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The Rainfall After Cloud

The reality of global Wide Area Networks in a cloud-first world

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Introduction

There is no doubt that cloud-based services have fundamentally changed the application world.

The ability to buy enterprise applications on a per-user basis, and for these services to be within the reach of even smaller businesses has led to many new opportunities. Much of this innovation and explosion of opportunities can be attributed to the rise of agile software development and DevOps as constant iterations of improvement push boundaries at rates not imagined before.

However, even as more applications go down this path and become further from the traditional network perimeter than ever before, the networks themselves have failed to keep up in many cases. All too frequently they are too rigid, too slow to adapt and too closed. A new SaaS application may have worked very well in a pilot environment close to the server, but does it provide the same benefits when rolled out across five continents with ill-suited or highly variable networks between it and the users? The network is essential to deliver on the promises of cloud-based applications, and networks need to get smarter for this to happen.

This need to look at the end to end delivery of cloud-based applications, and not just the applications themselves mean the '*three V's of data*' - volume, variety and velocity – require a fourth dimension operating in harmony, despite the challenges. Veracity of the data is critical. Clarity and a truly accurate interpretation of these changing data flows has never been more important. Obtaining a single view of the truth means you can not only redesign but optimize the network. It is essential to maintaining the integrity and security of this data in this era of rapid change.

Challenges or Opportunities? Both.

All of the factors above are combining to challenge the management of enterprise networks in really meaningful ways, and at an ever-increasing pace. Are these opportunities dressed up as challenges or the other way around? The *'Rainfall After Cloud'* is what we are dealing with here.

It's a simple analogy but *how do you manage 'where the water flows' when the 'clouds' can open up vast downpours in a matter of hours?* ...and we all know weather forecasts are helpful though no guaranteed prediction on the conditions ahead. This correlates directly to the quantum shift that IT departments are experiencing due to the dramatic changes in how applications are being delivered. Significant changes to networks and resources that previously were designed to handle reasonably predictable traffic flows and usage levels.

A key facet of these changes, or '*Nexus of Forces'* as Gartner labels them, is that the applications are actually getting further away from the end users. This may seem counter-intuitive to the users with expectations of ubiquitous access to the internet, even in far-flung geographies or on long-haul flights. The cloud comes to you anywhere and anytime, right? In fact, underneath the simplified cloud concept the fact that this application content is only accessible over the internet represents a fundamental change in enterprise network topology. This not only forces changes to how the suitability of historical providers is viewed, but usually means new connectivity types and more bandwidth is required. In the era of low CAPEX, everything-as-a-service, tapping into more network infrastructure is easy, but at what cost? How does it impact the TCO of the IaaS, PaaS or SaaS initiative being considered - or already rolled out? What is the ideal network architecture for this era when the definition of the "perimeter" of the network is so blurred it is now virtually meaningless?

With IT budgets in many organisations being based on *'just maintaining status quo'* or more commonly *'doing more with less'*, the sudden and sometimes dramatic influxes of additional traffic and resource demand due to cloud and mobile technologies are almost impossible to manage with current network topologies. When G. K. Chesterton (English writer 29 May 1874 – 14 June 1936) wrote; *"There are no rules of architecture for a castle built in the clouds"* little did he know that he would be coining a conundrum that is now occupying the minds of CIOs the world over as self-service IT expectations grow from the executive, business unit and employee end user levels.[1]

Similar to a battalion commander facing a tough adversary in a theatre of war, **the answer lies in developing agility.**

"There are no rules of architecture for a castle built in the clouds"

The Agility Required
Starting with a new thought process for network infrastructure

Another industry has already solved this problem, and learned how to *'fail faster'* to improve quality. ***The Agile Software development and DevOps movement provide salient lessons for the network world***

We have come to recognise Agile as a highly successful conceptual framework that promotes tight iterations to speed up the software development cycle. Through it we see continuous attention to technical excellence in design enabling the frequent and consistent delivery of progress. This results in heightened customer satisfaction and de-risks development cycles. Ultimately this has been seen to be a sustainable development mindset and regimen.

