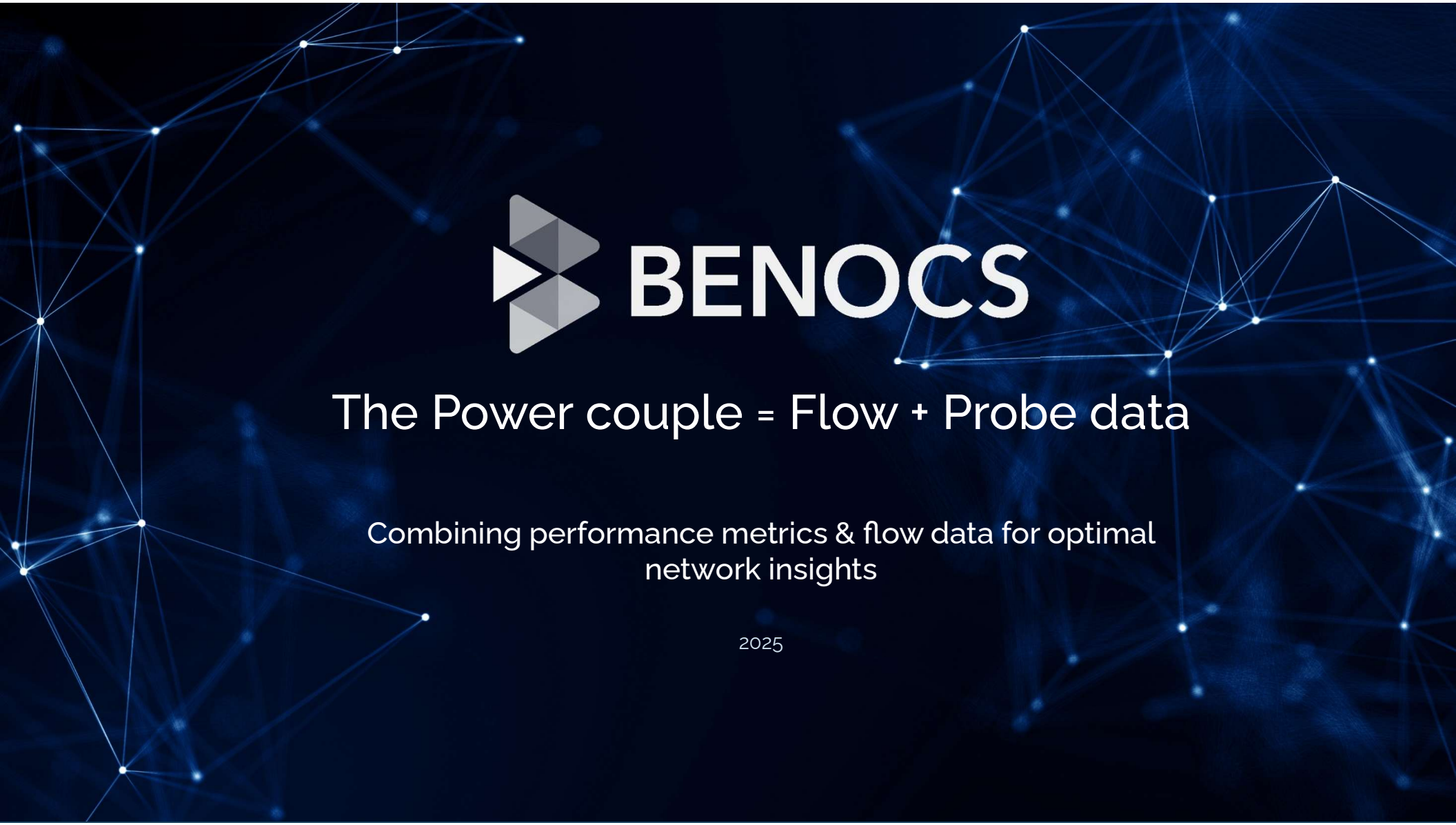
