Managing FileVault in macOS Catalina

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TRAVELLING TECH GUY

macOS and iOS management with a twist of Jamf (less travel, a lot more tech)

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Managing FileVault in macOS Catalina

Presentation agenda:

- Terminology
- SecureToken Flows
- Remotely enforcing FileVault
- Recovery Keys
- Troubleshooting and fixes

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Terminology

FileVault

SecureToken

BootstrapToken

“Managed Administrator”

Deferred enablement

Recovery Keys

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FileVault

Introduced in Mac OS X 10.3 Panther

Initially only the user's home folder

FileVault 2 introduced in Mac OS X 10.7 Lion

Full startup disk encryption

Further changes:

Mac OS X 10.13 High Sierra: SecureToken

Mac OS X 10.15 Catalina: BootstrapToken

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SecureToken

Wrapped version of a Key Encryption Key (KEK) protected by a user's password.

Basically an attribute linked to a user's account to allow it to interact with FileVault

FileVault enabled user = SecureToken enabled user

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BootstrapToken

Introduced in macOS Catalina to facilitate the management of FileVault and FileVault enabled users (SecureToken users)

Mainly due to the need of most MacAdmins to have a local administrator with SecureToken, to be able to interact with FileVault when needed.

A special token, generated via MDM enrolment, adding the ability to automatically generate a SecureToken for the ‘Managed Aministrator’ or Mobile Accounts

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Managed Administrator

When using Automated MDM enrolment, and downgrading the end user to ‘standard’ privileges, or skipping user creation entirely, Apple MDM specifications require the creation of an Admin account via MDM.

= ‘The Managed Admin’

!= ‘The Jamf Management Account’

“Administrator account created by MDM during Automated MDM enrolment (DEP)”

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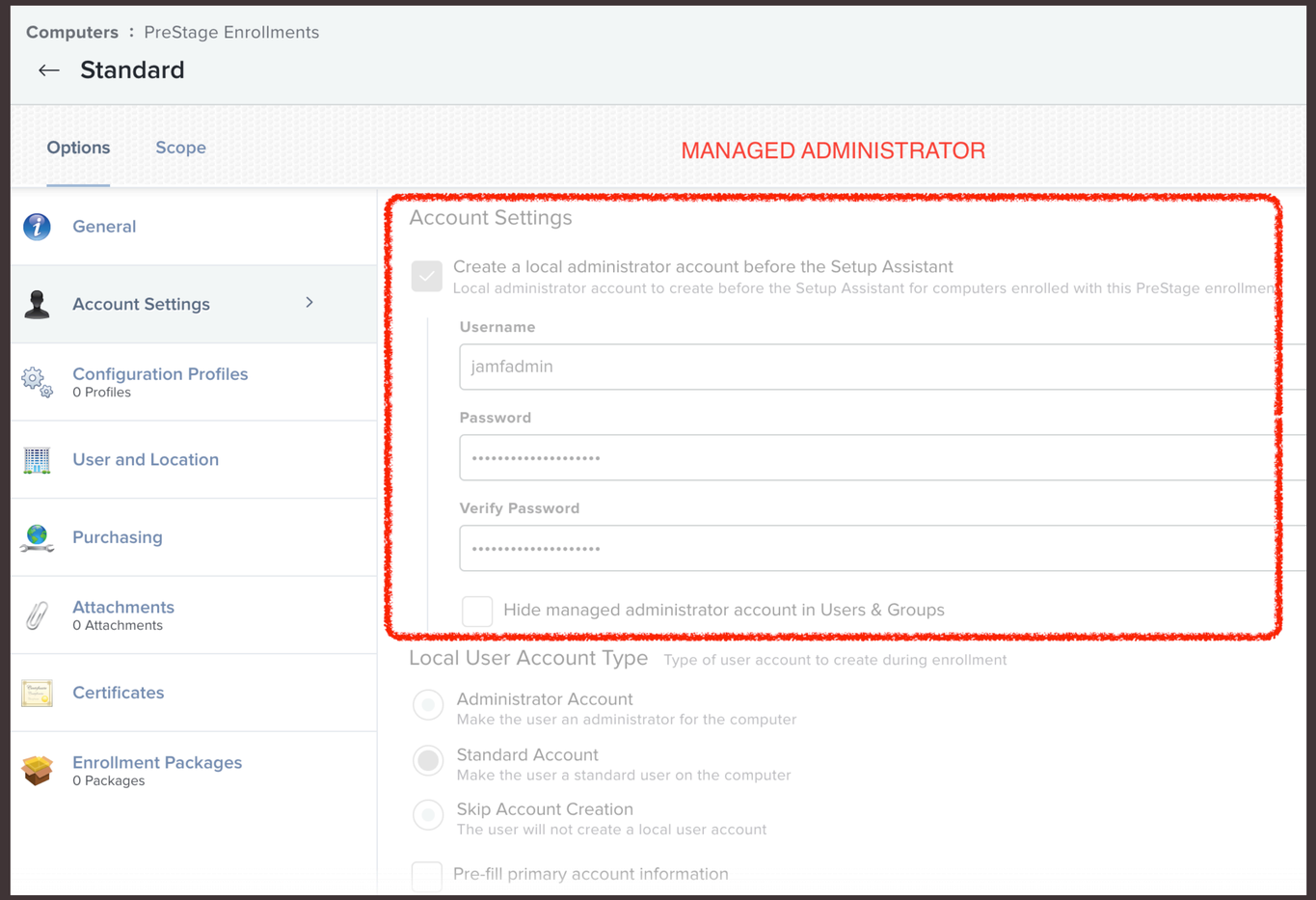
Managed Administrator



