QUOCIRCA INSIGHT REPORT June 2006

Grid Computing Update

Pilots move to Mainstream

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The fourth update to Quocirca's Grid Index shows how initial pilots of Grid computing are now moving towards full implementations. However, large-scale Grid implementations, covering an enterprise's total IT infrastructure, are still rare. Organisations are going for discrete cluster Grids in specific areas.

- **Initial pilots of Grid are now moving to full implementations**
  There is a marked growth in Grid implementations reflected by this cycle – significant use of Grid computing as cluster Grids in selected areas has grown from under 10% to nearly 30%, and modest use in selected areas has grown from 10% to 40%. Enterprise Grid adoption has risen from below 1% to over 5%.
- **The Grid indices continue to grow – but the rate of increase is slowing down.**
  The US is static across all Grid index measurements, with growth in Europe and the Asia Pacific regions being less in percentage terms than the previous cycle. The Asia Pacific region shows the highest levels of growth over the cycle.
- **As in Cycle III, Adoption in the United States is ahead of Europe, and the Asia Pacific region lags behind – but the rate of growth is slowing**
  The overall Grid indices for the United States, Europe and Asia Pacific were 6.1, 5.4 and 5.3 respectively. At the adoption index level, the United States leads Europe and Asia Pacific again, with scores of 4.3, 3.4 and 2.5 respectively.
- **Grid is being implemented as a mainstream technology, but not on a large enterprise scale, and the hurdles from Cycle III are still there.**
  The majority of Grid implementations are discrete Grids of clustered servers, rather than enterprise distributed Grids. The funding and ownership of Grids and the lack of maturity of Grid technologies remain as major hurdles to adoption. However, security and management of Grids or of Service Oriented Architectures are not seen as insurmountable issues, and those who have implemented such technologies (the "gurus") see little problem in these areas.
- **Overall knowledge of Service Oriented Architectures (SOA) is low**
  In both the business and technology respondents, there is a very low level of understanding as to what an SOA is about, and the value that it can bring to an organisation. Over 60% of business respondents and nearly 25% of IT respondents had no knowledge at all of SOA
- **Direct correlations can be seen between other technologies and Grid**
  There is a direct correlation between knowledge of SOA and the overall Grid indices for respondents, as well as for the usage of specific registries such as a UDDI for managing functional components.
- **Implementations of enterprise Grids and enterprise SOAs are not as strongly correlated at this point.**
  Although there is a tight correlation between SOA-enabling discrete parts of an infrastructure and the use of Grid technologies, the combination of broad-scale SOA adoption and Grid are not as close. Quocirca believes that this is due to organisations being loathe to combine too many new technologies in one large project.
- **There is a chasm in perceptions of IT involvement between IT management and business management**
  40% of business respondents believe that IT is involved in decision making at the earliest possible stage, while only 21% of IT respondents agree. 9% of IT respondents felt that they were involved too late to have any meaningful input – whereas less than 3% of business respondents felt that IT were totally left out of the decision making process. This chasm is also a major blocker to Grid adoption, as the technologists cannot communicate specific Grid-related values into the business.
- **Companies are not being as heavily driven by compliance issues as is generally thought**
  Only 42% of respondents agree that their company is being driven by compliance – as against 83% agreeing that strategy drives them, 74% are driven by numbers and 68% by the markets.

RESEARCH NOTE:
The information presented in this report was derived from 1 466 interviews with senior IT influencers and decision makers completed in April 2006. 179 of these were conducted in the United States, 721 in Europe and the remainder (566) in the Asia Pacific region. Respondents were from a mixture of large multinationals and medium to large national organisations, from across a broad cross section of industry sectors.

CONTENTS

1. Introduction

This is the fourth cycle of Quocirca's research into perceptions of Grid computing around the world. In this report, we look at the continuing evolution of trends in Grid computing. What we now see is a high level of uptake of Grid computing, but within more tightly constrained usage scenarios than we had expected. Pilots are resulting in definite implementations, but these implementations are based on advanced clustering of single applications.

When we look at the chasm that there is between the perceptions of the business and the IT departments when it comes to the value and approach to IT, we see that this gap in communication and understanding is what lies as the major block to mainstream Grid computing adoption.

As in Cycle III, the Grid indices that are mapped through this research show how infrastructures world wide are in a position where Grid computing is easily possible, as virtualisation of the network, of storage and of databases and the adoption of standards is at an all time high. Future moves to a Service Oriented Architecture (SOA) will make Grid a reality in many organisations – even if the end-user organisations themselves do not call it by such names.

The biggest caveat found through the research, however, is the lack of understanding from both the business and the IT respondents around SOA and what it means to their businesses. Without greater understanding of SOA and its part within a utility computing infrastructure, Quocirca believes that many Grid initiatives will struggle to survive beyond initial post-pilot implementations.

An explanation of how the Grid Index is designed is provided in Appendix A.

2. Grid's Continuing Evolution

Main Findings:

- Standardisation and rationalisation continues
- Virtualisation at multiple levels is happening
- Grid is being used for specific defined tasks

Through other research, Quocirca has seen that organisations are still going through various rationalisation initiatives, aimed at lowering the number of physical servers under management, in instances of applications running, in application server platforms being used and so on. The aims here are two-fold: one is to reduce cost, and rationalisation helps here by requiring fewer different skills and fewer resources to manage an equivalent set of processes, and the other is to create a more responsive infrastructural platform for the future.

Previous Grid research cycles have shown how this work has led to highly standardised infrastructures around the world (the average Foundational Readiness index score world wide is now 6.9 out of 10, as against the previous score of 6.7 in September 2005, and an original score of 5.0 in September 2004). For many organisations, this does not, however, lead directly to Grid computing. For example, the highest level of foundational standardisation occurs in Asia, and yet it has the lowest levels of Grid adoption.

What we are now seeing is greater uptake of virtualisation of IT assets, and greater vendor activity in presenting virtualisation as a business tool. For example, virtualisation is becoming a commodity within servers, both in the silicon layer and the operating system. Storage virtualisation is becoming more effective with broader reach and greater support for heterogeneity and at a more cost effective level. Database virtualisation via federation is broadly adopted within many organisations, and the ubiquity of services such as security and email to add value to these environments means that we are seeing broader overall interest in virtualisation as a means to helping the business.

That we are now seeing broad usage of Grid as a targeted tool points towards organisations beginning to utilise the power of their previous work on standardisation and rationalisation. Quocirca believes organisations will rapidly find that these islands of Grid will be relatively easy to bring together, enabling multiple service-based composite applications to share technology resources and provide greater flexibility for organisations going forward.

