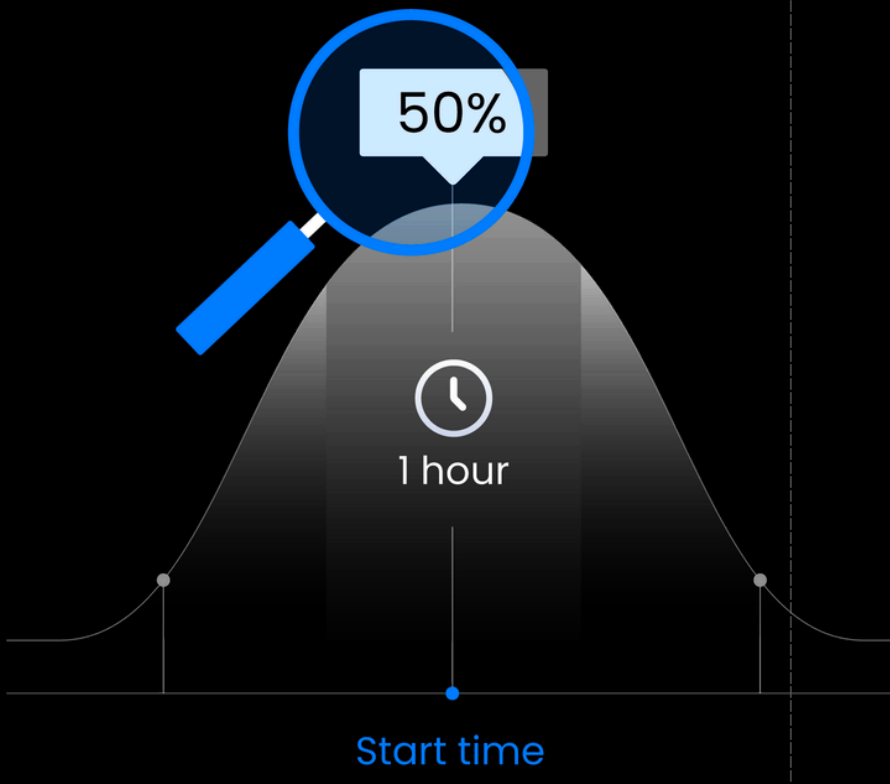
Event Data Lab Report #07

Half of Onsite Check-Ins Arrive Within a Single Hour

Data-backed benchmarks from real-world events

Arrival timing, peak concentration, and onsite throughput across 688 live events



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Executive Summary

Event teams size their check-in operation against total attendance. This report examines whether total attendance is the right planning input, using timestamped check-in records from live events to measure when attendees actually arrive and how much of an event's onsite volume lands in its busiest window.

KEY FINDINGS INCLUDE:

- In the median event, ~51% of opening-day check-ins occurred within a single 60-minute window, ~32% within a single 30-minute window, and ~19% within a single 15-minute window (Sample size 688 events).

