трамплин
электроникс

Advancing Technology — Building the Future

Contents

About the company

Tramplin Electronics — a Russian technology company focused on strategic investments in microelectronics and the development of electronic products and software.

Its primary focus is the development and production of licensed processors, microcontrollers, and electronic components.

The company combines several directions:

- Microelectronics and Radioelectronics Design Center
- Software Development
- Joint production of computing equipment with partners
- Research in security and performance

The goal is to bring Irtysh processors to market, supporting technological sovereignty through secure and reliable CPUs to meet national strategic needs and to foster an independent hardware and software ecosystem.

National technological independence — through synthesis and cooperation, through innovation and science

Fields of activity of Tramplin Electronics:

• Development of Irtysh family processors;

• Microelectronics design – VLSI development, FPGA prototyping of IP blocks according to customer requirements;

• Development and production of ready-made hardware and software solutions together with partners – servers, data storage systems, workstations with high localization;

• Software development – operating system based on the Linux kernel, porting open-source software to the LoongArch processor architecture;

• Educational programs with higher education institutions;

• Building a community around the Irtysh family processors;

Starting with a ready-made processor architecture is an economic and technological advantage

• **Time savings:** Developing a proprietary architecture (ISA) from scratch requires enormous resources. Adapting LoongArch reduces the time-to-market to 12–18 months;

• **Risk reduction:** Using a proven, reliable architecture allows you to focus on development of products, peripherals, and system integration;

• **Focus on competencies:** Tramplin Electronics concentrates on creating unique elements—its own IP blocks, compilers, etc;

• **Readiness for scaling and growth:** Tramplin Electronics has access to an established supply chain and partners' manufacturing processes, ensuring uninterrupted production and supply process;

Choosing LoongArch is a strategic decision for a fast entry into the domestic electronics market and for meeting the needs of businesses and the government for processors and computing devices.

LoongArch: A Ready-Made Processor Architecture — The Foundation of Technological Sovereignty

Own instruction set architecture (ISA) is a completely independent architecture (with no references to MIPS, x86, or ARM). It is based on a modern RISC concept with extended support for LSX and LASX vector instructions, ensuring high efficiency when carrying out high-performance computing, including multimedia processing and machine learning.

Today, support for LoongArch is integrated into the Linux core (Mainline), confirming the platform's maturity and guaranteeing long-term compatibility with leading software ecosystems, simplifying the porting and development of domestic software.

A well-developed ecosystem that is ready for implementation

Operating Systems: Full support in leading distributions (Alt Linux, Rosa, Debian, Loongnix Unity, Kylin, AOSC);

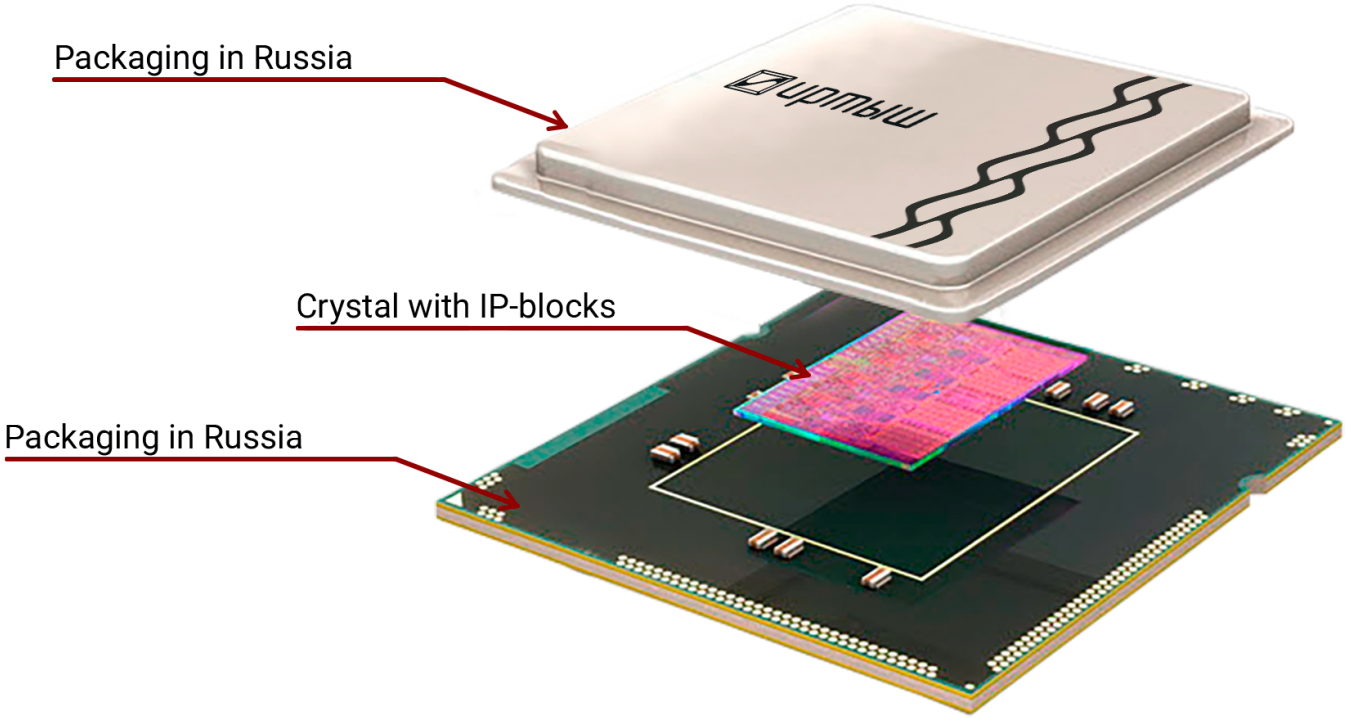
Development Tools: GCC and LLVM compilers support LoongArch "out of the box.“;
Supported programming languages: Java, JavaScript, C/C++ (gcc, clang), Go, Rust, Java (OpenJDK 8, 11, 17, 21), Python, Perl, Ruby, Lua (Lua, LuaJIT);



