Network Agility:

The Automation of Automation

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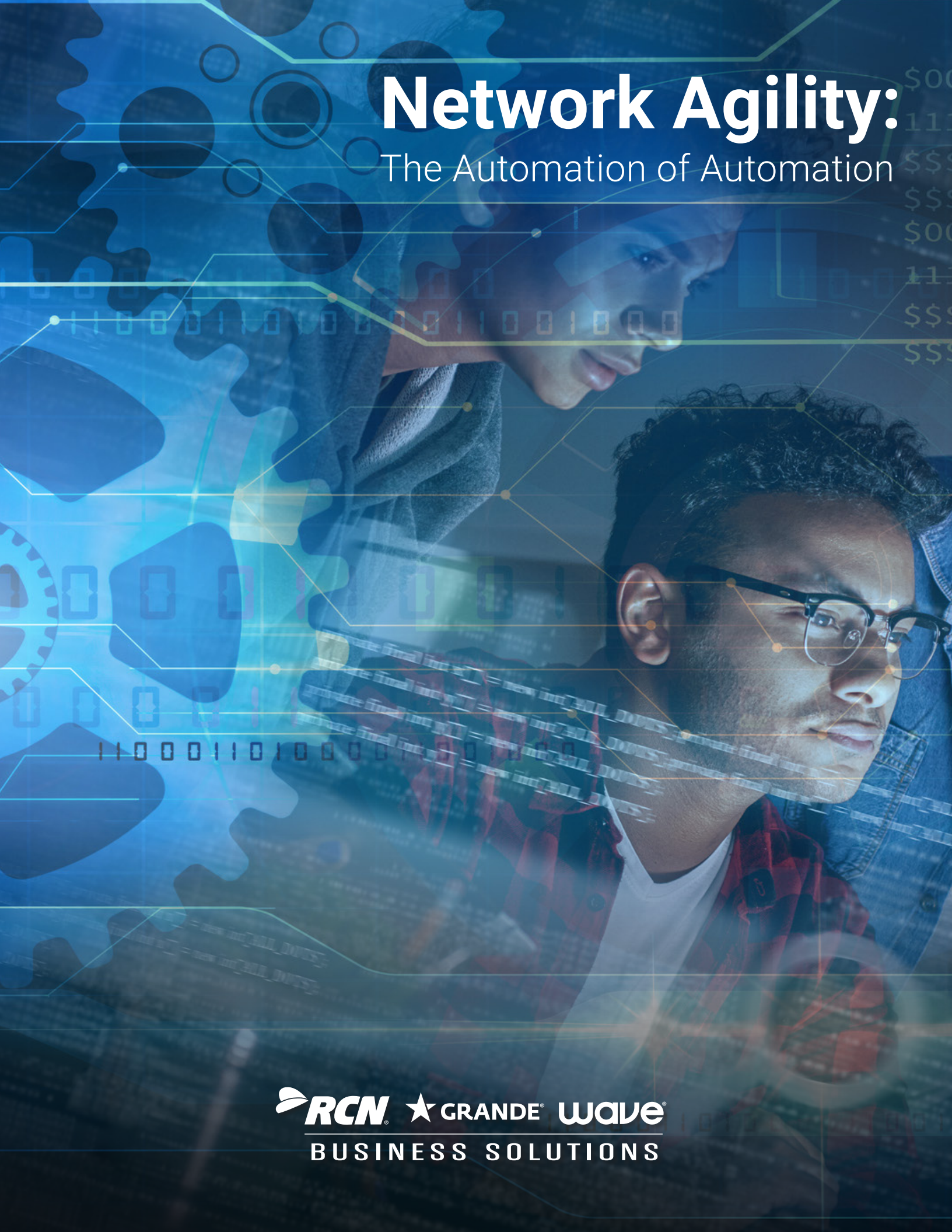

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Executive Summary

An agile network is the difference between solving a problem eventually or proactively. No doubt your team will identify and fix the problem as soon as they can, but what if they could do it faster, with less effort, or didn't have to do anything at all? That's network agility; the ability of software and hardware to automatically control and configure itself and other network assets across any number of devices on a network to keep pace with changing business objectives and network challenges.

