

Working Group Paper #17

Exposing and Exploiting the Kremlin's Software Networks and Dependencies

The International Working Group on Russian Sanctions

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<https://fsi.stanford.edu/working-group-sanctions>

The International Working Group on Russian Sanctions aims to provide expertise and experience to governments and companies around the world by assisting with the formulation of sanctions proposals that will increase the cost to Russia of invading Ukraine and that will support democratic Ukraine in the defense of its territorial integrity and national sovereignty. Our working group is comprised of independent experts from many countries. We coordinate and consult with the Government of Ukraine and those governments imposing sanctions. This consultation process helps to inform our views, but our members express independently held opinions and do not take direction from or act at the behest of the government of Ukraine or any other government, person, or entity. All members of this working group participate in their individual capacity.

EXECUTIVE SUMMARY

This working paper identifies the network of software that supports Russia's unlawful and destructive war in Ukraine. Many of the involved software developers and related parties maintain connections with companies in countries that have imposed sanctions, often through licensing or business ties.

Despite the Kremlin's efforts to reduce reliance on Western software for critical systems, this transition is progressing slowly. This sluggishness presents significant opportunities to disrupt Russia's military effectiveness and economic activities. Prompt and unified action is crucial to exploit these vulnerabilities.

Any profits that companies from sanction-imposing nations continue to make from their Russian operations, either directly or indirectly, significantly contribute to the devastation in Ukraine. The destruction of Ukrainian cities, infrastructure, and loss of civilian lives far outweighs any commercial benefits these companies might receive from their Russian engagements.

The paper is structured as follows:

1. **Recommendations** — Practical steps that should be followed immediately to the fullest extent possible by sanctions coalition countries.
2. **The Russian Software Landscape** — Highlights of Russia's main areas of dependence on software capabilities, and the efforts that have been taking place to reduce this dependency.
3. **Software in the Military Industrial Complex** — Focuses on the military industrial complex, the different ways software is used, critical enablers, and examples where sanctions coalition country companies continue to support Russia's capabilities.
4. **Software in the Energy and Extractive Sectors** — Looks at the energy and extractive sectors, which form the single largest economic pillar, and are tremendously reliant on modern Western software to maintain margins and productivity.
5. **Software in the Financial Sector** — Identifies how the financial sector continues to enable all economic activities, and yet how fragile banking and financial services are to the availability of a selection of Western software packages, including key Database Management Systems, Virtualization packages, and security infrastructure.
6. **Software in the AI Sector** — Examines recent advances in artificial intelligence, and how Russian entities are beginning to leverage breakthroughs for the war machine, including how enabling hardware and chips continue to be available within the Russian Federation, and are ultimately used for military purposes.
7. **Cloud Computing, Infrastructure, and Cloud Services** — Looks at cloud computing and storage providers' role, ranging from compute-intensive data centers replacing in-house computing resources, to cloud file storage services offered by the likes of Google, Microsoft, and Dropbox—each contributing to the resilience of Russia's economy, and ability to continue waging the war with minimal internal social consequences.

An appendix provides an extensive list of entities, individuals, networks, and pertinent details across the sectors discussed. The operations of these entities and individuals must be maximally constrained in order to impact the operations and logistics of Russia's war efforts.

WHY IS THIS IMPORTANT NOW?

The International Working Group on Russian Sanctions published a [series of recommendations](#) in November 2022 regarding the critical need to limit Russia's access to Western software and IT, licenses, training, and related infrastructure to use the technology in practice. Adoption of these recommendations has been slow, and Russia has benefited greatly from continued access to an almost full range of software dependencies to support their war efforts over the past year.

Russia uses Western software products to manufacture the munitions and key military systems that they are using to destroy Ukraine. They use Western software to extract oil and gas more efficiently to increase revenues in global markets and generate more funds for the Russian war machine. They use Western databases, analytics, and financial software to run a wartime economy intent on the destruction of Ukraine. They use Western network components and software in order to suppress the free flow of information, run information operations, and interfere in the governance of other countries around the world. Western companies continue to do business with subsidiaries and intermediaries to provide licenses, training, and software updates that are being used to maintain and enhance Russia's military operations.

This document partially uncovers the networks that remain active across several core government and industry sectors in Russia. While it is not a complete and comprehensive list, it is a wakeup call for sanctioning countries to do more to proactively shut down these networks; remove access to products, updates, and knowledge; and ensure that their IT developers and banking sectors are equipped to understand and react to the deviant strategies of Russian firms and state actors seeking to obtain or maintain access to critical capabilities.

1. RECOMMENDATIONS

This document provides detailed intelligence on the current status of the Russian software ecosystem supporting Russia's actions in Ukraine. Given Russia's ongoing attempts to reduce reliance on Western software through both substitution and illegal licensing/hacking of software products, we see a continuing window of opportunity to use sanctions and regulatory channels to minimize the enabling activities of Western software providers and their products within the Russian Federation. We propose the following key steps:

- **Impose sanctions on Russian software developers.** Target both individuals and legal entities involved in the development of key software. This document provides an extensive list of such entities but does not claim to be exhaustive.
- **Cease updates and support by Western vendors.** Ensure Western companies completely stop providing updates and technical support for software used by (or of potential use to) institutions in the Russian military-industrial complex. Governments should ask themselves whether IT support to any part of Russia's economy and society is appropriate in 2024.
- **Introduce developer responsibility.** Hold IT companies and intermediaries accountable if they continue to provide products, licenses, technical support, updates, or related infrastructure enablers in Russia. This includes IT and related technology companies becoming responsible for the same level of Know-Your-Customer (KYC) requirements as their counterparts in the banking sector. Financial sector entities have been subject to stringent background check requirements for years and have successfully adapted to this reality of doing business. There is no excuse for leading technology companies not to be similarly aware of their end users.
- **Monitor compliance with sanctions and export restrictions.** Implement continuous monitoring to ensure adherence to the imposed sanctions and restrictions. In particular, we recommend the indexing of country-level exports based on pre-war demand figures, to reduce the likelihood of circumvention of sanctions through a third country. It is unacceptable that large technology companies sell multiple times prior years' volumes to countries who likely resell to Russia, without consequence. If adequately enforced, this measure—together with KYC checks—would effectively curtail access to Western IT capabilities going forward.
- **Alert financial institutions.** Emphasize the importance of preventing financial transactions between Russian companies and software service providers. Ensure the responsibilities of financial intermediaries are clear and enforceable.
- **Prohibit participation in international events.** Ban Russian software developers from participating in international conferences, seminars, and other research events, and advocate for boycotting such events in Russia.
- **Establish a ban on receiving grants.** Prevent Russian companies and institutions engaged in software development from receiving grants from international foundations and private software investors.
- **Create a database of software alternatives.** Develop a database of alternatives to Russian software based on the recommendations given in ARPP's "Catalog of Compatibility of Russian Software," "Domestic Software," and "Competence Center for Import Substitution in the Field of ICT."
- **Inform businesses of consequences.** Communicate to businesses the negative implications of continuing to provide technical support for software in Russia.

2. THE RUSSIAN SOFTWARE LANDSCAPE

Software products are vital to the function Russia's state and to key industries like the military-industrial complex, extractive industries (notably oil, gas, coal), and the financial sector. The disruption of software sales or updates could significantly impede these sectors.

Recognizing the risks in relying on foreign software, Russia initiated the "Digital Economy" national program for software import substitution. The program has a stated goal for completion by the end of 2024, and a presidential decree mandates government agencies use only domestic software in critical information infrastructure from 2025 onward. However, transitioning to Russian software is challenging, and has often led to delayed deadlines.

