AMERICAS APPFORUM 2019 | ELEVATING ENTERPRISE INTELLIGENCE

ZEBRA CAPTURE YOUR EDGE

Advanced features of DataWedge for Barcode Scanning and beyond

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Advanced Features of DataWedge for Barcode Scanning

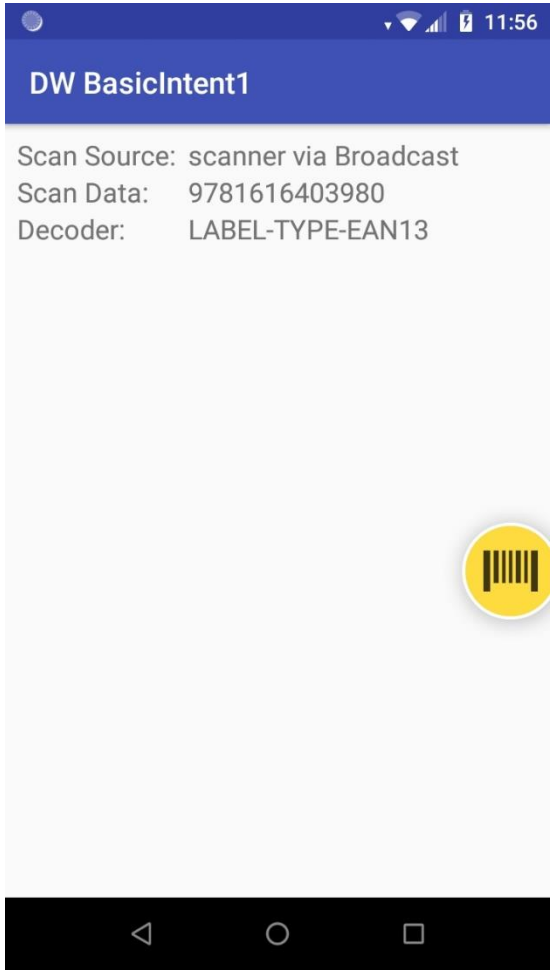
Agenda

- DataCapture Plus
- Voice Input plugin
- Advanced data formatting (ADF)
- Multi-barcode
- Multiple applications sharing a scanner / BT scanner
- IP based capture
- Other small enhancements

Advanced Features of DataWedge for Barcode Scanning

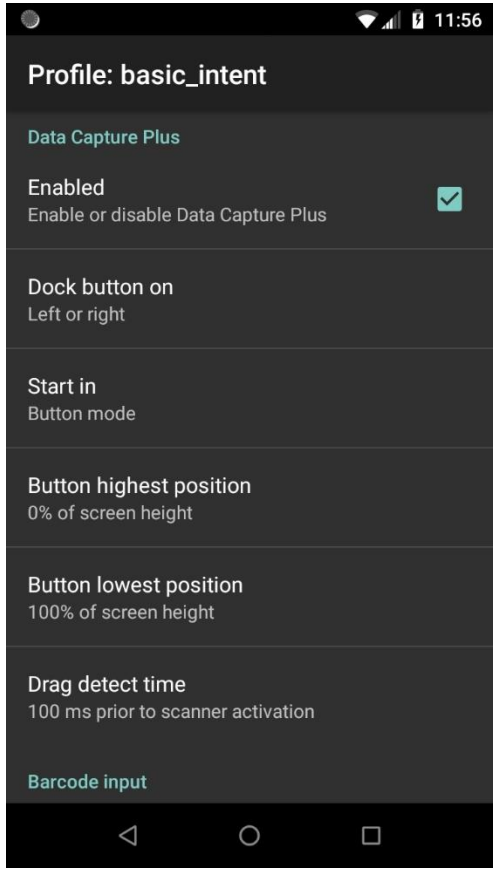
DataCapture Plus

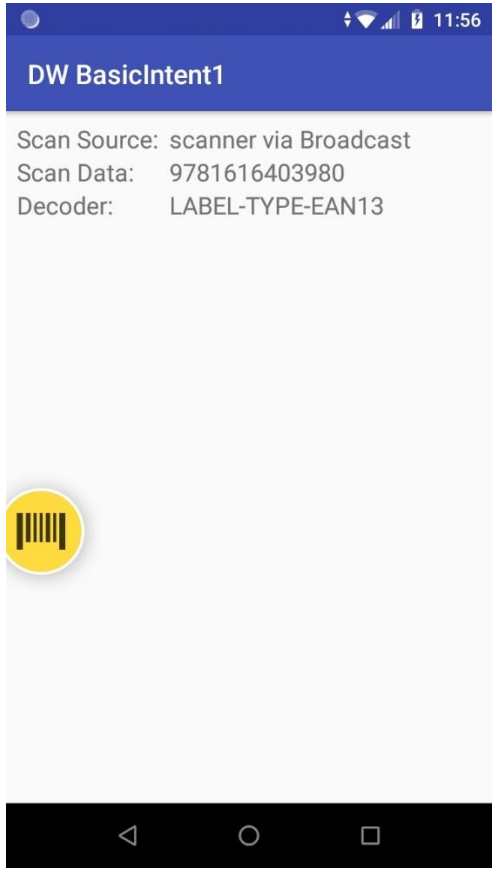
- Dedicate part of the screen to be a capture area
  - Show as a button on the left or right
  - Show as a full screen overlay
- User can control the button position – great for accessibility
- Augments & has the same effect as the hardware scan key
- Configurable through the DataWedge Intent API (Set / Get Config)
- More information available from TechDocs

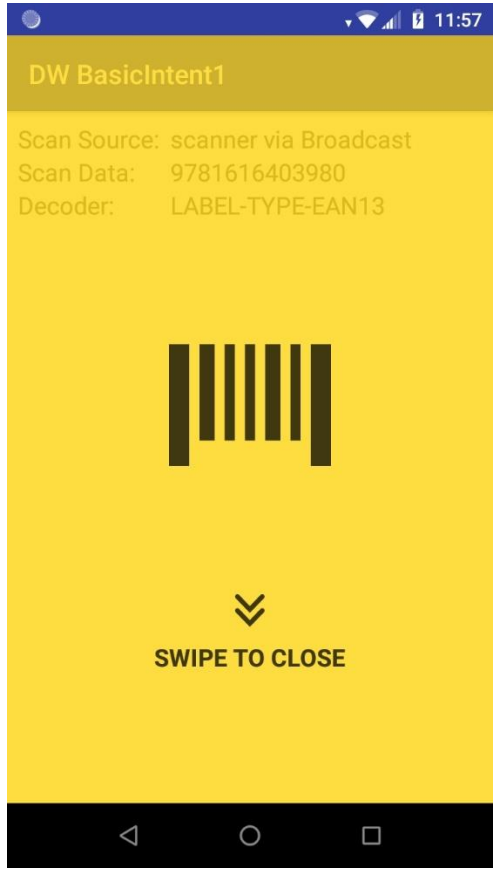


Advanced Features of DataWedge for Barcode Scanning

DataCapture Plus – Modes of operation







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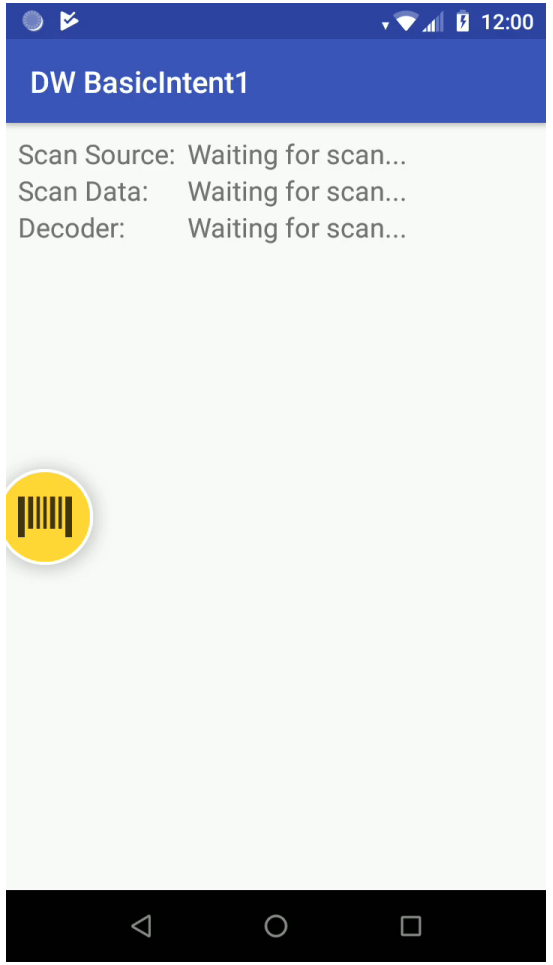
DataCapture Plus – Demo

- Demo showing the different modes of the Data Capture Plus panel
- Application source: BasicIntent1 from GitHub



Advanced Features of DataWedge for Barcode Scanning

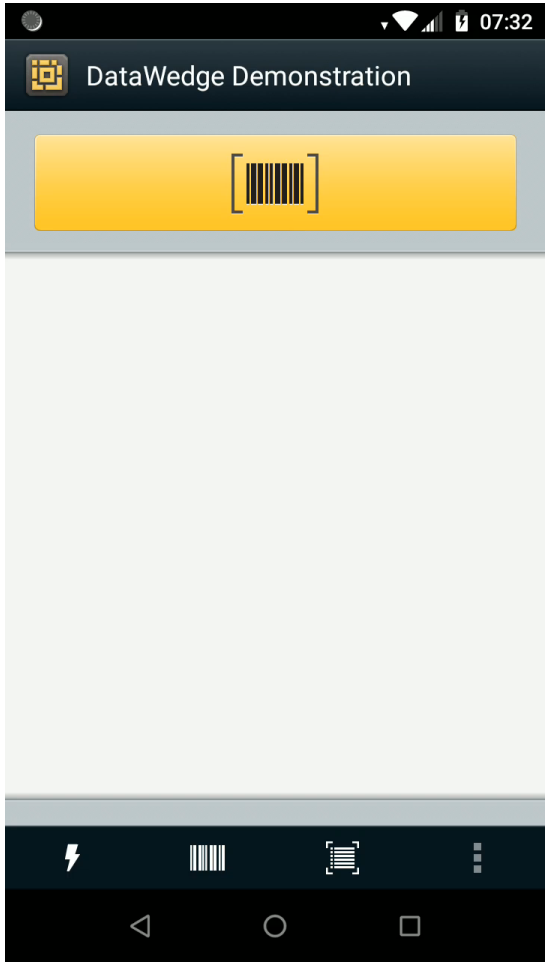
Feedback: Decode Screen Notification

- Receive feedback across the whole screen when a scan occurs
- Avoids having to provide feedback within your application
- Barcode Input settings → Configure scanner settings → Scan params → Decode Screen Notification
- Works with both hardware and soft triggers