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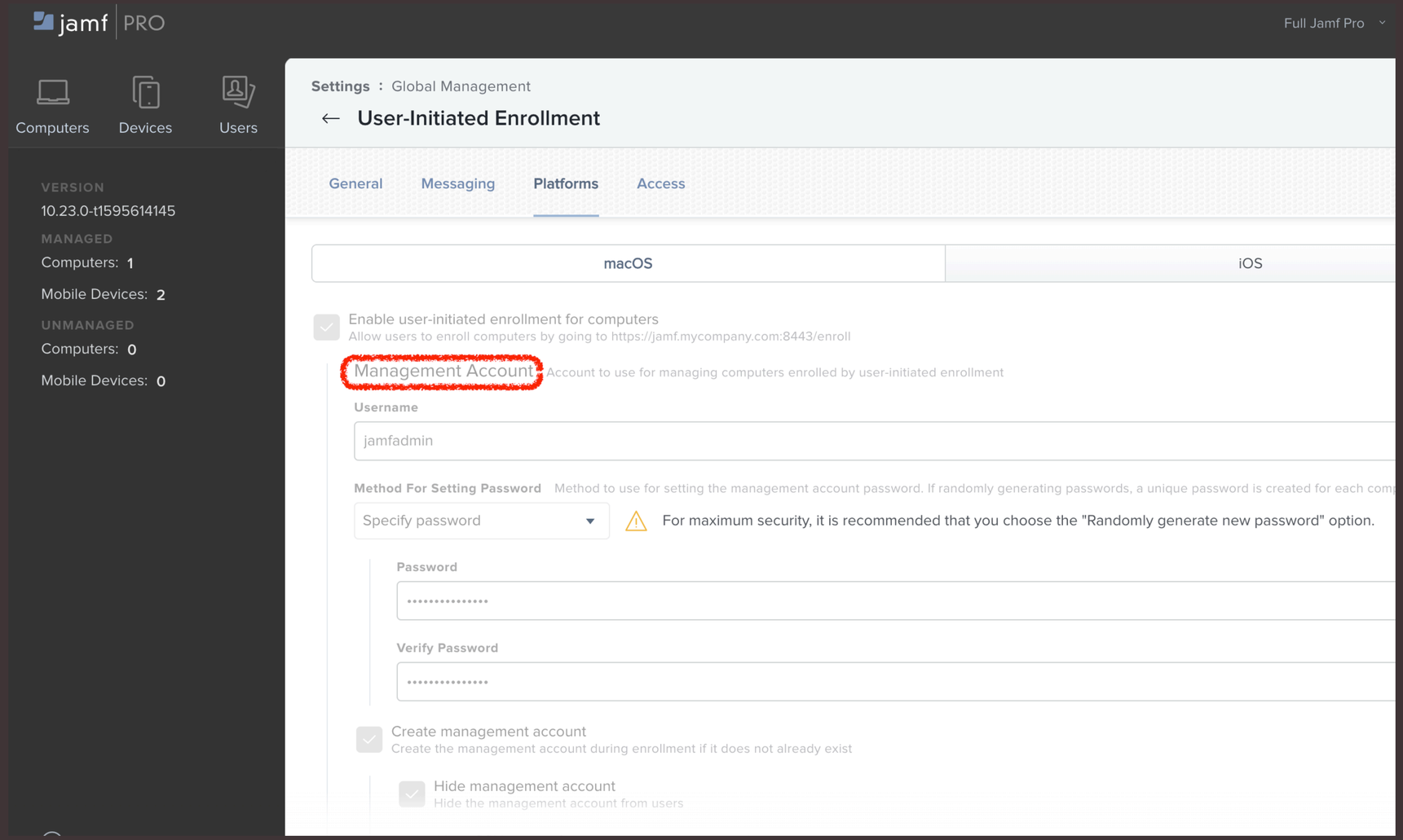
Jamf Management Account



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Deferred enablement

When remotely enabling / enforcing FileVault

- Jamf Pro Policy
- MDM Configuration Profile

Enabling FileVault (~ SecureToken) requires authentication (password)

“Delayed enablement” => to allow authentication

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Recovery keys

- iCloud recovery for FileVault (Apple ID)
- Personal Recovery Key
    - PseudoRandom (120 Bit) code
    - Automatically generated
    - xxxx-xxxx-xxxx-xxxx-xxxx-xxxx
- Institutional Recovery Key
    - Keychain
    - Public Key (certificate)
    - Private Key

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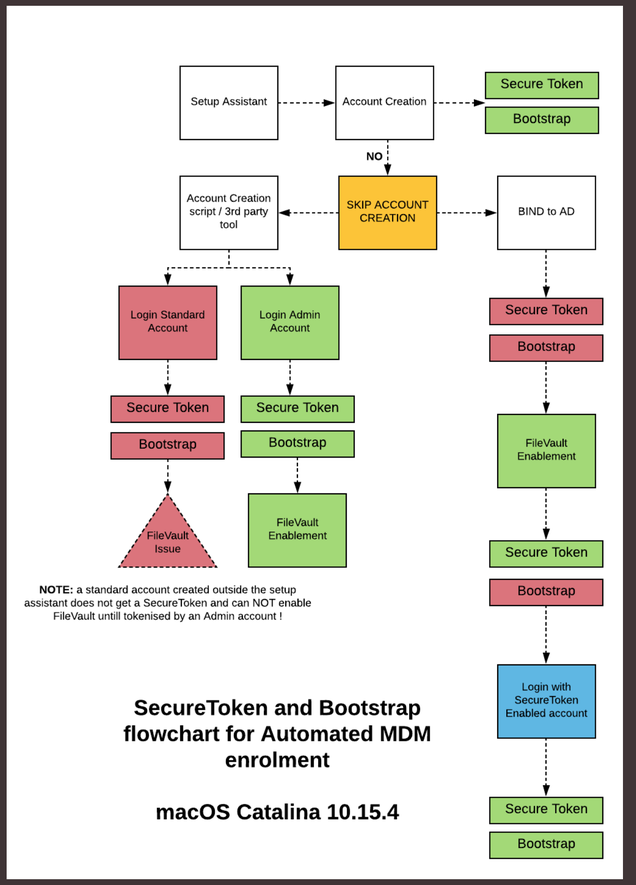
SecureToken Flows

User Initiated Enrolment

Automated MDM Enrolment



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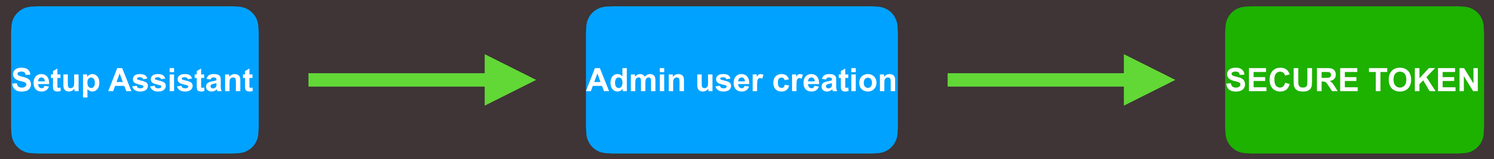
User Initiated Enrolment

No MDM involved during initial setup



UIE enrolment has NO impact or influence on SecureToken

Jamf Pro Management Account does NOT get a SecureToken

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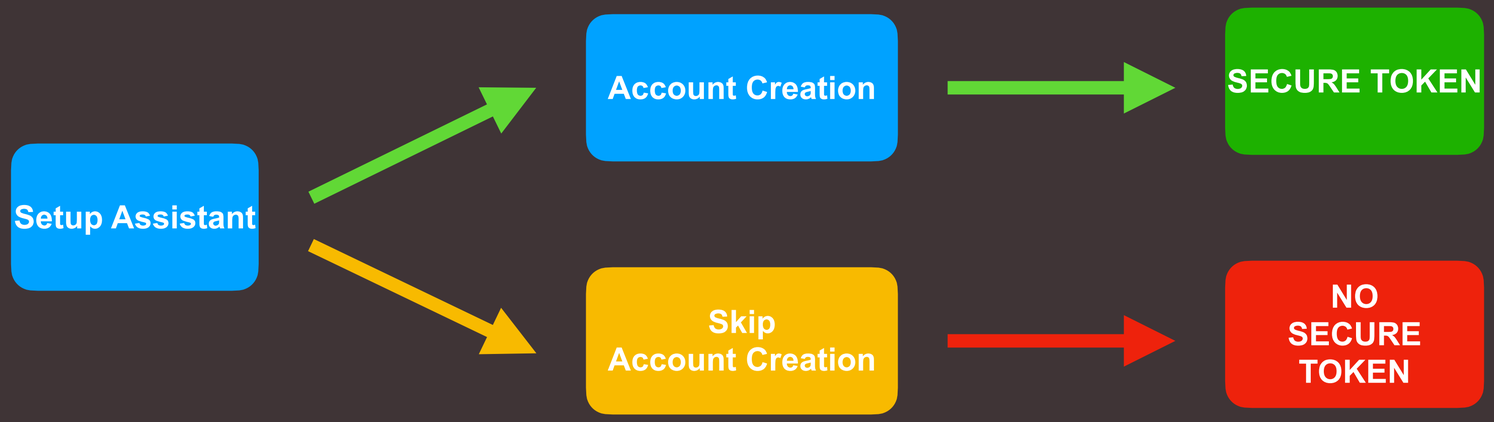
Automated MDM Enrolment

