



Wisconsin Chapter Meeting Spring 2022

SAP Mobility & Barcoding for ECC & S/4HANA (IM, WM, EWM)

Brief educational session to share and compare options for [mobile RF scanning & barcode printing](#) for SAP ECC 6.0 and SAP S/4HANA – and for IM, WM & EWM applications.

March 31st, 2022

About Presenter & Company

For over 20 years, BCC Distribution has been the premier provider of complete data collection solutions that integrate barcode scanning and barcode printing automation into SAP ERP business systems. BCCD offers clients best-of-breed mobile terminals, scanners, printers and wireless infrastructures along with the 'state of the art' software and technical services to deliver best practice solutions. By bringing all of our strengths to the table – hardware distributor, software developer and systems integrator, BCCD is able to deliver optimized barcode and RFID solutions that meet the unique requirements for inventory control and tracking in manufacturing, warehousing and/or distribution business operations.

Delivering and supporting ALL aspects of a turn-key IM/WM/EWM RF scanning and barcode printing solution for SAP ECC 6.0 and SAP S/4HANA.

- **SOFTWARE** | Solutions & Development
- **EQUIPMENT** | Distributor & Integrator
- **SERVICES** | Software & Equipment
- **SUPPORT** | All System Deliverables



Best Practice SAP Mobile Connectivity



REAL-TIME [Direct-Connect]

SAP ITSmobile (Browser)
SAP Console (Telnet)
UI5 Design (Neptune Toolset)
SAP Fiori (UI5)

- ✓ Native
- ✓ Speed/Ease
- ✓ Cost
- ✓ Maintenance
- ✓ Tried/True
- ✓ Existing Transactions



ONLINE/OFFLINE [Store & Forward]

Neptune Software (UI5)
SAP Fiori (UI5)

- More Costly
- Extended Time to Implement
- Customizations
- Additional Layers
- Recently Announced (Fiori)
<https://help.sap.com/fiori>



BATCH [Offline]

Neptune Software (UI5)
Custom Program

- No Wireless/RF
- Data Validation Issues

VALIDATION is the ROI. Eliminate Errors. Save Time. Minimize Investment.

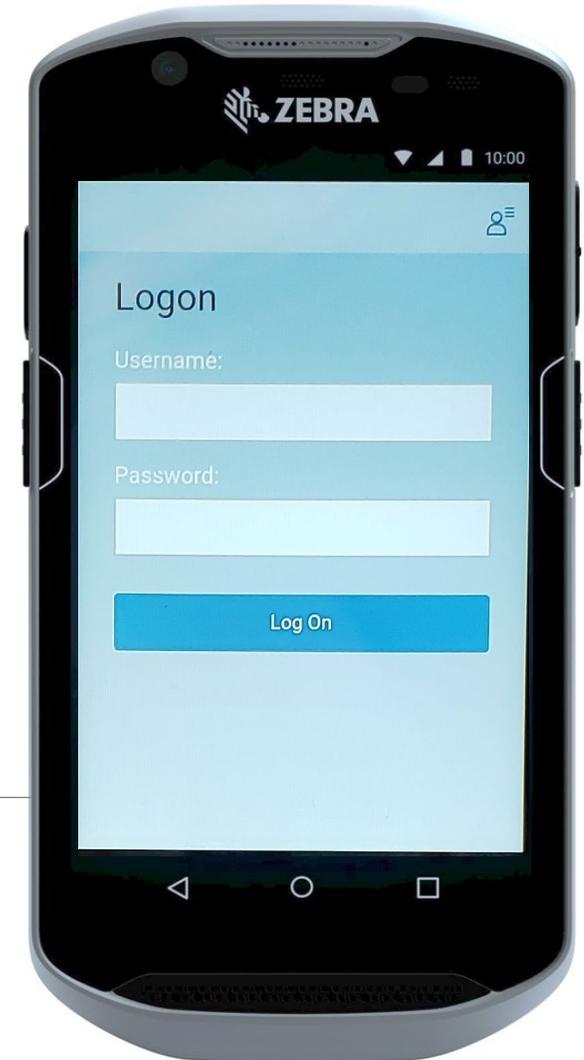
SAP Connectivity - Terms

Direct Connectivity (today's focus)

- Directly connected to the SAP System.
- Each user enters logs in with a SAP Username & Password.
- No additional server required.
- Typically native SAP (ABAP).



SAP ECC®
SAP S/4HANA®



SAP Connectivity - Terms

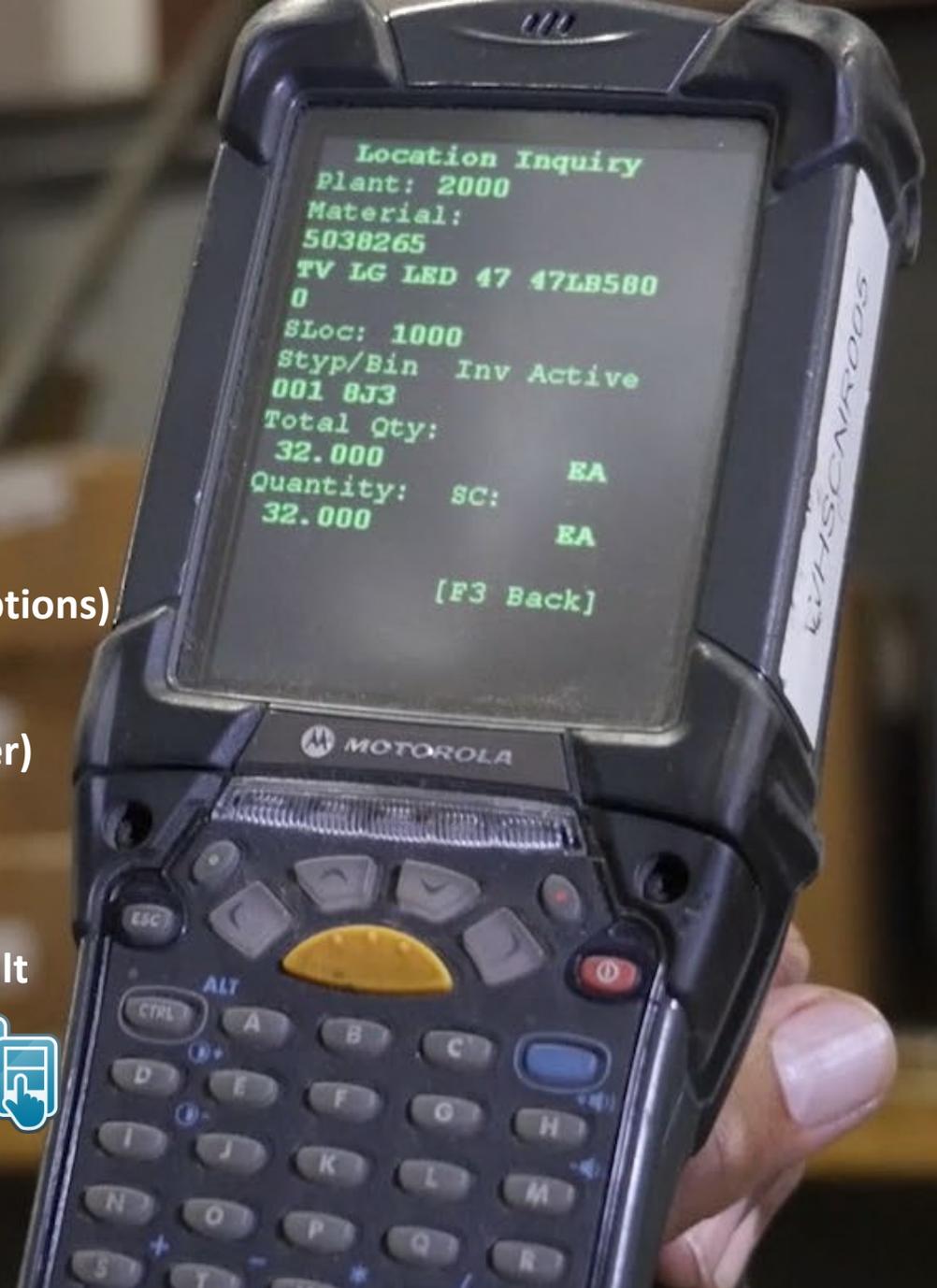
Near-Time Connectivity **(not in focus)**

