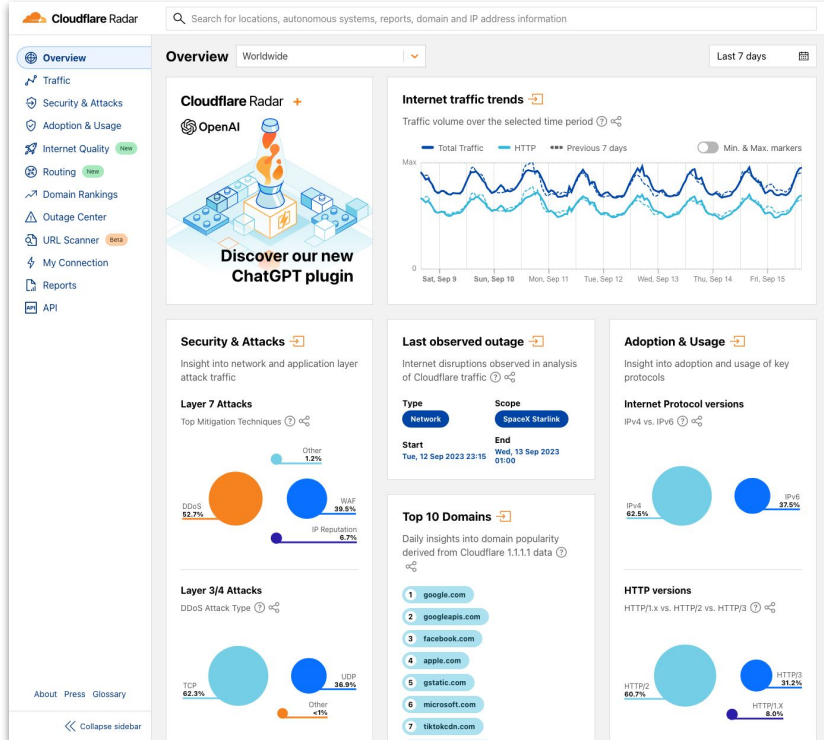




# Network Measurement: Cloudflare Radar

# 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/>

# What can you do on Cloudflare Radar?

- [Overview](#)
- [Traffic](#)
- [Security & Attacks](#)
- [Adoption & Usage](#)
- [Internet Quality New](#)
- [Routing New](#)
- [Domain Rankings](#)
- [Outage Center](#)
- [URL Scanner Beta](#)
- [My Connection](#)
- [Reports](#)
- [API](#)

Overview for United States

**Internet traffic**

Traffic volume over time

- Turkmenistan
- Turks and Caicos Islands
- Tuvalu
- Uganda
- Ukraine
- United Arab Emirates
- United Kingdom
- United States**

## Autonomous Systems

Top five ASes ? 🔗

ASN	Name
<a href="#">AS7922</a>	COMCAST-7922
<a href="#">AS7018</a>	ATT-INTERNET4
<a href="#">AS21928</a>	T-MOBILE-AS21928
<a href="#">AS701</a>	UUNET
<a href="#">AS20115</a>	CHARTER-20115

Calendar view for August 2023 and September 2023.

Navigation: < August 2023 September 2023 >

SU	MO	TU	WE	TH	FR	SA	SU	MO	TU	WE	TH	FR	SA	
			1	2	3	4	5						1	2
6	7	8	9	10	11	12	3	4	5	6	7	8	9	
13	14	15	16	17	18	19	10	11	12	13	14	15	16	
20	21	22	23	24	25	26	17	18	19	20	21	22	23	
27	28	29	30	31			24	25	26	27	28	29	30	

- Last 24 hours
- Last 48 hours
- Last 7 days**
- Last 2 weeks
- Last 4 weeks
- Last 3 months
- Last 6 months
- Last 12 months

Search for locations, autonomous systems, reports, domain and IP address information

EXAMPLE SEARCHES

- 
- 
- 
- 
- 
-

# Network Measurement: From Censorship to Shutdowns

How can Cloudflare Radar help detect and/or corroborate reports of Internet disruptions?

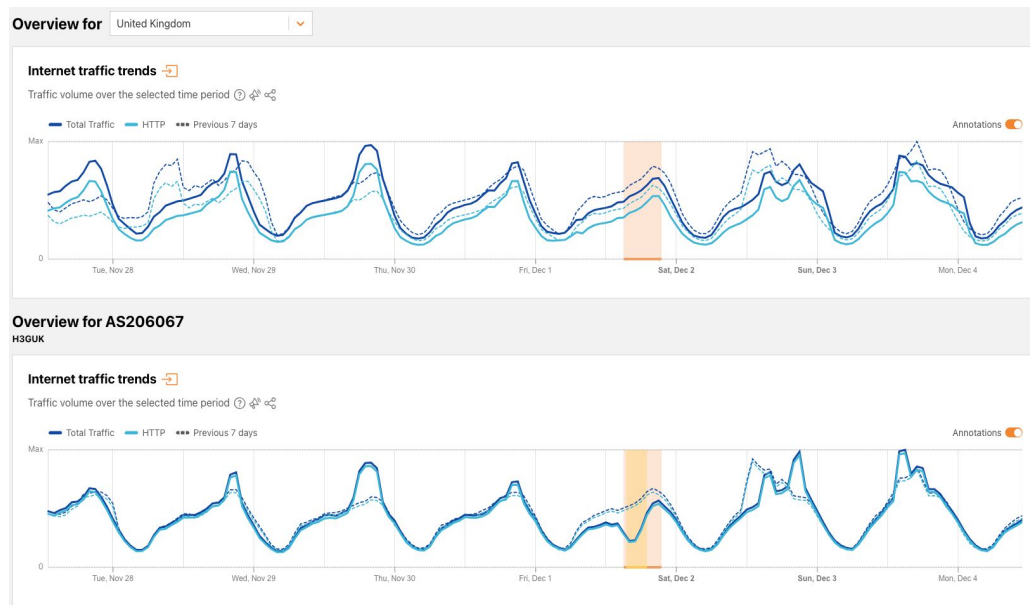
Macro/aggregate views of:

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

Supporting capabilities:

- Notifications
- API

# 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 Radar Outage Center (CROC)

**Internet outages**

Outages observed over the selected time period. Timestamps are in UTC.  
Follow @CloudflareRadar on Twitter for live updates. [↗](#)

Location	ASN	Type	Scope	Cause	Start	End	Actions
United Kingdom	AS206067	Network	Three UK	Unknown	Fri, 1 Dec 2023 15:00	Fri, 1 Dec 2023 21:30	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
Ukraine	—	Regional	Multiple regions in southern Ukraine, mostly occupied areas.	Weather	Sun, 26 Nov 2023 23:00	Tue, 28 Nov 2023 13:00	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
Mexico	—	Regional	Acapulco	Weather	Wed, 25 Oct 2023 06:25	—	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
Palestine	AS57704, AS199046, AS213207	Network	Gaza Strip related. SpeedClick, JETNET and TechHub.	Power Outage	Mon, 9 Oct 2023 14:15	—	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
Palestine	AS42314, AS210974, AS203905, AS60268, AS60363, AS62027	Network	Gaza Strip related. Fusion, AjyaFi, and DCC ASNs.	Power Outage	Sat, 7 Oct 2023 08:00	—	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
Ethiopia	—	Regional	Amhara	Government Directed	Wed, 2 Aug 2023 18:00	—	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>

[Download CSV](#)

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**Traffic anomalies**

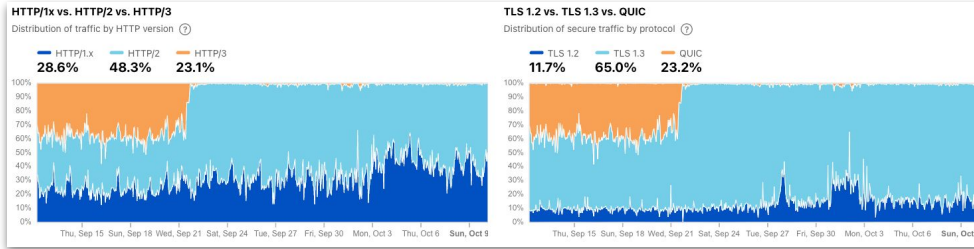
Anomalies automatically detected over the selected time period. Timestamps are in UTC. [↗](#)

Type	Entity	Start	Duration	Verified	Actions
ASN	AS56046 (CMNET-Jiangsu-AP)	Sun, 3 Dec 2023 21:15	2 hours	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS56041 (CMNET-Zhejiang-AP)	Sun, 3 Dec 2023 21:15	2 hours	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
Location	Guyana	Fri, 1 Dec 2023 20:00	1 hour	✓	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS206067 (H3GUK)	Fri, 1 Dec 2023 15:30	4 hours	✓	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS37054 (Telecom-Malagasy)	Fri, 1 Dec 2023 14:15	1 hour	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS48492 (IQ-Online)	Thu, 30 Nov 2023 22:00	10 hours	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS25133 (MCLAUT-AS)	Wed, 29 Nov 2023 12:45	less than 30 minutes	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS9341 (ICONPLN-ID-AP-ISP)	Wed, 29 Nov 2023 10:00	1 hour	✓	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS26615 (TM Celular)	Tue, 28 Nov 2023 04:15	15 minutes	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>
ASN	AS17552 (TRUEONLINE-AS-AP)	Mon, 27 Nov 2023 15:30	1 hour	✗	<a href="#">🔍</a> <a href="#">🔔</a> <a href="#">🔗</a>

