IMD 2026

Almaty, Kazakhstan

TOJIKTELECOM

TTK RIPE BOT

Internet Monitoring in Tajikistan

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MOVING FORWARD TOGETHER

THE PROJECT IS FUNDED BY THE EUROPEAN UNION

Internet connectivity in Tajikistan

One country. Multiple operator networks. A shared set of digital services.



NETWORK OPERATORS

Multiple independent operator networks

Different ASNs, routing paths and access conditions across the country.

- ASN DIVERSITY
- INDEPENDENT VIEWS
- SHARED TARGETS

Network context ≠ operator coverage map

KEY QUESTION **How do we compare the same service across different networks?**

MAP: STYLIZED VISUAL · SCHEMATIC NODES / LINKS

WHY MEASURE ACROSS NETWORKS?

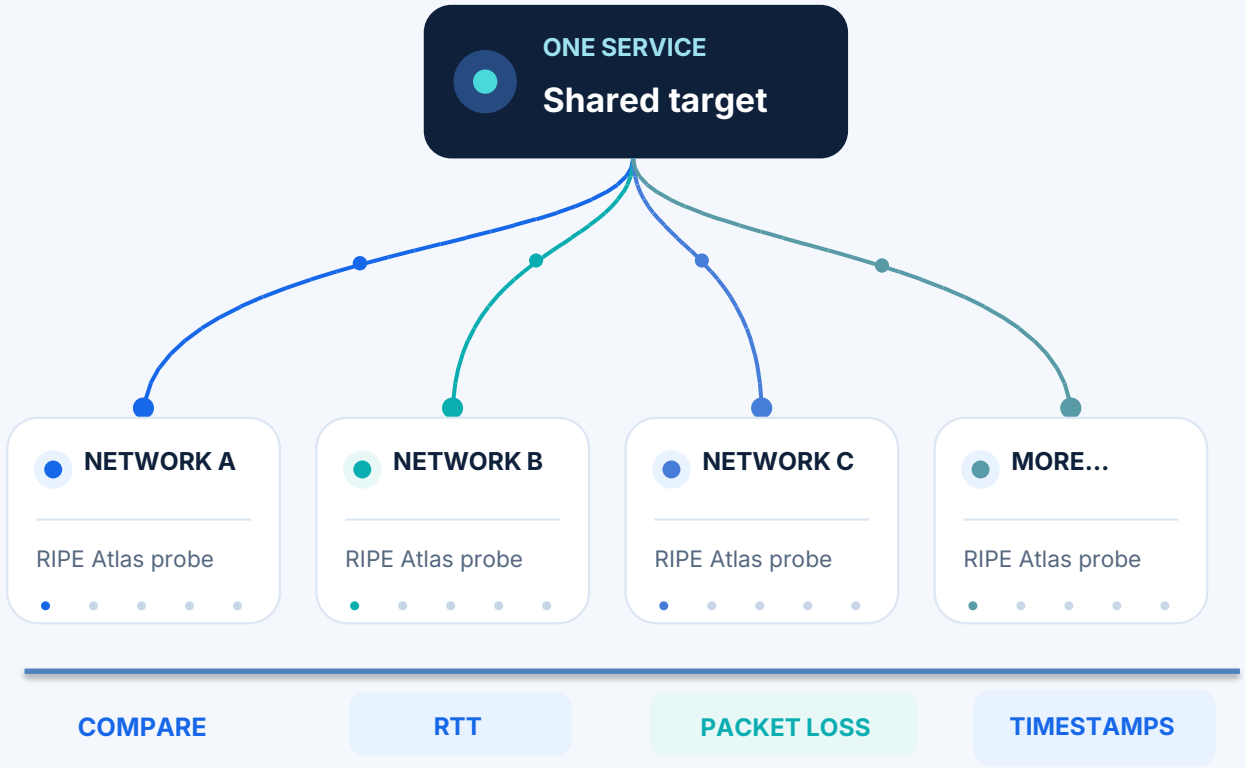
One service.
Many networks.
Different views.

