Technology Plan

2013-2016

MPC

MONTEREY PENINSULA
COLLEGE

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Executive Summary

The Technology Plan was developed to improve the overall student experience and learning environment at Monterey Peninsula College (MPC). The goal is to enhance student success by providing a high level of accessibility, service and support through the utilization of current technology.

State wide mandates such as SB1456-The Student Success Act make a robust technology infrastructure essential for the sustainability of MPC. SB1456 requires MPC to change and enhance the way we communicate with our students. SB1456 directly effects our funding, the decisions we make about these changes must be made in high regard to current needs, future compliance, and stability while ensuring that our existing core services be maintained or enhanced.

The MPC network can be leveraged to facilitate communications between the campus and students. These communications can be facilitated in real time, on demand, as-needed and leveraging communication devices that our students are already using. Our wired and wireless foundation is of paramount consideration in order to facilitate this communication strategy. If addressed and facilitated properly, our network can serve as the platform for MPC to fundamentally change the way we communicate with our students today and in the future.

This three year strategic plan sets forth a road map for technology enhancements at MPC. This Technology Plan, aligned with the goals and objectives of the five-year Education Master Plan, identifies the current technology needs at MPC and, to the extent possible, anticipates future technology needs. When possible, this plan lays out the means and steps necessary to meet those needs and the strategy to ensure that MPC resources support the delivery of high quality technology.

The key technology needs addressed in this plan are to replace the Student Information System, implement an integrated Enterprise Resource Planning system, redesign the website, implement a technology refreshment plan, move to a hosted email solution, upgrade campus Wi-Fi, enhance core network infrastructure, develop disaster preparedness/recovery plan, implement server and

desktop virtualization, and implement single sign-on.

The MPC Technology Plan is a living document that will be reviewed periodically by the Technology Committee and updated as needed. Major revisions of this document will be performed as necessary based on major revisions of dependent documents, such as the Institutional Goals, Educational Master Plan, Strategic Initiatives and/or College Mission. Ongoing meetings with individuals, shared governance committees, and functional area groups, as well as campus-wide surveys will be some of the methods used to continue to gather data.

Institutional Goals and Objectives

The Technology Plan aligns with the goals and objectives which are defined in the 2012 -2017 Educational Master Plan as follows:

Educational Master Plan:

MPC's 2012 -2017 Educational Master Plan (EMP) is the College's academic map; it serves as one of the College's central planning documents. It not only provides the College with general direction in support of achieving its mission and institutional goals, it also provides a framework for the integration of virtually all of the College's planning efforts for the duration of the plan.

Institutional Goals:

The Educational Master Plan has identified four institutional goals that provide the framework for all plans and initiatives developed by the college. The four institutional goals approved by the College Council and the Board of Trustees on April 5, 2011 are:

Goal 1. Promote academic excellence and student success.

Goal 2. Build MPC into an economic driving force for the Monterey area by supporting and developing programs that teach employable skills.

Goal 3. Manage the rate of growth in programs and services in Seaside and Marina, subject to funding and growth conditions.

Goal 4. Maintain and strengthen instructional and institutional technology.

These institutional goals provide the framework for the Educational Master Plan and will guide prioritization and implementation of technology initiatives.

In addition to the goals listed above, Appendix G of the EMP is the *Strategic Initiative for Technology Sustainability*. All initiatives included in this Technology Plan are clearly defined as aligning to one the Institutional Goals or the *Strategic Initiative for Technology Sustainability*.

Planning Assumptions

- ✓ All initiatives herein will support the institutional goals of the College, as articulated in the Educational Master Plan and encompassed by the College Strategic Initiatives, and in response to ACCJC planning agenda items and standards.

- ✓ The Technology Plan is one of the College's key strategic plans and plays a critical role in the success of the College.

- ✓ As the detailed design and planning phases are implemented through the Technology Plan, the IT Department will identify technology issues and initiatives to be incorporated into relevant plans.

- ✓ A significant number of demands for technology-related support will compete for limited funding. Consequently, the Technology Committee will rely on evaluation criteria to bring forward recommendations to College Council.

Technology planning and resource allocation is guided by the College's planning and resource allocation process, which is in turn shaped by MPC's institutional goals. College constituencies participate in the program review annual plans to identify needs. Technology related initiatives are collected through the division chairs, administrative structures, and other sources including campus-wide surveys. The initiatives are reviewed by the Technology Committee and a recommendation is made to College Council based on the Technology Committee's evaluation criteria.

Introduction

Current and Future Environment

Based on research, evaluation, and feedback the overall state of technology at MPC is well below reasonable expectations. Both the systems and services are in need of additional resources. Careful planning and follow-through is required to turn the course of technology for MPC. The items below are some factors in driving the need for this strategic technology plan.

Areas that Need Attention:

o MPC's reliance on the current Student Information System has put this college into a very vulnerable position.

o MPC needs a fully integrated Enterprise Resource Planning (ERP) system to pull together the systems of key functional areas.

o The Wi-Fi at MPC needs to be upgraded to address current demands and expectations of the college and its students. A plan needs to be in place to address Wi-Fi expectations such as Bring Your Own Device (BYOD) and other student focused needs.

o Solutions such as Virtualized Desktop Infrastructure (VDI) and hosted email are very important for the long-term sustainability of the technology at MPC.

o The Network and Server infrastructure needs to upgraded at hardware level and redesigned at a software and configuration level. This remediation work is critical to future projects, such as an ERP system and Wi-Fi.

o The current MPC website needs to be upgraded to address both functionality and appearance issues.

o Single-Sign On (SS0) technology needs to be implemented to address student needs such as accessibility and ease of use. SSO will also enhance faculty and staff efficiency.

o The age of all technology related equipment including workstations, networking devices, servers and storage equipment is well beyond industry use recommendations; there is a need to put significant resources and planning into technology refreshment.

o The decentralized model of IT support and services does not meet accepted industry standards and best practices.

o The IT Department must be provided with the necessary resources to improve the current state of technology at MPC.

o In addition to IT providing expert support to the infrastructure and applications, IT must be more proactive in training and supporting instructional technology.

o Collaboration and communication between functional areas, users and IT needs improvement.

o The design, procurement, and implementation of all technology on campus needs to be done in partnership with the IT Department through planning and collaboration.

o A reliance on in-house technology solutions vs. vendor supported solutions has put MPC in a very vulnerable situation. The in-house designed technology solutions often fall short of reasonable expectations. In addition vendor supported solutions and consulting can be held financially liable if contractual obligations are not fulfilled.

o Change is inherent with technology and the campus needs to be able to be flexible enough to predict and adapt to those changes as they occur in order to meet the technological needs and expectations of our students, faculty and staff.

Benefits to Students, Staff and Faculty

The three year strategic technology plan has both internal focus on functional areas and technology infrastructure. The primary purpose, however, is to improve technology systems and services designed to support instructional needs. The students of MPC will directly benefit from improved access to information and services. Learning needs will be the focal point when designing and implementing new technologies.

Benefits for students:

- Easy, clear and efficient enrollment process

- Access to campus wide Wi-Fi

- User-friendly navigation of new MPC website

- 24-hour access to class websites and materials

- Secure and efficient email communications with other students and instructors

- Up-to-date classroom and computer lab technology that reflects industry standards

Benefits for faculty and staff:

- Dependable technology equipment and support

- Reliable classroom technology, customizable for specific software requirements

- Sustainable technologies focused on efficiency

- Ability to communicate securely with students online/via email

- Easy access to forms, committee news, calendars, employee handbook, etc.

- Increased electronic storage and reduced need for printed materials

- Ability to customize department webpage easily (intuitively)

- Streamlined and efficient processes for routine tasks with flexibility to adjust/improve

Strategic Plan

Technology Plan Development

The following section illustrates the methodology used to gather relevant data for this strategic plan. Quantitative analysis was used to interpret the data from surveys. As an example, the results from student and employee surveys were categorized, tabulated and compared to other data, including the feedback contained in the Academic Senate Technology Discussions.

Research and Input

Research and input for the technology plan included the following components: (Summary results of research and input can be found in *Appendix B: Survey Summaries.*)

Academic Senate Technology Discussions 2010 – 2012

This report was provided by the Academic Senate to the Director, I.S / CISO in December 2012. Included in this report:

- History of technology related issues at MPC
- Minutes from Academic Senate meetings detail attempts to resolve technology issues
- Faculty Survey (Technology Related) Responses from Oct 2012

Employee Survey March 2013

In March 2013 and all-employee Technology Needs and Satisfaction Survey was administered via Survey Monkey. Here are the results:

The number of surveys received was 222. The areas of greatest need identified by the survey are:

- Website
- Age of equipment
- Currency of instructional-based technology
- IT Department communications
- Lack of resources

Direct I.T. Staff Feedback and Supervisor Evaluation

- Staff Meetings
- Individual Meetings
- Individual skillset and methodology gap analysis

- IT department staff strength, weakness, opportunity and threat (SWOT) analysis

Student Hosted Email Survey March 2014

In March 2014 a student survey was conducted via Class Climate evaluation.

283 students completed the survey.

Summary of results:

- 71% would use a their school email more if it was a hosted email solution
- 60% of students do not currently use their MPC.edu email account
- 50% of students are already using cloud storage

Students Technology Needs Survey

283 students completed the survey.

The top 3 areas needing improvement:

- Campus Wi-Fi
- Website
- Email

Of the top three area needing improvement, students overwhelmingly chose the campus Wi-Fi as the biggest priority.

Business Process Analysis

Hire outside vendor to perform Business Process Analysis (BPA) and several critical operation of the college. Use the findings from those BPAs to:

- Identify inefficient processes
- Use current technology that is in place to mitigate gaps
- Develop scripts for needs to be addressed by an ERP system

Interviews with IT leaders from other colleges and universities

Through relationships developed with IT leaders at other colleges and universities, compare

technical solutions in place. The following methods were used to gather information:

- Site visits to local schools including Cabrillo, Hartnell and CSUMB
- Chief Information Systems Officer (CISO) listserv
- Chief Information Systems Office Association (CISOA) Annual Conference and monthly board meetings

Reports from Expert Services

Reports from contracted expert services:

- Network security and health audit
  - o Assessment performed by *Development Group Inc.*
- Virtual Desktop Infrastructure (VDI) preparedness assessments
  - o Assessment performed by *GOVPLACE*
- Server-farm virtualization and health assessments
  - o Assessment performed by *CDW*
- Wi-Fi validation report
  - o Assessment performed by *OnDemand365*

Technology Committee Overview

Description:

The College Technology Committee reports directly to the College Council regarding technology issues, and provides information regarding institutional and academic technology needs to the college's Academic Affairs Advisory Group, Student Services Advisory Group, and Administrative Services Advisory Group.

Responsibilities:

The primary purpose of the Committee is to assess campus technology resources and needs and develop and annually update a comprehensive Technology Plan. The committee will evaluate and review specific equipment, software and/or training which the college requires in order to fulfill its mission. Specific duties and responsibilities of the committee include but are not limited to:

A. Annually assess campus technology resources and needs;
B. Create, and annually update, the College's Technology Plan;
C. Act as recommending resource to the College Council regarding technology issues;
D. Make recommendations regarding priorities for the acquisition of technology, hardware and software, during budget development and review processes. Such recommendations could include priorities for support staff, training, and access to computer resources and laboratories;
E. Recommend specifications and standards for the purchase, placement, operation, repair and replacement of technology resources as a part of the Action Plan process, grants, renovation and building projects and technology refreshment.
F. Review and make recommendations on the design and use of facilities and related technology resources.
G. Develop and recommend campus policy regarding use and control of technology resources.

Membership:

The membership shall consist of 10 voting individuals, two of whom are to be from Administration including the IT Director/CISO, and an additional 8 representing functional areas to be covered (see below). One member can cover one or more functions depending on their experience.

- 3 chosen by Academic Senate
- 3 chosen by MPCEA
- 1 chosen from ASMPC
- 1 identified by the other 9 committee members.

Additional resource people can be asked to attend specific meetings or all meetings as non-voting experts or non-voting members.

