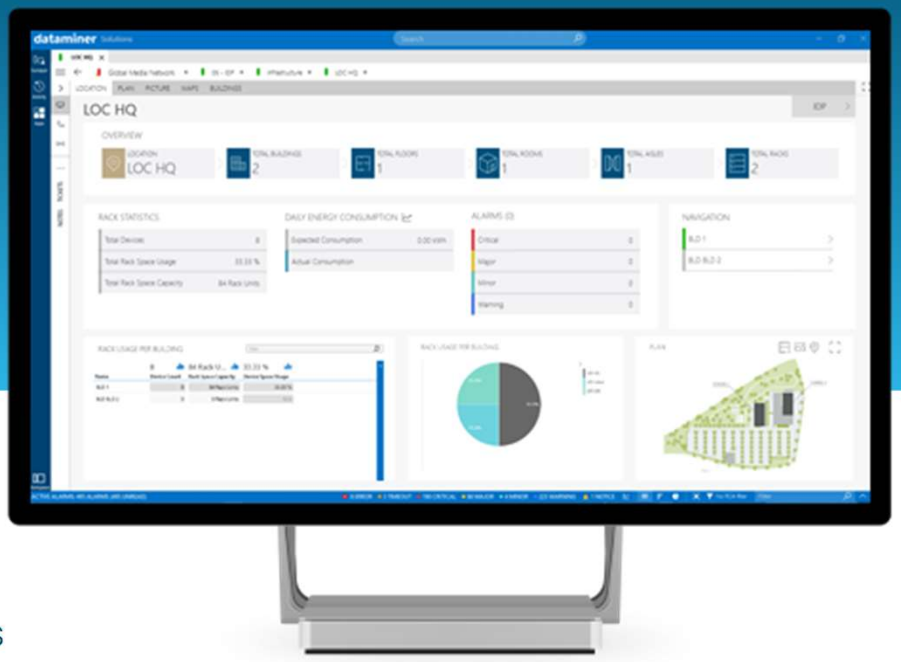
TECHNOLOGY PARTNER
WEBINAR

Innovative ways for Broadcasters to implement full IP content Contribution and Distribution

February 17th, 2021



Rahul Parameswaran
Manager, Technical Marketing, Cisco

Laurens Serneels
Media Solution Consultant, Skyline Communications

Cisco

- Cisco IPFM enables
  - Flexible IP fabric for SDI to IP transition
  - Automation through open APIs/ DCNM to simplify deployment
  - Real Time Telemetry for flow health monitoring
- Cisco Media Data Center
  - Optimized for post-production workflows

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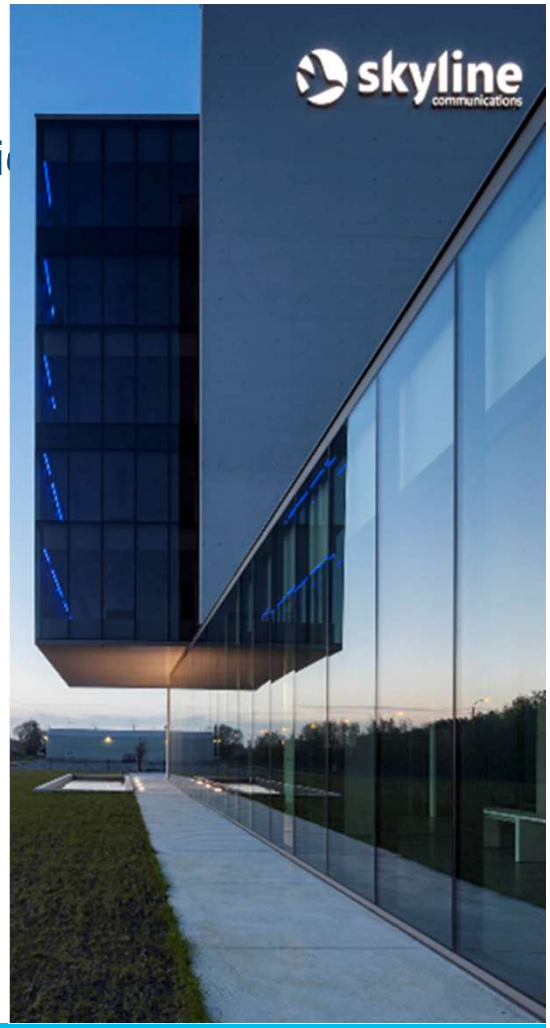
Skyline Communications

Redefining how operators can manage their entire operati more easily than ever before

- global leading software & ICT publisher for open monitoring & orchestration solutions
- focus on media & broadband industry
- connecting the world since 1985
- privately held – large operational freedom
- 350 staff across 20 different countries
- 1500+ users over 125 countries
- 9000+ nodes deployed
- 7000+ drivers for products from 1000+ different vendors



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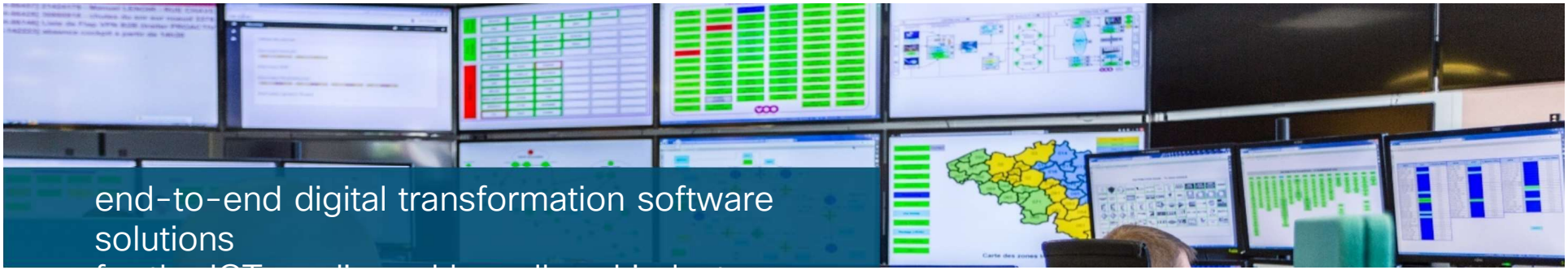

end-to-end digital transformation software solutions

- one powerful proven off-the-shelf platform that is vendor independent (multi-vendor)
- highly scalable, data driven operation
- AI enabled platform for faster troubleshooting and pro-active operation
- native flexibility & agility designed for dev-ops environments
- connects teams together into collaborative and multi-tenant organizations
- purpose-designed technology for your type of ICT media and broadband operation
- empowered by the open DataMiner Dojo community

Business, operational and technical process automation

Service life cycle orchestration and monitoring

(LSO)

Manage IT, media and broadband infrastructure

on premise - cloud

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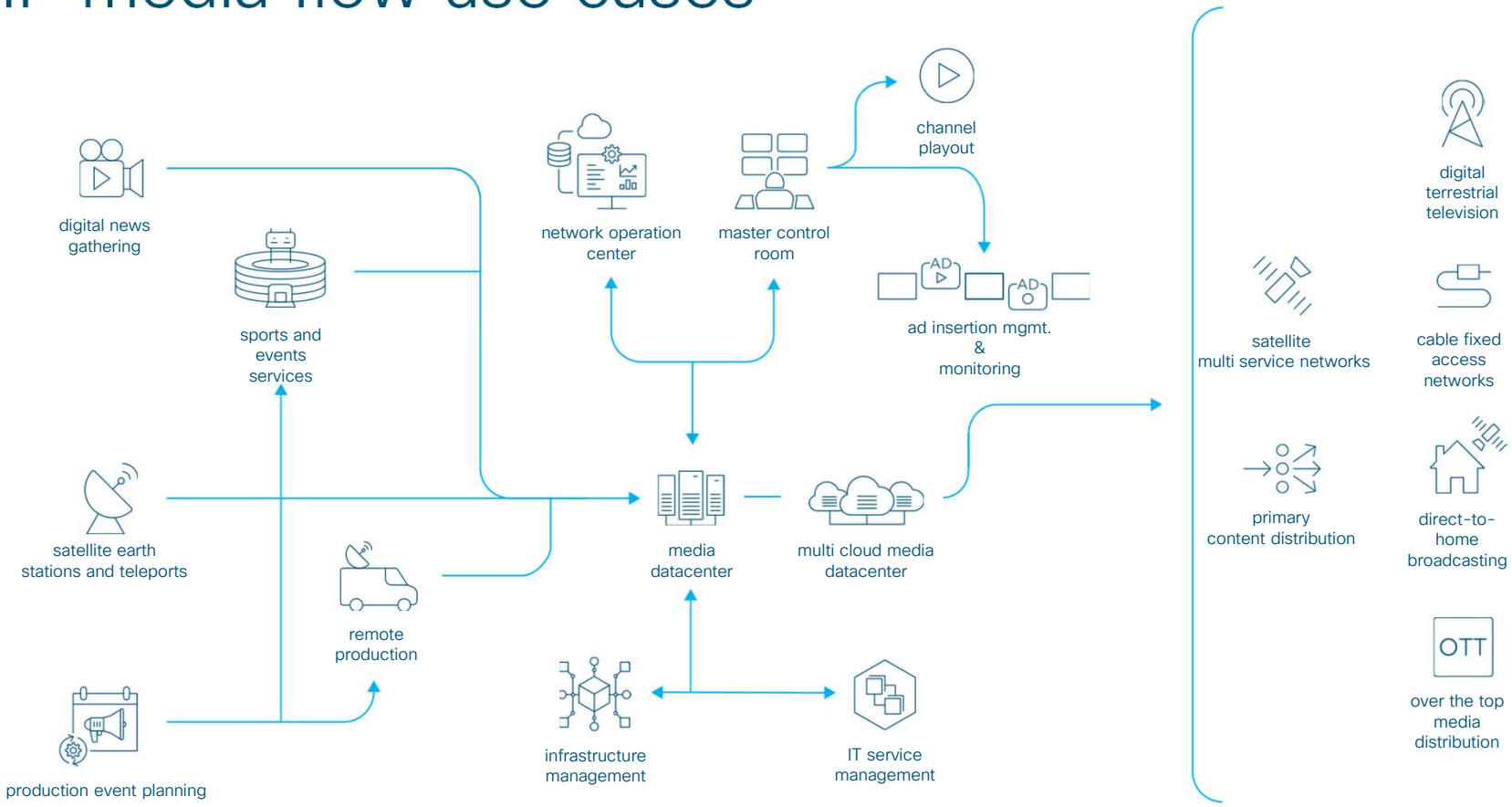
IP media flow use cases



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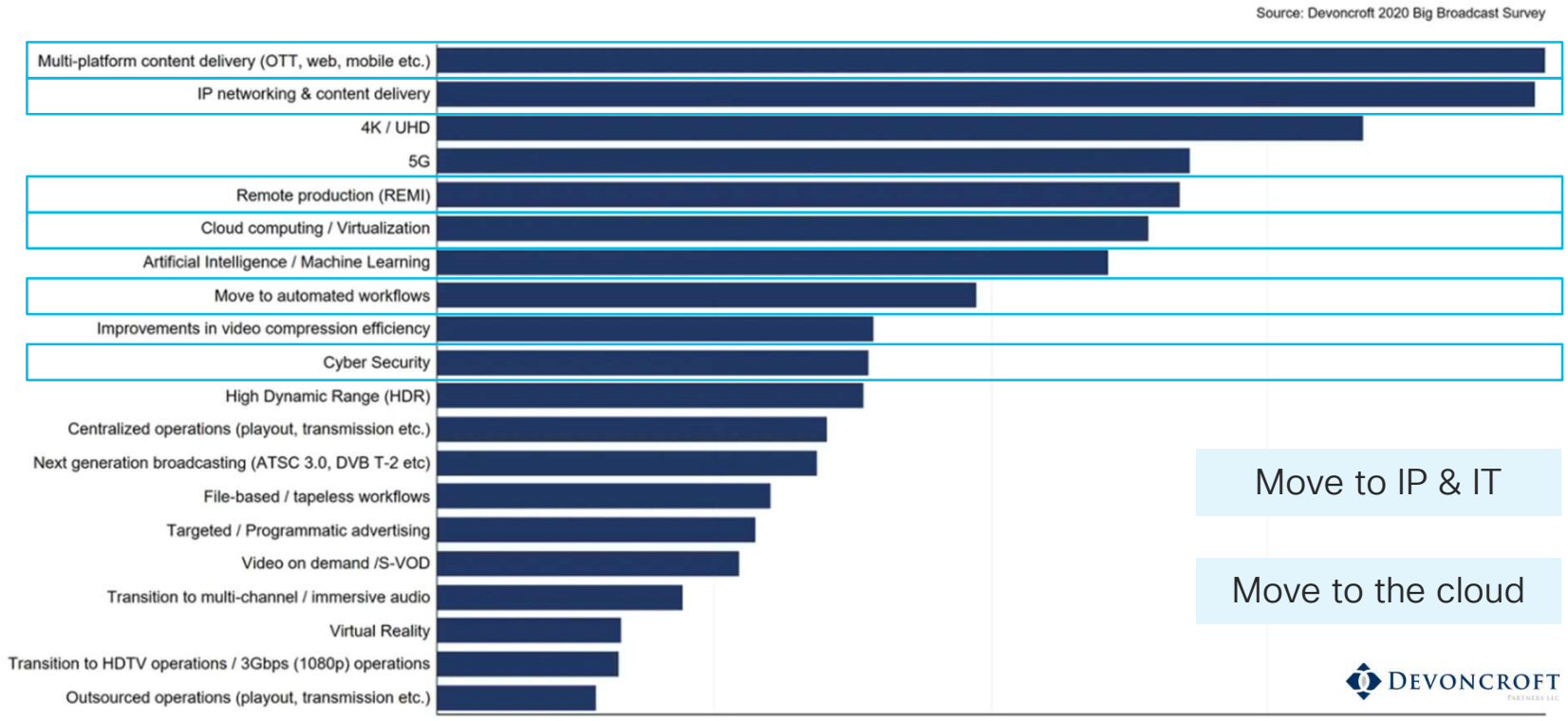
Customer priorities

