

CLICK COUNTING

PROCESS

Click counting is a manual counting method in which an employee (a volunteer or working student, etc.) counts the number of visitors using a hand-held counter or people counter. The location and the structure of the event site are of great importance for this process. It is important to have an employee at every entrance and exit, who clicks the counter every time a visitor enters or leaves the event.

Clicking everyone

Manual clicking a hand counter each time a visitor passes ensures that the total number of visitors entering or leaving the

event through a particular entrance is counted. Staff entrances should also be monitored. For the most accurate count, it is advisable to count everyone during the entire duration of the event and not only random samples.

The use of digital (counting) applications also makes it possible to calculate the total number of people present on the site, in near real-time.

ADVANTAGES

- + **Easy:** little prior knowledge is required. Click counting is easily performed, after a short training or briefing session.
- + **Convenient:** no complex technology or installation required – not even electricity.
- + **Accurate:** the counting method gives a good picture of the number of visitors present throughout the event. If a digital app is used, counting can take place in near real-time.

DISADVANTAGES

- **Double counting:** this counting method does not provide the unique number of visitors. Those who leave and then re-enter the site are counted twice.
- **No flows:** it is not possible with this method to chart visitor flows on the event site.
- **Intensive:** click counting is labour-intensive, as it has to be carried out throughout the event.
- **Maximum capacity:** with large influxes of people the accuracy of the method will decrease. A maximum of $\pm 1,700$ clicks can be made every five minutes.

COST (EXCL. VAT)

The number of counters used depends on the number of event entrances and exits. Hand counters can be purchased online at cost of about €5 each.

Personnel cost depends on the number of entrances and exits and the duration of the event. Reckon on a cost of €12 gross per hour, per temporary worker.

ACCURACY

Click counting has a margin of error of 5% (results of TETRA study Crowd Counting conducted in 2021). This means that if click counting indicates, for example, 1000 people, the actual number of people is between 950 and 1050.

POTENTIAL SUPPLIERS

iplusoffice.be | www.bol.com | www.onzea.be

ZONE-BASED COUNTING

PROCESS

Zone-based counting involves first dividing the event site into defined zones and then counting the number of visitors in each zone. For this it is crucial to know the total area available for visitors and to exclude any other parts of the site, such as parking spaces, stage areas and stalls, as they are not included in the area determination. After all, these are not included in the defined visitor area. The total visitor area is then divided into separate zones.

Aerial photo

Aerial photos form the best basis for zone-based counting. If the municipality agrees, one or more drones can be used to take aerial photographs of the total area at regular intervals – for instance, every hour. The aerial photo is then used to count all the people in each zone. Or a sample can be counted, per zone, and extrapolated to form a full zone count. The total of the actual or extrapolated number of people for all zones is the total number of visitors, per photo, of the total area.

Observation

It is not always feasible to use aerial photographs – for technical reasons, or because the event area is too spread out. In such cases, observation is a good alternative. This involves observing how many people are in each, clearly-defined zone on the ground. This can be the actual number of people or a sample, for extrapolation. This method does not take every zone into account. It selects a sample of the zones, adds them up and extrapolates from this fraction of the area to the total area. The count is based on real-time observation of the number of visitors. These numbers are passed on to the central operator by telephone or digitally. Via simple addition, the operator thus obtains quasi-real-time information on the number of visitors present at each count, for instance every hour.

ADVANTAGES

+ Little prior knowledge required: this counting method can be implemented relatively easily after a short training or briefing.

DISADVANTAGES

- **Technical requirements:** zone-based counting with aerial photos requires appropriate equipment and permission.
- **Complex terrain measurement:** when counting people in zones on the basis of observation, it is important to have a clear and detailed surface map of the event site for a quasi-real-time measurement.
- **Double counting:** zone-based counting cannot filter out double counting, making it impossible to get figures on the number of unique visitors.

COST (EXCL. VAT)

Zone-based counting using aerial photo with deployment of a hired drone:

- from €125 x number of days.

Zone-based counting by observation:

- €12 personnel cost per hour x number of days x number of hours per day

POTENTIAL SUPPLIERS

www.droprise.be | www.drones-huren.be | www.drone-zone.be

ZIP CODE COUNTING

PROCESS

This method combines a visitor survey at the event with an (online) resident survey after the event.

