# Event Internet Guide

Planning stable connectivity for interactive experiences and photo printing

*Technical explanatory document for event producers, organizers, and venue IT teams.*

*Version 1.0 · May 2026*

**English translation - November 2026**
Translated from the May 2026 reference edition. Network targets, equipment examples, prices and processing times are historical planning references. Actual requirements and performance depend on the setup and venue.

May 2026 reference: figures are historical planning examples, not performance guarantees.

# Why This Manual Exists

Interactive experiences at events - photo booths, AI-powered kiosks, brand activations, quizzes, and instant photo printing - depend on one thing that seems simple but is rarely given the attention it deserves: the venue’s internet connection.

When booking a venue, organizers often hear something like, “We have free Wi-Fi for guests.” That’s not enough. This type of network is designed for someone to view an Instagram Story, not to support a professional system that sends and receives files hundreds of times throughout the event.

This document explains, in accessible language and with technical sections for industry professionals, what type of connection works, why others fail, how much traffic the system actually generates, and what needs to be arranged before the day of the event.

---

## In one sentence

**A dedicated wired (Ethernet) internet connection for the equipment is ideal. If this is not possible, the alternative is a dedicated, password-protected 5 GHz Wi-Fi network with no other users connected. Open 2.4 GHz Wi-Fi shared with the public should be avoided.**

May 2026 reference: figures are historical planning examples, not performance guarantees.

# 1. How Wi-Fi Works, Using Two Analogies

Before we get into why a network might fail at an event, we need a mental picture of how Wi-Fi works. Two analogies will help.

## Analogy 1 - The Road

Imagine that each Wi-Fi network is a road. The width of that road (how many lanes it has) determines how many cars can pass at the same time. Each file sent or received is a car. When too many cars enter the same narrow road, a traffic jam forms - traffic doesn't stop, but it moves slowly, and some cars remain in the same spot for minutes.

In a professional photo booth, "a stuck print" can mean a photo that takes 90 seconds to print instead of 15, or a guest giving up on the line.

## Analogy 2 - Radio Stations

Wi-Fi also works like radio stations. There is a frequency (a "station") that the router uses to communicate with cell phones and devices. If two stations broadcast at the same time on the same frequency, you'll hear static and neither one will come through clearly. That's exactly what happens when two neighboring Wi-Fi networks use the same channel: they interfere with each other.

---

# 2. Why the 2.4 GHz network is unreliable at events

Home and public Wi-Fi typically operates on two main bands: 2.4 GHz (the older one) and 5 GHz (the newer one). The difference between them is similar to the difference between a three-lane two-way road and a 20-lane highway.

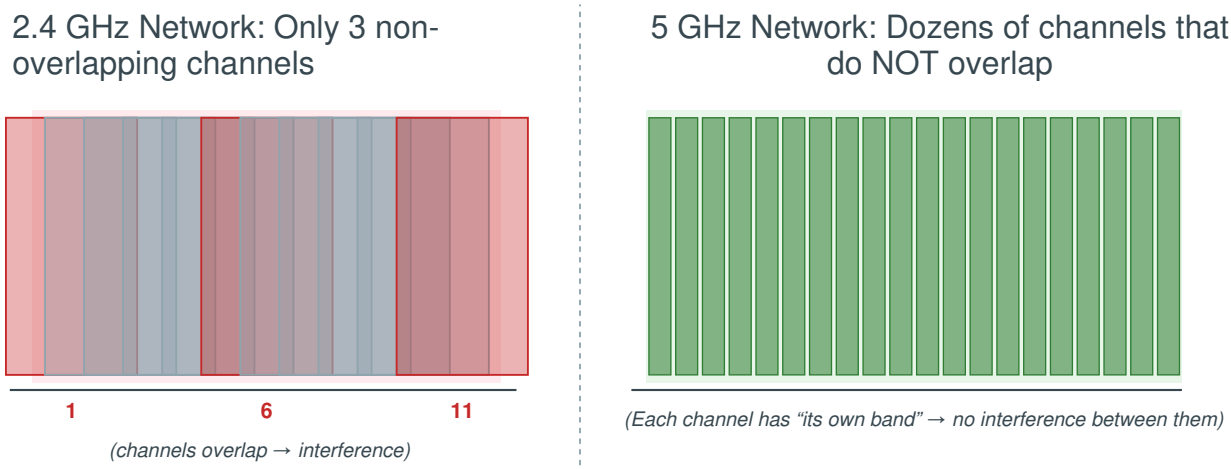



*Figure 1 - Simplified comparison of the 2.4 GHz vs. 5 GHz spectrum. At 2.4 GHz, all channels overlap; Only channels 1, 6, and 11 can operate "side by side" without interfering with each other.*

