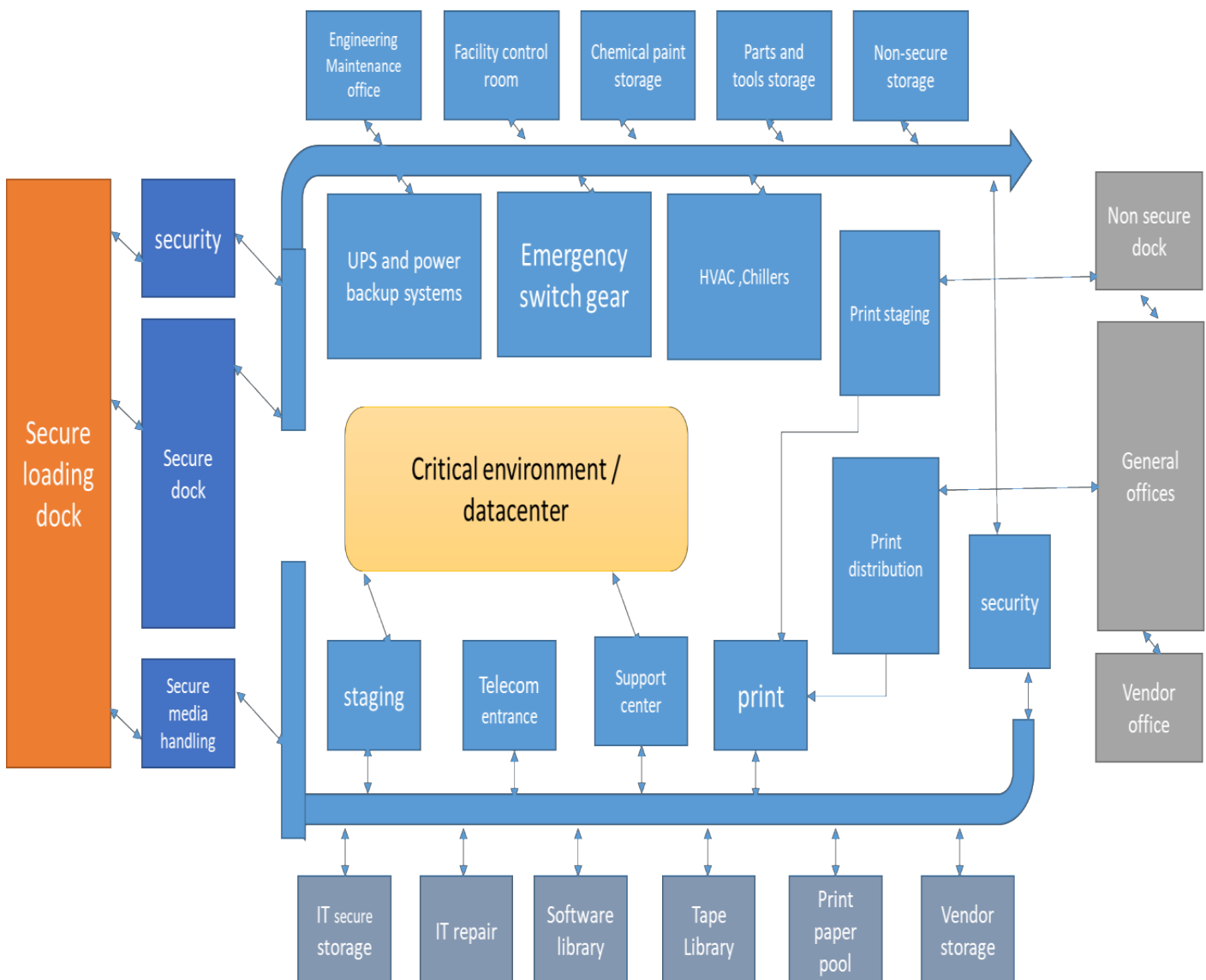


Space Planning

Space planning is one of the key activities in the process of datacenter preparation. The size of the computer room space determines the capacity of datacenter to accommodate IT, Telecommunications equipment, power and cooling system. High-density data centers will have a higher capacity of power and/or cooling per unit of computer room floor space.

A balance between space and capacity needs to be determined at the outset when designing a new data center and when modifying an existing data center space. The balance will depend on the type of IT and telecommunications systems the data center is to support and the number/combination of those systems that are to be placed within each cabinet or rack.



