Developing a Shared Business Continuity Data Center

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Developing the Data Center

Shared Facility
Feasibility Study - Phase I
Feasibility Study - Phase II
Feasibility Study - Phase III & IIIa
Construction
Operations
Data Center Tour
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NYSERNet’s Business Continuity Center

- 2000 sq.ft. Tier III +/- data center.
- Designed to enhance member DR/BC strategies.
- Participation open to any eligible institution.
- Culmination of a two-year effort.
- Engaging Board members, NYSERNet staff, working group, three engineering firms.
- Leveraging NYSERNet and member network infrastructure to advance BC/DR strategies.
- Shared investment, shared risk, mutual trust, a shared resource.
- How did NYSERNet accomplish this?
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Phase I - Board’s Charge to Staff

Convene a working group to explore the potential for developing a centralized Data Center dedicated to enhancing the disaster recovery and business continuity strategies of NYSERNet's member institutions.
Phase I - Goals

- Determine Need and Requirements
- Develop Specifications
- Identify Costs
- Report to the Board
Stage 1: Determining Requirements

- Formation of the Working Group.
- Creation of a strawman service description incorporating industry standards and best practices.
- Survey of Working Group members to gain their feedback on the strawman and other information relevant to this evaluation.
- Follow-up calls with each Working Group member to review their institution’s survey response and gain additional feedback.
Stage 2: Developing Specifications

- 50 cabinet initial capacity, expandable to 100.
- Cooling and power to handle 6,000 watts per cabinet.
- 6,000 sq. ft. facility (4,000 sq. ft. raised floor & 2,000 sq. ft. support space).
- A Tier III infrastructure as defined by the Uptime Institute and the Telecommunication Industry Association’s *Telecommunication Infrastructure Standards for Data Centers* (TIA-942).
- **Staffed 8x5; on-call 24x7.**
- Located in **Central New York.**
Stage 3: Identifying Costs

- Working with real estate agents to determine availability and rough cost of potential data center sites: greenfields, raw space, existing data centers.
- Designing and costing the required network infrastructure.
Stage IV - Findings

- Members project using 70 cabinets at 6 kW each.
- Syracuse is an acceptable location.
- No requirement to staff 24x7.
- Existing data centers offer no advantage.
- Potentially suitable raw space available @ $16/ft².
- Staff estimate of the cost to develop: $2.5M
- Nova’s estimate: $2.7 to $4.7M
- APC’s estimate: $1.6M
- Uptime Institute’s algorithm: $3.6M
Stage IV - Conclusions

- The Data Center is potentially feasible.
- Space is available and affordable.
- There is interest and need among members (and others.)
- NYSERNET staff are accepted as being qualified and neutral.
- *But important questions remained...*
Stage IV - Remaining Questions

- What are the true costs to develop and operate the Data Center?
- Can we develop an affordable service offering?
- Are there benefits that outweigh simple consideration of costs?
- How big should the facility be? What are member requirements for the next 3-5 years?
- What is the true level of commitment of members?
- Must we build a true Tier III facility?
Feasibility Review - Phase I

Chronology of Phase I

- Establish the Working Group’s membership - Jul. ‘05
- Benchmark commercial offerings - Aug.’05
- Review industry standards - Aug.’05
- Develop a survey and strawman service description - Aug.’05
- First Working Group meeting - Aug.’05
- Implement the member survey - Sep.’05
- Second Working Group meeting to review findings - Oct.’05
- Follow-on meetings with Working Group members - Oct.’05
- Preliminary search for candidate sites - Fall ‘05
- Specifications and cost estimates complete - Nov.05
- Report to Board and authorization for Phase II - Dec.05
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Phase II Goals

- Refine requirements and specifications.
- Identify completely the costs of developing and operating the center in specific buildings.
- Determine the impact on member commitment to participate based upon these costs.
Phase II Objectives

- Engage a data center design firm.
- Identify candidate sites for the Data Center.
- Assess each site’s risks & potential.
- Develop concepts, budgets, project plans for top candidates.
- Build a model to integrate the cost of power.
- Refine the strawman service description & pricing.
- Perform an analysis of competitive offerings.
- Meet with the Working Group to review findings.
- Integrate Working Group feedback into a report.
- Re-survey the Working Group.
- Deliver final report to the Board.
Engage a Design Firm

