

The Key Disruptive Technologies Supporting IT Modernization

An infrastructure-based perspective on IT transformation

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Author: Roy Illsley

SUMMARY

Catalyst

The role and purpose of IT in an organization is undergoing significant change, driven by the need for businesses to become more agile and have greater control over cost levers when it comes to using technology. This transformation of IT involves many different aspects, not all of which are technology-related, but the one thing they all share is that IT modernization is about making changes to meet the current and future demands of business. This report looks at IT modernization from a data center infrastructure perspective, and considers the technologies and management paradigms that will act as a catalyst for change for IT departments.

Ovum view

IT modernization is a term that has been used to describe the shift in IT delivery from an IT push model to a user pull model. This shift is driven by increased end-user awareness and understanding of technology, consumerization, and the need to make IT more integral to business operations. Ovum defines IT modernization as the move from information technology (IT) to business technology (BT), where the IT department delivers the capability for the business to innovate. The difference is subtle, but has profound implications. Consider the telephone as an example of BT in action. Twenty years ago a business telephone needed a PBX and an operator, and users were restricted in what they could do. Today, the mobile device is used for everything from email to phone calls and more, and is used by users without any assistance. Mobile therefore represents the future of computing in the enterprise.

The transformation needed by the IT department requires a seismic shift in thinking, skills, and structure to enable it to operate in this new BT environment. Ovum is not predicting the death of the IT department, but instead the opposite where technology will become so integral to the business that organizations will not be able to function without it. CIOs can begin this journey of transformation by changing some small but significant processes and technologies used in the data center.

Key messages

- Converged infrastructure solutions provide the CIO with a catalyst for change.
- Software-defined networks will abstract the service delivery from the physical infrastructure layer.
- Data center infrastructure management provides the capability for IT departments to manage transition and improve internal processes.
- Lean IT will shape the IT departmental structure and introduce a new discourse for CIOs and CEOs.
- Workload orchestration and automation are moving from a traditional linear script-based technology toward a more dynamic behavioral analysis approach.
- IaaS represents the most likely cloud technology to be adopted that will transform IT departments in the short term.

CONVERGED INFRASTRUCTURE SOLUTIONS PROVIDE THE CIO WITH A CATALYST FOR CHANGE

Converged infrastructure solutions are designed to help organizations move to business technology

The converged infrastructure segment includes everything from a reference architecture approach to a “black-box” engineered solution. Ovum believes that end customers are often confused by the wide range of offerings in the converged infrastructure space. We have categorized the market in a simple model: build (customers or partners must source approved components and construct the entire solution), configure (the hardware is pre-built but the virtualization, management software, and integration capability must be added to the solution), or install (the solution can either be simply plugged in and it works or it just needs the application software or data to be loaded). These different approaches are clearly aimed at different markets, but the overriding customer requirement is to enable speed and flexibility of IT delivery to match business demand.

The transition to the BT model for service delivery is facing two major obstacles, which are delaying its adoption in many organizations. First, enterprises are still organized in a siloed, line-of-business (LOB) way, which has evolved by a focus on optimizing internal organizational efficiency. Second, there is the question of how to facilitate a change in the IT delivery that does not adversely impact the organizational structure or disrupt normal business activity. These issues are creating tensions between IT departments and functional business managers.

To combat the first challenge, the emergence of pre-integrated infrastructure solutions means there is now a platform for organizations to adopt new delivery mechanisms. By encapsulating all the different hardware components in a pre-integrated solution, including management, these solutions effectively offer organizations a private cloud in a box. Another development is that many of these converged infrastructure solutions are designed and optimized for specific use cases such as Big Data analytics. Using these platforms, IT is able to deliver new services across LOB boundaries, accelerating an

organization's ability to on-board the cloud-computing principles that underpin those needed for BT more quickly than converting existing distributed components. These pre-integrated solutions tend to optimize their economic potential when shared across larger organizations and multiple functions.

