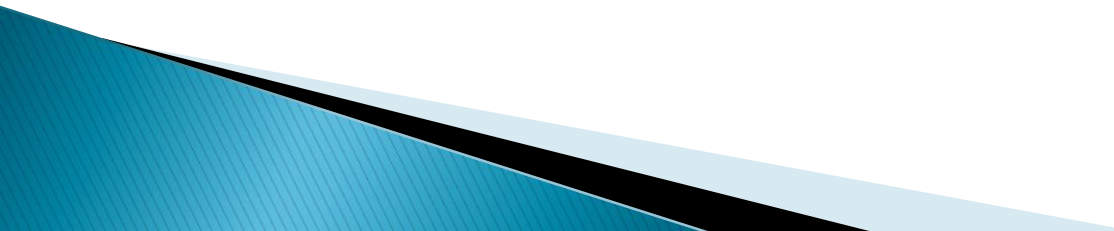# Prerequisites Establishment of a HPDA Centre of Excellence in Armenia

Yuri Shoukourian, Vladimir Sahakyan, Hrachya Astsatryan

3 May, 2018
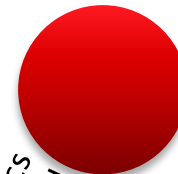Yerevan, Armenia

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 Sciences of Armenia)

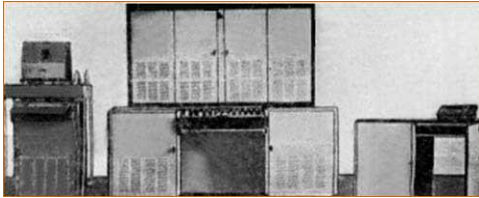**1957–1979** (Yerevan State University, Yerevan Polytechnic Institute)

Faculty of cybernetics and applied mathematics

Faculty of computer engineering and telemechanics

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**).
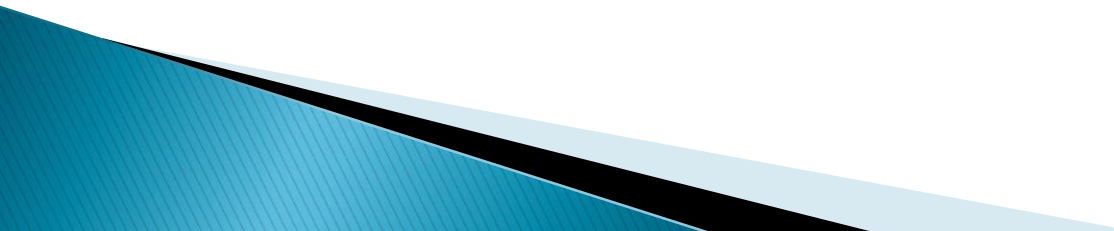
Small Computers (1963–1987)

