ITWC
The Content Experts

NETWORKS IN 2014
An Asychronous Conversation With IT Leaders

Jim Love, CIO, ITWC, The Content Experts

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Contents

Executive Summary

We picked the network as a focus of research because we believe it is an area that should receive more attention. Our worry was that this topic would be treated as "spinach" – good for you, but unappetizing. That was not the case. Over a period of 30 days, a group of leading professionals from across Canada made time in their crowded schedules to share their perspectives and make their opinions known, eagerly participating in an asynchronous conversation with Jim Love, CIO, of ITWC.

Among the key findings from the conversations are concepts that underscore the strategic value of networks, including recognition of them as:

- a key part of bringing organizational strategy to reality. The more an organization is focused on Cloud, SaaS and Mobility, the stronger the link.
- an essential component of a compelling business vision. Participants pushed away from what one termed as paths and ports.
- critical to business and strategic imperatives. Participants spoke of competitiveness and agility and looked to closer integration of clients. They shared a vision of cultural and organizational transformation. These goals were the end game of their network investments.

Most of the participants expressed surprise at how networks have moved to take such prominence in their day-to-day thinking — from a highly technical utility dealt with by technicians to a strategic investment requiring executive guidance. Whether this is because organizations are seeking strategic enablement or a greater emphasis on security and privacy (or both) there is a real focus on networks at this time.

In keeping with that focus, the participating companies have recently made major investments and others are in progress. Provisions were mentioned for increased security, but business drivers are the preeminent reasons for investment. There is recognition that Cloud, SaaS and what one CIO termed as fat apps have moved us from processing on the device to processing on the network. That move, combined with changes in the size of datasets and types of content (particularly the importance of video) have made bandwidth a top-of-mind subject.

Not surprisingly, participants are making strategic investments by increasing their

In 1984 John Burdette Gage, the 21st employee of Sun Microsystems, was credited with creating the phrase "the network is the computer". It was perhaps a little over the top back then. Today, it's simply a fact.

network capacity. Equally, they have been dismayed when that needed bandwidth was not available. They expressed the view that this is a period of increased investment and predicted that this will taper off in the near future as their organizations absorb the changes they have made.

Both in comments and in the stories shared, there was a sense that new networks are more complex to manage. Underscoring the idea that companies are more dependent on their networks is an increasing awareness of vulnerability. Hackers and outside agents figured prominently in these conversations. But there was also the sense that external threats are not the only issue. Some participants expressed concern that their companies may not have the technical skills to deal with rare but very serious issues. Continuous change has made keeping staff up to date difficult. Network complexity means that technical malfunctions or simple errors can escalate into situations that outstrip the skills that even large companies have in-house.

Today we take networks for granted. They are a silent utility that we count on. But they also are the fabric that holds together all of the things that have so rapidly become an integral part of our working and personal lives. Networks enable it all — mobility, social media, Cloud computing and what we can only term "Everything as a Service". Networks have taken the phrase "global village" from a fantasy or a cliché into a daily reality as knowledge work and communities span the globe and economies are changed.

All of that sounds grandiose, until you focus on the CIO or senior network architect in a corporation and realize that this is now within the power and reach of even a relatively small company.

In that context, networks are strategic to every business. Every business is dependent on them and benefits immeasurably from them. They:

- increase agility
- allow for greater collaboration with customers
- empower employees to work anywhere, anytime
- are not just for carrying data. They are a tool to transform an enterprise.

The promise of the network is just beginning. Having transferred processing

to the Cloud, our participants anticipate even more possibilities as analytics and big data are democratized and spread to smaller companies.

But with this promise comes dependency and with that, vulnerability. We need to be constantly vigilant in the current day. Moreover, companies need to anticipate that at one point a network issue may bring their business to a screeching halt. When it happens, it might be beyond the technical skills of their IT department to solve. Even those entities which have the resources to have top network staff will struggle to keep skills current in the constant wave of change.

Fortunately, for at least a handful of companies, a group of talented CIOs, architects, and consultants are working quietly in the background — like the network itself.

Introduction

With all of the emphasis on Cloud, SaaS, big data, collaboration, on-line marketing and all of the other high profile areas of discussion, there is a sense that we aren't paying enough attention to what enables all of these technologies – the network. It's funny — we seem to regard the network as a done deal. We take it for granted.

This report is an attempt to address that: to go back to basics and look at this part of our business infrastructure which makes modern miracles possible. We hope it's the start and not the finish of a continuing dialogue on this important topic.

In this report, we've tried to keep e xposition to a minimum and let the participants speak for themselves wherever possible. Each of them was asked a series of questions. What follows is a compilation of those responses.

Participant Profiles

Four CIOs, one very senior architect, and a consultant participated. If we'd walked into a bar, it would sound like the start of a joke. But we didn't walk into a bar, we engaged in a conversation. Initially, we had hoped (and still hope) to get the group together for a conversation in real time, but schedules and availability are very tough for this group. So we settled for an asynchronous discussion where the single common node in the network was Jim Love, CIO of ITWC.

Arik Kalinsky

VP, IT, Willson International

Arik is a technology executive with experience across various industries such as telcommunications, hardware manufacturing, software engineering, and logistics. Under his leadership, Willson International, a major customs brokerage, transformed its business by adopting new technologies including Cloud and Enterprise Content Management.

Fariba Anderson

CIO, Municipal Property Assessment Corporation (MPAC)

As CIO, Fariba is accountable for the contributions of IT to overall performance of MPAC's goals and objectives, key among which is serving the people of Ontario better every day. She leads the IT organization within MPAC towards attainment of its vision and mission in a manner consistent with its core values.

