Internet Quality in Iran

Analytical Report on Disruptions, Limitations, and Internet Speed in Iran

Second Report - Winter 2023-2024

TEHRAN
انجمن
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Introduction | The Deterioration of Internet Quality and the Gradual Decline of the Digital Development Dream

The internet in Iran is disturbed, restricted, and slow. According to internet quality index data, the state of Iran's internet closely resembles that of impoverished and underdeveloped countries. However, the main difference lies in the voluntary nature of this situation for Iran. "Voluntary" in the sense that a significant portion of the country's internet problems, from filtering and restrictions to speed and widespread disruptions, are not due to issues in infrastructure development but rather to policymaking, managerial actions, and the implementation of laws. Ultimately, the gradual familiarization of Iranian citizens and businesses with one of the world's most insecure and low-quality internets marks the slow death of the dream for the development of a digital economy and knowledge-based unicorns.

After the presentation of the initial report on the quality of the internet in Iran and consultations of the country's private sector with influential institutions, small but hopeful steps(1) were taken to improve the quality of the internet. The charts, compared to the previous report, show a slight improvement trend in internet speed (Latency and Bandwidth) and in the domains experiencing disruptions. However, this change has not been significant, and it can be said that the continuation of this trend means that the internet in Iran(2) is still in a precarious state. "Precarious" in the sense that the use of the internet for Iranians is still impossible without VPNs, and the logic of using VPNs, in addition to imposing a monthly cost of tens of millions of dollars(3) from the overall budget of Iranian families, has led to increased vulnerability on users' digital devices, penetration and leakage of business information, and an increase in digital harassment (Cyberbullying).

The imposition of widespread, opaque, and unaccountable internet restrictions in the country has become the principal barrier preventing Iranians from benefiting from the rapid pace of technological advancement and, as a result, from significant economic growth and the development of modern businesses. This self-imposed situation has led to the continuous exodus of experts, a growing sense of despair among the workforce, social unrest(4)(5), and ultimately, the drying up of the roots of the country's digital economy.

DISRUPTION

"Ditruption" means the loss of some information in an internet connection and is the main reason why ordinary users, without understanding why, have a poor experience using the internet.

CENSORSHIP

"Restriction" means the unavailability of domains and internet IP addresses, and is one of the main reasons for the inefficiency of the internet in a geographical area due to internal filtering or external sanctions.

SPEED

"Speed" refers to high bandwidth and low latency in loading a website or internet content. This metric is one of the key drivers of the emergence and widespread adoption of new technologies in the digital economy.

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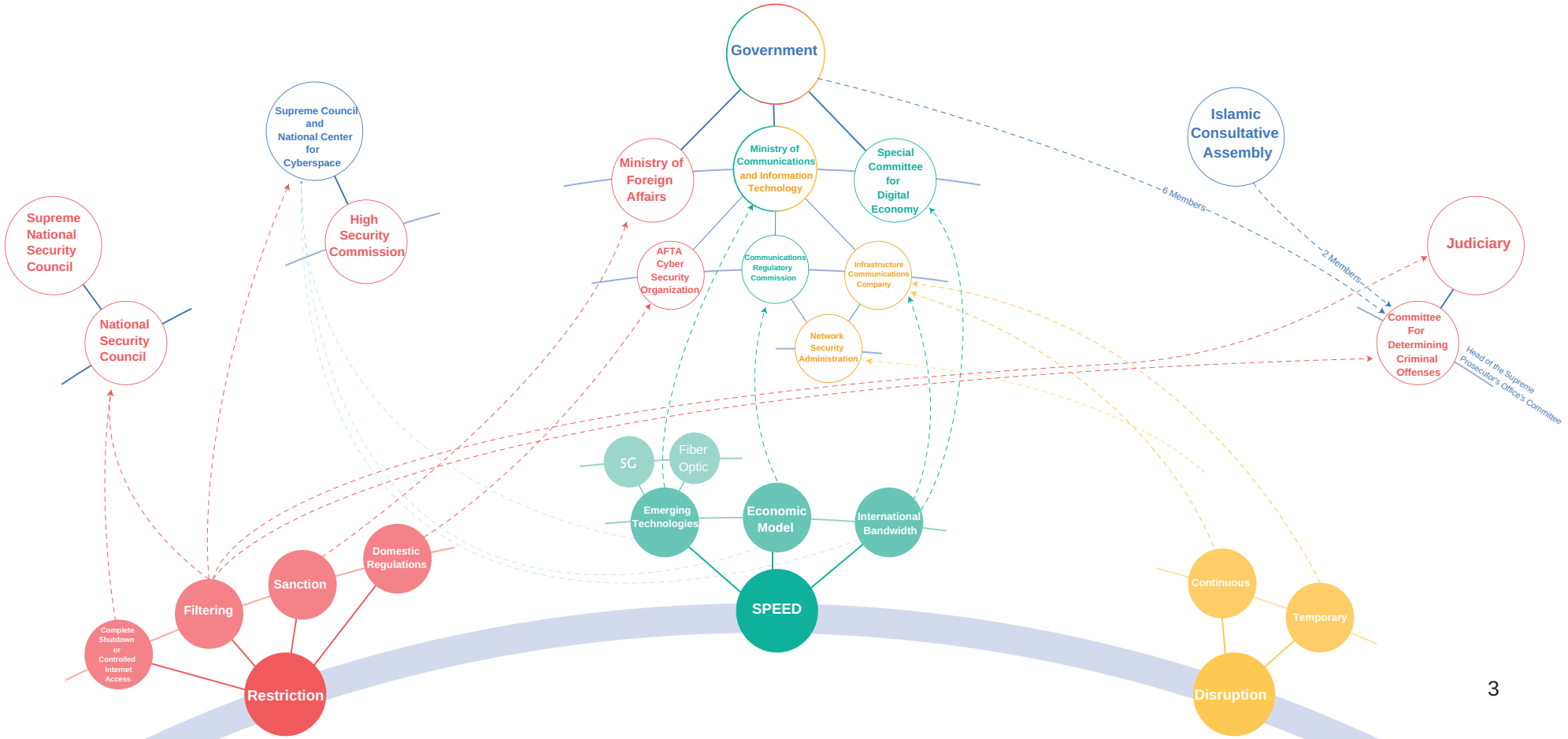
(1)The launch of the HTTP/3.0 protocol, the reduction of disruptions on major websites such as Bing, the resolution of upload issues to Cloudflare, and more. (These improvements are described in more detail in the section on actions taken by the E-Commerce Association.)
(2)This report examines the state of the country's internet over the last three years based on available data.
(3)According to speeches by parliament members, the Yekta Net company's Summer 2023 report, and an estimate based on the report from the Parliament's Industry and Mines Commission dated 21 August 2023, at least 64% of people use VPNs.
(4)Tiered internet leads to social unrest: 25 October 2022.
(5)Iran Migration Observatory (Sharif University) and Jobvision Employment Agency: 2022 survey on the migration inclination of the country's business activists.

Who* should be accountable for the low quality of the internet?

In this report, we have endeavored to identify the responsibilities of different stakeholders according to the country's ratified laws, so that the media, public opinion, and most importantly, the Islamic Consultative Assembly, can demand more precise accountability from them.



If the extensive details and the dispersion of power and decision-making in the upper chart are somewhat confusing, to put it simply, the President of the country has the power to:

- Head the Supreme National Security Council and appoint the head of the country's Security Council (Minister of Interior)
- Lead the Supreme Council of Cyberspace and appoint the Secretary of the Supreme Council of Cyberspace
- Appoint 6 members of the 12-member Working Group for Determining Instances of Criminal Content
- Appoint the Minister of Communications and thereby control its subdivisions including the Telecommunications Infrastructure Company, the Regulatory Authority, and the Information Technology Organization
- Appoint and lead the Cabinet and establish a Special Working Group for the Digital Economy

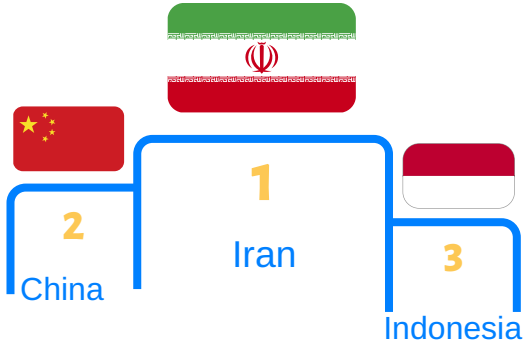
The President has sufficient authority and control to improve the quality of the internet in the country and should be more accountable to the people for the country's internet quality than anyone else.

*Based on:

(1) The Computer Crimes Law enacted in 2009,
(2) The law defining the responsibilities and authorities of the Ministry of Communications enacted in 2003,
(3) Resolutions of the Supreme Council of Cyberspace, including the resolution on the establishment of the Supreme Security Commission, the National Plan, and the architecture of the National Information Network,
(4) The charter of the Telecommunications Infrastructure Company approved by the Cabinet,
(5) The establishment of the Special Working Group for the Digital Economy by the Cabinet in 2021.

The quality of Iran's internet is in a dangerous state

A self-inflicted problem, not a result of underdevelopment !



The E-Commerce Association has prepared this report based on data from international sources and analysis by expert consultants on the country's internet infrastructure. Critics of this report, especially governmental and sovereign institutions that should be accountable for this situation, are invited to present their alternative claims with scientific evidence and quantitative data.

In this report, we analyzed and compared 50 different countries worldwide across three metrics: disruption, restriction, and speed. Given Iran's scores in disruption (47/50), restriction (49/50), and speed (50/50), Iran, with a total of 146 negative points (out of a possible 150), leads the list of countries with the worst internet quality, once again defending its title for poor internet service! China and Indonesia follow Iran in this list, with 135 and 131 negative points, respectively. Although Iran has received fewer negative points compared to the previous report, it's evident that the situation regarding the quality of Iran's internet still remains in a "dangerous" position.

The poor quality of Iran's internet, along with the country's low ranking in cloud ecosystem indices and digital economy metrics, has ultimately led to over 50% of the country's knowledge-based business activists considering migration. According to survey results about the drivers of migration among the country's innovation and technology ecosystem activists, the so-called "Protection Plan" and the unstable quality of the internet have been identified as one of the main reasons for migration.(6)

Ultimately, if Iran wishes to at least maintain a steady presence in the path of internet-based commerce and emerging technologies, it must address crises such as fluctuating economic conditions, increasing and multiple restrictions, the penetration of deterrent and damaging policies towards digital economy infrastructures with fundamental and continuous actions. One of the most obvious components of the digital economy is creating a stable security environment for economic activities. However, policies and regulations based on filtering from within and filtering and sanctions of infrastructure companies in this field from outside ultimately lead to disillusionment with the definition of digital business, human resource despair, and decreased social welfare.

It seems that what can restore the lost trust and social capital in this area is serious support for the activists of knowledge-based businesses and the fledgling technology ecosystem. This support should not only come through capital injection and the reproduction of a greenhouse ecosystem but also by providing basic and obvious infrastructures such as "quality internet for all the people of Iran" and a serious commitment to the general security of the people.(7)

(6) Survey by the Vice Presidency for Science and Technology of the Presidency and the Iran Migration Observatory. Summer 2023 and 2022.

(7) For the full version of this note, refer to Appendix 2.

Table 1
50 countries under review in the report based on the highest number of websites analyzed in the OONI database

GDP Rank	Country	GDP Rank	Country
1	United States	31	Venezuela
2	China	34	Austria
3	Japan	35	Singapore
4	Germany	36	Bangladesh
5	India	37	Vietnam
6	United Kingdom	38	Malaysia
7	France	39	South Africa
8	Russian Federation	40	Philippines
9	Canada	41	Denmark
10	Italy	42	Iran
11	Brazil	45	Colombia
12	Australia	46	Romania
13	Mexico	48	Czechia
15	Spain	49	Finland
16	Indonesia	50	Iraq
17	Saudi Arabia	52	New Zealand
18	Netherlands	55	Kazakhstan
19	Turkiye	56	Greece
20	Switzerland	59	Hungary
21	Poland	68	Kenya
23	Sweden	80	Uruguay
25	Belgium	82	Lithuania
27	Ireland	85	Serbia
28	Israel	90	Jordan
30	Thailand	98	Paraguay

The methodology for selecting 50 countries in the ranking section of this report

In our first report, we endeavored to compare and rank Iran across three different indicators of internet quality among the top 100 countries in the world. Our efforts to make this report more equitable led us, in the second report, to limit the comparison to 50 countries that had the highest commonality in sampling among them.

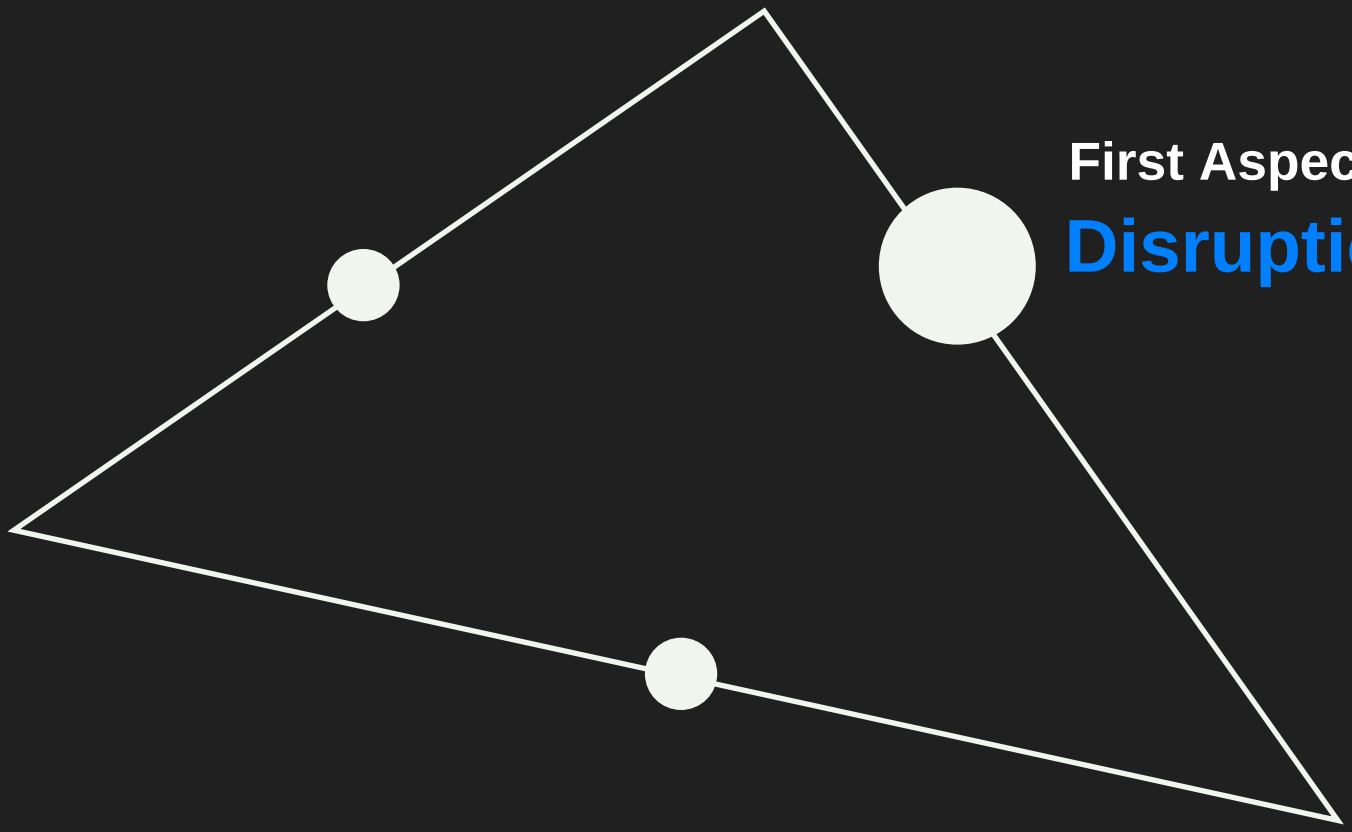
The OONI database actively works in the area of monitoring and observing disruptions and censorship on the internet in various countries. We extracted raw data from this database. From around mid-March (Local calendar: Farvardin 1402) to September 2023 (Local calendar : around Azar 1402), millions of tests had been conducted by probes in 165 countries worldwide.
Among these 165 countries, we selected 50 that were not only among the top 100 countries in the world based on Gross Domestic Product (GDP) but also had approximately 70% overlap in the web sites sampled. This was to ensure our final evaluation was comprehensive and defensible.

We then considered any website with a failed request rate between 10% to 50% of the total requests as experiencing disruptions, and those with more than 50% failed requests as filtered (censored). Next, we extracted the speed index rankings for these 50 countries based on Cloudflare data and conducted the final ranking.

In the ranking section, we ranked each of these countries based on the negative points they received in speed, disruption, and censorship (restrictions) indices to have a more precise measurement of each country's position.

Additionally, in each chapter, we tried to compare the final ranking or status of a country in the examined index with other credible sources to ensure that the data collected from the primary source were not biased positively or negatively.

D I S R U P T I O N



First Aspect

Disruption in Iran's Internet

Table 2
Ranking of Internet Disruptions in Iran Among Selected Countries

Rank	Country	%
1	Switzerland	%0
1	Germany	%0
1	Spain	%0
1	France	%0
⋮		
47	Iran	%11
48	Indonesia	%12
49	Israel	%39
50	Ireland	%48.9

Disruption Rank in the world

Verified based on three independent sources: OONI data, Cloudflare Radar, and ArvanCloud Radar

A trend towards improvement has been observed, but until November (2023)

It has shown improvement and eventually, in December 2023 (Local calendar: Azar 1402), with the recording of a disruption, Iran's position during these months has been fluctuating overall. It placed 47th out of the 50 countries under review with an 11% disruption; aside from the improvement of Iran's position in this ranking compared to the first report, the significant disruptions in "Israel's" internet, which are likely related to the conflict in Palestine, are noteworthy.
Internet disruptions can be categorized into two distinct types: temporary disruptions and continuous disruptions.

Group 1. Temporary Disruptions: From natural disasters to uncontrollable technical incidents

This group includes disruptions caused by natural or technical reasons on an occasional basis. The causes of these disruptions range from severed communication links in the internet network due to natural disasters to cyber-attacks, power outages, configuration errors, and similar incidents.

The recurrent disruptions in recent months have placed the country's internet stability in a concerning state. Normally, network disruptions due to uncontrollable external events might be considered inevitable.
However, when a single company monopolizes the country's internet, these disruptions cannot be viewed as ordinary, and the responsible authorities must be more accountable than ever for incidents caused by design, implementation, and maintenance flaws.

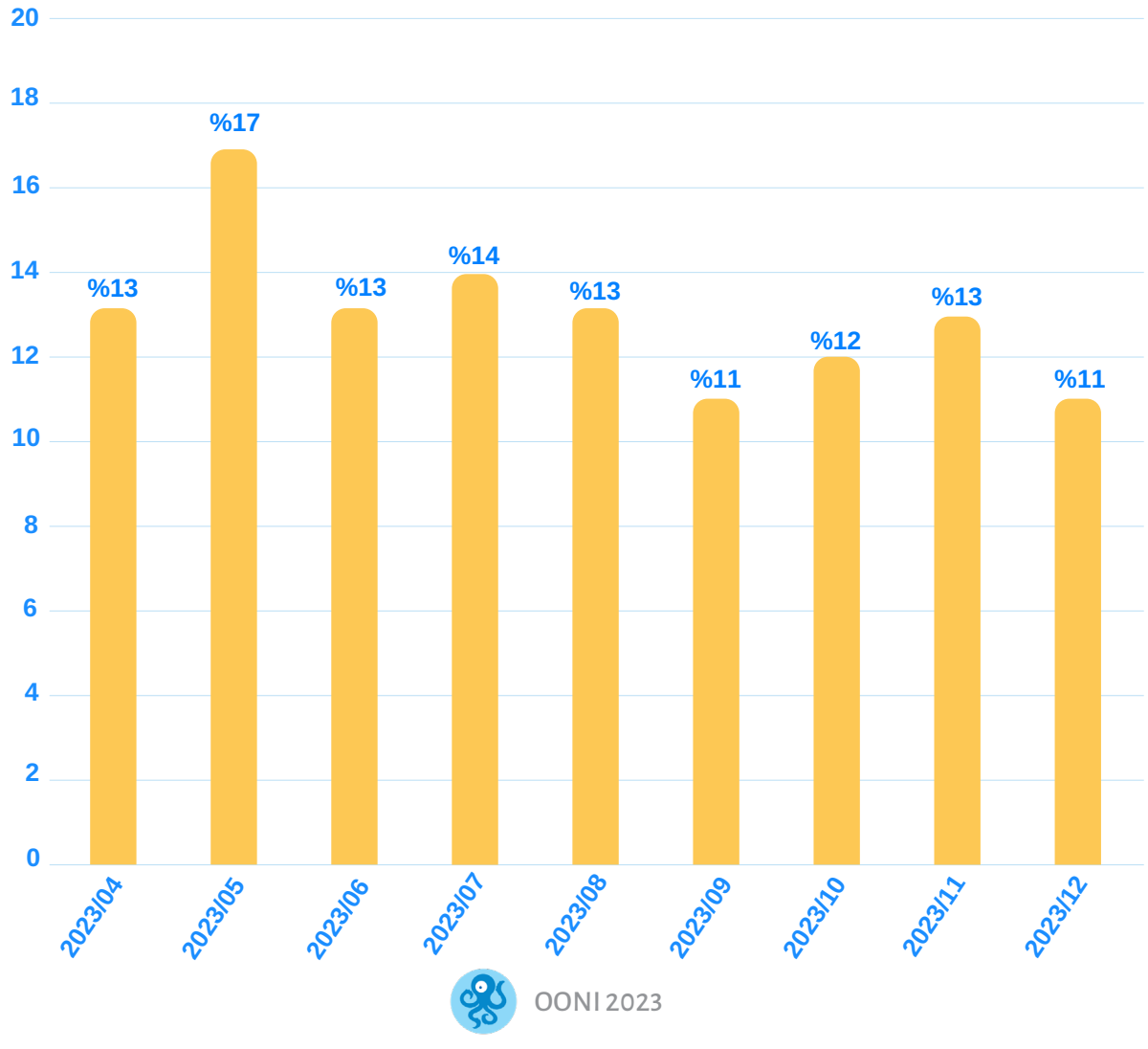
The Ministry of Communications' response and information dissemination during some incidents in recent months have been positive and progressive steps. However, until the monopoly of the Telecommunications Infrastructure Company is resolved, it is expected that transparent reports and information dissemination about future actions to prevent the recurrence of such problems should be published in a technical and precise manner, and the root causes of these disruptions should be thoroughly analyzed.

