Application Re-engineering

"Application Re-engineering" services from TechUnified will provide results within a short time frame and lesser cost

Application Re-engineering is a huge task facing enterprises across the globe
- Ed Yourdon, Rational Corporation

White Paper

JVs and Branches:
India, United Kingdom,
Australia, Bahrain, Japan,
Singapore

Introduction

This paper discusses TechUnified's approach to application re-engineering from mainframe-based applications to J2EE compliant applications working on IBM Websphere Application Server and Websphere Portal Server. TechUnified's approach to using Rational tools like Rational Rose and Requisite Pro during this process is also discussed. Rational Unified process is a de-facto industry standard these days and how it can be used to achieve a quality standard like SEI CMM is an important part of this document.

TechUnified is an IT Consulting, Software Development and Systems Integration Company having global partners in India, Saudi, USA, Germany, Japan, Bahrain, Kuwait, Oman, UAE and Qatar.

TechUnified's is one of the best-known application re-engineering consultants having vast experience on Websphere, Rational and SEI CMM guidelines. This engagement is being extended to other countries outside Saudi Arabia as well. The operations and delivery is manned by consultants having several years of functional and technical experience.

We boast of a client base that includes many of the Fortune 500 companies like Baxter, TUV, Batelco, nVidia, GE, Intel, American Express, British Airways, Singapore Airlines, Deloitte and Touche, Hewlett Packard, Citibank, ANZ Grindlays Bank, and many others. TechUnified prides itself on its capacity to acquire and assimilate the latest technology and apply these to provide the best possible Business solutions to customers.

TechUnified and its extended arm partners have technology alliances with IT majors like IBM, Oracle, Informatica and Autonomy. We are pleased to present an approach that is sensitive to the issues described in your request. We appreciate your interest in our solutions and hope to have the opportunity to initiate this relationship.

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Customer's objectives for going for a new system

The vision for the solution required by Customer's is the following:

- New application should be developed using the latest and the best technologies
- Development time should be as low as possible
- Development cost should be low
- Development process used during this re-engineering exercise should provide a guideline to Customer's on how to apply Rational Unified Process to Customer's existing processes
- To gain an exposure to SEI CMM standards and guidelines

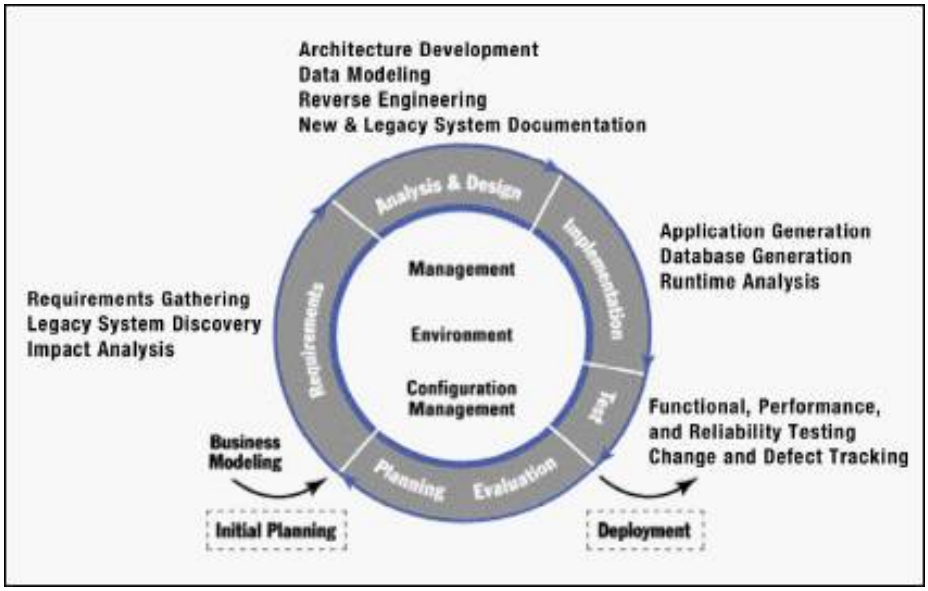
Customer has chosen IBM Websphere as the application suite and Rational tools like Requisite Pro and Rational Rose for requirements management and application modeling.

