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ALL IN

#CiscoLive



The bridge to possible

Eliminate Congestion Surprises and Fire Drills Forever with Crosswork Cloud

Traffic Analysis as a Service

Dan Backman, Principal Engineer, MIG Architecture
BRKSPG-2250

Cisco Webex App

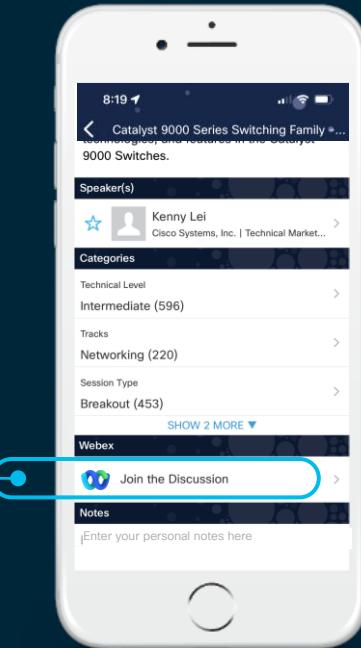
Questions?

Use Cisco Webex App to chat with the speaker after the session

How

- 1 Find this session in the Cisco Live Mobile App
- 2 Click “Join the Discussion”
- 3 Install the Webex App or go directly to the Webex space
- 4 Enter messages/questions in the Webex space

Webex spaces will be moderated by the speaker until June 17, 2022.



<https://ciscoevents.cisco.com/ciscolivebot/#BRKSPG-2250>

Agenda

- Cloud as a new services platform
- Network Insights BGP monitoring
- Traffic Analysis as-a-Service
- Cloud-to-Ground: Data Gateway
- Trust Insights and XR Operational Intelligence
- Conclusion



Automation vision

Automate processes by bringing together visibility, insights and actions in a closed loop



Visibility

Verify and monitor customer experience



Insights

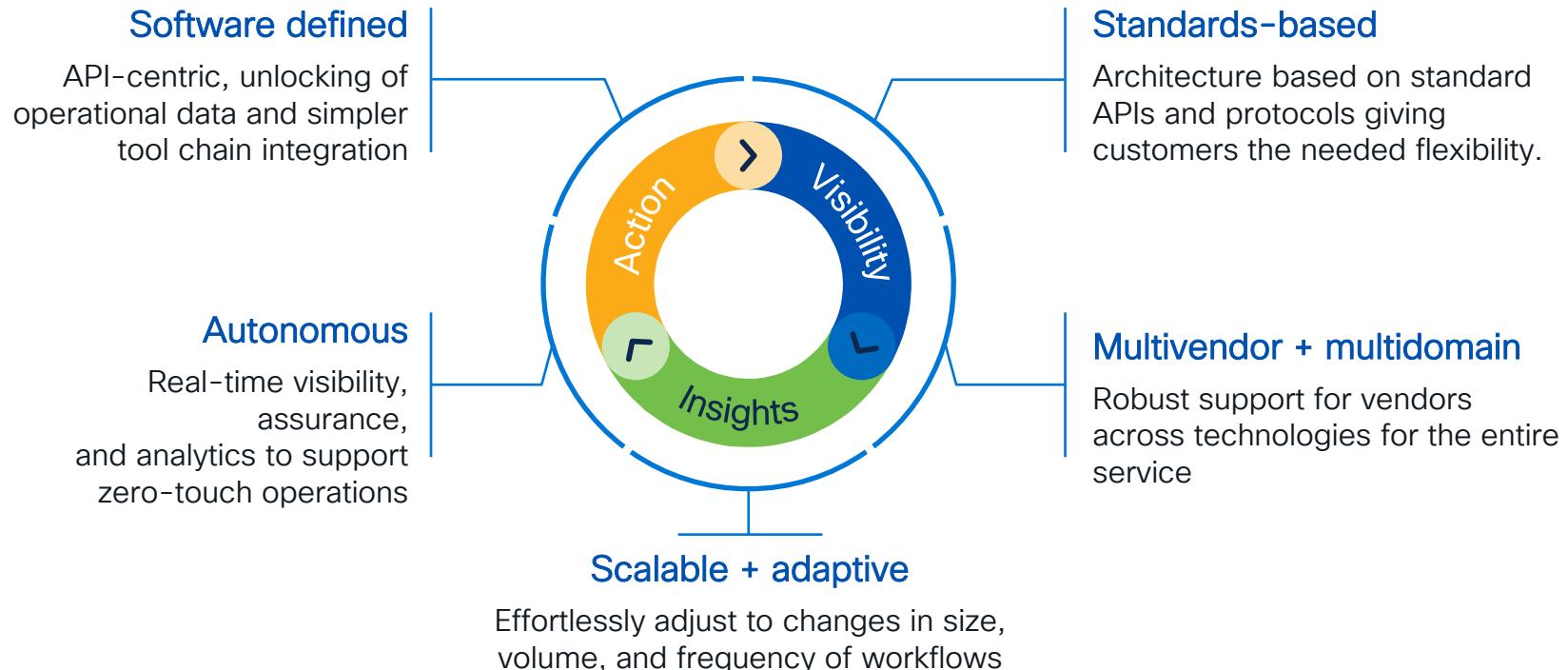
Correlate data, identify trends and patterns



Action

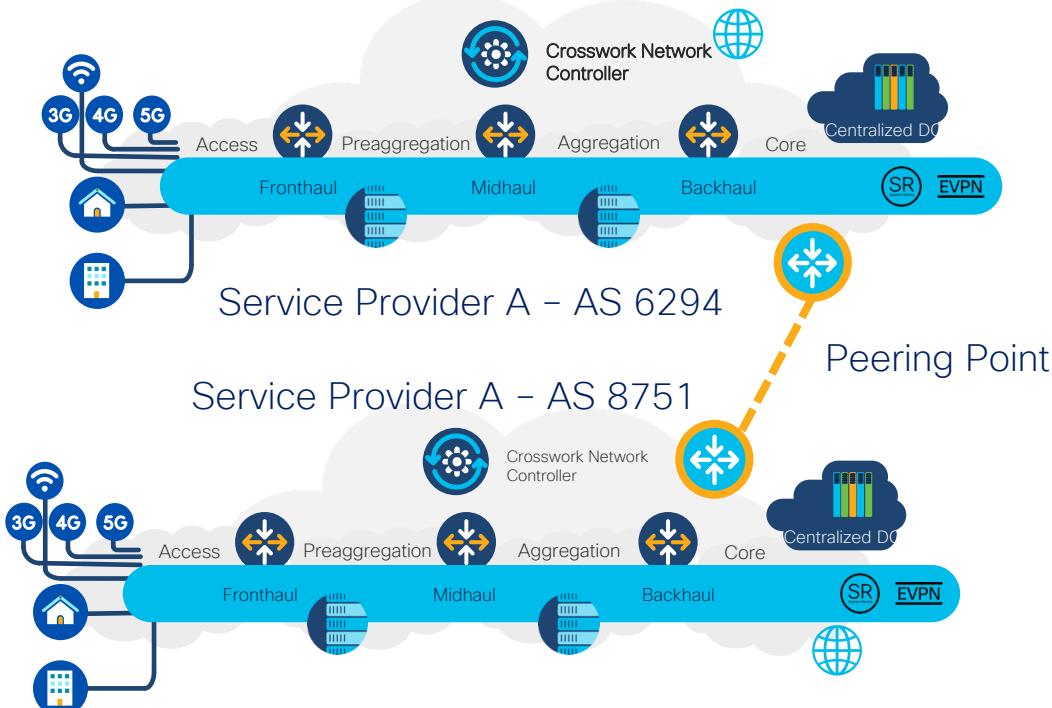
Automate processes to drive agility

Tenets of Cisco Crosswork Automation



Crosswork Cloud – Traffic Analysis

- What's the challenge?



