Journal of The Gujarat Research Society

ISSN: 0374-8588
Volume 21 Issue17,December 2019

An Efficient Policy-Based Adaptation of Workflow Processes through MOVE Framework

Dr. P. Malar
Assistant Professor, Department of Computer Science, Kaamadhenu Arts and Science College, Sathyamangalam.

Abstract: *In recent years, the foremost of the progress area unit having issue to adapt the advanced policies and most of the approaches required customized workflow engines. In our paper we tend to projected a brand new changed MVC framework for imposing the advanced policies to dynamic workflows. The framework Model-Operations-View-Events (MOVE) is especially supported Model-View-Controller pattern that is employed to feature the dynamic sites. The controller element in MVC framework is spitted into 2 blocks that area unit Operations and Events owing to artifact too several codes into the controller in MVC pattern we tend to area unit going for MOVE framework. Our aim is to style a progress processes as a template in abstract level. The progress language is employed to implement the logic and imposing the any kind of policies. Additionally to the present we tend to area unit attending to value by suggests that of learning the confidentiality and it's used permits the application-specific adaptation work running instance.*

Keywords: *MOVE, MVC, Confidentiality, Business Process Management (BPM), Web Services Business Process Execution Language (WS-BPEL)*

I. INTRODUCTION

In recent years, web services are becoming an emerging paradigm for business organizations and collaborations. A workflow is used to support workflow management systems for business execution. It mainly focuses on combining the web services into aggregate services. The modeling and controlling the execution of complex application processes are main objectives of workflow management in business organization. The syntax of the workflow system is used to run the business smoothly, and most of the organizations are using workflow language in workflow system for different parts of the business plan. The language used in workflow management systems are referred as business process management (BPM). The best examples

for workflow languages are Web Services Business Process Execution Language (WS-BPEL), Yet another Workflow Language (YAWL), which are used in workflow management systems to run the business smoothly. Workflow language is mainly used for high level system operations for example copying files, moving task etc [1]. Workflow can be set of consecutive task. The task may be delegated sometimes to services.

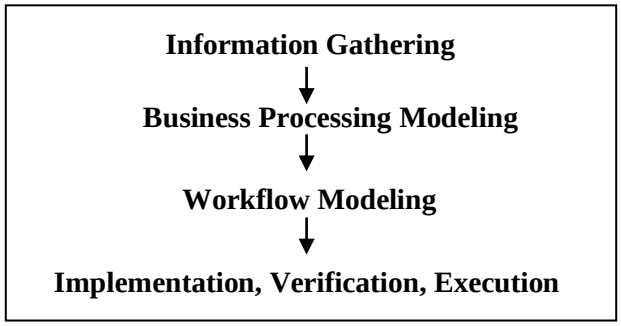

Figure: 1 Workflow Process

Workflow confidentiality is another important requirement for dynamic adaption in composite web services.

Enforcement of access control related constraints is the basic requirement for confidentiality. In this paper we are going to explain to main constraints for confidentiality such as a Separation of Duty (SOD) and Bond of Duty (BOD) in our example [2]. The two specific task are performed by different people is said to be a separation of duty. The user identity is mostly known in the workflow instance in SOD. As a result dynamic adaptation of the workflow is the main necessity for SOD and it is also used to check whether second task is performed by different user or not. In dynamic context, policies are used to specify the workflow processes and behaviors [3]. Instead of the service responsible for one task another service is used wrongly in that case adaptation policy is needed in workflow models.

This research work identifies four important requirements in dynamic workflow adaptation policies [4].

- Modeled separately
- Flexibility
- Portable
- Robust

The aforementioned are important requirements in dynamic workflow adaptations:

Modeled separately: The adaptation policy can be separated from functional requirements to reduce complex workflow and it enhances reusability of existing solution.

Flexibility: To implement complex policies that goes beyond the possibilities offered by traditional workflow. So the adaptation policy must be flexible one.

Portable: The adaptation policy solution must be portable one without any invasive modifications in existing workflow engine.

Robust: The application -specific adaptation is required at runtime to organize the task to user that satisfies the policies.

It has to handle similar the adaptation policies like SOD aforementioned.

According to the user provide information the framework generates the workflow specifications. It supports both deploy and runtime adaptation workflows .The Model-Operation-View-Event framework (MOVE) is proposed in this paper for policy-based adaptation for workflow processes. The proposed framework in our paper should support those four requirements aforesaid. In addition to this we are evaluating the workflow process by means of case study of confidentiality.

This paper is structured as follows. Section II introduces adaptation policies and brief study about confidentiality. Section III introduces a new proposed framework called MOVE framework. Section IV how the policies are imposed in workflow processes. Section V concludes a paper.

II. A CASE STUDY ON CONFIDENTIALITY

In recent years confidentiality becomes more important in the field of software. The key factor in confidentiality is controlling the access to the resources that contain sensitive information. On the other hand Hammer and Schneider [4] gives the new definition for confidentiality. It stated that *confidentiality is a thought of 1) ensuring that information is accessible for reading, listening, recording or physical removal only to subjects entitled to it, and 2) that subjects only read or listens to the information to the extent permitted.* These two can be achieved with access control and encryption mechanisms. A subject may be a person or organization or a processes.