DevOps has also risen in popularity over the last five years to help rapidly produce software products and services leveraging agile and other development processes or lean methodologies. It enables a flow of rapid feature releases from development to operations teams within the organisation, while preserving reliability, performance, availability and security.[3] It is similar to Agile in that it also promotes continuous deployment and delivery. The outcomes are that it maximizes the predictability, efficiency and maintainability of operational processes, inevitably leveraging the latest tools for automation.

What lessons from these successful movements in the software world can be applied to the slower moving network infrastructure domain? How can the ever-expanding expectations of users who see the benefits of these practices transform how they consume applications at home as much at work be delivered in the real-world of networking including carrier lead times for delivery.

Observing a situation, orienting what you're seeing against experience, deciding on what to do and then acting on your decision creates faster and faster results when applied effectively.

Which of course leads to a **faster operational tempo**. And a better ability to handle a 'lot of rain' as our analogy goes. The Agile software and DevOps mindset and methodologies provide an immensely powerful strategy to utilise in day-to-day decision making, however in the context of existing IT network installations, *one network infrastructure design change can sometimes take months to complete*.

Reimaginging the Network for Agility

Being 'agile' in an IT sense is to be able to cope and adapt to rapid change that is brought on by the changing needs of the business you support, as well as the even faster changing needs of customers.

A report from ZK Research (on behalf of Cisco Systems) had this to say about Network Agility that puts the issues in clear perspective:

> *"The lack of network agility limits IT agility. Legacy IT environments were highly siloed, with the compute and network layers being managed independently. This model had been sufficient because IT operated on a "best effort" model. However, IT is shifting rapidly to mobile and cloud computing - both of which are network-centric compute models. This means the lack of network agility significantly limits overall IT and business agility." [2]*

Adding to the agility issues faced by large enterprise networks is the cost and availability of adequate networking in many regions of the world. It's one thing to rapidly deploy cloud and mobile technologies in one location, but getting that data across the rest of the global network for applications such as big data analysis or to conduct video collaboration poses several issues. Not least is financial.

It's not for the lack of desire to do something different, it's the fact that many legacy systems just aren't smart enough, scalable enough or dynamic enough that they can adapt to rising traffic demands quickly.

With even minor network upgrades sometimes requiring a month of planning before execution and then factoring in the potential of failure (due to the complexity of manual human input required), agility in many cases is just a term that IT departments pay lip service to, rather than take seriously.

Smarter Networks for the Cloud

One of the biggest developments to have come from cloud technology that is positively affecting agility in large enterprise networks is Software Defined Networking ('SDN'). This latest generation networking technology takes the intelligence and complexity of management away from the end devices and instead puts control in a centralised location for better visibility, faster deployment times and better cost control.

SDN is turning into a powerful way for organisations to adapt their networks to cope with dynamically shifting demands on their network infrastructure (think of the rainfall analogy from earlier in this report and consider it's similarity with sudden traffic spikes). i.e. *What do you do to manage all of that 'sudden rain'?*

The technology has brought a number of major benefits to the enterprise network, with automation, rapid scalability and cost efficiency being some of the key factors.

With a number of big name vendors now offering SDN-based network solutions including Cisco, Brocade, Juniper, VMware, Alcatel-Lucent, Ciena and Plexxi, the options available are growing by the day. And so are the rates of uptake. A report by

Transparency Market Research found that the global SDN market is expected to reach $3.52 billion USD by 2018, with a CAGR of 61.5% for the four-year period from 2014 – 2018.[4]

What was interesting in the report's findings however was the fact that in 2012, over 35% of the entire SDN market was accounted for by enterprise users. So when cloud providers and telecommunications providers are included, it is insightful to note the extent of SDN networking that has been taken up by enterprise, considering the 'tech-savvy' operations of cloud providers and the volume / scale of requirements of telco's.

So networks can be made smarter, and agility can be 'bought', but at what price? And how?

Some Disruptive Plays Are Making Their Mark

As Andrew Lerner of Gartner recently articulated "The WAN is the new LAN" outlining his rationale for this he observes

> *"the adoption of the cloud apps has and will continue to change WAN architectures, so the WAN backbone (in essence) becomes the new data center LAN where high bandwidth, low latency connections are critical. The adoption of the cloud apps has and will continue to change WAN architectures, so the WAN backbone (in essence) becomes the new data center LAN where high bandwidth, low latency connections are critical."[5]*

There are a number of players making a serious 'dent' in traditional carrier networking spaces by offering disruptive network plays such as WiMAX and on-demand, core networking.

