Implementation Methodology for Agentry Based Mobile Applications

Provided by SAP Mobile - Rapid Innovation Group

Applicable Releases:
Agentry 5.X and 6.X - which Includes all SAP based mobile products running on Agentry

Version 1.0
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SECTION 1: IMPLEMENTATION METHODOLOGY

SAP has developed implementation best practices that have proven successful across industries. This Methodology is divided into the follow phases:

1. Scope and Requirements Phase
2. Project Planning Phase
3. Detailed Design Phase
4. Application Configuration Phase
5. QA Testing Phase
6. Project Completion Phase

Scope and Requirements Phase

The scoping phase starts with the Implementation Planning form (IPF) for the specific product version and backend version. This form details all of the configuration options for the OOB product with a goal to align the product with current SAP Configuration and Functional Requirements. This document covers details such as:

- Data Volumes
- Mobile Configuration Requirements
- Screen Modifications
- Connectivity
- SAP Customizations (i.e., BAPI’s, user exits)

The form also has questions designed to flush out any custom requirements that the customer may have. The next step of the process is to create a statement of work based on the information gathered through the Implementation process. SAP has a template that mirrors each question of the Implementation planning form, with details and refined estimates for the most common configurations. Additional information is added to this form and the estimates are adjusted if needed. Each major configuration will be recorded on the SOW. This:

- Establishes budget for project
- Becomes baseline for implementation requirements
- Provides a baseline scope to record changes requests against.

At end of scope and requirement phase - Each of below listed documents are deliverables which are reviewed with and approved by the customer

- Implementation Planning Form (IPF)
- Statement of Work (SOW)
- Functional System Requirements (FSR)
- AKA Functional Requirements Specification (FRS)
- High Level System Design (HLSD)

Project Planning Stage

- Ensuring all project prerequisites are met
- Making sure that your devices are certified to run with Agentry
- Making sure that you have the proper resources available when they are needed
- Making sure that you are aware of all requirements, not just configuration options
- Making sure that all dependencies are identified and recorded in the project plan

Facilitate this planning, SAP provides two very useful tools – the Customer Responsibility Sheet and the SAP Approved Devices list
SECTION 2: UNDERSTANDING REQUIREMENTS

The next thing you need to do is to ensure that you fully understand the project requirements. This goes beyond understanding the configuration choices and goes into broader areas such as:

- What are the Success criteria for the project? What must happen for this project to be considered a success? Do I need to increase productivity by 10% or reduce costs by 30%?

- What are the Performance criteria for the project? i.e. A Workorder should be pushed to the user within 5 minutes of being issued; the device needs to be able to hold 1000 signatures without transmitting.

- Non Functional requirements – number of work orders per user per day. How many equipment records will need to be stored on the device? Will users share devices or will they each have their own?

- Security requirements – Do I require SSL clients? What user security profile will you need for the mobile in the backend system? Are you using LDAP? What security rights will be implemented on Win32 clients, and so forth?

- Connectivity requirements – If I’m using GPRS do I want to implement failover so I always try a network first? If I want to implement attached documents, what are the network implications? Do I need to limit the data sent over my cellular connection i.e., Signatures only in network range?

- Architecture – Will I use load balancing or clustering? Will I use a 64 vs. 32 bit OS for my server, etc? The key is making sure that you are aware of any hardware needs or network configuration needs at the start of the project, not a week before rollout!!

Detailed Design

The detailed design stage will vary based on the amount of configuration and the customer’s documentation requirements. Customers with little configuration will consider the Implementation Planning Form to be the design while others may require documents including:

- Functional Requirements
- High Level System Design
- Detailed design or interface specifications

Based on FSR and high design document(s), we create Detailed Design specifications which capture all the end to end integration details like:

- Business Object Definitions
- Business Rule Definitions
- Transaction Design
- User Interface Design & Flow
- Screenflow Diagrams
- Action Definitions
- Screen Definitions
- Validation Rules
- Transaction to screen/action mapping
- Design Update Processes
- Define target systems
- Define update steps
- Design Error Handling
- Test Cases
- Define test cases and map to FRS

At end of design phase DDS needs to be reviewed with and approved by the customer.
**Design Dependencies**

Since SAP is a mobile front end, it is very dependent on the back end design and implementation. For example, if an SAP BAPI is not yet designed, SAP will not be able to design and configure the corresponding interface to it, and the project plan will slip accordingly.