Strategic Elements

Guiding Principles

The following principles were developed in concert with the institutional goals and objectives to guide decision-making and the prioritization of IT initiative.

1. Technology initiatives will be considered based on their effectiveness in promoting an environment conducive to the student experience.

2. Technology initiatives will be given consideration for the scope of positive impact.

3. Technology initiatives will be given consideration for current and ongoing feasibility. The feasibility analysis will include current funding, ongoing support and maintenance, IT staffing and IT equipment.

4. Technology initiatives will align with institutional goals as defined in the 2012 – 2017 Educational Master Plan (EMP).

5. Partnering opportunities will be pursued with other colleges and private sector organizations whenever possible.

6. Sustainable technologies including virtualization, hosted or cloud-based systems will be endorsed when appropriate.

7. Expert services will be utilized for highly complex / low frequency projects when practical.

8. Functional areas will partner with IT during investigation, consideration, procurement and deployment of campus technology to ensure standardization which increases support capability.

Goals, Objectives and Strategic Initiatives

IT Department Mission Statement

MPC will benefit from effective, high quality, secure and sustainable technology. The delivery of technology will be used to promote academic success and accessibility to information while aligning with our Institutional Goals.

- *Goals* identify MPC's main areas of technology focus and needs over the next three years. The goals in the Technology Plan align to institutional goals identified in the Educational Master Plan.

- *Objectives* are tied to the goals and identify the activities or action steps needed to obtain the results envisioned by the goals. Some objectives support more than one goal.

- *Strategic initiatives* break down the objectives into specific projects and activities. When possible, timelines and budget information is provided.

- *Guiding Principles* guide decision-making in the continual development and enhancement of technology related solutions and services.

Mission Statement

All Monterey Peninsula College will benefit from effective, high quality, secure and sustainable technology. The delivery of technology will be used to promote academic success and accessibility to information while aligning with our Institutional Goals.

Goal 1
Academic Accessibility & Success

Goal 2
Communications & Collaboration

Goal 3
Technology Infrastructure

Goal 4
Institutional Information Management

Goal 5
Funding & Sustainability of Technology

Objective 1a
Enhanced Delivery & Support of Technology to MPC

Objective 1b
Enhance Distance Education

Objective 1c
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Objective 2a
Enhance Multiple Channels of Communication & Collaboration

Objective 3a
Enhance Institutional Network & Internet Connectivity

Objective 3b
Enhance Security for Transactions, Storage, & Backups

Objective 3c
Increase Sustainability & Reduce Ongoing Overhead

Objective 4a
Enhance Data Storage, Retrieval, Organization & Access

Objective 5a
Enhance Institutional Budgeting, Prioritization, & Purchasing Processes

Goal 1:
Academic Accessibility & Success

To provide students have access to classes, services, and support with a focus on their overall academic success.

Scope:

With declining enrollment and the current funding challenges that face MPC, it is imperative that efforts to enhance student accessibility and success are fully supported. It is necessary that adequate resources be provided to the Information Technology Department in order to support the technology-focused goals of the college.

Objective 1a – Enhance the Delivery and Support of Technology to MPC		
Initiative	**Description**	**Measurable Outcomes**
1.a.1 Implement help desk software for IT/AV	The system of using email distribution lists as a help desk solution provided very limited functionality and did not provide reporting capabilities. Using a cloud-based help desk management system will provide functionality for users, such as being able to track requests and reporting capabilities for managers.	By April 2014 fully implement the ITDirect module of SchoolDude. The implementation will include training for groups and individuals.
1.a.2 Develop mobile apps for institutional use	The development of mobile apps designed to support student access has been identified as a priority. This initiative will lend to the perception of technology modernization and will be focused on the current usage trends of students.	By the end of fiscal year (FY) 2014/15 have a mobile app in production that will allow students to view campus maps, class schedules and other information.
Objective 1.b – Enhance Distance Education Support		
Initiative	**Description**	**Measurable Outcomes**
1.b.1 Implement help desk software for Distance Education Support	Implement a focused help desk solution specifically for Distance Education/ Online support. The use of this system is designed to increase efficiency and responsiveness when responding to online help desk issues.	By December 2013 fully implement help desk solution to address Distance Education issues.
1.b.2 Hire full time Instructional Support Technician	This position will directly support Distance Education and Online classes. This position will report to the Associate Dean of Instructional Technology and Development.	Fill position by July 2014

Objective 1.c – Technology Support, Services and Training		
Initiative	**Description**	**Measurable Outcomes**
1.c.1 Centralize and standardize technology support	MPC has division technicians whose specific knowledge and quick response make a division run well. This decentralized model of technical support has an adverse impact on technology support, efficiencies, and standardization. A centralized model of technology support, under the IT Department, will enhance efficiency and standardization of technology. Additionally, the current decentralized model of support leaves gaps in service areas such as the Marina and Seaside campuses. The centralized model of support, under Information Technology, is widely recognized as a best practice. The intent is to keep the benefit of a local technician while improving standardization and efficiency.	During FY 2013/14 research and plan for a model of centralized technology support and services. During FY 2014/15 begin implementing a strategic plan to centralize technology support and services with a goal of full implementation by the beginning of FY2015/16.
1.c.2 Increase technical proficiency and professional development	Technical training and professional development will be provided for IT personnel as well as other staff and faculty.	FY 13/14: IT Director completes Project Management Professional (PMP) and CISO Certification FY 13/14: Net Engineers complete Hyper V training FY 14/15: Complete training for technicians on Windows 7/8 FY 14/15: IT Director completes EDUCause leadership program FY 15/16: IT managers complete CISO certification. TBD: VMWare training and certification for IT staff January 2014: IT and the library begin offering Lynda.com training to MPC faculty and staff

1.c.3 Improve IT's use of best practices, planning and support	Develop a system of best practices and methodologies based on Project Manager Professional (PMP) and the Information Technology Infrastructure Library (ITIL). The benefits to the college will include technologies being planned and tested before being implemented.	Ongoing
1.c.4 Create a new computer/ network Acceptable Use Agreement (AUA)	This will provide an updated AUA to reflect current technology usage and needs. See *Appendix A: Policies* for draft.	By July 2014 develop a new AUA.
1.c.5 Develop a Service Level Agreement (SLA)	After a sustainable level of resources is allocated to the IT Department, based on the staffing / re-organization recommendations that were put forth by the CISO, a Service Level Agreement (SLA) would be put in place. This SLA would include hours of operations, expected response times and other expectations. See *Appendix A: Policies* for draft.	This initiative is dependent on Initiatives 1.c.1 and 1.c.8. By the end of FY 2014/15 the SLA will be fully implemented and include; telephone support for urgent issues, tiered escalation of issues, clearly defined response times.
1.c.6 Develop consortiums and partnerships with IT leaders and local colleges	Develop and enhance a collaborative relationship between the I.T. leadership at local colleges including CSUMB, Hartnell and Cabrillo. Utilize these relationships to share information, experiences and resources. Investigate the possibility of increased purchasing opportunities through these consortiums.	Ongoing
1.c.7 Develop an established IT maintenance window	This will provide the IT Department with a scheduled time to perform routine off-hours maintenance, such as system patching and other upgrades.	By September 2013 work with MPC leadership to establish approved maintenance windows.

	Create and fill a Network Operations Manager position. This position along with centralized support will provide IT with the human resources required to fulfill the technology expectations and needs of the college.	Fill this position as soon as possible.
1.c.8 Address IT staffing needs		

Goal 2:
Communication & Collaboration

Provide students, faculty and staff with access to proven technology that enhances communication and collaboration.

Scope:

Utilizing proven technology, students, faculty, and staff can effectively and efficiently access portals of communication and collaboration.

The enhancing of communications will lend to increased efficiency amongst functional areas on campus and will ultimately lead to better support and services for the students.

Objective 2a – Enhance Channels of Communication and Collaboration		
Initiative	**Description**	**Measurable Outcomes**
2.a.1 Redesign website including project management and hosted solution	Develop and advertise RFP for website redesign project. The intent is to increase effectiveness of the present website and to remove barriers to student success. Accept vendor proposal that is within budget. A hosted solution is desirable for availability and sustainability. The redesigned website should enhance channels of communication and collaboration.	By September 2013 - establish Website Redesign Sub-committee. By October 2013 – Develop and approve a Request for Proposal (RFP) for a website redesign project By December 2013 – Select a vendor. By April 2014 – Hire an internal Project Manager to work with the vendor By August 2014 – Go live with new website.
2.a.2 Implement hosted email, storage and collaboration solution	This initiative will reduce ongoing costs and overhead to the I.T. Department, while providing enhanced services to students, faculty and staff. Appropriate and timely Training for all stakeholders will be heavily emphasized during this implementation.	By Feb 2014 visit neighboring colleges and universities to research their email solutions. By March 2014 conduct student survey focused on email By Jan 2015 all students, faculty and staff will be using a hosted email solution. The implementation is estimated to take 4 – 6 months from the initiation.
2.a.3 Improve emergency alert system	A robust emergency alert system will need to be put in place. Recent tests and a real incident identified gaps in communications. A text alert system should be evaluated and gaps in current systems will need to be addressed.	By August 2014 a text alert system will be implemented.

Goal 3:
Technology Infrastructure

The college technology infrastructure needs to be enhanced and supported to provide the tools and resources for institutional technology needs.

Scope:

The technology infrastructure is the core of technology on this campus. We need to provide a modernized and sustainable foundation for which technology on this campus will grow. This includes: hardware, software, transmission networks, security protocols, backup and recovery systems, and monitoring systems.

3.a – Enhance the Institutional Network and Internet Connectivity		
Initiative	**Description**	**Measurable Outcomes**
3.a.1 Enhance network infrastructure	An upgrade to the core networking infrastructure will need to be performed. To date, 21 new switches have been purchased from contingency funds.	By August 2014: 21 switches will be installed at the Library. Ongoing this initiative is dependent on Initiatives 1.c.1 and 1.c.8.
3.a.2 Wi-Fi validation, plan and upgrade	The college Wi-Fi is performing well below reasonable standards and expectations. A Wi-Fi validation will be performed to identify areas of concern. Then a plan of remediation based on student expectations will be developed. After the plan is developed enhanced Wi-Fi solutions will be implemented.	By January 2014 hire consultant to perform Wi-Fi validation Contingent on Initiatives 1.c.1 and 1.c.8. and contracted expert services: By September 2014 A Wi-Fi prioritization plan will be developed to include Bring your Own Device (BYOD) By December 2014 address all known technical Wi-Fi issues. MPC will have a robust and sustainable Wi-Fi presence.
3.a.3 Enhance VOIP Voicemail	The current voicemail system is based on Microsoft Exchange. The voicemail system needs to be standardized on a Cisco platform.	Contingent on Initiatives 1.c.1 and 1.c.8.: By Jan 2015 Cisco Voicemail will be integrated into the Cisco Phone system. Combine this with hosted email will result in a software licensing decrease

3.b – Enhance Security for Transactions, Storage and Backups		
Initiative	**Description**	**Measurable Outcomes**
3.b.1 Utilize service provided by the CCC Information Security Center	These free services are supported by the Chancellor's Office and include vulnerability scanning and server monitoring. The security audits will be followed with plans to mitigate any vulnerabilities.	By March 2014 begin using this free service.
3.b.2 Implement network management/ monitoring software	Network monitoring is essential to help understand the extents of a smooth running network and to be able to negate issues before end-	This initiative is dependent on Initiatives 1.c.1 and 1.c.8.

	users are impacted.	
3.b.3 Develop disaster preparedness/ recovery plan	Preparation, planning and drills will be established by using industry best practices. The recovery plans will protect the essential data of the college and ensure business operations can be reestablished.	By August 2014 a Disaster preparedness / recovery plan will be formalized.

