



Overview of System Architecture



Contents	Introduction to the HR.net Enterprise Framework	1
	HR.net Enterprise Administrator Console	3
	HR.net Enterprise Document Explorer	4
	HR.net Enterprise Server Application	4
	HR.net Enterprise Database	4
	Requirements	4
	Database Server	4
	Web Server	5
	Application Server	5
	Client Computers	5
	Architecture of the HR.net Enterprise Framework	6
	Application Structure	6
	Clients Access	6
	Web Layer	6
	Business Façade Layer	7
	Business Rules Layer	7
	Data Access Layer	7
	Windows Service Applications	7
	HR.net Enterprise Database	7
	Deployment of Layers	8
	Hosting of Service Applications	8
	Communication between Tiers	8
	Network Load balancing	9
	Interaction between HR.net Enterprise Application Elements	10
	HR.net Enterprise Windows Authentication Web Application	11
	HR.net Enterprise Web Server Application	12
	Portal Community	12
	Messaging Page	13
	Workflow Forms	13
	Screens	14
	Document Manager	15
	Workflow Service	15
	Business Rules	15
	Data Access Layer	16
	HR Business Rules	16
	Hardware Requirements	17
	Server Hardware Specification	17
	Web Server Specification	17
	Database Server Specification	17
	Client Requirements	18

Technology

HR.net Enterprise uses several key technologies within its architecture. The following is a list of the technologies used:

- Windows 2003/2008 Server – This is the recommended operating system for HR.net Enterprise.
- SQL Server 2005/2008 Database
- Internet Information Services 6 (IIS 6) Web Server
- Visual Basic.NET – Microsoft's next generation of programming language for developing .NET applications.
- ASP.NET - Microsoft's object model for developing Web Browser applications.
- ADO.NET – Microsoft's object model for database access.
- Web Services – A method of enabling Web based applications to communicate with one another.
- .NET Remoting – A Microsoft technology that enables communication between tiers enabling access to remote programming objects hosted on other servers. It enables applications to be distributed across computers and promotes scalability.

Further Reading

The following links provide further reading about the Microsoft .NET framework:

<http://www.microsoft.com/net/business/>

Articles describing what Microsoft .NET means for businesses.

<http://www.microsoft.com/net/>

Provides links to technical resources and case studies.

http://msdn.microsoft.com/library/en-us/dndotnet/html/techmap_dotnet.asp

A guide to getting started with Microsoft .NET technologies.

Components of the HR.net Enterprise Framework

HR.net Enterprise consists of the following main components:

HR.net Enterprise Web Application

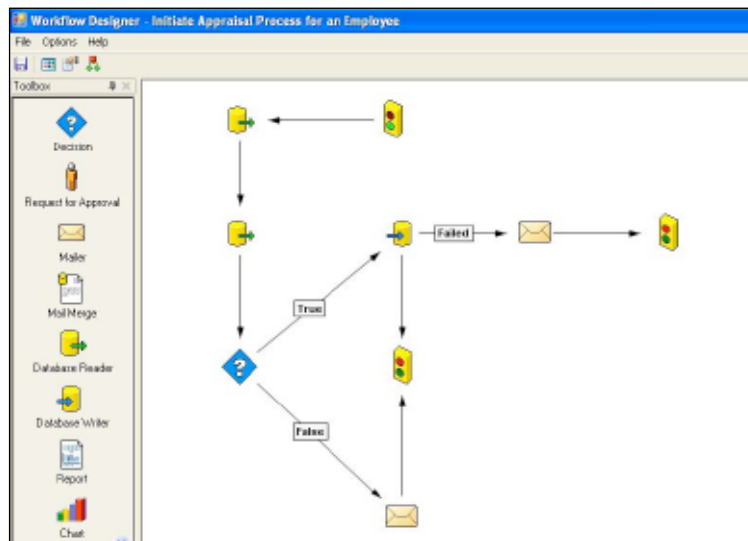
This user interface is used to access the HR.net Enterprise human resources functionality. A rich user interface is provided using standard HTML to an Internet Explorer 6 or later Web Browser. Users can perform a variety of tasks including viewing and contributing to the company portal, retrieving and managing documents, viewing and maintaining Human Resources information and making workflow requests such as holiday requests, changes of personal details, timesheets or expenses.