Deployment is simplified because these are "plug and play" products, but the ability to deploy these solutions quickly and simply provides a solution to only one of the challenges. The secret sauce that makes these integrated solutions an effective approach to adopting cloud computing, or BT, is the ability to fit in with and respond to existing organizational structures and responsibilities through the use of intelligent automation technologies. As the data center becomes more complex in terms of components, services, and technology, the need to manage the delivery from an end-to-end perspective becomes critical. Therefore, any cloud-in-a-box solution must allow IT departments not only to deploy it quickly, but also to manage it effectively and efficiently. Quick provisioning of new users, transparent tracking of infrastructure usage, reliable service, and real overall economic benefits must be obvious to the entire enterprise.

The impact of a converged infrastructure solution is to reduce deployment times from the traditional weeks to days. The biggest contribution is the need to perform some organizational restructuring in the IT department, and change existing processes to match the new delivery approach these converged solutions enable.

SOFTWARE-DEFINED NETWORKS WILL ABSTRACT THE SERVICE DELIVERY FROM THE PHYSICAL INFRASTRUCTURE LAYER

The concept of SDN will see a specialist versus generalist debate

The software-defined network (SDN) concept is challenging the notion that network equipment is a specialist device. The concept that the network can become a complete SDN has been about for many years (Juniper Networks spoke about it in 2009 when it announced the "new network"). The benefits of an SDN are expressed as reduced operating expenditure through increased use of automation, and a subsequent improvement in speed to deploy. However, the challenges of using an SDN are not fully understood, and these will only become clearer as organizations begin to understand more about how an SDN will operate. The truth is that SDNs or programmable networks are still some way from becoming a reality.

"Centralize what you can, distribute what you must" is the mantra for SDNs. The need to engineer the separation of the data path from the control path in the networking products, although not entirely analogous to how an SDN is defined today, does at least represent a new thinking about networks. To fully understand the current applicability of SDN, the network must be categorized into sub-elements or domains. There is no standard definition of these roles, but a perfectly valid way to segment the network would be: access and aggregation, edge, core, data center (DC), campus and branch, WAN, and consumer/business devices. Currently we advocate that the technology is only relevant for the DC and campus and branch domains in terms of supporting SDN concepts. While many would argue that edge

devices are the biggest area that needs to be addressed and are more relevant to the concepts of programmable networks, they are also the domains where technology is less stable, hence its applicability to the adoption of new concepts that are more prone to generate problems.

The concept of an SDN recognizes that not every problem can be solved through the distribution of systems. In addition, the controller currently provides more than one specific role or purpose. For example, there are storage, compute, and network controller capabilities, and to further complicate matters these operate both upstream and downstream in terms of communication channels. Therefore, the first question to ask is what functionality should be in the network, and what should be in the controller. For example, provisioning in a distributed way does not have all the information in one place so would make sub-optimal decisions, and likewise monitoring the average utilization of a network would be very hard to perform as a distributed function only. However, with the advent of packet switching, a lot of functionality was put in network nodes, such as topology, forwarding, and so on, and the centralized functions were management functions.

The SDN purist view is to go back to the old telephone world where control was centralized. Ovum believes this view is flawed because topology discovery and the ability to forward packets needs to be done in the nodes. Therefore, it is likely that the future will see an even split of what is centralized and distributed, but this will depend on domain.

The impact of SDN on IT modernization is the move away from the siloed team and the reliance on hardware change and configuration procedures, which tend to be measured in weeks. SDN technology will enable new skills and new organizational responsibilities to be adopted, which will lead to new IT departmental structures, effectively building on the work done to deploy converged infrastructure solutions.

DATA CENTER INFRASTRUCTURE MANAGEMENT PROVIDES THE CAPABILITY FOR IT DEPARTMENTS TO MANAGE TRANSITION AND IMPROVE INTERNAL PROCESSES

Cost transparency is a fundamental requirement of a cloudy world

Understanding the cost involved in delivering IT services is often compared to a black hole where nothing escapes. Data center infrastructure management (DCIM) has evolved into a comprehensive suite of software-based solutions that make IT costs transparent, clearly showing where IT investment should be directed, and enabling businesses to link this to business value. The IT department is facing a shift in its relationship with the other business functions. The primary driver behind this shift is new disruptive technologies, such as mobile, cloud, and social, all of which put the user in greater control. The impact of this is that IT becomes decentralized, and investment in IT becomes even more hidden than it already is. Ovum believes that to deliver value to the enterprise as a whole, IT investment must be transparent and coordinated from a central function. The delivery of IT can be fragmented and

distributed between on-site and offshore delivery methods depending on specific requirements and the risk/cost profile.