(8) Timeframe for measuring the main variables of this report to the month of December 2023 (Local calendar: Azar 1402); for studying the methodology of selecting the countries under review and the uneven trend of disruptions, refer to Appendix 1

Table 3 | Internet Disruptions in Iran in the Second Half of 2023 (Local calendar: 1402)

Problem	Date	Duration	Source of Report
Technical issue in the Telecommunications Infrastructure Company (Tehran Transmission Network)	40 minutes	November 18, 2023 (Local calendar: Aban 27, 1402) 06:14	Cloudflare / Attached Media / Arvan Cloud
Access disruption from outside the country	42 minutes	September 20, 2023 (Local calendar: Shahrivar 30, 1402) 01:24	Arvan Cloud
Disruption due to network development and improvement	2 hours	September 10, 2023 (Local calendar: Shahrivar 20, 1402) 21:30	Cloudflare - Attached Media
Disruption due to network development and improvement	1 hours	September 9, 2023 (Local calendar: Shahrivar 19, 1402) 21:15	Cloudflare - Arvan Cloud
Network disruption in the Telecommunications Infrastructure Company	-	August 3, 2023 (Local calendar: Mordad 12, 1402)	Attached Media
Nationwide disruption	4 hours	July 11, 2023 (Local calendar: Tir 20, 1402) 22:15	Attached Media
Fire in the telecommunications region 8 pools and serious internet disruption in Tehran	–	June 25, 2023 (Local calendar: Tir 4, 1402)	Attached Media
2.5 Terabits cut from the country's internet capacity	–	June 23, 2023 (Local calendar: Tir 2, 1402)	Attached Media

Chart 1 |
The status (percentage) of domains experiencing disruptions in Iran from March to December 2023 (Local calendar: Farvardin to Azar 1402) (In a study of 100 domains)



Group 2. Continuous Disruptions

The second group of disruptions involves nearly constant network disturbances, especially during peak usage hours (20:00 to 23:00).

To assess the state of continuous internet disruptions in Iran in a cumulative manner, from March to November 2023 (Local calendar: Farvardin to Aban 1402), we analyzed one hundred internet domains (selected based on SimilarWeb) from one hundred countries using the ooni.com database. The findings indicated that the disruptions (ranging from 10 to 50 percent) in Iran's internet, which affected 17% of domains in May (in Ordibehesht), showed a trend of improvement in November and December (Local calendar: Aban and Azar 1402), decreasing to 11%.
This trend gives hope for the effectiveness of expert critiques and efforts, as well as the Ministry of Communications' endeavors to enhance the quality of internet service.

The table below lists the countries at the bottom of the table among the 50 countries under review in the time frame from March to December 2023 (Local calendar: Farvardin to Azar 1402). As is evident, Iran, with an average of about 48% of websites experiencing disruptions, follows China, which has an approximate average of 47%, making it the country with the most internet disruptions over the last 9 months.

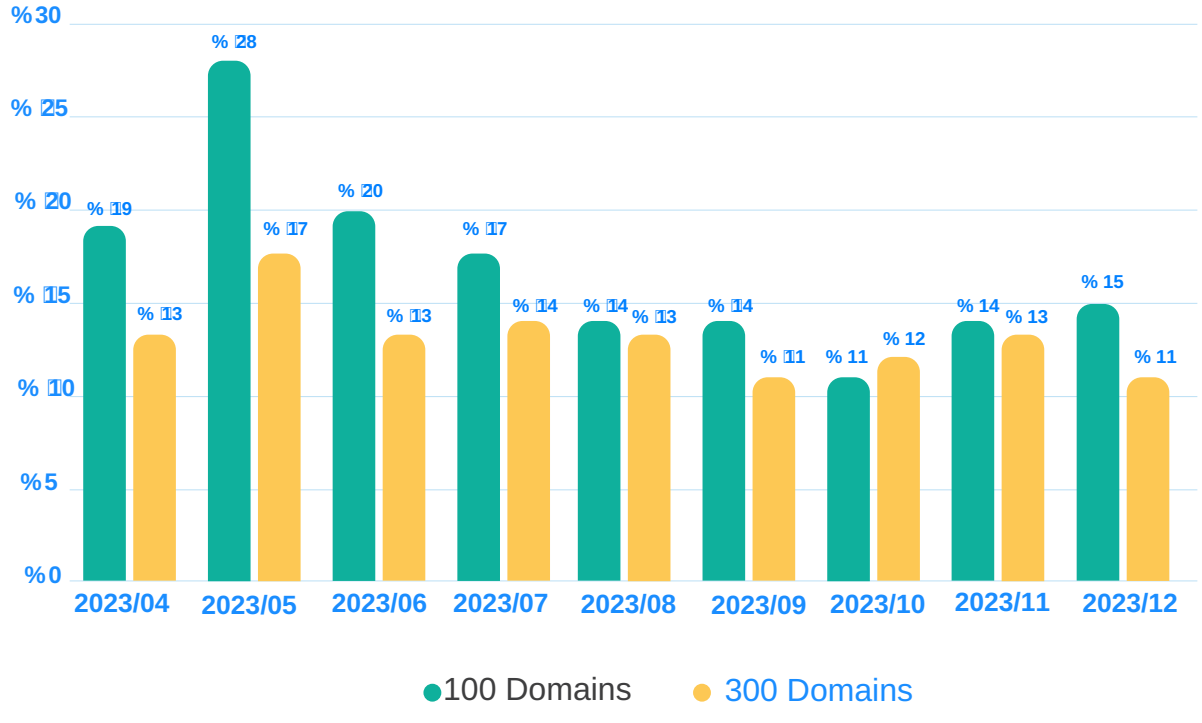
The dash in this table indicates that the selected countries were not among the lowest-ranked countries in this ranking; meaning that even these countries at the bottom of the table were not among those with very high disruptions in all months, whereas Iran has been at the top of this table during these months.

Table 4 | Countries with the Most Disruptions in the Time Frame from March to December 2023 (Local calendar: Farvardin to Azar 1402)

	2023/04	2023/05	2023/06	2023/07	2023/08	2023/09	2023/10	2023/11	2023/12
Iran	49	50	50	50	50	48	48	46	47
China	46	46	48	49	49	50	49	48	46
Israel	–	–	49	–	–	46	–	50	49
Indonesia	48	–	46	48	–	–	–	–	48
Ireland	–	–	–	–	–	–	50	49	50
Jordan	–	–	47	47	48	–	–	–	–
Bangladesh	–	–	–	64	47	47	–	–	–
Sweden	50	49	–	–	–	–	–	–	–
Paraguay	47	48	–	–	–	–	–	–	–
Malaysia	–	–	–	–	–	49	46	–	–
New Zealand	–	–	–	–	–	–	47	47	–
Lithuania	–	47	–	–	–	–	–	–	–
Colombia	–	–	–	–	46	–	–	–	–

Chart 2 | Percentage of Domains with Disruptions in Iran's Internet from May to December 2023 (Local calendar: Ordibehesht to the First Half of Azar 1402)

(Comparing the Status in 100 and 300 Domains)



October, the internet situation in Iran was at its best for the year 2023 (Local calendar: 1402)

As the previous charts clearly indicate, the trend of internet disruptions in Iran from May to October 2023 (Local calendar: Ordibehesht to the beginning of Mehr 1402) was improving. However, in November and December 2023(Local calendar: Aban and Azar 1402), this trend of decreasing disruptions was halted, with an increase in disruptions observed in both surveys (100 and 300 domains).

When we examine the trend of internet disruptions over the past seven months alongside public pressure, the activities of regulatory bodies, and recent negotiations[9] by the private sector, a clear correlation between the performance of related institutions and internet disruptions is evident. This situation, characterized by an average increase in disruptions during Aban and Azar, seems to require renewed attention.

(9)- Related to the actions taken by the E-Commerce Association, as mentioned on page 44 of this report.

Time	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2023-11-22				129	133	134	135	133	130	129	131	130	134	131	134	134	135	135	131	133	140	143	142	138
2023-11-23	136	136	129	127	127	124	124	129	128	131	134	135	135	135	137	138	136	137	137	138	141	141	142	139
2023-11-24	136	135	135	128	126	133	130	134	135	134	137	138	138	138	135	135	136	139	139	143	141	139	140	140
2023-11-25	139	133	132	127	126	126	130	128	128	131	131	133	131	130	132	132	133	134	138	137	138	139	142	142
2023-11-26	140	136	134	140	136	139	136	134	133	130	132	136	131	134	134	133	135	137	139	142	140	139	143	141
2023-11-27	138	134	134	135	129	128	133	138	137	135	135	132	130	128	130	128	129	131	131	133	132	134	135	132
2023-11-28	134	129	131	124	124	123	124	123	122	122	125	125	127	127	128	125	127	126	128	125	131	130	131	131
2023-11-29	129	125	121	119	121	120	122	122	122	126	126	123	125	122	126	122	123	124	125	128	127	128	127	130
2023-11-30	130	129	129	125	125	130	128	124	122	126	127	126	121	124	127	126	126	126	124	128	129	128	129	132
2023-12-01	130	131	130	123	125	132	125	128	122	130	126	122	125	126	126	126	124	125	130	128	127	126	130	130
2023-12-02	135	127	133	133	127	129	126	126	124	126	125	121	121	124	126	127	129	128	132	133	135	134	135	133
2023-12-03	127	129	127	129	121	133	148	139	137	130	127	125	127	127	125	128	127	128	131	133	137	140	140	137
2023-12-04	138	131	128	128	126	126	129	125	124	123	126	129	128	124	126	125	127	128	133	132	130	131	132	131
2023-12-05	129	131	126	122	123	123	124	123	125	125	126	127	128	128	129	129	130	132	136	136	139	136	140	136
2023-12-06	135	132	131	120	118	117	124	128	128	130	131	130	132	135	134	133	135	131	134	133	137	137	137	138
2023-12-07	133	129	129	133	131	126	119	123	122	129	129	128	129	128	127	132	131	136	132	135	134	135	134	132
2023-12-08	133	135	128	123	123	129	124	124	124	127	129	132	134	131	133	131	132	132	134	139	136	138	133	134
2023-12-09	134	131	136	129	126	128	128	124	126	125	124	123	125	126	129	132	132	134	131	133	134	137	142	139
2023-12-10	140	133	130	130	129	142	132	129	124	124	123	125	130	131	131	131	131	135	134	135	136	142	141	139
2023-12-11	138	134	139	138	144	135	129	127	127	134	133	132	130	134	138	137	139	143	142	145	151	146	150	145
2023-12-12	139	136	135	139	134	135	130	128	136	139	134	133	131	134	135	136	137	138	143	145	146	148	146	144
2023-12-13	144	138	139	136	134	134	128	132	130	135	132	132	131	137	134	134	136	137	137	139	139	144	140	145
2023-12-14	137	136	137	133	138	135	140	133	127	129	131	135	132	137	139	139	139	141	142	143	141	141	140	140
2023-12-15	140	138	134	136	138	135	136	137	147	142	143	141	139	137	137	139	140	141	140	138	140	146	144	141
2023-12-16	141	139	132	144	140	140	139	134	134	132	134	133	131	134	136	131	132	136	133	141	143	145	143	145
2023-12-17	142	135	136	133	128	139	130	128	125	130	135	134	134	136	135	140	146	145	140	138	140	142	141	138
2023-12-18	138	137	135	127	139	132	133	133	137	145	137	134	133	137	142	140	143	142	138	143	141	145	145	143
2023-12-19	140	138	130	129	129	132	133	131	132	131	135	131	134	135	135	138	141	138	141	138	142	144	146	143
2023-12-20	140	137	135	127	124	139	131	136	131	131	135	131	133	132	131	130	132	135	140	138	140	140	144	146
2023-12-21	145	143	137	136	132	132	132	128	132	136	132	136	135	137	138	138	141	140	140	140	137	138	137	142
2023-12-22	143	142	138																					

The color range in this chart goes from blue to red, representing the spectrum from good to bad conditions; meaning, blue is considered good relative to the available scores, and as the situation worsens, the chart shifts towards red.

The peak of internet disruptions in Iran occurs from 20:00 to 23:00 every day

To more accurately assess the internet situation, we considered different times of day as a significant variable for analysis. We monitored the internet condition in November 2023 (Local calendar: Aban 1402) in terms of the latency index from two providers, Hamrah-e Aval and Irancell.
As it becomes clear, from 17:00 to 23:00, coinciding with the increase in user consumption, the latency in accessing the internet also shows an increasing trend.

Chart 3
The Situation of the Internet Latency Index Ratio During Daily Hours over 30 Days in December 2023 (Local calendar: Azar 1402)

User data from Hamrah-e Aval
Accounting for 45% of Iran's traffic based on Cloudflare

Time	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2023-11-22				137	134	135	138	142	139	138	142	143	147	142	143	144	140	140	141	142	150	150	150	152
2023-11-23	149	148	146	140	139	141	138	142	141	141	143	143	141	147	148	148	146	149	149	151	154	153	156	153
2023-11-24	150	147	139	137	133	135	135	136	136	145	149	149	146	143	144	142	145	145	150	147	147	150	151	155
2023-11-25	151	140	140	134	142	137	139	142	139	140	138	139	139	141	148	145	143	140	145	147	151	152	155	152
2023-11-26	151	145	141	141	139	141	140	144	141	140	139	140	140	140	143	144	142	146	142	147	147	149	151	150
2023-11-27	144	142	142	141	134	135	135	137	136	142	142	141	141	136	138	139	136	134	133	137	143	142	145	144
2023-11-28	144	141	139	146	136	138	135	136	133	138	138	141	144	149	142	143	138	137	141	143	143	141	139	138
2023-11-29	142	137	135	129	133	132	144	145	142	140	138	138	140	139	141	139	141	141	142	139	143	141	142	143
2023-11-30	144	142	142	139	135	139	137	139	141	137	140	139	138	141	140	137	137	136	148	143	145	143	145	145
2023-12-01	141	142	141	140	132	134	128	137	133	139	137	137	136	137	137	143	142	138	134	138	140	140	148	149
2023-12-02	148	138	138	136	140	131	133	135	137	134	134	132	139	139	140	136	142	139	140	141	146	148	146	145
2023-12-03	144	143	146	143	139	137	131	131	139	140	138	135	135	140	139	143	139	139	140	140	144	146	146	148
2023-12-04	143	140	133	142	124	128	125	133	132	137	137	141	139	139	140	139	137	139	142	142	142	141	146	144
2023-12-05	141	141	139	139	127	126	129	131	138	136	137	139	142	143	141	142	142	142	144	149	153	153	148	144
2023-12-06	143	140	140	134	138	137	137	133	136	139	142	143	141	137	139	142	143	145	146	149	150	148	147	148
2023-12-07	145	142	144	146	146	140	135	131	134	138	138	139	140	143	144	141	138	142	142	142	141	144	148	149
2023-12-08	147	143	136	135	131	131	125	133	134	138	138	137	138	139	141	139	143	142	146	144	143	144	144	146
2023-12-09	140	142	137	139	135	136	139	137	135	136	140	142	140	140	139	140	140	140	144	150	150	152	144	142
2023-12-10	145	144	141	140	141	135	136	133	128	136	135	139	139	140	143	141	141	143	146	150	150	151	146	150
2023-12-11	143	146	133	139	134	135	134	132	136	143	148	148	143	148	147	146	148	149	145	150	149	159	154	154
2023-12-12	145	145	141	135	131	128	129	131	135	139	138	140	141	144	146	144	144	146	147	152	152	155	151	154
2023-12-13	148	147	142	149	144	148	140	143	143	144	145	148	142	143	143	147	149	147	152	148	150	153	151	152
2023-12-14	148	142	139	137	133	131	138	142	142	142	141	140	143	148	148	149	143	144	143	147	150	149	152	152
2023-12-15	151	149	144	139	141	145	143	139	141	143	145	142	142	142	142	147	150	153	152	153	150	156	157	157
2023-12-16	152	146	145	137	147	143	139	142	139	137	139	140	142	145	146	151	146	143	149	147	153	150	148	151
2023-12-17	149	148	144	148	135	136	141	143	141	145	146	146	143	148	148	154	149	144	148	150	149	149	152	149
2023-12-18	146	147	143	145	135	135	127	137	137	140	140	145	143	150	157	157	153	153	149	147	149	150	156	149
2023-12-19	153	144	146	144	135	141	139	150	147	144	145	141	143	147	148	152	151	149	157	158	159	157	154	151
2023-12-20	149	149	148	144	150	145	142	136	139	145	140	145	145	150	147	146	145	146	146	149	152	156	156	158
2023-12-21	150	156	147	146	141	132	134	139	138	139	142	145	144	143	143	147	145	146	148	149	152	150	149	150
2023-12-22	149	152	146																					

In a Black Box analysis, this chart indicates network layer saturation during peak usage hours. Saturation of the access layer, the transmission network, or even the international bandwidth (provided by the Telecommunication Infrastructure Company) could contribute to this event.

However, according to some unofficial reports submitted to the E-Commerce Association, the primary cause of this incident is a functional disruption and saturation of the processors in filtering equipment.

Chart 4
The Situation of the Internet Latency Index Ratio During Daily Hours over 30 Days in November 2023 (Local calendar: Aban 1402)

User data from Irancell (accounting for 32% of Iran's traffic on Cloudflare) based on Cloudflare Radar

Time	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2023-11-22				49	151	132	119	55	37	25	69	45	67	42	49	76	50	44	24	25	35	41	77	65
2023-11-23	53	35	45	27	25	18	20	22	24	24	23	22	22	21	22	25	27	27	24	22	36	33	77	62
2023-11-24	49	32	60	32	162	80	67	76	55	47	33	27	50	46	77	53	86	61	89	55	72	52	83	72
2023-11-25	73	90	53	48	36	83	44	33	17	16	21	23	19	19	18	21	26	31	32	29	27	27	36	45
2023-11-26	99	56	43	48	97	77	110	64	41	22	40	38	37	57	40	34	26	27	27	25	59	52	59	85
2023-11-27	84	109	66	98	46	46	29	41	31	41	36	44	49	45	71	77	56	43	45	76	52	48	29	25
2023-11-28	26	47	64	76	130	77	78	49	76	41	75	36	38	52	52	49	39	34	77	52	47	41	31	25
2023-11-29	67	52	45	40	40	81	98	65	48	23	38	28	49	34	35	36	31	35	46	34	52	39	84	48
2023-11-30	41	26	29	22	24	26	45	69	49	44	30	31	51	33	36	29	49	36	31	67	70	90	73	76
2023-12-01	67	58	49	53	82	45	36	41	29	30	21	34	26	66	81	70	44	33	44	30	49	77	48	46
2023-12-02	74	56	42	46	29	41	76	54	82	36	42	31	37	76	62	43	70	51	81	48	35	72	47	48
2023-12-03	36	30	40	30	35	25	40	28	26	68	75	93	56	92	96	113	88	67	41	29	29	48	40	37
2023-12-04	46	32	28	26	79	98	111	104	88	55	52	48	48	54	37	69	65	65	69	53	48	43	70	48
2023-12-05	39	23	21	44	31	26	73	49	39	29	69	62	54	43	42	32	26	23	23	26	23	21	24	37
2023-12-06	26	33	28	37	37	32	73	50	46	53	40	32	26	25	35	38	61	51	38	38	27	64	34	38
2023-12-07	30	27	76	58	45	70	37	35	25	25	24	23	29	24	44	44	54	70	44	42	23	31	25	34
2023-12-08	32	32	82	81	76	49	30	70	91	57	39	45	37	44	36	30	37	34	38	51	82	60	59	49
2023-12-09	83	49	40	32	28	33	59	44	33	26	23	26	26	28	22	43	42	40	29	68	68	52	41	26
2023-12-10	23	24	69	47	42	41	43	30	30	34	67	46	74	70	56	83	53	56	31	45	36	40	52	59
2023-12-11	60	85	49	61	26	24	30	64	53	72	38	34	25	31	43	39	30	23	68	51	42	26	34	37
2023-12-12	31	27	29	43	31	27	37	45	30	42	36	70	73	59	37	28	29	38	37	81	52	60	44	37
2023-12-13	50	32	34	23	19	73	40	48	28	31	26	21	49	76	67	60	71	63	58	52	44	33	26	27
2023-12-14	25	21	37	44	36	86	47	43	42	43	46	43	41	45	38	38	31	39	47	49	47	41	33	62
2023-12-15	88	108	72	52	52	85	61	43	27	30	23	49	57	52	36	27	40	32	35	30	35	30	32	33
2023-12-16	43	30	25	75	70	130	77	63	60	55	51	41	58	77	62	44	33	33	36	50	39	40	31	41
2023-12-17	37	28	22	32	22	32	69	88	56	59	76	54	73	62	44	58	33	36	27	24	41	71	51	87
2023-12-18	70	56	41	51	34	64	36	33	55	65	50	78	47	76	84	84	92	58	45	50	43	75	46	37
2023-12-19	33	65	50	41	28	28	21	42	32	42	40	60	49	39	36	30	28	36	43	34	40	76	89	93
2023-12-20	61	41	25	52	74	79	101	100	99	80	83	58	67	76	77	93	83	98	70	66	48	81	65	66
2023-12-21	45	109	105	70	38	55	36	35	42	65	54	67	40	33	25	25	66	48	61	37	34	32	38	33
2023-12-22	78	49	61																					

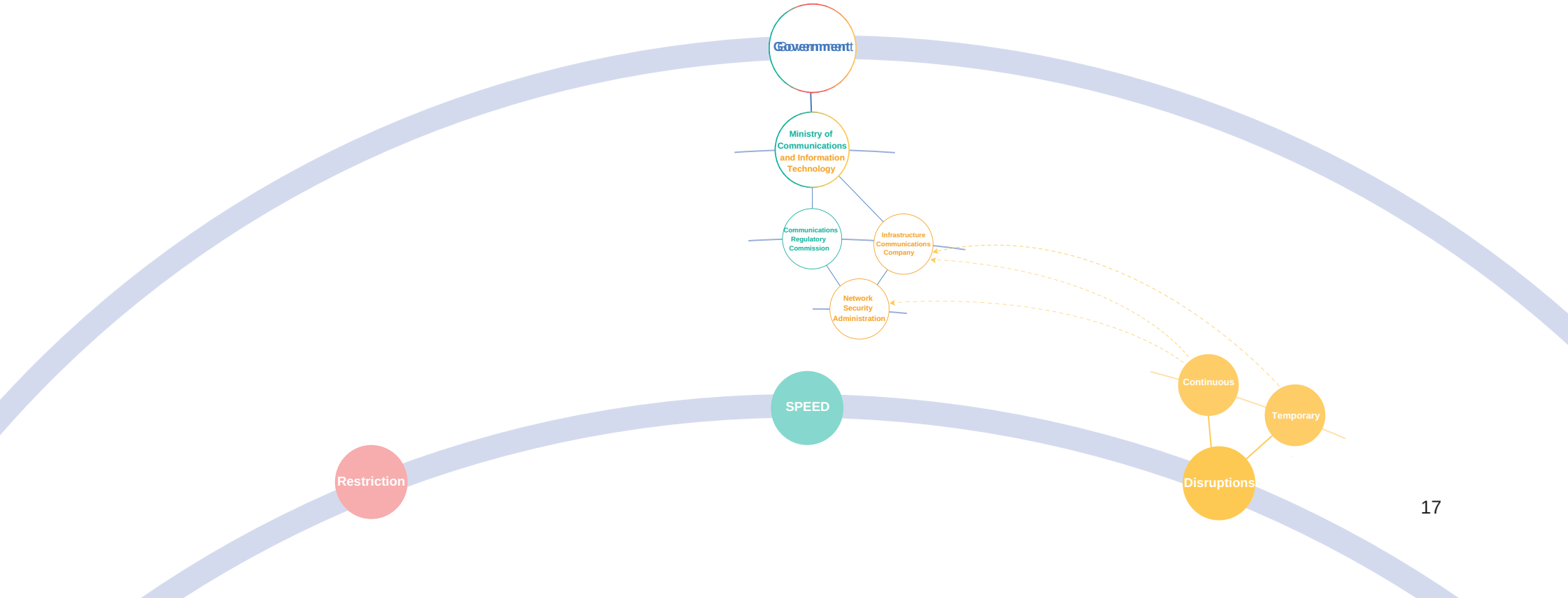
This chart represents the thermal condition of internet disruptions in the United Arab Emirates based on Cloudflare data. As evident, there is no oscillatory pattern observed during peak usage hours.

