Mobile Device Management

101

Get more out of iPad and iPhone in higher education

Table of Contents

The State of iOS in Higher Education

The Evolution of Mobility

Mobility began in the 1990s with handwriting recognition technology from Apple Newton and Palm Pilot, and the ability to connect to a dial-up modem.

The mid 2000s brought additional players to the smartphone market, with Symbian being the popular choice in Europe and Palm OS in the U.S. The market was crowded with five mobile operating systems and no clear winner.

The iPhone launched in 2007, followed by the first Android phone in 2008. Shortly after the iPhone launch, Apple's App Store gave developers the ability to build native apps for iOS, opening up a whole new world for mobile productivity and higher education process improvements.

Since 2007, BlackBerry and Windows Mobile users have declined drastically, while Palm, Symbian, and SideKick have been discontinued.

The early smartphones were dominated by BlackBerry and Windows Mobile, which opened the door for mobile communication.

Today, the mobile landscape has two major OS players. Smartphones have evolved beyond simple communication tools, with apps serving as the vehicle for transformation of mobility and higher education.

Why Choose iOS

Out of the top prevailing mobile operating systems, iOS is the only platform that is designed for consumers and embraced by universities. iOS boasts an intuitive user interface, a secure ecosystem of both business-ready apps as well as education-focused apps, and built-in tools that empower users to be more productive than ever before.

Fastest and most efficient mobile hardware

Runs on iPhone and iPad at different screen sizes

Native hardware-based encryption to keep data secure

Healthy developer ecosystem with 1.5 million apps in the App Store and $40B paid to developers

Touch ID for biometric security

Over 70% of users on latest OS with annual release cycles

Productivity apps to create documents, spreadsheets, and presentations including Microsoft Office for iOS

Split-screen multitasking for iPad

Built-in support for modern secure wireless networking, such as VPN and single sign-on

Built-in Microsoft Exchange support for email, calendars and contacts

Why iOS for Higher Education

As the demand for mobility has increased in the enterprise as well as K-12 education, higher education institutions are seeing similar demand increases in regards to users needing and wanting more mobile options. From administrative needs, faculty usage within lecture, as well as a learning tool for students. Mobility has become a critical function for productivity, engagement and learning within the higher education space.

How Many Higher Education Institutions Choose iOS?

In the recent Jamf Managing Apple Devices in Higher Education survey, nearly all higher education IT professionals say they've seen an increase in overall Apple adoption from the past year. Additionally almost all (94) professionals interviewed use iOS to enhance the education experience.

87%

of institutions saw an increase in their Apple adoption from the past year

94%

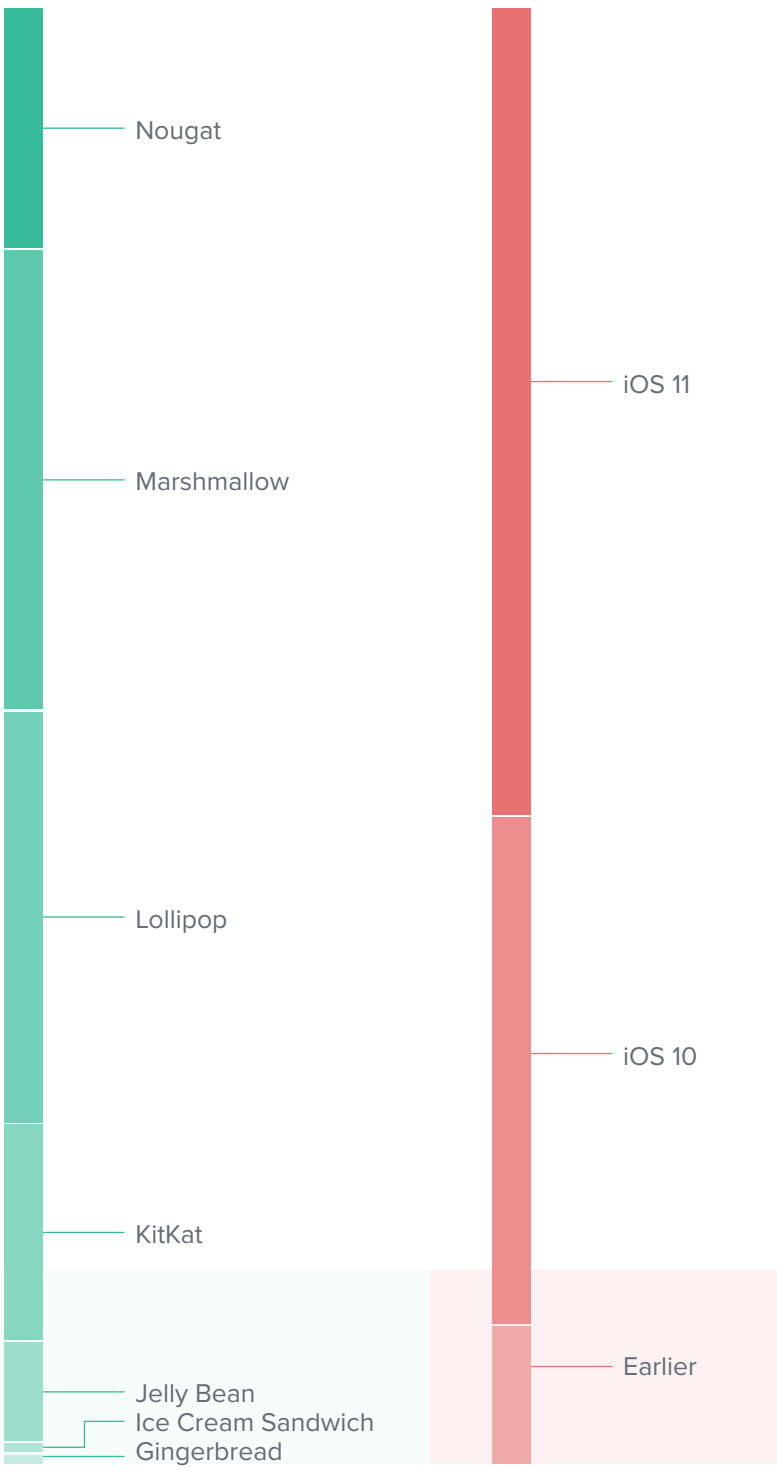
of higher education institutions use iOS to enhance the education experience

