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DEVTALK:

GMS Restricted – bridging the gap between
AOSP and GMS

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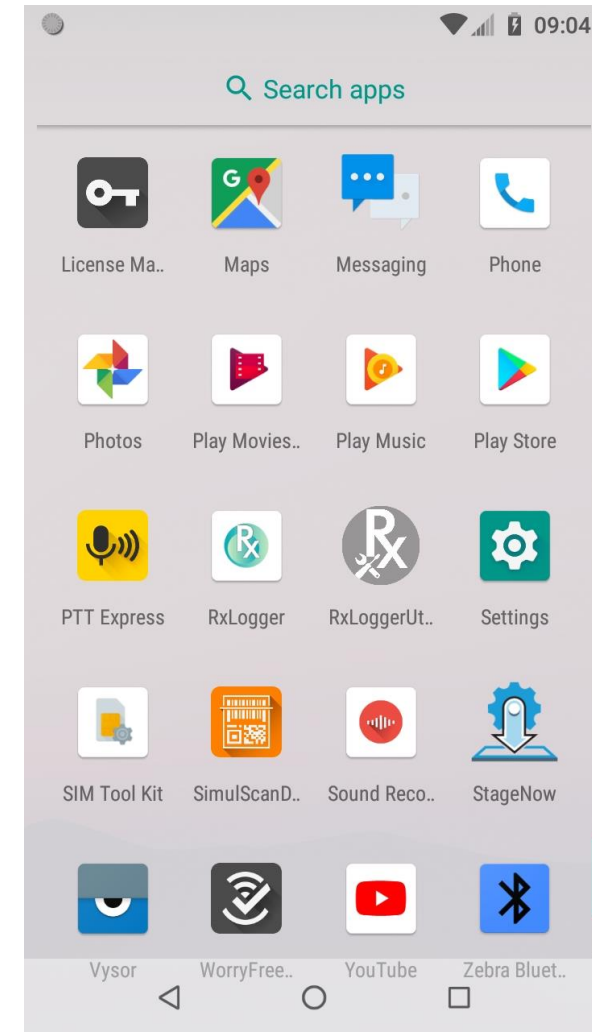
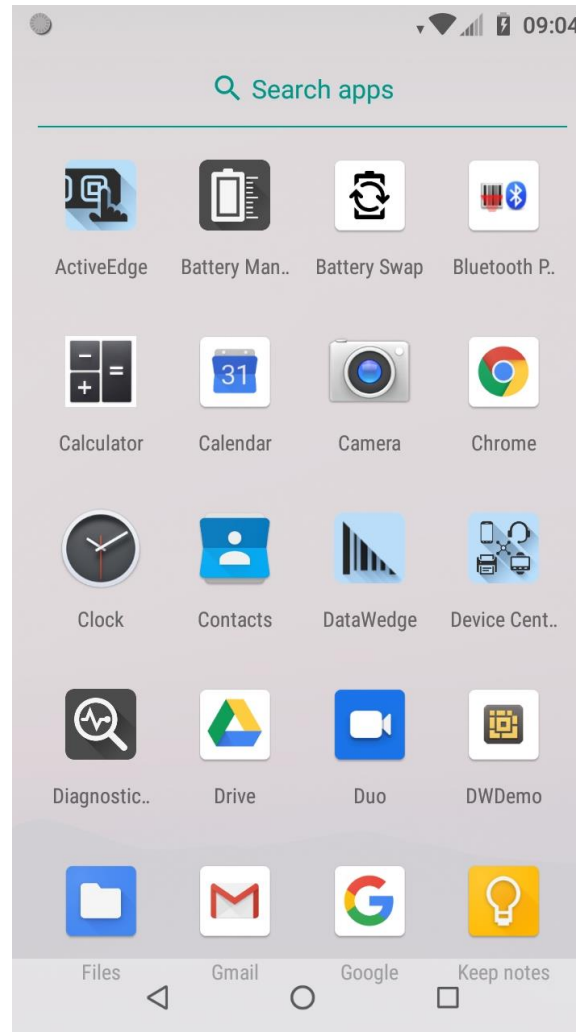
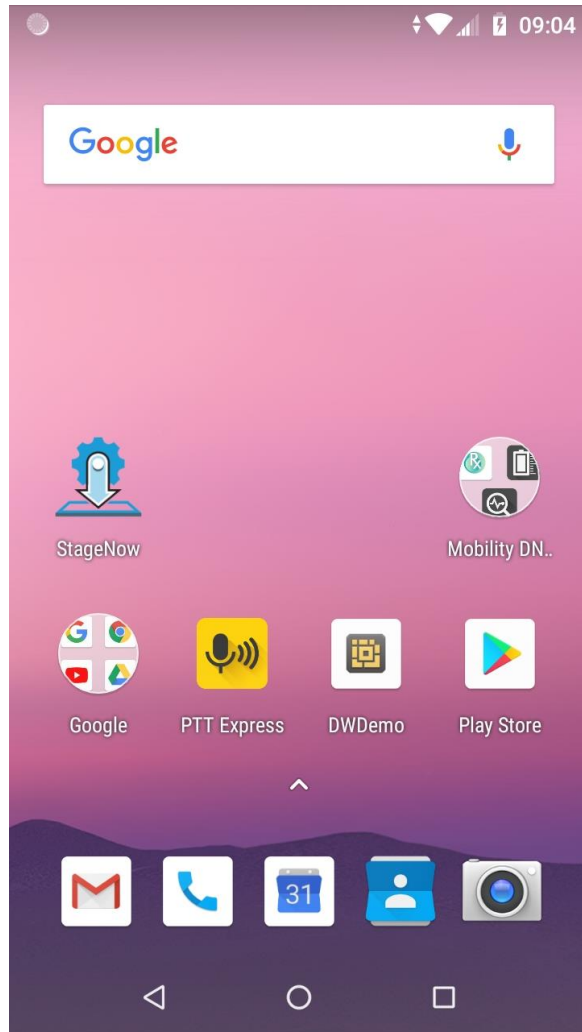
DevTalk – GMS Restricted

