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Improve Performance and Reduce Costs with Intel® Optane™ Technology

GPORTAL has more than doubled the number of game instances on a single server[1] while achieving stellar performance on Dell EMC PowerEdge servers

At a Glance:

- Intel® Optane™ DC persistent memory increased the number of games hosted on a single server by 2.78x[2]

- Better resource utilization enabled GPORTAL to lower customer prices for the first time in the company's history

- Intel is the only available supplier of processors that meet GPORTAL's performance requirements

- GPORTAL was able to rapidly procure, deploy and manage hundreds of new servers from Dell EMC

GPORTAL, Inc. is a leading supplier of online game-hosting services around the globe. The company's customers expect low latency and a great gaming experience regardless of where they are. Therefore, GPORTAL has high requirements for performance and stability—but increasing resource utilization and keeping costs low are also important. The company turned to Intel and Dell EMC to accomplish these goals.

Challenge

With multiple instances of 90+ different games being hosted on its servers, GPORTAL needs servers that are high-performance as well as reliable. To keep total cost of ownership (TCO) low, the company needs to run as many game instances as possible on a single server—without negatively impacting gaming performance. But not all games have the same CPU requirements. Some games run better in a Windows Server environment on a server with high single-threaded CPU clock speed. Other games, such as Minecraft, run in a Linux environment and require an immense amount of memory and cores. GPORTAL needed to find the right mix of hardware to meet its cores, threads and frequency requirements.

Solution

After surveying available technology, GPORTAL concluded that Intel is the only company capable of providing processors that can run single-threaded processes at the high frequencies GPORTAL needs—3.6 to 4.0 GHz and above—as well as multi-core processors that support the company's memory requirements. For Minecraft, the company plans to use Dell EMC PowerEdge R640 gaming servers with the dual-socket 2nd generation Intel® Xeon® Platinum 8268 processor (24 cores) and 1.5 terabyte (TB) of Intel® Optane™ DC persistent memory. For games that need single-threading, Dell Technologies OEM | Embedded & Edge Solutions developed a custom-built single-socket PowerEdge R240 server, which is equipped with a single-socket Intel® Xeon® E-2288G processor (eight cores/16 threads) that can reach frequencies of up to 4.4 GHz.

Results

GPORTAL was able to increase the number of Minecraft game instances on a single server by 2.78x without negatively impacting gameplay performance using a combination of 2nd gen Intel Xeon Scalable processors and Intel Optane DC persistent memory[3]. Based on this result, the company plans to migrate all its Minecraft servers to the new configuration over time. New technology from Intel, consisting of a combination of 2nd gen Intel Xeon Scalable processors and Intel Optane DC persistent memory, along with highly reliable PowerEdge servers from

Dell EMC, enables GPORTAL to meet customer expectations and increase data center efficiency without increasing costs.

Wanted: Affordable, Reliable Performance

Most of the popular online games available on the market today are hyper-optimized for single-threaded execution. Usually running at 60 frames per second (FPS), these games also require high core frequencies to ensure the low latency gamers expect. If latency climbs, gamers experience video jitter, delayed command response and time-outs—all of which wreak havoc on the gaming experience.

Gaming servers must be able to manage multiple users in parallel, handle numerous games on one system, and interconnect users. With up to a million gamers on their systems, each performing several transactions every minute, it's clear that GPORTAL needs server infrastructure that has plenty of memory, high-end compute capability and high-9s availability. On the other hand, in the online gaming world, server rental pricing is a major factor when gamers choose one hosting company over another. To accommodate an ever-growing customer base and more complex games, GPORTAL needed to modernize its infrastructure—but what was the right combination of technologies?

Combine Unique Memory Technology with High-Performance Processors

Intel has reimagined the memory storage hierarchy with Intel Optane DC persistent memory. This technology is a non-volatile memory option that delivers a combination of large memory capacity and support for data persistence for easy data accessibility. The workload-optimized technology sits between the memory and storage layers and helps enable businesses to handle data-intensive applications reliably and affordably. GPORTAL received a prototype of Intel Optane DC persistent memory and was intrigued by the possibilities. Running in Memory Mode, Intel Optane DC persistent memory provides terabytes of system memory—far more than can be provisioned using standard DRAM DIMMS. In App Direct Mode, Intel Optane DC persistent memory provides non-volatile memory that retains data through system reboots.