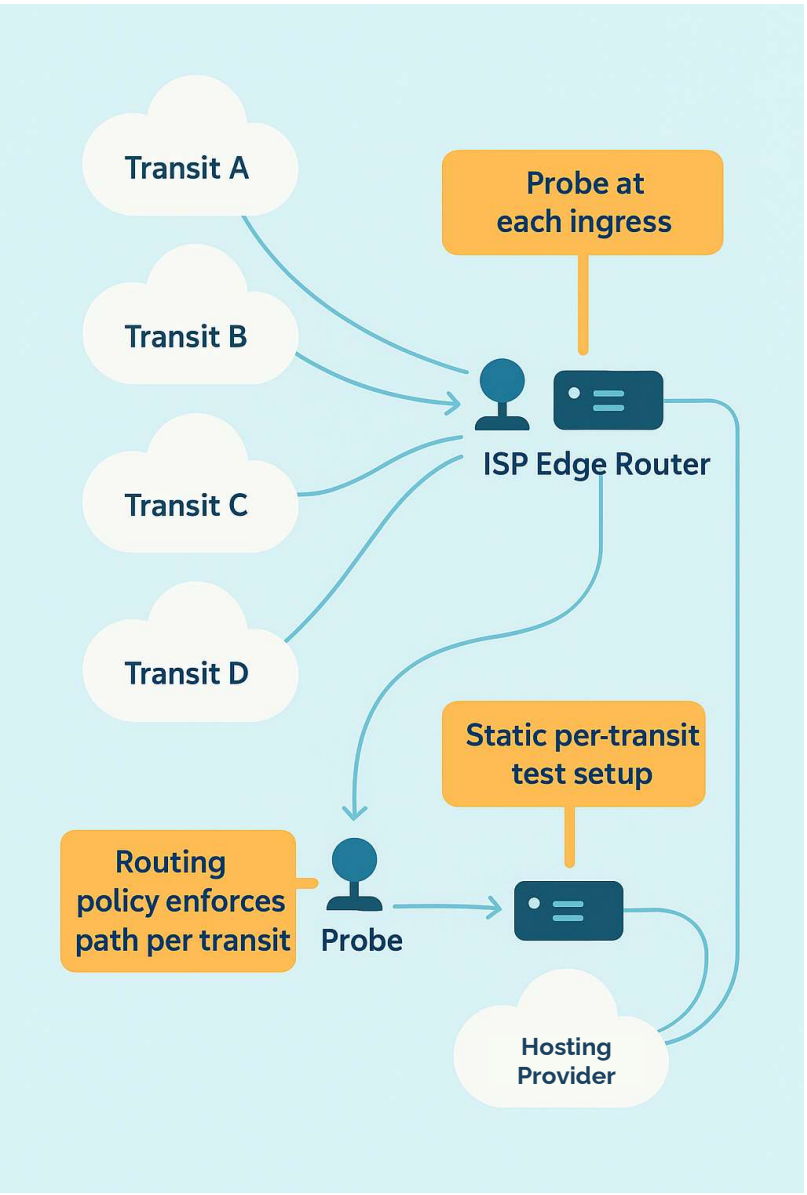

