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in this ISSUE:

- ⇒ **Co-Location Facilities**
- ⇒ **Co-Location Reliability Issues**
- ⇒ **7x24xForever Co-Location Facility Evaluation Check List**



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design PLUS

FEA has been publishing the designPLUS newsletter with the objective of informing our readers of mission critical design concepts. With the increased cost of hardened data centers, we have seen an increased interest in relocating data centers to co-location 'Co-Lo' facilities. It is imperative that these facilities be evaluated to ensure that they provide the reliability, redundancy, capacity and 7x24 capability that allows you to meet your "business objective". This issue of the designPLUS Newsletter addresses a number of issues with regard to evaluating 'Co-Lo' facilities including mission critical design aspects, considerations when evaluating the 'Co-Lo' facility, a facility check list and the need for trained staff. We hope you find it interesting and informative.

Co-Location Facilities

by *Leo P. Soucy, Jr., P.E.*

Within the past year an enormous amount of data center space has been constructed and this trend is continuing. Some space is the re-deployment of existing data centers that were abandoned when the Internet "boom" collapsed, while other space is the construction of new facilities.

Many of the abandoned data centers that are now being redeployed formerly supported Internet Service Providers (ISPs). These data centers were designed with minimal mission critical capabilities because if an area of the facility or the entire facility suffered a utility failure, the traffic was transferred to other resources. While being a major problem for the ISP, the result to the customer was slower response times, which was considered acceptable. Many of these facilities are being offered as leased 'Co-Lo' space.

Relocating your data processing to a 'Co-Lo' facility can provide hardened facilities without the expense of constructing a new facility. While a firm may find this option very attractive, it is imperative that a detailed due diligence of the 'Co-Lo' facilities' capabilities be

performed to ensure it meets your "business objective".

FEA has found that 'Co-Lo' facilities have very basic mission critical capabilities of redundancy, 7x24 capability, maintainability and capacity. Whereas this may be acceptable for some firms, it may not meet the more demanding requirements of other firms.

One of the reasons for providing minimal mission critical capabilities is because the facility owner knows that one of the driving factors in marketing the facility is the leased cost per square foot. It is important to point out that most firms that own and operate these facilities are well aware of the facilities' deficiencies and are cognizant of the mission critical upgrades required to meet almost any firm's requirements. It is the client's responsibility (buyer beware) to ask the right questions and evaluate the basic capabilities to ensure they meet your requirements. Keep in mind, the leased cost per square foot is not the only factor that needs to be evaluated.

Relocating your data center operation to a 'Co-Lo' data center commits all the firm's data processing capabilities to this facility. You need to ensure that it provides the necessary mission critical capabilities to meet your business requirements.

Co-Location Reliability Issues

by Leo P. Soucy, Jr., P.E.

With the decision to move data processing to a "Co-Lo" facility, it is necessary to evaluate the facility with regard to many issues including:

- ⇒ Governmental mandates and stockholder expectations
- ⇒ Mission critical capabilities
- ⇒ Power grid reliability

Governmental Mandates and Stockholder Expectations

The primary governmental mandate is Sarbanes-Oxley which although it is mainly concerned with holding corporate executives accountable for financial matters, compliance involves detailed audits that delve deeply into the corporation including the IT organization.¹

In addition to the above issues, there is a growing concern by corporate officers regarding stockholder lawsuits for not performing in their best interests. This has heightened the awareness for hardening critical corporate functions. Corporate officers are becoming sensitive to the requirement of implementing "best practices" throughout the corporation, knowing full well that their corporation and possibly they can be held personally liable if a disaster occurs and they have not taken appropriate measures to avoid or at least reduce the potential for any losses.

Mission Critical Capabilities

The Uptime Institute is an organi-

zation dedicated to assisting mission critical facilities in reviewing their systems with regard to mission critical hardening and distributing information regarding these issues.