- Middleware or SAAS (non-SAP software utility) that connects Mobile Devices to the SAP system.
- Shared SAP User ID & Password (not SAP best practices – per SAP EULA).
- NOT real-time, marketed as “close to real-time”. Accurately named near-time.
- Additional Software Layer(s).
- Additional Server(s) Required.
- Not Native SAP.



Console Connectivity

- Fast, Real-Time SAP Connectivity (no OFFLINE mode)
- Supported by SAP ECC 6.0 and S/4HANA
- SAP Console Connectivity (Character-Based Devices)
- Stateful SAP Connection (w/ Session Persistence Server options)
- Standard Locking of Objects
- Requires Telnet Server Software (Separate Windows Server)
- Requires Telnet Client Software, per Device
- Green/White on Black Screen (appearance)
- Physical Key Use Only, No Touch Screen (for SAP) by Default
(Requires additional device software emulation layer)
- Mature SAP Technology, no est. SAP EOL
- Support for Windows & Android OS



TranASAP™ SAP® Console-Telnet Infrastructure – Connectivity

by BCC Distribution, Inc.



Windows® Server

SAP® Console

- Console Admin
- Interface
- Translation

Telnet Server



Dedicated Network Connectivity from SAP® Server to the Facility(s) WLAN/LAN

- On-Premise
- Hosted
- Cloud+



SAP Console Certified RF Terminals



Certified Operating System

- Android Ent. (Mx)
- Windows®10*
- Windows® Mobile
- Windows® CE

Certified Telnet Client

- Georgia SoftWorks
- Velocity

Staged & Configured for Direct, Real-Time Connectivity to SAP

- OS/Firmware Version
- Utilities & GMS Disable
- I.P. Settings
- SSID
- Sys. Access/Passcode

SAP® Login Credentials

*Operating System availability limited on specific mobile RF terminals, and subject to EOL support.

ITSmobile Connectivity

- **Direct, Real-Time SAP Connectivity**
- **SAP's Recommended RF Framework**
- **Native SAP (ABAP) – Designed for SAP ECC 6.0 and S/4HANA**
- **Actual SAP Transactions and Screens, Optimized for Mobile/RF Device Utilization**
- **Immediate Data Validation w/ Each Field - Live User Interaction and System Feedback**
- **Stateful SAP Connection**
- **Standard Locking of Objects**
- **Industrial Web Browser, per Device**
- **HTML SAP Screens (appearance)**
- **Touch Screen & Physical Key Use**
- **Support for Windows & Android OS**
- **Supports RFID & Voice Enabling**



TranASAP™ SAP® ITSmobile Infrastructure – Connectivity

by BCC Distribution, Inc.

SAP's Recommended RF Framework for SAP S/4HANA



SAP® Certified
Powered by SAP NetWeaver®



- ✓ SAP S/4HANA®
- ✓ SAP ECC® 6.0
- SAP® NetWeaver®
- SAP® ITSmobile
- ABAP Software
- SAP Function Modules