Business Outcomes

Improve Customer Experience
Peering recommendations to improve traffic
Identify hijacks & route leaks

Increase Provider Profitability
Dashboard of my top talkers
Identify remediations before issues occur

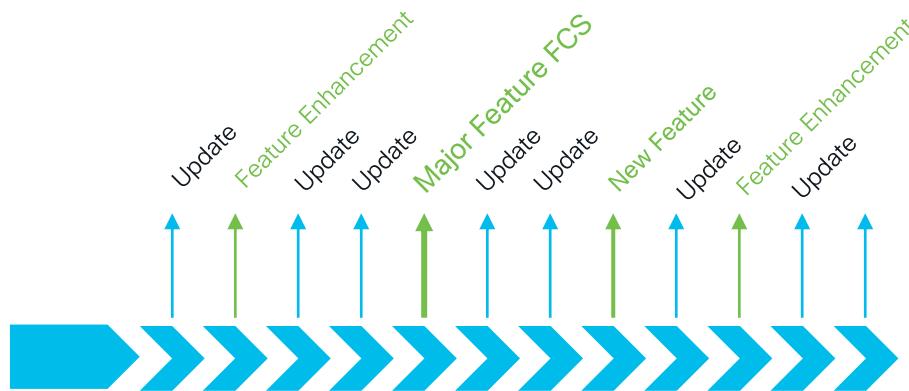
Operational Simplicity
Analytics translation into automatable actions
Visibility of network that's easy to understand

Operational Intelligence as a Service

- ✓ Cloud SaaS: Always-On, Immediate Time-to-Value, Always Advancing
- ✓ No software to deploy and maintain
- ✓ Cloud Scale and scale-out CDG for on-prem support
- ✓ Reduced Operational Cost and Seamless Scalability



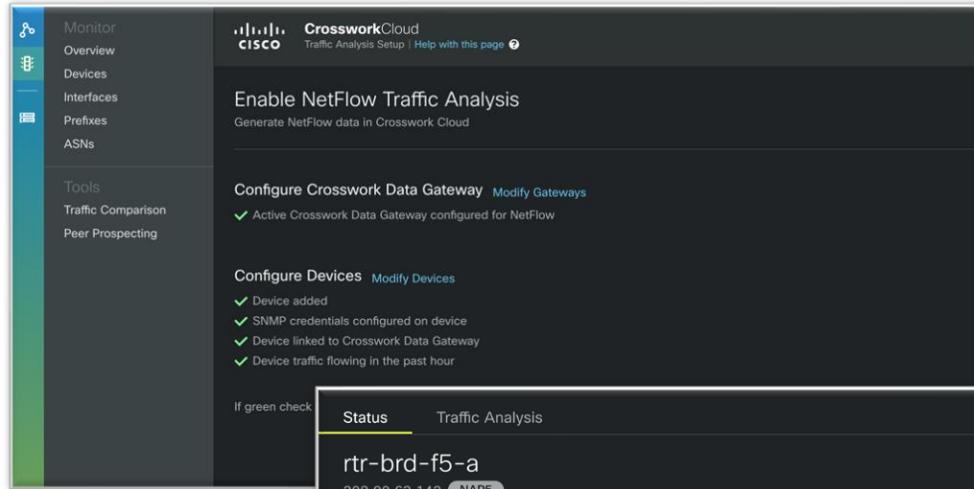
A new way to consume software as a service



No user testing or software maintenance required.

- Software delivered and maintained by Cisco
- Continuous (Weekly) delivery pipeline to production service
- Continuous pipeline for new features and fixes
- No customer action required for ongoing maintenance or upgrades

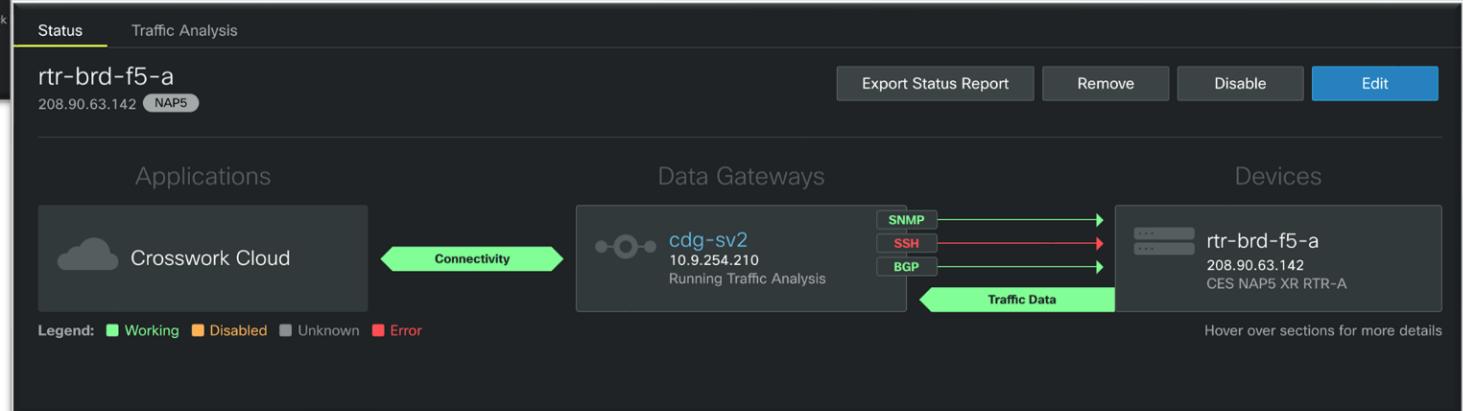
Designed for Ease of Use and Supportability



The screenshot shows the CrossworkCloud interface. On the left, a sidebar menu includes: Monitor (Overview, Devices, Interfaces, Prefixes, ASNs), Tools (Traffic Comparison, Peer Prospecting), and a 'If green check' section. The main content area has a header 'CrossworkCloud' with 'Traffic Analysis Setup' and 'Help with this page'. It displays 'Enable NetFlow Traffic Analysis' (Generate NetFlow data in Crosswork Cloud) and 'Configure Crosswork Data Gateway' (Modify Gateways, Active Crosswork Data Gateway configured for NetFlow). Below that is 'Configure Devices' (Modify Devices) with a list: Device added, SNMP credentials configured on device, Device linked to Crosswork Data Gateway, and Device traffic flowing in the past hour.

Designed for fast time-to-value

- Self-Guided Deployment
- Built-in connectivity diagnostics



ABCs of Crosswork Cloud: AS monitoring, Border Netflow Analytics, Compliance

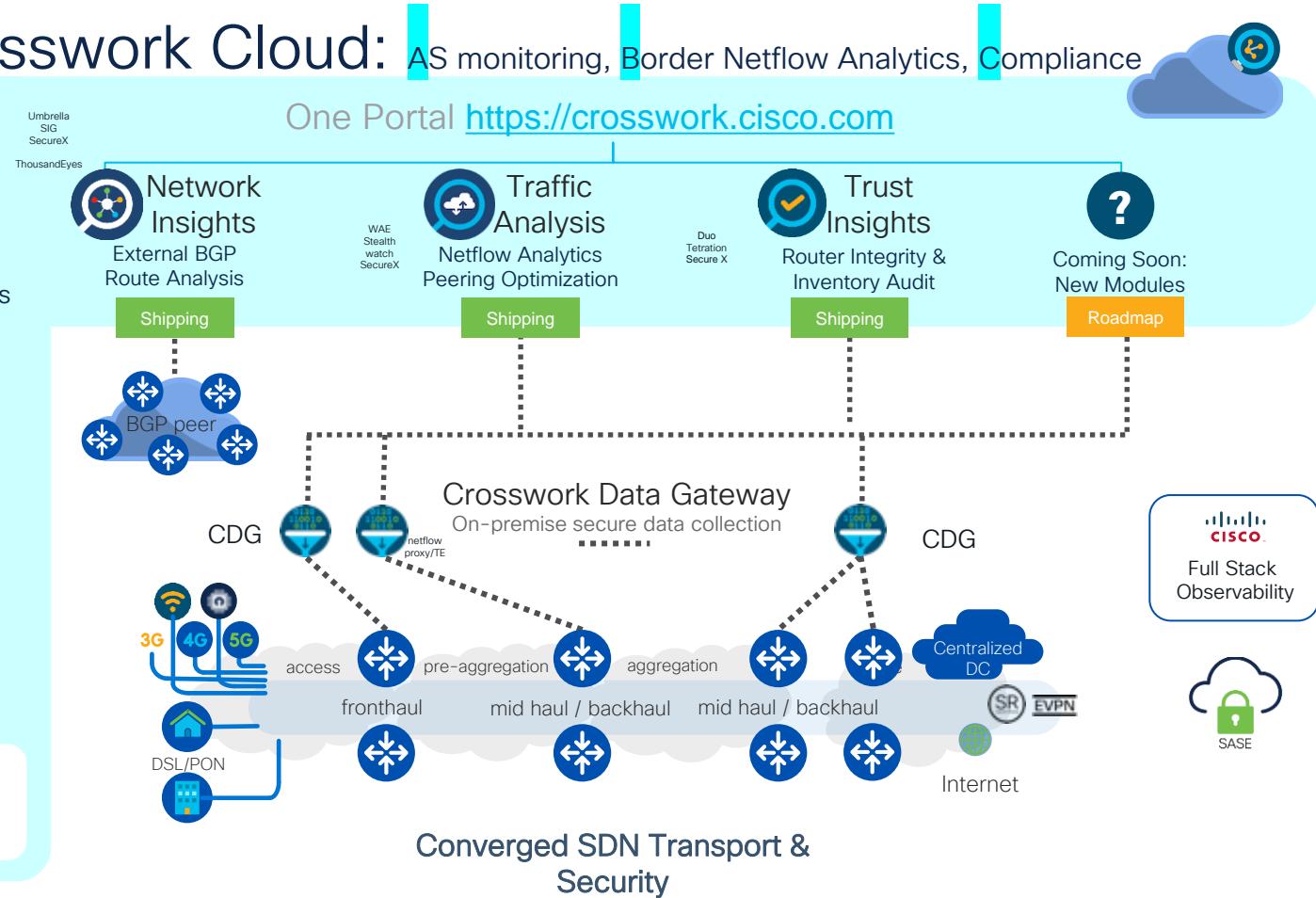
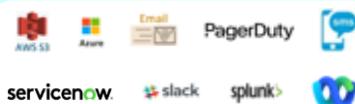
Key Points

