

# Building Infrastructure for Speed and Performance

## Jensen Precast Set to Streamline IT Infrastructure and Boost Productivity With the Micron® 9100 PCIe® SSD

Most industries face common challenges when it comes to IT. Computer hardware and network infrastructure can sometimes take a back seat to more pressing concerns like driving innovation and increasing efficiency. The same is true in the construction industry.

This was the case when Jacob Fogal joined Jensen Precast as system administrator nearly two years ago. The company's network infrastructure was a piecemeal mix of old computing equipment, such as an Intel® Express 220 stackable hub, Linksys™ and D-Link® wireless access points, and an SQL 2008 R2 database to run their enterprise resource planning (ERP) software. A few years earlier, the company had implemented a Citrix® VMware® cluster farm that connected back to an EMC® VNXe™ storage system with limited capacity. But no thought had been given to performance or future storage space needs.

Jensen Precast manufactures a line of precast products like culverts and septic systems for underground construction. Founded in Sparks, Nevada, it now has 16 locations across the western United States and more than 500 employees — 340 of them computer users.

As the company grew, the one storage array with one LUN and every VM pointing to it — with 100% share allocated for every device — was no longer enough. It was almost out of space and running sluggishly, Fogal says.

"We were very aware of how the storage bottleneck was affecting SQL," he says. "At any point in the day, we would have a salesperson needing to run a report, and the resulting bottleneck would affect everybody companywide.



"Not only would it slow down SQL, but also other services. The application would run slower, the porting would run slower. We'd get calls at two in the afternoon saying, 'I'm running this report, it's taking four hours, and nothing is happening.'"

This year, the company plans to re-implement the latest version of their ERP software, the Citrix farm, and a couple of other database servers.

To do all this, Fogal needed to update the company's infrastructure and storage system.

He migrated the SQL storage and many of the VMs to a new Nimble Storage® CS215 iSCSI storage array. He cut up the amount of resources allocated to each VM, based on need. However, the bottlenecks persisted.

## A New Drive to Clear the Bottlenecks

As he continued to work on upgrading the network, Fogal got a Micron 9100 PCIe NVMe™ SSD to test before its public release. It was immediately clear that its remarkable speed had the potential to put an end to the bottlenecks.

The 9100's NVMe protocol interface minimizes latency and provides consistently fast throughput up to 3 GB/s, bringing its data processing closer to the server than SAS or SATA SSDs. It has workload-focused endurance and capacities up to 3.2TB for read-centric and mixed-use applications and environments.

"I looked at the data sheets on the Micron 9100 PCIe, and I was pretty stoked," Fogal says. "Depending on a lot of factors, some of the throughput numbers were 1.3 GB/s — substantially faster than anything else we have here."

Fogal installed the drive on a brand-new Dell™ PowerEdge™ R220 server with Windows Server® 2012 R2, and then in a new Dell OptiPlex 3040 with both Windows 7 Professional and Windows 10 Professional.

It took less than five minutes to install, and about five minutes to upgrade the firmware. He says the drive makes no noise at all.

## 600,000 IOPS

For Fogal, the results were incredible. He was getting about 1172 IOPS on the EMC VNXe3150 storage system (15 x 10K SAS in RAID5) aggregate and about 16,000 IOPS aggregate on the Nimble Storage CS215 storage array. In initial tests, the Micron 9100 SSD produced about 600,000 IOPS in both the workstation and server with slightly lower numbers on the Windows 10 build.

He tested the drive with PassMark®, AS SSD benchmark and CrystalDiskMark. In all the tests, the 9100 outperformed similarly priced SSDs and performed as well as higher-priced units, Fogal says.

For example, in PassMark PerformanceTest 8.0, the Micron 9100 in the R220 server came in at just under 13,000 points in the composite average of results, nearly the same score the Intel SSD DC P3600 1.2 TB NVMe earned<sup>1</sup>. This Intel drive is listed as a \$2,400 drive<sup>1</sup>, considerably more than the Micron 9100 PCIe SSD.

"[The Micron 9100 PCIe] is making us re-think how we handle certain applications. I can take two or three entry-level servers, stick in one of these guys, and set up multiple redundancies in a database farm for under \$10,000 in hardware costs, which is just incredible."

JACOB FOGAL  
System Administrator

"In other words, it's super fast," Fogal says. "Looking at the numbers we consistently got back made my brain itch."

The speed is more than just theoretical. When he copies a DVD into a folder, it only takes three or four seconds.

