



Webinar, Thursday, July 10 at 10:00 a.m. CET

# [Webinar] The history of DNS: from the birth of the protocol to filtered security



# Speaker

**Antonio Prado** - technical popularizer and teacher



**Francesco Collini** - CEO FlashStart



# Topics

Antonio Prado

## The history of DNS

The birth of the DNS protocol

Francesco Collini

## DNS Security

Getting to be a filtered protection  
against malware and content today



# The history of DNS

Antonio Prado





# DNS Security

Francesco Collini



# The DNS protocol

*It is one of the oldest protocols on the Net.*

It was born in late 1983.

It is a fundamental and pervasive pillar and because of that...

can become our great “**Ally**”.





# The protective DNS



Uses the **normal DNS protocol** for operation



Uses the techniques of “DNS Firewall”



**Integrates a service** to identify malicious and dangerous sites



Optionally can **integrate** content filtering



# Several actors enter the field in the Defense...



**DNS Protection**



**Firewall**



**IPS / IDS**



**Antivirus**



**DPI**





# The DNS protocol is available in the mode...



**Protocol 53/UDP**  
(tradizionale)



**DNS over Https**  
(DoH)



**DNS over TLS**  
(DoT)



**DNS over Quic**  
(DoQ)





**DNS provides** important statistics, trends, and **valuable indicators** for securing one's Network.

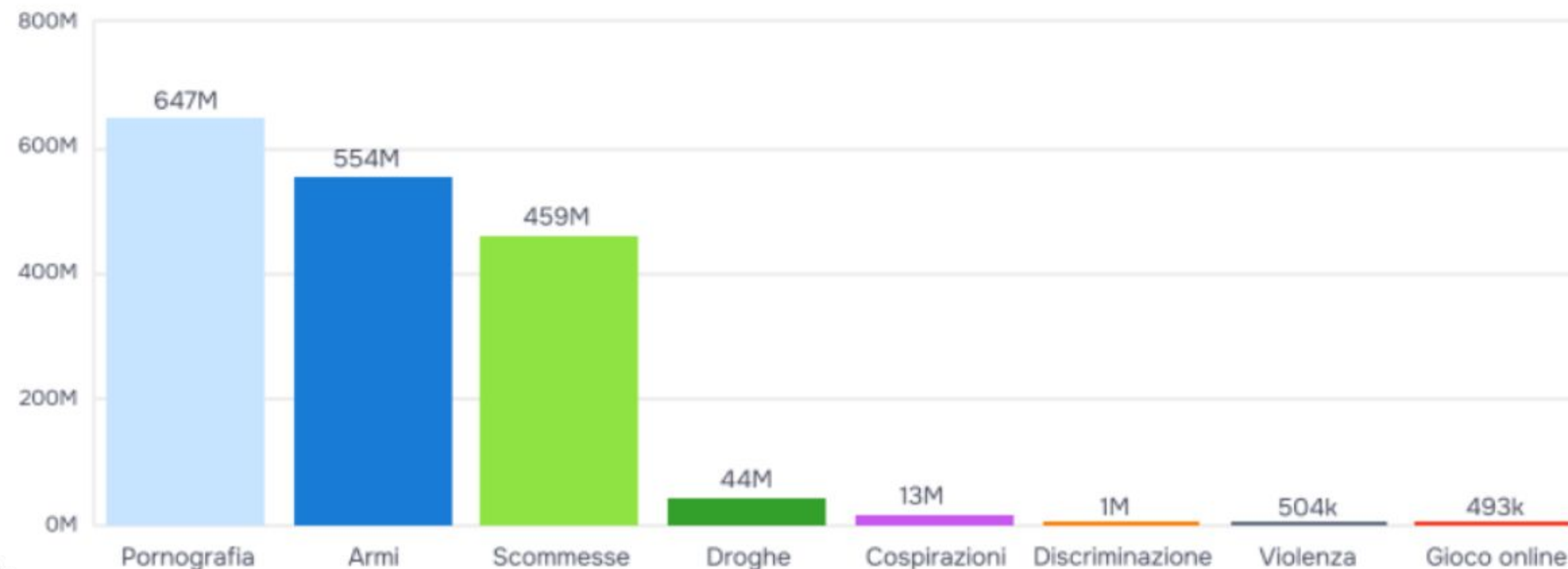
It is an **immediate glimpse** into the ecosystem.



# Most blocked sites

“The type of sites most blocked in enterprise network browsing.” (Source: the findings exposed in FlashStart's Threat report).