The Grid Index programme was designed to monitor the rate at which this kind of evolution is taking place across the enterprise sector, covering the three main theatres of the United States, Europe and the Asia Pacific region (APAC). The origin of the Grid Indices and an explanation of the terms used in shown in Appendix A; geo-demographics of the research are covered in Appendix B.

3. Business Drivers

Main Findings:

- Strategic concerns are the main driver for organisations
- Compliance is not a major driver – but risk mitigation may well be

In this cycle, we asked the business respondents what the major drivers for their organisation were (see Figure 1).

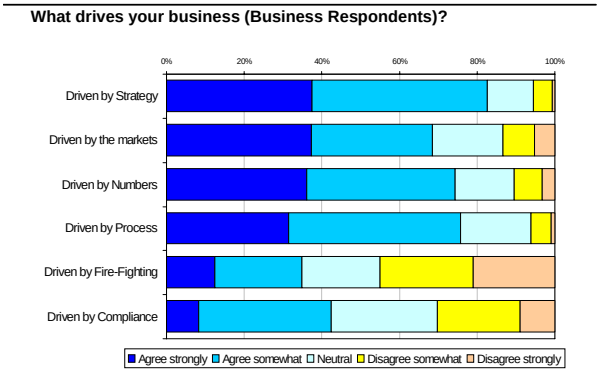

Figure 1

As we can see, the main driver is corporate strategy, with the markets a close second. Numbers and process follow on, with a low response for the feeling that the organisation is out of control and is perpetually fire-fighting. Surprisingly, as we see more and more legislation impact organisations on a global basis, compliance trailed in last place with fewer than 10% of respondents feeling that this was a major issue for them. We believe that this is because compliance is seen as a pure cost against the bottom line – whereas risk mitigation (i.e. calculating how much would be lost by non-compliance, including cost to the company's reputation against the cost of compliance measures needed to be put in place) would be seen as more strategic.

4. The IT/Business Chasm – A Recipe for Disaster

Main Findings:

- The business has a different view on IT's capabilities than the IT department itself
- This difference in view can lead to problems in investment decisions

Grid computing can be approached from different directions – one is through the Grid enablement of a specific application or group of services through the adoption of a constrained Grid, while the other is to move towards a total enablement of an organisation's environment to support Grid computing at an enterprise level.

The first approach means that Grid computing can be implemented as part of a single project and that it can be carried out without the need for what can be complex discussions with the business as to what Grid means to them.

The latter approach means that the business must have buy-in to the approach – Grid enabling a whole infrastructure has costs that cannot easily be absorbed into ongoing projects, and investment must be agreed by the business itself upfront.

However, Quocirca's research shows that the business' perceptions of what their IT infrastructure offers them differs widely from IT's perception, and this will lead to problems when looking at how such large-scale requirements are approached.

For example, when we asked business respondents for their views on their organisation's IT capabilities, we found that respondents were, on the whole, relatively happy (see Figure 2)

What are your perceptions of your company's IT capabilities (Business Respondents)?

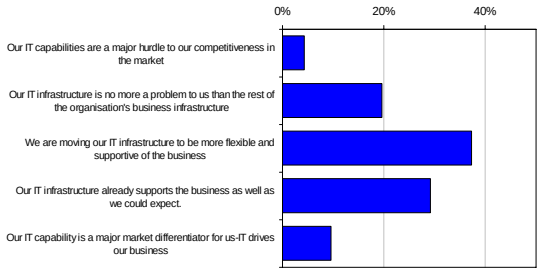

Figure 2

Less than 5% of respondents felt that their IT capabilities were a major hurdle, whereas 10% saw IT as being a major differentiator for them.

When compared to the responses to the same question from the IT respondents, however (see Figure 3), we see a different story.

Our IT capabilities are (IT respondents):

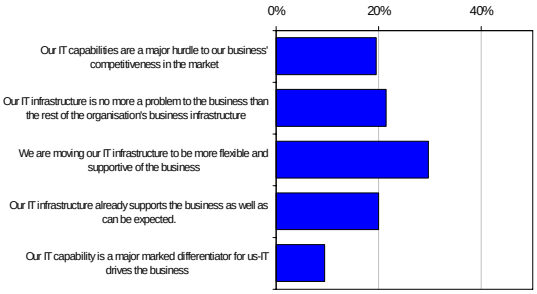

Figure 3

Here, over four times as many respondents saw IT as being a major hurdle to their organisation's overall capabilities – but 10% did see IT as being a major differentiator for their organisations.

The business also has a different perception of how early in the decision making process IT is involved – whereas 35% of business respondents felt that IT was involved at the earliest possible stage, only 21% of IT respondents felt the same (see Figure 5 and Figure 6). Indeed, 8% of IT respondents felt that they were involved too late to have any meaningful input, against less than 3% of business respondents.

The business involves IT in the decision making process (Business respondents):

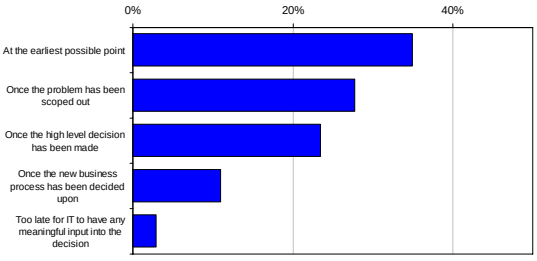

Figure 4

IT is involved in the decision making process (IT respondents):

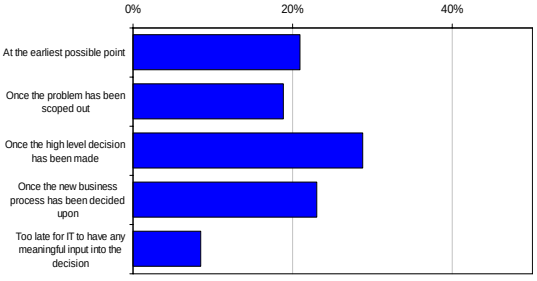

Figure 5

What this means is that the business sees fewer problems with its infrastructure than there are probably there in reality,

and that the involvement of IT at a late stage in the decision making process means that many IT departments are left with having to be responsive to the business, rather than having the capability to be proactive to the business' needs. In the last cycle of research, we saw how companies that were proactive invested far more in new IT projects than they did in fire-fighting, and as a result were far more successful in the markets than their competitors who spent 70% or more of their IT budgets on maintenance and fire-fighting.

That such high amounts of IT expenditure goes on maintenance and fire fighting is further supported by this cycle's research (see Figure 6 and Figure 7). However, the business perceives that more money is spent on fire-fighting and maintenance than the IT department believes is the case – but only just.

