Disaster Recovery: A Multi-Institutional Collaboration at the University of California System

Bob Albrecht, ECAR
Judith A. Pirani, ECAR

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Preface

The EDUCAUSE Center for Applied Research (ECAR) produces research to promote effective decisions regarding the selection, development, deployment, management, socialization, and use of information technologies in higher education. ECAR research includes

- research bulletins—short summary analyses of key information technology (IT) issues;
- research studies—in-depth applied research on complex and consequential technologies and practices;
- case studies—institution-specific reports designed to exemplify important themes, trends, and experiences in the management of IT investments and activities; and

- roadmaps—designed to help senior executives quickly grasp the core of important technology issues.

From its recent research, ECAR published a study, IT Collaboration: Multi-Institutional Partnerships to Develop, Manage, and Operate IT Resources, about IT collaboration in higher education. The study results indicate that the higher education IT community is open to collaboration when the benefits outweigh the incremental costs to form and manage a collaborative effort.

Literature Review

The literature review focused on several different aspects of collaboration. We examined prior research on the factors that differentiate successful collaborations, specialized collaborations in nonprofit organizations or government agencies, practitioners’ guides for structuring effective collaborations, and specialized collaborations to develop software.

Online Survey

We designed and administered three quantitative Web-based surveys. The first was a brief screening survey that was distributed to the senior IT leaders at all 1,473 EDUCAUSE member institutions. We received 586 responses to the screening survey. We next distributed two follow-up surveys. The first was tailored to those institutions that identified themselves as collaborators in the screening survey. This Web-based collaborators survey was distributed to 398 institutions. A second follow-up survey was designed and distributed to those institutions that identified themselves as non-collaborators in their screening survey responses. The Web-based non-collaborators survey was distributed to 183 institutions. We received 157 responses to the collaborators follow-up survey and 113 responses to the non-collaborators follow-up survey.
Interviews
We conducted follow-up telephone interviews with 30 individuals. Interviewees included representatives from both collaborating and non-collaborating institutions. These interviews helped us to interpret and explain the quantitative findings and explored how institutional mission and climate influence the IT organization’s approach to collaboration, and other topics. Finally, ECAR hosted a roundtable discussion with six IT leaders with significant experience at forming and operating collaborations.

Case Studies
Researchers conducted this in-depth case study to complement the core study. We assume readers of this case study will also read the primary study, which provides a general context for the individual case study findings. We undertook this case study on the joint disaster recovery (DR) strategy of the University of California Office of the President (UCOP) and the University of California, San Diego (UCSD), to understand the consequential benefits of the multi-institutional development of a ubiquitously needed IT service. ECAR owes a debt of gratitude to Fernan Gabato, IT Resource Manager III, Information Resources and Communications (IR&C), UCOP; Jon Good, Director of Information Security, IR&C, UCOP; Kristine Hafner, Associate Vice President and Chief Information Officer, UCOP; Elazar Harel, Assistant Vice Chancellor and Chief Information Officer, UCSD; Charlotte Klock, Executive Director, IT Infrastructure, Administrative Computing and Telecommunications, UCSD; Steven Relyea, Vice Chancellor, Business Affairs, UCSD; and Paul Weiss, Executive Director, Applications and Technology Support Services, IR&C, UCOP.

Introduction
IT organizations continue to face pressures to expand their services, maintain a reliable infrastructure, and control their costs. Yet ways must be found to add essential functions as required. For example, many IT leaders have designated DR as a high priority, but as Yanosky observes in the ECAR research study Shelter from the Storm: IT and Business Continuity in Higher Education, “Our respondents clearly see [business continuity, of which DR is a component] as an important activity worth the expenditure of considerable resources.... Nevertheless, work needs to be done on BC readiness.... To narrow the gap between BC readiness and current capabilities, institutions will have to seek innovative ways to transform IT support for BC from an overlay to an integral part of operations. That will mean more collaboration, better leveraging of emerging virtualization and service-oriented technologies to create resilient IT environments, and a planning and budgeting approach that builds BC into every endeavor the institution undertakes.”

This case study illustrates the consequential benefits that arise when two discrete IT organizations collaborate effectively on an integrated DR solution, a type of collaboration described in Goldstein’s parent study as a partnership to provide a shared IT resource. By leveraging emerging technology, procurement opportunities, and internal resources, UCSD and the Oakland-based UCOP were able to develop a complex DR solution involving the joint hosting and comprehensive mirroring of each location’s mainframe and non-mainframe computing environments. The frequency of collaboration among public institutions, as noted by Goldstein, comes in part from their common grouping in state systems. These organizations offer opportunities for voluntary collaboration among members, as exemplified here, when self-interest rather than mandate motivates the parties.