2020 Devoncroft 2020 BBS Broadcast Industry Global Trend Index



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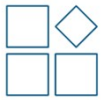
Common stack, common challenges

The IP media ecosystem

UC5: COLLABORATION

- Ticketing
- Multi-tenant operations
- Data Sharing
- Planned maintenance



business apps

UC4: SERVICE ORCHESTRATION

- Resource & capacity management
- Service monitoring
- Process automation
- Assurance & SLA management
- Security

media services

UC2: IP FLOW ORCHESTRATION, MONITORING

- Flow management
- Security

UC3: PTP MANAGEMENT

- PTP monitoring

UC6: VIRTUALIZATION & CLOUD

- On Premise Virtualization
- Public cloud
- Hybrid solutions

IT platform

UC1: ONBOARDING, MAINTENANCE & MANAGEMENT

- Software management
- Configuration management
- Security
- Open (IS04) vs proprietary protocols

infrastructure

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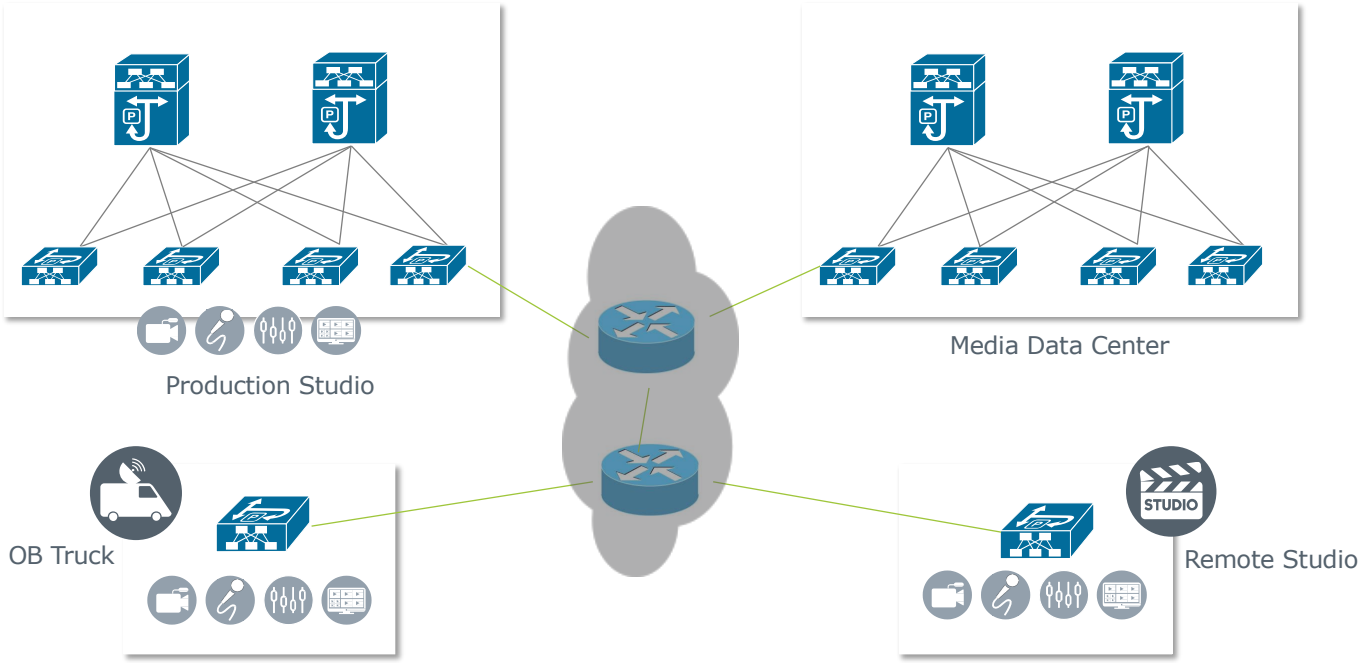
Infrastructure

Flexibility with IP



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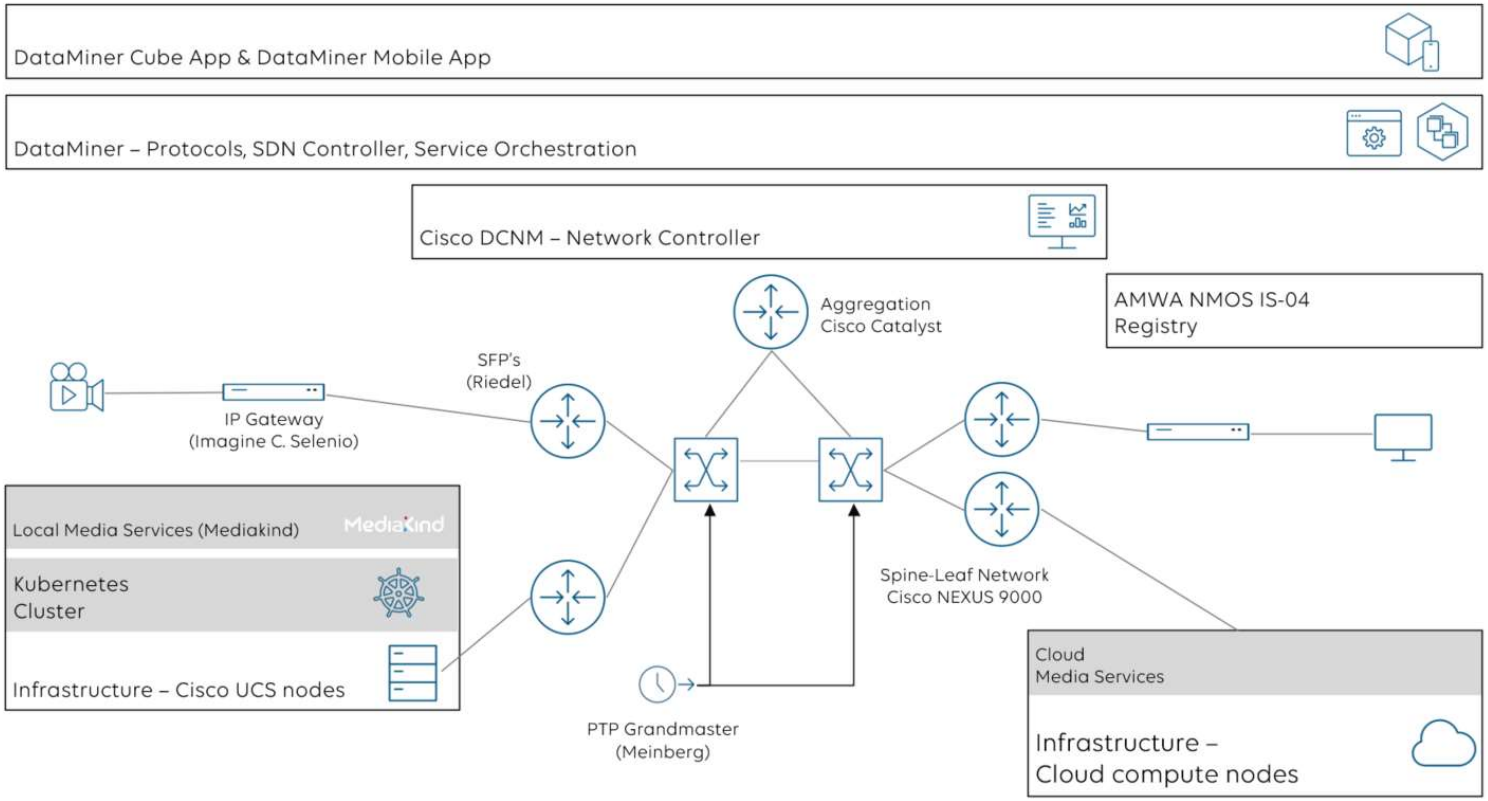
The setup



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ONBOARDING, MAINTENACE & MANAGEMENT

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infrastructure

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Onboarding, maintenance & management

DataMiner Infrastructure Discovery & Provisioning

Discover

- IS-04 or proprietary (SNMP, HTTP)
- LLDP
  - discover elements & connectivity
- SNMP / NX-API CLI-REST
- OpenConfig
- Netflow / Sflow / Syslog
- GRPC / Yang / GPB / DME

Provision

- Trend templating
- Alarm templating
- Monitoring templating

Manage

- Configuration management
  - Backup and restore
- Software management
- Facility management

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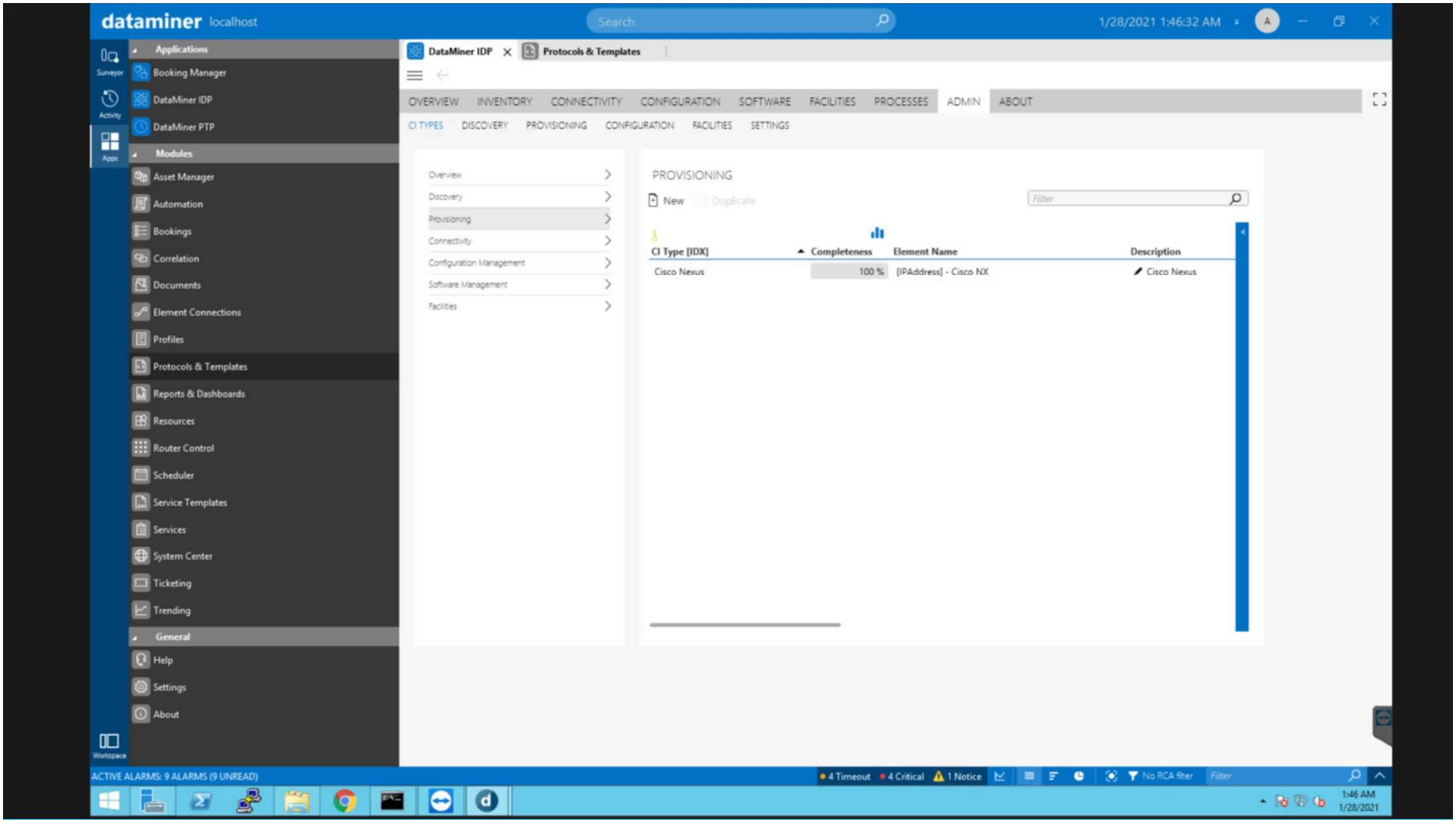
dataminer localhost
Search
1/28/2021 1:46:32 AM
Surveyor
Activity
Apps
Workspace
Applications
Booking Manager
DataMiner IDP
DataMiner PTP
Modules
Asset Manager
Automation
Bookings
Correlation
Documents
Element Connections
Profiles
Protocols & Templates
Reports & Dashboards
Resources
Router Control
Scheduler
Service Templates
Services
System Center
Ticketing
Trending
General
Help
Settings
About
DataMiner IDP
Protocols & Templates
OVERVIEW
INVENTORY
CONNECTIVITY
CONFIGURATION
SOFTWARE
FACILITIES
PROCESSES
ADMIN
ABOUT
CI TYPES
DISCOVERY
PROVISIONING
CONFIGURATION
FACILITIES
SETTINGS
Overview
Discovery
Provisioning
Connectivity
Configuration Management
Software Management
Facilities
PROVISIONING
New
Duplicate
Filter
CI Type [IDX]
Completeness
Element Name
Description
Cisco Nexus
100 %
[IPAddress] - Cisco NX
Cisco Nexus
ACTIVE ALARMS: 9 ALARMS (9 UNREAD)
4 Timeout
4 Critical
1 Notice
No RCA filter
Filter
1:46 AM
1/28/2021