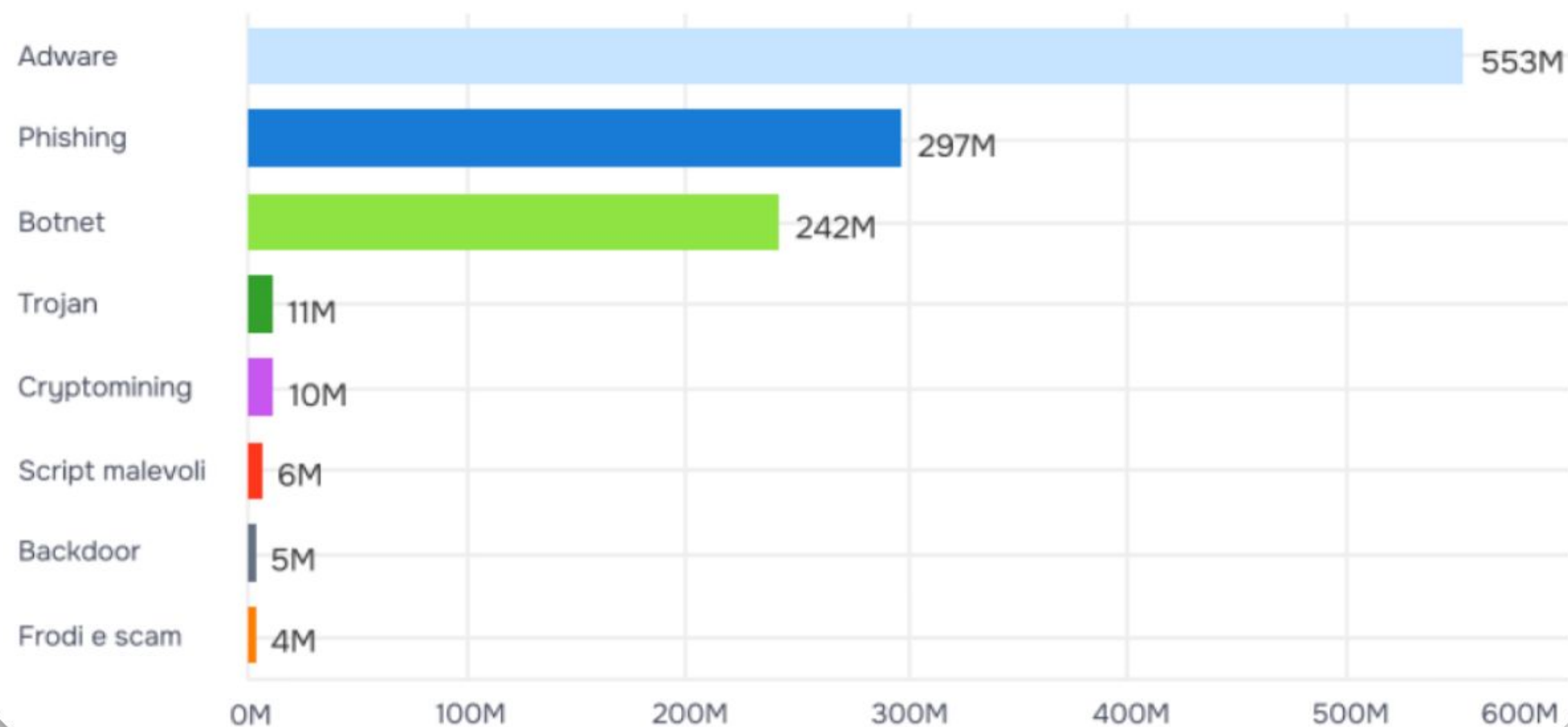
## Threat Report 2025 FlashStart



# The most common attacks

“The most frequent types of attacks in 2024.” (Source: the findings exposed in FlashStart's Threat report).

**Threat Report 2025 FlashStart**





In the **training of a Network Admin**, **DNS** is one of the first concepts you learn.

And so it **was in my early days**,  
long before FlashStart



**How our journey  
to discover the (Cyber) world began...**



**Over 10 years as  
MSP / Networking Consultants**



**In addition to Servers and networks, we also  
installed and configured Firewall and Security  
platforms  
(e.g., OpenDns)**



From our **point of view**,  
something was perhaps missing...  
We wanted a **global platform but**  
**with of Italian inspiration.**



An idea was born:  
**a secure DNS with quality and simplicity**  
**Italian, but with a global outlook**



