Technology Plan 2020-25

Table of Contents

Technology Plan 2020-2025

Jefferson College strives to maintain a high level of commitment to provide support of technology needs across instructional, administrative, and student services areas.

The purpose of this Technology Plan is to establish technology guidelines that will help direct Jefferson College as we prepare for the future. This plan contains visions and recommendations for technological enrichment within Jefferson College that will occur over the next five years.

This plan examines the current status of technology at Jefferson College, focusing on three major elements that are crucial for the success of any technology master plan: organization, processes, and technology. It contains administrative procedural recommendations that should be implemented and supported as the college intends to continue to maintain the high standard of education it currently provides.

After completion of the Updated 2020-2025 Strategic Plan, the Technology Planning Task Force was one of five planning teams formed and its charge is to develop a Technology Plan that aligns with the other planning groups to help achieve the college's vision.

Support of College Mission, Vision and Values

COLLEGE MISSION
Jefferson College serves our community by delivering quality learning opportunities that empower individuals to achieve their goals.

VISION
Jefferson College strives to inspire our community to explore, develop, and engage in innovative learning experiences in a supportive and inclusive environment.

VALUES
Jefferson College fosters a culture of excellence for its community of students, faculty, and staff by embracing the following values:

- *Success*
  Supporting a focus on achievement, self-discovery, scholarship, creativity, completion, and skill mastery;

- *Accessibility*
  Fostering an environment of diversity and inclusion where a culture of collaboration responds to the needs of our communities through quality and affordable educational opportunities;

- *Integrity*
  Encouraging open, honest, and respectful communication; committing to accountability in all interactions, operations, and procedures;

- *Learning*
  Establishing a high quality learning environment that features collaborative and innovative engagement, academic freedom, professional development, and continuous assessment for improvement; and

- *Service*
  Infusing a spirit of civic engagement through community volunteer initiatives, cultural enrichment, and service-learning opportunities.

Strategic Plan Alignment: Innovation

Our college prides itself on being in the vanguard of innovation. We are committed to the highest levels of rigor and inspiration, and so we explore innovative practices that will provide the best opportunities for our students.

Following are the overarching goals of the 2020-2025 Strategic Plan, which encompass four Strategic Priorities:

- STUDENT SUCCESS: Enhance the student experience through a supportive and inclusive environment allowing all students the opportunity to succeed
- INSTRUCTIONAL EXCELLENCE: Increase use of innovative teaching practices that foster an engaging learning environment and further develop academic programs that address community, industry, and student needs
- OPERATIONAL EXCELLENCE: Improve the College's capacity to achieve its mission and vision by promoting a collaborative working environment focused on operational excellence in all service areas
- COMMUNITY ENGAGEMENT: Expand the College's capacity to identify and serve the needs of the community through meaningful outreach and service initiatives

Technology Goals

In support of the college's mission, vision and Strategic Plan, the Technology Plan has the following three goals:

- **Support Instruction and Learning with Technology** - Provide and maintain current technology resources available to students and staff that meet their needs to be successful.
- **Enhance Infrastructure and Security -** Maintain a robust and secure network infrastructure that will support future technologies as demands require.
- **Support Communications, Collaboration and Innovation –** Develop collaborative relationships with faculty, students, staff, and other community members to best serve the campus' existing and future needs.

Current Status of Technology

Staff
The Jefferson College Information Technology Department is under the direction of the Senior Director of Information Technology. The Senior Director reports to the Vice-President of Finance and Administration. The Information Technology department currently has thirteen full-time and one part-time staff that support campus technologies. There are also two full-time position vacancies.

Facilities
Jefferson College has approximately 2200 computers available to students, staff and faculty. There are 50 student computer labs with 1600 (1400 desktops, 200 laptops) computers for student use. Approximately 160 classrooms are equipped as Smart classrooms. Open computer labs at Jefferson College have 75 computers available for use throughout the week.
Software available in the labs is standardized on Microsoft Office 2019 along with specialized programs to support specific disciplines (e.g. Adobe Creative Cloud and AutoCAD). Most and full-time faculty and staff have either a laptop or desktop computer available for their use with access to multiple printers and other resources.

The core networking, telecommunications and virtual server environments at Jefferson College are housed in the Data Center in the Administration building on the Hillsboro campus. Each building on our campuses has at least one designated data closet that connects the building network equipment to the core via a fiber optic cabling. Copper Ethernet cabling supports the link from the network switches in the data closets to the desktop and other devices. The virtual server cluster is composed of Dell equipment and it supports all the file, print, and software applications for both instructional and administrative uses.

Instructional Use of Technology

Students encounter and utilize technology continually, from their initial contact with the college, in classrooms and labs, all which helps support their success. Additional student support is provided using Internet-based services. These include enrollment and registration applications and routing, transcript requests, password resets, advisor appointment scheduling, tuition payments and financial aid refunds, housing requests, bookstore services, class schedule and course surveys.

Faculty utilized Blackboard's Learning Management System through spring of 2021 but have migrated to Canvas in the fall of 2021. The migration process to Instructure Canvas is complete. Course sections and rosters are loaded into the system at the beginning of the semester and updated regularly.
Students can access the system from home and from numerous locations on campus. Students also use PCs for online test-taking and research for their courses.
All classrooms are "smart classrooms" utilizing a networked computer with a digital projector, presenter, and sound system. Technology-based courses such as Digital Media, Computer Aided Design and Drafting (CADD), and Computer Science (programming) use personal computers extensively to simulate their work environments. Hardware and software used in these courses are periodically assessed and upgraded to meet current industry standards, as expected by the faculty and students in these courses.

