VIDEO SERVICES FORUM

Welcome

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

dataminer

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)

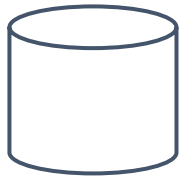
service monitoring and life cycle orchestration

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

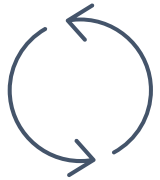
Inventory management

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

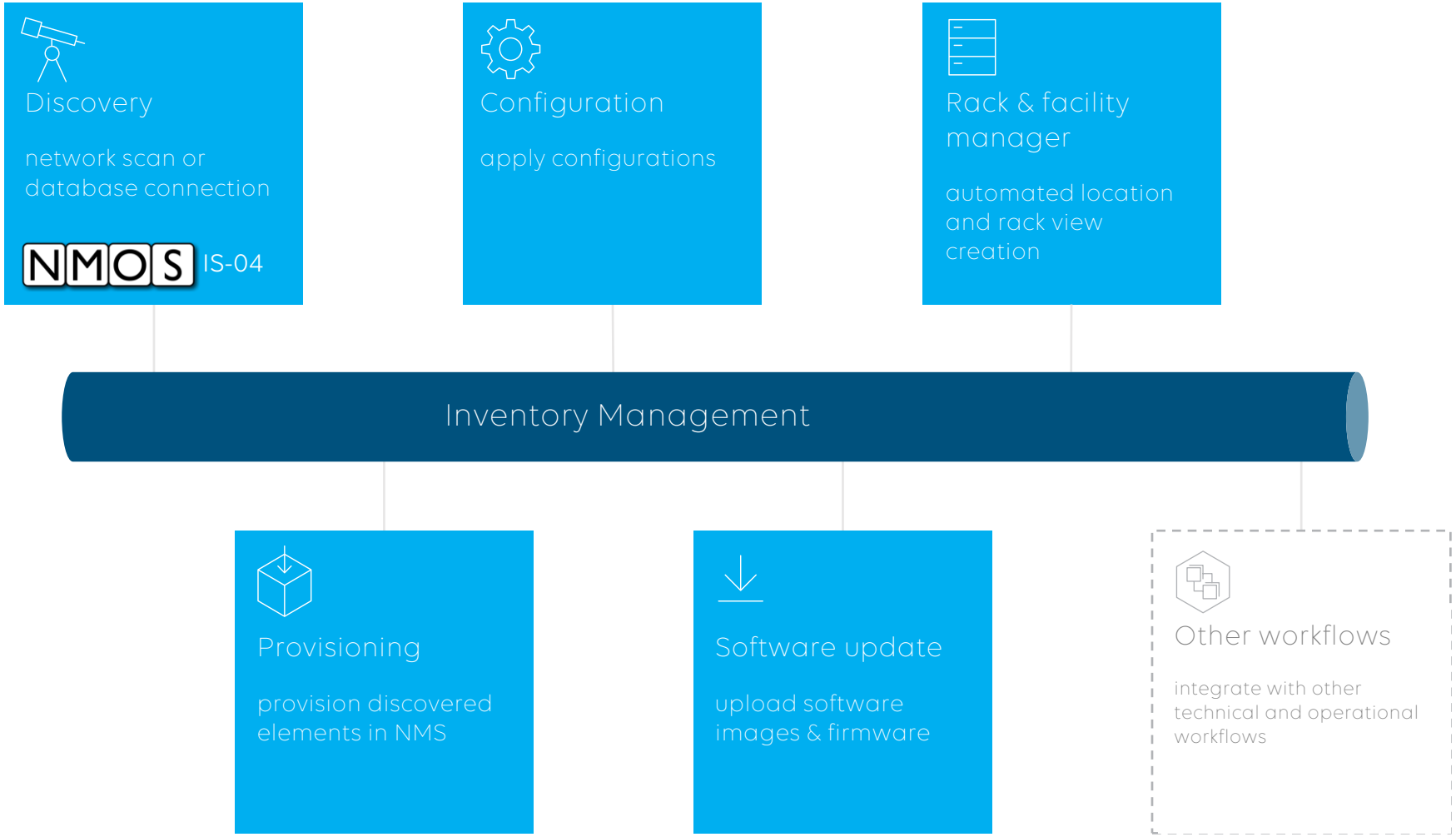
Controlled onboarding of inventory, SW versions and configurations

Automation

Far-reaching automation of all aspects of inventory management

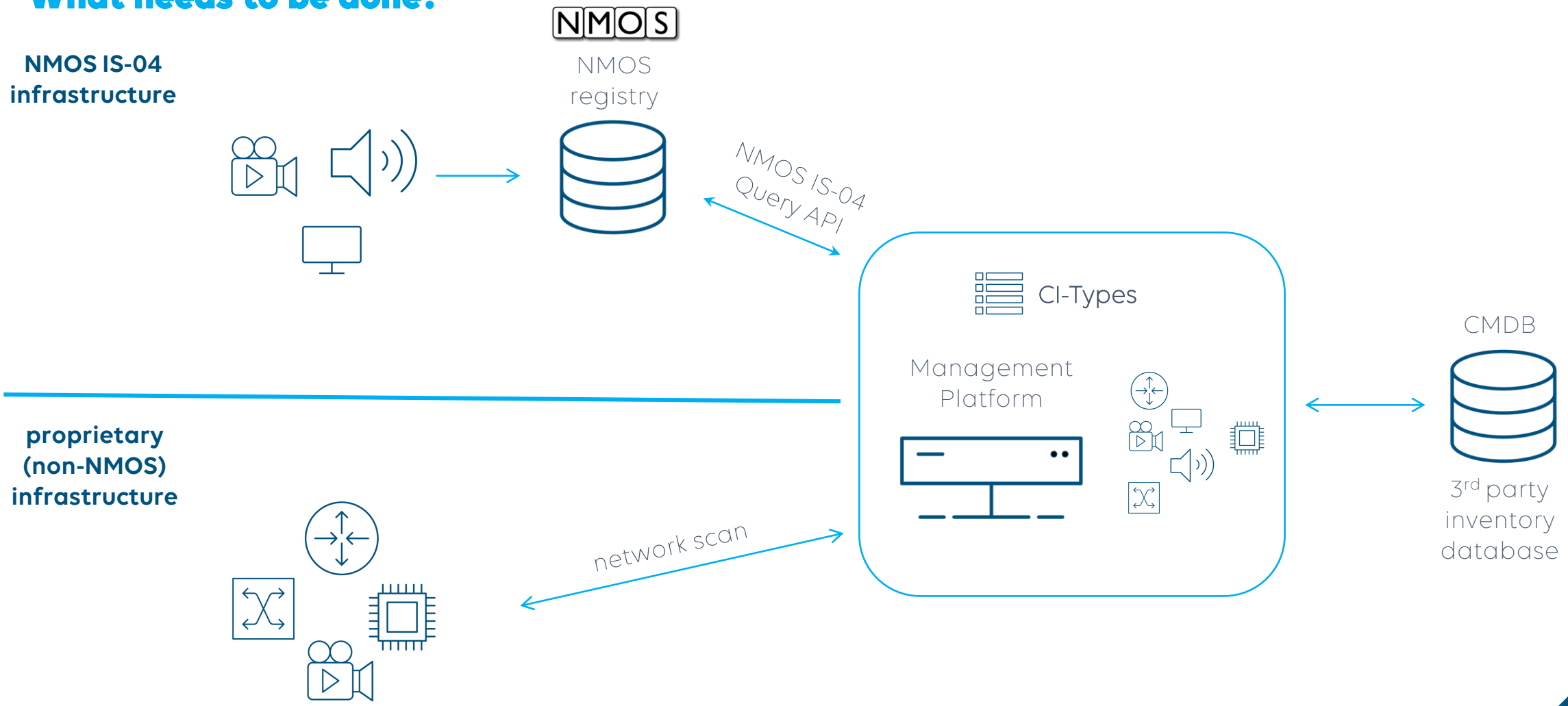
Inventory management

Includes many aspects



Discovery

What needs to be done?

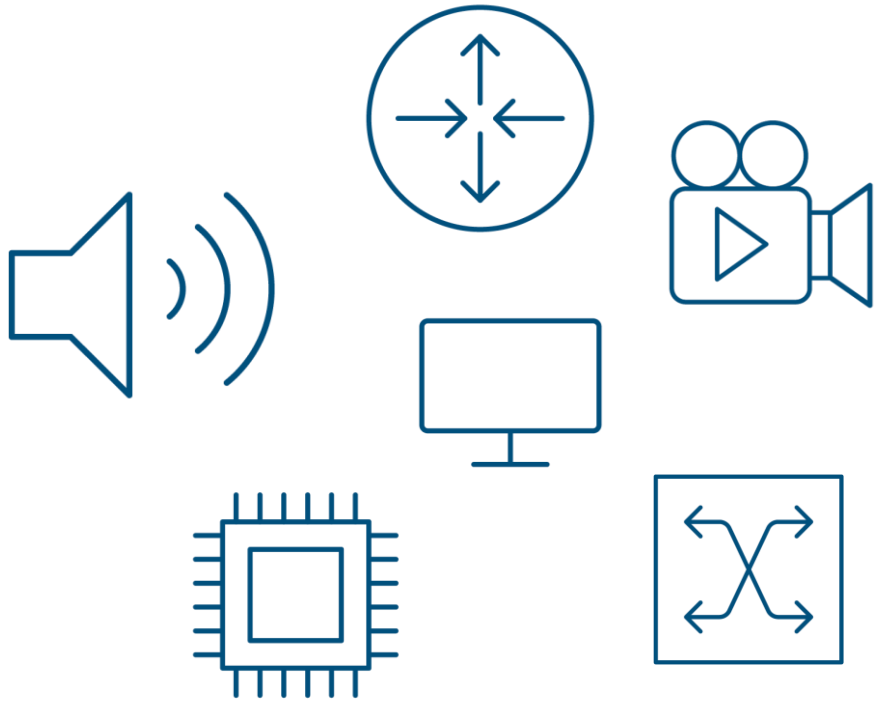


Configuration Item Types

(CI Types)

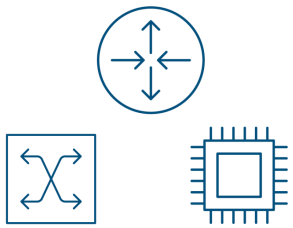
The CI type identifies the required attributes and relationships that comprise a configuration record.

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



Discovery

Non-NMOS workflow



1

scan network ranges

3

interface
via connector
(built upon one or
multiple vendor APIs)

CI Types

Management
Platform

2

provision
inventory

DISCOVER

PROVISION

NOT READY

READY

MONITOR,
CONTROL, MANAGE,
ORCHESTRATE

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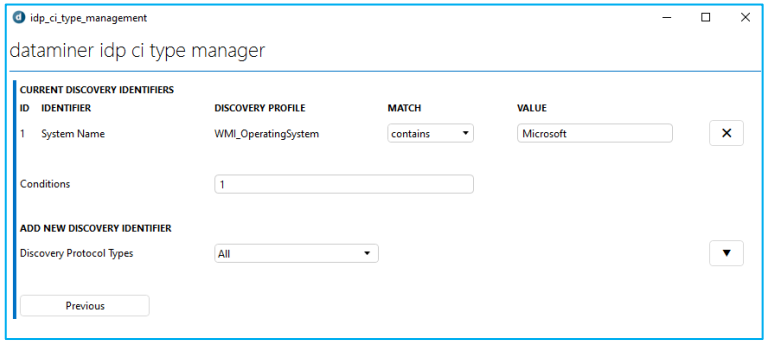
How to discover infrastructure?

