quocirca
Business and IT Analysis

Building a case for data centre infrastructure management (DCIM)

Measuring, monitoring and maintaining a data centre has often been viewed as a purely technical project. Business value can be significant - and explaining this can unlock budget for DCIM investments.

June 2010

The data centre is a major cost base for the majority of organisations, and requires constant changes to be implemented alongside the installation of new hardware and software. Much of this complexity is hidden from the business, yet green initiatives, uncertainties around energy prices and pressure on business approaches during a period of recession are raising the impact of IT capabilities to the board of directors. Ensuring that a data centre is run at its optimal levels will become increasingly important - yet the tools required to carry out such a task are not necessarily covered by the general IT budget: indeed, the tasks may be carried out through extensive spreadsheet use. Concentrating on the business values data centre infrastructure management (DCIM) will provide will help in enabling such a project to be undertaken more effectively.

Clive Longbottom
Quocirca Ltd
Tel : +44 118 948 3360 ext 200
Email: Clive.Longbottom@quocirca.com

Bob Tarzey
Quocirca Ltd
Tel: +44 1753 855 794
Email: Bob.Tarzey@quocirca.com

nlyte Software
ENLIGHTEN YOUR DATA CENTER

An independent report by Quocirca Ltd.

www.quocirca.com

Commissioned by nlyte Software

quocirca

Building a case for data centre infrastructure management (DCIM)

Measuring, monitoring and maintaining a data centre has often been viewed as a purely technical project. Business value can be significant - and explaining this can unlock budget for DCIM investments.

The data centre is becoming a point of focus for businesses as the inefficiencies of old-style architectures have started to be unearthed. It is important to be able to communicate the benefits of a fully-managed data centre to the business, and the following areas should be covered:

- **IT architectures are changing - yet existing assets must be sweated**
  A "rip and replace" approach to the data centre is not viable under current financial conditions. Fully understanding the asset base is necessary in order to ensure that full lifetime value is being gained from the individual IT assets available.
- **Energy costs will remain unpredictable**
  Ensuring that energy usage is fully understood enables optimisation of energy loads, both at the IT hardware level and in data centre cooling. Using optimised power and cooling designs can provide rapid payback and greater technical flexibility, with enhanced green credentials as a bonus.
- **Introducing new hardware and software rapidly and effectively is critically important**
  As markets change rapidly, organisations must be able to adapt to the changes. This requires better agility from IT, and the capacity to introduce new hardware and software into existing platforms has to be made more effective.
- **Avoiding building a new data centre can be a massive cost saver**
  Many organisations are close to exceeding the capabilities of their existing data centre, through space constraints, lack of power or poor design of facilities. In many cases, DCIM can be used to avoid this issue, maintaining business support and providing a more flexible platform for growth going forward.
- **The business needs to be able to ask "what if?": DCIM enables an answer to be provided**
  IT has to be seen as more flexible in how it can support and facilitate business. Understanding the true capabilities of the IT estate means that future states can be considered, and real responses and advice provided back into the business.
- **Quick wins need to be part of longer term aspirations**
  Organisations are searching for areas that have a fast and positive impact to the bottom line. Anything that is seen as having an ROI that is too long will not be high on priority lists. Therefore, messaging needs to prioritise benefits by timeliness, not necessarily by overall long-term payback.
- **Wherever possible, all messages need to be worded as supporting a Total Value Proposition**
  The business is looking for changes that lower costs, mitigate risk and/or maximise value. Building a business case around these three areas will enable a greater chance of true communication with the business, and of project investment being made available.

Conclusions

Building a business case for DCIM should not be a technical process. Benefits have to be worded in ways that the business will understand, and prioritised in a manner that allows the immediate and short term value to be easily understood. Using a Total Value Proposition approach means that a series of hard-hitting, business-oriented messages can be constructed so that a DCIM project can be more easily agreed with the business.

Contents

1. Introduction

Due to technology changes, mergers and acquisitions, business demands and so on, the data centre has ended up as a heterogeneous mix of hardware, software and capabilities. Although the result is not the direct fault of the IT department, IT is now increasingly being seen as a constraint on the business, rather than what it should be - a facilitator.

A full understanding of the current state of a data centre is required so that the IT platforms needed to support the business on an ongoing basis can be modelled and managed. For this to be carried out, tools are required to provide data centre infrastructure management (DCIM). These tools enable systems to be measured, monitored and managed, building up a picture over time which can be used to predict needs, and create effective predictive models of how a data centre can best be run to provide the business facilitation that is required.

However, the running of the data centre is generally seen as a pure cost to the business and, therefore, investment in tools is minimised wherever possible. In order to gain better focus from the business on the issue, it is important to present the data centre's problems to them in their own language, detailing how improvements in the data centre can really improve the business in the short, medium and long terms.

Quocirca has found that the best way to approach this is to use a technique called Total Value Proposition (TVP) - a simple methodology that enables messages to be created that are business focused.

2. Total Value Proposition

Quocirca's Total Value Proposition is a 4-part methodology (see Figure 1). The idea is to take any change that is occurring within an organisation and to ensure that sufficient arguments can be created to demonstrate that the overall value is great enough for the change to be undertaken. The first part, or stage 1, is for the individual to ensure that they are bought in to the approach, so understanding how the proposed change will impact the scope of any existing project, how timings may be impacted, and what the resource implications are. Provided that the individual believes that these three variables are controllable, then stage two can be looked at.