To support this transition, the Russian government provides preferential lending and grants for Russian IT solutions, and IT specialists are deferred from mobilization, provided they meet specific criteria regarding citizenship, employment, and company accreditation.

In 2022, Russian enterprises invested a record 310 billion rubles (~\$4.6B in 2022 dollars at the average exchange rate) in software creation and purchase, a 2.7-fold increase over five years. Major investments were in information and communications (131.3 billion rubles, ~\$2B), manufacturing (61.2 billion rubles, ~\$917M), trade (35 billion rubles, ~\$518M), professional and scientific services (27.5 billion rubles, ~\$407M), and transport and warehousing (14 billion rubles, ~\$207M), excluding financial organizations and government agencies.

Since 2016, the Russian Ministry of Digital Transformation operates the "Register of Russian Software," featuring over 18,000 Russian products from nearly 7,000 owners. The Ministry has also established a headquarters for IT company monitoring, including representatives from major national IT firms Yandex, 1C, and VK, as well as various governmental departments. This team, led by people like Dmitry Sergeevich Nikitin and Volodymyr Bengin, aims to identify and mitigate risks to IT organizations and ensure their sustainable development.

Challenges in Achieving Autonomy

Transitioning away from Western software has proven to be a complex and arduous process. Several factors contribute to the challenges faced by Russia in achieving autonomy in the software landscape:

Technical Complexity: Replacing established Western software products with domestic alternatives requires the development of software that matches the functionality and reliability of the existing systems. Achieving this level of technical proficiency is a difficult task that demands time and resources.

Resource Allocation: The development of indigenous software diverts resources away from other critical areas, including the ongoing conflict in Ukraine. As the Russian state allocates more resources to software development, and as the resulting software is less effective than Western products, it has less to devote to its military efforts and the war economy. This strains the state's capacity to finance and support its military endeavors.

Technical Expertise: Building a sophisticated software ecosystem requires a deep pool of technical expertise. While Russia possessed a significant talent pool before the war, massive migration of the tech community and the general complexity of replicating Western software solutions requires substantial time and investment in developing human capital.

Vulnerabilities and Dependencies: The process of migrating away from Western software has exposed vulnerabilities and dependencies in Russia's software landscape. Many key sectors of the economy and military-industrial complex (MIC) remain reliant on Western products, making them susceptible to supply

chain disruptions, licensing lockdowns, lack of new training offerings, and vulnerabilities that could be exploited during the conflict.

Taken together, it is clear that there is still a window for sanctions to be effective in hampering the software ecosystem and diverting resources away from the destruction of Ukraine. It is imperative to take action immediately, to the fullest extent possible, to prevent Western software products from supporting Russia's wartime economy and enabling Russian hostilities. To the extent that there is a calculus of decision making in the Kremlin, we must shift that calculus towards activities that reduce Russia's capabilities and capacity for war against Ukraine.

3. SOFTWARE IN THE MILITARY INDUSTRIAL COMPLEX

The Russian military-industrial complex and law enforcement agencies heavily rely on a web of software systems, many of which are developed or supported indirectly through Western technology and expertise. This interconnected software landscape plays a crucial role in Russia's military and civilian infrastructures. Targeted sanctions and strong enforcement on these software systems and their developers could significantly impact Russia's operational capabilities, both militarily and economically. It is of vital importance to immediately deploy sanctions both upstream and downstream to effectively disrupt these systems.

Key software systems include the "Mobile System of the Armed Forces," a secure operating system based on Red Hat Linux which has been used by the Russian Armed Forces since 2002. Its developer, JSC "All-Russian Research Institute of Control Automation in the Non-Industrial Sphere," is linked to other entities under Ukrainian sanctions. These relationships illustrate the complex network of developers and users in Russia's software ecosystem, extending to the National Guard and the Ministry of Defense (see the appendix for full details of the entities and relationships).

Another significant system is "Zarya," a secure operating system and database management system for military applications that is also based on Red Hat Enterprise Linux. Developed by JSC "Central Research Institute of Economics, Informatics and Control Systems," this software has repeatedly been supplied to the Russian Ministry of Defense.

"Neutrino," a real-time operating system built on the QNX platform, exemplifies the reliance on foreign platforms. Developed by SVD Embedded Systems LLC, it is connected to other software development entities and has supplied various sanctioned military-industrial enterprises.

The "Alt 8 SP" operating system, intended for corporate use, highlights the international collaboration in software development. It is based on the Russian "Sisyphus" repository but developed jointly by Bazalt SPO LLC and the group of companies under the umbrella of JSC "Information Implementation Company." The intricate web of relationships between these entities underscores the complex nature of the Russian software industry.

Astra Linux, an alternative to Microsoft Windows in Russian government organizations, was developed by JSC "Scientific and Production Association Russian Basic Information Technologies." Its partners include Dell and several Russian entities, demonstrating the blend of Western and Russian technologies in critical software systems.

RED OS, a Russian operating system for servers and workstations, shows a domestic shift away from Western software. Developed by Red Soft LLC, it's certified by Russian agencies for use in state information systems, further indicating Russia's attempt at technological self-reliance.

The use of CAD/ECAD/CAM/CAE systems like "ElectriCS Pro Aviation" and PolygonSoft for military equipment development further illustrates the sector's dependence on specialized software for critical operations.

The involvement of multiple software systems in different layers of Russia's military and civilian infrastructure, often supported indirectly by Western technology, highlights the crucial role of software in modern warfare and governance. This interconnectedness suggests that carefully targeted sanctions on these software systems and their developers could significantly impact Russia's operational capabilities both militarily and economically. It is of vital importance to deploy sanctions both upstream and downstream to effectively disrupt these systems.

4. SOFTWARE IN THE ENERGY AND EXTRACTIVE SECTORS

The Russian energy industry relies heavily on advanced reservoir modeling software primarily provided by Western oilfield companies. This dependency on Western technology enables Russian oil firms to enhance efficiency and recovery rates, thus significantly reducing their operational costs. Despite efforts at import substitution, Western software providers retained a dominant market share of 60% as of 2020.

Reservoir engineering and reservoir modeling software are essential for the design, management, and exploitation of oil and gas deposits. Among the key software systems used in Russia is "Roxar RMS" and "Paradigm" from AspenTech and Emerson Electric Co., respectively. These tools aid in optimizing reservoir management strategies and offer detailed insights into subsurface reservoirs. Despite sanctions, these software packages remain accessible in Russia through local representatives and continue to be utilized by major Russian oil companies like Rosneft, Gazprom, and others.

Halliburton's Landmark Engineer's Desktop (Edt) is another integral software suite in the Russian oil industry, offering a range of applications for well development and production. Although Halliburton reduced its presence in Russia, its former business, now operated under BurService LLC, retains access to this software.

SLB (formerly Schlumberger) also plays a significant role in Russia's oil and gas industry with its "Eclipse" and "Petrel" software. These programs are crucial for reservoir modeling and have been integrated into the Russian IT sector through a partnership with Yandex.Cloud. This collaboration allows Russian energy companies to leverage AI and big data for enhanced efficiency.

Baker Hughes's Jewel Suite Software, known for developing optimal strategies for complex field development, is another example. Post-sanctions, the Russian division of Baker Hughes rebranded as JSC OFS Technologies and continues to offer services that employ the use of specialized software.

The software "STARS" by CMG, an industry standard for hydrodynamic modeling, is used by major Russian oil companies. Russian educational institutions also hold academic licenses for this software.

Additionally, Weatherford's ReO software, a part of the Weatherford Field Office™ suite, is recognized for its capabilities in modeling petroleum engineering and optimizing production. Despite the sanctions, Weatherford LLC in Russia reported significant revenue in 2022 and continues to fulfill existing contracts.

