FACING CABLE INDUSTRY CHALLENGES

Fast deployment / low cost delivery methods, add pressures to cable providers in terms of cost, time, bandwidth and service diversity

| Revenue Sources	Cost Drivers	Optimization Enablers
SUBSCRIBERS — Quick activation of subscribers	**DEVICES**	**Automation**
SERVICES — Introduction and expansion of services	Multi-device delivery Simplify implementation Prevent errors Accelerate development Facilitate operation Optimize performance **NETWORK**	**Virtual Networking** **SDN**
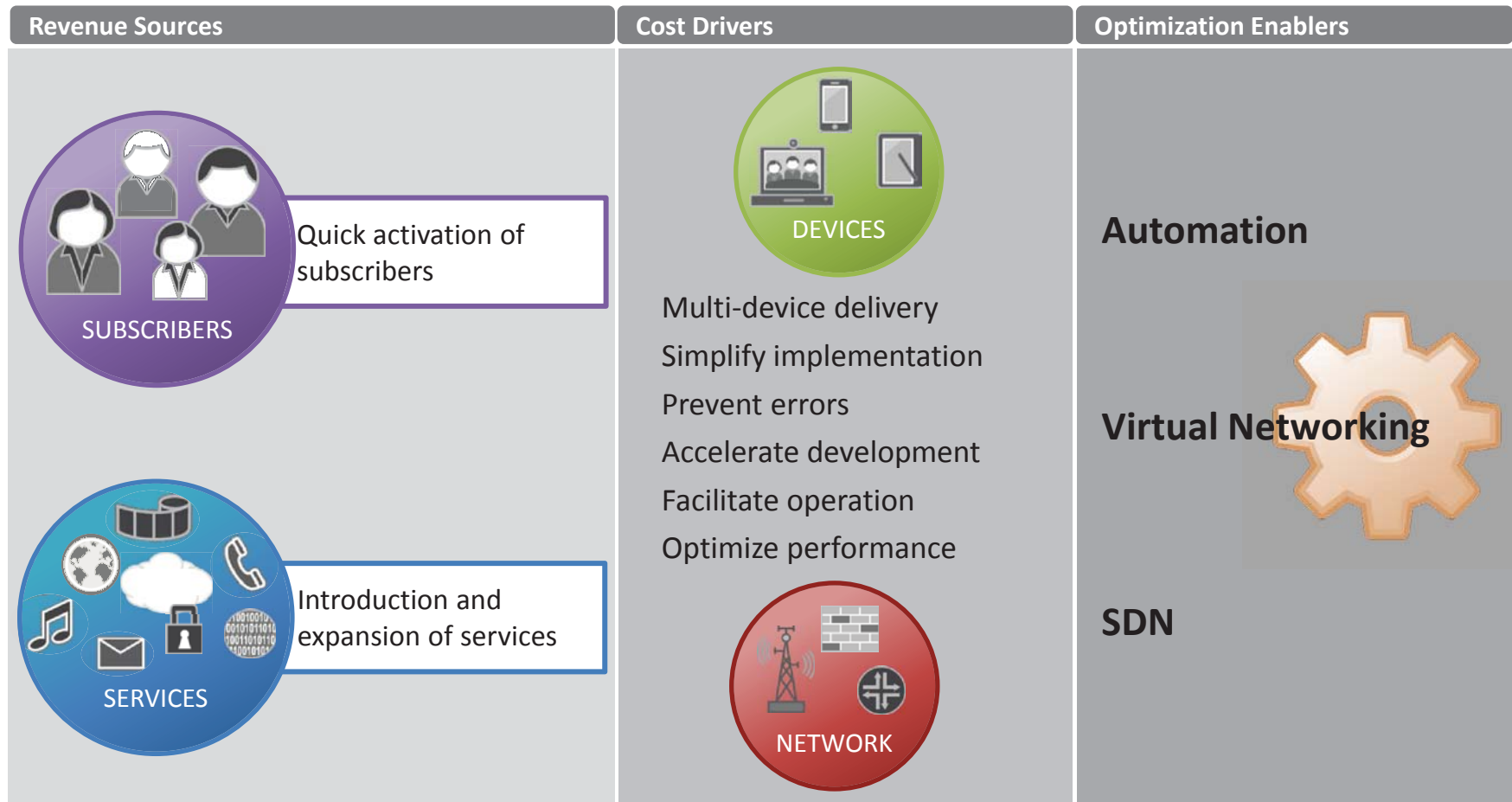
VIRTUALIZATION ROLE ON OPTIMIZATION LAB TEST OF SDN AND AUTOMATION

