

Building an Enterprise Portal Based on SOA and Information Technology Governance

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Abstract

Today every business has different three-screen (PC, Table PC and Mobile Device) equipment and information systems to provide all business colleagues to use and collaboration. The enterprise has a lot of information system services, for the daily operation of auxiliary enterprises, and the strategic objectives of managers and decision-making. The integration of information systems services in the same enterprise information portal. And increase the ease of system operation side, unity, integration of different data services on the ESB and adaptive architecture to have become the necessary conditions. The combination of information technology management services to business and enterprise information portal. SOA platform debug architecture to increase, while enhancing the effective operation of enterprise information portal, management.

Keywords: ITIL v3, EA, EIP, SOA, ESB.

1. Introduction

When all companies have to build enterprise portals are in the same time, many companies in fact are vigorously promoting the establishment enterprise dedicated ESB (Enterprise Service Bus). And the services provided by this platform and the effectiveness and governance structure (ITIL v3) mechanism. For businesses, EIP most basic requirement is to integrate enterprise data and information both inside and outside. In addition to more efficient data sorting a large enterprise, it should speed up information sharing and collaboration. The

characteristics of information systems will inevitably change, but also bring EIP platform inconvenient. Need fast and effective treatment, so this study combines ITIL v3 information management, increased automation, and quantitative presentation. Effective classification of all types of information services, information resources and commitment to achieve the best distribution and coordination.

The goal of ITIL v3 is responsible for the technical management of support service delivery. Including deploy after the user needs, functional needs and response mechanisms to modify. Information services to provide and manage the daily operational processes to achieve the SLA, OLA targets. After the service formally launched, to accept or review any information be managed and associated contingency measures. This study will provide EIP services to do with the relative mapping of ITIL v3 simulates, in order to achieve true IT governance services.

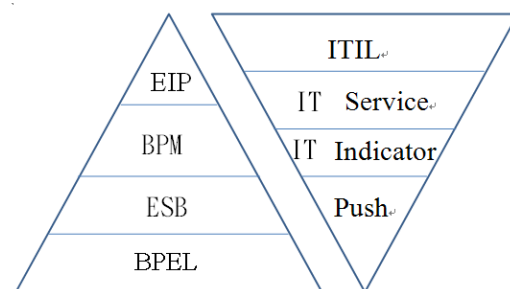


Fig.1 EIP and ITIL v3

2. Related work

2.1 ITIL v3

The late 80s, the British government departments to improve IT service efficiency,

inviting scholars and experts, IT companies and organizations to develop a set of standardized, can be measured in financial IT management best practice. The method is independent of any vendor and product above, for different scale, technology and service needs of the organization department. Optimize use of process resources, improve information technology service. ITIL is a set of major research on IT service management approach.

So far since 1980, ITIL has undergone three major versions. In 2007, OGC has developed ITIL3.0 version, which is based on integrated service lifecycle V1 and V2 of the essence. The times and the current into the field of IT service management Best practices.

The concept of ITIL V3 is more attention than the ITIL V2 IT governance framework. It is not that the IT service management work flow of a single individual independent. IT service management concept should be a complete life cycle. From service planning and development of the strategy, and then formulate a strategy designed to complete the implementation of the service can be. And then transferred to the customer needs the service or operation of the site. It is solid execution and management of the service continuing to improve the quality of the service. These phases are termed Service life cycle. Service life cycle and its relationship shown in Figure 1:



Fig. 2 ITIL V3 core system architecture diagram (Source: Taylor, Iqbal & Nieves, 2007.)

ITIL proposed service lifecycle model. In addition to the systematic expression of IT governance-related activities, more commercial operation based on the perspective of the overall integration of IT services to create value.

At present, not yet implemented ITIL v3. This study proposes an integrated ITIL v3 Service Operation and the framework for EIP by the SOA architecture design to meet the EIP platform feature in actual operation are flexible enough to be easily changed and adjusted.