>> CI types

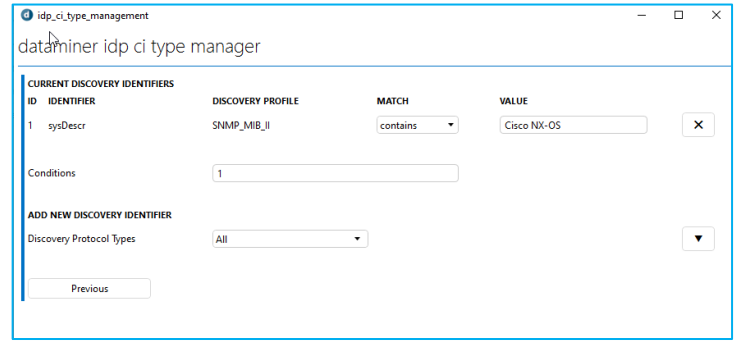
Need for **discovery profiles**

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

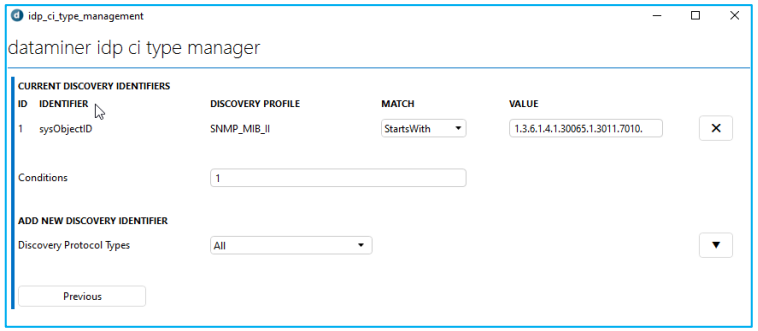
Windows OS



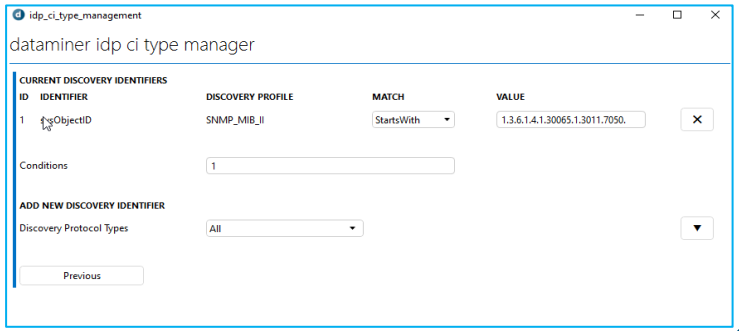
Cisco 7050



Arista 7010



Arista 7050



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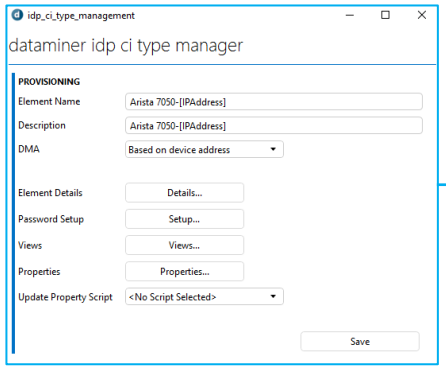
How to provision infrastructure?

