Quality of Internet : Iran

Analytical Report on Disruptions, Restrictions, and Internet Speed

Fifth Report - Summer 2025

TEHRAN
انجمن
تجارت
الکترونیک
تهران

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Summary

The internet is the root foundation of the digital economy. Without quality internet, the formation of a digital economy is impossible. The widespread recession and notable shutdown of technology companies, the migration of technology experts, and the relocation of startups to neighboring countries, although driven by various reasons, are certainly linked in part to problems related to internet quality.

The deteriorating condition of the internet in Iran, in addition to technical issues, has caused widespread disappointment among technology professionals and has ultimately destroyed hopes of building a strong and globally recognized technology ecosystem. To better clarify this matter and assess internet quality more accurately, we divided it into three indicators: disruption, restriction, and speed, and examined each of them separately.

Internet Quality

The quality of the internet in Iran is in a «critical» state. Internet access in Iran is disrupted, restricted, and slow. More precisely, among the 100 countries with the highest gross domestic product (GDP), Iran ranks as having the second most disrupted internet after Myanmar, the second most restricted internet after China, and is among the five slowest internets in the world.[1]

SPEED

«Speed»
refers to high bandwidth and low latency in loading a website or online content. This indicator is one of the key drivers behind the emergence and widespread adoption of new technologies in the digital economy.

CENSORSHIP

«Censorship»
refers to the filtering of internet domains and IP addresses, and it is one of the main causes of internet inefficiency within a given geographical area.

DISTRUPTION

«Disruption»
refers to the loss of part of the information during an internet connection. Disruption is the most significant factor causing ordinary users—without necessarily understanding the reason—to have a poor experience when using the internet and, more broadly, online services.

1-In the comparison tables, we also included two important neighboring countries—Turkey and the United Arab Emirates—as well as two Asian countries, Malaysia and South Korea. In recent years, these countries have experienced remarkable economic growth by relying on technology. While half a century ago Iran had a higher gross domestic product (GDP) than all four of these countries, today it faces the weakest economic situation among them.

Disruption in Iran's Internet

Verified based on three independent sources (OONI data – ArvanCloud Radar – Case Studies)

DISTRUPTION Rank in the world

Under current conditions, the main problem with the internet in Iran is the widespread and constant disruptions affecting nearly all IP addresses and websites worldwide. In practice, instead of defining a specific blacklist of unauthorized websites, websites and IP addresses have been divided into three categories:

1- Domains and IP addresses that have been filtered — Blacklist

2- Domains and IP addresses that have been selectively permitted — Whitelist

3- All other domains and IP addresses, which cover nearly the entire internet, and are subject to deliberate disruption — Greylist

Our examination of the domains and IP addresses on the greylist, which constitute the majority of the internet, shows that government-controlled equipment deliberately creates disruptions, causing up to 50% of transmitted data to encounter problems when reaching these destinations. This issue is the primary and widely felt reason behind the strong dissatisfaction users are currently expressing about internet use.

Rank in the world

		Anomaly (10% - 50% fail)		Filter (> 50% fail)		Normal (< 10% fail)	
		count	%	count	%	count	%
	Czechia	0	1%	1	1%	99	99%
	⋮						
	Turkey	1	1%	5	5%	94	94%
	South Korea	2	2%	0	0%	98	98%
	Malaysia	2	2%	0	0%	98	98%
	⋮						
	UAE	7	10%	6	9%	55	81%
	⋮						
	Pakistan	12	12%	0	0%	88	88%
99	Iran	14	14%	45	45%	41	41%
	Myanmar	15	15%	1	1%	84	84%

For the purpose of comparing Iran with other countries and expanding our tests, based on OONI data, we examined disruptions affecting 100 selected[1] domains across 100 different countries. We measured the percentage of websites that experienced more than 10% disruption over the course of one month.

The results showed that Iran, after Myanmar, had the highest level of disruption. In Iran, in addition to 45 websites that were inaccessible in at least 50% of the cases, 14 websites showed disruption levels between 10% and 50%. To expand the statistical sample, we reduced the number of countries and ultimately tested 300 websites in the world's top 50 countries by GDP[2]. The results again placed Iran at the top of the global disruption ranking, with 33.3% (100 out of 300 websites) filtered and 18% (54 out of 300 websites) disrupted.

The main cause of these disruptions is the new and flawed policy of "smart filtering" implemented by the Ministry of Communications (Infrastructure Communications Company – Protection Committee). This policy has created widespread and systematic disruptions for most websites and IP addresses worldwide. In practice, at present, any type of internet traffic that has not been selectively authorized by the responsible authorities (whitelist) is automatically subjected to disruption.

1- We extracted and analyzed the world's top 100 countries by GDP as reported by the World Bank. However, in the OONI system, sufficient data was not available for Angola (rank 69), Panama (rank 75), Congo (rank 88), and Turkmenistan (rank 93). In addition, the number of error measurements in Cuba and the United Arab Emirates was lower compared to other countries.

2- We had expected the list of websites to be tested in at least 80% of the countries. As a result, we adjusted the scope of analysis to the top 50 countries by GDP ranking.

Censorship in Iran’s Internet

Verified based on four independent sources (OONI data – Freedom House report – SimilarWeb data – Surfshark data)

In our review of the world’s top 100 websites (selected according to their ranking on SimilarWeb), more than 33% of them are inaccessible (filtered) in Iran. This proportion remains consistent when examining the top 200 websites. Based on OONI data, in two separate samples of 100 and 300 websites across 100 countries, Iran ranked as having the second most restricted internet in the world after China—with 50% of websites filtered in China, compared to 45% in Iran. Egypt, Russia, and Oman hold the third to fifth positions, respectively.

Although pornographic websites such as xvi**.com and por**.com are also commonly filtered in countries like South Korea, Turkey, and Malaysia, Iran’s unchecked, unjustified, and excessive filtering—including the blocking of countless websites without legal basis—has resulted in extensive restrictions on internet access. Iran, along with China and Turkmenistan, is among the only countries within the world’s top 100 economies to have blocked all six of the world’s most widely used social media platforms.

The expansion of such restrictions has reached a point where using the internet without a VPN has become virtually impossible. According to Peivast’s monthly report, 96% of Iranian users rely on VPNs on a daily basis.

Social media Censorship

Iran	✗	✗	✗	✗	✗	✗
UAE[1]	✓	✓	✓	✓	✗	✗
Turkye	✓	✓	✓	✓	✓	✓
Malaysia	✓	✓	✓	✓	✓	✓
South Korea	✓	✓	✓	✓	✓	✓

Rank in the world		Filter (C %)	
	South Korea	0	0 %
	Malaysia	0	0 %
⋮			
	Turkye	5	5 %
	UAE	6	9 %
⋮			
	Egypt	22	22 %
99	Iran	45	45 %
	China	50	50 %

The main reason for this issue is the country's macro policies and the decentralized decisions made by 1- The Prosecutor's Office and the Judiciary 2- The Commission for Determining Instances of Criminal Content 3- The Supreme National Security Council and the National Security Council 4- Non-transparent decisions made by certain security institutions.

1- Voice and video calls on Telegram and WhatsApp are restricted in the United Arab Emirates, but general use of these platforms is carried out without limitation.

Speed in Iran’s Internet

Verified based on four independent sources (Cloudflare data – Meter.net data – two Iranian FCP datasets)

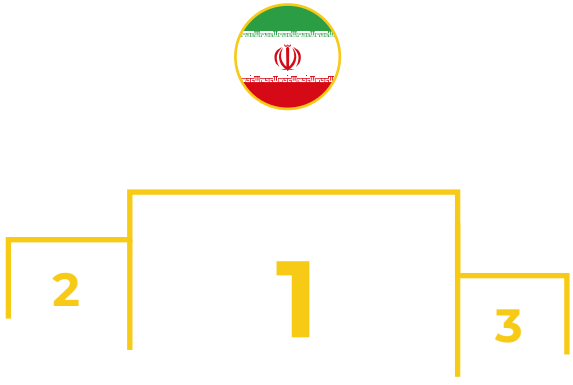
Based on Cloudflare Radar data, verified with the Meter.net database, the average internet speed in Iran is 4 Mbps, with an average latency of 145 ms. In this regard, Iran ranks 97th out of 100 countries in speed and 96th out of 100 in latency. In this ranking, only Sudan (3.4 Mbps), Cameroon (3 Mbps), and Cuba (2.3 Mbps) have slower internet speeds than Iran.

A closer look at countries in the same regional group as Iran in Asia shows a clear correlation between economic growth and growth in digital technology indicators, including internet quality and speed. Average speeds in these countries are significantly higher: Turkey at 12 Mbps, Malaysia at 22 Mbps, the United Arab Emirates at 26 Mbps, and South Korea at 60 Mbps.

Rank in the world

rank	Country	50% Avg (Mbps)
1	Singapore	67.4
2	Korea	60.3
3	Hong Kong	47.6
4	Sweden	41.1
5	Switzerland	40.3
⋮		
26	UAE	26.7
39	Malaysia	22.7
54	Turkey	12.6
⋮		
96	Ghana	4.2
97	Iran	4.1
98	Sudan	3.4
99	Cameroon	3.0
100	Cuba	2.3

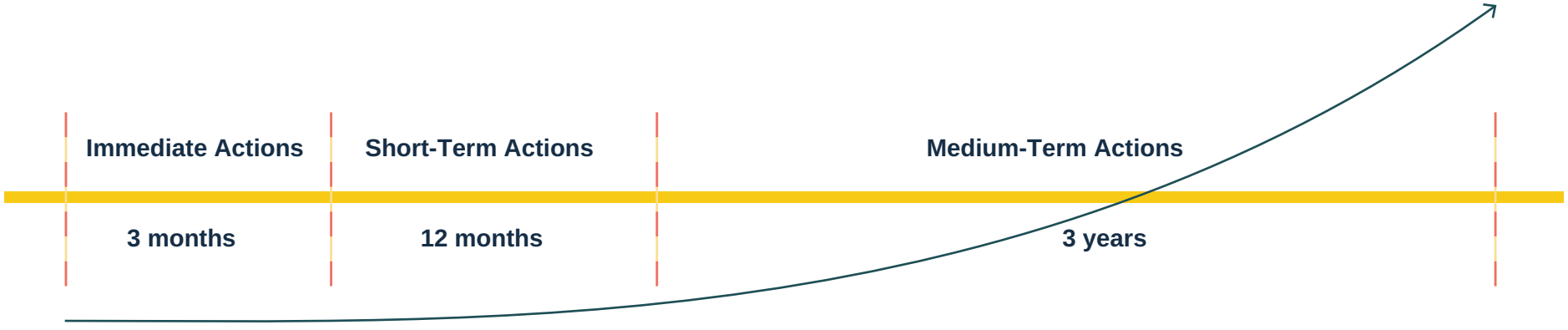
The main reasons for the low internet speed in Iran are the poor performance and inefficiency of the Telecommunications Company of Iran at the Access layer, the decline in investment in telecom infrastructure, the slow progress in developing 5G and fiber optic networks, and finally, the poor performance and inefficiency of the Infrastructure Communications Company at the Core layer. It should be noted, however, that even without any changes at the Access and communications layer, and solely through improvements at the Core layer, internet speed in Iran could increase up to eight times in mobile internet and up to three times in fixed internet.



Iran
The Champion of Low-Quality Internet in the World!

In total, with two runner-up positions and one honorable mention, and a score of -294 points, Iran can be regarded as the champion of low-quality internet in the world.

Even in Myanmar, which has the highest level of internet disruption, only 1% of websites are filtered, while its average internet speed is 8.8 Mbps—twice that of Iran—and its average latency is 69 ms, far lower than Iran’s.



Requests and Practical Solutions for Improving Internet Quality

Shedding light on a crisis and acknowledging the problem is an important part of the solution. This is the path we have tried to take in this report. In the continuation of this effort, and in future reports which we will also publish publicly, we aim to present our proposed practical solutions in detail, step by step, to policymakers, government executives, and the public.

In brief, the 10 key solutions requested by the private sector can be categorized into three groups: Immediate Actions, Short-Term Actions, and Medium-Term Actions.

