



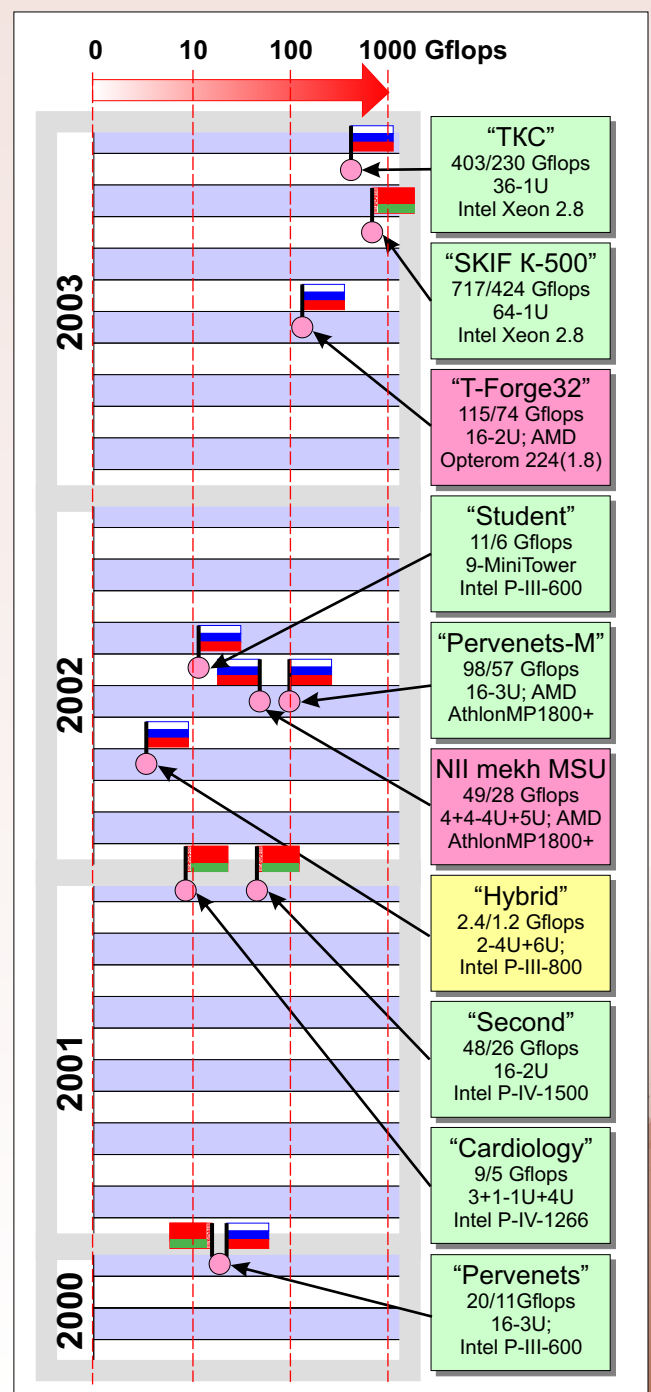
## Russian Federation and Republic of Belarus Union Program

### “Development and Production of High-Performance Parallel-Architecture Computer (Supercomputer) Family and Supercomputer-Based Applications ”

#### November 2003: The SKIF Program Main Results

- Documentation and prototypes of the Series 1 SKIF supercomputers were developed, passed acceptance tests, and were given the O1 type.
- Software of the cluster level of the Series 1 SKIF supercomputers passed acceptance tests and was given the O1 type.
- Several applications were developed for the SKIF supercomputers; some of them passed acceptance tests and were given the O1 type.
- NICEVT prepared a production basis, developed documentation, and began to commercially produce SCI system network adapters (N330, N337, N335) which are functional counterparts of Dolphin SCI adapters (D330, D337, D335).
- The Supercomputer Systems enterprise developed software and hardware solutions of the HCE level and designed an HCE experimental model. First prototypes must be developed in 2003. Acceptance tests are scheduled for 2004.
- 11 prototypes and installations of the Series 1 and Series 2 SKIF supercomputers were built. SKIF K-500 has the best characteristics: 716.8 Gflops peak performance, 425.2 Gflops Linpack performance.