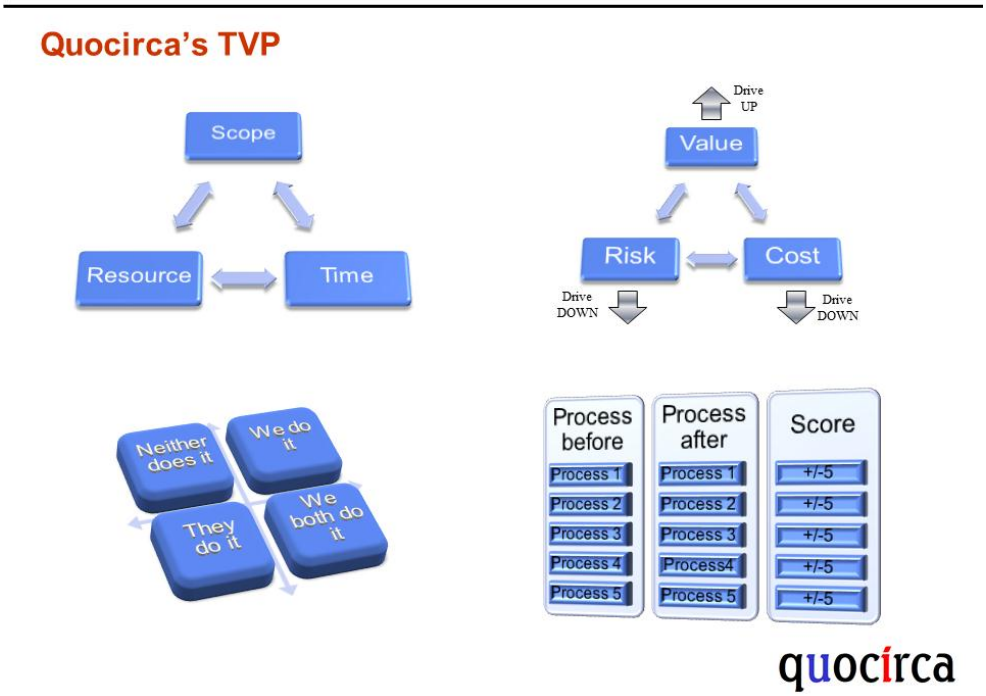


Figure 1

Stage 2 moves from the individual to the subject organisation. Here, the key is to look at how the change helps the business by lowering costs, mitigating risk or adding value. This stage is where the main messages will be created - and will be the one this report concentrates on in a later section. Stage 3 looks at the cost of not doing the change. Here, comparisons are drawn at a high level between the performance of the organisation and the performance of its greatest competitor. The same is then done for similar cases, but where the subject organisation implements the

change, where its competitor carries out the change and where they both carry out the change. This stage should show that for a suitable change there is a cost to the subject business' viability in not carrying out the change - if it does not, then the change is probably not worth carrying out.

The fourth and final stage looks at what the return on investment (ROI) is likely to be. Experience has shown that hard and fast ROI calculations are difficult to make correctly, therefore Quocirca's approach focuses on a more simple method. Here, take the top five or ten business processes that will be impacted by the change, and compare them against the equivalent processes after the change. Score them as follows: 1 to indicate that the change will result in a far cheaper process, 3 to indicate that the cost will be generally the same, with 5 indicating that the process will be a lot more expensive. Then, simply add up the scores and divide by the number of processes involved. If the score is less than 3, then there is a reasonable ROI, and the lower the number, the faster the ROI will be. If greater than 3, the return will be slow and, as such, the messaging created in stage 2 becomes the most important part of the approach.

3. The data centre and TVP

Building a suitable business case for DCIM should involve heavy use of TVP. At the individual level, the ongoing impact of DCIM should be that less time is spent on low-level work, such as fire fighting, on patching, upgrades and so on. A properly managed environment will reduce the amount of resources required, as pro-active management can replace reactive. The time recouped once DCIM is implemented will be considerable. Therefore, Quocirca assumes that stage 1 of the TVP methodology is covered.

For stage 2, the benefits of implementing a DCIM system should result in risk mitigation, in lower costs and in the provision of greater business value. Therefore, stage 2 of TVP is also covered.

For stage 3, again, a rapid comparison at a visceral level of how well you would expect an organisation that has full knowledge and control of its data centre, against one that is running against a chaotic or less controlled environment, should create a model where the one carrying out a DCIM implementation is seen as being more powerful in the market.

Stage 4 will be highly dependent on the type of business being assessed and on how well IT is integrated into the business needs themselves. Within this document, Quocirca has attempted to provide pointers to areas that it has found to be of greatest interest to data centre owners, and how TVP can be applied to these areas.

A more granular look at TVP within DCIM could be as follows:

3.1. Stage 1: Scope, Resource and Time (SRC)

Any project will have a project manager and/or a high level sponsor. The first stage of their thinking will be how they can balance the requirements of the timescales of the project with the existing scope, any possible scope creep over time and the resources (at the physical and financial levels) available to them (see Figure 2). Therefore, it is necessary to ensure that any possible problems are uncovered at an early stage and that the balance is brought back to a manageable state.

This requires openness from both the project manager/sponsor and the various other constituents involved with the project, from the business itself, from the project team and also from the vendors. The project manager/sponsor needs to understand the right questions to ask of these constituents - and the sort of responses that should be expected.

As an individual, you need to regard the data centre as an on-going project that needs a high degree of rigour in how day-to-day and longer term strategic issues are dealt with. Fire fighting, reactive approaches and ad-hoc usage of spreadsheets cannot lead to a solid means of dealing with the data centre and in supporting the business.

The use of a suitable DCIM system will help to identify where the inefficiencies are in the data centre. Systems can be rationalised through the use of virtualisation and better control can be gained of existing assets. Capital purchases can be offset while existing assets are better utilised, and time can be saved through fully managed patch and upgrade processes, rather than deploying semi-manual implementations and roll-back, both of which are prone to considerable error.

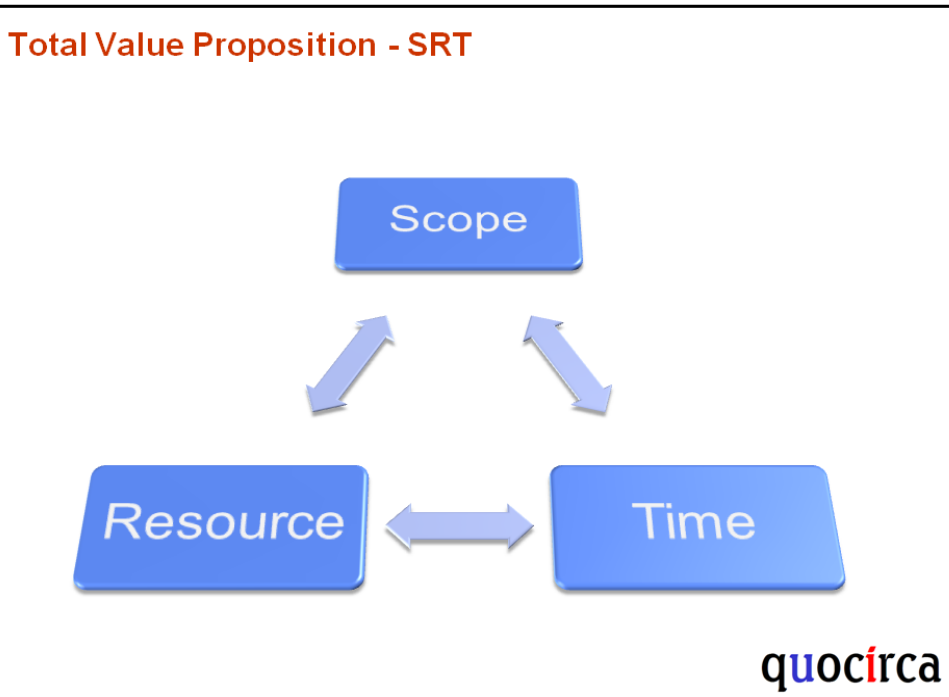


Figure 2

Scope

At an initial level, the scope of the data centre "project" will appear to have increased. A new variable is being introduced, and this will involve changes to up-front costs, but it will then also have a knock-on effect to downstream costs, which should be positive. Although there is an immediate increase in the scope of the project, Quocirca believes that the longer term benefits of DCIM outweigh any short term issues here.

