Quality of Internet in Iran;

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

Fourth Report - Winter 2024

انجمن تجارت الکترونیک تهران
TEHRAN

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Introduction

Sunk Cost Filtering

Or the blistered feet that shame us from turning back on the wrong path!

Hearing the statement, "Iran ranks at the bottom of the global internet quality index," might have become a repetitive phrase over the past two years and across all four editions of "Internet Quality in Iran." However, it must be reiterated that the quality of Iran's internet has not shown significant improvement compared to the previous report in the summer and remains in a dangerous state. This is the result of ongoing restrictive domestic policies, unilateral external sanctions, and widespread issues in the Access network, leading to a user experience that can still be described with three attributes: slow,[1] highly disrupted[2](91 out of 100), and restricted[3](99 out of 100 countries). Overall, the data place Iran's internet at 95 out of 100 countries.

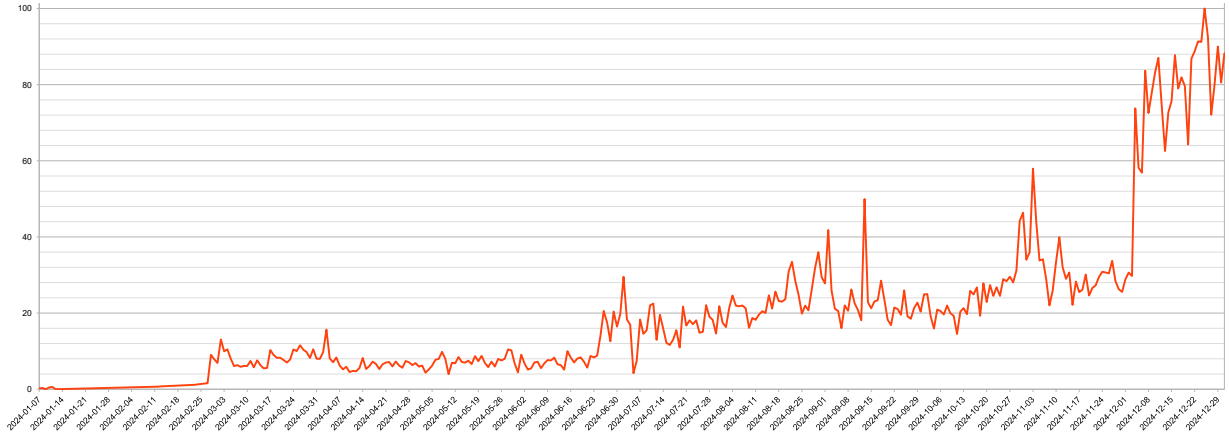
Although upgrading network infrastructure and expanding the Access layer in the short term is not feasible, revising restrictive policies remains the most immediate and impactful action to improve internet quality in the country. Widespread filtering, deliberate disruptions to block VPNs, weakening emerging protocols like HTTP/3, and network pollution resulting from these restrictions are among the key issues. Concerns intensify when, despite positive statements from the heads of the three branches of government regarding lifting restrictions, the Supreme Council of Cyberspace has yet to pass any resolutions to improve the current situation after three months. This prolonged and exhausting process has left many citizens disheartened about the prospects of improvement and reform.

For a long time, experts and academic institutions have warned about the severe and irreparable damage caused by the continuation of the current situation a warning that is now frequently echoed in the statements of officials and government bodies, highlighting the enormous losses from various perspectives. While previously, the primary concern was the statistic showing that over 84% of users relied on VPNs, according to a report by the Tehran Electronic Commerce Association, there is now an alarming surge in the purchase and use of satellite internet services.If the quality of the internet in Iran is not improved and transformed, despite innovative solutions in the access domain, a fundamental shift in the field of communications will soon be inevitable. As the data indicates, the era of imposing severe restrictions on the free flow of technology has effectively ended. Over the past few months, the use of Starlink services in Iran has seen significant growth, with the number of users exceeding several tens of thousands.

1) Speed: Refers to high bandwidth and low latency in loading a website or online content. This indicator is one of the drivers behind the emergence and adoption of new technologies in the digital economy.

2) Disruption: Refers to the blocking of domains and IPs, which is one of the main reasons for internet inefficiency in a specific geographical area. Regarding Iran, in addition to domestic censorship, this restriction is also a result of certain inhumane international policies that use internet access for Iranians as a tool of sanctions.

3) Censorship: Refers to high bandwidth and low latency in loading a website or online content. This is a key driver for the emergence and spread of new technologies in the digital economy.



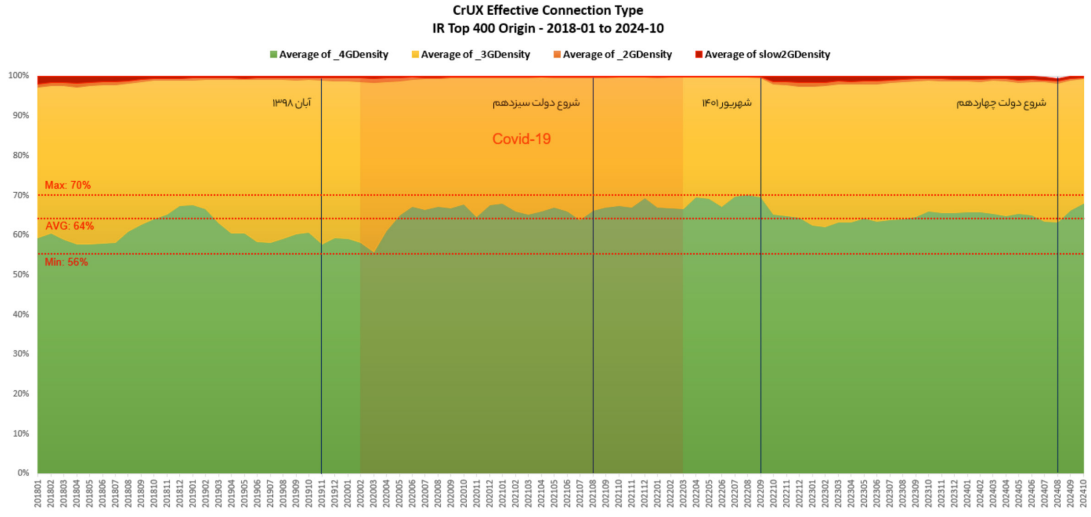
The increase in domestic users' consumption of Starlink satellite internet services in Iran.

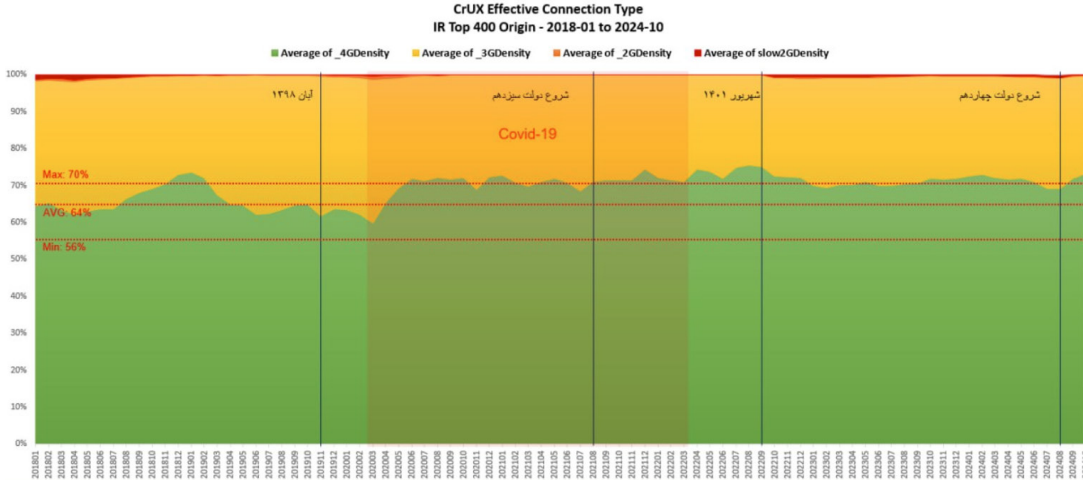
An examination of the current situation indicates that domestic policymakers, who have so far aligned with external sanctions by imposing restrictions on free internet, are now facing a massive technological transformation. While the inefficiency and costly nature of these restrictions and sanctions have already become apparent, with recent advancements in technology, continuing the flawed path of the past will become practically impossible.

In particular, with the widespread adoption of the next generation of satellite internet that enables direct mobile phone connectivity to the internet without requiring separate equipment (Direct To Cell), user adoption of these innovative technologies will accelerate significantly. Consequently, traditional internet access restrictions will lose their effectiveness more than ever before. As this technology expands, policymakers will no longer be able to maintain previous restrictions without justified, transparent reasons and without aligning public opinion.

When the majority of experts and even officials acknowledge the ineffectiveness of restrictive policies, it seems the only barrier to reversing previous decisions on filtering is the Sunk Cost of those choices. We remain hopeful that with bold decisions and the removal of policies that disrupt the country's network, hope can be restored to the digital economy and the people of the country, who are all users of the digital world—provided we recognize that there is no time left to lose.

This report examines the state of internet quality in Iran during the summer and fall of 1403. The impacts of unblocking "WhatsApp" and "Google Play," as well as the reopening of certain communication protocols at the beginning of Dey month, are not included in this analysis. The Electronic Commerce Association immediately welcomed this decision by the Supreme Council of Cyberspace, announcing its continued active efforts to achieve "a free and high-quality internet for all the people of Iran."





Still among the worst countries in terms of free access to the internet![4]

In this report, we analyzed and compared data across three key indicators: disruption, restriction, and speed of free internet access. We reviewed and cross-referenced data from sources including OONI,[5] Google CrUX, and additional platforms such as ArvanCloud Radar and Cloudflare for validation. As in the third report, we considered 100 countries with the highest GDP and analyzed their data using Google CrUX for more reliable insights into latency, disruptions, and speed. In this report, for the restriction category, we excluded 28 countries due to insufficient statistical representation and generalized their scores in the speed and disruption categories to the overall analysis.

As shown in the chart below, the green indicator (4G Density) has seen slight improvement in recent months, reaching 68%. However, there remains a significant gap between this figure and the global benchmark, where 90% to 95% of user experiences are expected to be of high quality.

Regarding disruptions, particularly the Slow2G Density, which saw a sharp increase after September 2022, there has been a slight improvement, but we have not yet returned to the previous levels.

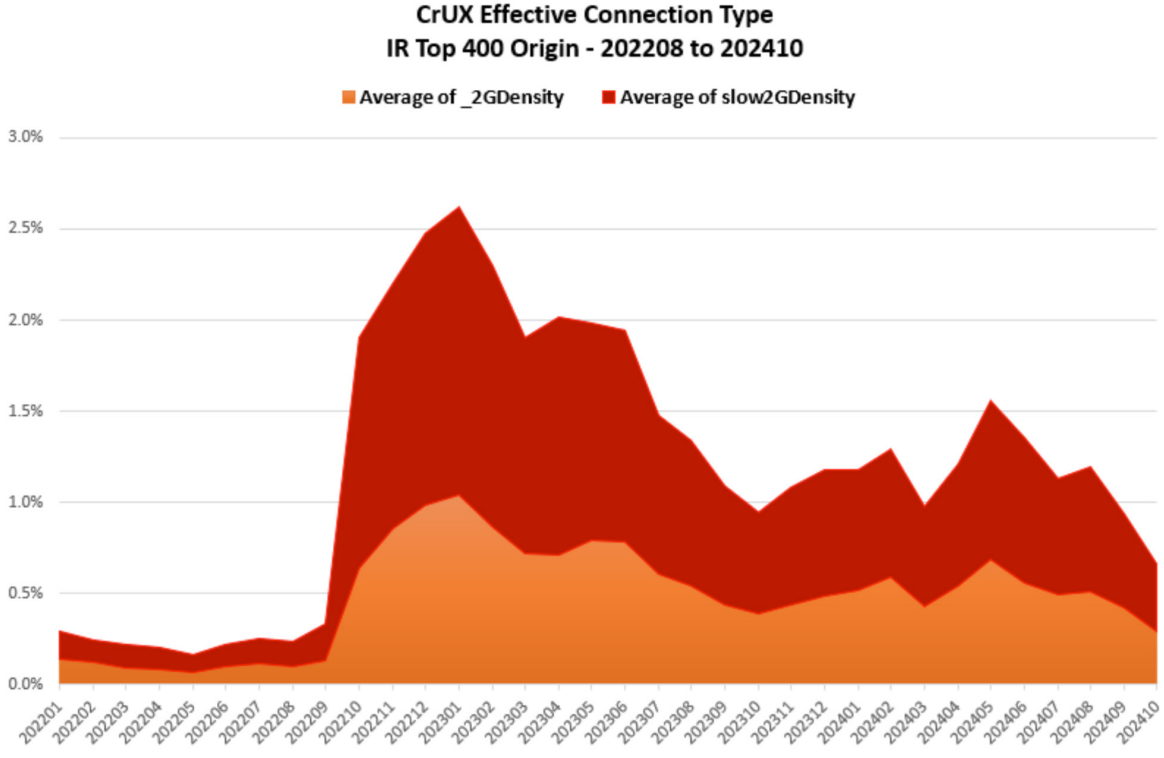
By removing filtered websites from the reviewed list, a 5% improvement can be achieved, bringing the index to 75% by October 2024.

4) The evaluation period for ranking countries was set for late Aban 1403 (November 2024). However, in the separate sections for each category (disruption, restriction, and speed), we considered the six-month period following the publication of the third internet report.

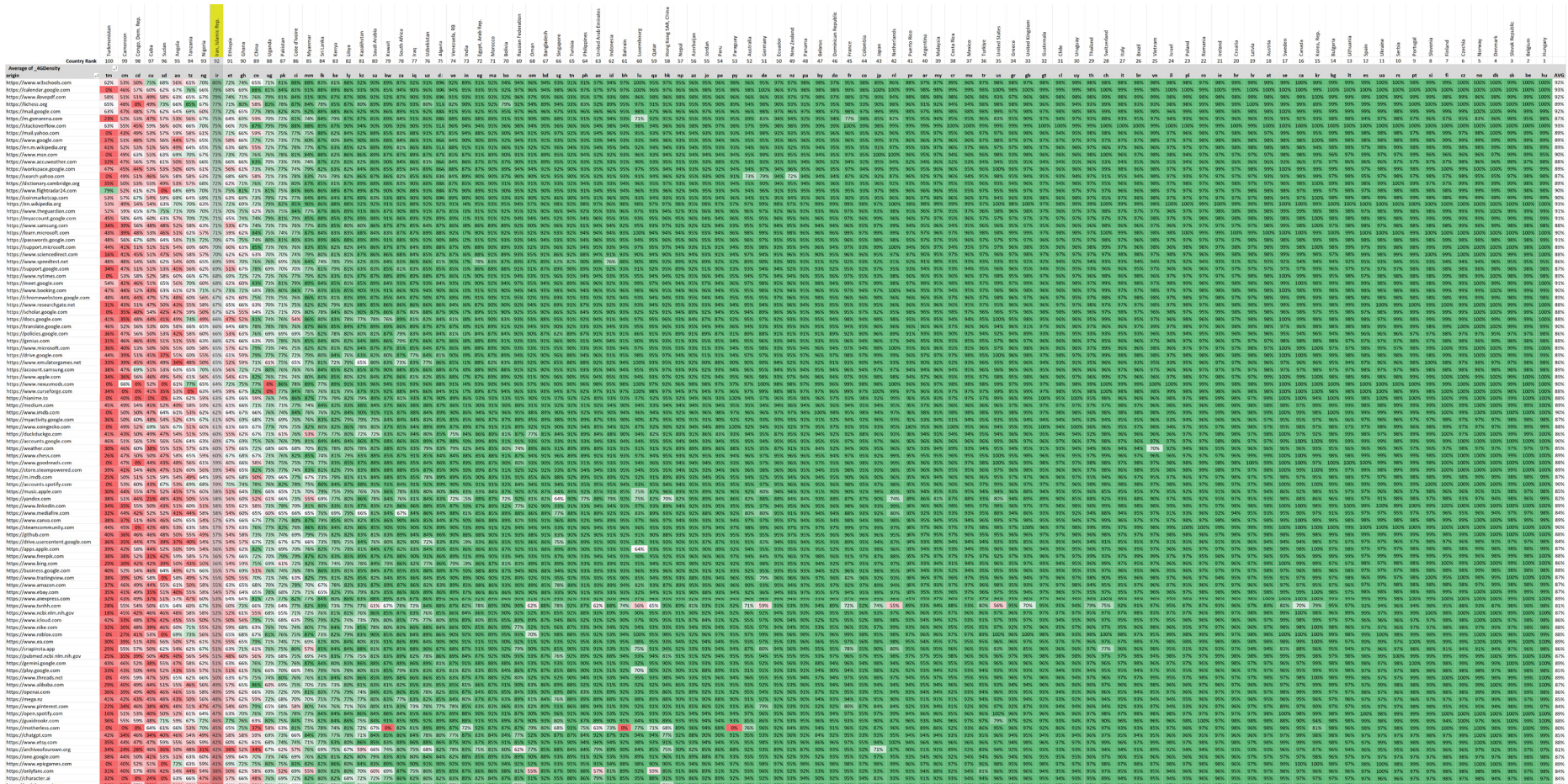
5) Open Observatory of Network Interference (OONI).

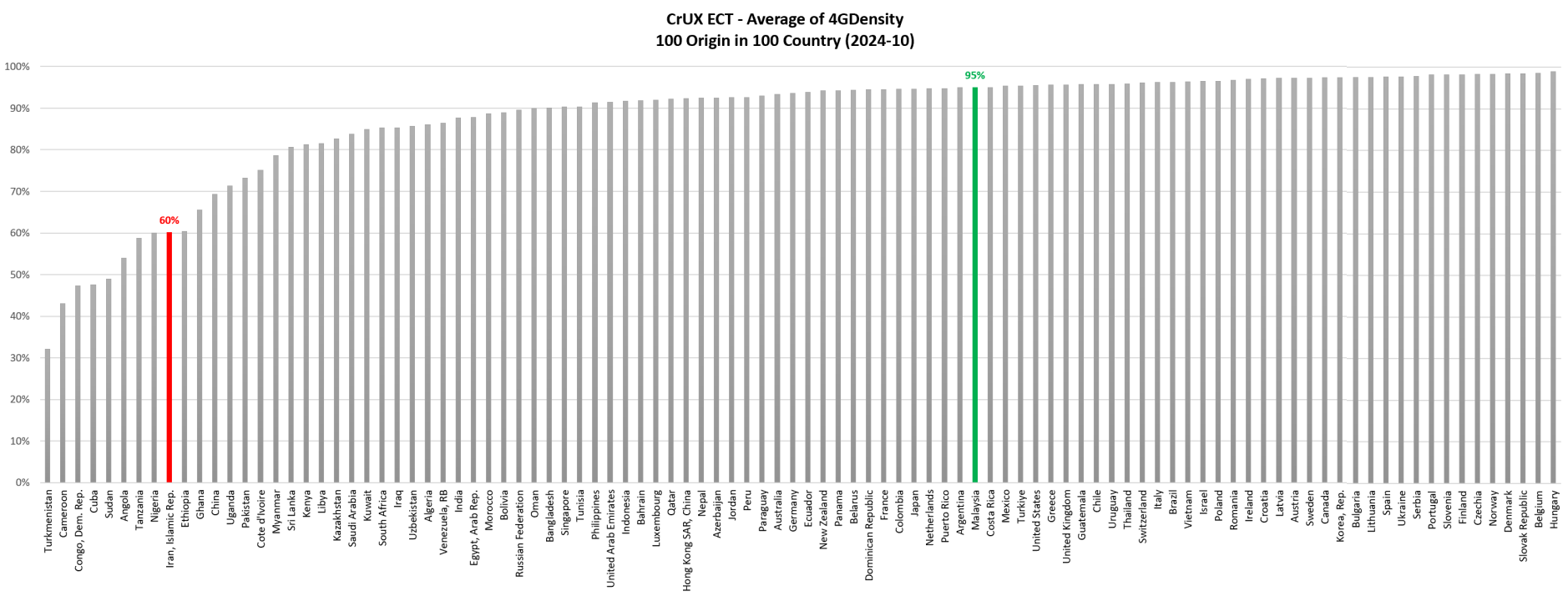
We compared the user experience of loading 5,000 of the most visited websites among countries with the highest GDP. From this set, the top 100 domains (based on the Tranco ranking) that were common across these countries were used as the basis for comparison.