Source 1 - Jamf
https://www.jamf.com/resources/2016-survey-managing-apple-devices-in-higher-education/

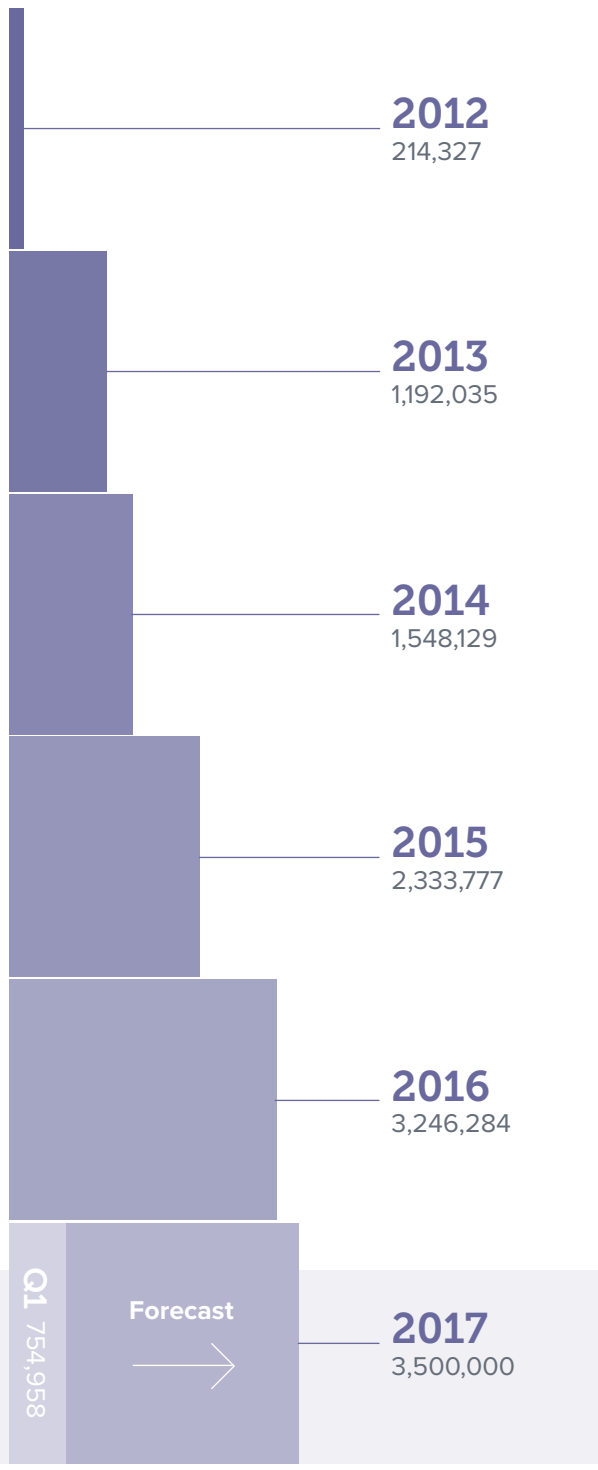
What About Android?

Google's Android operating system has risen in popularity due to its wide variety of form factors, a highly customizable operating system, and often less expensive devices. Android can be a good choice for consumers or BYOD programs since users value features differently. Within a university setting; however, Android is difficult to standardize on and support as well as maintain a secure environment.

Adoption Rates



New Android Malware Samples (per year)



Source 1 - Google: http://developer.android.com/about/dashboards/index.html
Source 2 - Apple: https://developer.apple.com/support/app-store/
Source 3 - G Data: https://public.gdatasoftware.com/Presse/Publikationen/Malware_Reports/G_DATA_MobileMWR_Q3_2015_EN.pdf

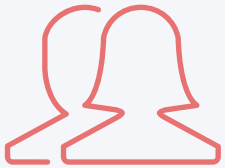
Mobile Device Management Overview

What is MDM?

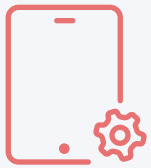
Mobile device management (MDM) is Apple's framework for managing iOS. To effectively manage iOS devices and unleash their full potential, organizations require an equally powerful MDM solution. From deploying new devices and gathering inventory, to configuring settings, managing apps or wiping data, MDM provides a complete toolset to address large-scale deployments and ensure device security.

