Webinars DIY

Programmabilité et automatisation dans les environnements LAN Datacenter

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Modèle DIY et architectures LAN Datacenter Cisco

Exemples du provisioning

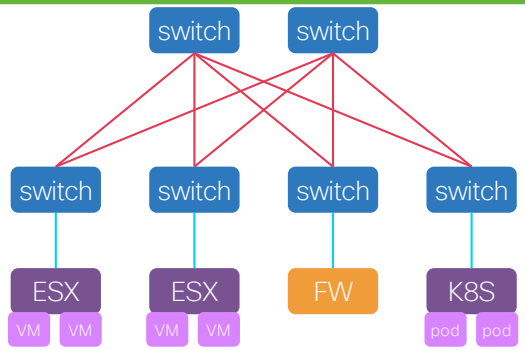
Open NX-OS

operateur

source of truth

ansible / autre

Focus de ces webinars
Comparaison avec NDFC / ACI
Quick wins avec VXLAN



NDFC

operateur

source of truth

ansible / autre

Youtube – ACI & Infrastructure as Code
ACI Days / VXLAN NDFC Days
Devnet

ACI

operateur

source of truth

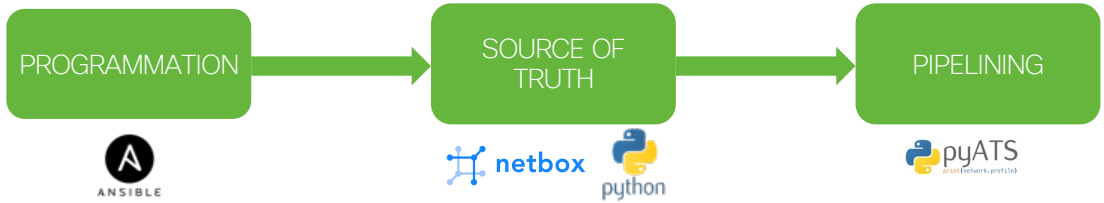
ansible / autre

service now

panorama

Exemples de mise en route

Automatisation du provisioning



1 Outillage N9K / ZTP

2 Fondations VXLAN

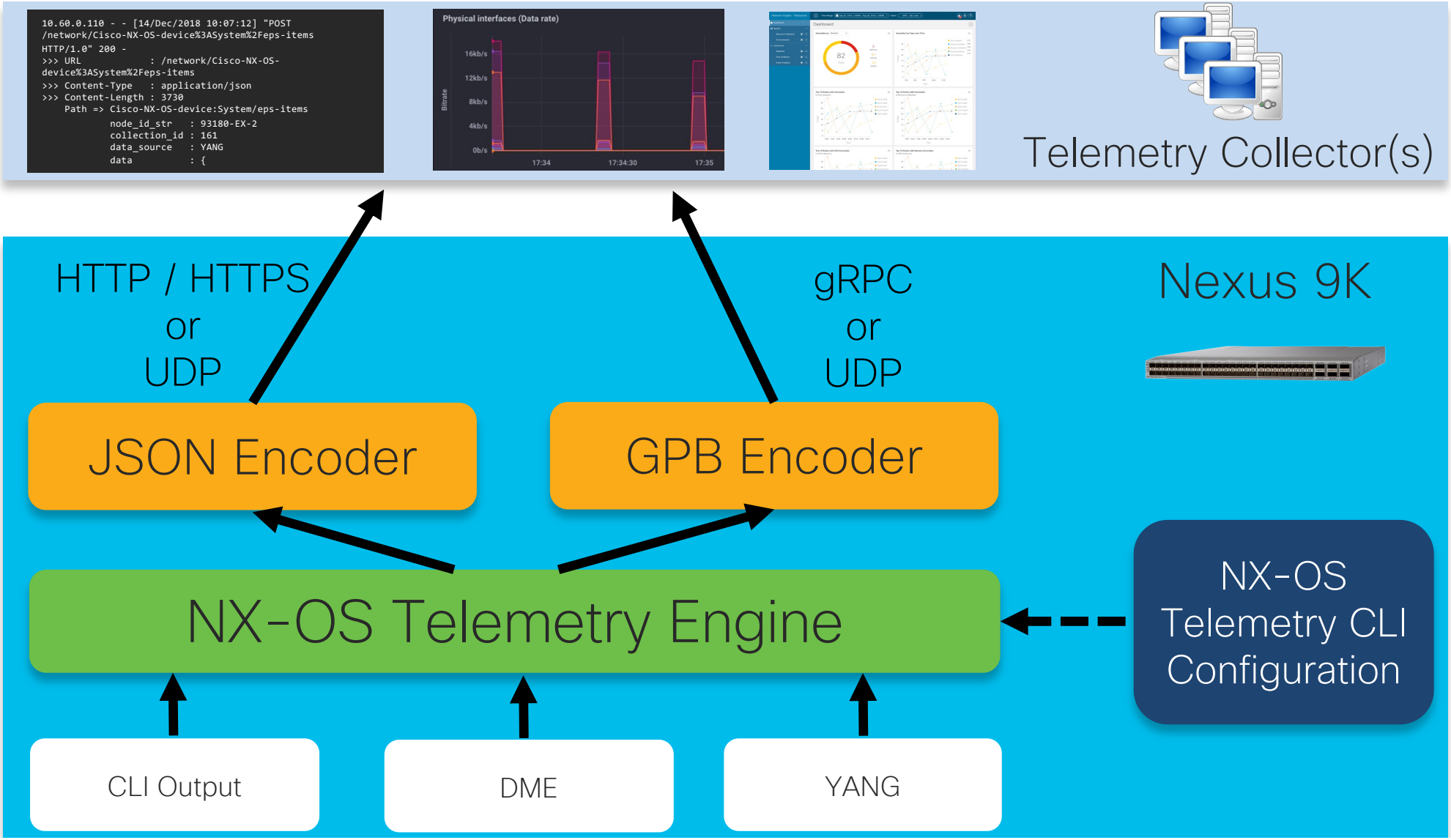
3 Netbox & services L2/L3

4 Fabric healthcheck

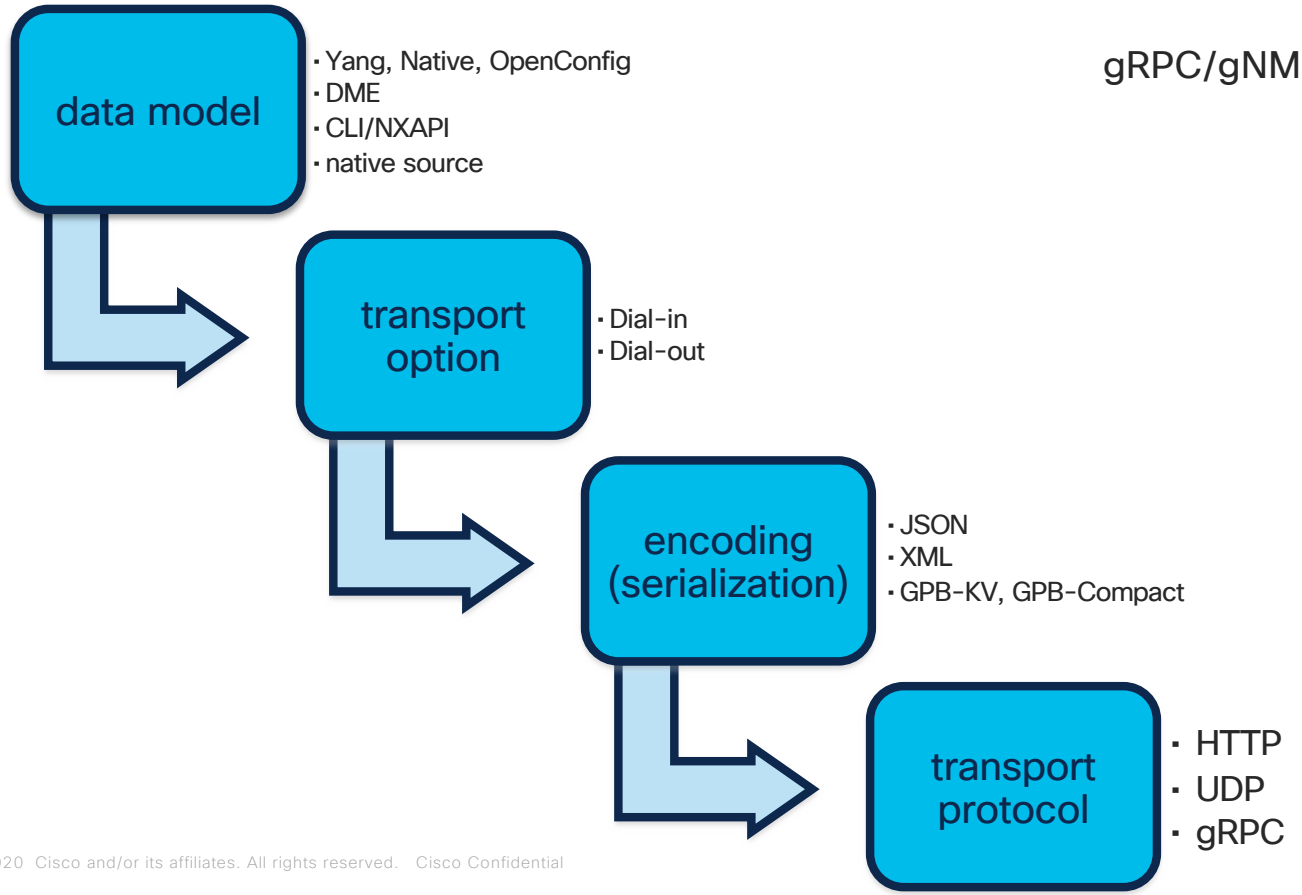
Day2Ops

5 Visualisation KPIs

6 Assurance


10.60.0.110 - - [14/Dec/2018 10:07:12] "POST /network/Cisco-NX-OS-device%3ASystem%2Feps-items HTTP/1.0" 200 -
