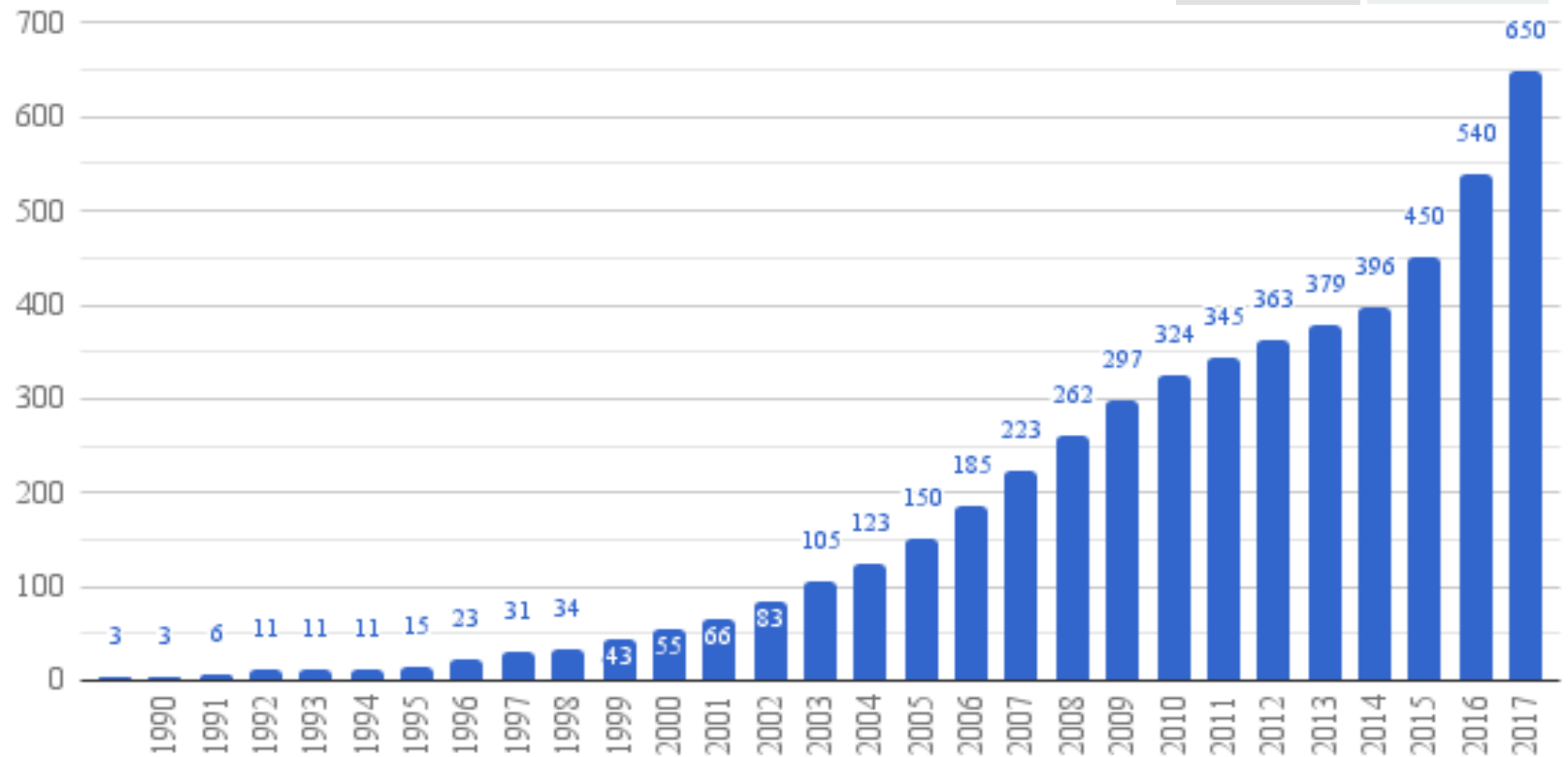
ICT sector in Armenia: numbers

Total number of ICT companies

Shadowmatic



SOLOLEARN
LEARN PLAYING PLAY LEARNING



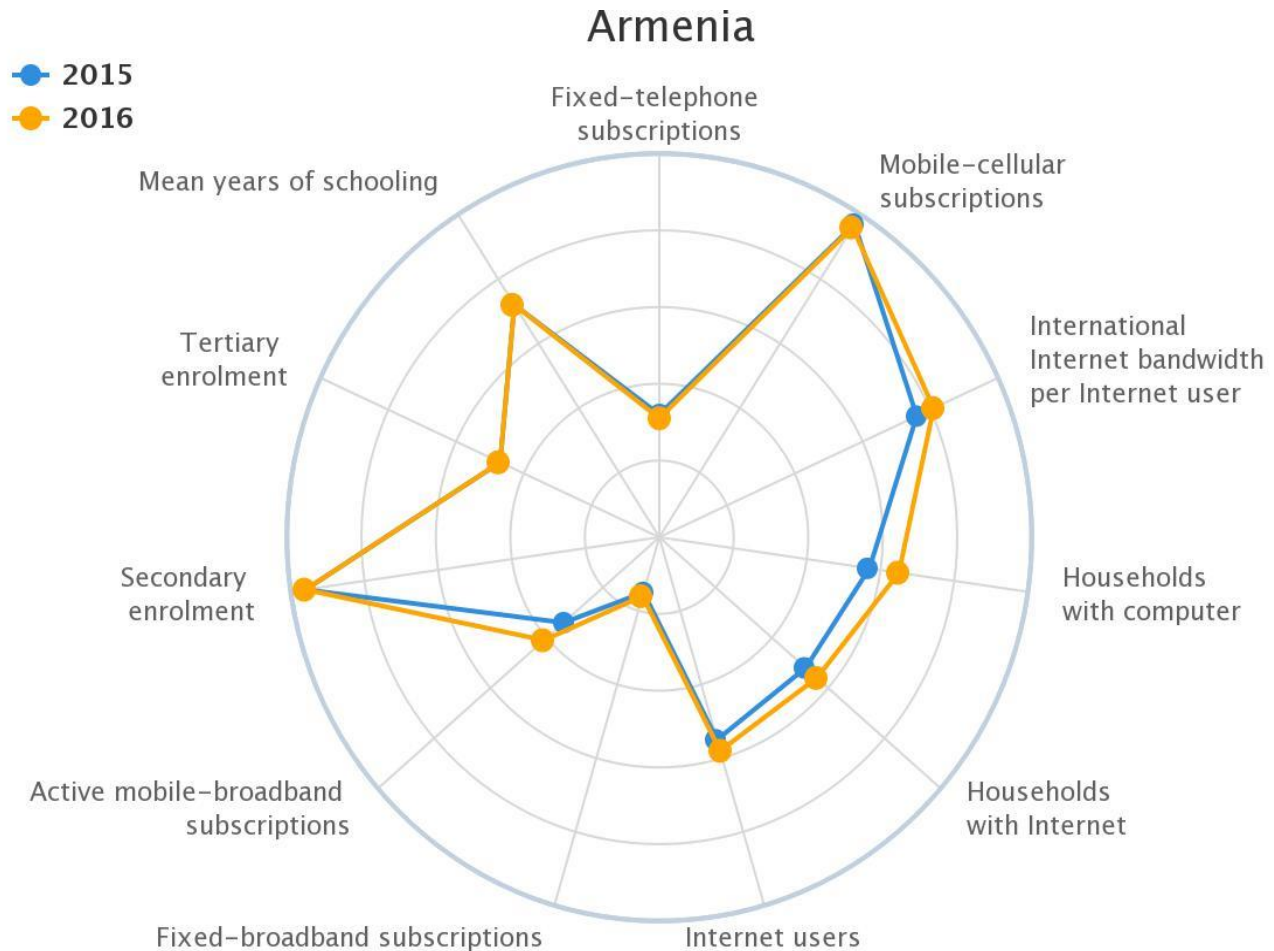
SYNOPSYS

NATIONAL
INSTRUMENTS

Mentor
Graphics

vmware

ICT sector in Armenia: key facts



IIAP: history

Before 1990

- Translator for Algol-60 for machine Razdan-3
- Instrumental software and provided research in computer science

- Transitional period for the technology sector (conflicts, a declining economy and brain drain)