These examples illustrate the deep integration of Western software in the Russian energy industry and its significance in enhancing the efficiency and profitability of Russian oil companies. Despite sanctions and the reduced presence of Western companies, Russian firms continue to access and utilize these advanced software systems, underscoring the importance and viability of effective sanctions policies and enforcement.

5. SOFTWARE IN THE FINANCIAL SECTOR

As of early 2023, the import substitution of system software in the Russian financial sector remained largely incomplete, with only 3% of systemically important enterprises and 1.7% of critical infrastructure entities having fully transitioned. A majority (53%) were still planning this transition. This slowness provides a unique (but disappearing) window of opportunity to leverage sanctions on DBMS, server equipment, analytical and virtualization systems, and information security platforms to immediately impact Russia's ability to sustain its war financing systems.

Russian banks rely heavily on two core information systems: the Automated Banking System (ABS) and processing systems. There are currently no specific import substitution solutions for these systems.

Database Management Systems (DBMS): Russian banks predominantly use Oracle Database and Microsoft SQL Server. Both Oracle and Microsoft have ceased operations in Russia, with Oracle also stopping all services and support. This has led banks to ban Oracle updates to maintain system stability and plan no immediate changes for 6 to 8 months. Russian alternatives include Diasoft Database Adapter, Nexign Nord, RDBMS LINTER BASTION, Postgres Pro DBMS, Tantor DBMS, Red Database, and "Novaya Athena". It is clear that recently identified unpatched vulnerabilities in such critical financial systems could be exploited to prevent the further illegal use of these platforms within the Russian Federation.

Server and Network Equipment: There's a notable shortage of server and network equipment in Russian banks, partly due to the withdrawal of American company Cisco from Russia. Russian banks are exploring options, including Chinese equipment and 'gray' import schemes. Russian alternatives are UserGate Client, SAKURA Software Package, Ideco UTM, Traffic Inspector Next Generation, ViPNet Coordinator HW 4, "ICS Firewall," and "Hardware and software complex FPSU-IP version 3".

Analytical Systems: Russian banks face challenges with SAS and IBM analytical systems, used for functions like credit scoring. There are no full-fledged Russian analogs for SAS. Alternatives include Digital Q.Reporting, "GRC Risk Event Accounting," Linkage Navigator, Polymatica, pSeven Enterprise, PolyAnalyst, and Triafly.

Virtualization Systems: Russian banks extensively use American virtualization solutions from VMware and Citrix. Transitioning to Russian systems could involve functionality loss and require 'constructors' from different vendors. The transition could take 6 to 18 months. Russian alternatives include ROSA Virtualization, "ASTER Multi-User Extension," Horizon-BC, "Virtualization Tools 'Brest'," and "RUSTEC Cloud Platform".

Information Security and Encryption: Russian banking security largely depends on foreign equipment like American SafeNet or French Thales. Transition to Russian equipment and software has been slow. Russian alternatives are JaCarta AWS UC, Unified Client JaCarta, ViPNet HSM, and Garda DB.

Mobile Platform Access: Sanctions have impacted mobile banking, notably with Apple removing the VTB mobile application from the AppStore, although Android applications remain functional.

In summary, while Russian banks are significantly dependent on Western software and equipment, especially in critical areas like DBMS, server equipment, analytical and virtualization systems, and information security, they are gradually exploring Russian alternatives. However, challenges in terms of functionality, reliability, and transition time are apparent.

6. SOFTWARE IN THE AI SECTOR

The Russian Federation has implemented a "2030 National Strategy for the Development of Artificial Intelligence" to advance AI technologies. This initiative includes scientific research, improving access to information and computing resources, and implementing Russian AI solutions in various economic sectors. The federal project "Artificial Intelligence," running until the end of 2024, has a budget of RUB 29.2 billion (~\$324M) from both budgetary and extra-budgetary sources.

Developments in the field of AI rely heavily on both computational infrastructure, hardware, data, and skilled human capital. As a prime example, NVIDIA GPU's continue to be broadly available within the Russian Federation, including within new state-of-the-art data centers, which support progress in this sector.

Key Figures in Russian AI Development:

- Dmitry Chernyshenko, Deputy Prime Minister, oversees the federal project.
- Maxim Kolesnikov, Deputy Minister of Economic Development, leads the project.

AI Market Overview:

- The AI market in Russia grew by 18% in 2022, reaching RUB 650 billion.
- Yandex and VK are market leaders, controlling 48% of the market.
- Geographical concentration is high, with 71% of AI companies based in Moscow.

Significant AI Developments:

Yandex

- CatBoost: A machine learning library for improving search engine results and various internet services.
- ClickHouse: A columnar database for real-time big data analytics.
- Masterpiece: A generative neural network for creating images from descriptions.
- YaGPT: A text-generating neural network used in various Yandex applications.
- Alexander Kraynov leads AI technology development at Yandex.

VK (VKontakte)

- Cloud ML Platform: A GPT model project under development.
- Voice Assistant "Marusya": Performs various voice commands and supports multiple functionalities.
- NeuroHD: A neural network for enhancing image clarity.

Sberbank

- ruDALL-E: Generates images from text descriptions.
- Kandinsky 2.0: Creates and redraws images based on text requests.
- ruGPT-3.5: A text generation neural network model.

AI RI Institute

- Conducts fundamental and applied AI research.
- Developed a neural network for automatic analysis of literary texts.

Kaspersky Lab and Motive NT

- Kaspersky Neuromorphic Platform (KNP): Creates and trains AI systems using the neuromorphic processor "Altai."

Rosatom Subsidiaries

- Implementing an "Intelligent Solution for Analysis of Regulatory Documentation" to streamline nuclear power plant design processes abroad.

MTS AI

- TenVision: Develops cloud video surveillance and analytics services.
- Audiogram: A platform for speech synthesis and recognition.
- NLP Platform: A low-code tool for creating voice and text bots.
- Service for Communication Analysis: Automates the analysis of operator and chatbot communications.

These developments reflect Russia's strategic focus on AI, with significant advancements in machine learning, neural networks, and AI applications across various sectors. However, it is important to note that advancements in AI cannot happen without the support of Western companies who provide critical software and hardware for state-of-the-art modelling and data processing. Among these, NVIDIA GPUs are among the most widely used, and recent announcements by Yandex show that these chips are still being purchased and are available within Russia for new data centers.

7. CLOUD COMPUTING, INFRASTRUCTURE, AND CLOUD SERVICES

In the Russian cloud services market, significant growth is expected in the Infrastructure as a Service (IaaS) segment, with a forecasted increase of 45-50% by the end of 2023. This growth mirrors the trends of 2022 and is driven by two main factors: the demand for import substitution and the migration of company information systems to cloud environments. Additionally, Russian legislation mandates that cloud providers store data exclusively within the country's borders.

It should be noted that key virtualization software, network equipment, and related infrastructure are designed and developed by Western companies, which means the Russian cloud computing market's expansion is subject to the effectiveness (or ineffectiveness) of Western sanctions on those inputs.

Key Trends in the Russian Cloud Market:

- Uneven development, with significant revenue growth for providers involved in government projects (like Gosoblako) and major providers like Yandex, Cloud.ru, VK Cloud, and Rostelecom.
- High growth rates for market leaders, exceeding 100%, while other players show more modest growth.
- IaaS (Infrastructure as a Service) developments are the primary market driver, offering cost optimization for IT infrastructure amid rising equipment costs and complex procurement processes. This centralization of equipment and procurement should be a target of sanctions.
- Web-based SaaS (Software as a Service) services are more likely to be cut for cost reductions, where they play a non-critical role.
- PaaS (Platform as a Service) services are in early development stages with significant potential to enable rapid new product development across sectors. AI also plays a role in the acceleration of these capabilities at smaller firms.
- Solutions involving hybrid clouds, containerization, and serverless clouds also show promise.

