

Best Practices in Creating a Printing Application for Zebra Printers



ZEBRA

ISV Engineering Team, Lincolnshire, IL, USA

Agenda

- **Basic Concepts of Printing Application Development**
- **Best Practices for Zebra Printing Application Development**
- **Printing Validation Program**
- **White Listing iOS apps**

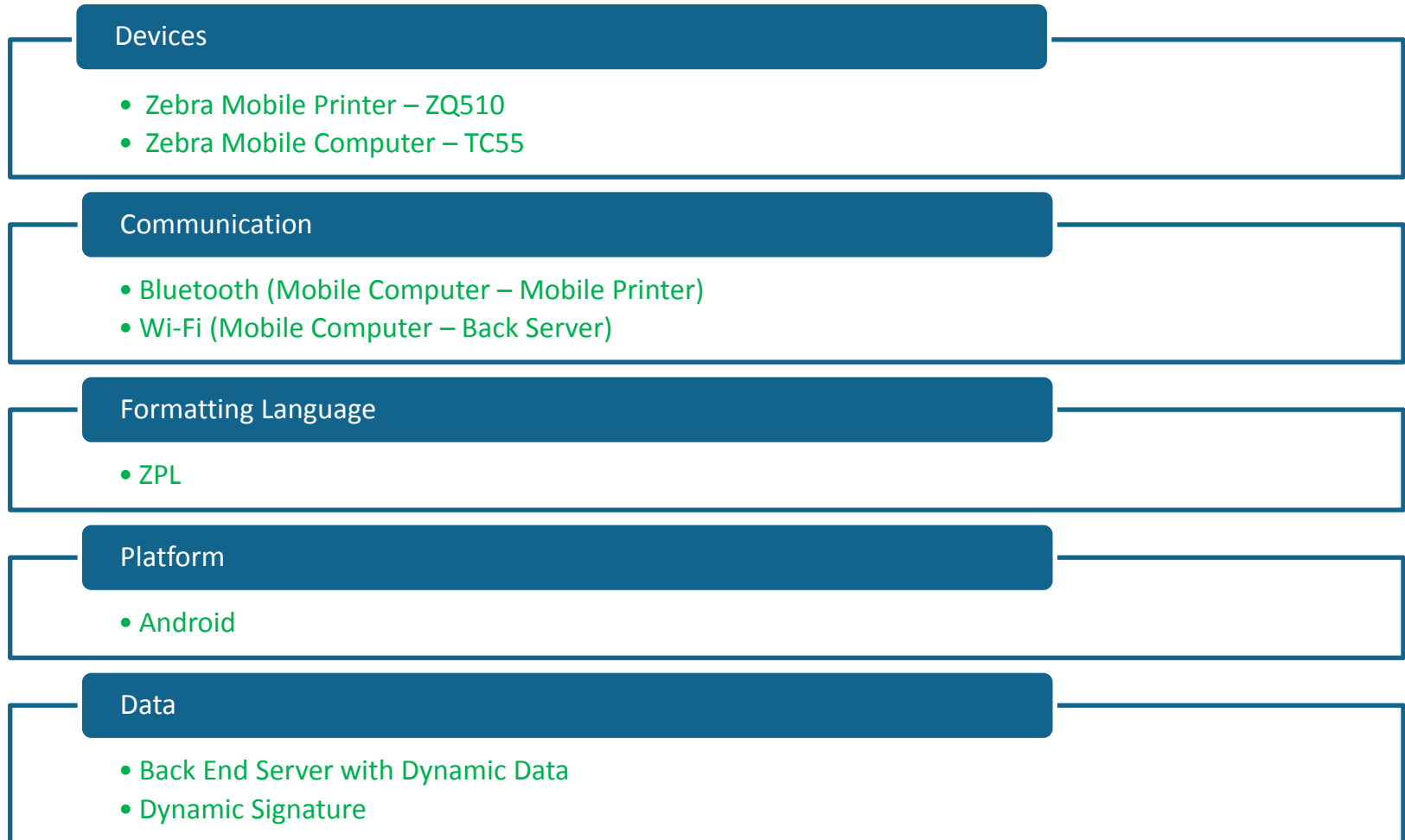
Goals

1. **Learn basic concepts to develop printing Apps with Zebra devices**
2. **Familiarize you with Zebra's Printing Development Best Practices**
3. **Introduce you to commonly used Zebra Printer terminology**
4. **Introduce you to the White Listing process and review when it is required**
5. **Promote Validation and White Listing as an effective tool to get new business with Partners and for the promotion of Partners' apps**

