

Welcome

Automated Inventory Discovery and Management for IS-04 Compatible & Proprietary Broadcast Infrastructure



The Company

Skyline Communications

- global leading software & ICT publisher for open monitoring & orchestration solutions
- focus on media & broadband industry
- 1500+ customers in over 125 countries
- 9000+ nodes deployed
- 7000+ connectors for products from 1000+ different vendors



A global team of 350+ ICT, software, broadcast & media subject matter experts growing consistently +30% each year



The Product

DataMiner

manage IT, media
and broadband
infrastructure
(on-premises –
cloud)

service
monitoring and
life cycle
orchestration

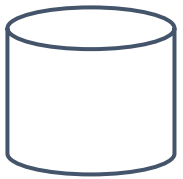
business,
operational and
technical process
automation

- end-to-end digital transformation software solutions for the ICT media and broadband industry
- 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 proactive operation
- native flexibility & agility designed for DevOps 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



Inventory management

Industry trends



Single source of truth

Single overview of inventory documentation, wiring, addresses, etc.



Consistency

M2M sync between as-is network and CMDB



Dynamics

Integration of full inventory, including VNI



Security

Controlled onboarding of inventory, SW versions and configurations

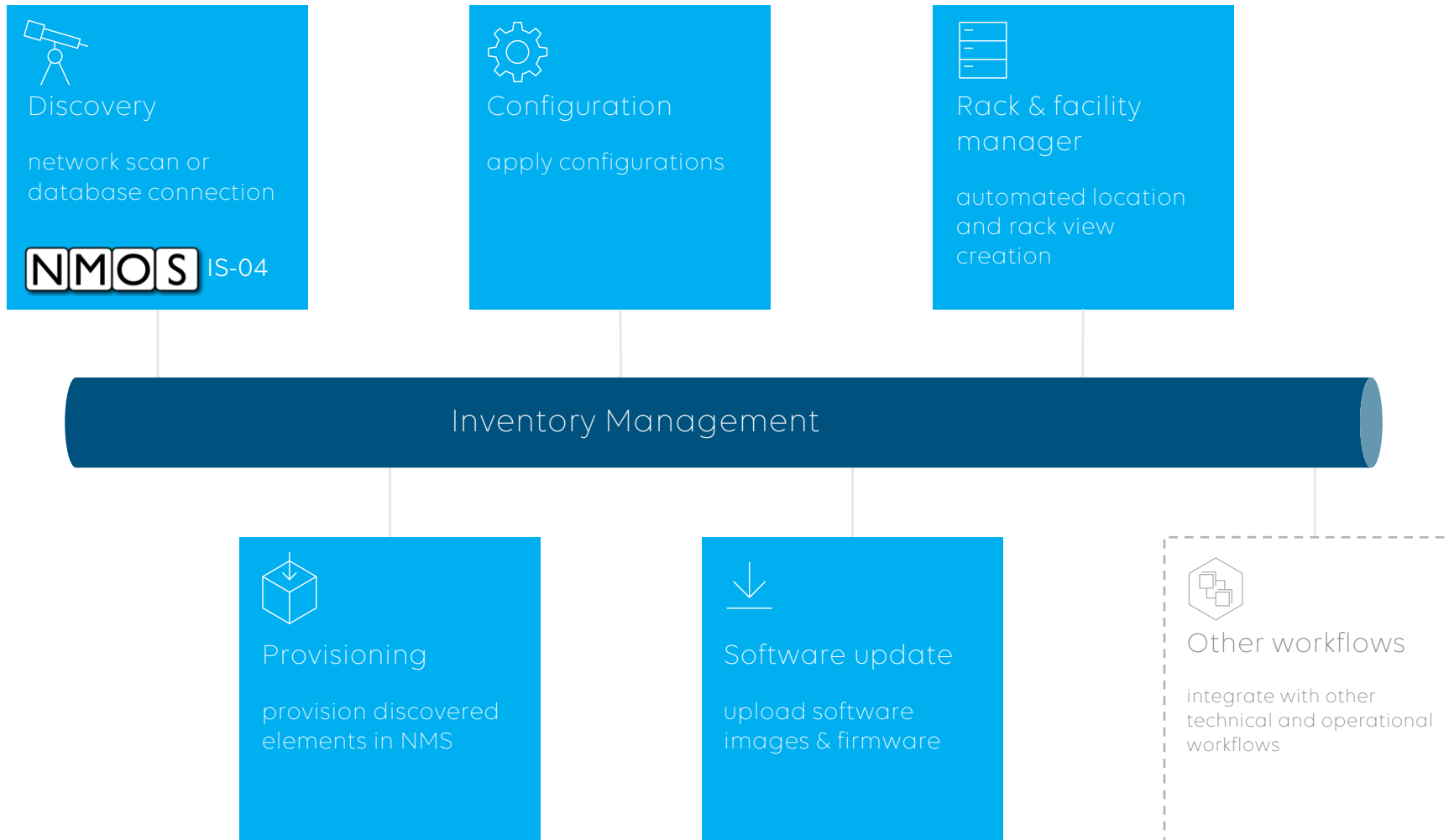


Automation

Far-reaching automation of all aspects of inventory management

Inventory management

Includes many aspects

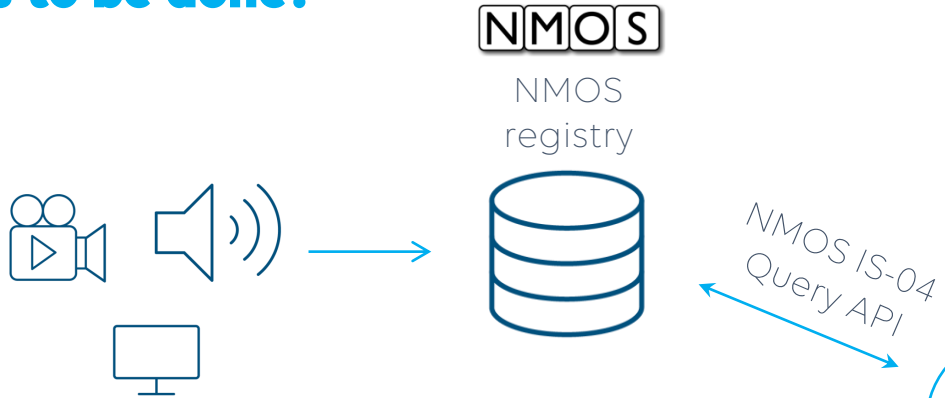




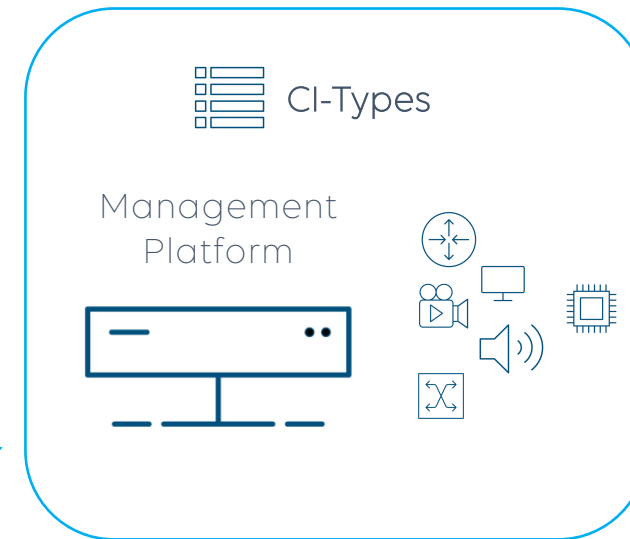
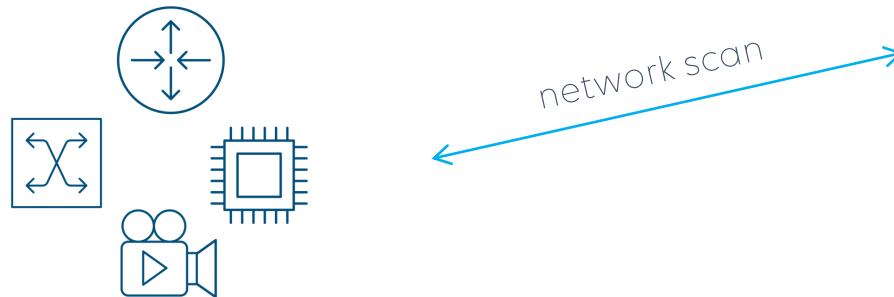
Discovery

What needs to be done?

NMOS IS-04
infrastructure

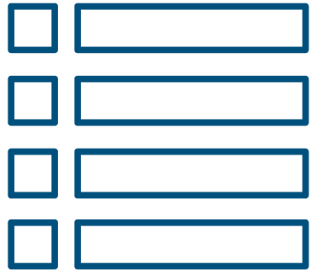


proprietary
(non-NMOS)
infrastructure



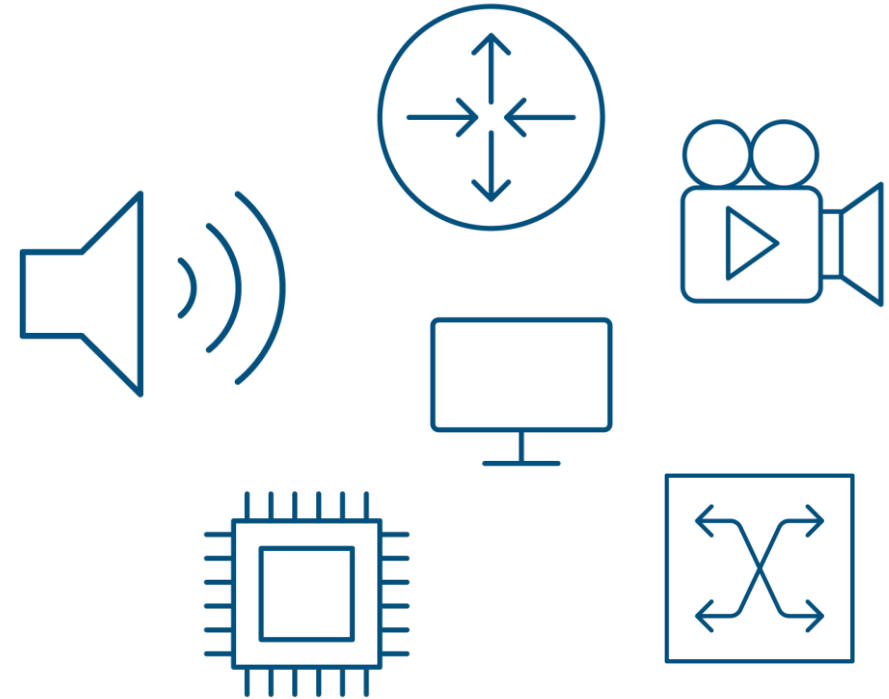
Configuration Item Types

(CI Types)



The CI type identifies the required attributes and relationships that comprise a configuration record.