Migration Trends:

The migration from foreign clouds, prominent in 2022-2023, is expected to be largely completed by the end of 2024. This was a missed opportunity to apply sanctions to disrupt critical IT pathways for the war effort—[a key recommendation that this group made in November 2022](#).

Legislation Compliance and Virtualization Systems:

- Some cloud service providers continue to operate data centers outside Russia, contrary to local legislation.
- A notable trend is that 20 out of 28 major Russian cloud service providers use VMware Inc.'s virtualization system. VMware holds about 75% of the global virtualization market and is integral to many enterprises' IT infrastructure.
- VMware's system is a closed virtualization system and reliant on updates from the developer. Thus, any restrictions on updates to Russian providers could significantly impact their performance.

Western Cloud Services in Russia:

Despite the focus on Russian cloud services, Western cloud file storage systems remain accessible in Russia. These include services from Abbyy, Atlassian, Amazon.com, Dropbox, Google, IBM, KMS Lighthouse, Microsoft, Netwrix Corporation, Nextcloud GmbH, Oracle, ownCloud GmbH, SAP, StealthBits, Veritas Technologies, and VMware.

The current state of the Russian cloud services market highlights the sector's dynamic growth, driven by domestic legislation and market trends, and the crucial role of major players and technologies like VMware in shaping the industry's future.

APPENDIX

Software and related entities by sector. Companies listed here actively develop, sell, license, or support the use of critical software within the Russian Federation.

MILITARY INDUSTRIAL SECTOR

1. **Name:** Mobile System of the Armed Forces

Related Companies: JSC "All-Russian Research Institute of Control Automation in the Non-Industrial Sphere. V.V. Solomatin" (TIN: 7727062154), JSC "Concern VNIINS" (TIN: 7727133398)

Related People: Sergey Mikhailovich Manyashin (TIN: 772640133380), Anton Valentinovich Solomatin (TIN: 770803082759)

Type of Software: General-purpose secure operating system

2. **Name:** Zarya (OS and DBMS)

Related Companies: JSC "Central Research Institute of Economics, Informatics and Control Systems" (TIN: 7703824477)

Related People: N/A

Type of Software: Secure operating system and database management system

3. **Name:** Neutrino

Related Companies: SVD Embedded Systems LLC (TIN: 7810267943), Nautsilus LLC (TIN: 7728089039)

Related People: Andrey Andreevich Fefilov (TIN: 525406369997)

Type of Software: Secure real-time operating system

4. **Name:** Alt 8 SP

Related Companies: Bazalt SPO LLC (TIN: 7714350892), JSC "Information Implementation Company" (TIN: 7702157005), LLC STC "Phobos-NT" (TIN: 5751030791), Non-Profit Partnership of Software Developers Russoft (TIN: 7826711265), ARPP Otechestvenny Soft (TIN: 7705058764)

Related People: N/A

Type of Software: Operating system for group and corporate use

5. **Name:** Astra Linux

Related Companies: JSC "Scientific and Production Association Russian Basic Information Technologies" (TIN: 7726604816), LLC "Dell" (TIN: 7704648707), Spirit Corp LLC (TIN: 7708072894), Firma Ankad LLC (TIN: 7735081665), JSC "Bars Group" (TIN: 1655251590), JSC "Concern VKO "Almaz-Antey" (TIN: 7731084175), JSC "Infowotch" (TIN: 7713515534), JSC "Krymtekhologii" (TIN: 9102261167), RPE Relex LLC (TIN: 3666123762), SAP CIS LLC (TIN: 7705058323), IBM Eastern Europe/Asia LLC (TIN: 7705041866)

Related People: Pavel Yurievich Kabankov (TIN: 694903071846), Alyushina Natalia Vladimirovna (TIN: 110100847382), Kryukova Galina Alexandrovna (TIN: 772806196878), Romanets Yuri Vasilyevich (TIN: 773505155326)

Type of Software: Operating system based on the Linux kernel

6. **Name:** RED OS

Related Companies: Red Soft LLC (TIN: 9705000373)

Related People: Maxim Vladimirovich Anisimov (TIN: 504009366145), Veselkin Kirill Evgenievich (TIN: 773409806046), Koptev Alexey Petrovich (TIN: 500707029689), Komlev Vyacheslav Aleksandrovich (TIN: 773418895243), Rustam Rustamov (TIN: 056205797710)

Type of Software: Linux family operating system for servers and workstations

7. **Name:** ElectriCS Pro Aviation and PolygonSoft (SYSOFT Development JSC)

Related Companies: JSC "SYSOFT Development" (TIN: 7722570620), JSC "Sysoft" (TIN: 7719266637), JSC "Lear Consulting" (TIN: 7722146354)

Related People: Alexander Borisovich Krylov (TIN: 501702897838)

Type of Software: CAD/ECAD/CAM/CAE systems

8. **Name:** QForm

Related Companies: QuantorForm LLC (TIN: 7731199056)

Related People: Stebunov Sergey Alexandrovich (TIN: 773109070044), Biba Nikolai Viktorovich (TIN: 772808141419), Zaivy Andrey Ivanovich (TIN: 50270791)

Type of Software: Simulation program for metal forming processes

9. **Name:** FlowVision and KompasFlow (Tesis LLC)

Related Companies: Tesis LLC (TIN: 7731238717)

Related People: Sergey Nikolaevich Kursakov (TIN: 773404815248), Andrey Aleksandrovich Aksyonov (TIN: 773104653170)

Type of Software: Aero-hydrodynamics and multidisciplinary modeling software

10. **Name:** pSeven

Related Companies: Datadvans LLC (TIN: 7701899205)

Related People: Sergey Mikhailovich Morozov (TIN: 507002488661)

Type of Software: Software platform for data analysis, optimization, and engineering calculations

11. **Name:** SimInTech

Related Companies: 3B Service LLC (TIN: 7726602103)

Related People: Vyacheslav Nikolaevich Petukhov (TIN: 672401894247), Anton Pavlovich Goldovsky (TIN: 771472138625), Alexey Nikolaevich Petukhov (TIN: 672402261938)

Type of Software: Environment for dynamic modeling of technical systems

12. **Name:** Logos

Related Companies: Russian Federal Nuclear Center - All-Russian Research Institute of Experimental Physics (TIN: 5254001230), JSC "State Scientific Center of the Russian Federation "Keldysh Research Center" (TIN: 7743355574)

Related People: N/A

Type of Software: CAE software for numerical modeling

13. **Name:** SprutCAM, SPRUT-TP, SPRUT-OKP

Related Companies: SPRUT-Technology LLC (TIN: 1650301536)

Related People: Alexander Kharlampievich Kharadzhiev (TIN: 165006984304)

Type of Software: Software for designing, production planning, and management

14. **Name:** ADEM-CAM, ADEM-CAPP

Related Companies: Adem-Engineering LLC (TIN: 9718084250), Krona LLC (TIN: 1841029507)

Related People: Viktor Viktorovich Silin (TIN: 771604571771), Alexey Alexandrovich Kozakov (TIN: 183506148586)

Type of Software: CAD/CAM system and technological processes design software

15. **Name:** Vertical, Pilot: PLM, KOMPAS-3D

Related Companies: ASCON JSC (TIN: 7809009923), Ascon-Design Systems LLC (TIN: 7801619483), Ascon-Business Solutions LLC (TIN: 5022043938), Ascon-Integration Solutions LLC (TIN: 7801586358), SZD Labs LLC (TIN: 7715938849), LLC "Ascon-Suzhts" (TIN: 7801586358)

Related People: Maxim Yurievich Bogdanov (TIN: 781706940022)

