



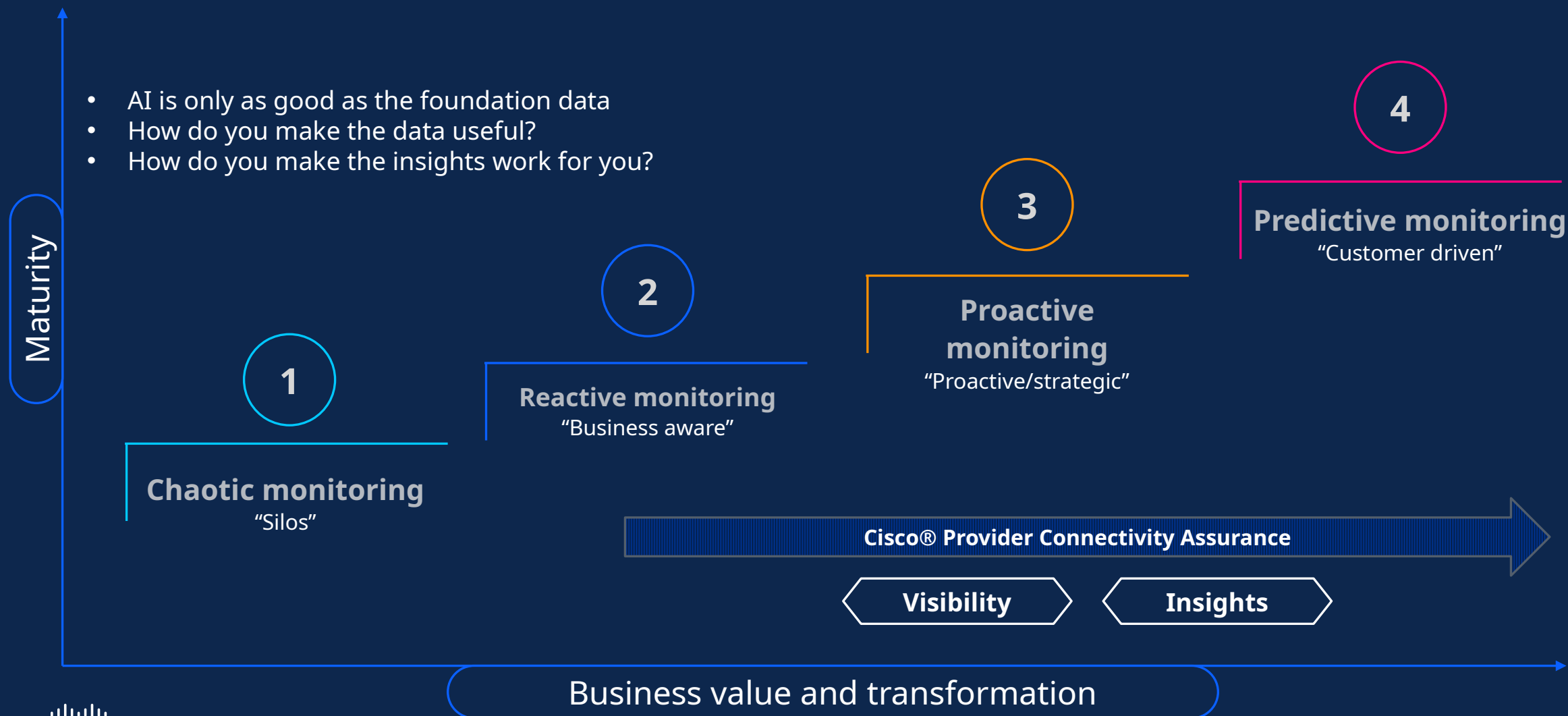
Observabilidad Universal

Cisco Provider Connectivity Assurance

Carles Batalla, Systems Architect
Cisco

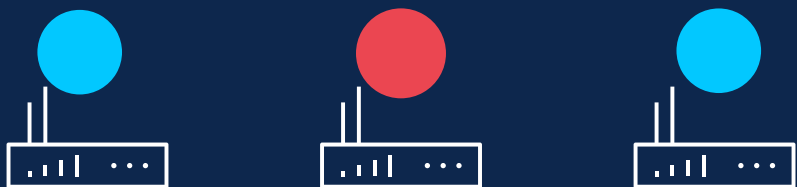
31 Oct 2025

It's a journey to predictive assurance



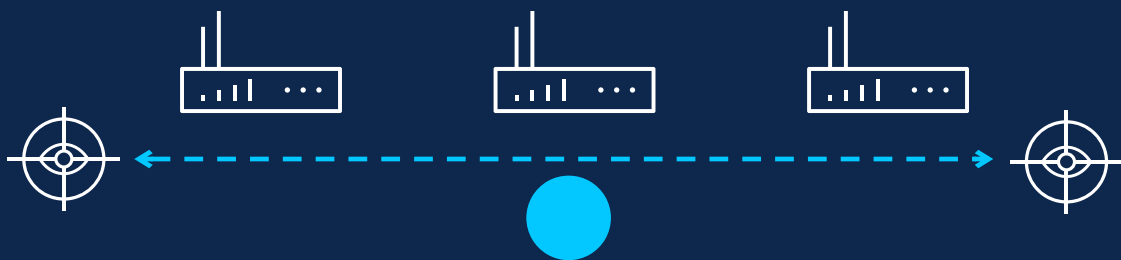
Service-centric assurance and visibility