Virtualization: KVM/QEMU support enables running isolated environments and emulating other architectures if needed;

Application Software: Ported software includes browsers (Chromium), office suites, database management system (PostgreSQL) and server software.

Tramplin Electronics begins production of its own Irtysh CPUs based on the LoongArch architecture for the Russian market, as well as delivery of ready-made solutions to the Russian Federation, the CIS and the BRICS countries.



The final stage of microchip manufacturing — packaging — will be carried out in Russia. This is a critical process in which the chip is placed into a protective package. Packaging provides mechanical protection from the environment, electrical connection between the chip and external pins, as well as heat dissipation, allowing the chip to be installed into printed circuit board.

Block Diagram of the Irtysh C632 Processor

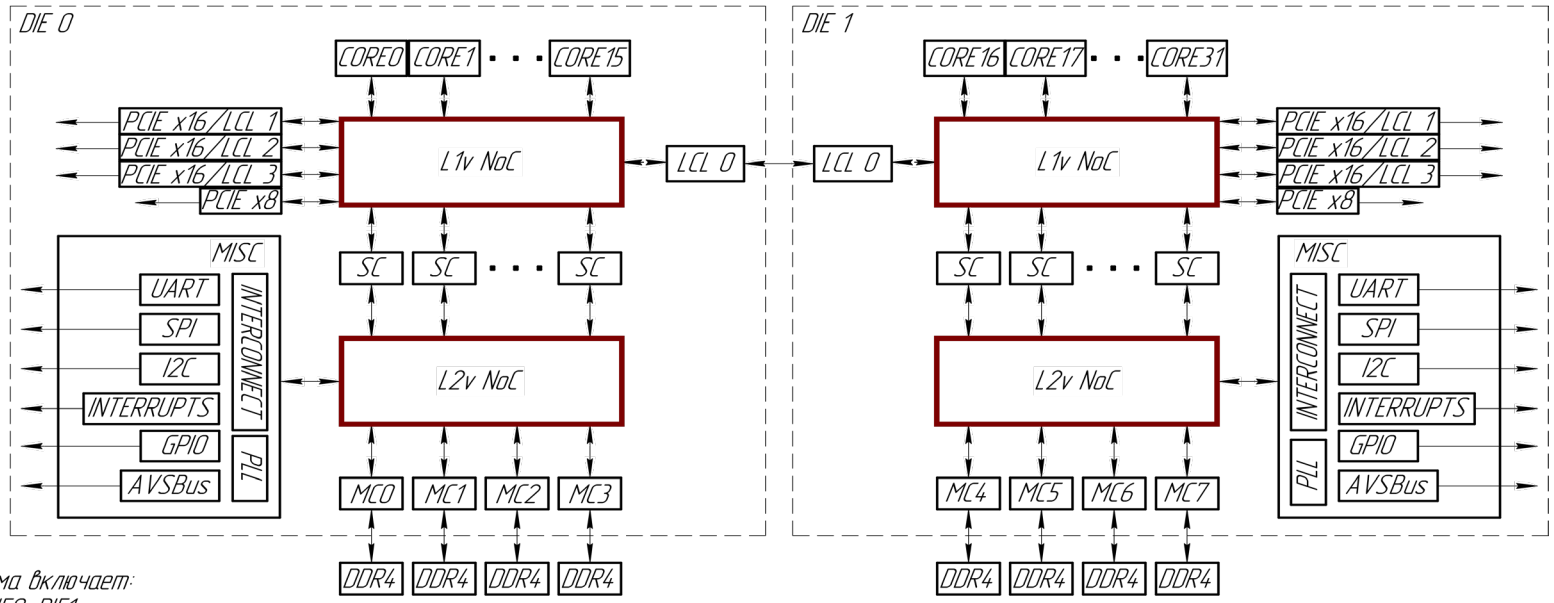


Схема включает:
- DIE0, DIE1 – кристаллы;
- CORE0...CORE31 – процессорное ядро;
- SC – общая кэш-память;
- MC0...MC7 – контроллеры доступа к оперативной памяти;
- LCL 0 – интерфейс межкристальных соединений;
- L1v NoC – встроенная коммутационная сеть 1 уровня на кристалле;
- L2v NoC – встроенная коммутационная сеть 2 уровня на кристалле;
- MISC – модуль запуска и настройки;
-PLL – генератор со схемой фазовой автоподстройки частоты;
- I2C – последовательная асимметричная шина для связи между интегральными схемами;
- PCIE x16 – периферийный интерфейс;
- DDR4 – оперативная память;
- INTERCONNECT – сеть межсоединений;
- UART – интерфейс универсальный приёмопередатчик для связи с другими устройствами;
- SPI – последовательный периферийный интерфейс;
- INTERRUPTS – блок прерывания;
- GPIO – Интерфейс ввода-вывода;
- AVSBus – интерфейс управления питанием кристаллов.

Security Engine, L1v NoC, L2v NoC blocks — a proprietary Russian development.

Irtysh processors are manufactured under an architectural license, including full rights to independently develop the processors. This enables the integration of proprietary super-functional blocks (SF-blocks or IP blocks) with Russian cryptographic standards, work with peripheral devices, a trusted boot environment (UEFI), and so on.

