

SAP NetWeaver BPM, BRM, WDJ 7.3 – Use Case & Design for the Public Sector Industry



Applies to:

SAP NetWeaver 7.3, Composition Environment, Business Process Management, Business Rules Management, WebDynpro for Java

Summary

This article is a Use Case/Design Pattern for A Complaint/Issue Management System for a Public Sector Organization such as a Local Self Government. It explains how one can realize a quick solution to this case using SAP's BPM, BRM 7.3 technologies. It serves as a good guide to those wishing to innovate solutions in this industry sector.

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1. Introduction

1.1. About this document

This document is a whitepaper on the implementation of a Citizen Complaint Management System. It will guide you through why a Citizen Complaint Management System is so crucial in a City Governance Organization like a Municipal Corporation. It will spell out the Use case and brief you through the Solutions that a typical Public Sector organization may have at hand. We will next run through the Business Requirements followed by the Technical Details on Architecting this solution. I have referred to an interesting study done on the SDN BPM Use Cases <http://wiki.sdn.sap.com/wiki/display/BPMUC/Streamlining+multi-channel+services+example+-+Handling+issue+reports+submitted+by+citizens>

1.2. Who should read this – the Target Audience

We would like to the following consultants to read this document, study it and keep it as a guide for implementations and reference – SOA Solution Architects, SAP Technical Consultants and Customer Engagement Managers.

This document will serve as an idea to those wishing to implement software services that are common across the Industry and take advantage of a Roll-Out Model.

2. Let's take a look at the Use Case (Citizen Issue Management System)

2.1. The Dilemma in a Public Sector Organization (City Government)

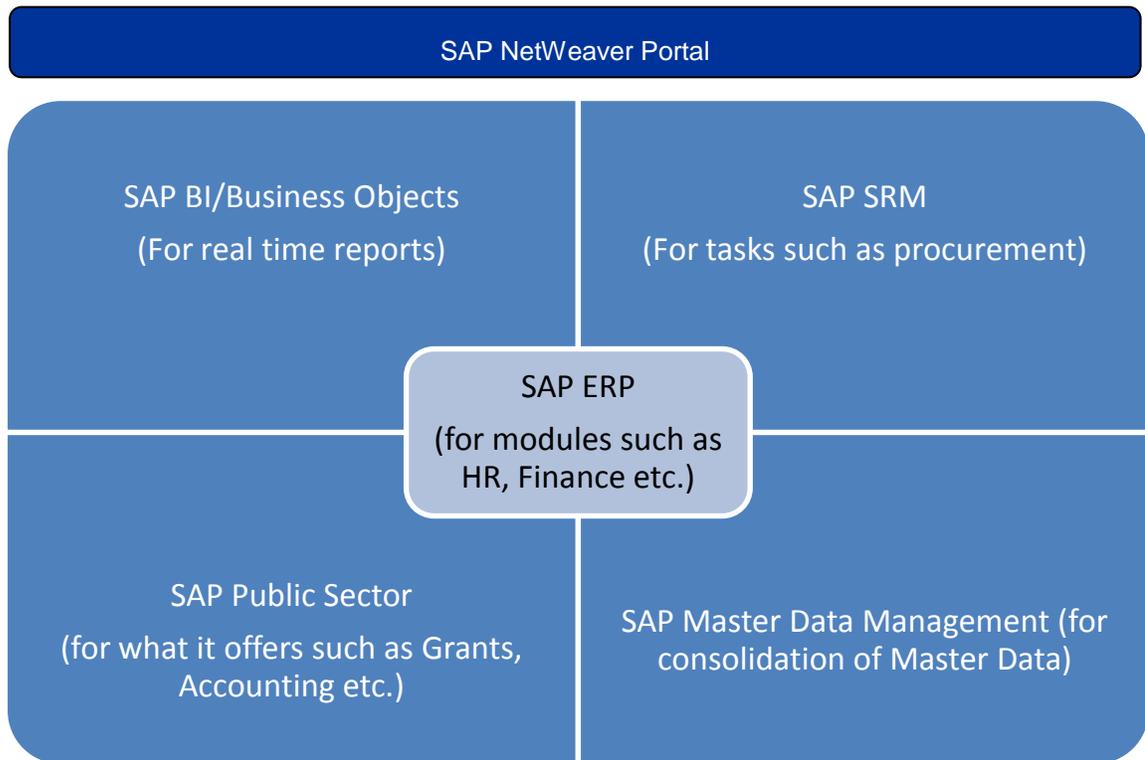
We are all as such, customers in some way or the other of this Industry. The Public Sector Industry spans across City Governments, State Owned Utilities such as Electric Supply, Oil and Natural Gas and so on. The Case study we have here takes a Local Self Government such as a City Municipality as its example; **Right from paying Local Taxes, Tolls, Water Supply Bills, License costs for setting up a shop all the way up to a service which catches the eye of the media – A Citizen Grievance System or A Complaint Management System.**