SDN helps operators to optimize cost performance by introducing adaptive networking and increase revenues by enabling new advanced services and dynamic service chaining. SDN facilitates smart distribution, and boosts network potential.

Automation accelerates configuration of new nodes, users and services, and can also contribute to reduce implementation errors.

Virtual networking lab environments allow for true scale testing for reliable development of services and creation of automation templates, scripts and tools.

> **Virtual Networking Labs enable reliable and efficient implementation of SDN and automation**

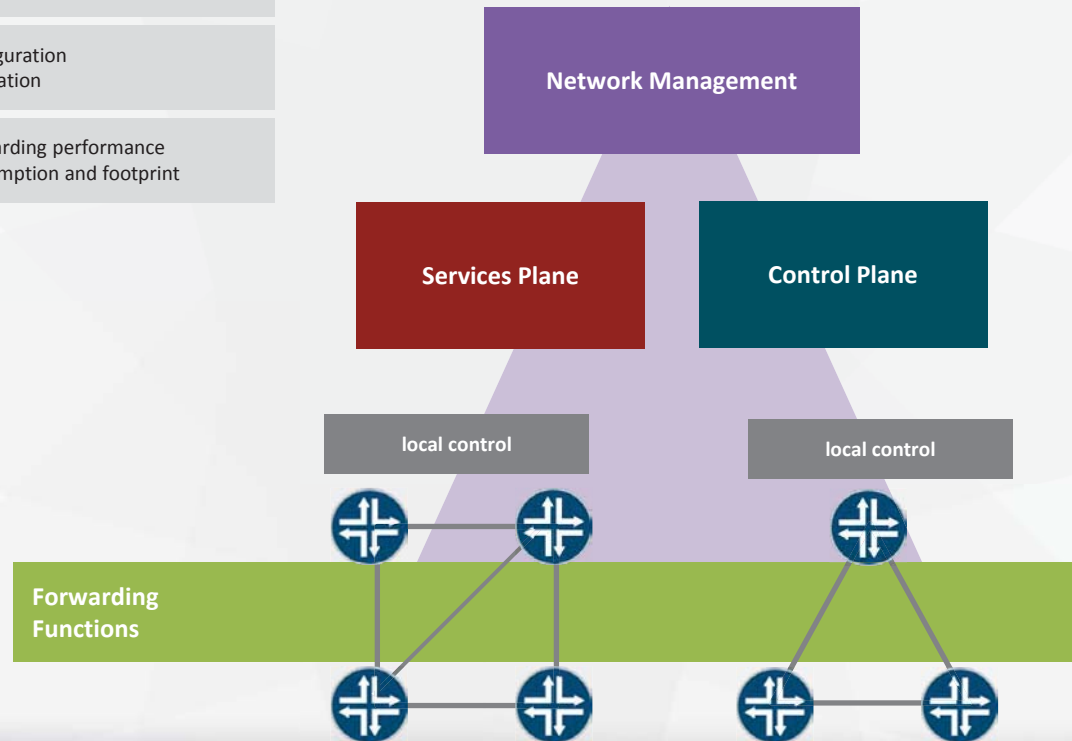**Virtual Networking**   **Automation**
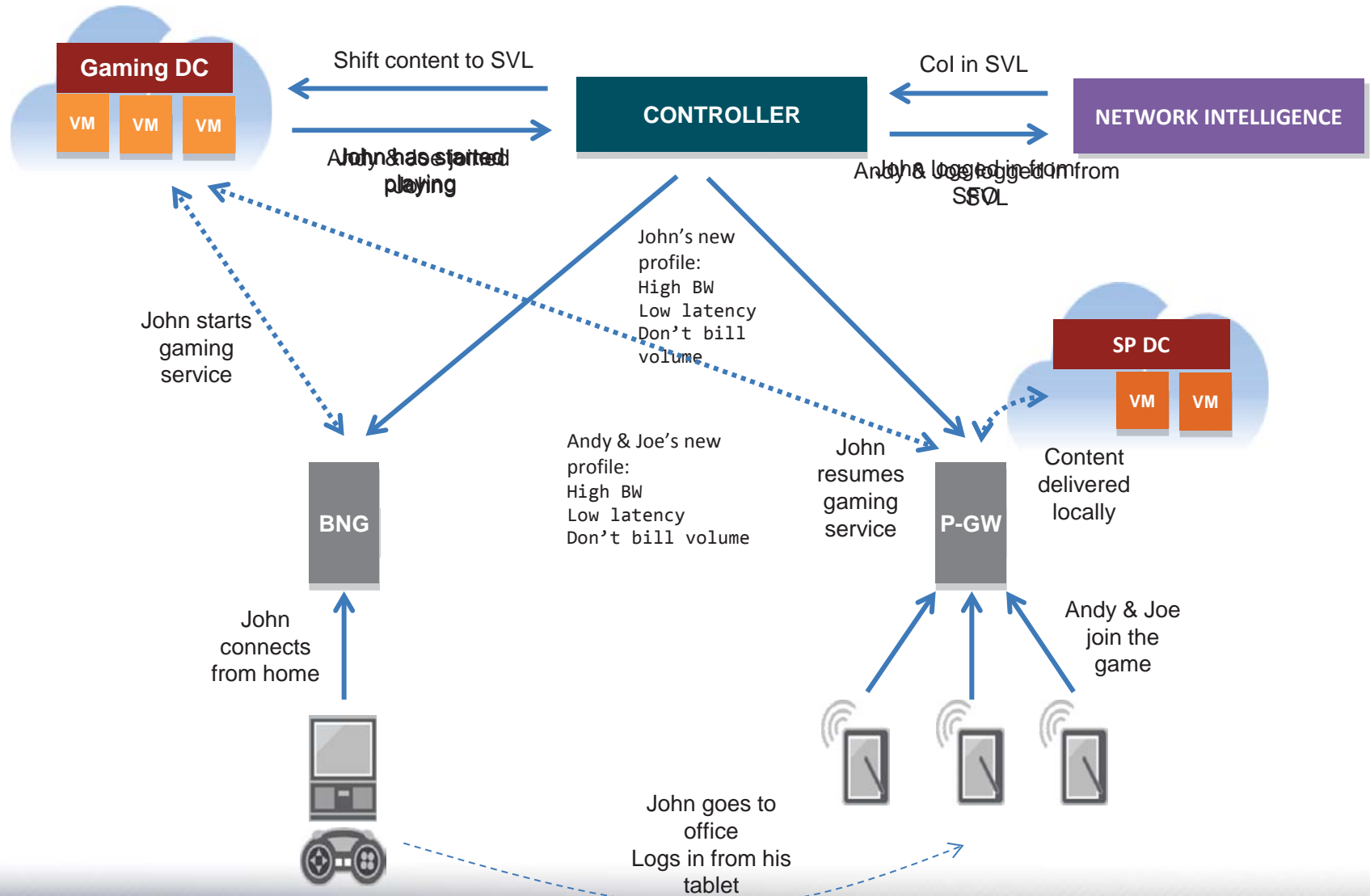
SDN
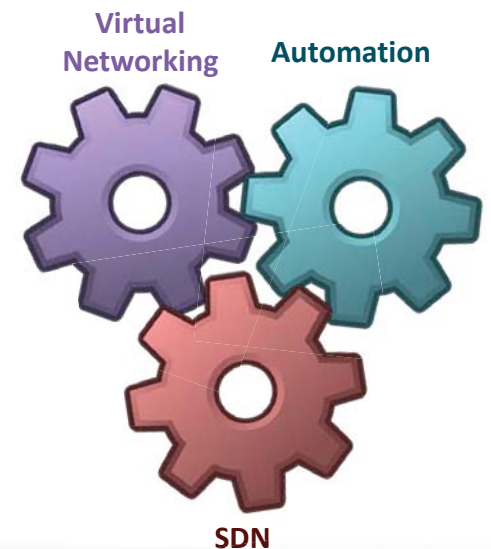
Overview of SDN