Workflow is set of consecutive task. A task is defined as a set of coherent activities fulfilling a specific functionality. In our paper for access control purpose we are introducing a new concept called OrBAC. The Role based access control does not provide flexibility as a result we are using organization based access control. It is mainly used to define a security policy which is independent of implementation. To achieve a security policy there are two levels in organization based access control.Concrete level: subject, object, action.Abstract level: role, activity, view.

The OrBAC [5] model is used to relate the task, workflow, role, permission, organization, and user. In this model we are adding two access control constraints such as Separation of Duty (SOD) and Binding of Duty (BOD). The constraints can be explained briefly with an example such as task x and y are performed by same user from organization A (BOD). The task x and y can also be performed by different user (SOD).

Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue17,December 2019

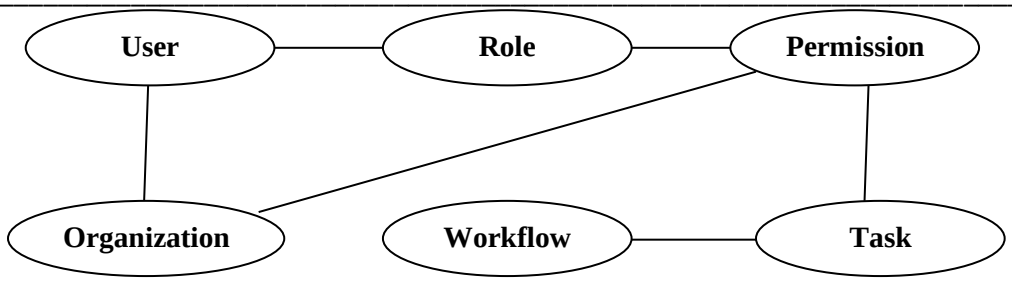

Figure 2: OrBAC Model

The organization uses workflow to execute the task by itself or sometimes the task given to other users and also other organizations. The unauthorized user in the organization reads the confidential information is said to be violation of an information flow policy. To overcome the violations of policy we are assigning permitted roles to the user who can execute the task.