Also, a poorly managed data centre will run out of space at some stage, and it will come to the point where a relatively cheap server will push beyond the capabilities of the existing data centre - whether this is through the need for more space, the incapability to get sufficient power into the data centre, or the lack of suitable cooling that is available. Industry figures from Reed Construction Data[1] show that the costs of building a new data centre are currently running at around £150 per square foot. Therefore, a new 10,000 square foot data centre would cost £1.5m - before the additional costs of having to move all existing hardware from the old to the new, and the accompanying downtime and impact on the business itself.

Resource

Again, it is likely that more resource will be required to implement a DCIM solution in the short term. However, if a moderate sized data centre is taken as an example, with, say, 1,000 servers in place, the generally accepted server-to-support ratio is around 20 to 50:1, leading to a lower level of 20 IT support staff for the data centre. A fully loaded cost for each support staff would be in the region of £75,000, leading to a support cost of £1.5m per year for the data centre.

Effective virtualisation could consolidate the server farm onto around 400 servers, without any real stress being introduced into the server loads. Therefore, the support resource required would then become 8 staff, or £600k per year: a saving of £900k of support, with this resource being able to be redeployed into providing business facilitation through IT - rather than IT-based task support - delivering cost saving for the business and fulfilment for the individuals.

Time

The whole stack of software in a data centre is permanently undergoing change - patches are a frequent need, upgrades are needed at regular intervals. Although the initial implementation of a DCIM system will require some

[1] http://www.reedconstructiondata.com/rsmeans/models/data-center/

time itself, the control that DCIM brings to patching and upgrades means that time is freed up on an ongoing basis from then on.

Again, taking the above moderate sized data centre as a starting point, manually patching 1,000 servers will consume a considerable amount of time. Each server will need to be checked to ensure that it meets the minimum specification to support the upgrade. The upgrade will need to be planned and carried out, checked for success and then made live. If it takes 30 minutes for each server, then a total of 500 man hours will be required to carry out such a change - and this is not taking into account any problems and the consequent need for roll back and re-implementation. At the fully loaded costs quoted above (£75k per person per year), this would cost approximately £24,000. If this is needed once per month, then the annual cost of patching alone is £281,250.

If fully automated systems are used, basing implementation on known, accurate information of the assets, and using ITIL-based processes as underpinnings, not only will resource be freed up for other, more important, tasks, but the time required for each update will be reduced. If this is combined with a consolidation exercise, then there will be fewer servers needing updating, thereby lowering the time requirements even further. As all actions are automated, time required from human resource is minimised - and the cost of an automated system will be considerably less than that of a human.

3.2. Stage 2: Value, Risk and Cost (VRC)

Once acceptance has been gained that a DCIM system will not adversely impact the day-to-day workload of the data centre manager, it becomes necessary to look at how such a system will actually improve the capabilities of the business itself. Stage 2 of TVP looks at how any change in an organisation impacts the three main areas a business should be concerned about - value creation, risk mitigation and cost control (see Figure 3).

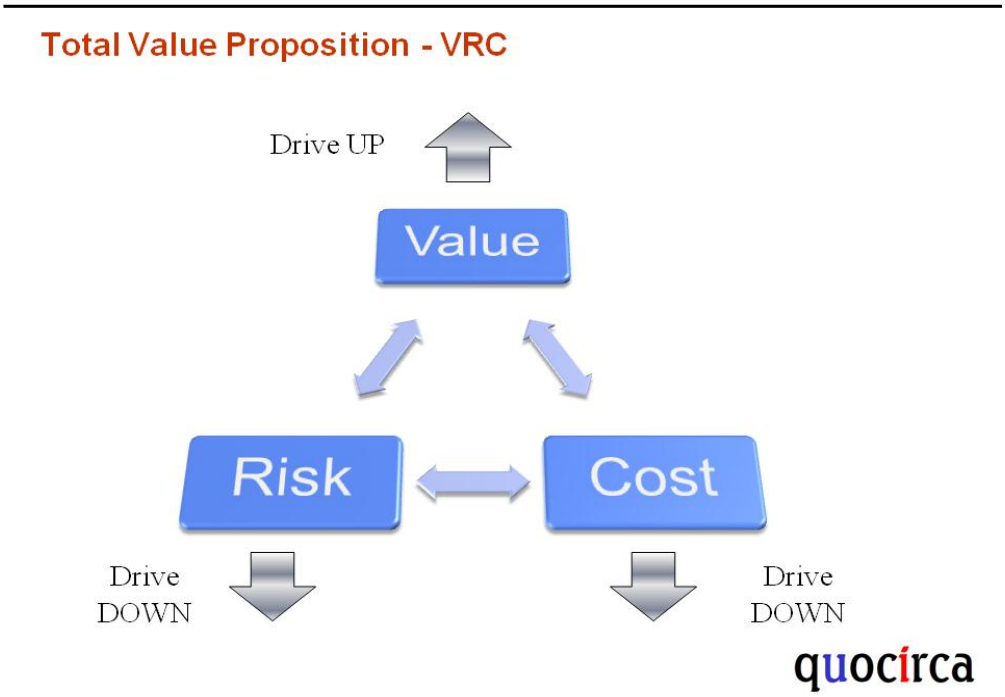


Figure 3

Value creation:

An optimised data centre can help the business through giving faster time to capability. Time to market is governed by the business, but a highly dynamic, scalable and consistent platform can ensure that changes to business processes and market conditions can be more easily managed.

Understanding the relationship between the various aspects of a data centre can lead to unearthing relationships, for example between customers, which have been hidden before. This can then lead to better capabilities for up- and cross-selling where applicable.

Correctly optimising the data centre leads to a far more dynamic environment; the business can run campaigns where response rates are unknown, and the IT environment can respond by growing the technical resources as necessary to support the workloads applied. Through this means, the business can experiment more with different campaigns and market approaches - and not have to repeatedly invest in new technology platforms to support this.