Account Creation

Skip account creation



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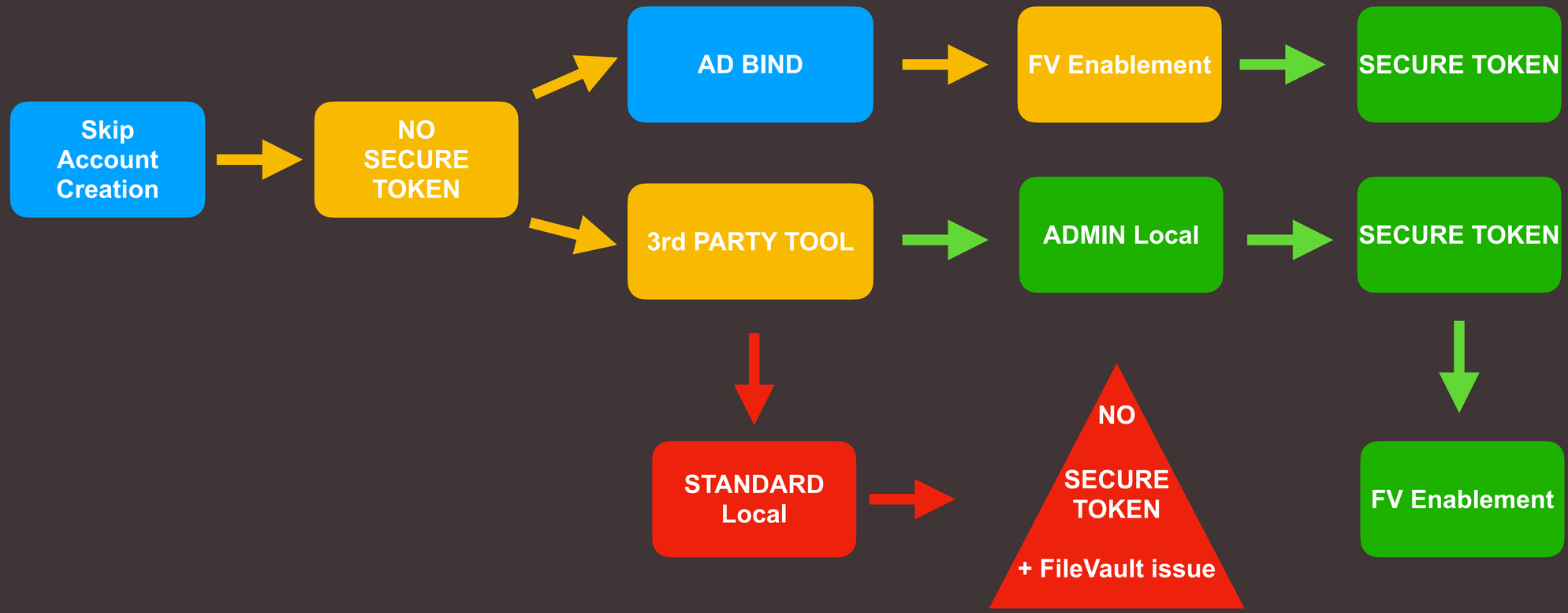
Skip Account Creation



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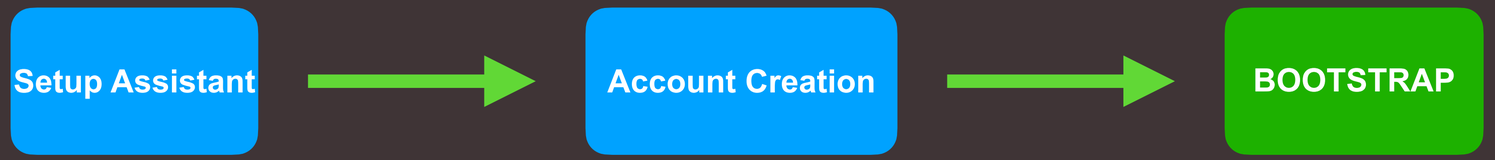
BootstrapToken

Apple Business / School Manager

“Managed Administrator” / Mobile Accounts

=> Automated MDM Enrolment



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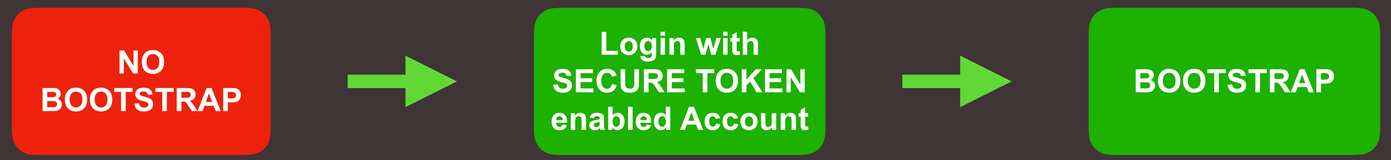
Automated MDM with skip account creation



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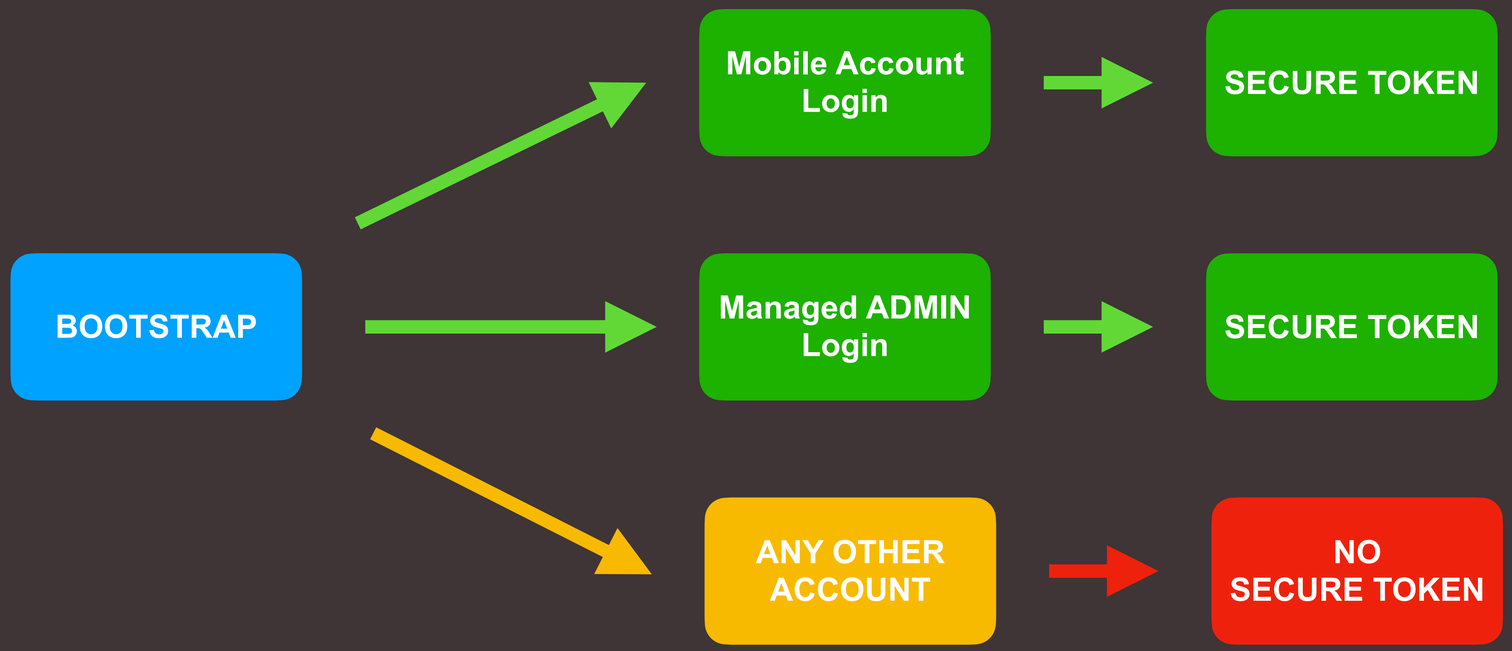
SecureToken generation via Bootstrap