The absolute best case scenario is that the backend configuration (SAP) is complete before the SAP implementation begins. In larger projects involving multiple teams working together, this is not always possible. If this is the case it is critical that you:

1. Fully understand all of the dependencies.
2. Align the design and our build dependencies with the plan for the backend system.
3. Link these dependencies in the programme project plan to show the dependency and capture risk.

**Application Configuration & Development**

Typically performed in development or sandbox environment.

**SECTION 3: DEVELOPMENT METHODOLOGY**

For highly configured or custom projects, we follow a 4 step design and build process. This process divides the configuration into steps and allows for customer feedback and adjustments at the completion of each step. The process is as follows:

- Step 1 – Data Retrieval/Display
- Step 2 – Business Logic (parallels SAP GUI)
- Step 3 – Backend Updates (via SAP BAPI’s)
- Step 4 – Other functionality

Details of each step follow below:

**Step 1 – Data Retrieval/Display**

- Using the DDS as a guide the team builds the application only to the point where data is retrieved from the backend and displayed on a mobile device. This includes:
  - Objects or Complex Tables
  - Fetches
  - Read Steps
  - Screens for Display
  - Actions for Display

- At the completion of this step, screens are reviewed with the client and the application is turned over for testing against the DDS and FRS. And SAP moves to step 2.

**Step 2 - Business Logic**

In step 2, the team builds screens to capture data while implementing rules and logic to validate the entries. During this step, the following definitions are configured:

- Transactions definitions
- Complex Tables for Dropdowns
- Complex Table mapping to UI
- Screens to Capture Data
- Actions for Transactions
- Client side rule definitions
Once complete, another meeting is setup with the client to review this functionality, and the expanded application is provided to the client again for additional testing against the DDS and FRS. SAP then moves to step 3.

Step 3 - Backend Updates

Changes are now made to the mobile app to update the backend with information collected on the device. For SAP this includes the BAPI’s. For other implementations, it can involve Web services, XML or other connection methods. The specific configurations involve:

- Update Steps
- Business Rules for Edits
- Customer Checkpoints

A third review session is scheduled and the application is again tested with the client to validate updates are being made to the backend properly and all business rules are being followed. After the review session, the further expanded application is provided to the client for additional testing against the DDS and FRS. SAP then moves onto Step 4.

Step 4 - Other Functionality

Finally, the team builds in any additional functionality. This involves configuring:

- Pushes
- Printing/Peripherals
- Other configurations

When these configurations are complete the team then participates in a final iterative test session with the client team.

QA Testing Phase

During the QA phase, the following tasks are executed:

- Define and Document Functional Acceptance Test Plan
- Transport Configuration from DEV to QAS
- Point Agentry Server at SAP QAS environment
- Integration Testing
- User Acceptance Testing
- Testing Round 3
- Sign off

It is a standard best practice that developers do not test their own code. In larger projects, we have found an effective practice is to have unit test checklists that developers sign off on as they perform their unit tests as well as when they peer test. This not only provides a paper trail, it encourages accountability.

As with the development environment, it is critical that your test environment match your production environment. This means that:

- You test with production logic.
- You test with the same devices that you will deploy over the same communication channels.
- The test environment has the same data, configuration, and security as the production environment.
- You have a firm issue resolution and point release plan agreed beforehand.
- It is also important that the project peer testing integrate the customer provided test cases to ensure that all scenarios will be tested.
**Project Completion Phase**

Project completion includes both Post Go Live support and Project Closeout.

Post Go Live Support is an important part of the process as it helps the users become comfortable with the system, identifies opportunities to fine tune, and provides for a mechanism to implement approved changes.

Post Go Live Support includes:

- Support client team
- Review feature requests/issues raised by users
- Implement new features

Project Closeout helps record any lessons learned during the project and helps position the project for long term success.

Project Closeout typically involves:

- Recording lessons learned in a formal document and meetings
- Long-term support transition to SAP Technical Support via the SAP process available from our Support Center
- Financial project reconciliation

**Project Plan**

When the required documentation has been completed, all dependencies will be identified and recorded in the project plan, along with all configurations and their time estimates. The project plan is based on the SOW and Detailed Design Phase and will include activities from all 5 Phases.

Two important things to note:

- Resource allocation is applied at 80%.
- Dependencies are assigned to all tasks (defines calendar time for project).

