Internet Quality in Iran

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

The 4th Report - Winter 2025

Tehran E-Commerce Association



Sunk Cost of Filtering: Blistered Feet that Prevent Us from Returning to the Wrong Path!

Preface

Perhaps hearing the statement "Iran is at the bottom of the world's internet quality table" has become a repeated phrase of the last two years and every issue of the "Internet Quality in Iran". But it should be repeated that the quality of Iran's internet compared to the previous report this summer has not significantly changed and is still in a dangerous situation. As a result of the continuation of domestic restrictive policies, unilateral foreign sanctions and widespread problems in the Access network, the Internet user experience in Iran continues to be slow (1), disrupted (2) (91 out of 100) and limited/ censored (3) (99). of 100)can be characterized. Overall, based on this data, Iran ranks 95th among 100 countries in terms of internet quality.

Although upgrading the network infrastructure and expanding the Access layer is not possible in the short term, but revising the restrictive policies is considered the most urgent and effective measure to improve the quality of the Internet in the country. Extensive filtering, creating intentional disruptions to prevent the activity of filter breakers, weakening emerging protocols such as HTTP/3, and network pollution is the result of these restrictions. The concern is aggravated when, despite the positive comments of the heads of the three powers regarding the cancellation of the restrictions, after three months, the Supreme Council of Cyber Space has not yet approved to improve the current situation; A long and erosive process that has disappointed many citizens from improving the situation and implementing reforms.

For a long time, experts and scientific centers had warned about the heavy and irreparable losses of continuing the existing situation; A warning that is often heard these days in the speeches of officials and government bodies, and its huge damages are pointed out from different dimensions. If earlier only the high usage statistics over 84% of users of filter breakers (VPNs) were relevant, now according to the report of the Tehran Electronic Commerce Association, we are facing a shocking growth in the purchase and use of satellite internet. If the quality of the Internet in Iran does not improve and evolve, despite the innovative solutions in the field of access, it will soon witness the imposition of severe restrictions on the free flow of technology. As the graphs show, there will be a fundamental change in the field of communication. The country's policy makers must accept that the use of Starlink service in Iran has increased significantly in recent months and the number of its users has exceeded tens of thousands of people.

- 1- Speed: High bandwidth and low latency when loading websites or internet content. Speed measures how quickly data transfers between servers and users. Higher bandwidth allows more data to flow simultaneously, while lower latency means faster response times. Together, they determine the overall user experience when browsing websites or streaming content.
- 2- Disruption: it means the filtering of internet domains and IPs and is one of the main reasons for the inefficiency of the internet in a geographical area. These restrictions on Iran, in addition to domestic censorship, are the result of some inhumane international policies that have made internet access for Iranians a tool of sanctions.
- 3- Censorship: It means high bandwidth and low latency in loading a website or internet content. This index is one of the drivers of the emergence and spread of new technologies in the digital economy.

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Increasing Usage of Starlink Satellite Internet by Users in Iran

Examining the current situation indicates that the domestic policymakers, who have been acting in line with the foreign sanctioners by imposing restrictions on the free internet, are now facing a huge change in technology. Although the ineffectiveness and costliness of these restrictions and sanctions have been revealed, from now on, with new developments in the field of technology, it will be impossible to continue the wrong path of the past. Especially with the spread of the next generation of satellite internet, which allows direct connection of mobile phones to the Internet without the need for separate equipment (Cell to Direct), the rate of adaptation of users to these new technologies will accelerate significantly. As a result, traditional Internet access restrictions will lose their effectiveness more than ever. With the expansion of this technology, policy makers will no longer be able to maintain the previous restrictions without clear and justified reasons and without accompanying public opinion.

When the most of experts and even officials say that restrictive policies are useless, apparently the only obstacle to reopening Cost Sunk is returning from previous decisions regarding filtering. We still hope that by making brave decisions and removing policies that cause disruption in the country's network, hope will return to the digital economy and the people of the country, who are all users of the digital world, if we believe that there is no time left to lose.

This report examines the quality of Iran's Internet in the summer and autumn seasons of 2024. As a result, unbanning "WhatsApp" and "Google Play", as well as the reopening of some communication protocols, have not been investigated at the beginning of January 2025.

Immediately after this decision of the Supreme Council of Cyber Space, The Tehran E-Commerce Association welcomed this decision and announced that it will continue its active efforts to achieve 'free and high-quality Internet for all Iranians'



CrUX Effective Connection Type

Still Among the Worst Countries in Free Internet Access! (4)

In this report, we analyzed and compared the latest data from *OONI and Google CrUX databases in the three indicators of disruption, censorship, and speed of free access to the Internet, and to be sure, we compared the information with other databases such as Arvancloud Radar and Cloudflare. As in the third report, we considered the number of countries surveyed as 100 countries with the highest GDP, and by analyzing and comparing countries in the Google CrUX database, we can obtain much more reliable data regarding slowness, probability, and speed. In this report, in the limitation section of the ranking of 28 countries, due to the lack of a sufficient statistical population, we removed them and extended their scores in the speed and disruption section to the overall report.

As it is clear from the graph below, the green status (or the G4 Density index) has improved slightly in recent months and has reached 68%, but we are still far from the global standard and ensuring that at least 90 to 95% of the user experience with High quality happens, the distance is impressive.

Also, in relation to the GDensity2slow situation, which we saw a significant increase after September 2022, we see a slight improvement, but we still haven>t returned to the previous point.

By removing the filtered websites from the reviewed list, we will have a 5% improvement and reach the 75% index in October 2024.

* OONI (Open Observatory of Network Interference) is a global platform that monitors internet censorship, while Google CrUX (Chrome User Experience Report) provides real-world data on website performance. These complementary data sources allow us to evaluate both connectivity restrictions and actual user experience.

4- We put the evaluation time of countries' ranking at the end of November 2024. But in the separate parts of each part (disruption, censorship, and speed), we considered the last six months (after

4 the publication of the third Internet report)

20%

5- Open Observatory of Network Interference



CrUX Effective Connection Type IR Top 400 Origin - 202208 to 202410

To better understand these graphs, we should compare it with other countries with the highest production. For comparison, we compared Iran among 100 gross national countries in terms of loading experience of 5000 most visited websites. Meanwhile, we used the first 100 domains (based on Tranco ranking) which were the same between these countries as a basis for comparison. In the next step, although filtered and sanctioned sites are also counted as part of the Iranian user experience, we removed these websites in the ranking for the benefit of Iran and reached the following comparison:





CrUX ECT - Average of 4GDensity 100 Origin in 100 Country (2024-10)

As can be seen in the picture, it is located in 45 countries with an average communication quality of 95% and in 67 countries with an average communication quality index of 90% with Density 4g quality, and for example, in Malaysia, this number is equal to 95%.



In another survey and to clarify the experience of connection quality in Iran, we compared the average density quality of two widely used online taxi services and online retail services in Iran compared to Turkey and the UAE. In the first comparison, it was found that 77% of Snapp and Tapsi users in Iran were able to view these websites with 4g Density quality, while UAE citizens view this country's online taxi (Careem) with 92% Density 4g. In another example about online stores, 81% of Iranian citizens see Digikala with 4g Density quality, and its similar service in Turkey (Trendyol) can be seen for citizens of Turkey with 97% in this index. It is necessary to remember that in the third report, we had compared the quality of the Internet for watching Aparat in Iran with YouTube in Turkey, and the results were like these results.

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| # | 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 information, we added the OONI information to our comparison, so that we can include the censorship/limitation variable in the final ranking in addition to speed and disruptions. As mentioned in the first part, Iran and China were at the top of this table with the most filtered domains. Among the 100 countries examined, 4 countries had no statistical sample, 22 countries had a minimal statistical sample, and other countries had a significant statistical sample. Among these, 54 countries did not have any filtered websites from this statistical sample of 100. Finally, by combining this table with the findings obtained from CrUX data, we reached the final ranking.

Key Positive and Negative Developments Affecting Iran's Internet Quality in the Past 6 Months

Transparency system for monitoring attacks DDoS

The Promise of Unbanning Fixing Disruptions of IPv6

The Promise! Unbanning

Reopening of Transparency system of Tehran-IX

What causes the news of the removal of internet filtering from Iran to be interpreted in two ways (good and bad) is the determination of the government to show its opposition to filtering on the one hand and the laxity and slowness of Iranian politicians in making decisions and implementing it. As if the Iranian politicians (in any level of legislation that has the application of restrictions on its agenda) can easily apply restrictive policies and take slow and slow steps to fix them in time and adjust! He has been convicted and removed from his position, he can filter Telegram overnight, but the heads of all three branches of the legislature, the executive and the judiciary cannot filter even one social network! What is this well and what is this stone that no one can overcome! In addition to the important issue of filtering, we should also mention other changes in the state of the country's Internet. Obtaining the procedure of transparency with the return of the Tehran-IX system and the creation of a new online monitoring system for DDoS attacks and... Also, solving problems on IPv6, which has increased its use in the country, is another important event that can be considered as the right steps for the future.

In the previous reports, we used to show a complicated picture in order to legally determine which part of the internet quality each device and organization is responsible for in Iran. The President has the power to chair the Iran National Supreme Security Council, the Supreme Council of Cyber Space, the power to appoint the Secretary of the Supreme Council of Cyber Space, appoint 6 members out of 12 members of the working group to determine criminal cases, etc., and has the most authority and control to improve the quality of the Internet in the country. And he should be responsible for this more than any other person.

Who Should Be Responsible for Internet Quality?

In this issue of the Internet Quality Report in Iran, it seems that we should avoid re-examining this issue and focus public opinion on the decisions of the Supreme Council of Cyberspace. Although the media have published speculations about the votes for and against the approval of the filter removal policies, in the latest statement, Mohammad Amin Aghamiri, the secretary of the Supreme Council of the Cyberspace of the country, denied voting in this regard. When we put it together with the hopes of the Ministry of Communications to remove the restrictions, it makes us still hopeful but worried about the events of this council's winter season. Perhaps this decision should be called one of the most important decisions of the Supreme Council of Cyberspace since its establishment and affecting the lives of millions of Iranians. As a result of the public and transparent communication of the council members' opinions, we consider transparency in expressing the options and proposals put forward and finally the detailed negotiations to be the right of the Iranian people.





