

EXTREME NETWORKS

Apply Config Template XIQ-SE workflow

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Apply Config Template XIQ-SE workflow



Workflow to apply an ASCII config template containing variables. Works with any device family

The embedded variables can be of three types:

- `${variableName}`: XIQ-SE Global or Site specific variables, in this preference order: local site, site parents, global
 - Selected `emc_vars` can be included by adding them to `const_EXPORT_EMC_VARS`; currently: `deviceIP`, `serverIP`, `serverName`
- `$<csvColumnKey>`: Device specific variables extracted from supplied CSV file
- `$UD1`, `$UD2`, `$UD3`, `$UD4`: Device specific values extracted from device User Data 1-4

For the CSV variables, a CSV file must be provided with the following syntax:

- First row has column labels, which need to match the `$<csvColumnKey>` variables, without the `$<>`
- Subsequent rows contain data values for every device, one row per device.
- First column contains the device lookup, either the device IP or Serial Number

ASCII config template file and the CSV file must be placed on the XIQ-SE filesystem.

Commands which generate a confirmation prompt enter as example: "no spanning-tree mstp\ny"

Workflow manual execution



- Workflow can be manually run against 1 or many switches simultaneously

The screenshot shows a network management interface with a table of devices. The table has columns: Status, Name, Site, IP Address, Poll Status, Poll Details, Device Type, and Family. The first five rows are highlighted in yellow. A context menu is open over the first row, showing options like FlexView, More Views, Configure..., Compass Search..., Rediscover, Clear Alarms..., Upgrade Firmware..., Add to Device Group..., and More Actions. The 'More Actions' option is expanded, showing a list of actions including Access Control, Config, Example, Macro, Provisioning, and Apply Config Template. The 'Apply Config Template' option is highlighted with a red box.

Status	Name	Site	IP Address	Poll Status	Poll Details	Device Type	Family
▲	Sbox-VSP7200-1	/World/PoC/Sandb...	10.8.4.2	Available: 1...	Up: 412 Do...	VSP-7254XSQ	VSP Series
▲	Sbox-VSP7200-2	/Wo		Available: 1...	Up: 412 Do...	VSP-7254XSQ	VSP Series
▲	Sbox-VSP7200-3	/Wo		Available: 1...	Up: 411 Do...	VSP-7254XSQ	VSP Series
▲	Sbox-VSP7200-4	/Wo		Available: 1...	Up: 412 Do...	VSP-7254XSQ	VSP Series
●	X460G2-1	/Wo		Available: 1...	Up: 412 Do...	X460-G2-24t-10G4	Summit Se...

Workflow automatic execution during onboarding



- Workflow can be automatically run after ZTP+ onboarding, under XIQ-SE Site Actions
- In this case script will always run against 1 switch only, the onboarding switch

Devices **Sandbox** Site Summary Endpoint Locations FlexReports

Discover **Actions** VRF/VLAN Topologies Services Port Templates ZTP+ Device Defaults Endpoint Locations Analytics Custom Variables

☒ Automatically Add Devices Collection Mode: Historical

☒ Add Trap Receiver Collection Interval (minutes): 10

☒ Add Syslog Receiver

☒ Add to Archive

☐ Add to Map

Custom Configuration

+ Add ✎ Edit ✖ Delete

Enabled	Vendor	Family	Topology	Task
<input checked="" type="checkbox"/>	Extreme	Universal Platform S	Any	Provisioning/Apply Config Template

Update Cancel

Workflow inputs, with CSV values



Run Workflow - Apply Config Template

Workflow Inputs

Custom Inputs

Notes:

Inputs below can be set either with absolute values or can be provided as \${<site-custom-variable>} if the workflow is to derive a site specific value for those inputs. The site of the device, and parent sites, will apply.

ASCII config template:

/root/Ludo/template.cfg

CSV data file:

/root/Ludo/variable-values.csv

Index into CSV file:

IP address

IP address

Serial Number

are not actually made. Debug: enable if you need to report a problem to the script author.

