

BPM Practice Bootcamp written by Practicing BPMers

Abstract—Workflow systems have been widely used in the South African market to automate business processes. The market has seen an adoption by IBM BPM , Oracle Fusion as well as Webmethods. This has led to rapid development and quick time to market of software as opposed to traditional development methods. The workflow engines give an advantage in that they integrate systems as well as allow for delegation of duties as well as process data among some of the main advantages. This practice book uses examples of IBM BPM as the workflow to be used. IBM BPM is a workflow that uses key BPM patterns namely BPEL and BPMN as well. IBM BPM 8.5.7 is the version used in this scenario.

1. Day1- Introduction to BPM

Business process management (BPM) is a methodology to manage processes and workflows in an organization. The goal of BPM is to increase efficiency, performance, and agility in the day-to-day operations of a business. BPM has been widely adopted by organizations and is essential for any enterprise businesses that want to be competitive in today's marketplace. For example, the world's leading airlines utilize BPM to manage flight schedules and terminal operations. From this perspective, BPM includes: organisational process mapping discovering the process landscape; detailed process modelling designing how the work works; managing process execution team management; automating process execution using software and managing process improvement.

1.1. BPM Methodology

is a management practice that provides for governance of an organization's process environment toward the goals of driving consistency, increasing agility, and improving operational performance. BPM methodology can generally be implemented in the following steps:

1.1.1. Analysis: Comprehensive analysis is done to discover and identify processes that can be created or optimized to meet business requirements or improve performance. Specifications for a design solution can be derived from this analysis.

1.1.2. Design: The design of a process involves workflows that include human-to-human, system-to-system, or human-to-system interactions. The design should aim to reduce errors and maintain relevant standard operating procedures or service level agreements.

1.1.3. Modeling: Once the process design is ready, it can be modeled using varying input values to observe its behavior. If undesirable behavior is observed, design changes can be made iteratively. Software tools are available to effectively model and evaluate processes.

1.1.4. Execution: A process model can be executed using a business rules engine to govern process execution.

1.1.5. Monitoring: During execution, processes can be monitored to collect reporting data for performance, errors, and compliance. Monitoring allows businesses to evaluate

executed BPM solutions against corresponding design models and against relevant KPIs. Data collected by real-time or ad-hoc monitoring can also be used by predictive analytics software to anticipate future problems.

1.1.6. Optimization:. Data from the modeling and monitoring phases can be used to identify areas of the solution that can be improved to derive higher efficiency and better value.

1.2. How BPM Creates Value

BPM not only can improve profitability, it also can expand competitive advantage. How? By using BPM platform technology, an organization can rapidly develop and deploy custom business applications to magnify what sets them apart. These applications ultimately enable a faster response to changing market, customer, and regulatory demands. A BPM-driven organization is not just better positioned to address current challenges; its better prepared to take advantage of future opportunities.

1.3. BPM Software and BPM Platform

BPM Software automates, executes, and monitors business processes from beginning to end by connecting people to people, applications to applications, and people to applications. BPM Platform delivers a variety of process, knowledge, and analytics functionality in a single platform, enabling organizations to quickly and efficiently build and launch custom applications that encapsulate process, data, collaboration, and other capabilities.

1.4. What is a workflow process?

A workflow consists of an orchestrated and repeatable pattern of business activity enabled by the systematic organization of resources into processes that transform materials, provide services, or process information.

1.5. What is a work flow system?

Workflow Management System (WMS) is a piece of software that provides an infrastructure to setup, execute, and monitor scientific workflows. In other words, the WMS provide an environment where in silico experiments can be defined and executed. A workflow application is a software application which automates, to at least some degree, a process or processes. The processes are usually business-related but can be any process that requires a series of steps to be automated via software. Major market Leaders include Pega, IBM BPM, Oracle Fusion as well as Web Methods.