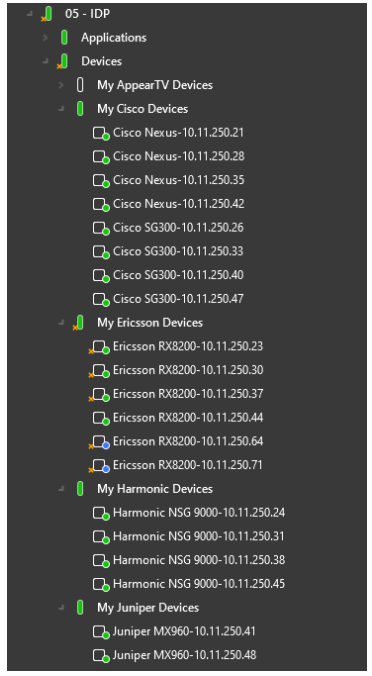
>> CI types

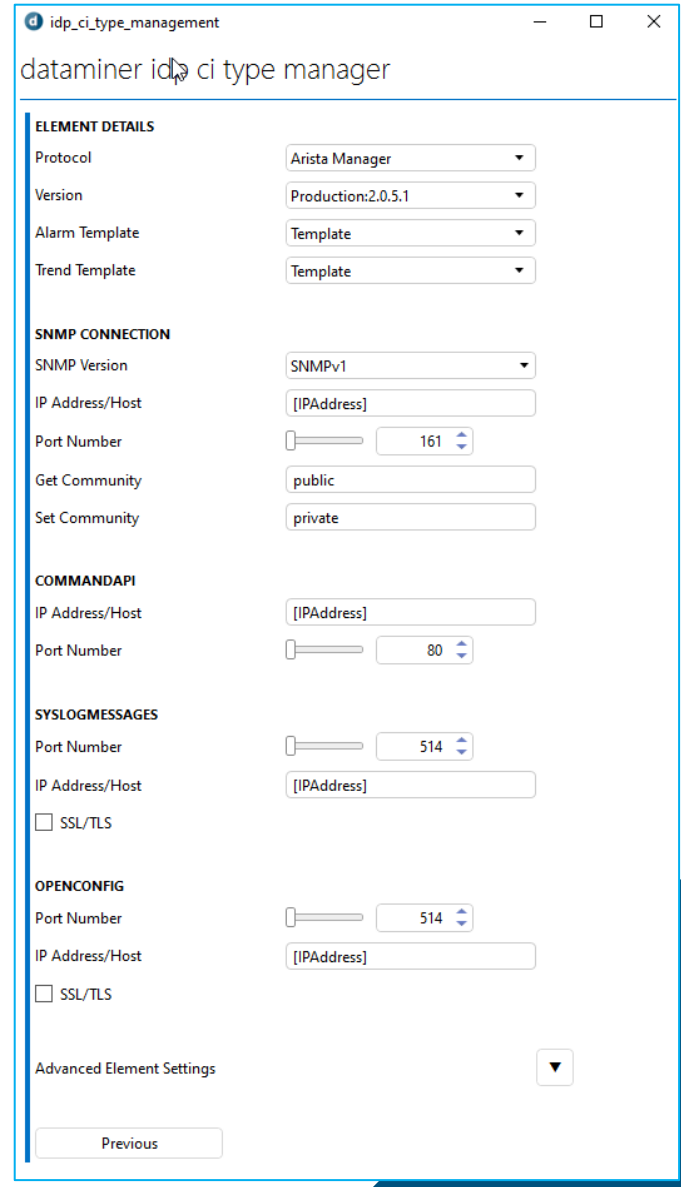
Need for **provisioning profiles**

- 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

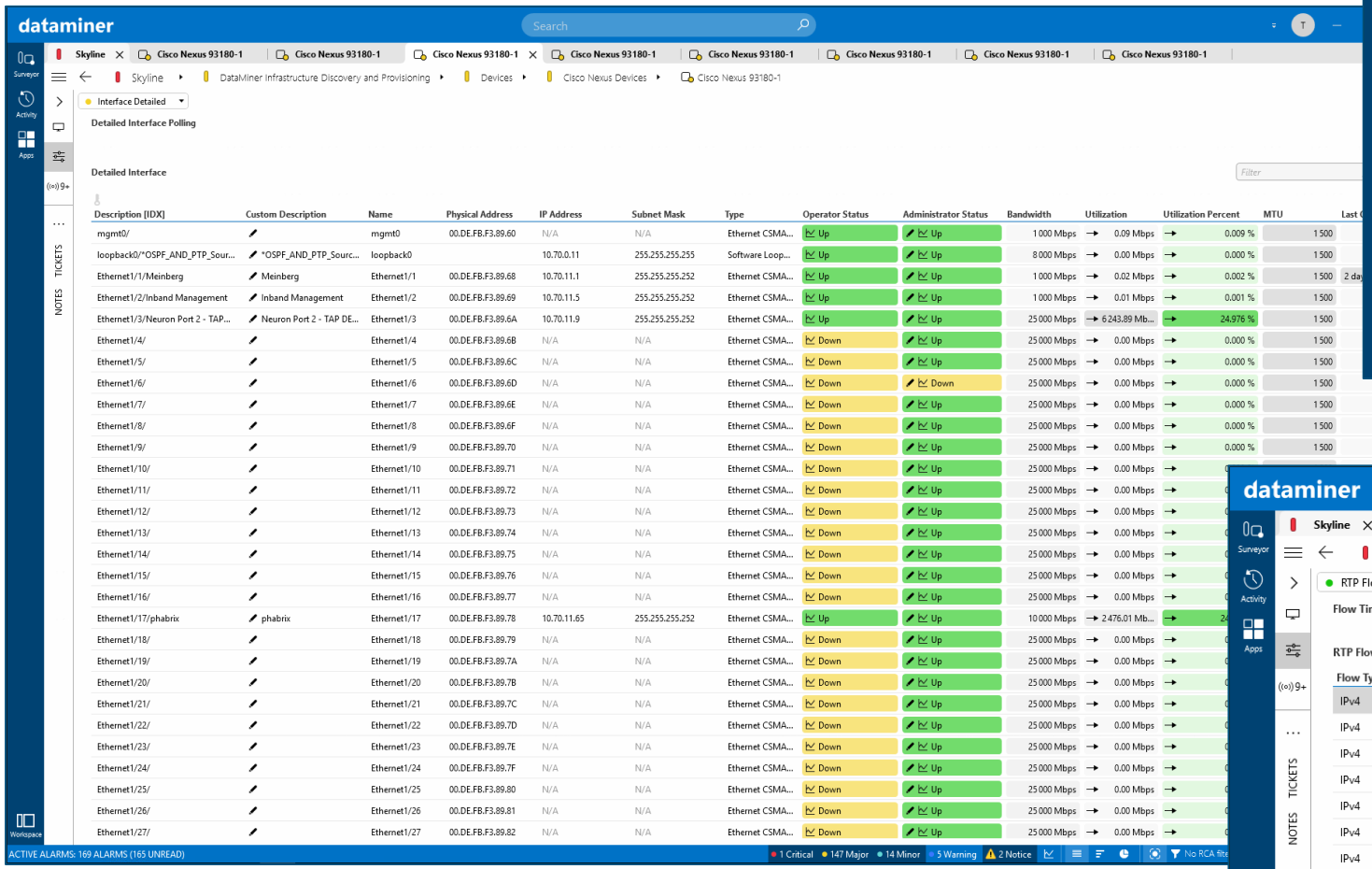


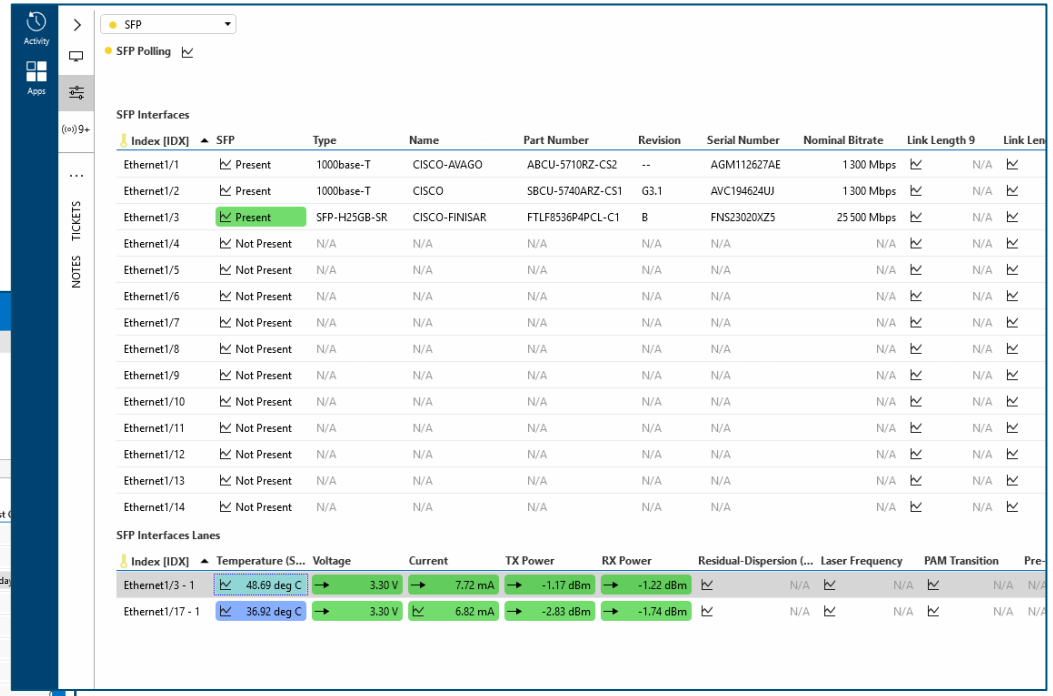


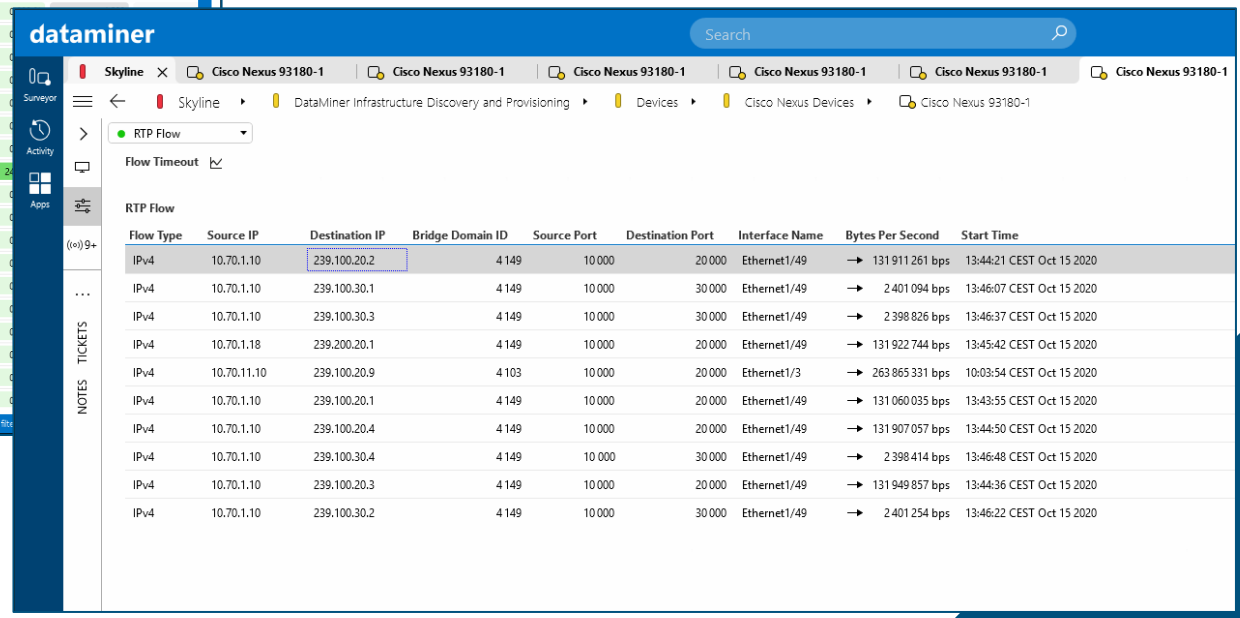


Device Management

Full read / write access

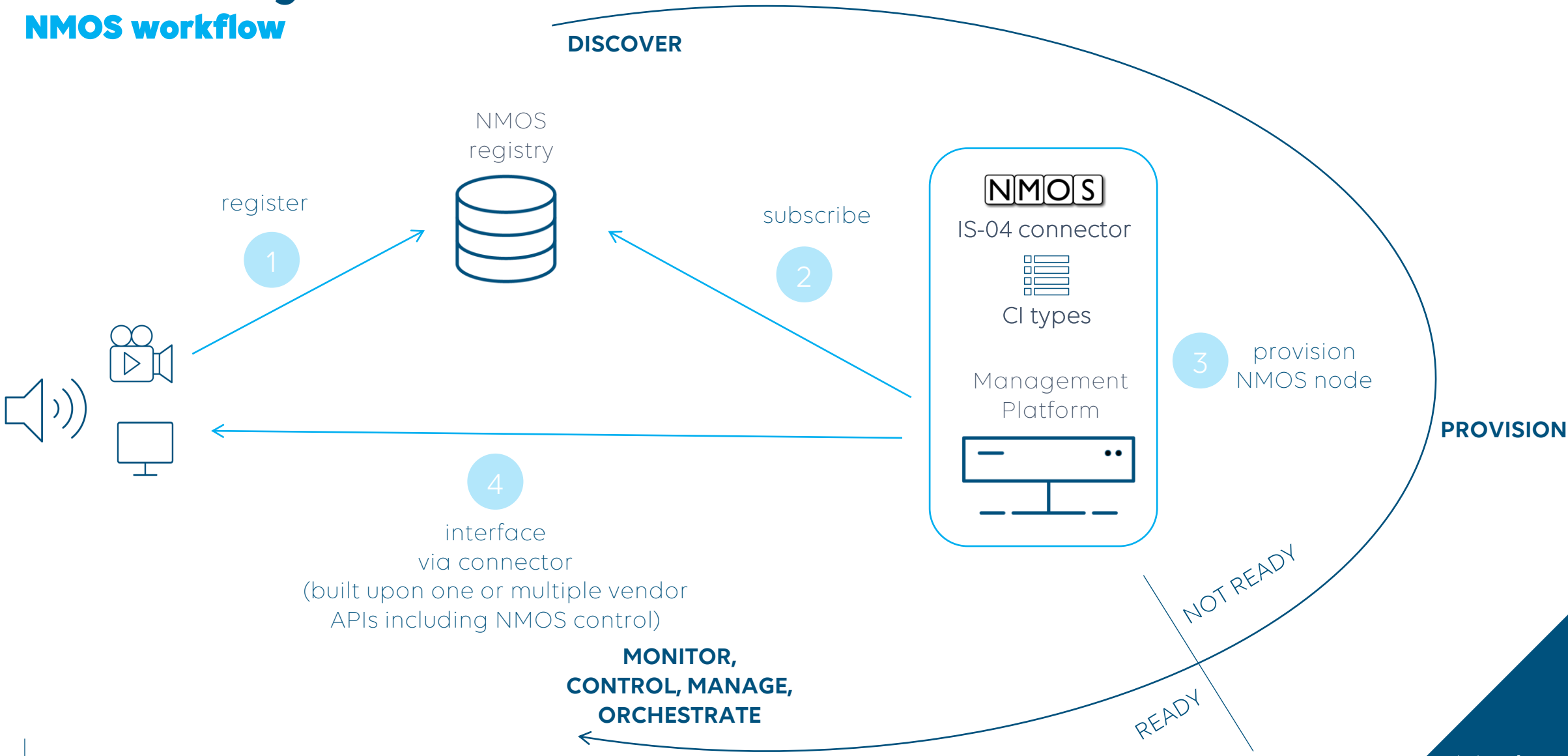






Discovery

NMOS workflow



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Discovery

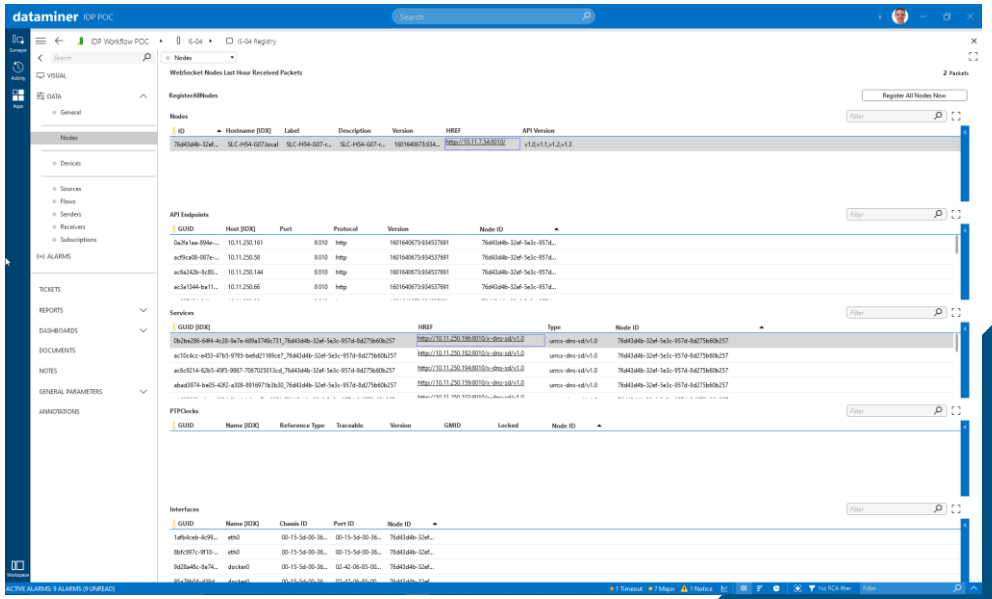
NMOS connector

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

any
NMOS registry

IS-04
Query API

NMOS IS-04
connector



Surveyor
Activity
Apps
Workspace

Search
VISUAL
DATA
General
Nodes
Devices
Sources
Flows
Senders
Receivers
Subscriptions
ALARMS
TICKETS
REPORTS
DASHBOARDS
DOCUMENTS
NOTES
GENERAL PARAMETERS
ANNOTATIONS

General

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

Filter

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

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DOCUMENTS
NOTES
GENERAL PARAMETERS
ANNOTATIONS
Workspace
Community

Senders

NMOS

WebSocket Senders Last Hour Received Packets 14 Packets

Senders

ID	Label [IDX]	Description	Manifest HREF	Version	Flow ID	Transport	Device ID
7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6	stream 139		http://10.11.1.39:4490/sdp/senders/7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6/stream.sdp	1620997949:545...	56db7692-c6ee-4ff7-b08f-17f145c73240	urn:x-nmos:transport:rtp.mcast	ba24ba40-a3a1-4720-8dce-cd1d113f4139
101a1a16-83df-492e-ab52-ee1a325110de	stream_1		http://10.11.3.66:4491/sdp/senders/101a1a16-83df-492e-ab52-ee1a325110de/stream.sdp	1620995479:851...	29854900-99db-4d02-8d1b-84965fabe9f6	urn:x-nmos:transport:rtp.mcast	1b428a59-5ebc-4cfd-af83-f617133aa489
ccfa2098-1520-4fb9-a9ec-9677e86ea599	stream_1		http://10.11.2.66:4490/sdp/senders/ccfa2098-1520-4fb9-a9ec-9677e86ea599/stream.sdp	1620995679:253...	c91b7bf1-6b69-4202-a0f3-efb374cc7c30	urn:x-nmos:transport:rtp.mcast	c8863913-81c3-4f82-a1a6-6953281fca33
cdf9bd3d-7c8f-4977-beb1-237f41720aa3	stream_1		http://10.11.2.39:4491/sdp/senders/cdf9bd3d-7c8f-4977-beb1-237f41720aa3/stream.sdp	1620995435:661...	4c94f0f3-c013-4e9b-8db6-dcfe96929bcc	urn:x-nmos:transport:rtp.mcast	6c208ed9-eca1-4cf0-82f6-eeec232de377

