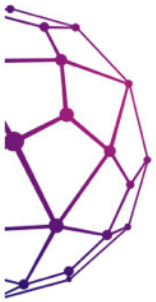


ЦЕНТР
ПРИКЛАДНЫХ
ИССЛЕДОВАНИЙ
КОМПЬЮТЕРНЫХ
СЕТЕЙ

Applied Research Center for Computer Networking

GENI, we be of one blood

R&D Director ARCCN, prof. R.Smelyanskiy
Moscow State University
smel@arccn.ru

12 November 2009

"We should complete the development of proposals to establish in Russia a powerful research and development center that would focus on the support of all areas."

"An attractive environment for the work of leading scientists, engineers, designers, programmers, managers and financiers would be formed there. In addition, new competitive technologies in the global market would be created there"

Dmitry Medvedev

President of Russia 2008-2012

SKOLKOVO Mission

SKOLKOVO IS TO BECOME AN INNOVATION HUB THAT WILL STIMULATE INNOVATIVE ENTREPRENEURSHIP AND DISSEMINATE ENTREPRENEURIAL CULTURE ACROSS THE COUNTRY TO INTEGRATE RUSSIA INTO THE GLOBAL ECONOMY

FOSTERING ADVANCEMENT OF HUMAN CAPITAL IN RUSSIA BY ATTRACTING FOREIGN SPECIALISTS AND CREATING CONDITIONS FOR LOCAL **INNOVATIVE TALENT DEVELOPMENT**	CREATING **GLOBALLY COMPETITIVE PRODUCTS** AND SERVICES BASED ON CUTTING-EDGE RESEARCH	ESTABLISHING **GLOBAL INNOVATIVE COMPANIES** IN RUSSIA

Priorities

APPLIED RESEARCH CENTER FOR COMPUTER NETWORKS

Sk Skolkovo

TECHNOLOGY CLUSTERS (ENERGY, BIOMEDICAL, IT, SPACE, NUCLEAR) WILL ENGAGE IN DEVELOPING NEW TECHNOLOGIES AND PRODUCTS

ARCCN is a member of SKOLKOVO project (IT cluster)

Energy

Energy efficiency and energy saving incl. development of new energy technology

IT

IT and software engineering

Biomedical

Biotechnology and medical technology incl. development of medical drugs and equipment

Space

Space technology in telecommunications and navigation systems

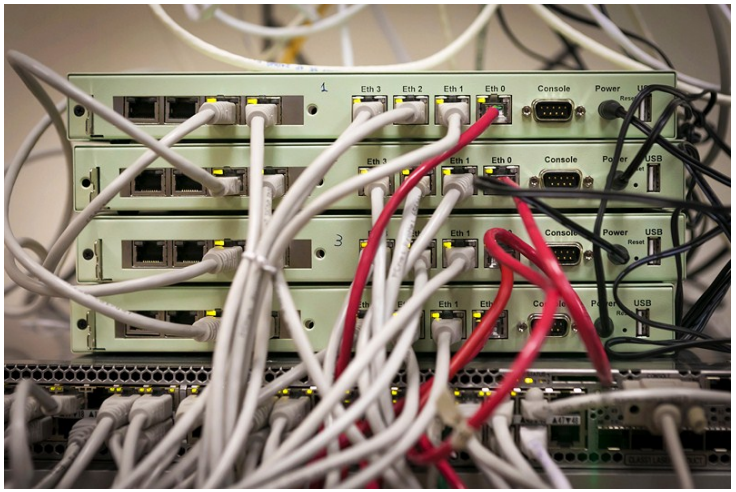
Nuclear technology (assistance for special companies in this area)

ARCCN Mission:

- to develop and distribute OpenFlow/SDN tools and technologies
- to create OpenFlow/SDN deployments in R&E networks for the benefit of the larger R&E community
- to allow researchers to seamlessly transition OpenFlow/SDN network control and management concepts from prototype to emulation to deployments in local and even national test beds

