Fresno Unified School District

Technology Review

January 19, 2007

Administrative Agent
Larry E. Reider
Kern County
Superintendent of Schools

Chief Executive Officer
Joel D. Montero
January 19, 2007

Michael E. Hanson, Superintendent
Fresno Unified School District
2309 Tulare Street
Fresno, California 93721-2287

Dear Superintendent Hanson:

In August 2006, the Fiscal Crisis and Management Assistance Team (FCMAT) entered into an agreement for a technology review with the Fresno Unified School District. The request specified that FCMAT would:

1. Assess the organization and operations of the district’s technology department and make recommendations for improvement.
2. Assess the district’s technology department staffing and structure and make recommendations for improvement.
3. Review the district’s administrative and instructional technology programs and make recommendations for improvement.
4. Review the district’s E-Rate program and make recommendations for improvement.
5. Conduct vulnerability and penetration testing from remote site to assess the district’s perimeter security and make recommendations for improvement.
6. Conduct on-site (physical) review of infrastructure and make recommendations for improvement.
7. Assess the district’s technology and security policies and make recommendations for improvement.
8. Review the district’s E-Rate documentation, applications, and procedures and make recommendations for improvement.

FCMAT visited the district to conduct fieldwork, interview staff and review reports. The attached final report contains the study team’s findings and recommendations.

We appreciate the opportunity to serve you and we extend our thanks to all the staff of the Fresno Unified School District.

Sincerely,

Joel D. Montero
Chief Executive Officer
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**Introduction**

The Technology Services department of the Fresno Unified School District supports the district’s software, hardware, and information/communications network residing on more than 100 local area networks. Approximately 6,000 teachers and administrators and nearly 80,000 students are served through the district’s online systems and technological applications. Technology Services also develops and maintains customized software programs and reports. The department oversees the district’s Internet Web server, central Web content, e-mail servers, all district-level security and password accounts, and content filtering.

In May 2006, the Fiscal Crisis and Management Assistance Team received a request from the Fresno Unified School District for a management review of its purchasing and warehouse, technology, and special education services. This report covers the technology component of the study agreement between FCMAT and the district. The scope and objectives of the technology review are to:

1. Assess the organization and operations of the district’s technology department and make recommendations for improvement.
2. Assess the district’s technology department staffing and structure and make recommendations for improvement.
3. Review the district’s administrative and instructional technology programs and make recommendations for improvement.
4. Review the district’s E-Rate program and make recommendations for improvement.
5. Conduct vulnerability and penetration testing from a remote site to assess the district’s perimeter security and make recommendations for improvement.
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7. Assess the district’s technology and security policies and make recommendations for improvement.
8. Review the district’s E-Rate documentation, applications, and procedures and make recommendations for improvement.

**Study Team**

The FCMAT study team was composed of the following members:

Andrew Prestage    Greg Lindner*
Management Analyst    Director of Technology Services
Fiscal Crisis and Management    Elk Grove Unified School District
Assistance Team    Elk Grove, California
*As members of this study team, these consultants were not representing their employers, but were working solely as independent consultants for FCMAT.

**Study Guidelines**

FCMAT consultants visited the district in October 2006 to conduct interviews, collect data and review documentation. This report is the result of those activities. The findings and recommendations of this report are presented in the following sections:

- Executive Summary
- Leadership and Communications
- Staffing and Organization
- Educational Technology
- Administrative Technology
- Network Infrastructure
Executive Summary

The Technology Services department reported to the district’s Business Division for many years, but recently began reporting directly to the Superintendent’s office. The Chief Technology Director now serves as a member of the Superintendent’s Cabinet. Many years of leadership changes in district administration and in Technology Services have diffused the focus of the department and limited its resources and ability to support the overall information and educational technology efforts of the district.

Technology Services has 60 employees plus two contract programmers. The department is organized in six general units, with additional staff reporting directly to the Chief Technology Officer. The units include:

1. User Support: includes the help desk and hardware repair. (30 FTE)
2. Network: includes the wide area network and file servers. (5 FTE)
3. Programming: covers programming and support of the financial system (AMS) and the student information system (SR) on the mainframe. (7 FTE with 2 contractors)
4. Telecommunications: handles phones, the VoIP network and associated equipment and the microwave network. This unit was just recently moved from Facilities to Technology Services. (5 FTE)
5. Systems and Operations: manages and supports the mainframe and printing. (6 FTE with 3 operators)
6. EETT Grants and Educational Technology – handles implementation of the EETT grant and training on instructional software. Certificated positions. (3 FTE total)

Operational departments such as purchasing, student systems, finance and human resources utilize technology systems that may be at risk of failure. School sites have little confidence in the district’s ability to provide timely and efficient technology services, and some operate outside district procedures to accomplish their technological goals.

The distribution of technology resources among schools appears uneven. Some sites have newer equipment and sufficient support staff, while others maintain older equipment with fewer support staff. There appears to be no baseline for distributing technology equipment and resources in the district.

Many technology projects are not properly planned with respect to time lines and available resources, and some projects are not completed. This has resulted in system failures, such as the recent GroupWise e-mail failure. The student information system experiences daily security breaches. Students may gain access to other students’ information. Some teachers allow students to enter grades on the electronic grade book, PowerGrade. Passwords are compromised. Servers are jeopardized by virus and hacker attacks. A high level of spam
messages has made it very difficult for teachers to respond to e-mails. Schools that are dependent on electronic communication cannot deliver the curriculum. Equipment is missing and often does not arrive at its intended destination. Laptops, computers and other pieces of hardware are taken off-site and never returned.

The district’s AMS system is not currently producing desired results and has high maintenance fees. Student information systems used in the district include PowerSchool at the secondary schools and some elementary schools. The other elementary schools either use the SR system or SASI. The non-mainframe systems use the school interoperability framework to transfer data to the mainframe. The use of three systems has resulted in staffing inefficiencies. Available funds could be spent on more efficient tools to manage district information and resources and ongoing support. Sufficient funds also should be spent on the necessary personnel and infrastructure.

A comprehensive K-12 technology plan will be required to update the technology used in classrooms at the elementary, middle school and high school levels. All schools should meet a baseline level of implementation, which will require a redistribution of resources to ensure that all students have equal access to the baseline.

Major recommendations in this report include:

- Creation of the following three departments within Technology Services:
  - Infrastructure and User Support
  - Applications Support
  - Educational Technology

- Creation of the following director positions to manage the new departments:
  a. Director of Infrastructure and User Support to oversee the district’s technology infrastructure and the user support function.
  b. Director of Applications Support to oversee all aspects of applications support, programming efforts, systems and operations, and a new group, Student Information Systems.
  c. Director of Educational Technology to oversee and manage the Educational Technology Department.

- Increase the number of staff development opportunities for staff and communicate these opportunities effectively utilizing an electronic calendar of activities and online enrollment.
Leadership and Communications

Technology Services is led by the Chief Technology Officer (CTO) position. This position has experienced high turnover over the past several years. The current CTO started work in the district in October 2006. There also has been considerable turnover in the Superintendent and Chief Financial Officer positions. The lack of leadership continuity has made it difficult to effectively coordinate the technology and information efforts of the organization. In addition, significant budget reductions over the past five years have left Technology Services short staffed and faced with challenges in meeting the expectations of its customers.

The CTO is responsible for coordinating the efforts of Technology Services with the major objectives of the organization. The CTO must maintain good communication with division leaders throughout the district to ensure that Technology Services remains focused on the district’s objectives. In addition, the CTO must communicate those district objectives to all Technology Services managers and staff members.

