Datacenter Consolidation

Achieving successful outcomes with analytics

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Introduction

In the pursuit of delivering IT services that satisfy business demand and drive growth, many IT organizations are now faced with managing an increasingly complex and sprawling IT estate. The evolution of multi-layer application architectures and heterogeneous platforms has resulted in a fragmented, silo-managed infrastructure - stretching resources to their limits, and with it much of the IT budget. For many organizations, the only quick and practical solution to meeting demand has been to deploy even greater numbers of servers, storage capacity and network bandwidth within their datacenters, and when the datacenter outgrows its performance and capacity constraints, outsource or build another.

Rising demand

While this approach would seemingly satisfy demand from the business, its long-term efficiency is far from appealing. Ignoring the upfront expenditure required for the new real estate and infrastructure, ongoing power and cooling costs make it an untenable option. Increased global demand has led to soaring energy prices - with recent analyst reports estimating that up to one third of the IT budget is consumed purely by energy costs alone. In parallel, environmental regulations, such as the UK Government's CRC Energy Efficiency programme, are placing pressure on organizations to reduce carbon emissions. With all these factors in mind, building or outsourcing further datacenter resource without firstly assessing how improvements can be made through consolidation, virtualization or cloud-based options is a wasted opportunity. But although such strategies have been at the forefront of CIOs' priorities for some years, many organizations will find it difficult to confidently implement a strategy that realizes both its cost savings without compromising on service quality.

Central to any consolidation, virtualization and cloud strategy is the issue of risk and the need to ensure a migration that doesn't subject the business to any undue disruption. When assessing requirements, a combination of performance, capacity and technology options will need to be taken into consideration, and each has a host of challenges that should be addressed to ensure risk to service is proactively avoided. For example, some initiatives may involve a physical location move that requires cost comparison between sites, network latency and end-user performance satisfaction testing. Other strategies may be motivated by the need to reduce costs, or switching hardware to more energy efficient servers and storage. There are also a number of less obvious issues that need to be addressed too. For example, organizations with users who are currently co-located with the existing datacenter, as these users are effectively 'hidden' as far as current WAN bandwidth demands are concerned. But whatever the reason to consolidate, it comes with the inevitable requirement to ensure the initiative is based on reliable facts that de-risk the migration. And it is with this need in mind that advanced analytics provides the robust, quantified facts to ensure all bases are covered.

First and foremost, all consolidation strategies should be based on a robust planning framework which encompasses quantifiable performance and capacity metrics for correctly sizing the new datacenter(s) requirements. However, with many organizations already stretched dealing with everyday services to keep the business functioning, gathering such intelligence is a considerable undertaking and one that requires specialist skills. Traditional approaches of sizing consolidation tend to be based on basic calculations and typically lack accuracy around forecasting user-perceived application performance and throughput, post change. Therefore these approaches, due to their relatively high element of risk, require a phased implementation approach, testing each stage of the migration carefully before moving on to the next. Similarly, when choosing to outsource or go to the cloud, careful consideration should be given to any calculations offered by suppliers themselves. While cost-savings from outsourcing and cloud services are tempting, strategies should be based on hard evidence collected in-house from the existing environment, and not grounded purely on conjecture or the merits of the outsourcing/cloud supplier alone.

Taking an analytics approach

Overcoming these issues, advanced analytics enables organizations to maximize the successful outcome of their consolidation strategies by being based on real data.
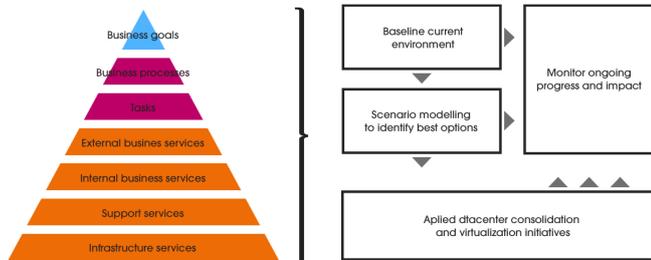
Fig. 1 - Analytics data-driven baselining and scenario modeling for datacenter consolidation and virtualization

Unlike traditional methods of sizing, analytics ensures a robust set of planning requirements by combining real data taken from the existing environment and applying sophisticated scenario modeling to "slice and dice" options under consideration, ensuring the most appropriate decision is selected for implementation.

