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Regis University
College for Professional Studies Graduate Programs
Final Project/Thesis

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Data Center Migration

Shane Wiswell

Regis University

School for Professional Studies

Master of Science in Computer Information Technology

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School for Professional Studies Graduate Programs

MSCIT Program

Graduate Programs Final Project/Thesis

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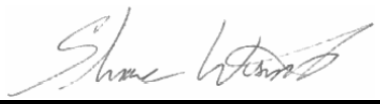
Date of Submission **10/25/2007** Degree Program **MSCIT**

Title of Submission **Data Center Migration**

Advisor/Faculty Name **Nancy Birkenheuer**

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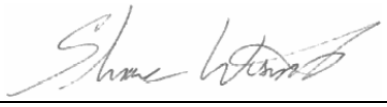
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I have advised this student through the Professional Project Process and approve of the final document as acceptable to be submitted as fulfillment of partial completion of requirements for the MSCIT Degree Program.

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Nancy Birkenheuer — Sept. 24, 2007

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Abstract

A successful datacenter migration plan will contribute to a company's productivity by minimizing the downtime of the business critical systems. After the design and construction of the new computer data center, a detailed project plan will be used to demonstrate the effectiveness of the data center migration in relation to the impact on the company’s client base.

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Executive Summary

Planning a move of any sort can cause significant stress and anxiety for anyone. Planning for a data center move or relocation, however, has the added pressure of potential disruptions to critical business operations and data losses that can severely damage an organization's overall business and reputation.

Many organizations have recently encountered the possibility of a data center move or relocation. The key business factors driving the decision to go forward with such a large-scale and expensive investment (research estimates range from $300 - $400 per foot to move existing equipment and $750 - $1,000 per foot to implement new equipment) as a data center move or relocation include:

- Need to upgrade data center facilities
- Need to identify cheaper data center facilities
- Requirements for redundancy -- business continuity improvements
- Physical data center consolidations as a result of mergers and acquisitions

Once the business decision to invest the necessary resources for a data center move or relocation is made, it is critical to follow a detailed and integrated roadmap to ensure a successful implementation. A data center move or relocation plan requires diligent and seamless integration between the data center facilities plan and the IT organization plan, and ensuring coordinated project management and execution.

Chapter 1 – An Introduction

1.1 A Brief History

Over the past few years, SPi has experienced substantial growth in terms of client base, revenue, and acquisitions. The company has outgrown it's current facility in many ways, one of which, is the computer facility. There is simply no more room available for the addition of hardware. Along with the lack of physical space, there is a lack of power and sufficient heating, ventilation, and air conditioning (HVAC). Because SPi is a healthcare provider, current regulations specify how best security practices are to be implemented as defined by the Health Insurance Portability and Accountability Act (HIPAA). One such security practice is that of securing the physical access to the computer room, but because of the current insufficient HVAC available to the room, the door is left open to help provide cooling for the servers.

With the end of the current lease nearing (Feb, 2007) and a new office location selection approved, the time has come for the design and construction of a data center to provide the robust physical attributes that are so lacking in the current room. The vision for this new room is to be able to grow SPi from a technology standpoint, without the limitations that SPi and its clients are bound by today.

1.2 Current Situation

With the recent acquisition of additional companies, SPi has surpassed its projected growth and must now refocus on new objectives to support this growth. The quality of the

internal technical infrastructure has a direct impact on the level of service SPi can deliver to its clients. The current physical plant of the SPi computer room is inadequate to house any level of enterprise technology solutions. The current facility lacks the proper HVAC, electrical, physical security, and fire suppression needed in today's modern data center infrastructures. In the past, management has been reluctant to accept the need for a better-equipped computer room facility. The number one factor driving the decision to upgrade the datacenter is the need to relocate the office at the end of the current lease term. In many ways, the liability of the current situation is much too great to continue down the same path. With the current lease of the office ending, the time has come to put into action the design and build out of a new data center to support the company's growing client base.

1.3 The Proposal

There will be several beneficial outcomes from the completion of this professional project. The most important of those will be the most practical one, SPi will have a first rate data center that will be able to keep up with the present and future growth of the company. SPi will be able to better adhere to the HIPAA standards when it comes to security and protecting patient data. With additional space, power, and cooling, redundancy is another area that will improve the client's service with a new datacenter. Limiting the liability of an inadequate technical infrastructure will help bolster confidence in the overall service provided by SPi to their clients. At this point, the only way to mitigate the liability is to start over with a new facility constructed correctly to house the technical infrastructure.

After the data center has been completed, a highly technical extremely detailed migration plan will be devised that will move the existing infrastructure from the old location to the new location as well as a contingency plan if such an occasion arises. Lastly, SPi will have a datacenter they can be proud of that the sales and marketing team can use as a show piece for perspective as well as existing clients.

1.4 The Approach

The professional project will occur in many steps and focus on the migration plan.

- Literary sources, external sources will be utilized to develop and validate the plan for the migration.
- Research data center migration best practices.
- Prepare a detailed systematical plan of the migration from the old data center location to the new data center location.
- Arrange times and dates with telecom vendor when the move will take place to have telecom and data services transferred.
- Put together the move team that will perform the migration.
- Based on completed tasks, designate a move date and notify clients.
- Prepare a contingency plan for the migration.
- After the move, analyze the results and compare that to the expected results.

Chapter 2 – Research Methodology

2.1 Past Experience

This particular data center move was not the authors' first data center move. However, the author was the one making the decisions for this particular move and for that, it was a first time experience. The author has had the opportunity in the past to work with some very articulate people when it comes to data center moves and is fortunate enough to have gone through the experience before. Drawing off these past experiences, the author was able to make some determinations as to what worked well, what didn't work well, what could have been done more effectively, and what should be avoided next time.

2.2 Research Strategy

The research strategy was simple. Locate as much information on the processes of data center migration as one possibly could. The author was able to use books that were already owned, purchased, or found at the library. Another avenue for researching was to search various databases for academic and refereed journal articles; the following sites were used in research for this project:

- ACM Digital Library
- Academic Search Premier

- ACM Portal
- Computer Database
- Computing Reviews
- InfoTrac OneFile
- Books 24x7
- Business & Company Resource Center
- Business Source Premier
- Expanded Academic ASAP
- ScienceDirect
- Wiley Interscience
- Xreferplus
- Bitpipe

Other useable research for this project was obtained via online search engines such as www.google.com, www.yahoo.com, and www.ask.com. These searches would find articles, posts, and forums discussing data center migrations. The author was able to read about successful and unsuccessful data center migrations and the steps that were involved performing these migration techniques.

2.3 Research Evaluation

The design, data analysis, and interpretation of research data has the potential to become biased through a variety of ways, a checklist was utilized on the Association for Supervision and

Curriculum Development (ASCD) website designed to help evaluate the risk of bias. It is not designed to raise specific doubt on the quality of the research; however, it is a guide to help identify possible areas of concern. By keeping these questions in mind while researching, one can distinguish the valid research data from data that is of sales pitch type information (ASCD, 2007).

