



**LIQID**

Liquid, Dell Technologies,  
and AMD Power the  
Industry's Fastest,  
No-Compromise,  
One-Socket Servers



**Single Socket - Single SSD - Single Server - Unlimited Performance**



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### Overview:

IT organizations across the globe face budget and space constraints. These challenges are worsened by poor server utilization. Those same data centers are now demanding high-performance, one-socket servers designed to increase utilization and lower acquisition expenditures and total cost of ownership (TCO).

Enter AMD EPYC™ 7002 Series Processors: the company's next-generation multichip microprocessor architecture designed to help lower TCO and enable organizations to right-size for key application workloads without feature compromise. Since its release, the AMD EPYC™ 7002 Series have set over 140 world records in performance\* and have steadily gained market share in the data center.

AMD EPYC™ 7002 Series powered solutions like the Dell Technologies PowerEdge R7515 one-socket rack server provides up to 64 cores and PCIe® 4.0 connectivity unlocking capabilities and unmatched performance previously not available, delivering a powerful out-of-box solution for the most demanding data center environments.

To provide enhanced solutions that further maximize application performance for data-intensive workloads, Liqid has partnered with Dell Technologies and AMD to deliver the fastest single socket storage solution on the market today. Liqid's composable Gen4 fabric technology deployed with the AMD EPYC™ 7002 Series, and powered by Dell Technologies R7515 server delivers the ideal architecture for next-generation, AI-driven, and HPC application environments.

The platform from Liqid, Dell Technologies, and AMD empowers users to deploy server systems with the highest compute and storage performance for core data centers as workflows and business needs constantly scale. The Dell Technologies R7515 powered by AMD EPYC™ 7002 Series and Liqid LQD4500 Gen4 NVMe SSD enables users to dynamically right-size their IT resources by delivering unmatched performance from a single socket server.

\*AMD EPYC™ Processor World Records,™ Advanced Micro Devices, Inc. [www.amd.com/worldrecords](http://www.amd.com/worldrecords) (accessed March 18, 2020)





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## Setup:

The Dell Technologies PowerEdge R7515 Rack Server is equipped with 2x Gen4 PCIe slots. In order to fully utilize these high-performance Gen4 PCIe slots, it is important to deploy the fastest Gen4 PCIe devices available. Using Gen4 PCIe storage devices like the LQD4500 that enable / deliver 2x-3x the storage performance compared to other NVMe SSDs enables system designers and solutions architects to use the remaining Gen4 PCIe slots for additional high-performance devices.

The performance results outlined below were generated with a single socket AMD CPU, single Liquid NVMe SSD, in a single Dell Server. Single Socket – Single SSD – Single Server ... Unlimited Performance. The hardware leveraged for this benchmarking includes:

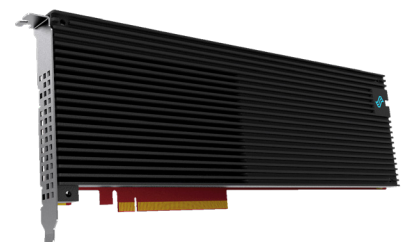
**Dell Technologies:** The Dell Technologies R7515 is a single-socket 2U server designed to handle workloads like software-defined storage, virtualization and data analytics. The server is built upon a scalable system architecture and provides choice and flexibility to meet performance demands.



**AMD EPYC™ 7002 Series Processors:** Utilizing the x86-architecture and built on 7nm technology, the AMD EPYC™ 7002 Series of processors bring together up to 64 cores, 4TB memory capacity, support for 8 channels of DDR4-3200, and 128 lanes of PCIe Gen4 I/O per socket, the AMD EPYC™ 7002 Series has been engineered for data centers that rely on CPU performance. From HPC workloads such as oil and gas exploration, to in-memory databases, to big data analytics to standard data center applications, highly parallel workloads have more cores to work with.



**Liquid:** The Liquid Element LQD4500 PCIe Add-In-Card (AIC), aka "The Honey Badger," is a full-height-full-length (FHFL), high storage capacity and extreme performance for mission critical and performance-demanding workloads delivering over 24GBs and 3M IOPS of performance. This makes the Element LQD4500 ideal for deployment in high-memory enterprise applications.





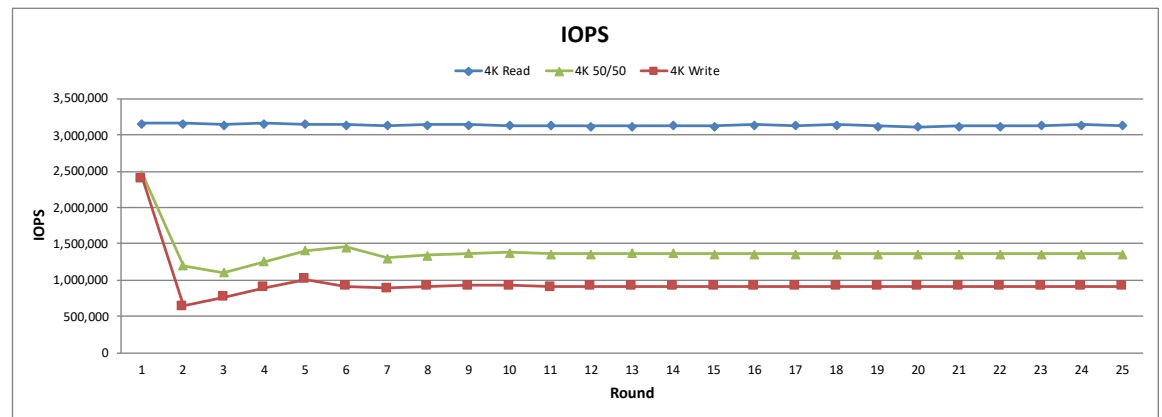
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## Performance Summary:

When benchmarking IOPS and for MB/s in sequential reads and writes, the Dell Technologies/AMD/Liquid platform delivered industry-leading performance results. Below test summary shows the power of Liquid Gen4 NVMe technology deployed on the Dell PowerEdge R7515 Rack Server powered by the AMD EPYC™ 7002 Series.

