The Quantitative and Qualitative Benefits of the New IP Network

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Introduction: Network Evolution Is a Business Imperative

Digitization is reshaping the business landscape faster than ever before. Business disruption is something that used to take decades; but natively, digital organizations such as Uber and Airbnb have disrupted their respective industries in fewer than 10 years. Digital transformation is creating new winners and losers at an unprecedented rate. Exhibit 1 shows that in 1960, businesses were on the S&P 500 Index for about 60 years. This number was cut in half by 1980 and will be cut in half again by 2025. Based on this economic data, ZK Research predicts that 75% of the S&P 500 Index will turn over in the next 10 years.

Because of digital transformation, business leaders are striving to build agile organizations. Agile businesses are those that can capitalize on market transitions and become digital organizations. Companies that can successfully make this shift will leapfrog the competition, while those that cannot will lag behind and struggle to survive.

The key to business agility in the digital computing era is IT agility. This is one reason why ZK Research estimates that organizations spent more than US$12 billion in 2014 on technologies to build private clouds, which are enablers of IT agility.

The one area of IT that has yet to fully evolve is the network. The architecture that is used to build networks has been in place for well over three decades. Legacy networks were designed for an era when all IT assets—servers, computers and data—were static in nature, so the network was built with a similar static architecture.

Business agility cannot be achieved without IT agility, but the IT infrastructure is only as agile as its least agile component. The lack of network flexibility today is the single biggest inhibitor to organizations capitalizing on digitization, which is why the shift to the New IP network is not just a technical initiative but must be at the top of every business leader’s priority list.

This report defines the New IP network and then provides both qualitative and quantitative benefits to help C-level executives and line-of-business managers better understand how to maximize their company’s investment in this business-transforming initiative.
Section II: Introducing the New IP Network

There are several technical criteria that define the New IP network. From a high-level perspective, though, the New IP network can be thought of as a network that is equipped for this digital era of business. The flexibility and dynamic nature of the New IP network bring it into alignment with the rest of IT.

Legacy IP networks were optimized for client/server computing (Exhibit 2), whereas the New IP network is optimized for more modern, network-centric compute paradigms such as the cloud, mobile computing and the Internet of Things. In the past, the workplace was fixed as well, with the majority of employees working from the same location every day. The New IP network can support orders of magnitude more connected endpoints and is optimized for a virtual, mobile workforce where information, people and devices are constantly on the move.

The New IP network is different from a legacy network in the following ways:

- **Simpler network design**: Traditional networks are hierarchical in design and composed of three or more network “tiers.” Information must flow up and down, or in a “North–South” direction, to move from one system to another. This was ideal in the client/server era, when most of the traffic flowed between PCs and corporate servers. In today’s era of big data and cloud, however, more and more traffic moves between servers, or in an “East–West” direction. A New IP network is flatter and simpler in design and optimized for the growing demand of East–West traffic.

- **Easier to manage**: During the past few decades, legacy networks have had many “patches” applied to them to make up for deficiencies in the original IP and Ethernet protocol specifications. Running a network is akin to managing alphabet soup as protocols such as MPLS, PIM and STP have been merged together. Even the best, most skilled engineers struggle with the complicated environment of current networks. A New IP network runs a more modern protocol that collapses all of the functionality, meaning the network is simpler to deploy, run and troubleshoot.

- **Automation capabilities**: The digital business needs the ability to quickly deploy applications and infrastructure services. Consequently, the New IP network must be agile to instantly adapt to changes within the business. The network’s ability to adapt to the speed of the cloud hinges on the automation of network updates and
Exhibit 2: The New IP Network Is a Business Enabler

<table>
<thead>
<tr>
<th>CLIENT/SERVER ERA</th>
<th>INTERNET ERA</th>
<th>DIGITAL ERA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected Endpoints</td>
<td>Millions</td>
<td>Hundreds of millions</td>
</tr>
<tr>
<td>Role of Network</td>
<td>Local connectivity</td>
<td>Company-wide connectivity</td>
</tr>
<tr>
<td>Value to the Organization</td>
<td>Connectivity</td>
<td>Tactical support</td>
</tr>
<tr>
<td>Compute Model</td>
<td>Server centric</td>
<td>Distributed computing</td>
</tr>
<tr>
<td>Network Era</td>
<td>Multiprotocol</td>
<td>IP networking</td>
</tr>
</tbody>
</table>

Source: ZK Research 2014 Network Purchase Intention Study

configuration changes based on business policy. Legacy networks have few automation capabilities, whereas automation is a key characteristic of the New IP network.

