Grid Computing Update

The Market Begins to Mature

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In this, the third update to Quocirca's Grid Index, we can begin to see how trends across the world are building. This cycle also shows how companies that have the business and IT well aligned are better prepared for the future than those where the business takes a lesser role in IT decision making.

- **Grid computing is firmly on the corporate radar, and both IT and the business are growing more aware of the difference approaches to Grid computing**
  In earlier cycles, we have seen a growing awareness of Grid, either in the area of high-power computing (HPC) or as an architectural approach within an infrastructure. We are now seeing organisations being able to differentiate between different styles of Grid computing – from discrete HPC Grids through mainstream cluster Grids to hosted/utility and community Grids. The research indicates that this maturation of understanding will enable more rapid Grid implementations.

- **The Grid indices have grown across the world**
  In all theatres, the indices that are measured through the research show that organisations are better prepared for Grid computing, through foundation readiness, awareness and knowledge and adoption. Indeed, the adoption index is up by 30% on the previous cycle, showing a rapid growth in the usage of Grid environments. Knowledge and awareness has grown by 22% in the US, by 15% in Europe and 12% in APAC.

- **Over 50% of respondents now see distributed Grid computing as "inevitable" or "very probable"**
  The majority now see the utilisation of Grid as an underlying architecture to support multiple different business processes as the way forwards. Less than 8% of respondents did not see Grid as a possibility within their organisation.

- **As in Cycle II, Adoption in North America is ahead of Europe, and the Asia Pacific region just behind Europe**
  The overall Grid indices for North America, Europe and APAC were 5.8, 5.1 and 4.9 respectively. Foundation readiness remains highest overall in APAC, but is not being carried through into adoption of Grid technologies. At the adoption index level, North America leads Europe and APAC again, with scores of 3.9, 3.2 and 2.0 respectively.

- **Organisations that acknowledge the need for a flexible, dependable infrastructure and who involve the business in IT decisions are strategically powerful**
  Organisations where the business is fully involved with the IT decision making process are more satisfied with how IT supports their business, have a greater degree of IT spend on new projects, and have a much higher probability to be a growing company than those where the business is not involved. Whereas 68% of those with no business involvement in IT follow the standard rule where more than 75% of IT expenditure is being spent on maintenance, 42% of those with full business involvement have greater than 75% of IT expenditure being dedicated to new projects.

- **Businesses see solid benefits in the utilisation of Grid technologies – and not just at a technology level**
  56% of respondents see Grid technologies as a definite enabler for IT to be more supportive of the business, with a further 34% seeing this as a possibility. 52% see the same technologies providing a means of removing the complexity of IT from the critical path in the business decision making process (with 34% seeing this as a possibility), so enabling the business to make faster, better decisions to react to market forces. 48% see Grid as definitely providing more robust systems (38% probably), with 47% seeing definite lower IT costs overall (31% probably).

- **The road to Grid is there, but organisations still see hurdles ahead.**
  51% of respondents see the funding and ownership of Grids as a major or significant issue. 53% see identity management and authentication as a major or significant issue. 41% see the lack of maturity of Grid as a major issue. However, awareness of these issues is also leading organisations to seek to address them – and the vendor community must also help through education and through the provision of suitable solutions.

RESEARCH NOTE:
The information presented in this report was derived from 1,466 interviews with senior IT influencers and decision makers completed in Sept 2005. 302 of these were conducted in North America, 603 in Europe and the remainder (561) 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.

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1. Introduction

This is the third cycle of Quocirca's research into Grid computing around the world, and we are now in a better position to trend the perceptions around it. The research shows that we have moved from a low awareness of even the term Grid as seen in the first cycle of the research run in June 2004, through a basic understanding in April 2005 and now to a level of understanding where organisations are able to distinguish between different types of Grids.

However, there still remain issues within the market for the broader adoption of Grid computing, and the research shows that the vendor community needs to address these concerns to drive users to see Grid as the evolutionary way forwards for their organisations.

The Grid indices that Quocirca maps through this research show how organisations are inexorably moving to a position where a move to Grid computing can be relatively simple, without the need for forklift infrastructural upgrades and rip and replace approaches to software stacks. The move to open standards, virtualisation, web services and service oriented architectures are all preparing people to move that one step further – to a highly dynamic and efficient infrastructural architecture that provides a flexible means of supporting the frequent changes required to the business processes.

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

2. Grid as an Evolutionary Concept

As discussed in the previous cycle report (http://www.quocirca.com/report_gridindex2.htm), we can consider that mainstream organisations typically go through a number of logical steps as they look to optimise different parts of their IT infrastructure. The first step is the rationalisation of the basic environment to lower complexity by standardising applications and platform components as much as possible.