Jefferson College provides full-time faculty members with an office computer and the Microsoft Office Suite and other software as required. Adjunct faculty have access to similar equipment in designated workspaces. Faculty use Canvas for student and scheduling information, class rosters, and for final grade entry. Additional faculty support is provided using Internet-based services including: Class Rosters, Advisee List, Student Participation, Early Alert, Central Office Supply Requests, and Maxient Incident Reporting.

Information Technology staff provide instructor technical support. Many tutorials are online and the IT staff is available for extended hours through the week.

Student Services and Administrative Use of Technology

Technology is used extensively by administrative and student services departments to meet the needs of students. Access to services is available on the Jefferson College website. Students are directed to use MyJeffco for enrollment and various status checks.

Ellucian's Banner product is the college's Enterprise Resource Management system that is used for all of the major operational/business functions, such as Human Resources, Finance, Student Records, and Curriculum Management. This database communicates with all other systems, such as Canvas, FAST and is the source of state and federal report content and institutional research data. Staff, advisors, faculty, and administrators use Banner extensively throughout each workday and a substantial amount of the information technology staffing is required to maintain this software.

Banner is used extensively for college information and processes. Students interact with the system using MyJeffco and can update email and residence address information. Students also use MyJeffco to register for classes. Banner records are updated with student contact information, and summary information is transferred for State MIS reporting and internal Institutional Research.

The College website is used in many ways. It provides resources and information for prospective, new, and continuing students, including registration, enrollment services, program offerings, articulation and transfer/career resources. The site is used to communicate news and events with students and staff. The site also serves staff and faculty with a login portal to access employee self-service applications and has links to departments and committees for reporting and communication.

Other supported software includes: Fischer Identity Manager (provisions/de-provisions accounts based on business rules), Hyland Perceptive (Document Imaging), Advisortrac (Advising), EMS Master Calendar, Student Success Plan (Advising), WebIM (Helpdesk chat), Everbridge (Mass Messaging), Google Enterprise for Education (GSuite - email, docs, drive, sheets, calendars, meet), TruCredential (Student/Staff IDs), Lib-Proxy (Library database access to students off campus).

Additional third party integrations include: Accuplacer (student test results imported into Banner), Nelnet (Payment processor integration), Intellicheck (AP Check printing), PeopleAdmin (import new hires info into Banner), Mobius (Library services), Maxient (behavior

records), CIGNA (insurance), Follet (bookstore), Adirondack (housing) and National Student Clearinghouse (electronic transcripts).

The Business Office uses Banner for all purchasing and accounts receivable. The cashiers are able to accept credit and debit cards from students and secure transactions can be made online through the Nelnet. In-house developed custom software solutions include: cos supply request, ebilling, finance reports, order business cards, parking permits, paycheck print, payroll summary, positive pay, purchase order, student transaction summary, unemployment wage file, w2 printing.

Other technologies used by the business office include:

Nelnet - This system is used heavily by A/R for students to make payments and set up payment plans. We also use this for e-billing and issuing student refunds along with CARES act grant payments.

Transactionsummary.com - This will breakdown our credit card payments received so that we can see what they are made up of and how to apply the payments to the students' accounts.

FAST - Millennium product used for budgeting, report writing, financial data mining, Human resource reports and student services reports.

Sage - This program tracks our fixed assets and also calculates depreciation for us.

Procare - This is used by the childcare center for attendance, billing, and connects to the state of Missouri Kinder Connect system for tracking purposes related to people who receive state subsidies for child care. This system does integrate with Banner.

Adirondack Solutions - This is used by Viking Woods to track billing for students in the housing. This system integrates with Banner.

Crypt Pay - This system tracks the student housing security deposits.

Clover Flex Devices and Clover.com dashboard - Our three portable credit card machines are on the secure unlisted Wi-Fi and we use Clover.com dashboard in order to allocate payments received to the proper school group that uses them.

State of Missouri - We use a system with them that intercepts state refunds to satisfy collections from past due students.

EZ Facility - this is used to bill and track fieldhouse memberships for use of the facility.

National clearinghouse website - this service is used for students to get transcripts online. NCH charges and collects fees for the transcript requests as well.

1098T Processing with Maximus TRA Services - This service integrates with Banner to extract the data that goes into the 1098T's and then sends the 1098T's out to the recipient.

The Jefferson College Foundation uses QuickBooks General Ledger system for tracking payments and receipts and Donor Perfect to track donors and the amounts they have donated.

There are also various portals that we must use for each branch of the military to bill and collect fees that they pay on their behalf.

Software Development

Custom FAST reports are developed to extract information maintained in Ellucian Banner.

When custom applications are needed, these are developed with the Java programming language. User interfaces are presented in HTML within a browser. Oracle database is used to store information.

Library Technology

The library website links out to the library's subscription databases. Access to these databases is authenticated using the LDAP through EZ-Proxy. Access is granted to current students, faculty, and staff.

