ROI for NCM Solutions in Enterprise Environments

An ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) White Paper
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EMA™
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Executive Summary

Manual processes for maintaining and managing network equipment configurations do not scale as networks grow in size and geographic distribution, even to modest sizes. Manual configuration of networking equipment creates inconsistencies that can lead to poor network performance as well as allowing for errors to be introduced that can result in network outages, costing companies time, money, and lost productivity. Network change and configuration management tools offer a wide number of benefits from not only automating and simplifying the configuration process, but also automating and maintaining backup configuration information, automating device discovery, tracking and alerting on changes, templating, enabling bulk changes, providing rollback and remediation, and making policy compliance a reality. SolarWinds Network Configuration Manager (NCM) is an example of a network change and configuration solution that can be purchased and used on its own or as part of an integrated overall network performance management solution. This ENTERPRISE MANAGEMENT ASSOCIATES® (EMA™) white paper examines the opportunities for realizing the ROI of implementing such a solution and examines four case examples where organizations deployed SolarWinds NCM in their production environments and how it is helped them save time and money as well as improve their operational efficiency.

The Value of Network Change and Configuration Management Solutions

In order for network engineering and operations to achieve the best possible operational efficiency, manual processes must give way to automated ones.

While datacenter automation has become a standard mode of operation, many networking and network management tasks remain largely rooted in manual processes. In order for network engineering and operations to achieve the best possible operational efficiency, manual processes must give way to automated ones. Most manual tasks associated with network device configuration are time consuming to execute and depend heavily on command line interface (CLI) interaction, rendering them prone to consistency and accuracy errors. Network Change and Configuration Management (NCCM) solutions came about as a way to help simplify and automate the process, but their value goes well beyond that.

As the network infrastructure grows, it becomes increasingly difficult to keep pace with all the updates, patches and configuration changes that are necessary to keep networking devices compliant. Traditional methods require an individual operator to log into each and every device. This process is both time consuming and fraught with potential problems such as limited accountability (who made which changes and when), no copies of good working configuration files, no accurate inventory of what is where on the network, and too many opportunities for fat fingering configuration changes. So for example, when a critical network device suffers a hard failure and must be replaced, if there are no backups of the configuration files then the entire configuration must not only be rebuilt, but also tested to make sure it works correctly. This greatly increases the time it takes to get the network back on line. NCCM solutions fill these gaps by automatically discovering the resources and configurations of network elements and ensuring that backups are regularly captured for fast restoration. They also track who makes changes and when, so it becomes possible to figure out precisely what went wrong and when, and how far to backtrack on change sequences.

Besides this tactical aspect of improving practices, NCCM solutions can also provide powerful capabilities for improving stability and control over the operating environment. By using standard templates, configuration consistency can be drastically improved and the time required to roll out new devices cut sharply. By automatically recognizing changes as they are made, engineers and operators

can be alerted to check for unanticipated side effects before the phones start ringing at the help desk. And by automating compliance auditing reports, countless hours can be saved and policy violations dealt with before they become embarrassing regulatory issues.

EMA firmly believes that implementing an NCCM solution is a key component of well-structured network management best practices.

EMA speaks with network practitioners on an ongoing basis and time and time again, those that embrace best network management practices find they experience better overall network stability, have fewer network performance related issues, longer Mean Time Between Failures (MTBF) and experience faster Mean Time To Repair (MTTR) because they are better able to determine what is contributing to a failure or degradation. EMA firmly believes that implementing an NCCM solution is a key component of well-structured network management best practices. Table 1 highlights some of the features typically found in NCCM solutions and the how they benefit network operations.

FEATURE	BENEFIT
Automated Device Discovery	Know what is running where on the network
Device Inventory	Ability to quickly view any device on the network and the product detail such as OS version etc.
Configuration Templates	Speed up and standardize the configuration process
Bulk Configuration Changes	Push out changes to many devices at a time
Real Time Change Alerting	Immediate notification of changes made to configuration files on monitored devices
Change Reporting	Reports on what changes were made when, on which devices and by whom
Policy Compliance Audits	Reports to reveal configuration drift, and which devices are in and out of compliance
Backup of Configuration Files	Automated snapshots of known/live configurations
Rollback and Remediation	Accelerated restoration of last known good configuration when problems arise

Table 1: Network Change and Configuration Management Tool Benefits

Increased visibility and knowing what the state is of each network device is a major step in moving towards more proactive (rather than reactive) network infrastructure management practices. Knowing what has changed can help reveal problems before they impact performance. Across EMA's many interactions with network engineering and operations personnel, once an effective NCCM product is in place, there is unanimous agreement that they could not imagine doing their jobs without it.