Type of Software: CAD and product life cycle management system

16. **Name:** KOMRADEnterpriseSIEM

Related Companies: Echelon Technologies JSC (TIN: 7718859120), IT Bastion LLC (TIN: 7717789462)

Related People: Alexander Vladimirovich Dorofeev (TIN: 772373962199)

Type of Software: Information security event management system

17. **Name:** IVK Bureaucrat

Related Companies: JSC "Information Implementation Company" (TIN: 7702157005), LLC PK "Vega" (TIN: 7718159030), ASK Integrator LLC (TIN: 7714342764), LLC "VN-Systems" (TIN: 5031151094)

Related People: Grigory Evgenievich Sizonenko (TIN: 772006706664)

Type of Software: Secure electronic document management system

18. **Name:** Secret Net Studio-C

Related Companies: Security Code LLC (TIN: 7715719244), Trustverse LLC (TIN: 7702668850), LLC "Rusatom - Digital Solutions" (TIN: 7726447225)

Related People: Andrey Viktorovich Golov (TIN: 771535025271), Philip Georgievich Gens (TIN: 773601231259)

Type of Software: Endpoint security solution for workstations and servers

19. **Name:** Dallas Lock 8.0-C

Related Companies: Confident LLC (TIN: 7811072513), Confidential-Integration LLC (TIN: 7811512250), Confidential-Distribution LLC (TIN: 7811771825)

Related People: Petr Aleksandrovich Kuznetsov (TIN: 782576569254)

Type of Software: Information protection system

20. **Name:** MDZ-Echelon Trusted Boot Module

Related Companies: JSC NPO Echelon (TIN: 7718676447)

Related People: N/A

Type of Software: Trusted boot software module

21. **Name:** Windchill

Related Companies: PTC Inc (Company Number: 001076660), Productive Technological Systems LLC (TIN: 7709812157)

Related People: Marina Klimova (TIN: 772140093500), Andrey Klimov (TIN: 772146341396)

Type of Software: Web-based database system

22. **Name:** SolidWorks

Related Companies: Dassault System LLC (TIN: 7743842200), DASSO SYSTEM INTERNATIONAL SAS (France), DASSO SYSTEM DEUTSCHLAND GMBH (Germany)

Related People: Alexander Nikolaevich Schipanov (TIN: 771574414666)

Type of Software: CAD software package

23. **Name:** Software Solutions for the Ministry of Internal Affairs and Ministry of Defense of the Russian Federation

Related Companies: JSC Papillon (TIN: 7415020254), LLC "Information Technologies Papillon" (TIN: 7415099399), Adis LLC (TIN: 7415068591)

Related People: Pavel Anatolyevich Zaitsev (TIN: 741500850059)

Type of Software: Security and management systems

24. **Name:** NetBeholder Tracking System

Related Companies: MFI-Soft LLC (TIN: 7710657509), PJSC "Moscow City Telephone Network"

Related People: Pavel Aleksandrovich Nikitin (TIN: 773116522076)

Type of Software: Communication tracking system

25. **Name:** Tracking System from STC Protey LLC

Related Companies: Proteus Science and Technology Center LLC (TIN: 7825483961), Protey ST LLC (TIN: 7802471913), Protey TL LLC (TIN: 7802862459), Protey IT-Engineering LLC (TIN: 7203447485), Neos LLC (TIN: 7802700779), Protei-LAB LLC (TIN: 7802891097), Sigurd-Aity LLC (TIN: 7802695166), TPK Optima LLC (TIN: 7810818365)

Related People: Nina Apostolova (TIN: 781409080631), Vladimir Anatolyevich Freinkman (TIN: 781009543525), Yuri Viktorovich Kolobkov (TIN: 781009534930), Anton Vladimirovich Pinchuk (TIN: 781009520662), Maxim Sergeevich Maslov (TIN: 781305261217)

Type of Software: Voice-to-text conversion and digital surveillance tools

26. **Name:** Tracking System from VAS Experts LLC

Related Companies: VAS Experts LLC (TIN: 7841476577), Itglobalcom Labs LLC (TIN: 7841483359), Simple 1 LLC (TIN: 9725013892), Growth Driver LLC (TIN: 7841054159)

Related People: Dmitry Valerianovich Gachko (TIN: 781116792283), Dmitry Viktorovich Moldavanov (TIN: 471404568036), Alexander Gennadievich Dmitriev (TIN: 781610395834), Alexey Aleksandrovich Alekseenko (TIN: 471401858259)

Type of Software: Software solutions for communication and internet traffic monitoring

27. **Name:** Yclients CRM

Related Companies: Waiklaents LLC (TIN: 7708274185), Peletino Limited (Cyprus)

Related People: Yuri Aleksandrovich Petrov (TIN: 780440638404)

Type of Software: Customer relationship management system

28. **Name:** ERA Foundation Software

Related Companies: Era Fund LLC (TIN: 6316237712), PSB Innovations and Investments LLC (TIN: 7731290146)

Related People: N/A

Type of Software: Software for defense and security projects

29. **Name:** RT ERP Platform

Related Companies: JSC RT-PROJECT TECHNOLOGIES (TIN: 7724804619), Diasoft Group of Companies, RT-DIASOFT LLC

Related People: N/A

Type of Software: Enterprise resource planning platform

ENERGY AND EXTRACTIVE SECTOR

1. **Name:** Roxar RMS, Paradigm

Related Companies: Aspen Technology LLC (TIN: 7704691830), Roxar Paradise - Solutions LLC (TIN: 7706243840), ROXAR SERVICES LLC (TIN: 7706598219)

Related People: Alexey Garrievich Etkin (TIN: 772610216209), Dmitry Vladimirovich Posvyansky, Irina Kolbikova, Ruslan Nasybulin, Anastasia Vekshina, Diana Shigapova

Type of Software: Reservoir simulation software solution. It optimizes reservoir management strategies by providing accurate and detailed information about subsurface reservoirs.

2. **Name:** Landmark Engineer's Desktop (Edt)

Related Companies: BurService LLC (TIN: 1106013435), Burservice JSC (TIN: 9715429274), Upstream Services LLC (TIN: 7715436574)

Related People: Maksud Rafig Ogly Mikayilov (TIN: 771563135036)

Type of Software: Integration platform for well development, drilling, and production. Includes tools like CasingSeat, COMPASS, EDM Data Analyzer, iWellfile, Real-Time View, StressCheck, WELLCAT, WELLPLAN, Landmark DecisionSpace Nexus.

3. **Name:** Eclipse, Petrel

Related Companies: SLB (Schlumberger), Yandex.Cloud (TIN: 7704458262), Schlumberger Logelko, Inc. (TIN: 9909012867), Petroalliance Service Company LLC (TIN: 7708084402)

Related People: Rustam Biktimirov (TIN: 027404027959), Artem Grigorievich Karapetov (TIN: 772910228212)

Type of Software: ECLIPSE is used for reservoir modeling; Petrel is a geological modeling platform. Both are integrated into the DELFI AI and digital tools platform.

4. **Name:** Jewel Suite

Related Companies: JSC OFS Technologies (TIN: 7714024384), LLC "Nefteservice Technologies" (TIN: 9703098194)

Related People: David Gadzhimirzayev (TIN: 503229804120), Natalia Aidarova (TIN: 772783691016), Alexander Monakhov (TIN: 772862075387), Alexey Anikeev (TIN: 505000427878)

Type of Software: Tool for developing optimal strategies for complex fields, predicting field-wide geomechanical performance under various scenarios.

5. **Name:** STARS (Simulator of Tight Reservoirs)

Related Companies: Rock Flow Dynamics (TIN: 7702364555)

Related People: Vasily Georgievich Shelkov (TIN: 501005092593)

Type of Software: Advanced 3D hydrodynamic modeling simulator for recovery processes involving steam, solvents, air, and chemicals.