Deployment

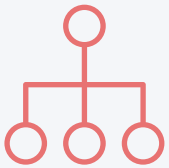
Inventory



Configuration Profiles



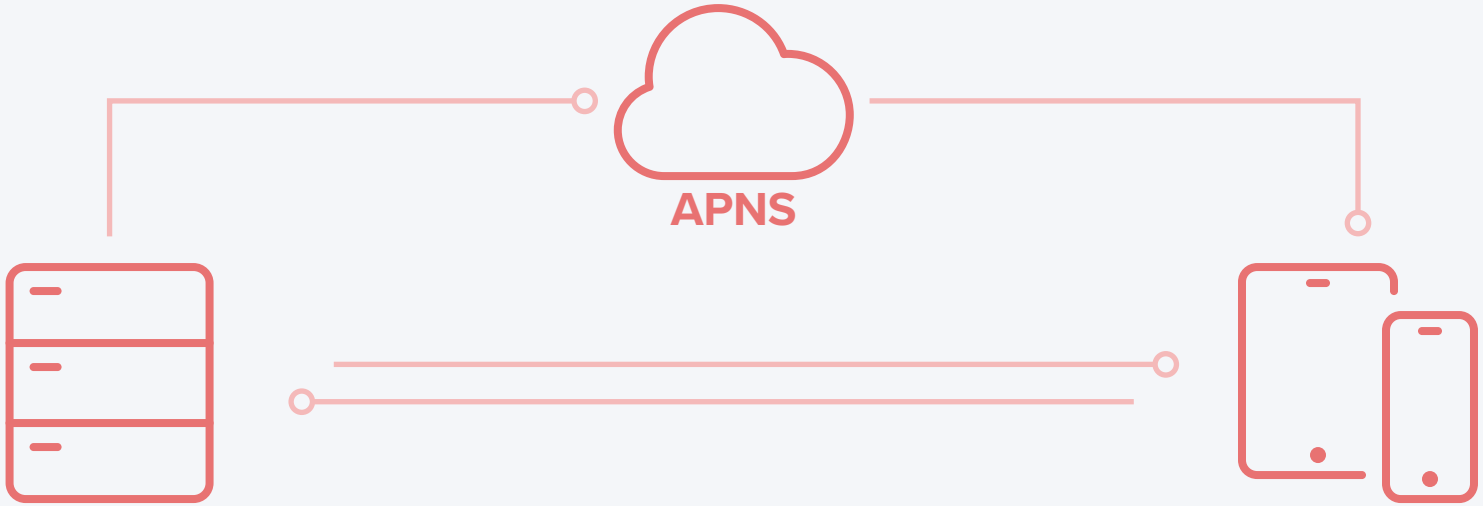
Management Commands



App Deployment

Security and Privacy

The Architecture for MDM



Apple Push Notification Server

When you send commands to Apple devices, your MDM server communicates with Apple's Push Notification Server (APNS). Apple's server maintains a constant connection to devices so you don't have to. Devices communicate back to the MDM server and receive the commands, configuration profiles or apps you send it.

Deployment Methods

Before you can use MDM to manage your iOS devices, you first have to enroll them. For iPad or iPhone, an MDM tool allows you to easily enroll devices into management, consistently distribute apps and content, and set up security and access profiles. There are several methods to enroll an Apple mobile device, including enrollment via Apple Configurator, a URL, or Apple School Manager.

Deployment Methods

	Description	User Experience	Supervision	Best For
Automated Deployment with MDM	Automatic enrollment over the air (also referred to as zero-touch deployment)	User receives shrink-wrapped box, and the device is automatically configured when turned on	Yes–wirelessly	Sending devices directly to end users
Apple Configurator	Enrollment through a Mac app that connects to devices via USB	N/A—IT manages this process and hands devices to users	Yes—wired	Shared-models and carts
User Initiated via URL	Over-the-air manual enrollment	User visits a specific URL to automatically configure their device	No	Devices currently in the field that need to be enrolled or BYOD

Supervision

Supervision is a special mode of iOS that enables deeper management by an MDM server. A growing number of configurations are only available if a device is supervised. It is recommended that university-owned devices are put into supervision mode.

Examples of Supervision-only Commands:

- Disable Camera
- Disable App Store
- Disable Safari
- Disable modifying wallpaper
- Disable adding email accounts
- Plus many more....

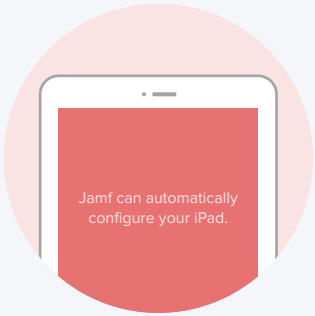
Best practice: Zero-Touch Deployments with MDM and Apple School Manager in Higher Education

1

Sign up for Apple School Manager via **https://school.apple.com/** and add your MDM server to the Apple School Manager portal.

2

Purchase devices and link them to your Apple School Manager account. Ship them directly to users.



3

As a user turns their iOS device on for the first time, the device will automatically be enrolled—no additional interaction is needed.

4

Device enrolls with the MDM server. Prepare any configuration profiles and apps you'd like to apply to devices.

5

Device receives configurations and apps scoped to it, and the user is brought to the Home screen. The device is now managed and configured—all without IT having to touch it!

