To,

Brig Gen S M Farhad (Retd.)
Secretary General, Association of Mobile Telecom Operators of Bangladesh (AMTOB)
Wali Center (2nd Floor), 74 Gulshan Avenue, Gulshan-1, Dhaka-1212, Bangladesh

16 September 2020

Subject: Industry Representation on the Benefits of Caching and Request to Expedite Caching Approvals in Bangladesh

Dear Madam/Sir,

Greetings from the Asia Internet Coalition (**AIC**).

We are an industry association that promotes engagement on policy issues relating to the Internet in the Asia Pacific region. As of 2019, our membership comprises leading Internet and technology companies such as Amazon, Airbnb, Apple, Booking.com, Facebook, Grab, Google, LinkedIn, Twitter and Yahoo *etc*. We write to you to provide our inputs on the importance and benefits of caching. As you are aware, there is a strong need for engagement with the regulators in Bangladesh on this issue, so as to enable a system that recognizes the importance of caching, and facilitates a suitable regulatory regime for the same.

At present, we understand that the Bangladesh Telecommunication Regulatory Commission **(BTRC)** requires that any party interested in setting up a caching server seek its approval. We further understand that many such approvals are presently on hold. Even in the recent instances of BTRC permitting to set up caching servers, we understand that several conditions were placed,[1] including requirements that the caching server be placed at National Internet Exchange (NIX)[2] only.

Given the enormous benefits of caching to consumers and operators in Bangladesh, there is a need for nuanced discourse on this issue, so that there can be a suitable mechanism for expediting approvals and taking other steps as needed including relevant deregulation measures to assist in speedy and smooth deployment of caching servers. We have highlighted common concerns below.

a.   Importance of Caching Servers During Lockdown

To provide a brief background on the need for caching: the caching industry was born as a result of the massive growth in Internet traffic. Caching servers facilitate data exchange between the hosts (the providers of content) and the consumers (who access the content) through enabling a temporary storage of certain type of content which is replicated closer to consumers[3]. A content provider replicates certain content from the hosting server to the caching server, so that when the consumer requests the content, it can be fetched locally from the caching server.

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[1] https://www.dhakatribune.com/showtime/2019/05/30/conditional-permission-for-netflix-cache-servers-in-bangladesh
[2] http://www.btrc.gov.bd/national-internet-exchange-nix
[3] https://www.ibm.com/support/knowledgecenter/en/ssw_aix_71/devicemanagement/caching_concept.html

There has been an increasing Internet demand following the widespread coronavirus-driven lockdown in early 2020[4]. The workplace, schooling, commerce, and entertainment have all moved online, and the usage of Internet per house has increased rapidly.[5] In Bangladesh, the Ministry of Posts, Telecommunications and Information Technology of Bangladesh reported that there has been a massive increase in the usage of Internet during the lockdown[6] and Bangladesh's bandwidth usage has shot up by 150 Gbps[7]. In this whole process, caching becomes an important part in developing a critical aspect of the content delivery chain.

Throughout the world, caching has been key to support the rapid change in Internet demand by making the entire Internet more reliable and resilient and ensuring the shared resources of the Internet are used efficiently[8]. It is important to note that without the availability of caching, this traffic would have to be carried on the international submarine or terrestrial links, resulting in significant congestion and degradation of service for all Internet users. Hence, the present situation necessitates the creation of an enabling environment for caching.

b.   General Benefits of Caching:

To highlight some of the general benefits of caching:

- **Caching provides benefits to consumers** by enabling faster, cheaper and more resilient access to content. The delay between a consumer requesting a service and receiving a response from that service is heavily reduced because of caching, and this can have a significant impact on consumers' quality of experience. For example, consulting firm Analysis Mason has reported that 53% of mobile site visits are abandoned if the site takes longer than three seconds to load. These delays are avoided through caching. Clearly, caching can help deliver material improvements in the quality of user experience.[9]

- **Caching allows for more efficient use of network capacity**, reducing the number of 'trips' to request and serve content to users. The use of caching reduces latency in delivering content requested by the user, as it will take less time to deliver content from a caching server located closer to the user compared to the hosting server, which may be further away. Caching services reduce network congestion and ensure adequate network capacity to support multiple services.[10] Caching can provide improved service availability, as it enables network loads to be balanced across multiple caches rather than a single hosting server.