In the next step, although filtered and sanctioned websites are part of the Iranian user experience, these websites were excluded from the rankings to benefit Iran, resulting in the following comparison:



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





As shown in the image, 45 countries have an average high-quality connection rate of 95%, and 67 countries have an average connection quality index of 90%, based on 4G Density. For instance, in Malaysia, this figure is 95%.

This situation highlights the detrimental impact of internet quality in Iran on the experience of Iranian users. In this analysis, the performance of businesses has not been evaluated.

Careem

92%

Snapp/Tapsi

77%

Trendyol

97%

Digikala

81%

In another analysis to better illustrate the state of connection quality in Iran, we compared the average Density quality of two widely used online services ride-hailing and online retail in Iran, against similar services in Turkey and the UAE.
In the first comparison, it was found that 77% of Snapp and Tapsi users in Iran could access these platforms with 4G Density, whereas 92% of Emirati citizens could access their local ride-hailing service, Careem, with the same quality.

In another example involving online retail, 81% of Iranian citizens accessed Digikala with 4G Density, while the equivalent service in Turkey, Trendyol, was accessible to Turkish citizens at 97% in this metric. It is worth noting that in the third internet quality report, we compared the experience of watching Aparat in Iran with YouTube in Turkey, and the results were similarly aligned with these findings.

#	GDP-Rank	Country	AVG 4G	Total Domain	Distrubed -%	Censored -%	Rank	Censored-Rank	Total (Avg)
100	93	Turkmenistan	32%	1	-	-	100	-	100
99	26	Cuba	48%	8	-	-	97	-	97
98	42	Iran, Islamic Rep.	60%	100	10%	38%	91	99	95
97	2	China	69%	100	9%	51%	89	100	95
96	76	Tanzania	59%	100	9%	2%	94	85	90
95	87	Myanmar	79%	99	14%	16%	85	98	92
94	43	Pakistan	73%	100	4%	7%	87	94	91
93	96	Cameroon	43%	100	4%	2%	99	85	92
92	17	Saudi Arabia	84%	100	3%	6%	80	93	87
91	31	Venezuela, RB	86%	100	4%	2%	74	85	80
90	32	Nigeria	60%	100	4%	1%	91	77	84
...	…	..	…	…	…	…	..	…	..
50	72	Luxembourg	92%	100	1%	0%	57	1	29
49	44	Hong Kong SAR, China	92%	100	2%	0%	57	1	29
48	54	Qatar	92%	0	-	-	57	-	57
47	90	Jordan	93%	3	-	-	52	-	52
46	98	Paraguay	93%	26	0%	0%	52	1	27
45	53	Peru	93%	68	1%	0%	52	1	27
44	12	Australia	93%	100	1%	0%	52	1	27
43	75	Panama	94%	1	-	-	46	-	46
42	79	Belarus	94%	2	-	-	46	-	46
41	66	Dominican Republic	94%	6	-	-	46	-	46
...	…	…	…	…	…	…	…	…	…
10	63	Slovak Republic	98%	21	0%	0%	3	1	2
9	71	Bulgaria	98%	29	3%	0%	3	1	2
8	85	Serbia	98%	48	0%	0%	3	1	2
7	15	Spain	98%	100	2%	0%	3	1	2
6	51	Portugal	98%	100	0%	0%	3	1	2
5	49	Finland	98%	100	2%	0%	3	1	2
4	48	Czechia	98%	100	1%	0%	3	1	2
3	24	Norway	98%	100	1%	0%	3	1	2
2	41	Denmark	98%	100	0%	0%	3	1	2
1	25	Belgium	99%	100	0%	0%	1	1	1

Final Ranking

After analyzing the CrUX data, we incorporated the OONI data into our comparison to account for the restriction variable in addition to speed and disruptions in the final ranking. As mentioned in the initial section, Iran and China, with the largest range of filtered domains, topped this list. Out of the 100 countries examined, 4 countries had no statistical samples, 22 countries had minimal statistical samples, and the rest had a significant number of statistical samples. Among these, 54 countries had no filtered websites within this 100-sample dataset. Finally, by merging this table with the findings obtained from CrUX data, we reached the final ranking.

The most significant positive and negative events related to internet quality in Iran over the past six months

What makes the news of lifting internet filtering in Iran interpretable in two ways—both good and bad—is the government's determination to demonstrate its opposition to filtering on one hand, and the sluggishness and indecisiveness of Iranian policymakers in making and implementing decisions on the other.

It seems that Iranian policymakers, at every level of legislation responsible for imposing restrictions, can easily enforce restrictive policies but require extensive time and slow, gradual steps to lift them.

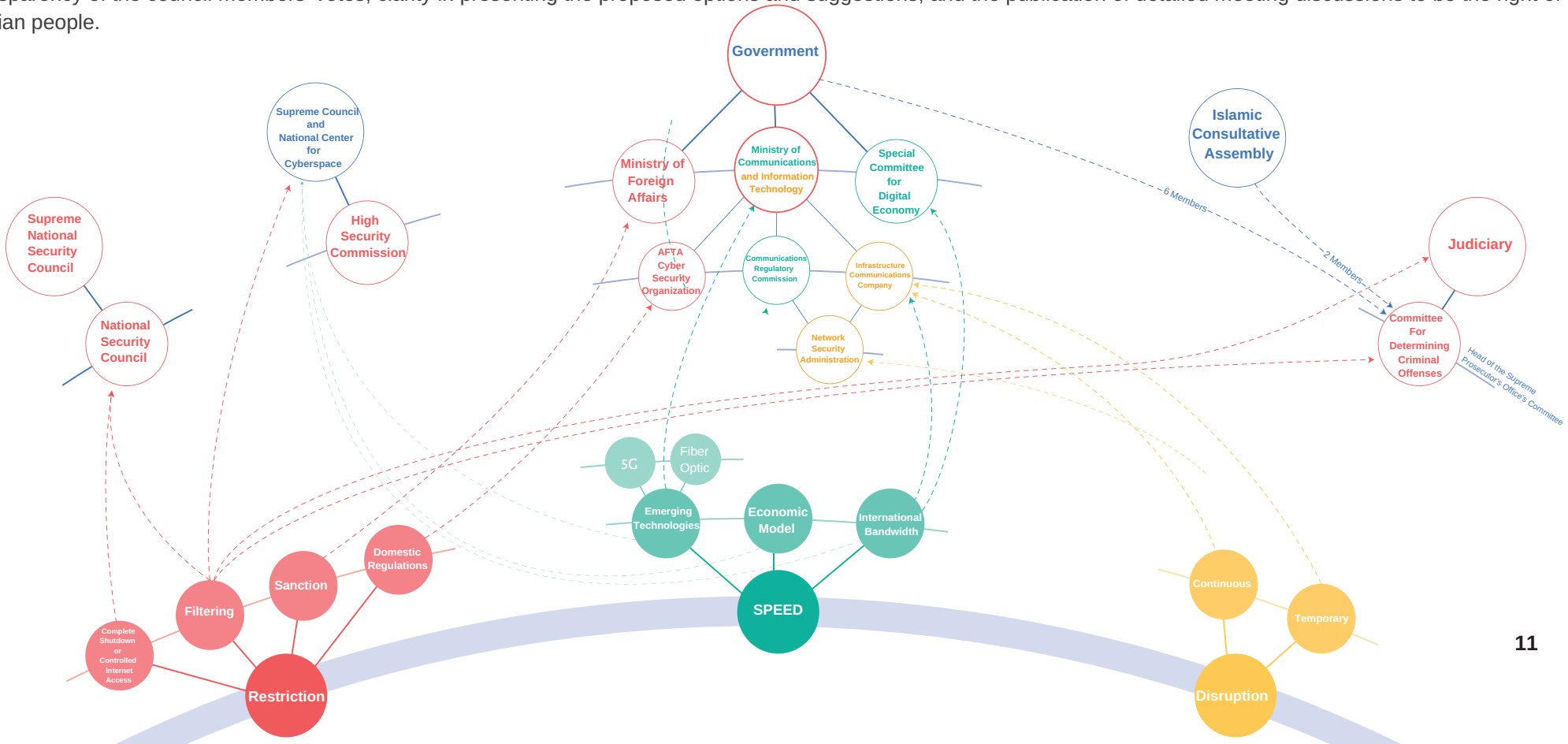
The issue lies in how it is possible for a single judge, later convicted and removed from office within the judiciary, to filter Telegram overnight, while the heads of all three branches of government—legislative, executive, and judiciary—cannot together lift the ban on even a single social network. What kind of obstacle is this, and why is it so insurmountable?

In addition to the critical issue of filtering, it is necessary to address other changes in the state of the country's internet over the past six months. Among the most significant developments welcomed by the Electronic Commerce Association, representing part of the country's innovation and technology ecosystem, are the Ministry of Communications' approach to adopting transparency, the reopening of the Tehran-IX system, the creation of a new online DDoS monitoring platform, and more. Furthermore, the resolution of IPv6 disruptions, which has led to increased adoption across the country, is another significant development that can be considered a forward-looking and positive trend.

Who should be held accountable for the quality of the internet?

In previous reports, we presented a complex overview to clarify the legal responsibilities of various entities and organizations regarding different aspects of internet quality in Iran. The President, with the authority of chairing the Supreme National Security Council, the Supreme Council of Cyberspace, appointing the Secretary of the Supreme Council of Cyberspace, and selecting 6 out of the 12 members of the Working Group for Determining Criminal Content, holds the greatest power and control to improve the quality of the country's internet and should be more accountable than anyone else in this regard.

Speculations have circulated regarding the votes for and against the approval of policies to lift filtering. However, in his most recent statement, Mohammad Amin Aghamiri, the Secretary of the Supreme Council of Cyberspace, denied any voting on this matter. When this is considered alongside the Ministry of Communications' optimism about lifting restrictions, it leaves us both hopeful and concerned about the council's developments in the winter session. This decision could arguably be one of the most significant decisions of the Supreme Council of Cyberspace since its inception, with far-reaching impacts on the lives of millions of Iranians. As a result, we consider public dissemination and transparency of the council members' votes, clarity in presenting the proposed options and suggestions, and the publication of detailed meeting discussions to be the right of the Iranian people.



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- گزارش‌های رسمی دولت در پایگاه Iran FTTX نشان می‌دهد، با وجود اقدامات موثر و رشد چشم‌گیری که باعث پوشش ۷.۵ میلیون نفر خانوار شده است، مشترکان فیبر نوری هنوز کم‌تر از ۵۵۰ هزار است و در شهرهای بزرگ از جمله تهران گسترش این فناوری با موانع جدی مواجه است.

پیرو موضوعات مطرح شده در گزارش سوم کیفیت اینترنت که هم‌زمان با انتخابات ریاست جمهوری کشور بود، مطالباتی را از نامزدهای انتخابات مطرح کردیم و خانم حمیده زرآبادی سخن‌گوی ستاد آقای مسعود پزشکیان در روز ارایه‌ی گزارش سوم کیفیت اینترنت، تعهد دادند که این مطالبات توسط رییس جمهور و دولت ایشان پیگیری خواهد شد. درخواست ما در این سه گروه طبقه‌بندی شده بود:

۱-تلاش فعالانه برای اصلاح ساختار فیلترینگ و کاهش محدودیت‌های اینترنت

۲-رفع انحصار شرکت ارتباطات زیرساخت و توسعه پرسرعت اینترنت

۳-تقویت دیپلماسی بین‌المللی و تلاش برای رفع تحریم‌های بین‌المللی

برخی از این درخواست‌ها از جمله «**رفع فوری اختلالات ایجاد شده از سوی سیستم‌های فیلترینگ با نظارت نمایندگان بخش خصوصی**»، «شفافیت آرای ۶ نماینده دولت در کارگروه تعیین مصادیق محتوای مجرمانه» و «گزارش شفاف و برخط شاخص‌های اینترنت (بازگشایی سامانه‌های غیرفعال شده در دولت سیزدهم)» بدون نیاز به هیچ زیرساختی، با تصمیماتی شجاعانه و در لحظه امکان‌پذیر خواهد بود.

به‌علاوه، با توجه به اینکه شماره‌ی چهارم گزارش کیفیت اینترنت در پاییز سال جاری منتشر خواهد شد، از شما خواستاریم تا آخرین گزارش این انجمن و راهکارهای پیشنهادی آن با تفصیل بیشتر برای جنابعالی ارائه شود، تا در فرصت محدود باقی مانده تا گزارش بعدی، مردم کشور شاهد اقدامات عملی دولت چهاردهم باشند.

باشد که بذر امید در دل مردم و جوانان فناوری کشور کاشته شود.

به نوبتند ملوک اندرین سپنج سرای

کنون که نوبت توست ای «ستار» به عدل گرای

نیما قاضی
رییس هیات مدیره انجمن تجارت الکترونیک تهران

انجمن تجارت الکترونیک تهران
TEHRAN

نامه سرگشاده انجمن تجارت الکترونیک تهران

پیگیری وعده‌های رییس جمهور و اقدامات فوری برای افزایش کیفیت اینترنت در ایران

جناب آقای سید ستار هاشمی

وزیر محترم ارتباطات و فناوری اطلاعات

همان‌طور که استحضار دارید، انجمن تجارت الکترونیک تهران به نمایندگی گروهی از استارتاپ‌ها و شرکت‌های بزرگ فناوری کشور تلاش می‌کند تا با گزارش‌دهی شفاف و مطالبه‌گری فعال، به افزایش کیفیت اینترنت در ایران به عنوان **ریشه‌ی اقتصاد دیجیتال** کمک کند.

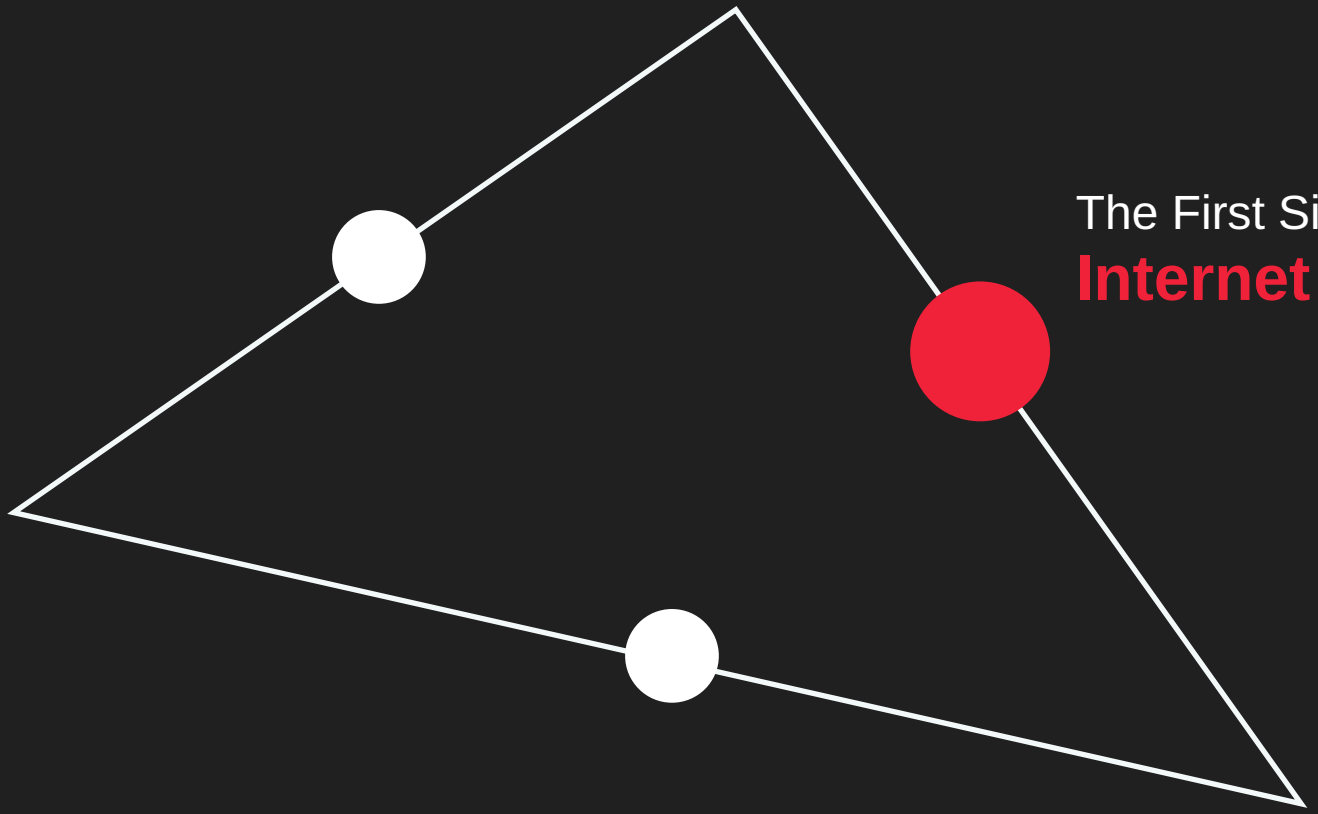
بدین منظور کمیسیون تخصصی اینترنت و زیرساخت ذیل این انجمن با ماموریت ارایه‌ی تصویر روشن از **کیفیت اینترنت در ایران** در سه محور اختلال، محدودیت و سرعت شکل گرفته است. این کمیسیون با تاکید بر شفافیت درباره‌ی وضعیت کیفیت اینترنت و سپس مطالبه‌گری درباره‌ی نقطه‌های تاریک آن، تاکنون سه گزارش از وضعیت کیفیت اینترنت در ایران را به صورت منظم و در فواصل شش ماهه منتشر کرده است. همچنین پس از انتشار هر گزارش تلاش شده است تا در عرصه‌ی داخلی (فیلترینگ، اختلال‌ها، مشکلات زیرساخت و ...) و در عرصه‌های بین‌المللی (تحریم) مطالبه‌گری‌های فعالی داشته باشیم.

با تاکید به این ماموریت، گزارش سوم این انجمن به پیوست این نامه تقدیم می‌شود. برخی از مهم‌ترین شاخص‌های این گزارش به این شرح است:

- ایران در بین ۱۰۰ کشور برتر جهان (از نظر اقتصادی)، بدترین جایگاه در دسترسی آزاد به اینترنت را دارد.
- در شاخص مرتبط با اختلالات و سرعت اینترنت، بر اساس اطلاعات CRuX در جایگاه ۹۰ از ۱۰۰ و بر اساس اطلاعات کلادفلر جایگاه ۹۷ از ۱۰۰ قرار دارد.
- نزدیک به ۴۰ درصد از تجربه کاربران در استفاده از ۵۰۰۰ وبسایت پربازدید کشور، با اختلال یا کندی کامل مواجه است. در حالی که این میزان کندی و اختلال در ۵۰ کشور برتر کمتر از ۶درصد است.
- نمایندگان فنی اپراتورها اعتقاد دارند تجهیزات فیلترینگ موثرترین عامل در کاهش کیفیت اینترنت کشور و جدی‌ترین مانع توسعه شبکه است.

Active efforts and transparent reporting to the public, again sanctions, filtering, and monopolies

In the third report, we presented our requests to the President. The spokesperson for Mr. Masoud Pezeshkian's office committed, on the day the third internet quality report was released, that these demands would be pursued by the President and his administration.
The Electronic Commerce Association, in an open letter to the Minister of Communications, reiterated these issues and followed up on various matters in meetings with the Ministry of Communications. Significant portions of these issues have been examined more thoroughly in this report.