**How it happened  
the design...**

# The technological design



**Anycast Network**  
(in primis)



**Firewalling and  
load balancing**



**Secure DNS  
resolver**



**Dashboard**



**Blacklist Database  
and update**



**Ecosystem of  
related services**



# Each DNS node is equipped with...



**Perimeter firewall**



**Load balancer**



**BGP**



One or more  
**backend DNS  
resolvers**



**Connection with  
Master nodes**



# Master knots



They are **located**  
around the world



They offer the  
**services of Stop  
Pag**



**They support global**  
DNS nodes



**Distribute the load in**  
**Global Network**



**Provide services**  
**internal/external**  
**API**





# Global nodes broken down by Region



# Datacenter in Italy





# Expansion in all of Europe





# USA





# Asia Pacific





# Oceania





# Africa





# Oceania





# Global anycast worldwide





# Some (very) important notes



Internet is  
**inescapable from  
DNS**



**DNS must be fast**  
(latency < 10ms)



**DNS must not lose  
Query**



**Global DNS should  
be monitored**





# On BGP and latency, specifically.



It does not always  
**“land”** in the  
**“nearest”** server



**Transportation,**  
**peering,** and  
routing policies



**Community BGP**  
**are important**  
(and a lot!)



**Packet loss should**  
**always** be  
evaluated





# Bare metal vs Cloud Servers



Performance and investment



Query loss guarantee  $< 0.01\%$



Analysis of history by Area



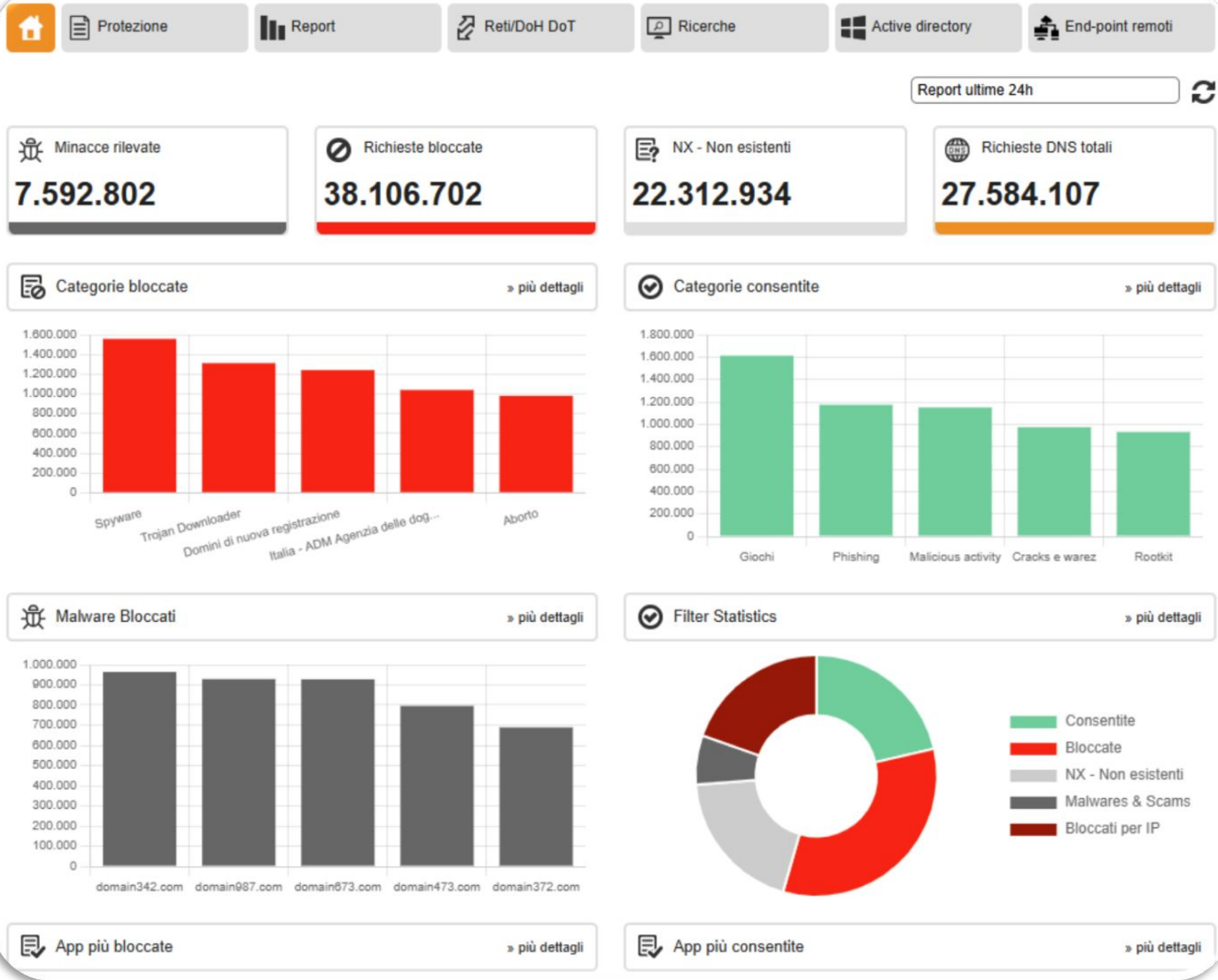
Evaluation of failover routes





# The FlashStart Dashboard



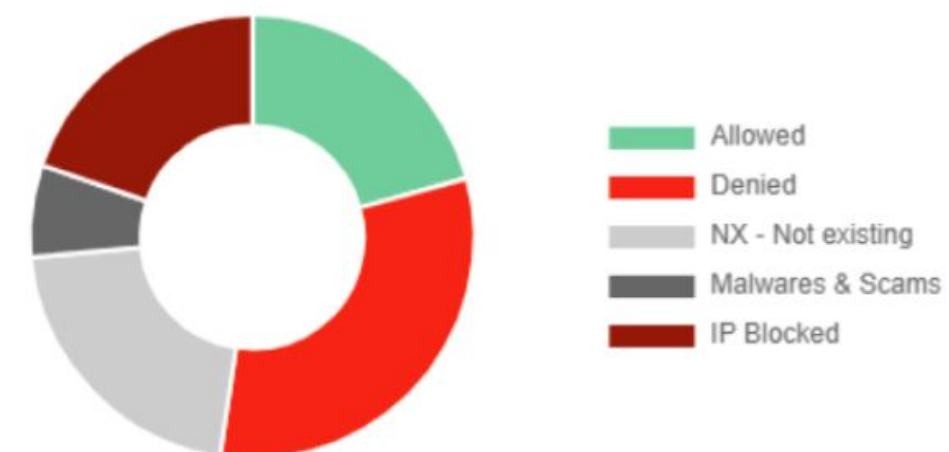




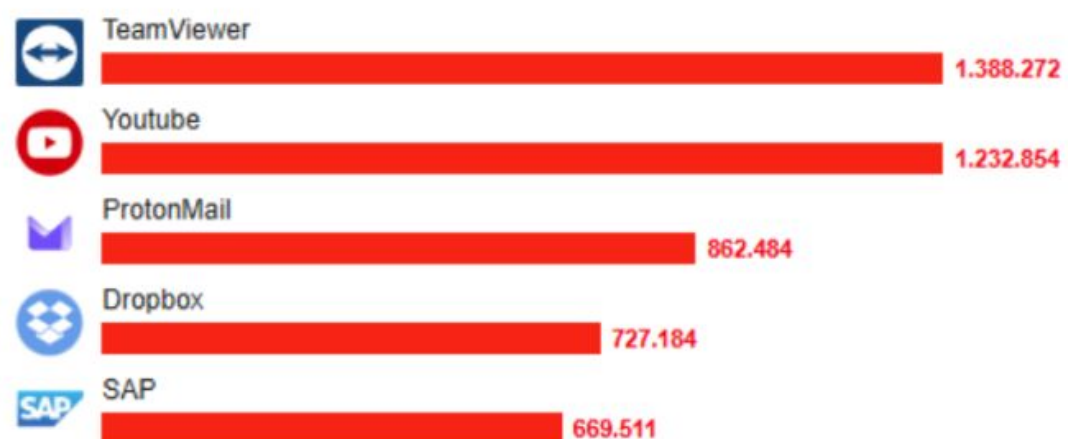
### Malware blocked

[» more details](#)