Approximately what percentage of your IT expenditure relates to specific projects recognised by the business, as opposed to spend on IT housekeeping and other fire fighting? (Business respondents)

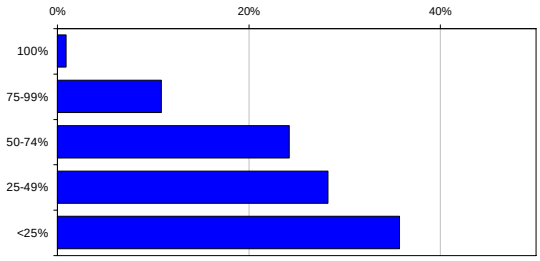

Figure 6

Approximately what percentage of your IT expenditure relates to specific projects recognised by the business, as opposed to spend on IT housekeeping and other fire fighting? (IT respondents):

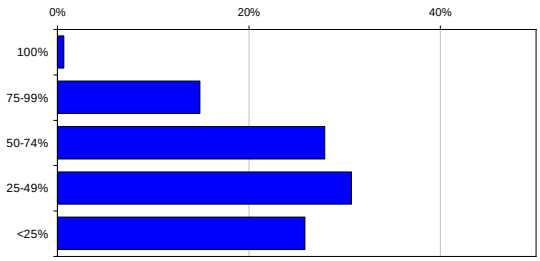

Figure 7

Against the business' relative happiness with the capabilities of the IT infrastructure we must lay another issue – the amount of functional re-use that is seen to be in place within the infrastructure.

Here again, the business has a perception of greater capabilities than the IT respondents say is the reality. Less than a quarter of business respondents see little to no re-use of functionality in the IT infrastructure, whereas over 35% of IT respondents see this – with 12% seeing no re-use at all (See Figure 8 and Figure 9).

How much re-use of functional capabilities do you perceive there is within your IT infrastructure (Business respondents)?

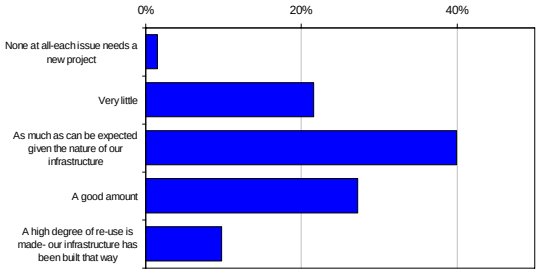

Figure 8

How much re-use is there in your IT infrastructure (IT respondents)?

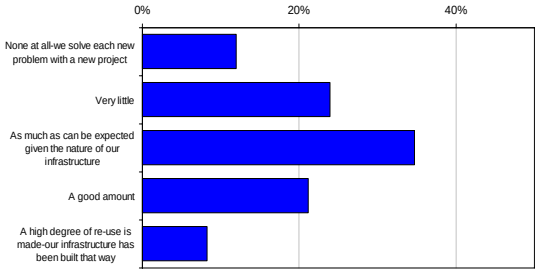

Figure 9

This means that should the IT department approach the business for funding, there is a probable need to point out faults with the existing infrastructure that have not been visible to the business beforehand. This then opens up the IT department to criticism, and may even lead to reviews around the overall value of the department, and whether outsourcing would make more sense.

Therefore, requests to move an organisation from an existing environment to a Grid/utility based infrastructure are likely to remain few – after all, why make the business aware of problems it is happy to be in ignorance of, and why try and create a flexible infrastructure when you are not being involved at an early enough stage for you to offer the additional value such a platform can offer?

This shows that vendors in the Grid/utility space have work to do in educating the business on the business value of Grid – not only as to the direct value that it provides to the business itself, but also in addressing hidden issues within an organisation's existing infrastructure.

5. Grid and SOA – Another Chasm?

Main Findings:

- Despite vendor marketing, recognition of SOA is low
- There is a strong correlation between SOA awareness and the overall Grid Index
- Full SOA implementations, however, are not being carried out at the same time as Grid adoptions

Previous research has shown that there is a definite link between Grid computing and Service Oriented Architectures (SOAs) in the perception of the market. Within this cycle, we decided to look at awareness of SOA in both the business and IT areas, and to look at current uptake of the technologies involved. The subject will be covered more completely in another Quocirca report, but the high-level findings are presented here.

The shock to those vendors who have been pushing SOA for many months is the lack of knowledge of the term SOA or of Service Oriented Architectures overall. Over 55% of business respondents had never heard of SOA, neither had 24% of IT respondents (see Figure 10 and Figure 11). Only 10% of respondents had been involved with the implementation of SOA at any level.

On a scale of 1 to 5, I would rate my existing knowledge of how an SOA works as (Business respondents):

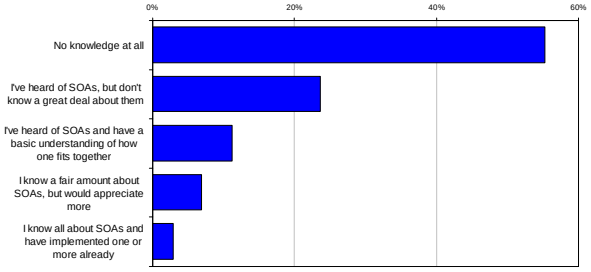

Figure 10

On a scale of 1 to 5, I would rate my existing knowledge of how an SOA works as (IT respondents):

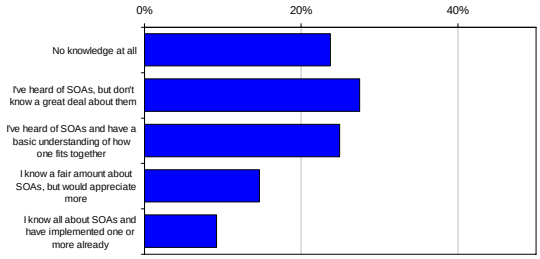

Figure 11

However, we did find a correlation between SOA knowledge and the overall Grid Index (see Figure 12). Here, we see that we have a simple relationship – those with the least SOA knowledge also have the lowest overall Grid Index.

Relationship between SOA knowledge and the Overall Grid Index

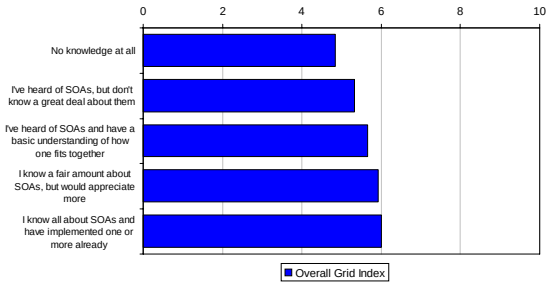

Figure 12

To create an effective Grid, Quocirca believes that it is necessary to utilise small, re-usable pieces of functionality which can be easily provisioned and de-provisioned in a dynamic Grid environment. With the standards around SOA reaching a reasonable level of maturity and with buy-in from all the major vendors, SOA makes the most sense as a direction of choice.