Risk mitigation:

Organisations are now far more dependent on their IT platform than ever. An unmanaged environment leads to higher risk of platform failure and, therefore, to business losses that will impact the bottom line. A well-managed environment will ensure that uptime is maximised and that business continuity is provided as much as possible. Indeed, the median costs for downtime for financial institutions are calculated as being £375,000 per incident, with the overall average being £175,000 per incident[2]. A fully managed environment will minimise unplanned downtime - and will also enable planned downtime to be minimised as well.

An unmanaged data centre can lead to security issues as information is spread around in multiple different data stores. Industry figures show that the costs per security breach per record has increased by nearly 30% over a 12 month period to £60 per record in 2008[3]. Understanding the interdependencies between different data and information stores can help in building an environment that optimises an organisation's capabilities to manage its own intellectual property, so avoiding accidental data leakage and optimising the capacity to gain the most from the data at its disposal.

Cost reduction:

As discussed in the Scope, Resource and Time section above, the costs of adding an additional or replacing an existing data centre are formidable. Gaining a full understanding of what IT assets are in the data centre, and what they are doing, enables business functional consolidation where redundant capabilities are identified and removed, so lowering the amount of hardware and software licences required, so optimising costs and freeing up data centre capacity for future growth. Alongside this, fewer resources will be required to maintain the estate, so removing the high cost of management, which Quocirca research has shown can run as high as 70% of an organisation's overall IT budget.

Energy pricing will remain volatile for the foreseeable future, with wholesale prices doubling between 2007 and 2009[4]. Although electricity prices may fall in the short term, the long term trend is up - and as the US, the UK and many other geographies move further into an energy deficit and need to bring in electricity from other sources, the instability in pricing will only become worse. With IT being one of the largest energy drains in an organisation, optimising energy usage will provide rapid returns. Functional consolidation, re-deployment and consolidation onto newer, more powerful, hardware and careful design of the data centre to optimise power feeds and cooling paths can drive down energy bills markedly.

3.3. Stage 3: Game Theory

With any proposed change in an organisation, there is always a possibility that inertia gets in the way, and that the choice is made to stay where the organisation already is - after all, the issues and associated costs are already being managed, and the perceived costs of change can always seem to be high. However, the costs of not changing also have to be understood (see Figure 4).

For example, should your main competitor decide to carry out a DCIM project, what impact would that have on your organisation? Would the competitor's capability to respond to the market faster, to bring new products and services in to play faster, to minimise their IT cost base have any impact on you? And if so, how much? How would your organisation have to respond to fight the competitor and what would the cost of this be if you did not have the capabilities of a DCIM solution?

If the competitor was to implement a DCIM solution, and then carried out a consolidation programme, it could be saving around £1.5m per annum in operating costs. If this money is taken and invested in IT that supports and facilitates the business, the competitor will become far more difficult to compete with. If your own organisation

[2] http://www.symantec.com/about/news/release/article.jsp?prid=20090630_01
[3] http://www.theregister.co.uk/2009/02/04/data_breach_cost_guesstimate/
[4] http://www.newenergyfocus.com/do/ecco/view_item?listid=1&listcatid=131&listitemid=3031

decides to continue with existing approaches, then this could mean that a whole new raft of IT assets will have to be bought, housed and managed, leading to more staff, more downtime, more issues and less actual business facilitation by IT. Such an approach can easily move an organisation from being a leader in its market to being one that is struggling - or even going out of business.

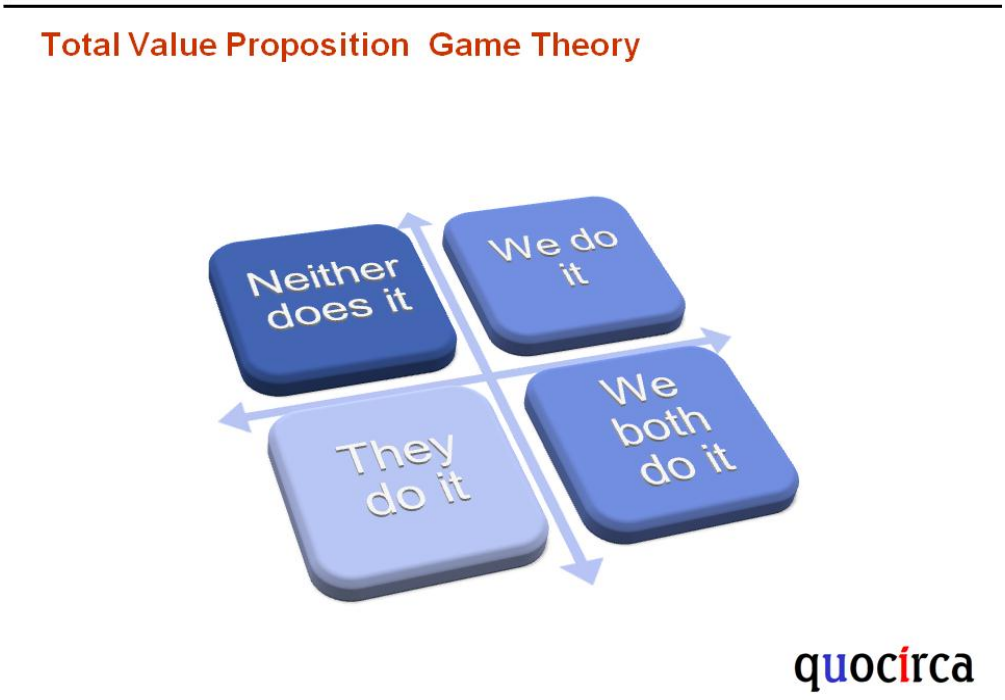


Figure 4

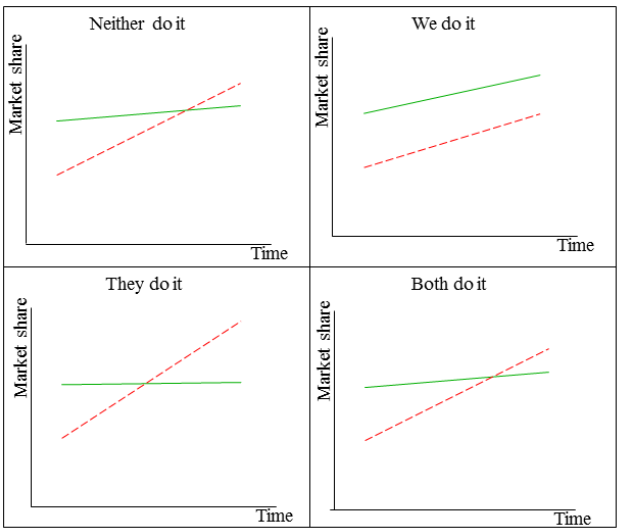
The longer term costs and benefits of implementing a DCIM solution have to be looked at - and using game theory to do this creates a simple visual that can be used with the business.