Nigel Fortlage
CIO, GHY

Nigel is well known to the CIO community as a thought leader. For several years, he's been working actively to develop the capabilities of GHY by leveraging network and Cloud applications.

Lawrence Coutinho
Manager, Senior Architect
Toronto District School Board

With a centralized delivery model for services, the Toronto District School Board's IT function is headed by a CTO as opposed to a CIO. A key issue which Lawrence faces is the size, scope and different needs of the stakeholders that the school board serves: over 250K students and approximately 30K staff.

Bill MacDonald
President
Marsal Consultants

Bill is a network consultant who provides telecommunications and information technology consulting services to a variety of companies, from not-for-profits to large, private and public entities. He also works with aboriginal communities, providing essential services in remote locations.

Jim Love
CIO, ITWC

AS CIO and Chief Digital Officer, Jim is the strategic voice of all technology in the company and liaises with ITWC's international partner, IDG. Jim led the technical transformation which enabled the Canadian firm to strategically move from print publishing to a digital media company. Jim also facilitated the asynchronous discussion upon which this report is based.

Network Definitions and Perceptions

To start the conversation, we wanted to scope out what everyone generally felt about networks with questions as to what people saw as changes and challenges. There was a surprising consensus among the group.

Has How We Think About Networks Changed?

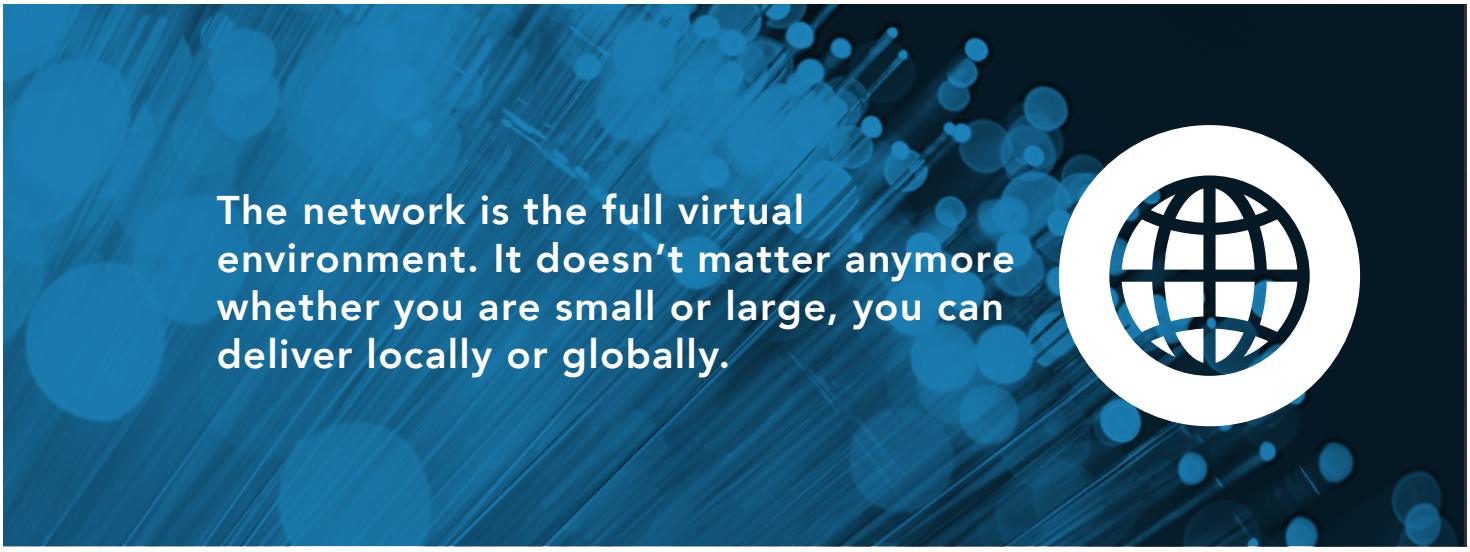
We asked the question, "What do you think of when you think of networks?" We did this because we had the idea that, as one participant said, "It's like when you say, Cloud. You get different answers from everyone".

We did indeed get different answers, yet they were remarkably consistent in their focus. Participants emphasized the network as an enabler of business strategy. "It's no longer technical" said one CIO, "it's not about paths and ports". In fact, when we asked for definitions, all of the participants used terms that were solidly non-technical.

For another CIO, the network is "an enabler of the firm's Cloud strategy" that allows the company to "leap ahead of the competition". Yet another remarked that it is a core part of a total rethinking of what the company is and how it leverages technology. Her company has changed its perception of itself as more than simply a government agency. They see themselves as an information provider. That, in turn, changes how IT positions itself. At one point, IT was a software development shop that relied on outside expertise for integration. Today, with a Cloud-first network centric strategy, it's the reverse. IT is more of an integrator and the application development comes from Cloud applications and external providers.

Another CIO described the network as a living thing, veins and arteries. Information is the life-blood of the company. We should not imply that this group is not sophisticated technically. The key issue is that nowadays the technical is largely a given. People expect a network to work and to be reliable. Those features are table stakes. Today, a lot more is expected from the network.

One of the participants who represents the biggest network (at least by numbers) said it well. "The issue is about what the network delivers. It starts and ends with the delivery of an application. Our challenge is how do we make it transparent in the



delivery of those applications? We need to focus on how it all fits together in the delivery of an application."