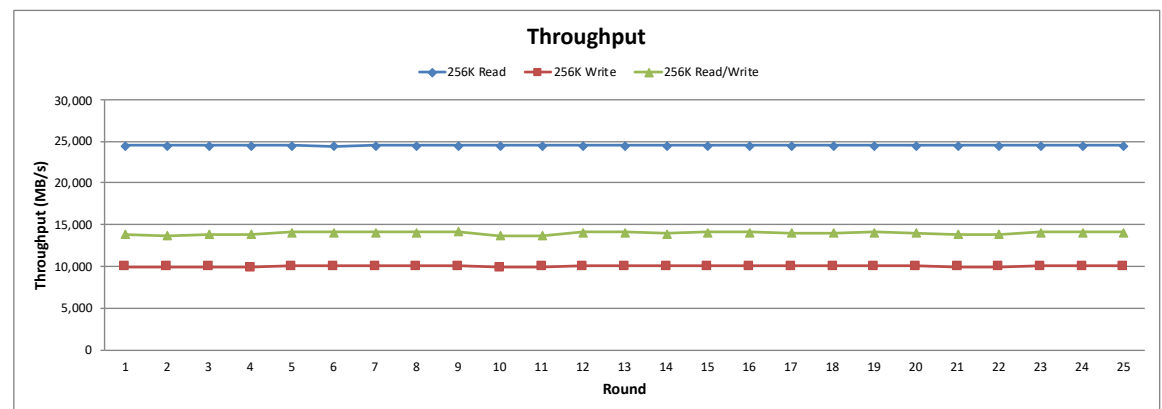
### Random IOPS

| IOPS       |                   |           |         |
|------------|-------------------|-----------|---------|
| Block Size | Read / Write Mix% |           |         |
|            | 100/0             | 50/50     | 0/100   |
| 4K         | 3,138,001         | 1,390,460 | 961,663 |
| 8K         | 1,794,673         | 730,052   | 479,889 |



### Sequential bandwidth

| Throughput (MB/s) |                   |        |        |
|-------------------|-------------------|--------|--------|
| Block Size        | Read / Write Mix% |        |        |
|                   | 100/0             | 50/50  | 0/100  |
| 128K              | 24,471            | 13,834 | 10,052 |
| 256K              | 24,481            | 14,002 | 10,028 |





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## Conclusions:

The Dell Technologies platform powered by AMD and Liqid enables users to deploy server systems with the highest compute and storage performance on the market. The Dell Technologies R7515 powered by AMD EPYC™ 7002 Series and Liqid Honey Badger Gen4 NVMe SSD enables users to dynamically right-size their IT resources by delivering unmatched performance from a single socket server. The configuration delivers an industry-leading solution that out-performs other dual socket and multi-processor servers. This leading edge Gen4 PCIe platform is enabling next levels of performance not previously available from a single server let alone a single socket server.

## Comparison of AMD Single Socket vs. Intel Single & Dual Socket

| Configuration | Single Socket    | Single Socket   | Dual Socket     |
|---------------|------------------|-----------------|-----------------|
| Processor     | AMD EPYC™        | Intel Xeon      | Intel Xeon      |
| Model         | AMD EPYC™ 7742   | Platinum 8280   | Platinum 8280   |
| PCIe Bus      | Gen4 - 128 Lanes | Gen3 - 48 Lanes | Gen3 - 96 Lanes |
| Core Count    | 64               | 28              | 56              |
| Thread Count  | 128              | 56              | 112             |
| Max CPU Speed | 3.4GHz           | 3.8GHz          | 3.8GHz          |
| Power         | 225W             | 215W*           | 430W*           |
| Memory        | DDR4-3200        | DDR4-2933       | DDR4-2933       |

*\*Intel Power includes PCH chip-set*





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## About Liqid

Liqid provides the world's most-comprehensive software-defined composable infrastructure platform. The Liqid Composable platform empowers users to manage, scale, and configure physical, bare-metal server systems in seconds and then reallocate core data center devices on-demand as workflows and business needs evolve. Liqid Command Center software enables users to dynamically right size their IT resources on the fly. For more information, contact [info@liqid.com](mailto:info@liqid.com) or visit [www.liqid.com](http://www.liqid.com). Follow Liqid on [Twitter](#) and [LinkedIn](#).

## About Dell Technologies

Dell Technologies, enables organizations to modernize, automate and transform their data center using industry-leading converged infrastructure, servers, storage and data protection technologies. This provides a trusted foundation for businesses to transform IT, through the creation of a hybrid cloud, and transform their business through the creation of cloud-native applications and big data solutions. Dell Technologies services customers across 180 countries – including 98 percent of the Fortune 500 – with the industry's most comprehensive and innovative portfolio from edge to core to cloud.

## About AMD

For 50 years AMD has driven innovation in high-performance computing, graphics and visualization technologies – the building blocks for gaming, immersive platforms and the data center. Hundreds of millions of consumers, leading Fortune 500 businesses and cutting-edge scientific research facilities around the world rely on AMD technology daily to improve how they live, work and play. AMD employees around the world are focused on building great products that push the boundaries of what is possible. For more information about how AMD is enabling today and inspiring tomorrow, visit the [AMD \(NASDAQ: AMD\) website](#), [blog](#), and [Twitter pages](#).

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