Migration, Deployment, and General Supplement

Workspace ONE for Android

Android applications can be integrated with the Workspace ONE® platform, by using its mobile software development kit.

This document is a collection of content from the earlier developer guide that hasn't yet been moved to the new integration guide set.

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SQLCipher Support and Migrating Databases

The Workspace ONE SDK for Android uses SQLCipher 4.4 by default. In an application upgrade scenario, the SDK handles database migration. However, if an application uses additional databases, you must migrate them.

To migrate and upgrade an existing database and preserve data and schemas, use the new default settings and use PRAGMA cipher_migrate. For more information, access SQLCipher 4.0.0 Release.

Required Libraries and Dependencies for Migration to the Latest SDK Version

Add the necessary libraries and add dependencies to Gradle when you migrate to the latest Workspace ONE SDK for Android. Also, ensure that the base classes have the latest code. Always upgrade the dependent libraries with the SDK because the dependent libraries that are packaged with the SDK are upgraded with every new version of the SDK.

20.2

Workspace ONE SDK for Android has migrated to Koin version 2.1.0. This version is not compatible with earlier Koin versions. Any app consuming Workspace ONE SDK for Android 20.3 must update to Koin v2.1.0 or later.

19.8

Workspace ONE SDK for Android offers a new method getNightMode() to support Dark Mode, also known as Night Mode. Dark Mode includes colors and style updates in the AWFramework. After migration, validate that your app's colors and styles are not having UI issues. If you need specific colors from AWFramework, and the migration to 19.9 (or later) changes those colors, you can revert the colors back. Refer to the 19.8 colors.xml file and override those colors in the app's colors.xml file. You can also revert styles back in the same way.

19.7

Workspace ONE SDK for Android v19.8 uses AndroidX support libraries. AndroidX replaces the original support library APIs with packages in the AndroidX namespace. Refer to Migrating to AndroidX for steps to migrate to AndroidX. You must migrate to AndroidX to use Workspace ONE SDK for Android v19.8.

19.4

The Workspace ONE SDK for Android v19.6 adds support for tunnelling features on Android 10 (Q). Older SDK versions fail with a "Connection reset" or "Tunnel connection failed" error on Android 10 (Q) devices. Applications using tunnelling features should use SDK versions 19.6 or later and use the AW wrapper classes provided by the AWNetworkLibrary. For more details, see the separate Workspace ONE for Android Networking Developer Guide.

17.x

The Workspace ONE SDK for Android does not require entries to migrate from 17.x.

16.10

Add the following entry to the build.gradle file.

```
android {
    defaultConfig {
        ... ndk {
            abiFilters 'x86', 'x86_64', 'armeabiv7a', 'arm64-v8a'
            }
        }
     }
```

The Workspace ONE SDK for Android 17.x includes updates to the AWNetworkLibrary. The updates remove the requirement to send an authentication token in an HTTP header. See the separate Workspace ONE for Android Networking Developer Guide for updated requirements.

16.x

Select a migration process based on the use of a login module for initialization.

• Login Module - To upgrade the master key manager, override the getPassword method in the application class. This override extends AWApplication to handle the upgrade.

 No Login Module - Initialize your SDKContextManager and call the updateSDKForUpgrade() API.

```
SDKContextHelper sdkContextHelper = new SDKContextHelper();
SharedPreferences securePreferences =
SDKContextManager.getSDKContext().getSDKSecur ePreferences();
int oldSDKVersion = securePreferences.getInt(SDKSecurePreferencesKeys.CURRENT_FRAMEWORK_VERSION, 0);
SDKContextHelper.AWContextCallBack callBack = new SDKContextHelper.AWContextCallBack() \overline{\{}
    @Override
    public void onSuccess(int requestCode, Object result) {
        //success continue
    }
    @Override
    public void onFailed(AirWatchSDKException e) {
        //failed
};
try {
    sdkContextHelper.updateSDKForUpgrade(0, oldSDKVersion, callBack);
} catch (AirWatchSDKException e){
        //handle exception
```

Older than 16.x

- Libraries
 - A total of 23 libraries including JAR and AAR files
 - SQLCipher library is an AAR file instead of a JAR file
- Gradle Methods
 - For 16.02 compile (name:'AWFramework 16.02',ext:'aar')
 - For 16.04 compile (name:'AWFramework 16.04',ext:'aar')
 - For both compile (name:'sqlcipher-3.5.2-2',ext:'aar')
- Code

If you are not using the login module for initialization, check the implementation of base classes.

Application Signing Key Registration

In some cases, the public signing key used to sign an app must be:

- Registered with Omnissa.
- Configured in the customer Workspace ONE UEM management console.

Registration Requirement

The need for key registration might apply to an application that has integrated the Workspace ONE software development kit (SDK) for Android, depending on:

- The version of SDK that is integrated.
- How the app will be installed.
- Whether the app will be installed into an Android Enterprise partition.

An enterprise that sets up an Android Enterprise partition on a device will control what apps can be installed into the partition. The mechanism of control can be a managed Play Store, or a private enterprise Play Store, for example. In any case, the requirement for signing key registration is the same.

As follows.

- If the app will be installed into an Android Enterprise partition, and the SDK is version 19.4 or earlier, then the key must be registered.
- If the app will be installed into an Android Enterprise partition, and the SDK is version 19.6 or later, then the key doesn't have to be registered.
- If the app will be uploaded to the customer Workspace ONE UEM management console, and installed by the Workspace ONE Intelligent Hub app, then the key doesn't have to be registered. This applies regardless of the SDK version.

In this case some security restrictions must be relaxed on the UEM in order to allow installation of an app that is under development. Specifically, the following must be enabled in the Restrictions payload of the assigned device profile:

- Allow USB Debugging.
- Allow NonMarket.
- If the app will be installed from the public Play Store, without enterprise control, then the key must be registered. Note:
 - This applies regardless of the SDK version.
 - Installation of this type won't be into an Android Enterprise partition.
 - This will include any device enrolled in Workspace ONE registered mode.
 - This will include any device enrolled using Workspace ONE legacy Android enrollment.

For details of the managed Play Store, see the Android developer website, for example:

https://developer.android.com/distribute/google-play/work

Registration Overview

If the key must be registered, then follow the Registration Procedure.