Chart 5
The Situation of the Internet Latency Index Ratio During Daily Hours over 30 Days in November 2023 (Local calendar: Aban 1402)

User data from the United Arab Emirates (based on Cloudflare Radar)

Who is responsible for the internet disruptions in Iran?

As indicated in the analysis below, the Ministry of Communication should be the primary entity accountable for the quality of the internet in Iran, more so than any other institution. This holds true regardless of whether 1) The imposed policies from security institutions, the Committee for Determining Instances of Criminal Content, prosecutors' orders, etc., or 2) The quality issues in the Access layer associated with fixed and mobile operators are the causes of these disruptions. The principle of the matter remains unaffected, and it is the Ministry of Communications and Information Technology that should address and resolve the reported issues through transparent and data-driven communication with the public.



C E N S O R S H I P

The second aspect:

Restrictions in Iran's internet

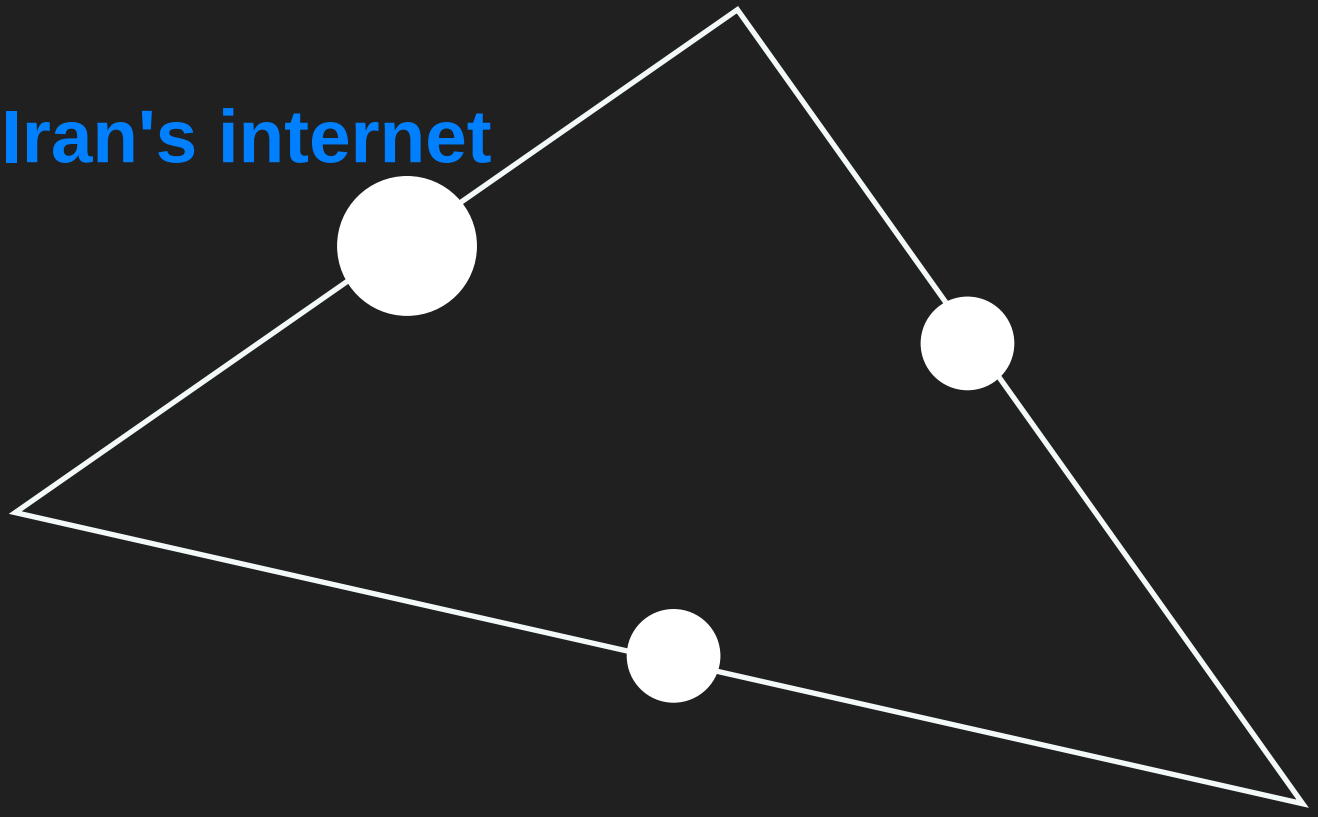


Table 5
Ranking of Internet Restrictions in Iran Among Selected Countries

Rank		Country	٪
1		Switzerland	%0
1		Canada	%0
1		Singapore	%0
1		Germany	%0
	⋮		
47		Saudi Arabia	%11
48		Russian Federation	%29
49		Iran	%55
50		China	%59

CENSORSHIP

Rank in the world

Internet restrictions in Iran can generally be classified into four levels: "Complete/Controlled Internet Shutdown", "Filtering", "Sanctions", and "Domestic Regulations". Each of these categories will be addressed separately in the following sections.

Iran experiences the highest number of absolute internet blackouts in the world!

In the first half of 2023, Iran, India, and Pakistan were the top three countries in terms of the most self-imposed (political) nationwide internet disruptions(11). According to analyses by the website Surfshark, most of these internet shutdowns in Iran occurred on Fridays and were related to socio-political events in Zahedan. Iran, with 14 shutdowns, India with 9, and Pakistan with 3, respectively, had the most restricted internet access in the world during the first half of 2023.

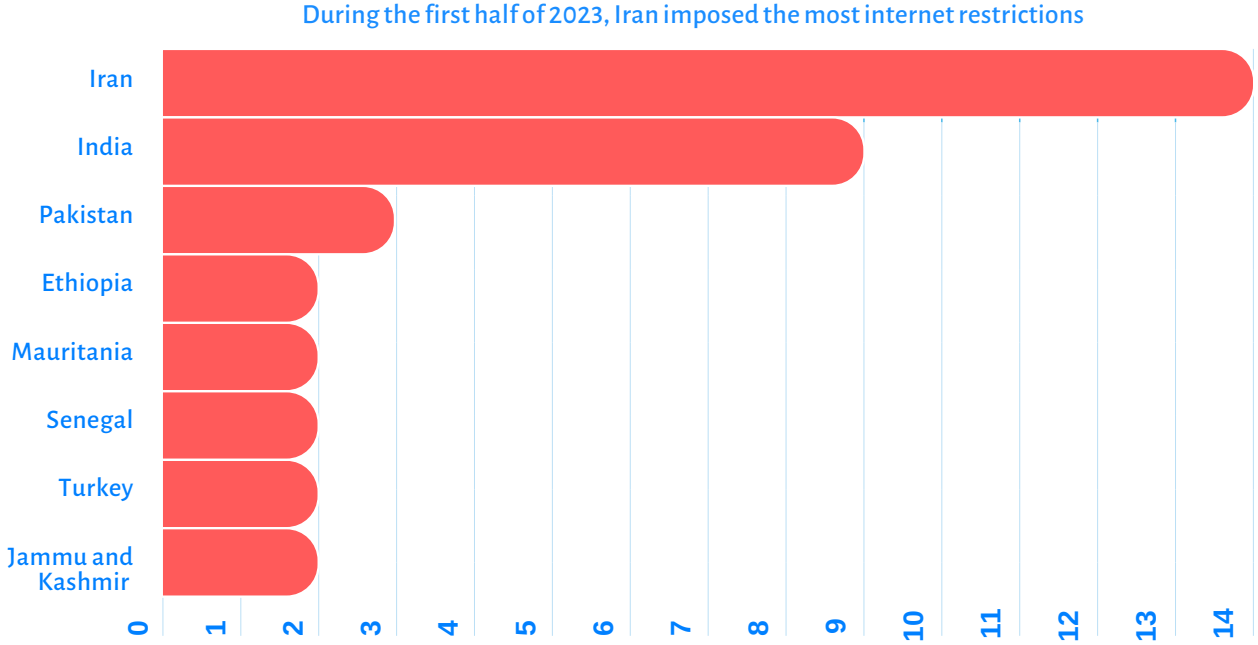


Chart 6 / Countries with the Most Complete Internet Shutdowns in the Year 2023

11. https://surfshark.com

Section One: Complete or Controlled Internet Shutdown

A complete or controlled internet shutdown refers to incidents where the internet in a country is fully or partially cut off due to an authoritative command. Events related to the 2009 elections, the incidents of November 2019, and September 2022 fall under this category. It appears that so far, these actions may have been carried out by orders from the country's Security Council.

The table below lists the countries at the bottom of the table among 50 countries surveyed during the period from April to December 2023 (Local calendar: Farvardin to Azar 1402).
As evident, Iran, with an average of approximately 49.5% of websites filtered, ranks as the country with the most internet restrictions in the past 9 months, following China with an average of about 49.4%.

The dash in this table indicates that the selected countries are not among the worst in this ranking; meaning, even these countries at the bottom of the table were not always among those with the most restrictions every month. However, Iran consistently ranks at the top in terms of this index.

Table 6
Countries with the Most Restrictions in the Time Period from April to December 2023 (Local calendar: Farvardin to Azar 1402)

	2023/04	2023/05	2023/06	2023/07	2023/08	2023/09	2023/10	2023/11	2023/12
China	50	50	49	50	49	49	49	50	50
Iran	49	49	50	49	50	50	50	49	49
Russian Federation	48	48	48	48	48	48	48	48	48
Saudi Arabia	47	47	47	47	47	46	47	47	47
Jordan	46	46	46	–	46	47	46	46	46
Uruguay	–	–	–	46	–	–	–	–	–

Section Two: Filtering

In studies conducted using OONI data on a sample of 100 different websites, Iran, with 49 filtered websites, has the second most restricted internet in the world, following China, which has 64 domains filtered. Although pornographic websites are commonly filtered in other countries such as South Korea, Turkey, and Malaysia, the comprehensive and widespread filtering in Iran goes beyond justifiable restrictions for public opinion and the needs of citizens and businesses.

Iran applies IP-level filtering without justification!

A test: Is the Iranian policymaker adhering to their own filtering protocols?

Another important aspect of filtering policies in Iran is the concept of collateral damage to websites with non-criminal content. This means that, intentionally or unintentionally (due to a lack of technical knowledge), the policymakers or technical systems in Iran end up blocking websites with educational content or those unrelated to filtering policies.
For example, restrictions on the IP address of the apple.com website can be mentioned, which uses one of the world's largest CDN (Content Delivery Network) services, Akamai. Akamai uses various IP addresses based on geographical location and other variables to display its client websites. One of these IP addresses is 23.46.88.150. This IP address is blocked by some operators (e.g., Irancell) without any legal basis for filtering Apple or even Akamai, while it is accessible through other operators (e.g., Hamrah-e Aval-MCI). As a result, the Apple website sometimes faces disruptions when accessed through the Irancell operator.

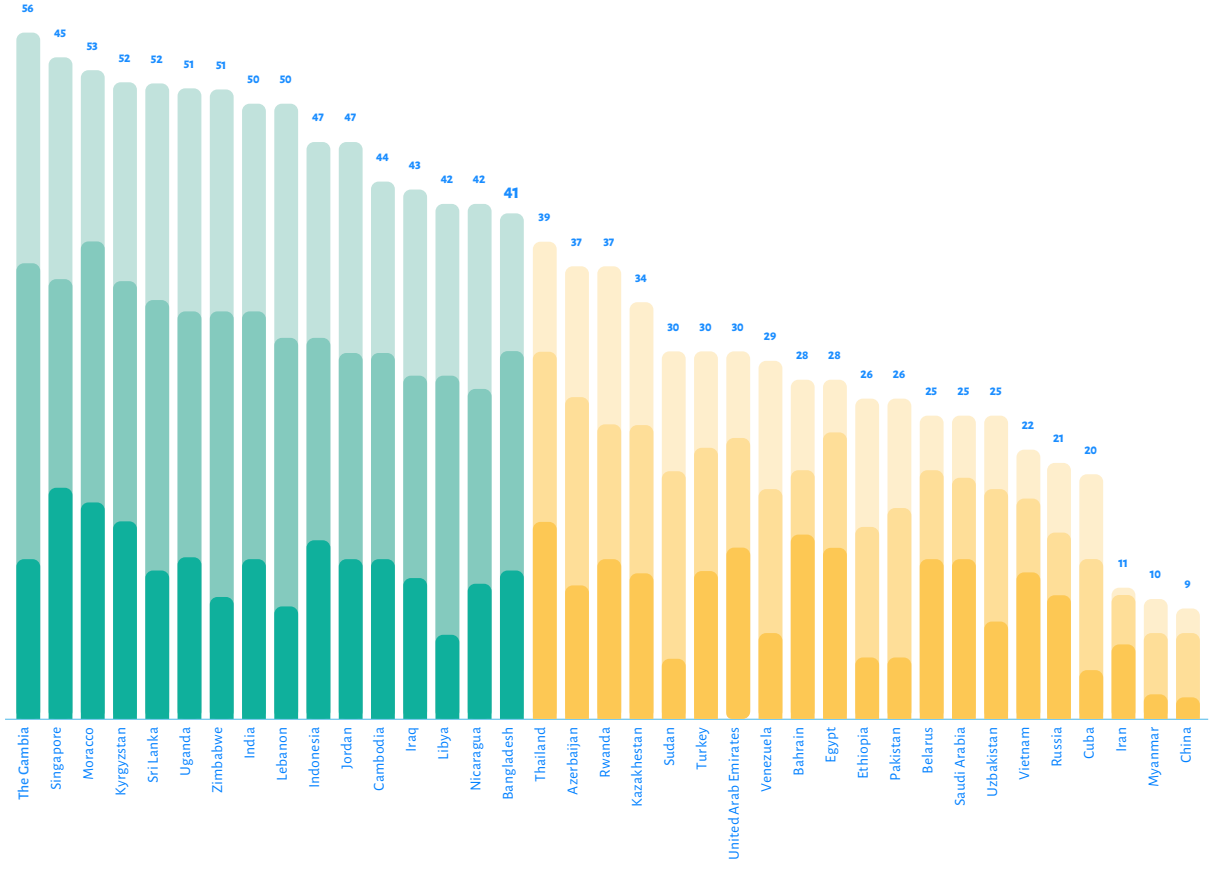
Similar issues have been repeatedly reported by individuals and various companies on social media networks. For clarity on this matter, we conducted a simple test. We randomly selected a few filtered domains (excluding pornographic content) from the OONI list. One of our tests was conducted on the domain ananzi.co.za, a search website for stores in South Africa. Given the absence of any system to inquire about the filtering status of websites, to display the related resolution, the reasons for it, and ultimately to object to it, our review of the website's content led us to strongly believe that there should not be any motive to filter such a site.
In the next step, we discovered that instead of restricting that particular domain, the filtering was applied to the IP address. As a result, other domains using this IP, or consumers of this IP after its transfer, will remain on the filter list.

What's even more peculiar is the subjective and unstructured approach to the implementation of filtering for the same domain among the country's internet providers, which shows significant differences. This means that in Hamrah-e Aval(MCI), not only is this IP filtered, but the entire range of /24 (i.e., 256 different IPs) is also blocked, while in Irancell, such filtering does not exist!

This is just a random example among millions of IP addresses that have been mistakenly filtered with an opaque and unprofessional mechanism. Ultimately, in such a situation, accessing the internet without a VPN becomes an inevitable condition for Iranian users, which naturally leads to a slow and insecure internet experience.

Chart 7

Iran's Status Among Selected Countries in Terms of Free Internet Access



Iran is at the bottom of the Internet Access Freedom Index,Ranking 68th out of 70

In 2023, the Freedom on the Net website analyzed 70 countries for free internet access, considering factors such as user rights violations, access barriers, and content restrictions. Iran ranked among the worst, following Myanmar and China, in terms of free internet access among these countries. Moreover, in specific sub-indices of this study, Iran was the worst country (ranked 1st) "Respect for citizens' rights" and ranked 4th in internet content restriction (censorship) among the countries evaluated(12).

(12) For the study ":What percentage of countries worldwide have free access to the internet?", refer to Annex 5
"Iran's position among countries with the highest governmental authority over the internet", refer to Annex 5.

Table 7
Status of Social Network Restrictions in the Year 2023

	Iran	✕	✕	✕	✕	✕	✕
1	China	✕	✕	✕	✕	✕	✕
	Turkmenistan	✕	✕	✕	✕	✕	✕
	North Korea	✕	✕	✕	✕		✕
2	Guinea	✕		✕	✕	✕	✕
	Pakistan	✕	✕	✕	✕		
3	Myanmar	✕	✕		✕		✕
	Uzbekistan	✕		✕	✕	✕	
4	Ethiopia	✕	✕	✕		✕	
	Thailand					✕	
5	Iraq					✕	

Social networks continue to be under complete restrictions!

Iran, China, and Turkmenistan are at the forefront of restricting social networks.

Social networks such as Twitter, Instagram, Telegram, WhatsApp, Facebook, and YouTube are filtered in Iran, placing the country alongside China and Turkmenistan at the forefront of nations with the maximum restrictions on social networks.

As previously mentioned, the Surfshark website, in its analytical statistics published in the first half of this year, also examined 29 countries involved in various forms of internet censorship, where Iran was among the countries in the worst situation. When these data are considered alongside this table, it becomes evident that the situation regarding the access of Iranian citizens and businesses to mass information platforms and facilities is significantly more restricted compared to other countries around the world.

Widespread and Unfounded Restrictions: Google Play and Phishing of Iranian Users

When we evaluate the filtered websites in terms of the services they offer, we encounter a significant number of useful tools (such as Google Play Services), for which there is no logical reason to be filtered. The restriction of these systems by domestic policy-making bodies, in addition to causing knowledge and technical damage to Iranian users, forces them to resort to alternative methods for updating or installing software, often compromising security in order to bypass these restrictions. Ultimately:

1

With the filtering of Google Play, automatic updates for applications on millions of mobile phones, tablets, and smart TVs have been halted, a situation that significantly compromises the security and vulnerability of digital devices.

2

A group of users, due to the unavailability of Google Play, are compelled to directly install applications from websites or social networks, which lack the security controls present in the official Google app store.

3

The automatic sending of billions of requests from Android phones to Google Play, and their lack of response, leads to a reduction in network quality, increased battery consumption, and disruptions on mobile phones.

Inefficient Filtering Mechanism

The inefficient filtering mechanism in Iran can be categorized into three significant groups:

The mechanisms of flawed and inefficient filtering laws

The current smart filtering mechanism is error-prone, slow, and very costly. It's a system that not only lacks the capability to identify criminal content but also causes disruptions across a wide array of internet systems, leading to a general decline in internet quality. IP-based filtering, broad filtering of one or more international service providers, the absence of supportive mechanisms for licensed domestic websites, etc., are among the most significant issues.

Lack of transparency, accountability, and the opportunity to object

Currently, following the unavailability of the Peyvandha.ir and Inernet.ir websites, which occurred after the hacking of the prosecutor's office systems and the leak of 52 million user records on the judicial announcement system, there is no system in place for inquiring about or objecting to the status of a filtered website or IP. Although that mechanism itself lacked the structures necessary for protecting citizens' rights, enabling judicial complaints in case of rights infringements for businesses, and providing a clear explanation for the reasons and resolutions for filtering a system, now, it's even impossible for ordinary internet users to determine whether a site is inaccessible due to filtering, sanctions, or a technical error.

Review of Filtered Websites

Filtering in Iran is a one-way street; the filtering of a system or an IP is not temporary, and it seems that there is never any consensus on lifting the filters on even the most important and non-sensitive systems.
The lack of accountability and transparency in the mechanisms of the Committee for Determining Instances of Criminal Content has significantly exacerbated this issue.

What Have We Done to Lift Filtering?

The E-Commerce Association announces its readiness to, upon receiving interest from the Committee for Determining Instances of Criminal Content or other relevant authorities, prepare and publish introductions for each of these websites, discussing the advantages of them being unfilteredand the disadvantages of them being filtered. This is to allow for a more detailed expert review.