- SaaS Delivered
- Immediate Deployment
- Always up-to-date
- Minimal Support OpEx
- Weekly Updates
- Dynamic Scalable Workloads
- Continuous New Features
- Task & Process Automation
- Focus on Analytics
- Give Answers not Questions

Operational Intelligence

- Multivendor & Multidomain
- Multiplatform Traffic Analytics
- Network security focused
- IOS XR7 device posturing
- REST API integration

Integrated Collaboration tools



Network Insights

External BGP Analysis

Network Insights monitors hundreds of peers world-wide



Using Network Insights

- **(Always-On) Continuous monitoring and alerting for your BGP advertisements**
 - Define policies to automatically alert on unexpected changes or anomalies
 - Detect common BGP issues: route leaks, prefix hijack events, withdrawals
- **(Right now) Global BGP Looking Glass**
 - Global view of how your BGP advertisements are received
 - Consolidated view of all global looking-glasses
- **(History) BGP Update Log (Global BGP History)**
 - Forensic view of all observed BGP updates with history

Crosswork Network Insights – Route Analysis

Unlimited Peer Route Tracking

Peer Alarms

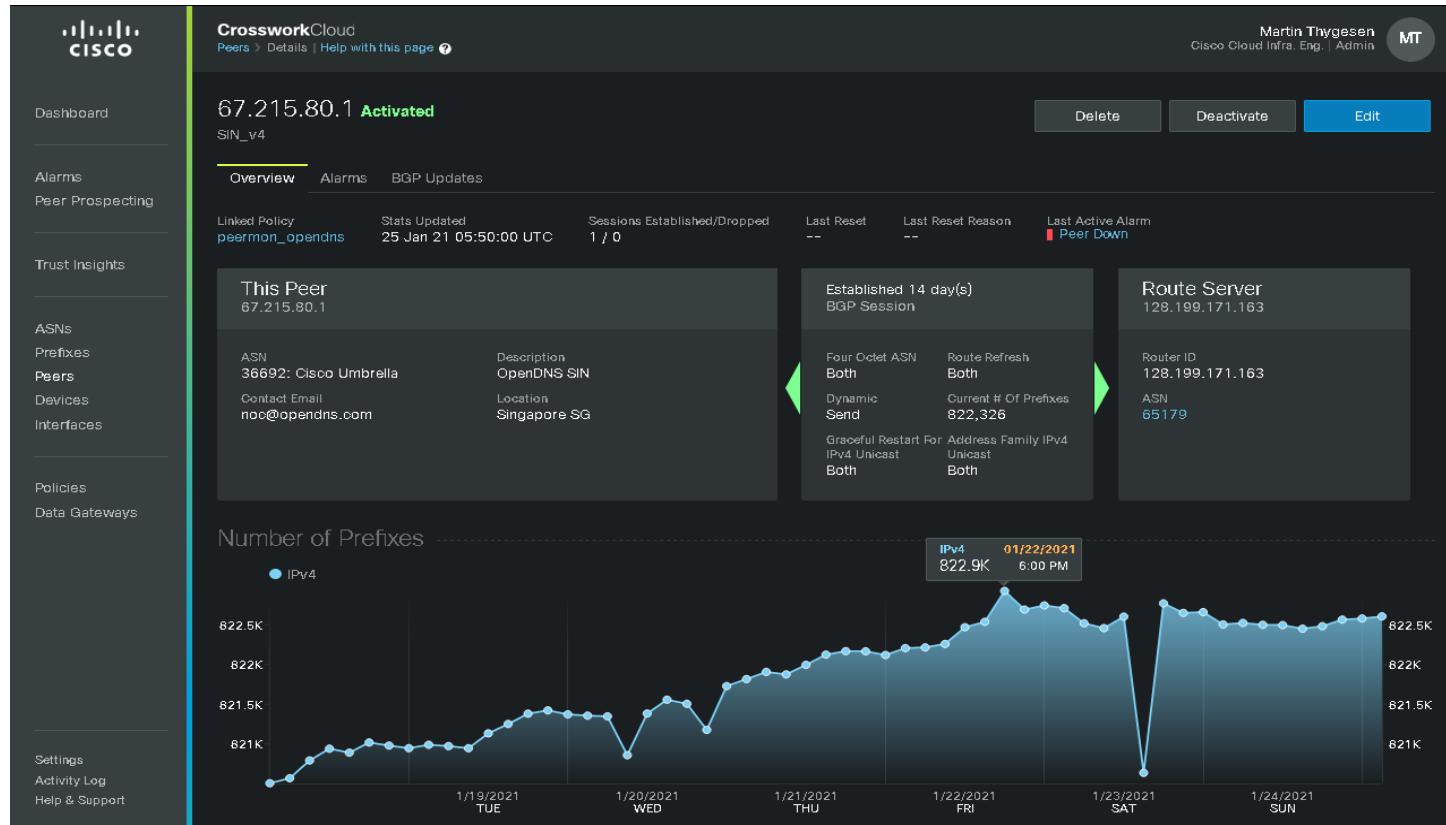
A large routing sensor network

Correlate BGP with other events

Free Access

Paid monitoring options

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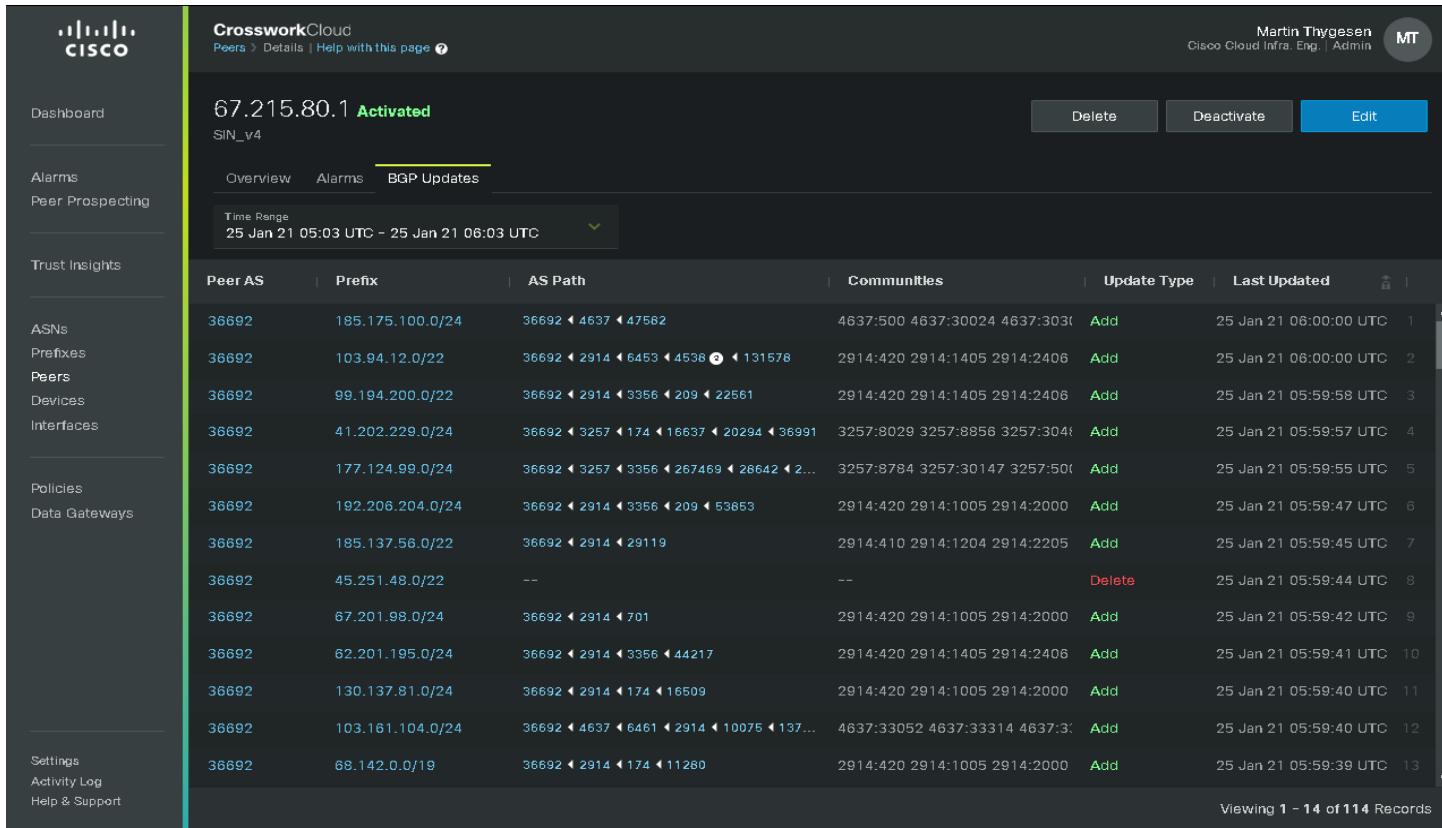
Crosswork Network Insights – Route Analysis

3 months of
Route Updates
history

Peer ID
Information kept
private

No cost views
of what your
routers are
advertising

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The screenshot shows the CrossworkCloud interface for route analysis. The left sidebar has a Cisco logo and links to Dashboard, Alarms, Peer Prospecting, Trust Insights (ASN, Prefixes, Peers, Devices, Interfaces), Policies (Data Gateways), and Settings (Activity Log, Help & Support). The main area shows a table of BGP updates for peer 67.215.80.1, which is activated. The table has columns for Peer AS, Prefix, AS Path, Communities, Update Type, and Last Updated. The AS Path and Communities columns show complex route paths. The table shows 144 records from Jan 21, 05:03 UTC to 06:03 UTC. The top right shows the user Martin Thygesen (Cisco Cloud Infra. Eng. | Admin) and a 'MT' icon.