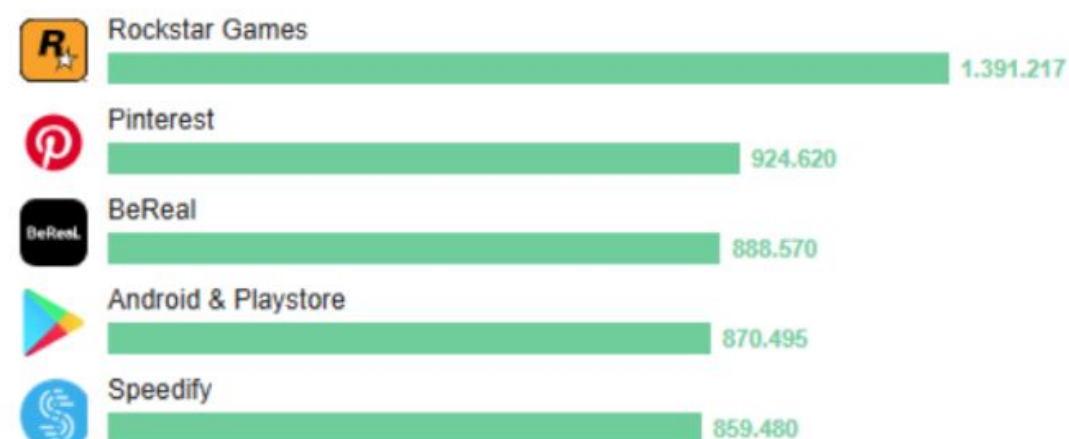
### Filter Statistics

[» more details](#)

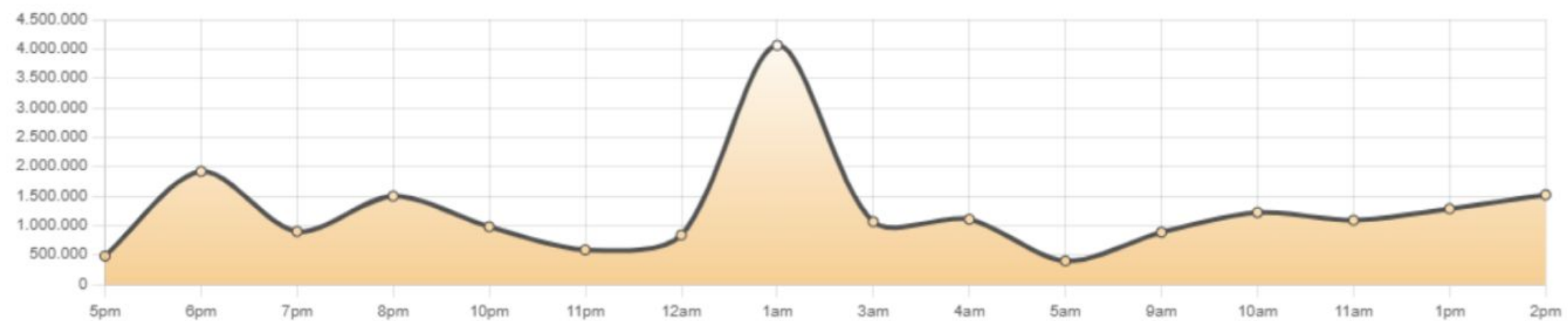
### Most Blocked Apps

[» more details](#)

### Allowed Apps

[» more details](#)

### Per hour request

[» more details](#)







**Protection** Report Network/DoH DoT Searches Active directory Remote end-points

Don't know which category a domain belongs to? [Search the domain](#)

**Protection** [Easy Configuration »](#)

Protection Enable profile synchronization ☐

**Threat Protection** 26 / 41 blocked

**Content Filter** 0 / 71 blocked

**App Blocker** 0 / 115 blocked

Advanced Protection

**IP Blocking** Enabled

Protection for **search engines** and **YouTube** 2 / 2 active

**Geoblocking** protection 250 / 250 blocked

Exceptions

**Personal blacklists** 11 exceptions



Protection Report Network/DoH DoT Searches Active directory Remote end-points

Don't know which category a domain belongs to? [Search the domain](#)

Protection

[Easy Configuration >](#)

Protection Enable profile synchronization ☐

Threat Protection

26 / 41 blocked































	Always Allow	Always Block	Schedule blocks
Malware & Threats	<input type="radio"/>	<input checked="" type="radio"/>	
Malware & Threats Community	<input checked="" type="radio"/>	<input type="radio"/>	
Newly registered domains	<input checked="" type="radio"/>	<input type="radio"/>	
Proxy Filter & Avoidance	<input type="radio"/>	<input checked="" type="radio"/>	
Frauds & Dangerous	<input checked="" type="radio"/>	<input type="radio"/>	

Content Filter

0 / 71 blocked

	Always Allow	Always Block	Schedule blocks
Parental control	<input checked="" type="radio"/>	<input type="radio"/>	
Information Technology	<input checked="" type="radio"/>	<input type="radio"/>	
Work-Related	<input checked="" type="radio"/>	<input type="radio"/>	
Free time and others	<input checked="" type="radio"/>	<input type="radio"/>	
Ads & Trackers	<input checked="" type="radio"/>	<input type="radio"/>	
National Blocklists and Foundations	<input checked="" type="radio"/>	<input type="radio"/>	



	Always Allow	Always Block	Schedule blocks
▶  Dating	<input checked="" type="radio"/>	<input type="radio"/>	
▶  E-Commerce	<input checked="" type="radio"/>	<input type="radio"/>	
▶  File Sharing	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Games	<input checked="" type="radio"/>	<input type="radio"/>	
▶  CryptoMining	<input type="radio"/>	<input checked="" type="radio"/>	
▶  Music	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Financial	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Services	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Messaging	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Social Networks	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Streaming	<input type="radio"/>	<input checked="" type="radio"/>	
▶  VPN & Proxy	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Business	<input checked="" type="radio"/>	<input type="radio"/>	
▶  Ecosystem of Applications	<input checked="" type="radio"/>	<input type="radio"/>	
▶  AI Providers	<input checked="" type="radio"/>	<input type="radio"/>	