Tramplin Electronics is building a developer community to create a large-scale ecosystem of solutions

We help port software to Irtysh processors and provide:

- Documentation and SDK;
- Cloud-based testing hardware on the target architecture;
- Compatibility expertise with certification issuance;

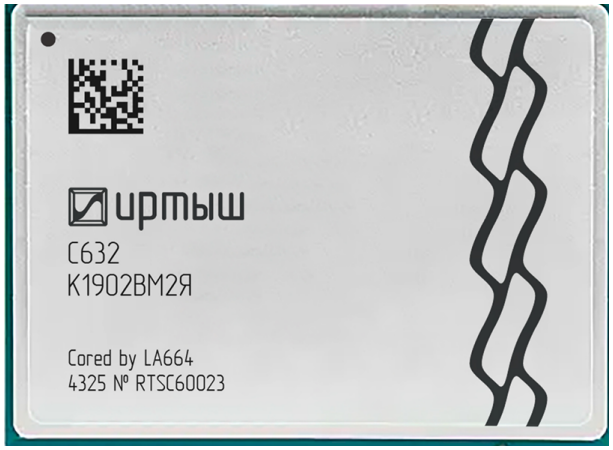
We promote trusted solutions in the Russian Federation and Eurasian Economic Union countries:

- Computing equipment;
- Servers;
- Laptops;
- Industrial computers;
- Hardware-software complexes;
- Data storage systems;
- Software (Open Source and proprietary);

Irtysh Processors: Technical Specifications

New Russian Irtysh Processors

Irtysh is a family of modern, high-performance processors based on the LoongArch architecture. They are designed for mission-critical tasks where reliability, cost-effectiveness, and manufacturing availability are essential. Fully software-compatible with existing software, featuring a proprietary ISA, Irtysh is a trusted solution for areas with high security requirements.

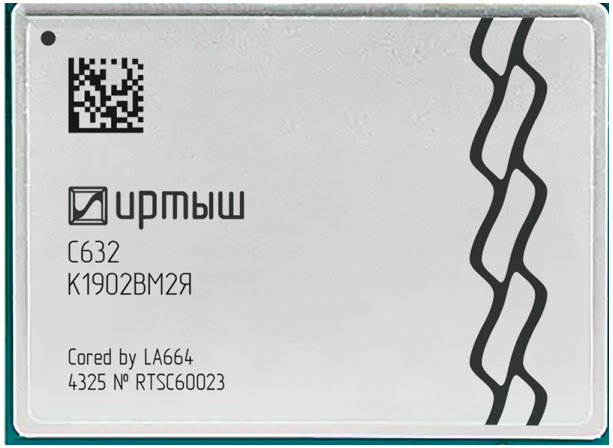


Technical Specifications
the Irtysh C616 server processor

Peak clock frequency	2.2GHz	Performance	844.8GFlops@2.2GHz
Number of cores	16	Number of threads	32
Number of chips on wafer	1	Typical power consumption	100-120W
Processor core	64-bit superscalar core LA664; Supports the LoongArch instruction set; Supports 128/256-bit vector instructions; 6-issue out-of-order execution; 4 fixed-point blocks, 4 vector blocks, and 4 access blocks.	Power management	Supports dynamic clock gating of the main module; Supports dynamic frequency scaling of the main clock domain; Supports dynamic regulation of the main voltage domain.
Interprocessor bus	LCL PCIe multiplexing	Security module	Own development that meets the requirements of Russian regulators.
Cache	Every core contains L1 of instructions: 64KB L1 of data: 64KB L2: 256KB Shared L3: 32MB	Memory	4 channels 72 -bit DDR4-3200
I/O	4 channels PCIe x 16 (64 Lane)	Other I/O	SPI UART I2C GPIO

