How much upload bandwidth do security cameras need?

The honest answer is: add up the bitrates of the streams that actually leave the building at the same time. Here is how to read those bitrates off your own cameras and turn them into a number, with a worked example.

Networking · Published 2026-10-25 · Online version:
vuepointsecure.com/support/how-much-upload-bandwidth-do-security-cameras-need

Cameras recording to an NVR on site use no internet bandwidth at all; that traffic stays on the local network. Upload bandwidth only matters for video that leaves the building: someone viewing remotely, cloud recording, or a monitoring service pulling streams. Generic per-camera figures are guesses. Your cameras already tell you exactly what they send.

Step 1: read the real bitrates

Every IP camera has a video or encoding settings page (often **Configuration > Video/Audio**, **Camera > Encode** or **Stream settings**, depending on brand) showing at least two streams:

- **Main stream:** full resolution, used for recording and full-screen viewing. Typically several Mbps.
- **Sub-stream:** low resolution, used for multi-camera grids and phone apps. Typically a few hundred kbps up to about 1 Mbps.
- **Bitrate mode:** with **CBR** (constant) the figure is what it sends. With **VBR** (variable) the figure is a ceiling; scenes with motion, rain, foliage or night-time noise push it toward the ceiling, so plan on the maximum.
- **Codec:** H.265 typically needs noticeably less bitrate than H.264 for similar image quality, but only if the camera, recorder and viewing app all support it.

Step 2: decide which streams leave the site at once

Use	What goes upstream
Phone app, grid view	One sub-stream per tile on screen
Phone or PC, single camera full screen	Usually the main stream (some apps let you choose)
Remote playback / clip download	Main stream of the recording, often faster than real time if bandwidth allows
Continuous cloud recording	Every recorded stream, all the time
Event-based cloud upload or monitoring	Short clips or streams only when events occur, plus live view during an incident

Step 3: do the arithmetic

1 **Add up the simultaneous streams**
Sum the bitrates of everything in your worst realistic case, for example two people viewing at once during an incident.

2 **Add headroom**
Upload links are shared with everything else on site, and speeds vary through the day. Our working rule is to keep camera traffic to roughly 70 to 80 percent of the measured upload speed at most, never 100 percent.

3 **Measure your real upload**
Run a speed test from a wired computer on the same network, at the busiest time of day. Use the upload figure, not the download figure; many connections have a fraction of the upload that they have download.

4 **If cloud or cellular, convert to data per month**
1 Mbps running continuously is about 450 MB per hour, about 10.8 GB per day, and about 324 GB per 30 days. Multiply by your continuous bitrate.

Worked example

A yard with **8 cameras**. Each main stream is configured at **4 Mbps** (H.265, VBR ceiling) and each sub-stream at **512 kbps**. Recording is to an NVR on site. These settings are an example; use your own.

Scenario	Calculation	Upload in use	Measured upload to have (with headroom)
One person, 8-tile grid on phone	8 x 0.512 Mbps	about 4.1 Mbps	about 5 to 6 Mbps
One person, one camera full screen	1 x 4 Mbps	4 Mbps	about 5 to 6 Mbps
Two people, one grid plus one full screen	4.1 + 4 Mbps	about 8.1 Mbps	about 10 to 12 Mbps
Continuous cloud recording of all main streams	8 x 4 Mbps	32 Mbps, all day	about 40 to 46 Mbps

Upload needed for different ways of using the same 8-camera system.

The last row is the one that surprises people: continuously sending eight main streams off site needs a fast, symmetrical connection, and at 32 Mbps it moves roughly 10 TB a month. On a cellular plan that is not workable, which is why remote and solar sites send events and short clips rather than continuous video.

Bitrate	Per day	Per 30 days
0.5 Mbps	about 5.4 GB	about 162 GB
1 Mbps	about 10.8 GB	about 324 GB
2 Mbps	about 21.6 GB	about 648 GB
4 Mbps	about 43.2 GB	about 1.3 TB
8 Mbps	about 86.4 GB	about 2.6 TB

Data used by one continuous stream.

If remote viewing is choppy

Lower the sub-stream bitrate or frame rate before touching the main stream; recording quality stays the same. Make sure the phone app uses the sub-stream for grids. Check for other heavy uploads on the site (backups, cloud sync).

Frequently asked questions

Does recording to the NVR use internet bandwidth?

No. Cameras-to-NVR traffic stays on the local network. Only viewing, playback, cloud upload or monitoring from outside the building uses the internet connection.

Why does my bandwidth jump at night?

Low-light image noise and IR-lit scenes compress poorly, so VBR streams climb toward their ceiling. Plan on the configured maximum, not the daytime figure.

Related guides

- P2P cloud vs port forwarding vs VPN for remote viewing — vuepointsecure.com/support/p2p-cloud-vs-port-forwarding-vs-vpn-for-remote-viewing
- PoE switch and cabling basics for IP cameras — vuepointsecure.com/support/poe-switch-and-cabling-basics-for-ip-cameras
- Cameras on sites with no power and no network — vuepointsecure.com/support/no-power-no-network-deployments
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