The UCOP–UCSD project takes interinstitutional collaboration to a new level because “it requires full and permanent commitment of support in case of a disaster,” explains Elazar Harel, assistant vice chancellor and CIO,
UCSD. “Each entity has hardware stored and maintained at the partner’s site. Everything is already tied together: the financial systems, the payroll systems, etcetera. This makes a big difference in our DR strategy. Our past DR scenario assumed an extended downtime of our computer systems, forcing us to rely on manual or alternative processes in the interim. With this solution, we can bring up the system within a day, and the data is no more than four hours old. The business offices can assume the systems will be operational and they can continue to work.”

Working together enabled the two campuses to implement this solution with minimal staff additions and equipment expense while enhancing DR readiness. In UCOP’s case, the collaboration enabled it to eliminate the cost of contracting for external hot-site services. “We have done this without extraordinary extra expense to either one of us because of joint equipment purchasing and the ability to use our system-wide network capability,” states Charlotte Klock, executive director, IT infrastructure, administrative computing and telecommunications, UCSD, “but it’s the collaboration between our teams that makes it all work.”

UCOP

The University of California (UC) system includes more than 209,000 students and more than 170,000 faculty and staff. It comprises 10 California-based campuses at Berkeley, Davis, Irvine, Los Angeles, Merced, Riverside, San Diego, San Francisco, Santa Cruz, and Santa Barbara, and five medical centers at Davis, Irvine, Los Angeles, San Diego, and San Francisco. The University of California also manages the Lawrence Berkeley National Laboratory under contract to the Department of Energy. The Office of the President, UC’s system-wide headquarters, is in Oakland, California. Its divisions oversee UC’s academic mission, budget, external relations, community affairs, legal matters, and business and financial activities.

UCOP’s Information Resources and Communications (IR&C) provides a range of IT services to the University of California campuses and Office of the President. Led by Associate Vice President and CIO Kristine Hafner, IR&C’s responsibilities cover such broad areas as data center operations, application development, maintenance and hosting on behalf of the campuses, corporate data warehouses, telecommunications, records management, and end-user computing support. IR&C also provides system-wide services including IT contracts and licenses, IT policy development, and coordination of strategic IT initiatives. Executive Director Paul Weiss manages IR&C’s Applications and Technology Support Services division, which provides all technical, operational, and development services to UCOP and campus customers.

The individual UC campus IT organizations convene at the system-wide level through the University of California Information Technology Leadership Council. It comprises CIOs and other senior IT leaders from the UC campuses, UCOP, Lawrence Berkeley National Laboratory, and UC medical centers. The leadership council works with UC leadership to develop strategies and technology-based solutions in support of UC’s missions. Several system-wide working groups and standing committees, including the Joint Data Center Management Group (JDCMG), exchange ideas in specific areas and provide additional resources in support of leadership council activities. UCOP’s Weiss and UCSD’s Klock cochaired the JDCMG previously.

IT collaboration at the UC system level can be a delicate dance, as the UC campuses constantly balance the system’s needs with the priorities of their own campuses. Kristine Hafner describes the situation: “When things work well at a system-wide level in UC, there is gravity at the center due to a compelling reason to join forces and strong leadership. Without a sense of the collective interest, decision makers will spin into their own orbits,
and the farther they go the harder it is to bring them back.” To promote this strong center, Provost and Executive Vice President Wyatt R. "Rory" Hume uses the umbrella term “the power and promise of ten” in academic planning to communicate the notion that, system-wide, the value is greater with the sum of the parts.

Individual campus IT organizations do try to collaborate whenever possible. UCOP and campus IT organizations join forces on system-wide IT contracts with vendors, resulting in significant savings and efficiencies. The Corporation for Education Network Initiatives in California (CENIC), the regional network that UC founded and that now provides networking services to California’s K–20 education and research communities, demonstrates the value of a single service provider. Application collaborations are fairly common, too. For example, UCOP, in partnership with five UC campuses (UCLA, UC Berkeley, UCSF, UCSD, and UC Davis), has developed a new Web-based effort reporting system to certify effort devoted to sponsored projects.

