

The Fairfield Public Schools Technology Plan 2018-2023



FAIRFIELD
PUBLIC SCHOOLS

District Technology Steering Committee

Member	Title	Constituency Represented
Mike Cummings	Superintendent	District
Allison Antonucci	Technology Integrator	High Schools
Frank Arnone	Executive Director of Innovation, Curriculum and Programs PK-12	Elementary
Chris Brand	Application Integration Specialist	Technology
Nancy Byrnes	Director of Information Technology	Technology
Katrina Cronin	Assistive Technology Specialist	Special Education
Nicki Callahan	Library Media Specialist, RLMS	K-8 Library Media
Jackie Galante	Library Media Specialist, FWMS	K-8 Library Media
Thomas Honohan	Executive Director of Digital Learning	Digital Learning Prek-12
David Hudspeth	Principal, Osborn Hill School	Elementary Schools
Karin King	Technology Integration Specialist, FWHS	High Schools
Lakesha Kirkland	Technology Integration Specialist, TMS	Middle Schools
John McCandless	Technology Education Teacher, FLHS	High Schools
Penny Proskinitopoulos	Technology Integration Specialist, RLMS	Middle Schools
James Pruitt	Science Teacher, WFC	Alternative High School
Jason Purzycki	Dean, RLMS	Middle Schools
Bari Rabine	Housemaster, FLHS	High School
Paul Rasmussen	Director , Secondary Math and Student Achievement	Grades 6-12 Mathematics
Judy Salemme	Library Media Specialist, OHS	Elementary
Jennifer Swingler	Director, Secondary Literacy and Learning	Grades 6-12 Literacy
Carolyn Waters	Library Media Specialist, FLHS	Secondary Library Media
Walter Wakeman	Director, Elementary Math, Science and Enrichment	Elementary Schools
Paul Zhitomi	Technology Education Teacher, FWHS	High Schools

Background

The Fairfield School District Information Technology Department in consultation with the District Technology Steering Committee has created a plan to insure capacity, ease of access and security of the computing network and environment. This document will describe the 2018-2023 Technology Plan, its benefits and strategies, and the required resources to meet planned objectives.

The Committee's work put forward the following broad objectives for the next three years:

- Move all instructional resources to be accessible via the Internet in support of 24/7/365 learning.
- Update the number of devices available to students at all levels; and equitable access to those resources by implementing and sustaining an innovative learning program primarily using streaming devices.
- Improve the accessibility, quality and quantity of storage available to retain student work in a secure environment by migration to Cloud resources such as Office 365 and Google's G Suite.
- Ensure all resources used meet the protection and privacy standards of CT PA 16-189 as amended, COPPA, CIPA, PPRA and FERPA.
- Continually evaluate and update wireless access and Internet bandwidth within the schools and central office to meet the demands of students, faculty and staff.
- Continue to move to electronic document creation, usage, storage and workflow to preserve resources, improve workflows and achieve efficiencies of operation.
- Integrate student and faculty logins where feasible to a single sign on.
- Ensure that products and services provide safeguards of student and personnel information to prevent data loss or misappropriation.
- Implement Voice over IP to enhance voice communication efficiency and reliability.

Current State of the Network

The 1990's school network design was originally a distributed environment; each school had its own mini-computer network. This was reasonable at the time, as connections between schools were not always reliable, and minimal resources were required access to the Internet or central office. Student and faculty files and resources were located on school-based servers to insure access during the school day. The original network was similar to that of a small business model.

A new fiber-based wide area network (WAN) was installed in 2005. This increased capacity and reliability to centralized resources. The use of email grew to be a primary communication vehicle for the district.

In an effort to continue to reduce the capital and overhead costs, (power, cooling, space and storage capacity), the department has been and will continue to move away from traditional server storage to Cloud storage within the Microsoft Office 365 and Google Suite environment.

The Fairfield Public Schools uses internet access provided by the State of Connecticut, known as the Connecticut Education Network (CEN). In 2017, the district expanded Internet access by installing a second circuit (or path), to the CEN effectively doubling capacity at the time. Approximately half the

elementary and middle schools get to the Internet through one of the high schools using this design. Both links have an excellent reliability rating. Many more instructional and productivity resources were automated, and are accessible via the Internet or from the central office, rather than locally on school servers and desktop computers.

Cyber security protocols are in place and are constantly reviewed by the Director and engineering staff. Professional development using FEMA and other government resources, trusted vendors and the NIST protocols are used to evaluate systems for effectiveness and protection of end-users, technology equipment and infrastructure.