- 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.
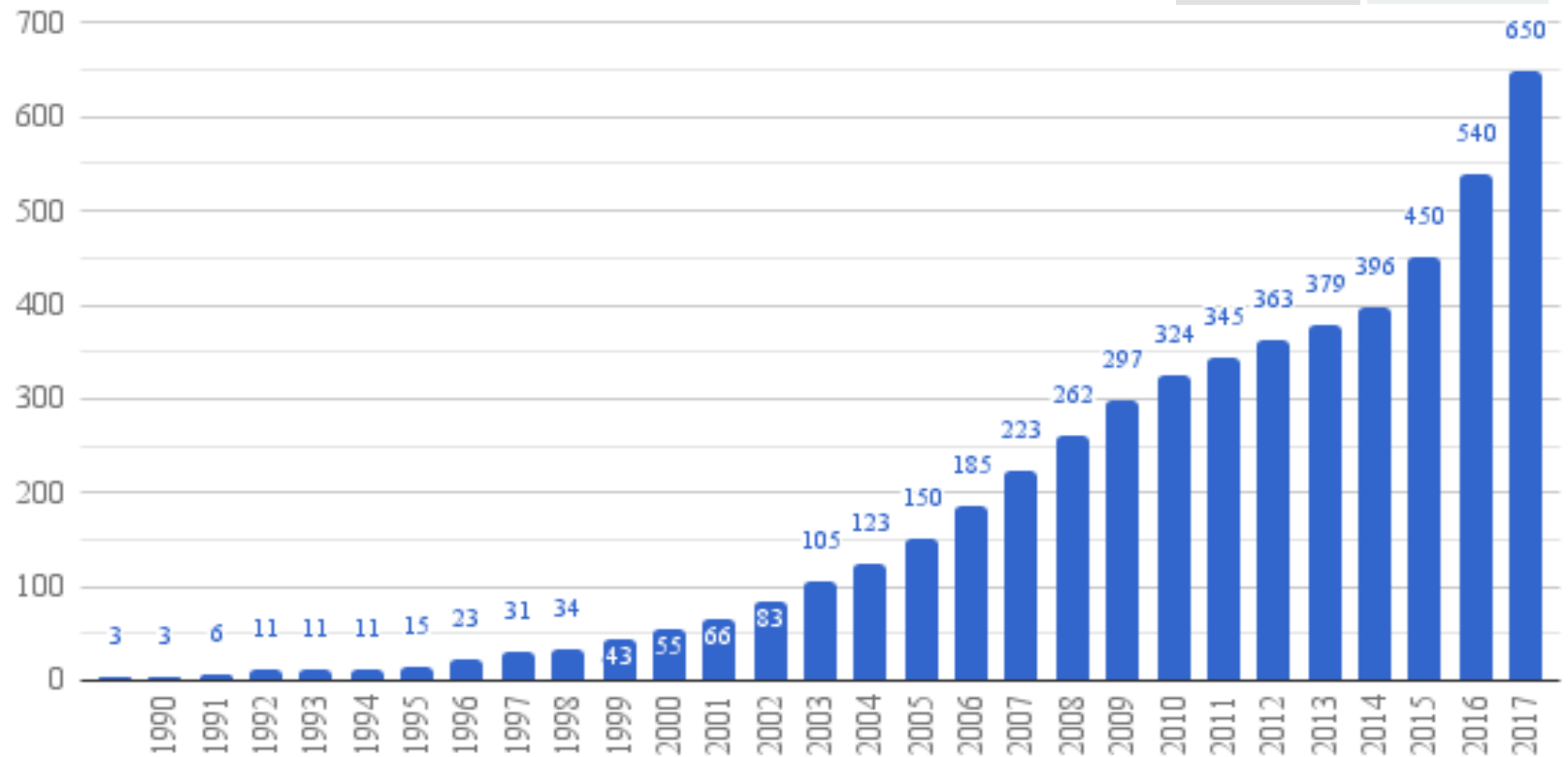
ICT sector in Armenia: numbers