HR.net Enterprise Administrator Console

The Administrator Console is an application used to configure HR.net Enterprise. It is designed as a System Administration tool and can be used remotely across the Internet or on a local network.

System Administrators can perform a variety of functions, including:

- Modification of the HR.net Enterprise database structure
- Modification and creation of the screens displayed to end users of the HR.net Enterprise Web Application.
- Design of workflow processes.
- Management of user security.
- Modification of plug-in code that provides more advanced functionality.



The graphical workflow design environment in HR.net Enterprise.

HR.net Enterprise Document Explorer

The HR.net Enterprise Document Explorer is an application used to design reports, data exports, charts and mail merge templates. The documents and reports are made available to users through the HR.net Enterprise Web Browser application. The application can be used remotely across the Internet or on a local network.

HR.net Enterprise Server Application

The HR.net Enterprise Server Application consists of a number of scalable applications hosted on one or more Windows servers. The applications provide the logic, data access and user interface processing of the HR.net Enterprise Framework.

HR.net Enterprise Database

The HR.net Enterprise database contains both framework tables and custom tables created using the Admin Console. Multiple databases can be created and each database is independent of one another. At the time of login a user can specify which HR.net Enterprise database to connect to.

In the Application Service Provider (ASP) or Software as a Service (SaaS) scenario where HR.net Enterprise is hosted for clients, each client has their own HR.net Enterprise database which has a unique name. Multiple HR.net Enterprise databases can be hosted on a single database server.

Requirements

HR.net Enterprise has been developed as a multi-tiered application. As a minimum requirement two servers are required; one server to host the Microsoft SQL Server database and a Web server hosting the HR.net Enterprise application.

To provide additional scalability the application can be divided into Web and Application tiers and hosted on separate servers.

The following is a list of the software requirements for each tier. The Web and Application tiers can be combined and hosted on a single server or hosted on multiple dedicated servers.

Database Server

- Windows Server 2003/2008 fully service packed.
- SQL Server 2005/2008 Standard Edition fully service packed

Web Server

- Windows Server 2003/2008 fully service packed.
- IIS 6 or above fully service packed.
- Microsoft .NET framework version 3.5.

Application Server

- Windows Server 2000, Server 2003 or 2008 fully service packed.
- Microsoft.NET framework version 3.5.
- Microsoft Data Access Components 2.8.

Client Computers

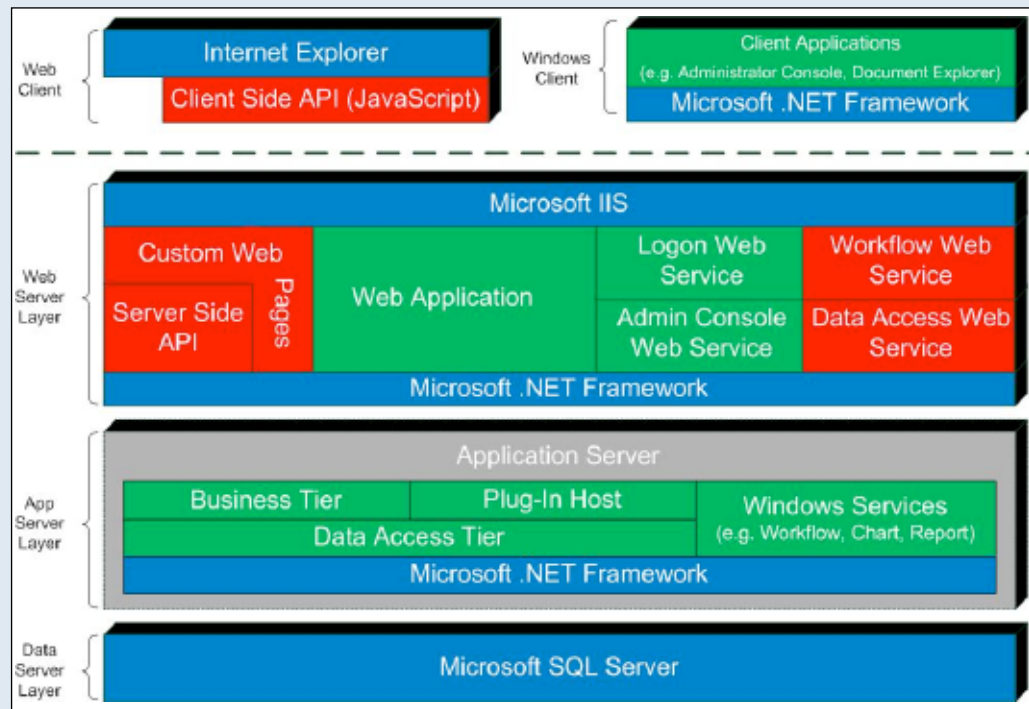
User building: Client computers that are to run HR.net Enterprise Framework configuration applications (the Administrator Console and Document Explorer for system configuration, report writing etc.) require the Microsoft .NET framework version 3.5 to be installed.