Large Metropolitan Cities have built systems and Early Watch systems that monitor various Infrastructure set-ups in the City such as Telephone lines, Electricity Lines etc. that regularly send feedback about the Quality of Service and any outages or failures if any. This is supposed to ensure uninterrupted service. However things may not always run as smoothly as we expect and as time goes by, only a Feedback service from Customers will give a true picture of how things are running.

In many Cities, large amount of Complaints are generated by several means. It becomes then a mammoth task to organize them into genuine complaints, pass them over to responsible departments, take care of financial restrictions and notify the Citizen once completed. **And, of course, a responsible organization would want to see real time analytics of Data and plan out a strategy of improvement in areas which are consistently failing.** These, are indeed, very important points to consider.

2.2. What SAP systems a City Government will implement.

Now, there are already several Public Sector bodies that are currently running SAP Solutions such as Local Government bodies. Let's take a look at what solutions a City Government maybe using.



In all Scenarios, an SAP NetWeaver Portal can be used for User Interaction (I've seen a scenario where an SAP Portal has been accessed over the internet by thousands of Citizens to see what's offered).

Now in this Whitepaper we will try to make use of the SAP NetWeaver CE/SAP NetWeaver Portal system to quickly prototype a Solution where Citizens, over a publicly accessible SAP Portal can lodge a complaint.

3. A Quick Run of the Solutions in hand

The Solutions we can make use of (considering now we are in an SAP environment) are:

SAP's Java Persistence API implementation

One can model entities and carry out the entire Data Modeling using SAP's Implementation of JPA. It's a robust and tested solution for performing DB Persistence Operations and Searches. Using this technology we can implement a Staging Database. **In the Best Practices of BPM Implementation, if there are large amount of data to be stored and retrieved it is quite advisable to store the bare necessary data in the BPM context and stage the remaining in a database.** JPA is a quick and reliable way to not only model data but also create wrapper services for actions on this data such as creating records, deleting them, querying records and so on.

SAP NetWeaver Business Process Management

Until recently, SAP delivered its Portal in a separate 'box' and its SOA Composition Tools in a separate 'box' called SAP NetWeaver Composition Environment. With releases of the latter in versions such as CE 7.10, CE 7.11, CE 7.20, consultants composed their solutions in these boxes and consumed them in as SAP NetWeaver Portal. **However, since the release of SAP NetWeaver 7.3 recently, the two tools have been merged.** It makes it all the more flexible to implement.

Here we use BPM to draw and realize the workflow strategy in a Customer Complaint Process. Routing to necessary users, escalation of tasks, sending of notification mails can be carried out using BPM. Moreover, with the 7.3 version SAP has released the API's for tasks such as initiating a process (which was earlier done through a Web service invocation), reading tasks assigned to a user

and completing them. Vendors may chose to implement SAP BPM using their own UI solutions such as light weight JSP/JSF to Mobile/Table PC interfaces

SAP NetWeaver Business Rules Management

Needless to say, SAP NetWeaver BRM is also delivered along with the 7.3 version and can be easily used to implement and consume rules that govern an organization in a BPM Process or elsewhere. This is a flexible tool that now even provides a User Interface for Business users to edit rules on the fly.

