IP SHOWCASE THEATRE

CURATED BY VSF VIDEO SERVICES FORUM

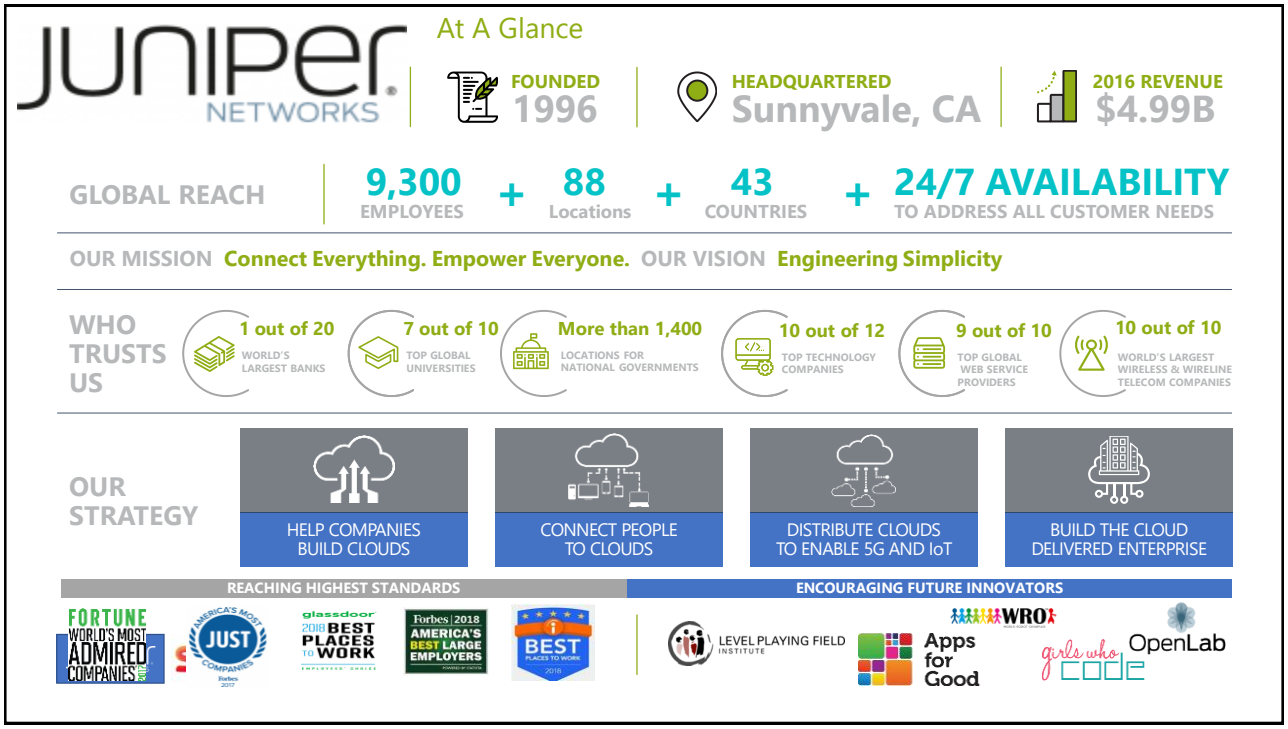
SDN Controller in WAN for content distribution