2.2 Enterprise Information Portal

Enterprise Information Portal (EIP) is the recent evolution of electronic business is an important stage. Through Internet technology, information resources related businesses will be compiled into an integrated portal. Users only need a single entry, can obtain integrated information resources. Murray believes that EIP scholars not only to provide personal information, decision-making applications. Should contain the information required for users and tools. Such as workflow management, groupware and e-mail and other related functions.

In addition, Deltor considered EIP is “a creation, transmission, storage and use of knowledge of the place, and provides extensive business information including information sharing space.” This contains three spaces:

- 1) Content space: provides organizations with related but different and diverse sources of information and documents. Speed up information access and retrieval.
- 2) Communication space: provide a rich dialogue and sharing of information channels. Improve organizational communication and coordination among the members, to facilitate knowledge transfer and knowledge reuse.

3) Coordination free: business organizations to provide support collaborative processes between members of the related activities.

Three different functions through the intersection of the space information sharing work space, is called the Enterprise Information Portal.

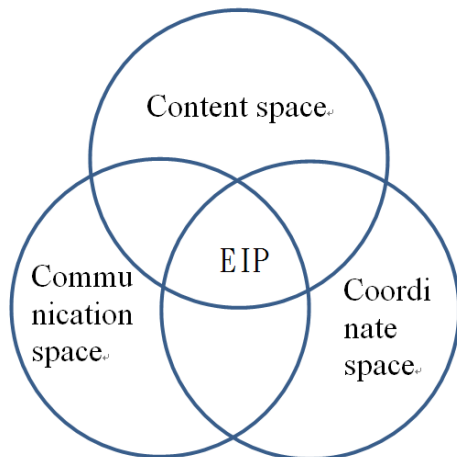


Fig.3 Information sharing workspace
(Source: Detlor, B., 2000)

Yuan-qing management consulting firm that the structure of EIP must include eight essential features: Content Management: Managing the enterprise structured and unstructured information. Search engine: search for ways to provide different search business information. Collaboration: the role of matching business-related Internet resources for interactive use, such as information sharing and discussion of communication. Workflow: task-oriented business objectives through process control and reduce the manual file transfer to business efficiency. Business Intelligence: through the system in some automatic or semi-automated processing, according to the information needs of users and analyzed, and forecasts to as a basis for decision making. Personal: user needs and users for the roles and permissions to provide individualized information content. Integration: the integration of enterprise resources, including various resources internal and external integration and process

execution. Method process: according to business needs and build their own purposes, the structure into line with business needs.

In addition to, includes the database and operating system infrastructure, the integration of different components work together with the program application server, and application framework.

2.2 Service oriented architecture

Service oriented architecture (SOA) is a programming structure. It is defined through the application connected to different ports and functional units' agreement. The ports are defined; it should be independent of implementation services, hardware platforms, operating systems and programming languages. Therefore, the system consists of a variety of services to the construction of the interaction can be run on the same platform.

Service oriented architecture is commonly used as the basic unit of Web Service, and Web Service's operational structure, including:

- 1) Service providers: to provide a functional element or a group of business model and execution, not which specific pre-defined input and output interfaces.
- 2) Service users: the service user is a set of components, the use of one or more services provided by the Web Service.
- 3) Services Directory: responsible for storage service providers to provide a description of the Web Service. Service providers in the registry Web Service and the user can find the need in this Web Service.

