Data Size and Transfer Time Converter (Decimal and Binary Prefixes)

Converts an amount of data between bits, bytes and decimal (kB, MB, GB, TB) or binary (KiB, MiB, GiB, TiB) multiples, and the transfer time at a link speed.

Method: Decimal and binary prefixes; IEC 80000-13; ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Amount	4.7000	
Unit of the amount	GB (10^9 bytes)	
Link speed (Mbit/s)	100.00	
Link efficiency (protocol overhead)	90.000	%

Calculated results

Parameter	Value	Unit
Bits	3.7600e+10	
Bytes	4.7000e+09	
Megabytes (10^6)	4,700.0	
Mebibytes (2^{20})	4,482.3	
Gigabytes (10^9)	4.7000	
Gibibytes (2^{30})	4.3772	
Transfer time	6.9630	min

Notes for this case

• Decimal prefixes (k, M, G, T) are powers of 1000; binary prefixes (Ki, Mi, Gi, Ti) are powers of 1024. Disk makers use decimal units while many operating systems show binary ones, so a '1 TB' drive appears as about 931 GiB. Link speeds are in bits per second (8 bits per byte); protocol overhead typically leaves 85–95 % for data.

Formula and method

$$1\ \mathrm{KiB} = 2^{10}\ \mathrm{B}, \quad 1\ \mathrm{kB} = 10^{3}\ \mathrm{B}, \quad t = \frac{8 \cdot \mathrm{bytes}}{R\eta}$$

Variables

x	Amount	-
unit	Unit of the amount	-
R	Link speed (Mbit/s)	-
η	Link efficiency (protocol overhead)	-
b	Bits	-
B	Bytes	-
MB	Megabytes (10^6)	-
MiB	Mebibytes (2^{20})	-
GB	Gigabytes (10^9)	-
GiB	Gibibytes (2^{30})	-
t	Transfer time	s

Method and standards

Data units.

Assumptions and limits

- Constant link speed.

References

Decimal and binary prefixes, IEC 80000-13, Quantities and units: Information science and technology (binary prefixes, method)

Report details

Report reference	FCC-JRCP-ZAZG (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/unit-conversions/data-unit-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.