2. Day 1-History of BPM and Workflow

2.1. Evolution of the workflow management systems

In 1980 ago, most of the companies and customers were seen an crisis and obstacle. It was because of the structure of organization were very inflexible and slow to response the new requirement from the markets and customers. As the market become international, the competition between organizational increased rapidly. To overcome and increased the power of competition, organization need to changes their organization structure to faced the new requirement from market. Because of these challenges, computer sciences industry have to created and develop a new information communication technology to suited the new requirement of markets. So the workflow technologies was developed in early 1990 was an leading to the new trend of computer industry.

Workflow management systems is comes from the word "workflow", which means that is sequence of jobs/ operation to distribute to a person or a groups of people on a simple or complex works. It may also delegate a small portion of big task to distribute , work split to others people for controlling purposes. The most common described the flow refer to the document that is being transferred from one to another. For more detailed, workflow is an activity that can described the information flow, process of work and organizational structure such as functions and hierarchies into a work process.

In 1990s, workflow management system was created based on workflow process and business rules. The main purpose of the creation is to resolved the paper-based task with electronic process. At the end of 1990s, the workflow management system was created with additional function like modelling tools, business rules process and others. But in year 2005, Microsoft was created windows workflow foundation to replaced the original workflow with others functionality like BPM (Business Process Management).

2.2. Definition

A workflow consists of an orchestrated and repeatable pattern of business activity enabled by the systematic organization of resources into processes that transform materials, provide services, or process information.[1] It can be depicted as a sequence of operations, declared as work of a person or group,[2] an organization of staff, or one or more simple or complex mechanisms. From a more abstract or higher-level perspective, workflow may be considered a view or representation of real work.[3] The flow being described may refer to a document, service or product that is being transferred from one step to another. Workflows may be viewed as one fundamental building block to be combined with other parts of an organization's structure such as information technology, teams, projects and hierarchies.[4]. In workflow management system, they are different module

to run the business process. For example, document images processing, office system and transaction processing was build during these trend. From the beginning, the system is more concerned about storing, retrieving and tracking the data and information. Later, the system will more emphasized on office system which e-mails will become the core module to communicated for workflow system to exchange files and documents among them.

In workflow management, there can divided into four generation (see figure 1). In first generation of workflow management system, the system is more focusing on e-mails exchange and document management. Then in next generation, the workflow process are tailorable through coding. Third generation, the systems have the standard architecture then can fully supported with third party tools. In fourth generation, the systems can fully supported with e-mail exchange, workflow process management etc.

Workflow management systems is a computer system that manage multiple tasks in an organisation to produce output to others. It allow us to define workflows for work of processes or types of jobs. Example, in a manufacturing company, the product of design document may from designer then pass to technical people to production engineer. In every stage of workflow, every individual is responsible for their specific task and jobs. When the task is completed, the workflow management system will make sure that people that in charge of the task are notified and the information they need to process in their own stages. Its also help to eliminate redundant jobs and others uncompleted task are followed up. This called dependencies, means the system required the dependencies of every completion tasks. Others function of workflow management systems is using to replacing paper document transfer (paperless). (Kmpf and Gromann. 2006).

2.3. Types of workflows

There are three types of workflows namely sequential, state machine and ad-hoc or case management flow.

2.3.1. Sequential workflow. Sequential workflow style is execute set of process and activities sequentially or one followed by another. There are no return to previous flow if required. For example figure 3.

2.3.2. State machine workflow. State machine workflow is combine of state, actions and others. These workflow usually complex and may return to previous flow if required. For example figure

2.3.3. Case management Flow. State machine workflow is combine of state, actions and others. These workflow usually complex and may return to previous flow if required. For example figure

3. Day 1-Fundamentals of Integration and Role of BPM Developer

3.1. Intergration in IT, SOA

3.2. Jobs in Intergration

- * BPM Developer/Modeller/Designer
- * BPM Analyst
- * BPM Architect
- * BPM Infrastructure Specialist

3.3. Skills needed to be a BPM Developer

- Programming -Java,javascript,.Net,
- Basic Database skills
- Basic OS Skills -Linux, Windows Server , AIX,Redhat
- REST skills
- Web Service Skills

4. Day 1-CLASSIFICATIONS BUSINESS AND SCIENTIFIC WORKFLOWS

The list of products for modeling and execution of workflow systems is long. The products now have different level of maturity and they are presented as market available an open source software suits. Here are presented classifications of these software tools: Software for business and scientific workflows. Tools according to their software language design. Tools according to their supported standard.