As these trends continue, and more business and educational functions are handled through electronic means (e.g. form workflows for approvals; assessments; curriculum content) the necessity of a stable and appropriately sized computer network and systems architecture has become imperative. That said, resources are limited and the department plan is to continue with changes to maximize access to files and applications while minimizing the cost of equipment, software and support staff required. The district network has grown to an enterprise mid-range network from its original small business origins.

Storage Capacity and Universal Access

Since 2014, the department has instituted the use of virtual servers. This allows the district to use one integrated system, which includes server functionality and storage for multiple environments. For example, we consolidated 11 elementary school servers into one piece of hardware. That same hardware supports many other applications.

We have placed servers at each high school as well as central office. Initially, this plan allowed for the creation of replacement “student” and “faculty” servers in a virtual environment, rather than have the need for two separate physical servers at each site. The long-range goal is to move those files and folders into Cloud resource storage using Microsoft and Google resources.

Each of these three server arrays provide for immediate access while in district. Using a single sign-on, users can gain access at any location. As students and faculty continue to migrate their files and folders to Cloud storage, a reduction in the demand for onsite storage is expected. In the meantime, the onsite servers have the capacity to connect to different types of storage. This system allows us to combine lower-cost drive storage with higher-cost storage in the same array. The servers use a software product that enables the server to separate high demand data from infrequently accessed data that performs at a slower rate. This is will continue to keep costs down and require less engineering resources to implement.

The network engineer manages the volume of data by utilizing tools such as de-duplication. De-duplication is a process wherein the operating system of the server has the capacity to compare data files held by one person or multiple people on the same server. It maintains the link for each person to get to the files as expected, but rather than storing multiple copies of an exact copy, it keeps only one. This is transparent to the user.

De-duplication not only saves space on the server storage, but also saves back up disk space and overhead as critical production servers are backed up daily to a third party site for disaster recovery and business continuity purposes.

Tri Site Design

The creation of the Storage Area Network (SAN) and Internet capacity triangle between the central office, FWHS and FLHS is part of the server consolidation process and redundant access to resources (drives in the Cloud, applications and storage) described above. The wide area network (WAN), which connects all schools, uses these three sites as the core. All K-8 schools funnel to one of these three, the majority at one of the two high schools. There is also a direct WAN connection between the high schools to ensure connectivity in the event central office is offline.

The Tri Site design moves critical resources among the three sites, so there is not one point of failure.

Use of Virtual Local Area Networks

The district implemented virtual local area networks, which allows control over the allocation of bandwidth assigned to discrete functions such as wireless devices and voice systems. Essentially, this practice creates separate broadcast networks, simplifying IT's ability to segregate traffic on the network by device type or purpose, and therefore applying different quality of service as desired: Voice traffic, for example would get a higher priority than guest Wi-Fi devices. VLANs provide flexibility and adaptability as network requirements change.

Wireless Networking

In 2009, the district installed wireless networking at the two high schools and central office. In 2012-2013, a wireless network was added to the thirteen K-8 school sites. Due to the demand for access to wireless access to the Internet, driven by personally owned smartphones as well as wireless district owned laptops and tablets, the district increased the density of the wireless network in 2016 at FWHS and at FLHS in 2017. In 2018, the three middle school wireless upgrades were completed. The elementary schools have been audited and are planned for an upgrade in 2020 as part of the Technology Department capital budget request.

Use of Cloud Services or SAAS

The department has recommended and ultimately moved, in coordination with other district departments, several key applications to software as a service, (SaaS). This moves the need to host or provide these applications on district hardware to private, secure Cloud space, in line with our move to Cloud-based resources. Applications moved from traditional in-house servers to vendor-hosted are: Tyler Munis Financial and Human Resources system, the Follett Destiny Library Circulation, Textbook and Asset Manager as well as Versatrans, the bus transportation routing and planning service.

As a result, these moves have saved district support resources which can focus on other projects, and lowered operating expenses in utility costs, backup systems and capital costs (for replacement servers).

Use of Google and Office 365

The district implemented the use of Microsoft Office 365 and Google Suite Cloud accounts for students and faculty beginning in 2012. The domains of these Cloud systems are fairfieldschools.net for Google and fairfieldschools.org for Office 365. Each student and faculty member has an account. As new resources within each platform are released, they are incorporated into our instructional practice and added to the teacher's toolbox.

The domains are currently secured and set to limit students to correspondence with others solely in the Fairfield district. This helps to ensure compliance with COPPA and CIPA. There may be compelling reasons to expand and create a separate Cloud domain space for high school students without this limitation but there are no plans to do so at present.

In late 2018, the district moved faculty email from an onsite system to Microsoft's Office 365 Cloud service. This allows the district to minimize the additional capital costs associated with the storage, functionality, backup and recovery systems required for an onsite email system.