Library technology resources and services available to students and the campus community include:

Hardware -

Desktop computers for circulation processes
Hand scanners, flatbed scanner, microphones, keyboards, mice
IMac, Magic Mouse, Apple Mini IPads
Digital Microfilm/Microfiche Reader
Hot Spots, laptops, web cams, Go Pro
Voice recorders, projectors, Chromebooks

Software –

Microsoft Office Suite
Sierra, iMovie, Photobooth, OCLC
LDAP through EZ-Proxy
Libguides – Online research guides
LibCal – Online booking system
Gimlet – Questions tracking system
Library H3lp – Online chat service
Adobe Creative Suite (Photoshop, Illustrator, Audition,Premier Pro, After Effects)

Buildings and Grounds Technology

Spiceworks is a cloud-based CMMS (Computerized Maintenance Management System) tool to facilitate monitoring, managing and tracking work-orders issued by faculty and staff across all campus buildings. We are using a free version of this software currently and are researching other CMMS platforms on the market with a goal to implement a more robust platform in 2021, to include features such as inventory management, preventive maintenance and more.

RC Studios is a Reliable Controls BACnet Advanced Workstation (B-AWS) product used to manage building databases, alarms, scheduling and operations management for all mechanical and technical equipment. This software allows remote access to building energy functions as well as fault detection and diagnostic control. This platform supports campus sustainability and efficiency goals.

Johnson Controls Fire System Safety Detection is operating across all campus buildings to include residential housing. This integrated system includes fire sensors, annunciators, control panels with remote diagnostics for fire detection. Currently the Fire Safety system is interconnected via copper telephone cabling. Single mode fiber optic cabling is being installed to interconnect the Fire Safety system in a more reliable manner.

Trane Tracer BAS Operator Suite is currently operating in the ATS building to allow operators to control building roof-top units from anywhere. This application monitors equipment, makes set point changes, controls spaces, and manages alarms, remotely from a desktop and mobile app.

Jefferson College Police Department Technology

Technology used by commissioned officers in the police department:

Mules (Missouri Uniform Law Enforcement System)
MULES is the system used to run background checks on individuals and it allows us to identify vehicle owners. The system can be integrated with other technologies to help identify people or vehicles such as LPRs, Facial recognition, Fingerprint scanners, etc. All users of the system are required to abide by State and Federal Law requirements.

ITI Report Writing System
ITI allows officers to write incident reports, log citations and log daily activities. It aids the evidence tech to log and keep track of evidence. The system allows officers to search for people in other jurisdictions that help track down suspect information.

MDT (Mobile Data Terminal)
MDTs allow officers to use MULES and ITI while being on patrol. MDTs are also linked to Jefferson County 911 for dispatching and GPS location.

ID Fingerprint Scanner
The fingerprint scanner allows us to identify anyone by scanning their fingerprint. It can be connected to MULES so we can check individuals for warrants and pedigree information.

LPR (License Plate Reader) Cameras

These cameras are located at our campus entrances and read license plates on vehicles as they enter. It then relays the plate information and a picture of the vehicle to our campus police office. This is helpful in many ways such as; tracking vehicles of suspects, entering in vehicles of people of interest for the campus, and tracking people who have been issued a no trespass order.

The LPR can also be connected to the MULES system to scan for license plates with active warrants.

Surveillance Cameras
The police department monitors all security cameras on campus by using the VI MonitorPlus system. It allows us to view in live time, backtrack to a previous time, and record video as we need for evidence.

Campus Data Center Environment

Our current hosting environment consists of several physical servers, vmware, and two Compellent SANs. The vmware cluster consists of six physical servers that are hosts. They are divided into test and production data centers in vmware. Two servers are assigned to Test and four are assigned to Production. There are about 150 virtual servers running in this cluster.

All six servers connect to the two Compellent systems for storage. One Compellent system has primarily flash storage (fast). This one is used to run all of the production virtual machines. The other is filled with spinning disks (slow) and holds our backup archives.

The connection to the SANs is facilitated by two Brocade fiber channel switches. Each switch is a separate fabric in order to be redundant and fault tolerant.

Each host in the cluster has 12 copper ports for the regular network connections. These are also redundant so each server has two links to each network segment.

Disaster Recovery and Backup
An on premise Uninterruptible Power Supply (UPS) provides clean computer-grade power and battery backup to critical equipment in the Administration building Data Center to maintain computing operations in the event of a utility power outage. A stand-by generator provides power to the Data Center for indefinite run-time to allow operation during an extended power failure.

Server operating systems are patched at minimum every quarter and physical access to the data Center is restricted to Information Technology staff to ensure safety and security of hardware, software, and information.

Veeam is used on site to backup servers (both physical and virtual). The backups are stored in different retention periods depending on the function of the server. One week of backups is stored on the primary SAN for quick recovery. Archives are stored on the backup SAN.

To address the requirement for off-site backup and disaster recovery, Amazon Web Services (AWS) S3 and Glacier products are used for warm and cold backups. Critical campus files for faculty and staff are accessible within 24 hours in the event of a complete loss of on premise servers.

The backup and recovery plan is tested at least once a year to ensure recovery of data.

Cloud Services
The college uses multiple cloud services to support operations.

Google Suite Enterprise for Education is used for a number of services. Email, calendars, personal drives, and Google Meet are all provided through this service. Google also serves as the primary authentication for web services.

Blackboard was the Learning Management System used by the college until summer 2021. It was provided as a hosted service. Since the Fall of 2021 Jefferson College has utilized Canvas LMS. Canvas is also provided as a hosted service.

Currently Amazon Web Services is used primarily as a disaster recovery site and offsite storage for backups. However, the IT department is working on migrating a number of core systems to AWS. The migration will provide access to features not available on premise and improve our business continuity and disaster recovery posture.