TechUnified's Application Re-engineering approach

TechUnified follows the following approach to Application Re-engineering and Development

- Use-case based approach to requirements analysis
- Requisite Pro and Rational Rose will be used for requirements gathering and requirements modeling
- COBOL to Java transformation using standard transformation tool and Flow-charts for visual modeling using standard flow chart generator
- Just in time resource allocation using Rational Unified Process as the guiding process and all the artifacts developed using RUP
- SEI CMM 5 as the quality guideline all through the project life cycle

The figure below gives a high level picture about the project life cycle in case of reverse engineering from a legacy system using Rational Unified Process



Managing the Requirements and Use Case Based Approach

Requirements management is a key process area for improving Customer project success. The better you communicate and manage your requirements, the better chance your projects have for delivering the right solution on time and on budget.

Use cases express the behavior of a system—i.e., the functional requirements—in a way that enables all project stakeholders to understand and verify that behavior. This is because use cases naturally extend the requirements format beyond the limited efficacy of “shall-based” functional descriptions like “the system shall prompt users to perform operation xyz.” A well written use case clearly expresses a functional requirement by outlining, in text and in a diagram, the sequence of steps that users and the system will perform to accomplish the stated business goal.

- Use cases are understandable and usable by both technical and non technical stakeholders
- Because they are easy to understand, use cases promote the quick resolution of disagreements among stakeholders, thus saving costly re-work later
- Use cases work very well to support modern, object-oriented design and development practices
- Use cases provide ideal input for business modeling efforts, change management, defect tracking, and so forth

Deriving Use Cases from the Current System

A specification of the legacy environment, in the form of use cases, provides an invaluable foundation for ongoing design and development efforts. For creating this foundation quickly and cost-effectively is to approach it step by step, as described below:

- Identify the users (actors) of the system’s most important processes
- Categorize them according to their roles
- Apply interviews and observation to determine the business value of these

How the tools like Requisite Pro come to help

- Combines the familiarity and ease of Microsoft Word documents
- Helps understand the impact of change so you can better manage it by having change management procedures in place
- Integrates requirements across tools and teams to keep everyone informed of the most current requirements information

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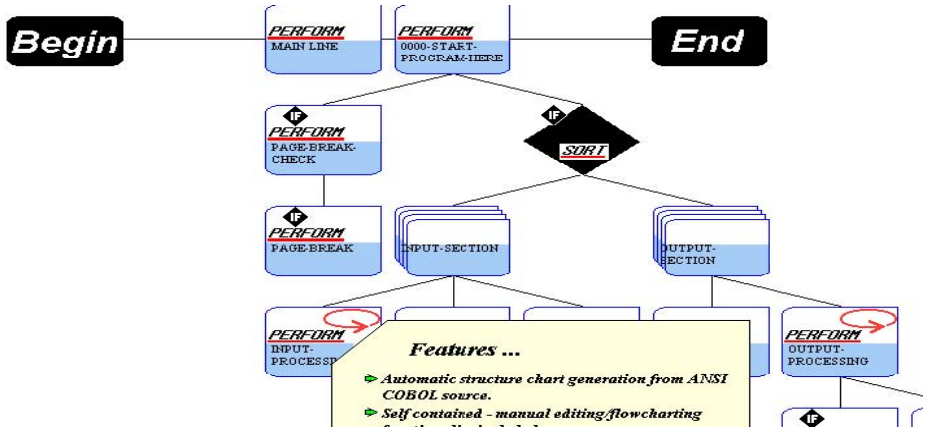
Cobol to Java Transformation and Flowchart approach

Interviews and meetings with the current owners of the legacy applications at customer site is a must but to make the work faster, TechUnified has planned to use transformation and flow chart mechanism.

Cobol to Java transformation tools will be used to reduce the time frame required to manually convert all the legacy codes to Java. Following this process does not mean that all Cobol code can be transformed but it will reduce the effort to a large extent.

Using tools to convert legacy codes to flow chart will make the work much simpler for the developers in visualizing the scenario. An example is shown in the figure below.



