

UNIVA

# Grid Engine Case Study:

## The Power of Commercial Support for Open Core Products

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DEOPLI



## INTRODUCTION

Like most business savvy customers, Tata Steel Automotive Engineering continuously monitors operational costs in an effort to guarantee they are receiving quality solutions (at cost-effective prices) for the services and functions necessary to run their business. Therefore, when Tata Steel (i.e., TSAE) originally sought a workload management solution, Grid Engine (at the time offered from Sun Microsystems) was the perfect fit. As an open-source solution, Sun Grid Engine (i.e., SGE) limited initial investment, making it a cost-effective direction. Grid Engine was also selected for a reputation as a very mature, full-featured product, with a long history and proven track record - lending credibility to its reliability.

However, self-support solutions, while possessing tremendous advantages, often contain hidden costs and risks. The following case study examines TSAE's process of evolving from an open source solution to a commercial product (with commercial support and an open source core) from the Univa Corporation. In addition, this case study illustrates the valuable experience that led to an even deeper relationship between TSAE and Univa.

## OPEN CORE SOLUTIONS

Typically, open source software is viewed as a low cost alternative to commercial software. However, there are often additional costs that accompany an open source model that may not be accounted for in direct comparisons. In order to understand a total cost comparison, support must be taken into account - in the form of installation and configuration, bug fixes and day-to-day care and feeding. Robust support creates the assurance that there are dedicated resources standing behind the product. This ensures production-worthy status, as well as confidence in recovery within a reasonable period of time (in the event of a major bug or outage). In addition to reactive support, a successful model must address feature enhancements (many times referred to as ECOs, or engineering change requests) and integrate with companion products while pro-actively addressing future demand. This way, features and capabilities are available at day one of delivery for technology innovations that lie outside of the product. Each of these capabilities has an escalating cost, benefit, and quality of service impact - in addition to required education and training.

In large, these additional tasks can be addressed by re-tasking personnel already within the support organization, increasing the support team, or contracting through outside resources. Regardless of the method, there is a clear cost to using open source solutions that directly impacts user support budget. If software support is not the core business of the consumer, outsourcing that function to domain experts makes the most sense, provided support can be acquired cost-effectively.

When compared to proprietary/closed solutions, even more benefits (beyond cost advantage) to using open source-based products are revealed. Open source-based products possess licensing models that are far more flexible, while the base of the solution, by the nature of open source's access to source code, is generally more extensible. Access to the source code provides the ability to make modifications that accommodate custom or specific needs, allowing the solution to scale and expand along with the infrastructure. Open source solutions also participate in a significantly larger "network effect" - benefitting from tens of thousands, or even hundreds of thousands, of reviewers and contributors. This provides a crucial insight perspective, a cross section of feature requests, contributes process and code solutions that enhances the overall product, improves the maturity of the overall solution, and creates greater applicability and quality assurance.

In today's market, a business model is emerging that uses open source software as the core of the solution, but charges for the value added above and beyond the basic open source code set. A successful example is RedHat and Oracle charging for Linux support, or Univa and Oracle charging for support of Grid Engine. With Univa-branded Grid Engine, access to new features or premium capabilities not yet available in the open source code base are pro-actively provided. This combines the benefits of an open source solution with the benefits of a commercial solution and mitigates the disadvantages of closed source - all at a cost-effective price.

## ABOUT TATA STEEL AUTOMOTIVE ENGINEERING

Tata Steel is a top ten global steel maker and the world's second most geographically diversified steel producer. Tata Steel was founded in India in 1907. The total revenue of Tata companies, taken together, was 67.4 billion USD in 2009, with 57 per cent of this coming from business outside India. Over 395,000 people worldwide are currently employed in the seven business sectors in which the Tata Group Companies operate. TSAE is a unit of Tata Steel, based at the International Automotive Research Centre on the campus of the University of Warwick in the United Kingdom.

TSAE utilizes compute clusters running technical computing applications to allow TSAE engineers to design and virtually test automotive components against product requirements. TSAE focuses on delivering cost-effective, robust and lightweight design solutions predominantly for Automotive customers, by combining the Company's knowledge of materials with Automotive Industry insight. To this end, significant compute power is required for a number of software applications that simulate the manufacturing processes and performance of finished products at the component, system and whole-vehicle levels. The goals of these simulations are to reduce cost, improve vehicle performance in normal operating conditions and enhance vehicle safety - with the purpose of winning steel supply for parts and supporting the Automotive Sector Team in developing new business opportunities. Thus, their challenge is in maximizing the throughput of their compute cluster to maximise the return on investment in the software licenses employed.