6. **Name:** GeoSoftware

Related Companies: SJJ Vostok LLC (TIN: 7703558151)

Related People: Alexander Yuryevich Lyandres (TIN: 772815769405)

Type of Software: Software suite for geologists, geophysicists, petrophysicists, mining engineers. Includes tools for various aspects of geological and geophysical analysis.

7. **Name:** Weatherford ReO Software

Related Companies: Weatherford LLC (TIN: 7708639661), Weatherford Holdings (Rus) LLC (TIN: 7702690319)

Related People: N/A

Type of Software: Tool for modeling petroleum engineering and optimizing production. Includes solutions for modeling and optimizing surface networks from wellhead to processing plant.

FINANCIAL AND BANKING SECTOR

1. **Name:** Oracle Database

Type of Software: Database Management System (DBMS).

2. **Name:** Microsoft SQL Server

Type of Software: Database Management System (DBMS).

3. **Name:** Diasoft Database Adapter

Related Companies: JSC "Management Company 'Diasoft'" (TIN: 9715302870), includes LLC "Diasoft", LLC "Techno Diasoft", LLC "Diasoft Technopark", LLC "Diasoft Digital", LLC "Diasoft Ecosystem", LLC "Diasoft Asp", LLC "Diasoft Data Management", LLC "Diasoft Innovations", JSC "Management Company DS Technopark", JSC "Excalibur Management", Diasoft GMBH

Related People: Oleg Roshchupkin (Director), Alexander Valerievich Glazkov, Oleg Mitrofanovich Roshchupkin, Oleg Vladimirovich Mikhalev, Alexander Gentsis, Denys Olshevsky, Sergey Ovchinnikov, Alexey Groshev, Andrey Dymov

Type of Software: Software translator allowing information systems to work on various DBMS, adapting applications for PostgreSQL DBMS.

4. **Name:** Nexign Nord

Related Companies: JSC "Nexine" (TIN: 7801019126), PJSC "Megafon" (TIN: 7812014560)

Related People: Mikhail Vladimirovich Matyushin (CEO)

Type of Software: Russian relational database based on PostgreSQL.

5. **Name:** RDBMS LINTER BASTION, RDBMS LINTER STANDARD

Related Companies: JSC Research and Production Enterprise "Relational Expert Systems" (TIN: 3664031210), Ruksoft LLC, Relex NPP LLC

Related People: Igor Alekseevich Boychenko (General Director)

Type of Software: Specialized and universal Russian DBMS.

6. **Name:** Postgres Pro DBMS

Related Companies: Postgres Professional LLC (TIN: 7729445882)

Related People: Oleg Sergeevich Bartunov (General Director), Fedor Gennadievich Sigaev, Anton Valerievich Sushkevich, Andrey Nikolaevich Fleyta

Type of Software: Secure database management system for mission-critical applications.

7. **Name:** Tantor DBMS

Related Companies: Tantor Labs LLC (TIN: 9701183207)

Related People: Vadim Yatsenko (CEO), Mikhail Goldberg, Karina Ruslanivna Yatsenko

Type of Software: Russian-made database developed on the basis of PostgreSQL.

8. **Name:** DBMS "Red Database"

Related Companies: Red Soft LLC (TIN: 9705000373)

Related People: Maxim Vladimirovich Anisimov (CEO), Kirill Evgenievich Veselkin, Alexey Petrovich Koptev, Vyacheslav Aleksandrovich Komlev, Rustam Rustamov

Type of Software: Russian-made DBMS developed on PostgreSQL.

9. **Name:** DBMS "Novaya Athena"

Related Companies: JSC "Novaya Athena" (TIN: 7722159459), ProgramBank, Diasoft

Related People: Evgeny Nikolaevich Khokhlov (General Director), Dmitry Leonidovich Garbar (Managing Director)

Type of Software: System for automation of banking activities, based on Oracle DBMS.

10. **Name:** ProgramBank.ABS and Related Systems

Related Companies: JSC ProgramBank (TIN: 7722283167), JSC "Novaya Athena"

Related People: Evgeniy Nikolaevich Khokhlov (General Director)

Type of Software: Solutions for automating back-office operations of banks.

11. **Name:** SAKURA Software Package

Related Companies: IT-Expertiza LLC (TIN: 7725373193)

Related People: Vyacheslav Igorevich Savlyuk (General Director)

Type of Software: Security software for workplace monitoring and access management.

12. **Name:** Ideco UTM

Related Companies: Ideko LLC (TIN: 6670208848), Skydns LLC, Aideco Software LLC

Related People: Dmitry Sergeevich Khomutov (CEO)

Type of Software: UTM solution for network perimeter protection and traffic control.

13. **Name:** Traffic Inspector Next Generation

Related Companies: SMART-Soft LLC (TIN: 5022032904), SMART-Soft Trading LLC, Technologies of Digital Business Support LLC

Related People: Andriy Davydovych (CEO)

Type of Software: Universal security gateway for controlled Internet access and cyber threat protection.

14. **Name:** ViPNet Coordinator HW 4, KB 4, VA 4

Related Companies: JSC "Information Technologies and Communication Systems" (InfoTeKS, TIN: 7710013769), SFB Lab LLC, Prokvant JSC, Infotex Training Center, Ruhelsnet LLC, Trust Services LLC

Related People: Andrey Anatolyevich Chapchaev (General Director)

Type of Software: Range of security gateways for secure data transfer and IP traffic filtering.

15. **Name:** ICS Firewall

Related Companies: A-Real Consulting LLC (TIN: 7606047112)

Related People: Igor Evgenievich Sukharev (Director)

Type of Software: Next-generation firewall for network optimization and data protection.

16. **Name:** Hardware and Software Complex FPSU-IP version 3

Related Companies: Amicon LLC (TIN: 7701025060)

Related People: Shekov Alexander Mikhailovich (Director)

Type of Software: Firewall and VPN solution for optimizing communication channels.

17. **Name:** TrueConf Video Conferencing Server

Related Companies: TKC JSC (TIN: 9717098324), Truconf LLC, Integrit LLC, Sykret LLC

Related People: Stanislav Soldatov (General Director)

Type of Software: Video conferencing server as a secure alternative to Cisco Webex Meetings.

18. **Name:** Quantum Security Gateway (Checkpoint)

Related Companies: Check Point Software Technologies (Russia) LLC (TIN: 7702528066)

Related People: Vasily Vasilyevich Shirokov (Director)

Type of Software: Security gateway for comprehensive data center protection.

19. **Name:** Digital Q.Reporting

Related Companies: JSC "Management Company 'Diasoft'" (TIN: 9715302870)

Type of Software: Analytical complex for data analysis and reporting.

20. **Name:** GRC Risk Event Accounting

Related Companies: LLC "Technologies and Business" (TIN: 7709470190)

Related People: Belyaev Denis Anatolyevich (CEO)

Type of Software: Risk management system for organizing internal control and audit procedures.

21. **Name:** Linkage Navigator

Related Companies: WestLink Group of Companies JSC (TIN: 9705074872)

Related People: Konstantin Valerievich Capricorn (President)

Type of Software: Logical data array for business process setup, BI analytics, and indicator management.

22. **Name:** Polymatica

Related Companies: Polymatica Rus LLC (TIN: 7721721509)

Related People: Gennady Gennadievich Sashin (General Director)

Type of Software: Holistic data analysis solution, including Polymatica Dashboards, Analytics, and ML for enterprise-level Business Intelligence tasks.

