



# Automate Configuration Management with SolarWinds<sup>®</sup> NCM

Learn how SolarWinds Network Configuration Manager (NCM) can help reduce human errors and result in savings

Share:   

**“82% of IT Pros have experienced network downtime as a result of human error made while configuring changes to the network core.”**

The same poll revealed loss in revenue to the tune of \$140,000 per incident. The hardest hits were those from the financial services industry, who reported having lost an average of \$540,358 for each incident.

-Avaya Survey<sup>1</sup>

Conducted in early 2014, the Avaya survey clearly indicates that human errors can result in serious network outages and huge losses in revenue. And don't forget, human errors also put the network at risk with security holes that many times go unnoticed. In some cases, the error is so serious that it could cost the IT staff their jobs.

Increasingly, statistics point towards the need to eliminate human errors by automating configuration management tasks. A recent IT Spending Survey<sup>2</sup> ranks network management second behind network security on the list of network investment priorities.

Manual methods fall short in enabling efficient management of large, growing networks. This is primarily because they're time consuming and require frequent use of Command Line Interface (CLI). One advantage of automation is that it helps eliminate human errors. The other advantage is that it gives way to achieve optimal operational efficiency. Automation also makes the IT administrator's job easier by providing a better means of managing configuration changes, scheduling backups, making bulk configuration changes, and ensuring compliance to internal and external standards.

## How to Avoid Network Downtime

A recent Gartner study<sup>3</sup> projected that through 2015, 80% of outages impacting mission-critical services will be caused by people and process issues. The study goes on to say that more than 50% of those outages will be caused by change/configuration/release integration and hand-off issues.

Network downtime has a cost associated with it. Taking some basic steps and implementing best practices helps protect your network from unexpected outages. So, what are required configuration management mandates that help you better manage your IT infrastructure?

- Gain complete visibility into network devices and their orchestration

- Understand the impact of a change before making it
- Maintain change approval and compliance processes
- Implement disaster recovery measures in case a change goes wrong
- Utilize device data and inventory details to facilitate budgeting and provisioning

A key component of network management best practices is the implementation of an automated Network Configuration and Change Management System (NCCM). Let's see why.

## How Does Automation Help?

In a network that deals with hundreds of devices spread across various locations, it's not feasible to manually carry out jobs like managing configurations, replicating the same change over multiple devices, ensuring that device configurations are compliant to standards, keeping track of configuration changes, and so on. Automation helps manage these repetitive tasks by:

- Maintaining consistency in configuration - standardization
- Detecting unauthorized or non-conforming changes
- Controlling environmental variances - disaster recovery
- Ensuring configuration policy enforcement
- Providing efficiency and eliminating human errors

The SolarWinds automated solution, Network Configuration Manager (NCM), helps adhere to best practices and saves time by automating repetitive management and verification tasks like, let's see how.

## #1 How to automate configuration backup

NCM helps automatically backup network device configuration by scheduling backups on a daily/weekly basis. Not having a configuration backup plan for critical devices like routers, switches, and other devices will put your network at risk. Archived configurations are useful in fixing unauthorized changes and also for maintaining configuration change reporting and compliance.

- Schedule network configuration backups
- Record network configurations for archival history
- Easily view network configuration backups and history

To set up automatic backup for all configurations of your network devices in NCM, create a backup job and schedule it to run as required.

