

Questions to HW providers:

In 2008 and 2011 the recommended intake air temperature for IT Equipment was defined to be 18°C (64,4°F) to 27°C (80,6°F) by ASHRAE. In respect to the document mentioned above we would like you to answer the following questions:

(Note: the answers are in its original form, not translated or corrected)

| 1. Do you support 27 °C at the Intake of your IT equipment over an indefinite time? Please note that all but the air intake may be exposed to considerably higher temperature, 27-40°C. This typically occurs when the IT equipment runs in a hot or cold isle environment. | 2. Are there exceptions? Define any exceptions, like "not supported on Units built before 20xx" | 3. Do you observe higher energy consumption in the IT equipment when the air temperature reaches 27°C at it's intake? This may occur due to cooling fans in the IT equipment running faster at 27°C. | 4. How much does the energy consumption of the IT equipment increase in % when running at 27°C compared to when running at 24°C? | Vendor additional remarks |
|--|--|---|--|---|
| <p>Answer IBM Jörg Schanze joes@ch.ibm.com</p> <p>Ja, IBM SFS unterstützt eindeutig die in der ashrae.org aufgeführten Intake Temperatur von maximal 27 GradCelsius im Ansaugbereich entsprechend des Bereiches im Feuchtekgeldiagramm. Es ist immer der Zusammenhang Dry-Bulb, Humidity, Dew Point, Wet Bulb, Meereshöhe zu beachten und einzuhalten. Hier die Zusammenfassung dazu aus Sicht IBM Data Center Education (See attached file: Data Center New ASHRAE Environmental Envelopes 2011.pdf)</p> | <p>IBM</p> <p>Es sind keine generellen Geräteausnahmen von dieser Norm bekannt</p> | <p>IBM</p> <p>Ja - die Energieaufnahme der einzelnen IT Geräte erhöht sich. Hier ist keine generelle Geräteausgabe möglich.</p> | <p>IBM</p> <p>Es ist keine generelle Aussage sinnvoll und möglich</p> | <p>IBM</p> <p>Wir erlauben uns diese Einschätzung da der SFS Fachbereich von IBM (SFS – Site and Facilities Services) genau die Brück zwischen den Anforderungen der IT und der Liegenschaft schlägt. Mit IBM Site & Facilities Services haben Sie einen Ansprechpartner, der Sie im Bereich Rechenzentrumslösungen kompetent und umfassend unterstützen kann – angefangen von Beratung bis hin zur Realisierung von Rechenzentren. In unserer Beilage finden Sie eine Übersicht über unsere Services. See attached file: Flyer_Site & Facilities Services.pdf</p> |
| <p>Answer Dell Victor_Simin@Dell.com</p> <p>We do - the specs are in the technical guidebooks for each server, so for the R710 the guidebook is here http://www.dell.com/downloads/global/products/psg/en/server-poweredge-r710-tech-guidebook.pdf The specifications are on page 23 The guidebooks can be found on each of the product pages on www.dell.com e.g.: http://www.dell.com/us/en/enterprise/servers/server-poweredge-r710/pd.aspx?refid=server-poweredge-r710&s=biz&cs=555</p> | <p>DELL</p> <p>There are no published specifications before 2007.</p> | <p>DELL</p> <p>Cooling is linear up to 30 deg C, as per the whitepaper sent earlier.</p> | <p>DELL</p> <p>There is an increase, but this is not particularly significant, perhaps 10%-15% at 27 deg C. The actual percentage is dependent on the form factor and the load under which the system is operating. Please be aware that systems built in the last 2-3 years are much more dynamic under load than previous generations (for all TIER 1 manufacturers). Cooling is kept to a minimum, but fans increase in speed and hence power whenever there is load.</p> | <p>DELL</p> |
| <p>Answer EMC daniel.bystrom@emc.com</p> <p>Since 27 °C is below the maximum for both the V-Max (32 °C) and the VNX (40 °C) platforms, it is fully supported as long as the temperature stays within the specifications below.</p> <p>V-Max Operating Environment Specifications Temperature: 10 - 32 °C Altitude: Max 2286 m Relative Humidity: 20% to 80% (non-condensing) Raised Floor Recommended VNX Operating Environment Specifications Temperature: 10 - 40 °C Altitude: 2286 m @ 40 °C, 3048 m @ 37 °C max. Relative Humidity: 20% to 80% (non-condensing)</p> | <p>EMC</p> <p>There are no exceptions as long as the temperature specifications in "Answer 1" are met.