Onboarding, maintenance & management

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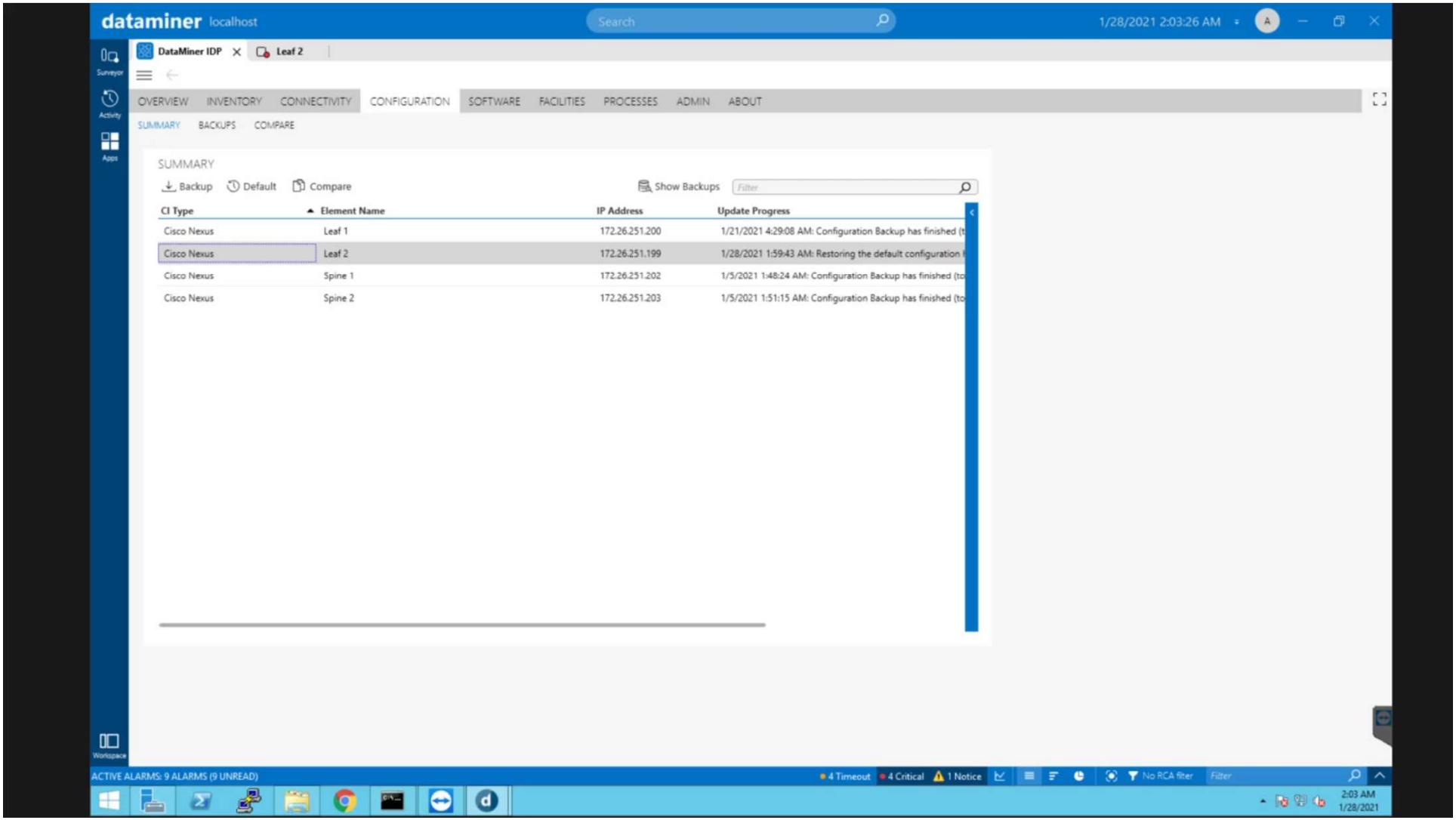
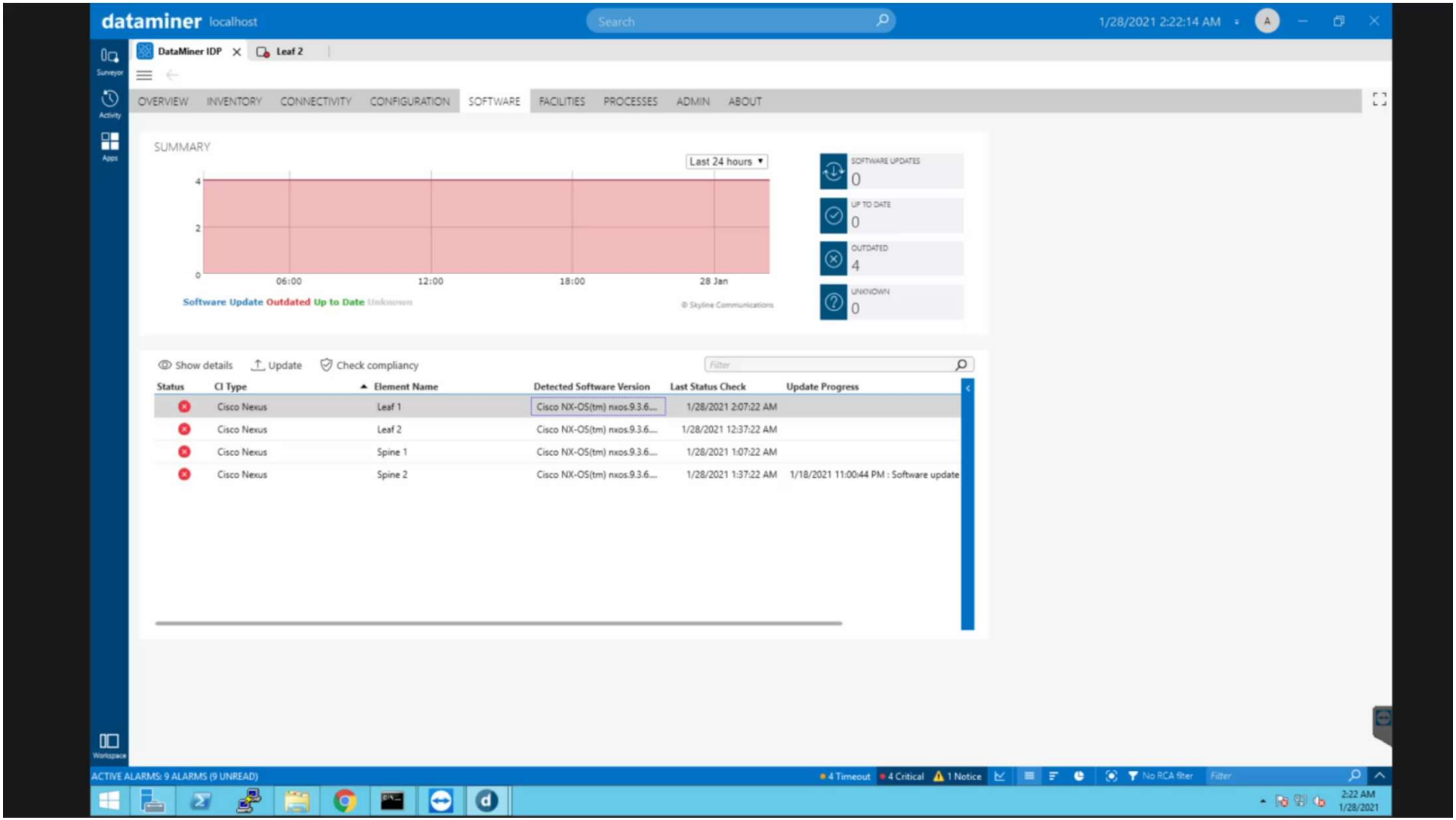
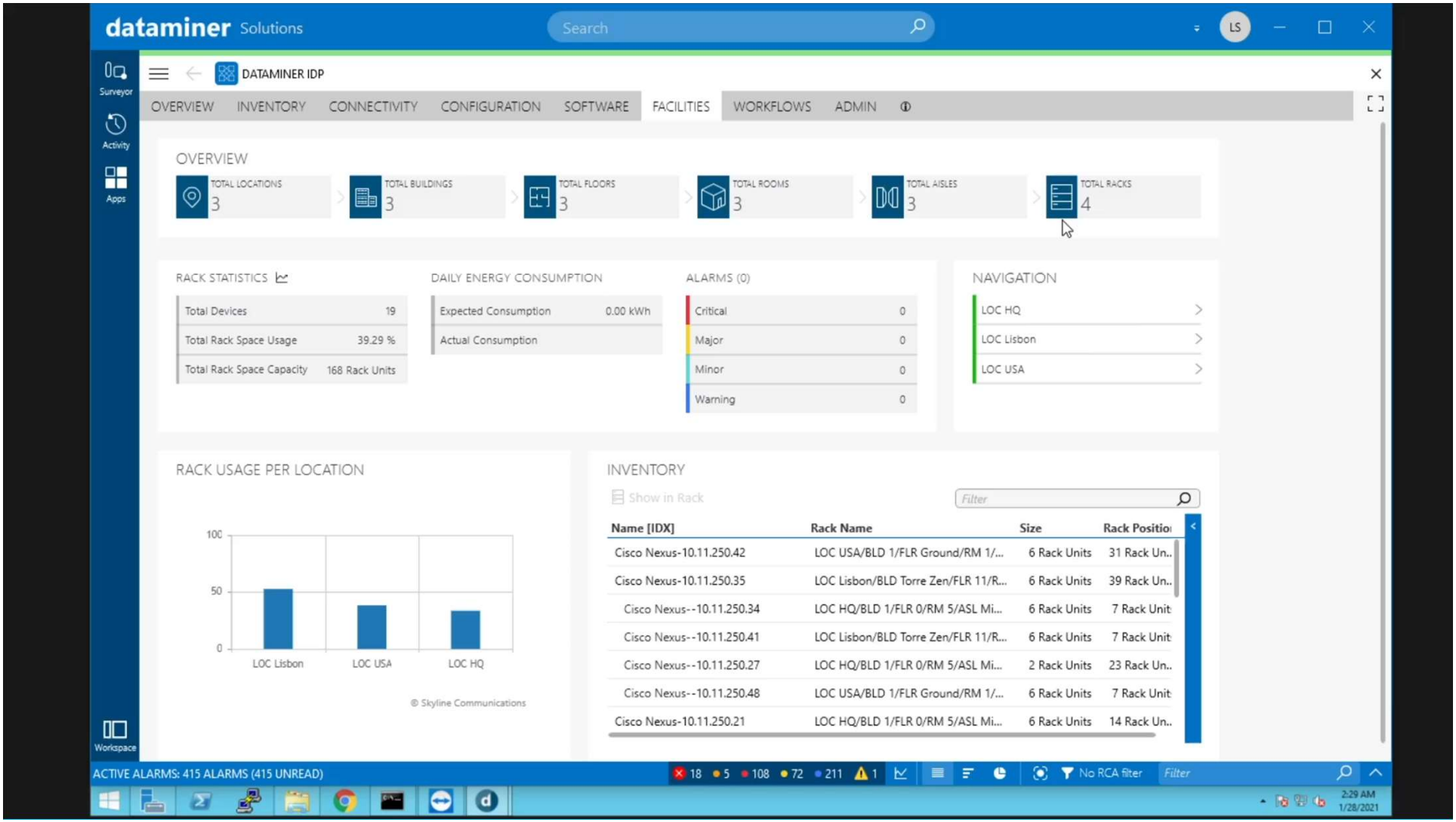

dataminer localhost
Search
1/28/2021 2:03:26 AM
DataMiner IDP
Leaf 2
Surveyor
Activity
Apps
Workspace
OVERVIEW
INVENTORY
CONNECTIVITY
CONFIGURATION
SOFTWARE
FACILITIES
PROCESSES
ADMIN
ABOUT
SUMMARY
BACKUPS
COMPARE
SUMMARY
Backup
Default
Compare
Show Backups
Filter
CI Type
Element Name
IP Address
Update Progress
Cisco Nexus
Leaf 1
172.26.251.200
1/21/2021 4:29:08 AM: Configuration Backup has finished (t
Cisco Nexus
Leaf 2
172.26.251.199
1/28/2021 1:59:43 AM: Restoring the default configuration
Cisco Nexus
Spine 1
172.26.251.202
1/5/2021 1:48:24 AM: Configuration Backup has finished (to
Cisco Nexus
Spine 2
172.26.251.203
1/5/2021 1:51:15 AM: Configuration Backup has finished (to
ACTIVE ALARMS: 9 ALARMS (9 UNREAD)
4 Timeout
4 Critical
1 Notice
No RCA filter
Filter
2:03 AM
1/28/2021