Main activities

Research

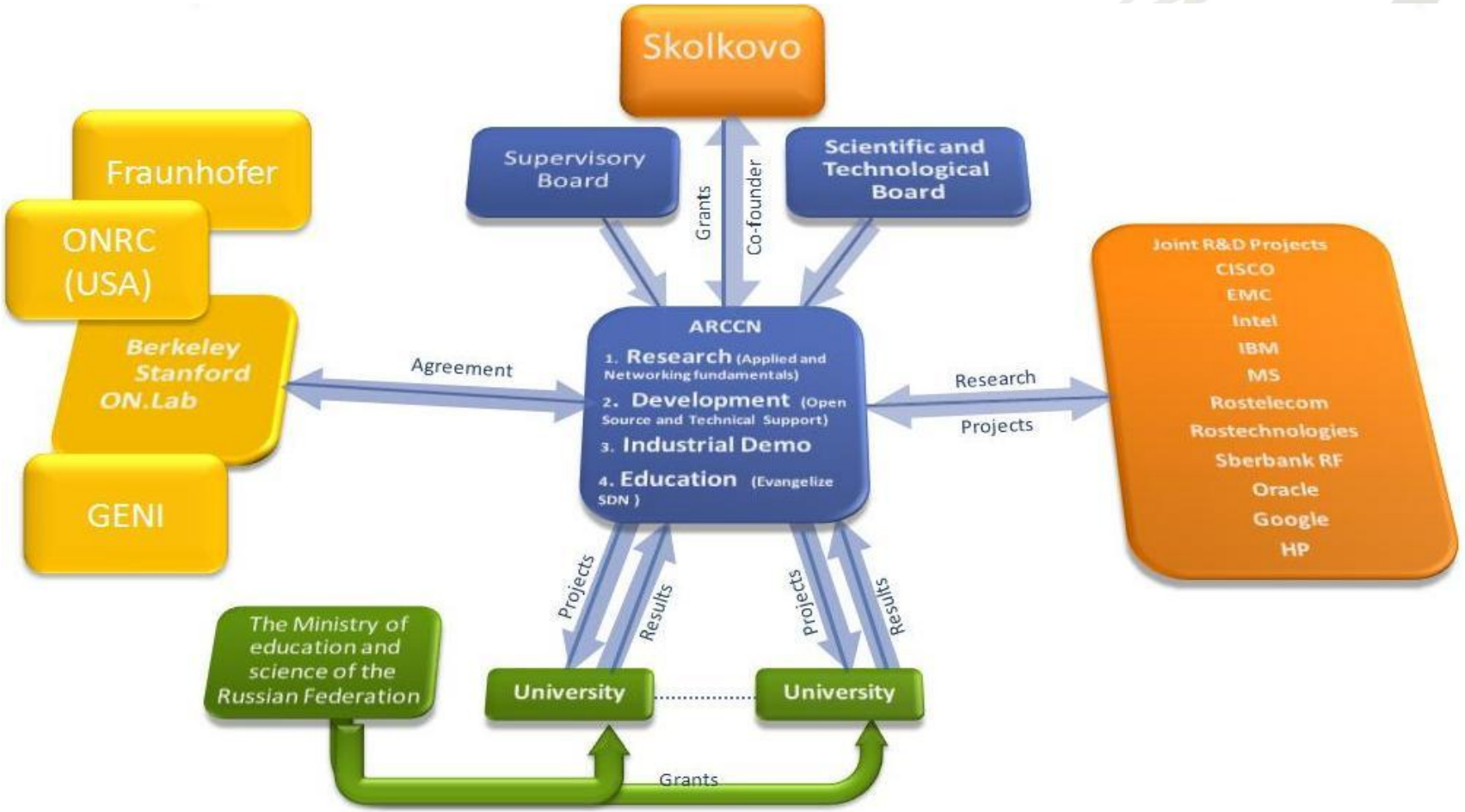


Education

Industry Cooperation

University Consortium

Applied Research Center for Computer Networking



Current research projects for Industry

Rostelecom
More possibilities

- Development of pilot segment cloud platform for data centers based on SDN

- Resource usage efficiency increasing methods for data centers based on the storage virtualization

EMC²

Established in 1841
SBERBANK

- Development of security technology for payment transactions via cellphones from unauthorized access

- Research and development on OpenFlow switch architecture on Intel Platform using Intel Data Plane Development Kit

intel

Current Activities

- Summer and Autumn SDN Schools for students, researchers & engineers in collaboration with ON Lab (Stanford, Berkley)

  >40 participants

- Open Lectures about SDN/OpenFlow with Nick McKeown, Scott Shenker and Russian scientists and experts

  > 600 participants offline & > 2000 participants online

ARCCN Today

- 20 engineers: 9 Ph.D., 9 Ph.D. students;
- Cooperation with 11 Russian universities and research centers;
- Develop first Russian OpenFlow/SDN - network segment;
- Develop special education program for engineers and researchers in collaboration with ON.Lab;
- Contracts for industrial research

Connectivity 2012/2013

Initiative of NFS and Russian Ministry of Education and Science to support cooperation US Universities & Russian Universities within GENI

Cooperation with GENI: Proposals

- Methodology , workbench and benchmarks for OpenFlow/SDN controller testing;
- Develop a general protocol to provide direct communication between the distributed application and the OpenFlow/SDN network it uses;
- Building of a distributed real-time simulation environment over OpenFlow/SDN network;
- Controller as an Open System (Modularization of NOS);
- Research collaboration proposal on network security with SDN (Map, port, distribute firewall, IDS/IPS, WAF functionality onto SDN switches and controllers. Make content- and behavior-aware network access control the feature of SDN control plane);
- Research possible vulnerabilities in OpenFlow/SDN Software tools (open SDN Vulnerability Databases like Common Vulnerabilities and Exposures (www.cvedetails.com), the Common Weakness Enumeration Specification (CWE) (http://cwe.mitre.org/) and others.

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Mathematical Framework Development

- Given a description of a forwarding policy provided by a controller, whether this policy is correct and safe?
- Given a description of a forwarding policy and a network of switches supplied with flow tables, whether the behavior of the network satisfies the policy?
- Whether several forwarding policies are consistent?
- For a given a description of a forwarding policy and a network topology, generate flow tables for network switches so that the behavior of the network complies with the policy;
- For a given change of one forwarding policy to another one to generate an appropriate sequence of flow table updating commands which alter the behavior of a network correspondingly

Ruslan L. Smelyansky

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- Honored Scientist of Russian Federation
- The correspondent member of Russian Academy of Sciences;
- Dr. of Sci. (Physical and Mathematical Sciences),
- Distinguished Professor of Moscow State University;
- Head of Computer Systems Laboratory (MSU);
- *R&D Director for ARCCN*

HLA RTI implementations

Deployment	Organization	License	HLA specification
NCWare & SimWare	Nextel[1]	Proprietary	1516-2000
EODiSP	P&P Software[2]	Open/GPL	1516-2000
CERTI	ONERA[3]	Open/GPL	1516-2000
MAK RTI	MAK Technologies[4]	Proprietary	1516-2010 (Evolved)
pRTI	Pitch Technologies[5]	Proprietary	1516-2010 (Evolved)
GAIA	University of Bologna [6]	Open/GPL	1516-2000
Portico	Portico[7]	Open/GPL	1.3