Authentication and Identity Management
The college has a number of interconnected systems. Fischer Identity Management uses Banner data to provision accounts and user data to the follow systems:
Google Suite
Active Directory
OpenLDAP

In the Canvas transition, it is planned to add a connector from Fischer to Canvas.

Fischer provides self-service password management and synchronizes passwords across user accounts.

Google serves as the primary authentication method for most of the college's web applications. It works using SAML protocol for single sign on(SSO). Unfortunately Banner does not support SAML so there is a CAS proxy that delegates authentication to Google. Most of the applications use the CAS proxy. Everbridge mass messaging service and Canvas use Google SAML directly.

Active Directory and OpenLDAP provide authentication for applications that do not use SSO. OpenLDAP contains the entire population (students and employees). Active Directory is also used for workstation authentication. It only includes the employee population.

Helpdesk-Structure

Jefferson College's Technology Help Desk is separated into two separate teams that support the various aspects of campus technology support. Internally, college employees are directed to call the User Services Coordinator or reach the IT Helpdesk via a designated email account. For student needs, a 'myJeffco Help Desk' has been established at 636-481-3234, which provides the caller with a variety of options depending on the technology need. The choice of Option 1, for password support, directs the caller to the online password and account management kiosk. Option 2, for LMS support, connects the caller to the Online Services team. Option 3, for office and classroom technology support, directs the caller to the internal phone number of the User Service Coordinator.
For Information Technology requests, IT utilizes the Spiceworks ticketing system. Technicians

remediate tickets from a queue, indicating work performed or troubleshooting needed.

The technical staff also acts as a backup to the User Service Coordinator for overflow of Help Desk services. Technicians are assigned a duty phone which is carried in a rotation of team members. The Coordinator's phone line is forwarded to the duty phone as needed for continuity of help desk services.

IT Technical Services Standards of Process and End-User Computing
IT's Technical Services team constantly monitors the current state of computing resources on campus, and as such, determines how often maintenance and upgrades should be processed to campus PCs. On an annual basis, technicians produce two regular upgrade packages that are installed on all systems. Named "summer" and "winter" updates, occasional update packages are installed mid semester as needed.

These updates vary in shape, size, and install duration, but regularly include, but are not limited to the following:

Microsoft's Windows

Updates Antivirus updates

Third-party application updates

Security and feature enhancements

Academic Software Lock (SMARTShield)
IT utilizes Centurion Technology's SMARTShield software on campus-wide Academic-use PCs. SMARTShield allows systems to work in a "locked" state, meaning they reset to a predefined state on reboot. Additionally, SMARTShield allows Students and Faculty to utilize campus computing resources in a state of "full availability,' without having to worry about managing minute settings that oftentimes detracts from the user experience.

Lecture Management Software (NetOp Vision)
In Academic lab environments, IT utilizes the netOP Vision product. The software allows an instructor to send files to desktops from an instructor station, publish screen broadcasts and screen takeovers, as well as block Internet access. The Instructor at the SMARTDesk PC in each lab environment manages this software.

Detailed Inventory Procedures (AssetTiger)
IT's Technical Services staff employs a detailed process for onboarding and management of campus computing hardware. Utilizing the freeware utility AssetTiger, a barcode is affixed to each piece of new technology when it arrives on campus. The barcode and serial number, make, model, and location are gathered and added to a new record in the AssetTiger application.

Annually, Technical Services staff visits all Faculty, Staff, and Student computing areas and scans each barcode to ensure that inventory is properly reconciled.

Among the items in inventory, Technical Services staff maintains the following list of asset types:

Computers, Document Cameras, Laptops, Printers, Projectors, Scanners, Servers, SMARTBoards and Tablets

Support for New Educational Technology Needs
Technical Services staff are often called upon to assist in the implementation of new or enhanced software. Software is assessed through committees like Strategic Planning or the Enhancement Grant Steering Committee, and implemented according to approved Faculty requests.

Endpoint Security Software (Kaspersky Antivirus)
Kaspersky Endpoint Security is employed on all computers on campus. In addition to traditional antivirus services, this software also has modules to remote scanning and a central management console. Updates are published automatically to systems and do not require user intervention. The Endpoint Security management console can also facilitate remote installation of third-party packages, which is employed regularly to staff PCs should an immediate need arise.

Instructional Technology Standards
Technical Services strives to maintain a set of Instructional Technology standards in such a way that Students and Faculty can easily find and are familiar with the resources available to them in any classroom or lab environment on campus. Internal documentation specifies the process by which new and upgraded PCs are built, maintaining a deliberate and accurate installation process on each PC. Instructor stations and SMARTDesks are also built in a deliberate fashion such that Faculty and quickly identify the type of equipment, which inputs and outputs are used for particular resources, and standard software used across all PCs. One-on-one User training is made available via the helpdesk on an as-needed basis.

Annual Technology Bid
During the fall semester, IT staff coordinate an annual purchase of end user technology encompassing office and academic use PCs, and peripherals.. This process is a culmination of work performed throughout the year that replaces aged and unsupported computing hardware through campus. Driven in part from the annual Enhancement Grant and in part from IT inventory, staff works to create a distribution list of equipment. Staff then devise a specifications sheet for each replacement item, acquiring demo equipment if necessary to verify specifications.

In accordance with purchasing guidelines, the final unit counts and specifications, along with a distribution list of IT vendors is sent to the Director of Purchasing. The Director of Purchasing sends bids packets, and determines the date of closure for the bid.

