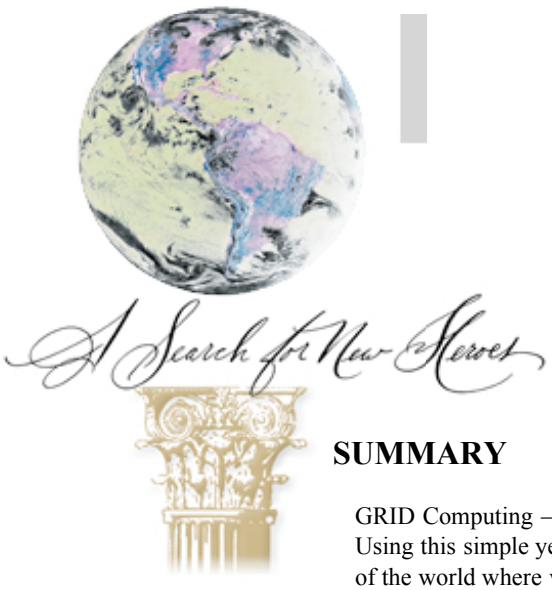

Robert Carrigan,
Chairmen of the Chairmen's Committee

Ron Milton,
Vice-Chairman of the Chairmen's Committee

Dan Morrow,
Chief Historian

GRID COMPUTING - THE WORLD MAP PICTURES

2005 COMPUTERWORLD HONORS CASE STUDY

Business & Related Services

A simple yet powerful graphical depiction of global resource usage allowed Cendant TDS to identify portions of the world where they could take on incremental business without requiring incremental data processing resources, resulting in immediate cost avoidance savings of $2 million, while providing an effective "roadmap" defining the best areas for business growth. **[20055186]**

SUMMARY

GRID Computing – the "World Map". Cendant TDS is a provider of technology to users all over the world. Using this simple yet powerful graphical depiction of global resource usage has allowed us to identify portions of the world where we could take on incremental business without requiring incremental processing resources. The information allowed us to offer cost avoidance savings of $2 million in 2003 and showed the best areas for business growth going forward.

APPLICATION

Cendant Travel Distribution Services (TDS), a subsidiary of Cendant Corporation (NYSE:CD), is one of the world's largest and most geographically diverse collections of travel brands and distribution businesses. The division includes: Galileo, a leading global distribution services (GDS) company, serving more than 44,000 travel agencies and over 60,000 hotels; hotel distribution and services businesses (TRUST, THOR, WizCom and Neat Group); leading online travel agencies (Orbitz, CheapTickets®, Lodging.com, HotelClub.com and RatesToGo.com); Shepherd Systems, an airline market intelligence company; Travelwire, an international travel technology and software company; Travel 2/Travel 4, a leading international provider of long-haul air travel and travel product consolidator; online global corporate travel management solutions, through Travelport and Orbitz for Business. TDS connects the most buyers and sellers in the global travel marketplace.

The TDS Data Center handles, on average, more than 350 million messages per day, 4051 messages per second and more than 912 million bookings/cancellations a year and more than 206 billion fare quotes per year.

Acquired by Cendant in 2001, Galileo International with its two GDS systems (Apollo and Galileo), 360 Fares system and Web Services, provides travel content access, shopping and reservation booking capability to users in virtually every country in the world. To support this system, Galileo runs hundreds of servers capable of processing upwards of 8,000 messages per second.

Previously separate companies serving different sectors of the world (Apollo: North America and Japan – Galileo: everywhere else) the Apollo and Galileo systems were supported by separate TPF complexes – and each service (essentially) opposing sides of the globe. Because of this, they had historically been unable to take full advantage of processing sharing benefits normally available to global companies.

Studying the resource utilization graph, a simple line graph showing how TPF computer resources were consumed during a 24 hour period based on Mountain Standard Time – our data centre is located in Denver – it suddenly became apparent that the graph might have much more meaning if were could super impose it over a map of the world. Because of the way we traditionally read (left to right) conflicts with the Sun's path (i.e. time) across the globe, we needed to reverse the utilization chart so that it now tracked from right to left.

It's difficult to clearly represent this without a picture but the method works very well…

The next step was to determine the average peak utilization hour in each country and line that time up with Denver (as the chart was based on MST). Doing so allowed us to see how each country's utilization impacted a single set of computer resources serving the globe.

Once we had this we were able to show that allowing the two TPF systems to share resources would not only save us aggregate resources (i.e. the new combined peak was less that the two individual peaks) but the new peak was also much higher, meaning that the adjacent 'valleys' were much deeper and much longer.

Incremental business driven from countries residing within these valleys now have a much lower impact on overall incremental costs. This is where the real benefit is.

In 2003 and 2004 we completed the task of allowing the two systems to fully share each other's resources and were able to avoid over $2 million in system expansion costs.