dataminer localhost
Search
1/28/2021 2:22:14 AM
DataMiner IDP
Leaf 2
OVERVIEW
INVENTORY
CONNECTIVITY
CONFIGURATION
SOFTWARE
FACILITIES
PROCESSES
ADMIN
ABOUT
SUMMARY
Last 24 hours
06:00
12:00
18:00
28 Jan
Software Update Outdated Up to Date Unknown
SOFTWARE UPDATES 0
UP TO DATE 0
OUTDATED 4
UNKNOWN 0
Show details
Update
Check compliancy
Filter
Status
CI Type
Element Name
Detected Software Version
Last Status Check
Update Progress
Cisco Nexus
Leaf 1
Cisco NX-OS(tm) nxos.9.3.6....
1/28/2021 2:07:22 AM
Cisco Nexus
Leaf 2
Cisco NX-OS(tm) nxos.9.3.6....
1/28/2021 12:37:22 AM
Cisco Nexus
Spine 1
Cisco NX-OS(tm) nxos.9.3.6....
1/28/2021 1:07:22 AM
Cisco Nexus
Spine 2
Cisco NX-OS(tm) nxos.9.3.6....
1/28/2021 1:37:22 AM
1/18/2021 11:00:44 PM : Software update
ACTIVE ALARMS: 9 ALARMS (9 UNREAD)
4 Timeout
4 Critical
1 Notice
No RCA filter
2:22 AM
1/28/2021


dataminer Solutions
Search
LS
Surveyor
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Workspace
DATAMINER IDP
OVERVIEW
INVENTORY
CONNECTIVITY
CONFIGURATION
SOFTWARE
FACILITIES
WORKFLOWS
ADMIN
OVERVIEW
TOTAL LOCATIONS 3
TOTAL BUILDINGS 3
TOTAL FLOORS 3
TOTAL ROOMS 3
TOTAL AISLES 3
TOTAL RACKS 4
RACK STATISTICS
Total Devices 19
Total Rack Space Usage 39.29 %
Total Rack Space Capacity 168 Rack Units
DAILY ENERGY CONSUMPTION
Expected Consumption 0.00 kWh
Actual Consumption
ALARMS (0)
Critical 0
Major 0
Minor 0
Warning 0
NAVIGATION
LOC HQ
LOC Lisbon
LOC USA
RACK USAGE PER LOCATION
100
50
0
LOC Lisbon
LOC USA
LOC HQ
© Skyline Communications
INVENTORY
Show in Rack
Filter
Name [IDX]
Rack Name
Size
Rack Positio
Cisco Nexus-10.11.250.42
LOC USA/BLD 1/FLR Ground/RM 1/...
6 Rack Units
31 Rack Un..
Cisco Nexus-10.11.250.35
LOC Lisbon/BLD Torre Zen/FLR 11/R...
6 Rack Units
39 Rack Un..
Cisco Nexus--10.11.250.34
LOC HQ/BLD 1/FLR 0/RM 5/ASL Mi...
6 Rack Units
7 Rack Unit
Cisco Nexus--10.11.250.41
LOC Lisbon/BLD Torre Zen/FLR 11/R...
6 Rack Units
7 Rack Unit
Cisco Nexus--10.11.250.27
LOC HQ/BLD 1/FLR 0/RM 5/ASL Mi...
2 Rack Units
23 Rack Un..
Cisco Nexus--10.11.250.48
LOC USA/BLD 1/FLR Ground/RM 1/...
6 Rack Units
7 Rack Unit
Cisco Nexus-10.11.250.21
LOC HQ/BLD 1/FLR 0/RM 5/ASL Mi...
6 Rack Units
14 Rack Un..
ACTIVE ALARMS: 415 ALARMS (415 UNREAD)
18 5 108 72 211 1
No RCA filter
Filter
2:29 AM
1/28/2021

IP FLOW ORCHESTRATION, MONITORING

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infrastructure

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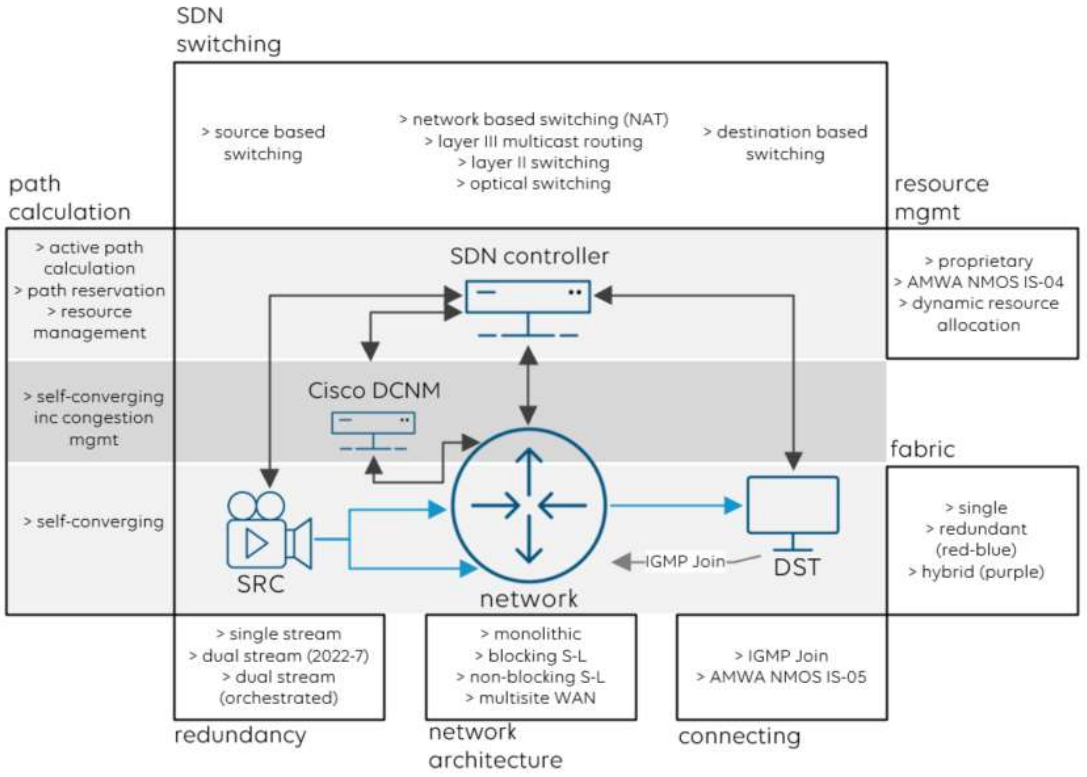
IP FLOW Control

Types of SDN Setups



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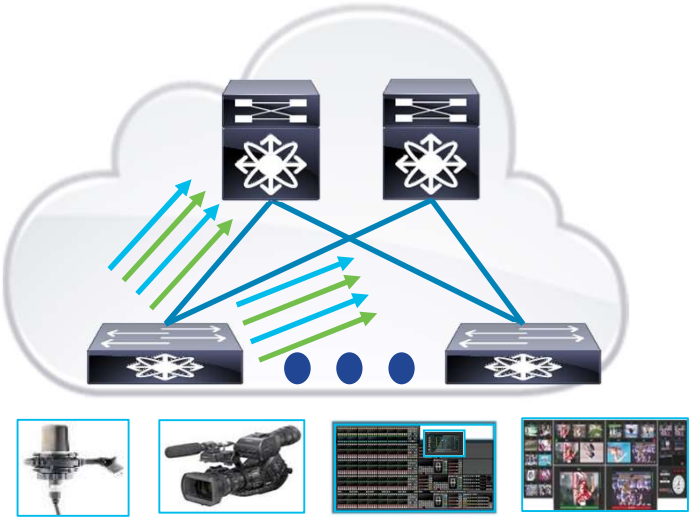
Cisco’s Non Blocking Multicast (NBM)

- NBM brings bandwidth awareness to PIM
- Traffic load balanced using flow bandwidth as a parameter
- Prevents link oversubscription by ensuring flows more than link capacity is not sent



PIM with NBM
ECMP with BW awareness

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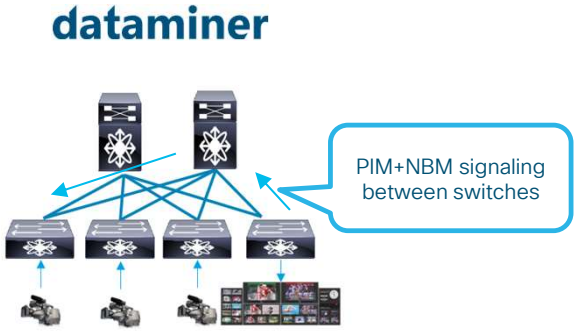
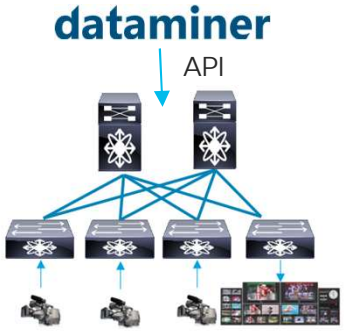
NBM flexible modes

- NBM active mode (default)
- NBM orchestrates flows in the fabric
- NBM finds and programs a optimized non-blocking path from source to destination
- Destination either use IGMP or Broadcast controller uses API to request for traffic



- NBM passive mode (shipping starting 9.3(2))
- NBM exposes API using which external controller can program end to end flow path from source to destination



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IP Flow Setup

DataMiner SDMN Solution

Book

Reserve capacity

Make sure all planned flows will run smoothly by ensuring the right network capacity at the right time