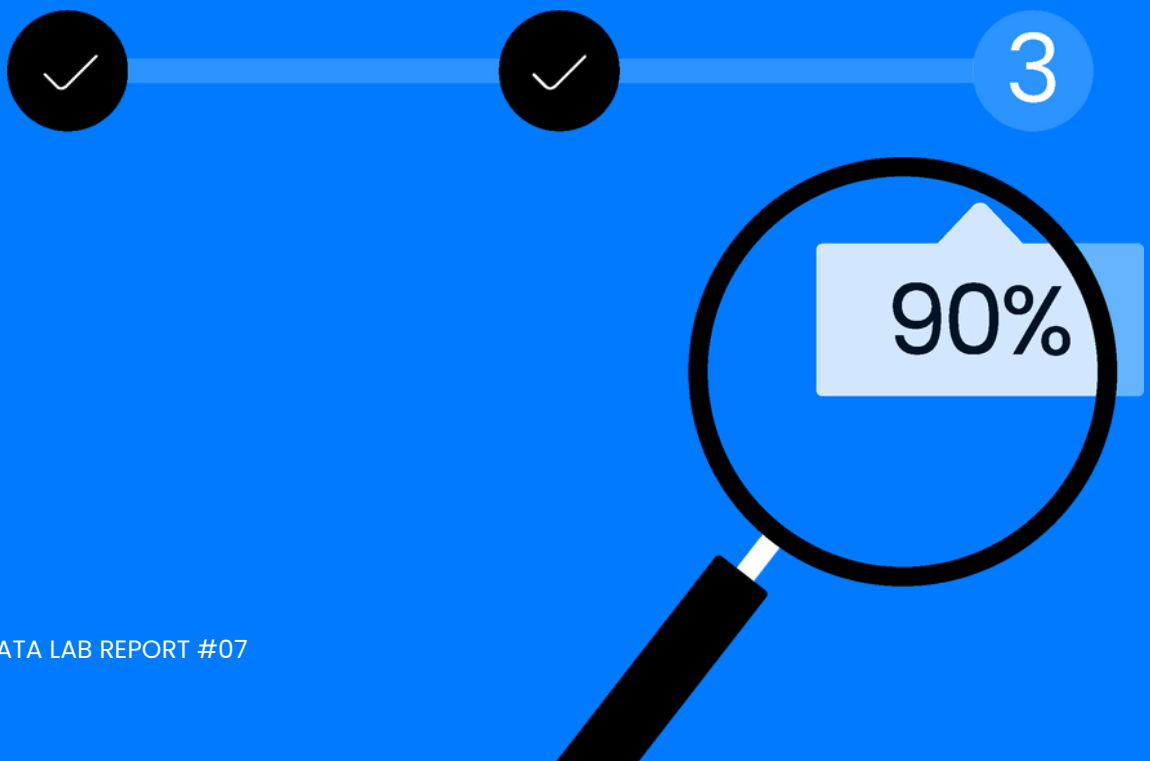
- The busiest hour began within two minutes of the published start time in the median event, with an interquartile range of 24 minutes before to two hours after.

- Peak concentration falls as events grow, but absolute peak load rises. The busiest hour absorbed ~71% of opening-day check-ins at events under 150 attendees and ~32% at events above 1,200, while the number of people processed in that hour rose from ~54 to ~287.

These findings are intended to help event teams size onsite check-in capacity against peak throughput rather than total registrations, and to identify which structural characteristics of an event predict a heavier or lighter peak.

About the Event Data Lab

The **Event Data Lab** is an ongoing research initiative focused on analyzing real-world event performance using aggregated and anonymized data. Reports published under the Event Data Lab aim to surface empirical benchmarks and operational insights across registration, onsite operations, engagement, and ROI.



Dataset Overview

This report is based on aggregated and anonymized check-in data collected across live events. No individual event or organization is identifiable. Findings should be interpreted as directional benchmarks rather than guarantees of performance.

Scope

- 1,055 events with recorded check-in activity, comprising 554,943 timestamped check-in records
- 753 events retained after exclusions for benchmark calculation
- 688 events retained for opening-day arrival curve analysis, comprising 227,396 check-in records
- Time period: Q1 2024 through Q3 2026, all eleven quarters represented, 37 to 133 events per quarter
- Expected attendees: median 421, 5th to 95th percentile range of 100 to 2,135
- Check-ins per event: median 324, maximum 7,211
- Event duration: 207 single-day, 157 two-day, 177 three-day, 147 of four days or longer
- 98% of events located in North America across 38 timezones

Exclusions

To ensure statistical stability and reduce noise:

- Test, sandbox, and internal events were excluded before delivery

- Events with fewer than 50 check-in records were excluded before delivery
- 188 events were excluded because no published start time existed, meaning the recorded start was a calendar default rather than a scheduled time
- 87 events were excluded as bulk imports, identified where more than 25% of an event's check-ins shared a single minute or where the entire check-in record spanned under one hour
- 27 events were excluded for missing or invalid duration
- Events with fewer than 30 opening-day check-ins were excluded from arrival curve analysis to avoid unstable per-event distributions

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Anonymization

No individual event, organization, or attendee can be identified from this report. Check-in records in this dataset carry no attendee identifiers. All event references are anonymized codes.

