Dana Holding Corporation Utilizes Vendor-Agnostic Cluster Management Tool To Remain Focused on Driving Product Innovation

CASE STUDY

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— Steve Shortino
HPC Systems Administrator

Dana Holding Corporation is an American worldwide supplier of driveline, sealing, and thermal-management technologies for passenger vehicle, commercial truck, and off-highway equipment markets. The Ohio-based automotive supplier is on a mission to innovate – with a focus on developing advanced designs for driveline, sealing, and thermal-management products.

Using advanced high-performance clusters (HPCs) and powerful computer-aided engineering (CAE) tools, engineers at Dana conduct routine simulations and provide feedback to product engineering teams. Using these results, engineers refine designs for a variety of powertrain products, as well as thermal management and cooling systems for hybrid and electric vehicle applications.

Dana prides itself on continually updating its HPC capabilities to meet new benchmarks. However, each time they have transitioned to a different HPC hardware vendor, they have encountered a new set of management tools – each with a steep learning curve that demanded attention – drawing time away from their core mission.

After opting for Bright Cluster Manager, they now have a hardware-agnostic tool that continues to work regardless of the hardware they use.

The Challenge

The complex CAE simulations performed on Dana's HPC clusters have helped the engineers produce substantial product innovation. To assure that they are optimizing their hardware investment and can continue to use their HPC resources to drive design innovation, Dana periodically reviews its technology stack and refreshes its hardware.

According to Dana's Matt Rassenfoss, IT Manager for Wintel and HPC, Dana's challenge was that these hardware updates were causing delays, taking away from their primary focus on making certain their engineers have what they need to be competitive.

He explains that each hardware vendor has their own installation process and their own particular brand of cluster management tools. In addition, any updates or customization usually requires vendor involvement. His team would learn the ins and outs of one management tool, only to go right back to square one after introduction of refreshed hardware.

"Each time we installed new hardware, we had to devote far too much time to learning new management software. This had an adverse impact on our team's ability to launch updated hardware in a timely manner for our engineers.

With only three systems administrators supporting 100 engineers, their tools need to be as efficient as possible," said Rassenfoss, "Our administrators were blocking and tackling to building clusters, when their focus should have been on information technology improvement."

To meet the challenge and continue to be an agile and effective team, they needed a hardware-agnostic management tool that would continue to work, no matter which vendor hardware was selected over the years.

The Solution

After visiting the Bright Computing booth at the SC show in 2013 and discussing the Bright Cluster Manager solution, Steve Shortino, HPC Systems Administrator at Dana began to consider how the Bright tool might meet the company's needs by reducing the time require to launch hardware updates. He ran Bright on a legacy cluster to test and explore the option on an evaluation license, and found it quick and intuitive to use. Whereas it had taken about three weeks to set up a cluster with previous software, it took only a week with Bright Cluster Manager.

After making the decision to adopt Bright Cluster Manager, Dana installed the program on the next production cluster to be refreshed and created a gold image. This included the application, library, and all required tools, bundled together. Administrators are now using this image to deploy these solutions across all clusters.

With Bright Cluster Manager, administrator are no longer required to keep learning different architecture as, in the past, each cluster was unique. The team agrees that it is far easier to keep track of one image, as opposed to being mindful of the idiosyncrasies of individual clusters.

"Bright makes it easy to deploy new hardware because you don't have to treat each cluster as separate," said Shortino. "Making a gold operating system image on a compute node and then transporting it across all the clusters will give us a consistent HPC environment, one in which engineers can log into any cluster and instantly understand the tools and methods. Standardization delivers a consistent end-user experience across the globe and makes the whole process more efficient."

The Result

Currently, Dana has five clusters around the world that they are transitioning to Cray hardware, which is providing a substantial performance improvement. Each new install is transitioning into Bright Cluster Manager and admins are getting used to working with a single product across the globe. Clusters of various sizes are running Bright at Dana's World Headquarters in Maumee, Ohio and additional sites in India and Canada. They also have two sites in the planning stage for future implementation.

Before adopting Bright, they had to spend most of their time bringing nodes on line, whereas, now they can spend time on other projects that help develop new products and technologies for the marketplace.

In addition, Bright cuts build time from weeks to days – Dana estimates that it takes 50 percent less time to build each cluster. "It is all about speed to market, or in this case, delivery speed to our internal customers," said Rassenfoss. "Our mission as an HPC team is to deliver the best value in resources to our company's engineers and innovators. In the past, our cluster management software was adding to our build time. With Bright, our team has found a way to be more agile, responsive and to better optimize our processes of updating hardware."

Shortino also commented on the responsiveness of Bright whenever they have had any issues and questions, up to and including logging in to help administrators through any required fixes.

"When we moved to Bright, they provided all the tools that we required to effectively manage clusters, regardless of the hardware. We have been very happy with the results and the ongoing support that the Bright team has provided us with throughout implementation."

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