vegayan
Simplifying NextGen Networks

Automation in service delivery & policy implementation to enable SDN for carrier WAN's

- Girish Saraph, Vegayan Systems

Strong growth drivers for SDN

vegayan
Simplifying NextGen Networks

- Strong growth drivers: *Related factors driving market dynamics*
  - Cloud computing
  - Software as a service (SaaS)
  - Data-hosting
  - Application-hosting

  → Remote delivery, virtualization & flexibility (pay-as-you-scale)

- Global SaaS market expected to reach $106B by 2016 w 30% growth

  … Study by *Goldman Sachs (2015)*

  - Driving strong growth in Datacenter market
  - New business models: Infra as a Service (IaaS) or Platform as a Service (PaaS)

- Datacenters embracing SDN for flexibility & virtualization

→ Telecom carriers and ISP's are exploring new revenue generation avenues through new platforms

SDN Market Opportunity

vegayan
Simplifying NextGen Networks

- SDN-enabled equipment market to exceed $35B by 2018
  - Report from *SDN Central, Plexxi & Lightspeed Ventures (Apr, 2013)*
  - Market led by data-center hardware; 46% HW to be SDN-enabled
- SDN products market expected to reach $2.45B by 2018
  - Report by *Doyle Research & GigaOM (Feb, 2013)*
  - Enterprise-WAN would be significant part of SDN market by 2018
- *"Moving SDN out of the data-center and into the WAN is a big challenge for enterprises" - Light Reading (Apr, 2014)*

→ Leveraging existing network infrastructure of carriers or ISP's is key to delivering SDN-WAN services to enterprise customers

SDN Beginnings

vegayan
Simplifying NextGen Networks

- SDN definition *(GigaOM Pro report, 2012)* :
  - Packet forwarding or Data plane is separated from Control plane
  - Centralized intelligence and control of switching (network devices)
  - Central programmability to (i) change traffic flows
  (ii) switch network partitions (iii) control application-level quality
  (iv) provide network flexibility (iv) dynamically change priorities
- Data-center (DC) SDN: Initial driver of SDN market
  - On-demand application/data hosting (SaaS model) for Cloud services
  - On-demand, dynamic network connectivity between virtual servers, compute & storage resources
- Extension of SDN overlay to multiple DC sites for redundant access, geographic reach & mobility through data synchronization

SDN-WAN

vegayan
Simplifying NextGen Networks

- Enterprise customers require application performance delivery at remote delivery sites through private or hybrid WAN
  - → SDN-DC is only one part, the other is WAN delivery
  - → SDN-WAN allows on-demand, flexible service delivery
- WAN involves existing networks with diverse devices, technologies & services → Need effective SDN overlay for carrier NW's
- **"Achieving SDN in MAN/WAN is no trivial task. While DCs are simple, homogeneous and with essentially limitless bandwidth, carrier networks are complex, multi-vendor and subject to many technology and bandwidth constraints."**

  - Alcatel-Lucent report on Cloud-optimized MAN & WAN SDN, 2013

Evolution of OSS for SDN-WAN

vegayan
Simplifying NextGen Networks

- **"In a telecom network, the maturing and evolution of its OSS/BSS system would be a pre-requisite to an end-to-end SDN implementation."**

  - Light Reading article by Deepak Kumar "SDN: Can Telco's do …." (Dec, 2013)

- **"At the heart of Service Provider SDN is software & a major transformation of the OSS layer …. creating a good abstraction of the entire network in terms of resources available in order to start software-controlling the network."**

  - Ulf Ewaldsson, Ericsson CTO in Light Reading by Michelle Donegan (Oct, 2013)

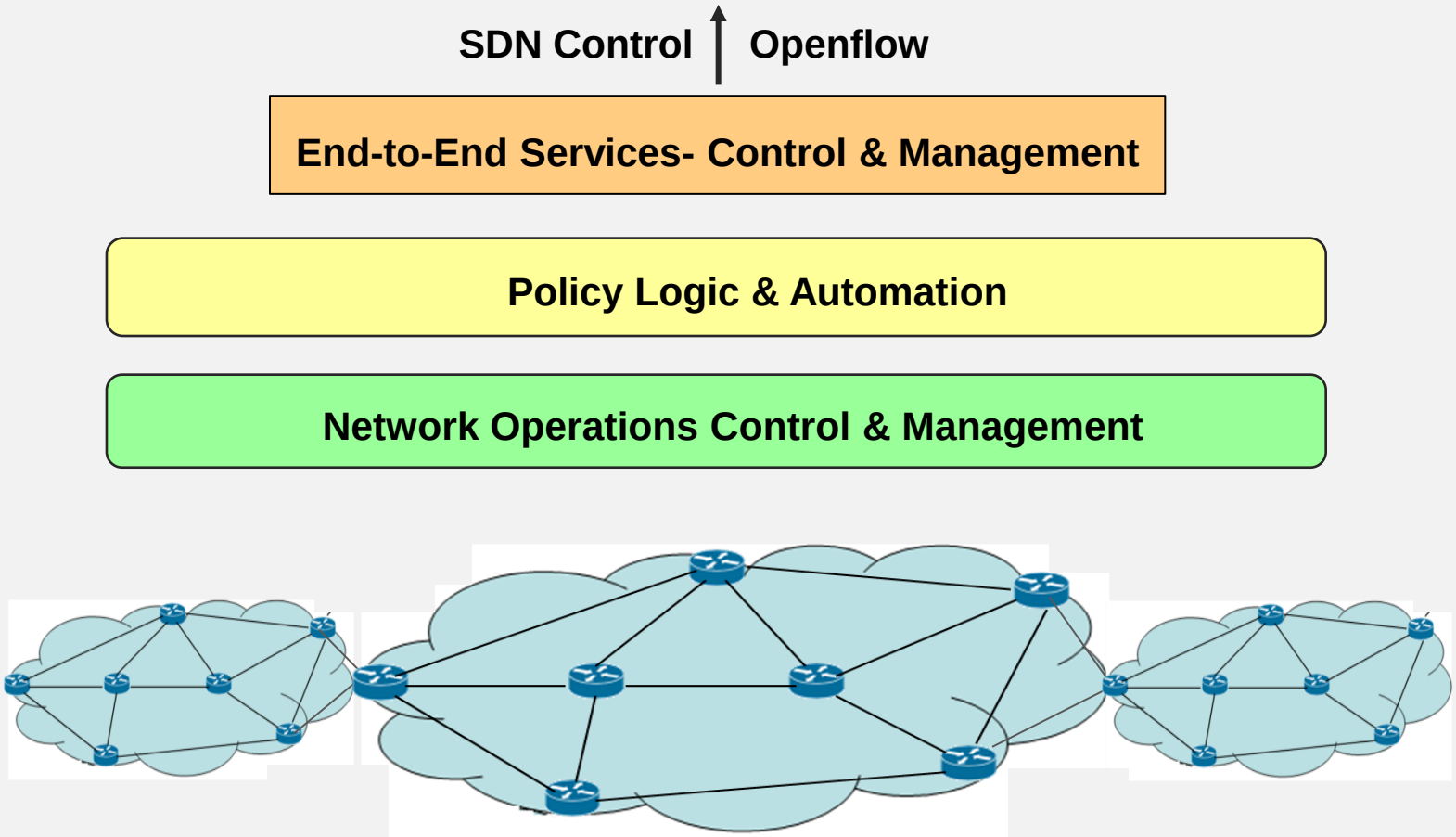
- **"The promise of SDN for telecom industry includes automated traffic management, improved bandwidth engineering, and ability to tailor the network "on demand" to customer needs/applications."**

