The Anatomy of Olympic Games: a Mobile Traffic Demand Perspective

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Abstract

Summer Olympic Games are one of the major sports and social events worldwide, attracting global media attention, thousands of athletes, and large crowds to the hosting country. As such, the Olympics also represent a moment of severe strain for local infrastructures, including the telecommunication one. Yet, very little is known about how this large event affects demands for telco services. In this paper, we explore how the 2024 Summer Olympics hosted by Paris, France conditioned local mobile data traffic volumes and dynamics. We do so from a privileged vantage point by analyzing measurements collected in Orange's production network, largest mobile operator in the country and the official communications partner to the event organization. Our results shed light on a variety of aspects, including how Olympic Games affect consumption of mobile services, the burden that the event imposes on the local mobile network infrastructure, and how operators prepare for it.

CCS Concepts

• **Networks → Mobile networks**; **Network measurement**.

Keywords

Olympic Games, Service demands, Mobile network measurement

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1 Introduction

Summer Olympic Games are the major multi-sport event in the world, held every four years and bringing together athletes, coaches, reporters, and fans from over 200 countries. The Paris 2024 Summer Olympics took place from July 26 to August 11, 2024 with sportive events starting on July 24. Contests were held on newly developed and modern facilities, as well as in iconic urban settings, attracting fans not only for the games but for the one-of-a-kind views. During the 2024 Olympics, more than 9.5 out of the 10 million available tickets were sold as five different sports broke all-time attendance records; fan zones in the city attracted over 90,000 people per day; and 11.2 million visitors traveled to the Paris region [12].

Such a large-scale multi-week event clearly represents a circumstance of particular stress on the local transport, accommodation or communication infrastructures. Yet, our understanding of how a city-wide happening like the Olympics impacts the indigenous mobile traffic demands or how Mobile Network Operators (MNOs) prepare to accommodate them is limited. Previous studies about the relationship between social events and the mobile traffic have focused on much more circumscribed happenings like concerts [6, 16], individual sport matches [14, 25, 26], leisure gatherings [4], road congestion [11], or public manifestations [22, 27]. In most cases, these investigations have been carried out from a client-side viewpoint, by analyzing social media activity [2, 8, 24] or specific classes of applications [18, 23], whereas MNO perspectives are more widely explored to characterize typical traffic conditions [19, 20]. These prior works concur that social events leave strong footprints on mobile service utilization that are very diverse across types of events. This further motivates the importance of comprehending how a unique happening like the Olympics affects mobile traffic.

In this paper, we provide first insights into the dynamics of mobile traffic demands during the most recent installment of the Olympic Games. We benefit from the privileged vantage point of Orange–the MNO serving as the official communications partner to the event organization–and provide original figures about the overall data traffic usage in the Paris region during the Olympics, the specific demands at the venues hosting the different sports events, and the way individual mobile applications are affected by the Games. Our results complement and expand the few available reports on mobile network performance during the 2024 Olympics, which rely on crowdsensed measurements and offer a very partial view of the effects of the event on the mobile demands [9, 13]. Yet, it is worth noting that the scope of the study is restricted to Orange subscribers only, hence traffic generated by foreigner visitors–a minority when compared to French tourists, yet a relevant one–is not covered by our analysis. Also, given the distinct nature of the event, insights derived in Paris may not directly generalize to Olympic Games organized in previous years at other venues.

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2 Methodology

Our work analyzes measurements from the production network of Orange, collected in a continuous manner from July 31, 2023 to September 14, 2025, as detailed in § 2.1. The representativeness of such data is then discussed in § 2.2.

2.1 Mobile traffic measurements

We analyze the traffic served by over 24•000 antennas covering the Paris region where most of the activities related to the 2024 Olympic Games were held. Based on information about the RAN infrastructure, we also identify a set of *Olympics antennas* that were specially installed for the Games, *i.e.*, deployed in the two months preceding the event and dismantled in the two months following it.