All other users: (HR managers, employees etc) Client computers that are to connect to the HR.net Enterprise Web Application must have Internet Explorer version 6 (IE6) with Service Pack 1 or later installed. They do not require the Microsoft.NET framework. From version 4 of HR.net Enterprise customers will be able to access HR.net using Firefox (version 3 or above). Please speak to your Visual consultant or partner for more information.

Architecture of the HR.net Enterprise Framework

Application Structure

The HR.net Enterprise application is divided into several components as illustrated below:



Clients Access

Clients access HR.net Enterprise using either a Web Browser or using the Administrator Console or Document Explorer Windows Forms applications.

Web Layer

The Web layer provides access for clients to the application. The Web layer consists of two ASP.NET Web applications and two Web Services applications.

The ASP.NET HR.net Enterprise Web Application provides the user experience in HTML.

The HR.net Enterprise Windows Authentication Application authenticates users using Integrated Windows authentication. It enables users who have pre-authenticated themselves at the Windows Logon to login to HR.net Enterprise without the need to re-type their user credentials, thereby achieving single sign-on. This application is described in more another of the document in this series - HR.net Enterprise Security.

The Web Service applications communicate with the Windows Forms Applications (Administrator Console and Document Explorer).

Deployment of Layers

The HR.net Enterprise architecture enables the Web, Business Rules\Data Access and Windows Service Applications layers to be deployed on a single server or separate servers. A low load implementation of HR.net Enterprise can be supported on a single Web server hosting all three layers together with a dedicated server hosting Microsoft SQL Server 2005 or 2008. As the number of concurrent users increase each layer can be scaled out and placed on a dedicated server.

Although the Business Rules and Data Access layers can be deployed on separate servers, for performance reasons they should be deployed on the same server.

Hosting of Service Applications

HR.net Enterprise supports the hosting of individual Windows Service Applications on dedicated servers. If there is a high demand for reporting for example, the Reporting Service may be hosted on its own dedicated server. Any number of instances of each Windows Service Application may be deployed with each server hosting a single instance. For example, two servers may be used to run the Workflow Service Application each server running a single instance of the Workflow Service Application.

Communication between Tiers

When the Web and Business Rules\Data Access layers are hosted on separate servers, .NET Remoting is used to enable communication between them.

Remoting is a Microsoft technology that enables communication between tiers of an application. IP address restrictions can be used to ensure that requests to the Remoting server come from a known source.

Remoting listens for requests on a given port and passes them to an application for processing. The configuration of Remoting is specified in a Remoting configuration file. The Remoting configuration file specifies the application that should be sent the incoming request and the transport and data format. TCP with binary format provides the best combination of performance (this is the default setting for HR.net Enterprise), but TCP/SOAP, HTTP/binary & HTTP/SOAP can be specified.

Remoting can be hosted in two ways:

- 1 Remoting Windows Service Application

A Windows Service application, called the HR.net Enterprise Remoting Service, hosts the Remoting and listens for requests on a specified port. This option provides the best performance.