  - Doyle Research article in NetworkWorld (Dec, 2012)

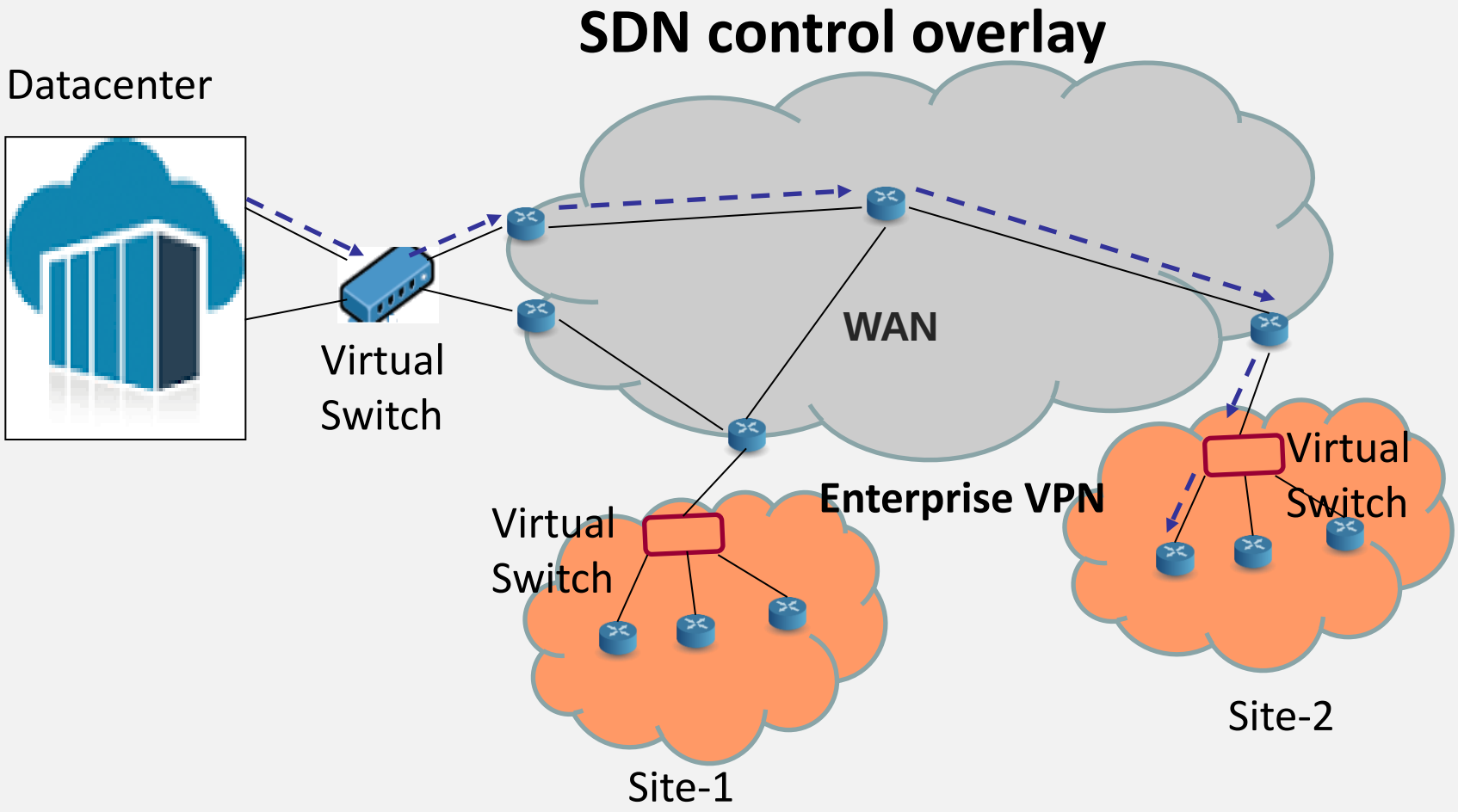
SDN-WAN Solution Blocks

vegayan
Simplifying NextGen Networks

Building policy intelligence & programmability above OSS layer



E2E WAN circuits



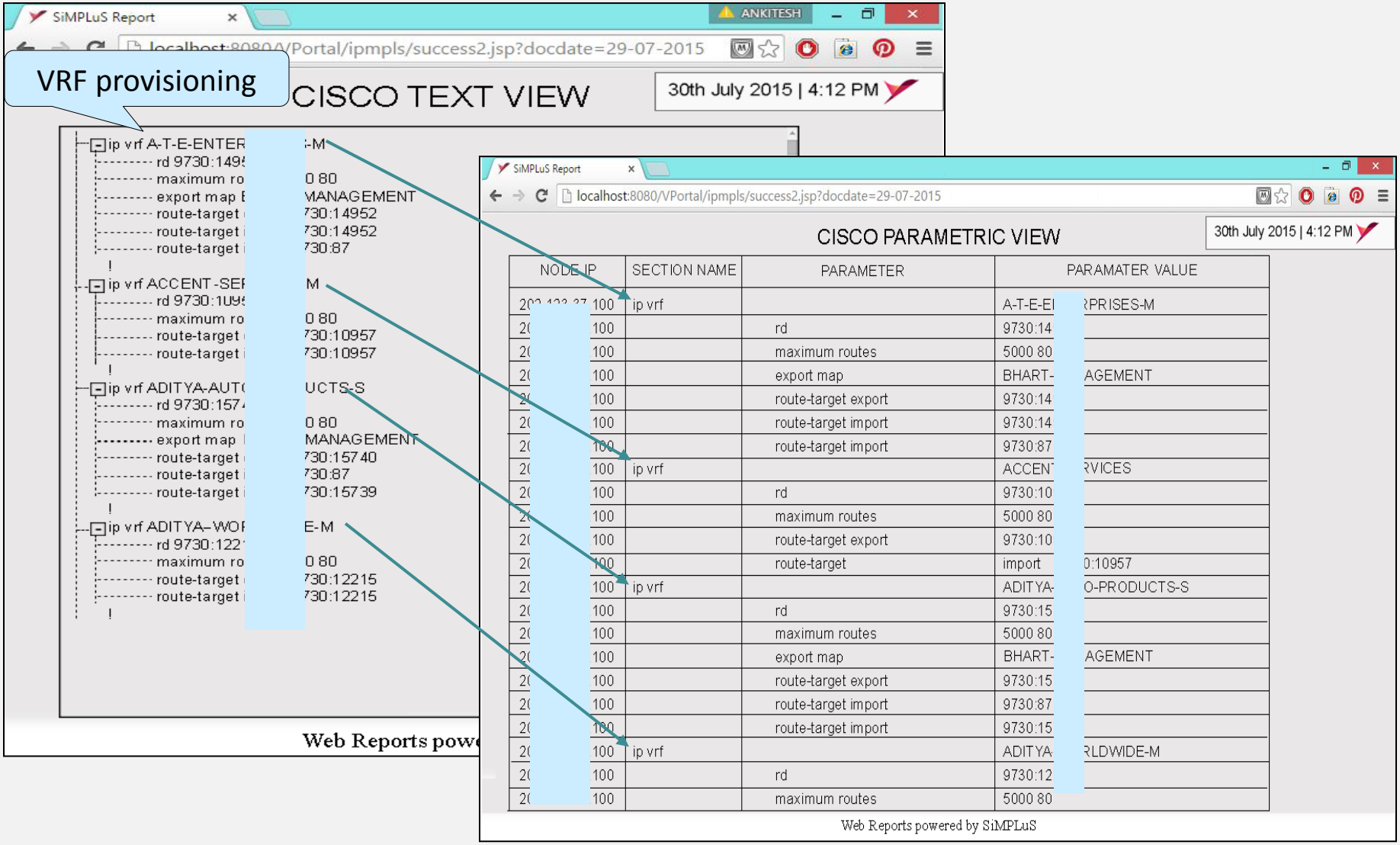
Automating service provisioning

vegayan
Simplifying NextGen Networks

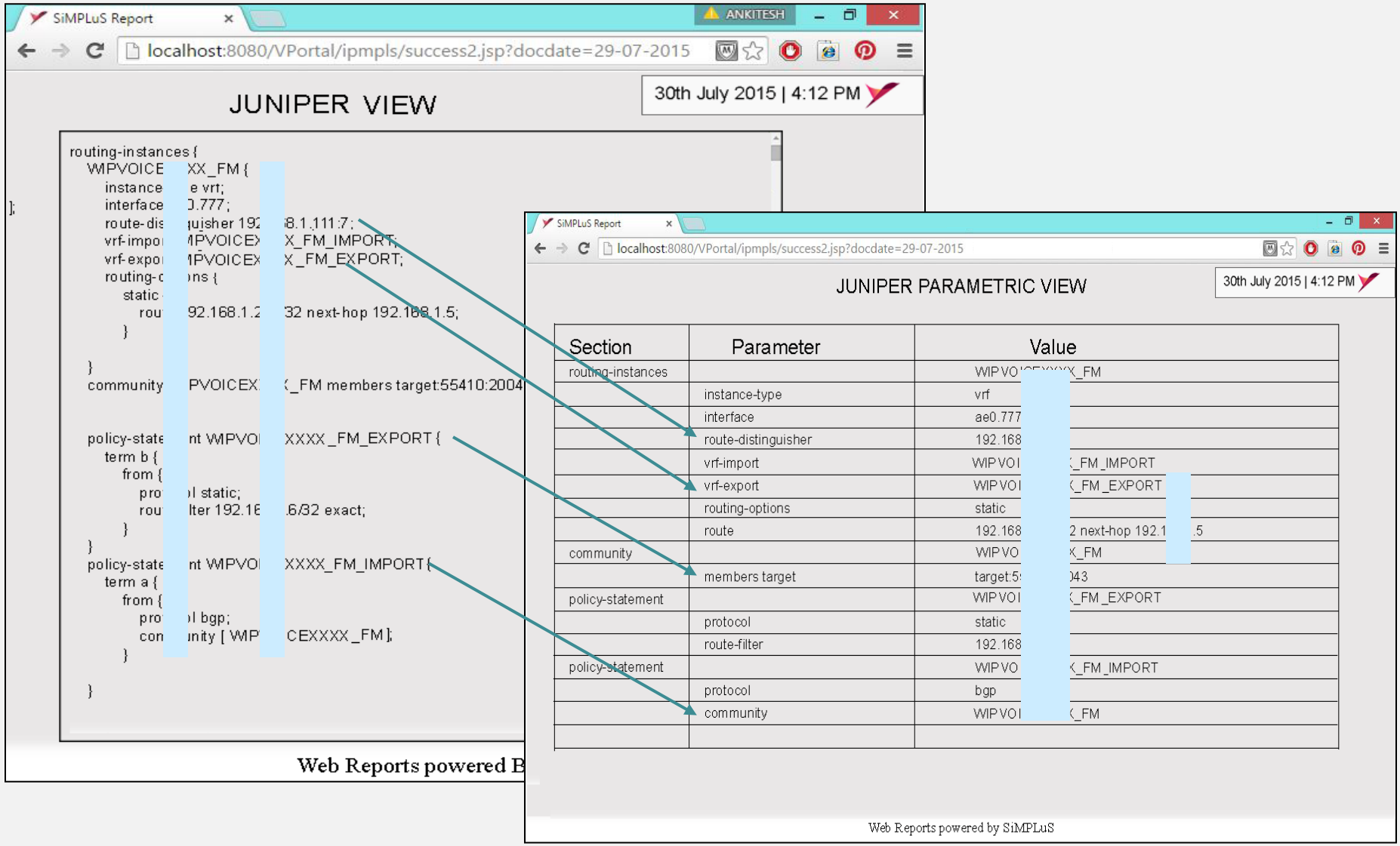
- Multi-vendor confliglets for provisioning different types of services; VLAN, L2/L3-VPN, VPLS, VPWS, etc.
- Pre-defined templates for each vendor & type of service
- Parametric view of configurable parameters
- Build logic for selecting parameters automatically
- Create configlets for provisioning new services w selected parameters
- Templates for configuring new routing/switching elements
- Provide variety of policy templates - security/access/QoS