# Disponibilidad de **Filtro** para redes y dispositivos **móviles**



(the trial expires on 07/31/2025) ⓘ

▶ Installation

▼ Clients (26)

Modify selected

<input type="radio"/>	↕ Client	↕ Connected user	↕ Version	↕ Remote IP	↕ Profile	Protection state	Actions
<input type="radio"/>	VORTEX HD55 (via DoH)				Default		
<input type="radio"/>	Client Klocko (via DoH)						
<input type="radio"/>	Ensnared						
<input type="radio"/>	22wVORTEX. HD55 (via DoH)				Default		
<input type="radio"/>	HMD Vibe (via DoH)				Default		
<input type="radio"/>	VORTEX HD55 (via DoH)				Default		
<input type="radio"/>	Diotalleivi_Test (via DoH)						
<input type="radio"/>	Client Williamson (via DoH)						
<input type="radio"/>	GerardoLedezman (via DoH)				Default		
<input type="radio"/>	Client Bins (via DoH)						
<input type="radio"/>	adawdawd (via DoH)						
<input type="radio"/>	magi (via DoH)						
<input type="radio"/>	moto edge 50 pro (via DoH)				Default		
<input type="radio"/>	Litrik's emulator (via DoH)				Default		



(the trial expires on 07/31/2025) ⓘ

▼ ⚙️ Installation

Step 1 / Select protection profile

👤 Default ▾

Step 2 / Security key (required in the configuration page)

E1138BD8E6F980FF3AD97E56C279CD19 📄

Step 3 / Access the configuration page from your device

[go.flashstart.com](https://go.flashstart.com) 🔗 ✉️ Send by Email

Available on any device

🪟	Windows (64 bit), 11/10/8.1/7	↓
🍏	Mac OS, >= 11.0 Big Sur	↓
🍏	iOS, > 15.0	↓
🌐	Chrome OS, > 7.0	↓
🤖	Android, > 7.0	↓

- ▶️ 🖥️ Clients (26)
- ▶️ 🌐 Windows Local Zones
- ▶️ 🔒 Disable PIN
- ▶️ 🗑️ Uninstall PIN (Only for Windows)
- ▶️ ⏻ Office Stand-Up
- ▶️ ⌚ Session History
- ▶️ 👤 Privacy



# A Valid Analysis Tool

## Statistics:

```
Queries sent:          15597
Queries completed:     15497 (99.36%)
Queries lost:          0 (0.00%)
Queries interrupted:   100 (0.64%)

Response codes:        NOERROR 14794 (95.46%), SERVFAIL 188 (1.21%), NXDOMAIN 515 (3.32%)
Average packet size:   request 44, response 120
Run time (s):          5.315497
Queries per second:    2915.437635

Average Latency (s):   0.010441 (min 0.005683, max 0.509732)
Latency StdDev (s):    0.007185
```



# Benchmarking global



**The Independent Benchmark for DNS:  
guarantees a check every minute from 200+  
locations**





TIME	MS	RESOLVER	NS	N ID	NODE IP	CONTINENT	COUNTRY	CITY	ASN	ISP
Jun 9, 14:56:39	1	FlashStart	185.236.104.104	436	18.228.245.xxx	South America	Brazil	Sao Paulo	16509	Amazon.com
Jun 9, 14:56:37	12	FlashStart	185.236.104.104	76	94.176.232.xxx	Europe	Republic of Lithuania	Vilnius	212531	UAB Interneto vizija
Jun 9, 14:56:36	2	FlashStart	185.236.104.104	127	23.92.54.xxx	North America	United States	Los Angeles	35916	Multacom Corporation
Jun 9, 14:56:36	8	FlashStart	185.236.104.104	379	34.168.85.xxx	North America	United States	Portland	396982	Google Cloud
Jun 9, 14:56:36	4	FlashStart	185.236.104.104	434	176.58.89.xxx	Europe	Netherlands	Amsterdam	36236	NetActuate
Jun 9, 14:56:36	230	FlashStart	185.236.104.104	507	38.54.42.xxx	Asia	Bangladesh	Dhaka	138915	Kaopu Cloud HK
Jun 9, 14:56:36	11	FlashStart	185.236.104.104	62	185.224.199.xxx	Europe	Ireland	Dublin	21130	Iomart Cloud Services
Jun 9, 14:56:35	2	FlashStart	185.236.104.104	118	139.162.84.xxx	Asia	Japan	Tokyo	63949	Akamai Connected Cloud
Jun 9, 14:56:35	3	FlashStart	185.236.104.104	559	169.44.29.xxx	North America	United States	Dallas	36351	SoftLayer Technologies
Jun 9, 14:56:34	4	FlashStart	185.236.104.104	413	148.163.220.xxx	South America	Brazil	Sao Paulo	36236	NetActuate
Jun 9, 14:56:31	5	FlashStart	185.236.104.104	342	69.36.182.xxx	North America	United States	New York City	13213	UK2.NET
Jun 9, 14:56:31	1	FlashStart	185.236.104.104	362	74.207.234.xxx	North America	United States	Atlanta	63949	Akamai Connected Cloud
Jun 9, 14:56:31	4	FlashStart	185.236.104.104	428	192.73.242.xxx	North America	United States	Denver	36236	NetActuate
Jun 9, 14:56:30	15	FlashStart	185.236.104.104	528	34.17.56.xxx	Europe	Italy	Turin	396982	Google Cloud
Jun 9, 14:56:30	2	FlashStart	185.236.104.104	544	139.162.111.xxx	Asia	Japan	Tokyo	63949	Akamai Connected Cloud
Jun 9, 14:56:29	2	FlashStart	185.236.104.104	238	45.93.95.xxx	Asia	Israel	Tel Aviv	44709	O.m.c. Computers & Communi...
Jun 9, 14:56:29	2	FlashStart	185.236.104.104	332	178.128.102.xxx	Asia	Singapore	Singapore	14061	Digital Ocean