To this end, TSAE significantly expanded their technical computing environment approximately 5 years ago, and implemented a commercial user job submission portal to address the increased capacity and complexity the expansion brought. While the portal provided a simple interface for engineers to submit workloads, a workload manager to match workload to machines was still in need. The portal was interoperable with a range of workload schedulers, and in assessing the available schedulers on the market, TSAE concluded that SGE was the best all-round package to address their needs. The following risks were identified:

- Support provided by 3rd party consultants
- Support more difficult due to the solution integrated with multiple components to create a complete solution
- Given the multi-component nature of the solution, issue resolution could require multi-party cooperation.
- Bug fixes would come from the Grid Engine community
- Upgrades would be executed by internal resources, and made more difficult

TSAE felt these risks were acceptable because they already had internal resources available to participate in support and they felt SGE was a stable product that would not have many issues. However, 2 1/2 years later, TSAE decided to move to a Univa-branded solution that offered an SGE solution based on best-in-class open source components integrated by Univa, packaged with Univa-provided support for the entire software stack. This move was a big step forward for TSAE. If an issue arose with any of the components, then, from a business perspective, they understood the resolution would process through Univa. TSAE also stressed importance on streamlining their internal support operation, moving to 100% reliance on Univa for technical support, with internal resources providing front-line support for troubleshooting. Conclusively, TSAE's relationship with Univa proved very beneficial - the product was well engineered, the consultants knew the different products extremely well, and the support team was very responsive.

## BUSINESS CHALLENGES AT TSAE

When Oracle acquired Sun, and subsequently discontinued support for Open Source Grid Engine, this created a level of concern for TSAE. Grid Engine's scheduler was a business critical application in their environment. TSAE didn't particularly want to move to different scheduling technology, as they had a reasonable understanding and comfort level with SGE. However, they recognized the likelihood that product enhancements and innovations would cease. As change was required, TSAE explored the options available for better addressing their technical needs, while simultaneously addressing the business drivers of cost and reliability. In evaluating available schedule technology, it became apparent that there was a cost associated with changing their workload management solution. The cost varied according to how much work was involved in the change. A complete change of scheduler would hold the highest cost impact, due to the amount of changes necessary during the implementation phase. Just the same, tactical differences in implementation could also result in high cost implications.

TSAE would either need to design the new system to look and feel like the old one (right down to bugs and messaging) or risk having to change many interfacing processes while providing significant re-training. Any customizing that had been implemented on the old tool would need to be replicated on the new tool. This factor highlights one reason why customizing is so detrimental, it creates a 'lock-in' situation that leads to product stagnation and ineffectiveness.

## BUSINESS SOLUTIONS

TSAE set forth, examining the business requirements and available solutions in order to select a model that met their needs. Though they had already determined that the current, unsupported model was critical to the business, they later realized installing a solution that was adequately supported became a requirement. TSAE could opt to remain with their existing open source solution - staffing up their internal support organization to provide the personnel required to properly maintain Sun Grid Engine. This would require a significant increase in budget, directly conflicting with the other requirement to maintain or reduce budget. An alternate solution was to locate a tool that came bundled with a commercial support organization. The downside of transitioning, however, was that there was a high transition cost, which again violated their requirement to maintain or reduce budget requirement.

When Univa announced that they had acquired the SGE team, this made TSAE's decision fairly easy. Their move to Univa's closed source version of the scheduler was also a fairly obvious right answer. The move would keep TSAE with current technology, strengthen the levels of support they were already experiencing and allow them access to an even greater level of expertise than they had previously experienced up to that point (a level they were already very happy with). By maintaining access to the latest software release, they gained performance and stability benefits. They were now fully supported at both a product and integration level, adding additional value. In addition, the licensing/support model and cost structure adopted by Univa was of significant importance in TSAE's decision process. Based on their past experience, TSAE was very confident in Univa's ability to deliver on the support aspect of their solution.

*"We upgraded to the first Univa Grid Engine release in May 2011. One of the development teams came to our site to carry out the update, and I would class it as one of the smoothest updates we have ever undertaken. In addition to the update, we had a 'best practice' review, took time to do some knowledge exchange/training, and were able to implement a number of minor enhancements through a better understanding of some of the more detailed configuration options."*

-Mike Twelves, TSAE

TSAE arrived at the conclusion that they could stay with their existing tool (not incurring change costs), re-purpose internal resources that had previously provided SGE support (providing higher value-add to the business), and contract domain experts (i.e., Univa) to provide business critical tool support, integration, and professional services at a very cost effective price. Additionally, the deep knowledge applied by the developers during an integration or upgrade enables significant improvements in performance, reliability, stability, and capability. By applying their intimate understanding of the product, Univa enabled TSAE to implement their desired solution by optimizing configuration options to deliver a workload manager specific to their business requirements. Univa also provided tremendous background knowledge with regard to best practices, proper operational configurations, and customized only what was necessary. All customizations were captured and documented for repeatability and ease of upgrades.