The First Side:

Internet Disruption

Part One: Intermittent Disruptions

From Natural Disasters to Uncontrollable Technical Incidents

In the past six months, the majority of outages or technical disruptions can be categorized into three groups: disruptions caused by incidents in international links, disruptions related to DDoS attacks, and scattered urban outages linked to power cuts. Below, we will examine DDoS attacks and power-related outages in more detail.

1-1 Outage due to international link failures:

Two significant disruptions in the fall of 2024 occurred due to international link failures on November 15 and December 4.
The dimensions and details of these incidents were clarified through updates provided by the CEO of the Telecommunications Infrastructure Company.
It is evident that increasing the capacity of the Telecommunications Infrastructure Company can enhance the country's resilience against uncontrollable incidents and events in the future.

Friday, November 15 (Aban 25):

Outage in international links on the Europe route with a volume of 3Tbps, equivalent to approximately 28% of the country's internet capacity.

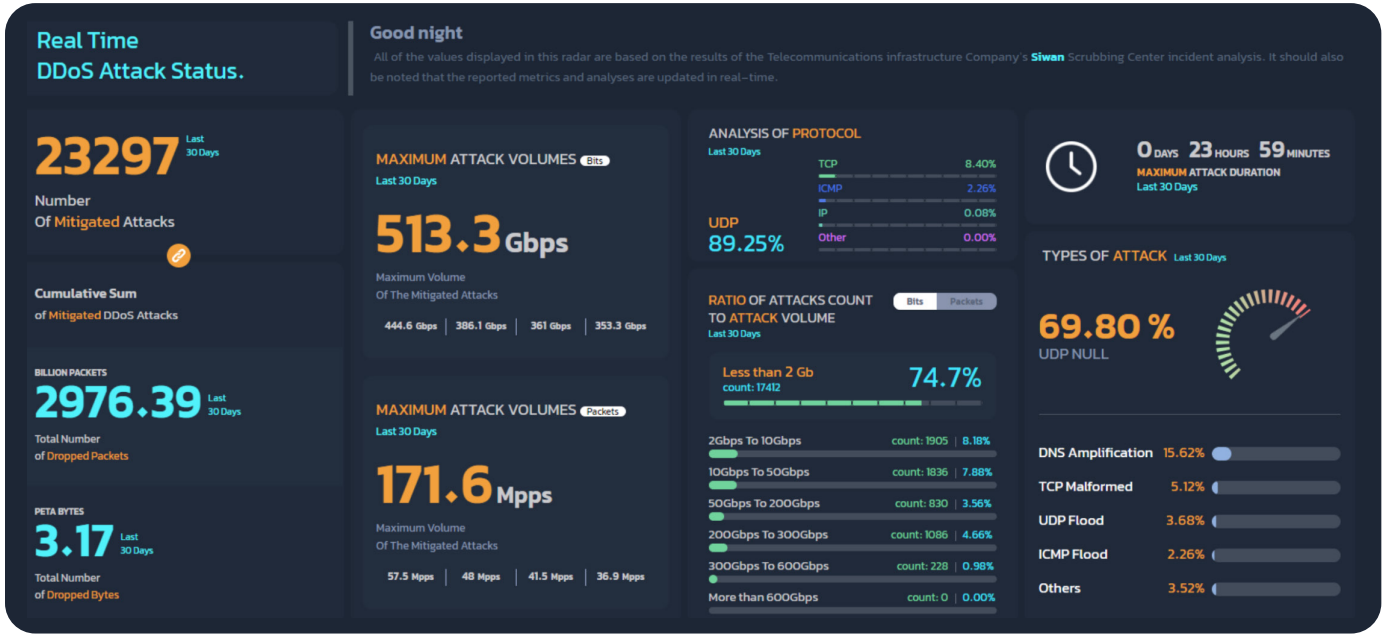
Wednesday, December 4 (Azar 14):

Outage in international links with a volume of 4Tbps, equivalent to approximately 37% of the country's internet capacity.

"Arvan Cloud Radar indicates an increase in disruptions to the country's internet on December 4, 2024 (Azar 14, 1403) from 15:15 to 17:30."

1-2 Widespread DDoS attacks as one of the causes of technical disruptions in the fall

The country's network is subjected to distributed denial-of-service (DDoS) attacks for various reasons. As highlighted in the third report by the Electronic Commerce Association, these attacks have significantly increased since the beginning of the year, causing substantial damage to the quality of the country's internet.
Organized attacks by governments aiming to damage other countries' infrastructures, commercial competition between companies and operators, and increased internet pollution caused by widespread filtering and the resulting extensive use of insecure VPNs are among the main reasons for the rise in these attacks.

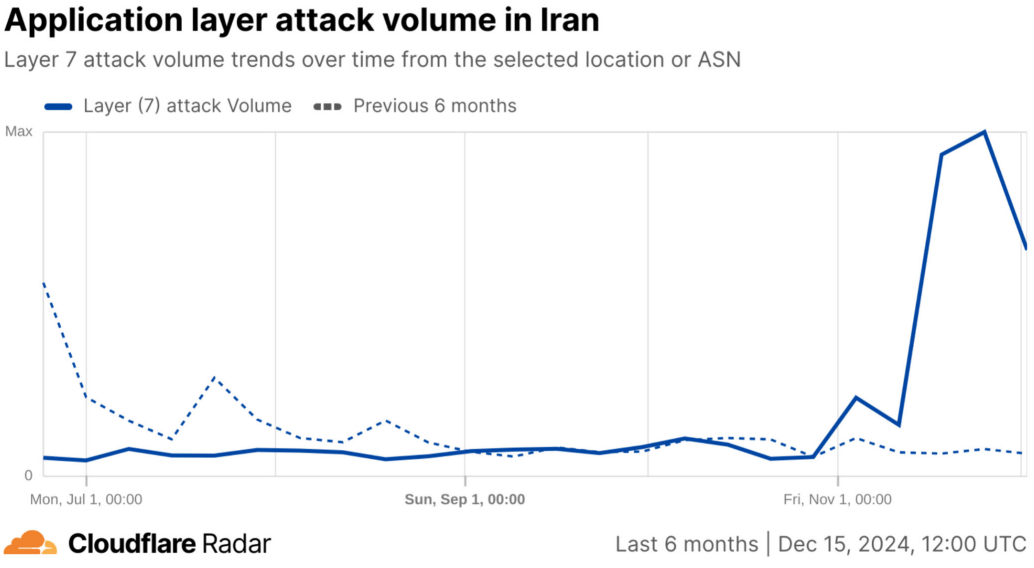


The Telecommunications Infrastructure Company has taken a positive step by unveiling the transparency system for monitoring DDoS attacks at https://ddos.tic.ir. According to the data from this platform, DDoS attacks have increased to a peak of 513Gbps this year, a figure hat, based on the company's explanations of the platform's performance, may actually be up to double this amount.
As detailed in the third report, key measures include increasing the capacity of the country's international links and improving the architecture and capacity for countering DDoS attacks within the network of the Telecommunications Infrastructure Company, which exclusively controls the connection of domestic and international operators.

Reports indicate that Iran has not only been the target of DDoS attacks but also that nodes, or more simply, internet-connected devices used by the Iranian population, have been exploited by hackers to carry out DDoS attacks against targets outside the country. Cloudflare data reveals that DDoS attacks originating from Iran have also increased in the past six months, with the highest number of such attacks recorded on November 25 (Azar 5).

One of the most significant reasons for the increase in these attacks originating from Iran is widespread filtering, which has led to the extensive use of free VPNs by the population, ultimately increasing network pollution. Many citizens' mobile devices are exploited by hackers as botnets through the installation of free VPNs. At a specific time, these devices receive commands from a central controller and simultaneously begin sending requests to the targeted victim.

This issue not only increases the pollution of the country's internet network and leads to the systematic blocking of Iranian IPs by many defense systems, but also causes a sudden surge in bandwidth consumption, quickly depleting users' internet packages.
This problem is more prevalent among older citizens with less knowledge of the internet, imposing additional economic costs.
This topic, with more technical details and supported by credible international studies, will be examined further in subsequent sections.

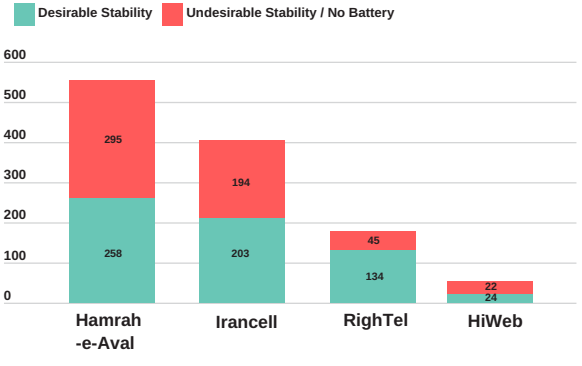


1-3 The Mobile Internet Crisis During Power Outages!

The internet crisis in Iran resembles other crises in the country. Years of indifference toward imbalances in gas, electricity, and water resources, as well as covering up air pollution that is visible to the naked eye, have turned these issues into seemingly unsolvable problems. Accumulated debts hidden beneath the surface suddenly erupt and descend on the population like an avalanche. One such issue that emerged during power outages in the fall of 2024 was the disruption or slowdown of mobile internet caused by power cuts in various regions across the country.

Simply put, mobile users connect to the network via the nearest BTS (Base Transceiver Station). These BTS units must rely on UPS batteries to continue functioning during power outages.
However, as the government has stated, due to the deterioration or "inefficiency of power storage equipment," every power outage causes disruptions to mobile networks as they depend on the duration of power retention in UPS batteries. In some cases, even mobile phone signals are completely lost.
This situation once again brings us into the closed loop of the country's economic development model. Sanctions, reduced purchasing power, and overarching policies such as filtering lead to reduced operator revenues, increased costs, and a shrinking telecom economy. As a result, telecom companies lack the resources to invest in replacing and upgrading batteries—or, more broadly, modernizing the network. Consequently, internet quality suffers with every incident.
During the twelfth administration, the Ministry of Communications published a transparent report detailing the status of UPS batteries by operator and province. It is recommended that the Ministry of Communications update this report, provide transparency on the current state of the country's UPS infrastructure, and announce a timeline for repairing and improving this critical infrastructure.

Subjec	Hamrah -e-Aval	Irancell	RighTel
Single Sites	28.159	14.490	2539
Hub Sites	586	1380	1397
Sites with Functional Batteries	16.264	8.951	3241
Sites with Malfunctioning Batteries	10.279	3.556	182
Centers Equipped with Diesel Generators	2.202	330	417
Sites with Stolen Batteries	1.761	1.983	22



Report on the Status of UPS Batteries in the Country – Dated July 9, 2021 / Tejarat News

Section Two
Disruptions and Slowdowns

Disruptions and Slowdowns in the Last Three Reports:

First Report Summer 2023

In this report, we addressed the dangerous internet crisis in the country. At that time, certain domains and IPs were whitelisted (permitted access), while other domains were greylisted and faced deliberate disruptions. After the publication of the first report and the presentation of technical evidence, this process was halted, resolving one of the biggest threats to the country's internet.

Second Report Winter 2023

The disruptions during the review period of this report were caused by several major factors: technical issues in the network of the Telecommunications Infrastructure Company, disruptions in international access to domestic networks, nationwide outages, fires in regional communication hubs in Tehran, and the loss of 2.5 terabits of the country's internet capacity, among other reasons. This report also highlighted the escalation of internet disruptions between 8:00 PM and 11:00 PM daily due to the saturation of filtering equipment.

Third Report Summer 2024

In the third report, we focused more on the existing disruptions affecting the world's largest CDNs. The examined cases included: disruptions in the form of timeouts on Fastly, connection-related disruptions on Akamai, upload restrictions on Cloudflare, performance degradation of up to six times slower with HTTP/3 compared to HTTP/2, and disruptions on the UDP protocol with global providers.

The third version of the HTTP protocol and its widespread disruptions in Iran

ISP / CDN Provider	Cloudflare	Fastly	AWS	Hostinger	Arvancloud
APTEL	Success	Failed	Failed	Success	Success
Irancell	Failed	Failed	Failed	Failed	Success
MCI	Semi-successful	Semi-successful	Failed	Success	Success
MobinNet	Success	Success	Failed	Success	Success
Zitel	Success	Failed	Failed	Success	Success
Pishgaman	Success	Failed	Failed	Success	Success
Shatel	Success	Failed	Failed	Success	Success
Asiatech	Success	Failed	Failed	Success	Success

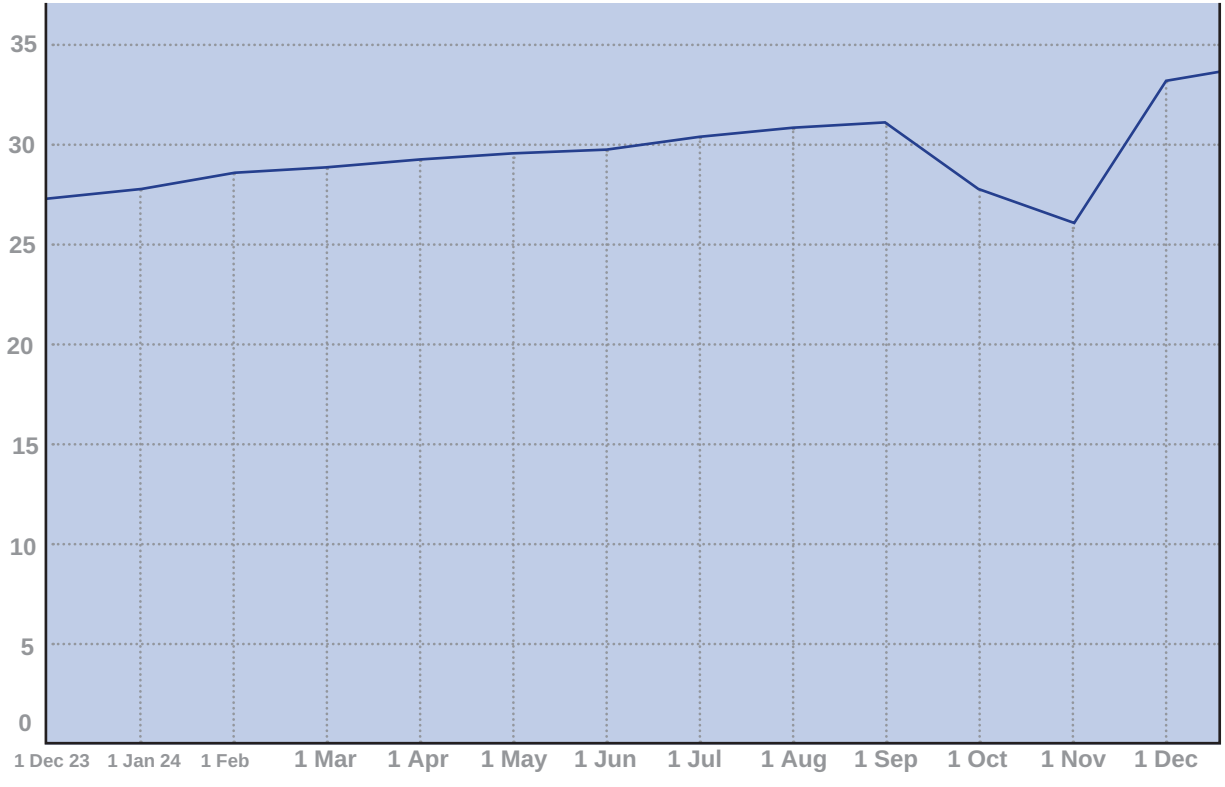
From the first report, we emphasized the high importance of HTTP/3 and demonstrated how its widespread disruptions could lead to significant costs and the loss of a major opportunity to improve the quality of internet services in the country. After the first report, the reported disruptions on Cloudflare were resolved, and the data showed a remarkable increase in the usage of this protocol across the country within just a few days. However, disruptions persisted on the networks of certain global service providers.

In the new investigations conducted for HTTP/3, we observed varying behaviors among internet service providers. At this stage, five CDN services supporting HTTP/3 were selected, and repeated tests were performed on domains utilizing their services.

After reviewing the results, which are summarized in the table above, the following points can be highlighted:

- **HTTP/3 requests to the AWS service provider faced complete disruption.**
- **On the Hamrah-e-Aval network, requests related to the two service providers Cloudflare and Fastly experienced intermittent disruptions but were occasionally functioning without issues.**
- **On the Irancell network, all HTTP/3 requests to destinations outside the country faced complete disruption.**

The global HTTP/3 traffic increased to 33% of total worldwide traffic

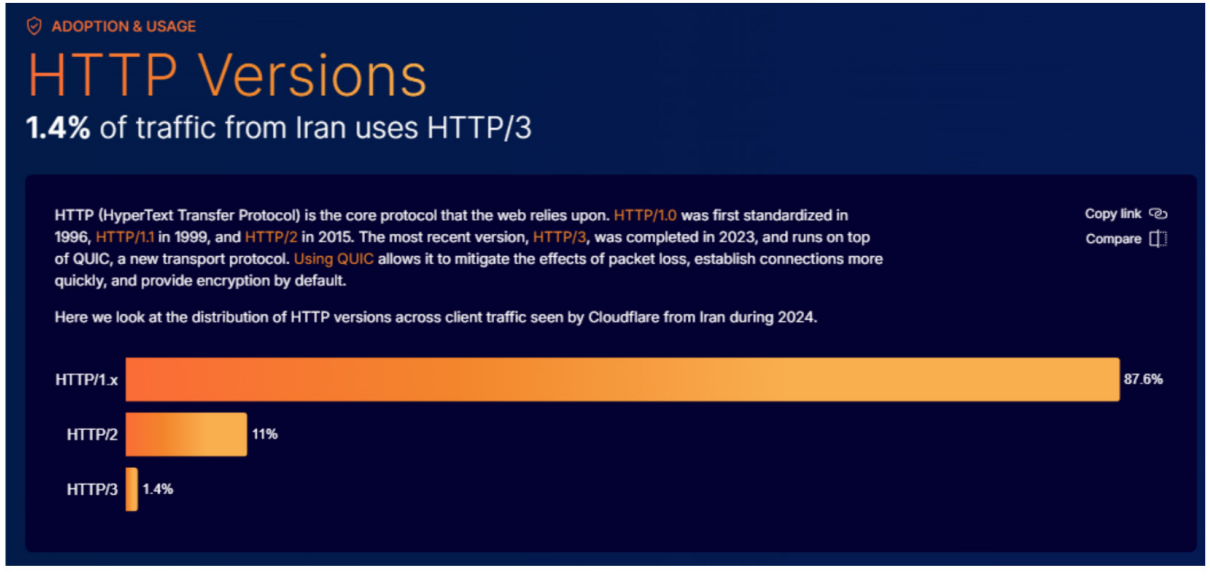


As mentioned in previous reports, the advantages of this protocol have been discussed in detail. Today, according to W3Tech, more than 33% of total internet traffic is based on HTTP/3, and over 95% of browsers support this protocol. The inherent use of this protocol with the UDP model can significantly help the Iranian internet, which suffers from widespread weaknesses, especially in the access layer, thereby rapidly improving the user experience.

According to statistics from Cloudflare, only 1.4% of traffic in Iran was based on this protocol last year, which, considering the tables above and the widespread disruptions to this protocol in Iran, is not surprising.

Usage of HTTP/3 for websites,
20 Dec 2024, W3Techs.com

Economic Damages Caused by Disruptions to the HTTP/3 Protocol:
The economic damage caused by disruptions to HTTP/3 for a hypothetical retail business is estimated at 730 billion tomans per year.



To assess the economic damage caused by disruptions to the HTTP/3 protocol, a hypothetical business was used as a reference, and various variables affected by this protocol were calculated:
Research, including a report by Akamai, shows that a 100-millisecond delay in loading time can result in a 7% decrease in conversion rates. For example, Akamai reported that a 100-millisecond delay in loading time could reduce conversion rates by up to 7%, while a 2-second delay could increase the bounce rate by 103%. Additionally, based on global data, HTTP/3 can improve page loading times by 20% to 40% compared to HTTP/2 in typical web environments.