It's not either-or. The network is an enabler of strategy. But it is also a technical tool. Our networks handle voice and data communications. They link large number of users. They also connect us to our audience, the people we serve. That group, even for the smaller companies, can be enormous in size and high in expectations.

Even our consultant, whom you might have expected to be the most technical, focused on what a network can do rather than what it was. "The network is the full virtual environment. It doesn't matter anymore whether you are small or large, you can deliver locally or globally.

The difference from just a few years ago is found in this emphasis on the strategic business and not the technical side of the network. As one panelist summarized it, "the discussion about the network is not primarily technical. It's more about how it enables business capabilities". Others identified another potential reason for the reduced emphasis on the technical as part of a growing dependency on outside service providers. "We have moved past the hands-on and the plumbing. Today we are much more dependent on service providers."

Despite the nuances and differences in focus on some issues, everyone agreed that networks are utilities. Today, people take the network for granted. People do worry to some extent about security – an issue that we discussed in some detail. "Clearly the difference is the security stance related to the network."

But, for the most part, networks are not top of mind, even though that itself is a change. Moreover, there is no doubt that technology and networks have changed us. "Over the past five years, the change on the network has been dramatic. How many people have more than one cell phone? We now expect people to respond instantly. If I send you an important email, you have a minute to respond. My cell phone is my computer and my computer is the network."

Major Drivers of Change

What's driving this change in how the network is perceived and how it functions? Customer demand and competitive situations are clearly contributors. Our partici-

pants all noted the need to stay connected to customers or audience constantly. All of our participants focused on the need to be agile, to meet rising demand in real time.

More than one of the participants acknowledged the network as core to business and cultural transformation. Connecting with customers is key, but as a result of that connection, real changes are required to the way people work and, in turn, our dependency on networks to do that work increases. One member of our panel, representing a government agency, said, "It's about changing everything. We are making the move to Cloud and wireless for everyone. Our business strategy is based on mobility. Government organizations have to stop playing the game of effectiveness or efficiency. You have to be both: reliable but innovative. Fail fast and learn fast. In our organization, everyone is a knowledge worker. We have multiple locations. In this distributed environment we must have connectivity."

For some participants, all of the above drivers were seen as applicable: the need to be more agile and to be close to their respective audiences and customers. But that is part of a fundamental change driven by technology. As one panelist noted, "SaaS, Cloud, mobile. We moved our e-mail and collaboration systems to the Cloud. Everyone is mobile and wireless. People do their work from everywhere. All of us live on our smart phone. Expectations are for instant access and instant answers."

Perception of Vulnerability and Reasons

This study was done before the Heartbleed virus happened. Despite that, significant concerns about vulnerability were already raised.

For one participant, the situation is perceived as really being about the same. "Personally, I knew that networks were vulnerable five to 10 years ago. Because of the extreme reliance on networks over the past five years, there is more visibility and the perception that things are more vulnerable, but that's not the case. It seems that we are more vulnerable because businesses are paying more attention now. Why? Router, networks, LANs — the deeper you go, the more vulnerable you are. The safest option is to be open to no one. But that's not an option. The relationship between vulnerability and openness is a bit of an art. Make sure that when the network is open, you do a proper risk analysis. You can do risk management - you can identify the risks and mitigate them and apply that across the organization."

Another participant expressed the opinion that we are much more vulnerable. He noted that his organization is prepared to invest in security. "Securing the network. We have never spent the money we are spending now. It's a lot like the move from the 80's security to now."

For yet another member, asking questions led to a greater concern. "I felt good until a couple of odd things happened. They turned out to be nothing to be alarmed about." However, he asked the following question of his network administrator: "How do we know we are being hacked?. The answer: "I don't know". That was the call to action. "We have now done something. I feel better."

Overall, participants recognized, as one noted, that technology has moved quickly and vulnerabilities become more visible with time. Even those who believe vulnerability has not increased recognized that "It's a fallacy to think that we were more secure in our own data centres. Everything went through the network anyway. The characteristics haven't changed".

Everyone participating in this asynchronous conversation noted the ever increasing number of attacks. "There are a number of malicious ways that they (hackers) create to get your information." The network consultant noted: "I am not going to tell you security stories. It'll make you uncomfortable. Why? As he put it, "The Internet has so much stuff on it. Breaking into networks is not a big deal. We've proved that with equipment which you can easily buy from Future Shop, you can get a legitimate user name and password from almost any government system: provincial, federal and local. Now it's easier. Hacking and malware is abundant. Denials of service attacks are becoming more common. A lot is happening that you don't see. People are stealing your CPU and you don't know it. People are disrupting your services and you don't know it. You can't prevent it, you can only limit it. Lots of companies are dealing with how to encrypt things."

Vulnerabilities are not just technical. The weakest link is human. As a result, real threats are often more likely to use psychology than simply technical prowess. "No longer is it the emails from the prince of some foreign country," said one participant. "Phishing is a lot more sophisticated. We get phony bank transfers. But we deal with bank transfers in our day-to-day business. I get questions about authenticity from employees, at least from the ones who are sharp enough to ask questions. The question then becomes "what else slips through?"

Everyone concurred that some action needs to be taken. If the problem isn't technical, for at least one member the solution might be. "We have to build something that is foolproof." One participant expressed the real issue in terms of a mistaken focus. "Endpoints. Believe it or not, it's not the technology; it's the gateways into the backend".

Others looked beyond the technical, to people, process and even governance changes and a lack of investment. Education of business users has become a big part of security. But is education enough?