Configuration Options:
- 1xIrtysh C616:
16 cores, maximum RAM 256 GB
- 2x Irtysh C616:
32 cores, maximum RAM 512 GB
- 4x Irtysh C616:
64 cores, maximum RAM 1 TB

Technical Specifications
the Irtysh C632 server processor



Peak clock frequency	2.1GHz	Performance	1612.8GFlops@2.1GHz
Number of cores	32	Number of threads	64
Number of chips on wafer	2	Typical power consumption	180-200W
Processor core	64-bit superscalar core LA664; Supports the LoongArch instruction set; Supports 128/256-bit vector instructions; 6-issue out-of-order execution; 4 fixed-point blocks, 4 vector blocks, and 4 access blocks.	Power management	Supports dynamic clock gating of the main module; Supports dynamic frequency scaling of the main clock domain; Supports dynamic regulation of the main voltage domain.
Interprocessor bus	LCL PCIe multiplexing	Security module	Own development that meets the requirements of Russian regulators.
Cache	Каждое ядро содержит L1 of instructions: 64KB L1 of data: 64KB L2: 256KB Shared L3: 32MB	Memory	8 channels 72-bit DDR4-3200
I/O	8 channels PCIe x 16 (128 Lane)	Other I/O	SPI UART I2C GPIO

Configuration Options:
- 1x Irtysh C632:
32 cores, maximum RAM 512GB
- 2x Irtysh C632:
64 cores, maximum RAM 1 TB

Technical Specifications
the Irtysh C664 server processor

Peak clock frequency	2.0 GHz	Performance	3072GFlops@2.0GHz
Number of cores	64	Number of threads	128
Number of chips on wafer	4	Typical power consumption	250-300W
Processor core	64-bit superscalar core LA664; Supports the LoongArch instruction set; Supports 128/256-bit vector instructions; 6-issue out-of-order execution; 4 fixed-point blocks, 4 vector blocks, and 4 access blocks.	Power management	Supports dynamic clock gating of the main module; Supports dynamic frequency scaling of the main clock domain; Supports dynamic regulation of the main voltage domain.
Interprocessor bus	LCL PCIe multiplexing	Security module	Own development that meets the requirements of Russian regulators.
Cache	Каждое ядро содержит L1 of instructions: 64KB L1 of data: 64KB L2: 256KB Shared L3: 32MB	Memory	8 channels72-bit DDR4-3200
I/O	8 channels PCIe x 16 (128 Lane)	Other I/O	SPI UART I2C GPIO

Configuration Options:
1x Irtysh C664:
64 cores, maximum RAM 1 TB
2x Irtysh C664:
128 cores, maximum RAM 2 TB

Technical Specifications
SoC Irtysh A68SV

Category	Characteristic	Value/description
Computing core	CPU	8 cores LA364 (64-bit), up to 2.0 GHz+
	Architecture	Triple-issue superscalar (3 instructions per tact)
	Cache memory	L1: 64+64 KB; L2: 6 MB (total)
Graphics and video	GPU	LG200 3D graphics (64 GFlops), AI acceleration 6 TOPS (8INT)
	Display	3 video outputs: HDMI + eDP + DP
	Video codecs	VVC/AV1/HEVC/VP9/AVS2.0/High10 H264/H.264/VP8/VC1 - 4K@30FPS MPEG-2 & MPEG-1/VP7/H.263/RV8/RV9/RV10 - 1080p@60FPS Hardware H.264 / H.265 (Enc/Dec)
Memory	RAM	64-бит DDR4 или 2x32-бит LPDDR4/DDR4
	Storage	eMMC, 2x SDIO, SATA 3.0
Interfaces	PCIe	2x PCIe 3.0 x4 (configurable), RapidIO
	Network and USB	2x RGMII (Gigabit), 4x USB 3.1, 8x USB 2.0
	Industrial networks	4x CAN-FD, 8x UART, 4x I2C, 2x SPI, 64x GPIO
Power supply and work conditions	Thermal management	~15 Вт (typical), supports DVFS
	Temperature	-40°C ... +85°C (Industrial)

Areas of applications:

- Industrial automation;
- Embedded devices;
- Onboard systems and specialized computing units;
- Robotics;
- Communications equipment;
- Internet of Things – IIoT/IoT;

Irtysh Processors: Solution Overview and Development Roadmap

Roadmaps and Outlook for 2026–2027

Areas of applications:

Cloud & Data Centers
Sovereign server solutions with full data control

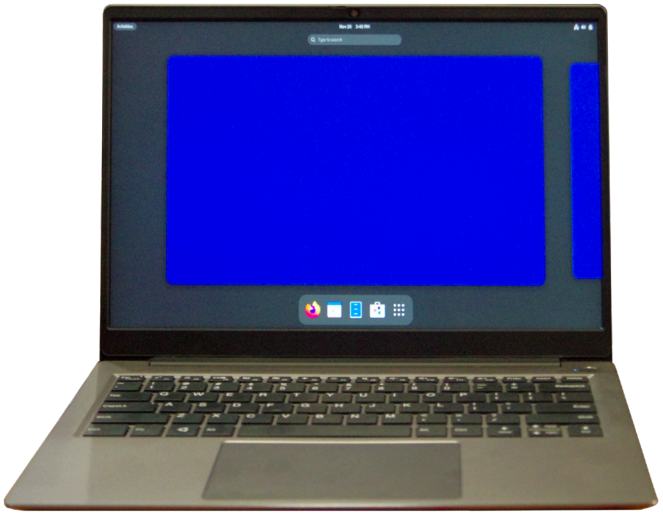
High-performance computing
Efficiency for scientific and engineering computations, big data processing

Government Sector & the Department/Ministry of Defense
Secure control systems, data encryption, secure servers

Banking & Finance
Payment systems, transaction processing, cybersecurity protection

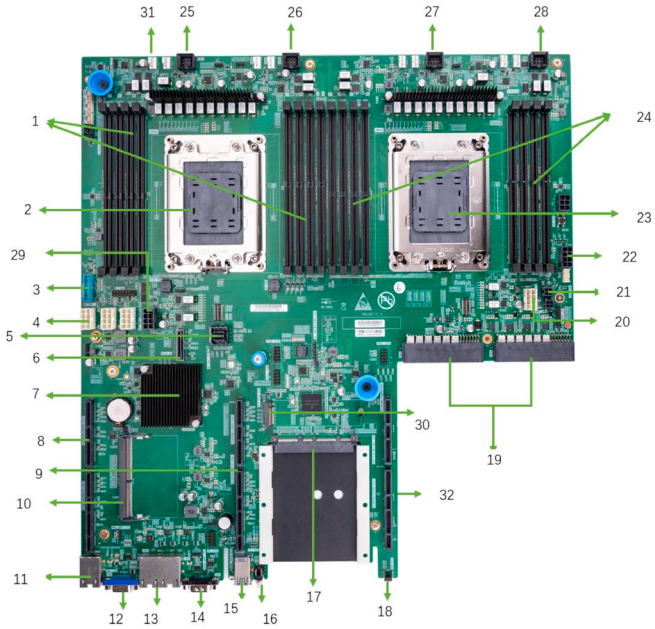
Industry & Energy
Automated control systems

Configuration and Computing Equipment Options:



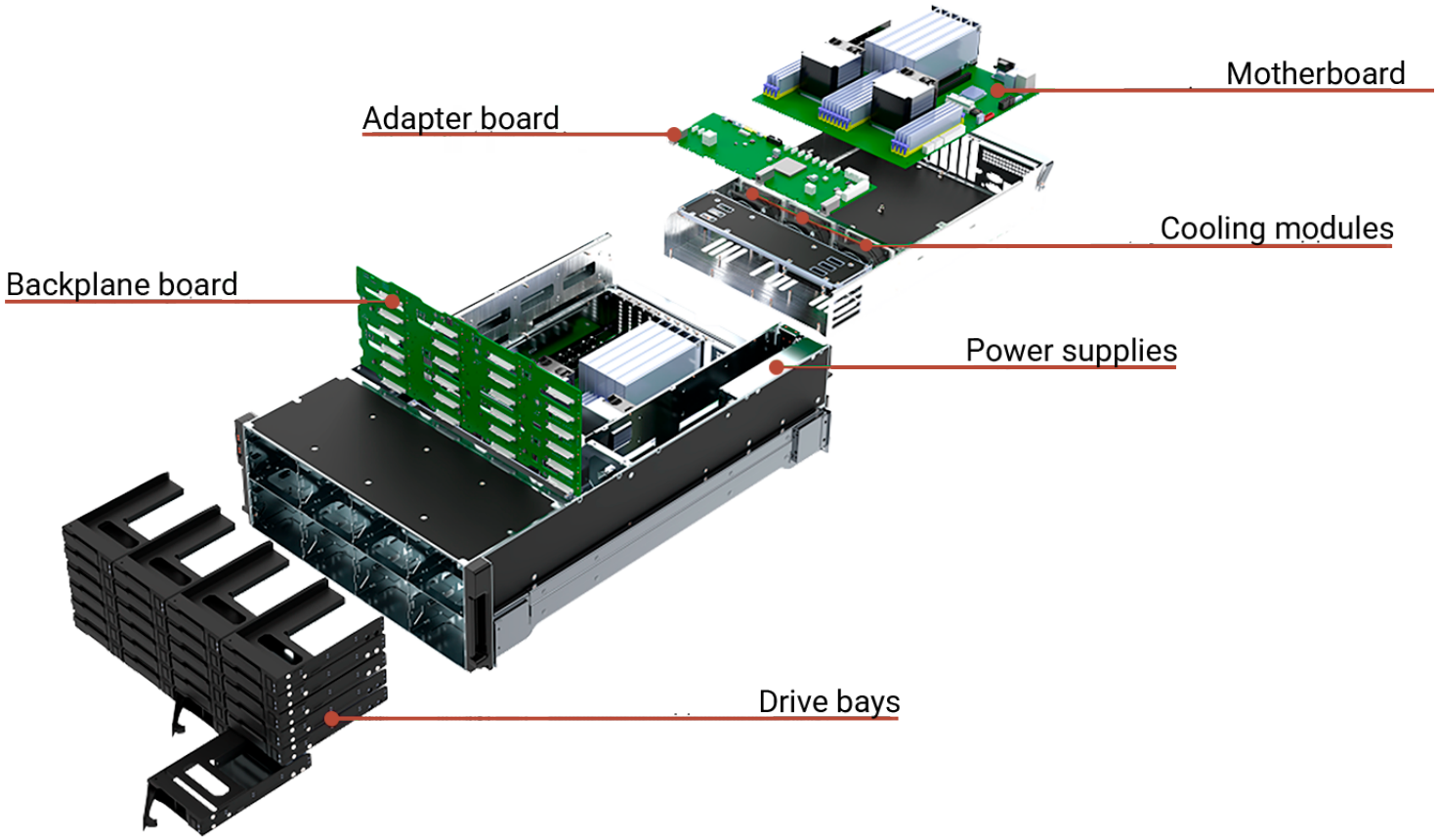
Personal computers and laptops

Servers and data storage systems



Possible server solutions:
• 2x Irtysh C664: 128 cores/256 threads, maximum RAM up to 2 TB;
• 2x Irtysh C632: 64 cores/ 128 threads, maximum RAM up to 1 TB;
• 2x Irtysh C616: 32 cores/ 64 threads, maximum RAM up to 512 GB.

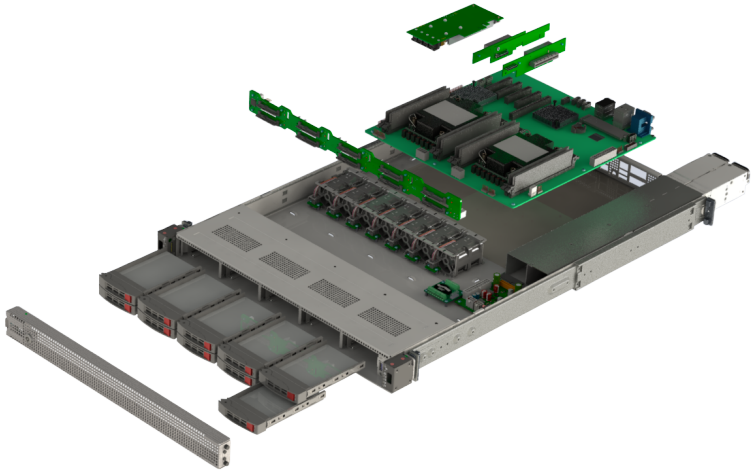
Structure of a Russian server solution
based on the Irtysh processor



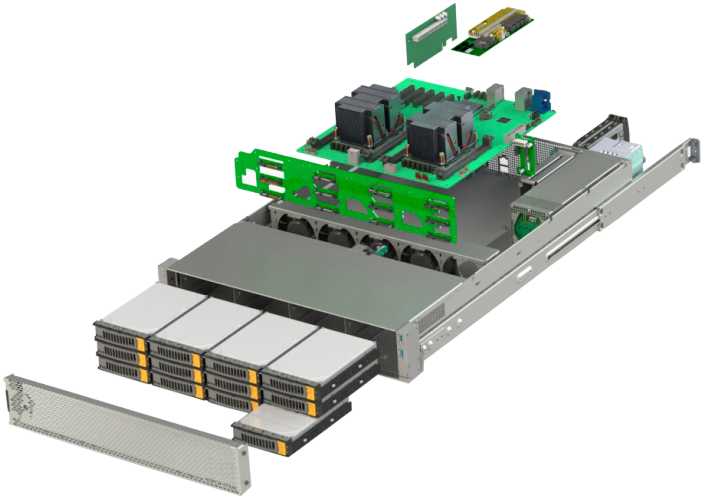
Assembly drawing: hardware platform of the **BITBLAZE Sirius 4100** data storage system

Chassis, drive bays, backplane, and adapter board – designed and manufactured by Promobit company.

