Excelero

BEZEQ TURBOCHARGES MISSION-CRITICAL DATA WAREHOUSE WITH SHARED NVMe

Cuts database run times up to 90%, boosts throughput 2x-3x

CASE STUDY

Bezeq Mellanox TECHNOLOGIES belocal ADVANCED TECHNOLOGY SOLUTIONS FUJITSU intel

Bezeq is the leading telecommunications provider in Israel, offering a variety of services to business and private customers. These services include phone and internet services, smart devices, cybersecurity and cloud backup services. Its massive data warehouse in Tel Aviv holds vital data on sales, services, financial transactions, engineering devices and customer interactions. Information extracted from that data helps management to streamline operations and make decisions on expansion into promising new lines of business such as high-performance computing and hosted cloud services.

Bezeq chose Excelero NVMesh® as the centerpiece of a new scale-out storage architecture to power its mission-critical data warehouse: NVMesh running on Fujitsu PRIMERGY servers with Intel NVMe devices and Mellanox 100Gbps Ethernet switches. With the new NVMe-powered storage infrastructure, Bezeq achieved a 2x to 3x throughput improvement and cut query run times by up to 90%. Data warehouses are treasure troves of information that telcos need to stay ahead of the competition, but making them run efficiently can be a challenge. Excelero provides a readily extensible platform from which it can grow. The new storage platform prepares Bezeq for the age of the self-adapting warehouse and facilitates future use of machine learning.

Benefits of NVMesh for data warehouses:

- **Elastic NVMe**
  Leverage NVMe flash at any scale
- **Unbeatable performance**
  3x more throughput
  90% faster runtimes than AFA
- **Scale linearly**
  Performance and capacity
- **Predictable application performance**
  Storage is not a bottleneck
- **100% software-defined**
  No expensive proprietary hardware
- **Easy to manage & monitor**
  Minimize maintenance TCO

STORAGE IS THE BACKBONE OF THE NEXT-GENERATION DATA WAREHOUSE

Insightful information enables intelligent decision-making in business. Fast and agile access to data warehouses, organized in a way that improves business performance and provides quick, accurate, and relevant insights is of utmost importance in today's competitive business environment. Top-performing companies are more effective in every aspect of data analytics: they have optimized data warehouse infrastructures and cutting-edge applications to capture, store and analyze more data faster to make better business decisions.

With innovations in machine learning and evolution in low-latency, high-performance scale-out storage, the age of the self-adapting data warehouse is coming. Today more than ever, there is a real opportunity to create competitive advantage by deploying advanced data warehouse infrastructures. Analytics capabilities are heavily influenced by the volume of data that can be analyzed and the speed at which this can be done. Scale-out, high-performance storage is therefore the backbone of the next generation data warehouse infrastructures. It doesn't matter how powerful the analytics engine is, or how feature-rich the used applications are if the storage infrastructure does not meet performance and scalability requirements of the data warehouse and its applications.

Organizations that are seeking to differentiate through strong analytics need high-performance storage at massive scale. Traditionally, all flash arrays have been the go-to architecture for analytics environments, but these solutions were not designed to meet performance requirements dictated by today's analytics applications and enabled by technologies such as GPU's.

"The Excelero NVMesh software-defined technology is the only technological solution that meets our performance demands and has proven to be an excellent decision. As a leader in the national communications market, we are on the look-out for promising new technologies. NVMesh is a highly advanced solution and we have quickly seen the tangible benefits of replacing the complicated server with internal SSD and all-flash array with the simplicity and scale of Excelero NVMesh." - Igal Muginstein, Storage and backup team Manager Bezeq