Start the registration process as soon as possible, in parallel with your development effort. Finalization of registration at Omnissa will depend on releases of the Workspace ONE Intelligent Hub app and the Workspace ONE SDK for Android. Expect the process to take from two to six weeks.

After registration at Omnissa, some configuration steps must be taken in the customer UEM. The UEM configuration steps are included in the Registration Procedure, towards the end.

The configuration steps would also apply to an app from a public independent software vendor (ISV) or other partner. A list of partner app signing keys is included here, see ISV App Keys.

Registration Procedure

Proceed as follows.

 Send the public signing key to your Workspace ONE UEM support representative for registration at Omnissa. This action adds the key to releases of the Workspace ONE Intelligent Hub and the Workspace ONE SDK for Android. This is the step that takes two to six weeks.

You can contact your representative by creating a support request on the Workspace ONE support website: https://support.workspaceone.com/

- 2. Extract the signing key value from the APK.
 - 1. Start a terminal or other command-line application on a machine that has the app APK file.
 - 2. Navigate to the directory containing the APK file.
 - 3. Display the signing key value, for example by running keytool as follows.

```
keytool -rfc -printcert -jarfile YourAppName.apk
```

- 4. Copy and paste the key signing value into a text editor.
- 5. In the text editor, remove all line breaks and spaces so the value is one, long string value.

The required value is all the text between the begin and end markers, as in:

---BEGIN CERTIFICATE---AllTextHere---END CERTIFICATE---

This text will be the signing key value utilized in the next step.

- 3. Add the signing key value to the SDK profile assigned to the Workspace ONE Intelligent Hub for Android. This requires administrator privileges. Proceed as follows.
 - Find the SDK profile assigned to the Workspace ONE Intelligent Hub by navigating as follows in the Workspace ONE UEM console: Groups & Settings, All Settings, Devices & Users, Android, Intelligent Hub Settings, SDK Profile.

Make a note of the name of the assigned profile. The name will be required in the next step.

- 2. Navigate to the named Custom Settings payload of the SDK profile that is assigned to Workspace ONE Intelligent Hub. It is either the default profile or a custom profile.
 - Default SDK profile would be at: Groups & Settings, All Settings, Apps, Settings and Policies, Settings, Custom Settings.
 - Custom SDK profile would be at Groups & Settings, All Settings, Apps, Settings and Policies, Profiles.

Then select the profile and the Custom Settings payload.

3. To introduce the trusted key signing value in the Custom Settings text box, enter a code block like the following.

```
trustedKeys" :["key_value_1","key_value_2"]
}
```

- 4. Replace, for example, "key_value_1" with the key signing value. To add multiple trusted keys, separate the values with a comma.
- 5. Save the profile.

- 4. Add the signing key value to the SDK profile assigned to your application. This requires administrator privileges. Proceed as follows.
 - 1. Find the SDK profile assigned to your application by navigating as follows in the Workspace ONE UEM console:

Apps & Books, Native, Public, then select the application.

Then continue navigation to: More, SDK, SDK Profile.

Make a note of the name of the assigned profile. The name will be required in the next step.

- 2. Navigate to the named Custom Settings payload of the SDK profile that is assigned to your app. It is either the default profile or a custom profile.
 - Default SDK profile would be at: Groups & Settings, All Settings, Apps, Settings and Policies, Settings, Custom Settings.
 - Custom SDK profile would be at Groups & Settings, All Settings, Apps, Settings and Policies, Profiles.

Then select the profile and the Custom Settings payload.

3. To introduce the trusted key signing value in the Custom Settings text box, enter a code block like the following.

```
{
    "trustedKeys" :["key_value_1","key_value_2"]
}
```

- 4. Replace, for example, "key_value_1" with the key signing value. To add multiple trusted keys, separate the values with a comma.
- 5. Save the profile.
- 5. Update your app with the latest version of the SDK that includes the registered signing key.
- 6. Update the device to the latest version of Workspace ONE Intelligent Hub that includes the registered signing key.
- 7. Test the public application on a device enrolled with the Workspace ONE Intelligent Hub.

This concludes the registration procedure.

ISV App Keys

Cut and paste these app keys to the SDK profiles of the Workspace ONE Intelligent Hub and the app if you use apps that are from public independent software vendors (ISV) or partner apps.

Note: Each key must be pasted without line breaks. It can be helpful first to copy the key from here into a text editor. Then delete any line breaks in the editor before copying again and pasting into the management console user interface.

Webalo

MIIDdDCCAlygAwIBAgIETczrszANBgkqhkiG9w0BAQUFADB8MQswCQYDVQQGEwJVUzETMBEGA1UECBMKQ2FsaWZvcm5pYTEUMBIGA1U EBxMLTG9zIEFuZ2VsZMxFTATBgNVBAoTDFdlYmFsbywgSW5jLjEUMBIGA1UECxMLRGV2ZWxvcG1lbnQxFTATBgNVBAMTDFdlYmFsby wgSW5jLjAeFw0xMTA1MTMwDDI4MzVaFw0z0DA5Mjgw0DI4MzVaMHwxCzAJBgNVBAYTA1VTMRMwEQYDVQQIEwpDYWxpZm9ybmlhMRQwE gYDVQQHEwtMb3MgQW5nZWx1czEVMBMGA1UEChMMV2ViYWxvLCBJbmMuMRQwEgYDVQQLEwtEZXZlbG9wbWVudDEVMBMGA1UEAxMMV2Vi YWxvLCBJbmMuMIIBIjANBgkqhkiG9w0BAQEFAA0CAQ8AMIIBCgKCAQEAonjegLiAInGofaVq94A+1VA00kDNjpNSTirUHw0sM4EMvy0 KvgUGruYI1qKP0URi0qkxyeywMWuGXrQTYygiIaLgJFA3Az9Pgx/oWFkYaxNMzbXZpy05EFgRRxJoEt7c5PA7Bk+syv0qm0cuob39wk M0wDK5opjqIhB6kSdwDCt4F6omjenTTzyd1WNpJxCjEqUE78F3Cydqkh8VAciIGXaco/T9QXDZxHm4GAt0XicGBtnBEi1lGSWn0+Le8 NHy6e/H/uxKZe3faiED08uwGxdYQRw+4hYhUsdFB+DN1Xg09RX7xgnUYuSFIXS6/950EqLVm8LBFt+VMZj0Ifd7awIDAQABMA0GCSqG SIb3DQEBBQUAA4IBAQBosVL3vCn+dHqqwHSEns0MuHjeacgB2nNNjRZ78fpL795BbM8DjLnUh1ialL32AC6t/VaVldnKo06iFNSk+U0 xn6I9wHn1ZGwLrSw0+G+u0Cp1H23MVK3FuIZHeYRQc5csgFUKMsFgFWd91kf0sRXLai8NXEYYhZTxdG5BNixx2EbB5QqVPDa0DomvT6 WsCyeWzTKzd3Rcu0a9nnbJ5B5343QoEq78UxYZL+BbdaYWYx9jU5z/PUt/ZxCQx4yBrhnBwYPUiUGtLL4zgvYEpHdK3qa708mJNkunF Wx40NycFLPdzWo1q2nYL1F0C00eXJVGUUgpShtaYieBuf6Tyydi