Orchestrate

Orchestrate endpoints and network

Dynamically configure all devices and policies

Automatically and safely set up all streams

Control

Switch your streams ad hoc

Without compromising on planned capacity security

Monitor

Monitor the health of your existing flows & services

Keep track of all relevant KPI's & SLA's

Monitor the full stack

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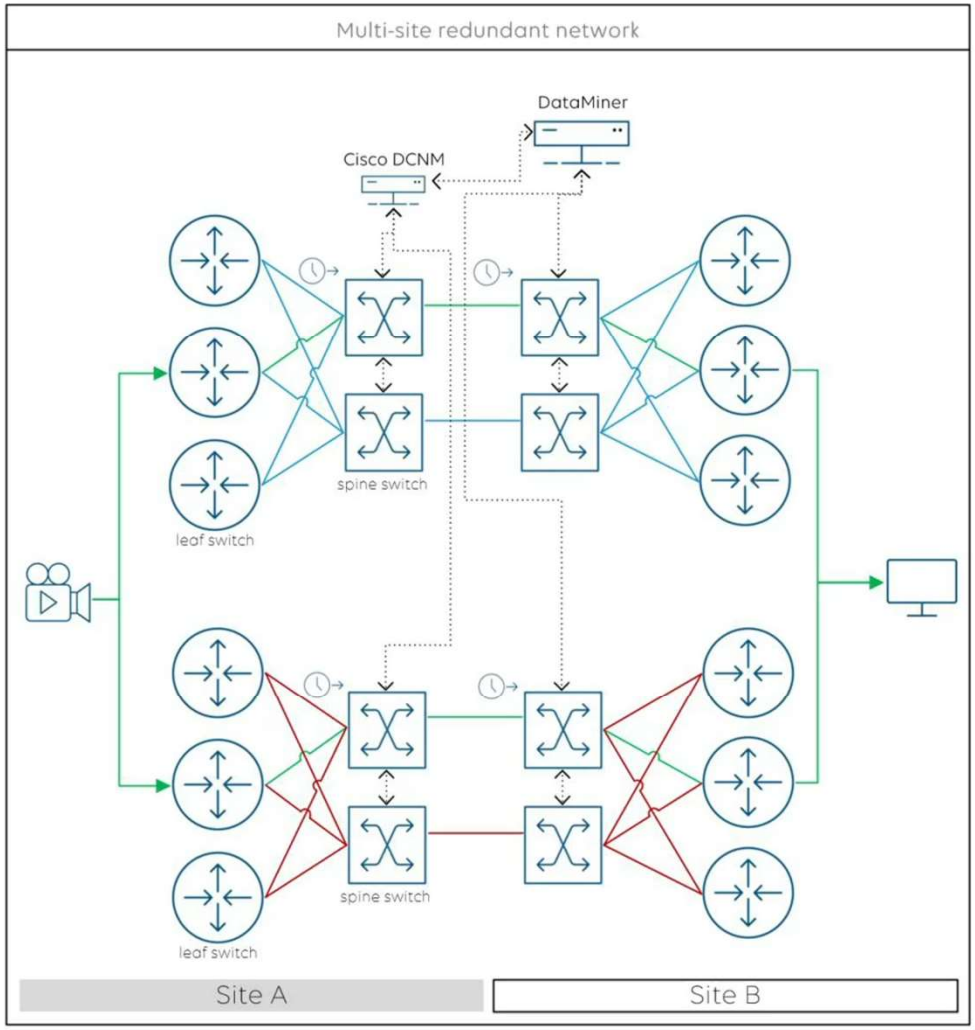
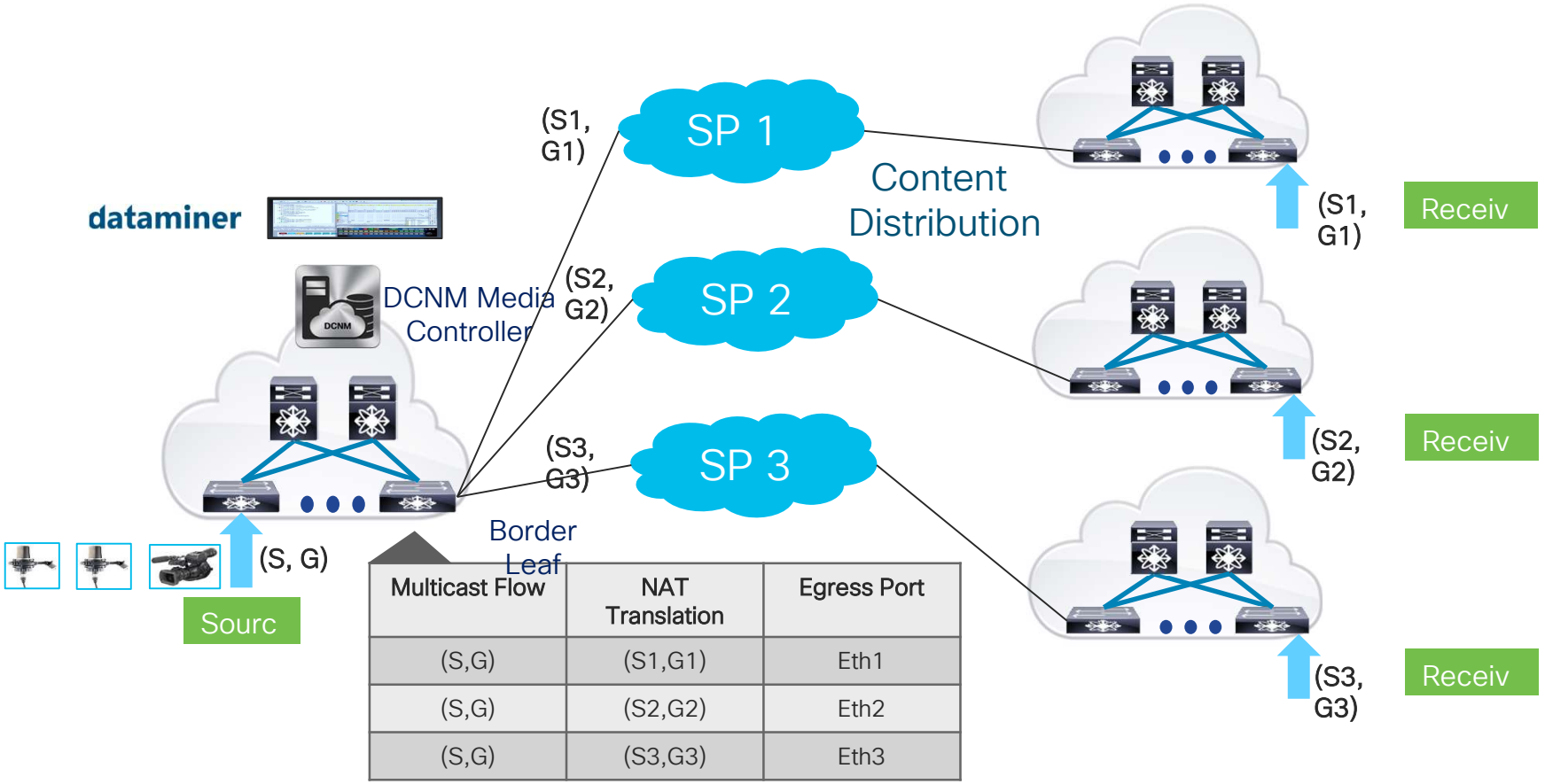

Multi-site redundant network
DataMiner
Cisco DCNM
spine switch
leaf switch
spine switch
leaf switch
Site A
Site B

Multicast NAT – Distribution



Multicast Flow	NAT Translation	Egress Port
(S,G)	(S1,G1)	Eth1
(S,G)	(S2,G2)	Eth2
(S,G)	(S3,G3)	Eth3

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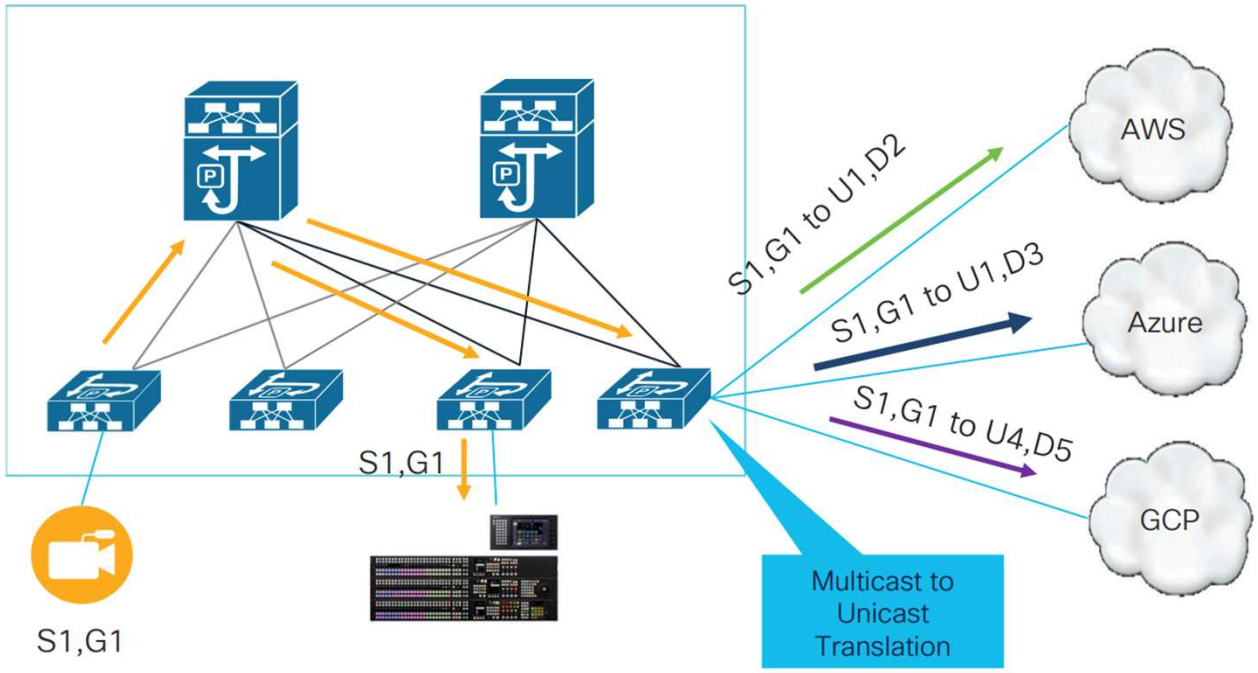
Handing off Content to Public Cloud

Multicast to Unicast conversion

Roadmap
1HCY21



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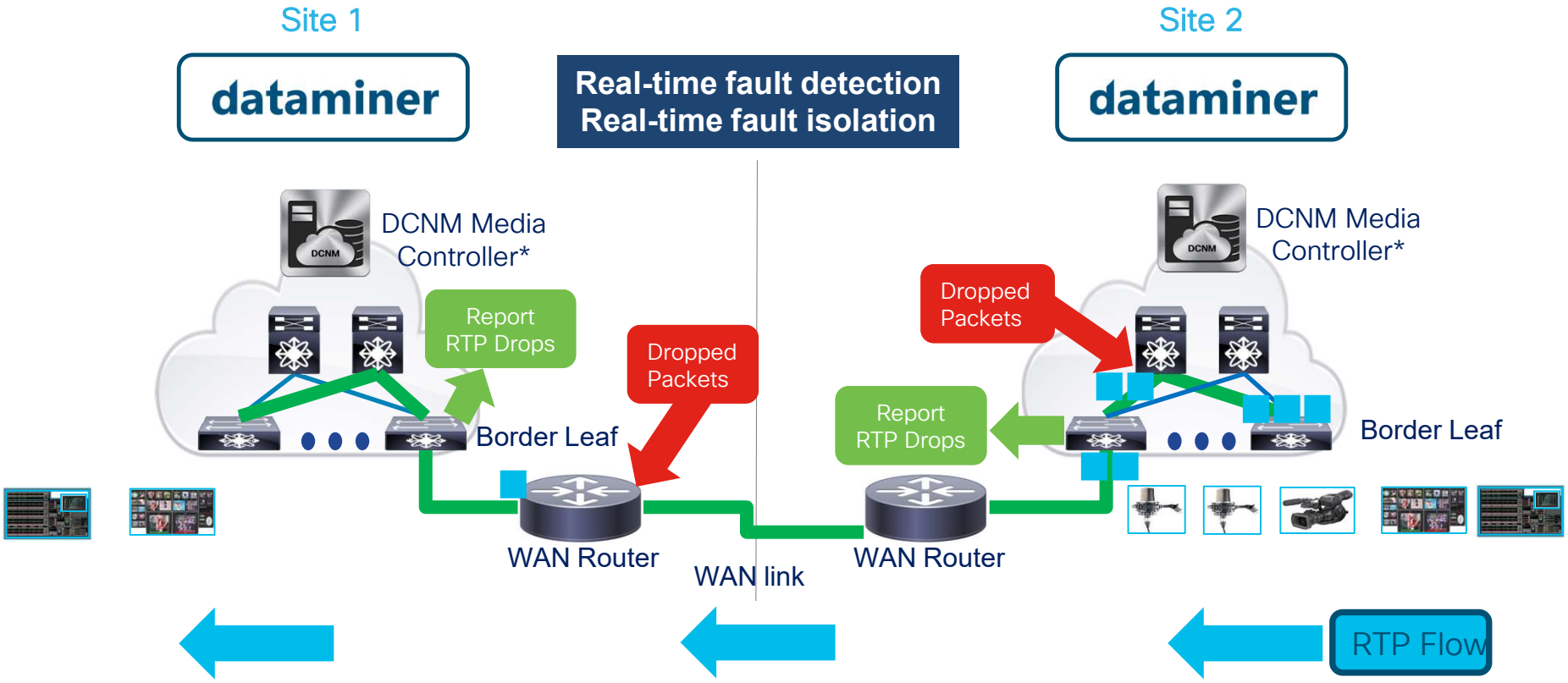
Media Flow Analytics



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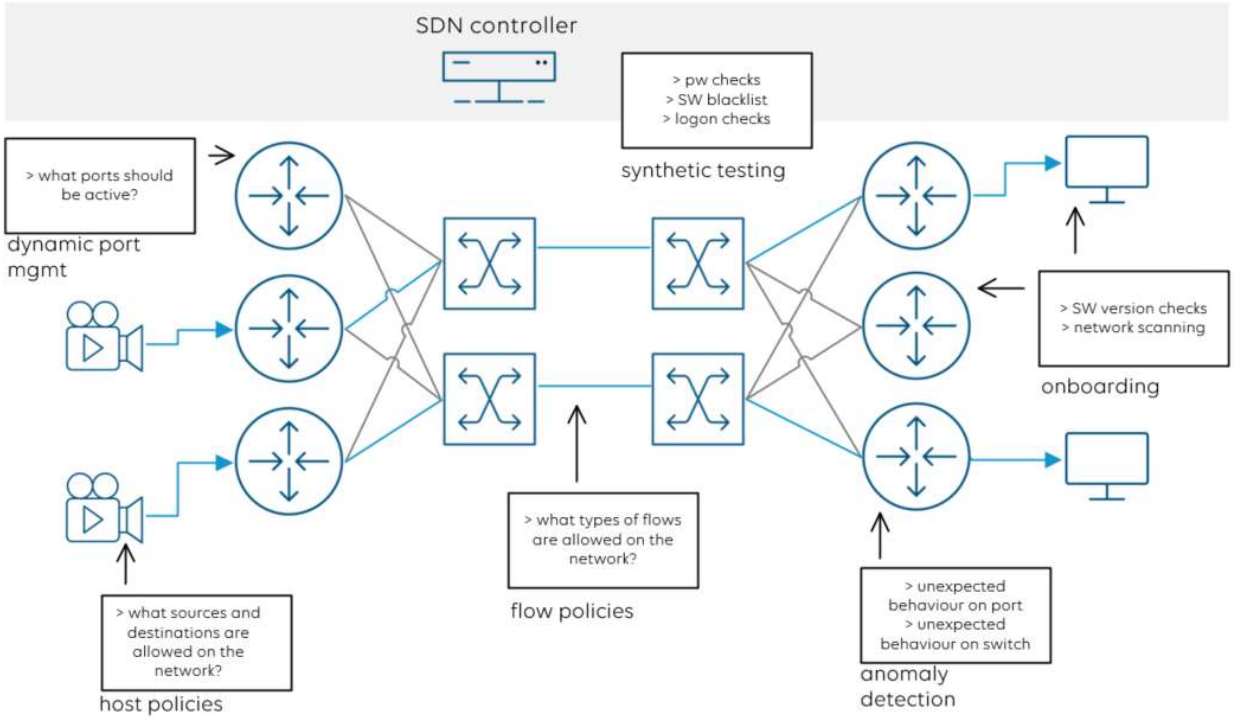
Security

