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Move Planning and Transition Coordination

Most important for PVHMC, however, was that no issues impacted network operations, and all critical services remained online throughout the project. A partition was erected to protect the computers from dust, and the new area was constructed. Then it was time for the most critical step in the construction phase: bringing down the network and moving the hardware to the new NOC room.

RSFT’s solution architect Kuehn worked closely with the IS core team to assist in planning a phased approach that ensured minimal downtime and disruption to the hospital’s doctors, administrators, and, ultimately, PATIENTS! Kuehn’s long list of similar operating center moves, as well as his expertise, were major contributors to the success of the project and the ultimate success of the Information Services Department.

Kuehn also attributed much of the success to his “partner” at PVHMC, network manager Enrique Iglesias. “Enrique took complete ownership of this move,” said Kuehn. “He must have put in 24 straight hours. He is an exemplary employee.” Other PVHMC associates who contributed to the success of the project included

Crystal Lester, senior interface analyst, Dana Vonallmen, interface analyst, and Paul Marcoux, IS operator. Other vendors that contributed that night were Digital Equipment Corp. (now Compaq Computer Corporation) and Hardcopy Communications.

The move was scheduled on a Saturday night, starting at 10:00 PM and had to be up and running by 6:00 AM the following Monday. The end result? Success in less than half the time allocated, and the IS Department was praised for the results by the entire PVHMC staff from the top down!

As Joe Diaz explains, “This was critical for us. The network is the lifeblood of our operation. We had patients in the hospital, and we could not compromise care at all. But whenever the network goes down, we basically have to go back to all our old paper and phone-based processes and procedures for tracking patient treatments and ordering tests. We even use runners to hand-carry paperwork when necessary. It was absolutely essential that the downtime not drag on. In this case, we expected to be down at least 24 hours and could only hope that we would not run into problems that would extend the time. Instead, thanks to very meticulous planning by our network manager and Kevin Kuehn, we were back up in only 12 hours. Everything had its place and fit perfectly. It was the most important step of the whole project and a real highlight.”

The Formula for Success

Move-in took place on time in November of 1998. “It is a very impressive, efficient space,” said Diaz, “with real Twenty-first Century design. The windows

that look through into the network room and all the fixtures throughout the space give it a very clean, organized, high-tech appearance.”

Most importantly, however, was the realization of PVHMC’s vision for a secure, high-capacity IS Center. Added Diaz, “RSFT’s design expertise really helped us create a secure, autonomous, and usable space protected from events taking place at other locations in the hospital, and with redundancy in power, air-conditioning, and fire safety. They were able to build the site without bringing down our existing network, which was absolutely essential.”

For Rancho Santa Fe Technology, the overall success of the PVHMC Data Center can be attributed to:

- The PVHMC team, which was the best of the best!
- In-depth expertise in all areas of Data Center construction.
- An interactive approach that proactively involved all relevant hospital teams to determine needs.
- Planning ahead to accommodate future growth.
- A commitment to hands-on project management and meeting milestones.
- Keeping options open at each phase of the project to avoid locking PVHMC into a generic solution that did not meet specific needs.
- Working with subcontractors who had the appropriate experience and expertise for each construction step.

Case Study Insights

Ensuring the Success of a Data Center Expansion Step by Step

Pomona Valley Hospital Medical Center



For Pomona Valley Hospital Medical Center (PVHMC), located in Pomona, California, expanding and remodeling its Data Center was a serious operation that required the same care and planning as surgery. At stake was the nerve center of the entire facility, including vital communication and data storage for the laboratory, radiology, pharmacy, respiratory therapy, patient admitting, medical records, accounting and payroll.

“Everyone at the hospital relies on our computer services for truly mission-critical tasks,” said Joe Diaz, manager of operations at PVHMC. “Requests from doctors for stat lab or radiology tests are transmitted via the network. Information about patients, pharmacy orders, and supply orders are all there. We had to approach our expansion very carefully because the hospital could not afford significant downtime for these systems.”

A Data Center Solution

PVHMC, a thriving 449-bed medical facility with over 350 active physicians on staff, has twice been included in the 100 Top Hospitals: Benchmarks for Success study produced by HCIA Inc., a company that specializes in healthcare information. The study recognizes hospitals with superior management teams that deliver the most cost-efficient and highest quality medical care. In 1998, the hospital treated over 22,000 inpatients, including acute care and newborns, and had nearly 150,000 outpatient registrations. With so many critical activities dependent on the computing systems, PVHMC recognized that it needed to more than double the 390 sq. ft. Data Center located in the basement of the hospital.