TranASAP



Dedicated Network Connectivity from SAP® Server to the Facility(s) WLAN/LAN

- On-Premise
- Hosted
- Cloud+



SAP ITSmobile Certified RF Terminals



Certified Operating System

- Android Ent. (Mx)
- Windows® 10*
- Windows® Mobile
- Windows® CE

Certified Industrial Web Browser

- Zebra EB
- Velocity
- Naurtech

Staged & Configured for Direct, Real-Time Connectivity to SAP

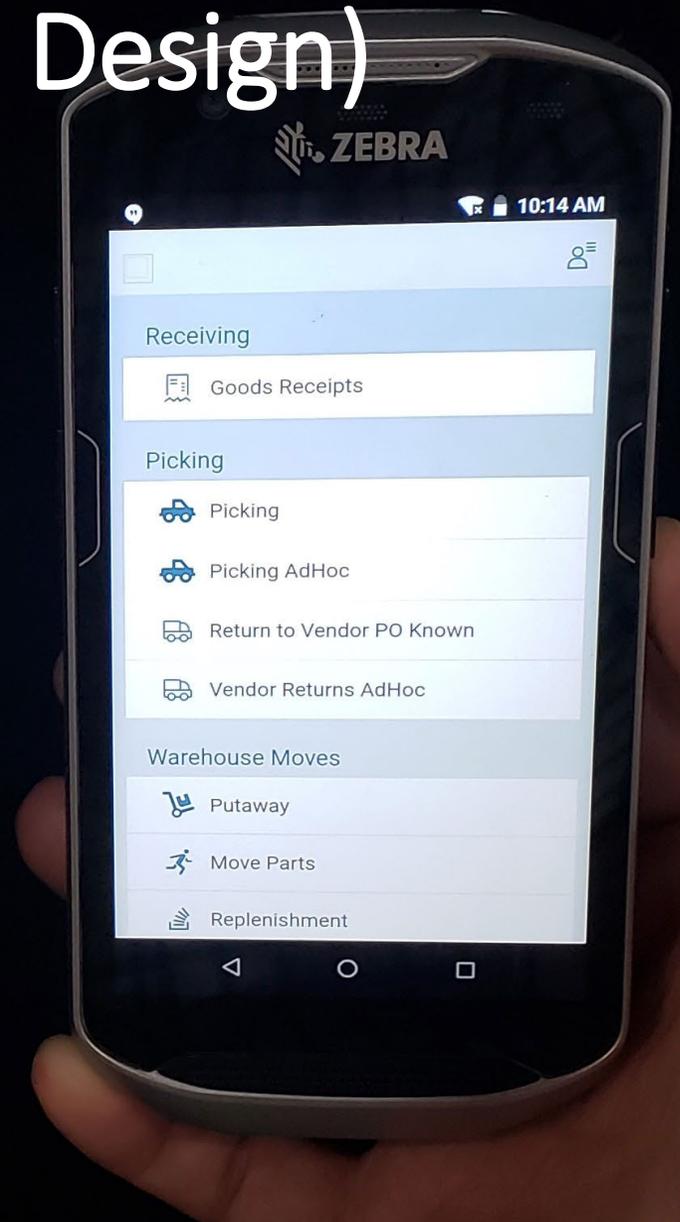
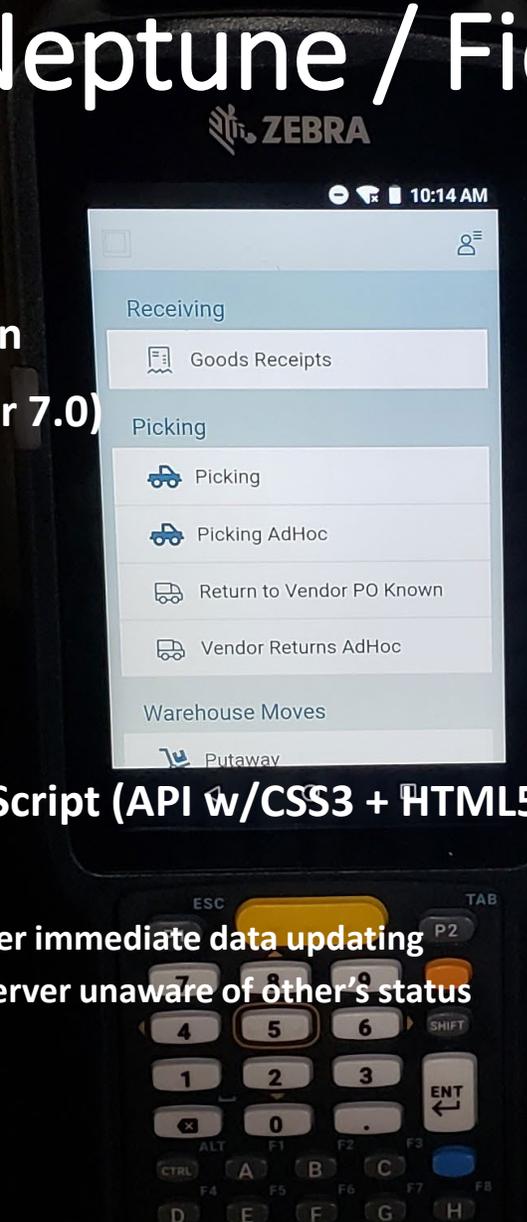
- OS/Firmware Version
- Utilities & GMS Disable
- I.P. Settings
- SSID
- Sys. Access/Passcode

SAP® Login Credentials

*Operating System availability limited on specific mobile RF terminals, and subject to EOL support.

UI5 Connectivity (Neptune / Fiori Design)

- Direct, Fast SAP Connectivity
- Support for OFFLINE/Batch Data Collection
- For SAP ECC 6.0 and S/4HANA (NetWeaver 7.0)
- SAP Certified, SAP Add-On Connectivity
- Touch Screen & Physical Key Use
- UI5 (Fiori-Design) Application
- Screen Responsive (Conforms to Device)
- Built using ABAP (JSON, ODATA) and JavaScript (API w/ CSS3 + HTML5)
- Standard Locking of SAP Objects
 - Online – Stateful (Session Holding), Client/Server immediate data updating
 - Offline – Stateless (w/ Lock Handling), Client/Server unaware of other's status
- Android, iOS, Windows 10 Support*
- Supports Single Sign On (SSO)



*Each OS has minimum version requirements with this SAP architecture.

SAP® Certified
Powered by SAP NetWeaver®

BCCD Certified RF Rugged Terminals



Approved Operating System

- Android, iOS, Win10

Neptune Client Application (Native API)

Neptune S&F Database

Staged & Configured w/ Neptune Toolset for Store & Forward Connectivity

- Firmware Version
- I.P. Settings
- SSID
- Sys. Access/Passcode

Min Device Requirements

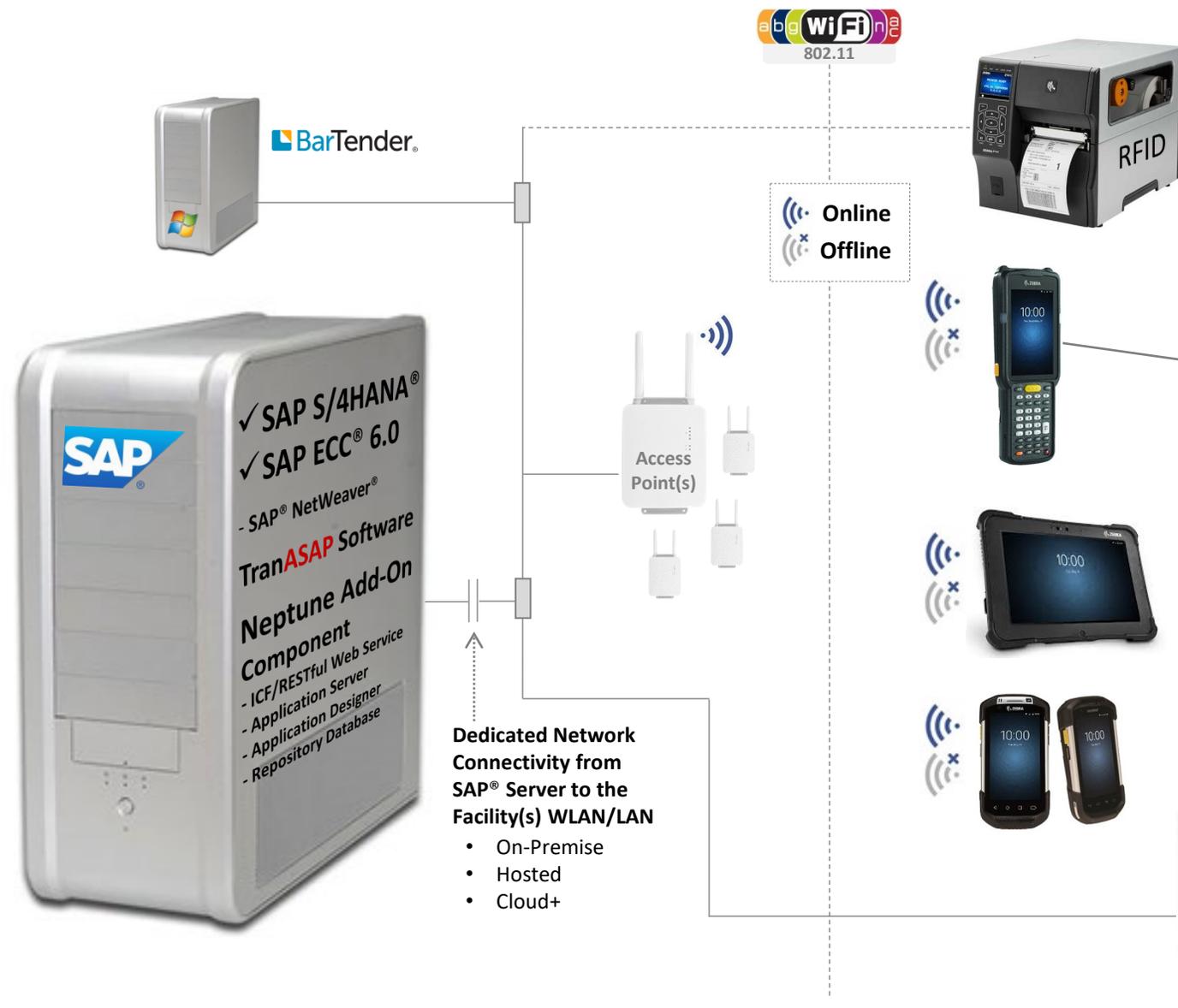
- CPU Processor (1.5+ Ghz Dual)
- 2GB RAM/4GB Flash Memory+
- HTML5 Capable