نامه سرائشاده انجمن تجارت الكثرونيك تهران ینگیری وعددهای رسس جمهور و اقدامات فوری برای افزایش کیفیت اینترنت در ایران

وزير محثرم ارتباطات و فناورى اطلاعات

همانطور که استحضار دارید، انجمن تجارت الکترونیک تهران به نمایندگی گروهی از استارتابیها و شرکتهای بزرگ فناوری کشور تلاش می کند تا با گزارشدهی شفاف و مطالبه گری فعال، به افزایش کیفیت اینترنت در ایران به عنوان و **بشهی افتصاد** دىچىتال كېك كند

بدين منظور كميسيون تخصصي اينترنت و زيرساخت ذيل اين لجمن با ماموريت ارايدي تصوير روشن از كبقيت ابتنوقت در ایران در سه محور اختلال، محدودیت و سرعت شکل گرفته است. این کمیسیون با تاکید بر شفاقیت دربارهی وضعیت کیفیت اینترنت و سپس مطالبه گری 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 عرصه ی داخلی (قیلترینگ، اختلالها، مشکلات زیرساخت و …) و در عرصدهای بینالمللی (تحریم) مطالبه گریهای فعالی داشته باشيم

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

- ایران در بین ۱۰۰ کشور برتر جهان (از نظر اقتصادی)، بنترین جایگاه در تسترسی 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 قدرصد است.
- نمايندگان فنى ايراتورها اعتقاد دارند تجهيزات فيلترينگ موثرترين عامل در كاهش كيفيت اينترنت كشور و جدىترين مائع توسعه شبكه است.



پوشش ۵٫۷ 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.

یبرو 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 سخن گوی 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 فعالاته برای اصلاح ساختار فیلترینگ و کاهش محدودیتهای اینترنت
 - ۲-رفع انحصار شرکت ارتباطات زیرساخت و توسعه پرسرعت اینترنت
 - ۲- تقویت دیپلماسی بین المللی و تلاش برای رفع تحریمهای بین المللی

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 ساماندهای غیرفعال شده در دولت سیزدهم)» بدون نیاز به هیچ زیرساختی، با تصمیماتی شجاعانه و در لحظه امکانپذیر خواهد بود.

بهعلاوه، با توجه به اینکه شماره ی چهارم الزارش 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 نویتند ملوک اندرین سینج سرای

کنون که نوبت توست ای «ستار» به عدل گرای

نيما قاضى رييس هيات مديره الجمن تجارت الكترونيك تهران **Active Efforts and Transparent Reporting** to the Public: Opposing Sanctions, Filtering and Monopolization

In the third report, we presented our requests to the president, the spokesperson of the headquarters of Mr. Masoud Pezeshkian, on the day of the presentation of the third report about the quality of the Internet, promised that these demands will be followed up by the president and his government. In an open letter to the Minister of Communications, Tehran Electronic Commerce Association reminded these issues and followed up and demanded various issues in meetings with the Ministry of Communications. The cases of which important parts have been examined more closely in this report.

جناب أقاى سيد ستار هاشمى



From Natural Disasters to Out-Of-Control Technical **Disasters**

In the last six months, most outages or technical problems can be divided into three categories. Disruptions due to incidents in international links, DDoS attacks, and finally sporadic urban outages related to power outages. In the following, we will further examine DDoS attacks and outages related to power outages.



The First Part;

Cross-Sectional Disruptions

1.1 INTERRUPTION DUE TO INTERRUPTION OF INTERNATIONAL LINKS:

Two important disruptions in the fall of 2024 were due to the disconnection of international links on 15 November and 4 December, the dimensions and details of which were determined by the CEO of the Communications Infrastructure Company. It is obvious that increasing the capacity of the infrastructure communication company can improve the resilience of the country against out-of-control events and incidents.

Interruption of international links on the Friday, European route to the volume of 3 Tbps, equivalent to about 28% of the country>s November 15 internet capacity

Interruption of international links to the amount of 4 Tbps, equivalent to about 37% of the country's internet capacity

Wednesday, **December 4**

"Arvankald radar shows the increase of disruption on the country's Internet on December 4 from 15:15 to 17:30"

1.2 Massive DdoS Attacks Are One of The Causes Of Technical Disruptions In The Fall



The country's network is under distributed denial of service (DDoS) attacks for various reasons. As mentioned in the third report of the Tehran Electronic Commerce Association, these attacks have increased significantly since the beginning of this year and have caused great damage to the quality of the country's Internet. Organized attacks by governments with the aim of damaging the infrastructure of other countries, commercial competition between companies and operators, and finally increasing the country's internet pollution due to widespread filtering and as a result the widespread use of insecure filter breakers are among the most important reasons for the spread of these attacks.

In a positive development, the Communications Infrastructure Company has unveiled a transparency system for monitoring DDoS attacks at http://tic.ir. According to data from this system, DDoS attacks have increased to up to 315 Gbps this year—potentially twice as high as previously reported, according to the infrastructure company's own performance metrics.

As discussed in detail in the third report, increasing the capacity of the country's international links and improving the architecture and capacity to deal with DDoS attacks in the network of the Infrastructure Communications Company, which exclusively controls the connection of domestic and international operators, is the most important of these measures.

DDoS (Distributed Denial of Service) attacks attempt to disrupt normal traffic by overwhelming servers with a flood of internet traffic. The 315 Gbps figure represents a significant volume of attack traffic that can severely impact network infrastructure. Such attacks are particularly challenging for Iran's internet ecosystem due to the limited redundancy in its international connectivity points.

Reports show that Iran is not the only target of DDoS attacks, and Nodes, or in simpler words, equipment connected to the Internet used by Iranian people, have been misused by hackers to carry out DDoS attacks abroad. Cloudflare data shows that in the last six months, DDoS attacks from Iran have also increased, and the largest number of such attacks was recorded on November 25. One of the most important reasons for the increase in these attacks from Iran is extensive filtering and the result is the widespread use of free filters and the increase in network pollution. Many citizens' mobile phones are abused

Application layer attack volume in Iran

Layer 7 attack volume trends over time from the selected location or ASN



by hackers through the installation of free filter breakers, and at a certain time, with the command of the command center, At the same time, they start sending requests to the victim.

This issue not only increases the pollution of the country's Internet network and the systematic blocking of Iranian IPs in many defense systems, but on the other hand, it causes an explosive increase in bandwidth consumption and the emptying of users' Internet packages. An issue that is more prevalent in relation to citizens with older age and less knowledge than the internet space and causes economic costs. This issue has been discussed in more technical details and based on valid international reviews in the following sections.

1.3 Mobile Internet Crisis During Power Outages

. Internet crisis in Iran is like other crises. Years of indifference towards gas, electricity and water shortages in the country and covering up the air pollution that can be seen with the naked eye have turned into unsolvable situations. Accumulation of debts that have been swept under the carpet suddenly become soldiers and fall on the people of the country like an avalanche. One of these issues that became apparent with the power outage in the fall of 2024 was the interruption or reduction of mobile internet speed due to power outages in different parts of the country.

In simple terms, mobile users connect to the nearest BTS to connect to the network. These BTSs should be able to continue working through UPS batteries during power outages. However, as the government has announced, due to the wear and tear or "inefficiency of the power storage equipment", after every power cut, the connection of mobile networks of users depending on the time of power storage in UPS batteries is disrupted, and even the antenna of mobile phones is disconnected in some cases. they become in this way; we once again enter the closed loop of the economic model of development in the country. Sanctions, reducing people's purchasing power and general policies including filtering will reduce the income of operators, increase costs, and shrink the telecom economy in the country, as a result, telecommunications companies cannot afford to invest in replacing and renewing batteries or, better to say, upgrading the network in general. As a result, the quality of the Internet is damaged with any incident. In the 12th government, the Ministry of Communications published a clear report on the status of UPS batteries, separating the operators and provinces of the country. It is suggested that the Ministry of Communications, by updating this report, should clarify the country's latest situation in this field and announce the schedule for reforming and improving this vital infrastructure.





| | Rightel | Irancell | Communication Company of Iran | Subject |
|----|---------|----------|----------------------------------|--------------------------------|
| | 2539 | 14.490 | 28.159 | Single sites |
| | 1397 | 1380 | 586 | Hub sites |
| | 3241 | 8.951 | 16.264 | Sites with healthy battery |
| | 182 | 3.556 | 10.279 | Sites with bad battery |
| | 417 | 330 | 2.202 | Centers with diesel generators |
| :b | 22 | 1.983 | 1.761 | Stolen sites without battery |

Hamrah-e

. . . .

Tejarat News ,2021 29th Status Report of Country's Ups Batteries On June

The Second Part Disruptions and Delays

Disruptions And Delays in The Last Three Reports

| In this report, we discussed the dangerous internet crisis in the country. At that time, some domains and IPs were whitelisted (allowed to access) and other domains were graylisted and faced with intentional disruption. After the publication of the first report and the presentation of technical evidence, this process was stopped and one of the biggest risks of the country's Internet was removed. | The First Report; Summer 2023 |
|---|-----------------------------------|
| The state of disruptions during the review period of this report had several major causes: technical problem in the network of the Infrastructure Communications Company, disruption of access from outside the country to the interior, nationwide disruption and fire in Tehran's regional reservoirs, and 2.5 terabytes of the country's internet capacity cut off, etc. We reported on the peak of Internet disruptions at 20:00 to 23:00 every day due to the saturation of filtering equipment. | The Second Report, Winter 2024 |
| In the third report, we discussed more about the problems on the biggest CDNs in the world. The investigated cases included: out time error on Fastly, connection error on Akamai, upload limit error on Cloudflare, error up to 6 times slower than HTTP/2 on HTTP/3, error on UDP protocol in global providers. | The Third Report; Summer 2024 |



HTTP/3: Implementation Challenges in Iran

From the first report, we paid attention to the importance of HTTP/3 and showed how its widespread disruption will cause a lot of costs and the loss of a great opportunity to improve the quality of the Internet in the country. After the first report, the disturbances reported on Cloudflare were resolved and the graphs showed that the use of this protocol in the country has increased significantly in less than a few days, but the disturbance remained on the network of some global service providers. In the new investigations that were done for HTTP/3, we saw multiple behaviors of Internet servers. At this stage, 5 CDN services that support HTTP/3 were selected and successive tests were performed on the domains that receive services from them.

After examining the results that can be seen in the summary table above, the following can be mentioned:

requests abroad were accompanied by complete disruption

In Irancell network, all HTTP/3 • In Hamrah-e Aval (Mobile •HTTP/3 requests to the AWS server Communication Company of Iran), the requests related to the two Cloudflare and Fastly servers had occasional disruptions, but at other times there were no problems.

were completely disrupted.

HTTP/3 represents a major evolution in web protocols, using QUIC (Quick UDP Internet Connections) instead of TCP. This enables faster connections, reduced latency, and improved performance 19 on unreliable networks. However, Iran's network infrastructure struggles with UDP-based protocols due to filtering mechanisms designed for TCP traffic, resulting in performance degradation instead of improvement when using this newer technology.

GLOBAL TRAFFIC HTTP/3 INCREASE TO 33% OF TOTAL WORLD TRAFFIC



As mentioned, the benefits of this protocol were discussed in detail in previous reports. Today, according to w3tech, more than 33% of all Internet traffic is HTTP version 3, and more than 95% of browsers support this protocol. The nature of this protocol's use of the UDP model will help Iran's Internet, which has extensive weaknesses, especially in the access layer, to improve the user experience quickly. According to Cloudflare's statistics, only 1.4% of the traffic in Iran last year was on this protocol, which can be predicted considering the above tables and the widespread disruptions of this protocol in Iran.