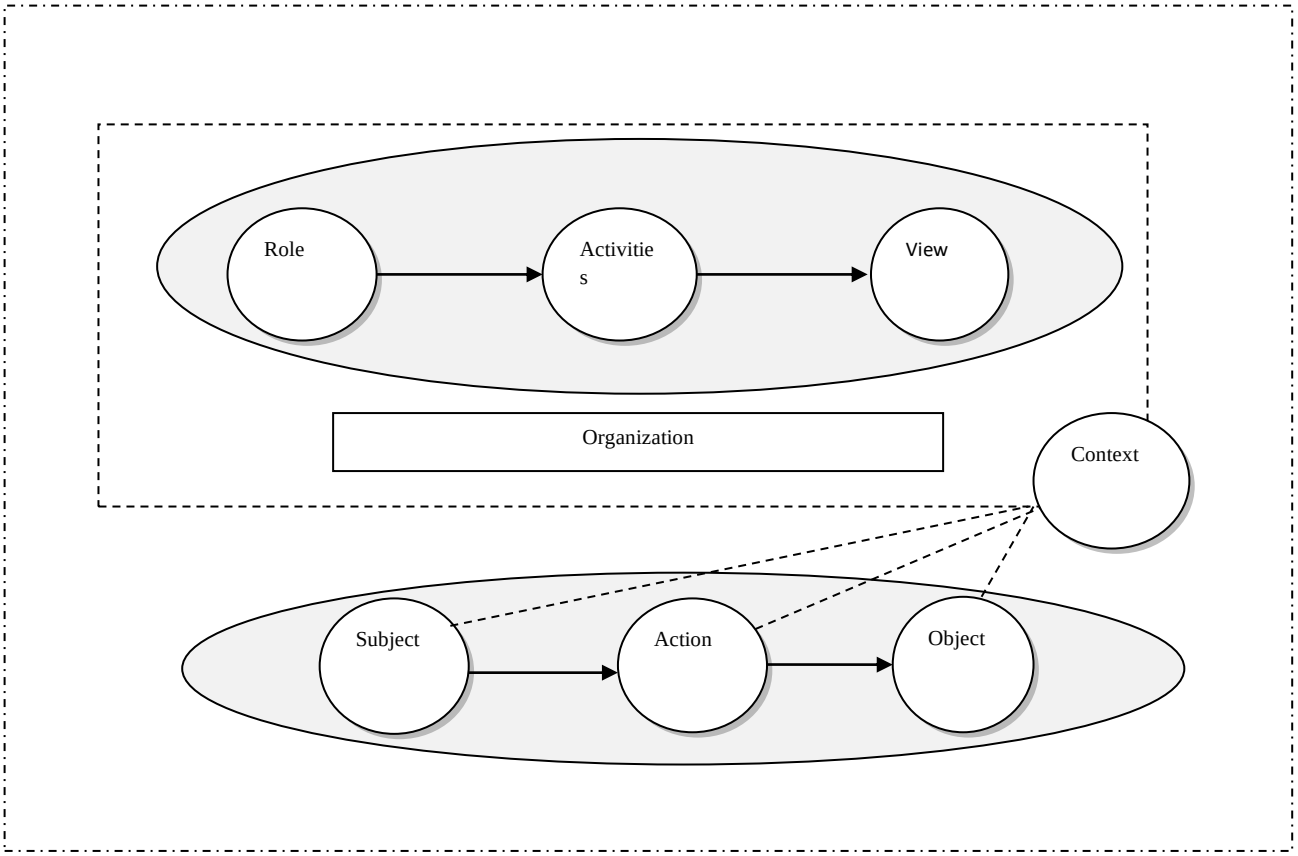

Figure 3: Organization Based Access Control

Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue17,December 2019

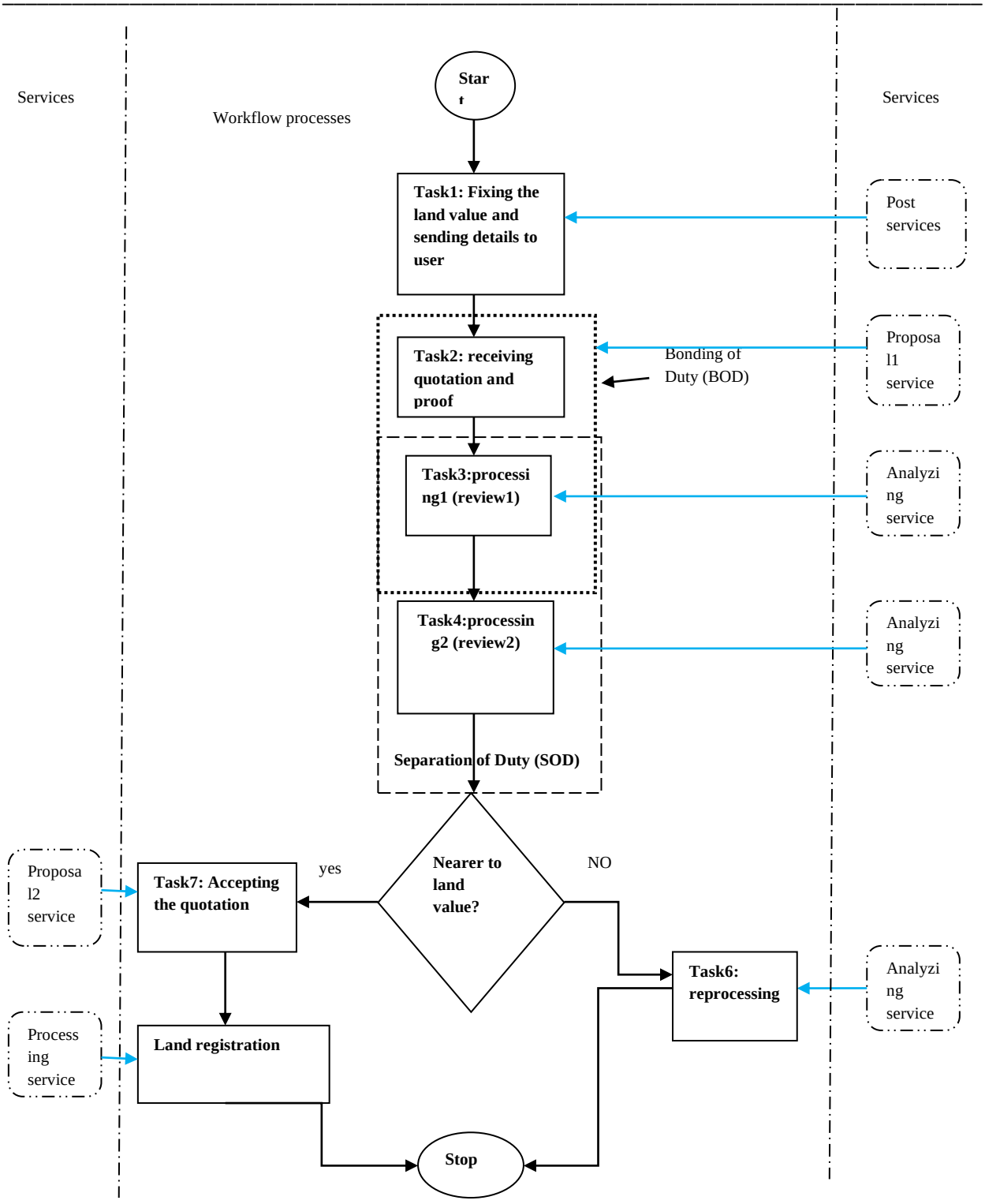

Figure 4: Online Land Sales Service

In this subsection we are going to study about the example online land sales and service. In our example we are going to see about process of fixing the land value and process of selling the land to the registered users in online web service. The workflow is explained briefly in fig 4.

