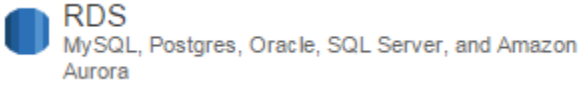
Part G – Software Specification

Cloud Deployment

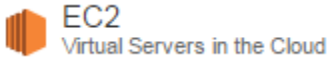
We use the Amazon (AWS) hosting services. Amazon EC2 provides resizable compute capacity in the cloud. It is designed to make web-scale computing easier for developers and system administrators.

As part of the support agreement with the client, this infrastructure is included in the maintenance agreement.



RDS (Relational Database Service) – Using the Oracle 11.2.0.4 2vCPU 7.5 GB Ram with the following features noted

- RDS maintain a synchronous standby replica in a different Availability Zone than the DB instance. Amazon RDS will automatically fail over to the standby in the case of a planned or unplanned outage of the primary
- Provisioned IOPS (SSD) storage is suitable for I/O-intensive database workloads. Provides flexibility to provision I/O ranging from 1,000 to 30,000 IOPS.
- RDS does not assign a public IP address to the DB instance, and no instance or devices outside of the VPC will be able to connect.
- Character set is AL32UTF8
- Back Up Retention is set to 7 days.
    - Automated backup is an Amazon RDS feature that automatically creates a backup of your database. Automated backups are enabled by default for a new DB instance.
    - An automated backup occurs during a daily user-configurable period of time known as the preferred backup window. Backups created during the backup window are retained for a user-configurable number of days (the backup retention period). Note that if the backup requires more time than allotted to the backup window, the backup will continue to completion.



EC2- Virtual Server

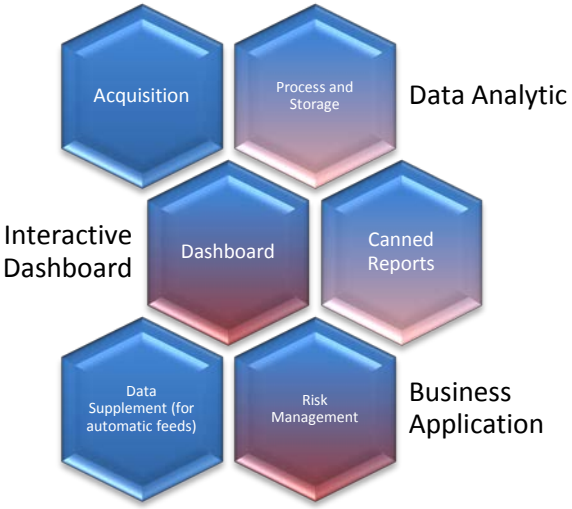
The web service is based on an m3.xlarge instance type which runs 4 vCPUs and 15 GB memory and SSD 2x40GB, this provides a balance of compute, memory, and network resources, and it is a good choice for many applications. Features: High Frequency Intel Xeon E5-2670 v2 (Ivy Bridge) Processors*, SSD-based instance storage for fast I/O performance, balance of compute, memory, and network resources