A sample project plan template has been provided:

SAP - Syco MS Project Template.mpp
Three Layer Development Cycle

Work Manager’s 3 layers of Development

Layer 1:

- Complete the Development & Configuration in SAP.
- Test the BAPI wrapper.
Figure 2: Mobile Data Object High Level Flow
Figure 3: SAP Mobile Development process
Layer 2: Java Development

- Develop the required Java Classes
- Generate the Jar file

Layer 3: Agentry Development

- Configure Mobile Application in Agentry
- Publish and Test in ATE
- Test on Mobile Device

SAP Development Environment

One of the most common causes of development issues is a development or QA environment that differs from the final production environment. It is critical that both the development and QA environments match production especially in terms of production data and configuration.

- Note: This is not just the quality of the data, but the quantity. If you have 20 equipment records in Dev or Test and 200,000 in Production, you are going to miss required configurations as well as fail to catch possible issues

You will also need real data such as Work orders, equipment records or whatever transactional data your application is based on.

Security is also important. Design, implement and test your security profiles before the project starts and be sure that all environments have matching configurations. If you test with an admin profile and go live with limited user profiles, you run a huge risk of issues that escaped the test process.
Finally, when setting up your development environment, do not forget that the consultant or a designated project resource will need access and rights in the back end system to create transactional data such as workorders for development and unit testing.

SECTION 4: STREAMLINE YOUR APPLICATIONS

The performance of your application will be impacted by the size of your application. The size is determined by the number of definitions, indexes, screens, rules, etc.

Especially if you have a large application, you will want to search for and eliminate any unused definitions. This will not only optimize performance, but will make the application easier to maintain. The tool used to examine your definitions is the dependency checker.

You also want to monitor the number of production logic versions in your server as all versions in the production folder will load at startup and consume memory. You only need to go as far back as your oldest unsynched user and finally data volume. There are two types of data in Agentry. There is the static data held in complex tables and data tables, and there is the transactional data held in objects and transactions.

Streamline data – Bring down only necessary data and always implement exchange processing to download changes only.

Prepare for Go Live

Once testing has been signed off, the customer prepares for customer go live. This involves the following tasks:

- Training
- Transport Configuration from QAS to PROD
- Point Mobile Server at SAP PROD environment
- Configure Devices
- Limited PROD Test
- Customer approval to go live
Implementation Methodology for Agentry Based Mobile Applications

Check List Before Go-live

1. Installation of Add-on (done) - This is through transport request from QA to PROD.
2. Ensure that you read the Post Installation Steps mentioned in the Configuration Document. These will be necessary in the later steps below.
3. Activate BC Set – This is usually done through transport request from QA to PROD.
4. Perform Post Installation Steps as mentioned in the document [One of the steps is related to maintaining Number Ranges. If the Number range that we maintained is locked in TR, then you can Transport it].
5. Move all Agentry Mobile related work bench and customization transport requests.
6. Check Authorization and Roles to users in production so that transactions can be posted. Ensure that mobile users have the right authorizations as per post installation steps mentioned in the document.
7. All the mobile users should have S_RFC.
8. Data Setup for Work Manager Application in SAP
9. Every Mobile User needs to have a HR Personnel ID assignment if CATS is going to used.
10. Maintain User Parameters along with values for all Mobile Users .
   a. IWK [Maintenance Planning Plant]
   b. LAG [Storage Location]
   c. SWK [Maintenance Plant]
   d. WRK [Plant]
11. Agentry Installation (done) – Ensure that the installation as a Production Server.
12. During the installation process of Agentry – Ensure that you have a SERVICE USER ID & PASSWORD.
13. NOTE: Make sure that the SAP System ECC 6.0 can be reached from the system where the Agentry Server is installed.
14. Ensure that you update the classpath in the file Agentry.ini follow the steps mentioned below.
   a. Open the Agentry.ini in edit mode.
   b. Look for the section [Java-1], below this section you will find classPath.
   c. This path needs to be edited to include a reference to Z_SAPWM-5.3.0.0.jar.
   d. Remove the ./Java sections. Your final classpath should look as an example given below.
      i. [Java-1]
      ii. classPath=./ini4j.jar;/sapjco.jar;/Java/Z_SAPWM-5.3.0.0.jar;/Java/Agentryv5.jar;/Java/SAPWM-5.3.0.0.jar;/Java/SAPCommon-122971.jar;
   e. NOTE: The reference to the jar file Z_SAPWM-5.3.0.0.jar is before the core Work Manager Application by the name SAPWM-5.3.0.0.jar. This is important.
15. Take the latest applications from QA and deploy it to Agentry Server on Production.