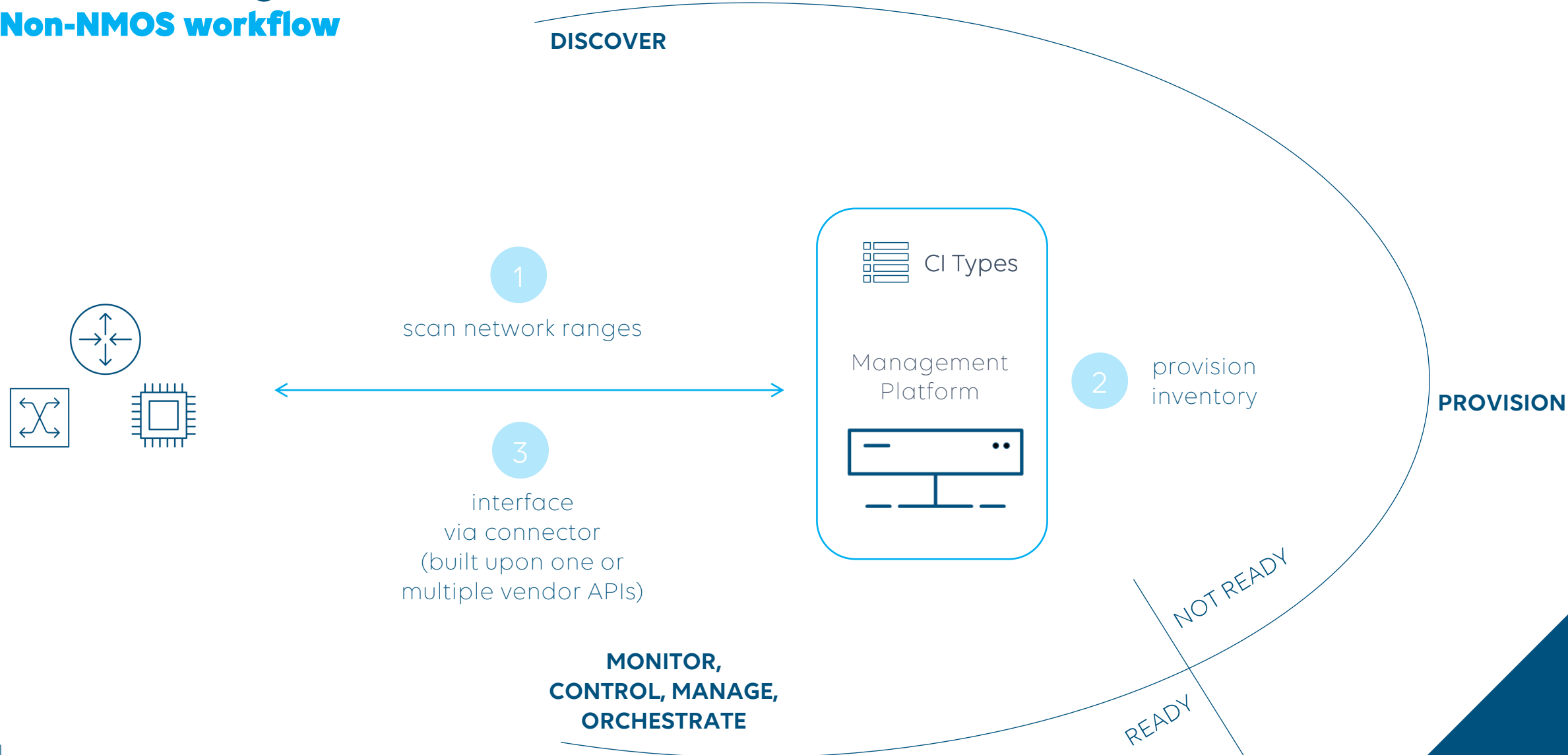
Common CI Types include hardware, software, documents and users.





Discovery

Non-NMOS workflow





How to discover infrastructure?

>> CI types



Need for **discovery profiles**

- HTTP
- HTTPS
- SNMP (V1, V2, V3)
- WMI
- TELNET
-

Windows OS

idp_ci_type_management
dataminer idp ci type manager

ID	IDENTIFIER	DISCOVERY PROFILE	MATCH	VALUE
1	System Name	WMI_OperatingSystem	contains	Microsoft

Conditions: 1

ADD NEW DISCOVERY IDENTIFIER

Discovery Protocol Types: All

Previous

Cisco 7050

idp_ci_type_management
dataminer idp ci type manager

ID	IDENTIFIER	DISCOVERY PROFILE	MATCH	VALUE
1	sysDescr	SNMP_MIB_II	contains	Cisco NX-OS

Conditions: 1

ADD NEW DISCOVERY IDENTIFIER

Discovery Protocol Types: All

Previous

Arista 7010

idp_ci_type_management
dataminer idp ci type manager

ID	IDENTIFIER	DISCOVERY PROFILE	MATCH	VALUE
1	sysObjectID	SNMP_MIB_II	StartsWith	1.3.6.1.4.1.30065.1.3011.7010.

Conditions: 1

ADD NEW DISCOVERY IDENTIFIER

Discovery Protocol Types: All

Previous

Arista 7050

idp_ci_type_management
dataminer idp ci type manager

ID	IDENTIFIER	DISCOVERY PROFILE	MATCH	VALUE
1	sysObjectID	SNMP_MIB_II	StartsWith	1.3.6.1.4.1.30065.1.3011.7050.

Conditions: 1

ADD NEW DISCOVERY IDENTIFIER

Discovery Protocol Types: All

Previous

How to provision infrastructure?

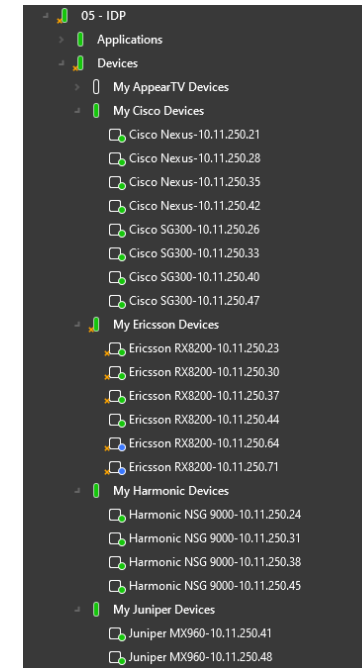
>> CI types



Need for **provisioning profiles**

- naming convention
- view
- connector and connector version
- alarm and trend templates
- passwords
- element state – stopped/paused/started
- URL to retrieve data from CMDBs
 - power consumption, rack location...

>> a managed element gets created



Device Management

Full read / write access

dataminer													
Skyline x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1													
Skyline DataMiner Infrastructure Discovery and Provisioning Devices Cisco Nexus Devices Cisco Nexus 93180-1													
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	Utilization Percent	MTU	Last C
mgmt0/		mgmt0	00.DE.FB.F3.89.60	N/A	N/A	Ethernet CSMA...	Up	Up	1 000 Mbps	0.09 Mbps	0.009 %	1500	
loopback0/*OSPF_AND_PTP_Sour...	*OSPF_AND_PTP_Sour...	loopback0		10.70.0.11	255.255.255.255	Software Loop...	Up	Up	8 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/1/Meinberg	Meinberg	Ethernet1/1	00.DE.FB.F3.89.68	10.70.11.1	255.255.255.252	Ethernet CSMA...	Up	Up	1 000 Mbps	0.02 Mbps	0.002 %	1500	2 da
Ethernet1/2/Inband Management	Inband Management	Ethernet1/2	00.DE.FB.F3.89.69	10.70.11.5	255.255.255.252	Ethernet CSMA...	Up	Up	1 000 Mbps	0.01 Mbps	0.001 %	1500	
Ethernet1/3/Neuron Port 2 - TAP...	Neuron Port 2 - TAP...	Ethernet1/3	00.DE.FB.F3.89.6A	10.70.11.9	255.255.255.252	Ethernet CSMA...	Up	Up	25 000 Mbps	6 243.89 Mb...	24.976 %	1500	
Ethernet1/4/		Ethernet1/4	00.DE.FB.F3.89.6B	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/5/		Ethernet1/5	00.DE.FB.F3.89.6C	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/6/		Ethernet1/6	00.DE.FB.F3.89.6D	N/A	N/A	Ethernet CSMA...	Down	Down	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/7/		Ethernet1/7	00.DE.FB.F3.89.6E	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/8/		Ethernet1/8	00.DE.FB.F3.89.6F	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/9/		Ethernet1/9	00.DE.FB.F3.89.70	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/10/		Ethernet1/10	00.DE.FB.F3.89.71	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/11/		Ethernet1/11	00.DE.FB.F3.89.72	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/12/		Ethernet1/12	00.DE.FB.F3.89.73	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/13/		Ethernet1/13	00.DE.FB.F3.89.74	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/14/		Ethernet1/14	00.DE.FB.F3.89.75	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/15/		Ethernet1/15	00.DE.FB.F3.89.76	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/16/		Ethernet1/16	00.DE.FB.F3.89.77	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/17/phabrix	phabrix	Ethernet1/17	00.DE.FB.F3.89.78	10.70.11.65	255.255.255.252	Ethernet CSMA...	Up	Up	10 000 Mbps	2 476.01 Mb...	24.760 %	1500	
Ethernet1/18/		Ethernet1/18	00.DE.FB.F3.89.79	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/19/		Ethernet1/19	00.DE.FB.F3.89.7A	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/20/		Ethernet1/20	00.DE.FB.F3.89.7B	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/21/		Ethernet1/21	00.DE.FB.F3.89.7C	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/22/		Ethernet1/22	00.DE.FB.F3.89.7D	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/23/		Ethernet1/23	00.DE.FB.F3.89.7E	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/24/		Ethernet1/24	00.DE.FB.F3.89.7F	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/25/		Ethernet1/25	00.DE.FB.F3.89.80	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/26/		Ethernet1/26	00.DE.FB.F3.89.81	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	
Ethernet1/27/		Ethernet1/27	00.DE.FB.F3.89.82	N/A	N/A	Ethernet CSMA...	Down	Up	25 000 Mbps	0.00 Mbps	0.000 %	1500	

