CASE STUDY

Service Providers
Data Center

Mail.Ru Group Cuts TCO by up to 40 Percent

To reduce the total cost of ownership (TCO) of its services at scale, Mail.Ru Group, a leader in the Russian Internet market, adopted more powerful Intel® Xeon® processors. As a result, it was able to cut both capital and operational expenditure

At a Glance:

- For new installations, Mail.RU Group (MRG) adopted the Intel® Xeon® processor E5-2660 v4, instead of the Intel® Xeon® processors E5-2620 v3 it was already using
- The new processor offers a higher core count, and has a larger cache and memory bandwidth
- With the new processor, MRG was able to do the work of up to three old servers with one new one
- The company realized one-year CapEx savings of up to 35 percent and one-year OpEx savings of up to 67 percent, cutting its three-year TCO by up to 40 percent

To stay ahead of the competition, Cloud Service Providers (CSPs) need to innovate continuously. Mail.Ru Group (MRG) launches new services using the Intel® Xeon® processors E5-2620 v3, which offer a lower cost entry point. However, as services scale, it is more cost effective for the company to adopt the more performant Intel® Xeon® processor E5-2660 v4. It enables MRG to use fewer servers, and realize significant operational expenditure (OpEx) and capital expenditure (CapEx) savings.

Challenge

- Enable a cost-effective and easy way to launch new services
- Ensure that services can be supported cost-effectively, even as they scale beyond 1,000 servers

Solution

- The Intel Xeon processor E5-2620 v3 provides a cost-effective processor for testing new ideas in MRG's data centers
- As services scale up, the Intel Xeon processor E5-2660 v4 offers a lower total cost of ownership (TCO)
- The higher performance of the Intel Xeon processor E5-2660 v4 enables MRG to consolidate servers and save on data center rental or hosting costs
- Intel offers training and advice to enable MRG to optimize its infrastructure using Intel® technologies

Results

- MRG realized one-year operational cost savings of up to 67 percent
- MRG realized one-year capital expenditure savings of up to 35 percent
- MRG achieved a three-year TCO reduction of up to 40 percent

Scaling from Trial to Mass Deployment

The CSP business is driven by innovation. One of the challenges is how to cost-effectively grow from running a small test of a new idea, into running a full service at scale.

MRG knows this well. Its products reach 94 percent of Russian Internet users each month, and include an email service with 100 million active accounts; a portal which is used by 58.2 million users monthly; and social networks VK*, and Odnoklassniki*.

MRG continues to innovate, trying new ideas using servers based on the Intel Xeon processors E5-2620 v3. "We start projects using lower specification CPUs because at that initial stage they offer sufficient performance," said Stanislav Zakirov, Head of Labs, MRG. "The Intel Xeon processor E5-2620 gives us the reliability and security features we need."

MRG has data centers in Moscow, Saint Petersburg, Amsterdam and San Francisco. It also uses rented space in third-party data centers. External providers typically charge a flat cost for a rack with 5-8 kilowatts of power. "If we're running three servers for a new service trial, it's really cheap to rent them or host them," said Zakirov, "but we have more than 30,000 servers now in our own data centers. VK uses 60,000 servers. When services scale up, it is important to calculate the total cost of ownership, and find the most appropriate platform."

MRG calculates the TCO based on the capital costs of the hardware and the projected hosting costs for at least three years. "If we calculate the cost per core and exclude the hosting, network and platform costs, the Intel Xeon processor E5-2620 performs well," said Zakirov. "If a service scales beyond 1,000 servers, though, there is an opportunity to save money by using a platform that offers more consolidation, saving us space and power costs."

Consolidating Servers with More Performant Processors

For some of its applications that had grown to maturity, MRG uses the Intel Xeon processor E5-2660 v4 (see Figure 1) instead of the Intel Xeon processor E5-2620 v3. The higher performing processor offers 14 cores and 28 threads (an increase from the 6 cores and 12 threads supported on the Intel Xeon processor E5-2620 v3), and 35MB cache (up from 15MB). The maximum memory bandwidth is 76.8GB/s (compared to 59GB/s).

MRG found that the higher processing capacity of its new processor enabled it to use fewer servers. Most of MRG's applications have been designed to scale across multiple cores and multiple processors, so two or three servers based on the Intel Xeon processor E5-2620 v3 could be replaced with a single server based on the Intel Xeon processor E5-2660 v4, while achieving the same level of performance. The replacement ratio depends on the application running on the server.

The consolidation resulted in lower rack space rental and hosting costs, lower total power costs, higher efficiency, and a simpler management process with fewer servers to supervise. The more performant platform enabled MRG to realize cost savings of up to 35 percent in one-year capital expenditure and up to 67 percent in one-year operational expenditure.

