WHITE PAPER: NETWORK MANAGEMENT

The Changing Face of Network Management

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CA ENTERPRISE SYSTEMS MANAGEMENT

Table of Contents

Executive Summary

Challenge

Managing your network is serious business. It is absolutely essential that it is up and running since your critical business services depend on it — and so does your revenue stream. At the same time, your network continues to grow in size and complexity, with the addition of more devices and new technologies, in response to business growth and demands.

Preventing network downtime and performance degradation is every IT manager's goal. Causes are not always preventable — major power outages and other external events occur — but a considerable amount of disruption can be prevented. Industry analysts agree that erroneous network configuration changes, manually entered, cause a significant portion of network downtime and performance degradation. With that kind of impact, getting change and configuration management under control is critical.

Opportunity

Addressing preventable downtime and degradation is becoming easier, with analysts and vendors focused on network change and configuration management (NCCM). Automated NCCM tools provide an opportunity to reduce the downtime and degradation caused by configuration changes by ensuring uniform configurations and by minimizing the impacts of human error inherent in manual configuration changes. Independent NCCM tools, however, are not enough on their own.

With so many network faults caused by configuration changes, shouldn't your fault management solution be change-aware? Integration of NCCM capabilities in fault management "closes the loop" on network problems that stem from configuration changes. Integration enables correlation of network events to configuration changes and it can also provide a configuration audit trail of any selected network device through the history typically retained by fault management tools.

Benefits

Several benefits result from incorporating network configuration change capabilities into change-aware fault management tools.

- First and foremost, downtime and degradation is reduced due to uniform configurations, the reduction of human error and a fast correlation of network faults to configuration changes.
- Finding the root cause of the fault is easier, resulting in faster mean time to repair (MTTR).
- Service level objectives can be more reliably met.
- The automation inherent in NCCM software reduces the load on IT staffs.

SECTION 1

Keeping up with Changes

The Only Thing Certain is Change

Today's complex network infrastructures can contain hundreds or thousands of business-critical devices. Unauthorized or incorrect changes to even a single device can have a rippling effect on the health and availability of the network infrastructure. A recent article in Network World's Network/Systems Management Newsletter suggested that the impact of configuration change on network stability is significant. It stated, "It has become common knowledge that when systems go down, applications stall and networks fail it's usually due to unknown, undocumented or unauthorized changes to network and systems configurations — and not because of technology failures. In fact, it has been estimated by numerous industry watchers that up to 80% of application performance problems and network downtime can be attributed to some configuration change or error."[1] Even if only half of all catastrophic network failures are caused by configuration change, shouldn't you make network configuration change management a priority?

Change is inevitable, except from vending machines.

Unknown

Exact Change Only

There are many reasons why configuration changes are so often incorrect.

- There are simply so many of them. Router changes are numerous and networks teem with routers and switches and other devices. They represent multiple vendors, each with their own command line structures. The number of changes is daunting and the variety of syntax makes managing with multiple tools difficult.
- Network management and configuration is highly detailed and is often handled by a few seasoned techies. Manual input is still common and even seasoned techies can make mistakes when keeping track of so many details.
- Discrepancies develop between the start-up and running configurations. This can happen when the configuration change is correct but is not saved to non-volatile RAM. In the event of a device reboot, the device reverts to the old configuration.
- Time delays caused by manual input can cause problems. If five routers need a similar change, some of them will be done before others. The time discrepancy may cause incompatibilities while the entire task is being completed.
- If configuration changes are handled manually, in the data center, then there is opportunity for less knowledgeable staff to input a change incorrectly.

Network Outage Impact

- A retail giant's web site is down...
- Online trading is suspended...
- ATM machines are shut down...
- Orders are not logged...

The potential impact of configuration changes is evident. A quick Internet search shows that universities advertise their expected outages to network users when they have configuration changes planned, since the campus depends on the network and outages generate numerous complaints from users. Concern over outages is even greater for businesses whose revenue depends on services that run over their network. The greatest problem for businesses is when the change and the outage come as a surprise.

1 "Change, configuration and release management catch on." Denise Dubie. Network World, Network/Systems Management Newsletter. May 16, 2007

SECTION 2

An Opportunity to Change for the Better

A good network fault and performance management solution is a necessity for keeping the network up and running. If your solution provides end-to-end visibility you will know when network operations are in jeopardy. Preventing network problems, such as those stemming from incorrect configuration changes, are opportunities to increase network uptime, provide better business services and improve business continuity. There are several things you should think about when incorporating configuration change management into your solution.

With Tools, Less is More

One decision to make regarding network configuration and change management is what solution you are going to deploy — a niche stand-alone application or one incorporated into your fault and performance management solution. Here is an opportunity to simplify your overall network management, thereby relieving your IT staff of significant error-prone, labor-intensive effort.

The more tools you have, the less integrated the management of various technology domains and the less efficient your IT staff will be. A niche tool only exhibits its excellence in its native environment. With many different vendors and platforms, the amount of manual correlation is significant and you lose the opportunity to speed up and clean up change processes.