>>> URL : /network/Cisco-NX-OS-device%3ASystem%2Feps-items
>>> Content-Type : application/json
>>> Content-Length : 3730
Path => Cisco-NX-OS-device:System/eps-items
node_id_str : 93180-EX-2
collection_id : 161
data_source : YANG
data : {
Physical interfaces (Data rate)
16kb/s
12kb/s
8kb/s
4kb/s
0b/s
Bitrate
17:34
17:34:30
17:35
Telemetry Collector(s)
HTTP / HTTPS
or
UDP
gRPC
or
UDP
Nexus 9K
JSON Encoder
GPB Encoder
NX-OS Telemetry Engine
NX-OS
Telemetry CLI
Configuration
CLI Output
DME
YANG

Chose the data model first



gRPC/gNMI dial-in only support gRPC

Data Sources

Data Source- Native Yang

- Native Yang model is vendor specific model but still described in Yang, aka device Yang.
- NX-OS native yang is defined in ***Cisco-NX-OS-device.yang***
- It is almost 100% mapping from native yang to DME objects
  - Ex DME path ***sys/bgp/inst*** can be mapped to native yang path ***/System/bgp-items/inst-items/dom-items***
- Some large scale oper-data is only available in native Yang like mac address table and rib
- Model that is not defined in OC Yang is available in Native Yang like VNI

Data Source-DME

- Data Management Engine is tree-like data store structure in nx-os, originated from Cisco ACI
- It is also an interface between user input to data store, all the configuration will be writen into DME objects then hardware. Oper-data from various source will also be updated in DME
- Each objects is represented by one DN(Distinguish Name)
  - Ex, "`vlan 2300`" is represented in DME as `sys/bd/bd-[vlan-2300]`
- As 9.3.5, about 90% of data in nx-os is *dmelized*
- Both config-data and oper-data can be retrieved from DME
- Like Yang, DME also has native data type, string, float, integer which is easy for collector to consume
- DME also support cadence- and event- based telemetry
- `filter-condition` and `query-condition` can be used on DME data source