What is GMS Restricted?

- All GMS Applications disabled (e.g. Play Store, Chrome, GMail, Maps etc)
 - Re-enable functionality with “Profiles” or 3rd party applications.
 - AOSP / EKB keyboards are available on the device (Use [UI Manager](#) to set these).
- All GMS services disabled
 - Automatic opt-out of Google analytics data collection & location services
 - Doze mode is disabled (to match AOSP behaviour)
- NO data leaves the device from GMS apps & services or the platform
- Zebra applications will continue to work
- Terminology:
 - “Restricts” the capabilities of the device, no GMS apps available
 - “Restricts” the device from communicating with Google

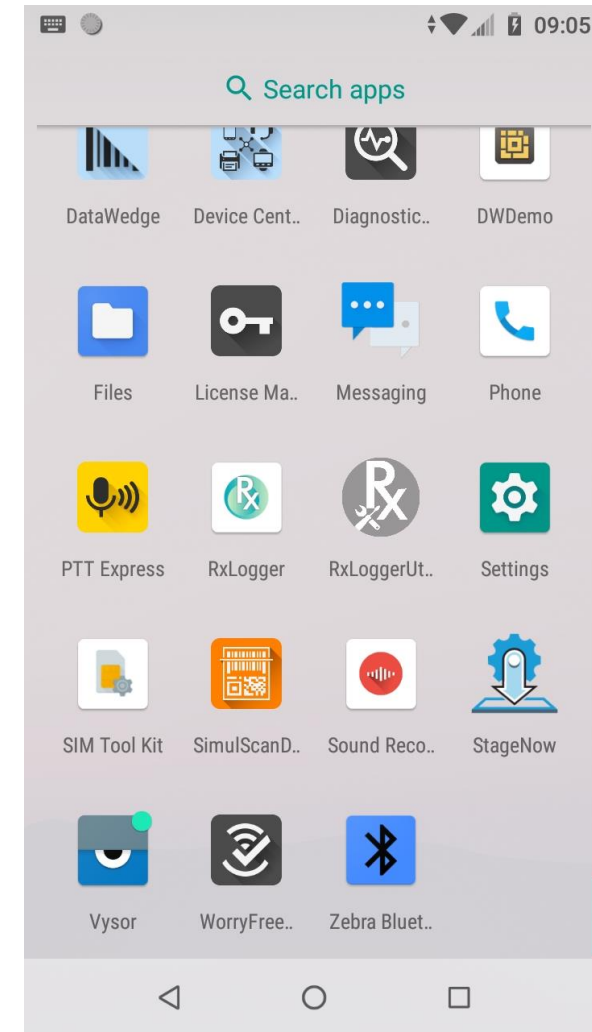
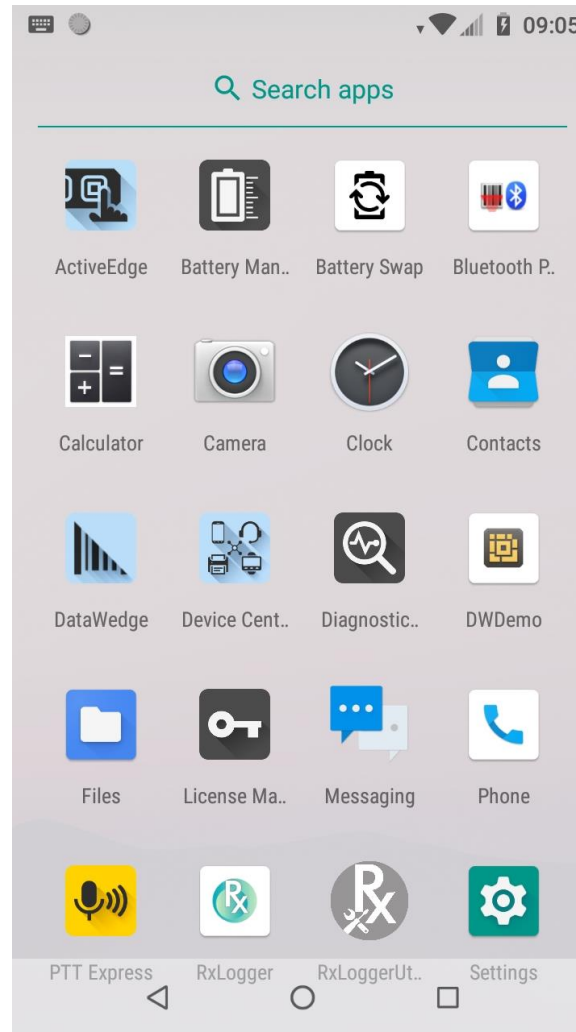
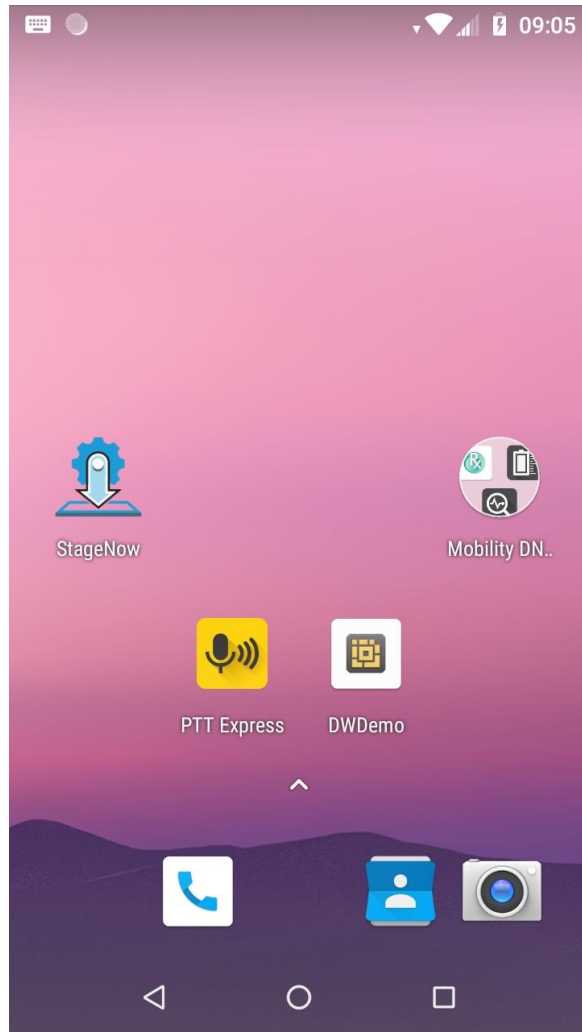
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GMS Device out of Box



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GMS Restricted Device



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Why GMS Restricted?