Inventory

MDM solutions are capable of querying an iOS device to collect a large amount of inventory data, ensuring you always have up to date device information to make informed management decisions. Inventory can be collected from a device at various intervals, and includes information such as serial number, iOS version, apps installed, and much more.

Examples of Data Collected with MDM

Hardware Details

- Device Type
- Device Model
- Device Name
- Serial Number
- UDID
- Battery Level

Software Details

- iOS Version
- List of Apps Installed
- Storage Capacity
- Available Space
- iTunes Store Status

Management Details

- Managed Status
- Supervised Status
- IP Address
- Enrollment Method
- Security Status

Additional Details

- Profiles Installed
- Certificates Installed
- Activation Lock Status
- Purchasing Information
- Last Inventory Update

Why Does Inventory Matter?

You can't manage what you can't measure. The inventory data that MDM collects can be used for a wide range of education needs and empower you to answer common questions like: Are all my devices secure? How many apps do we have deployed? What version of iOS do we have deployed?

Configuration Profiles

Configuration profiles give you the ability to tell your devices how they are supposed to behave. While you once had to manually configure devices, MDM technology allows you to automate the process of configuring passcode settings, Wi-Fi passwords, VPN configurations, and more. Profiles also have the ability to restrict items in iOS such as the Camera, Safari web browser, or even renaming the device.

Available Profiles for MDM

The Basics

- Passcode
- Restrictions
- Wi-Fi
- VPN
- Home Screen Layout
- Single App Mode
- LDAP
- Web Clips

Email Accounts

- Mail
- Exchange ActiveSync
- Google Account
- VPN
- Calendar
- Contacts
- Subscribed Calendars
- macOS Server Account

Internet Settings

- Global HTTP Proxy
- Content Filter
- Domains
- Cellular
- Network Usage Rules
- Certificates

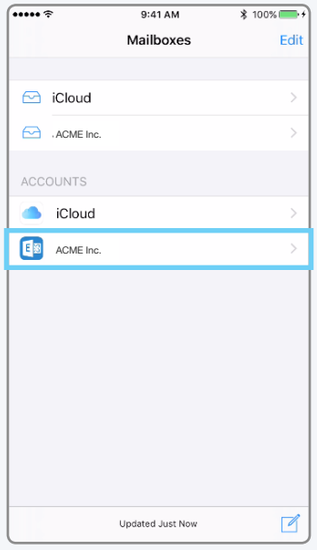
Other Settings

- AirPlay
- AirPlay Security
- Conference Room Display
- AirPrint
- Fonts
- SCEP
- Lock Screen Message
- Notifications
- Single Sign-on
- Access Point Name

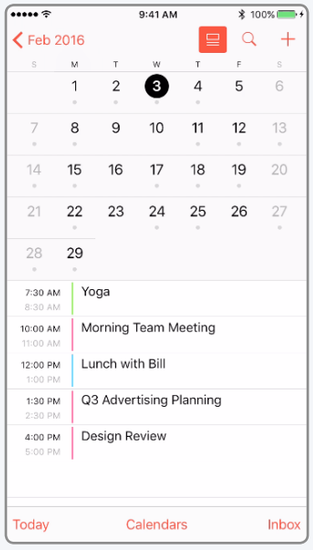
Eliminate Containers for iOS Management

In the world of MDM, a container is an additional app designed to serve as a secure location for corporate info such as email, calendars, contacts, and even web browsing. Organizations are drawn to this concept, but it gets in the way of a good user experience. Containers became popular among some MDM solutions to help overcome Android security flaws.

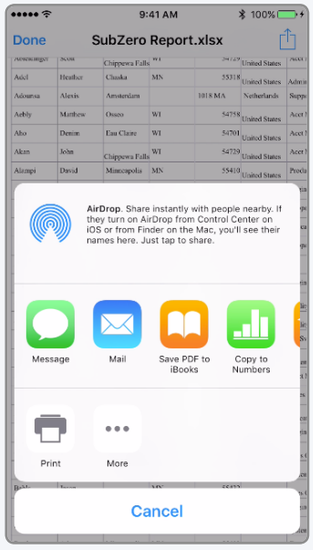
The reality is that iOS native apps (Mail, Calendar, Contacts and Safari) are already secure. There is simply no need for a “secure” email container. To preserve the best experience for users, simply use configuration profiles. A profile has the ability to add an Exchange account to iOS, which will in turn provide access to corporate email and calendars.



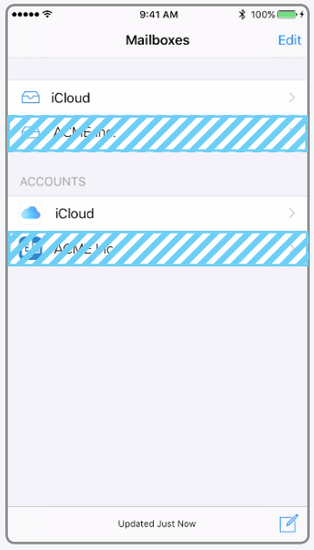
A configuration profile adds an Exchange account next to a user’s personal email account in the native Mail app.



Corporate data now lives right next to personal data in the native apps, preserving user experience and security.



IT can also control the flow of data by preventing apps from opening attachments in their corporate email account.