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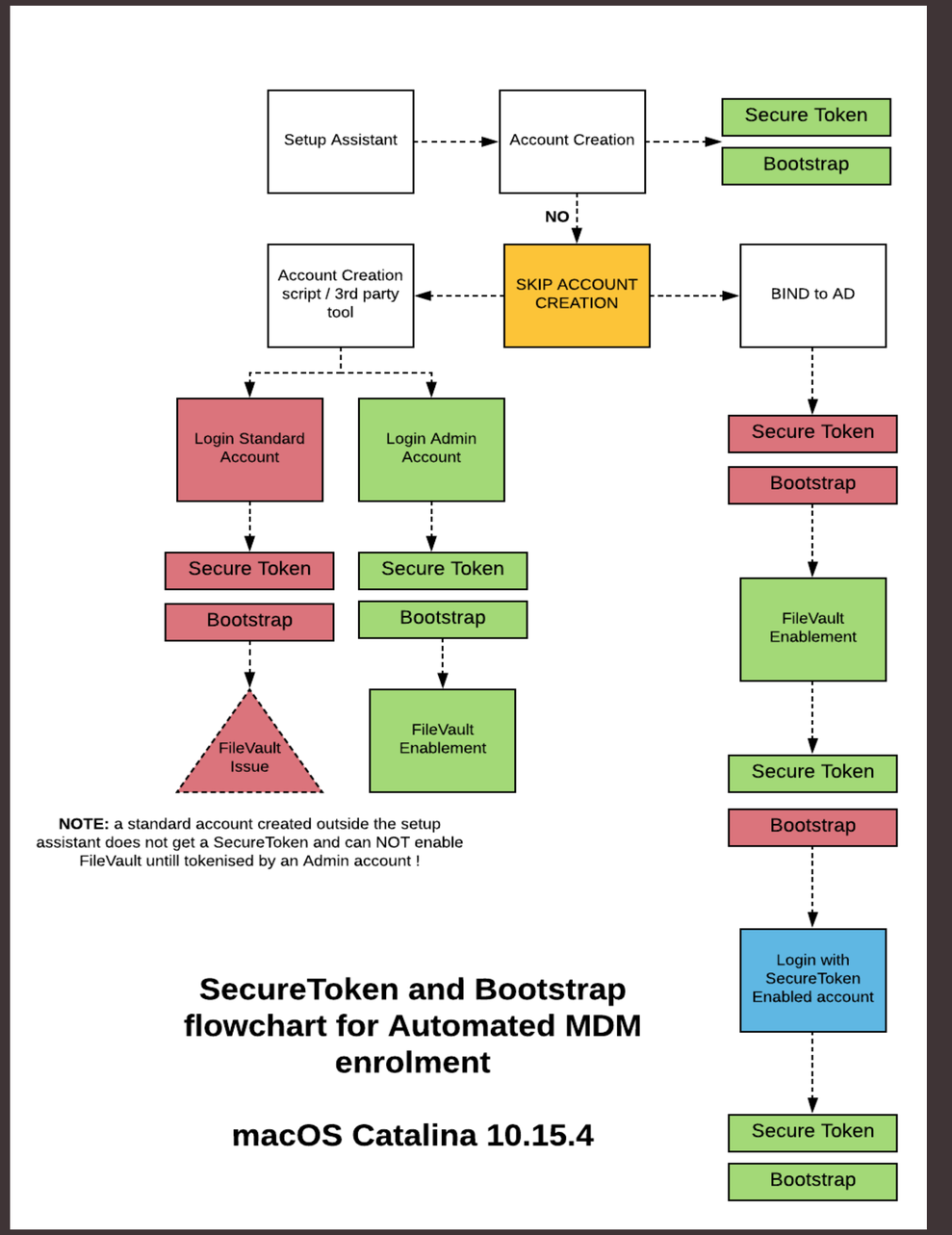
Overview



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Remotely enabling/enforcing FileVault

Configuration profile

Jamf Pro Policy

Jamf Connect Login

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Configuration profile (High Sierra and Later)

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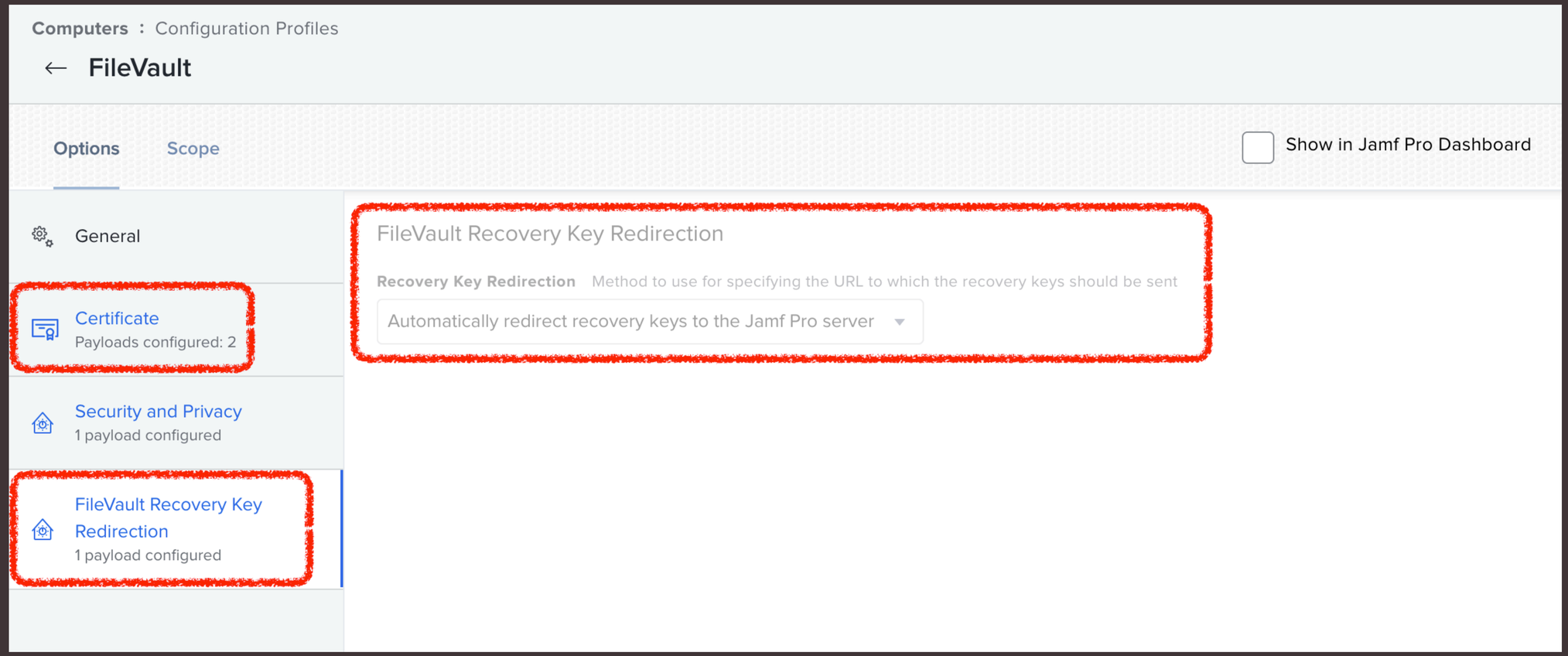
Configuration profile (pre - High Sierra)