- **Programmable network**: Legacy networks have no native programmable capabilities. Some highly skilled network engineers have the ability to create scripts to program the network, but this is often done on an ad hoc basis. With a New IP network, programmable application programming interfaces (APIs) bridge the application, control and infrastructure layers. The APIs enable network programmability but also give applications the ability to interact with the network.

- **Dynamic agility**: Making changes to a traditional network is typically done on a box-by-box or even port-by-port basis. Even a simple change can often require many months to complete, as dozens or even hundreds of network devices need to be reconfigured to support the change. The slow nature of change management renders a legacy network inflexible. A New IP network has the capability of making changes almost instantaneously, meaning the network can be reconfigured at the speed of business.

- **Economic flexibility**: Traditional networks typically require a high upfront commitment to purchase infrastructure because organizations are often forced to buy capacity they might not use for years. The New IP network incorporates a subscription pricing model so the network can be a true IT utility. A subscription model enables organizations to deploy the needed level of capacity today, but then add more when the business requires it. With a New IP network, organizations can choose the economic model that fits their business best.

**Section III: The ROI of the New IP Network**

The New IP network can be thought of as an enabler of business transformation and a key to taking advantage of digitization. Legacy networks had, at best, tactical value. In contrast, the New IP network should be considered a strategic asset that can provide both tactical and short-term value but also be a platform for continuous innovation and long-term strategic advantage.

Organizations that make the shift to a New IP network will realize a number of technical benefits, such as having the ability to evolve to more modern networking protocols, including TRILL, or being compliant with SDN standards such as OpenFlow. New IP networks also offer a number of significant business benefits, which means C-level executives and line-of-business managers should make evolving the network a top priority.
However, business leaders require different proof points from what technical leaders may need to justify the purchase. The following items are the top qualitative and quantitative benefits of the New IP network. The data provided in this report is based on more than 30 one-on-one interviews conducted by ZK Research with businesses that have implemented a network fabric, the foundation of the New IP network.

1. **Reduced total cost of ownership (TCO) of the network:** There are two components involved in calculating the TCO of a network: one-time capital expenses, such as network hardware and software, and operational expenses, such as people-related costs and maintenance charges. The New IP network can reduce both components of TCO. In a legacy, multi-tier network, many of the ports (physical connections) are used to connect one network device to another. The more tiers there are, the more device-to-device connections there are. The flat, simplified nature of the New IP network reduces the number of ports required to build a network by as much as 40%, which means businesses have fewer actual network devices to buy, configure and manage. Operationally, the automation capabilities reduce the amount of engineering time required to operate the network. ZK Research estimates that the operational costs of running a New IP network can be reduced by as much as 50%, meaning engineers can devote more time to driving innovation rather than maintaining the status quo.

2. **Faster time to market:** In the digital era, organizations that can get new services to market first will gain a competitive edge in the market. Those that can’t will fall farther behind and will eventually be challenged to even stay in business. Any new business service will likely require IT to make changes to the infrastructure. The manual nature of managing network changes leads to long lead times. In fact, ZK Research calculates the average time required to just start making network changes is 27 days. The simplified nature of the New IP network enables businesses to start making changes in just two to three days. On average, businesses that deploy a New IP network can implement new services 13 times faster than with traditional networks.

3. **Higher uptime through the reduction of human errors:** The ZK Research 2014 Network Purchase Intention Study found that human error is the largest cause of network downtime (Exhibit 3). This happens when network engineers make changes through scripts and then must apply them to every device in the company. This multi-step, multi-device nature of change management is almost impossible to scale. In a New IP network, changes can be automated and initiated by applications. Also, when updates are required, the changes can be applied at a single point and propagated across the network. With the New IP network, unplanned downtime due to human error can be reduced from 35% to zero.

4. **Higher worker productivity:** According to ZK Research (Exhibit 4), workers are, on average, 14% less productive due to poor application performance and availability. Unplanned network downtime, poor network design and long troubleshooting times all directly contribute to a loss of productivity. Organizations spend billions of dollars every year trying to make workers more productive. However, if businesses could just optimize the performance of existing applications, they could achieve a double-digit improvement in productivity.

5. **Faster network recovery times:** As networks have evolved, new protocols have been layered on to deliver new functionality or to patch problems. Each protocol has a specific function, and often—particularly during a network outage—these protocols can actually interfere with one another as network operations are restored. A New IP network has more modern protocols that were designed for the digital business era, resulting in network recovery times that are 2,500 times faster than when using legacy networks. In most verticals, having a network recover even just a few minutes faster can yield a significant positive impact on revenue flow and company reputation.