The CTO must work to match the district’s overall goals and objectives with appropriate technology resources. The CTO must also support the overall goals of the organization by coordinating the activities of the various department managers/supervisors to achieve maximum efficiency of all support staff. This requires establishing clear means of ongoing communication and coordination among and between all members of the technology management staff to help ensure the development of proper project management strategies, adequate progress toward district technology initiatives, and the resolution of any issues that are impeding progress. This is normally accomplished through regularly scheduled meetings with clear agenda topics, goals, and outcomes.

Technology management staff indicated these types of meetings have not occurred for a year or longer. Some of the managers have occasionally met with each other to try to resolve problems, but this was irregular and infrequent.

Additionally, technology management staff have not regularly communicated to establish guidelines or priorities for overall departmental objectives. This has hampered the performance of each group in the department and the department as a whole. Requests by lower level managers for additional staff and training have not been successfully passed along to either the CTO or Superintendent and have contributed to a decline in department productivity.

Because Technology Services has been unable to provide proper technology and information services to other district departments, technology support groups have developed independently within the academic, fiscal, research, and maintenance departments. These groups have worked independently from Technology Services and have grown in scope and staffing. Many technology support staff in the district that work outside Technology Services should exist within the department.
The new CTO is communicating with the Superintendent and other division leaders to gain a better understanding of Technology Services’ resources and how those might be better utilized to meet the needs of the district.

Reporting directly to the CTO are:
- Technology Services Manager
- Educational Technology Coordinator
- A PowerSchool implementation group consisting of three staff members
- Department Secretary
- IT Technician who supports attendance gathering systems and provides some secretarial support
- IT Coordinator
- Webmaster

**Technology Services Manager**
Under the current organizational structure the Technology Services Manager is responsible for coordinating nearly all the information technology support for the district. The Technology Services Manager takes direction from the CTO, relays the information to the managers/supervisors that he oversees, and coordinates their efforts to achieve maximum staff efficiency and support of the district’s goals.

Reporting directly to the Technology Services Manager are:
- Supervisor of User Support
- Supervisor Network Services
- Supervisor of Programming Services
- Manager of Telecommunications Services
- Manager of Systems and Operations
- Two contract programmers

**Proposed Systems and Network Administration Positions**
Technology Services has proposed the creation of four new positions. Three positions are titled Systems and Network Administrator and one is titled Senior Systems and Network Administrator. The reasoning behind these proposed new positions is to bring into the department highly skilled staff to support the existing staff in network administration and systems management. The proposal also includes a recommendation to place these new staff members at the high schools and to eventually create regional operations centers for technology services at all eight comprehensive high schools.

Although the existing staff will need significant training to properly support the infrastructure, creating another group in the department with similar responsibilities may cause confusion and harm department morale.
Creating regional technology centers and placing staff in various locations may result in an overall lack of coordination, reduced collaboration, and duplication of tools if not implemented as part of an overall district technology plan.

**Recommendations**

*The district should:*

1. Consider creating three departments within the Technology Services Division: Infrastructure and User Support, Applications Support, and Educational Technology. Add staff members to support all aspects of the operation. A proposed organizational chart is included as Appendix A.

2. Consider creating a new position of Director of Infrastructure and User Support to oversee the infrastructure and user support functions. Assign this position to be responsible and accountable for all personal computers, servers, network infrastructure, and user support of those systems. Assign the director to oversee the Network Supervisor, Telecommunications Manager, and User Support Supervisor, and their respective staffs.

3. Reconsider the creation of an additional group to support networks and systems. Consider using these resources to augment the existing work groups with appropriate staff and to provide training to bring the skill sets up to the level needed to accomplish their responsibilities.

4. Consider creating a new position of Director of Application Support and assign to this position the responsibility for overseeing all aspects of applications support, programming efforts, systems and operations, and a new group, Student Information Systems. Areas of responsibility within this department would include:

   - **Programming/Applications:** The Programming Applications Supervisor will coordinate their group’s efforts on both the IBM mainframe as well as programming and database support for server based applications.

   - **Systems and Operations:** Staff members in this group should receive additional training on skills relative to their current role on the mainframe and the associated role on a server. Eventual replacement of the district mainframe will likely necessitate reassignment of the Computer Operators to other support roles. These operators should begin to receive appropriate training for placement elsewhere in the department or district.

   - **Student Information Systems:** A new position of Student Information Systems Manager could oversee all aspects of support for the PowerSchool
and Student Records systems. This position would oversee the increasing amount of data being generated by students and the need to organize that data so that it can effectively be used in decision making.

5. Consider creating a position titled Director of Educational Technology to manage educational technology functions and report directly to the CTO.
Staffing and Organization

User Support

The user support group is responsible for three major functions. These functions can generally be defined as (1) support of the district’s desktops and related peripherals, (2) desktop and peripheral electronic repairs, and (3) operation of the user support help desk.

The User Support Supervisor provides day-to-day direction for the desktop support staff. Microcomputer Specialists staff the elementary, middle, and high school sites. Computer servicing responsibilities at the elementary and middle schools is shared among 15 Microcomputer Specialists who each serve multiple sites and may be dispatched to any district site. Service at each high school is provided by a dedicated Microcomputer Specialist permanently assigned to and located at that site. When a problem cannot be resolved by the Microcomputer Specialist, additional support is provided by a User Systems Technician II. There are currently two staff members in this role.

The Microcomputer Specialists at the sites have the daunting task of supporting more than 23,000 computers and laptops along with 421 thin client workstations. Nearly 10,000 of the computers are more than four years old. The aging computer base requires more support than the newer machines, which are less prone to breakage.

At the eight comprehensive high schools the number of computers supported ranges from a low of 322 at Bullard High School to a high of 1,035 at Sunnyside High School, with each Microcomputer Specialist servicing an average of 750 computers at each high school site.

The average number of computers at the elementary and middle school sites is approximately 214, and the total number of computers at all elementary and middle school sites is 17,351. They are serviced by the 15 Microcomputer Specialists. This brings the average number of computers served per technician to 1,156. If all the district’s computer devices were newer and contained up-to-date software, a technician-to-computer ratio of 1:1,000 could be feasible. However, given the district’s high number of older devices, supporting them at a 1:1,156 ratio is a daunting task.

During school site visits the study team found parents, teachers, and other volunteers performing maintenance work on the district’s computers. This raises issues of security, CSEA union issues, and software licensing issues. The district must find a better means of support for these systems. For example, the Electronic Service Specialists at the Technology Services offices can repair desktop electronics and related peripherals. They provide repairs on a wide range of makes, models, and devices.

The help desk is staffed by three operators who are sometimes able to resolve issues over the phone. They also serve as a clearinghouse for support calls that are then routed to various groups in Technology Services such as student information systems, financial, or HR systems.
The key tracking component of user support is based on a mainframe application known as computer support tickets (CST). This online system allows the user support group to maintain information regarding specific problems and related tracking information. As tickets are accumulated each day, the User Support Supervisor prioritizes the work for the Microcomputer Specialists. Each morning the elementary and middle school Microcomputer Specialists come to the Technology Services offices to receive their printed CST assignments and then are dispatched to the school sites. At the end of the day they return to the office where they update the status of their CST tickets.

Many school districts use a slightly different model of desktop support where the technicians receive their assignments electronically and report directly to the sites they have been assigned.

The manner of communication between user support group members was of concern to the FCMAT study team. Peer-to-peer support and problem solving does not appear to occur. Although each Microcomputer Specialist is equipped with a Blackberry communication device, they are discouraged from contacting their peers. In addition to direct contact, many districts provide electronic forums for support team members to post questions to their peers via e-mail, which expands the availability of information to everyone.