To do this, start by drawing a square, and sectioning this into four sub-squares. In the top left hand square, create a nominal point against axes of time and market share for where your business is now. Now do the same for the competitor. Do the same for a point in the future - a year, 2 years or whatever. Join the dots together and you will have a very simple chart of expected performance of your own organisation against the competitor's organisation - should no change take place.

In the top right hand square, use the same starting points as in the previous example. Now think of how implementing a DCIM system would change your business - and how it would impact the competitor, assuming that they do not implement DCIM. Create two new points for the future that represent how you believe DCIM would impact the market. In the bottom left hand square, do the same, but this time assuming that the competitor does carry out a DCIM implementation, but your organisation does not. Finally, in the bottom right hand square, do the same, but assuming that both your own organisation and the competitor implement DCIM.

An example grid is then shown in figure 5.

Game Theory



quocirca

Figure 5

Here, the green lines represent your own organisation, and the red (dashed) lines the competitor's. The assumption here is that the competitor is already beginning to outperform you in the market, and that this is a matter of concern for the business. Without any change being put in place, it is assumed that the competitor will take a larger market share sometime in the future. However, if your own organisation implements a DCIM system, the benefits gained will not only improve the overall performance of the business, but will also take custom away from the competitor, due to better efficiencies, better business processes and faster response to market changes. Therefore, the competitor fails to significantly impact our market share.

However, if the competitor implements DCIM and your organisation does not, the competitor gains all the benefits - and takes market share away from you, so impacting your own market share and overtaking you in the market at a much earlier stage.

If both your organisation and the competitor implement DCIM, then the worst that can happen is that you have "raised the bar" - both organisations continue to fight in the market, possibly taking market share against other competition, but effectively maintaining your overall positions in the market over time.

Therefore, there is a possible cost to not implementing DCIM that could be catastrophic - market leadership could be lost and your underlying cost base could become crippling as the competition lower their base and so free up more money and resource for business investment, rather than IT support.

Further, the capability to carry out "what if?" modelling is increasingly important - and game theory can help here as well. For example, should the business decide to bring out a new product, what impact would that have on IT? Are existing systems up to supporting the business needs, or will more hardware, software and other resources be required? With a DCIM system in place, such models can be rapidly constructed and tested to see what the impact would be - and DCIM can also provide the insights to ensure that any impact is minimised.

3.4. Stage 4: Return on Investment/Total Cost of Ownership

The biggest issue with attempting to create meaningful ROI/TCO calculations is knowing exactly what the current cost of any process or task is. If your organisation already has a strong idea of actual costs, then it is likely that there is a high level of process management already in place - but Quocirca often finds that the reason an organisation is looking to change is to put in place such control and, therefore, little data is available to create baselines against which to compare costs after a change.

TVP utilises a far simpler step-wise approach to getting an idea of how fast an ROI can be expected from a change (see Figure 6).

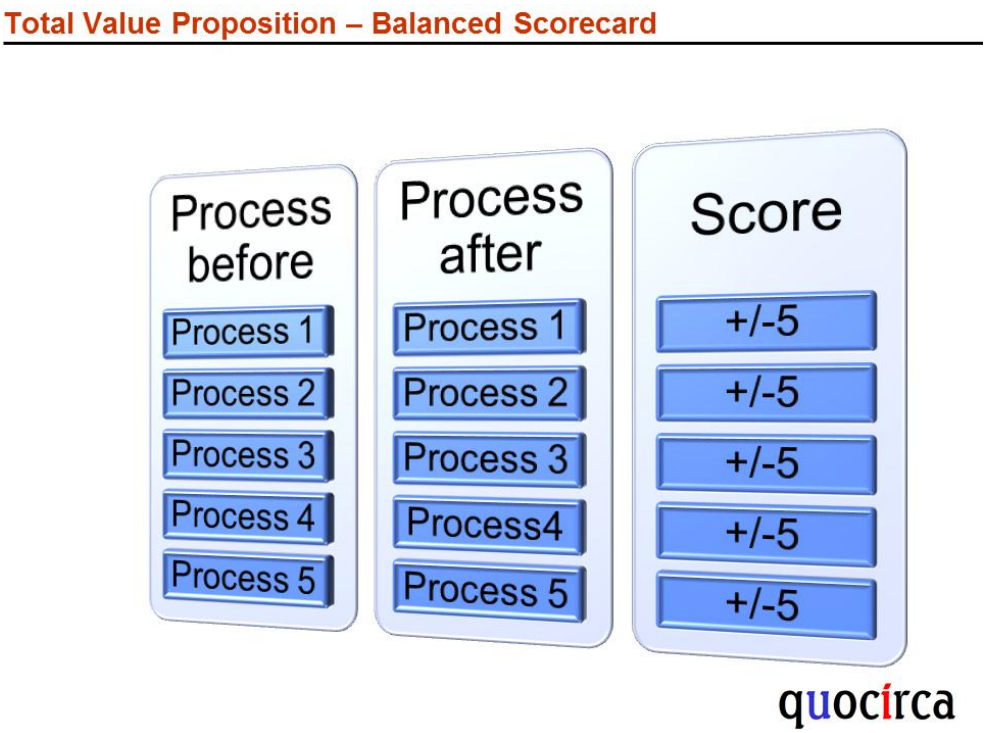


Figure 6

1. Start by taking the top five or ten processes or costs in your environment that will be impacted by the change.
2. Write these down on a piece of paper, and then look at what the process or cost is likely to be after the change is implemented.
3. Based on your expectations, knowledge and any outside data you can get hold of, give a score to each process or cost:
   - 1 denotes that the process will be far less costly than it is now,
   - 2 denotes that the process will be somewhat less costly than it is now,
   - 3 denotes that it will cost the same,
   - 4 denotes that the process will cost somewhat more than it does now,
   - 5 denotes that it will cost considerably more.
4. Do this for each process, and add the scores up. Divide by the number of processes being looked at, and you will gain a score that indicates what the overall speed of ROI is likely to be.
   - Less than 2 means that the change is long overdue, and should probably have been implemented some time ago.
   - Between 2 and 3 means that a reasonable ROI can be expected.
   - Between 3 and 4 means that the ROI is likely to be more long term.
   - Over 4 means that the change should only be implemented if the arguments under Value, Risk and Cost and Game Theory demonstrate that the change is needed for the very survival of the organisation.

A table is provided in section 5. Here, we see a mix of technical and business issues, based on a list of typical changes that can be looked at through the use of DCIM tools. This list should only be regarded as a starting point for any

ROI/TCO investigation: the more processes or costs that can be chosen and ranked, the more effective the final case will be.