The SolarWinds NCM Solution

SolarWinds is a pure play IT management solution provider. The company's flagship product is its network performance management solution, SolarWinds Network Performance Monitor (NPM), but the SolarWinds product portfolio spans the entire IT infrastructure including storage, server virtualization, networking, systems and application management. The SolarWinds Network Configuration Manager (NCM) solution is part of the networking solution product portfolio. SolarWinds NCM is a software-based solution that is available either as a standalone product or integrated with SolarWinds NPM. In conversations with practitioners using the product in production environments as part of this study, those who started using NCM as a standalone product eventually moved to the integrated scenario, adding and leveraging the extra advantages of NPM. Conversely, those already using NPM found the addition of NCM a "no brainer" because it was not only affordable, but fully integrated and provided the same look and feel as NPM.

In addition to providing all the key features and benefits mentioned in Table 1, EMA found in conversations with SolarWinds solution users during this study that there were some specific benefits that stood out. These capabilities and attributes made SolarWinds NCM the network configuration management tool of choice for these shops, and included the following:

- **Ease of use**: One of the sticking points EMA has discovered when IT departments are attempting to standardize network operations is getting team members to agree to use the same tool. There are many free options available as well as the old reliable telnet into the switch to get the job done. An intuitive tool that makes it easier and faster for a network operator to do their job with fewer mistakes is of great value. The SolarWinds combination of a common look and feel across multiple products as well as an intuitive design makes ease of use one of the major reasons for choosing SolarWinds products, and why practitioners tell EMA that they will take these tools with them to their next job. These same benefits translate into little or no training required, whether installing the tool for the first time or when adding new modules.
- **Integration with SolarWinds product portfolio**: Management tools sourced from multiple vendors tend to lack integration – each will have its own look and feel and its own way of organizing information and details about the managed environment. NCM is part of a broader IT management portfolio that shares a common platform, leveraging a consistent user interface for presenting information and workflow navigation. This makes it easier for new modules to be added and greatly reduces the need for additional training.
- **Reporting**: The reporting features within NCM was cited as one of the most useful features from the perspective of both proactive network management and providing a method for keeping less technical personnel in the loop. While reporting is not as often used by line network managers, EMA research regularly underscores the importance of reporting for keeping those outside the networking group (peer groups, upper management, as well as the service business community) informed as to the state of the network. Reports produced by SolarWinds NCM (and the SolarWinds portfolio, more broadly) were repeatedly acknowledged as easy to read and readily understood by less technical personnel.
- **End-user community – *thwack***: SolarWinds has a very active end-user community. This community is a valuable resource for both SolarWinds and those who use SolarWinds management solutions. For SolarWinds, the community provides instant feedback to new products and features and affords an ongoing dialogue with the community at large. The end-user community can share ideas, templates and contribute feature suggestions for future releases of the product. EMA believes that SolarWinds has one of the best examples of a well-designed, active, vendor-moderated community website anywhere in the management tools industry.

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- **Solution cost:** Network management tools run the gambit from free open source tools to very expensive heavy duty ones. IT departments need solutions that do not bust the IT budget. While free tools have a low cost of entry, they invariably consume human resource costs, in the form of time to customize, maintain and configure. The SolarWinds NCM solution begins at $2,845 for 50 nodes and upwards of 1,000 nodes can be monitored for $11,495. In every single instance of EMA dialogues, the relatively low cost of NCM versus other industry options was cited as a major contributing factor for the purchase decision.

Case Studies

The best way to validate the ROI benefits that can be realized when implementing a network change management solution is to hear directly from technical practitioners who are using the product in live deployment environments. Following are four case studies of organizations at which SolarWinds NCM has been deployed to solve various network operations issues around change and configuration management.

Legal Services Organization

Situational background: This networking team in this organization has been managing a growing infrastructure – from approximately 150 devices six years ago to currently 439 devices across multiple locations. Two major outages occurred within a six-month period six years ago and the solution in use at the time failed to archive the configuration information necessary to get a critical switch back on line. In both instances, the configuration files had to be rebuilt from scratch.

Challenge: When the second major outage occurred, the group decided they needed a newer, updated solution that would provide configuration file archiving. The solution they had was out of date and not getting the job done. Since the organization already had SolarWinds NPM in place, NCM seemed to be a logical choice.

SolarWinds NCM solution: The SolarWinds NCM product has been deployed for five years as an integrated solution with SolarWinds NPM. NCM is now used regularly to push out configurations to new devices and run compliance reports to make sure devices remain in configuration compliance. The entire IT department has read access to NPM, but the NCM solution is limited to designated administrative users. Because of the team's familiarity with NPM, the addition of NCM did not require any additional training for operators.