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

Economic Losses Caused by The Disruption of HTTP/3: Calculation of The Economic Damages of HTTP Disruption for A Hypothetical Retail Store; 730 Billion Tomans Per Year



To check the amount of damage caused by a disruption to the HTTP/3 protocol, we used a hypothetical business as a benchmark and calculated the types of variables that are affected by this index:

Research, including the Akamai report, shows that a delay of 100 milliseconds in loading time can cause a 7% decrease in conversion rate. For example, Akamai reports that a delay of 100 milliseconds in load time can reduce conversion rates by 7%, and a delay of 2 seconds can increase bounce/abandonment rates by 103%. Also, based on global data, HTTP/3 can improve page load time by 20-40% compared to HTTP/2 in typical web environments.

In this section, we are trying to explain the economic and

development benefits of the application and remove the complete limitations of the new protocols, and provide an estimate of the direct damages of applying any restrictions on these vital protocols. Undoubtedly, the damage caused by the restriction of new protocols on the country's digital ecosystem and the quality of users' experience is not limited to the following, and this simplification of the influencing factors has been done only to facilitate calculations. Slower loading times weaken the user experience, which may result in companies losing customers. Even a second delay can reduce the conversion rate.)6(.

In situations where it is not possible to fully use the capacity of new protocols, companies are forced to use alternative solutions or other technologies, which impose additional costs on them.

Attrition And Customer Abandonment:

Investing In Infrastructure: Impact On Business Operations and Costs

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

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

Increase In Operational Costs:

Consumer Experience and Costs

Using older protocols increases data usage and costs, especially when Higher Data Usage: mobile data is expensive.

Iranian users do not benefit from the benefits of HTTP/3 such as delay reduction and face more loading time and buffering (7)problems.

As global companies move to HTTP/3, Iranian business users have problems accessing these efficient services **Limited access to global** services:

6- The conversion rate is a measure that shows the percentage of people or visitors to a website who become potential customers in each period. For example, if your goal is for visitors to fill out a certain form, the conversion rate shows the percentage of people who have done so.

7- Buffering problem occurs when the device or program cannot download or process data (usually audio or video) fast enough to play and run it smoothly and continuously. This problem leads to interruption, pause or Interruption in the user's playback experience.

Loss Of Opportunities for Growth and Innovation

compared to international competitors, Iranian companies are in a weaker position due to their dependence on old infrastructure and the ban on technology companies, which can exacerbate this situation by imposing restrictions on new communication protocols.

International Competitiveness: Restricting the use of HTTP/3 hinders the use and adoption of advanced technologies, especially in areas such as online games, video streaming, and IoT services.

Innovation Speed Breaker:

Examples of the impact of HTTP/3 on different platforms

| Longer loading times lead to abandoned shopping carts and reduced | E-commerce: | platforms such as Netflix and YouTube use HTTP/3, which reduces latency | Streaming services: |
|---|---------------|---|-----------------------------------|
| sales | | and improves user experience. Continuing to apply some restrictions on | |
| | | HTTP/3 can cause Iranian users to face buffering problems and lower | |
| | | quality. | |
| Improving page loading speed can improve website rankings in search engines and significantly reduce marketing costs. | SEO Benefits: | Delays in receiving real-time information can lead to missed opportunities or improper execution of transactions. | Real-Time Financial Platforms: |

By reducing seconds in loading time, it can increase the conversion rate between 20 and 40% and increase the daily income of user-generated content and streaming platforms, online retail, fintech and the like by several times. increase a hundred million Tomans per month.

Calculating the economic damage of disruption on HTTP/3 on a hypothetical retail store;

730 Billion Tomans Per Year

Quantifying economic damages caused by internet filtering or disruption is a key step in understanding the effects of this problem on the country's digital economy. First, let's see what damages an online retailer sees from not being compatible and the existence of HTTP/3 disturbances:

| A) Damage Caused by More Loading Time | |
|--|--|
| | |
| B)Income Opportunities with Http/3 | |
| C) The Potential of | |
| Saving and Improving | |
| Profitability | |
| | |

By improving page loading speed, the ranking of this startup company in Google results will be better, which means more organic traffic and less need for paid advertising.

Note: Economic impact analysis of internet restrictions should consider three dimensions: (1) Direct costs to businesses through lost revenue and inefficiencies, (2) Indirect costs through slower innovation and reduced competitive capacity, and (3) Opportunity costs from unrealized digital growth and deterred investment. This comprehensive framework allows for more accurate assessment of both short and long-term economic consequences. Based on this index, we analyzed the performance of this hypothetical retail store, focusing on the HTTP/3 index. The results show that the use of the new generation of HTTP/3 protocol, which has been intentionally disrupted in the country, can increase the daily income of this business by two billion tomans; A figure that reaches 730 billion Tomans annually. These numbers show the potential capacities that can help the flourishing of the digital economy by removing the obstacles.

| Indicator | (2HTTP/) current value | (3/Potential value (HTTP | Difference | |
|-------------------------|------------------------|--------------------------|--------------|--|
| Page load time | .Sec 2.5 | .Sec 1.5 | +%40 | |
| Conversion rate | %2 | %2.4 | %20 | |
| Abandoned shopping cart | Up | %10 Down | Improvement | |
| daily income | Billion 10 | Billion 12 | Billion 2+ | Summary table of the economic effects of using new protocols |
| Annual income | Billion 3650 | Billion 4380 | Billion 730+ | (damage caused by disruption in HTTP/3) |



In general, Iran's internet restrictions can be classified into four levels: "complete or controlled internet cutoff", "filtering", "sanctions" and "internal regulations", and in the following, each of them will be addressed separately.

Internet Restriction Status in The Last Three Reports

33% of the top hundred websites (selected for the best ranking on similarweb) are filters. Social networks are still in full fliritation.The First Report,
Summer 2023:Iran has the highest absolute blackout of the Internet in the world. Also, 49% of the 100 most used Iranian websites are filtered.The Second Report,
Winter 2024:Iran has the highest absolute blackout of the Internet in the world. Also, 49% of the 100 most used Iranian websites are filtering on IP instead of
Imiting the range. As a result, other domains that use this IP, or its future users after the transfer, will remain in the filter list. Social
networks are still in full fliritation.The Second Report,
Winter 2024:According to CruX Google data, 730 websites are directly filtered out of the 5000 most used Iranian websites and their main
and omains are resolved to filtering IPs. Also, this number should be aggregated next to domains that are filtered due to CDN. The
use of filter breakers by Iranians has tripled, and this means imposing an annual cost of at least 5 thousand billion tomans on
Iranian citizens!The Third Report,
Summer 2024:

Internet Restrictions in Iran;

The first part

Complete, Regional or Controlled Shutdown Of The Internet

A complete or controlled shutdown of the Internet refers to the events that the country's Internet is completely or partially disconnected by command. The events related to the presidential elections of 2019, the events of November 2019, the 2020 regional blackouts in Khuzestan, the regional blackouts in September 2022, etc. are included in this category. In the past 6 months, we have not had an absolute blackout in the country.



Second Part Filtering

We checked 100 origin internet domains using the OONI database. Then, we benchmarked the domains that had the most coverage among these countries. The result was that in November of this year, the number of domains with filtering or interference above 50% did not change significantly compared to the same period last year. Findings about restricted websites show that some of these domains comply with the general rules of criminal content examples (such as phishing, pornography, etc.), but a significant share of highly visited functional websites (such as news-information, social networks, entertainment websites, and even Skilled domains are also filters that together these websites include a significant share of the daily needs of Iranians. In general, this situation can be a symbol of the inefficiency of the structure and function. Filtering in the country is known to deprive citizens of access to useful information, which is the obvious result of the policies that have placed Iran at the top of the countries without free access to the Internet.



Social Networks Are Still Fully Restricted!

| | Country | f | y | | Õ | 1 | \bigcirc |
|---|--------------|---|---|---|---|---|---------------------------------|
| | China | * | * | * | * | * | * |
| ١ | Turkmenistan | * | * | * | * | * | * |
| | Iran | * | * | * | * | * | Unfiltered since Winter ۲০۲۵ |
| ۲ | Uzbekistan | * | - | * | * | * | - |
| ٣ | Ginea | * | - | - | - | * | * |
| ۴ | Ethiopia | * | - | * | - | * | - |
| ۵ | Myanmar | * | * | - | * | - | * |
| ۶ | Russia | * | * | - | * | - | - |
| γ | Yemen | - | - | * | - | - | - |

Twitter, Instagram, Telegram, Facebook, YouTube, and Twitch social networks are still filtered in Iran, and from this point of view, Iran, along with China and Turkmenistan, is at the top of the countries with maximum restrictions on social networks. In the analytical statistics published in the first half of this year, the Surfshark website examined 29 countries involved in Internet censorship, according to which Iran was among the countries with the worst free access to social networks. In our review, we used the OONI database, which operates in order to monitor the state of interference and censorship in different countries, as a benchmark for these indicators. In general, it was found that Iranian citizens' access to mass media platforms is much more limited than other countries in the world, next to China. Of course, in the second week of January 2025, the WhatsApp social network was removed from the filter.

8- As mentioned in the introduction of the report, this report examines the summer and autumn periods of 2024 which is before the removal of WhatsApp and Google Play filters.

Supporting Domestic Businesses Against Filtering and Restrictions



While the Electronic Commerce Association advocates for the removal of filtering and a comprehensive review of the extensive and irrational policies that create restrictions in the country, we think that we should simultaneously follow this demand and other demands in different dimensions with the aim of "improving the quality of the Internet in Iran". With this aim, in expert meetings with the secretary and vice-chairs of the Supreme Council of Cyber Space and the Electronic Commerce Association, the need to support domestic businesses as well as international businesses on which domestic small businesses are highly dependent was raised and the points raised were welcomed by this council. After that, expert meetings were held inside this association and after the review of the legal teams, the proposal of this association was sent to this council for consideration on November 17, 2024. In the following, we will have the image of this letter and the provisions of the proposed law.

Explanatory Introduction

Considering the importance of supporting virtual businesses and Internet platforms and preventing damage caused by the decisions of various institutions, including regulators of various sectors, and increasing predictability in the economy and in line with the protection of public rights (paragraph 14 of the third article of the Constitution) and The right to a fair trial (Principle 74 of the Constitution), maintaining the sanctity of the principle of innocence (Principle 37 of the Constitution), supporting the expansion of the Persian language and other native languages common in Iran (Principle 15th of the Constitution (and in order to complete the objectives of the Law on Publishing and Free Access to Information approved, 2019, this resolution is for the purpose of systematizing the application of any order to block the domain address or Internet IP or imposing restrictions such as sealing the physical location and closing the payment gateway of these businesses, for approval It is suggested to the Supreme Council of Cyberspace.

