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Business and IT Analysis

Running a technology platform for the business

Using predictive approaches for dynamic IT

November 2010

IT is moving from being a point of differentiation for an organisation towards becoming a point of constraint. Old-style approaches to computing, looking at particular applications for specific areas, one application per server and platforms engineered for peak usage are beginning to look too costly and inflexible to meet today's business needs. The home of IT – the data centre – has too many discrete masters, through facilities management, IT and even the business itself. The cost of change – and the impact of change on the business – is often cited as the reason why so many organisations still struggle on with existing platforms and architectures. A new approach is needed – one where future states can be rapidly modelled to identify what impact there will be on the business directly, on the cost of the new platform and where workloads should be placed in order to best meet the needs of the business

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Technology is reaching a point where the intelligent organisation has to make a decision as to where the IT platform future lies. Will existing technical architectures be sufficient to see a business through the next few years, or will the emergence of cloud computing, built on the proven approaches of web services and service oriented architectures, be the better way forward? Will proposed changes be able to be implemented within the constraints of the existing data centre facility? Only through a capability to model and predict future states can the intelligent organisation make the right decisions.

- **Flexibility is key**
  Old-style 5-year plans for IT are no longer valid. The need to change platforms on a regular basis has knock on impacts to how power distribution and cooling are managed in the data centre itself, and the move from one platform to another has direct impact on the business. However, fear of change is not a strategic reason to avoid such change.
- **Technology is reaching a tipping point – cloud computing is not a passing fad**
  Although cloud computing has been over hyped, its promise cannot be overlooked, and its implementation over the next few years will further stress organisations looking at where workloads are best managed and how they are moved from existing architectures to private, public and hybrid cloud environments.
- **Cloud leads towards a far more dynamic technological platform**
  With cloud, a workload that is currently part of an application can suddenly be moved to be a discrete function being run in a different location – and then may need pulling back in to the existing environment for cyclical workload or latency reasons. The impact not only on the IT estate, but also on the data centre itself has to be known before such movements take place.
- **Understanding how best to optimise existing platforms is a key starting point**
  Few, if any, companies are in the position to start from a completely green field position. IT and facilities decisions have already been made, and the investments have to be optimised wherever possible. Building up a non-invasive model of what is already there is a key starting point.
- **Modelling enables greater understanding of PUE and CRC**
  With the UK government's changes to the CRC legislation around carbon output, the need to control carbon emissions has grown. Ensuring that the carbon impact of any change is known means that carbon outputs (and consequently PUE) are managed correctly.
- **Matching IT with a business' risk profile moves IT back into the business**
  Once a full picture of the IT estate has been built along with the dependencies between IT and the data centre facility, better advice can be provided into the business based on matching the available options to the business' own risk profile. This way, IT becomes a trusted advisor to the business where facilitation is now key – rather than a constraint to the business where fear of change makes the IT department or facilities management far more likely to say "No" than "These are the options".
- **Granular cost models enable the business to make informed decisions**
  With budgets under severe pressure not only at the IT level but all the way through the business, organisations have to be able to take decisions based on a whole set of variables. Only through the provision of information based on highly granular data can IT ensure that what it is advising the business can be discussed sensibly and the correct final decision reached.

Conclusions

IT is facing a massive change in how it operates – and the knock on effect to facilities management is also large. Without a full understanding of how IT and facilities should deal with the changes, the business will begin to fall behind competitors who are managing such change effectively. A highly granular knowledge of the existing IT estate and data centres is required, along with the capability to accurately and rapidly predict future states.
Only then can the business be advised accordingly, and the correct business decisions be made.

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1. The big IT problem

Historically, IT has taken a business problem and has tried to solve it by implementing a point solution. For example, where a business had a problem in dealing with its customers, a customer relationship management application was bought and implemented; similarly, where problems were perceived in how a business looked after various aspects of inventory and in dealing with internal resource management, an enterprise resource management (ERP) application would be brought to bear.

Although this enabled a degree of automation and efficiency to be enabled, as everyone implemented such systems, the constraints of such an approach became far more apparent than the benefits. Islands of automation led to siloes of data; integration of disparate systems led to the need for more layers of technology being applied, such as cross-application work flow systems and reporting packages. What had held so much promise as a technological future had evolved into a monster – and IT had suddenly become a constraint on the business, rather than an enabler.