A successful check from one location cannot represent connectivity across an entire country.

ONE VANTAGE POINT ≠ FULL VISIBILITY

ILLUSTRATIVE DISTRIBUTED MEASUREMENT

Same target. Independent network paths.



What do we measure?

Selected digital-service targets, measured from independent network vantage points.

SELECTED SERVICE TARGETS

9 TARGETS

MESSAGING

- WhatsApp
- Telegram

SOCIAL & VIDEO

- Instagram
- Facebook
- YouTube
- TikTok
- VK

PLATFORM & LOCAL

- Apple
- ORIZ

OBSERVABLE NETWORK SIGNALS

RTT

Round-trip time · ms



PACKET LOSS

Unanswered ICMP · %



FRESHNESS

Probe & result timestamps



REACHABILITY SIGNALS, NOT FULL APP QoE

PING to a selected target cannot prove application-layer health.

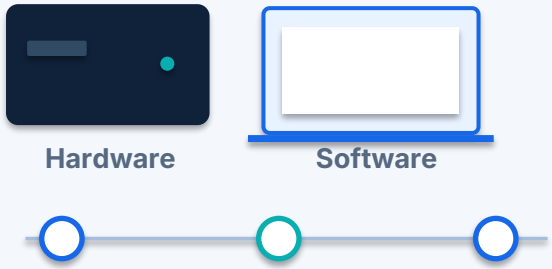
SERVICE NAMES INDICATE SELECTED TEST TARGETS · DIAGRAM IS ILLUSTRATIVE

Introducing RIPE Atlas

Independent Internet vantage points. Active measurements. Publicly accessible results.

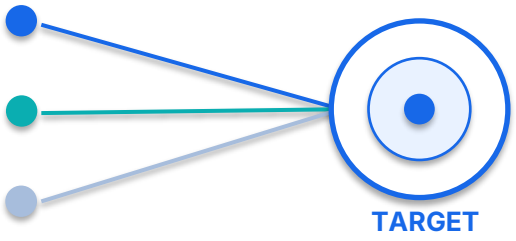
01 DISTRIBUTED PROBES

Hosted in different networks



02 ACTIVE MEASUREMENTS

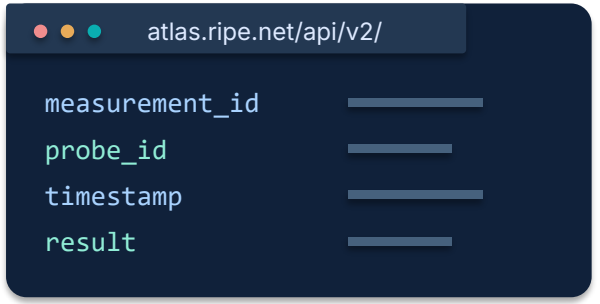
Probes test a selected target



PING · TRACEROUTE · DNS

03 OPEN MEASUREMENT DATA

Collected by the RIPE NCC



REST API · RESULTS

FROM INDEPENDENT PROBES TO SHARED EVIDENCE

Measure reachability and paths — not private user traffic.

CONCEPTUAL WORKFLOW · SOURCE: RIPE ATLAS OFFICIAL DOCUMENTATION

RIPE Atlas in Tajikistan

Geography, Autonomous Systems and probe availability shape what we can observe.



01 VERIFIED LOCAL EXAMPLE

TOJIKTELECOM Anchor

PROBE 7638 | AS51346

Public RIPE Atlas anchor near Dushanbe

PROBE CONTEXT

ASN | STATUS | LAST SEEN

COUNTRY COVERAGE ≠ NETWORK COVERAGE

Compare distinct ASNs, probe status and result freshness.

ILLUSTRATIVE MAP · ANCHOR DETAILS: RIPE ATLAS PUBLIC DIRECTORY

From probes to measurements

From an engineering question to traceable observations across independent networks.