→ Automated step-wise E-E circuit provisioning

Cisco VRF Config



Juniper VRF Config



Automating provisioning logic

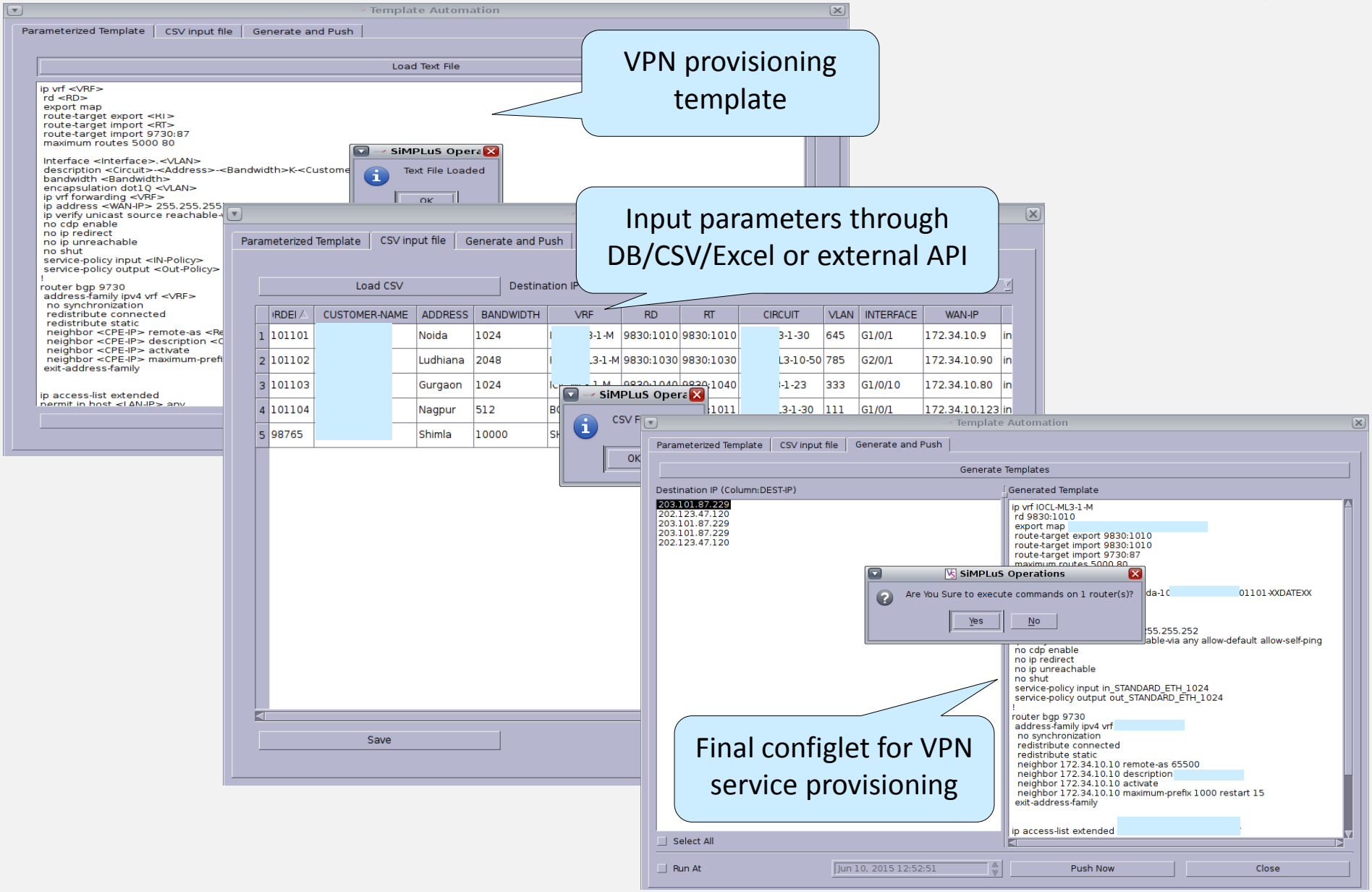
vegayan
Simplifying NextGen Networks

Initiate auto-service provisioning from control layer or user-order

- Select service type, bandwidth & quality from controller/order info
- Select available interface, sub-interface or virtual interface
- Select WAN-IP address from available pool & register N/W info
- Select circuit-ID or interface description & aliases w policy logic
- Select vendor-specific provisioning template w given parameters
- Select network-specific parameters e.g. VRF, RD/RT, VLAN …
- Ensure compliance to various policies e.g. security, access, QoS, …
- Push / execute final provisioning configlet to routers/switches
- Verify execution success or log errors