Advanced Features of DataWedge for Barcode Scanning

Feedback: Decode Screen Notification - Demo

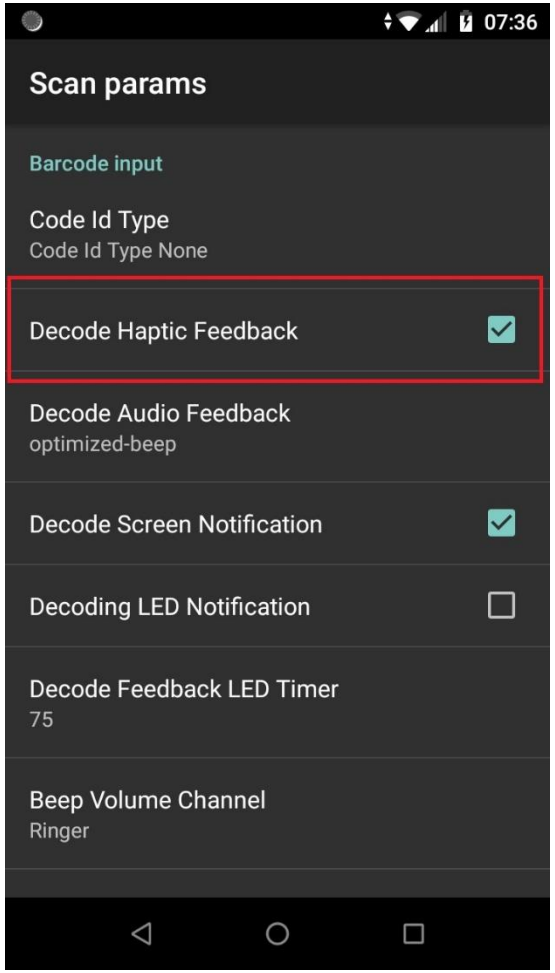
- Demo showing decode screen notification
- Using the DataWedge Demo app



Advanced Features of DataWedge for Barcode Scanning

Feedback: Haptic feedback

- Vibrate the device when a scan occurs
- Avoids having to provide feedback within your application
- Barcode Input settings → Configure scanner settings → Scan params → Decode Haptic Feedback



Advanced Features of DataWedge for Barcode Scanning

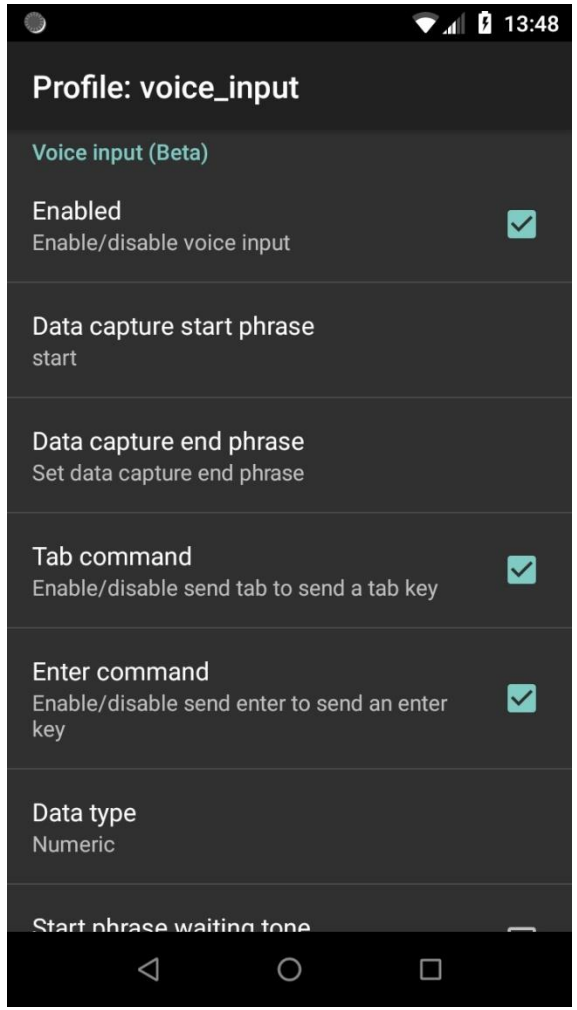
Voice Input Plugin - Overview

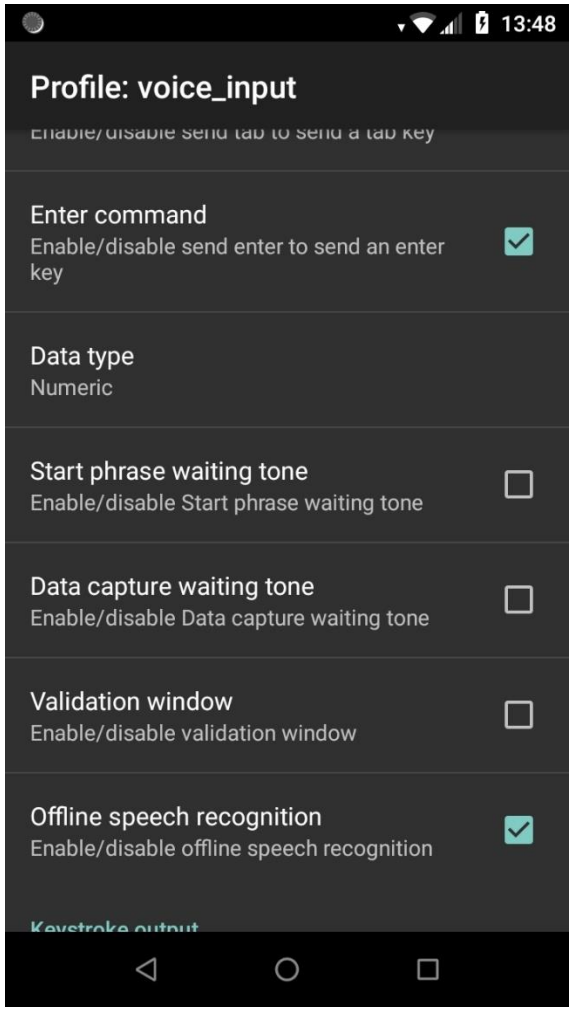
- New method of input to DataWedge - Voice
  1. Profile becomes active – DataWedge waits for the ‘start’ phrase
  2. User speaks the ‘start’ phrase followed by the data they want to enter
  3. User speaks the ‘end’ phrase (if defined)
  4. Data is captured and displayed depending on DataWedge output configuration
  5. DataWedge continues to wait for the ‘start’ phrase
- DevTalk on this topic took place in November 2018
- More information available in the Voice Input guide on TechDocs
- Programmatic interface is available through DataWedge Intents (SET / GET Config)
- Depends on GMS voice recognition, standard on Android GMS builds
  - Will not work with GMS Restricted

Advanced Features of DataWedge for Barcode Scanning

Voice Input Plugin – DataWedge options

- DataWedge profile options:
  - Define a start and optional end phrase
  - Listen for “Send Tab” and “Send Enter” special commands
  - Specify the data type (alphanumeric or numeric)
  - Enable waiting tone user feedback
  - Enable offline speech recognition





Advanced Features of DataWedge for Barcode Scanning

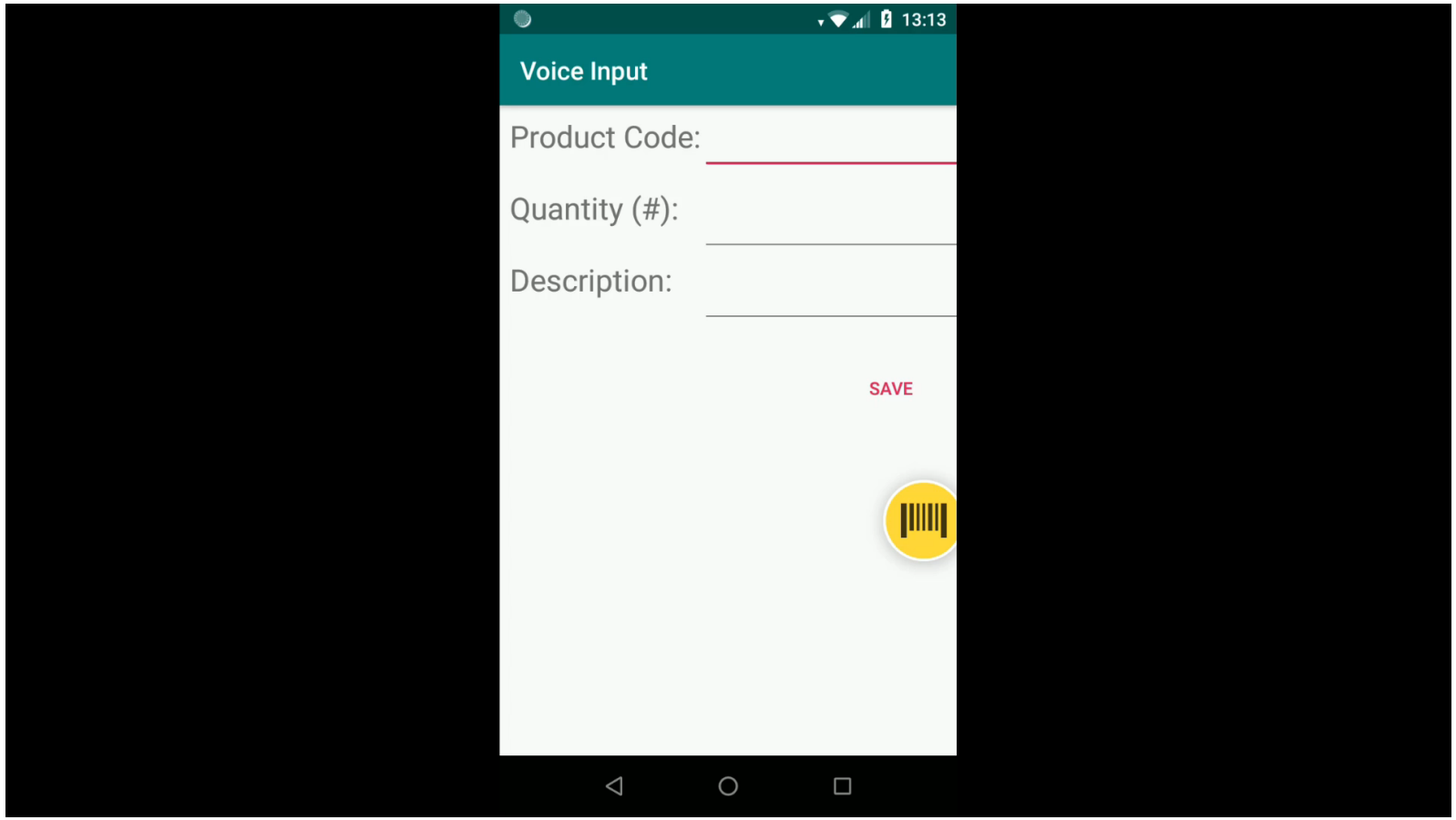
Voice Input Plugin – Demo app

- I have created an application to show how you might use Voice Input
  - Available from Github
  - Depends on an associated DW profile (also in Github)
- Combines scanning and voice input into a “product catalogue creator”
- Uses the Scanner and voice input plugins to gather data
- Uses the Keyboard output plugin to output data
- Uses the DataWedge API to switch profile parameters depending on the textbox in focus
  - Product Code does not listen for voice input
  - Quantity is numeric only
  - Description is alpha numeric
  - “Save” listens for the user saying “Send Enter”

Advanced Features of DataWedge for Barcode Scanning

Voice Input Plugin – Demo app

- Demo with annotations (please forgive the amateurish compositing, I am not a YouTube blogger)