4. Example areas to look at for TVP and data centre modelling and monitoring

Quocirca recommends that the following areas be taken into account when constructing a TVP case around the implementation of a modelling and monitoring system across a data centre. In each case, Quocirca offers some arguments to be applied as to how the areas fit into the value, risk and cost section of TVP.

- **Baselining**
  One of the major issues for organisations is the lack of true knowledge of the existing state of an environment. This is the main reason why organisations are looking at DCIM tools - there is a perception that the data centre is running close to being out of control and, therefore, there is a need to gain better visibility of what is happening at a granular level.
    - **Value:** Gaining a better understanding of what is happening within a data centre provides a far greater capability to be responsive to the business' needs. For example, knowing what actual workloads and levels of utilisation are across a complete asset base enables decisions to be made as to how best to re-assign and provision resources as required. It also enables IT to respond more quickly to requests: new hardware can be introduced more rapidly and with fewer issues, and new applications can be effectively provisioned on to these resources.
    - **Risk:** Knowing exactly what is happening across the IT asset base means that issues can be identified and resolved far more effectively, and problems can be avoided by moving application instances, data and network activity on to resources that are currently underutilised.
    - **Cost:** Once a baseline has been measured, IT is then in a much better position to identify where cost savings can be made; from the reduction in excess physical resource, through better energy management in the data centre to more effective cooling capabilities. Each of these areas is a significant cost within the data centre, and DCIM tools provide the means of setting the baseline against which all future savings are to be made.
- **Power utilisation**
  Previous research carried out by Quocirca for nlyte Software has shown that there is little visibility of power usage in a data centre, even at a high level. A highly granular approach to monitoring power usage at a rack level enables a far greater level of control to be applied.
    - **Value:** Being able to better identify systems' power usage means that plans can be created to prioritise power management should the main power feeds be disrupted in any way. Increasingly, providing full uninterruptible power supplies (UPS) for a whole data centre is just not cost effective. With full knowledge of how each rack (or even individual IT asset) is using power, plans can be put in place as to which systems can be taken off line when the main power fails, and which systems should be kept running for as long as possible. Again, should the power outage look as if it may last for a longer period of time, prioritisation of systems can be made as to which systems are kept running for the longest interval to protect the business' capability to maintain revenues and/or customer services.
    - **Risk:** In many cases, increasingly high power utilisation is a sign of an asset getting close to failure. By monitoring power utilisation, events can be triggered as baseline figures are surpassed. Therefore, incipient failure can be dealt with before actual failure occurs, so enhancing business continuity. Maintenance can be better organised to minimise planned and unplanned downtime within the data centre, bringing maintenance plans in line with power equipment maintenance agreements.
    - **Cost:** The easy one: by gaining a better view of power usage across the data centre, steps can be taken to optimise how power is being used. By optimising power usage, direct savings against a highly variable but upward trending cost can be made.
- **Cooling**
  In the majority of existing data centres, cooling is aimed at maintaining a standard overall average temperature throughout the data centre, generally between 18 and 21°C. However, this means that far more cooling is being carried out than is actually required. Increasingly, IT equipment vendors and data centre designers are looking at baseline temperatures of 27°C, with moves towards 30°C plus. Better modelling of air flows and knowledge of where hot spots are enables cooling designs to be optimised, directly lowering costs and ensuring that cooling is applied where it is needed, so lowering the risk of component failure.

- **Value:** Unmanaged cooling may appear to be working well as the inlet and outlet air temperatures will fall within limits. However, this does not reflect issues with any hot spots within equipment, which may then fail without notice. A better knowledge of the heat profile, down to rack and item level, enables cooling to be better applied - thereby improving business continuity. Optimised cooling designs also help in managing an organisation's carbon footprint and provide a better sustainability message.
- **Risk:** The average energy costs of cooling a data centre can be as much as or higher than the amount of power needed to run the IT equipment in the data centre itself. Under floor cooling can rapidly be made inefficient as unmanaged cable installations cause flow issues, tiles are left open and general flows do not reach where they can do most good. A better knowledge of where the real heat is being generated enables a more measured approach to the use of ducting cooling, hot aisle/cold aisle approaches and laminar flow modelling, reducing the amount of cooling required and protecting those assets that are the main sources of excess heat. By optimising the cooling requirement, a greater amount of redundant back up cooling can be provided, so that the failure of any one cooling system can be rapidly and cost-effectively replaced with a backup system.
- **Cost:** A more accurate understanding of the total cooling required allows both for the optimisation of current cooling costs as well as enabling better planning for future cooling needs. Cooling down mass volumes of air takes a lot of cooling equipment, which then uses a lot of energy. Mass air movements also means that the outlet air temperature will not be far above the inlet temperature, making any re-use of the air infeasible. Targeted cooling can lead to a far lower power usage, and outlet air temperatures can be high enough to re-use for space heating elsewhere in a building, or via a heat pump towards the water heating requirements of a building.

- **Data centre consolidation and renewal**

  Many existing data centres have exceeded their design capabilities, and merger and acquisition has often led to the proliferation of data centres across multiple locations with a redundancy of function. Gaining a greater knowledge of what there is within data centres, and what everything does, can enable data centres to be consolidated into fewer facilities - provided that these centres are fitted out correctly to deal with the new and future needs.

  - **Value:** Technology has become mission critical for the vast majority of today's organisations. However, the capability of many to keep up with the demands of the business has been compromised by the existing technology platform. Building up a complete picture of what is already available, how it all works and the interdependencies between the various assets means that a better approach can be taken as to how best to support the business. Downtime due to unmanaged events and the need to change from existing to new data centre facilities can be avoided by making better use of existing facilities.
  - **Risk:** Unmanaged data centres can lead to functional redundancy and copies of key data being stored in multiple places. Attempting to pull a true picture of a business together in such circumstances is almost impossible, leading to the risk that business opportunities and issues will be missed in the process. Identifying where the issues are and creating a more rationalised and consolidated set of data centres can lead to massive improvements in data quality and business reporting. Having a full view of what is involved in moving to a new platform, combined with the capability to visualise and test new platforms under synthetic conditions, leads to faster project completion, as well as massively lowered risks of the project not fulfilling needs. Moving from an existing data centre to a new facility involves a high degree of inherent risk, with the need for new systems to be brought on line with a break in function and a loss of transactional data. Maintaining capabilities through redesigning and retrofitting existing facilities while ensuring minimum business disruption can be enabled through having a full understanding of how all assets, from hardware through to software, need to be optimally managed.
  - **Cost:** Multiple data centres are very expensive to run at many levels: power, cooling, real estate, maintenance, excess operating system and application licences, which all build up to a heavy load on the overall IT budget. Consolidation and rationalisation can provide instant dividends, and can easily pay for the modernisation of the data centre facilities that remain in use. The cost of a new data centre is becoming prohibitive for many organisations, both at the financial and business levels. Being able to extend the life of existing facilities by many years has obvious cost saving implications.