**UCSD**

The University of California, San Diego, is one of the 10 campuses in the University of California system. Total campus enrollment was 26,876 students in fall 2006. UCSD’s graduate and professional schools include Scripps Institution of Oceanography, School of Medicine, School of International Relations and Pacific Studies, School of Pharmacy and Pharmaceutical Sciences, Jacobs School of Engineering, and Rady School of Management. The campus also is home to the San Diego Supercomputer Center, the California Institute for Information Technology and Telecommunications, the Center for Research in Computing and the Arts, the Institute on Global Conflict and Cooperation, and the Institute of the Americas. UCSD’s annual research funding was $627 million in 2004. The National Science Foundation ranks UCSD fifth in the nation in federal R&D expenditures.

Harel heads up UCSD’s Administrative Computing and Telecommunications area, which includes campus, business, and student portals; MyServices, a series of Web-based tools allowing users to securely access personal information and conduct university-related business online; the Link Family, an integrated Web-based environment that provides UCSD students, faculty, and staff with access to administrative information; the financial, student, and payroll/personnel administrative systems; the campus telephone system; and the campus backbone network, Charlotte Klock reports directly to Harel and manages the Data Center Operations, DBA, Data Warehouse, Technical Support, Active Directory & Messaging, Network Architecture, Security, Production Control, and Telecommunications Operations teams.

UCSD’s environment fosters IT collaboration, too. “Whenever we see an institution doing something interesting in a new area, our reaction is why should we reinvent that application, let’s partner with them,” states Steven Relyea, vice chancellor, UCSD.

### The Collaborative Process

Behind this DR implementation are several collaborative practices that bolstered its probability for success. Goldstein summarized their characteristics in his ECAR study *IT Collaboration: Multi-Institutional Partnerships to Develop, Manage, and Operate IT Resources.* Drawing on a study conducted by the Amherst H. Wilder foundation identifying the 20 factors that most frequently influence the success of collaborations, Goldstein notes that the factors boil down to

- an environment that is conducive to supporting the collaboration;
- choosing the right members and establishing mutual trust and respect;
- creating flexible and adaptable management processes that all participants buy into;
sustaining open and frequent communication, both formal and informal;
creating a shared vision and common objectives among the participants;
and possessing sufficient resources and skilled leadership to accomplish the task.

The reader will note these factors surfacing throughout this study of the UCOP–UCSD collaboration.

Different Paths Intersect for Collaboration

Both UCOP and UCSD have worked individually on DR activities for years, but only in 2006 did their activities converge to create an opportunity for the two organizations to collaborate on a joint solution.

Post-Katrina Support for Collaborative DR Solutions at the UC System

Hurricane Katrina brought DR to the forefront of the University of California Information Technology Leadership Council. It hosted a business continuity planning session in January 2006 to raise awareness, share information, and recommend action items for improving the system’s DR preparedness. “It was a watershed because it brought the leadership across divisions together and there was interesting dialogue,” recalls Hafner. “It was an ‘a-ha’ where we realized the campuses had variations of business recovery plans, but there were no concerted efforts across the system.” Of particular note was the session presentation by John Lawson, CIO of Tulane University, who discussed his experiences in the aftermath of Hurricane Katrina. At the planning session’s conclusion, the council members endorsed strongly “the development of intercampus agreements for backup and disaster recovery planning for mission-critical application systems.” This resulted in a supportive leadership stance that eventually “helped everyone fall into place [on the UCOP–UCSD project],” states Fernan Gabato, IT resource manager III, IR&C, UCOP. “The positive leadership attitude permeated throughout the entire project.”

UCOP Opt for Internal DR Solution

At UCOP, a post-Hurricane Katrina review of its DR status in 2006 found gaps. For example, despite having a vendor contract for an external hot site, UCOP found that after Katrina it was difficult to schedule its tests at the facility due to the demand for ongoing recovery services from Gulf Coast organizations. “The funny thing is the service contract is an insurance premium [that] gets you a place in line at the hot site,” recalls UCOP’s Weiss. “With Katrina’s fallout, people were queuing left and right for data center recovery services. It seemed that UCOP might not receive a guaranteed slot at the hot site in the event of a disaster, and even if we did receive a slot, we might not have access to all the required equipment.”