In this section, we aim to explain the economic and developmental benefits of adopting and completely lifting restrictions on new protocols while providing an estimate of the direct damages caused by imposing any limitations on these critical protocols.

It is evident that the damages resulting from restricting new protocols on the country’s digital ecosystem and the quality of user experience are not limited to the factors outlined below. This simplification of influencing variables has been done solely to facilitate calculations.

Impact on Operations and Business Costs

Efficiency Reduction

The lower speed of HTTP/3 in Iran compared to HTTP/2 reduces the efficiency of businesses that require fast data transfer, such as e-commerce platforms and cloud services.

Investment in infrastructure

In situations where the full utilization of new protocol capacities is not feasible, companies are compelled to adopt alternative solutions or other technologies, resulting in additional costs

Frustration and Customer Abandonment

Slower loading times weaken the user experience, which may result in businesses losing their customers. Even a one-second delay can reduce conversion[6] rates.

Increase in operational costs

The reduction in network speed extends processing times and imposes higher costs on companies. As a result, businesses that require real-time updates (such as financial services) face significant operational delays and serious revenue risks.

Consumer experience and costs

Decline in user experience quality Iranian users do not benefit from the advantages of HTTP/3, such as reduced latency, and face longer loading times and buffering[7] issues.

Higher data consumption The use of older protocols leads to increased data consumption and higher costs, especially in cases where mobile data is expensive.

Limited access to global services As global companies transition to HTTP/3, users of Iranian businesses face difficulties in accessing these efficient services.

6. The Conversion Rate is a metric that shows the percentage of individuals or visitors to a website who are converted into potential customers within a specific period. For example, if your goal is for visitors to fill out a specific form, the conversion rate represents the percentage of people who have completed this action.

7. Buffering issues occur when a device or application is unable to download or process data (typically audio or video) quickly enough to ensure smooth and continuous playback. These issues result in interruptions, pauses, or stuttering in the user's streaming experience.

Loss of growth and innovation opportunities

Barrier to innovation

Restricting the use of HTTP/3 hinders the adoption and implementation of advanced technologies, particularly in areas such as online gaming, video streaming, and IoT services.

International competitiveness

Iranian companies, compared to their international competitors, are in a weaker position due to their reliance on outdated infrastructure and sanctions on technology firms. Imposing restrictions on new communication protocols could further exacerbate this situation.

Examples of HTTP/3 Impact on Various Platforms

Streaming Services

Platforms such as Netflix and YouTube use HTTP/3, which reduces latency and enhances user experience. Continued restrictions on HTTP/3 could result in buffering issues and lower quality for Iranian users.

Real-time financial platforms

Delays in receiving real-time information can result in missed opportunities or incorrect execution of transactions.

E-commerce

Longer loading times lead to abandoned shopping carts and decreased sales.

SEO benefits

Improving page load speed can enhance website rankings in search engines and significantly reduce marketing costs.

Improving Conversion Rate with HTTP/3

Reducing loading time by 1 second can increase conversion rates by 20% to 40%, potentially boosting the monthly revenue of streaming platforms, user-generated content services, online retail, fintech, and similar industries by several hundred million.

Calculation of Economic Loss Due to Disruption of HTTP/3 on a Hypothetical Retail Business: about $7,910,000 USD per Year.

Quantifying the economic losses caused by internet filtering or disruptions is a key step in understanding the impact of this issue on the country's digital economy. First, let’s examine the losses an online retailer may face due to incompatibility and disruptions in HTTP/3.

(A) Losses Due to Increased Loading Time	**1. Decrease in Conversion Rate**	Research indicates that every 1-second delay in loading can reduce the conversion rate by up to 7%. For this hypothetical website, a 1-second delay (from 1.5 to 2.5 seconds) could result in an approximately 15-20% decrease in the conversion rate.
	2. Daily Losses	With a daily revenue of approximately $108,108 USD, a 15% decrease in the conversion rate results in a daily loss of approximately $16,216 USD.
	3. Annual Losses	Approximately $16,216 USD × 365 days = Approximately $5,918,919 USD in annual losses.
(B) Revenue Opportunities with HTTP/3	**1. Increase in Conversion Rate with Reduced Loading Time**	With the implementation of HTTP/3 and a 1-second reduction in page load time, the conversion rate can increase by up to 20%. This improvement in conversion rate could raise daily revenue from approximately $108,108 USD to approximately $129,730 USD.
(C) Potential Savings and Profitability Improvement	**1. Reduction in Abandoned Shopping Carts**	Research indicates that each second of delay can increase the cart abandonment rate by up to 14%. HTTP/3 can reduce this rate by at least 10%, recovering billions of Tomans in lost sales.
	2. Reduction in Marketing Costs	By improving page load speed, the startup's ranking in Google search results will improve, leading to increased organic traffic and reducing the need for paid advertisements.

Based on this metric, we analyzed the performance of this hypothetical retail business with a focus on the HTTP/3 indicator. The results show that adopting the next-generation HTTP/3 protocol, which has been deliberately disrupted in the country, could increase the daily revenue of this business by approximately $21,622 USD. On an annual scale, this figure amounts to around $7,891,892 USD.

These numbers highlight the significant potential that, if obstacles are removed, could contribute to the growth and prosperity of the digital economy.

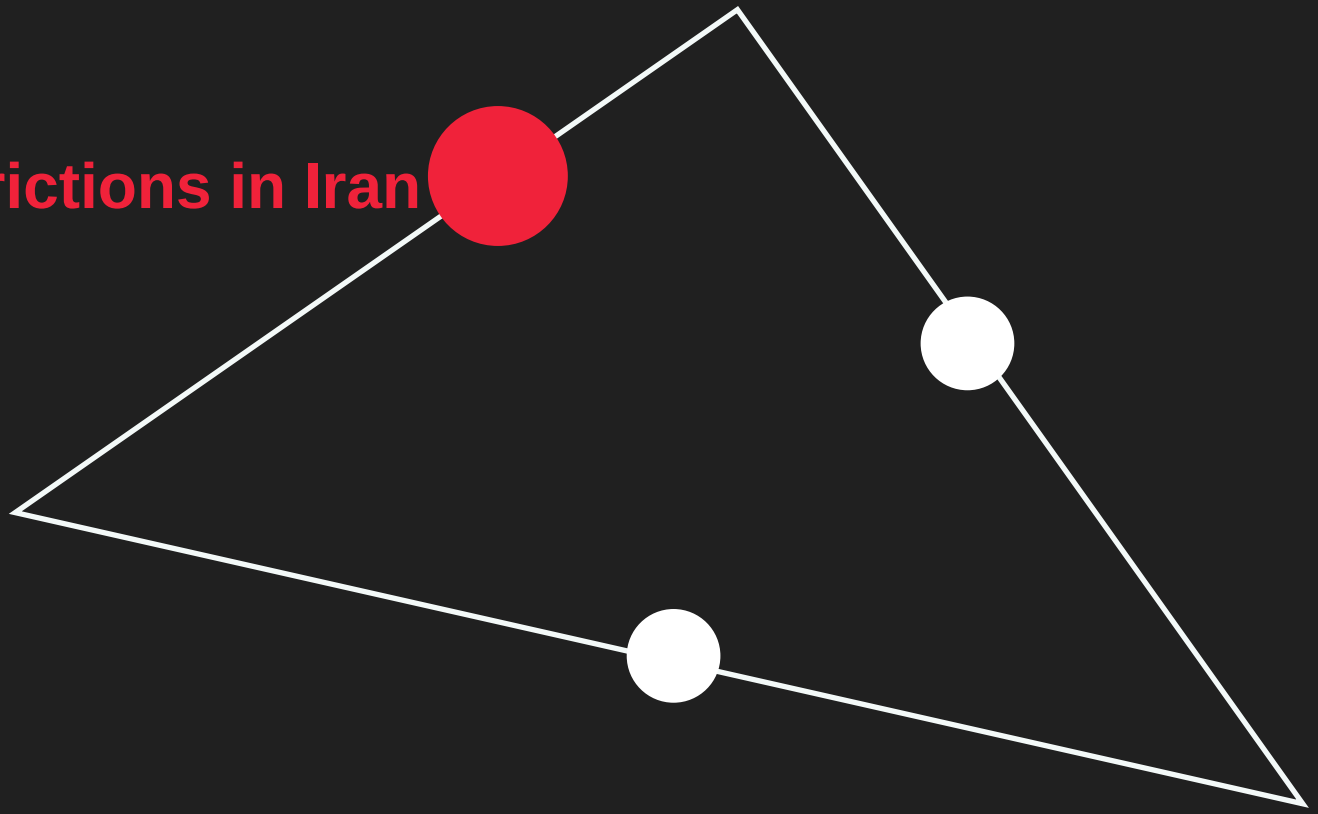
Indicator	Current Value (HTTP/2)	Potential Value (HTTP/3)	Difference
Page Load Time	2.5 second	1.5 seconds	+40%
Conversion Rate	2%	2.4%	+20%
Abandoned Shopping Cart	High	10% reduction	Improvement
Daily Revenue	$108,108 USD	$129,730 USD	+$21,622 USD
Annual Revenue	$39,459,459 USD	$47,351,351 USD	+$7,891,892 USD

Summary Table of Economic Impacts of Implementing New Protocols

(Losses Due to HTTP/3 Disruptions)

Second Aspect

Internet Restrictions in Iran



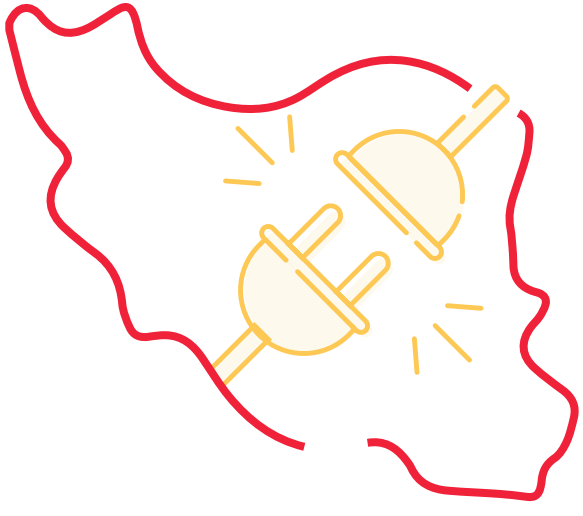
Internet Restrictions in Iran

Overall, internet restrictions in Iran can be classified into four levels: "Complete or Controlled Internet Shutdown," "Filtering," "Sanctions," and "Domestic Regulations." Each of these will be examined separately in the following sections, similar to previous reports.

Internet Restriction Status in the Last Three Reports:

First Report **Summer 1402 (2023)**	33% of the top 100 websites (ranked according to SimilarWeb) are filtered. Social media platforms remain fully blocked.
Second Report **Winter 1402 (2024)**	Iran has the highest absolute internet shutdowns in the world. Additionally, 49% of the top 100 most-used websites in Iran are filtered. Moreover, Iran applies IP-level filtering without justification. A test demonstrated that instead of restricting domains, filtering is enforced at the IP level. As a result, other domains using the same IP, or future users after an IP transfer, remain blocked. Social media platforms continue to be fully filtered.
Third Report **Summer 1403 (2024)**	Out of the 5,000 most-used websites in Iran, based on Google CrUX data, 730 websites have been directly filtered, with their primary domains resolving to filtering IPs. Additionally, this number should be aggregated with domains that have been blocked due to CDN restrictions. The use of VPNs among Iranians has tripled, imposing an annual cost of at least $54,054,054 USD on Iranian citizens.

Section One
Complete, Regional, or Controlled Internet Shutdowns

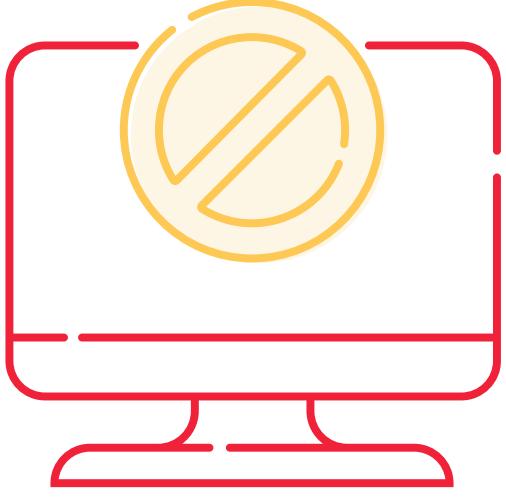


A complete or controlled internet shutdown refers to events where internet access across the country is entirely or partially cut off by official directives.

Incidents such as the 2009 election events, the November 2019 protests, regional shutdowns in Khuzestan in 2020, and the regional shutdown in September 2022 fall into this category. It appears that these shutdowns have been carried out under the directive of the National Security Council (SHAK).

In the past six months, there has been no total internet shutdowns in the country.

Section Two
Filtering



We analyzed 100 Origin internet domains using the OONI database and selected those with the highest coverage across multiple countries as a benchmark.

The results indicate that as of November this year, the number of domains experiencing filtering or disruptions above 50% has not shown a significant change compared to the same period last year.
Findings regarding restricted websites reveal that while some domains align with general criminal content regulations (such as phishing, pornography, etc.), a substantial portion of high-traffic and essential websites—including news and information platforms, social media, entertainment websites, and even skill-based domains—are also filtered. Collectively, these websites cover a significant portion of Iranians' daily needs.
Overall, this situation reflects the inefficiency of the filtering system and its implementation in the country, depriving citizens of access to essential information. As a direct consequence of arbitrary policies, Iran ranks among the top countries with the most restricted access to the open internet.

	Country	Facebook	Twitter	YouTube	Instagram	Telegram	WhatsApp
1	China	*	*	*	*	*	*
	Turkmenistan	*	*	*	*	*	*
	Iran	*	*	*	*	*	Reopening from Winter[8] 1403 (2025)
2	Uzbekistan	*	-	*	*	*	-
3	Guinea	*	-	-	-	*	*
4	Ethiopia	*	-	*	-	*	-
5	Myanmar	*	*	-	*	-	*
6	Russia	*	*	-	*	-	-
7	Yemen	-	-	*	-	-	-

Social Media Platforms Still Under Complete Restriction!

Social Media Platforms Remain Fully Restricted!
Twitter, Instagram, Telegram, Facebook, YouTube, and Twitch remain blocked in Iran, placing the country alongside China and Turkmenistan as one of the most restrictive nations in terms of social media access.
According to Surfshark's analytical report published in the first half of this year, Iran is among the countries with the worst levels of free access to social media, based on an analysis of internet censorship in 29 countries worldwide.
In this analysis, data from OONI, an organization that monitors internet disruptions and censorship globally, was used as a benchmark. The results confirm that Iranian citizens' access to mass communication platforms is among the most restricted worldwide, second only to China.
However, in the second week of January 2025, the WhatsApp social media platform was removed from the filtering list.

8.As mentioned in the introduction of the report, this analysis covers the Summer and Fall of 1403 (2024), which precede the unblocking of WhatsApp and Google Play.

Supporting Domestic Businesses Against Filtering and Restrictions

شماره: ن۲۲۸-۴۰۳۰۷۲۰
تاریخ: ۱۴۰۳/۰۸/۲۷
پیوست: -

انجمن تجارت الکترونیک تهران
TEHRAN

بسمه تعالی

جناب آقای سید محمدامین آقامیری
ریاست محترم مرکز ملی فضای مجازی

پیش‌نویس مصوبه حمایت از کسب‌وکارهای ایرانی و ایجاد شفافیت در اعمال مسدودسازی آی‌پی‌ها، دامنه‌ها و سکوهای فضای مجازی

با سلام

همانطور که استحضار دارید انجمن تجارت الکترونیک تهران به نمایندگی گروهی از استارت‌آپ‌ها و شرکت‌های بزرگ فناوری دیجیتال کشور تلاش می‌کند تا با گزارش‌دهی شفاف و مطالبه‌گری فعال، به افزایش کیفیت اینترنت در ایران به عنوان ریشه اقتصاد دیجیتال کمک کند. پیش‌نویس «پیش‌نویس مصوبه حمایت از کسب‌وکارهای ایرانی و ایجاد شفافیت در اعمال مسدودسازی آی‌پی‌ها، دامنه‌ها و سکوهای فضای مجازی» که در ادامه خواهد آمد، بخشی از همین ماموریت کمیسیون اینترنت انجمن تجارت الکترونیک تهران است که برای حمایت از حقوق بدیهی کسب‌وکارهای مجازی و سکوهای اینترنتی کشور آمده است:

Although the E-Commerce Association's primary demand is the lifting of widespread filtering and a comprehensive review of restrictive policies in the country, we believe that alongside pursuing this objective, we must also advocate for other measures aimed at improving internet quality in Iran. With this goal in mind, during expert meetings with the Secretary and Deputy Heads of the Supreme Council of Cyberspace and the E-Commerce Association, we emphasized the necessity of supporting domestic businesses as well as international platforms that small local businesses heavily depend on. These discussions were well received by the council.

Subsequently, internal expert meetings were held within the association, and after thorough legal review, the association’s proposal was submitted to the council on November 17, 2024 (27 Aban 1403) for further review.

The following sections will include an image of this letter and the proposed legal framework.

Proposed Draft for Legal Approval
In the Supreme Council of Cyberspace, aimed at supporting Iranian businesses and ensuring transparency in the enforcement of IP blocking, domain restrictions, and platform limitations in cyberspace.

Justification Introduction

Considering the importance of supporting digital businesses and online platforms, preventing harm caused by decisions made by various regulatory bodies, and enhancing economic predictability, this proposal aims to uphold public rights (Article 14 of the Constitution), the right to a fair trial (Article 34 of the Constitution), the presumption of innocence (Article 37 of the Constitution), and support for the expansion of the Persian language and other indigenous languages in Iran (Article 15 of the Constitution).
Additionally, in alignment with the objectives of the Law on Publication and Free Access to Information (enacted in 2009), this resolution seeks to regulate the enforcement of any domain or IP address blocking orders, as well as restrictions such as physical location closures or the suspension of payment gateways for businesses.
This proposal is submitted to the Supreme Council of Cyberspace for approval to establish a structured and transparent approach to implementing such restrictions.

Section One – Transparency in the Enforcement of Restrictions and the Process for Issuing IP or Domain Blocking Orders

1. The Committee for Determining Instances of Criminal Content is required to establish an online system within three months of this resolution to enable inquiries into blocked domains and IP addresses.
In this inquiry process, the blocking status (whether blocked or not), the legal basis and judicial order behind the restriction, the type of criminal content that led to the decision (including its specific category and supporting evidence), and the date of the order must be specified.

2. The domain and IP holders, as well as associations, unions, and trade organizations active in the digital business sector, can submit a request for unblocking to the committee.
The committee is required to review and respond to this request within 10 business days.
If the unblocking request is denied, the mentioned parties have the right to appeal the decision to the Administrative Justice Court. The court is required to allocate specialized branches to expedite the processing of these complaints.

3. The committee is required to establish an electronic system that allows citizens to submit objections regarding the blocking of domain addresses or IPs.
If at least 10,000 citizens object to a block, the committee is obligated to reassess the case and publicly disclose its decision and reasoning.
The implementation regulations for this clause will be drafted by the Minister of Justice and approved by the Chief Justice of the Judiciary.

4. To prevent the violation of user rights and legally registered digital businesses, including those licensed by relevant authorities (such as the E-Commerce Union and the National Computer Trade Organization), the blocking of an entire platform, IP, or domain due to violations or criminal content is prohibited unless at least two written warnings are issued at least 72 hours before enforcement.

5. For domain addresses or IPs of digital businesses with over 100,000 registered users, or foreign platforms with more than 1 million Iranian users (or exceeding 100Gbps peak daily traffic), the issuance of any blocking order is prohibited without specific approval from the Supreme Council of Cyberspace.

6. The closure of offices or physical locations of digital businesses with over 100,000 users is prohibited without approval from the Supreme Council of Cyberspace.
In urgent and necessary cases, the judicial authority executing the order must inform the Head of the National Cyberspace Center.
Within a maximum of 24 hours after enforcement, a formal meeting must be held with the legal representative of the affected business and a representative from the National Cyberspace Center to review the reasons for the restriction and discuss possible solutions for resolving the issue.