- Upgrade path for customers currently deploying AOSP devices
 - SDM-660 devices are GMS only (TC52/57, TC72/77, PS20 etc)
- Addresses privacy concerns with GMS
- Enables a selected subset of GMS features (as defined by profiles)
- Full administrator control:
 - Applications cannot be selectively re-enabled which could lead to an unstable platform
 - Set and forget – no need to worry about what will happen when the OS is updated

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Applying GMS Restricted Mode

- GMS Restricted is a staging configuration, applied via StageNow. It is NOT a separate SKU




CSP	Action	Description	Applies to
GMS Manager	All	Enables all GMS applications and services. Out of box configuration.	MX: 8.3+ Android API: 26+ SDM-660 platform devices only
GMS Manager	Restricted	Disables all GMS applications and services on a device. For example, the Play Store, YouTube etc.	MX: 8.3+ Android API: 26+ SDM-660 platform devices only
GMS Manager	Profiled	Disables all but the specific GMS applications / services defined by the profile	MX: 9.0+ Android API: 26+ SDM-660 platform devices only

Related to the functions in GMS Manager are App Manager's EnableGMSApps and DisableGMSApps actions. Where possible, the GMS Manager should be used in preference to App Manager.

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Available Profiles

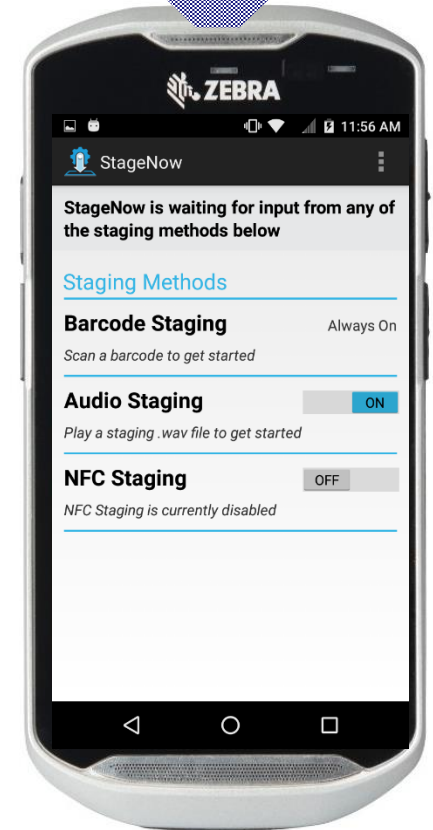
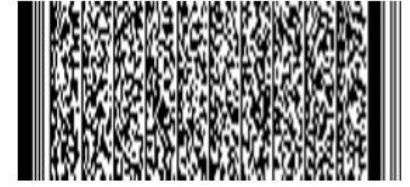
- Profiles allow only the selected functionality to be available on a GMS Restricted device. They cannot be combined

Profile Name	Description	Dependencies
 Chrome	Enables the Chrome browser	Few
 Maps	Enables the Google Maps application, location and sets the location accuracy to the highest possible on the device.	Many including Google Play Services
 Firebase Cloud Messaging	Allows applications to receive Firebase Cloud messages	Many including Google Play Services