Metric Definitions

Peak concentration

$$\text{Peak concentration} = \frac{\text{Check-ins in busiest rolling window}}{\text{Total opening-day check-ins}}$$

The window is measured against each event's own busiest period rather than against a fixed clock time or a fixed offset from the published start. This makes the metric independent of how an organizer chose to populate the start time field.

Arrival offset

$$\text{Arrival offset} = \text{Check-in timestamp - Published event start time}$$

All timestamps were converted to event-local time before analysis.

Capture ratio

$$\text{Capture ratio} = \frac{\text{Total check-ins}}{\text{Expected attendees}}$$

What these metrics do not measure

These metrics measure when check-in records were completed. They do not measure queue length, wait time, the number of check-in stations in operation, staffing levels, or whether check-in was self-service or staffed. They do not distinguish a smooth 60-minute flow from a 60-minute backlog.

> Peak concentration is deliberately anchored to each event's own peak rather than to the published start time. Roughly 18% of events with check-in activity carry no published start time at all, and among those that do, the field records doors opening at some events and program commencement at others. Anchoring to the observed peak removes that inconsistency from the headline finding.

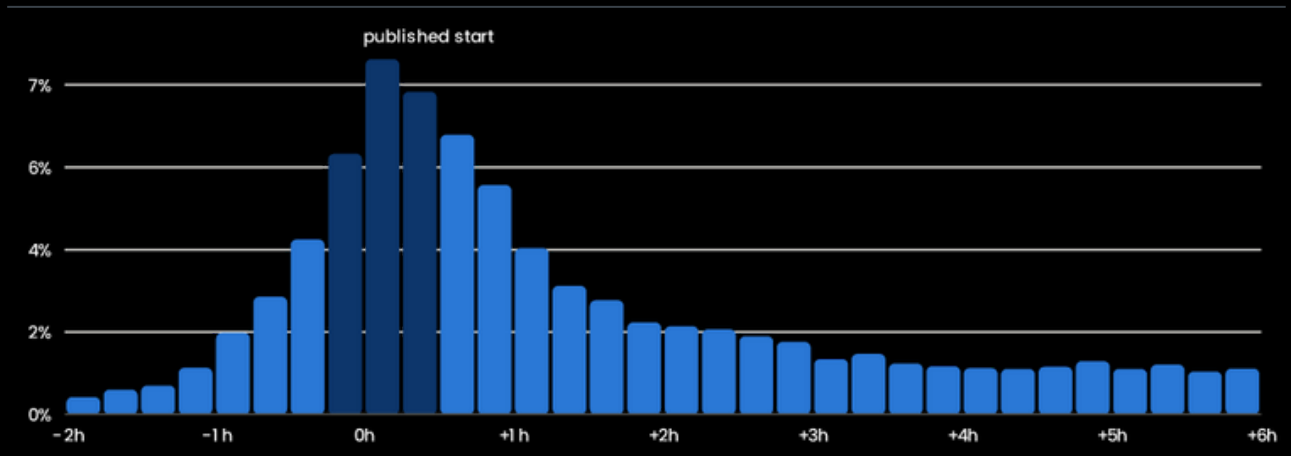
Benchmark results: peak concentration

Check-in volume concentrates far more tightly than total attendance figures suggest.

Window	Median event	25th percentile	75th percentile
Busiest 15 minutes	~19%	~13%	~27%
Busiest 30 minutes	~32%	~21%	~44%
Busiest 60 minutes	**~51%**	~34%	~70%

Measured across the full run of an event rather than opening day alone, a single hour still accounted for a median ~38% of all check-ins, with an interquartile range of ~24% to ~62% (Sample size 753 events).

Opening-day arrival curve



Hours relative to published start time. Each column = 15 minutes. Event-weighted mean, n=688 events.

The curve is unimodal. Volume builds through the 90 minutes before the published start, peaks in the window straddling it, then decays into a long flat tail. There is no observable second peak, which does not support the expectation of a post-lunch surge.