BENOCS
The Power couple = Flow + Probe data
Combining performance metrics & flow data for optimal network insights
2025

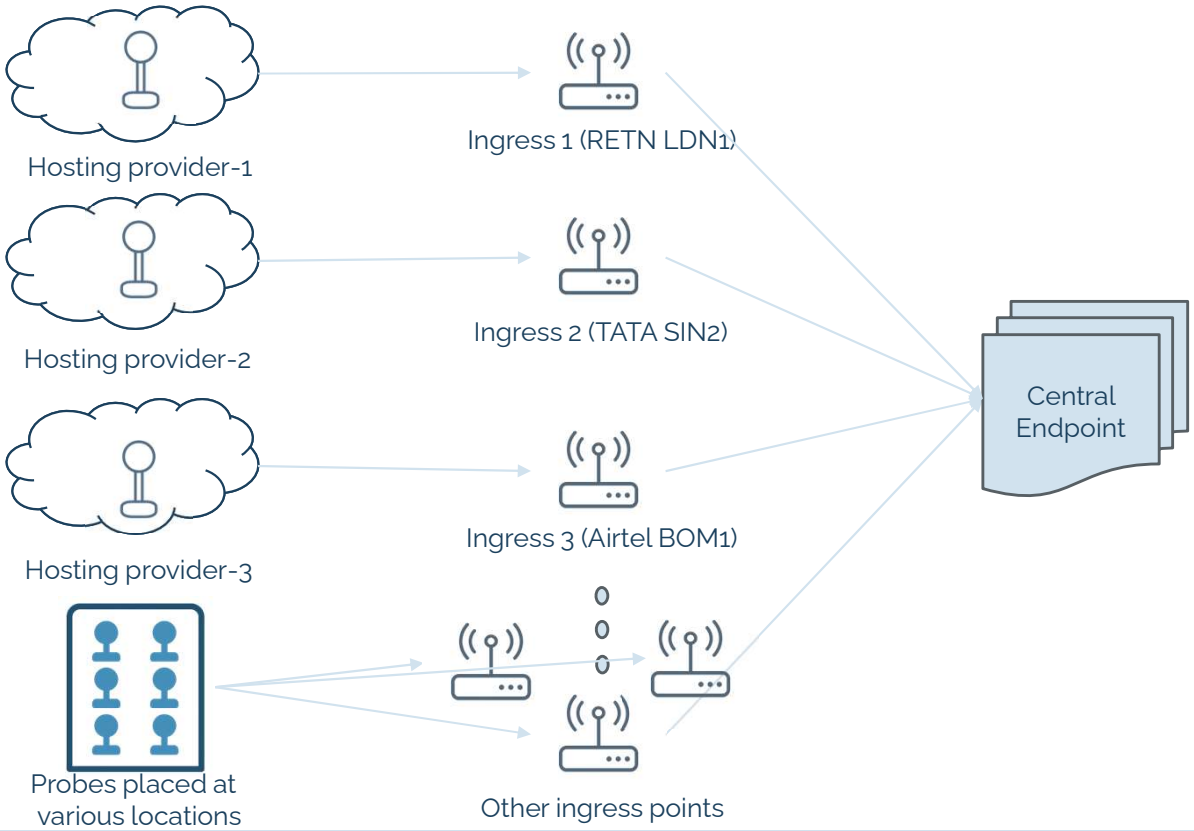

Challenge: Monitor 20 ingress
(transit) points



How ISPs monitor today?