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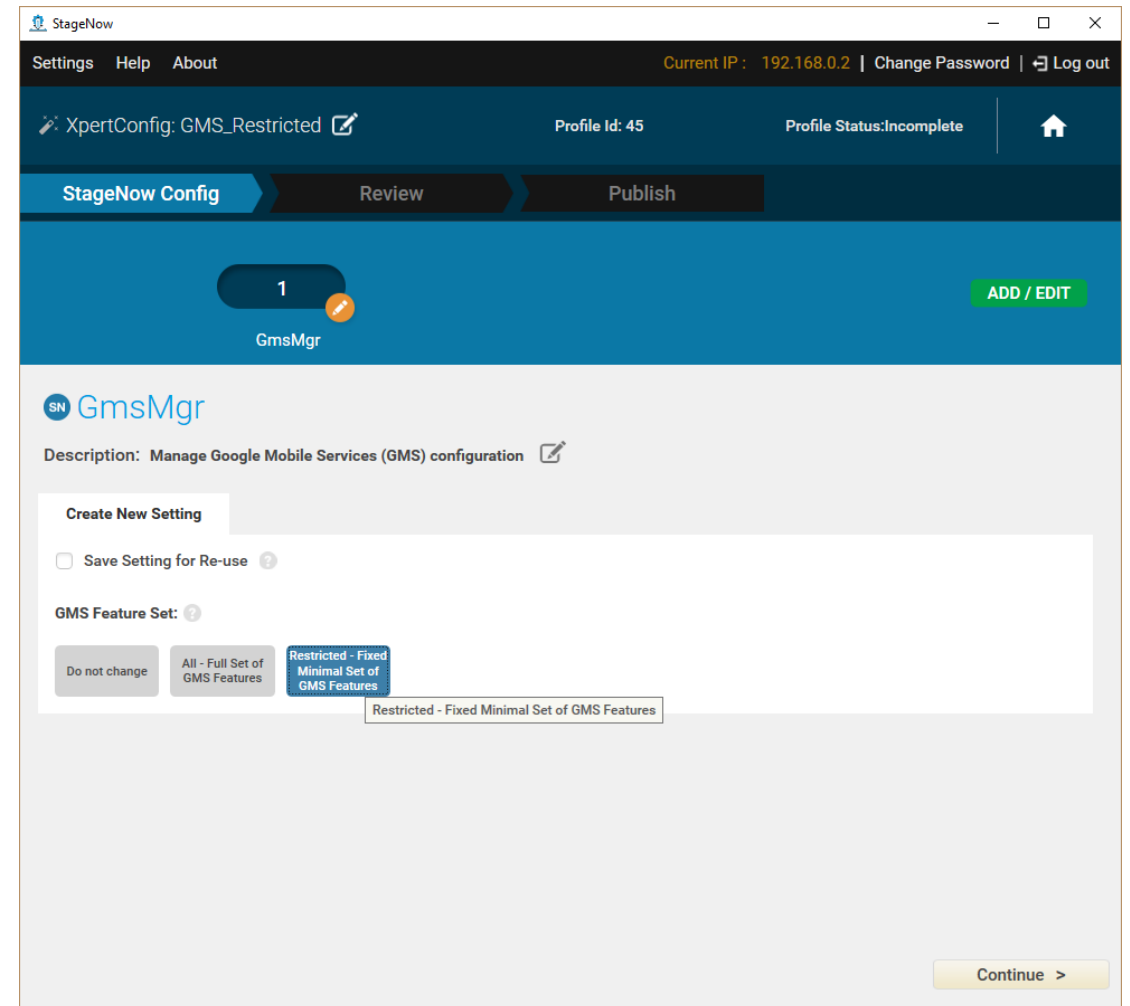
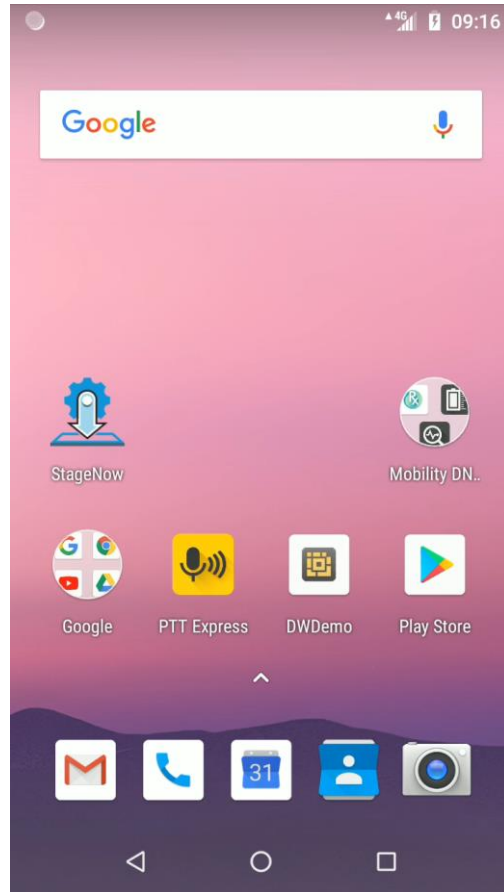
The *Typical* Out of Box Experience

1. [Bypass the Setup Wizard](#) using the SUW bypass barcode. This will launch StageNow
2. Create your staging profile containing the following, in this order:
 - GMS Manager: Apply GMS Restricted
 - Wi-Fi Manager: Configure WiFi connection
 - ... etc...
3. Device is now ready to go after scanning two barcodes
 - Bypass SUW barcode
 - StageNow barcode



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Demonstration: TC57 applying GMS Restricted Mode via StageNow



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GMS Restricted Profiles in StageNow 3.3 (Screenshot)