Sender Interface Bindings

GUID	Interface [IDX]	Sender ID
0ad35438-214d-4879-8627-6e8f53d51234_4ed8e447-3a34-4f83-9376-87d5dc3a8d04	ethernet_32768	Not initialized
0b2af7f4-752f-442f-a3ac-0b3dd4a5e0f9_7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6	ethernet_32768	7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6
4ae01510-19c6-4397-925e-fd17d8d51b8d_cdf9bd3d-7c8f-4977-beb1-237f41720aa3	ethernet_32768	Not initialized
4c50fe9d-b128-44d4-9c50-66671e348b2d_7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6	ethernet_32768	7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6
7d12863a-1694-489a-a004-2b0411740881 4ed8e447-3a34-4f83-9376-87d5dc3a8d04	ethernet 32768	Not initialized

Sender Subscribers

GUID [IDX]	Receiver ID	Active	Sender ID
2a630ac7-9bdd...	Not initialized	Disabled	7f205d54-c9a8-4cb2-94e5-3ad7e5d8dff6
1477c089-0ba0...	Not initialized	Disabled	101a1a16-83df-492e-ab52-ee1a325110de
d7060341-b0f8...	Not initialized	Disabled	cdf9bd3d-7c8f-4977-beb1-237f41720aa3
e865a2c5-3fc5-...	Not initialized	Disabled	ccfa2098-1520-4fb9-a9ec-9677e86ea599

Senders Tags

GUID [IDX]	Key	Value	Sender ID

Senders Caps

GUID [IDX]	Key	Value	Sender ID

Sender Group Hints

GUID	Group Name [IDX]	Description	Role	Scope	Sender ID	Tag ID	Device ID

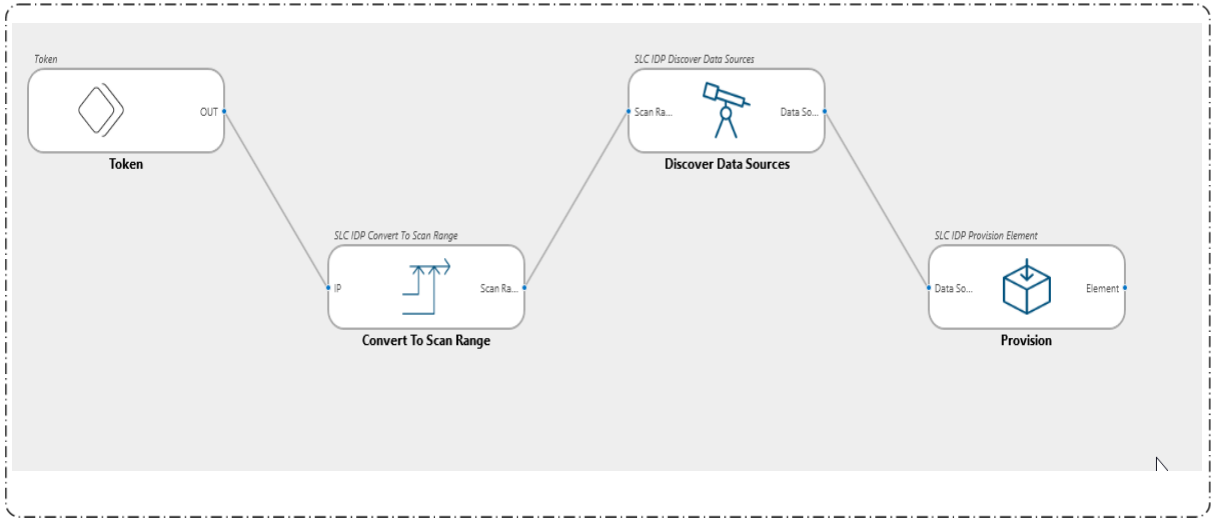
```
v=0
o=- 3829822719 0 IN IP4 10.11.2.39
s=stream_1
t=0 0
a=group:DUP 1 2
m=audio 5004 RTP/AVP 96
c=IN IP4 239.10.39.1/2
a=source-filter: incl IN IP4 239.10.39.1 10.11.2.39
a=mediaclk:direct=0
a=rtpmap:96 L16/48000/2
a=ptime:1
a=ts-refclk:localmac=00-15-5D-00-66-01
a=mid:1
m=audio 5004 RTP/AVP 96
c=IN IP4 239.10.39.1/2
a=source-filter: incl IN IP4 239.10.39.1 10.11.2.39
a=mediaclk:direct=0
a=rtpmap:96 L16/48000/2
a=ptime:1
a=ts-refclk:localmac=00-15-5D-00-66-01
a=mid:2
```

Provisioning

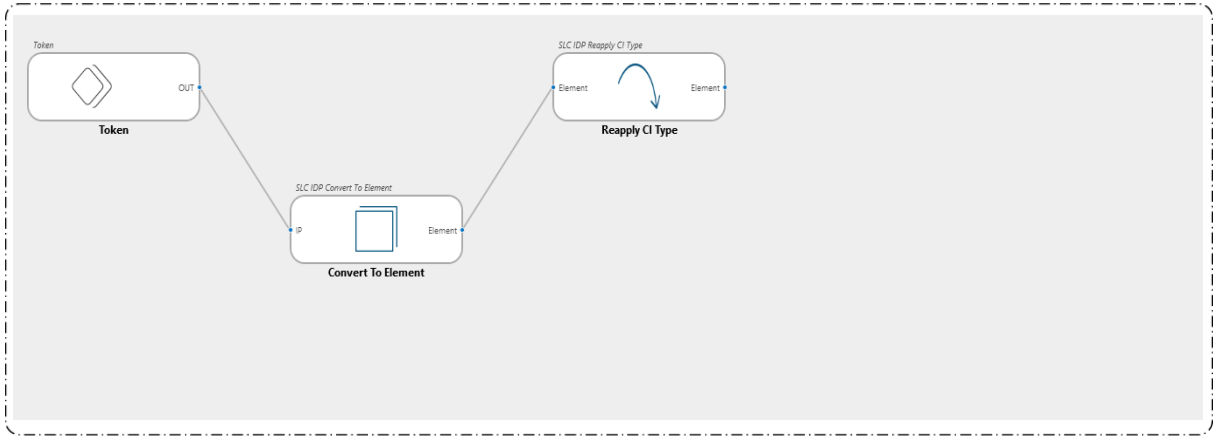
Provisioning process for NMOS nodes

- 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



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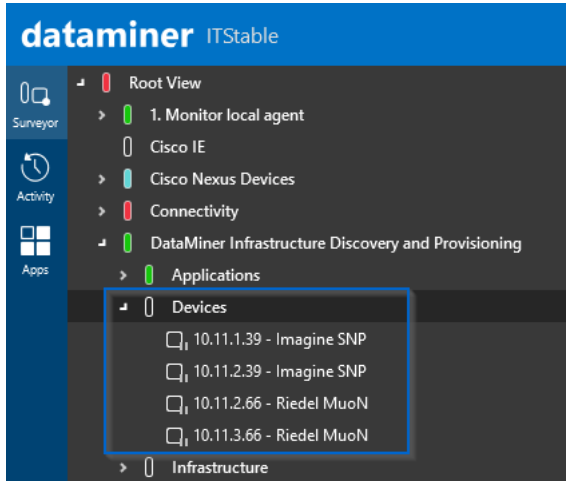
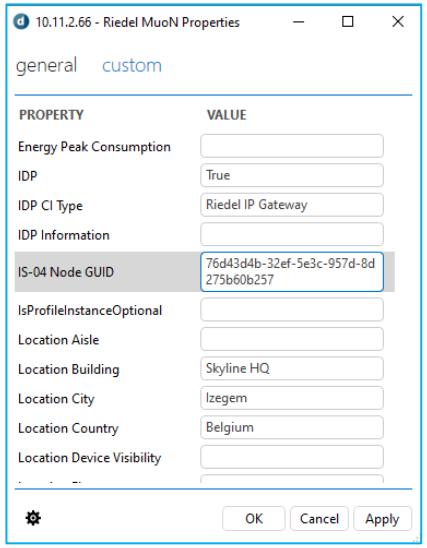
Provisioning

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

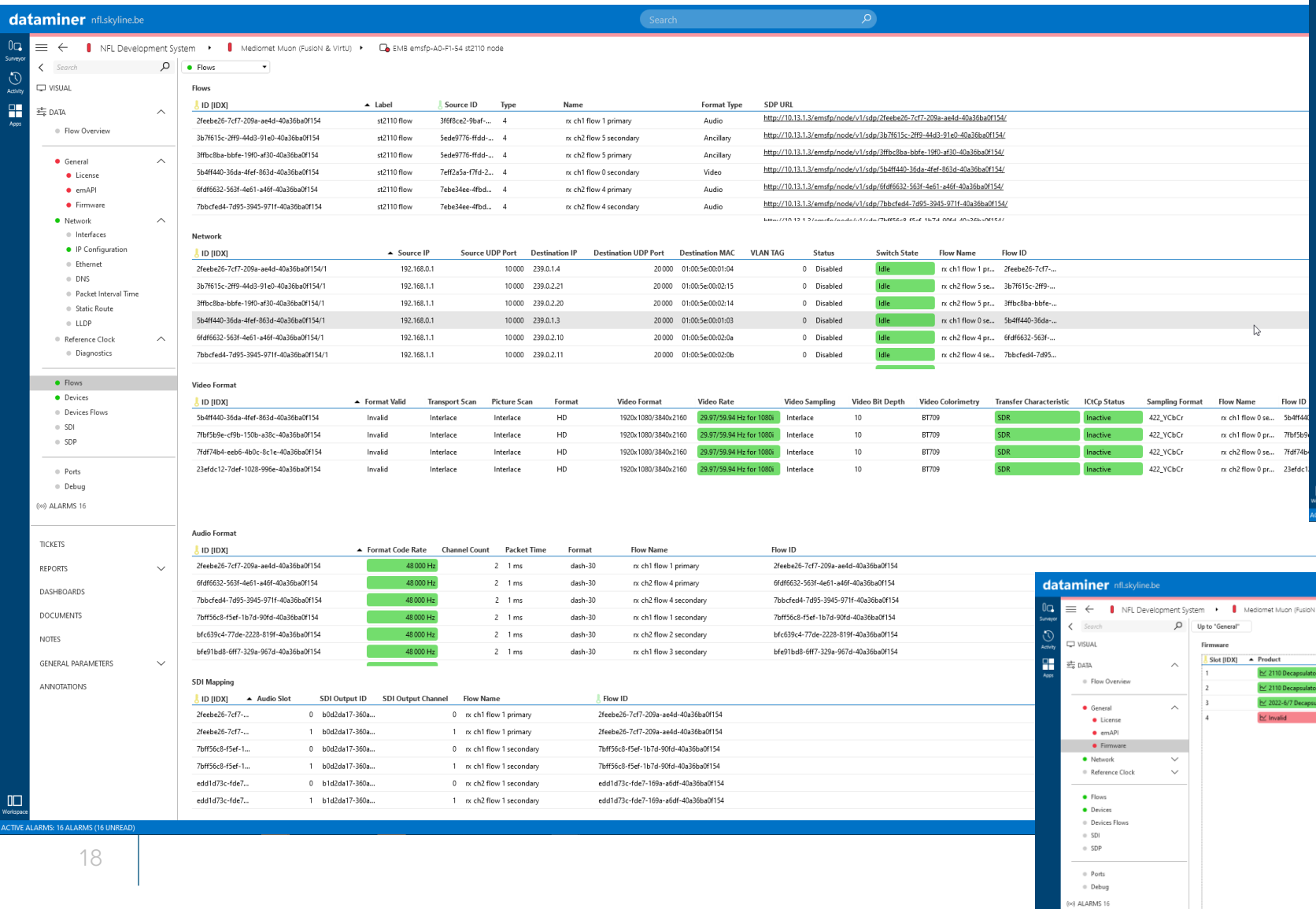
For physical Nodes, the Node ID must be universally unique to that Node, and remain the same for all time (much in the same way as a serial number).