Data Source- CLI/NX-API

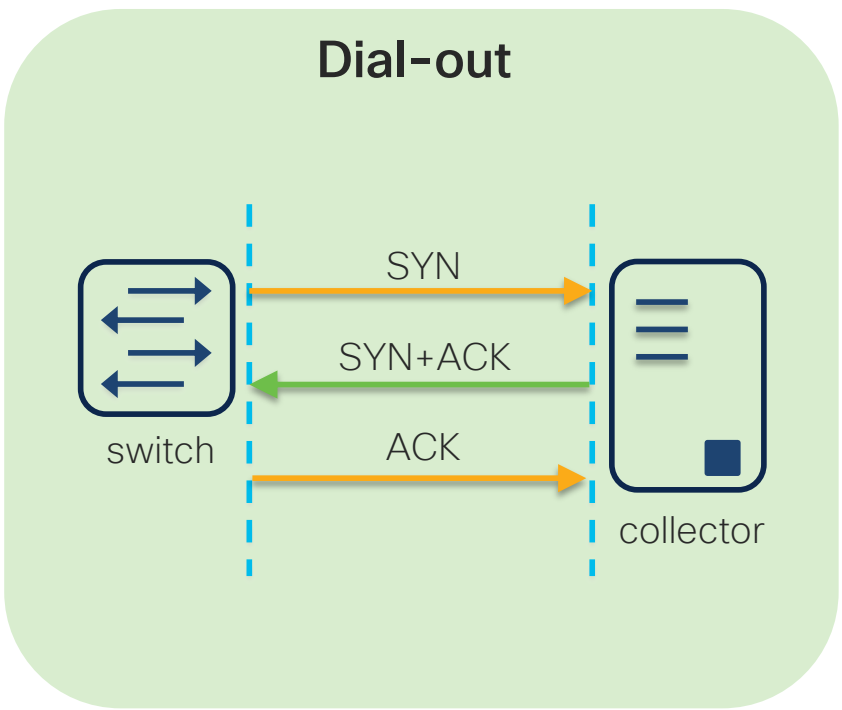
- NX-API is cli program interface nx-os, query result will be returned as structured data encoded in json
- As 9.3.5, almost 100% of show command of nx-os has structured output except some platform specific command
- CLI/NX-API only support cadence-based telemetry
- CLI doesn't have native data type, all the value is string type, collector need parse the result to "guess" the value of data

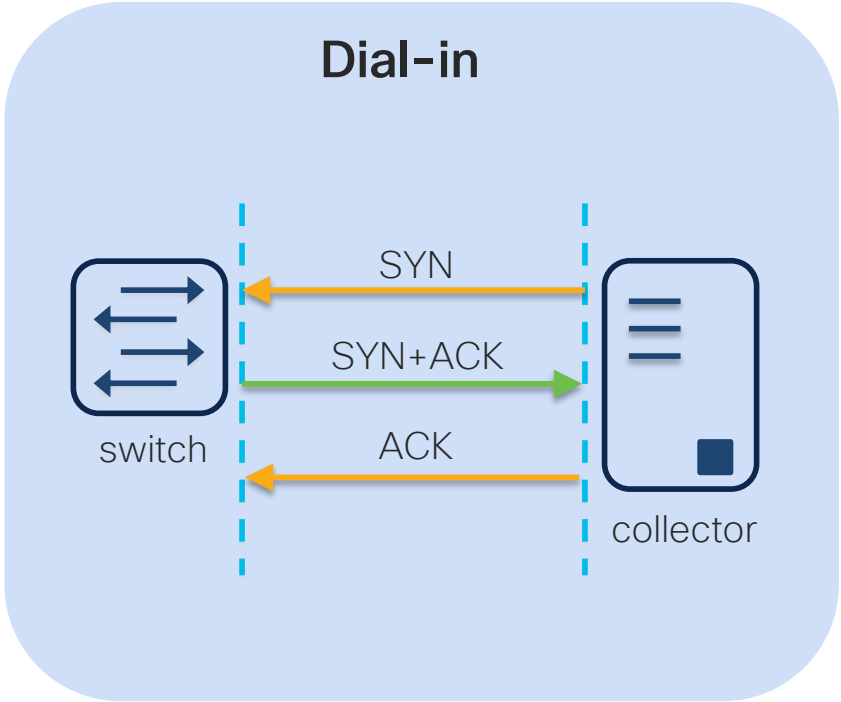
Transport options

Dial-out vs Dial-in

Dial-out vs Dial-in

- TCP connection are always persistent in telemetry
- Difference is which part initial the connection