The screenshot displays the StageNow 3.3 web interface. At the top, a dark navigation bar contains 'Settings', 'Help', and 'About' on the left, and 'Current IP : 192.168.0.2 | Change Password | Log out' on the right. Below this, a header section shows 'XpertConfig: GMSProfile' with an edit icon, 'Profile Id: 51', and 'Profile Status: Incomplete' with a home icon. A progress bar below the header has three steps: 'StageNow Config' (active), 'Review', and 'Publish'. The main content area has a blue background with a large '1' in a dark blue circle, an orange edit icon, and the text 'GmsMgr'. A green 'ADD / EDIT' button is on the right. Below this, the 'GmsMgr' section is titled with a 'SN' icon. Its description is 'Manage Google Mobile Services (GMS) configuration' with an edit icon. Under 'Create New Setting', there is a checkbox for 'Save Setting for Re-use' with a help icon. The 'GMS Feature Set:' section has a dropdown menu currently showing 'Profiled - Selected Subset of GMS Features'. The 'GMS Profile:' section has three buttons: 'Chrome Browser' (active), 'Google Maps', and 'Firebase Cloud Messaging'. A 'Continue >' button is at the bottom right.

StageNow

Settings Help About

Current IP : 192.168.0.2 | Change Password | Log out

XpertConfig: GMSProfile Profile Id: 51 Profile Status: Incomplete

StageNow Config Review Publish

1 ADD / EDIT

GmsMgr

SN GmsMgr

Description: Manage Google Mobile Services (GMS) configuration

Create New Setting

☐ Save Setting for Re-use

GMS Feature Set: ?

Profiled - Selected Subset of GMS Features

GMS Profile: ?

Chrome Browser Google Maps Firebase Cloud Messaging

Continue >

“Frequently” Asked Questions

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“Frequently Asked Questions”

- How do I transition from AOSP to Restricted GMS?
 - Devices which currently ship with a non-GMS variant of Android will continue to do so.
 - If you are upgrading your device to a platform that does not support AOSP, (for example moving from a TC51 to a TC52) then your existing line of business apps will continue to work on a Restricted GMS device.
 - Take note that some applications will not have an out of box equivalent installed by default.
 - **Note:** If you are going from GMS → Restricted GMS then existing line of business apps that depend on GMS features will no longer work. *This is the same behaviour as going from GMS → AOSP.*

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“Frequently Asked Questions”

- Does my EMM support GMS Restricted?
 - Perhaps but it depends on whether or not your EMM is designed to work with AOSP.
 - EMM(s) that do support AOSP mode have been tested in GMS Restricted mode and work. We are working with EMM(s) to fully support GMS Restricted mode with their clients.
 - Look out for more announcements on this topic soon as Zebra continue to work with our EMM partners to provide a solution for customers using GMS Restricted
- Does GMS Restricted work with Zero Touch?
 - No, Zero Touch requires the setup wizard as well as a number of other GMS components to function.
- Can I suggest a new Profile?
 - Zebra have selected the 3 available profiles (Chrome, Maps, FCM) based on customer requests. Certainly more will be added in time if there is demand.

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“Frequently Asked Questions”

- Can I use the Play Store?
 - No, the Google Play Store is a GMS application and no profile has been exposed to enable the Play Store.
- Will xxx application be affected?
 - If the application depends on GMS services or makes use of other GMS applications (e.g. sending a geo:// Intent expecting it to be resolved by Google Maps) then yes, it will be affected.
 - Later in this deck there are slides on developing applications to work in GMS Restricted Mode
 - For 3rd party sideloaded applications, it is not possible to say conclusively if they would be affected by GMS Restricted or not

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“Frequently Asked Questions”

- Are applications uninstalled?
 - No, applications are disabled and cannot be re-enabled whilst GMS Restricted mode is in effect but they still remain on the device. To clarify, even MX features such as the App Manager’s EnableApplication feature will not re-enable a GMS application when the device is in GMS Restricted mode.
- Is the application WebView affected?
 - No, applications making use of the WebView component will continue to function without issue

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“Frequently Asked Questions”