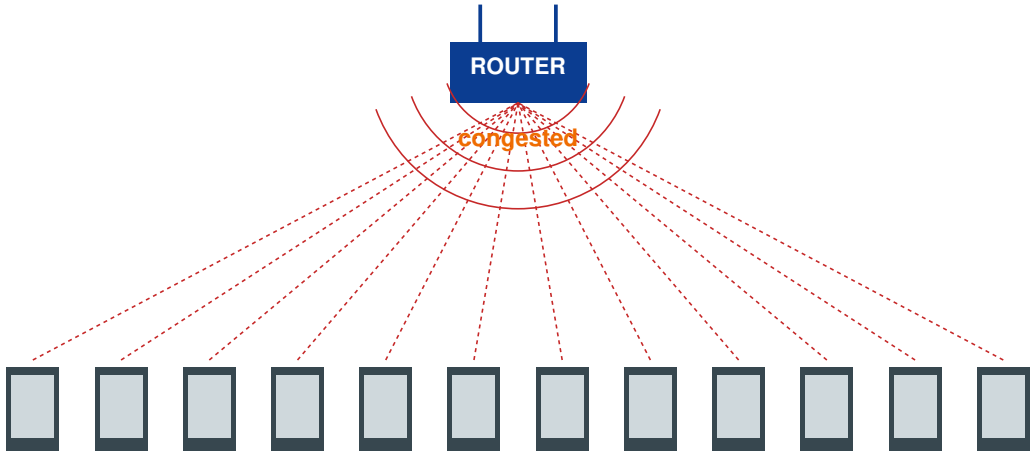
May 2026 reference: figures are historical planning examples, not performance guarantees.

## The three main reasons

(a) Few channels that actually fit. In practice, the 2.4 GHz band offers only 3 non-overlapping channels (1, 6, and 11). The 5 GHz band, on the other hand, offers between 20 and 25 independent channels, depending on the country. In an event space with several nearby networks - the catering network, the sound system, the restroom network, the guests' network, and the neighbor's network upstairs - the 2.4 GHz band is already congested before you even arrive.

(b) It penetrates many walls - and that's a problem. The 2.4 GHz band has greater range and penetrates walls more easily. It sounds like an advantage, but at an event, it means your neighbor's network intrudes on yours, and yours intrudes on theirs. At 5 GHz, the range is shorter and more "confined to the immediate environment," which, ironically, protects your network from what's happening in the next room.

(c) Many household devices use the same frequency. Microwaves, older cordless phones, lighting controls, Bluetooth (which operates at 2.4 GHz), baby monitors, some mixing consoles, and even some DJ equipment operate in this band. All of this generates background noise at 2.4 GHz, but not at 5 GHz.




**Dozens of guests' cell phones are competing for the same 2.4 GHz "channel"**

*Everyone wants to download Stories, send photos, and play music - and your print job joins the queue with them*

*Figure 2 - At an event, dozens (or hundreds) of guests connect to the venue's Wi-Fi. At 2.4 GHz, everyone They compete for the same three channels - and your equipment joins the queue along with them.*

What this means in practice: At a crowded event, connecting the equipment to an open 2.4 GHz network means sharing that same frequency with dozens of cell phones, microwaves, and Bluetooth headphones in the space. It will work - but the time it takes for each printout becomes a matter of chance.

May 2026 reference: figures are historical planning examples, not performance guarantees.

### For the venue’s technical (IT) team

```
2.4 GHz in practice: 11 regulated channels (Brazil) with a bandwidth of 22 MHz and
a center-to-center spacing of only 5 MHz, resulting in overlap. Only 1/6/11 are
truly orthogonal. ACI (Adjacent Channel Interference) and CCI (Co-Channel
Interference) are endemic in dense urban environments. Add non-Wi-Fi sources:
microwaves (2.45 GHz center frequency), Bluetooth Classic (frequency hopping
across the entire ISM band), Zigbee, inexpensive analog cameras, etc. The noise
floor typically rises to -75 to -80 dBm during an average event.


5 GHz in practice: UNII-1 (36-48), UNII-2A (52-64), UNII-2C (100-144, requires DFS),
and UNII-3 (149-165) channels. Standard channel widths are 20/40/80 MHz. Even with
wider channel widths, there are still enough non-overlapping channels available to
isolate the operation. Recommendation: Use a fixed (non-automatic) 20- or 40-MHz
channel on UNII-1 or UNII-3, avoiding DFS to prevent “channel changes” in the middle
of the operation.
```