Security

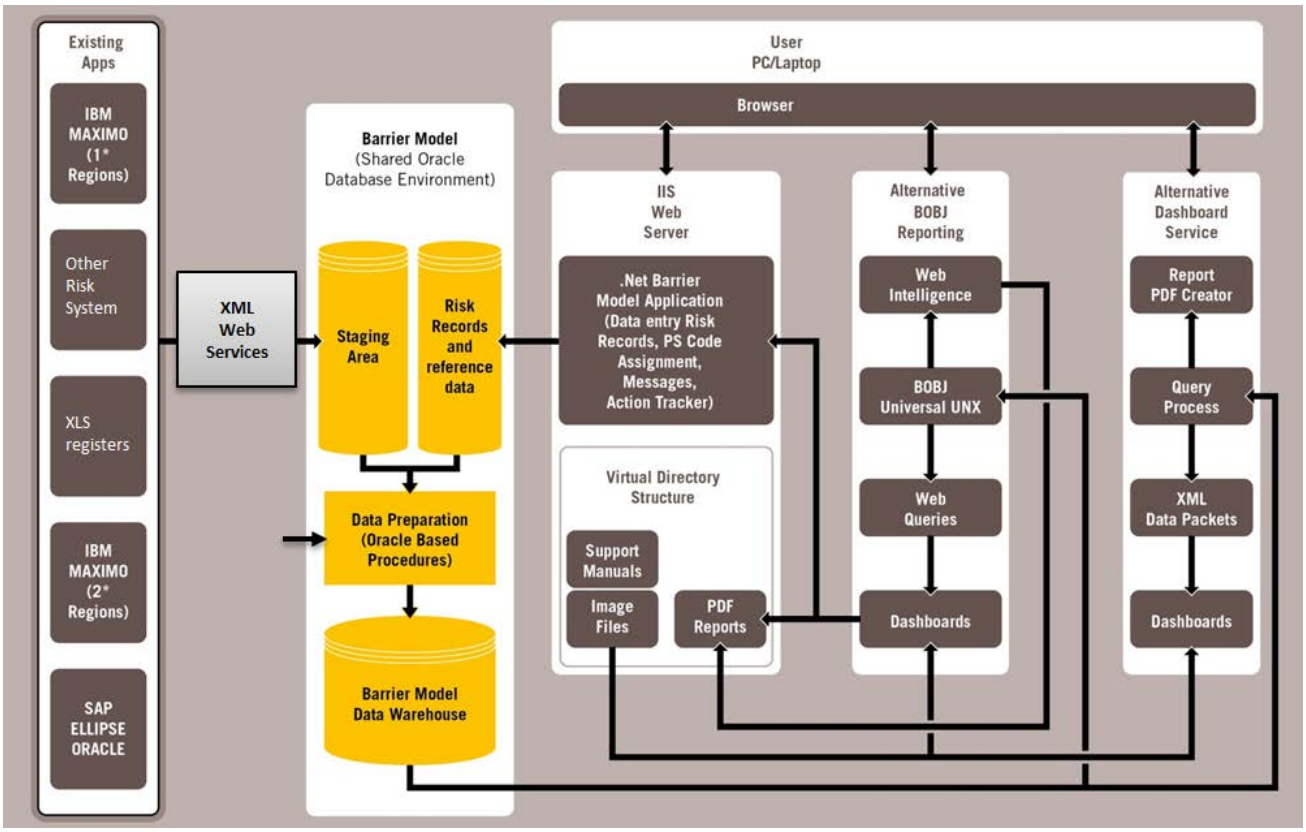
IIS server is running the barrier model, the web site uses a wildcard SSL Certificate that supports 2048 bit encryption based on our registered *.tpsco.com domain site name. The certificate has been issued via GoDaddy public traded internet domain registrar. This secured the transmission of data from point of origin to the data centre. Furthermore, AES encryption is used to encrypt secure data within the database layer.

The Software, Data and Materials within the scope of the license agreement can be considered to fall into 3 related categories

1. Oracle Database and Connections
2. Dashboard Components
3. Business Application
    a. Application Framework
    b. Web Services for Integration