Automated Service Provisioning

vegayan
Simplifying NextGen Networks



Patch/upgrade Management

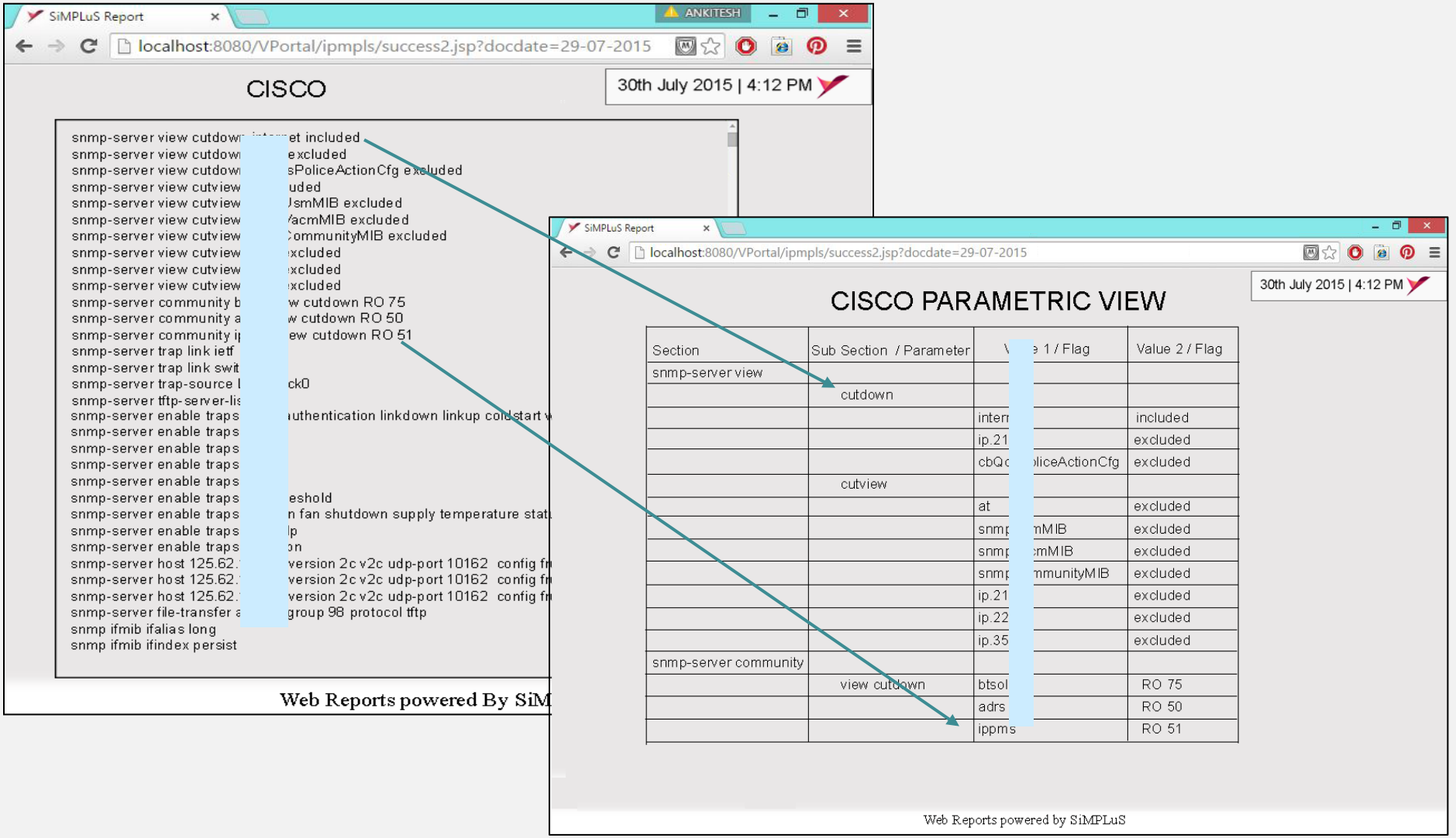
vegayan
Simplifying NextGen Networks

- ❖ Patch for security vulnerability or OS upgrade
- ❖ New access/QoS policy implementation
- ❖ Transition to new network design policy (e.g. from SNMP-v2 to v3)
- Configuration upgrade to 1000's of devices as per policy or for patch
- Devices listing selected based on vendor, model & OS number etc.
- Policy compliance audit of entire N/W – List of noncompliant devices
- Selective bulk push to dev-list – Auto-execute patch/upgrade in parallel
- Intelligent summary of results – Success log & failure report