Security Operations



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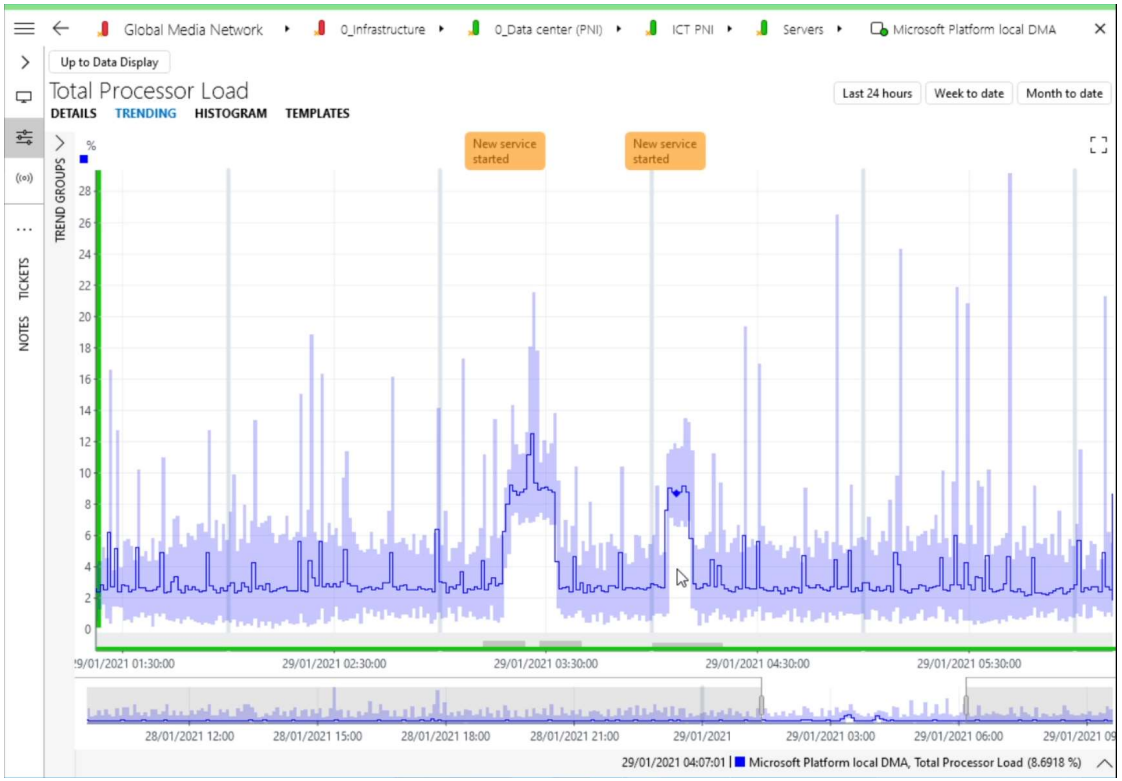
Security – anomaly detection



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Security - policies

Multicast	Mask	Role	Permit	Sequence Number	Created By
*	N/A	Sender	True	0	system
*	N/A	Local Receiver	True	0	system
*	N/A	External Receiver	True	0	system
239.20.1.4	32	Sender	True	1	admin
239.20.1.3	32	Sender	True	2	admin
239.20.1.2	32	Sender	True	3	admin
239.8.2.2	32	Sender	True	4	admin
239.8.2.1	32	Sender	True	5	admin
*	N/A	Sender	True	0	system
*	N/A	Local Receiver	True	0	system
*	N/A	External Receiver	True	0	system
*	N/A	Sender	True	0	system
*	N/A	Local Receiver	True	0	system
*	N/A	External Receiver	True	0	system

Flow Policy

1 877.3 Mbps

ID [IDX]	Bandwidth	QoS/DSCP	State	Last Update Time	VRF	Instance
Default_LAN/Default	0.0 Mbps	Best Effort	Disabled	02/10/2020 15:28:10	default	Default_LAN_-1
POC_Lutech/Ancillary	5.0 Mbps	Best Effort	Enabled	29/10/2020 16:51:58	default	POC_Lutech_5...
POC_Lutech/TSoIP_200MB	200.0 Mbps	AF53 High Drop	Enabled	29/10/2020 16:52:03	default	POC_Lutech_5...
POC_Lutech/test	3 000.0 Mbps	AF53 High Drop	Disabled	29/10/2020 16:52:05	default	POC_Lutech_5...
POC_Lutech/Audio_2110	3 000.0 Mbps	AF11 Low Drop	Enabled	29/10/2020 16:52:06	default	POC_Lutech_5...
POC_Lutech/Default	0.0 Mbps	Best Effort	Disabled	22/10/2020 16:25:06	default	POC_Lutech_-1
Saxa_Rubra/SX_Video_S...	300.0 Mbps	Best Effort	Disabled	29/10/2020 16:51:52	default	Saxa_Rubra_5360
Saxa_Rubra/SX_Video_U...	10 000.0 Mbps	AF53 High Drop	Disabled	29/10/2020 16:51:52	default	Saxa_Rubra_5370
Saxa_Rubra/RM_Video_3...	4 000.0 Mbps	AF53 High Drop	Enabled	29/10/2020 16:51:53	default	Saxa_Rubra_5380
Saxa_Rubra/Video_HD_3...	4 000.0 Mbps	AF53 High Drop	Enabled	29/10/2020 16:51:54	default	Saxa_Rubra_5390
Saxa_Rubra/TSoIP_200MB	60.0 Mbps	AF53 High Drop	Enabled	29/10/2020 16:51:55	default	Saxa_Rubra_5400

Flow Policy Multicast Ranges

Information [IDX]	Name	Multicast IP Begin	Multicast IP End
3100/Saxa_Rubra_3100	Saxa_Rubra_3100	Not initialized	Not initialized
3120/Saxa_Rubra_3120	Saxa_Rubra_3120	Not initialized	Not initialized
3130/Saxa_Rubra_3130	Saxa_Rubra_3130	Not initialized	Not initialized
3150/Saxa_Rubra_3150	Saxa_Rubra_3150	Not initialized	Not initialized
3190/Saxa_Rubra_3190	Saxa_Rubra_3190	Not initialized	Not initialized
3200/Saxa_Rubra_3200	Saxa_Rubra_3200	Not initialized	Not initialized
3210/Saxa_Rubra_3210	Saxa_Rubra_3210	Not initialized	Not initialized
3240/Saxa_Rubra_3240	Saxa_Rubra_3240	Not initialized	Not initialized
3250/POC_Lutech_3250	POC_Lutech_3...	Not initialized	Not initialized
3260/Saxa_Rubra_3260	Saxa_Rubra_3260	Not initialized	Not initialized
3300/Saxa_Rubra_3300	Saxa_Rubra_3300	Not initialized	Not initialized
3310/Saxa_Rubra_3310	Saxa_Rubra_3310	Not initialized	Not initialized

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Security – dynamic port management

Interface Detailed

Detailed Interface Polling

Detailed Interface

Description [IDX]	Custom Description	Name	Physical Address	IP Address	Subnet Mask	Type	Operator Status	Administrator Status	Bandwidth	Utilization
mgmt0/		mgmt0	64.3A.EA.27.2F.44	N/A	N/A	Ethernet CSMA...	Up	Up	1 000 Mbps	0.10 Mbps
Vlan1/		Vlan1	64.3A.EA.27.2F.4B	N/A	N/A	Prop Virtual	Down	Down	1 000 Mbps	0.00 Mbps
loopback100/LOOPBACK MGMT	LOOPBACK MGMT	loopback100		192.168.207.22	255.255.255.255	Software Loop...	Up	Up	8 000 Mbps	0.00 Mbps
Ethernet1/1/p2p to spine 1 C9336...	p2p to spine 1 C9336 -...	Ethernet1/1	64.3A.EA.27.2F.4C	192.168.201.2	255.255.255.252	Ethernet CSMA...	Up	Up	100 000 Mbps	5 462.46 Mbps
Ethernet1/2/p2p to spine 1 C9336...	p2p to spine 1 C9336 -...	Ethernet1/2	64.3A.EA.27.2F.50	192.168.201.6	255.255.255.252	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/3/p2p to spine 1 C9336...	p2p to spine 1 C9336 -...	Ethernet1/3	64.3A.EA.27.2F.54	192.168.201.10	255.255.255.252	Ethernet CSMA...	Down	Up	100 000 Mbps	0.00 Mbps
Ethernet1/4/p2p to spine 1 C9336...	p2p to spine 1 C9336 -...	Ethernet1/4	64.3A.EA.27.2F.58	192.168.201.14	255.255.255.252	Ethernet CSMA...	Down	Up	100 000 Mbps	0.00 Mbps
Ethernet1/5/p2p to spine 2 C9336...	p2p to spine 2 C9336 -...	Ethernet1/5	64.3A.EA.27.2F.5C	192.168.201.26	255.255.255.252	Ethernet CSMA...	Up	Up	100 000 Mbps	2 844.04 Mbps
Ethernet1/6/p2p to spine 2 C9336...	p2p to spine 2 C9336 -...	Ethernet1/6	64.3A.EA.27.2F.60	192.168.201.30	255.255.255.252	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/7/p2p to spine 2 C9336...	p2p to spine 2 C9336 -...	Ethernet1/7	64.3A.EA.27.2F.64	192.168.201.34	255.255.255.252	Ethernet CSMA...	Down	Up	100 000 Mbps	0.00 Mbps
Ethernet1/8/p2p to spine 2 C9336...	p2p to spine 2 C9336 -...	Ethernet1/8	64.3A.EA.27.2F.68	192.168.201.38	255.255.255.252	Ethernet CSMA...	Down	Up	100 000 Mbps	0.00 Mbps
Ethernet1/9/		Ethernet1/9	64.3A.EA.27.2F.6C	N/A	N/A	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/10/		Ethernet1/10	64.3A.EA.27.2F.70	N/A	N/A	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/11/		Ethernet1/11	64.3A.EA.27.2F.74	N/A	N/A	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/12/		Ethernet1/12	64.3A.EA.27.2F.78	N/A	N/A	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/13/		Ethernet1/13	64.3A.EA.27.2F.7C	N/A	N/A	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps
Ethernet1/14/		Ethernet1/14	64.3A.EA.27.2F.80	N/A	N/A	Ethernet CSMA...	Down	Down	100 000 Mbps	0.00 Mbps

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PTP MANAGEMENT

UC5: COLLABORATION
- Ticketing
- Multi-tenant operations
- Data Sharing
- Planned maintenance

business apps

UC4: SERVICE ORCHESTRATION
- Resource & capacity management
- Service monitoring
- Process automation
- Assurance & SLA management
- Security

media services

UC2: IP FLOW ORCHESTRATION, MONITORING
- Flow management
- Security

UC6: VIRTUALIZATION & CLOUD
- On Premise Virtualization
- Public cloud
- Hybrid solutions

UC3: PTP MANAGEMENT
- PTP monitoring

IT platform

UC1: ONBOARDING, MAINTENANCE & MANAGEMENT
- Software management
- Configuration management
- Security
- Open (IS04) vs proprietary protocols

infrastructure

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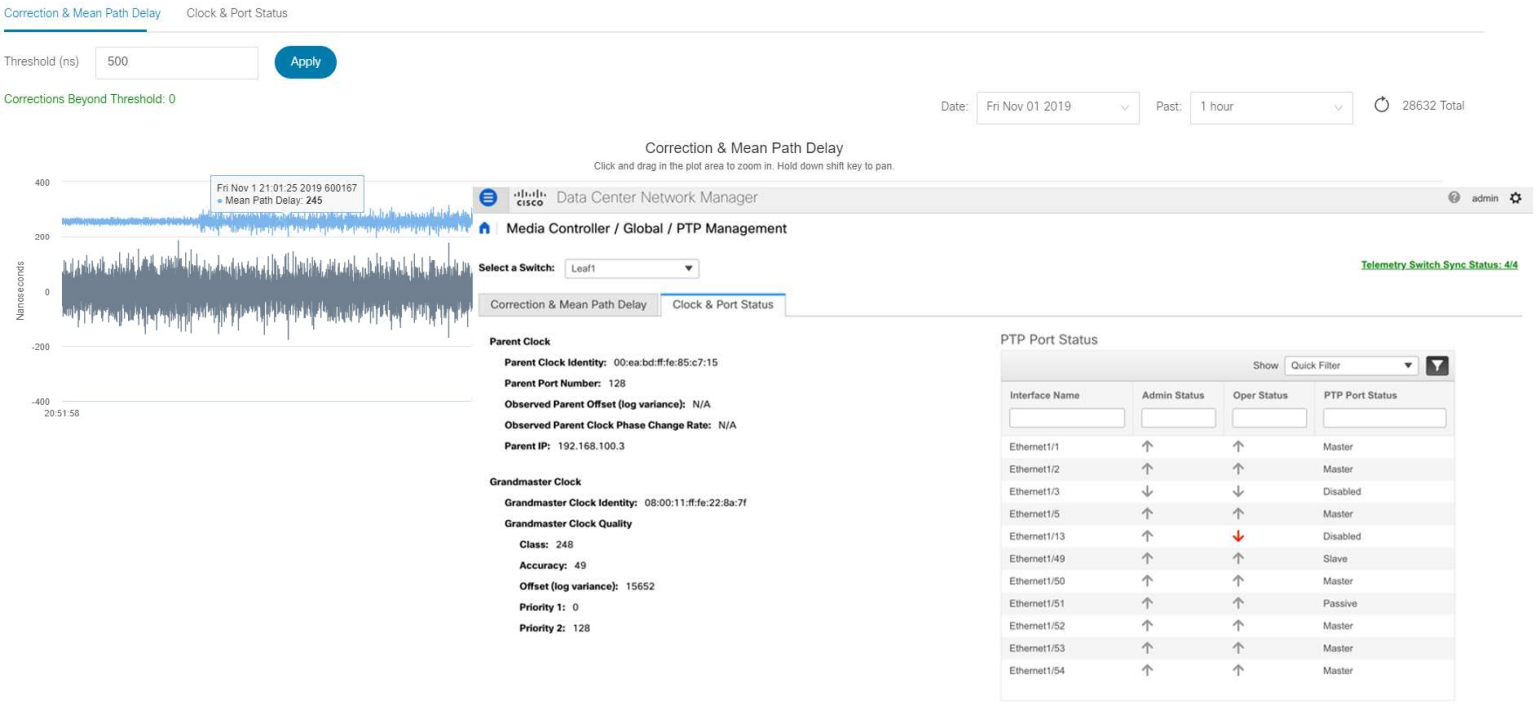
IPFM – PTP Monitoring

