

TIA-942 "Telecommunications Infrastructure Standard for Data Centers"

Key Facts

Distributed by NDS INFORMATION- TELECOM SYSTEM



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Objective of standard:

Provide requirements & guidelines for the design & installation of a data center or computer room. Standard will enable the data center design to be considered early in the building development process, contributing to the architectural considerations, by providing information that cuts across the multidisciplinary design efforts; promoting cooperation in the design and construction.

Ratification date & availability:

Ratified April, 2005 and available from Global Engineering Documents (www.global.ihs.com).

Audience:

Intended for use by designers who need a comprehensive understanding of the data center design including the facility planning, the cabling system and the network design.

Topics covered in the standard:

(1) cabling; (2) pathways and spaces; (3) redundancy; (4) network design; (5) location; (6) access; (7) architectural; (8) environmental design; (9) electrical design; (10) fire protection; and (11) water intrusion.

Basic elements of data center structured cabling system architecture:

(1) Horizontal cabling; (2) Backbone cabling; (3) Cross-connect in the entrance room or main distribution area; (4) Main cross-connect (MC) in the main distribution area; (5) Horizontal cross-connect (HC) in the telecommunications room, horizontal distribution area or main distribution area; (6) Zone outlet or consolidation point in the zone distribution area; and (7) Outlet in the equipment distribution area.

Spaces in the data center to support telecommunications equipment & cabling:

(1) entrance room (ER); (2) main distribution area (MDA); (3) horizontal distribution area (HDA); (4) zone distribution area (ZDA); and (5) equipment distribution area (EDA). The ER, MDA, HDA, ZDA and EDA are analogous but not to the Entrance Facility, Equipment Room, Telecom Room, Consolidation Point, and Work Area, respectively, as defined in the TIA/EIA-568-B.1 standard. Note that data center size and other factors will determine whether all these spaces are used. Spaces should be planned to provide for growth and transition to evolving technologies. Spaces may or not be walled off or otherwise separated from other computer room spaces.

Example topologies & architectures:

1. **Basic data center topology:** appropriate for many single tenant enterprise data centers and multi-tenant Internet hosting data centers.
2. **Distributed data center topology:** utilizes more than one entrance room and appropriate where additional redundancy is required and/or circuit distance limitations would otherwise be exceeded
3. **Reduced data center topology:** appropriate for smaller installations where the HDA that is combined with the MDA. The telecommunications room (TR) and ER may also be combined in very small data centers. Fiber horizontal cabling may extend to 300 meters

4. **Data center centralized fiber cabling:** consolidates data center electronics in the MDA and the EDA, reducing HDA space and powering requirements while centralizing administration.

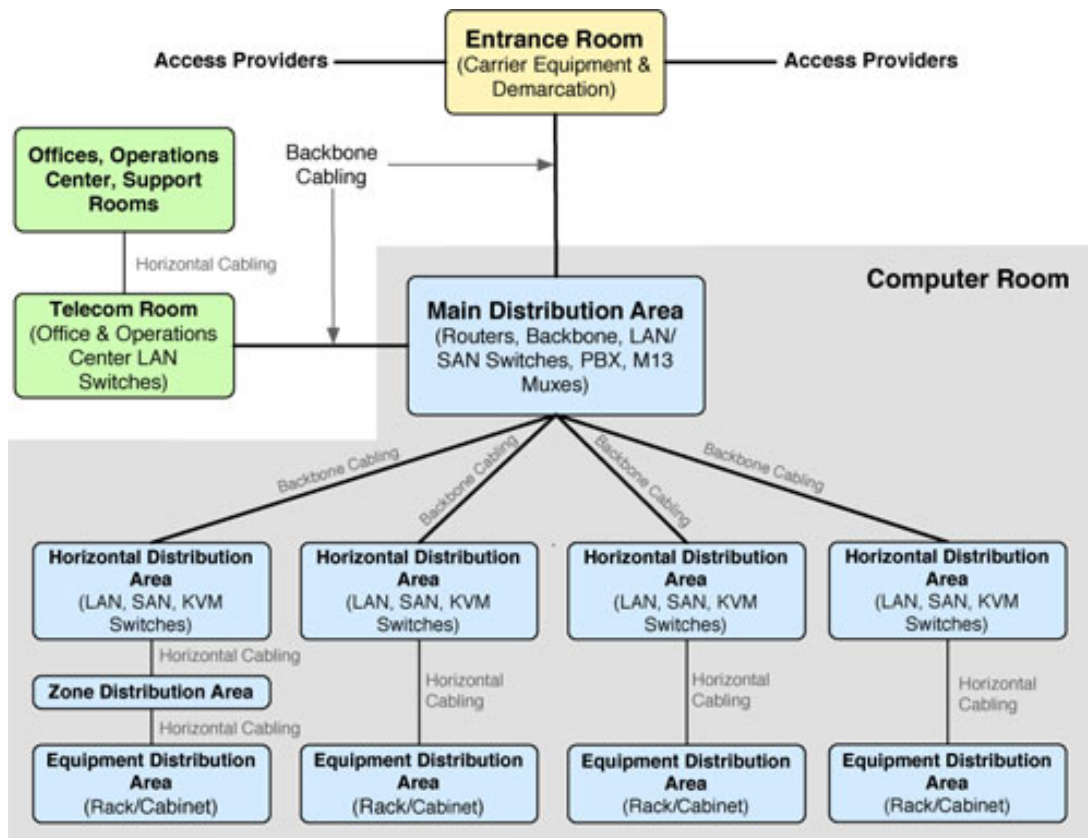
Recognized media:

1. **Copper:** 100-ohm twisted-pair cable compliant with ANSI/TIA/EIA-568-B.2 (Category 3 or 5e). Category 6, compliant with ANSI/TIA/EIA-568-B.2-1 recommended.
2. **Fiber:** Multimode optical fiber cable, either 62.5/125 μm or 50/125 μm compliant with ANSI/TIA/EIA-568-B.3; 50/125 μm 850 nm laser optimized multimode fiber, compliant with ANSI/TIA-568-B.3-1 recommended.

Data Center Topologies supported in TIA-942 Standard: "Telecommunications Infrastructure for Data Centers"[\[1\]](#)

Basic Data Center Topology

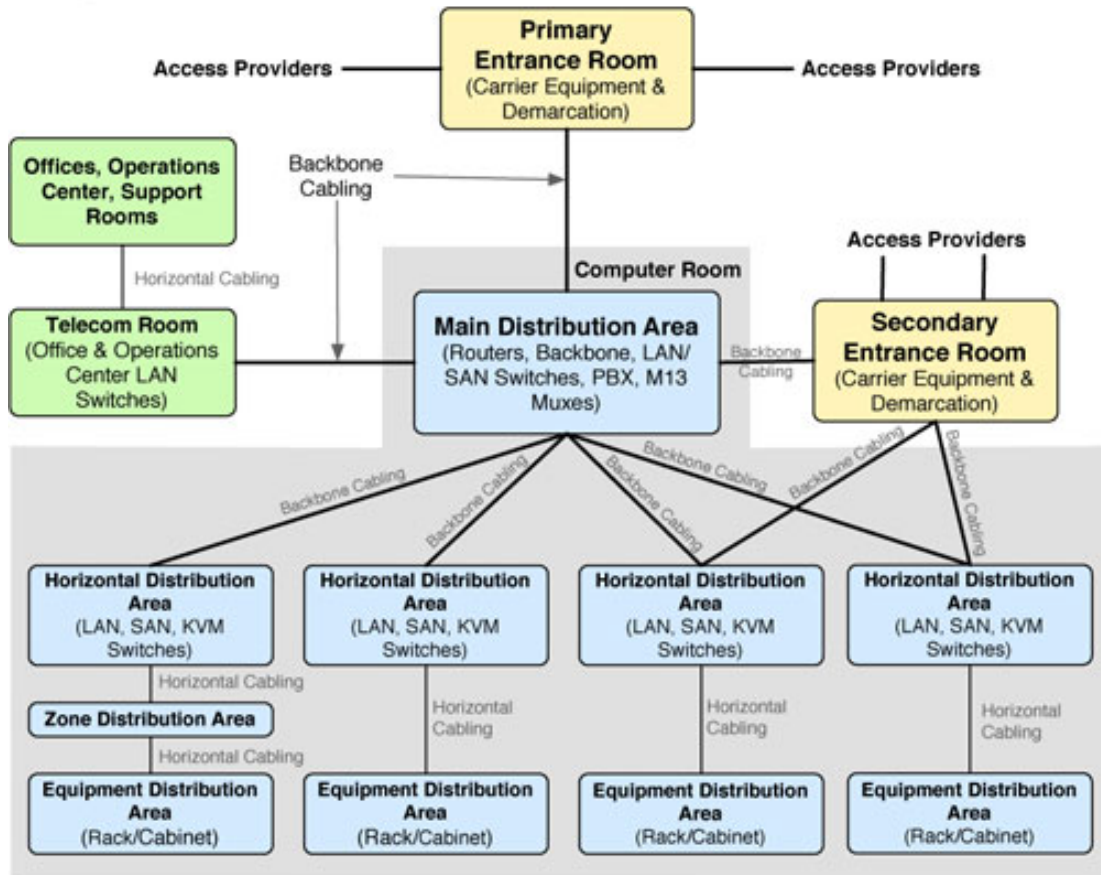
Here you can see the various "spaces" and cabling subsystems that comprise a basic data center topology. The architecture here is typical of that deployed for a large enterprise or an Internet data center that provides services such as web hosting.



