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# MAY I ANALYZE THAT FOR YOU, SIR?

## Using Big Data to Solve and Even Avoid Network Problems

What will the weather be like tomorrow? How can a search engine find what you are looking for in the amorphous mass called the Internet? What book are you likely to enjoy based on those you have already searched for? All of these problems, and many, many more, call upon the analysis of huge amounts of information using techniques that, collectively, have come to be called Big Data.

Many of the commonly known examples of Big Data being used by businesses involve targeting customers: if they know your shopping patterns, they can get you to buy more. This can be viewed positively—because the consumer is presented with exactly the sorts of products

he or she is interested in—or negatively as a form of “forced consumption.” But there are many other, unambiguously positive uses for Big Data, especially when it comes to supporting the highly complex technologies that make up today’s networking and security environments.

Your network grows and evolves over time, with each step following a very clear lifecycle. Projects start with a Plan phase as you decide what your needs are and the best way to fulfill them. They move into the Build phase as you implement those plans. And finally they become operational, what we call the Operate phase. And that is where Juniper Networks takes full advantage of Big Data.



### PLAN

Assess, design and plan your network.



### BUILD

Deploy your new or upgraded network and security system.



### OPERATE

Keep your network up and running.

Experience with thousands of customers over many years has informed our view that to keep today’s modern networks up and running at the levels required by our customers, it is absolutely necessary to automate as much as possible and use Big Data techniques to identify issues before they become problems.

Nowhere is there a more intimate long-term relationship between the customer and the vendor than when it comes to support. You count on your network. If anything goes wrong, your reputation—or even your entire business—

is at stake. Which is why there are two sorts of maintenance: reactive maintenance, which involves fixing what goes wrong after it goes wrong, and preemptive maintenance, which means fixing it *before* it goes wrong. And we all know it is better to avoid a problem altogether than to rush madly to fix it.

Juniper Networks drives reactive and preemptive maintenance on two parallel tracks that feed into each other: automation and analytics.

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## Automate Wherever Possible

The key to automation is in the software that runs on our devices. The Juniper Networks® Junos® operating system constantly monitors all processes within the machine, noting, for instance, hardware failures, software exceptions, and thresholds that have been exceeded. Those alerts and alarms trigger intelligent scripts which launch a thorough analysis based on the type of issue detected, detailing exactly what was happening at the moment the incident occurred and ensuring that the support engineer has all the information needed to determine the root cause of the problem. Several types of files are

involved, including log files and core dumps, with sizes ranging up to many gigabytes.

Device automation is not enough, however. It is also important that the information be effectively collated and presented to the support engineer. This can be done manually or automatically using Juniper software called Junos Space Service Now. Service Now lets customers decide whether or not to open a case and forward the information, and provides them with security routines that can strip out details such as IP addresses, device names, and other sensitive information.

## Analyze First, Ask Questions Later

This is where Big Data and data mining techniques come into play. With files running into gigabytes, human analysis becomes impossible. But Juniper has gone far beyond just developing automated tools that look for anomalies. We have put the log files and core dumps from thousands of previous cases into a huge database, removing any identifying details that haven't already been taken out by customers. For every new case that comes in, we first compare the case information to the thousands of files in this database. Using Big Data techniques, the system immediately searches for matches. This means that every Juniper customer benefits from our experience with thousands of previous customers. In many cases we find a match to a known issue. The system identifies an existing Problem Report and aims the engineer at the solution, a

workaround, or the current status if no solution yet exists. This saves the engineer countless hours or even days of troubleshooting, significantly reducing the time to fix a problem. In some cases, the resolution can be almost immediate.

But we go even further. We use data mining tools to also check these files for other known issues. In almost 10% of the cases, we find known software bugs, configuration errors, and other anomalies that have not been noticed as problems by the customer, yet.

Armed with this information, Juniper support engineers work to resolve the immediate problem as quickly as possible, while at the same time providing recommendations on actions the customer should take to avoid the other problems that have been identified.

## Conclusion

Modern networking and security devices have software running into the millions of lines of code, and the devices themselves interact in myriad combinations. Manual troubleshooting in this environment is almost impossible.

Supportability must be designed into the products, but even that is not enough. Only automation of data acquisition and analysis can provide the speed and thoroughness required to maintain complex networks. Juniper Networks

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has harnessed the power of Big Data to give our support engineers the tools needed to take advantage of our built-in self-diagnostics and sophisticated, automated data gathering. This powerful combination of reactive maintenance

with preemptive support solves problems quickly, and in many cases has been proven to help avoid them altogether. It is a key reason you can trust your network to Juniper.

## Juniper Networks Customer Services and Support

The Juniper Customer Services and Support team consists of over 1,800 Juniper support personnel and more than 1,000 consultants within our partner community. Our global Professional Services team alone consists of

more than 200 senior-level consultants, each with an average of over 10 years' networking experience within multiple industries. For more information, visit <http://www.juniper.net/us/en/products-services/services/technical-services/>.

## About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that

transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at **[www.juniper.net](http://www.juniper.net)**



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