The impact of DCIM on IT modernization is to provide the tools needed to understand the cost and value equation of the services being delivered. Another advantage is that it can provide the process framework for operating IT in a more transparent and dynamic way. These tools can enable the business case for change to be displayed in business terms, not IT speak.

LEAN IT WILL SHAPE THE IT DEPARTMENTAL STRUCTURE AND INTRODUCE A NEW DISCOURSE FOR CIOs AND CEOs

Learning from manufacturing about how to become more efficient in terms of process and structure

The term “lean” has been associated with Japanese manufacturing, and was coined to describe Toyota's business during the late 1980s by a research team headed by Jim Womack, PhD, at MIT's International Motor Vehicle Program.

According to the Lean Enterprise Institute: "A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste."

Today, lean is becoming a vogue term for how organizations can look to ensure that the operational aspects of other functions in business can be made more efficient, hence the term operational efficiency (OE) is now more widely understood. However, moving a function such as IT to be a lean operation requires organizational change, as well as a shift in thinking by the IT department. Critical to this is defining the role of IT within the enterprise, and getting business leaders and IT to agree on the key aspects of responsibility and accountability.

Most IT departments have either begun or are part way through adopting a standard process and procedure model for operational activities, with ITIL the most widely used. However, lean IT is about more than just adopting standard, repeatable processes, it is about embedding these processes in the culture and people of an organization. Like the roots of trees, the culture is difficult to see, and therefore difficult for competitors to copy, yet provides the foundations of stability for future growth. The purpose of lean IT is not only OE, but also using OE to create a strategy that provides a clear sustainable competitive advantage between an enterprise and its competitors.

Ovum believes that very few organizations will be ready and able to adopt lean IT principles without first going through a standardization/consolidation stage. The need to consolidate the services offered as well as understand the services consumed is a foundation layer of any move to lean IT. Some advanced ITIL-based organizations will have the maturity to adopt lean, but while ITIL provides the starting

standardized platform it is not an assurance of lean success. Adopting lean IT is a journey and its path will need to be navigated based on a vision for the organization.

Lean IT provides the framework for how the reorganization of the IT department can be managed as it goes through the many different stages of its transformation toward a demand-led IT supply chain.

WORKLOAD ORCHESTRATION AND AUTOMATION ARE MOVING FROM A TRADITIONAL LINEAR SCRIPT-BASED TECHNOLOGY TOWARD A MORE DYNAMIC BEHAVIORAL ANALYSIS APPROACH

Increased use of behavioral analysis will be needed to identify valuable patterns buried in the ocean of data that monitoring tools collect

Ovum believes that the behavioral analysis, or self-learning, technologies that are beginning to be developed will significantly help with the problem of how to deal with too much data. A couple of years ago these technologies were only to be found in some security tools and a few niche management vendors, but today many more mainstream vendors are experimenting with this type of technology.

The issue with behavioral analysis has been one of trust, and the issue of CIO and other C-level executives believing the system is capable of making decisions that have not been hard-coded into its logic engine. The trust question is difficult to dismiss, making it even more difficult to convince skeptical employees that it does work. Many CIOs have automated parts of their IT operations in an attempt to reduce operational costs, but still retain in-house staff that monitor the events closely to capture any unforeseen and therefore un-coded situations. As the proportion of operational expense continues to shift away from infrastructure and toward the cost of people (Ovum estimates 70% of current IT operational spend is on people costs) then technology must be deployed that can remove the need for humans in IT service delivery. The areas that represent the biggest business benefit from greater use of self-learning automation are service-level agreements (SLA) and service quality. For the organization to fully adopt an automated self-learning ethos requires the enterprise as a whole to change its approach to the SLA. The introduction of differential SLAs based on process condition represents one method of freeing CIOs from the shackles that bind them to a people-centric approach to IT operations.