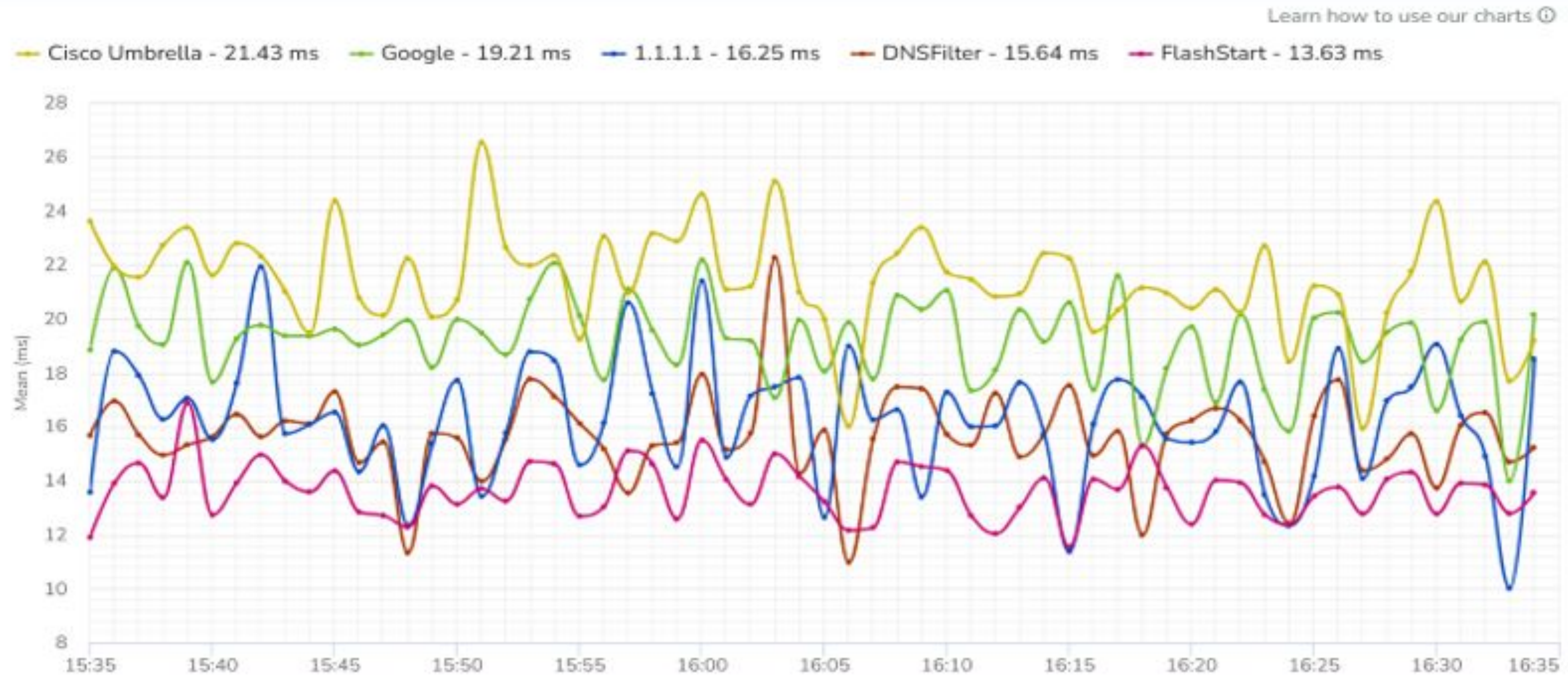
TIME	MS	RESOLVER	NS	N ID	NODE IP	CONTINENT	COUNTRY	CITY	ASN	ISP
Jun 9, 14:56:39	1	FlashStart	185.236.104.104	436	18.228.245.xxx	South America	Brazil	Sao Paulo	16509	Amazon.com
Jun 9, 14:56:37	12	FlashStart	185.236.104.104	76	94.176.232.xxx	Europe	Republic of Lithuania	Vilnius	212531	UAB Interneto vizija
Jun 9, 14:56:36	2	FlashStart	185.236.104.104	127	23.92.54.xxx	North America	United States	Los Angeles	35916	Multacom Corporation
Jun 9, 14:56:36	8	FlashStart	185.236.104.104	379	34.168.85.xxx	North America	United States	Portland	396982	Google Cloud
Jun 9, 14:56:36	4	FlashStart	185.236.104.104	434	176.58.89.xxx	Europe	Netherlands	Amsterdam	36236	NetActuate
Jun 9, 14:56:36	230	FlashStart	185.236.104.104	507	38.54.42.xxx	Asia	Bangladesh	Dhaka	138915	Kaopu Cloud HK
Jun 9, 14:56:36	11	FlashStart	185.236.104.104	62	185.224.199.xxx	Europe	Ireland	Dublin	21130	Iomart Cloud Services
Jun 9, 14:56:35	2	FlashStart	185.236.104.104	118	139.162.84.xxx	Asia	Japan	Tokyo	63949	Akamai Connected Cloud
Jun 9, 14:56:35	3	FlashStart	185.236.104.104	559	169.44.29.xxx	North America	United States	Dallas	36351	SoftLayer Technologies
Jun 9, 14:56:34	4	FlashStart	185.236.104.104	413	148.163.220.xxx	South America	Brazil	Sao Paulo	36236	NetActuate
Jun 9, 14:56:31	5	FlashStart	185.236.104.104	342	69.36.182.xxx	North America	United States	New York City	13213	UK2.NET
Jun 9, 14:56:31	1	FlashStart	185.236.104.104	362	74.207.234.xxx	North America	United States	Atlanta	63949	Akamai Connected Cloud
Jun 9, 14:56:31	4	FlashStart	185.236.104.104	428	192.73.242.xxx	North America	United States	Denver	36236	NetActuate
Jun 9, 14:56:30	15	FlashStart	185.236.104.104	528	34.17.56.xxx	Europe	Italy	Turin	396982	Google Cloud
Jun 9, 14:56:30	2	FlashStart	185.236.104.104	544	139.162.111.xxx	Asia	Japan	Tokyo	63949	Akamai Connected Cloud
Jun 9, 14:56:29	2	FlashStart	185.236.104.104	238	45.93.95.xxx	Asia	Israel	Tel Aviv	44709	O.m.c. Computers & Communi...
Jun 9, 14:56:29	2	FlashStart	185.236.104.104	332	178.128.102.xxx	Asia	Singapore	Singapore	14061	Digital Ocean