Peer AS	Prefix	AS Path	Communities	Update Type	Last Updated
36692	185.175.100.0/24	36692 4637 47562	4637:500 4637:30024 4637:3030	Add	25 Jan 21 06:00:00 UTC 1
36692	103.94.12.0/22	36692 2914 6454 4538 131578	2914:420 2914:1405 2914:2406	Add	25 Jan 21 06:00:00 UTC 2
36692	99.194.200.0/22	36692 2914 3356 209 22561	2914:420 2914:1405 2914:2406	Add	25 Jan 21 05:59:58 UTC 3
36692	41.202.229.0/24	36692 3257 174 16637 20294 36991	3257:8029 3257:8856 3257:3048	Add	25 Jan 21 05:59:57 UTC 4
36692	177.124.99.0/24	36692 3257 3356 267469 28642 2...	3257:8784 3257:30147 3257:50	Add	25 Jan 21 05:59:55 UTC 5
36692	192.206.204.0/24	36692 2914 3356 209 53853	2914:420 2914:1005 2914:2000	Add	25 Jan 21 05:59:47 UTC 6
36692	185.137.56.0/22	36692 2914 29119	2914:410 2914:1204 2914:2205	Add	25 Jan 21 05:59:45 UTC 7
36692	45.251.48.0/22	--	--	Delete	25 Jan 21 05:59:44 UTC 8
36692	67.201.98.0/24	36692 2914 701	2914:420 2914:1005 2914:2000	Add	25 Jan 21 05:59:42 UTC 9
36692	62.201.195.0/24	36692 2914 3356 44217	2914:420 2914:1405 2914:2406	Add	25 Jan 21 05:59:41 UTC 10
36692	130.137.81.0/24	36692 2914 174 16509	2914:420 2914:1005 2914:2000	Add	25 Jan 21 05:59:40 UTC 11
36692	103.161.104.0/24	36692 4637 6461 2914 10075 137...	4637:33052 4637:33314 4637:30	Add	25 Jan 21 05:59:40 UTC 12
36692	68.142.0.0/19	36692 2914 174 11280	2914:420 2914:1005 2914:2000	Add	25 Jan 21 05:59:39 UTC 13

Demo

Network Insights

External BGP Monitoring

Traffic Analysis

Crosswork Traffic Analysis



Monitor Overview Devices Interfaces Prefixes ASNs Tools Traffic Comparison Peer Prospecting Configure Devices Data Gateways Credentials Device Groups Removed Devices

CrossworkCloud Traffic Analysis | Help with this page

Time Last Week Updated 7:08 PM DB

Cloud-Delivered NetFlow Traffic Analytics

Top 10 Input ASNs

- Q. Can we quickly manage congestion at network edge?

Top To/From ASNs

- Q. Are we proactive in identifying network edge congestion?
- Q. How do IP Routing tables relate to traffic flow in congested devices?

Prefix Comparison

- Q. Where and Who should we be peering with?
- Q. What small changes could help improve network edge congestion?
- Q. What is the impact of moving traffic between edge devices?
- Q. What happens if we start peering deeper in our Access networks?

Device Overview

BRKSPG-2250

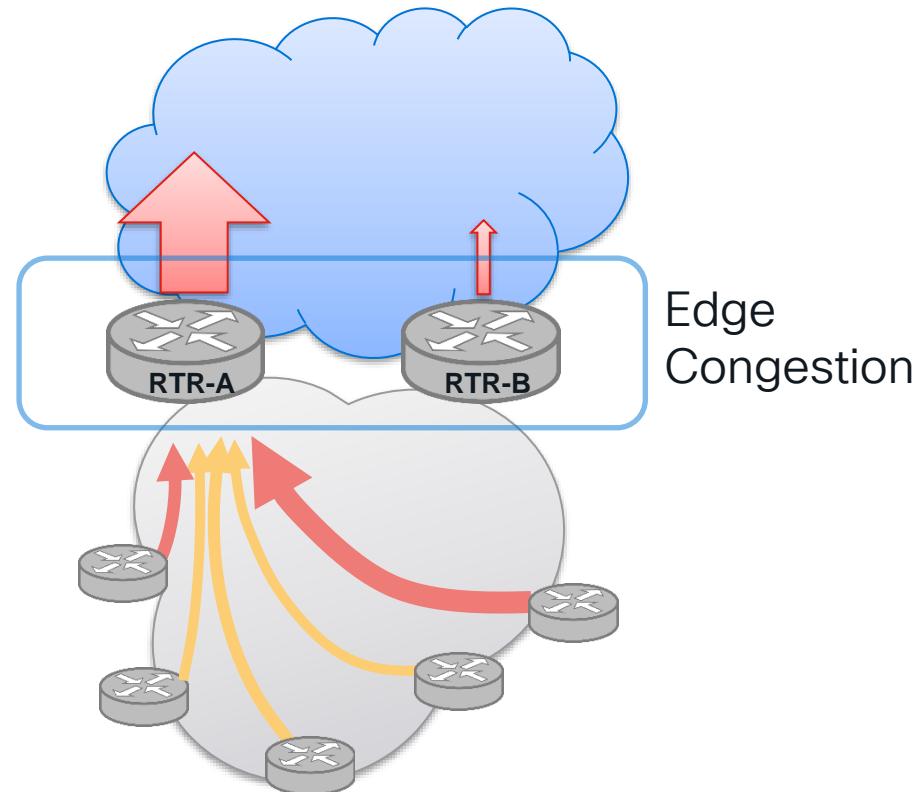
Device	TX Traffic	TX BPS	TX Mbps	TX Gbps
rtr-brd-f5-a	1.1 Gbps	/ 594.8 Mbps		2 Gbps
rtr-brd-f5-b	12.8 bps	/ 583.3 Mbps		0 bps
rtr-peer-f4-1	236.6 Mbps	/ 211.5 Mbps		2 Gbps
rtr-brd-f4-a	21.7 Mbps	/ 15 Mbps		0 bps