In line with this issue, we compiled a list of websiteswhose access is restricted for Iranians. After removing domains related to pornography, we categorized the remaining websites based on their functionality. Then, in an expert review, we prepared an initial list of over 200 websites suggested for unfiltering, which can be presented to the Committee for Determining Instances of Criminal Content. We even divided this list into "sensitive" and "non-sensitive" categories to allow for a step-by-step approach. The complete listof these websites, categorized accordingly, is included in Annexes 6 and 7 of this report.

Section Three: Sanctions

What they appear to be,
they are not!

International institutions and organizations have established an inhumane framework through the formulation of laws that impose extensive restrictions on Iranian users and businesses. Based on these laws, many businesses have restricted access for Iranian IPs. This mechanism, along with the double standards of international institutions, needs to be examined. For instance, the United States, with a document known as "General License D-2" (13) and under the guise of supporting the rights of Iranian citizens, defends internet service providers, but acts contrary to this in resolutions and international sanctions.

In essence, General License D-2 appears to be a comprehensive report supporting the lifting of sanctions regarding internet and cloud service providers to Iranians, but in practice, it is ineffective and unenforceable. The ambiguity of this document lies in the lack of executive incentives and the presence of concepts that are open to reinterpretation and ambiguity(14); whereas, clearer expressions could have been used to convey the intended message. This conservatism must be interpreted in the context of the imposition of international sanctions on cloud service companies in Iran.

What Have We Done to Lift Sanctions?(15)

The significance of this section lies in the hypothetical scenario where, even if Iran were to remove all filters, due to these sanctions, Iranian users would still need VPNs to access the free internet.

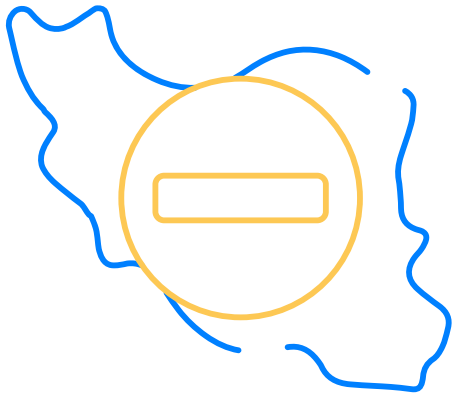
With the help of the "online.403" system, we compiled a list of approximately 600 foreign websites that restrict access to Iranian IPs. We reached out to these websites via emails and published a public text on social networks to highlight how these sanctions disrupt Iran's internet, violate the civil rights of Iranians, and affect the quality of Iran's internet.

In these letters, we also referred to the United States Treasury's General License D-2 and stated our intention to engage in legal discussions with them. However, this action was a small and symbolic gesture, requiring extensive legal and media efforts at the international level to be effective.

13. https://home.treasury.gov/

14. For activity not covered by GL D-2, expands existing case-by-case licensing policy, particularly to allow Iranian developers to create homegrown anti-surveillance and anti-censorship apps, which many Iranian people rely upon to circumvent domestic internet controls«of home.treasury .gov:D-2.

15-The image of the letter sent is included in the section detailing the actions taken by the E-Commerce Association.



Section Four: Domestic Regulations

Self-filtering within the country; Restricting access to domestic domains (IRAN Access)

Stranger than filtering foreign websites is the filtering of domestic sites for users outside the country. Many Iranian government websites and banks are not accessible to international users. In an analysis of the top 100 government websites (16) in Iran, 57 were found to be inaccessible from abroad. Important national websites, including those of the parliament, ministries, major organizations, Shaparak, etc., are not accessible to non-Iranian users.
The investigation revealed that the primary services (17) of these websites include government institutions and ministries, public services (related to insurance and education), and financial and banking institutions, which are detailed in the annex of this report.

(16)- For studying the websites that cause Iran access restrictions from outside Iran, see Annex 4.

(17)- For an analysis of the categorization of services provided by websites restricted with the Iran access structure, refer to Annex 4.

(18)- The image of the letter sent is included in the section detailing the actions taken by the E-Commerce Association.

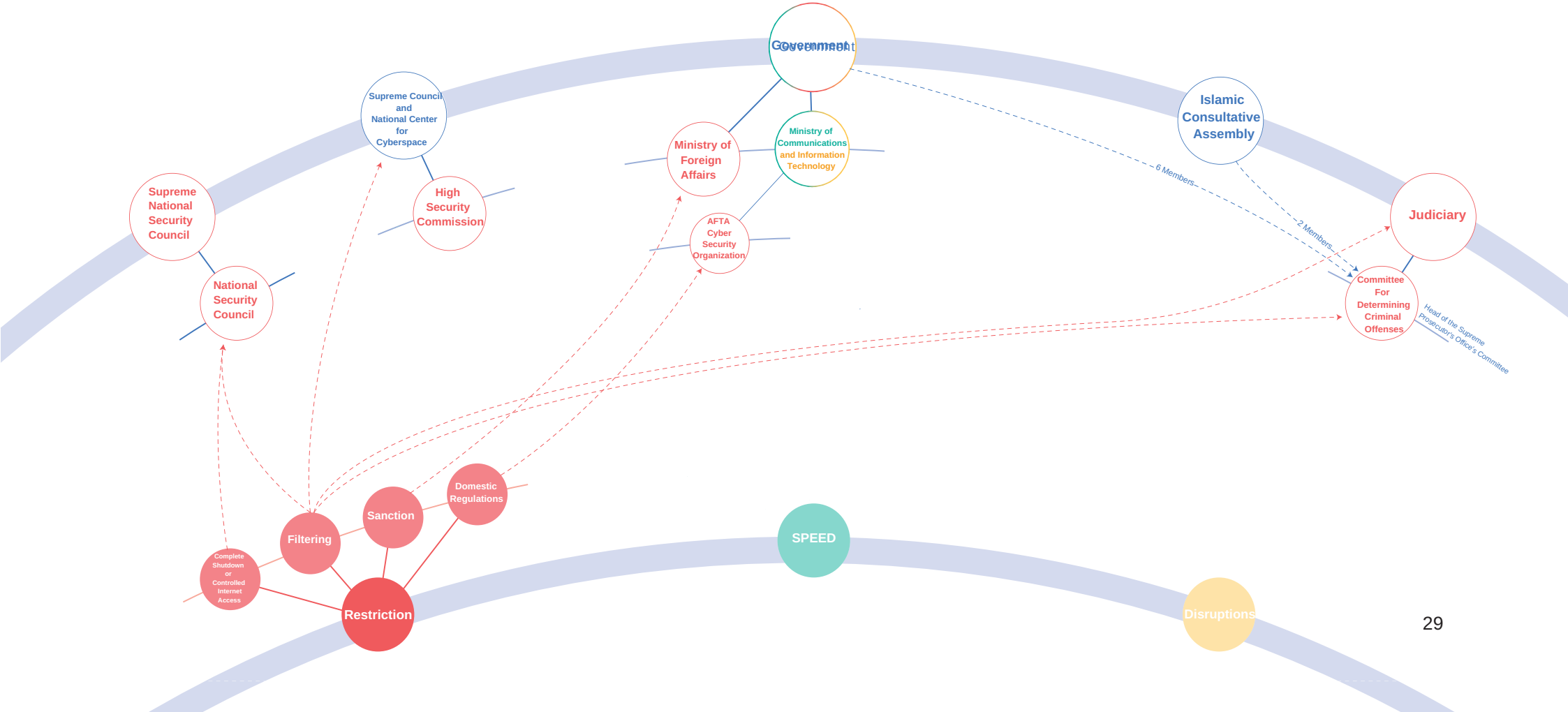
What Have We Done to Address Iran Access Restrictions? (18)

We sent official letters to domestic companies and organizations that, through self-filtering, restricted access to foreign IPs, highlighting the consequences of this restrictive approach as a tool contributing to internet insecurity and deteriorating internet quality.

In a conversation with an official from the "AFTA" organization, it was clarified that there is no permanent law enforcing Iran Access restrictions. However, instructions to implement this restriction have been communicated to government agencies at various times. If this restriction is permanent, it indicates a lack of attention by the relevant institution.

Who is Responsible for Internet Restrictions in Iran?

As evident from the context, all three branches of the government play a direct role in imposing these restrictions. The Judiciary, through the issuance of orders by judges, the prosecutor's office, or based on the opaque, unaccountable, and inefficient policies of the Committee for Determining Instances of Criminal Content headed by the country's Attorney General, has a fundamental role in the enactment of many of the country's internet restrictions. But what about the government's role?



What Do Government Officials Say About the State of Internet Restrictions in Iran?

1. Discourse detached from reality and devoid of meaning (Interview with the Minister of Culture and Islamic Guidance)(19).
2. Shifting responsibility to others, showing a lack of accountability (Interviews with the Minister of Information and Communications Technology)(20).
3. Attributing the responsibility for filtering to foreign platforms that do not establish branches in Iran (Interviews with the former head of the Supreme Council of Cyberspace, Minister of Culture and Islamic Guidance, and Minister of Information and Communications Technology)(21).
4. Orders for review and removal of restrictions without precise follow-up and a clear timeline (Interviews and letters from the President to the Ministry of Information and Communications Technology and the Supreme Council of Cyberspace)(22).

Despite the contradictory positions of the members of the thirteenth cabinet, the President, by appointing half of the members of the Committee for Determining Instances of Criminal Content, if not having complete authority, certainly has a significant share in internet censorship in Iran. However, it's predictable that when an issue is managed by multiple committees and parallel, non-transparent institutions, political games play a significant role in the outcomes.

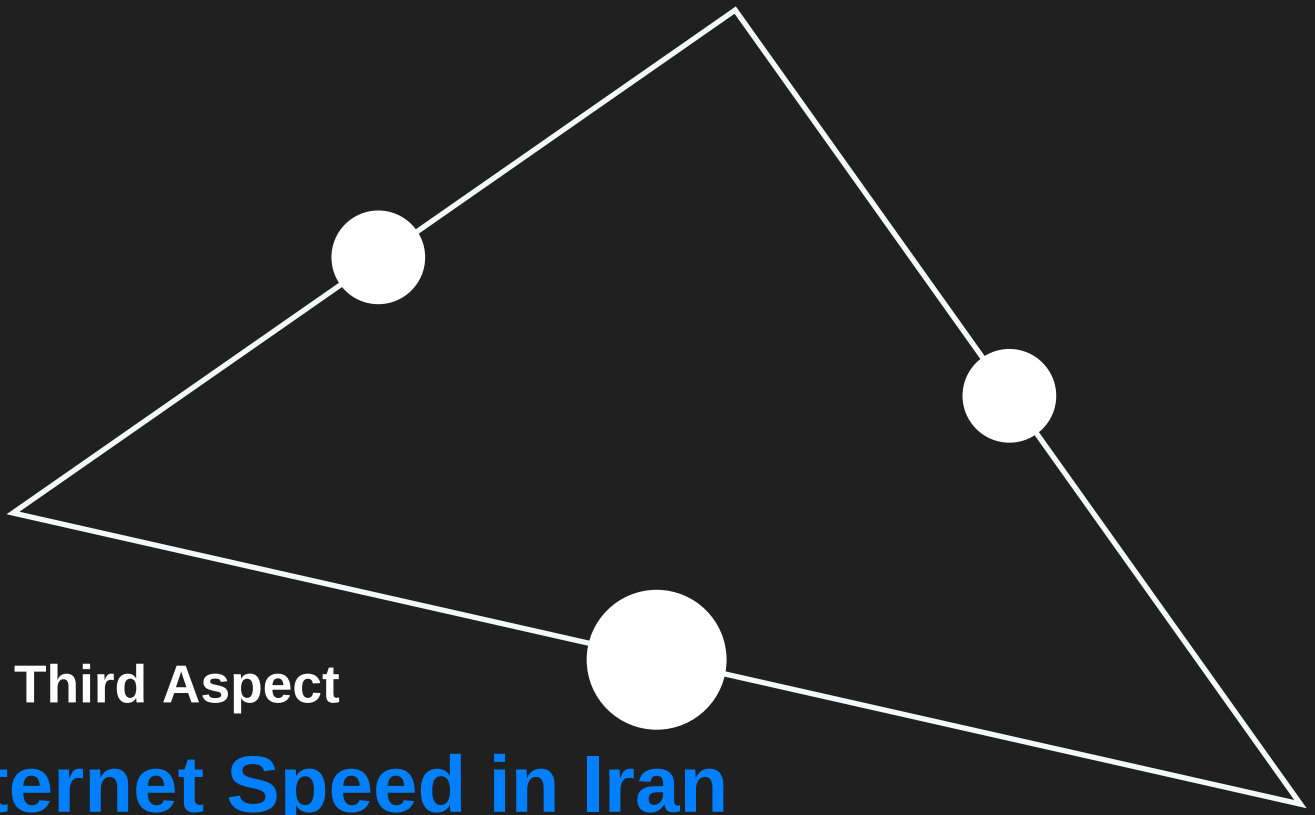
On December 26, 2023, the Minister of Information and Communications Technology and the spokesperson for the thirteenth government (23) announced that for the second time, a request by the Minister of Information and Communications Technology to lift the filter on Google Play was discussed in the Committee for Determining Instances of Criminal Content but was opposed.

This decision raises the important question of how the government, holding half of the decision-making seats, could have acted without internal coordination and consensus. And if this statement is accurate, why doesn't the government spokesperson attribute the responsibility for this decision to the government?

The situation becomes even more peculiar when the Minister of Information and Communications Technology of the twelfth government claimed that there was a consensus within the government at the time to lift the filter on certain websites, including Twitter, but the head of the Committee for Determining Instances of Criminal Content refrained from holding meetings(24). Additionally, the prosecutor at the time stated in an interview that the request to unfilter Twitter was illegal, and the Committee for Determining Instances of Criminal Content is not the authority to violate judicial orders and decrees.(25)

19. Minister of Culture and Islamic Guidance: "We don't have filtering in Iran."
20. Minister of Information and Communications Technology: "The government is not responsible for filtering the cyberspace."
21. Minister of Culture and Islamic Guidance: "There is no filtering in Iran."
22. President: "Filtering should be reviewed."
23. Government Spokesperson: "The unblocking of Google Play has not been approved."
24. Azari Jahromi: "They won't allow the Committee for Determining Instances of Criminal Content to convene."
25. Deputy Prosecutor: "The Minister of Information and Communications Technology's request to unfilter Twitter is illegal!"

S P E E D



The Third Aspect

Internet Speed in Iran

Table 8
Ranking of Internet Speed in Iran Among Various Countries

Rank	Country	Bandwith	DNS	Latency
1	Switzerland	32	22	21
2	Sweden	40	27	19
3	Netherlands	33	27	22
4	United Kingdom	27	26	23
	⋮			
47	Saudi Arabia	6	95	98
48	Venezuela	6	96	89
49	Kazakhstan	6	111	110
50	Iran	5	118	133

SPEED

Rank in the world

Tested based on data from three independent sources:
OONI data, Cloudflare Radar information, and ArvanCloud Radar

The Cloudflare Radar database assesses the internet speed status of each country using the indices of Latency, Bandwidth, and DNS. In all three indices, Iran's situation was compared with various countries, and unfortunately, it did not achieve a rank better than 50 of 50 in any of them.

As will be discussed further, the status of internet peed in Iran in this database has shown an improving trend from May to November, but with minimal growth. For instance, in the Bandwidth index, it increased from 4.0 mbps in May to 4.8 mbps by the end of November. In the Latency index, it improved from 146 ms in May to 136 ms in November, and in the DNS index, it improved from 157 ms in May to 116 ms in November.

Despite all the follow-ups by the E-Commerce Association with the Ministry of Communications and the Telecommunications Infrastructure Company, none of the indicators such as the total international bandwidth of the country, its changes during the thirteenth government, and the average speed of Iranian users accessing the international internet (up to the time of publishing this report) have been publicly released.

This situation persists even though providing reports with scientific and quantitative evidence to the public is among the primary rights of the citizens of a country and an obvious duty of the responsible authorities.

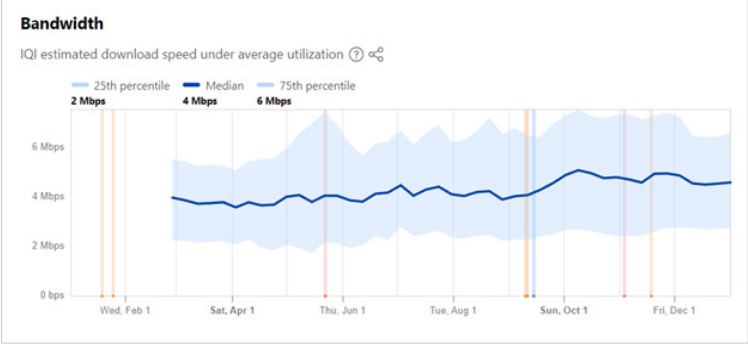


Chart 8: Trend of Internet Bandwidth Changes in Iran over the Last 12 Gregorian Months

- Latency: The amount of time it takes for data to be sent from the source to the destination.

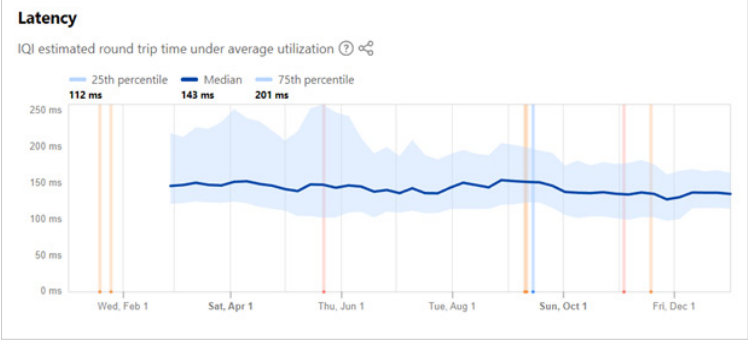


Chart 9: Trend of changes in internet Latency in Iran over the last 12 Gregorian months

- Bandwidth refers to the amount of data that can be transmitted over a network in a given amount of time.

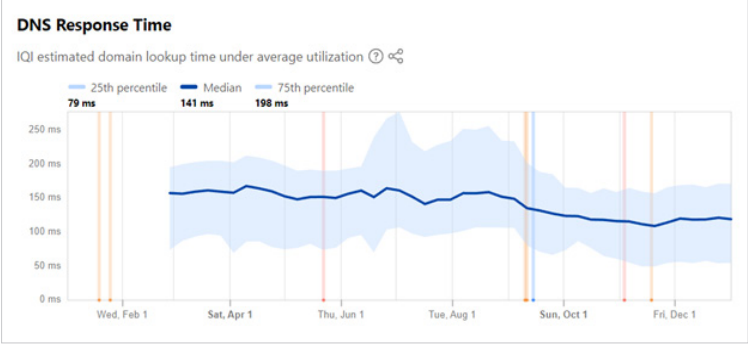


Chart 10: Trend of Internet DNS Speed in Iran over the Last 12 Gregorian Months

- Latency: The amount of time it takes for data to be sent from the source to the destination

The reduction in internet speed in Iran and the partial compensation for it over the past 7 months

Iran's internet became approximately 3 times slower in loading Google!

The Google CrUX (Chrome User Experience Report) database is considered one of the most comprehensive references for evaluating internet load speed due to its extensive statistical community. This website assesses related speed indicators, the origin, and the date of data sent (from both mobile and fixed phones) to Google on a monthly basis. According to Google CrUX evaluations, the load speed for Google in Iran has become three times slower over a 5-year period; it has decreased from 2.5 seconds in 2018 to 6.323 seconds in 2023.

Although when examining the five-year trend of Google website load speed changes in developed countries, this indicator tends to decline as well (26), a notable point regarding Iran is the stark difference and threefold decrease in load speed of this search engine and tech giant over the past 5 years. This is in contrast to countries with economic and political situations roughly similar to Iran, which have experienced less change in this period (27).

On meter.net, we do not rank among the top 100 countries in terms of internet speed!

According to the meter.net (28) database, by examining the internet's download speed, upload speed, and ping in Iran, the country has experienced a decline of at least three ranks and has fallen out of the top 100 countries list (29). Meanwhile, countries like Bolivia, Kuwait, Chile, Myanmar, and Morocco are among the top 100 countries in this index and are in a better position than Iran.

26. In Denmark, the time decreased from 1.810 seconds in 2018 to 2.604 seconds in 2023, and in Sweden from 1.71 seconds in 2018 to 2.622 seconds in 2023.
27. In Malaysia, the time increased from 2.02 seconds in 2018 to 3 seconds in 2023, in South Korea from 1.99 seconds in 2018 to 2.535 seconds in 2023, in Saudi Arabia from 2.99 seconds in 2018 to 5.00 seconds in 2023, and in Turkey from 1.972 seconds in 2018 to 4.439 seconds in 2023.
28. Despite this, in the most recent report July 2023 (Local calendar: as of Tir 1402), Iran was ranked 97th out of the top 100 countries in this index.
29 This database lists the top 100 countries based on download and upload speeds. The index this database evaluates is just one value (the average result per specific IP address). Therefore, if someone performs 100 tests with a result of one gigabit, it will weigh the same as one test with a result of 1 megabit.

Like other sections, here too, we've divided the topic of internet speed into three significant parts:

1. International bandwidth which is monopolized by the Telecommunications Infrastructure Company and lacks transparent reporting on its current status and development plans.

2. Emerging Technologies Focus on emerging technologies, with acceptable development in 5G and fiber optics in the country's Access layer.

3. Economic model That has managed to simultaneously provoke protests from both consumers (the public) and sellers (fixed and mobile operators). We will delve into the reasons for this issue.

In early Dey, the enactment of a law to increase internet prices in Iran by 34% sparked a wave of protests on social networks and reignited public attention to the issue of internet pricing in Iran. The rationale for price increases has several general analytical bases: 1- The lack of price increases in past years despite high annual inflation, 2- Comparing the price of home internet in Iran with international rates in other countries. On the other hand, the main arguments against the price increase focus on 1- The very low quality and 2- Extensive internet restrictions, 3- Not considering the costs of obtaining VPNs, and ultimately 4- The low purchasing power of Iranian subscribers and the high dependency and daily usage of the internet by the people.

However, as mentioned, it's peculiar that an economic model is unsatisfactory for both the seller and the consumer. We will explain that the three main causes of this issue should be sought in the following:

Table 9

Article 1. The tariff for internet bandwidth services for 100 Mbps and above is determined as follows in the table below.