## ADDITIONAL BENEFITS

After purchasing Grid Engine support from Univa, TSAE observed their support relationship with Univa. Exposed to only good experiences, trust developed over time. Tata observed Univa's timely delivery of requests, with solutions that were well-executed and well-documented. They also observed that consultants from Univa were always available to participate in any special projects with which TSAE required assistance, growing to rely on the Univa support organization and their trustworthy history of reliability and excellence.

Additionally, TSAE had realized significant benefit in the form of no "finger pointing" when issues arose - as the solution was bundled for end-to-end support. They achieved significant economic advantage over an internal support model with the same capabilities, with access to domain expertise assistance for one-time projects available through Univa. As well, they contained their business risk by trusting a commercial entity (Univa) to stand behind their open source solution - receiving prompt support for bug fixes (including prioritization and escalation).

*"It's actually not a big step (financially) to go from an open source solution to an open core solution, but the benefits are significant, especially in managing the risk the business is exposed to."*

*-Mike Twelves, TSAE*

TSAE's adoption of the commercial tool from Univa allowed them to have deeper integration with the tool. This included capabilities that enabled their engineers to further automate runs, therefore allowing more work to be done with the same resources. TSAE realized further benefit because the commercial product had a more proactive positioning, anticipating advances in technology instead of reacting to them as they came out (often lagging months to implement new technologies). With commercial support for a value-added enhancement of an open source core (the Univa release of Grid Engine), TSAE improved the robustness of their solution, as well as gained access to customer-driven feature additions and enhancements. When TSAE received news that Univa acquired several key members of the original Grid Engine Team, deepening their partnership became an obvious next step. Therefore, TSAE took advantage of the proactive feature additions delivered at the same time as the technology innovation they enabled, while enjoying additional benefits of integration with all other Univa eco-system components (UniCluster, UniCloud, and UniSight; in addition to other products lines and other commercial, closed-source products).

## CONCLUSION

Open source solutions offer many advantages over closed source solutions, but may also inflict disadvantages that closed source solutions may not suffer. It is critical to capture the advantages of open source, combined with the advantages of closed source, while eliminating the disadvantages of both open source and closed source solutions. While an open-source solution always seems like the most inexpensive route, there are many factors that contribute to costs not easily observed (e.g., dedicated support, larger eco-system, proactive feature development, training). These costs can be accounted for by looking to commercial support for open source based solutions, allowing the total solution costs to total the same or lower than competitive proprietary solutions. In this model, we gain access to the advantages of open source, mitigate the disadvantages of close source, and still attain accountability and reliability for the solution.

Additionally, a model must weigh the revolutionary changes verses evolutionary changes against the investment required to make those changes. Technology is only one facet of a solution, with people and process comprising the other two components. Changes from one similar technology to another may have significant cost that is not readily visible from a surface perspective. A difference in solution design philosophy or implementation can have an impact on the people and process, requiring entirely new processes to be developed to work around a difference in design philosophy or implementation detail. Therefore, we must carefully consider any changes to existing toolsets, to verify all changes make sense - depending on the reason for change and the cost implications of change.

In looking for the most cost effective solution, it is critical to determine whether the solution must be adaptive to new technologies as they are released, capturing the gains that technology innovations brings, whether from a cost, performance, or feature perspective. If a solution that pro-actively evolves is not a requirement, then acquiring commercial support for existing open source products makes the most sense. However, if proactive evolution of the product is business-critical, then commercial support for a commercial product that has an open core can be the most cost effective and beneficial.

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### ABOUT DEOPLI:

Deopli is one of the foremost thought leaders in the EDA infrastructure and cloud computing space. Composed of highly-trained personnel, equipped with technology and experience, operating under principles of self-sufficiency, technical competence, speed, efficiency and close teamwork. Providing advisory and consulting services to EDA companies with respect to their HPC environments, they also conduct specialized operations including reconnaissance, strategy definition, tactical definition and resource training. In addition, Deopli executes non-operational, high-risk tasks to achieve significant strategic objectives. Deopli is headquartered in Irvine, California. For more information, visit [www.deopli.com](http://www.deopli.com).

### ABOUT UNIVA:

Univa, the Data Center Optimization Company, is the leading provider of optimization and management software for traditional, dynamic and cloud data centers. Their award-winning products are used by Global 2500 companies to improve resource sharing, amplify the efficiency of people and processes, and increase application and license utilization. Univa offers the industry's broadest, most innovative and integrated product set for managing shared, high-demand data center resources. From workload management to policy-driven provisioning across physical, virtual and cloud resources, only Univa provides a proven combination of enterprise-class capabilities, industry expertise, and community sponsorship. Univa is headquartered in Lisle, Illinois with offices worldwide. For more information, visit [www.univa.com](http://www.univa.com).