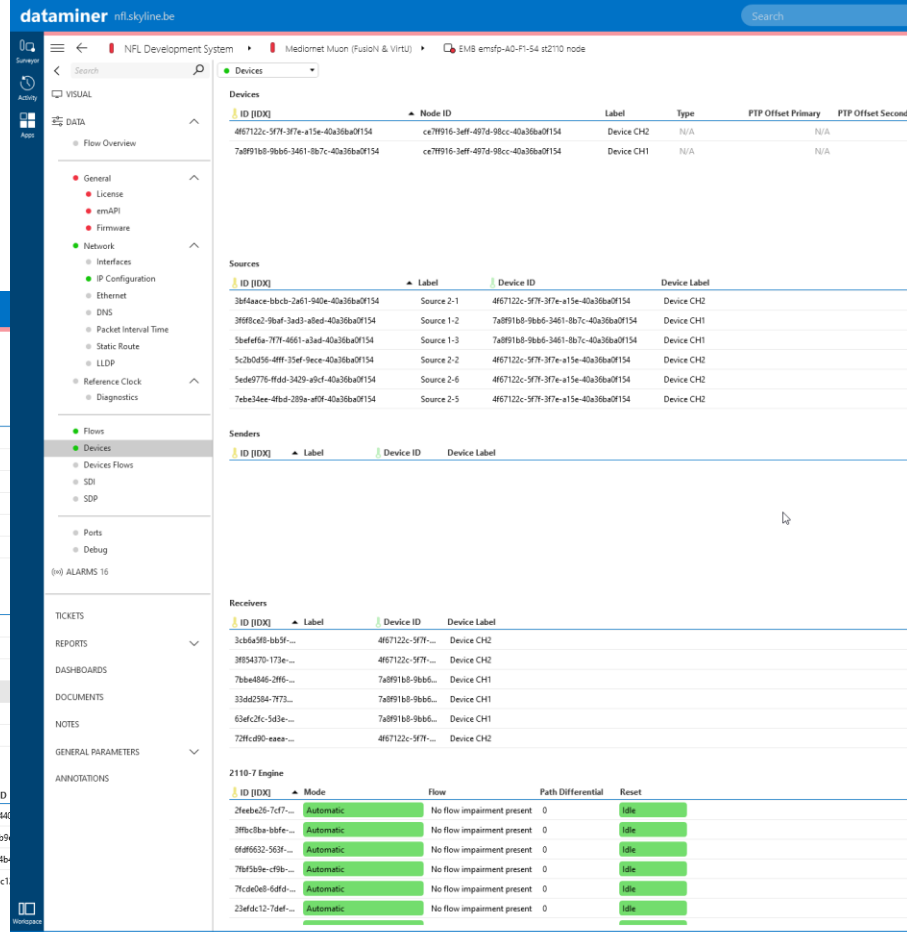
For virtual Nodes, the Node ID must be universally unique to that Node. If a snapshot is taken of the virtual Node then it should be stored with the same ID, however the following conditions must be applied when re-deploying the virtual Node from this snapshot:

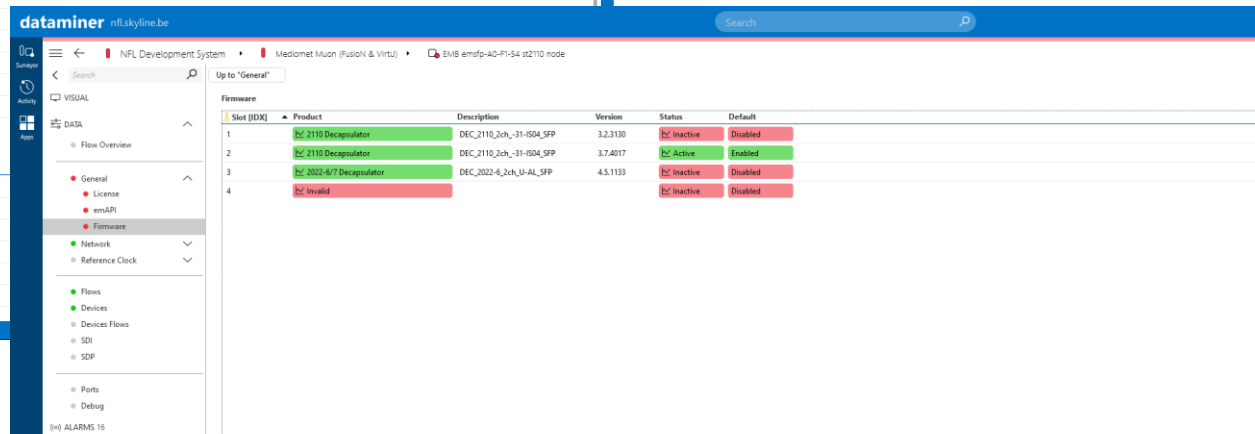
- If deploying via the same controller which created it and no other instantiation of this virtual Node exists, the original Node ID should be used.
- If deploying via the same controller which created it and an instantiation of this virtual Node exists, it must be deployed with a new ID. Uses of this 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

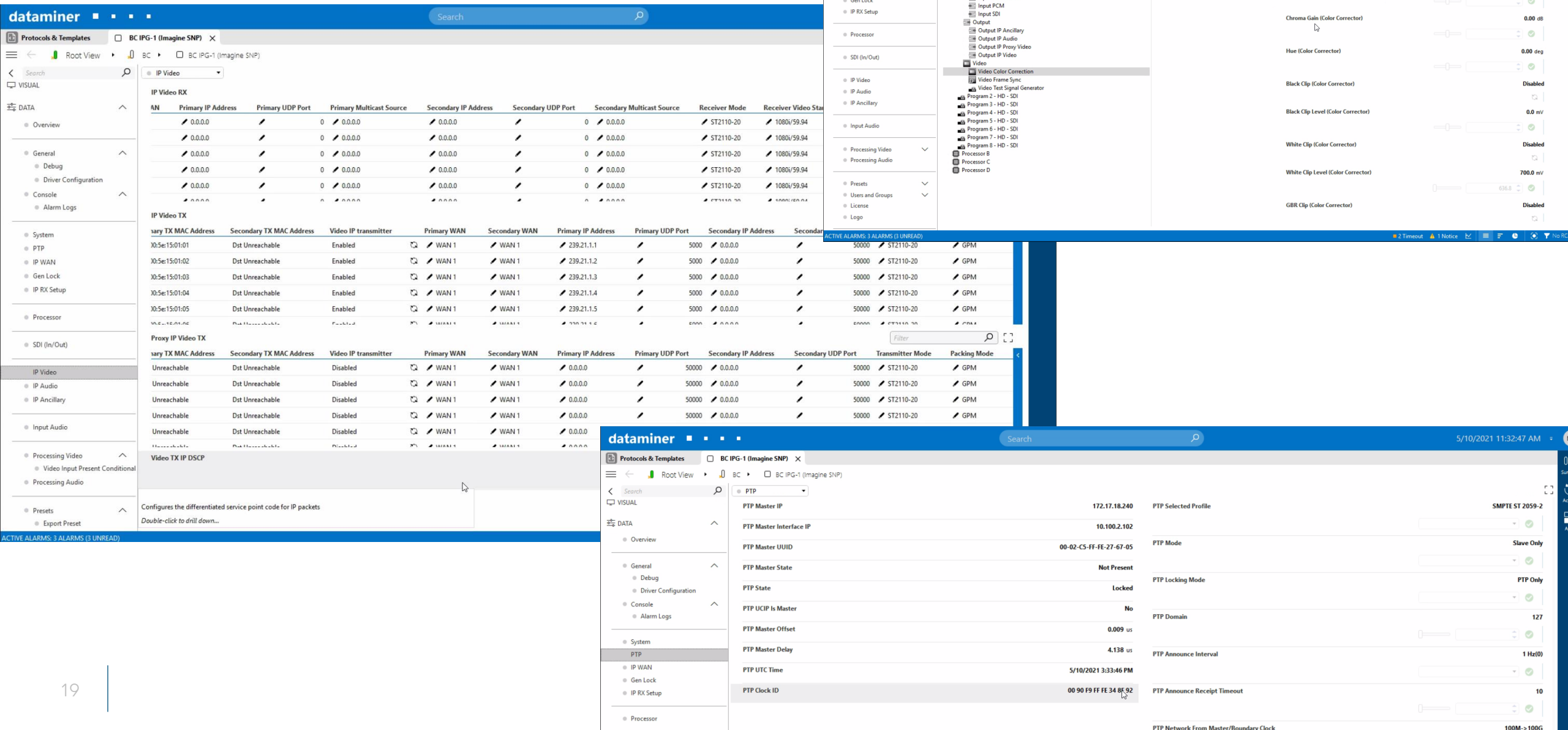






Device Management

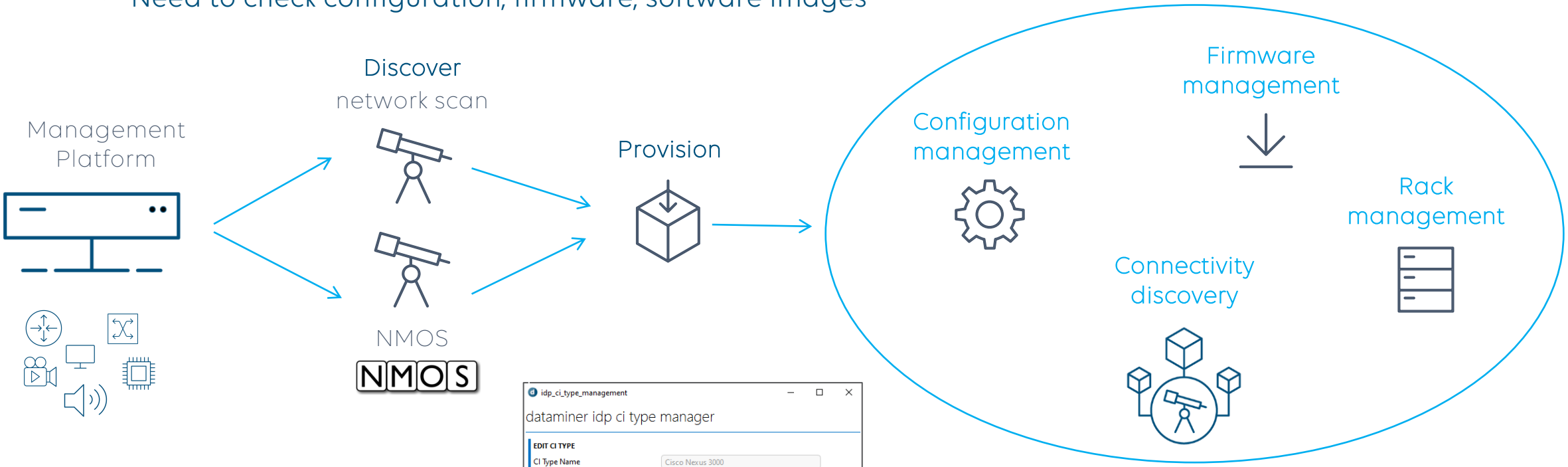
Full access to NMOS node – Imagine SNP example

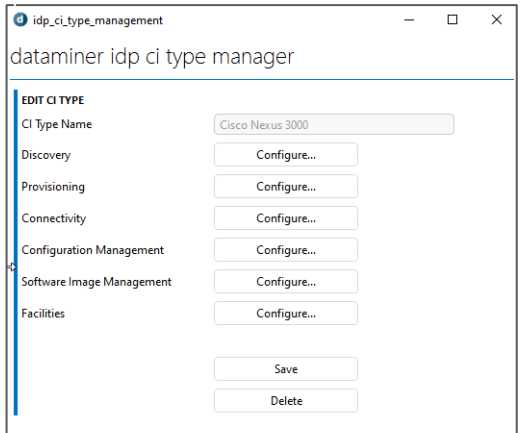


Are we done yet? NO!