SDN PRINCIPLES

Separation of networking functional blocks to create modular service development through balanced centralized/distributed deployment of these functions

Network Management	Unified network operation Smart discovery and orchestration
Services Plane	Accelerate creation of differentiated services Multi-source platforms
Control Plane	Simplify network configuration Dynamic route optimization
Forwarding Functions	Maximize bitrate forwarding performance Minimize power consumption and footprint

Network Management

Services Plane

Control Plane

local control

local control

Forwarding Functions

SDN EXAMPLE
SERVICE CHAINING IN ACTION

Gaming DC

VM VM VM

Shift content to SVL

Col in SVL

CONTROLLER

NETWORK INTELLIGENCE

John has started
playing

Andy & Joe logged on from
SVL

John's new
profile:
High BW
Low latency
Don't bill
volume

John starts
gaming
service

SP DC

VM VM

Andy & Joe's new
profile:
High BW
Low latency
Don't bill volume

John
resumes
gaming
service

Content
delivered
locally

BNG

P-GW

John
connects
from home

Andy & Joe
join the
game

John goes to
office
Logs in from his
tablet

Use of a virtual lab for network optimization

Step by step implementation

LAB PRACTICES TODAY
PLANNING, DEPLOYMENT AND MAINTENANCE

Today…

How much **time** does it take you to set a test environment to verify new services or automation scripts?

How often do you test these elements at on a large **scale** environment

Is it feasible to test at a large scale on a network with the same properties as the production environment… and do so **efficiently**?

What do you do when the network experiences problems?... do you have time to **verify** the fix before pushing it into production?

STEP 1
CAPTURE THE PRODUCTION NETWORK

The Network Capture technology allows for quick replication of the production environment in the virtual lab to facilitate planning, test of automated procedures, and conduct efficient operational pre-tests for services.
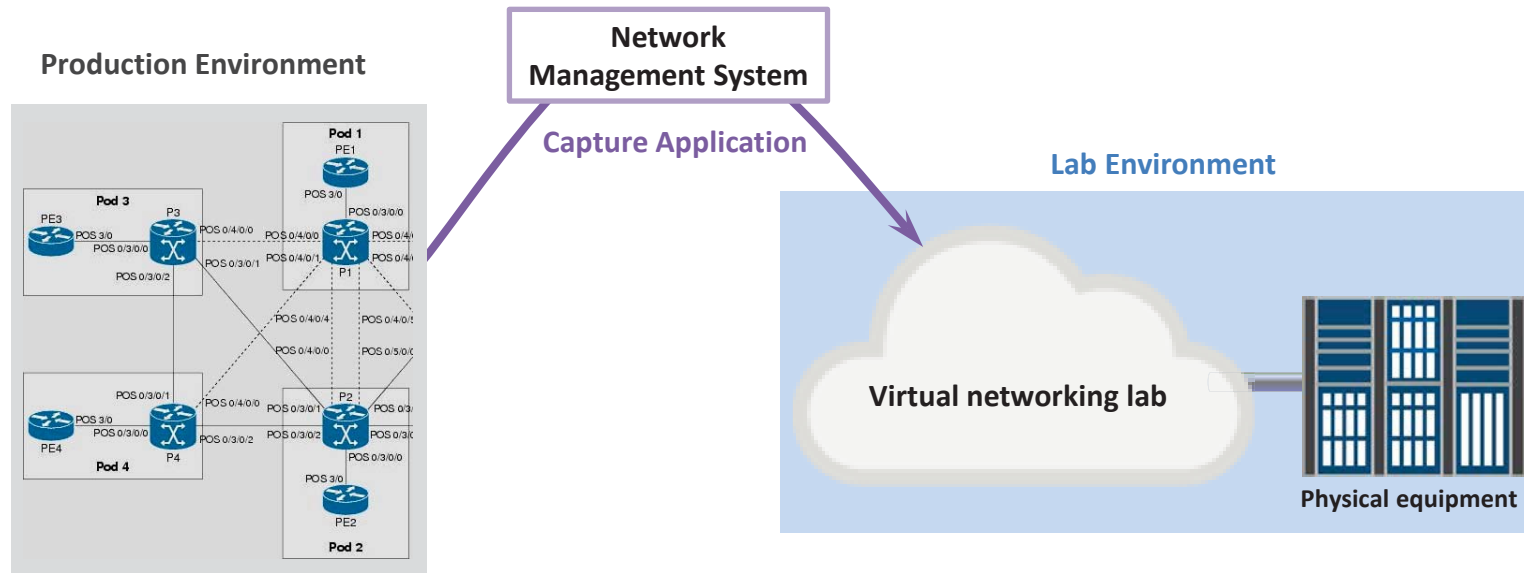
Next-gen lab automation method, patented by Juniper, boosts operational efficiency