This finding is stable. Median peak-60 concentration was recalculated across nine cohort definitions and ranged from ~43% to ~52%. The lower values appear only on subsets restricted to large events, which is consistent with the size relationship reported on the following page. Full robustness table in the appendix.

Benchmark results: arrival timing

In the median event, the busiest 60-minute window began within two minutes of the published start time. The interquartile range runs from 24 minutes before the start to two hours after.

Cumulative share of opening-day check-ins completed

Time relative to published start	Cumulative share
1 hour before	~6%
30 minutes before	~11%
15 minutes before	~15%
Published start	**~21%**
15 minutes after	~30%
30 minutes after	~38%
1 hour after	**~50%**
2 hour after	~62
4 hour after	~75%
8 hour after	~91%

Approximately half of the opening day's check-ins are complete within an hour of the published start. The remaining half trails across the rest of the day.

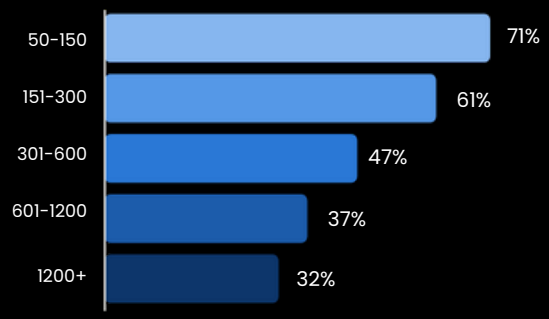
> Pre-start arrivals vary widely with how organizers populate the start time field. The event median is ~11% and the event mean is ~21%. 160 of 688 events recorded no pre-start check-ins at all, and their median 50%-complete point falls more than five hours after the published start, which is consistent with the field recording program commencement rather than doors opening. Where the published start falls in the afternoon or evening, the majority of the room is typically already checked in. Correlation between pre-start share and published start hour is +0.43 (Spearman). The event median is reported above; the mean is stated here for completeness.

Benchmark results: event size

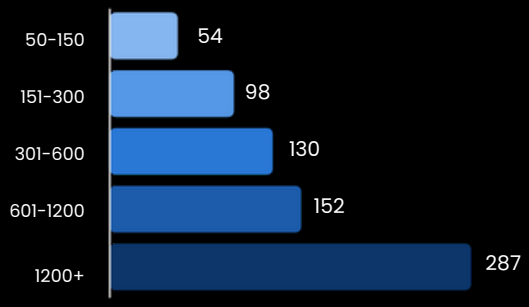
Event size (total check-ins)	Events	Median expected	Busiest 15 min	Busiest 30 min	Busiest 60 min	In busiest hour	Peak per min
50 to 150	144	143	~29%	~48%	~71%	~54	~1.5
151 to 300	168	271	~23%	~38%	~61%	~99	~2.3
301 to 600	190	495	~17%	~29%	~47%	~130	~3.1
601 to 1,200	119	1,001	~14%	~23%	~37%	~152	~3.7
Above 1,200	67	2,199	~10%	~18%	~32%	~287	~6.5

Peak throughput is measured over each event's busiest 15 minutes. At the 90th percentile of the largest size band it reaches ~16.5 check-ins per minute. Correlation between peak-60 concentration and log event size is -0.50 (Spearman).