Other concerns surfaced about the external solution, too. “The vendor was fine,” continues Weiss. “But our contract was woefully deficient in what we had to achieve. For what we were paying, we could not deliver or execute services.” The arrangement guaranteed a 1Mbps network, not enough to enable UCOP to bring up all its mission-critical services. The IT organization could determine if their system came up, but the users would not be able to use the system. In addition, once UCOP brought up their systems at the hot site, they would incur a daily fee to operate their systems remotely at the hot site. If the disaster required several months of remote operation, it would devastate the IT budget. UCOP staff determined it could take 3 to 10 days to bring up their remote services and they could lose as much as seven days of data, which is unacceptable for some UC administrative systems. And with equipment outside the mainframe environment reaching commodity prices, the added value of contracting a hot site with a vendor was questionable.
With their contract due for renewal in November 2006, Weiss determined the economics were more compelling to implement an internal solution. “The real numbers that we calculated were staggering,” recalls Weiss. “With that vendor solution, we calculated we needed to spend twice as much to create our ideal configuration.” He analyzed the UC system’s IT environment holistically for possible internal DR alternatives—and liked what he saw. For example, CENIC provides enormous bandwidth that is not in competition with the public Internet. UC campuses offer computing facilities at various locations across the state. “It did not make sense to spend significant funds outside if we can do it cost-effectively inside,” continues Weiss. “We determined that we could provide DR services ourselves more cheaply—provided we could find the right partner.”

The evaluation process for potential partners focused mainly on UCOP’s knowledge of the other UC campuses, particularly because the subject had long been discussed among the UC institutions at meetings of the University of California Information Technology Leadership Council and the JDCMG. “I can’t say we began with a formal study,” states Weiss. “First we took a [mental] trip around the campuses to determine where-withal, willingness, resources, and potential synergy.” Geography was a top priority, too. Oakland-based UCOP searched for a Southern California partner that is located in a different earthquake zone. UCSD presented itself as a prime candidate because of its location and similar mainframe environment.

**UCSD’s Storage Area Network Upgrade Provides a Collaborative Opportunity**

At UCSD’s Administrative Computing and Telecommunications area, components of a DR plan existed, consisting of an offsite DR resource for payroll and tape and data backup. But it struggled for years with designing a more thorough DR process. Harel and Klock went through several iterations, “but it always came to a matter of cost and not having the available funds to make it work with an outside vendor for a hot site,” states Klock. “So we created a DR plan, but no place to execute the hardware pieces.” Hurricane Katrina raised DR’s priority, too. “The management of our campus and our auditors continued to bring it to our attention,” recalls Relyea. “We wondered how we would fare if something like that happened to us.”

As she began planning the replacement of her storage environment at the UCSD data center, Klock identified a potential opportunity to collaborate with another institution on a DR solution. “I realized if we negotiated with the vendor correctly, we could implement the right technology at both places to replicate our data as a first stage of DR without spending beyond the cost to replace the storage. I know companies with many data center sites use a similar DR implementation strategy, so it makes sense for a UC-like system with the appropriate infrastructure to go the same route. That was my first foray into thinking we could collaborate on DR with anybody.”

**Interests Intersect at the Joint Data Center Management Group**

DR emerged as a priority for the University of California Information Technology Leadership Council’s JDCMG, too. “We had this on our discussion plate for a long time as to how UC campuses could potentially back each other up in a disaster situation,” states Klock. “We went through multiple iterations with all of the group members, but the question remained as to whether or not people wanted to buy into the plan. Some campuses had already made investments in other vendor products and/or solutions that they did not want to abandon.”

Eventually, Weiss and Klock’s joint chairmanship of the JDCMG created the foundation for the UCOP–UCSD collaboration. Through their work together, the two realized that their
individual activities—UCOP’s decision to transition to an internal DR solution, and UCSD’s storage upgrade and desire to enhance their DR strategy—created a collaborative opportunity. “That is how we got connected,” states Weiss. “It was a natural fit for us. We realized that if our storage area networks [SANs] could do the DR heavy lifting, they could talk to each other over CENIC, providing near real-time data replication. The light bulb that lit up when we determined we could implement a DR solution ourselves burned brighter when we saw this opportunity with UCSD.”

Both Klock and Weiss concede that their working relationship encouraged them to pursue the collaboration. (Such personal relationships—brought together by a common vision—commonly occur in these collaborations, according to Goldstein’s study.) “Paul and I seem to have the same philosophy,” states Klock. “We needed to push it, make it happen, and drive it. Otherwise, trying to get consensus across 10 campuses did not seem to be able to move the DR initiative along at a pace that we needed to make happen.” The two decided to create a DR pilot between the two institutions, with the long-term goal of expanding the service out to other UC campuses. At UCOP, Weiss serves as project director. For the project’s first six months, Jon Good, director of information security, IR&C, served as UCOP’s day-to-day manager. Currently Gabato is the day-to-day manager as part of his position. Klock manages the UCSD activities and now has a part-time DR coordinator on board to help facilitate the project. IT staff members at both institutions incorporated the DR project into their daily activities.