The impact of behavioral analysis is less clear on IT modernization, but Ovum believes that the ability to accelerate processes and release human capital provides a critical supporting technology.

IAAS REPRESENTS THE MOST LIKELY CLOUD TECHNOLOGY TO BE ADOPTED THAT WILL TRANSFORM IT DEPARTMENTS IN THE SHORT TERM

Cloud computing will be introduced in a piecemeal approach based on business needs and IT's ability to deliver

Ovum's research has discovered that the adoption of a cloud-computing model for IT delivery is likely to be a fragmented journey based on geography and organizational size. For example, the adoption of public cloud solutions from the likes of Rackspace and Amazon is most prevalent in the North American market, and appears to be focused on the SMB sector, while the adoption of private clouds is being driven by large enterprises and has no specific geographical aspect (except that according to Ovum's clients, Australia appears to be a leader in adoption).

Furthermore, we believe the journey to this cloud model will be fragmented and piecemeal, because many organizations will struggle with the structural and cultural changes needed. The drivers for adoption remain the twin challenge of cost reduction and increased agility, which we believe create the conditions for the tactical use of cloud computing. Ovum cautions that unless this tactical deployment is carried out as part of an overall strategic plan, organizations will face difficult and costly choices in the future.

The final point on cloud computing as a disruptive trend is that it will not be the only source of IT supply. Ovum believes that cloud models, whether public, private, or hybrid, will be one source of IT, and over time slowly will become the most dominant form. However, much of the cloud computing future will depend on how well the management tools have adapted to allow the free movement of workloads between different IT supply types, such as public cloud, in-house, co-located, or hosted.

In terms of IT modernization, IaaS technology is the most likely to become adopted as part of the transformation of the delivery of IT services. In terms of transition, the move to IaaS represents a small step technologically, where the abstraction and aggregation of the resources from a physical entity to a virtual entity allows for the same underlying technology to be used. The management transition represents the biggest challenge, which can be circumnavigated for a short time, but must be properly addressed in the long term.

RECOMMENDATIONS

Recommendations for enterprises

IT modernization is not a silver-bullet solution, but is a combination of technologies and strategies that can help identify the right time to make the correct changes in support of the business. Ovum recommends that CIOs consider the specific requirements of the business and select a technology that can address these needs. As a consequence of this, CIOs should look to exploit some of the transformational technologies and use them as a catalyst for change. The lean IT approach can be

adopted as the framework that can drive this change, with different technologies providing the vehicle to facilitate specific change. For example, to deploy infrastructure faster, a converged infrastructure solution is an appropriate solution, and using this technology provides the CIO with an opportunity to retrain the storage, server, and network teams, and implement a new departmental structure. Lean IT provides the principles, and converged infrastructure provides the method to move the IT department along the IT modernization journey.

Recommendations for vendors

The solutions produced under the label of IT modernization or transformational IT must clearly show how their use can fit in with a specific business imperative, and can deliver the CIO an opportunity to change. Ovum believes that it is the latter aspect that many vendors fail to advertise sufficiently well. As the IT modernization message begins to resonate, the opportunity presented by adopting the solution/technology to support transformational change will gain importance. Therefore, gaining a leading position as a transformation-enabling vendor can represent an opportunity for many vendors.

Alternative views

The move from IT to BT is not universally considered as the route IT is heading, and as such the modernization of IT means different things. The alternative perspective is that IT will pervade the business, but it will do so with the IT department remaining in control, with no diffusion to the business user. In this scenario, IT modernization is all about making IT more efficient, with greater automation and more granular control the weapons that it needs to cement its position.

APPENDIX

Author

Roy Illsley, Principal Analyst, Ovum IT

roy.illsley@ovum.com

Ovum Consulting

We hope that this analysis will help you make informed and imaginative business decisions. If you have further requirements, Ovum's consulting team may be able to help you. For more information about Ovum's consulting capabilities, please contact us directly at consulting@ovum.com.

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