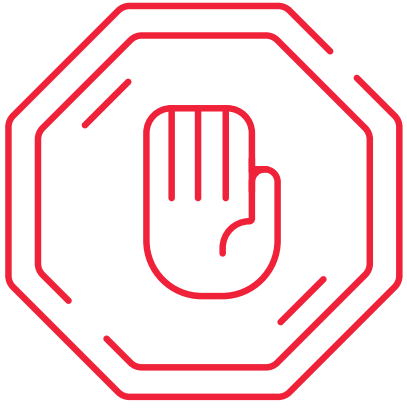
7. To support businesses providing data center and cloud services and to ensure fair competition with foreign companies offering similar services, blocking orders issued by the Committee for Determining Instances of Criminal Content must be limited solely to restricting access to the violating website or platform, without prohibiting the provision of other hosting services. In exceptional and necessary cases, a separate judicial order is required for imposing additional restrictions.

Section Two – Protecting Business Rights in the Oversight Processes of the E-Commerce Trust Seal (E-Namad)

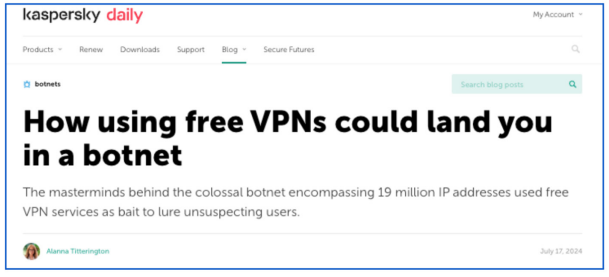
8. The E-Commerce Development Center is required to notify the holder of the E-Namad at least 7 business days before the revocation or suspension of the trust seal for digital businesses.
This notification must include the legal documentation and reasons for the action and must provide the business with an opportunity to rectify or resolve the identified issues.

9. The blocking of domains or IPs, revocation or suspension of E-Namad, or closure of payment gateways for digital businesses with over 100,000 users is prohibited without approval from the Supreme Council of Cyberspace.

Examining the VPN Mafia: Analyzing the Consequences of Filtering Policies in Iran



In the third report on internet quality in Iran, we examined the impacts of filtering policies and demonstrated that these policies extend far beyond a simple decision, affecting both cultural and economic aspects. Due to unjustified and widespread restrictions, ordinary citizens and private businesses have been forced to rely on Virtual Private Networks (VPNs). This issue has resulted in irreparable damages across various sectors in the country.



Paid VPNs pose serious security and political challenges. For example, according to a report by Mint News, Israel has invested in some of the largest VPN service providers, using them for user data collection and espionage operations. This presents a direct threat to user privacy and security.
On the other hand, free VPNs are also not a viable solution due to technical and security issues.
Research by Kaspersky has shown that many free VPNs are infected with malware, which can severely compromise users' sensitive information.

Does a VPN Mafia Exist in Iran?

Evidence and analyses suggest that the existence of organized networks related to the VPN industry in Iran cannot be ruled out.
However, what is certain is that filtering policies have created a flawed, opaque, and ambiguous environment that fosters the growth of such phenomena.
If we assume that a VPN mafia does exist in the country, the most effective and sustainable solution to reduce reliance on VPNs and mitigate the social issues caused by them is to reassess filtering policies and lift restrictions on high-traffic social media platforms.
Such a move would directly impact the desirability and real demand for VPNs, serving as a key step in protecting user privacy, strengthening digital businesses, and preventing illegal exploitation.

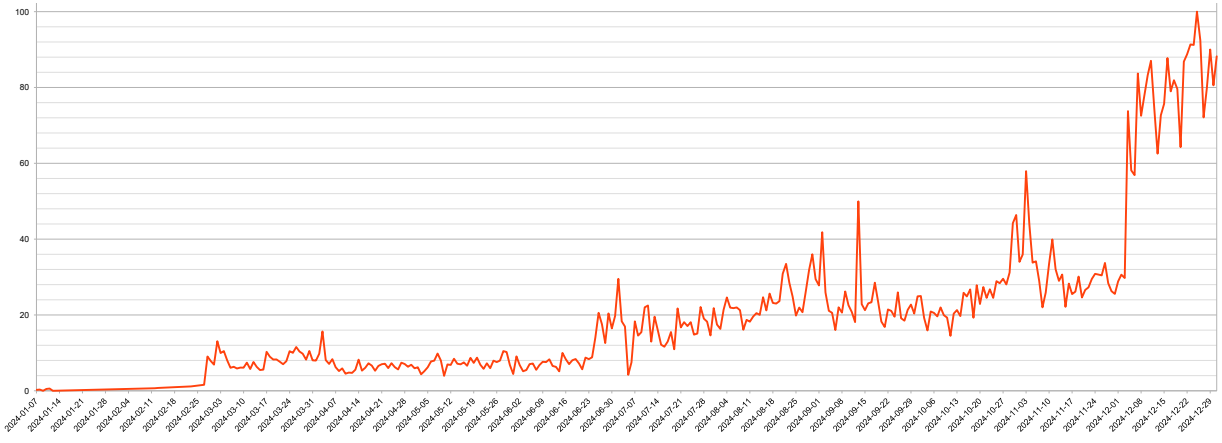
Starlink is Closer to the People Than It Appears...

The internet problems in the country can be categorized into several areas, but as mentioned in the editorial of this issue, the most significant factors contributing to the current critical situation are domestic filtering, the lack of development in the Access network, and external sanctions. Filtering, in addition to creating restrictions on access, has also become one of the main factors contributing to persistent slow speeds, network instability, and a significant barrier to increasing internet speed and development in the country.

On the other hand, technology experts have repeatedly emphasized that the complete blocking of VPNs is technically impossible, and with the intensification of restrictions, VPN algorithms continuously become more complex. These algorithms can simulate user behavior, standard protocols like HTTP, and even browser fingerprints, making it more difficult to track and block them. Studies show that the use of VPNs among Iranian users has significantly increased; according to an ISPA report, 83.6% of internet users use VPNs. Similarly, data from DataTech reveals that after a temporary drop in Instagram usage in September 2022, more than 90% of users had returned to the platform by March 2024. These statistics indicate that users' resistance to internet restrictions continues, and any attempt to implement widespread blocking will bring significant technical and social challenges.

Provider	Speed range	Starting monthly cost	Regular monthly cost	Contract	Monthly equipment costs
Hughesnet Read full review	50-100Mbps download, 5Mbps upload	$50-$95	$75-$120	2 years	$15-$20 a month or $300-$450 one-time purchase
Starlink Read full review	5-220Mbps download, 5-20Mbps upload	$120; $140-$500 (Priority); $50-$5,000 (Mobile)	$120; $140-$500 (Priority); $50-$5,000 (Mobile)	None	$349 one-time purchase for Standard ($349-$2,500 for Priority)
Viasat Read full review	25-150Mbps download, 3Mbps upload	$100-$150 (varies by location)	$100-$150 (varies by location)	None	$15 or $250 one-time purchase

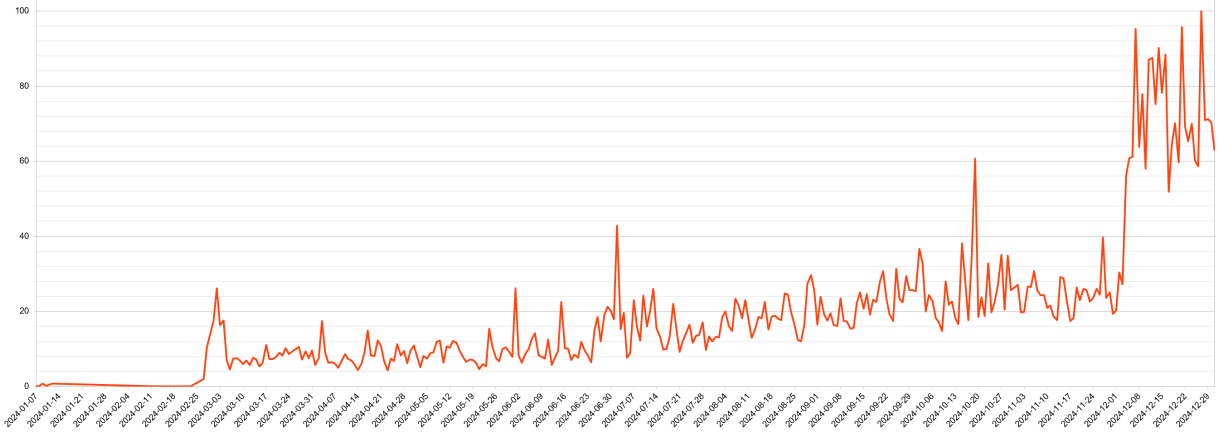
However, the new surprise, which was also discussed in the editorial, is the rapid increase in users' adoption of satellite internet. Although many people recognize it by the well-known Starlink brand, various other brands and competitors around the world are preparing the world for a major shift.



The amount of Starlink traffic originating from Iran since the beginning of 2024.

In a report published in December 2024, the prestigious magazine Forbes estimated that there were over 20,000 Starlink users in Iran. However, a report from the E-commerce Association indicates that the number of Starlink users in Iran should exceed 30,000. While the number of a few tens of thousands of users may seem small compared to Iran's population of 89 million, when we consider its rapid expansion, we realize that we are witnessing a phenomenon that will lead to a serious paradigm shift in technology.

In the two charts below, we examined the number of requests and user traffic from Starlink users in a large sample to identify its exponential growth trend throughout 2024.



The number of Starlink requests originating from Iran since the beginning of the year 2024.

Consider this alongside the Direct To Cell technology, which is set to be publicly available soon and will allow mobile phone users to connect to high-speed satellite internet without the need for any equipment or receiver.

According to Forbes, although the cost of purchasing Starlink equipment is around $250, Iranians, due to sanctions and the illegality of buying and selling this equipment, acquire it at prices ranging from $700 to $2,000.

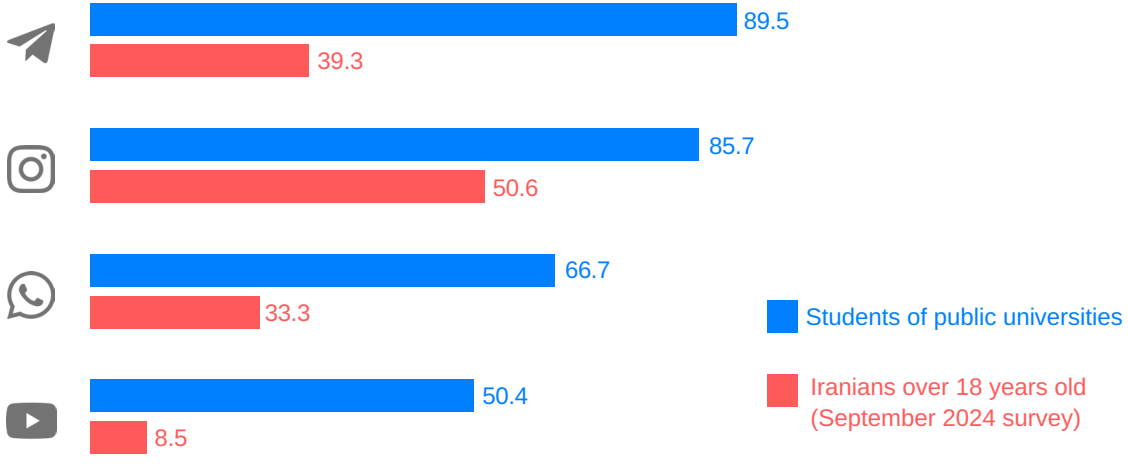
Case and Special: YouTube Filtering

The status of filtering on various platforms, which has been mentioned in recent reports and remains in effect:

Case Report Two: **Google Play**	The extensive and unjustifiable restrictions, such as the filtering of Google Play and phishing of Iranian users, were discussed. Google Play filtering has halted the automatic updates of applications on millions of mobile phones, tablets, and smart TVs, making them insecure and leaving users vulnerable. Additionally, the automatic sending of billions of requests from Android phones to Google Play, without any response, leads to a decrease in network quality, increased battery consumption, and disruptions on mobile phones.
Case Report Three: **Twitch**	The impact of filtering on the industry was questioned among online game developers and internet providers. The result was that 100% of online game developers stated that the filtering situation has led to a decrease in internet quality and increased complexity in streaming conditions.

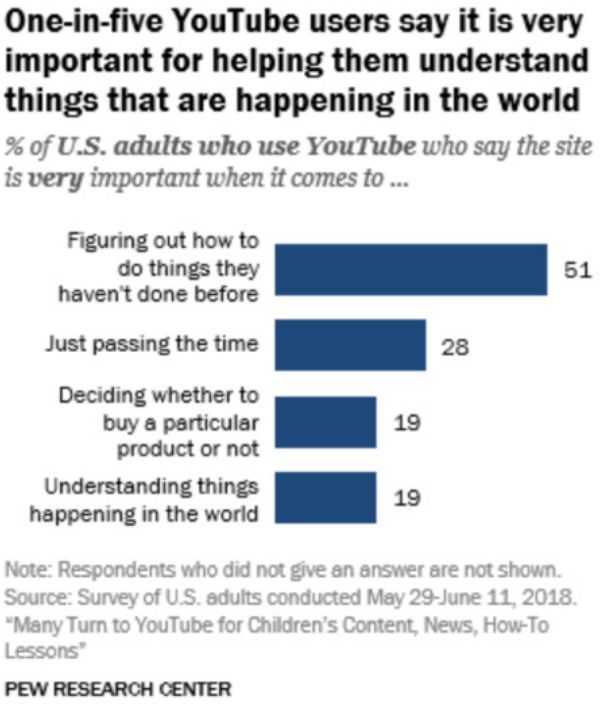
Discussing the impact of YouTube filtering in comparison to other heavily filtered platforms is more challenging. This platform was blocked in Iran at a time when it had not yet become one of the most visited websites globally. In 2008, only 13% of online video content was on YouTube, while now (2024), this share has reached nearly 90% of the global video platform market.

According to a Pew survey, more than 50% of users visit YouTube for educational and learning purposes. The diversity, variety, and vast volume of useful content on YouTube, combined with free access, make it attractive to users worldwide. Iranian users, in particular, are able to benefit from the hidden opportunities on this platform due to bypassing technological sanctions and accessing content that may not be available through local platforms or is otherwise costly due to the need for a subscription fee in dollars.



Digital platforms, especially YouTube, have played a key role in facilitating and advancing education, and numerous studies have confirmed their importance in this regard. With the accelerating pace of technological advancements and the impact of the COVID-19 pandemic in accelerating the global shift towards online education, platforms like YouTube are gradually replacing and complementing traditional educational models in schools and universities. This shift is not only due to the flexibility and breadth of content on these platforms but also driven by the changing preferences of users, especially the younger generation, towards interactive, engaging, and on-demand content, which YouTube and other digital platforms provide in the best possible way. While traditional educational systems are often inefficient in meeting these needs, digital platforms have been able to offer a personalized learning experience tailored to users' interests.

There are 500M views of learning-related content on YouTube every day.



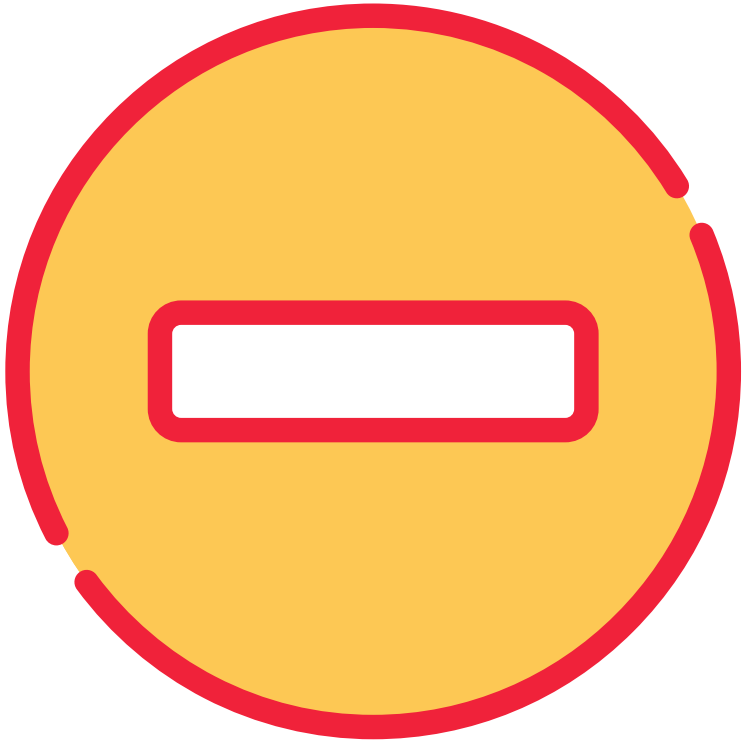
Reports indicate a growing trend and expansion in the volume of content produced by Iranian users on this platform. According to estimates from a company that facilitates content creators' monetization on YouTube, there are currently around 100,000 active Persian-language channels, 15,000 of which have enabled monetization. The number of Persian-language channels has grown by 15% annually, and it is estimated that there are between 10 to 15 million active Iranian users on YouTube.

The advantage of YouTube compared to other social media platforms.

Many YouTubers publish their content exclusively on YouTube because YouTube's recommendation system is designed in such a way that if your video is engaging and informative (provided it succeeds in getting audience feedback), it will find the right viewers worldwide. YouTube's content discoverability is stronger than its competitors, such as Instagram, because it hosts long videos and, with its subtitle and translation system, displays its content in search engine results as well. Additionally, unlike text-based social media platforms, which are often controlled by bots and subject to various algorithmic fraud and programmed attacks, bots are much less active on YouTube, which results in greater transparency and trust for content creators and viewers.

Unblocking YouTube could attract many viewers to this platform. Although monetizing through direct ads may initially be challenging for Iranians due to sanctions, over time, collaboration between content creators and brands will lead to a new revenue model, similar to what is currently happening on Instagram.

Challenges and consequences of designing and developing internal skins



In recent years, the development of alternative tools and government-controlled platforms for widely used foreign platforms has been repeatedly attempted; from various Telegram skins to internal interfaces for restricted access to platforms like YouTube. If this solution is chosen by the government, certain specific companies that have been preparing for this purpose for years are likely to play a key role. However, these ineffective solutions will face serious challenges:

1 **Creating unproductive rent:**

This development model eliminates competition and, instead of fostering innovation, creates unproductive rent and a system of distributing privileges.

2 **Technological instability:**

Like the experience of the sudden removal of Telegram Gold, these tools are often short-term and unreliable.

3 **Policy duality:**

In the case of Telegram skins, some policymakers considered them a security achievement, while others viewed them as tools for the influence of the country's adversaries.

The strategy of developing authorized portals (skins) for users to access YouTube, in addition to the previously mentioned points, carries additional weaknesses and deficiencies that, in practice, will make its implementation impossible and harmful:

Destruction of content creators' market:

The possibility of defining an alternative revenue-sharing model to return income to creators through internal skins is not feasible; or if it exists, it is very time-consuming and costly, making it unlikely that startups will have the capacity to take such investment risks initially and will require government funding. YouTube skins harm content creators. Content published on YouTube may be copied and displayed on internal servers without any visits being recorded on YouTube itself. This action does not send the necessary signals to YouTube's algorithm, thus reducing the chances of the content being seen. Furthermore, internal systems, due to weaknesses in content recommendations and insufficient data for machine learning, cannot offer an experience similar to YouTube.

Privacy violation:

Internal skins are not only insecure but, in some cases, can lead to the theft of users' personal information and more.

Contradiction in objectives:

Policies such as the filtering of Google Play have recently pushed users towards downloading and installing insecure (unofficial) versions, and the introduction of new skins could exacerbate this trend.