# 3. The Correct Order of Priority

When it comes to connecting the activation equipment to the internet, there is a clear hierarchy. The higher on this list, the better:

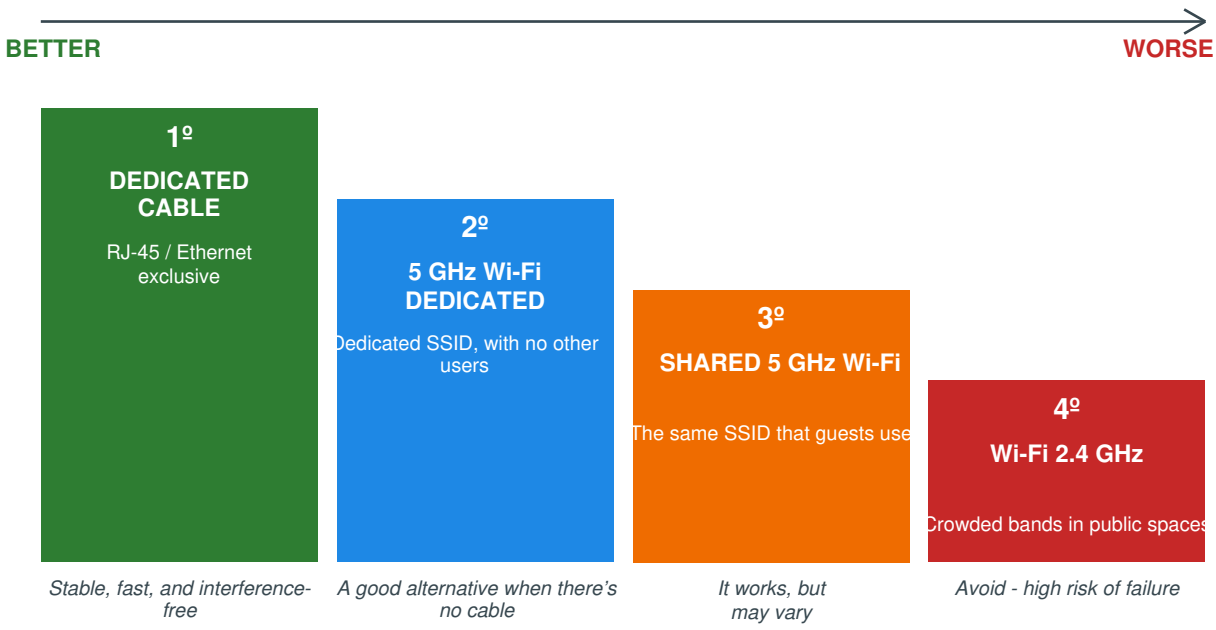



*Figure 3 - Connectivity hierarchy, from the most stable (left) to the least reliable (right).*

# 3.1 Highest Priority - Network Cable (Ethernet)

A network cable connected directly from the equipment to the venue’s router (or switch) is the most stable option available. There’s no interference, it doesn’t compete for frequency with anyone, and it doesn’t go down because someone turned on a microwave. It’s the same technology that powers data centers and banking operations - it works because it’s reliable by design.

May 2026 reference: figures are historical planning examples, not performance guarantees.

**The request to the venue is simple: “I need an RJ-45 network port with internet access, dedicated exclusively to our equipment, at location X.” If it’s far away, bring the cable: up to 90 meters of standard cable (Cat5e/Cat6) will work just fine.**

### For the venue’s technical (IT) team

```
Typical requirement: 1× Gigabit Ethernet port (1000Base-T) with DHCP enabled, MTU
1500, no captive portal, and no proxy. Direct internet connection, with at least
25 Mbps of symmetrical bandwidth available for this port. Ideally, a VLAN
dedicated to the operation, isolated from the guest network but with NAT and
internet access. Target latency: < 80 ms to AWS/Cloud services.
```

## 3.2 Second Option - Dedicated 5 GHz Wi-Fi

When running a cable is not feasible (due to a distant location, a venue that does not allow drilling, an outdoor event, etc.), the alternative is a 5 GHz Wi-Fi network with its own SSID (a “network with a name just for us”), protected by a password, and one that no one else uses: not guests, not the catering service, and not the sound provider.