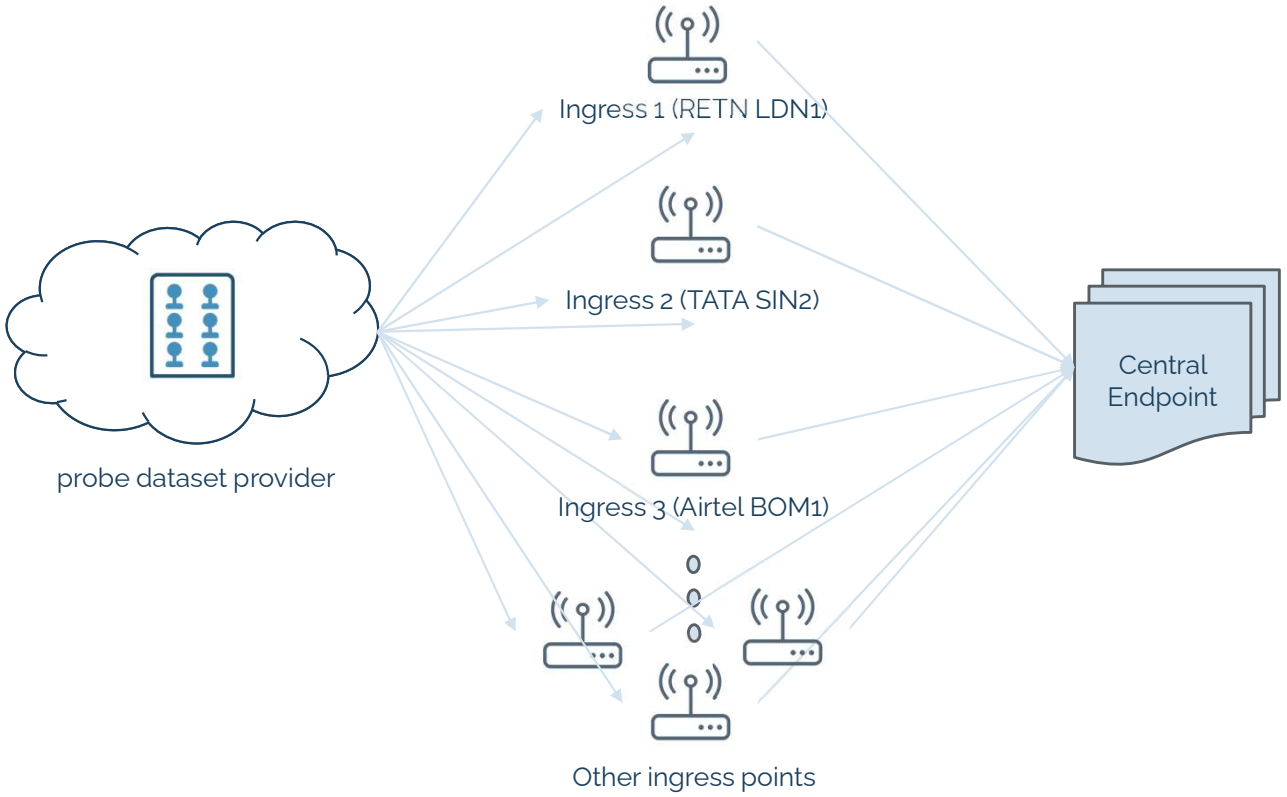
There are three solutions

Operator-managed external probes



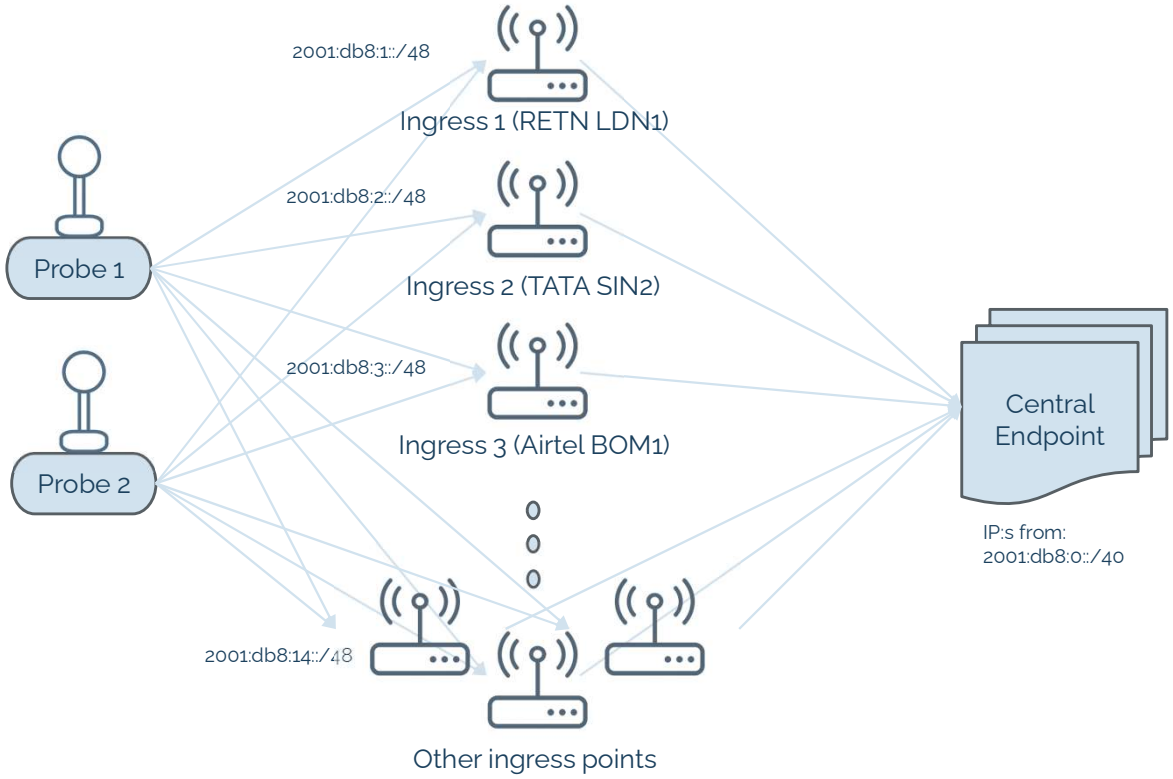
- Probes placed at **external hosting locations**
- Inbound path is **probabilistic** (BGP decision **outside operator's control**)
- Require many **vantage points** (~50) to establish coverage

Third-party probe dataset providers



- Subscription based access to **large probe pools**
- **Global coverage** from vendor's vantage network
- Still **probabilistic** for **inbound transit paths**
- **Regional ISP** coverage **questionable**