Draft proposal for legal approval in the Supreme Council of Cyberspace with the aim of supporting Iranian businesses and creating transparency in the application of blocking IPs, domains, and cyberspace platforms.

First Part - Transparency in Applying Restrictions and The Process of Issuing An Order to Block Ips or Internet Domains

1- The working group for determining examples of criminal content is obliged to provide the possibility of online inquiry of blocked internet domains and IPs in an internet system within a period of three months from this resolution. In the process of this inquiry, the state of blocking or non-blocking, the legal document, and the judicial order as the basis for blocking and the criminal content that caused the order to be issued (the type of criminal content and its documentation) and the date of the order should be specified.

2- The owner of the domain name and IP and the associations, unions, and trade organizations active in the field of virtual businesses can submit a request to remove the blocking to the working group. The working group is obliged to deal with this request within 10 working days. If the request to remove the blocking is not accepted, the aforementioned persons can complain about the decision of the working group to the Court of Administrative Justice. The court is obliged to assign special branches to speed up the handling of these complaints.

3- The working group is obliged to create an electronic system to provide the possibility of registering citizens' objections to the blocking of domain addresses or Internet IP addresses. If at least 10,000 citizens object to the blocking, the working group is obliged to review the matter again and publish the decision and its reasons. The executive regulations of this paragraph will be prepared by the Minister of Justice and will be approved by the head of the judiciary.

4- In order to prevent the violation of the rights of users and virtual businesses that have a legal license to operate from competent authorities (including the Union of Virtual Businesses, the Computer Trade Union Organization of the country and the like), block the entire platform or IP or the relevant internet domain, in case of violation or publication of criminal content, it is prohibited without sending at least 2 written warnings at least 72 hours before blocking.

5- Regarding the domain address or Internet IP of virtual businesses that have more than one hundred thousand registered users, or foreign platforms with more than one million registered Iranian users (or more than 100 Gbps daily peak traffic), issuing any blocking order without confirmation in the case of the Supreme Council, virtual space is prohibited

6- Sealing the place of activity and physical offices of virtual businesses with more than a hundred thousand users is prohibited without the approval of the Supreme Council of Cyberspace. In necessary and urgent cases, it is necessary for the judicial officer executing the order to inform the head of the National Center of Cyberspace and after applying the restriction within a maximum period of 24 hours, the reasons, and solutions to solve the issue and remedy the violation in meetings with the presence of the legal representative of the said business and the representative of the National Center for Virtual Space should be checked

7- In order to support businesses that provide data center and cloud services and create equal conditions with foreign companies that provide similar services, the blocking decision by the working group to determine instances of criminal content should only block access to the offending website or platform without prohibiting the provision of other hosting services. be limited to that. In special and necessary cases, it is necessary to issue a separate judicial order for other restrictions.

The Second Part - Maintaining the Rights of Businesses in The Regulatory Processes of The Electronic Trust Symbol (E-Namad/ ENAMAD)

8- The e-commerce development center is obliged to inform the holder of this information along with legal documents and the reasons for this action at least 7 working days before canceling or suspending this virtual business, and provide the possibility of correcting or solving the notification problems.

9- Any blocking of IP or domain, cancellation or suspension of this website or closing the banking portal of virtual businesses with more than a hundred thousand users is prohibited without the approval of Iran Supreme Council of Cyber Space.

In the third report on internet quality in Iran, we examined the effects of filtering policies and demonstrated that these policies have cultural and economic implications that go far beyond a simple decision. Ordinary citizens and private businesses have been forced to use virtual private networks (VPN) due to unreasonable and extensive restrictions, which has caused irreparable damage in the country from all sides.

The paid filter breakers (VPNs) create serious security and political challenges. For example, according to News Mint, Israel is engaged in user

| kaspersky daily | M | Account ~ |
|--|--------|-----------|
| Products v Renew Downloads Support Blog v Secure Futures | | |
| D botnets | | ۹ |
| | | |
| How using free VPNs could la in a botnet | nd you | L |

data collection and espionage operations by investing in some of the largest VPN providers. This is a direct threat to the privacy and security of users. On the other hand, free VPNs cannot be a suitable solution for users due to technical and security problems. Kaspersky's research has shown that many free VPNs are infected with malware that can seriously compromise users' sensitive information.

Investigating The Filter-Breaking Mafia: Analyzing the Consequences of The Filtering Policy In Iran

INVESTIGATIONS ANALYSES CARTOONS PORCASES VIEWS POLIAGUAGE SUPPORTURY INTERCE CALARISTICAL CARTONICS OF CONTROL YOUR VPN



Is There a Phenomenon Called Filter Breaking Mafia in Iran?

The evidence and analysis show that the possibility of the existence of organized networks related to the VPN industry in Iran is not ruled out. However, what is certain is that the filtering policy has created a flawed, opaque, and ambiguous platform for the growth of such phenomena. If we assume that such a mafia exists in the country, the best and most stable solution to reduce dependence on VPN and solve the social problems caused by them is to review the filtering policies and cancel the restrictions imposed on social networks that are widely used, so that it is clear about the desirability of using filter breakers. And the amount of real demand for these tools is working. This action can serve as a key step to protect users' privacy, strengthen digital businesses, and prevent illegal exploitation.

Starlink Is Closer to People Than What You See...

| 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 |

various brands and competitors around the world are preparing the world for a big change

The country's internet problems can be categorized into different parts, but as mentioned in the editorial of this issue, the biggest role in the current critical situation is internal filtering, the lack of development of the Access network, and foreign sanctions. Filtering, in addition to creating Limitation in access has become one of the main factors of sustained slowness, network instability and a serious obstacle in the path of increasing the speed and development of the Internet in the country. On the other hand, technology experts have repeatedly emphasized that it is technically impossible to completely block filter breakers, and with the tightening of restrictions, the filter breaker algorithms are becoming more and more complex and can simulate user behavior, standard protocols such as HTTP, and even browsers' fingerprints; As a result, it becomes more difficult to track and block them. Surveys show that the use of filter breakers among Iranian users has greatly increased; According to percent of Internet users use a filter breaker. Similarly, Datak data shows 83.6, the ISPA report more, 2024 to March 2022 that after a temporary drop in the use of Instagram in September of users returned to this platform. These statistics indicate that users' resistance to %90 than internet restrictions continues and any attempt to block widely will bring significant technical .and social challenges

But the new surprise that we discussed in the editorial is the rapid increase in the use of satellite internet users. Although many people know it with the famous brand Starlink, but its

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





In a report published in December 2024, the prestigious Forbes magazine estimated the number of Iranian Starlink users to be more than 20,000. Meanwhile, the report of the Electronic Commerce Association shows that the number of Starlink users in Iran should be more than 30,000 people. The ratio of a few tens of thousands of people to Iran's population of 89 million people may seem low, but when we put it next to the speed of its expansion, we realize that we are facing a phenomenon that will be a serious technological paradigm shift. In the two graphs below, we have analyzed the number of requests and traffic of users who use Starlink in a large statistical sample in order to determine its exponential growth trend during 2024. Put this issue next to the Cell To Direct technology, which is going to be publicly available soon and will connect mobile phone users to high-speed satellite Internet without the need for any equipment or receiver. According to Forbes, although the purchase price of Starlink equipment is around 250 dollars, Iranians buy it for 700 to 2000 thousand dollars due to the embargo and the illegality of buying and selling this equipment.

Note: Starlink's growing adoption in Iran represents a significant shift toward satellite-based internet access that bypasses traditional infrastructure limitations. This trend is particularly notable for three reasons: (1) It indicates users' willingness to invest in alternative access methods despite high costs, (2) It demonstrates the limitations of current filtering approaches, and (3) It foreshadows further disruption with the upcoming Cell-to-Direct technology that will enable mobile phones to connect directly to satellites without additional equipment.

Special Case:

YouTube Filtering

The state of filtering in different platforms that was mentioned in recent reports is still in effect.

| Extensive and unjustified restrictions such as Google Play filtering and phishing of Iranian users were mentioned. Google's filtering | Second report file, Google |
|--|----------------------------|
| has stopped the automatic updating of applications on millions of mobile phones, tablets, and smart TVs, making them insecure | Play: |
| and vulnerable to users. Also, automatically sending billions of requests from Android phones to Google Play and leaving it | |
| unanswered will reduce network quality, increase battery consumption, and disrupt mobile phones. | |
| | |
| Online game players and Internet service providers were asked about the impact of filtering on their industry. As a result, 100% of online game players said that the filtering situation has reduced the quality of the Internet and the complexity of the streaming situation. | Third report file, Twitch: |
| | |

It is more difficult to talk about the effect of YouTube filtering compared to other popular filtered platforms. This platform was blocked in Iran when it had not yet become one of the most visited websites in the world. In 2008, only 13% of the share of online videos was allocated to YouTube, while now (2024) this share has reached nearly 90% of the total market of video platforms in the world.

According to a Pew survey, more than 50% of users go to YouTube for educational and learning purposes. The variety, abundance, and very high volume of useful content on the YouTube platform, along with its free access, attracts users all over the world. Iranian users can also benefit from the opportunities hidden in this platform due to bypassing technological sanctions and accessing different content packages that may not be available through domestic platforms or due to the need to pay affordable subscription fees.



Digital platforms, especially YouTube, have played a key role in facilitating and developing education, and numerous studies have confirmed their importance in this field. With the increasing speed of technological developments and the accelerating impact of the Covid-19 pandemic on the global trend towards online education, platforms such as YouTube are gradually replacing and complementing traditional educational models in schools and universities. This change is not only due to the flexibility and breadth of the content of these platforms, but also due to the change in the taste of users, especially the new generation, towards interactive, attractive, and on-demand content that YouTube and other digital platforms provide in the best way. While traditional educational systems are often ineffective in meeting these needs, digital platforms have been able to provide a personalized learning experience tailored to the interests of users.





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

One-in-five YouTube users say it is very important for helping them understand things that are happening in the world

% of **U.S. adults who use YouTube** who say the site is **very** important when it comes to ...



Note: Respondents who did not give an answer are not shown. Source: Survey of U.S. adults conducted May 29-June 11, 2018. "Many Turn to YouTube for Children's Content, News, How-To Lessons"

PEW RESEARCH CENTER

The reports indicate the growing trend and expansion of the volume of content produced by Iranian users on this platform. According to the estimate of one of the companies that is active in the field of facilitating the income generation of content producers on the YouTube platform, there are currently about 100 thousand Persian channels active, of which 15 thousand have clarified the ability to generate income. The number of Persian channels has grown by 15-20% year by year and it is calculated that between 10 and 15 million Iranian users are active on YouTube.