23. **Name:** pSeven Enterprise

Related Companies: Datadvans LLC (TIN: 7701899205)

Related People: Sergey Mikhailovich Morozov (General Director)

Type of Software: Cloud-based low-code development environment for multidisciplinary analysis and optimization.

24. **Name:** PolyAnalyst

Related Companies: Megabrewer Intelligence Company LLC (TIN: 7727006174)

Related People: Russkikh Alexey Nikolaevich (General Director)

Type of Software: Data analysis system with tools for developing and editing multi-step data analysis scenarios.

25. **Name:** Triaflly

Related Companies: Trusted Environment LLC (TIN: 7701081120)

Related People: Fedorov Vasily Vyacheslavovich (General Director)

Type of Software: BI and DSS platform for data collection, processing, storage, analysis, and visualization.

26. **Name:** Foresight

Related Companies: Foresight LLC (TIN: 7715841300)

Related People: Vladimir Yuryevich Komov (General Director)

Type of Software: Digital analytical platform combining classical and advanced analytics, and business process management (BPM).

27. **Name:** Management in Space

Related Companies: Bureau of Information Technologies LLC (TIN: 5905251112)

Related People: Svetlana Plotnikova (General Director)

Type of Software: Platform combining BI analytics, 3D cartographic monitoring, dynamic modeling, and scenario forecasting.

28. **Name:** Asana

Related Companies: Swedbyte LLC (TIN: 7810832627)

Type of Software: Project management software used for various organizational processes and digital transformation.

29. **Name:** ROSA Virtualization

Related Companies: JSC "Scientific and Technical Center for Information Technologies ROSA" (TIN: 7735201059)

Related People: Oleg Stanislavovich Karpitsky (General Director)

Type of Software: Platform for deploying virtualized data centers, supporting VMs for private and government data centers.

30. **Name:** ASTER Multi-User Extension

Related Companies: Ibik LLC (TIN: 5026002770)

Related People: Vadim Valentinovich Andreev (General Director)

Type of Software: Analogue of MS Windows Multipoint Server, allowing multiple workstations to connect to a single system unit.

31. **Name:** Horizon-BC Virtualization Platform

Related Companies: Barrikady Innovation Center LLC (TIN: 7733239949)

Related People: Marat Rafaevich Davletshin (General Director)

Type of Software: Virtualization solution including subsystems and platforms for computing resources, distributed storage systems, and workplace virtualization.

32. **Name:** Virtualization Tools "Brest"

Related Companies: JSC "Scientific and Production Association Russian Basic Information Technologies" (TIN: 7726604816)

Related People: Pavel Yurievich Kabankov (General Director)

Type of Software: Russian platform with Astra Linux Special Edition OS for cloud virtual IT infrastructures creation and management.

33. **Name:** RUSTEC Cloud Platform

Related Companies: Rustec LLC (TIN: 7727457586)

Related People: Georgy Zurabovich Megrelishvili (Director)

Type of Software: Digital service platform for automating cloud computing.

34. **Name:** JaCarta AWS UC

Related Companies: JSC "Aladdin R.D." (TIN: 7719165935)

Related People: Sergey Lvovich Gruzdev (General Director)

Type of Software: Partial analogue of SafeNet Authentication Client, cryptographic token-based authentication system.

35. **Name:** ViPNet HSM

Related Companies: JSC "Information Technologies and Communication Systems" (aka JSC "InfoTeKS", TIN: 7710013769)

Related People: Andrey Anatolyevich Chapchaev (General Director)

Type of Software: Partial analogue of SafeNet Luna Network HSM, hardware and software platform for cryptographic protection of electronic services.

36. **Name:** Garda DB

Related Companies: Garda Technologies LLC (TIN: 5260443081)

Type of Software: Partial analogue of Thales CipherTrust Database Protection, system for DBMS security and audit of database operations.

37. **Name:** UserGate Client

Related Companies: Usergate LLC (TIN: 5408308256)

Related People: Kurashev Dmitry Sergeevich (Founder), Levchenko Alexander Vladimirovich (Founder)

Type of Software: Tool for secure remote access and workstation status analysis, part of EDR/XDR solutions.

AI SECTOR

1. **Name:** CatBoost

Related Companies: Yandex LLC (TIN: not provided), Yandex Data Factory (Yandex Europe B.V.)

Related People: Not specifically mentioned

Type of Software: Machine learning library implementing the CatBoost algorithm, used for various applications including search engine optimization, recommendation feeds, weather forecasting, and other Internet services.

2. **Name:** ClickHouse

Related Companies: Yandex LLC (TIN: not provided)

Related People: Not specifically mentioned

Type of Software: Column-oriented database management system for real-time analytics on structured big data.

3. **Name:** Masterpiece

Related Companies: Yandex LLC (TIN: not provided)

Related People: Not specifically mentioned

Type of Software: Generative neural network for image creation from descriptions, capable of working in various artistic styles and imitating famous artists.

4. **Name:** YaGPT

Related Companies: Yandex LLC (TIN: not provided)

Related People: Not specifically mentioned

Type of Software: Neural network for text generation, used in virtual voice assistant "Alice" and various Yandex applications.

5. **Name:** Yandex – Unmanned Technologies LLC

Related Companies: Yandex N.V. (Netherlands)

Related People: Sergey Melnik (General Director)

Type of Software: Development of AI technologies for unmanned applications.

6. **Name:** Alice Lab LLC

Related Companies: Yandex N.V. (Netherlands)

Related People: Melnyk Sergey Vasilyevich (General Director)

Type of Software: Development of AI technologies and applications.

7. **Name:** Yandex.Technologies LLC

Related Companies: Yandex N.V. (Netherlands)

Related People: Dmitry Viktorovich Masyuk (General Director)

Type of Software: Development of various AI technologies and applications.

8. **Name:** Cloud ML Platform in VK Cloud

Related Companies: VK Company LLC (TIN: 7714789489)

Related People: Alexander Volynsky (Technical Manager)

Type of Software: GPT model project for AI and machine learning in VK Cloud.

9. **Name:** Voice assistant "Marusya"

Related Companies: VK Company LLC (TIN: 7714789489)

Related People: Not specifically mentioned

Type of Software: Intelligent voice system capable of various voice commands and tasks.

10. **Name:** NeuroHD

Related Companies: VK Company LLC (TIN: 7714789489)

Related People: Not specifically mentioned

Type of Software: Neural network from the generative-adversarial network (GAN) family for enhanced image generation.

11. **Name:** ruDALL-E

Related Companies: Sberbank - Technologies JSC (TIN: 7736632467)

Related People: Maxim Anatolyevich Tyatyushev (General Director)

Type of Software: Neural network for creating images based on text descriptions in Russian.

12. **Name:** Kandinsky 2.0

Related Companies: Sberbank - Technologies JSC (TIN: 7736632467)

Related People: Not specifically mentioned

Type of Software: Neural network for generating, drawing, and redrawing images based on text requests.

13. **Name:** ruGPT-3.5

Related Companies: Sberbank - Technologies JSC (TIN: 7736632467), SaluteDevices LLC (TIN: 7730253720)

Related People: Not specifically mentioned

Type of Software: Neural network model for text generation in Russian, used in GigaChat service and other applications.

14. **Name:** Virtual Assistant "Salute"

Related Companies: Sberbank - Technologies JSC (TIN: 7736632467), SaluteDevices LLC (TIN: 7730253720)

Related People: Not specifically mentioned

Type of Software: AI-powered virtual assistant capable of understanding natural speech and performing various tasks.