1991–1997

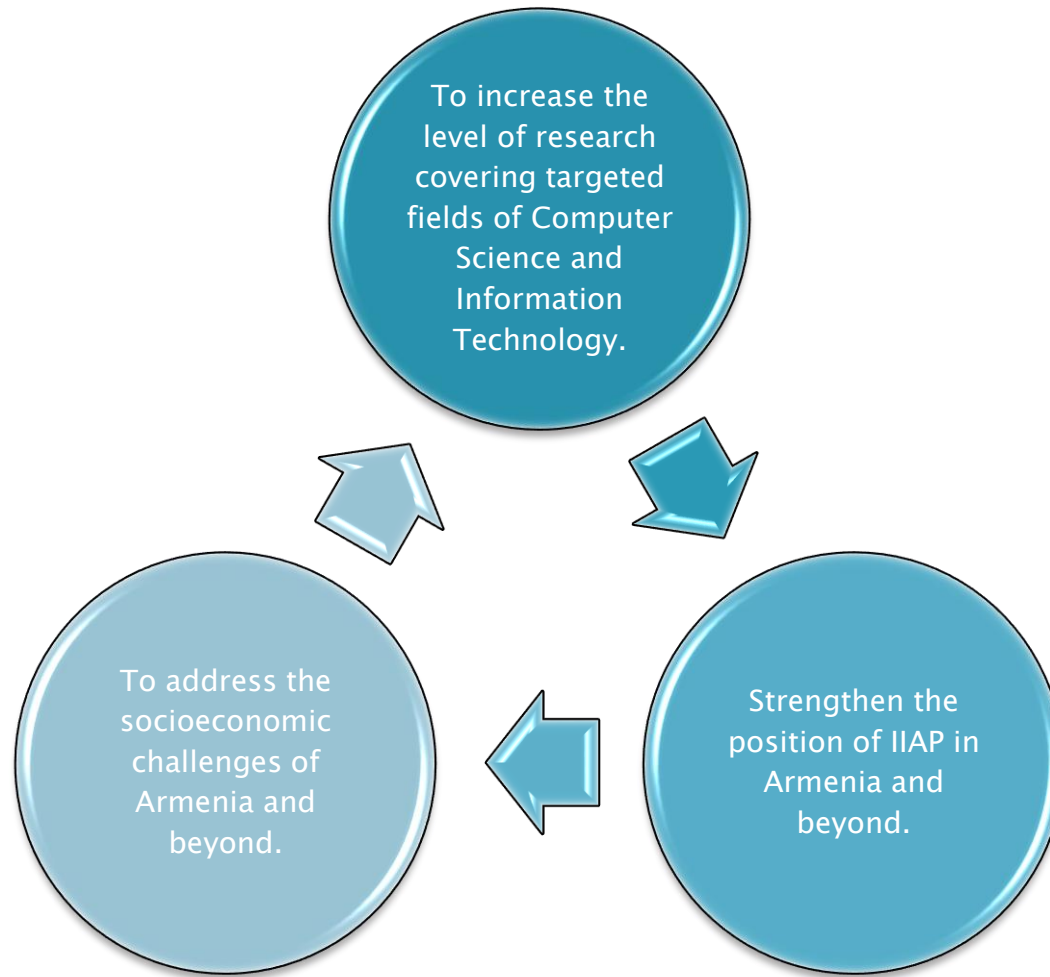
2002–2004

- First HPC System in the South Caucasus

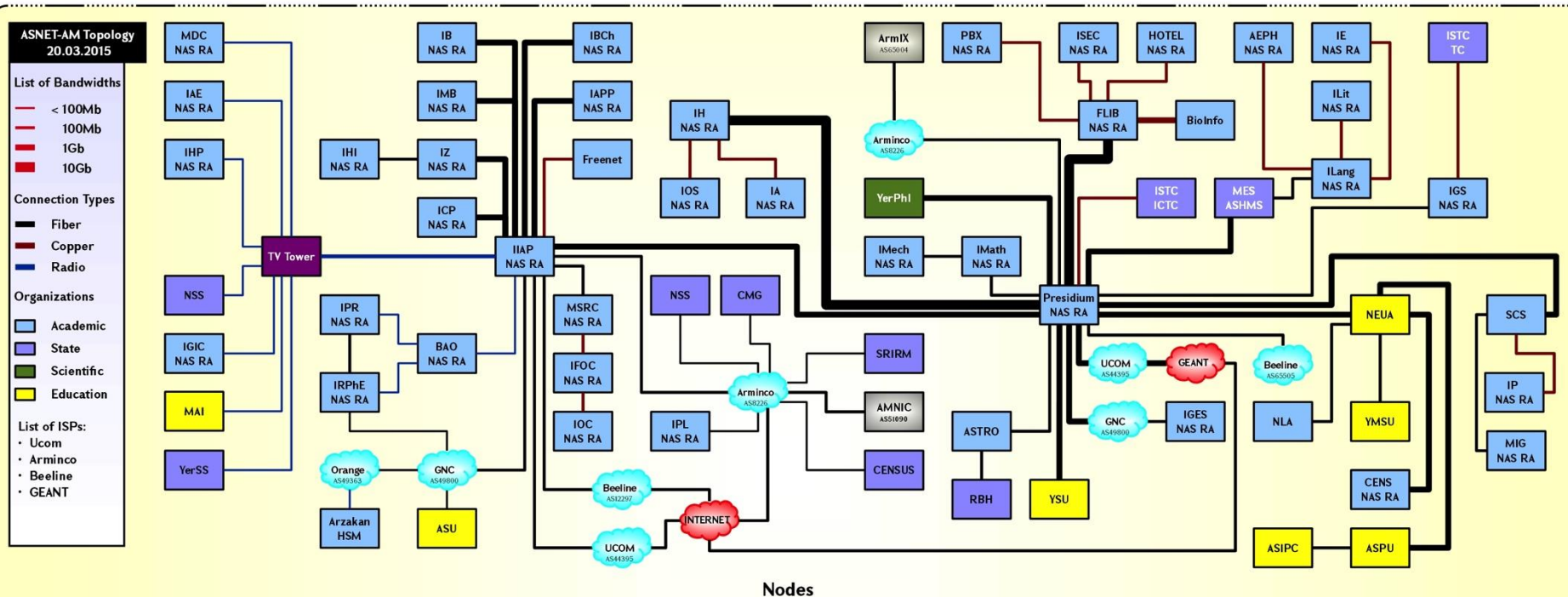
- National and International collaboration
- New scientific directions