After bid close, IT Staff reviews the bid documentation from all vendors and creates a bid review. At the first Board of Trustees meeting after the closure of the bid, the Technology Bid awards are presented to the board for approval.

Student Response Systems (PollEverywhere)
IT's Technical Services supports the PollEverywhere product on every SMARTDesk on all campuses. It allows instructors to create polls to engage students during instruction. The software creates an automatically generated URL for students to visit on personal and lab devices in order to participate in the poll. Technical Services supports the Microsoft PowerPoint add-in installed on campus SMARTDesks.

Networking and Information Security

Fiber Optic Infrastructure
Jefferson College's fiber infrastructure roughly parallels that of the copper infrastructure, with a star topology and demarcation point in the college's Data Center. Multi-mode OM2, 62.5-micron fiber optic cable is encased in inner duct in underground conduits. The college's fiber optic infrastructure dates back to its original installation date during the 1996 fiscal year. Fiber optic terminations exist in enclosed "data cabinets" which house fiber and copper connectivity in each building. Because of the limitations of data throughput speeds on the existing fiber infrastructure, we are in the process of upgrading the fiber optic facilities to a 24 pair, single-mode, 9-micron cable infrastructure encased in new conduit with demarcation points in each building to meet the data speed demands for today and many years into the future.

Copper Networking Infrastructure
The Fiber optic infrastructure connects to data switches in each of the buildings' data cabinets. These network switches then provide a central connection point for the networked devices in the building. The copper network is cabled in a hierarchical star topology. Some buildings have many switches due to the number of networked devices in the building. The campus buildings have a combination of TIA/EIA category 5, category 5E, and category 6 cable. The current standard requires CAT 6 cabling to end devices and CAT 6a cabling between network devices (switches). All copper cabling is terminated to the TIA/EIA T568B wiring scheme. The copper cable connects most devices to the network switch at a 1Gbps link. Some areas only have a 100Mbps link but that equipment is scheduled to be phased out soon. The majority of devices utilizing the copper networking infrastructure include: computers, printers, cameras, wireless Access points, and VOIP (Voice over Internet Protocol) phones. The network is virtually segmented into VLANs (Virtual Local Area Networks). This provides security, performance and management benefits. There are separate VLANs for student devices, employee devices, VOIP phones, video surveillance, and data center servers.

WIFI Infrastructure
Wireless access to the internet is available in all buildings on all campuses. The current wireless infrastructure is aged and end-of-life so plans are being made to upgrade this system in the near future to allow higher connection density, better coverage and a faster connection speed.

Faculty, staff, students, and members of the public have the capability to connect to the college Wi-Fi. For security, there are two different levels of access. Guests and the general public access the guest Wi-Fi only allowing access to the internet.

Employees login to the Administrative Wi-Fi network allowing access to network printers and shares on campus servers. 802.1x authentication is used to allow user auditing when needed.

Remote Access
For security purposes many campus resources are only available from within the internal campus network rather than available on the public internet. Remote accessibility to these secured resources is available through a VPN connection to the college network. The VPN uses a

software installed on the remote employee's laptop to create a secure connection back to the campus firewall. This secured connection allows the remote laptop to access internal network resources from a remote network. An employee's supervisor can request an employee be added to the VPN access group. This access group allows the employee to access their office computer through the remote desktop protocol. An employee can access their office computer from a laptop on a remote network and use the on campus computer to access internal resources no differently than if physically present at the campus computer.

System Monitoring
The IT department uses several pieces of software to ensure system availability and security.

PRTG is a network monitoring software used to alert specific IT staff when network devices are nearing capacity or go offline. Various services and websites are also monitored with PRTG. Logs are stored indicating current network conditions and time of network failures. This information is critical when troubleshooting network service issues.

AD360 is an Active Directory change monitoring software. It is used to log changes and login information to windows desktops and servers. Reports are regularly generated for accreditation purposes.

The IT department contacts outside parties to scan the college network. Any vulnerabilities discovered are reported back to college staff with recommendations on how to eliminate the vulnerabilities.

Internal and external security scans are performed periodically to ensure best practices and improve network security posture.

PCI scope is very small and all POS systems utilize POTS telecommunications. No transaction data happens on the data network.

Telecommunications Infrastructure

Jefferson College's telecommunications infrastructure encompasses the copper and fiber infrastructure, wireless connectivity, telephony, and wide-area networking between the Hillsboro and the Arnold and Imperial satellite campuses.

Copper Telecommunications Infrastructure
Jefferson College's copper infrastructure consists of 25 and 50 pair category 3 cabling installed in a star topology. Each building on the Hillsboro campus has connectivity back to the college's Data Center with gas tube protection on either end of the circuit at building entry demarcation

and in the Data Center. This infrastructure serves the analog and digital telephony needs of the college, as well as life safety, fax services, and additional third-party telephony needs for the college's contract-based services.

Campus Phone System
An Alcatel-Lucent OmniPCX telephony system is used across all buildings at all campuses. A list of published 'lead numbers' are the primary contacts for outside callers. Primary contact numbers are as follows:

636-789-3000 636-797-3000

636-942-3000 636-481-3000

Internal 'station-to-station' dialing is done by way of a four-digit number. Internal callers may dial the four-digit number of the station they wish to reach or use the system directory that is accessible from their desk phone.

Employing direct inward dialing (DID), outside callers can reach Jefferson College stations using a dialing prefix of 636-481-xxxx, where xxxx is equal to the extension number of the contact the caller wishes to reach. Callers may also use the "dial-by-name feature".