STEP 2
ADD TOOLS AND NODES TO NETWORK CAPTURE

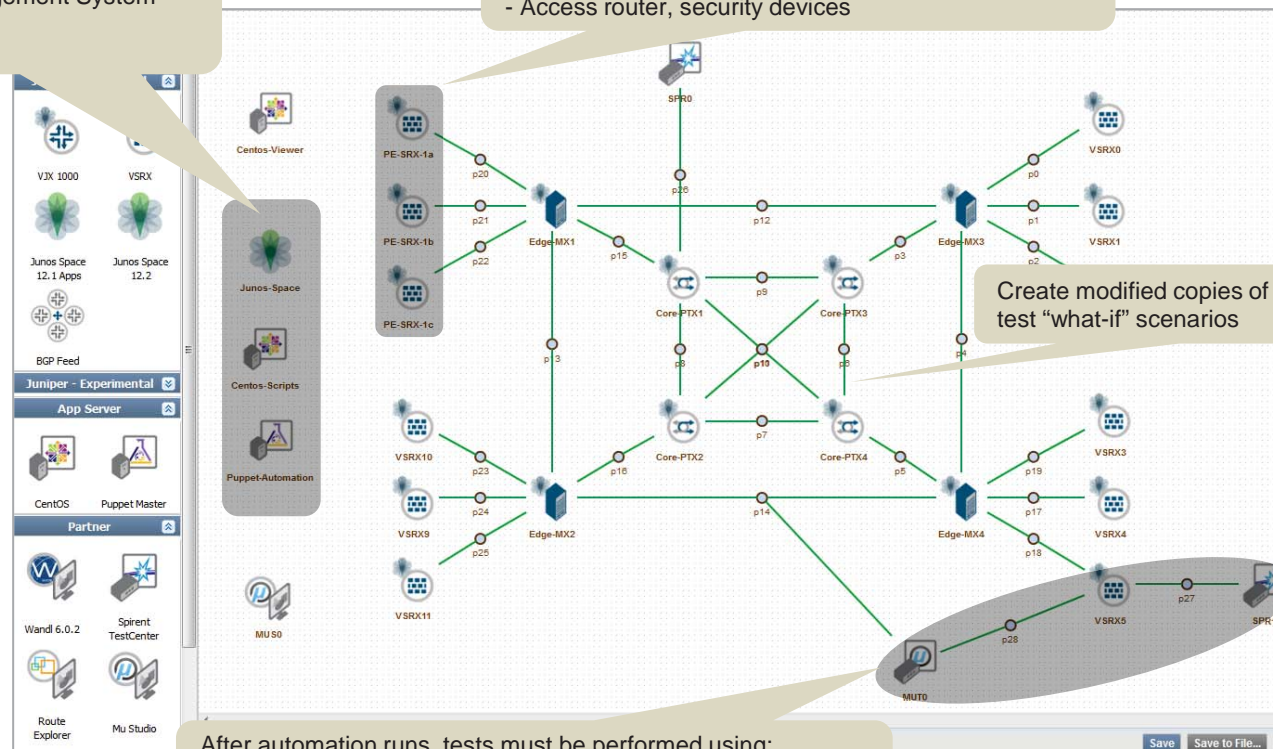Case 1: Test automated configuration to add new subscribers on any access node