Sanity:





Debug:

*template.cfg - Notepad


File Edit Format View Help

```
link-state group 1 enable
link-state group 1 upstream interface gigabitEthernet $UD1
link-state group 1 downstream interface gigabitEthernet ${tuni port}
router vrf fabext
  ip route 0.0.0.0 0.0.0.0 $UD2 weight 10
  ip route ${tunnelDest} 255.255.255.255 $UD2 weight 10
exit
router isis
  ip-tunnel-source-address ${deviceIP} vrf fabext
  manual-area ${isis area}
exit
logical-intf isis 255 dest-ip ${tunnelDest} name ${tunnel name}
isis
  isis spbm 1
  isis spbm 1 ll-metric ${vxlan nni metric}
  isis enable
exit
filter acl 1 type inPort
filter acl port 1 ${tuni port}
filter acl ace 1 1001
filter acl ace action 1 1001 permit remark-dot1p ${macsec qos remark}
filter acl ace action 1 1001 permit count
filter acl ace action 1 1001 permit internal-qos ${macsec qos remark}
filter acl ace ethernet 1 1001 dst-mac mask 00:00:00:00:00:00 0xffffffffffff
filter acl ace 1 1001 enable
i-sid ${tuni isid} elan-transparent
  port ${tuni port}
exit
```

AutoSave Off






variable-values.csv


 Search (Alt+Q)

FileHomeInsertDrawPage LayoutFormulasDataReviewViewHelp

A1



ip

 Not set

PublicInternalConfidential

Highly Confidential

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	ip	mask	macsec nni	macsec nni metric	tuni port	tunnel dest	isis area	tunnel name	vxlan nni metric	macsec qos remark	tuni isid	macsec key	macsec parity
2	10.8.4.2	255.255.255.0	Jan-21	20	Jan-22	10.10.10.10	47 DC1		10		4 15000001	1234567890	odd
3	10.8.4.3	255.255.255.0	Jan-21	20	Jan-22	10.10.10.20	47 DC2		10		4 15000002	1234567890	odd
4	10.8.4.4	255.255.255.0	Jan-21	20	Jan-22	10.10.10.10	47 DC1		10		4 15000003	1234567890	odd
5	10.8.4.5	255.255.255.0	Jan-21	20	Jan-22	10.10.10.20	47 DC2		10		4 15000004	1234567890	odd

- If your XIQ-SE was installed without “root” access, place the CSV file here instead:
/usr/local/Extreme_Networks/NetSight/appdata/logs/scripting/NetSight_Server

Workflow, site variables

- Template can also take \${var} variables
- Values for these variables are looked up in the Site Custom variables, in this preference order:
 - Site of device
 - Parent Site of device
 - Parent sites up to Root site
 - Global variable

```
*template.cfg - Notepad
File Edit Format View Help
link-state group 1 enable
link-state group 1 upstream interface gigabitEthernet $UD1
link-state group 1 downstream interface gigabitEthernet $<tuni port>
router vrf fabext
  ip route 0.0.0.0 0.0.0.0 $UD2 weight 10
  ip route ${tunnelDest} 255.255.255.255 $UD2 weight 10
exit
router isis
  ip-tunnel-source-address ${deviceIP} vrf fabext
  manual-area $<isis area>
exit
logical-intf isis 255 dest-ip ${tunnelDest} name $<tunnel name>
  isis
  isis spbm 1
  isis spbm 1 ll-metric $<vxlan nni metric>
  isis enable
exit
filter acl 1 type inPort
filter acl port 1 $<tuni port>
filter acl ace 1 1001
filter acl ace action 1 1001 permit remark-dot1p $<macsec qos remark>
filter acl ace action 1 1001 permit count
filter acl ace action 1 1001 permit internal-qos $<macsec qos remark>
filter acl ace ethernet 1 1001 dst-mac mask 00:00:00:00:00:00 0xffffffffffff
  ace 1 1001 enable
  ni isid> elan-transparent
  tuni port>
```

