

A Study of Impact to Internet Traffic during the Tokyo 2020 Games : Correlation between Traffic and TV Rating

YOSHIDA Tomoya SUZUKI Takashi MATSUZAKI Mitsunari



When world-class sporting events such as the Olympic and Paralympic Games and the Soccer World Cup are held, or when high-profile TV programs are broadcast, Internet traffic (hereinafter referred to as “traffic”) is affected. In the Olympic and Paralympic Games Tokyo 2020, we observed some interesting fluctuations in Internet traffic during the opening and closing ceremonies of the games, as well as during the events, which conflicted with the TV viewership. In this article, we introduce those traffic trends.

Keywords : Traffic, TV ratings

1. Introduction

Human behavior and traffic are closely related. For example, the recent coronavirus disease 2019 (COVID-19) increased the traffic due to the stay-home, and the traffic increases temporarily when a high-profile event is held via the Internet due to increased Internet viewers.

In the Olympic and Paralympic Games Tokyo 2020 (hereinafter referred to as “Tokyo 2020 Games”), we observed an increase in online viewing traffic due to online distribution via TVer and gorin.jp, while a decrease in traffic was observed during TV broadcast by NHK and commercial broadcasters. In section 2, we introduce the actual traffic fluctuations concerning TV viewership. Note that the traffic trends introduced here include the amount of Internet viewing.

2. Traffic Trends of Tokyo 2020 Games

In this section, we introduce the traffic trends of the Tokyo 2020 Games, including the overall trends, the opening ceremony, and the trends of the most popular events.

2.1 Overall Trends during the Games

Figure 1 shows the traffic trends of OCN, an NTT Communications Internet service provider.

During the Tokyo 2020 Games, especially from the end of July to the beginning of August, a significant decrease in Internet traffic was observed for a certain period. This means that many people watched the competition events on TV, resulting in a decrease in traffic volume. Internet traffic volume declines when high-profile events are held. However, characteristics such as a decline in traffic over a period are rare and have not been observed in recent years except for the Tokyo 2020 Games.

This trend is similar to the decrease in traffic observed during the year-end and New Year holidays. Internet usage decreases for about a week during the year-end and New Year holidays due to increased TV viewing at

YOSHIDA Tomoya
Cloud and Network Services, NTT Communications Corporation
E-mail tomoya.yoshida@ntt.com
SUZUKI Takashi
Cloud and Network Services, NTT Communications Corporation
MATSUZAKI Mitsunari
Cloud and Network Services, NTT Communications Corporation
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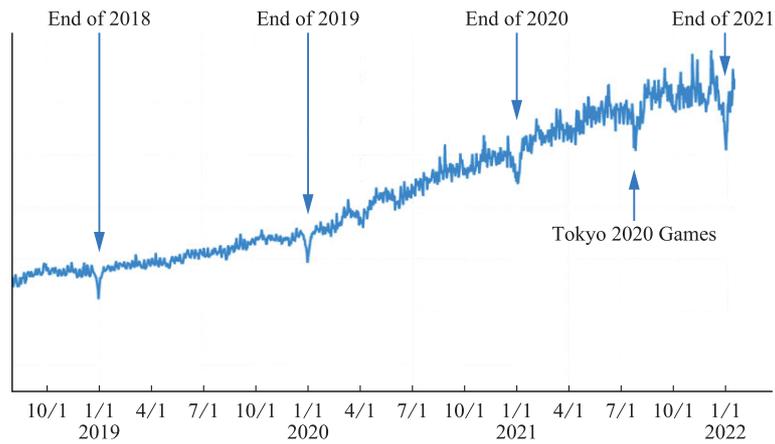


