Readily-available grid services enable Omens Studios to scale production with ease

Omens Studios is a boutique animation studio providing original concept development and 3D computer graphics (CG) animation services. Its work ranges from "short-form" projects like 30-second television commercials to "long-form" projects such as a television series or feature films.

In 2006, Omens Studios tapped on the National Grid Pilot Platform, which has since evolved into the National Grid for additional computing power when the projects it was working on required more processing capacity than it had at that time. Besides providing a pool of readily available computing power and allowing Omens Studios to optimise the use of its in-house computing resources, grid services also enabled the company to avoid incurring the additional cost of acquiring new hardware and software, infrastructure management and utilities.

ORGANISATION
Omens Studios

INDUSTRY
Digital Media

CHALLENGE
A major process in the production of computer graphics animation is rendering, which makes very heavy use of computing power and is very time-intensive. Companies like Omens Studios have to find a way to handle any sudden surge in the rendering workload without having to constantly invest in new hardware or software.

SOLUTION
Omens Studios makes use of grid services such as computing power and floating licences for Mental Ray, a type of photorealistic rendering software, to complement its rendering farm when faced with an increase in workload.

BENEFITS OF GRID COMPUTING
- Ready availability of computing power
- More efficient use of in-house resources
- Faster turnaround of projects
- Cost savings
- Cost avoidance in terms of depreciation, manpower costs and utilities
- Security assurance

The business challenge

Animation projects go through a rendering phase that requires very intensive use of computer processing power and specialised software. It is also very time-consuming. Mr Tang Chi Sim, Managing Director of Omens Studios, estimates that for a typical commercial, the rendering of each frame may take about 30 minutes to an hour. Considering that television content is transmitted at 25 frames per second, multiply that by the average length of each commercial, which is about 30 seconds, and the total time needed for rendering could add up to as much as 750 hours.

To cope with such processing needs, Omens Studios has to assemble a "render farm", or a pool of machines that can handle the job 24 hours a day, 7 days a week. Other computer workstations which are used for production during the day are also linked up to do rendering at night when the staff have gone home.

However, during unexpected surge in projects, there is a need to ramp up rendering capacity in a very short time, in order to deliver the projects within schedule.

In 2006, for example, Omens Studios faced such a capacity crunch when it was asked to take on a complex CG animation project that required very heavy rendering in a very short time. At that time, Omens Studios had only a small handful of CPUs that was suitable for the task, which were not sufficient to complete the project within schedule. Omens Studios' options were to rent

or purchase additional hardware and software for the project, or tap on grid services.

The rental or purchase of physical hardware and the software required for rendering was not practical due to the time and budget constraints.

Solution

Grid computing presented an attractive alternative because it gave Omens Studios access to a pool of resources that was immediately available, on demand, and did not require heavy up-front costs.

Using grid services, the high-definition online game trailer "Gong" was rendered within four weeks.

Grid computing is the use of shared computing resources that can be purchased on-demand, very much the same way utilities such as water and electricity are consumed. It has been widely used in commercial sectors such as animation, where it played a key role in the production of popular movies such as "Shrek 3", "Shark Tale" and "Madagascar".

In Singapore, a National Grid Pilot Platform (NGPP) was established in 2003 primarily for use by the R&D community and to demonstrate proof-of-concept for the delivery of grid services to businesses. This has since evolved into today's National Grid, a national effort that draws together commercial grid service providers to offer pay-per-use access to compute, storage and software facilities.

In the grid set-up, password access was restricted to authorised Omens Studios staff and the grid administrator, ensuring that Omens Studios' assets were secure. In fact, with the grid resources housed in data centre facilities, the level of security would generally be higher than that found within the business premises of a typical small and medium enterprise.

As a test run, the first project that Omens Studios ran on the Grid was a CG animation for a public service announcement called "Smoking Fish – Hold onto your Butt", which was commissioned by the Surfrider Foundation of America to educate the public about how pollution was harming the country's coastline.

The "Smoking Fish" project involved rendering 755 frames for the sea floor of the animation. By tapping on 20 nodes on the NGPP and 40 Mental Ray licences, it was completed in just 24 minutes, compared with the time of 760 minutes that Omens Studios would have taken using its own internal resources.

After the successful conclusion of this trial run, Omens Studios continued to engage grid services for its subsequent projects – "Gong" and "Aegis Faction". "Gong" was a high-definition trailer developed for a Japanese client launching an online game while "Aegis Faction" was an internal original production by Omens Studios, partially sponsored by the Media Development Authority of Singapore. "Aegis Faction", in particular, involved very high-resolution characters and environments which Omens Studios could not have rendered in-house in a short time.

Benefits

Ready availability of computing power

One of the key benefits of grid computing is that it makes computing power available to companies like Omens Studios whenever they need it. "There are ready resources such as CPUs and RAM that I can use for the period that I need to," says Mr Tang. For example, Omens Studios' IT resources are currently running at near-maximum capacity in order to handle the production of three high definition episodes of a

television series each month, each lasting about 11 minutes. If any other projects were to come up, the grid resources would provide it with a ready pool of additional resources that it could tap on to handle the extra workload.