Collaborating on a DR Solution

“The joint DR collaboration was a good combination of people, available technology, and a need to complete an act during the same time frame,” states Harel. “The IT organizations quickly realized that it is doable, the technology was there, and the required investment was minimal. It was mostly a process issue and getting all the right people together.”

Weiss concurs with Harel’s assessment: “It was an interesting challenge from the management perspective because we had not tried something like this before. You need true traditional project management because there are a lot of hairy details that need to be worked through with different departments at two UC locations.” The team implemented such traditional project management tools as Gantt charts. An added dynamic at the project’s commencement was that UCSD’s network area reported to an organization outside Klock’s department, unlike at UCOP, where all IT project areas reported to Weiss. (As of July 2007, however, networking now reports up through Klock.)

Weiss and Klock built upon their working relationship forged at the JDCMG to create a common project culture for the UCOP–UCSD IT organizations. This was an issue, as each IT organization had a different culture and IT orientation. The main difference is the lack of students at the UCOP site. “For example, the operational applications at both locations have different criticality time periods,” states Klock. “When something breaks down in the middle of our student registration period, it is not the same as a benefits system failure that prevents a UC employee from changing their address online.”

At the foundation of the project’s culture is what Weiss describes as the two managers’ “principles conversation” to establish mutual trust on the project and to agree on how to work out problems as they arise. More importantly, they outlined the principle of the project’s equipment ownership. If, for example, UCSD purchased UCOP’s equipment for UCOP to use at the UCSD data center, it would be assigned a UCSD asset tag and the two organizations would reconcile the financial implications after the fact. This holds true as well for any equipment that UCOP purchases for UCSD.
Technical Synopsis of UCOP–UCSD DR Solution

The UCOP–UCSD DR solution covers both institutions’ mainframe and non-mainframe environments. The goal is to mirror each institution’s computer environment to create a DR solution that is as hands-off as possible. Each location’s mainframe is configured to replicate data via its storage area networks (SANs), whereas its Linux, UNIX, and Windows servers are hosted jointly at each location. Each partner specified its equipment for delivery at the other’s site, where it is entered on the latter’s property list and maintained by the local IT staff. For example, UCOP delineated its required DR equipment, which USCD ordered, inventoried, and installed at its data center and now maintains. The two institutions took advantage of several factors that came together in a similar time frame that facilitated a cost-effective implementation.

First, UCOP and UCSD exploited their similar mainframe environments, as both use the same vendor’s computers. “One reason this became practical from the cost perspective is related to how industry has changed its cost structure for software and hardware,” explains UCSD’s Harel. “In the past, if a user needed more CPUs on their mainframe, he/she had to buy them and pay for them up front. The new charging model is very different. The vendor delivers the mainframe with X number of processors, and you pay only for the ones that you use. If the box has eight processors and you only need three, you buy three and use them. In case of emergency, you need another three and you just turn them on. So in case of an emergency at UCOP, we can continue to work full capacity at UCSD and add UCOP’s capacity to our mainframe by switching on more processors.”

Second, UCOP and UCSD synchronized their individual disk replacement projects to purchase the same equipment. UCSD wrote their request for proposals (RFPs) so that any UC system site could participate. “The real cost was the duplication of disk space, but again, the project’s timing worked in the institutions’ favor,” continues Harel. “Both planned to upgrade their storage systems and agreed from the beginning to purchase their equipment together from the same vendor under a single RFP. By leveraging a multisite agreement, we were able to get the extra disks at almost no additional cost.” Weiss notes that the winning vendor realized their bid should reflect the potential sales opportunity for the entire UC system, not just UCSD storage replacement. Klock assisted the project’s design by writing the RFP in a way to require the vendors to describe how they would implement the UCOP–UCSD proposed solution and to highlight the pros and cons of previous customers’ DR implementations.

Both locations connect their mainframes and servers via CENIC, the UC system’s 10-gigabit backbone network, which provides a high-speed data replication solution without any additional expense. “Normally, the cost of the network piece would have far exceeded our means,” concedes Klock. But with CENIC, data backup bottlenecks are avoided. In fact, UCOP and UCSD have achieved near real-time data replication of storage in the mainframe environment.

The non-mainframe DR solution differs in two respects. Rather than have the non-mainframe devices replicate with the SANs, UCOP opted to use onboard disk server storage for some of their Windows, Linux, and UNIX servers. “UCSD is doing theirs lock, stock, and barrel, creating a unified perspective,” states Weiss. “Over time, we hope to retrofit our
solution.“ For their non-mainframe devices, the institutions chose daily data replication due to the costs of real-time data replication.