This White Paper is intended to educate CIO and IT professionals about the advantages of implementing network agility and automation tools to enable better, faster decision making.

Eventually or Proactively? That is the question.

Maybe you're the CIO of a hospital network, the IT Director of a regional bank, or running the logistics end of a supermarket chain. It doesn't matter if you're moving patient data, funds between accounts, or fruits and vegetables. What your network is dealing with are ones and zeroes, and how quickly it can move them impacts your organization's ability to make decisions.

Let's say you're a cloud service provider for an enterprise with several satellite offices and/or retail stores reporting into your data center. In total, there are hundreds of users with various permission levels simultaneously accessing multiple applications at every location. That means you are managing terabytes of data storage daily to keep all your resources and applications running smoothly. There are hundreds if not thousands of pieces of hardware, drives and mobile devices connected to the network in myriad ways. All those endpoints must have ample processing power to run the latest applications – applications that must be kept malware-free and user permissions kept current to maintain a secure environment. And you must deploy connectivity in the right places and supply scalable bandwidth across the network to reliably connect all those devices and users running apps and inputting data. Each of these layers has a key role to play, and it only takes a problem in one of them to cause a slowdown that could cripple productivity across the entire network or cause a service provider to miss its SLA targets.

It all comes down to the network keeping pace with the business needs. As cloud-based infrastructure becomes more prevalent and 5G arrives on the scene, data traffic will explode and the scale of "things" and endpoints will increase exponentially. Networks need to evolve to cope with the increased stress this growth will place on the system[1]. They need to get *agile*.

What could *possibly* go wrong?

Your network is running several cloud apps sharing resources with thousands of users when you notice an increase in latency.

Where is the bottleneck?

Do you have enough RAM locally? Does the cloud server have enough processing power?

Is the network connection too slow because of the latest binge watching or e-sporting event?

The fact is choke points can happen anywhere and without agile technologies and platforms that work together to identify the cause, automation cannot work, hampering agility.

Let's consider an example. On Tuesday, you came into the office to find that the network is reacting slower than it ought to. You don't know why…yet.

Perhaps there is some bad code or a virus that has corrupted an application. Maybe a new application has devoured local memory and it can no longer cache or load an application without frustrating delays. Is it just a bad connection at a remote location caused by weather, or is something else causing latency?

Without access to the proper diagnostic tools and analytics, you might suffer in silence for a while, diving down various rabbit holes in hopes of finding the cause. Restart the application. Reboot the server. Call the network operator to see if it's an issue on their end. Put in a trouble ticket. And wait. (Or even worse, invest in solutions that don't change anything – wasting more time and money.) No doubt your team will identify and fix the problem as soon as they can. But what if they could do it faster, with less effort, or didn't have to do anything at all?

Network agility brings an intelligent management layer to the network that allows many tasks to be automated to make the most efficient use of resources.

Advanced analytics are used to determine the cause of an issue. It scrutinizes and compares multiple network metrics – CPU utilization, memory and storage usage, packet loss, latency, etc. – and notes areas of bottlenecks and performance degradation versus past performance or benchmarked levels to pinpoint the cause and its exact location for speedy correction. Today, an agile network can alert IT administrators to an impending failure before it impacts productivity. Tomorrow an agile network with more advanced AI capabilities will be able to fix itself, allocating its own resources or rerouting data around the point of failure to correct the problem without human intervention or users experiencing downtime. An agile network is the difference between solving a problem *eventually* or *proactively*.

What is Network Agility?