Visitor survey

The visitor survey establishes the number of people attending the event and where they live, on the basis of the ZIP codes. This makes it possible to determine the percentage of visitors who are also residents of the city or municipality in which the event takes place.

Resident survey

After the event, a second survey asks inhabitants of the city or municipality whether they attended the event. The most (cost-) efficient way to do this is with an online survey that measures the percentage of inhabitants who attended the event.

The resident survey shows how many residents visited the event. The visitor survey, in turn, provides the percentage of event visitors who were also residents of the city or municipality. The combined results provide an overall picture of the number of people who attended the event.

ADVANTAGES

- + **Residents:** this method not only provides the total number of visitors, but also the number of visitors resident in the city or municipality in which the event was held.
- + **Additional data:** for (a reasonable) additional price, additional information can be obtained by adding survey questions, for example questions about visitor spending patterns and residents' attitudes towards the event.
- + **Extrapolation:** extrapolation of results to reflect the total number of visitors at the event is achieved with a simple calculation.

DISADVANTAGES

- **No visitor flows:** this method cannot measure visitor flows, or the number of visitors during the entire event.
- **Labour-intensive:** this method requires the use of interviewers. This can be expensive, especially at multi-day events.

COST (EXCL. VAT)

Cost is determined by two factors:

- **Conducting the visitor survey:** this requires interviewers on the ground, who remain active throughout the event. An interviewer costs on average €12 gross per hour. The number of interviewers needed depends on the expected attendance. If less than 1,000 visitors are expected, one interviewer will suffice. If the number of visitors is between 1,000 and 5,000, it is best to have three interviewers. If more than 5,000 visitors are expected, eight interviewers should ideally be used.
- **Conducting the resident survey:** for large cities, a digital survey of the inhabitants can be done using an online panel. However, an organiser does not always have the contact details of the inhabitants, and the research sample must also represent the entire population. It is therefore recommended to use, if possible, a market research agency with an extensive online panel. A representative survey of 1,000 inhabitants by a market research agency costs, on average, €4,000.

POTENTIAL SUPPLIERS

The Cube Belgium website (cubelgium.be/members) provides an overview of market research agencies.

Sample size to ensure quality results:

Visitor survey: 1% of the number of visitors

- E.g. 100,000 visitors: 1,000 interviews

Resident survey: sample size based on the number of inhabitants per city or municipality

- < 20,000 inhabitants: 200 respondents
- 20,000 to 100,000 inhabitants: 500 respondents
- > 100,000 inhabitants: 1,000 respondents

GIVEAWAY COUNTING

PROCESS

Counting the number of unique visitors attending an event, without double counting those who walk in and out several times, merely requires counting the number of (scanned) tickets or other admission tokens, such as wristbands or stamps. But what about events for which no admission ticket is required? At free events, as well as those that charge for admission, but don't use a ticket or registration system, handing out a small gift to each visitor can be the solution. This can be a wristband, but also a gadget linked to the event or to one of the sponsors, and preferably as sustainable as possible.

Estimating the number of visitors

In order to be sure of sufficient gifts for all attendees, it is crucial to make a good estimate of the number of visitors expected, before the event. In order to calculate the effective number of unique visitors, after the event, just deduct the number of gifts remaining from the total number of gifts purchased. Ideally, people should be employed to distribute the gifts throughout the duration of the event, or at least until there are no new arrivals.

ADVANTAGES

- + **Unique visitors:** each visitor is counted only once, which makes it possible to identify the unique number of visitors.
- + **Easy:** little or no prior knowledge is required. Thorough briefing of the staff and an overview of the distribution locations are sufficient. It is important that each entrance is manned and that each visitor only receives one gift.

DISADVANTAGES

- **No crowd pressure measurement:** the method does not provide any insight into crowd density. Further, it is not possible to chart the dynamics of visitor flows.
- **Work:** the method is labour-intensive.
- **Waiting times:** at an event where many visitors arrive simultaneously, this method can lead to longer queues.
- **Up-front estimate:** a correct estimate of the number of expected visitors is essential. Underestimating leads to a shortage of gifts, as a result of which not all visitors can be counted. Overestimating leads to unnecessary expenditure and unusable stock afterwards.
- **Duration:** This counting method is only accurate if there are enough people present to hand out gifts to everyone - throughout the event.