Identify Printer's Place in App Architecture

Identify Use Case – **Printing a Dynamic Receipt**

Document Basic Requirements: **Sample information listed in green**



Logic Workflow for Incorporating Printing

1. Discover Printers

2. Select and Connect the printer

3. Save printer's profile (App)

Communication

4. Check and Setup Language to "ZPL"

5. Close Connection

Settings & Formatting

6. Input Dynamic data

7. Create an image with Signature Capture

App's Processes

8. Open Connection

Print Graphics Only When Necessary

9. Store the "ZPL format to print" with logo in Printer

10. Store the image with Signature in Printer

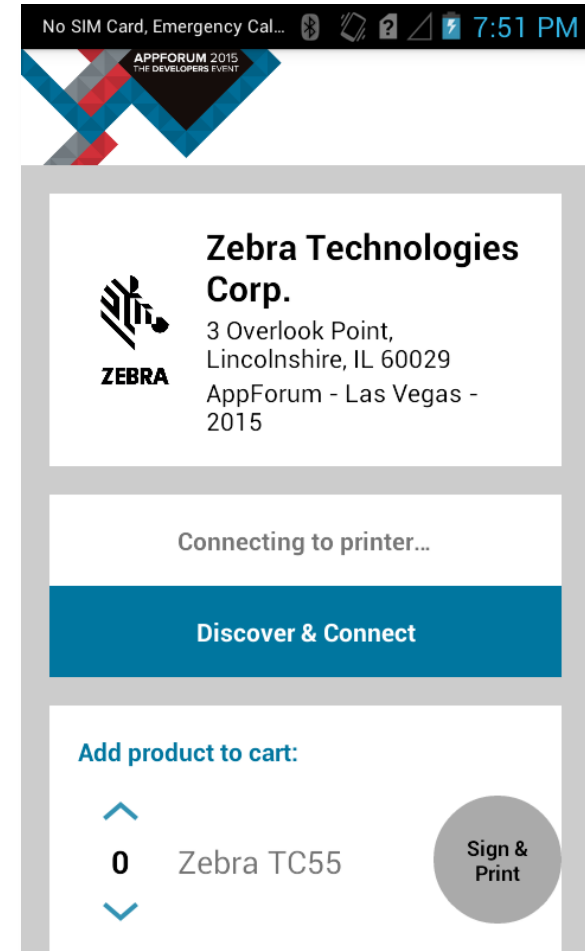
11. Check for status before to print

Status

12. Recall ZPL format and print

13. Close connection

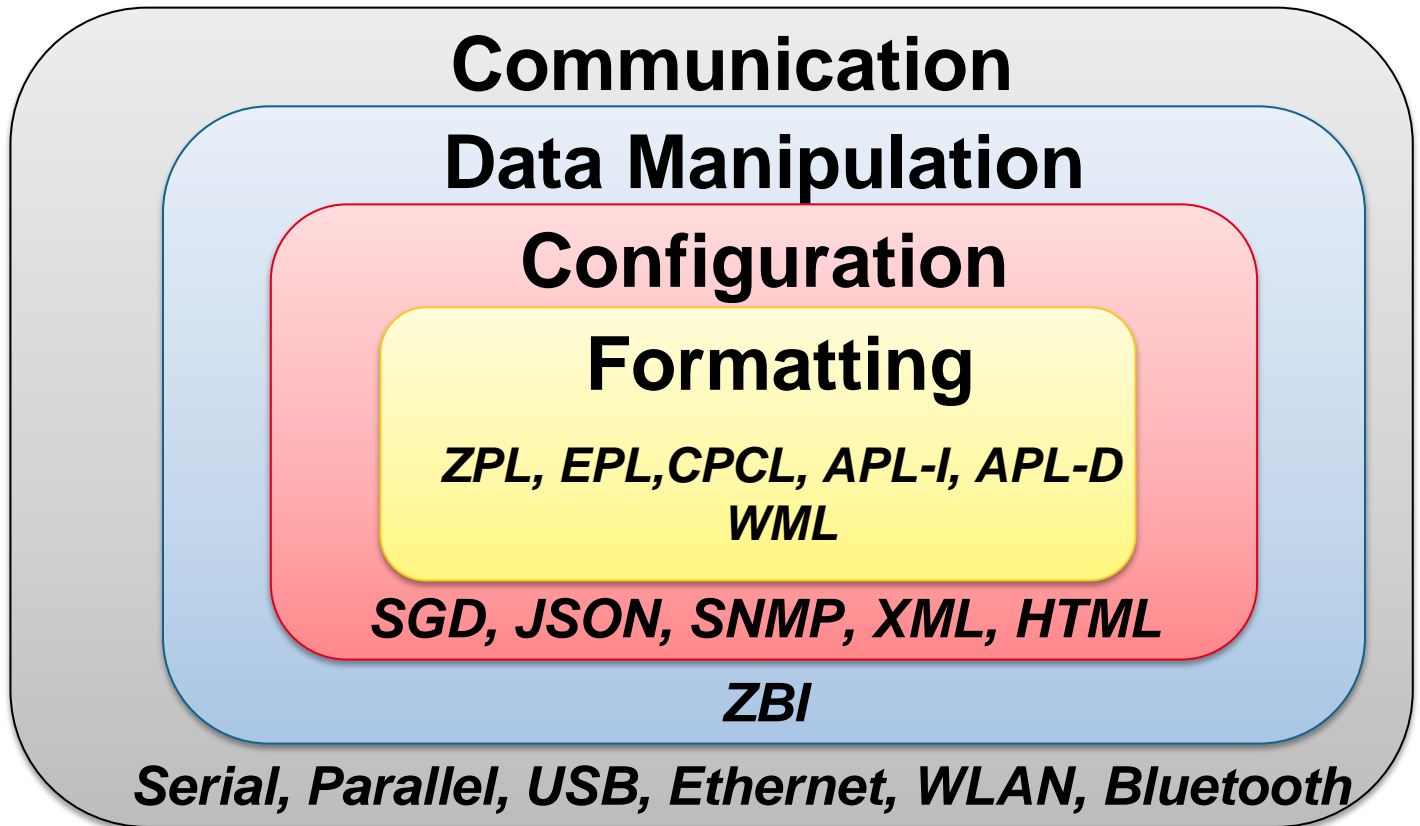
Printing



Zebra Printing Terminology

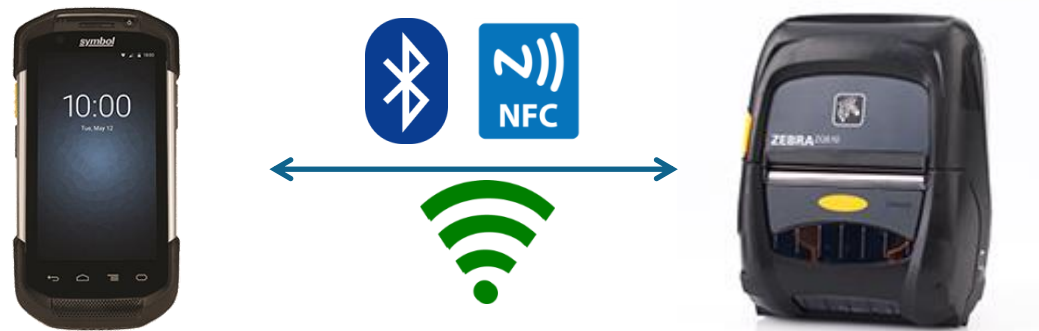