Both parties test their DR solution frequently to ensure the procedures are operational for bringing up equipment and systems. Gabato estimates they held eight tests during the November 2006–June 2007 time frame alone. With testing comes a growing list of concerns that encompass infrastructure, applications, and users. For example, how will UCSD print paychecks for the entire UC system to back up UCOP payroll operations? How will the DR readiness of the UC system’s human benefits IT organization impact UCOP’s DR activities? Change management is also an issue, to account for evolving changes in each institution’s environment—for example, the coordination of patches, upgrades, and maintenance at two IT organizations, especially on the mainframes. But balancing readiness versus overkill can be a problem. “There are a lot of issues as to how deep to go with testing,” states Weiss. “You could run all the way to running in production mode at this location and failback. You can optimize, but you don’t want to lose perspective of the prime objective.” The project has a game plan to broaden the testing exercises’ scope bit by bit.

In the project’s first phase, the impacted location’s IT staff is required to travel to the DR site to resume operations, which may not be plausible in a disaster situation. The second phase strives to achieve, as Weiss describes, “the sweet spot”: the independent execution of the DR plan at the partner site. This involves cross-training and process documentation to enable the staff members at one location to execute the DR plan with minimal or no assistance from its partner location. The second goal is especially important to UCOP because it manages the payroll for about 80 percent of the UC system locations. The goal is to have the staff at both locations cross-trained on both systems by the end of 2007.

When the two parties agreed to develop a shared DR solution in June 2006, they knew time was of the essence because UCOP needed a DR solution in place by the time their vendor contract expired in November 2006. Given these circumstances, the two decided to implement UCOP’s DR solution at UCSD first. Currently, UCOP’s IT environment is completely mirrored at UCSD, but only the mainframe DR solution is complete from UCSD to UCOP. Work is scheduled to begin shortly on the rest of UCSD’s DR implementation. It should be noted that UCSD had to work this project into many others that had equal importance due to the student growth and the growing departmental dependence on technology at the campus.

Longer term, there are opportunities for technical refinements through clustering and virtualization.1 UCOP is in the process of installing tape drives, too, at UCSD to facilitate backups in the event of a long-term DR event. Since both locations use the same job scheduler software, UCOP and UCSD are investigating ways to ensure that critical applications are run and replicated in an automated process.

Endnote

From their aligned principles, they created a united front between the UCOP and UCSD IT teams. Staff members from the two organizations may know each other professionally, but most had never worked together before.

First, Klock and Weiss presented a common message to the project members. “We put in front of them the reasons we needed to have this DR strategy in place,” states Klock. “Both Paul and I drove home the point that this is a commitment, we are moving forward, there needs to be teamwork involved, people would be doing things that they normally had not done in the past, and we needed to work through whatever issues came up.” Weiss recalls, too, that “we tried to focus on our similarities, not our differences, because we have more in common than differences. We stressed the message that this is not a UCSD-versus-UCOP situation; we are all on the same side. If Charlotte and I ever sensed in any action or behavior that anyone deviated from a sense of team or ‘we,’ we dealt with it instantly.”

For example, whenever an IT staff member pushed back, Weiss or Klock addressed their issues directly. “There were points where a staff member was not quite comfortable with IT-specific actions, especially if the action originated from the partner location and impacted the staff member directly,” states Klock. “So we discussed how to mitigate risks, how we’d back out if we broke something. We stepped into very specific tasks so each group could understand and feel comfortable with the proposed actions. Once we did that a couple of times, it broke the roadblocks. Then Paul and I did not have to get involved in those discussions anymore. It happened naturally.”

Second, Klock and Weiss initiated regular, planned communications with the two IT teams. Early on, the UCOP project members visited the UCSD campus for a two-day planning session to review the process and build a project plan. In conjunction with all the project’s spontaneous e-mails and phone calls, there are formal weekly conference calls with both organizations’ IT project teams originally initiated by Good to discuss the project activities and to air issues. Gabato discusses how he uses the conference calls: “Every time we test the system, something pops out,” he explains. “The best way to address the problem is to communicate with UCSD. We use the calls to agree on principles, as, for example, on how to update our documentation. I personally have a list of problems and changes that need to be reviewed or reminded as our group accomplishes our more important priorities. It has worked out well, and unless something else changes, we will continue with the calls.” To enhance communications, the team is investigating online document sharing documentation to automatically replicate any changes at both sites.