Ready-made solutions
from partners Tramplin Electronics partners:



Nika 466533.422
Universal server 1U «Norsi-Dragon» 10SFF



Nika 466533.423
Universal server 2U «Norsi-Dragon» 12LFF

Nika 466533.506
System unit based on the NT Dragon 2C-3C5 «Manul-D» motherboard

Devboard on the Irtysh SoC

Use Cases:

• Industrial automation controller, IoT;

• Onboard computing device for transportation and unmanned aerial systems;

Key Specifications

Processor: Irtysh A68SV, 8 cores, 2.0 GHz, architecture LA364;

RAM: 1× DDR4-SODIMM, DDR4-3200, up to 32 GB, single-channel;

USB: 6× USB 3.0 + 6× USB 2.0

COM ports: 10 units

• COM1/2: full-signal RS232

• COM9/10: RS485

• Others: 3-wire RS232

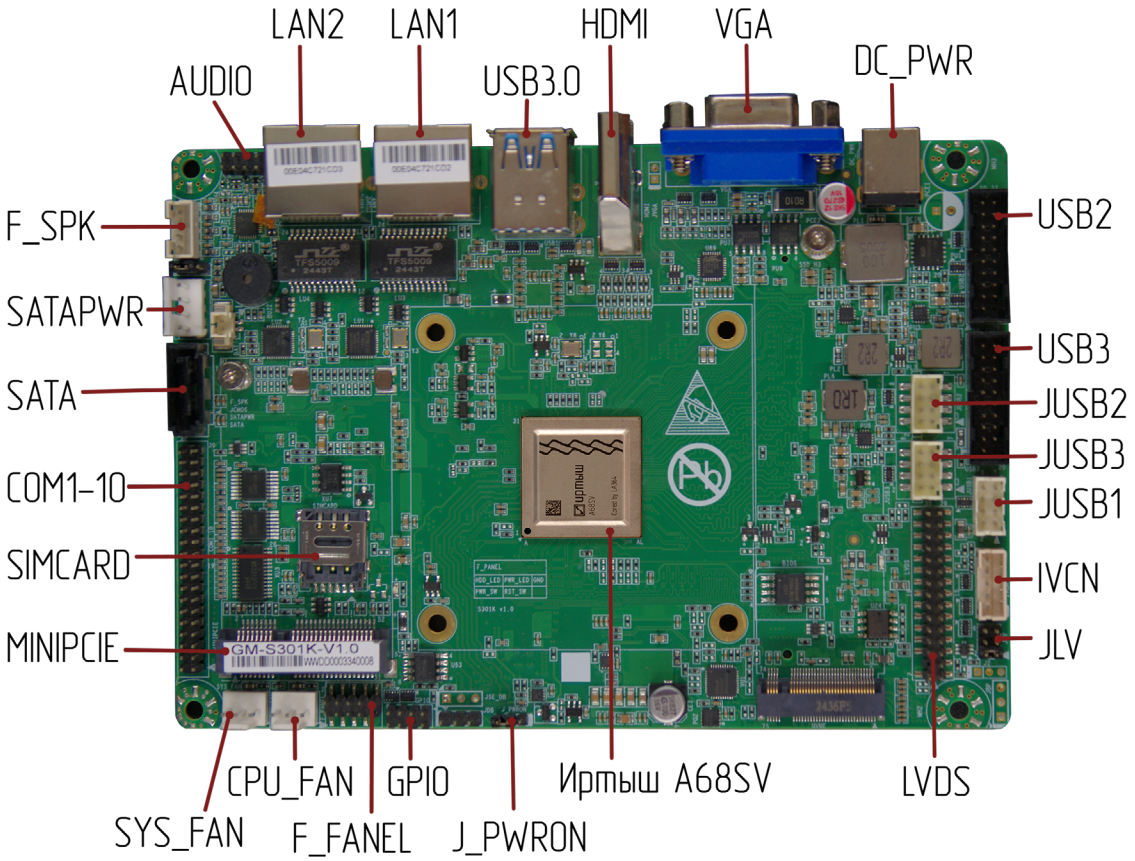
Display: 1× VGA, 1× HDMI, 1× LVDS or EDP (shared channel);

Expansion slots: 1× Mini PCIe, 1× M.2 SSD (Key-M, NVMe protocol), 1× SATA 3.0;

Audio: Line Out + Mic In + 1× F_SPK (up to 2.6W);

Power supply: DC 12V–36V (wide voltage);

Dimensions: 146*102 mm



Tramplin Electronics Partner Network

Омский государственный университет им. Ф.М. Достоевского

Irtysh Processors Development Roadmap 2026–2028

The 2nd quarter of 2026

• Submission of application to the Ministry of Industry and Trade for state registration* of Irtysh C616, C632, C664 processors;
• Voluntary certification;
• Support for ROSA OS;
• Strategic agreements with three server and data storage system manufacturers;
• Entry of proprietary UEFI into the registry;
• Start of development of proprietary security module.

The 3rd quarter of 2026

• Start of deliveries of A68SV engineering samples;
• Serial deliveries of Irtysh S616, S632, S664 processors;
• Market release of partner HSC engineering samples;
• Opening of the RTU MIREA educational center;
• Launch of educational program at OmSU (Omsk State University).