Figure 1 OCN Traffic Trends

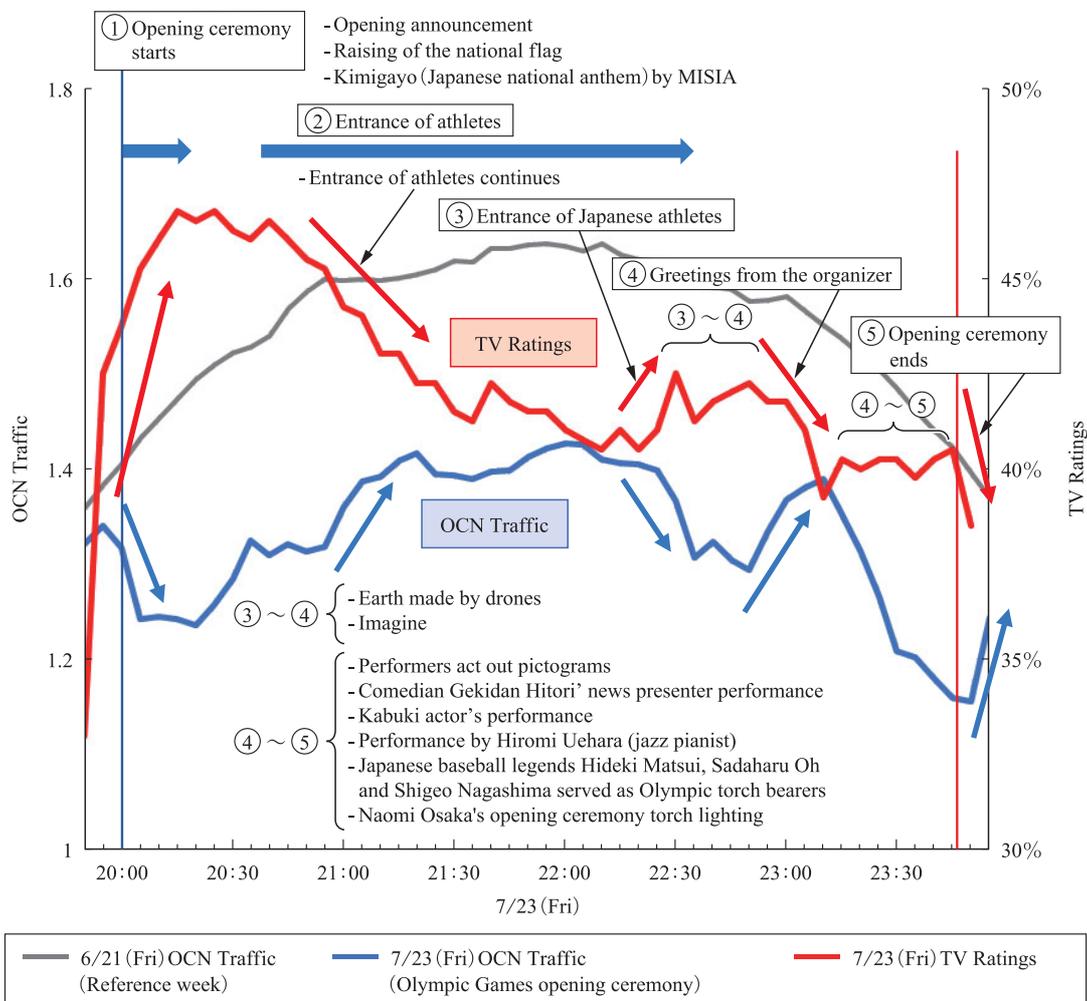


Figure 2 Traffic Trends during Olympic Opening Ceremony

home and when returning home. Traffic trends for the Tokyo 2020 Games are similar to this trend.

2.2 Traffic Trends during the Opening and Closing Ceremonies

Next, we introduce the traffic trends during the opening ceremony of the Tokyo 2020 Games. Figure 2 shows the correlation between the traffic for the opening ceremony of the Tokyo 2020 Games and the change in TV viewership⁽¹⁾ (the change in traffic when the average weekly traffic during the base week of June 21 is set to 1).

Characteristic changes were observed in ①~⑤. The traffic decreased when the TV viewership increased and conversely increased when the TV viewership decreased for the various events of the Olympic opening ceremony⁽²⁾. The increase or decrease in traffic was inversely related to the level of interest of the TV viewers, which was an interesting result.

- ① Traffic decreased with the start of the opening and closing ceremonies.
- ② Traffic increased during the entrance of the athletes.
- ③ Traffic decreased with the entrance of the Japanese athletes.
- ④ Traffic increased during the time of the greeting by the organizer of the games.
- ⑤ Traffic increased after the closing ceremony.

Compared to the traffic trend on the same day of the week of June 21, approximately one month before the opening ceremony, the traffic volume decreased considerably on the day of the opening ceremony, indicating a high level of interest. In Figure 3, the closing ceremony of the Olympic Games⁽³⁾, the traffic decreased at the beginning of the closing ceremony and the entrance of the Japanese athletes, which may be due to the increase in the number of TV viewers.