COST (EXCL. VAT)

Cost depends on two factors:

- **Type of gift:** Wristbands are frequently used and relatively inexpensive as gifts. They are available in various materials. A printed silicone wristband costs approximately €0.20, a Tyvec wristband approximately €0.10. For an ecological alternative, expect to pay more. PET wristbands cost an average of €1.50 and a biological cotton wristband is €2.
- **Staff deployment:** The biggest cost is the deployment of temporary staff for the distribution of giveaways. Reckon on approximately €12 gross per hour, per staff member. Ideally, you should deploy at least one employee at each entrance to the event. At peak times, this could be two or more.

POTENTIAL SUPPLIERS

www.polsbandshop.be | www.allgifts.be

GATE COUNTING

PROCESS

An entrance gate is a turnstile that can be used for access control as well for counting the number of visitors.

There are gates on the market that have a reader and only admit visitors with a valid ticket. These are often used in concert halls and museums. There are also gates that register visitor numbers based on the number of revolutions of the gate, without reading admission tickets.

Entrance gates can be set to turn in one or both directions, to count only incoming or also outgoing visitors. For crowd control purposes, it is recommended to run the gates in one direction and install them at each entrance and exit of the event.

ADVANTAGES

- + **Crowd density:** gate counting can count the number of visitors throughout the duration of the event and thus provide an accurate crowd count, provided the gates are installed at both the entrance(s) and exit(s) of the event. This makes it possible to estimate in real-time how many people are on the event site.
- + **No staff:** counting is automatic. During the event itself, no employees are required to carry out counts.

DISADVANTAGES

- **Double counting:** double counting cannot be excluded. If someone enters and leaves the site several times, this person will also be counted several times.
- **Not for open sites:** gate counting is only effective for events with (semi-) restricted access, as the gates have to be installed at clearly defined entrances and exits.

COST (EXCL. BTW)

A container equipped with six entrance gates rents from €2,000 per unit, including installation costs and data reporting.

Cost calculation: €2,000 x number of days

POTENTIAL SUPPLIERS

- www.geran-access.com/mobiele-oplossingen
- www.cornelisfencing.be/nl/home/hekwerk/mobiel-hekwerk-en-toegangen
- www.bambormet.be/nl/draaitrommels
- www.betafence.be/nl/draaitrommel-bt4bt5

CAMERA COUNTING

PROCESS

For camera counting, cameras (3D sensors) are placed above each entrance and exit of the event location, at a height of three to six metres. The cameras count all visitors in a zone of about six by six metres below the camera. They also register the direction in which the visitors are moving and simultaneously measure the inflow and outflow. This gives the organiser a real-time overview of the number of people present throughout the event.

Events without entrance restriction

For events without clearly identifiable entrances, camera counting is a less optimal counting method. Zone counting can offer a solution in such cases. If the entire area can be divided

into clearly delimited, interconnected zones of about 40 m² each, a camera can be installed per zone. This makes it possible to estimate the number of people present, even at events without defined entrances and exits.

Entrance and exit combined with zone counting

Combined camera counting, covering zones and entrances, provides more information than just the number of visitors. The additional cameras can, for example, track how many people are in a particular zone, or which zones are visited more frequently. If several adjacent zones are monitored, the cameras can also record the percentage of people moving from one zone to another.

ADVANTAGES

- + **Real time:** the number of attendees is counted in near real time and can be broadcasted on a live dashboard. This offers added value in terms of crowd control, queue management and optimal personnel deployment strategies.
- + **Movements:** the deployment of additional cameras in certain zones provides information on crowd density in these zones and the movement of visitors within and between such zones.

DISADVANTAGES

- **Infrastructure:** electricity and a power distribution system are required on the site. In order to install the cameras at a sufficient height, a ceiling or other on-site structure is also required.
- **Double counting:** camera counting does not provide insights in the unique number of visitors. Those who leave the event location and then re-enter are counted twice by this method.

COST (EXCL. VAT)

Cameras are priced between €500 and €1,000 each, including installation and rental.