ACTIVE ALARMS: 169 ALARMS (165 UNREAD)

1 Critical 147 Major 14 Minor 5 Warning 2 Notice No RCA

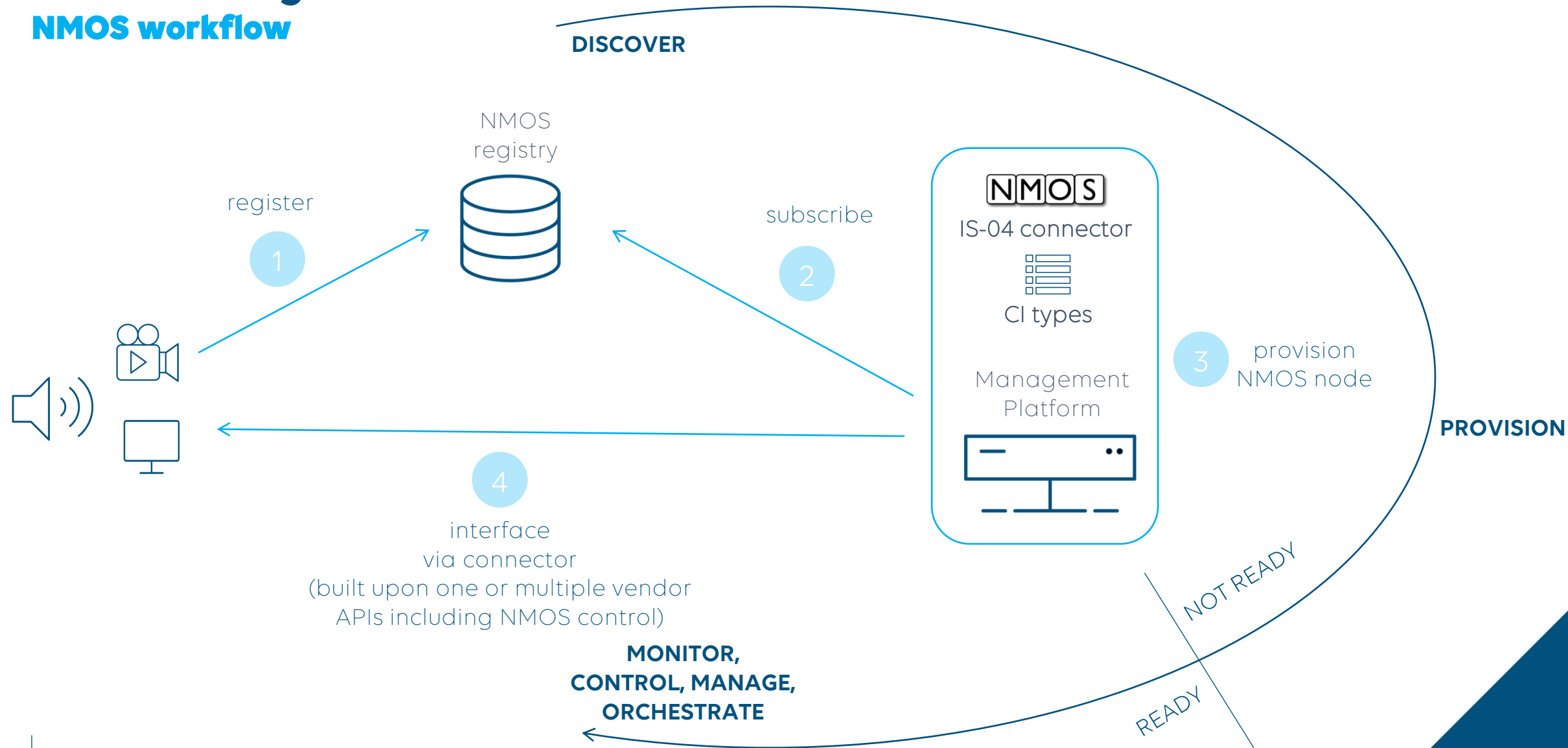
SFP													
SFP Polling													
SFP Interfaces													
Index [IDX]	SFP	Type	Name	Part Number	Revision	Serial Number	Nominal Bitrate	Link Length 9	Link Len				
Ethernet1/1	Present	1000base-T	CISCO-AVAGO	ABCU-5710RZ-CS2	--	AGM112627AE	1 300 Mbps		N/A				
Ethernet1/2	Present	1000base-T	CISCO	SBCU-5740ARZ-CS1	G3.1	AVC194624UJ	1 300 Mbps		N/A				
Ethernet1/3	Present	SFP-H25GB-SR	CISCO-FINISAR	FTLF8536P4PCL-C1	B	FNS23020XZ5	25 500 Mbps		N/A				
Ethernet1/4	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/5	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/6	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/7	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/8	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/9	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/10	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/11	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/12	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/13	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
Ethernet1/14	Not Present	N/A	N/A	N/A	N/A	N/A	N/A		N/A				
SFP Interfaces Lanes													
Index [IDX]	Temperature (S...	Voltage	Current	TX Power	RX Power	Residual-Dispersion (...	Laser Frequency	PAM Transition	Pre				
Ethernet1/3 - 1	48.69 deg C	3.30 V	7.72 mA	-1.17 dBm	-1.22 dBm		N/A		N/A				
Ethernet1/17 - 1	36.92 deg C	3.30 V	6.82 mA	-2.83 dBm	-1.74 dBm		N/A		N/A				

dataminer													
Skyline x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1 x Cisco Nexus 93180-1													
Skyline DataMiner Infrastructure Discovery and Provisioning Devices Cisco Nexus Devices Cisco Nexus 93180-1													
RTP Flow													
Flow Type	Source IP	Destination IP	Bridge Domain ID	Source Port	Destination Port	Interface Name	Bytes Per Second	Start Time					
IPv4	10.70.1.10	239.100.20.2	4 149	10 000	20 000	Ethernet1/49	131 911 261 bps	13:44:21 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.30.1	4 149	10 000	30 000	Ethernet1/49	2 401 094 bps	13:46:07 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.30.3	4 149	10 000	30 000	Ethernet1/49	2 398 826 bps	13:46:37 CEST Oct 15 2020					
IPv4	10.70.1.18	239.200.20.1	4 149	10 000	20 000	Ethernet1/49	131 922 744 bps	13:45:42 CEST Oct 15 2020					
IPv4	10.70.11.10	239.100.20.9	4 103	10 000	20 000	Ethernet1/3	263 865 331 bps	10:03:54 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.20.1	4 149	10 000	20 000	Ethernet1/49	131 060 035 bps	13:43:55 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.20.4	4 149	10 000	20 000	Ethernet1/49	131 907 057 bps	13:44:50 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.30.4	4 149	10 000	30 000	Ethernet1/49	2 398 414 bps	13:46:48 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.20.3	4 149	10 000	20 000	Ethernet1/49	131 949 857 bps	13:44:36 CEST Oct 15 2020					
IPv4	10.70.1.10	239.100.30.2	4 149	10 000	30 000	Ethernet1/49	2 401 254 bps	13:46:22 CEST Oct 15 2020					