01 DEFINE

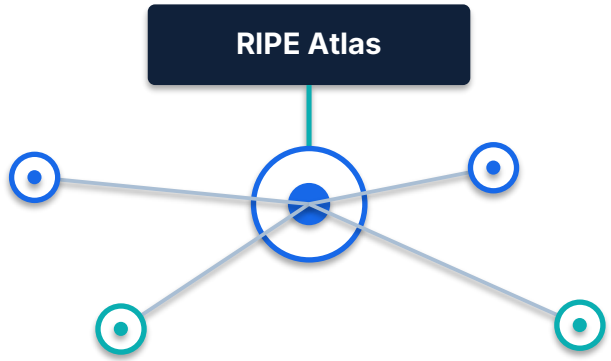
What and where to measure

TEST	PING · IPv4
TARGET	IP address / FQDN
SOURCES	Selected RIPE Atlas probes
MODE	One-off or recurring

POST /api/v2/measurements/

02 EXECUTE

RIPE Atlas dispatches the test



INDEPENDENT NETWORK VANTAGE POINTS

03 OBSERVE

Retrieve per-probe results

GET /measurements/{id}/results/

prb_id	Probe identifier
timestamp	Observation time
result[]	RTT samples
sent / rcvd	Packet response counts

MEASUREMENT ID + PROBE ID

TRACEABLE BY DESIGN — Measurement ID · Probe ID · Timestamp · ASN context

CONCEPTUAL USER-DEFINED MEASUREMENT WORKFLOW · SOURCE: RIPE ATLAS REST API DOCUMENTATION

How Tojiktelecom measures connectivity

One endpoint. Multiple independent networks. Consistent, time-stamped evidence.

OUR MEASUREMENT MODEL

Select targets → observe from different ASNs → compare signals



COMPARE LIKE WITH LIKE • IDENTICAL TARGET • ASN GROUPING • RESULT AGE

TOJIKTELECOM METHOD

Operational discipline

01 **SAME DESTINATION**
Compare identical configured endpoints

02 **ASN PROVENANCE**
Keep every probe tied to its network

03 **RESULT FRESHNESS**
Check status and observation time

SCHEDULED BASELINE — 30-minute cycle

ON-DEMAND CHECKS — LIVE measurement

CONCEPTUAL FLOW · SOURCE: TOJIKTELECOM WORKFLOW & RIPE ATLAS OBSERVATIONS · NO FABRICATED RESULTS

From raw data to network intelligence

RIPE Atlas provides per-probe evidence. Engineers need a clear, traceable view across networks.

01 / THE RAW INPUT

RIPE Atlas REST API

MEASUREMENT RESULT

```
{
  "msm_id"      : <measurement>
  "prb_id"      : <probe>
  "timestamp"   : <UTC time>
  "dst_addr"    : <target>
  "result"      : [ ... ]
}
```

- Many records, many probes

02 / OPERATIONAL LOGIC

Turn records into context

01 **NORMALISE**
Align timestamps & results

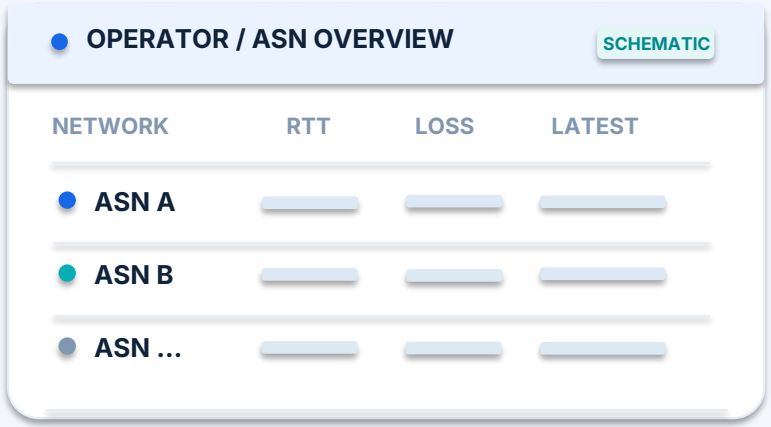
02 **GROUP**
By ASN, service and probe

03 **COMPARE**
RTT, loss & freshness

PRESERVE PROVENANCE

03 / THE ENGINEER VIEW

One understandable picture



- Time, source and result stay visible

WHY WE BUILT TTK RIPE ATLAS BOT

Less manual analysis. More actionable context.