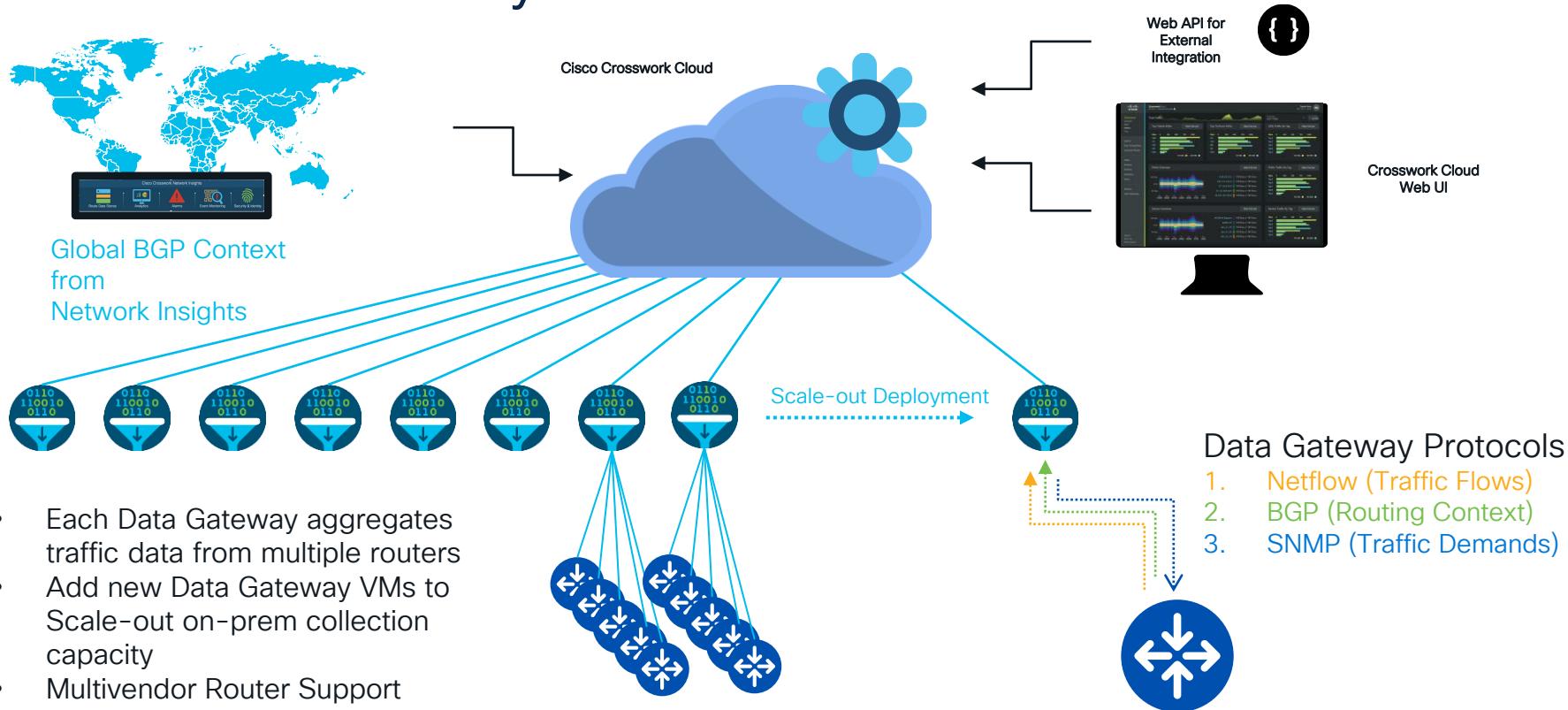
Where is Traffic Analysis needed

When Edge Congestion occurs,
Operators need to understand the root
cause and what actions they can take.

- Network Operators control Routing
not Application Protocols
- Protocol Information tells us what
the traffic is, but Routing is the key
to making changes.
- Network Operators need to
understand the source of flows and
the size in order to quickly identify
what actions can be taken



How Traffic Analysis Works



Traffic Analysis - ASN and Prefix Analysis



CrossworkCloud
Traffic Analysis | Help with this page

DB

Viewing Device Group Device Group Site-BRD Time Last 7 Days Updated 14:21 UTC

Top Device Transit ASNs

Gbps 0 0.5 1 1.5 2 2.5

16417: IRO... 23005: SWI... 3356: LEVEL3 174: COGE... 1299: TWEL...

RX Traffic TX Traffic

Top Device To/From ASNs

Gbps 0 0.5 1 1.5 2 2.5

16417: IRO... 8075: MICR... 15169: GO... 2571: DHLN... 16509: AM...

RX Traffic TX Traffic

Prefix Overview

2 Gbps 0 bps 2 Gbps

104.40.0.0/13 68.232.134.0/23 216.71.154.0/23 68.232.148.0/23 68.232.143.0/24

1.1 Gbps / 223.2 Mbps 137.5 Mbps / 160.1 Mbps 133.3 Mbps / 152.7 Mbps 133.8 Mbps / 93.7 Mbps 96.6 Mbps / 94 Mbps

6/7/2022 TUE 6/8/2022 WED 6/9/2022 THU 6/10/2022 FRI 6/11/2022 SAT 6/12/2022 SUN

Device Overview

2 Gbps 0 bps 2 Gbps

rtr-brd-f5-a rtr-brd-f4-b rtr-brd-f4-a rtr-brd-f5-b

1.2 Gbps / 665.5 Mbps 234.9 Mbps / 837.9 Mbps 346.3 Mbps / 463.1 Mbps 13.7 bps / 670.7 Mbps

6/7/2022 TUE 6/8/2022 WED 6/9/2022 THU 6/10/2022 FRI 6/11/2022 SAT 6/12/2022 SUN

Monitor

- Overview
- Devices
- Interfaces
- Prefixes
- ASNs

Tools

- Traffic Drilldown
- Traffic Comparison
- Peer Prospecting
- Recommendations

Configure

- Devices
- Data Gateways
- Flow Replication
- Credentials
- Device Groups
- Removed Devices

Setup Checklist

<https://crosswork.cisco.com/#/traffic/asn/23005/traffic>



Traffic Analysis – Traffic Drilldown

CrossworkCloud
Traffic Drilldown | Help with this page

Device Centric **Prefix Centric**

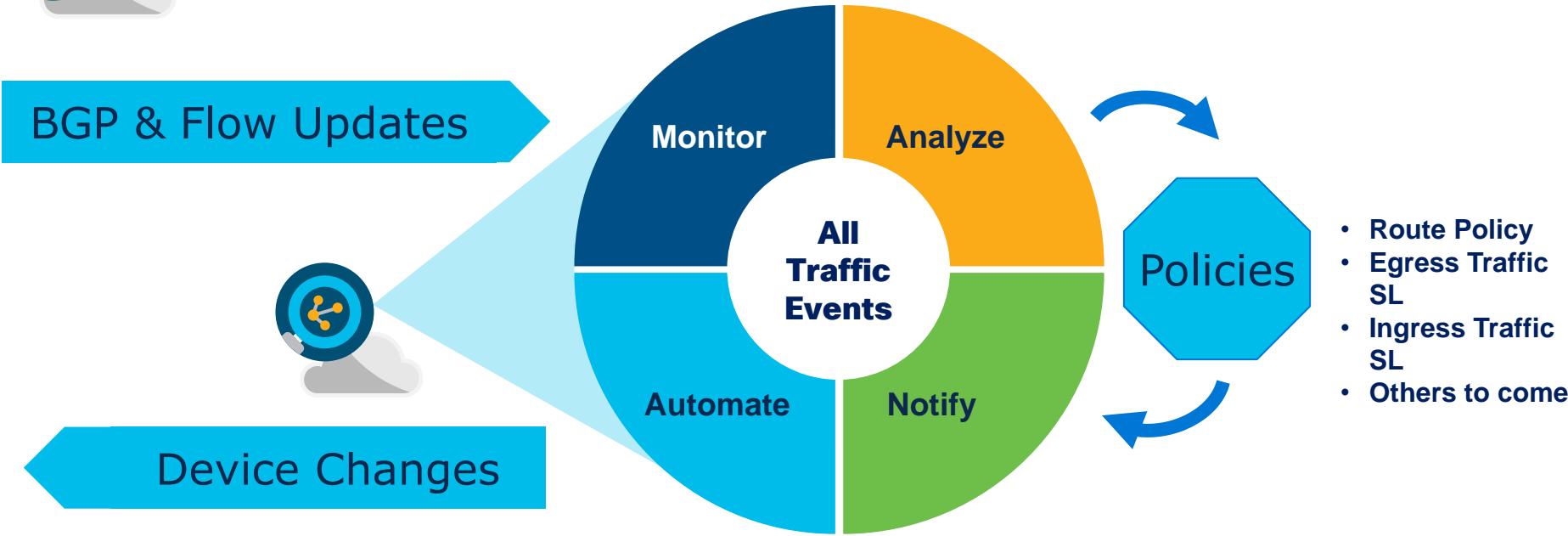
Time **Last Day**

Device	Interface	Description	Type	Utilization	Capacity	TX: SNMP	RX: SNMP	Tags	⋮
FYHA-NMSR-CI-001	HundredGigE0/3/0/18	Connected to FRA, FRA-M...	Internal	53%	100 Gbps	9.4 Gbps	52.9 Gbps		1
MLQ2-NMSR-CI-001	TenGigE0/2/0/2	⋮	Internal	53%	10 Gbps	917.1 Mbps	5.3 Gbps		2
ADAM-NMSR-CI-001	HundredGigE0/3/0/18	Connected to FRA, FRA-M...	Internal	52%	10 Gbps	911.7 Mbps	5.2 Gbps		3
SULM-NMSR-CI-001	HundredGigE0/3/0/18	⋮	Internal	52%	10 Gbps	900.4 Mbps	5.2 Gbps		4
FRAN-NMSR-CI-001	HundredGigE0/3/0/18	Connected to FRA, FRA-M...	Internal	52%	10 Gbps	896.9 Mbps	5.2 Gbps		5
JED1-NMSR-CI-001	HundredGigE0/3/0/18	⋮	Internal	52%	10 Gbps	898.5 Mbps	5.2 Gbps		6
ADAM-NMSR-CI-002	HundredGigE0/3/0/18	Connected to FRA, FRA-M...	Internal	52%	10 Gbps	898.8 Mbps	5.2 Gbps		7
AMST-NMSR-CI-001	HundredGigE0/3/0/18	⋮	Internal	52%	10 Gbps	891.9 Mbps	5.2 Gbps		8
MARS-NMSR-CI-001	HundredGigE0/3/0/18	Connected to FRA, FRA-M...	Internal	52%	10 Gbps	893 Mbps	5.2 Gbps		9
FUJA-NMSR-CI-001	HundredGigE0/3/0/18	⋮	Internal	52%	10 Gbps	898.3 Mbps	5.2 Gbps		10
SING-NMSR-CI-001	HundredGigE0/3/0/18	Connected to FRA, FRA-M...	Internal	52%	10 Gbps	895.9 Mbps	5.2 Gbps		11
DUXB-NMSR-CI-001	HundredGigE0/3/0/18	⋮	Internal	52%	10 Gbps	893.4 Mbps	5.2 Gbps		12
	TenGigE0/1/0/2	⋮	Internal	51%	10 Gbps	906 Mbps	5.1 Gbps		13
	TenGigE0/1/0/1	⋮	Internal	51%	10 Gbps	904.7 Mbps	5.1 Gbps		14
	TenGigE0/1/2/0	⋮	Internal	51%	10 Gbps	916.7 Mbps	5.1 Gbps		15
	TenGigE0/1/2/7	⋮	External	49%	10 Gbps	1.9 Mbps	4.9 Gbps		16
	Bundle-Ether11	⋮	External	49%	20 Gbps	3.8 Mbps	9.8 Gbps		17