This then leads to a higher level of consistency in the IT environment, which leads to savings in management, in how assets can be maintained and also in how these assets can be viewed within the greater concept of the business requirements. For example, if we have rationalised multiple application instances into a single instance, we are in a better position to divorce the application from the data – and this then means that the application itself becomes far more consistent. If extra compute power is required, we have an application image that can be more easily built on to an existing hardware platform within a short timescale to meet the needs of the application – and we are already looking at the concept of Grid computing.

Through virtualising these assets, we begin to have a platform where we can begin to layer on software stacks (from operating system through application server to application or discrete self-contained service) in a highly dynamic manner, leading to distinct efficiencies in overall asset utilisation and so to a more cost effective and business strategic IT environment.

Each of these steps are evolutionary – not revolutionary – and many companies are well along the path towards a flexible infrastructure based on high levels of standardisation, consolidation and virtualisation. It is Quocirca's contention that a move to Grid computing is just part of this overall evolution, and that as the leading-edge companies gain market differentiation through the added value that Grid offers, the mainstream will find it increasingly easy to move into Grid. Indeed, the increasing speed with which vendors are moving to support the web services standards, and more flexible licensing will also provide a spur towards such an architecture – provided that Grid registry and management tools are seen to be available, robust and flexible. However, as we have already mentioned, there are many issues that vendors will have to deal with first to propel Grid into the mainstream.

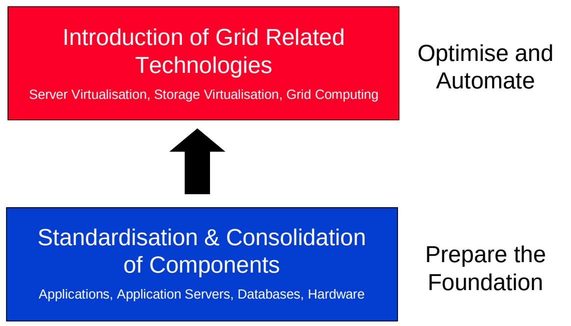
The Grid Index programme was designed to monitor the rate at which this kind of evolution is taking place across the enterprise sector, covering the three main theatres of North America, Europe and Asia Pacific (APAC). The geo-demographics of the research are covered in Appendix B.

3. Grid as an Infrastructure to Support the Business

In the last report, we examined how organisations look to two different approaches when evolving their infrastructures. The first is in foundation preparation, while the second is based around optimisation and automation as illustrated in Figure 1.

Figure 1

Driving Efficiency, Flexibility and Responsiveness



Optimisation and automation are more easily provided based on a highly rationalised and standardised infrastructure, and the research finds that the main drivers within businesses are focused around creating such an infrastructure.

With this research cycle we also wanted to look at how the interaction between the business and the IT department shaped the decisions made around moving to such an infrastructure, and how this impacted the overall success of a company.

Although the questions around this area were not worded so as to be Grid specific, Quocirca was looking to gauge how a Grid-ready infrastructure would be seen by technical and business people as providing value to their companies. The research also aimed to identify how IT budgets were spent within companies where IT was seen as an important facilitator to the business, against how the budgets were spent in those companies where IT was seen less as a core part of the company.

Figure 2

Future proof IT platforms to support key applications are important to the ongoing health of the business

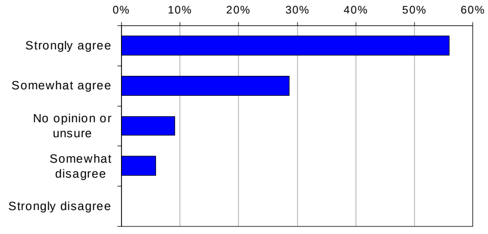
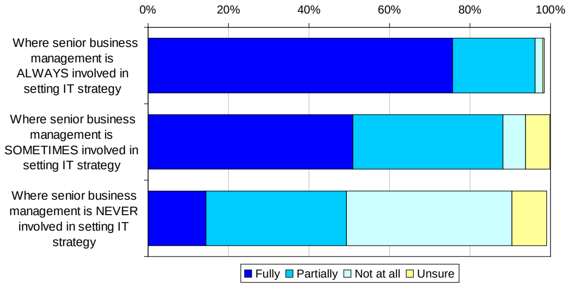


Figure 2 shows that the majority (56%) of respondents strongly agree with the proposition that a future proof IT platform is important to the business. When we then look at a comparison between organisations that always, sometimes and never have business involvement in the IT decision making process, we see that this appreciation for a sound infrastructure within the business is directly related to the level of involvement (Figure 3).

Figure 3

To what degree do senior business management within your organisation, e.g. the board and heads of division/department, appreciate the need for a sound IT infrastructure to support the business?



Furthermore, this is not only reflected in the level of satisfaction the business has with IT (Figure 4), but also on the amount of IT expenditure that is spent directly on projects, rather than on maintenance (Figure 5).

Figure 4

How enthusiastic or satisfied would you say senior business management were with the way in which IT supports the business in general?

