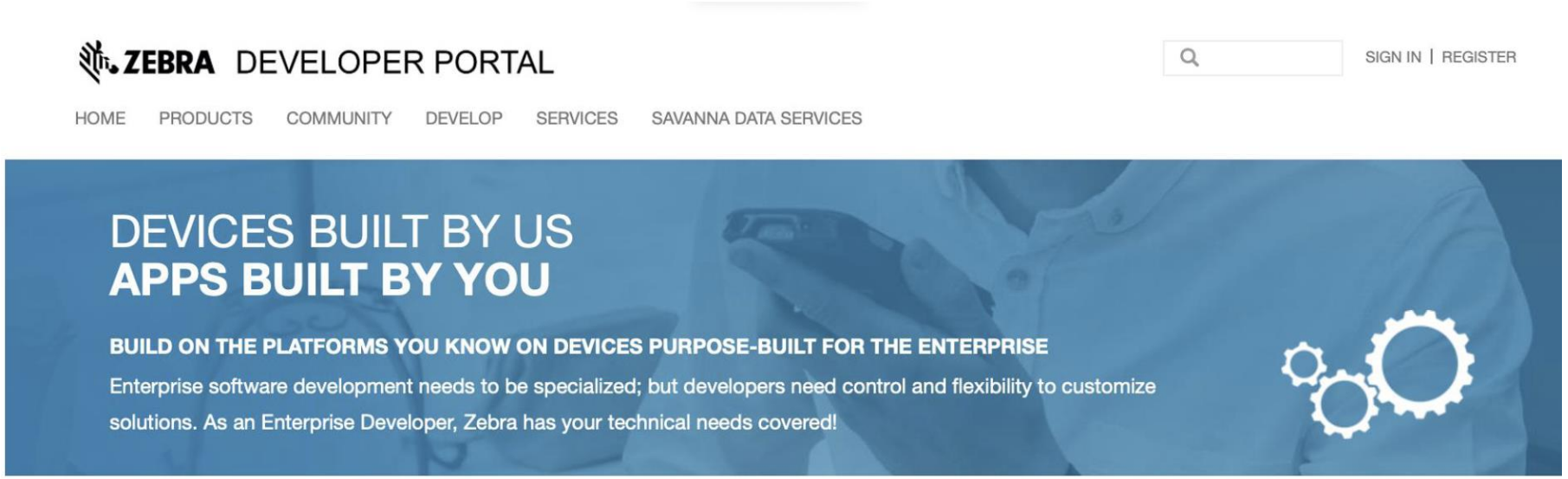
Zebra Developers

Build Your Edge



Zebra Developers
Build Your Edge

Join our Developer Community

ZEBRA DEVELOPER PORTAL

http://developer.zebra.com

DevTalk – What's new for Zebra developers in Android 10

Zebra Developers
Build Your Edge

Darryn Campbell

SW Architect, Zebra Technologies

15th July 2020

What's new for Zebra developers in Android 10

Android 10 support for Zebra devices

TC21 / TC26

MC3300x

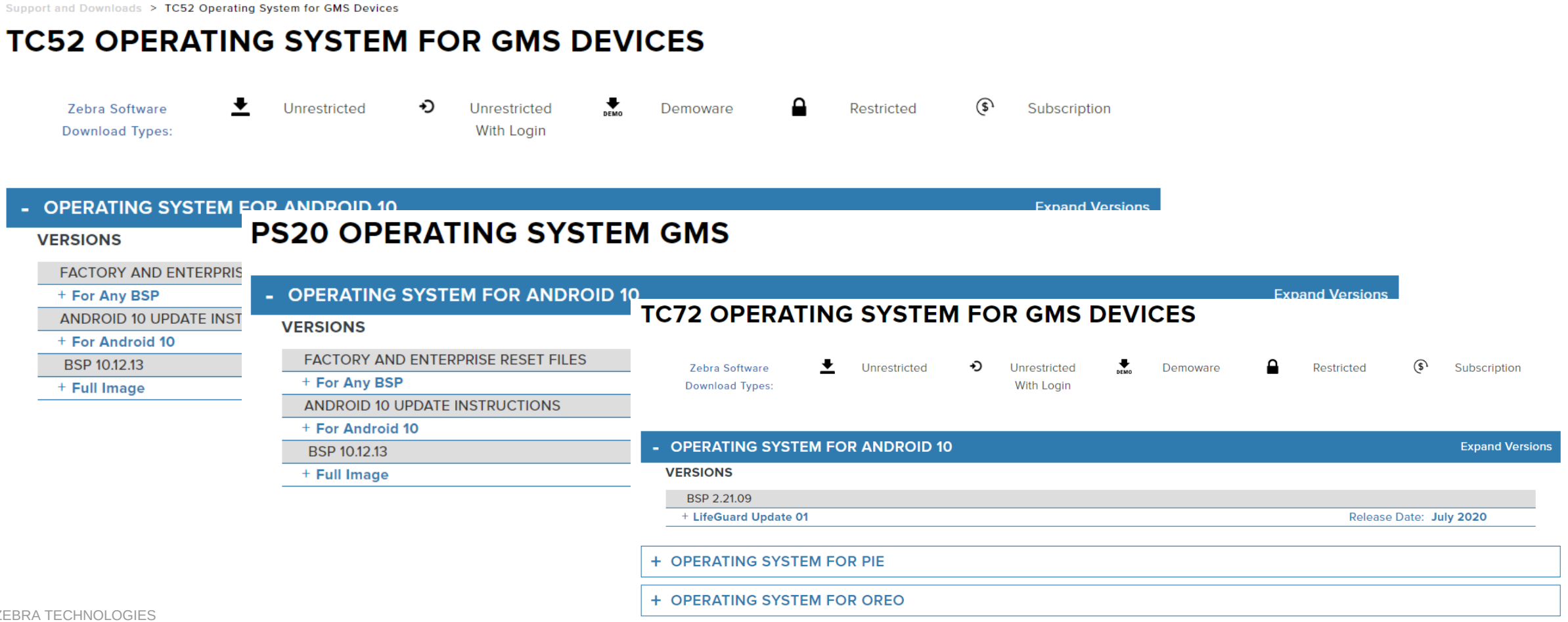
TC52x / TC57x

Plus, existing devices will receive an upgrade to Android 10

What's new for Zebra developers in Android 10

Android 10 support for Zebra devices

Plus, existing devices will receive an upgrade to Android 10



What's new for Zebra developers in Android 10

Trends over time

						
Running in the background	Job Scheduler	Doze mode	Doze “on the go”	Background restrictions	Machine learning for intelligent restrictions	**New permission for background location**
Notifications	Quick settings & notification shade	Long press to access options	Direct reply & bundled notifications	Notification channels & snooze	Enhanced messaging experience	**Smart Replies**
One or Two other major changes affecting Enterprise	Material design	Runtime permissions	Multi-window	Changes to the Google Play Store policies	Non-SDK methods actively discouraged	**Scoped Storage Device identifiers**
Android Enterprise features	Android for Work, app restrictions	DO mode, lock task mode, managed configs	DPM API enhancements	DPM API enhancements	DPM API enhancements	**Transition to DO mode**

What's new for Zebra developers in Android 10

Google’s highlighted features

- Foldables
- 5G
- Smart reply
- Dark theme
- Gesture navigation
- Settings panels
- Sharing shortcuts
- **User privacy**
- **Security (Storage encryption, TLS 1.3 by default, Platform hardening)**
- New audio and video codecs

What's new for Zebra developers in Android 10

Scoped Storage

- Change in behaviour how an application can handle device mass storage
  - Previously: Application had unrestricted access so long as the appropriate permissions were granted
  - Scoped storage: Applications only have access to an app-specific directory on external storage
- Impact:
  - Ability to read files from external storage is severely curtailed:
    - Media files (images, videos, audio) can be accessed via the Media API & use dedicated shared folders.
    - Any file can be chosen and opened with the Storage Access Framework but that requires a user file picker
  - Only affects applications targeting Android 10 (API level 29)
  - Use case examples:
    - Reading a configuration file from external storage
    - Sharing a log file via external storage
    - Etc.