Viewing 1-12 of 12 Viewing 1-17 of 176



From Analysis to Intent based Automation



Intent is expressed as “What should be ”

Policies = Intent, they trigger notification actions

Actions can be Manual or Automated based on business value

Cloud Benefits: Data Sharing via Cloud API



Collaboration

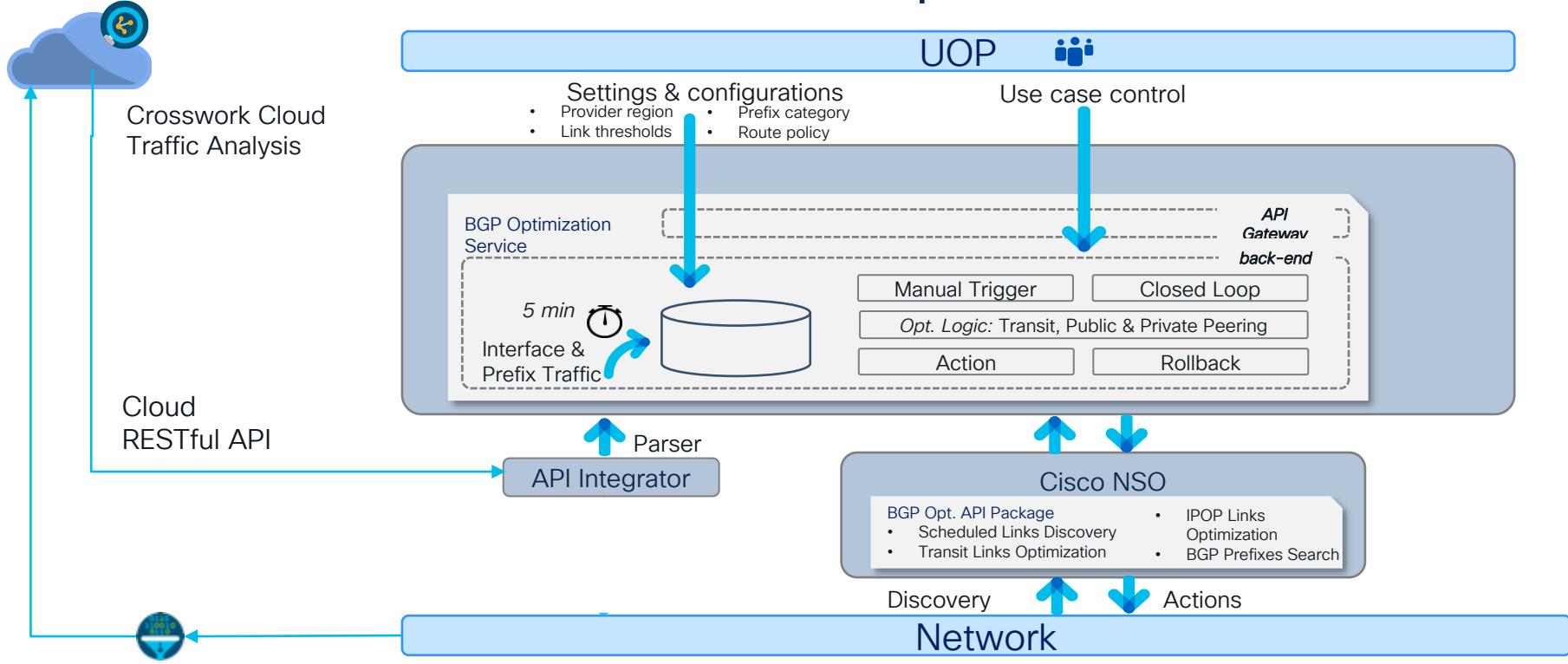
- Cloud service allows shared access between departments within your network (opt-in with vendors or partners) with no additional infrastructure



Cloud-based API access

- Crosswork Cloud can become a data provider for other operational systems
- Common point of integration for API access to inventory data
- Simple integration to external cloud services and SIEM systems

API: SPIS Automated BGP Optimization



Demo

Traffic Analysis

Netflow Analytics as a Service



Data Gateway Cloud-to-Ground Connectivity

Connecting Crosswork Cloud to your network

Cisco's Cloud is hosted by Cisco in a secure environment



You need a secure way to connect these two

You need an operationally simple and reliable method to deploy this secure layer

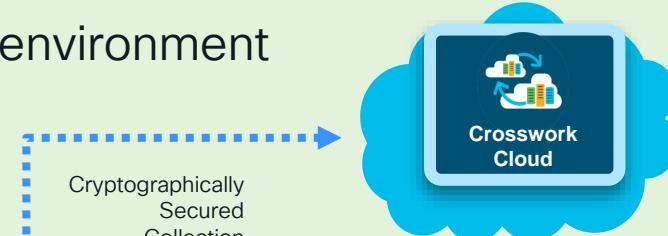
You need a solution that can scale to whatever your network demands are today *and tomorrow*

You have devices in
your secure network



Connecting Cisco's Cloud to your network

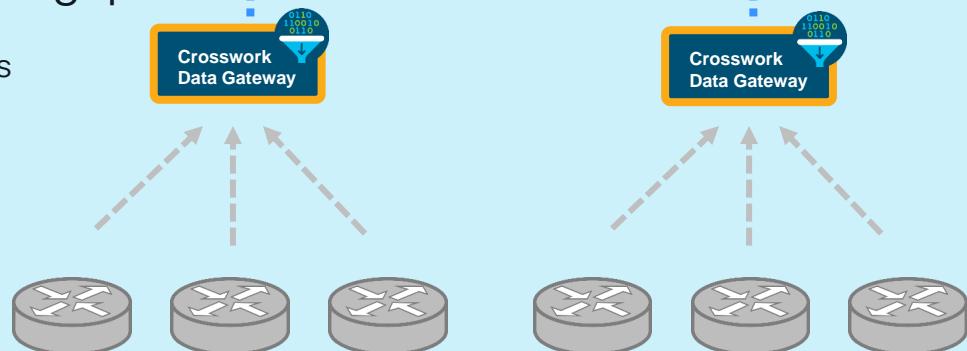
Cisco's Cloud is hosted by Cisco in a secure environment



Crosswork Data Gateway bridges this gap.