Rational Unified Process Applied to Legacy Re-Engineering

Rational Unified Process guides the complete re-engineering project. Basically RUP is a combination best practice. There's a lot to be described about RUP as it has been used across the world in thousands of mission critical projects but within the current scope of work, RUP will help the customer in following ways:

- Step by Step and Iterative process spanning the project right from requirements gathering to analysis, design, development, testing and even production
- Common methodology facilitates team communication, improves project predictability, and helps better manage and mitigate risk
- Artifact templates, tool helps customer in tracing and maintaining records of every step during project life cycle
- Personalized project views provide each team member the resources they need to stay focused on delivering working application

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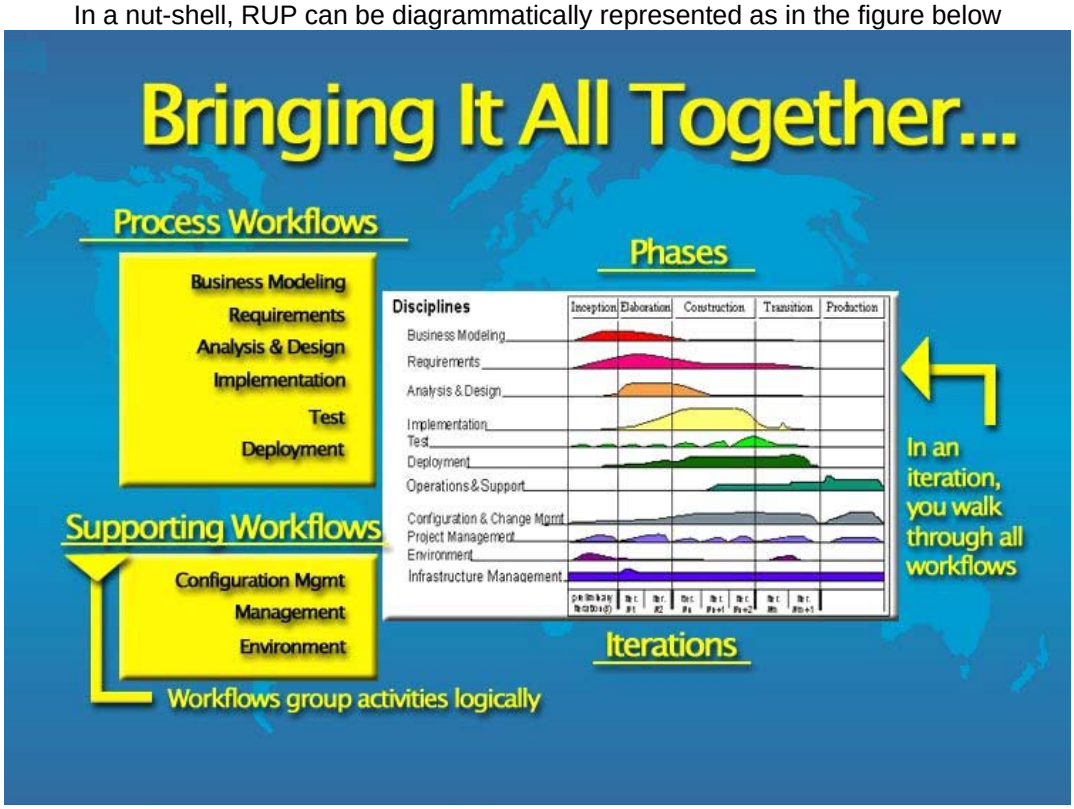
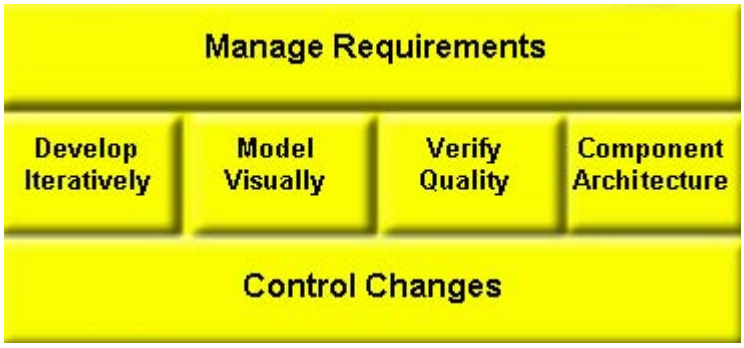
In a nut-shell, RUP can be diagrammatically represented as in the figure below



The combination of best practices provided by RUP can be represented diagrammatically as shown in the figure below