Immediate Actions

1 to 3 months

- Preventing disruptions in the internet under the pretext of combating VPNs
- Transparent and quantitative reporting by the Ministry of Communications on international gateways, and the reinstatement of online monitoring systems such as tehran-ix
- Prohibiting government agencies from permanently restricting systems to “Iran Access” only

Short-Term Actions

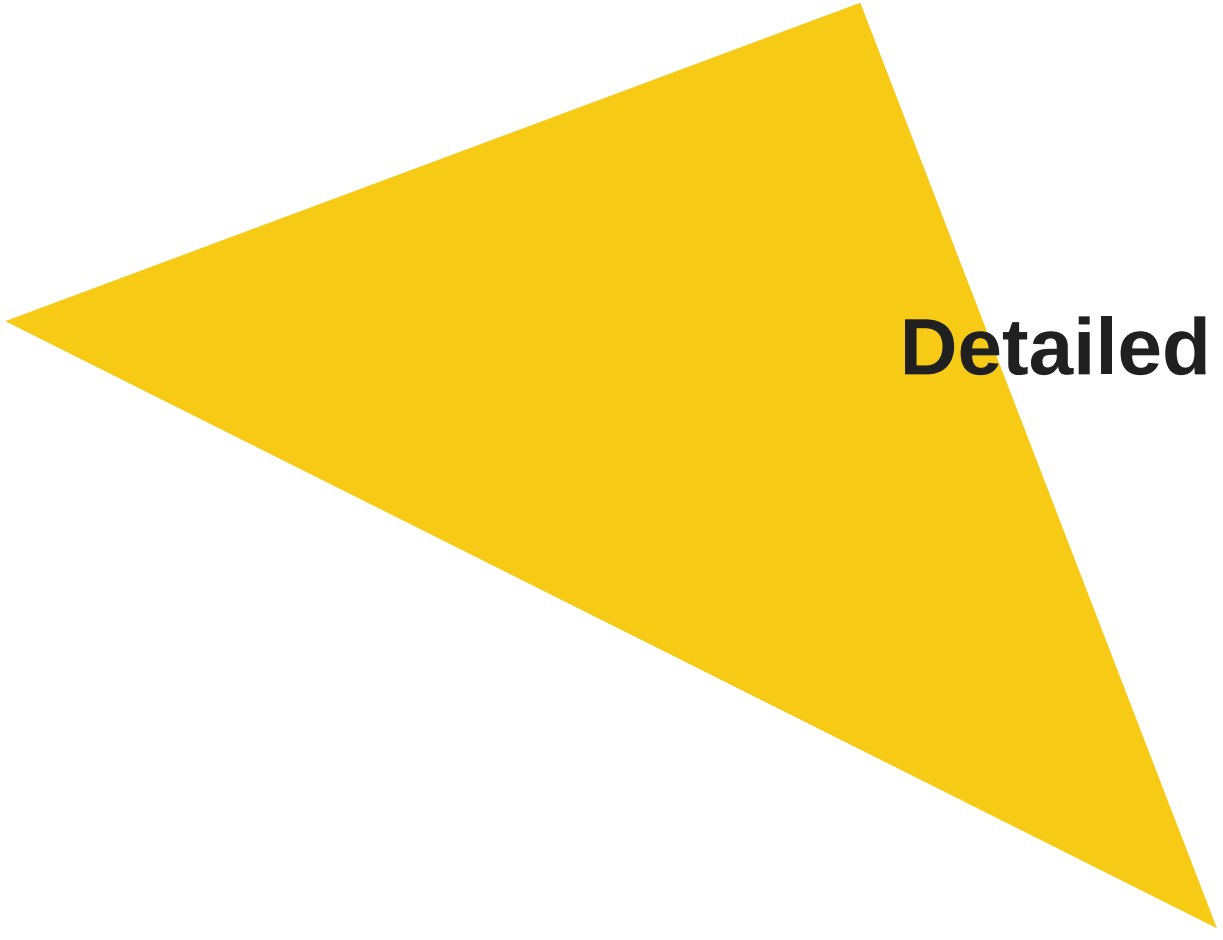
3 to 12 months

- Lifting the ban on public websites needed by the people and improving Iran’s Internet Freedom Index
- Increasing international bandwidth and providing transparent reports of it to the public
- Establishing transparency platforms regarding filtering policies, with mechanisms for inquiry, complaints, and follow-up on the unblocking of IPs and domains

Medium-Term Actions

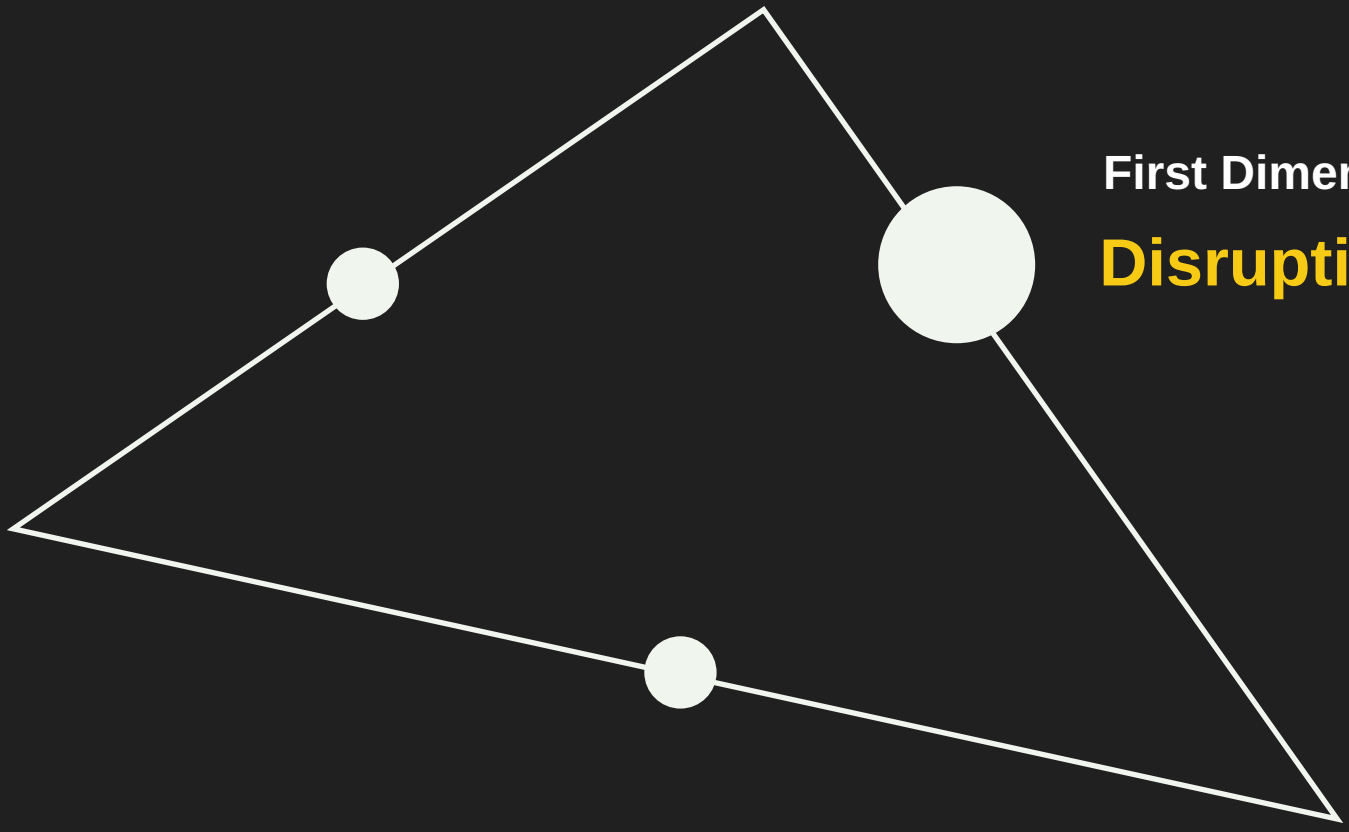
12 to 36 months

- Ending the monopoly of the Infrastructure Communications Company and granting licenses for internet imports by the private sector
- Investing in the expansion of fiber optic networks and the development of fixed communications
- Investing in the expansion of 5G communications
- Establishing mutual international interests and sustainable relations with global technology companies, with maximum participation of the private sector



Detailed Report

D I S T R U P T I O N



First Dimension

Disruption in Iran’s Internet

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Disruption in Iran’s Internet

Under current conditions, the main problem with the internet in Iran is the widespread and constant disruptions affecting nearly all IP addresses and websites worldwide. In practice, instead of defining a specific blacklist of unauthorized websites, websites and IP addresses are divided into three categories:

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Although this report aims to provide a clear picture of the current state of the internet in Iran without delving into historical background, it is important to note that today’s conditions of poor quality and constant disruption have gradually emerged over the past two years as a result of new filtering policies in Iran.

Preliminary Review

For the preliminary review, we referred to the website https://ooni.org , which operates to detect disruptions and censorship worldwide. We extracted the raw data from the past month (2023/06/09 to 2023/07/09) and used it for the initial assessment. During this period, five million tests were conducted from probes in 165 countries around the world. From among the world's top 100 countries by GDP, sufficient data was available for 96 countries. For comparison, we considered the 3,000 most accessible websites—those with the highest global ranking according to Tranco[1] data and that had been tested in at least 80% of these countries. The results were then compared across countries.

For classification, any website where the number of failed requests was between 10% and 50% of total requests was considered to show disruption, and any website where failed requests exceeded 50% was considered to be filtered.

1 .https://tranco-list.eu

	Country	Anomaly Count	%	Filter Count	%	Normal Count	%	Total Count	Total%
	Czechia	0	0%	1	1%	99	99%	100	100%
	...								
	TURKIYE	1	1%	5	5%	94	94%	100	100%
	KOREA	2	2%	0	0%	98	94%	100	100%
	MALAYSIA	2	2%	0	0%	98	98%	100	
	...								100%
	CAMEROON	5	5%	1	1%	94	94%	100	100%
	BELARUS	5	6%	4	5%	72	89%	81	100%
	EGYPT	6	6%	22	22%	72	72%	100	100%
	BANGLADESH	6	6%	2	2%	92	92%	100	100%
	INDONESIA	6	6%	4	4%	90	90%	100	100%
	UAE	7	10%	6	9%	55	81%	68	100%
	ESTONIA	7	7%	1	1%	92	92%	100	100%
	NIGERIA	7	8%	1	1%	79	91%	87	100%
	PAKISTAN	12	12%		0%	88	88%	100	100%
99	IRAN	14	14%	45	45%	41	41%	100	100%
	MYANMAR	15	15%	1	1%	84	84%	100	100%

secure.flickr.com 64%	avatars.mds.yandex.net 2%	www.ning.com 5%	www.cbsnews.com 93%	telegram.org 94%	surfshark.com 93%
timesofindia.indiatimes.com 92%	creativecommons.org 4%	www.cdc.gov 4%	www.latimes.com 7%	weibo.com 94%	vk.com 93%
www.telegraph.co.uk 91%	www.who.int 5%	www.ohchr.org 9%	en.wikipedia.org 2%	www.cbc.ca 4%	www.grindr.com 92%
www.aljazeera.com 3%	www.rambler.ru 94%	slashdot.org 4%	www.nbcnews.com 4%	www.foxnews.com 95%	www.linkedin.com 11%
www.photobucket.com 93%	www.huffpost.com 94%	www.bing.com 10%	substack.com 8%	www.reuters.com 14%	www.4chan.org 93%
www.washingtonpost.com 87%	www.reddit.com 94%	download.cnet.com 11%	www.aljazeera.net 3%	imageshack.com 93%	nypost.com 46%
www.whatsapp.com 93%	9gag.com 93%	www.bbc.co.uk 91%	certbot.eff.org 71%	www.ilo.org 11%	slate.com 45%
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www.hootsuite.com 75%	twitter.com 96%	www.meetme.com 94%	www.ft.com 24%	preview.redd.it 31%	www.mail.lycos.com 4%
disqus.com 8%	cdn.fbsbx.com 68%	www.rfi.fr 10%	ria.ru 10%	encrypted-tbn0.gstatic.com 1%	www.nytimes.com 27%
www.yelp.com 8%	vimeo.com 93%	www.viber.com 36%	www.patreon.com 4%	www.meetup.com 6%	threema.ch 93%
cyber.harvard.edu 4%	abc.go.com 93%	www.douyin.com 93%	www.tiktok.com 94%	mega.nz 2%	www.wordreference.com 5%
foursquare.com 4%	www.youtube.com 96%	clubhouse.pubnub.com 4%	badoo.com 94%	www.pandora.com 98%	edition.cnn.com 94%
www.unicef.org 4%	www.echr.coe.int 6%	proton.me 3%	www.dw.com 94%	massbrowser.cs.umass.edu 17%	www.snapchat.com 94%
www.gnu.org 4%	mask-api.icloud.com 3%	www.lemonde.fr 94%	www.facebook.com 96%	www.rt.com 6%	www.brookings.edu 2%
www.opendns.com 3%	www.chinadaily.com.cn 5%	www.quora.com 94%	www.hrw.org 92%	nordvpn.com 92%	
www.microsoft.com 7%	icao.maps.arcgis.com 2%	ocsp.int-x3.letsencrypt.org 1%	www.google.com 32%	www.change.org 94%	

Among the websites that showed disruptions in Iran are several major platforms, including Bing, Google, Reuters, LinkedIn, The New York Times, iCloud, SourceForge, CNET, GitLab, Reddit, and Let's Encrypt.

To ensure the reliability of our review, we increased the sample size of evaluated websites to 300 websites. To keep the comparison fair and to examine websites that had been tested in at least 80% of the countries, we reduced the list to the top 50 countries in the world by GDP.
Even with this adjustment, Iran still ranked at the top among the most disrupted countries.
If we arrange the table based on the combined score of disruption and restriction, from lowest to highest, the result is shown in the following table:

#	Country	Anomaly Count	%	Filter Count	%	Normal Count	%	Total Count	Total%
1	United States	2	0.67%	2	0.00%	298	99.33%	300	100.00%
2	Czechia		0.00%	1	0.67%	298	99.33%	300	100.00%
3	Brazil	2	0.67%		0.33%	297	99.00%	300	100.00%
4	Canada	4	1.33%		0.00%	296	98.67%	300	100.00%
5	Mexico	4	1.33%		0.00%	296	98.67%	300	100.00%
45	Russian Federation	4	1.33%	41	13.67%	255	85.00%	300	100.00%
46	UAE	7	9.33%	6	8.00%	62	82.67%	75	100.00%
47	Cuba		0.00%	3	18.75%	13	81.25%	16[1]	100.00%
48	Egypt, Arab Rep.	19	6.33%	62	20.67%	219	73.00%	300	100.00%
49	China	23	7.67%	125	41.67%	152	50.67%	300	100.00%
50	Iran, Islamic Rep.	54	18.00%	100	33.33%	146	48.67%	300	100.00%

1- Among the 50 countries examined, the sample size for three countries Cuba (16), the United Arab Emirates (75), and Nigeria (145) was fewer than 200 cases.

? Do domestic sources also confirm the existence of such widespread disruptions?

Alongside the data obtained from OONI, ArvanCloud Radar has also shown widespread disruptions in recent months, particularly affecting the Bing website. Case-by-case reviews conducted in various data centers have likewise confirmed these extensive disruptions. In the following sections, we will examine these disruptions and their underlying causes in detail.

Hypothesis

It appears that within the national network, deliberate disruptions are applied across all IPs and connections under the pretext of combating VPNs. Some websites are placed on the whitelist—either due to public sensitivity or business-related considerations—while deliberate disruption is imposed on all other websites and IP addresses.