One warning was seen in the research, however. Those that are busy implementing broad scale SOA systems do so to the exclusion of Grid (see Figure 13).

Correlation between SOA adoption and Grid adoption

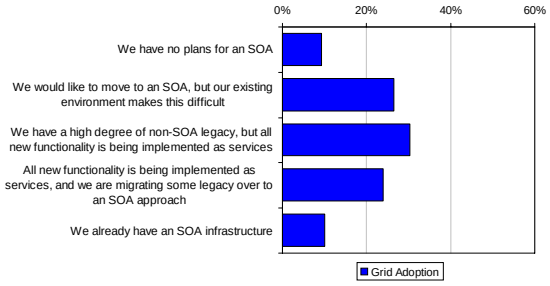

Figure 13

Quocirca believes that this is due to organisations not wanting to attempt to utilise too many new technologies in the same large project, due to the need for risk mitigation. However, we would expect these SOA implementations to rapidly become Grids once in production.

Without driving knowledge of SOA to a much higher level, Quocirca does not believe that enterprise Grid computing can take off to the extent that we feel it could. It is incumbent on the software vendors involved to create solid messaging around SOA at both a business and technical level and to ensure that this messaging remains consistent and is played in context with Grid and other forms of utility computing.

6. Current Progress and Activity in Grid computing

Main Findings:

- Overall, the Grid index growth has slowed

The Overall Grid Index is made up of 3 sub-indices (covered in depth in Appendix A). These sub-indices are:

- Foundational Readiness – how standardised and virtualised is a respondent's IT infrastructure
- Knowledge and Awareness – how much does a respondent know about the technologies underpinning a Grid architecture
- Adoption – how advanced is a respondent in adopting Grid and its associated technologies

The following picture provides a summary level snapshot of activity and progress on a global basis (See Figure 14):

Global Grid Index April 2006

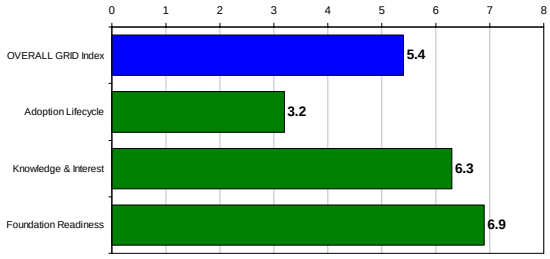

Figure 14

The results upon which this picture is based were derived from 1,466 interviews with senior IT influencers and decision makers from around the world completed in April 2006 (see Appendix B for sample distribution).

Global Grid Trends April 2006

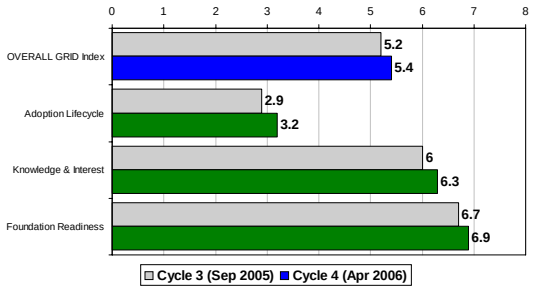

Figure 15

To see how the indices have trended from the last cycle, we can look at Figure 15. Although growth has continued across all indices, we see a degree of flattening out. This is to be expected as we see the index figures get to higher levels – the maturity of the markets counts against big percentage growth. However, adoption has grown by 10% over the last cycle.

7. Market Dynamics in Regional Theatres

Main Findings:

- US Grid activity has stalled
- APAC has the largest index growth
- Europe sees regional variances

Research was carried out across 23 different countries, and the results were then aggregated into 15 areas for analysis and then into 3 regional theatres. These are:

- **The United States**
- **Europe**

  Comprising Benelux, France, Germany, Italy, the Nordics, Spain, the UK and bringing in Eastern Europe for the first time (comprising Hungary, Slovakia, Poland and the Czech Republic)

- **APAC**

  Comprising Australia/New Zealand, Greater China (comprising China, Taiwan and Hong Kong), India, Japan, Korea and S.E. Asia (comprising Malaysia, Thailand and Singapore)

Canada was included in the last cycle, but has not been included in this round. Eastern Europe has been added for this cycle.

This fourth cycle gives us three cycles for regional trends as well as global trends. Between the first cycle (June 2004) and the second cycle (April 2005), we saw a rapid rise in lower level indices across Europe, where basic knowledge of Grid and the understanding of possible benefits doubled during the period. As we stated in the last report, we believe that similar activity was happening in North America, whereas less was happening in APAC.

Grid Index Trends for the USA

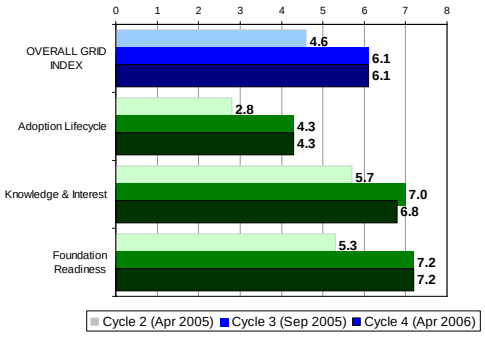

Figure 16

To give a better picture of real activity at a regional level, we can now look at the comparative trends from the last three cycles. This is where we see the slowing down within the indices – the United States has come to a halt, with little change in its indices between September 2005 and April 2006 (see Figure 16). This is against a growth of 30%

between April 2005 and September 2005 in the main index. Note that for these figures, we have removed Canada from the previous cycle's results to maintain consistency in the trends.

We expected strong growth in Grid adoption in the US during this cycle, and yet the index was static. Our analysis of this is that the majority of early adopters have already having made their first steps in to Grid, and that the mainstream adopters are still waiting to see the outcome of these implementations and for greater maturity within the technologies involved.

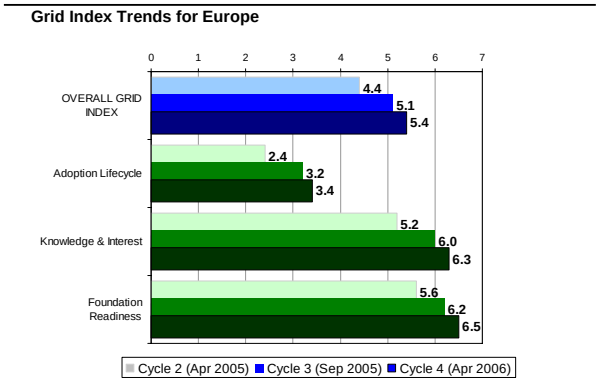

Figure 17

Europe (See Figure 17) shows continued growth from Cycle III, It should also be noted that the inclusion of Eastern Europe within the regional figures has a deleterious effect on Europe's figures.