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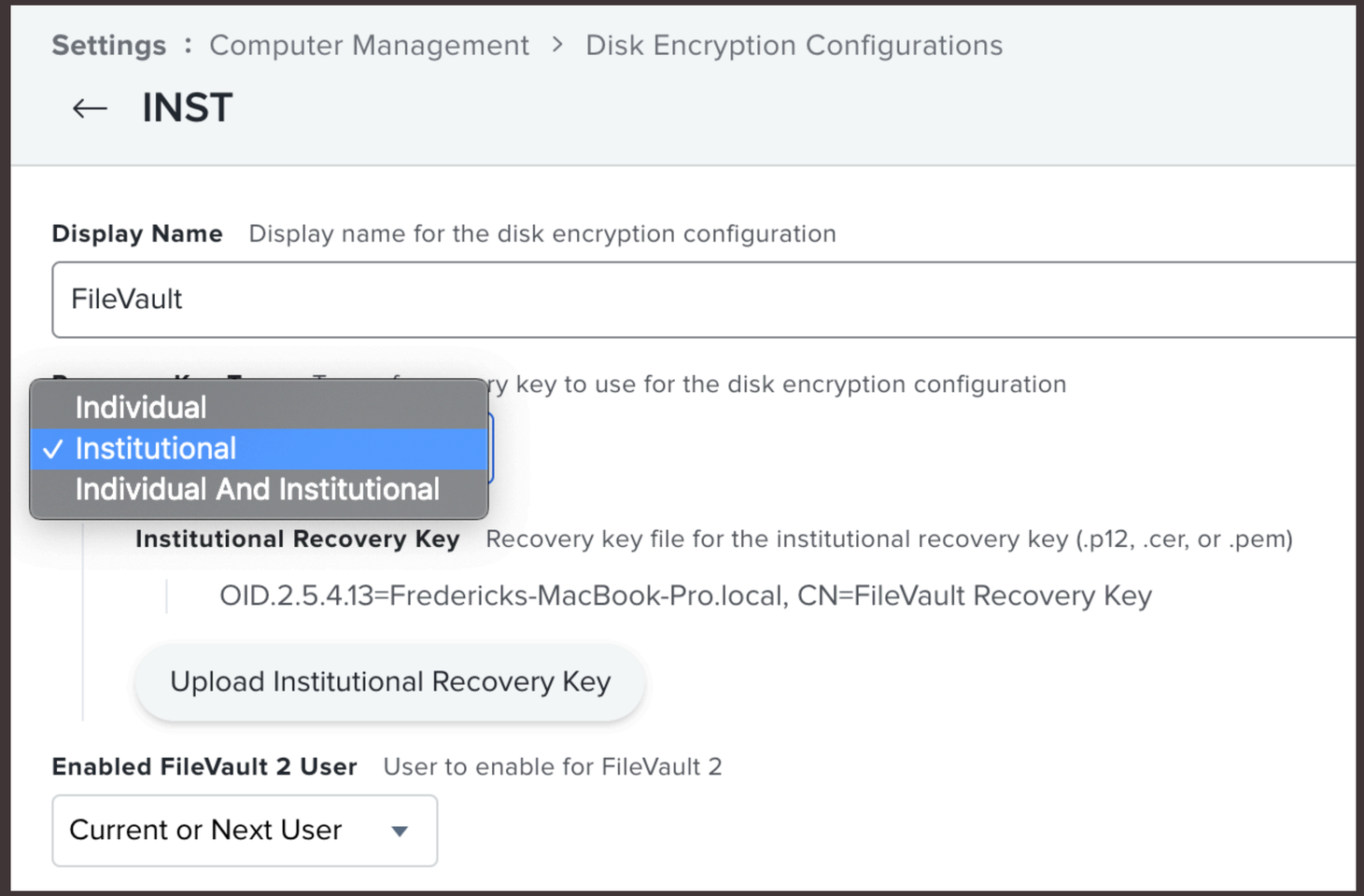
Jamf Pro Policy



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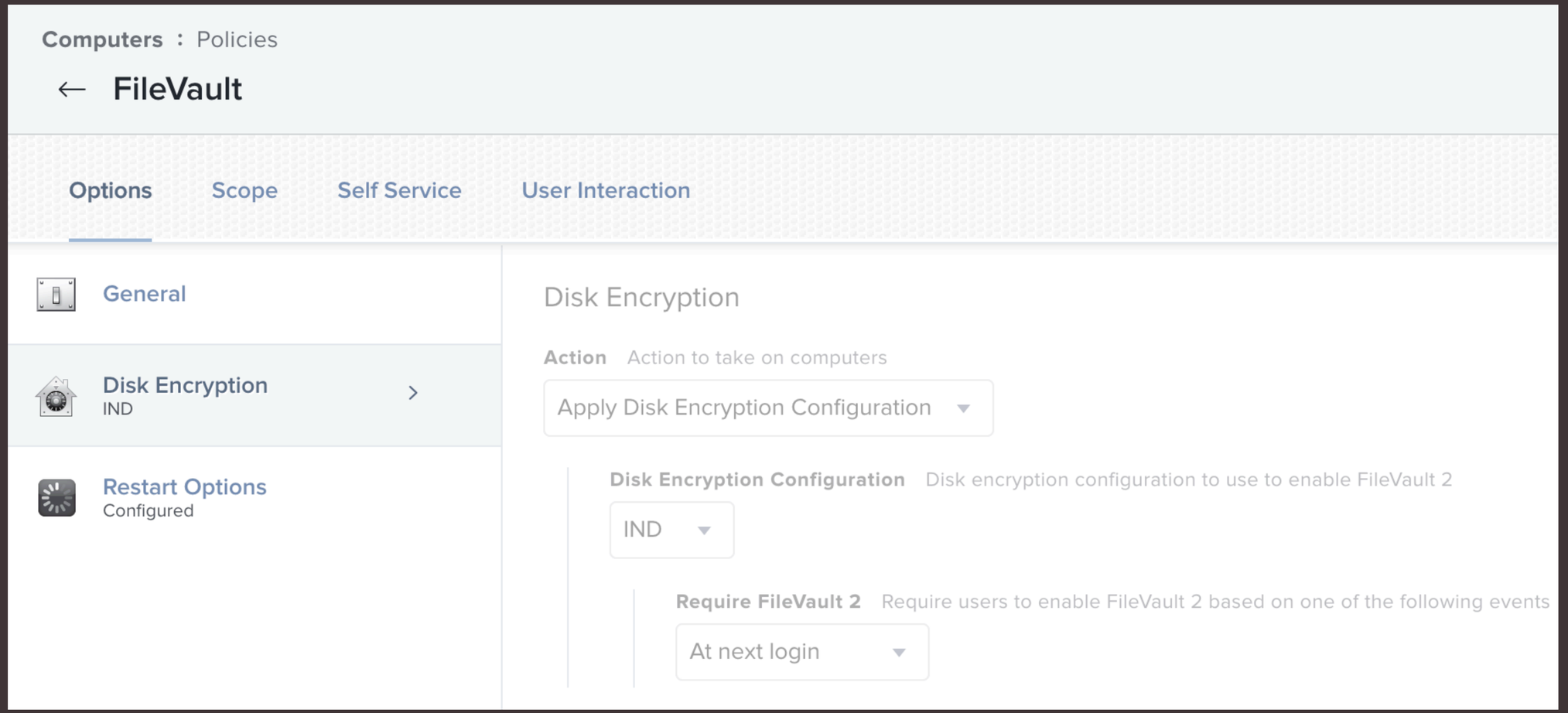
Jamf Pro Policy