Discovery

NMOS workflow





Discovery

NMOS connector

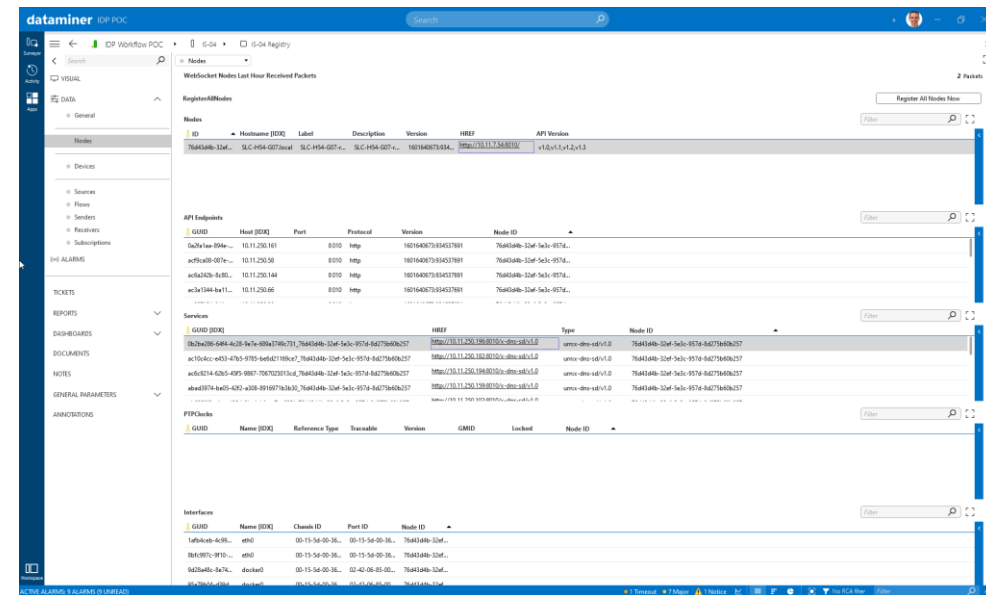
- When node registers with IS-04 registry, the connector
 - detects new node in registry
 - identifies if element exists in the management platform

NMOS any NMOS registry



IS-04
Query API
NMOS

NMOS
NMOS IS-04
connector





- Menu icons: Hamburger, Back, IDP Workflow POC, IS-04, IS-04 Registry, Search, and a magnifying glass.
- General
- Nodes
- Devices
- Sources
- Flows
- Senders
- Receivers
- Subscriptions
- ALARMS
- TICKETS
- REPORTS
- DASHBOARDS
- DOCUMENTS
- NOTES
- GENERAL PARAMETERS
- ANNOTATIONS

API Version 1.3		
WebSocket Node Status		Open
WebSocket Receivers Status		Open
WebSocket Senders Status		Open
WebSocket Flow Status		Open
WebSocket Devices Status		Open
WebSocket Sources Status		Open

API Version 1.2		
WebSocket Node Status (V1.2)		Open
WebSocket Receivers Status (V1.2)		Open
WebSocket Senders Status (V1.2)		Open
WebSocket Flow Status (V1.2)		Open
WebSocket Devices Status (V1.2)		Open
WebSocket Sources Status (V1.2)		Open

Received Packets	
WebSocket Nodes Last Hour Received Packets	2 Packets
WebSocket Receivers Last Hour Received Packets	Not initialized
WebSocket Senders Last Hour Received Packets	Not initialized
WebSocket Flow Last Hour Received Packets	Not initialized
WebSocket Devices Last Hour Received Packets	Not initialized
WebSocket Sources Last Hour Received Packets	Not initialized

Nodes Register

Register Nodes Script IDP_Register_IS04Nodes

Register Nodes Enabled

Register Node Script Status

Register Nodes Settings

Action [IDX]	Status	Reservation GUID	Token Profile Instance GUID
New	Enabled	00000000-0000-00...	00000000-0000-0000-0000-0...
Update	Enabled	00000000-0000-00...	00000000-0000-0000-0000-0...

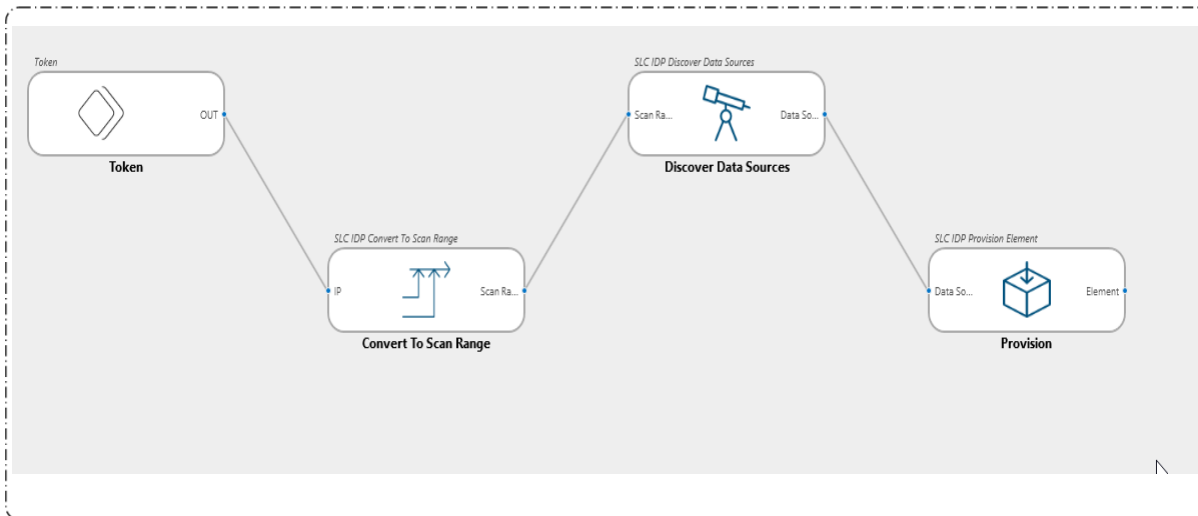


Provisioning

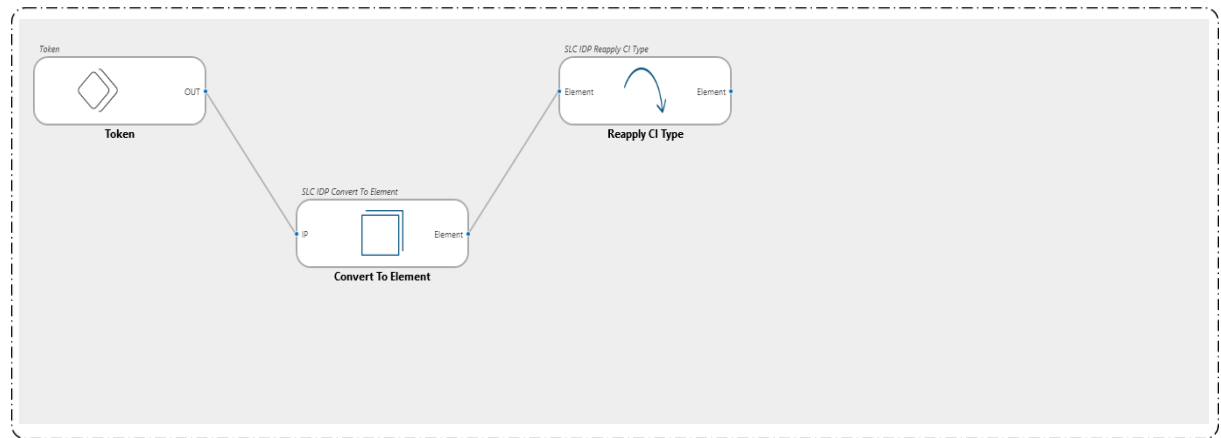
Provisioning process for NMOS nodes

- NMOS IS-04 connector creates a token and triggers a PROCESS to:
 - provision a new node
 - or update an existing node

Provision new nodes



Update existing nodes

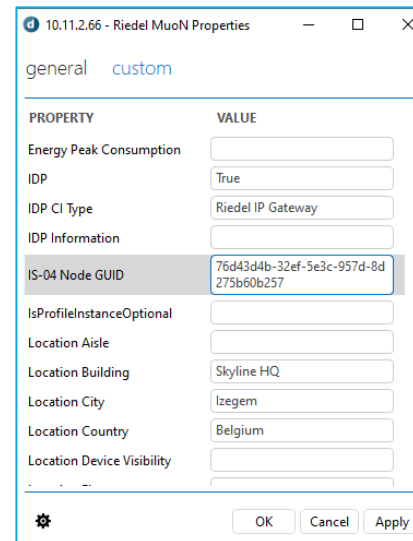
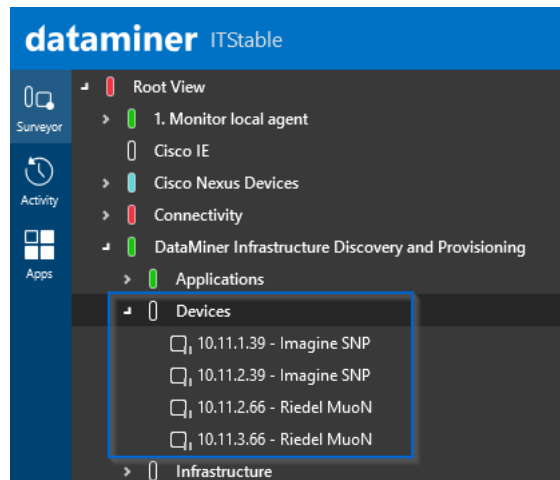




Provisioning

Provisioning process for NMOS nodes

- after the process has run successfully, a “managed element” gets created
- “managed element” & NMOS registry are kept in sync via “IS-04 Node GUID”



IS-04 specs

Node ID

For physical Nodes, the Node ID must be universally unique to that Node, and remain the same for all time (much in the same way as a serial number).

For virtual Nodes, the Node ID must be universally unique to that Node. If a snapshot is taken of the virtual Node then it should be stored with the same ID, however the following conditions must be applied when re-deploying the virtual Node from this snapshot:

- If deploying via the same controller which created it and no other instantiation of this virtual Node exists, the original Node ID should be used.
- If deploying via the same controller which created it and an instantiation of this virtual Node exists, it must be deployed with a new ID. Uses of this Node ID (and child resources) in any other stored data must be mapped to the new ID during this process.
- If deploying via a different controller it cannot be guaranteed that another instance of this virtual Node isn't already in existence. A new Node ID must therefore be generated, with any stored data being mapped to the new ID during the process.