Devices Sandbox ZTF Site Summary Endpoint Locations FlexReports					
Discover Actions VRF/VLAN Topologies Services Port Templates ZTP+ Device Defaults Endpoint Locations Analytics Custom Variables					
Add Edit Delete					
Scope		Variable			
Category	Site	Type	Name	Type	Value
Site	/World/PoC/Sandbox ZTF		locationGroup	String	PhysicalSandbox
Site	/World/PoC/Sandbox ZTF		dataIsid	String	0
Site	/World/PoC/Sandbox ZTF		tunnelDest	String	20.120.10.20
Site	/World/PoC/Sandbox ZTF		dataVlan	String	0
Site	Global		Auto Sync VLANs in...	String	Done
Site	Global		nacEnable	String	enable
Site	Global		locationGroup	String	0

Workflow, emc_vars as variables

- Selected emc_vars can also be fed into the same \${var} space, by adding them to workflow variable const_EXPORT_EMCC_VARS

```
*template.cfg - Notepad
File Edit Format View Help
link-state group 1 enable
link-state group 1 upstream interface gigabitEthernet $UD1
link-state group 1 downstream interface gigabitEthernet $<tuni port>
router vrf fabext
  ip route 0.0.0.0 0.0.0.0 $UD2 weight 10
  ip route ${tunnelDest} 255.255.255.255 $UD2 weight 10
exit
router isis
  ip-tunnel-source-address ${deviceIP} vrf fabext
  manual-area $<isis area>
exit
logical-intf isis 255 dest-ip ${tunnelDest} name $<tunnel name>
  isis
  isis spbm 1
  isis spbm 1 ll-metric $<vxlan nni metric>
  isis enable
exit
filter acl 1 type inPort
filter acl port 1 $<tuni port>
filter acl ace 1 1001
filter acl ace action 1 1001 permit remark-dot1p $<macsec qos remark>
filter acl ace action 1 1001 permit count
filter acl ace action 1 1001 permit internal-qos $<macsec qos remark>
filter acl ace ethernet 1 1001 dst-mac mask 00:00:00:00:00:00 0xffffffffffff
filter acl ace 1 1001 enable
i-sid $<tuni isid> elan-transparent
```

Workflow Dashboard Scheduled Tasks Saved Tasks Scripts **Workflows**

Palette /Workflows/Ludovico/Apply Config Template

Activities

Start → Apply Config Template → Signal - Config Applied → End

Details

General Variables Inputs Outputs Menus Network OS

Add Edit Delete Global Variables...

Name ↑	Default Value	Variable Reference	Scope	Type
const_EXPORT_EMCC_VARS	["deviceIP", "serverIP", "serverName"]		Workflow	Json
devices			Workflow	Json
input_configFile			Workflow	String
input_csvFile			Workflow	String
input_csvKey			Workflow	String
input_notes			Workflow	String



Workflow, UserData1-4 variables

- Values unique to each device can also be fetched from the device UserData1-4 fields
- Only value after “=” is used

The screenshot shows the 'Configure Device' interface. On the left, a table lists devices with columns for Status, Name, and Site. The device 'Sbox-VSP7200-2' is selected. The main form on the right has tabs for Device, Device Annotation, VRF Definitions, VLAN Definitions, CLIP Addresses, Topology, and Services. The 'Device Annotation' tab is active, showing fields for Nickname, Asset Tag, and four User Data fields. The 'User Data 1' field contains 'wan port = 1/1' and the 'User Data 2' field contains 'wan router = 192.168.255.123'. The 'User Data 3' and 'User Data 4' fields are empty. The 'Note' field is also empty.

Device ID	System Name	Device Nickname	Device Type
10.8.4.3	Sbox-VSP7200-2	Sbox-VSP7200-2	VSP-7254XSQ

Device: Sbox-VSP7200-2

Nickname: Sbox-VSP7200-2

Asset Tag:

User Data 1: wan port = 1/1

User Data 2: wan router = 192.168.255.123

User Data 3:

User Data 4:

Note:

```
*template.cfg - Notepad
File Edit Format View Help
link-state group 1 enable
link-state group 1 upstream interface gigabitEthernet $UD1
link-state group 1 downstream interface gigabitEthernet ${tuni port}
router vrf fabext
  ip route 0.0.0.0 0.0.0.0 $UD2 weight 10
  ip route ${tunnelDest} 255.255.255.255 $UD2 weight 10
exit
router isis
  ip-tunnel-source-address ${deviceIP} vrf fabext
  manual-area ${isis area}
exit
logical-intf isis 255 dest-ip ${tunnelDest} name ${tunnel name}
  isis
  isis spbm 1
  isis spbm 1 ll-metric ${vxlan nni metric}
  isis enable
exit
filter acl 1 type inPort
filter acl port 1 ${tuni port}
filter acl ace 1 1001
filter acl ace action 1 1001 permit remark-dot1p ${macsec qos remark}
filter acl ace action 1 1001 permit count
filter acl ace action 1 1001 permit internal-qos ${macsec qos remark}
filter acl ace ethernet 1 1001 dst-mac mask 00:00:00:00:00:00 0xffffffffffff
filter acl ace 1 1001 enable
i-sid ${tuni isid} elan-transparent
  port ${tuni port}
exit
```


Comparison of template variables



- Site variables `${var}`: Useful to apply same values to all devices in same XIQ-SE Site. Or to apply same values to all devices in same sub-Sites
- CSV variables `$<var>`: Useful to provide device specific values
- UserData variables `$UD1-4`: Useful to provide device specific values, but for values obtained dynamically from the device itself (by another workflow or activity) and then make these available in this Apply Config Template workflow
- Emc_vars `${deviceIP}`: Useful to feed some of these values into the same space as Site variables

Cisco velocity type statements: #if/#elseif/#else/#end



- The template file can also include **#if/#elseif/#else/#end** statement blocks
- To match Cisco velocity type statements
- The conditional string, inside “(“”)” will be evaluated using Python’s eval() function, so any valid Python expression may be used
- Any of CSV variables [\$<var>], Site variables [{var}] or UserData variables [\$UD1-4] can be inserted inside the conditional string, but they will always be evaluated as String values.
- For instance, to evaluate an integer value, insert the variable inside Python’s int() method like this:
 - #if (int(\$<myvar>) > 10)

```
template2.cfg - Notepad
File Edit Format View Help
config terminal
interface GigabitEthernet $<myport>
    #if($<myport> == "1/1")
        name "first port"
    #elseif($<myport> == "1/24")
        name "middle port"
    #else
        name "last port"
    #end
exit
```

Error mode: #error fail|stop|continue



- The template file can also include **#error fail|stop|continue** statement
- Determines the behaviour if a command in the template errors when executed on the switch
 - **fail**: workflow aborts immediately with an error
 - **stop**: no further commands from the template are executed, the workflow continues and does not fail
 - **continue**: execution of template commands continues even if commands error
- The default behaviour is **fail**

```
template.cfg - Notepad
File Edit Format View Help
config terminal
link-state group 1 enable
link-state group 1 upstream interface gigabitEthernet $UD1
link-state group 1 downstream interface gigabitEthernet $<tuni port>
#error continue
macsec connectivity-association macsec-profile connectivity-association-key $<macsec key> key-parity $<macsec parity>
#error stop
interface GigabitEthernet $<macsec nni>
    macsec connectivity-association macsec-profile
    macsec encryption enable
    macsec enable
exit
#error fail
filter acl 1 type inPort
filter acl port 1 $<tuni port>
filter acl ace 1 1001
filter acl ace action 1 1001 permit remark-dot1p $<macsec qos remark>
filter acl ace action 1 1001 permit count
filter acl ace action 1 1001 permit internal-qos $<macsec qos remark>
filter acl ace ethernet 1 1001 dst-mac mask 00:00:00:00:00:00 0xffffffffffff
filter acl ace 1 1001 enable
end
Ln 22, Col 1 100% Windows (CRLF) UTF-8
```

Commands which require Y/N confirmation prompt on device



- Some commands require “y” confirmation on certain devices (VOSS/ERS)
- To push such commands via the template, append “\ny” to those commands, as shown
- On EXOS the workflow will automatically “disable cli prompting” so this is not necessary

A screenshot of a Notepad window titled 'template.txt - Notepad'. The window contains a network configuration template with the following text:

```
File Edit Format View Help
config term
interface gigabitEthernet 1/1-1/48
    no spanning-tree mstp\ny
exit
end
|
```

The text '\ny' is highlighted in yellow.