- 2 Microsoft IIS

Microsoft IIS can be used to listen for Remoting requests on port 80. SOAP or Binary format can be specified.

Network Load Balancing

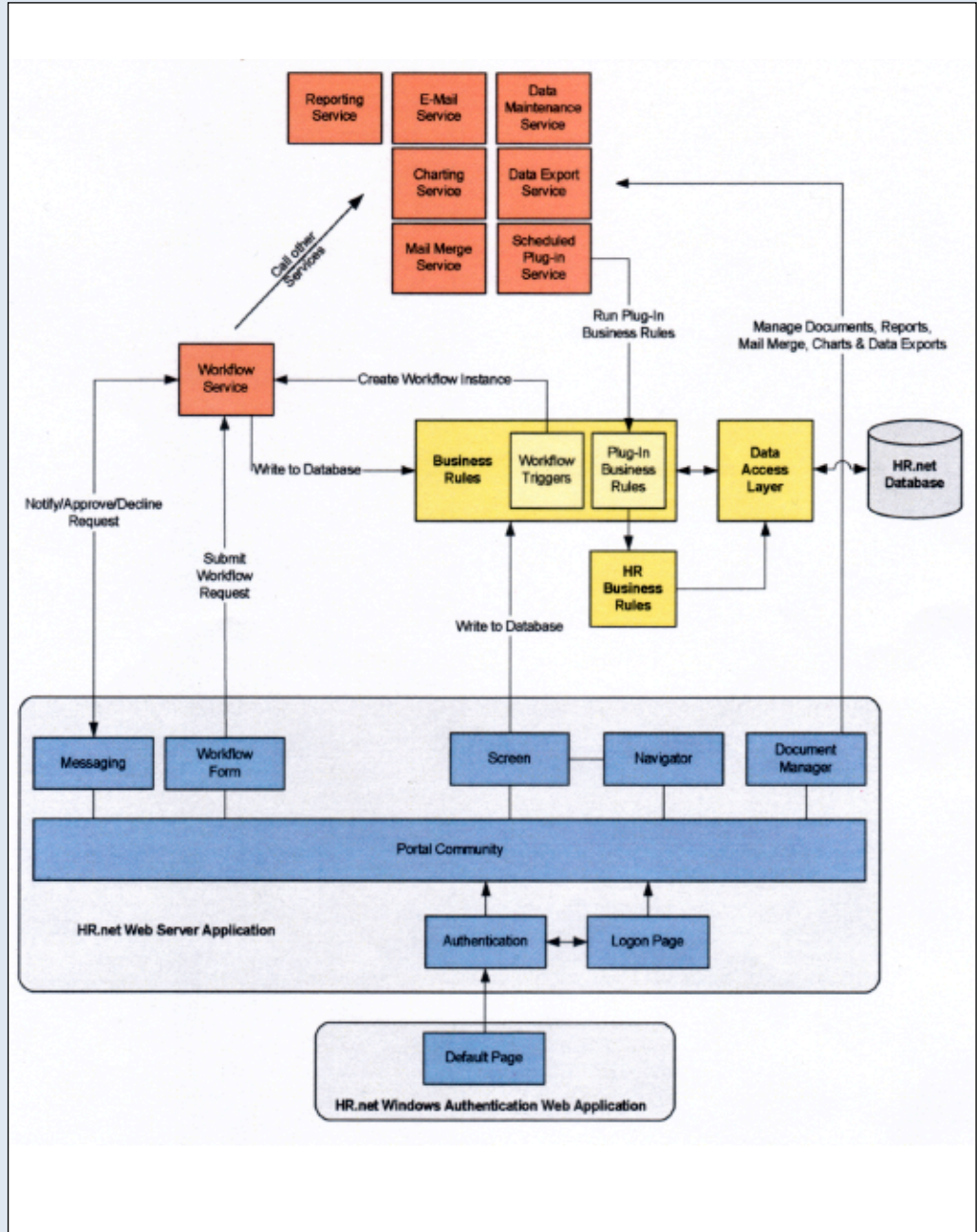
Microsoft Windows Network Load Balancing is used to scale out the application. Each clustered server would contain a mirror image of the HR.net Enterprise applications. For example, the Web layer could be load balanced between two or more servers.