Values recognized: The most immediate and important value realized was the ongoing historical retention of known good configurations, so that in the event of a major switch failure, downtime is kept to a minimum since the configuration file does not need to be recreated from scratch. The compliance reports have also helped tremendously in ensuring that devices remain configured properly.

ROI realized: A floor switch failure is considered a major event – it means regions of a floor, a complete floor, or the entire site is down. The biggest ROI for this company was MTTR benefits in the event of floor switch failure, especially at a remote site. With NCM, the recovery scenario has been greatly simplified and thus greatly accelerated. Once it has been determined that a hardware failure had occurred at a remote site, a network engineer would grab the latest running and startup configurations from NCM and that engineer would then be deployed to take a new hardware device to the site, remove the old one, and install and configure the new device. The engineer estimates that the physical installation and configuration would take just under one hour with NCM. Without those configuration files, the engineer estimates it would take at least another 3 hours to recreate the device configurations from scratch and retest the configuration.

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Public School District

Situational background: This educational institution had no centralized infrastructure for managing all the various school district and school site networking equipment. Each site was set up on an ad hoc basis as funds became available, including the deployment and configuration of the networking equipment. Everything was done manually – there was no consistency of configuration across devices. A trained and dedicated network engineer was hired as a first step to identify and discover all the networking equipment currently in use.

Challenge: The district's network engineer discovered that the district had 300 legacy Cisco devices that were no longer under support contract and a daylight savings glitch was going to require manual patching for each individual device. An outside vendor that the network engineer was working with at the time recommended considering SolarWinds NCM.

SolarWinds NCM solution: The price point of SolarWinds NCM made it possible for the engineer to purchase the standalone version of the product. The network engineer found that NCM was designed in a very intuitive manner and required no training to use. NCM was deployed as a standalone solution for three years. In 2008, thanks to new virtualization projects and additional funding, SolarWinds NPM was brought in to replace the existing network monitoring solution. Additional modules were also purchased for NetFlow, SLA, server virtualization and wireless. The legacy devices have since been replaced and the number of devices under centralized management has since grown to almost 500.

Values recognized: One of the biggest benefits of using NCM has been the ability to check other people's work, since the engineer does not always do the work at individual school sites, but rather must rely on third parties. Now, any time a third-party contractor deploys or makes any changes on a network node, the engineer uses NCM to make sure they have done the configuration correctly and, if not, makes corrections remotely. In this way, performance issues due to network configuration errors are kept in check, before they can become a problem. Rather than always being reactive, the engineer checks the change report daily to see what has changed, so now change is monitored.

Another big plus is the search feature, so configurations can be reused over and over again and not recreated from scratch. The ability to archive configuration images is also helpful for reference purposes. Finally the script library feature makes it easy to save and find previously used scripts that, prior to deploying NCM, were saved in email and very difficult to locate.

ROI realized: The network engineer stated that is would not be possible for one person to do the job without NCM due to the number and type of devices under management. For example, to add a new IP to an access control list on a network device, if done manually would take approximately five minutes per device. This is simple if only one device is changed, but when a global change is needed that will touch all 500 devices, the effort becomes roughly 40 hours or one week of an FTE's time and brings with it 500 chances for accidental misconfiguration. In contrast, that same exercise with NCM would take about 10 minutes total, to define and push out the changes to all 500 devices, with no fat fingering, since the same configuration would be used across all the devices. From a normal operations perspective, global configuration changes across all devices occurs once a month on average. Over a year those same manual configuration changes would represent approximately 480 hours of work, in contrast to 24 hours with NCM. Using EMA estimates for average fully loaded operator headcount of $35/hour, a cost of $16,800 versus $840 or a cost savings of over $15k per year.

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Government – State Agency

Situational background: This state governmental agency comprises multiple regional authorities, and each region had its own IT department up until two years ago when the decision was made to centralize and standardize IT operations. The SolarWinds NPM product was chosen as the platform of choice for centralized operations monitoring, and SolarWinds NCM was included as part of that purchase.

Challenge: Prior to deploying SolarWinds NCM, many tools were in use across the regions, and some regions didn't have any proper configuration management, instead relying on purely manual processes. The initial challenge was thus getting all the devices discovered and under management, so that configurations could be backed up regularly and consistently and so that all changes could be logged. Additional challenges lay further ahead, to establish a true, formalized structure for change management and to create and use standardized configuration templates.