4.0.1. BPEL based . iGrafx BPEL Apache Agila ActiveBPEL Engine Bexee ActiveWebflow Standard Cape Clear Biztalk Server IBM BPWS4J Oracle BPEL Process Manager JOpera PXE MidOffice

4.0.2. Open Source Workflow Engines Written in Java. ActiveBPEL Antflow Apache Agila Beexee Bigbross Bossa Codehaus Workflow con:cern Dalma Enhydra Shark Freefluo jBpm Jfolder MidOffice BPEL Engine Micro-Workflow ObjectWeb Bonita OFBiz OpenWFE OpenSymphony OSWorkflow Pi Calculus for SOA PXE

4.0.3. BPMN based . Borland Together Desidner ITpearls Process Modeler IntalioDesigner AXway Process Manager Fujitsu: Interstage Business Process Manager 7.1 Kaisha-Tec: ActiveModeler Lanner: Witness Mega International: Mega Suite

4.0.4. Open Source Workflow Tools . Additional information can be found in <http://java-source.net/open-source/workflow-engines> Twister jBPM Enhydra Shark OpenSymphony OSWorkflow con:cern Codehaus Werkflow ObjectWeb Bonita Bigbross Bossa Open Business Engine The Open for Business Workflow Engine OpenWFE Wf-MOpen XFlow Jfolder Taverna Freefluo Micro-Flow Jflower YAWL Syrup PXE ActiveBPEL Antflow Swish

4.0.5. Commercial Workflow Tools . Active Endpoints ActiveWebflow Server ActiveWebflow Designer ADONIS Biztalk Server Cape Clear Orchestrator Digit Process Composer Fiorano SOA Platform FiveSight PXE FuegoBPM IBM BPWS4J IBM WebSphere Business Integration Server Foundation OpenLink Virtuoso Universal Server OpenStorm ChoreoServer Oracle BPEL Process Manager Parasoft BPEL Maestro PolarLake Integration Suite SAP NetWeaver Exchange Infrastructure SeeBeyond eInsight BPM

5. Day 1- Introduction to IBM BPM ,BPMN/BPEL debate.

5.1. BPMN 2.0

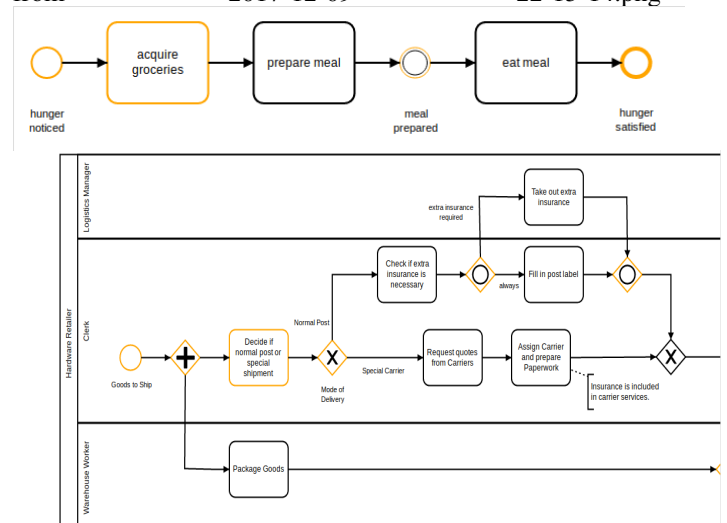
Business Process Model and Notation (BPMN) is the global standard for process modeling and one of the most important components of successful Business-IT-Alignment.

More and more organizations are using BPMN and in more and more universities BPMN is taught as a subject. These are the reasons:

Standard BPMN is not owned by a certain enterprise but by an institution (OMG), which is already established through other world-wide standards, e.g., UML. The standard is supported by many software products; you are less dependent on any particular vendor's products. Simplicity The principle behind BPMN is rather simple which is why you can start working with this notation very quickly. Power of expression If necessary, you can describe precisely how a process functions with BPMN. However, this is more difficult than only roughly describing the process. This way of precise modeling is possible, but not mandatory. Implementation in IT BPMN has been primarily developed to support technical implementation of processes ("Process Automation"). The more important the IT is in a company, the more helpful the use of BPMN becomes.