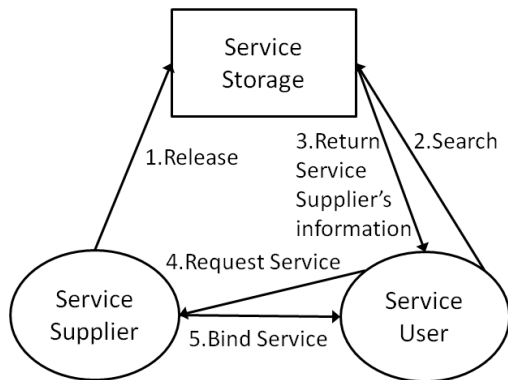


Fig. 4 SOA used by Web Service
(Source: Zhang, Y., 2009)

2.3 Business process management

The concept of Business process management (BPM) is from top to bottom, and start from the management side, from a process point of view. Establish and continuously improve business processes, organizational models in response to changing business models and issues at any time to adjust. And a complete BPM system can not only provide the required business process of planning, monitoring and improving function. But also provide when the process is time across heterogeneous system support for information exchange capabilities. The quick response and immediate feedback to the user needs to construct a Flow Designer and Form Builder two sets of services to users at any time to meet the needs of BPR.

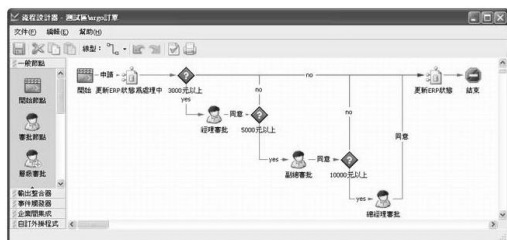


Fig. 5 BPM Flow Designer

2.4 Model-driven architecture

How to respond to rapidly changing business and technology, the software sector has been a problem. OMG developed by the agency Model-driven architecture (MDA) standards. MDA separates business applications and technology platform. UML

that Standard modeling language and reach a platform-independent PIM. Then design a suitable platform-specific PSM. So, as separate and package the business and technical aspects of the change, so reducing the affect between the two. UML MDA model output mainly divided into the following three stages:

1) CIM: focus on the system environment and needs, but does not cover the system's internal structure and operational details.

2) PIM: Focus on the details within the system, but does not involve the physical implementation of the system platform.

PSM: focus on a particular entity in the system to implement the platform in detail.

3) MDA project's development is starting from CIM. CIM express system environment of information application, rather than the information system itself. PIM design must be independent of the expression or independent of any one particular platform, and PSM the contrary, it must be able to really implement and binding to a specific platform.

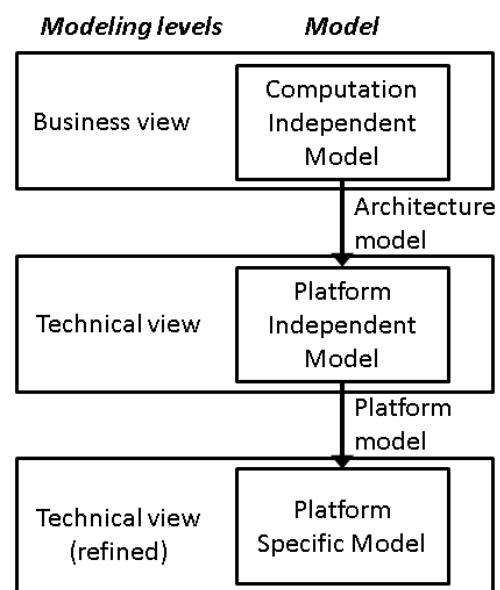


Fig. 6 MDA
(Source: Li, Y., 2008)

2.5 Business process execution language

Web Services business process execution language (WS-BPEL) is a workflow language, composed by the XML syntax. It is designed to integrate Web Services and developed a specification standard. Widely used in business process management system. It can be used to separate a group of loosely coupled services to Web Service approach, the series into new business services. To meet the enterprise business process management in heterogeneous system integration needs. Every single step by the Web Services to realize that each business process by receive, invoke, reply and other operating units of the composition.

2.6 Enterprise service bus

Enterprise service bus (ESB) is a new middleware, which can be unified in conjunction with various services, applications and resources. This is the core of SOA. Through the ESB, Service Manager can access and control all of the services. ESB generally have five main functions: message routing, format conversion, notice, expansion and security.