The communications have served as a means not only to exchange ideas and opinions but also to develop a similar terminology between the two locations. Jon Good recalls terminology’s importance, especially when dealing with product specifications. “There was a lot of information sharing in this project, and it was important to develop clear understandings,” states Good. “I know you said ‘x,’ but you need to understand what ‘x’ means to me so I can understand what you are saying. On occasion, I would find out that there were differences of understanding. I found that this was especially true as my project tasks bridged the applications area and the data center infrastructure area in addition to the UCOP and UCSD locations. I know from my own experience there is always going to be a subtle breakdown in communications. So I overcame this by making sure everything was crystal clear.” The collaborators employed face-to-face meetings as well as audioconferencing to bring people from both locations together. Extensive conversations were an integral part of the process that has led to the collaboration’s success.
Third, both Weiss and Klock demonstrated their project-oriented attitude through their actions. As discussed earlier, both UCOP and UCSD planned to upgrade their mainframe SANs as part of the project. Weiss tangibly demonstrated his trust in the UCSD IT organization by deciding to select outright the same storage equipment as UCSD without internal UCOP deliberations, thus piggybacking automatically on the UCSD RFP. “By buying the same storage from the same vendor, there would be no finger-pointing,” explains Weiss. “Instead of both sides working out problems, we could get the vendor to help us make it work.”

Another example is Weiss and Klock’s previously discussed agreement to purchase and inventory each other’s project equipment. As noted earlier, the project was further complicated in two dimensions. First, Klock had to coordinate her project activities through two different branches of the UCSD IT organization that reported to different vice chancellors. “I ensured they were on board, part of the plan, and part of the discussion,” states Klock. “Part of my sell to them was they did not have to spend an exorbitant amount of time on the project: for example, they needed not to participate in all the meetings, as there were only specific areas in which they were involved.”

Second, the project’s novel equipment arrangement had to be approved by each location’s procurement department. “We had to go through an approval process to ensure that when we bought equipment on behalf of UCOP, that on paper it belonged to UCSD,” states Klock. “I was very involved in moving forward the process of responses and the negotiations with the purchasing department and the contract language.” Klock adds, “The success of this project from a UCSD perspective was dependent entirely on the technical skills my team brought to the table. Frank Whittemore, open systems technical manager, Tom Kelly, mainframe technical manager, and Steve Mariani, data center operations manager, all played a key role in making this work. We would never have pulled this off if the technical skills were not there as well as their dedication to the project.” Weiss, too, cites the technical excellence and contributions of his team for the project’s success: Michael Yuan, Ashley Gould, Lee Dela Cruz, Jason Lam, John McCahon, Gilbert Loo, Michael Shannon, and Julian Blauth of the UCOP Network and Systems Group; Steve Cavalli, Jamelton Jew, Frank Furino, and Linda Lozano of Data Center Operations.

Consequently, the two IT organizations have developed a highly cooperative project working environment. For example, when UCOP submitted its equipment specifications to UCSD for ordering for the San Diego site, the UCSD IT organization proactively reviewed them in detail. Their subsequent questions enabled UCOP to catch a few mistakes. “It was a benefit of another set of eyes,” states Good. Both teams worked diligently together, finishing the UCOP DR implementation in November 2006, in time for UCOP to cancel its vendor contract for external hot-site services. “I thought this project took three times as long as it should,” states Weiss. “Others told me that it went 10 times faster than anyone thought.”

With the success of the UCOP-UCSD project, Weiss notes that “the trust factor keeps multiplying.” Indeed, more campuses are approaching UCOP to provide similar DR capabilities, especially as the University of California Information Technology Leadership Council members become apprised of the project. The one caveat is to keep UCSD in the loop. “Because we are the UCOP recovery site, we have to make sure that we can accommodate any further UCOP recovery agreements with other UC campuses,” states Klock. “UCOP has to failover them to us as well.”

Longer term, the DR solution marries the two IT organizations and obligates them to work together in the future. As Weiss says, “The decisions about storage worked well this
time, but it will be interesting in three or four years when it comes time for another storage refresh. Will there be a problem?“ Working in the collaboration’s favor,

- the continuance of the weekly conference calls fosters communication, planning, and culture; and
- the budgetary formalization of the DR solution at each institution ensures that its sustainability transcends Klock and Weiss’s original professional relationship.

### Lessons Learned

Collaboration requires a certain set of skills and continued diligence to work in harmony with your collaborative partners. Members of the UCOP–UCSD project offer several lessons learned; some are general truisms, others are specific to collaborative practices.