- To review survey responses and resulting requirements.
- To validate our specifications for the data center.
- To ensure that requirements and specifications are complete and appropriate.
- To survey and evaluate potential locations.
- To develop conceptual designs and budgets.
- RFP for design services issued - 12.22.05
- BRUNS-PAK and Nova Corp. hired - 1.5.06
Two real estate firms engaged.
Sites assessed against site selection criteria.
Agents canvass market for suitable locations.
Twenty candidates identified and quickly culled to six.
Field inspections with Nova eliminate two more.
One candidate withdrawn by the leaseholder.
Three locations remain.
Nova develops conceptual designs and budgets for remaining sites.
RFP issued to property owners.
Meeting with Working Group - March 2006

- Review of Phases I and II of the feasibility study.
- Presentation of concepts by Nova and BRUNS-PAK.
- Discussion on the network design.
- Discussion on data center services.
- Discussion on potential locations.
- Atrium first proposed as potential location based upon advantages and despite disadvantages.
Three (now four) potential sites selected.

Conceptual designs completed for top three candidates.

Still a question of feasibility - a question of participation; re-survey response rate low.

The Atrium is desirable, possibly the preferred location, but...

Is it suitable for a data center?

What are the costs to develop and operate a data center service in the Atrium?
Chronology of Phase II

- Identify cost of developing and operating the center in a particular location; determine the impact on member commitment based upon these costs.
- Engage two data center design firms - Jan.’06
- Identify candidate sites for the data center - Feb.’06
- Assess each site’s risks & potential - Mar.’06
- Develop budgets and project plans for candidates - Mar.’06
- Refine the strawman service description; develop strawman pricing based upon the new budget - Mar.’06
- Meet with Working Group to review these findings - Mar.’06
- Deliver report to the Board - Apr.’06
- Plus a host of parallel activities…
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Phase III - Goals

- Determine the absolute level of commitment of members.
- Determine suitability of the Atrium.
- Provide Board with information necessary to make go/nogo decision.
Phase III - Objectives

- Survey the Atrium and develop conceptual design and budget for a 100 cabinet data center.
- Complete development of business model.
- Update market analysis.
- Develop and distribute a prospectus on the service.
- Seek an LOI from each interested institution to determine absolute commitment levels.
Phase III - Findings & Conclusions

- The Atrium is a suitable location and the most cost effective of all locations surveyed.
- However, the data center as specified is not feasible.
- Member commitment level is insufficient to secure financing.
- Financial risk is too great even if financing could be secured.
- Need for the service has not lessened.
Phase IIIa - Objectives

- Engage *Nova* to develop engineering, budget, project plan for a 50 cabinet facility in the Atrium.
- Continue refining the business model.
- Continue seeking LOIs from members.
- Report to the Board at its September retreat.
Phase IIIa - Findings/Conclusions

- Member commitment level increases only slightly.
- New design offers some savings.
- Board concludes to proceed with construction.
Chronology of Phase IIIa

- Staff seek LOIs from member institutions - Apr.’06
- *Nova* and *BRUNS-PAK* evaluate the Atrium - Apr.’06
- Report to Board that project is not feasible - Apr.‘06
- Staff continue seeking LOIs from members - Summer ‘06
- *Nova* develop detailed engineering for 50 cabinet facility at the Atrium - Summer ’06
- NYSERNet Board votes to proceed with construction - Sep.’06
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Chronology of the Construction Phase

- Prepare the lease and design/build agreements for Board authorization by December; Complete the facility by summer 2007.
- NYSERNet hires a Data Center Manager - Oct.’06
- Negotiation of Design/Build agreement and Atrium lease commences - Oct.’06
- Staff report to the Board that the cost of the project has increased 15% and seeks re-authorization - Dec.’06.
- NYSERNet engages CBD builders to develop the data center and executes lease with Atrium Associates - Jan.’07
- Project complete; staff and AMNH move in - Jun.’07
Parallel Projects - Developing the Service

- Data Center Web Site
- Member Agreements
- Office Relocation
- Staff Technology
- Voice Services
- Intra-Building Fiber
- Commercial Internet
- Facility Security
- Federal Funding
- Video Surveillance
- Burstable Service
- R&E and Optical Network Services
- Empire Zone Application
- Operational Procedures
- Command Center
- Implementations
Data Center Construction

Project Costs

- Pre-Construction (assessment of potential locations, development of conceptual designs) ~ 100K
- Architectural/Engineering Services ~ 100K
- Construction (includes 5,000 sq.ft. office space) ~ 1.4M
- Data Center Equipment (CRACs, PDUs, genset, FM200, surveillance, security, etc.) ~ 1.0M
- Network Equipment (upgrades to existing network, routers, racks, intra-building fiber) ~ 300K