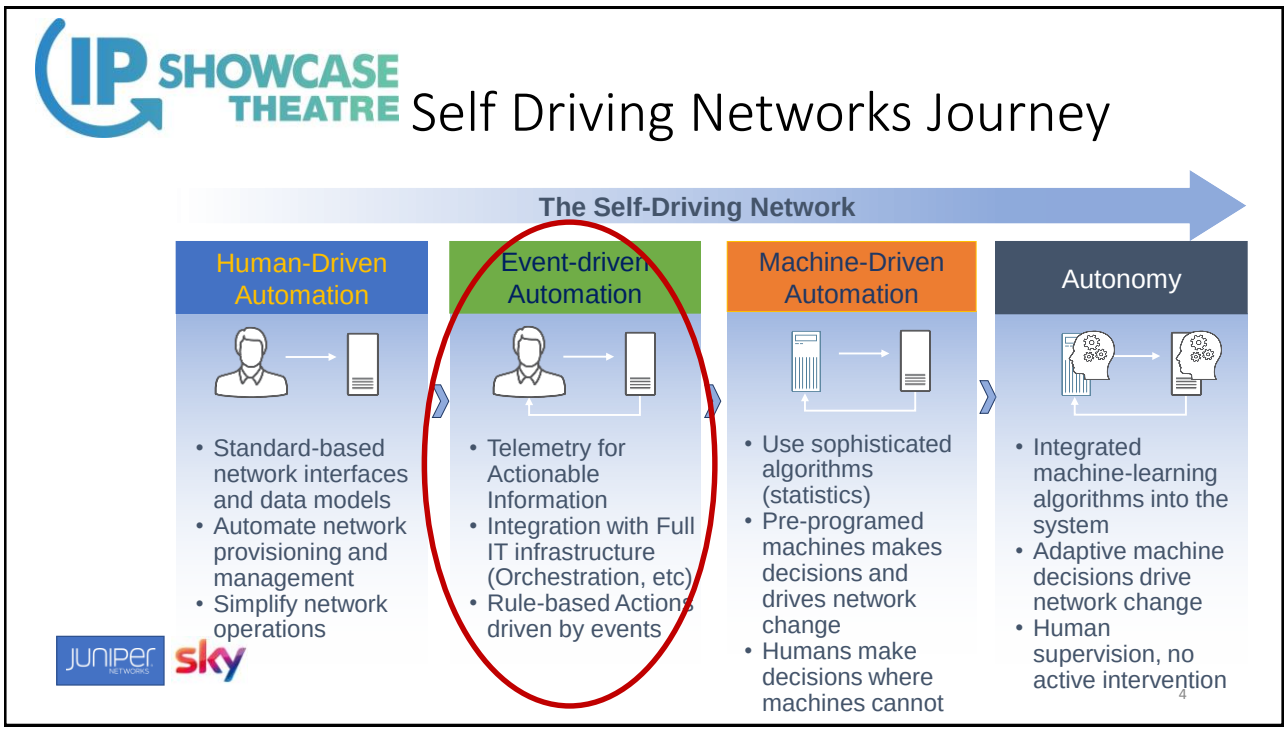
Massimo Magnani – Consulting Engineer – Juniper Networks

Gabriele Ubertini – Director of Technology Engineering and Innovation – SKY Italia

JUNIPER NETWORKS sky

IP SHOWCASE THEATRE AT IBC – SEPT. 14-18, 2018


JUNIPER NETWORKS
At A Glance
FOUNDED 1996
HEADQUARTERED Sunnyvale, CA
2016 REVENUE $4.99B
GLOBAL REACH
9,300 EMPLOYEES + 88 Locations + 43 COUNTRIES + 24/7 AVAILABILITY TO ADDRESS ALL CUSTOMER NEEDS
OUR MISSION Connect Everything. Empower Everyone. OUR VISION Engineering Simplicity
WHO TRUSTS US
1 out of 20 WORLD'S LARGEST BANKS
7 out of 10 TOP GLOBAL UNIVERSITIES
More than 1,400 LOCATIONS FOR NATIONAL GOVERNMENTS
10 out of 12 TOP TECHNOLOGY COMPANIES
9 out of 10 TOP GLOBAL WEB SERVICE PROVIDERS
10 out of 10 WORLD'S LARGEST WIRELESS & WIRELINE TELECOM COMPANIES
OUR STRATEGY
HELP COMPANIES BUILD CLOUDS
CONNECT PEOPLE TO CLOUDS
DISTRIBUTE CLOUDS TO ENABLE 5G AND IoT
BUILD THE CLOUD DELIVERED ENTERPRISE
REACHING HIGHEST STANDARDS
ENCOURAGING FUTURE INNOVATORS
FORTUNE WORLD'S MOST ADMIRED COMPANIES
JUST
glassdoor 2018 BEST PLACES TO WORK
Forbes 2018 AMERICA'S BEST LARGE EMPLOYERS
BEST PLACES TO WORK 2018
LEVEL PLAYING FIELD INSTITUTE
Apps for Good
WRO
girls who CODE
OpenLab