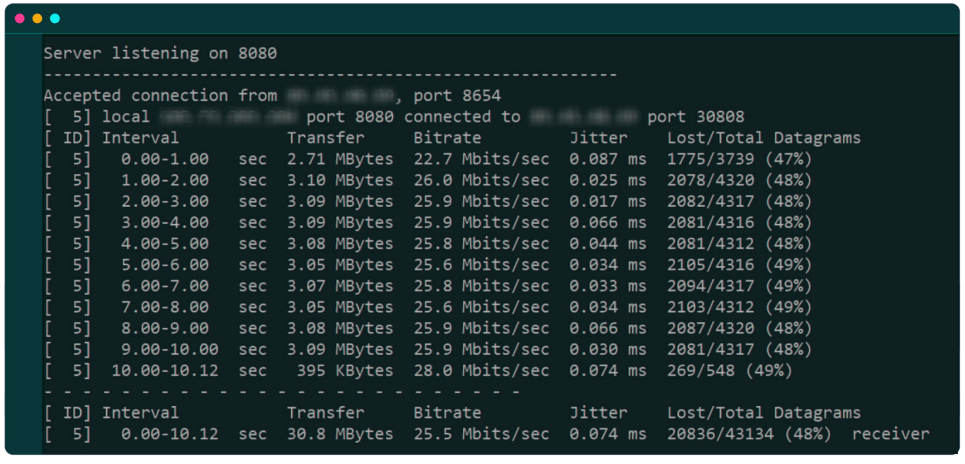
Testing the Hypothesis on Hamrah Aval Mobile Internet

Using the[1] iperf3[2] tool, we established a connection between a node acting as a server located in Turkey and a simple client node in the Hamrah Aval data center. For this test, we used a clean IP address for the Turkish server—meaning an IP that was not filtered and had not been used over the past year. To ensure accuracy, even the connection to the server was initiated through a separate IP address.[3]

We first ran the test with /bitrate 50 Mbits/sec using the UDP protocol. The upload speed on Hamrah Aval was 50 Mbps, while the download speed in Turkey was 25 Mbps. This clearly shows that more than 50% of the traffic was lost on the route from Iran to Turkey.

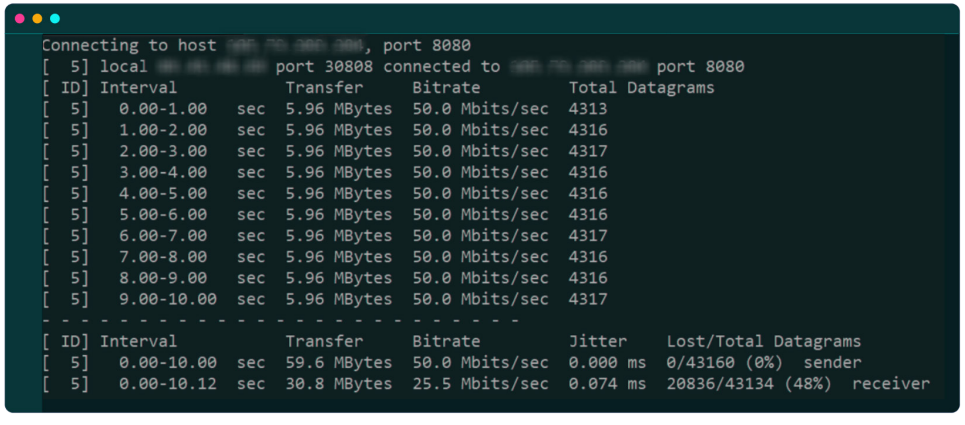
1- In the tests conducted in this report, using the objdump tool, the evaluated traffic at the network layer was carefully inspected and recorded, in order to validate the results through further review.
2- https://github.com/esnet/iperf
3- Traffic related to SSH and management protocols was routed through a different IP range.

```
$ iperf3 -c x.x.x.x -p 80808 -y -b 50m
```



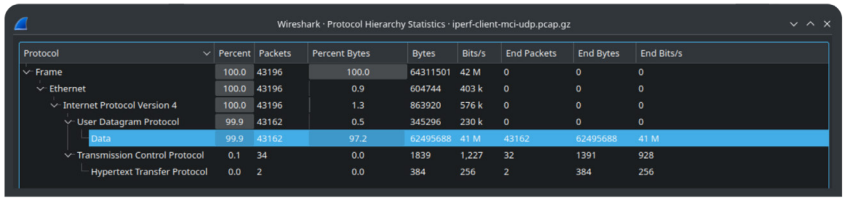
```
Server listening on 8080
-----------------------------------------------------------
Accepted connection from [redacted], port 8654
[  5] local [redacted] port 8080 connected to [redacted] port 30808
[ ID] Interval           Transfer     Bitrate         Jitter    Lost/Total Datagrams
[  5]   0.00-1.00   sec  2.71 MBytes  22.7 Mbits/sec  0.087 ms  1775/3739 (47%)
[  5]   1.00-2.00   sec  3.10 MBytes  26.0 Mbits/sec  0.025 ms  2078/4320 (48%)
[  5]   2.00-3.00   sec  3.09 MBytes  25.9 Mbits/sec  0.017 ms  2082/4317 (48%)
[  5]   3.00-4.00   sec  3.09 MBytes  25.9 Mbits/sec  0.066 ms  2081/4316 (48%)
[  5]   4.00-5.00   sec  3.08 MBytes  25.8 Mbits/sec  0.044 ms  2081/4312 (48%)
[  5]   5.00-6.00   sec  3.05 MBytes  25.6 Mbits/sec  0.034 ms  2105/4316 (49%)
[  5]   6.00-7.00   sec  3.07 MBytes  25.8 Mbits/sec  0.033 ms  2094/4317 (49%)
[  5]   7.00-8.00   sec  3.05 MBytes  25.6 Mbits/sec  0.034 ms  2103/4312 (49%)
[  5]   8.00-9.00   sec  3.08 MBytes  25.9 Mbits/sec  0.066 ms  2087/4320 (48%)
[  5]   9.00-10.00  sec  3.09 MBytes  25.9 Mbits/sec  0.030 ms  2081/4317 (48%)
[  5]  10.00-10.12  sec   395 KBytes  28.0 Mbits/sec  0.074 ms  269/548 (49%)
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Jitter    Lost/Total Datagrams
[  5]   0.00-10.12  sec  30.8 MBytes  25.5 Mbits/sec  0.074 ms  20836/43134 (48%)  receiver
```

The client transmitted data at a bitrate of 50 Mbps.

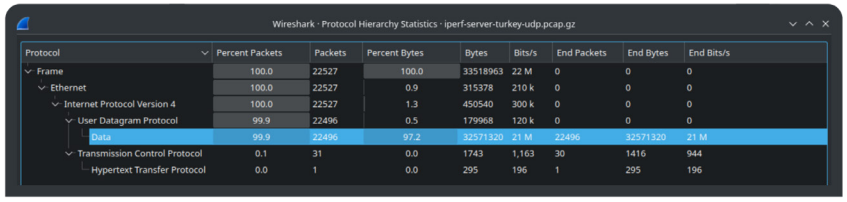


```
Connecting to host [redacted], port 8080
[  5] local [redacted] port 30808 connected to [redacted] port 8080
[ ID] Interval           Transfer     Bitrate         Total Datagrams
[  5]   0.00-1.00   sec  5.96 MBytes  50.0 Mbits/sec  4313
[  5]   1.00-2.00   sec  5.96 MBytes  50.0 Mbits/sec  4316
[  5]   2.00-3.00   sec  5.96 MBytes  50.0 Mbits/sec  4317
[  5]   3.00-4.00   sec  5.96 MBytes  50.0 Mbits/sec  4316
[  5]   4.00-5.00   sec  5.96 MBytes  50.0 Mbits/sec  4316
[  5]   5.00-6.00   sec  5.96 MBytes  50.0 Mbits/sec  4316
[  5]   6.00-7.00   sec  5.96 MBytes  50.0 Mbits/sec  4317
[  5]   7.00-8.00   sec  5.96 MBytes  50.0 Mbits/sec  4316
[  5]   8.00-9.00   sec  5.96 MBytes  50.0 Mbits/sec  4316
[  5]   9.00-10.00  sec  5.96 MBytes  50.0 Mbits/sec  4317
- - - - - - - - - - - - - - - - - - - - - - - - -
[ ID] Interval           Transfer     Bitrate         Jitter    Lost/Total Datagrams
[  5]   0.00-10.00  sec  59.6 MBytes  50.0 Mbits/sec  0.000 ms  0/43160 (0%)  sender
[  5]   0.00-10.12  sec  30.8 MBytes  25.5 Mbits/sec  0.074 ms  20836/43134 (48%)  receiver
```

The server received data at a bitrate of approximately 25 Mbps.



Analysis of the pcap file on the Hamrah Aval node shows that 62,495,688 bytes of data were transmitted.

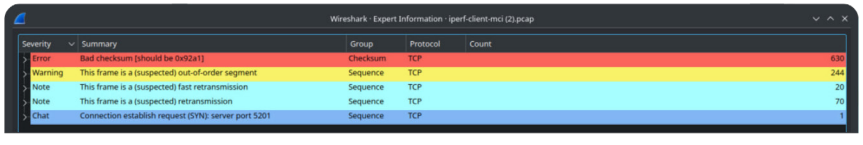


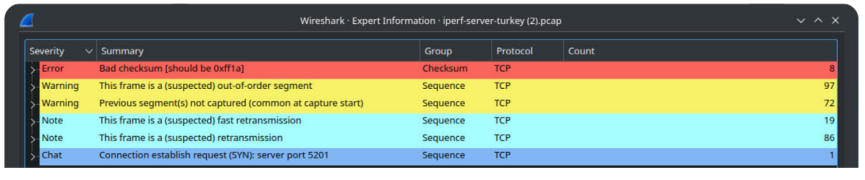
Analysis of the pcap file on the Turkish server node shows that 32,571,320 bytes of data were received only half of the bytes sent.

This test was also repeated through Hamrah Aval Data-LTE internet using an Android client, and similar results were obtained. In addition, the test was conducted with destinations in different countries across Europe, the United States, and Asia, yielding similar outcomes.

In the next step, we repeated the test using the TCP protocol. The results were again similar, with the difference that, due to the structure of TCP, the process of TCP retransmission was used for resending lost packets.

By analyzing the recorded pcap data from both the server and the client, we reached the following results:





Statistical View of the Two Servers

As a result of this issue, with the activation of the Congestion Control mechanism, significant delays occur in the transmission of traffic. In practice, when a user attempts to upload a file even if they eventually succeed after multiple attempts they must pay more than twice the cost to their operator and spend several times longer to complete the task.

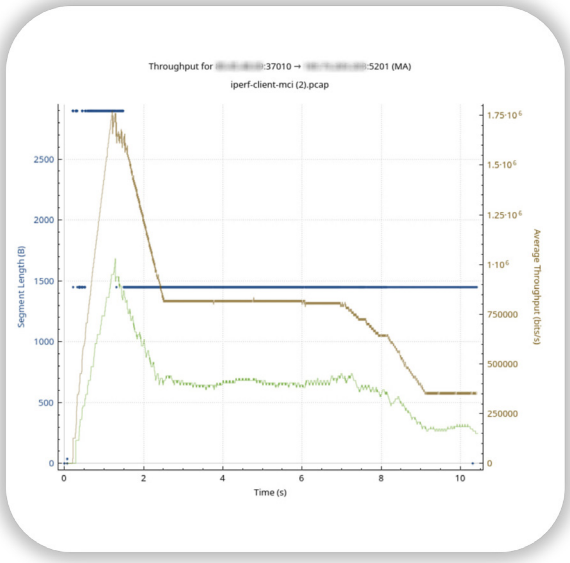


Chart of transmitted data (yellow) and data received by the server (green)

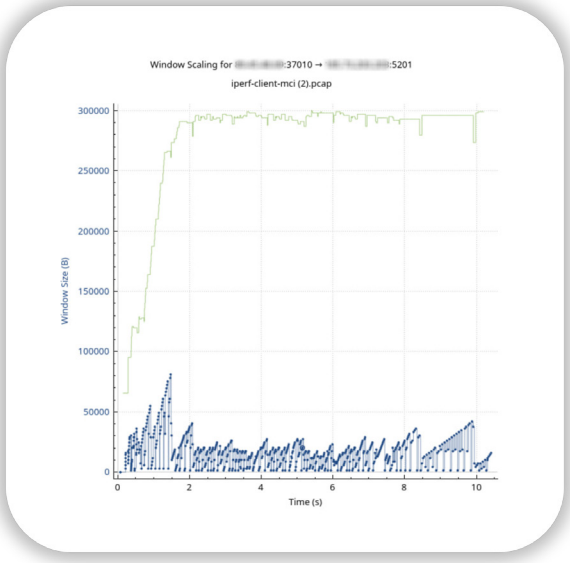
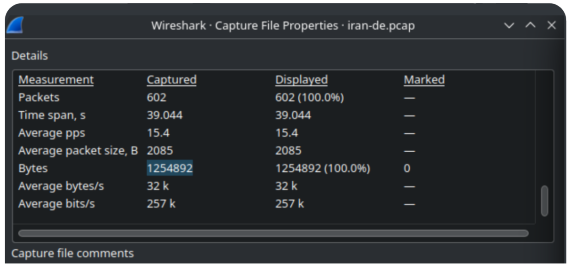
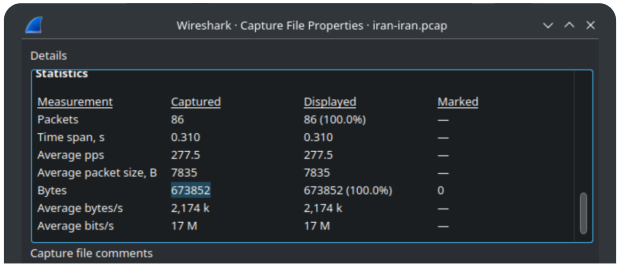


Chart of outgoing bytes (blue) over time

As shown in the figure above, similar to the UDP protocol, there is also a 50% disruption present in TCP.

Financial Impact of This Disruption on the End User





(Right) Iran to Iran – (Left) Iran to Germany – Result of one of the tests showing bytes increased by 1.8 times.