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Capriza / Worksimple

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Varonis / DatAnywhere

MIICBTCCAW6gAwIBAgIEUVwUNDANBgkqhkiG9w0BAQUFADBHMQ8wDQYDVQQGEwZJc3JhZWwxEDA0BgNVBAoTB1Zhcm9uaXMxEDA0BgN VBAsTB1Zhcm9uaXMxEDA0BgNVBAMTB1Zhcm9uaXMwHhcNMTMwNDAzMTEzNjIwhcNNDMwMzI3MTEzNjIwhjBHMQ8wDQYDVQQGEwZJc3 JhZWwxEDA0BgNVBAoTB1Zhcm9uaXMxEDA0BgNVBAsTB1Zhcm9uaXMxEDA0BgNVBAMTB1Zhcm9uaXMwgZ8wDQYJKoZIhvcNAQEBBQADg Y0AMIGJAoGBAKG8QUrZAH8JtndsFArybDkvNjfT6HrMrytzZQGtXWkk063t1QZzm1g24UVGblbwReschTEStops6eD9WAk/gnosR+rj XiDGP6M6MyDJJRke08BuRgDFFdGZDr0VkAzBcf3ikkHVUw+6JpjthpcC70DUyNyVeyvd4fuAlKXtYbVAgMBAAEwDQYJKoZIhvcNAQE FBQADgYEANP3fmpRobzSONlxKB7ckmyK7PUbjmXh97Fanwtqfiw/a2MDAhkoDEG3Z7BPxfPWdjRQ1xcxo3UaAUolXhszYKEtIS7t9z/ G1tllfIZtDWHgElZc243uvvHr/lMXU50QBUPNwj0SeJivbFnYUDe00mk+1NNFTCZQJuT9ses1n/Qs=

Palo Alto Networks / Traps

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Skycure / SEP Mobile

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Cogosense / bSafeMobile

MIIDzTCCArWgAwIBAgIEIw6v3zANBgkqhw0BAQsFADCBljELMAkGA1UEBhMC00ExGTAXBgNVBAgTEEJyaXRpc2ggQ29sdW1iaWExEzA RBgNVBAcTClBvcn0gTW9vZHkxIjAgBgNVBAoTGUNvZ9zZW5zZSBUZWNobm9sb2d5IEluYy4xFDASBgNVBAsTC0VuZ2luZWVyaW5nMR 0wGw7DVQQDExRDb2dvc2Vuc2UgVGVjaG5vbG9neTAeFw0xNjA1MjAw0DQzMzZaFw00MzEwMDYw0DQzMzZaMIGWMQswCQYDVQQGEwJDQ TEZMBcGA1UECBMQQnJpdGlzaCBDb2x1bWJpYTETMBEGA1UEBxMKUG9ydCBNb29keTEiMCAGA1UEChMZQ29nb3NlbnNlIFRlY2hub2xv Z3kgSW5jLjEUMBIGA1UECxMLRW5naW51ZXJpbmcxHTAbBgNVBAMTFENvZ29zZW5zZSBUZWNobm9sb2d5MIIBIjANBgkqhkiG9w0BAQE FAA0CAQ8AMIIBCgKCAQEAmumtaA86vRbZMoxuWVCUIzLW5+FAbXq1jkGyf651t+w0nL0cJ6CtizgPXAaC12A77d1tofj8I4inp+1FPe JhSZS/UvZJK7mvWl8y0tyr1tJYtkwhYdCha/lXxkqBdAUAo++YRg08X9DF7sTaPZF6Hi30TVorYffJQ2vF209ofHyA0IZ9D4GVImWg gLJRc5FZIGiojGz0KtAxZj31HDBBbIpnTRXnfDXpuzE+jtVrbayoErSnLDp5GEtiwDv851K/318jj2PtdEQX1oLcAUw8Kq01nNc1btj 2TfGw+eg1h+TLQhYMjJb1DTXDV81Pz3WbRWJJILuLri3gLZopVgBQIDAQABoyEwHzAdBgNVHQ4EFgQUZQfKgRF7ymdJSSKe2PTtSHo dSostxAKW4QwfzuhhXWlN1PfjI948UbF1PqbB22GtWnU7urLL50D4pbZIrK//Z4EILJFrGN4o3xRKGC369DSrLRW1ietYDp0TC/bkpt 17dcMjbpg9T3LwtRZk0vLEoCTsm0Bi/Y9k37X40RozX3oAP9zHr1tA2RFJCHY8pG4RR7Mxg6B6H+1tL3EQMtK1PhPoBmWQfjeo3YxHP 0ZY3DBdpT/tYm/qSom26LeUTw274KHdJ5akLMsPKdVoMPKWeyTbKK2vpRPfAXaw=