Table 1: ASCD Research Questionnaire

Taken from ASCD website

Yes	No	Questions for research evaluation
Yes	No	Was the funding source apparent?
Yes	No	Was the research funded by an organization that generally advocates a specific point of view?
Yes	No	Do the findings of the research parallel the organization's point of view?
Yes	No	Is the researcher affiliated with an organization that promotes a specific point of view?
Yes	No	Does the researcher produce studies that consistently generate the same conclusions?
Yes	No	Was there an executive summary or forward?
Yes	No	If so, were they written by others interpreting the researcher's findings?
Yes	No	Were there boxed off or otherwise emphasized quotations from the text?
Yes	No	Was there frequent use of distracting images?
Yes	No	Were the findings significantly divergent with the existing body of research?
Yes	No	If so, were any discrepancies explained?
Yes	No	Was the data source manipulated to produce analyzable data?
Yes	No	Was the data source selected using an unusual methodology?
Yes	No	Was the data source unusually small or narrow, or tightly controlled by the researcher?
Yes	No	Was the data source self-selected?
Yes	No	Were there significant gaps in the identified methodology?
Yes	No	Were there obvious research questions that were overlooked?
Yes	No	Were any statistical methods used to manipulate the data during analysis?
Yes	No	Were claims of causality made when the analysis can only test for correlation?
Yes	No	Were data unnecessarily lumped together during analysis?
Yes	No	Were the conclusions based on data gathered at only one point in time?
Yes	No	Was the sample small or unique?
Yes	No	Was the population self-selected?
Yes	No	Were only selected conclusions emphasized?
Yes	No	Were the conclusions overwhelmingly positive or negative?

Yes **No** Were policy recommendations strongly emphasized?
Yes **No** Was the research released without review by an outside source?

When a yes is checked, it should raise questions and be addressed within the research. If there are large quantities of checks on the yes boxes, this could cast doubt on the research quality and therefore should be subjective for use on the project.

2.4 Question Review Sample

This section provides a sample demonstration of how the author addressed and answered the questions listed from the ASCD research evaluation questions. The first step is to review the list of questions before reading the paper so to have them fresh in the mind. When reading through the paper, certain passages could sometimes trigger an association to a question that was on the list. This would immediately mark the paper for a selection of either yes or no depending on how the content was interpreted.

This brings up an interesting thought on the validity of this research evaluation question sheet. It would be possible for one person to read and answer the questions to a paper, achieving an outcome of valid research. While another person reading the same paper could interpret the paper for not being a valid source of research based on the outcome of how the questions were perceived and answered. So there is some subjectivity to this set of questions as to how valid is the research one is reading based on the individual themselves.

The following is a sample of how the author used the ASCD research questions to help identify valid works to use for this project. Using what is considered a valid research source, here

are the answers that the author came up with. Only the first 12 questions of will be addressed for the sake of this paper.

Research source:

Stager, Susan, Sitko, Toby, (1986), "How To Move Your Computer Center 1.7 Miles (With Only Five User Complaints)", SIGUCC Newsletter XVI/4

Retrieved from acm.org website (2006)

http://delivery.acm.org.dml.regis.edu/10.1145/390000/382974/p26-stager.pdf?key1=382974&key2=7148030811&coll=portal&dl=ACM&CFID=23760203&CFTOKEN=43170928

Question 1: Was the funding source apparent?

Although the authors worked for Indiana State University, it was not stated or implied that the university was funding this paper. I believe the paper to be written simply as an account of the event.

Question 2: Was the research funded by an organization that generally advocates a specific point of view?

Based on the readings my thoughts on this were simply no.

Question 3: Do the findings of the research parallel the organization's point of view?

This question did not seem to apply to the particular paper, therefore no answer was given.

Question 4: Is the researcher affiliated with an organization that promotes a specific point of view?

Although the researcher is affiliated with the organization, I am not sure the organization promotes any one specific point of view. My answer to this question was no.

Question 5: Does the researcher produce studies that consistently generate the same conclusions?

I am not aware of any other research by this author and could not substantiate any other conclusions other than the results of this paper. I marked this question no, although it could be argued, because no other research was found by this author, the question could be considered not applicable.

Question 6: Was there an executive summary or forward?

For this paper there was neither an executive summary nor a forward.

Question 7: If so, were they written by others interpreting the researcher's findings?

Because question 6 was answered no, question 7 is considered not applicable and has no answer.

Question 8: Were there boxed off or otherwise emphasized quotations from the text?

This paper did not have boxed or emphasized quotations from the text.

Question 9: Was there frequent use of distracting images?

No images accompanied this paper.

Question 10: Were the findings significantly divergent with the existing body of research?

No

Question 11: If so, were any discrepancies explained?

This question is not applicable based on the answer of question 10.

Question 12: Was the data source manipulated to produce analyzable data?

To my knowledge this is not the case with the paper. No.

Below shows the results for each question answered for the entire questionnaire on this particular paper. The answers are denoted by the bold, italicized, and all capital letter font. No change of font for an answer signifies that the question was not valid for the paper due to the content or how a previous question was answered.

Table 2: ASCD research questionnaire filled out

Yes	No	**Questions for research evaluation**
Yes	***NO***	Was the funding source apparent?
Yes	***NO***	Was the research funded by an organization that generally advocates a specific point of view?
Yes	No	Do the findings of the research parallel the organization's point of view?
Yes	***NO***	Is the researcher affiliated with an organization that promotes a specific point of view?
Yes	***NO***	Does the researcher produce studies that consistently generate the same conclusions?
Yes	***NO***	Was there an executive summary or forward?
Yes	No	If so, were they written by others interpreting the researcher's findings?
Yes	***NO***	Were there boxed off or otherwise emphasized quotations from the text?
Yes	***NO***	Was there frequent use of distracting images?
Yes	***NO***	Were the findings significantly divergent with the existing body of research?
Yes	No	If so, were any discrepancies explained?
Yes	***NO***	Was the data source manipulated to produce analyzable data?
Yes	***NO***	Was the data source selected using an unusual methodology?
YES	No	Was the data source unusually small or narrow, or tightly controlled by the researcher?
Yes	***NO***	Was the data source self-selected?
Yes	***NO***	Were there significant gaps in the identified methodology?
Yes	***NO***	Were there obvious research questions that were overlooked?
Yes	***NO***	Were any statistical methods used to manipulate the data during analysis?
Yes	***NO***	Were claims of causality made when the analysis can only test for correlation?
Yes	***NO***	Were data unnecessarily lumped together during analysis?
YES	No	Were the conclusions based on data gathered at only one point in time?
YES	No	Was the sample small or unique?
Yes	No	Was the population self-selected?
YES	No	Were only selected conclusions emphasized?
Yes	***NO***	Were the conclusions overwhelmingly positive or negative?