ESB focus in the choice of different message routing service. In fact, ESB is a message switching and routing infrastructure. As we all know, the basis of information, loosely coupled properties, on the SOA is very important. If service requester and service provider they relationships are loosely coupled. When a service provider that does not work when there are other service providers to enable service requesters to normal operation without any problems. ESB can easily handle the routing of these messages.

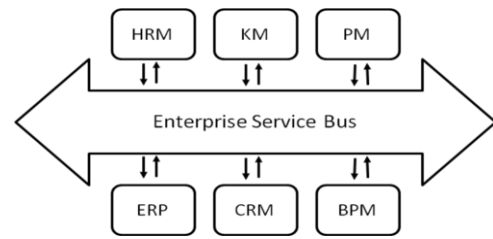


Fig.7 ESB architecture

2.7 ObjectRiver Template

ObjectRiber Template is for WS-BPEL module flexible tool. As used in the enterprise Orchestration, there is often a small adjustment. Orchestration's setting is not easy to change at any time often, and sometimes must be re-used in other Orchestration. Therefore, ObjectRiver established by the Template Parameter, which you can adjust the settings in the Web interface to increase the flexibility of WS-BPEL.

3. Select Service indicators

Made for all services, the ultimate goal is to operation. In order to maintain good quality of the operation must be performed after delivery of the related management services. When the stage of life cycle. Service operations have a duty to ensure that the business value generated by services is achieved. Not only meet some of the personnel requirements. For service operations, the goal of balancing the different roles is very important. Need to balance the conflict between the following four perspectives (Taylor, Cannon & Wheeldon, 2007): the internal IT and external customer point of view, to maintain stability and respond to IT events IT service quality and cost of services, prevention and after the operation in advance.

Service operation management processes and key activities: incident management, demand fulfillment, problem management, access management and participation roles. And it is for the event, accident, needs, and problems of access to a standard set of processes.

Services operate a total of four features, including Service Desk, Technical Management, and IT Operation Management Application Management.

3.1 Service Component Reference Model

Budget Management Office of the United States proposed in 2002, the Federal Enterprise Architecture (FEA, Federal Enterprise Architecture), American Standards Institute in the frame of reference and Zahchman companies and other commercial areas of research based on the proposed work.

The purpose of the federal enterprise architecture includes:

1) Learn from experiences of individual departments. Establish and apply a series of reference model. On the federal government business processes and IT architecture to be defined and uniform deployment.

2) Of the Federal Government Development of e-government services to be re-planning and assessment to reduce duplication of investment. Achieve the maximum benefit from limited resources rate.

3) To promote the federal government horizontal integration between various departments and the federal government, state and local governments longitudinal Integration of IT resources integration. Detailed description of the Federal Enterprise Architecture of the federal government and all citizens of the interaction process, the services provided by the Government, various government and key business processes.

Service Component Reference Model is the performance reference model and the functionality of the business reference model

framework. With this functional framework, the Performance Reference Model and Business Model of the goals and needs and the way the implementation of a variety of services divided into components. A variety of services and components used to frame the necessary IT services to customers. Service Component Reference Model and the proposed services can be clearly the content and scope of functions available. And support for IT services in the whole reuse process. In order to clearly explain all of the relationships between service components, service component reference model is divided into service areas and thirty seven service categories. The service component reference model will reference the seven service areas and service categories and thirty service requests with the common request is classified, for analysis, this research service indicators.

3.2 Service indicators

Federal Enterprise Architecture U.S. Federal Government to establish e-government policy has undergone major changes. From the original focus only on individual IT projects, business services and resource allocation management. Into the introduction of performance management, development of business codes, technical standards, clear hierarchical management model.

As the service component FEA Reference Model is divided into two-story: services and service category. Also takes into account the classification of the three levels more in line with the depth of people acceptable. With two common problems, this study used three indicators of service levels.

The performance targets for the generation, list services and service categories. The formal performance indicators need not apply throughout the Domain than the classification of services. This study collected from the user terminal

509 service requests, turn the weight of each service category, use the AHP algorithm to remove the classification of services is not applicable, as this study has left the service operating indicators.