9Folders / Nine Work

MIIBqTCCARKgAwIBAgIEUlIPdDANBgkqhkiG9w0BAQUFADAYMRYwFAYDVQQHEw05Rm9sZGVycyBJbmMuMCAXDTEzMTAwNzAxMzM0MFo yDzIwNjMwOTIIMDEzMzQwWjAYMRYwFAYDVQQHEw05Rm9sZGVycyBJbmMuMIGfMA0GCSqGSIb3DQEBAQUAA4GNADCBiQKBgQCfvpIUAr VlzNxWaHBV3wphJILBRx0oNs/6hI7ija2Zlft443IdGsLQ/gZHCDaadPTKqh3WS2YrD4a53fGikrvFEYpGnyVVuAQgMZoHZ96fgbW2c OlVhYFtERnNEpPgyK1pLfFnehHhQXJSP43VtCvDLLG0gD6tlefzzazZHmdWBwIDAQABMA0GCSqGSIb3DQEBBQUAA4GBAIZHTLPHb3VR baUNXXoxIjxzbrMR+YMnx0egn+HEsBbHmCocpF7yWEAIFRdIe71XpME7ECXsdsXdwboL0/ll+IQpnPBcM6Cxl0fqhM6ry2393M0eZaz IIpt4K0uYjQb+bZv3ghtuq5XmmgLnMNk1+Y1tKu3a4yf2Xv8/Uvx0tz9I

Appthority

MIIDpTCCAo2gAwIBAgIEZnL5UjANBgkqhkiG9w0BAQsFADCBgTELMAkGA1UEBhMCVVMxEzARBgNVBAgTCkNhbGlmb3JuaWExFjAUBgN VBAcTDVNhbiBGcmFuY2LzY28xFzAVBgNVBAoTDkFwcHRob3JpdHkgSW5jMRUwEwYDVQQLEwxBbmRyb2lkIFRlYW0xFTATBgNVBAMTDE Fua2l0IERldmFuaTAgFw0xNjAxMDUxNjI4NDBaGA8yMjg5MTAyMDE2Mjg0MFowgYExCzAJBgNVBAYTAlVTMRMwEQYDVQQIEwpDYWxpZ m9ybmlhMRYwFAYDVQQHEw1TYW4gRnJhbmNpc2NvMRcwFQYDVQQKEw5BcHB0aG9yaXR5IELuYzEVMBMGA1UECxMMQW5kcm9pZCBUZWFt MRUwEwYDVQQDEwxBbmtpdCBEZXZhbmkwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQCiDD7a1lPf00zE0D3EgQcdsmJSHoZ +XU+Fg2KhuuAlkC0dHNafqDaXYc4f5aWgsofYDrw7Ppx3yr+J+qLLhgfYJNX751gr++rYKECFwMALA0L0BwoNXMpXPj5KTw9vAwa8kb szN98Narw8rKa5tzjJpk+URSXm3fWXbuAy3D5DY54QuX/2q3PLii6kl7DV7wqJ0o2r0c6IMYyB0gXagPaHMWJeXyVg4e23jLhPpoU7k 9Dv10g5bfNLUjwEyU2dUIoZ/krN1iM1pq+iQQOYCnWVA+096kM40FA0fQ/4J4ZA4sZAsFcpr0yHEUyj3BPEKNCwkPC6A8ig7La0eSh0 pC+bAgMBAAGjITAfMB0GA1UdDgQWBB5fntsTxAZQ8+40jrwNGGijadgHzTANBgkqhkiG9w0BAQsFAA0CAQEAfj341f4vAXjp1KS9s7V 7/mbzK59/CI5HNa196MLe37/pIqb0UerijNurTCpr1Z7WRyghi70/V80otVgJn356d2FfBzwcsfkYw36f44mU0Eolo2XQuE28ElWLiq E7uqClyFTbD9+2QULvSpb4/V+7hygNq1faX970oSpJFXz5igE68zaKc+81AuTEnHLiJHWo601TjAerMEnz+eIwejt8q8VBcbQ6t4SD YJMhm+u/ed0KiQBNxJ13/3KWdGqc4PoQroFwcJahKhjUZhDAu+3P+zCWq1LY4NYANSeN4LPV29sSv7ZK5ZEs0h8X0W6P/JqLlgP0UDx 45L2UTm3QrFUXQ==

Movius

MIIDjjCCAnagAwIBAgIEUKqV8jANBgkqhkiG9w0BAQUFADCBiDELMAkGA1UEBhMCVVMxEDAOBgNVBAgTB0dlb3JnaWExFDASBgNVBAc TC0pvaG5zIENyZWVrMScwJQYDVQQKEx5Nb3ZpdXMgSW50ZXJhY3RpdmUgQ29ycG9yYXRpb24xEjAQBgNVBAsTCU1hcmtldGluZzEUMB IGA1UEAxMLSm9zZSB5b211cm8wHhcNMTIxMTE5MjAyNjI2WhcNNDAwNDA2MjAyNjI2WjGDyXRpb24xEjAQBgNVBAsTCU1hcmtldGluZzEUMB 0dlb3JnaWExFDASBgNVBAcTC0pvaG5zIENyZWVrMScwJQYDVQQKEx5Nb3ZpdXMgSW50ZXJhY3RpdmUgQ29ycG9yYXRpb24xEjAQBgNV BAsTCU1hcmtldGluZzEUMBIGA1UEAxMLSm9zZSB5b211cm8wggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDiigQgehRMGOU KfZILdgHonkkAOmySVF0kzN07Fv+oMWB+qVv1j2ZQdNqyiTkj5nhxGjArj5MobDTc9zH42anpYcfU7KyMj6vpMFZfpyfROUyFXdTWEL 0b31Xd1QZAZwzBg5yDmklNqHHJ1z8moA18PLg+X0b2W92CFxbkkacG1zJnZGGjJkfMPfQ/sQcayK+hXdr3CaavduDUSIdQoa3IfkiLG Hw62zHm0hcPeV/LwDwhe+LXPew/VNap0uBZgNPnm22pLYrpPWSMMk20q31c0spCZJDX1p/zfhiE4xH91CIsKBStP5c6buQJd9cwrPpq X+fobDozd0eAZt5Z9E25AgMBAAEwDQYJKoZIhvcNAQEFBQADggEBAK72k97hFpHHhuTfJiRAAy/TsU54MyDawvVMCqTd/kQDA0DDA/j QDv6U380wIG0uB5rn5UyoKbH4ZN0hizhiAAdIsIBR9B97mn19zZGlk2x4sxECHjs/YCXkyLL81cALVMoph+WGCPR7RzP1WbvqF0Fecq k/cCNcNGLVI2Qm/TuKMvCvdIjGlRgY2Car9w3NbQ7y4Avflv2mzuzHI4zLaxgGs7n6Jw0jiD0ruzL1NbiuldYABkM+XCLtNtTTqpeN3 2dFrZ0H6d4cJkAjTqh2iYd+HcYDX3t6N9pA9ADAunKJbf0MgjW0rrcvSc6VkhpMH4Tk2WyAdYdZCpFkSWQnt+M=