3.c – Increase Sustainability and Reduce Ongoing Overhead		
Initiative	**Description**	**Measurable Outcomes**
3.c.1 Implement server and desktop virtualization technologies	Virtualization technologies are software applications that allow a single desktop computer or server to mimic multiple desktops or servers. This increased use of virtualization will reduce energy consumption; speed up desktop/server deployment, improve disaster recovery capabilities and enhance remote access capabilities.	By March 2014 – Using consulting help and in-house staffing resources. Implement Virtual Desktop Infrastructure (VDI) lab Contingent on Initiatives 1.c.1 and 1.c.8. and funding: By January 2015 - 30% of all workstations, servers and lab PCs will be virtualized By Jan 2016 – 50% of all workstations, servers and lab PCs will be virtualized. The result of this initiative will be sustainable technology that will reduce power consumption.
3.c.2 Implement Single Sign On (SSO) solution	This will allow users to log in to the computer once to gain access to all connected systems without being prompted to log in again at each one of them. The authentication to college services is centralized through Active Directory.	By June 2014 hire consultant to configure SSO for open CCCApply Contingent on Initiatives 1.c.1 and 1.c.8 By September 2014 All applicable applications will be accessible by SSO
3.c.3 Active directory redesign	A redesign of active directory to industry standards and functionality will enhance the overall functionality and	Contingent on Initiatives 1.c.1 and 1.c.8. and possible need for expert services: By September 2014 Active Directory

	performance of critical enterprise services, including SSO and security.	will be completely resigned. This is a necessary preparation step for hosted email and other efficiency saving initiatives.
3.c.4 Develop sustainable printing solutions	Evaluate sustainable printing solutions. It has the potential to enhance the sustainability and functionality for this core service. By properly designing and implementing a campus-wide centralized printing solution, the overall number of printers can be reduced.	June 2014 begin evaluating present campus wide printing solutions. By December 2014 make recommendations to reduce printing costs for MPC.

Goal 4:
Institutional Information Management

> **Faculty and Staff will have access to college information systems that facilitate storage, retrieval, analysis and reporting of institutional information.**

Scope:

The guidelines for a business process analysis, the procurement of an Enterprise Resource Planning system, as well as institutional reporting in concert with the ERP system will be established.

4.a Enhance the Institutional Data Storage, Retrieval, Organization and Access		
Initiative	**Description**	**Measurable Outcomes**
4.a.1 Perform a Business Performance Analysis (BPA)	A Business Process Analysis (BPA) will be an opportunity to examine current business processes. The goal is to identify inefficiencies and ineffectiveness and to develop a plan to mitigate those flaws.	By December 2013 hire consultant to perform BPA for A & R and HR Other functional areas TBD
4.a.2 Procure and implement Enterprise Resource Planning (ERP) software	The Santa Rosa SIS system is operating with increasingly reduced resources. A fully supported and integrated Enterprise Resource Planning (ERP) system will need to be procured and implemented.	By October 2014 begin the process of developing Request for Proposal (RFP) for an Enterprise Resource Planning (ERP).
4.a.3 Enhance institutional reporting; in concert with the new ERP system	This is dependent on available funding through a Title V grant. A plan will need to be developed to train people on how to use the ARGOs reporting system.	By May 2014 file submission for Title V grant. Depending on results of grant and identified other funding sources, begin implementing ERP system by the end of spring 2015

Goal 5:
Funding & Sustainability of Technology

Technology solutions will be high priorities for the college and are funded, acquired, developed and implemented in a timely, sustainable and cost-effective manner.

Scope:

The Technology Committee in consultation with the IT department will research a sustainable refresh strategy and identify additional funding sources. Grants and partnerships that are obtained will enhance technology for the campus and strengthen relationships with other educational and professional entities.

5.a Improve Technology Budgeting, Prioritization and Purchasing Processes		
Initiative	**Description**	**Measurable Outcomes**
5.a.1 Develop and update a sustainable technology refreshment strategy	The College must develop a sustainable technology refresh budget. The budget should be centralized under the IT Department to ensure the ability to leverage purchasing options.	By the beginning of FY 15/16 a refresh budget should be established.
5.a.2 Develop processes for departments to partner with IT for investigation, purchase and implementation of technology	Without a pre-purchase partnership, there is a risk that technology will be purchased the IT Department is not aware of, cannot support, and/or is not compatible with the IT infrastructure. It is imperative, for long-term sustainability and robust college-wide technology, that all technology purchasing is reviewed and approved by the IT Department.	Ongoing
5.a.3 Explore funding opportunities, including grants and partnerships	Explore funding opportunities including grants through the MPC Foundation and through other funding opportunities. This will develop opportunities and strengthen partnerships with vendors.	Ongoing
5.a.4 Develop a system to prioritize and rank current and future initiatives.	The Technology Committee will develop a clearly defined system to rank and prioritize technology initiatives. Criteria such as scope of positive impact to student success and feasibly will be utilized.	By December 2014 an initiative prioritization system will be in place.

Strategic Initiatives by Cost

	Timeframe	One-Time Expense	Annual Recurring Expense	Total Cost Through FY17
Goal 1 – Academic Accessibility and Success				
Objective 1a – Enhance Delivery and Support of Technology to MPC				
1.a.1 Implement help desk software for IT/AV	FY 13/14	$4,000	$2,500	$12,000
1.a.2 Develop mobile apps for institutional use	TBD			
Objective 1b – Enhance Distance Education				
1.b.1 Implement help desk software for Distance Education issues	FY 13/14	$1,000	$1,000	$5,000
1.b.2 Hire full time instructional support technician	FY 13/14			
Objective 1c – Technology Support, Services & Training				
1.c.1 Centralize & standardize technology support	FY 14/15	N/A		
1.c.2 Increase technical proficiency & professional development	Ongoing			
1.c.3 Improve IT best practice, planning & support	Ongoing			
1.c.4 Create a new computer/ network Acceptable Use Agreement (AUA)	FY 13/14	N/A	N/A	N/A
1.c.5 Develop a Service Level Agreement (SLA)	FY 13/14	N/A	N/A	N/A
1.c.6 Develop consortiums & partnerships with IT Leaderships at CCCs	Ongoing			
1.c.7 Establish IT maintenance windows	FY 13/14	N/A	N/A	N/A
1.c.8 Address staffing needs	TBD			

Goal 2 – Communication and Collaboration	Timeframe
Objective 2a – Enhance Multiple Channels of Communication & Collaboration	
2.a.1 Redesign website including project management & hosted solution	FY 13/14
2.a.2 Implement hosted email, storage & collaboration solution	FY 13/14
2.a.3 Improve emergency alert system	TBD
2.a.4 Implement & enhance the use of social media	TBD
Goal 3 – Technology Infrastructure	
Objective 3a – Enhance the Institutional Network & Internet Connectivity	
3.a.1 Enhance network infrastructure	TBD
3.a.2 Wi-Fi validation, plan & upgrade	TBD
3.a.3 A redesign of VOIP Voicemail	TBD
Objective 3b – Enhance Security for Transactions, Storage & Backups	
3.b.1 Utilize services provided by the CCC Information Security Center	TBD
3.b.2 Implement network management/ monitoring software	FY 13/14
3.b.3 Develop disaster preparedness/ recovery plan	TBD
Objective 3c – Increase Sustainability & Reduce Ongoing Overhead	
3.c.1 Implement server & desktop virtualization technologies	FY 13/14
3.c.2 Implement Single Sign On (SSO)	TBD
3.c.3 Active directory redesign	TBD
3.c.4 Develop a centralized printing solution	TBD

Goal 4 – Institutional Information Management			
Objective 4a - Enhance the Institutional Data Storage, Retrieval, Organization & Access			
4.a.1	Hire consultant to perform a Business Performance Analysis (BPA)	FY 13 /14	$42,0000
4.a.2	Procure & implement Enterprise Resource Planning (ERP) Software		
4.a.3	Enhance institutional reporting in concert with the new ERP system	TBD	

Goal 5 – Institutional Information Management		
Objective 5a – Enhance Institutional Data Storage, Retrieval, Organization & Access.		
5.a.1	Develop & update a sustainable technology refreshment strategy	TBD
5.a.2	Develop processes for departments to partners with IT for investigation, purchase & deployment of technology	TBD
5.a.3	Explore funding opportunities, including grants & partnerships	TBD

Information Technology Department Overview

An essential factor in the Technology Plan is the available resources to successfully complete technology initiatives. The Information Technology (IT) Department is responsible for the implementation and continuing maintenance of the majority of the technologies discussed in this plan. The narrative below is the current status of the IT Department staffing as well as a proposed staffing model to address current and future technology needs as defined in this Technology Plan.

Current Staff Model

The IT Department supports the technology needs of the College in areas of instruction, student services and administration ranging from the central systems to individual desktops. The staff is composed of individuals trained in their area of specialty.

Qty.	Position	Assignment or Specialty
1	Director of Information Systems	Department Management and Chief Information Systems Officer (CISO) for the College
1	Systems & Programming Manager	Supervises, organizes, coordinates, and participates in the work assigned to Programmer/Analysts
2	Programmer/Analyst	Develops and maintains applications. Also responsible for required submissions, such as MIS
3	Network Engineer	Instructional, staff, and faculty infrastructure administration and support
2	IT Support Technician	Instructional, staff, and faculty technical support
3	A/V Media Technician	Multimedia support for classrooms and events
1	Reprographics Technician	Print shop operations and support

Proposed IT Staffing

The MPC IT Department must stay current with technology and provide service and value to the college. Gaining efficiencies and improving productivity are necessary adaptations to the changing economic conditions of the California education sector. Based on evaluation of the current IT staff model, the following additional resources are the recommended means to satisfy the goals laid out in this plan. This IT staffing model will not eliminate the need for outside technical expert services; however, it will greatly reduce the need and ongoing dependence on consulting to achieve the goals identified in this plan.

Network Operations Manager (New Position)

There is a growing need for strong in-house project management, process control, and enhanced methodology. This position would be designed to fill gaps in technical skillsets and in overall methodology. The Network Operations Manager would work directly with the Director of Information Systems to put in place a strategic planning methodology based on Project Management Institute (PMI) standards and best practices. The Network Operations Manager would also have supervision responsibilities over the Network Engineers and IT Technician positions.

This position would require strong and current Network Administrator skillset including, but not limited to, Cisco Routing, Switching, VoIP, Windows Server Active Directory, and virtualization technologies.

Examples of the type of projects that would benefit from the addition of this position would be successful VDI implementation, network storage and use initiatives, and wireless access planning to implementation.

This position would work directly with the Director of Information Systems to put in place systems for resource control and enhanced processes including comparative technical solutions, invoking end-user feedback and appropriate use of outside consulting resources and synergy with other California Community Colleges. This position will be essential for the backfill of duties of the CISO during ERP preparation and implementation.

Technicians and Audio/Visual

Centralizing technology support could benefit the college in many ways including standardization of technologies and support. The standardization of technologies and support would add to effectiveness and increase efficiencies.

A feasibility analysis of the current A/V media services and all MPC technicians should be evaluated for currency of support, efficiencies and other factors. The analysis will determine if current duties can be performed more efficiently by centralization and standardization.

The implementation of the IT/AV helpdesk system (School Dude ITDirect) has put a lot of the oversight and management infrastructure in place

Programmer/ Systems Analyst/ Database Administrator

The need to increase staffing and or resources under the System and Programming Manager will increase when an ERP system is implemented. Initially, because of the very specialized nature of ERP implementation, most needs will have to be addressed with expert services. However, a gap analysis can be performed for post-implementation ongoing maintenance and the need to increase in-house staffing may be identified.

Additional I.T. Staffing and Resource Considerations:
- The proposed staffing model should be considered adequate to fulfill the expectations for day-to-day support and many technology implementation projects. However, augmentation by consultants or other available resources may be required for specific projects.

- The technology support roles and responsibilities should be centralized and standardized technical support with oversight, training and support of the IT Department.

- Student workers should be evaluated as a possible resource in areas where they could help other students by providing IT department approved information and documentation.

Instructional Technology and Distance Education

The ICDE is made up of faculty, staff, and administrators with expertise and interest in distance education including: the Vice President of Academic Affairs, Associate Dean of Instructional Technology & Development, Director of Information Systems, the MPC Online Instructional Technologist, and the Faculty Coordinator for Distance Education. The ICDE's membership also includes representatives from the institutional research and Financial Aid departments, division technicians, and instructional faculty members drawn from counseling/advising, library sciences, career technical education, liberal arts, and the sciences.