→ Simplifies task from multiple hours / days to few minutes

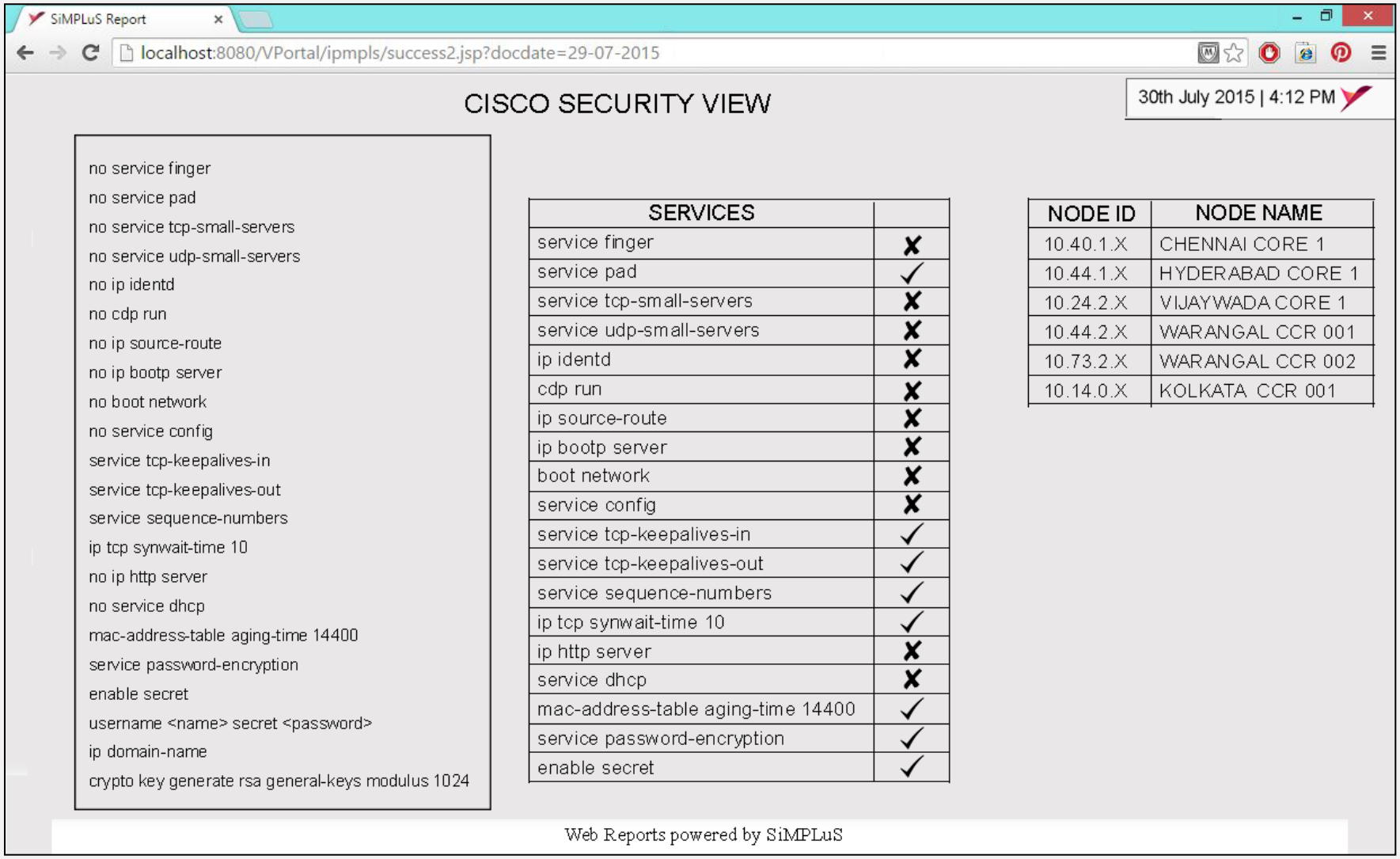
SNMP Configuration

vegayan
Simplifying NextGen Networks

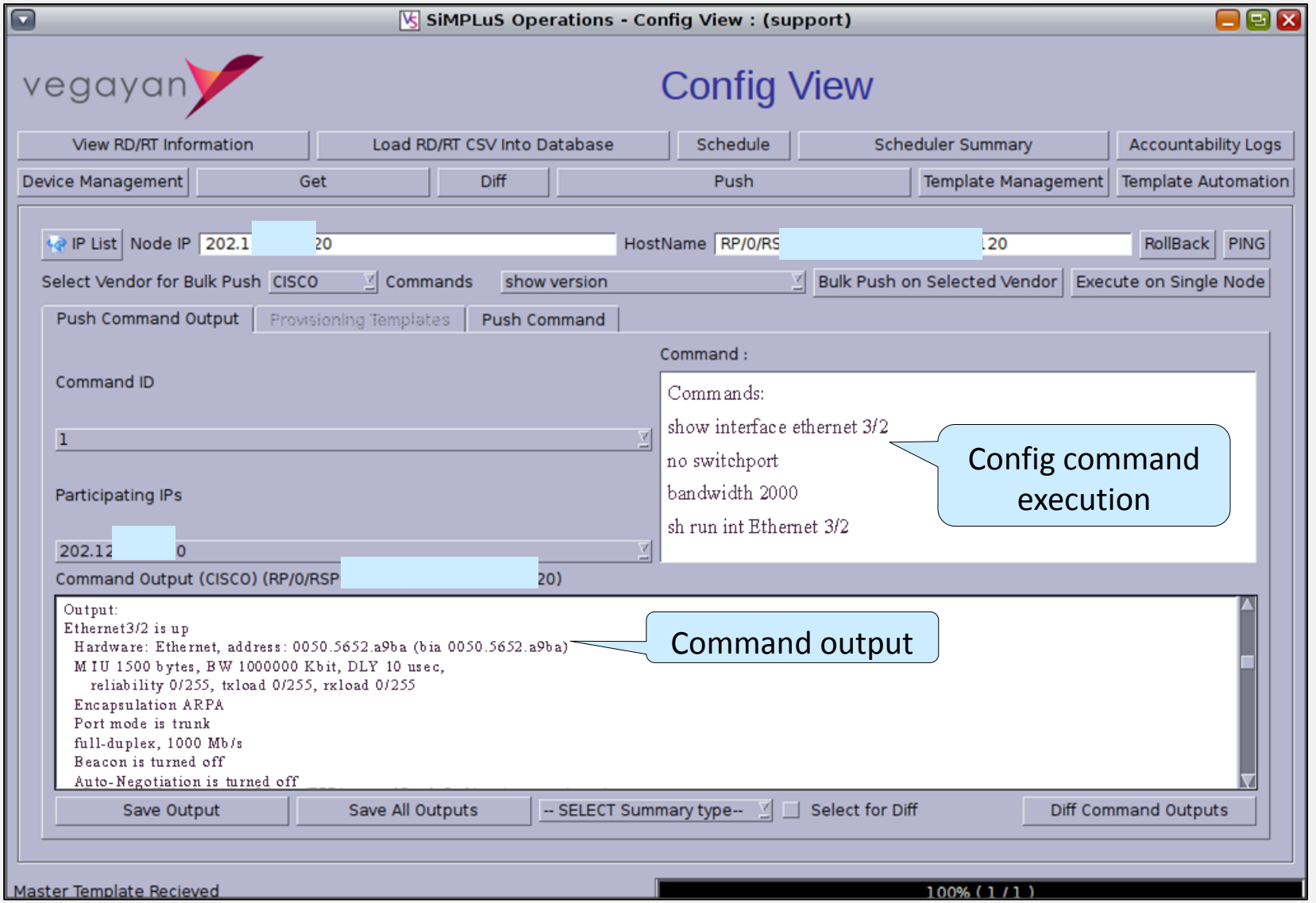


Security Policy Implementation

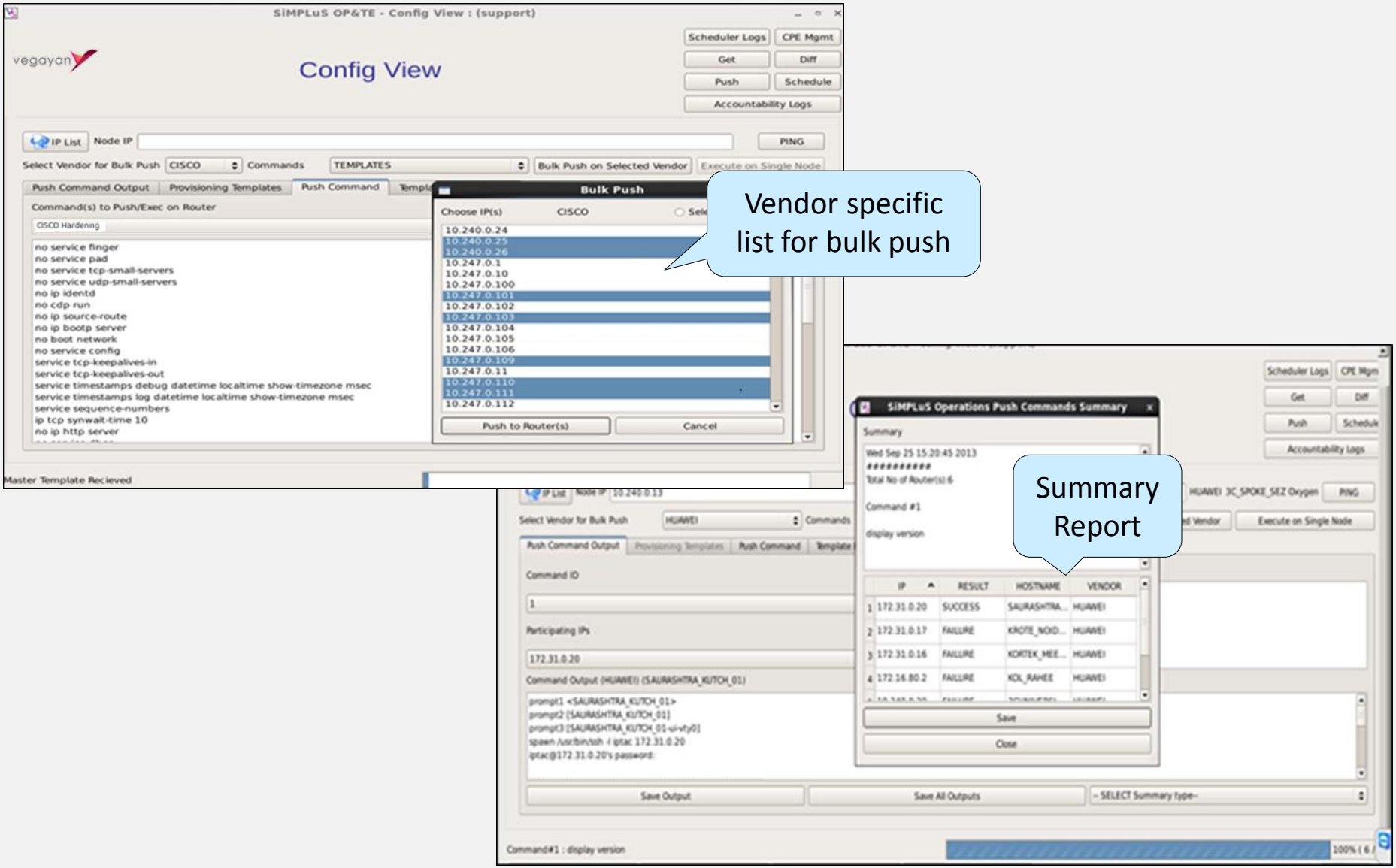
vegayan
Simplifying NextGen Networks



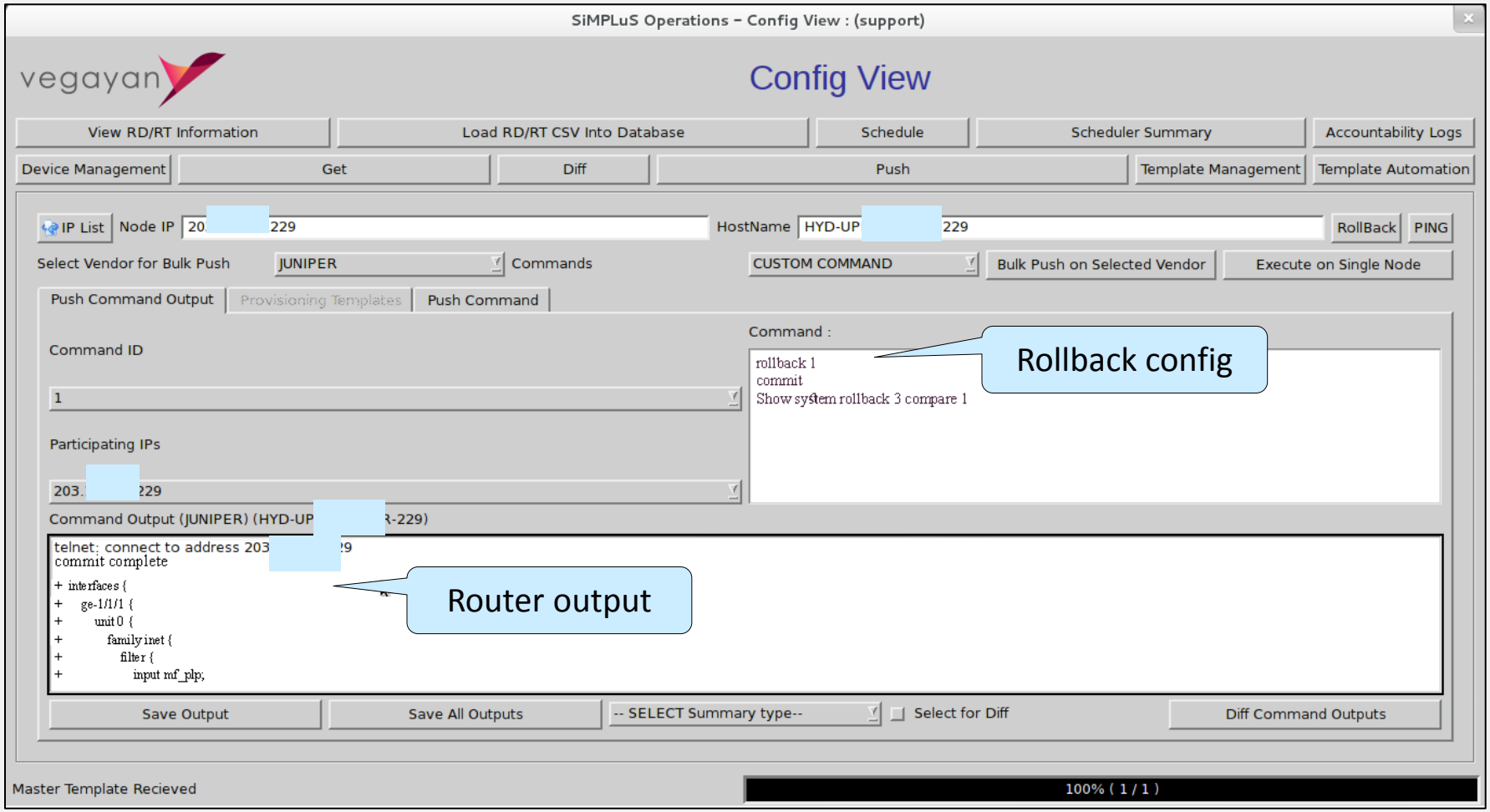
Push Command



Bulk Push


SIMPLuS OP&TE - Config View : (support)
Config View
Scheduler Logs
CPE Mgmt
Get
Diff
Push
Schedule
Accountability Logs
IP List
Node IP
PING
Select Vendor for Bulk Push
CISCO
Commands
TEMPLATES
Bulk Push on Selected Vendor
Execute on Single Node
Push Command Output
Provisioning Templates
Push Command
Command(s) to Push/Exec on Router
CISCO Hardening
no service finger
no service pad
no service tcp-small-servers
no service udp-small-servers
no ip identd
no cdp run
no ip source-route
no ip bootp server
no boot network
no service config
service tcp-keepalives-in
service tcp-keepalives-out