NetDocuments

MIICzTCCAbWgAwIBAgIEXS/TXzANBgkqhkiG9w0BAQsFADAXMRUwEwYDVQQKEwx0ZXREb2N1bWVudHMwHhcNMTcwNjI2MTAw0TQ1Whc NNDIwNjIwMTAw0TQ1WjAXMRUwEwYDVQQKEwx0ZXREb2N1bWVudHMwggEiMA0GCSqGSIb3DQEBAQUAA4IBDwAwggEKAoIBAQDTSWa+Gj VADWgH3Wj+ZGeoxVEcY4uFZTIR6f9MWjEGUNNPHf9Ljs8CUcvlu6xXmW0trAP8U/++0kkq7izkanT9of3T6bS/4DKLVe0zISg42xQzo dGIz+zZhQ2+2F7xZklV59F7IthZPbRTn86D2YhKs6YM0aFotMnX131pWpdPEnuN4n7CKsfKwbj4VHMKMUTAjpml+TWLtVx55BoY+XLx r26G9/osp6Q3Hr8iHGFwCop72tE5vpdMyhD7+zuW0VueFriijpGFnr5R5zTHAlgBks9HFW5tjbnXIBp44ytzFE8ju1aQ/zSZy9SgnAd JS6HEHnuwV18BgBZEDIJZJXNpAgMBAAGjITAfMB0GA1UdDgQWBBTyt4Alh+gNKyYVk5dHy9A4PVv4TANBgkqhkiG9w0BAQsFAAOCAQ UBFjiuiQl0ayoc/Bqu250AJ2f2j0ygfB/5ncg5BHuPBQRM2UXTi60/43Wk0Mf0MwBCBoTwwaHoZTaLCaoA0h2kkIIDnoaTN0paxC2r7 Hkcr1foui4LKs07h0M6o08C8fJXBZd0320+NtfrXSCU0hnHT8xbYLUwqWLqb0Lt0TnFZbtuWEdES38b7a06oQxd1ngYCAXNhpsd8J3A fykBhMCGoWFLUcshHIH1W/oD73QD7pd+ULA==

IBM

MIICQDCCAmagAwIBAgIETNrtMjALBgcqhkj00AQDBQAwNzELMAkGA1UEBhMCVVMxDjAMBgNVBAsTBUxvdHVzMRgwFgYDVQQDEw9JQk0 qQ29ycG9yYXRpb24wHhcNMTAxMTEwMTkwNjI2WhcNMzgwMzI4MTkwNjI2WjA3MQswCQYDVQQGEwJVUzEOMAwGA1UECxMFTG90dXMxGD AWBgNVBAMTD0lCTSBDb3Jwb3JhdGlvbjCCAbgwggEsBgcqhkj00AQBMIIBHwKBgQD9f10BHXUSKVLfSpwu7OTn9hG3UjzvRADDHj+At lEmaUVdQCJR+1k9jVj6v8X1ujD2y5tVbNeB04AdNG/yZmC3a5lQpaSfn+gEexAiwk+7qdf+t8Yb+DtX58aophUPBPuD9tPFHsMCNVQT WhaRMvZ1864rYdcq7/IiAxmd0UgBxwIVAJdgUI8VIwvMspKSgqLrhAvwWB21AoGBAPfhoIXWmz3ey7yrXDa4V7l5lK+7+jrqgvlXTAs 9B4JnUVLXjrrUWU/mcQcQgYC0SRZxI+hMKBYTt88JMozIpuE8FnqLVHyNKOCjrh4rs6Z1kW6jfwv6ITVi8ftiegEk08yk8b6oUZCJqI Pf4VrlnwaSi2ZegHtVJWQBTDv+z0kqA4GFAAKBgQCpzsGYWkP3Ab7mgl8gdEGnBH91U+6R/3UJ0lB5AyRlokcuTwzA7AMhj34tU7x2S grBhwYYfGmlsoNx5Ad41Qr4KwAuY9/6wlgKrHSVZo0/xVHwT4pyjof/W+MC7n9FacDz+kvVBCWAXqyIMG5QK/u3dTT6ew/qH0WVGwt4 JBTPFDALBgcqhkj00AQDBQADLwAwLAIUILyb9f0FfHE0tYvYYnGVbAVhCg0CFCoLbVTdLhFwn6H1i427vvKu4Qsh

TrustBridge

MIICtzCCAZ+gAwIBAgIEJ7uJNDANBgkqhkiG9w0BAQsFADAMMQowCAYDVQQDEwFLMB4XDTE4MDUxNTE1NTc1NloXDTQzMDUw0TE1NTc INlowDDEKMAgGA1UEAxMB5zCCASIwDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBALSNBYa0peFLpIIyxIWsy9iQ2ILwC2hACQ9lEi pXL10BKyZxym5HUGnHX0/W6XG40TAfMmQ10WA3skJB+YCpD2fD8wZMNEJGiHmf/wcrEzxtC8sVcJm2Cw38/l8fgryep6LTb/dnbTV35 wN4+25X+W6kxaK200AYhqfDvtBoNZUu850WxLuJ2LzXHUdfme05jHcda0h1/FZGLoGLAzVDpx5Gm3WuMvWr61hrcoVuR0Iq7CP8pa0w KTul92GJ+erTiqBGfjFhF57tD4asU/qo5G5+Eb6+Tha/agz+k36b00y6+8HJwmsaD7CzVdBvRkVeu+tczWSQ0fl10PGUTY0yXeECAwE AAaMhMB8wHQYDVR00BBYEFPA1539ff3Ymbf+sBzeVuKRltJR8MA6GCSqG5Ib3DQEBCwUAA4IBAQBm0NLVraBd6Gak/Jg0P3KIYc710x TnSrmb/994RAXB011eQGkzwfy3nEe4cn4IkFIlvpyECZBPF04qlCd8BsNFLMsMJ0ZH64/IG0mf0eNCrZmR702rwKljeX9CqAicgYgj/ 09aBZ3G4EhKhijbQ4DBZ/Pw9hu2xabh0wnCDRifpCcwm0C4JGH/Hl3okAKU3k1/l5L5TW4LRUbT0hHrV0YEpe9rfbS03xsyzhjaw/r9 sRfb6P0zk8HvZyU99T7uXG1RvxEdBbHvZWx40yRcFt1fCQDSur17x3VIqKFYvqGr/cK+o7Nd10BLE9GVzdxkoXf/XP/V7/xlbfR+588