Due to the inability of the Technology Services Division to provide effective technology and information services to other groups within the district, islands of technology support have developed within the academic, fiscal, research, and maintenance departments. An example of this independent growth of technology service is the Research, Evaluation and Assessment (REA) department, which has taken root and grown in both scope and staffing levels. Consisting of 22 full-time staff members, REA independently created its own internal assessment software application (AIS). While the system has received many positive comments, it is being developed, managed, and supported by untrained technology personnel. When systems ultimately become integral to accomplishing the work, as appears to be the case with the AIS, the lack of directly involved, trained technology personnel increases the risk of long-term failure.

In a normally functioning K-12 technology services environment, the REA function would be incorporated as part of technology services. However, because the Technology Services Division has not been operating effectively, these technology efforts have been fulfilled by staff in other district divisions. As part of this review and incorporated recommendations it would be efficient to recommend that these technology efforts performed outside of the Technology Services Division be placed within the Division as part of the overall reorganization. However FCMAT believes that it will take at least 24 months for the technology services division to correct many of the problems associated with organization, staffing, and training issues within the division. Therefore the timing of incorporating the REA division may best be deferred until such time that the functions, duties, and roles associated
with this function can be integrated into a more efficiently and effectively operating technology services department.

**Network Services**
The Supervisor of Network Services oversees two positions: a User Systems Technician II and a User Support Technician III. The three work together to support approximately 130 servers at school sites, 60 servers at the district offices, and router networking equipment serving all locations. Complicating their efforts are aging server hardware and server operating systems from both Novell and Microsoft.

Management of the edge network switch gear is done by the telecommunications group, which recently was transferred to Technology Services from Maintenance and Operations. Support for the wide area and local area networks previously was provided by two distinct groups, which impeded the coordination of planning and problem resolution.

**Programming Services**
The Programming Services department has six staff members who are led by a Programming Supervisor. The Programming Supervisor position has been vacant since summer 2006. Two of the six non-management positions are vacant, leaving only four staff members to support the applications. These staff members have been diligent in managing the incoming system priorities and requests.

Programming efforts within the Technology Services division have historically revolved around support for IBM-based mainframe applications such as student records, finance, HR, and payroll. Over the past few years there has been good progress in migrating some of the core financial and HR applications off the mainframe and onto server-based technologies. Two contract programmers have been utilized to run the two systems (mainframe and server) during this migration period.

The four permanent programming staff members have significant experience and longevity with Technology Services, and much of their careers have been spent working solely on mainframe applications. Because the technology is moving away from mainframes in favor of server-based applications, they will need the skills to work on the server-based applications. However, they have not yet received training in this area.

The recent introduction of the PowerSchool student information system into the district resulted in the formation of a separate group to run the system. This group reports directly to the CTO. The skill sets and needs of existing staff members were not assessed. Staff members who had supported the student records system on the mainframe should have received appropriate training to transition to PowerSchool. Instead, the district brought in three certificated employees to manage the training and professional development associated with the PowerSchool implementation.
Telecommunication Services
A Telecommunications Manager leads a telecommunications services staff of four. As mentioned earlier in this report, the telecommunications group recently moved from the Maintenance and Operations division to Technology Services. The primary responsibilities of this group are to manage all aspects of telephone services within the district, maintain the microwave wide area network (WAN) equipment, and maintain, service, and configure the local area network (LAN) switch gear located throughout the district.

Recently the telecommunications group implemented a Voice over IP (VoIP) based phone system at approximately 60 of the district’s school sites. This resulted in a secondary WAN and in some cases duplication of the LAN, which has further complicated the support of an ever-increasing and complex network structure. The telecommunications services group manages the Cisco router equipment for the secondary network, and the network group manages the other district router. This division of responsibilities is causing an overall lack of efficiency and may disrupt services.

Systems and Operations Services
The systems and operations services group is led by a Systems and Operations Supervisor, who oversees these positions:

- Systems Programmer (1 FTE)
- Database Specialist (1 FTE)
- Computer Operator II (3 FTE)
- Computer Operator III (1 FTE)

This group generally handles the operations and processing of the district’s IBM mainframe computer. Although the amount of work being done on the mainframe has significantly diminished over the years, many positions still support the system.

Work shifts in this group cover a schedule of five days a week, 20 hours a day. The Computer Operators monitor batch processing on the mainframe, overall system health, AP and payroll warrants, report cards, and other miscellaneous reports. The group acknowledges that the printing volume has decreased significantly over the past few years, thus partially reducing the need for the Computer Operator positions.

These staff members average more than 20 years of experience in mainframe support for the district and expressed concern about the slow but steady migration of applications off the mainframe computer and onto server systems that are unfamiliar to them. As the mainframe applications continue to decrease, these mainframe specialists and operators should receive training to acquire new skills to support the smaller, more cost-efficient server-based systems.
Educational Technology Support
Support of the district’s educational technology needs is provided by the Technology Coordinator and two Teachers on Special Assignment. Both teachers are funded by the Enhancing Education Through Technology grant monies. If these grant monies were no longer available the district would have a single Technology Coordinator to support more than 100 sites and several thousand teachers and administrators. In a district of this size, a Director of Educational Technology and an Educational Technology Specialist position are needed to focus more attention on providing professional development to the certificated staff.

Training
Many staff in Technology Services expressed frustration regarding lack of adequate training for technical staff. In a department where technology rapidly changes, specific and focused training must occur regularly to provide the level of support that the department’s customers expect. Without exception, staff members commented that they had not been adequately trained nor have they received ongoing training to keep their skills current. Management staff acknowledged the lack of training and attributed this to a lack of available funding.

A general practice by most districts is to forecast upcoming projects and related technology expertise and assess whether the staff members involved in the project have the necessary skills to support the project or require additional training. The cost of this training is then factored into the overall cost of the project proposal along with other factors such as hardware, software and professional development.

Should the department undergo extensive reorganization with respect to staffing levels, staffing allocations, major technologies, refocused priorities and department organization as reflected in the recommendations of this report, the relevant training needs for each staff member must be considered. There are several options for completing a skills assessment. Many technology training companies can provide this service for a fee. The fee may be reduced or eliminated if the district chooses to contract with the same company to provide the staff with technical training. Another option is the TechSETS skills assessment system located at http://www.techsets.org/training/. This free resource provides some of the same tools that a commercial company would use in a needs assessment. However, if the district wishes to more quickly assess skills and coordinate technical training, a third-party technology training company might provide these services more expeditiously.

Though it is difficult to estimate the costs for a large department, training could easily exceed $5,000 to $10,000 per staff member. Over the past several years expenditures for technology training have been minimal.
Recommendations

*The district should:*

1. Transfer responsibility for managing and maintaining the AIS system from the Research, Evaluation and Assessment department to Technology Services for continued support and development as soon as the staff receives training.

2. Defer plans to transfer the Research, Evaluation and Assessment staff into Technology Services until the new Chief Technology Officer has had an opportunity to resolve many of the staffing and organizational structure issues outlined in this report. Following a period of “settling” pursuant to these reorganization efforts, move the Research, Evaluation and Assessment staff and functions to Technology Services.

3. Consider creating a new position of Technology Research and Development Specialist to provide the Chief Technology Officer with information relating to emerging technologies. This position will require an individual who is forward thinking, extremely technically savvy, and who can understand how best to apply rapidly changing technology solutions to the organization’s goals.

4. Reassign two of the Telecom Technicians responsible for maintaining network switches to report to the Network Supervisor to improve the overall coordination and stability of the district’s network infrastructure.

5. Consider creating an additional User Systems Technician III position to assist with supporting the server and network infrastructure.

6. Rename the position of Microcomputer Specialist to Technology Assistance Specialist (TAS) to reflect the position’s responsibility for many types of peripherals including smart boards, scanners and printers. Because the technicians’ role at the high schools is more complex due to the complexity and size of the networks and users at the sites, consider reclassifying the specialists at the elementary and middle schools as TAS I and the specialists at the high schools as TAS II. Work with the bargaining unit on the reclassification of these positions. Assign additional responsibilities to the TAS II positions including network user account and server and network diagnostics and support.