2004–2017

IIAP: future



IIAP: network facilities



- Presidium of NAS RA
- IMath NAS RA - Institute of Mathematics
- IMech NAS RA - Institute of Mechanics
- IIP 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

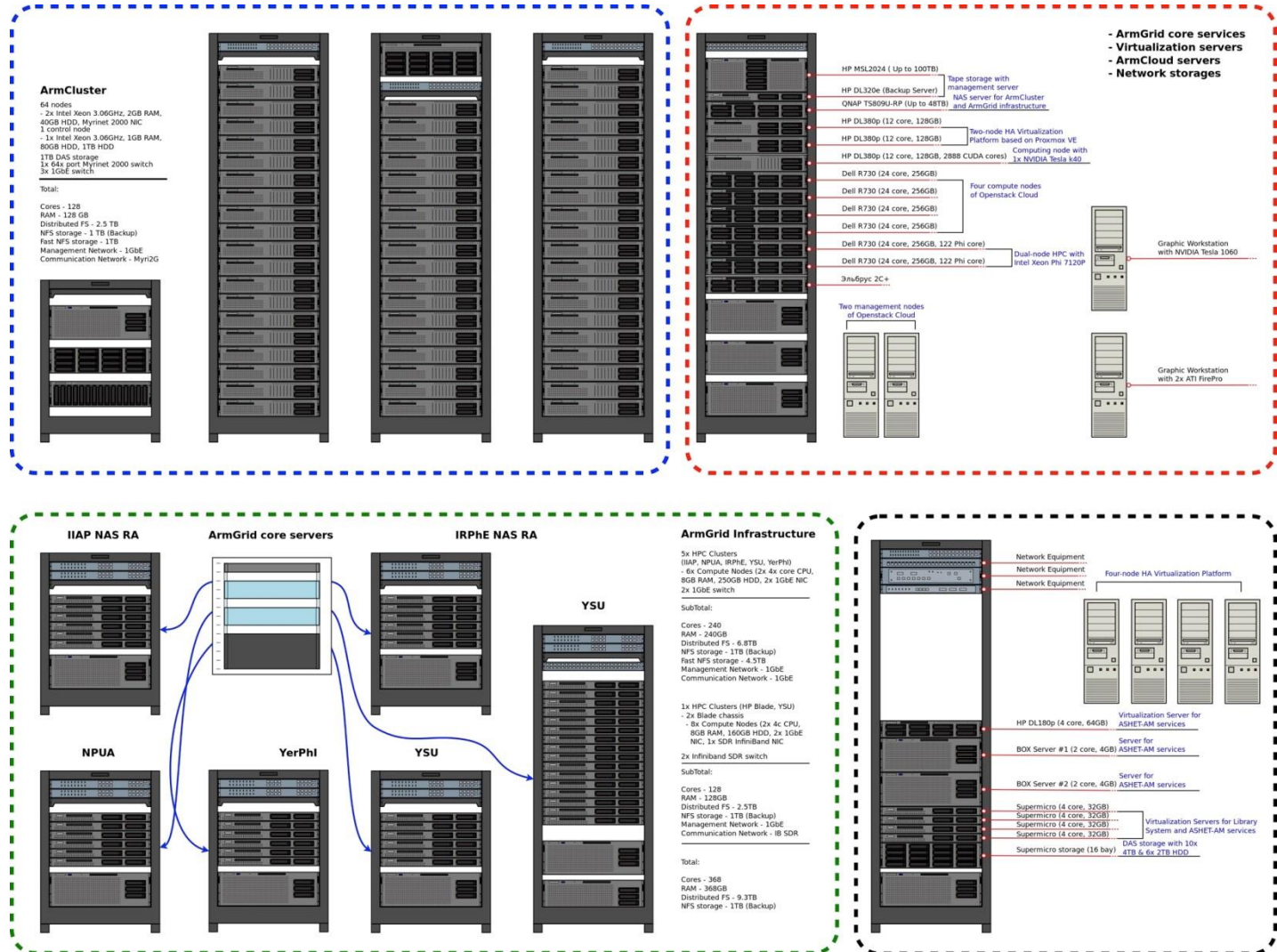
- IFOC NAS RA - Institute of Fine Organic Chemistry of Scientific
- IOC NAS RA - Institute of Organic Chemistry of Scientific
- MSRC NAS RA - Molecular Structure Research Center of Scientific
- ICP NAS RA - Institute of Chemical Physics
- IGIC NAS RA - Institute of General and Inorganic Chemistry
- IGS 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