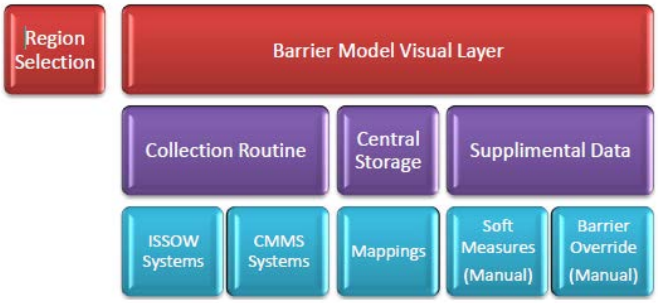


Overall Architecture Structure

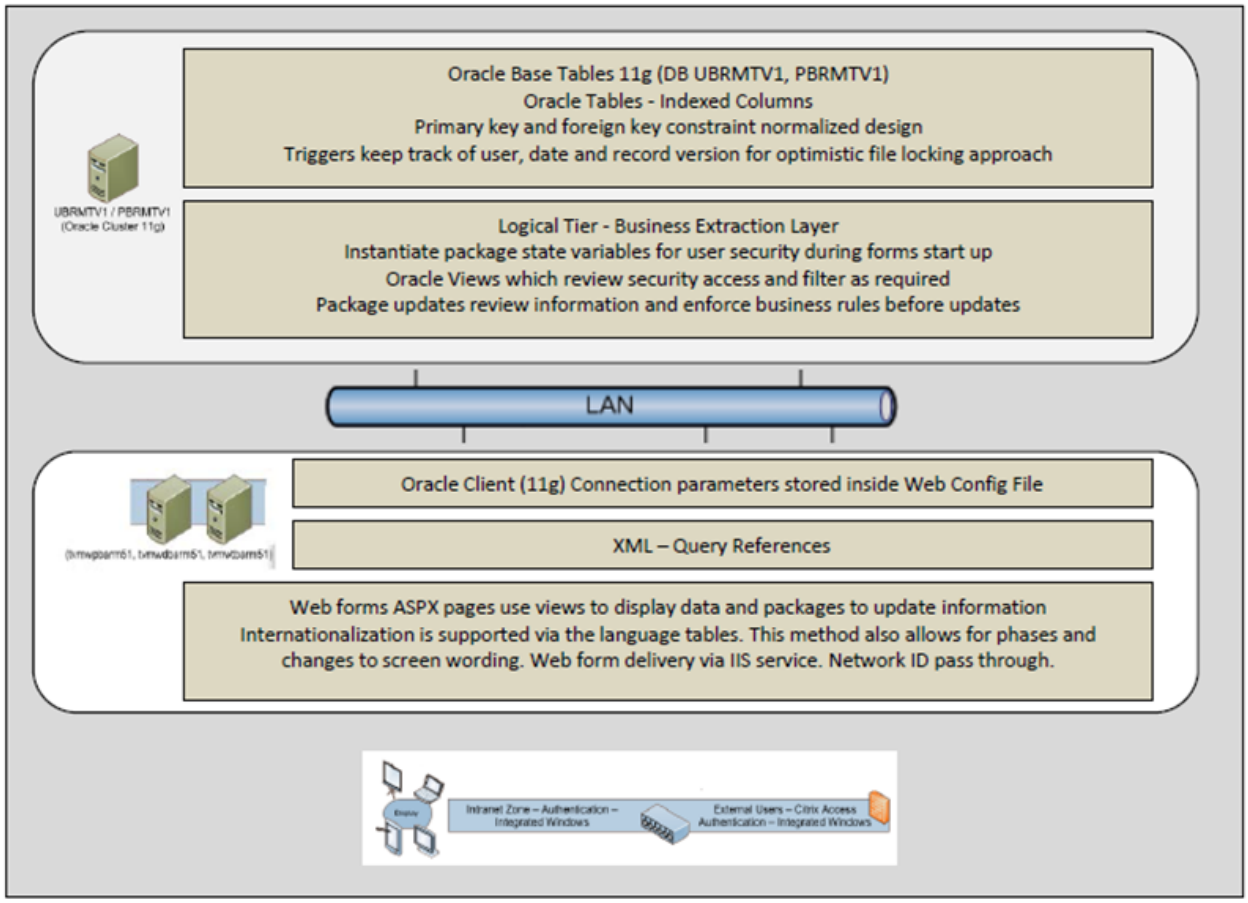


Oracle Database

The Oracle Database contains the following high level components. Information is consolidated via a data analytic which stores information ready for presentation by the dashboard and reports.



In addition to storing the analytic information, the same Oracle DBMS is used for application processing based on the following structure.



Dashboard and Reporting Components

Drilldown reports are listed on the barrier model display. The user can simply click on the relevant content to launch a report. Report details are PDF documents updated either on the hour or every day. These documents support the data held in the barrier or produce operational style documents that can be used for regular meetings. The reports are refreshed on a scheduled interval and stored in a virtual directory as PDF documents.

Barrier Model			
Modules Affected	**Module Type**	**Folder Group Virtual Directory**	**Scheduled**
BM_RISK_RECORD_HARDCOPY	PDF	/BARRIER/REGION/REPORTS/	Yes
BM_ACTION_BY_DICIPLINE	PDF		Yes
BM_ACTION_TRACKER	PDF		Yes
BM_BARRIER_REPORT	PDF		Yes
BM_CMS_DRILLDOWN	PDF		Yes
BM_BARRIER_HISTORY	PDF		Yes
BM_ISSOW_DETAIL	PDF		Yes
BM_CMS_MISSINGCODES	PDF		Yes
BM_PS_DRILLDOWN	PDF		Yes
ANNUAL BARRIER MODEL REPORT	PDF		Yes