Alternative Proposal and Conclusion

Global successful experiences have shown that the approach of engagement and using digital diplomacy when dealing with foreign platforms is far more effective than restrictive or ad hoc solutions (such as internal skins). For example, Turkey, after a decade of filtering Wikipedia, eventually turned to cooperate with this platform and, in return, used taxation policies to reach a mutual agreement with various social media platforms within regulatory frameworks for public benefit.

Policies based on creating internal skins, instead of solving problems, only make them more complex. These actions, rather than addressing the real needs of users, only weaken public trust and increase security threats. In general, the worst possible scenario in terms of content creators, users, and the country's budget is the skinning policy for YouTube or other foreign platforms. This policy will be even more detrimental than blocking YouTube. The skinning policy not only creates unproductive rent and fosters non-innovative entrepreneurship dependent on the government, but there is always the risk of access being cut off or severe restrictions being imposed by the platform itself.

Section Three: Sanctions

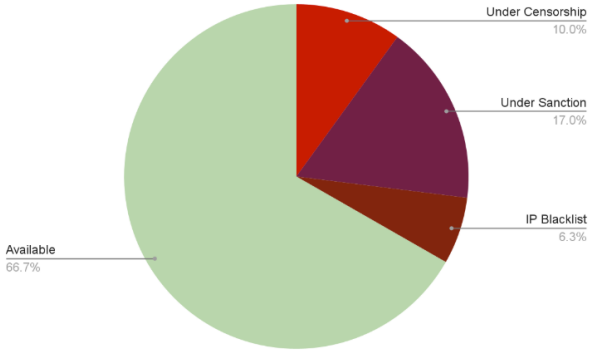
They are not what they appear to be!

Iran is one of the countries that has been subjected to technological discrimination for years; something that places Iran in the lower spectrum (Semi-Periphery or Periphery) in international divisions and prevents or has made it difficult for the country to play a role in the global economic power streams as much as the powerful group (Core). Along with global industrial revolutions, the dualistic logic of economic underdevelopment and dominance is reproduced[10] through various tools[11] such as sanctions, SDGs, and the claim that the world is moving towards peace and equality. This reproduction contradicts the broader goals of debt creation, exploitation of knowledge and technology, and is in direct conflict with them. Infrastructure sanctions and restrictions on access to educational resources are examples of such issues, topics that have also been addressed in previous reports.

Report two **Winter 2024**	We have compiled a list of 200 useful and skill-building websites that have sanctioned Iranian users. Iranian citizens and activists in the tech industry have condemned all technological sanctions against Iranian users. (Examples include restrictions on purchasing internet services, the disconnection of Iranian companies from international IXP networks, the removal of Iranian nationality in registration forms, and the inability to register with Iranian phone numbers (+98), among others.)
Report three **Summer 2024**	We have highlighted the most important impacts of sanctions in various dimensions: sanctions on the sale of international internet to Iran, where even with IP changes, Iranian users are deprived of foreign subscription-based services due to banking sanctions, which means falling behind in AI services. Additionally, sanctions on Iranian businesses and their lack of access to regional and international markets remain some of the most significant issues that continue to persist.

9. https://www.researchgate.net/publication/373821421_WORLD-SYSTEMS_ANALYSIS_AN_INTRODUCTION_TO_THE_THINKING_OF_IMMANUEL_WALLERSTEIN
10. Dependency Theory
11. https://www.undp.org/sustainable-development-goals

An analysis of the top 100,000 websites on Tranco shows that alongside 10% of websites that are inaccessible due to filtering, many of which are major and high-traffic global websites, 17% of websites are blocked due to sanctions, and 6.3% are blocked due to the banning of Iran's IP addresses for various reasons, including network contamination, preventing Iranian users from accessing the free internet.



Case: Code.org

Last summer, according to the findings of the Internet and Infrastructure Commission of the Tehran E-commerce Association, it was revealed that the educational website codeinfarsi.org is no longer accessible to Iranian users and, following Google Cloud's sanctions policies, automatically blocks Iranian users. A review of the domain codeinfarsi.org shows that requests made with Iranian IP addresses were being blocked on the Google Cloud network.

We officially notified the office of Code.org about this issue and, through social media, asked Hadi Partooy, the Iranian founder of this non-profit project, to act according to their beliefs that "this project is about children, not politics" and to follow up on this matter.

Although we did not receive a direct response to the letter from the E-commerce Association or on social media, **fortunately, by the end of Fall 2024, the restriction on the Persian website, codefarsi, was completely lifted,** and Iranians can now access this educational website without any sanctions-related limitations.

An international action;
The private sector of Iran facing the sanctioning side of the table!

Previously, we made efforts through various methods, including signing petitions and corresponding with companies that sanction Iranian users, in an attempt to take a step towards restoring the rights of Iranians. However, most of our requests were met with negative or unanswered responses from the sanctioning commercial brands. Therefore, the Internet Commission of the Tehran E-commerce Association has formed a legal task force with the goal of lifting sanctions on Iranian users from skill-building and practical websites, preparing for further actions.

The E-commerce Association has started negotiations with international lawyers in this regard and is working to defend the basic and human rights of the people of Iran to education and free access to information, either through negotiations with international organizations like OFAC, discussions with technology companies, or filing complaints in international courts.

Additionally, in statements from the Internet Commission of the Tehran E-commerce Association, we have worked to amplify the voice of Iranian citizens against international sanctions.

The article "An Alliance to Break Technological Monopolies" was published in Modern Diplomacy on December 25th.

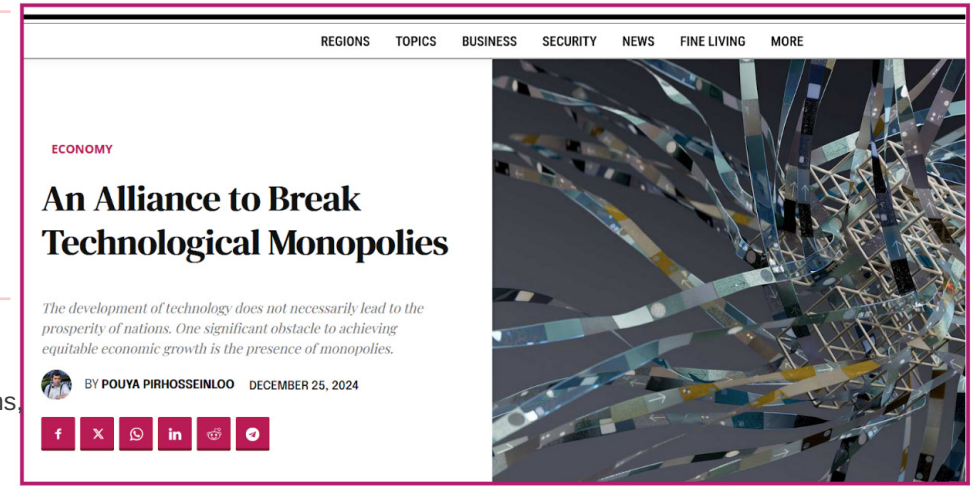
This article examines the formation of a global alliance aimed at combating technological monopolies and the restrictions resulting from sanctions. Key sections of the article address technological monopolies as a factor creating a gap in access between countries and marginalizing developing nations. It also explores technological alliances to counter these issues. The main points mentioned in this note are as follows:

1. Technological advancements and monopolies

Not only does technological advancement not inevitably lead to the well-being of people and a fairer distribution of wealth between countries and individuals, but it has often resulted in increased income inequality, widespread unemployment, and even poverty. Just as monopolies within a country lead to greater injustice and class divides, they also create a similar mechanism between different countries, where dominant nations, through both soft and hard monopolies, weaken and exploit developing nations.

2. The necessity of an alliance to break the monopoly chain

The formation of an alliance of countries and independent technology companies can break the monopoly of tech giants in the production and distribution of technology. Member companies of the BRICS+ alliance, given their economic capacities, populations, and potential markets, can play a role as a balancing force in the existing monopoly.



3. Establishing a permanent department for digital economy

The proposal presented in this article is to create a Digital Economy Department within BRICS+ aimed at supporting and providing both software and hardware infrastructure for startups and tech companies across member countries and BRICS partners. This department will function similarly to a large international innovation center and accelerator, with three main priorities for facilitation:

The first layer

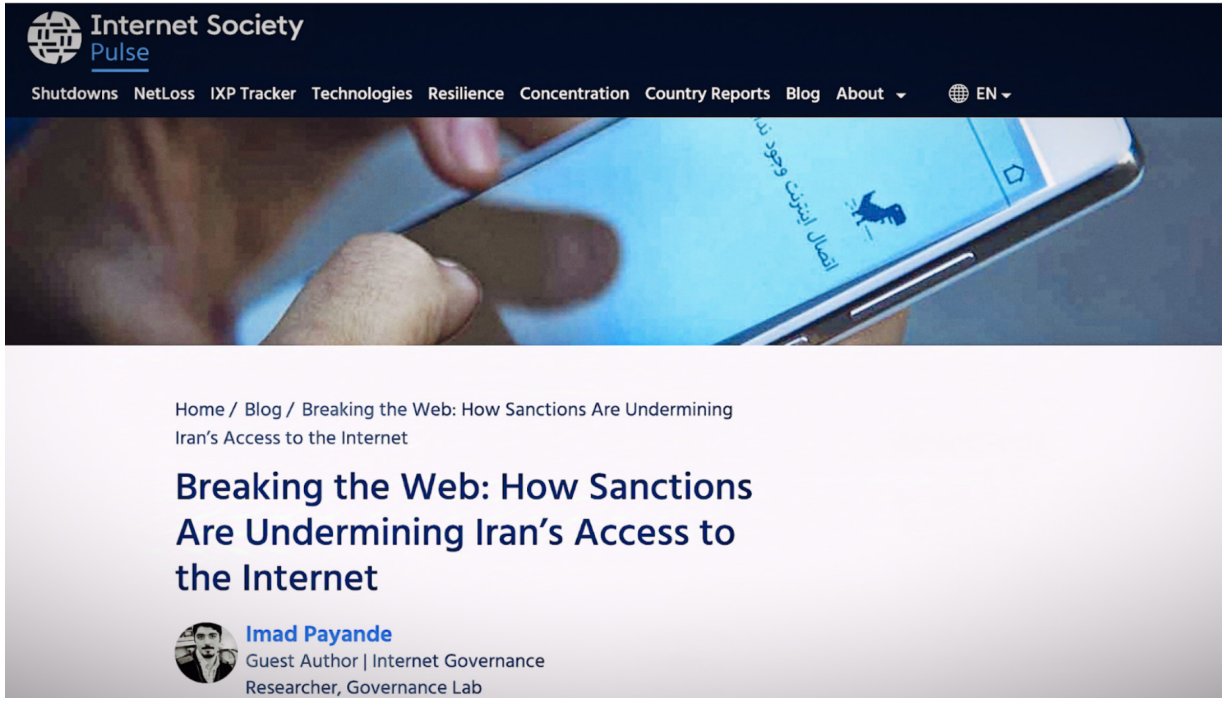
will focus on foundational regulation and soft infrastructure, including payment systems (BRICS PAY), financing (through NBD), unified data governance laws (similar to GDPR), preventing double taxation, a shared arbitration center, and more.

The second layer

will focus on shared technology infrastructure, including data centers, shared cloud infrastructure and artificial intelligence, as well as traffic exchange points and international traffic transit.

The third layer

will focus on facilitating and liberalizing the 3 billion-person market for all startups and tech companies across the BRICS+ region, as well as removing international trade restrictions.



Breaking the Web: How Sanctions Are Undermining Iran's Access to the Internet. (Published in November 2024).

- This analytical note addresses the unprecedented challenges faced by Iran's digital ecosystem due to internal restrictions and international sanctions.

- According to this note, "technological sanctions" in recent years have created significant technical barriers that have disrupted Iranian users' access to the internet and severely harmed developers, businesses, and ordinary users. The application of restrictive and destructive techniques such as DNS Spoofing has exacerbated this problem, making access to vital online services impossible even with the use of circumvention tools.

- Supporters of the sanctions often claim that technological sanctions do not affect civilian populations and ordinary users. However, evidence contradicting this claim has been proven. A list of 600 widely used websites blocked due to technological sanctions reveals the discriminatory nature and double standards of these restrictions; platforms such as GitHub, Amazon Web Services, and even educational and practical websites like ChatGPT are among the essential services that have been rendered inaccessible. Iranian users are forced to turn to insecure alternatives and unofficial, illicit digital marketplaces to access some of the basic and critical tools.

- At the same time, the financial burden of circumventing these restrictions has also placed additional pressure on users; for instance, the cost of VPNs ranges from $5 to $6 per month, which can sometimes be up to twice the average cost of $3 for mobile data in Iran.

Section Four: Domestic Regulations

Continuation of the Domestic Self-Filtering Policy In recent months (IRAN Access)

Report One **Summer 2024**	57 out of 100 government-reviewed websites from outside the country are not accessible. Additionally, we sent a letter to the country's internet gateways, asking them to prioritize lifting the Iran Access restrictions in their actions.
Report Two **Winter 2024**	In a discussion with officials from the AFTA company, it was clarified that there is no law mandating the permanent implementation of the Iran Access restriction. We also pointed out that this restriction serves as a tool for insecurity and the deterioration of the quality of the country's internet!
Report Three **Summer 2024**	In a meeting with the Secretary of the Supreme Council of Cyberspace, it was agreed that a list of proposed websites for lifting this restriction would be provided. Although 7 domains were removed from these restrictions, unfortunately, the process of this domestic self-filtering continues.

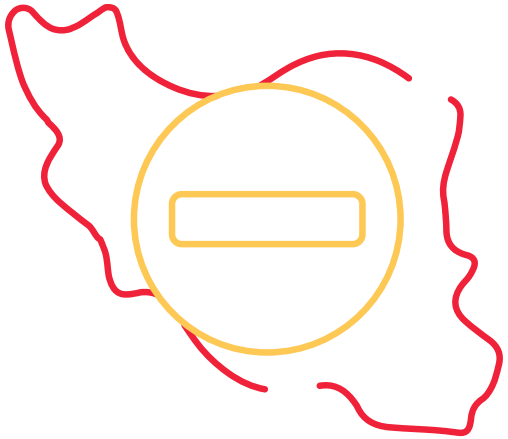
Stranger than filtering foreign websites is the filtering of domestic websites for users outside the country. Many Iranian government websites and banks are not accessible to international users. Important national websites, including those of the parliament, ministries, major organizations, Shaparak, and others, are unavailable to users outside of Iran! A key point in this regard is that since the publication of the third report, 13 more domains have been added to this list. In Appendix Five of this report, the names of these domains are listed along with their status over the past six months.

What have we done to lift the Iran Access restriction[12]?

Last summer, we sent official letters to all domestic companies and organizations that restricted access to foreign IPs, pointing out the consequences of this restrictive approach as a tool for undermining internet security and deteriorating internet quality.

In a meeting with the Secretary of the Supreme Council of Cyberspace, it was decided that we would provide a list of proposed websites to lift these restrictions. This list, which is included in Appendix Three of this report, was sent to the Supreme Council of Cyberspace. As of the publication of this report, 8 domains have been removed from the restriction list. However, unfortunately, after the regional events and cybersecurity threats over the past six months, 13 websites have been added to this list.

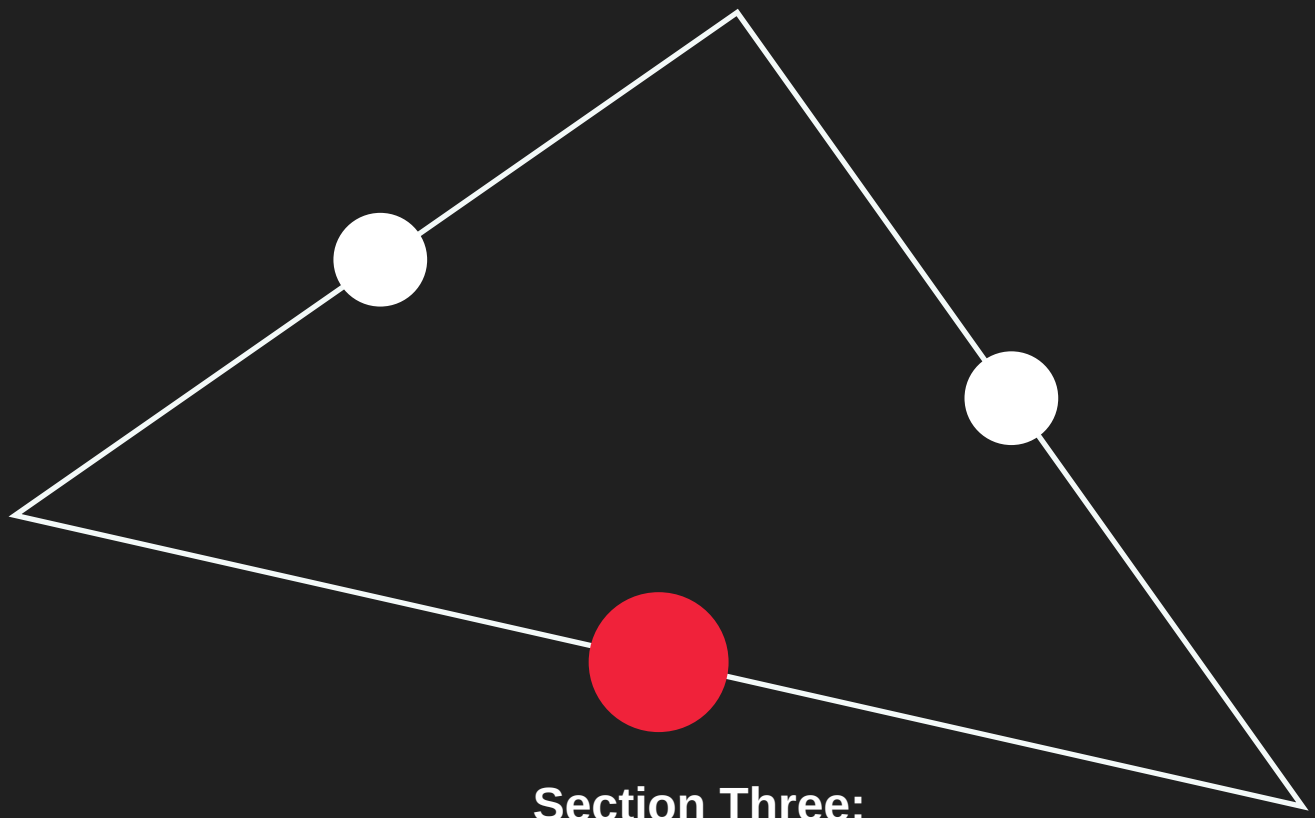
The E-commerce Association has repeatedly explained from a technical standpoint that this action not only does not help improve the security of domestic websites, but is itself a significant factor against internet security and the safety of users in the country.



Unfortunately, in the fall of 2024, the AFTA center repeatedly issued notices obliging businesses to implement Iran Access. The technical flaws of such decisions and their counterproductive and anti-security effects have been explained in previous reports. Therefore, it is expected that AFTA and other relevant government bodies refrain from such decisions or hold joint technical meetings with representatives from the private sector to thoroughly examine this issue from a technical perspective.

Although this issue has not been resolved yet, the Supreme Council of Cyberspace has promised to take effective action.
In the latest meeting of the E-commerce Association with representatives from the Ministry of Communications, a commitment was made to improve and resolve the issue, with a promise that at least government-controlled websites would be removed from the Iran Access restriction. The E-commerce Association will follow up on this matter in its next report and will publish the results.

12. The image of the letter sent is included in the "Actions of the E-commerce Association" section in previous reports.



Section Three:

Internet Speed in Iran

Internet Speed in Iran

Report One **Summer 2024**	The main reasons for slow internet speeds in Iran are the poor performance and inefficiency of the Iranian Telecommunications Company in the Access layer, reduced investment in telecom infrastructure, the slow development of 5G and fiber optics, and, ultimately, the weak and non-transparent performance of the Communications Infrastructure Company in the Core layer.
Report Two **Winter 2024**	According to evaluations, the Google Load speed has become three times slower over a 5-year period. Additionally, in the .meter net database, Iran is no longer among the top 100 countries.
Report Three **Summer 2024**	The biggest concern of the people is slow internet. The fiber optic development project has been one of the best actions of the 13th government, but the connection statistics are still not in a good state. In the transmission network and inter-operator communications, the situation is acceptable in the inter-provincial network. Technical experts from the country's operators stated: "Changes in the country's policies and the need to install governmental equipment in the internal network have led to increased costs and a reduction in development plans in other provinces of the country."