WebDynpro for Java, JavaServer Pages, SAP NetWeaver Portal

WebDynpro for Java is undoubtedly one of the best options you have for integration with BPM. But now with 7.3 – again! you can chose to use your own lightweight UI's and implement the BPM API's e.g. in a JSP, JSP etc.

4. Business Requirements spelt out

Now that we have a case study and the tools, let's draw out the Use Cases.

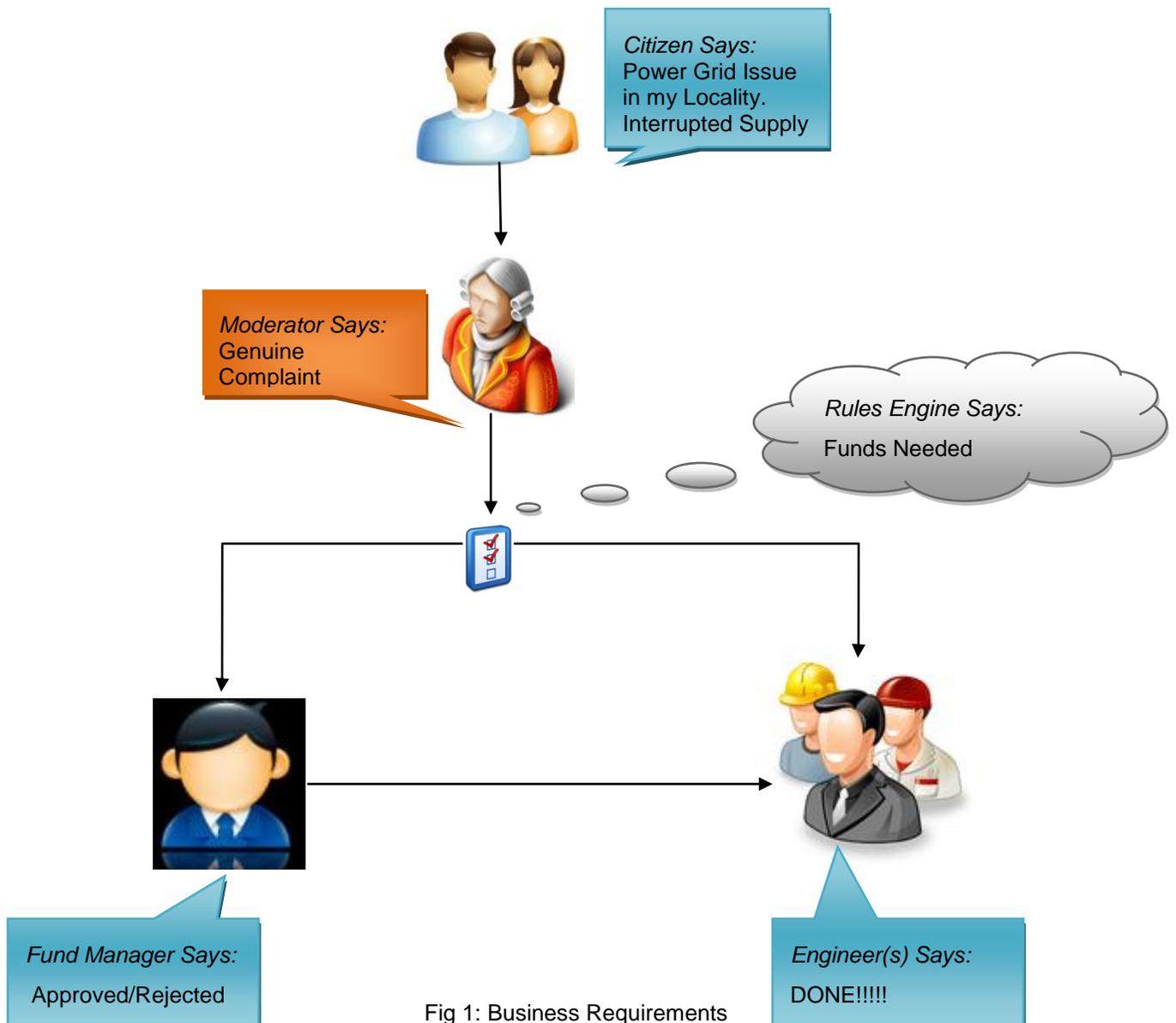


Fig 1: Business Requirements

1. A Citizen/Group of Citizens may want to report an issue that needs immediate attention. She/he will fill out Mandatory fields of the Complaint Type (e.g. Water Works) and Complaint Sub Type (e.g. Shortage), Email ID, Telephone Number and Description.

Now, we can't expect a Million Citizens to have Login ID's on SAP Portal, neither would we recommend it. **We can provide a Form to fill this data on an Anonymous/Non-Logged in Page. This is quite OK, as many Citizen Portals in the world don't expect their users to be actually be UME Users in the system.**

2. One might ask, what can stop an end user from flooding the system with "fake" requests. This makes it advisable to have a step between the citizen and the actors who will perform the main tasks. You can call him a **Moderator**. Technically speaking, this helps the BPM engine too; as we need *raise a BPM process only once the Moderator starts it*. The citizen's filled data is only persisted in a database!
3. Once a Moderator initiates a Process based on Data received, we need to check up a matrix of Business rules stating which Civic Service Department (not show in the diagram) it must be forwarded to. The Civil Servant from the group that picks it up first is expected to read the complaint and suggest a fix in words and submit the form.