Network Agility is the ability of network software and hardware to automatically control and configure itself and other network assets across any number of devices on a network[2]. Network agility is about solving real-world business problems using existing technology. Software tools are used to discover, categorize and inventory all the hardware resources (servers, routers, switches, drives and endpoints) and software assets (licensed applications, subscription services, ERP packages, virtual machines, etc.) that reside on a network. Business process parameters and workflows are entered for what the network must achieve. Network agility tools are then in a position to optimize existing hardware to run software assets as needed to realize identified business objectives.

The curveball thrown at you here is that network usage is never linear. Conditions are dynamic; bandwidth is always in demand and "scale" is a moving target. Business objectives change, product and service offerings are constantly evolving, connections to data centers drop, hardware fails, organizations themselves change, and countless other variables can impact network performance.

So, when business goals change or there is an end of period crunch (i.e. monthly, quarterly or annually), there may be times when IT administrators have to manage significantly more VMs in their virtual and cloud environments. Their dynamic nature allows them to get provisioned and destroyed several times a day, requiring an agile network infrastructure. Manual processes can be error prone, labor intensive and non-scalable, which forces IT administrators to perform non-value-add activities instead of focusing on higher-value business initiatives.

Network agility solves this challenge by automating key elements of network infrastructure in virtualized and cloud environments, saving time and expense. It allows an IT manager to virtually spin up storage, computing or network resources in minutes through software rather than physically sitting in front of a piece of hardware and manually provisioning it, for example. And it reduces costs because there is no need to purchase that piece of hardware.

Network Agility: A Smart Investment

Networks are comprised of several fundamental layers or building blocks, each with varying complexities. A foundation of the Compute, Memory, Storage and Network Connectivity layers creates an environment for Applications. All of these must work in harmony to deliver a pleasing user experience.

Applications and code are complex by themselves, so when performance drops, what's the quickest way to learn which layer is to blame?

Using an agile network AI console, you might notice that processor utilization is high on your cloud segment, for example, so you spin up a higher-powered processor with your cloud provider. Or perhaps network latency seems to have increased significantly, so you notify your carrier to temporarily slow non-mission-critical applications until it is fixed. When storage and RAM reach high utilization, you can switch applications to more efficient resources, or recommend the replacement of specific servers impacting performance.

Agile networks take the guesswork out of where to invest in network resources by specifically identifying problem areas, maximizing ROI.

The challenge is that the network environment of many older enterprises are legacy systems constructed on an ad hoc basis to meet new objectives as the business expanded over time. The result is that many organizations' data networks have evolved not as one cross-domain system interconnected with various business units, but into segmented digital silos connected to the business using proprietary bridges and software patches that no single system can replace. These are labor intensive, closed environments employing multiple vendors with disparate security workflows and rigid network architectures[5]. The good news is with the right investment and the many cloud-based intelligent network options available, agility is no longer out of reach.

And 5G is coming, along with the proliferation of cloud and edge computing, HD and 4K video streams, virtual reality, AI and the Internet of Things. That means business customers and service providers need to deliver agility to their infrastructure teams in order for them to deliver agile applications to the business to help manage the exponential growth of data volume and drive revenue. Applications need to be dynamic and able to change to support evolving business needs – and the networks that these applications traverse need to be agile as well. And "more bandwidth" is not the whole answer[6].

If you're not with an enterprise that was born digital with an open architecture and raised on the cloud (Yelp!, Chewy.com, Esurance.com, Uber, etc.), chances are you've got some catching up to do. With these changes on the horizon, your organization needs to be part of the digital transformation *now*. The risks of not keeping pace with advancements in network agility – downgraded internal productivity, delayed customer responses, extended service outages, enhanced susceptibility to security breaches, longer product roll-outs, etc. – are costly and can only be considered revenue drainers and growth inhibitors. The loss of a customer, a sale or a client switching to a competing service provider is literally only a click away. But you can't just rip out and replace an entire legacy data center in one grand endeavor. The answer is likely "baby steps;" slowly implementing automation tools in pilot programs and transforming your network silo by silo until it achieves the ability to adapt to changing conditions and act as one unified dynamic system.