IP SHOWCASE THEATRE
Self Driving Networks Journey
The Self-Driving Network
Human-Driven Automation
• Standard-based network interfaces and data models
• Automate network provisioning and management
• Simplify network operations
Event-driven Automation
• Telemetry for Actionable Information
• Integration with Full IT infrastructure (Orchestration, etc)
• Rule-based Actions driven by events
Machine-Driven Automation
• Use sophisticated algorithms (statistics)
• Pre-programed machines makes decisions and drives network change
• Humans make decisions where machines cannot
Autonomy
• Integrated machine-learning algorithms into the system
• Adaptive machine decisions drive network change
• Human supervision, no active intervention
JUNIPER NETWORKS
sky
4

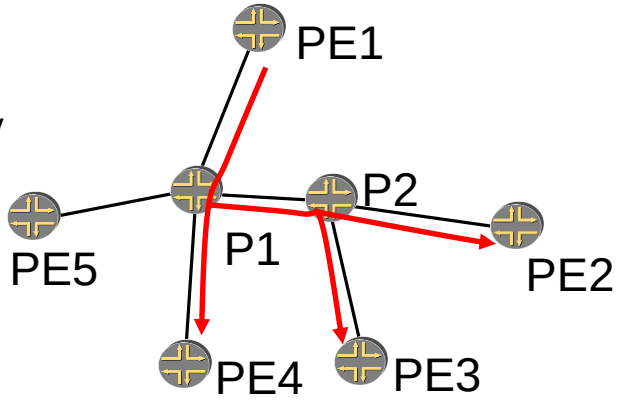
A quick technological recap…

P2MP IP/MPLS LSP is THE technology of choice to distribute multicast contents

Replication happens where needed only

Fast restoration to minimize traffic loss

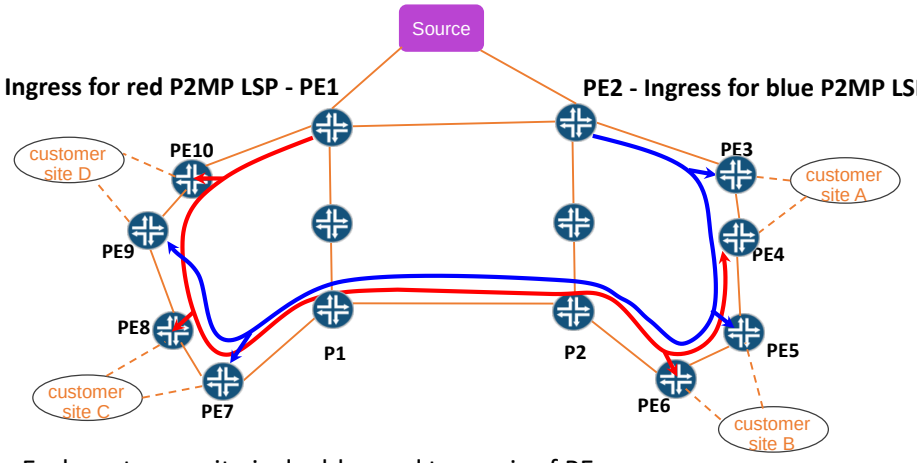
Constraints based path computation



Let's see a very common application in media ip based distribution infrastructure