The Advantage of YouTube Compared to Other Social Media

Many YouTubers publish their content only on the YouTube platform, because YouTube's recommendation system is designed in such a way that if your video is interesting and informative (provided it is successful in getting feedback from the audience), it will find the right audience for it all over the world. YouTube's content discovery is stronger than its competitors, such as Instagram, because it hosts longer videos and with its subtitle and translation system, it also displays its content in search engine results, unlike social media Content-oriented, which are subject to all kinds of algorithmic frauds and programmed attacks, the activity of bots is much less in YouTube, and this causes more transparency and trust for content creators and audiences. Unblocking YouTube can attract a large audience to this platform Although it may be difficult for Iranians to generate revenue from direct advertising due to sanctions restrictions, over time, a new revenue generation model will prevail between content creators and brands, like what is happening now on Instagram. Over the years, there have been numerous attempts to develop alternative, governmentcontrolled tools for widely used external platforms. These government-sponsored alternatives to global platforms (sometimes called "national alternatives") often face significant adoption challenges. Their development represents an attempt to create controlled digital environments that can be more easily monitored and regulated than international platforms, but typically struggle with user experience issues and limited functionality compared to their global counterparts. From different Telegram skins to internal interfaces for limited access to platforms like YouTube. If the government chooses this solution, some special companies that have been ready for this purpose for years will play a key role. But these inefficient solutions will have serious problems ahead:

2

3

Creation Of Unproductive Economic Rent: This development model destroys competition and instead of innovation, it creates unproductive rent and a system of distribution of points.

Technological Instability: Like the experience of the sudden deletion of Telegram Gold, these tools are often short-lived and unreliable.

The Duality of Policymaking: In the story of Telegram skins, some policymakers considered them a security achievement and another part considered them a tool of influence for the country's enemies.

Challenges and Consequences of Design and Development of Internal Shells



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

The strategy of developing authorized portals (shell) for the use of YouTube users, in addition to the above-mentioned, has additional weaknesses and shortcomings, which will make its implementation impossible and harmful in practice:

Destruction Of the Market of Content Producers: it is not possible to define an alternative revenue sharing model to return producers' income to them through internal shells; Or if there is, it will be very time-consuming and expensive, and of course, start-up businesses cannot afford to invest a lot of risk in this field at the beginning and will need government funds. YouTube skins hurt content producers. Content published on YouTube may be copied and displayed on internal servers, without recording a visit to YouTube. This does not send the necessary signals to the YouTube algorithm and reduces the chance of the content being seen. In addition, internal systems cannot provide the same experience as YouTube due to the weakness in content suggestion and the small amount of data for machine learning.

Contradiction In Goals: In recent years, policies such as Google Play filtering have led users to download and install insecure (unofficial) versions, and providing new skins can intensify this process.

Violation Of Privacy: internal skins are not only not safe, but in some cases, it can lead to the theft of users' personal information, etc.

Alternative Suggestion and Conclusion

Successful global experiences have shown that the strategy of interaction and use of digital diplomacy in facing foreign platforms is far more effective than limiting or creating solutions (such as internal shells). For example, after a decade of filtering Wikipedia, Turkey finally cooperated with this platform. Instead, he used tax policies to reach a common agreement with various social media in the field of regulatory frameworks for public benefit. Policies based on creating internal layers, instead of solving problems, made them more complicated Instead of responding to the real needs of users, this policy only weakens public trust and increases security threats It will be even more harmful than the blocking of YouTube. The skinning policy not only creates unproductive rent and encourages non-innovative and government-dependent entrepreneurship, but there is always the possibility of cutting off access or applying severe restrictions by the main platform itself.

They Are Not What They Show!

Iran is one of the countries that has faced technological discrimination for many years, leading to its classification in the lower spectrum (Periphery or Semi-Periphery)* in international rankings and is not allowed or has not been able to play a role in the currents of economic power of the world as much as the powerful group (Core). In parallel with the global industrial revolutions, the economic dichotomy logic of inferior and superior economy is reproduced with various means such as sanctions, indebtedness of exploitation 1, etc., regardless of the economic values of the inferior countries, which is contrary to the main goals of SDGs (11) and with the claim that the world is moving towards the side of peace and equality in knowledge and technology is in clear conflict. Infrastructural sanctions and limiting access to educational resources are among these issues, which we have discussed in previous reports.

The Third Part: Sanctions

| We defined a list of 200 practical and skill sites that banned Iranian users. Iranian citizens and activists of Iranian technology | The Second Report, |
|--|--------------------|
| businesses condemned all technological sanctions behavior towards Iranian users. (Cases such as restrictions on buying internet | Winter 2024 |
| and connecting Iranian companies to international IXP networks, removing Iranian nationality from registration forms and the | |
| impossibility of registering with Iranian phone numbers (+98) and | |
| | |
| | |
| We mentioned the meet important effects of the canations in the calendrical dimensions: Sanctions on international internat | |
| | The Third Benort |
| sales to Iran, Iranian users are deprived of foreign subscription services even with IP changes due to banking sanctions, and this | The fille heport, |
| means lagging artificial intelligence services. Also, the embargo on Iranian businesses and not having access to the regional and | Summer 2024 |
| international markets was one of the most important issues that is still in effect! | |
| | |

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

* The terms "Periphery" and "Semi-Periphery" come from World-Systems Theory, which categorizes countries based on their position in the global economic structure. Core countries control advanced technology and capital, while Periphery countries provide resources and labor. This framework helps explain how technological access and digital development are influenced by global power structures and
42 international relations.'

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



A review of the top 100,000 Tranco websites shows that along with 10% of websites that are not available due to filtering, many of which are the main and most visited websites and platforms in the world, 17% of websites are due to sanctions and 6.3% of websites are not available. Because Iranian IPs are blocked for various reasons, including network pollution, Iranian users are prevented from accessing the free Internet.

Code.org Case

Code.org به زبان فارسی

«تو افا بود هر که دانا بود / ز دانش دل پیر بر نا بود.» - فردوسی عزل زیر اغار اول بیت شری است که بیعنی فار مرز بان میآمراند. این نشان نطا میزان او میتیکی بنگیری و نشان در فرهای باریی است - ان خاصر به عنوان ارز شهای سال از تعطی سان در انهای مرکزی بیشماری میترد. Last summer, according to the investigations of the Internet and Infrastructure Commission of the Tehran E-Commerce Association, it was found that the educational site codeinfarsi.org is no longer available to Iranian users and, following Google Cloud's sanctions policy, it bans Iranian users by default. Examining the codeinfarsi. org domain shows that the requests with Iranian IP were blocked in the Google Cloud network.

We informed them of this issue by sending an official letter to the code.org office, and on social networks we asked Hadi Partovi, the founder of this non-profit Iranian project, to act based on their own beliefs that this project is "about children and not politics" and this issue follow up Although we did not receive a direct response to the e-commerce association's letter or on social networks, fortunately, in the last days of fall 1, the restrictions on the Farsi website codefarsi were completely removed, and Iranians can use this educational website without restrictions.



An International Action;

IRAN'S PRIVATE SECTOR ON THE OTHER SIDE OF THE SANCTIONING TABLE!

Previously, we attempted to restore the violated rights of Iranians through various methods, including signing petitions and sending letters to companies that boycott Iranian users, but we were faced with a negative response or unanswered responses to most of our requests from the boycotting commercial brands. Therefore, the Internet Commission of the Tehran Electronic Commerce Association has formed a legal working group with the aim of lifting the embargo on Iranian users from professional and practical websites.

The Electronic Commerce Association has started its negotiations with international lawyers in this field and is trying to negotiate with international institutions such as OFAC, negotiate with technology companies or file a complaint in international courts about the obvious and human rights of the Iranian people to education and free access to defend information In addition, we tried to be the voice of Iranian citizens against international sanctions in notes from the Internet Commission of Electronic Commerce Association.



The article "An Alliance to Break Technological Monopolies" was published in Modern Diplomacy magazine on December 25. In this article, the formation of a global coalition with the aim of dealing with technological monopolies and restrictions caused by sanctions has been investigated. Important parts of this article are related to technological monopolies as a factor in the gap in access between countries and the inferiority of developing countries, and it examines technological alliances to deal with it. The most important points mentioned in this note are as follows:



1- Technological advancements and monopoly

Not only does technological progress inevitably led to people's well-being and a fairer distribution of wealth among countries and individuals, but it often leads to an increase in income inequality, widespread unemployment, and even poverty. Just as monopoly in a country increases injustice and class divisions, it also creates a similar mechanism among oppressive countries, and dominant countries weaken and exploit subordinate countries through their soft and hard monopolies.

2-The need for a coalition to break the monopoly chain

The formation of a coalition of countries and independent technology companies can break the monopoly of technology giants in the field of technology production and distribution. BRICS+ member companies can play the role of a balancing force in the existing monopoly, considering their economic capacities, population, and potential markets.

3- Creating a permanent digital economy department: the proposal presented in this article is to create a digital economy department in BRICS+ with the aim of supporting and providing soft and hard infrastructure for startups and technology companies throughout BRICS member countries and partners. This department will act like a large international accelerator and innovation center and will have three important facilitation priorities:

The first layer will be basic regulation and soft infrastructure, including The second layer of shared technology infrastructure will include data the possibility of payment (PAY BRICS), financing (through NBD), centers, shared cloud infrastructure and artificial intelligence, and unified data governance rules (like GDPR), prevention of double traffic exchange points and international traffic transit. taxation, joint arbitration center, etc.

The third layer will be the facilitation and liberalization of the market of 3 billion people for all startups and technology companies throughout the BRICS+ region and the removal of international trade restrictions.



Note "Breaking the Web, How Sanctions Are Undermining Iran's Access to 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" have created significant technical barriers in recent years that have disrupted Iranian users' access to the Internet and severely harmed developers, businesses, and ordinary users. The use of restrictive and destructive techniques such as Spoofing DNS has aggravated this problem and made it impossible to access critical online services even if filtering bypass tools are used. –

Proponents of sanctions often claim that technological sanctions have no effect on civilians and ordinary users, but evidence has proven the opposite of this claim. A list of 600 popular websites blocked by technological sanctions reveals the discriminatory nature and double standard of these restrictions; Platforms such as GitHub, Amazon Web

Services, and even educational-application websites such as ChatGPT are among other essential services that have become unavailable. Iranian users are forced to turn to unsafe alternatives and informal and smuggled digital markets to access some basic and vital tools. –

At the same time, the financial burden caused by bypassing these restrictions has put more pressure on users; Thus, the cost of VPNs is between 5 and 6 dollars per month, which sometimes reaches twice the average cost of 3 dollars for mobile data in Iran.