5.1.1. A simple flow in BPMN. Let's begin our BPMN tutorial with a rather simple process diagram:

from 2017-12-09 22-15-14.png
from 2017-12-09 22-15-14.png



The Business Process Modeling Notation (BPMN) is a graphical notation that defines the steps in a business process.

BPMN is a standard set of diagramming conventions for describing business processes. It is designed to visualize a rich set of process flow semantics within a business process and the communication between independent processes. Business Process Modeling Notation (BPMN) is the standard for modeling business processes and web service

processes. BPMN is a core enabler of Business Process Management (BPM), a new initiative in enterprise architecture, which is concerned with managing change to improve business processes. The primary goal of BPMN is to provide a business process modeling notation that is understandable by all business users, from the business analysts that create the design of the processes, to the technical developers responsible for implementing the technology that will perform those processes, and finally, to the business managers who will manage and monitor those processes.

The secondary goal of BPMN is to ensure that XML languages designed for the execution of business processes, like BPEL4WS (Business Process Execution Language for Web Services), can be visualized with a business-oriented notation. BPMN enables developers, (just like a low-code platform does) analysts and business managers the ability to communicate business processes in a standard manner. BPMN is the current modeling standard within the business modeling community. Unlike object-oriented modelling techniques, BPMN takes a process-oriented approach to process modelling, that is more conducive to the way business analysts model. BPMN is intended to supply sufficient information to allow it to be the source of an executable process.

BPMN consists of a diagram, called the Business Process Diagram (BPD). The BPMN Business Process Diagram has been designed to be easy to use and understand, but also provides the ability to model complex business processes. To model a workflow, you set the business process starting event, business decisions, workflow branching (gateways) and workflow outputs results. BPMN, which maps directly to BPEL, was developed with a solid mathematical foundation the Pi-Calculus branch of Process Calculi. This is a formal method of computation for dynamic and mobile processes which ensures that business processes can be directly mapped to any business modeling executable languages for immediate execution.

IBM BPM provides rich and comprehensive support for Business Process Modeling Notation (BPMN). Live workflows can be exported and imported as BPMN files providing an activation layer which enables users to generate applications based on BPMN and BPEL modeling.

5.2. BPMN/BPEL debate

BPEL is an XML-based process specification language with a strong focus on automation. BPMN started as a purely graphical business process notation. Initially and by design, BPMN and BPEL were often used in conjunction (see this link as posted in a previous answer): BPMN was used for the business user-centered perspective and BPEL for the technical specification.

BPMN and BPEL were designed for entirely different purposes. BPEL is for completely automated processes, primarily Web Service orchestration. BPEL processes are typically stateless and complete in a few seconds or less. BPMN is intended for longer running stateful processes, typically involving people for some of the tasks. BPMN

process typically run from a few minutes to several weeks or even longer. is a XML-based language used to define enterprise business processes within Web services. Every company has its unique way of defining its business process flow. The key objective of BPEL is to standardize the format of business process flow definition so companies can work together seamlessly using Web services. BPEL extends the Web services interaction model and enables it to support business transactions. BPEL is based on Web services in the sense that each of the business process involved is assumed to be implemented as a Web service. Processes written in BPEL can orchestrate interactions between Web services using XML documents in a standardized manner. These processes can be executed on any platform or product that complies with the BPEL specification.

BPEL supports two different types of business processes: Executable processes: Models the actual behavior of a participant in a business interaction. They follow the orchestration paradigm and can be executed by an orchestration engine. Abstract processes: Uses process descriptions that specify the mutually visible message exchange behavior of each of the parties involved in the protocol, without revealing their internal behavior. BPEL is used to model the behavior of both executable and abstract processes.