A camera must be mounted at every entrance up to 6 metres wide. If density measurement is also required in selected zones, additional cameras can be deployed. Each camera covers a zone of 40 m².

ACCURACY

Camera counting has a 10% margin of error (results of TETRA study Crowd Counting conducted in 2021). This means that if cameras, for example, count 1000 people, the actual number of people will be between 900 and 1100.

POTENTIAL SUPPLIERS

www.acurity.be | citymesh.com

RADIO FREQUENCY COUNTING

PROCESS

Radio frequency counting uses sensors installed 1.5 metres above the ground. The sensors are quite inconspicuous and can easily be attached to existing structures without causing any damage. Low-energy radio waves are sufficiently weak to be completely harmless to people.

Signal attenuation

The sensors continuously send radio frequency signals to each other and are thus in constant contact with each other. As soon as people enter the zone of the sensors, the signals between the sensors weaken. This weakening or attenuation is expressed in decibels (dB) and used as the basis for counting the number of visitors.

Crowd density per zone

At least three sensors are placed at a maximum distance of 700 metres from each other in each zone in which crowd density is to be measured. A central gateway is installed, which controls the entire network. At the start of the event, the sensors are calibrated to determine the zero point. The radio frequency values are then recorded in relation to particular numbers of attendees. Thus, during the event, the number of attendees per signal attenuation will be known.

ADVANTAGES

- + **Real-time:** this method counts in near real-time and can measure crowd density via a live dashboard, which provides added strategic value for crowd control, queue management and optimal staffing.
- + **Visitor flows:** radio frequency counting gives an insight into how people move around the site, which can be important in ensuring safety during the event.
- + **Discreet:** sensors can be installed inconspicuously or out of sight.
- + **Open venues or access:** this method is also suitable for open, unfenced, event locations and for events with no clear entrance.
- + **GDPR:** this tagless crowd estimation technique guarantees the privacy of visitors.

DISADVANTAGES

- **Double counting:** this counting method does not provide any information on the unique number of visitors, as no distinction is made between known and new visitors. Double counting can therefore not be excluded.
- **Labour-intensive:** installing and demounting the system can be labour-intensive.
- **Expensive:** this process is less interesting to event organisers who do not want real-time insights into traffic and visitor numbers, due to its cost.

ACCURACY

Radio frequency counting has a 10% margin of error (results of TETRA study Crowd Counting conducted in 2021). This means that when this method produces a count of 1,000 people, the actual number of people will be between 900 and 1100.

COST (EXCL. VAT)

+/- €8,000 including reporting and installation of the sensors.

POTENTIAL SUPPLIERS

www.crowdscan.be

CELLULAR DATA COUNTING

PROCESS

This is a process by which providers use data and telephony technology to carry out counts using 'base transceiver station' (BTS) and signals from visitors' cell phones.

Coverage from cell phone masts

Based on this data, the network provider can determine how many people are within range of a BTS within a given time window. The event organiser can use data from the network provider to determine how many stations cover the event location. For large events, the organiser often has additional stations installed, to reinforce the cellular data network locally. These stations can also be used to count visitors and to provide enhanced zone coverage.

Provider's market share

Providers only have access to data on their own customers. It is therefore necessary to extrapolate from the numbers measured to reflect the general population. Providers do this by estimating the actual number of attendees (including attendees

who subscribe to different providers, or don't have a cell phone) on the basis of parameters such as their market share of the expected audience and the coverage of their own network.

Who are the visitors?

It is essential to properly define 'a visitor' when using this counting method. When does a passer-by become a visitor? How long must this person be present at the event, and how many times must he or she be recognised? It is also crucial to measure who is in the vicinity of the event location, a few days before and after the event. Residents, employees and passers-by may be on site for other reasons and should therefore not be counted as visitors. Cellular data counting suppliers do this at the specific event location, and use information provided by the organiser.

ADVANTAGES

- + **Unique visitors:** each visitor is counted only once. This method can filter out double counting and identify the unique number of visitors.
- + **Not too technical:** no on-site, technical installation is required for actual counting.
- + **Visitor profiles:** it is possible to link identification data to other data (origin, route, repeat visit, overnight stay, etc.) and derive a visitor profile, while not breaching the person's privacy under the GDPR.
- + **Retrospective:** this process can also be used to retrospectively count visitors to past events (up to 18 months ago).
- + **Selective:** specific definitions and filters can enable detailed selections. So, for example, the number of commuters, overnight stays or repeat visits can be counted.

