A 6-Step Guide to Getting Started With
Network Automation

Network automation is becoming increasingly important for organizations of any size that are striving to make their IT infrastructure more agile, reliable and cost-efficient. While companies of all sizes have embraced server and storage virtualization, the network typically has not kept pace. In many cases, network provisioning and management are still handled by manual processes that slow down deployments, increase overhead costs and add risk in the form of human error.

Today's reality is that companies can no longer afford to think they are too small to consider network automation. Networks are the connective tissue for the entire business; any performance problems or deployment delays and the entire organization feels the effects. Fortunately, irrespective of size, businesses can now deploy advanced tools and processes to automate network provisioning and management.

Along with innovations such as Zero Touch Provisioning (ZTP), single-pane-of-glass management and real-time telemetry and analytics, IT teams can use network automation as the foundation for a more orchestrated approach to deploying and managing the entire infrastructure. But, while the tools to embrace network automation are available, the steps involved in moving forward pose challenges, particularly for organizations that may not have the budget or a huge pool of IT staff. Bringing automation to the network is not merely about the technology: It's also about

addressing business and cultural issues that may get in the way of progress.

In this white paper we offer a six-step guide to getting started with network automation. We outline the processes involved in planning for automation and define areas of the business that can benefit, while also discussing how to overcome cultural challenges and ensure that you choose the right tools and partners.

STEP 1: Make the Case for Automation

As with any important technology initiative, the IT team should be prepared to make a strong business case for network automation. Among the key benefits to address:

- **Lower costs:** Automation can lower operational costs by eliminating many of the repetitive, time-consuming manual processes involved in provisioning, managing, deploying and scaling network infrastructure. This allows organizations to use their limited IT staffing resources much more strategically. With the right tools, automation can pay for itself very quickly through cost savings, improved productivity and faster time to market.

- **Accelerate time to value:** Reaching the time to value faster is critical in today's era of cloud computing and IT consumerization. A business launching a new service or onboarding new employees must be able to move with quickness and agility in order to keep pace with competitive market pressures. Any delays in leveraging a new business opportunity or in making employees more productive can have a negative impact on business operations and company morale.

- **Reduce risk and improve availability:** One of the biggest challenges of relying upon manual processes for network provisioning and management is the possibility of downtime caused by human error. With automation comes consistency between multiple repetitions of the same processes. With manual processes, there is always the risk of human error that can result in network downtime or outages, causing key applications to crash or delays in getting new services to users.

- **Increase productivity:** Network automation will help increase productivity across the board. IT teams will be able to reduce the time required to provision and scale infrastructure, and end users will have the advantage of accessing new applications and services more quickly. From a business perspective, there is a reduced risk of downtime and continuous access to critical applications.

- **Modernize IT infrastructure:** Network automation is critical to modernizing every organization's IT infrastructure. Companies that are setting the pace for innovation—the hyperscale cloud suppliers such as Amazon, Google and Microsoft Azure—are all leveraging network automation to reduce costs and increase agility. While your company may not have the same scale as these market leaders, the reality is that many of the tools, processes and lessons learned are now available to companies of any size.

STEP 2: Identify Business Processes That Can Benefit

Once you've built the business case for network automation, the next step is to identify business process functions that can benefit most quickly and readily. You are probably not going to deploy network automation at the very first instance across the board, so you want to build a series of success stories that will provide tangible proof of the value of automation.

Take, for example, the human resources business function. Within that area, identify the standard, repeatable tasks that could benefit from an automated approach—for instance, how new employees are set up on the network as part of the onboarding process. The processes are consistent, giving employees an identity and permissions for the resources they are allowed to access. When employees leave the company, the processes are also consistent: deleting them from the system and restricting their access. Contractors are another area within HR: They need to be given certain levels of temporary access to do their jobs, but you don't want them accessing the entire network. Then, when their work is completed, you want to take them off the network.

If your IT and network teams have to make manual changes for each employee and contractor for every one of these processes, they will have little time to be doing anything else. With automation, these tasks can be handled simply, quickly and reliably.