Finally, if an employee leaves an organization, IT can simply remove the configuration profile and the corporate email account is removed along with the data. Personal accounts are not deleted.

Best Practice: Standardize iPad

Whether your iOS devices are used for students during lecture, or for staff and faculty as part of their job, help improve user productivity by offering a consistent experience on your institutionally owned devices. Standardizing Apple devices for your workforce creates a streamlined setup process that allows users to quickly access the apps they need, when and where they need them. Less time searching for apps leads to increased productivity from users.

Here are three ways you can standardize iPad and iPhone devices at your university:

Set the Home screen wallpaper

Create brand consistency by displaying your organization's logo on the wallpaper.

Pre-design the Home screen layout

Define the placement of apps and folders, along with web clips, on the Home screen. Put mission-critical apps on the first page and less important apps on other pages.

Show/hide apps

Display only the apps your staff and students need. Hide the ones that are not necessary for their work.

Management Commands

Management commands are specific actions you can apply to individual devices to ensure security of corporate data. Leverage this capability within MDM to take action on lost or stolen devices by locking a device or wiping it completely. Additional commands allow you to send push notifications, update iOS to the latest version, and change the device name to make it easier for IT to manage their fleet of devices.

Available Commands for MDM

INTERNET SETTINGS

LOCK DEVICE

CLEAR PASSCODE

CLEAR RESTRICTIONS

UNMANAGE DEVICE

WIPE DEVICE

SEND BLANK PUSH

SET WALLPAPER

SEND NOTIFICATION

UPDATE IOS

CHANGE NAME

SHUTDOWN DEVICE

RESTART DEVICE

LOST MODE & SOUND

LOGOUT USER *

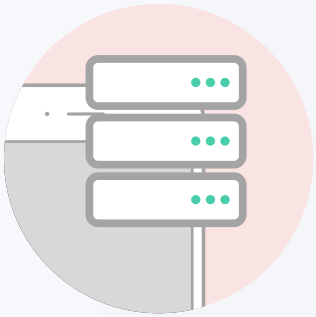
DELETE USER *

* Shared iPad only

Best Practice: Manage Activation Lock with MDM

Activation Lock is designed to prevent theft of iPhones and iPads. By requiring an Apple ID and password, not just anyone can activate a device. This feature is great for theft prevention, but can cause problems when IT admins need to reassign devices to students if they are not managing their students' Apple IDs. However, when pairing Activation Lock with an MDM solution, IT admins are able to manage Activation Lock much easier. As long as a device is enrolled in an MDM server and is supervised, you can generate an Activation Lock Bypass Code in case you receive a device that is locked to a previous Apple ID. Once you have the code, you can enter it into the password field during the Setup Assistant and the device is unlocked.

1



Device is already enrolled in an MDM server and is supervised. An Activation Lock Bypass Code is generated and stored in the MDM server.

2

A locked device is returned to IT, so they retrieve the Bypass Code stored in the MDM server.

3

IT reboots the device into the Setup Assistant and the first screen asks for the previous student's Apple ID and password. To bypass the Activation Lock, IT enters the code in the password field and leaves the Apple ID field blank. The device is now unlocked.

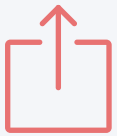
App Deployment

An iOS device serves as a great communication tool out of the box, but the rich library of personal and business apps in the App Store can enhance user productivity and help your faculty and staff achieve even more. Further, you can use App Store apps for both administrative tasks as well as for learning and engagement. With an app strategy and a mobile device management solution to manage your app deployments, you will ensure users have the apps they need—configured and secure for your environment.

App Management Strategies

What is a Managed App?

Introduced in iOS 5, managed apps differ from a standard app because they are flagged as owned by an organization. Specifically, managed apps are distributed via MDM technology and can be configured to prevent backup of the app's data and deleted when the MDM profile is removed.