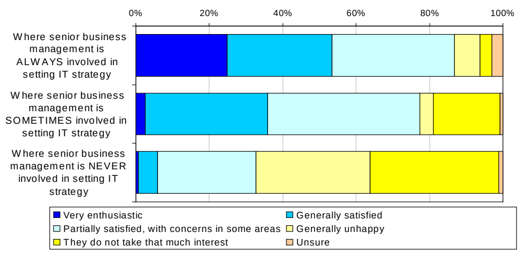
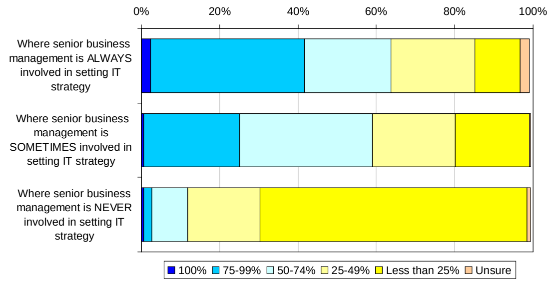


Figure 5

Approximately what percentage of your IT expenditure relates to specific projects recognised by the business, as opposed to spend on general underlying infrastructure, IT housekeeping, etc?



The noticeable impact here is that for companies that have little or no involvement of the business spend around the accepted industry average on maintenance (around 75% of IT expenditure), whereas the vast majority (85%) of those with a strong link to the business are spending over 25% of the IT budget on new functionality – so providing a better base for the business to build on. This is then reflected in the satisfaction data, where those companies that have a flexible and responsive infrastructure are far happier than those where constant fire fighting is occurring.

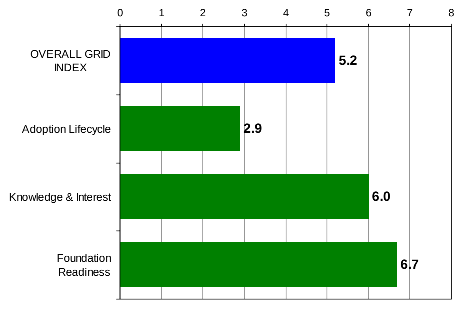
That the underlying concepts of Grid computing – the provision of an infrastructure that is highly flexible, standardised and optimised – fits in with the mindset of the thought leaders in the market is easily apparent. Indeed, as one of the main hurdles that we identify to Grid adoption is the budgeting and funding of a Grid project, it would seem that those companies with the highest levels of business involvement in the IT function will be the ones to first pilot Grid systems, as these are the companies that have the largest investment budgets. On the other hand, it is obvious that those with low business involvement will have little money to invest in such projects as the IT budget is spent on fire-fighting and maintenance.

4. Current Level of Progress and Activity in Grid computing

The following picture provides a summary level snapshot of activity and progress on a global basis (Figure 6):

Figure 6

Global Grid Index for Fall 2005

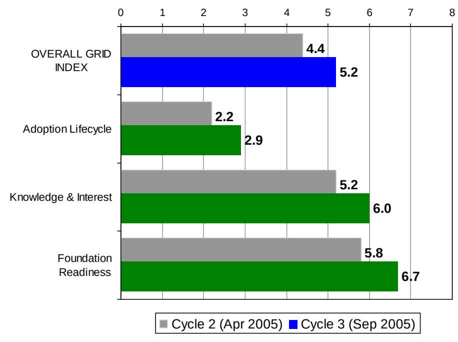


The results upon which this picture is based were derived from 1,466 interviews with senior IT influencers and decision makers from around the world completed in September 2005 (see Appendix B for sample distribution).

Figure 7 shows how the indices have trended from the last cycle. Here we see reasonable growth across the board. Foundation readiness continues to grow, and is now at a level where the majority of companies have a capability to begin looking towards Grid implementations.

Figure 7

Global Trends



Knowledge and interest have also grown, and this has led to a readiness to look at different forms of Grid computing – which we will discuss later.

The adoption index has also grown – but is still relatively low. Quocirca does not find this surprising, as other findings in the research point to respondents still not regarding Grid as a mature solution, of standardisation still having to be tied down, of possible problems in introducing Grid into already complex environments – and also around how such a concept should be budgeted for, funded and owned within a highly dynamic organisational structure.

5. Market Dynamics in Regional Theatres

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

- **North America**

  Comprising the US and Canada

- **Europe**

  Comprising Benelux, France, Germany, Italy, the Nordics, Spain and the UK

- **APAC**

  Comprising Australia/New Zealand, Greater China, India, Japan, Korean and S.E. Asia

Japan is a new addition to this cycle – all other countries were covered in cycle II of the research.