One panelist noted that his company is "looking to CoBit to create a process to drive us to think more systematically about change management". Another stated: "organizations require some form of governance" but also noted "organizations tend to be slow at putting it in place".

If policies and governance are the solution, more than one person on our panel expressed serious concerns about the ability to develop and rely on policies, questioning whether business users will comply. "Technology is being marketed and sold directly to end users. This is a broken process, selling to end users. Policies and oversight are required. They will use the technology without using the policy."

The question of whether governance processes can keep up and respond fast enough was explored. One panelist stated that "as the complexities grow, governance policies can't move quickly enough. By the time you have governance processes in place, it's too late. Technology is always ahead. Hackers don't have to worry about governance. So they stay ahead".

Even those who looked to policy and process as part of the solution, remarked that "polices won't stop hacking. You can't do thou shall and thou shalt not". One solution that was discussed: "We need digital citizenship. People need to realize that they do certain things because it's going to benefit them and they can't do other things because it's not going to benefit them. We need to open the networks but give people guidance on how to be good digital citizens. Our challenge is how to provide good guidance."

Network Management and Complexity

We posed the question, "compared to three and five years ago, is it your impression that managing your network is much more or much less complex?" The majority responded that it was much more complex and noted a number of reasons:

- Virtual networks, virtual SAN. With IPV6 there are also more points of failure. Technically, it's more complex.
- Even with brand new gear, the different vendors and devices in the mix means there is no single pane of glass [with which] to see and manage the network appropriately. When you go non-single vendor, there are real challenges. (Of course, this raises the question as to whether it is really any better if you go to a single vendor.)
- More devices – mobile management is increasingly an issue. VOIP, QoS and network management is a problem. The last mile in our aging building is there.
- Moving to Gmail and some Cloud applications has reduced issues with VPN from home but created new issues as there is no longer delineation where the private and public networks begin and end.

- The issue is applications. From a network standpoint we've talked about how they've matured. We've ironed out the kinks. What we have done is what we did on servers and virtualization that reduced the costs of hardware and maintenance on the hardware. We haven't concentrated on the virtualization of the network. The big players supplied us. They have started to realize that there are economies of scale to be had. They are in the space of virtualizing the network. Service providers like cable did something similar in the past. They pushed self-service out to the cable box so, for example, you can directly order a movie. Today that concept is being pushed out to the enterprise. There are lots of administrators who are looking after routing, firewall configuration, etc. This ties into the move that vendors are putting in with new end points, new devices and applications. There is a refresh every month and new applications are being churned out even more frequently. So you have to bring that all up to speed within a network. We need to automate, to share the number of layers in the network and move some of these up to the application, that is make the network application dependent as opposed to having to configure it manually. Such skills need to be developed. The network is being pushed into the application to reduce demand on human as well as hardware space."

Once again, participants saw the challenge as people and skills, and not technical in nature. "I think that what we have is a competency issue. It looks like it's more complex because we are lacking in the skills to manage these new developments and services." Another remarked that "The challenge is that you have to act fast. You can't have a process that is slow and overpowering. If you've got a large organization, you have real trouble. You need a thin group, empowered, who can act".

Current Challenges

The participants were asked about their challenges in a number of areas. Their comments were very revealing.

Capacity and Bandwidth

Clearly this was an important issue. Comments included:

- With everything that is going on, it's important. Without the appropriate bandwidth and network speed the user experience is 'horrible'. If the experience is less than using local apps - you fail.
- We are more and more dependent on what can only be termed fat apps. We took the processing off the device and put it on the network.

For some, the current situation is adequate. For one, simply adding more bandwidth from fiber and burstable networks has been sufficient. QoS takes care of what adding capacity cannot do. For others the challenges are more intense: "Bandwidth is cheaper, but managing the data that needs to traverse the network is what makes it a challenge. Video in particular is an issue. The Olympics are a recent example of a current event. In schools, video is increasingly part of the curriculum."

One big surprise — although fiber has solved the issue of bandwidth in many locations, it's not as universal a solution as we might think. First of all, fiber is not available everywhere. As one participant noted, "Just how much of the country is still dependent on DSL is amazing". Another panelist noted that the fiber last mile is an issue. "Regardless of the geography, we find that all too often fiber is not in the last mile, or it is capped out or doesn't exist. We don't have access to that information prior to making decisions. We are trying to get telecoms to disclose it. They won't. This is a huge challenge for planning."

Our consultant validated this. "It's amazing how there are places where needed bandwidth is not available, even in the Greater Toronto Area. It's particularly evident in retail, and there have been cases of companies opening stores in locations only to find that they can't get enough bandwidth to properly operate all their systems. In particular, Canada is among the worst in upload speeds."

Stability and Management of Networks and Devices

If our networks are indeed enablers of our business strategy, this is a two-edged sword. Everyone recognized just how dependent our businesses have become as evidenced in comments such as:

- The network is now extended to the customer. This creates vulnerability in that we can't generate revenue if the network isn't functioning.
- We are very dependent on our networks.
- That challenge was felt not just by the leadership, but by all staff involved. Technology has forced people who run the infrastructure to keep up and learn new skills.

Not surprisingly, there have been issues and some members of our group have spent a lot of time and focus building this reliability and dependability as noted here:

- There were even some growing pains in the past year.
- We've done a lot of work with a very small network to make it stable.
- We are doing some key implementations. We hope this will go to moderate after those.