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Jamf Connect Login

Key	Description	Example

`EnableFDE`	**Enable FileVault**
	
	If set to true, FileVault will be enabled for the first user that logs in to a computer.
		`<key>EnableFDE</key>`
		
		`<false/>`

`EnableFDERecoveryKey`	**Save FileVault Recovery Key**
	
	If set to true, Jamf Connect will store the FileVault recovery key to `/var/db/NoMADFDE` unless otherwise specified.
		`<key>EnableFDERecoveryKey</key>`
		
		`<false/>`

`EnableFDERecoveryKeyPath`	**Set Recovery Key Filepath**
	
	Specifies a custom file path for the FileVault recovery key
		`<key>EnableFDERecoveryKeyPath</key>`
		
		`<string>/usr/local/filevault</string>`

`LAPSUser`	**LAPS User**
	
	An existing local administrator account, of which Jamf Connect can change the password to the personal recovery key. This setting is only used by Jamf Connect to help enable FileVault on standard accounts on macOS 10.15 or later.
		`<key>LAPSUser</key>`
		
		`<string>AdminUser</string>`

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Jamf Connect Login

- Local Admin Password Solution (LAPS)

```
<key>LAPSUser</key>
<string>AdminUser</string>
```

Watch out with Passcode policies in Configuration Profiles!

(Standard Account creation only)

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Jamf Connect Login

- Local Admin Password Solution (LAPS)

```
<dict>
    <key>SystemPolicyAllFiles</key>
    <array>
        <dict>
            <key>Allowed</key>
            <true/>
            <key>CodeRequirement</key>
            <string>identifier "com.apple.authorizationhost" and anchor apple</string>
            <key>Comment</key>
            <string></string>
            <key>Identifier</key>
            <string>com.apple.authorizationhost</string>
            <key>IdentifierType</key>
            <string>bundleID</string>
            <key>StaticCode</key>
            <false/>
        </dict>
    </array>
</dict>
```

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Recovery Keys

Personal Recovery Key

Institutional Recovery Key

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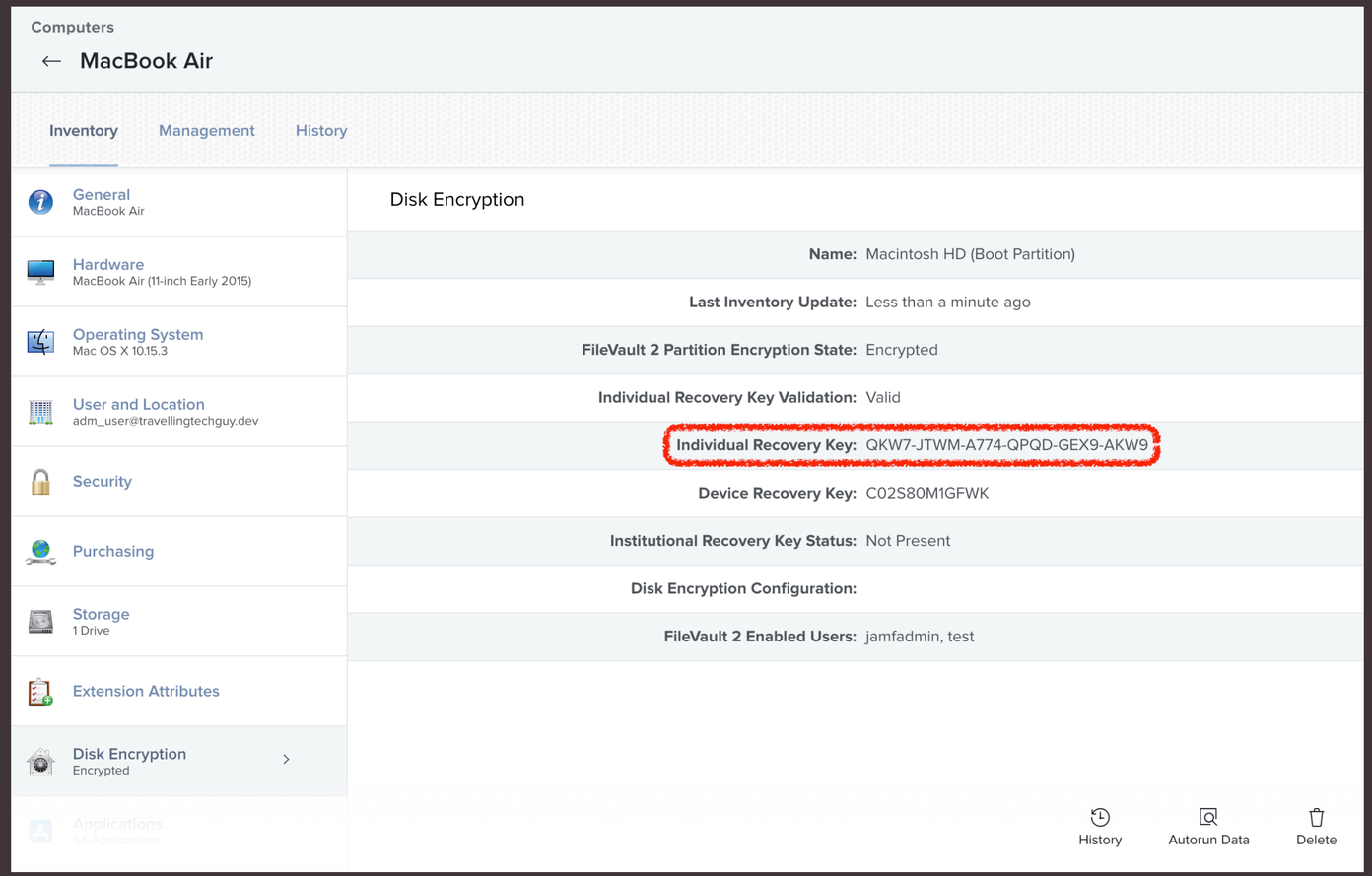
Personal Recovery Key



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Institutional Recovery Key

security create-filevaultmaster-keychain ~/Desktop/FileVaultMaster.keychain

You can export the recovery key with or without the private key. Exporting with the private key allows you to store it in Jamf Pro. If you export without the private key, you must store it in a secure location so you can access it when needed.