These disruptions have caused the number of bytes (traffic) exchanged with servers outside the country to double on average due to excessive retransmissions. This factor, which is the main reason behind the extremely poor quality of internet in the country, also has a direct impact on consumers. For example, at the time of writing this report, a 7 GB monthly mobile internet package from Hamrah Aval costs 28,200 tomans[1] (≈ $0.56 USD). However, because of this disruption, a user is forced to purchase this package twice to consume the same 7 GB, effectively paying 56,400 tomans (≈ $1.12 USD).

If transparent information about international gateways were published, we could accurately state that the people of Iran are collectively paying several thousand billion tomans each month (tens of millions of USD) as a penalty for no fault of their own costs imposed on them illegally due to these disruptions.

1- https://mci.ir/internet-plans

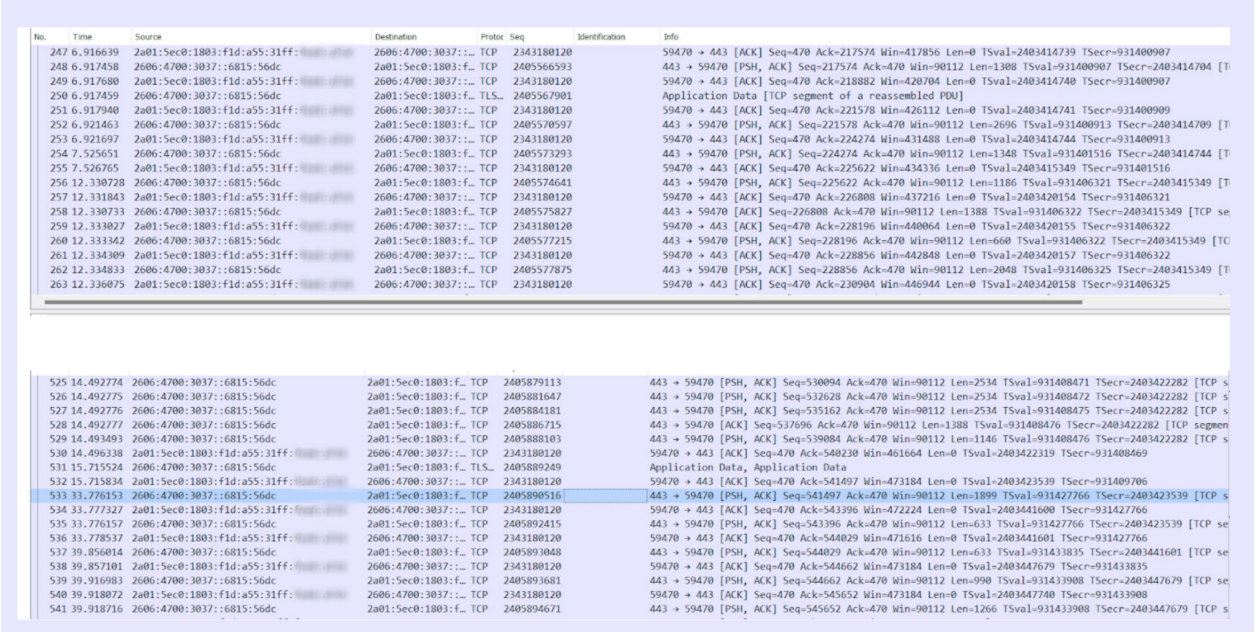
Testing the Hypothesis on Irancell Internet

In Iran, internet services are under the monopoly of the Infrastructure Communications Company. The default configuration of filtering equipment is also installed within this company's network. However, as specified in Resolution No. 4 of Meeting 313 of the Communications Regulatory Authority (dated 1399/11/12 [January 31, 2021])[1], internet operators are permitted to invest in and purchase filtering equipment, install it within their own networks, and benefit from a 10% to 15% discount on internet procurement.

Both Hamrah Aval and Irancell have installed such equipment in their networks, intensifying disruptions and causing harm to the domestic network and inter-operator traffic. Hamrah Aval uses filtering equipment from Yafaar, while Irancell uses filtering equipment from Douran. As a result, the behavior and policies applied by these operators differ from one another.

In the Irancell network, it is not even possible to conduct tests using iperf or iperf3, as packets on the inside-to-outside route are completely filtered. Similarly, the use of the SSH protocol on Irancell is practically impossible due to extremely high latency.

1- https://tic.ir/Content/media/image/2021/02/56230_orig.pdf



No.	Time	Source	Destination	Protoc	Seq	Identification	Info
247	6.916639	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=217574 Win=417856 Len=0 TSval=2403414739 TSecr=931400907
248	6.917458	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405566593		443 → 59470 [PSH, ACK] Seq=217574 Ack=470 Win=90112 Len=1308 TSval=931400907 TSecr=2403414704 [T
249	6.917680	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=218882 Win=420704 Len=0 TSval=2403414740 TSecr=931400907
250	6.917459	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TLS…	2405567901		Application Data [TCP segment of a reassembled PDU]
251	6.917940	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=221578 Win=426112 Len=0 TSval=2403414741 TSecr=931400909
252	6.921463	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405570597		443 → 59470 [PSH, ACK] Seq=221578 Ack=470 Win=90112 Len=2696 TSval=931400913 TSecr=2403414709 [T
253	6.921697	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=224274 Win=431488 Len=0 TSval=2403414744 TSecr=931400913
254	7.525651	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405573293		443 → 59470 [PSH, ACK] Seq=224274 Ack=470 Win=90112 Len=1348 TSval=931401516 TSecr=2403414744 [T
255	7.526765	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=225622 Win=434336 Len=0 TSval=2403415349 TSecr=931401516
256	12.330728	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405574641		443 → 59470 [PSH, ACK] Seq=225622 Ack=470 Win=90112 Len=1186 TSval=931406321 TSecr=2403415349 [T
257	12.331843	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=226808 Win=437216 Len=0 TSval=2403420154 TSecr=931406321
258	12.330733	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405575827		443 → 59470 [ACK] Seq=226808 Ack=470 Win=90112 Len=1388 TSval=931406322 TSecr=2403415349 [TCP se
259	12.333027	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=228196 Win=440064 Len=0 TSval=2403420155 TSecr=931406322
260	12.333342	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405577215		443 → 59470 [PSH, ACK] Seq=228196 Ack=470 Win=90112 Len=660 TSval=931406322 TSecr=2403415349 [TC
261	12.334309	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=228856 Win=442848 Len=0 TSval=2403420157 TSecr=931406322
262	12.334833	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405577875		443 → 59470 [PSH, ACK] Seq=228856 Ack=470 Win=90112 Len=2048 TSval=931406325 TSecr=2403415349 [T
263	12.336075	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=230904 Win=446944 Len=0 TSval=2403420158 TSecr=931406325
525	14.492774	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405879113		443 → 59470 [PSH, ACK] Seq=530094 Ack=470 Win=90112 Len=2534 TSval=931408471 TSecr=2403422282 [TCP s
526	14.492775	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405881647		443 → 59470 [PSH, ACK] Seq=532628 Ack=470 Win=90112 Len=2534 TSval=931408472 TSecr=2403422282 [TCP s
527	14.492776	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405884181		443 → 59470 [PSH, ACK] Seq=535162 Ack=470 Win=90112 Len=2534 TSval=931408475 TSecr=2403422282 [TCP s
528	14.492777	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405886715		443 → 59470 [ACK] Seq=537696 Ack=470 Win=90112 Len=1388 TSval=931408476 TSecr=2403422282 [TCP segmen
529	14.493493	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405888103		443 → 59470 [PSH, ACK] Seq=539084 Ack=470 Win=90112 Len=1146 TSval=931408476 TSecr=2403422282 [TCP s
530	14.496338	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=540230 Win=461664 Len=0 TSval=2403422319 TSecr=931408469
531	15.715524	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TLS…	2405889249		Application Data, Application Data
532	15.715834	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=541497 Win=473184 Len=0 TSval=2403423539 TSecr=931409706
533	33.776153	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405890516		443 → 59470 [PSH, ACK] Seq=541497 Ack=470 Win=90112 Len=1899 TSval=931427766 TSecr=2403423539 [TCP s
534	33.777327	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=543396 Win=472224 Len=0 TSval=2403441600 TSecr=931427766
535	33.776157	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405892415		443 → 59470 [PSH, ACK] Seq=543396 Ack=470 Win=90112 Len=633 TSval=931427766 TSecr=2403423539 [TCP se
536	33.778537	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=544029 Win=471616 Len=0 TSval=2403441601 TSecr=931427766
537	39.856014	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405893048		443 → 59470 [PSH, ACK] Seq=544029 Ack=470 Win=90112 Len=633 TSval=931433835 TSecr=2403441601 [TCP se
538	39.857101	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=544662 Win=473184 Len=0 TSval=2403447679 TSecr=931433835
539	39.916983	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405893681		443 → 59470 [PSH, ACK] Seq=544662 Ack=470 Win=90112 Len=990 TSval=931433908 TSecr=2403447679 [TCP se
540	39.918072	2a01:5ec0:1803:f1d:a55:31ff:	2606:4700:3037::…	TCP	2343180120		59470 → 443 [ACK] Seq=470 Ack=545652 Win=473184 Len=0 TSval=2403447740 TSecr=931433908
541	39.918716	2606:4700:3037::6815:56dc	2a01:5ec0:1803:f…	TCP	2405894671		443 → 59470 [PSH, ACK] Seq=545652 Ack=470 Win=90112 Len=1266 TSval=931433908 TSecr=2403447679 [TCP s

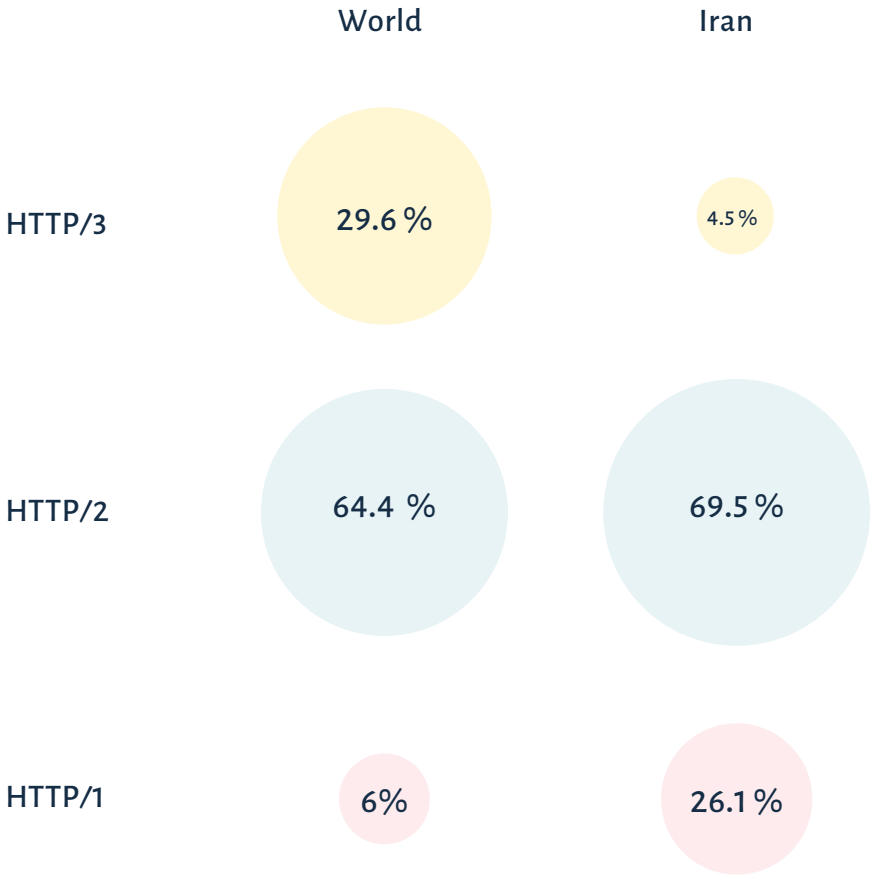
In general, disruptions on the Irancell network appear as short, frequent connection drops. This type of disruption manifests differently depending on the protocol: in HTTP as stalled downloads, in SSH as extreme delays in sending commands, and in multimedia as interrupted streaming (for example, audio and video dropouts during a call).

In the figure below, a several-second disconnection in the Irancell network during testing is observed. From second 7 to 12.3, no data is delivered to the Iranian user; then the download resumes, only to stop again between second 15.7 and 33.7, when all activity halts.

The world moves forward, we move backward

The HTTP/2 protocol addresses the Head-of-Line Blocking problem at the application layer and allows multiple HTTP requests (streams) to be sent simultaneously within a single connection. However, since HTTP/2 relies on the TCP protocol, the Head-of-Line Blocking issue still exists at the transport layer. This means that if network quality is poor and packet loss occurs, due to TCP's guarantee of packet order, even packets that were transmitted earlier must wait until the lost packets are retransmitted.

The HTTP/3 protocol, on the other hand, uses QUIC (which is built on UDP) instead of TCP, thereby fully solving this problem. In this case, if one request (stream) experiences packet loss, it does not delay the delivery of other requests. In theory, such a protocol on Iran's network could be extremely helpful. However, in Iran, because of the 50% disruption, the use of UDP protocols except for DNS is severely hindered and unstable. As a result, the adoption of HTTP/3 by Iranian users is very low.

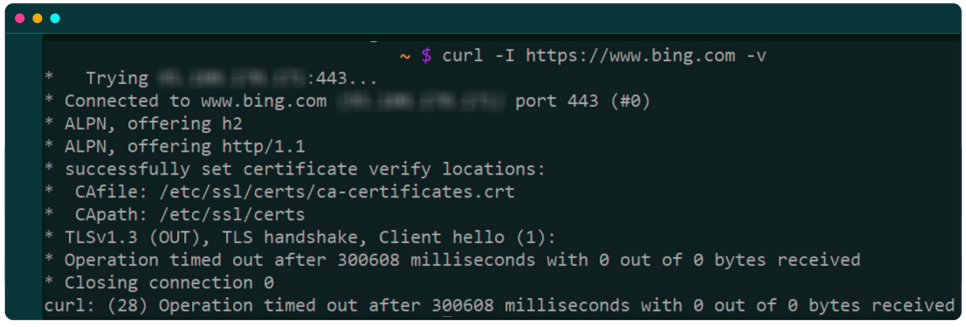


Ultimately, unlike the rest of the world, not only are we unable to properly benefit from HTTP/2 and HTTP/3, but real-world tests show that HTTP/1.1 actually performs better in Iran due to its use of multiple TCP connections. Or, more accurately, HTTP/2 and HTTP/3 protocols in Iran rather than improving efficiency in most cases lead to reduced performance.