Level	Capacity	Monthly Tariff per Mbps (in Rials)
1	100 Mbps	1,044,000
2	1 Gbps	900,000
3	10 Gbps	750,000
4	40 Gbps	675,000
5	100 Gbps	600,000

1. The high cost of exclusive bandwidth from the Telecommunications Infrastructure Company

The monopoly on the supply and sale of bandwidth in Iran is held by the Telecommunications Infrastructure Company. This entity sells the internet at a cheaper rate than some neighboring countries (such as the UAE) but at several times the price of developed countries.

As shown in the table, in the best-case scenario, the price of internet purchased by operators for a 100mbps connection is set at 6 million Tomans, and for a 1gbps connection, which the Minister of Communications speaks of, it's set at 60 million Tomans per month.

In all countries, internet service providers reduce their final costs by sharing bandwidth or selling internet based on volume, making the purchase reasonable for home internet users. If we consider an 8-fold share ratio, the final cost of 100mbps bandwidth for an operator becomes 750,000 Tomans. Assuming half of the internet traffic of Iranian users is routed domestically and the other half uses international bandwidth, this figure drops to 375,000 Tomans, to which high costs of salaries and wages, investment in purchasing equipment, transfer costs, the cost of buying bandwidth at IXP, etc., must be added.

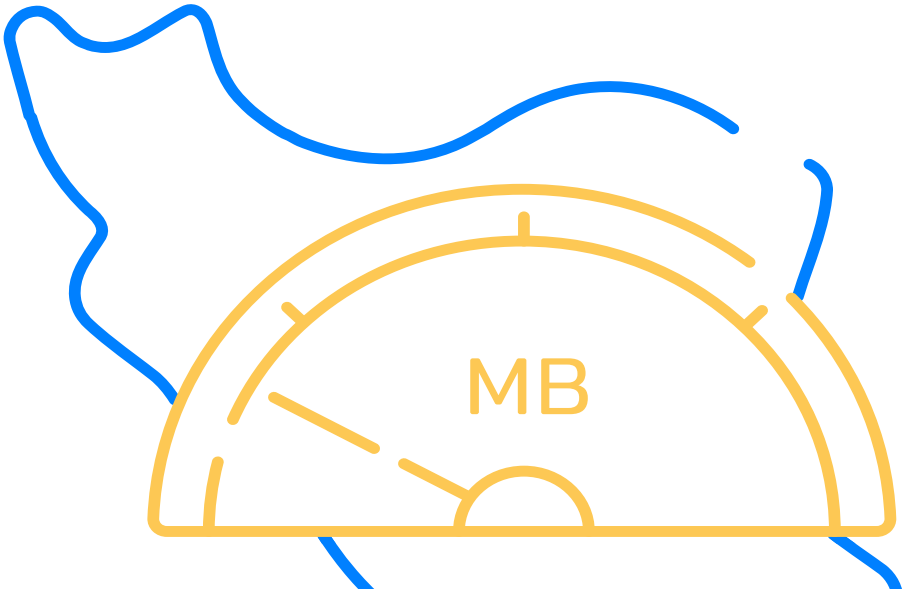
Therefore, the path to providing fast and affordable internet goes through the government and the Telecommunications Infrastructure Company, not from the price set by the Regulatory Authority for internet operators.

2- Imbalance in international bandwidth due to filtering conditions

The international bandwidth status of Iran at the end of the twelfth government was reported to be 8 terabits per second. While the Ministry of Communications does not provide a clear report on this matter, internet experts estimate that this figure dropped to 3 terabits per second in October 2022 and has currently only reached 6 terabits per second.

Technical factors, including limitations in the Access layer, high prices that hinder the sale of standard global bandwidth, and most importantly, extensive filtering have caused international bandwidth not only to not grow but also to decrease in consumption. This is one of the significant issues leading to a very high final internet cost for the Telecommunications Infrastructure Company. The next issue is the extensive internet censorship in Iran, causing an imbalance in international traffic.

Under normal conditions, Iranians should receive "Instagram" traffic "cheaply" from its CDN within Iran. In semi-normal conditions, Iranians should be able to receive at least "Instagram" traffic "at a moderate price" from its CDN in one of the neighboring countries such as Armenia, Turkey, or Azerbaijan. However, currently, they have to receive it "expensively" from one of the European IXs like Frankfurt or Amsterdam because most VPNs are routed through the main transmission centers in Europe.



3- The high cost of filtering equipment, a cost that people must pay for being filtered:

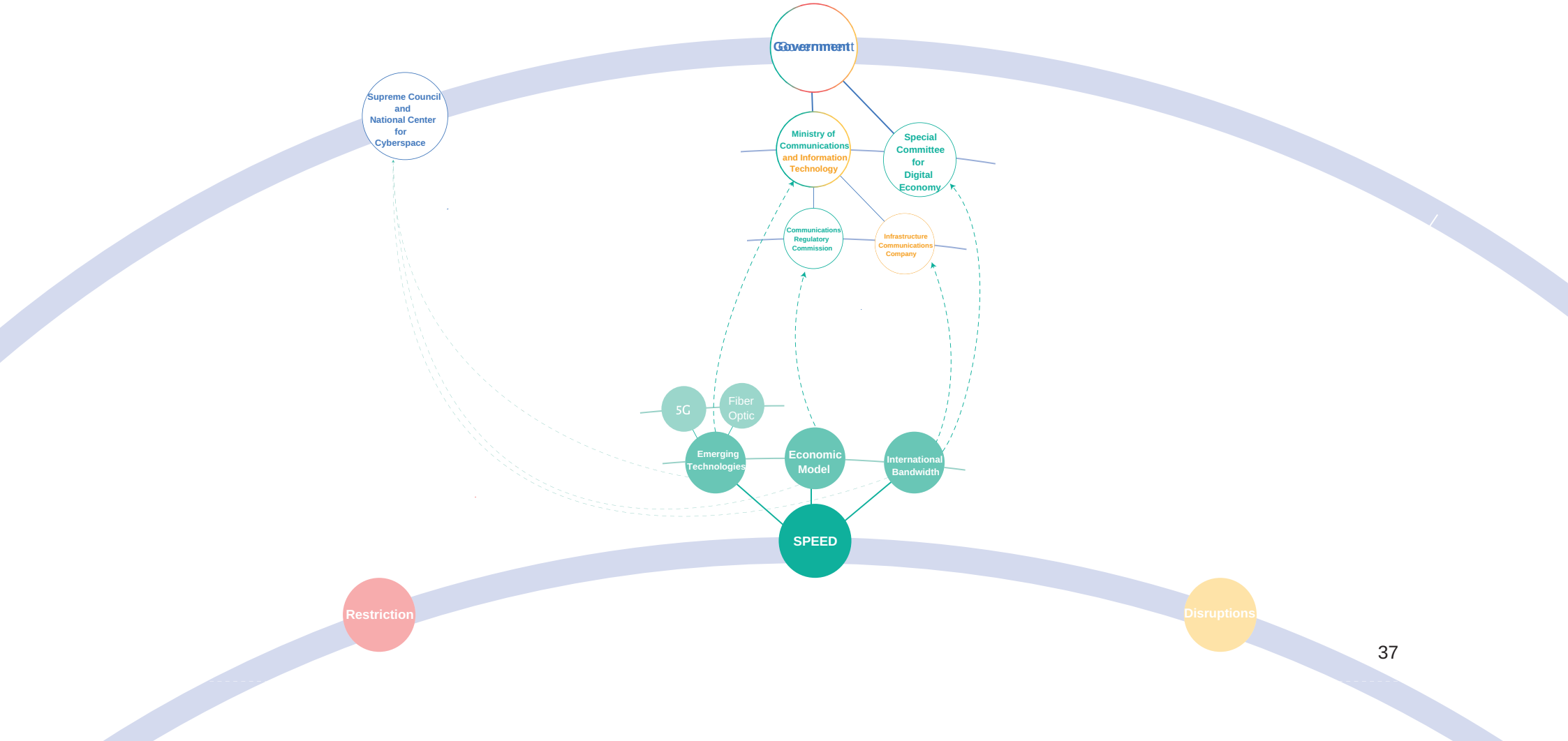
Although there is no precise and clear evidence of the total cost of filtering equipment in Iran, according to some reports from experts in the field, operators need to pay around 200 thousand dollars for filtering equipment to develop 10 Gbps in their network. This figure includes the costs of procuring the necessary hardware, establishing infrastructure for deploying the related systems, and licenses, with a significant portion being paid annually for license renewals.

This issue has become a bottleneck for development in many parts of the country, forcing many operators to transfer internet traffic to Tehran due to a lack of sufficient filtering equipment in that province, which increases costs and reduces quality. This uneven infrastructure development in the country has led to a kind of territorial injustice in internet access, at least at a uniform speed for all Iranians, meaning that different towns and cities do not experience the same speed as users in Tehran. As a result, it seems that a non-Tehran resident experiences somewhat slower internet - due to the time taken to send data to Tehran and back - and ultimately at a higher cost.

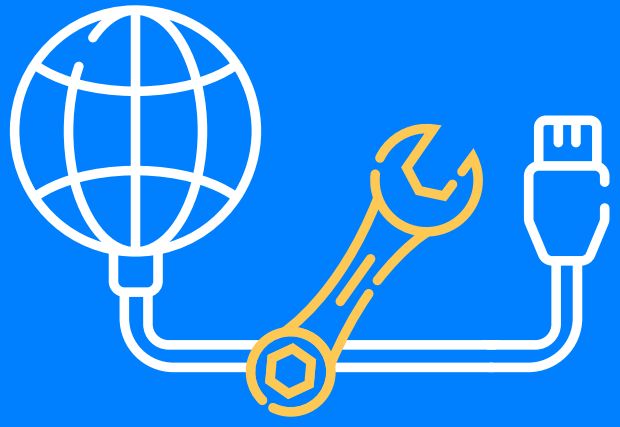
Even more peculiar is the new policy of the Ministry of Communications in the thirteenth government, which has also focused on developing filtering equipment in the Access layer and among mobile operators, and has started planning and implementing it in fixed operators as well. In other words, domestic traffic will also pass through filtering equipment from now on, and it is predictable that the mentioned disruptions in Iran's domestic network will become more evident in the near future.

Currently, people not only have to pay for equipment that reduces internet quality and causes filtering, but without any technical or expert justification, they must pay at least twice as much as the country's internet needs.

Who is Responsible for the Low Internet Speed in Iran?



What Changes Occurred After the Initial Report on "Internet Quality in Iran"?



Practical Actions of the E-Commerce Association Following the initial report and its impacts on the quality of the internet

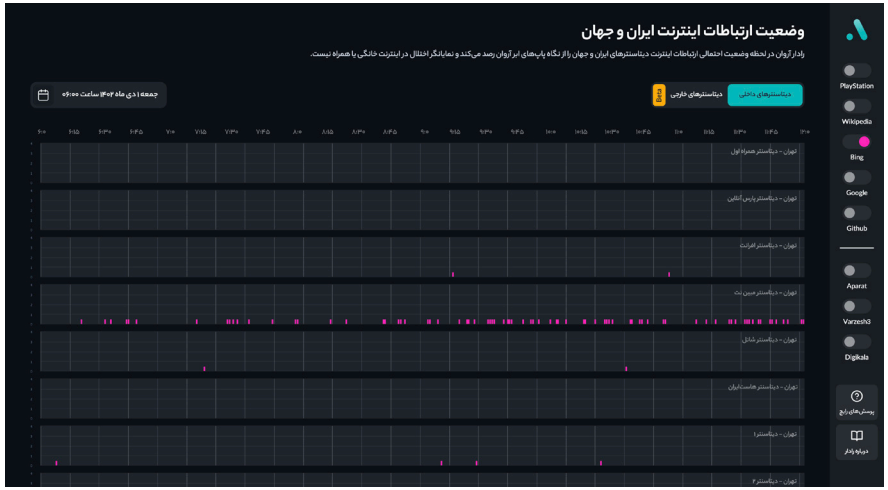
E-Commerce Association has initiated an active form of advocacy for improving the internet quality in Iran by establishing the "Internet and Infrastructure" commission.

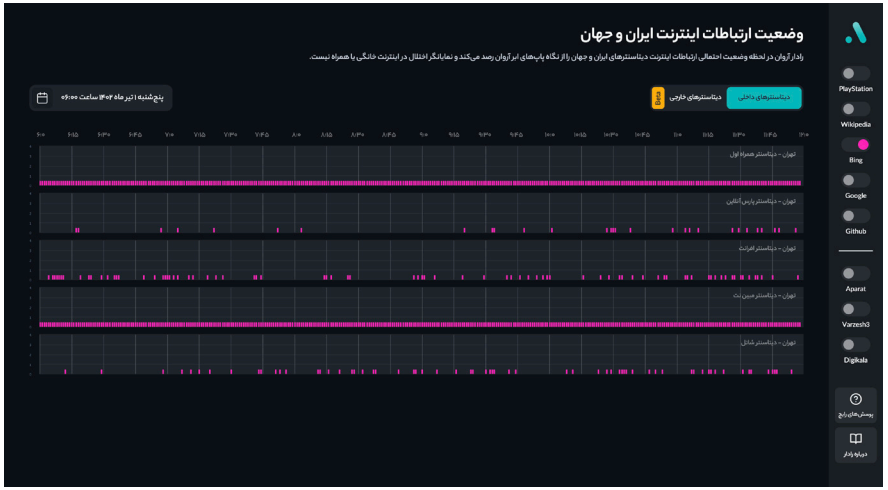
We believe that if the private sector, instead of being a passive critic, cannot become the main designer and demander for improving the internet situation, we cannot solely rely on policymakers to bring about a significant change in the quality and stability of the internet for people and businesses.

This path has been pursued with several executive steps by the country's innovation and technology ecosystem, based on the issues in the internet sector. In our first step, in July 2023, we published our initial report on the state of the internet in Iran. Then, through advocacy and holding numerous expert meetings, we tried to explain these issues more clearly to the officials. We also attempted to confront some misguided policies in this area by following up on issues and sending letters to various agencies. The summary of the most important actions and their impacts has been reviewed. It is possible that the improvement of some of these indicators occurred independently and not related to the activities of the E-Commerce Association.

1. Reduction of Disruptions from Bing Domain

According to the "Arvan Cloud Radar" (30) report, disruptions in the Bing domain have significantly decreased in the fall of 2023.



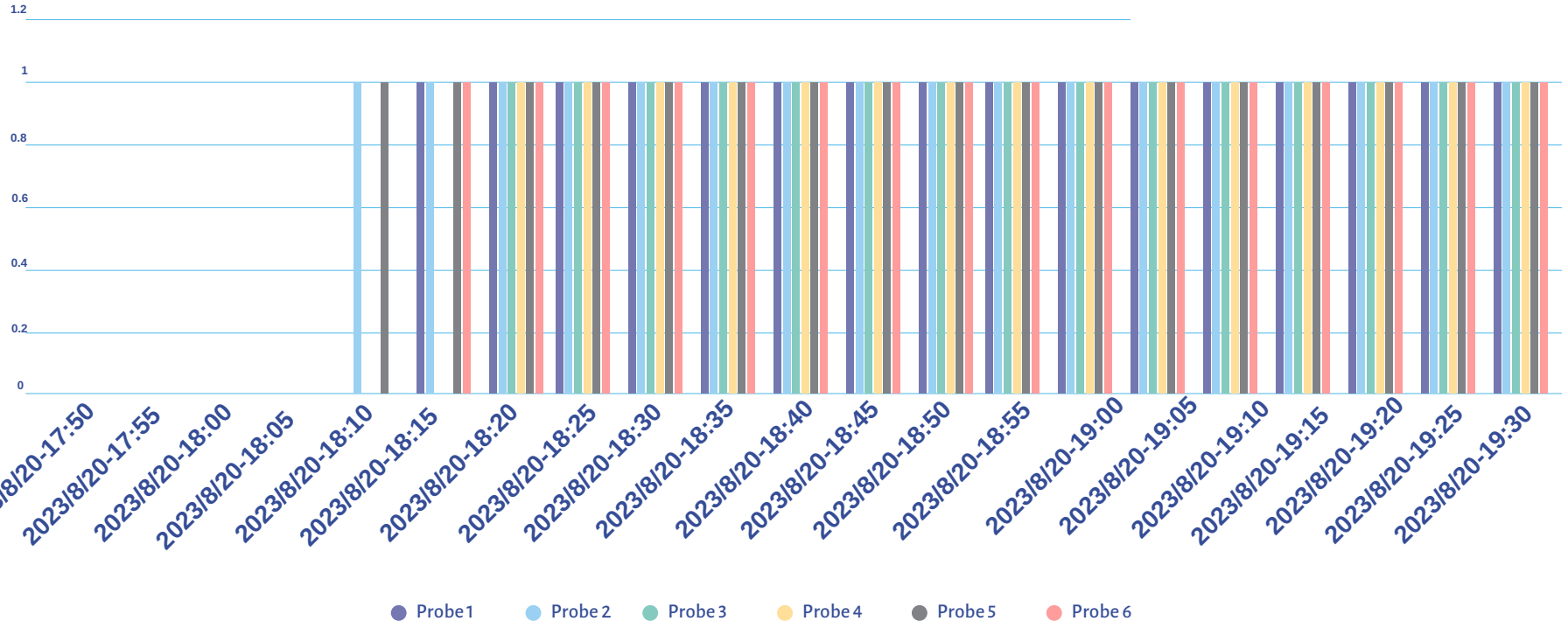


30. radar.arvancloud.ir

2. Resolving Access Disruptions to Cloudflare

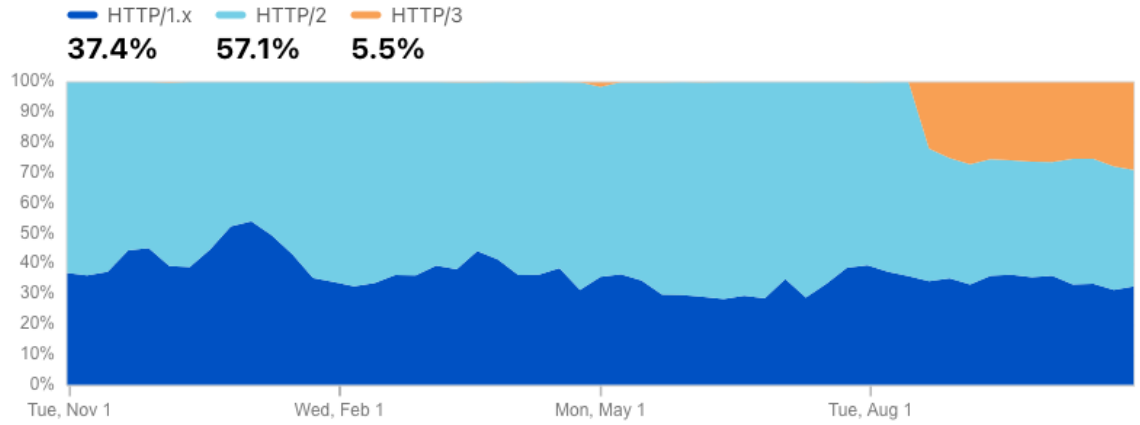
In this chart, the number 1 (colored lines) indicates an improvement in the upload status to "Cloudflare," and zero represents an unsatisfactory condition. As evident, from the beginning of fall 2023, this indicator has improved in domains utilizing the CDN services of Cloudflare.

Chart 10 | Resolving Access Disruptions to Cloudflare



3. Lifting the Limitation on the HTTP v3.0 Protocol

August 2023



November 2023

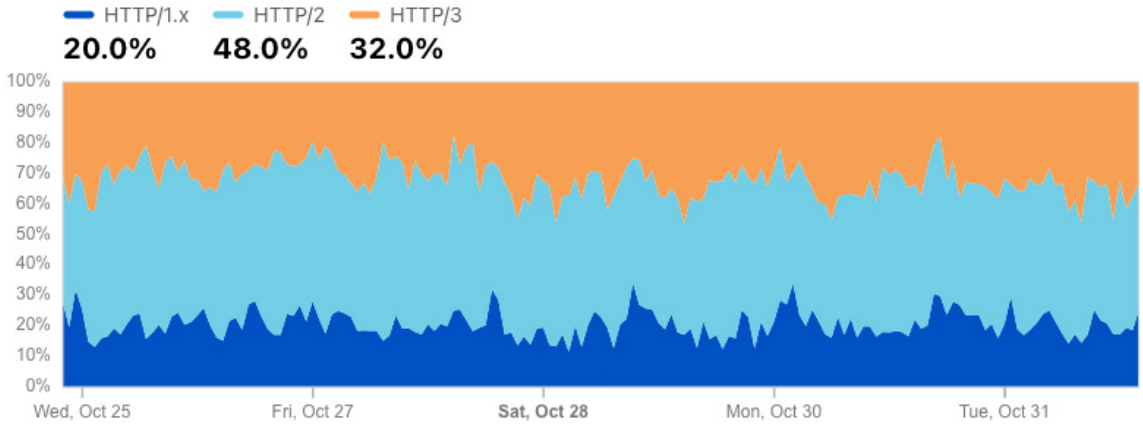
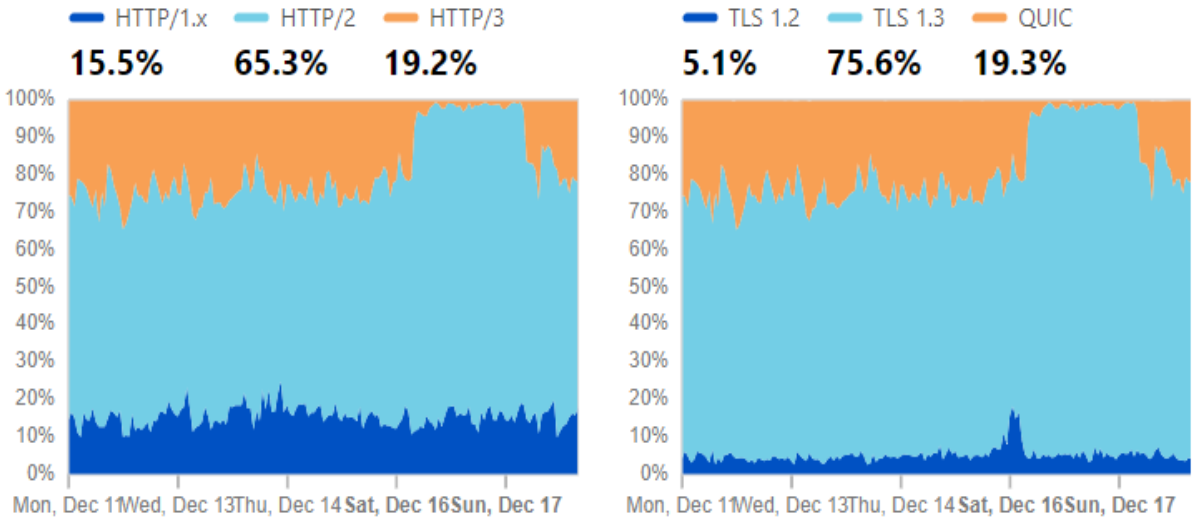


Chart 11
Lifting the Limitation on the HTTP v3.0 Protocol

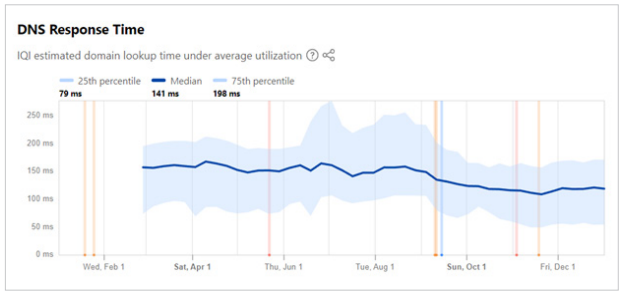
From 5:30 a.m. on August 3, 2023, the HTTP v3.0 disruptions were resolved, and with a significant increase in usage, it accounted for about 32 percent of the country's internet traffic.
It's important to note that on December 16, 2023, the HTTP v3.0 protocol was disconnected again. One day later, after 26 hours, without any transparent report from the Ministry of Communications regarding the reason for the reinstatement of this limitation, the disruption was resolved, and the country's traffic returned to normal.
It seems that the information dissemination by the E-Commerce Association, followed by up-to-date media coverage, played an influential role in resolving this limitation.