What's new for Zebra developers in Android 10

Scoped Storage

- Many challenges from the consumer developer community when this change was introduced
  - Resulted in less aggressive rollout in Android 10
    - **Can make a manifest change to defer to ‘legacy behaviour’**
  - Full rollout will take place in Android 11

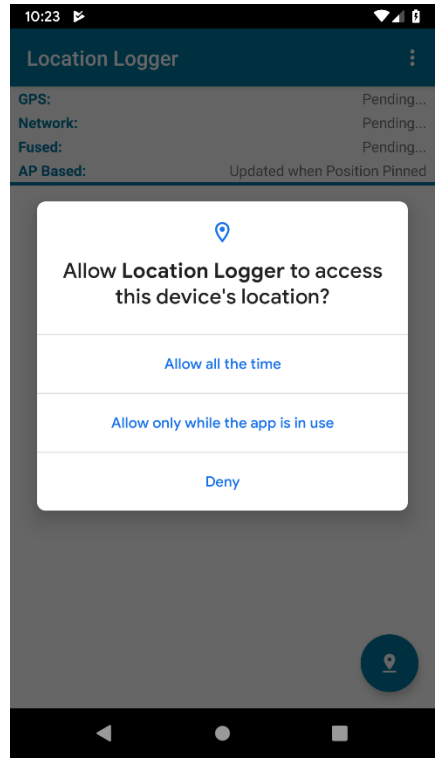
```
<manifest ... >
  <!-- This attribute is "false" by default on apps targeting
       Android 10 or higher. -->
    <application android:requestLegacyExternalStorage="true" ... >
      ...
    </application>
</manifest>
```

- **Either make changes to your app in line with Google’s recommendations or defer until Android 11**

What's new for Zebra developers in Android 10

User control over location in the background

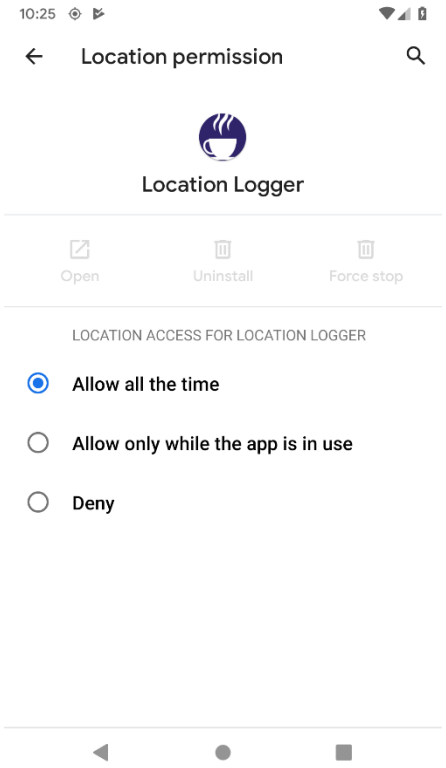
- New differentiation between when an application can access user location
- In Pie and earlier: Granting an app location permission allowed the app to use location in the **foreground and background**
- In Android 10: Only foreground access is permitted by default.
  - Apps desiring background access need to request a new permission, ACCESS_BACKGROUND_LOCATION
- Even if application requests both foreground and background access, user can choose to only grant foreground permission (or deny permission)



What's new for Zebra developers in Android 10

User control over location in the background: Enterprise implications

- These are still runtime permissions
  - EMMs and StageNow will grant runtime permissions automatically without user interaction. (Configurable on EMMs)
  - Applications targeting 10 still need to request ACCESS_BACKGROUND_LOCATION otherwise it will not be granted
  - Applications with a target SDK of Pie (28) and earlier will automatically have ACCESS_BACKGROUND_LOCATION granted
- Workaround in Oreo / Pie was to use a foreground service for location
  - In Android 10, need to ensure this **foreground service is of type "location"** (no additional impact to doing this in Android 10 but Android 11 likely to make greater use of this feature)
- Typically the user will be denied access to the app permission screen in enterprise deployments
  - If the user does have access, they can change permissions post-install



