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Case Study

The Perfectly Quiet Office Cluster

"The cluster is in my office; from my desk you cannot even hear it.
It's an excellent cluster for an office."
Byron Bemis, Senior Research Associate for Owens Corning

Their Challenge

Byron Bemis, Senior Research Associate for Owens Corning was looking for a quiet, powerful, and reasonably priced cluster. "Cray had something like that which caught my interest a while ago, but it was too expensive," he said. "Our simulations have been getting bigger and bigger and more power hungry over the last 10 years and our hardware wasn't keeping pace. We had outgrown workstation capabilities—we've used some pretty big workstations in the past, but they just couldn't keep up."

He continued, "We started looking at the big datacenter HPCs. They were really quite expensive. So we looked to see what there was as far as office clusters. I just started searching online--looking for companies that had offerings in this space; less than 1,000 cores that you could put in an office. Nor-Tech had the most credibility— testimonials, case studies…things like that on their website. I liked their experience in the air traffic control/military space. I used to be in the military so I know the rigor it takes to fulfill military contracts. The solution that Nor-Tech offers fits nicely between the 1,000s of cores that you would find in a typical datacenter cluster and a workstation. They were really the only company that offered what I was looking for in terms of product and also credibility."

Byron called Nor-Tech and connected with Account Manager Tom Morton. "Byron wanted a departmental cluster," Tom explained. "He wasn't getting the resources that he needed from the Cloud computing service and he wanted local resources. He let us know basic parameters of what he needed in terms of computing power, storage, portability, etc. He needed a specific number of processors to start with while allowing room for expandability. We knew time was tight for him so we put together a quote quickly."

Our Solution

Nor-Tech designed a cluster for Owens Corning with one head node and 4 compute nodes that featured: FDR 56Gb/s InfiniBand by Mellanox and the following software:

- Bright Cluster Manager 7.2
- Red Hat RHEL 6.7
- PBS Professional
- Commercial engineering simulation software

Nor-Tech was also able to incorporate some of the client's existing software. In addition to working with Tom, Byron also worked closely with Nor-Tech's Vice President of Engineering Dom Daninger and Senior HPC Technician Kyle Gross.

"Dom helped with technical info quite a bit," Tom said. "In addition to being powerful, expandable, and portable, it needed to reside in a soundproof chassis. That was important since it wasn't going to be housed in a datacenter. Byron added a few items to make it more turnkey. The beauty of the system design was that Byron was able to literally roll it off the truck, plug it in, and start working within hours. We offered to send someone out there, but he didn't need us. The whole thing came together quickly and within their timeframe."

Their Success

Byron explained that, in addition to increased power and flexibility, the cluster made sense in terms of dollars. "The last desktop workstation I bought was about $35,000," he said. "The cluster cost around $73,000. So you are looking at the capability of 4 times as many cores as the workstation for roughly 2 times the price. The math isn't hard. If we need to, we can also run the cluster like a big workstation. It fits into our workflow pretty seamlessly."

As far as disruptive noise…there isn't any. "We have been using it for a little over two months," Byron explained. "It is in my office on the far wall. From my desk you cannot even hear it. In the cubicle that's next to it, it's just low white noise from the fan. You can hear it, but it doesn't affect phone conversations or anything like that. It's an excellent cluster for an office."

Tom said that he and the rest of the Nor-Tech HPC team very much enjoyed working with Byron and Owens Corning. "We are confident that this will be the beginning of a mutually beneficial relationship," he said. "I think Byron has a very good feeling going forward that if he needs anything we will be right there for him."

Byron confirms that. "Just my experience with Tom and Dom and Kyle has been fantastic," he said. "Tom and Dom worked closely with me from the beginning for design, testing, and set up. Kyle has been able to walk me through anything I need from a technical standpoint. I can't say enough about the support guys."

He summarized, "I certainly would recommend Nor-Tech because the hardware was what it was supposed to be. It performed as it was advertised. The commissioning phase of it— testing remotely, shipping, the set up, and bringing it online all went smoothly. We are very happy with the support and very happy with the performance of the machine. As the need arises we will continue to contact Nor-Tech."

About Nor-Tech's Quiet Office Clusters

One of the primary roadblocks to upgrading from a workstation to a cluster until now has been noise. The noise isn't an issue for clusters in server rooms, but for any organization, like Owens Corning, that needs to place a cluster in an office environment, noise *is* a factor.

Nor-Tech has solved this problem by introducing a low-noise cluster cabinet that makes the sound almost imperceptible. These cabinets feature:

- 28.5dBA Noise Reduction: They are up to 5 times quieter than a standard cluster cabinet.
- 7.2kW Heat Dissipation: Dissipated heat is equivalent to 7, single-bar electric radiators.
- Expandability: A cabinet can be ordered that allows for future expandability.
- Portability: The cabinets are equipped with castors.
- Compatibility: They work with all server configurations, including blade servers.
- Options: Add-ons include dust filters, ventilation systems, cable entry boxes, etc.
- A Range of Heights: Cabinets can accommodate 12U, 24U, and 42U (all are 30.7 inches wide and 43.3 inches deep).

For reference, a single blade server produces about 78dBA of noise; 70dBA is equivalent to the volume of a vacuum cleaner. Removing 28.5dBA reduces the sound to a level that is halfway between normal conversation and a whisper. The record-breaking sound reduction factor was independently verified by MIRA Test Laboratories, which conducts sound power measurement in accordance with ISO3744.

These cabinets only add about 10%-15% to the total cluster cost—easily recouped by eliminating the need for dedicated server space and allowing for mobility from department to department. To hear just how quiet these clusters are, watch Nor-Tech's 30-second video: http://www.nor-tech.com/solutions/hpc/office-clusters/.

About Nor-Tech

Nor-Tech built its reputation on the industry's easiest-to-deploy cluster solutions and guaranteed no wait time support. The company designed and built the HPC cluster that enabled the first detection of a gravitational wave—a discovery destined to change history. In addition to HPC clusters, Nor-Tech's custom technology includes workstations, desktops, and servers for a range of applications including CAE, CFD, and FEA. Clients include some of the most respected organizations in the world. Nor-Tech engineers average 20+ years of experience and are responsible for significant high performance computing innovations. The company has been in business since 1998 and is headquartered in Burnsville, Minn. just outside of Minneapolis.

Get Started Now!

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