Subsequently, we have now applied the "World Map" concept to all other systems (Fares, Web Services etc.) to allow us to get a much better understanding of our per-country costs and system capacity needs.

BENEFITS

- Has your project helped those it was designed to help?

Yes, and beyond.

The application of the "World Map" view allowed us to reduce our system expansion costs by over $2 million p.a. as well providing us with a much better understanding of our per-country costs and system capacity needs across all of our global supporting systems – Fares, Web Services etc.

- In your opinion how has it affected them?

Reduced expansion spend and created a much clearer understanding of the cost of doing business internationally and by region.

- What new advantage or opportunities does your project provide to people?

The creation of large and deep valleys allows us greater speculation in countries where incremental business may present much more favorable opportunities in terms of cost per transaction.

- Has your project fundamentally changed how tasks are performed?

Yes. Virtually all of our business cost models now use information derived from these views.

- Does your work define new challenges for society? If so please describe what you believe they may be.

The ability to clearly view system resource utilization on a graphical view allows greater intelligence into areas where market opportunities may be more or less favorable.

IMPORTANCE

- How did information technology contribute to this project?

Understanding and containing the cost of IT was the main focus of this project.

The names of the individuals who were primarily responsible for that reference implementation are as follows:

Robert Wiseman CTO – CD TDS
Chuck Barnhart Vice President TPF Systems – CD TDS
Graham Macfarlane TPF Systems – IBM
Mickey Lutz CIO

- Why was information technology particularly important to it?

As above.

- In your opinion, have you developed a technology that may lead to new ways of communicating or processing information?

Absolutely. Being able to view – at a glance – a simplified representation of global system resources is critical

in understanding capacity planning and market opportunities for any company serving a global market. The is the essence behind GRID computing.

- Describe any new technologies and/or cite innovative ways to use existing technology to create benefits for society? Or did you define a problem and develop new technology to solve it?

The innovation was the true understanding of what already existed. Transforming dull and often meaningless resource utilization charts into a graphical depiction of how "local" usage world wide - i.e. we were able to see (for each global region) what effect their peak hours had on our Data Centre resources – has become incredibly valuable to us.

ORIGINALITY

- What are the exceptional aspects of your project?

The graph, which very nicely allows us to see, at a glance, global resource usage. By lining up any hour on the time scale with the time zone associated with it (in our case Mountain Time) we can see how volumes for that hour of day, anywhere in the world, impact our system.

In all of our examples we use Mountain Standard Time (MST) because our data centre is in Denver Colorado. By reversing the time scale on the resource utilization chart – so it runs from right to left - super imposing a map of the world over it (scaled down so that each of the hourly increments lines up with a 1000 mile longitude line) and lining up any hour over Denver (MST) we can see how each country in the world affects our system at that hour – LOCAL TIME. I.E. if we line up noon in Denver, we can see how business transactions at noon in New York, or at noon in New Delhi, affect our globally serving computer systems.

It's difficult to clearly represent this without a picture but the method works very well… try it!

- Is it original? Is it the first, the only, the best or the most effective application of its kind?

I've done IT industry presentations on this topic all over the world and no-one has ever claimed to have seen it before.

- How did your project evolve? What is its background?

Previously separate companies serving different sectors of the world (Apollo: North America and Japan – Galileo: everywhere else) the Apollo and Galileo systems were supported by separate TPF complexes – and each service (essentially) opposing sides of the globe. Because of this, they had historically been unable to take full advantage of processing sharing benefits normally available to global companies.

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SUCCESS

- Has your project achieved or exceeded it goals?

It has exceeded its goals. We have been able to reduce our cost growth expenditure by several million dollars and now have a much clearer and more accurate picture of processing costs throughout the world, not just for TPF (the system it originally targeted) but for all golbal, customer facing systems.

- Is it fully operational?

Yes – we completed full resource sharing in 2004 and have subsequently mad the Galileo system capable of serving agencies world wide, in large part due to the success of this effort

- How quickly has your target audience of users embraced your innovation? Or how rapidly do you predict they will?

They already have and did so very quickly. Since the opportunities of resource sharing and global cost breakdowns became available, Cendant TDS has initiated and implemented several efforts that have taken advantage of this information.

DIFFICULTY

- What were the most important obstacles that had to be overcome in order to be successful? Technical problems? Resources? Expertise? Organizational problems?

The initial realization that this could even be done was the hard – followed by a confusing hour or so before I realised that the Sun's path over the Earth's (right to left) was in conflict with the way our resource chart read (left to right).

- Often most innovative projects encounter the greatest resistance when they are originally proposed. If you had to fight for approval and/or funding it would be useful to include a summary of the objections you faced and how you overcame them. - Did you encounter any unexpected challenges?

Not really. In this particular case, audiences have been very receptive.