- MAI - Military Aviation Institute
- NSS - National Statistical Service
- YerSS - Yerevan Statistical Service
- Arzakan HSM - House of Scientific Meetings "Arzakan"
- ASU - Artsakh State University
- Freenet - Armenian Freenet
- CMG - Center of Medical Genetics and Primary Health Care
- SRIRM - Scientific Research Institute of Radio Measurements
- PBX NAS RA - Private Branch Exchange
- ISEC NAS RA - International Scientific-Educational Center
- HOTEL NAS RA
- BioInfo - Bioinformatics Center
- FLIB NAS RA - Fundamental Library
- NLA - National Library of Armenia
- YMSU - Yerevan State Medical University
- NEUA - National Engineering University of Armenia
- ASPU - Armenian State Pedagogical University

- ASIPC - Armenian State Institute of Physical Culture
- YSU - Yerevan State University
- SCS - State Committee of Science
- ISTC TC - ISTC Training Center
- ISTC ICTC - ISTC ICT Center
- MES ASHMS - Ministry of Emergency Situations Armenian State Hydrometeorological and Monitoring Service
- YerPhI - Yerevan Physics Institute
- CENSUS - Armenian Census
- ASTRO - Regional Center for Relativistic Astrophysics Research
- RBH - Russian Book House
- ArmIX - Armenian Internet Traffic Exchange Foundation
- AMNIC - AM Network Information Centre
- GEANT - pan-European data network for the research and education community