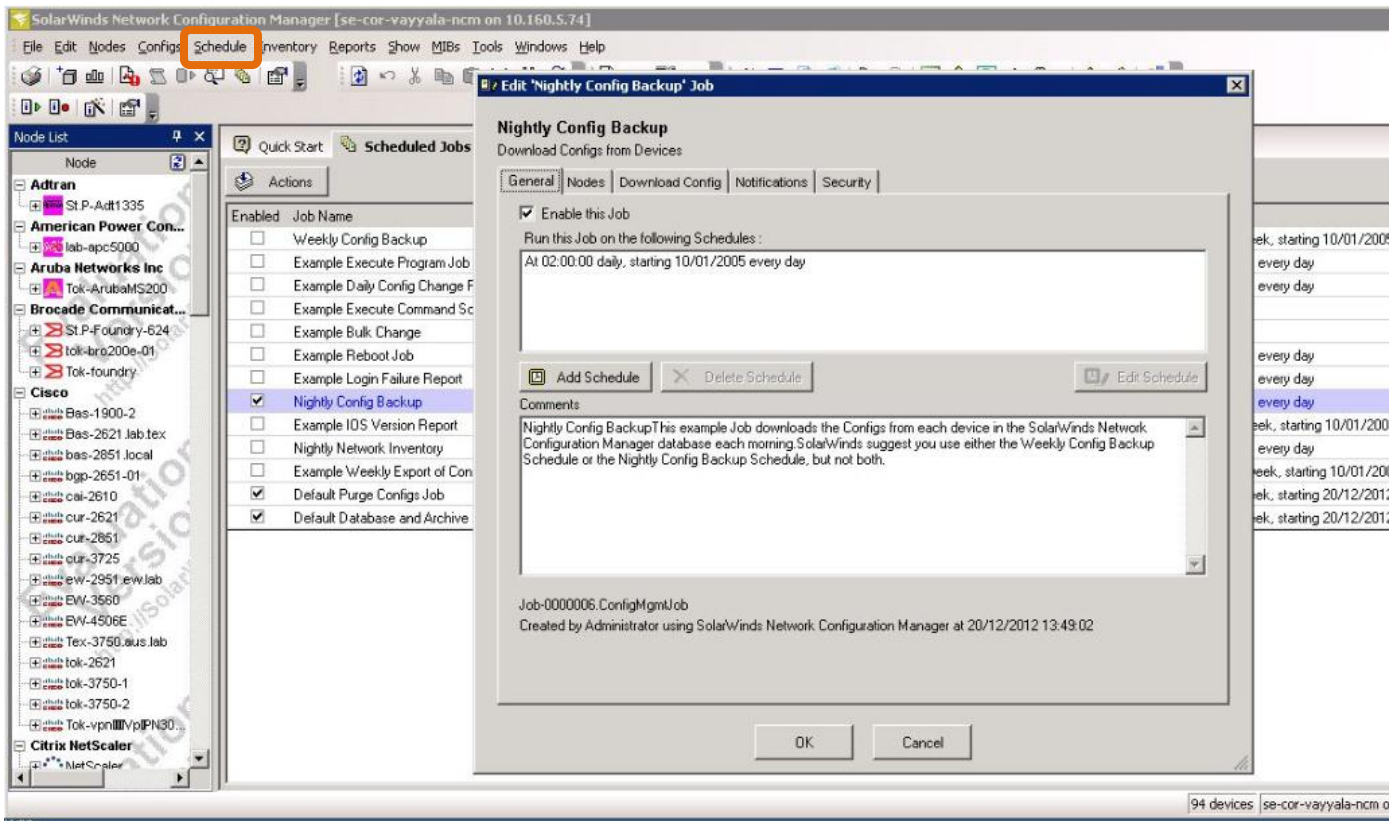
### Setting Up the Nightly Backup Wizard in NCM

Open NCM from the **Start** menu, choose the **Schedule** option and click on **display/edit job** option to open the **Nightly backup configuration** wizard.

Set of options available, to easily set up your backup task are:

1. Set up nodes, by clicking on the **Nodes** tab.
2. In the **Download Config** tab, select options to back up the 'Running' or 'Startup' or both configurations.
3. Use the **Notifications** tab to define email addresses for notifications, the email server to be used, etc.

This completes the backup configuration task and the configuration will now list under the device in the device list. On point-click, it displays the text of the configuration on the right panel.



*Opening Nightly backup Wizard in SolarWinds NCM*

**Note:** To perform automated, periodic back up, first ensure that all devices are added to NCM either manually or through automatic discovery.