SDK Profile Refresh Interval

The SDK profile applies SDK functionality to an SDK-built app. The SDK retrieves updates from the console at varying intervals based on the app's activity status.

Purpose of the SDK Profile

You enable an SDK-built app with SDK functionality using code and settings in the Workspace ONE UEM console. The SDK profile is what carries the console configurations to the application.

You configure default profiles in the Groups & Settings > All Settings > Apps > Settings and Policies and then select from Security Policies, Settings, or SDK App Compliance.

You configure custom profiles in Groups & Settings > All Settings > Apps > Settings and Policies > Profiles.

After you configure the profile, you assign it to the application when uploading it to the console. The refresh interval is the schedule the Workspace ONE UEM console sends changes and updates to the SDK profile assigned to the app.

Refresh Interval When App is in the Background

The SDK updates the SDK default or custom profile when it has been 30 minutes since the last profile retrieval for these app activity statuses.

- The app transitions from the background to the foreground.
- The app wakes from doze mode.

You can change the time to retrieval with the API AWSDKApplicationDelegate.getScheduleSdkFetchTime().

Refresh Interval When App is in the Foreground

The SDK updates the SDK default or custom profile when it has been four hours since the last profile retrieval for this app activity status.

• The app is in the foreground and remains there for an extend period.

You cannot change this value.

Run a Process Before Initialization, Optional

Use this optional procedure to run processes that analyze the environment into which the application is deployed. For example, run a process to determine if your application needs to start the SDK in a specific environment. To run a process before initialization in your SDK-built application, edit the AndroidManifest.xml file and customize an activity.

Procedure

- In the AndroidManifest.xml file, remove the launcher tag

 category android:name="android.intent.category.LAUNCHER" />.
 You add the tag in the placeholder activity you create to run your process.
- 2. Create an activity and register it in the AndroidManifest.xml file. This activity runs the desired process.
- 3. Add the intent filter to the activity you just created in the manifest. The filter resembles the example.

4. Call startActivity(new Intent(this, SDKSplashActivity.class)) after the process completes.

Certificate Pinning

The Workspace ONE software development kit (SDK) for Android has a number of certificate pinning customization features. Some examples follow.

- 1. Use the programming interfaces:
 - getScheduleSdkFetchTime() Override this method to change when the login module fetches updates to SDK settings from the Workspace ONE UEM console.
 - getKeyManager() Override this method to a value rather than null so that the login module initializes another key manager and not its own.
- 2. In the AndroidManifest, add the certificate pinning meta tags under the opening application tag.

```
<application
    ... attributes here ...>
    <meta-data
        android:name="com.airwatch.certpinning.refresh.interval"
        android:value="1"/>
    <meta-data
        android:name="com.airwatch.certpinning.refresh.interval.unit"
        android:name="com.airwatch.certpinning.refresh.interval.unit"
        android:value="DAYS"/>
    ...
```

</application>

Base Activity

If you need the SDK authentication, DLP, and timeout behavior, app activities should extend from SDKBaseActivity. These activities allow the application to handle the life cycle correctly and to manage the state of the SDK.

If the app Activity class extends SDKBaseActivity, then the SDK will enforce any data loss prevention (DLP) restrictions specified in the management console. Some examples of actions that can be restricted by DLP are as follows.

- Copy and paste out of the app.
- Copy and paste into the app.
- Application data backup.
- Screen capture, also known as screenshot.

The SDKContext and Custom Data Encryption

To encrypt custom data and to secure storage data, use the data encryption API set to encrypt and decrypt data.

Retrieve the SDK Profile

Once the SDKContext is in the configured state, you can call the SDKContext getSDKConfiguration() method to retrieve the SDK profile. The SDK must be finished with its configuration otherwise calling getSDKConfiguration() returns with an empty value.

```
if (sdkContext.getCurrentState() == SDKContext.State.CONFIGURED) {
   String sdkProfileString = SDKContextManager.getSDKContext().
   getSDKConfiguration().toString();
}
```

Encrypt Custom Data

Once the SDKContext is in the initialized state, you can call the data encryption API set. This set of functions uses the Workspace ONE SDK's intrinsic key management framework to encrypt and decrypt any data you feed in.

Use the MasterKeyManager API set when the SDK is in an initialized or configured state. See the example of how you can encrypt and decrypt a string value.

```
if (SDKContextManager.getSDKContext().getCurrentState()!=SDKContext.State.IDLE) {
    MasterKeyManager masterKeyManager = SDKContextManager.getSDKContext().getKeyManager();
    String encryptedString = masterKeyManager.encryptAndEncodeString("HelloWorld");
    String decryptedString = masterKeyManager.decodeAndDecryptString(encryptedString);
}
```

Secure Storage Data

After the SDKContext is in the initialized state, you can call the secure storage API set. This set of functions stores key value pairs in encrypted storage.

```
if (SDKContextManager.getSDKContext().getCurrentState()!=SDKContext.State.IDLE) {
    SecurePreferences pref = SDKContextManager.getSDKContext().getSDKSecurePreferences();
    pref.edit().putString(<KEY_NAME>, <VALUE>).commit(); // to store value
    Object value = pref.getString(<KEY_NAME>, <Default_Value>);
}
```

APIs for Copy and Paste Restrictions

To use the Workspace ONE SDK copy restriction, replace the Android classes in your application to the listed Workspace ONE APIs.