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Ensuring the Success of a Data Center Expansion Step by Step

Fortunately for PVHMC, in early 1998, a subcontractor that the hospital often worked with had just witnessed a very similar, although significantly larger, very successful Data Center expansion that had been completed at the University Medical Center in Tucson, Arizona.

The company responsible for that Data Center was San Diego-based Rancho Santa Fe Technology, Inc. (RSFT). Founded in 1991, RSFT focuses on ensuring that mission-critical information systems stay up and running, no matter what. Its clients include large and geographically diverse organizations in a variety of industries including manufacturing, healthcare, high-technology, telecommunications, finance and government.

Based on the subcontractor's rave review of the Tucson project, PVHMC interviewed and engaged RSFT. The solution to this complex project was to take a modular, step-by-step approach that clearly defined the project's requirements and broke the project into three independent phases that gave PVHMC the confidence to utilize RSFT's expertise and ensure the project's success.

According to Cory Crommett, co-founder of RSFT and the head of the Facility Design and Construction business unit, "We use a modular approach in our proposals in order to provide our clients with maximum flexibility, a low start-up cost, and a higher confidence level to proceed at each stage. Modularity also builds into the process significantly greater communication and feedback at each stage to ensure the project is done right."



Phase 1 Discovery – The Critical "First Step" on the Path to Success

The Discovery phase is a very low-cost way to ensure the success of a very expensive project. Because of the low cost, PVHMC was able to engage Rancho Santa Fe Technology without significant financial risk but with the confidence that it would obtain extremely valuable information for the project, whether or not it decided to proceed to Phase 2 with RSFT.

To start, RSFT's in-house architect, Mike Gilkerson, AIA, and his support staff of capacity planners and engineers conducted a series of interviews with operations manager Joe Diaz as well as Steve Moore, the MIS director, Enrique Iglesias, the network manager, and Chip Riddle, the facilities management director. The objective was to ascertain, for both immediate and future needs, the key systems involved, how information was utilized and stored, how human resources were distributed, and how the expansion would be connected to the hospital's infrastructure and utilities. Gilkerson also utilized onsite engineering investigation and subcontractor reviews of existing infrastructures.

Deliverables for this phase included bubble diagrams to depict the two-dimensional relationships of these functions, preliminary floor plans and sketches to help envision the new facility and its growth capacity to accommodate future technology changes, an engineering overview to highlight the true mission-critical and redundant infrastructure of the plan, and a final conceptual layout with three-dimensional views.

"Our goal at this stage," said Gilkerson, "was to listen carefully to understand the exact needs of the client, review existing conditions, and determine what would need to be done to achieve the client's goals. The client also listened carefully to our recommendations, which were the result of our detailed analysis combined with many years of experience doing this kind of project."

Based on this interactive process, Gilkerson determined the requirements for the new Data Center, including computer hardware growth projections, space allocations, power requirements (which were currently non-redundant), data flow, security, environment, and user needs. Also noted were the interdependencies and criticality of the

The Help Desk area also services as a Network Operations Area.



Management of hardware systems was established through cabinet environment and ensured system security.

systems and functions to ensure that all single points of failure were identified and eliminated.

The resulting Discovery Document made the following specific recommendations geared toward ensuring maximum safety, up-time, and productivity:

- Expanding and reconfiguring adjacent spaces to maximize utility and productivity, including separate rooms for printing, storage and filing, data entry, IS call center, and the manager's office, which was centrally located to increase efficiency and accessibility.
- Replacing the existing porous ceiling tiles with a non-porous ceiling tile that would control temperature and humidity more efficiently as well as release no particles into the environment.
- Mounting two new, completely independent air-conditioning units in the ceiling — with condensers located outside the building — achieving security, redundancy, and an autonomous environment for the computer equipment while increasing usable square footage within the Data Center. The choice and location of the equipment was specifically designed for maximum performance based on the type of rack-mounted computer equipment being installed.
- Integrating the Data Center's critical infrastructure into a standby generator system that was capable of supporting the entire Data Center indefinitely, including the Uninterruptible Power Supply (UPS), HVAC units, and general lighting.

- Installing a double interlocking, pre-action sprinkler system that eliminates the risk of water residing above the computer hardware while still protecting the assets from catastrophic loss. With this system, the IS staff can sleep easily at night knowing that if someone accidentally knocks a sprinkler head off, the computer room won't be destroyed by water.