MPC has long recognized that distance education and online instruction support the learning and success of all students, traditional and non-traditional alike, by allowing for the incorporation of interactive technologies and a variety of media applications in instruction.

In addition to providing up-to-date computer technology for learning, MPC's information technology goals include: providing support for distance learning technologies such as online and video conferencing, maintaining an instructional technology lab for use by faculty, and ensuring that students with disabilities have equal access to technology.

MPC's Institutional Committee on Distance Education (ICDE) serves as the recommending body on all matters related to online teaching and learning. ICDE makes recommendations on issues pertaining to academic and technical support for online students and instructors, policies and procedures related to online instruction, and also planning, development, evaluation and review of online offerings.

The oversight and leadership of Instructional Technology and Distance Education is provided by the Associate Dean of Instructional Technology and Development.

Appendix A: Policies

Computer and Network Acceptable Use Agreement (AUA)

I. Introduction

To comply with federal and state regulations, laws, and harassment mitigation policies, educational organizations are compelled to establish Internet safety guidelines otherwise known as Acceptable Use Agreements (AUAs) for the appropriate use of computer systems.

II. Rights and Responsibilities

Use of computers, services, and networks owned by Monterey Peninsula College (MPC) is a privilege governed by certain regulations and restrictions as defined by the College as well as by all applicable federal, state and local laws.

The user agrees to abide by the regulations set forth in this AUA. This means that the user agrees to behave responsibly in accordance with the standards established by MPC and this document while using college systems and network resources.

III. Right to Privacy

MPC supports each individual's right for personal communication; however, messages on computing resources are accessible to others through normal system administration activities and to the public through public records laws. Therefore MPC cannot guarantee privacy of electronic communication.

The system administrator reserves the right to monitor the usage of all network resources to ensure compliance with this policy, College policy, and federal, state and local laws. User files may be subject to search by law enforcement agencies under court order if such files contain information which may be used as evidence in a court of law.

MPC users are expected to comply with copyright and intellectual property laws.

Users who become aware of any violation of this policy should notify the proper authorities.

IV. Email

Email correspondence between employees of MPC to students or the community directly related to performing the duties and business of the College must take place using the official MPC.edu email address. Any official correspondence to a preferred or provided email address that is not a MPC domain email address will be considered a violation of this policy. MPC students should be directed to check MPC.edu email often for communication from the college and its employees. The MPC administration acknowledges there are exceptions to this policy such as when contacted by past students who no longer use college email or prospective students who have not yet received their student email address. There may also be situations when communicating with preferred or personal email is required and limited to direct students to use their MPC.edu email address.

V. Student E-mail

An MPC e-mail address (username@mpc.edu) is provided to all students as an official means of communication. Students are responsible for all MPC communication sent to their MPC e-mail address.

It is expected that students check their e-mail account on a frequent and consistent basis. To ensure that students remain current with MPC-related communications, students are strongly encouraged:

To check their e-mail at least two times a week.

To respond to all official MPC communications as directed in each communication (e.g., responding in person, by surface mail, or by e-mail).

Do not assume an e-mail response is a satisfactory substitution when directed otherwise.

Students are subject to this policy during academic terms for which they are enrolled, during breaks between terms, and during MPC holidays and vacations.

Faculty members determine how they will use e-mail in their classes. Faculty may wish to include their e-mail expectations in the course syllabus. The distribution of mass communications is restricted to MPC departments and offices for MPC business. External requests for mass communications will not be honored.

MPC employs various measures to protect the security of its computing resources and users' accounts. However, users should be aware that MPC does not and cannot guarantee such security. Furthermore, individuals are advised to exercise caution when sending sensitive or FERPA-protected student information via e-mail. In addition, individuals are reminded that some MPC information is not appropriate for e-mail communication.

VI. Enforcement

Violations of this policy will be reported to the appropriate administrator and, if warranted, the appropriate civil authorities. Non-compliance with this policy may also result in the loss of access to computer resources.

Students will be subject to the student discipline process as outlined in the college catalog.

Employees: Enforcement and discipline of this policy will be decided upon by HR and/or applicable union contract agreements.

VII. Acceptable Use Agreement

Conduct which is deemed non-acceptable use of MPC technology resources includes, but is not limited to, the following activities:

- Using a computer account without authorization.
- Using the campus network to gain unauthorized access to any computer systems.
- Connecting unauthorized equipment to the campus network.

- Using a personally-owned wireless access point or wireless device acting as an access point on campus.
- Attempting to circumvent data protection schemes or uncover security loopholes. This includes creating and/or running programs that are designed to identify security loopholes and/or decrypt intentionally secure data.
- Knowingly or carelessly performing an act that will interfere with the normal operation of computers, terminals, peripherals, or networks, e.g., deleting programs or changing icon names.
- Knowingly or carelessly running or installing on any computer system or network, or giving to another user a program intended to damage or to place excessive load on a computer system or network. This includes, but is not limited to, programs known as computer viruses, Trojan Horses, and worms.
- Deliberately wasting/overloading computing resources, such as printing too many copies of a document.
- Violating terms of applicable software licensing agreements or copyright laws.
- Violating copyright laws and their fair use provisions through inappropriate reproduction or dissemination of copyrighted text, images, movies, etc.
- Using College resources for commercial activity, such as creating products or services for sale.
- Using electronic mail to harass or threaten others. This includes sending repeated, unwanted e-mail to another user.
- Initiating or propagating electronic chain letters.
- Inappropriate mass mailing. This includes multiple mailings to newsgroups, mailing lists, or individuals, e.g. "spamming," "flooding," or "bombing."
- Forging the identity of a user or machine in an electronic communication.
- Transmitting, reproducing, or publicly displaying materials that are slanderous or defamatory in nature or that otherwise violate existing laws or MPC regulations.
- Attempting to monitor or tamper with another user's electronic communications. Reading, copying, changing, or deleting another user's files or software without the explicit agreement of the owner.
- Transmitting pornographic material. This may be in violation of federal law.
- Software theft (pirating). Users will not install unapproved software on computers owned by MPC, including software that does not include a site license agreement via MPC Tech Services. This is a violation of federal law.
- Accessing MPC Ethernet (wired) network without written permission from MPC IT is strictly prohibited. Violations of this include:
  o Moving computers, printers or other devices from one data port to another.
  o Plugging any personal device into a data port.

- Network shared storage is for work related purposed only. Storing non-work related personal items, including photos, video clips and music is prohibited.

Services Level Agreement (SLA)

Purpose

The purpose of this document is to define service levels provided to Monterey Peninsula College (MPC), to ensure supported business needs are met. This Service Level Agreement (SLA) identifies customer expectations and defines services provided by MPC Information Technology (IT), stating agreed-upon service level goals, operating practices, and reporting policies.

Commitment to excellence

- IT is committed to delivering excellent customer service by:
- Responding to requests for support within published time frames.
- Interacting with the MPC campus community in a respectful and courteous manner.
- Requesting feedback for opportunities for improvement.
- Continuously working to improve quality of service.
- Regularly reviewing and monitoring performance based on this SLA.
- Publicly publishing weekly status reports.

Scope*

- IT provides support to MPC employees in the following categories:
- MPC owned computing devices – desktops, laptops, etc.
- MPC owned telephones, fax machines
- Supported software applications
- MPC IT approved Operating Systems, hardware, firmware, and supported software updates
- MPC IT recommended anti-virus and power management software
- Access to shared folders
- MPC owned peripherals such as printers and scanners
- Network hardware management
- Internet connectivity and core phone systems/services

- Core Enterprise Applications; Email, SIS

- Network equipment configuration/installation

*The list above is not comprehensive and does not reflect the collaborative efforts between IT and the Lab Technicians in the current decentralized technical support model.

Out of Scope

- Any equipment that is not owned by MPC.

- Personal computers, laptops, tablets, or smart-phones of faculty, staff or students.

- All personally owned devices and software.

- Third party software not installed by IT.

- District or College purchased software cannot be installed on personal systems.

- Ad hoc end-user training on applications.

Hours of Operation

Normal hours of operation are Monday through Friday, 8:00 – 5:00. All campus-observed holidays are excluded.

Requesting Service/Assistance

Submit all requests and question through the IT & AV Help Desk

Priority Levels

IT will make every effort to resolve issues at the time of the call. If the problem cannot be resolved over the phone, a work order will be generated by the Help Desk staff. IT will assign priorities for all requests not resolved at the time of the initial call, based on the below definitions. Requests will be handled according to the priority of the work order, as determined by IT.

The following table briefly describes priority levels assigned to work orders, and initial response time expectations. While every effort will be made to resolve all issues immediately, circumstances may delay remediation or repair. In such cases, a resolution path and approximate time frame will be determined, and communicated to the end-user.

Level	Description	Initial response	First Contact Point	Escalation
1	Critical/Emergency	1 Hour	831-646-3073* and IT & AV Help Desk	1. Tier 3 – Director, IS / Systems Programming Manager
2	Urgent/High	2 Hours	IT & AV Help Desk	
3	Normal	1 Day	IT & AV Help Desk	2. Tier 2 – Network Engineers / Programmers
4	Low/Scheduled	5 Days	IT & AV Help Desk	
5	Project Based	Scheduled	IT & AV Help Desk	3. Tier 1 – Technicians / Helpdesk

*Temporary until "urgent call line" is staffed

Priority levels in detail

(Bullet points are examples only and not inclusive of possible range of issues. Also may not reflect current model of decentralized technical support)

Priority 1 – 1 hour response

Defined: Immediate impact upon instruction

- Classroom technology failure, preventing the class from proceeding
- Critical service failure for one or more divisions/business groups

Priority 2 – 2 hour response

Defined: Urgent or high priority issues directly impacting instruction or business operations

- Classroom technology failure that must be addressed before the next class meeting
- Staff inability to access core services
- Faculty or staff computer is non-functional, and preventing them from working
- Virus infection

Priority 3 – 1 day response

Defined: Day-to-day support issues of a non-urgent nature

- One or more applications will not function, but an alternative exists
- Classroom technology problems that do not prevent the class from proceeding
- Issues of an inconvenient nature, but not impacting day-to-day business operations

Priority 4 – 5 day's response

Defined: Low priority or scheduled requests

- The user has requested A/V for a class in the future
- A time is setup/appointment made for new or replacement equipment to be set up
- Computer OS or Software updates
- Equipment/phone moves and setup

Priority 5 – Project based requests

Defined: These requests are considered informational, or project-oriented, and will be addressed as part of larger projects or ongoing maintenance issues.

- Any request for non-essential help without time constraints
- Technology initiatives or projects
- Non-urgent software or equipment purchase consultation

Exceptions:

During traditionally busy times, such as the first week of a semester, response times may be longer than normal. Help Desk staff will inform callers if a delay is to be expected.

Response times do not guarantee resolution times, although every effort will be made to resolve all work orders upon first contact. If an immediate resolution is not available, interim solutions will be suggested and made available. Examples of delays:

- A part needs to be ordered to return a computer to operation. If possible a loaner computer will be made available.
- A subject matter expert must be contacted in order to resolve the problem.

Customer Responsibilities

To help facilitate the IT support process, the MPC campus community is requested to:

- Provide a clear, detailed narrative of the problem, including location and contact information.
- Provide a clean, safe and hospitable work environment for IT while they are in your office, class or lab.

- Notify IT at least 24 hours advance of any pre-determined need.*

- Interact with IT in a respectful and courteous manner.

- Attend training opportunities offered on campus for technology that will be used.

- IT must be consulted regarding new hardware or software purchases to have expectations of ongoing support.

*Depending on the scope of the request, additional lead-time may be required.

Feedback and Escalation

To give feedback or for escalation, please contact:

Director of Information Systems

Name: Michael Midkiff
Office Phone: 831-646-3073
Email: mmidkiff@mpc.edu
Cellular: 831-760-2245

Notes and Caveats: This Service Level Agreement (SLA) is based on a fully staffed and centralized model of technical support under the Information Technology Department.