In this research work, we are going to fix the starting value for land which has to be sale and sending land information details to the users who are all registered. The registered users list is taken from our organization database (task1). The receiving quotation along with the identity proof from each and every user which has to be sensitive information constraint and quotation information can be read by permitted user from organization only (task2). In our example we are going to enforce the access control constraints also. A bond of duty (BOD) regulates the users who are all sending their quotations to the organization and the process of validating the received quotation and the identity proof details are started (task 3). The task 2 and 3 are marked with dashed rectangle. The BoD is an example of an information policy on the organizational level. There are always two independent process for validating the users quotation and proof details (task3 and 4). As a result the user's quotation is compared with current land value. If the user quotation is high means then the quotation is accepted by organization (task 6) and land registration is started (task 7). On the other hand if we receiving the user quotation are not satisfied means we are doing the comparing the process again and again (task 5). The separation of duty is involved so that in order to be effective task 3, 4, 5 needed to be performed by different persons for validating the proof and quotation. Once the results are obtained means the land registration is started.

III. MOVE FRAMEWORK FOR POLICY-BASED ADAPTATION

We are introducing a MOVE framework that allows adaption of WS-BPEL process in dynamic way. According to the user's expectation our framework is proposed. In this section we are going to explain about the overview of MOVE framework and also used for policy based adaptation.

A. Overview

The proposed framework generates a workflow according to the user adaptation logic précised in controller block. Dynamic adaptation of running instance is done according to runtime adaptation logic. We are going to discuss the main building blocks of our proposed new framework. In our proposed framework, it includes Model Operations View Events [6, 7] .The figure 5 shows the basic structure of MOVE application

1) Model it assembles everything in the application.
2) Operation it encapsulates everything application does.
3) Events used to join all the components safely.
4) Views it is mediator between application and the user.

ISSN: 0374-8588
Volume 21 Issue17,December 2019

1) **Model:**

It warps knowledge i.e., it contains the function that is used to check the database but it does not contain function which is used to upload or save in the database. That would be the job of operation block. In our paper model block includes the aspect library, policy and instance related data. The different aspects of WS-BPEL activities should be modularized as specific task [8].These entire tasks are reusable and bundled in the library. An aspect defines basic and structured WS-BPEL activities which recognize a particular functionality. The evaluation of adaptation policies are done by parameter or properties of policy-related data. The instance-related data uses the value of the variable from workflow and its current executing activity. Dynamic adaptation of running instance is depending upon the specific workflow.

2) **Operations:**

It is responsible for making changes, showing the right view at the right time and responding to event triggers. It is called Doers of MOVE world. It has to select the logic according to information available through the model i.e., it has to select the adaptation logic based on the information available. The adaptation policies are defined as set of context –free and context-sensitive constraints on the task which constitute workflow.

3) **View:**

View is used to display the state of the application in simple meaningful manner. It merely emits events to operations and waits for changes listening to events emitted by models [9]. The master process is designed using aspect library as a template. It specifies the sequence of tasks which is to be executed and also it is designed as a process. If the task depends upon the certain constraint then only general types are included.

Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue17,December 2019

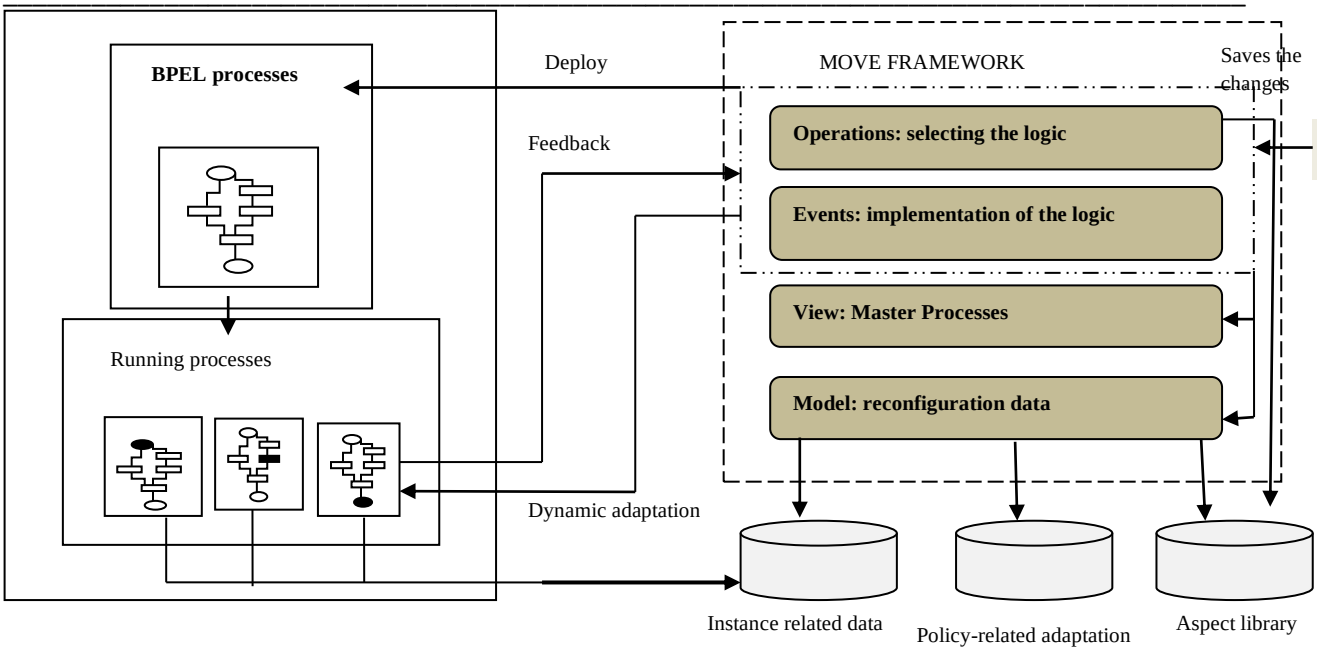

Figure 5: Overview of Proposed Framework

4) **Events:**

In event block, the model is allowed by event to update the view without the knowledge of updating. The components are allowed to coupled with each other is considered as a powerful abstraction technique. In our paper event block has to implement the selected adaptation policy logic according to information available in the aspect library.

B. Prototype Implementation & Used Technologies

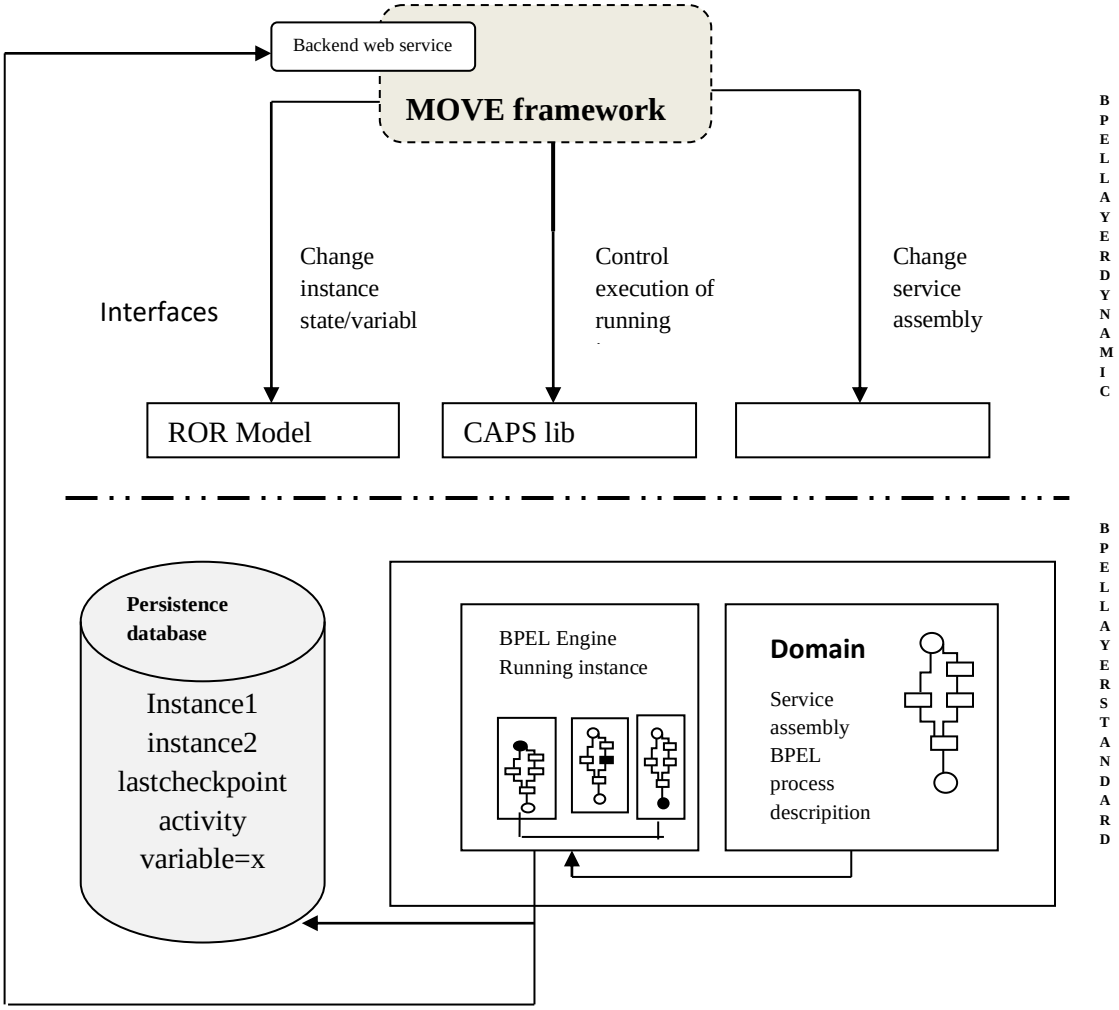

Figure 6: Prototype Implementation

In prototype of framework, the implementation is placed on the top of sun bpel engine (a component of the open enterprise service bus).fig 5 gives overview of prototype of framework. Our proposed framework is implemented in Ruby-on-Rail (ROR) which well known for adding dynamic web pages [10,11]. The WS-BPEL process is designed by openESB in WS-BPEL editor. Once WS_BPEL module should be added in composite application after the processor is ready. It is an enclosed as a service assembly. It should be organized and executed on a domain of the application server. In deployment, the service assembly is copied to domain directory. According to the process description of a process the new running instance will be created on engine and it is included in the service assembly while create-instance is triggered [12]. The

persistence option is used to save the crucial points in the persistence database and it is used in almost every implementation of WS-BPEL engine while it executes.