APAC has shown the fastest growth in this cycle, with the overall index growing by a little over 8% (see Figure 18). Likewise, although APAC's Grid Adoption remains the lowest of the three main theatres, it has grown by 25% in six months, and is now rapidly closing in on Europe. Foundational readiness still leads the world due to reasons discussed in earlier cycles, and with the relatively low knowledge and interest score also having grown rapidly, we are finally seeing the APAC region becoming a major Grid player.

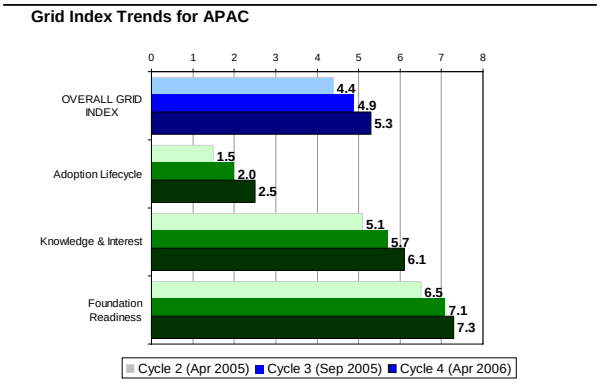

Figure 18

In the last report, we predicted a plateauing in the Foundational Readiness index, which has happened in all three theatres, and we still see growth in the Knowledge and Interest and Adoption indices for both APAC and Europe. The US has stalled, but at a relatively high level. This denotes that Grid Computing as a concept is maturing in the US, and that we can expect to see far slower growth in any of the indices in the US in the future. As the promise of Grid is seen to bear fruit for early US practitioners, and we see more case studies on commercial (as opposed to high performance, technical/scientific) Grids come through, we would expect to see renewed growth in the US adoption index.

8. Grid types

Main Findings:

- Cluster Grids are the most popular Grid type
- Distributed Enterprise Grids are seen as a logical conclusion
- Grid adoption rates have grown rapidly – modest or significant use in some areas has grown between 3 and four fold over the last cycle

With Cycle III, we subdivided Grid computing into 5 different classes, and found that respondents were open to these definitions and to the relevancy within their organisations. These five classes were defined as:

- **Cluster Grids**

  A Cluster Grid is defined as one in which all components are physically located together, e.g. in a single computer room or data centre, obviously operating behind your firewall.

- **Distributed Enterprise Grids**

  A Distributed Enterprise Grid is defined as one in which all components are operating behind your firewall, but are physically distributed across multiple locations or sites.

- **Managed Hosted Grids**

  A Managed Hosted Grid is one in which you have a dedicated Grid for your organisation, but it is a solution hosted and managed by third party service provider.

- **Utility Grid Services**

  A Utility Grid Service is one in which you buy computing resource on demand from a service provider who operates a single large Grid to serve the needs of multiple customers.

- **Partner/Community Grids**

  QA partner/community Grid is one in which you and other members of a supply chain or community donate computing resource to form part of a larger group that are shared by everyone.

Figure 19 shows the growth between Cycle III and IV in how respondents see the relevance of different Grid types to their organisations. For example, we see that the relevance of Cluster Grids has grown from under 20% to 50%, and even Partner/Community Grid relevance has increased twofold.

Which of the following types of Grid computing would you say could be relevant to your organisation either now or in the future?

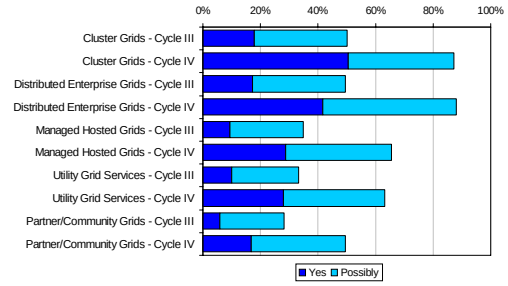

Figure 19

This large increase in the perception of relevance of different types of Grid computing has not led to a big rise in the numbers of respondents who see Enterprise Grids as the logical end-point (see Figure 20). However, we do see that well over 50% of respondents see this as being "inevitable" or "very probable" – with very few seeing this as "unlikely".

Regardless of how you initially start with Grid, do you envisage a time when you have one or more larger grids that support the needs of many different business systems across your organisation?

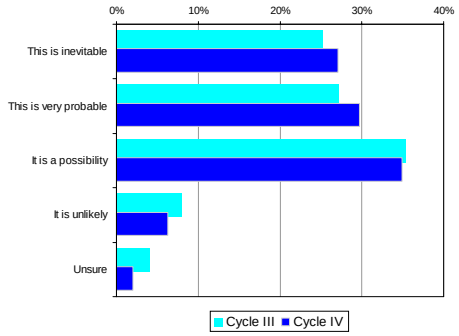

Figure 20

Where we do see a major shift is in the current status of Grid adoption (see Figure 21).

How would you describe the current status of your adoption of Grid Computing?

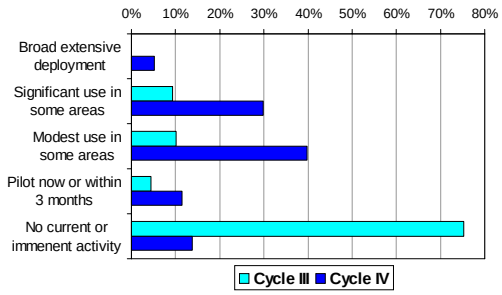

Figure 21

Here we see large uptake of Cluster Grids as seen through "Significant use in some areas" and "Modest use in some areas", and we see the adoption of Enterprise Grids ("Broad extensive deployment") moving from less than 1% to over 5% - one in 20 of the survey respondents are now utilising Grid as a major architecture.

9. Relationship between Grid, Other Technologies and the Business

Main Findings:

- There are marked correlations between an organisation's approach to technology, technology investment levels, SOA utilisation and UDDI adoption and the overall Grid index

In previous cycles we have looked at the interplay and correlation between Grid computing and areas such as blade architectures and SOA. As we have seen earlier in this report, there is a direct correlation between SOA knowledge and the overall Grid index.