SAP® Login Credentials

Laptop or Workstation PC w/ Approved Web Browser

- Chrome, IE, Firefox, Safari

Neptune Client Application (URL - Launch Pad)



Dedicated Network Connectivity from SAP® Server to the Facility(s) WLAN/LAN

- On-Premise
- Hosted
- Cloud+

Cost Considerations

- **Console** – Native , Additional Cost/Licensing for:
 - Telnet Server (on non-SAP physical server).
 - Mobile Device Telnet License.
- **ITSmobile** – Native, Additional Cost/Licensing for:
 - Mobile Device Industrial Web Browser.
- **UI5 Neptune (Fiori Design)** – Native Add-On, Additional Cost/Licensing for:
 - Neptune Software Runtime License.
 - Neptune User Licenses.
- **Fiori** – Native, Additional Cost/Licensing for:
 - SAP Mobile Platform Server – for Authentication, SSO, Offline Enablement.
 - SAP Web IDE - Develop, Test, Deploy, Role-based Apps for Mobile and Hybrid.

“Speed” Considerations

- **Console**
 - Fast, Character-Based Data Exchange
- **ITSmobile**
 - Fast, Direct, Importance of Design (send all data vs bits)
- **UI5 Neptune (Fiori Design)**
 - Fast based on design, Faster (batch-speed) when Offline!
- **Fiori – Moderate/Acceptable**
 - End-user feedback due to additional architecture layering, plus design requirements for sending/reloading entire HTML5 page data.



Mobility Example Scenarios

SAP Console

- Existing Telnet Environment
- Large Existing Investment of (still) Supported Legacy RF Equipment
- Legacy SAP System Version (Maintaining Fenced Environment)
- Maximum Transactional Speed Processing
- Rapid Project Implementation Methodology/Requirement

ITSmobile

- Simple & Direct Architecture (additional server not needed)
- Utilization of Legacy & Modern RF Equipment
- Utilization of Modern Mobile Functionality (Touch-Screen, Improved UX, Voice Integration)
- Utilization of existing/pre-configured SAP Mobile/RF Transactions
- Rapid Project Implementation Methodology/Requirement

UI5 (Neptune S&F, Batch, and/or Fiori-Design)

- Requirement for Store & Forward (online/offline)
- OFFLINE (Primary Batch) application requirement and capability – 3PL's Consignment, Gov't, HazLocs, etc.
- Extended App Development beyond WMS - IM, WM, eWM Inventory Control (HR, Accounting, SD, etc.)
- User Experience Desire for latest/greatest UI5 Technology
- Larger Staff in place with ABAP and JavaScript Expertise.

Version Support & Sys Requirements

SAP Mobility Version Support

- Console – for SAP R/3, ECC and S/4HANA
- ITSmobile – for R/3, ECC and S/4HANA
- UI5 Neptune (Fiori Design) – SAP Version w/ NetWeaver 7.0+
- Fiori – for SAP Version w/ NetWeaver 7.5+

Device Minimum System Requirements

- Console - Windows CE, Windows Mobile, and Android
 - ✓ Telnet Device License (some RF devices are pre-loaded / pre-licensed)
- ITSmobile – Windows CE, Window Mobile, and Android
 - ✓ Industrial Web Browser Device License
- UI5 / Neptune (Fiori Design) – Android (4.3+), iOS (7+), Windows 10
 - ✓ Minimum CPU (1.5 GHz dual core processor), Memory – 2GB RAM /4 GB Flash
- Fiori – Android (6.x+), iOS (12.4+), Windows w/ Chrome (version 45+)
 - ✓ Varies by device: ~4GB RAM, Quad Core (2.15 GHz + 1.6 GHz Quad) CPU, 32 GB Flash



Certified Mobile Devices for SAP®

Industrial RF Scanning Terminals
aka Barcode Scanners, Scan Guns



Four industrial RF scanning terminals are shown. One is a large, rugged handheld scanner with a full QWERTY keyboard and a large screen. The others are smaller, more compact handheld scanners with various screen sizes and keyboard layouts.

Rugged Tablets
w/ Integrated Barcode Scanning



Four rugged tablets are displayed. Two are shown in landscape orientation, and two are in portrait orientation. They all feature protective cases and some have integrated barcode scanning capabilities.

Wearable RF Terminals
Hands-Free & Voice Technology



A person is shown wearing a wearable RF terminal on their wrist. The device has a small screen and a keypad. A headset with a microphone is also visible, along with a handheld scanner being used by the person's hand.

Handheld RF Terminals
PDA/Phone-Style Rugged Devices



Four handheld RF terminals are shown. One is a PDA-style device with a full keyboard and a large screen. The other three are phone-style rugged devices with smaller screens and minimal keyboards.