Appendix B:

Research & Input Summaries

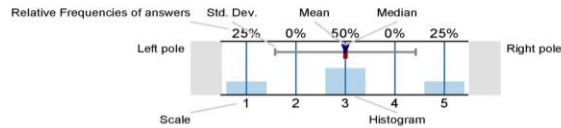## Student Hosted Email Survey - March 2014

IT Email Survey(EM) No. of responses = 283   ●MPC

Survey Results

Legend

Question text

Relative Frequencies of answers   Std. Dev.   Mean   Median

25%   0%   50%   0%   25%

Left pole   Right pole

1   2   3   4   5

Scale   Histogram

n=Amount
av.=Mean
md=Median
dev.=Std. Dev.
ab.=Abstention

1. MPC Email

1.1) Would you use your MPC email more if it was powered by Google or Office 365?

Yes	71.4%	n=280
No	28.6%	

1.2) Do you currently use your MPC email account?

Yes	39.6%	n=288
No	60.4%	

1.3) Do you currently use Cloud Storage? Select all that apply.

Don't Use	50.5%	n=283
Google Drive	43.8%	
SkyDrive / OneDrive	11%	
Dropbox	20.5%	
Other	11%	

1.5) What do you use now for your personal email?

GMail	67.1%	n=283
Yahoo	48.1%	
Hot Mail / Outlook	15.2%	
iCloud	6.7%	
Other	9.5%	

Student Technology Needs Survey – April 2014

IT Student Technology(ST) No. of responses = 281

MPC

Survey Results

Legend

Question text

Relative Frequencies of answers Std. Dev. Mean Median

25% 0% 50% 0% 25%

Left pole | Right pole

n=Amount
av.=Mean
md=Median
dev.=Std. Dev.
ab.=Abstention

Scale   1   2   3   4   5   Histogram

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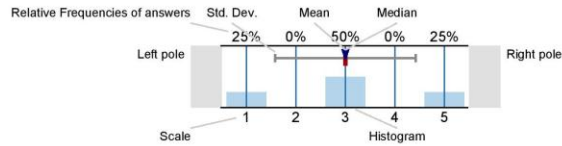
1. Campus Technology

1.1) How would you rate the technology on campus?

6.3% 8.2% 26.4% 38.7% 20.4%

Poor | Excellent
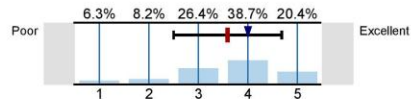
n=269
av.=3.59
md=4
dev.=1.09

1.2) What areas of campus technology are working well? (Select all that apply)

Internet Access	61.6%
Wireless	33.8%
Printing	45.2%
Computers – Classroom and Labs	58%
Email	40.9%
Website	48%
Classroom A/V (Projectors, Smart boards & Sound Systems)	33.1%
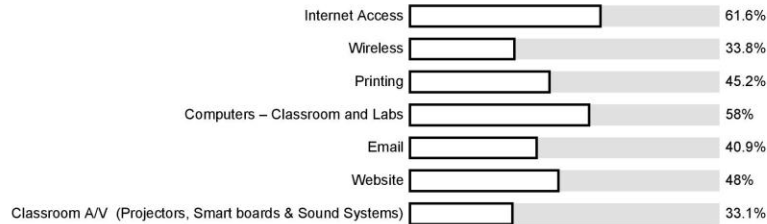
n=281

1.3) What areas of campus technology are not working or needs improvement? (Select all that apply)

Internet Access	23.1%
Wireless	55.9%
Printing	19.2%
Computers – Classroom and Labs	10.3%
Email	23.5%
Website	24.6%
Classroom A/V (Projectors, Smart boards & Sound Systems)	13.5%
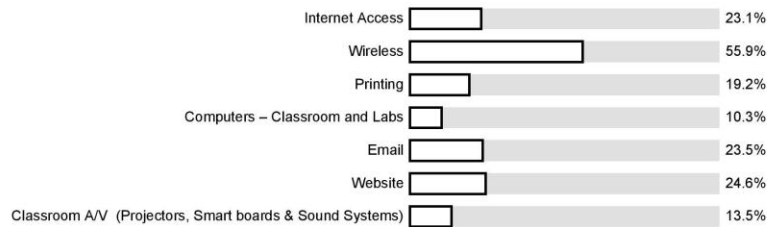
n=281

1.4) What areas of campus technology need improvement first?

Internet Access	4.5%
Wireless	51.1%
Printing	6.8%
Computers	6%
Email	8.3%
Website	12%
Classroom A/V	11.3%

n=133
av.=3.44
dev.=1.95

47
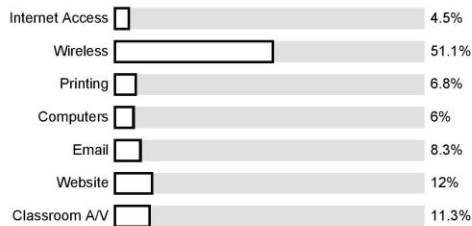
Employee Survey – March 2013

Top Comments from the Survey

Wireless

Wi-Fi	make it secure. Secure logins to allow access to MPC printers, email.
Wi-Fi	make it simpler to use
Wi-Fi	Slow when many students simultaneously accessing
Wi-Fi	make it work more reliably
Wi-Fi	make it good enough for academic use
Wi-Fi	strong access in every building on campus. Campus-wide wifi. Extend to lecture forums, our largest teaching area
Wi-Fi	better wifi

Website

mpc.edu	Update, rework. Cluttered. Difficult to search. Non-functional. Consult with faculty when updating. Sharepoint not workable for average users. Front page audience should be students only. Make it easier for students on first day to find course websites.
mpc.edu	MPC employees must keep website up to date
mpc.edu	clear application and registration info
mpc.edu	make the class site easier to get to
ADD	ADD compliance for websites
support	after hours and weekend support for Moodle website
login	One account to register, check email, take online classes. multiple logins are difficult for many students. Simplify login process for mpc.edu and moodle. Single sign-on. A more unified online system where one login gives access to everything instead of separate accounts for separate services
login	misconception: students need to be able to use MPC email without signing on multiple times.
login	Default password is too difficult
login	Don't require lobosmpc\ to login.
login	upgrade the connection provided to sign-in online so we don't need assistance
moodle	fix Moodle bugs
moodle	video tutorials
moodle	standardize on Moodle

moodle	rolling over moodle courses to next semester should be easier than it is.
moodle	make gradebook easier for faculty
moodle	moodle would be better if more user friendly
moodle	use Blackboard instead so we have same platform as CSUs. Use blackbord, or webct or ecomons
moodle	make sending email to students easy for instructor
moodle	automatic coordination with A&R so dropped students are removed from Moodle
moodle	training for instructors
online	Faculty should have own personalized website, like we had with mpcfaculty.net
online	Our division needs more online classes
online	better online services for courses. Mpconline and mympc systems are inadequate, unfriendly. Instructors need easy, accessible, commonsensical web pages for on-line or net-supported courses.
online	set up web server so static pages don't time out.
online	Get someone with online/instructional experience to help faculty with technology & instruction
online	expand online courses
onnline	expand on-line academic services
message boards	Separate message boards for students and faculty/staff.

Computers

computers	regularly updated software on all computers so no messages saying Adobe or IE or something needs an update before it will work.
computers	All staff computers need update of MS Office & IE. Get every computer on latest MS Office
computers	staff computers: lack of administrative priviliges is a real barrier. Let us update our own software. Smart classroom too. Perhaps have more people with admin rights to add/update software on individual computers. Would be great to install updates like Adobe without having to have IT do it.
computers	official campus support for the 50+ Mac computers in Life Sciences.
computers	Costume shop in Theater needs a computer
computers	ASC needs more computers for CSIS tutoring.
computers	Lack of computers/printers for adjunct use
computers	more available computers/laptops to work with in class
computers	more computers available for students
computers	an additional computer lab for BMC
computers	Mac computers as an option for faculty would be good.
computers	allow faculty access to laptops, especially if teach online.

computers   make easily available updates on software like Word for instructors who use
             their own computers at home

Refresh

refresh   need refresh. need a full tech refresh plan: thin clients, bring-your-
           own-devices, cloud computing, …. Include staff computers. Many
           computers have died & not been replaced. Computers in upstairs
           library faculty room too slow to use. Need current inventory with
           details on dates purchased, repair history, network problems. More
           RAM and SSDs may be cheap way to get more speed.

refresh   Computers that are reasonably fast, particulary in smart classrooms.

refresh   B&T needs some faster computers for running virtual machines
refresh   software needs refresh too
refresh   MPC laptops need updating.
refresh   cumbersome, sometimes takes 5-10 minutes to logon. Waste of
           faculty time.

HelpDesk Support

helpdesk   Tracking &communication of issues sent to networkSupport,
                 onlineHelp, phone calls, etc…. Some acknowledgement,
                 timetable, queue, something, helpdesk software. A Ticketing
                 system.
helpdesk   help desk for students including for BYOD and distance ed
                 and first day and financial aid, registration, email, mpconline,
                 etc….
helpdesk   MPC laptops in class. Helpdesk for problems would be nice.
                 Networked PCs woud be better
helpdesk   MPC has increased reliance on technology, but not increased
                 support. Many servicse have been put online, but no support
                 is added. Students to go library and ESSC for help for
                 registration, financial aid, MPCOnline, email. Techs around
                 campus are assisting, but these are strained resources.
helpdesk   some student have had problems accessing the class site
helpdesk   a tech workshop each semester for students to learn to
                 navigate their online classes & resources
helpdesk   a phone line to call for help, not email. For students and
                 faculty/staff. Staffed with helpful techies oriented to
                 customer service ideals.
helpdesk   helpdesk for students via phone and face-to-face and

	evenings and weekends.
helpdesk	centralized helpdesk to cover all IT needs instead of different email groups.
help desk	students call financial aid office because other departments cannot be reached or don't answer their phones
support	computers going down. Need computers that are actually working.
support	customer supoprt (IT staff) needs to be more user friendly to all including students
support	have someone available in a moment's notice at all times to resolve student computer issues.
support	more tech support people. Better support. Increase IT staff to be able to cover MPC, Seaside, Marina
support	several students have said it is difficult to get a response via phone or email from tech services. Maybe true, or maybe students evading responsibilty for not completing work.
support	need classroom instructional technology support in the evenings.
support	Greater coordination between administrative and divisional computer/technology support
support	make internet/phone lines in conference rooms ALL function, not just 1 of them or at least mark the actually working one so we don't have to play "find the internet"
support	Hard to get working computer in T 800. Eventually keyboard replaced.
support	byod: bring your own devices. Support it.
assistance	we need a formal process for getting assistance with special projects. It feels like a favor to get help with academic projects on non i-learn issues.
not working	sometimes difficult to connect to printers in staff lounge of reading center.
myDocuments	Can't always access MyDocuments folder from different computers, particularly Marina
	Reduce # of sync issues for classroom-to-campus-account

Training

training	Training and support for Moodle for online & face-to-face class use.
training	intensitve targeted training for our standard hardware/software. If not instructor-led, computer based.

training	workshop explaining webreg, online classes, mpc mail for faculty & staff. How to update MPC faculty page, upload documents, change content. How to use PhotoShop, Excel, make better PowerPoints.
training	basic skills training for students
training	Each department should have an upgrade specialist for educating faculty/staff nearly one-on-one. Result would be capable staff & faculty who can solve unexpected problems, freeing IT. Train faculty to troubleshoot common issues. Not practical to chase down a lab tech when a student laptop doesn't work.
training	basic how-to sessions during flex days: Outlook (basic & advanced). Explain Knighthawk and how to use effectively.