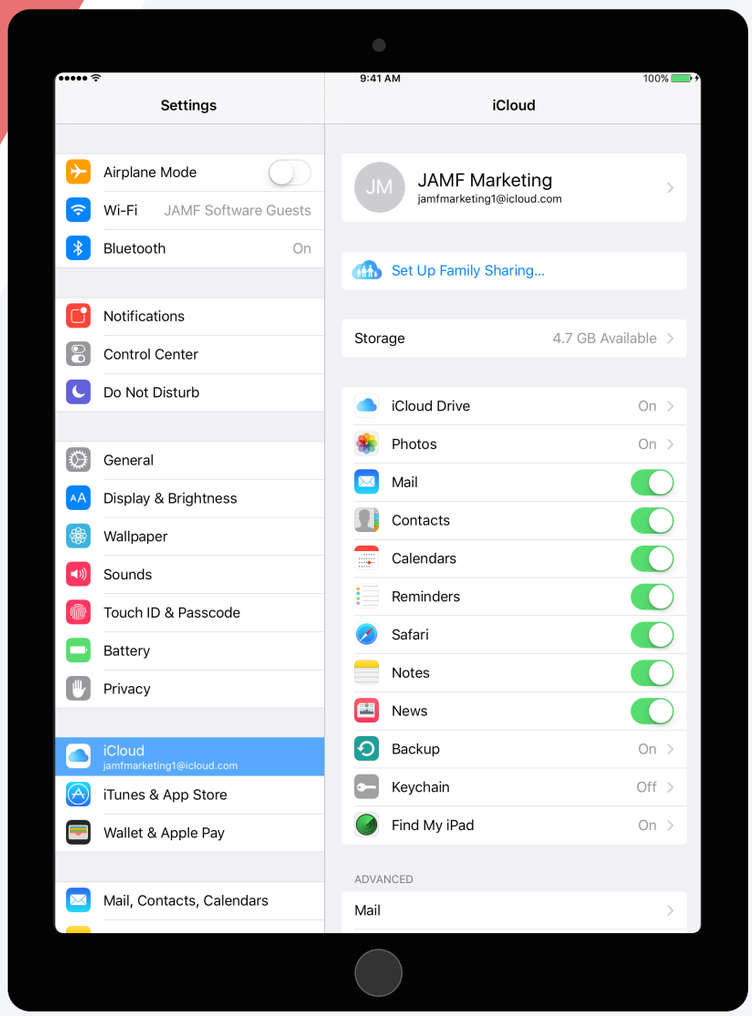
Managed Open In

Managed Open In takes the concept of managed apps a step further by controlling the flow of data from one app to another. Organizations can restrict what apps are presented in the iOS share sheet for opening documents. For example, you could define rules that state mail attachments from corporate email accounts can only be opened in the Box app and not in a personal Dropbox account. This allows for truly native data management without the need for a container.

App Configurations

Sometimes deploying an app isn't enough and you'd like to pre-customize some of the settings. This is the premise for App Configurations. App developers can define what settings can be pre-configured by an MDM server for their app. For example, you could deploy the Box app with the server URL pre-populated so users only need to enter their username and password to get the app up and running.

Best Practice: Individual Apple IDs for Users



Individual personal Apple IDs help increase adoption of iOS and encourage your users to find unique solutions to their problems.

What is an Apple ID?

An Apple ID is a personal account for users to access Apple services such as the App Store, iTunes, iCloud, iMessage, FaceTime, and more. An Apple ID consists of an email address and password, as well as contact, payment and security details.

Why Are Apple IDs Important for Users?

An Apple ID allows users to take full advantage of iOS and the App Store. For example, allowing users to have an Apple ID enables them to access free communication services from Apple such as FaceTime and iMessage, as well as other services like Find My iPhone and iCloud.

What About University-owned Apps?

Since the VPP store now allows you to license apps via the “Managed Distribution” method, you can simply assign apps to a user’s device or Apple ID without permanently transferring ownership to the user. This way, IT doesn’t have to spend hours creating Apple IDs specific to a device.

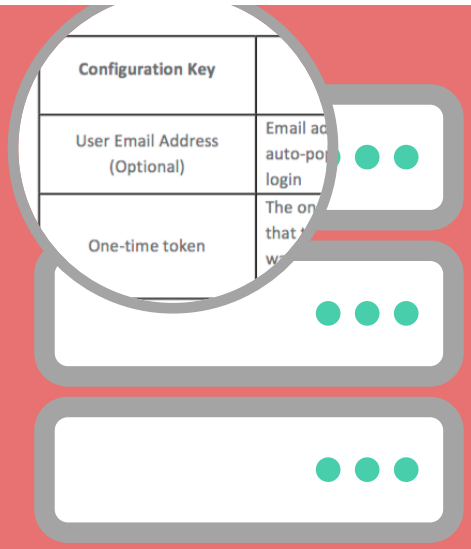
What About Security Risks?

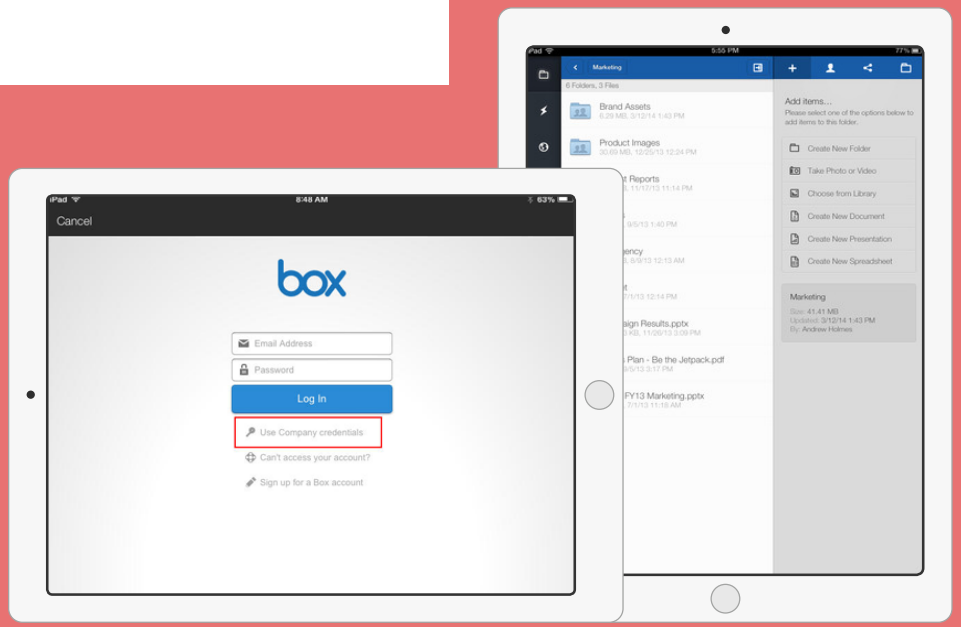
Utilizing MDM features such as Managed Open In and restrictions within a configuration profile, IT can better mitigate security risks as opposed to prohibiting Apple IDs altogether. Apple’s services are known for their security, and adding a personal Apple ID to a corporate device does not reduce the overall security. In some cases, you can even increase security since Apple IDs support two-step authentication.