Corporations make decisions based on financial and risk assessments. With that in mind, The Uptime Institute has developed a matrix outlining the availability of a data center based on the level of hardening of the infrastructure. They have developed a four tier design criteria for mission critical facilities.²

Tier I systems are N+0 providing a site availability of 99.671% resulting in a potential 28.8 hours of annual IT downtime. This downtime may be attributable to equipment failure, but it is also necessary to shut down the equipment to perform annual maintenance. It is important to note that the potential downtime may not occur annually, but over a period of time it will average out. For example, when preventative maintenance is not performed on a Tier I facility due to the fact that it requires a shut-down, at some point there will be a major equipment failure that can shut down the facility for hours or even days.

"Best practice" design results in a Tier IV facility which has a site availability of 99.995% resulting in a potential 24 minutes of annual downtime due to the site infrastructure. This hardened design improves the reliability of the facility by a factor 72.

Power Grid Reliability

Over the past ten years there have

been large scale power outages in California, western and northeastern United States and in Europe. Conventional wisdom concludes that improved controls and increased infrastructure investment can ultimately improve the reliability of these power grids and help avoid large-scale outages. This has been studied extensively since the August 14, 2003 northeast power outage, and the findings indicate that it may not be possible to improve the power grid reliability because the systems are so large and complicated. The outages that occurred were overdue and could be repeated at any time.³

Conclusion

The above concerns need to be included in any evaluation of a "Co-Lo" facility to ensure that the decision to relocate the company's data processing does not result in putting that operation at unacceptable risk.

Only the corporation can assess the risks associated with relocating data processing to a "Co-Lo" facility but it must be pointed out that it is very difficult to defend a decision that results in a major loss of a firm's data processing capabilities for an extended period of time.

References and additional information can be found at the following web addresses:

1 - Information on the impact of the Sarbanes-Oxley on information technology http://www.dmreview.com/article_sub.cfm?articleId=1014514

2 - Information on the Uptime Institute's Standard Tier Classification <http://www.uptime.com/TUIpages/whitepapers/tuitiers.html>

3 - Information based on "The Unruly Power Grid" by Peter Fairley, August 2004 edition of IEEE Spectrum. <http://www.spectrum.ieee.org/WEBONLY/publicfeature/aug04/0804grid.html>

7x24xForever Co-Location Facility Evaluation Check List

by William H. Flaherty, Jr., P.E.

The following check list will allow the reader to get a quick snapshot of the 7x24xForever viability of a facility that is being considered as a Co-Lo site. It is not totally comprehensive and has been generalized to cover a variety of applications. Such a list could be custom written for a specific facility and would provide valuable information for the management to consider in the decision process as to whether or not to use a particular facility. The questions should be answered by a responsible person whose task is to maintain and operate the facility.

MAINTENANCE	LAST TEST/ MAINTENANCE DATE	CRITICAL LOAD AT RISK WHEN PERFORMING MAINTENANCE	ABILITY TO REPLACE W/O INCREASE IN RISK TO CRITICAL LOAD
UPS			
Generators			
Chillers			
Cooling Towers			
Pumps			
Valves			
Cooling Units			
Automatic Transfer Switch			
Circuit Breakers			

How the Data Center is operated as well as staff training can affect system reliability and 7x24xForever availability. The following items are indicators of attention to detail and the ability to react to situations that may threaten the availability of the facility.

OPERATIONS	LAST TEST/ MAINTENANCE DATE	CRITICAL LOAD AT RISK WHEN PERFORMING MAINTENANCE	ABILITY TO REPLACE W/O INCREASE IN RISK TO CRITICAL LOAD
Simulated power failure			
Generators at full load			
Staff at full strength			
Cross training elect/mech			
Posted system documentation			
Equipment identification			
Dual Power cord: load update			
Infra-red reading on panels			

Food For Thought

Reliability is expressed by the number of 9s that are achieved with a particular design. A five 9s design can be expected to be offline due to an equipment or system failure for 5.3 minutes per year. We have found that achieving system reliability above three 9s requires not only proper system design, but also proper 24-hour staffing, proactive maintenance, detailed operator and switching/valving procedures and continuous training. You need to verify that the Co-Lo data center is providing these ongoing services.

Policy

designPLUS Newsletter is published to keep the readers current with the latest trends in mission critical systems.

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