What's new for Zebra developers in Android 10

Access to device identifiers

- All device identifiers including the serial number, IMEI, device id, MEID, SIM serial number and subscriber ID are not available
- In Android 9 these identifiers were protected by the READ_PHONE_STATE runtime permission.
- In Android 10 these identifiers are protected by the READ_PRIVILEGED_PHONE_STATE permission, only assigned to system apps
- Some exceptions exist for EMMs acting as the Device Owner
- Recommendation is to use a self-generated GUID rather than rely on device characteristics
  - Or, Settings.Secure.Android_ID (tied to user – resets on new user or factory / enterprise reset)
  - Or, less realistically for Zebra customers, an advertising ID
  - More info: https://developer.android.com/training/articles/user-data-ids

What's new for Zebra developers in Android 10

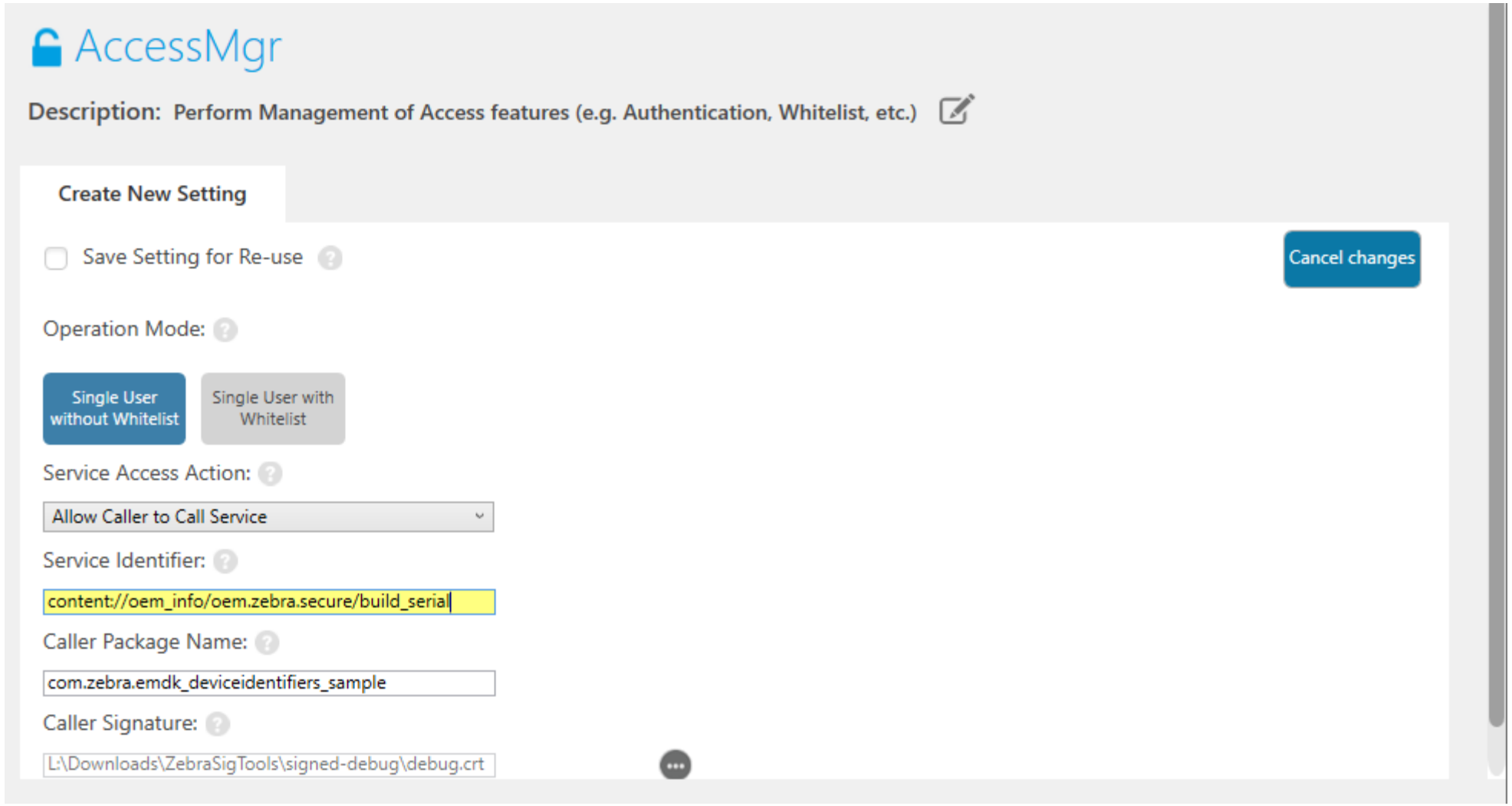
Access to device identifiers on Zebra devices running Android 10