5

Why P2MP matters… diverse path

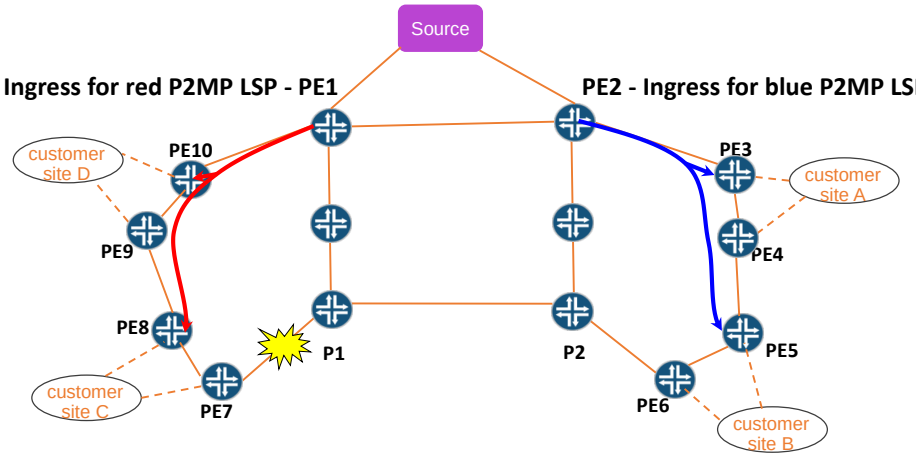


Each customer site is dual-homed to a pair of PEs

one PE is served by the red P2MP LSP, the other is served by the blue P2MP LSP.

6

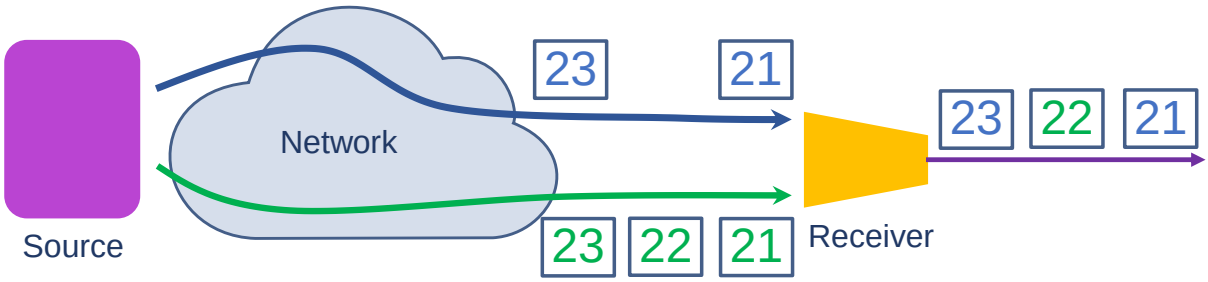
Why P2MP matters… diverse path



If any node or link breaks, each site is still served by at least one P2MP LSP, so no interruption to service

Live-Live seamless protection with diverse path are a perfect match!

SMPTE 2022-7 Seamless Protection



Two duplicate streams sent simultaneously into network: ”Live-live”

RTP media streams with sequence numbers

They follow diverse paths across network

Receiver buffers streams and inspects RTP seq # of packets – If packet with Seq. # N is missing from one stream, is replaced by corresponding packet from other stream

So, what?

So, now that we have understood what P2MP are, what path diversity is, how do these two solutions map to an SDN WAN Controller?

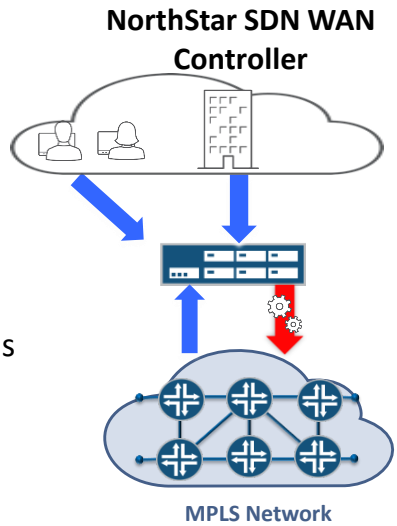
9

SDN WAN Controller: What is it?