Device Management

Full access to NMOS node – Riedel Muon example

Surveyor

Activity

Apps

Search

Search

Visual

DATA

Flow Overview

General

License

emAPI

Firmware

Network

Interfaces

IP Configuration

Ethernet

DNS

Packet Interval Time

Static Route

LLDP

Reference Clock

Diagnostics

Flows

Devices

Devices Flows

SDI

SDP

Ports

Debug

ALARMS 16

TICKETS

REPORTS

DASHBOARDS

DOCUMENTS

NOTES

GENERAL PARAMETERS

ANNOTATIONS

nl.skyline.be

Search

NFL Development System

Mediomert Muon (Fusion & Virtu)

EM8 em8fp-A0-F1-54 st2110 node

Flows

ID [IDX]	Label	Source ID	Type	Name	Format Type	SDP URL
2feebe26-7c7f-209a-ae4d-40a36ba0f154	st2110 flow	3f6f8ce2-9ba1...	4	rx ch1 flow 1 primary	Audio	http://10.13.1.3/em8fp/node/v1/sdp/2feebe26-7c7f-209a-ae4d-40a36ba0f154/
3b76f15c-2f9f-44d3-91e0-40a36ba0f154	st2110 flow	5ede9776-fdd...	4	rx ch2 flow 5 secondary	Ancillary	http://10.13.1.3/em8fp/node/v1/sdp/3b76f15c-2f9f-44d3-91e0-40a36ba0f154/
3f6f8ce2-bbfe-19d0-a530-40a36ba0f154	st2110 flow	5ede9776-fdd...	4	rx ch2 flow 5 primary	Ancillary	http://10.13.1.3/em8fp/node/v1/sdp/3f6f8ce2-bbfe-19d0-a530-40a36ba0f154/
5b4ff440-36da-4fef-863d-40a36ba0f154	st2110 flow	7effd25a-17d-2...	4	rx ch1 flow 0 secondary	Video	http://10.13.1.3/em8fp/node/v1/sdp/5b4ff440-36da-4fef-863d-40a36ba0f154/
6fd6632-563f-4e61-a4ef-40a36ba0f154	st2110 flow	7ebc34ee-4fbd...	4	rx ch2 flow 4 primary	Audio	http://10.13.1.3/em8fp/node/v1/sdp/6fd6632-563f-4e61-a4ef-40a36ba0f154/
7bbcfed4-7d95-3945-971f-40a36ba0f154	st2110 flow	7ebc34ee-4fbd...	4	rx ch2 flow 4 secondary	Audio	http://10.13.1.3/em8fp/node/v1/sdp/7bbcfed4-7d95-3945-971f-40a36ba0f154/

Network

ID [IDX]	Source IP	Source UDP Port	Destination IP	Destination UDP Port	Destination MAC	VLAN TAG	Status	Switch State	Flow Name	Flow ID
2feebe26-7c7f-209a-ae4d-40a36ba0f154/1	192.168.0.1	10000	239.0.1.4	20000	01:00:5e:00:01:04	0	Disabled	Idle	rx ch1 flow 1 pr...	2feebe26-7c7f-...
3b76f15c-2f9f-44d3-91e0-40a36ba0f154/1	192.168.1.1	10000	239.0.2.21	20000	01:00:5e:00:02:15	0	Disabled	Idle	rx ch2 flow 5 se...	3b76f15c-2f9f-...
3f6f8ce2-bbfe-19d0-a530-40a36ba0f154/1	192.168.1.1	10000	239.0.2.20	20000	01:00:5e:00:02:14	0	Disabled	Idle	rx ch2 flow 5 pr...	3f6f8ce2-bbfe-...
5b4ff440-36da-4fef-863d-40a36ba0f154/1	192.168.0.1	10000	239.0.1.3	20000	01:00:5e:00:01:03	0	Disabled	Idle	rx ch1 flow 0 se...	5b4ff440-36da-...
6fd6632-563f-4e61-a4ef-40a36ba0f154/1	192.168.1.1	10000	239.0.2.10	20000	01:00:5e:00:02:0a	0	Disabled	Idle	rx ch2 flow 4 pr...	6fd6632-563f-...
7bbcfed4-7d95-3945-971f-40a36ba0f154/1	192.168.1.1	10000	239.0.2.11	20000	01:00:5e:00:02:0b	0	Disabled	Idle	rx ch2 flow 4 se...	7bbcfed4-7d95-...

Video Format

ID [IDX]	Format Valid	Transport Scan	Picture Scan	Format	Video Format	Video Rate	Video Sampling	Video Bit Depth	Video Colorimetry	Transfer Characteristic	ICpC Status	Sampling Format	Flow Name	Flow ID
5b4ff440-36da-4fef-863d-40a36ba0f154	Invalid	Interface	Interface	HD	1920x1080/3840x2160	29.97/59.94 Hz for 1080i	Interface	10	BT709	SDR	Inactive	422_YCbCr	rx ch1 flow 0 se...	5b4ff440-36da-4fef-863d-40a36ba0f154
7b6f56e8-cf5e-15b0-a38c-40a36ba0f154	Invalid	Interface	Interface	HD	1920x1080/3840x2160	29.97/59.94 Hz for 1080i	Interface	10	BT709	SDR	Inactive	422_YCbCr	rx ch1 flow 0 pr...	7b6f56e8-cf5e-15b0-a38c-40a36ba0f154
7fd774b4-eeb6-4b0c-8c1e-40a36ba0f154	Invalid	Interface	Interface	HD	1920x1080/3840x2160	29.97/59.94 Hz for 1080i	Interface	10	BT709	SDR	Inactive	422_YCbCr	rx ch2 flow 0 se...	7fd774b4-eeb6-4b0c-8c1e-40a36ba0f154
23efdc12-7def-1028-996e-40a36ba0f154	Invalid	Interface	Interface	HD	1920x1080/3840x2160	29.97/59.94 Hz for 1080i	Interface	10	BT709	SDR	Inactive	422_YCbCr	rx ch2 flow 0 pr...	23efdc12-7def-1028-996e-40a36ba0f154

Audio Format

ID [IDX]	Format Code Rate	Channel Count	Packet Time	Format	Flow Name	Flow ID
2feebe26-7c7f-209a-ae4d-40a36ba0f154	48 000 Hz	2	1 ms	dash-30	rx ch1 flow 1 primary	2feebe26-7c7f-209a-ae4d-40a36ba0f154
6fd6632-563f-4e61-a4ef-40a36ba0f154	48 000 Hz	2	1 ms	dash-30	rx ch2 flow 4 primary	6fd6632-563f-4e61-a4ef-40a36ba0f154
7bbcfed4-7d95-3945-971f-40a36ba0f154	48 000 Hz	2	1 ms	dash-30	rx ch2 flow 4 secondary	7bbcfed4-7d95-3945-971f-40a36ba0f154
7b6f56e8-cf5e-1b7d-90fd-40a36ba0f154	48 000 Hz	2	1 ms	dash-30	rx ch1 flow 1 secondary	7b6f56e8-cf5e-1b7d-90fd-40a36ba0f154
bfc639c4-77de-2228-819f-40a36ba0f154	48 000 Hz	2	1 ms	dash-30	rx ch2 flow 2 secondary	bfc639c4-77de-2228-819f-40a36ba0f154
bfe91b48-6ff7-329a-967d-40a36ba0f154	48 000 Hz	2	1 ms	dash-30	rx ch1 flow 3 secondary	bfe91b48-6ff7-329a-967d-40a36ba0f154

SDI Mapping

ID [IDX]	Audio Slot	SDI Output ID	SDI Output Channel	Flow Name	Flow ID
2feebe26-7c7f-...	0	b0d2da17-360a...	0	rx ch1 flow 1 primary	2feebe26-7c7f-209a-ae4d-40a36ba0f154
2feebe26-7c7f-...	1	b0d2da17-360a...	1	rx ch1 flow 1 primary	2feebe26-7c7f-209a-ae4d-40a36ba0f154
7b6f56e8-cf5e-1...	0	b0d2da17-360a...	0	rx ch1 flow 1 secondary	7b6f56e8-cf5e-1b7d-90fd-40a36ba0f154
7b6f56e8-cf5e-1...	1	b0d2da17-360a...	1	rx ch1 flow 1 secondary	7b6f56e8-cf5e-1b7d-90fd-40a36ba0f154
edd1d73c-fde7-...	0	b1d2da17-360a...	0	rx ch2 flow 1 secondary	edd1d73c-fde7-169a-a6df-40a36ba0f154
edd1d73c-fde7-...	1	b1d2da17-360a...	1	rx ch2 flow 1 secondary	edd1d73c-fde7-169a-a6df-40a36ba0f154

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Search

NFL Development System

Mediomert Muon (Fusion & Virtu)

EM8 em8fp-A0-F1-54 st2110 node

Visual

DATA

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emAPI

Firmware

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Ethernet

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Static Route

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Up to "General"

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Firmware

Slot [IDX]	Product	Description	Version	Status	Default
1	bc 2110 Decapulator	DEC_2110_2ch_31-ISGA_SFP	3.2.3130	bc Inactive	Disabled
2	bc 2110 Decapulator	DEC_2110_2ch_31-ISGA_SFP	3.7.4017	bc Active	Enabled
3	bc 2022-6/7 Decapulator	DEC_2022-6_2ch_U-AL_SFP	4.5.1133	bc Inactive	Disabled
4	bc Invalid			bc Inactive	Disabled