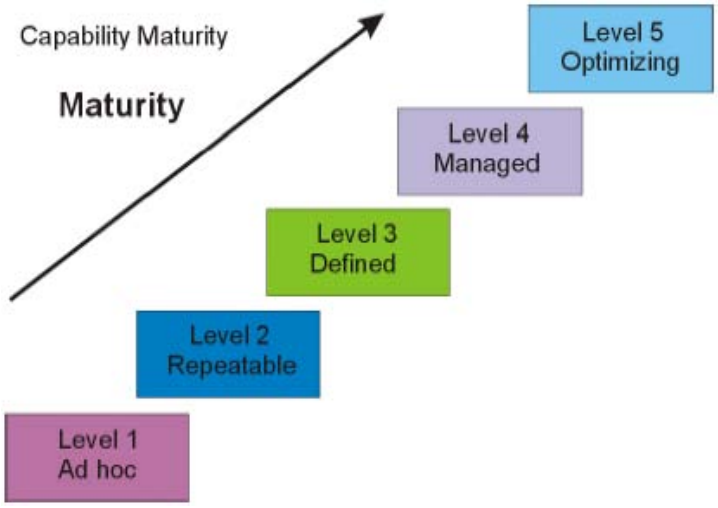


TechUnified will execute the complete project at customer site using RUP and the best practices suggested there in. Many times, processes need to be tailored to the specific needs of the customer. In these cases, TechUnified will make sure that we tailor RUP to gain the maximum benefit from the project.

SEI CMM Initiatives at Customer Site

The Software Engineering Institute's (SEI) Capability Maturity Model (CMM) provides a well-known benchmark of software process maturity. The CMM has become a popular vehicle for assessing the maturity of an organization's software process in many domains. TechUnified will support customer to achieve CMM Level-2, Repeatable, and Level-3, Defined, software process maturity levels.

The CMM covers practices for planning, engineering and managing software development and maintenance. These key practices improve the ability of organizations to meet goals for cost, schedule, functionality, and product quality. The CMM has five levels of maturity: Level-1 to Level-5. As illustrated in the following figure, each maturity level is composed of Key Process Areas (KPAs), and each KPA identifies a cluster of related activities. When performed collectively, these related activities achieve a set of goals considered important for establishing process capability at that maturity



Level-2, the Repeatable Level, is defined as follows

At the Repeatable Level, policies for managing a software project and procedures to implement those policies are established. Planning and managing new projects is based on experience with similar projects. An objective in reaching Level-2 is to institutionalize effective management processes for software projects, which allow organizations to repeat successful practices developed -in earlier projects, although the specific processes implemented by the projects may differ. An effective process can be characterized as practiced, documented, enforced, trained, measured, and able to improve. Projects in Level-2 organizations have installed basic software management controls. Realistic project commitments are based on the results observed on previous projects and on the requirements of the current project. The software managers for a project track software costs, schedules, and functionality; problems in meeting commitments are identified when they arise. Software requirements and the work products developed to satisfy them is base lined, and their integrity is controlled.

The key performance indexes for level 2 are:

- Requirements Management
- Software Project Planning
- Software Project Tracking and Oversight
- Software Subcontract Management
- Software Quality Assurance
- Software Configuration Management

Level-3, the Defined Level, is defined as follows: At the Defined Level, the standard process for developing and maintaining software across the organization is documented, including both software engineering and management processes, and these processes are integrated into a coherent whole. The standard process is referred to throughout the CMM as the organization's standard software process. Processes established at Level-3 are used (and changed, as appropriate) to help the software managers and technical staff perform more effectively. The organization exploits effective software engineering practices when standardizing its software processes. There is a group that is responsible for the organization's software process activities; for example, software engineering or SEPG. An organization-wide training program is implemented to ensure that the staff and managers have the knowledge and skills required to fulfill their assigned roles.

The key performance indexes for level 3 are:

- Organization Process Focus
- Organization Process Definition
- Training Program
- Integrated Software Management
- Software Product Engineering.
- Intergroup Coordination Peer Reviews

TechUnified plans to have full time SEI CMM experts at customer site during the project life cycle to train and make sure the other project teams also follow the processes to achieve the SEI CMM guidelines. TechUnified also proposes to do the GAP analysis at customer site and then finally get the CMM certification agencies to do the CMM certification for customer. For customer site, it will be a transparent and smooth process during the transition from SEI CMM level 1 to SEI CMM level 5.