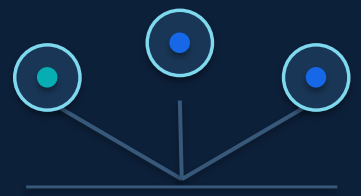
Inside TTK RIPE Atlas Bot

A lightweight operational layer: measurement orchestration, analysis and delivery.

MEASUREMENT FOUNDATION

RIPE Atlas

Distributed probes across independent ASNs



RIPE Atlas REST API

Probes • measurement results

TTK CONTROL & PROCESSING

Python application

UBUNTU SERVER

SCHEDULED
30-min baseline

LIVE / ON-DEMAND
Single-shot measurement

API INGEST + NORMALISATION
Probe ID · measurement ID · timestamp · target

ANALYTICS
RTT · loss · freshness

DATABASE
History · users · state

OPERATIONAL OUTPUTS

Engineer-facing views

TELEGRAM BOT
LIVE controls · reports

WEB REPORT
Interactive charts & probes

DAILY DIGEST
Scheduled overview

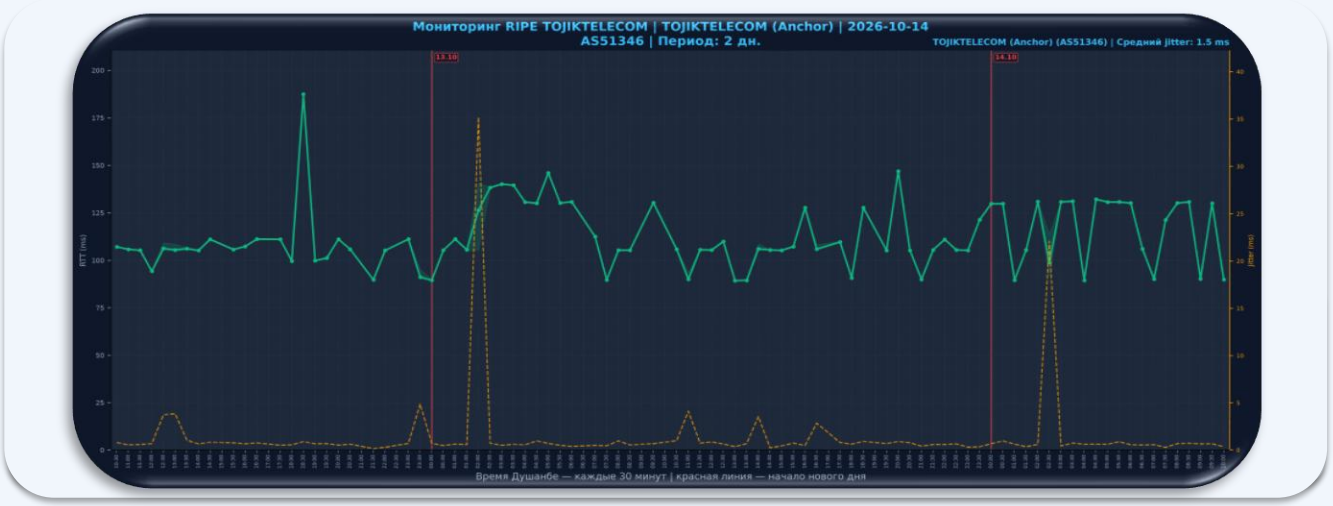
RELIABLE OPERATIONS systemd • watchdog • Cloudflare Tunnel **TRACEABLE RIPE ATLAS IDS**