Privacy and Security

In a world where all conversations begin with Snowden and in a country with great national debates about privacy and anti-spam legislation, it was not surprising that security and privacy took some prominence in our discussions. As noted, this conversation occurred just before the Heartbleed issue hit the press.

One panelist saw security as, "not necessarily any more challenging. The challenge was always there. It just gets more attention." Others saw it as very challenging but for different reasons, including:

- Networks are now public. We have to do encryption in transit.
- Mobility, Cloud and virtualization create exposures.
- Mobile, Cloud, virtualization, access from anywhere. It's a constant worry.

One panelist took it much beyond the classic idea of security and privacy within a corporate organization and thought about it in a much wider context. As part of a school board, their concern ran into areas beyond their control. "Technology companies are not thinking about the impacts and the consequences. In some cases we don't have control over it. One good example is cyber bullying and its consequences. There has to be some accountability by technology companies. They are not thinking about privacy and its impact. How children understand it is not being considered."

Not surprisingly, although none of the participants were comfortable with security challenges, those who had focused time and investment in this area were at least cautiously optimistic. "We've done a lot of work recently. Don't have a great deal of concern at this point."

That opinion was not shared by the security expert that was part of this group. He was clear that there are more vulnerabilities than people recognize. "I won't describe how or who, but we did a test

where we sent someone coast to coast in a van. With what you could buy from Future Shop, we could obtain valid passwords and user IDs for a host of government services." As if to prove his statement about unknown weaknesses, a week later, the Heartbleed vulnerability turned up in the media after lying undiscovered for two years.

Mobility and Demands for Service

Clearly, the anytime, anywhere aspect of networks and the amount of mobile devices has changed the expectations and demands of business users and customers. "Customers are not sitting at their desks anymore. Our customers are changing how they do business with us. We have all of these Cloud offerings. The new prime directive is that these cannot just be Windows apps. They have to work on everything - Mac, Blackberry - the works."

It is interesting to note how this whole answer focused on the customer, not the employee, yet others expressed pressures from employees in comments such as "There are very high expectations even for remote service." and "I hear from everyone if we have even a blip."

One participant commented: "currently we are embarking on an enterprise mobility strategy. Institutions like ours are grappling with BYOD. These devices have been available for some time but the challenge is figuring out how to manage privacy and stability. We need enterprise mobility management for all wireless devices and different classes of service and standards. But from a cost standpoint, how do you manage all of this?" Some members of the group noted that the younger workers are especially concerned with mobility and access, "They are concerned with how they will live, not how long they will live. For them mobility is critical."

Once again, the amount of time expended and recent investments made was correlated to how confident the companies are in addressing mobility and service demand challenges.

Cloud and SaaS Applications

Those individuals whose organizations have made a substantial shift to Cloud applications were clear on the impact of Cloud as part of network challenges. Only in this case, the network involved is not just their own – it extends all the way to the Cloud provider.

How big is this challenge? Responses included:

- As important as it gets. We have used Cloud to move a whole bunch of CAPEX into OPEX. Cloud affects our cash flow. It also puts demands on bandwidth.
- (Cloud and SaaS) bring together all of

the challenges we talked about earlier. Privacy, governance, cost. Interesting opportunity to save money on things like hot sites. Private Cloud makes more sense as we look at access for standard types of applications, e.g. Microsoft. If we look at things like student data, we should consider private Cloud to reduce cost and give flexibility to application development staff to do this. For other aspects we might not have to spend time and money on: these we should consider for the public Cloud."

- We use a lot of Cloud as external SaaS. We need to ensure that we have secure access.

If this group is truly representative of Canadian organizations, the push to Cloud and SaaS is much stronger than even common wisdom suggests. We heard it time and again: "We are taking everything to the Cloud; most of our infrastructure is Cloud based or virtualized; and we are a Cloud first shop."

Other Challenges

There was a wide range of other challenges and issues raised. For some, the challenge is around processes and policies. They focused on things like ITIL and foundational pieces. "Processes keep this together. Standard approaches ensure quality and cost."

Others tried to balance between knowing enough and getting into what they termed as the weeds. As one panelist said, "I need to learn more without becoming the expert. The more I learn, the more I need to keep on top of it."

It has been a fight for some of the participants to get the needed investment in something as mundane as a network. There is concern that as network technology advances, companies can't afford to be as complacent as they go forward. "It took years to get the business to invest in the last round of improvements. Can't wait five years now. That's going to be a challenge." As another panelist put it when asked about his challenges: "Keeping up. Knowing what to invest in."

It's not that businesses are short-sighted. Many are simply budget constrained. Technology budgets for infrastructure have been declining for years across the board. In smaller companies, it's been even tougher. Another panelist commented, "We

watch every dime. And, we are a business that is being disrupted and transformed. If it's not adding to the bottom line, it's hard to get money."

As an old cartoon opined, "we have met the enemy and it is us". Clearly, those of us who are most intimately involved in technology — especially anyone old enough to know this comic reference — might be part of the problem. Old attitudes may be holding us back and not just in business. "The biggest challenge is IT itself. IT can't fight this or try to run along the old lines. It can't be business versus IT. The new job of a CIO is to make everyone a technology expert. Sometimes IT people can become too attached to one particular technology or vendor. There are people whose career focuses on a particular technology. They are evangelists and might as well work for HP, Oracle or Microsoft."

Recent Experiences

Sometimes the best part of this discussion was the stories that the participants shared. They had tales of the good, the bad and the ugly. Here are some stories that were particularly poignant.