The three critical points:

- 5 GHz band - not 2.4. If the venue’s router offers both, we’ll use only the 5 GHz band.
- Dedicated SSID for the equipment - a separate network (e.g., “ATIVACAO-MARCA-5G”) with a strong password. No guests, operators, or organizers should connect to it.
- Good signal at the operating location - the equipment must be no more than ~10 meters from the access point, with no major obstacles. Recommended signal strength: -65 dBm or better (on a cell phone, this appears as “almost full”).

### For the venue’s technical (IT) team

```
Provision a unique SSID on the nearest access point, 5 GHz band only (disable band-
steering / 2.4 GHz for this SSID), WPA2-PSK or WPA3-PSK, fixed channel on UNII-1 or
UNII-3 (avoid DFS), 20 or 40 MHz bandwidth. No captive portal, no client isolation
(the equipment must be able to access the internet freely). Ensure a signal level
of -65 dBm or better at the equipment’s physical location; if necessary, position
an additional AP. Maximum number of clients on this SSID: 4 (only the equipment and
operator).
```

May 2026 reference: figures are historical planning examples, not performance guarantees.

# 4. How much internet data does the equipment consume?

Here's one of the most overlooked points. Each interaction isn't just "a photo being sent." It's a photo being uploaded and a photo being downloaded - usually larger, because it has been processed.




**Each interaction = 1 upload + 1 download. Count both sides.**

*Figure 4 - Each interaction consists of two steps: uploading the original photo and downloading the processed photo, ready for Print.*

## 4.1 Photo Size

A photo captured by the equipment can range in size from 500 KB to 4 MB (megabytes), depending on the quality and resolution of the shot - a booth that captures in high resolution for large prints generates larger files than one that captures only for the screen. The photo returned after AI processing also ranges from 1 to 4 MB, depending on the type of effect applied.

| Scenario | | Original photo (upload)<br>Finished photo (download) | Total per interaction |
|---|---|---|---|
| Lightweight screenshot (low resolution) | 500 KB | 1 MB | 1.5 MB |
| Average capture (good quality) | 2 MB | 2 MB | 4 MB |
| High-resolution capture | 4 MB | 4 MB | 8 MB |

## 4.2 Amount of Data Transferred

Let's look at a realistic example. A 4-hour event with a busy photo booth generates between 150 and 250 interactions. Using the average scenario (4 MB per interaction, upload + download):

| Movement | Total interactions | Total traffic | Comment |
|---|---|---|---|
| Take | 150 | ≈ 600 MB | low-key event, average number of photos taken |
| Medium | 200 | ≈ 800 MB | typical, average capture |
| Heavy | 300 | ≈ 2.4 GB | high-resolution photo |

May 2026 reference: figures are historical planning examples, not performance guarantees.

## 4.3 Required speed (not to be confused with volume)

Total volume over the course of the event is not the same as speed at the moment of interaction. What matters for a smooth experience is the connection speed for each individual interaction.

Since each interaction must be completed in a few seconds to avoid long lines, the minimum recommendation is:

- Upload: 10 Mbps dedicated bandwidth (minimum). Uploading a 2 MB photo takes ~1.6 seconds at this speed.
- Download: 25 Mbps dedicated bandwidth (minimum). It takes ~1.3 seconds to receive a 4 MB finished photo.
- Latency (ping): under 100 ms to cloud services.
- Stability: no fluctuations exceeding 2 seconds during operation.

## For the venue's technical (IT) team

```
Recommended bandwidth (minimum): 25/10 Mbps symmetrical-equivalent dedicated to the
equipment. At 5 GHz with a clear channel, an 802.11ac (Wi-Fi 5) network already
delivers usable TCP throughput > 100 Mbps, so the bottleneck becomes the venue's
WAN link. Peak traffic: bursts of 2-6 MB every ~15-30 s. Simultaneous connections
for cloud-based HTTPS services: typically 4-12. No specific QoS is required, but
ensure that this SSID/VLAN is not subject to shaping or rate limiting applied to
the guest SSID.
```