Access Layer (Access)

The disastrous status of outdated ADSL technology is the main issue in connecting users in the Access layer. In Iran, there are over 9 million ADSL connections, 70% of which have speeds under 10 Mbps, and more than 30% are connected to the local operator at speeds lower than 6 Mbps. Additionally, the limitations of this outdated technology have kept users' upload speeds consistently below 900 kbps. Therefore, it is clear to everyone that one of the government's main priorities should be the development of the Access network and the expansion of fiber optic connections. In its next report, the E-commerce Association will not only provide connection statistics but also aim to report in detail the actions and agreements made in this area. Although the implementation of the fiber optic project is generally complex, time-consuming, and requires extensive investment, unfortunately, municipalities in large cities, particularly the Tehran Municipality, have been the biggest obstacle to the expansion of this technology in the country in recent years.

Based on Speed Test: A Statistical Deception About Internet Speed in Iran! Or How 70% of Tehran's Internet Status is Generalized to the Entire Country?!

One of the statistical sources used to measure internet speed in Iran is the Ookla website (Speed Test application). The data from this platform is commonly used by domestic policymakers as a benchmark for evaluating the overall internet status in the country. However, closer scrutiny reveals that in the third quarter of this year, 70% of the data related to Iran in the Ookla database pertains only to the city of Tehran, and these data disproportionately represent fixed internet over mobile internet. This issue can lead to incorrect generalization of the results to the entire country.

The Ookla database evaluates internet speed (download, upload, etc.) based on multiple Speed Tests conducted by users, on a quarterly basis. These data are presented in the form of geographic tiles (Quadkey), where each tile represents a geographic square with central coordinates (lat/long). The average internet speed in each tile is calculated and reported based on the number of tests and categorized by the type of device (fixed internet or mobile). However, the precise geographic location of this data, broken down by provinces and regions of the country, is not available, which can complicate the analysis and interpretation of the data.

To more accurately assess internet speed in the provinces of Iran, all Quadkeys were converted to the locations of cities in the country using geographic coordinate mechanisms (lat/long). The data validation criterion for this analysis was the presence of at least 10 devices in each Quadkey over a three-month period. The results of these analyses are as follows:

Total number of devices in the data from the third quarter of the year.	Tehran city share	Related to fixed internet	Related to mobile internet
106,000 devices	77,000 devices (approximately 70%)	59,000 data points	46,000 data points

Province	Fixed	Mobile	Grand Total
Tehran Province	47,053	30,267	77320
Alborz Province	3,784	2,937	6,721
Razavi Khorasan	1,672	3,856	5,528
Isfahan Province	1,834	1,678	3,512
Fars Province	1,088	2,238	3,326
Khuzestan Province	639	1,269	1,908
Gilan Province	706	767	1,473
East Azarbaijan Province	624	678	1,302
Hormozgan Province	410	736	1,146
Qom Province	408	412	820
Mazandaran Province	136	377	513
Golestan Province	355	146	501
West Azarbaijan Province	148	256	404
Kerman Province	158	235	393
Bushehr Province	71	158	229
Sistan and Baluchestan Province		217	217
Yazd Province	134	76	210
Ardebil Province	58	48	106
Hamadan Province		100	100
Markazi Province	48	41	89
Kermanshah Province	21	61	82
Zanjan Province	45	32	77
Qazvin Province		70	70
Kurdistan Province		70	70
Lorestan Province	11	49	60
Semnan Province	20	25	45
Kohgiluye and Buyer ahmad Province		19	19
North Khorasan Province		11	11
Grand Total	59,423	46,829	106,252

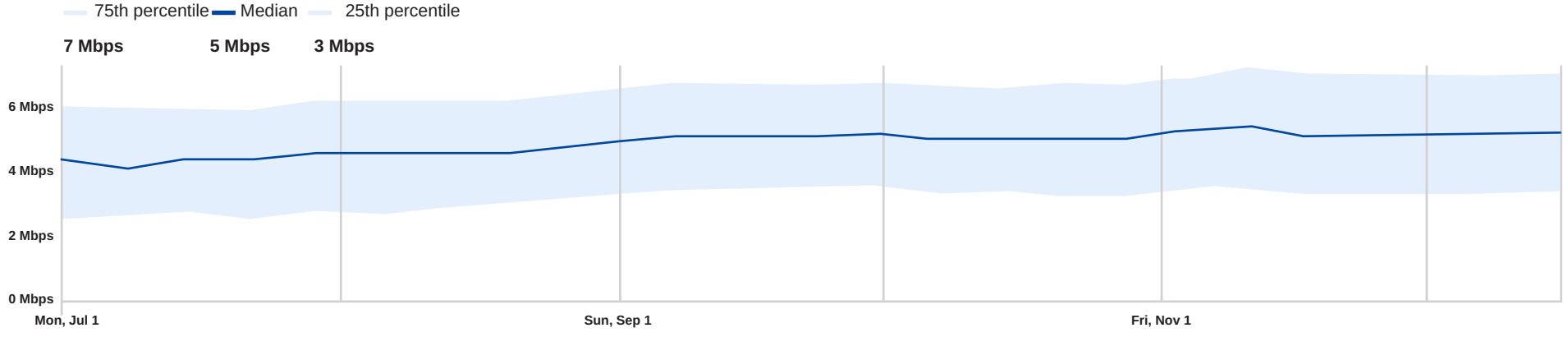
This significant concentration of data from the city of Tehran, especially compared to other provinces, shows that the majority of internet speed data in this database is limited to the capital. Additionally, while official statistics indicate that more than 70% of Iranian users' internet consumption is dedicated to mobile internet, the Ookla report shows a larger share related to fixed internet. This discrepancy suggests that the data recorded in Ookla does not fully reflect the behavior of Iranian internet users.

Furthermore, the analysis indicates that some provinces of the country lack data in this database. This geographical coverage gap means that the available data cannot accurately represent the internet speed status across the entire country.

In the first report, the E-commerce Association explained that the default Speedtest connection to local servers primarily reflects the speed of the Access layer, not overall internet speed. In this report, based on the analysis of Ookla’s data, the high concentration of data in Tehran and the disproportionate share of fixed internet compared to mobile further exacerbates the fundamental issue with this system, making it unsuitable as a comprehensive measure for evaluating the country's internet status.

Gateways and International Bandwidth

Unofficial reports indicate a minimum 15% increase in international bandwidth in recent months due to some reforms. The Caldefler report shows that over the past 6 months, the average speed for Iranian users has also seen a slight increase, rising from 4.5 Mbps to 5.4 Mbps.



We hope that this trend is not temporary and that its improvement accelerates. In the next report from the E-commerce Association, we expect to see an increase in Iran's ranking in the internet quality index.

Special Cases

The Status of the Digital Quality of Life Index: A Voluntary Status!

Iran ranks 95th out of 121 countries in the Digital Quality of Life Index

The Digital Quality of Life Index represents the well-being and digital quality of life in countries. The Digital Quality of Life Index is calculated annually by Surfshark, and its overall goal is to assess the online experience of users in different countries. The most important sub-indices examined in the annual Digital Quality of Life report are related to the affordability of the internet, internet quality, electronic infrastructure, security, and e-government.

In this report, the internet access index, the amount of time spent working to afford the cheapest internet in each country, and its impact have been examined. The internet quality index also evaluates factors such as internet speed, bandwidth, and more. According to this analysis, France, Finland, and Denmark are the top three countries. Iran ranks 95th in this analysis, following Pakistan and Nepal, with Ghana and Laos ranked just after Iran.

E-government (weighted)	E-security (weighted)	E-infrastructure (weighted)	Internet quality (weighted)	Internet affordability (weighted)	DQLI	DQL rank	Subregion	Region	Country
0.1761	0.189	0.1821	0.1135	0.1295	0.7902	1	Western Europe	Europe	France
0.1888	0.1904	0.1911	0.0917	0.0862	0.7483	2	Northern Europe	Europe	Finland
0.1852	0.189	0.1952	0.115	0.533	0.7377	3	Northern Europe	Europe	Denmark
0.1638	0.1959	0.1888	0.0856	0.1016	0.7357	4	Western Europe	Europe	Germany
0.1624	0.1699	0.1888	0.0888	0.1258	0.7357	5	Western Europe	Europe	Luxembourg
0.1647	0.1931	0.1758	0.1084	0.0812	0.7232	6	Southern Europe	Europe	Spain
0.1818	0.1986	0.1830	0.0187	0.0734	0.7185	7	Northern Europe	Europe	Estonia
0.1717	0.1904	0.1768	0.0712	0.1066	0.7166	8	Western Europe	Europe	Austria
0.1567	0.1594	0.1939	0.1097	0.0909	0.7106	9	Western Europe	Europe	Switzerland
0.1943	0.0953	0.1908	0.1157	0.1134	0.7096	10	South-eastern Asia	Asia	Singapore
..	..	…	…	…	…	…	…	…	…
0.0981	0.0755	0.1187	0.072	0.0099	0.3762	88	Sub-Saharan Africa	Africa	Nigeria
0.106	0.0392	0.1434	0.0535	0.0211	0.3632	89	Eastern Asia	Asia	Mongolia

E-government (weighted)	E-security (weighted)	E-infrastructure (weighted)	Internet quality (weighted)	Internet affordability (weighted)	DQLI	DQL rank	Subregion	Region	Country
0.0911	0.0556	0.1337	0.0726	0.0072	0.3603	90	Latin America and the Caribbean	North America	Trinidad and Tobago
0.0924	0.0638	0.1265	0.0671	0.0074	0.3572	91	Latin America and the Caribbean	North America	Jamaica
0.0786	0.0556	0.133	0.0629	0.023	0.3531	92	Northern Africa	Africa	Algeria
0.1035	0.0438	0.1041	0.0579	0.0433	0.3526	93	Southern Asia	Asia	Pakistan
0.0818	0.0501	0.1162	0.0644	0.0326	0.3451	94	Southern Asia	Asia	Nepal
0.0948	0.0151	0.1484	0.0543	0.0272	0.3397	95	Southern Asia	Asia	Iran
0.0963	0.0729	0.0943	0.0641	0.0122	0.3397	96	Sub-Saharan Africa	Africa	Ghana
0.0671	0.0392	0.1066	0.0656	0.0571	0.3355	97	South-eastern Asia	Asia	Laos
0.0943	0.1016	0.0749	0.0532	0.0081	0.3321	98	Sub-Saharan Africa	Africa	Benin
0.0896	0.0605	0.106	0.0512	0.023	0.3305	99	Sub-Saharan Africa	Africa	Senegal
0.0899	0.0329	0.1249	0.0547	0.0191	0.3215	100	Latin America and the Caribbean	South America	Bolivia
0.0828	0.026	0.1255	0.0701	0.0081	0.3126	101	Latin America and the Caribbean	North America	El Salvador
0.0787	0.0789	0.0946	0.032	0.028	0.3121	102	Sub-Saharan Africa	Africa	Zambia
0.0908	0.0729	0.0939	0.0452	0.0058	0.3085	103	Sub-Saharan Africa	Africa	Ivory Coast
0.0948	0.026	0.1053	0.0737	0.0082	0.3081	104	Latin America and the Caribbean	North America	Guatemala
0.0782	0.0164	0.129	0.0646	0.0184	0.3066	105	South-eastern Asia	Asia	Cambodia
0.0648	0.0301	0.1218	0.0699	0.0193	0.3059	106	Latin America and the Caribbean	South America	Venezuela
...	..	..	..	...	...	...	...	...	...
0.0726	0.0364	0.0955	0.0474	0.0045	0.2563	115	Sub-Saharan Africa	Africa	Zimbabwe

E-government (weighted)	E-security (weighted)	E-infrastructure (weighted)	Internet quality (weighted)	Internet affordability (weighted)	DQLI	DQL rank	Subregion	Region	Country
0.075	0.0342	0.0751	0.0445	0.0059	0.2347	116	Sub-Saharan Africa	Africa	Cameroon
0.0815	0.031	0.0737	0.0364	0.0091	0.2315	117	Central Asia	Asia	Tajikistan
0.0668	0.0342	0.0547	0.0382	0.0265	0.2205	118	Sub-Saharan Africa	Africa	Ethiopia
0.0619	0.0296	0.0554	0.0515	0.0174	0.2158	119	Sub-Saharan Africa	Africa	Mozambique
0.047	0.0255	0.0465	0.0379	0.0256	0.1824	120	Sub-Saharan Africa	Africa	Congo DR
0.0541	0.0082	0.0494	0.0284	0.0303	0.1705	121	Western Asia	Asia	Yemen

In the Cloud Global Ecosystem Index 2022, which is conducted by MIT and covers 76 countries, a similar ranking is repeated on a different scale. This report examines composite indicators related to the quality of internet infrastructure. Iran ranks 51st in the infrastructure component, 53rd in ecosystem adoption, and 71st in the security and assurance category. The overall score shows that despite Iran's relative advantage in talent and specialized human resources, it is ranked 51st, below the global average.

Interestingly, according to this report, which was prepared in 2022, part of the analysis focuses on human resources quality (in terms of innovation and mathematical indices, etc.), where Iranians rank 3rd in the world for talent and human affinity, after Germany and Singapore. When all these indices are considered together, it can be claimed that Iranian human resources, along with the country's technological infrastructure (policies), are in a state of inconsistency. In other words, Iranians are talented and capable citizens on a global scale, but due to policy deficiencies and restrictive laws, they cannot translate this ability into technological infrastructure, thus hindering technological justice and broader accessibility. Ultimately, this results in Iran falling behind developed countries in other digital quality indicators.

Appendices

Appendices-1

Methodology of the Report

The Google CrUX database aims to provide a realistic view of the internet user experience worldwide by collecting data from Google Chrome browsers across the globe. One of the main advantages of this database is that, due to its connection to the browser, it can accurately identify Iranian users and, even when the user employs various circumvention tools and VPNs, correctly determine the user's country. This allows it to effectively analyze the most commonly used websites and the final user experience in each country.
In this report, we extracted data for 5,000 high-traffic Iranian websites from April 2024 (Farvardin and Ordibehesht 1403) to early October 2024 (Aban 1403). In the first step, we examined how many of these websites had been used by Iranian users over the past 77 months. With this information, we were able to compare user experiences and show the fluctuations in internet quality over the past years. Ultimately, we were able to compare the experience of Iranian users in loading 400 high-traffic websites, which had been accessed in every month, over several years.

Google categorizes the connection speed and website loading performance for users into four quality levels:

	Maximum downlink	Minimum RTT	Title
Suitable internet for receiving low-volume content, such as text-only content	50Kbps	2000ms	Slow 2- g
Suitable internet for receiving small images	70Kbps	1400ms	2g
Suitable internet for receiving large content, including high-quality images, audio, and SD quality videos	700Kbps	270ms	3g
Suitable internet for receiving HD videos and video streaming	∞	0ms	4g

Methodological Note on CrUX

Google CrUX is a dataset that collects user feedback from various sources, including Google services such as the search engine, maps, and Google Play, as well as third-party apps and websites. The data is collected anonymously to provide insights into user experiences, pain points in user experience, and user preferences across different countries.

The advantages of using Google CrUX include its comprehensive coverage, large scale, and the ability to compare different countries and regions. Furthermore, because Google uses more than just the IP address to determine user locations, it provides more accurate results for evaluating user experiences in countries like Iran, where VPN usage is high.

However, there are also drawbacks and limitations to the methodology when using Google CrUX for user experience analysis. The most notable of these is "positive bias." Since the data used in this method is often biased towards users who are more active online, the results of CrUX-based analysis tend to overestimate performance and always represent the situation slightly better than it actually is.

13- According to Cloudflare Radar data, 90% of the browsers used in Iran are Chrome: https://radar.cloudflare.com/ir?dateRange=52w

Methodological Considerations of Speed Test Tools

Today, various tools and advancements are available to users for measuring internet speed and quality. These tools use different methods to measure indicators such as latency, download and upload speed, jitter, and other quality metrics of communication. Some of the most prominent user-centric tools in this field include Opensignal, Ookla Speedtest, and Cloudflare Speedtest.

Despite the widespread use of these tools, their results cannot fully and accurately assess internet quality on a national scale due to methodological limitations. For example, Ookla Speedtest mainly relies on point-based tests by users and is primarily limited to measuring connection speed to the nearest server. This method does not reflect real internet usage conditions, such as the impact of internal networks, filtering, or international limitations.

Below, we will outline some of these methodological considerations and explain why relying solely on Ookla Speedtest results cannot be considered a reliable measure for analyzing internet user experience on a larger scale, such as national policymaking or assessing communication quality at the country level.

The OpenSignal method involves collecting billions of daily tests from diverse panels and represents users who have consented to automatic data collection or participated in tests. The tests are conducted regularly in different locations and conditions, capturing both domestic and international experiences through Wi-Fi networks and mobile networks. OpenSignal provides a realistic and comprehensive view of the user experience (internet quality) by measuring network performance through connections to the most common and widely used internet endpoints, such as CDNs (e.g., Google, Akamai, and Amazon). This method ensures that the insights provided reflect real user conditions as closely as possible and are not influenced by network optimizations that target test traffic.

OpenSignal's focus on real-world conditions and user-centric metrics distinguishes it from other tools like SpeedTest. While Ookla fundamentally relies on user-initiated tests, often conducted under ideal scenarios, OpenSignal uses automated and periodic tests in diverse environments to better represent the typical user experience and continuously refine results, including scenarios with weak signals or tests conducted in indoor spaces. Additionally, OpenSignal prioritizes sustained speeds, or "goodput" — the successful delivery rate of data on the network, excluding retransmissions, errors, and network overheads — which are critical for real-world applications that users rely on today, such as video streaming and downloading large files. By eliminating distorting network optimizations that target test traffic and using precise classification methods, OpenSignal provides a more accurate and reliable picture of network performance.

Comparison of Two Indices

OpenSignal and CrUX are both tools designed to evaluate network performance and user experience, but they differ in their data collection methods, focus areas, and analytical applications.

Key Differences:

Data Scope:

OpenSignal focuses on mobile network performance, while CrUX measures the user experience of web pages on the Google Chrome browser.

OpenSignal :

OpenSignal relies on active tests conducted by users of its app, whereas CrUX collects passive (inactive) data from a subset of Google Chrome users.

User Base:

CrUX data is limited to users of the Chrome browser who have opted to share their data, and it is not representative of all internet users. However, according to a report from Yektanet (2024), more than 80% of web browsing experiences of Iranian users occur through the Chrome browser.

Focus Areas:

OpenSignal:

Measures metrics such as download/upload speed, latency , and signal strength, providing insights into network performance, quality, and mobile network coverage.

Google CrUX:

Focuses on user-centric performance metrics, including the core Google Web Vitals (LCP, CLS, INP), which are essential for evaluating the user experience on key and fundamental web pages.

Data Collection Method:

OpenSignal:

Utilizes a dedicated app installed by users to conduct speed tests and collect network performance data. This approach records real-world user experiences on various devices and locations.

Google CrUX:

Collects anonymous performance data from real users of the Chrome browser who have opted to share data. This dataset reflects user experiences on popular and functional websites, focusing on metrics such as loading time and interaction quality.

In summary, OpenSignal and Google CrUX provide valuable insights into different aspects of user experience. OpenSignal is one of the best options for evaluating mobile network performance, while CrUX offers a very accurate assessment of web page performance experienced by real Chrome users. Therefore, the first index is by no means representative of app experiences, and secondly, due to measuring popular websites, it is often subject to overestimation.