The excellent communication fostered by RSFT's interactive approach, along with the specific recommendations that showed a clear understanding of the hospital's needs, gave the PVHMC core team a high level of confidence and excitement that this was the right project and that RSFT was that right team to move forward on the implementation!

Phase 2 – Architectural Engineering – The Construction Documents

Rancho Santa Fe Technology's architect Gilkerson then took charge as the program manager and point person for a team of specialized mission-critical engineers and capacity planners that created the construction documents. These carefully designed, custom implementation blueprints showed all the structural elements: computer equipment, mechanical and electrical systems, raised flooring, ceiling clearances, and safety systems that not only were unique to a mission critical Data Center but also had to comply with stringent Office of Statewide Health Planning and Development (OSHPD) mandatory requirements for any facility providing life care.

Once again, to ensure that the core team was working in a focused and cohesive direction, and that all needs were being met while costs were controlled, Gilkerson initiated design reviews at the 25%, 60%, and 90% milestones. Ongoing interviews with the facilities management director, OSHPD, MIS staff, and RSFT team of specialty subcontractors were conducted every step of the way in order to expose all hidden conditions and eliminate any additional single points of failure.

When RSFT had incorporated all the data, reviewed and confirmed the plan, and made the necessary final changes, the plan was sent to OSHPD in Sacramento for final review and construction approval. A final construction budget was established with the confidence that the RSFT team had minimized any potential project design changes and cost impacts, which are a customer's worst nightmare.

At this stage, RSFT's solution architect and capacity planner, Kevin Kuehn, also worked very closely with network manager Iglesias to detail the requirements for the Network Operations Center (NOC) room, including:

- All the network requirements, including the number and types of data and voice lines and all necessary hardware.
- Location of every rack, shelf, desk, CPU, monitor, keyboard, and mouse.
- Height, width, depth, and clearance for every physical unit in the NOC.
- Even the smallest details were considered, right down to whether keyboard shelves should be fixed or pullout and where to locate small holders for nuts and bolts.

Phase 3 – Construction – A Job Well Built

Once again, PVHMC reviewed the Architectural Engineering documentation and asked Rancho Santa Fe Technology to proceed with the next phase, construction, which began in Q2, 1998.

RSFT assigned a full-time on-site superintendent, Bill Barker, to manage all of the construction trades and coordinate their activities. He also worked synergistically with architect Gilkerson, facilities director Riddle, MIS director Moore, and OSHPD, all of whom had specific requirements and ultimate approval authority. With ten different subcontractors and five levels of approval authority, overall coordination was challenging, especially considering the need to work within the small basement space and maintain the existing Data Center operation that supported the hospital's critical information systems and IT staff.

"This is a hospital with real lives at stake," stated Barker, who has more than 30 years of experience. "If I don't do my job properly and take a strong leadership role with my subcontractors, the results could be catastrophic for people as well as for the hospital's assets. This is not a game."

The visual connection from the Network Operations Center into the Data Center was a key factor to PVH.

Barker and Gilkerson kept the PVHMC core team informed about the progress of the work, discussed any necessary changes due to changing conditions, conducted regular meetings, and upon the completion of the project, thoroughly trained the appropriate

facilities staff on operation, maintenance, and service of the facility.

To meet the design specifications with the highest quality workmanship, all millwork — furniture, cabinets, storage areas — was custom designed and built. The result was a dramatically appealing modern space with maximum flexibility that really impressed hospital management as well as visitors.

As with any job of this magnitude, however, there were challenges to overcome. For instance, both PVHMC and RSFT had hoped that the data entry operators could continue to work in one part of the original space while construction proceeded. Unfortunately, because of the age of the building, the restricted basement location, and single-door access for both the operators and the contractors, the noise and activity made it impossible for the operators to continue their work, and their workstations had to be temporarily relocated.

"We knew that noise and dust were going to be a big issue," said RSFT co-founder Crommett, "because their staff and computer operations had to reside in our construction area with all this building going on. My hat is off to their staff. They put up with us almost to the end, but then, even utilizing plastic barriers and off-work hours, couldn't make it work anymore. They just had to be relocated in order to keep working. Steve Moore, the PVHMC MIS director, met with the director of facilities and they found a temporary, but still very challenging, work area for the staff, so we could finish our work and they could still do theirs. I owe the IS Staff a great deal for putting up with us through this tedious process." Joked Crommett, "I hope it was like building a pool for them. Boy, they hated me until they took their first swim."

