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Background

VPAC is an independent company, founded in 2000 by 6 Victorian Member Universities, with $6M of seed funding from the Victorian State Government. VPAC is a founding Partner of APAC. VPAC's business model is that the Member Universities contribute fixed annual subscriptions in proportion to their research needs for Advanced Computing services and support. In return, VPAC delivers research services and support to Members under a resource distribution model that targets ensuring that all Members receive an equitable return on their investment. VPAC supplements its income from Member subscriptions from a variety of funding sources, notably from provision of contract R&D support to industry and other organizations. Profit from such supplemental income is returned to Members through a competitive grant scheme.

VPAC has grown to point where, in November 2006:

- All 8 Victorian Universities are Members of VPAC, through 2011, with total subscription of ~$2.0M p.a.
- VPAC's contract R&D income is approximately ~$5.0M p.a., generating a profit of ~0.5M p.a., with approximately 30 current R&D contracts for 20 clients
- VPAC employs ~50 staff in two locations
- VPAC has well over 400 registered users of its HPC facility, of which ~200 are active

Vision

VPAC's vision is to be a leading international e-Research service provider, serving the needs of its Member Universities, the State, and national and international communities.

Strategy

VPAC's strategy is based growing its collaboration, resources, and business in e-Research support. The key themes of that Strategy include:

- Maintaining strong relations and collaboration with all VPAC's stakeholders, including Member Universities, the State government, and APAC
- Support the evolving R&D support needs of Members of VPAC, through provision of a range of services and facilities - notably HPC, data storage, data and compute grids, and visualization
- Growing VPAC's national and international collaborations and R&D support reputation
- Continuing to grow VPAC's commercial R&D support activities, and broadening VPAC's range of clients – while continuing to focus on Advanced Computing R&D areas that complement Member and State strengths

Facilities – Computational, Data, and Visualization

VPAC has a long-term strategy of operating two significant compute clusters and replacing one of them every two years. This is a cost effective means of purchasing compute capacity and means:

- Each machine is replaced every four years and VPAC always has one machine less than two years old.
- The end users are provided with an easy and relaxed migration path.
- There is significant capacity available, even when decommissioning an existing machine and installing a new one.

VPAC currently operates two large High Performance Compute systems and several smaller systems for specific purposes. Total peak capacity is around two GFlops (~450 CPUs) and there are plans to replace the x86 system early in 2007. VPAC's remaining systems are all 64bit, being IBM Power5 and Opteron based. VPAC achieves a very high usage rate, usually above 80% for its HPC systems; this figure is not adjusted in any way for scheduled or otherwise downtime or system unavailability. For its two main machines, the usage is typically in the high eighties. There is thus a high and growing demand for HPC – since 2000 VPAC's compute capacity, measured in FLOPs, has grown by a factor of x10.

Additionally, VPAC operates a number of smaller, but not insignificant, clusters for other organizations, particularly two for Member universities and two for groups with whom commercial arrangements exist. VPAC operates a consolidated user file system so that replacement of a compute system does not require users (or VPAC systems

administrators) to move user files from an old system to a new. VPAC does sell time on its computer clusters for commercial use, but this is a relatively small amount. Most commercial users are either interested in full-service solutions (from modeling to visualization) or in advice and consultancies on scoping or purchasing HPC facilities for their own use.

The total storage that VPAC manages is ~12Terabytes, with some large datasets being hosted for Members. VPAC operates a Visualization facility for a commercial client.

Demonstrated Technical Strengths

VPAC services and projects are operated on a fully commercial basis, by full-time staff, and VPAC's business processes have been ISO 9001 accredited for over 3 years. Increasing, e-Research and Advanced Computing require a very diverse and collaborative skill base, ranging from software engineering and systems administration to scientists and engineers.

VPAC's employment profile consists roughly of:

10 Systems administration and systems programmers
10 Computational engineers
8 Software engineers
2 Scientists – biochemistry and geospatial sciences
5 Project managers

Aside from this pool of employees, VPAC has close technical ties with and collaboratively works with many more technical staff at Member Universities. The annual growth in VPAC staff is about 20% p.a. with a very low turnover. VPAC runs a highly competitive summer internship program, which has employed an average of about a dozen students p.a. each year for the past 6 years (in 2006 there were over 200 applicants). VPAC also runs a strong technical training program, both for Member staff and for other research organizations.

VPAC has projects, expertise, and staff actively working in the following technical areas:

- Engineering and Manufacturing (CFD, FEA, CAD, and Virtual Engineering)
- Life Sciences (Computational biochemistry and medical informatics)
- Geospatial Sciences (Remote sensing and geospatial modeling and visualization)
- Computational Science (Scalable parallel solvers, solver frameworks and geosciences applications)
- Grid Computing (Authentication and authorization; middleware; portal deployment)

VPAC manages the Compute Infrastructure of the APACGrid and has delivered a range of success stories that are internationally recognized (e.g., use of virtualization for grid gateways).

Major Clients and Projects

VPAC has ongoing projects and collaboration, funded from sources that include

- California Institute of Technology (Caltech) [School of Earth Sciences]
- Holden and GH (North America)
- Caterpillar
- 2 major international aerospace companies
- BHP Billiton
- Melbourne Health
- Victorian Infectious Diseases Reference Laboratory (VIDRL)
- VICNISS – Hospital Aquired Infection Survaillance
- Falls Creek Alpine Resort
- Department of Primary Industry; Department of Sustainability and the Environment; Country Fire Authority
- Bureau of Emergency Services
- Life Saving Victoria

Strategic Relationships

VPAC has strategic relationships and agreements with many organizations, but the following are noteworthy:

- APAC and its Partners
- The Victorian State Government and at least 4 of its departments
- E-Research groups in the USA (VPAC has a staff member on the Executive Board of the NSF funded Center for Computational Infrastructure in Geodynamics (www.geodynamics.org)
- General Motors
- New Zealand (Canterbury University)
- PRAGMA and OGF Working groups