Our focus is on 4G and 5G data traffic since the other Radio Access Network (RAN) technologies account for a tiny (<0’5%) fraction of the demand in the target region. At the time of the collection, Orange had a non-standalone (NSA) 5G deployment, where mobility control operations for both 4G gNodeBs and 5G eNodeBs happen via the 4G Mobility Management Entity (MME). Monitoring the S1-MME interface allows localizing both 4G and 5G equipment by associating them to a carrier (hence to its geographical site) at every time they generate signaling traffic.

The traffic generated by Orange subscribers was analyzed via proprietary classifiers that hinge upon Deep Packet Inspection (DPI) and tap at the SGi interface of the 4G Packet Gateway (PGW) that is serving both 4G and 5G users in the NSA 5G deployment. The vantage point within the core network lets the classifiers analyze IP packets in all user sessions through advanced traffic inspection techniques–such as IP to domain mapping, protocol detection, TLS fingerprinting, and analysis of packet payload signatures, among others–and allows the association of each IP traffic flow to one mobile application. Although the precise operation of the classifiers is confidential, they are asserted to operate under challenging real-world conditions such as encryption and shared infrastructures, as per state-of-the-art approaches in the literature that report high accuracy (>98%) in such environments [1, 15]. Indeed, the classification results we employ are systematically used in production by the operator, *e.g.*, for network monitoring and optimization.

By crossing the localization information with the service-level classification data, and aggregating the result over all mobile devices attached to every RAN carrier, the operator computed the demands for each application served by every carrier. For this study, such information also accumulated into 5-minute intervals. The result are time series of the volume of traffic (in bytes) generated by over 400 mobile services at each of the target 24•200 carriers at every 5 minutes. As discussed in detail in App. D, the data measurements and processing abide by all applicable regulations, and the resulting aggregates are privacy-preserving since they do not allow re-identifying individuals or retrieving personal information.

2.2 Data representativeness

Our measurement data is limited to one MNO and to its customers. We cannot track traffic demands served by other operators or generated by international users–not even if they are roaming through the local Orange network. Hence, our study only observes a portion of the total mobile traffic that is consumed in the Parisian region during the Olympic Games. In particular, we are unable to offer insights on the behavior of international visitors during the event. As the absence of certain groups of Olympic visitors may introduce bias in the observed patterns, it is important to discuss how suitable the available data is for our target characterization task.

First, we highlight that Orange has a large market share above 30% in France, hence it is safe to assume that the monitored demands are representative of the national usage patterns. Second, the official post-event figures show that the total number of visitors in the Paris region during the Olympics was 11.2 million. However, 85% of those visitors came from other regions of France [12], meaning that they are captured by our data–always proportionally to the Orange market share. This is consistent with observations that international tourists visiting a location for a large-scale sport event typically have a significant negative effect on the number of foreign visitors that would travel to the same location otherwise [7]. Ultimately, the limited presence of roaming users lets us hypothesize that not tracking them does not curb the validity of our observations.

3 Olympics and citywide demands

We first study the impact that the Olympic Games have on the overall network load. The Games are held during the summer period, when seasonal migration typically induces a significant drop in mobile traffic consumption across both monitored radio access technologies, as shown in Fig. 1 using normalized traffic volumes to abide by the non-disclosure agreement with the MNO. The figure highlights in green the weeks from July 22 to August 11, 2024, during which the Olympics were held. Equivalent calendar weeks in 2023 (July 31 to August 13) and in 2025 (July 28 to August 10) are shown in light gray for comparison. Additionally, typical summer weeks (defined as the last two weeks of August) are highlighted in dark gray: these are August 14-27 in 2023, August 12-25 in 2024, and August 11-24 in 2025. Although peak tourism in the Paris region typically extends from June to August, we focus on summer periods that also capture the well-known exodus of local residents, which usually begins in late July. In the plots, the reduction in the demand during summer is computed with respect to a regressed line that captures the growing trend of consumption in normal non-vacation times (*i.e.*, excluding July and August) over the full observation interval: the drop is in the 30–40% range in 2023, and in the 20–30% range in 2025. The relative traffic increase in summer 2025 with respect to 2023 aligns with the recent growth in summer tourist activity in the Paris region [21]. However, the Olympics have a clear impact on the summer mobile network utilization, as the traffic is much higher than usual for the period and the reduction in the demand is strongly mitigated (-17%) in 4G and absent (+2%) in 5G. Still, the total traffic volume induced by the Games is below (4G) or on par with (5G) that served in other seasons.