The Continuation of The Internal Self-Filtering Policy in Recent Months (Iran Access)

The Fourth Part; Internal Regulations

| Out of 100 verified Iranian government websites, 57 are inaccessible from abroad. Moreover, by sending a letter to the internet | the first report; |
|---|-----------------------------------|
| portals of the country, we asked them to prioritize the removal of Iran Access* restrictions. | summer 2023 |
| In a conversation with officials of Afta Company, it was found that there is no law to permanently restrict Access Iran. We also noted that this restriction is a tool in the service of insecurity and distorting the quality of the country's Internet! | The Second Report; Winter 2024 |
| In a meeting with the secretary of the Supreme Council of Cyberspace, it was decided to provide a list of sites proposed to remove this restriction, although 7 domains were removed from these restrictions, but unfortunately, the internal self-filtering process continues. | The Third Report; Summer 2024 |

Stranger than filtering foreign sites is to filter internal sites for citizens outside the country, many government websites and Iranian banks are not available for international citizens. Important websites of the country, including the parliament, ministries, major organizations of the country, Shaparak, etc., are not available for users outside Iran! An important point in this context is that since the publication of the third report, 13 more domains have been added to this list. In Appendix 5 of this report, the names of these domains are listed according to their status in these six months.

* This "Iran Access" phenomenon creates what could be called a "digital island" effect, where Iranian digital services become isolated from the global internet. This limits international engagement, reduces government transparency, hampers Iranian businesses with international interests, and creates technical complications for services that need to operate across borders.'

What Have We Done to Eliminate the Limitation of Iran Access?(12)

In the summer of last year, we sent official letters to all domestic companies and organizations that restricted the access of foreign IPs, and noted the consequences of this restrictive approach as a tool in the service of Internet insecurity and distorting the quality of the Internet.

In meetings with the Secretary of the Supreme Council of Cyberspace, it was decided to provide a list of suggested sites to remove these restrictions. This list, which is included in the third appendix of this report, was sent to the Supreme Council of Cyberspace and until the publication of this report, 8 domains have been removed from the list of this restriction, but unfortunately, after the regional incidents and cyber threats of the last six months, 13 websites were added to this list.

The Electronic Commerce Association has explained many times from a technical point of view that this action not only does not help to increase the security of domestic websites, but it is a serious factor against the security of the Internet and the security of the country's users.



Unfortunately, in the fall of 2024, AFTA Center repeatedly issued notices requiring businesses to implement Iran Access. It has been explained many times in previous reports that such a decision is wrong from a technical point of view and its anti-security function, and as a result, it is expected that the AFTA center and other related departments of the country will refrain from such decisions or hold joint technical meetings with representatives of the private sector in order to the technical opinion of this matter should be examined.

Although before this the Supreme Council of Cyberspace promised to follow up and solve this problem, but no effective action has been taken to solve this problem. In the last meeting of the e-commerce association with representatives of the Ministry of Communications, regarding the improvement and solution of this problem, a favorable promise was made that at least the government-controlled websites would be removed from Iran Access mode. The E-commerce Association will follow up on this issue and publish its results in its next report.

12. The picture of the sent letter can be found in the section of "Actions of the E-Commerce Association" is in the previous reports.



Internet Speed in Iran

| The main reasons for the slow internet speed in Iran are the weak and inefficient performance of the Iranian Telecommunications To Company in the Access layer, the decrease in investment in the telecom infrastructure sector, the slow development of fiber optics, and finally the weak and non-transparent performance of the Infrastructure Communications Company in the Core layer. | The First Report, Summer 2023 |
|---|-----------------------------------|
| T According to evaluations, Google>s loading speed has slowed three times over a period of 5 years. Moreover, Iran is no longer among the first 100 countries in the meter.net database. | The Second Report, Winter 2024 |
| The most important concern of people is the slowness of the Internet. An optical fiber development project has been among the best measures of the 13th government, but the connection statistics are still not in good condition. There is an acceptable situation in the inter-provincial network in the transmission network and inter-operational communication. The technical experts of the country>s operators said: «The change in the country>s policies and the need to install governance equipment in the domestic network has increased the cost and reduced the development plans in other provinces of the country.» | The Third Report, Summer 2024 |

*The Access layer refers to the "last mile" infrastructure connecting end users to the network, while the Core layer handles high-volume data transmission between networks. Both require different investment strategies: Access layer improvements primarily require widespread local infrastructure development, while Core layer improvements need focused investments in high-capacity equipment and international connectivity points.

The catastrophic state of obsolete ADSL technology is the country's most important problem in connecting users to the Access network. In Iran, there are more than 9 million ADSL connections, of which 70% are below 10 mbps and more than 30% of them are connected to the local operator with a speed lower than 6 mbps. Also, the limitation of this obsolete technology has caused the upload speed of users to be always less than 900 kbps. So, as a result, it is clear to everyone that one of the important priorities of the government should be the development of the Access network and the expansion of the fiber optic network connection. In its next report, Tehran E-commerce Association will try to report in detail the actions and agreements made in this sector, not only the connection statistics. Although the implementation of an optical fiber project is generally complex, time-consuming and requires extensive investment, unfortunately, municipalities in metropolitan cities, especially Tehran Municipality, have been the biggest obstacle to the development of this technology in the country in the past years.

Access Layer

Reference To Test Speed: A Statistical Deception About Iran's Internet Speed! Or How Do They Generalize the Situation of 7% Internet in Tehran to The Whole Country?

One of the statistical sources used to measure internet speed in Iran is the Ookla website (test speed program). The data of this database is usually proposed by domestic policy makers as a criterion for evaluating the overall state of the Internet in the country. However, more detailed investigations show that in the third quarter of this year, 70% of the data related to Iran in the Ookla database is dedicated to the city of Tehran only, and these data show a disproportionate share of fixed internet compared to mobile internet. This issue can lead to incorrect generalization of the results to the whole country. The Ookla database evaluates the internet speed (download, upload, etc.) seasonally and based on numerous Test Speeds from users. These data are presented in the form of geographic tiles (Quadkey), where each tile represents a geographic square with coordinates. central (lat/long). The average internet speed in each tile is calculated and reported based on the number of tests and according to the type of device (fixed or mobile internet). However, the exact geographic location of this data is not available by provinces and regions of the country, and this can be analyzed and interpreted the data very challenging.

Related to Mobile Internet

Related To Fixed Internet

The Share of The City of Tehran

46 thousand data

59 thousand data

77 thousand devices (about 70 percent)

The Total Number of Devices in The Data of The Third Season of Ad

106 thousand devices

In order to evaluate the internet speed more accurately in the provinces of Iran, all Quadkeys were converted to the location of the country's cities using geographical coordinates (lat/long) mechanisms. The data validation criterion in this analysis was the presence of at least 10 devices in each Quadkey during three months. The results of these investigations are as follows:

| FIGNINGE | Fixeu | wobie | Granu Iotai |
|------------------------------------|--------|--------|-------------|
| 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 focus on Tehran city's data, especially compared to other provinces, shows that most internet speed data in this database is limited to the country's capital. Also, while according to official statistics, more than 70% of Iranian users' internet consumption is dedicated to mobile internet, in Ookla's report, the largest share is related to fixed internet. This contradiction shows that the data recorded in Ookla does not fully reflect the consumption behavior of Iranian users

. Also, the conducted investigations show that some provinces of the country lack data in this database. This lack of geographic coverage makes the available data unable to represent the state of Internet speed in the entire country.

In the first Tehran e-commerce Association report, we explained that the default Speedtest connection to internal servers is more indicative of Access layer speed and not Internet speed. In this report, based on the data analysis of the Ookla database, the high concentration of data on the city of Tehran and the disproportionate share of fixed internet compared to mobile phones can be added to the basic problem of this system, so that it cannot be used as a comprehensive measure to evaluate the state of the internet in the country.

International Ports and Bandwidth

Unofficial reports indicate an increase of at least 15% in international bandwidth in recent months due to some reforms. Coldfeller's report shows that during the last 6 months, the average speed of Iranian users has increased slightly and has reached mbps 5.4 from mbps4.5.



We hope that this trend is not temporary and that its improvement will speed up and in the next report of the Tehran Electronic Commerce Association, we will see the growth of Iran's rank in the Internet Quality Index in Iran.

Status of Digital Quality of Life Index

An Arbitrary Situation!

Iran Ranks 95 Out of 121 Countries in The World

Special Cases

Digital Life Quality Index (Digital Quality of Life) represents the well-being and quality of digital life in countries. The digital quality of life index is calculated annually by Surfshark and its general purpose is to evaluate the online experience of users in different countries. The most important sub-indicators examined in the annual report of the quality of digital life are related to the cost-effectiveness of the Internet, the quality of the Internet, electronic infrastructure, security, and electronic government.

In this internet access index report, the amount of time spent working to get the cheapest internet in countries is weighted. In the Internet quality index, it has also examined components such as Internet speed, bandwidth, etc. According to this survey, France, Finland, and Denmark are the first three countries of this survey. After Pakistan and Nepal, Iran is ranked 95th in this survey, and after Iran are the countries of Ghana and Eleusis.

| 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 | 0.0533 | 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 | 0.0817 | 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 |
| | | | | | | | u | | |
| 0.0981 | 0.0775 | 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) | 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 | North America | Trinidad and Tobago |
| 0.0924 | 0.0638 | 0.1265 | 0.0671 | 0.0074 | 0.3572 | 91 | Caribbean | North America | Jamaica |
| 0.0786 | 0.0556 | 0.133 | 0.0629 | 0.023 | 0.3531 | 92 | Latin America and the | Africa | Algeria |
| 0.1035 | 0.0438 | 0.1041 | 0.0579 | 0.0433 | 0.3526 | 93 | Caribbean | Asia | Pakistan |
| 0.0818 | 0.0501 | 0.1162 | 0.0644 | 0.0326 | 0.3451 | 94 | Northern Africa | 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 | Southern Asia | Africa | Ghana |
| 0.0671 | 0.0392 | 0.1066 | 0.0656 | 0.0571 | 0.3355 | 97 | Southern 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 | South-eastern Asia | Africa | Senegal |
| 0.0899 | 0.0329 | 0.1249 | 0.0547 | 0.0191 | 0.3215 | 100 | Sub-Saharan Africa | South America | Bolivia |
| 0.0828 | 0.026 | 0.1255 | 0.0701 | 0.0081 | 0.3126 | 101 | Sub-Saharan Africa | North America | El Salvador |
| 0.0787 | 0.0789 | 0.0946 | 0.032 | 0.028 | 0.3121 | 102 | Latin America and the | Africa | Zambia |
| 0.0908 | 0.0729 | 0.0939 | 0.0452 | 0.0058 | 0.3085 | 103 | Caribbean | Africa | Ivory Coast |
| 0.0948 | 0.026 | 0.1053 | 0.0737 | 0.0082 | 0.3081 | 104 | Latin America and the | North America | Guatemala |
| 0.0782 | 0.0164 | 0.129 | 0.0646 | 0.0184 | 0.3066 | 105 | Caribbean | Asia | Cambodia |
| 0.0648 | 0.0301 | 0.1218 | 0.0699 | 0.0193 | 0.3059 | 106 | Sub-Saharan Africa | South America | Venezuela |
| | | | | | | | Sub-Saharan Africa | | |
| 0.0726 | 0.0364 | 0.0955 | 0.0474 | 0.0045 | 0.2563 | 115 | Latin America and the | 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 | Caribbean | Africa | Cameroon |
| 0.0815 | 0.031 | 0.0737 | 0.0364 | 0.0091 | 0.2315 | 117 | South-eastern Asia | Asia | Tajikistan |
| 0.0668 | 0.0342 | 0.0547 | 0.0382 | 0.0265 | 0.2205 | 118 | Latin America and the Caribbean | 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 | Central Asia | Asia | Yemen |

In the 2022 Global Cloud Ecosystem Index report by MIT University, which is reviewed among 76 countries, this classification is almost repeated on a different scale; In fact, this report examines the composite indicators related to the infrastructure quality of the Internet. Iran ranks 51st in the infrastructure component, 53rd in the adoption ecosystem component, and 71st in the assurance and security category. The total score of the index shows that Iran, despite having a relative advantage in the field of talent and specialized human resources, is ranked 51, i.e., lower than the world average.