Advanced Features of DataWedge for Barcode Scanning

Voice Input Plugin – Demo app

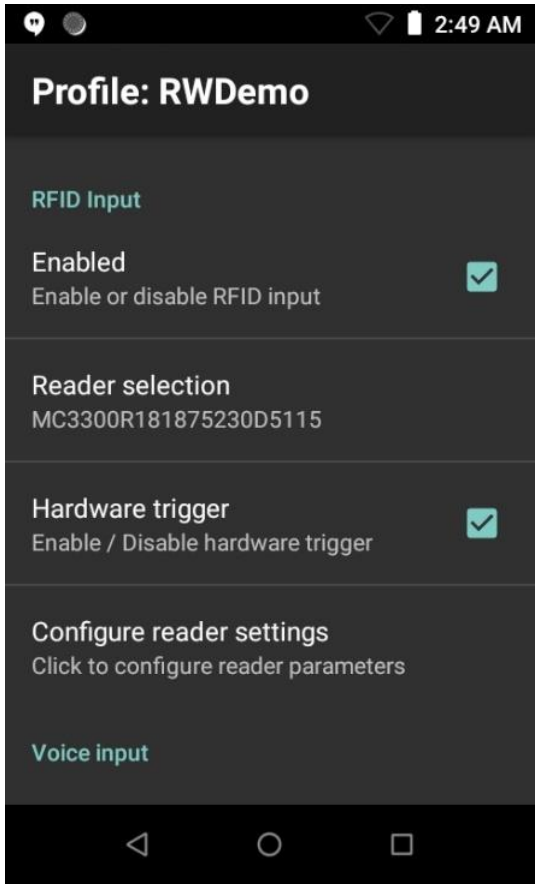
Excerpt showing voice configuration via DataWedge Intent API:

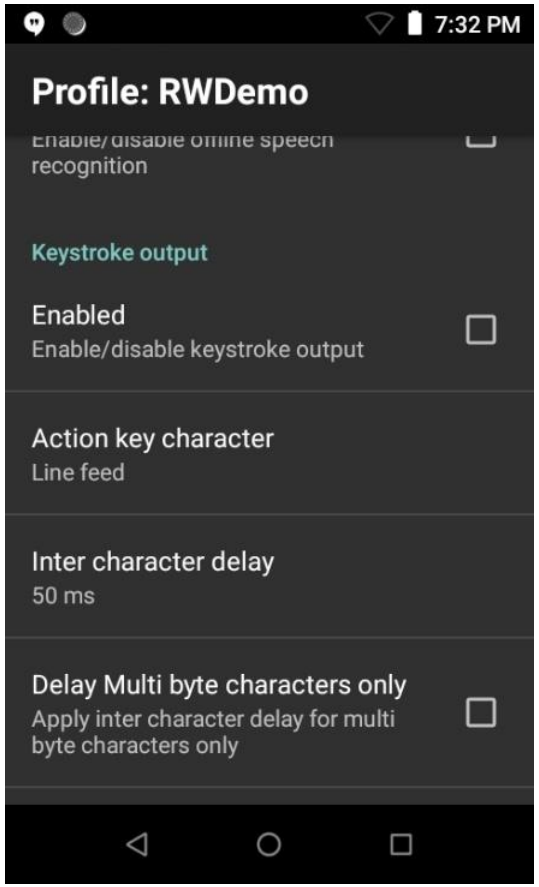
```
Bundle voiceConfig = new Bundle();
voiceConfig.putString("PLUGIN_NAME", "VOICE");
voiceConfig.putString("RESET_CONFIG", "false");
Bundle voiceProps = new Bundle();
if (bVoiceInput)
    voiceProps.putString("voice_input_enabled", "true");
else
    voiceProps.putString("voice_input_enabled", "false");
if (bVoiceNumericOnly)
    voiceProps.putString("voice_data_type", "2");
else
    voiceProps.putString("voice_data_type", "0");
voiceConfig.putBundle("PARAM_LIST", voiceProps);
profileConfig.putBundle("PLUGIN_CONFIG", voiceConfig);
sendDataWedgeIntentWithExtra(ACTION_DATAWEDGE_FROM_6_2,
EXTRA_SET_CONFIG, profileConfig);
```

Advanced Features of DataWedge for Barcode Scanning

RFID Input

- Supported in DataWedge 7.3: RFID Input Plugin
  - MC3300R Only
  - Device contains RWDemo app
    - Creates profiles on first launch
  - Can be configured with DataWedge API

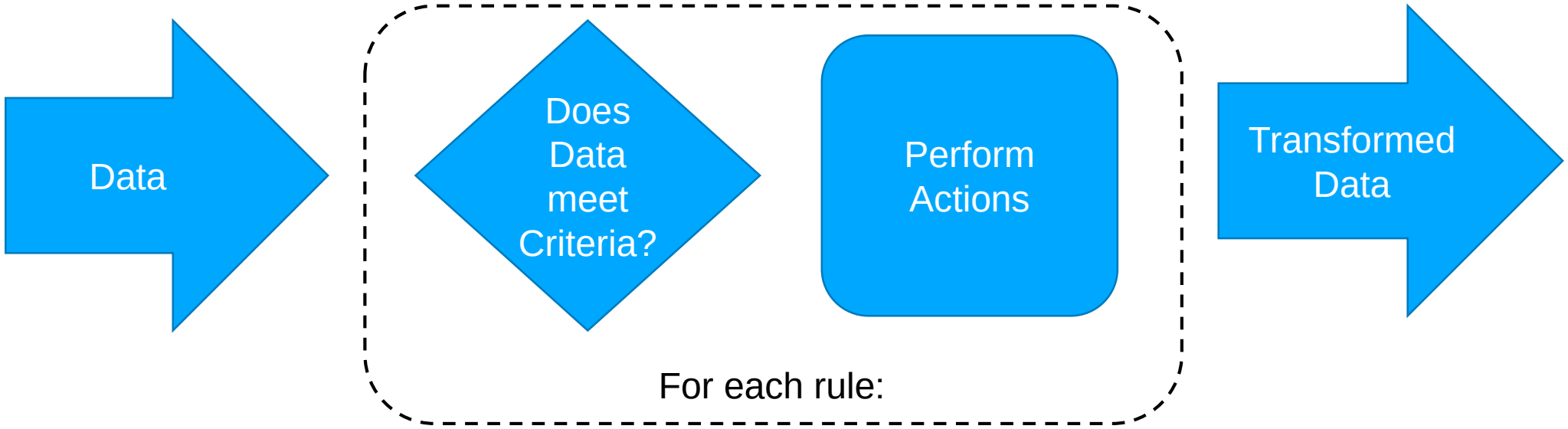




Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting – Overview

- Manipulate acquired data based on its contents and / or custom rules configured to trigger (or prevent) actions based on specific criteria
- For more information see the TechDocs guide.
- Applicable to all output plugins



Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting - Criteria

- The data must meet any of the following criteria, if defined:

Criteria	Description
String to check for	The input data must contain the specified character or string. Leave blank to match any input
String position	The ‘String to check for’ must occur at this position in the string
String length	Optional. The captured data string must be this many characters long
Source criteria	Specific criteria related to the input plugin from which the data was captured, e.g. Barcode input, only EAN13 symbology

- If you do not specify any criteria then all captured data will be passed to the next step, perform actions

Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting – Actions (Cursor movement)

- A conceptual cursor operates on the captured data and can be manipulated by actions:

Action	Description
Skip ahead	Move the cursor forward by the specified number of characters
Skip back	Move the cursor back by the specified number of characters
Skip to start	Moves the cursor to the beginning of the data
Move to	Moves the cursor forward until the specified string is found
Move past	Moves the cursor forward past the specified string

- Actions are executed contiguously

Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting – Actions (Sending data)

- Data can be added to the transformed output using the following actions which act from the conceptual cursor position:

Action	Description
Send next	Sends the specified number of characters from the current cursor position (default=0)
Send remaining	Sends all the data that remains from the current cursor position
Send up to	Sends all data up to the specified string
Send pause	Pauses the specified number of milliseconds before executing the next action
Send string	Sends the specified string
Send char	Sends the specified ASCII/Unicode character

Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting – Actions (Data modification)

- The input data can be modified with the following actions before being transformed:

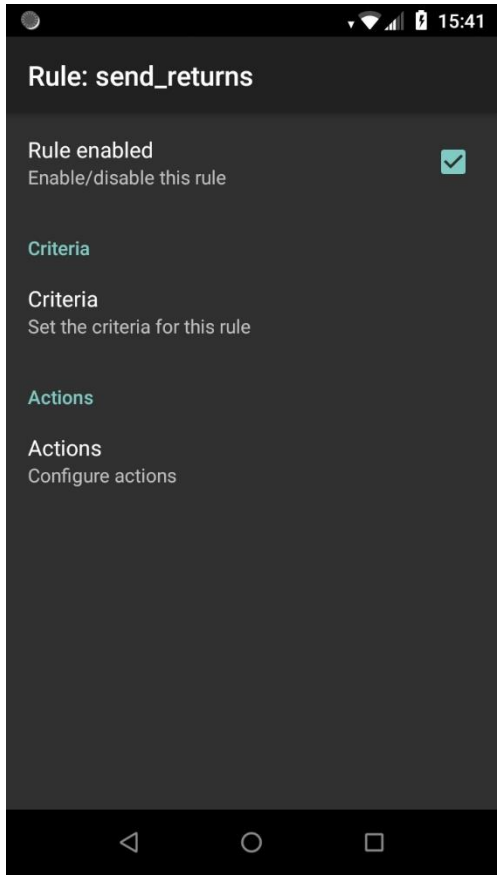
Action	Description
Crunch spaces	Trims space from strings and reduces inter string whitespace to 1 char
Remove all spaces	Remove all spaces in the data
Remove leading zeros	Remove all zeros at the beginning of data
Pad with zeros	Left-pad data with the specified number of zeros
Replace string	Replaces a specified string with a new specified string.
Remove characters	Remove characters from the transformed string (i.e. when ‘sending data’ actions are performed). You can configure where the characters are removed from

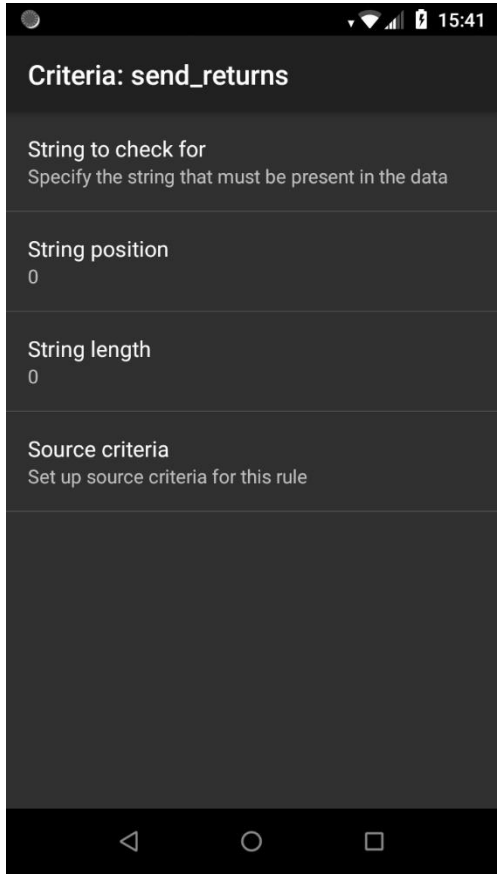
- All the above actions have corresponding ‘Stop’ versions so you can apply them to only part of the input string.