Case 2: Test automation to enable a service to a subscriber

Config automation can use:
- Templates on Management System
- Custom Linux scripts
- Puppet tools

Automated configurations can be applied to new network nodes:
- Access router, security devices

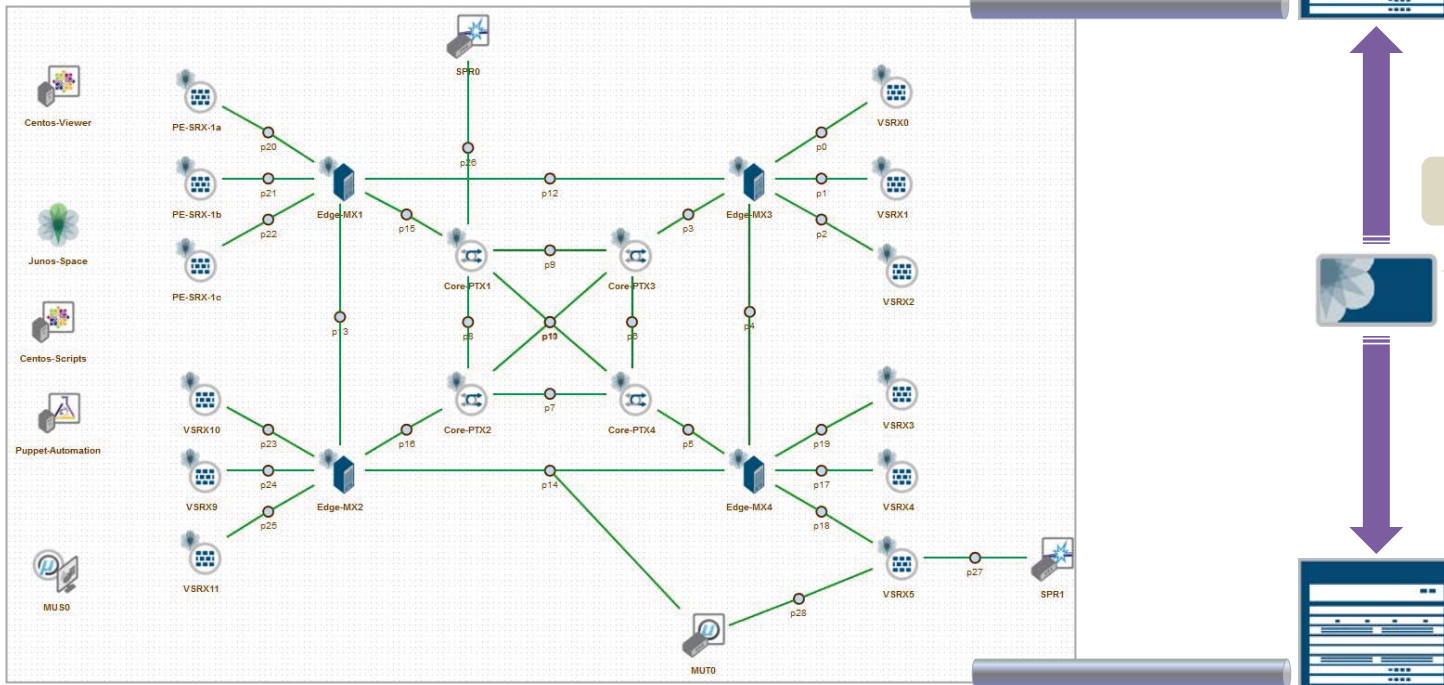Create modified copies of the topology to test "what-if" scenarios

After automation runs, tests must be performed using:
- Ecosystem tools
- Junos Space alarms / information