7. Consider creating five new TAS I positions to increase the level of support at the elementary and middle schools.
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8. Consider creating a new position of Lead Help Desk Operator to better manage the increasing workload at the help desk.


10. Reconsider the creation of regional technology centers because of the organizational fragmentation that would occur if the centers are not part of an overall district technology plan.

11. Consider creating an Educational Technology Specialist position to research and recommend emerging technologies to better support the learning needs in the classroom.

12. Complete a skill-level needs assessment for all Technology Services staff to determine current technical skills, additional skills needed for the position, and how training will be obtained.

13. Consider the following changes to current roles and titles (please see next two pages):
<table>
<thead>
<tr>
<th>Current Role/Title</th>
<th>Proposed Role/Title</th>
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<td>MCS, Elem &amp; Middle Sch</td>
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Educational Technology

The district’s educational technology services are limited. There is no district-wide Educational Technology Committee or other venue for educational technologists to discuss state-of-the-art educational delivery models for instruction and learning. Teachers do not collaborate in an organized manner to share best practices.

Many districts find a technology oversight committee very helpful for reviewing operations regarding educational and information technology issues and for making recommendations regarding projects, community outreach, board communications, and department budgeting and staffing. Typically, the committee considers and approves major technology initiatives and forwards its recommendation to the administration. Subcommittees are often formed to deal with either educational or information technology. The committee and subcommittees should consist of Technology Services staff, principals, teachers, district administrators, parents and support staff, with up to 20 members.

The district’s teachers need training in current technologies such as blogs, Wikis, and podcasts. The use of site funds for training is more costly than if the same training were coordinated and delivered by the district. A district-wide technology staff development plan should be developed to systematically cover current products and desktop applications, along with visionary sessions for teachers and other staff regarding the future of educational technology.

Teachers are rarely consulted on district-wide technology adoptions. Software acquisitions that are intended to maximize learning are acquired with little or no teacher, administrator or parent input. Accelerated Reader and smart boards are two examples frequently cited as examples of district-driven initiatives with little teacher input. PowerSchool is similarly perceived.

Principals stated that they feel alienated from the technology adoption process. They don’t consider themselves as collaborators in a planned technology process, but function as independent agents in securing resources for their schools. Some site administrators shared a perception that the district is more of a hindrance than a partner in technology adoption. Because site administrators must ultimately oversee projects at their site, they should be included in the process from the beginning.

Educational technology is not a standard agenda item for Cabinet or Principals’ Council meetings. As a result, technology issues and/or a vision for educational technology are not considered. Standing issues like the disparity in available technology between categorically funded schools and others is not an item of discussion.

There are pockets of successful technology programs that positively affect learning, but no systematic process for sharing these successes. There is no coordination between the
curriculum and the technology needed to support it. No district entity exists to support curriculum leaders with the necessary technology to begin using new products like Accelerated Reader. There is no inventory to determine if the product can be used with existing equipment and no desktop support for the product. Technology Services is reluctant to participate in these endeavors because of the excessive workload and their lack of involvement in selecting the products.

A small Educational Technology Department currently resides in Technology Services. This department has reported to four different managers over the past five years. Three categorically funded employees provide support, but there is no benchmark by which to measure progress or process to determine the school sites’ needs. Poor district-wide communication leaves the staff to gather information haphazardly. As a result, their efforts often do not reflect the district’s educational needs. School principals expressed a desire for a coordinated effort to support instructional technology initiatives, but district staff do not inquire about their needs.

Recommendations

The district should:

1. Increase staff development opportunities for instructional staff and communicate these opportunities through an electronic calendar of activities and online enrollment.

2. Engage Technology Services staff at all levels to maintain a consistent delivery of services across the district.

3. Establish a Technology Committee to focus attention on educational issues and information technology issues.

4. Create a technology staff development plan to substantially augment the training that is currently offered. Identify staff to conduct training sessions.

5. Include teachers in the decision-making process for all educational technology initiatives to ensure that district resources are maximized to benefit staff and students.

6. Include technology as a standard agenda and discussion item at Principals’ Council meetings.

7. Provide a venue for communicating successes in teaching and learning via the Technology Committee. Identify opportunities to serve students’ needs and interventions that can improve their chances for success.
Administrative Technology

Technology Services primarily supports a mainframe infrastructure running a student information system and a financial system. Two additional student information systems (SASI, PowerSchool) are also used and the data integrated into the mainframe system. The student information system is called SR and is the system of record. The financial/payroll/HR system is AMS. The use of three independent student information systems has led to inefficiencies in staffing, support, and data accuracy. In addition, the migration of AMS to a server-based system was not accompanied by adequate training for end users.

PowerSchool is used at the secondary schools and some elementary schools. The other elementary schools either use the SR system or SASI. The non-mainframe systems use the school interoperability framework to transfer data to the mainframe. The use of three systems has resulted in staffing inefficiencies. Three employees support the PowerSchool system in addition to the staff for the mainframe system.

Technology Services staff occasionally offer advice on hardware purchases and software, but most sites cannot get assistance and thus buy what they prefer or what a vendor proposes. Recently, the Purchasing Department has asked Technology Services to review hardware and software purchases, but no formal review process is in place. The Purchasing Department is unaware that the AMS system can route requisitions by object code, which would allow Technology Services to review and approve purchase requests before they go to budget or purchasing. This has resulted in the schools buying whatever they felt was best without the guidance of standards. Thus, the Microcomputer Specialists must support a variety of PC hardware with various drivers, configurations, and software. Remote computer imaging is not available, so an MCS must travel to each computer to fix, re-image or repair it, which adds greatly to the time it takes to fix a computer.

The educational technology unit has been implementing smart boards throughout the district. The smart boards have been well received, but no one in Technology Services has been trained to repair them. As a result, the repairs are delayed and instructional time is lost for the teachers who utilize the devices.

The district’s e-mail system has not functioned properly for more than three months. While Technology Services has been working on it since the start of school, no solution has been found. Little discussion was held before the district migrated its e-mail from Groupwise 5 to Groupwise 7 and no meetings were held with principals to discuss the project. Those who have Internet e-mail and regular e-mail via Groupwise 7 report receiving several hundred spam e-mails daily. Technology Services leadership was unaware that spam can be deleted before it reaches e-mail servers as opposed to every user setting up spam filtering on their desktop. No outside help has been sought to resolve the problem. Technology Services leadership has not prioritized addressing the effects of the lack of this vital communications tool. Much information is lost due to the lack of e-mail capability and high levels of spam.
The district’s network design is in need of expert analysis. The design creates bottlenecks that are exacerbated by very old servers that cause delays of three minutes to check one e-mail. The district’s microwave network is a ds3 to the downtown center from all high schools. Those connections then pile onto one ds3 (45mb) link to the Technology Services office. The VoIP network is totally separate from the microwave and land based (T-1) network. This has resulted in inefficiencies throughout the district due to the wait time for an application to respond, which was cited as three minutes to delete an e-mail and 20-30 minutes for a scheduling run. It has also resulted in increased costs for network infrastructure.

Internet access is obtained from an Internet service provider (ISP) at an annual cost for 2006-07 of $102,000 for 20mb of capacity. The Fresno County Office of Education node on the K12 high speed network (HSN) is not used for connectivity. While 86% of the districts in Fresno County and the surrounding region connect to the COE, Fresno Unified does not. Budgets show the cost to connect in the past has been between $1,100 and $2,400 for a 20 mb connection. Additionally, many of the node sites on the K12-HSN are being upgraded to gigabit speeds.