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[4] https://www.technologyreview.com/2020/04/07/998552/why-the-coronavirus-lockdown-is-making-the-Internet-better-than-ever/
[5] https://www.forbes.com/sites/markbeech/2020/03/25/covid-19-pushes-up-Internet-use-70-streaming-more-than-12-first-figures-reveal/#330d6d8f3104
[6] https://www.dhakatribune.com/bangladesh/2020/04/11/bandwidth-consumption-spikes-following-lockdown-in-bangladesh
[7] https://www.dhakatribune.com/bangladesh/2020/04/11/bandwidth-consumption-spikes-following-lockdown-in-bangladesh
[8] https://www.analysysmason.com/contentassets/cb6f16932339489fa50ca31f6e89244d/analysys-mason_benefits-of-caching_may-2020.pdf
[9] https://www.analysysmason.com/contentassets/cb6f16932339489fa50ca31f6e89244d/analysys-mason_benefits-of-caching_may-2020.pdf
[10] https://www.analysysmason.com/contentassets/cb6f16932339489fa50ca31f6e89244d/analysys-mason_benefits-of-caching_may-2020.pdf

- **Caching helps telecom operators** as it reduces the reliance of Network Service Providers on international links for static content. This frees up capacity for dynamic content and helps ISPs manage their bandwidth costs. In Bangladesh, there is a relatively high price of international connectivity, which means that international links are under-provisioned compared to the demand. The use of caches can reduce the demand on these links, significantly improving the usability of Internet services during peak usage times.[11] Downstream deployment of servers is best suited to improve bandwidth efficiency, as this allows ISPs to deliver content faster and reduces the costs incurred by ISPs in retrieving content from a centralized location.

- **Caching benefits the market** as it helps in developing dynamic competition and innovation. With access to caching services, especially those available downstream, there is a low entry barrier for emerging content providers. Thus, this system supports all small companies in delivering innovative services to consumers. Through this system, smaller companies can deliver a good user experience without making costly infrastructure investments, enabling them to compete with more established players.[12] For existing service providers, caching allows them to scale up to provide access to more high quality content more easily.

- **Caching improves security** by allowing immediate access to enterprise-level security features. This includes protection from common network attacks such as distributed denial of services (DDoS).

- **Caching can help provide environmental benefits**. This can happen by making extensive use of shared infrastructure rather than standalone infrastructure. For example, Cloudflare has reported that using its infrastructure can result in a 30% more efficient use of processing units compared to standalone infrastructure. This can thus lead to significant reductions in power consumption.[13]

c. Downstream Placement of Caches

We understand from news reports that in some cases conditional approval is being given for placement of caches at NIXs only.[14] In this regard, we would like to submit that:

- **Upstream deployment increases latency**: Placement of caching servers only in NIXs degrades consumer experience, as there will be a limited number of servers to service consumer needs, which would increase the amount of time needed to retrieve content from such servers. By contrast, if the servers were to be deployed downstream, a larger number of such servers could be deployed. This would facilitate quicker services for consumers, as caching servers deployed in the premises of ISPs and MNOs would be able to meet the needs of a larger number of users, with multiple caching servers at multiple locations, where the proximity between the user and the server would be greater.