- **Uncoordinated data centre management**
  The lack of capability to see the business impact and costs of the data centre "in the round" means that the majority of data centres are running as sub-optimised business systems. With facilities management and IT having responsibilities for different parts of the data centre, it is often difficult to pull everything together to ensure that a full picture of the data centre is obtained. With other groups, such as purchasing and engineering also getting involved, the data centre ceases to be an entity and becomes a jigsaw of different views and responsibilities that makes it impossible to plan or operate effectively for future needs.
    - **Value:** data centre infrastructure management requires a total view of everything that impacts a data centre. A suitable system will pull together the required information from across multiple data sources and ensure that full reporting can be carried out. Therefore, the data centre can be seen as a single entity, and business investments into the data centre can be better costed out and benefits calculated. The data centre is put back where it should be - it is there to facilitate the business, not to act as a constraint on the business' capabilities.
    - **Risk:** Running data centres across multiple groups can lead to gaps in capabilities between various aspects of the data centre itself. For example, errors in understanding between IT (with responsibility for server and network hardware) and facilities management (with responsibility for power supplies and building cooling) can lead to insufficient power being made available to a new server rack, which could lead to all power to a data centre tripping out. Insufficient cooling may lead to premature failure of data centre assets. By bringing all groups together and enabling the modelling of total systems together, such risks can be removed from the building and operating of data centres.
    - **Cost:** With multiple groups working in semi-isolation, certain parts of work will be repeated in each group trying to fully understand the needs from their own viewpoint. Information may need to be manually transcribed from one system to another; plans will have to be discussed and iterated many times; each iteration racking up further costs. By unifying the view of the data centre, such costs are minimised, and everyone gets the same correct view of the data centre as it is now and how it will be once the proposed changes are implemented.
- **Data centre space management**
  Many data centres have grown organically, with a mix of tower systems, rack-mounted servers/storage/network assets and newer form factors such as blades. Lack of optimisation at both a technical and space utilisation level means that many data centres are using far greater volumes of space that is actually necessary.
    - **Value:** In prime areas, office space is running at $125 per square foot (US figures, Digital Reality Trust) and £70-80 per square foot per year (London figures, October 2009, findalondonoffice.com). A 10,000 square foot data centre would therefore cost around £750,000 in building rental costs alone. If the space taken could be reduced by 20%, savings could be £150,000 by reducing overall space needed, or the space could be moved to actual office space, so reducing the need for a business to move offices as it grows. By using DCIM solutions, it becomes possible to optimise space usage, so becoming far more cost effective, including extending the life of a data centre.
    - **Risk:** The lack of management of space within a data centre can not only lead to massive cost issues, but can also lead to issues within the data centre itself. For example, if all power supply units are piled in one area, any problems there could take out all the power for the data centre. If all network assets are stacked in towers in one area, the need to run cables through to them could cause issues with air flows and with data/power interactions, leading to poor data quality and slow networks. Using a data centre infrastructure management approach helps to plan for optimised data centre space utilisation, ensuring that the smallest possible area is used for the best possible technical capabilities and support for the business.
    - **Cost:** As well as the possible savings on rental costs, as outlined above, the actual incremental costs of a data centre have to borne in mind: the power for the excess servers, network assets, storage and peripheral areas, as well as the extra cooling required. By better managing the space, the data centre can be better optimised, lowering such costs proportionally.
- **Deployment of hardware and software**
  In an unmanaged data centre, it is often the case that the "safe" option is to deploy one application per server. Therefore, when a new application is required, there is also the need for a new server. Likewise, when an existing application needs more resource, either the existing server has to be taken out of service to have more resource installed, or a new server has to be put in place to support the application. A better understanding of the data centre, combined with the use of virtualisation, enables new hardware to be more

easily and effectively deployed, for new applications to be rapidly provisioned and for existing applications to have additional resource applied as required.

- **Value:** With overall utilisation rates of server hardware running at less than 10% and storage at 30%, data centres are full of unused resource. However, lack of visibility of where resource is available and how this can be shared with other applications means that the business often becomes constrained by the IT systems. By virtualising the resources and using DCIM tools, it becomes possible to more effectively apply resources as required, on the fly, so becoming far more responsive to the business' needs.
- **Risk:** Earlier Quocirca research showed that many organisations could take up to three months to acquire a new server from identifying the point of need. The level of commercial risk that this can introduce to an organisation is far too high. DCIM tools, in conjunction with virtualisation, can ensure that excess resource is made available as pools of resources that can be freely allocated as required against existing or new application images. New hardware can be sourced well in advance, and can be effectively provisioned based on automated procedures that minimise the risk of poor installations and configurations.
- **Cost:** Driving utilisation rates up from 10% to 50% will enable existing IT assets to be rationalised, extend asset lifecycles and put off new asset purchases for a period of time. Fewer administrative staff will be required to look after the number of servers, plus automated procedures for provisioning hardware and applications will further reduce the need for staff. Therefore, cost savings can be made through the redeployment (or loss) of staff.

- **Planning for the future state of the business**

  Markets are becoming increasingly dynamic and uncertain. Businesses need the capability to react to market changes rapidly and effectively, but often find that IT becomes a constraint due to the slowness of IT to respond in a timely manner to business demands. DCIM enables IT to carry out "what if" modelling to provide early stage plans for supporting possible future states for the business, and the capability to rapidly implement these plans effectively as needed.
  - **Value:** Not only can DCIM enable an IT department to rapidly respond to the business' needs, but it can also enable IT to carry out "what if" modelling in a manner where IT can provide advice to the business on the best way forwards. IT therefore becomes a core part of the business, rather than just a group of resources available to the business.
  - **Risk:** With markets changing on a rapid basis, IT cannot be seen as becoming too much of a constraint on the business. IT has to be able to rapidly provide information back into the business on what would be required to support a proposed future state, with the business then having enough information to make decisions on what path to take to meet the balance of its financial and risk profiles.
  - **Cost:** Attempting to fire fight an unmanaged IT platform against incoming business demands leads to under optimised and costly systems that suffer from implementation issues and on-going maintenance problems. Through future state modelling, issues can be minimised, existing resources utilised where possible and costs minimised.