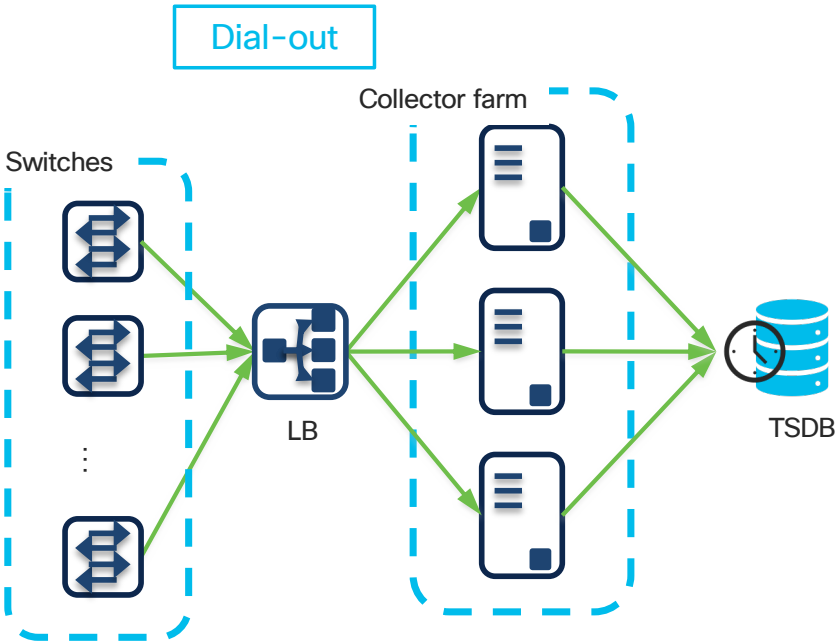




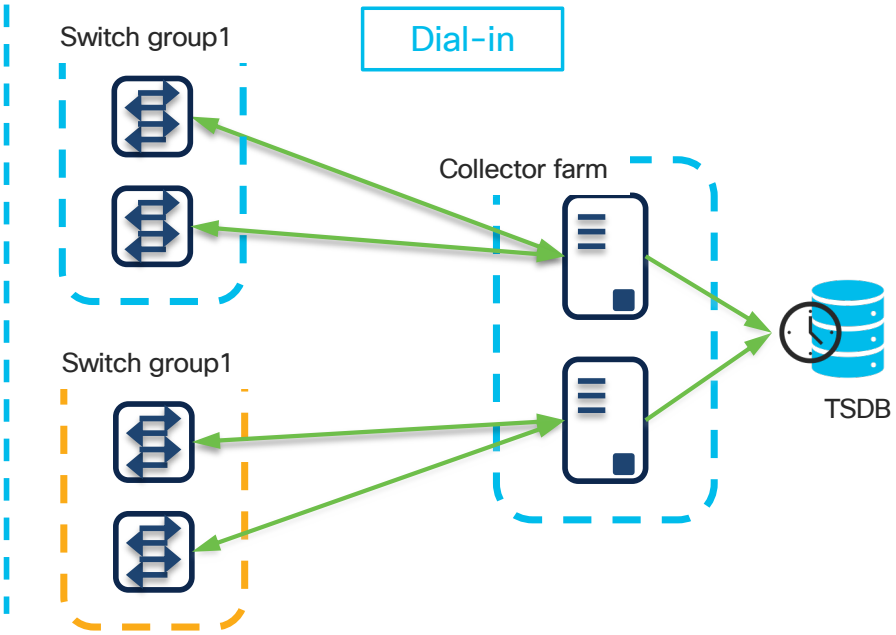
Dial-out vs Dial-in

Dial-out	Dial-in
Support gRPC, http, tcp as transport protocol	Only gRPC is supported as protocol
Configuration need be done from cli or other management interface	Single channel for subscription and data transport
No need open specific port to management interface of switch	Firewall rule need apply to ingress direction to switch for gRPC
Load balancing is easy by setting up collector behind VIP	gRPC/gNMI client need distributed between switches

Dial-out vs Dial-in- design consideration



Collectors can be set up behind load balancer, all switches streams to same VIP of collector



