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Your IT Solution for Tomorrow's Business...

Structured Cabling

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Structured cabling is building or campus telecommunications cabling infrastructure that consists of a number of standardized smaller elements (hence structured) called subsystems.

Structured cabling falls into six subsystems:

- Entrance Facilities are where the building interfaces with the outside world.
- Equipment Rooms host equipment which serve the users inside the building.
- Telecommunications Rooms house telecommunication equipment which connect the backbone and the horizontal cabling subsystems.
- Backbone Cabling connect between the entrance facilities, equipment rooms and telecommunications rooms.
- Horizontal Cabling connect telecommunications rooms to individual outlets on the floor.
- Work-Area Components connect end-user equipment to outlets of the horizontal cabling system.

Structured cabling design and installation is governed by a set of standards that specify wiring data centers, offices, and apartment buildings for data or voice communications, using category 5 (CAT 5E) or category 6 cable (CAT 6) and modular sockets. These standards define how to lay the cabling in a star formation, such that all outlets terminate at a central patch panel (which is normally 19 inch rack-mounted), from where it can be determined exactly how these connections will be used. Each outlet can be 'patched' into a data network switch (normally also rack mounted alongside), or patched into a 'telecoms patch panel' which forms a bridge into a private branch exchange (PBX) telephone system, thus making the connection to a voice port.

The reason for having a 'Standard' is to define a method of connecting all types of vendor's voice and data equipment, over a cabling system that uses a common media, common connectors and a common topology. This means that a building can be cabled for all its communications needs without the planner or architect ever having to know what type of equipment will be used.

Now for the good news, the standards are mostly concerned with the performance criteria of the components of a cabling system, and, as that is guaranteed by the manufacturers of the different cabling components, you don't have to worry about it.

Using Stranded vs. Solid

Stranded cable is used for patch leads because it is more flexible than solid copper. The solid cable is used in the fixed part of the installation, i.e. the cable between the patch cabinet and the wall outlets (ref. Horizontal Cabling above). Solid cable has better performance characteristics than stranded and it is cheaper to make, however; by design, it is not recommended for Patch Cables because the solid cables are susceptible to failure as the cables are miss-handled improperly. Careful consideration should be made when using solid copper for patch cables since there is an exposure as the single point of failure on any given network.

You should also avoid splicing solid copper directly into an RJ45 and plugging it directly to a Switch from a workstation. Again, the standard is to terminate this type of connection via Horizontal Cabling as described above and connect the equipment with the Stranded Patch Cables to complete the connectivity.

Exceeding Cable Length

Length limits are not for particular types of cables. They are for the type of data signal that they carry. For some proprietary networks such as Thinnet, the distance is set at the maximum length that the signal will work reliably at a given speed over a given type of cable.

When we talk about Cat 5, 5e, 6 etc. these are cabling 'Standards' which define a method of connecting all types of networking protocols, over a cabling system that uses a common media, common connectors and a common topology. So the length limit was arbitrarily set for the worst case scenario. 10BaseT may well work on Cat 5 for 150m (492 ft.) but ATM, AS400, Token Ring etc. may not, and because a structured cabling system has to work for all networking methods, a limit had to be set.

With the current speeds of Gigabit Ethernet it is more critical not to exceed the minimum length of 100m (328 Ft.).

Standards

U.S. Cabling Standards are administered through the American National Standards Institute (ANSI) along with Standard Committees such as Building Industry Consulting Service International (BICSI), the association supporting the information transport systems (ITS) industry with information, education and knowledge assessment. BICSI is an ANSI-accredited standards development organization.

As the voice of the U.S. standards and conformity assessment system, the American National Standards Institute (ANSI) empowers its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment.

The Institute oversees the creation, promulgation and use of thousands of norms and guidelines that directly impact businesses in nearly every sector: from acoustical devices to construction equipment, from dairy and livestock production to energy distribution, and many more. ANSI is also actively engaged in accrediting programs that assess conformance to standards – including globally-recognized cross-sector programs such as the ISO 9000 (quality) and ISO 14000 (environmental) management systems.

References

http://www.ansi.org/about_ansi/overview/overview.aspx?menuid=1

http://bicsi.org/standards/standards.aspx