## 4.4 How long does it take to take a photo at each speed?

"Speed" is a word that obscures what really matters: how long the interaction takes. Here is the actual time it takes to send and receive a photo, based on an average scenario (original photo of 2 MB and processed photo of 4 MB - 48 megabits total). For high-resolution captures, the upload can reach 4 MB, which doubles the time shown in the upload column below.

| Connection speed | Upload (photo 2 MB = 16 Mb) | Download (photo 4 MB = 32 Mb) | Total time by Interação | Verdict |
|---|---|---|---|---|
| 1 Mbps | 16 s | 32 s | ≈ 48 s | **Not feasible** |
| 5 Mbps | 3.2 s | 6.4 s | ≈ 10 s | **Slow, causes lines** |
| 10 Mbps | 1.6 s | 3.2 s | ≈ 5 s | **Acceptable** |
| 25 Mbps | 0.6 s | 1.3 s | ≈ 2 s | **Good** |
| 50 Mbps | 0.3 s | 0.6 s | ≈ 1 s | **Great** |
| 100 Mbps | 0.15 s | 0.3 s | ≈ 0.5 s | **Excellent** |

*Simple formula: time (in seconds) = photo size in megabits ÷ speed in Mbps. 1 MB = 8 Mb. That's why the the advertised speed of an internet plan can seem high.*

May 2026 reference: figures are historical planning examples, not performance guarantees.

Note - the times above refer ONLY to network transmission. The numbers in the table represent only the internet portion: uploading the original photo and downloading the finished photo. Image processing by AI in the cloud is an additional step that, under normal conditions, takes between 10 and 60 seconds per photo - depending on the type of effect applied, the current load on the AI server, and the complexity of the edit (changing clothes, changing the background, merging characters, etc.).

Actual total time per interaction = upload + AI processing + download. In other words, even on an excellent network (50 Mbps), guests will still wait 11-61 seconds for their photo, because the bottleneck becomes the AI processing time, not the network.

### 4.5 Contracted Speed × Actual Speed

This is where a lot of expectations fall short. When a venue says, “We have 200 Mega of internet,” that’s the contracted amount - the maximum capacity shared among all connected users. In practice, the equipment never actually receives the full 200.

At a crowded event - with guests, vendors, sound equipment, registration systems, and even a live camera all using the same connection - the actual speed available to each device is typically 10 to 30% of the contracted speed. The 200 Mbps becomes 20-60 Mbps of shared bandwidth - and that’s still split among dozens of devices.

That’s why dedicated networks exist. When equipment has its own channel (a dedicated cable or Wi-Fi connection), it doesn’t have to compete with anyone else for that bandwidth - whatever the link delivers is yours.

## 5. The “full house” effect - the band’s performance gets worse as the event fills up

There’s a practical consideration that few people take into account: a network that works perfectly during setup may become overloaded when the event reaches its peak attendance. The 2.4 GHz band starts off slow and eventually becomes unusable. The 5 GHz band starts out clear but also struggles at large events. Here’s why:

### 5.1 Invisible guest hotspots

Most modern cell phones come with a personal internet sharing (hotspot) feature that’s easy to turn on - and many people turn it on without realizing it, to connect a smartwatch, a tablet, or headphones. Each cell phone in this mode becomes a mini-router that transmits on both 2.4 GHz and 5 GHz, causing interference in exactly the same bands as your equipment.

At an event with 300 people, it is reasonable to estimate that between 30 and 60 hotspots will be active without anyone knowing. Each one occupies a channel.

### 5.2 Vendors provide their own internet connection

DJ with a 4G modem for music software, photographer with a hotspot to upload photos directly to the client, registration system with its own Wi-Fi, chip-enabled card reader, smart lighting, and video desk with a live streaming link. Each vendor brings its own network - and each network takes up bandwidth.

### 5.3 Bluetooth and Accessories

Wireless headphones, smartwatches, lapel microphones, lighting controls, Bluetooth speakers - all of these operate on the same 2.4 GHz band, generating constant background noise.

> How this plays out in operation: The start of the setup is smooth - the first 30 or 40 photos print in 5 seconds. As the crowd gathers at the venue, each print begins to take 10, 15, or 30 seconds. This isn't an equipment issue - it's the air filling up. It's time to activate Plan B.

Practical conclusion: even with the best on-site network prearranged, the operation must be prepared for the scenario in which that network degrades during peak times. That is why the next section discusses Plans B and C.

May 2026 reference: figures are historical planning examples, not performance guarantees.