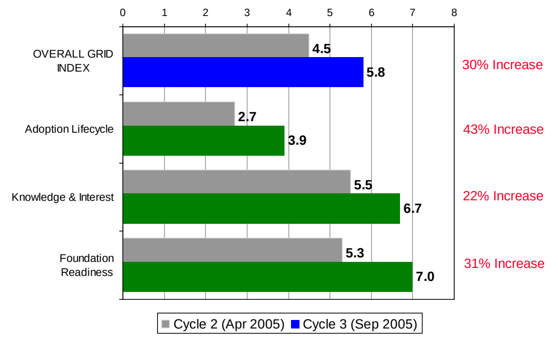
This cycle now allows us to look at regional trends as well as global trends. Between the first cycle (June 2004) and the second cycle (April 2005), we saw a rapid rise in lower level indices across Europe, where basic knowledge of Grid and the understanding of possible benefits doubled during the period. Looking at the regional figures in the second cycle, Quocirca believes that it is safe to presume that the same process was happening in North America and to a lesser extent in APAC.

However, to gain a better picture of real movement in the markets, we can now compare the results directly from cycle II and III. At a high level, the overall Grid index scores show good growth – with a 30% increase in North America, 16% in Europe and 13% in APAC.

To gain greater insights, however, we need to drill down in to these figures. The trends from cycle II to cycle III within the regions are shown in figures 8, 9 and 10.

Figure 8

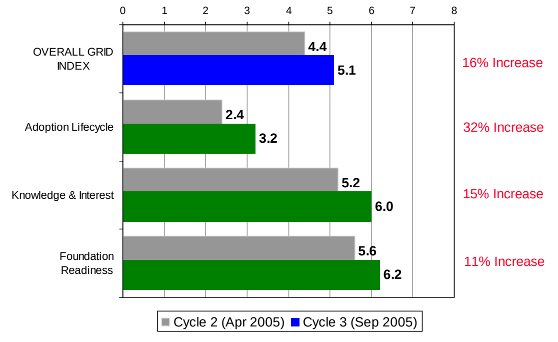
North American Trends



In North America (Figure 8), there is appreciable growth in all the sub-indices, even from a relatively strong starting point. A 43% increase in adoption shows that North American organisations are already making considerable moves in implementing Grids within their organisations. Foundation readiness has also grown well, indicating that we should expect North America to continue Grid adoption strongly through the next cycle.

Figure 9

European Trends

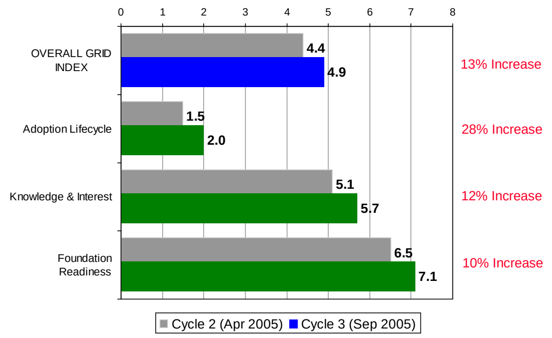


Europe (Figure 9) shows lower growth, but is still relatively well positioned with a 32% growth in the adoption index. Foundation readiness is plateauing, but the 15% growth in knowledge and interest may well drive further index growth in later cycles. It should be noted that Europe's granularity is hidden within these high-level figures. For example, the Nordics are ahead of North America in all indices, whereas Italy lags behind.

Although APAC has the lowest overall index score (Figure 10), and lags North America and Europe in Knowledge and Awareness along with Adoption, it still leads North America and Europe in its Foundational Readiness score. However, this is heavily swayed by the results from Greater China, Korea and S.E. Asia – areas where we see a mix of fast growth and recent acquisition activity, combined with older, proprietary systems being ripped out to be replaced with more modern systems. Although this is likely to provide high levels of standardisation, it is not necessarily the point that these companies are looking towards web services, SOAs and Grid in the near future.

Figure 10

Asia Pacific Trends



At this stage of market maturation, we would still expect to see high growth within the individual indices. Quocirca expects the world-wide growth in foundation readiness to plateau beginning in the next index, with knowledge and interest beginning to plateau 6-12 months after that, but we do not expect the adoption index to plateau for at least 2-3 years.

Overall, it is clear that North America is currently leading the way, with Europe following and APAC being well positioned to adopt Grid as the users' knowledge increases. In-region specifics, such as the impact of Greater China, Korea and S.E Asia on the APAC scores, high index scores from the Nordics against low Italian indices for Europe are exceptions that we expect to see even out over time.

6. Grid types

Within this cycle, we subdivided Grid computing into 5 different classes to gauge respondents' views on the direction they believe Grid computing will go, and more importantly, the direction their own organisations are likely to go. These five classes are:

- **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, operating behind the company firewall.

