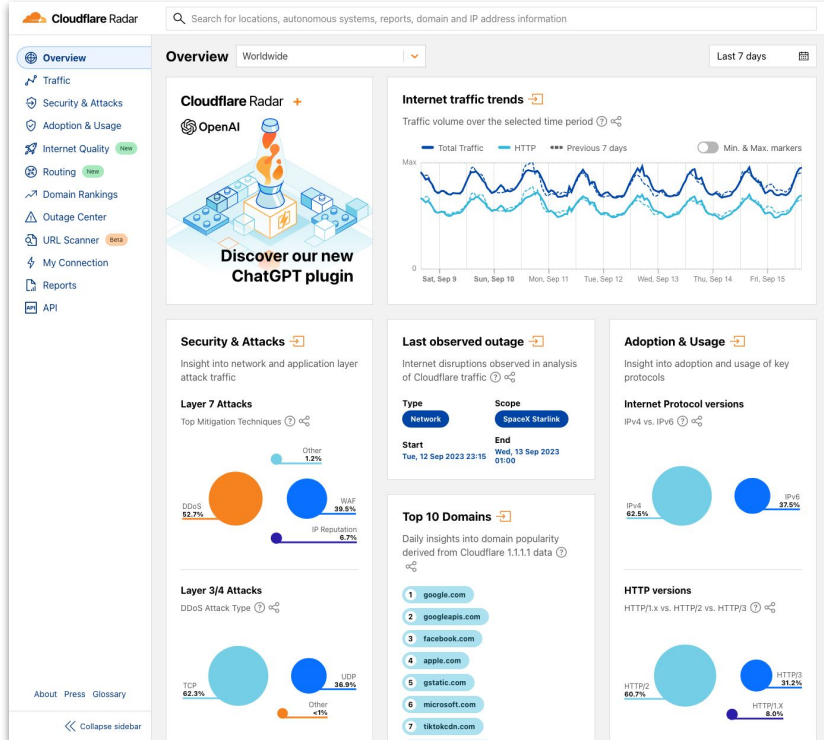CLOUDFLARE

Network Measurement: Cloudflare Radar

What is Cloudflare Radar?

September 30, 2020 launch blog post:

*Our goal is to help build a better Internet and we want to do this by **exposing insights, threats, and trends** based on the **aggregated data** that we have. We want to help anyone **understand what is happening on the Internet** from a **security, performance, and usage** perspective. Every Internet user should have easy access to answer the questions that they have.*

https://radar.cloudflare.com/

![CLOUDFLARE]

What can you do on Cloudflare Radar?

Network Measurement: From Censorship to Shutdowns

How can Cloudflare Radar help detect and/or corroborate reports of Internet disruptions?
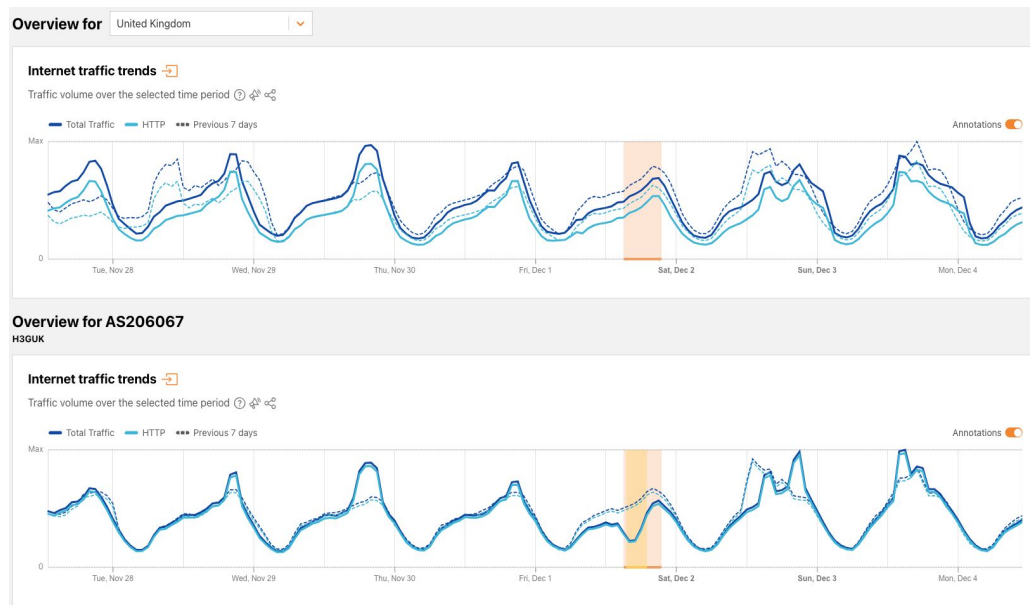
Macro/aggregate views of:

- Internet Traffic
- Outages
- Adoption & Usage
- Connection Quality
- Routing
- TCP Connection Tampering

Supporting capabilities:

- Notifications
- API

CLOUDFLARE

Internet Traffic

- Country & ASN-level traffic
- Netflows-based
  (total traffic & HTTP traffic)
- Pre-defined or
  user-selectable time frames

- Data available via API

https://radar.cloudflare.com/traffic

CLOUDFLARE

Cloudflare Radar Outage Center (CROC)

https://radar.cloudflare.com/outage-center

- Curated list of observed & verified Internet outages
- Automatically updated list of detected traffic anomalies

- "Metadata" about the outage or traffic anomaly
- Action links

- Data available via API

Adoption & Usage
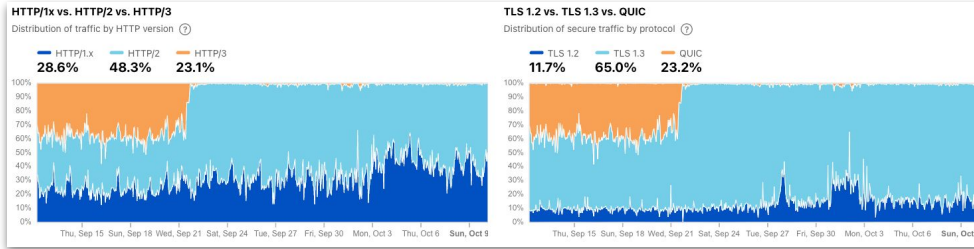
Protests in Iran, September 2022
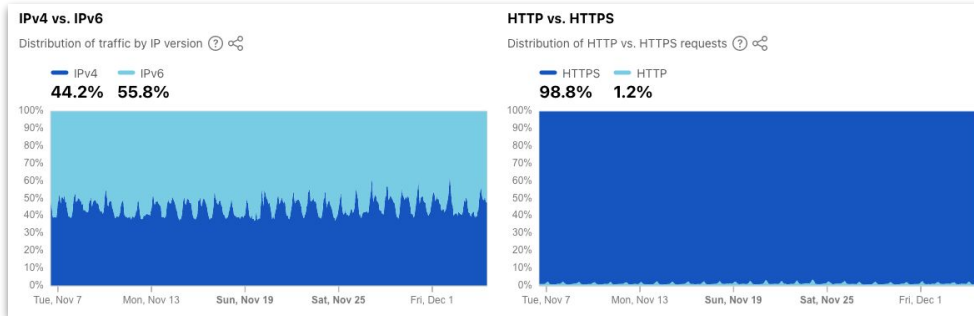
- HTTP versions
- TLS versions

- IPv4 vs IPv6
- HTTP vs HTTPS

- Filtering/blocking can be evident in these graphs

- Data available via API

https://radar.cloudflare.com/adoption-and-usage

Internet/Connection Quality

Bandwidth

IQI estimated download speed under average utilization ⑦ ⤳

— 75th percentile — Median — 25th percentile
12 Mbps   **6 Mbps**   **4 Mbps**

Latency

IQI estimated round trip time under average utilization ⑦ ⤳

— 75th percentile — Median — 25th percentile
108 ms   **72 ms**   **44 ms**
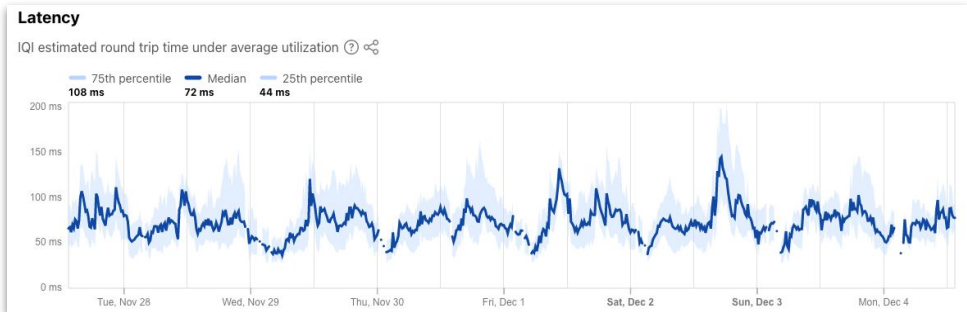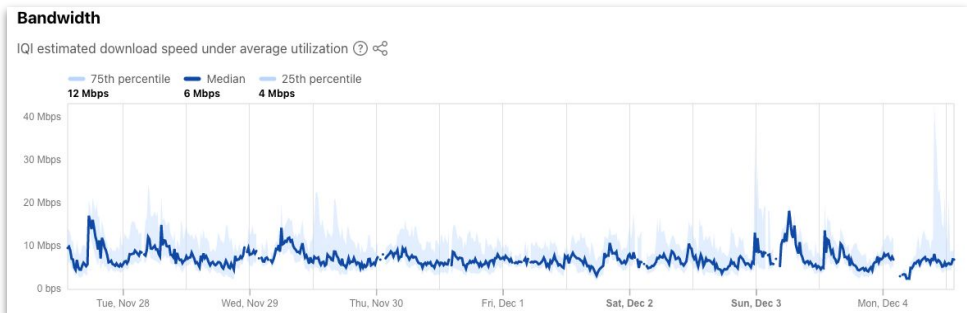
- Bandwidth (download speed), latency, DNS response time trends
- Benchmark testing across multiple CDN providers

