

white paper

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data 

Data Centre Networking

Architecting Application Services



IT applications are critical elements of modern business operations, without which, the majority of organisations would not be able to function. Almost every aspect of the modern business uses one or other application to assist it to efficiently run the business, from communications, customer information, resource planning, to controlling finances and billing. CIOs are facing a number of application challenges such as application sprawl, the need to modernise ageing application software and understand how the move to cloud computing models will impact applications. One area that is often overlooked however, is the underlying network infrastructure and how it delivers applications to end users. This critical to the success of any application, irrespective of its type, where it resides and whether it is delivered as a cloud services or not. Ensuring that applications are highly available, are accelerated to give users a good quality of experience and are secure, is the function of the network.

While putting in place a modern and efficient application in an organisations data centre is a challenge in itself; ensuring that the users who are connecting to this application have a good quality of experience is equally important. End to end performance, i.e. the performance between the user and the application software is the 'acid test' of true performance. However, there are many links in the chain connecting users to applications that need to be considered, such as the data centre network, the WAN and the remote office network. Many of the 'mega trends' facing organisations today, such as consolidation and virtualisation, consumerisation and democratisation of IT, mobility and the move to new computing models are making end to end performance more difficult to achieve.

This paper examines the elements of application delivery that should be considered by organisations when deciding on a future application services architecture.

What is application delivery?

Application delivery is a suite of technologies that provide availability, security, visibility, and acceleration to an organisations business applications. The objective is to effectively and efficiently deliver these applications to end users, irrespective of where they are connecting from, which network they are connecting over, or what device they are using.

All applications were not created equal

Some applications are business critical while others are less important, some are real-time (voice, video) and are sensitive to network performance while others will run well on networks with lower performance specifications. The network infrastructure needs a level of intelligence to understand which applications are more important and therefore require special treatment. Different levels of optimisation, acceleration and bandwidth management should be applied to the different sets of application traffic to support the organisation's business goals.

A considerable number of applications in today's environment are based on web standards and one of the major applications trends underway is the ongoing 'webification' of more applications. This can simplify how users connect to applications by using their standard web browsers, but web applications tend to increase the amount of web traffic when compared to their client-server equivalents by five to seven times. In addition to the extra network traffic that this creates, it is possible to route this traffic over the broader Internet, and application performance then becomes even more challenging.

The application challenge in consolidation, virtualisation and cloud...

Mass consolidation of infrastructure is taking place, from branch office infrastructure, to servers and now entire data centres are being consolidated into fewer facilities. Once applications are centrally located, they need to serve an ever broader geographic area, and inefficient protocols combined with network latency are highly detrimental to application performance.

In addition, organisations are deploying virtualisation technologies into all elements of their IT infrastructures in their move towards more efficient computing and inevitably towards cloud computing. Having applications resident on a combination of physical servers, virtual machines (VMs), organisation owned data centres or service provider owned data centres, poses challenges to the network. The network needs an additional level of intelligence to understand where the applications reside, with a high level of integration to virtualisation platforms, so that changes to the application server infrastructure can be communicated to the network automatically. Events like VM migrations, additional VMs being provisioned or de-provisioned need to be communicated to the network so that user sessions to these VMs can be controlled appropriately.

It is also highly likely that organisations will use a combination of their own multiple data centres and hosting service provider data centres to house their applications. An important element of application delivery is managing and accelerating user sessions across different 'clouds'. Global load balancing provides critical high availability functionality and user session control irrespective of where the application resides to ensure a high level of user satisfaction.

What about application security?

The majority of applications provide very little of their own security and are fundamentally reliant upon the mechanisms that are deployed into the network. With users accessing more external applications at work to perform their jobs and with the trend for users to bring their own devices into the corporate environment, additional security mechanisms are required. Application delivery technology is well-suited to provide application level security controls, where these devices front-end all user sessions and are able to apply deep packet inspection into each session and block undesirable or malicious traffic before it penetrates the application itself. In addition, organisations can add their own security policy rules to enhance security, e.g. preventing users from connecting to the application from specific countries or geographies, which adds an additional element of security to applications.

Application delivery functionality

The following table provides more detail on the functionality that should be expected from an application delivery solution.

Function	Description
Load balancing	Load balancing across two or more application instances, either on separate physical machines, or on different virtual machines, and thereby providing session continuity and increased availability of applications.
Acceleration	Applying techniques such as caching, compression, and rate shaping ensure that traffic is accelerated.
Protocol optimisation	Many of the protocols used by applications are inefficient and protocol optimisation techniques are intelligently applied to ensure the most efficient performance is possible.
Offload	The application delivery device can handle many processor intensive functions, e.g. SSL encryption and XML code inspection to free up capacity on application server hardware to focus on application serving.
Security	The application delivery devices inspect network traffic before it gets to the application server and provides a sophisticated set of application level security mechanisms.



Crafting an application services architecture

Architecture does not consider individual elements or products but rather the best possible combination of elements to form a solution that addresses a specific business requirement. A typical architectural engagement would examine the current business requirements and infrastructure, and propose a future architecture that would meet all current and future requirements. Successful application services architecture should therefore provide for all of the abovementioned features and functionality whether by using a single tool or by combining multiple tools into a single, bundled offering.

The overall goal of an application services architecture should be primarily to ensure

that application users have a good quality of experience when connecting to applications, irrespective of where the applications reside, or how they are connecting, or what type of device they are using. This goal is becoming more complicated to achieve given the underlying trends that are taking place in the industry, but it is clear that an improved quality of experience leads to performance and productivity gains.

A structured approach to achieving end-to-end performance is required where the organisations applications, data centre, virtualisation and cloud computing strategies are understood and taken into account so that an appropriate application delivery architecture is delivered that will support the organisation achieve their business goals.

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