- Zebra DOES allow developers to access the **serial number** and **IMEI**
- New content provider exposed, specific to Zebra devices
- Does **not** modify the behaviour of the existing Android API
- Requires the administrator to specifically grant access to the particular app's signature (Example for StageNow on next slide)
- Sample:
  - https://github.com/darryncampbell/EMDK-DeviceIdentifiers-Sample


```
String URI_SERIAL = "content://oem_info/oem.zebra.secure/build_serial";
Uri uri = Uri.parse(URI_SERIAL);
Cursor cursor = getContentResolver().query(uri, null, null, null, null);
cursor.moveToNext();
String serial =
   cursor.getString(cursor.getColumnIndex(cursor.getColumnName(i)));
```

What's new for Zebra developers in Android 10

Access to device identifiers on Zebra devices running Android 10



What's new for Zebra developers in Android 10

Bluetooth and Wi-Fi APIs require FINE location permission

If your app targets Android 10 or higher, it must have the **ACCESS_FINE_LOCATION** permission in order to use several methods within the Wi-Fi, Wi-Fi Aware, or Bluetooth APIs

Telephony

TelephonyManager:

getCellLocation()

getAllCellInfo()

requestNetworkScan()

requestCellInfoUpdate()

getAvailableNetworks()

getServiceState()

TelephonyScanManager

requestNetworkScan()

PhoneStateListener

onCellLocationChanged()

onCellInfoChanged()

onServiceStateChanged()

Wi-Fi

WifiManager

startScan()

getScanResults()

getConnectionInfo()

getConfiguredNetworks()

WifiAwareManager

WifiP2pManager

WifiRttManager

Bluetooth

BluetoothAdapter

startDiscovery()

startLeScan()