Secure and automated infrastructure onboarding needs more...

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





>> CI types

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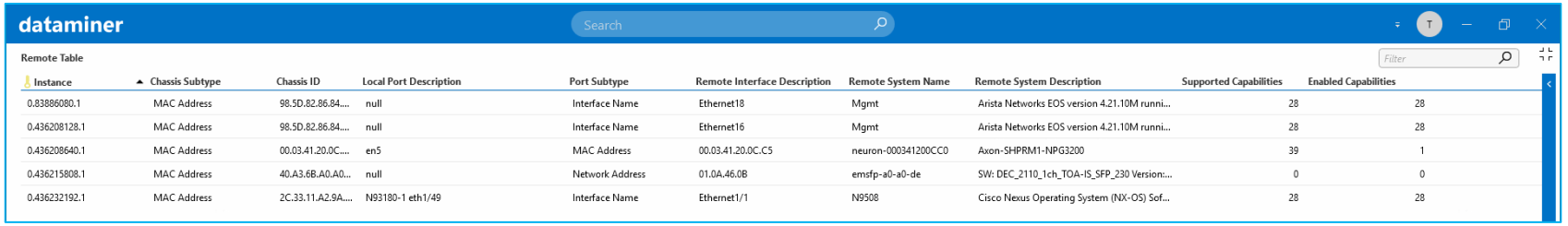
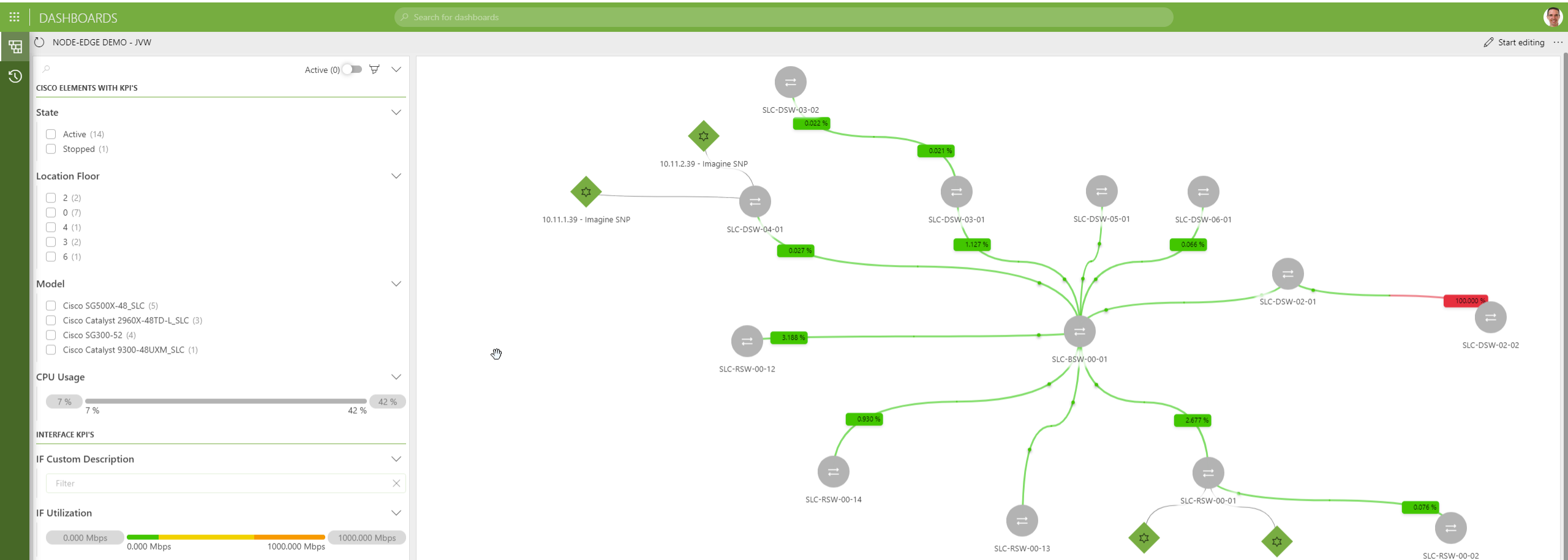
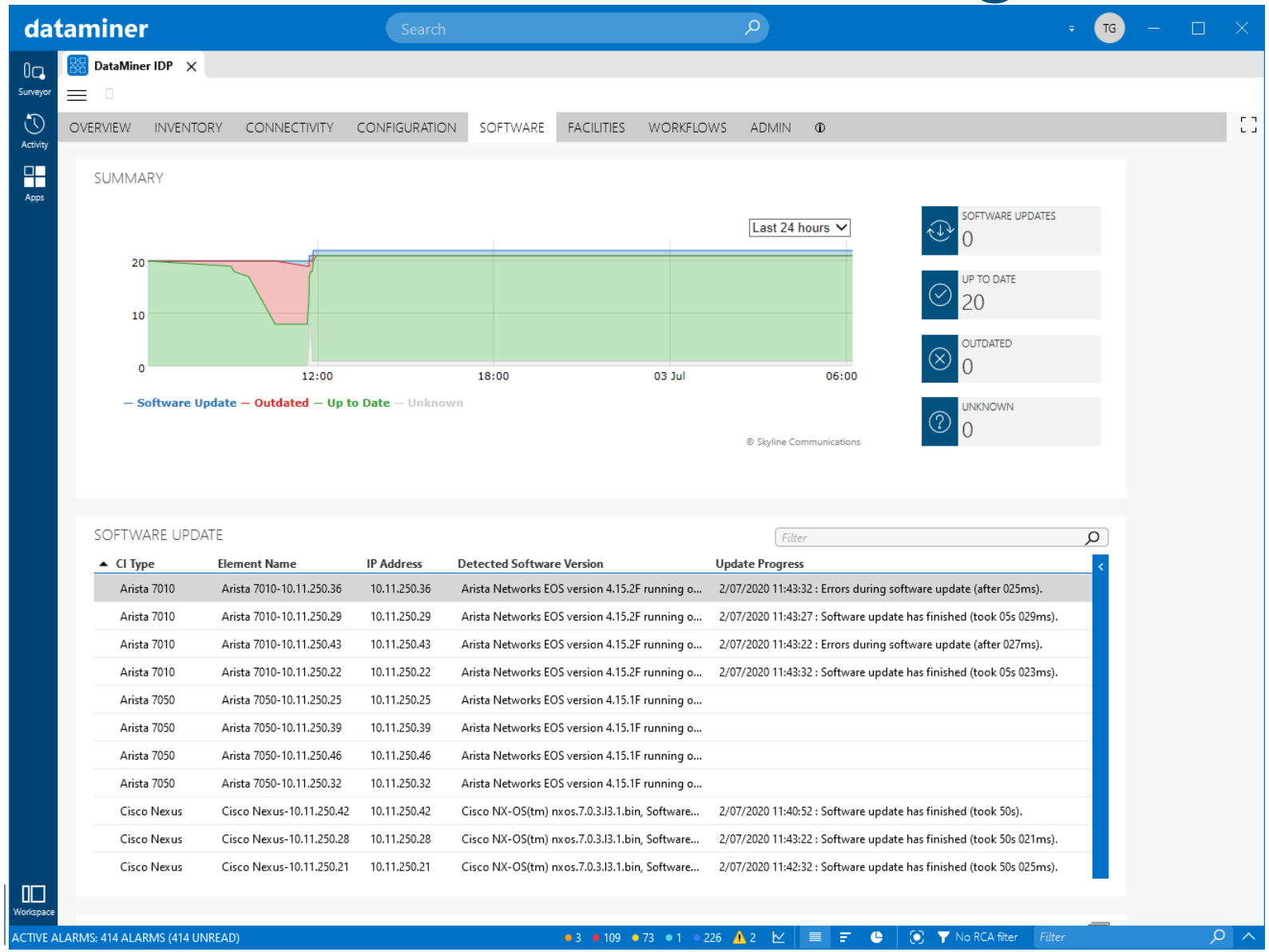
Connectivity Discovery

