



Bellcore/Telcordia SONET Standard

SONET is an acronym for Synchronous **O**ptical **N**ETwork and is a standard for optical communication. The SONET standard was initiated by Bellcore (now Telcordia) on behalf of the Regional Bell Operating Companies (RBOCs) for the following purposes:

- To facilitate optical interconnectivity in a multi-vendor environment (mid-span meet)
- To eliminate the need for multi-stage multiplexing
- To position the network for transport of new services
- To enhance Operations, Administration and Maintenance
- To enhance bandwidth management capabilities

In Phase 1, (1988), of SONET standardization, ANSI (American National Standards Institute) defined a hierarchy of synchronous rates and formats, overhead definitions and layering, frequency justification principles, scrambling algorithm and payload mapping schemes for signals from asynchronous multiplexing hierarchy.

In Phase 2, (1991), ANSI defined additional payload mapping schemes for some new services. Also, further definitions of OAM capabilities were provided and some aspects on Automatic Protection Switching were clarified.

Digital Hierarchy

SONET defines optical carrier (OC) levels and their electrical equivalent – Synchronous Transport Signals (STS). The base rate is 51.84 Mb/s (STS-1). The STS-1 is a basic building block for higher SONET rates and the higher rates are direct integer multiples of the base rate.

STS-N has exactly N times the rate of 51.84 Mb/s. For example, STS-12 is exactly $12 \times 51.84 \text{ Mb/s} = 622 \text{ Mb/s}$. Note that STS-N and OC-N signals have the same bit rate and frame formats. STS-N signals become OC-N signals after electrical to optical conversion and vice versa.

SONET Optical Line Rates

Optical Carrier Level	Electrical Equivalent	Line Rate Mb/s
OC-1	STS-1	51.84
OC-3	STS-3	155.52
OC-12	STS-12	622.08
OC-48	STS-48	2488.32
OC-192	STS-192	9953.28

NOTE: The higher line rates are integer multiples of the base rate of 51.84 Mb/s. For example, $OC-12 = 12 \times 51.84 \text{ Mb/s} = 622.08 \text{ Mb/s}$.