Smart Classrooms

smart classrooms	smart classrooms lack consistency. Makes teaching in different rooms difficult. Some remotes don't work. Many have broken doc readers, bulbs go out, DVD players not working, or other problems. Need clearly written directions. Need reliable, fluid classroom computer use.
smart classrooms	poor visibility of overhead projector screens
smart classrooms	every smart classroom needs whiteboard space. Move projection screens out of the way of whiteboards.
smart classrooms	more smart classrooms
smart classrooms	Classes, particularly tech classes, need to be provided with necessary equipment
smart classrooms	Respond to instructor needs. E.g. took 4 class sessions before flourescent bulbs removed that prevented seeing the screen. They were put back in the next day. Large stack of bulbs remains in T 800 even though they could be a danger.
smart classroom	Life Science presentation equipment not working reliably.

Training

training	Training and support for Moodle for online & face-to-face class use.
training	intensitve targeted training for our standard hardware/software. If not instructor-led, computer based.
training	workshop explaining webreg, online classes, mpc mail for faculty & staff. How to update MPC faculty page, upload documents, change content. How to use PhotoShop, Excel, make better PowerPoints.
training	basic skills training for students
training	Each department should have an upgrade specialist for educating faculty/staff nearly one-on-one. Result would be capable staff & faculty who can solve unexpected problems, freeing IT. Train faculty to troubleshoot common issues. Not practical to chase down a lab tech when a student laptop doesn't work.
training	basic how-to sessions during flex days: Outlook (basic & advanced). Explain Knighthawk and how to use effectively.

Miscellaneous

sis	SIS Upgrade to provide data reports for accurate attendance accounting, enrollment mgmt, and scheduling. Integrated management information system. SIS needs to be more user friendly with search optins. No options to view reports by division. Must select each individual dept. within the division of which I have 17. Consult DOMS about things that would make SIS easier to use
sis	integrated SIS
system software	Financial Aid Office needs an integrated system that coordinates with admission/records and Fiscal Services.
system software	Make sure student payment records, refunds, and class schedules are working properly & current.
system software	Escape software for HR

system software	Student Services systems don't talk to each other, so difficult to give students accurate info. Software that collects data required for "score card". SIS talk to SARS.
system software	Need a DSPS specific database management system.
system software	online appointment making system that works on & off campus without limitations of fire walls
network	need consistent network.
network	network sluggish occasionally.
network	network stability
network	reliable remote connections. Look into another method for remote connections that will work on other machines/operating systems.
network	better reliability needed in network, phones, servers.
network	move from Microsoft servers to Unix.
network	move away from campus-supported Microsoft email to Google Mail and associated apps
network	more network storage campus-wide.
network	invest in updated infrastructure to accommodate new equipment/software.
network	stable reliable network wuld have big benefits because everything runs through it
network	address "down time" issues and recent slowing down of software & internet responses
All is good	I don't have any problems
marina	Marina laptops don't work well. Set it up like BMC computer labs. Tech refreshment and funding for Marina
marina	support in Marina
marina	ESSC's timekeeper in Marina should be linked to TK on main campus so students only need 1 log-in number.
marina	laptop availability in Marina occasionally a problem for ESSC. As we grow, may get worse.
marina	access to computers/laptops is scare in Marina. Set up a day or 2 to work off the main campus?

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software	CSIS software costs are too much: PhotoShop, DreamWeaver, Flash
IT	IT folks are great. Respond fairly quicly considering how few there are.
IT	college's IT tech staff is effective, though often not timely.
IT	better communication and response from IT.
IT	hire people who really know what is going on in networking world.
lab tech	lab support needed in Student Services
lab tech	Unnamed division, lab needs a lab tech.
lab tech	our lab tech is resourceful and quick.
lab tech	localized tech support (by division)
printer	Unnamed department needs a color printer.
printer	Should be a printer in the print shop to print an original before making copies
availability	computer labs: better hours. More evening and weekend time. Keep library open more.
availability	more access to networked classrooms to bring students into at various times.
availability	Remove limitations on student access to technology (no details provided.)
survey	Thanks for having the survey
survey	Repeat this survey every semester
Communication	provide IT staff training to help communication. Or an assigned liaison to each user group (student, faculty, staff) who can communicate effectively with patience.
Communication	Improve communication between Instructional Technology and Campus Technology.
Communication	Communication issues between our lab tech and Campus Tech.

Communication	Communication with IT department has improved with emails regarding phone #s, contacts, etc…
Communication	Communicate & demonstrate your services. E.g. College Success Resources for Facilty is great, but not well known.
plan	Don't make big decisions without input from non-IT staff hwo will be affected by the change
plan	Develop good technology plan. Be realistic about needs. Long term goals so we don't need to band-aid things.
plan	better communication and planning. Don't force technology that doesn't fit instructional needs
plan	make sure the low-tech works, and then work on more high-tech applications
plan	MPC lacks communication and clarity about responsibilities for computer technology.
plan	Empower the tech committee to prioritize recommendations for the survey topics from question #2. publish, plan, execute.
standardize	standardize equipment
email	change email program to one with a larger memory
email	make email more easily accessible off campus
email	don't automatically time out email.
email	improve email quota and availability for mpc email
email	streamline webmail access for students.
email	allow secure, unmediated webmail password reset since students regularly forget their passwords. Modernize secure shell technology.
email	Students should use their MPC email addresses as primary address. Some faculty send emails to personal addresses, not MPC address, creating confusion for everyone.
email	Students need access to their mpc email after they register
phone	A phone needs to be put in IC-103

smart phones	We need to electronically notify students via their smart phones
phones	Automated Cisco phone systems need updating.
phone	need improved phone services. PSTC phone service is not good.
ipad	ipad app integration. Ipad integration.
security	on-campus security call boxes
testing	require usability testing
downtime	"system" being down in January was very difficult. (what system? Not specified.)
ASL	ASL needs a lab for students to record their signing skills.
mobile app	mobile app to check financial aid status, register for classes, campus safety notices, etc….. Mobile access.
teach	students need social media services (a desired skill in the business world), beginning computer skills (more basic than word or windows) and web publishing.
copiers	more copies for students
backup	Ensure all data from faculty computers is backed up regularly for all computer users PC & Mac.

Network Health and Security Audit

DEVELOPMENT GROUP INC.

BUILD A BETTER NETWORK

Engineering Report

Monterey Peninsula College

Network and Voice Assessment

Capture Report / Based on Data collected 2/14-15 2013 and 2/28/2013

Document Number: Version 1.5

March 5, 2013

PRIVATE / PROPRIETARY / SECURE:

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Contents

Executive Summary:

Monterey Peninsula College has contracted Development Group INC to provide analysis on the MPC Network in an effort to understand the current state of the network and any noted issues found. This document will go over five main categories: The State of the Network, Network Vulnerabilities, Issues noted, a Remediation Plan, and Network Enhancement Recommendations.

As a whole, the core MPC network equipment is current, but most of the edge equipment is either nearing the end of its typical life or has already exceeded it. Approximately 22% of the MPC gear will reach the end of support by July 2015, and approximately 12% of MPC gear has already passed the manufacturer supported date.

The data analysis has uncovered numerous vulnerabilities from a security perspective that should be addressed as soon as possible. In addition, there currently does not appear to be a best practice Quality of Service (QoS) in place. Without this framework to protect voice traffic from being dropped on the network, it is likely the contributing to phone call quality degradation.

There were many switches that have exhibited a large amount of errors and will require further investigation and/or replacement to resolve. These errors are likely contributing to some of the network-related issues that appear to be taking place in the MPC environment.

The Remediation Plan involves implementing Quality of Service to protect the customer voice traffic and also involves implementing best practice configurations for the equipment. The remediation plan also intends to further diagnose and mitigate sources of errors wherever possible.

The network enhancements section recommends the addition of an appliance to handle equipment logins and accountability for changes made in the MPC environment.

MPC has been having ongoing call quality problems in their environment. The call quality problems are believed to be unrelated to any server configuration at this time. For the most part, the MPC VOIP server environment appears to be set up following best practices. There are some notable areas that require attention, such as Emergency Responder, in order to achieve full compliance with these best practices.

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State of the Network:

The MPC network currently is composed of three campuses, the main campus, Seaside, and Marina. Marina and Seaside are both connected to the main campus.

The Seaside campus currently has a low speed link, with a Multilink PPP bundled 4.5 Mbps link. This link appears to be congested often and has many drops on the interface. The switches at Seaside all have an End of Support date for 7/2015 but do appear to be operating well with minimal errors in the environment. The 3845 WAN router at Seaside has an end of support date of 10/2016.

The Marina campus is composed of exclusively new equipment, none of which has an end of life date announced. Minimal errors were seen at this campus as well, and the equipment seems to be running well with the exception of the hub switch. There are substantial amounts of drops on that switch which will need to be investigated further.

The main campus has the most diverse mix of switches deployed out of the campuses. There are some switches that have substantial amounts of errors on the interfaces, most of these switches are older 3550 model switches. There is evidence of output drops on key links, indicating possible oversubscription for some links. The data ASA 5520 has a substantial amount of underruns on both the inside and outside interfaces, suggesting possible oversubscription of the device. A good portion of the equipment currently in the main campus has an end of support date, such as the 3550s witch have already exceeded their end of support date.

The MPC VOIP environment is running recent software (8.6) on supported hardware. There appears to be minor VM-Ware configuration optimizations as well as some basic cleanup to be done in Cisco Unified Call Manager (CUCM). Currently there are many ATAs in the environment being used for analog devices such as fax machines. The ATAs have reached End of Support status with Cisco and it is recommended that these devices be replaced. Additionally, the Cisco Emergency Responder is in need of configuration to properly report building or room level information in the event of a 911 call.

Network Vulnerabilities:

- Currently shared passwords are utilized in the MPC network. Shared passwords are easier to manage but come at the cost of accountability. This is a violation of best practice. When all users share a password, it is impossible to determine which user made changes in the environment.

- Passwords in use are simple and prone to dictionary or brute force attacks. This is a violation of best practice. There's currently no limit for attempts a person can make to login to the MPC environment, which makes these simple passwords even more of a liability.

- Telnet is being used as the primary management session protocol. Telnet is a protocol that is transmitted in plaintext, meaning that the traffic is unencrypted. An unauthorized user could introduce a network sniffer and capture passwords in transit. SSH should be configured to be the exclusive remote management protocol as that protocol is encrypted. Using telnet is a violation of best practice.

- Passwords in the configuration are utilizing reversible encryption. This is a violation of best practice. With access to a configuration backup, passwords can be cracked using easily available tools.

- SNMP Read Only (RO) and Read/Write (RW) strings are not protected by an ACL and are simple strings. This is a violation of best practice. SNMP RW strings are especially important to secure as devices using the string have full administrative privilege on the equipment.

- There is currently no access-list preventing management access to network infrastructure. This is a violation of best practice. The result of this configuration is that any person connected to any location on the MPC network will be able to log into the network equipment if they have the credentials.

- Spanning-Tree root bridge protection is not in place. This is a violation of best practice. Any switch can claim the root bridge role in the MPC environment which can result in inconsistent topologies. Spanning-tree inconsistencies can cause network outages and performance issues. Protection of the Spanning-tree root bridge is a best practice.

- There is currently no VTP password in place in the switching environments. This is a violation of best practice. New switches are able to "learn" the VTP domain name and join when there is no password configured. This allows users with malicious intent to

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have easy access to corrupt the VTP domain if desired. This also introduces the possibility of accidental additions and deletions when new switches are added.

- Currently the DMZ interface on the firewall has no ports restrictions to the LAN. This is a violation of best practice. The classic purpose for a DMZ is to provide a restricted environment for services that are accessible to both internal and external users. With the current security posture, a server comprised in the DMZ has full access to the internal LAN. The reverse is also true. Users on the LAN are able to access any/all ports on MPC LAN or DMZ equipment which leaves the campus especially vulnerable to attacks launched internally.

Noted Issues:

- Many switches have errors on some interfaces, requiring additional analysis. Errors on a interface can be within tolerance, therefore interface errors do not necessarily indicate a widespread problem. All interface counters should be cleared to identify whether interface problems are consistent or intermittent and resolving issues should be prioritized accordingly.

- Most switches do not have default gateways configured, switches are likely reachable only through proxy-arp configurations which violates best practice.

- Many switches have output drops, requiring additional analysis. Output drops are a result of congestion on an interface at a certain point in time. All interface counters should be cleared to identify whether interface problems are consistent or intermittent. Interfaces that are consistently oversubscribed may need to be upgraded.