To distributed the workload, collector need “dial-in” different switch group, need extra effort to keep sensor configure same across the cluster

Dial-out vs Dial-in

- Most of customer would like to use gNMI dial-in
  - User can keep centralized configuration by leveraging on communication channel from collector to switches
- Customer usually build the telemetry system with telegraf and selected time series database like influxdb or promtheus
  - The gNMI dial-in plugin(**`cisco_telemetry_gnmi`**) is ready for Yang module as it was first developed for IOS-XR, support both OC Yang and Native Yang model
  - Enhanced DME support in telegraf plugin is under developing by Cisco
  - Dial-out plugin(**`cisco_telemetry_mdt`**) supports any type of data source

gNMI Introduction

- Specification of RPCs and behaviors for managing state on network device
- Support both configuration and steaming telemetry
- Built on gRPC framework
- Design to carry any tree-structured data
- Offers any alternative to netconf, restconf

gNMI RPCs

- Capabilities, Retrieve the set of capabilities supported by the target, usually happened on initial communication
- Get, retrieve a snapshot of data from target
- Set, Modify the state of data on the target
- Subscribe, Subscribe to a stream of values of particular paths within the data tree

Encodings

Encoding

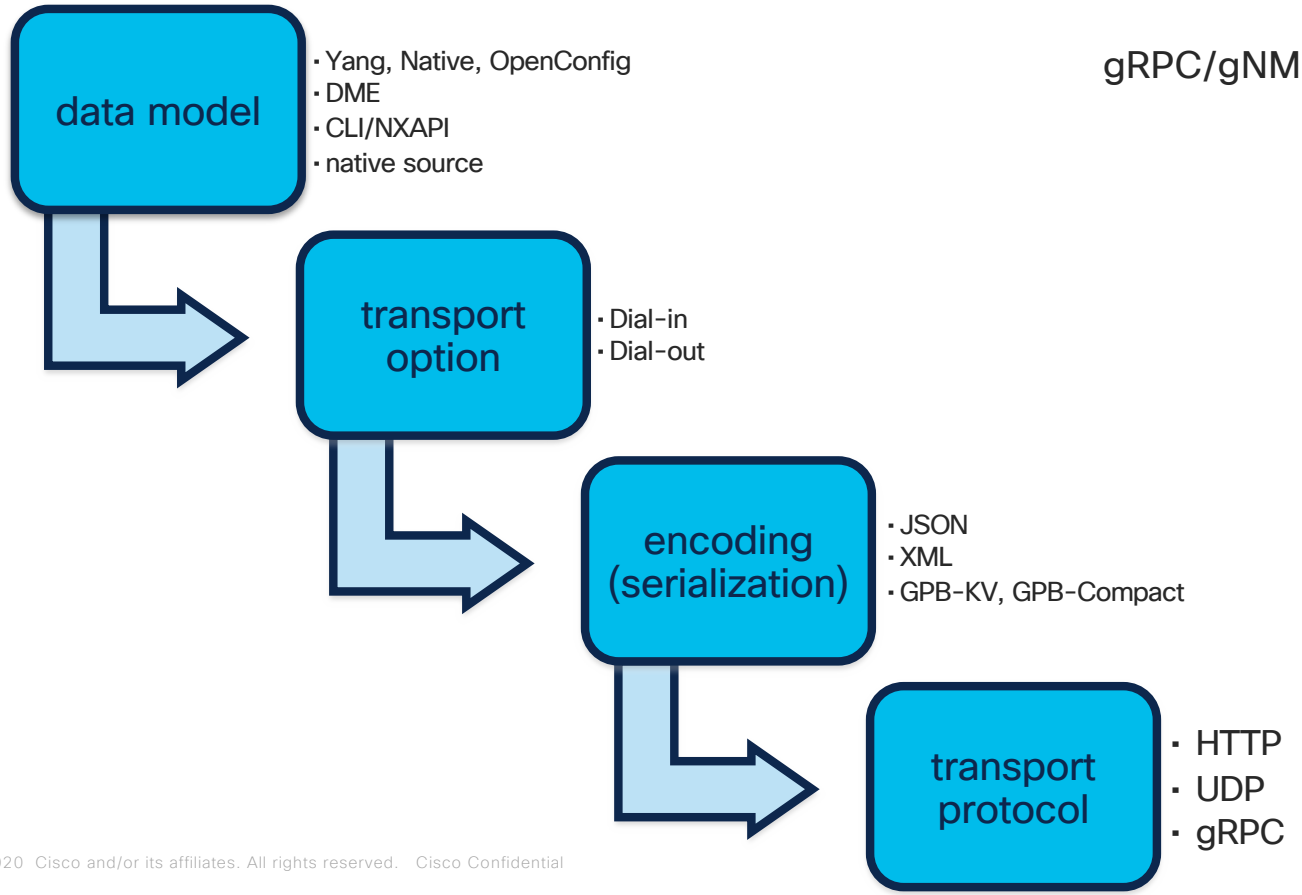
- nx-os support json, xml and gpb-kv and gpb-compact as encoding
- by default gpb-kv is used
- Encoding and data source are independent with below exception:
  - Only native paths: rib, mac-all, adjacency and Yang path that listed in command **`show telemetry yang direct-path cisco-nxos-device`** supports gpb-compact as encoding
- gRPC only supports gpb as encoding
- http only supports json as encoding
- udp both gpb and json as encoding
- When using dial-in as transport option, only gpb-kv is supported

