

SCG Addresses Tier IV Requirements for a Data Center

A Tier IV data center meets the most stringent requirements for fault tolerance and uninterruptable operation. SCG meets the requirements of the Tier IV standard, and exceeds them in many cases.

According to the Uptime Institute, a respected provider of educational and consulting services for Facilities and Information Technology organizations interested in maximizing data center uptime, the Tier IV standard can be broken down into three areas of compliance: Fundamental requirements, performance confirmation tests, and operational impact.

Fundamental Requirements¹:

- A fault tolerant data center has multiple, independent, physically isolated systems that each have redundant capacity components and multiple, independent, diverse, active distribution paths simultaneously serving the computer equipment.
- All IT equipment is dual powered and installed properly to be compatible with the topology of the site's architecture.

Performance Confirmation Test(s)¹:

- A single failure of any capacity system, capacity component, or distribution element will not impact the computer equipment.
- The system itself automatically responds to a failure to prevent further impact to the site.
- Each and every capacity component and element in the distribution paths must be able to be removed from service on a planned basis without impacting any of the computer equipment.
- Complementary systems and distribution paths must be physically isolated from one another (compartmentalized) to prevent any single event from simultaneously impacting both systems or paths.
- Continuous cooling is required.
- There is sufficient capacity to meet the needs of the site when redundant components or distribution paths have been removed from service.

Operational Impact (s)¹:

- The site is not susceptible to distribution from a single unplanned event.
- The site is not susceptible to disruption from any unplanned work activities.
- In order to establish concurrent maintainability of the critical power distribution systems between the UPS and the computer equipment, Tier IV sites require all computer hardware to have dual power inputs as defined by the Institute's *Fault Tolerant Compliance Specification, Version 2.0*. Transfer devices, such as point-of-use switches, must be incorporated for computer equipment that does not meet specification.
- The site infrastructure maintenance can be performed by using the redundant capacity components and distribution paths to safely work on the remaining equipment.

The Tiered design requirements are listed below, as well as how the data center at SCG meets or exceeds the standard:

Reliability					
	Tier I	Tier II	Tier III	Tier IV	SCG
Number of delivery paths for power and cooling distribution	1	1	1 active, 1 passive	2 active	2 + 1 active on electric, 3 rd with addition of generator; N+1 chillers, N+1 pump controls, N+1 air handlers
Redundant components	N	N+1	N+1	2(N+1) or S+S	2(N+1)
Support space to raised floor ratio	20%	30%	89-90%	100%	100% for equipment, 2,000 sq ft of soft space available
Initial watts/sq ft	20-30	40-50	40-60	50-80	125 watts per sq ft; 1,000KW/8,000=125. (300KW power set aside for A/C)
Ultimate watts/sq ft	20-30	40-50	100-150	150+	250 watts per sq ft; 2,000KW/8,000=250. (600 power KW set aside for AC)
Raised floor height	12"	18"	30-36"	30-36"	Only 15" needed for cooling; wiring and cables over head with 22 ft ceilings
Floor loading pounds/sq ft	85	100	150	150	150 standard, up to 300
Utility voltage	208, 480	208, 480	12-15KV	12-15KV	15KV; dual sub-stations
Months to implement	3	3 to 6	15 to 20	15 to 20	Ready for equipment placement
Annual downtime due to site	28.5 hrs	22 hrs	1.6 hrs	.4 hrs	0.00 hrs
Site availability	99.671%	99.749%	99.982%	99.995%	99.999%

Source of table, the Uptime Institute

¹The Uptime Institute, White Paper: Tier Classifications Define Site Infrastructure Performance. Downloaded November 18, 2008 at www.uptimeinstitute.org