Chart 12 | Disruption from HTTP v3.0 Protocol on August 21, 2023

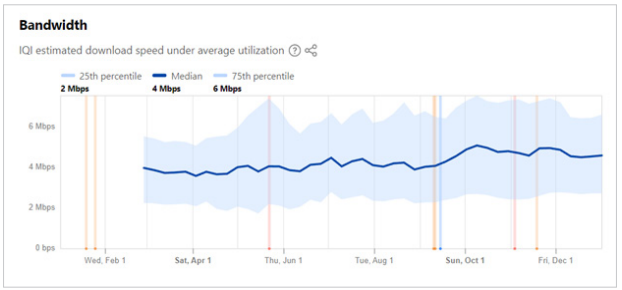


4. Relative Improvement in Iran's Status in Internet Speed and Latency Indices

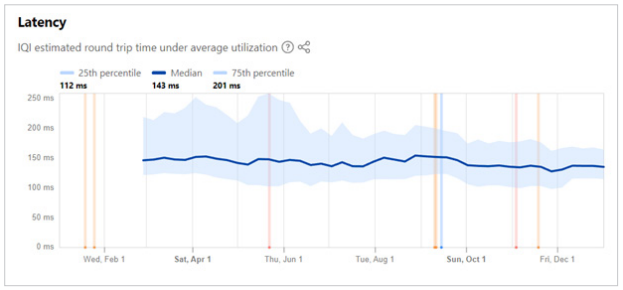
Chart 13 / Relative Improvement in Iran's Status in Internet Speed and Latency Indices



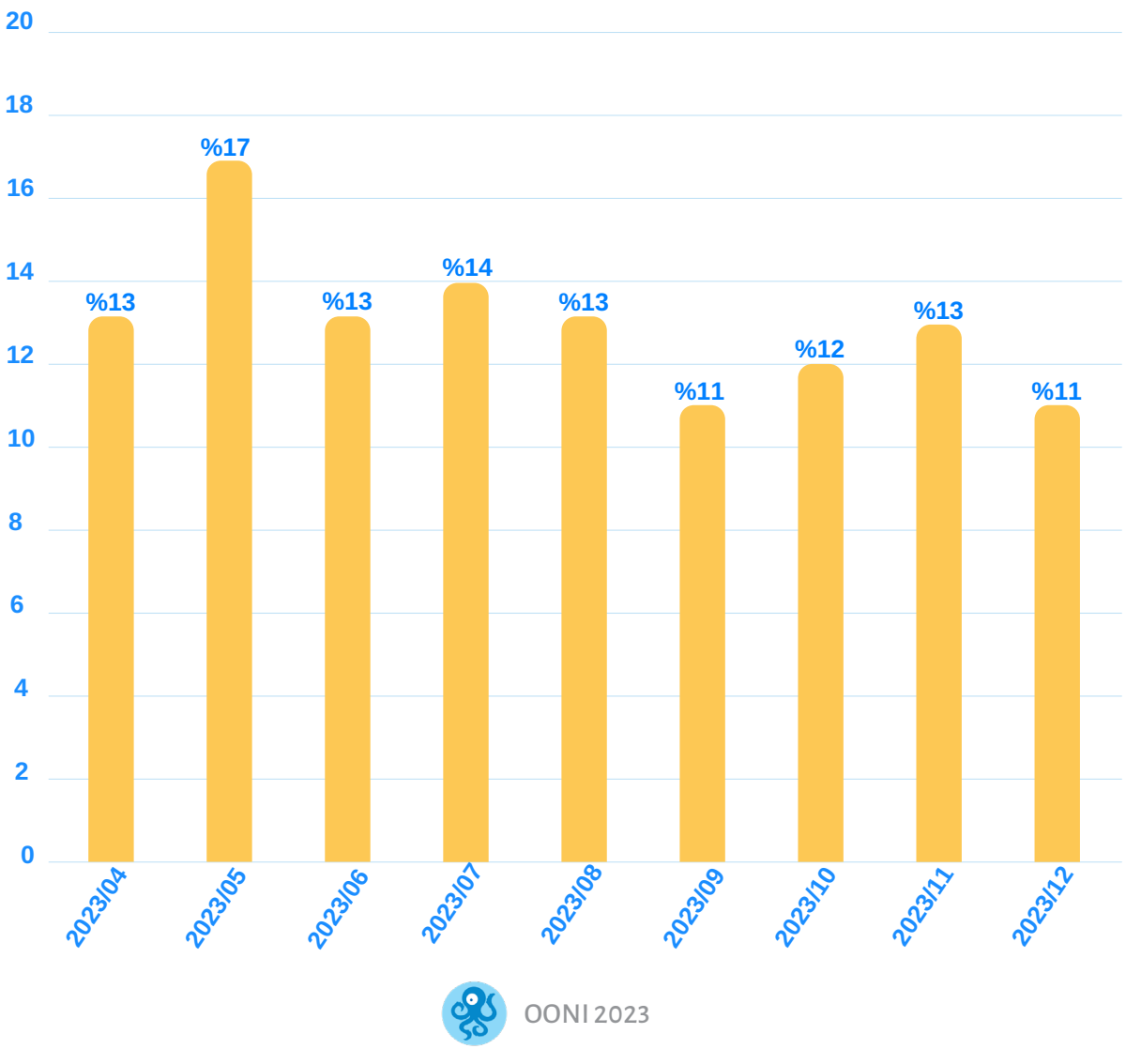
DNS



Bandwidth



Latency



5. Reduction of Disruptions:

Improvement in the status of internet disruptions in Iran: Internet disruptions have decreased from 17% in May 2023 to 11% in December 2023.

6. Sending Letters and Following Up on Iran Access Removal

We prepared a list of Iranian websites that have imposed some type of access restriction on non-Iranian IPs. In letters highlighting the consequences of these restrictions on the overall quality of Iran's internet, we requested these sites to remove such limitations.

مدیران محترم درگاه‌های اینترنتی کشور

با عرض سلام و ادب

احتراما به استحضار می‌رساند، با توجه به نتایج تست‌های کمیسیون اینترنت و زیرساخت انجمن تجارت الکترونیک، درگاه شما فقط از طریق آدرس‌های اینترنتی ایران قابل دسترس است (IRAN Access شده است). این موضوع، باعث نارضایتی کاربران و اختلال‌هایی از جمله موارد ذیل شده‌است:

- کاربران بین‌المللی، از جمله ایرانیان خارج از کشور، امکان اتصال به این وب‌سایت را ندارند.
- ممکن است کاربران داخلی در هنگام استفاده از VPN ، خدمات شما را دچار اختلال یا قطع، تصور کنند.
- موتورهای جست‌وجو و ربات‌های دسته‌بندی و تحلیل اطلاعات از جمله گوگل و بینگ، در پیمایش و اتصال کاربران به وب‌سایت شما با اختلال مواجه می‌شوند.
- اختلال موتورهای جست‌وجو باعث افزایش حملات کلاه‌برداری (فیشینگ) از طریق وب‌سایت‌هایی می‌شود که تلاش می‌کنند خود را جایگزین وب‌سایت شما معرفی کنند.
- سهم محتوای فارسی از اینترنت، کاهش و توسعه و ویژه‌سازی ابزارهای جهانی با زبان فارسی به مرور کاهش پیدا می‌کند.

این موضوع علاوه بر آسیبی که مستقیم به شما و کاربران شما وارد می‌کند، باعث کاهش کیفیت اینترنت و دامن زدن به ایزوله شدن اینترنت کشور می‌شود. در نتیجه انجمن تجارت الکترونیک احتراما دعوت می‌کند که این اعلام محدودیت خودخواسته که احتمالا به دلیل نگرانی‌های امنیتی انجام شده‌است، و به نظر کارشناسان این حوزه تاثیری در ارتقا امنیت درگاه شما ندارد، به فوریت برداشته شود.

در همین‌راستا، انجمن با مشارکت شرکت‌های پیشرو در زمینه امنیت اطلاعات و خدمات ابری، آمادگی خود را جهت ارائه مشاوره رایگان در راستای رفع نگرانی‌هایی که باعث چنین تصمیمی شده است، اعلام می‌کند.

پیشاپیش از همکاری و توجه شما سپاسگزاریم.

نیما قاضی

رئیس انجمن تجارت الکترونیک تهران

7. Sending Letters and Requests for Removal of Sanction-Related Restrictions

By compiling a list of websites that have restricted access for Iranians, we formally emailed them, requesting the removal of these restrictions in line with the goals of information freedom for Iranians.

5 September 2023

Greetings,

We hope this letter finds you well. As a non-profit organization dedicated to fostering e-commerce growth in Iran, we are actively working on a program to improve internet quality in the country. We are writing to you today to express a critical concern regarding this matter.

Over the past few months, we have launched our first report on the state of Internet quality in Iran. The report has shown some concerning issues in speed, stability, and censorship. Our mission is to support e-commerce startups and businesses, and prevent Internet Isolation in the country, seeking support from all sectors.

As part of our efforts, we are addressing restrictions such as censorship inside Iran and geo-blocking that impede Iranians' access to global websites outside the country. We have noted that your website and services are currently inaccessible to Iranian users.

We would like to highlight the **OFAC General License D2, which allows for the provision of services to Iranian users**. This license signifies a commitment to information flow, human rights, and global connectivity. We kindly request you to reconsider this decision and unblock your services. Such restrictions endanger essential rights and isolate Iranians from the global online community.

Understanding the legal complexities organizations face, we propose collaboration between our legal teams to ensure a seamless, risk-free resolution at your side.

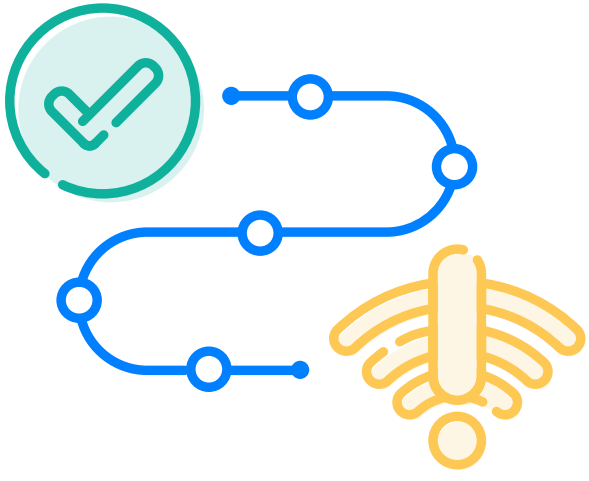
We greatly appreciate your understanding and support. Together, we can make a substantial impact.

With warm regards,

Nima Ghazi
Chairman of the Board

The Path Forward

Solutions and Future Plans



The Path Ahead: Summary of Requests and Practical Solutions for Improving Iran's Internet Quality

In a situation where sprawling organizations and officials responsible for internet quality in the country are in a state of passivity, without taking any concrete action to enhance internet quality due to a lack of clear vision, the private sector has concluded that it must adopt a proactive approach. This involves publishing transparent reports, reminding authorities of their responsibilities, and presenting practical solutions.

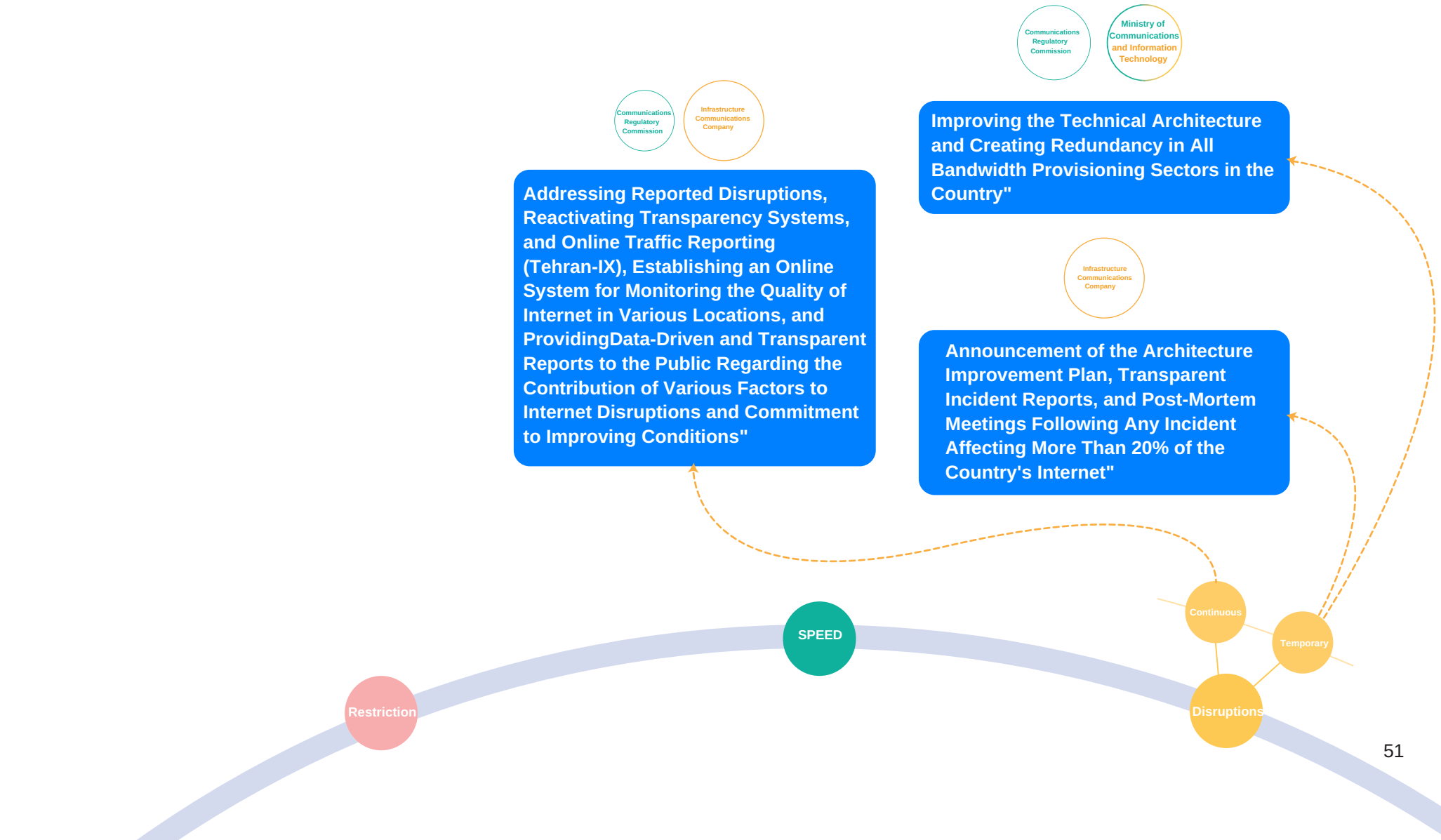
Connectivity to the community is one of the most critical indicators of efforts towards territorial development. The publication of reports on the quality of Iran's internet follows this logic and is, in fact, based on a kind of evidence-based advocacy to facilitate the process of "access to free and high-quality internet for all people in Iran."

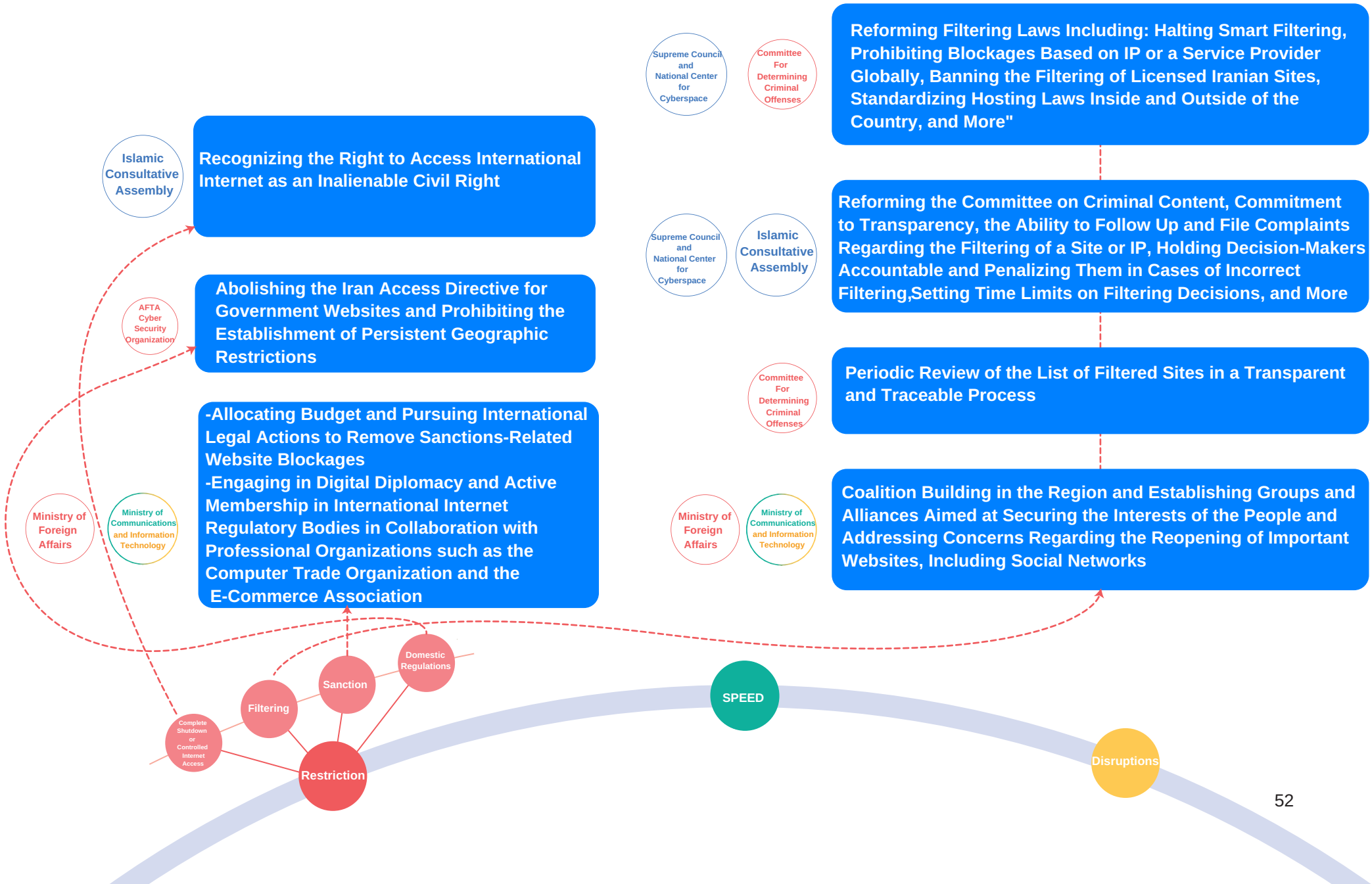
Here, 13 important requests and suggestions from the E-Commerce Association are presented in three sections: disruptions, restrictions, and speed. We hope that the responsible authorities will move out of their state of passivity and initiate urgent actions in this direction.