Along with this is the problem of the facility. Data centres have tended to be designed with a 10-20 year life in mind, and yet the evolution of IT has led to some severe problems in how power is distributed within any such facility, as well as how cooling and backup power are provided. Retro-fitted solutions tend to lead to problems as systems become less fit for purpose, and adding layers of additional systems just tends to exacerbate the problem.

The IT department and facilities management have been left with a highly complex environment, where a mix of applications and hardware platforms is being maintained in sub-optimal facilities at a high cost to the business. Consistently, research by Quocirca and other analyst companies has shown that around 70% of an organisation's IT budget is spent purely on "keeping the lights on", that is in dealing with the day-to-day issues of maintaining existing systems, leaving only 30% of the budget to be spent on new investments.

Increasingly, the business is becoming aware that all is not well with how IT and facilities management are supporting it. Questions are being asked as to the allocation of funding requests for core technology projects. For example, a departmental project that requires more storage may find itself with a bill for a new enterprise storage area network (SAN), yet they know that this will eventually be shared by other departments. Another department may want to use highly virtualised systems, yet be faced with project costs that include new hardware and operating system costs, as well as costs to modify the data centre itself, where again the entire organisation may well benefit from the approach over time. On top of this is the unknown impact that any change will have on the department involved, or on the overall business: is the proposed new platform the right one to meet the need, will it deal with the flexibility of the workloads envisaged, will it be able to share resources with other areas?

The problem for IT is that it has become increasingly difficult to accurately measure the actual cost of what is already happening within an IT estate, never mind what the cost of a change may well be. IT cannot make decisions on its own – there will always be a concomitant impact on the data centre facility when any change is involved, and facilities management has to be involved in any planning and actual change implementation. The business is making increasing demands of IT – not just with demands for how technology should be used to support the business directly, but also in being able to meet the expanding needs in areas such as carbon reduction and in being able to better understand what a power usage effectiveness (PUE) measurement actually means, and what can be done to better manage both IT and facilities more effectively.

The key to managing the new IT is in being able to predict future states, in being able to provide highly granular details of cost and business impacts where changes are proposed and in being able to advise the business, in its own terms, of how technology can be best used to support the business' own aims.

2. The changing face of IT

It is Quocirca's belief that the enterprise application is facing a long, slow death. The need to react to market forces more directly, along with the emergence of new architectures and computing approaches means that more organisations will make an evolutionary move towards a more functional computing model. A business is run on processes, which in turn break down into tasks. These tasks need to be facilitated and automated as much as possible – and this is where technology comes in. However, today's process may not be the right one for tomorrow's business needs, and enterprise applications that prescribe how processes have to be run stop businesses from being able to react rapidly to external forces.

Cloud computing brings a different approach to how a business can utilise technology to support its needs. Individual functions can be created and then made available at very short notice with technical resources being provided on an as needed basis. If a process changes, the technical functions required to facilitate the process can also change – there becomes a move from an "enterprise" to a "composite" application; one where the overall functionality is made up from a set of loosely coupled functions that are aggregated and used as required.