Europe, London DC34, AS62240  query time: 3ms	"Manchester-FW"	Europe, Vienna DC154, AS203833  query time: 0ms	"Vienna-FW"	Europe, London DC423, AS36236  query time: 3ms	"London-FW"	Europe, Hamina DC372, AS396982  query time: 7ms	"Stockholm-FW"
Europe, Reykjavik DC170, AS50613  query time: 39ms	"London-FW"	Europe, Frankfurt am Main DC374, AS396982  query time: 3ms	"Frankfurt-FW2"	Europe, Sandefjord DC169, AS56655  query time: 12ms	"Stockholm-FW"	Europe, Dublin DC439, AS16509  query time: 11ms	"London-FW"
Europe, Iasi DC357, AS39798  query time: 24ms	"Istanbul-FW"	Europe, Manchester DC500, AS20473  query time: 4ms	"Manchester-FW"	Europe, Brugge DC93, AS9009  query time: 3ms	"Amsterdam-FW-DP"	Europe, Chisinau DC99, AS43289  query time: 16ms	"Sofia-FW"
Europe, Amsterdam DC25, AS43350  query time: 4ms	"Amsterdam-FW"	Europe, Barcelona DC86, AS43578  query time: 8ms	"Madrid-FW"	Europe, Vienna DC537, AS57169  query time: 0ms	"Vienna-FW"	Europe, Amsterdam DC434, AS36236  query time: 0ms	"Amsterdam-FW"
Europe, Frankfurt am Main DC426, AS36236  query time: 8ms	"Frankfurt-FW-DP"	Europe, Groningen DC375, AS396982  query time: 8ms	"Amsterdam-FW"	Europe, Madrid DC421, AS36236  query time: 4ms	"Madrid-FW"	Europe, Copenhagen DC570, AS136258  query time: 8ms	"Stockholm-FW"
Europe, Frankfurt am Main DC155, AS44066  query time: 4ms	"Frankfurt-FW2"	Europe, Vilnius DC76, AS212531  query time: 8ms	"Warsaw-FW"	Europe, Dublin DC119, AS30900  query time: 8ms	"Manchester-FW"	Europe, Frankfurt am Main DC137, AS9009  query time: 7ms	"Amsterdam-FW-DP"
Europe, Saint Petersburg DC38, AS43317  query time: 8ms	"Stockholm-FW"	Europe, Vienna DC538, AS57169  query time: 0ms	"Vienna-FW"	Europe, London DC19, AS59764  query time: 7ms	"Paris-FW"	Europe, Amsterdam DC344, AS13213  query time: 0ms	"Amsterdam-FW"
Europe, Bucharest DC432, AS36236  query time: 15ms	"Vienna-FW"	Europe, Amsterdam DC2, AS20473  query time: 0ms	"Amsterdam-FW"	Europe, Saint-Ghislain DC267, AS396982  query time: 4ms	"Paris-FW"	Europe, Munich DC462, AS61098  query time: 12ms	"Frankfurt-FW2"