Yes	***NO***	Were policy recommendations strongly emphasized?
Yes	No	Was the research released without review by an outside source?

As one can see from the results the majority of the questions answered belonged to the "***NO***" column. Despite a handful of "***YES***" answers, the decision was made to use this paper for part of the research for this paper.

2.5 Managing Research Information

All digital information was kept documented on a word document. This included quotes, links, and notes to the various papers, journals, and articles for use in this project.

Chapter 3 – Research Expert Planning

3.1 What is Involved

There is a lot to consider when planning a data center move. “Moving from an old data center to a new facility must be one of the more stressful IT jobs. Clearly, a lot of planning will need to go into such a move” (Ortiz Jr., 2006). The following are some questions and issues to consider before taking on a data center migration:

- A project of this magnitude will require a great deal of planning. A data center migration will encompass technical skills, organizational skills, and careful project planning.
- You will need to know what is currently housed in your data center before you begin planning the move. “Unless you have up-to-date inventories and a very strict change-management policy, there will be servers, applications and dependencies no one knows about. One possible solution is to use network flow-monitoring tools to get an inventory of applications as-seen rather than as-documented” (Ortiz Jr., 2006).
- Is this a great opportunity to redesign your data center? Why not start fresh, now that you have a clean slate? IT executives consider this a very bad idea. You should only change one variable at a time. The move is going to be painful enough without combining it with

massive change. Instead, try to keep everything stable for a period of time before the move - a status-freeze (Alger, 2005).

- Another possible strategy would be to equip the new data center with all new equipment. "The move could be made to coincide with a lease-refresh cycle on the equipment, allowing you to get all the new equipment delivered to the new data center. While this is a tempting approach, it introduces significant changes at a time when you want stability" (Taffel, 2003).

3.2 Timelines

Most of the research shows a typical data center move should be from three to six months in length. This however, is subject to change due to varying conditions such as the amount of data requirements to gather, data center construction, costs, etc.... The main sentiment is simple and best summed up by Douglas Alger, "be sure to give yourself and your organization enough time to do the job and do it right" (Alger, 2005).

3.3 Team Players

Form a multi-disciplinary move team that includes members from the various groups: IT operations, applications, data network operations, facilities, human resources, and even executive supporters (Latala, 2006). This team will require a dedicated project manager, who is closely aligned with the IT organization, to lead and coordinate all activities during the planning phase

as well as through the implementation of the data center move and into the post-move occupancy to ensure newly defined processes and procedures will continue to be utilized. These key stakeholders should be recruited early on as advisors for the data center move to ensure buy-in throughout the organization.

3.4 Business Case

Develop a business case to highlight the critical success factors of the data center move project. This will also server to help the move team and organization understand the potential obstacles that lay ahead (Taffel, 2003). This step in the project helps the move team prioritize key issues and manage expectations for the rest of the organization.

3.5 Requirements Planning

The project move team must establish a comprehensive requirements plan that specifies both near-term and long-term needs for data center operations. Included in this plan should be details on data center facility size, location, site plans, physical security requirements, risk management initiatives, security priorities and business continuity (Taffel, 2003). Issues detailing critical infrastructure capacities, initial estimates of equipment densities, power and cooling capacities and levels of redundancy must also be addressed during this planning phase.

3.6 Inventory Preparation

A detailed physical inventory of all data center equipment that will be moved and that will need to be replaced should be developed (Maingot & Brigham, 2005). This analysis should be made on a multi-dimensional level to include the physical, logical and holistic aspects of everything within the existing data center and the relationships between each of the assets. Developing the inventory becomes a good starting point to document and track assets and the contracts associated with those assets prior to the actual data center move (Taffel, 2003). If this process has not been instilled within the IT organization yet, now is the time.

3.7 Design Layout

Review the desired state for the new data center with regards to functionality, technical and financial considerations and any new process improvements that must be made. The space layout and design should include all engineering and space aspects for the new data center including the logical and physical environment, the critical operations infrastructure which includes power, cooling, network connectivity, along with future growth considerations (Alger, 2005). By utilizing visual databases, maps to develop the rack layout and to determine the optimal electrical and air cooling distribution systems can be easily achieved.

3.8 Move Plan

One of the most critical steps within a data center move project the move team will be faced with is the need to create a detailed move plan that includes the equipment move sequence, back-up operations during the move, installation and testing. The sequencing plan will outline the

specific equipment relocation steps, for example, how each device will be positioned within the racks and how each rack module will be positioned within the overall floor space (Stager & Sitko, 1986). It is also essential to have a well-coordinated plan with the physical plant to ensure the appropriate electrical distribution, HVAC capacities, and back-up powers are in place. The last step of this process is to execute the plan and move the data center (Alger, 2005).

3.9 Contingency Plan

A healthy streak of paranoia is not a bad quality to have when planning a data center's move. A good contingency plan ensures that any unexpected problems are addressed quickly, efficiently, and with minimal business interruption (Ortiz Jr, 2006).

Contingency plans vary based on the criticality to the business of the systems involved. For that reason it is important to understand the interrelationships between the systems, both from an infrastructure and a business-flow perspective. The end result is a business impact assessment for each item on the move list (Latala, 2006).

“Don't get complacent just because the relocation appears to be far off on the horizon. Start planning your move as soon as you learn about it. Although you can't prepare for every unwanted surprise that could spring up during your move, allowing plenty of time to prepare should improve your odds” (Ortiz Jr, 2006).

3.10 Post Move

It is highly recommended for the project team to conduct a post-move audit and review of the data center relocation project. The evaluation should compare the results to the initial business case, conformity to schedule, cost estimates and feedback from move team members and key stakeholders (Taffel, 2003; Fujitsu, 2003). The lessons learned from the data center move project can be used to leverage process improvements to enhance future projects (Latala, 2006).

Chapter 4 – Research Contingency Planning

4.1 What is it?

Every business and organization can experience a serious incident that can prevent it from continuing normal operations. For the purpose of this paper, I am referring to a serious computer malfunction or Information Security incident resulting from the data center move.

The IT management of the organization has a responsibility to recover from such incidents in the minimum amount of time, with minimum disruption and at minimum cost. This requires careful preparation and planning (CPDRG, 2002).

4.2 The Starting Point

It is vitally important that the organization takes the development and maintenance of the disaster recovery plan seriously. It is not a task that can be left until someone has time to deal with it. A serious incident during the data center move could affect the organization (CPDRG, 2002).

The backup plan needs to be developed by the move team which should represent all functional areas of the organization. A formal project plan should be established, which should have approval and support from the key stakeholders (Fujitsu, 2003).