During the opening ceremony⁽⁴⁾ and closing ceremony⁽⁵⁾ of the Paralympics (Figure 4 and Figure 5, respectively), although the traffic did not increase or decrease as much as in the Olympics, it did increase or decrease according to the level of attention to each event.

It can be said that there was an inverse relationship between the level of interest of the TV viewers and the traffic.

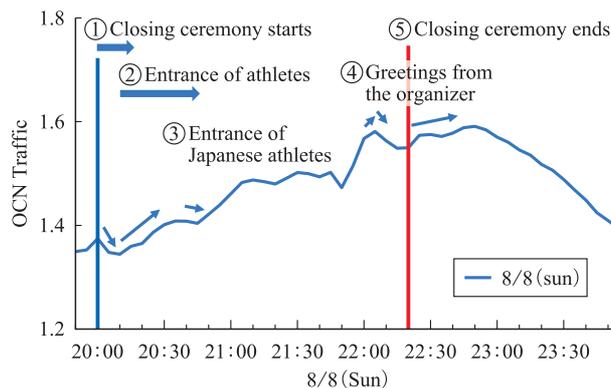


Figure 3 Traffic Trend of Olympic Closing Ceremony

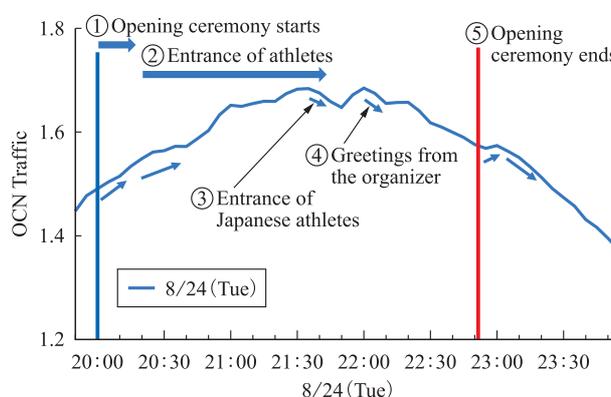


Figure 4 Traffic Trends for the Opening Ceremony of the Paralympics

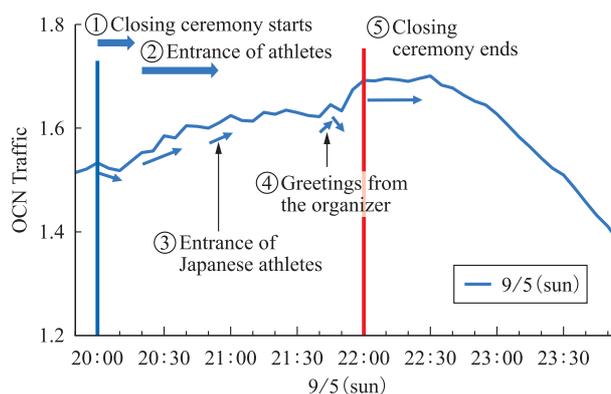


Figure 5 Traffic Trend of Paralympic Games Closing Ceremony

2.3 Event Traffic Trends

Here are two of the most high-profile traffic trends in the Olympic competitions.