Further details of Network Load Balancing can be found at:

<http://www.microsoft.com/technet/prodtechnol/windows2000serv/deploy/confeat/nlbovw.msp>

Interaction between HR.net Enterprise Application Elements

The diagram below illustrates the interaction between the various elements of the HR.net Enterprise Framework:



HR.net Enterprise Windows Authentication Web Application

The HR.net Enterprise Windows Authentication Application authenticates users using Integrated Windows authentication. It enables users who have pre-authenticated themselves at the Windows Logon to login to HR.net Enterprise without the need to re-type their user credentials, thereby achieving single sign-on.

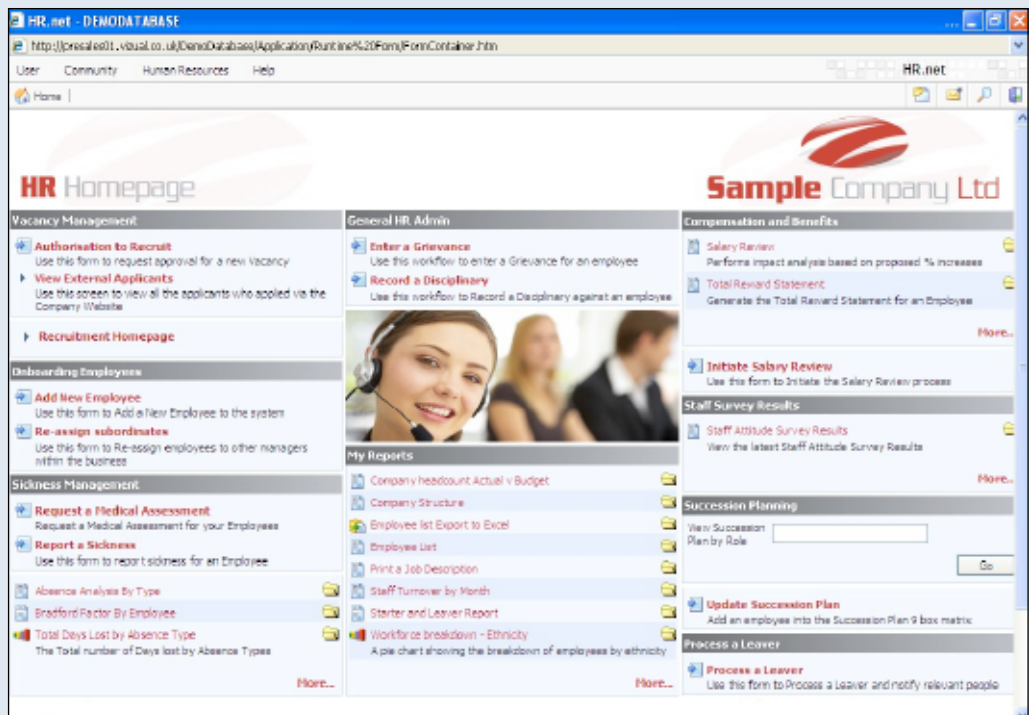
Once a user has been authenticated they are issued with an ASP.NET Forms authentication cookie and re-directed to the HR.net Enterprise Web Application. The HR.net Enterprise Web Application checks for the presence of a Forms Authentication cookie, if one is not found then the user is redirected to the HR.net Enterprise Logon page.

HR.net Enterprise Web Server Application

The HR.net Enterprise Web Application consists of a number of dynamically created Web pages such as communities which are accessed by users.