Device-centric



You don't know if your customers or your network services are impacted

Service-centric



You'll know if your Layer 2/3 VPN services are OK

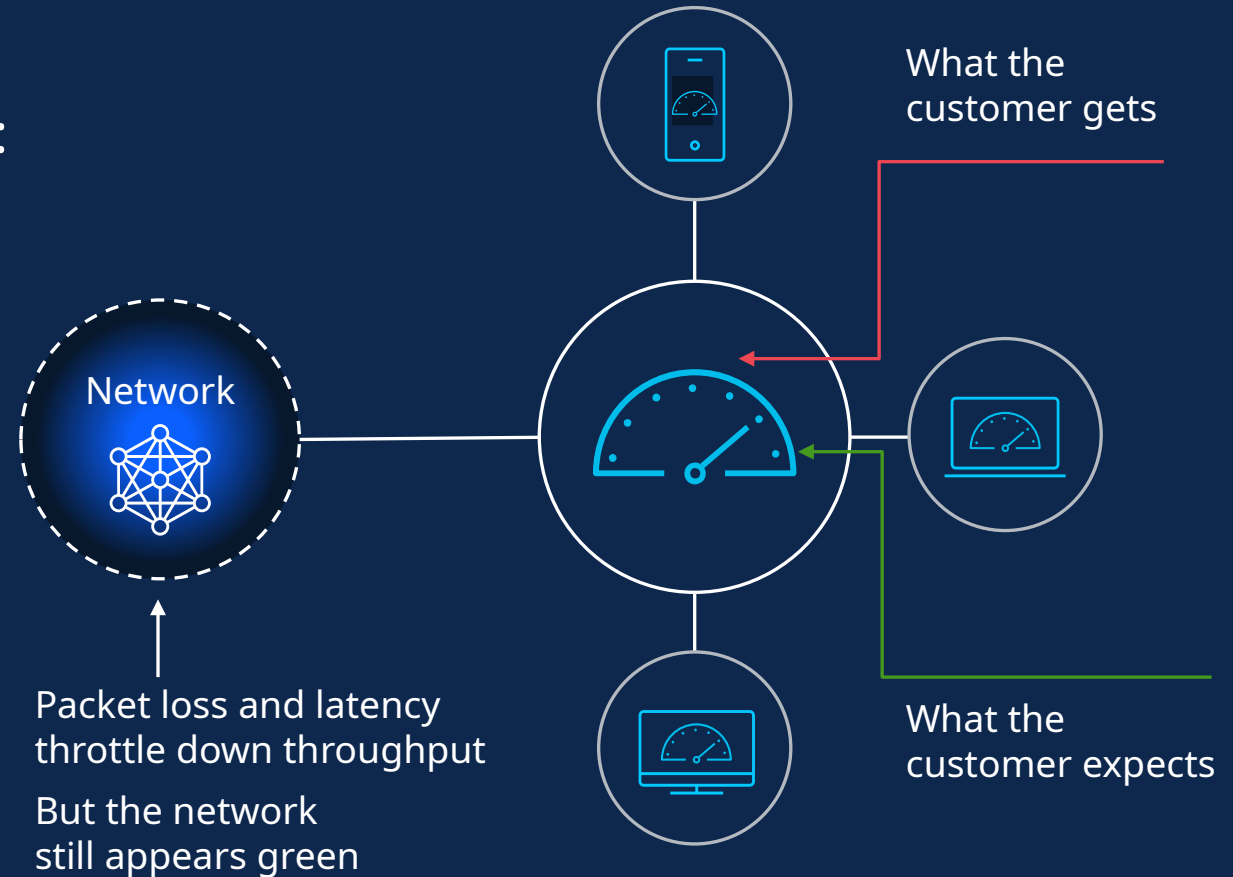
If not, you'll know the impact and magnitude—what and where

Combine both

Most tools are ineffective at detecting today's QoE issues

Without deep visibility into micro events:

- 0.53% **packet loss** leads to a 50% decrease in data throughput
- 5 ms **delay** leads to a 10% decrease in data throughput
- 10 ms **jitter** leads to a 10% decrease in data throughput



The quality of the network has a major influence on user quality of experience (QoE)