#### Prototypes of the SKIF Family Supercomputer



## The SKIF K-500 Supercomputer

In 2003 it was decided to produce the first prototype in the teraflop range – with a performance not less than 500 Gflops (SKIF K-500). The following companies were among the developers of the prototype:

- UIIP, NAS, Minsk, Belarus, was the main customer, assembled, set up the installation, and was its allocation.
- UE NII EVM, Minsk, Belarus, developed the main form factors and assembled the installation.
- PSI, RAS, Pereslavl-Zalessky, Russia, developed and installed software pieces.
- T-Platforms Company, Moscow, Russia, developed computational nodes.

In May 2003 the development of SKIF K-500 architectural features was completed. In September 2003 T-Platforms Company built 64 nodes of the installation and assembled the technical configuration in order to demonstrate the operability of computational nodes. PSI, RAS, performed the installation of cluster level software and measured the performance of SKIF K-500.



**Technical configuration of the SKIF K-500 installation, T-Platforms, Moscow, September 2003.**

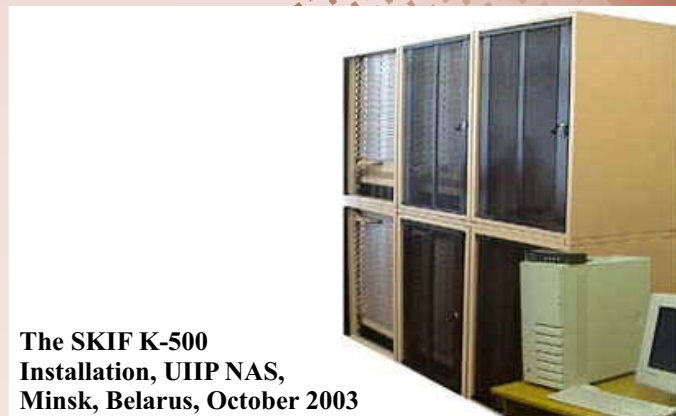
In addition to high performance, the following facts are worth noting:

- SKIF K-500 has a good performance/price ratio: 1 Tflops costs less than \$1,000,000;
- SKIF K-500 uses the form factor 1U;
- SKIF K-500 is the first cluster in Russia and Belarus that uses so many nodes — 64 nodes — connected by the SCI system network with the 3D-torus topology.

After the SKIF K-500 trial run had proved successful, the installation was disassembled and sent to Minsk where the final configuration was assembled using form factors developed in UE NII EVM. At the end of September 2003, the SKIF K-500 supercomputer was submitted for the TOP500 List.

On November 16, 2003, SKIF K-500 was included in the 22nd TOP500 List and became the first supercomputer designed within the framework of the Russian Federation and Republic of Belarus Program.

Before that day only a dozen of countries producing supercomputers had been honoured to be in the TOP500 List. Now the Republic of Belarus and the Russia and Belarus Union belongs to this supercomputer elite.



**The SKIF K-500 Installation, UIIP NAS, Minsk, Belarus, October 2003**

## The SKIF K-500 Supercomputer Data Sheet

Peak performance (Linpack)	<b>716.8 (425.2) Gflops</b>
CPU:	<b>Intel Xeon 2.8 Ghz</b>
Computational nodes/processors:	<b>64/128</b>
Node/Installation RAM:	<b>64*2=128 GB</b>
Disk memory:	<b>64*60=3840 GB</b>
System network:	<b>3D-top, SCI, D336</b>
Service network:	<b>GB Ethernet</b>
Form factor:	<b>1 U</b>
Extra:	<b>Linpack 59% (dimensionality 123.500 N 1/2=25,000)</b>

The cluster has a service network designed and developed in PSI, RAS and produced in UE NII EVM.

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