15. **Name:** Kaspersky Neuromorphic Platform (KNP)

Related Companies: Kaspersky Lab (TIN: 7713140469), Motive NT (TIN: 773101001)

Related People: Romanov Alexey Viktorovich (Head of Motive NT)

Type of Software: Platform for creating and training AI-based systems, operating with neuromorphic processor "Altai"

16. **Name:** "Intelligent Solution for Analysis of Regulatory Documentation" (IS IAND)
Related Companies: JSC Rusatom Energy Projects (TIN 9705165390, part of Rosatom State Corporation), JSC Rusatom Automated Control Systems (TIN 7734358970), Private Institution for Digitalization of the Nuclear Industry "Cifrum" (TIN 7726450860).
Related People: N/A
Type of Software: AI and Machine Learning to recognize requirements in regulatory documents for state nuclear projects.
17. **Name:** TenVision, Audiogram, NLP
Related Companies: MTS AI (MTS Artificial Intelligence Center LLC, TIN 9725021438) is a subsidiary of MTS PJSC.
Related People: N/A
Type of Software: Various AI projects at experimental stage for cloud video surveillance, speech synthesis and generation, and a wide range of NLP tasks.

CLOUD INFRASTRUCTURE PROVIDERS

No	Company	Sanctions	"Virtualization Platforms"	Data Centers
1	Rostelecom (PJSC "Rostelecom", TIN 7707049388)	United States Canada Australia Ukraine	VMware, Hyper-V, OpenStack (Tionix)	DataLine OST/Nord, Moscow-I/II/III, Moscow 4.1, M9, M9. PLUS, Udomlya, St. Petersburg, Ekb, NSK
2	Cloud.ru (Cloud Technologies LLC, TIN 7736279160, which are part of PJSC Sberbank of Russia)	-	VMware, KVM, OpenStack	IXcellerate, Skolkovo, DataPro, 3data, MMTS-9
3	Selectel (Selectel Data Center Network LLC, TIN 7842393933)	-	VMware, OpenStack-KVM	"Tsvetochnaya 1-2", Dubrovka 1-3, Berzarina, DataPro Moscow One, Nextremum (Novosibirsk)
4	Cloud MTS (PJSC "Mobile Telesystems", TIN 7740000076)	Canada Ukraine	VMware	MTS data centers in Moscow (incl. Avantage), St. Petersburg, Nsk, Vladivostok, Nizhny Novgorod and others; DataSpace, Xelent, Ahost.

5	Yandex.Cloud (Yandex. Cloud ", TIN 7704458262)	-	QEMU-KVM	N/A
6	CROC Cloud Services (CJSC "KROK Incorporated" , TIN 7701004101)	-	VMware, KVM	"Data Center Compressor", Data Center "Volochnaevskaya- 1", Data Center "Volochnaevskaya-2"
7	OnCloud (Onlanta LLC , TIN 7722653629)	-	VMware, KVM	Ixcellerate, DataSpace
8	Softline (PJSC "Softline" , TIN 7736227885)	Ukraine	VMware, Hyper- V, in-house developed	IXcellerate, DataLine OST/ NORD, Xelent, RTCloud, MegaFon Ekb, PS. KZ, STACK 24, TTC Ostankino
9	M1Cloud (Stack Group LLC , TIN 7729739360)	-	VMware, Hyper- V, Rustec, OpenStack-KVM	M1, DataPro
10	ITGlobal.com (ITGLOBALKOM Rus LLC , TIN 7838413489)	-	VMware, vStack	DataSpace, IXcellerate, beCloud, AM2 Equinix, Kazteleport, NJ3, TOR3, Star of Bosphorus Data Center (Istanbul, Turkey)
11	Beeline cloud (PJSC Vimpel- Communications , TIN 7713076301)	Canada	VMware, freebsd bhyve	Oxygen, Linxdatacenter, CDC (Rostelecom), Ostankino Data Center, Beeline, Key Point
12	Timeweb Cloud (TimeWeb.Cloud LLC , TIN 7810945525)	-	VMware, KVM (in-house development)	"Selectel SPb, DataLine, Adman (Nsk), Artnet (Warsaw, Poland), TTK (Almaty, Kazakhstan), euNetworks (Amsterdam, Netherlands)"
13	"Ayteko. Cloud" (JSC "I-Teko" , TIN 7704160892)	Ukraine	VMware, Rustec	"TrustInfo"

14	Reg.ru (LLC "Registrar of Domain Names REG. RU", TIN 7733568767)	Ukraine	VMware, KVM, OpenStack	Data centers Reg.ru: Kurchatovsky, Varshavka, Aviamotornaya
15	Cloud4Y (Flex LLC, TIN 7743122379)	-	VMware, Rustec	Nord4, M8 (Moscow), Teknotel (<i>Istanbul, Turkey</i>)
16	EdgeCenter (Edgecenter LLC, TIN 7704848336)	-	KVM	N/A
17	VK Cloud Solutions (VK LLC, TIN 7743001840)	-	OpenStack	N/A
18	CorpSoft24 (JSC "Corp Soft", TIN 7743813810)	-	VMware	Selectel Spb, M10, M9, DataLine Nord, Linxdatacenter Moscow, Equinix FR5 (<i>Germany</i>),
19	Oxygen (O2 CLOUD LLC, TIN 9710050732)	-	VMware	Oxygen, DataPro
20	LanCloud (Lankay IT LLC, TIN 9705008196)	-	VMware, Hyper-V	DataSpace, DataPro
21	RCloud by 3data (Russian Clouds LLC, TIN 7703799100)	-	VMware, Huawei (OpenStack)	3data NR26, 3data E2, 3data M8, 3data Y8, 3data AM69
22	Rusonyx (Russonics LLC, TIN 7707301630)	-	KVM, OpenStack	DataPro, SafeData, Infobox
23	"CloudLibrary" (Oblakoteka LLC, TIN 7703765969)	-	Hyper-V, KVM	Dataline, Reconn
24	ProCloud (Procloud LLC, TIN 7702412488)	-	KVM, OpenStack	TrustInfo Moscow, MMTS-9 Moscow, <i>Equinix Miami NAP</i> ,

				Equinix WA3, Digital Realty Dallas, Digital Realty SF
25	Linx Cloud (Svyaz VSD LLC, TIN 7713339141)	-	VMware, KVM	Linxdatacenter Moscow and St. Petersburg
26	RUVDS.com (MT Finance LLC, TIN 7706424050)	-	HyperV, KVM	Rucloud, M9, TTC Ostankino, Linxdatacenter (St. Petersburg), IT Park (Kazan), EKB Data Center, Sibtelco
27	Nubes (Nubes LLC, TIN 9706005293)	-	VMware	Nubes Alto, Ost
28	"Rosukrep" (RU LLC, TIN 7729671842)	-	N/A	IXcellerate

Additional Cloud Services

It should be noted that in addition to Russian cloud services, Western cloud file storage systems continue to be available to users in Russia, in particular from companies such as:

- Abbyy (Abbyy Intelligent Search, Adobe Document Cloud)
- Atlassian (Atlassian Confluence)
- Amazon.com, Inc. (Amazon Web Services)
- Dropbox Inc.
- Google LLC (Google Cloud, Google Workspace)
- International Business Machines Corporation (IBM File Net Content Manager)
- KMS Lighthouse
- Microsoft Corporation (Microsoft 365, Microsoft Exchange, Microsoft Exchange Online, Microsoft Hyper-V, Microsoft Office, Microsoft Office Web Apps, Microsoft SharePoint, One Drive)
- Netwrix Corporation (Netwrix Auditor, Netwrix Data Classification Platform)
- Nextcloud GmbH (Nextcloud)
- Oracle Corporation (Oracle Cloud)
- ownCloud GmbH (OwnCloud)
- Systemanalyse Programmentwicklung (SAP Solution Manager)
- StealthBits
- Veritas Technologies (Veritas eDiscovery Platform)
- VMware, Inc. (VMware VSAN)

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