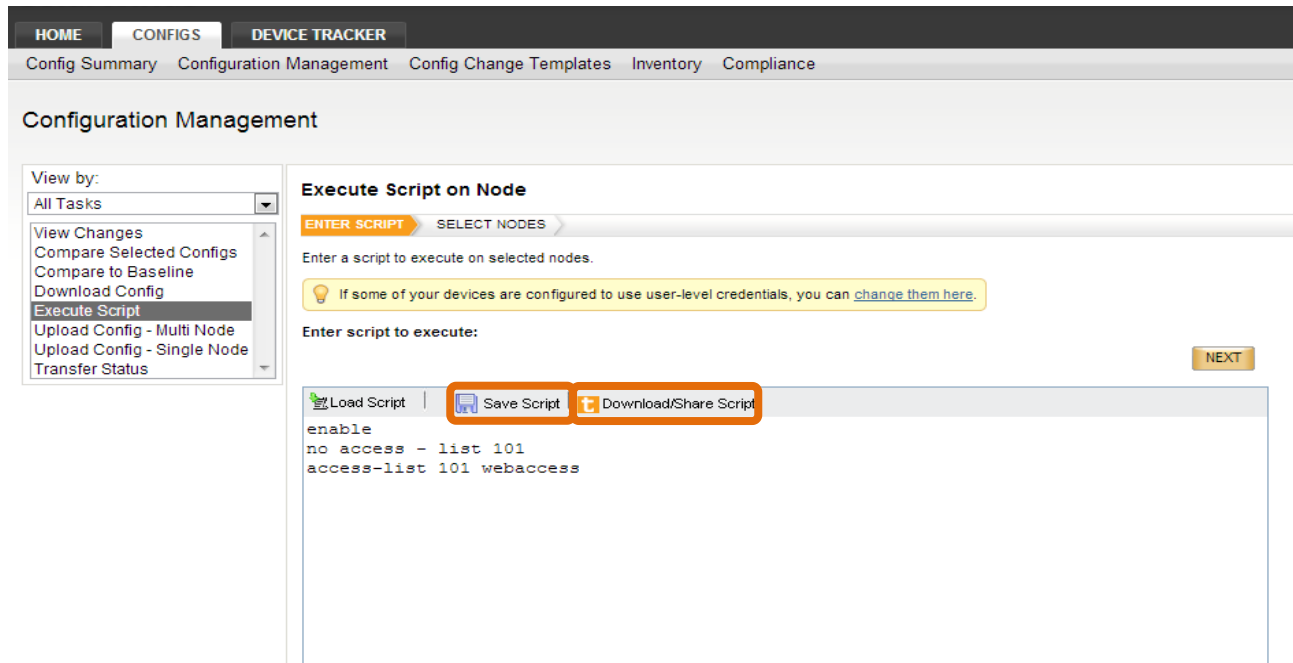
## #2 How to execute bulk changes

How do you push out bulk configuration changes in a convenient and scalable manner? For example, to meet PCI standards, you are required to change the format of the SNMP community string from default 'public' on 200 devices spread across 3 branch locations. With NCM, you can automate the effort, save time, and reduce chances for human error. Execute changes at once to all devices and help eliminate human error. The fact is that majority of network errors are caused due to incorrect configuration changes.

The best way to go about configuration changes is to test and validate them and then use a system to push it out. So, how do you push changes in bulk through NCM?

## Bulk configuration change through NCM

1. **Execute a script** - For example, to make a change to an ACL, log in to the Web console of NCM, click on **Configuration Management** and select **Execute script**. Now, go into 'enable mode' of the device, type no access-list and specify the name of the new access-list. Then, either click **Save script** or **Download/Share** to use an already existing script.



*Executing a script with Create/Download script options to modify a configuration in SolarWinds NCM*

Once done, hit **'Next'** and input details in case you want to schedule it for later. Next, choose the devices that you want to apply it to and then hit **'Execute'**.

**Note:** Our community website, thwack, contains a whole list of configuration scripts that other users have written and tested. You can import these templates into NCM for use.

HOME CONFIGS **DEVICE TRACKER**

Config Summary Configuration Management Config Change Templates Inventory Compliance

### Configuration Management

View by: All Tasks

- View Changes
- Compare Selected Configs
- Compare to Baseline
- Download Config
- Execute Script**
- Upload Config - Multi Node
- Upload Config - Single Node
- Transfer Status

#### Execute Script on Node

ENTER SCRIPT **SELECT NODES**

Select Node(s):  
Script will be executed on selected nodes.

BACK **EXECUTE** CANCEL

Level: 1 Group by: Vendor Clear All

- 3Com
- Adtran
- Agilent Technologies
- Brocade Communications Systems, Inc.
- Cisco
- F5 Labs, Inc.
- Fore Systems, Inc.
- HP
- Juniper Networks, Inc.

*Executing a script to modify a configuration using SolarWinds NCM*

2. **Create or update a whole new configuration** - Select a device through the GUI, modify a configuration, and then upload the change to the device. You can either make the change to the whole configuration or to a part of the configuration. This is much simpler than manually changing a configuration through CLI.

HOME CONFIGS **DEVICE TRACKER**

Config Summary Configuration Management Config Change Templates Inventory Compliance

Scheduled Discovery: 0 new nodes found. [View Results](#) [Dismiss Message](#)

### Configuration Management

View by: All Tasks

- View Changes
- Compare Selected Configs
- Compare to Baseline
- Download Config
- Execute Script
- Upload Config - Multi Node**
- Upload Config - Single Node
- Transfer Status

#### Upload Config to Multiple Nodes

**SELECT CONFIG** MODIFY CONFIG SELECT NODES

Select a config, edit the selected config (optional), and choose the nodes that you would like to upload the config to.