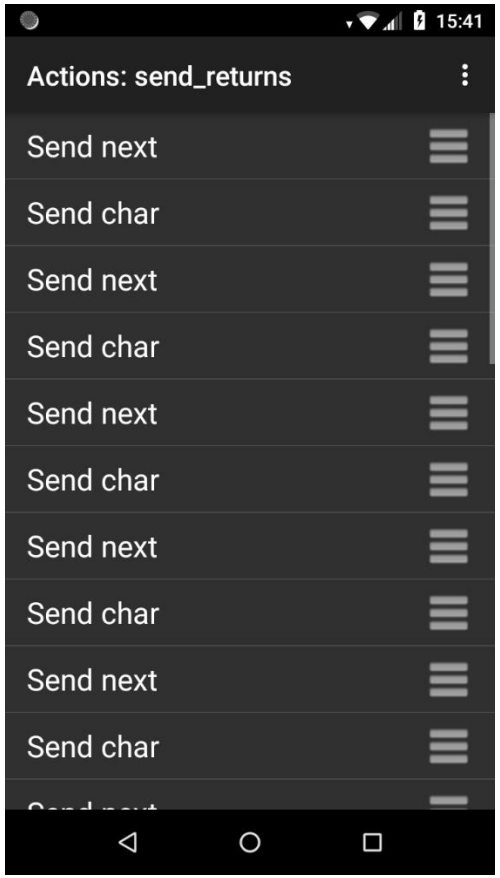
Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting – Actions (Example)

- Send a carriage return after each character in the string



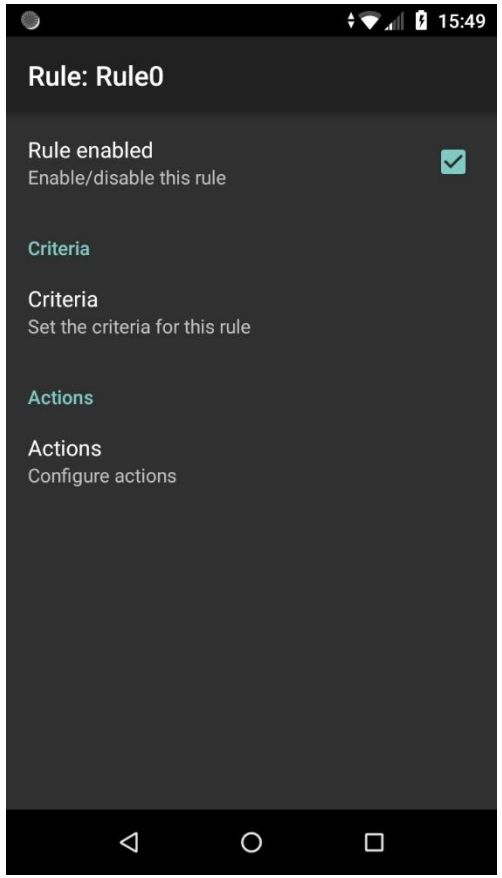


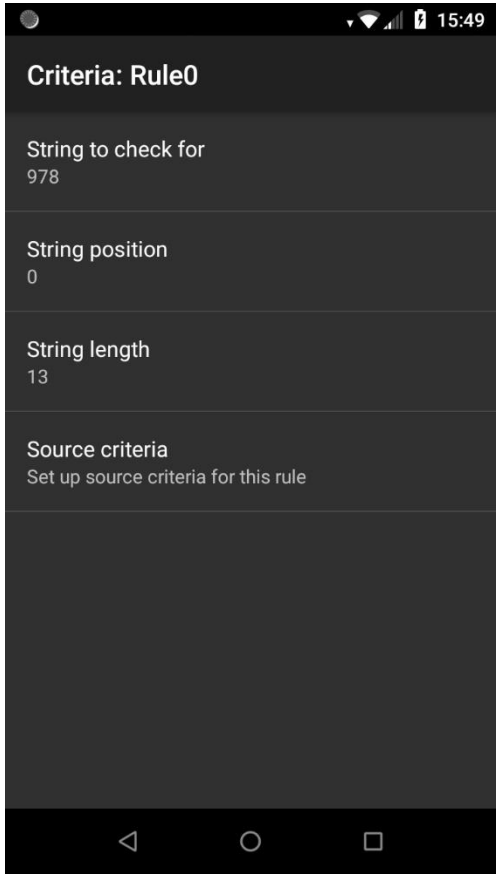


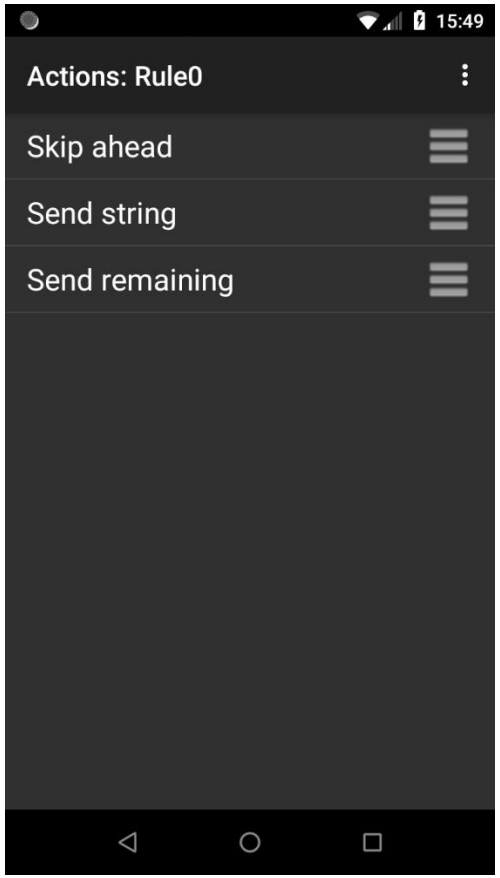
Advanced Features of DataWedge for Barcode Scanning

Advanced Data Formatting – Actions (Example)

- Barcode that starts with 978 and is 13 characters long. Replace first 3 characters with ‘123’







Advanced Features of DataWedge for Barcode Scanning

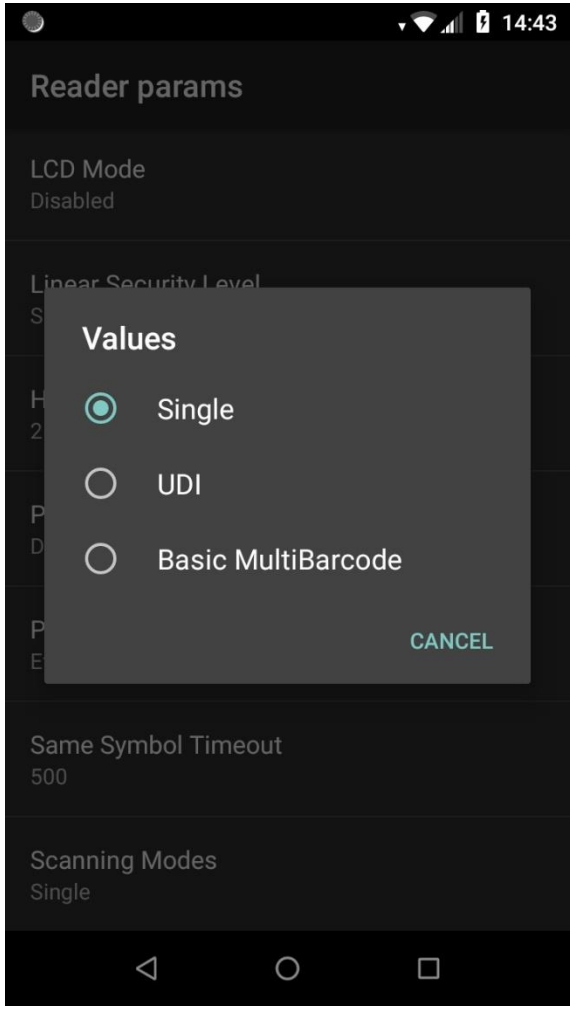
Multi-Barcode - Overview

- Capture multiple barcodes simultaneously
- Part of the underlying scan framework (Barcode input plugin).
  - Do not confuse with SimulScan which is a separate input plugin – this is a completely free feature
- Capture from 2 to 10 barcodes with one trigger pull
- Output the captured barcodes via Intent, Keystroke or IP (or any combination thereof)
  - You can define the data separator for Keystroke & IP
- Not variable – Must specify how many barcodes are being captured
  - I.e. “3 barcodes” not “Up to 3 barcodes”
  - If presented with more than the maximum number of barcodes, the scanner will decode only as many as requested. I.e. show that same scanner 4 barcodes and 3 will be read.
- Will not scan duplicate barcodes
- Multiple symbologies can be decoded together

Advanced Features of DataWedge for Barcode Scanning

Multi-Barcode – How to enable (1/3)

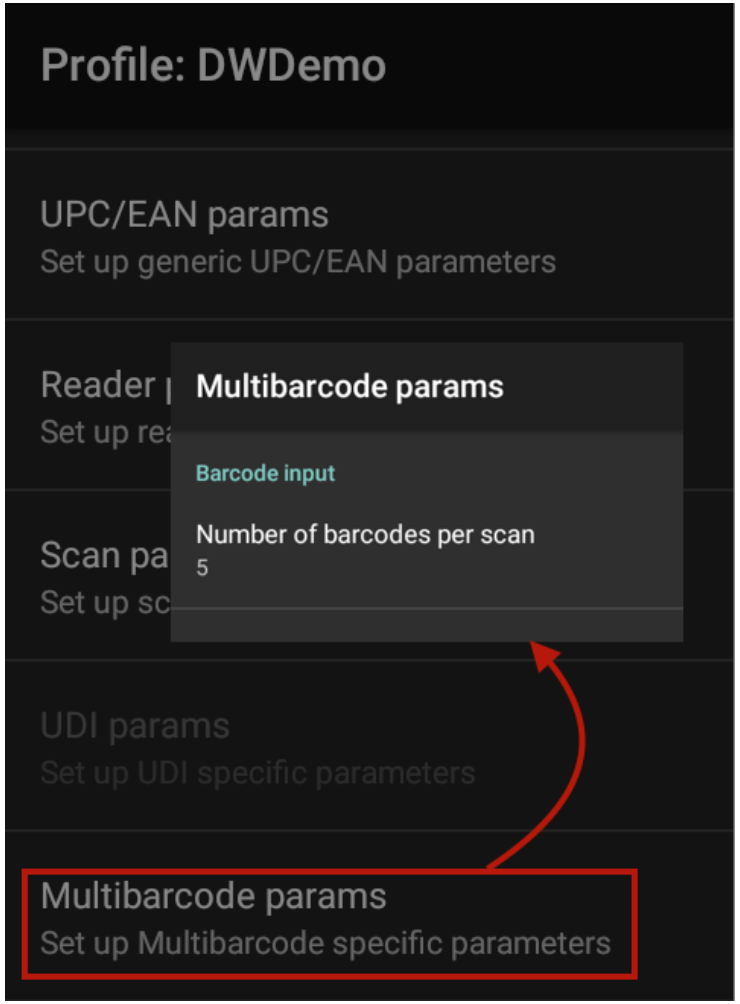
- Specify MultiBarcode scanning mode
  - Barcode input → Configure scanner settings → Reader params → Scanning Modes → **Basic MultiBarcode**



Advanced Features of DataWedge for Barcode Scanning

Multi-Barcode – How to enable (2/3)