- **ZPL** – Zebra Programming Language, one type of programming language that Zebra printers use. We recommend this development language. Other languages are EPL, CPCL and LINE_PRINT.
- **ZPL Command:** An instruction you send to the printer to configure the printer, print label (formats/templates), and get device status information (ex. ^B8 command prints a EAN-8 bar code).
- **ZPL Format** : One time send (all of the data is sent together) of a *static* form built with ZPL code to print or download to the printer.
- **ZPL Template:** A ZPL code *dynamic* form that you can download to the printer that adds variable data fields.
- **Recall ZPL Template:** Prints by dynamically allocating values to variables in a ZPL template previously downloaded to the printer.
- **ZPL RFID Command:** In addition to reading or encoding RFID tags, the RFID ZPL commands also provide for RFID exception handling, such as setting the number of read/write retries before declaring a transponder defective (set with ^RR, ^RT, and ^WT) or setting the number of labels the printer prints if an error occurs (set with ^RS).
- **SGD Command (Set, Get, Do):** An instruction you send to the printer to set or get configuration details (ex. configure the printer language). These commands allow you to configure printers with firmware versions V60.15.xZ, V50.15.xZ, V61.15.xZ, V56.15.xZ, V53.15.xZ, or later. The printer performs the function immediately after receiving the command. Commands are case sensitive. The 3 types of commands are: setvar, getvar and do. For example, ! U1 setvar “device.languages” “zpl”.
- **Zebra's Best Practices Document:** A document outlining Zebra’s recommendations on how to build a best in class application. It includes minimum functional requirements and best practices.

APPLICATIONS



Communications – Mobile printers

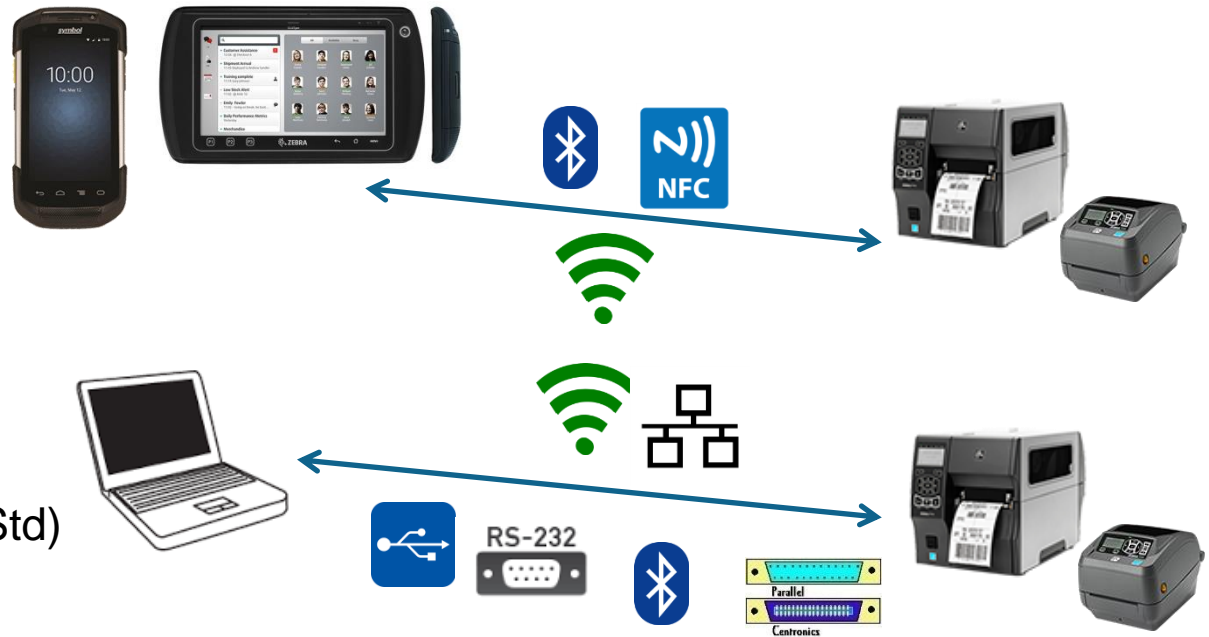
- **Bluetooth** (3.0/4.0)
- **Wi-Fi** (802.11a/b/g/n)
- **NFC** (Device dependent)