The district’s technology maintenance costs are approximately $2 million a year. These costs are primarily related to the mainframe, Oracle licensing, and Novell licensing.

Administrative computers are protected against viruses but student machines are not. If all computers are not covered, the district is not covered. This has resulted in increased virus problems, decreased productivity while the infected computers are repaired, and lost instructional time. Technology Services does not support student servers or student accounts, which has led the school sites to develop their own support mechanisms.

Computers, desktop and servers are more than four years old in most cases and cannot run the latest software. This results in frequent breakdowns and the inability to send a common attachment that can be opened by all, which results in departments sending out paper memos or faxes. This increases costs when a document has to go out to a large number of staff. Hardware repair is performed by three FTE and has an annual budget of $125,000 for 2006-07 primarily due to the age of the equipment. A similar sized district in Northern California with newer equipment has annual repair costs of $25,000 to $35,000.

E-Rate has been handled by the telecommunications unit. While it has been used primarily for voice and data lines, it has also been used for some routers and servers. It has been severely underutilized when the district’s shared discount rate of 82% is considered. This has resulted in increased costs to school sites that have purchased equipment that could have been covered under E-Rate as well as increased inefficiencies attributable to the older equipment (servers) that could have been replaced under the E-Rate program. None of the E-Rate savings are put into the Technology Services budget as is done in many other
districts. A consultant could manage and maintain the district’s E-Rate program at a cost of $35,000 to $40,000 annually, which could be offset by district savings on equipment purchases.

The district’s migration to the Web-based version of the AMS financial system has been difficult. School site employees say it is very difficult to find out what their budgets are and feel that the process is more cumbersome than before. The system crashes every night. Technology support employees were not trained on the system. The staff was given only a week and a half to test the system and were told that the system had to be fully operational before going live. Site staff were not adequately apprised as to the time lines and have lost trust in the system. Increased staff time is required to review financial information. The district pays approximately $500,000 per year for AMS system maintenance.

The district’s research, evaluation and assessment team has written its own assessment information system (AIS). While the system has received many positive comments, it has not been developed, managed, or supported by trained IT personnel. This puts it at risk of long-term failure. Security and coding techniques also are a concern.

The district has received substantial funding this year in one-time funds that can be used for technology, including the Microsoft K-12 Voucher Program. There has been no leadership or direction on using these funds to meet the district’s goals. This has resulted in lost opportunities for the district to standardize and utilize the funds.

There are no minimum technology standards for the district. New schools get new equipment but older schools must fund their own equipment. This has resulted in an equity issue for schools with less funding.

District technology consists of Novell, mainframe, some Microsoft Active Directory, and terminal services. Technology Services managers/supervisors now suggest using Linux. There is no easy-to-understand vision of the district’s technology goals. This has resulted in disparate and often obsolete technology throughout the district.

Security in the district is lax. Server passwords are routinely given to the sites. Many sites change the passwords and lock out the Technology Services staff. This increases the time it takes to repair or work on computers because the technicians must hunt down the person with the password before they can start to work on a computer. Many administrators never change their default password when first given an account. This can lead to a security breach.

The PowerSchool system is managed by certificated staff with very good technical skills but who are untrained in IT methodologies and best practices. When asked if any security breaches had occurred, one staff member stated that it was an urban legend that kids hack
into systems. This group also manages the backups for the data on the servers and wants to “take ownership” of the servers. There is a false sense of security surrounding the data housed in these servers that places the district at serious risk of lost or corrupted data on an essential system.

PowerSchool and e-mail problems led to a rough opening of school for many sites. It reportedly took 20-30 minutes to schedule one student. When student data were rolled from one year to the next, 400-500 students simply disappeared from the system. This profoundly affects the student system and teacher allocation.

Handling drops and enrollments on three student systems has been difficult and raises concerns with CBEDS enrollment reporting, which was automated via CSIS this year.

There is little or no documentation of systems or their interdependence. This can result in severe problems due to loss of institutional history and knowledge when employees leave the district or retire. New employees would have no written documents or procedures to follow to keep the systems operational, or to understand how they work together.

Measure K was passed to provide for facility improvements. The technology expenditures have been processed through the telecommunication unit, without collaboration with Technology Services.

While some district staff are aware of the public, educational, and government channel (PEG) opportunities, they do not appear to be used to their full potential. The district has not approached the cable commission or Comcast to inquire about an institutional network (I-Net) that many other communities have as part of their cable franchise agreement. The passage and signing of AB 2987 has reinforced the availability of these services to the district: “All video service providers and the incumbent cable operator shall be subject to the same requirements for recurring payments for the support of PEG channel facilities and institutional networks, whether expressed as a percentage of gross revenue or as an amount per subscriber, per month, or otherwise.”

**Recommendations**

*The district should:*

1. Develop a plan to discontinue using the mainframe once AMS is moved elsewhere. Develop a three- to five-year plan to update staff skills through extensive training.

2. Consolidate all student information systems to one system. Perform the major network, server, and desktop upgrades required to accomplish this task (roughly $6 million to $8 million for desktops, $1 million to $2 million for servers and
approximately $1 million to $2 million for network equipment upgrades).
Upgrade the bandwidth throughout the district to at least 10mb per elementary
school and 100/1000 per secondary school. Plan to accomplish this work in
stages over two to three years.

3. Purchase a high-functioning help desk system. Train all staff on the system
and require its use for all help requests. Train site personnel on how to submit
requests and review their status.

4. Configure the AMS system to route all requisitions pertaining to technology and
software so that Technology Services must approve a purchase request before it
goes to budget or purchasing. Post standards and price lists on the Intranet web
pages to guide sites and departments in their technological purchases.

5. Provide training on the use of smart boards for the MCS staff. Coordinate edu-
cational technology purchases with the other units in the department to schedule
implementation and training.

6. Immediately repair the e-mail system by contracting with an outside consultant.
Based on the district’s general migration toward Microsoft technologies, de-
velop a long-term strategy to implement a new system that represents a closer
strategic fit with district communication requirements and that is representative
of emerging communication technologies. Communicate the process and plan of
action to school principals.

7. Develop a funding plan to refresh or replace old equipment.

8. Hire a consulting firm to review, analyze and assess the network design includ-
ing the server infrastructure and security.

9. Contact the Fresno County Office of Education regarding Internet access.
Contact the cable commission about obtaining fiber optics from the local cable
provider (Comcast) as part of the cable franchise agreement or I-net/PEG obli-
gations.

10. Protect all computers with anti-virus software, either immediately or as comput-
ers are replaced.

11. Ensure that Technology Services staff supports student servers and student
accounts. Include these services as a component of the technology vision and
staffing plans.
12. Develop a program to replace all computers that are five years old or older. Utilize a product such as LANDesk to facilitate automated inventory and remote control, thus saving money in the long run by allowing MCS staff members to fix problems remotely.

13. Consider contracting with a consultant to manage and maintain the E-Rate program. Ensure that E-rate savings accrued each year are put back into the Technology Services budget to be used for training, technology services equipment upgrades or other needs, including contracted services.

14. Contract out the hardware repair program and redistribute/retrain these staff members as MCS personnel. Implement a policy that the district will only pay for repairs when the cost of the repair is less than half the value of the equipment. Charge all repairs for networked computers and networked connected printers to Technology Services.

15. Hire a certified project manager with technology experience to manage major projects. Postpone migration of the HR system to the new Web-based version until the project manager is hired, the finance system is stable, and a plan to migrate off the mainframe is developed and approved.

16. Reconsider use of the AMS system in light of the high price of maintenance compared to alternative systems.

17. Develop minimum technology standards or baselines for the district. This should become standard for all new schools and part of every future modernization. A committee of technology services, district leadership, and site leaders should be convened to reach agreement on these minimum standards.