GPORTAL explored both modes—as well as Dual Mode, which provides expanded memory as well as non-volatile

"Intel® Optane™ DC persistent memory modules give us lots of memory, for an average price, and are persistent—so even if you restart the system, you don't lose the data."

—Roberto Omezzolli
CEO & Founder, GPORTAL, Inc.

storage—and was pleased with the results. Which mode GPORTAL uses depends on the specific game. For example, GPORTAL's Minecraft servers are now provisioned with eight x 128 gigabyte (GB) Intel Optane DC persistent memory modules, running in Dual Mode.

Depending on the game, GPORTAL uses a variety of Dell EMC PowerEdge servers equipped with Intel® Xeon® Gold 6254 processors, Intel Xeon Platinum 8268 processors or an Intel Xeon E-2288G processor (which is a single-socket CPU with up to 4.4 GHz frequency on a single thread). GPORTAL has observed outstanding performance from the Intel Xeon Platinum 8268 processor combined with Intel Optane DC persistent memory, and plans to migrate all the company's existing Minecraft users to that configuration over time.

"[Minecraft] players reported they are currently experiencing the best performance in their customer lifetime at GPORTAL. And we were able to lower costs for the first time in GPORTAL's history and pass that saving on to our customers."

—Roberto Omezzolli
CEO & Founder, GPORTAL, Inc.

GPORTAL Works with Dell EMC to Secure a Global Gaming-Server Contract

When a video-game producer offered GPORTAL a gaming-server contract that required the immediate deployment of 160 physical servers globally, GPORTAL contracted with Dell Technologies OEM | Embedded & Edge Solutions to custom manufacture a PowerEdge server for GPORTAL's unique requirements. The Dell EMC PowerEdge R240 servers provide a special BIOS version and a non-volatile memory express (NVMe)-based SSD (and sport the GPORTAL logo). These new servers—available only to GPORTAL—provide the single-threaded high-performance GPORTAL needs for certain games, and are highly reliable. What's more, Dell EMC was able to supply them in just six days, compared to the several weeks other OEMs required—enabling GPORTAL to move quickly to secure the new and valuable contract opportunity.

Another advantage of working with Dell EMC is the ability for IT staff to proactively manage Dell EMC PowerEdge servers from one site using insights from integrated Dell Remote Access Controller (iDRAC) and Dell EMC OpenManage Enterprise. In particular, iDRAC helps keep costs low by avoiding IT staff travel expenses or hiring expensive IT staff abroad. With Dell EMC OpenManage Enterprise, GPORTAL can proactively schedule BIOS and firmware updates and detect issues in real time. For example, if a memory module

begins to fail, the software tags the issue and requests an onsite technician for the next business day to install a replacement module. This real-time management capability has helped to reduce downtime and outages and significantly improves GPORTAL's customer satisfaction. Dell EMC Services automatically provide replacement parts and on-site technicians if necessary, and Dell EMC partner Concat manages global installations for GPORTAL.

"We've realized extreme time and money savings by partnering with Dell EMC and gained the flexibility to thrive in the unpredictable gaming industry."
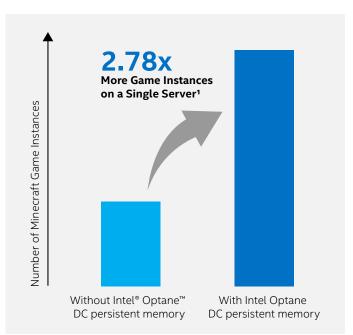
—Roberto Omezzolli
CEO & Founder, GPORTAL, Inc.

Using Machine Learning to Improve User Experience

GPORTAL is committed to providing its gaming clients with an exceptional experience. Besides investing in state-of-the-art server technology, the company uses machine learning to load-balance servers by forecasting play behaviors of specific game servers. For example, one customer uses a Conan Exiles Server on Fridays and Saturdays more frequently than on any other day of the week. GPORTAL's machine learning tool collects this usage data, stores it, and creates a workload specific for this service. In this way, GPORTAL can load-balance specific servers to help guarantee an outstanding performance for clients.