Baselining the current environment

An advanced analytics approach firstly captures and combines utilization data from the current datacenter estate and end-user/business demand to create a baseline "big picture" model of the current working environment. This baseline model exposes the correlations between performance, capacity, technology and costs to indicate where applied changes can bring the most benefit from both an operational efficiency and cost saving standpoint. By building this baseline model, analytics enables datacenter consolidation strategies to be based on current levels of application performance and capacity, so that any selected initiative can be confidently based on achieving the same if not better standard of service quality, while also achieving its cost and resource saving targets.

Scenario modeling

From building a baseline view of the current position analytics then enables organizations to understand t before and after picture of options under considerati through the use of "what if?" scenario modeling a change analysis. The benefit of this approach is th organizations can effectively model the likely bene and impact of each option being considered, providing quantified answers to questions that would be difficult to deduce using traditional decision making methods, such as:

- What will be the impact of application latency, throughput and user-perceived performance be if we switch datacenter locations?

- What impact will virtualization make to our running costs?

- What are the potential cost savings from reducing the number of our applications, and how do we assess which ones are valued by the business?

- What impact will consolidating our separate datacenters have on our energy costs and carbon-reduction commitments?

Modeling performance

TThe baseline view establishes the current throughput performance of applications based on current capacity requirements and technology platforms. By capturing utilization metrics at the packet level and applying cluster analysis, analytics identifies common interactions and behaviors that provide a precise understanding on whether applications will be impacted by additional network delay post change, and hence if there is any expected impact on end-user perceived performance. The findings clarified here will ensure performance maintains current levels and that the end-user experience is actively maintained post migration.

Modeling capacity

For determining accurate future capacity requirements, forecasting business growth and disaster recovery requirements, analytics calculates precise utilization measurements from all relevant infrastructure components (network, servers, storage, HVAC, etc.) and their associated running costs. The captured data will cover time of day variations to uncover peaks in demand for each application. By then applying scenario modeling to forecast in anticipated demand from the business (for example, over 3, 6 and 12 months) analytics can then predict each chosen scenario's outcome, taking into account all influencing criteria such as busy-hour differences, hidden users, technology.
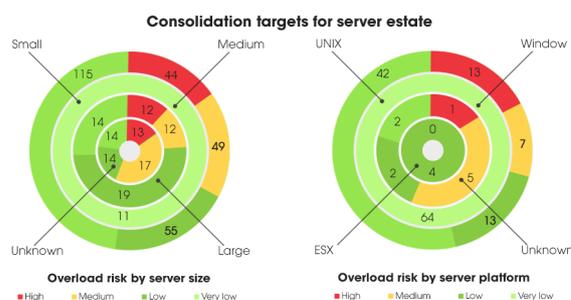

Fig. 2- Sumerian visualizations of consolidation targets by server size and platform.

For example, in rightsizing server requirements, analytics models the headroom, technology options, server and rack count required for the proposed change scenarios, accurately predicting the necessary environment. For power and HVAC, analytics can predict server load relationships, energy costs and associated CO_2 emission rate of the consolidated environment. Again, the intelligence gathered from modeling capacity from real data provides the assurances that, post implementation, capacity will be able to fulfill forecasted demand.

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Modeling technology options

Many consolidation strategies will also encompass some switch to different technology platforms - with virtualization and cloud-based environments being high on many organizations' wish lists. In terms of assessing requirements and de-risking migration, analytics provides the ability to determine whether a reduction in physical servers will result in the desired cost and management savings, providing robust evidence to support cases for its adoption. Through its powerful modeling capabilities, different scenarios under consideration can be effectively weighed up to identify the most advantageous migration plan – pinpointing the best moves and gains to the organization's application requirements.

For other technology options such as cloud vs. point-to-point, analytics can effectively assess the likely impact on capacity distribution, enabling precise sizing and cost impact to be accurately calculated. Similarly, with comparisons involving MPLS against Ethernet, analytics can determine the impact on application latency and throughput performance between the two, giving precise facts on the most favorable option for the business.

Measuring success and ongoing management

Once consolidation and virtualization efforts are completed, analytics can track their relative progress and business impact by taking regular samples of performance data. The advantage of applying this post consolidation is that it enables organizations to obtain a holistic, end-to-end view of service performance and capacity, establishing a "what normal looks like" model, and enabling trends and developing issues to be proactively identified and addressed. The delivered benefit is that organizations can break away from siloed, reactive infrastructure and application monitoring, and instead, proactively manage the IT estate in terms of business-aligned services, keeping track of costs and eliminating risks from service failure.

