

Cloudflare and Internet routing security

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The Cloudflare Network



300 cities in 100+ countries

12,000

networks directly connect to Cloudflare, including every major ISP, cloud provider, and enterprise

~50 ms

from 95% of the world's Internet-connected population



Where are we?

BGP security

• Follow MANRS BCPs

- RPKI ROAs for all Cloudflare-owned prefixes
- RPKI ROV on all external BGP sessions
- Community engagement (RIPE, NANOG, APNIC)
- Tooling contributions (<u>rpki.cloudflare.com</u>, <u>radar.cloudflare.com</u>)

Customer posture

- Enforce IRR entries for BYOIP/BYOASN
- Highly encourage RPKI ROAs*
- Automated hijack detection (Artemis)
- Customer education
- Security as a Service



How is the US doing?

Percent of prefix validation status



Percent of users with an ISP filtering out invalid routes

Users Behind ASNs With More Than 95% ROV Adoption 2023-06-01 00:00:00 to 2023-06-30 23:59:59 (UTC)



Cloudflare Radar

Publicly available Internet weatherstation

- >	C A https://radar.cld	oudflare.com/routing	g/us				** 🗖 🔮	
2	Cloudflare Radar	Q Search for lo	ocations, autonomous s	systems, reports, dom	ain and IP addre	ss information		
€	Routing Inform	ation in the	United States					
N								
2	Routing Statist	ics						
2	Statistics about relevant clobal routing table entries							
9								
8	ASes		Prefixes	Routes		31%	86%	
R	18.1k		304.3k	309.4k				
	IPv4 17,85	5	IPv4 262,103	IPv4 265,622				
~	IPv6 4,216	6	IPv6 42,212	IPv6 43,805				
×	RPKI Valio	i	RPKI Invalid	RPKI Unknow	n			
2	97.2k		2.4k	209.8k				
4	(31%)		(1%)	(68%)	•	RPKI Unknown	IPv6	
=	IPv4 73,92	8	IPv4 1,015	IPv4 190,679		68%	14%	
0	IPv6 23,27	5	IPv6 1,425	IPv6 19,105				
API	Data generated at 2023-07-26T12:00:00 UTC							
	ASes Persisters	d in United St	rates					
	ASes Registere	a in onited St	ales					
	ASes ranked by the number of prefixes announced to the global routing table. Q Se				Q Search for	ASes		
	ASN	Country	Name P			Prefix	Count	
	AS16509	US	AMAZON-02			12570	12570	
	AS22773	US	ASN-CXA-ALL-CC	ASN-CXA-ALL-CCI-22773-RDC			5108	
?	AS11492	US	CABLEONE	CABLEONE			1529	
A9	AS174	US	COGENT-174 4416					
8-	AS7155 US VIASAT-SP-BACKBONE				4202			
	AS20115 US CHARTER-20115				3574			
	AS30036	AS30036 US MEDIACOM-ENTERPRISE-BUSINESS				3443		
~	AS16625	US AKAMAI-AS				3309		
		AS13335 US CLOUDFLARENET				3223		

CLOUDFLARE

https://radar.cloudflare.com/routing/us



Where are we going?

RPKI ecosystem

- Enforce RPKI ROAs for BYOIP
- ASPA engagement and deployment
- Push remaining suppliers for ROV
- RTBH/TE prefix solution?

Other

- Further footprint expansion
- Work on other layers (TLS, ZT products, ...)
- Further monitoring/counteract bad actors