4.3 Risk Assessment

One of the first tasks to be undertaken is to prepare a comprehensive list of the potentially serious incidents that could affect the normal operations of the business. This list should include all possible incidents no matter how remote the likelihood of their occurrence (CPDRG, 2002).

Against each item listed the project team should note a probability rating. Each incident should also be rated for potential impact severity level. From this information, it will become much easier to frame the plan in the context of the real needs of the organization.

4.4 Plan Development

Once the assessment stage has been completed, the structure of the plan itself can be established. The plan will contain a range of milestones to move the organization from its disrupted status towards a return to normal operations and normal business.

The first important milestone is the process which deals with the immediate aftermath of the disaster. This may involve the emergency services or other specialists, who are trained to deal with extreme situations and circumstances (CPDRG, 2002).

The next stage is to determine which critical business functions need to be resumed and in what order. The plan will, of necessity, be detailed, and will identify the key individuals who should be familiar with their duties under the plan (CPDRG, 2002).

Chapter 5 – Analysis

5.1 What the Author Did

Based on the research that was done, the author took away some good ideas to perform the data center move project. Starting with the building of the move team, there were no problems garnering the support from every business group of the company; since this data center move affected every aspect of the company it was perfectly clear as to why everyone was eager to help make this data center move a success.

A business case was done mainly showing the financial outcomes of a successful data center move.

With the support of top executives, planning of the move began. This started with a series of meetings with the move team to discuss all aspects of the move and how it would affect the business. Meetings with key vendors were also put together to discuss timelines and commitments. From these meetings, a project plan with detailed steps and mile stones was created. This project plan helped to narrow down a designated move day which the executive staff was anxious for. Along with the detailed project plan were Visio diagrams of the new network and the server rack space configurations.

As time got closer to the move date, a detailed move plan was devised. This was a step by step of what systems were moved (see Appendix E), who moved them, and where they were

moving to. Along with this detailed move plan, a contingency plan was developed in case certain systems were not able to function properly due to seen and unforeseen circumstances.

Time came to give notice to clients and vendors that a data center move was taking place. This was typically about a three to four week advanced notice, depending on the client, their contractual agreement, and vendor. One week before the move, a special customer service relations team consisting of two senior account managers from the SPi Operations dept. was created. This idea came from the IT dept., to have a temporary liaison ensure all client concerns and issues would be addressed quickly either by phone or periodic email updates before, during, and after the move. Instead of fielding questions by anxious clients, the IT dept. was in constant communication with the special customer service relations team, who would relay the information to the clients calling in for updates. The team was in place for one week after the completion of the move to help resolve lingering issues concerning the changes made. Success of this venture allowed the IT dept. to focus on the task at hand, moving the data center.

A four hour outage was called for the actual data center move during what was considered off peak client time. A period of 15 minutes total outage for client connectivity is all that was experienced. This was because of the telecom switch-over that took place which interrupted all telecom services which was unavoidable. The careful planning of the systems move allowed the clients to maintain a minimal amount of outage on the front end during the entire data center move.

Testing of the systems began as soon as they were online in the new facility. As more and more systems came online their applications and services were tested with their interdependent relationships with the other systems. Issues such as failed hard drives, network mappings, and

domain connectivity problems were worked out and resolved in a timely fashion which helped with the success of the data center move.

The total time for the data center move took thirty minutes longer than what was scheduled making the total move four hours and thirty minutes. This was deemed a success by the company and more importantly, by the clients.

5.2 What the Author Thinks

The author feels that the development of the plan follows closely that of the research that was done for this project. The information found in the research matched closely the actual events of the data center move.

The decisions made for the move were based in part on the research data, such as creating the business plan financials to help foster support for the move. By using these decision making factors, a successful data center move was accomplished and now it's time to settle into business as usual, which according to the president of the company, is the best thing that could happen.

5.3 Evolution

As the company continues to grow there are more and more talks of acquisitions. If these acquisitions occur, there will be a need to incorporate the newly acquired technical infrastructure into the existing one. This will require more data center moves into this new facility. As this happens the move process will be reviewed, refined, and changed as each situation will present

new obstacles to conquer. However, what is in place is a good base project plan on which to build for the continued success of each new move.

5.4 Conclusion

The benefits of carefully planned and executed data center relocation go well beyond what meets the eye of the user or the business. Done correctly, the end result is not only a seamless transition for the business, but also the creation of a set of business continuity disciplines that can validate or provide groundwork for disaster recovery and business continuity planning as well as IT and physical security, asset management, systems documentation, change control, operating standards and processes, capacity planning, maintenance and license management, service and operating level agreements, business alignment and data center facility management.

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Appendixes

Appendix A Financials

Table 3: CAPEX

New Nashville Office: Gateway Plaza

FINANCIAL ANALYSIS (In US$)
Full Year (Start in Jan 2007)

Facility Related Expense	**New Ofc**	**Current Office**	**Savings**
Rent	221,660	290,624	68,964
Communications	485,730	485,730	0
Others	19,581	14,007	-5,575
Total	**726,972**	**790,361**	**63,389**

Table 4: Old Office

HEALTHCARE DOCUMENTATION INC.
Current Office - Sunmark Building
In US$

			Current Office FY (In US$)	
Overheads				
1. Rent				
Sunmark Building - Nashville,TN			**52,660**	
Area (in sq ft)				
Rent-Off Building	11.66	p.a.	21,713	
Rent-Off Equipment (PCs)			11,430	
Rent-Others (Furnitures,Storage)			19,517	
Lawrenceburg, TN			**7,500**	
Area (in sq ft)				
Rent			7,500	
Cymed - Chattanooga, TN Office			**46,032**	

Area (in sq ft)					
Rent				43,200	
Rent-Off Equipment (Copier,Mailing Machine)				1,889	
Rent-Others (Water cooler, storage)				942	
Cymed - Knoxville, TN Office				**26,888**	
Area (in sq ft)					
Rent				21,000	
Rent-Off Equipment				5,888	
Cymed - Virginia Office				**125,144**	
Area (in sq ft)	6,773				
Rent	14.85	p.a.		100,579	
Rent-Off Equipment (PC)				24,565	
Cymed - Ohio Office				**32,400**	
Area (in sq ft)					
Rent				32,400	
Total Rent				**290,624**	
2. Utilities - water				1,365	
3. Janitorial & Security					
4. Communications				485,730	
Nashville TN					
Cymed-TN					
Cymed-VA					
Cymed-OH					
5. Supplies Expense				12,641	
6. Shipping Cost (Moving cost)					
Total Facilities Related Cost				**790,361**	