ArvanCloud Radar Data – Bing Issues

For an extended period, ArvanCloud Radar continuously displayed widespread disruptions affecting Bing. These disruptions, similar to the previously analyzed patterns, occurred randomly but frequently across the country and in various data centers.

1- Display of Bing disruptions in 8 different data centers across Iran – June 22, 2023 (1 Tir 1402)



Technical reviews showed that, in general, all Akamai IPs the world's largest enterprise CDN are deliberately disrupted, except in cases where they have been selectively whitelisted. Bing is only one of the hundreds of thousands of critical services hosted by Akamai. Other major websites and services relying on Akamai include Skype (4.6% disruption), Apple (8.4% disruption), Pinterest (4.8% disruption), iCloud (21% disruption), and Microsoft (6.7% disruption). In some operators, user requests were stopped at the TLS Handshake Client stage, while in others, no response at all was received to user packets sent to this important search engine.

Deliberate Disruption on Traffic – Asymmetric

Another major quality issue in Iran's internet is the deliberate disruption of asymmetric traffic. Globally, it is common for an internet operator to use one link for sending data and another link for receiving it, due to various technical or commercial reasons.

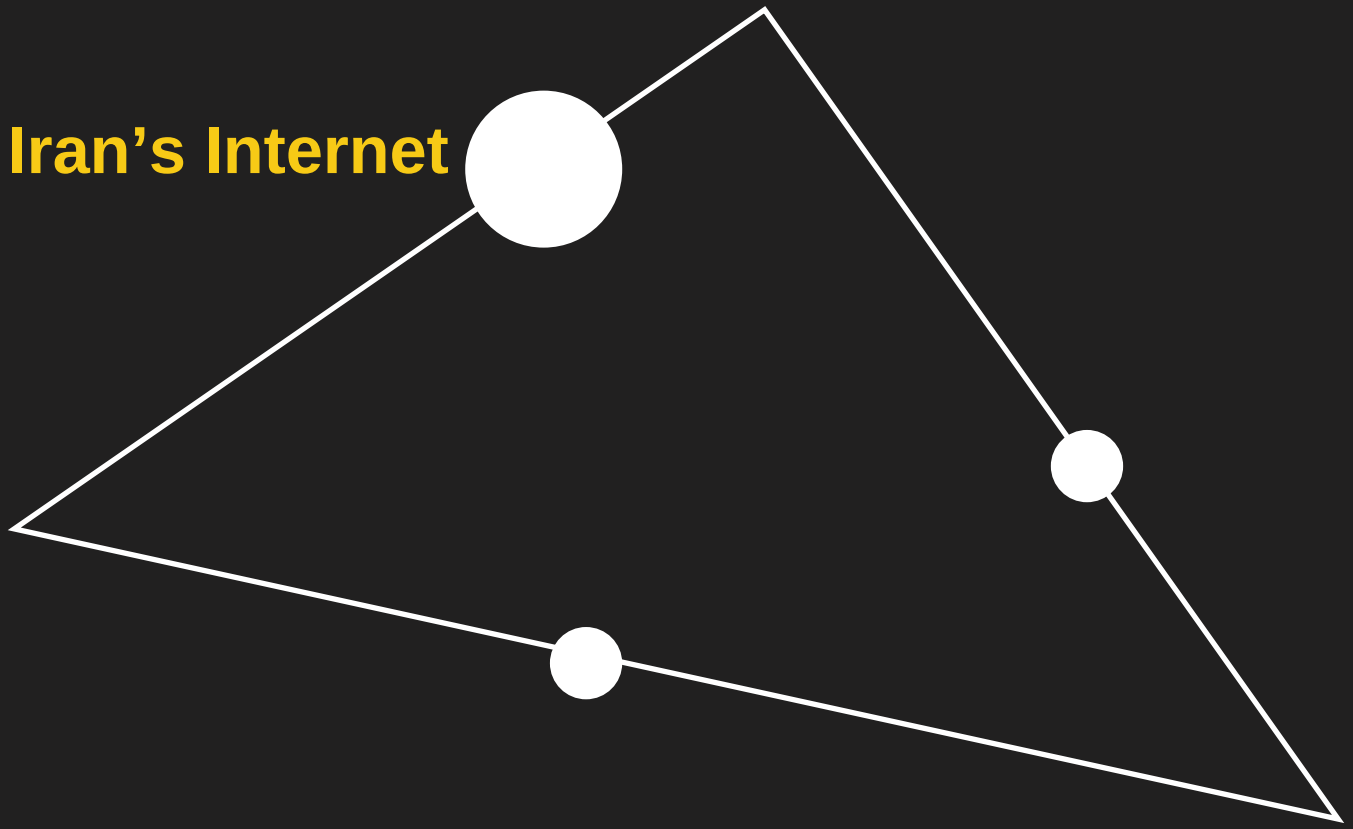
Internet service providers (ISPs) should be able to use different routes for internet traffic routing based on their technical, policy, and revenue models. This is a solved matter in the global internet ecosystem, and operators worldwide do this routinely for financial and technical efficiency. In Iran, however, filtering is implemented in a stateful manner across the network. In such cases, if return packets enter the filtering module through a path different from the outgoing one, they are automatically dropped. In simpler terms, if traffic routing for outgoing and incoming data is not identical whether accidentally or intentionally, or if an operator routes part of the traffic asymmetrically for economic reasons internet disruptions increase significantly. Evidence shows that this issue has been frequent within Iran's network.

In the end, it appears that despite all the investments made in “smart filtering,” none of the contractors have possessed the technology to detect HTTPS-based proxies (such as v2ray and Trojan).
To compensate for this shortcoming, the Infrastructure Communications Company, in an illegal move, has created widespread disruptions at Layer 4 of the network.

C E N S O R S H I P

Second Dimension

Censorship in Iran’s Internet



Second Dimension Iran's Internet Is Highly Restricted

As mentioned in the introduction, Iran has one of the most restricted internets in the world, second only to China. Based on data extracted from OONI, we compared the filtering status of 100 websites across various categories in the world's top 100 countries by gross domestic product (GDP). The results showed that China, Iran, Russia, Egypt, and Saudi Arabia have the highest share of filtered websites, respectively.

It is important to note that in this review, as evident from the selected categories, no pornographic websites were included.

Country	Anonymization and circumvention tools	Communication Tools	Culture	Human Rights Issues	Intergovernmen–tal Organizations	LGBTQ+	Media sharing	News Media	Public Health	Search Engines	Social Networking	Grand Total
China	4	4	1	3		1	5	18		2	12	50
Iran	3	3		3		1	7	14			14	45
Egypt	3	2		3	1		2	8		1	2	22
Russian	2			1			2	5			6	16
Oman	1	2									5	8
Saudi Arabia	2	1				1	1				2	7
UAE	2			1		1					2	6
Jordan	2						1				3	6
Turkey	1						1	1	1		1	5
MALAYSIA												0
KOREA												0

#	Country	count	%
1	China	125	41.67%
2	Iran, Islamic Rep.	100	33.33%
3	Egypt, Arab Rep.	62	20.67%
4	Russian Federation	41	13.67%
5	Indonesia	14	4.67%
6	Saudi Arabia	13	5.68%
7	Turkiye	12	4.00%
8	India	12	4.00%
9	Vietnam	11	3.67%
10	Venezuela, RB	9	3.00%
...	...		
43	Switzerland	0	0.00%
44	United States	0	0.00%
45	Norway	0	0.00%
46	Singapore	0	0.00%
47	Canada	0	0.00%
48	Poland	0	0.00%
49	Mexico	0	0.00%
50	Japan	0	0.00%
	Grand Total	485	3.42%

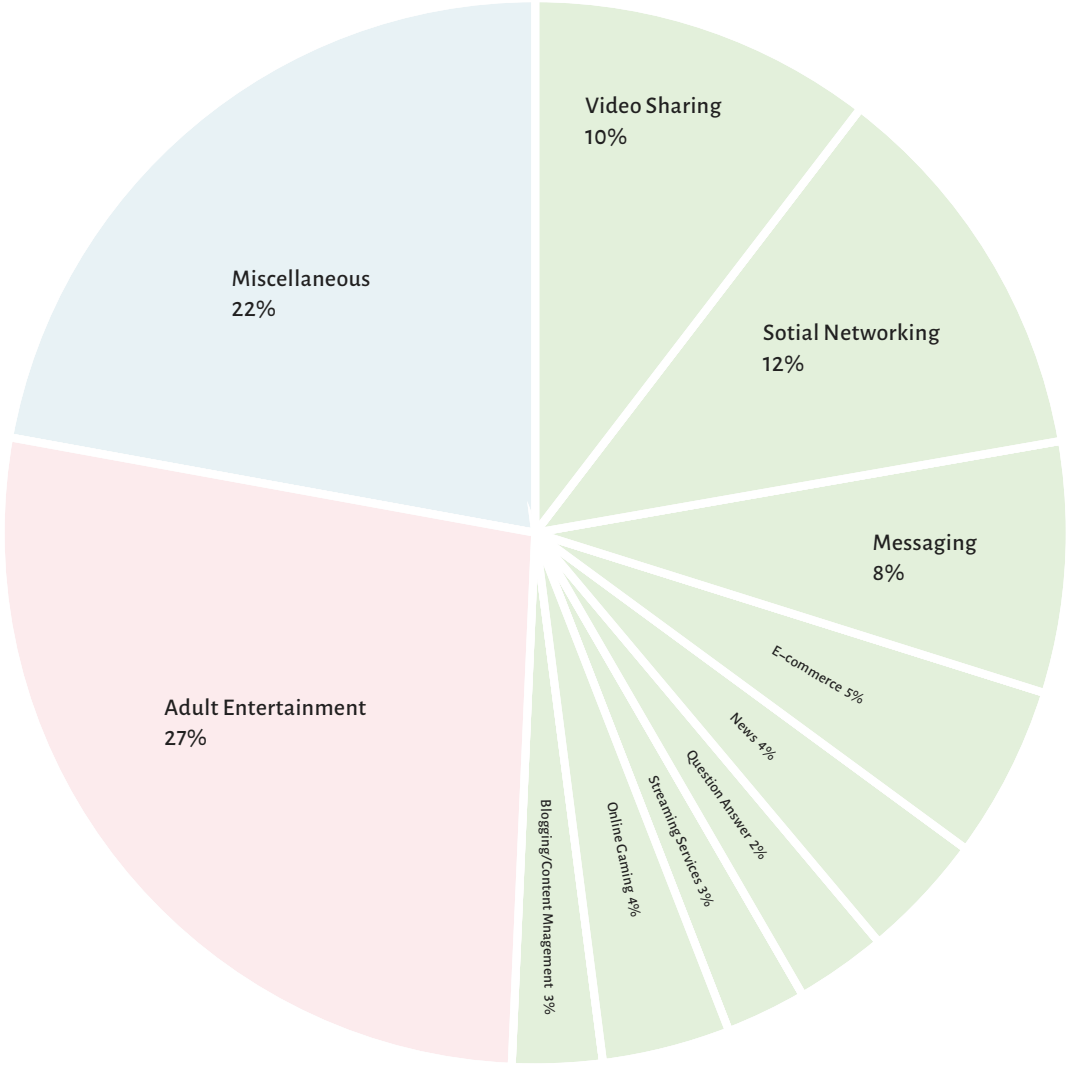
To increase the reliability of the ranking, we tripled the sample size, raising the number of websites examined to 300. Although Russia and Egypt swapped places, and Indonesia and Saudi Arabia also changed positions, China and Iran retained their positions as champion and runner-up, respectively.

Verification of Data through Review of the Top 200 SimilarWeb Websites

In the previous section, the 100 and 300 sampled websites had been selected by OONI. To further ensure the reliability of the sample, we extracted the top 200 websites worldwide (based on the SimilarWeb report) and used a script to check whether their primary domains were filtered[1] in Iran. The results show that 65 websites (-32.5%) from this list are filtered in Iran a list in which more than half are related to websites with social functions.

Category	Similar	Domain
Video Sharing	2	youtube.com
Social Networking	3	facebook.com
Social Networking	4	instagram.com
Social Networking	5	twitter.com
Adult Entertainment	7	xvid****
Adult Entertainment	10	por****
Adult Entertainment	11	xnxx****
Video Sharing	14	tiktok.com
Social Networking	17	vk.com
Social Networking	18	reddit.com
Messaging	20	whatsapp.com
Adult Entertainment	22	xham****
Video Sharing	28	bilibili.com
Streaming Services	30	netflix.com
Miscellaneous	33	turbopages.org
Adult Entertainment	34	span****
Adult Entertainment	46	strip****
Online Gaming	48	twitch.tv
Miscellaneous	51	fandom.com
Adult Entertainment	52	chat****
Question and Answer	61	quora.com
E-commerce	67	ozon.ru
E-commerce	68	wildberries.ru
Messaging	71	t.me
Adult Entertainment	84	nhen****
Miscellaneous	88	pixiv.net
E-commerce	91	taobao.com
E-commerce	96	shein.com
Question and Answer	97	zhihu.com
Messaging	100	messenger.com
Adult Entertainment	106	rule****
Messaging	114	telegram.org
Adult Entertainment	115	epor****
Adult Entertainment	116	miss****
Miscellaneous	121	wp.pl
Adult Entertainment	130	xvide****
Adult Entertainment	131	fc2****
Miscellaneous	136	noodlemagazine.com
News	140	foxnews.com
Miscellaneous	142	jw.org
Blogging	146	wordpress.com
Adult Entertainment	153	xham****
Messaging	156	line.me
Adult Entertainment	157	livej****

1- Due to the consolidation of subdomains, the domain rankings in the table are listed from 1 to 230.