BluetoothAdapter.LeScanCallback

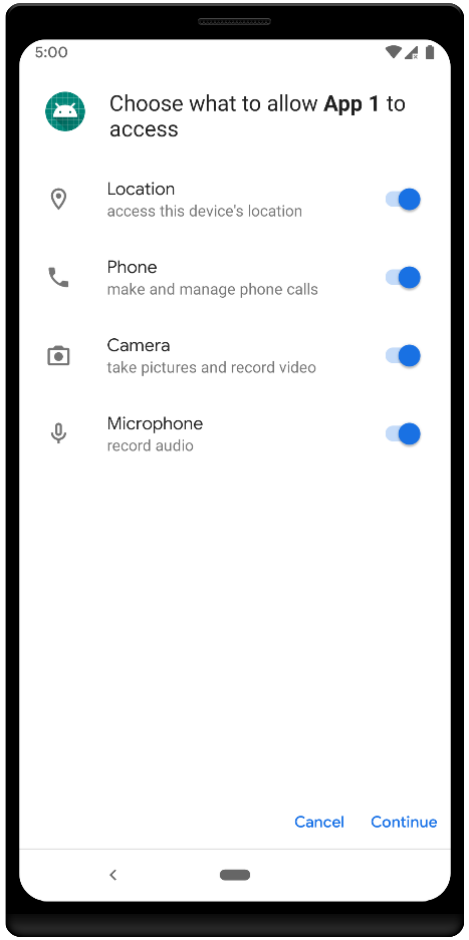
BluetoothLeScanner

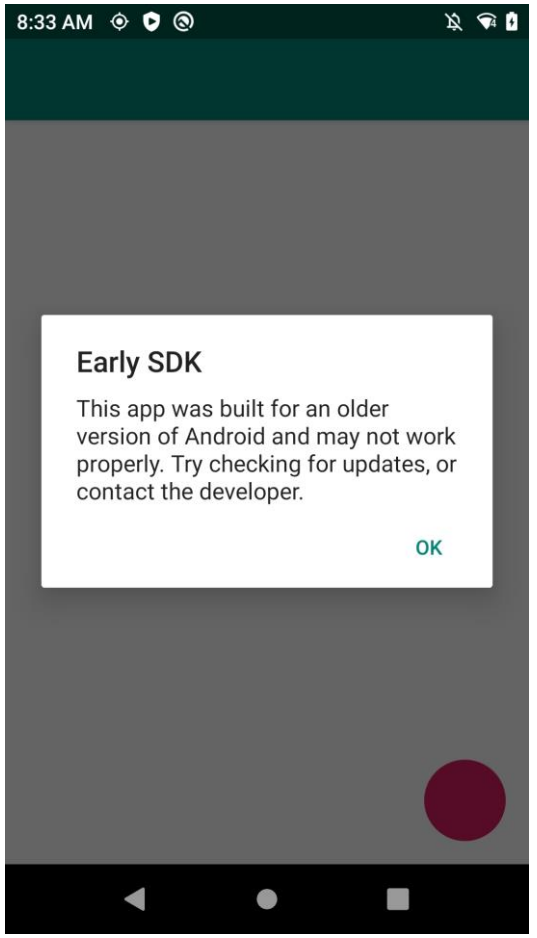
startScan()

What's new for Zebra developers in Android 10

Legacy applications: Permissions and warnings

- Applications targeting SDK 21 (Lollipop) or earlier installed on Android 10 will present 2 screens when first run:
  - Re-confirm the user is happy with the permissions the application uses.
    - Addresses apps who are still circumventing the runtime permissions introduced in Marshmallow
    - **Not possible to silently grant runtime permissions on applications targeting Lollipop or earlier.**
  - Warning that the app was built for an older version of Android
    - No current way to circumvent
- We still have a large install base of Lollipop devices – these customers may be affected if they upgrade.





What's new for Zebra developers in Android 10

Changes to the Google Play Store requirements

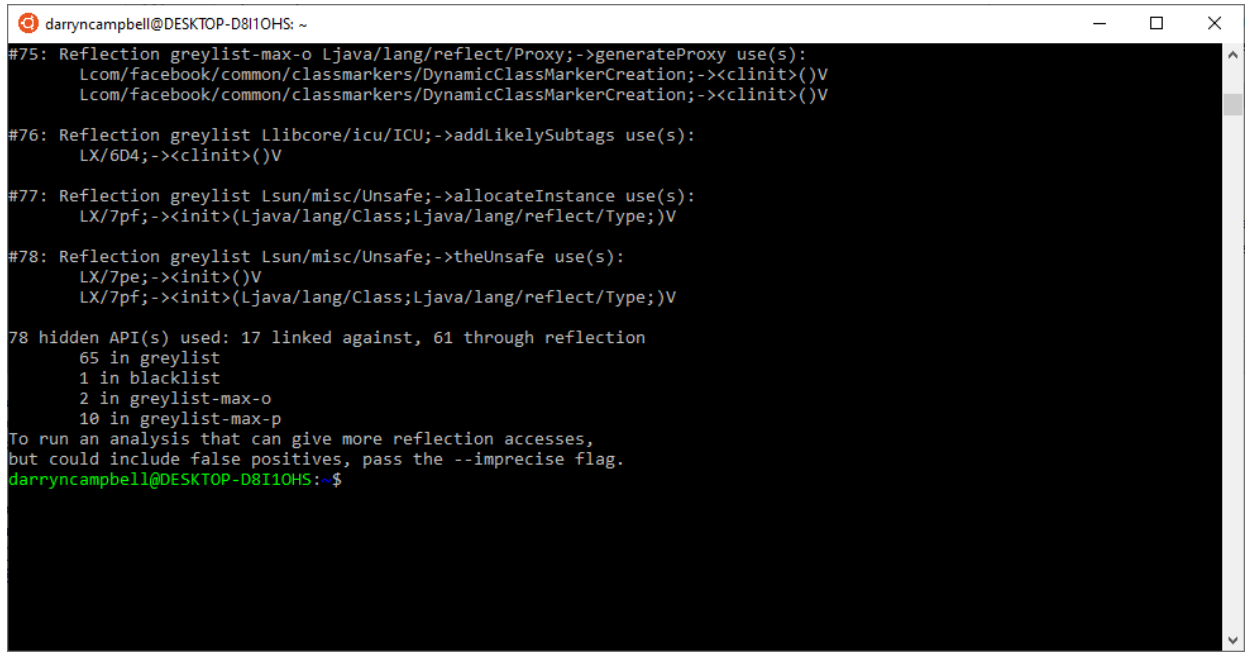
- To be allowed in the Google Play Store applications need to target a recent API level
  - May well change application behaviour. Google have an extensive & detailed documentation.
- The required API level updates annually (changes apply in August & November)
- This will affect more and more of our customers as organizations move to managed Android and the Managed Play Store
- Customers should also consider other Play Store policies such as content restrictions & harmful app scanning
- Latest SDK levels (link):