STEP 3
DEVELOP AND TEST VIRTUAL SERVICES WITH VIRTUAL APP ENGINE

Scale testing of tethered services, and service chaining, using a hybrid virtual-to-physical connector

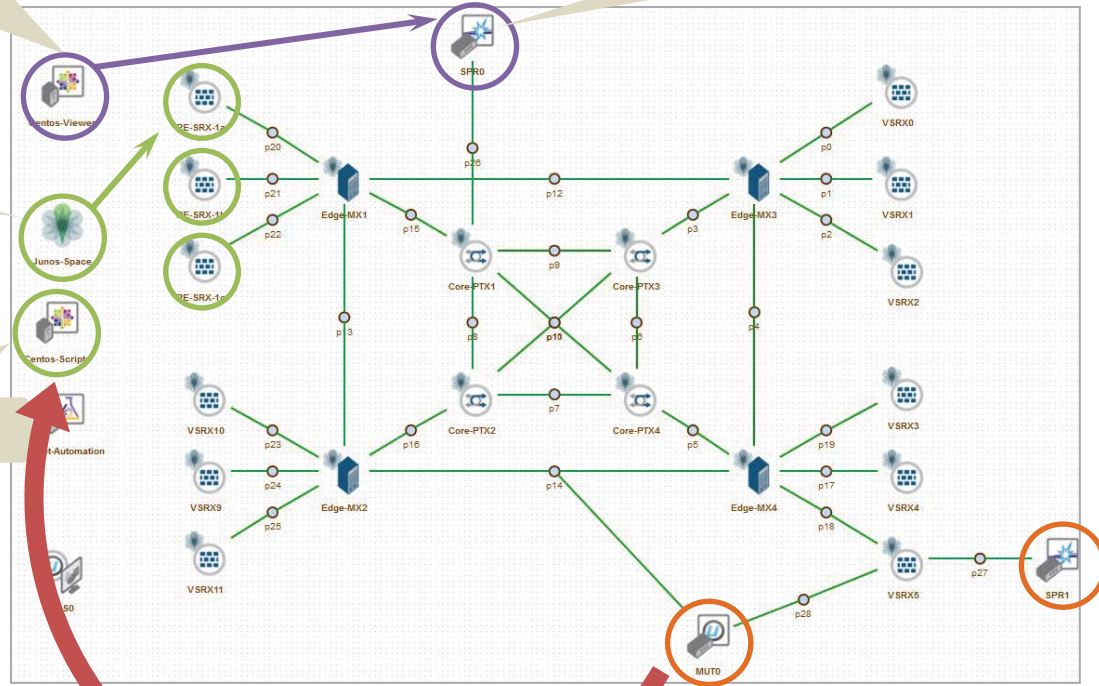Run and test new services on a centralized services engine

STEP 4
TEST AND CORRECT ON VIRTUAL LAB

Run test scripts using APIs to control test equipment

Generate traffic and test proper operation of protocols and policies at scale

Run batch process to apply config templates to multiple nodes

Load Space SDKs on Centos server

Revise configurations and automation tools to eliminate errors

Society of Cable Telecommunications Engineers

STEP 5
ADD THE TESTED METHODS INTO PRODUCTION

Topologies	Scripts	Templates	Configurations
Topologies are stored as efficient zip files that can be shared within Junosphere sandboxes. Topologies can be reused multiple times, copied, and analyzed by diverse teams.	All scripts can be uploaded and downloaded between the user's machine and the instance in Junosphere's sandbox via FTP. The corrected scripts can be copied and passed from the development team to the engineering and implementation teams.	The revised templates from the Space instance in Junosphere, can be transferred to the Space system on the production network.	With new developments to the VMX, users will be able to run the same configuration file in Junosphere and their physical nodes.

All network, configuration and automation information can be shared transparently from automation and architecture design to the engineering and operation teams. All teams have copies of the test files, and can easily submit specific / reproducible feedback when they detect issues.

Pre-production | Production

Planning & Design | Subscriber & Service activation | Operation and troubleshooting

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