SolarWinds NCM solution: SolarWinds NCM is now deployed as a fully integrated component with SolarWinds NPM. The team is using the SolarWinds solution to manage 1000 nodes, which includes network switches and routers as well as some servers. Anywhere from 15 to 20 people interact with NCM on a daily basis. The entire network team uses NCM, and the security teams also have access to the tool. NCM is used to perform inventory of physical infrastructure devices on the network as well as backing up configuration files and, if necessary, restoring of configurations. The team found that the tool is easy to use and did not require training for new operators.

Values recognized: Moving from a manual to a structured configuration process has helped them to achieve greater consistency across devices. The ability to limit access through rights and limitations has also helped prevent unauthorized access to network nodes. The ability to manage change and have visibility into what has changed has not only helped save time when resolving configuration issues, but has also established greater accountability. For example, an administrator in another district installed a new Cisco switch into a stack and because the switch had been set with an incorrect priority, it conflicted with the master switch and wiped out the configuration information on the rest of the stack. With NCM, the network engineer was able to retrieve the configuration information from the previous stack and restore it, saving hours of time in restoration. Further, the manager-level reporting within NCM helps keep the agency's upper management in the loop.

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ROI realized: One big area of savings for the networking team has been for major rollouts of new network switches. For example, the agency is incrementally refreshing network infrastructure, and a typical project includes rolling out 5 new Cisco Catalyst 3860 switches to replace a full stack at the core site. With NCM, the configuration process took 2 hours total, whereas without NCM, doing it manually it could have taken days to get the switches up and running.

Another example involves regular, quarterly configuration audits. These are being conducted as part of asset management as well as for preventative recognition of configuration policy compliance issues, a.k.a. "configuration drift." Without NCM, these checks would have to be done manually, and would require 3-5 hours per switch. With NCM, this is all done automatically with no operator intervention required. Based on the number of devices currently under management within NCM and industry-average operator hourly rates, the organization is saving over $15k/year for this function alone.

Large Healthcare Provider

Situational background: A large healthcare provider network was leasing its network equipment and used a third party to provide remote monitoring and maintenance. As a result, the provider's internal IT team lacked control and visibility of their network infrastructure. The third party was slow to notify them of problems on the network and resolution was not always satisfactory. As a result, outages and degradations in the network were affecting availability and performance of critical applications and network-connected medical devices and instrumentation, endangering health service quality for patients and aggravating staff.

Challenge: The team needed better visibility and control of the network. After careful study, they built the business case and won approval to in-source the network, buying the equipment and taking on the management in-house. The challenge was to provide better quality and performance at a lower cost. Specific to change and configuration management, the challenge was to find a better way than using manual telnet and CLI.

SolarWinds NCM solution: The team brought in NPM first, as a common monitoring platform, and a year later added NCM along with Server and Application Monitor. A five-person team was created from both the networking and security teams to manage the network and is now using NCM to manage 400 networking devices. The common look and feel across the SolarWinds product lines makes it easy to transition to new modules, requiring no significant training. The team runs nightly backups of configurations, and each morning the team looks at the automated change report to see what was changed and by whom.

Values recognized: The first and most obvious result of the project was better overall network performance. Previously the network had not been running well and the outsourced support was slow to respond. Since the NCM/NPM solution has been in production, the networking team can now better troubleshoot performance problems – especially when the network is not the problem. The reports give them the proof points for other teams. NCM has allowed the team to move from a manual and chaotic network change and configuration process to a formal and controlled process. It has enabled them to establish best practices across both security and networking teams. The network engineer also noted that the SolarWinds user community, thwack, is extremely helpful for exchanging information as well as staying current.

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ROI realized: The biggest ROI was moving from leasing and outsourcing their network equipment and maintenance to bringing it in house. Previously the company had no insight into outages and the network was not stable. The company had been spending $60k per month in leasing and maintenance costs. Of that $60k, 30% was being spent on professional services for dealing with network device configuration issues. NCM saved them roughly $18k/month or $216k per year in professional services expenses.

ROI Benefits Summary

As illustrated by the case studies, there are a number of ways that ROI can be realized from implementing the SolarWinds NCM solution. To better understand how an NCM tool can demonstrate tangible time and cost savings, Table 2 reflects hypothetical examples of the time it would take to perform various tasks manually versus using a network change and configuration tool such as NCM. For our example, we have assembled typical tasks for a network that consists of 300 managed network switches. The effort-based cost savings are calculated at a rate of $35/hour for a network engineering FTE – a conservative rate based on EMA's broad industry analysis.