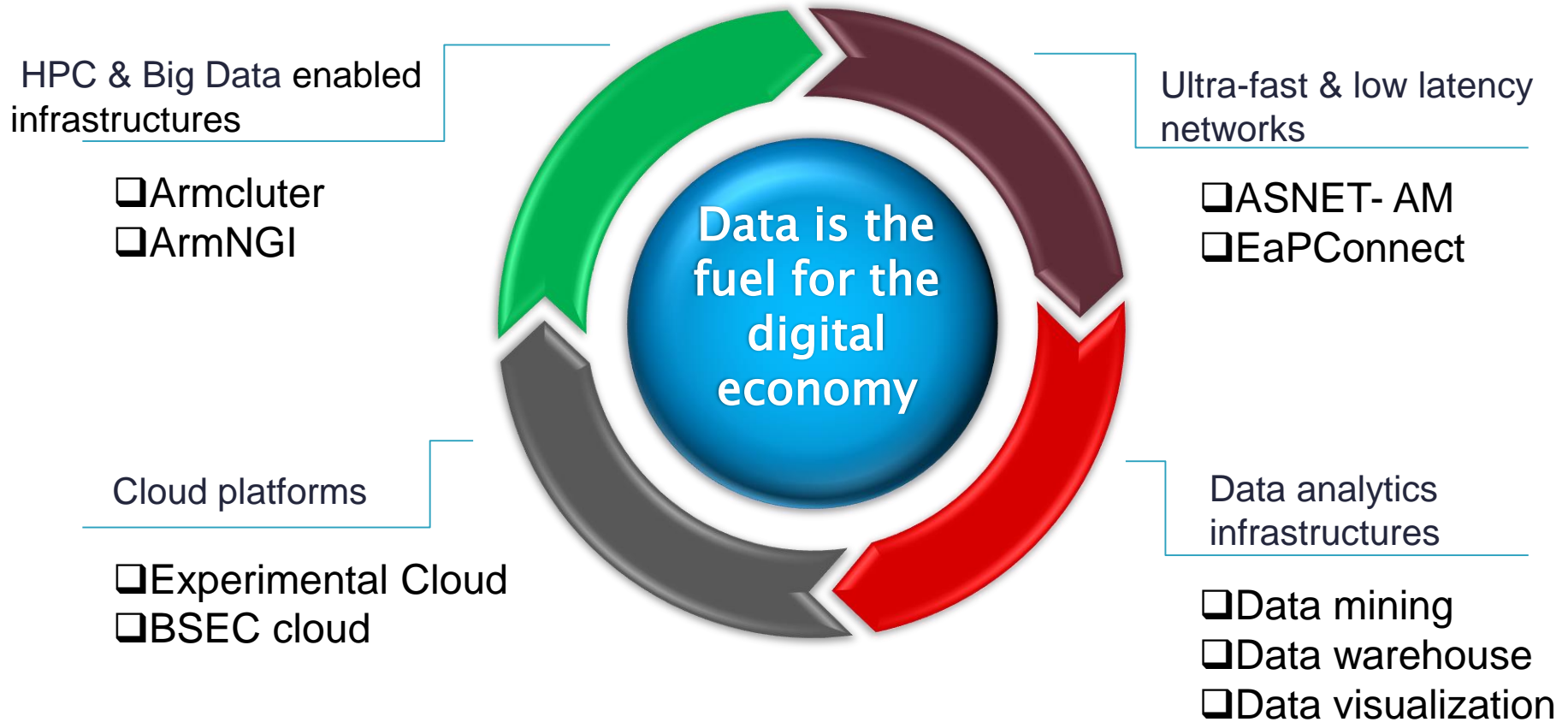
- >60 organizations
- Availability in 6 cities of Armenia
- Direct connectivity with Geant

IIAP: computational facilities



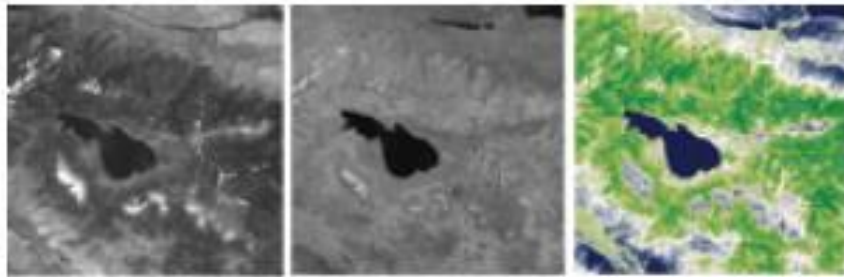
- Armenian Grid Initiative (6 sites)
- Cloud infrastructure (100cores)
- EGI-European Grid Initiative

Prerequisites: infrastructures



The Institute of Informatics and Automation Problems of the National Academy of Sciences of the Republic of Armenia coordinate the National e-infrastructure, developing the provision of services to the promotion of science and the social challenges.

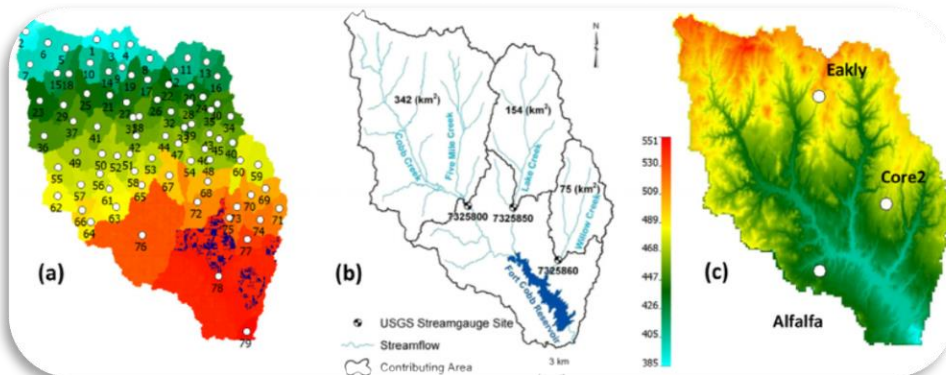
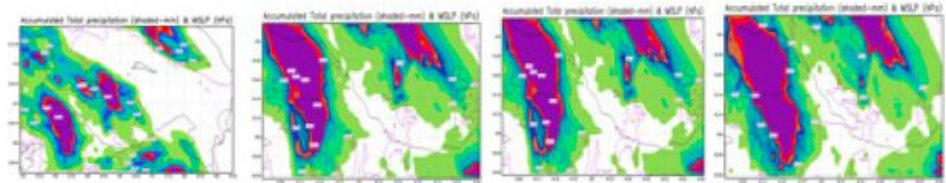
Prerequisites: communities