The district will eventually eliminate the "P" or "projects drive" and continue to prepare and support teachers in the use of Microsoft Office 365 and the Google Suite for collaborative projects. H drives will remain onsite, as an alternative to Cloud storage, but teachers will be encouraged to use the Microsoft Office 365 file storage for ease of use.

Firewall (Summer 2015)

As part of the Internet circuit expansion at both high schools mentioned above, additional firewalls with cybersecurity features were added at the high schools. These next-generation firewalls are threat focused and include protection against targeted and malware attacks. School districts continue to experience an increase in attacks from external sources. Introducing web accessible applications where users are operating on non-district equipment increases the risk of malicious attacks. The improved firewall system will help to mitigate these threats.

Single Sign-On (SSO)

To facilitate student and faculty navigation and access to online resources (whether internally or externally hosted), the district has acquired a single sign-on product. All of the applications available to students and faculty are available through a web-based portal. This will also offer applications based on that student's age or location. Once the login information has been completed for each application, the student/teacher is able to click and go. It provides better navigation to Cloud and external storage, and facilitates saving and retrieving files on personally owned and district devices. The product enables access to all resources from any site with an Internet connection.

Website

In the fall of 2018, the district began the process of migrating from the current WordPress website that was built in January 2015. The Finalsity platform is ADA-compliant, provides a simplified navigation for users, has a user-friendly interface to compose and maintain online resources, has a responsive display for viewing on different devices, and will provide a better overall layout and web management system.

Additionally, we are moving the host of the website from Rackspace® to Finalsite. This provides us with scalability and improved support as access to our web resources becomes increasingly crucial to the business of the district.

Disaster Recovery and Business Continuity

The department has implemented backup systems as follows:

Email

The email system has now been migrated to Microsoft's Office 365 Cloud, and as a result, Microsoft handles the backups and the recovery. This saves the district the cost of on-demand backup recovery, disaster storage and backup costs.

The district completed the migration of the email vault and archive system to the Cloud in the summer of 2019. Retention of emails in the vault is set to two years.

Financial and Human Resource Systems

As previously noted, the district moved to Software as a Service and Tyler Munis Financial. The Human Resources database application is now hosted by Tyler from Maine. Tyler has several remote sites that backup and act as redundant sites should they have an elongated failure in Maine. The system is reachable via the Internet on mobile devices that are set up with the appropriate Tyler virtual private network (VPN) client. We have two laptops set up in this manner. Additionally, we have subscribed to two mobile hotspots to provide a cellular based alternative to the district's typical Internet access should central office not be available or accessible. Tyler's DR process for the printing of checks in the event our printing environment is unavailable, is to print them in Maine and deliver them to our designated location by driver or by FedEx.

Student, Staff and Faculty Files

All students, staff and faculty files, which are locally stored on district servers, are backed-up incrementally during each business day. These backups are retained at the end of each fiscal/school year in late June. At that point, the accumulated files will be archived to a year-end master file and a new snapshot is taken. The new snapshot is then the foundation for the New Year's back up, with incrementals added periodically each business day.

This process uses disk-to-disk storage. The backups are located at our third party vendor site in Trumbull, and saved to an out-of-state backup site. It is important to note that restoring a file from backup requires knowledge of which server the file was originally saved to, and the file name. Additionally, older files may not open correctly as operating systems and Office suite types change over time, causing older file corruption and data loss.

The migration to Google Drive and Microsoft Office 365 provides an additional location for student work. Each of these providers backs up and stores files in multiple locations to insure access. As Google's

retention system holds the most recent 90 days of data, the district has contracted with a third party for additional recovery storage. The district retention for Google resources is 2 years.

Data Analysis and Reporting

The district acquired licenses for Tableau, which is a data analysis/data mining software with the implementation of Infinite Campus in 2013. These two products have facilitated the district's ability to pull data elements from disparate sources for analysis. A server acquired with high I/O capacity (can handle "crunching" large amounts of data) in 2015 assists in running these data analytics. A request for a replacement will be part of the budget process in 2021.

Infinite Campus

The implementation of Infinite Campus in 2013 has provided open communication between students, parents, faculty and staff. As the product continues to evolve, additional modules for analytics, student achievement and instructional tools are added. This student information system continues to be a valuable investment that supports student learning by streamlining educational processes, promoting stakeholder collaboration and personalizing learning.