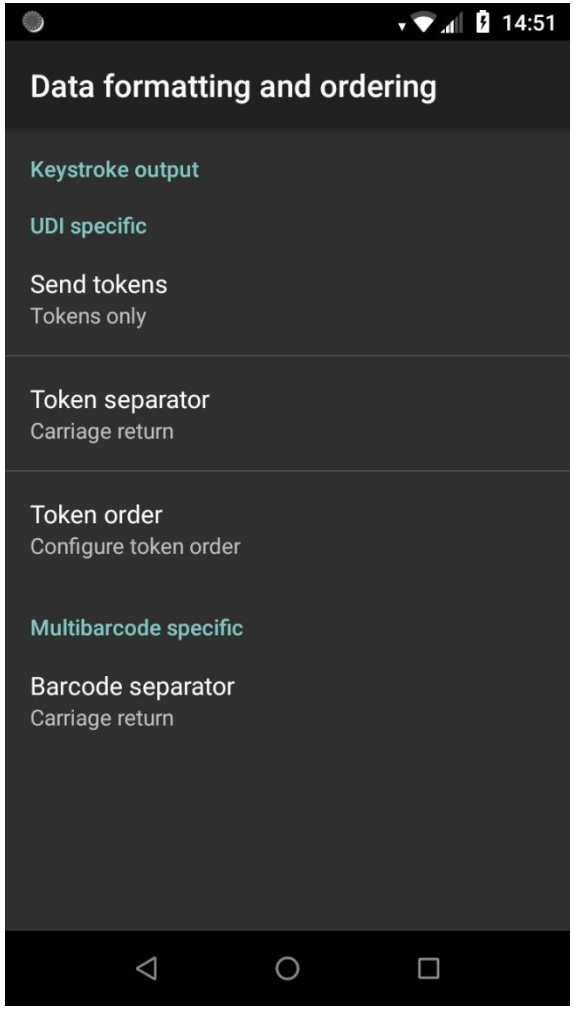
- Specify the number of barcodes to scan
  - Barcode input → Configure scanner settings → MultiBarcode params → Number of barcodes per scan



Advanced Features of DataWedge for Barcode Scanning

Multi-Barcode – How to enable (3/3)

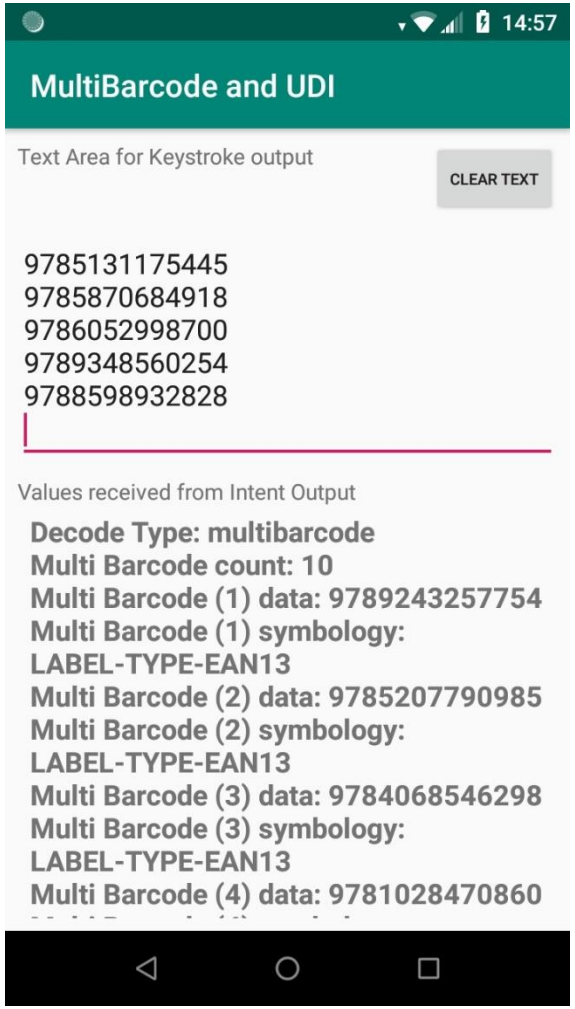
- Configure the Keystroke & IP output settings (if applicable)
  - Keytroke output → Data formatting and ordering → MultiBarcode specific → Barcode Separator



Advanced Features of DataWedge for Barcode Scanning

Multi-Barcode – Demo

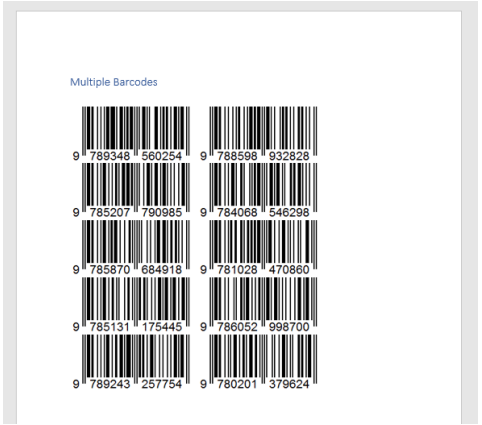
- I have created an application to demonstrate Multi Barcode
  - Available from Github
  - Depends on an associated DW profile (Also in Github)
    - You will need to manually adjust the Scanning Mode to be Multi Barcode
    - Profile will look for 5 barcodes by default. The screenshot (right) shows this value adjusted to 10
  - Top half shows the output from the Keystroke plugin
  - Bottom half shows the output from the Intent plugin

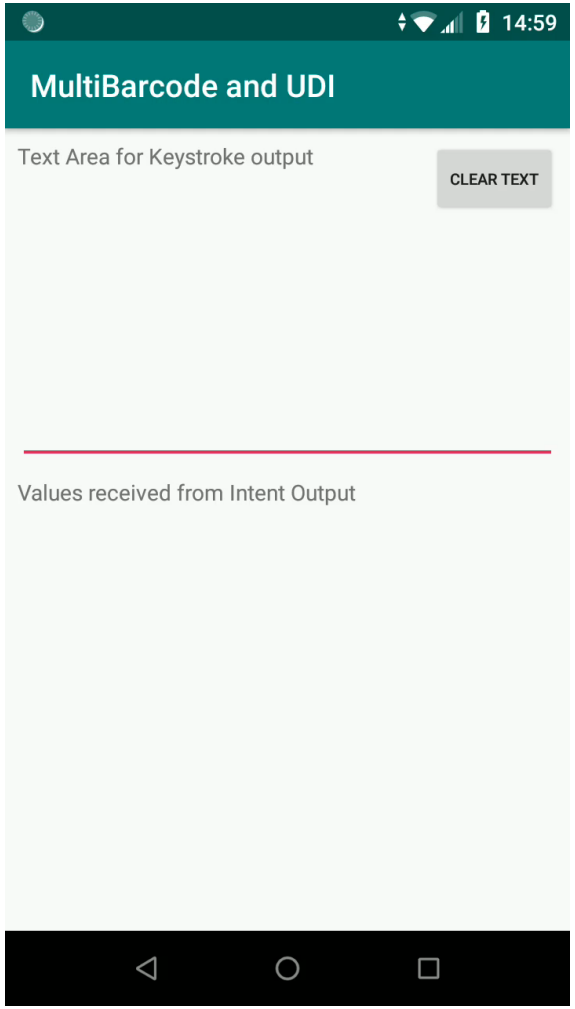


Advanced Features of DataWedge for Barcode Scanning

Multi-Barcode – Demo

- Demo
  - Scanning 10 barcodes with the camera scanner
    - Imager would also work but the camera looks better in a video
  - Running on TC57 (note: TC20/25 supports imager only)
  - Keystroke plugin separator is ‘Carriage Return’
  - Notice how the Intent plugin returns the symbology of the scanned barcode also (they do not all have to be the same)
  - Order of returned barcodes is “Random”

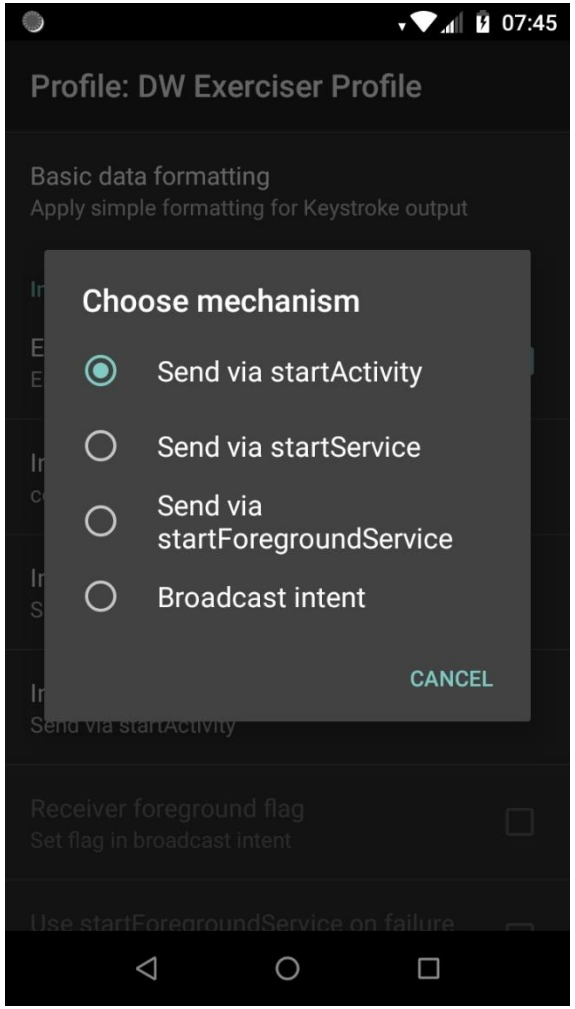




Advanced Features of DataWedge for Barcode Scanning

Intent Plugin Delivery Options

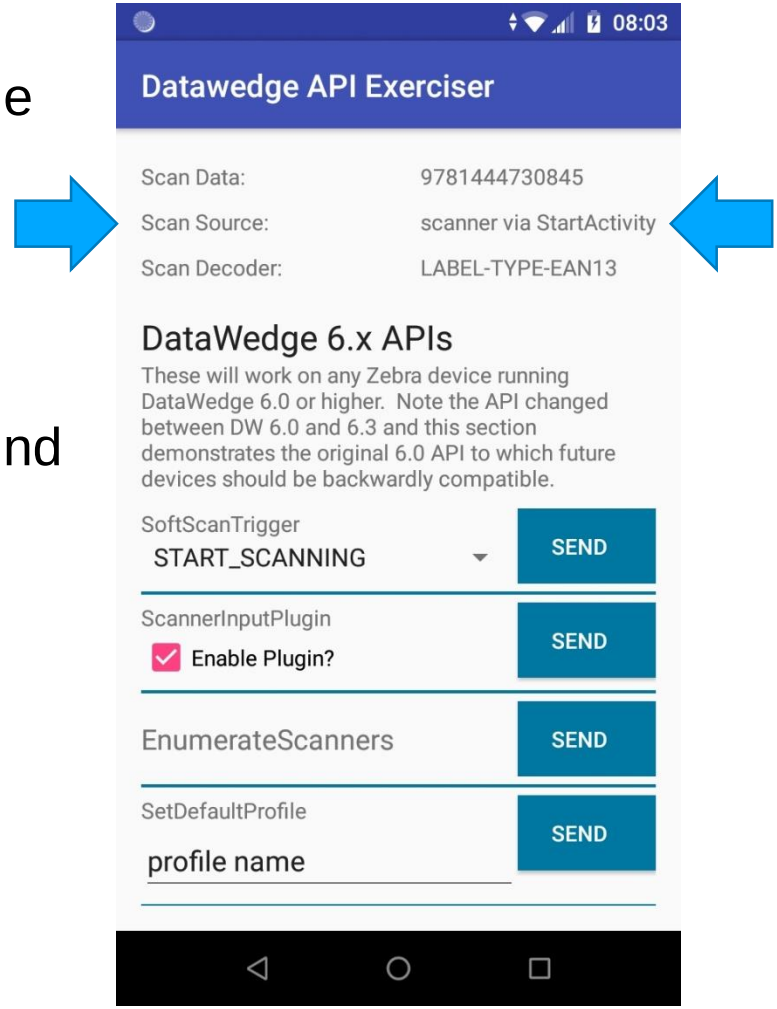
- The Intent plugin supports delivery via:
  - Start Activity
    - Maps to Context.StartActivity
  - Start Service (requires app to be in Foreground)
    - Maps to Context.StartService
  - Broadcast Intent
    - Maps to Context.SendBroadcast
  - Start Foreground Service
    - Maps to Context.StartForegroundService



