

Information and Computing Infrastructure of JINR

Leader: V.V. Korenkov
Deputy: T.A. Strizh

Participating countries and international organizations:

Armenia, Azerbaijan, Belarus, Bulgaria, CERN, China, Cuba, Czech Republic, Egypt, France, Georgia, Germany, Italy, Kazakhstan, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, South Africa, Sweden, Taiwan, Ukraine, USA.

Issues addressed and main goals of research:

The purpose of the theme is to ensure the further development of the network, information and computing infrastructure of JINR for the research and production activities of the Institute and its Member States on the basis of state-of-the-art information technologies in accordance with the JINR Seven-Year Plan of development. A particular area within the theme is the development of the Multifunctional Information and Computing Complex (MICC) at LIT JINR, presented in a Project form.

Expected major results in the current year:

- Putting into service additional 100 Gbps telecommunication data links JINR-Moscow. Provision of the reliable operation of JINR local network. Transition of the JINR Backbone to 100 Gbps. Provision of "Personal Cabinet" and SSO services.

Completion of work on the system of redundant power supply and uninterrupted power supply of the MICC infrastructure. Putting into service new infrastructure modules in the MICC computer hall to create optimal climate conditions for the equipment. Development of the project on fire safety for the engineering infrastructure of MICC.

Building-up of the base grid-component of MICC-Tier1 centre for the CMS experiment at JINR: 52% growth of CPU capacity, 20% - disk storage and 100% - tape storage.

Expansion of the computer resources and data storage as part of the integral component of Tier 2/CICC - 27% growth of processor capacity and 26% - disk storage.

Introduction of services for managing supercomputer "Govorun" and monitoring the resources and tasks into the software and information environment of the heterogeneous computational platform HybriLIT. User's personal cabinet elaboration. Development of service for using application software packages and mathematical software with advanced graphical interfaces on the HybriLIT platform.

Expansion of the resources of the cloud-based component foresees 28% increase in the number of cores, 30% growth of RAM and 33% - disk storage capacity. Increase in quotas for cloud resources for experiments underway at JINR (NICA, BESIII, NOvA, Daya Bay, JUNO, Baikal-GVD, COMPASS, etc.) and the JINR Member States.

Putting into service a "data lake" (common data warehouse) of the JINR MICC on the basis of IOS and dCache systems. Creation of a distributed storage system on the basis of EOS file system for offline cluster of the NICA megaproject in MICC and VBLHEP.

Testing in the real software-computing environment of the "Govorun" supercomputer, the computing models for the NICA mega-project that satisfy the requirements to the time characteristics of receiving data from detectors with their subsequent transfer for processing, analysis and storage as well as the requirements to the efficiency of modeling and processing events in the experiment.

Implementation of a server monitoring system for heterogeneous cluster HybriLIT and supercomputer "Govorun". Provision of monitoring subsystems for the supercomputer's engineering infrastructure (cooling system, power supply, leakage sensors), cooling towers, diesel generators and their integration into the existing monitoring system of the MICC.

- Development of an EDS “Dubna” version adapted for mobile devices. Improvement of existing modules and development of new ones for administrating the EDS “Dubna”, in particular the development of modules “Designer of forms of documents”, “The Coordination route template designer”. Modernization of the subsystem of the document routing on the basis of the analysis of problems and bottlenecks. Installation and refinement of new documents: “Order on the admission of persons invited to visit JINR” and integration of this document with the CHI system, “Secondment order”, “Supplier invoice” and others.

Transition of systems EDS “Dubna”, PIN, ADB2, “Document Base” to the user authentication via SSO (Single sign-on) system, integration with “User’s personal cabinet”. Revision of the PIN system to enhance its protection against hacking and unauthorized access to information.

Development of the project management system APT EVM for NICA, ADB2 systems, EDS “Dubna”, ISS, “Document Base” in accordance with decisions of the working group on the development of the JINR information systems. Current support of EDS "Dubna", APT EVM for NICA, ADB 2, ISS, “Document Base”, PIN.