Outside dedicated lines are utilized for life safety and fax connectivity on campus. These lines are provided by a carrier separate from the carrier used for telephone system connectivity and have a physical demarcation point in the college Data Center.

Mobile telephony is provided on an as-needed basis for college employees only. Duty phones, service phones, and mobile hotspots encompass all of the mobile telephony used across campus.

Adds, Moves and Changes
Adds, moves, and changes to the OmniPCX phone system are applied in as timely a manner as possible. A budget manager or supervisor must first confirm the change or telephone move, and IT Staff implement these modifications according to best practice guidelines provided by Alcatel-Lucent.

Voicemail Management
Voicemail connectivity is provided utilizing an AVST voicemail solution. A standard voicemail inbox allows for twenty messages with a three-minute duration for each message. Voicemail users are directed to utilize the best practice guidelines provided by AVST to make greeting, PIN, out of office, etc. modifications to their voice mailboxes.

AVST also controls the master schedule and recorded greetings for all campus auto attendants. During holidays, inclement weather, or other deviations from the standard auto attendant message, IT Staff employee best practices as provided by AVST to record, manage, and program auto attendant greetings.

AVST controls the master schedule, but allows for scheduled and on-demand overrides. The college's Academic Calendar is the master reference for scheduled overrides. The calendar is

consulted in advance of scheduled off-days, greetings are either created or modified, and placed into service according to start and end dates published in the calendar.

Inclement weather and other unscheduled overrides are programming in the same fashion. Greetings are recorded to an ad-hoc 'Inclement Weather' auto attendant, and placed into service according to the direction of college administration.

Cell Phone Amplification System
Historically cellular service and call quality has been poor through the college campus due to campus geography and building construction. Between 2016 and 2020, each building on the Hillsboro campus, as well as the Arnold campus, had a Passive DAS cellular amplification system installed. All hardware is standardized on the Wilson Electronics product line. Buildings are outfitted with an outdoor antenna to transmit cell service to the carriers' antennas and coax cable to bring the signal to one or more amplifiers within the building. The signal is then transmitted from the amplifier via coax cabling to indoor antennas located throughout the building. Since this is a passive system, there are no recurring annual costs. The college has no visibility into the type and quantity of cellular wireless traffic transmitted through this system. These systems are designed to work with all cellular carriers in this geographic area.

Identifying and Assessing Future Technology Needs
As technology continues to develop, improve, and diversify in its application, Jefferson College staff are encouraged to request and implement technology tools in support of increased student success.

- Staff involved in the college's online learning coordinate with the college's IT department to identify and implement emerging technologies to improve the delivery of online courses and to ensure that instructors and students are able to maintain regular and effective contact in their courses. Technology supporting online learning courses are Canvas and Google Classroom.

- Jefferson College submits requests on an annual basis to the State of Missouri's Department of Elementary and Secondary Education (DESE) for access to DESE's Enhancement Grant funds. Designed to support "in demand" programs across the state, the Enhancement Grant regularly funds technology upgrades in these programs. A steering committee composed of various stakeholders from across the college annually reviews submissions from the Information Technology Department as well as Faculty to determine the viability of the requests. The Enhancement Grant is regularly utilized to update and upgrade instructional technology, classroom PCs and printers, laptops and mobility charging facilities, and software maintenance for programs covered under the grant's designation. The Enhancement Grant requires that any purchases be utilized in direct support of the program and it's curriculum for a term of three years before equipment can be surplused or reutilized outside of the targeted program.

- Many area k-12 schools have implemented one-to-one technology, which allows students to effectively provide their own device to and from school each day. A close eye should be kept on the state of one-to-one technology with regards to incoming

students, with the possibility of expanding to Bring Your Own Device (BYOD) technologies in the coming years around campus. A comprehensive Mobile Device Management (MDM) solution should also be a consideration in BYOD policy creation.

Refresh Model

Based on best practices and the budget available, we use the following refresh model as a guide to provide consistent quality and reliability of technology tools campus-wide.

Equipment Type	**Cycle**
Computer Lab (General Use)	6 years
Computer Lab (Advanced)	3 years – upgrade or replace as funding allows
On-Premise Servers	5 years
Staff Laptops/Desktops	5 years
Network Infrastructure	5-10 years – depending on physical layer (copper, fiber, wireless) and network utilization and equipment obsolescence.
Classroom AV infrastructure *wiring Projectors Updated*	10 years 5 Years
Printers	As needed

Whenever possible, refreshed computers will be cycled to other uses. Once computing hardware has reached its end of useful life it is disposed of through GovDeals online.

Hardware standards

The following standards will be updated periodically by the Information Technology Department to meet the needs of students and staff with the intent that all new purchases will provide effective functionality throughout the expected life of the device. Current general specifications are:

Processor- Intel Core i5 or AMD Ryzen 5 equivalent

Memory- 8 GB with capability to increase to 32 GB or

greater Hard drive- 256 GB Solid State Drive

All devices are procured with a minimum of 3-year hardware and support warranty.

The following are recommended hardware manufacturers for administrative and academic applications. Additional manufacturers may be considered after review from the Information Technology department.

- *Dell*
- *HP*
- *Apple, Inc.*

Uniform printer specifications allow the most efficiency in printing. Unless there is a specific

need, printers will be B&W. There is at least one color printer in each building to accommodate needs of color printing.