Reliable data = Efficient outcomes

Accuracy and granularity



Low

Perception

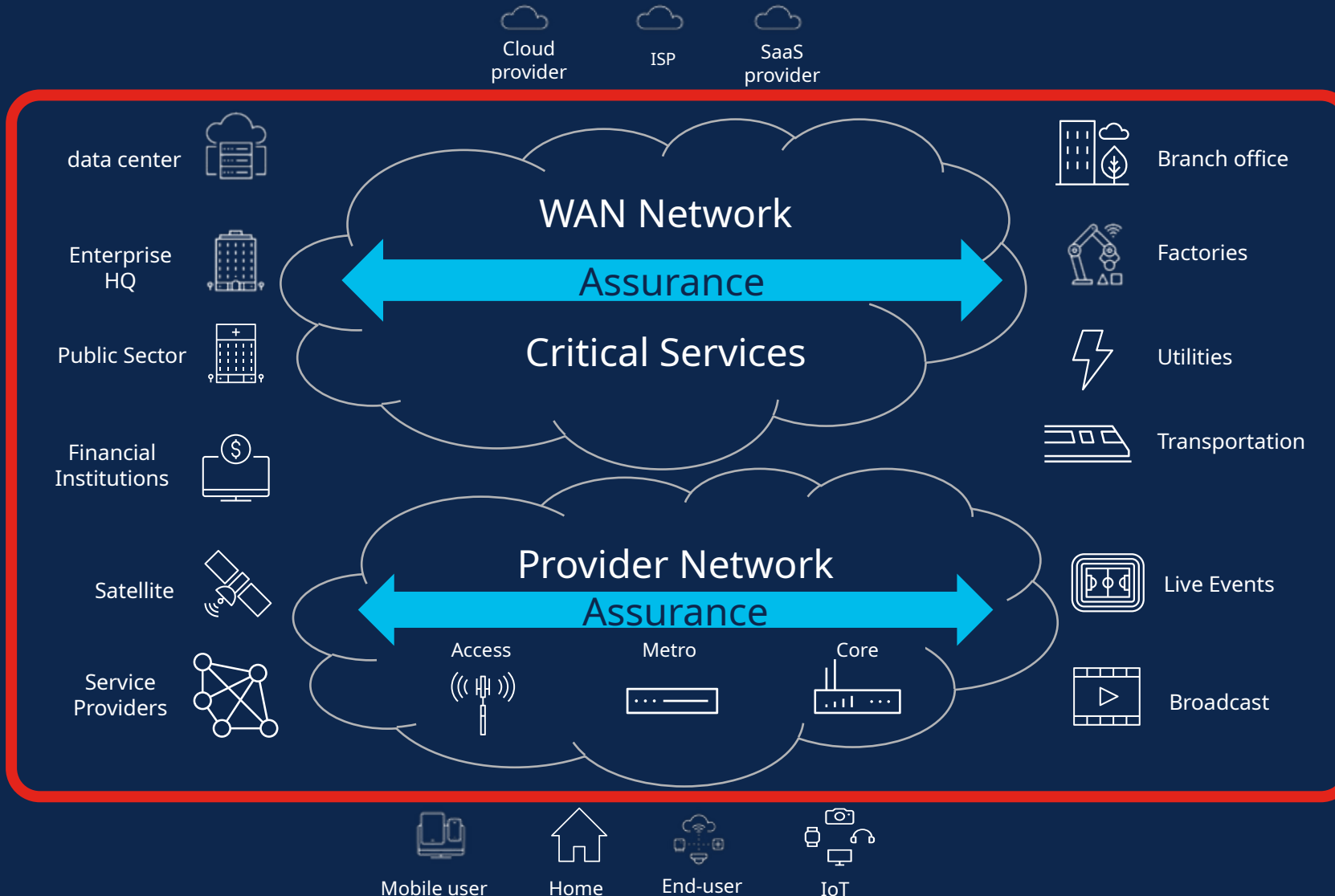


Reality



High

Provider Connectivity Assurance domain



- **Critical Networks:**
 - Factories, utilities, transportation
 - Public Sector
 - Financial institutions
 - Connectivity to/from and between DC
 - Enterprise to branch offices
- **Service Providers:**
 - Mobile/Access to Core
 - B2B and wholesale
 - Satellite
 - Live Events and Broadcast

Solution Components

- Assurance Platform

- Framework for running centralized services, either fully hosted in the cloud, deployed on customer premise or hybrid.

- Assurance Sensors

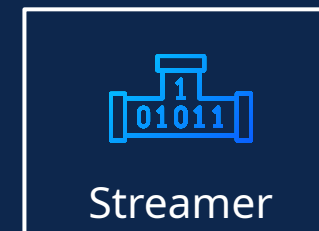
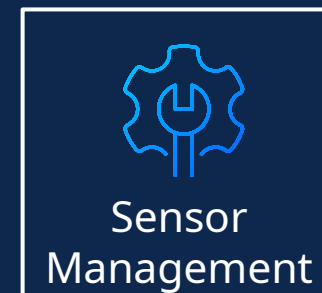
- Suite of hardware and software sensors, capable of performing layer 2 through layer 4 performance tests

- Collectors

- Telemetry Collectors gather data from Cisco devices, Third-Party devices and other network data sources (like SD-WAN).
- Sensor Collectors securely transmit data up to the Assurance Platform.