An interesting point is that according to this report that was prepared in 2015, in a part of this report, which examines the quality of human resources (in terms of innovation and math indicators, etc.), Iranians are ranked third in the world after Germany and Singapore in terms of affinity human and talent. When we put all these indicators together, it can be claimed that the Iranian manpower is in an incompatibility with the technological infrastructure (policies) of the country; that is, Iranians are talented and capable citizens in There are global scales that cannot extend this ability to infrastructural technologies due to political inadequacies and restrictive laws, so that with technological justice and wider accessibility, we can finally be on par with developed countries in other indicators of digital quality!

Attachments

Attachment 1 Report methodology

The Google CrUX database tries to provide a realistic picture of the experience of Internet users around the world by collecting information from Google's Chrome browsers around the world. One of the most important advantages of this database is that due to the connection to the browser, it can identify Iranian users with appropriate accuracy and can correctly identify the user's country even in the situation where the user uses various embargo-breaking and filter-breaking tools, and as a result, the most used sites and analyze the final experience of users in each country. In this report, we extracted 5000 most visited Iranian websites from April 2024 to the beginning of October 2024. In the first step, we checked how many of these websites were used by Iranian users' during the last 77 months and with this point we were able to show the fluctuations of the internet quality in the past years by comparing the user experience. Finally, we were able to compare Iranian users' experience of loading 400 most visited websites that they have used in all months, during different years.

Google categorizes the speed of connection and loading of websites by users in four qualitative levels:

| | Maximum downlink | Minimum RTT | title |
|--|---|-------------|---------|
| Suitable Internet for receiving low-volume content, such as text-only content | 50 Kbps | 2000ms | Slow2-g |
| Suitable Internet for receiving thumbnails | 70 Kbps | 1400ms | 2g |
| • Suitable Internet for receiving large content, including high-quality images, sound and SD high-quality videos | 700 Kbps | 270ms | 3g |
| Suitable Internet for receiving HD videos and streaming video | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | 0ms | 4g |

CrUX Methodological Consideration

Google CrUX is a collection of data that collects user feedback from various sources, including Google's own services such as the search engine, Maps, and Google Play, as well as third-party apps and websites. Data is collected in an anonymized form to provide insights into user experiences, user experience pain points and user preferences in different countries.

One of the advantages of using Google CrUX is its comprehensive coverage, large scale, and the possibility of comparing different countries and regions. In addition, since Google uses more than IP address to determine the location of users, it gives more accurate results to evaluate the experience of users in countries such as Iran where VPN usage is high. However, there are also methodological shortcomings in the use of Google CrUX to analyze user experience, the most important of which is "positive bias". Since the data used in this method is usually biased towards users who are more active online, it can be said that the analysis results based on the CrUX database are somewhat overestimated and always represent a slightly better situation than it 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 Testing Tools

Today, various tools and improvements are available to users to measure the speed and quality of the Internet. Using different methods, these tools measure indicators such as latency, download and upload speed, fluctuation (Jitter) and other qualitative measures of communication. Among the most prominent user-oriented tools in this field, Ookla Speedtest, Opensignal and Cloudflare Speedtest can be mentioned.

Despite the widespread use of these tools, their results cannot fully and accurately evaluate the quality of the Internet on a national scale due to methodological limitations. For example, Ooklass Speedtest is more based on userss point tests and is mainly limited to measuring the connection speed with the nearest server. This method does not reflect actual Internet usage conditions, such as internal network effects, filtering, or international restrictions.

OpenSignal>s emphasis on real-world conditions and user-centric benchmarks sets it apart from other tools like SpeedTest. While Ookla relies primarily on user-initiated tests, often performed under ideal scenarios, OpenSignal uses automated tests and rounds in a variety of environments to better represent typical user experiences and continuously refine results, including scenarios with weak signals or tests. Used indoors. In addition, OpenSignal prioritizes stable speeds or goodput - the rate of successful data delivery in the network, excluding retransmissions, errors, and network overhead, which is essential for real-world applications such as streaming videos and downloading large files. are very key. By removing distorting network optimizations that target test traffic and using accurate classification methods, OpenSignal provides a more accurate and accurate picture of network performance.

Comparison of Two Indicators

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

Data Collection Method

OpenSignal: Takes advantage of a dedicated application installed by users to perform speed tests and collect network performance data. This approach captures real-world user experiences across devices and locations

Google's CrUX: It collects anonymous performance data from real Chrome browser users who have opted-in to data sharing. This dataset represents user experiences on popular and functional websites, focusing on metrics such as loading time and interaction quality.

Focus Points

OpenSignal: It measures metrics such as download/upload

speed, latency, and signal strength and provides insight into mobile network performance, quality, and coverage.

Google's CrUX: It focuses on user-centric performance metrics, including Google's Vitals Web Core (LCP INP CLS), which are key to evaluating the user experience of web pages.

Key Differences:

Data Scope: OpenSignal focuses on mobile network performance, while CrUX measures web page user experience on the Google Chrome platform. Data Sources: OpenSignal relies on active user tests of its app, while CrUX collects passive (passive) data from a subset of Google Chrome users.

User Base: CrUX data is limited to users of the Chrome browser who have selected the data sharing option and is certainly not representative of all Internet users. However, according to the Yektanet report (2023), more than 80% of Iranian users> browsing experience is done through the Chrome browser.

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

In summary, Google's OpenSignal and CrUX provide valuable insights into various aspects of the user experience. OpenSignal is among the best possible options for evaluating mobile network performance, while CrUX provides a very accurate evaluation of web page performance as experienced by real Chrome users. So, this first index is not representative of the application experience in any way, and secondly, due to the measurement of popular sites, it is mostly subject to overestimation.

Methodological Consideration of Digital Quality of Life Index (DQL)

Surfshark's Digital Quality of Life Index ranks countries based on five key pillars: Internet affordability, Internet quality, e-infrastructure, e-security, and e-government. Using reliable and well-known data sources such as ITU, World Bank, Ookla and the United Nations, this index provides a comprehensive picture of well-being and quality of digital life around the world.

Internet Affordability: This pillar evaluates the costs that people incur for buying regular mobile and fixed internet packages in terms of the amount of time they must work to obtain this amount of income.

Internet Quality: This component evaluates 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 cyber security readiness and data protection laws of countries.

E-Government: This pillar evaluates the accessibility and quality of online public services and digital literacy.

. Overall, the digital quality of life index highlights the international successful experiences and improvement areas for creating a better digital future with a human-centered approach, with a clear and explicit focus on practical insights.

OONI Methodological Considerations

OONI>s methodology for evaluating censorship (filtering) focuses on the detection of website blocking through web connectivity testing. This test assesses whether websites are accessible on the user>s network by comparing the tested network measurements with a set of control measurements collected from in which blocking is not applied. Moreover, it detects possible interference.

The Testing Process in Brief for Each Selected Website

DNS Lookup: Checks if the website domain reaches the expected IP address, and detects DNS-based blocking.

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

HTTP Request: Sends an HTTP request to successfully fetch (fetch) website content and identify potential blocking via HTTP headers or response codes.

For instant, in October about 2300 domains from Iran (with at least 30 tests per month) have been reviewed and evaluated.

Analysis and Comparison

Results are checked and analyzed in real-time against control measurements (from non-blocking networks) to determine whether any anomalies, such as timing, incorrect DNS responses, or content manipulation, are more likely to be synonymous with blocking as known. Standard 4 is not only strict, but it is expected that with todays technologies, at times when there is no disruption or slowness in the network, all requests with less than BU at a speed of more than 700 should be uploaded in various international reports. It is also clear that in the first 50 countries, more than 94% of communications are classified in the same way and categorized into Density 4G barriers. As a result, due to the widespread use of communication technology, it can be considered as a possible slowness or disruption and communications that are slog-2 considered as slowness or (severe) disorder.



As it is obvious in the images of the report, over the past year, about 8% of the communications of Iranian users have been related to the observation of the most visited websites with high quality (Density 4G). In a concrete event in September 2022, this situation suffered a decline and gradually experienced a relative growth, but it still did not reach its peak in September 2022.

Attachment 2 100 Domains Reviewed in OONI for Comparison Between Countries

| 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 |

Attachment 3 List of Compared Countries Based on The Highest 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 |

Attachment 4

The list of some important websites that have banned the access of Iranian users:

| GDP RANK | Country | Country | GDP RANK | Country | Country |
|-------------|-------------------------|---|-------------|----------------------|--|
| 1 | Android Developers | https://developer.android.com | 26 | Docker | https://www.docker.com |
| 2 | Visual Studio Installer | https://visualstudio.microsoft.com | 27 | BugSnag | https://www.bugsnag.com |
| 3 | Chat GPT | https://www.chat.openai.com | 28 | Nvidia experience | https://www.nvidia.com |
| 4 | Coursera | https://www.coursera.org | 29 | Microsoft Download | https://www.microsoft.com/en-us/download |
| 5 | Google cloud | https://cloud.google.com | 30 | MathWorks | https://www.mathworks.com |
| 6 | Google Developers | https://developers.google.com | 31 | Google Research | https://www.research.google.com |
| 7 | Firebase | https://firebase.google.com | 32 | Adobe | https://adobe.com |
| 8 | Spotify DE | https://www.spotify.com | 33 | Android Studio | https://developer.android.com/studio |
| 9 | CentOS Repositories | https://mirror.centos.org | 34 | ItPro | https://www.itpro.tv |
| 10 | BootStrap | https://www.bootstrapcdn.com | 35 | HuggingFace | https://huggingface.co |
| 11 | CodeCanyon | https://codecanyon.net | 36 | MaxCDN | https://cp.maxcdn.com |
| 12 | Elsevier | https://www.elsevier.com | 37 | Unity | https://unity.com |
| 13 | Google Lens | https://lens.google | 38 | StudyTogether | https://www.studytogether.com |
| 14 | Envato | https://www.envato.com | 39 | Freepik | https://www.freepik.com |
| 15 | CloudEra | https://www.cloudera.com | 40 | MySQL | https://www.mysql.com |
| 16 | GtMetrix | https://gtmetrix.com | 41 | MyFonts | https://www.myfonts.com |
| 17 | Openai | https://www.openai.com | 42 | Qualcomm | https://www.qualcomm.com |
| 18 | Google Analytics | https://analytics.google.com | 43 | Zoom | https://zoom.us |
| 19 | JetBrains | https://www.jetbrains.com | 44 | Artstation | https://www.artstation.com |
| 20 | Googleplay console | https://play.google.com/console/developer | 45 | Udemy | https://www.udemy.com |
| 21 | Figma | https://www.figma.com | 46 | Google services | https://code.earthengine.google.com |
| 22 | Clamav | https://www.clamav.net | 47 | Kaggle | https://www.kaggle.com |
| 23 | Google Earth | https://earth.google.com | 48 | Pearson | https://www.pearson.com |
| 24 | Bytes | https://bytes.com | 49 | Google Remotedesktop | https://www.remotedesktop.google.com |
| 25 | Cadence | https://www.cadence.com | 50 | Ubuntu | https://ubuntu.com |