DISADVANTAGES

- **Impactful events only:** the event must generate a sufficiently large number of cell phone connections as compared to normal connections without the event.
- **Data dependence:** correct estimation of the provider's market share during the event is essential. If this data is not reliable, extrapolation will result in excessive error.
- **Crowded areas:** this counting process is less suitable for densely-populated areas. In such cases, residents are filtered out, even though they may be attending the event. This can be taken into account when extrapolating, but will increase predicted error.
- **No flows:** visitor flows cannot be measured.

ACCURACY

Cellular data counting has a 70% margin of error (results of TETRA study Crowd Counting conducted in 2021). This means, for example, that the real number of a cellular data count result of 1,000 persons could be anywhere between 300 and 1,700.

COST (EXCL. VAT)

± €2,675 for ex post analysis and reporting (per zone/per measurement)
± €4,475 for real-time tracking and reporting (max. 10 consecutive days)

POTENTIAL SUPPLIERS

www.orange.be (in cooperation with www.cropland.be) | www.proximus.be

WI-FI COUNTING

PROCESS

The Wi-Fi counting system registers smartphones, tablets and other Wi-Fi devices that are in the vicinity of strategically placed Wi-Fi sensors, spread across the event site. More specifically, the sensors pick up the MAC addresses stored on the smartphones and other devices carried by visitors. When a device with a MAC address is carried within range of a Wi-Fi sensor, this device is counted, provided that the Wi-Fi on that device is switched on. This information is then immediately pseudonymised, i.e. data that could lead to the identification of visitors is immediately encrypted.

Combination with cameras

With this counting method, it is essential to clearly define the term visitor and to determine the minimum time someone must be present to be considered a visitor. When Wi-Fi counts are combined with the use of cameras, (incidental) passers-by,

residents and employees can be excluded from the total number of visitors via an algorithm in the calculation.

Wi-Fi counting makes it possible to estimate the number of people present in a certain area. However, it is difficult to establish how many devices with Wi-Fi signals are being carried by each individual at the event. So, someone carrying a smartphone, a laptop and/or a tablet will be counted two or three times.

However, using periodic scans, Wi-Fi counting can provide a good picture of changes in crowd density in an area. Movements of individuals between the different zones on the event site in which sensors have been placed can also be measured. The dwell times of visitors can also be registered.

ADVANTAGES

- + **Movements:** visitor movements can be measured within sensor-equipped zones.
- + **Varied picture:** in addition to measuring the number of visitors per zone, this method also gives a picture of dwell times within zones and traffic between zones.
- + **Additional visitor data can be gathered**, such as origin (country, province) and the proportion of local to non-local visitors.

DISADVANTAGES

- **No real-time:** counting the number of visitors is possible, but with a delay and therefore not in real-time.
- **Technology-dependent:** not everyone carries a device with an identifiable MAC address. This is a challenge, especially at events that are more family-oriented and include many children (without smartphones) among the visitors.
- **Double counting:** the number of devices is counted, not the number of people. And some visitors have several Wi-Fi devices with them. In order to obtain a correct count, Wi-Fi counting can be combined with the use of camera people counters.
- **Randomisation:** Some mobile devices hide the MAC addresses with which they can be identified, or broadcast several at once.
- **Passers-by:** By clearly defining visitors in advance, random passers-by can be filtered out as much as possible in the counts, but there is still a real chance of inaccuracy.

COST (EXCL. VAT)

The number of Wi-Fi sensors to be installed depends on the total area of the site. Recommended numbers:

- site < 10,000 m²: approximately 3 sensors
- site 10,000 m² - 100,000 m²: approximately 7 sensors
- site > 100,000 m²: approximately 12 sensors

Cost is determined by the number of sensors and the rental period:
(€410 installation cost x number of sensors) + (€125 rent per sensor x number of days x number of sensors)

A report costs, on average, €650 and access to the online portal during the event costs, on average, €250.

POTENTIAL SUPPLIERS

www.theretailfactory.be | citymesh.com