Transport protocols

Transport protocol

- NX-OS supports HTTP, UDP and gRPC as transport protocol
- UDP is efficiency on wire as it has least header overhead. However due to length in header, the max datagram is 64k(for safety purpose, nx-os limits it to 32k)
- gRPC is currently implemented above HTTP/2
- TLS is supported on both HTTP and gRPC
- Both ipv4 and ipv6 are supported

Chose the data model first



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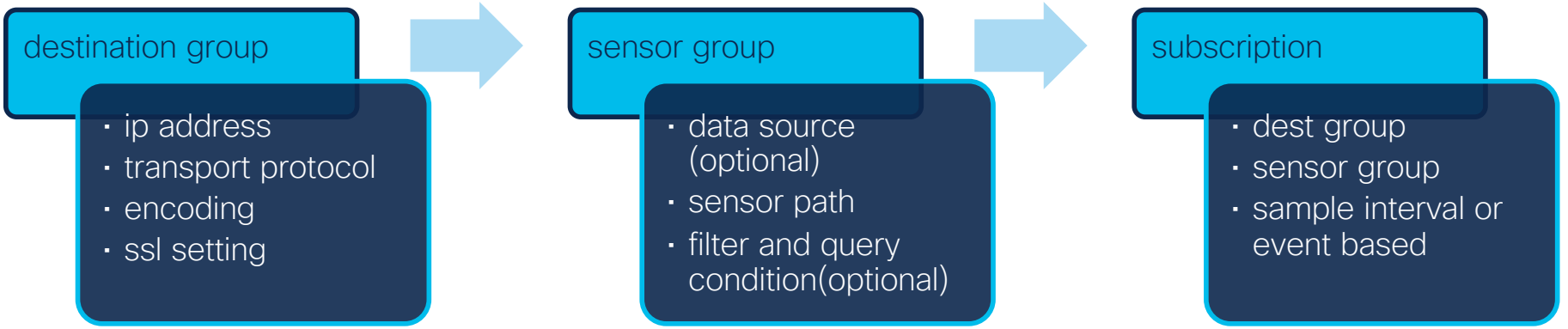
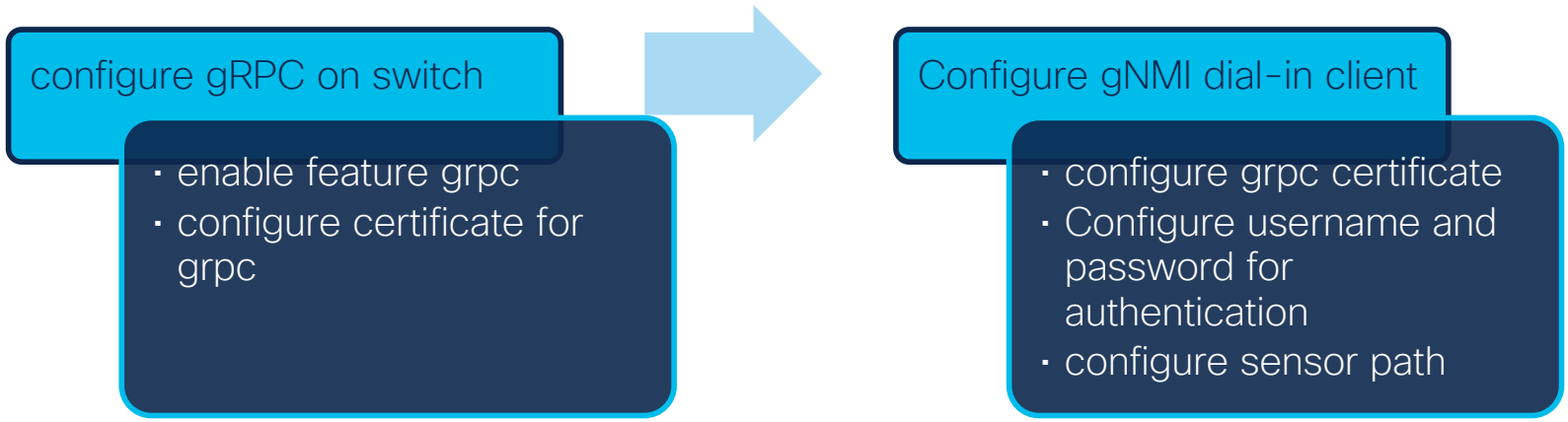
Configuration