ICT sector in Armenia: key facts

Armenia

2015
2016

Fixed-telephone subscriptions
Mobile-cellular subscriptions
International Internet bandwidth per Internet user
Households with computer
Households with Internet
Internet users
Fixed-broadband subscriptions
Active mobile-broadband subscriptions
Secondary enrolment
Tertiary enrolment
Mean years of schooling
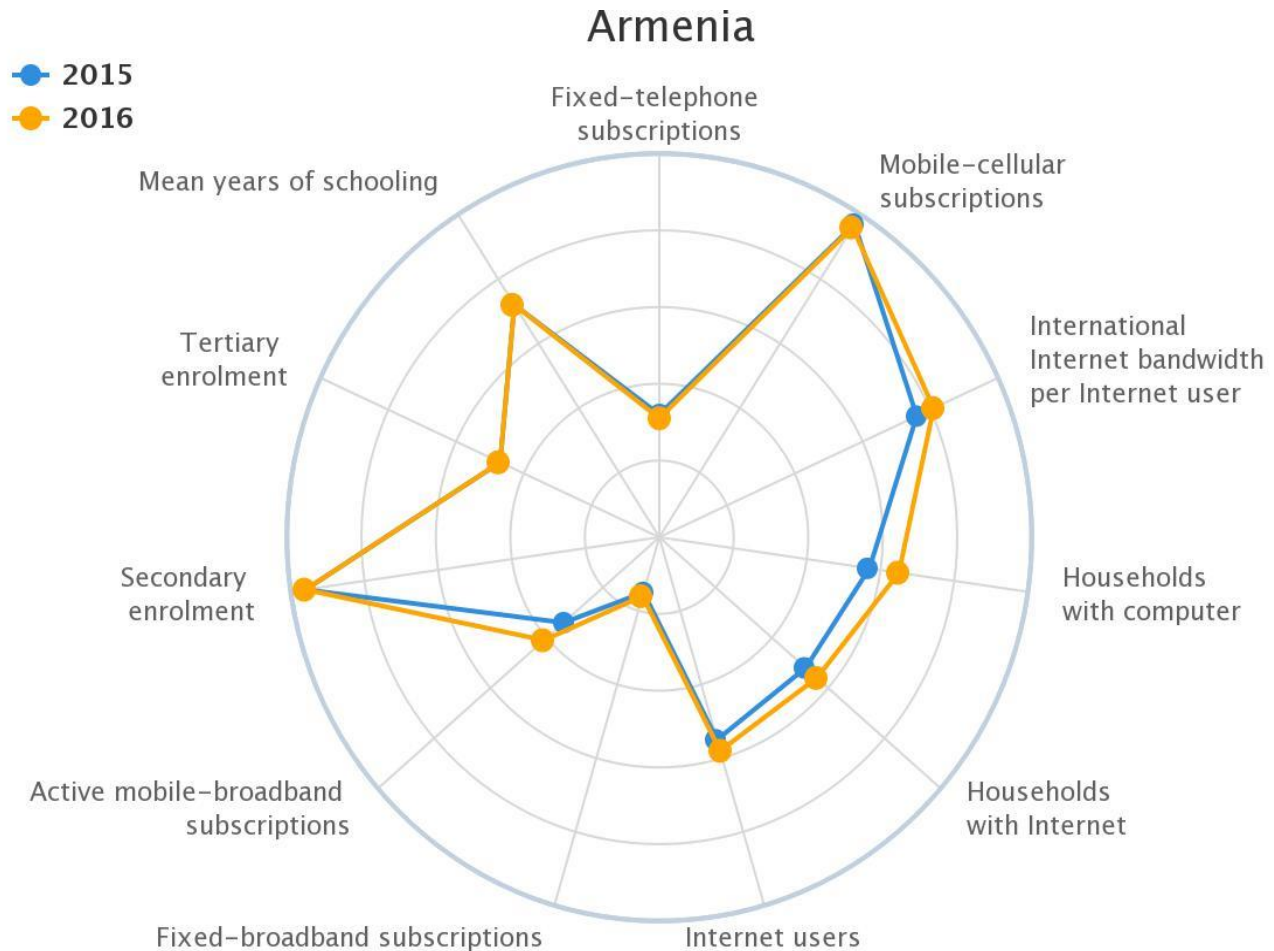
IIAP: history