- A few switches have interfaces in Half-Duplex mode, which typically results in degraded performance for hosts connected to those interfaces. Switchports in Half-duplex should be investigated to see if that is expected behavior for the device connected to it.

- Firewall interfaces have underruns on outside and inside interfaces, indicating possible oversubscription issue. This should be investigated further.

Remediation Plan:

LAN Security:

- All network equipment should be configured with a management access control list limiting access to equipment to a customer defined subnet.

- All network equipment SNMP community strings should be will be reconfigured to be more complex.

- All network equipment SNMP community strings should be configured to allow access to SNMP server(s) only.

- All access ports should be configured statically as access ports and dynamic trunking negotiation should be turned off.

- DHCP snooping should be enabled to ensure rogue DHCP servers are not able to be placed on LAN.

- All network devices will be configured to use SSH as the primary management protocol. Some switches may need software upgrades or may need to be replaced outright to support the feature.

- All interfaces with phones attached should be configured with the voice VLAN feature as opposed to the current trunking method.

- 802.1Q trunks should utilize a different native VLAN than the default VLAN 1.

- Default-gateways should be configured on all layer 2 equipment to ensure proxy-arp can be safely disabled in environment.

- ACLs should be configured to restrict access to needed services as appropriate inside MPC environment.

- Shared passwords should be replaced with unique logins for each individual or authentication should be handled by external AAA server.

Quality of Service:

- Quality of Service must be configured to support VOIP traffic. A comprehensive queuing strategy, especially on any WAN links in the customer environment is critical.

Spanning-Tree:

- Core 6500 VSS switch will be configured as the Spanning-Tree root bridge unconditionally.

- All downstream switches, from the perspective of the Spanning-Tree root bridge will be set to ensure that accidental or malicious modifications to Spanning-Tree role are ignored.

- Access ports should never receive Spanning-Tree BPDUs so all access ports will be configured to shut down the port in the event that BPDUs are received on that interface.

- Rapid Per-VLAN Spanning-tree should be configured in all switches. RPVST has several enhancements that aid convergence in the environment.

VTP:

- VTP password will be configured on all switches in MPC environment and all devices except core 6500s will be configured to be VTP clients.

- Optionally, all switches can be configured to operate in VTP transparent mode. This mode places switches into an autonomous state where database updates, malicious or otherwise, are not acted upon.

Interface Errors:

- All counters will be cleared in the environment to eliminate any stale information. Switches continuing to exhibit consistent interface errors will be troubleshot further. A majority of the switches exhibiting errors are older, end of life, switch models and will likely need to be replaced as part of a standard equipment lifecycle.

DMZ Security:

- Public facing services should be careful audited to see what level of access is required from DMZ devices to the internal LAN. There should only be the minimum amount of ports open required for a service to function to reduce the maximum scope of an attack.

- Private VLANs likely should be implemented in DMZ to limit the scope of a comprised server if that event were to occur.

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Recommended Network Enhancements:

ACS should be added to fill the following gaps:

- Currently equipment management takes place using a single shared password. ACS can be configured to act as an authentication source to provide equipment access authenticated against Active Directory.
- Currently there is no audit trail in place for the devices, if a network change is made there is no ability to look at when or who made the change. ACS has a built in auditing system to track these changes.
- ACS can effectively scale to authenticate wireless devices and users.
- ACS can also be configured to authenticate mobile VPN connected users if desired.

Voice Addendum:

Network Vulnerabilities:

- The voice gateway is currently configured with a SNMP RW string that is not protected by an access-list. The RW string provides full administrative access to the device, which will allow any user with the RW string the ability to make any changes desired. This RW string can be accessed from any point on campus, making this vulnerability particularly important to resolve as soon as possible. There is also no limit to the amount of times a user can attempt to use the string, making this particularly vulnerable to a brute force attack

- Currently telnet is being used to manage the voice router and VG devices. Telnet is an unencrypted protocol, making it vulnerable to network sniffing in transit. With the receipt of this password, an unauthorized user would have full management access to the equipment.

- Some phones/patterns in CUCM are not currently associated with a partition. Partitions and Calling Search Spaces (CSS) in CUCM allow an administrator to determine which patterns an end user can dial. A particular use case may be to prevent a lobby phone from being able to make international calls for example. All phones should be associated with a partition to allow proper administrator call control.

- Automatic Backups appear to be failing, but are configured properly in CUCM. These failures are likely the result of an unreliable backup server. It is recommended to purchase a Cisco Supported SFTP server to ensure that backups reliably complete.

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Noted Issues:

- VMware tools are out of date on the second UCS blade server. VMware tools helps to make the interface between the servers run more efficiently in a virtualized environment, and it is a best practice to keep these tools up to date in a virtual CUCM deployment.

- One blade has two CUCM servers residing on it. There is little additional benefit to having two servers on the same blade and this is not a supported configuration. In the event that the blade is lost or unreachable, both servers are also unreachable.

- The T.38 protocol is not currently being used for faxing in the MPC environment. T.38 provides additional reliability and control for Fax transmissions and its usage is considered a best practice for faxing.

- A Windows XP VM is currently installed on one of the UCS blades providing CUCM services. While there is arguably no technical reason why this is improper, Cisco has strict rules regarding operating system Co-Residency on the UCS blades in order to receive support from Cisco TAC. While highly unlikely, there is a possibility that Cisco TAC could consider this an invalid configuration and can reasonably consider MPC's deployment to be unsupported.

- There are no Media Resource Groups currently configured in the MPC environment. Media Resource Groups provide resources for Music on Hold, transcoding, and other media related services. There can be adverse effects depending on the environment and creating and supplying a media resource group to all devices is a best practice.

- Cisco Emergency Responder (CER) currently has 317 phones under the unlocated status. This means that in the event of a 911 call, (CER) will only show the main site as the source of the 911 call for these phones. All phones should be properly added to the CER to ensure that 911 calls provide the appropriate amount of detail as determined by the MPC administrative policy.

- There are directory numbers that appear to be abandoned in the MPC phone system and should be cleaned up if confirmed. This is typical in most environments, but unused directory numbers can potentially introduce accidental activation or dial plan overlap.

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Remediation Plan:

- All network equipment should be configured with a management access control list limiting access to equipment to a customer defined subnet.

- All network equipment SNMP community strings should be will be reconfigured to be more complex.

- All network equipment SNMP community strings should be configured to allow access to SNMP server(s) only.

- All phones and patterns should be associated with appropriate partitions to ensure proper dialing permissions for users

- CER should be configured to ensure that all devices are located and that appropriate 911 information is sent in the event of a call. This can be as granular as room level for the deployment, so administratively policy should dictate the appropriate level of visibility to provide to emergency personnel.

- A Cisco supported SFTP backup server should be provisioned in the MPC environment to ensure reliable backups.

- VMWare tools should be upgraded for second B Series blade.

- Media resources group(s) should be configured and associated with appropriate devices.

- T.38 should be implemented as the fax protocol in the MPC environment to ensure reliable transmission of faxes in the MPC environment.

- Windows XP machine should be removed from any hypervisor currently hosting a voice server.

- Customer should audit existing directory numbers and delete any confirmed unused numbers.

- CUCMs residing on same blade should either be moved to another supported platform or one CUCM server should be removed from production environment.

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VDI Preparedness Assessment

VDI Assessment Results

The results found in the interviews with MPC IT staff determined

- Skill Set Gaps
  - A. Lacking Project Management, Planning and Documentation
  - B. Formalized Strategic Testing Environment Not in Place
  - C. Lacking Knowledge of VDI Best Practices and Methodologies
  - D. Communication Break Down at All Levels (Administrative, Peer and End User)

The Hardware and Software Assessed and Discovery

- Technologies
  - A. Servers
  - B. Storage
  - C. Network

Network

Resource	Location	Details	Notes	Notes
DL980G7	MPC	8 processors with 8 Cores=64 CPUs		Nehalem E6550 2.0 GHz - BPA
DL980G7	MPC	8 processors with 8 Cores=64 CPUs		Nehalem E6550 2.0 GHz – Turned Off
DL980G7	MEC	8 processors with 8 Cores=64 CPUs		Nehalem E6550 2.0 GHz – Turned Off
DL980G7	MEC	8 processors with 8 Cores=64 CPUs		Nehalem E6550 2.0 GHz – Not Running VM's
Guest	Both MPC/MEC	2 X 1 Gbe Network Connections		HP Team
ISCSI	Both MPC/MEC	1 Gbe Network Connections		Not Teamed
Hyper-V host	Both MPC/MEC	1 X 1 Gbe Network Connection		HP Team
Live Migration	Both MPC/MEC	1 X 1 Gbe Network Connection		Not Teamed

Storage

P4500	MPC	2 Nodes of 12 drives per node		600GB 15k Drives 3GB SAS
P4500	MEC	2 Nodes of 12 drives per node		600GB 15k Drives 3GB SAS
ISCSI	MPC	LOC		
vWorkspace	MPC	Not deployed		not deployed

What went wrong with implementations:

Lack of Executive Sponsorship - VDI projects are a fundamental shift in how desktops are managed and without leadership from the College Board the project is deemed as not mandatory participation by end users.

Lack of Project Plan – The VDI project never had milestones and task associated with the project. In fact there is no project planning being done for the IT department in general and this would help in resource loading and scheduling. It also formalizes project responsibility and authority for the success or failure of the project.

Lack of Technical Engineering Implementation plan – There was no collaboration between the end user champions, Network admins, Server VDI admins, IT management and Help Desktop teams. There should have been a collective goal of how the technology is going to be deployed from the installation to rollout plan. This would include technical products and configurations, testing plan, success criteria and technical operation support of the product. This would roll up into the master project plan. This would include everything from defining server, storage and networking configurations to overall responsibilities for each of the pieces in support of the project.

Lack of technical expertise in deploying the product – Some of the technologies were new to the team and there was some steep learning curves. Choosing technology has to be based on overall on going implementation and operation costs. The costs of a specific product set have to be weighed against the ability to maintain the product set. If it is cheap to buy but expensive to maintain then one could make a case that no savings occurred.

Why Vmware is superior to Hyper-V

VMware is company dedicated to Virtualization. They are the industry leader because they have built product sets that make it easy to do complex tasks. This includes maintaining and operating the environment as well as building the management consoles and policies to efficiently support the product sets.

VMware in their desktop Virtualization product uses the industry leading Teradici PCOIP protocol which gives the greatest end user experience based on Thick, THIN client or Zero Client endpoint devices. VMware leverages the largest community of engineers, ISV's and ecosystem of companies that are making innovative and compelling products and services for the users of the VMware products. This innovation has led to products that meet the largest commercial and government requirements for support, security, functionality and TCO.

The time to deploy a VMware VDI or Server Virtualization platform is much quicker in terms of overall level of effort compared to Hyper-V.

Hyper-V has been playing catch up to VMware in terms of the technology in several areas but most noticeably the VMware VMFS file system is superior to the aged slow NTFS file system. The ability to quickly and easily setup VMware Clusters, High Availability and load balanced systems far outreaches the Hyper-V methods.

VMware has the most efficient hypervisor with a 2-1 physical to virtual consolidation ratio over Hyper-V leading to less virtualization hardware and reduced management costs.

The desktop experience with PCOIP gives the highest quality user experience when combined with the Unidesk Application virtualization platform. Together these two products deliver a unified virtualized desktop experience with the best management and cost per desktop ROI.

Current state of implementation:

The Hyper-v implementation has failed on many fronts because there is not proper Broker Implementation. No proper application virtualization. A complete re-engineering would be in order to move forward with a successful implementation.

The Hardware and Software Assessment draws attention to the complexity of the current HyperV solution and MPC's staff's inability (Resourcing, knowledge of technology and best practices etc.) to implement and maintain. To implement the HyperV

solution again would entail a complete rebuild of the infrastructure and could put MPC at serious risk of another failed implementation. It also creates on going overhead (Time and more Money) to manage this complex solution.