Example of basic data center topology

Distributed Data Center Topology

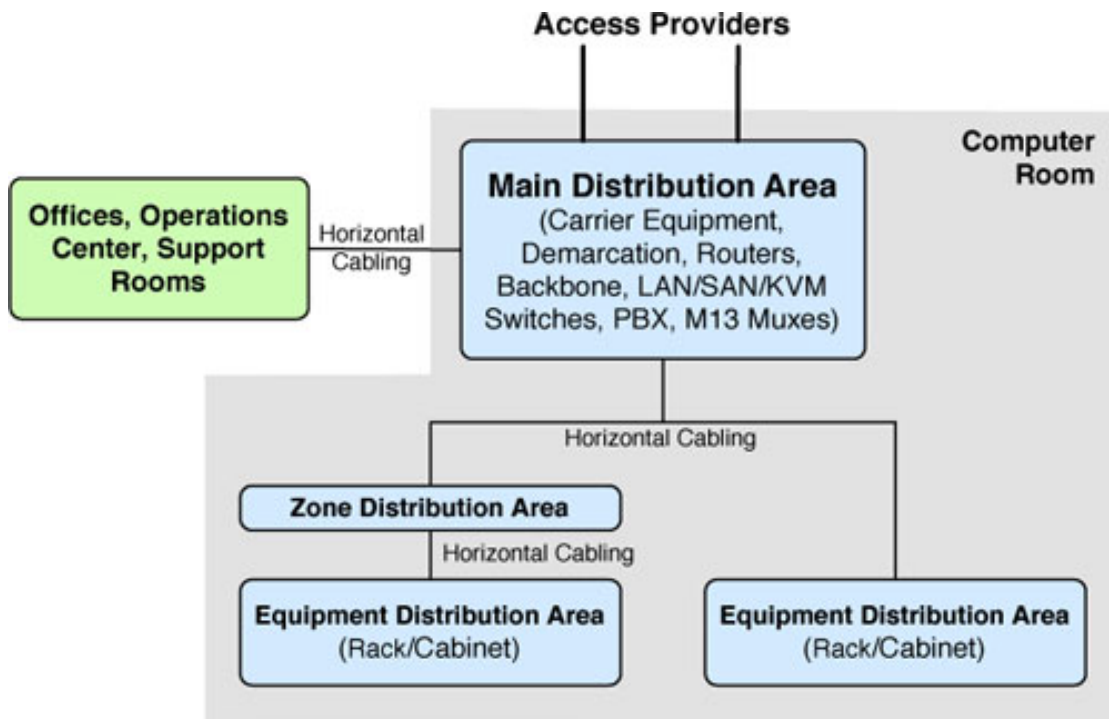
Here is a data center design that may be used for larger data centers that have either large office and support areas or those in which the distances separating the two is significant. Multiple telecommunications rooms may also be used for data centers of this type. In addition, multiple entrance rooms may be required due to circuit distance restrictions. The additional entrance rooms may be connected to the MDA they support using optical fiber, twisted-pair or coaxial cables.