Deterministic path selection via BGP announcements to a test host

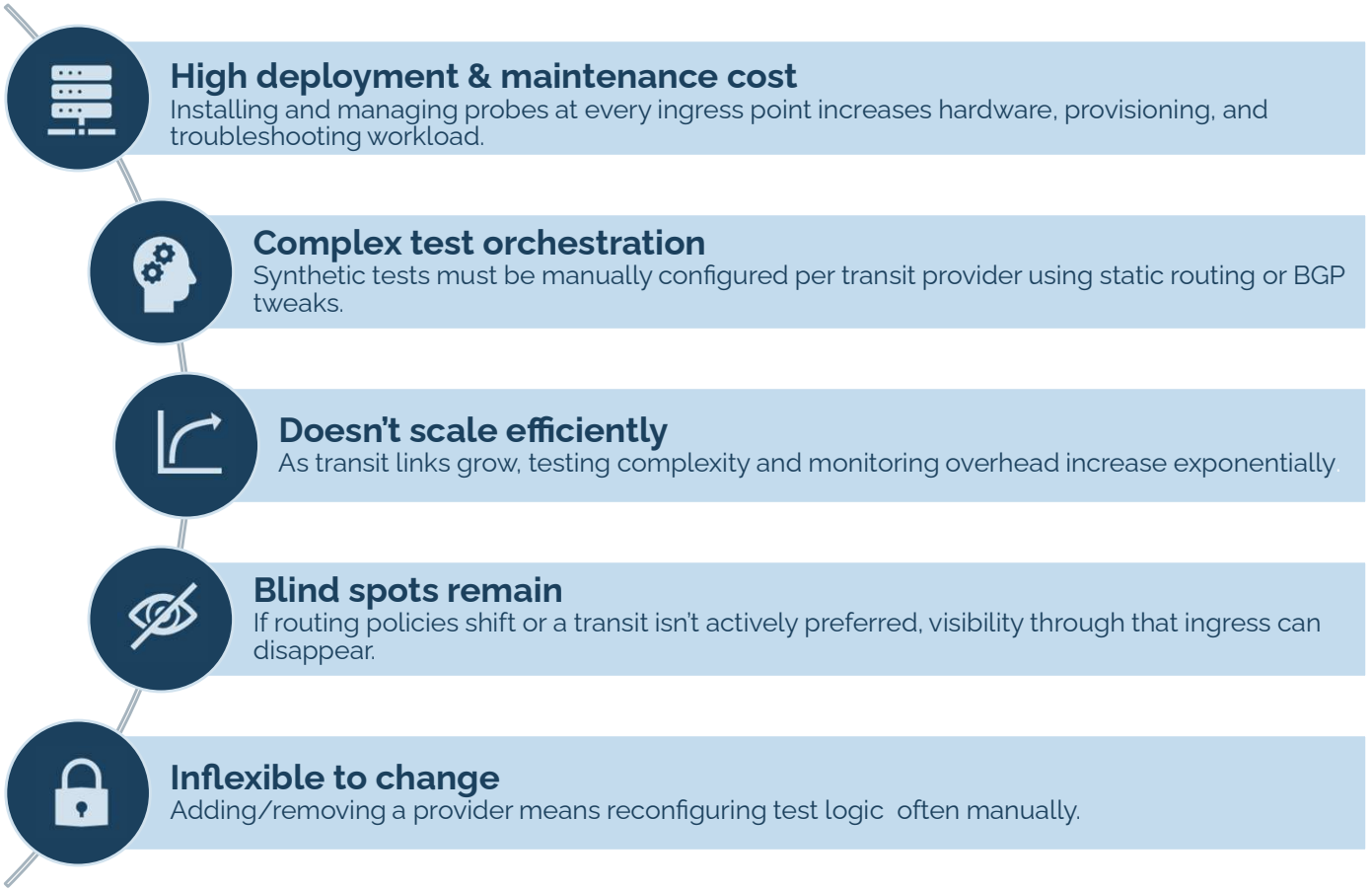


- Use **2 probes** and **announce a dedicated IPv6 /48** at each transit.
- Each /48 is announced **only via one ingress**, enabling deterministic path validation to a **single test host**.
- This setup allows **broad, scalable ingress monitoring** — with static per-transit routing.

Comparison of three solutions

Metric	Solution 1	Solution 2	Solution 3
Probe Location	External hosting (self-managed)	Vendor vantage network	2 on-premises probes
Path Control	Low / probabilistic inbound	Low / probabilistic inbound	High - deterministic via /48 per transit
Hardware Cost	Medium–High	None	Low
Ongoing Cost	VPS hosting + maintenance	Subscription fees	Minimal OPEX
Deployment Complexity	High	Low	Low
Coverage	Geographic spread improves odds	Vendor coverage improves odds	Full ingress coverage by design
Independence	High (you own probes)	Low (vendor dependency)	High

Limitations of probe only monitoring



High deployment & maintenance cost
Installing and managing probes at every ingress point increases hardware, provisioning, and troubleshooting workload.

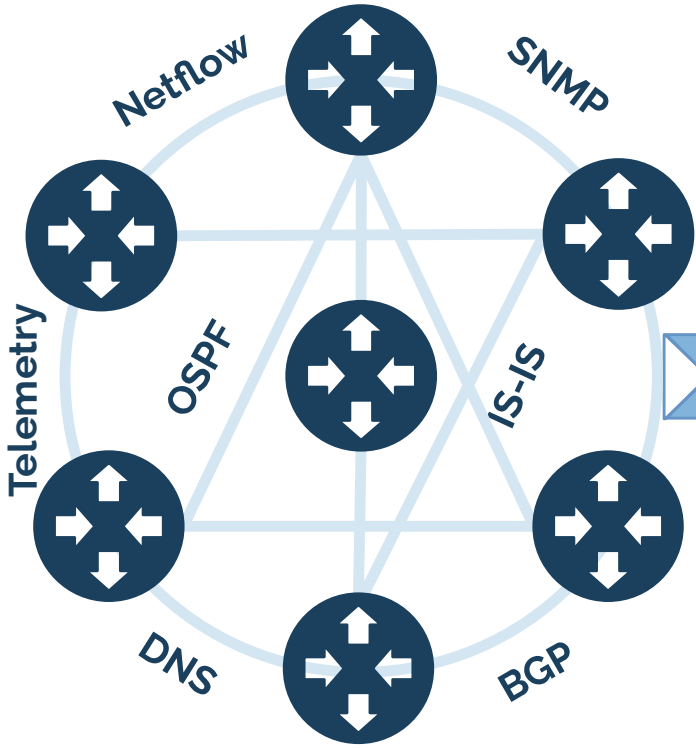
Complex test orchestration
Synthetic tests must be manually configured per transit provider using static routing or BGP tweaks.

Doesn't scale efficiently
As transit links grow, testing complexity and monitoring overhead increase exponentially.