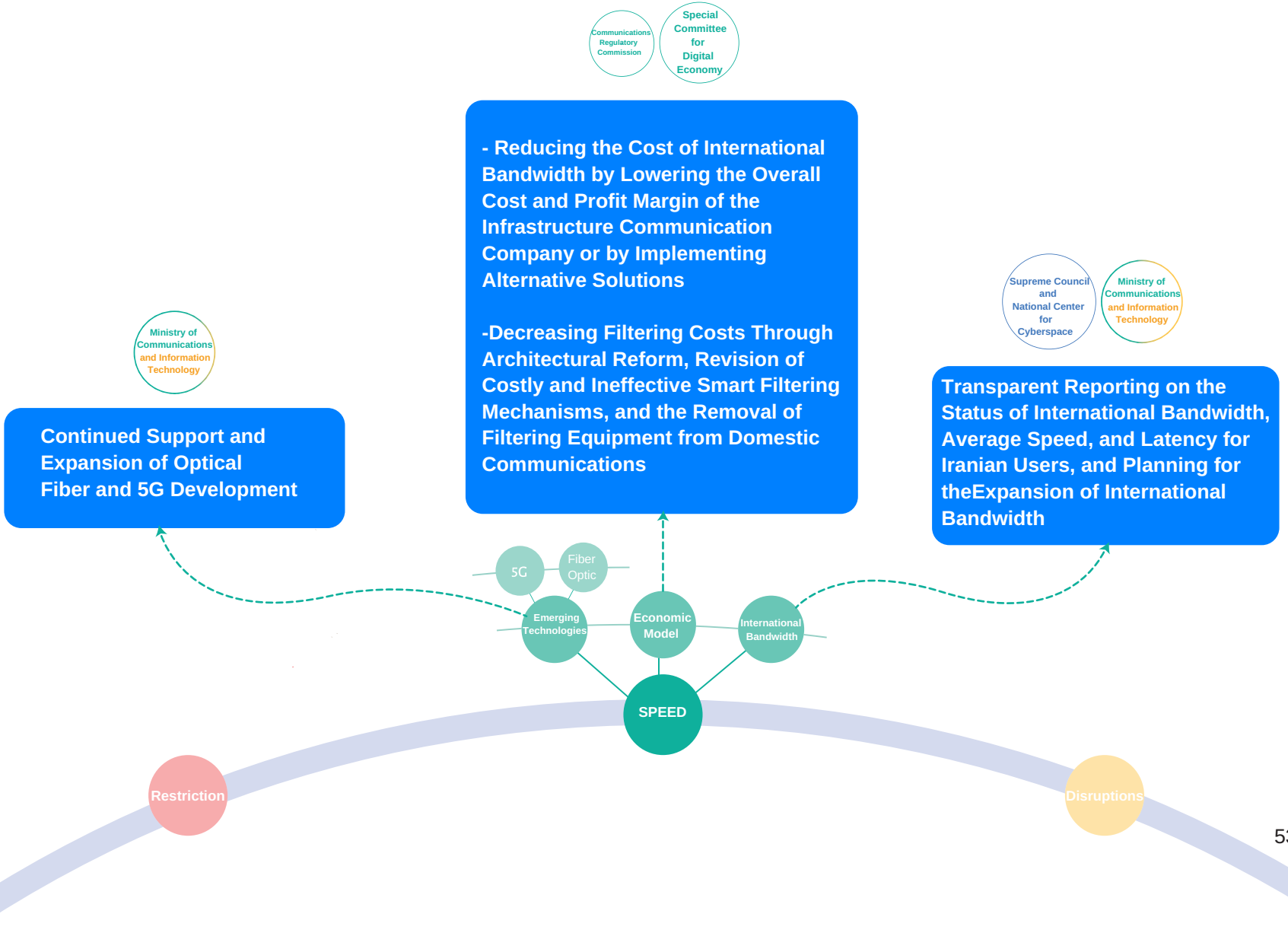
The E-Commerce Association, along with the attached reports, will communicate its requests to the responsible authorities through the letters that will be sent.

Table 10 | Summary of Requests and Practical Solutions for Improving the Quality of Iran's Internet

The responsible party	Requests/Suggestions	Categorizing	
Digital Economy Task Force or Ministry of Communications	Improving technical architecture and enhancing capacity in all sectors of the country's bandwidth prov	Temporary	Disruptions
Telecommunications Infrastructure Company	Announcing the program for improving architecture, transparent reporting of incidents, and conducting post-mortem sessions after any incident that has more than a 20% impact on the country's internet		
Communications and Regulations Organization and Telecommunications Infrastructure Company (Radio)	Rectifying reported disruptions, reactivating transparency systems and online traffic reporting (Tehran-IX), establishing an online system for monitoring internet quality nationwide, and providing transparent and data-driven reports to the public regarding the contributions of various factors to internet disruptions and commitments to improving the situation	Continuous	
Islamic Consultative Assembly (Iranian Parliament)	Recognizing access to the international internet as an inalienable citizenship right	Complete Shutdown or Controlled Internet Access	Restriction
Criminal content determination instances by the task force or Virtual space of the Supreme Council or Parliament	Amending filtering laws to include: halting intelligent filtering, prohibiting blanket blocking based on IP or a service provider, prohibiting filtering of licensed Iranian websites, harmonizing hosting laws domestically and internationally, and so on	Filtering	
Virtual space of the Supreme Council or Parliament	Reforming the structure of the Committee for Determining Criminal Offenses, commitment to transparency, enabling tracking and complaints regarding filtering of a website or IP, accountability and penalties for decision-makers in case of wrongful filtering, imposing time limits on filtering decisions, and so on		
Criminal instances determination committee	Periodically reviewing the list of filtered websites in a transparent and traceable process		
Ministry of Communications or Ministry of Foreign Affairs	Regional coalition-building and establishment of allied groups and assemblies with the aim of securing the interests of the people and addressing concerns, including the reopening of important websites, such as social media networks		
Ministry of Communications or Ministry of Foreign Affairs	-Allocating budget and pursuing international legal avenues to lift sanctions on blocked websites -Digital diplomacy and effective participation in international legislative forums in the field of the internet, in cooperation with professional institutions such as the Computer Guild Organization and the Electronic Commerce Association	Sanction	
Ministry of Communications	Repealing the Iran Access directive, unblocking government websites, and discontinuing continuous geographical restrictions	Domestic regulations	
Communications Ministry or Virtual Space of the Supreme Council	Transparent reporting on the status of international bandwidth, average speed, and latency of Iranian users, and planning for the expansion of international bandwidth	International Bandwidth	SPEED
Digital Economy Special Task Force or Communications Regulatory Commission	-Decreasing international bandwidth prices through reducing total costs and lowering the profits of the telecommunication infrastructure company or implementing alternative solutions. -Reducing filtering costs through architectural reforms, improving costly and inefficient filtering mechanisms, and removing filtering equipment from domestic communications	Economic Model	
Ministry of Communications	Continuing support for the expansion of fiber optics and the development of 5G	Emerging Technologies	


Communications Regulatory Commission
Ministry of Communications and Information Technology
Improving the Technical Architecture and Creating Redundancy in All Bandwidth Provisioning Sectors in the Country"
Communications Regulatory Commission
Infrastructure Communications Company
Addressing Reported Disruptions, Reactivating Transparency Systems, and Online Traffic Reporting (Tehran-IX), Establishing an Online System for Monitoring the Quality of Internet in Various Locations, and ProvidingData-Driven and Transparent Reports to the Public Regarding the Contribution of Various Factors to Internet Disruptions and Commitment to Improving Conditions"
Infrastructure Communications Company
Announcement of the Architecture Improvement Plan, Transparent Incident Reports, and Post-Mortem Meetings Following Any Incident Affecting More Than 20% of the Country's Internet"
Continuous
Temporary
SPEED
Restriction
Disruptions


Reforming Filtering Laws Including: Halting Smart Filtering, Prohibiting Blockages Based on IP or a Service Provider Globally, Banning the Filtering of Licensed Iranian Sites, Standardizing Hosting Laws Inside and Outside of the Country, and More"
Supreme Council and National Center for Cyberspace
Committee For Determining Criminal Offenses
Reforming the Committee on Criminal Content, Commitment to Transparency, the Ability to Follow Up and File Complaints Regarding the Filtering of a Site or IP, Holding Decision-Makers Accountable and Penalizing Them in Cases of Incorrect Filtering,Setting Time Limits on Filtering Decisions, and More
Supreme Council and National Center for Cyberspace
Islamic Consultative Assembly
Periodic Review of the List of Filtered Sites in a Transparent and Traceable Process
Committee For Determining Criminal Offenses
Coalition Building in the Region and Establishing Groups and Alliances Aimed at Securing the Interests of the People and Addressing Concerns Regarding the Reopening of Important Websites, Including Social Networks
Ministry of Foreign Affairs
Ministry of Communications and Information Technology
Islamic Consultative Assembly
Recognizing the Right to Access International Internet as an Inalienable Civil Right
AFTA Cyber Security Organization
Abolishing the Iran Access Directive for Government Websites and Prohibiting the Establishment of Persistent Geographic Restrictions
-Allocating Budget and Pursuing International Legal Actions to Remove Sanctions-Related Website Blockages
-Engaging in Digital Diplomacy and Active Membership in International Internet Regulatory Bodies in Collaboration with Professional Organizations such as the Computer Trade Organization and the E-Commerce Association
Ministry of Foreign Affairs
Ministry of Communications and Information Technology
Domestic Regulations
Sanction
Filtering
Complete Shutdown or Controlled Internet Access
Restriction
SPEED
Disruptions


Communications Regulatory Commission
Special Committee for Digital Economy
- Reducing the Cost of International Bandwidth by Lowering the Overall Cost and Profit Margin of the Infrastructure Communication Company or by Implementing Alternative Solutions
-Decreasing Filtering Costs Through Architectural Reform, Revision of Costly and Ineffective Smart Filtering Mechanisms, and the Removal of Filtering Equipment from Domestic Communications
Ministry of Communications and Information Technology
Continued Support and Expansion of Optical Fiber and 5G Development
Supreme Council and National Center for Cyberspace
Ministry of Communications and Information Technology
Transparent Reporting on the Status of International Bandwidth, Average Speed, and Latency for Iranian Users, and Planning for theExpansion of International Bandwidth
5G
Fiber Optic
Emerging Technologies
Economic Model
International Bandwidth
SPEED
Restriction
Disruptions

Appendixes

www.ananzi.co.za	42%	53%	45%	41%	58%	81%	91%	59%
globalvoices.org	31%	49%	43%	34%	50%	67%	91%	52%
www.usatoday.com	61%	52%	46%	49%	46%	55%	52%	51%
grindr.mobi	48%	59%	52%	42%	55%	51%	39%	49%
video.google.com	52%	50%	53%	41%	56%	56%	35%	49%
pflag.org	43%	47%	47%	41%	53%	51%	39%	46%
now.org	39%	45%	48%	40%	48%	54%	35%	44%
ncac.org	43%	51%	44%	37%	51%	49%	35%	44%
www.zeit.de	65%	52%	56%	56%	41%	20%	11%	43%
ilga.org	41%	47%	42%	35%	53%	43%	34%	42%
www.google.com	40%	29%	34%	33%	31%	55%	63%	41%
www.rfi.fr	5%	10%	20%	20%	24%	90%	95%	38%
www.redditstatic.com	54%	51%	41%	33%	30%	26%	29%	38%
www.viber.com	٪39	38%	33%	26%	34%	44%	41%	36%
indymedia.org	34%	43%	31%	28%	42%	38%	32%	35%
minorityrights.org	33%	46%	33%	7%	10%	50%	39%	31%
www.currenttime.tv	35%	36%	43%	25%	26%	14%	30%	30%
www.ft.com	38%	18%	20%	18%	29%	34%	53%	30%
avatars.mds.yandex.net	2%	2%	4%	19%	66%	48%	57%	28%
www.theatlantic.com	45%	44%	47%	39%	6%	3%	5%	27%
theintercept.com	11%	2%	13%	14%	46%	51%	42%	26%
www.logmein.com	24%	27%	30%	17%	7%	9%	25%	20%
www.nytimes.com	55%	51%	6%	3%	5%	5%	11%	19%
preview.redd.it	32%	35%	33%	19%	1%	4%	2%	18%
www.who.int	10%	7%	3%	4%	19%	33%	36%	16%

Appendix 1

Assessment of Disruptions in This Report

We examined a range of popular domains among Iranian users. For this section, we used the ooni website as a reference to assess the state of censorship and disruptions in the global internet. The statistical population was based on raw data around the end of July 2023 (Local calendar: Mordad 1402) to September 2023 (Local calendar: around Azar 1402).
During this period, millions of tests were conducted by Probes in 165 countries with the highest GDP, but only 96 countries had sufficient data for a global assessment, among which 100 evaluations existed.

A website was considered filtered if 10% to 50% of its request failures occurred, indicating a filter in place. Instances where more than 50% of requests failed were considered disruptions. We considered these criteria to determine the extent of internet filtering and disruptions experienced by users.

Chart 20 | The State of Internet Disruptions in Various Websites

In the chart above, the frequency of disruptions across various websites is illustrated. For instance, the domain WHO(31), which is associated with the World Health Organization, is at the bottom of this table and exhibits an intermittent and unstable condition, indicating it has been affected by factors related to disruptions. Generally, it can be said that the range affected by disruptions in these domains is variable and unstable, a factor that exacerbates the poor quality experience of the country's domestic internet.

(31). https://www.who.int

Appendix 2

Filtering Does Not 'Protect' Human Resources!

The significant impact of the internet on the concept of the digital economy is such that access to various internet functionalities in different societies is considered a staple indicator of "development." For instance, the United Nations' "Digital Economy Report 2021" (32)highlights access and universal participation in the free flow of information as the primary concern in the digital economy sector. This is precisely why, especially after the COVID-19 pandemic and with the advent of a different face of "Artificial Intelligence" in recent years, we are witnessing a broader process of the internet's influence on the formation of states' economic identities (such as major visionary programs and proposed communication models); something referred to as the Fifth Industrial Revolution(33). For example, a report on the state of the digital economy and society in 2020 considers variables like age, gender, education, and the scale of services purchased online as crucial indicators of digitalization in countries' development programs(34). Another report from the European Union, with a ten-year forecast for the continent, indicates that policymakers support the increasing coverage of internet services in society, aiming for a larger goal of achieving an e-commerce platform in Europe and a business model that reduces commercial distances; a model ultimately aimed at achieving "commercial leadership" with all the necessary infrastructure(35). These infrastructures lead to the international attraction of skilled labor and a nationwide network of trade and international economy(36). In fact, this comprehensive perspective on a region's economic future is the very definition of the digital economy, which will be further explored in the context of Iran with comprehensive indicators of human resources, resources and infrastructures, and the gross domestic product rate.

32. https://unctad.org/system/files/official-document/der2021_overview
33. The Fifth Industrial Revolution: How Harmonious Human Machine Collaboration is Triggering a Retail and Service [R]evolution
34. desi_2020_thematic_chapters_-_use_of_internet_services/
35. https://www.researchgate.net/publication/
36. Report on the state of the Digital Decade 2023

Digital Economy Indicators of Iran;

High Ranking in Human and Natural Resources but Below Average in Management and Productivity

To assess the value of e-commerce in any country, general indicators such as population, infrastructure, and Gross Domestic Product (GDP) rates are examined(37). In more detailed studies, the practical application of the internet is measured in three layers: digital businesses, software production, and participation in other industries (38)(such as the role of emerging technologies in the metal and automotive industries). Iran's status in the impact of technology on industrial infrastructures is nearly zero, and in the other two indicators (software production and the role of the internet in digital businesses), it is roughly around the global average. The digital economy's share in the country's GDP is 7.5%; in a chart from the UNCTAD report, Iran ranks 75th with 53% in the indicator of "Readiness for Frontier Technologies" in 2022. Meanwhile, the UAE (with 74% and ranked 37th) and Saudi Arabia (with 65% and ranked 47th) are positioned. In other major areas of the digital economy, such as indicators related to energy, population, and the cultivation of specialized human resources, we are in a favorable position compared to countries with similar economic situations. However, when these achievements approach the realm of manifestation and impact in the industry, Iran falls to a position near the bottom of the global table.

37. European E-Commerce Reports – EuroCommerce 2023
38. unctad
39. GTCI 2022
40. National Science Foundation, 2023
41. The average inclination to remain in the host country among Middle Eastern countries is approximately 63%.
42. Thechnology and innovation report 2023

Population:

According to the United Nations' forecasts, Iran will have a population of 89 million by 2023. Iran is in a better position regarding the "growth" and "empowerment" of human resources in terms of quality compared to the "retention" and "attraction" indices.[39] However, it is the 19th largest student-sending country in the world. To assess the future vulnerability of the country's digital economy, the student-sending rate in the ICT sector must be considered alongside the rate of these individuals' return to the country. The situation is concerning when we know that, for example, about 93.5% of Iranians who obtained a temporary study visa for doctoral studies in the United States between 2012 and 2022 have studied in fields related to sciences and engineering(40). Moreover, 91.7% of them are inclined to stay in America(41). Overall, this has led to a four-rank drop for Iran in the technology and innovation index compared to 2021.[42]

Table 11 | The Status of the Cloud Ecosystem in Selected Countries

Saudi Arabia	UAE	Russia	China	Turkey	IRAN	Sub-index	Cloud-based Echo Index System
5.8	7.3	8.6	6.5	6.4	5.8		Overall Score
8.4	9.3	7.7	7.3	6.2	6.1	1.1- Telecommunications Infrastructure	1. Infrastructure
5.3	5.8	3.8	2.3	5.6	4.3	1.2- Data Center	
4.1	5.6	7.5	5.2	6.9	6	1.3- Security of Services	
7.1	8	5.4	7.2	7	6	1.4- IP Addressing	
4.7	5.5	5.9	3.9	4.2	3.3	1.5- Internet Speed	
10	10	10	10	10	10	1.6- Electricity Supply	
4.3	8	9	2.9	10	8	2.1- Digital Acceptance	2. Ecosystem Acceptance
5.6	7.9	6.3	7.5	4.2	3.7	2.2- Government Artificial Intelligence Readiness	
6.9	4.4	8	7.3	6.9	3.7	2.3- Bandwidth Pricing	
4	6	4.8	8.1	5.2	4.2	2.4- Innovation	
7	9.4	8.6	9.6	8.9	4.3	2.5- Electronic Participation	
7	5.7	5.4	5.9	6.3	10	2.6- SaaS Companies	
4	4.6	2.9	4.5	3.8	2.9	2.7- Future Green Index	
10	9.8	9.8	9.2	9.7	8	3.1- Cyber Security	3. Security and Assurance
2	9	5	10	5	6	3.2- Data Protectio	
6.3	8.3	3.8	5.2	5.4	1.0	3.3- Quality Monitoring	
4.8	7.6	4.5	4.7	4.4	2.1	3.4- Government Efficiency	
3	5.4	4.8	1.0	4.6	1.8	3.5- Global Media Freedom	
8.2	6.4	8.4	6.5	7.7	6.9	4.1- Human Development Index	4. Human Resources Talent
8.1	9.4	8.6	6.9	7.6	9.7	4.2- Internet Users	
4.7	7.3	7.3	7	3.9	10	4.3- Engineering Graduates	

Iran's Status in the Cloud Ecosystem[43]

What does the 2023 Cloud Ecosystem report say about Iran?

The Cloud Ecosystem status report is a significant indicator of the state of countries, measuring indicators related to energy, infrastructure, and human resources. The importance of this report lies in assessing access to new technologies and the development of the digital economy.

Iran's status in this index is average, considering the mixed scores Iran receives in various indicators. For instance, Iran's specialized human resources and energy infrastructure rank among the top in the world, but governance policies have placed Iran alongside countries with very low scores in this index.

Other reports also confirm Iran's situation; for example, the 2023[44] Technology and Innovation report, with its composite indicators, addresses economic metrics influenced by countries' internet status. It also evaluates the "deployment of information and communication technology, the percentage of internet users, average download speed," and then examines it alongside human resource skills, economic activity, and financing (the ratio of credit allocated by the government).

For example, Iran's status in a chart related to providing suitable job positions for digital domain experts is below average.

43. global cloud ecosystem index،MIT،2022

44. Thechnology and innovation report 2023

Through Incorrect Policies, We Only Lose Human Capital!

The table above outlines Iran's status in the sub-indexes of the Cloud Ecosystem report published by MIT, which evaluates countries based on four major indexes, ultimately gauging their capabilities, readiness, and efforts to integrate into the cloud ecosystem chain as an indicator of benefiting from technological progress.
As evident from Iran's average ranking, the country is positioned among those benefiting from cloud infrastructure, thanks to its high-quality human resources and energy-related infrastructure. Iran's performance in these indexes is not significantly different from economically progressing countries like Qatar, Ukraine, Slovakia, and Greece.
However, when examining indexes related to internet infrastructure or the government's impact on process facilitation separately, Iran aligns with countries at the lower end of the table, such as Zimbabwe.
This leads to the conclusion that Iran stands among the world's top countries in terms of human resource quality and energy infrastructure. However, when these assets should be redefined by policy facilitation and government to give a new meaning to the digital economy, they become deterrents and ironically drive capital out of the country.

In the context of mobile internet access, Iran ranks 6.5 out of 45 countries studied. Additionally, a separate study by Meta has identified Iran's position in the gender discrimination index. In terms of public trust towards cybersecurity among Iranian users, Iran scores 61 out of approximately 99, and in the trust index for data published on social networks, Iran ranks 35 out of 85.

Overall, it can be concluded that Iran is relatively high in terms of human resource quality and energy infrastructure on a global scale. However, when these two assets should be redefined by policy facilitation and government to give a new meaning to the digital economy and social trust, they become deterrents and, ironically, drivers of capital outflow from the country.[45]

Iran's Digital ; A Melange of Discretionary Internet Surveillance! And Ultimately, Despair, Poverty, and Capital Flight

As previously mentioned, Iran's average ranking in cloud ecosystem indexes and digital economy indicators is in an unfavorable position. This situation, combined with the quality of internet in Iran, has ultimately led to approximately 50%[46] of the country's knowledge-based business activists considering migration. According to survey results and opinion polls regarding the drivers of migration among the innovation and technology ecosystem activists, the plan known as "Protection" and the unstable quality of internet have been identified as one of the main reasons for migration.
This condition is just one side of the story, as internet filtering also significantly impacts the lives of ordinary people. Implementing filtering policies means imposing additional costs on the citizens of a society already facing sanctions and high inflation rates. According to an estimate by Etemad Newspaper on the approximate size of the filtering market in Iran (25 to 30 trillion Tomans), with this amount, it would be possible to build 100 hospitals with 100 beds each, 500 schools with 12 classrooms each, 6,000 apartment homes, pay a month's subsidy to 79 million people, construct 1,000 crossover vehicles, and cover the annual pensions of Committee of Charity recipients.
This significant issue should be considered alongside numerous reports about the increase in the total costs of internet rates that have recently been discussed, which is one of the main factors making access to free and public internet difficult.

It seems that the country's major decision-making trend does not have a reparative approach; for example, Iran's international diplomacy in the field of technology and innovation is also in line with the country's contractionary foreign policy. For instance, the so-called "Cooperation Agreement in the Field of Information Security between Iran and Russia, " which was recently published by the Presidential Institution, appears to have unclear consequences yet, but it has led to international comments and fears of further sanctions against Iran.
Overall, it must be said that despair and Iran's unfavorable position in the "territorial outlook" index – which is a consequence of the dire economic situation – have led to the emigration of the country's young workforce. To the extent that Iranians have become the leading nationality applying for asylum in the UK,[47] rank first in emigration to the OECD[48] region, and are the eighth nationality in founding unicorns[49] in the US. This situation, without a policy review regarding the potential of Iranians abroad and even undefined suitable internet-communication infrastructures, does not allow for efforts to obtain a clear figure of "remittances"[50] (funds sent by migrants back to their home country) from Iranians abroad.

What should do?