- How does this relate to the previous “DisableGMSApps” feature of MX App Manager?
 - DisableGMSApps is a momentary, stateless setting applied to the device which is not guaranteed across an OS update and can be conceptualized as:

```
for each (application) on device
    if(isGMS_App())
        disable();
```
 - GMS Restricted in contrast is a fully managed mode which cannot be escaped or bypassed and will work across an OS update
- Should I use GMS Manager or App Manager’s “DisableGMSApps”?
 - If supported, you should use GMS Manager in preference to App Manager

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“Frequently Asked Questions”

- Why does GMS Restricted only support SDM-660 based products?
 - All our non-SD660 devices have non-GMS SKUs available and GMS Restricted was therefore not necessary for those devices.
- How do I just enable location on a GMS Restricted device?
 - Location is only available as part of the Maps profile and is set to the highest location accuracy available on the device, which cannot be changed when the profile is in effect.
- Can I get a list of these GMS applications?
 - Zebra do not publish a list of GMS packages disabled as part of GMS Restricted since it will vary from Android version to Android version and will quickly become out of date.

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“Frequently Asked Questions”

- How do you define what a GMS application is?
 - A GMS application which will be disabled is defined as:
 - Published / signed by Google
 - The device will boot when this package is disabled
 - Some packages are mandatory to boot the device and therefore cannot be disabled.
 - These mandatory packages do not communicate with Google servers and Zebra continue to monitor this scenario.
- Does GMS Restricted block communication with Google at the network layer?
 - No, GMS Restricted prevents GMS packages from communicating with Google by disabling the applications.
 - If you re-enable applications via a Profile then enabled apps will be able to communicate with Google servers to provide their value (e.g. Maps or FCM).
 - To show this principle, I could still load Firefox on a device and navigate to www.google.co.uk

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A note about persistence

- GMS Restricted, as applied through the GMS Manager will behave in the following ways:

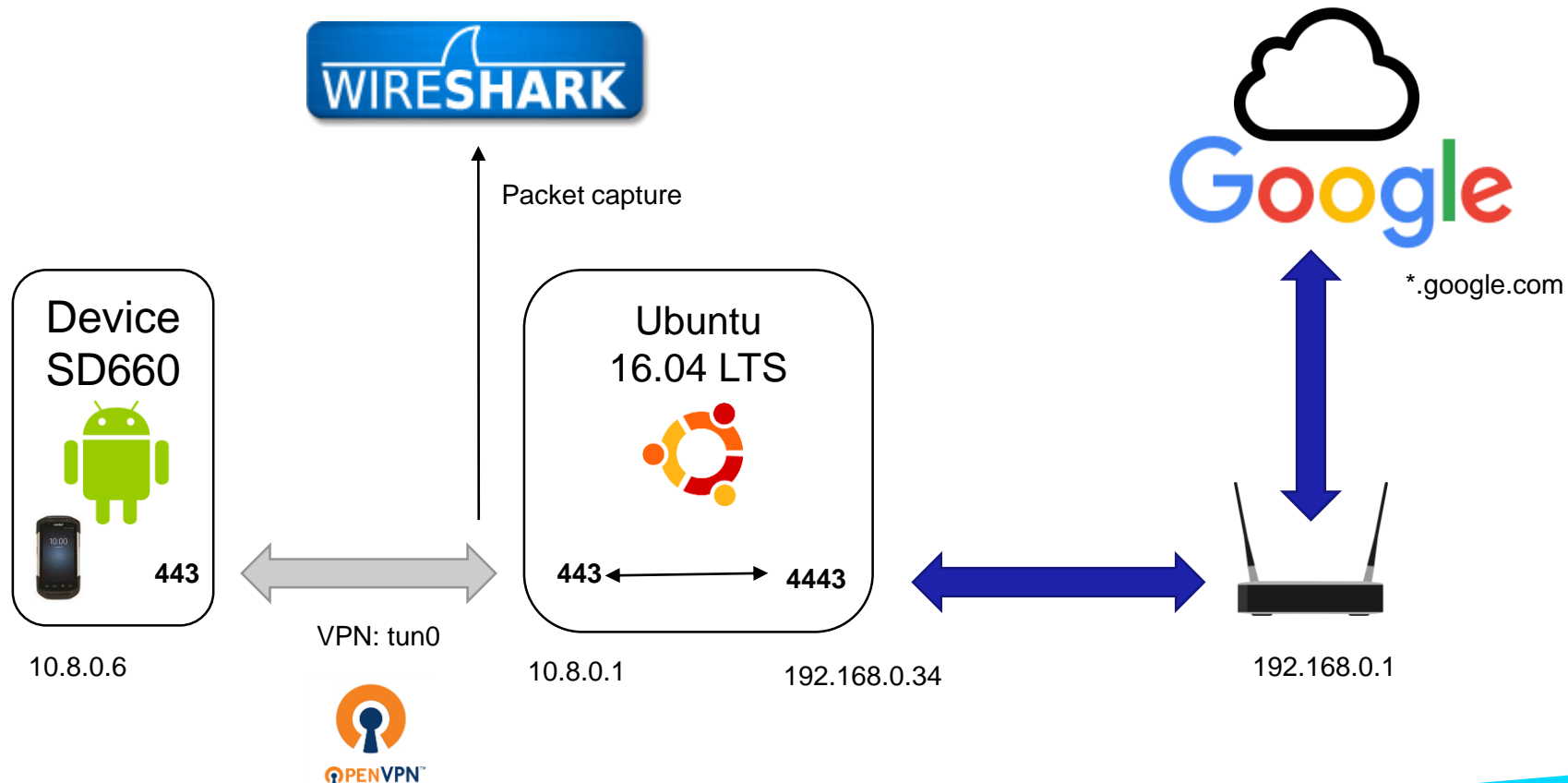
Reboot / Reset type	Behaviour of GMS Restricted
Device reboot	The device will remain in a Restricted state following a reboot.
Operating System Update	The device will remain in a Restricted state following an OS update. Any new GMS applications present in the new OS will be disabled automatically. Any change in dependencies of the GMS applications will be handled automatically
Enterprise Reset	It is necessary to use the Persistence Manager to persist GMS Restricted across an Enterprise Reset. You MUST specify to bypass the SUW as part of the call to Enterprise Reset.
Factory Reset	The device will leave the Restricted state following a factory reset