Miscellaneous	159	diretta.it
Miscellaneous	162	onet.pl
Adult Entertainment	164	youp****
Online Gambling	167	bet365.com
Adult Entertainment	170	bong****
Miscellaneous	175	sohu.com
Online Gaming	176	fmkorea.com
Messaging	178	snapchat.com
Adult Entertainment	179	hitom****
Miscellaneous	180	zoro.to
Miscellaneous	182	wattpad.com
Miscellaneous	184	interia.pl
Miscellaneous	201	nicovideo.jp
Adult Entertainment	202	ixx****
Adult Entertainment	212	por****
Streaming Services	213	hotstar.com
E–commerce	214	shopee.co.id
Miscellaneous	224	163.com
Adult Entertainment	228	tnaf****
Miscellaneous	229	kinopoisk.ru
Adult Entertainment	230	redt****

Review of Social Media Status Based on Surfshark Data

Social media Censorship						
Iran	✗	✗	✗	✗	✗	✗
UAE	✓	✓	✓	✓	✗	✗
Turkye	✓	✓	✓	✓	✓	✓
Malaysia	✓	✓	✓	✓	✓	✓
South Korea	✓	✓	✓	✓	✓	✓

Surfshark is a website that focuses on aggregating data related to internet shutdowns and censorship worldwide. We extracted the data recorded in this database and compared the top 100 countries by GDP in terms of social media filtering.[1]

The six most widely used social networks in the world Facebook, Twitter, YouTube, Instagram, Telegram, and WhatsApp—were evaluated in this review.

Iran, China, and Turkmenistan are the only countries where all six social networks are filtered. In total, only 11 countries filter at least one social network. This report once again demonstrates that Iran has one of the most restricted internets in the world.

1- https://surfshark.com/research/internet-censorship

#	Country	Total Score
1	Iceland	95
2	Estonia	93
3	Costa Rica	88
4	Canada	87
5	Taiwan	79
.	.	.
.	.	.
.	.	.
66	Vietnam	22
67	Cuba	20
68	Iran	16
69	Myanmar	12
70	China	10

Do other reports also confirm this data?

Another report that examines internet restrictions worldwide is the Freedom on the Net report by Freedom House. According to this report, China, Myanmar, and Iran were identified as having the most restricted internets in the world among the 70 countries reviewed in 2022.[1]

1- https://freedomhouse.org/sites/default/files/2022-10/FOTN_2022_Country_Score_Data.xlsx

Filtering and Widespread Domestic Self-Censorship

codal.ir	Codal – Publisher Information Disclosure System
mrud.ir	Ministry of Roads & Urban Development
sanjesh.org	National Organization of Educational Testing (Sanjesh)
isti.ir	Vice Presidency for Science, Technology & Knowledge-Based Economy
ihio.gov.ir	Iran Health Insurance Organization
bank-maskan.ir	Bank Maskan (Housing Bank)
farhang.gov.ir	Ministry of Culture & Islamic Guidance
behdasht.gov.ir	Ministry of Health & Medical Education
majlis.ir	Islamic Consultative Assembly (Parliament)
irica.ir	Islamic Republic of Iran Customs Administration
eadl.ir	Judiciary Portal of Iran
mporg.ir	Plan & Budget Organization
icana.ir	Islamic Consultative Assembly News Agency (ICANA)
iranianasnaf.ir	Iranian Guilds & Unions Organization
rahvar120.ir	NAJA Traffic Police (Rahvar 120)

shaparak.ir	Shaparak – Iran's Payment Network
ikco.ir	Iran Khodro Company (IKCO)
bmi.ir	Bank Melli Iran (BMI)
tamin.ir	Social Security Organization of Iran
tax.gov.ir	National Tax Administration
enamad.ir	E-Namad (E-commerce Trust Seal)
tci.ir	Telecommunication Company of Iran
medu.ir	Ministry of Education
ssaa.ir	Organization for Registration of Deeds & Properties
epolice.ir	Police e-Services (Police+10)
ntsw.ir	Iran's Integrated Trade System (NTSW)
setadiran.ir	Government Electronic Procurement System (SETA)
samandehi.ir	Website Filtering & Content Regulation (Samandehi)
mcls.gov.ir	Ministry of Cooperatives, Labour & Social Welfare
cbi.ir	Central Bank of Iran

Stranger than blocking foreign websites is blocking domestic websites for users outside the country. Many government websites and Iranian banks are not accessible to international users. In a review conducted, out of the top 100 Iranian government websites, 57 websites are inaccessible from abroad. We hope this catastrophe is not passed over lightly. Important national websites including those of the Parliament, ministries, major state organizations, Shaparak, and others are inaccessible to the people of the world, to Iranians living abroad, and to the 96% of Iranians who use VPNs daily.

In this list, you can see the names of 57 government websites (out of the top 100) that are inaccessible from outside the country:

divan-edalat.ir	Administrative Court of Justice
ikcopress.ir	Iran Khodro News
iranair.com	Iran Air (Islamic Republic of Iran Airlines)
mosharekatha.ir	Organization for Non-Governmental Schools and Development of Public Participation
tehranedu.ir	Tehran Department of Education
imidro.gov.ir	Iranian Mines and Mining Industries Development and Renovation Organization (IMIDRO)
tpww.ir	Tehran Province Water and Wastewater Company
karaj.ir	Karaj Municipality
medu.gov.ir	Ministry of Education
maj.ir	Ministry of Agriculture Jihad
gilan.ir	Gilan Governorship (Governorate)
sampad.gov.ir	National Organization for Development of Exceptional Talents (Sampad)
niopdc.ir	National Iranian Oil Products Distribution Company (NIOPDC)
cra.ir	Communications Regulatory Authority (CRA)
inif.ir	Innovation and Prosperity Fund
nlai.ir	National Library and Archives of Iran
irica.gov.ir	Islamic Republic of Iran Customs Administration (IRICA)
postbank.ir	Post Bank of Iran
intamedia.ir	Iranian National Tax Administration (INTA) Official Portal
caa.gov.ir	Civil Aviation Organization of Iran (CAA)
ict.gov.ir	Ministry of Information and Communications Technology (ICT)
sanjeshp.ir	Medical Education Assessment Center
esata.ir	Social Security Organization of the Armed Forces (ESATA)
bazresi.ir	General Inspection Organization of Iran
mcth.ir	Ministry of Cultural Heritage, Tourism, and Handicrafts
dotic.ir	National Legal Information Base of Laws and Regulations
tavanir.org.ir	Tavanir (Iran Power Generation, Transmission and Distribution Company)

It is regrettable that the Ministry of Communications itself is at the forefront of this strange practice. The websites of the Ministry of Information and Communications Technology, the Communications Regulatory Authority, and the Telecommunication Infrastructure Company are all inaccessible from outside the country. What makes this even more paradoxical is that the Ministry of Communications continues to update its websites in English.

Location	Status	Packets sent/rec/lost(%)	Replies	Partner
	30 Fail 0 Ok			
Berlin, Berlin, Germany	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	IRANVPS
Prague, Czech Republic	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	is*hosting
Erfurt, Thuringen, Germany	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	Keyweb
Kyiv, Ukraine	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	uaVPS
Caracas, Venezuela	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	EXservers
Mumbai, India	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	OneProvider
Zürich, Switzerland	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	4VPS
Kyiv, Ukraine	Bad	4/0/4(100%)	#1: Ping error: TimedOut #2: Ping error: TimedOut #3: Ping error: TimedOut #4: Ping error: TimedOut	IT Army

For specialists, it is clear that excuses such as DDoS attacks and other forms of cyberattacks are unjustified and mainly used to influence public opinion. For years, diverse solutions have existed to prevent DDoS attacks, and in Iran, they are widely offered by various companies and utilized in the private sector. Ultimately, in the event of incidents beyond control, geographic restrictions are only acceptable for a few minutes, not as a broad and permanent directive.

It should also be noted that many of the hacks and data leaks over the past year have been related to government systems that had Iran-only access enabled.

The Prevalence of VPN Usage

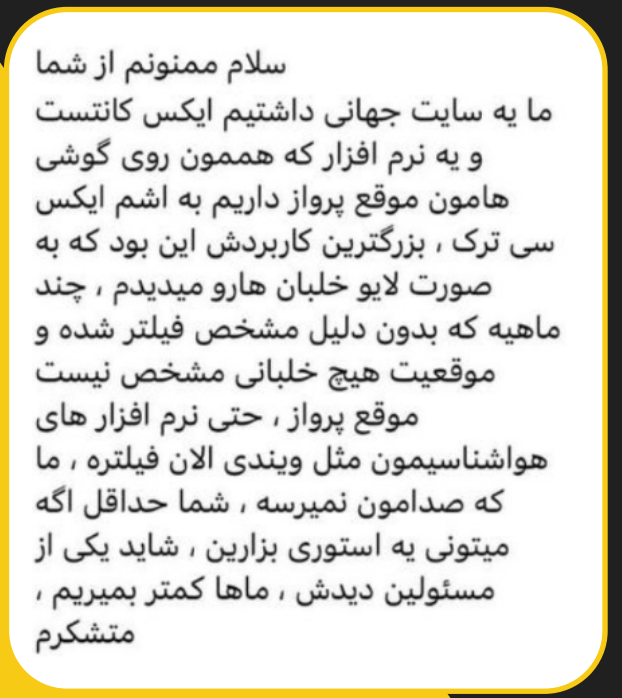
Widespread filtering has caused VPNs to become an inseparable part of the daily lives of internet users in Iran. According to Peyvast, 96% of Iranian users make use of VPNs or various methods to bypass filtering.[1]

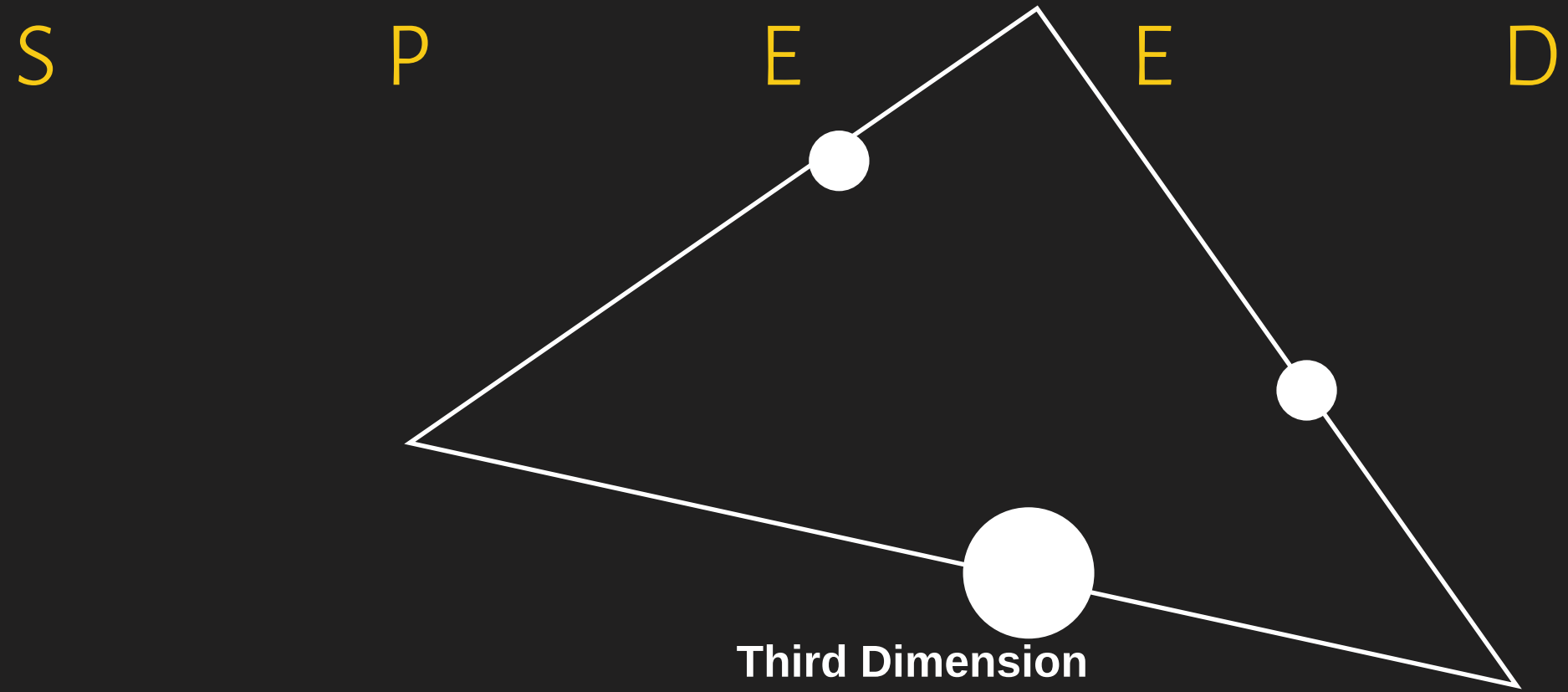
The government's performative policies have also led, under the pretext of combating VPNs, to the imposition of widespread, nationwide disruptions on the country's internet an issue that was examined in detail in the previous chapter. It is possible to examine in detail the cultural, security, and economic harms of the spread of VPN use in the country, but the important point is this: in order to bring VPN usage closer to global averages and limit its use to necessary cases, irrational restrictions and internet disruptions must be brought to an end rather than expanded under the pretext of combating them.

1- https://peivast.com/166552

Unrestrained filtering takes its toll

In June 2023, a tragic incident led to the death of Hesam Goodarzi, a 42-year-old paraglider pilot. This message was shared by one of Hesam -Goodarzi's friends in a specialized telecom infrastructure group. There are thousands of websites and IPs that, without any legal or logical justification, have been restricted and filtered in Iran without any process available for appeal or redress.