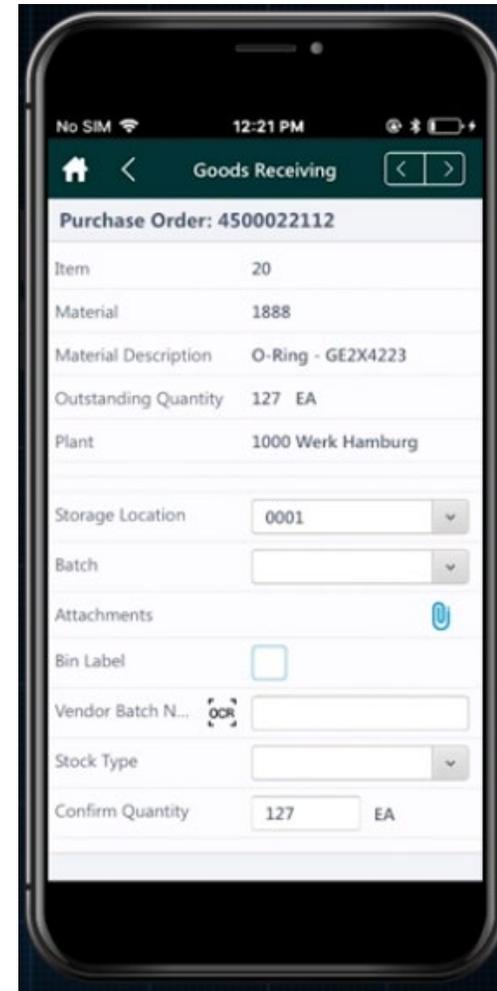
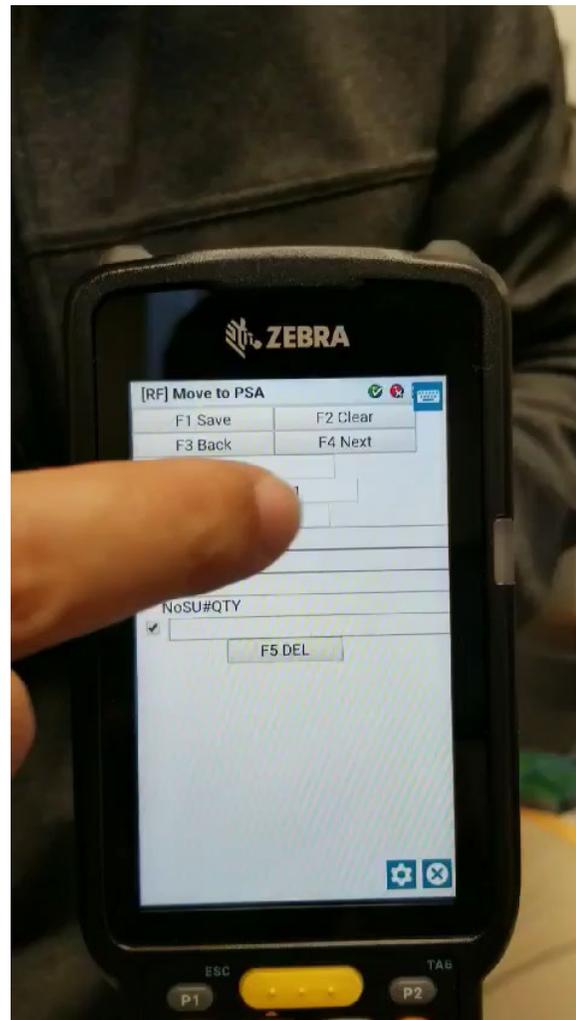
Vehicle-Mounted Solutions
Long-Range Barcode Imaging
Wireless Label Printing



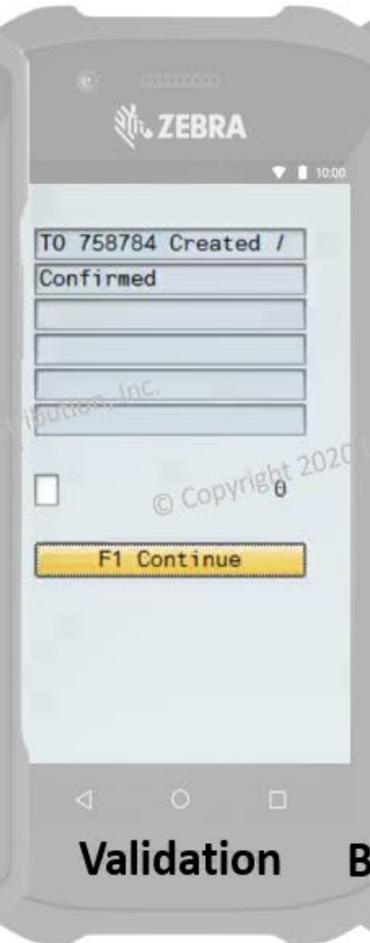
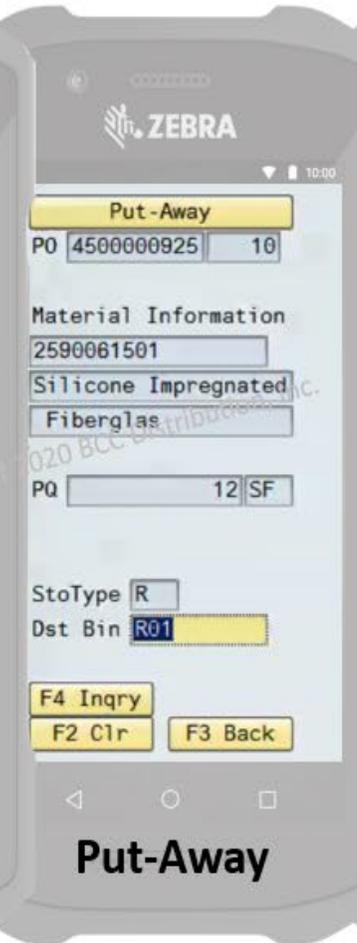
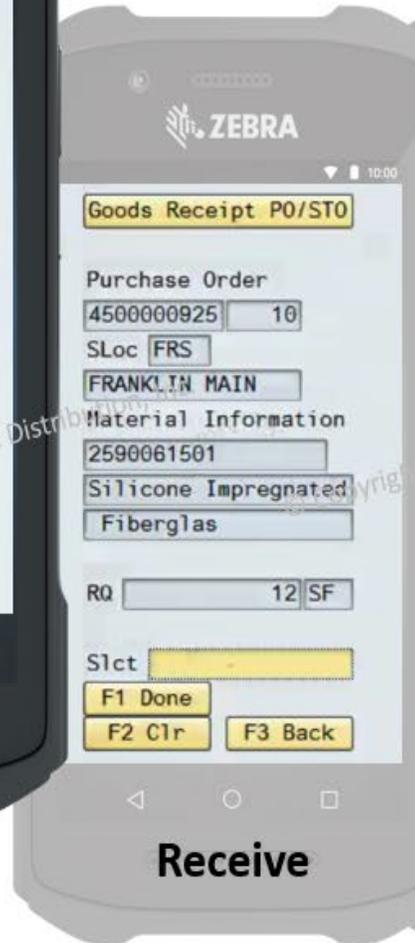
A vehicle-mounted terminal is shown on the left, featuring a large screen and a full keyboard. To its right is a handheld scanner and a wireless label printer that is printing a barcode label.



Poor Examples of Design/Implement



Sample Illustration of an Optimized & Automated Mobile RF Transaction (for use with SAP ECC® and SAP S/4HANA®)



Enterprise Printing [Docs, Labels, RFID, etc.]