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
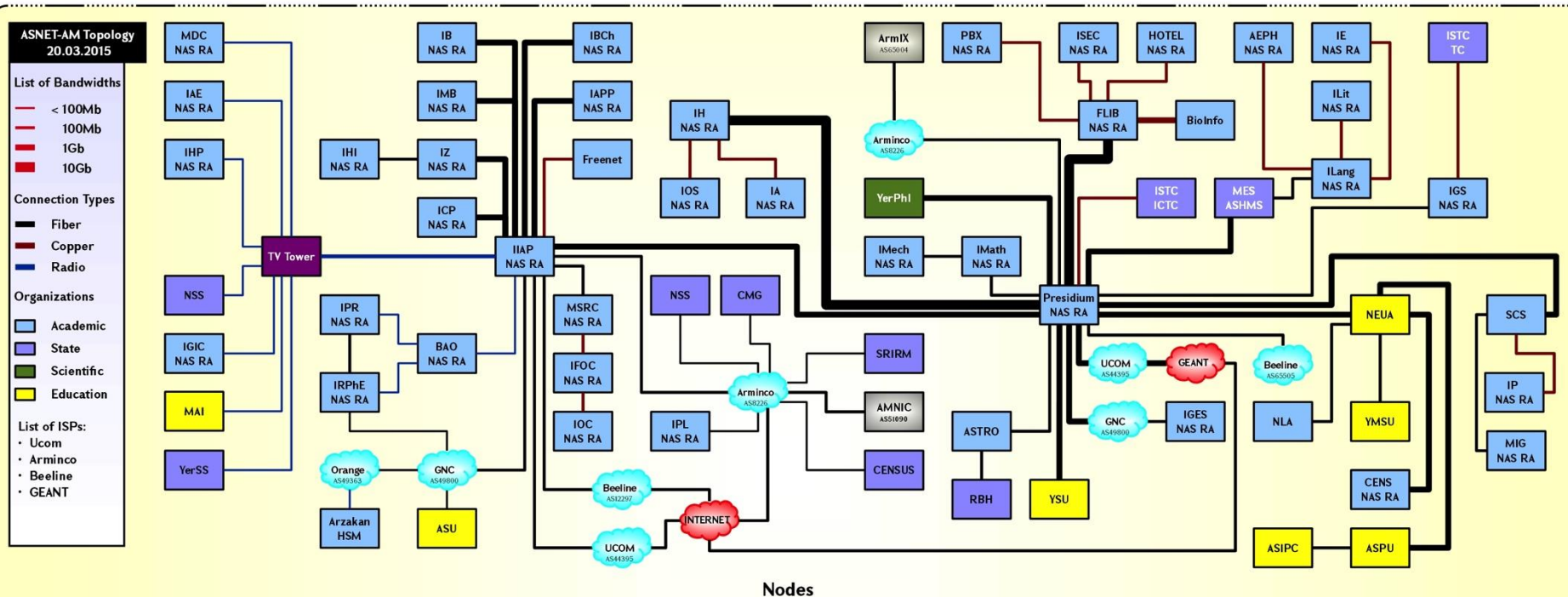
2002-2004
- First HPC System in the South Caucasus

- National and International collaboration
- New scientific directions

2004-2017

IIAP: future