Portal Community

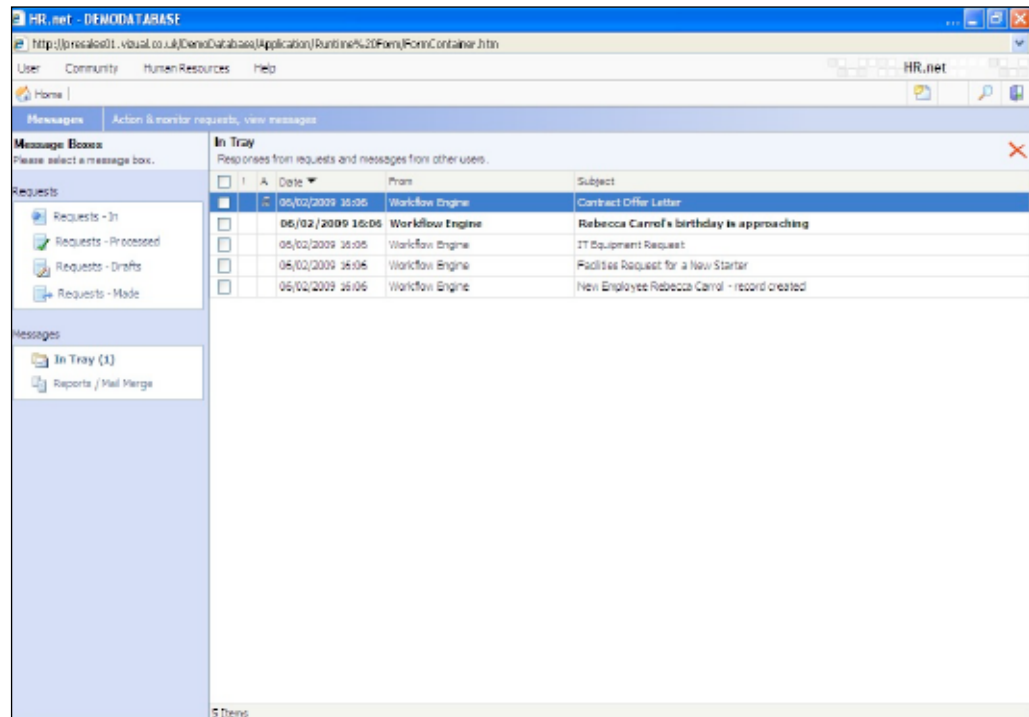
The Portal Community is the first page displayed to the user after logging into HR.net Enterprise. It contains a set of Add-Ins that link to the various areas of functionality within the HR.net Enterprise Web application such as documents, workflow forms and screens. It provides the main navigation page for the majority of users.



Example user Community in HR.net Enterprise

Messaging Page

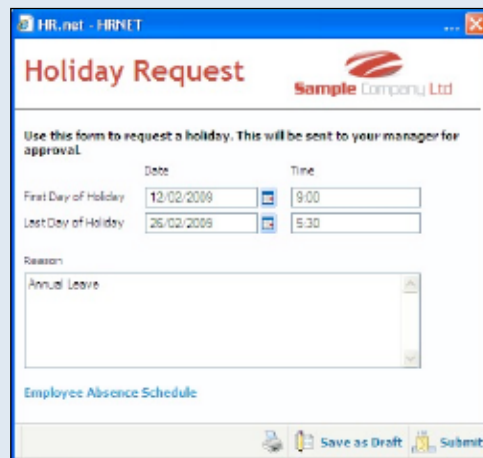
The Messaging page is used to service workflow requests: read, approve, access drafts and decline Workflow requests. When a Workflow request is accepted or declined by a user its status within the Workflow queue is updated and the Workflow Service Application processes the workflow instance.