- **Distributed Enterprise Grids**

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

- **Managed Hosted Grids**

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

- **Utility Grid Services**

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

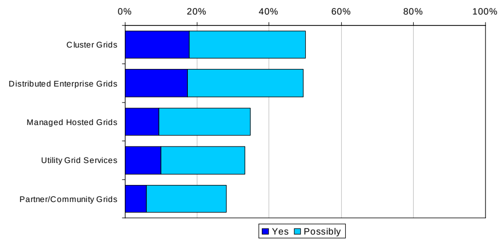
- **Partner/Community Grids**

  A partner/community Grid is one in which an organisation 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 11 shows that nearly 50% of respondents feel that Cluster and Distributed Enterprise Grids are a likely way forward saying that their future adoption is definite or possible for their organisations which is encouraging even at this stage of Grid's market maturation.

Figure 11

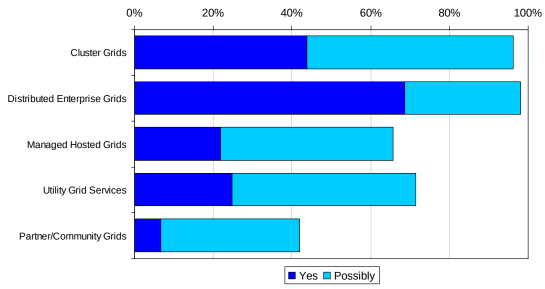
Which of the following types of Grid computing would you say could be relevant to your organisation either now or in the future?



To look at how adoption is already progressing, we took a group of "Experienced Gurus" – those who are already using a Grid infrastructure, and then refined the responses (see Figure 12).

Figure 12

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



Here, we see that nearly 70% of respondents see the larger, distributed enterprise Grids as being the way forwards (with almost 100% seeing it as at least "possible"), with over 40% seeing cluster Grids as a definite for their organisations.

Note that although there is a degree of support for hosted and utility style Grids, there is little support for partner/community Grids from the commercial world. These highly complex, widely shared environments are deemed to be a step too far for the majority of companies – security is seen as a major issue, along with application and service licensing, predictability of service and overall flexibility. Although we have seen successful community Grids (such as SETI@Home and the smallpox Grid), currently these seem to be the exception rather than the rule.

What this also shows is that those who have started down the Grid path are gaining distinct value from the experience, and are willing to continue to invest in Grids in the future. For those who have yet to make any Grid investments, the findings from these "experienced Gurus" is well worth considering.

Figure 13

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?

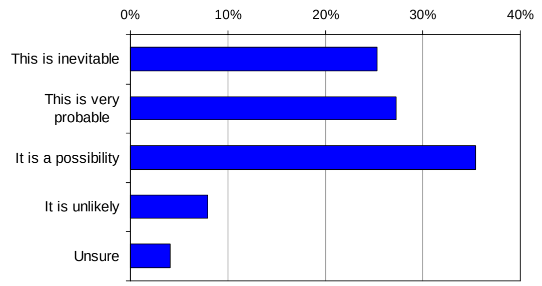


Figure 13 shows the overall perceptions around future adoption of Grid. As discussed in a previous section of this report, Grid is seen by Quocirca as an evolutionary step. Here we see that less than 10% of respondents do not see Grid as a possible way forwards, with 25% seeing it as inevitable.

7. Relationship between Grid and Other Technologies

In the last cycle, we looked at the correlation between the use of Grid and the use of blade servers and SOA architectures. Within this cycle, we have drilled down a little further into these areas to gauge the inter-relation between the technologies.

To create a suitable level of granularity, we have narrowed the limits between the Grid Commitment bands within this cycle, and we have allowed for a different range of responses to the questions. However, the correlation between the views of those who fall into the Grid Guru class (band 1) when it comes to how Grid, Blade Servers and SOA go together is plain to see (see Figures 14 and 15)

Figure 14

Are you considering or using Blade Server technology?

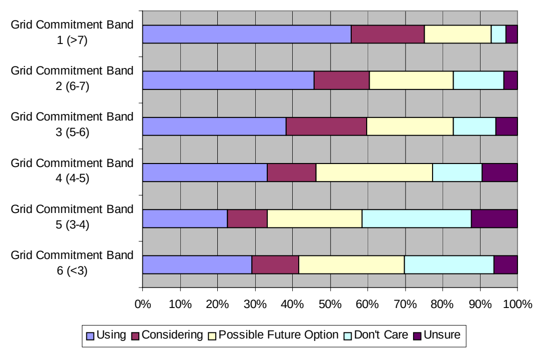
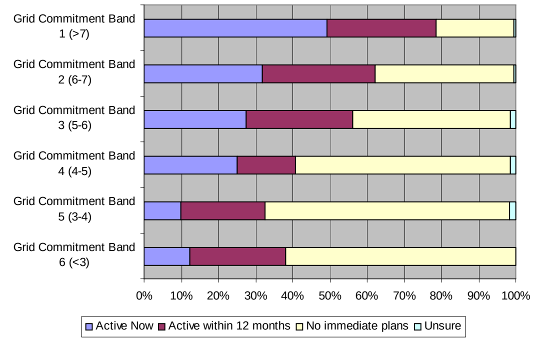


Figure 15

Are you active with SOA for development and deployment of software?