- **WLAN** connectivity supports both 2.4GHz and 5GHz bands and roaming within and across bands.
- **The multiport radio** can simultaneously operate 802.11a/b/g/n and Bluetooth 3.0.
- **Print Touch** enables new experiences and quick access to helpful information. Print Touch devices offer app and web page launching features.

Communications – Desktop/Table top

- **Bluetooth** (3.0/4.0)
- **Wi-Fi** (802.11a/b/g/n)
- **NFC** (Except for Apple)



- **RS-232** Auto-sensing Serial Interface DB-9 (Std)
- **Centronics** Parallel (Std)
- **Ethernet** (10/100) Internal (Std)

- **WLAN** connectivity supports both 2.4GHz and 5GHz bands and roaming within and across bands.
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Formatting Language – ZPL – CPCL – LINE_PRINT



```

^XA \r\n
^FO50,50 \r\n
^FDZEBRA^FS \r\n
^FO50,150 \r\n
^FDPROGRAMMING^FS \r\n
^FO50,250 \r\n
^FDLANGUAGE^FS \r\n
^XZ \r\n
    
```



```

! 0 200 200 210 1 \r\n
ML 47 \r\n
TEXT 4 0 10 20 \r\n
ZEBRA \r\n
PROGRAMMING \r\n
LANGUAGE \r\n
ENDML \r\n
FORM \r\n
PRINT \r\n
    
```



```

ZEBRA \r\n
PROGRAMMING \r\n
LANGUAGE \r\n
    
```



ZPL

CPCL

LINE_PRINT

Detecting and Displaying the Printer Status

- Check Status/Display Errors
 - No connection
 - Door Open
 - Out of Media
- Data Loss
- Apps do not print correctly
- Poor User experience



No Connection



Door Open



Out of Media

Putting It All Together

- Store Format
 - Selecting ZPL file
 - Store ZPL file in Zebra Printer
- Send “ZPL format to print”
- Print of a Image (JPG/PNG)
 - Select an image on Mobile Device
 - Print the image
 - Store & recall Image
- Signature Capture (**Dynamic Image**)
 - Dynamic capture of signature on Android Device
 - Store & recall dynamic image
 - Print image of signature
- Receipt
 - Input Data
 - Dynamic addition to ZPL format
 - Send to print



Zebra Technologies Corp.
 7 Overlook Point, Lincolnshire, IL, 60029
ZEBRA AppForum – London – 2015
 Sample Receipt

Product:	Price :	QTY:
Zebra TC55	\$580.00	1
Charger	\$100.00	1
TAX :	\$ 61.20	
TOTAL :	\$741.20	

Barcode: [Barcode]

Signature: [Signature]

Best Practices for Printing Apps

App interfaces with printer out of the box

- Printer does not need special set up to work with app

Stability

- The app will not freeze, lockup, or crash when interacting with the printer, such as attempting to communicate with the printer and encountering the common error cases in the following list:
 - Printer unreachable by the client
 - Printer is out of media
 - Printer media door is open

Printed Output

- The app produces the print output you expect with acceptable print quality

Check Printer Formatting Language

- The application checks and sets the language of the printer (ZPL, LINE_PRINT, CPCL, etc.)

Check Printer Status

- The application checks the status of the printer before sending a print-job. Once the printer verifies the printer is not in an error state, you can send the print job.