## The Benefit to Jensen Precast — and Other Construction Companies

He hasn't put the drive into production yet, but Fogal can see how the Micron 9100 could provide significant savings for his company and others with similar IT needs. It would allow companies to quickly, easily and inexpensively upgrade their storage while focusing on the projects that bring in revenue.

For example, Jensen Precast recently spent over \$20,000 on a storage array without processing power. Going forward, he could buy a \$1,200 server, add the Micron 9100 PCIe, and have "amazing storage."

"It's making us re-think how we handle certain applications," he says. "I can take two or three entry-level servers, stick in one of these guys, and set up multiple redundancies in a database farm for under \$10,000 in hardware costs, which is just incredible."

While the Micron 9100 PCIe might not offer as much raw storage space as some spindle-based storage arrays, it's providing much better performance for less money, he says. That's why he'll be buying more of them.

1. "Hard Drive Benchmarks," PassMark Software, 2016

“Even when I was pushing the drive hard, it didn’t get hot,” Fogal says. “So, you’re looking at power. It just pops into a server, which is pretty awesome. 1.6 terabytes is nothing to shy away from for storage, obviously. It’s fast. If you’ve got the space, you should get it, for sure.”

## The Micron 9100 PCIe NVMe SSD

The Micron 9100 PCIe NVMe SSD has the speed and endurance required for today’s cloud computing environments. Its NVMe protocol interface brings data processing closer to the server than SAS or SATA SSDs, minimizing latency and providing consistently fast throughput up to 3 GB/s.

Available in HHL and U.2 form factors, the Micron 9100 SSD has workload-focused endurance and just the right capacities (up to 3.2 TB) for read-centric and mixed-use applications and environments.

Learn more at [micron.com](http://micron.com).

## Fast Facts

- » **Organization:** Jensen Precast
- » **Industry:** Construction
- » **Employees:** 500+
- » **Challenges:** The company’s old network infrastructure was running out of space and performing sluggishly. Network bottlenecks were affecting company productivity. Money for a replacement solution was taking a back seat to more pressing concerns.
- » **Solution:** Rebuild the company’s infrastructure and storage system. Pilot tests were run with Micron’s 9100 PCIe NVMe SSD in the storage arrays. Initial results show the 9100 outperformed similarly priced SSDs and performed as well as higher-priced units.
- » **What Made the Difference:** The Micron 9100’s NVMe protocol interface brings data processing closer to the server, minimizing latency and providing consistently fast throughput, achieving up to 600,000 IOPS in pilot tests.

*Reference herein to any specific third-party commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by Micron or the referenced customer.*

*This case study was prepared for informational purposes only as a general account of certain assistance provided by Micron to the referenced customer. Many factors may have contributed to the results and benefits described in this case study, and Micron does not guarantee comparable results elsewhere. The information in this case study is provided “as is” and does not constitute any representation or warranty, either express or implied, by Micron or the referenced customer regarding any information, apparatus, product, or process discussed herein, or regarding the accuracy, completeness, or usefulness of any information, apparatus, product, or process discussed herein, and all such representations and warranties are hereby expressly disclaimed, including without limitation those respecting merchant ability or fitness for a particular purpose. Micron products are warranted only to meet Micron’s production data sheet specifications. Micron products and specifications are subject to change without notice. Information in this case study is subject to change without notice. Any dates or timelines referenced in this case study are estimates only.*

©2016 Micron Technology, Inc. All rights reserved. All information herein is provided on an “AS IS” basis without warranties of any kind. Micron, the Micron logo, and all other Micron trademarks are the property of Micron Technology, Inc. Intel is a trademark of Intel Corporation or its subsidiaries in the U.S. and/or other countries. LINKSYS is a trademark registered an/or owned by Belkin International, Inc. in the United States and other countries. Citrix is a trademark of Citrix Systems, Inc. and/or one of its subsidiaries, and may be registered in the United States Patent and Trademark Office and in other countries. VMware is a registered trademark of VMware, Inc. in the United States and certain other countries. EMC and VNXe are either registered trademarks or trademarks of EMC Corporation in the United States and/or other countries. Nimble Storage is a trademark or registered trademark of Nimble Storage. PCIe is a registered trademark of PCI-SIG. NVMe is a trademark of NVM Express, Inc. Dell and PowerEdge are trademarks of Dell Inc. PassMark is a registered trademark of PassMark Software Pty Ltd. All other trademarks are property of their respective owners. Rev. A 11/16, CCMMD-xxx