The program currently supports the following key functions:

- Online gradebook/assignments and collaboration
- Web portal and "mobile app" access for parents and students which tracks attendance, grades, discipline and assignments
- Online registration for new students
- Several scheduling "systems" to assist in maximizing use of building and teaching resources in support of student requests
- Online document retention
- Electronic access to report cards and transcript data
- Ad hoc reporting
- Data visualizations
- Messaging

Device Allocation and 1:1

In the 2015-2018 Technology Plan, the previous steering committee strongly believed that the district should implement a 1:1 plan for technology equipment with students at the secondary schools. This plan, called the "Innovation Learning Initiative" was implemented in the summer of 2018 for all high school students and Grade 7 at the middle schools. (Note: Grade 7 students would keep their devices as they move up to Grade 8.) Ongoing support, training, and professional development continue as the program evolves. A website and online handbook were created with parent and student information. An interactive platform was also provided to answer questions and provide feedback.

The technology budget request for the summer of 2019 contained funding to complete the middle schools by providing a device to students in the remaining grade levels (Grade 6 and Grade 7).

Graduating seniors will return their Chromebooks, which will be redistributed to the incoming freshman class. In subsequent years, 12th grade devices will be recycled to underclassmen until the Chromebooks reach year 5 in their lifecycle, or Google stops supporting the OS on those devices.

Additional devices will be procured to fill gaps in enrollment counts versus computers available, and to provide spares.

The elementary distribution model will be reviewed in 2019-20 in order to develop a plan for implementation with the 2020-2021 budget.

Audio Visual Systems and Interactive Systems

The district has invested in projection systems in most classrooms. In a few specialty areas such as Family Consumer Science and Wood Shop, display systems are installed in lieu of multimedia projectors, due to room restrictions or environmental concerns.

Smartboards, a brand of interactive whiteboard, have been funded primarily by PTA grants, and installed in most elementary classrooms. A handful are in use at the secondary level as well, principally in math and science classrooms.

These types of interactive boards are approaching the end of their product life. The committee, as of this writing will be investigating and selecting replacement solutions based on parameters to be determined (i.e. simple and secure screen sharing, less expensive installation).

Voice Over IP

In joint effort with the Town, the district selected a Cisco Voice over Internet Protocol (VoIP) solution to replace its existing Centrex/Nortel phone system that had reached end of life. Total Communications, a subsidiary of Frontier Communications, won the award. The system has been designed with survivability nodes at three locations and provides 911 calling access from schools (even if the VOIP system is offline). Additional productivity features such as message waiting, caller ID and 16-person conference calling is included in the package.

The district completed a launch and cutover to the new phone system in February 2019.

This project required that phone support move from the Business Office to the Technology Department.

Safety and Security Systems

The Safety and Security Department, in conjunction with the Police Department and the IT department has implemented several security systems including interior and exterior cameras and door locking mechanisms. Access to security systems is through both the Internet and the network. The IT Department has taken responsibility for moves, adds, changes and repairs for these systems.

Building Control Systems

Presently, there are several building control systems used to allow tradespeople to “dial in” and monitor the HVAC and other control systems in the schools. A project is currently in place to upgrade these systems (from older software dependent on aging operating systems) and improve remote access. The IT Department has been assisting building maintenance to maintain and migrate the existing systems.

Student Records Management

With the use of Infinite Campus, IEP Direct, and other online systems, the district has begun to maintain student records information online. Hard copy folders do exist for basic information. The district plans to formalize regulations and standardize procedures for the location of certain documents within the databases over the term of this plan. Policy updates are ongoing to conform to changes in state and federal statutes.

Application Support and File Storage

Productivity Applications

- G Suite for Education would be offered Grades 3-12
- Microsoft Office 365 would be offered PreK- 12
- ClassLink will be offered to all students and faculty

File Storage

- All students using Single Sign-On (SSO), would be able to select their choice of location for their files. (Office 365, Google Drive, ClassLink or district servers).
- Faculty work will be stored either in Google Drive, Office 365 or district storage.
- Administrative and Business work of the district will be held on a combination of Google Drive, Office 365 and district storage, depending upon the nature of the files.

Instructional Applications and Curriculum Content

Where possible, all district curricular materials will be accessible via the Internet. The committee strongly recommends that all text and ancillary resources selected meet this criterion. The purpose is to provide access 24/7/365 days per year, keeping the resources current. Future analysis of the cost savings that a district-provided device provides in lieu of traditional hardbound text and/or materials, shall be undertaken each of the years of this plan.

Instructional Apps

<https://sites.google.com/a/fairfieldschools.net/school-approved-apps/home>

The above site reviews the app approval process, subject to funding. With budgeted approval, the request process will be moved to the Learn Platform and coordinated with the state platform in the 2019-2020 school year.