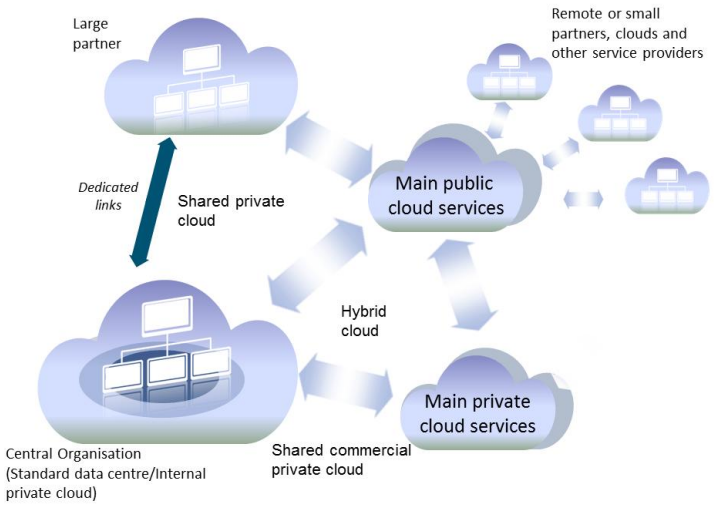

Figure 1: The evolution and interplay of cloud computing

A schematic of how cloud computing is evolving is provided in Figure 1. Many functions will be provided from the "internal private" cloud: existing applications will have functions made available through "wrappering", enabling these functions to be used from elsewhere without having to use the whole of the application for a prescribed process. Incremental new functionality may well be provided from the same data centre but based on highly targeted, small items of coded services that can be called and used as necessary. Other functions may be pulled in from the "extended private" cloud – functions that are run in highly controlled data centres where the hardware and functions are dedicated for specific use by specific organisations. Other functions may best be served by "public" clouds – functions that can be called and used by anyone to carry out specific tasks such as mapping data pulled from the internal cloud onto Google or Bing maps, or in integrating social networking capabilities into functions being used within a more private cloud. The overall approach leads to a "hybrid" cloud platform – one where workloads are spread across data centres controlled by the organisations, ones where the functions of the data centres are managed on behalf of the organisation and ones where the data centres' control is outside of the remit of the organisation completely.

For IT, this provides too many variables to enable them to enter into full and meaningful discussions with the business. For example, what functions should reside where and in what cloud? What will be the cost of change from using this function to that function? What are the risks involved from a business perspective from carrying out such a change? What impact will such a change have on how data centres under our control are configured and run? What impacts will this change have on how carbon reduction commitment (CRC) targets are reported, and what does it mean for the business' PUE score?

To respond to the business' needs, IT has to move towards a far more dynamic and meaningful means of predicting the impact and cost of change and in advising the business on which technologies and technological approaches make the best sense to match the business' needs and fit within its risk profile.

3. The business, its needs and its risk profile

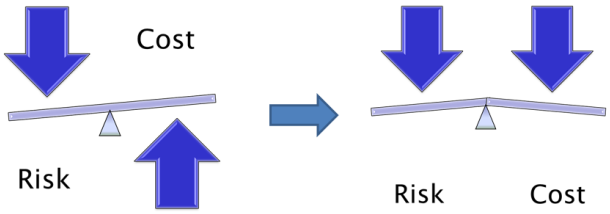

Figure 2: The breaking of the risk/cost equilibrium

Historically, when a business has considered its risk profile, it has tended to see it as an area where the lowering of risk costs more, or implementing savings tends to lead to more risk. The nirvana of saving money while lowering risk has not been seen as being possible (see Figure 2). However, with the right tools and approach in place, Quocirca believes that it is now possible to reach this point.

As previously discussed, a business is run on its processes. These processes can be aimed at a range of approaches in the business itself, from streamlining existing workflows (optimisation), through to doing things in a different way (innovation) and doing something completely new (invention). The risks associated with such an approach increase from optimisation to innovation and to invention (see Figure 3).

The function of IT is to ensure that as much money can be freed up from the day-to-day running of the existing IT platform investment and that this money can then be made available for the high payback areas of innovation and invention within the business.

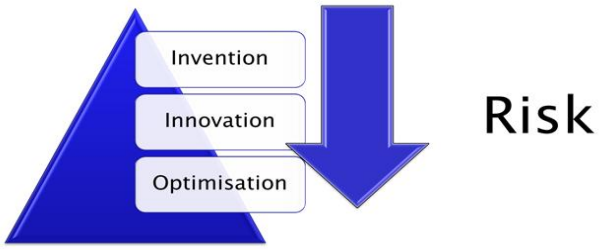

Figure 3: The process/risk dependency

To do this, however, needs a better knowledge of what is already available in the existing IT platform. Only then can an understanding of the full ramifications of what any proposed change may have on the existing IT estate, the data centres and the business. This is enabled through the capability to model and predict the impact of such a change at a business level, and the capability to advise the business on the range of options that are available to it in order to meet its declared business aims.

4. Model, predict and advise

For the majority of organisations, IT has grown through the years into a complex mix of hardware and software platforms. Systems management software has been brought to bear, often using ITIL to underpin certain processes aimed at automating some of the more costly but common workflows found within an IT environment. Facilities management has brought in modelling tools for managing the physical aspects of the data centre, often in isolation to what is happening within the IT estate itself. Such an approach has been aimed at managing what is already there at a lower cost – not in creating a better environment that is more responsive to the business or providing an advanced capability to respond to changes in both technology and external market forces.