It's a single pane of glass which can:

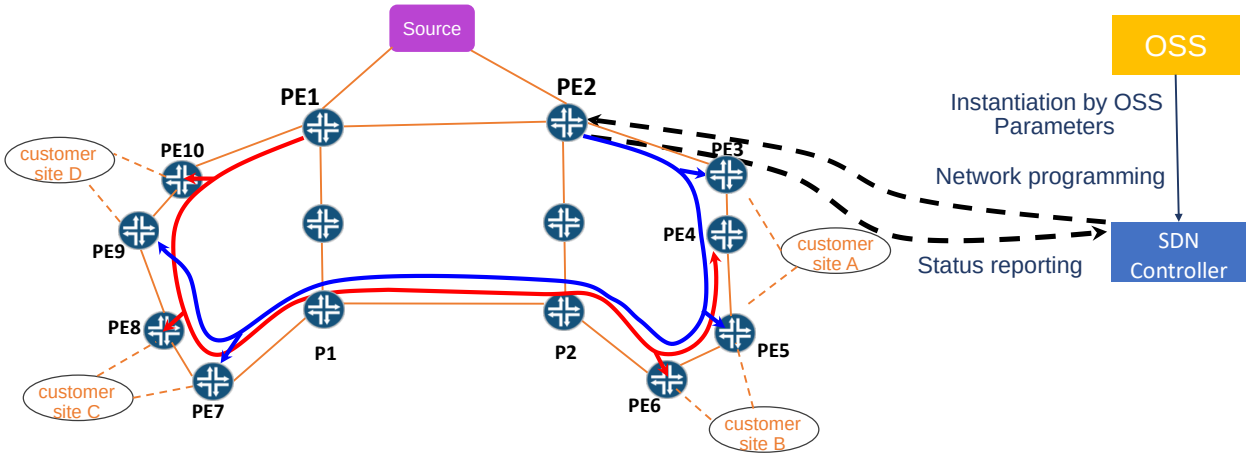
- Acquire full network states in real-time
- Show Network topology and states in real time
- Receive requests by users
- Receive requests by external systems (OSS/BSS)
- Program the network according to requests
- Continuously monitor the network utilization
- Eventually, autonomously optimize network paths

How does it map on diverse path use case?



10

Diverse path with Controller



Diversely routed pair of P2MP LSPs requested via a single API call.
Controller performs diverse path computation and instantiates the LSPs onto the network

11

Relevance of AMWA IS-06

The IS-06 Network API in principle could be used between the OSS and the NorthStar Controller, as it has some of the required ingredients (endpoints, network flows etc)

At present, IS-06 does not have a way of requesting a pair of diversely-routed multicast trees. Also it does not deal with multi-tenant networks (e.g. mapping of a P2MP LSP to a particular tenant's VPN)

12

Juniper and SKY – The beginning

Juniper Networks and SKY TV Italy relationship has a long history starting in 2011…

Juniper Networks was selected to deliver a fully converged IP and video distribution solution

Since 2011, things have been hugely evolving in video technology

… hence transport infrastructure, and not only, must evolve too!

13

Juniper and SKY – The evolution

Juniper and SKY are on a multi-level journey to modernization involving

- Network Infrastructure
- Content delivery
- Network management, visibility and infrastructure usage optimization

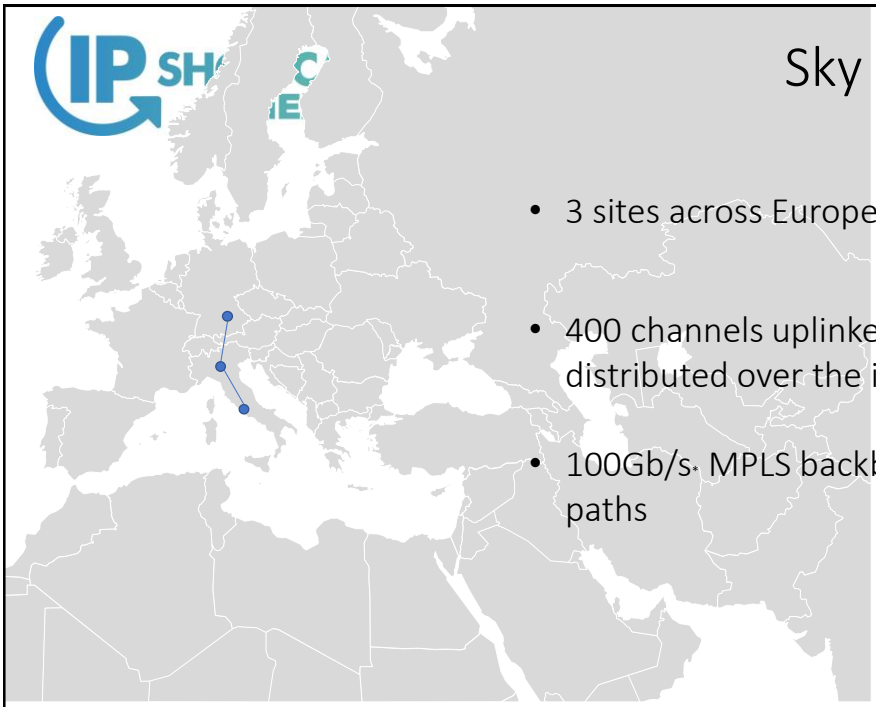
Good news: this is the perfect fit for SDN WAN controller!