More efficient use of in-house resources

With grid services, Omens Studios has greater flexibility to use its own computing resources for other production work instead of setting them aside for rendering. As Mr Tang points out, "We have the latest CPUs and top-end video cards, but they're for production purposes. If I do rendering (on those machines) 24 x 7, I can't do anything else."

Faster turnaround of projects

Using grid services, Omens Studios has also been able to turn around projects up to three times more quickly. For example, the rendering of projects like "Gong", "Smoking Fish" and "Aegis Faction" would have required production workstations to double up as render nodes at night. For "Gong", Omens Studios estimated that it would have taken three days to render each scene by scheduling the jobs around the use of in-house resources. Using 15 nodes (dual cores or 30 CPUs) on the Grid, Omens Studios took just one day each. Similarly, for "Aegis Faction", it took just two days to render each scene using grid services compared to the six days which would have been required using the in-house workstations.

Cost savings

Cost comparisons based on estimates by the National Grid Office indicate that Grid services are a more cost-effective option for helping companies like Omens Studios to meet ad hoc computing resource requirements. As the "Gong" example shows, the use of grid services worked out to be three times cheaper than the rental/purchase option.

Grid services: A cost illustration

Project: Gong
Number of cores used: 30

To render "Gong", a high-definition trailer for an online game, Omens Studios made use of a grid of 15 nodes (dual cores or 30 Pentium 4 CPUs) and completed the job in four weeks. At that time, Omens Studios had 10 workstations (dual core 32-bit CPUs) which would have to be used as render nodes at night if it were to handle the Gong project in-house. It would have taken Omens Studios three months to complete the rendering work using this option.

Alternatively, to provision equivalent computing power to what it was using through grid services, Omens Studios would have had to rent 30 Pentium 4 cores and purchase 30 Mental Ray licences. A comparison between the use of grid services and the rental/purchase option, based on estimates provided by the National Grid Office, indicates cost savings of up to three times using grid services.

Cost components	Cost (S$)		Remarks
	Rental / Purchase	Grid Services	
Hardware	60,000.00	—	Rental of 30 cores for four weeks.
Mental Ray licences	36,150.00	—	Purchase of 30 Mental Ray licences.
Electricity	1,200	—	To power 30 cores for four weeks.
Manpower	2,000	—	Manpower effort required for technical setup and support.
Services (licences)	—	25,670.40	Use of 30 floating Mental Ray licences for four weeks.
Services (compute resources)	—	7,056.00	Use of 30 cores from the grid for four weeks.
Total	**99,350.00**	**32,726.40**	

Table: Year 2007 cost comparison for rendering project "Gong" using rental/purchase model versus using grid services. With special thanks to Dr Ma Dan from School of Information Systems, Singapore Management University for her contributions in the cost calculations.

The production of Aegis Faction involved very high-resolution characters and environments.

Cost avoidance

a) Depreciation

By tapping on grid services, Omens Studios does not carry the cost of purchasing or maintaining the hardware and software. "Hardware depreciates all the time. If we use grid services, we do not have to worry about that. We don't carry the depreciation in our books," says Mr Tang.

b) Manpower

Omens Studios currently has two people on its IT support team – one taking care of the servers and the other handling the software. Growing its render farm would mean putting more people on its payroll to maintain the IT resources for the long term.

c) Utilities

As Omens Studios experienced last year, the electricity bill involved in running an in-house rendering farm 24x7 can be quite significant. Tapping on grid services would enable it to reduce its utility costs by up to two-thirds.

Security Assurance

With the servers hosted in a secure data centre facility and stringent access control measures in place, grid services offer a more secure IT set-up than what a small and medium enterprises would typically have. The National Grid also offers commercial grid services with more stringent Services Level Agreements, higher availability and better response times.

About the National Grid

Singapore is one of the first countries in the world to embark on a national effort that draws together commercial grid service providers to offer pay-per-use access to compute, storage and software facilities.

Launched in 2008, the National Grid allows businesses, from multi-national corporations to small-and-medium sized firms, to enjoy:

- cost savings, since they no longer need to fork out hefty upfront investments for servers or software, or pay subsequent maintenance costs;
- better utilisation of infocomm resources, as they need to pay for only what they need and reduce the occurrence of computing resources lying around idle; and
- increased competitiveness, as they can focus on core competencies instead of having to handle maintenance, and can leverage the grid's computing capabilities to deliver new and innovative business models.

The implementation of the National Grid followed the successful trial of the National Grid Pilot Platform, which was set up in 2003 to provide compute-resources to both the R&D community and to businesses and establish proof-of-concept for the delivery of grid services.

The three consortia appointed National Grid Service Providers are Alatum led by Singapore Computer Systems Ltd (now part of SingTel), nGrid led by New Media Express Pte Ltd and PTC System (S) Pte Ltd.

By 2013, Singapore envisions the development of an infocomm-enabled marketplace of infocomm service providers offering the global community a platform to share, buy and sell infocomm resources such as software, computing and storage, on-demand and on a pay-per-use basis.

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