Provider Connectivity Assurance Platform



Sensor Collector



Telemetry Collector



SFP



Module



LX, LT-S
GT, GT-S

Hardware Sensors



Control



Agent

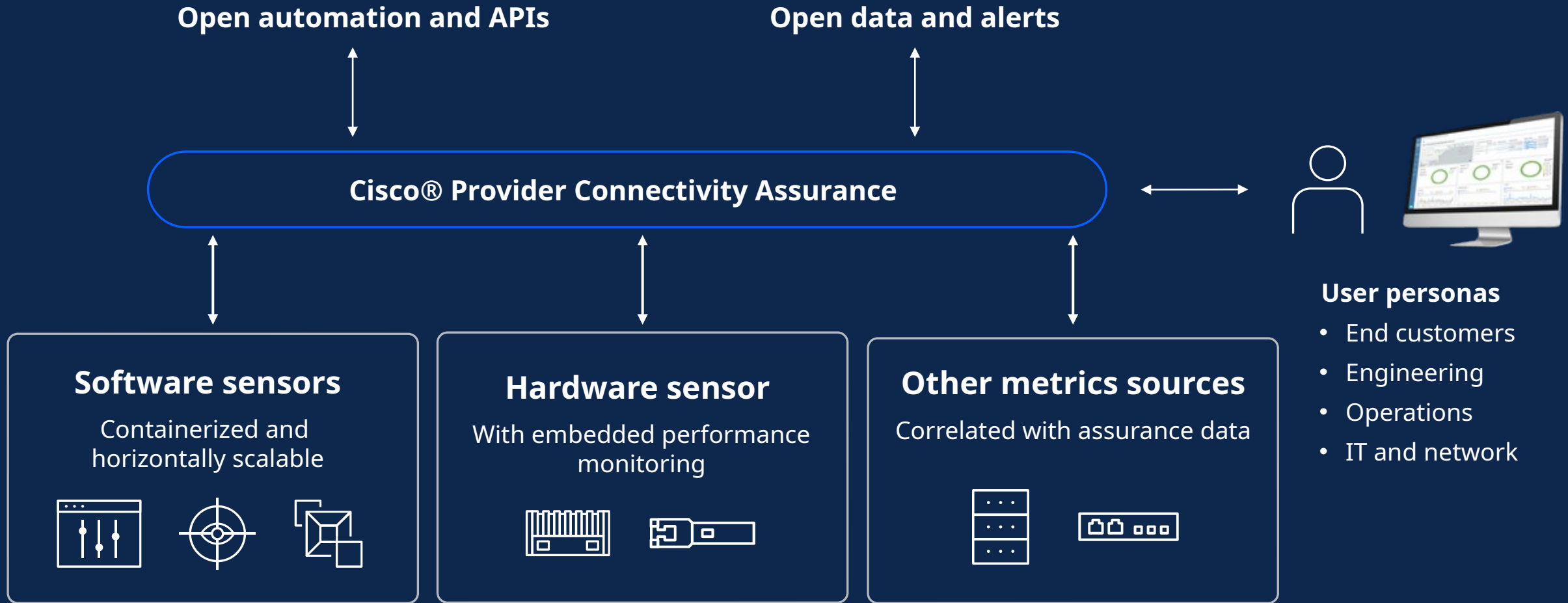


User
Experience

Software Sensors

Provider Connectivity Assurance Sensors

Provider Connectivity Assurance



Visibility: Building the foundation

PCA Assurance Sensors

Assurance Sensor SFP and Modules



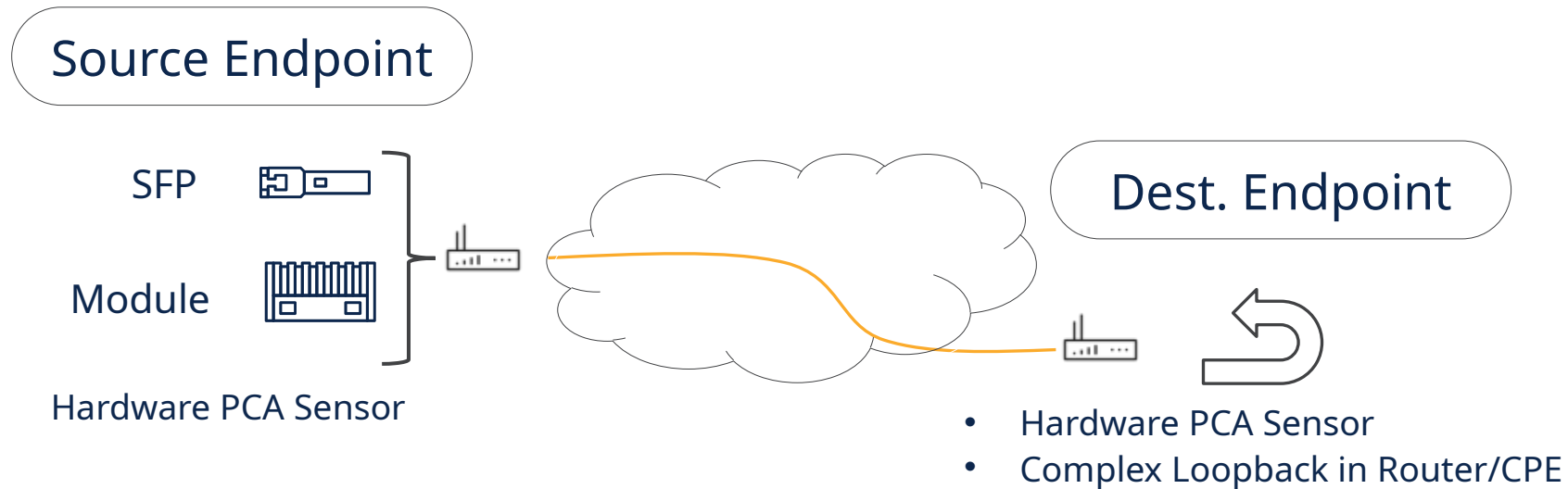
Feature Set

Measuring the real service path: vlan, dscp....

- Available as 1Gbps and 10Gbps different variants
- Can be installed:
 - In-line with traffic as any other SFP
 - Or out-of-line in an unused port
- Advantages of Hardware without the inconveniences:
 - No need for extra power or space
 - High precision and accuracy without affecting the measurement
 - L2 and L3 measurements (impossible with SW)
- Service Activation Test (SAT)
 - Remote Full line rate test traffic generation
 - RFC-2544 or Y.1564
- Continuous active performance monitoring – standards based:
 - TWAMP (L3), Y.1731 (L2), ICMP Echo (L3)
 - Multi-vendor
 - KPIs beyond the standards: one-way, 50+ KPIs
- Per-flow bandwidth metering (high sample rate)

Service Activation Testing with PCA

- Remote L2 or L3 service testing up to 10Gbps
- Test Reports based on RFC-2544 or Y.1564 standards: Throughput, frame loss, CIR/EIR, etc..
- Exportable (PDF) birth certificate
- Remote and on-demand: reduce truck-rolls