RED

NIR

NDVI

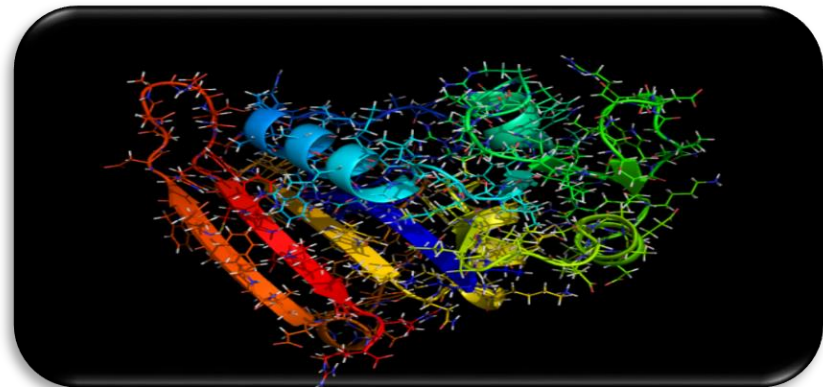


Societal Challenges

- ☐ Climate Change
- ☐ Weather Forecast
- ☐ Air Quality
- ☐ Seismology
- ☐ Water Monitoring /Like Sevan/

Scientific Challenges

- ☐ Particle Physics
- ☐ Life Science & Chemistry
- ☐ Astronomy



Prerequisites: collaborations



Modernization of Mathematics and Statistics curricula for Engineering and Natural Sciences studies in Georgian and Armenian Universities by introducing modern educational technologies (MATH-GEAR).

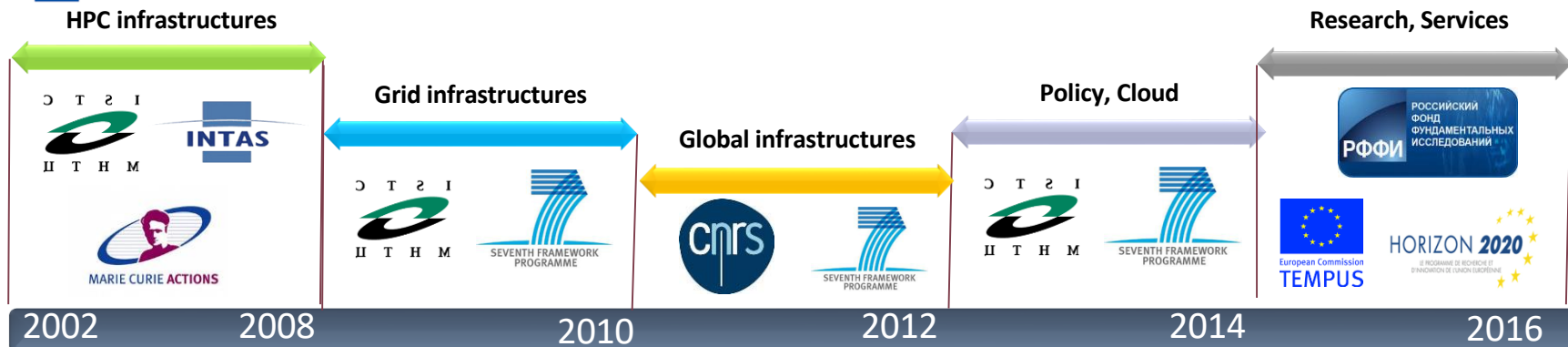
VI-SEEM (VRE for regional Interdisciplinary communities in Southeast Europe and the Eastern Mediterranean)

GEANT2020 (GÉANT Research and Education Networking)

European Commission Directorate-General for Neighbourhood and Enlargements Negotiations, EaPConnect (Eastern Partnership Connect)