LLDP tables



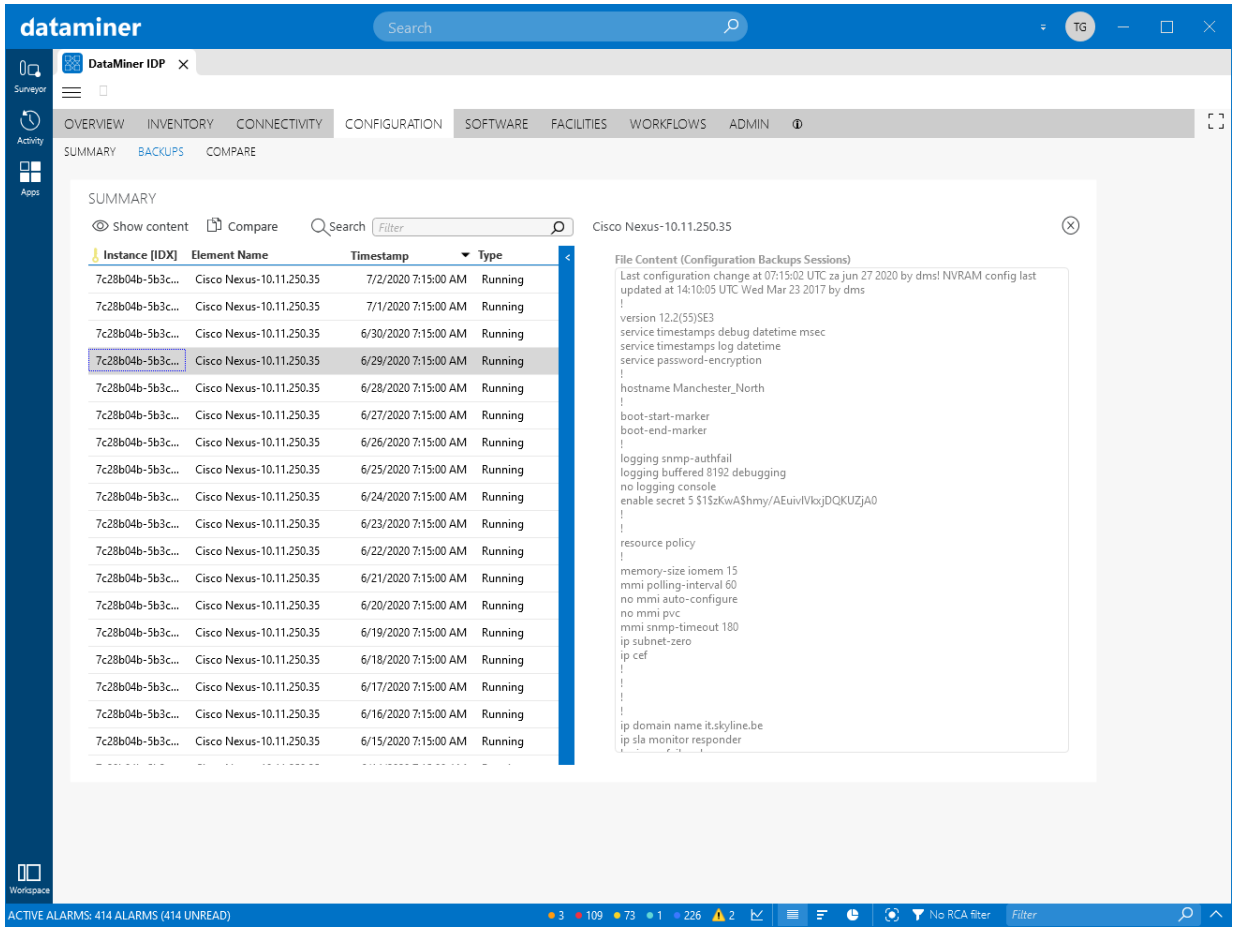


Software / Firmware Management



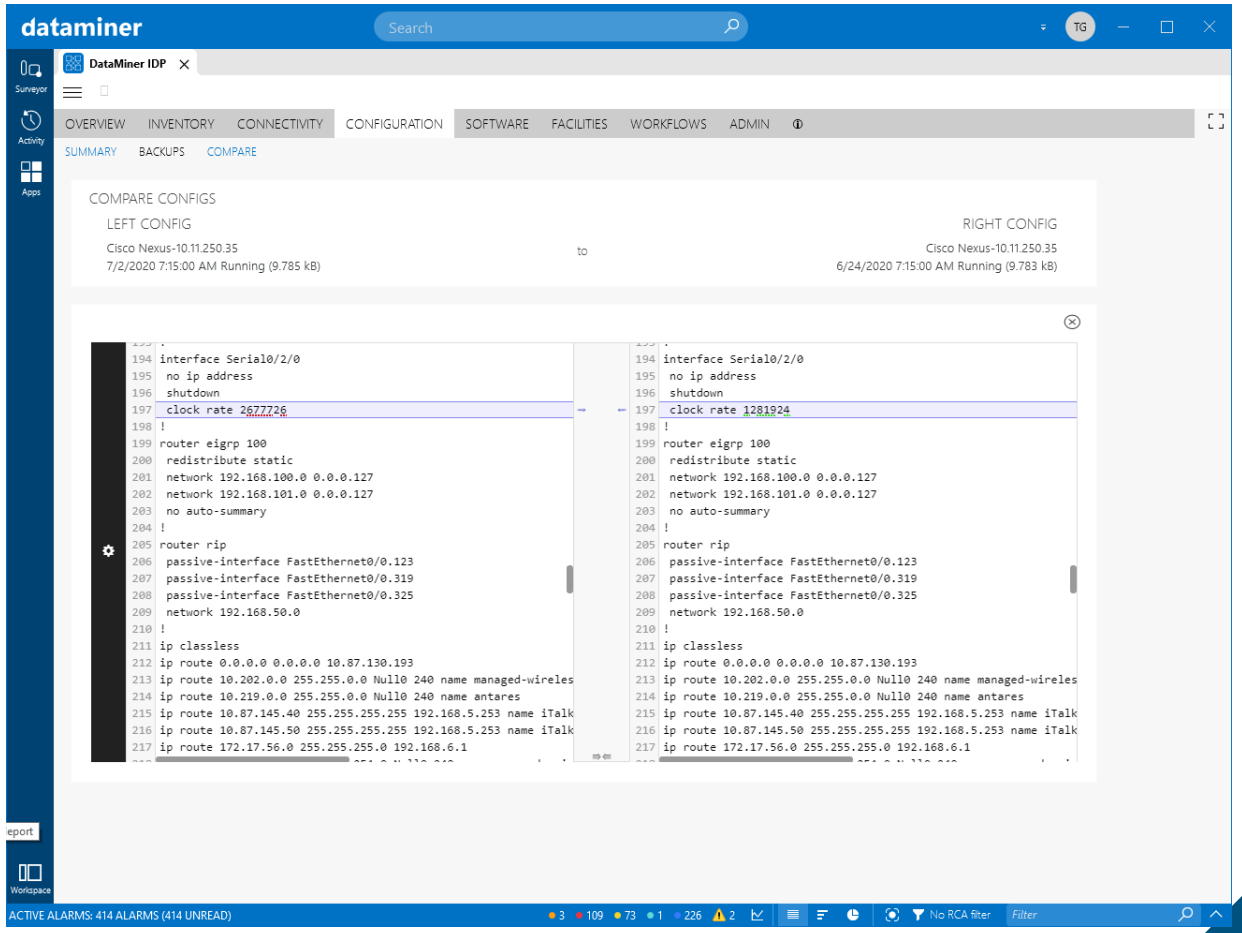
Automatically upload the correct firmware / software image