18. Develop a technology vision and a short vision statement that lays the foundation for the future of technology in the district.

19. Transfer responsibility for the PowerSchool system to those responsible for the mainframe student information system. Train staff members on PowerSchool, Structured Query Language (SQL) servers and the server infrastructure before transferring this responsibility.

20. Develop a plan for resolving PowerSchool problems. Review the new version of PowerSchool to determine whether to stay with PowerSchool or replace all systems and implement one unified system.
21. Pay particularly close attention to the accuracy of CBEDS data given that three systems feed the data to CSIS from SR.

22. Require documentation for all new projects, systems, and procedures, including a project chart or information chart to show the progress and effects of all major projects.

23. Review the provisions of Measure K to determine whether the funds can be used for the technology infrastructure updates and equipment needs that serve school sites. Institute collaboration between telecommunications and Technology Services for purchases of this nature.

24. Ensure that Technology Services becomes well versed in AB 2987, their local cable franchise agreement and the cable commission to benefit from an I-Net that would connect all the schools on fiber and resolve many of the bandwidth issues.
Network Infrastructure
The study team performed a detailed analysis of the district’s network infrastructure. Network elements reviewed were routers, Ethernet switches, VPN concentrators, and wireless access points. The team also performed a remote penetration scan of the district’s public Internet IP address space. The network elements were analyzed using documentation provided by district staff, and elements that were not included in the documentation were not reviewed.

Routers and Switches
The manufacturer of several of the district’s network routers and switches no longer supports them. Hardware that is no longer supported by the manufacturer is not eligible for vendor support. The software that runs on this hardware also is no longer maintained by the vendor, and may contain significant security or performance related bugs that cannot be resolved.

Management access to all network routers and switches is not adequately protected. Management access types include: VTY (telnet or ssh), SNMP community strings, HTTP and HTTPS, console ports, and auxiliary ports where they are supported by the router. The routers and switches are vulnerable to unauthorized remote configuration changes that could be made by any workstation connected to the district’s network.

None of the network routers or switches use authentication, authorization, and accounting (AAA). The lack of AAA prevents finely grained access control, command authorization, and audit trails for network element access. The district should consider implementing AAA via either Radius or TACACS+ in all routers and switches, which will allow the assignment of individual user logins for each router. AAA eliminates the need to modify each individual router or switch configuration when a change is needed to a login password because all user logins are located on a central AAA server. The use of AAA also allows the assignment of different levels of access to different users and enables the creation of a detailed audit log, recording each user’s entered commands and login session time stamps.

The network routers and switches are not set for remote logging. Collecting and storing network element logs remotely is important, because the logs are not saved between equipment reboots and could easily be deleted by someone who gains unauthorized access to the network element. Network element logs are essential in troubleshooting network problems, and are essential in the successful prosecution of a criminal case involving unauthorized network access. The district should consider installing a syslog server using either Windows or Unix as the underlying operating system. This server should have considerable disk space that will allow the collection of at least 30 days worth of logs from all network elements. All network elements should be configured to send logs to the remote server. Collecting network element logs in this manner permits the use of tools that automatically
view the logs in real time and alert the network staff to potential problems. A syslog server also creates a secure repository for network element logs if they are requested by law enforcement.

Network routers and switches are not configured for network time protocol (NTP) clock synchronization. NTP is a method of synchronizing the time and date of multiple electronic devices across an IP network to a small pool of highly accurate external clock sources. The use of NTP on every network element will keep the date and time on each element accurately synchronized. An NTP process should be installed on a central server that is reachable by all network elements. This can be the same server utilized for AAA and remote syslog collection. The server process should be configured to synchronize with at least three remote NTP clock servers. A list of public NTP servers is located at: http://ntp.isc.org/bin/view/Servers/WebHome. All network elements should be set to synchronize with this centralized server, and to use the device’s local time to time stamp logs. Accurate time-stamped logs are required for the successful prosecution of unauthorized network access.

None of the network routers or switches are configured with adequate login banners. The district should consider placing a login banner on every network element that supports them. The banners should contain the district’s access policy regarding logins to network elements. Properly worded login banners are important to the successful prosecution of unauthorized network access.

Administrative and educational network traffic is commingled at the Ethernet level on all of the network routers. This allows potential access to administrative traffic, such as student information system traffic, by any workstation attached to the network. The district should consider separating this traffic as soon as possible through virtual LANs (VLANs) or by completely separating the administrative and educational networks at the Ethernet level of every router. Either solution will require additional hardware, as several routers do not support VLANs or do not have enough Ethernet ports to permit physical separation with their current configuration.

All of the district’s network switches are configured to act as a single layer two broadcast domain at each site. This creates an environment where network traffic from the administrative and educational networks is commingled. This is a severe security risk. As above, the use of VLANs or the complete physical separation of the administrative and educational networks at each site is advised to prevent the unauthorized reception of administrative traffic on the educational network.

Many Ethernet hubs appear to be in use throughout the district’s network. Ethernet hubs are not secure due to their method of operation; that is, an Ethernet hub repeats all traffic to all ports on the hub. This may allow the unauthorized interception of network traffic. Ethernet hubs also negatively affect network performance because they transmit a large
amount of unneeded traffic. Most Ethernet hubs are not SNMP manageable devices, and cannot supply important network performance information. Because of their shortcomings, Ethernet hubs are generally considered obsolete. The district should identify all Ethernet hubs still on the network, and replace them with Ethernet switches from a recognized vendor. This will provide greater security, better performance, and more insight into network operations to the district network staff.

Many of the network routers are configured with questionable IP access lists. In several cases, access lists are configured on the routers, but are not applied to any interfaces or ports. In other cases, the access lists are applied to interfaces, but the lists block one or two types of traffic and allow everything else. None of the access lists are configured to log packets that match “deny” statements in the access lists. All routers should be reviewed for the proper implementation of IP access lists. Access lists that are not in use on a router should be deleted, and all access lists that are in use should be configured to log all attempts that match any “deny” lines in the access list. All access lists should be periodically reviewed to ensure that they provide the desired filtering and do not unintentionally allow undesirable traffic to be transmitted. Proper review and configuration of access lists will ensure that undesirable traffic is not permitted past the list, and logging all “deny” matches will alert the network staff to unauthorized network access attempts.

The district should consider using access lists to restrict VTY and SNMP access to a few network management workstations. All console and auxiliary ports should be configured to require users to provide valid authentication credentials.

The Internetwork Packet Exchange (IPX) protocol is in use throughout the district’s network. This protocol has been essentially rendered obsolete by TCP/IP. Any applications the district runs that require IPX are likely obsolete and have been replaced by versions that support TCP/IP. The district should identify precisely what applications continue to use IPX. Once these issues are identified, the district can replace “must have” resources with a version that uses TCP/IP, and obsolete software and hardware should be removed. This will provide the district with up-to-date hardware and software that is fully vendor supported.

None of the switches currently installed in the district’s network is configured to use MAC address limiting, or 802.1x. All of the switches and hubs currently installed are vulnerable to a rogue node (a computer that is not authorized to connect to the district’s network). One example could be a laptop that a student brings from home and plugs into an available switch or hub port somewhere in the network. This rogue node now has access to the network and can begin capturing and analyzing network traffic. The district should, at a minimum, configure MAC address limiting on all switch ports. If a switch does not support this feature it should be replaced with a switch that does. Computers rarely move around in an educational setting, and even users that carry laptops use the same switch port
when connecting to the wired network. A more manageable approach for a network that has a large number of roaming nodes is 802.1x. This is an authentication process that takes place between a node and an Ethernet switch before the node is allowed to transmit to the network. The process protects quite well against rogue nodes and permits a user to connect their computer to any switch port in the network. A network-wide 802.1x implementation is a sizeable task that requires significant network engineering resources.