- Total Cost = $2.9M = $1,450/sq.ft. = $8,285/kW
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Business Continuity Center

- ... where NYSERNet members can deploy mission critical applications and data integral to their disaster recovery and business continuity strategies.
- Designed and developed by NYSERNet’s members.
- Commercial-grade, 70 Cabinet, ~Tier III “hot site”.
- Located in Syracuse.
- Leveraging the NYSERNet optical infrastructure.
- Leveraging NYSERNet skills and knowledge: engineering, project management, colocation facility construction.
- Leveraging CNY - location and infrastructure.
- Opened June 1, 2007.
Center Features

- N+1 - fully concurrently maintainable infrastructure.
- Full generator backup and centralized UPS.
- VESDA, pre-action drypipe and FM200 fire prevention.
- *Foreseeer* monitors power, HVAC, security, fire, water - currently monitoring ~7,000 individual points.
- Cardkey access control and 24x7 [video surveillance](#).
- Standard 19” lockable cabinets - ½ and ⅓ cabinets available.
- Customer-provided and 23” cabinets available.
- Primary and redundant power available in 110v and 208v.
- Network access via NYSERNet R&E Network, commercial Internet and NYSERNet λ.
Campus Connection to Data Center Network
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CRAC Unit Plumbing
Fire Prevention – VESDA & Fike Cheetah
Fire Prevention – Pre-Action Dry Pipe & FM200
Generator & External Fuel Tank
Meeting & Guest Office Space
Thank you.
Feasibility Study Working Group

- Alfred University
- American Museum of Natural History
- Binghamton University
- City University of New York
- Columbia University
- Cornell University
- Hofstra University
- Le Moyne College
- Marist College
- New York Presbyterian Hospital
- New York Public Library
- New York University
- Rensselaer Polytechnic Institute
- Rochester Institute of Technology
- Stony Brook University
- Syracuse University
- University at Albany
- University at Buffalo
- University of Rochester
Why 8x5 and not 24x7?

- Expensive to accomplish.
- Staff members likely underutilized.
- Effective security and monitoring mitigates the need.
- It’s a DR/BC facility with redundant applications not primary.
- Existing NOC staff available to provide support.
- Hire a single expert to complement NOC staff.
Why Central New York?

- More than 50 km away from every NYSERNet member institution, except Syracuse University.
- Syracuse, although the US’s snowiest major city, not prone to natural disaster.
- Easily accessible by car via Routes 90 and 81, by Amtrak, and by a dozen commercial airlines.
- Well-served with long and short-haul fiber and telecommunication services.
- NYSERNet’s operational headquarters and most of its staff reside in or near Syracuse.
Site Selection Considerations

- Susceptibility to natural disaster.
- Proximity to member data centers - not less than 50 km.
- Proximity to 100-year floodplain.
- Proximity to airport flight paths.
- More than 1000 yards from major highways and rail lines.
- Single-tenant, single-story preferred.
- Minimum floor-loading capacity of 150 lbs./sq.ft.
- Convenient to public transportation.
- Availability of power/cost to remediate.
- Diversity of serving power grid.
- Cost to extend NYSERNet network.
- Overall cost to outfit/remediate facility.
Atrium Advantages

- Available space, reasonably priced.
- Proximity to NYSERNet POP.
- Proximity to Level3 and Broadwing POPs.
- Reliable power, lots of it.
- Building owners HQ on-site.
- Empire Zone certified.
- Interior space for generator.
- High-capacity freight elevator.
- Loading dock.
Atrium Disadvantages

- Parking availability. Parking fees.
- Commute from main office in Liverpool.
- Multi-Story.
- Multi-Tenant.
- Floor loading.
- Distributed operational environment.
- City of Syracuse Code Enforcement.
Other Phase II Activities

- Seeking external funding.
- Identifying financing options.
- Designing network services.
- Developing alternative conceptual designs.
- Re-surveying the working group.
- Developing an energy budget.
- Developing budget models and project plans.
- Revising service descriptions.
Data Center Manager Responsibilities

- Oversee data center construction.
- Review data center engineering.
- Select and acquire critical infrastructure equipment.
- Lead the commissioning effort.
- Integrate the NOC into a 24x7 DC support organization.
- Develop and implement preventative maintenance program.
- Develop and ensure adherence to all operating procedures.
- Monitor operation of all electrical and mechanical systems.
- Provide pre-sales engineering support.
Foreseer Monitors Critical Infrastructure
DigiEye Video Surveillance System