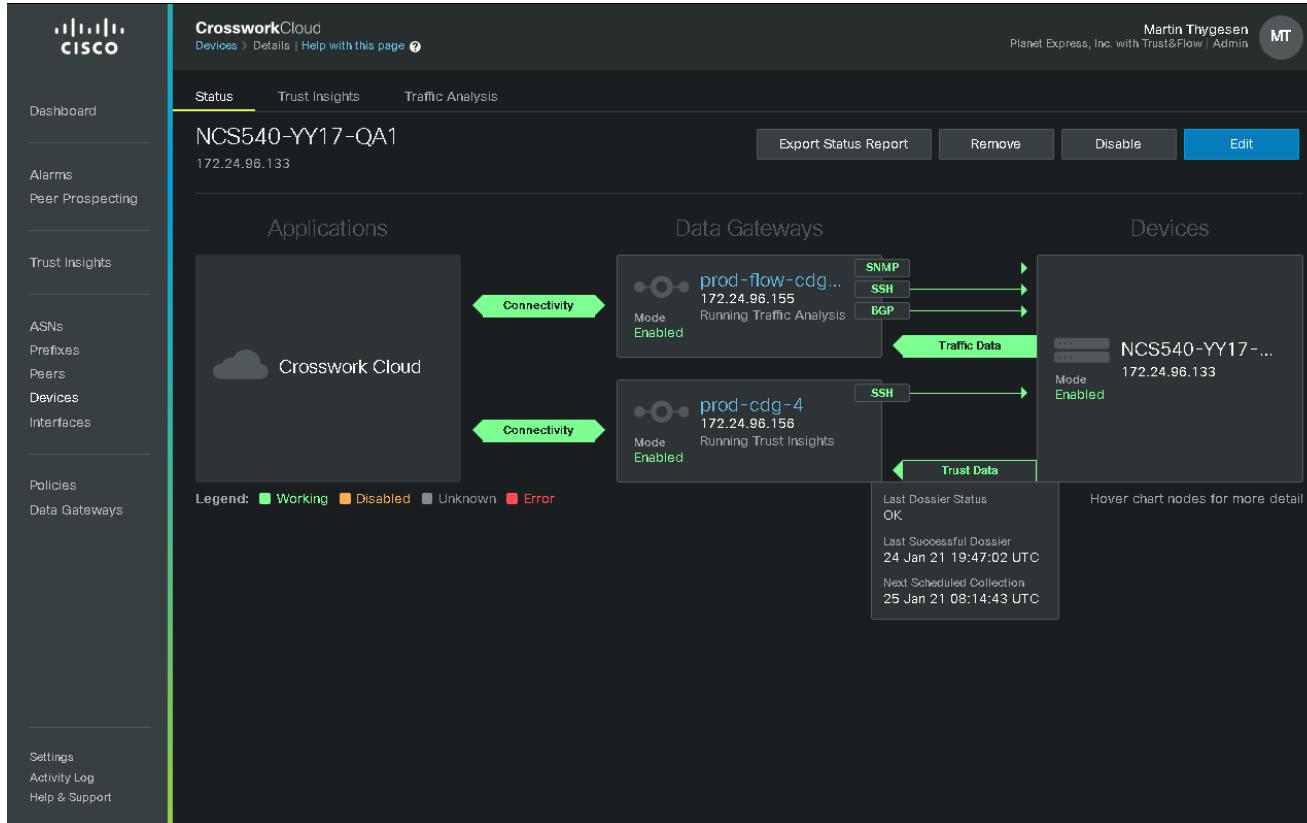
- **Secure connectivity** to Crosswork Cloud
- Simple and repeatable deployment model with VMs
- **Scales** as you grow with a horizontal design
- Deploys **on premise** in your secure network

You have devices in your secure network



Crosswork Data Gateway

- Visibility of connection state
- Clear linkage between protocol collection and devices
- Platform health, resource management & reporting



Trust Insights: XR Inventory and Integrity

Crosswork Trust Insights

- Cloud-enabled IOS XR 7



Security Capabilities and Software Reporting



Trust in the network operating system with image signing and secure boot infrastructure



Trust at runtime with run time defense, encrypted transport, DDoS protection



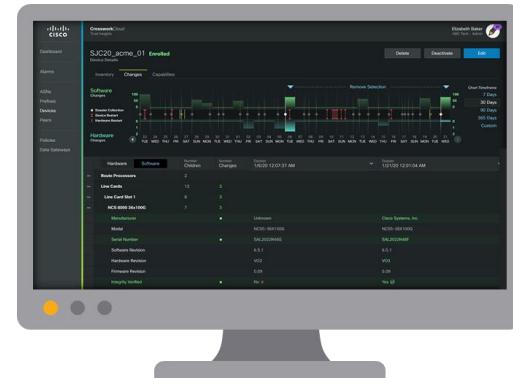
Trustworthiness Report and Audit



Visualize and report on the trustworthiness of network infrastructure



Operation simplicity that provides a source of truth with your infrastructure (hardware, software, runtime)



Forensic Analysis

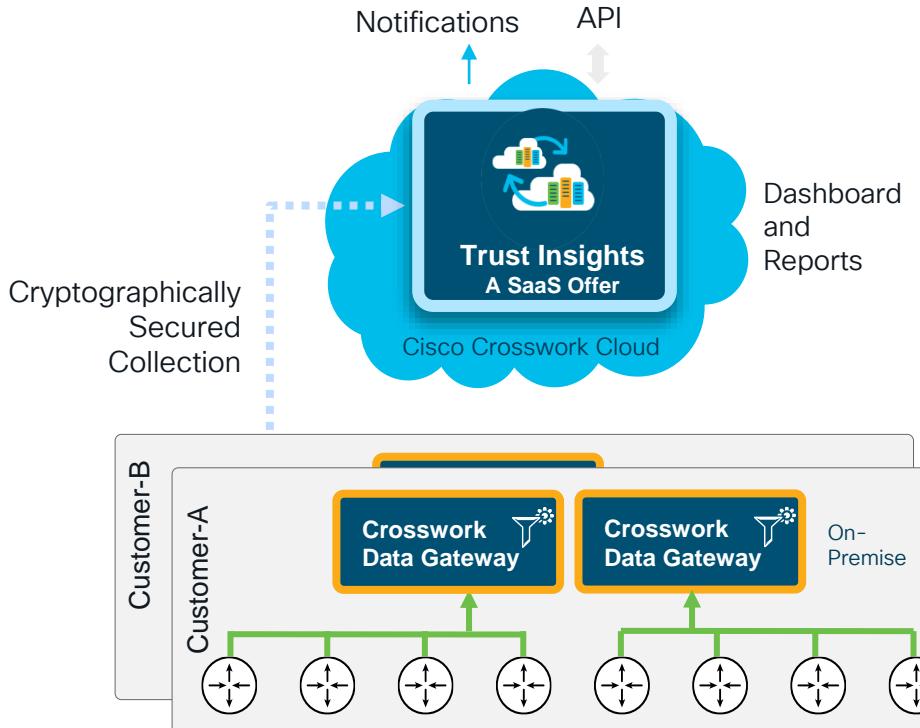


Track changes in infrastructure over time



Cryptographic and verifiable proof of what happened in the past

Crosswork Trust Insights Architecture



- On-Premises Data Gateway collects signed trust dossier from IOS XR Routers
- Dossier is human-readable
- Utilizes up-to-date feed of Known-Good-Values (KGV) from IOS XR Build and Regression
- Constantly evolving analytics of hardware and software fingerprints in Cloud Service

Status Trust Insights

NCS8001-Spitfire

172.27.150.118

SJC20

Collect Dossier

Remove

Disable

Edit

Platform

Inventory

Changes

Capabilities

Model

NCS_8000

Location

SJC20

OS Version

7.0.12

Uptime

7 weeks, 1 day, 6 hours, 40 minutes

Last Successful Dossier

27 day(s) ago

Last Dossier Status

OK

Description

--

Use The Chart Below To Modify Selection

12/15/2020 12:20:58 PM



Hardware

Software

Quick Search



Package Name	Category	Known Cisco Release	Architecture	Release	Version	Built Time	Hashes Seen
cisco-grub	Os Base	RPM 7.0.12	corei7_64	0.29	1.0	3/9/2020 7:34:48 AM	Details
base-files	Os Base	RPM 7.0.12	wrlsdk_x86	89.7	3.0.14	3/9/2020 7:29:01 AM	Details
kernel-image-bzimage-4.8.28-wr9	Os Base	RPM 7.0.12	wrlsdk_x86	0.169	4.8.28	3/9/2020 7:29:01 AM	Details
kernel-module-br-netfilter	Os Base	RPM 7.0.12	wrlsdk_x86	0.169	4.8.28	3/9/2020 7:29:01 AM	Details
kernel-module-bridge	Os Base	RPM 7.0.12	wrlsdk_x86	0.169	4.8.28	3/9/2020 7:29:01 AM	Details
kernel-module-cdc-eem	Os Base	RPM 7.0.12	wrlsdk_x86	0.169	4.8.28	3/9/2020 7:29:01 AM	Details
kernel-module-cisco-fpga-qspi	Os Base	RPM 7.0.12	wrlsdk_x86	0.65	1.0	3/9/2020 7:29:01 AM	Details

Find Files

Locate files by entering a hash, file and path, or search by device.

Find By Hash

Find By Device

ASR 9000v

Mismatch **Include** | Exclude

Runtime

Add Filter

Device Name	Path	Node	Device Model	OS Version	Tags	Mismatch Status
XRv9K-003						✗ Runtime 1
XRv9K-003						✗ Runtime 2
XRv9K-003						✗ Runtime 3
XRv9K-003						✗ Runtime 4
XRv9K-003						✗ Runtime 5
XRv9K-003						✗ Runtime 6
XRv9K-003						✗ Runtime 7
XRv9K-003						✗ Runtime 8
XRv9K-003						✗ Runtime 9
XRv9K-003						✗ Runtime 10
XRv9K-003						✗ Runtime 11
XRv9K-003						✗ Runtime 12
XRv9K-003						✗ Runtime 13
XRv9K-003						✗ Runtime 14
XRv9K-003						✗ Runtime 15
XRv9K-003	/bin/cp.coreutils	0/RP0/CPU0	ASR 900v	7.2.1.31	SJC	✗ Runtime 36

Operational Intelligence as a Service



Always-On, Automated KGV Feeds, Up-to-Date Analytics



No software to deploy and maintain



Instant Integration, Continuous Improvement



Reduced Operational Cost and Seamless Scalability





CrossworkCloud



CrossworkCloud

Trial Account Request

To activate your trial subscription, do the following:

1. Sign in with your existing Cisco Connection Online (CCO) account or create one here
2. Click Next. After user authentication, please complete the Trial Account Request form

If you run into any issues or need more information, see the [Cisco Crosswork Cloud Trial Guide](#).