4. Once submitted the **Business rule** is expected to decide if Funds may be needed to carry out the task. If so it needs to be forwarded to a Fund Manager. The Fund Manager may put a few words and do the necessary fund allocation manually and pass it on to the group of servicemen/engineers, or may just stick on to the task till funds are available.
5. If a Fund Manager submits the request ahead, the group of engineers will receive the task and seeing the Civil Servants comments earlier will proceed to fix it and submit the form again. On this last step, the Citizen will be notified by email which she/he earlier mentioned and the process comes to an end.

5. Architecting the Solution

5.1. Data Modeling using JPA and BPM

The good thing about using SAP's JPA in SAP NetWeaver Developer Studio, is that you can complete 2 tasks – Modeling Data and Generating Java Classes for Data Objects in one go.

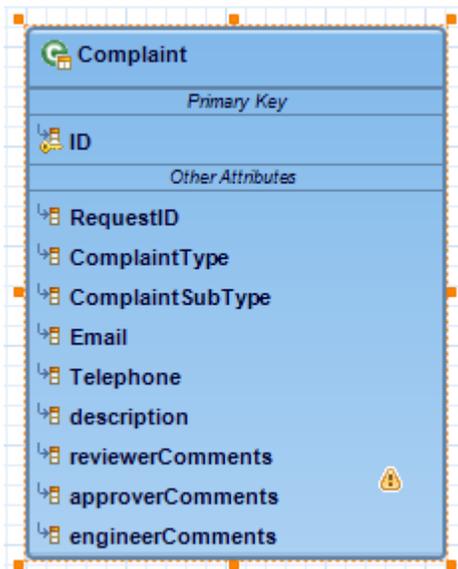


Fig 2: Entity Model

Shown above is a snap shot of how one can create an Entity with its attributes in the JPA Modeling tool. One can then generate Entity classes from the same.

Now, the Entity class is nothing but a class having the attributes with accesors and mutators. **What you really need next is a Session Bean with methods to perform “Creates” (executed when citizen submits the form), “Updates” (executed at every step in the BPM to incorporate comments), “Reads” (Technically needed to populate the form with data from the database at every step in the workflow) and “Deletes” (for a moderator to delete junk requests).**

Now, it's worth mentioning here why we use JPA and a custom defined Database tables to hold data during the process.