Case Studies for TechUnified's Websphere and Rational Expertise

TechUnified and its extended arm partners have implemented more than 20 projects using Web-sphere application suite and Rational Tools. A few of them are application re-engineering and re-implementation projects. In fact a large number of team members are from IBM Global Services.

Case Study: A global certification agency uses Websphere and Rational Solution to publish legacy information over the Internet. The project includes a major re-engineering activity

The Organization: The customer is a global certification agency having operations across the globe. The purpose of the system is to bring secured information closer to the customers regarding the certification authenticity, validation and features and standards of the products that were certified. The organization has more than 7500 employees and operates in more than 300 different locations across the world

Business Problem: The organization wanted to replace paper-based and localized software based information request process with a. "self service" Internet-based Global process for accessing product certification information. The new system had to bring online the records stored across varied platforms and systems spread across different countries. The data source varied from Oracle tables to Lotus Notes to AS-400 systems. Many units of customer in different countries had developed their own versions of applications to do this task. It was a major reengineering after under-standing the salient features of the new system which was the super-set of all the features provided by all the localized applications taken together.

TechUnified's analysts gathered requirements from the business analysts and stored them in IBM Rational Requisite Pro, then used IBM Rational Rose to create use-case diagrams showing what the system should do. The developers were then able to link the visual models to requirements.

The analyst also hyperlinked samples of interface screens to the models, providing developers with a clear, unambiguous picture of how the system should work. If they needed more detail, developers could easily access associated requirements and hyperlinked screen shots to ensure delivery of the right system the first time. Clear Case and Clear Quest were used as the configuration management and defect tracking tools.

Websphere application server and portal server were used to bring the final information to the end users who connected to the corporate portal to get the desired information.

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Case Study: A leading banking company uses Portal and Rational Solution to bring information to its employees through EIP (Enterprise Information Portal)

The Organization: A leading banking company having large number of employees needs to collaborate and share the information on the intranet portal.

Business Problem: The organization wanted to bring all the information available on the Intranet in various servers in the form of an Intranet portal. Intelligent search facilities to search the information from static content (in the file systems) and the dynamic contents generated by the CMS (Content Management Server).

TechUnified's analysts gathered requirements from the business analysts and stored them in IBM Rational Requisite Pro, then used IBM Rational Rose to create use-case diagrams showing what the system should do. Rational Clear Case and Clear Quest were used as the configuration management and defect tracking tools.

Portal server and application server were used to bring the final information to the end users who connected to the corporate portal to get the desired information.

Case Study: Project Tracking System for a global certification agency. The project includes a major re-engineering activity.

The Organization: The customer is a global certification agency having operations across the globe. The purpose of the system is to be able to manage and track the existing projects going on within the organization. This system has been created for satisfying resource planning and client communication needs of the company. It serves 30 business fields divided into 5 business areas. The organization has more than 7500 employees and operates in more than 300 different locations across the world.

Business Problem: The old system uses SAP to maintain the data related to the projects handled by the company. The project tracking system was not integrated with SAP. The data that is needed by the project tracking system had to be manually entered into the project tracking system. To ease the transfer of data from the SAP system to the project tracking system the migration has to be auto-mated to save time and reduce errors. In the old system the personal details of an engineer and skill matrix were maintained separately using Excel sheets.

When selecting the members for a team in the project tracking system the appropriate engineer had to be selected by scanning through the Excel sheets manually. To improve the efficiency of selecting the members with relevant competency the skills of individual engineers have to be stored in an easily searchable form. The process of updating the skill matrix also has to be improved to reduce errors.

Keeping track of the availability of an engineer has to be integrated with the project tracking system so that the resources are utilized in the best possible manner. The availability of the resource has to be decided based on the tasks assigned to the resource from current/other projects as well as the personal appointments of the resource.

The system should provide facility to manage the equipment available for the different locations where the projects are carried out. Equipment can belong to a lab, or they can belong to a business field of the customer or they can be external equipment. The system has to provide functionality through which the details such as calibration, the personals that are trained to use the equipment and the status of equipments can be captured and managed.

The system attempts to make the certification process paperless. All the documents required for the processing of a particular project have to be categorized and stored in a secure location.

Facility has to be provided to version the documents and store templates of various frequently used formats.

Reporting is one of the key necessities of any enterprise system. The reporting solution has to display a variety of reports and allows the user to generate different kinds of statistical reports from the System. Provision should be made to save different criteria for generating statistical reports and rename the saved criteria.