14

Sky Italia

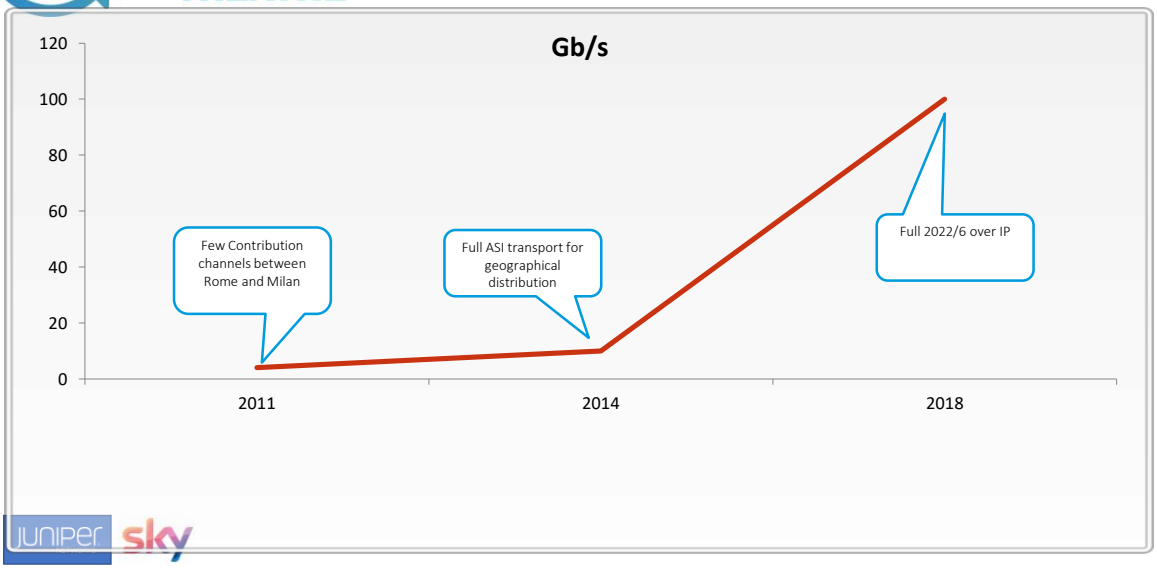
Sky Italia, established on July 31st, 2003, has a 5.5m subscriber base. It is part of Sky plc, Europe's leading entertainment company with 22 million customers across five countries: Italy, Germany, Austria, the UK and Ireland, Spain.