</p> | <p>EMC</p> <p>The energy consumption will not be affected in any significant way up to 27 °C. In the V-Max system, the fans do not increase speed until a higher temperature (~32 °C). The new VNX system does have more granularity in engine fan speed, which would go from a 50% duty cycle to 60%. This however is a small contribution to the overall system power consumption.</p> | <p>EMC</p> <p>Temperature variations definitely will affect the energy efficiency but that is just a part of the equation. There are a lot of other factors including the PUE (Power Usage Effectiveness) of the infrastructure which makes it impossible to say that increasing the temperature by 1 degree reduces energy consumption, and therefore the cost by X%.</p> | <p>EMC</p> <p>To be able to answer the question with an exact number, an assessment of the entire data center is recommended to make sure that all factors related to energy consumptions are taken into account. For more information about our services offerings don't hesitate to write me back on daniel.bystrom@emc.com and I'll do all I can do help you.</p> |
| <p>Answer CISCO Markus Halter mahalter@cisco.com</p> <p>The Cisco Nexus 7000 Series is rated to operate in a temperature range of 0°C to 40°C UCS & Nexus 5000 Yes system will run with air intake at 27C for an indefinite time. The Cisco Allen datacenter does this today. MDS Yes system will run with air intake at 27C for an indefinite time. The Cisco Allen datacenter does this today.</p> | <p>CISCO</p> <p>No - all Nexus 7000 Series equipment supports the same operating environment MDS UCS and Nexus 5000 NO exceptions</p> | <p>CISCO</p> <p>Nexus 7000 As air intake temperature increases the rotational speed of the cooling fans is incrementally increased to provide increased airflow, and the same cooling capacity. The system uses 3°C steps and the effect of running at between 24°C and 27°C is the same, as this is within the same 3°C increment. Temperature at 28°C would result in one speed step change, resulting in up to 60W of additional power used by the system cooling. UCS Nexus 5000 : We do not drive the fans directly off the air intake sensor, we monitor the internal temperatures at multiple points and the fan speeds are driven by internal temperatures. As an extreme example when the servers are idle there is no difference in power. At maximum power load, note that this is not necessarily the same as 100% CPU utilization, there will likely be higher fan speeds</p> | <p>CISCO</p> <p>Nexus 7000 There is no increase in energy consumption between 24°C and 27°C as these are within a single fan speed setting. Raising temperature to 28°C would result in approximately 60W of extra power for fans which represents under 2% of total system power (System power over 3,000W for a system with at least two modules). UCS Nexus 5000 We have not directly measured this and it would be very dependent on workload. But in total the worst case fan power makes up less than 15% of the worst case load so the difference in total power consumption would likely be 5% or less.</p> | <p>CISCO</p> |
| <p>Answer Fujitsu david.snelling@uk.fujitsu.com</p> <p>Most modern servers (from any manufacturer) will operate well at temperatures above the 2008 ASHRAE recommendations. Note that ASHRAE are about to publish wider guideline for DC temperature in the near future. In DC not operating a carefully managed air conditioning regime (e.g. hot/cold isle) should be very careful about raising the temperature.</p> | <p>Fujitsu</p> <p>I can't really say anything about specific dates, sorry.</p> | <p>Fujitsu</p> <p>Due to factors such as cooling fans and leakage current, servers will tend to draw more power at higher temperatures. However, the reason for raising the temperature is to improve the function of the M&E part of the data centre. This will require changing set points in the CRACs or CRAHs and the water temperatures to cooling towers. Under these conditions the over energy savings can be very significant (we have seen over 10%). But you have to deal with the whole DC, not just the IT equipment.</p> | <p>Fujitsu</p> | <p>Fujitsu</p> |