Table 5: New Office

HEALTHCARE DOCUMENTATION INC.
New Tennessee Office - Gateway Plaza
In US$

				New Office FY (In US$)	
Facility Related Expenses					
1. Rent					
Gateway Plaza - Nashville, TN				**83,086**	
Area (in sq ft)	3,663				
Rent-Off Building	17.25	p.a.		61,971	
Rent-Off Equipment (PCs)				11,430	
Rent-Others (Furnitures,Storage)				9,685	
Lawrenceburg, TN				**7,500**	
Area (in sq ft)					
Rent				7,500	
Cymed - Chattanooga, TN Office				**15,344**	
Area (in sq ft)	*3,811*				

Rent			14,400	
Rent-Off Equipment (Copier,Mailing Machine)			630	
Rent-Others (Water cooler, storage)			314	
Cymed - Knoxville, TN Office			**17,925**	
Area (in sq ft)	*1,500*			
Rent			14,000	
Rent-Off Equipment			3,925	
Cymed - Virginia Office			**89,705**	
Area (in sq ft)	*6,773*			
Rent	14.85	p.a.	65,140	
Rent-Off Equipment (PC)			24,565	
Cymed - Ohio Office			**8,100**	
Area (in sq ft)				
Rent			8,100	
Total Rent			**221,660**	
2. Utilities			1,440	
3. Janitorial & Security				
4. Communications			485,730	
Nashville TN				
Cymed-TN				
Cymed-VA				
Cymed-OH				
5. Supplies Expense			12,641	
6. Shipping Cost (Moving Expense)			5,500	
Total Facilities Related Cost			**726,972**	

Table 6: Fit Out Cost

	Price (In US$)		Life	Annual Depreciation
Demolition	864.00			
Doors	650.00			
Drywall	3,187.00			
Ceilings	1,880.00			
Flooring	9,200.00			
Painting	3,900.00			
Sprinkler	950.00			
General Conditions	2,920.00			
Overhead and Profit	4,475.00			
Total	**$28,026.00**		3	9,342.00
Breakdown				
Space	16,616.00			
Computer Room Improvement	11,410.00			

	Construction			
1	20 amp 120 volt dedicated emergency power lighting circuit			
1	UPS			
1	Generator			
1	100 amp, 480 volt, 30 5 wire circuit from auto transfer switch to 100amp pin and sleeve receptacle located on 1st floor			
1	8 ft cooper clad driven ground rod			
1	125 amp 277/480 volt 30 4wire 20 circuit emergency power distribution panel with 70 amp 3 pole breaker, two 30 amp 3 pole breakers and three 20 amp single pole breakers			
	Total	**$27,039.00**	3	9,013.00
		Price (In US$)		
		$28,539.00	3	9,513.00
		$21,854.00	3	7,284.67
		$32,262.00	3	10,754.00
	Cubicle panels	10,000.00	3	3,333.33
	Filing Cabinets	5,000.00	3	1,666.67
	Chairs	3,500.00	3	1,166.67
	Total	**$18,500.00**		6,166.67
	Grand Total	**$156,220.00**		**$52,073.33**

Appendix B Risk Management

Project Manager: *Shane Wiswell*

Project Scope: *SPi Healthcare corporate has outgrown the current office setting through growth and accusations. A new office and data centre are needed to accommodate this new growth. A new office location must be selected and built as well as a new data centre for the business to move in to.*

Table 7

Rating for Likelihood and Seriousness for each risk			
L	Rated as Low	E	Rated as Extreme (Used for Seriousness only)
M	Rated as Medium	NA	Not Assessed
H	Rated as High		

Grade: Combined effect of Likelihood/Seriousness					
	Seriousness				
Likelihood		low	medium	high	EXTREME
	low	E	D	C	A
	medium	D	C	B	A
	high	C	B	A	A

Recommended actions for grades of risk	
Grade	**Risk mitigation actions**
A	Mitigation actions to reduce the likelihood and seriousness to be identified and implemented as soon as the project commences.
B	Mitigation actions to reduce the likelihood and seriousness to be identified and appropriate actions implemented during project execution.
C	Mitigation actions to reduce the likelihood and seriousness to be identified and costed for possible action if funds permit.

D	To be noted - no action is needed unless grading increases over time.
E	To be noted - no action is needed unless grading increases over time.

Change to Grade since last assessment			
NEW	New risk	↓	Grading decreased
—	No change to Grade	↑	Grading increased

Id	Description of Risk Identify consequences[1]	Likelihood	Seriousness	Grade	Change	Mitigation Actions	Responsible Officer
1.1	Inadequate funding to complete the project	M	M	B	—	Re-scope project, focusing on time and resources	Shane Wiswell
1.2	Lack of technical skills to complete move	L	H	C	↑	Work with senior technical advisors in SPi	Shane Wiswell
1.3	Building of office and data centre fall behind schedule.	H	H	A	—	Keep current with DWC and sub contractors.	Shane Wiswell
1.4	BellSouth incorrect / incomplete install of services	M	H	B	—	Work with BellSouth closely. Test lines prior to move date	Shane Wiswell
1.5	Lack of moving services	L	M	D	—	Have a backup mover in mind	Shane Wiswell
1.6	Put off moving day due to whether	L	L	E	—	Create a second and third option for a moving day	Shane Wiswell

Appendix C Communications Plan

Nashville Office Move

Communications Management Plan

Prepared by: Shane Wiswell **Date:** January 2, 2007

1. Introduction

The current Nashville office for SPi has been deemed inadequate, lack of space for the current integration of the CyMed acquisition is the driving factor behind this move.

The scope of this project is:

- Find adequate office space
- Construct a data center which will handle the current integration efforts as well as future growth
- Build office space to the specifications per the executive management.

- Furnish new office space.
- Move from current office location to the new location while minimizing client and employee interruptions.

The project is scheduled to run between Dec 1, 2006 and March 28, 2007. Below is a brief summary of stakeholders:

SPi

President - Dave Woodrow

V.P. Operations - Jeff Marwill

IT Director - David McAllister

Assigned Resources

Project Manager – Shane Wiswell

Telecom Engineer – John James

Network Engineer – Nestor Umalin

Mid-South Financial

Assigned Resources

Project Manager – Warren Smith

Project Manager – Collins Smith

Asst. Project Manager – Corri Golden

DWC Construction

Assigned Resources

Project Manager – Craig Fultcher

Site Supervisor – JR Fultcher

BellSouth

Assigned Resources

Project Manager – Linda Gray

Service Consultant – Tammy Clark

Account Manager - Joann Dilbeck

Network Service Engineer - Bill Gassaway

Migration Service Consultant - Sally Sensebe

BSLD Order Entry Support - Sue Michel

BICS Engineer - Montgomery Crafton

Ken Rich Electric

Assigned Resources

Electrician – Ken Brown

Lee Company

Assigned Resources

Project Manager - Clinton Gentry

Walick Kemp

Assigned Resources

Project Manager – Bob Walick

APEX Moving

Assigned Resources

Project Manager – Christopher Breze

Stakeholders are grouped as follows:

- Project Team - all project manager resources
- Sponsors – Spi management
- Project Leadership - SPi project manager
- All Stakeholders - everyone

2. Collection and filing structure for gathering and storing project information

Information shall be posted and stored in the following locations:

Nashville Office Move folder on the public_docs of the TK-421 server.