The three interfaces are used to permit the interaction between existing layer and WS-BPEL layer. In first interface WS-BPEL process description should be changed within service assembly and new instance will be created which is considered as a template. In second interface includes Java CAPS library which stands for Java Composite Application Platform Suite. It is mainly interacts with sun-bpel components of SOA architecture while it is composed of packages. To recover the workflow instance, it has to restart the engine. In third interface, the ruby objects in the tables are manipulated and saved which is the best way to use RoR framework within Ruby. Now we are going to explain about enforcing context-sensitive policies in WSBPEL. In the RoR backend web service, policy rule is assessed using synchronous invoke and policy identifier is feeds back [13]. In MOVE framework, controller i.e., operation block are used to check the adaptation policy for that specific instance from persistence database where instance-related data are retrieved (using RoR model). The roll back is done when the policy is not satisfied and it goes back to previous checkpoint to restore its state (using CAPS library).

IV. AN EFFICIENT WORKFLOW CONFIDENTIALITY THROUGH MOVE FRAMEWORK

In this paper, some adaptation policies are enforced in deployment time while some others are enforced during run-time based on the workflow information available. In WS-BPEL processor, communication between the users or organization takes place in two ways either synchronous or asynchronous way. In synchronous way, communication takes place in same location and also we can easily identify the end users by assuming the location endpoint character identity. On the other hand asynchronous communication the user is identified using correlation identifier which is calculated by matching between request and response using correlation sets. Therefore workflow must be authenticated first to decide the role of user [14]. As a result policy enforcement can be done at run-time. In this section we are going to see about deployment time adaptation and run-time adaptation. In deployment adaptation, synchronous communication takes place where as in run-time adaptation asynchronous communication is takes place.To optimize the aspect allocation during the deployment-time, it is compliant with context-free policies. The following adaptation processes are used 1) before the creation of workflow instance while incoming message is triggered, the controller can be triggered to (re)generate process. 2a) the controller read the partner information and policy-related data. 2b) the corresponding aspects are selected from the library [5].3) the WS-BPEL process is generated by the controller component. To implement the some aspects of confidentiality at deployment time, presuming the synchronous communication. In synchronous communication, an endpoint of an invoke activity characterizes its identity. The adaptation logic that determines suitable configuration for policies is used allocates the task [5]. In our paper, the selected aspects invoked the endpoints which are.

Journal of The Gujarat Research Society
ISSN: 0374-8588
Volume 21 Issue17,December 2019

In our framework the information flow policy and prevention of obtaining sensitive information constraint are implemented implicitly. The analyzing process is invoked when the proposal is received from the user that is used in workflow which is considered to be the bond of duty (BoD).