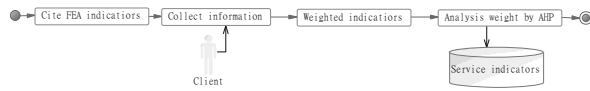


Fig.8 Building service indicators process diagram

Analysis of performance indicators, this study uses algorithms AHP. AHP algorithm is not only one of group decision making methodology, the problem can be further used in the analysis and so on. Thirteen main categories can be applied in the following problems (Saaty, 1980): determine priorities, choose the best option to generate alternate solutions to determine needs, resource allocation, forecasting results, performance measurement, system design, to ensure system stability, the best Technology, planning, conflict resolution, risk assessment.

The following table is collected from the user terminal 509 requests for test data service. Classify the resulting weight of each category of data. Through the AHP pair wise comparison algorithm to the classification of the lower ex weight, and merge the results. (See Table 1.)

TABLE 1. Service indicators

ERP	Management	Login / password problems
		Other
		Permission requirements Software Upgrade
	Finance	Error Message
		Other
		Issue invoices
	Human Resources	Unable to update employee data
		Error Message
		Other
	Logistics	Ship cannot be performed
		Error Message
		Other
	Other modules	Error Message
Other		
Sales	Order cannot be	
	Error Message	
	Other	
Quality Management	Product quality	Quality of Abnormal Exception Handling Quality Report
		Customer

	standards	Customer quality standards
Network Equipment	Firewall	Configuration changes error
		Policy Update Upgrade
	other	error
	Router	Configuration changes error
	Switch	error
Service Component Reference Model	Customer Service	Customer Relationship Management Customer preferences Customer assistance
	Process automation services	Workflow and tracking Transmission and scheduling process
	Business Management Services	Program Manager Organizational Management Investment Management Supply Chain Management
	Digital Asset Services	Content Management Document Management Knowledge Management Documents and archives management
	Business Analysis Services	Analysis and Statistics View Services Knowledge Discovery Business Intelligence Report
	Commonality of administrative services	Data Management Human Resource Management Financial Management Assets and material management Development and Integration Human Capital / Team
	Support Services	Cooperation Contact Form Management Search Security Management System Management

4. Building an EIP

Enhance the knowledge enterprise application management capabilities. To EIP Portal system is divided into six main modules (document management system, knowledge management systems, training systems, corporate portals, office automation, and search engine system) and information transport layer. The internal documents, databases, files, high-capacity applications are compiled knowledge. Through used of SOA architecture to enhance the convenience and high flexibility of the application. User-friendly is for a variety of applications. Reduce the user to achieve due to lack of knowledge lead to inefficient communication, new staff members are not familiar with the skills to enter the application cannot work fast performance, the data can be applied because of excessive lead and other issues is not easy to find information. EIP SOA, enterprise integration of knowledge resources available. And internal business process, closely integrated with permissions. Complete one-stop service. Directly enhance the user and corporate managerial efficiency.

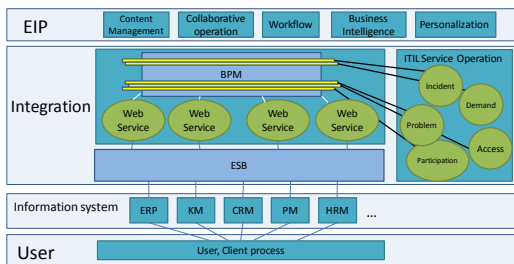


Fig.9 EIP System architecture diagram

4.1 Development Framework

Software development process is now no longer emphasized linear processes, iterative process became stressed. Robust software architecture in component-style development is of particular importance, and based on 4+1 View Architecture to design the software architecture point of view: logical view, implementation view, process view, deployment view and use case view. Use case model to fully express the software functional requirements.