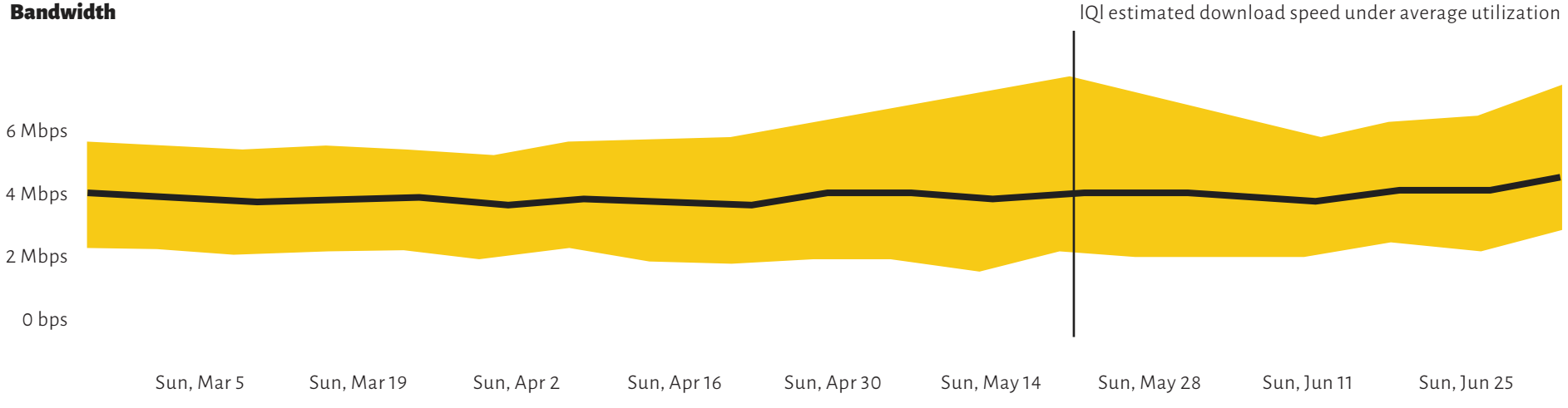




Speed in Iran’s Internet

Third Dimension
Internet Speed

According to Cloudflare Radar, the average internet speed for Iranian users has been around 4 Mbps.[1]



1- https://radar.cloudflare.com/quality/ir?dateRange=52w

Rank in the world

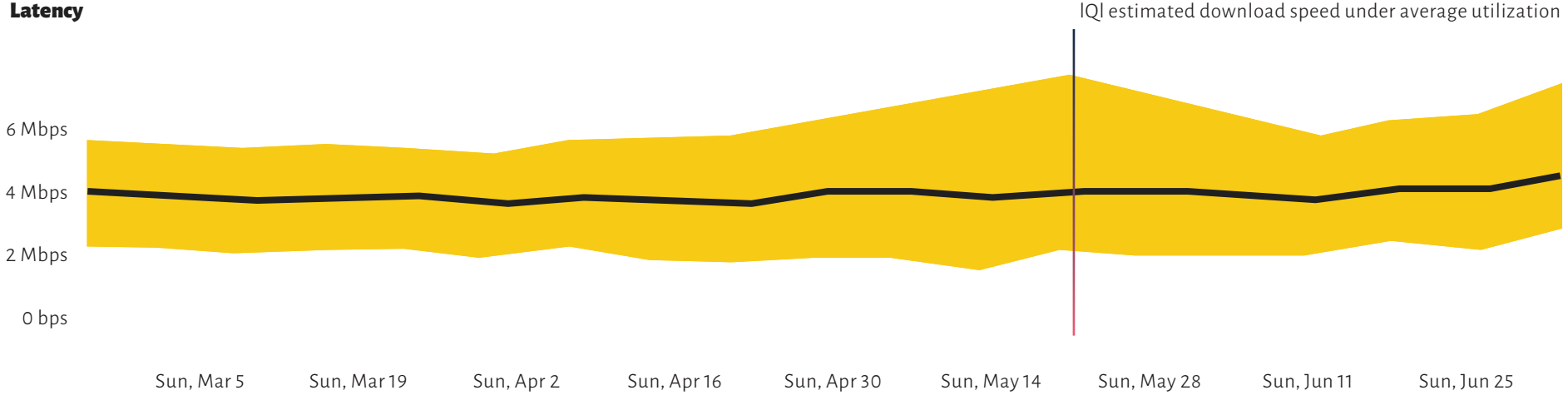
rank	Country	Country	50% Avg (Mbps)
1	sg	Singapore	67.4
2	kr	Korea	60.3
3	hk	Hong Kong	47.6
4	se	Sweden	41.1
5	ch	Switzerland	40.3
		⋮	
26	ae	UAE	26.7
39	my	Malaysia	22.7
54	tr	Turkey	12.6
...		⋮	
96	gh	Ghana	4.2
97	ir	Iran	4.1
98	sd	Sudan	3.4
99	cm	Cameroon	3.0
100	cu	Cuba	2.3

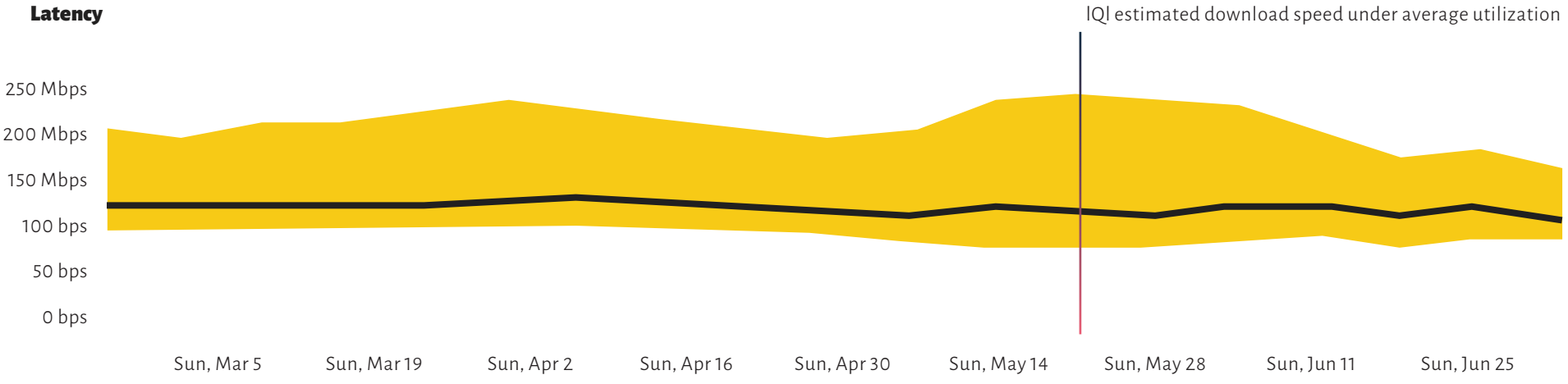
Rank in the world

For examining internet speed in Iran, data from Cloudflare Radar was extracted and analyzed. Similar to the reports in the first and second chapters, the 100 countries with the highest Gross Domestic Product (GDP) were selected and ranked by speed. A look at Iran's peer countries in Asia shows that an increase in internet speed is a definite indicator of economic development. The average speed in Turkey is 12 Mbps, in Malaysia 22 Mbps, in the United Arab Emirates 26 Mbps, and in South Korea 60 Mbps.

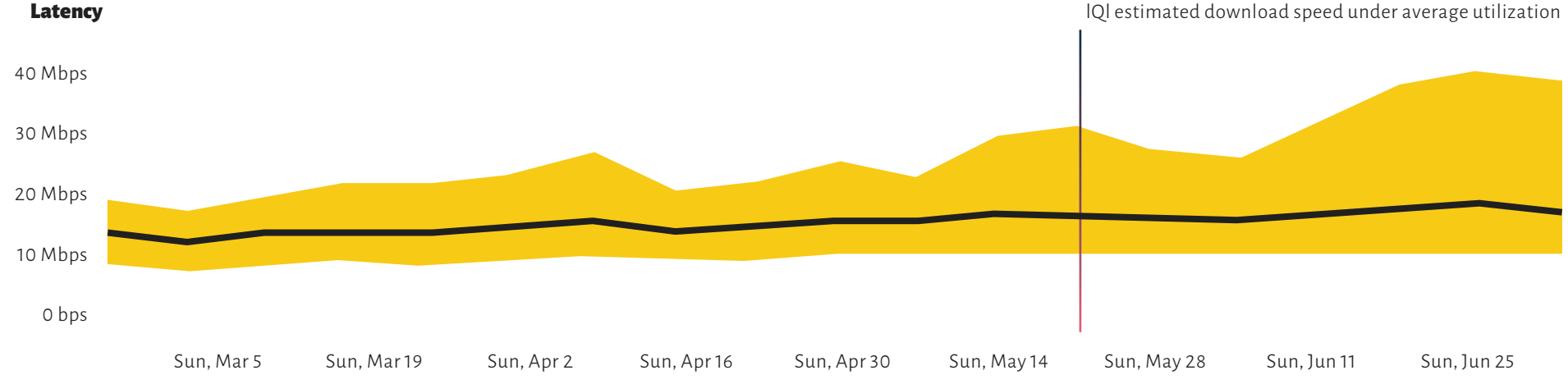
Network Latency

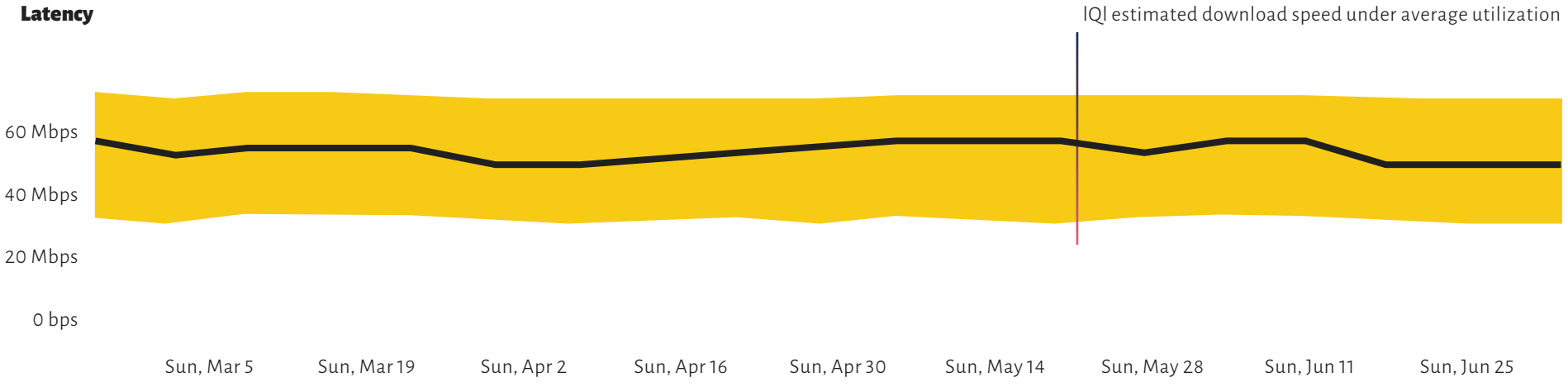
In examining network speed, in addition to measuring bandwidth, network latency must also be measured. The average latency for Iranian users when accessing various websites worldwide is around 145ms, ranking among the highest delays in the global internet.



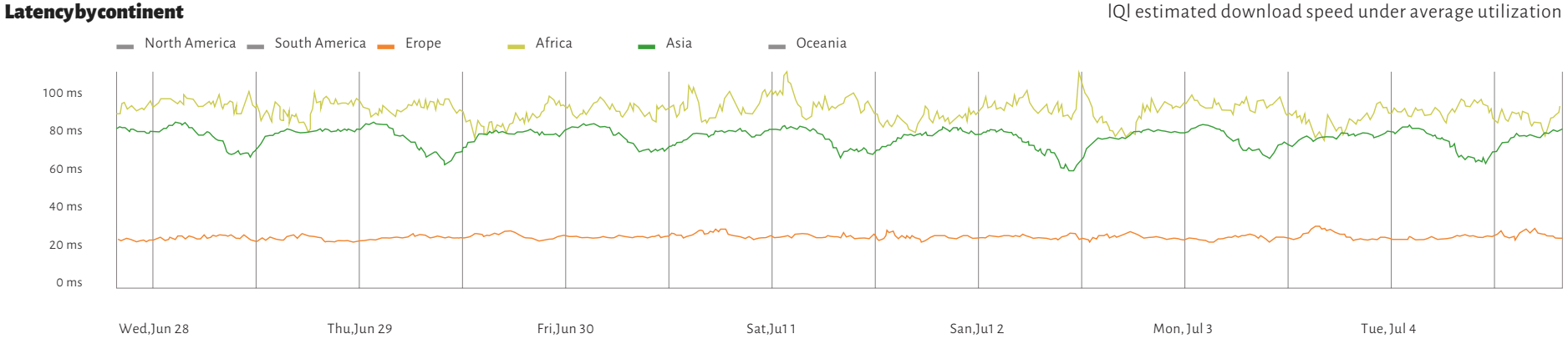


In South Korea, the average latency for users is 14ms, while in Turkey it is 60ms.





The average internet latency in Iran is even higher than the average latency of less developed African countries.



Rank in the world

rank	Country	Country	50% Avg (Ms)
1	kr	Korea	14.9
2	se	Sweden	16.7
3	ch	Switzerland	18.1
4	es	Spain	19.4
5	no	Norway	19.8
		⋮	
31	ae	UAE	28.8
42	my	Malaysia	36.4
59	tr	Turkey	56.6
		⋮	
96	ir	Iran	145.6
97	ng	Nigeria	158.3
98	sd	Sudan	160.8
99	cu	Cuba	180.4
100	cm	Cameroon	197.9

Latency Rank in the world

Once again, we extracted the list of 100 countries under review and compared their average network latency. In this ranking as well, Iran does not hold a position better than 96 out of 100.

If we remove the limitation of only reviewing 100 countries, Iran ranks a disastrous 203rd in latency and 211th in average speed (bandwidth) out of all 237 countries included in Cloudflare Radar's dataset.

Verification with Meter.net Data

In examining network speed, in addition to measuring bandwidth, it is also necessary to measure network latency. The average latency of Iranian users in accessing various websites worldwide is around 145ms, ranking among the highest delays in the global internet.