**Recommendations**

*The district should:*

1. Identify all network routers and switches and verify with the respective vendor whether the hardware and software is supported. Replace all routers, switches and software that are no longer supported by the vendor.

2. Identify all Ethernet hubs installed on the network and replace them with Ethernet switches from a recognized vendor.

3. Use access lists to restrict VTY access to a few network management workstations. Protect SNMP community strings with access lists that permit SNMP access from only a few network management workstations. Configure all console and auxiliary ports to require users to provide valid authentication credentials.

4. Consider implementing AAA via either Radius or TACACS+ in all routers and switches.

5. Install a syslog server using either Windows or Unix as the underlying operating system. Configure all network elements to send logs to this remote server.

6. Install an NTP server process on a central server that is reachable by all network elements and configure it appropriately.

7. Configure login banners for use on every network element that supports login banners. A sample login banner is attached to this report as Appendix B.

8. Separate administrative and educational network traffic at the Ethernet level on all of the routers and switches on the district’s network by implementing VLANs or by completely separating the administrative and educational networks at the Ethernet level of every router and switch.

9. Review all routers for the proper implementation of IP access lists. Delete access lists that are not in use, and configure all access lists that are in use to log all attempts that match any “deny” lines in the access list. Periodically review
all access lists to ensure that they provide the desired filtering and do not allow undesirable traffic.

10. Identify any applications that require the use of IPX and consider replacing them with versions that support TCP/IP.

11. Configure MAC address limiting on all switch ports.

**VPN Concentrator**
The district provides VPN access to the district network via a Cisco 3005 VPN concentrator. The firmware loaded on this device has reached end of life status with the vendor and may contain several performance and security related bugs. This device should be upgraded to the current version of firmware recommended by the vendor. A newer version of firmware will contain new features as well as several security and performance related features.

The configuration running on the VPN concentrator contains several different access policies for remote VPN clients. Some of these policies do not appear to be as secure as others, and the district may be permitting remote access to the network without proper safeguards. The district should consider creating a single remote access policy. This policy would use IKE (Internet Key Exchange), the encryption algorithms 3DES (Data Encryption Standard) or AES (Advanced Encryption Standard) only, Diffie-Hellman group 2, HMAC-SHA-1 for integrity protection, and a SA (Security Association) lifetime of approximately four hours. The use of split tunneling should not be permitted because it creates an environment where one side of a remote node connects to the public Internet while the other side connects directly to the district network. This can result in unauthorized access to the district network by a third party that has remote control of the remote node. Access lists should also be created to allow access to required district resources while denying access to everything else, and should be pushed to the remote node upon the successful initiation of an IPSec tunnel. The installation of a district specified antivirus and anti-spyware platform should also be required on all remote nodes that access the district network via the VPN. This type of VPN configuration would support only the IP protocol. A secure access policy will ensure that remote nodes connecting to the district’s network via a VPN connection will not create unmanageable security risks.

**Recommendations**
*The district should:*

1. Upgrade the firmware loaded on the Cisco 3005 VPN concentrator to the current version of firmware recommended by the vendor.

2. Create a single remote access policy for remote VPN clients.
**Wireless Access Points**
Several wireless access points on the district’s network are no longer supported by the manufacturer and thus are not eligible for hardware or software support from the vendor. The software running on this hardware is also no longer maintained by the vendor, and may contain significant security or performance related bugs that cannot be resolved. The district should identify all wireless access points on the network and verify their support status with the respective vendor. All wireless access points and software that are no longer supported should be replaced. This will ultimately provide the district with a more reliable network.

Management access to several of the wireless access points on the district’s network is not properly secured. These elements are vulnerable to unauthorized configuration changes. The district should review the configuration of each wireless access point and ensure that all VTY (telnet and ssh) ports, HTTP and HTTPS, and SNMP community strings are protected by access lists that allow only a few management workstations to connect to these devices. All console and auxiliary ports should require valid authentication credentials to gain management access.

The current wireless network access policy uses WAP with 64 bit encryption keys. This level of security is inadequate, and the encryption can be broken in less than five minutes with software tools freely available on the Internet. Although MAC address filtering is also in use, the addresses can be modified via software, so there is no guarantee against a rogue node gaining access to the wireless network. The district should consider implementing the 802.11i standard across all wireless access points. 802.11i utilizes strong encryption, 802.1x, and MAC address filtering to create a very secure means of wireless network access. All wireless access points will need to be checked to see if their firmware supports 802.11i. Points that are obsolete should be replaced, and firmware upgraded where necessary.

**Recommendations**
*The district should:*

1. Identify all wireless access points in the network, and replace all points and software that are no longer supported by the vendor.

2. Review the configuration on each wireless access point and ensure that all VTY (telnet and ssh) ports, HTTP and HTTPS, and SNMP community strings are protected by access lists that allow connection by only a few management workstations. Require valid authentication credentials to gain management access to console and auxiliary ports.

3. Implement the 802.11i standard across all wireless access points. Replace obsolete wireless access points and upgrade firmware as needed.
Penetration Test Port Scan
A remote scan of the subnets 63.207.252.0/24 and 63.202.49.0/24 was performed, with 77 hosts found to have ports reachable from the Internet. Many of these hosts run public Web, ftp, e-mail, and DNS servers and require these services to be reachable from the Internet. Several hosts appeared to be running remote access/control applications that seem to be reachable from any host on the Internet. These remote access/control applications are: ssh, telnet, Timbuktu, RDC, PC anywhere, and X-windows. Remote access services of this type should not be reachable by any random host on the Internet. The hosts running these services are vulnerable to repeated attempts by remote hosts to gain unauthorized control of these district nodes. The district should close all open remote access/control ports in its firewall and support remote access via properly authenticated VPN clients. If access must be temporarily granted to a node, it should be protected with an access list that allows only the specific remote node to connect to the service via the Internet. Closing these holes will enhance network security and make it impossible for random Internet hosts to connect to these systems.

The firewall access policies should be periodically reviewed for proper configuration, and any unneeded access permissions removed from the external Internet policies. This process will ensure that only the intended access is allowed from the Internet into the district network.

All systems that run services that are open to the Internet should be regularly audited for all recommended OS and third party software patches. Regular maintenance should be scheduled to install and activate the patches. All nodes running Internet reachable servers should fully patched to protect them from known security bugs.

Recommendations
The district should:

1. Eliminate remote access services that are reachable by random hosts on the Internet by closing open remote access/control ports in the firewall, and support remote access to these nodes via properly authenticated VPN clients.

2. Review firewall access policies for proper configuration, and remove any unneeded access permissions from the external Internet policies.

3. Regularly audit all systems that run services that are exposed to the Internet for all recommended operating system and third party software patches. Schedule regular maintenance to install and activate the patches.
Appendices

Appendix A - Organizational Chart
Appendix B - Sample Login Banner
Appendix C - Study Agreement
Sample Log-In Banner

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NOTICE TO USERS

This is a Fresno Unified School District computer system and is the property of Fresno Unified School District. It is for authorized use only. Users (authorized or unauthorized) have no explicit or implicit expectation of privacy.

Any or all uses of this system and all files on this system may be intercepted, monitored, recorded, copied, audited, inspected, and disclosed to authorized site, Fresno Unified School District, and law enforcement personnel, as well as authorized officials of other agencies, both domestic and foreign. By using this system, the user consents to such interception, monitoring, recording, copying, auditing, inspection, and disclosure at the discretion of authorized site or Fresno Unified School District personnel.

Unauthorized or improper use of this system may result in administrative disciplinary action and civil and criminal penalties. By continuing to use this system you indicate your awareness of and consent to these terms and conditions of use. LOG OFF IMMEDIATELY if you do not agree to the conditions stated in this warning.