Thermal
Laser
Automation
Specialty

Industrial, Desktop and Wireless Mobile Printing
Document and Forms Printing
Print & Apply, Direct Part Marking, and RFID Printing/Encoding
Color, Regulatory and Compliance



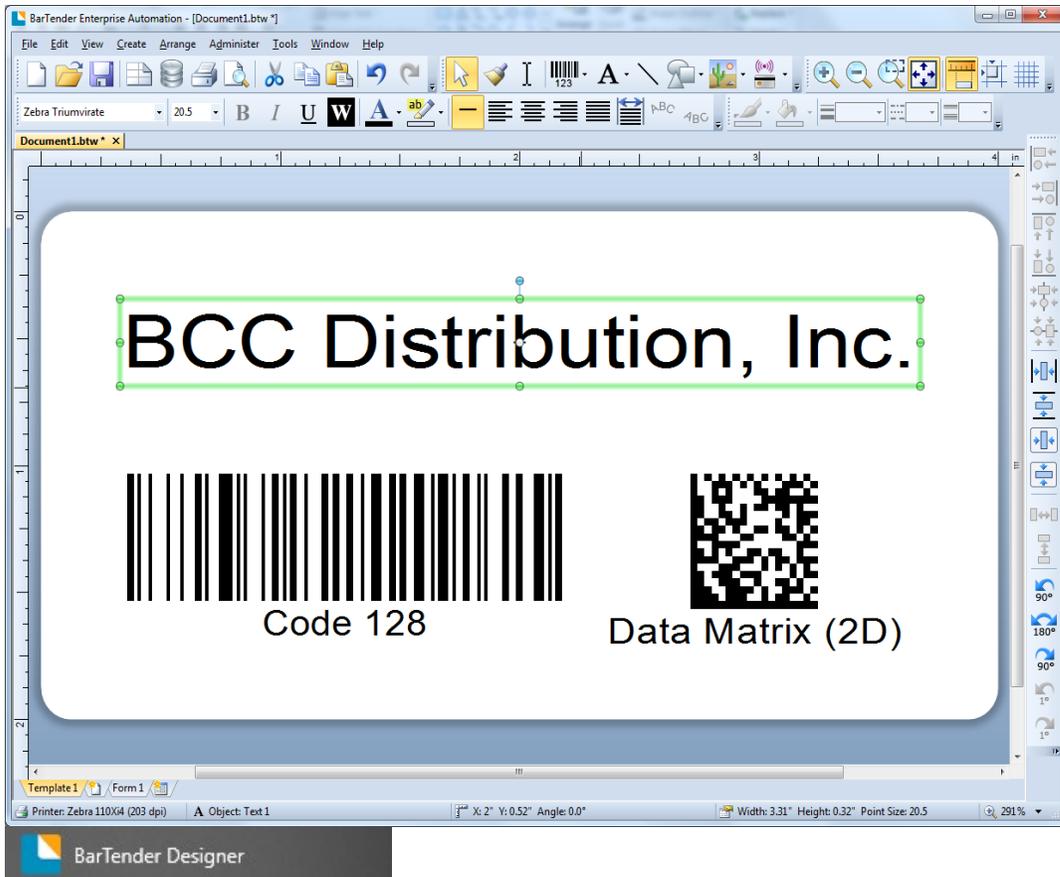
Familiar Printing Challenges in SAP Environments

1. M&A – acquisition of a new business entity + printing expectations.
2. Standardization – multitude of existing/rouge printing programs.
3. Customer Compliance – printing labels to meet a requirement.
4. Complexity – label design and length of time to make any change.
5. Costs – time to implement or dev./programmer resource availability.
6. Limitations – inability to print 2D barcodes, mobile printers, RFID, etc.
7. General printing system performance (poor impl. or architecture).
8. Improve printing system (revision control, graphics handling, security)
9. Addition of web-based (external) vendor/supplier printing support.
10. Personal preference or prior experience.

WYSIWYG & Embedded Code Comparison

WYSIWYG

Easily Design, Modify, Deploy & Print



Printer Code Templates (SAPscript ITF)

Programmatic Code Changes

Template Maintenance for all Formats

Template Maintenance for all Printers

Cut and paste, test, modify, and test again.