Realizing the benefits

While consolidation represents a clear opportunity to redress the balance of stretched datacenter resources, management and running costs, without careful preparation and taking into account the business' performance and future capacity demands - service quality and expected cost savings can be left in jeopardy. Instead, by using analytics to baseline current performance, capacity and technology options, model scenarios and accurately rightsize the options, IT organizations can be confident in implementing initiatives that achieve their desired objectives and ROI. For the ongoing optimization of services, analytics delivers the quantifiable metrics needed to ensure that ongoing service quality is not only upheld, but that further consolidation opportunities can be readily identified.

Case study 1 – De-risking datacentre relocation

In work carried out by Sumerian, the trading arm of a large UK bank was planning to move its datacenter grid out of its current City of London offices to a more cost effective premises outside the M25. The core application infrastructure was to remain in London, with the grid engines being outsourced. The bank had worked with Sumerian on previous analysis projects, and had found the use of advanced analytics advantageous in de-risking such large-scale change.

Sumerian approached the project by gaining a full understanding of the bank's application architectures and how these related to underlying infrastructure. From this research, Sumerian then captured data from the existing environment's infrastructure components to create models for all of the applications under migration consideration. These models were then populated with detailed measurements of existing application performance and task execution times to establish a baseline model of pre-change application latency and throughput dynamics. Using these models, Sumerian then applied scenario modeling to determine whether the applications would be impacted by latency issues due to the increased distance, and what type of datacenter hosting configuration was required to achieve the most optimal performance and cost returns; for example, whether applications could be hosted solely at the new, more cost-effective location, be spread across both locations, or if they needed to remain at the existing datacenter.

From the results of this analysis Sumerian was able to recommend the most optimal post-move deployment architecture, including which parts of the infrastructure and component software needed to be altered to secure user-perceived latency and throughput in the post-change environment. The analysis enabled the bank to plan which applications could be outsourced to the new datacenter location, and take appropriate action to keep the latency sensitive ones within shorter proximity. As a result, Sumerian enabled the bank to de-risk the project and ensure services were not impacted by the additional latency introduced. Overall, by using Sumerian to quantify and model requirements against the various scenarios under consideration, the bank gained the validation it needed to ensure that the new outsourced grid would not only uphold the levels of performance demanded by the business – but that highly favorable cost savings could be realized too.

Case study 2 – Datacenter consolidation and private cloud

A large professional services company, with independently run infrastructure architectures spread across three European countries, was in the process of carrying out a large-scale merger that would result in the three organizations merging into one central operation. A critical part of the merger was the consolidation of datacenter services to form a new private cloud environment, with elements being outsourced via a procurement process.

Sumerian approached the requirements by first establishing baselines of the current demand and utilization across the total datacenter estate. Data was captured from a wide range of components across the underlying infrastructure. This included a detailed assessment into the capacity, cooling, and space requirements needed for the merged location and its disaster recovery needs. On top of this, important influencing criteria such as cost comparisons and energy consumption/CO2 emissions were also factored in through the use of multi-layered scenario modeling. In total, over 500 GB of data was captured, modeled and analyzed to provide an exact calculation of the company's total datacenter requirements.

The resulting findings qualified requirements across all platforms - including network bandwidth demands, application latency projections, and projected business growth over the next 5 years – all of which was fed directly into the company's RFP (supplier selection) document. By then participating in the evaluation of supplier responses, Sumerian provided like-for-like comparisons of each supplier's capabilities and costs with fully independent recommendations on the most appropriate. Overall, Sumerian's analytics provided the company with the independently verified, quantified facts it needed to de-risk the initiative, and ensure service quality would be met post implementation. The ability to gain precise facts based on actual data meant that this critical business initiative could be reliably informed, ensuring its outsourcing decisions were based first and foremost on the company's strategic and operational needs, and not purely influenced by cost savings alone.

More information

To find out more about **Sumerian Forward Thinking**® **Analytics** and using **Sumerian Virtualize**, just give us a call on 0131 226 9300, drop an email to sarah@sumerian.com or visit our website at www.sumerian.com