Power Systems

The requirements of power systems should be considered when developing the space plan which includes electrical feeders, conduits and bus bar usage.

The type of UPS System should be decided before hand to plan the space accordingly and if the UPS system is centralized or distributed and the redundant power systems, replacement space, and equipment service area should be considered.

Necessary clearance should be provided for safety, access and maintenance for all electrical equipment as specified by the manufacturer, applicable codes and standards, and the applicable local approvals.

Electric Utility Service Feeds

Independent electric utility service feeds and associated switchgear should be in a dedicated space that is adjacent or in proximity to the primary data center electrical distribution space.

The electric utility service feeds and associated switchgear should be in a dedicated space that is equally distanced between or in proximity to the dual data center electrical distribution spaces.

Independent electric utility service feeds and associated switchgear should be in dedicated spaces separate from each other.

Utility entrance space A should be located adjacent to electrical distribution space A, and utility entrance space B should be located adjacent to electrical distribution space B. A catastrophic event affecting one should not affect the other.

Generator Power

The type of generator either indoors or outdoors is based on the site and the user requirements.

The indoor generators should have automated louvers, noise reduction/mitigation and exhaust management.

Outdoor generators will have increased exposure to physical and weather-related damage and generators installed outdoors should be installed within shelters.

Requirements for weight, vibration, lateral structure, and fire rating of surrounding surfaces of the space intended for a generator fuel tank capacity and location should be well planned for in the planning.

Generator exhaust systems should be located outside so that they do not flow into building ventilation air intakes, preferably on the prevailing downwind side from building ventilation air intakes.

Space planning will need to account for on-site fuel storage. The quantity of fuel that is required and can be stored will be affected by the following:

Availability of backup or disaster recovery site for applications supported by the data center and expected time required to recover applications at the backup site.

- Proximity of the data center to locations or services, which provide fuel replenishment
- Priority status of the organization and response time for fuel replenishment during regional disasters, such as earthquakes, floods, and hurricanes
- Criticality of applications and regulatory requirements
- Business drivers requiring self-sustaining operations.
- Security considerations
- Protection from the elements (e.g., floods, storms)
- Location of fuel pumps
- Environmental requirements
- Storage of large amounts of fuel on site may trigger extensive jurisdictional and environmental permit reviews.
- Also, the permitting process may be more stringent for underground storage tanks (UST) than four aboveground storage tanks (AST).

Cooling Capacity

The space required to support the cooling systems will vary depending on the type of cooling system selected and the cooling systems should be selected based on the data center design and it can be one of

– types below,

- central air handlers
- Perimeter CRAC units
- In row
- ceiling mount
- point of use cooling systems

Security

A security room should be located at or adjacent to the main personnel entrance to the facility. A visitor sign-in area should be physically separated from the facility security operations.

The security rooms should include the security operations facility, including video monitoring and access control system database and front end-user interface. When planning this space consider:

- Video monitoring space requirements
- Access control system space requirements
- Access control storage requirements
- Unobstructed access to key storage
- Unobstructed access to access-card (temporary and blank) storage
- Fire/smoke alarm monitoring systems
- Restricted access to the security control room

Telecommunications Entrance Room

Provide a secure point where entering media from access providers can be converted from outdoor cable to indoor cable.

House the access provider-owned equipment such as their demarcation, termination, and provisioning equipment's.

The location for Main distribution Area, IDA and Horizontal distribution Area shall consider the maximum channel length of applications supported on the backbone cabling types to be installed.

The entrance room must be located with respect to the computer room and it should be designed to have the distance limitations of circuits to be provisioned from the entrance room.

The entrance room should be adjacent to or be in a secured space within the computer room.

The entrance room with the telecommunications main grounding bus bar (TMGB) should be close to the main electrical grounding bus bar to minimize the length of the bonding conductor for telecommunications (BCT), the conductor that interconnects the main electrical ground bar to the TMGB.

The distance limitations for T-1, T-3, E-1 and E-3 circuits and the type of media these circuits utilize and the number of DSX panels and patch panels in the channel and should refer TIA 942-A coaxial circuits for guidance.

Service Provider Considerations

The Service provider equipment and any associated cabling should be provided with adequate space. Separate or secured cable routes may be required between the entrance room and the access provider's equipment.