- Data available via API

https://radar.cloudflare.com/quality

Routing

BGP Route Leaks Beta
Detected route leaks originated by any ASN

| From	By	To	Start (UTC)	End (UTC)	BGP Messages	Prefixes	Origins	Vantage Points	Actions
AS29049 (AZ)	AS34170 (AZ)	AS196925 (AZ)	2023-12-04 20:16	—	5	5	1	1	
AS6762 (IT)	AS21826 (VE)	AS52320 (CO)	2023-12-04 18:14	—	3	1	1	1	
AS4230 (BR)	AS11271 (BR)	AS16735 (BR)	2023-12-04 18:11	—	10	1	1	8	
AS28917 (LT)	AS35640 (RU)	AS50509 (RU)	2023-12-04 18:01	—	520	2	1	79	
AS264127 (BR)	AS264197 (BR)	AS269096 (BR)	2023-12-04 17:44	—	61	1	1	47	
AS3356 (US)	AS27951 (CO)	AS52320 (CO)	2023-12-04 17:43	—	6	3	1	2	
AS3356 (US)	AS28258 (BR)	AS52320 (CO)	2023-12-04 17:28	—	472	1	1	37	
AS4761 (ID)	AS23679 (ID)	AS136106 (ID)	2023-12-04 16:11	—	3	1	1	3	
AS3491 (US)	AS4761 (ID)	AS7473 (SG)	2023-12-04 16:09	—	44	2	1	14	
AS3491 (US)	AS4761 (ID)	AS9002 (GB)	2023-12-04 16:09	—	33	3	3	7	

BGP Origin Hijacks Beta
Detected BGP hijack events originated by any ASN

Detected Origin	Expected Origin(s)	Start Time (UTC)	Duration	BGP Messages	Prefixes	Confidence	Tags	Actions
AS45820 (IN)	AS17753 (IN)	2023-12-04 20:05	1 minute	1 msgs (1 peers)	202.157.94.0/24	Medium	IRR INVALID	
AS45510 (AU)	AS38333 (AU)	2023-12-04 20:07	—	1 msgs (1 peers)	202.93.96.0/20	Medium	IRR INVALID	
AS59634 (GB)	AS39175 (GB)	2023-12-04 20:06	—	1 msgs (1 peers)	154.60.88.0/23	Low	IRR INVALID IRR OLD ORIGIN INVALID	
AS263129 (BR)	AS268262 (BR)	2023-12-04 20:07	—	4 msgs (4 peers)	45.237.25.0/24	Medium	RPKI INVALID PROVIDER	
AS13767 (US)	AS63209 (US)	2023-12-04 19:31	1 minute	38 msgs (19 peers)	162.254.28.0/24	Medium	RPKI INVALID PROVIDER	
AS21062 (BY)	AS50590 (BY)	2023-12-04 19:33	—	128 msgs (64 peers)	77.94.46.0/24	Medium	IRR INVALID	
AS17465 (IN)	AS17771 (IN)	2023-12-04 19:38	—	58 msgs (13 peers)	202.63.105.0/24	High	RPKI INVALID IRR INVALID PROVIDER	
AS50263 (UA)	AS60159 (UA)	2023-12-04 19:16	—	10 msgs (2 peers)	194.146.188.0/22...1 more	High	RPKI INVALID IRR INVALID	
AS36926 (KE)	AS329044 (KE)	2023-12-04 19:19	—	117 msgs (35 peers)	102.216.84.0/20	Medium	IRR INVALID	
AS51474 (RO)	AS44807 (RO)	2023-12-04 19:20	—	23 msgs (5 peers)	89.39.109.0/24	Medium	IRR INVALID	

https://radar.cloudflare.com/routing

- Route leaks & origin hijacks (global, location, ASN)
- Routing statistics
- AS list by country/region

By ASN:

- BGP announcement activity
- Prefixes announced
- Connectivity

- Data available via API

TCP Connection Tampering

TCP connection tampering
Proportion of connections that match tampering signatures over time ⓘ ⚹

Post SYN — Post ACK — Post PSH
3.1%   **22.2%**   **6.9%**
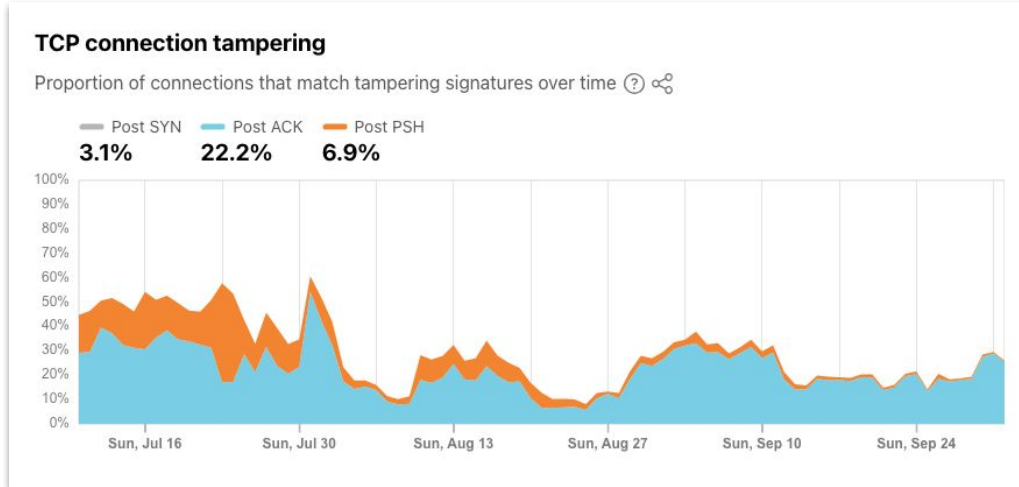
- Based on *Global, Passive Detection of Connection Tampering*, presented at ACM SIGCOMM 2023

- Country/region & ASN level

- In the Radar UI in Q1 2024
- Data available *now* via API

https://radar.cloudflare.com/security-and-attacks

E-mail & Webhook Notifications

Add Notification

Define what you want to be notified about and how.

Notifications documentation

Radar

Notification name

Description (optional)

Notify me for:

All events

Filtered by (optional):

Locations is one of:

Select...

ASNs is one of:

Select...

Notification email

+ Add email recipient

Cloudflare Radar

BGP Hijack by AS262494
Virtex Ltda

Hijacker ASN:
AS262494 Virtex Ltda

Victim ASN(s):
AS266965 SAMUEL DE LUCENA MARTINS - EPP

Prefixes:
2804:460c::/32

Messages: 7
Peer count: 7

First detected at: 2023-09-26T11:53:37.293Z
Last detected at: 2023-09-26T11:53:52.584Z

Confidence: Medium

Tags: ASREL_NEW_ORIGIN_PROVIDER   IRR_NEW_ORIGIN_UNKNOWN
IRR_OLD_ORIGIN_UNKNOWN   RPKI_NEW_ORIGIN_INVALID   RPKI_OLD_ORIGIN_VALID

View hijack on Radar

Radar notifications APP 11:31 AM
dbelson-radar-anomalies
Title of Alert: Traffic anomaly in Dominica
Link: https://radar.cloudflare.com/DM?dateStart=2023-09-26&dateEnd=2023-09-27
Time detected: 2023-09-26T13:45:00Z
Affected Locations: [DM]
Affected ASNs: []
Cloudflare | Today at 11:30 AM

https://blog.cloudflare.com/traffic-anomalies-notifications-radar/

- Available for traffic anomalies & outages, BGP route leaks & origin hijacks
- Notify for global (all), country/region, ASN
- All you need is a free Cloudflare account

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Cloudflare Radar API

Radar Netflows	˅
Get NetFlows Time Series	GET

Radar Quality	˅
Get IQI Summary	GET
Get IQI Time Series	GET

Radar BGP	˅
Get BGP hijack events	GET
Get BGP route leak events	GET

Radar Connection Tampering	˅
Get Connection Tampering Summary	GET
Get Connection Tampering Time Series	GET

Radar Traffic Anomalies	˅
Get latest Internet traffic anomalies.	GET
Get top locations by total traffic anomalies generated.	GET

Radar Annotations	˅
Get latest Internet outages and anomalies.	GET
Get the number of outages for locations.	GET

- ● Radar is built on top of this API

- ● Summary & time series data sets

- ● Examples provided in over 15 languages

https://developers.cloudflare.com/api/operations

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CLOUDFLARE

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