Task/Event	# of devices	Manual effort	Using NCM	Cost Before/After	% Saved
24 port switch failure with no backup configuration	1	3 hours	1 hour	3 hrs x $35/hr = $105 1 hrs x $35/hr = $35	67%
Bulk configuration updates	300	5 mins/device	10 mins total	25 hrs x $35/hr = $875 10mins x 35/hr = $5.83	99%
Configuration audits	300	4 hrs/device	0 (fully automated)	1200 hrs x $35/hr = $42k 0 x $35/hr = 0	100%
New device rollouts (112 ports) with standardized configuration	4	4 hrs/device	2 hrs total	16 hrs x $35/hr = $560 2 hrs x $35 = $70	88%

Table 2: Cost Savings

The table is a guideline for estimating cost savings. Most of these types of events or tasks happen multiple times throughout the year. For repetitive tasks that happen many times over the course of a calendar year, such as bulk change configurations, the results compound into significant time and cost savings. The most dramatic savings are realized in the ability to leverage the information that is collected to run reports, including configuration policy and compliance reports, in a completely automated fashion, turning a task that otherwise requires a high level of human resource commitment to one requiring no resources whatsoever. Further cost savings are realized in terms of worker productivity, whenever network outages can be quickly addressed and resolved.

ROI in this example is overwhelmingly positive. The SolarWinds NCM is licensed by device and includes the first year of maintenance in the cost. To manage our example 300 devices it would be necessary to purchase a 500 node SKU, which sells for $8,365. A single configuration audit cycle in our example pays for the NCM investment almost six times over. Even bulk configuration updates, if done once a month, would completely pay back the investment in a mere nine months.

EMA Perspective

Ad hoc manual network management practices have no place in today's fast paced enterprise network environments. They create unstable, unreliable networks that are difficult to troubleshoot and diagnose. Good network management practices should without a doubt include network change and configuration solutions to achieve higher levels of operational efficiency and improve the stability and resilience of the network. However, EMA's research has found that despite the maturity of these types of solutions and the obvious benefits they provide,

Ad hoc manual network management practices have no place in today's fast paced enterprise network environments.

practitioners still too often rely on either manual or device specific management solutions that lack the cross platform capabilities and the feature/function benefits of a true NCCM solution. EMA believes this lack of adoption may in part be due to the fact that the full value of these types of solutions is not fully understood or appreciated. In most cases we found that companies made the purchase to solve one particular tactical issue, but once implemented found ongoing cost/operational benefits.

EMA's conversations with SolarWinds NCM practitioners revealed a very clear transformation from unstructured/chaotic/reactive practices prior to implementing NCM to more disciplined/proactive practices afterwards. As further testament to the value of the tool, when practitioners were asked if they would take NCM to their next job, it was common for them to state that they would not take a job without it. EMA strongly believes that good network management practices require moving towards more proactive approaches and network change and configuration management tools like SolarWinds NCM are clearly valuable to help achieve that goal.

About SolarWinds

SolarWinds provides powerful and affordable IT management software to customers worldwide, from Fortune 500® enterprises to small businesses, managed service providers (MSPs), government agencies, and educational institutions. We are committed to focusing exclusively on IT, MSP, and DevOps professionals, and strive to eliminate the complexity that our customers have been forced to accept from traditional enterprise software vendors. Regardless of where the IT asset or user sits, SolarWinds delivers products that are easy to find, buy, use, maintain, and scale while providing the power to address key areas of the infrastructure from on-premises to the cloud. This focus and commitment to excellence in end-to-end hybrid IT performance management has established SolarWinds as the worldwide leader in both network management software and MSP solutions, and is driving similar growth across the full spectrum of IT management software. Our solutions are rooted in our deep connection to our user base, which interacts in our THWACK online community to solve problems, share technology and best practices, and directly participate in our product development process. Learn more today at www.solarwinds.com.

About Enterprise Management Associates, Inc.

Founded in 1996, Enterprise Management Associates (EMA) is a leading industry analyst firm that provides deep insight across the full spectrum of IT and data management technologies. EMA analysts leverage a unique combination of practical experience, insight into industry best practices, and in-depth knowledge of current and planned vendor solutions to help EMA's clients achieve their goals. Learn more about EMA research, analysis, and consulting services for enterprise line of business users, IT professionals, and IT vendors at www.enterprisemanagement.com or blogs.enterprisemanagement.com. You can also follow EMA on Twitter, Facebook, or LinkedIn.

Corporate Headquarters:
1995 North 57th Court, Suite 120
Boulder, CO 80301
Phone: +1 303.543.9500
Fax: +1 303.543.7687
www.enterprisemanagement.com

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