Utilizing VMware View with Unidesk will enable MPC to maximize its investment and reduce the risk of an unsuccessful deployment. The combination Unidesk and Vmware, will allow for application delivery in a flexible manner as well as the ability for users in install their own applications. This solution is also compatible with the existing hardware investment and is considered the most mature, stable, and robust approach in the market today. Unidesk will enable MPC to deploy persistent or non-persistent desktops on 70% less shared storage.

The current limitations of the HYPERV approach and the time required by so many different consoles break this VDI model. With Unidesk, MPC gets simplicity and completeness. LESS COSTLY THAN MICROSOFT PERSISTENT VDI.

Layering (Unidesk Technology) is the key technology that will enable the benefits associated with this recommendation. Unidesk only works with the VMware platform.

VMware is the only virtualization solution robust enough to make the technology work. VMware also has the greatest ecosystem of knowledgeable administrators and 3rd part products to further enhance the

capabilities in the future, if MPC should find the need.

The major areas of weakness require further investigation and remedial action by MPC management.

- Govplace Recommendations include
    - A. Project Plan
        - I.   Planning (Technical Design, Pilot)
        - II.   Project Timeline
    - B. Roll Out Plan
        - I.   Uses Cases
        - II.   Project Plan (Phased Roll Out with Inclusion of End Users.
                Technicians and Lab Technicians)
        - III.   Common Goals
    - C. Communication Plan
        - I.   Regular Email and Verbal Communications
        - II.   Dashboards Showing Continuous Progress
    - D. Software Solution
        - I.   VMware Horizon
        - II.   Unidesk

A precise technical design along with a clearly communicated project plan will assist in a healthy VDI implementation regardless of the product utilized.

Server-Farm Virtualization & Health Assessment

Assessment Report
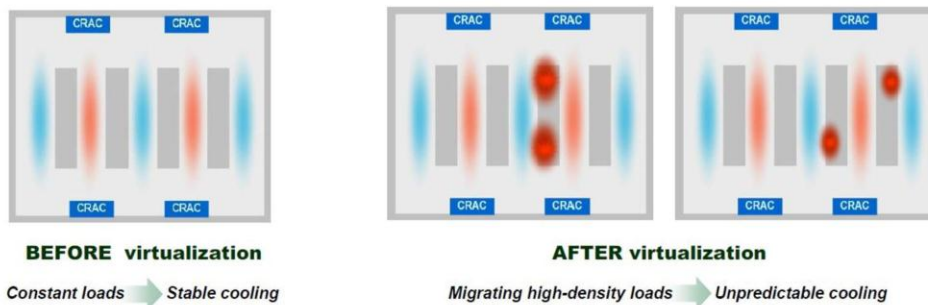
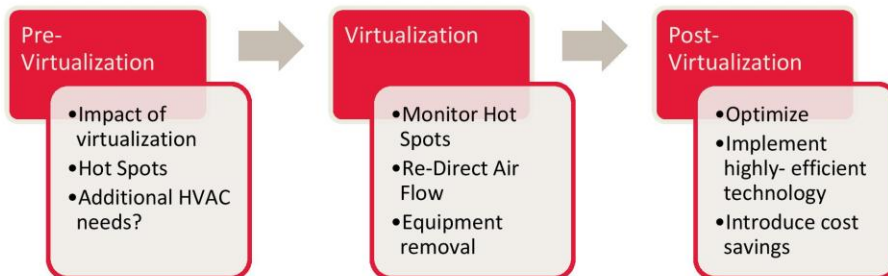### Prepared for Monterey Peninsula College

Version 1.1

November 26, 2013

Virtualization Impact on the Computer Room

A common misconception of virtualization is that consumption of power and cooling will diminish and the existing equipment/layout is efficient since the overall numbers will decreased. In essence, virtualization will initially raise the demand for these resources when the solution is introduced and as physical systems become virtualized, power and cooling will be lowered. However, a refocus of these resources is necessary to avoid hot spots.

Illustration from APC's Virtualization: Optimized Power and Cooling to Maximize Benefits

BEFORE virtualization

Constant loads ➔ Stable cooling

AFTER virtualization

Migrating high-density loads ➔ Unpredictable cooling

This illustration demonstrates how virtualization can introduce hot spots and unpredictable power and cooling demands. The graph below highlights areas of focus throughout the virtualization life cycle.

Pre-Virtualization
- Impact of virtualization
- Hot Spots
- Additional HVAC needs?

Virtualization
- Monitor Hot Spots
- Re-Direct Air Flow
- Equipment removal

Post-Virtualization
- Optimize
- Implement highly-efficient technology
- Introduce cost savings

Review the Go Green Initiative in the Appendix or contact your CDW Customer Representative to speak with a CDW Power and Cooling Solution Architect for assistance through-out your virtualization journey.

Estimated Green Savings

The calculator below provides an example of potential energy savings and how those savings could impact the environment. This is, of course, only an example and results will vary depending on actual energy use and conditions. To estimate potential energy savings, shown under "Option 1", we applied certain assumptions, as noted below, along with Carbon Emissions figures from the U.S. Environmental Protection Agency.

Go Green Benefits		
Power/Cooling Savings	**Current**	**Option #1**
Power Cost (Annual)	$12,432.61	$1,688.94
Cooling Cost (Annual)	$19,999.06	$2,518.87
Total Annual Savings		$28,223.85
Assumptions	**Value**	
Average price per KW/Hr http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.html	0.1042	
Cooling Efficiency (assumption - varies depending on cooling device/s, location and air flow)	67%	
Standard Math Variables	**Value**	
Watts to BTU Conversion	3.412	
lb CO2 / kWh	1.57	
Carbon Footprint	**Current**	**Option #1**
Carbon Emissions in lbs/hr	21.68	2.95
Environment Impact		**Savings**
Carbon Savings		18.74
Equivalent - cars removed annually		14
Equivalent - planting 10-year old tree		1931
Carbon References		
Tree/Car and CO2 reference http://www.epa.gov/cleanenergy/energy-resources/refs.html		

Server Consolidation with Reuse

Virtualization is best accommodated on current equipment. Hardware manufacturers have dramatically increased the efficiency for virtualization through improvements in chip and memory architecture. Using outdated equipment in your solution may cause a reduction of all processor function to the capability of your oldest processor. To leverage older servers, look to the management software for your hypervisor. The management tools associated with your virtualization solution have much less stringent hardware needs, and can more easily be accommodated on older servers. In addition, the ability to run 64 bit Operating Systems within a Virtual Machine and leverage new hypervisor technologies is limited to newer virtual enabled processors.
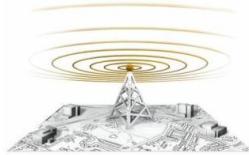
MPC
MONTEREY PENINSULA
COLLEGE

Wi-Fi Validation

Executive Report

January 29, 2014

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Background

Monterey Peninsula College (MPCC) has an end to end wired and Wireless Cisco networking infrastructure. The current active infrastructure was installed over 7 years ago. As the college has become more dependent on wireless access to serve up curriculum to its student population, the college has experience a substantial degradation in its wireless quality of service.

Introduction

Currently MPCC has a student population of around twelve thousand students using multiple smart devices (BYOD) to access the internet. Both Teachers and Students have been complaining of both connectivity and performance issues related to the current wireless infrastructure. Some of these issues have been more prevalent in areas with higher student concentration. Through the use of both indoor and outdoor access points MPCC has been serving up wireless connectivity throughout the campus.

As part of its goal to validate and determine the shortcomings of the existing wireless infrastructure, MPCC has engaged Ondemand365 consulting team to do a complete wireless validation survey to establish a baseline of which MPCC can determine how to move forward in resolving its wireless issues.

While the survey was primarily focused on the MPCC Monterey campus, both Seaside and Marina campuses where included for reference purposes.

The following is a high level executive summary detailing the findings of the validation work. For a more detailed analysis, tools and methodologies used, please refer to the full technical report.

Goals & Approach Overview

In conducting a wireless validation, our primary goal was to measure three primary factors that can impact the wireless network coverage and performance. Our approach included a Passive, Active/Predictive Survey and interference analysis.

The Passive Survey measured the area covered by the wireless infrastructure and outlined any shortcomings. This includes both inside the building and outside areas where wireless access is expected. The Active/Predictive Survey simulates and takes sample performance measurements of the Access points. Finally, we measured the internal and external sources of interference. All of these measurements were then compared against industry established thresholds and end user goals which dictate a pass or fail for each category.

Please note that it is not within the scope of this Wi-Fi validation to do any kind of troubleshooting nor assessment at the switching, routing and cabling levels. Furthermore, testing of the end user devices was beyond the scope of this project.

Validation Overview & Findings

Coverage Analysis

Our survey has revealed that the overall wireless signal coverage at the MPC campus varies substantially from building to building. Some buildings have shown excellent coverage while others have very problematic coverage areas. Below is a brief overview of the outcome of the Passive Survey.

The images below display the signal coverage (in dBm) at each point in the map layout. As a general rule, regions with signal levels below -67 dBm provide insufficient coverage for standard use (this value may vary depending on user requirements, service level agreements, applications used, number of users serviced, etc.). The Green color indicates a very strong single while yellow to orange colors indicates a poor quality signal. At MPC, all the buildings that were surveyed (entire indoor and outdoor areas) signals ranged from Very-Good to Excellent.

Note: An active Wi-Fi area can incorporate a variety of environmental factors that can vary throughout the day and may adversely affect RF coverage.

Performance Analysis

A sample testing using predictive performance analysis has revealed that the installed access points have revealed that in areas where MPCC has higher concentration of usage, MPCC has insufficient wireless capacity to handle the required bandwidth. In this case our primary goal was to measure the capacity of individual access points to ensure its ability handle multiple student connections with sustained bandwidth.

The following buildings maps reflect the current wireless performance level by building and in-building locations. In some cases you will notice performance gaps with in specific building or outside in certain areas. These could be reflected in areas where channel interference is prevalent (see interference section) or areas of insufficient capacity due to equipment or wireless user concentration. As a general rule anything above 20dBm is considered acceptable.

Interference Analysis

Our survey has revealed that there is some level interference from both internal and external sources. While there is some interference from neighboring buildings access points, the primary cause of the interference is related to inter-access point channel interference. The current technology in the majority of the installed access points on MPCC campus only allows for 3 none overlapping channels which means that in any one area MPCC can only allocate three access points in any one proximity. Due to MPCC's coverage requirement & student concentration areas, MPCC has had to locate in some cases as many as (6 to10) access points with in the same channel proximity. This has caused substantial interference in those areas and hence a substantial degradation of performance.

The main problem here seems to be coming from the 2.4GHz Band which utilizes channels 1, 6 & 11 and the (A 5Ghz) band which is a much older technology. Access points that are near each other and operating at the same channel tend to interfere with each other's performance.

Newer wireless technologies that are available today such as (N & AC) would mitigate this type of problem since they support a much larger number of channels

Design Review

In analyzing the design of an installed wireless infrastructure, we take into account the installed technology in conjunction with its ability to provide performance and coverage. For the purpose of this review we did not consider elements of high availability or redundancy; it was purely reviewed from a performance and coverage prospective.

The majority of the Access points installed are using the A/B/G older band with a few using the newer N band for wireless. Being that these access points are controller based, makes them excellent from admin manageability prospective. Furthermore, MPCC currently has at least one access point in each class room, which is considered to be ideal related to best practices for classroom environment.

In cases where multiple access points where installed to meet student density requirements, this has caused a negative effect by substantially eroding the performance and creating connectivity issues. Unfortunately, using the current installed access point's technology, it would not be an easy task to try to mitigate the problem. This is due to channel limitation in the installed access points. In some cases the power of each access point would have to be reduced and in others the access point would have to be relocated.

Conclusion & Recommendations

In reviewing all the different elements that my impact the performance of the MPCC Campus wireless infrastructure, the primary issue impacting the performance and accessibility of the network is related to older wireless technology that makes it very challenging to cater to the demands of users using multiple smart devices. It may be worthwhile for MPCC to consider upgrading certain areas of high concentration to newer N or AC technologies