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Search

NFL Development System

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Device Management

Full access to NMOS node – Imagine SNP example

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IP Audio

IP Ancillary

Processing Video

Video Input Present Conditional

Processing Audio

Presets

Export Preset

IP Video RX

AN	Primary IP Address	Primary UDP Port	Primary Multicast Source	Secondary IP Address	Secondary UDP Port	Secondary Multicast Source	Receiver Mode	Receiver Video Sta
0.0.0.0	0	0	0.0.0.0	0.0.0.0	0	0.0.0.0	ST2110-20	1080i/59.94
0.0.0.0	0	0	0.0.0.0	0.0.0.0	0	0.0.0.0	ST2110-20	1080i/59.94
0.0.0.0	0	0	0.0.0.0	0.0.0.0	0	0.0.0.0	ST2110-20	1080i/59.94
0.0.0.0	0	0	0.0.0.0	0.0.0.0	0	0.0.0.0	ST2110-20	1080i/59.94
0.0.0.0	0	0	0.0.0.0	0.0.0.0	0	0.0.0.0	ST2110-20	1080i/59.94

IP Video TX

Primary TX MAC Address	Secondary TX MAC Address	Video IP transmitter	Primary WAN	Secondary WAN	Primary IP Address	Primary UDP Port	Secondary IP Address	Secondary
10:5e:15:01:01	Dst Unreachable	Enabled	WAN 1	WAN 1	239.21.1.1	5000	0.0.0.0	50000
10:5e:15:01:02	Dst Unreachable	Enabled	WAN 1	WAN 1	239.21.1.2	5000	0.0.0.0	50000
10:5e:15:01:03	Dst Unreachable	Enabled	WAN 1	WAN 1	239.21.1.3	5000	0.0.0.0	50000
10:5e:15:01:04	Dst Unreachable	Enabled	WAN 1	WAN 1	239.21.1.4	5000	0.0.0.0	50000
10:5e:15:01:05	Dst Unreachable	Enabled	WAN 1	WAN 1	239.21.1.5	5000	0.0.0.0	50000

Proxy IP Video TX

Primary TX MAC Address	Secondary TX MAC Address	Video IP transmitter	Primary WAN	Secondary WAN	Primary IP Address	Primary UDP Port	Secondary IP Address	Secondary UDP Port	Transmitter Mode	Packing Mode
Unreachable	Dst Unreachable	Disabled	WAN 1	WAN 1	0.0.0.0	50000	0.0.0.0	50000	ST2110-20	GPM
Unreachable	Dst Unreachable	Disabled	WAN 1	WAN 1	0.0.0.0	50000	0.0.0.0	50000	ST2110-20	GPM
Unreachable	Dst Unreachable	Disabled	WAN 1	WAN 1	0.0.0.0	50000	0.0.0.0	50000	ST2110-20	GPM
Unreachable	Dst Unreachable	Disabled	WAN 1	WAN 1	0.0.0.0	50000	0.0.0.0	50000	ST2110-20	GPM
Unreachable	Dst Unreachable	Disabled	WAN 1	WAN 1	0.0.0.0	50000	0.0.0.0	50000	ST2110-20	GPM

Video TX IP DSCP

Configures the differentiated service point code for IP packets

Double-click to drill down...

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Input Audio Processing

Input DMB V-Bit

Input Pair Source

Gen Lock

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Output IP Ancillary

Output IP Audio

Output IP Proxy Video

Output IP Video

Video

Video Color Correction

Video Frame Sync

Video Test Signal Generator

Program 2 - HD - SDI

Program 3 - HD - SDI

Program 4 - HD - SDI

Program 5 - HD - SDI

Program 6 - HD - SDI

Program 7 - HD - SDI

Program 8 - HD - SDI

Processor B

Processor C

Processor D

Label (Free Control Layer 4)

Object ID (Color Corrector)

Name (ID) (Color Corrector)

Processor Link (Color Corrector)

Black Level (Color Corrector)

Luma Gain (Color Corrector)

Chroma Gain (Color Corrector)

Hue (Color Corrector)

Black Clip (Color Corrector)

Black Clip Level (Color Corrector)

White Clip (Color Corrector)

White Clip Level (Color Corrector)

GBR Clip (Color Corrector)

ACTIVE ALARMS: 3 ALARMS (3 UNREAD)

Timeout

Notice

5/10/2021 11:32:46 AM

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Protocols & Templates

BC IPG-1 (Imagine SNP)

Root View

BC

BC IPG-1 (Imagine SNP)

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PTP Master IP

172.17.18.240

PTP Master Interface IP

10.100.2.102

PTP Master UUID

00-02-C5-FF-FE-27-67-05

PTP Master State

Not Present

PTP State

Locked

PTP UCIP Is Master

No

PTP Master Offset

0.009 us

PTP Master Delay

4.138 us

PTP UTC Time

5/10/2021 3:33:46 PM

PTP Clock ID

00 90 F9 FF FE 34 8E 92

PTP Selected Profile

SMPTE ST 2059-2

PTP Mode

Slave Only

PTP Locking Mode

PTP Only

PTP Domain

127

PTP Announce Interval

1 Hz(0)

PTP Announce Receipt Timeout

10

PTP Network From Master/Boundary Clock

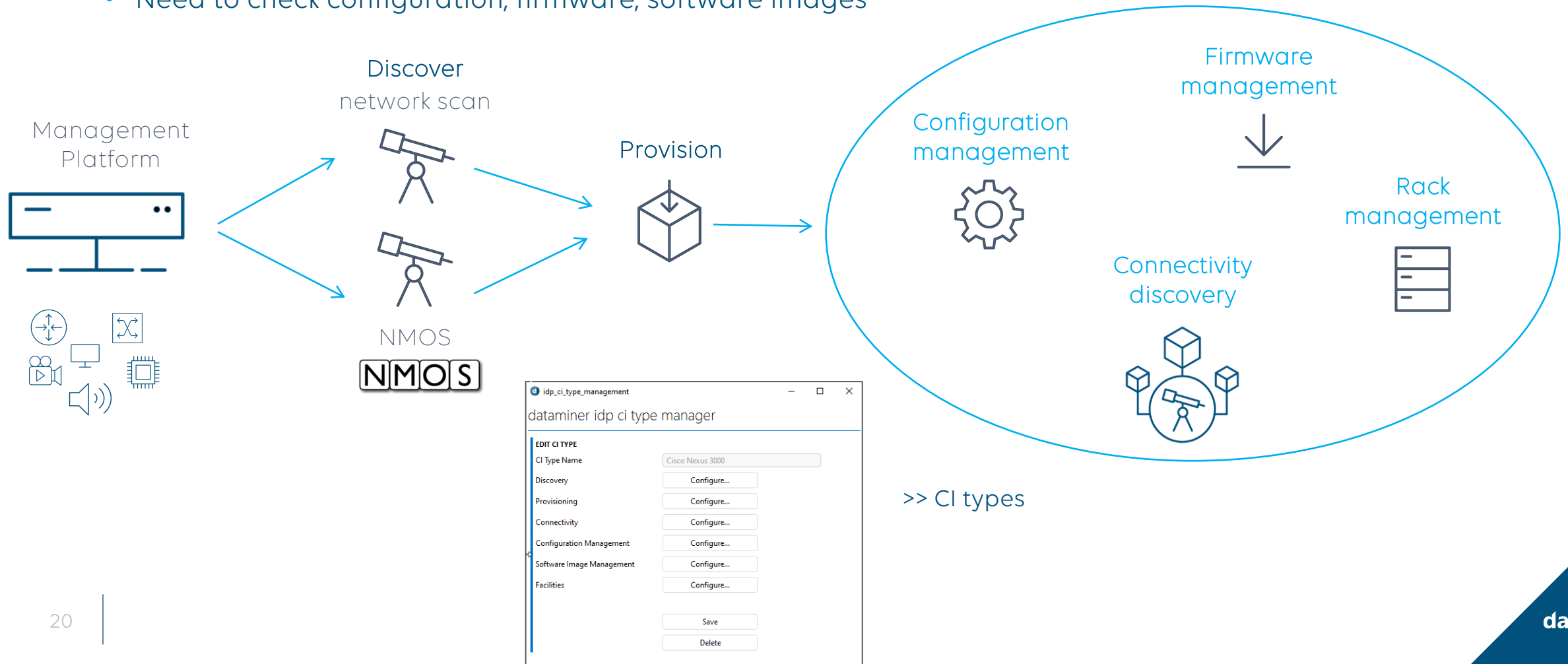
100M->100M

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Are we done yet? NO!

Secure and automated infrastructure onboarding needs more...

- Need to discover connectivity
- Need to check configuration, firmware, software images