Standards based Performance Assurance: Extended KPIs

Relevant, actionable, near real-time metrics for SLAs

Comprehensive Set of Metrics per Session

One-way delay, PDV, and IPDV (jitter)

- Min/max/average
- Median (p50)
- Percentile 25/75/95/96/98/99
- Standard deviation

One-way packet statistics

- Packets lost (number and %)
- Loss bursts
- Longest loss burst
- Shortest loss burst
- Reordered packets (number and %)
- Packets duplicated (number and %)

One-way packet field and QoS metrics

- IP TOS max (DSCP diffserv)
- IP TOS min
- TTL max/min
- VLAN Pbit max/min
- ETH-OAM MEG level max/min
- MOS
- R-value

Service activation testing

Throughput validation – circuit readiness

- RFC2544 generation and reflection
- Y.1564 generation and reflection

Bandwidth metering

Throughput metrics

- Min Throughput – **Per Flow**
- Average Throughput – **Per Flow**
- Max Throughput – **Per Flow**

Time-series data

Telemetry collector:

- MDT, gNMI, SNMP, csv, Kafka, etc....

Network-wide service performance visibility

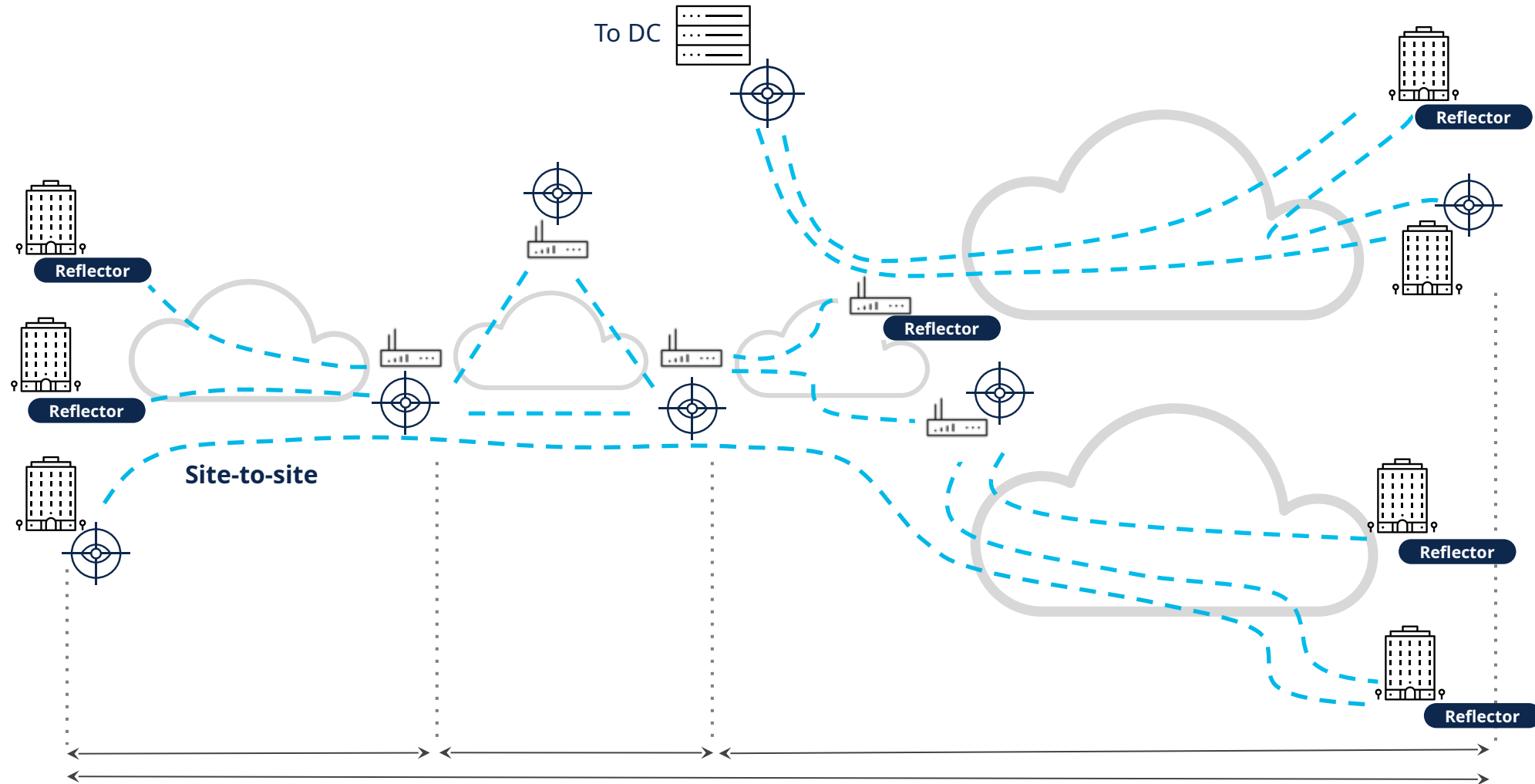
- Deploy in any physical or virtual infrastructure
- Continuous active/synthetic monitoring