- The horror of UPD collisions. A few years ago we introduced a new application into the data centre to compress bandwidth and optimize the stream. The first few days, everything was fine. All of a sudden we have everything going off line. It all stopped working. Main components were down. We put sniffers on it. Network experts couldn't figure it out. We took everything off line, one by one. Some firmware started flooding the network with UDP packets. One faulty 10k device and you end up with your own internal DDoS. Under the SLA, the offending company pays for the device costs but that doesn't cover the amount of damage that the device did. Our business is time sensitive. For example, a truck load of melons that needs customs clearance doesn't take long to go bad.
- Recently we took an eight-hour outage. It turned out to be a drop in the office attached to a printer. It created a flood on the network, a virtual ARP storm that exhausted the capacity of the network. Every server was working but all communications were off line. It was a nightmare. The complexity of this type of issue can easily go beyond the internal expertise of all but the largest company. We did problem analysis but to figure out the detail was beyond our in-house skill sets. We had to bring in a very high priced consultant to try to figure it out.

Challenges don't need to be extraordinary. Coping with the day-to-day can also be a challenge. "Video usage is much larger but after our network upgrade it's not such an issue. QOS is important as we move to VOIP. We suddenly ended up with a VOIP issue that was nowhere to be accounted for in our setup or equipment. It's sporadic and doesn't affect everyone. Trouble shooting that issue has been an enormous time loss. "

External threats were also an issue. "DoS has been an issue, but we've been able to manage it because of our hosting provider's network. We've seen some problems with Cloud application availability, but that might be application issue and not the network. We had a huge virus attack a year ago."

Despite the challenges and the risks, participants' organizations are charging

DoS has been an issue, but we've been able to manage it because of our hosting provider's network. We've seen some problems with Cloud application availability, but that might be application issue and not the network.

ahead. "We made a bold move and went to Office365. We gave everyone a lease. We followed with an open concept model. Mobility was absolutely necessary to make this work; people are not tied to a desk. We have done this in three offices so far. All of these are going wireless. No land-lines. Softphones only."

Some participants indicated they are trying to be pro-active in managing issues. "Event monitoring and event management. Alerts allow us to avert outages and when we can measure this, we can show what great service we have."

Projects

Current

Whether this is typical of the average company, we do not know but for members of this group, there have been significant investments made in recent months and years. Given this, some participants are trying to absorb the investments and changes made: "Stabilize what we have done to date. Firewalls and switch upgrades. New switch stack with 10GB networking. Adding nine new 48 port switches with four 10 GB connections coming back between the server and the desktop. We only have 1 GB back to the desktop now".

Others have an ongoing strategy. "It is really all about the strategy we have for office 2.0 — wireless infrastructure and continued move to Cloud computing. Migrating our legacy to Cloud." And others have done quite a bit of work: "We've moved everything to private and public Cloud. Audience data has to stay private Cloud. Everything else we can is public Cloud. We've done VOIP. We replaced our physical network and switches."

Starting in Next 12 Months

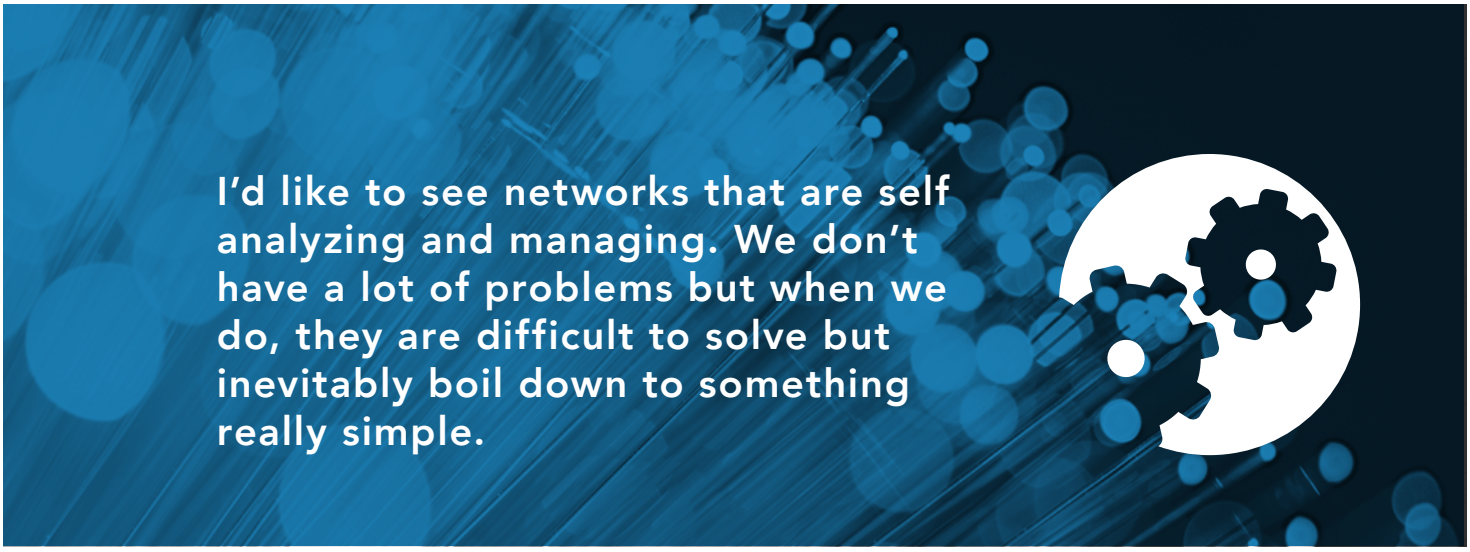
The amount of expected activity ranged widely as shown below, and as can be seen, there was a real focus on practical changes:

- Not a whole lot of infrastructure. We have all that stuff in place. ERP, Cloud - all without major CAPEX.
- Next twelve months? Real video conferencing and possibly VOIP.
- Our next projects in the area of networks? Not much to do for us. MDM is the big thing for me.
- VOIP, Enterprise Mobility Management strategy. Local administration system: when kids come back in September, they don't remember their passwords.
- Trying to decentralize the setup and maintenance of accounts. Going to bring back to our portal. Virtualization is done. Now moving to second site and private Cloud with an eye on public Cloud. May also look at Cloud point of presence and disaster recovery.