If some of your devices are configured to use user-level credentials, you can [change them here](#).

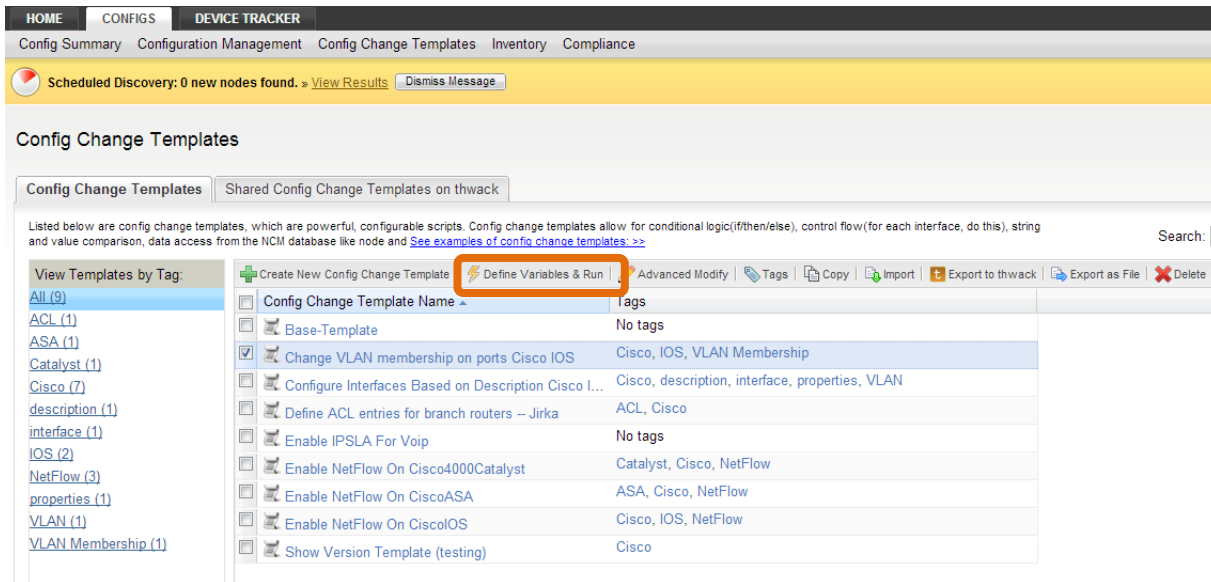
Select config to upload: **NEXT**

Level: 1 Group by: Vendor

- 3Com
- Adtran
- Agilent Technologies
- Brocade Communications Systems, Inc.
- Cisco
- F5 Labs, Inc.
- Fore Systems, Inc.
- HP

*Create a change and upload the modification to a configuration using SolarWinds NCM*

3. **Config Change Templates** - This is an easier way of making standard template changes, especially changes that are repetitive. The value of this feature is that it eliminates the need to directly deal with complex syntaxes, configure the same change, etc. You can either create a new template or use an existing one. Tested and verified config change templates are available on thwack and available for your immediate use.



*Using a template to execute repetitive configuration changes using SolarWinds NCM*

## Configuration Comparison

Select any two configurations, right click and click **Compare the selected configs**. This displays the text of both configurations side by side and the wizard highlights where the configuration changes have been made.

The NCM client also provides an option to save text based configurations to the file system. This is useful in case a roll back is required to fix a bad configuration change.