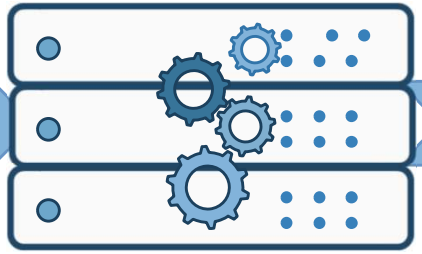
Blind spots remain
If routing policies shift or a transit isn't actively preferred, visibility through that ingress can disappear.

Inflexible to change
Adding/removing a provider means reconfiguring test logic often manually.

What BENOCS does:



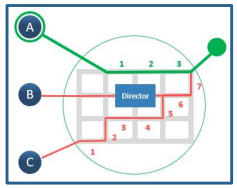
BENOCS CORE ENGINE



Our proprietary aggregation and cross correlation process requires significantly less compute power compared to competitors

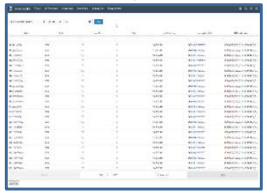
Flow Explorer

CDN Flow Director



Capacity Planner

Looking Glass



Anomaly Detection

Application Monitor

NETFLIX
STEAM
YouTube
Disney+
TikTok

PROTOCOL POOL ▶ PROCESSING ▶ NETWORK INTELLIGENCE

How BENOCS correlates?

1

Probe metrics

- Performance data from strategic network points provides detailed metrics on latency, packet loss and jitter.

2

Flow records

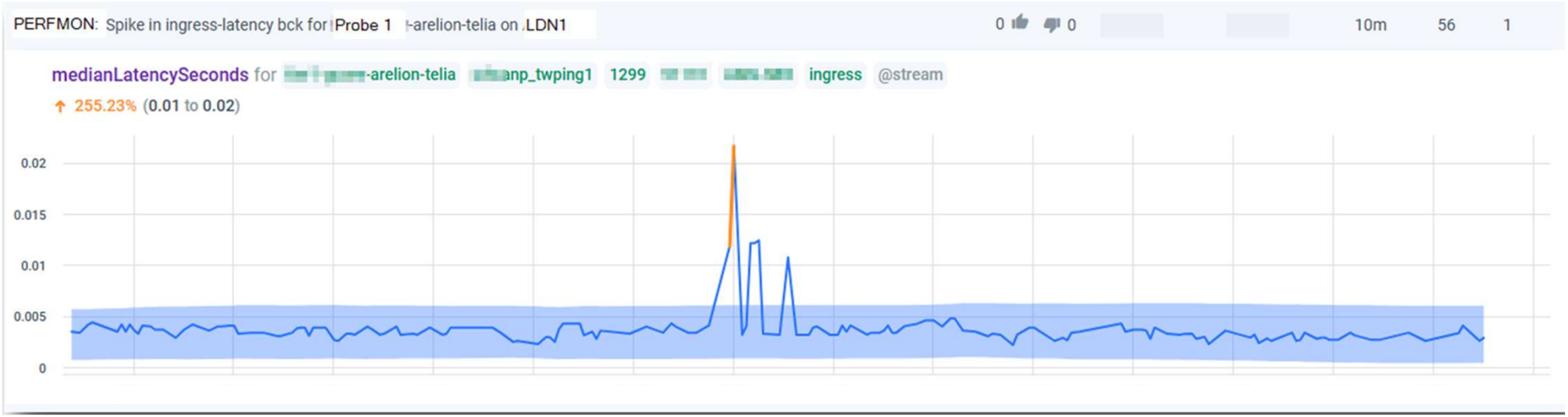
- Flow analytics capture network-wide traffic statistics revealing source, handover, ingress and egress regions, volume and application data

3

BENOCS Core

- Our core engine automatically links performance issues to specific traffic flows, providing complete context for every alert