API level requirement	Starting date
Android 8.0 (API level 26)	• August 1, 2018: Required for new apps • November 1, 2018: Required for app updates
Android 9 (API level 28)	• August 1, 2019: Required for new apps • November 1, 2019: Required for app updates
Android 10 (API level 29)	• August 3, 2020: Required for new apps • November 2, 2020: Required for app updates

What's new for Zebra developers in Android 10

Restrictions on Non-SDK interfaces

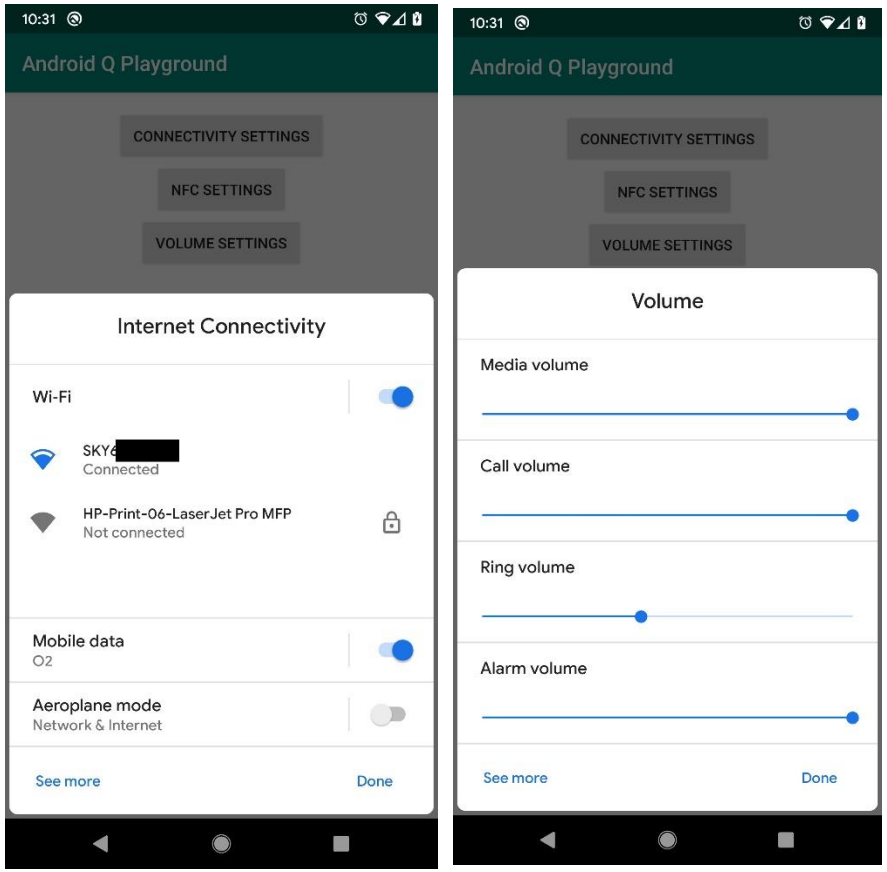
- Designed to prevent access to APIs not part of the public API set
- APIs are classified into whitelist (allowed), graylist (allowed with caveats) or blacklist (disallowed)
- Google have dedicated documentation for this and we have an article on the developer portal
- Various forms of analysis exist for a developer to detect if they are calling any forbidden APIs