Monitor PTP Events across the Network



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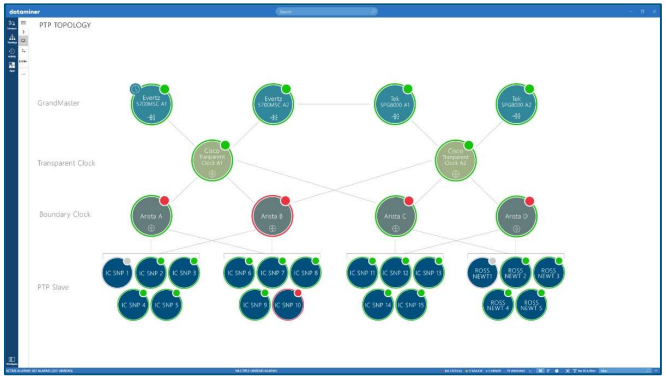
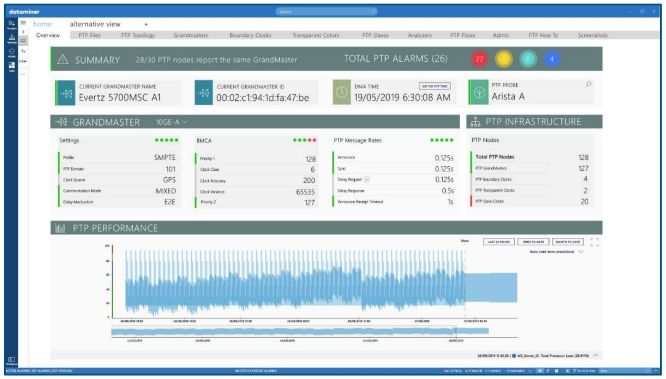
Monitoring & Maintenance

DataMiner PTP app

- Monitor every single PTP metric on all PTP grandmasters, PTP masters, PTP slaves
- Monitor PTP performance (e.g. PTP offset, PTP mean path delay)
- Monitor PTP multicast traffic (network packets as well as switch tables)
- Apply PTP security workflows (e.g. block PTP slave devices to never become a master)
- Integrate third party PTP network analyzers
- Use DataMiner IDP to automatically configure PTP with a single click





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SERVICE ORCHESTRATION

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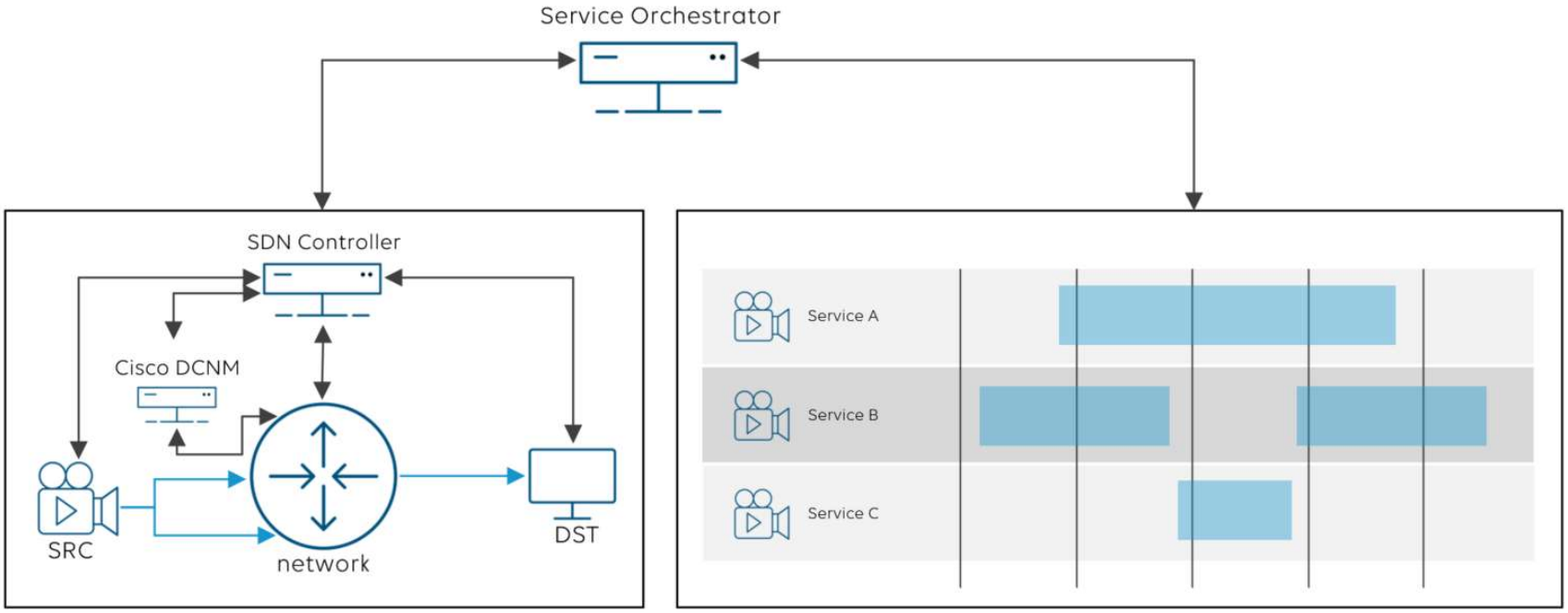
Service Orchestration



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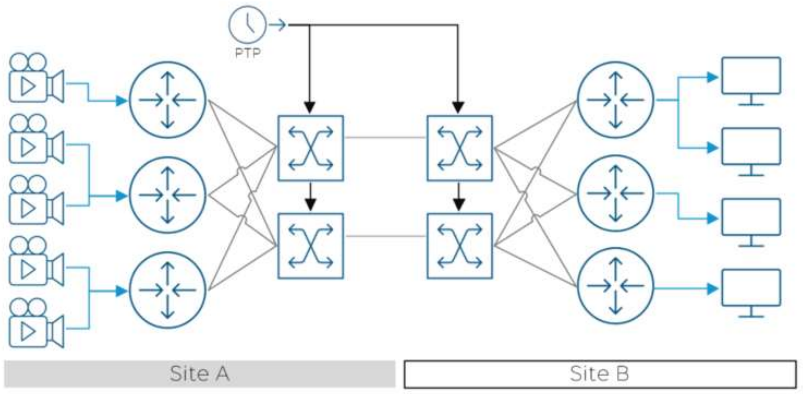
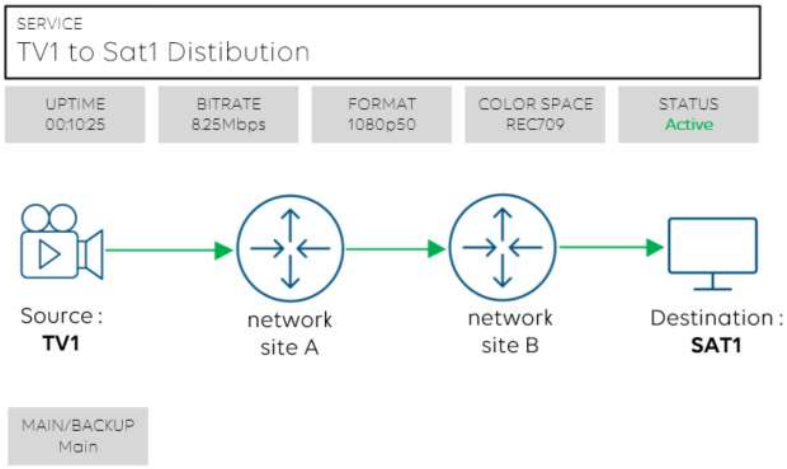
Service Orchestration



Network Topology



East-West View

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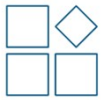
COLLABORATION

UC5: COLLABORATION

- Ticketing
- Multi-tenant operations
- Data Sharing
- Planned maintenance



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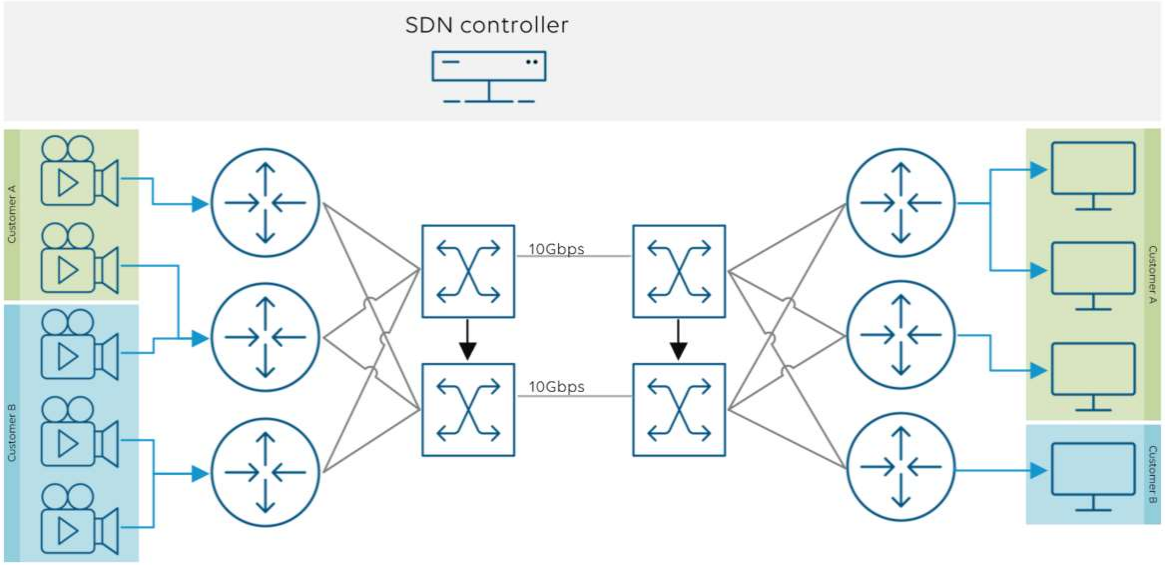
Collaboration

Sharing & Multi Tenancy

- Share or rent out common infrastructure as a service
- Keep full control as a service owner