Display Printer Error Status

- All apps must alert you if the printer is unreachable or in any other error states before sending a print job. Be specific about the error state that the printer is in, i.e. Out of paper, door open, etc.

Proper Zebra Branding

- Verify that, if present, usage of Zebra printer branding (logo, model number, etc.) meets Zebra Technologies Global Brand Standards.

Best Practices: When applicable printing apps should ...

Use **ZPL** for label formatting

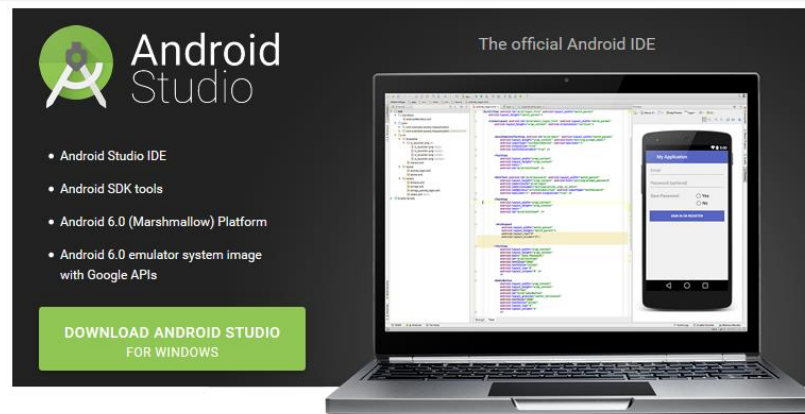
- New functionality and features are being focused exclusively on ZPL

Print Graphics Only When Necessary

- Graphic data is generally a larger file size. It also introduces risk of distortion & unreadable barcodes
- Store static images, such as logos, in printer memory and recall at the time of print

Best Practices – Android-specific Recommendations

- As a best practice, Zebra recommends that you not make calls to the API from the UI thread. As of Android version 2.3 (Gingerbread), networking communication is no longer allowed on the UI thread. Use AsyncTask to accomplish this.
- If you try to print a large image (e.g. 1024x768) using the GraphicsUtil print methods, you may receive an OutOfMemoryError exception.
- Zebra recommends putting all of your Zebra jar libraries in your Android project's "libs" directory for best results when developing in Eclipse
- Zebra recommends you to develop your new Android apps using Android Studio. Google does not support Eclipse IDE for Android as of 12/31/2015.



Best Practices – iOS-specific Recommendations

- Zebra recommends not making calls to the API from the GUI thread. Use Grand Central Dispatch to accomplish this.
- Only use each ZebraPrinterConnection object on a single thread.



ZEBRA VALIDATION PROGRAM




ZEBRA
VALIDATED

Learn More

Zebra's Validation Program helps you develop a testing protocol for incorporating Zebra devices into the applications you develop. You'll save time and money during development and testing, and your customers will see fewer problems in the field. Get a jump start on the testing


TRANSPORTATION & LOGISTICS	RETAIL	MANUFACTURING	HEALTHCARE	GOVERNMENT
GENERAL				



IFORM BY ZERION SOFTWARE

iFormBuilder is an award-winning, patented clipboard replacement solution that is being used across the globe.

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INVOICE ASAP FOR PAYPAL & QUICKBOOKS BY INVOICEASAP

Invoice ASAP is a mobile, cloud-based invoicing solution that allows estimating and invoicing in the field. Estimates can easily be converted to invoices. invoiceASAP connects to QuickBooks to eliminate double-entry.

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Validation Program

Enhance app quality

- Teach ISVs about printing use cases
- Enhances customer experience; decreases deployment issues

Drive deeper engagements

- Promote top ISV applications
- Align strategy and efforts with ISV
- Consult on best practices
- Embed Zebra differentiated features in apps (i.e. Cloud Connect, Web-Print, Xamarin, Low-battery status)

Results

- ISV apps used in Zebra New Product Interoperability testing
- 100% of Validated apps enhanced through program
- Bugs fixed in over 40% apps
- Promotion of tested apps by Zebra

White Listing of iOS Apps

What is it?