3. Distribution structure (what information goes to whom, when, and how)

Information shall be distributed generally via emails, telephone calls, conference calls, and on site meetings.

The following documents and communications are expected over the course of this project:

Table 8: Written Communications

Document	Sent to	Due	Format	Location
Business Case	All stakeholders	Jan 4	Word 2003	Nashville Office Move folder
Project Charter	All stakeholders	Jan 11	Word 2003	Nashville Office Move folder
Scope Statement	All stakeholders	Jan 11	Word 2003	Nashville Office Move folder
Stakeholder Analysis	Project leadership Project team	Jan 18	Word 2003	Nashville Office Move folder
Organization Chart	Project leadership Project team	Jan 18	Visio 2003	Nashville Office Move folder
Measurements of Performance	Project leadership Sponsors	Jan 18	Word 2003	Nashville Office Move folder
Project Schedule	Project Team Project leadership Sponsors	Jan 18	Excel 2003	Nashville Office Move folder
Project Communication Plan	Project team Sponsors	Jan 11	Word 2003	Nashville Office Move folder
Risk Assessment	Sponsors Project leadership Project team	Jan 11	Word 2003	Nashville Office Move folder
Project Budget	Sponsors Project leadership	Jan 14	Excel 2003	Nashville Office Move folder
Change Management Process	Sponsors Project team	Jan 11	Word 2003	Nashville Office Move folder

Schedule Variance Report	Project manager	Ad hoc	Word 2003	Email
Budget Variance Report	Project manager	Ad hoc	Word 2003	Email
Change Register	Sponsors Project team	Initiated Jan 11, updated ad hoc	Excel 2003	Nashville Office Move folder
Issues Table	Project team	Initiated Jan 11, updated ad hoc	Excel 2003	Nashville Office Move folder
Meeting Minutes	Project team Sponsors	Weekly starting Jan 15	Word 2003	Nashville Office Move folder
Procurement Plan	Project team Sponsors	Jan 11	Word 2003	Nashville Office Move folder
Performance Reports	Sponsors Project team	Weekly starting Jan 18	Word 2003	Nashville Office Move folder
Status Reports	Sponsors Project team	Weekly starting Jan 18	Word 2003	Nashville Office Move folder
Audit Process	Sponsors Project team	Jan 11	Word 2003	Nashville Office Move folder
Lessons Learned	Sponsors Project team Project leadership	Apr 1	Word 2003	Nashville Office Move folder

4. Format, content, and level of detail of key project information

All communications shall be created using the standard templates stored in the Nashville Office Move folder whenever possible.

Level of detail will remain broad for documents posted to the Nashville Office Move folder. Within the MS Project File, the level of detail will be more robust.

5. Production schedule and resources for producing key project information

Initial documentation will be produced before the project kick-off meeting on Jan 8, 2007. These documents will be produced by the project manager.

Following that meeting, as a result of decisions and consensus from that meeting, the rest of the product planning documents shall be completed on Jan 15, 2007. These documents will be produced by the project manager with input from sponsors, project resources, and leadership.

The budget will be completed on Jan 22, 2007 by project leadership with input from sponsors and the project manager.

Weekly reports will begin on Jan 18, 2007 and will be produced by the project manager.

6. Technologies, access methods, and frequency of communications

Information shall be distributed generally via emails, telephone calls, conference calls, and on site meetings as needed.

7. Method for updating the communications management plan

Upon acceptance from sponsors and project leadership, this document shall be updated or changed only by those methods established in the change control management document.

8. Escalation procedures

Schedule and budgeting variances shall be reported to the project manager via telephone or email. When variances result in a change in the date of milestones or project delivery, the sponsor shall be notified immediately via phone or email.

Technical problems shall be reported to the resource responsible, and the project manager shall also be copied.

9. Stakeholder communications analysis

Table 9

Stakeholders	Document Name	Document Format	Contact Person	Due Date
Project manager	Weekly status reports	Word 2003	Shane Wiswell	Fridays
Project manager	Change management requests	Word 2003	Shane Wiswell	Immediately
Project manager	Schedule variance report	Email	Shane Wiswell	Immediately
Project manager	Budget variance report	Email	Shane Wiswell	Immediately
Sponsors	Project planning documents	Word 2003	Dave Woodrow	12/4/2006 1/11/2007
Project manager	Project planning documents (signed)	Hard copy	Shane Wiswell	1/9/2007 1/16/2007
Project team	Project schedule	Excel 2003	See stakeholders	1/11/2007
Project Team	Project planning documents	Word 2003	Shane Wiswell	1/11/2007