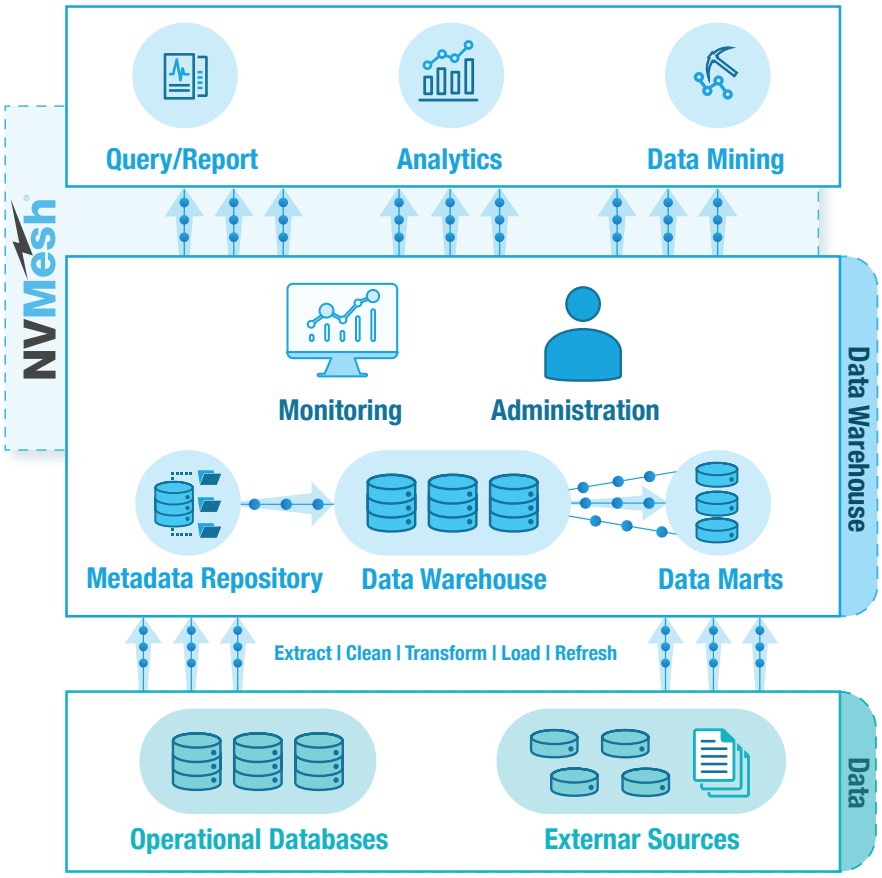
LEVERAGING NVMe IN THE NEXT-GENERATION DATA WAREHOUSE

All flash arrays have contributed tremendously to present-day data warehouses but today they are unable to feed data fast enough to data-hungry analytics engines and GPU servers. Next-generation data warehouses essentially require two fundamental changes in storage design: faster storage media and scalable high-performance architectures. The latest generation of NVMe flash devices already solves part of the problem as a single NVMe flash drive can deliver more than a million IOPs. But to leverage NVMe flash at scale you also need to take away the controller bottleneck of traditional flash arrays.

This was also the experience for the Bezeq IT team: they migrated from an Oracle Exadata system to a Hitachi UCP with internal Fusion IO and F400 all-flash array running via Fibre Channel several years ago. But today, with present-day application requirements, the storage solution's insufficient throughput, slow response times, and inability to be expanded led the IT team at Bezeq to seek a revamp. Bezeq is known to be an innovator and as a leader in the national communications market, they are continuously on the look-out for promising new technologies. The team was already familiar with the performance benefits of NVMe and the potential the new flash standard has for advanced analytics. After some initial tests of NVMesh, the team quickly recognized it as a highly advanced solution and immediately spotted the tangible benefits of replacing the all-flash array with the simplicity and scale of Excelero's software-defined distributed block storage.

NVMesh FOR THE NEXT-GENERATION DATA WAREHOUSE

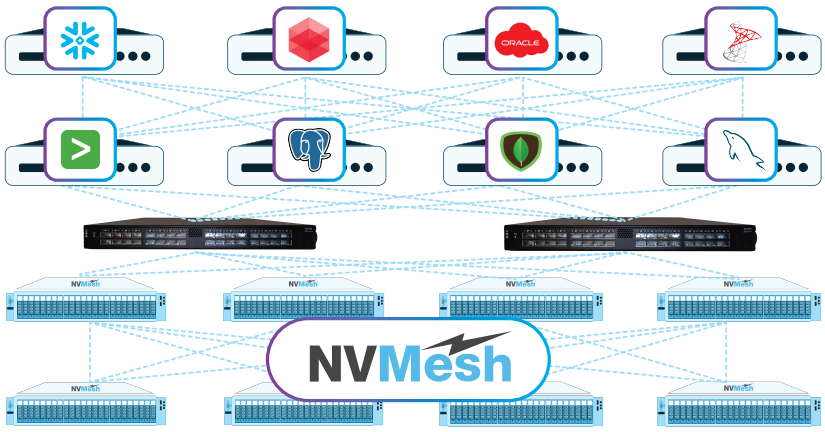
NVMesh is a Software-Defined Block Storage solution that features Elastic NVMe, a distributed block layer that allows data warehouse applications to utilize pooled NVMe storage devices across a network at local speeds and latencies. NVMe storage resources are pooled with the ability to create arbitrary, dynamic block volumes that can be utilized by any host running the NVMesh block client. These virtual volumes can be striped, mirrored, or both while enjoying centralized management, monitoring, and administration. In short, data warehouse applications can enjoy the latency, throughput, and IOPS of a local NVMe device while at the same time getting the benefits of centralized, redundant storage.



NVMesh provides the ability to attach volumes ubiquitously, enabling users to mount databases on any server at any time. NVMesh is deployed as a virtual, distributed non-volatile array and supports both converged and disaggregated architectures, giving customers full freedom in their architectural data warehouse design.

NVMesh SOLUTION FOR BEZEQ

Bezeq's new data warehouse storage infrastructure incorporates Excelero NVMesh running on PRIMERGY RX2540 M4 Fujitsu storage nodes. The servers are loaded with Intel SSD DC P4501 4TB NVMe drives. The data warehouse and its applications runs on Fujitsu RX4770 M4 servers, featuring 96 cores and 1TB memory. The NVMesh and data warehouse nodes are connected through Mellanox 100 Gbps switches.



Bezeq implemented the NVMesh solution in two phases. In the first phase, the solution was installed in the Bezeq Disaster Recovery site for 3 months. The system was tested vigorously, with impressive results: performance improvements range from 38% to 90% compared to the same workloads in the production site. In contrast to the maximum 8 GB/s throughput of the displaced Fusion IO devices, the NVMesh environment delivered 16-23 GB/s – well above Bezeq's requested 15 GB/s throughput. When these tests were completed successfully, the team started to implement NVMesh in the production site as well.

NVMesh TEST RESULTS, RUN ON THE BEZEQ DR DWH

Test Run	VSP-F400 + FusionIO	NVMesh	Performance Gain
CRM Order	2:40:53	0:23:45	85%
Morning	1:18:17	0:43:42	44%
Transport of Networking Packets	1:17:14	0:08:00	90%
CRM Hash	1:05:40	0:12:30	81%
Splunk Daily Load	0:38:57	0:13:42	65%
CRM Business Sales	1:04:03	0:39:40	38%
Cash Flow	0:58:12	0:12:23	79%

The Bezeq team found multiple benefits to using NVMesh besides the undisputable massive performance gain:

- The software-only approach allows Bezeq to use any hardware, which completely avoid vendor lock-in
- Scalability is as simple as adding additional NVMe drives or nodes
- The team detected reduced CPU demand, enabling them squeeze maximum compute power from existing resources.