Current uniform specifications are:

Manufacturer- *HP*
Warranty- *1 year*
Toner- *High yield*
Features- *Duplex printing and Networked*

Facility Technology Guidelines

New construction or facility upgrades

The IT department works closely with the Buildings and Grounds department to review standards for new classrooms, offices, and other meeting spaces. Current cabling/hardware standards are being developed for network connectivity that will be shared with all parties engaged with projects that require adds, moves or changes regarding technology.

Strategic Priority 1 - Student Success

Goal 1 - Enhance the student experience through quality curricular and co-curricular experiences.

Objective 1

Improve Wi-Fi density and access in more locations on campus

Action(s)

1.	Collect and review wireless use analytics and survey data to find possible sources of dissatisfaction with the wireless network (coverage, indoor/outdoor, buildings, rooms, download speed, performance based on time of day, connection issues, security concerns, wireless/LTE service).
2.	Add Wi-Fi support to the helpdesk voice greeting and publish the helpdesk phone number on the wireless accept page.
3.	Deploy a new wireless infrastructure to support the demands of WIFI on campus.

Assessment and KPIs: Percentage of WIFI updated buildings, student surveys (satisfaction with campus technology), and wireless analytics. Number of support calls/tickets related to wireless.

Objective 2

Develop and publish a technology standard for student technology purchase needs.

Action(s)

1	Research and regularly publish a standards document for students with recommended technology notebook, laptop, and desktop PC hardware specifications required to access college resources.

Assessment and KPIs: Measure the types of student-owned technology and the ways they relate its use to coursework.

Strategic Priority 1 - Student Success

Goal 2: Increase student persistence, retention, and completion.

Objective 3

Provide additional hardware resources to students.

Action(s)

1.	Provide an institutionally-subsidized notebook computer for eligible students before the start of each school year
2.	Dedicate a portion of the computer replacement budget for incentive laptops.

Assessment and KPIs: Student survey to measure the ways students utilize the institution-subsidized technology as it relates to coursework.

Objective 4

Aid students during their transition from K12 to the college environment

Action(s)

1.	Explore the possibility to implement additional Chrome OS technology onto campus labs and classrooms.
2	Pilot this technology with the assistance of faculty/staff to assess Chromebook implementation.

Assessment and KPIs: Number of classrooms with Chrome OS.

Strategic Priority 2 - Instructional Excellence

Goal 5: Utilize emerging technologies to support the curricular and co-curricular experience.

Objective 5

Publish an annual technology survey to faculty and students.

Action(s)

1.	Survey Faculty and Students to gauge developing needs and/or discover changes to emerging faculty or student-facing technology needs.

Assessment and KPIs: Survey results (faculty and staff satisfaction)

Objective 6

Improve instructor workstation experience and utilization.

Action(s)

1.	Create training videos for smart desk models and utilization
2.	Standardize smart desk equipment and technology

Assessment and KPIs: training videos developed and distributed; standard specifications for smart desks (published internally).

Strategic Priority 3 - Operational Excellence

Goal 2 - Develop integrated operational plans to address facilities, maintenance, workforce and technology needs.

Objective 7

Identify technology needs of the campus community.

Action(s)

1.	Develop surveys for targeted user groups that request feedback to help identify technology gaps/needs.

Assessment and KPIs: Targeted surveys developed.

Objective 8

Enhance the Hillsboro campus fiber optic network infrastructure to support faster backbone speeds and future technologies.

Action(s)

1.	Install new single mode fiber optic cable on the Hillsboro campus to support today's technology and future technological initiatives

Assessment and KPIs: Fiber optic cable installed.

Objective 9

Interconnect building automation/life safety systems on a more reliable/stable medium.

Action(s)

1.	Install new single mode fiber optic cable on the Hillsboro campus to support the campus fire alarm system and other critical support systems.

Assessment and KPIs: Fiber optic cable installed.

Objective 10

Manage active accounts to increase security and reduce costs associated with account based licenses.

Action(s)

1.	Review other College's policies and amend the College's policy to better reflect the number of active users.

Assessment and KPIs: Updated policy published internally; number of unused accounts deactivated by implementation policy.

Objective 11

Pilot virtual desktop technology environments in classrooms and computer labs, where applicable.

Action(s)

1.	Invest in Data Center computers and storage resources
2.	Generate a list of frequently used, high quality environments for implementation of VDI technology
3.	Install back-end services to support VDI, and install thin-client hardware and services to selected areas
4.	Measure satisfaction, service delivery, and user experience, and tweak as needed.
5.	Install additional VDI resources utilizing annual capital money, Enhancement Grant opportunities, or other funding as applicable.

Assessment and KPIs: Number of VDI stations installed, return on long term investment.

Objective 12

Develop a mobile-friendly infrastructure for prioritizing on premise and cloud security.

Action(s)

1.	Adopt a mobile computing policy to include requirements for MDM, security standards, and expectations of technology use.
2.	Invest in MDM and security software.
3.	Develop mobile-centric procedures to aid the rollout of laptops over desktops.
4.	Implement a network access control solution to secure wired and wireless environments for employee use.

Assessment and KPIs: Number of mobile-friendly laptops delivered; number of institution-hours worked.

Objective 13

Reduce hard copy needs.

Action(s)

1.	Evaluate the need for departments to have a .pdf generation tool to cut down on paper waste and generate a single workflow process across the institution.
2.	Evaluate available .pdf and digital signature tools.
3.	Incorporate the .pdf tools into the office workflow.
4.	Evaluate remaining BANNER forms that do not have render to .pdf enabled.
5.	Formulate a plan to enable the render to .pdf feature.
6.	Purchase a site-wide license for a standardized .pdf generation and digital signature tool.