There is a strong need to be able to model what is already present in the IT estate – yet the very act of modelling can have an adverse impact on the platform's stability and performance. Therefore, a means of carrying out that modelling without it being intrusive to the existing environment is required. All dependencies between systems are also required to be known – for example, what impact will the introduction of a new server in a specific rack have on power utilisation, on heat profiles and the need for cooling? By using modelling where the characteristics of equipment are already known, models can be built that are not dependent on agents and physical measurement of the needs of the IT and physical estate itself. Once a working model of the existing environment has been created, "what if?" analysis can begin to be carried out. Here, the model can be adjusted to predict what the cost of a future state would be, what new hardware and changes to the data centre will be required, what impact any change would have on the business and so on.

With the correct granularity of analysis, the exact cost of a change can be predicted – not only on a solid hardware/software basis, but also at a per transaction, per user or per time element basis. With such information to hand, IT can become a trusted advisor to the business.

As an example, consider an organisation that has 1,000 servers in place, each running an operating system and different application software stacks on top of this. It is believed that moving to highly virtualised platform would deliver considerable savings – but how can this be shown?

Received wisdom indicates that the majority of Windows-based servers run at less than 10% cpu utilisation. Therefore, a non-stretch target of moving towards 50% cpu utilisation would indicate that a saving of 80% hardware assets could be made, which would lead to a saving of 80% of operating system licences and maintenance. With a one system admin per 20 server calculation, then it could also lead to the capability to lose or redeploy 40 system admins.

PUE

Power usage effectiveness (PUE) is measure of how IT uses power within its data centre(s). The key measure is made by taking the total amount of energy used by the facility, including all cooling, losses due to uninterruptable power supplies (UPSs) and other facilities equipment and dividing it by the power used in "useful" IT functions – or that used for running servers, storage and so on.

A "perfect" data centre would have a score of 1. However, this is impossible, and the best data centres (generally based on containerised or modularised data centres) have scores of around 1.15-1.25.

Improving PUE can be fraught with danger – moving to a highly virtualised environment where facilities do not change the cooling approach can actually lead to a worse PUE – and so future state modelling can ensure that this is understood by IT, facilities management and the business, and that additional changes can be suitably recommended.

Sounds great. However, moving towards such a massively virtualised platform is fraught with danger. Are all the applications suitable for moving to a virtual platform? Will input/output (I/O) become a constraining factor, even though cpu capacity still has plenty of headroom? Will the increase in server workload density result in a need for more targeted cooling or even for a need for hot aisle/cold aisle approaches to be implemented? How will the switchover be handled, and what impact could this have on the business? Would it make better sense to move some part or all of certain workloads to an external environment, freeing up physical resource within the existing environment without the need to move to mass virtualisation?

As another example, consider the external forces facing a business that directly impact IT. The CRC legislation is encompassing an increasing number of organisations and the recent changes to the CRC legislation brought in as part of the strategic spending review (CSR) means that every organisation caught in the CRC net will now find that its carbon output results in a cost. Previously, those who managed their carbon outputs effectively would actually get their carbon credit costs back – and the best performers would get rewarded through reallocating some of the money paid by the worst performers. As all carbon output will now be regarded as a source of revenue for the government with a probable impact of 10-15% in energy costs for those within the CRC net, being able to predict the impact of change on an organisation's CRC profile will be massively important. Likewise, many organisations like to use the PUE scores for their data centres as an indication of how green their IT is – and yet many beneficial changes to IT (such as the introduction of virtualisation) can make a PUE number look worse than it was. Again, only through a highly granular means of predicting the impact of any technology change on the multiple variables that a business has to consider today can such areas be well understood and discussed at a business level before the change is implemented.

Without a workable predictive model, such decisions have to be made through "gut feel" and through attempts to find others who might have gone through a similar change so as to learn from their mistakes. With a suitable model, multiple different approaches can be assessed – and can then be presented to the

business. With a full knowledge of the business costs and impacts of a range of options, the business can match the options to its risk profile, and IT can then implement what has been chosen. The business has been put in control of its strategy, and IT has been placed in a better position of being a trusted advisor to the business, rather than being seen as a group whose response has increasingly been perceived to be one of "please don't make us change something that we're struggling to keep working".

5. Conclusions

The pace of competitive change in the market is driving the need for IT to be far more responsive in how it supports the business. The business is beginning to look at how it can squeeze IT budgets, asking for more to be done with less and for a better degree of support for the general and specialist user with "always available" replacing service level agreements and "support this strategy now" replacing long term platform projects where the results may not be realised for months or even years.