Provider
Connectivity
Assurance

Reporting and
Analytics



Assurance
Sensors



Network and service performance visibility Segmented or End-to-End



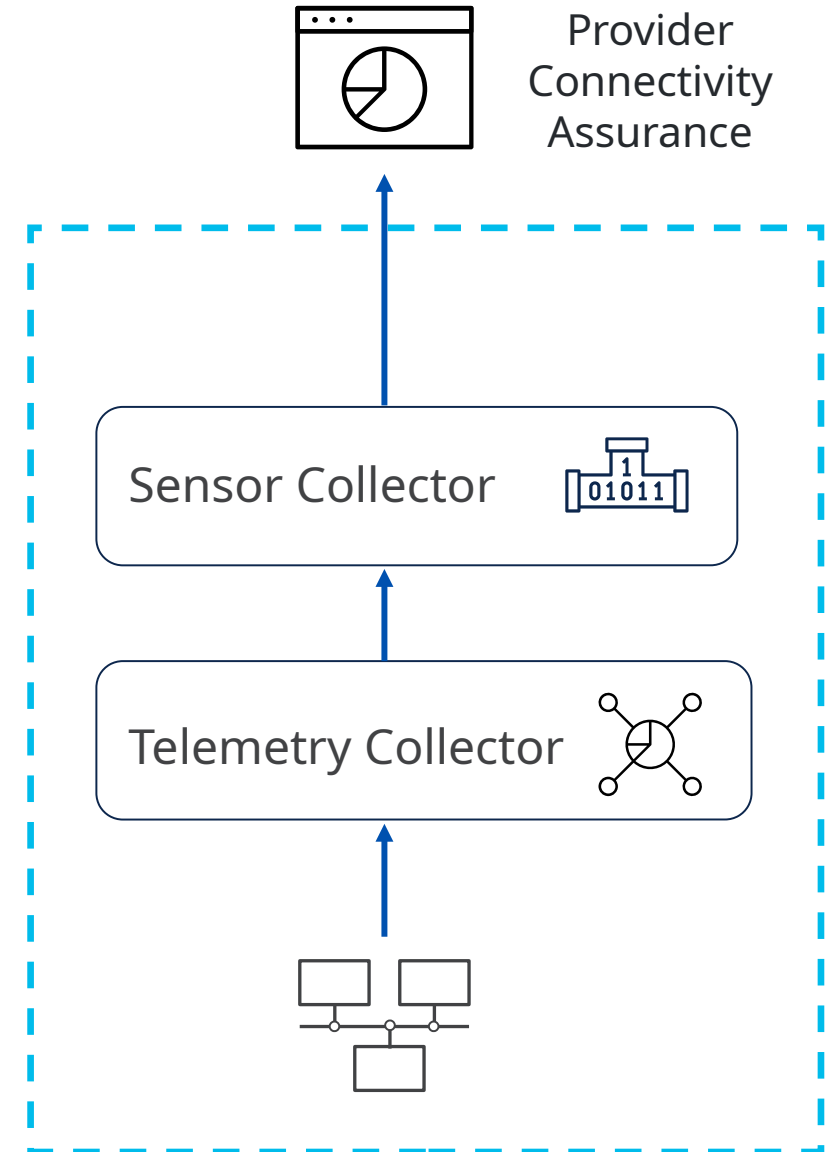
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Insights: Making the data useful

PCA Data Ingestion

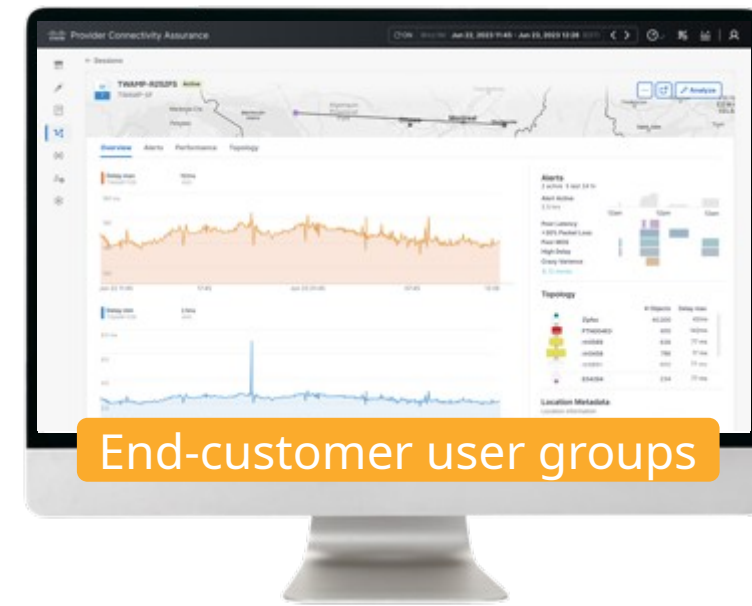
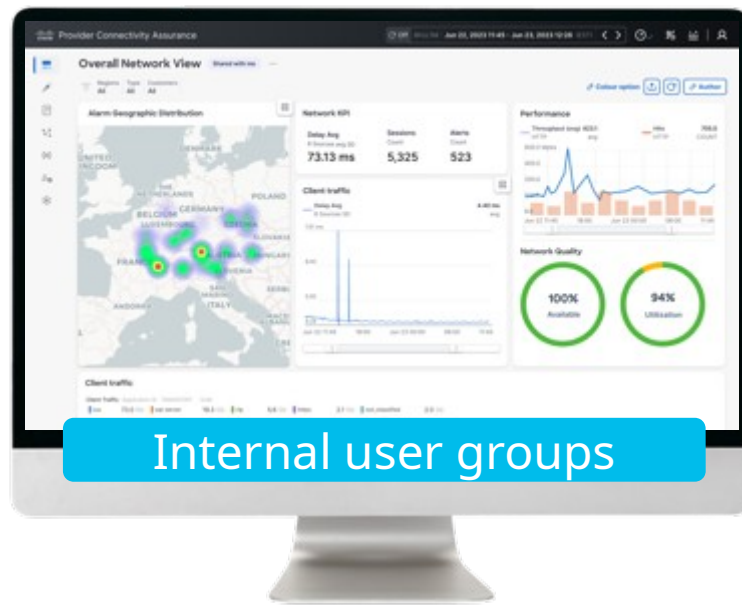
- Can ingest any time-series data:
 - From Cisco devices
 - From other time series data sources
e.g.: MDT,gNMI, Kafka, SNMP, etc...
- Ingestion pipeline normalizes and enriches data:
 - Common metrics irrespective of vendor
 - Common dashboards, alert profiles, reports and SLAs