Continuation of cooperation with partner institutions on the JOIN2 project (Just anOther INvenio INstance), development of the JINR Document Server repository infrastructure based on the JOIN2 software platform. Maintenance of program libraries JINRLIB, CERNLIB and CPC. Provision of access to the software and data of NEA OECD Bank.

Development and maintenance of the central information servers and portals to provide information and software support of JINR’s activity.

Development and support of the services for the information and computing environment of the “Govorun” supercomputer including installation and maintenance of specialized libraries and packages on users’ request.

Creation of a library of licensed software for the structural subdivisions of JINR.

- Conducting regular training courses and tutorials for JINR employees, students and young scientists from the JINR Member States on advanced information technologies, including Big Data, distributed, cloud and parallel programming technologies, tools and means of application development for computations on hybrid computing architectures on the basis of the education and research grid-cloud infrastructure and the education and test polygon HybriLIT. Organizing and conducting special courses of the leading software developers. Conducting student schools on information technologies in frames of the conferences held by LIT JINR as well as special training courses in the JINR Member States in the framework of the programmes on international cooperation.

List of projects:

Project	Leader	Priority (period of realization)
1. MICC	V.V. Korenkov	1 (2017 – 2019)

List of activities:

Activity or experiment Laboratory or other Division of JINR	Leaders Main researchers
1. MICC Project	V.V. Korenkov A.G. Dolbilov V.V. Mitsyn T.A. Strizh

LIT

Gh. Adam, G. Adamov, Eu.I. Aleksandrov, I.N. Aleksandrov, K.N. Angelov, N.S. Astakhov, A.S. Baginyan, A.I. Balandin, N.A. Balashov, A.V. Baranov, S.D. Belov, D.V. Belyakov, A.S. Bondyakov, Yu.A. Butenko, A.I. Churin, S.V. Chashchin, S.V. Gavrilov, A.P. Gavrish, V.V. Galaktionov, T.M. Goloskokova, A.O. Golunov, Eu.A. Grafov, N.I. Gromova, A.E. Gushchin, I.S. Kadochnikov, A.S. Kamensky, V.A. Kapitonov, I.A. Kashunin, A.O. Kondratiev, G.A. Korobova, E.Yu. Kulpin, N.A. Kutovskiy, A.A. Lavrentiev, S.B. Marchenko, M.A. Matveev, S.V. Mitsyn, A.V. Nechaevsky, D.A. Oleynik, G.A. Ososkov, I.S. Pelevanyuk, A.Sh. Petrosyan, M.S. Plyashkevich, D.V. Podgainy, L.A. Popov, D.I. Pryakhina, Ya.I. Rozenberg, T.F. Sapozhnikova, R.N. Semenov, M.L. Shishmakov, O.I. Streltsova, V.V. Trofimov, N.N. Voitishin, A.S. Vorontsov, A.V. Uzhinskiy, A.Yu. Zakomoldin, V.E. Zhiltsov, P.V. Zrelov, M.I. Zuev