The 4th quarter of 2026

• Voluntary certification of CII (critical information infrastructure) HSC (hardware-software complexes);
• Registered hardware-software complexes;
• Engineering samples of server processors with proprietary security module;
• Educational laboratory at MTUCI.

The 1st quarter of 2027

•Serial deliveries of server processors with proprietary security module;

The 2nd quarter of 2027

• Serial deliveries of the A68SV system-on-chip;
• Engineering samples of graphics accelerators;
• Packaging of server processors with proprietary security module.

The 2nd quarter of 2028

• Start of export deliveries

Submission of applications for inclusion in the Registries of Russian Industrial Products under Russian Government Decree No. 719 of July 17, 2015, and the Registry of Russian Radio-Electronic Products under Russian Government Decree No. 878 of July 10, 2019, to confirm production localization on the territory of the Russian Federation, which is required for obtaining state support.

Tramplin Foundation

Tramplin Foundation — a noncommercial organization dedicated to the development of the scientific, educational, and research environment in the fields of microelectronics, computing systems, and advanced digital technologies.

The key goal of Tramplin Foundation is to create conditions in which talented students, educators, and engineers can:

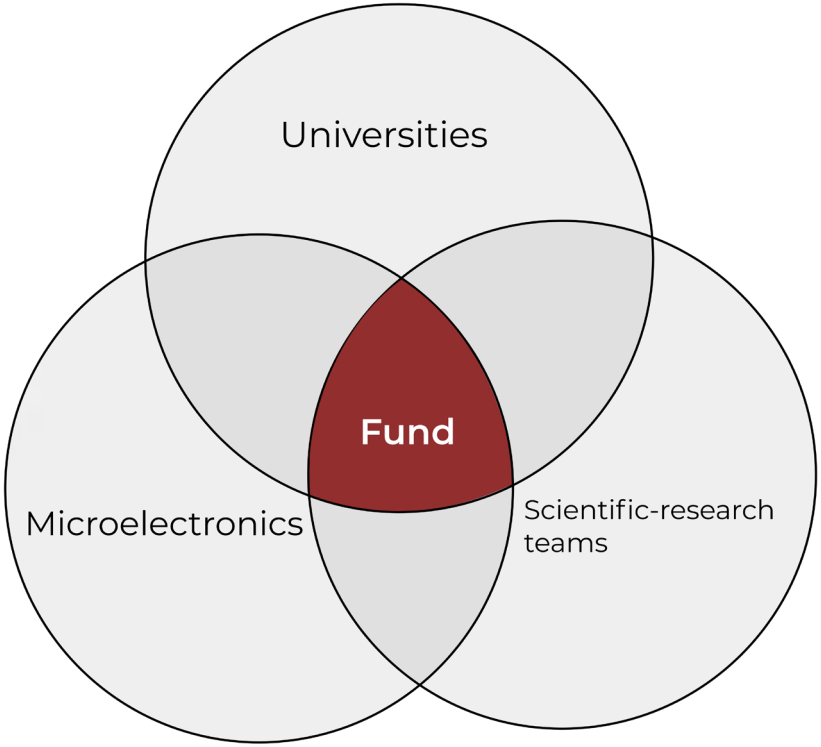
- acquire relevant knowledge that meets market demands;
- engage in real scientific and technological projects;
- unlock their potential;
- enhance their professional qualifications.

Омский государственный университет им. Ф.М. Достоевского

УНИВЕРСИТЕТ ЛОБАЧЕВСКОГО

НЕЙМАРК

Priority Fields of Activity of **Tramplin Foundation**



- Grant support for students and young researchers;
- Funding for research and development (R&D) work;
- Development of competencies in microprocessor architecture and low-level software field;
- Support for educators involved in the implementation of educational initiatives.

The foundation's plans include: launch of an educational program with Omsk State University (OmSU) (autumn 2026), a hackathon (spring 2027), lectures and meetups for students, schoolchildren, and developers, industry events, scientific conferences, and seminars.

Partnership with Universities

Pilot case – launch of an educational course together with Omsk State University (OmSU). The course is designed for students of the faculties of Applied Mathematics and Computer Science, Software Engineering, Information Security, Radiophysics and Electronics, Physics, Computer Science and Computing Technologies.

The program includes theory and practical problem-solving, including:

- Introduction to microprocessor architecture
- LoongArch architecture and Irtysh processor family;
- Low-level programming (C / Assembler);
- Operating systems and system programming;
- Compilers and toolchain;
- Parallel computing and architectures;
- Hardware verification and testing;
- Fundamentals of digital circuitry.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ОСНОВЫ ЦИФРОВОГО БУДУЩЕГО: ИИ,

Participation Format

• Courses are offered as electives and additional educational modules;

• Top students receive the opportunity to join project teams at Tramplin Electronics;

• Research scholarships are provided for educator and research staff, and academic scholarships for students, master's students, and postgraduates;

Further integration into R&D teams of the company and its partners is possible.

The foundation is ready to tailor its approach to meet the needs of each individual partner.

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Shaping Russia's technological future — together!

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