Well, effectively SAP BPM itself keeps the data in the context and you can stick to that. But, if it's a massive Process in terms of Data (e.g. Creation of Material for Material Master, Creation of Employee with employee Data), it's not advisable to store so many fields in the BPM Data Context. The number of fields can sometimes go up to 300 in number and it would load the BPM engine to a great extent. Moreover, you may not want to lose crucial information if somebody accidentally deleted your BPM process from the process desk.

Staging data is always an important resource in Querying and Analytics and Compliance, so you will get additional benefits this way.

Even in our use case where number of attributes is low but volume of BPM processes is high, it makes sense to keep the bare minimum attributes in BPM and the rest in a staging database.

The way to go about this is by keeping a common attribute such as a Request ID in both places (BPM context and Database Table)

5.2. Process Flow using BPM and BRM

Shown below is a sample model of the process.

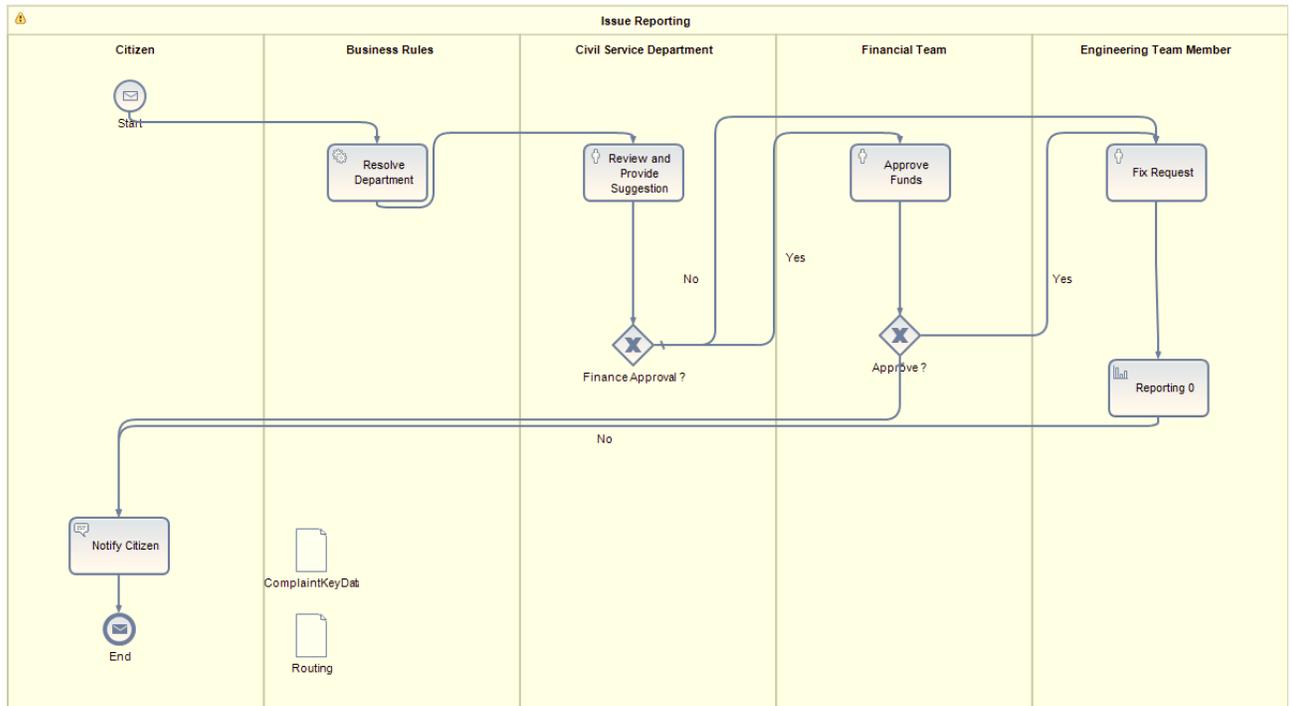


Fig 3: BPM diagram

1. **Citizen Lane:** The Process is well defined in Lanes, one for each actor. As one can see, the step where a Citizen fills the form and where the Moderator initiates it or deletes it is not in the BPM process.