Sky Italia Facilities



- 3 sites across Europe
- 400 channels uplinked to satellite or distributed over the internet
- 100Gb/s MPLS backbone over 3 diverse paths

Sky Italia MPLS net Evolution



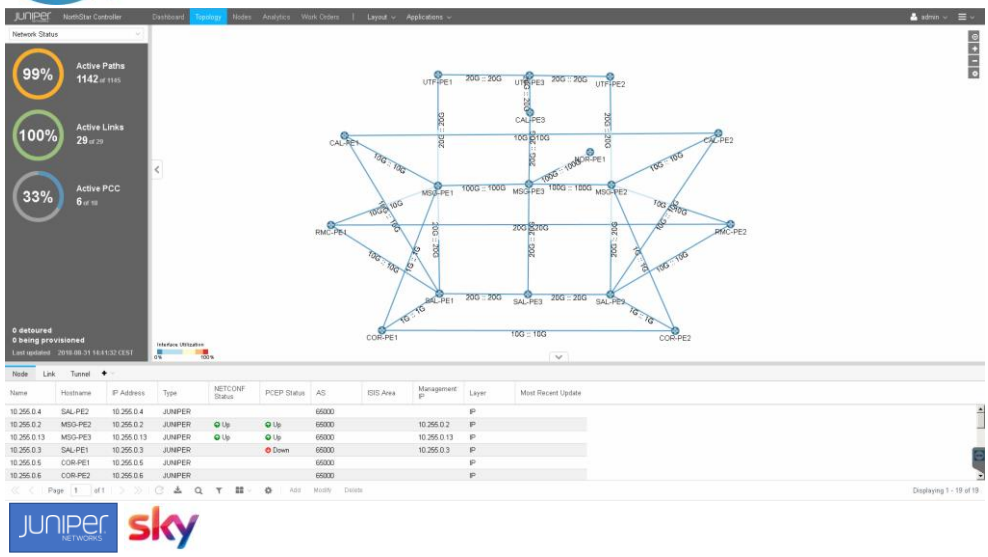
Monitoring&Control

- Simple CLI
- Dataminer Dashboard for alarm collection and performance tracking
- Northstar v3: visual monitoring and alarm collection

Monitor&Control Evolution

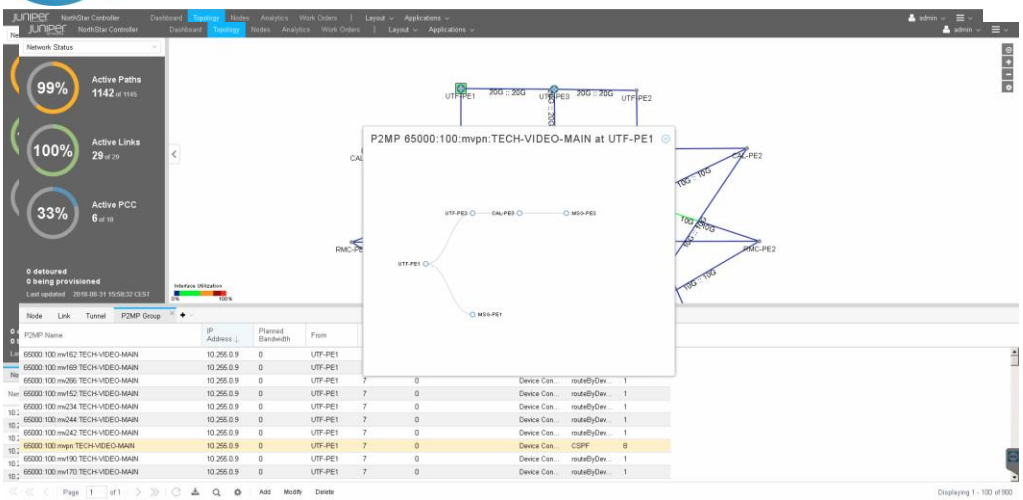
- Northstar v4: control and routing
- Future: self healing and application metrics mpls rerouting

How does NS look in SKY today?!