LOGICAL ARCHITECTURE · MODULES ARE NOT CLAIMED AS INDEPENDENT MICROSERVICES · NO SYNTHETIC METRICS

Continuous monitoring, without manual checks

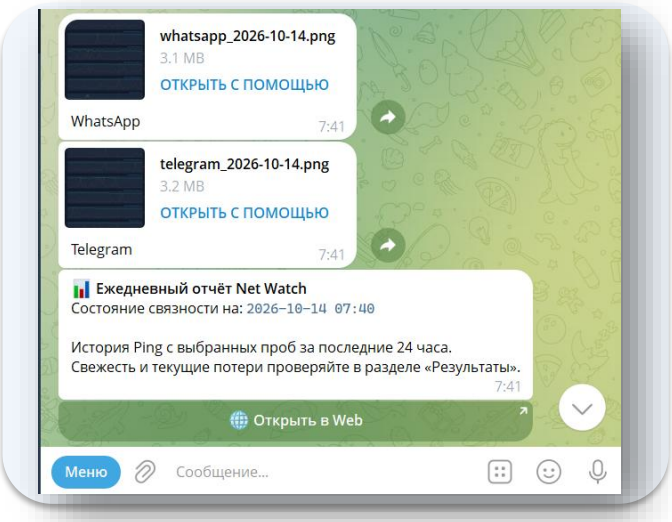
An automated baseline makes changes over time visible and keeps a daily summary ready.

SCHEDULED MEASUREMENT CYCLE



DAILY DIGEST

~07:35



30-MINUTE BASELINE

Historical context / Daily executive digest

LIVE measurement: investigate on demand

A new RIPE Atlas measurement is launched when an engineer needs a fresh network view.