While the total traffic load generated during the Olympic Games is not extraordinary compared to that normally absorbed by the local RAN, it may be that the demands during the event have peculiar spatiotemporal dynamics that do not align well with the existing RAN planning: for instance, the Olympics may cause network dimensioning issues and service degradation if they were to create moments of high demand in specific neighborhoods where the peak traffic is usually low. In order to verify if this is the case, we study the spatial and temporal patterns of the overall mobile

(a) Total (b) 4G (c) 5G

Figure 1: Weekly mobile traffic consumption (dots) for the observation period between Aug-23 and Aug-25, with a linear fit over the normal, *i.e.*, non-vacation, periods (red solid line). Traffic changes are reported for the Olympic Games weeks (green region), and typical summer periods (dark gray regions). The summer weeks in 2023 and 2025 that correspond to those when the Games are held in 2024 are told apart (light grey region). Plots refer to the (a) total, (b) 4G, and (c) 5G traffic. Traffic volumes are normalized to abide by the non-disclosure agreement with the MNO.

(a) Normal (b) Olympics (c) Summer

Figure 2: Anonymized time series of traffic demands for (a) normal non-holiday, (b) Olympics, and (c) typical summer period.

traffic during the Olympics and compare it against that observed in normal non-holiday and summer conditions.

For the spatial analysis, we estimate the geographical distribution of the demand served by each antenna in our dataset at a $100 \times 100\,\text{m}^2$ resolution using DeepMEND [17] and aggregate the results over all antennas on IRIS areas, *i.e.*, the finest-grained statistical zoning in France. Fig. 8 in App. A shows maps of the spatial distribution of the mobile traffic in the Paris region during a normal non-holiday period (from May 20 to June 2, 2024), the Olympics (from July 22 to August 11, 2024), and a typical summer (from August 12 to August 25, 2024). Interestingly, the maps look almost indistinguishable across the three time periods, implying that the Games do not induce spatial unexpected patterns in the mobile demand. This is confirmed by the Earth Mover's Distance (EMD), which quantifies the dissimilarity between distributions and is commonly used in pattern recognition. The EMD between the different maps in Fig. 8 in App. A is low, in the order of $0.01-0.02$, confirming their structural similarity; for comparison, the EMD between the morning and afternoon periods of a typical day is ten times higher at around 0.1, indicating that the traffic fluctuations normally observed in a working day are much higher than the differences in the geographical patterns of demands spawned by the Olympic Games.

In order to investigate the temporal fluctuations of traffic, we compare weekly time series of the average demands recorded in the Paris region during the different time periods. Fig. 2 shows the time series with hourly resolution. It is apparent that, as already discussed, network utilization during the Olympics is higher than in a regular summer but lower than in a normal period. In fact, not only the volume but also temporal fluctuations of traffic observed during the Olympics seem an interpolation of behaviors in the summer and normal periods: for instance, the high imbalance of demands between working days and weekends or the morning, midday and afternoon peaks that characterize non-holiday periods are absent during summer but partially appear with Olympic Games.

We also more formally prove our point by computing the dynamic time warping (DTW) distance between the time series, upon an individual min-max normalization that removes the bias of volume differences. We observe that the DTW is 30% lower between the Olympics and a normal period than between the latter and any summer time. This also holds for the same weeks of the Olympics in 2023 and 2025, denoted by a lighter gray intervals in Fig. 1, proving that the temporal patterns observed during the Olympic Games are due to the event and not typical of the weeks when it takes place.

