CAPITOLINE

Data Centre Design and Training

The Telecommunications Spaces

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Getting the 'Spaces' right is key element of any successful network and infrastructure design.
The Spaces, as defined as TIA 569, BICSI TDDM, and others, are;

The Telecommunications Room
The Equipment Room
The Entrance Facility

To this we can add a computer room for larger projects and from there into a fully-fledged Data Centre which is further defined in TIA 942. A large campus based organisation may well have all of the above spaces and facilities arranged in a hierarchical fashion.

A Telecommunications Room, or TR, is an enclosed architectural space for housing telecommunications equipment, cable terminations, and cross-connect cabling.

A Telecommunications Enclosure, TE, is a case or housing for telecommunications equipment, cable terminations, and cross connect cabling and may suffice for the smaller project.

TRs and TEs differ from Equipment Rooms, ERs and Entrance facilities, EFs, in that they are generally considered to be floor serving or tenant-serving (e.g., as opposed to building or campus serving) spaces that provide a connection point between backbone and horizontal infrastructures.

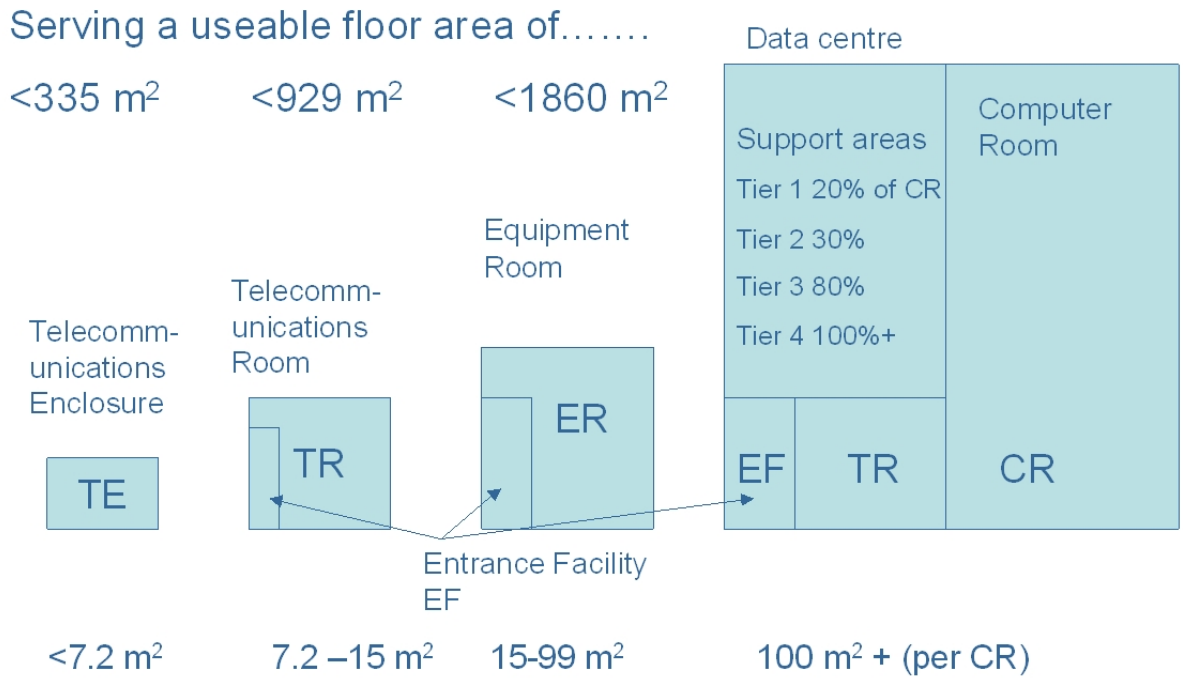
An Equipment Room, ER, is an environmentally controlled centralized space for telecommunications equipment that usually houses a main or intermediate cross-connect. ERs differ from TRs in that ERs are generally considered to serve a building, a campus, a tenant, or a SP, whereas TRs serve a floor area of a building.

An Entrance Facility (sometimes called an Entrance Room), EF, is expected to provide the following:

- Point of demarcation between the Service Providers and customer premises cabling (if required)
- Primary (electrical) protection devices governed by the applicable electrical codes
- Space to house the transition between cabling used in the Outside Plant to cabling approved for intrabuilding use. This usually involves transition to fire-rated cable

The TR is the link for the individual cable outlets, or Telecommunications Outlets, TOs. The cable between the TR and TO is known as the Horizontal cabling and may be copper (Cat 5, Cat 6 etc) or optical fibre. The TO will be an RJ45 copper connector in a wall or floor box or an optical connector. The maximum length of the Horizontal cabling is limited to 100 m.

The TRs connect to the Equipment Room via the backbone cable; sometimes called the Riser cabling.
The diagram attempts to show the relative sizes of the Spaces in question. To serve a floor area of less than 335 m^2 then the TE would expect to be sized at around 7 m^2. Up to a floor space of 929 m^2 then a Telecommunications Room is required with a size of between 7.2 and 15 m^2. The TR can of course be bigger if circumstances permit but should not be smaller.



Relative sizing of the Spaces

Every area of floor space up to 929 m^2 should have its own TR even if it's on the same floor. That's because the 100 m limit on cabling runs will start to be exceeded at floor area larger than this. Some of the sizes look a little odd when expressed in square metres but that is because they started off life in square feet, e.g. 929 m^2 equals 10,000 square feet.

It would be permissible to have a TR serving a floor and the one above and below it if for the floors are very sparsely populated in terms of Telecommunications Outlets.

The ER serves the building or where a floor exceeds 1860 m^2 and would have an area of between 15 and 99 m^2. The calculation given in the Standard is;

Allow 9 sq m per work area
Multiply No of work areas by 0.07 sq m
Minimum size 3 x 5 m
e.g. 5000 sq m of office space
5000/9 = 555
555 x 0.07 = 39 sq m

I have set the limit at an arbitrary 99m^2 as above that we have really evolved into a main computer room.

Finally we get to the Data Centre with the Computer Room at whatever size it needs to be and its support areas. The size of the support areas is suggested by the Tier level (i.e. a Tier 1 is a basic design with no redundant paths and a Tier 4 is a fully duplicated resilient design). A Tier 4 design should have at least as much room dedicated to the support areas as the computer room itself. Although the TIA 942 standards offers smaller ratios for the lower Tiers it is quite difficult to support any computer room at support area ratios of much less than 1:1.

The Entrance Facility can be found supporting an ER or a TR or a combined area alongside a Data Centre. Remember that most countries have laws forbidding the installation of outdoor grade (flammable) cable for more than 5 m within a building. So if the EF isn't within 5 m of the point where the cables actually enter the building then they should be encased in steel conduit.

The size allocated for the EF also depends upon the area supported and the suggested allowance depends upon whether a length of wall space is being calculated (if wall mounted cross connect blocks were to be used) or if freestanding equipment frames were to be used.

TIA 569B states a minimum of 9 sq m for the EF when used in multi-tenanted buildings and an absolute minimum of 7 square metres.

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