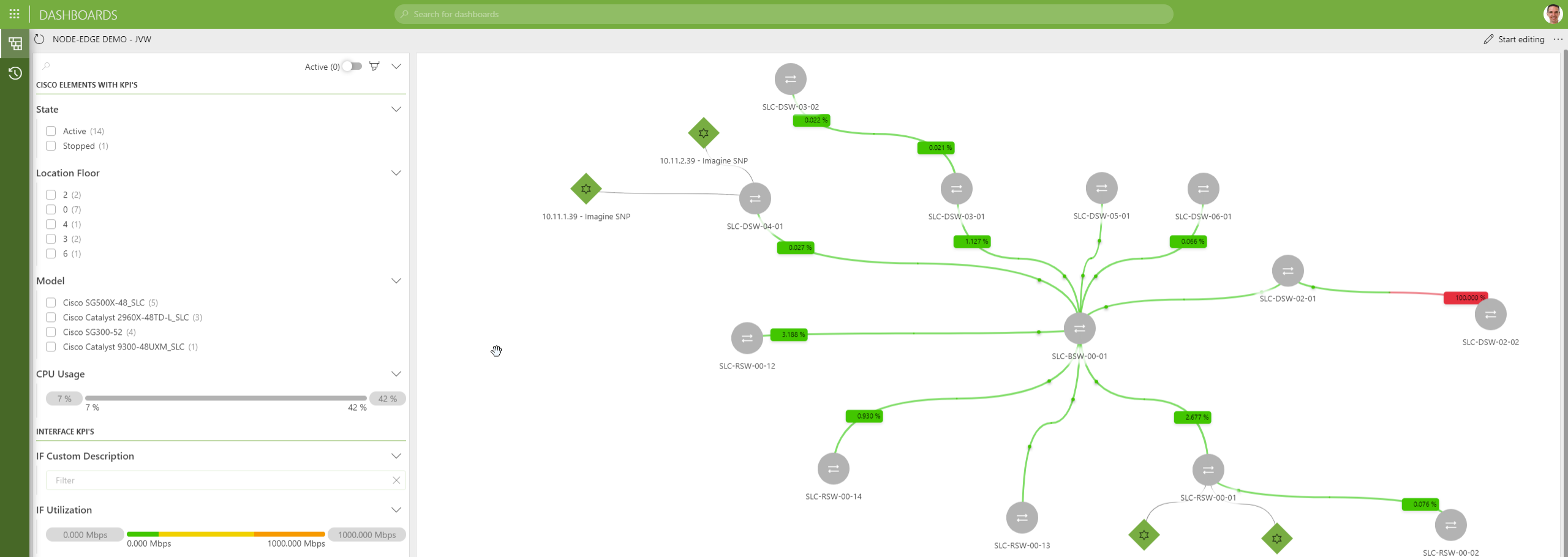


Connectivity Discovery



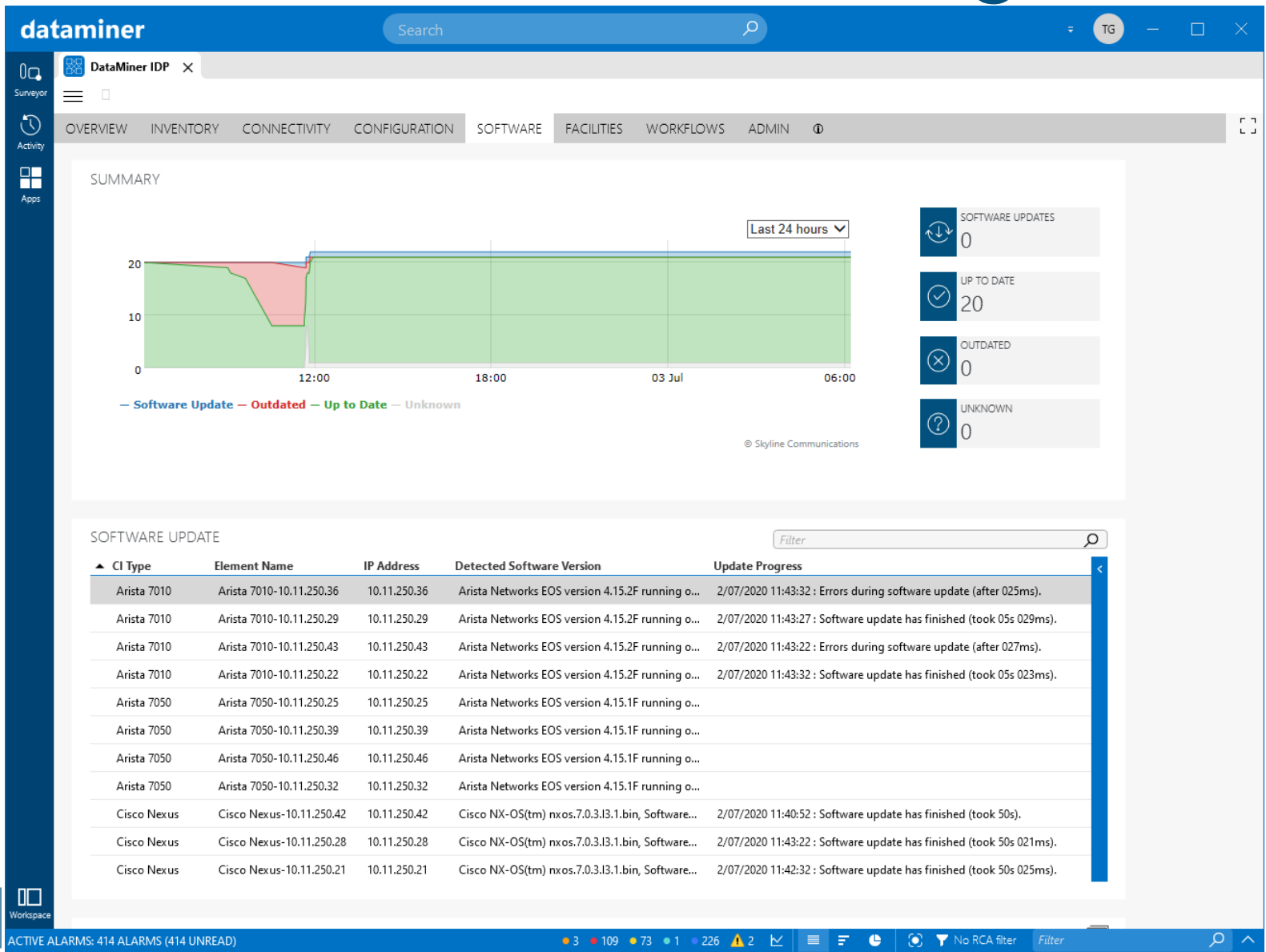
LLDP tables

dataminer										
Remote Table										
Instance	Chassis Subtype	Chassis ID	Local Port Description	Port Subtype	Remote Interface Description	Remote System Name	Remote System Description	Supported Capabilities	Enabled Capabilities	
0.83886080.1	MAC Address	98.5D.82.86.84....	null	Interface Name	Ethernet18	Mgmt	Arista Networks EOS version 4.21.10M runni...	28	28	
0.436208128.1	MAC Address	98.5D.82.86.84....	null	Interface Name	Ethernet16	Mgmt	Arista Networks EOS version 4.21.10M runni...	28	28	
0.436208640.1	MAC Address	00.03.41.20.0C....	en5	MAC Address	00.03.41.20.0C.C5	neuron-000341200CC0	Avon-SHPRM1-NPG3200	39	1	
0.436215808.1	MAC Address	40.A3.6B.A0.A0....	null	Network Address	01.0A.46.0B	emfip-a0-a0-de	SW: DEC_2110_1ch_TOA-IS_SFP_230 Version:...	0	0	
0.436232192.1	MAC Address	2C.33.11.A2.9A....	N93180-1 eth1/49	Interface Name	Ethernet1/1	N9508	Cisco Nexus Operating System (NX-OS) Sof...	28	28	





Software / Firmware Management



Automatically upload
the correct firmware /
software image



Configuration Management

dataminer Search TG

OVERVIEW INVENTORY CONNECTIVITY CONFIGURATION SOFTWARE FACILITIES WORKFLOWS ADMIN

SUMMARY BACKUPS COMPARE

SUMMARY

Show content Compare Search Filter

Cisco Nexus-10.11.250.35

Instance [IDX]	Element Name	Timestamp	Type
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	7/2/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	7/1/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/30/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/29/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/28/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/27/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/26/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/25/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/24/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/23/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/22/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/21/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/20/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/19/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/18/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/17/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/16/2020 7:15:00 AM	Running
7c28b04b-5b3c...	Cisco Nexus-10.11.250.35	6/15/2020 7:15:00 AM	Running

File Content (Configuration Backups Sessions)

Last configuration change at 07:15:02 UTC za jun 27 2020 by dms! NVRAM config last updated at 14:10:05 UTC Wed Mar 23 2017 by dms

```
!
version 12.2(55)SE3
service timestamps debug datetime msec
service timestamps log datetime
service password-encryption
!
hostname Manchester_North
!
boot-start-marker
boot-end-marker
!
logging snmp-authfail
logging buffered 8192 debugging
no logging console
enable secret 5 $1SzKwA$hmY/AEuvivVxjDQKUzJA0
!
resource policy
!
memory-size iomem 15
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
ip subnet-zero
ip cef
!
!
ip domain name it.skyline.be
ip sla monitor responder
```

Apply "golden" configuration
Take backups

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OVERVIEW INVENTORY CONNECTIVITY CONFIGURATION SOFTWARE FACILITIES WORKFLOWS ADMIN

SUMMARY BACKUPS COMPARE

COMPARE CONFIGS

LEFT CONFIG

Cisco Nexus-10.11.250.35
7/2/2020 7:15:00 AM Running (9.785 kB)

to

RIGHT CONFIG

Cisco Nexus-10.11.250.35
6/24/2020 7:15:00 AM Running (9.783 kB)

```
194 interface Serial0/2/0
195 no ip address
196 shutdown
197 clock rate 2627226
198 !
199 router eigrp 100
200 redistribute static
201 network 192.168.100.0 0.0.0.127
202 network 192.168.101.0 0.0.0.127
203 no auto-summary
204 !
205 router rip
206 passive-interface FastEthernet0/0.123
207 passive-interface FastEthernet0/0.319
208 passive-interface FastEthernet0/0.325
209 network 192.168.50.0
210 !
211 ip classless
212 ip route 0.0.0.0 0.0.0.0 10.87.130.193
213 ip route 10.202.0.0 255.255.0.0 Null0 240 name managed-wireles
214 ip route 10.219.0.0 255.255.0.0 Null0 240 name antares
215 ip route 10.87.145.40 255.255.255.255 192.168.5.253 name iTalk
216 ip route 10.87.145.50 255.255.255.255 192.168.5.253 name iTalk
217 ip route 172.17.56.0 255.255.255.0 192.168.6.1
```