The project tracking system should enable communication between the various team members and with the client from within the application. The system must provide facility to store the contact information of the various individuals involved in the system.

Also provision should be made to add minutes of meetings, send emails and faxes and keep track of the communications made from the system. The system should enable the clients of the customer to view and comment on the status of their project(s). This has to be a web application that can be integrated with the other web applications of the customer. So that there can be a single point access to all the clients of the customer. TechUnified's: The analysts gathered requirements from the business analysts and stored them in IBM Rational Requisite Pro, then used IBM Rational Rose to create use-case diagrams showing what the system should do. Clear Case and Clear Quest were used as the configuration management and defect tracking tools.

The integration of lotus notes and the legacy SAP application is done using RFCs. RFCs allow the data from SAP to be converted to lotus notes documents. This is achieved by scheduling the migration activity to happen once a day. In the meantime if the user wishes to import the changes done to a particular project the migration procedure can be initiated by supplying the date range or the project number range as input to the RFCs. The RFCs in turn pickup only the modified/new data into the lotus notes database.

The skill matrix and the competency information of an engineer are stored in a configuration data-base in the form of an NSF file. This allows engineers to be searched easily based on the business field and the area of expertise. This data can be used in the application where team is selected for a project. Based on the business field of the project the list of matching engineers is automatically populated in a text list from which the desired engineer can be selected as a member of a project.

For keeping track of the availability of a particular engineer on a given day the scheduler is used. The scheduler allows creation of the different kinds of tasks for a particular engineer. Once a task is created or modified a java agent is triggered which picks up the changed/new documents and creates a corresponding entry in the mail database of the user. This is done by, fetching the names of the team members and looking up the global address book for information regarding the location of the mail database. Once the mail database is obtained a calendar entry is made using the details found in the task document. To make scheduling user-friendlier a java applet is used which provides a GUI representation of the schedule of all the members of the project team.

This applet provides certain advanced features like dragging and dropping tasks and stretching using the mouse.
The information about the equipments and calibration are maintained in a separate notes database. Which will enable the project tracking system to select the equipments users needs for execution of a particular project

To provide an effective solution to the document management needs of the system Domino.Doc is used. Domino.Doc is an off the shelf solution for managing documents. Since Domino.Doc is also a notes database it can be included in the system without much difficulty. In the project tracking system the documents are organized in the form of folders. Each folder corresponds to a particular type of document. From the folders the documents can either be sent to the client or to the web application.

The reporting requirements are met by using bookmarks on the templates using which the details to be furnished in the reports are formatted properly and an understandable manner. The Communication module allows the users of the system to maintain the communication made to in connection to a particular project.

Since the Web interface has to be provided using a J2EE application. The data has to be migrated to and from an oracle database. The oracle database is chosen over the notes database for storing the data required for iTrack to improve the performance though it involves complicated migration routines. To enable an easy migration another database called iTrack.nsf is maintained which will server as a buffer for all the data that has to be migrated. Once information is changed or created in project the tracking system, only the information that needs to be shown to a customer is pushed to the iTrack.nsf. From iTrack.nsf the data is migrated using a java program that uses IIOP and HTTP to access the data stored in iTrack.nsf and Domino.Doc database and transfers the new/modified data and documents.

Portal server and application server were used to bring the final information to the end users who connected to the corporate portal to get the desired information.

Deliverables and Milestones

The key deliverables and milestones can be scheduled at the end of each of the steps followed as a part of Application re-engineering methodology

1. High Level System Requirements document
2. Detailed Requirements Specification Document and Use-Case analysis documents identifying all requirements, actors, dependencies, visual models and flow charts
3. Design Document covering the strategy for re-engineering each legacy application that needs to be re-implemented
4. Environment set up, Programs, Scripts for COBOL to Java conversion, and Flow charts
5. Re-engineering procedure document along with time-line for various steps and Final J2EE compliant code
6. Sign-off of the individual legacy application re-implementation

Summary

The application re-engineering approach provided in this document is specific to customer where the re-implementation of legacy applications has to be done using Web-sphere and Rational application suite. TechUnified s and its partners have vast experience in application migration and re-engineering projects using Websphere and Rational. This will enable the complete project to be executed with the highest degree of quality standards and processes. SEI CMM Level 5 will be the benchmark for all the deliveries.