BPEL gives a much higher degree of vendor independence as it was designed for that from the beginning. The XML is the primary representation, with the graphical notation secondary. BPMN is the opposite. All vendors only have implemented a subset of the BPMN standard, and many only pretend to support the XML interchange format. Nearly all BPMN products include proprietary extensions to the standard. There certainly is overlap in modeling capabilities, and there are some problems which could reasonably be solved with either.

BPMN 2.0 and WS-BPEL 2.0 are the two most important standards for BPM today. But why are there two? Can't you just care about BPEL or just care about BPMN? In fact, both standards matter and the two should be used together. To back that up, I have to convince you both that BPEL needs BPMN and that BPMN needs BPEL. In today's post, I'll concentrate on the first: why BPEL needs BPMN.

First, let's assume that you are convinced of the value of BPEL. You see that it is a great high-level language for creating business processes and orchestrating services. Its service-centric approach is simpler and better for long-term manageability and reuse than other approaches to business process management. It is an accepted OASIS standard with multiple vendor implementations, so investments in BPEL processes are not tied to a single vendor and you can find people who already know the language without having to train them from scratch.

But if you are convinced you want BPEL, why should you care about BPMN? There are two main reasons:

- 1) To get the value of a standard notation;

- 2) To improve collaboration with a wide variety of stakeholders in the process, since BPMN is a significant simplification over existing notations used for BPEL.

When WS-BPEL 2.0 was standardized, the OASIS Technical Committee chose not to standardize a graphical notation for it. This was unfortunate, since no one creates a business process by writing BPEL in XML, which is the only standardized representation. Every vendor, and every BPEL developer, creates their processes using a graphical representation, but that representation is different for every tool.

And the notations used by these tools havent really been very good. They typically provide a one-to-one correspondence between control flow constructs in BPEL and things on the canvas. However, if you use the BPMN notation, it shows a notation that can mostly be understood without any knowledge of BPEL or even BPMN for that matter (as long as the labels are chosen carefully).

6. Graphical elements found in a BPMN

In BPMN, a business process diagram (BPD) consists of flow objects connecting objects, swimlanes, and artifacts. The specification defines the notation and semantics of a BPD. Oracle Business Process Analysis Suite is not 100-percent compliant with the BPMN standard. In this section, I will describe the elements in more detail and discuss how this process can be modeled with Oracle Business Process Analysis Suite.. Flow Objects

There are three types of flow objects: activities, events, and gateways.

6.1. Activities

An activity is work that is performed in the business process. There are three types of activities: Tasks, looped activities, and subprocesses. Subprocesses dont show up in Oracle Business Process Analysis Suite as the specification describes, but they can be modeled in it by editing the BPMN attributes. The same is true for looped activities.

Within a BPMN tool, vendors can add markers or icons to tasks, as long as this does not affect the footprint of the diagram. In Oracle Business Process Analysis Suite, tasks are represented by the following objects: function, automated activity, notification , human task, and business rule function.