VBLHEP

Yu.K. Potrebenikov

Yu.P. Minaev, O.V. Rogachevsky, B.G. Shchinov, S.V. Shmatov

FLNP

G.A. Sukhomlinov

LRB

V.N. Chausov

FLNR

V.V. Sorokoumov

A.G. Polyakov

DLNP

Yu.P. Ivanov

BLTP

A.A. Sazonov

UC

I.N. Semeniushkin

2. Information and software support of the research-and-production activity at JINR

P.V. Zrelov

V.V. Korenkov

I.A. Filozova

LIT

T.O. Ablyazimov, N.A. Balashov, A.V. Baranov, D.V. Belyakov, N.A. Davyudova, S.V. Duchits, V.P. Gerdt, T.M. Goloskokova, D.S. Golub, N.V. Jerusalimova, L.A. Kalmykova, A.A. Karlov, D.V. Kekelidze, S.A. Kretova, S.V. Kunyaev, G.A. Kurmaeva, N.A. Kutovskiy, A.A. Kutovskaya, O.G. Melnikova, G.G. Musulmanbekov, S.A. Nechitailo, E.A. Paschenko, V.V. Pervushov, M.S. Plyashkevich, E.Yu. Polyakova, L.V. Popkova, A.V. Prikhodko, V.M. Pushkina, A.M. Raportirenko, A.P. Sapozhnikov, T.F. Sapozhnikova, S.V. Semashko, R.N. Semenov, A.V. Sheyko, G.V. Shestakova, D.B. Stankus, T.S. Syresina, N.N. Vorobieva, V.M. Yagafarova, A.G. Zaikina, T.N. Zaikina

SOICO

A.S. Sorin

V.F. Borisovskiy

VBLHEP
Yu.K. Potrebenikov

A.V. Philippov, K.V. Turusina

3. Development of a system of training and advanced training of IT professionals based on educational and research infrastructure and creation of an information system to provide assistance to users (Helpdesk)

**V.V. Korenkov
T.A. Strizh
O.I. Streltsova**

LIT

N.A. Balashov, A.V. Baranov, S.D. Belov,
V.V. Galaktionov, T.M. Goloskokova, N.I. Gromova,
I.S. Kadochnikov, D.V. Kekelidze, N.A. Kutovskiy,
V.V. Mitsyn, S.V. Mitsyn, I.K. Nekrasova,
A.V. Nechaevsky, D.A. Oleynik, A.Sh. Petrosyan,
D.V. Podgainy, T.F. Sapozhnikova, R.N. Semenov,
V.V. Trofimov, A.V. Uzhinskiy, V.E. Zhiltsov, M.I. Zuev

UC
S.Z. Pakuliak

Collaboration

Country or International Organization	City	Institute or Laboratory
Armenia	Yerevan	IIAP NAS RA YSU
Azerbaijan	Baku	IP ANAS
Belarus	Minsk	BSTU INP BSU JIPNR-Sosny NASB INRNE BAS
Bulgaria	Sofia	SU
CERN	Geneva	CERN
China	Beijing	IHEP CAS
Czech Republic	Prague	IP CAS
Egypt	Giza	CU
France	Marseille	CPPM
Georgia	Tbilisi	GRENA GTU TSU
Germany	Darmstadt Frankfurt/Main Hamburg Karlsruhe Zeuthen	GSI Univ. DESY KIT DESY
Italy	Bologna	INFN
Kazakhstan	Astana	BA INP ENU NULITS

Moldova	Almaty	INP
	Chişinău	ASM
Mongolia	Ulaanbaatar	IAP ASM
	Krakow	RENAM
Poland	Bucharest	NUM
Romania	Cluj-Napoca	CYFRONET
	Moscow	IFA
Russia	Moscow, Troitsk	IFIN-HH
	Chernogolovka	INCDTIM
Dubna	Dubna	FRC IM RAS
	Gatchina	IITP RAS
Nizhny Novgorod	Nizhny Novgorod	ISP RAS
	Novosibirsk	ITEP
Pereslavl-Zalesskiy	Pereslavl-Zalesskiy	KIAM RAS
	Protvino	MPEI
Puschino	Puschino	MSU
	Samara	NRC KI
St. Petersburg	St. Petersburg	RCC MSU
	Košice	RIPN
Slovakia	Prešov	RSCC
	Cape Town	SINP MSU
South Africa	Lund	INR RAS
	Taipei	SCC IPCP RAS
Sweden	Kiev	LITP RAS
	Kharkov	Dubna State Univ.
Taiwan		SCC "Dubna"
		SEZ "Dubna"
Ukraine		NRC KI PNPI
		UNN
		BINP SB RAS
		PSI RAS
		IHEP
		IMPB RAS
		SU
		FIP
		ITMO
		SPbSU
		SPbSPU
		IEP SAS
		PU
		UCT
		LU
		ASGCC
		BITP NASU
		NSC KIPT

USA

Arlington, TX

Batavia, IL

Upton, NY

UTA

Fermilab

BNL