Throughput

Understanding Throughput in HD Surveillance Servers

When specifying servers for a surveillance system, it's essential to consider the data throughput required—especially as higher-resolution cameras are added to your network.

Back in 2014, IP cameras overtook analogue in sales, with 1080p HD becoming the standard in most professional CCTV applications. Now, 4K and beyond are increasingly common, with some cameras reaching up to 30 megapixels on a single sensor. While higher resolution improves image quality, it also dramatically increases data volume.

More Resolution = More Data

Using the same compression and frame rates, data output increases proportionally with resolution. To fit more cameras onto a server, you might consider lowering frame rates or increasing compression—but this comes at a cost. Even though H.264 is efficient, over-compression negates the benefits of higher resolution.

How H.264 Compression Works

H.264 is a **motion-compensated compression** method using:

- **I-Frames**: Full reference images
- **P-Frames**: Predictive frames that only encode pixel changes

This dramatically reduces file size, but the amount of data generated depends on **scene complexity**—the more movement, the more pixel change, the more bandwidth required.

Why Industry Calculators Fall Short

Most calculators estimate **average bandwidth**, based on typical usage in Mbps (megabits per second). This is useful for **storage planning**, but it leaves out a critical factor: **peak bandwidth**—the maximum output if all pixels change at once.

If your server can't handle peak demand, it can **fail at the worst possible moment**.

Real-World Example: A Hotel Fire

A hotel's CCTV system might show low activity at night—quiet hallways, empty bars. But in an emergency, like a fire, **every camera records high motion simultaneously**: flashing lights, smoke, people running.

If your server can't handle this peak, the system could crash when it's needed most.

The Limitations of General-Purpose Servers

Most servers used in surveillance are **rebadged general-purpose machines**, designed for websites, databases, or file storage. While they may run your VMS, they're not built for the **intensive data demands of HD video**.

Upgrading the processor alone won't solve throughput issues. True optimisation requires **specialist design and components**.

The Secure Logiq Difference

Secure Logiq and other leading surveillance-focused server manufacturers understand how **IP video flows**, how different VMS platforms work, and how to design systems that **maximise throughput** without compromise.

Our HD surveillance servers can deliver **up to 4000 Mbps**—equivalent to **15 standard IT servers**—all while saving on **rack space, power, and cost**.

VMS & Additional Workloads

Video Management Systems, mobile gateways, LPR (License Plate Recognition), analytics—these all impact server performance. Often, **multiple servers or virtualisation** are needed to meet your system requirements.

Off-the-shelf calculators won't account for these variables, nor will they help your local server provider build a truly optimised solution.

Final Thought

Recording HD video is only half the challenge. You also need hardware capable of **decoding and displaying** multiple live or playback streams—especially with the rise of HD panoramic cameras.

But that's another paper…