service timestamps debug datetime localtime show-timezone msec
service timestamps log datetime localtime show-timezone msec
service sequence-numbers
ip tcp synwait-time 10
no ip http server
Bulk Push
Choose IP(s)
CISCO
10.240.0.24
10.240.0.25
10.240.0.26
10.247.0.1
10.247.0.10
10.247.0.100
10.247.0.101
10.247.0.102
10.247.0.103
10.247.0.104
10.247.0.105
10.247.0.106
10.247.0.109
10.247.0.11
10.247.0.110
10.247.0.111
10.247.0.112
Push to Router(s)
Cancel
Master Template Recieved
Vendor specific list for bulk push
SIMPLuS Operations Push Commands Summary
Summary
Wed Sep 25 15:20:45 2013
Total No of Router(s) 6
Command #1
display version
IP
RESULT
HOSTNAME
VENDOR
1 172.31.0.20 SUCCESS SAURASHTRA... HUAWEI
2 172.31.0.17 FAILURE KROTE_NOID... HUAWEI
3 172.31.0.16 FAILURE KORTEK_MEE... HUAWEI
4 172.16.80.2 FAILURE KOL_RAHEE HUAWEI
Save
Close
Summary Report
Select Vendor for Bulk Push
HUAWEI
Push Command Output
Command ID
Participating IPs
172.31.0.20
Command Output (HUAWEI) (SAURASHTRA_KUTCH_01)
Save Output
Save All Outputs
-- SELECT Summary type--
Command#1 : display version

Rollback Config



Automation in provisioning & policy implementation to enable SDN

vegayan
Simplifying NextGen Networks

- Network set-up is abstracted by a vendor-neutral layer
- Network provisioning & policies are simplified in parametric form
- Decision-making & parameter value selection is automated by logic building block with preselected rules
- Logical rule selections capture N/W design criteria, human decision making steps & external information (through set interfaces)
- Allows fast execution with ability to scale to 1000's of devices
- Allows network-wide changes in policy or patch roll-out

→ Automation provides dynamic & flexible WAN network control

Hides complexity in config syntax & N/W design policy criteria

vegayan
Simplifying NextGen Networks

Thank You

Vegayan Systems Pvt. Ltd.

Website: www.vegayan.com

Further information: info@vegayan.com

Sales enquiries: sales@vegayan.com