Dial-out configuration workflow



Dial-in configuration workflow



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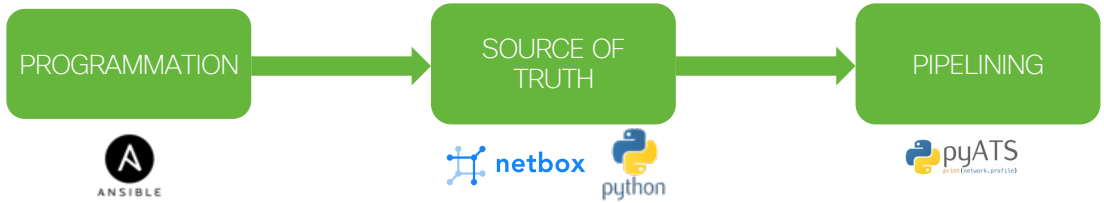

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En résumé

https://gblogs.cisco.com/fr/

Webinar 1 : Cas d'usage et bénéfices DIY – Jeudi 10 février de 10:00 à 12:00 : inscription

Webinar 2 : Zero Touch Provisionning – Jeudi 17 février de 10:00 à 12:00 : inscription

Webinar 3 : Provisioning de bout en bout – Jeudi 10 mars de 10:00 à 12:00 : inscription

Webinar 4 : PyATS – Jeudi 17 mars de 10:00 à 12:00 : inscription

Webinar 5 : Télémétrie et intégration IP Fabric – Jeudi 24 mars de 10:00 à 12:00 : inscription

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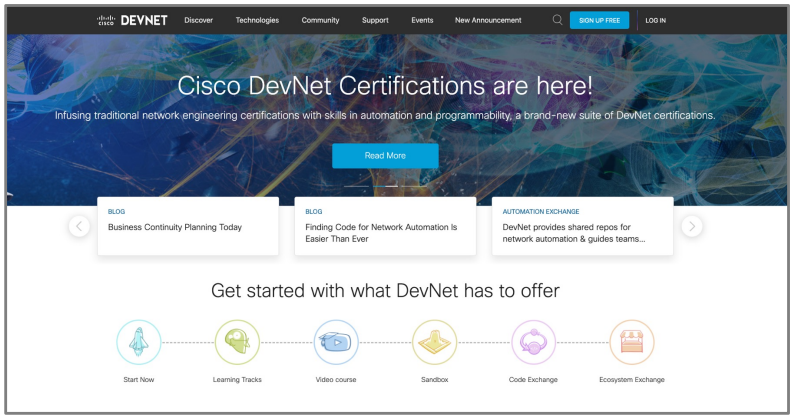

Contenu DevNet pour le Datacenter :