Next

Request a Trial

Interested in experiencing how Cisco Crosswork Cloud can help evaluate the routing health and telemetry of your network? Sign up for a free trial product account of Cisco Crosswork Cloud.



Health and security



Network Insights

Network and BGP analysis to make your network more efficient by monitoring for route leakages.

 Watch Video

 Find Out More



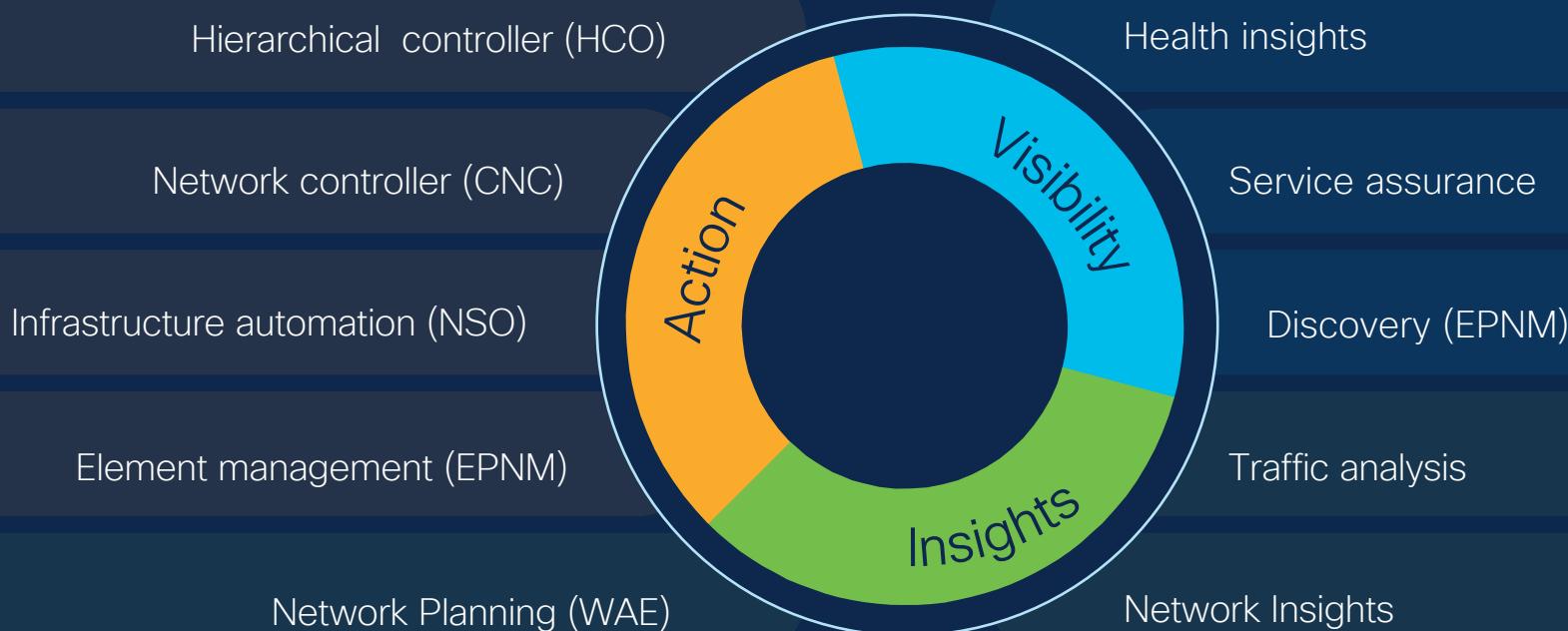
Trust Insights

Gain operational visibility to preserve the trustworthiness of your network infrastructure.

 Watch Video

 Find Out More

Crosswork gives you a comprehensive toolkit



For more
information on
Cisco's Automation
Portfolio please visit

cisco.com/go/crosswork

CISCO Live!



The screenshot shows the Cisco Crosswork Cloud landing page. At the top, the Cisco logo is displayed with the text "Products and Services", "Solutions", "Support", "Learn", and "Partners". A search bar is located in the top right corner. The main heading is "Cisco Crosswork Cloud", followed by a subtext: "Crosswork Cloud is a powerful addition to any network operations using always-on, always-up-to-date, SaaS-based services to help improve routing health, increase network visibility, maintain trustworthy infrastructure, and generate network traffic insights." Below this are two buttons: "Watch video tutorial" and "Free 30-day trial". The page features a navigation bar with links to "Benefits", "Products", "Instrument", "Resources", and "Success". A "Partner Help" link is also present. The main content area is titled "Transform your network operations with cloud-based automation" and describes Crosswork Cloud as "the most powerful automated analytics service that offers pervasive visibility, predictive insights, and intent-based actions". It highlights four key benefits: "Powerful automated analytics" (data-driven network analytics), "Operational simplicity" (reduce internal operational complexity), "Improved business agility" (natively available to meet increasing demand for resources), and "Reduced cost with SaaS-based consumption" (obtain financial benefits from moving IT costs from CapEx to OpEx with a pay-as-you-grow model). A "Read case study" button is located below the benefit descriptions. The section "Crosswork Cloud components" is shown with three circular icons: "Crosswork Network Insights" (monitoring route loops and hijacks), "Crosswork Traffic Analysis" (visualize, analyze, and optimize network traffic at distributed peering points to improve customer experience), and "Crosswork Trust Insights" (gain operational visibility to preserve the trustworthiness of your network infrastructure). Each component has a "Read data sheet" link.

Cisco Crosswork Cloud

Crosswork Cloud is a powerful addition to any network operations using always-on, always-up-to-date, SaaS-based services to help improve routing health, increase network visibility, maintain trustworthy infrastructure, and generate network traffic insights.

Watch video tutorial

Free 30-day trial

Benefits

Products

Instrument

Resources

Success

Partner Help

Transform your network operations with cloud-based automation

Crosswork Cloud is the most powerful automated analytics service that offers pervasive visibility, predictive insights, and intent-based actions.

Powerful automated analytics

Data-driven network analytics provide pervasive visibility, predictive insights, and intent-based actions to deliver optimal customer experiences.

Operational simplicity

Reduce internal operational complexity and speed up deployment with nothing to deploy, implement, or manage on-premises. Always stay up to date with the most current features and feature velocity.

Improved business agility

Natively available to meet increasing demand for resources when you need them. Free staff operations and security teams for strategic work that boosts the bottom line.

Reduced cost with SaaS-based consumption

Obtain financial benefits from moving IT costs from CapEx to OpEx with a pay-as-you-grow model.

Read case study

Crosswork Cloud components

Crosswork Network Insights

Network routing analysis to maintain routing health by monitoring route loops and hijacks.

Read data sheet

Crosswork Traffic Analysis

Visualize, analyze, and optimize network traffic at distributed peering points to improve customer experience.

Read data sheet

Crosswork Trust Insights

Gain operational visibility to preserve the trustworthiness of your network infrastructure.

Read data sheet

Technical Session Surveys

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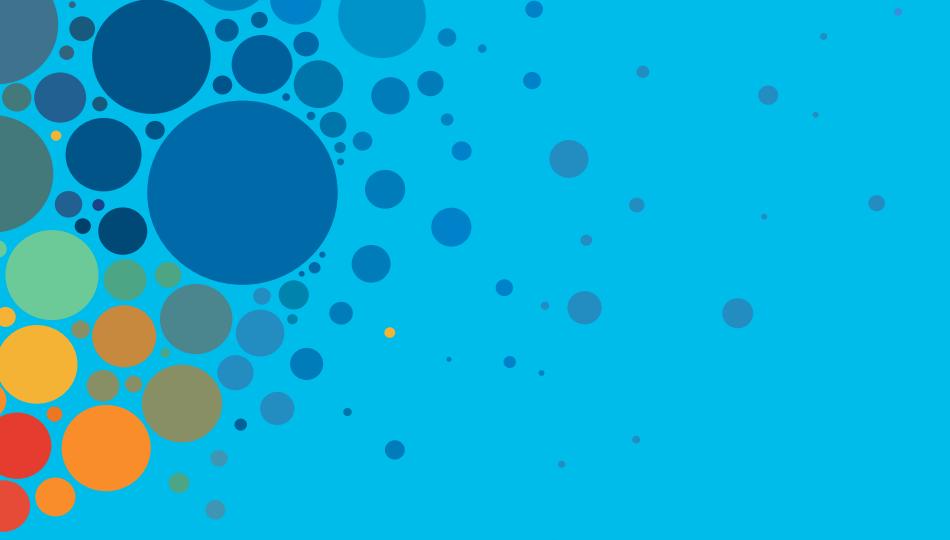
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