Finally, we investigate the impact of the Games on the city-wide mobile traffic at a higher temporal resolution of 15 minutes. Fig. 3a shows experimental distributions of the per-15-minute demand in Paris during the normal working period, Olympics, and typical summer, respectively. The complete distributions corroborate our earlier observations, as Olympics yield values in between those observed in the other two periods, and confirm that such a pattern occurs consistently in time. However, interesting differences emerge when focusing on the location of traffic peaks, *i.e.*, samples in the rightmost portion of the distributions. Fig 3b juxtaposes the locations of the highest-valued samples in the distributions for normal and Olympics periods, showing a completely different distribution. Specifically, we find that all traffic peaks during the Games

(a) Traffic distribution (b) Traffic peaks

Figure 3: (a) Distribution of city-wide traffic volumes at 15-minute resolution for different periods. (b) Spatial distribution of traffic volumes during peak traffic intervals for normal (top) and Olympics (bottom) periods.

are driven by major events, such as the Olympic Ceremony which is depicted in the bottom-right plot of Fig 3b or finals.

Key insights: while they dramatically increase the mobile demand in the region with respect to a typical summer, the Olympics do not generate higher traffic than in normal working periods, nor they induce strongly unique spatial or temporal dynamics in the network load. Overall, the Games do not appear to strain the Paris citywide communication infrastructure and the vast majority of the legacy RAN deployment is sufficient to serve the demands during the event. However, significant effects emerge in the traffic demands recorded at the specific venues where the sports events take place.

4 A focus on Olympic venues

Motivated by the latest result above, we focus our investigation on the Olympics venues. To this end, we gather information from official sources regarding the locations where Olympic-related activities were held: these include the sport facilities and fields, the Olympic Village where athletes live, the area of the opening ceremony (a boat parade along the Seine river), and dedicated fan zones (e.g., the Parc de la Villette where Olympic Committees of different countries organize their national houses, or the Trocadéro Gardens where athletes celebrate their victories with fans) [5, 10]. We also consider the location of major transport hubs, such as airports and train stations, as they serve as the entry point for millions of visitors during the Olympics. A map of the venues we analyze and a complete list of the same is in App. B.

For each Olympic venue, we single out the RAN antennas providing coverage to the local events by considering all sites located within the venue surface plus a 500-meter surrounding buffer. Fig. 9b in App. B illustrates the process for three representative venues. This lets us associate to every venue a mobile traffic time series for the three weeks of the Olympic Games: Fig. 4 shows examples of such time-varying demand volumes at three venues. In the same figure, the time intervals during which qualifying events and finals take place are marked in gray and green, respectively.

In general, it is easy to spot a significant increase in mobile traffic whenever an event is close to begin or is underway. However, it is worth noting that medal events do not necessarily induce the highest demands and peaks may instead occur during qualifiers, mainly because the latter involve several contests in parallel across multiple fields hence attract larger crowds than single-event finals (e.g., equestrian sports in Fig. 4b). Another interesting effect is that some sports show clear differences in mobile traffic activity induced by men and women contests (e.g., golf in Fig. 4a, where the first set of four events is the men competition and the second is the women one) while others do not (e.g., cross-country cycling in Fig. 4c, where the two events are for female and male athletes, respectively).

We quantitatively assess the impact of the Olympics on the mobile demands at all venues in Fig. 5. First, we examine the increase in traffic relative to a normal non-holiday period as observed at times when Olympic events happen at each venue (blue). For a generic Olympic event e, the relative increase r_e and its symmetric version ρ_e are computed as

$$r_e = \frac{U(\tau_e)}{T(\tau_e)} \quad \text{and} \quad \rho_e = \frac{r_e - 1}{r_e + 1}, \qquad (1)$$

where τ_e is the time span of the event, $U(\tau_e)$ is the measured traffic at the venue during the Olympics, and $T(\tau_e)$ is the average traffic recorded in normal days at the venue during the same weekday and hours of τ_e. For our analysis, we employ ρ_e as it mitigates the unbounded growth and asymmetry of r_e, allowing for easier visualization and comparison of venues experiencing both increased and decreased traffic: $\rho_e \in [-1, 1]$ and, e.g., values equal to 0.3 and 0.5 correspond to 2× and 3× increases.