Best Practice: Managed App Configuration Deployment Example

Box for iPhone and iPad helps you get work done on the go. It's fast, secure and simple to use, so you can be productive from anywhere, which is the reason more than 25 million users and 225,000 companies use Box.

Deploy Box using VPP with options pre-configured to ensure adoption among your users.





Box provides a set of configuration keys that pre-populate items such as the URL, user email address, a one-time token, and more. These configuration keys can be added to your MDM server to help automate the initial set up of Box.

When the app has been deployed via your MDM server, the configuration keys carry through. If you pre-configured the URL, for example, the first time Box is launched users will automatically be brought to the company login screen and not presented with the default personal account login screen.

Security and Privacy

Security and privacy concerns are major issues for higher education institutions. iOS has a number of security features built right into the mobile operating system to keep both student and teacher data safe. Additionally, with Apple's commitment to student privacy, parents and students can feel safe knowing that Apple does not allow geo-tracking for devices. Coupling these features with an MDM solution, you can ensure that your devices, apps, and network are secure while users feel safe using their devices.

Native Apple Security Features

Lost Mode

With Lost Mode, schools now have the ability to locate and recover lost or stolen Apple devices without compromising student privacy through ongoing location tracking. When Lost Mode is activated, the iOS device receives a customized lock screen message, is disabled from use, and sends its location to IT.

Encryption

iOS has 256-bit encryption built in and is automatically enabled if a passcode is enabled. This means the data on your devices remain secure without having to add any additional software bloat to the operating system. Since Apple makes both the hardware and software, the encryption is so fast that it is unnoticeable to the user.

Pre-App VPN

Virtual Private Networks (VPN) have long been implemented in higher education institutions as a means to encrypt traffic over the internet. Traditional desktops can operate by routing all traffic over VPN; however, that model can break down when it comes to mobile. Apple solves this by allowing universities and app developers to define, at the app level, what data gets routed through VPN. This helps save bandwidth and improve network speed.

Touch ID and Face ID

A fingerprint sensor is now included in the majority of Apple's new iOS devices, additionally facial recognition has been added to some of the newer iOS devices, adding biometric security to the operating system. Touch ID and Face ID can be used to unlock a device and sign into certain apps. Fingerprint and facial data are stored locally on the device and is never shared with Apple.

Enforcing Encryption on iOS Devices

To keep data private and protected, enforcing encryption on all managed devices is highly recommended. By applying a configuration profile to managed iOS devices that requires a passcode, data encryption is enabled.

Within your configuration settings you can specify:

- Length of passcode
- Simple or complex passcodes
- Passcode rotation frequency
- Allow or deny previously used passcodes
- Auto lock time
- Maximum number of failed passcode attempts before wiping the device

Best Practice: Using an MDM Solution for Loss Prevention

The ability to use MDM to place a supervised device into Managed Lost Mode is a key security enhancement available on iOS 9.3 or later. This setting can provide the device location, which is instrumental in finding lost or stolen devices. Additionally, only when Lost Mode is disabled will the user be able to unlock their device. At that time, any location information that was accessed will be shared with the user.

Managed Lost Mode is controlled by the administrator and must be disabled by the administrator before the device can regain operability. Similar to Find My iPhone, an administrator can send messages to the device while it is in Managed Lost Mode.

Moving Higher Education Forward with Apple TV

As mobile demands increase within higher education institutions, your technology needs to keep up. With the latest tvOS, Managed Apple TV now allows IT to transform consumer Apple TV devices into managed work tools.

Wireless Conference Room

To create a modern conference room, set up an adapter and wireless display. Then enable Conference Display Mode and create a customized welcome message that includes additional instructions or information specific to each room.

Digital Signage

Apple TV makes digital signage more affordable, accessible, scalable and manageable. And, with MDM software, schools can easily control what is shown at a single location or across multiple sites.

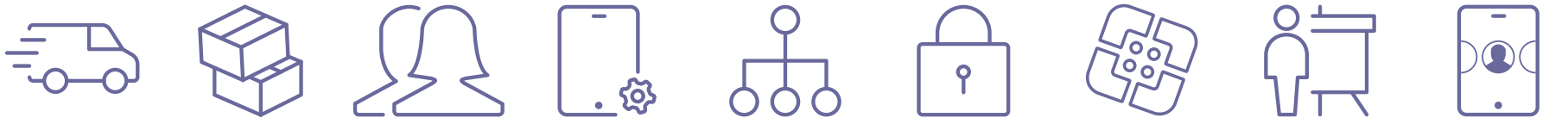
Spontaneous Collaboration

Managed Apple TV and Airplay makes it easier than ever to instantly display screens from a device onto a shared screen. This creates a setting perfect for collaboration within classrooms and offices.

jamf | PRO

Mobile Device Management for Higher Education

Jamf Pro is the leading mobile device management tool for iOS in higher education. Designed to automate common tasks around Apple deployment, inventory and security, Jamf Pro makes device management easy, so you can better ensure a transformative learning experience while maintaining a secure environment.