This is so because, the first actor in a workflow is the initiator of the process and while a BPM administrator can track even this data, keeping the same within the process would need somebody to start the BPM process to reach there. Nobody will want somebody to start a BPM for them and then fill the data. So we trigger the BPM process from a WebDynpro Application or so.

In our case study even after a Citizen fills a form and submits it, we don't yet start the BPM process. This is simply because a Citizen is anonymous and we want to put in some security here. This fits in well with our Business requirement as well, since we want a Moderator to take a call on whether to start a BPM process or not.

Hence, the Citizen and Moderator step is not technically a part of any of the lanes. In the section on UI Design we will see how we provide UI's for these 2 Actors.

2. **Business Rules Lane:** This Lane is just to single out one activity for readability. This is the Automated BPM Task which invokes the BRM Web service. The BRM Decision Table created gives an idea of how a task which, now, the moderator has initiated will be routed to the right Civil Service Department.

Type	Sub Type	Department Approver Group = {String}	Financial Approval Needed = {boolean}
Water Works	Leaks in Water Lines	WW_LEAKAGE	false
	Shortage	WW_SHORTAGE	true
Solid Waste Man...	Garbage not lifted	SWM_GARBAGE_LIFT	false
	Silt to be lifted	SWM_SILT	false

Fig 4: BRM Table

This means, if a Moderator has initiated a Process out of a Citizen Compliant where the Complaint Type is Water Works and the Sub Type is Shortage the Portal User Group to forward the task to is “WW_SHORTAGE”. And once that step is completed it just cannot go to the Engineer but rather to a Fund Manager because Financial Approval needed is **true**. The advantage of using BRM here is easy maintenance by the Company.

3. **Civil Service Department, Financial Team & Engineering Team:** These Lanes in the BPM hold Human Task artifacts in BPM. This means that we use a common WebDynpro Java Component for all of these 3 Steps.

We attach the WebDynpro Java Component to all the 3 Human Tasks and the Actor of the Human Tasks is dynamically retrieved from the BRM. Each of these Actors can place a comment in their respective field in the UI and Approve/Reject/Complete their task according to their role.

A BPM Context Parameter in each of these Human Tasks will tell the WebDynpro Component at Runtime what step it is. Accordingly we could disable/enable certain fields and show/hide certain buttons (e.g. We would not allow a Fund Manager to change the technical description on fixing a problem written earlier by the Civil Department).

We would also like to mention here about the Task called “Reporting”. This is a Task in BPM which can be used to consume some of the BPM Parameters. You can then create a DataSource out of this and use it for reporting in Visual Composer.

5.3. User Interface design with WebDynpro and JSP's

Tackling a UI Design strategy can not only be challenging in implementation but will have a big say about the success of your application once used. And when a million users are going to use it, it better be sturdy and appealing. In this section we will study the different options we have and how we go about choosing the UI based on the role.

Citizen User: This must be a UI which is light weight, appealing, and easy to use, minimal fields and lastly, made available as an anonymous content on an SAP Portal.

What we readily have for this is a JSP. We can enhance it with JavaScript libraries (such as jQuery) for its look and feel.

The image shows a mobile application interface for filing a complaint. The form is titled "Complaint" and includes the following fields and controls:

- Email*:** A text input field.
- Telephone*:** A text input field.
- Description*:** A larger text area for providing details.
- Select complaint : *:** A dropdown menu with "Select" as the current selection.
- Select complaint sub type: *:** A dropdown menu with "Select" as the current selection.
- Buttons:** "Cancel" and "Submit" buttons at the bottom.

Fig 5a: Citizen Form

On click of Submit, we persist the data on the form using the CRUD operations mentioned earlier. The BPM has not yet been started.

Fig 5b: Citizen Form

The UI can be consumed by a Portal iView and provided on an External Facing Anonymous Portal.