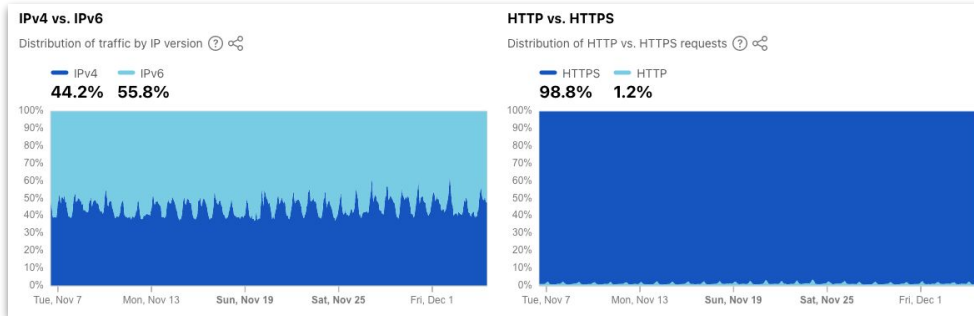
- Curated list of observed & verified Internet outages
- Automatically updated list of detected traffic anomalies
- “Metadata” about the outage or traffic anomaly
- Action links
- Data available via API

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

# Adoption & Usage



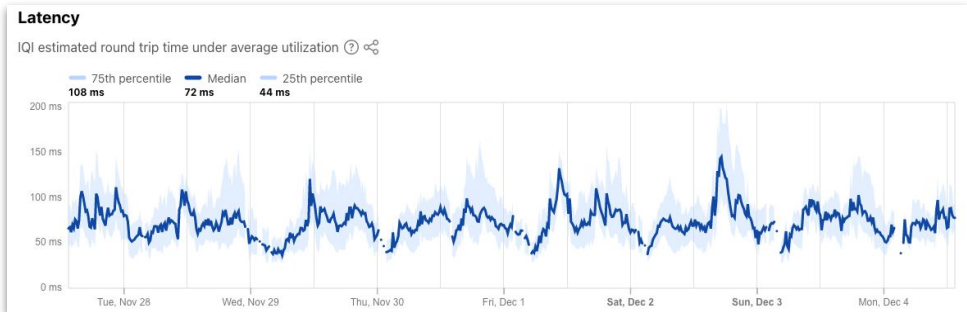
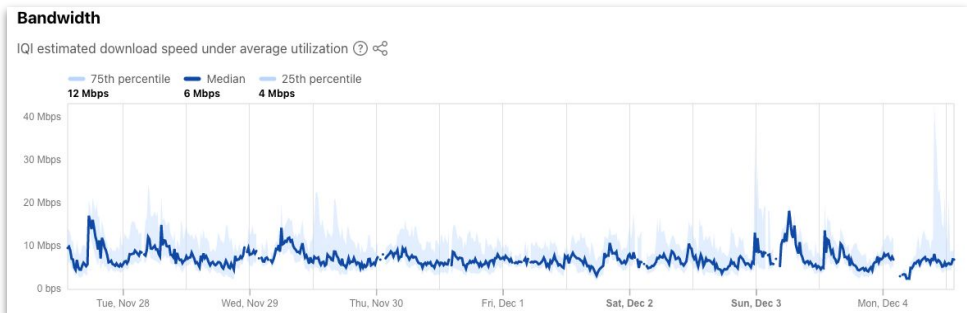
Protests in Iran, September 2022



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

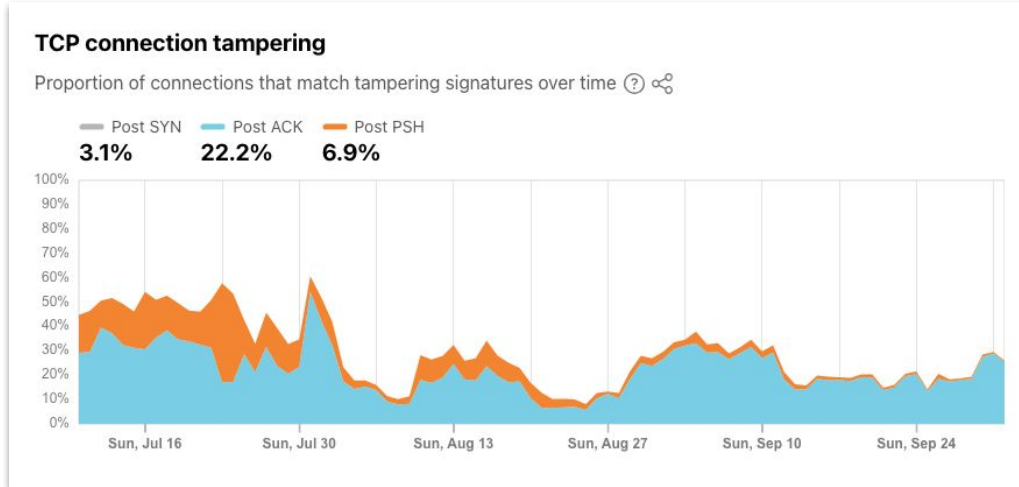
- Route leaks & origin hijacks (global, location, ASN)
- Routing statistics
- AS list by country/region

By ASN:

- BGP announcement activity
- Prefixes announced
- Connectivity
- Data available via API

<https://radar.cloudflare.com/routing>

# TCP Connection Tampering



- 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:

Filtered by (optional):

ASNs is one of:

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](#)

**Radars** 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

- 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

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



# 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 is built on top of this API
- Summary & time series data sets
- Examples provided in over 15 languages

Radar Annotations ▼

Get latest Internet outages and anomalies. GET

Get the number of outages for locations. GET

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

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