# 6. Warning Signs Before the Event

Here are some phrases that are often said by venue staff before the event and that deserve attention:

| | |
|---|---|
| I “The Wi-Fi password is the same as the guests’.” | Shared network. Request a separate network. |
| I “It works really well; everyone uses it.” | What works for Stories ≠ what works for the Operation. Confirm 5 GHz and actual speed. |
| I “Oh, just connect to our Wi-Fi when you get here.” | Without a test run, it’s a gamble. Request a test at least 48 hours in advance. |
| I “The signal here is only 2.4, but it’s strong!” | Strong ≠ stable. Insist on a full stop OR Dedicated 5 GHz access point. |
| I “No cable needed - the hall’s Wi-Fi reaches that far.” | A signal that travels “far” is precisely what is shared with neighbors. Confirm the dB level on site. |

May 2026 reference: figures are historical planning examples, not performance guarantees.

# 7. Plans B and C - 4G/5G and Starlink

The operating rule is simple: every setup requires a Plan B; critical events also require a Plan C. That's because even the best cable in the world can fail: the venue's internet provider experiences an outage, someone trips over a cable, the router's power supply burns out, or the venue's internet provider's connection goes down for 20 minutes. Without an alternative, the operation simply grinds to a halt, and the frustration is on full display.

## Plan A - Dedicated cable or dedicated 5 GHz Wi-Fi at the venue

This is everything we detail in Sections 3 and 4: the main network, planned and tested in advance. It works at 95% of events. The problem is the remaining 5%.

## Plan B - Dedicated 4G/5G router (mobile carrier connection)

A 4G/5G modem with a carrier SIM card (TIM, Vivo, Claro, Algar), provided by the operator. In the event of a local network outage, the equipment connects to this modem within a few seconds.

- Advantage: complete independence from the venue's network - even if the venue's connection goes down, your device continues to function.
- Typical cost: 30-100 GB prepaid SIM card for the month of the event (~R$ 50-150). The modem itself is a one-time investment.
- Note 1 - Local coverage: The carrier's 4G/5G signal at the event location must be strong. In underground locations (basement halls, old mansions with thick walls), the signal may not reach the venue.
- Note 2 - Antenna saturation: At large events, thousands of guests using the same antenna can cause the 4G network to become saturated as well. This is a real issue, especially at festivals and concerts.
- Best practice: Bring two SIM cards from different carriers (e.g., TIM + Vivo). The likelihood of both becoming overloaded at the same time is low.

## Plan C - Portable Starlink (critical events)

For events where an internet outage is unacceptable (product launches, brand activations, high-profile corporate events, festivals with thousands of attendees), the third layer comes into play: satellite internet.

- Starlink Mini or Roam antenna - portable device (~3 kg) that plugs into an outlet. Direct communication with low-Earth orbit satellites, without relying on the operator's ground antenna or the venue's network connection.
- Cost: R$ 2,500-3,500 (equipment, one-time fee) + R$ 200-450/month for a mobile data plan (can be paused between events).
- Typical speed: 50-200 Mbps even in congested or rural areas.
- Latency: 30-60 ms - comparable to residential fiber, sufficient for operation.
- Physical requirement: The antenna must have a clear line of sight to the sky. In an enclosed hall, it must be positioned near a window, on a balcony, in a parking lot, or on the roof, with the cable routed indoors.

May 2026 reference: figures are historical planning examples, not performance guarantees.

## When each plan is required

| Event Type | Plan A cable / 5 GHz | Plan B 4G / 5G mobile | Plan C Starlink |
|---|---|---|---|
| Small private party (up to 100 people) | required | Recommended | optional |
| Wedding or social event (100-300) | required | required | optional |
| Corporate event (300+) | required | required | Recommended |
| Product launch / brand activation | required | required | required |
| Festival, fair, outdoor activation | required | required | required |

The question that determines the level: How much does it cost - in money or in brand image - for the equipment to be down for 30 minutes? If the answer is “nothing - it’s just a private party,” Plan A with a simple Plan B will suffice. If the answer is “the ROI of the entire activation” or “it embarrasses the client’s brand in front of all the guests,” you need Plan C.

