Sun Microsystems, Inc.

Best Practices
External / Customer Ready Version
Rev. 1.0

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IMPORTANT NOTES

The Best Practices will be reviewed on a regular basis and updated as necessary. This document, while describing best practices, may not apply in all circumstances.

This document applies to customers on Sun Servers E3500 − E10000.

This Best Practices external document is intended to address key issues proven to affect E3500 − E10000 system reliability.

In order to ensure Data Center Readiness for E3500 − E10000 systems, a site audit should be completed for verification of acceptable environmental conditions. Below is a listing of the environmental elements to be reviewed. Note: System reliability is enhanced by the optimal environmental practices such as those indicated below:

1.0 Temperature & Humidity

The field should check the ambient temperature and relative humidity levels where the Ultra Enterprise Servers are located using an electronic thermo−hygrometer. Taking readings from monitoring equipment (mounted somewhere within the data center) or from air conditioning units may provide incorrect data if the data center environment is not correctly maintained.

1.1.0 Optimum ambient temperature 22 C/72 F.

Operating specification for the Ultra Enterprise Server Range may seem quite wide, (0−40C/32−104F for Sunfire, 10−30C/50−86F for Starfire. This is because most hardware is designed to operate in a wide range of conditions. While these machines may be able to operate within this wide range, more stringent control over environmental factors is necessary if optimal reliability is to be achieved. Therefore, if a high level of reliability is required, then optimal conditions should be maintained.

1.1.1 Maximum rate of change of temperature is 5.5 C/10F in any 60 minute period of operation.

This optimum level is desirable because it is easier to maintain safe associated relative humidity levels and there is an acceptable wide operational buffer in case of environmental support systems down−time.

1.2.0 Optimum relative humidity 45% to 50% Rh.

The operating specification for the Ultra Enterprise Server Range is 20% Rh to 80% Rh, but like temperature, the optimum levels of relative humidity must be obtained to achieve system reliability.

This optimum range helps protect hardware from corrosive problems associated with high humidity levels and failures caused by static discharge when humidity is too low. It also provides the greatest operating time buffer in the event of environmental support system failure.

1.2.1 Maximum rate of change of relative humidity is 10% in any 60 minute period of operation.

1.2.2 When positioning Sun servers in proximity to air handling equipment, ensure that the rate of change of temperature and humidity does not exceed previous recommendation during air conditioner cycles.

1.3.0 Subfloor temperature is not to exceed 15.5C/60F.

Assuming appropriate ambient temperatures are being maintained and there is at least a moderate heat load in the data center, subfloor temperature should generally register near 15.5C/60F.

This is also the optimal temperature recommended by manufacturers of hardware that utilize direct subfloor cooling.

2.0 Flooring

2.1.0 Good subfloor pressure (if used) is 0.005 inch wg/1.3mm wg (water gauge).

The pressurization of the subfloor void in relation to the above−floor hardware space should be maintained at the optimum level of 0.005 inch wg. If this level is maintained, the conditioned air provided by the environmental support system is delivered to all hardware within the data center. A level of 0.002 inch wg (0.5mm wg) is the minimal recommendation.

2.2.0 Appropriate subfloor title positioning.

Air distributed titles should be placed in such a fashion so as to deliver conditioned air to the intake of each hardware cabinet.

The Ultra Enterprise 10000 utilizes ambient cooling, but also intakes air from the bottom of the machine and it's recommended that perforated titles are placed directly under the machine and in front and at the rear for optimal performance.

2.3.0 No zinc whiskers present from old subfloors.

Galvanized tiles are coated with zinc to help protect them from corrosion. If these tiles used the electroplated process, there is a possibility of zinc whisker growth appearing over a period to time.

Zinc whiskers are conductive contaminants and can actually cause short circuits on components.

3.0 Cleanliness

3.1.0 Good data center cleaning practices resulting in no air contamination.

Even a perfectly designed data center will require continued maintenance. An effective cleaning schedule must consist of specially designed short−term and long−term actions. These can be summarized as follows:

3.1.1 Cleaning Schedule

Frequency	**Task**
Daily Actions	Rubbish removed
Weekly Actions	Access floor maintenance (vacuum and damp mop)
Quarterly Actions	Hardware decontamination and room surface decontamination
Bi−Annual Actions	Subfloor void decontamination and air conditioner decontamination (as necessary)

3.2.0 Air conditioning filter changing practices and appropriate frequency.

Clean air filters on E10000 when contamination is visible or every 3 months, whichever comes first.

It is recommended that filters are inspected with a mirror prior to removal. If the filters do require cleaning or replacing and they are removed while the machine is running, contaminants will be sucked into the system boards and the first components they reach are the CPU modules. This may potentially cause system reliability problems.

If the filters need cleaning or replacing, then it is recommended that the machine is powered down first.

It is a good idea to have a spare set of filters on−site, and that every three months the filters be rotated and cleaned outside of the data center.

If the filters are blocked with contaminants then this is a symptom of a poor data center and the true cause needs to be rectified.

3.3.0 Ensure a clean AC power source (neutral/earth). The use of Dranetz−BMI analyzers, for example, is not for the faint−hearted as far as the complexity of the test is concerned. This should be part of a more detailed site audit.

4.0 Electrostatic Discharge (ESD)

4.1.0 Ensure that correct machine grounding procedures are followed.

4.1.1 Check the earth bonding on the system cabinet and storage expansion cabinets. If a ground strap from the system cabinet and storage expansion cabinets to earth ground is being used, then it's very important to check that the power receptacle (IEC309) ground and the grounding point of the strap (i.e. raised floor ground) are both tied to the same earth ground.

4.1.2 Correct ESD and handling practices must be used when handling spares.

4.1.3 ESD mats and wrist straps must be used and tested regularly.

5.0 Monitoring

5.1.0 Optimum E10000 CPU temperature is not to exceed 55C/131F.

This should be achieved if E10000 filters are clean, ambient temperature is at recommended optimum level, there is adequate cool air flow and environmental support systems are maintained.

5.1.1 Optimum E3500−6500 CPU temperature is not to exceed 50C/122F.

This should be achieved if ambient temperature is at recommended optimum level, there is adequate cool air flow and environmental support systems are maintained.

5.2.0 Monitoring and control for temperature and humidity.

Accurate and comprehensive monitoring of environmental support equipment and in−room conditions is extremely important in an environment as complex and sensitive as a computer data center. The monitoring system should have historical trend capabilities. The data gleaned from analysis of historical psychometric information can be instrumental in determining seasonal changes or other outside influences.

A psychrometer is a hygrometer consisting of two similar thermometers with a bulb of one being kept wet so that the cooling that results from evaporation makes it register a lower temperature than one dry one. The difference between the readings constitutes a measure of dryness of the atmosphere.

6.0 Miscellaneous

6.1.0 Available on−site spares if appropriate.

6.2.0 Controlled change management process in place.

6.3.0 Software patching procedure identified and followed.

6.4.0 Diagnostics used where appropriate (Hpost, SunVTS).

6.5.0 Enable error logging for Enterprise Servers.

6.6.0 Enable netcon logging for Enterprise Servers.

6.7.0 Need regularly scheduled maintenance window for implementation of items above.

6.8.0 Watch for obvious external influences such as close placement to air conditioners, elevator shafts, industrial equipment or other sources of vibration, particulates or substantial electromagnet interference (i.e. heavy electrical equipment).