These results are very similar in pattern to those found in cycle II – the figures just show a maturation of the market as the actual levels of activity now or within the next twelve months have risen.

Beyond the link that the Grid Gurus see between these technologies, the software and hardware vendors are also likely to take this as an opportunity – the provision of SOA-based software solutions and of Blade farms outside of an overall Grid message will maintain a flexible infrastructure for the buyer so that Grid will remain an option for the future. Therefore, organisations can expect vendors to push Grid-capable environments – even to those not yet investigating the technology.

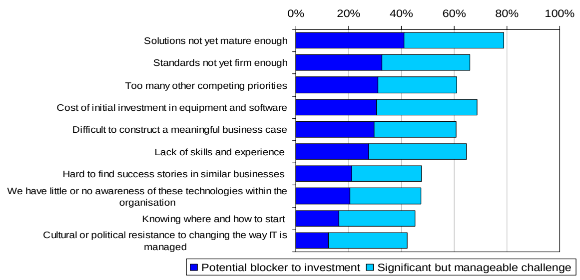
8. Hurdles to Grid Adoption

Although the benefits of Grid are now better understood, this understanding is also being matched by a growth in the perceived hurdles to Grid adoption. For many, the decision becomes a simple one of a balanced scorecard approach – do the perceived benefits outweigh the perceived problems? However, for others, the perceived problems can be the reason for a "no" decision on Grid adoption.

When asked, respondents ranked Grid maturity as the main hurdle to adoption, closely followed by lack of firm standards (closely allied to Grid maturity), and also that Grid was not high enough up on the list of priorities for their business. When combined with the perceived cost of a Grid solution, this then leads to issues as to how to build a suitable business case for any Grid initiative.

Figure 16

Which of the following would you regard as significant hurdles or inhibitors to investment in Virtualisation or Grid Computing technologies?



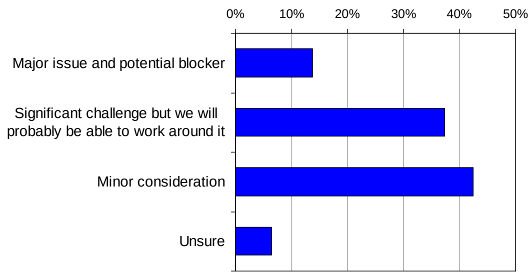
These hurdles are similar to those found in the last cycle – except that "Limited awareness within the organisation" is no longer seen as much of an issue.

If we look at two distinct areas – cost and security – we can see how the respondents see these within the context of Grid computing.

When we look at cost (Figure 17), we see that around 14% of respondents see budgeting, funding and cost ownership of a Grid as a potential blocker to a Grid initiative, with a further 37% seeing it as a significant challenge.

Figure 17

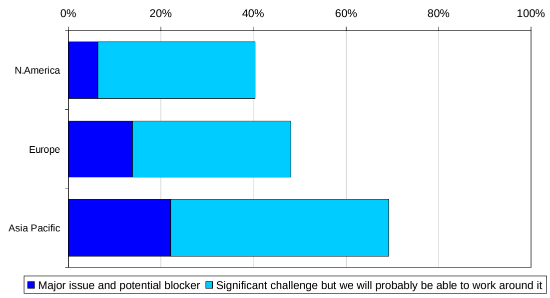
To what degree do you see challenges with managing the budgets, funding and ownership issues associated with a single platform entity, i.e. "The Grid", serving many departments, cost centres, etc



A regional breakdown of this, however, paints a different picture (Figure 18).

Figure 18

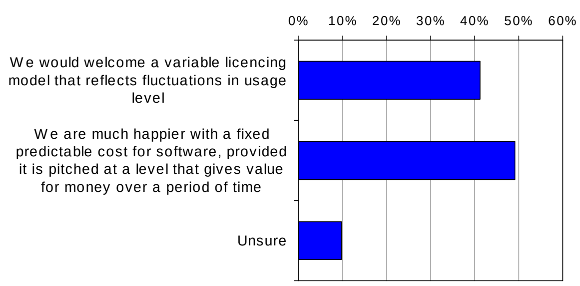
To what degree do you see challenges with managing the budgets, funding and ownership issues associated with a single platform entity, i.e. "The Grid", serving many departments, cost centres, etc



Here, we see the influence of APAC on the overall findings, with North America and Europe seeing cost as less of an issue.

Figure 19

Without going into detail, what are your views on variable versus fixed licencing costs?