Examples

If Java class XYZ extends TextView{...}, change it to extend
AWTextView{...}

If you override the method onTextContextMenuItem(int id), do not process the listed IDs. You must call return super.onTextContextMenuItem(id); for the listed IDs.

- android.R.id.cut
- android.R.id.copy
- android.R.id.paste
- android.R.id.shareText

Change <TextView> in all Layout XML or View XML to <com.airwatch.ui.widget.AWTextView.../>.

APIs

Android Class	Workspace ONE SDK API
android.support.v7.widget.	com.airwatch.ui.widget.
AppCompatEditText	AWEditText
android.support.v7.widget.	com.airwatch.ui.widget.
AppCompatTextView	AWTextView
android.support.v7.widget.	com.airwatch.ui.widget.
AppCompatAutoCompleteTextView	AWAutoCompleteTextView
android.support.design.widget.	com.airwatch.ui.widget.
TextInputEditText	AWTextInputEditText
android.support.v7.widget.	com.airwatch.ui.widget.
SearchView.SearchAutoComplete	AWSearchAutoComplete
android.webkit.WebView	com.airwatch.ui.widget.CopyEnabledWebView

Push Notification Support

Code Apps to Use the SDK to Send Push Notifications with FCM

If you use Firebase Cloud Messaging (FCM), use two Workspace ONE SDK for Android APIs in your SDK-built, internal application to integrate your FCM solution with Workspace ONE UEM. This feature replaces sending push notifications with GCM.

The Workspace ONE SDK for Android handles two tasks with APIs.

• Accept the registration token and send it to the console.

```
/**
* API to register the Notification Token with the WS1 Console.
*/
PushNotificationManager::registerToken(token: String)
```

• Check for and recieve notifications from the application based on the notification parameters.

```
/**
* API to notify the SDK that a message has been received.
*
* @param title: Notification Title
* @param body: Notification Message
* @param payload: (Optional) Generic container to downstream multiple actions, data, etc.
*/
PushNotificationManager::processMessage(
    title: String, body: String, payload: Map<String, Any>?)
```

Prerequisites for FCM

Devices must have an internal, SDK-built application deployed to them that supports push notifications for this to work. Also, your application needs to handle getting the registration token and the sending of push notifications not delegated to the SDK. The Workspace ONE SDK for Android does not handle token registration and non-delegated push notifications for the FCM model.

Procedure for FCM

1. Use the register token API to register the FCM token with the SDK.

Workspace ONE SDK for Android sends the token to the Workspace ONE UEM console.

2. Use the process message API to define parameters for the Workspace ONE SDK for Android to consume the push notification. Currently, the SDK checks for command actions.

```
class FCMMessagingService : FirebaseMessagingService() {
    private val TAG = "FCMMessagingService"
    override fun onMessageReceived(message: RemoteMessage?) {
        val context = SDKContextManager.getSDKContext().context
PushNotificationManager.getInstance(context).processMessage(message?.notification?.title?: "",
            message?.notification?.body ?: "You got a message", null)
    }
    override fun onNewToken(token: String?) {
        Logger.d(TAG, "onNewToken() called with $token")
        super.onNewToken(token)
        val context = SDKContextManager.getSDKContext().context
        if (token != null)
            PushNotificationManager.getInstance(context).registerToken(token)
        }
}
```

Configure Push Notifications in the Console

Use internal, SDK-built applications to send push notifications integrated with systems like FCM.

Procedure

- 1. Upload the application to Workspace ONE UEM.
- 2. Navigate to Apps & Books > Applications > Native > Internal and select the application from the list view.
- 3. Select the Devices tab.
- 4. Select all the devices to which you want to send the notification.
- 5. Select Send Message to All or Send.
- 6. Select Push Notification for the Message Type.
- 7. Select the SDK-built application in the **Application Name** field the system uses to send push notifications to selected devices.
- 8. Enter the message in the **Message Body**, complete the rest of the procedure, and send it to devices.

Send Push Notifications Through Internal Applications with GCM and Workspace ONE UEM

If you use Google Cloud Messaging (GCM), you can send push notifications from applications uploaded to the Workspace ONE UEM console to Android devices through GCM. Devices must have an SDK-built application on it that supports push notifications.

Firebase Cloud Messaging (FCM) replaces GCM. This outlined process does not work for applications that use FCM.

Prerequisites for GCM

Google has deprecated GCM as of April 10, 2018. See Code Apps to Use the SDK to Send Push Notifications with FCM.

This feature requires Workspace ONE UEM console v9.5+.

Procedure for GCM

- 1. To send notifications using GCM, configure GCM and get a sender ID and an API server key.
 - Sender ID

The GCM system generates this value when you configure an GCM API project. The system uses the value to identify the package ID for the application.

- API Server Key

This key gets saved on application server to authorize the server to access Google services. Enter this value when you upload the internal application to the Workspace ONE UEM console.

These two values enable GCM, Workspace ONE UEM, the client, and the application to communicate.

The Client Gets a Registration Token from GCM. Call the registration API on the client to register with GCM. The client then sends the registration token to the Workspace ONE UEM console. Each client has its own registration token. The console uses the registration token to identify the client for which push notifications are sent through GCM servers.

- 2. Register the application with GCM using the directions at https://developers.google.com/cloudmessaging/android/client.
- 3. Retrieve the sender ID and code it in the application class.
- 4. Retrieve the API server key and enter it in the console while uploading the app.
- 5. Call Register API on the client side to register the device with the GCM server and to retrieve the registration token (GCM token).

- 6. The SDK beacon sends the token to the Workspace ONE UEM console. If you want to force sending the token immediately, stop and restart the application.
- 7. Upload the Application to Workspace ONE UEM.
- 8. Send push notifications with Workspace ONE UEM from the Workspace ONE UEM console.
 - 1. Navigate to Apps & Books > Applications > Native > Internal and select the application from the list view.
 - 2. Select the Devices tab.
 - 3. Select all the devices to which you want to send the notification.
 - 4. Select Send Message to All or Send.
 - 5. Select Push Notification for the Message Type.
 - 6. Select the SDK-built application in the Application Name field the system uses to send push notifications to selected devices.
 - 7. Enter the message in the Message Body, complete the rest of the procedure, and send it to devices.