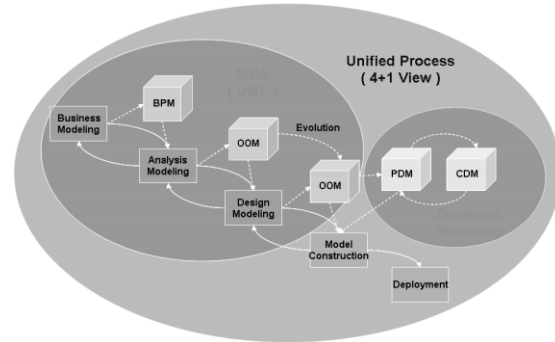


Fig.10 4+1 View Architecture

4.2 Based on SOA

Because of EIP is an integrated portal, which integrated different systems. Each systems have to communicate with ESB; but because each subsystems EIP, is a dynamic composition. At any time it dose to change. System architecture using SOA, the impact of changes can minimize. To be meet the company's properties.

Construction of a loosely coupled structure of EIP allows rapid integration of various enterprise applications. It will often change the corporate applications used. Therefore, the loose coupling SOA architecture is quite appropriate create the structure of EIP. The following picture shows the demand for planning service-oriented environment map.

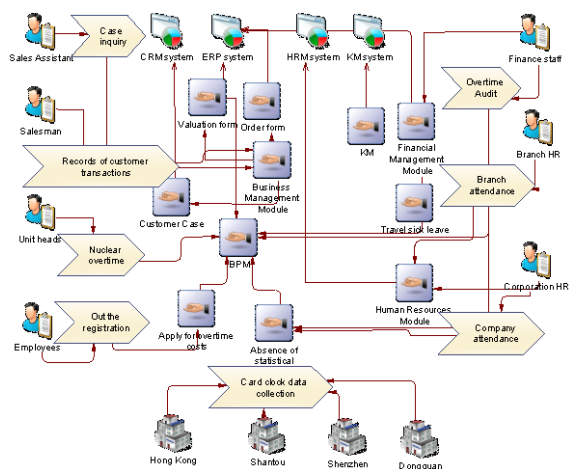


Fig.11 SOA diagram

4.3 BPM base on service operation

Client installation problems program returns, the program will record and send data to the server. Server using Data Mining techniques, the problem is classified into the corresponding service indicators. Server sends service requests, and by business people use BPM sequential processing.

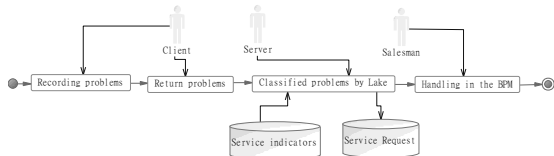


Fig.12 Deal with the problem flow chart

By the following example to explain what is BPM. Enterprises to provide an existing deal with the problem of signing the form and process this form, fill in the required fields contain, what role each field by the filled and when completed will produce other objects.

品質異常處理報告		年 月 日
製造指令/採購單號	規格尺寸	
產品名稱/配方型號	訂單(訂購)數量	
現況描述:	異常數量	不良率%
異常說明:	由品管單位開始填寫	
建議改善措施:	簽名:	
生產單位處理意見:	由生產單位填寫	
及時處理意見:	生產單位處理方式:	
改善處理辦法:	簽名:	
	例如: SOP 建立、壽命分析、製程/流程改善(實際作為)...	
	由生技單位填寫	
	相關單位會簽	
複查結果: YES <input type="checkbox"/> NO <input type="checkbox"/>	簽名:	
核准:	審核:	製表:
保存期限: 一年	由品管單位填寫, 做為結案依據	製表:
		表單編號: QA-PR-0006-D03-01

Fig.13 Exception handling quality report form

When the quality of anomalous situation occurs, client process will detect the problem. And client process dose return the problem to server. Under normal circumstances, the system automatically

instead of quality control personnel to write problem describe. Then, it also provided advice to the production, production technology units. Speed up the processing speed. According to the problem frequency and severity analyzed other reasons to issue the process, completely prevent the occurrence of by professionals.