Country	Download (Mbits)				Download (Mbits)				Download (Mbits)			
	AVG	Q1	Median	Q3	AVG	Q1	Median	Q3	AVG	Q1	Median	Q3
Iran	4,31	0,60	1,96	4,98	1,36	0,21	0,36	1,32	326	196	235	285

Data from the Meter.net platform also shows that the average download speed[1] in Iran is 4.31 Mbps, a report that confirms Cloudflare's findings. In this report, the average upload speed is 1.36 Mbps, and the average latency, at 326 ms, is even worse than what was recorded in the Cloudflare report. Furthermore, in the ranking of the top 100 countries with the highest internet speeds, Iran is not included. In this list, Japan, South Korea, Denmark, Israel, and Canada are recorded as the five countries with the fastest internet. The lowest position in the table (rank 100) belongs to Tunisia, with an average download speed of 13.55 Mbps still three times higher than the average download speed in Iran.[2]

1- https://www.meter.net/stats/country/iran

2- https://www.meter.net/stats/country

Why do the data from Speedtest by Ookla show different numbers?

Iran’s ranking in terms of internet speed, according to the Speedtest database, is also far from satisfactory[1], for mobile internet, Iran stands at rank 64, and for fixed broadband, at rank 146.

The average speeds reported in this ranking are 35.6 Mbps for mobile internet and 12.6 Mbps for fixed broadband. In fact, the speeds reported for Iran here are 3 to 8 times higher than those recorded by Cloudflare. A similar discrepancy exists when reviewing other countries as well for example, while Cloudflare reports an average speed of 26 Mbps for the UAE, Speedtest reports an average of 200 Mbps.

The reason for this difference lies in the methodology of measurement used by the two systems. In Speedtest, although users can manually change the physical location of the test servers, by default, the platform connects the user to the nearest server within the same country. As a result, rather than measuring the true internet quality, Speedtest primarily measures domestic network communication speed. In practice, Speedtest evaluates the quality of the network’s access layer, not the actual internet service quality experienced by end users an important distinction that explains the gap between reported numbers and people’s lived experience of connectivity.

1- https://www.speedtest.net/global-index

Ultimately, a comparison of these figures shows that despite all the problems present in the country's access layer, if the Telecommunication Infrastructure Company prioritizes addressing existing obstacles such as quality issues and capacity expansion there is potential for a several-fold increase in internet speed in Iran in the short term.


Who Is
Responsible?

Who Is Responsible?

In this report, we have sought to outline the triangle of poor-quality internet. Its most important sides are: widespread disruptions, restrictions, and low speed. Here, we briefly examine which institutions are responsible for each side, and identify the bodies from which, as citizens and private-sector businesses, we must pursue our demands.

1- Widespread Disruptions

The greatest crisis facing Iran's internet today is its widespread disruptions a matter for which responsibility lies entirely with the Ministry of Communications, the Telecommunication Infrastructure Company, and ultimately the Committee for Network Protection and Security, as the body in charge of implementing filtering in Iran.

2- Extensive Restrictions

Some restrictions—such as the blocking of Telegram—were imposed by order of the Prosecutor's Office; others, such as Twitter, by the Committee for Determining Criminal Content; and still others, such as Instagram and WhatsApp, by the National Security Council. A large number of disruptions and filters, however, have been carried out without any official order or legal basis, solely under the pressure of security agencies. For example, the disruptions targeting Clubhouse at the end of the previous Ministry of Communications' term were illegally implemented by Irancell, Hamrah Aval, and the Telecommunication Company of Iran, leading to a government resolution imposing daily fines of 50 billion tomans on them. That complaint ultimately ended without result due to the intervention of security bodies.

Another example was the launch of the social network Threads, which was filtered in Iran from the very beginning without the approval of any legal authority.[1]

Considering that the President presides over both the Supreme National Security Council and the Supreme Council of Cyberspace, and that the government as a whole holds half of the seats on the Committee for Determining Criminal Content,[2] the task assigned by the President to resolve the issue of internet quality presents a real opportunity for meaningful action and problem-solving in this area.

1- As mentioned, widespread filtering on Akamai, the complete filtering of Meta's CDN, and extensive disruptions on Cloudflare have resulted in millions of websites around the world being either filtered or heavily disrupted.

2- The Minister of Communications, Minister of Culture, Minister of Science, Minister of Education, Minister of Justice, and Minister of Intelligence.

3- Low Speed

Compared to the previous two dimensions, this area requires more planning, time, and investment.
In this section, there are several serious weaknesses and, as a result, multiple different responsible bodies.

Telecommunication Infrastructure Company

Development of Fiber Optics and 5G

Telecommunication Company of Iran

3-1 Telecommunication Company of Iran

One of the biggest problems with internet speed in Iran is the continued reliance on the outdated ADSL technology. Beyond the inherent limitations of this technology which severely restricts upload speeds the anti-competitive practices and extremely poor quality of the Telecommunication Company of Iran in providing last-mile connections have tied ADSL in Iran to low-quality service.

Had it not been for the monopoly of a state-owned company offering substandard services,[1] this technology might have been upgraded years ago to VDSL, allowing home internet speeds to increase up to 80 Mbps and easing user expectations while waiting for the rollout of fiber-optic connections.

1- A great deal could be written about the anti-competitive practices of the Telecommunication Company of Iran or the various restrictions imposed on private companies by municipalities, but such discussion falls outside the scope of this report.

2-3 Development of Fiber Optics and 5G

The country's lag in developing fiber-optic networks is one of the main obstacles to boosting internet speed in Iran. However, widespread disruptions, extensive restrictions, and other factors have led to a severe recession in the digital economy, which in turn has slowed investment in the nation's telecom infrastructure.

Despite government promises, unofficial reports indicate that the depreciation of the telecom industry has surpassed new investment. Put simply, not only are we failing to expand the country's infrastructure, but even the existing infrastructure is deteriorating.

That said, within the triangle of Iran's internet quality, this is the only area where the Ministry of Communications appears to have a concrete plan, with practical measures undertaken for the development of fiber-optic networks and the expansion of 5G in the country.

3-3 Telecommunication Infrastructure Company

The country's internet is imported exclusively through the Telecommunication Infrastructure Company, with a very limited portion provided for academic use via the Institute for Research in Fundamental Sciences (IPM). The monopoly of the Infrastructure Company in supplying and distributing internet in Iran combined with inefficiency and low productivity has resulted not only in severe quality issues but also in very high internet prices. The Infrastructure Company sells internet to Iranian internet service providers at prices reported to be about 60 times[1] higher than in Europe, yet it provides no transparent reports on the routes and capacities of the internet within the country[2], nor does it accept responsibility for the widespread disruptions or the low speed of internet service.

1- According to the resolution of the Communications Regulatory Commission, the price of 100 Gbps monthly internet in Iran is 6 billion tomans. In comparison, the price of 100 Gbps from Cogent in Europe is around $2,000 (about 100 million tomans) (https://www.fdcservers.net/100gbps-special/) While considering transmission and hidden costs, and the generally higher internet prices in the Middle East, it cannot be expected that prices in Iran would decrease by as much as 60 times. However, this comparison clearly demonstrates the impact of the monopoly of a single state-owned company in the country.

2- The high price of international internet should not be confused with the low price of home internet, which is dictated by the regulatory body's directives and imposed on private companies. According to internet operators, one of the reasons behind the lag in network investment and development in Iran is precisely this pricing paradox.

Transparency and Data-Driven Practices

It is self-evident that the first step toward improving any indicator is to measure it. In the new term of the Ministry of Communications, not only has no serious step been taken toward transparency, real-time monitoring, and the provision of data-driven reports, but even the pre-existing mechanisms in the country have been dismantled.

Transparent Report on the Status of IXP Points

In Iran, there are five main Internet Exchange Points (IXPs) located in Tehran, Mashhad, Shiraz, Tabriz, and Isfahan. The real-time traffic of each of these points used to be available online through the website tehran-ix.ir. However, after several major disruptions at the Tehran IXP, which were reflected in the media based on data from tehran-ix.ir website, the Ministry of Communications rather than providing a clear explanation regarding these disruptions took the website offline.

Transparent and Data-Driven Report on the Country's International Bandwidth

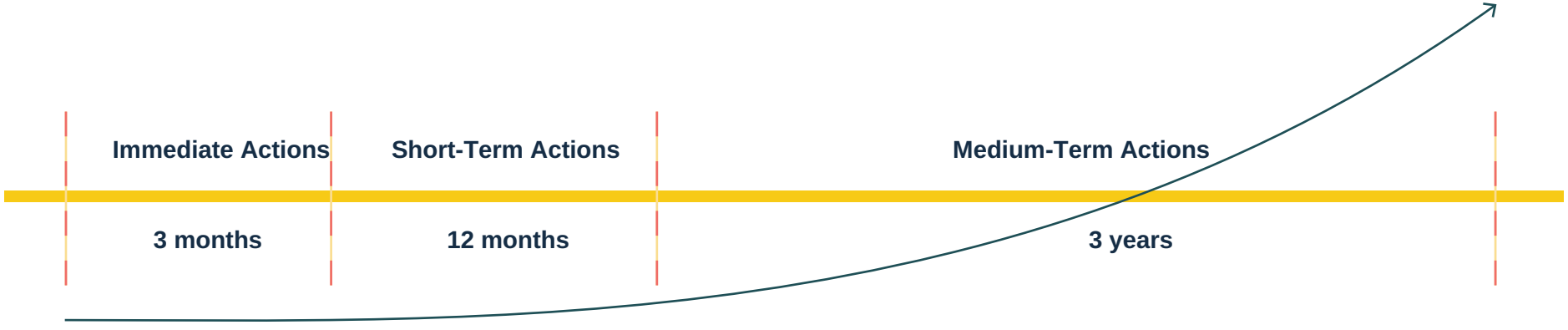
Since the beginning of the new term of the Ministry of Communications, no detailed report has been published on the country's bandwidth capacity, its level of consumption, or its increase or decrease over time.

Transparent Report on Filtering Policies and Equipment Performance

Unfortunately, there is no transparent mechanism regarding the policies and performance of filtering equipment in the country. The website Internet.ir was hacked in November 2022, and hundreds of thousands of its emails were leaked publicly. After eight months, the system has still not been restored. As a result, there is no available channel for Iranian citizens or businesses to appeal, track, or verify whether an IP address or domain is being filtered. Although Internet.ir, in its time, provided at least a minimum level of transparency and accountability despite most appeals remaining unresolved even that limited access no longer exists today.

Citizens and businesses should be able to check online whether their IPs are filtered or disrupted and have the possibility to file appeals. If an individual's or organization's IP or domain is mistakenly filtered, there must be a legal process for complaints and compensation for damages. Such a mechanism could provide at least some measure of control over the current chaotic situation.

Practical Solutions for Improving Internet Quality



Practical Solutions for Improving Internet Quality

Shedding light on a crisis and acknowledging the problem is an important part of the solution. This is the path we have tried to take in this report. In the continuation of this effort, and in future reports which we will also publish publicly, we aim to present our proposed practical solutions in detail, step by step, to policymakers, government executives, and the public.

In brief, the key solutions requested by the private sector can be categorized into three groups: Immediate Actions, Short-Term Actions, and Medium-Term Actions.

Immediate Actions

1 to 3 months

- Preventing disruptions in the internet under the pretext of combating VPNs
- Transparent and quantitative reporting by the Ministry of Communications on international gateways, and the reinstatement of online monitoring systems such as tehran-ix
- Prohibiting government agencies from permanently restricting systems to “Iran Access” only

The President can immediately instruct the Ministry of Communications to end the practice of creating deliberate disruptions in the country’s internet. Monitoring systems, including Tehran-IX, must be reactivated, and the Ministry of Communications should be obliged to provide regular and transparent reports on the state of the nation’s internet. In addition, it must be mandated across all government institutions that restricting websites to Iran-only access (Iran Access) be criminalized or prohibited.

Short-Term Actions

3 to 12 months

- Lifting the ban on public websites needed by the people and improving Iran's Internet Freedom Index
- Increasing international bandwidth and providing transparent reports of it to the public
- Establishing transparency platforms regarding filtering policies, with mechanisms for inquiry, complaints, and follow-up on the unblocking of IPs and domains

In the next step, it is expected that influential bodies, particularly the Supreme Council of Cyberspace, will begin the process of lifting the filtering of public websites needed by the people through clarification and consultation. Thousands of websites have been filtered without any legal foundation; considering that the principle is innocence, if there is not sufficient legal documentation regarding a specific website or IP, all of them must be unfiltered. In the following step, discussions must begin regarding the review of websites that the people of Iran widely need.

Lifting the monopoly of the Telecommunication Infrastructure Company and allowing competition by the private sector, increasing international bandwidth, the necessity of creating real-time monitoring systems and providing transparent reports to the people of Iran, as well as establishing transparency over all restrictive and filtering mechanisms in the country, will be the next executive steps in improving the quality of the internet in Iran.

Medium-Term Actions

12 to 36 months

- Ending the monopoly of the Infrastructure Communications Company and granting licenses for internet imports by the private sector
- Investing in the expansion of fiber optic networks and the development of fixed communications
- Investing in the expansion of 5G communications
- Establishing mutual international interests and sustainable relations with global technology companies, with maximum participation of the private sector

In the medium term, investment in the country's infrastructure and the removal of obstacles must accelerate the expansion of fiber-optic networks and 5G communications, while taking more serious steps toward lifting restrictions on the internet and moving toward a free, high-speed, and high-quality internet for businesses and for the people an internet of quality for all Iranians.

Another important point is the activation of cyber diplomacy. Writing a one-sided letter to the world's largest platforms and presenting illogical, unilateral demands does not constitute cyber diplomacy. We must first be able to define common interests with different countries, and then, on that broader foundation, enter into negotiations with major global technology companies and platforms.

TEHRAN
انجمن
تجارت
الکترونیک
تهران

Analytical Report on Disruptions, Restrictions, and Internet Speed in Iran
July 2025

project ainita

TRANSLATED TO ENGLISH
BY PROJECT AINITA
https://ainita.net/