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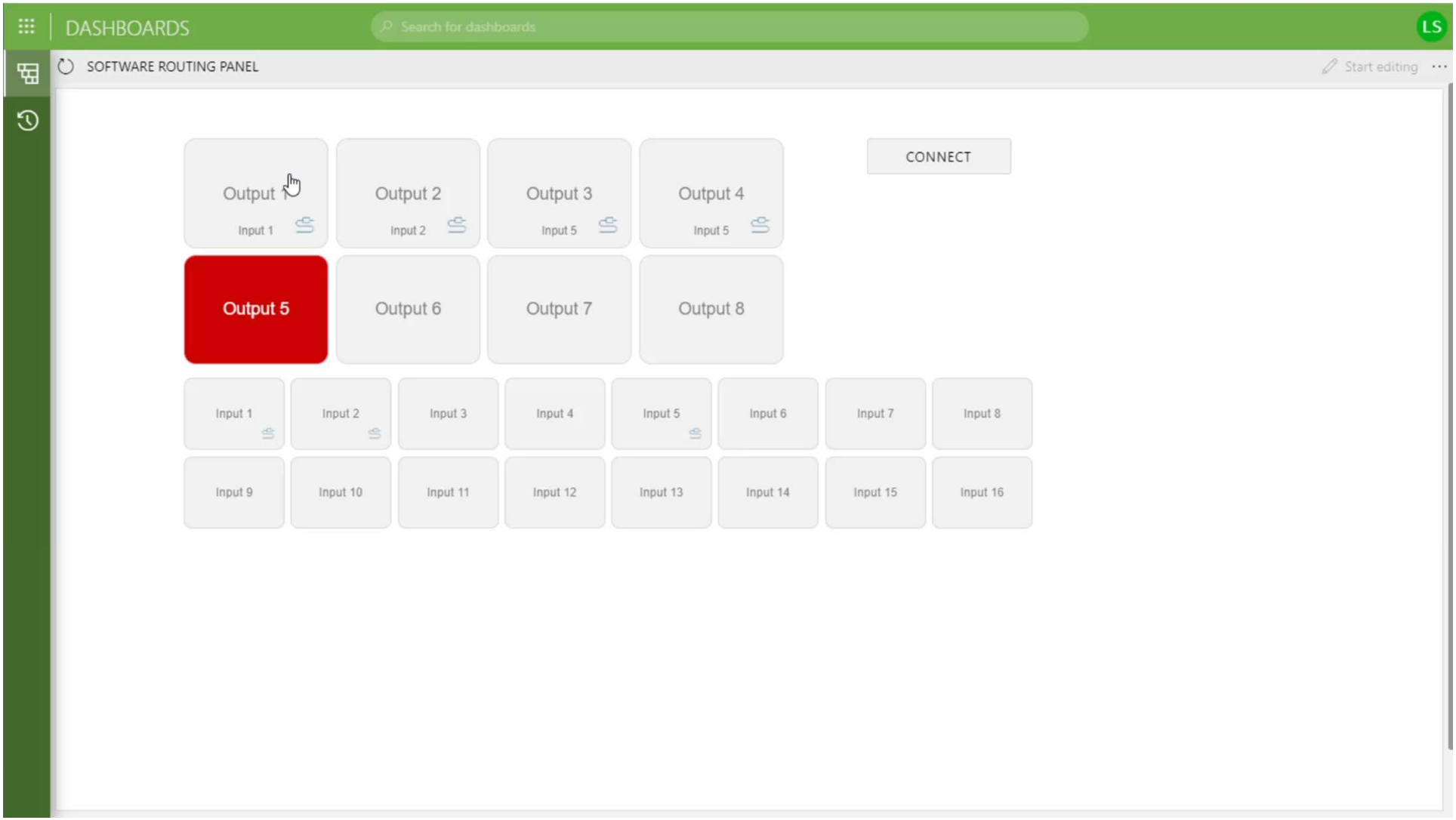
DASHBOARDS
Search for dashboards
LS
SOFTWARE ROUTING PANEL
Start editing
CONNECT
Output 1
Input 1
Output 2
Input 2
Output 3
Input 5
Output 4
Input 5
Output 5
Output 6
Output 7
Output 8
Input 1
Input 2
Input 3
Input 4
Input 5
Input 6
Input 7
Input 8
Input 9
Input 10
Input 11
Input 12
Input 13
Input 14
Input 15
Input 16

VIRTUALIZATION & CLOUD

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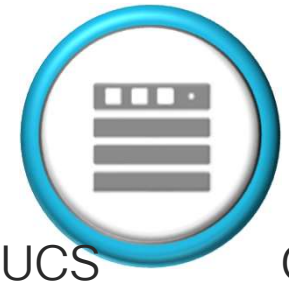
Media Data Center



Cisco UCS

Cisco Hyperflex

- Flexible, high-performance, highly-scalable compute
  - Blade, rack, and modular form factors
  - GPU acceleration for video and AI/ML
- Run bare-metal, virtualized, containerized, and serverless workloads
  - Hybrid Cloud enablement
  - Converged, Hyperconverged, and Scale-out Storage
- Easy to use, easy to manage from anywhere
  - API based policy-driven programmable infrastructure
  - Visibility and Analytics
- Secure workflows on-prem and in the cloud

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Virtualization

MDC overview

Book	Deploy	Run	Monitor
Reserve capacity in the K8S cluster	Deploy POD's and containers in the K8S cluster	Orchestrate the media service	Full stack visibility east-west and north-south

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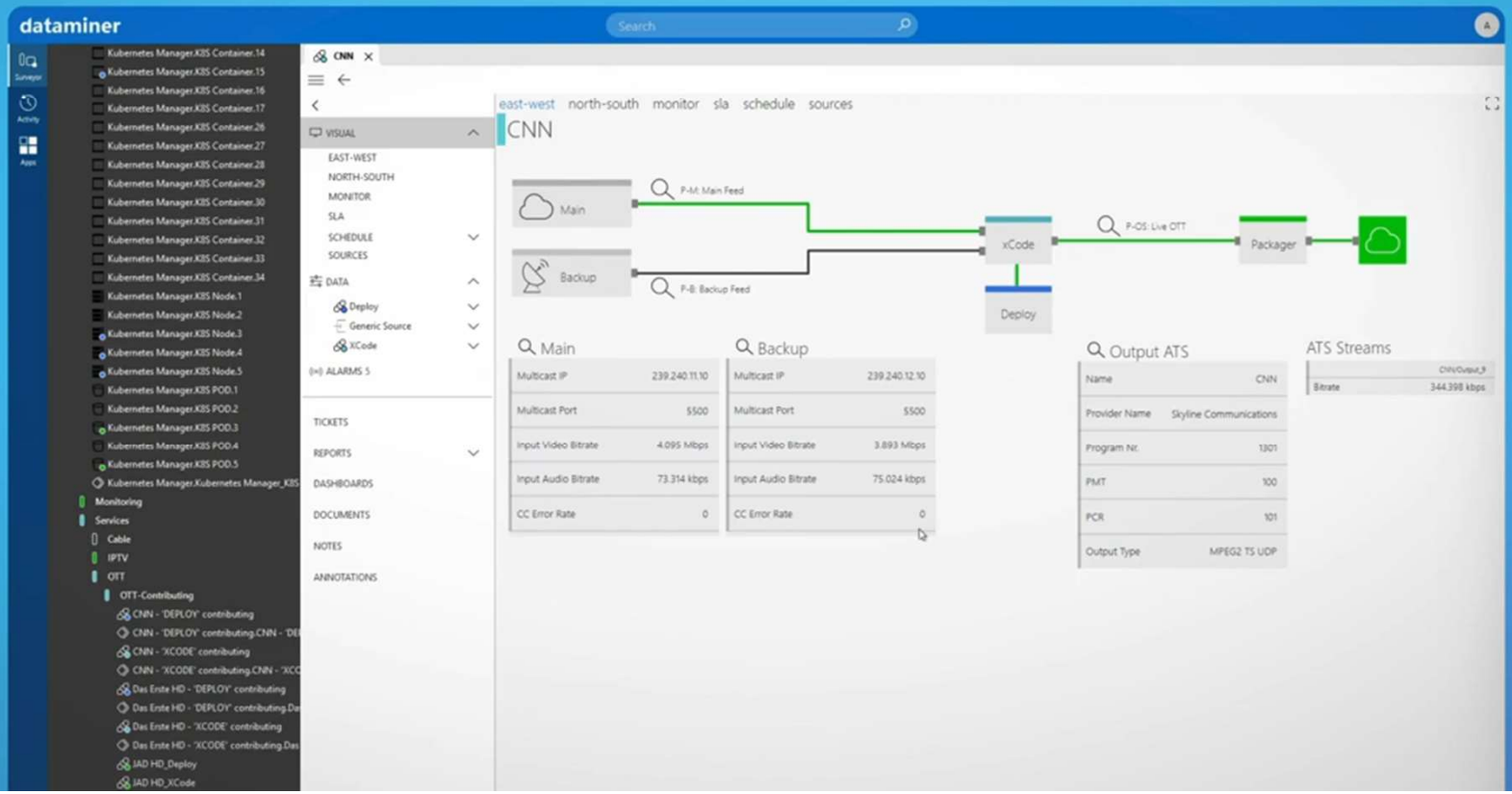
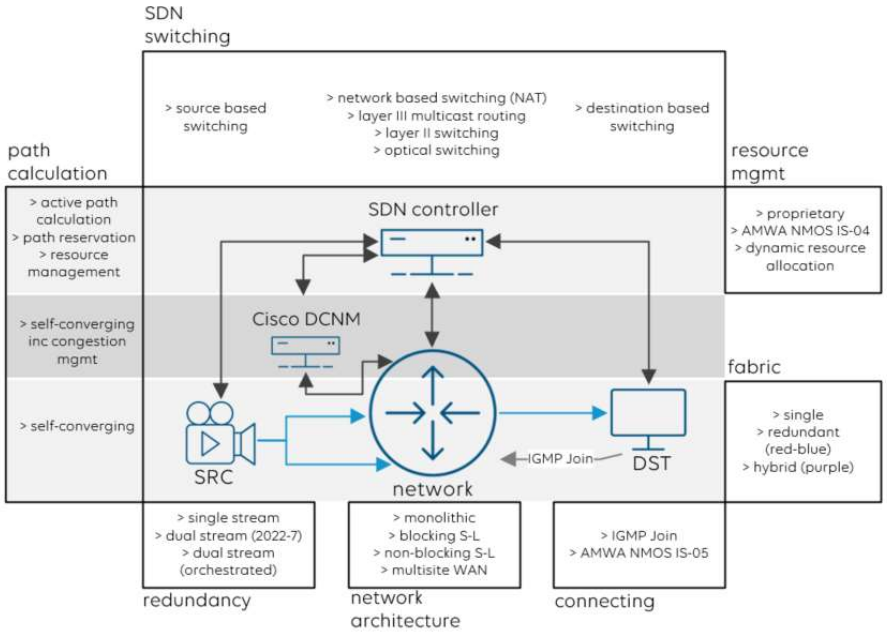

dataminer
Search
CNN
east-west
north-south
monitor
sla
schedule
sources
CNN
VISUAL
EAST-WEST
NORTH-SOUTH
MONITOR
SLA
SCHEDULE
SOURCES
DATA
Deploy
Generic Source
XCode
ALARMS 5
TICKETS
REPORTS
DASHBOARDS
DOCUMENTS
NOTES
ANNOTATIONS
Main
P-M: Main Feed
Backup
P-B: Backup Feed
xCode
P-OS: Live OTT
Packager
Deploy
Main
Multicast IP 239.240.11.10
Multicast Port 5500
Input Video Bitrate 4.095 Mbps
Input Audio Bitrate 73.314 kbps
CC Error Rate 0
Backup
Multicast IP 239.240.12.10
Multicast Port 5500
Input Video Bitrate 3.893 Mbps
Input Audio Bitrate 75.024 kbps
CC Error Rate 0
Output ATS
Name CNN
Provider Name Skyline Communications
Program Nr. 1301
PMT 100
PCR 101
Output Type MPEG2 TS UDP
ATS Streams
Bitrate 344.398 kbps

Summary

DataMiner SDMN & Cisco Nexus 9000 IPFM

- BOOK
  - Plan flows ahead of time
- RUN
  - Orchestrate full ecosystem of infrastructure and servi
  - Range of possibilities according to your architecture
  - Flexibility
- CONTROL
  - Control your IP media solution according to your neec
- MONITOR
  - Keep track of KPI's and SLA's
  - Real time telemetry
  - Security & reliability



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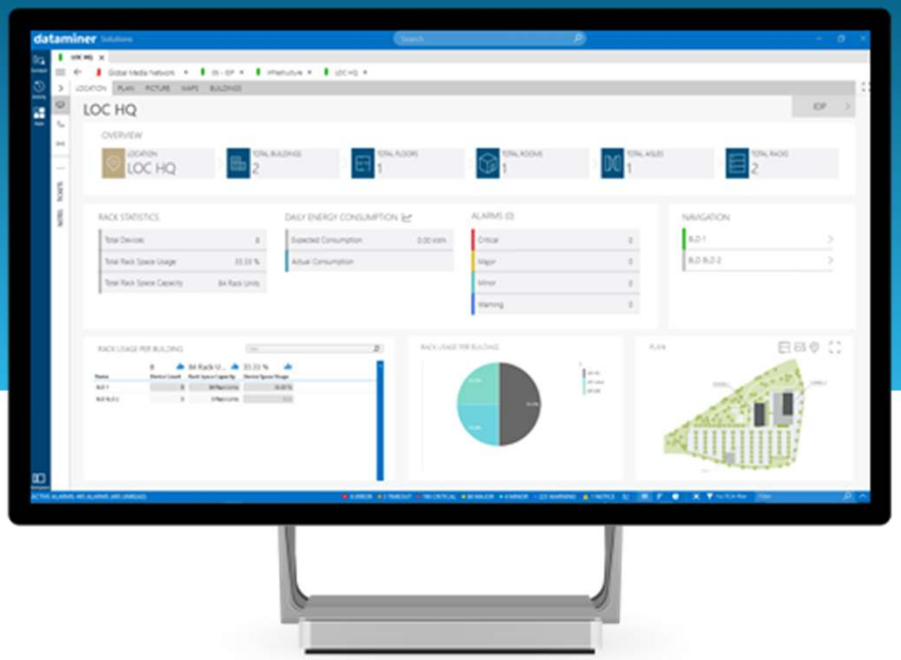
TECHNOLOGY PARTNER
WEBINAR

Any questions?

Thank you for joining us!



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