Advanced Features of DataWedge for Barcode Scanning

Intent Plugin Delivery Options: Demo

- You can see the following intent delivery mechanisms in action with the DataWedge API Exericser:
  - Start Activity
  - Start Service
  - Send Broadcast
- The DataWedge API Exerciser is NOT compatible with Start Foreground Service
  - The receiving service does not call StartForeground so Android throws an error.
  - Not a bug, just a design choice ☺
- Link: https://github.com/Zebra/samples-datawedge/tree/master/DataWedge-API-Exerciser



Advanced Features of DataWedge for Barcode Scanning

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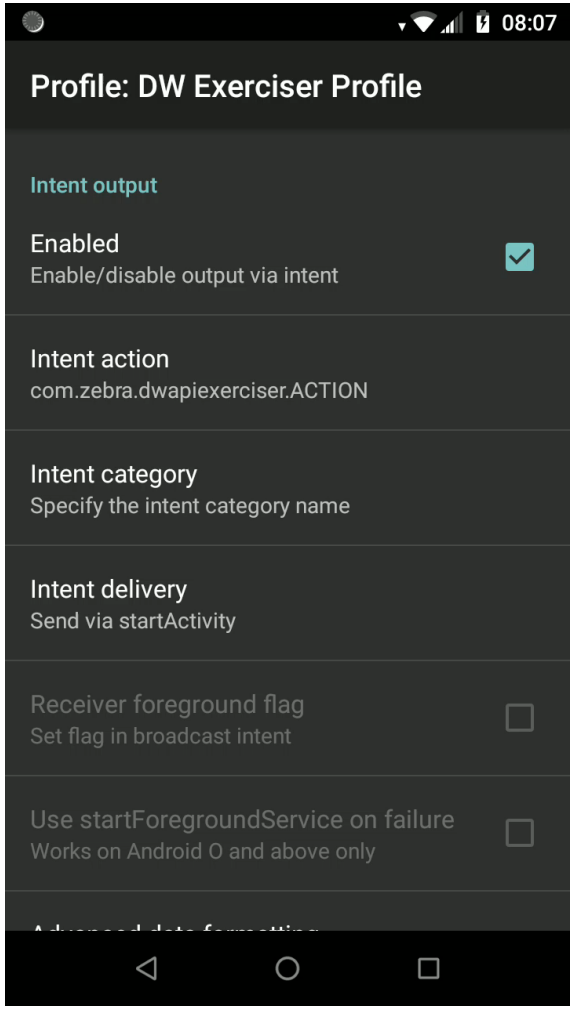
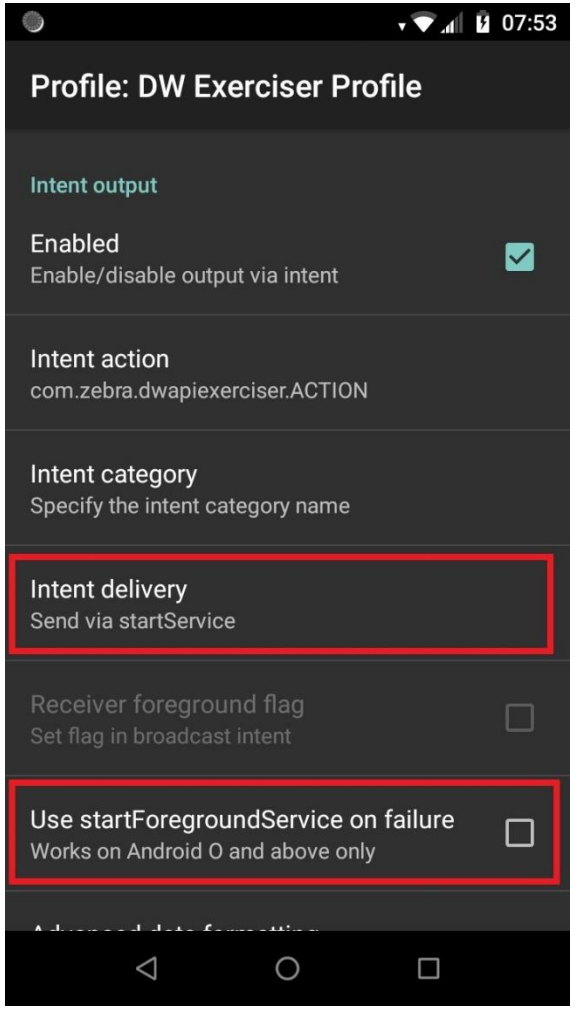


Advanced Features of DataWedge for Barcode Scanning

Intent Plugin Delivery Start Service / Start Foreground Service

- Android Oreo introduced a restriction on Android services:
  - Applications in the background cannot create services
  - The way background applications create foreground services was changed in Oreo, new API was added to start a foreground service.
    - The service then needs to call startForeground() to promote this service to the foreground
- DataWedge added two new features to handle this scenario:
  - Start Foreground Service
    - Maps to Context.StartForegroundService
  - Try Start Service (maps to Context.StartService) and if that fails, resort to Start Foreground Service
    - Enables backwards compatibility with applications running on Nougat devices and earlier since the Intent delivery remains as StartService.



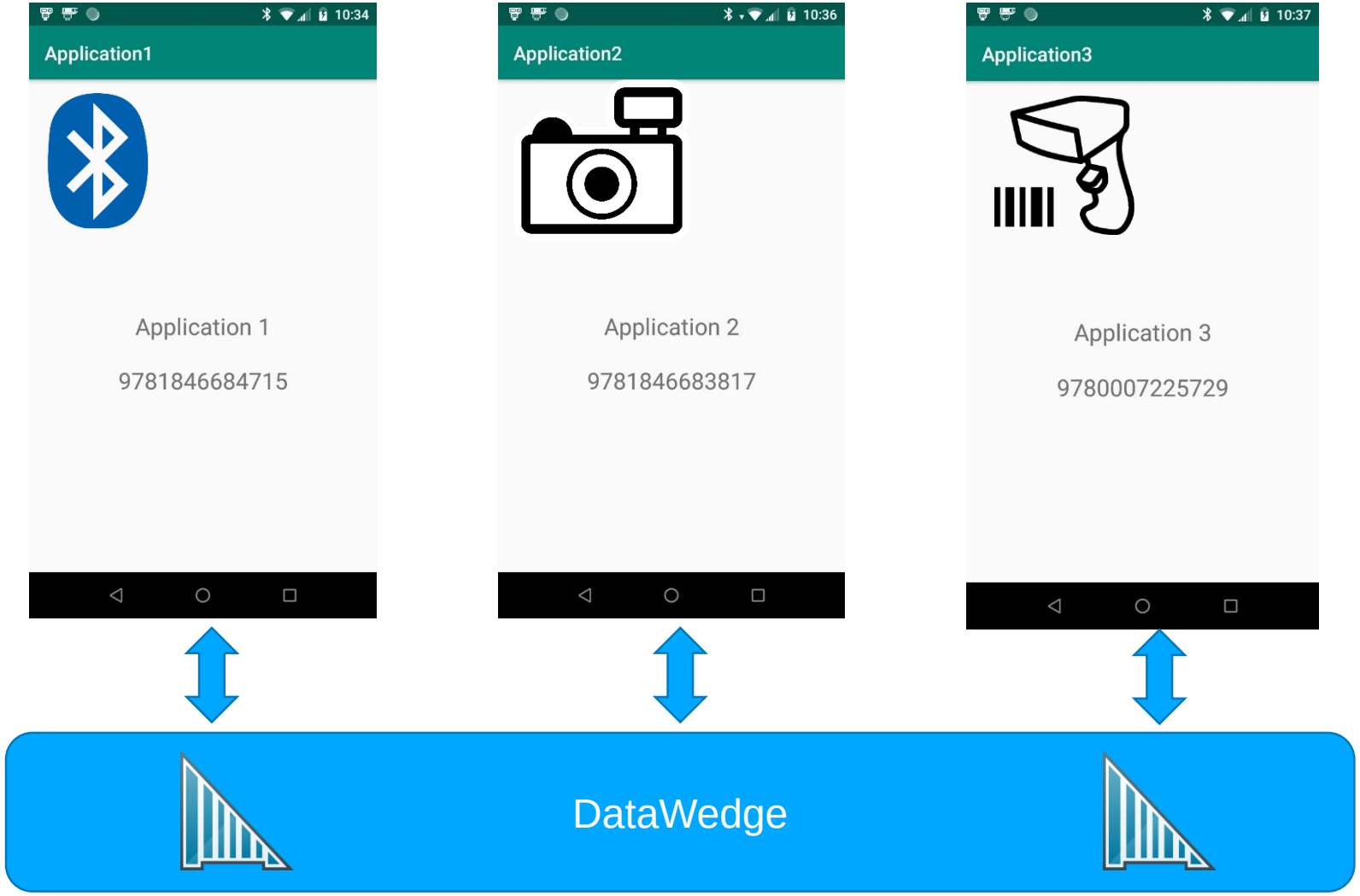
Advanced Features of DataWedge for Barcode Scanning

Multiple applications sharing the scanner: Overview

- The most common challenge for customers using the Android SDK (EMDK) is sharing the scanner between multiple applications
  - The scanner is a shared resource. With the EMDK you need to relinquish the scanner when switching to a different application that also needs to use the scanner
  - Bluetooth scanners add another level of complexity since you need to manage the scanner connection and most commonly also scan after the screen goes off.
- Honestly, the best way to handle multiple applications all using the scanner is not to use EMDK at all but to instead use DataWedge
  - You could have separate profiles for each application and DW will handover scanner control for you
  - You could use the same profile and just receive data in the foreground app (e.g. by using a dynamic broadcast receiver)

Advanced Features of DataWedge for Barcode Scanning

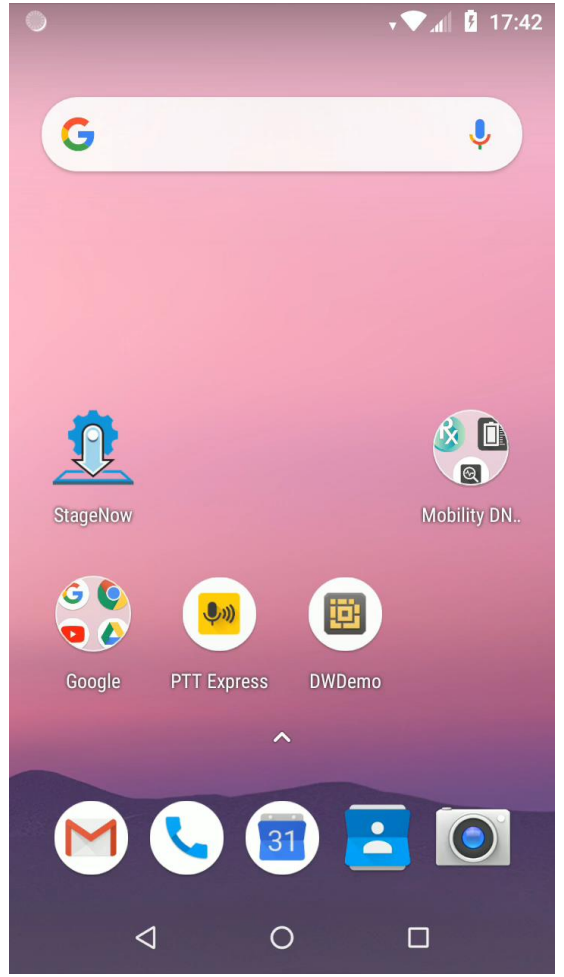
Multiple applications sharing the scanner: Overview