Deployment | Inventory | Configuration Profiles | Management Commands | App Deployment | Security and Privacy | Self Service | Apple School Manager | Classroom Management

Start Managing iOS with a Free Trial

Configuration Profile Payloads and Management Commands List

Managed Only

Passcode payload

- Allow simple value
- Require alphanumeric value
- Minimum passcode length (0-16)
- Minimum number of complex characters (0-4)
- Maximum passcode age (0-730 days)
- Maximum Auto-Lock time
- Passcode history (0-50 passcodes)
- Maximum grace period for device lock
- Maximum number of failed attempts

Restrictions payload

- Allow use of camera
- Allow screenshots and screen recording
- Allow voice dialing while device is locked
- Allow Siri
- Allow Siri while device locked
- Allow Siri suggestions
- Allow installing apps using Apple Configurator and iTunes
- Allow in-app purchase
- Require iTunes Store password for all purchases
- Allow iCloud backup
- Allow iCloud keychain
- Allow managed apps to store data in iCloud
- Allow backup of enterprise books
- Allow notes and highlights sync for enterprise books
- Allow iCloud Photo Sharing
- Allow iCloud Photo Library
- Allow My Photo Stream
- Allow automatic sync while roaming
- Force encrypted backups
- Force limited ad tracking
- Allow users to accept untrusted TLS certificates
- Allow automatic updates to certificate trust settings
- Allow trusting new enterprise app authors
- Allow documents from managed sources in unmanaged destinations
- Allow documents from unmanaged sources in managed destinations
- Treat AirDrop as unmanaged destination
- Allow Handoff
- Allow sending diagnostic and usage data to Apple
- Allow Touch ID to unlock device
- Force Apple Watch wrist detection
- Require passcode on first AirPlay pairing
- Allow Wallet notifications in Lock screen
- Show Control Center in Lock screen
- Show Notification Center in Lock screen
- Show Today view in Lock screen
- Set ratings region
- Set allowable content ratings for Movies, TV and Apps
- Allow explicit sexual content in iBooks Store

Other Payloads

- Wi-Fi payload
- VPN payload
- Mail payload
- Exchange ActiveSync payload
- Google Account payload
- LDAP payload
- Calendar payload
- Contacts payload
- Subscribed Calendars payload
- Web Clips payload
- macOS Server Accounts payload
- Domains payload
- Certificates payload
- SCEP payload
- APN payload
- Cellular payload
- Single Sign-On payload
- Fonts payload
- AirPrint payload
- Network Usage Rules payload

Management Commands

- Remote Lock
- Remote Wipe
- Clear Passcode
- Un-Manage Device
- Update Inventory
- Send Blank Push

Managed + Supervised

Enrollment (DEP Only)

- Supervise Device
- Make MDM Profile Mandatory
- Disallow pairing to Mac computers
- Disallow the user from removing the MDM profile
- Enable Shared iPad
- Require credentials for enrollment
- Skip Setup Assistant options
- Define a naming method for devices

Restrictions Payload (Supervised Only)

- Allow FaceTime
- Allow screen observation by Classroom app
- Allow modifying the AirPlay and View Screen permission for managed classes
- Allow AirDrop
- Allow iMessage
- Enable Siri profanity filter
- Allow user-generated content in Siri
- Allow iBooks Store
- Allow installing apps using App Store
- Allow automatic app downloads
- Allow removing apps
- Allow Apple Music
- Allow Radio
- Allow iCloud documents & data
- Allow Erase All Content and Settings
- Allow installing configuration profiles
- Allow modifying account settings
- Allow modifying Bluetooth settings
- Allow modifying cellular data app settings
- Allow modifying device name
- Allow modifying Find My Friends settings
- Allow modifying notifications settings
- Allow modifying passcode
- Allow modifying Touch ID fingerprints
- Allow modifying restrictions
- Allow modifying Wallpaper
- Allow pairing with non-Configurator hosts
- Allow modifying diagnostics settings
- Allow pairing with Apple Watch
- Allow connection to unmanaged Wi-Fi networks
- Allow predictive keyboard
- Allow keyboard shortcuts
- Allow auto correction
- Allow spell check
- Allow Define
- Allow dictation
- Allow use of iTunes Store
- Allow use of News
- Allow use of Podcasts
- Allow use of Game Center
- Allow use of Safari
- Enable AutoFill
- Force fraud warning
- Enable JavaScript
- Block pop-ups
- Block Cookies
- Allow playback of explicit music, podcasts and iTunes U
- Autonomous Single App Mod
- Hide/Show Apps
- Restrict AirPlay destinations

Other Payloads (Supervised Only)

- Home Screen Layout payload
- Single App Mode
- Global HTTP proxy payload
- Content Filter payload
- Lock Screen Message payload
- Notifications payload

Management Commands (Supervised Only)

- Set Wallpaper
- Bypass Activation Lock
- Lost Mode with Sound
- Update iOS (DEP enrollment only)
- Clear Restrictions
- Rename Device
- Restart Device
- Shut Down Device
- Delete User (Shared iPad only)
- Logout User (Shared iPad only)