Compare configurations

Rack Management

Auto-create rack views

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Search

LOC HQ/BLD 1/FLR 0/RM 5/ASL Middle

Global Media Network

LOC HQ

LOC HQ/BLD 1

LOC HQ/BLD 1/FLR 0

LOC HQ/BLD 1/FLR 0/RM 5

LOC HQ/BLD 1/FLR 0/RM 5/ASL Middle

AISLE

LOC HQ/BLD 1/FLR 0/RM 5/ASL Middle

OVERVIEW

LOCATION LOC HQ

BUILDING BLD 1

FLOOR FLR 0

ROOM RM 5

AISLE ASL Middle

TOTAL RACKS 2

RACK STATISTICS

Total Devices	15
Total Rack Space Usage	47.62 %
Total Rack Space Capacity	84 Rack Units

DAILY ENERGY CONSUMPTION

Expected Consumption 0.00 kWh

ALARMS (0)

Critical	0
Major	0
Minor	0
Warning	0

NAVIGATION

- RCK Rack 01
- RCK Rack 02

RACKS | Current Rack Side: Front

Loading...

dataminer

Search

LOC HQ/BLD 1/FLR 0/RM 5/ASL Middle/RCK Rack 01

Global Media Network

LOC HQ

LOC HQ/BLD 1

LOC HQ/BLD 1/FLR 0

LOC HQ/BLD 1/FLR 0/RM 5

LOC HQ/BLD 1/FLR 0/RM 5/ASL Middle

LOC HQ/BLD 1/FLR 0/RM 5/ASL Middle/RCK Rack 01

OVERVIEW

LOCATION LOC HQ

BUILDING BLD 1

FLOOR FLR 0

ROOM RM 5

AISLE ASL Middle

RCK Rack 01

RACK STATISTICS

Total Devices	7
Total Rack Space Usage	42.86 %
Total Rack Space Capacity	42 Rack Units

DAILY ENERGY CONSUMPTION

Expected Consumption 0.00 kWh

ALARMS (0)

Critical	0
Major	0
Minor	0
Warning	0

VISUAL OVERVIEW

front rear

FRONT PANEL

Device Information

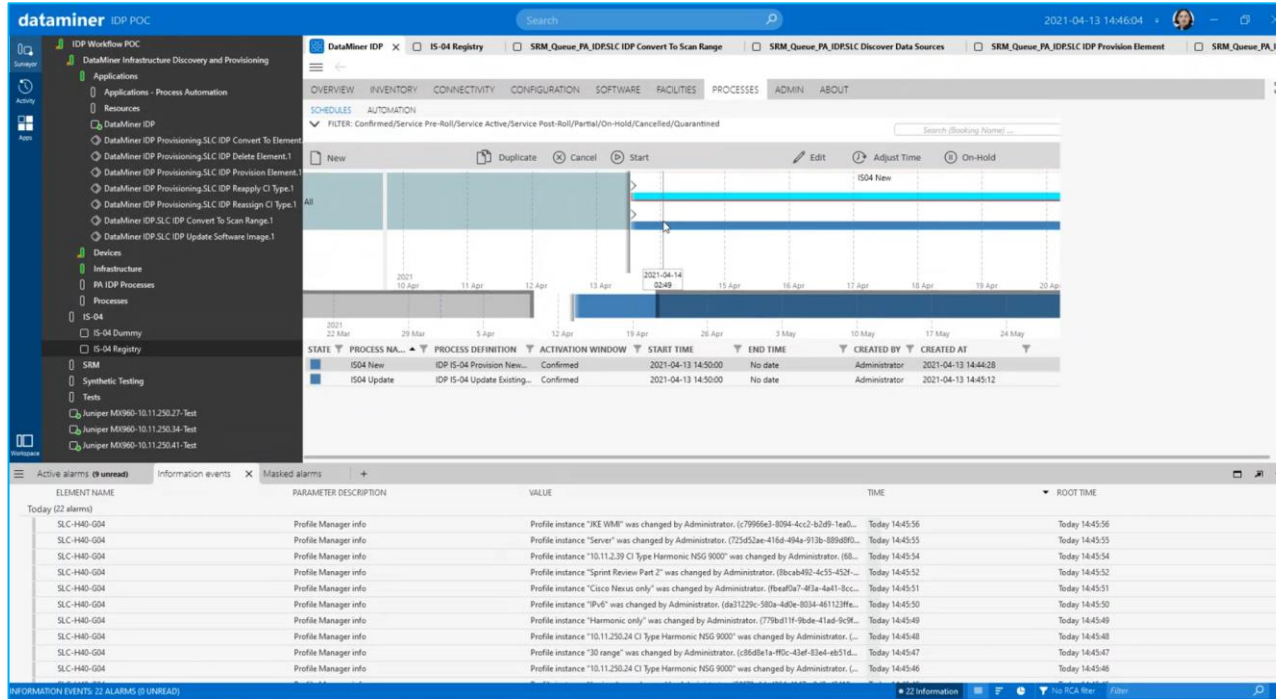
Software Version	01.06.08.001	Location	Summaryville CA	Harmonic NSG 9000-10.11.250.24
Hardware Version	SD 221-0038886	Contact	1-888-44-PEGTIVO	Harmonic NSG9000

ACTIVE ALARMS: 414 ALARMS (414 UNREAD)

Drill down to details

When to run processes?

Schedule and automate your inventory management processes



fine-grained
automation

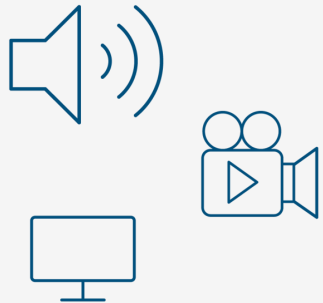
CI Type [IDX]	Discovery	Provisioning	Connectivity Dis...	Take Backup	Configuration Up...	Software Update	Software Compl...	Rack Assignment
AMWA	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
booking manager	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Cisco IE30004 TC	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Cisco Nexus 3000	Enabled	Enabled	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled
Harmonic NSG 9000	Enabled	Enabled	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled
Imagine IP Gateway	Enabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
ms	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
QA_DCF_IRD-Production	Disabled	Enabled	Enabled	Disabled	Enabled	Disabled	Disabled	Disabled
Riedel IP Gateway	Enabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Sony MKS-E1620	Enabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Sony MKS-R4020	Enabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled

schedule processes
(Note: IS-04 processes
typically run permanently)

What's next?

Only after a successful onboarding, you should use your equipment in production

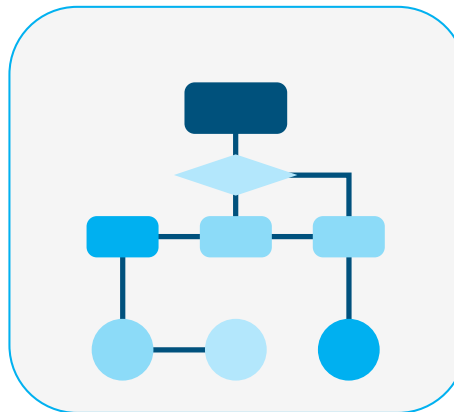
successfully
onboarded



READY >>

Sample use case:
SDN controller

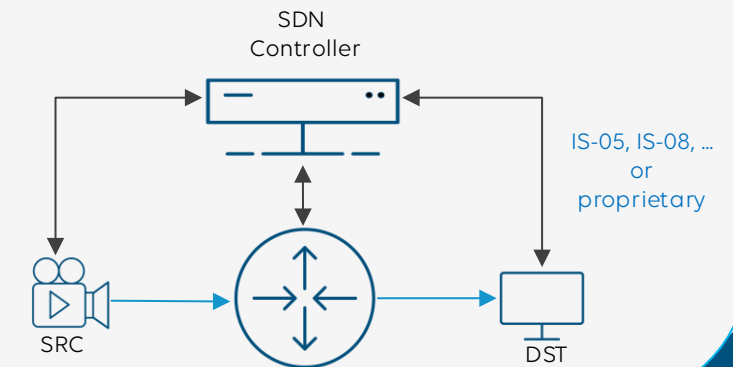
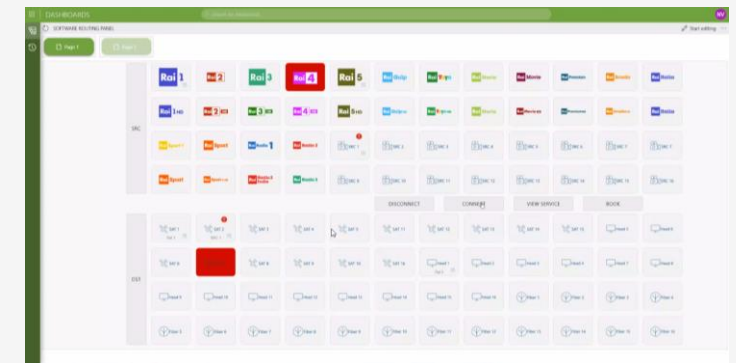
(optional)
APPROVAL WORKFLOW



ADD
SRC or DST
>>

and more:
reserve capacity
host & flow policies
add rate card
>>

SDN controller







SUMMARY



- IS-04 compatible and proprietary infrastructure can all be managed together
- automated infrastructure discovery only is not sufficient to use equipment in production
- equipment needs to be onboarded in a highly automated fashion
- automation brings security

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Here's a simple explanation of how the massive SolarWinds hack happened and why it's such a big deal

Isabella Jibilian and Katie Canales Feb 25, 2021, 5:03 PM

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MailOnline

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Channel Nine hit by 'sophisticated and targeted' CYBER HACKING attack - forcing it to abandon weekend shows and tell employees to work from home

- Nine Network falls victim to a cyber-attack that disrupts live programming
- Weekend programs including Weekend Today and Sunday Sports unable to air
- Australian broadcaster urges employees across the country to work from home

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**do you have any
questions?**

feel free to get in touch

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