Advanced Features of DataWedge for Barcode Scanning

Multiple applications sharing the scanner: Demo

- Based on a recent post on the developer portal and accompanying repository on Github.
  - See that post for more information
- 3 applications, each associated with a different DataWedge profile
  - Application 1 connects to the RS6000 Bluetooth scanner
  - Application 2 is configured to use the camera scanner
  - Application 3 is configured to use the internal imager
- These applications are very simple, they just register a broadcast receiver to be notified when a scan happens.
  - All the logic of switching scanners and managing which application has the scanner is handled by DataWedge



Advanced Features of DataWedge for Barcode Scanning

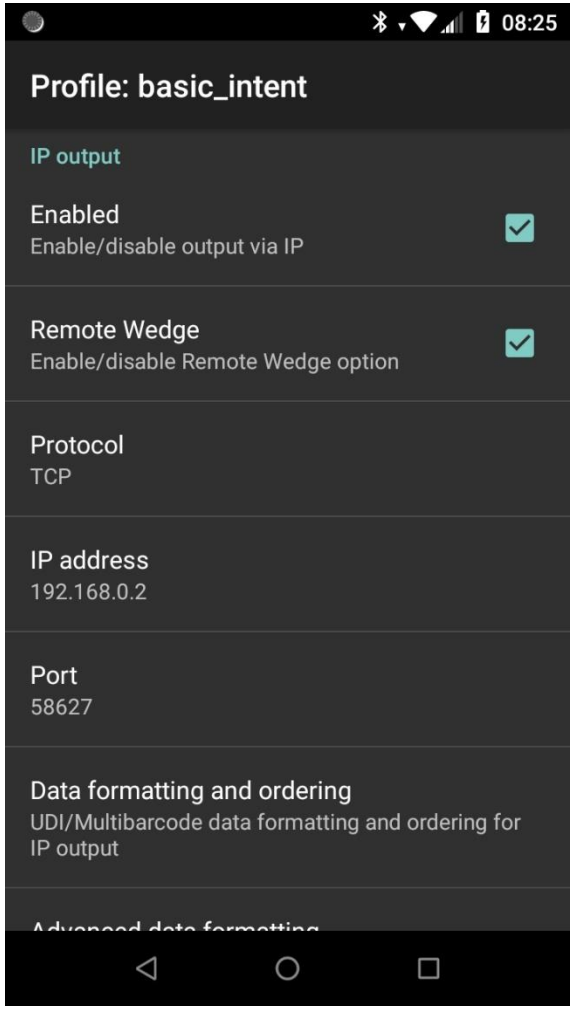
IP Output Plugin: Overview

- IP (Internet Protocol) output designed to address “Queue busting” use case
- Convert your mobile computer into a ‘remote’ barcode scanner, process scans on a server.
- Only server component ‘IPWedge’ is supported
  - Any server listening on the server on the correct port *should work* but: “Zebra does not support this usage scenario”
  - Only Windows supported, not Linux or Mac
- More information available from TechDocs
- Implemented as a separate output plugin, enable it in DataWedge and configure
- Barcode data sent as key strokes (similar to the Keystroke output plugin)

Advanced Features of DataWedge for Barcode Scanning

IP Output Plugin: Configuring the plugin

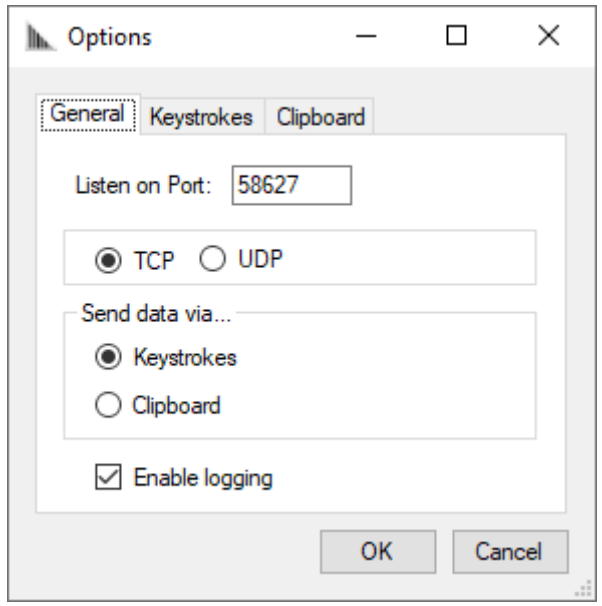
- Enable the IP output for the DataWedge profile in use
- Specify the IP address and port of the Windows machine running IP Wedge
- Keep ‘Remote Wedge’ enabled as this enables the use of IP Wedge tool
- Optionally: Specify some advanced or basic data formatting
  - E.g. use BDF to append a carriage return after each scan (‘Send ENTER key’)

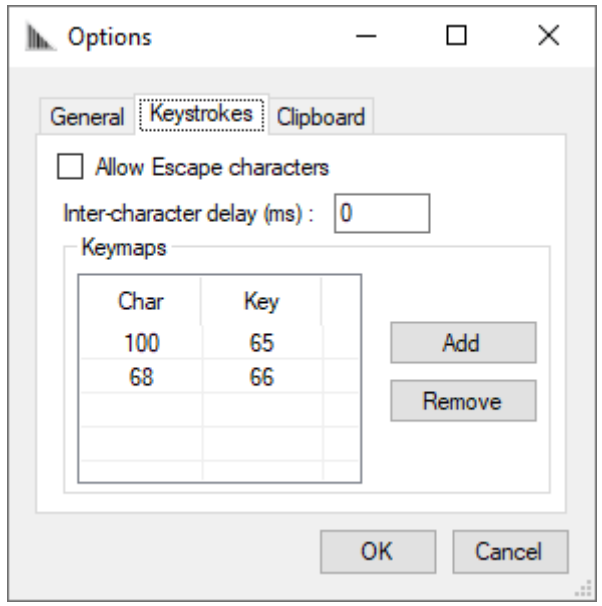


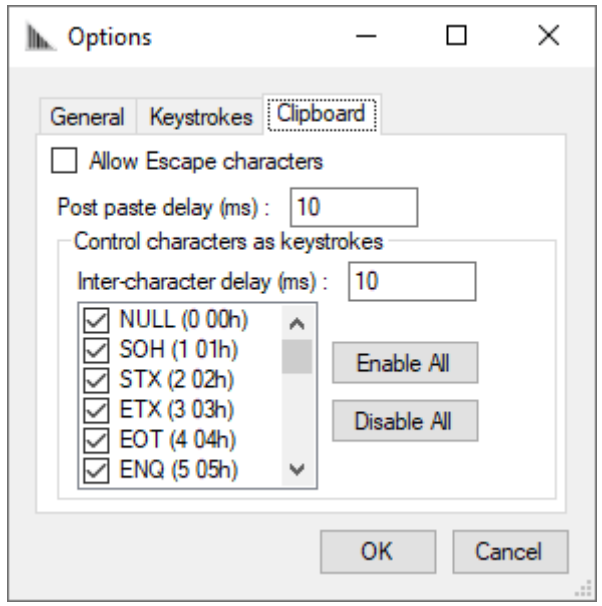
Advanced Features of DataWedge for Barcode Scanning

IP Output Plugin: Configuring IP Wedge

- Runs in the system tray. Make sure it is enabled. Right click for options
- General tab should match the settings previously specified in the DataWedge profile
- Keystrokes tab allows you to remap characters (seems case insensitive)
- Specify an inter-character delay if needed by the receiving application