2.3.1 Japan Men's Soccer Semifinal (August 3)

One of the most popular events was the semifinal of

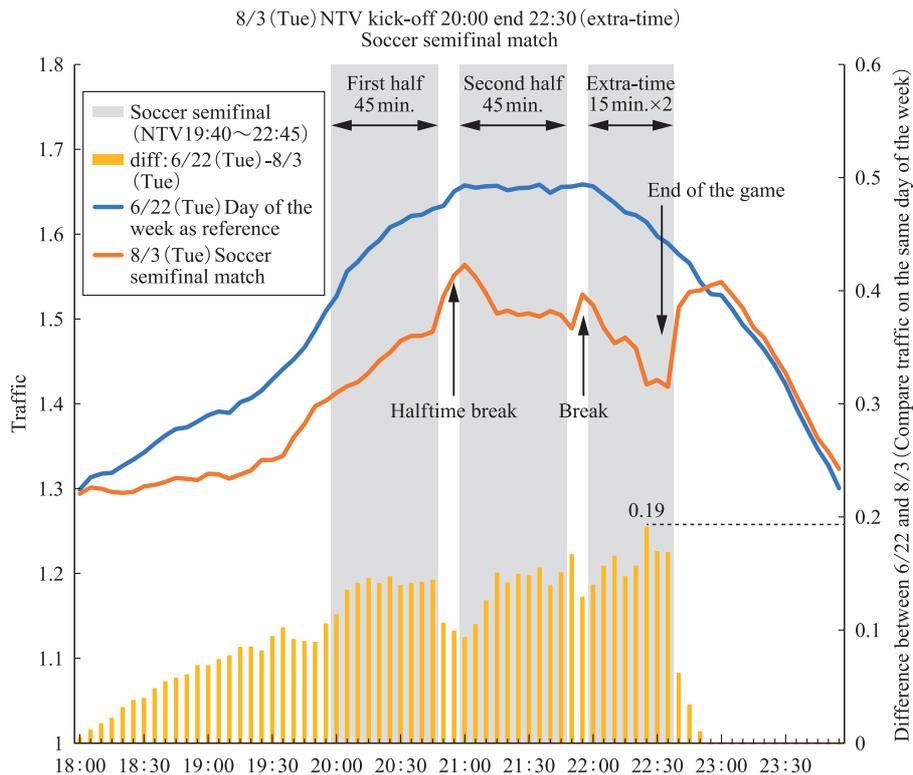


Figure 6 Traffic Trend of Men's Soccer Semifinal

the Japanese men's soccer tournament. The traffic also showed characteristic changes.

As shown in the red line in Figure 6, traffic growth slowed down before 20:00, when the various games were being watched on TV, but after 20:00, when the soccer game started, the growth slowed down further. The decrease in traffic also indicates the degree of attention paid to this game. Then, at around 20:45, the traffic increased significantly at the end of the first half. This indicates that Internet users increased after the first half when they temporarily stopped watching TV. When the second half of the game started, the traffic decreased again. The traffic trend shows that people watch TV during soccer games and use the Internet during breaks. The traffic increased temporarily during the break before the extra time, as well as during the half time. The traffic decreased more and more during extra time as more attention was paid to the match. The traffic increased around 22:30 when the game ended and returned to the usual traffic trend about 30 minutes later.

The same traffic trend was observed for the high-profile soccer matches at the Olympics and the World Cup, and the high-profile Japanese men's semifinal soccer match at the Olympics was a remarkable result.

2.3.2 Samurai Japan Baseball Final (August 7)

Another high-profile event, the final game of the Samurai Japan baseball tournament, was also observed as a high-profile event.

As shown in Figure 7, a decrease in traffic was observed from 19:00 during the final game, during the gold medal game of Samurai Japan. A certain amount of traffic decreased for an extended period compared to Saturday traffic during the week of June 21. The traffic change results appear to reflect the tendency of baseball to have longer game times than soccer and no significant scene changes. The traffic decreased further because of the tense matchups and the final game for the gold medal by Samurai Japan, which is inversely related to the increase in the number of TV viewers. (Estimated because TV ratings are unknown.) The most significant decrease in traffic was observed at the moment of the victory. It is assumed that this moment attracted the most attention. The traffic decreased but returned to the usual at 23:00. The Internet traffic returned to regular traffic relatively soon after the soccer game because the team lost the game. However, Internet traffic returned to regular traffic late in the day after the baseball game because the baseball team won the gold medal, and it was a Saturday.

