TOP TEN TIPS FOR SETTING UP AND MANAGING YOUR HPC CLUSTER SYSTEM

CLUSTER ADMINISTRATION: SHOULD YOU HIRE, TRAIN OR OUTSOURCE?

With the level of complexity involved in an HPC system, having the right person in charge can be the difference between mediocre research and a high productivity machine that is delivering a high return on your investment. This paper will help you decide what works best for your organization.

Cluster Administration: Should you hire, train or outsource?

So you've decided to invest in a High Performance Computing (HPC) cluster system to maximize your research capabilities. Now what? Are there employees on-hand who have been trained to manage the system to make sure it's being utilized to its highest capacity? Trying to decide if your company should hire and train employees or turn the administration over to an outside company can be a hard decision.

With the level of complexity involved in an HPC system, having the right person in charge can be the difference between mediocre research and a high productivity machine that is delivering a high return on your investment. If you are deciding which way to go with HPC management, here are 10 tips to help make that decision:

1. **Define your strengths.** It boils down to time and skills. If your company has the time and skills to administer the HPC system, you likely have a solid team in place to keep cluster management in-house. Often times, organizations lack the skills but want to invest in building up a technical HPC staff. This situation will require technical training and ramp-up time, which can take anywhere from 6 months to 36 months, depending on the individual's background and existing skills. In this case, hiring an outsource HPC management company to provide supplemental support and even knowledge transfer can be a good solution. If your company has the skills but no capacity to administer the system at hand, or if your employees do not have specialized HPC skills, hiring an outside management provider is a great solution.

2. **What is your company's core goal?** If you hire someone specifically to monitor the HPC system, does that go along with the core reason for your business's existence? Although most companies utilize technology that is critical for everyday business (website administration, networks, email, etc.) it usually isn't the main focus of a company. Would you rather hire a new employee that would further your company's goal? If so, HPC services outsourcing could be a great option.

3. **Conduct a cost-analysis.** Maybe you don't want to hire a full-time person or more often than not, do not need a full-time person to manage your HPC cluster. For some enterprises, the HPC niche may involve less than five percent of its IT infrastructure; and hiring a full-time person (with management and other costs such as individual computer equipment & software, health care, 401Ks, etc.) might be cost-prohibitive. Could you find a part-time administrator that had the skills necessary to manage your HPC cluster? Can your enterprise IT team manage your HPC cluster when they don't typically have the skills or experience? Or would there be a cost-savings to outsourcing the management? When performing this cost analysis, don't ignore the overhead of a new employee. An employee who is proficient in HPC clusters is very valuable—and very expensive. International Data Corporation (IDC) studies indicate the average time to hire and train a new person to provide system administration services for an HPC system is two-to-three years. A high-level cost analysis might help making a final decision much easier.

4. **Productivity.** How fast do you need your HPC system to be running and in production? Do you have time to hire a new employee or train a current one? Often, HPC clusters sit idle due to lack of tools and visibility, as well as inexperienced cluster management skills in monitoring and improving system utilization. Consider the cost to your organization of a poorly utilized and low productivity system. Consider the cost to your organization with researchers and developers who can't perform their jobs? If

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timeliness is an issue, it might be better to outsource the HPC management in order to get the system on-line and operating smoothly as soon as possible.

5. **Reporting and Tracking.** How much feedback or reporting do you want from your system administrator? Many organizations receive infrequent reports on system usage, downtime, performance and productivity, which in many cases is due to inexperience with reporting tools, or overcapacity of in-house staff. An HPC outsourced service can provide you regular reports that measure application performance, system utilization, system uptime and issue tracking. Good and consistent reporting can increase system utilization, up-time and raise the ROI of your HPC investment.

6. **Expertise = reduced outages.** Frequent system down-time and outages could be an indication that the person managing the system is doing too many things, doesn't understand the technology or doesn't have the time to spend supervising and preparing for outages. Also, what is the complexity of your HPC machine? How large is your system and how much knowledge will an expert need to make it run smoothly? If down-time and outages increase, your system manager might be overwhelmed with the complexity of the new program. Supplementing in-house staff in these instances can make a lot of sense.

7. **Short-Term Solution.** Do you need some temporary assistance until you can get a new hire ready to take over the responsibility of HPC management? A short-term solution could be in order. Consider engaging a good outsourcing company to provide resources for a short time until your employee is in place and ready-to-go.

8. **What about repairs?** What contingency plan do you have in place if hardware or software needs to be replaced? Do you have an employee who can work with vendors to get new equipment ordered, installed and functioning? Some HPC outsourcing companies serve as intermediaries to co-ordinate with various vendors and drive the process to expedite a resolution.

9. **Managing Valuable Resources.** Are your scientists, researchers and engineers spending too much time trying to figure out and manage their HPC system themselves? In many cases, outsourcing HPC management frees up skilled employees who can then turn their attention to research instead of HPC system management and maintenance. If time, talent and finances are being wasted, it might be time to outsource.

10. **Peace-of-Mind Value.** Finally, consider what is the value of peace-of-mind when it comes to managing and protecting your HPC investment? Although having an on-site employee with HPC skills can be ideal in many situations, there are clear situations where employing an outsourced HPC services model makes the most sense. Whatever the final decision, make sure you are utilizing your employees' time, talent and skill-set to ensure your company runs efficiently, capably and productively. And don't hesitate to contact a professional HPC outsourcing provider to answer any questions regarding their services.

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