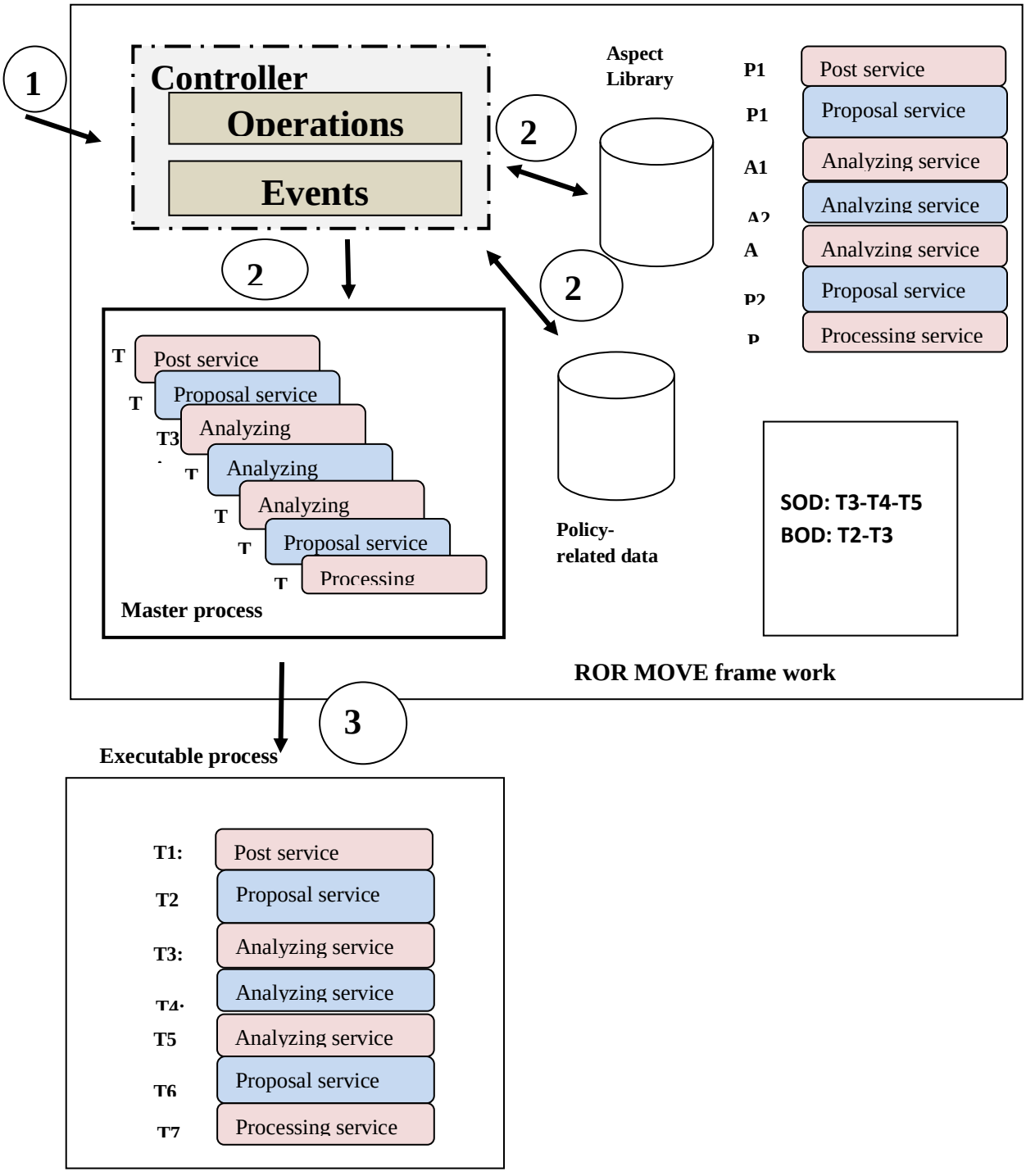

Figure: 7 Deployment adaptations

Runtime adaptation:

The proposed framework is used to access the history of the partners who are all participated in the execution of an instance because the framework does not trust the participating partners. As a result the enforced access control policies are more restrictive.

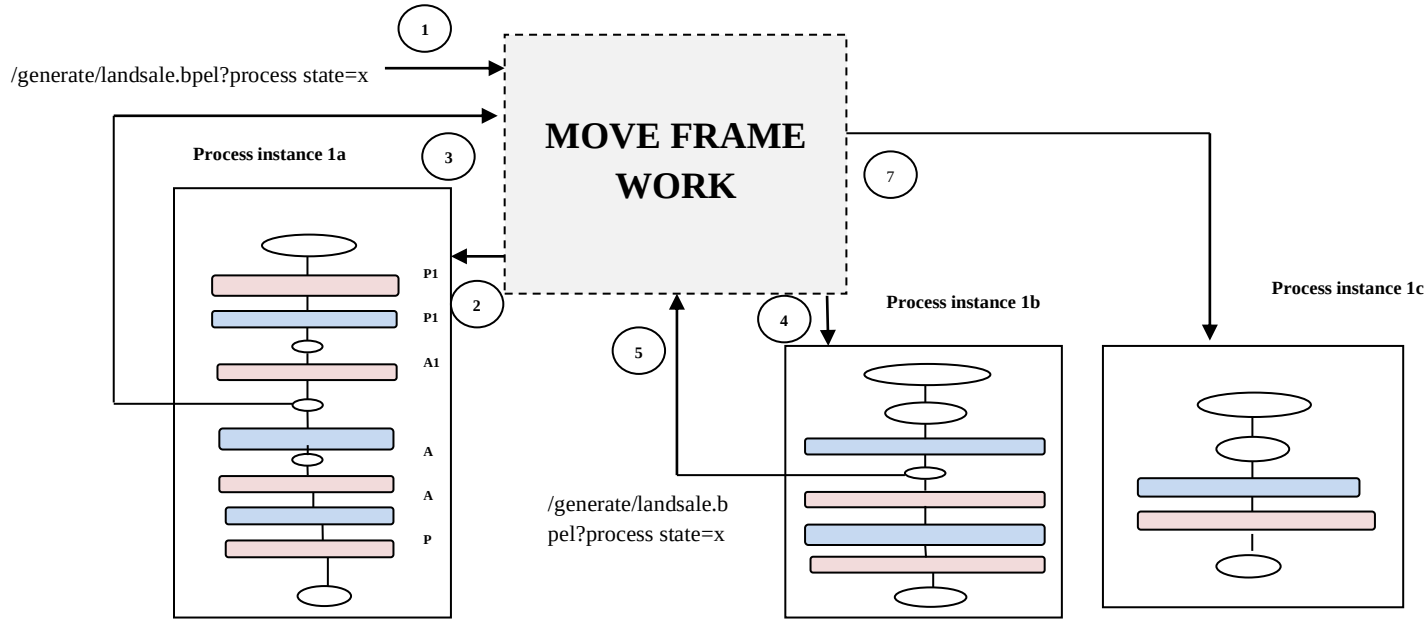

Figure 8: Runtime Adaptation

Figure 8 illustrates the framework used in online land sales and service. During the deployment-time adaptation, optimal scenario is generated with context-free constraints. In our example consider processes instance 1a P1 is used to send the invitations and details of the land to the registered users. Po1 i.e., proposal service is used to obtain the user quotation for that land along with the identity proof [15]. The proofs along with other details are validated in MOVE framework. After validation MOVE framework can regenerate the process instance with context-sensitive constraints.