IIAP: network facilities

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

IIAP: computational facilities
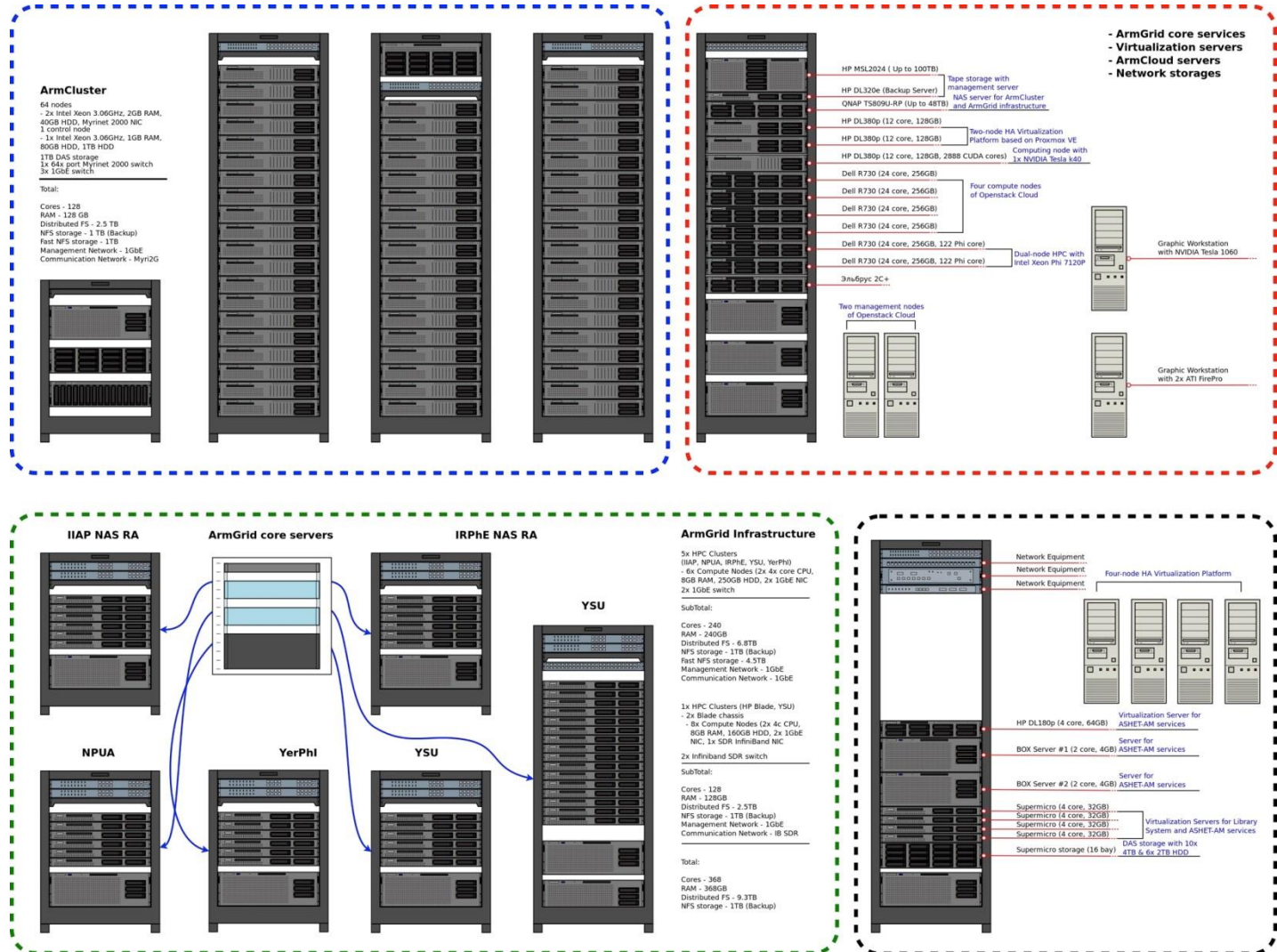
- Armenian Grid Initiative (6 sites)
- Cloud infrastructure (100cores)
- EGI–European Grid Initiative