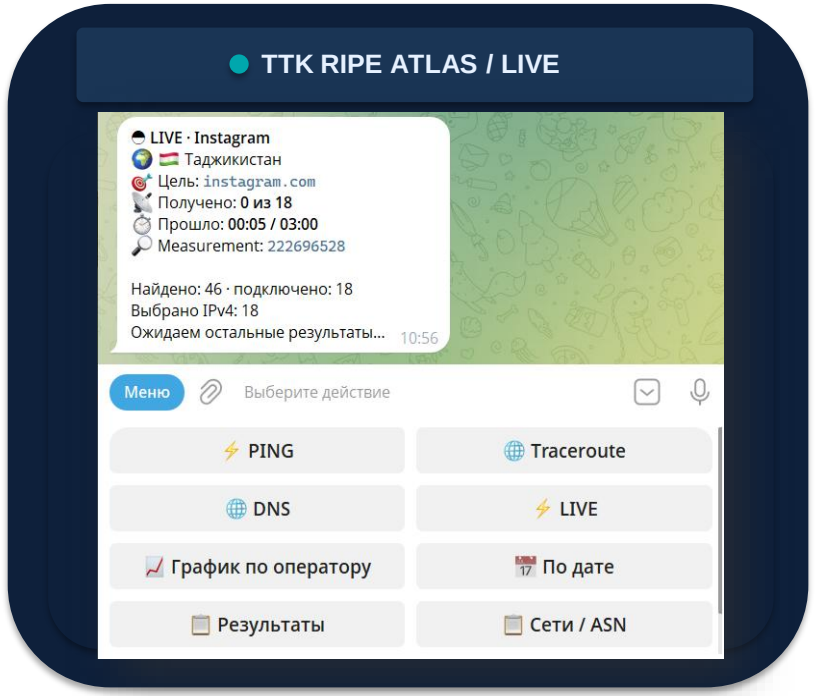
LIVE PING / REQUEST FLOW

01 SELECT TARGET
Choose a service endpoint

02 REQUEST MEASUREMENT
RIPE Atlas creates an ID

03 WAIT FOR COMPLETION
Results arrive asynchronously

04 COMPARE VANTAGE POINTS
Inspect ASN, RTT and loss

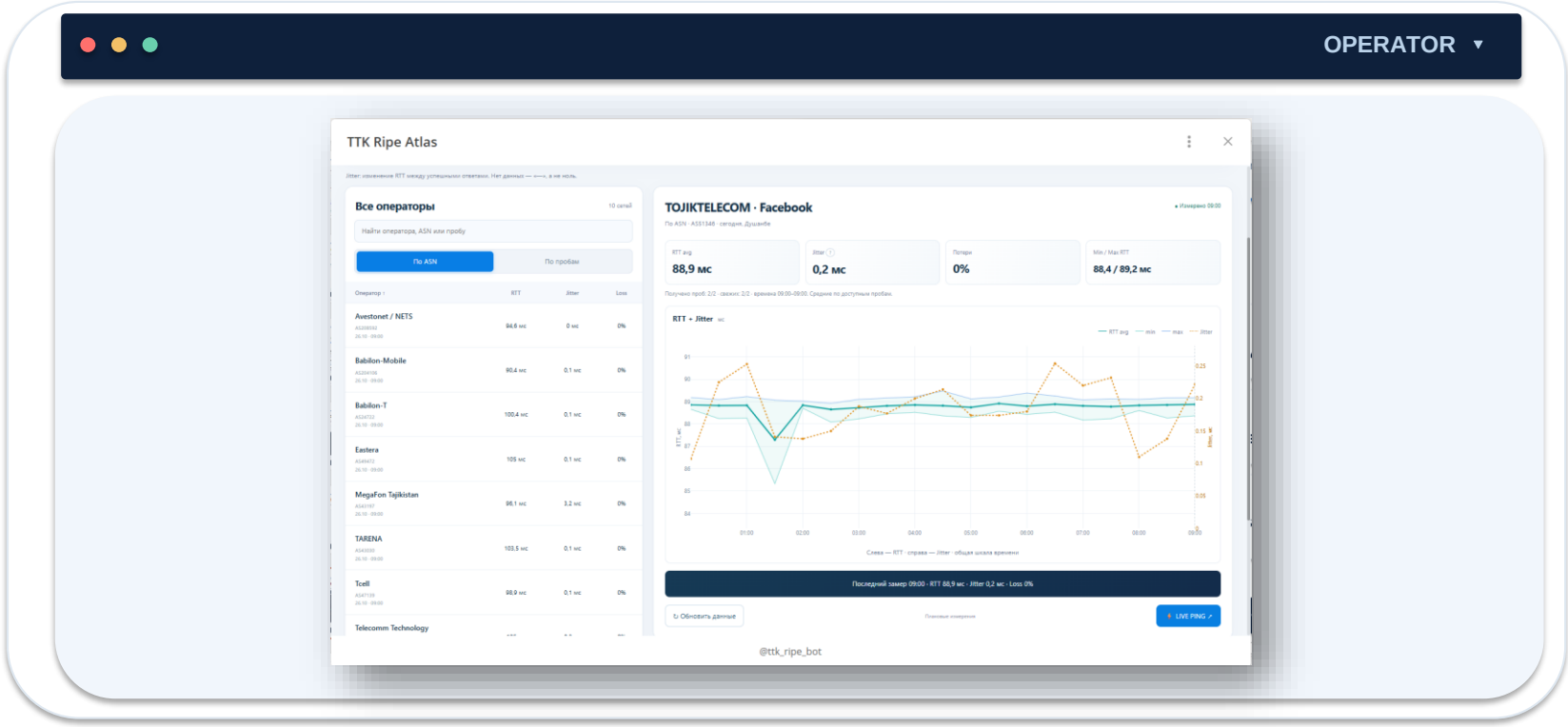


HISTORY EXPLAINS PATTERNS — LIVE ADDS CURRENT EVIDENCE

MEASUREMENT ID IS ASSIGNED BY RIPE ATLAS · WORKFLOW IS SCHEMATIC

Web Observatory: from points to patterns

Interactive exploration adds location, operator context, probe metadata and history.



01 / CONTEXT

Probe-aware view

02 / COMPARISON

Cross-network trends

03 / TRACEABILITY

Source IDs & freshness

TELEGRAM FOR RAPID CHECKS

WEB FOR DEEPER INVESTIGATION

From a complaint to testable evidence

A repeatable investigation path — not a premature claim about the root cause.

USER REPORT

“Facebook is slow or unreachable.”