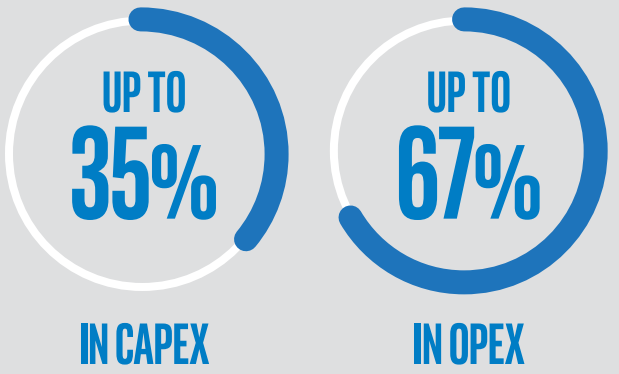
When the processor performance was upgraded, it was important to ensure that the storage, networking and memory did not become new bottlenecks, unable to satisfy the potential of the new processor. As a result, MRG doubled the capacity of the hard disks or solid state drives, and increased the memory. To improve I/O capacity and throughput, MRG deployed the Intel® Ethernet Network Adapter XXV710-DA2 in both testing and production environments.

During 2018, MRG aims to upgrade all of its data centers, which house xxx servers.

Some of the company's applications run in a virtualized environment. For its internal cloud, and for its public cloud virtual server offering, MRG uses the Intel Xeon processor E5-2660 v4.

	Cores	Threads	Cache	Memory bandwidth	Relative throughput
Intel® Xeon® processor E5-2620 v3	6	12	15MB	59GB/s	1x (baseline)
Intel® Xeon® processor E5-2660 v4	14	28	35MB	76.8GB/s	2x or 3x depending

Figure 1: MRG found that migrating to the Intel® Xeon® processor E5-2660 v4 gave it a more performant processor, and enabled it to achieve two or three times the throughput



Using the Intel® Xeon® processor E5-2660 v4

(over one year, compared to the Intel® Xeon® processor E5-2620 v3)

Technical Components of the Solution

- **Intel® Xeon® processor E5-2660 v4.** Built on 14nm processor technology, the Intel Xeon processor E5-2660 v4 offers 14 cores/28 threads per socket and 35MB last-level cache (LLC) per socket
- **Intel® Ethernet Network Adapter XXV710-DA2.** The Intel Ethernet Network Adapter XXV710-DA2 delivers excellent performance for 25GbE connectivity and is backwards compatible to 1/10GbE, making migration to higher speeds easier. It is part of the Intel® Ethernet 700 Series Network Adapters. These adapters are the foundation for server connectivity, providing broad interoperability, critical performance optimizations, and increased agility for telecommunications, cloud, and enterprise IT network solutions

Testing the New Platform

Before upgrading the servers, the hardware team at MRG engaged in a testing and tuning program. They started by taking some workloads from the production environment and testing them on the new hardware configuration, benchmarking performance against the old platform. To confirm the results were valid and the new platform would deliver the performance required, the systems administrators, service reliability engineers, and developers validated the new platform.

Ongoing Collaboration with Intel

Intel works closely with MRG to support its innovation. It provides MRG with early access to new processors, enabling it to launch its services on the Intel® Xeon® processor E5-2660 v4 shortly after the public launch of the platform. Intel offers guidance on new features in the processor, so that MRG can achieve the best results in its software optimizations. MRG is planning to undertake training from Intel on Intel® Optane™ technology, the Intel® Xeon Phi™ processor, the Intel® Xeon® processor Scalable family, and Intel® SSDs, as MRG seeks further optimizations across its data centers.

Spotlight on Mail.Ru Group

Mail.ru Group (MRG) is a leading company in the Russian-speaking Internet market. Its 2016 revenue was 38 billion rubles (USD584.6 million). Its services include email (with 100 million active accounts), a portal with an audience of 58.2 million users per month, and an instant messaging service with 18.8 million users per month. Its social networks include Odnoklassniki*, which reunites school friends and has 74 million average monthly users; VK*, which has 62 million daily average users; and My World*, which has 23.7 million monthly average users. The company's products reach approximately 94 percent of Russian Internet users monthly. While the Russian speaking market remains MRG's major focus, the company continues to seek opportunities to leverage its R&D and technology across the widest possible user base. As such, MRG is launching products into the US, European and other markets.

https://corp.mail.ru/en/

Lessons Learned

Based on its experience, Zakirov offers this advice to other CSPs:

- Migrating to a more efficient infrastructure can deliver significant savings to the business. It is worth investing more in a higher performing processor to cut the total cost of ownership (TCO) for operating the platform and delivering the service
- It is important to optimize for performance and cost, and Zakirov recommends doing this annually or every other year. "You can see a big difference in CPU performance or core counts in the latest processors over that period, and can see the trends in your applications and users too," he said
- The Intel® Xeon® processor E5-2620 v3 provides a lower cost processor for testing new services, but as the services scale up, the Intel® Xeon® processor E5-2660 v4 offersgreater consolidation and lower TCO

Learn More

- Intel® Xeon® processor E5-2660 v4
- Intel® Ethernet Network Adapter XXV710-DA2

Find the solution that is right for your organization. Contact your Intel representative or visit intel.com/cloud

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