Prerequisites: infrastructures

HPC & Big Data enabled infrastructures
- ❑Armcluter
- ❑ArmNGI

Ultra-fast & low latency networks
- ❑ASNET- AM
- ❑EaPConnect

Cloud platforms
- ❑Experimental Cloud
- ❑BSEC cloud

Data analytics infrastructures
- ❑Data mining
- ❑Data warehouse
- ❑Data visualization

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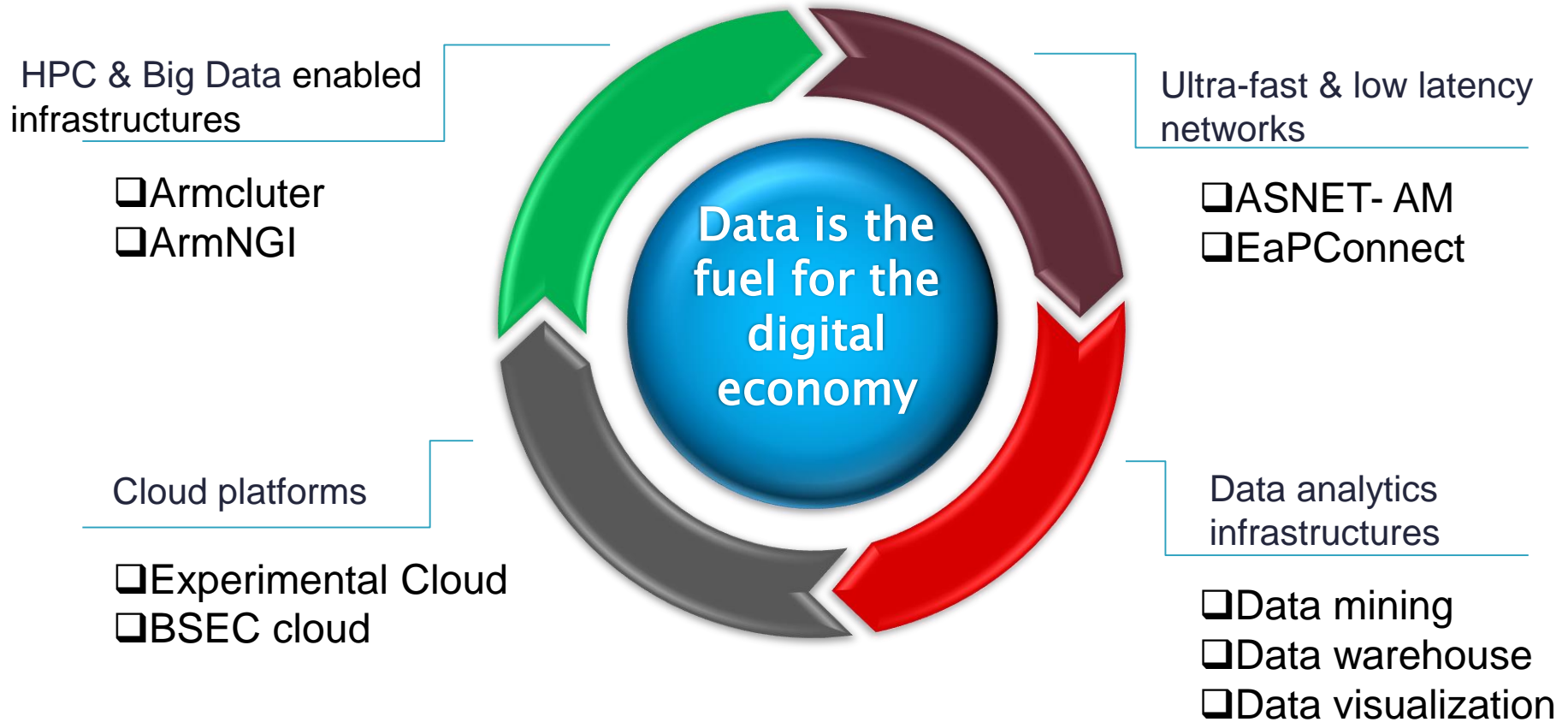
The Institute of Informatics and Automation Problems of the National Academy of Sciences of the Republic of Armenia coordinate the National e-infrastructure, developing the provision of services to the promotion of science and the social challenges.

Prerequisites: communities

RED   NIR   NDVI

Scientific Challenges
- Particle Physics
- Life Science & Chemistry
- Astronomy
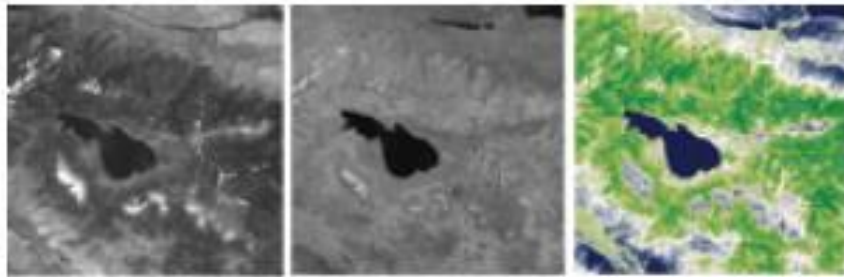
Societal Challenges
- Climate Change
- Weather Forecast
- Air Quality
- Seismology
- Water Monitoring /Like Sevan/