Appendix D Project Plan

Table 10: Project Plan

	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	**Office Move**	**84 days**	**Mon 12/11/06**	**Thu 4/5/07**		
2	**Before Moving Day**	**72 days**	**Mon 12/11/06**	**Tue 3/20/07**		
3	Finalize lease on office space	3 days	Wed 12/13/06	Fri 12/15/06		Dave Woodrow & Le
4	Identify major tenant improvement needs	5 days	Fri 12/15/06	Thu 12/21/06	3	Spi Move Team
5	Identify costs for new office equipment	10 days	Mon 12/18/06	Fri 12/29/06	3	Spi Move Team
6	[illegible]	10 days	Mon 1/1/07	Fri 1/12/07	5	Dave Woodrow & Le
7	This task was completed on Fri 1/12/07.	1 day	Mon 12/18/06	Mon 12/18/06	3	Spi Move Team
8	Work on major improvements	15 days	Fri 12/22/06	Thu 1/11/07	4	Spi Move Team
9	Finalize Telecom Contracts	1 day	Tue 1/16/07	Tue 1/16/07	3	Dave Mcallister, Shai
10	Communicate to employees	1 day	Mon 12/18/06	Mon 12/18/06	3	Jeff Marwill, Dave W
11	Get business insurance quotes for new spa	5 days	Mon 12/18/06	Fri 12/22/06	3	Dave Woodrow & Le
12	Purchase insurance for new space	10 days	Mon 12/25/06	Fri 1/5/07	11	Dave Woodrow & Le
13	**Computer Room Buildout**	**72 days**	**Mon 12/11/06**	**Tue 3/20/07**	**3**	
14	Get security system quote	2 days	Mon 12/11/06	Tue 12/12/06	3	Shane Wiswell
15	Order security system	5 days	Mon 3/5/07	Fri 3/9/07		Shane Wiswell
16	Order keys, access cards	5 days	Mon 3/12/07	Fri 3/16/07	15	Shane Wiswell
17	**Install BellSouth telecom and data**	**43 days**	**Wed 1/17/07**	**Fri 3/16/07**	**9**	**Shane Wiswell**
18	BellSouth Install	38 days	Wed 1/17/07	Fri 3/9/07	9	
19	External IP address changes	5 days	Mon 3/12/07	Fri 3/16/07	18	Shane Wiswell
20	Send BellSouth Telecom Req's	5 days	Wed 1/17/07	Tue 1/23/07	9	Shane Wiswell
21	Patch lines from Wall to Patch Pa	3 days	Mon 3/12/07	Wed 3/14/07	18	Shane Wiswell
22	Get general construction bids	2 days	Mon 12/18/06	Tue 12/19/06	3	Shane Wiswell
23	Get general construction approvals	1 day	Wed 12/20/06	Wed 12/20/06	22	
24	Complete general construction	16 days	Thu 2/8/07	Thu 3/1/07	23	Shane Wiswell
25	Get Electrical Bid	5 days	Thu 1/11/07	Wed 1/17/07	3	Shane Wiswell
26	Get Electrical Approvals	1 day	Thu 1/18/07	Thu 1/18/07	25	
27	Install Electrical	30 days	Fri 1/19/07	Thu 3/1/07	26	Shane Wiswell
28	Get UPS bid	4 days	Thu 1/11/07	Tue 1/16/07	27	Shane Wiswell
29	Get UPS Approvals	17 days	Wed 1/17/07	Thu 2/8/07	28	
30	UPS Shipping and Install	16 days	Fri 2/9/07	Fri 3/2/07	29	Shane Wiswell
31	Get HVAC bid	5 days	Fri 1/5/07	Thu 1/11/07	3	Shane Wiswell
32	Get HVAC Approvals	20 days	Fri 1/12/07	Thu 2/8/07	31	
33	Install HVAC	16 days	Fri 2/9/07	Fri 3/2/07	32	Shane Wiswell
34	Get network wiring bid	5 days	Wed 12/13/06	Tue 12/19/06	3	Shane Wiswell
35	Get wiring Approvals	33 days	Wed 12/20/06	Fri 2/2/07	34	
36	Install network wiring at new location	15 days	Mon 2/5/07	Fri 2/23/07	35	Shane Wiswell

38		Order New Server Racks	10 days	Mon 12/18/06	Fri 12/29/06	3	Shane Wiswell
39		Order and Receive New Firewall	10 days	Mon 2/12/07	Fri 2/23/07		Shane Wiswell
40		Configure New Firewall	3 days	Mon 3/12/07	Wed 3/14/07	18	
41		Install phone system	3 days	Thu 3/15/07	Mon 3/19/07	40	Shane Wiswell
42		Prepare inventory of equipment to mov	5 days	Wed 1/31/07	Tue 2/6/07		Shane Wiswell
43		Prepare exact move sequence of equi	2 days	Wed 2/7/07	Thu 2/8/07	42	Shane Wiswell
44		Contingency plan for move	2 days	Fri 2/9/07	Mon 2/12/07	43	Shane Wiswell
45		Certificate of Occupancy	1 day	Tue 3/20/07	Tue 3/20/07	41,24,27,33,36	Shane Wiswell
46		**Pre-Move Items**	**10 days**	**Mon 3/19/07**	**Fri 3/30/07**		
47		Plan for disposal of old office equipment	1 day	Wed 3/21/07	Wed 3/21/07	45	Spi Move Team
48		Dispose of old office equipment	1 day	Thu 3/22/07	Thu 3/22/07	47	Spi Move Team
49		Plan for disposal of old office furniture	1 day	Thu 3/22/07	Thu 3/22/07	47	Spi Move Team
50		Dispose of old office furniture	1 day	Fri 3/23/07	Fri 3/23/07	49	Spi Move Team
51		Pack up common areas	5 days	Fri 3/23/07	Thu 3/29/07	49	Spi Move Team
52		Pack up desks, personal spaces	4 days	Fri 3/23/07	Wed 3/28/07	49	Movers
53		Store property that will not be moved	1 day	Thu 3/29/07	Thu 3/29/07	52	Spi Move Team
54		Label furniture to be moved	2 days	Thu 3/29/07	Fri 3/30/07	52	Spi Move Team
55		Distribute new keys, cards	1 day	Fri 3/30/07	Fri 3/30/07	53	Shane Wiswell
56		Collect old keys, cards	1 day	Fri 3/30/07	Fri 3/30/07	53	Shane Wiswell
57		Empty, defrost and clean refrigerator	1 day	Fri 3/30/07	Fri 3/30/07	51	Cleaning service
58		Coordinate with clients to change VPN's	5 days	Mon 3/19/07	Fri 3/23/07	19	
59		Coordinate with clients to change voice rea	5 days	Mon 3/19/07	Fri 3/23/07	19	
60		**Moving Day**	**8 days**	**Wed 3/21/07**	**Fri 3/30/07**	**45**	
61		Put moving day team in place	1 day	Wed 3/21/07	Wed 3/21/07	3	Spi Move Team
62		Protect main moving paths	1 day	Fri 3/30/07	Fri 3/30/07	53	Spi Move Team
63		Move	1 day	Fri 3/30/07	Fri 3/30/07	53	Movers
64		Execute telecom and data changes with Bel	1 day	Fri 3/30/07	Fri 3/30/07	53	Shane Wiswell
65		Execute client VPN changes	1 day	Fri 3/30/07	Fri 3/30/07	53	Spi Move Team
66		Execute client voice reader changes	1 day	Fri 3/30/07	Fri 3/30/07	53	Spi Move Team
67		**Post-Move**	**4 days**	**Mon 4/2/07**	**Thu 4/5/07**	**60**	
68		Check carefully for any damaged or missing	1 day	Mon 4/2/07	Mon 4/2/07		Spi Move Team
69		Schedule phone training	1 day	Tue 4/3/07	Tue 4/3/07	68	Shane Wiswell
70		Schedule security training	1 day	Wed 4/4/07	Wed 4/4/07	69	Shane Wiswell
71		Schedule fire drill	1 day	Thu 4/5/07	Thu 4/5/07	70	Shane Wiswell
72		Periodically visit old office to pick up mail	1 day	Mon 4/2/07	Mon 4/2/07	63	Spi Move Team
73		Schedule open house for clients	1 day	Mon 4/2/07	Mon 4/2/07	63	Jeff Marwill
74		Office move project complete	0 days	Thu 4/5/07	Thu 4/5/07	68,69,70,71,72,7	

Appendix E Critical Systems Move Plan

Pre steps for move:

1. Create and send to customers the procedure to change the Chartnet applications
2. Build the existing VPN tunnels on the new CheckPoint firewall
3. Rewrite the HL7 Interfaces
4. Assign the new IP addresses for the production servers
5. Rewrite the server scripts
6. Compile the list of the new telecom numbers
7. Notify customers of Interface changes
8. Change the Chartnet ADS.INI file