With around 70% of an average IT budget being spent on maintaining existing systems, it is obvious that savings can be made. However, without a full knowledge of the technical and business impacts that any change will create, the impetus for change tends to be strangled by the inertia of the perception of safety in just continuing as things are. This then creates a spiral of problems for the business – strategic aims cannot be maintained within the timescales dictated by the market, leading to losses to competitors who are more nimble and fleet of foot in the market. Such losses mean that the business has to look to further savings, and IT can only maintain its position for so long.

The business then tends to look to outsourcing as a possible cost cutting measure, but if this is done purely for cost reasons, IT is commoditised where it shouldn't be, and the negative business impact may well outweigh any savings made at the technology level.

IT has to bring its capabilities up to the business mark: it has to be able to provide a range of options to the business that reflects a range of risk and cost equations. IT and facilities management have to be able to work more closely together, with the impact of changes in either's domain fully understood. Moves to different technology provision approaches, such as cloud computing, have to be fully understood, not just at a technology level, but as to how these fit with the business and its risk profile, and what impact any moves will have to both the existing estate and the business itself. The business can then make informed decisions as to what approach best serves its current problems – will a tactical, short term solution be better than a longer term, more strategic one? Will a low cost solution that carries a degree more risk be better than a more costly one that removes risk completely?

To do this, IT and facilities management have to have a highly granular understanding not only of the existing IT estate – they have to be able to model the cost and impact of any changes that take place within existing assets, and also the cost and impact of bringing in functionality from outside or of moving workloads from the existing environment to an external provider.

The use of extensive information based on real life understanding of the characteristics and performance of servers, routers, storage systems, power supplies, cooling systems and so on means that models can be built rapidly and with no impact on existing environments. Models can then be created of proposed changes, and the best equipment can be identified to support these changes, whether it be from existing assets or from the buying in of new equipment, as well as whether this should be done within the existing data centre or through use of external systems. By providing a set of alternatives to the business, all couched within terms of value, cost and risk, IT provides a full service to the business. Rather than being seen as constraint to the business, IT becomes a true facilitator. The business is back in control, IT makes sure that it is has the competitiveness that its business strategy demands.

Predictive modelling is the only way that this can be carried out effectively.

About Romonet

Founded in 2006 by Zahl Limbuwala & Liam Newcombe, Romonet Limited is a privately held business based in the United Kingdom. With both founders being actively involved in the data center and IT sectors for many years, their combined experience led them into two years researching and developing a better way to understand, optimise and allocate energy and cost within the data center.

Romonet was born out of their belief that organisations would soon require the tools to be able to cost, energy and carbon account on a per service or per activity basis.

Romonet today provides software, consulting and advisory services to commercial, public sector, non-profit and legislative organisations and bodies. Zahl & Liam remain active voices within the ICT industry, regularly challenging the established ways of thinking to drive innovation and positive change.

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REPORT NOTE:
This report has been written independently by Quocirca Ltd to provide an overview of the issues facing organisations seeking to maximise the effectiveness of today's dynamic workforce.

The report draws on Quocirca's extensive knowledge of the technology and business arenas, and provides advice on the approach that organisations should take to create a more effective and efficient environment for future growth.

About Quocirca

Quocirca is a primary research and analysis company specialising in the business impact of information technology and communications (ITC). With world-wide, native language reach, Quocirca provides in-depth insights into the views of buyers and influencers in large, mid-sized and small organisations. Its analyst team is made up of real-world practitioners with firsthand experience of ITC delivery who continuously research and track the industry and its real usage in the markets.

Through researching perceptions, Quocirca uncovers the real hurdles to technology adoption – the personal and political aspects of an organisation's environment and the pressures of the need for demonstrable business value in any implementation. This capability to uncover and report back on the end-user perceptions in the market enables Quocirca to advise on the realities of technology adoption, not the promises.

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 organisations improve their success rate in process enablement through better levels of understanding and the adoption of the correct technologies at the correct time.

Quocirca has a pro-active primary research programme, regularly surveying users, purchasers and resellers of ITC products and services on emerging, evolving and maturing technologies. 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, O2, T-Mobile, HP, Xerox, EMC, Symantec and Cisco, along with other large and medium-sized vendors, service providers and more specialist firms.

Details of Quocirca's work and the services it offers can be found at http://www.quocirca.com

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