

# NAS Network Speed Planning Worksheet

File Size · Transfer Time · Real-World Speeds · Bottleneck Checklist

## 1 YOUR WORKLOAD

Typical file size: \_\_\_\_\_ GB

Files transferred at once: \_\_\_\_\_ files

Total transfer size: \_\_\_\_\_ GB

Desired transfer time: \_\_\_\_\_ minutes

Simultaneous users: \_\_\_\_\_ users

Plex streams (4K): \_\_\_\_\_ streams

Required speed (MB/s) = Transfer size (MB) ÷ Time (seconds)

Example: 50 GB ÷ 300s = **~167 MB/s** → needs 2.5GbE

## REAL-WORLD NAS TRANSFER SPEEDS

CONNECTION	THEORETICAL	LARGE FILES	SMALL FILES	4K STREAMS
<b>1GbE</b> Standard g/gigabit	<b>125 MB/s</b>	<b>80-110 MB/s</b>	<b>10-40 MB/s</b>	<b>~3-4</b>
<b>2.5GbE</b> Modern NAS default	<b>312 MB/s</b>	<b>200-280 MB/s</b>	<b>20-80 MB/s</b>	<b>~8-10</b>
<b>5GbE</b> Mid-range upgrade	<b>625 MB/s</b>	<b>400-550 MB/s</b>	<b>40-150 MB/s</b>	<b>~15-20</b>
<b>10GbE</b> Professional / video	<b>1,250 MB/s</b>	<b>600-1,100 MB/s</b>	<b>80-300 MB/s</b>	<b>30+</b>

Small file performance dominated by IOPS, not link speed. 4K Plex streams ≈ 40-80 Mbps each (direct play). Real speeds limited by slowest component – see bottlenecks.

## 2 TRANSFER TIME REFERENCE

FILE / DATASET SIZE	1GBE (~100MB/S)	2.5GBE (~250MB/S)	10GBE (~900MB/S)
1 GB	~10 sec	~4 sec	~1 sec
10 GB	~1.7 min	~40 sec	~11 sec
50 GB	~8 min	~3.5 min	~56 sec
100 GB	~17 min	~7 min	~2 min
500 GB	~1.4 hrs	~33 min	~9 min
1 TB	~2.8 hrs	~67 min	~19 min
4 TB	~11 hrs	~4.5 hrs	~75 min

Model exact speeds for your setup:  
[needtoknowit.com.au/tools/transfer-speed-estimator/](https://needtoknowit.com.au/tools/transfer-speed-estimator/)

## BOTTLENECK CHECKLIST

- NAS Storage Type**  
HDD arrays cap at ~100-200 MB/s sequential. SSD cache or all-SSD needed for 10GbE saturation.
- Client Drive Speed**  
Laptop HDD writing at 80 MB/s caps your transfer regardless of network speed.
- Switch / Cable**  
A 1GbE switch between a 2.5GbE NAS and client caps at 1GbE. All ports must match the target speed.
- Protocol Overhead**  
SMB encryption (AES-256-GCM) costs ~15-30% throughput on older CPUs. SMB 3.0+ multichannel helps.
- File Size Mix**  
Thousands of small files hit IOPS limits, not bandwidth. 1GbE often adequate for document storage.



Transfer Speed Estimator

⚠ Upgrading to 10GbE without SSD cache often yields <200 MB/s – HDD is the real bottleneck.

### MORE FREE NAS PLANNING TOOLS

[needtoknowit.com.au/tools](https://needtoknowit.com.au/tools) – Transfer Speed Estimator · Network Upgrade ROI · NAS Sizing Wizard  
 RAID Calculator · Power Calculator · Backup Calculator

**Need to Know IT**  
 Independent Australian storage guidance  
[needtoknowit.com.au](https://needtoknowit.com.au)