Fig. 5a shows the distribution of the ρ_e values at each venue as an interquartile box plot reporting the median as well as the 5th to the 95th percentile as whiskers. As a term of comparison, we also report the metric ρ_e in (1) for the typical summer (yellow) by replacing $U(\tau_e)$ with the average demand observed in the remaining August 2024 weeks. The plot reveals how the activity during the events is higher than normal ($\rho_e > 0$) at 24 out of the 25 sport venues, as well as in the fan zones and Olympic Village. The effect is present also at 3 out of 4 airports but not at train stations. Control tests on the typical summer show that the relative increase is negative in almost all venues in the rest of August 2024, hence the surge in mobile demands above is to be ascribed to the Olympics.

A deeper look into the relative increase reveals how the traffic load can reach high peaks during the Olympic events, as most of the sports venues experience demands that are 3× ($\rho_e \geq 0.5$) to 10× ($\rho_e \geq 0.8$) times higher than what normally served by the RAN. At a couple of venues, the traffic is two orders of magnitude higher than usual. Fig. 5b reveals that, while the highest ρ_e are artifacts of low demands in normal days, the majority of the venues attract substantial traffic in typical conditions and yet experience high mean relative increases over 50% ($\rho_e \geq 0.2$) during Olympic events.

Considering the significant surge in mobile traffic at Olympic venues, we investigate how the MNO prepared for the Games at those locations. As anticipated, temporary antennas were deployed at many of the venues specifically for the event, as also illustrated in Fig. 9b in App. B for three cases. However, the dedicated infrastructure deployed for the Olympics is far from massive: Fig. 6a shows that just 1–5% additional antennas were installed at sport venues and fan zones on top of existing RAN. Across all relevant venues, these dedicated antennas usually absorb a relatively low

(a) Golf National (b) Château de Versailles (c) Elancourt Hill

Figure 4: Time series of the mobile traffic recorded at different Olympic venues throughout the three weeks of the event. The shaded intervals pinpoint the periods when qualifying rounds (gray) and finals (green) were celebrated.

(a) Distribution of relative increase (b) Relative increase vs normal traffic

Figure 5: Traffic volume changes at the venues with respect to the normal period. (a) Distribution of the relative demand increase during the Olympic events (blue) and during the typical summer (yellow). (b) Mean relative increase during the Olympic events versus the (normalized) average traffic non-holiday volume at the venue.

(a) Olympic antennas prevalence (b) Surplus traffic absorbed

Figure 6: Impact of the dedicated RAN infrastructure deployed at the Olympic venues. (a) Percentage of Olympic antennas at each venue. (b) Distribution of the percentage of the surplus mobile traffic generated during the events that is absorbed by Olympic antennas at sport venues and fan zones.

1 20% of the traffic demand generated by Games-related activities[1], as portrayed by the interquartile box plots with 5th 95th percentile whiskers in Fig. 6b. However, they are fundamental to accommodate outlying traffic peaks (red dots), in which cases they serve up to 10 50% of the demand.

Key insights: Mobile demands surge dramatically at many Olympic venues but exclusively during the associated events. In those occasions, the Games can induce huge peaks of activity not observed in normal conditions even at locations where the usual load is significant. Deploying a limited amount of dedicated antennas helps substantially in absorbing such bursts

5 Olympics and mobile services

The observed unusual traffic demands at Olympic venues may be linked to unconventional consumption of specific classes of mobile applications. To explore this possibility, we quantify the relative usage of popular applications listed in App. C at the venues. More precisely, we leverage the Revealed Comparative Advantage (RCA), originally introduced for international trade analysis, and later adapted to measure activity specialization in different contexts [3]. We define the RCA of each application 0 at every venue E as

$$\mathrm{RCA}_{0,E} \circ \frac{\bar{\$}_{0,E} / \circ_{0^1 \circ} \bar{\$}_{0^1,E}}{\bar{\$}_{0,} / \quad_{0^1} \bar{\$}_{0^1,}} , \qquad (2)$$

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[1] This is computed as the surplus traffic recorded during the Olympic events with respect to the average load observed at the venue on a normal day.