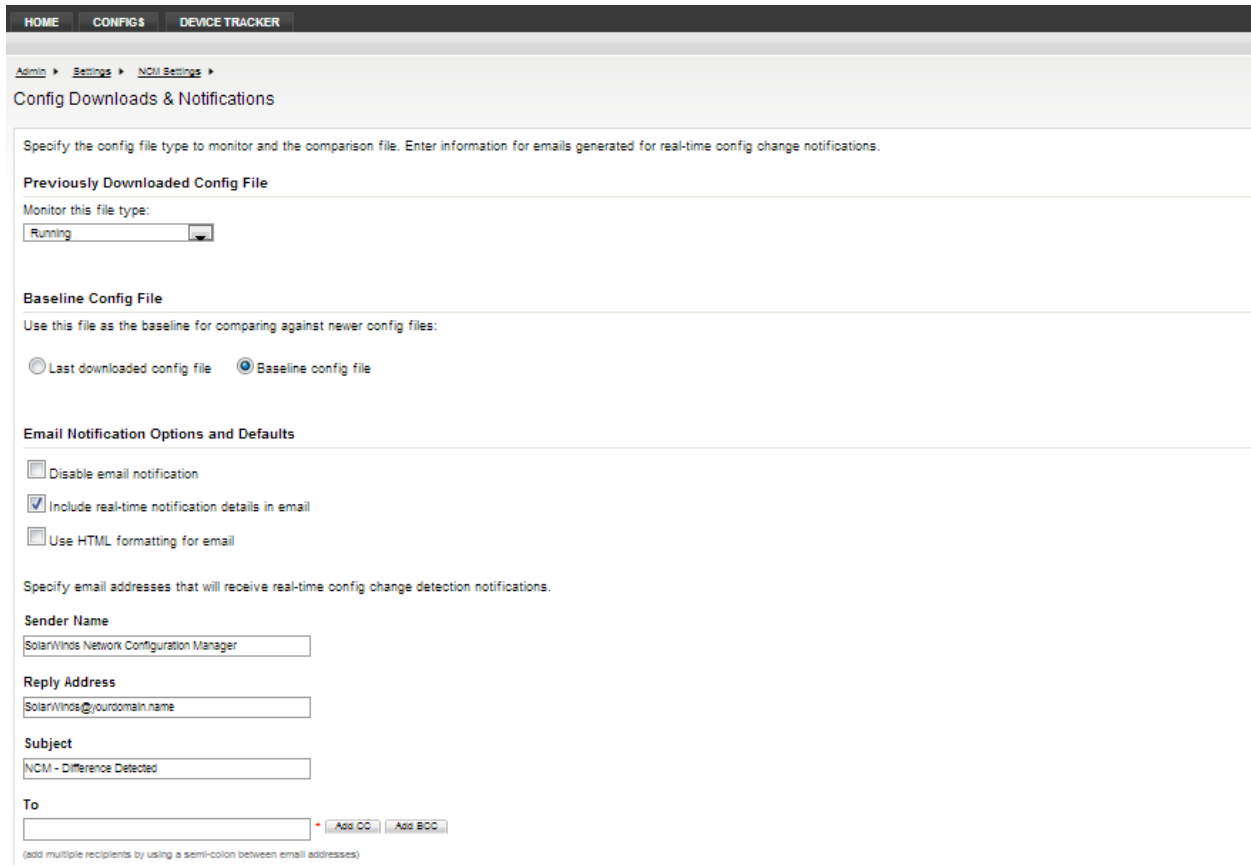


The screenshot shows the SolarWinds NCM Configuration Management interface. At the top, there are navigation tabs for HOME, CONFIGS, and DEVICE TRACKER. Below these are sub-tabs for Config Summary, Configuration Management, Config Change Templates, Inventory, and Compliance. A yellow notification bar at the top indicates 'Scheduled Discovery: 0 new nodes found.' and '4 new blog post(s)'. The main content area is titled 'Configuration Management' and features a 'View by:' dropdown menu on the left with options like 'All Tasks', 'View Changes', 'Compare Selected Configs', etc. The central area is titled 'Compare Selected Configs' and includes a 'Select 2 configs to compare.' instruction. Below this is a 'Select Configs:' section with a 'Level: 1' dropdown and a 'Group by: Vendor' dropdown. A list of configurations is displayed, grouped by vendor (3Com, Artran, Agilent Technologies, Brocade Communications Systems, Inc., Cisco, FS Labs, Inc., Fore Systems, Inc., HP, Juniper Networks, Inc., etc.). A 'COMPARE SELECTED' button is highlighted with an orange box in the top right corner of the configuration list area.

*Comparing configurations in SolarWinds NCM*

### #3 Managing Configuration Change Reporting and Alerting

Tracking configuration changes, detecting unauthorized or bad changes, maintaining policy compliance, and troubleshooting issues caused due to a configuration change can all be made simpler with NCM. All actionable instances are automatically alerted in real time. In addition, on detecting a change, NCM downloads the configuration and notifies you. This is done by attaching the changed configuration with changes marked and with an option to roll back the change to the most recent backed up configuration.



The screenshot shows the 'Config Downloads & Notifications' settings page in SolarWinds NCM. The page has a navigation bar with 'HOME', 'CONFIGS', and 'DEVICE TRACKER'. Below the navigation bar, there is a breadcrumb trail: 'Admin > Settings > NCM Settings > Config Downloads & Notifications'. The main content area is titled 'Specify the config file type to monitor and the comparison file. Enter information for emails generated for real-time config change notifications.' It is divided into several sections: 'Previously Downloaded Config File' with a dropdown menu set to 'Running'; 'Baseline Config File' with radio buttons for 'Last downloaded config file' and 'Baseline config file' (selected); 'Email Notification Options and Defaults' with checkboxes for 'Disable email notification' (unchecked), 'Include real-time notification details in email' (checked), and 'Use HTML formatting for email' (unchecked); and a section for 'Specify email addresses that will receive real-time config change detection notifications.' This section includes input fields for 'Sender Name' (SolarWinds Network Configuration Manager), 'Reply Address' (SolarWinds@yourdomain.name), 'Subject' (NCM - Difference Detected), and 'To' (with 'Add CC' and 'Add BCC' buttons). A note at the bottom says '(add multiple recipients by using a semi-colon between email addresses)'.