The Case for Network Agility

You want the business to grow as fast as it can. You want to decision makers to allocate budget and company resources to where they will get the best return on investment, yet every stakeholder has a different idea of what that should be. Convincing leadership that a chunk of this year's budget should be spent on tools that allow the network to automatically control and configure itself when "you have resources for that" won't be easy. Build your case by presenting the benefits an agile network brings to the enterprise:

- **Granular network visibility.** An agile network allows system administrators to define and detect almost anything connected to the network – including users, devices, departments, services and content – at will. Administrators have greater network visibility and are able to control access to components based on time zone, location, importance of data, user permissions and threat damage level.

- **Faster problem resolution.** Even the most reliable apps and hardware will fail from time to time. An agile network employs machine learning to drive faster response to problems, while analytics measures current performance levels versus benchmarked standards to identify areas for improvement or impending failure[4]. As a result, an agile network can automate many tasks to allow management of the network to be far less labor intensive while reducing latency.

- **Enhanced security and compliance.** An agile network can achieve better centralized control over all access and endpoints to enforce consistent security and compliance policies across the entire network[3]. This can reduce vulnerabilities such as exposure to malware and data breaches, which in turn limit risk and exposure to fines and penalties for non-compliance.

- **Simplified, faster deployment.** An agile network can expedite the roll-out of new services and products across the network with reduced operational overhead. Timeframes to develop, test and cascade new network services are reduced from months to days by using design templates and automating the provisioning and configuration of the network, so the company can leverage a first-to-market position.

- **Heightened awareness of network traffic.** An agile network can provide greater insight into who is using the network, and where and when data volume peaks and ebbs[3]. A better understanding of network traffic patterns can help the organization put its products or services in front of the right audience at the right time, increasing sales while lowering costs through better utilization.

- **Better management of network assets.** An agile network knows when current devices or services are approaching end-of-life and can recommend savings through device consolidation. Rather than remaining locked in to proprietary code and solutions, an agile network is vendor agnostic, offering the flexibility to implement and control new solutions regardless of brand and eliminating interoperability issues through open architecture[5].

- **Scalability at reduced costs.** An agile network allows administrators to execute multiple tasks through software (automatically) instead of keystrokes. Rather than purchasing and installing another physical server, its functionality can be replicated using software and virtual machines in a cloud environment, for example. This promotes scalability and the potential for dynamic growth while lowering total cost of ownership.

- **Transforming cost centers into profit centers.** Traditionally viewed as a business expense, an agile data center and network can actually lower the cost of business by freeing up resources and staff to perform more high value tasks. It allows an enterprise to streamline vendors and reduce licensing costs by identifying areas of redundancy while being less labor-intensive[5]. It can manage fluctuations in bandwidth with load balancing to eliminate unnecessary spending on peak capacity. In the end, a more agile network is a business enabler, quickly responding to business challenges to reach to new customers, increase sales and generate new sources of digital revenues.

All of these benefits demonstrate how an agile network will enable the enterprise to increase revenues and operate more efficiently – while positioning itself for future growth.

Network agility is the automation of automation.

Meet the Network Agility Challenge

Digital transformation is changing the way networks are designed and maintained, and the resulting user experience. Users – whether internal employees or external customers – have become conditioned to near real-time response. Enterprises and their networks need to be agile to thrive and quickly adapt to future market conditions and network challenges, or else the customer will click off to another provider that can solve their problem while you're still fixing yours.

Perhaps the best advice in the quest for network agility is to select technology partners that employ open architecture solutions, apply common networking standards, support virtualization, and offer a migration path to the cloud with world-class support teams to assist you in the process, rather than vendors offering closed proprietary systems[7]. Then you can begin the journey to the promised land of network agility with partners who can take you the whole way.

We are committed to regularly providing our customers with valuable information on emerging technologies that impact your business.

Sources & Acknowledgements:

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[4] https://www.insightcdct.com/Solutions/Security-and-Networking/Enterprise-Networking plus related case studies linked to this page

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