- If app connects an iOS device to a Zebra MFi product via BT & will be in Apple's B2B or standard App Store, Apple requires it to be white listed by Zebra
- Associates app to Zebra's product & can only be registered by Zebra (mfg. of the product)

Note: Apple rejects the app if it is not white listed by Zebra

Click to read
Zebra's FAQ on
White Listing



ZEBRA



White Listing – MFi Program – Made for iPhone, iPad & iPod Touch



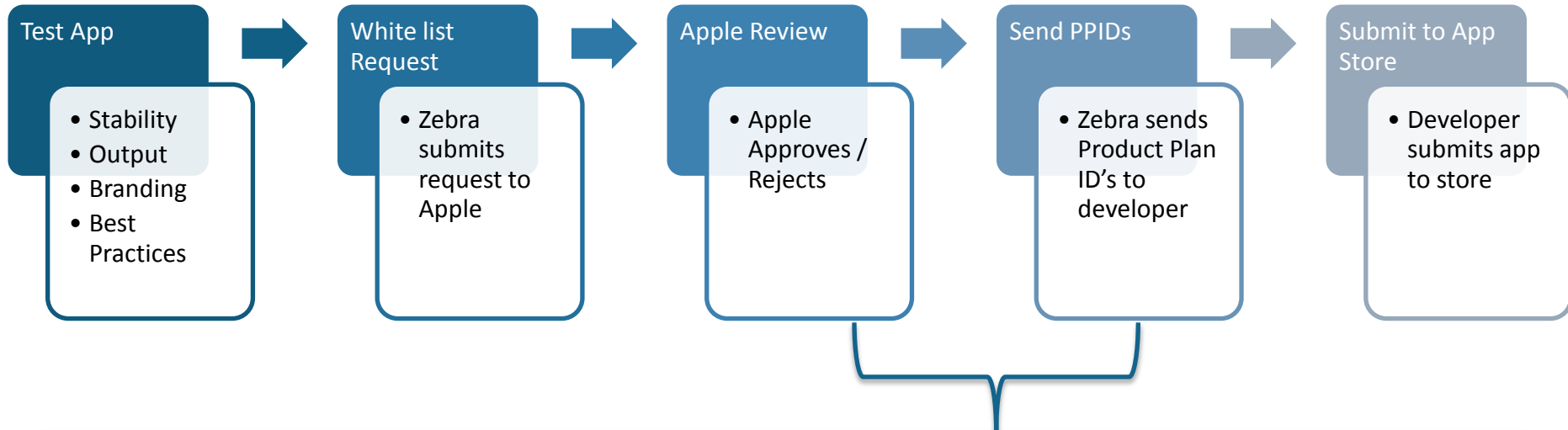
- Apple's way of controlling the User Experience
- Addresses how Bluetooth pairing and comms operate
- Discovery & initial pairing occurs in BT setup in iOS settings on MFi products
- MFi is not a retrofit or field upgrade – it's a product change
- MFi products: iMZ, QLn, ZD400, ZD500, ZQ110, ZQ500, ZT400, CS4070 & RFD8500
- Zebra helps developers “white list” their apps

Key Facts:

- Apps that interact w/ MFi products must be white listed to be on the App Store
- MFi products must be approved by Apple to be released
- MFi products can be used with non-Apple products

White Listing

What happens during the white listing process?



Note: You must complete **BOTH** steps to submit app to App Store so it is not rejected.

White Listing

When is registration required?

	Bluetooth	Wi-Fi/WLAN/BLE
Std. App Store	✓	✗
B2B Store	✓	✗
Enterprise Store	✗	✗



When is re-registration required?

- If name or bundle ID of app changes
- Adding in support for a different Zebra MFi product model

How do you register your app with Zebra?

- Read [Zebra's App White Listing FAQ](#) & then contact Zebra at iOSApp@zebra.com





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