Customer portal

A unified view of performance visibility and reporting

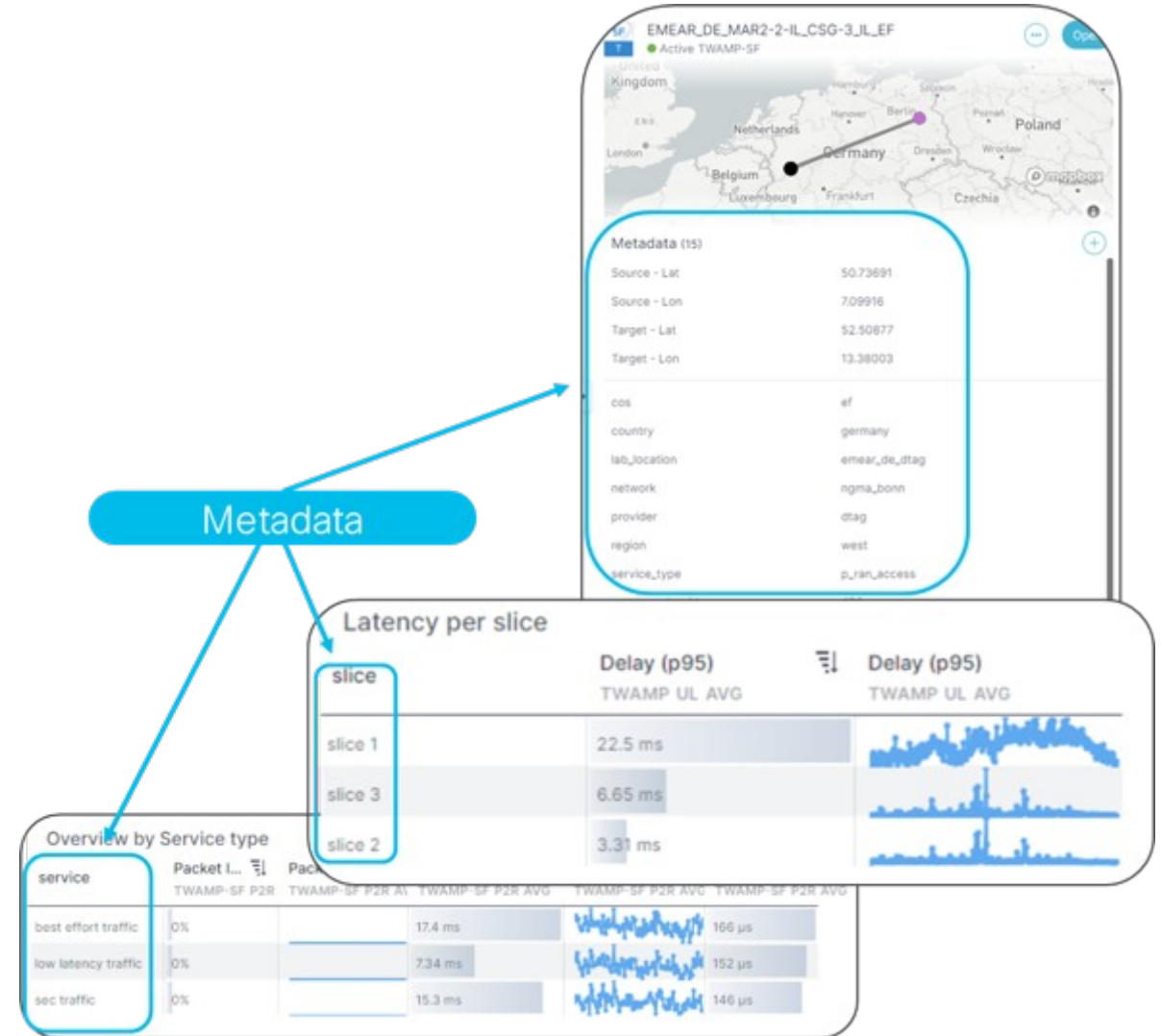
- Same user interface look and feel – customized data visibility and dashboards
- Have meaningful conversations around planning, service improvements, and SLA management
- One investment to drive mutual benefits – the service provider and their internal or end customers