01

TRIGGER

Run LIVE PING

→

02

VALIDATE

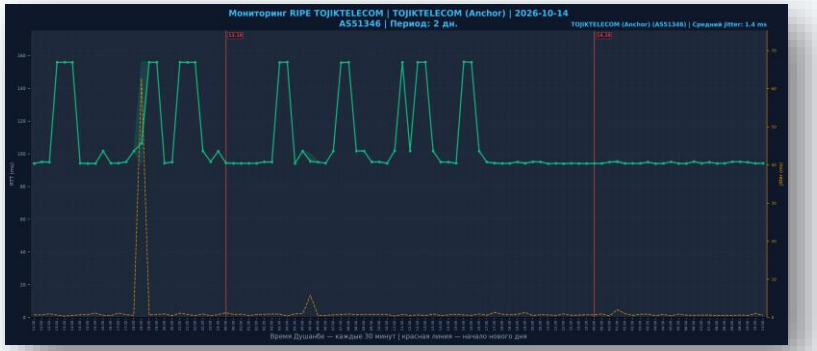
Check probe / ASN

→

03

COMPARE

Review differences



MEASURE FIRST. COMPARE FAIRLY.

Only then decide where to investigate next.

Lessons learned. Where we go next.

Keep the observations defensible, the workflow repeatable and the next steps realistic.

LESSON 01

Probe diversity

A single vantage point cannot represent all access networks.

LESSON 02

Freshness is evidence

Disconnected or stale probes can distort a comparison.

LESSON 03

ICMP has limits

Reachability signals are not end-to-end application QoE.

NOW

Operational baseline

Scheduled PING · LIVE · Telegram · Web

NEXT

Richer diagnosis

Better multi-probe context and route analysis

LATER

Shared intelligence

Evidence exchange & deeper correlation

THE VALUE IS NOT MORE CHARTS

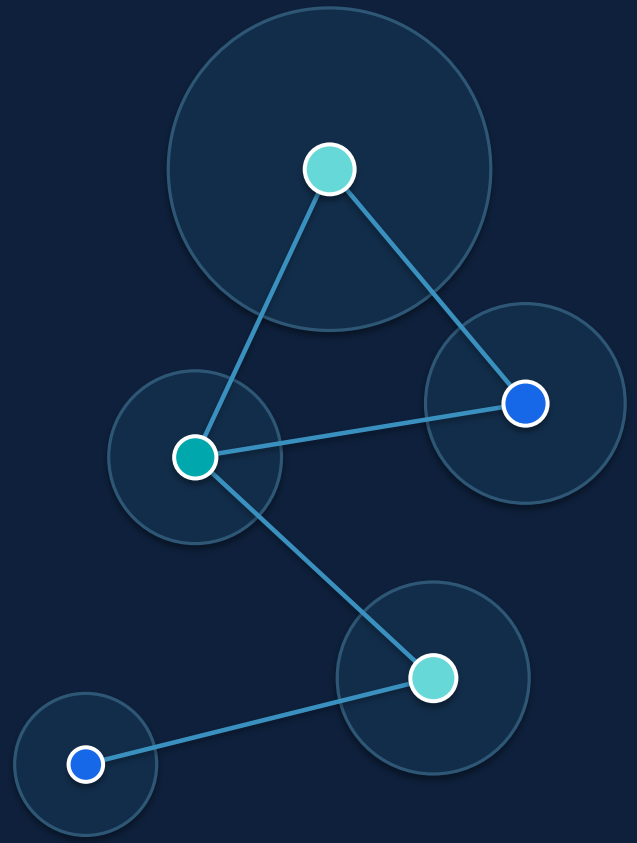
It is clearer, reproducible operational evidence.

IMD 2026

Almaty, Kazakhstan

TOJIKTELECOM

THANK YOU



Let’s compare observations across networks.

Nizomi Shonazriev | Tojiktelecom | Tajikistan

RIPE ATLAS DATA · ENGINEERING · OPEN INTERNET

MOVING FORWARD TOGETHER

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