You cannot use an institutional recovery key with a private key to activate FileVault Disk Encryption using a configuration profile in Jamf Pro. You must create and deploy the disk encryption configuration using a policy in Jamf Pro.

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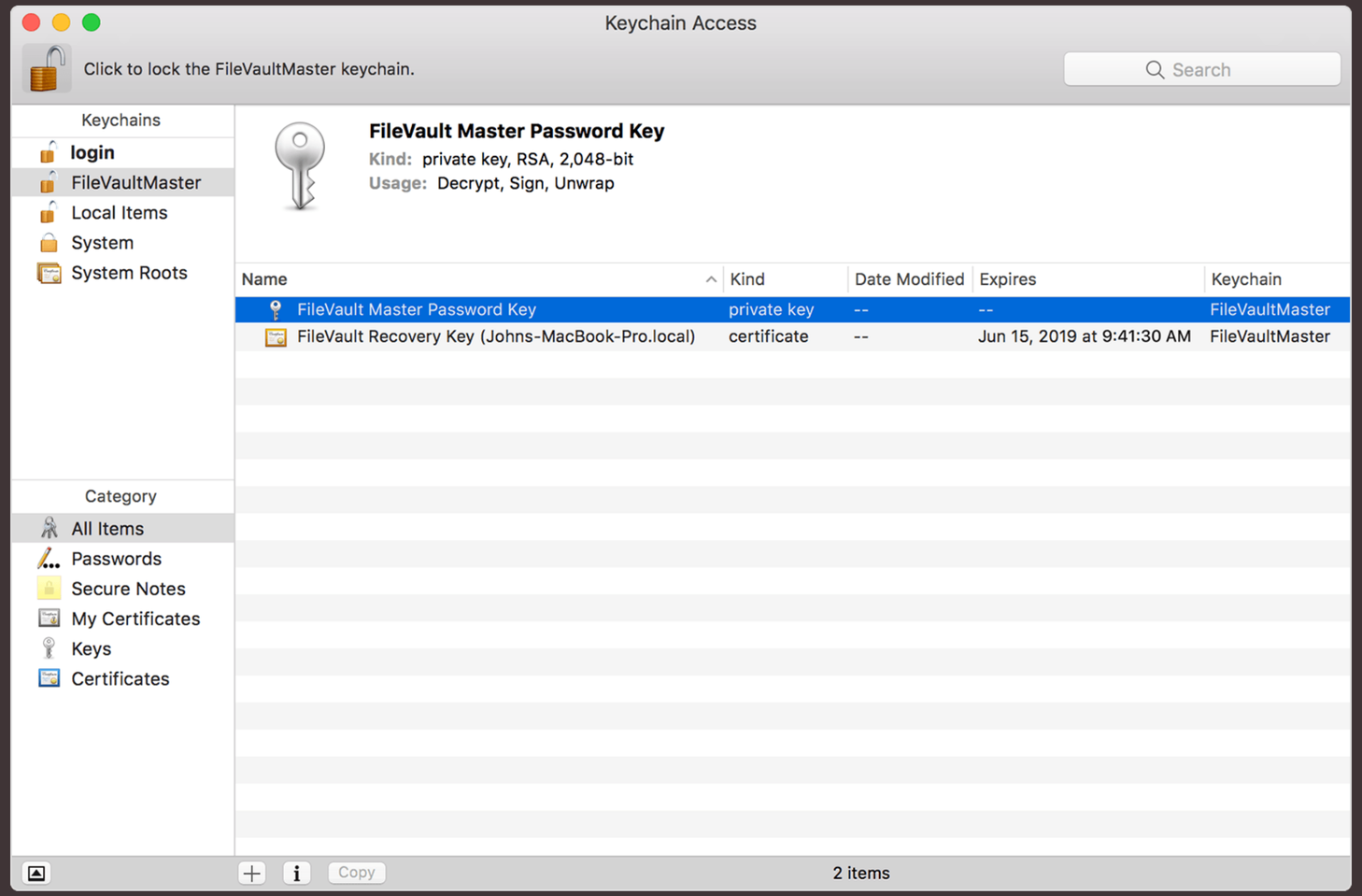
Institutional Recovery Key



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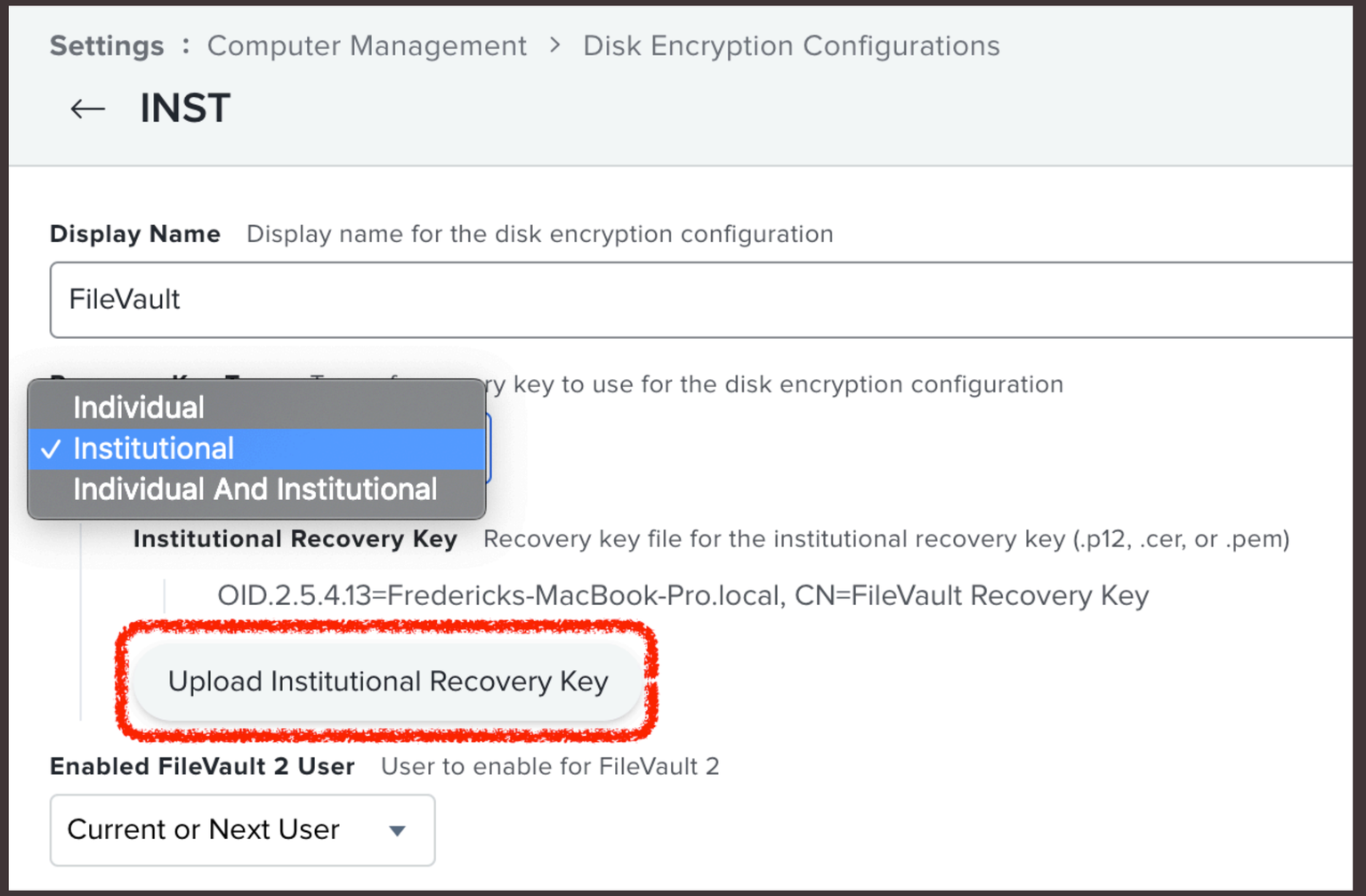
Upload Institutional Recovery Key