**Identifying viable partners is critical.** Collaboration may solve a problem, but finding the best partners to make the partnership work is essential. The goals of the collaboration cannot be met until the partners are able to work together to achieve them. As Good puts it, “To me, an important prerequisite for collaborating is finding the right players who are willing to participate.” Successful collaborators often remark that not only must potential partners be willing to collaborate, but the timing of factors such as cost, need, and opportunity must also be present.

**Clear communication is important.** With different institutions, IT areas, and administrative offices involved, clear communication was essential to ensure the expedient and correct implementation of project tasks. “The project was a good opportunity to get folks in the same room and ask very carefully, ‘What did you just say?’” states Good. “People learned to be more careful, not to jump to their own conclusion, and to understand that ‘x’ has a whole range of different meanings. It started a good dialogue within the UCOP IT organization. We began to think beyond the equipment to the real application on the other side of it.”

**Seek models of collaboration.** UCSD’s Klock had found models in the corporate sector that showed how the technology and the pattern of diverse locations could be used. That provided an example for higher education institutions to follow, although separate corporate divisions or branches only resemble separate campuses. The corporate model at least encourages others to join in a workable structure.

**Potential collaborators must have strong leaders for the project.** In complex collaborations, such as the subject of this case study, the leaders must be able to convince institutional executives to allocate revenue to the project while encouraging enthusiasm over the project among staff. Without support from budget administrators and willingness from those who execute the plan, such collaborations are rarely successful. People at UCOP and UCSD were able to bring on board both leaders and staff, ensuring the success of the plan and its implementation. As Weiss observes, “Technical folks like to focus on the project’s activities; usually it is the project’s leadership that leads the project astray if they can’t get aligned. But the leadership is aligned in this project, and it showed in the timeliness of our DR implementation.”

**Project management is critical.** Project management in this collaboration took on multiple dimensions, requiring solving problems of purchasing, equipment ownership, vendor relations, and training across two organizations that had not previously cooperated in such a project. In general, each of the partners had its own procedures. Without thoughtful management, the collaboration could have founded of either bureaucracy. A collaboration between or among campuses—whether of one system, different systems, or private institutions—requires extraordinary management. While “mostly a process issue,” as Harel says, knitting together the bureaucratic structures developed for “my” institution with those of “your” institu-
tion required carefully nurtured communication, understanding, and fixed attention on goals, as evidenced by this collaboration’s success.

_Sustainability requires continued planning._ The collaboration between UCSD and UCOP has established a set of DR procedures supported by a complex technology. However, the project leaders recognize the need to test the solution continually, leading both to the discovery of “glitches” and to the recognition of benefits yet to be implemented. Running tests of the system becomes part of planning the future of the collaboration.

_Partnerships are made, not born._ The complexity of the University of California system with its 10 campuses might suggest similarity to an outsider, while complementarity may be the descriptor to an insider. A collaboration highlights the differences as well as the common elements among such players. The effort to bring this collaboration together highlights the challenge of almost every collaboration: matching elements of partner institutions as necessary for a particular project. History, structures, and loyalties may become hurdles rather than values. In this case, Hafner’s self-described ‘a-ha’ about the lack of concerted DR efforts across the system as well as Klock and Weiss’s working relationship in the JDCMG helped to broker this partnership. Growing demands for intercampus and system-wide collaboration throughout UC are more easily addressed when recent examples of successful partnerships are visible. The DR collaboration is an example of such a partnership.

**Conclusion**

The joint UCOP–UCSD project has been a win-win for the two locations and for the UC system as a whole. It created a model for a cost-effective, internal DR solution that addresses UCOP’s and UCSD’s immediate needs and provides a model from which other UC campuses can benefit. As Weiss states, “The start of this project’s success occurred before we even began working together. We set up the rules and principles so both parties agreed that it was the right model. It facilitated communications between the two organizations. From my perspective, the challenge of pulling together people, seeing them work together, breaking down communication barriers was valuable not only to UCOP and UCSD, but to the university as a whole. We demonstrated that collaboration can be done to the benefit of all.”

Klock concurs: “Having worked for the UC system for almost 10 years, this is one of the multicampus projects that I can say was a true success. I foresee many other opportunities for cooperative team implementation. By doing these types of projects in the future, the UC system will gain more value for the money spent on staff and equipment, and the benefits can be much more wide reaching than just a single campus. I plan to push for more projects like this one whenever possible. It just makes sense.”

**Endnotes**