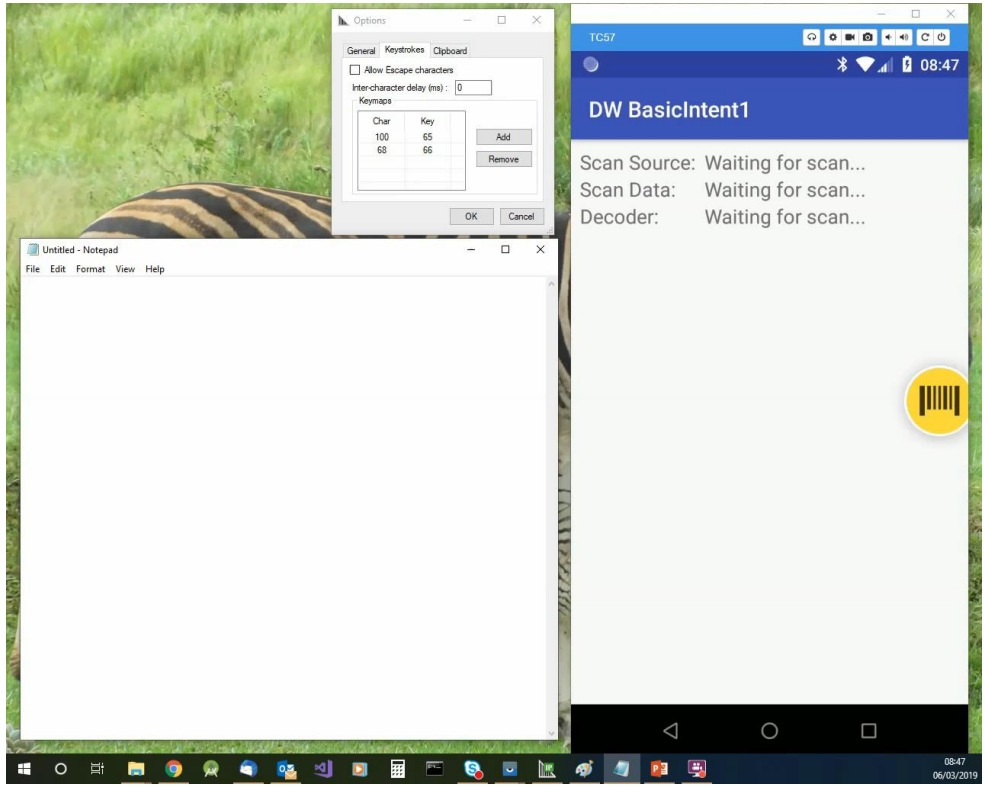




Advanced Features of DataWedge for Barcode Scanning

IP Output Plugin: Demo – Basic Scanning

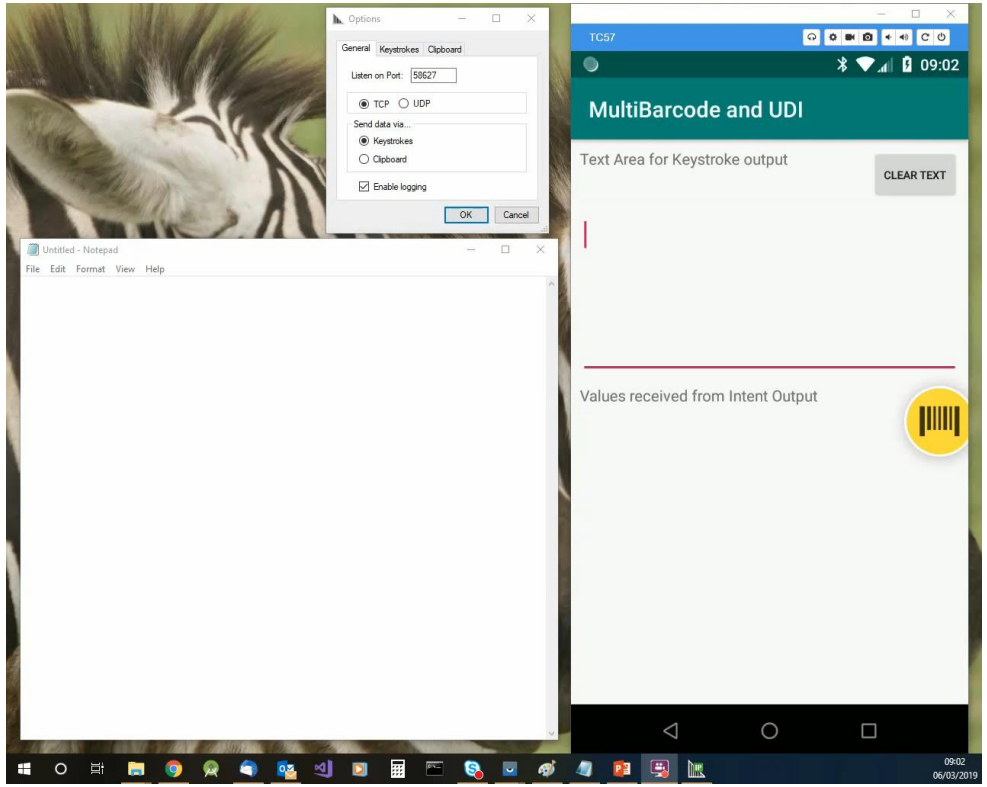
- Application source: BasicIntent1 from GitHub
- IP Output enabled, sending to a Windows 10 machine
- Basic Data Formatting configured to ‘send ENTER’ after each scan
- IP Wedge configured to send data via Keystrokes
  - ‘d’ and ‘D’ are remapped to ‘a’



Advanced Features of DataWedge for Barcode Scanning

IP Output Plugin: Demo – Multi-barcode

- Application source: MultiBarcodeUDI as covered earlier
- DataWedge Profile: IP output configured as follows:
  - IP Output enabled, sending to a Windows 10 machine
  - Data formatting and ordering: Multibarcode separator is a ‘Carriage return’
- DataWedge Profile: Barcode input configured as follows:
  - Barcode input: enabled
  - Scanning mode set to ‘Basic Multibarcode’
- No data formatting is applied to the data itself
- *Note: Multi-barcode is not compatible with sending data via the clipboard (in my testing)*



Advanced Features of DataWedge for Barcode Scanning

Scanner settings: AimType

- The AimType changes how the scanner behaves when the trigger is pressed. Documentation

Aim Type	Description
Trigger	Standard behaviour, a scan is performed for each trigger press
Timed Hold	After pressing the trigger, no barcode will be decoded until a period of time has passed – allows the user to aim at the correct barcode.
Timed Release	Pressing the trigger allows the user to aim the scanner. When the trigger is released the barcode will be decoded.
Press and Release	Scanning beam is emitted after release. Same as 'Trigger' but you do not have to hold the trigger down.
Presentation	*Future use only – presumably will work the same as Presentation on the old WinCE kiosks*
Continuous Read	Hold down the trigger to scan multiple barcodes. If you need *very rapid* scanning then consider using the EMDK rather than DataWedge
Press and Sustain	Similar to Press and Release

Advanced Features of DataWedge for Barcode Scanning

Scanner settings: PickList

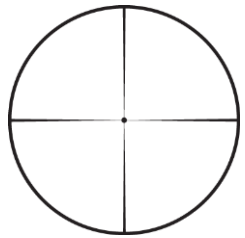
- PickList will only decode the barcode directly under the aimer, cross-hair or reticle. Documentation

Picklist	Description
Disable	Disables picklist mode (default)
Hardware Picklist	Where supported by the hardware, picklist mode is enabled
Software Picklist	Picklist is implemented via software (scanner decode algorithms)

Advanced Features of DataWedge for Barcode Scanning

Scanner settings: Aim Mode, Illumination Mode & Viewfinder Mode

- Aim Mode will turn the aiming pattern on or off (red circle on many devices)
- Illumination Mode will turn on the light around the aim pattern emitted by the laser imager
- Viewfinder Mode: Static Reticle will show a reticle when using the camera for scanning

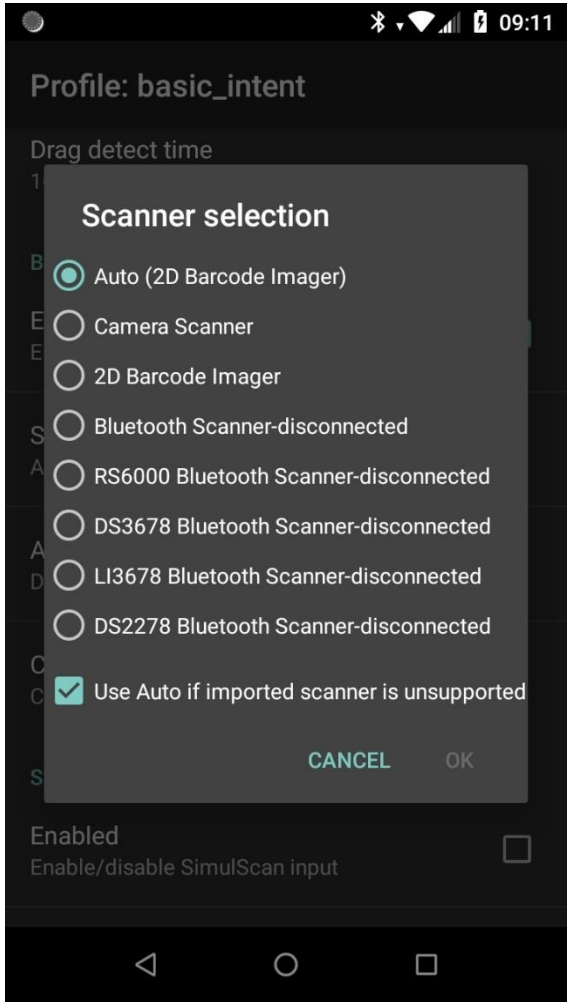


For more information on the Barcode paramters, see the Documentation on techdocs

Advanced Features of DataWedge for Barcode Scanning

Other Small Enhancements: Additional Bluetooth Scanner support

- DataWedge now supports many different Zebra Bluetooth scanners:
- Just modify the Barcode input plugin under ‘Scanner selection’

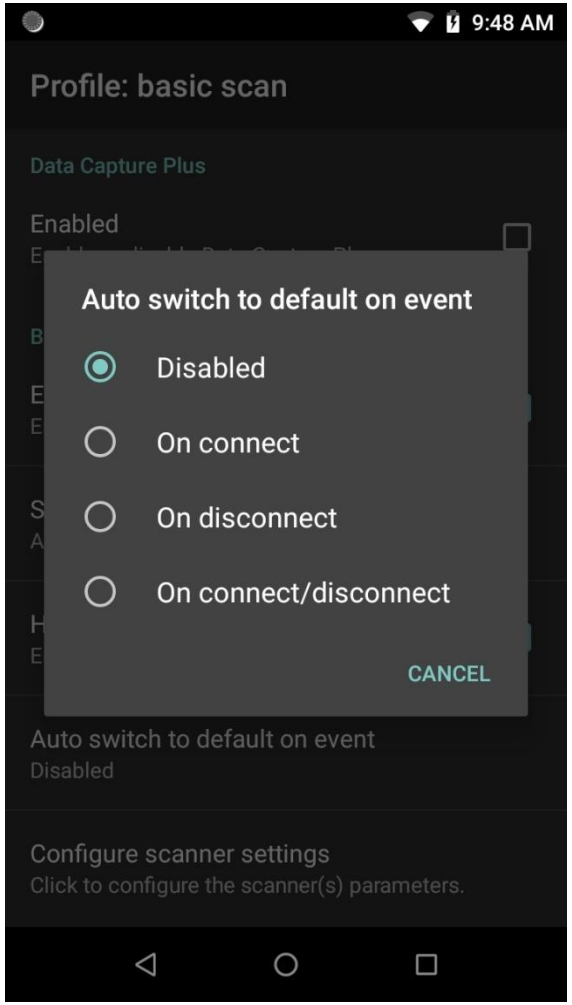


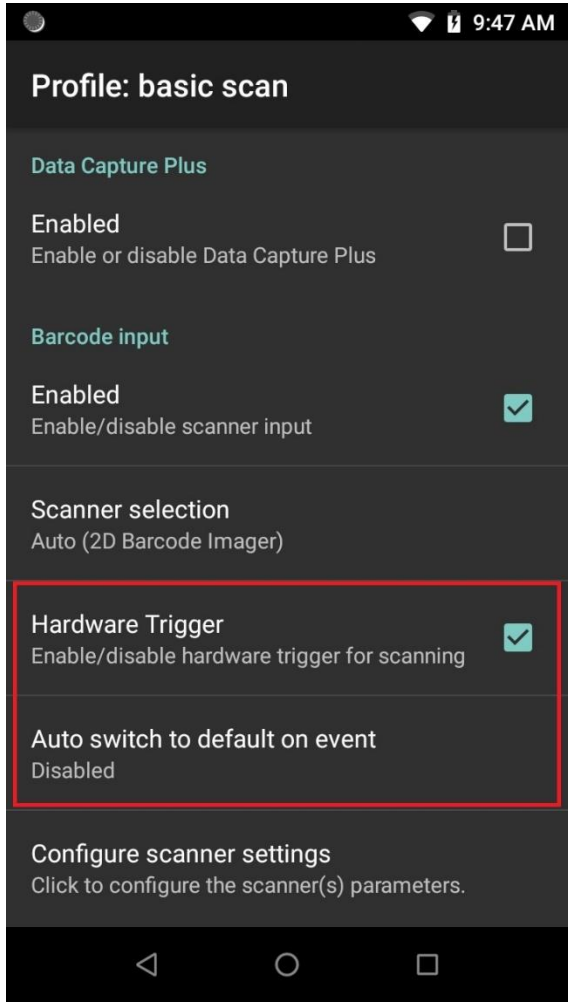
- From Left to Right: RS507, RS6000, DS3678, LI3678, DS2278

Advanced Features of DataWedge for Barcode Scanning

Other Small Enhancements: New Barcode input changes

- Hardware Trigger
  - Disable the physical trigger button but still allow the trigger to be started via:
    - A soft button in your application
    - The Data Capture Plus button
  - Provides greater control over what a user can do
- Auto switch to default on event. E.g.:
  - Automatically switch to a paired Bluetooth scanner when that scanner connects
  - Automatically switch to the internal imager when the Bluetooth scanner disconnects
  - *Left Image*





Advanced Features of DataWedge for Barcode Scanning

Resources

- Sample applications and profiles used in this presentation:
  - https://github.com/darryncampbell/Appforum_2019_DataWedge_Advanced
  - https://github.com/Zebra/samples-datawedge
  - Using a Bluetooth ring scanner with DataWedge across multiple apps (Developer post | Sample apps)
- DataWedge help on Techdocs:
  - http://techdocs.zebra.com/datawedge/latest/guide/about/

Questions?

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