In the US, Comcast is building out over 8 million hotspots to offer the largest WiFi coverage network in the country.[6] In Australia, Telstra has announced a $100 million project to build one of the world's largest WiFi networks. This involves building out some 8,000 new WiFi hot spots over the next five years to boost wireless connectivity in high-traffic areas such as major shopping, holiday and transport hubs, as well leveraging capacity with councils and businesses.[7] At a global level, WiFi provider Fon already has more than 10 million international hotspots in countries including Britain, Germany, France, Poland and Japan aiming to address both residential and business users collaborating with numerous large telcos. This creates both an incredible source of mobile networking opportunities that are closer to the cloud-based applications and ideal for field staff, temporary offices and potentially a communication solution to replace desktop handsets however it also poses many new problems as well. Who will manage the devices? The data consumption? The security?

In Australia, innovative companies such as BigAir are offering fast deployable, high-speed wireless bandwidth at cost effective rates. This is challenging the install times, long contracts and high prices paid by businesses for fixed terrestrial bandwidth.

Another company that is changing the enterprise connectivity space with a disruptive play is Megaport, offering a Network-as-a-Service platform with user deployable bandwidth of up to 10Gb/s between major data centre locations for usage periods as little as a single day. Other providers such as Coresite are adopting a similar model in the US. This regional notion of more flexible big bandwidth is extended globally by players such as Equinix.

Gartner sees the cost of 1/10/100Gbps network connections will continue to fall 15% per year.[7] These offerings are all adding to the arsenal of the Large Enterprise Network manager however they still need some strategic overview and direction to make their investment worthwhile.

Conclusion

When you combine the dynamic potential of smart networking technologies like SDN and Network as a Service, and integrate disruptive network offerings into the enterprise, some major agility issues can be neutralised. This fosters the ability for cloud technology and the data that goes with it, to 'rain' as much as it 'needs to', without requiring months of pre-planning.

The starting point in redefining large enterprise networks for the better is in getting a strategic view over the whole organisation, so that the real problems can be seen. This in itself requires a certain level of agility that busy CIOs and IT Managers often don't have the time for.

If agility can't be gained through a lack of time or immediate priorities, then buying agility may well be the next best thing.

In the second part of our White Paper series:

- Innovation at the edge of the network
- Making the cloud work in the hardest emerging markets

[1] Gilbert K. Chesterton. GoodReads.com, 2014.
http://www.goodreads.com/quotes/55643-there-are-no-rules-of-architecture-for-a-castle-in (May 29, 2014).

[2] http://www.cisco.com/c/dam/en/us/products/collateral/cloud-systems-management/application-policy-infrastructure-controller-apic/white-paper-c11-730846.pdf

[3] http://mobile.blogs.wsj.com/cio/2014/05/22/enterprise-devops-adoption-isnt-mandatory-but-neither-is-survival/?mg=blogs-wsj

[4] Software Defined Networking (SDN) Market - Global Industry Analysis, Size, Share, Growth, Trends, and Forecast, 2012-2018. Source: www.transparencymarketresearch.com

[5] http://blogs.gartner.com/andrew-lerner/2014/05/22/wanisthenewlan/

[6] http://www.lightreading.com/cable-video/cable-wi-fi/comcast-whips-up-more-wifi/d/d-id/708876

[7] http://www.telstra.com.au/broadband/wifi/

About Coevolve

Coevolve provides a range of consulting and managed services across the entire network life cycle for multinational enterprises. Coevolve's mission is to deliver measurable improvement in the technical, operational and commercial performance of these complex networks.

Many new "as a service" offerings are driving an unprecedented need to change outdated network designs. Constantly changing traffic patterns mean achieving application performance visibility across the network is now essential. Coevolve helps enterprises face these challenges, bringing new levels of flexibility and agility into the network infrastructure arena, and always with the objective of achieving improved application performance for end users.

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