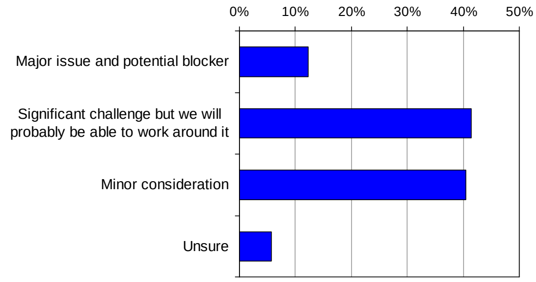


Licencing is obviously one of the main areas of cost concern, and existing licence models will have to adapt to reflect the special needs of a Grid environment. With Figure 19, we look at how respondents view licensing costs for an on-demand environment. As can be seen, the respondents are split in this area – many prefer the fixed price model, as this provides a known ongoing cost, but over 40% would now prefer to see more flexible systems based on a per-usage model. This split between fixed and flexible licensing models was relatively evenly split across the three regions.

Similarly, when we look at security in a Grid enabled environment, we get the world-wide findings in Figure 20, showing a similar profile to that around costs.

Figure 20

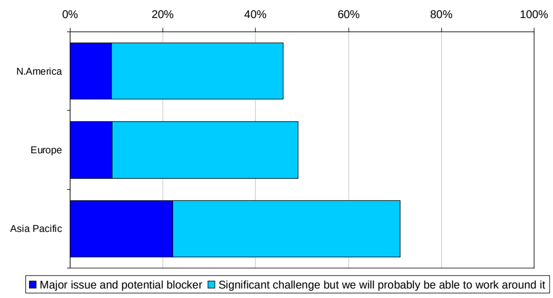
To what degree do you see challenges with identity management and authentication in an environment where applications and data (and therefore users) can be shifted from one set of CPU resources to a different set flexibly



Again, we see the impact of APAC on these figures in Figure 21. Even with this regional effect, it is worth noting that although there is a lot of activity around the need for security in the vendor and media community, the respondents here do not see security as such a major issue, with only 13% overall seeing security within a Grid environment as a major issue.

Figure 21

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



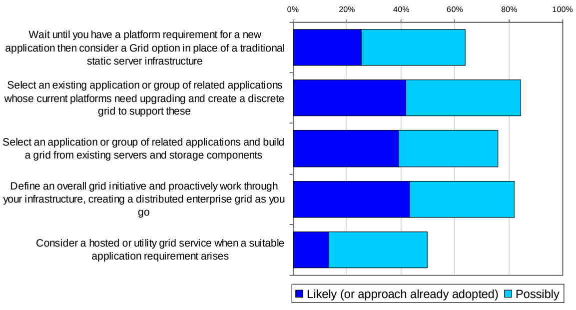
9. The Application of Grid

In cycle II, we looked at how organisations were looking to implement Grid at an application level, and we found that the core enterprise systems were the focus for nearly 70% of respondents, followed by the call centre and internal applications. With cycle III, we looked at the decision making process that organisation would go through to choose whether a proposed solution would be best served by a Grid infrastructure.

Figure 22 shows that the main focus is a pragmatic one – respondents are looking to select an existing application or group of applications where an upgrade is already under consideration, where the company will then build a new discrete Cluster Grid to provide a more flexible environment.. Close behind this comes the more strategic approach of defining an overall Grid initiative and then working through the existing infrastructure to create an Enterprise Grid. A third option is similar to the first – choosing an application or group of applications and creating a Cluster Grid from existing hardware assets. The "wait" options for either an in-house solution or a hosted solution have markedly lower support.

Figure 22

How likely is it that the following approaches to implementing grid will be taken in your organisation in the early stages of adoption? (those implementing or likely to implement Grid Computing)



These findings also further dispel the perception that Grid computing is only for High Performance Computing (HPC) environments (e.g. pharmaceutical modelling, oil and gas exploration, academia), and demonstrate that companies are building Grid considerations into all aspects of their IT futures.

10.Discussion

The findings in this report show that perceptions about Grid being an acknowledged IT architecture are progressing. Although we still see some hurdles, few respondents see any of them as being a blocker to a decision to move towards a Grid architecture. Indeed, with the awareness of Grid having grown so much, and with foundation readiness being at a very high level, there is little to stop organisations from moving towards Grid, even if this be through a highly constrained, discrete Cluster Grid as a pilot project.

This speed of change has been surprising. When we started carrying out Grid research in early 2003, Quocirca believed that mainstream Grid computing was still around 5 years away. 2 years on, and we find that 20% of companies are now utilising or experimenting with Grid, pointing to mainstream adoption within the next 2 years.

This rapid take-up of Grid has been helped by the speed of adoption of open standards by all the major players in the market. However, this strength may also end up being Grid's weakness. We are already seeing the early Grid standards being upgraded, and we also have multiple bodies defining slightly different versions within the market. If users cannot depend on a fully standardised, interoperable environment, we may yet fall back into the problems of yesteryear, where de facto standards (those already in use within the end user environment) were modified by de jure groups (standards committees, often driven by different agendas), and multiple solutions led in divergent directions to solutions that ended in evolutionary cul-de-sacs. It is therefore extremely important that vendors and organisations alike keep an eye on standards evolution within the Grid markets.