Limited to printer font, barcode and graphics capabilities.

```

PrinterTemplate.prn - Notepad
PrinterT
File Edit Format View Help
Format = 'Document', Printer = Zebra ZT411 (203 dpi)
/^XA
^XZ /*RS<<->>.3.N<->.2
^XA /*RR3
^SZ2^JMA /*XZ
^MZY^PMM /*XZ
^PW822 /*MZY^PMM
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^JZY /*JSN
^LH0,0^LF /*JZY
^XZ /*LH0,0^LFRN
~DGR:SSGF /*XZ
/-DGR:SSGF X000.GRF,17136,68,-Z64.eJz2203DYUB/DHEAhdGMMLDIZXSDnFYHSPc
Dm1rODXUR = KWQcYMuDAQd/GNAm7a9CvW7qyCKHM5GSDmVLE89q4QvCD04m9F8ZGc5Hfxq5qXhI6
+6TqBuINC = DmrODXURICzpm0zrTheT+zMKIjempqXNH4Zw8BuWp4knOTDJeN3c4XJUCqbuhs/GYW
jYixJTAME = HU42OdkfHjhg+eF0V0rOzUkKkhaKPT/Sc2mgR5wN6qmaG+6TqBuNC1UONanPC4wz
+NAZONgl = 973kVw5vMTAdvVuxm703L2D8ncmgTWP8GhMqQqTYRyJYTBwT43qZvB69JGQoLw
M0j8YBz = 15q86PqZqMxumHw3+QqXUnoz5ZmNy9j9/PSn80RBYBlavYixJTAME4rhwDjHe4
+uF3zQRn = j29w8WmVjTgZUaUHEI76eD07J06MFLaLhT0a+NAZONglN9ITzmWsnhK5dHwLR
nu01mJTIV = vVrY4GToYb01Gw8gmpfRud96N0Z69YWLtbscHRXvobPfc3mMmYmuG1Z2ZDwYz
rYnz/nM2 = Dvr3ymCngyqMP5LNvysaPj0AVDqG4E64a0b8M0j8YBz8PkuTIAw3GhUmcz9
+1cw3ryCU = 8ANRRTgNj93yWQatS0JN8ZwWVgzcovF0HFLG7j9mWDEWkXg+VwF3QnRul
+bjnyjour = wXNHByk189030d1gM1tyBcyJscOZ2WjZ2mTbCvSms2ubjym3JMTrdLPeWp6AU
+eGrbuWm = 258eAXjpp70LcMM8Mmu854zqH8YzqP80Nvav3uFQrmdsTUN0mUjV7
+KXa6GDo = 6XmH5iYd6DnhvUpy6aerPZ7ZOrM7bHuuqy2wZLEcs7YULI4pXhWdMw9uWZK
+YPAUHT21 = S92+9mQYzba2IPkbyGwZvDbYECZMDY9Cp22ehfktJ3P661B/4vo
u1r2Ma151 = mBy4UwF7H4TYe/rPrEtL9mar+axcGNm5pE6Tg3awibx+L2aCDWAITQ3MPDh0BxM
+ZFDqdEC = T8ZLup+ZIQP3nd8X49RWM3SeY+1cw3ryCUaJERISpOoUaJERISpOoUaJERISpOo
+pvnBdFV1 = UaJERISpOoUaJERISpOoUaJERILU+bjnyjourNwXUAIGa4eCZgagauLBO5FSZR
+IIBhp6S5 = q1YePq38a5DsXvQbXdzvH8pHJvZyAmHoaleZ8ZWNHdpAww1cDKS93IRTg6BjCG
ZMpUfM01 = S+eGrbuWmV0CzKqO8GjSDzBzNz2M5x3UrjGcd1+76nCHYQYHAHZXUoge
^XA = +s26Fkw1
^DFE:SSFI = hYHAvQShJrmMoVKEH204yid2e04kOn5Qm1Lx4Bqao+KXa6GDoM5v27H1
^FO101,15 = OQFYXCabJp4Mv2U96ky4V88myC4TIDZ2B7FKGN+YPAUHT21ndcVXPXzAeLn
^FO101,15 = BpL0k1EV18dnuMqouMbaA5J4TYEeaWuAyV65vUB2ur2Ma15U8pTUjv29SD
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^FO101,15 = MM679DU5Z2XPLUPHZPxoKf7veY80XCMwP0zCmTsm+pmBdFV17pskDOck0H3EXR0
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^FO101,15 = R3JqCEMBp+s26Fkw1Kc8NHRHSv67Yst0pqrFYNVV7E8uDUJGD87-SkTjNPL+7YT
^FO101,15 = hYHAvQShJrmMoVKEH204yid2e04kOn5Qm1Lx4Bqao+KXa6GDoM5v27H1
^FO101,15 = n8+H8p6S587HMA1eF+c63bqHJBLkemo9T4C2pqrFzLNO80KY46zPkdA4FR9j1RYKS
^FO101,15 = QJXkz2e8CKM1a1eF+c63bqHJBLkemo9T4C2pqrFzLNO80KY46zPkdA4FR9j1RYKS
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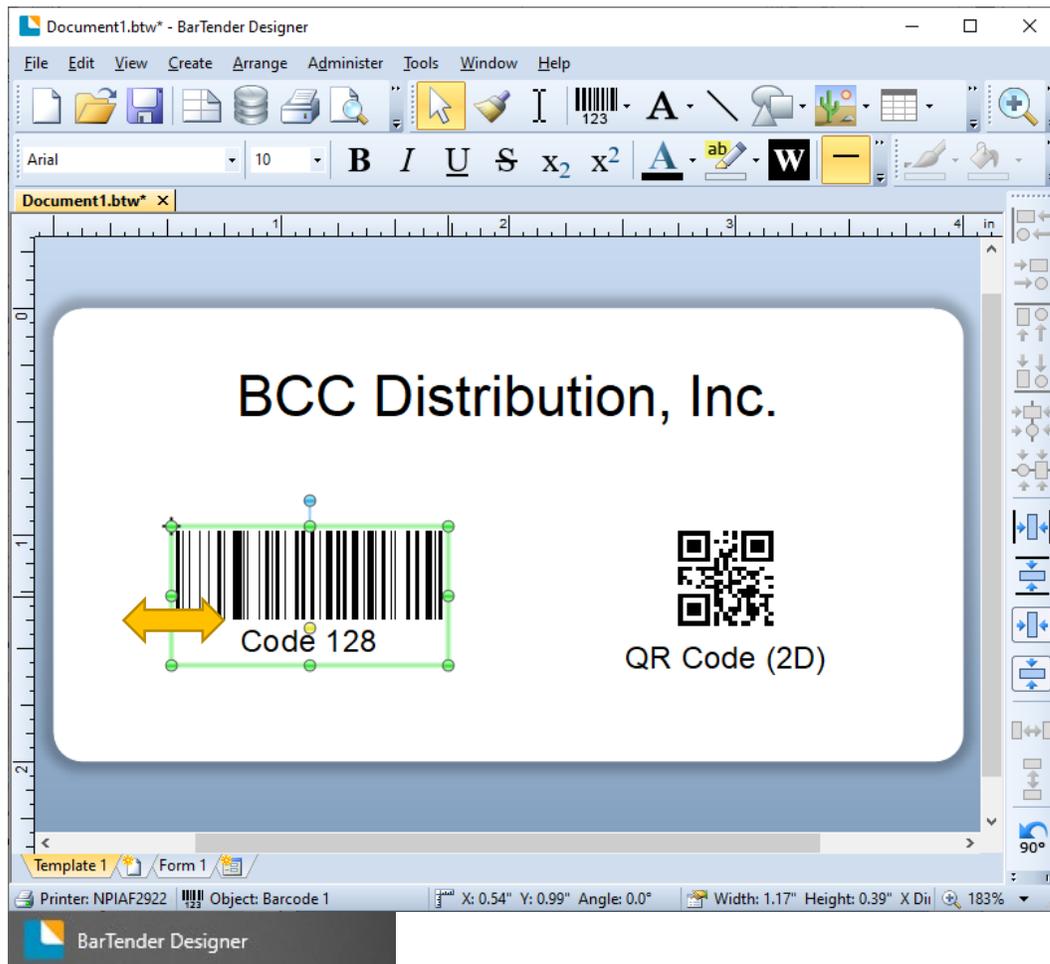
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 YmuG1Z2ZDwYz0xRyGmCngyqMP5LNvysaPj0AVDqG4E64a0b8
