

## Q&A – State Data Center, May 2005

**Question: A white paper on the Uptime Institute Web site states that a Tier III facility has a 30” to 36” raised floor. The state data center has a 24” raised floor. How can it qualify as Tier III?**

Answer: The principal purpose of having a raised floor is to use the under floor air space as an air plenum to deliver cooled air to the computer equipment. The cooled air is delivered to equipment through floor tiles that have perforations or vents. Different pieces of equipment have different cooling needs. Using the entire floor as a plenum allows a great deal of flexibility in where these venting floor tiles are located and, therefore, where computer equipment is located.

Unfortunately, using the entire floor as a plenum usually leads to unequal air pressure. This often becomes extreme leading to positive air pressure under some of the floor and negative air pressure actually sucking air down under the floor on other parts of the raised floor. One way to mitigate this problem is to increase the height of the raised floor from the standard 18” to 30” or even 48”. Greater height means more capacity which allows for more even pressurization of the air. The 30” height specified in the Uptime Institute white paper is not a rule, but rather a recommendation to help assure even air pressure. W. Pitt Turner, one of the authors of that white paper, and his firm ComputerSite Engineering, were hired as consultants to the Oregon data center design process. Pitt participated in our design meetings and is one of the engineers who certified the design as Tier III compliant.

The new data center uses the raised floor as an air plenum but it also incorporates a relatively new design concept. The design build team of Yost Grube Hall Architecture, Mazzetti & Associates Engineers, and J.E. Dunn Construction engineered a design incorporating a 24” air space in the north and south walls forming a contiguous 24” wall and floor air plenum. This design creates a much larger volume of plenum space to equalize pressure. We actually end up with a superior system at lower cost.

The cost of raised floor systems is significant. As the height of the raised floor increases its cost increases greatly due to the need for stronger floor supports and seismic bracing. Good engineering and good design dictates that floor engineers thoroughly examine all options. Engineers from Mazzetti generated air flow calculations for 24”, 30”, and 36” floor heights. These calculations were audited by ComputerSite Engineering. The calculations showed 24” was more than sufficient. It would have been an unnecessary extra expense to raise the floor above 24”.

Link to state data center Tier III certification information:  
[http://www.das.state.or.us/DAS/IRMD/cnic\\_TierIII\\_announce.shtml](http://www.das.state.or.us/DAS/IRMD/cnic_TierIII_announce.shtml).