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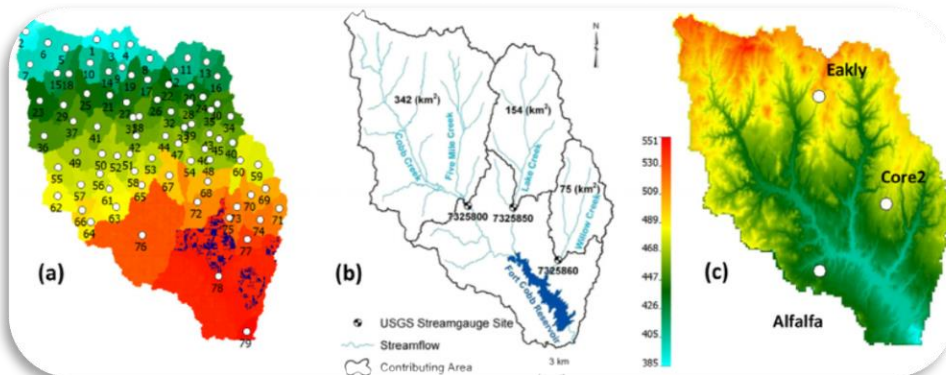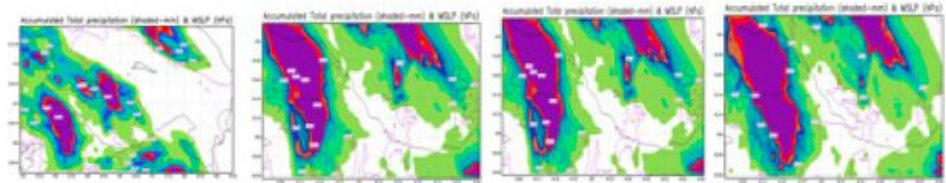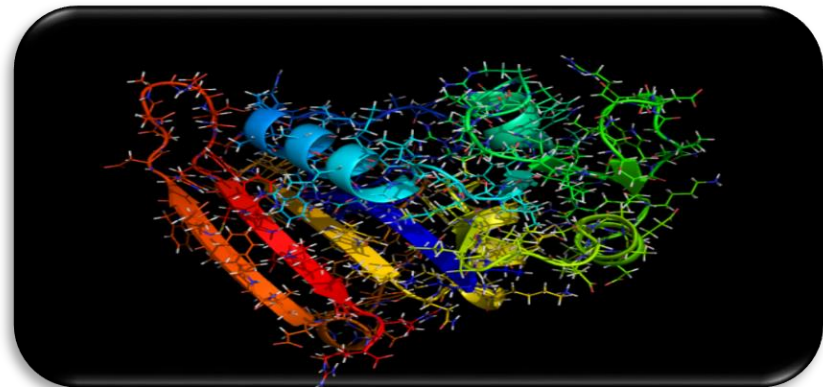
VI-SEEM (VRE for regional Interdisciplinary communities in Southeast Europe and the Eastern Mediterranean)

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).

HPC infrastructures

Grid infrastructures

Global infrastructures

Policy, Cloud

Research, Services

2002   2008   2010   2012   2014   2016
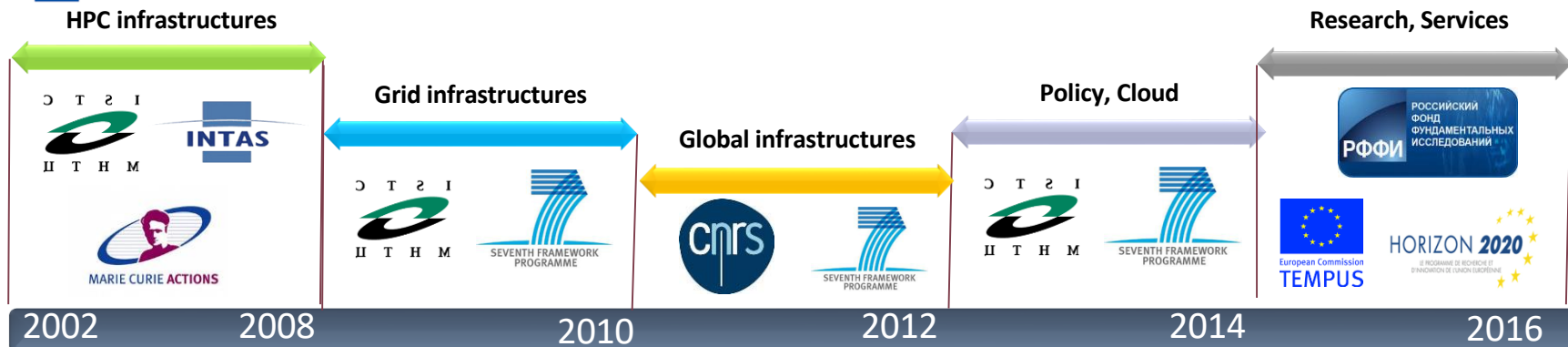
Prerequisites: user driven services

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

HPC

**Visualization
Data archive
Cloud services**

NETWORK

DATA

Development of a digital infrastructure (Digital Repository of Armenia)