### *Configuring Downloads and configuration change notifications in SolarWinds NCM*

**Note:** For real time change notification to work, configure your routers, switches and other devices to send syslog messages to NCM.

## How to rollback a configuration

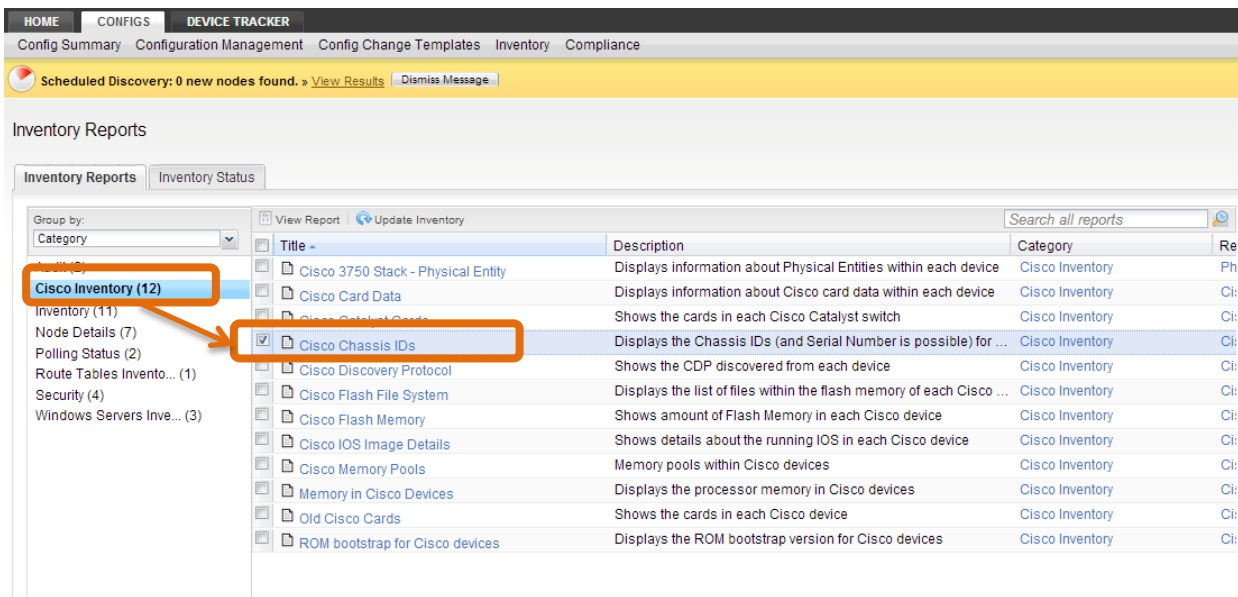
In the wake of a network configuration issue, there are two ways to roll back a configuration.

1. Select the configuration for the device, right click and select **Upload Configuration**. If you have configured TFTP or SCP as the configuration transfer mechanism, it would overwrite the configuration and make it the new running configuration. This method overwrites the full configuration.
2. This method involves using configuration snippet technology. In this case, the Access Control Lists (ACL) is documented as configuration snippets. To overwrite an ACL, upload the entire

ACL section onto the device. Select **Actions>>Upload Entire Configuration**. This uploads the specific configuration snippet for a device.