To maintain a stable presence in the path of internet-based trade and emerging technologies, Iran must address crises such as volatile economic conditions, increasing restrictions,and the influence of deterrent policies harmful to digital economy infrastructures through fundamental and continuous actions. One of the most evident components of the digital economy is establishing enduring security for economic activities. However, policies and regulations based on domestic filtering, along with international sanctions and filtering of infrastructure companies in this field, ultimately lead to disillusionment with defining digital business, resulting in human capital despair and decreased social welfare.
All these factors combined—cyber insecurity, deterrents to human capital from easy participation in international forums, and policies not aligned with economic activists—ultimately lead to the migration of human capital, which is the most crucial driver for the development of the country's digital economy.
What seems capable of restoring the lost trust and social capital in this area is serious support for creative business activists and the emerging technology ecosystem.
This support should not merely involve injecting capital and recreating a greenhouse ecosystem but should provide normal and essential infrastructures like free internet and earnest efforts in integrating technology with more traditional industrial sectors.

45. https://impact.economist.com/projects/inclusive-internet-index/reports
46. Presidency for Science and Technology of the Presidency and the Iran Migration Observatory (2023/2024)
47. gov. uk.2021
46. In 2020, the number of new Iranian migrants entering the OECD area was 48,000. By 2021, this number had increased by 141% to reach 115,000 new entries for the year. Consequently, Iran has recorded the highest rate of new migrant growth, securing the top position in terms of emigration growth rate according to the UNESCO Institute for Statistics in 2023.
49. anderson 2022
50. Remittances index measures the value of funds sent back home by migrants from a country.

Appendix 3

Table 12 | Websites That Have Sanctioned Access for Iranian Users

Consent Manager	SolarWinds	Pagespeed
PartnerLink	SourceForge	plotly
Cally	TeamTreeHouse	stepzen
Pushcrew	Training Sap	algolia
Bksv	KhanAcademy	scu.edu
OpenNeuro	MailGun	redis
VectorStock	Maven	wandb
Drupal	MathWorks	analytics.moz
Cloudflare	Renesas	traceparts
Turbo squid	Qualcomm	pexels
Vuforia	MouseFlow	Iconfinder
Weebly	Grafana	elevenlabs
GrabCad	GraphicRiver	canva
Webex	GSK	Quillbot
Warkiani Lab	GoDoc	realpars
Pixel Squid	GoAnimate	anchor
Rjx hobby	Flurry	99design
VideoHive	GrAvatar	cloudways
Veritas	MixPanel	digikey
tinyjpg	MyFonts	semrush
Twilio	NewRelic	learndigital.withgoogle
SketchFab	PhotoDune	flutter
Zoom	Elastic	mimo
AcousticJava	Envato	sanity
MatLabExpo	GtMetrix	gfxdomain
Instructure	HuggingFace	developer.chrome
SendGrid	InfoWorld	animoto
Gradle	SpiceWorks	wevideo
invisionapp	Tenable	nfinite UNIVERSITY
salesforce	Elsevier	Airtable
seleniumhq	JitPack	Alldatasheet
simplilearn	ItPro	rytr
GFI	JetBrains	phonixNAP
IDT DNA	Paessler	golang
Mbed	Pearson	chaos
Rstudio	PerKins	corona-render
Realm	Expo	Character.AI
HashiCorp	StudyTogether	Google Drive
MSC Software	DemandBase	lowinsider
NXP	MaxCDN	rapidapi
ResellerClub	Coursera	freenom
Kaggle	CodeCanyon	code with mosh
NetBeans	CloudEra	Google Earth Engine
SigmaAldrich	Bytes	Wallpaperaccess
Sartorius	Clamav	app.asana

instructables			
codecademy	Cambridge	Adobe Firefly	
ResearchGate	neptune	AppOnFly	
Pastebin	Octopart	Alchemy	
Vercel	University of Turin	VRayMtl	
Android Source	Kubernetes	Spark Mail	
Programiz	Moz	Bitdefender	
WesternDigital	Mathforums	Rancher	
Ansys	Preplexity AI	Rank Math	
Quixel	Windows Insider	Turing	
Google Cloud Console	Tinymledu	Google Tag Assistant	
app.rytr	Leather Bag Pattern	Heroic Labs	
colab research google	Code Visual Studio	Wordtune	
Heroku	Osmosis	CGmood	
scopus	Framer	italki	
TIBCO	Similarweb	Lightstep	
edX	TeamSpeak	Datadog	
sublime Text	Epic Games	Adobe Fonts	
free-css	Next.js	Mangools	
hpe	GitHub copilot	Fortinet	
TeraBox	Teaching English	CodeSandbox	
glasp	Remotasks	Upwork	
Liferay	GilaStudio	Siemens	
logobee	Sonos	nestify	
365data science	Apple ID	Typography	
Dart	Napster	Lucky Orange	
Offensive-security	Lightning AI	Mixamo	
HackerRank	Colors With Google	Visitors	
AlphaFold	Termius	LMS.courselearn	
Pipedrive	Google Ads	Scarab Search	
OpenCV	Microsoft Azure	Emarsys	
Autodesk	gVisor	Influ2	
IconScout	Poe	CGtrader	
Sololearn	Learnosity	Pond5	
OneTrust	TechSmith	Okta	
STMicroelectronics	Pbi Visuals Power BI	OSS Nokalva	
Playground AI	PubsOnLine	Sift Science	
Cengage EMEA	Spline	hCaptcha	

GeForce	Replit	Gitlab	Artstation	Cadence	Agisoft Cloud
Mixkit	Daily	Firebase	Flaticon	BugSnag	CodeIgniter
Ahrefs	DoubleClick	Asus	Epidemic Sound	BootStrap	Yith
Sentry	Photomath	BeMyEyes	Videvo	BitBucket	CodePen
Pendo	Windy	Google Developers	inshot	Codeium	FreeCodeCamp
EarthExplorer	npm	Intel	Lenovo	Api Codeium	Code Golf
Wirefreethought GeoDB	Launchpad	Twitch Sound Alerts	IBM	Chat GPT	Codewars
	Softaculous	Sygic	MaasHero	Simple Note	AngularJS
	Fedora	Google Code	BMC	MySQL	Google Bard
	Proxmox	Google cloud	ATI Radeon	Google Earth	Google One
	Notion	Jquery Code	OverLeaf	Google services	Developer
	Brightcove	GCD API	Bintray	Click House	ArcGIS Developers
	Acunetix	Remini	Ubuntu	opensea	DatasheetQ
	Elicit	Data Camp	Arcgis Online	tutsplus	Google Adsense
	Vocal Remover	Mongodb	Sketch	teachable	LeetCode
	Garmin	Google Remotedesktop	Ti	miro	DirectAdmin
	ArdanLabs	Unity	Sophos	artlist	Mailchimp
	ScienceDirect	Amazon Prime	Mcafee	artgrid	The Cat API
	w3schools	CentOS Repositories	Merck millipore	openhub	SiteGround
	Pinterest	Openai	Ebay	Newport	CompTIA
	Altium	Udemy	PackAgist	Corel	Chakra UI
	Busuu	Java	BackTory	TIDAL	Analytics Mania
	Google Classroom	Trello	Analog	HubSpot	ProWritingAid
	Keil	Slack	3d Ocean	Go	FAO Water Productivity
	MUI	Microsoft Download	Apache	Brightspace	Google Home
	Neo4j	RedHat	Audio Jungle	heynode	XDA Developers
	Clipchamp	Vmware	Atlassian	RisingStack	arXiv info
	Motion Elements	Themeforest	ThermoFisher	Osio Labs	Foo.Bar with Google
	Intercom	PhpStorm	Spring	Nikon	Qt
	Google AdMob	Tensorflow	Stripe	CAMBLY	Smartsheet
	YOU	Schema	SyncFusion	Mail	AppSheet
	OSHA	Dribbble	TeamViewer	ClickASnap	BuiltWith
	DAF Tracks Global	Oracle	Vagrantup	Xfce–look	Topcoder
	Kotlin Programming Language	Googleplay console	Toggl	Gnome–look	Vimeo
	Shutterstock	Cisco	Ansible	Cloud R	SnapKit
	Fiverr	foodiesfeed	Google Research	Monday	Segmnt3
	3Commas	Google Analytics	Virtual Box	Yarn – Package Manager	Spotify DE
	Avast	Google tag manager		Eltngl	Google Lens
	WPBeginner	burst shopify	Corsair	Nicepage	Melpa
	Tailwind CSS	IIS app platform	Clearbit	Evanto Elements	Krisp.ai
	Aave	Figma	AntPeak	aramco	Voicemod
	ClickUp	unsplash	Business Google	Patreon	Parsec
	Browserleaks	NuGet	Conan	CapCut	Amd Radeon
	SzlCSC	Visual Studio Installer	NetFlow Analyzer	DroneStock	Android Developers
	Hqchip	Apple developer	Calgary Board Of Education	Mashable	Adobe
	NestJS	Unreal Engine	BendingSpoons	Lit	BlueStacks
	Cisia	HP	Samsung	StreamLit	Asus Rog
	Deno	Android Studio	Amplitude	Slite	Docker
	Koo	Freepik	Habitica	Codility	Nvidia experience

What damage have sanctions done to businesses?

Sina Rezvanzadeh, Data Manager at Tapsell:

Points out that after various sanctions, especially with Google Play's sanctions, app developers are paying a heavy price, including financial conflicts and a significant time investment. Companies have found different solutions, such as releasing separate versions for Google Play and Iranian stores or exclusively updating their app for either Iranian or foreign users. Being on Google Play offers significant advantages, like access to foreign users and revenue in dollars. With the current capacity of the Iranian app market, developers could potentially earn up to $500,000 monthly, which could increase to $10 million monthly in a two-year outlook. Dollar revenue has many benefits, including bringing currency into Iran and potentially even causing reverse migration of Iranians abroad, many of whom migrated for the sake of earning in dollars.

Amirhossein Nateghi, App Manager, Founder, and CEO of Quiz of Kings:

Despite the approval of Clause D2, which should have lifted some sanctions, conditions attached make it practically impossible for foreign sites to lift restrictions for Iranians. One condition is that no user connected to the government should be among the consumers, a requirement impossible for any analyzer to verify. Consequently, many service providers and tools do not offer their services to Iranians from the outset. The gaming industry has suffered significantly due to sanctions, with quality users from Google Play becoming more expensive and of lower quality post-sanctions, alongside a 30% fee paid to Iranian stores.

Amirhasan Moein, Product Manager at Tapsi:

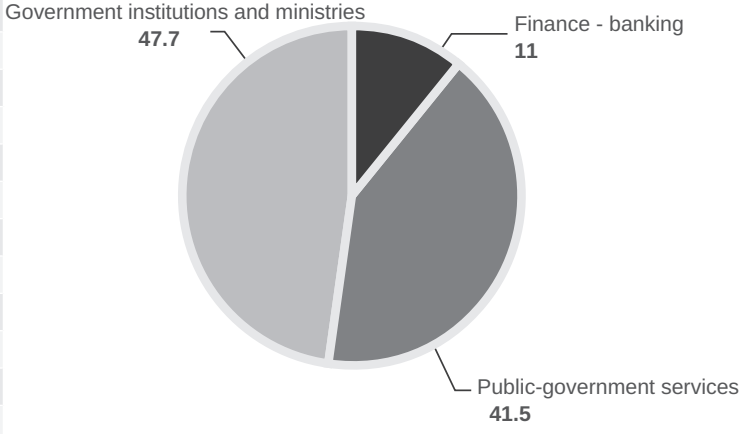
One major challenge in the sanction environment is the need to circumvent sanctions for the Iranian audience, entailing several serious costs. First, the price of accounts purchased is much higher than the actual price of the product. Second, when one of the app's routes is blocked due to sanctions, our PackageNames in Google Play get closed, making Android PackageName maintenance and updates significantly challenging compared to normal conditions in other countries.

Table 13 | Websites Restricted by Iranian Policymakers (Iran Access)

National Iranian Oil Products Distribution Company	niopdc.ir
Regulatory Authority Organization	cra.ir
Innovation and Prosperity Fund	inif.ir
Iran National Library and Archives Organization	nlai.ir
Islamic Republic of Iran Customs Administration	irica.gov.ir
Iran Post Bank	postbank.ir
Official Portal of the National Tax Administration Organization	intamedia.ir
Civil Aviation Organization of Iran	caa.gov.ir
Ministry of Communications and Information Technology	ict.gov.ir
Medical Education Assessment Center	sanjeshp.ir
Armed Forces Social Security Organization	esata.ir
National Inspection Organization	bazresi.ir
Ministry of Cultural Heritage, Tourism, and Handicrafts	mcth.ir
National Portal for Dissemination of Laws and Regulations	dotic.ir
Iran Power Generation, Transmission, and Distribution Management Company	tavanir.org.ir
Administrative Justice Court	divan-edalat.ir
Iran Khodro News	ikcopress.ir
Islamic Republic of Iran Air Force	iranair.com
Organization of Schools, Non-Governmental Centers, and Development of Public Participation	mosharekatha.ir
Tehran Education Department	tehranedu.ir
Iran Mines and Mining Industries Development and Renovation Organization (IMIDRO)	imidro.gov.ir
Tehran Province Water and Wastewater Company	tpww.ir
Karaj Municipality	karaj.ir
Ministry of Education	medu.gov.ir
Ministry of Agriculture Jihad	maj.ir
Gilan Governorate	gilan.ir
National Organization for Development of Exceptional Talents, abbreviated as SAMT or SAMPAD	sampad.gov.ir
Shaparak	shaparak.ir
Iran Khodro	ikco.ir
Bank Melli Iran	bmi.ir
Social Security Organization	tamin.ir
Tax Electronic Operations Service Desk	tax.gov.ir
e-Namad	enamad.ir
Telecommunication Company of Iran Portal	tci.ir
Ministry of Education	medu.ir
National Organization for Registration of Deeds and Properties of the Country	ssaa.ir
Electronic Services of Law Enforcement | Police+10	epolice.ir
Comprehensive System of Iran's Commerce	ntsw.ir
Government Electronic Procurement System	setadiran.ir
Standardization	samandehi.ir
Ministry of Cooperatives, Labor, and Social Welfare	mcls.gov.ir
Central Bank of Iran	cbi.ir
CODAL Publishers Information System	codal.ir
Ministry of Roads and Urban Development	mrud.ir
National Organization for Educational Assessment	sanjesh.org
Vice Presidency for Science and Technology and Knowledge-Based Economy of the Presidency	isti.ir
Iran Health Insurance Organization	ihio.gov.ir
Home Page - Bank Maskan Website	bank-maskan.ir
Ministry of Culture and Islamic Guidance	farhang.gov.ir
Ministry of Health	behdasht.gov.ir
Islamic Consultative Assembly (Parliament)	majlis.ir
Islamic Republic of Iran Customs Administration	irica.ir
Judiciary's National Portal	eadl.ir
Organization of Management and Planning of Iran	mporg.ir
Islamic Consultative Assembly News Agency	icana.ir
Secretariat of the Supreme Monitoring Council	iranianasnaf.ir
Traffic Police	rahvar120.ir

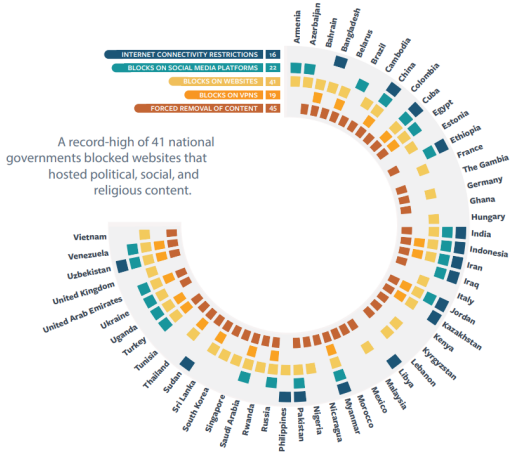
Appendix 4:

Classification of types of website services that are limited by foreign policy ("Iran Access" means only accessible from an Iranian IP address)



Iran is among the countries with the most practices Sovereign authority of the Internet

The Freedom House Social and Political Data Analysis base evaluates the position of countries regarding the freedom of information dissemination. A key variable in this assessment is the degree of government or state power exertion or efforts to legislate in controlling technology and the internet.
As highlighted in Chart No. 8, Iranian policymakers are among the most restrictive legislators in this index, demonstrating significant control over technological freedoms. This indicates a high level of governmental intervention in internet and technology-related freedoms within Iran, impacting the country's digital landscape and information accessibility.



Iran's internet is among those with the highest level of control and restriction

According to another report from the same institution, the level of technological repression by governments is assessed. The main indicators in this chart include "Internet Connection Restrictions," "Social Media Filtering," "VPN Restrictions,"[52] and "Content Censorship."
Iran is among the countries that experience a controlling discourse on the internet in all four aspects, indicating a significant level of internet governance and surveillance that impacts the accessibility and freedom of online spaces within the country.

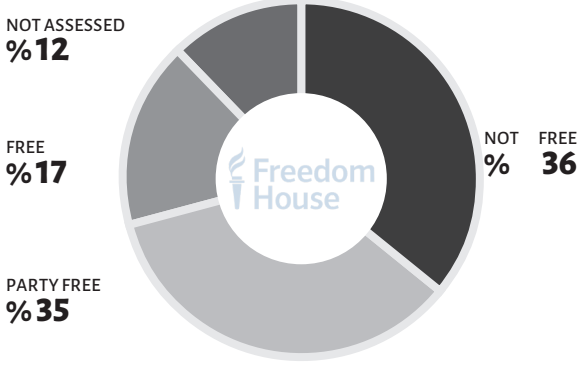
52. Blocks on vpns

Appendix 5

The Status of Countries Worldwide Regarding Access to Free Internet

Overall, out of 88%[51] of the global internet users (approximately 4.9 billion people), 17% have access to free internet, 36% to partially free internet, and 36% to not free internet. Iran is among the countries categorized in this latter group. According to this study, global internet freedom declined for the thirteenth consecutive year in 2023, and for the ninth consecutive year, China had the worst conditions for internet freedom. However, notably, Iran experienced the most significant decline in this index over a year, followed by the Philippines, Belarus, Costa Rica, and Nicaragua. In over three-quarters of the countries surveyed in this research, individuals faced arrest for simple expressions of opinion online, and governments in 41 countries resorted to censoring political, social, or religious content.

GLOBAL INTERNET POPULATION BY 2023 FOTN STATUS



Freedom in the Net assesses 88 precent of the world's internet user population

51. 12% of global internet users are not accounted for in this report's data.

Appendix 6

List of suggested websites for unblocking that are considered "sensitive."

vk.com
twitch.tv
vimeo.com
quora.com
scribd.com
behance.net
kickstarter.com
fastly.net
myspace.com
Instagram
Telegram
whatsapp
android–safebrowsing.google.com
dns.google.com
google–public–dns–a.google.com
Google Play
facebook.com
youtube.com
youtu.be
medium.com
twitter.com
pinterest.com
adobe.com
spotify.com
blogspot.com
reddit.com
snapchat.com
flickr.com
paypal.com
soundcloud.com

qph.fs.quoracdn.net
doh.dns.apple.com
cloudflare–dns.com
dns.google
doh.familyshield.opendns.com
doh.opendns.com
doh.sandbox.opendns.com
resolver1–fs.opendns.com
resolver2–fs.opendns.com
opencdn.jomodns.com
duckdns.org
dns.alidns.com
dynamic–dns.net
quad9.net
mask.icloud.com
google–public–dns–b.google.com
groups.google.com
plusone.google.com
sites.google.com
play–fe.googleapis.com
safebrowsing.googleapis.com
youtubei.googleapis.com
dns.google
workers.dev
amazon.co.uk
ssl.hwcdn.net
opencdn.jomodns.com
ae01.alicdn.com
gs1.wac.edgecastcdn.net
i.mycdn.me

adguard.com	imagetwist.com	pixlr.com	cdiscount.com	target.com
tenor.com	cutt.ly	coinbase.com	walgreens.com	lenovo.com
tenor.co	shazam.com	binance.com	gumroad.com	nike.com
knowyourmeme.com	tinyurl.com	mydrivers.com	poshmark.com	livescores.com
runoob.com	minichat.com	istockphoto.com	wish.com	scribd.com
wordpress.com	linktr.ee	deadline.com	gumtree.com	itch.io
bit.ly	y2mate.com	poki.com	gifts.com	secondlife.com
bitly.com	softonic.com	citi.com	columbia.edu	lagged.com
herokuapp.com	quizlet.com	usps.com	courseworks2.columbia.edu	/https://bonbast.com
onesignal.com	gofile.io	alibaba.com	cmu.edu	wattpad.com
quizlet.com	stackexchange.com	capitalone.com	chick–fil–a.com	prevention.com
heylink.me	squarespace.com	etsy.com	nvidia.com	sofascore.com
remove.bg	weiyun.com	taobao.com	buzzfeed.com	audible.com
photobucket.com	tampermonkey.net	flipkart.com	evidon.com	overdrive.com
truecaller.com	streamtape.com	ozon.ru	goodrx.com	gamerant.com
cutt.ly	wondershare.com	walmart.com	scoop.it	ultimate–guitar.com
chegg.com	imgbb.com	wildberries.ru	xing.com	theknot.com
pastebin.com	apache.org	kickstarter.com	schwab.com	biblegateway.com
hackerone.com	atlassian.com	indiatimes.com	agoda.com	tenor.com
ow.ly	similarweb.com	forbes.com	expedia.com	flashscore.com
wp.me	audioboom.com	infobae.com	att.com	livescore.in
anyclip.com	tawk.to	globo.com	behance.net	snopes.com
justpaste.it	gettyimages.com	novinky.cz	deviantart.com	rottentomatoes.com
rebrand.ly	dreamstime.com	thepaper.cn	istockphoto.com	tvtropes.org
shorturl.at	depositphotos.com	cctv.com	shutterstock.com	letterboxd.com
ranker.com	alamy.com	zaobao.com.sg	shutterstock.com	vulture.com
archive.is	about.me	screenrant.com	pexels.com	rottentomatoes.com
br.com	docusign.com	onet.pl	unsplash.com	/wikimapia.org
ifttt.com	reverso.net	shopify.com	pixabay.com	artstation.com
wrike.com	pngwing.com	shein.com	123rf.com	pinterest.es

Appendix 7

List of websites for unblocking that are considered "non-sensitive."

TEHRAN
انجمن
تجارت
الکترونیک
تهران

project ainita

TRANSLATED TO ENGLISH BY
PROJECT AINITA - AINITA.NET

Analytical Report on Disruptions Restrictions and Internet Speed in Iran

Winter 2023-2024 (Local calendar: 1402)