Assurance reporting and analytics

Leveraging metadata

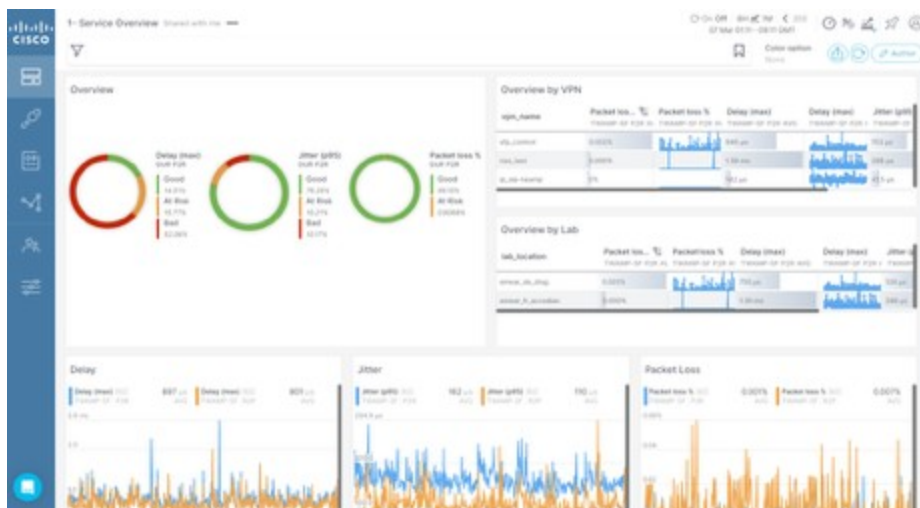
- All Cisco assurance and non-Cisco data can be enriched with metadata
- Metadata is user-defined contextual information
 - Examples: site, region, class of service, geo coordinates, topology, etc.
- How it is used:
 - Filtering, grouping, aggregating relevant data
 - Correlate and find commonalities for root cause analysis and troubleshooting
 - Adds flexibility to dashboards to suit multiple usage scenarios



Assurance reporting and analytics

From the macro view to micro details

Macro view



Analysis



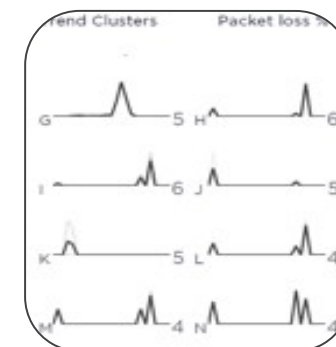
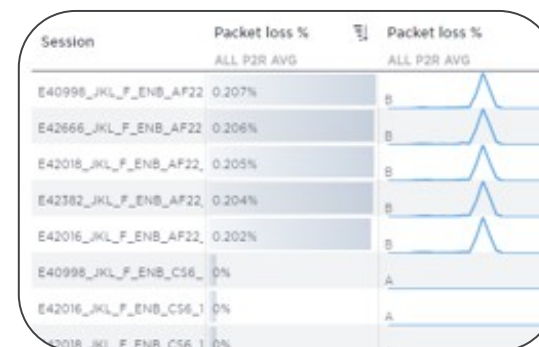
Drill-down
and
clustering



Micro details



- Analytics and correlation capabilities
- Metadata enrichment makes data meaningful
- Quickly visualize network and pinpoint problems
- Increase efficacy of operations teams



Assurance reporting and analytics

Accuracy: Ability to measure micro-second latency

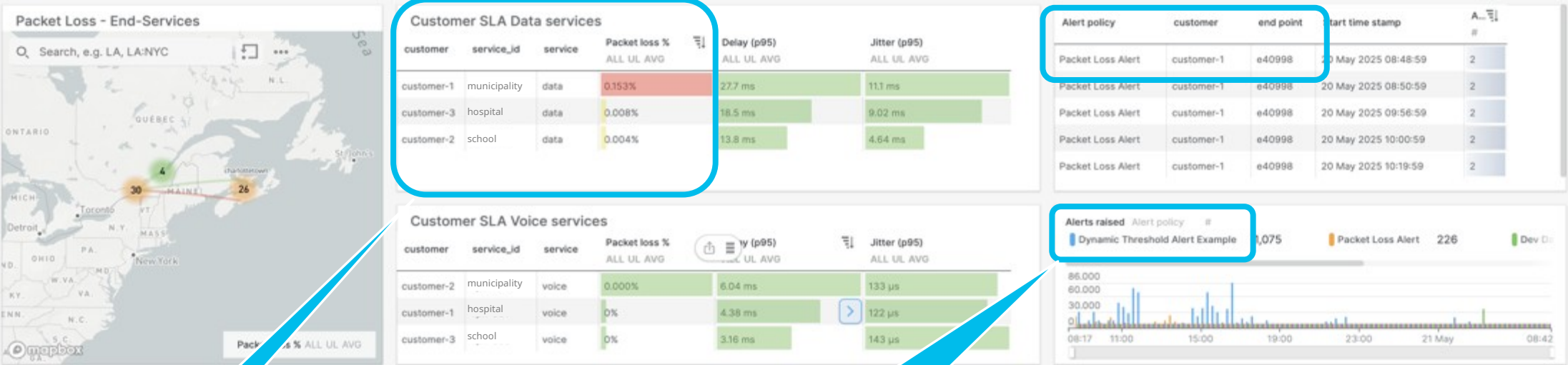


Detection of short-lived spikes that could have an impact!



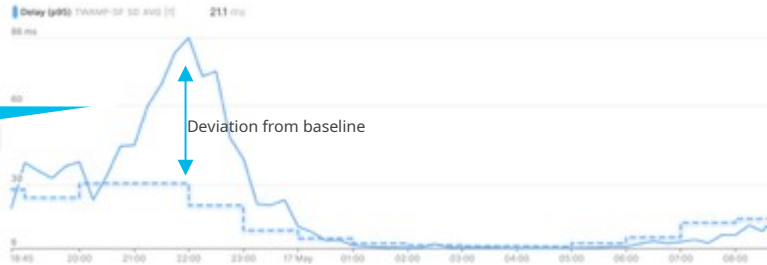
Assurance reporting and analytics

Alerts with context



SLAs

Dynamic Thresholds: deviation from baseline



PCA with Cisco Crosswork Automation