A single tool for fault and performance management, with a centralized control point, will not only enable better network configuration and management in the first place, but it will enable you to rapidly spot and resolve configuration conflicts. For example, intelligent thresholds are essential to performance management and should include proactive performance alarming on key performance indicators for a particular service, such as VoIP. With "change-aware" network fault management, 'what changed' can be correlated with 'what performance changed' and can dramatically improve ongoing performance of critical business applications.

A single tool allows administrators to have control of who has viewing access or can perform configuration tasks, further reducing errors. The combination of a single tool, plus automation, will bring clarity to change management.

For a Change of Pace try Automation

Managing configuration changes well takes two key capabilities — awareness and automation. Network configuration management needs to notice and notify when changes are made to network devices. Awareness of configuration changes won't always prevent downtime or degradation but it does provide the opportunity to make a fast correction, such as a fall back to a previous, working configuration. Change awareness, integrated into your network fault management solution, should identify configuration changes in real-time, verify them against established correct configurations and notify the correct individual regarding unexpected changes.

Automation gives you the opportunity to add action — and speed — to awareness. Today's fault management tools depend upon automation to take immediate action to prevent downtime and to correct developing performance problems. While automated actions must be based on business policies established by trusted technical advisors, automating the resulting action eliminates a great deal of risk. Automation improves both your proactive change management and your reactive change management.

Proactively, automation can easily implement scheduled upgrades and deliver immediate notification of unauthorized changes. Stored configurations can be uploaded to multiple devices simultaneously and any changes are automatically tracked.

You will have the opportunity to improve your reactive management as well. When changes have been made to device configurations, alerts are automatically sent to appropriate individuals, giving them the opportunity to make corrections or take other action to ensure overall network compatibility. If problems do occur, automation can quickly roll back network device configurations to their last known good state. Manual corrections could never be as fast.

SECTION 3

Benefits of Managing Change

Automated, single source fault and configuration management presents huge benefits. Device configuration verification, change notification and audit capabilities avoid costly human configuration errors and better ensure business and service continuity.

A unified fault, performance and configuration management solution results in a simplified, focused view of your network that will enable greater uptime and better service to the applications and users that rely on it. Imagine tracking and ensuring accuracy of every configuration for a critical set of network elements. It is an enormous task. Using a single, automated tool your IT staff:

- can leverage a common database for network fault and configuration management for more comprehensive, focused management
- can improve network uptime by leveraging cross-domain information for faster problem resolution
- will not need to learn numerous user interfaces
- will deliver better service to their clients
- will have a shorter learning curve
- will be more productive
- will be able to export configuration information for integration with CMDB

They say that time changes things, but you actually have to change them yourself.

Andy Warhol

From a service-focused standpoint, you will cut your network degradation and performance problems significantly. If configuration changes are accurate and timely, many causes of outages are eliminated. Users tend to be more forgiving of outages that are caused by external events than they are over outages that are caused by inadequate management.

SECTION 4

It's Time for Change

As network service has become more essential to the basic aspect of doing business, it has also become another business utility, much like electric service. And it needs to become just as reliable and standardized.

The band aid approach to network change and configuration management will undermine your business's competitiveness since your business services cannot be more reliable than your network.

Integration of configuration management within your fault management helps to bring network service to a new level of reliability, with standard configurations automatically distributed and tracked and immediate, automated notification of problems and policy-based corrective action.

What to Look for in Network Configuration Management:

- Real-time configuration monitoring
- Tightly integrated with fault and performance management
- Automated configuration deployment
- Automated configuration comparison (run-time vs. start-up)
- Policy-based configuration validation
- Ability to remediate configuration violations
- Detect and alert on configuration change
- Control over configuration change access
- Activity and Compliance reporting

CA is Change-Aware

CA provides fully integrated, "change-aware" configuration management within its CA SPECTRUM® fault management solution for improved network reliability and increased uptime. CA SPECTRUM approaches fault management from a business perspective, ensuring that your most important business services and customers get priority response.

As a result, CA SPECTRUM's root cause analysis is change aware; CA SPECTRUM Network Configuration Manager can detect changes made to the configuration to devices and alert appropriate individuals. CA realizes that tracking and ensuring accuracy of every configuration essential to your network is an enormous task. CA SPECTRUM Network Configuration Manager is an intelligent, integrated application that automates management of critical device configurations for increased operating efficiency and improved network performance and availability.

SECTION 5

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About the Author

Pam Snaith has been involved in the development and marketing of network and systems software for over 25 years, both from the customer side at the Federal Reserve Bank and Cornell, and from the vendor side, at Digital Equipment Corporation, Xyplex, Lucent and Avaya. She is currently a Product Marketing Manager in the Enterprise Systems Management business unit.

CA, one of the world's largest information technology (IT) management software companies, unifies and simplifies complex IT management across the enterprise for greater business results. With our Enterprise IT Management vision, solutions and expertise, we help customers effectively govern, manage and secure IT.

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