Commands which prompt for interactive input on device



- Some commands which set passwords, prompt the user interactively to enter such passwords, sometimes twice
- To push such commands via the template, append the data (passwords) in the same sequence as they would be requested, separated by "//"
- The following example shows how this can be done for "config" which then prompts for:
 - Configuring from terminal or network [terminal]?
To which, "term" will be fed
- The example also shows how to create an SNMPv3 privAuth user which will ask for both the priv password and auth password twice each

A screenshot of a Notepad window titled "template.txt - Notepad". The window contains the following text:

```
File Edit Format View Help
config // term
snmp-server user snmpuser1 group "snmprw" sha aes // snmpauthcred // snmpauthcred // snmpprivcred // snmpprivcred
end
```

Workflow execution



Workflow Dashboard Scheduled Tasks Saved Tasks Scripts Workflows Apply Config Template (26110) x

Summary

Status	Start Date/Time	Name	Version	Source	# Devices	Started By	End Date/Time	Message	Path
✓	7/18/2022 2:11:04 ...	Apply Config Templ...	32	Workflow Designer ...	4	Istevens	7/18/2022 2:11:09 ...	Applied Config Template on devices 10.8.4.5...	/Workflows/Ludovico/Apply Config Template

Graph View Table View



Stop Workflow Show Output Show Variables



Devices Grid

Show Output

Status	Device IP	Output Path	Start Date/Time	End Date/Time	Message
SUCCESS	10.8.4.5		7/18/2022 2:1...	7/18/2022 2:1...	Applied Co...
SUCCESS	10.8.4.3		7/18/2022 2:1...	7/18/2022 2:1...	Applied Co...
SUCCESS	10.8.4.4		7/18/2022 2:1...	7/18/2022 2:1...	Applied Co...
SUCCESS	10.8.4.2		7/18/2022 2:1...	7/18/2022 2:1...	Applied Co...

Workflow execution



Workflow Dashboard Scheduled Tasks Saved Tasks Scripts V

Summary

Status	Start Date/Time	Name	Version	So
✓	7/18/2022 2:11:04 ...	Apply Config Templ...	32	Wi

Graph View Table View

🔍 🔍 📖

```
graph LR; Start((Start)) --> Apply[Apply Config Template]; Apply --> Signal[Signal - C];
```

Output - 10.8.4.5

Script Name: Apply Config Template_Apply_Config_Template
Date and Time: 2022-07-18T14:11:04.670
XIQ-SE User: lstevens
XIQ-SE User Domain:
IP: 10.8.4.5
Workflow version 32 on XIQ-SE/XMC version 22.6.10.70
Activity: ApplyConfigTemplate
Using family type 'VSP Series' for this script

Input Data:

- Selected Switch IP = 10.8.4.5
- Input Config Template file = /root/Ludo/template.cfg
- Input CSV file = /root/Ludo/variable-values.csv
- Key to CSV data = IP address

Retained device 10.8.4.5 Site Variables:

```
{
  "Auto Sync VLANs in progress": "Done",
  "__PATH__": "/World/PoC/Sandbox ZTF",
  "core1": "",
  "core2": "",
  "dataIsid": "",
  "dataVlan": "",
  "deviceIP": "10.8.4.5",
```

Show Output

Start Date/Time	End Date/Time	Message
7/18/2022 2:11:04 ...	7/18/2022 2:11:04 ...	Applied Co...
7/18/2022 2:11:04 ...	7/18/2022 2:11:04 ...	Applied Co...
7/18/2022 2:11:04 ...	7/18/2022 2:11:04 ...	Applied Co...
7/18/2022 2:11:04 ...	7/18/2022 2:11:04 ...	Applied Co...

Close

Workflow Event signal



Alarms Alarm Configuration Events Event Configuration							
<div><div> All</div><div>Type: Console View</div><div> Export to CSV</div></div>							
Date/Time	Source	Subcomponent	Client	User	Type	Event	Information
1/18/2022 3:07:37 PM	[10.8.4.5, 10.8.4.3, 10....	Workflow: Apply Config Template	---	Istevens	Event	Configuration Template /root/Ludo/template.cfg applied	Configuration Template /root/Ludo/template.cfg applied to device [10.8.4.5, 10.8.4.3, 10.8.4.4, 10.8.4.2]