Assessment and KPIs: Percentage of users utilizing the .pdf tool set; .Percentage of BANNER forms with render to .pdf enabled.

Objective 14

Evaluate a campus hosted telephony solution.

Action(s)

1.	Centralize telephone services away from legacy analog and digital to 100% VoIP and softphone services.

Assessment and KPIs: Adoption rate of cloud-hosted solutions and softphone features.

Objective 15

Add all existing technology to the replacement cycle to ensure consistency in the Technology experience.

Action(s)

1.	Standardize smart equipment across all classrooms by keeping all components of technology current generation.
2.	Budget additional resources for added technology cost due to shorter life cycles.
3.	Add the following hardware to a replacement cycle: Document Cameras, Projectors/Smart Boards, Smart Instructional Furniture and Security Cameras.
4.	Add Webcam/microphone capabilities to every smart classroom
5.	Develop a notification process for Faculty/Staff to be informed when the technology will be upgraded or changed.

Assessment and KPIs: Additional Faculty survey results; number of support tickets compared to previous semesters.

Objective 16

Develop/Improve Training and support for campus technology.

Action(s)

1.	Formal training on hardware in the smart classrooms and labs ● Process for training during the Faculty onboard process ● Process for Faculty/Staff to request training when needed
2.	Formal training on Productivity Programs for staff ● On demand videos ● Small group training sessions as required.
3.	Training for instructional software such as poll Everywhere, screencast-o-matic, etc. ● Process for training during the Faculty onboard process ● Process for Faculty/Staff to request training when needed ● On demand videos
4.	Maintain a technology resource manual/web page that lists the hardware and software resources available to all faculty and staff. Include/advertise the support resources available. ● How to navigate Help Desk option 1/option 2, library support, CTL ● How to request new/replacement technology ● Add training videos for new technology
5.	Quick Use/Troubleshooting Guides in each smart classroom ● How to turn on ● How to display PC on smartboard ● How to display Document camera on smartboard ● How to share screen ● How to adjust volume ● Include Support phone numbers
6.	IT support staff at JCA during the afternoon and evening hours.

Assessment and KPIs: Additional Faculty surveys; number of support tickets compared to previous semesters.

Objective 17

Coordinate a Technology use policy into the College's Remote Work policy.

Action(s)

1.	Coordinate with HR throughout the work from home policy development process.
2.	Develop acceptable use policy for work from home technology (college owned and personal devices.)
3.	Clearly defined VPN resources available and procedures for VPN access.
4.	Clearly defined remote printing capabilities/expectations. ● Paperless initiatives ● Centralized printing locations ● ink/toner/paper allowance
5.	Ability to access a college phone number/extension while remote.

Assessment and KPIs: Additional Faculty/Staff surveys; Great Colleges to Work For results.

Strategic Priority 3 - Operational Excellence

Goal 5 - Utilize emerging technologies to support the curricular and co-curricular experience.

Objective 18

Provide periodic training for faculty on classroom technology.

Action(s)

1.	Explore opportunities to schedule and provide training sessions on classroom technology.

Assessment and KPIs: Percentage of faculty utilizing training opportunities.

Objective 19

Create a technology onboarding process for new (and returning) adjunct Faculty for classroom technology training.

Action(s)

1.	Provide opportunities to schedule training sessions on classroom technology.

Assessment and KPIs: Percentage of adjunct faculty utilizing training opportunities.

Objective 20

Provide synchronous technology as a standard in classrooms and labs.

Action(s)

1.	Invest in higher-quality audio and video components in classrooms and labs to support the faculty and student experience.

Assessment and KPIs: Number of classrooms and labs outfitted with updated technology.

Objective 21

Provide a standard set of technology hardware across all classrooms and labs.

Action(s)

1.	Collaborate with all disciplines (schools) to develop a standard set of technology needs for each classroom.
2.	Develop a timeline and budget to reach 100% integration of technology standards across campus.
3.	Establish a Finance and Administration to budget the acquisition of purchases, exploring grant funded opportunities where applicable.
4.	Communicate with the Information Technology Department to deploy updated hardware to classrooms and labs.

Assessment and KPIs: Percentage of updated classrooms and labs

Objective 22

Develop and implement a full-featured student response solution.

Action(s)

1.	Consider forming a task force to evaluate student response technologies.
1.	Formulate a plan to purchase and implement a product that works across multiple disciplines.

Assessment and KPIs: Measure the number of courses utilizing the SRS; measure student satisfaction with the SRS.

Objective 23

Develop and implement a full-featured mobile LMS solution.

Action(s)

1.	Utilize the mobile app environment in Canvas to promote a fully mobile-friendly LMS environment for students and teachers.

Assessment and KPIs: Number of students utilizing the app-based version of LMS.

Terms and Definitions

- Strategic Priority, Aligned directly to a 2020-25 Strategic Priority
- Strategic Goal, Aligned directly to a Goal under the Strategic Priority
- Objective, Description of initiative's intent in terms of the Strategic Goal
    - Rationale and Supporting Data, Industry data, survey or focus group data or other research to support the objective
- Action, Description of the action intended to support the implementation of the objective
- Assessment, Ways in which the objective can be measured or tested for consistency
    - KPI, Any KPIs that support the initiative