Relationship between level of SOA implementation and the Overall Grid Index

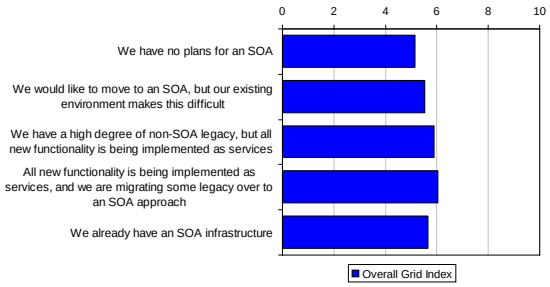

Figure 22

When we look at the relationship between the overall Grid index and the level of SOA implementation (see Figure 22), we see a similar correlation – except for those who have already implemented an enterprise-wide SOA – a similar result as we have already seen in comparing SOA and Grid adoption patterns earlier. We believe that the reason behind this would be that a broad-scale SOA project would be a major focus for a company, and that Grid would not be considered at the same time as such a large project, due to the perception of high risk involved with absorbing too many new concepts in one go. However, once an SOA is in place, Quocirca would expect a Grid environment to follow naturally – all the components are in place and as new hardware and software components are added, the SOA will automatically grow to be an Enterprise Grid.

If we look at the relationship between an organisation's approach to business and the overall Grid Index, we get Figure 23.

Relationship between approach to business issues and the Overall Grid Index

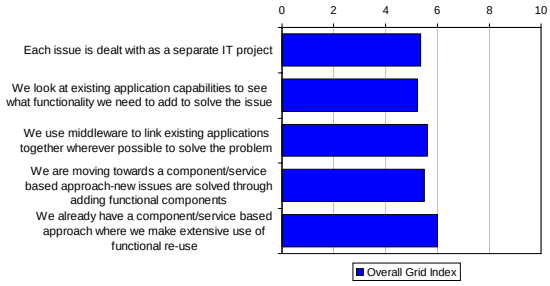

Figure 23

Here, we see that those organisations that take a componentised, functional re-use approach to IT implementations tend to have higher overall Grid indices.

Indeed, if we then look at the relationship between IT investment and overall Grid index, we get Figure 24.

Relationship between IT investment and the Overall Grid Index

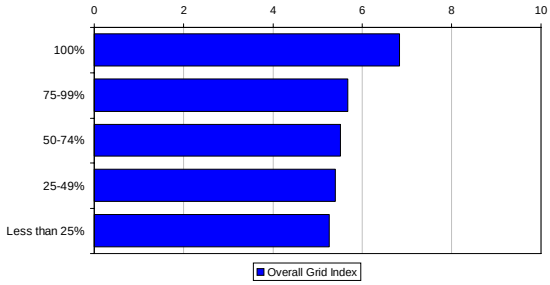

Figure 24

Here, we see that those who are continuously fire-fighting issues have the lowest overall Grid index scores, whereas those who invest the most in IT have the highest scores.

Relationship between drive for consistency and the Overall Grid Index

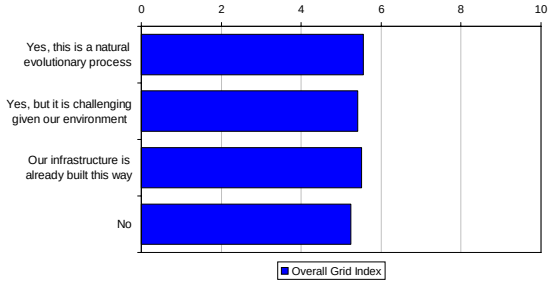

Figure 25

For those who are looking at building more consistency into their IT infrastructures, Grid is seen as a natural progression (see Figure 25). Here, those who do not see that they will be driving for more consistency lag the others, and those who see such a move being difficult are behind those who see consistency as a natural progression and those who already have consistency built in to their infrastructures.

If we also look at the relationship between those who are utilising a registry/database such as a Uniform Description, Discovery and Integration system (UDDI) to manage the disparate components that make up a web service or SOA environment and overall Grid index, we get Figure 26.

Relationship between UDDI usage and the Overall Grid Index

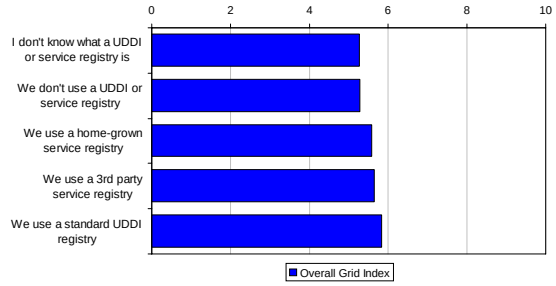

Figure 26

Again, we can see the correlation between the maturity of understanding/adoption and the overall Grid index. Interestingly, those who are using a third party UDDI registry are the ones who gain the highest overall Grid scores – this may well be due to these people being more at the bleeding edge of the technology curve.

Overall, these relationships detailed above point to one fact – that those organisations that see IT as a integral part of the business tend to be further along the technology curve than those where IT is seen as more of a necessary evil.

10.Hurdles to Grid Adoption

Main Findings:

- The perception that Grid is costly to implement has increased
- Perception of that Grid is immature has decreased, but the state of Grid standards is seen as a growing issue

In the last cycle, we saw that the growth in understanding of the possibilities of Grid computing had been matched by the growth in the perception of problems that Grid computing may also bring to an organisation. In this cycle, we asked the same questions around what respondents saw as the main hurdles to Grid adoption (see Figure 27).

When we look at the trend information, we see that the perceptions around the immaturity of Grid computing have decreased, as has the higher prioritisation of other technology projects. However, cost is now seen as a bigger issue than six months ago, as are the perceptions of the state of Grid related standards – probably driven by the various Grid vendor "camps" being perceived to drive their own standards requirements, and the emergence of multiple Grid-related groups such as Globus, the Global Grid Forum (GGF), Oasis, the Enterprise Grid Alliance, Grip and so on. However, when we dig behind these groups, Quocirca finds that the basis for the standards remains the same – the use of Web Services, the use of Service Oriented Architectures and so

on. Quocirca believes that Grid standards are at a good level of maturity, and that Grid interoperability is highly possible now.

Also noticeable is the big rise in respondents looking for success stories – this is also reflected in the lack of awareness of Grid within the greater organisation, and respondents want to be able to point to those who have already gone down the Grid route as a means of demonstrating the benefits that can be obtained.

In more general terms, which of the following would you regard as significant hurdles or inhibitors to investment in Virtualisation or Grid Computing technologies?