Moderator: This is a UI used by the Moderator to Initiate/Cancel tasks raised in the earlier step. Cancelling a task is all about calling the delete operation on the complaint. And Initiating a Process from the Complaint is all about invoking the Update operation to assign it a Request ID. Since initiating a process involves invoking the all new released BPM 7.3 API, taking all things into consideration, the best UI to have here in a WebDynpro for Java Component.

Moderator Screen

ID	Request ID	Complaint Type	Complaint Sub Type	Description	Email	Telephone
602	BLANK	Water Works	Shortage	There's an acute water shortage in my suburb. Please fix it ASAP.	city1@gmail.com	+919999999991
603	BLANK	Solid Waste Management	Garbage not lifted	I'm out of the shire in Mordor. Please lift the Garbage	frodo.baggins@shire.com	+441212111223
604	BLANK	Water Works	Leaks in Water Lines	asdasd	sadasd	sadasd
605	BLANK	Water Works	Leaks in Water Lines	Leak in water line. I need it fixed for Stark Industries	stark@stark.com	+12345678987

Initiate Complaint Process | Delete Junk Data
 Note *: Select a record that you do not want to process to delete it permanently. Otherwise select the same and press Initiate complaint Process

Moderator Screen

ID	Request ID	Complaint Type	Complaint Sub Type	Description	Email	Telephone
603	BLANK	Solid Waste Management	Garbage not lifted	I'm out of the shire in Mordor. Please lift the Garbage	frodo.baggins@shire.com	+441212111223

Initiate Complaint Process | Delete Junk Data
 Note *: Select a record that you do not want to process to delete it permanently. Otherwise select the same and press Initiate complaint Process

Fig 6: Moderator Form

One can make a Portal iView out of this Application and assign it to a Authenticated User form the company.

Civil Service, Funds Manager& Engineer: BPM provides a mechanism to generate a WebDynpro for Java UI Component straight out of a Task in BPM. Assuming the BPM has a Context (which I had earlier said you must keep to a bare minimum), you can proceed to generate the WDJ component out of this context. The Wizard not only sets up the dependencies but also creates the necessary events, buttons and View.

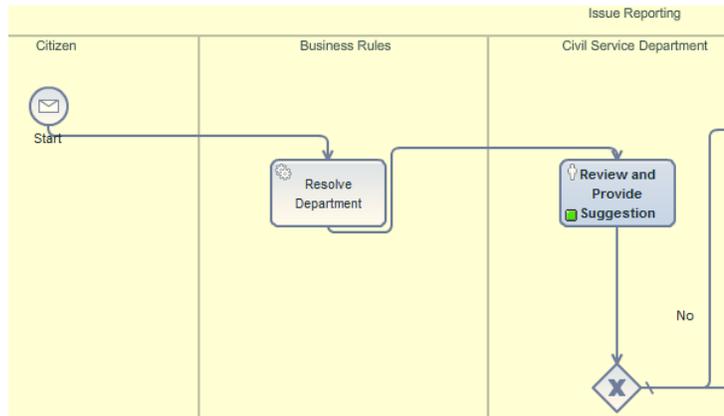


Fig 7: Process Visualization

Quite good! Now an important design consideration.... Do not make multiple WDJ Components for each task in the BPM where the Screen is more than 50% similar. For example, in this case study, the Civil Service Executive, The Fund Manager & the Engineer have almost the same UI. Except that, the Fund Manager gets buttons to Approve/Reject, the Engineer just gets a single button and that each of the 3 can only edit a Text Box on the form for comments which are applicable to them.

Civil Service - Please suggest on this - CUST-606.