6. **Shortened troubleshooting time:** The complexity of legacy networks makes them very difficult to troubleshoot and repair. Often, just isolating the problem can take hours and even days—something no business can tolerate. The simpler New IP network is easier to troubleshoot and can be diagnosed and remediated eight times as fast.

7. **Improved security:** With a New IP network, provisioning is done at the edge, so the core is somewhat “hidden” from attacks. Any breach at the edge of the network will not propagate any further into the business. Also, the ability to build overlay networks means traffic is truly isolated in each virtual network. This greatly increases the level of security and can help businesses meet regulatory and compliance requirements. Security solutions can be procured as...
standalone solutions or integrated into network infrastructure. Typically, when security is integrated into network devices, these devices offer faster implementation times and better threat protection than standalone solutions.

8. **Increased network agility:** IT agility is a key to becoming a digital organization. This is one of the reasons why businesses have spent approximately $12 billion globally on compute, storage and application infrastructure to improve IT agility, according to ZK Research. A New IP network can deliver the same level of network agility that exists within the other parts of IT, meaning businesses will get a better return on the IT investments they have already made.

9. **Better network utilization:** Historically, network utilization has ranged between 30% and 35%. Businesses overbuild networks to accommodate peak periods but rarely need all of the capacity purchased. A New IP network can be scaled up and down quickly, meaning organizations can provision for the norm and “burst” when required. This can improve network utilization from where it is today to 70% or even more. The implication of improved efficiency is more revenue for the providers achieved by the increase in network utilization.

10. **Shifting from capex to opex:** Many organizations have been striving to shift IT budgets from being predominantly capital expenditures to being operational expenditures. This has some tax implications, and the year-over-year consistency can be easier to budget for. The New IP network can be purchased via a subscription, making it easier to shift network budgets from a capex-driven model to an opex-driven one.
Section IV: Conclusion and Recommendations

The era of the digital business is here to stay. In this IT era, competitive advantage is based on an organization’s ability to be agile, adapt to changes and make rapid shifts to capture market transitions. Virtualization and the cloud enable businesses to have compute agility. However, the network today remains relatively inflexible. The long lead times required to change the network can be considered the silent killer of businesses, as the true cost of staying with a legacy network is missed business opportunities. At best, the missed opportunity will result in a loss of market share and revenue; at worst, it could be the death knell of an organization. IT and business leaders must make the deployment of the New IP network a priority because it can align the network with business goals.

The New IP network is the best network model for this era of IT (Exhibit 5), and business and IT leaders should elevate the evolution of the network to the top of their priority lists.

To enable a rapid shift to the New IP network, ZK Research recommends the following:

- **Make the New IP network a priority.** Historically, most business leaders took little interest in the company network. Times have changed, and today’s compute models—such as the cloud, mobility and the Internet of Things—are all network-centric. The New IP network should be considered a strategic asset and the foundation for future innovation. Business leaders should take an active role in ensuring this transition happens.
Exhibit 5: Legacy Networks vs. a New IP Network

<table>
<thead>
<tr>
<th>LEGACY IP NETWORK</th>
<th>NEW IP NETWORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tactical resource</td>
<td>Strategic enabler</td>
</tr>
<tr>
<td>Scales to millions of connected endpoints</td>
<td>Scales to billions of connected endpoints</td>
</tr>
<tr>
<td>Closed, proprietary, vertically integrated</td>
<td>Open, standards-based, ecosystem-integrated</td>
</tr>
<tr>
<td>Intelligent devices provide value</td>
<td>Intelligent network provides value</td>
</tr>
<tr>
<td>3- to 5-year upgrade cycle</td>
<td>Over 10-year upgrade cycle</td>
</tr>
<tr>
<td>High up-front costs</td>
<td>Utility-based pricing</td>
</tr>
</tbody>
</table>

Source: ZK Research, 2015

- **Benchmark the organization and create a plan to evolve to a New IP network.** The goal of digital transformation is to have an innovation-led organization that can capture market opportunities quickly and leapfrog the competition. Business leaders and IT leaders should partner together to understand where the business is today and develop a multi-step process to evolve to a New IP network. Key steps on the way to becoming innovation led are to align business and IT goals, virtualize the data center and automate IT processes.

- **Evaluate network vendors on their ability to deliver the New IP network.** Businesses need to shed conventional thinking regarding network solution providers. A New IP network requires a new set of requirements from vendors. Organizations should not make a purchase decision based on market share or incumbency, or even traditional metrics such as port density and speed. Instead, evaluators of the New IP network should consider criteria in alignment with the digital business era, including speed of network change, automation capabilities and simplicity of architecture. It’s important to understand that the vendor that brought the network to where it is today may not be able to take the business where it needs to go in the future.