STEP 3: Map to the Network Infrastructure

The next step is to determine how to map the targeted business process to the network infrastructure. Once you have identified which services employees can access and the permissions appropriate to their job functions, you will then be able to map out what you need to automate against your IT operations and network infrastructure. There are many questions that you need to address, including:

- What is the complexity of the change each time you make it?

- How often are you making the change?

- What is the risk of downtime?

- How many times do you need to bring multiple devices, either new or existing, online?

- If you are supporting users and devices at branch locations, do you have expertise at the local sites?

- What are your company's policies with regard to bring your own device?

- If you are provisioning a mobile device, how can you provide seamless connectivity from wherever the user is located?

STEP 4: Make a Plan (Hint: Start Simple)

At this stage of the process, you have identified your business processes and mapped them to the infrastructure. Now, what is your plan and where do you begin? One possibility is to start simple with a network "read-only" type activity, i.e., with tasks that require auditing and reporting. As an example, collect an inventory of available network ports or compliance-related information across the network devices to satisfy regulatory requirements. Another potential starting point is to use virtual sandboxes to set up and validate automated processes without live network.

Once you are successful with any of these endeavors, you can start rolling out automation tools to other processes that can benefit. This will allow you to build up trust and credibility with corporate management so they are willing to invest in further automation initiatives.

Overall, when building the game plan for network automation, there are three important factors that should inform your critical decisions. These are:

- **Provisioning and deployment: Y**ou want flat and simple networks that support the addition of each new networking device by automating the set-up, configuration and provisioning processes.

- **Management and operations:** Reduce the time consumed in managing the network by enabling programming adjustments to occur automatically and using analytics to deliver current, consistent and accurate information.

- **Orchestration:** The network has to be managed in orchestration with other elements of the data center. When a server or storage configuration is changed, the corresponding network changes should take place simply and automatically.

STEP 5: Emphasize the Human Element

Too often the human element is ignored in IT, leading to initiatives that fail to deliver on their promised benefits. In the case of network automation, it is vitally important to clearly communicate the benefits to your network administrators. They may be fearful that automation will put them out of work when, in reality, automation will make their jobs more interesting and open up new opportunities.

The C-suite is another important constituency. You want to show them your plan and make a strong business case for the value of automation. End-users are a final consideration. To them you want to emphasize the opportunity to be more productive and have faster, more accurate and more reliable access to the applications and information they need to do their jobs successfully.

STEP 6: Use the Right Tools to Leverage the Benefits of Automation

Start with the right tools that will help you make the right level of progress. Often, a lack of programming skills can be perceived as a barrier, so consider scripting with languages such as Python that help network administrators automate network functions. You could also use change management tools such as Puppet or Chef to interface between server and network teams. Similarly, consider flatter and simpler architectures that make it easier to:

- **Provision:** Use solutions such as Zero Touch Provisioning from Juniper Networks to automate the provisioning of any device on the network—automatically download the correct image and configuration as soon as devices are racked, stacked and powered on.
- **Manage:** Use tools to visualize, analyze and control the entire network through a single pane of glass, advanced telemetry and analytics. Address potential problems before they impact operations with tools such as Juniper's Junos Space Network Director and Cloud Analytics Engine.
- **Orchestrate:** This is where open network architecture is particularly important. You want to be able to use orchestration tools such as OpenStack and CloudStack, along with a network management solution that supports seamless integration.

Taking the Next Step

Network automation brings too many benefits to the business for it to be ignored or delayed any longer. With the right tools and partners in place, you can reduce costs and increase agility across the entire infrastructure. IT teams can be more productive and end users can have faster and more reliable access to the applications and information they need to do their jobs. What's more, network automation is a critical step to modernizing IT infrastructures for the cloud era and supporting next-generation architectural models such as software-defined networking (SDN).

In embracing network automation, it is important to follow a logical and carefully thought-out path that starts with identifying the overall business benefits and continues through the key steps outlined in this paper. You want to make sure you choose a network partner that is committed to the simpler, flatter and open network architectures of the future, with a comprehensive set of tools to enable and support automation at all stages: provisioning, management and orchestration.

Juniper Networks has been a leader in stressing the importance of flatter, simpler open networks and has been a major proponent of automation as a critical tool in modernizing network infrastructures. This leadership is reflected throughout Juniper's solutions, including fabrics, switches, operating systems and management tools.

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