

## Making a data centre work

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In an earlier article I looked at the telecommunications 'Spaces' and gave some rules for estimating the amount of space that needs to be allocated. If we look at a wider approach we can consider all the spaces that need to be designed into a modern data centre.

To make it work we need the following areas to be dedicated to the task;

Space	Function
'Computer room', 'server room', 'machine room' etc	To house the computer racks and communications equipment. A generic space with sufficient air conditioning, power supplies and communications cabling to allow a non-application specific IT environment with best use of space
Control room	An area, adjoining the computer room, where all control and monitoring functions relevant to the site are concentrated
General office area	An office area where the IT staff can work
Telecommunications Entrance Facility	A room or area where all external communications cabling enters the building. It serves as a point of demarcation between different owners of cabling, provides a point for over-voltage protection and allows a transition from external (flammable) cables to internal cables. Two are required for Tiers 3 & 4
Fire gas suppression store	If inert gas is used as the main fire suppression system then it requires a large volume for storage. Alternatively the gas bottles may be placed against a wall adjacent to the Computer Room or if a fluorocarbon gas is used (placed within the Computer Room) this area may be dispensed with
Electrical switch room	A room where the external power cables enter the building and forms a point of demarcation between different cable owners plus all main switching and metering. Two electrical entrance points are required for Tiers 3 & 4.
UPS and battery room	For loads in excess of 100 kVA (TIA 942) it is recommended to have a separate UPS and battery room to save space and heat load in the main Computer Room
Generator room	To house the standby diesel generators. This may be in or adjacent to the main building
Oil store	To house the diesel fuel to run the standby generators for between 8 and 96 hours. This may be in or adjacent to the main building. The electrical switch room, UPS and generator must all be close to each other to minimise electrical losses in long power cables
Storage and build area	An area to store and unpack equipment and to build items like racks without making dust and causing disruption in the main Computer Room
Delivery and loading area	An area adjacent to the main doors to allow heavy equipment to be shipped into the building
Main entrance	A secure entrance with anti-piggybacking- airlock controls
Planning and	A room to hold meeting and provide additional office space

meeting room	
Internal staff facilities	Male/female/disabled toilets. Shower room. Basic dining area and kitchen facilities
Electrical substation	Due to the power load it is likely that separate electrical substation would be needed by the utility company. This should be away from the main building to reduce EMC issues
Air conditioning condensers	If split DX units are to be used then a condenser unit is needed for each Computer Room DX unit. These must be in a secure area either adjacent to the main building or even on top of it, but preferably not over the computer room itself
Main gate and hard standing	A secure main gate leading onto hard standing area of sufficient space and strength for HGVs to unload heavy equipment and manoeuvre
External staff facilities	Parking space for cars, bicycle storage and smoking shelter

The above table describes a standalone facility. Where a computer room is housed in an already existing building then some of the above functions would be shared with the rest of the building.

The Uptime Institute recommends that a Tier 2 data centre should have support areas representing at least 30% of the computer room area. Tier 3 should be 80-90 % whereas Tier 4 should be 100%+. The above figures give a clearer distinction between Tiers 2 and 3. However in a standalone data centre it would be difficult to design anything below Tier 3 support area sizes, i.e. at least a 1:1 CR to support area ratio.



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