Development of a core for scientific digital content
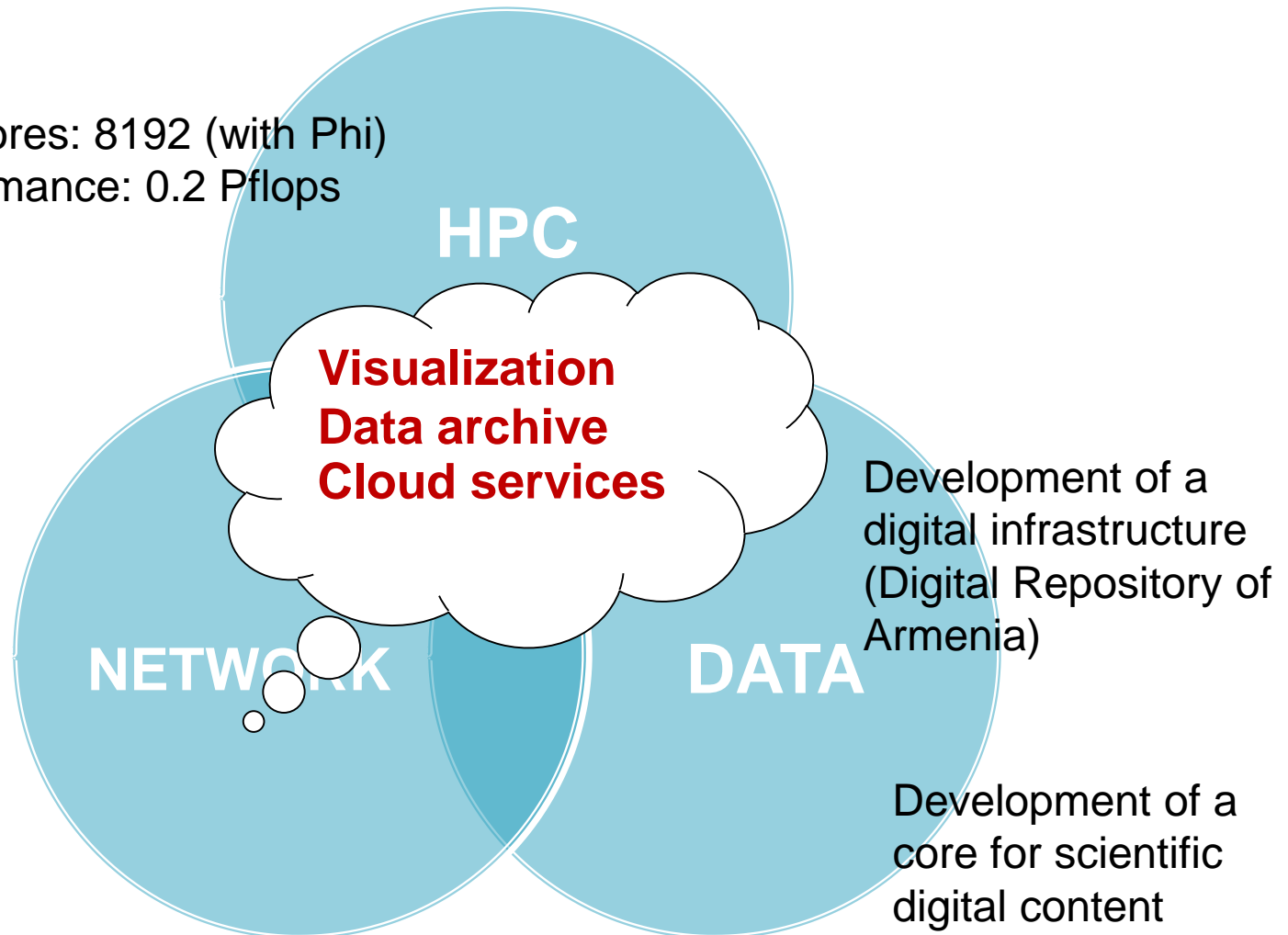
Prerequisites: Vision

Support	Services	Research Teams	Education
• User • Supercomputer • Network • Security	• Computing • Big Data • Cloud Computing and Portals • Visualizations	• Scientific and educational • Environment and emergency situations • Life sciences and health	• 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 became 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