Needed but Not Supported Today

What would we most like to be able to do that we can't do today?

This group has a great deal of capability from their current networks. Yet there are still some things that they would like to see supported in the future. These range from greater automation — self diagnosing, self adjusting networks — all the way



to some pretty simple, proactive management tools. Some of these are:

- More BI. We have introduced a level of BI. I'd like the ability to see more - to see things you wouldn't otherwise see. More intelligence from the network that we have coming in.
- I'd like to see a network that could learn. The current answer to every problem is to give it more. You have to direct QOS. It would be great to just enable it and let it learn.
- I'd like to see more pro-active monitoring. It all comes back to this idea of event management. I'd like to see that move into the Software Defined Network (SDN) space. There is another area called NFV (Network Function Virtualization) which is the next area to mature. Like to see this get to be self serve.
- Looking for a way to monitor threats. We thought about an IDS (Intrusion Detection System) but what is really needed is an IPS (Intrusion Prevention System). The advice I got was that if you have nothing today, you might as well go for the brass ring.
- Love to be able to run VPN at full speed. A 10MB line can only support 1MB tunnel. Would love to make that a 10MB tunnel.
- I'd like to be able to detect where the fibre is and isn't. I'd like better analytics of what is happening on the network, deep packet inspection.
- The ability to run apps on low bandwidth. This is the next revolution.
- I'd like to see networks that are self analyzing and managing. We don't have a lot of problems but when we do, they are difficult to solve and inevitably boil down to something really simple.

Share of Mind

We wanted to discuss awareness of key issues and future developments with the group, to find out what is truly top of mind. All of the participants were well informed and very current even with relatively recent topics like SDN and network virtualization. This led us naturally to the idea of how much they thought about networks and how they stayed informed.

Networks - Share of Mind

Almost all of the participants reported that networks have a greater share of mind than three to five years ago. For many of them, networks occupied only a tiny percentage of their time a few years back, but that had steadily grown. Those who were working on projects or major upgrades reported focusing on networks for as much as 50 per cent or more of their time. Even those who don't have major projects on the go, estimated that they spend 10 to 20 per cent of their time thinking about networks.

What are the main reasons identified by participants for this increase? Cloud, mobility and SaaS are key. Security is another. Whatever the reason, our participants felt that they are spending more time thinking about networks than at any time in the past. Equally, almost all of them believe that they will spend less time focusing on networks in the coming years. Some believe that the heavy lifting is behind them given the significant upgrades which they have made. Others indicated that a lot of this work would be outsourced. "The thing I need to think about is managing the vendors and not managing the networks. Makes more sense to bring in the vendor because they build the technology."

Staying Informed

Not surprisingly, networks provide the prime source of information. All the participants obtain their best information from digital sources. Most of them reported that they receive a vast amount of information by email or gather it using collection or curation software. In the midst of this tsunami of content, they are snackers scanning for compelling headlines.

In keeping with a general marketplace trend, vendors and vendor materials are perceived as suspect by all but one member of this group. Yet, most of the participants indicated they would attend a webcast even when presenter bias is a given, if the topic is compelling. However they reconcile this disconnect, it's good news for vendor-sponsored webcasts (provided they have compelling topics and are relatively short).

Social media figured prominently with Twitter, Google Plus and LinkedIn all being mentioned (in that order). Two participants referenced Twitter and Google Plus as not only exceptional for data sharing but also as communities that are very helpful. Surprisingly, podcasts are generally out of favour. As one panelist said, "I used to do this, but I can't multi-task". Forums and user groups were also mentioned but only by one participant.

Webcasts and panel discussions are the most favoured of the information sources, but each participant noted that time is a major restriction.

Future Trends and Issues

Asked what they saw as necessary, each of the participants had a wish list. Among the things they mentioned:

- Analytics in the Cloud.
- In six months, we will be implementing our first BI application suite; getting our feet wet; getting our mind into the processes; instrumenting and driving business by data points that matter. This will make us a smarter organization. I'm not even sure what I'm asking. Predictive analytics is understanding what people know before they know it. What does that mean? It needs to tie into something meaningful to my business.
- Bandwidth, much more robust. Higher capacity switches.
- Collaborative applications. How we make networks more available, more stable, more capable. New technologies and more virtualization.
- Bar coding, implanted chips and tracking will be the required network developments.
- The internet of things is on the five year horizon.
- Maturity in the use and deployment of the Cloud with practical applications. For example, we don't have a hot site. The Cloud could be that hot site, if there was the right platform.
- Collaboration and social will be my world.
- Simplification. The network connecting these environments can be complex. Again the challenge is how to simplify this.
- Simplicity. In 2010, we had 17 physical wires to the box. After our new upgrade, there will be three.
- Self-managing, self-diagnosing software-driven networks.
- An even greater business focus and practicality. Everyone talks about five pillars. They are converging. It's called IT, it's called business, and it's called life. It's all one thing. How do we keep pulling things together?
- Looking towards one platform – encompassing all aspects of how we communicate and all aspect of convergence.