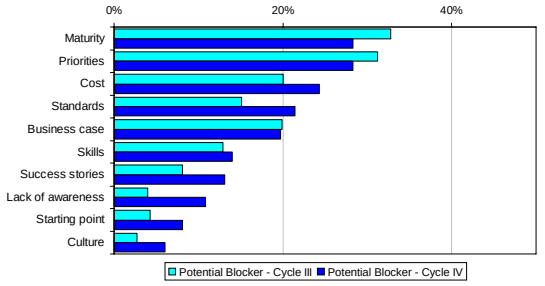

Figure 27

The order of the issues is relatively unchanged between the two cycles – the only big mover is Standards, which has seen a 30% increase in focus. Quocirca's belief is that there is a perception in the market that there are two opposing Grid camps, both intent on promoting their own version of Grid, and in utilising their own Grid standards. Therefore, it is incumbent on the vendors, and on the standards bodies, to show the synergies between the two camps and how their standards interoperate – otherwise, this perception will continue to grow into being a major hurdle to Grid adoption.

These hurdles have also impacted the ROI that respondents expect from Grid (see Figure 28).

Expected ROI on Grid implementations

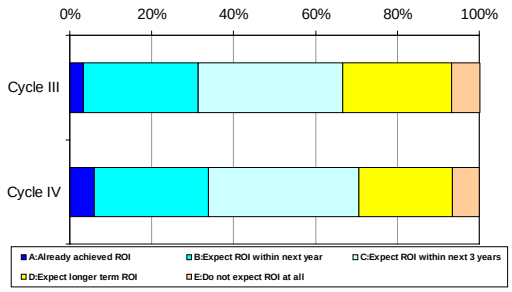

Figure 28

We would have expected ROIs to be seen as being shorter, based on the overall positive responses to Grid that we have seen. However, there has been little change between Cycle III and Cycle IV – and Quocirca believes that this is due to the mitigating effect of the perceived hurdles to Grid adoption.

If we then look at two main areas of concern to the majority of IT departments when it comes to any IT project – cost and security – we see trends as in Figure 29 and Figure 30.

To what degree do you see challenges with managing the budgets, funding and ownership issues associated with a single platform entity, i.e. "The Grid", serving many departments, cost centres, etc

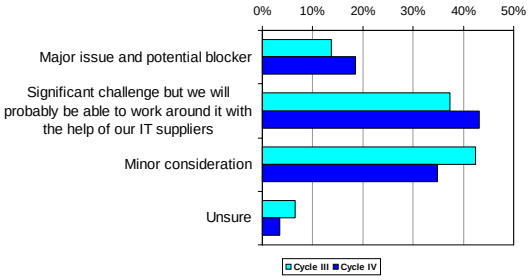

Figure 29

To what degree do you see challenges with identity management and authentication in an environment where applications and data (and therefore users) can be shifted from one set of CPU resources to a different set flexibly

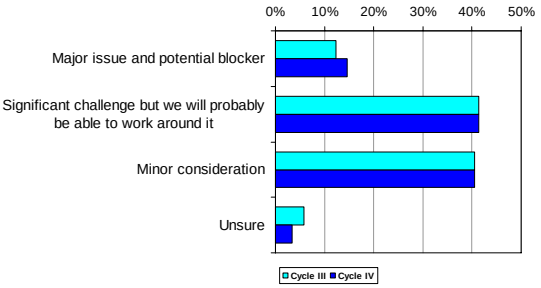

Figure 30

Here, we see that cost is seen as more of an issue than it was in Cycle III – and to an extent where the cost issue could block any move to Grid at all. However, Quocirca believes that Grid costs can be minimised through the use of evolutionary approaches, as we already see through the rationalisation, standardisation and virtualisation of networks, and through the adoption of Grid as sets of point solutions for specific issues that can then be brought together as an enterprise Grid further down the line.

However, the perception of issues around security has barely changed between the two cycles.

11. The Application of Grid

Main Findings:

- Grid implementations are still focussed on pragmatic, single issue Grids
- The view of hosted Grids is gaining better approval, as outsourcing gains more traction worldwide

In the last cycle, we identified a pragmatic approach to initial Grid implementations – respondents were looking to select an existing application or group of applications to build a new discrete Cluster Grid. Close behind this came the more strategic approach of defining an overall Grid initiative and then working through the existing infrastructure to create an Enterprise Grid. This cycle, we see a similar set of results (see Figure 31). However, it is noticeable that overall the likelihood of each approach is slightly down, apart from the use of a hosted Grid. This greater likelihood of outsourcing

the infrastructure reflects other research that Quocirca has undertaken, where functional outsourcing is back on the organisational radar.

How likely is it that the following approaches to implementing grid will be taken in your organisation in the early stages of adoption?

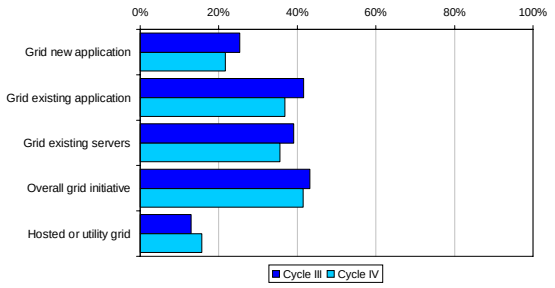

Figure 31

12. Discussion

Overall, we are seeing Grid coming through its first incarnation as a high performance computing (HPC) platform for scientific and research areas, through highly specific compute grids for number crunching to an acceptance by businesses that Grid can be an architecture for business flexibility.

In the last report, we questioned whether the proliferation of standards in the utility/Grid computing markets would impact the acceptance of Grid. From the research, we can see that many more organisations are now questioning whether Grid standards are at a suitable point for general adoption, and Quocirca believes that the various bodies around Web Services, Service Oriented Architectures and Grid need to ensure that a common language is utilised, and that the interoperability and interdependencies of the various standards is underlined in marketing collateral and presentations.

Also in the last report, we questioned the suitability of a standard UDDI to manage the functions provided by web services/SOA within a Gridded environment. Again, the research shows that many users have shared this concern, and that those who have been most successful with the Grid environment have had to go for non-generic UDDI registries, or have had to develop their own.

In previous cycles, we have identified the building of a business case as a major problem facing prospective Grid customers. This continues to be the case, and as more Grid prospects search for suitable Grid case studies, the vendor community must help by providing suitable use case scenarios and real-life case studies to help these companies to create a meaningful value proposition for the organisation.

13. Other Reading

This report is the fourth cycle of research into Grid Computing, and follows a primer written around what Grid computing is.