Deployment and Roll Out

You will need to make sure that the customer works with the hardware vendor to plan the physical roll out of the devices and then answer questions such as:

- Will they use mobile device management software such as Afaria or SAP MDM?
- Device imaging plan (i.e. Agentry client, VPN client, GPRS configuration, network configuration, etc.) for rollout
- Logistics determined for imaging/shipping/deployment.
- Optimal GPRS settings and Wireless LAN settings
- Optimal hardware settings (calibration, brightness, contrast, etc.)
- Are they going to have the devices etched with ID numbers or otherwise cataloged?
- Storage/Charging strategy defined
- Support/backup strategy (extra flashcards, extra styluses, how do they replace bad devices or devices that need to be reloaded, etc?)
- All other roll out related questions.
You will also need to make sure that you have measured and taken into account the network load for the deployment. The first load requires all complex table data be loaded and will require significantly more network bandwidth than subsequent transmits. Take into account the number of clients that will connect simultaneously.

Support considerations:

**Training** – You will need to consider formal training for the support personnel. They will need to be versed in:

- Agentry Administration
- Client use
- Troubleshooting

**Administration** - You will need to designate a SAP administrator who will be the single point of contact for SAP technical support.

**Support contact** - You will need a point of contact for users in the field.

**Issue resolution** - You will need a solid plan for Issue Resolution in production and planned point releases

**Customer Responsibility Sheet**

During the SOW process, the customer is given a customized Customer Responsibilities sheet. This document is provides a checklist of all things that they must have in place before the consultant can start work on the project. This document is very detailed and covers requirements pertaining to:

- System Access
- VPN requirements
- SAP Dependencies
- Mobile Server specifications
- SAP Permissions/Authorization that need to be in place
- Developer Keys
- Permissions for BAPI’s
- Transactions

**SAP Approved Devices List**

The second document, the SAP Approved Devices List, can be found on the SAP resource center via the customer portal. This document is a list of all devices that have been tested by the SAP QA department and certified to run with Agentry.

When checking this list, be aware that many devices have various OS’s and peripherals options, so be sure to check the exact specifications of your device for the Agentry version you will be implementing.

- If you want to move to a device that is not on this list, you can contact your Account Exec or consultant and they can walk you through the process of getting your device certified.
SECTION 5: VERSION CONTROL
The next best practice is universal to any software project – version control. SAP has new team development functionality that will take you through the new methods of checking in your code, but if you use team development or old fashion version control where you check in your projects, it is critical that you check in your projects on a regular basis, and have a configuration management plan in place.

It is equally as important that you do not move code from environment to environment by copying it directly from one server to another. You should always tag and check in the code and then deploy from version control using a predefined process. This is especially important in large deployments where you have a lot of hands touching the code and a separate deployment team, or in projects that have gone live that have multiple trunks of code that need to be kept synchronized.

Check with customer to see if they use a version control tool that can be used for the projects.

SECTION 6: COMMENT YOUR CODE
Comment, Comment, Comment!
This is one of the most often broken cardinal rules. Every developer hates to do it, but nothing is more important. Remember that once you finish the configuration, most likely another group or SAP technical support will need to support it. If modifications or upgrades are ever necessary, it might not be you who does the work, and even if it is, you may not remember exactly what you did a year later! Put detailed, concise notes on editor definitions and in your backend scripts.

SECTION 7: TEST ENVIRONMENT
It is important that you have a separate environment available to do the required testing. Most importantly, make sure that the test environment matches the production environment in terms of Configuration quality and quantity of data and in security.

You also need to test using production devices over the production connection methods. This means that I have test users configured with real life security privileges, I have test Workorders that mirror production Workorders, and I have the same volume of equipment and location records as I do in production.

It also means that I am testing with the same devices that I will use in production (i.e. if I am deploying on IPhones or CE devices, I test with these devices – NOT a windows client) and testing all of my connection methods (i.e. you may see different issues connecting over GPRS than you will with a straight network connection, or if you are going live with a network connection that fails over to GPRS, you need to be able to test this). You need to test using production application logic as the behavior differs slightly from the development servers. Keep in mind, if the QA environment differs from your production environment, you are not doing a true test and you risk missing potential issues that may pop up when you go live.
SECTION 8: SAP PROJECT TESTING METHODOLOGY

The Functionality Acceptance Test is an end-to-end regression script that is provided for every SAP out-of-the-box product. The consultant modifies this script to reflect any new functionality or changes they made to existing functionality. This is basically a regression test to ensure that:

- The system is configured as specified in the IPF or design doc.
- No standard functionality has been impacted by the configurations.