CUST-606

Task Data

Due at: <No due date> Status: In Progress Attachments: 0 Process: [Issue Reporting](#)
 Owner: SHORTAGE, Priority: Medium Notes:

Task Application

Reviewer Screen

Enter the details here

Complaint Type:	<input type="text" value="Water Works"/>
Complaint Sub Type:	<input type="text" value="Shortage"/>
Telephone:	<input type="text" value="+4412345"/>
Email:	<input type="text" value="frodo.baggins@shire.com"/>
Description:	<input type="text" value="Out of the Shire for a few"/>
Reviewer Comments:	<input type="text" value="Release the Water from D"/>
Approver Comments:	<input type="text"/>
Engineer Comments:	<input type="text"/>

Fig 8a: Civil Service Form

Fig 8b: Engineer Form

It's useful to use WDJ here since we can control visibility and edit ability easily. In BPM we can set up a Context Parameter and Hard-Code it to a String e.g. "Reviewer", "Engineer". The WDJ View can pick up this value at runtime and set up the UI accordingly.

5.4. Business Analytics with Visual Composer

Analytics is a must these days with organizations wanting to review data and correct a few wrongs. We haven't covered much on this topic here, but could write a few points on it.

The Reporting Task in BPM allows you to extract BPM Process context Data and create a Data Source. You can then use Visual Composer as a tool to generate a report based on this data.

Furthermore, BPM itself provides for 4 standard Data Sources related to Process Infrastructure Data such as Initiators, Task Dates and so on which you could utilize.

Now, in a scenario like ours where part of the Data is in the BPM Context and some other portion of it in a Staging Database, you can make a Data Source of the Database table you have for storing the Staging Data. Next, you can make a Mash-Up of the BPM Data Source and the Staging DB Data Source to view complete Data.

5.5. Going Further with User Experience

1. Mobile UI's?

The buzzword in the Consulting market is enabling User Interfaces on a Hand Held device. SAP itself is investing a lot in developing Mobile Apps for its Business Suite. Consider looking at the same user interface for a Citizen on a Mobile. You can visualize it the same way as seen in the JSP developed already.

Fig 9: Mobile App

Use of jQuery in the JSP is targeted at giving it a Mobile UI look and feel. Now since the Citizen form itself can be built as a Web Module without authentication; ideally just accessing this Web URL over a mobile would suffice.

However, if you would like to build a Native Application for, say, an Android Platform or an Apple MacOS, it shouldn't be very difficult. Developing the UI involves finding and using the right plug-ins for Android platform. All you need to do is on Submit you need to develop a feature to persist the data into the Database which you have been using all this while. Since we are not yet starting the BPM until it reaches the Moderator there is no BPM called from the mobile.

2. Customer Tracking

In the previous point we saw how we can make things better for an end user from a UI point of view. Another thought, is how one can make a Citizen aware of his process and where it stands at the moment.

An enhancement to the solution to address this would be to assign the necessary roles to the Guest user to view BPM data in the BPM's view of the Running Process. As seen in an earlier screen Fig. 7, Process Visualization shows the step where a process rests. Since the same is nothing but a URL with a ProcessID parameter, one can enhance this solution to provide a "print preview" of the Process Data plus the Process State.

6. Conclusion

Ever since SAP released BPM and BRM, it has caught the attention of many customers who have business processes in their organizations spanning various systems. Seeing that it would've been pretty cumbersome, they avoided migrating these to SAP. But with BPM, it's much neater to implement.

Some of the industries that these clients fall under are: Retail, Finance, Telecommunications and Public Sector. Some of the use cases involve Master Data Creation of Vendors, Customers and Materials. Many use cases also involve non Master Data operations such as Complaint Management, Cash Advances as so on.

In our Use Case, ***we would like to highlight the best use of BPM, BRM and their related technologies in the Public Sector.*** Governments across the world implement schemes to enhance interaction with the public to help them improve their own works. It also helps increasing accountability.

We would recommend ***brainstorming the services offered by the Public Sector (both within and those in tandem with the public) and develop more such use cases.***

Related Content

Hope you enjoyed reading this article. If you would like to read more about these topics, we recommend you visit the following site.

[An Introduction to CE](#)

[Industry Trends Report](#)

[Use of BRM](#)

[SDN Use Case for Public Sector on WIKI](#)

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