Example of distributed data center topology with multiple entrance rooms

Reduced Data Center Topology

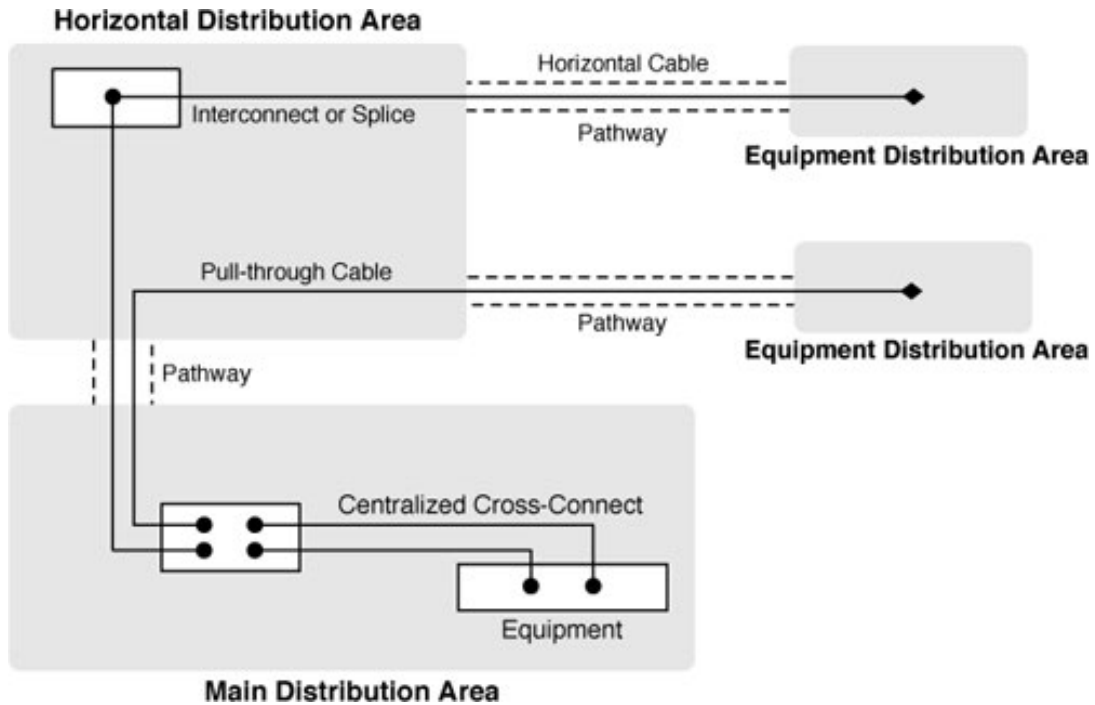
Here is a smaller data center that would support a medium size enterprise. In this design, the main cross connect (MCC) and horizontal cross-connect (HCC) can be consolidated and be as small as a single cabinet or rack. As in a traditional premises structured cabling system, the Telecommunication Room for cabling to the support areas and the Equipment Room can also be consolidated into the MDA in this reduced data center topology.



Example of reduced data center topology

Centralized Fiber Design

Finally, here is a data center using a centralized fiber architecture. This architecture is similar to that supported in the TIA/EIA-568-B.1 standard for Commercial Building Telecommunications Cabling Systems and ISO 11801, the international equivalent. This architecture provides an alternative to the optical cross-connection in the HDA whereby no electronics are required in that space. In addition, there are significant cost reduction factors realized in a data center employing this architecture. These include: (1) a smaller, simpler HDA; (2) faster and easier installation and testing; (3) fewer idle ports; (4) centralized administration; and (5) simplified moves, adds and changes.



Example of centralized fiber design

Why Design Your Data Center for Compliance with TIA-942?

Standards are created to ensure uniformly high quality of design and performance in many industries. In addition they function to ensure interoperability between vendors and encourage a high level of competition within the industry so that users receive the best performance at competitive prices.

Data centers have historically been designed in the absence of rigorous guidelines leading to uniqueness in virtually every data center and challenges in product selection and troublesome maintenance and re-supply issues. Commercial building owners benefited greatly from the TIA-568 standards. Similarly, designing your data center in accordance with the new TIA-942 standard will help ensure robust data center design, standardized nomenclature, ready supply, competitive pricing and scalability for future applications.