- **"Green" and sustainability**

  Although green has taken more of a back seat during the recession, much can still be done that helps an organisation's green credentials at no incremental cost to the business itself. However, such approaches can only be managed with a full, granular level of knowledge of the present and future states of the data centre - which requires the presence of a DCIM solution.
  - **Value:** Although "investment green " (where the benefits are drawn out over a period of years with a long payback period) is not a prime focus for organisations at the moment, immediate value can be gained through "standard green" projects - lowering power usage, cutting back on excess IT assets, extending asset lifecycles and optimising cooling approaches. Through the use of a DCIM solution, the business value of any green strategy can be easily seen - and green can be implemented as an aspect that improves profitability, rather than something that harms it.
  - **Risk:** Trying to move towards a "carbon neutral" basis is difficult, and getting it wrong can lead to major impacts on the capabilities of the business. Also, the increasing move to carbon trading (see Quocirca report "Managing Carbon reduction Across Your Data Centre Assets") means that not managing your green strategies effectively can have a major cost risk to the organisation.
  - **Cost:** "Standard green" strategies of saving power costs need to have a solid plan behind them. Rationalisation, consolidation and virtualisation are all excellent means of moving towards the optimised data centre, and in massively lowering the power footprint of a data centre - as well as lowering the embedded carbon of excess IT assets. However, an uncoordinated and unmanaged

approach to these areas can lead to further constraints on the capabilities of the business, as insufficient resources are available to deal with the peaks of cyclical and ad hoc workloads. DCIM solutions can help in providing all the necessary information for a well thought out and accurate approach to be taken to moving towards an optimised and sustainable data centre.

5. DCIM and ROI/TCO

Similarly, the above list of areas covered by DCIM can be used in constructing the ROI/TCO table needed for TVP. Below, Quocirca provides an outline table where you can apply your own figures for the key elements as to the cost differences envisaged.

Existing System	**New System**	**Cost Delta** **1 = considerably cheaper** **2 = somewhat cheaper** **3 = no change** **4 = somewhat more costly** **5 = considerably more costly**
Cost associated with unknown or vague baselines	Cost benefits through greater visibility of baselines within data centre	
Internal data centre costs associated with energy usage against current environment	Cost of energy against consolidated IT assets	
Cost of cooling existing data centre	Cost of cooling smaller IT asset base using better targeted cooling approaches	
Cost of managing existing data centre	Cost of managing redesigned data centre	
Cost of deploying new hardware and software into existing data centre	Cost of deploying new hardware and software into *new* data centre	
Cost of planning for supporting the future state of the business against existing IT platform	Cost of planning for supporting the future state of the business against new, fully managed IT platform	
Cost of extending within existing data centre and building new data centre in defined timescale	Cost of retrofitting existing data centre and extending data centre life	
Cost of data centre sustainability over defined period of time in existing facility	Cost of data centre facility in redesigned, controlled facility	
	Total scores for cost delta	
	Average scores for cost deltas (Total/8)	

As described above, the lower the average score, the more rapid the return on investment will be. However, even a high score may warrant the investment, as it may well be that the capabilities of the existing data centre are insufficient to provide the support the business requires. This will have been shown through the results of the Game Theory section of the TVP methodology.

6. Conclusions

Data centre infrastructure management (DCIM) is increasingly important - not just at a technical level, but as a means of ensuring that organisations remain competitive in increasingly difficult markets. To ensure that data centres support the business, a means of identifying all hardware assets that there are in an estate is needed, along with a means of profiling these assets as to power usage, cooling requirements, applications running, utilisation levels and so on. Only once a full working knowledge of an existing data centre is in place can future states (i.e. proposed changes to the IT infrastructure) be investigated. This then needs the capabilities to play "what if?" scenarios, looking at what the "new" data centre would look like and how well it would perform if certain changes were carried out.

However, the acquisition of tooling to enable this is often seen as something the IT department needs to hide within its own budget, as the imperfections of existing data centres are perceived as somehow being a reflection on the very IT people who are trying to deal with the data centre. That the data centre has grown organically, driven by technological changes, business drivers and often by mergers and acquisitions becomes lost in any discussions between IT and the business. Therefore, DCIM projects tend to be piecemeal, done "on the cheap" and are rarely successful in achieving the aims of the IT managers who are trying to do the impossible.

Quocirca believes that the creation of a set of business-led messages can raise DCIM to be a solid business issue. TVP enables business messages to be constructed that reflect the three main business drivers of value creation, risk mitigation and cost reduction, consider the impact of not doing something, as well as providing a rapid means of seeing what the likely speed of ROI is going to be. Therefore, a DCIM project can be made to be seen as a business investment, not a business cost. Quocirca's Total Value Proposition methodology provides an easy and rapid means of creating a view of whether a change in an organisation will be worthwhile - not just at a single level, but by combining the needs of the business to operate viably in itself and against its competition.

Wherever possible, these messages should be supported with cost examples, enabling the business to gain better insights into how much is already being wasted in attempting to manage such a complex environment, and how much could be redeployed as business investment funds through the use of a DCIM system.

DCIM is a solid means of turning a data centre from a cost centre to a centre of support of the business imperatives. Uncontrolled and unmanaged data centres result in the majority of an IT budget being spent on "keeping the lights on" – patching, upgrading and generally fire fighting issues. DCIM enables data centres to be brought under direct control and management, so freeing up a proportion of the IT budget for what it should be there for – investment in supporting the business itself.

About nlyte Software

nlyte Software is a leading provider of data centre infrastructure management (DCIM) solutions for intelligent capacity planning. Its performance-based solution enables the world's largest companies to optimally place data centre assets to make the most efficient use of power, cooling and space, enabling:

- a reduction in operating expenses by up to 20% annually
- a reduction in the time to deploy new assets by up to 50%
- a data centre life extension by up to 5 years
- the information needed to attain a power usage effectiveness (PUE) rating of 2.0 or less

Founded by data centre professionals in 2003, nlyte Software is headquartered in Menlo Park, California and can be found online at http://www.nlyte.com.

Contact details

nlyte Software - USA

Global Headquarters

4040 Campbell Avenue, Suite 100, Menlo Park, CA 94025

Tel: +1 (650) 561-8200

Fax: +1 (650) 561-8201

Email: info@nlyte.com

nlyte Software - UK

UK & EMEA Office

Riverside House, 26 Osiers Road, London SW18 1NH

Tel: +44 (0) 208 877 7200

Fax: +44 (0) 208 877 7205

Email: enlighten@nlyte.com

Web: www.nlyte.com

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.

Quocirca would like to thank nlyte Software for its sponsorship of this report.

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

quocirca