 +v
 zAXJppX17c/fLCMM8Mmu854zqtH48YzqP1o8Nvav3uFQrmdsTU
 +a9eQYzjba2IPkby/yGwZvDbYECZMDYsJcP22ehfktJ3P661B/4vo
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ITF (Printer Code Template)

Zebra ZPL (.PRN file)

WYSIWYG & Smart Form/SAPscript Comparison

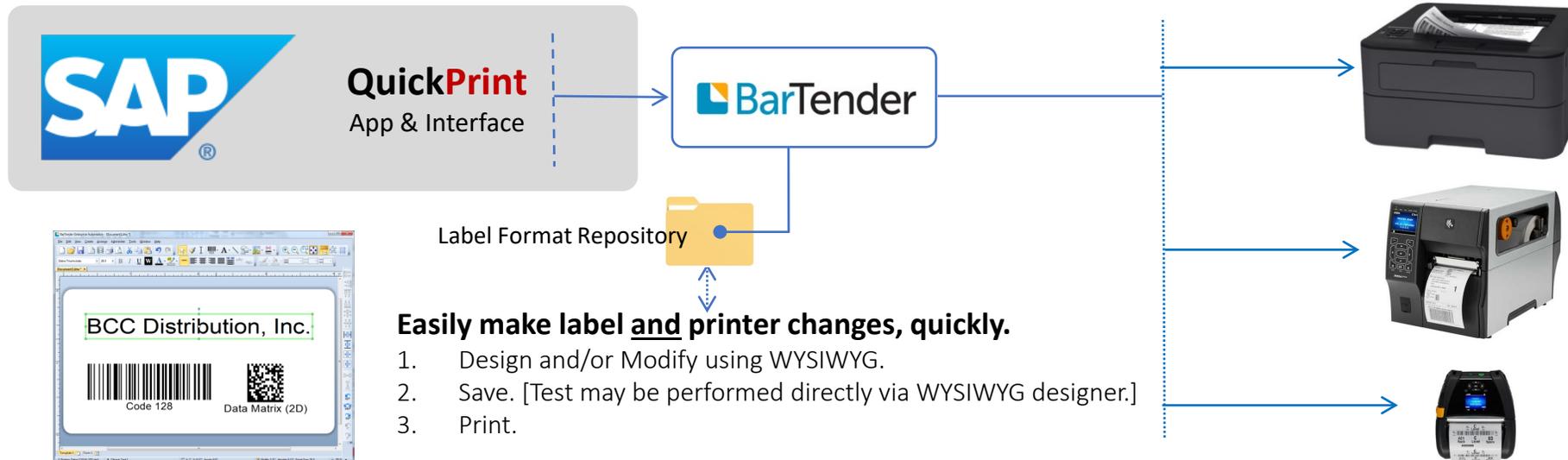
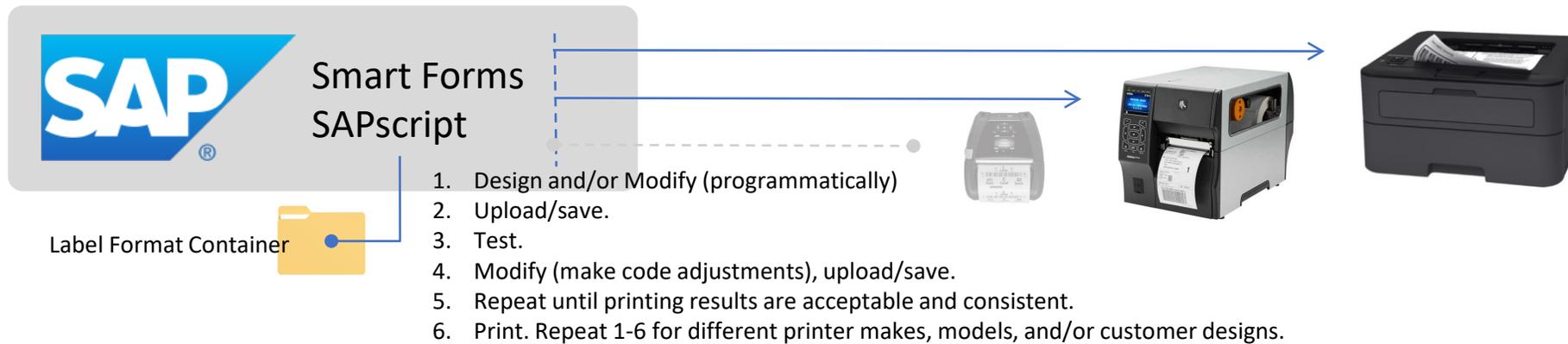
Making a standard ["height" and "width"] adjustments.



Example device type: HP LaserJet. Explanation of SAPscript control sequences.

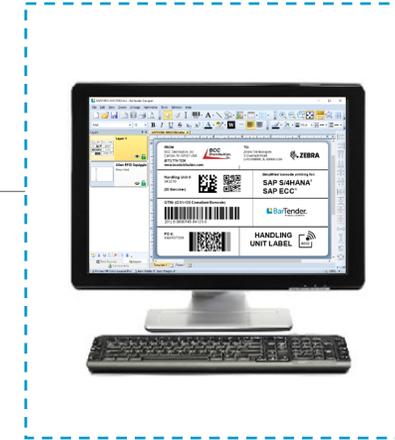
1. A custom barcode is created by copying the system bar code C128A_00 using transaction SE73.
2. Next, bar code ZC128A_0 is included for printer device type HPLJ4000. Each printer barcode has to contain a prefix and a suffix. Prefix is like SBPxx and suffix are like SBSxx. Print control sequences are maintained in both prefix and suffix.
3. For the HPLJ4000, the prefix for C128A_00 was SBP25 and the suffix was SBS01. For ZC128A_0, the suffix is kept as SBS01. For prefix, a new prefix ZBP25 was created by copying the control sequence of SBP25 and then changing it. The logic for changing the control sequence has been explained below.
4. Original control sequence for SBP25:
1B2873317030303068313476352C313062352C313073323437303154.
5. Within this control sequence, height of this barcode is represented by 313476 i.e. 14 point i.e. $14 * 1 / 72$ inches. In order to create a barcode of height 3 cm, this was changed to 383476 i.e. 84 point i.e. $84 * 1 / 72$ inches.
6. **While increasing the width and the spacing of the barcode, it has to be remembered to do it proportionately otherwise barcode won't be scannable.**
7. Within this control sequence, width of the (first and second) bars have been represented by 352C313062 i.e. 5 & 10 respectively, i.e. $5 * 1 / 600$ inches and $10 * 1 / 600$ inches respectively. Ex. changed it to 31322C323462 i.e. 12 & 24 i.e. $12 * 1 / 600$ inches and $24 * 1 / 600$ inches respectively.
8. Within this control sequence, width of the (first and second) spaces have been represented by 352C313073 i.e. 5 & 10 respectively, i.e. $5 * 1 / 600$ inches and $10 * 1 / 600$ inches respectively. Ex. changed to 31322C323473 i.e. 12 & 24 i.e. $12 * 1 / 600$ inches and $24 * 1 / 600$ inches respectively.
9. Changed control sequence is:
1B287331706838347631322C32346231322C323473323437303154

SAP-Integrated Printing Comparison



Enterprise Printing for SAP S/4HANA®

Support for Centralized & Decentralized Architectures
Printer-Based Licensing | Unlimited Networked Users



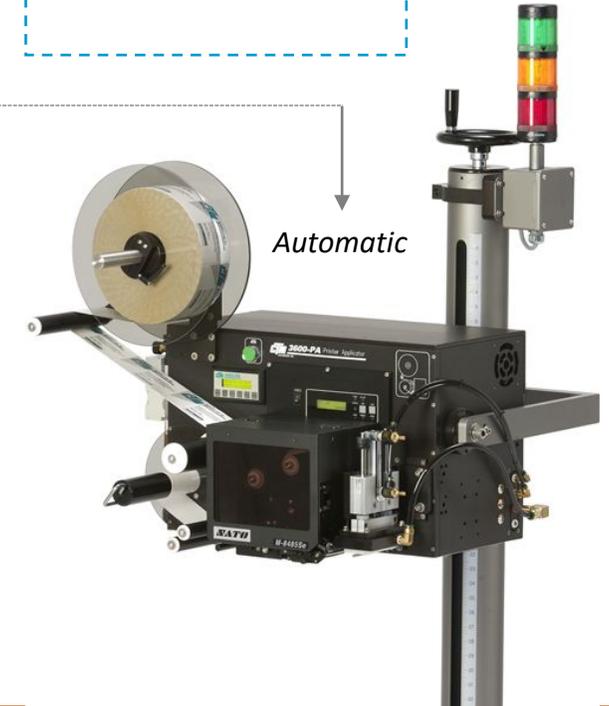
Documents

Labels, Tags & RFID

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