Step 1: Anomaly in the probe data



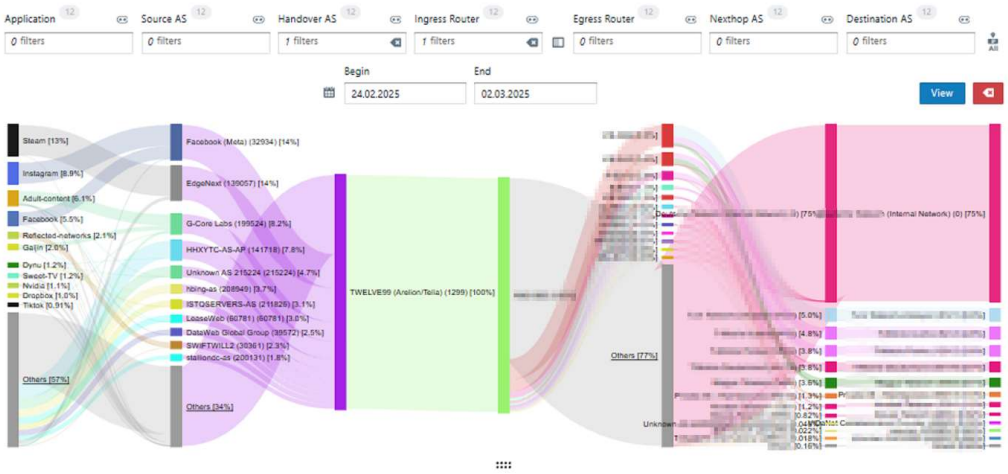
Step 1: Alert triggered

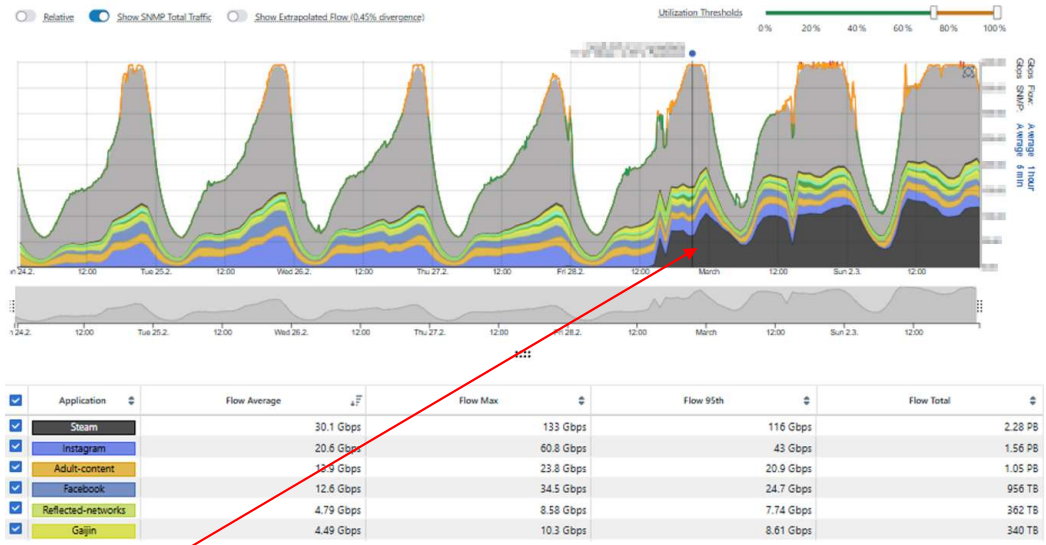
Peer and ingress router are known from the IPv6 prefix

- That gives us the key identifiers to correlate with flow data
- All traffic of the alerted ingress-point can be displayed to show full context

https://xyz.com/asflows?asFilters=%7B%22HND%22%3A%5B%22**1299**%22%5D%2C%22INROUTER%22%3A%5B%22**LDN1**%22%5D%7D&customDimension=%22AS_APPLICATION%2CAS_SRC_INGRESS%2CAS_HND_INGRESS%2CROUTER_IN_INGRESS%2CROUTER_OUT_INGRESS%2CAS_NXT_INGRESS%2CAS_DST_INGRESS%22&dateRange=LAST_7_DAYS&disaggregations=%7B%7D&tagAggregations=%5B%7B%22dimension%22%3A%22ROUTER_OUT_INGRESS%22%2C%22id%22%3A4%7D%5D&tags=%5B%5D&tsDimension=AS_APPLICATION