The SAP project testing methodology is as follows:

- Develop (Unit test as you develop).
- SAP runs through functionality acceptance test end-to-end.
- SAP fixes any issues uncovered and retests.
- SAP runs through the functionality acceptance test with the customer.
- The customer logs change requests and issues encountered during testing.
- SAP fixes any issues uncovered and retests.
- The customer retests fixes.
- The customer signs off on the Functionality Acceptance Test.
- The users may or may not opt to do UAT with the end users (SAP is typically not involved in this).

So we’ve made it through testing, let’s talk about some of the best practices when rolling out your code to the users.

SECTION 9: CLIENT DEPLOYMENT

First of all, when you first install Agentry, a client executable must be installed on each device and then the client must transmit to reload its resident data (the equipment, location and other data that needs to reside on the mobile device). This is going to require careful planning—especially if you have a large number of users, or if your users are in physically dispersed locations or work different shifts.

There are several ways to deploy this client executable that range from physically touching each device to pushing the client out with SAP’s device management software or third party software.

Let’s take a look at the different options:

1. The first option is to run the installer and **physically install** the client on each device. This is typically not used in the larger implementations.
2. The second option is to install on one device, copy the data from the device to the **flashcard**, and then copy the data from the flashcard on to the device. Note that this method still requires that you touch each device.
3. The third option is **imaging the devices**. This is a popular method when using Win 32 clients. Just a quick tip – If you go with an imaging option, one common mistake is transmitting with the device before creating your image. The problem is that the first time the Agentry client connects to the server, a unique ID for the device is created in the registry. If this is not manually cleared before creating the image, you will get transmit errors because all devices will have the same ID.
4. **Mobile device management software**, which can push the Agentry Client to the device from a centralized location, can be an application such as Afaria which is used by our SAP customers or SAP’s MDM product that is included in your Agentry licensing.
Device Deployment

How is the customer going to roll out the hardware? You need to carefully plan the hardware deployment at the start of the project.

Decisions will need to be made regarding questions such as:

- Are the devices going to be etched with ID numbers or otherwise cataloged?
- What are the optimal GPRS settings and Wireless LAN settings?
- What are the optimal hardware settings (calibration, brightness, contrast, etc.)?
- What is the device imaging plan (i.e. Agentry client, VPN client, App center software, GPRS configuration, network configuration, etc.) for rollout?
- Am I going to configure the device to make sure that all apps and settings are reloaded automatically on a cold boot if desired?
- What are the logistics for imaging/shipping/deployment?
- What is my strategy for storage and charging?
- What is my support/backup strategy (extra flashcards, extra styluses)?
- How do they replace bad devices or devices that need to be reloaded, etc.?)?
- Any other questions that might relate to the specific customer needs.

SECTION 10: DATA FIRST TIME SYNC

When a client is installed on a device, the first time it connects it must do its initial synchronization to the server. The first sync time will be much longer as the client needs to download or update all of its resident data. After any subsequent transmits, the exchange process kicks in and only deltas are downloaded (i.e. if you add 10 Equipment records, only those 10 records are downloaded. The entire table is not replaced).

As this is a larger volume of data than a normal transmit, keep the network load in account and test to measure impact before deploying a large number of clients. You may also want to consider pre-building the client using one of the deployment options that we discussed previously.

Keep in mind, if users are limiting the data based on the area that they work in or some other criteria, multiple clients may have to be pre-built and the deployment and support carefully planned.

SECTION 11: SUPPORT STRATEGY

What is the support strategy for the roll-out? You will need to plan the logistics of who will be available, where they will be located, who the users will call with issues.

Who will contact Technical Support if necessary? This person will need to be trained on how to work with the log files, how to enable them, and what information to send to Support.

For production issues, we follow the same strategy as we do in testing. A new software release will only be made if it is a showstopper issue. Otherwise, all changes will be incorporated into a point release that will be put into production after regression testing at a pre-determined date.

SECTION 12: TRAINING BEST PRACTICES

Your training needs will vary depending on the level of configuration. Installations that are closer to out of the box are very intuitive and will require as little as 3-4 hours of training. More complex installations that implement complex processes and forms and/or multiple integrated could take significantly longer. The typical SAP training involves train-the-trainer type scenarios where the consultant will train super-users who will train and work with their peers. Decide early on who will be in the classes, how many will attend each session, when they will be held, and what type of support material will be provided. We strongly recommend training users right before they start using the devices, and that all relevant scenarios are covered (i.e. for Work Manager, cover both corrective maintenance and planned maintenance with job plans).