| GDP RANK | Country | Country | GDP RANK | Country | Country |
|-------------|--------------------|-------------------------------|-------------|-------------|------------------------------------|
| 51 | Gitlab | https://about.gitlab.com | 76 | Virtual Box | https://www.virtualbox.org |
| 52 | InfoWorld | https://www.infoworld.com | 77 | Remini | https://www.remini.ai |
| 53 | Apple developer | https://developer.apple.com | 78 | PhpStorm | https://www.jetbrains.com/phpstorm |
| 54 | Unreal Engine | https://www.unrealengine.com | 79 | Tensorflow | https://www.tensorflow.org |
| 55 | Google Code | https://code.google.com | 80 | Maven | https://maven.apache.org |
| 56 | GoDoc | https://godoc.org | 81 | inshot | https://inshot.cc |
| 57 | unsplash | https://unsplash.com | 82 | TeamViewer | https://www.teamviewer.com |
| 58 | Elastic | https://www.elastic.co | 83 | PhotoDune | https://photodune.net |
| 59 | Expo | https://expo.dev | 84 | MatLabExpo | https://www.matlabexpo.com |
| 60 | Ebay | https://www.ebay.com | 85 | GrAvatar | https://gravatar.com |
| 61 | JitPack | https://jitpack.io | 86 | DemandBase | https://www.demandbase.com |
| 62 | KhanAcademy | https://www.khanacademy.org | 87 | Java | https://www.java.com |
| 63 | Krisp.ai | https://krisp.ai | 88 | NXP | https://www.nxp.com |
| 64 | Codeium | https://www.codeium.com | 89 | Tenable | https://www.tenable.com |
| 65 | GraphicRiver | https://graphicriver.net | 90 | Flaticon | https://www.flaticon.com |
| 66 | GoAnimate | https://goanimate.com | 91 | Oracle | https://www.oracle.com |
| 67 | Google tag manager | https://tagmanager.google.com | 92 | HP | https://www.hp.com/us-en/home.html |
| 68 | Simple Note | https://simplenote.com | 93 | NetBeans | https://netbeans.apache.org |
| 69 | Realm | https://realm.io | 94 | GrabCad | https://grabcad.com |
| 70 | Grafana | https://grafana.com | 95 | Asus | https://www.asus.com/us |
| 71 | Melpa | https://melpa.org | 96 | GSK | https://www.gsk.com |
| 72 | Gradle | https://gradle.org | 97 | PerKins | https://www.perkins.com |
| 73 | SpiceWorks | https://www.spiceworks.com | 98 | Intel | https://www.intel.com |
| 74 | MouseFlow | https://mouseflow.com | 99 | Vmware | https://www.vmware.com |
| 75 | Api Codeium | https://www.api.codeium.com | 100 | SolarWinds | https://www.solarwinds.com |

| GDP RANK | Country | Country | GDP RANK | Country | Country |
|-------------|---------------|------------------------------|-------------|------------------|--|
| 101 | Cisco | https://www.cisco.com | 126 | Dribbble | https://www.dribbble.com |
| 102 | Rstudio | https://www.rstudio.com | 127 | VideoHive | https://videohive.net |
| 103 | SketchFab | https://sketchfab.com | 128 | NuGet | https://www.nuget.org |
| 104 | Mongodb | https://www.mongodb.com | 129 | Slack | https://api.slack.com |
| 105 | TeamTreeHouse | https://teamtreehouse.com | 130 | invisionapp | https://www.invisionapp.com |
| 106 | HashiCorp | https://www.hashicorp.com | 131 | Ti | https://ti.com |
| 107 | Asus Rog | https://www.asus.com | 132 | NewRelic | https://newrelic.com |
| 108 | MixPanel | https://mixpanel.com | 133 | Turbo squid | https://www.turbosquid.com |
| 109 | Paessler | https://www.paessler.com/ | 134 | Webex | https://www.webex.com |
| 110 | Renesas | https://www.renesas.com | 135 | Mcafee | https://www.mcafee.com |
| 111 | MSC Software | https://mscsoftware.com | 136 | simplilearn | https://www.simplilearn.com |
| 112 | SourceForge | https://www.sourceforge.net | 137 | IIS app platform | https://www.microsoft.com/web/downloads/platform.asp |
| 113 | tinyjpg | https://tinyjpg.com | 138 | Instructure | https://www.instructure.com |
| 114 | 3d Ocean | https://3docean.net | 139 | Sygic | https://www.sygic.com |
| 115 | Amd Radeon | https://www.amd.com | 140 | Spring | https://spring.io |
| 116 | RedHat | https://www.redhat.com/en | 141 | Analog | https://analog.com |
| 117 | Trello | https://www.trello.com | 142 | GFI | https://www.gfi.com |
| 118 | Flurry | https://flurry.com | 143 | Ansible | https://www.ansible.com |
| 119 | Themeforest | https://www.themeforest.net | 144 | Sketch | https://sketch.com |
| 120 | MailGun | https://www.mailgun.com | 145 | IDT DNA | https://www.idtdna.com |
| 121 | ResellerClub | https://www.resellerclub.com | 146 | SendGrid | https://sendgrid.com |
| 122 | Lenovo | https://www.lenovo.com | 147 | seleniumhq | https://www.selenium.dev |
| 123 | Amazon Prime | https://www.amazon.com | 148 | salesforce | https://www.salesforce.com |
| 124 | Twilio | https://www.twilio.com | 149 | Sartorius | https://www.sartorius.com |
| 125 | Training Sap | https://training.sap.com/ | 150 | Jquery Code | https://www.jquery.com |

| GDP RANK | Country | Country | GDP RANK | Country | Country |
|-------------|---------------|--|-------------|-----------------|--------------------------------|
| 151 | Weebly | https://www.weebly.com | 176 | Veritas | https://www.veritas.com |
| 152 | IBM | https://www.ibm.com | 177 | ThermoFisher | https://www.thermofisher.com |
| 153 | SigmaAldrich | https://www.sigmaaldrich.com | 178 | Vagrantup | https://www.vagrantup.com |
| 154 | Pixel Squid | https://www.pixelsquid.com | 179 | Bintray | https://bintray.com |
| 155 | PackAgist | https://packagist.org | 180 | Merck millipore | https://www.merckmillipore.com |
| 156 | Mbed | https://os.mbed.com | 181 | Rjx hobby | https://www.rjxhobby.com |
| 157 | Data Camp | https://www.datacamp.com | 182 | Epidemic Sound | https://www.epidemicsound.com |
| 158 | OverLeaf | https://www.overleaf.com | 183 | SyncFusion | https://www.syncfusion.com |
| 159 | ATI Radeon | https://ati.com | 184 | MAAS | https://maas.io |
| 160 | AcousticJava | https://acousticjava.com | 185 | BMC | https://bmc.com |
| 161 | Voicemod | https://www.voicemod.net | 186 | BackTory | https://backtory.com |
| 162 | Arcgis Online | https://www.arcgis.com/home | 187 | Warkiani Lab | https://www.warkianilab.com |
| 163 | Stripe | https://stripe.com | 188 | artgrid | https://artgrid.io |
| 164 | Toggl | https://toggl.com | 189 | artlist | https://artlist.io |
| 165 | Sophos | https://sophos.com | 190 | analytics.moz | https://analytics.moz.com |
| 166 | Apache | https://apache.org | 191 | miro | https://miro.com |
| 167 | Videvo | https://www.videvo.net | 192 | openhub | https://www.openhub.net |
| 168 | Atlassian | https://www.atlassian.com | 193 | Pagespeed | https://pagespeed.web.dev |
| 169 | Parsec | https://parsec.app | 194 | redis | https://redis.io |
| 170 | Vuforia | https://developer.vuforia.com | 195 | wandb | https://wandb.ai |
| 171 | Audio Jungle | https://audiojungle.net | 196 | Click House | https://clickhouse.com |
| 172 | GCD API | https://cloud.google.com/api/datastorage | 197 | opensea | https://www.opensea.io |
| 173 | Schema | https://www.schema.org | 198 | tutsplus | https://tutsplus.com |
| 174 | burst shopify | https://burst.shopify.com | 199 | teachable | https://www.teachable.com/ |
| 175 | foodiesfeed | https://www.foodiesfeed.com | 200 | plotly | https://plotly.com |

Attachment 5

Websites (among the top 300 websites in Iran) that face access restrictions from abroad (Iran Access).

| shaparak.ir |
|-----------------|
| isti.ir |
| behdasht.gov.ir |
| imidro.gov.ir |
| mcth.ir |
| nlai.ir |
| inif.ir |
| iranair.ir |

| gsi.ir | sampad.gov.ir | niopdc.ir | medu.ir | | |
|---------------------|-------------------|---------------------------|--------------------|--|--|
| intamedia.ir | ict.gov.ir | cra.ir ssaa.ir | | | |
| cra.ir | caa.gov.ir | irica.gov.ir | epolice.ir | | |
| nioc.ir | mcls.gov.ir | postbank.ir | ntsw.ir | | |
| nigc.ir | anaj.ir | intamedia.ir setadiran.ir | | | |
| tedan.ir | spsco.ir | sanjeshp.ir | site.samandehi.ir | | |
| seo.ir | refah.swf.ir | esata.ir | cbi.ir | | |
| intamedia.ir | cc.saipayadak.org | bazresi.ir | ir codal.ir | | |
| bim.ir | farhang.gov.ir | dotic.ir | 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 | lu.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 | | |

| | | 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 |
| | | | | | | | | |

Attachment 6 Speed Report Update - Cloudflare

In the first and second reports, our first reference to compare the speed of the Cloudflare radar report was, since Cloudflare does not have a pop in Iran, it was not an ideal reference to compare the speed between Iran and other countries, but it was the best reference to compare between countries. By replacing CrUX reports in this report, we used Cloudflare information only for comparison and analysis of other data.

Previous Reports