Students:

Secondary students will be provided a Chromebook (Grades 6-12).

Faculty and Staff

All faculty will be provided with a choice of a laptop, desktop or tablet device. One device will be issued per teacher/administrator.

Staff will be allocated a device based on defined role and the standard assigned to that role. Currently the following staff member roles are assigned computers:

- 1) All Administrators
- 2) All Secretaries
- 3) All Information Technology staff
- 4) All Head Custodians
- 5) All department heads
- 6) All certified, full time support staff

Staffing

Technical Support

As of 2019, the district has:

1. 10 school based technicians
2. 4 help desk technicians
3. 3 data integrators/ analysts
4. 1 engineer
5. 1 director

The department continues to restructure the current FTE to maximize support available for the additional equipment and uses of the network.

With the increased resources that have been added to the network over time and the challenging demands of cyber security, the need for an additional network engineer is anticipated. A possible reconfiguration of responsibilities and department structure may be required.

Instructional Integration

As of 2019, technology integration teachers support secondary teachers with technology integration into curriculum and instruction. Approximately ten years ago, the district also had technology integrators at the elementary schools.

Technology integrators have been very effective in assisting teachers with adopting technologies such as Google Classroom, Microsoft Office 365 and other approved online resources; it is important to continue this instructional support. A second technology integrator was hired at the high school level in the summer of 2018.

The committee recommended the position of Instructional leader for Technology in 2012. This position was created as the Executive Director of Digital Learning in 2018. This position will assist in the evaluation of software and apps and will work with the curriculum leaders and liaisons to ensure technology is integrated into the curriculum.

Instructional Technology Goals and Action Plan

Goal 1: Engaging and Empowering Learning Experiences

1. Develop and adopt a framework of K12 instructional technology skills aligned to ISTE student standards with exit skills for Grades 5, 8 and graduation. (1 year)
2. Incorporate instructional technology, (per the framework), into:
 - Problem based learning experiences. (1-3 years)
 - Performance based assessments for students. (1-3 years)
 - Curriculum implementation documents. (1-3 years)
3. Continue to curate, ensure privacy compliance and maintain Cloud-based resources, databases and applications to support student learning. (Ongoing 1-3 years)
 - Ensure the usage of curated resources through systemic professional development and usage statistics.

Goal 2: Assessment

1. Annually evaluate assessments' needs when purchasing technology devices. For example: grade level, curriculum content, and compatibility. (1 - 3 years)
2. Annually evaluate current technology devices to determine compatibility/appropriateness with district and state mandated assessments. (1-3 years)
3. Promote teacher access to and usage of data and visualizations.
 - Support teacher professional development in use of data analytic tools and evaluation of results. (1-3 years)
4. Train and promote administrative access to data and visualizations in support of district and school improvement plans.

Goal 3: Connected Teaching and Learning

1. Develop and maintain a resource of all available, approved instructional applications and resources for better awareness of available tools. (1 year)
 - a) Implement the Learn Platform for Fairfield to provide access to an approved list and improve the app and app privacy compliance approval process for teachers.
 - b) Develop and implement a workflow for continual review of app usage for consideration of changes to licensing (grade levels using an app), elimination of use or migration to another product to reach the same instructional goal.
2. Create a local support network to create opportunities for Instructional Technology Professional Development. (1-2 years)
 - o Support and promote technology skills certifications for teachers (Google, Microsoft, etc.)
 - o Implement use of the Infinite Campus Learning Tools for FPS staff.
3. Work with curriculum leaders to ensure that technology is embedded in professional development for each content area. (2 years)
4. ISTE certification for select teachers and administrators to provide “train the trainer” program in house. (1-3 years)

Goal 4: Infrastructure for Teaching and Learning

1. Continue to manage the wireless infrastructure to meet the above goals. Implement additional access points at Elementary in summer 2020 (based on approved 2020-2021 budget). Implement additional coverage where warranted (ex: outdoor playing fields).
2. Continue to support students without internet access at home through filtered “hotspots.”
3. Evaluate the Innovative Learning Initiative (Chromebook 1:1) in Grades 6-12 for effectiveness.
4. Continue to evaluate resources for effectiveness and accuracy with Program Directors, Liaisons, Library Media Specialists and Technology Integration Specialists.
5. Support innovation through a timely application review process. (Ongoing)
6. Implement a cyber-security audit to determine vulnerabilities and work with the administration on priorities for recommended changes to infrastructure, access to data and end user training.
7. Continue to monitor changes to applications to insure vendors are compliant with the CT privacy laws, insuring data deletion requests are issued and vendors follow through.
8. Continue to review solutions to address end user, data and infrastructure security needs as they evolve.