Note: Transitioning from AppManager’s DisableGMSApps will require a 2 step process

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Testing what data is leaving the device

To verify that no data is leaving a GMS Restricted device destined for Google servers, Zebra has employed the following setup which can be duplicated by any customer or developer:



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Developer Impact

- Applications with the following dependencies **WILL** be affected:
 - Dependencies on other **GMS Applications** such as launching Maps or the browser to show a location
 - Dependencies on **Google Play Services**
 - i.e. anything that requires the [GoogleApiClient](#)
 - For example: location, awareness, ads, safetynet, Firebase Cloud Messaging, places.
- What action should I take (1/3)?
 - In some instances, a GMS Restricted Profile may help, e.g. Maps if your app gives directions.
 - Install a 3rd party application as the default handler

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Developer Impact

- What action should I take (2/3)?

- Ensure that any intents will resolve before calling startActivity:

```
Uri mapUri = Uri.parse("geo:0,0?q=London");
Intent mapIntent = new Intent(Intent.ACTION_VIEW, mapUri);
final PackageManager pm = getPackageManager();
if (mapIntent.resolveActivity(pm) != null)
    startActivity(mapIntent);
else
    Toast.makeText(getApplicationContext(), "No application to handle Map intent",
    Toast.LENGTH_LONG).show();
```

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Developer Impact

- What action should I take (3/3)?

- Check whether the GoogleApiClient ever connects:

@Override

```
public void onConnected(@Nullable Bundle bundle) {  
    setGmsServicesAvailable("Yes");  
    // Since we have GMS Services available we can run the Location Services test  
    CheckLocationServices();  
}
```

- Full code in context at <https://github.com/darryncampbell/GoogleServicesCheck>

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Resources

- GMS Manager Techdocs page: <http://techdocs.zebra.com/mx/gmsmgr/>
- GMS Manager StageNow page: <http://techdocs.zebra.com/stagenow/latest/csp/gmsmgr/>
- App Manager Techdocs page: <http://techdocs.zebra.com/mx/appmgr/>
- (unofficial) Sample application to detect the presence of Google apps and services: <https://github.com/darryncampbell/GoogleServicesCheck>
- (unofficial) Methodology for detecting what traffic is leaving the device: <http://www.darryncampbell.co.uk/2017/12/29/android-traffic-analysis-to-google-servers-methodology/>

Coming soon...

- Developer portal post on Restricted GMS
- Detailed user guide on the feature on our TechDocs site

Questions?

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<http://developer.zebra.com>

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BACKUP



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