Share of opening-day check-ins in busiest hour

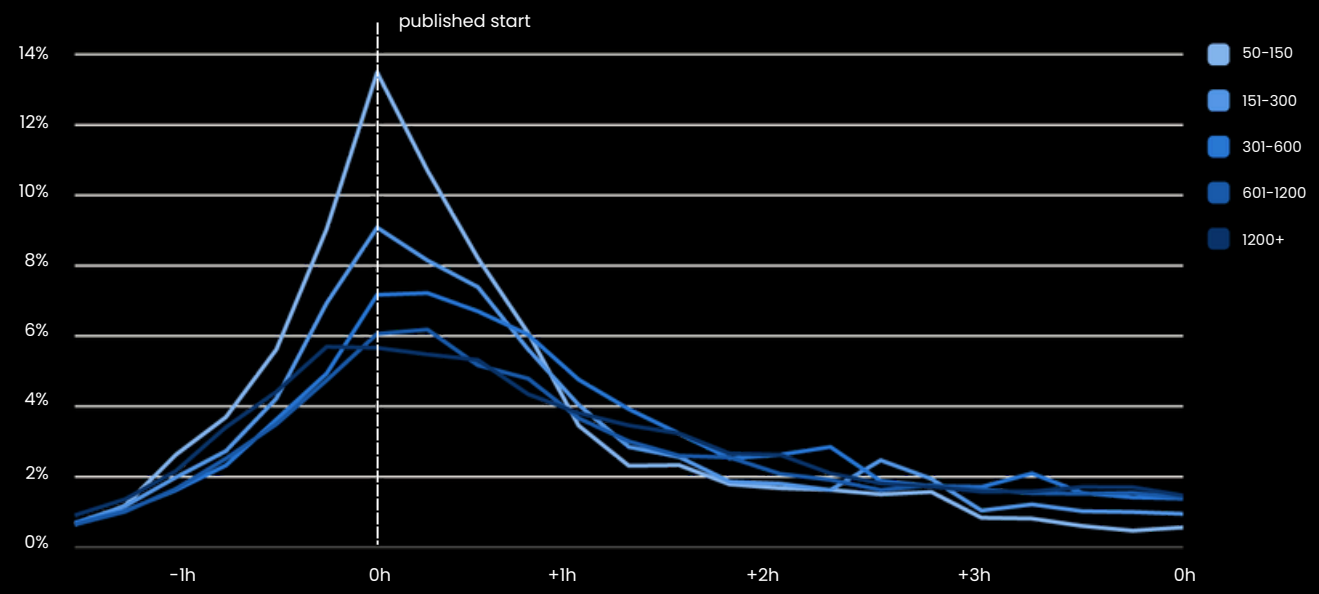


People processed in busiest hour



This pattern indicates that larger events arrive more evenly than smaller ones, and that the operational difficulty of a large check-in is a function of absolute peak volume rather than of arrival concentration. A flatter curve on a larger base produced a heavier peak in every size band in this dataset.

Benchmark results: arrival curve by size



Total check-ins per event. Share of opening-day check-ins per 15 minutes, event-weighted mean.

The smallest events produce a sharp spike in the 30 minutes surrounding the published start. As size increases the spike flattens and the tail thickens, with the largest events sustaining a materially higher arrival rate four hours after the start than the smallest events reach at any point after the first hour.

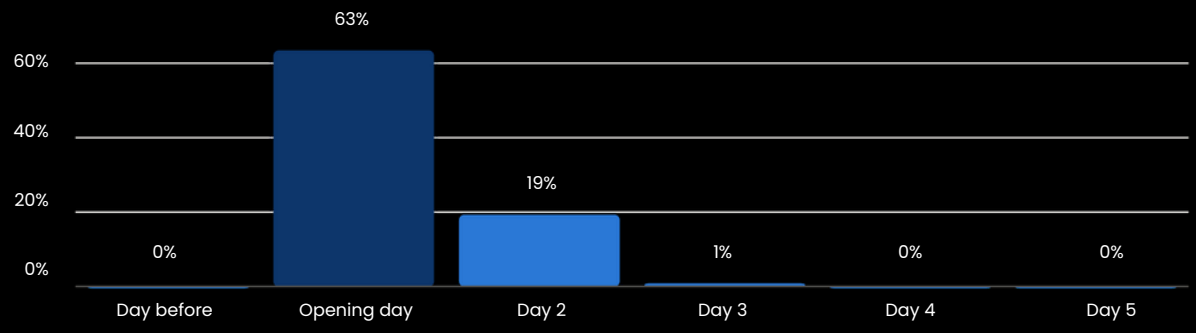
The practical consequence is that arrival concentration and arrival volume must be planned separately. A large event's flatter curve does not shorten the queue; it lengthens the period during which the desk must stay at capacity.