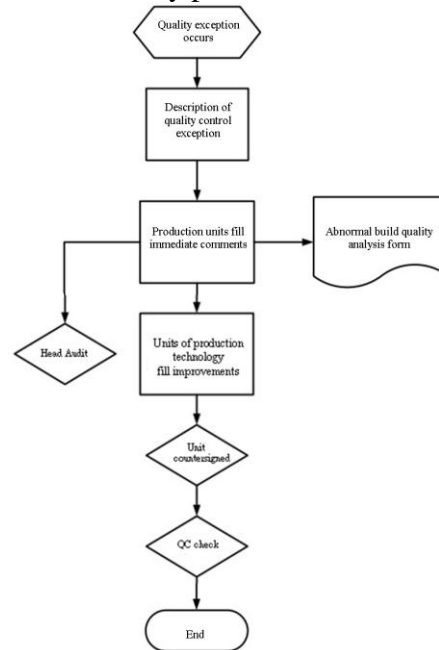


Fig. 14 Flowchart exception handling quality report

The form converted into the database schema, the Web page and adds ObjectRiver Template that mapping the Parameter field, create a data table. With the form design tools, and workflow characteristics in accordance with properly designed forms. Bind the form fields and the data table columns. Make the form access fields correctly.

Using workflow tools, each node will be drawn workflow. From the quality control unit, biotechnology unit, to sign the units in charge of quality control checks, and joined the ObjectRiver parameter node that defined by the ObjectRiver Template. Set each node access to the fields, and conditional ObjectRiver Parameter nodes.

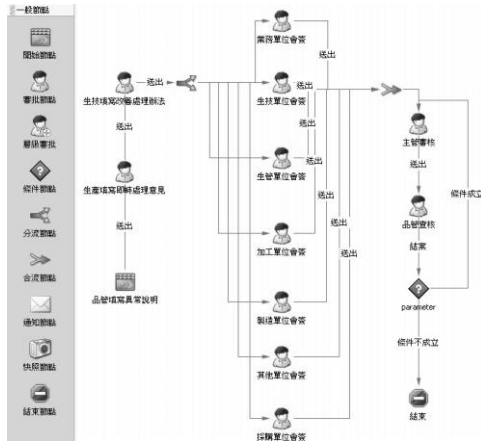


Fig.15 Exception handling process design quality report

After the planning workflow, each node according to the different needs of the staff positions have different permissions. Set each field read and write permissions. This step is very important. Without this step will not control workflow on each person's responsibility. Also affect the efficiency. Therefore, this study at the design workflow set the permissions.

At ObjectRiver Template tool set Parameters of the Orchestration. At ObjectRiver Template tool set this Orchestration of the Parameter. Because business processes often need to be adjusted. The standard setting process parameters in the process will be quite inconvenient. Thus, in ObjectRiver Template tool where can be set the parameters of the process related. Enhance process design flexibility.

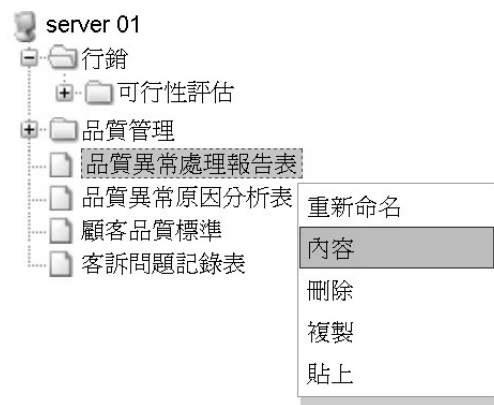


Fig. 18 ObjectRiver Template Tool



Fig.16 Node data flow control

In each Condition nodes, set specified by the ObjectRiver Template Parameter. When the relationship between the value of Parameter compliance with the operator when the conditions to set up. Workflow according to that predetermined path to execute.