Figure 7: Heatmap of the sRCA values for 50 mobile applications (rows) at clustered Olympic venues (columns). In the bottom part, a Sankey diagram maps venue clusters and categories. The final ordering of venues and applications in the heatmap is reported in Tab. 1 and Tab. 2, respectively.

where $\bar{T}_{a,v} = \sum_{t \in \mathcal{T}_v} T_{a,v}(t)$ is the traffic volume generated by a at v during all time intervals $\mathcal{T}_v$ when Olympic events were hosted at v. We denote by $\mathcal{V}$ all the locations in the Paris region. The RCA expression in (2) captures how prevalent the demand for application a is consumed at venue v (numerator) with respect to its usual consumption in the region (denominator). To enable a more interpretable and intuitive analysis between over- and under-consumed applications, we adopt the symmetric RCA (sRCA), which normalizes the unbounded RCA in the $[-1, 1]$ range as follows:

$$\mathrm{sRCA}_{a,v} = \frac{\mathrm{RCA}_{a,v} - 1}{\mathrm{RCA}_{a,v} + 1}, \qquad (3)$$

We summarize the sRCA values for all combinations of applications (rows) and venues (columns) as a heatmap in Fig. 7. We also group venues based on agglomerative hierarchical clustering, a method that iteratively merges venues with the highest similarity. Similarity between venues is measured using the Euclidean distance between their application demand distribution (i.e., sRCA values). To determine the optimal number of clusters, we analyze the resulting dendrogram using Ward's method to identify a natural cutoff point in the hierarchical structure. This results in five clusters (A through E in the figure) that show comparable patterns of application sRCA values.

Airports and train stations have distinct characterizing clusters (A and E, respectively) that are told apart by diverse consumption patterns: for instance, audio streaming services and work-related apps are much more popular in train stations than airports. By comparing these results with those of previous studies of mobile demands in indoor environments [27], it emerges that the patterns we identify are in fact similar to those observed in normal conditions in both airports and train stations. Hence, the Olympics do not appear to have a significant effect on the usage in transportation hubs. The Olympic Village is clustered with airports, suggesting that, when resting, athletes tend to consume similar services as travelers in airports: this is understandable since in both situations users mainly seek to relax.

Instead, sport venues show a variety of usage patterns and are split across all clusters. A few sport venues are clustered with airports (A) or train stations (E): those are the Paris La Defense Arena, the Vaires-sur-Marne Nautical Stadium, and the Bercy Arena, i.e., large arenas hosting many events and medal ceremonies where sizeable crowds spend long periods of time, which could explain more usual indoor service demand patterns. A smaller cluster (D) only contains two sports venues, i.e., Elancourt Hill and Hôtel de Ville. These venues host only two short events each, which are insufficient to generate a statistically significant footprint in application sRCA values.

The most interesting behavior are observed in the two main clusters of sport venues (B and C). First, we remark that both clusters show a significantly increased usage of the last streaming service, i.e., CanalPlus (see Tab. 2), which was the official broadcaster of the Olympic Games in France. Normally a pay-for service, CanalPlus openly streamed a large number of main events during the Olympics. High consumption of live and on-demand videos about Olympic events is therefore a major characterizing factor of demands across most sport venues. Second, the two clusters appear to show similar patterns of application usage, but with different intensity: e.g., both feature increased demands for Instagram, Twitter/X, and Facebook, whereas the consumption of Netflix, Dinsey+, Snapchat, TikTok, or music streaming services is reduced. Yet, the effect is much stronger in cluster C than B. A closer inspection reveals that cluster C is composed of the seven Olympic venues with the highest mean relative increase in traffic volume in Fig. 5. This is not accidental: the demands at those venues are almost completely induced by the Olympic Games, while usages in cluster B mix the significant habitual traffic at those locations with that produced by the Olympics as it happens also in fan zones situated in popular touristic places. We conclude that usages in cluster C are more representative of a pure demand created by subscribers attending Olympic events.