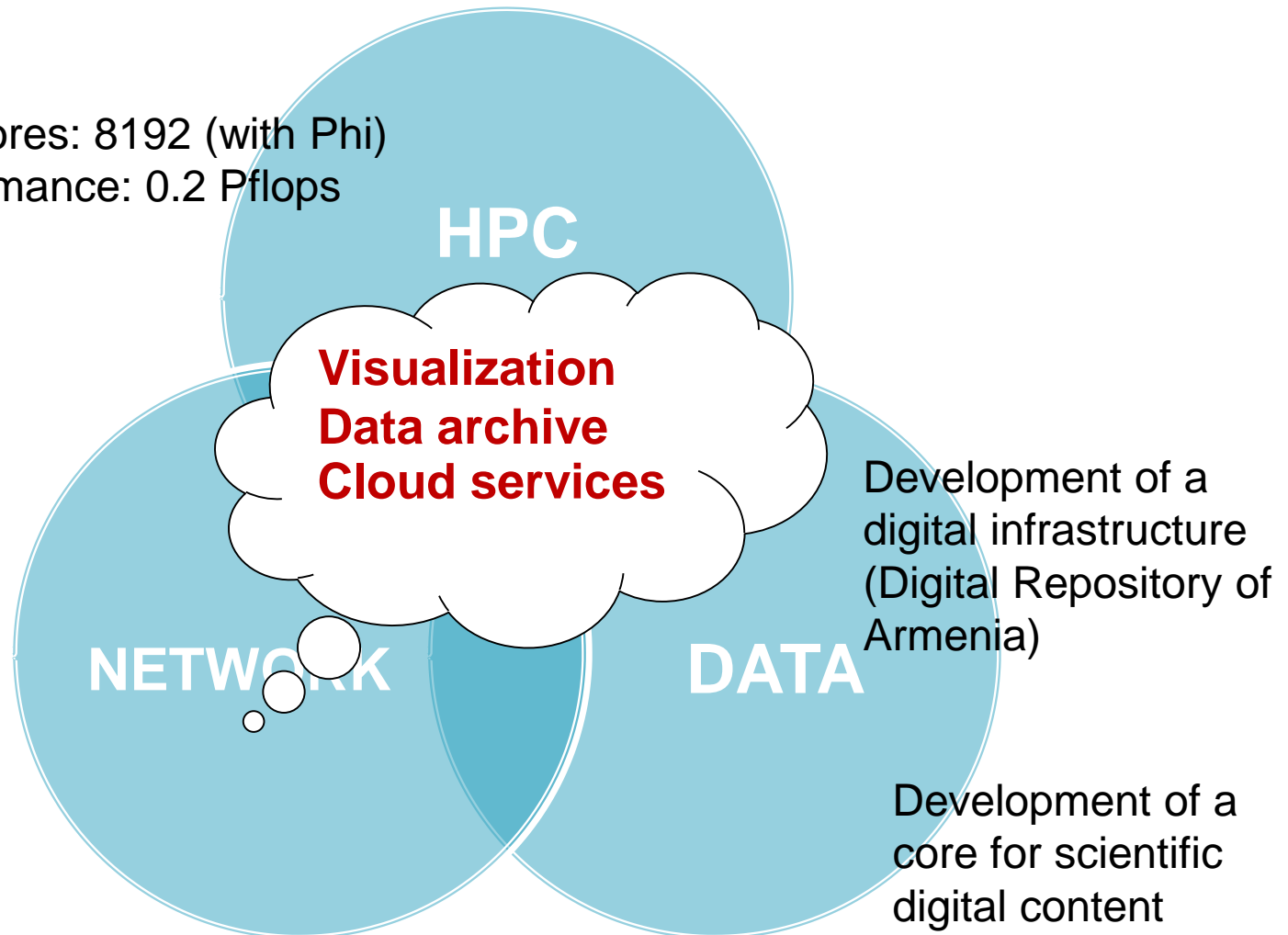


IRIT-IIAP Collaboration in the field of Computational Science (8-MS,4-PhD,8-Staff).



Prerequisites: user driven services

Compute Cores: 8192 (with Phi)
Peak performance: 0.2 Pflops



Prerequisites: Vision

Support

- User
- Supercomputer
- Network
- Security

Services

- Computing
- Big Data
- Cloud Computing and Portals
- Visualizations

Research Teams

- Scientific and educational
- Environment and emergency situations
- Life sciences and health

Education

- Courses
- Conferences/workshops
- Documents

- ❑ The mission is to develop and apply high-performance information technologies for science and society in Armenia and beyond, and to deliver scientifically excellent and industry relevant research in the fields of high performance computing
- ❑ The vision is to become top regional Centre of Excellence in IT with the emphasis on high performance computing, and to further enhance and develop the close collaboration among various science disciplines by applying the activities undertaken in the computer and information sciences