Given the earlier focus on business results, it's not surprising that BI was an important future consideration. Interestingly, there were a number of variations on the wish for more robust bandwidth, from more bandwidth to applications which could function over slow networks.

Strategy, Investment and Decision Making

Certainly the discussions proved that the network is strategic to everyone who participated in this conversation. As pointed out, each of them see networks as critical to the success of their business strategies. But whether the business leaders see networks in the same light is not certain. Even for those who have made major investments, there is a lingering idea that additional funds might not be so easy to come by.

As noted earlier, "It took years to get the business to invest in the last round of improvements. Can't wait five years now. That's going to be a challenge." Or as another panelist put it when asked to identify his challenge: "Keeping up, knowing what to invest in."

Taking the advice to "follow the money", we asked about spending on networks and how it has changed over the years. Participants were asked to guesstimate the level of spend on the network as a percentage of total IT, whether this has increased over the past three to five years, and whether it is likely to increase or decrease in the future.

The answers were interesting:

- Guess that the overall percentage is about 30 per cent. It's greater than in the past. We've built in more things including disaster recovery. In the next few years, I think it will decrease on the investment side but increase on the maintenance side."
- Overall spend is about 7 per cent and it is greater than it was five years ago. We expect it to increase in the next two to five years.
- No answer on current or past spending. Presume that spending will increase in the coming years as we move a decentralized and virtual organization.
- Our network spend is about 10 per cent of our IT spend. It's gone down because of VOIP but if you factor that out, it's remained constant with the exception of the one-time cost this year for new switches, wiring and VOIP equipment.

Projected Spending

When asked if network spending would increase or decrease, all of the participants indicated that it would decrease in the coming years. The reasons varied. Some participants have made significant investments in the past few years, while others, are counting on Moore's Law, the Cloud and the economies of scale presented by some of the big providers.

One member of the group felt that there may be some government intervention in Canada. This reflected earlier comments about the poor availability of bandwidth, particularly upload speeds around the country and the challenge this presents to business. "There is a possibility that spend will decrease, if the government does something about the number of players. It has focused on cellular but a lot of this country is still DSL.

Main Decision Makers, Recommendations and Budget Decisions

As noted, each of the organizations involved in this conversation treat networks as a strategic investment. Perhaps this is because their organizations are of significant size. More importantly, perhaps it is because each of the participants has done a good job of communicating how important networks are to the business strategy. Each one of them had a clear, coherent and defined plan and planning process.

We asked the participants if they had a network plan. They responded as follows:

- We had a bandwidth strategic plan. With virtualization, private Cloud, etc., we defined a strategy for bandwidth including predictions on how much data, peaks and so forth. Came up with a bandwidth strategy for the next few years to ensure scalability.
- That is something driven by the CEO. There is a strategy roadmap. The plan would take this and break it into the network strategy. There is one separate strategy for the network."
- We have an IT strategic plan.
- There is an overall corporate strategy to move to the Cloud. Cloud and network is integral to the overall business strategy.

We also asked: "Who makes the decisions? Has this changed in the past few years?"

- It's still at senior levels and hasn't changed.
- The Executive. It hasn't changed.
- Hasn't changed. It's still the approval at the Board level, the elected officials. Internal technology leaders go to the CTO who proposes it to the director, who takes it to the Board.
- Our approach is team based. Research is done by specialists. Two or three people make sure all the aspects have been investigated and factored into our decision.
- CIO reporting to the President and the shareholders. We're pretty flat.

Canada Versus the World

The participants were split on this. Two see Canada as a leader. Others identify our country as a laggard.

We asked: "Who are the perceived leaders?"

There was no clear winner on this. Answers ranged from Europe to Asia. The general impression is that the U.S. is not on the leading edge either. One participant remarked that Canada is less fragmented than the U.S.

Last Words

After allowing for some time to reflect on the discussion, we asked participants whether there was anything we missed. The universal comment received back was, "No. Very thorough."

We also asked them to identify the greatest areas of concern and whether this discussion raised issues for them or left them with questions or areas to think further about. Here's what they had to say:

- Definitely thinking more about security. Am I thinking about it enough? This has made me think. Also, I need to know more about risks and how we do risk management moving forward. What's happening? Who has an issue that I need to be worrying about.
- This has raised some visibility on what others may want to think about. How much focus should I be putting on sources of information? Some of the concerns around security and vulnerability resonate. I assume it's a known thing - but it should be known by everyone. I need to know more, not about the technology but the governance of the network. Also thinking about the involvement that is driving mobility."
- I feel better that what's happening with the network isn't just my concern. It's on the radar. I think if you put it out there and have more people talking about it, it's a good thing."
- A real eye opener for me. We are small but very well positioned as a company. But we know that we are not perfect and there is always more to do. And as soon as we master one challenge, there'll be another.

About ITWC

ITWC is a privately-owned digital media and content services company. Building on over three decades of solid relationships with Canada's technology decision-makers through award-winning excellence in journalism, ITWC delivers incisive, relevant information to executive and managerial audiences. It also provides leading, integrated marketing content strategies to clients, including over 200 global Fortune 1000 companies.

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This Asynchronous Conversation was moderated by Jim Love, CIO of ITWC.