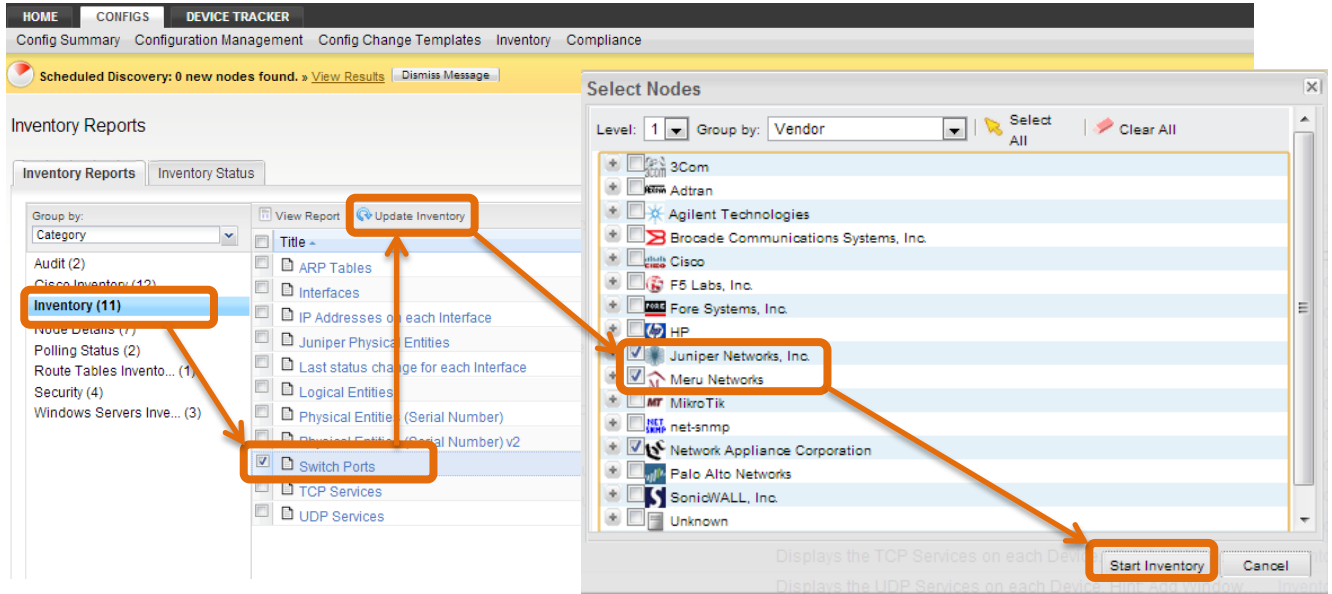
## #4 Device Inventory Reporting

Tracking all your device information manually is next to impossible. NCM helps keep a track of your device vendor details, chassis ids, serial number, IOS versions, and end-of life (EoL) information, etc. NCM helps maintain EoL data for Cisco® and Juniper® devices. In short, manage the overall inventory of your network infrastructure with the Inventory Report section of NCM. Create your own or use existing reports to know, at all times, what devices are in the network and their location. Automated discovery helps notify if there is a new device connected in your network.



*Inventory Reports View in SolarWinds NCM*

To update inventory, select **Category**, choose the device components to be updated, and then click on the **Update Inventory** button.



*Using the Update Inventory option in SolarWinds NCM*

**Note:** Discover all devices in the network using NCM before accessing the inventory report to display device details.

## #5 Policy Compliance Reporting

Organizations have to adhere to different policy compliance requirements such as HIPPA, SOX, DISA, STIG, FISMA, PCI. Therefore, as people at the infrastructure level, network admins play an equally important role to help maintain compliance to both external, as well as company polices. Some of them are SNMP community strings, password strength, SNMP Public, ACL Permissions, Forbidden Protocols, User access, etc. NCM assists in complying with all these set policies.

One commonly used method in NCM is the Cisco compliance report. This report shows you, at a glance, if your configuration is out of policy or non-compliant. Following this, select a script/template/configuration upload and push the change directly from there.

HOME CONFIGS DEVICE TRACKER

Summary Groups Top 10 Events Alerts Syslog Traps Message Center Reports thwack Community Custom Summary Training

Scheduled Discovery: 0 new nodes found. View Results Dismiss Message 4 new blog post(s) More Details Dismiss Message

Compliance >

### Cisco Policy Report

Last updated Friday, May 10, 2013 04:11:08 AM

SUMMARY DETAILS

- Console Settings (searched 54 configs)
  - Disable Reverse-Telnet (18 violations)
  - Session Timeout - 5 min (18 violations)
- Flood Prevention (searched 72 configs)
  - Disable IP Redirects & IP Unreachables (18 violations)
  - Login Delay (18 violations)
  - Login Failure Control (18 violations)
  - Verify Unicast Reverse-Path (18 violations)
- Time Settings (searched 54 configs)
  - NTP Server Settings (18 violations)
  - Summer-Time - Americas - CDT (18 violations)
  - Time Zone - Americas - CST (17 violations)