From Quocirca's point of view, there still remain some major issues that the vendors must address – overall Grid management remains an issue, as does rapid provisioning and de-provisioning of complete solution stacks. We also see that basing Grid Services on the relatively mature Web Services standards will need some modifications – for example, Quocirca is already seeing that the use of a standardised Universal Description, Discovery and Integration (UDDI) registry to manage how services are called has been problematic in the real world, and the need for highly dynamic service management within a full enterprise Grid will need speciality Grid registries.

In cycle II, we identified the need to build the business case as the major problem facing prospective Grid customers. This has not changed, and it is incumbent on the vendor community to help these companies to identify the value propositions that make Grid a way forward. The use of Grid Gurus who can provide case studies where added value can be easily identified and defined will help in this area.

This third cycle of the Grid research shows that overall, companies are now ready for Grid. However, there are major regional variations, and within the regions there are also local variations. It is likely that these variations will even out with time, and it seems that although North America leads in Grid adoption, Europe is not that far behind, and APAC is well positioned to move to Grid – if and when awareness of the possibilities of such an environment grows.

Grid, in one shape or another, seems inevitable. The need for greater efficiencies and effectiveness means that organisations want more from their existing assets, and also want to spend less in the future on new assets. Grid's promise of a highly flexible infrastructure enabling such benefits is found to be true by the Grid gurus within this research. Increasingly, mainstream companies are trialling and implementing Grids within their organisation. For those who remain unconvinced, ensuring that the infrastructure moves down a highly standardised, virtualised, service-oriented route will keep options open for the future, while still providing a degree of enhanced business flexibility and efficiency.

11.Other Reading

This report is the third 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

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 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 about 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 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 September 2005. 302 of these were conducted in North America, 603 in Europe and 561 in Asia Pacific. Respondents were from a mixture of large multinationals and medium to large national organisations across all vertical industry sectors.

Distribution of the sample by geography and industry was as follows (Figures 22 and 23):

Quocirca would like to thank all the participants in this research for their time.

Figure 22

Distribution by Geography

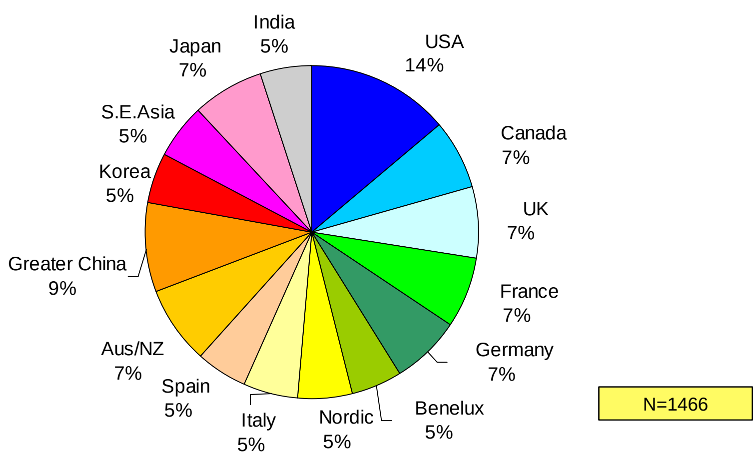
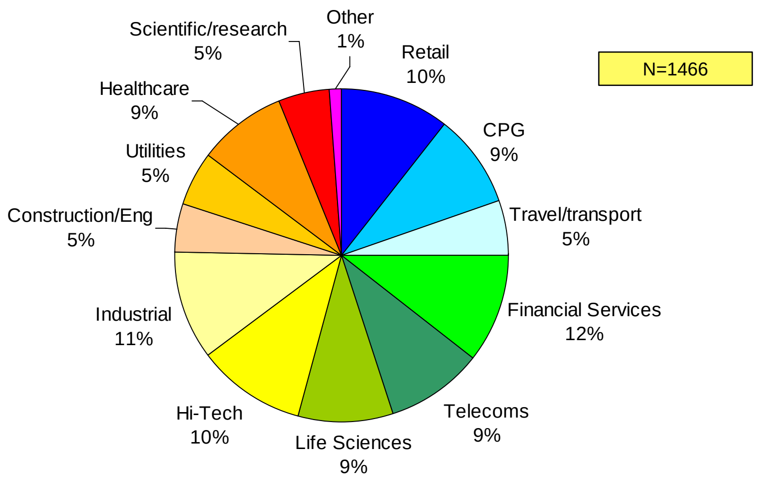


Figure 23

Distribution by Industry



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 Morgan Stanley, Oracle, Microsoft, IBM, CA 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 requested via www.quocirca.com.

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