Methodological Considerations of the Digital Quality of Life (DQL) Index

The Digital Quality of Life (DQL) index by Surfshark ranks countries based on an evaluation of five key pillars: internet affordability, internet quality, electronic infrastructure, e-security, and e-government. This index uses reliable and well-known data sources such as ITU, the World Bank, Ookla, and the United Nations to provide a comprehensive view of digital well-being and quality of life worldwide.

- **Internet Affordability:** This pillar evaluates the costs individuals incur for purchasing typical mobile and fixed internet packages, based on the amount of time they need to work to earn that income.
- **Internet Quality:** This pillar assesses the speed and stability of the internet using Ookla's Speedtest database.
- **Electronic Infrastructure:** This pillar examines and monitors internet penetration and network readiness.
- **E-Security:** This pillar evaluates countries' cybersecurity readiness and data protection laws.
- **E-Government:** This pillar assesses the access to and quality of online public services, as well as digital literacy.

Overall, the Digital Quality of Life index highlights practical insights, successful international experiences, and areas for improvement in countries to create a better digital future with a human-centered approach.

Methodological Considerations of OONI

OONI's methodology for evaluating censorship (filtering) focuses on detecting website blockages through connectivity tests. This test assesses whether websites are accessible on the user's network or not and detects potential interference by comparing the network measurements obtained from the test with a set of control measurements collected from a location where no blocking is applied.

Testing Process, in Brief, for Each Selected Website:

DNS Lookup: Checks whether the website's domain resolves to the expected IP address, identifying DNS-based blocking.

TCP/IP Connection: Attempts to establish a network connection to the website's server to detect IP-based blocking.

HTTP Request: Sends an HTTP request to fetch the website content successfully and identifies potential blocking through HTTP headers or response codes.

For example, in October, approximately 2,300 domains from Iran (with at least 30 tests per month) were evaluated and assessed.

Analysis and Comparison:

The results are analyzed in real-time against control measurements (from networks without blocking) to determine whether any anomalies, such as timing, incorrect DNS responses, or content manipulation, are likely associated with blocking. As shown, the standard of 4 is not only not strict, but it is expected that, with today's technologies, all requests should load with an RTT (Round Trip Time) of less than 270ms and a speed of over 700kbps when there is no disruption or delay in the network. International reports also indicate that in the top 50 countries, more than 94% of communications are categorized in the same manner and as 4 Density.

As a result, given the widespread use of technology, communications classified as 3 can be considered as indicating potential slowness or disruption, and those classified as 2 or 2-slow can be considered as experiencing slow or severe disruption.

As shown in the report's images, over the past six years, about 80% of Iranian users' connections related to viewing high-quality, high-traffic websites (4G Density). A tangible decline occurred in September 2022, and although there has been gradual growth since then, it still has not reached its peak from September 2022.

Appendix 2

100 Domains Analyzed in OONI for Cross-Country Comparison

www.youtube.com	www.unwomen.org	www.linkedin.com	www.nytimes.com	messages.google.com
www.google.com	www.ran.org	www.gnupg.org	surfshark.com	www.tumblr.com
signal.org	www.clubhouse.com	www.brookings.edu	help.unhcr.org	www.pinterest.com
www.whatsapp.com	www.cato.org	www.article19.org	www.theguardian.com	mail.yahoo.com
telegram.org	www.bbc.com	www.apple.com	www.starlink.com	letsencrypt.org
www.wechat.com	github.com	tinder.com	www.messenger.com	duckduckgo.com
www.snapchat.com	www.hrw.org	riseup.net	nypost.com	www.twitch.tv
en.wikipedia.org	www.dw.com	freedomhouse.org	news.google.com	www.netflix.com
blogmarks.net	plus.im	creativecommons.org	cdnjs.cloudflare.com	video.google.com
www.un.org	gpgtools.org	www.skype.com	www.ftchinese.com	login.live.com
download.cnet.com	triller.co	www.gnu.org	telegra.ph	discord.com
bsky.app	ooni.org	www.economist.com	imo.im	www.slideshare.net
www.unfpa.org	mega.nz	www.cbsnews.com	dns.google	www.flickr.com
www.netaddress.com	hrlibrary.umn.edu	substack.com	dl.google.com	www.baidu.com
mastodon.social	groups.google.com	sputnikglobe.com	cdn.jsdelivr.net	www.ask.com
x.com	wikileaks.org	speedify.com	www.openstreetmap.org	www.bing.com
adium.im	weibo.com	disqus.com	www.mediafire.com	translate.google.com
www.wordreference.com	vk.com	cyber.harvard.edu	www.dailymotion.com	docs.github.com
www.edf.org	www.tiktok.com	cloudflare–dns.com	app.slack.com	play.google.com
foursquare.com	www.quora.com	www.opendns.com	transparencyreport.google.com	irna.ir

Appendix 3

List of Countries Compared Based on Highest Gross Domestic Product (GDP)

GDP RANK	Country	GDP RANK	Country	GDP RANK	Country	GDP RANK	Country
1	United States	26	Cuba	51	Portugal	76	Tanzania
2	China	27	Ireland	52	New Zealand	77	Sri Lanka
3	Japan	28	Israel	53	Peru	78	Ghana
4	Germany	29	United Arab Emirates	54	Qatar	79	Belarus
5	India	30	Thailand	55	Kazakhstan	80	Uruguay
6	United Kingdom	31	Venezuela, RB	56	Greece	81	Croatia
7	France	32	Nigeria	57	Algeria	82	Lithuania
8	Russian Federation	33	Egypt, Arab Rep.	58	Kuwait	83	Cote d'Ivoire
9	Canada	34	Austria	59	Hungary	84	Costa Rica
10	Italy	35	Singapore	60	Ukraine	85	Serbia
11	Brazil	36	Bangladesh	61	Morocco	86	Slovenia
12	Australia	37	Vietnam	62	Ethiopia	87	Myanmar
13	Korea, Rep.	38	Malaysia	63	Slovak Republic	88	Congo, Dem. Rep.
14	Mexico	39	South Africa	64	Ecuador	89	Sudan
15	Spain	40	Philippines	65	Oman	90	Jordan
16	Indonesia	41	Denmark	66	Dominican Republic	91	Tunisia
17	Saudi Arabia	42	Iran, Islamic Rep.	67	Puerto Rico	92	Libya
18	Netherlands	43	Pakistan	68	Kenya	93	Turkmenistan
19	Turkiye	44	Hong Kong SAR, China	69	Angola	94	Uganda
20	Switzerland	45	Colombia	70	Guatemala	95	Bahrain
21	Poland	46	Romania	71	Bulgaria	96	Cameroon
22	Argentina	47	Chile	72	Luxembourg	97	Bolivia
23	Sweden	48	Czechia	73	Uzbekistan	98	Paraguay
24	Norway	49	Finland	74	Azerbaijan	99	Latvia
25	Belgium	50	Iraq	75	Panama	100	Nepal

Appendix 4

List of Some Important Websites That Have Blocked Access for Iranian Users:

GDP RANK	Country	Country
1	Android Developers	https://developer.android.com
2	Visual Studio Installer	https://visualstudio.microsoft.com
3	Chat GPT	https://www.chat.openai.com
4	Coursera	https://www.coursera.org
5	Google cloud	https://cloud.google.com
6	Google Developers	https://developers.google.com
7	Firebase	https://firebase.google.com
8	Spotify DE	https://www.spotify.com
9	CentOS Repositories	https://mirror.centos.org
10	BootStrap	https://www.bootstrapcdn.com
11	CodeCanyon	https://codecanyon.net
12	Elsevier	https://www.elsevier.com
13	Google Lens	https://lens.google
14	Envato	https://www.envato.com
15	CloudEra	https://www.cloudera.com
16	GtMetrix	https://gtmetrix.com
17	Openai	https://www.openai.com
18	Google Analytics	https://analytics.google.com
19	JetBrains	https://www.jetbrains.com
20	Googleplay console	https://play.google.com/console/developer
21	Figma	https://www.figma.com
22	Clamav	https://www.clamav.net
23	Google Earth	https://earth.google.com
24	Bytes	https://bytes.com
25	Cadence	https://www.cadence.com

GDP RANK	Country	Country
26	Docker	https://www.docker.com
27	BugSnag	https://www.bugsnag.com
28	Nvidia experience	https://www.nvidia.com
29	Microsoft Download	https://www.microsoft.com/en-us/download
30	MathWorks	https://www.mathworks.com
31	Google Research	https://www.research.google.com
32	Adobe	https://adobe.com
33	Android Studio	https://developer.android.com/studio
34	ItPro	https://www.itpro.tv
35	HuggingFace	https://huggingface.co
36	MaxCDN	https://cp.maxcdn.com
37	Unity	https://unity.com
38	StudyTogether	https://www.studytogether.com
39	Freepik	https://www.freepik.com
40	MySQL	https://www.mysql.com
41	MyFonts	https://www.myfonts.com
42	Qualcomm	https://www.qualcomm.com
43	Zoom	https://zoom.us
44	Artstation	https://www.artstation.com
45	Udemy	https://www.udemy.com
46	Google services	https://code.earthengine.google.com
47	Kaggle	https://www.kaggle.com
48	Pearson	https://www.pearson.com
49	Google Remotedesktop	https://www.remotedesktop.google.com
50	Ubuntu	https://ubuntu.com

GDP RANK	Country	Country
51	Gitlab	https://about.gitlab.com
52	InfoWorld	https://www.infoworld.com
53	Apple developer	https://developer.apple.com
54	Unreal Engine	https://www.unrealengine.com
55	Google Code	https://code.google.com
56	GoDoc	https://godoc.org
57	unsplash	https://unsplash.com
58	Elastic	https://www.elastic.co
59	Expo	https://expo.dev
60	Ebay	https://www.ebay.com
61	JitPack	https://jitpack.io
62	KhanAcademy	https://www.khanacademy.org
63	Krisp.ai	https://krisp.ai
64	Codeium	https://www.codeium.com
65	GraphicRiver	https://graphicriver.net
66	GoAnimate	https://goanimate.com
67	Google tag manager	https://tagmanager.google.com
68	Simple Note	https://simplenote.com
69	Realm	https://realm.io
70	Grafana	https://grafana.com
71	Melpa	https://melpa.org
72	Gradle	https://gradle.org
73	SpiceWorks	https://www.spiceworks.com
74	MouseFlow	https://mouseflow.com
75	Api Codeium	https://www.api.codeium.com

GDP RANK	Country	Country
76	Virtual Box	https://www.virtualbox.org
77	Remini	https://www.remini.ai
78	PhpStorm	https://www.jetbrains.com/phpstorm
79	Tensorflow	https://www.tensorflow.org
80	Maven	https://maven.apache.org
81	inshot	https://inshot.cc
82	TeamViewer	https://www.teamviewer.com
83	PhotoDune	https://photodune.net
84	MatLabExpo	https://www.matlabexpo.com
85	GrAvatar	https://gravatar.com
86	DemandBase	https://www.demandbase.com
87	Java	https://www.java.com
88	NXP	https://www.nxp.com
89	Tenable	https://www.tenable.com
90	Flaticon	https://www.flaticon.com
91	Oracle	https://www.oracle.com
92	HP	https://www.hp.com/us-en/home.html
93	NetBeans	https://netbeans.apache.org
94	GrabCad	https://grabcad.com
95	Asus	https://www.asus.com/us
96	GSK	https://www.gsk.com
97	PerKins	https://www.perkins.com
98	Intel	https://www.intel.com
99	Vmware	https://www.vmware.com
100	SolarWinds	https://www.solarwinds.com

GDP RANK	Country	Country
101	Cisco	https://www.cisco.com
102	Rstudio	https://www.rstudio.com
103	SketchFab	https://sketchfab.com
104	Mongodb	https://www.mongodb.com
105	TeamTreeHouse	https://teamtreehouse.com
106	HashiCorp	https://www.hashicorp.com
107	Asus Rog	https://www.asus.com
108	MixPanel	https://mixpanel.com
109	Paessler	https://www.paessler.com/
110	Renesas	https://www.renesas.com
111	MSC Software	https://mscsoftware.com
112	SourceForge	https://www.sourceforge.net
113	tinyjpg	https://tinyjpg.com
114	3d Ocean	https:// 3docean.net
115	Amd Radeon	https://www.amd.com
116	RedHat	https://www.redhat.com/en
117	Trello	https://www.trello.com
118	Flurry	https://flurry.com
119	Themeforest	https://www.themeforest.net
120	MailGun	https://www.mailgun.com
121	ResellerClub	https://www.resellerclub.com
122	Lenovo	https://www.lenovo.com
123	Amazon Prime	https://www.amazon.com
124	Twilio	https://www.twilio.com
125	Training Sap	https://training.sap.com/

GDP RANK	Country	Country
126	Dribbble	https://www.dribbble.com
127	VideoHive	https://videohive.net
128	NuGet	https://www.nuget.org
129	Slack	https://api.slack.com
130	invisionapp	https://www.invisionapp.com
131	Ti	https://ti.com
132	NewRelic	https://newrelic.com
133	Turbo squid	https://www.turbosquid.com
134	Webex	https://www.webex.com
135	Mcafee	https://www.mcafee.com
136	simplilearn	https://www.simplilearn.com
137	IIS app platform	https://www.microsoft.com/web/downloads/platform.aspx
138	Instructure	https://www.instructure.com
139	Sygic	https://www.sygic.com
140	Spring	https://spring.io
141	Analog	https://analog.com
142	GFI	https://www.gfi.com
143	Ansible	https://www.ansible.com
144	Sketch	https://sketch.com
145	IDT DNA	https://www.idtdna.com
146	SendGrid	https://sendgrid.com
147	seleniumhq	https://www.selenium.dev
148	salesforce	https://www.salesforce.com
149	Sartorius	https://www.sartorius.com
150	Jquery Code	https://www.jquery.com

GDP RANK	Country	Country
151	Weebly	https://www.weebly.com
152	IBM	https://www.ibm.com
153	SigmaAldrich	https://www.sigmaaldrich.com
154	Pixel Squid	https://www.pixelsquid.com
155	PackAgist	https://packagist.org
156	Mbed	https://os.mbed.com
157	Data Camp	https://www.datacamp.com
158	OverLeaf	https://www.overleaf.com
159	ATI Radeon	https://ati.com
160	AcousticJava	https://acousticjava.com
161	Voicemod	https://www.voicemod.net
162	Arcgis Online	https://www.arcgis.com/home
163	Stripe	https://stripe.com
164	Toggl	https://toggl.com
165	Sophos	https://sophos.com
166	Apache	https://apache.org
167	Videvo	https://www.videvo.net
168	Atlassian	https://www.atlassian.com
169	Parsec	https://parsec.app
170	Vuforia	https://developer.vuforia.com
171	Audio Jungle	https://audiojungle.net
172	GCD API	https://cloud.google.com/api/datastorage
173	Schema	https://www.schema.org
174	burst shopify	https://burst.shopify.com
175	foodiesfeed	https://www.foodiesfeed.com

GDP RANK	Country	Country
176	Veritas	https://www.veritas.com
177	ThermoFisher	https://www.thermofisher.com
178	Vagrantup	https://www.vagrantup.com
179	Bintray	https://bintray.com
180	Merck millipore	https://www.merckmillipore.com
181	Rjx hobby	https://www.rjxhobby.com
182	Epidemic Sound	https://www.epidemicsound.com
183	SyncFusion	https://www.syncfusion.com
184	MAAS	https://maas.io
185	BMC	https://bmc.com
186	BackTory	https://backtory.com
187	Warkiani Lab	https://www.warkianilab.com
188	artgrid	https://artgrid.io
189	artlist	https://artlist.io
190	analytics.moz	https://analytics.moz.com
191	miro	https://miro.com
192	openhub	https://www.openhub.net
193	Pagespeed	https://pagespeed.web.dev
194	redis	https://redis.io
195	wandb	https://wandb.ai
196	Click House	https://clickhouse.com
197	opensea	https://www.opensea.io
198	tutsplus	https://tutsplus.com
199	teachable	https://www.teachable.com/
200	plotly	https://plotly.com

Appendix 5

Websites (Among the Top 300 Websites in Iran) Facing Access Restrictions from Abroad (Iran Access).

shaparak.ir	gsi.ir	sampad.gov.ir	niopdc.ir	medu.ir
isti.ir	intamedia.ir	ict.gov.ir	cra.ir	ssaa.ir
behdasht.gov.ir	cra.ir	caa.gov.ir	irica.gov.ir	epolice.ir
imidro.gov.ir	nioc.ir	mcls.gov.ir	postbank.ir	ntsw.ir
mcth.ir	nigc.ir	anaj.ir	intamedia.ir	setadiran.ir
nlai.ir	tedan.ir	spsco.ir	sanjeshp.ir	site.samandehi.ir
inif.ir	seo.ir	refah.swf.ir	esata.ir	cbi.ir
iranair.ir	intamedia.ir	cc.saipayadak.org	bazresi.ir	codal.ir
	bim.ir	farhang.gov.ir	dotic.ir	mrud.ir
	rcs.ir	parliran.ir	tavanir.org.ir	farhang.gov.ir
	mrud.ir	pmo.ir	rmto.ir	majlis.ir
	foia.farhang.gov.ir	rai.ir	airport.ir	moj.gov.ir
	audit.org.ir	parliran.ir	divan-edalat.ir	sanjesh.org
	ikco.ir	esalecar.ir	ikcopress.ir	ihio.gov.ir
	bmi.ir	tehran.ir	mosharekatha.ir	bank-maskan.ir
	tamin.ir	ibto.ir	tehran.medu.gov.ir	irica.ir
	tax.gov.ir	post.ir	tpww.ir	eadl.ir
	enamad.ir	msrt.ir	karaj.ir	mporg.ir
	tci.ir	medu.ir	medu.gov.ir	icana.ir
		imeo.ir	maj.ir	iranianasnaf.ir
		nlho.ir	gilan.ir	rahvar120.ir

tobank.ir
sasanhospital.com
bipc.ir
iranfoia.ir
moi.ir
imo.org.ir
tic.ir
edu.iau.ac.ir
iranemp.ir
marooffestival.ir
cinemaorg.ir
imaroof.ir
honarazmoon.ir

	value			rank				
Country	bandwidth	dns	latency	bandwidth	dns	latency	avg	Rank
Iran, Islamic Rep.	4	80	151	50	49	50	50	50
Kenya	6	80	113	46	49	48	48	49
Kazakhstan	6	69	106	46	48	47	47	48
Venezuela, RB	7	65	85	43	47	43	44	46
Saudi Arabia	7	55	91	43	45	46	45	47
Bangladesh	8	55	80	42	45	42	43	45
Russian Federation	10	52	89	39	41	45	42	44
India	10	52	66	39	41	40	40	43
Jordan	7	42	75	43	34	41	39	42
Iraq	6	35	86	46	23	44	38	39
China	5	21	141	49	1	49	33	34
Indonesia	10	48	53	39	39	39	39	41
Colombia	14	53	51	34	43	37	38	40
Mexico	13	45	50	35	37	36	36	36
Paraguay	12	46	48	38	38	35	37	38
Turkiye	13	44	52	35	35	38	36	36
Vietnam	13	44	44	35	35	32	34	35
Poland	15	40	45	32	31	34	32	33
South Africa	15	37	44	32	26	32	30	32
Brazil	16	39	42	29	28	31	29	31
Philippines	16	39	40	29	28	29	29	30
Thailand	19	40	38	27	31	26	28	29
Greece	16	39	37	29	28	25	27	27
Uruguay	20	48	30	23	39	21	28	28
Italy	17	36	40	28	24	29	27	26
Malaysia	20	37	38	23	26	26	25	24
United States	23	41	35	20	33	24	26	25
Lithuania	20	33	39	23	20	28	24	23

Appendix 6

Speed Report Update - Cloudflare

In the first and second reports, our primary reference for speed comparison was the Cloudflare Radar report. Since Cloudflare does not have a POP in Iran, it was not the ideal reference for comparing speed between Iran and other countries, but it was the best available reference for cross-country comparisons. In this report, by replacing CrUX reports, we have used Cloudflare data only for comparison and analysis of other data used.

Previous Reports

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تجارت
الکترونیک
تهران
TEHRAN

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