These reports are available free of charge from Quocirca's web site at:

http://www.quocirca.com/report_grid.htm

http://www.quocirca.com/report_grid_2004.htm

http://www.quocirca.com/report_gridindex2.htm

http://www.quocirca.com/report_gridindex3.htm

APPENDIX A

Origin of the Grid Indices

Approach and Rationale

Assessing and tracking the level of progress and adoption of emerging ideas and technologies is a challenge. Measuring the end point only, e.g. the number of companies achieving return on investment, can be potentially misleading. Using such an approach, it would be difficult, for example, to distinguish between a technology with broad appeal that was at the beginnings of widespread adoption, versus a niche technology that had achieved rapid adoption in certain areas but had limited growth potential beyond this.

It is for this kind of reason that the overall Grid Index is based on more detailed measurements based on activity throughout the adoption lifecycle – the foundation readiness index (based on standardisation and rationalisation of the infrastructure), knowledge and interest (knowledge driven by vendor, media, analyst and peer activity, and interest being based on readiness to consider Grid as a way forward) and adoption (the actual implementation of a Grid system in any defined form).

By correlating these, we can both validate our assumptions of the lifecycle (e.g. those who have a suitable architecture tend to move to adoption once they have reached a suitable level of understanding and benefits appreciation), and track how activity is unfolding long before the end point is reached.

The absolute values of the indices themselves are far less important than the differences between them and how they change over time. The Grid Index programme is therefore designed to run on a regular basis and as time goes on, we will be able to "calibrate" the indices more accurately and continue to develop benchmarks by looking at scores achieved by the most committed adopters. We can learn a great deal from comparing and contrasting index values as we have seen in this report.

Data Gathering and Index Calculation

Questions used to capture information during telephone interviews were designed to allow the respondent to provide a meaningful response, but also allow that response to be translated into a numeric score, e.g.

How would you rate your level of knowledge and understanding of the concepts and practicalities of Grid Computing?	
Deep understanding	Score = 10
Comfortably familiar	Score = 8
Limited familiarity	Score = 6
Passing awareness	Score = 4
Negligible knowledge	Score = 2
Completely unfamiliar	Score = 0

Using this kind of technique, similarly formatted questions were constructed in the following areas:

Foundation Readiness Index

- Level of adoption of standardisation and Grid precursor technologies such as web services, service oriented architectures and blade servers

Knowledge and Interest Index:

- Level of knowledge of Grid computing at a general level
- Level of knowledge of different Grid computing types
- Level of interest in the utilisation of Grid technologies within the respondents environment

Adoption index:

- Current status of adoption
- Part played in overall IT strategy
- Likely investment over the next 12 months

APPENDIX B

Interview Sample Distribution

The information presented in this report was derived from 1,466 interviews with senior IT influencers and decision makers completed in April 2006. 179 of these were conducted in the United States, 721 in Europe and the remainder (566) in Asia Pacific. Respondents were from a mixture of large multinationals and medium to large national organisations across a broad cross section of industry sectors.

Distribution of the sample by geography and industry was as follows (Figure 32 and Figure 33):

Sample by Geography (Detail)

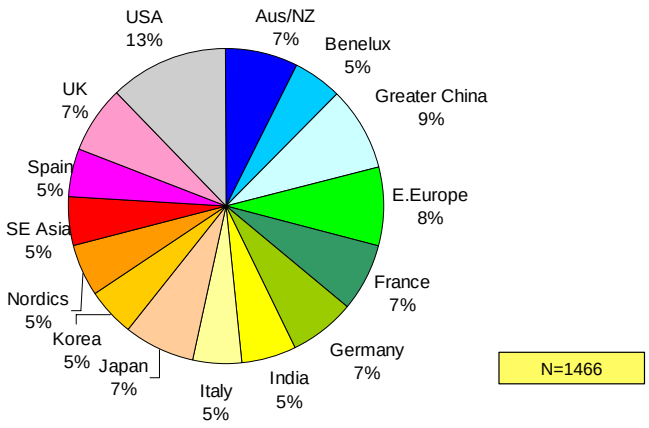

Figure 32

Sample by Industry

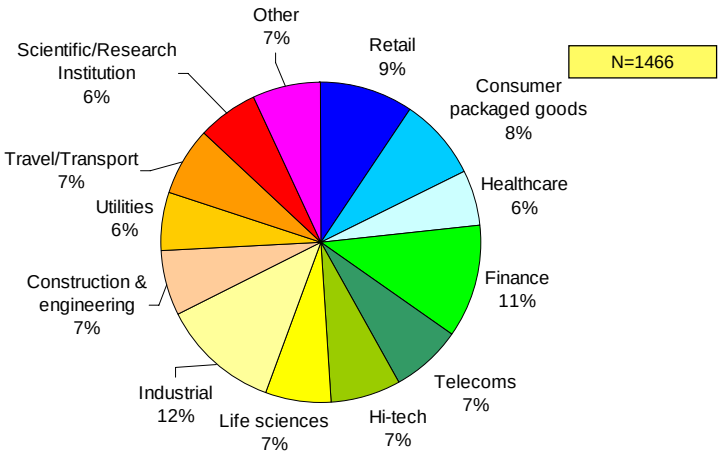

Figure 33

About Oracle

Oracle (NASDAQ: ORCL) is the world's largest enterprise software company. For more information about Oracle, please visit http://www.oracle.com.

About Quocirca

Quocirca is a perceptional research and analysis company with world-wide research capabilities and a focus on the European market for information technology and communications (ITC). Its analyst team is made up of real-world practitioners with first hand experience of ITC delivery who continuously research and track the industry in the following key areas:

- Business Process Evolution and Enablement
- Enterprise Applications and Integration
- Communications, Collaboration and Mobility
- Infrastructure and IT Systems Management
- Utility Computing and Delivery of IT as a Service
- IT Delivery Channels and Practices
- IT Investment Activity, Behaviour and Planning

Quocirca research is always pragmatic, business orientated and conducted in the context of the bigger picture. ITC has the ability to transform businesses and the processes that drive them, but often fails to do so. Quocirca's mission is to help its customers improve their success rate.

Quocirca has a pro-active primary research programme, regularly polling users, purchasers and resellers of ITC products and services on the issues of the day. Over time, Quocirca has built a picture of long term investment trends, providing invaluable information for the whole of the ITC community.

Quocirca works with global and local providers of ITC products and services to help them deliver on the promise that ITC holds for business. Quocirca's clients include Oracle, Microsoft, IBM, CA, O2, Symantec and Cisco. Sponsorship of specific studies by such organisations allows much of Quocirca's research to be placed into the public domain. Quocirca's independent culture and the real-world experience of Quocirca's analysts, however, ensures that our research and analysis is always objective, accurate, actionable and challenging.

Many Quocirca reports are freely available and may be downloaded directly from www.quocirca.com.

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