Move Timeline:

5:30pm – Meet at old data center

6:00pm – Make DNS changes

6:05pm – Change IP addresses to new IP schema and power down servers

6:30pm – Call AT&T to cut over the telecom numbers

7:00pm – Start install of servers in the new data center

8:00pm – Power on servers

- TK-421
- SPIFNTD1

- SPIFNTMAIN
- FNBUSRVR
- CNETSRVR
- CNETSRVR03
- IG-88
- AA-23
- CHARTVOX14
- BIGBROTHER

8:30pm to 10:00pm - Testing

1. Dial each new phone line and verify connectivity
2. Test Chartnet connections – (voice client, review, trans, etc…)
3. Verify terminal server connections
4. Drive mappings
5. Scripts
6. Server monitoring (hostmonitor, bigbrother, nagios)
7. Test Interfix
8. Check host files
9. Remote servers – (CCRMC, Pinehurst, PCH, CMC)

Annotated Bibliography

Ortiz Jr, Sixto, (2006), "Moving the Data Center"

Retrieved from forsythe.com web site 11/2006

http://www.forsythe.com/infrastrat&man/dcr/documents/MovingTheDataCenter.pdf

The author, director of data center relocation services, discusses the various aspects of a data center relocation project. Planning, transporting equipment, and testing are covered and discussed in his article. The author pays close attention to the emphasis of a timeline schedule, and includes an example of a data center move timeline.

Stager, Susan, Sitko, Toby, (1986), "How To Move Your Computer Center 1.7 Miles (With Only Five User Complaints), SIGUCC Newsletter XVI/4

Retrieved from acm.org website (2006)

http://delivery.acm.org.dml.regis.edu/10.1145/390000/382974/p26-stager.pdf?key1=382974&key2=7148030811&coll=portal&dl=ACM&CFID=23760203&CFTOKEN=43170928

Indiana University Academic Computer Services authors detail out their data center move of 12 mainframe systems for the University. Their steps included a critical pre move task list that would help them identify the key stake holders for this project.

ASCD, (2007), "Research Evaluation tools"

Retrieved from the ASCD website 2/2007

http://www.ascd.org/portal/site/ascd/menuitem.e5325afc6a4ea7cf989ad324d3108a0c/

There are a variety of ways that research might be biased in design, data analysis, and interpretation. The authors of the checklist used in this project was designed to assist and evaluate the risk of bias associated with any given research product, as well as identify steps the researchers may have taken to protect their work from the influences of bias.

Latala, Fred, (2006), "Best Practices in Data Center Relocation"

Retrieved from the Data Center Journal website 2/2007

http://www.datacenterjournal.com/News/Article.asp?article_id=584

The author dives into an in depth understanding and proper documentation of all facets of the interrelationships between the technology infrastructure and the supported business operations. Some of the main points the author makes through out the work is that successful data center relocations can completely transform the overall operating environment in a way that has significant benefits for an organization's disaster recovery readiness as well as day-to-day operational efficiencies.

CPDRG, (2002), "The Contingency Planning Guide"

Retrieved from The Contingency Planning Guide website 2/2007

http://www.contingency-planning-disaster-recovery-guide.co.uk/

The author outlines the most common steps in contingency planning and disaster recovery. The author also identifies popular tools and solutions in an effort to help make the contingency planning process less daunting for the business.

Alger, Douglas, (2005), "Build the Best Data Center Facility for Your Business"

Cisco Press, Cisco Systems, Inc

The author discusses at length data center builds, moves, and maintenance and how these items are critical for companies of today. The goal for the author is to have the reader become familiar with all aspects of a data center and its physical components.

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Data Systems Analyst, (2006), "Case Study, Data Center Migration"

Retrieved from DSAINC website 2/2007

http://www.dsainc.com/CaseStudy27.html

This case study recounts a 2004 data center move and consolidation effort for a global research-driven Pharmaceutical company. The initiative of the study was to close down two existing datacenters and open a new, centralized datacenter 500 miles from their present location. In addition to the move, they implemented full Disaster Recovery for their most critical applications and upgraded the hardware and software on most of their equipment.

Fujitsu, (2003), "Data Cneter Relocations and Consolidations, A Primer"

Retrieved from fujitsu website 1/2007

http://www.computers.us.fujitsu.com/downloads/wp_relocation.pdf

The author of this paper addresses the differences between data center consolidation and data center migration. The purpose of this paper is to give the reader a glimpse into the world of data center relocation and the many challenges that can arise due to the unpredictability of such a task.

Taffel, Martain D., (2003), "A Relocation Road Map, Best-In-Class Practices"

Retrieved from siteselection website 1/2007

http://www.siteselection.com/issues/2003/jan/ss101/pg02.htm

The topic of this paper was not necessarily the specific task of a dater center relocation, but of a general business office relocation. The author discusses items such as developing a detailed relocation schedule, project coordination, communication techniques to the business employees, move implementation, and post move issues.

Maingot, Trevor, Brigham, Todd, (2005), "Relocating a Serve Room, A Case Study"

Retrieved from techrepublic website 1/2007

http://i.i.com.com/cnwk.1d/i/tr/downloads/home/relocate_server_room.pdf

The authors of this paper were charged with combining two offices, relocating both offices and their data centers to a new location. What is discussed is how they prepared for the move that was to take place in a three month time period. This paper discusses a number of tasks such as communicating with vendors, documenting their existing network infrastructure, and dealing with a host of problems in getting this data center relocated.

Glossary

Web Site: A collection of hyperlinked HTTP documents

Browser: Software used to access web sites

HVAC: acronym that stands for heating, ventilating, and air conditioning

Genset: self-contained and dedicated electrical generatation system

Conduit: duct used for heating, ventilating and air-conditioning purposes

PRI: Primary Rate Interface (1.544 Mbps)

Channelized T1: a T1 line is divided into 24 channels, each having a maximum data speed of 64 Kbps

VOiP: Voice over Broadband is the routing of voice conversations over the Internet or through any other IP-based network

UPS: a device which maintains a continuous supply of electric power to connected equipment by supplying power from a separate source when utility power is not available

Volt-Ampere: the amount of apparent power in an alternating current circuit equal to a current of one ampere at an emf of one volt

Disaster Recovery: the process of regaining access to the data, hardware and software necessary to resume critical business operations after a natural or human-induced disaster.

Business Continuity Planning: a process used to create and validate a practiced logistical plan for how an organization will recover and restore partially or completely interrupted critical function(s) within a predetermined time after a disaster or extended disruption.

Risk Management: an activity which integrates recognition of risk, risk assessment, developing strategies to manage it, and mitigation of risk using managerial resources.

Project Plan: a formal, approved document used to guide both project execution and project control.