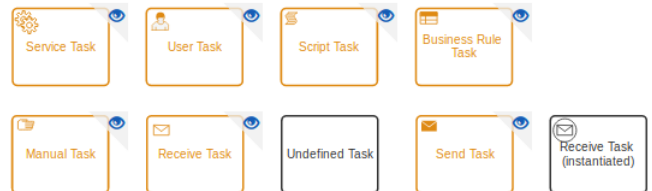
Participants



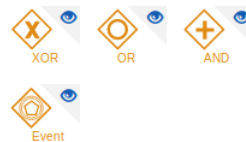
Subprocesses



Tasks



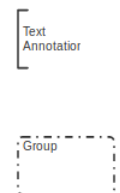
Gateways



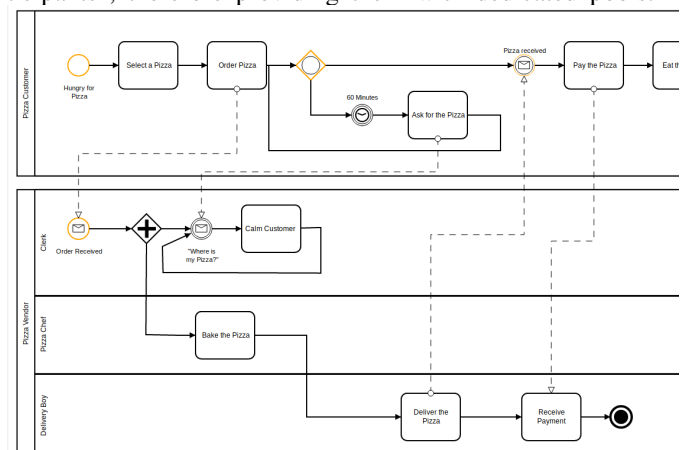
Data



Artifacts



6.1.1. Pizza Delivery BPMN Diagram. This example is about Business-To-Business-Collaboration. Because we want to explicitly model the interaction between a pizza customer and the vendor, we have classified them as "participants", therefore providing them with dedicated pools:



6.2. Events

An event is something that happens during the business process. It is usually triggered by something and/or has a result. The type of event depends on the place in the

business process. There are three types of events: start event, intermediate event, and end event. In BPMN, the trigger and result can be modeled by using the attributes dialog box. Gateways

6.3. Gateways

is the last category of flow objects. There are different types of gateways. They all merge and split the flow. If the flow does not need to be controlled, a gateway is not needed. In Oracle Business Process Analysis Suite, you can model XOR (exclusive or) gateways (data based and event based), OR, AND, and complex gateways. Connecting Objects

The connecting objects can be sequence flows (a connector that connects two activities), message flows, or association flows.

6.4. Swimlanes

In BPMN, there are two types of swimlanes: pools and lanes. Pools are used to mark the boundaries of an organization. Interactions between pools are through message flows. Sequence flows are not allowed to cross a pool boundary. This means that a process is always fully contained within a pool. Lanes can be used to divide a pool for example, to mark different organizational roles within an organization. Sequence flows can cross lanes. Artifacts

The last category of objects in BPMN is artifacts. There are three types of artifacts: data objects, groups, and annotations. Annotations and groups are not supported in Oracle Business Process Analysis Suite. Data objects consist of a group of different types: person type function, data cluster, and so on. BPMN Example

Now that we know what objects can appear on a BPD, we can start with an example. In this example, we will model part of the process of publishing an article for Oracle Technology Network (OTN).

The process starts when the abstract is approved. This is modeled as a start event, with a message. The marker shows up, when you choose Message in the BPMN attribute Trigger/Result.

The article is written and submitted to the editors. The artifact article is used to depict the information carrier. Then the writer waits for review results. When the article with revisions is received, the writer reviews it. Depending on the result, the process ends or the article is edited and submitted to the editors again. This is modeled by the 'exclusive-or-data' gateway and a sequence flow going back to 'edit article'. The process ends with the publishing of the article.

As you can see, there are three events here: a start event, an intermediate event, and an end event. There is one gateway of the type exclusive or. There are three activities, all tasks. All flow objects are connected using sequence flows. There are two artifacts: one article that is sent to OTN and one revision that is sent to the writer. These are connected to the tasks using associations. In this diagram, we could have added two pools: one for the writer and one

for OTN. You won't do this in this case, to keep the example simple.

It is common practice to identify different levels of abstraction in the process models. The most-detailed processes contain information that links the process to IT systems; the more-abstract models don't.

The goal of these process models is to visualize the business process in an organization. These models can be used for different goals: to automate processes with IT services to support and improve the process, to write instructions for employees, to show compliance to auditors, and to create insight into the business. In this article, you will use the model to automate and monitor the process. To accomplish this, you need to transform it into an executable language, BPEL. Before you do that, you will create a variant of the process with specific implementation

6.5. BPEL

BPEL comprises basic and structured activities, variables, partner links and handlers. It uses XML to describe these things. Oracle SOA Suite supports BPEL4WS 1.1. In addition, Oracle has added extensions that are not in the specification. The latest specification is the final BPEL 2.0 specification; it can be found at the OASIS site.