***********************************************
The FISCAL CRISIS AND MANAGEMENT ASSISTANCE TEAM (FCMAT), hereinafter referred to as the Team, and the Fresno Unified School District, hereinafter referred to as the District, mutually agree as follows:

1. **BASIS OF AGREEMENT**

   The Team provides a variety of services to school districts and county offices of education upon request. The District has requested that the Team provide for the assignment of professionals to study specific aspects of the Fresno Unified School District operations, in the areas of Technology, Purchasing/Warehouse, and Special Education. These professionals may include staff of the Team, County Offices of Education, the California State Department of Education, school districts, or private contractors. All work shall be performed in accordance with the terms and conditions of this Agreement. Three specialized FCMAT review teams will be formed to conduct the reviews and will work independently of each other.

2. **SCOPE OF THE WORK**

   A. **Scope and Objectives of the Study, by areas of operation**

   The scope and objectives of the Technology review are to:

   1) Assess the organization and operations of the district's technology services department and make recommendations for improvement.

   2) Assess the district's technology department staffing and structure and make recommendations for improvement.

   3) Review the district’s administrative and instructional technology programs and make recommendations for improvement.

   4) Review the district's E-Rate program and make recommendations for improvement.

   5) Conduct vulnerability and penetration testing from remote site to assess the district's perimeter security and make recommendations for improvement.

   6) Conduct on-site (physical) review of infrastructure and make recommendations for improvement.

   7) Assess the district's technology and security policies and make recommendations for improvement.

   8) Review the district's E-Rate documentation, applications, and procedures
and make recommendations for improvement.

The scope and objectives of the Purchasing/Warehouse review are to:

1) Review the District’s purchasing functions for compliance with competitive bid requirements, board policies, standard purchasing best practices, and proper internal control.

2) Evaluate the purchasing and warehouse procedures and practices to determine operational effectiveness, efficiency, leveraging of buying power, and vendor selection methods.

3) Determine whether or not the purchasing and warehouse departments are making the best use of technology.

4) Identify the procedural and fiscal impacts of the warehouse operations to determine if the current level of “just in time” purchases versus the items carried in stores stock is the most cost effective and efficient mix to best serve the schools site and departments within the district.

5) Suggest areas of improvement and make recommendations as necessary.

The scope and objectives of the Special Education review are to:

1) Review the efficiency and effectiveness of the District’s Special Education fiscal and program delivery system.

2) Review the referral processes and determine effectiveness of student study teams.

3) Review the district process on determining the hiring of one-on-one paraprofessionals and make recommendations for improvement.

4) Review Special Education staffing ratios and the allocation of FTE teachers to student class size.

5) Review the relationship of roles and responsibilities between the Fresno Unified School District SELPA and District programs. Review SELPA allocation funding formula.

6) Review the District process of involving parents. Examine the role and functions of the District’s and/or SELPA Special Education citizen’s advisory committee.

7) Review the computerized program the district is attempting to implement regarding IEP’s. Make recommendations on effectiveness, timeline for implementation, and cost effectiveness compared to other options that maybe available.
8) Review the district processes for MediCal billing and reimbursements for the Special Ed and Health Services divisions.

B. Services and Products to be Provided

1) Orientation Meeting - The Teams will conduct an orientation session at the District to brief District management and supervisory personnel on the procedures of the Team and on the purpose and schedule of the study.

2) On-site Review - The Teams will conduct an on-site review at the District office and at school sites if necessary.

3) Progress Reports - The Teams will hold an exit meeting at the conclusion of the on-site review to inform the District of significant findings and recommendations to that point.

4) Exit Letter - The Teams will issue an exit letter approximately 10 days after the exit meeting detailing significant findings and recommendations to date and memorializing the topics discussed in the exit meeting.

5) Draft Reports - Sufficient copies of a preliminary draft report will be delivered to the District administration for review and comment.

6) Final Report - Sufficient copies of the final study report will be delivered to the District following completion of the review.

3. PROJECT PERSONNEL

The study team will be supervised by Anthony Bridges, Interim Deputy Executive Officer, Fiscal Crisis and Management Assistance Team, Kern County Superintendent of Schools Office. The study team may also include:

Technology Team
A. Andrew Prestage, FCMAT Management Analyst
B. Bradley L. White, FCMAT Technology Consultant
C. Scott Sexsmith, FCMAT Technology Consultant
D. Greg Lindner, FCMAT Technology Consultant
E. Gary Habeeb, FCMAT Technology Consultant

Purchasing Team
A. Michele McClowry, FCMAT Fiscal Intervention Specialist
B. FCMAT Purchasing Consultant
C. FCMAT Purchasing Consultant

Special Education Team
A. Dr. William Gillaspie, FCMAT Management Analyst
B. Sarge Kennedy, FCMAT Special Education Consultant
C. Kay Atchison, FCMAT Special Education Consultant
D. Bill Puddy, FCMAT Special Education Consultant
Other equally qualified consultants will be substituted in the event one of the above noted individuals is unable to participate in the study.

4. PROJECT COSTS

The cost for studies requested pursuant to E.C. 42127.8(d)(1) shall be:

A. $500.00 per day for each Team Member while on site, conducting fieldwork at other locations, presenting reports, or participating in meetings.

B. All out-of-pocket expenses, including travel, meals, lodging, etc. Based on the scope listed in section 2 A, estimated cost is $60,000. The District will be billed based on actual time and expenses of the study teams.

C. The District will be invoiced at actual costs, with 50% due following the completion of the on-site review and the remaining 50% due upon acceptance of the final report by the District.

Payments for FCMAT services are payable to Kern County Superintendent of Schools-Administrative Agent.

5. RESPONSIBILITIES OF THE DISTRICT

A. The District will provide office and conference room space while on-site reviews are in progress.

B. The District will provide the following (if requested):

1) A map of the local area
2) Existing policies, regulations and prior reports addressing the study request
3) Current organizational charts
4) Current and four (4) prior year's audit reports
5) Any documents requested on a supplemental listing

C. The District Administration will review a preliminary draft copy of the study. Any comments regarding the accuracy of the data presented in the report or the practicability of the recommendations will be reviewed with the Team prior to completion of the final report.

Pursuant to EC 45125.1(c), representatives of FCMAT will have limited contact with District pupils. The District shall take appropriate steps to comply with EC 45125.1(c).
6. PROJECT SCHEDULE

The following schedule outlines the planned completion dates for key study milestones.

Technology Review
Orientation: July 12, 2006
Staff Interviews: Estimated October 16-18, 2006
Exit Interviews: Estimated October 18, 2006
Preliminary Report Submitted: Estimated November 2, 2006

Purchasing Review
Orientation: August 18, 2006
Staff Interviews: Estimated September 18 – 21, 2006
Exit Interview: Estimated September 21, 2006
Preliminary Report Submitted: Estimated November 2, 2006

Special Education Review
Orientation: August 18, 2006
Staff Interviews: Estimated September 25 – 29, 2006
Exit Interview: Estimated September 29, 2006
Preliminary Report Submitted: Estimated November 2, 2006

Final Report Submitted
Board Presentation
To be determined
To be determined

7. CONTACT PERSON

Please print name of contact person: Michael Hanson, Superintendent and Ruth F. Quinto, Chief Financial Officer

Telephone 559-457-6200 FAX 559-457-6202

Internet Address rfquinto@fresno.k12.ca.us

Michael E. Hanson, Superintendent Date Aug. 30, 2006
Fresno Unified School District

Barbara Dean, Deputy Administrative Officer Date Aug. 24, 2006
Fiscal Crisis and Management Assistance Team

In keeping with the provisions of AB1200, the County Superintendent will be notified of this agreement between the District and FCMAT and will receive a copy of the final report.