Access to the entrance room will be required by both the data center network operations staff and the access providers' technicians. Access to customer-owned equipment in the entrance room and the computer room should be secure from access provider technicians.

The entrance rooms should be sized to accommodate each anticipated access provider. The designer should meet with each access provider to determine their space requirements before sizing the entrance rooms. Additionally, cabinet and rack space will be required for customer-owned equipment and termination of cabling to the computer room and the rest of the building.

If there are multiple access providers, they may each request their own space. These requested spaces may be provided within the same room by using secure fencing, or they can be created by walls.

Command Center

The command center should have monitoring, but not control, a capability for all the data center building systems so that the network and system administrators are fully aware of all data center critical building system alerts or alarms.

The telecommunications room (TR) that supports the command center and other nearby data center support spaces should be outside the computer room.

The work area communications devices within the command center may need connectivity back to two different supporting cross-connect fields. Network monitoring may need connectivity directly to the core network hardware located in the Main Distribution Area space. Corporate LAN and telephone system will need connectivity to the general telecommunications cross-connect serving non-computer room communications.

Helpdesk

The helpdesk does not need to be located near the computer room and may be integrated into the general office space adjoining the data center. Alternatively, it may be acceptable to build the helpdesk and other general office space in a different building when there is no need for its location within the hardened portion of the data center facility.

Operator workstations for the helpdesk should be provided with critical electrical circuits fed from the backup generator and UPS systems to ensure that support functions are not disrupted by power fluctuations or blackouts.

Print

Printers should be located within a dedicated print room separate from the main computer room. The print room should have its own dedicated air handling system.

Power systems supporting the print functions should be considered critical and supported by the backup generator and UPS systems. Print storage may be located adjacent either to a loading dock or preferably the print room.

Loading Dock

A dedicated data center facility shall include a secure loading dock area.

Location of the loading dock should provide a step-free route through to the computer spaces with enough floor loading capacity to withstand material and equipment weights.

A dedicated data center facility should only have secure delivery capabilities such as a secure loading dock. A multi-purpose building with a data center should have a non-secure loading dock, separate from the data center, for general building deliveries.

Storage

A secured storage area for high-value equipment should be located adjacent to a secured loading dock. The space required for secured high-value storage is recommended to be a ratio of 1:10 in comparison to the computer room space. The minimum space recommended is 23 m² (250 ft²). The ratio may be reduced for large data centers depending on the specific operational practices.

The secured storage area should be monitored by the building CCTV security system or access controlled by the facility access control system. The system should generate a history of all access attempts.

A secured storage area should be provided for vendors' equipment. The space needed depends on the number and type of vendors who will be storing equipment on site. The vendor storage area should be monitored by the building CCTV security system or located near or adjacent to a secured loading dock. The security requirements for vendor storage should be the same as the staging area.

Staging

All storage and unpacking activities should occur outside the computer room space, either in storage rooms or in staging areas. Preferably, a staging area should be located adjacent to the computer room. For high-value equipment, a staging area should be provided for unpacking and should be separate from any test-bench or lab space.

A staging area should have an air conditioning system separate from the computer room as cardboard boxes and packing materials can generate large amounts of particulates.

The staging area should be monitored by the building CCTV security system or access controlled by the facility access control system. The system should generate a history of all access attempts.

Administrative and engineering office

The engineering offices should be located near the electrical switchgear, UPS, generator, chiller, and HVAC rooms with enough space provided for power and cooling engineers and support staff.

The administrative or general office space may not require the same level of detailed construction as the data center and supporting back-of-house areas.

Items to be considered in the design of administrative space include: •

- Disaster recovery and business continuity plans
- Operational policy during extreme weather conditions (e.g., what areas require staffing)
- Locations of emergency or “shelter in place” areas for personnel
- Future administrative space growth requirements, either as an expansion to the overall data center or

as a stand-alone project

- Special function rooms such as a large conference or “war room” with wall-to-wall, floor-to-ceiling white Boards

Waste/Recycle

Recycling and compliance with local environmental initiatives is recommended. Local, state, or national incentive programs might be available to underwrite some cost.

As these facilities generate a large number of boxes, packing material, and other waste, adequate space should be allocated for its handling. Frequency of removal, fire prevention/protection, local authority requirements, and dumpster requirements, such as size, access, and location, should also be considered.

Revision #1

Created 3 October 2025 10:41:00 by RISA

Updated 3 October 2025 10:58:41 by RISA