What's new for Zebra developers in Android 10

Settings panels

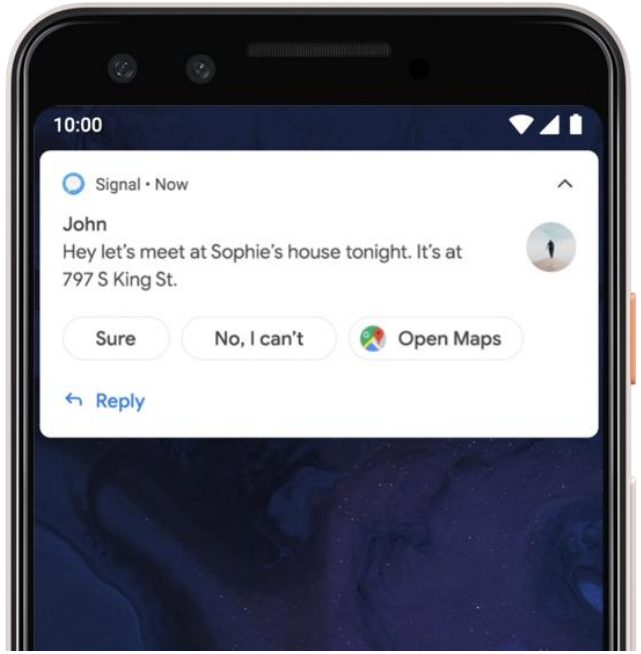
- Apps have a very simple interface to show limited settings
- Designed to allow the customer to fix issues (e.g. connect to WiFi) without leaving the app context
- Not all settings are available.
  - Currently connectivity, NFC and volume are exposed.
- More feature-rich version of the quick-settings pull down
- Typically enterprise devices will have most (or all) settings locked down.
  - **Recommendation: It is bad practice for an application to rely on the availability of the settings panels**



What's new for Zebra developers in Android 10

Smart replies

- Android 10 will suggest contextual actions in notifications
  - Applies to notifications built to handle inline replies
  - Logic to determine replies is entirely on-device
  - Smart replies for messages or opening a map for an address in the notification.
- Enabled by default but applications can opt-out by calling setAllowGeneratedReplies() and setAllowSystemGeneratedContextualActions()
- Personally I would recommend *disabling* smart replies for Enterprise apps. Must be done at the app level – no way to achieve via EMM.
  - I have seen some irrelevant or inappropriate suggested replies both online and when using my personal phone.
  - Google maps or other apps to handle the contextual actions may not be enabled



What's new for Zebra developers in Android 10

Dark theme

- Dark theme is popular amongst many users and Android 10 implements native support for the feature
  - Settings → Display → Dark
- There are no current plans for Zebra to expose the ability to enable dark mode
- Applications can use the standard theming model mechanism to provide a dark theme that respects user preference
- According to Google dark mode can reduce the power consumption of devices regardless of the display technology, though AMOLED savings are higher.

What's new for Zebra developers in Android 10

Conclusions

Android 10

- Emphasis on giving more power & privacy to the end user continues
  - Enterprise implications particularly around:
    - Scoped storage
    - Background location
    - Device identifiers
  - Developers should be aware of potential code changes required

Latest Android Pie & 10 features for your Enterprise Application

Resources

- Zebra best practices for Android migration: https://techdocs.zebra.com/bestpractices/migration/
- What's New for Android 'P' and the impact on Zebra Developers:
  - [Developer portal post | DevTALK on YouTube]
- What's New for Android 10 and the impact on Zebra Developers:
  - [Developer portal post]
- Serial number / IMEI example: https://github.com/darryncampbell/EMDK-DeviceIdentifiers-Sample
- Google published documentation for each new release (samples, behaviour changes, API changes)
  - Lollipop, Marshmallow, Nougat, Oreo, Pie, 10
- Google published documentation for new Android Enterprise features (primarily EMM focused)
  - Nougat, Oreo, Pie , 10
- Recommended Google resources for specific Pie features:
  - Android Enterprise talk on Power changes | Background execution advice (blog)

Zebra Developers

Build Your Edge

Questions?

http://developer.zebra.com

Zebra Developer Community – LinkedIn Group

@ZebraDevs