Configuration Management



Apply "golden" configuration

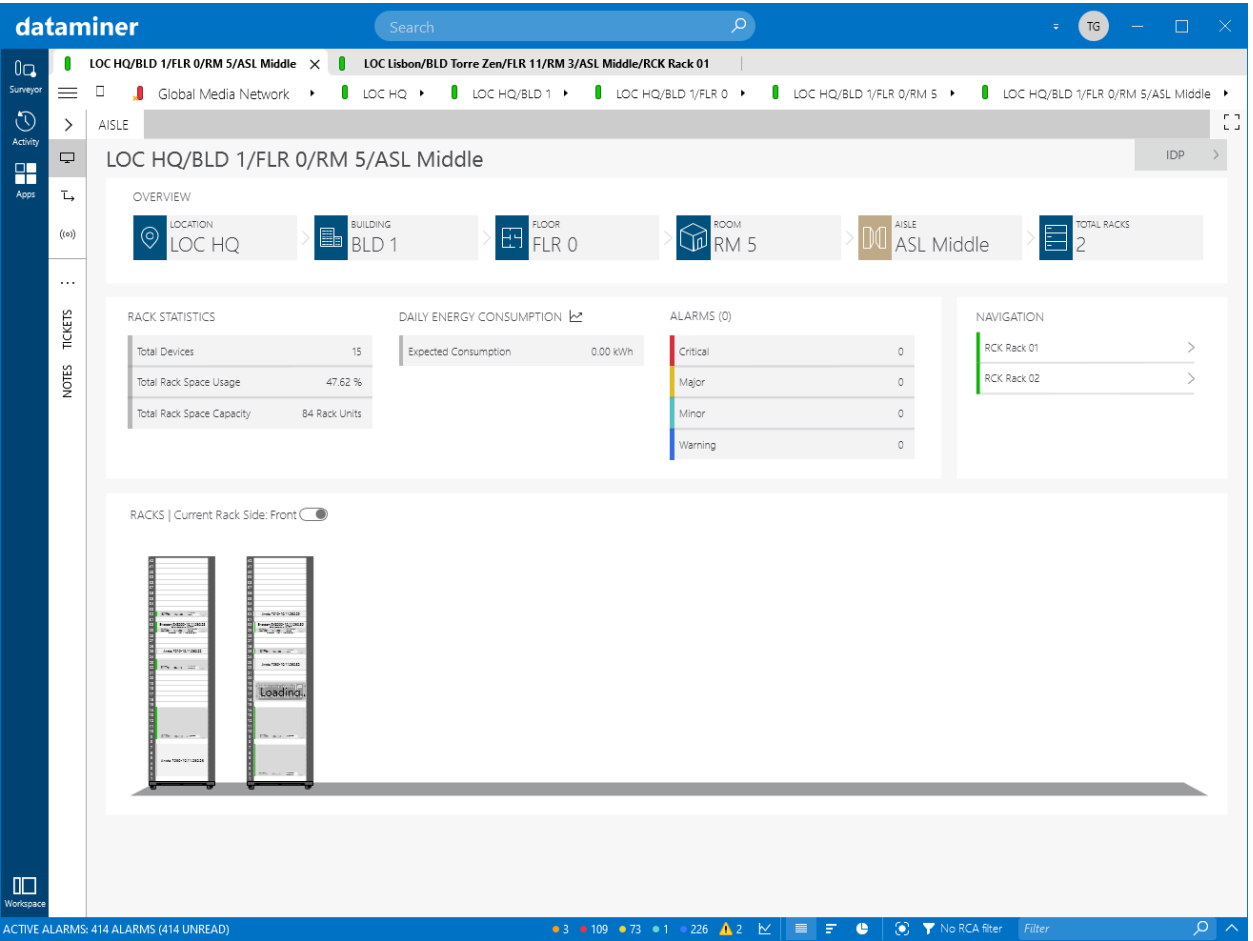
Take backups

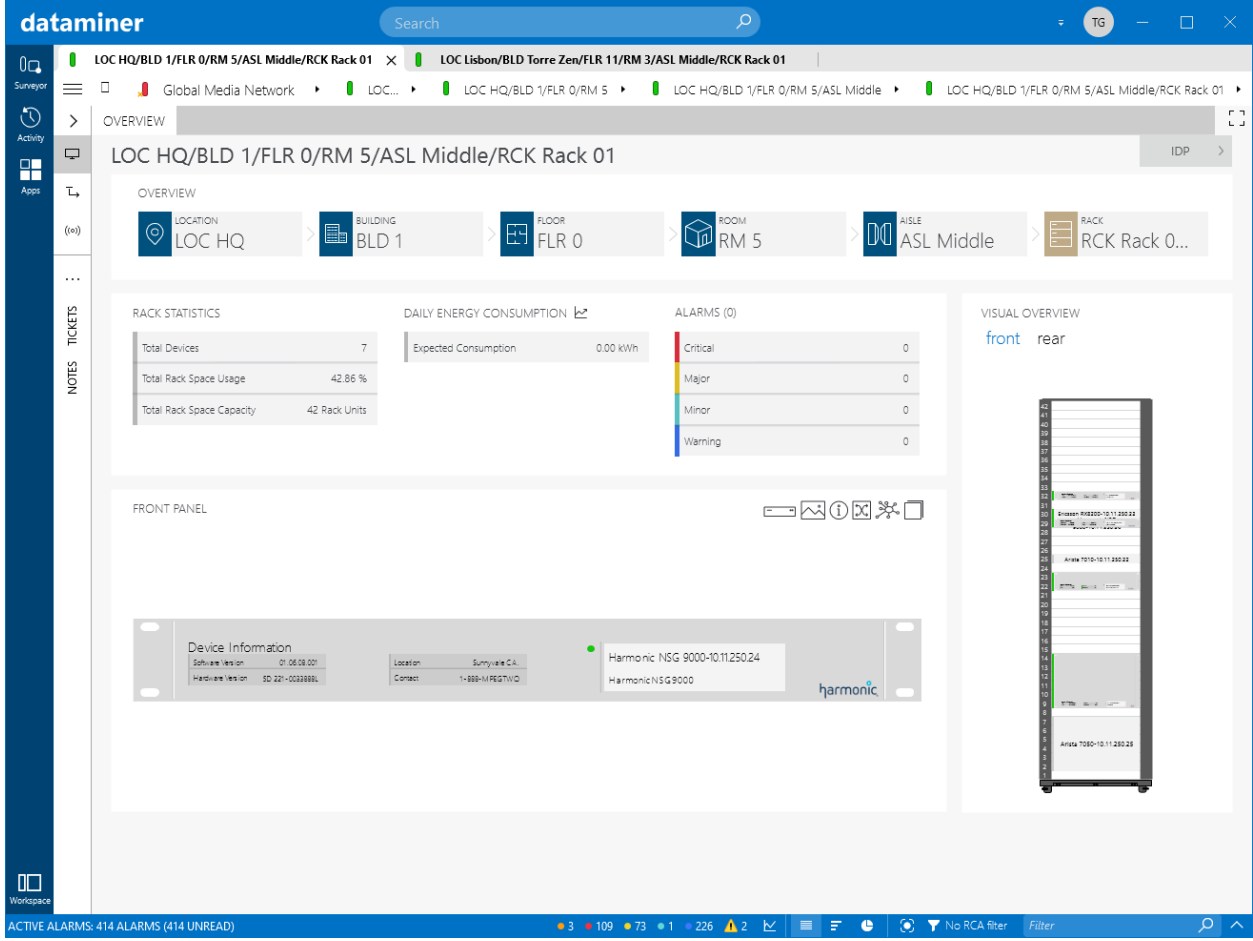


Compare configurations

Rack Management

Auto-create rack views





Drill down to details

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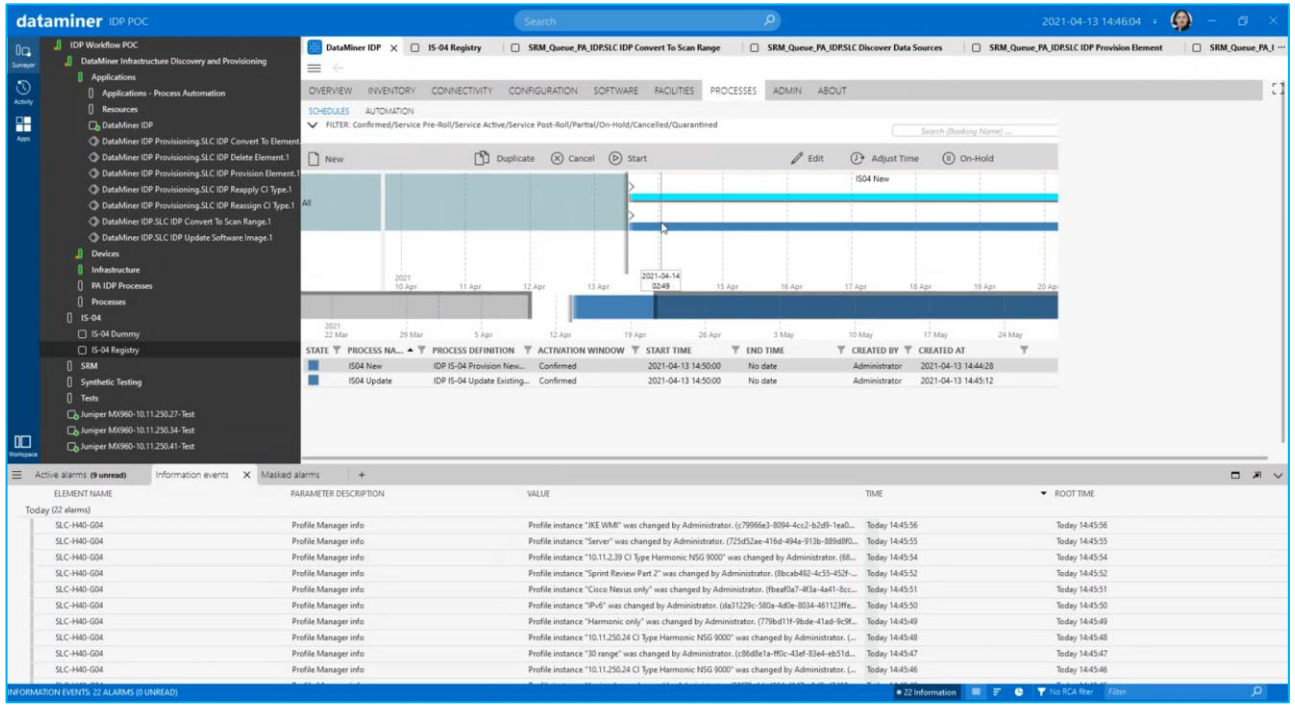
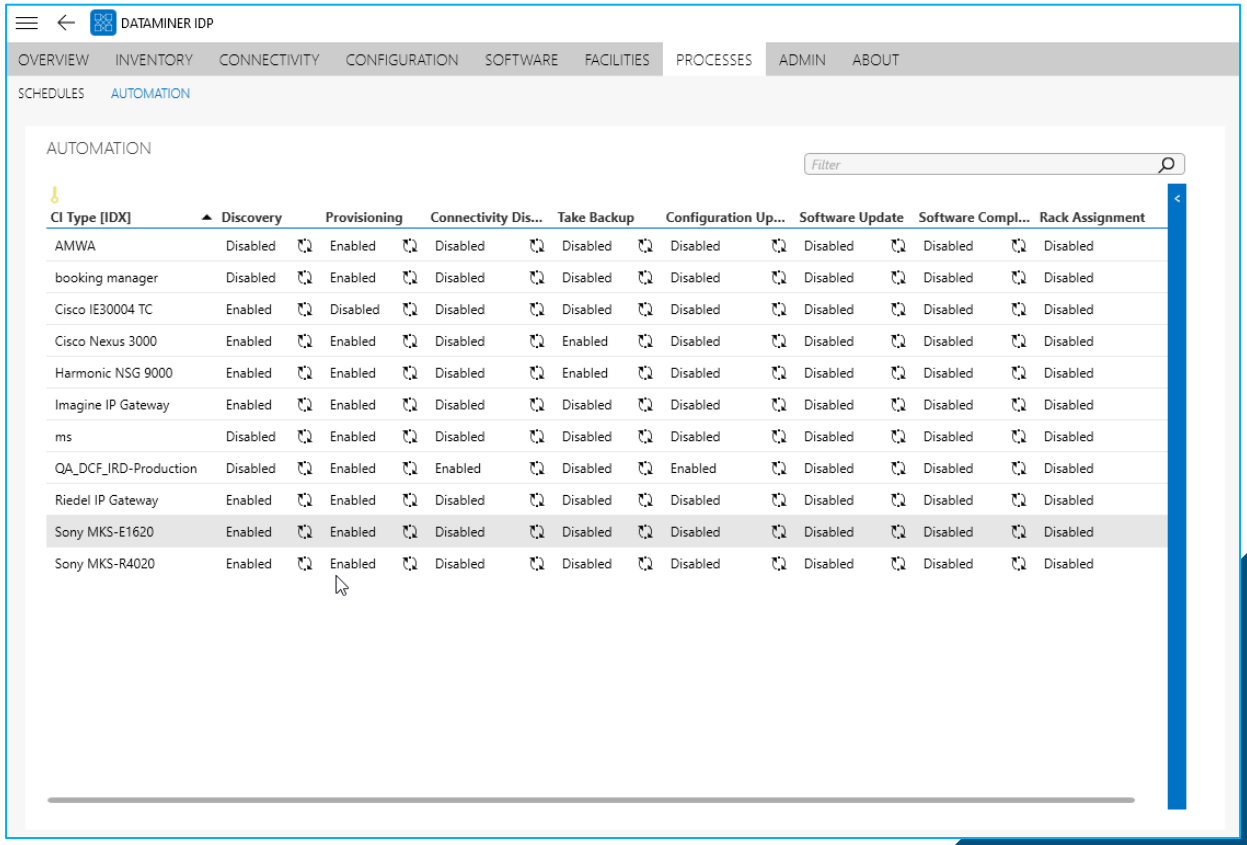
When to run processes?

Schedule and automate your inventory management processes



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

fine-grained
automation



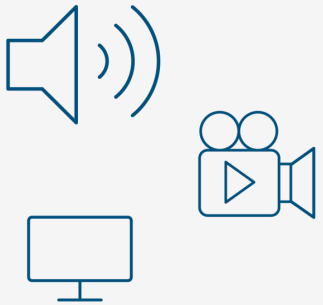
CI Type [IDX]	Discovery	Provisioning	Connectivity Dis...	Take Backup	Configuration Up...	Software Update	Software Compl...	Rack Assignment
AMWA	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
booking manager	Disabled	Enabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
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

What's next?

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

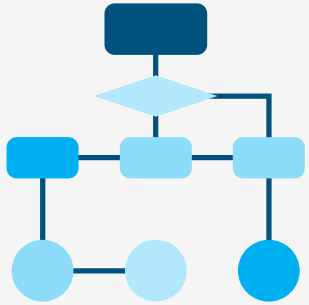
Sample use case:
SDN controller

successfully onboarded



READY >>

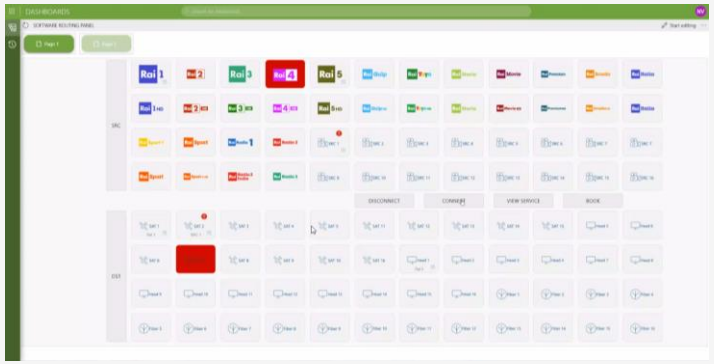
(optional)
APPROVAL WORKFLOW

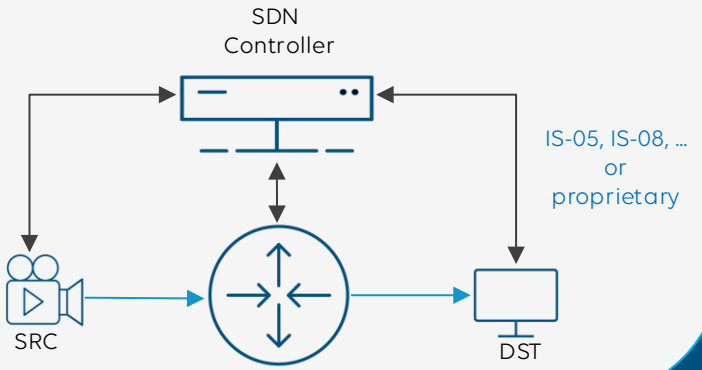


ADD
SRC or DST
>>

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

SDN controller





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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

You want to avoid such news

Just because you have overlooked one system running on old software...

VSF
VIDEO SERVICES FORUM

do you have any questions?

feel free to get in touch

thomas.gunkel@skyline.be

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