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Troubleshooting & Fixes

- Identifying SecureToken holders
- Deferred enablement related issues
- Validating Recovery Key
- Renewing Recovery Keys
- Validating / Enabling Bootstrap
- Scripting Secure Token

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Identifying SecureToken holders

diskutil apfs listusers /

(diskutil apfs listcryptousers /)

```
Cryptographic users for disk1s5 (4 found)
|
+-- FB756838-82AC-4C28-8FA0-40FB5E7D5D3F
|   Type: Local Open Directory User
|
+-- EBC6C064-0000-11AA-AA11-00306543ECAC
|   Type: Personal Recovery User
|
+-- C22BDCD3-11DE-422F-9C4C-65D3332605C3
|   Type: Local Open Directory User
|
+-- 2457711A-523C-4604-B75A-F48A571D5036
    Type: MDM Bootstrap Token External Key
```

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Identifying SecureToken holders

sudo fdesetup list -extended

```
ESCROW  UUID                                                TYPE USER
        FB756838-82AC-4C28-8FA0-40FB5E7D5D3F                OS User frederick.abeloos
        EBC6C064-0000-11AA-AA11-00306543ECAC  Personal Recovery Record
        C22BDCD3-11DE-422F-9C4C-65D3332605C3                OS User ttg
        2457711A-523C-4604-B75A-F48A571D5036         Bootstrap Token
```

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Identifying SecureToken holders

```
sysadminctl -adminUser <username> -adminPassword
<password> -secureTokenStatus ttg
```

```
2020-08-03 23:46:41.454 sysadminctl[20009:609662] Secure
token is ENABLED for user Travelling Techguy
```

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Deferred enablement related issues

fdesetup status

FileVault is ON/OFF

“Deferred enablement appears to be active for user ‘username’”

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Deferred enablement related issues

Unscope FileVault Config Profile / Policy

sudo fdesetup disable

+REBOOT

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Validating Recovery Key

fdesetup haspersonalrecoverykey

fdesetup hasinstitutionalrecoverykey

sudo fdesetup validaterecovery

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Renewing Recovery Key

macOS 10.14 or later

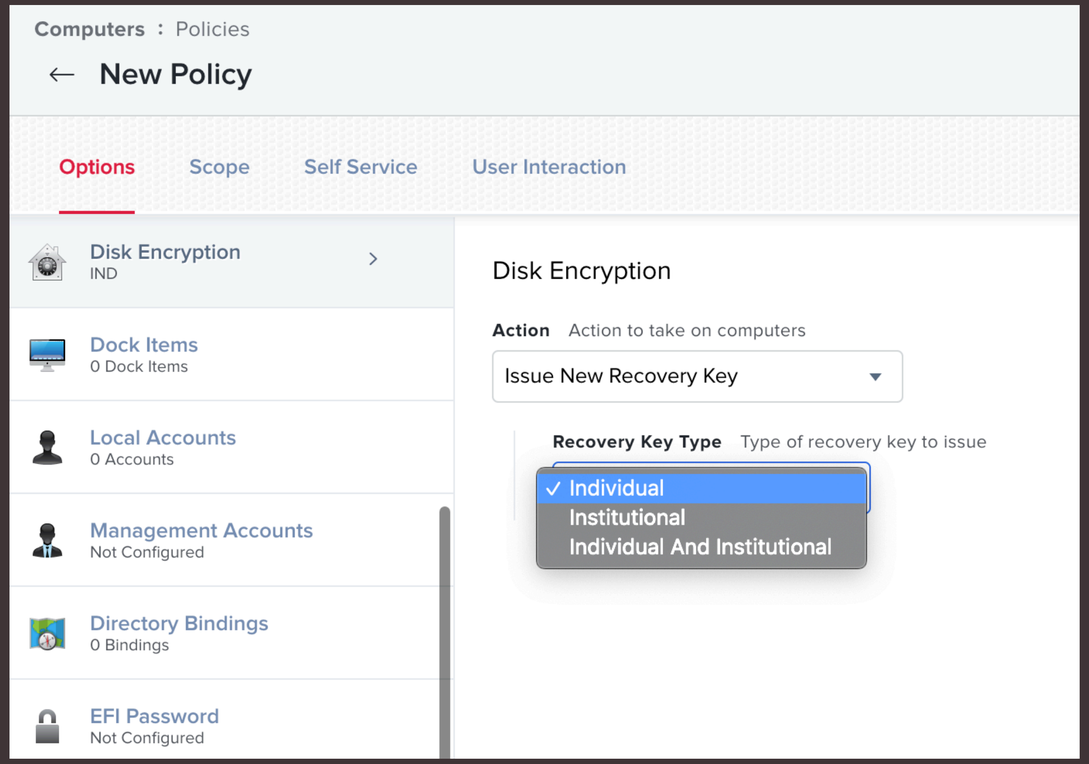
A “Recovery HD” partition

FileVault activated

One of the following two conditions met:

- The management account with a SecureToken

- An existing, valid individual recovery key (Personal Recovery Key only)



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Renewing Personal Recovery Key

fdesetup changerecovery -personal

(script)

! Make sure to have escrow in place !

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Renewing Institutional Recovery Key

```
fdesetup changerecovery -institutional -keychain
-certificate /path/to/filename.cer
```

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Validating / Enabling Bootstrap

sudo profiles status -type bootstraptoken

Profiles: Bootstrap Token supported on Server YES/NO

Profiles: Bootstrap Token escrowed to Server YES/NO

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Validating / Enabling Bootstrap

sudo profiles install -type bootstraptoken

sudo profiles remove -type bootstraptoken

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Scripting SecureToken

```
sysadminctl -adminUser $addAdminUser
-adminPassword $addAdminUserPassword
-secureTokenOn $userName -password $userPass
```

Both username/password of a SecureToken-enabled ADMIN and the targeted username are required!

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Anticipated changes in future macOS versions

To be confirmed

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