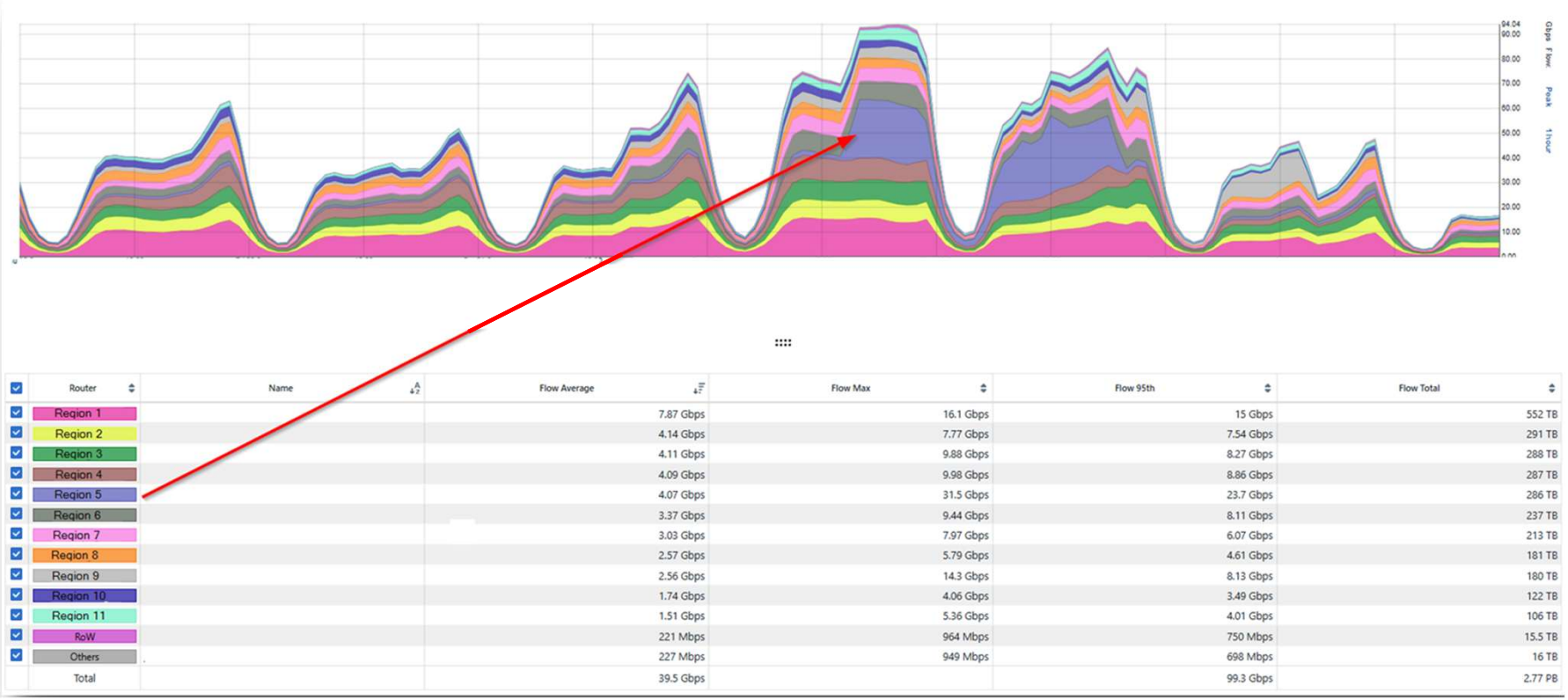
Step 2: Flow correlation





Traffic on the affected ingress point was jammed by Steam/Valve traffic

Step 3 : Detailed investigation



Router	Name	Flow Average	Flow Max	Flow 95th	Flow Total
Region 1		7.87 Gbps	16.1 Gbps	15 Gbps	552 TB
Region 2		4.14 Gbps	7.77 Gbps	7.54 Gbps	291 TB
Region 3		4.11 Gbps	9.88 Gbps	8.27 Gbps	288 TB
Region 4		4.09 Gbps	9.98 Gbps	8.86 Gbps	287 TB
Region 5		4.07 Gbps	31.5 Gbps	23.7 Gbps	286 TB
Region 6		3.37 Gbps	9.44 Gbps	8.11 Gbps	237 TB
Region 7		3.03 Gbps	7.97 Gbps	6.07 Gbps	213 TB
Region 8		2.57 Gbps	5.79 Gbps	4.61 Gbps	181 TB
Region 9		2.56 Gbps	14.3 Gbps	8.13 Gbps	180 TB
Region 10		1.74 Gbps	4.06 Gbps	3.49 Gbps	122 TB
Region 11		1.51 Gbps	5.36 Gbps	4.01 Gbps	106 TB
RoW		221 Mbps	964 Mbps	750 Mbps	15.5 TB
Others		227 Mbps	949 Mbps	698 Mbps	16 TB
Total		39.5 Gbps		99.3 Gbps	2.77 PB

Additional traffic on the affected ingress point was mainly targeted at region 5

Real-world impact: Steam traffic

Steam hit **40,270,997** concurrent users on Feb 28, 2025, due to the massive popularity of Black Myth: Wukong which triggered multi Tbps bursts at provider ingress points

1. **Anomaly alert triggered**
   Performance degradation detected at key ingress points
2. **Flow Correlation**
   BENOCS instantly identified the traffic pattern and source
3. **Detailed Investigation**
   Valve's content distribution automatically pinpointed, and the affected region spotted
4. **Resolution**
   Traffic rerouted within minutes instead of hours

Power couple = Flow + Probe data

Probe → fault detection

Reveals performance issues such as **Latency, Jitter** but misses broader traffic context

Flow → Full context & Scope

Shows traffic statistics such as **volume, ingress and egress specific traffic** and the **applications**

Combined→ full visibility

Delivers true end-to-end visibility with both performance precision and traffic context

Recommendations for ISPs

1. Strengthen Network Capacity

- Upgrade backbone bandwidth and core hardware
- Distribute load across multiple PoPs/data centres

2. Improve Content Delivery

- Peer directly with major platforms or IXPs
- Host content locally via CDNs/caching partnerships
- Coordinate with providers to pre-load updates

3. Optimize Traffic Flow

- Prioritize gaming/streaming traffic during peaks
- Use real-time monitoring and analytics

4. Enhance End-User Experience

- Offer setup guides for optimal connectivity

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Thank you!

Questions?