By installing the program on the client's return registration code and other sources of information to the server after to collect. Analysis by Lake Algorithms summarize category. Finally, the treatment process is triggered by the various problems.

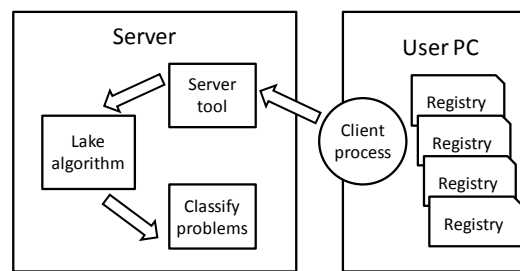


Fig. 19 Collection and analysis of service requests

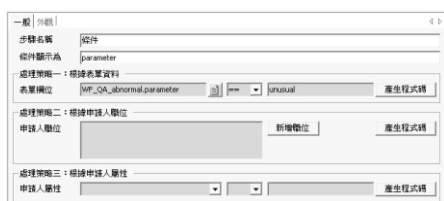


Fig. 17 Quality Report Parameter Node Exception Handling

When processing is triggered, a service request record increase in help desk. Service requester can view the current processing situation here. Administrators can also manually assign staff. At help desk where all the service requests are in accordance with ITIL v3 service operation specification to monitor, adjustment and checking.

#	類別	子類別	標題	狀態	優先級	緊急	解決順序	解決方案
1	品質管理	設備標準	設備天燈功能故障	Open	Idc	Urgent	Normal	
2	資訊維護	其它	影響訓練系統	New	Idc	Normal	Highest	
3	資訊維護	使用者服務	服務條件無法輸入	New	Idc	Normal	Highest	
4	品質管理	高品質管理	產品品質化會議	New	Idc	Urgent	Highest	
5	品質管理	高品質管理	TR-1752 有雜質	New	Idc	Very High	Highest	請料再溝通
6	資訊維護	使用者服務	設定機身視窗	New	Idc	Low	Normal	
7	資訊維護	資訊分析	Non-MS41 報廢紀錄	New	Idc	Normal	Normal	
8	資訊維護	網站服務	資產管理的通知 不辨識歷史與事件	New	Idc	Normal	Normal	
9	資訊維護	使用者服務	業務問題處理	New	Idc	Normal	Normal	
10	資訊維護	資訊分析	專案工作文件審查	New	Idc	Very High	Normal	

Fig. 20 Service Request

Service request automatically create related to process forms that provides handlers treatment at sign-tool. Responsible personnel in report form by the quality of exception handling workflow completed treatment. System using historical Service request data to made in advance for the recommendations with deal problem. Reduce the staff's processing time.

流程名稱	新增
成品預估材料與成本v01	2011-03-08 16:25:19
組織、職位變更申請流程	2011-03-09 11:59:46
看新處理流程-運費	2011-03-09 16:05:16
標準物性表(一般材料)v01	2011-03-09 14:05:23
可行性評估 v01	2011-03-10 11:15:31
品質異常處理報告 v01	2011-03-10 16:06:01
訂單自動v2	2011-03-11 14:06:23
產能規劃參數表	2011-03-13 16:07:22
BPM申請_002	2011-03-13 13:07:38
業務工作日報表	2011-03-13 16:17:58

Fig. 21 BPM Drafts folder

5. Conclusion

Many businesses current owned in a variety of information systems into the EIP, but lacks SOA for other systems cannot be successful integration. And is not yet automatically determine priorities, choose the best option, resource allocation and optimization. In this study, the case demonstrates, FEA and this study proposed services indicators are consistent. This study provides programs that will indexes indicators of enterprise application integration with EIP. With the Indicators for of data, available again enhance the accuracy of indicators. The future can be increased automation and classification mechanism. Web is to allow people to create new

business opportunities with the best market opportunities. Believe that the future is unpredictable.

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