Competitive Advantage Through Technology

The online gaming market is fiercely competitive, and is growing quickly. Free-to-play and pay-to-play massively multiplayer gaming combined generated nearly USD 20 billion in revenue in 2016 and is forecast to grow from 126 petabytes (PB) in 2016 to 568 PB in 2020[4]. The PC online game market worldwide is expected to reach USD 44.2 billion in 2020[5]. In this market environment, companies providing online gaming hosting seek to provide customers with the optimum combination of gameplay experience and price.

By investing in modern data center infrastructure—including 2nd gen Intel Xeon Scalable processors, Intel Optane DC persistent memory and state-of-the-art Dell EMC PowerEdge servers—GPORTAL was able to more than double the number of Minecraft game instances on a single server (see Figure 1) to 500 instances without exceeding a peak CPU

load of 60 percent. This increased resource utilization and lowered the overall cost of game hosting—a savings that GPORTAL was able to pass on to its customers, lowering the server rental price for the first time in the company's history.

Figure 1. GPORTAL was able to host more than twice as many Minecraft game instances on a single Dell EMC PowerEdge server by using 2nd generation Intel Xeon Scalable processors and Intel Optane DC persistent memory.

Spotlight on Dell Technologies

In 2016, industry giants Dell and EMC joined forces in the largest technology merger in history to become Dell Technologies, which provides organizations and individuals with a broad and innovative technology and services portfolio that spans from edge to core to cloud. Today, Dell Technologies unites seven technology leaders—Dell, Dell EMC, Pivotal, RSA, Secureworks, Virtustream and VMware—in one company with the power to drive digital transformation and generate real results every day.

Dell EMC PowerEdge rack servers combine a highly scalable architecture and optimum balance of compute and memory to maximize performance across a wide range of applications. Intuitive tools work together to deliver automated, repeatable processes to make management effortless. Integrated security offers protection from unauthorized changes and cyber-attacks. Organizations can future-proof their data centers with the worry-free PowerEdge rack portfolio.

Spotlight on GPORTAL, Inc.

With 12 data centers located across the globe, GPORTAL (a subsidiary of Ociris) supports 100 million players per year, on 50,000 game servers. Currently the company offers customers a choice of more than 90 online games and provides access to games on a variety of platforms (PC, Xbox One and PS4). That's quite a tall order for a company that was a two-person startup just seven years ago. Headquartered in Germany, GPORTAL has been doubling its customer base every year and is poised for further growth in years to come.

Learn More

You may find the following resources helpful:

- GPORTAL home page
- Intel® Optane™ DC persistent memory
- 2nd generation Intel® Xeon® Scalable processor
- Dell EMC PowerEdge Servers

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

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors.

Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information, visit www.intel.com/benchmarks.

[1] Baseline Configuration: Dell EMC PowerEdge R640 server; 2x Intel® Xeon® Gold 6154 processor @ 3.0 GHz (18 cores/36 threads); 768 GB DDR4; BIOS = 2.3.10; OS = Linux
Results: 180 Minecraft game instances

DUT Configuration: Dell EMC PowerEdge R640 server; 2x Intel® Xeon® Platinum 8268 processor @ 2.90 GHz (24 cores/48 threads); 12 x 32 GB DDR4 + 12 x 128 GB Intel® Optane™ DC persistent memory modules; BIOS = 2.3.10; OS = Linux
Results: 500 Minecraft game instances. Testing by GPORTAL as of 5 December 2019.

Performance results are based on testing as of the date set forth in the configurations and may not reflect all publicly available security updates. See configuration disclosure for details. No product or component can be absolutely secure.

[2] See endnote 1

[3] Based on customer feedback provided to GPORTAL by Minecraft users

[4] https://www.statista.com/topics/1551/online-gaming/

[5] https://www.statista.com/statistics/292516/pc-online-game-market-value-worldwide/

Cost reduction scenarios described are intended as examples of how a given Intel- based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

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