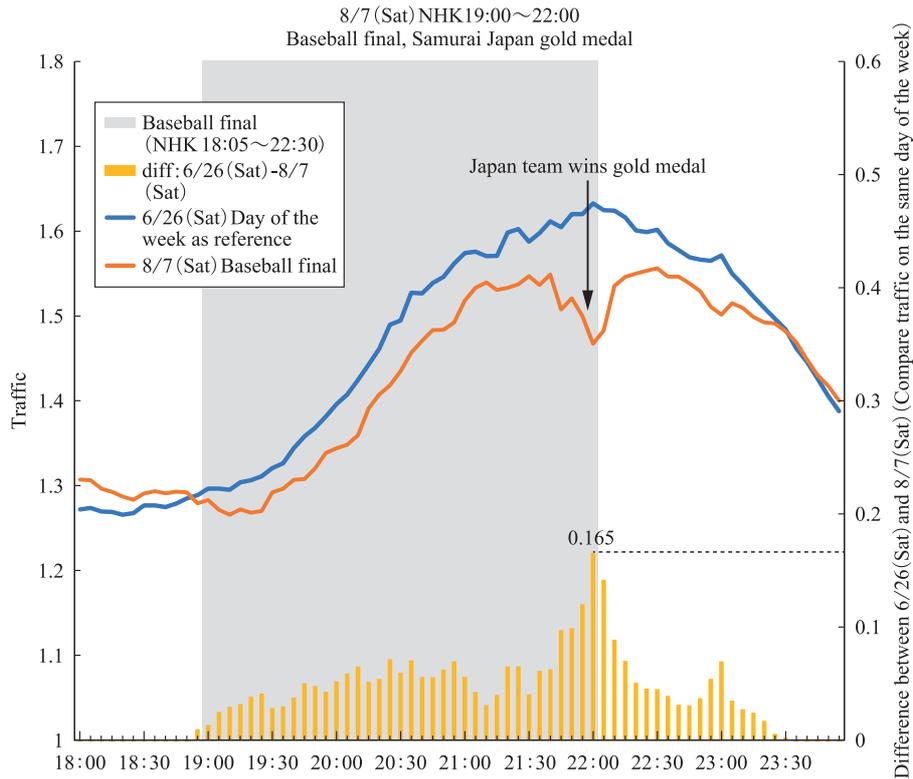


Figure 7 Traffic Trend of the Final Match of Samurai Japan

Table 1 Traffic Difference Compared to the Same Day of the Week on June 21

	Day of the week	Difference from normal (Max. value)
Opening ceremony	Friday	0.298
Soccer semifinal	Tuesday	0.191
Baseball final	Saturday	0.165

2.4 Traffic Differences from Usual Times

Table 1 shows the maximum difference in traffic between the three events, the opening ceremony of the Olympics, the men's soccer semifinal and the baseball final, compared to the same day of the week on June 21.

This table shows the attention paid to the opening ceremony. The traffic difference from the usual time was higher for the soccer semifinal held on Tuesday than for the gold medal-winning baseball game, and the overall traffic decrease was also higher, indicating the high level of attention and interest.

3. Conclusion

In this article, we introduced traffic trends for the Tokyo 2020 Games and found an inverse relationship between traffic and TV viewership. The most high-

profile events, such as the Olympics, saw an increase in TV viewership and a decrease in Internet traffic. The results were particularly interesting for the opening ceremony and other high-profile competition events, where traffic fluctuations were observed for each scene.

Not only at this Tokyo 2020 Games but also at various other events, human behavior and characteristics can be extracted from changes in Internet traffic. It is expected that traffic trends will continue to be analyzed from various perspectives in the future.

References

- (1) Yahoo! JAPAN News, "Viewership of the Opening Ceremony : 42.5%, Triple that of Rio." <https://news.yahoo.co.jp/byline/suzukiyuji/20210724-00249622>
- (2) The Olympic Games Tokyo 2020 Opening Ceremony. <https://www3.nhk.or.jp/news/html/20210723/k10013155501000.html>
- (3) The Olympic Games Tokyo 2020 Closing Ceremony. <https://www3.nhk.or.jp/news/html/20210808/k10013189101000.html>
- (4) The Paralympic Games Tokyo 2020 Opening Ceremony. <https://www3.nhk.or.jp/news/html/20210824/k10013221141000.html>
- (5) The Paralympic Games Tokyo 2020 Closing Ceremony. <https://www3.nhk.or.jp/news/html/20210905/k10013245281000.html>

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YOSHIDA Tomoya

YOSHIDA Tomoya graduated from Chuo University in 1998 with a bachelor's degree in Information Science and Technology. He joined Nippon Telegraph and Telephone Corporation in the same year. Since then, he has been engaged in the operation and development of IP networks. He is an evangelist at NTT Communications Corporation, Director of the Cloud and Network Services Department, and Chair of the CONECT :COuncil for Network Efficiency by Cross-layer Technical members.



MATSUZAKI Mitsunari

MATSUZAKI Mitsunari graduated from Kumamoto National College of Technology in 2017 and joined NTT Com Engineering Corporation in the same year. Since then, he has been engaged in the operation and development of FLET'S network services. Currently, he works at Cloud and Network Services Department, NTT Communications Corporation.



SUZUKI Takashi

SUZUKI Takashi joined Nippon Telegraph and Telephone Corporation in 1996. 2012 Joined NTT Communications Corporation, where he was engaged in the development of domestic IP networks and FLET'S network services. Currently, he is a Cloud and Network Services Department manager, Data Analyst.