Key insights: Olympic Games have a unique and distinctive signature of mobile service demands that is different from that observed in standard indoor and outdoor environments.

6 Conclusions

We analyzed the mobile traffic served during the 2024 Olympics by the operational network of the official communications partner of the event, revealing previously unknown phenomena in the demands generated by such a unique happening.

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Table 1: Venue abbreviations, descriptions and clusters.

Venue Name	Abbrev.	Description	Cluster
Aérodrome de Paris-Saclay-Versailles	PSV	Airport	A
Aéroport de Paris-Charles-de-Gaulle	CDG	Airport	A
Aéroport de Paris-Le Bourget	LBG	Airport	A
Aéroport de Paris-Orly	ORY	Airport	A
Olympic Village Paris	OVP	Athletes accommodation	A
Paris La Defense Arena	PDA	Swimming - Water Polo	A
Vaires-sur-Marne Nautical Stadium	VMN	Canoeing - Rowing	A
Champ de Mars Arena	CMA	Judo - Wrestling	B
Eiffel Tower Stadium	ETS	Beach Volleyball	B
Grand Palais	GPL	Fencing - Taekwondo	B
Invalides	INV	Archery - Marathon Finish	B
La Concorde	LCO	3x3 Basketball - Breaking - Cycling Freestyle - Skateboarding	B
Le Bourget Sport Climbing Venue	LSC	Sport Climbing	B
Pont Alexandre III	PA3	Cycling - Triathlon - Marathon Swimming	B
Porte de la Chapelle Arena	PCA	Badminton - Gymnastics	B
Parc des Princes	PDP	Football	B
South Paris Arena	SPA	Volleyball - Table Tennis - Handball - Weightlifting	B
Stade Roland-Garros	SRG	Tennis - Boxing	B
Trocadéro	TRC	Race Walk - Cycling Road Race Start and Finish	B
Yves-du-Manoir Stadium	YMS	Hockey	B
Champions Park	CHP	Medallist parade	B
Opening ceremony	OPC	Athletes parade	B
Parc des Nations	PDN	Nations "Houses"	B
Aquatics Centre	AQC	Diving - Water Polo - Artistic Swimming	C
Château de Versailles	CDV	Equestrian - Modern Pentathlon	C
Golf National	GFN	Golf	C
North Paris Arena	NPA	Boxing - Modern Pentathlon	C
Saint-Quentin-en-Yvelines BMX Stadium	SBX	Cycling Racing	C
Stade de France	SDF	Rugby - Athletics - Closing Ceremony	C
Saint-Quentin-en-Yvelines Velodrome	SVL	Cycling	C
Elancourt Hill	ELH	Cycling Cross-country	D
Hôtel de Ville	HDV	Marathon Start	D
Bercy Arena	BAR	Gymnastics - Basketball	E
Gare Austerlitz	GAU	Train Station	E
Gare de Bercy	GBE	Train Station	E
Gare du Nord	GDN	Train Station	E
Gare de l'Est	GLE	Train Station	E
Gare de Lyon	GLY	Train Station	E
Gare Montparnasse	GMP	Train Station	E
Gare Saint-Lazare	GSL	Train Station	E

A Spatial traffic

Fig. 8 shows maps of the spatial distribution of the mobile traffic in the Paris region during a normal working period (from May 20 to June 2, 2024), the Olympics (from July 22 to August 11, 2024), and a typical summer (from August 12 to August 25, 2024), respectively; the zoomed-in maps offer a view of the city center. All maps are independently z-score standardized since we are interested in the geographical patterns and not in differences of volume.

B Olympic venue information

Fig. 9 portrays a map of the Paris region with the locations of all the Olympic venues considered in our study. The figure also provides examples of individual venues and their associated RAN deployment. Tab. 1 provides a complete list of the same venues including their location, abbreviated name used in the figures, description, and category.