## For the venue’s technical (IT) team

```
Typical failover: NextWave Reach / Cradlepoint / Pepwave MAX BR1 with two chips
and a standby SIM; the device’s Wi-Fi connects to this router, which prioritizes
the primary link (on-site Ethernet) and automatically falls back to the 4G/5G/
Starlink link if the WAN output fails (health-check ping to CloudFront/8.8.8.8
every 5 seconds). Starlink Roam: average latency 35–50 ms, throughput 80–180 Mbps,
compatible as a secondary WAN on any router with an RJ-45 port – no proprietary
software required.
```

May 2026 reference: figures are historical planning examples, not performance guarantees.

# 8. Practical Checklist for Event Day

Use this checklist within 48 hours before the event and during setup. Print it out and check off each item.

## Pre-event (48 hours in advance)

- ☐ Confirmed in writing with the venue: connection type (wired / 5 GHz / 2.4 GHz).
- ☐ The contracted internet connection speed at the venue has been received (e.g., 200 Mbps).
- ☐ Request a dedicated SSID for the equipment (if Wi-Fi is used).
- ☐ Confirmed that the dedicated network operates at 5 GHz, not 2.4 GHz.
- ☐ Confirmed that there is NO captive portal (login page) on the network.
- ☐ Dedicated network password received and tested by us.
- ☐ Physical placement of the equipment in accordance with the venue (floor plan + power outlet).
- ☐ Confirmed distance between the equipment and the access point or cable outlet.
- ☐ Plan B (4G/5G) ready: mobile router with a SIM card that has been loaded and tested.
- ☐ **Verify 4G/5G coverage at the event location (with 2 carriers, if possible).**
- ☐ Plan C evaluated: critical event? Starlink configured and tested at a location with a clear view of the sky.

## On setup day (at least 2 hours before opening)

- ☐ Connect the equipment to the agreed network (wired or dedicated 5 GHz).
- ☐ Verified the actual speed of the equipment (upload and download tests).
- ☐ Confirmed that the speed meets the minimum requirement (≥ 25 Mbps download / 10 Mbps upload).
- ☐ End-to-end testing completed: photo uploaded, processed, and printed.
- ☐ The total interaction time was within expectations (≤ 30 seconds).
- ☐ Plan B tested on-site: 4G/5G router connected and tested.
- ☐ Operator briefed on how to respond if the internet connection fluctuates and how to implement Plan B.

## During the event

- ☐ Quick check every hour - equipment still connected, normal print time.
- ☐ If the connection becomes unstable, switch to Plan B (4G/5G) before a queue builds up.
- ☐ Record (screenshot) any instability to report to the venue later.

May 2026 reference: figures are historical planning examples, not performance guarantees.

# 9. Glossary - in plain English

| | |
|---|---|
| **Wi-Fi** | Wireless Internet. It operates on two main frequency bands: 2.4 GHz and 5 GHz. |
| **2.4 GHz** | An older Wi-Fi band, with few channels and a lot of interference in crowded environments. |
| **5 GHz** | The newest Wi-Fi band, with many channels, less interference, and faster speeds. |
| **SSID** | The Wi-Fi network's "name" (the one that appears in the list on your cell phone). |
| **Ethernet / RJ-45** | Network cable. The connector looks like a “chubby phone.” |
| **Router** | A device that provides internet access. It has antennas (Wi-Fi) and ports for cables. |
| **Access Point (AP)** | Additional Wi-Fi antenna. It is usually mounted on the ceiling in large spaces. |
| **Channel** | The “radio station” that the network is using within the frequency band. |
| **Upload** | Send data from the local machine to the Internet (upload). |
| **Download** | Receive data from the Internet to the local machine (download). |
| **Mbps** | Megabits per second. A unit of Internet speed. To convert to MB/s, divide by 8. |
| **MB** | Megabyte. A unit of file size. 1 MB ≈ 1 medium-quality photo. |
| **Captive Portal** | That page that pops up asking for your name and email address before giving you access to the internet. It interferes with automated systems. |
| **Latency (ping)** | The time it takes for a die to go back and forth. The shorter, the better. |
| **dBm** | Wi-Fi signal strength unit. The LESS negative the value, the better (-50 is strong, -80 is weak). |
| **4G / 5G** | Internet via a cell phone carrier's terrestrial antenna. Used as a backup plan via a modem with a SIM card. |
| **Hotspot** | A feature available on any cell phone or modem that turns the device into a mini Wi-Fi router, sharing the SIM card's internet connection with other devices. |
| **Starlink** | Low-Earth orbit satellite internet. Used as Plan C in critical situations. Requires a clear view of the sky. |