REPORT DETAILS

Export

NodeName	Disable Reverse-Telnet (18 violations)	Line CON 0 - Input All (5 violations)	Session Timeout - 5 min (18 violations)	Disable IP Redirects & IP Unreachables (18 violations)	Login Delay (18 violations)	Login Failure Control (18 violations)	Verify Unicast Reverse-Path (18 violations)	NTP Server Settings (18 violations)
Bas-2505	✗	✗	⚠	⚠	⚠	⚠	⚠	⚠
bas-2851.local	✗	✗	⚠	⚠	⚠	⚠	⚠	⚠
bgp-2651-01	✗		⚠	⚠	⚠	⚠	⚠	⚠
bgp-2651-02	✗		⚠	⚠	⚠	⚠	⚠	⚠
bgp-2651-03	✗		⚠	⚠	⚠	⚠	⚠	⚠
cur-2851	✗		⚠	⚠	⚠	⚠	⚠	⚠
cur-3750	✗		⚠	⚠	⚠	⚠	⚠	⚠
ew-2951	✗	✗	⚠	⚠	⚠	⚠	⚠	⚠

Using the Compliance View in SolarWinds NCM to check for compliance

To validate these reports, after making the change, select the report and click **'Update All'**. This pulls data from all devices, revalidates it, and runs the reports again.

HOME CONFIGS DEVICE TRACKER

Summary Groups Top 10 Events Alerts Syslog Traps Message Center Reports thwack Community Custom Summary Training

Scheduled Discovery: 0 new nodes found. View Results Dismiss Message

Compliance Policy Reports

View Reports by Folder:

- All (8)
- Cisco Reports (2)
- CISP Reports (1)
- Foundry Reports (1)
- HIPAA Reports (1)
- Juniper Reports (1)
- SOX Reports (1)
- No Folder (1)

View Report Update All Manage Policy Reports

Name	Last Update	Folder	Description
Cisco Policy Report	5/10/2013 10:26 am	Cisco Reports	Reports any violations found in the Cisco Policies
Cisco Security Audit	5/10/2013 10:26 am	Cisco Reports	Sample Report based on the Cisco Security Auditor

Using the Compliance View in SolarWinds NCM to check for compliance

**Note:** Customize each of the compliance reports according to the requirement of your organization.

SolarWinds NCM is a great solution to meet your network configuration requirements. It provides you with enhanced policy reporting, custom configuration file types and enhanced performance.

## Top 5 Reasons to Download NCM

- Automated device configuration management and bulk change management to **save time, reduce errors, and reduce the risk of costly network downtime**
- Automatic, scheduled backups of network configurations so your **critical devices are always protected**
- Configuration comparison and **rollback of failed changes** to instantly recover a device to a previous “known good” state
- **Real-time change detection and alerts** to protect against policy violations, unauthorized, unscheduled, and erroneous configuration changes
- Out-the-box **compliance reports**, along with automated **network inventory reports** customizable to your networks needs

[LEARN MORE »](#)[DOWNLOAD FREE TRIAL](#)

## References

1 Network Downtime Results in Job, Revenue Loss:

<http://www.avaya.com/usa/about-avaya/newsroom/news-releases/2014/pr-140305>

2 IT Spending Survey, ESG: [http://www.networkcomputing.com/network-downtime-the-costly-fallout/240166543?cid=NLC\\_NWC\\_Report\\_240166543&elq=d7cb101538d948f39666c4d9d0659579](http://www.networkcomputing.com/network-downtime-the-costly-fallout/240166543?cid=NLC_NWC_Report_240166543&elq=d7cb101538d948f39666c4d9d0659579)

[http://www.networkcomputing.com/network-downtime-the-costly-fallout/240166543?cid=NLC\\_NWC\\_Report\\_240166543&elq=d7cb101538d948f39666c4d9d0659579](http://www.networkcomputing.com/network-downtime-the-costly-fallout/240166543?cid=NLC_NWC_Report_240166543&elq=d7cb101538d948f39666c4d9d0659579)

3 Gartner Study: <http://www.networkcomputing.com/data-networking-management/how-to-avoid-network-outages-go-back-to/240166042>

## About SolarWinds

[SolarWinds](#) (NYSE: SWI) provides powerful and affordable IT management software to customers worldwide. Focused exclusively on IT Pros, we strive to eliminate the complexity in IT management software that many have been forced to accept from traditional enterprise software vendors. SolarWinds delivers on this commitment with unexpected simplicity through products that are easy to find, buy, use, and maintain, while providing the power to address any IT management problem on any scale. Our solutions are rooted in our deep connection to our user base, which interacts in our online community, [thwack](#), to solve problems, share technology and best practices, and directly participate in our product development process. Learn more at <http://www.solarwinds.com>.