6.5.1. Activities. There are two types of activities in BPEL: basic and structured. Basic activities that are available in Oracle SOA Suite 10g include invoke, receive, reply, assign, throw, wait, terminate, and transform. Structured activities are used to combine basic activities. The following activities are supported in Oracle SOA Suite 10g: sequence, flow, flowN, switch, while, and pick.

6.5.2. Variables. Variables are used to store messages that are exchanged and to store the state of the process. There are three types of variables:

Simple type. This type of variable holds an XML Schema simple type (such as string, date, and so on). Message type. This type holds a WSDL message. Element. This type holds an XML Schema element.

7. Day 1-XML and REST Theory and Lab practice 1

7.1. REST

7.2. Web Services

7.3. Lab 1a–Calculator and GetTime Web Services

SampleWebService—This sample web service is used to demonstrate how to test web services with SmartBear's TestComplete.

The following operations are supported. For a formal definition, please review the Service Description.

7.3.1. GetArray. This method returns an array of integer values.

7.3.2. GetCurrentTime. This method returns the current system time.

7.3.3. GetSampleObject. This method returns an object.

Endpoint <http://secure.smartbearsoftware.com/samples/testcomplete10/webservices/Service.asmx>

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:smar="http://smartbear.com">
  <soapenv:Header/>
  <soapenv:Body>
    <smar:GetCurrentTime/>
  </soapenv:Body>
</soapenv:Envelope>
```

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Body>
    <GetCurrentTimeResponse
      xmlns="http://smartbear.com">
      <GetCurrentTimeResult>2017-12-09T16:55:55.26175-05:00
    </GetCurrentTimeResult>
    </GetCurrentTimeResponse>
  </soap:Body>
</soap:Envelope>
```

<http://www.dneonline.com/calculator.asmx?WSDL>
<http://www.webservices.net/globalweather.asmx?op=GetWeather>

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:tem="http://tempuri.org/">
```

```
<soap:Header/>
<soap:Body>
  <tem:Add>
    <tem:intA>2</tem:intA>
    <tem:intB>3</tem:intB>
  </tem:Add>
</soap:Body>
</soap:Envelope>
```

```
<soap:Envelope xmlns:soap="http://www.w3.org/2003/05/soap-envelope"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <soap:Body>
    <AddResponse xmlns="http://tempuri.org/">
      <AddResult>5</AddResult>
    </AddResponse>
  </soap:Body>
</soap:Envelope>
```

7.4. Lab 1b–REST Service-Current weather data

Access current weather data for any location including over 200,000 cities. Current weather is frequently updated based on global models and data from more than 40,000 weather stations. Data is available in JSON, XML, or HTML format. Available for Free and all other paid accounts from <https://openweathermap.org/api>

Request:
<http://samples.openweathermap.org/data/2.5/weather?q=London,uk&appid=b6907d289e10714a6e88b30761fae22>

Response:

```
{
  "coord": {
    "lon": -0.13,
    "lat": 51.51
  },
  "weather": [
    {
      "id": 300,
      "main": "Drizzle",
      "description": "light intensity drizzle",
      "icon": "09d"
    }
  ],
  "base": "stations",
  "main": {
    "temp": 280.32,
    "pressure": 1012,
    "humidity": 81,
    "temp_min": 279.15,
    "temp_max": 281.15
  },
  "visibility": 10000,
  "wind": {
    "speed": 4.1,
    "deg": 80
  },
  "clouds": {
    "all": 90
  },
  "dt": 1485789600,
  "sys": {
    "type": 1,
    "id": 5091,
    "message": 0.0103,
    "country": "GB"
  },
  "sunrise": 1485762037,
  "sunset": 1485794875,
  "id": 2643743,
  "name": "London",
  "cod": 200
}
```

GET https://saas.afrigis.co.za/rest/2/weather.tstorms.historicalDetails/AUTH_PARAMS/?location=-33.7083,23.0083&location_buffer=300&response_format=GeoJSON&time_start=2016-09-11T15:00:00Z&time_end=2016-09-18T00:00:00Z&dbz=40

<http://www.webservices.net/globalweather.asmx?op=GetWeather>

8. Process Monitoring and Mining

Process mining is a process management technique that allows for the analysis of business processes based on event logs. During process mining, specialized data-mining algorithms are applied to event log datasets in order to identify trends, patterns and details contained in event logs recorded by an information system. Process mining aims to improve process efficiency and understanding of processes. Process design may be supported by feedback from process monitoring (action or event recording or logging). What data mining is to conventional software applications, process mining also gives to workflow systems the audit trails of a workflow management system or the transaction logs of an enterprise resource planning system can be used to discover models describing processes, organizations, and product. Imagine a customer-care center. A customer registers a complaint; the system then records the details as a case, and the customer-care agents work to resolve the casewriting comments, involving different teams as required and, finally, closing the case. Customers have complained that, every other day, different agents call them to ask for more details, but nothing happens after that. Process mining can read the logs for each case, and then visually display the process in as much detail as required. This will discover the real process and show what is actually done (and what is not done). This information can be used for further analysis

9. Day Lab and Assignment Questions

- The assignment is to get the Weather for the following cities as of now, namely Hong Kong, Moscow, New York, Nairobi, Dubai and London. Please list the results in a table?
- Please explain the difference of REST and Web Service.
- What is the difference between synchronous and asynchronous services
- Please explain the following XML, JSON and explain the advantages.
- Please list 2 BPM corporate products that have bigger market share in the world?
- Define Workflow and give advantages of workflow in South African context.
- Distinguish BPEL and BPMN ?
- Please design a BPMN diagram for a Pizza delivery process using blueworks live online.
- What is the difference between a java or .Net Developer and a BPM Developer.
- Process Mining is also a big field in Process and Workflows. Please define what it entails and what is its difference from Data Mining.

10. Conclusion

The next chapter will discuss about the design of a BPM solution using an IBM product called IBM BPM 8.5.7 version. The product is a BPMN and BPEL combo product.

10.1. Day 2-IBM BPM Infrastructure overview

10.2. Day 2-Logging and use of Portal, REST and Process Admin lab practices 2

11. Day 2- Workflow Design Fundamentals

11.1. Process Design Fundamentals

11.2. Straight Throug processes and Case Management Discussion

11.3. Process Design Lab practice1

11.4. BPM Design patternsData ,start process and expiry etx

11.5. Start Process implementation Types ,REST, javascript

11.6. Start Process Lab

11.7. Decision points, rules, and other process artifacts discussion

11.8. Process implementation lap practice 2

11.9. Ajax Services/Service Flow Design

11.10. Ajax Services/Service Flow Lab practice3

12. Day 3- Workflow UI Development

Process UI Development Coach fundamentals Coach Lab 1 Coach View Fundmanetals Coach View Lab 2 Responsive Vs Heritage Coach Development Responsive Coaches Lab 3 Error Handling and Testing using BPM Tools Discusiion Error Handling and Testing Lab 4.

13. Day 4- Workflow Programming Fundamentals

Log Analysis and Debugging of Processes Error Handling and Testing Lab 1 Validation of BPM coaches Validation Lab 2 Javascript API and programming Javascript Lab 3 Java programming Java Lab 4 Team Services Fundamentals Team Services Lab 5 User Management in process design Routing and Escalations implementation Lab 6 practice

14. Day 5- ECM Intergration Fundamentals

Document Upload fundamentals Use of Alfresco and Filenet Document Upload Lab practice1 Web Service Integration Fundamentals Web Service Practices Lab 1 REST Service Integration Fundamentals and in-depth discussion REST Services Lab 2 Reporting Fundamentals Reporting Lab 3 Portal Fundamentals Reporting Lab 4 Performance Fundamentals

15. Day 6- BPM Infrastructure Fundamentals

Question and Answer Lab reviews More indepth implementations of other topics In depth review of the infrastructure Basic Learning of running BPM on a Linux or AIX environment Learning to support BPM in a production environment Lab 1 Use of Putty, and other supporting tools Analysing Performance issues on BPM. Exam Assignment and Project for 1 week

15.1. Future Work

Future Improvements include use of Deep Learning in feature extraction and classification. Other proposed future work activities include using CUDA and other parallel programming interfaces in facial recognition.

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