Benchmark results: event duration

Event duration	Events	Busiest 60 min	Peak hour begins	Arrival span (5th to 95th pct)
1 day	207	~64%	6 min before start	~2.7 hours
2 day	157	~60%	5 min before start	~3.7 hours
3 day	177	~44%	43 min after start	~5.6 hours
4 or more days	147	~33%	1 h 3 min after start	~6.7 hours

Correlation between peak-60 concentration and event duration is -0.52 (Spearman).

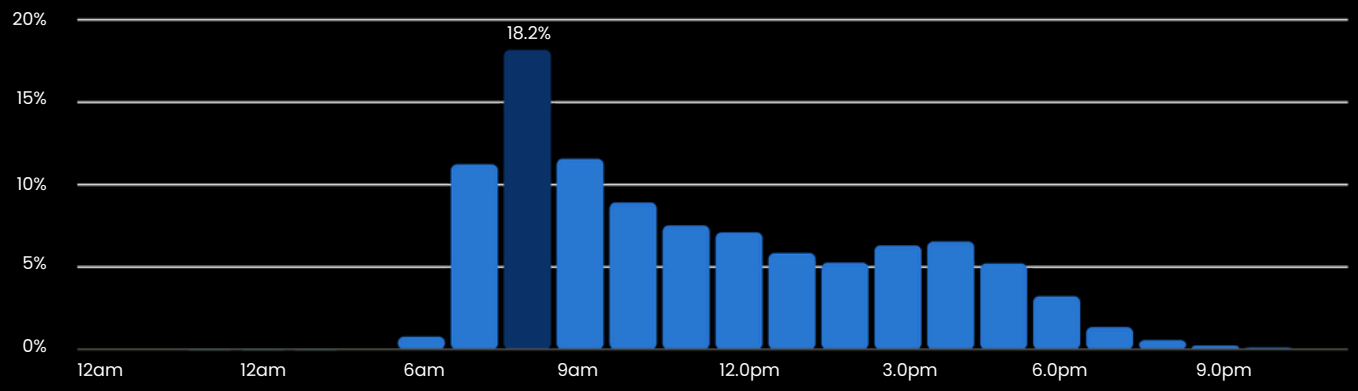
Day-over-day distribution at multi-day events



Median share of an event's total check-ins, multi-day events only. n=528 events.

Multi-day events remain heavily front-loaded. The median event recorded ~63% of its total check-ins on opening day, ~19% on day two, and ~1% on day three. The mean share on the day before opening is ~7% against a median of ~0%, reflecting that 278 of 528 multi-day events recorded no pre-opening check-ins at all while the events that did use day-before check-in used it substantially.

Benchmark results: time of day



Share of all check-ins by event-local hour. n=961 events, 539,932 records

The 7am to 9am block accounts for ~29% of all check-ins across the dataset. Only ~0.9% occur before 7am. The afternoon forms a long flat plateau running at roughly a third of the morning rate.

This cut uses a broader cohort than the arrival curve analysis, because time-of-day measurement does not require a published start time. It includes 961 events after bulk-import exclusion, comprising 539,932 check-in records.

A note on event type

Event type was not available in this dataset. A name-based classification was tested against the taxonomy used in Report #01 and produced samples of 51 association conferences and 26 trade shows at usable confidence, both below the threshold required for even directional publication. Within those samples, differences in peak concentration between types were small relative to the spread within each type, and disappeared once event size and duration were held constant. Consistent with Report #01, structural characteristics of an event appear to explain arrival behavior more than event category does. Event type benchmarks for onsite operations are deferred until the field is available.

Arrival curve worksheet

The following converts the benchmarks in this report into a planning estimate. It is derived arithmetic applied to observed peak volumes, not a measurement of staffing or wait time.

Step 1. Estimate opening-day check-in volume

Expected attendees × 0.83. Median observed capture ratio in this dataset was ~0.83, with an interquartile range of ~0.71 to ~0.90. For multi-day events, multiply by a further ~0.63 to isolate opening day.

Step 2. Estimate the peak hour

Multiply opening-day volume by the peak-60 concentration for the matching size band: ~71% under 150, ~61% for 151 to 300, ~47% for 301 to 600, ~37% for 601 to 1,200, ~32% above 1,200. Subtract roughly 15 to 30 percentage points for events running three days or longer.