IP SHOWCASE THEATRE

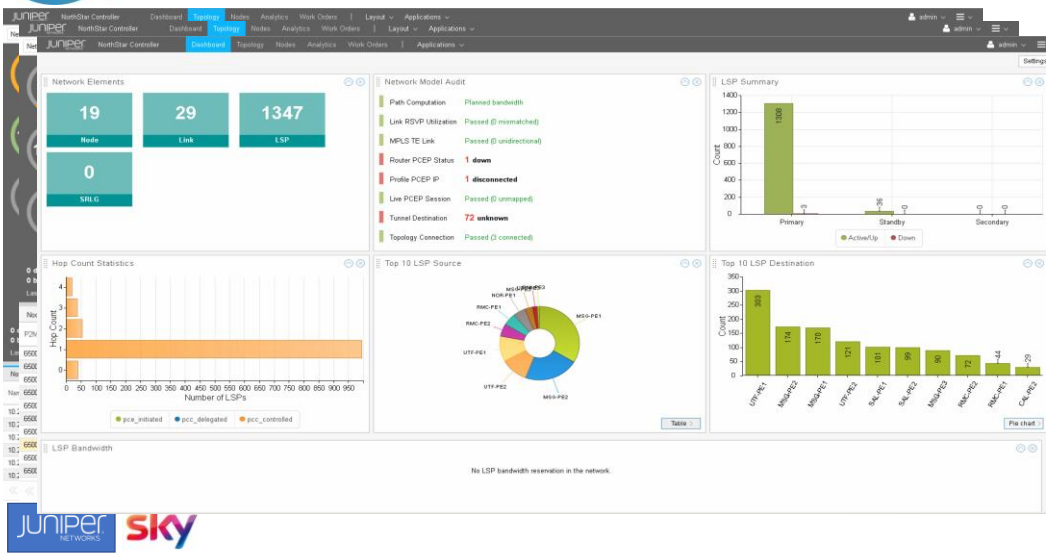
How does NS look in SKY today?!



JUNIPER NETWORKS sky

IP SHOWCASE THEATRE

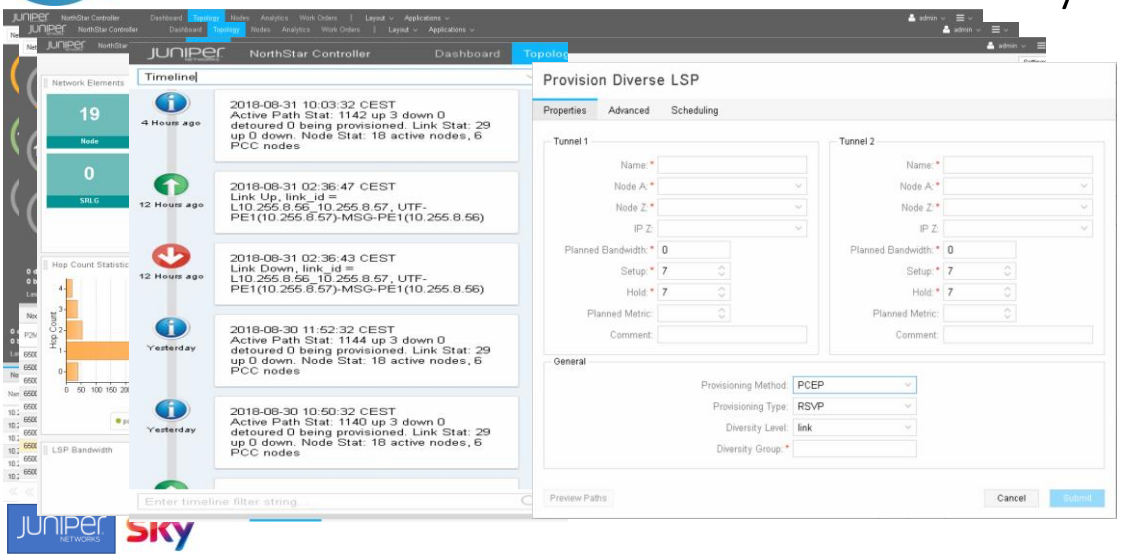
How does NS look in SKY today?!



JUNIPER NETWORKS sky

IP SHOWCASE THEATRE

How does NS look in SKY today?!



23

IP SHOWCASE THEATRE

CURATED BY VSF VIDEO SERVICES FORUM

Thank You

Massimo Magnani, Juniper Networks
mmagnani@juniper.net, +393492428808
Gabriele Ubertini, SKYTV Italy
gabriele.ubertini@skytv.it, +393492428808

IP SHOWCASE THEATRE AT IBC – SEPT. 14-18, 2018