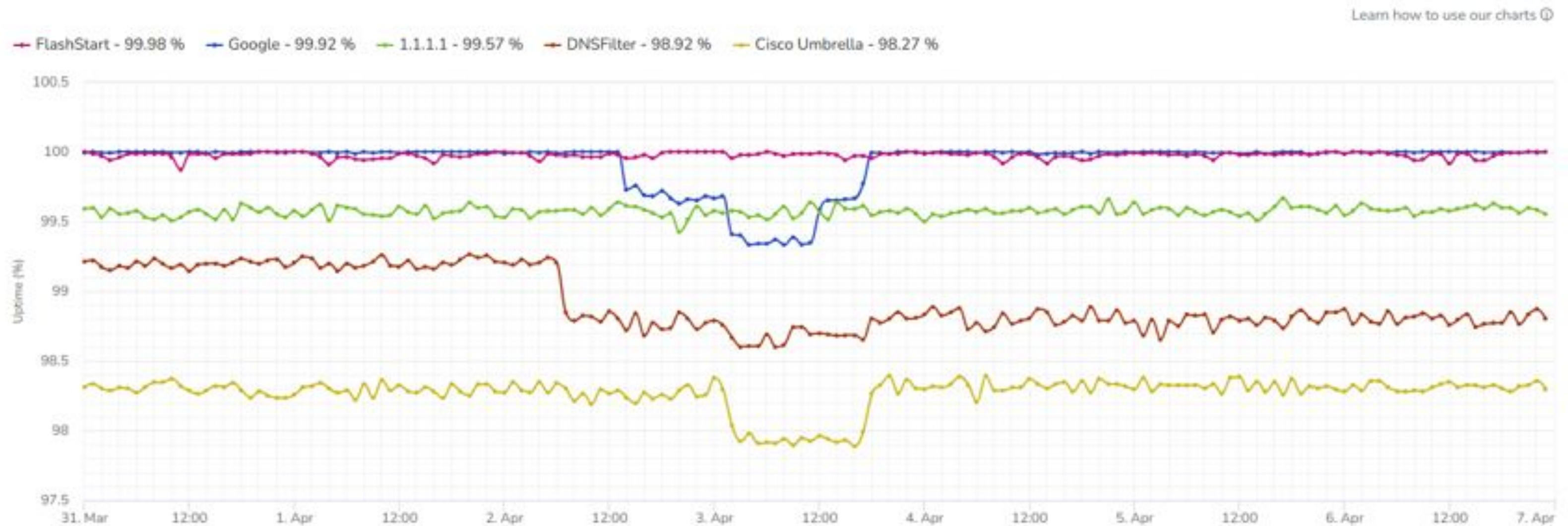


# Top 5 filtering DNS comparison





# Global uptime last 7 days





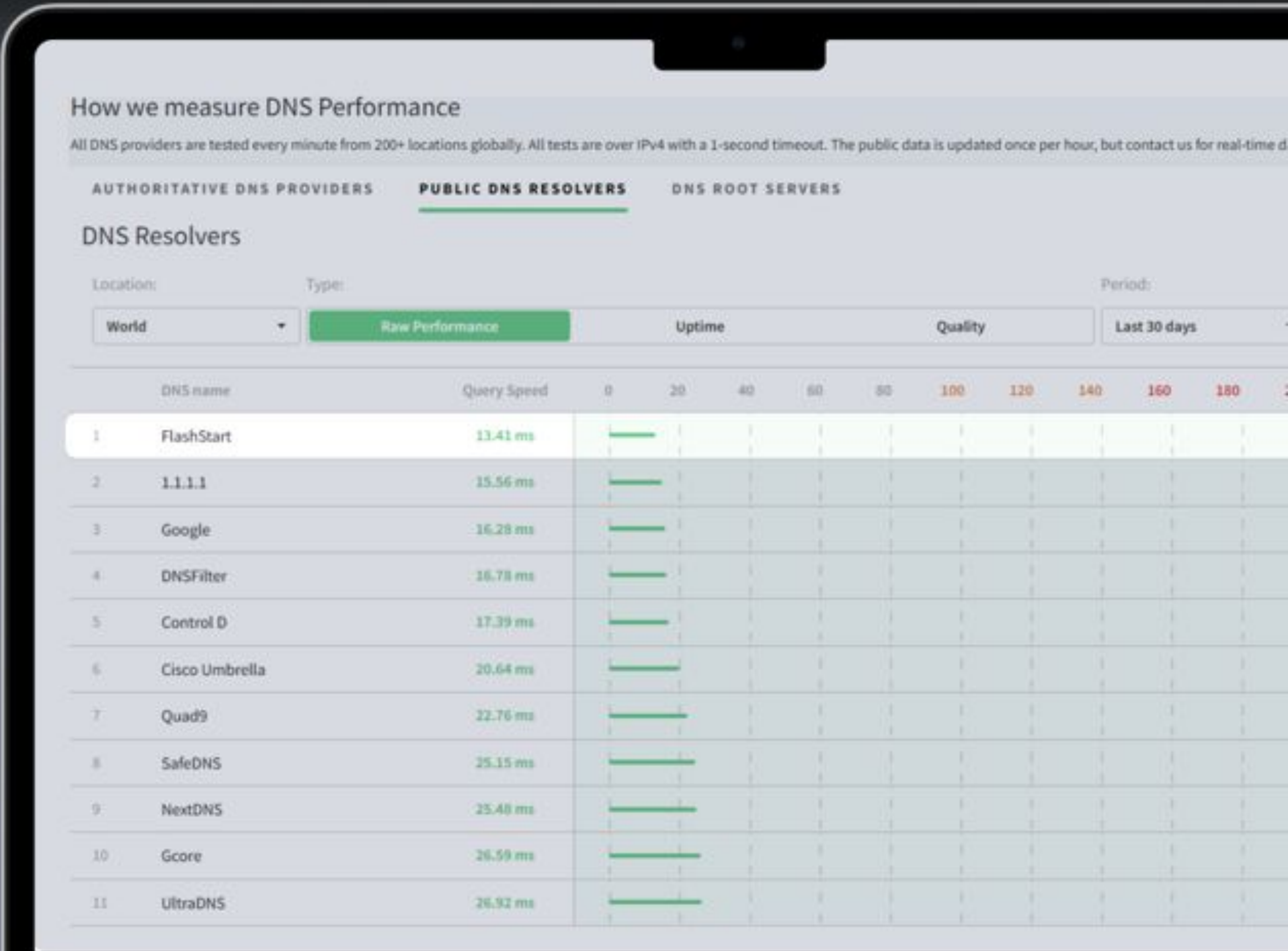
# DNS Performance







FlashStart is the fastest secure DNS!







# Increase the resilience and reliability of DNS



# Le Federation

- Peaks management.
- DDOS management.
- Management of degraded nodes.





# BGP re-routing

- Quality monitoring.
- Monitoring unreplied.
- Monitoring packetloss.
- Instant re-routing action.





# The role of AI is critical

Currently, **FlashStart's artificial intelligence** provides:

- **98.5% of domains** predicted correctly.
- **More than 10K** new domains per day.
- Support for more than **45 languages**.





## **Future developments...Passive DNS.**

**It is based on Domain > IP Address  
analysis  
and is efficient when scaled to large  
numbers.**

**The role of AI in the context is important.**



# Q & A



**Thank you  
for listening !!!**





✉ [welcome@flashstart.com](mailto:welcome@flashstart.com)

🏠 [FlashStart Group](#)

▶ [FlashStart Internet Protection](#)