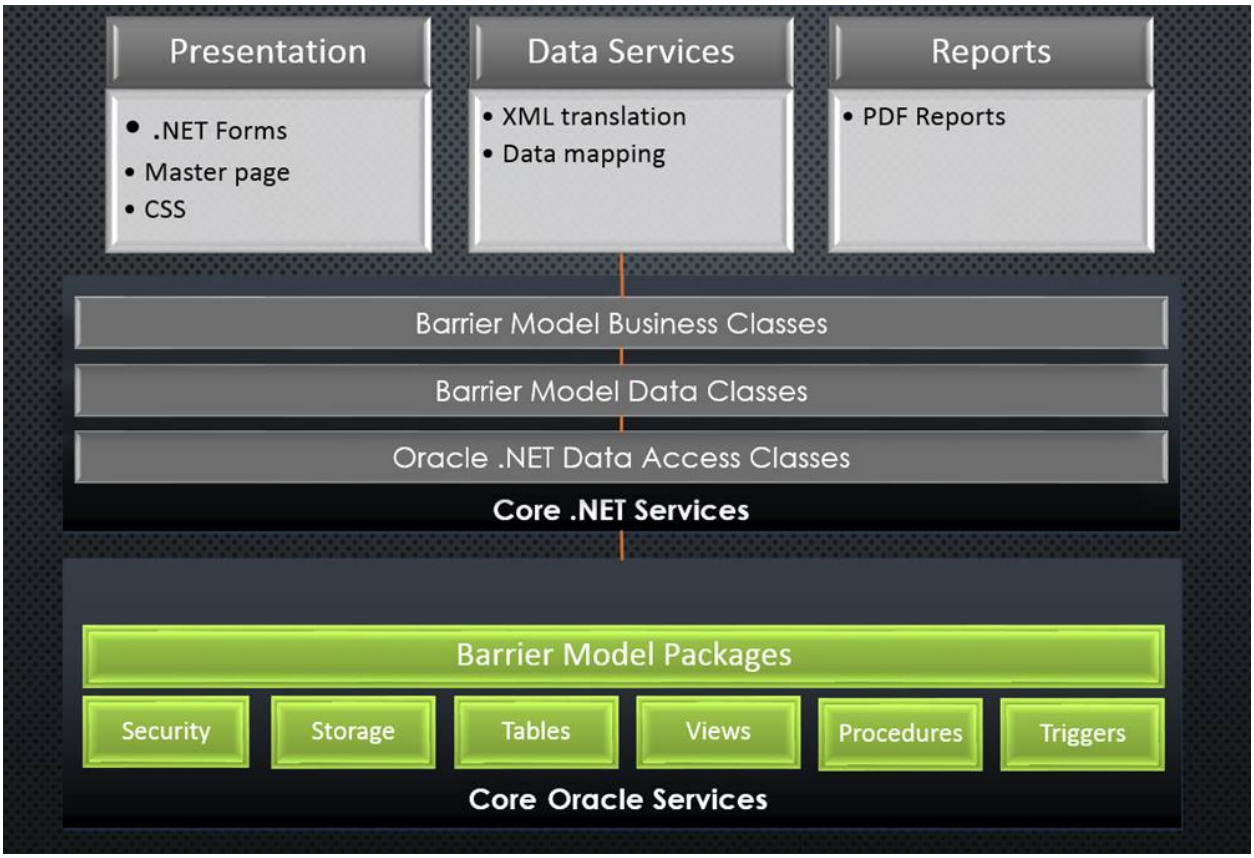
Dashboard

The dashboard is deployed as an Adobe Swift file (Flash) which uses XML for data deployment. XML documents are produced by the Oracle DBMS and stored locally on the Web Service. They are generated based on operational requirements from the Oracle application which links to the cyclic schedules that are GMT offset.

The single SWF file uses a flash variable to control the region display.

Barrier Model			
Modules Affected	**Module Type**	**Folder Group Virtual Directory**	**Scheduled**
BARRIER_MODEL.SWF	SWF	Region and site Display	No
BARRIER_MODEL_GLOBAL.SWF	SWF	Country Display	No

Client Objects



The IIS Server which will run Barrier Model must have the following software installed:

- Microsoft Windows Server 2003 (SP 2) or later version
- Microsoft .NET Framework SDK 4.0
- Internet Information Services (IIS) 5.1 or later version
- Web Browser
- ODAC 11.2 Release 5 and Oracle Developer Tools for Visual Studio (found at http://www.oracle.com/technetwork/topics/dotnet/utilsoft-086879.html)

The client machines must have the following software and settings applied:

- Web Browser Version 9.0 or above for I.E. or Chrome Browser.
- Allow Asp.NET v4.0 x86 within the IIS configuration for ISAPI and CGI Restrictions
- When creating the application pool, establish as BarrierModelAppPool and link to .Net framework version 4.0 Enable the 32 Bit application support
- Authentication – to be Windows Authentication and enable Asp.Net Impersonation
- Enable recycling on a regular interval 4.00 AM daily basis

When deploying the application the virtual directory will be called BarrierModel.