Code GCM Push Notifications in the Application

To use push notifications in your application and Workspace ONE UEM, code the support of push notifications in the AWFramework module in the application class.

Use the PushNotificationContext Interface.

The AWFramework module provides an abstract AWApplication class that runs the PushNotificationContext with default behaviors. Your application can override some of the methods to intercept callbacks for additional actions or if it does not use the AWApplication class.

Follow this procedure to code support for push notifications if your application does not use the AWApplication class.

Prerequisites

Google has deprecated GCM as of April 10, 2018. See Code Apps to Use the SDK to Send Push Notifications with FCM.

- Code the sender ID from GCM into the application class for push notifications to work.
- Add the API server key from GCM to the Workspace ONE UEM console when the admin uploads the application.

Procedure for GCM Push Notifications in the Application

 Override the registerForPushNotifications() method in the PushNotificationContext class and call GCMManager.registerForPushNotifications(getApplicationContext());.

A call to **registerForPushNotifications()** initiates the GCM registration process.

- 2. Override getSenderID() and return your application's corresponding sender ID.
- 3. To intercept GCM registration and GCM push notification events, use the callbacks in **IPushNotificationReceiver**.
- If your application sends other push notifications besides those for Workspace ONE UEM, override AWPushNotificationReceiver implementation and call super.

For details about specific Workspace ONE UEM actions, review AWPushNotificationReceiver. Actions include uploading the registration token and checking for secure messages in the console. If the application class overrides AWApplication and does not use push notifications for anything else, do not override getPushNotificationReceiver(). 5. To code that the application received a notification and to not use AWApplication's default behavior, override onSecureMessageReceived(String message) with the desired behavior.

The default behavior is to display a notification in the notification bar with a Workspace ONE UEM icon.

APIs to Use Custom Certificates for Your SDK-Built Apps

The Workspace ONE SDK for Android provides APIs to retrieve custom certificate authority (CA) certificates configured in the SDK profile and to perform trust validations based on these custom CA certificates. The admin configures trusted certificates as Credentials in the SDK profile. When the SDK fetches the SDK profile, it also fetches and stores the CA certificates.

API to Retrieve CA Certificates

```
List<X509Certificate> caCerts =
SDKContextManager.getSDKContext().getKeyStore().getCACertificates();
```

API to Perform Trust Validations

Use the previous API with the following SDK provided API to perform trust validations on any X509 certificate.

The declaration is in the CertificateUtils class:

The parameters are as follows.

- inputCerts
 List of the X509Certificate chain that must be validated for trust.
- trustedCerts

List of CA certificates to compare against.

If the **inputCerts** chain, up to any of the CA certificates, is **trustCerts**, then this API returns true.

Build Custom X509TrustManager Objects

You can build custom X509TrustManager objects with the two APIs. You can use them with URLConnection, OkHttpClient, and any other networking libraries that require TLS/SSL trust.

```
X509TrustManager customTrustManager = new X509TrustManager() {
  @Override
  public void checkServerTrusted(
        X509Certificate[] chain, String authType
  ) throws CertificateException
  {
      List<X509Certificate> caCerts =
      SDKContextManager.getSDKContext().getKeyStore().getCACertificates();
      if(!new CertificateUtils().isTrusted(chain, caCerts)) {
        throw new CertificateException("Certificate chain not trusted");
      }
  }
};
```

API to Perform Certificate Classification

The SDK provides an API to retrieve certificates based on the certificate use. It classifies all the certificates configured in the SDK profile into four types.

- Authentication
- CA
- Signing
- Encryption

The API classifies based on the Key Usage and Extended Key Usage attributes present in the certificates.

The following code snippet illustrates usage.

```
KeyStore authCerts = SDKContextManager.getSDKContext().getKeyStore().getKeyStoreByUsage(
        SDKKeyStore.CertificateUsage.AUTHENTICATION_CERTIFICATE);
```

This API returns a java.security.KeyStore object that contains all key-pair entries classified as authentication certificates.

Set Inactivity Timer Reset for Application Inactivity

To use the Application Inactivity setting in the default Workspace ONE SDK for Android profiles in the Workspace ONE UEM console, code your SDK-built app to reset the user inactivity timer. Code this feature with the AWFramework library.

The SDK resets the user inactivity timer implicitly whenever the application comes to the device foreground. An explicit reset is required only when user interaction takes place without the application coming to the device foreground.

Workspace ONE UEM console Configurations

Have your Workspace ONE UEM admin enable the Application Inactivity setting in the console. The admin can find this setting in Groups & Settings > All Settings > Apps > Settings and Policies > SDK App Compliance.

Code Additions

To integrate the inactivity timer reset into a Workspace ONE SDK for Androidbuilt app, add the listed methods.

- Implement AirWatchSDKIntentService::onClearAppDataCommandReceived. Your app must implement wipe callbacks, that are in the ClientSDK library.
- By default, the app in the foreground is considered App Activity. Otherwise, it is considered App Inactivity. If the user can interact with the app without bringing it to the foreground, and if you want to count it as App Activity, call ApplicationLifecycleUtil::resetInteractionTime to reset inactivity time.

How to Implement a Wipe Callback

Here is an example of implementing a wipe callback.

override fun onClearAppDataCommandReceived(context: Context, reasonCode: ClearReasonCode) {
 // This method is invoked by the SDK to wipe the application data, for example
 // following a failed inactivity check.
 //
 // Run application code to do the following from here:
 //
 // - Delete any data that was encrypted with a key that is being deleted.
 // - Delete any data that wasn't encrypted.
 // - Delete any data that was encrypted with a key from elsewhere.
 // - Delete any data that was encrypted with a key from elsewhere.
 // The following SDK method must be called at some point in the implementation.
 SDKContextManager.getSDKContext().sdkClearAction.clear(SDKClearAction.Type.ALL)

Document Information

Revision History

23jul2020 First publication, for 20.7 SDK for Android.
09sep2020 Added note about DLP enforcement
11oct2020 Updated for 20.9 SDK for Android.
18Feb2025 Brand Revision

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