Step 3. Convert to throughput

Divide the peak hour estimate by 60 for an average rate, then apply a 1.5× factor to account for the observed 15-minute peak running above the hourly average.

Step 4. Convert to stations

Divide peak throughput by the sustainable rate per station. At an illustrative 20 seconds per check-in, one station sustains three per minute.

Event size (total check-ins)	Median implied stations	90th percentile
50 to 150	1	1
151 to 300	1	2
301 to 600	2	3
601 to 1,200	2	3
Above 1,200	3	6

Step 5. Position the window

Plan for the peak hour to begin at the published start time, not after it. In the median event it began within two minutes of that time.

> This worksheet assumes a fixed service rate and no queue abandonment. Actual station requirements depend on scan technology, badge production, exception handling, and floor layout, none of which are captured in this dataset. The station counts are illustrative arithmetic, not observed values.

Practical implications for event teams

- Event teams should size check-in capacity against the estimated busiest hour rather than against total registrations. Two events with identical attendance and different arrival curves impose materially different peak loads.
- Large event teams should not assume that a flatter arrival curve reduces operational difficulty. In this dataset, flatter curves on larger bases produced heavier absolute peaks in every size band.
- Teams should treat the published start time as the center of the peak rather than its beginning. Opening the desk at the published start places setup inside the busiest window.
- Multi-day event teams should expect roughly two thirds of total check-in volume on opening day, and should be cautious about staffing later days in proportion to program content rather than to observed arrival volume.
- Day-before check-in is measurably underused. 278 of 528 multi-day events in this dataset recorded no check-ins on the day before opening, which leaves the full load on the opening-day peak.
- Teams evaluating check-in performance should measure their own peak-window concentration rather than average throughput. Average throughput across a full day understates the constraint by a factor of roughly two.

Limitations

- Benchmarks are based on aggregated event data and reflect observed behavior within this dataset.
- Check-in timestamps record completion, not arrival at the queue. Wait time, queue length, and service duration are not observable in this data.
- Staffing levels, station counts, and check-in method are not captured. The station estimates in the arrival curve worksheet are derived arithmetic under a stated assumption, not measurements.
- 18% of events with check-in activity carried no published start time and were excluded from all startrelative analysis. Where organizers do publish a start time, its meaning varies between doors opening and program commencement.
- Event type was not available and is not benchmarked in this report.
- Session-level and per-day scheduled times were not available, so arrival curves for day two and beyond cannot be anchored to a scheduled time. Day-level volume shares are reported instead.
- The dataset was pre-filtered to events with at least 50 check-in records, which selects for events that actively used onsite check-in. Ratios involving expected attendees should be read as upper bounds.
- Results may vary based on audience, venue layout, event format, and check-in configuration.

How to Use These Benchmarks

These benchmarks are most useful as:

- Planning references for catering, seating, materials, and staffing decisions

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- Diagnostic tools for identifying events with abnormally high or low no-show rates

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- Context for evaluating whether free vs paid pricing affects operational predictability

They should not be interpreted as performance targets or guarantees.

Appendix

Robustness of the headline finding

Window	Median event	Median busiest 60m
Registration completion	688	~51%
Excluding midnight to 6am starts	677	~51%
7am to 10am starts only	491	~51%
100 or more opening-day check-ins	542	~47%
200 or more opening-day check-ins	363	~43%
Single-day events only	207	~64%
2024 to 2025 only	481	~52%
2025 only	207	~48%
Trimmed top and bottom 5%	618	~51%

Data exclusions

Exclusion	Events removed
No published start time	188
Bulk-import signature	87
Missing end time	21
Invalid or absurd duration	6
Fewer than 30 opening-day check-ins	65

Closing

Event Data Lab benchmarks are designed to help event teams move beyond anecdote and evaluate performance using empirical evidence.

Future reports will examine additional dimensions of onsite operations, including session attendance patterns, networking activity, and exhibitor lead capture behavior.

Event Data Lab research is informed by data captured across live events supported by modern event infrastructure and operational tooling.