When the proof is validated successfully in the controller component of the MOVE framework and it concludes that regeneration is not necessary. If the unauthorized user is responded means instance is reinitialized on the previous task. The next task is obtaining the second opinion about the proof and quotation details of the registered users are validated by another person. The new instance is created by enforcing the context sensitive SoD. After the successful validation of

proof by new instance both opinions are compared [16,17]. As a result land registration instance is created (process instance 1c) and can end the workflow.

V. CONCLUSION

A Model-Operation-View-Event framework is presented in this research work that enables policy-based adaptation of WS-BPEL processes while based on the properties of the setting and the running workflow instances (Model) this framework will dynamically adapt a workflow instance. A workflow is intended as a master method that represents a model wherever tasks may be given on Associate in nursing abstract level (View). Concrete implementations, modeled as an aspects, area unit then elite by the adaptation logic in keeping with the policy (Controller). Our framework, accomplished mistreatment standards-based technologies, supports modularization of tasks in reusable aspects, has flexibility to support advanced policies because the social control logics enforced in a very general purpose language, is transportable to different execution environments because it is freelance from the advancement language, and it permits the planning of sturdy workflows as they'll be custom-made and rolled-back.

References

[1] http://www.wisegeek.com/what-is-a-workflow-language.htm

[2] "Web Services Business Process Execution Language Version 2.0", April2007, OASIS Technical Committee, http://docs.oasis-open.org/wsbpel/.

[3] Charfi, A., Mezini, M., "Aspect-oriented web service composition with AO4BPEL," , Proceedings of the 2nd European Conference on Web Services (ECOWS 2004), Erfurt, Germany, Springer-Verlag, 2004, pp.168-182

[4] J.H. Hammer and G. Schneider. "On the Definition and Policies of Confidentiality" Third International Symposium on Information Assurance and Security (IAS), pages 337-342, 2007.

[5] http://www.orbac.org/

[6] http://cirw.in/blog/time-to-move-on

[7] Kristof Geebelen, Eryk Kulikowski, Eddy Truyen and Wouter Joosen, "A MVC Framework for Policy-Based Adaptation of Workflow Processes: A Case Study On Confidentiality" IEEE International Conference on Web Services 2010

[8] Braem, M., Verlaenen, K., et al., "Isolating process-level concerns using Padus," Proc. of the 4th International Conference on Business Process Management (BPM2006), Vienna, Austria, Springer , 2006.

[9] Kloppmann, M., Rickayzen, A., et al., "WS-BPEL Extension for Subprocesses-BPEL-SPE.", A Joint White Paper by IBM and SAP, 2005.

[10] Akram, A., Meredith, D. and Allan R.: "Evaluation of BPEL to Scientific Workflows." Proceedings of the Sixth IEEE International Symposium on Cluster Computing and the Grid (CCGRID'06).

[11] Braem, M., Joncheere, N., Geebelen, K. And Verlaenen, K., "Guidingaspect-oriented service composition in WS-BPEL and Padus (Demonstration)," Proceedings of the 6th international conference on aspectorientedsoftware development, March 2007.

[12] Wil M.P. van der Aalst,Marlon Dumas Arthur H.M. ter Hofstede,"Web Service Composition Languages: Old Wine in New Bottles?",

[13] Thomas, D.,Hansson, D.,Breedt, L. and Clark, M.,"Agile Web Development with Rails," 2nd Edition (2007).

[14] Hewett, R., Kijsanayothin, P., and Thipse, A., "Security Analysis of Role-based Separation of Duty with Workflows," In Proceedings of the 2008 Third international Conference on Availability, Reliability and Security (March 04 - 07, 2008). ARES. IEEE Computer Society, 2008,Washington, DC, 765-770.

[15] San-Yih Hwang, Chuan Yin, Chien-Hsiang Lee, "Selecting Web Services and Participants for Enforcing Workflow Access Control," hicss, 42nd Hawaii International Conference on System Sciences, 2009, pp.1-10.

[16] Wang, X., Zhang, Y., Shi, H., Yang, J.: BPEL4RBAC: An Authorisation Specification for WS-BPEL. In: Bailey, J., Maier, D., Schewe, K.-D., Thalheim, B., Wang, X.S. (eds.) WISE 2008. LNCS, vol. 5175, pp. 381-395. Springer, Heidelberg (2008)

[17] http://blog.appfog.com/putting-the-move-framework-in-proper-perspective/