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[11] https://www.analysysmason.com/contentassets/cb6f16932339489fa50ca31f6e89244d/analysys-mason_benefits-of-caching_may-2020.pdf

[12] https://www.analysysmason.com/contentassets/cb6f16932339489fa50ca31f6e89244d/analysys-mason_benefits-of-caching_may-2020.pdf

[13] https://www.analysysmason.com/contentassets/cb6f16932339489fa50ca31f6e89244d/analysys-mason_benefits-of-caching_may-2020.pdf

[14] https://www.dhakatribune.com/showtime/2019/05/30/conditional-permission-for-netflix-cache-servers-in-bangladesh

- **Higher costs for consumers**: The placement of caching servers only in NIXs would increase costs for ISPs and MNOs since they would need to purchase bandwidth from NIXs to access and deliver the content from caching servers. The increased costs would in turn be passed on to the consumers, resulting in higher data tariffs. This is especially harmful for customers located in rural areas. Higher data tariffs may prohibitively impede their access to the internet. As mentioned above, there has been a massive increase in internet usage in Bangladesh. The rapid growth of the internet and resultant benefits would also be obstructed by higher data costs.

- **Network congestion**: Bangladesh has only 6 NIX operators,[15] and all ISPs and MNOs may have to obtain interconnection with the NIX operators to access the caching server as they cannot place their own cache servers. This would place pressure on network capabilities, and result in more congestion as compared to a situation where more ISPs can deploy their own cache servers. Thus, it would be more efficient to allow placement of servers by all ISPs and MNOs.

- **Greater centralisation and risk of failure**: The centralized deployment of cache servers runs greater risks from technological failures, thereby creating greater inefficiencies in delivering content. By contrast, if cache servers were deployed downstream, a failure at the premises of one ISP/ MNO would not impact other caching servers.

- **No additional ability to block content**: Caching has no implication on content regulation or blocking; it is merely a method to enable quicker delivery of content and reduce latency. As such, keeping caches at NIX does not provide any centralised ability to regulate or block content.

- **Absence of a market failure**: There exists a healthy and functioning market for deployment of caching servers with win-win for all - operators, consumers and content providers. We suggest that there be forbearance in regulatory intervention on issues such as pricing, location etc. in the absence of any market failure, as this would hinder innovation. The high costs created as a result of centralized deployment of caching servers would also erect barriers to entry for smaller players wishing to enter internet-driven markets.

d. Recommendations:

We recommend that regulations concerning caching should be approached carefully in order to avoid harmful disruption to legitimate content delivery, augment the quality of experience of end users, and reduce the cost of carrying and delivering traffic for content providers and licensed operators. Our primary recommendations are as follows:

i. **In order to avoid such disruptions, we recommend that BTRC expedite approvals for caching servers.** As mentioned above, caching has many benefits to both consumers and operators. Therefore, placing approvals on hold might disrupt the working of the entire Internet ecosystem in Bangladesh.

ii. **Caching approval should not be subject to conditions of centralised deployments at NIX, as this may degrade consumer experience and increase data tariffs for consumers.** BTRC

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[15] http://www.theindependentbd.com/home/printnews/200385

should encourage deployment of caches in the premises of downstream players like ISPs and MNOs.

We are hereby sharing a paper here by David Abecassis, Andrew Daly, Michael Kende, Dr Robert Woolfson on the *"Benefits of Caching"* published in May 2020. This paper elaborates on our arguments above by providing a more detailed study of caching and more evidence to prove that a facilitative regulatory framework will be useful for all stakeholders in the market and, more importantly, the citizens of Bangladesh.

As Telecom Minister of Bangladesh, Mr. Mustafa Jabbar, recently wrote[16] *"Bandwidth usage has increased in the country due to coronavirus and the sharp rise indicates that the Internet is very essential for us."* Given that the Internet is an essential service and everyone deserves a right to it, we recommend that BTRC take steps to ensure that all consumers are able to enjoy optimum use of the internet.

Thank you for your time and consideration.

Sincerely,

Jeff Paine
Managing Director
Asia Internet Coalition (AIC)

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[16] https://www.dhakatribune.com/bangladesh/2020/04/11/bandwidth-consumption-spikes-following-lockdown-in-bangladesh