The main user task manager in HR.net Enterprise

Workflow Forms

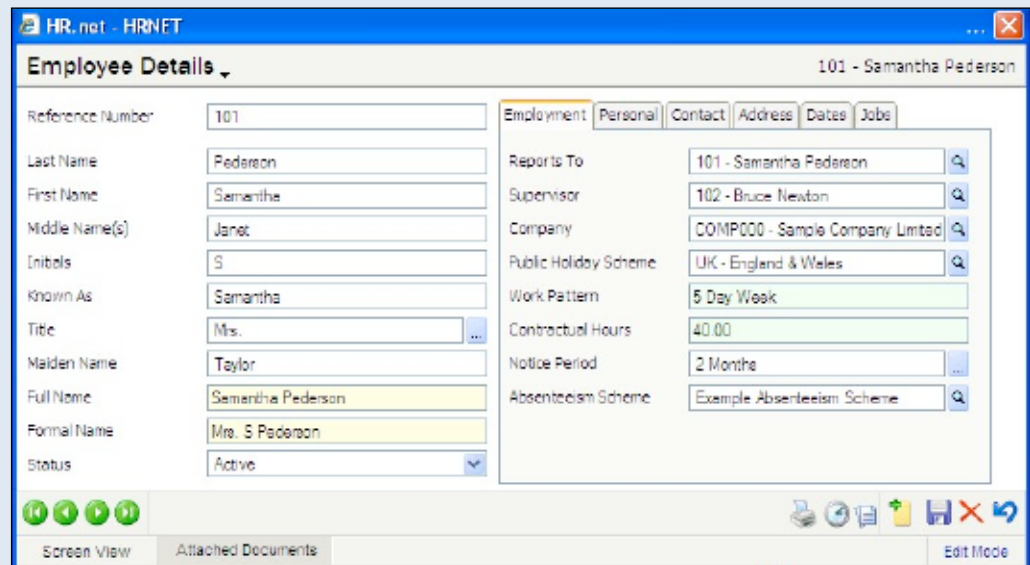
Workflow Forms enable users to make requests such as holiday requests or expense claim requests. Workflow Forms are accessed from the Portal Community page. When a Workflow Form is submitted by a user a new instance of a Workflow is created and placed in the Workflow Queue table. The Workflow Service Application processes workflow instances the Workflow Queue table and interacts with other areas of the system as required.



Example workflow form in HR.net Enterprise

Screens

Screens are used to display data to the user and are created using the Screen Designer within the Administrator Console.



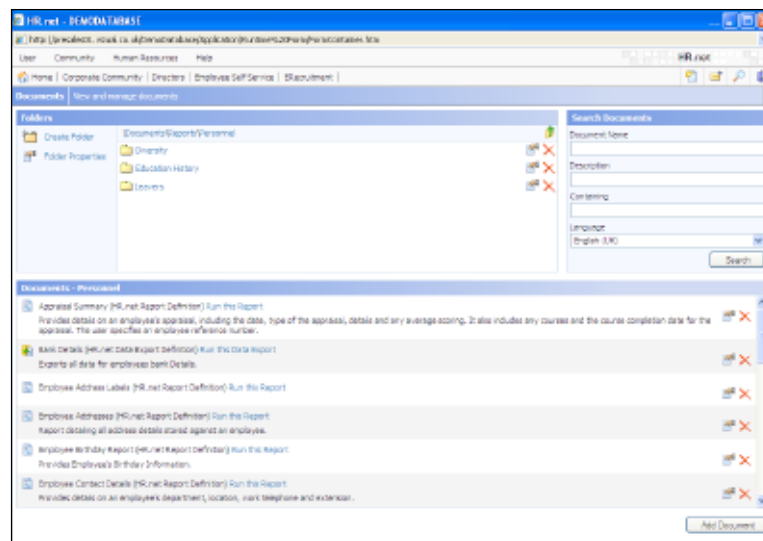
Example Data Screen in HR.net Enterprise

Screens are accessed from either a Screens Add-In on the Portal Community or the Navigator page. A user may, depending upon their security privileges, be able to make changes to the data and save the changes back to the database. When this occurs the Business Rules layer is called to save the changes.

Document Manager

The Document Manager page enables users to access documents, reports, mail merge templates, data exports and charts that are stored in the HR.net Enterprise database.

When a user requests either a report, mail merge, data export or chart the request is placed on a queue in the HR.net Enterprise database and the appropriate Windows Service Application processes the queue, processes the requested document and sends it to the user by placing the finished document in the user's message box by writing to the messages table in the HR.net Enterprise database.



Example Document Screen in HR.net Enterprise

Workflow Service

The Workflow Service is a Windows Service Application that reads workflow instances from a queue table in the HR.net Enterprise database. A Workflow process can call upon the services of any of the other Windows Service Applications such as the Reporting Service. A Workflow process can also write data to any of the custom tables (tables that have been created using the Administrator Console application) defined in the HR.net Enterprise database. Data is written to the database by calling the Business Rules class library.

Business Rules

The Business Rules is a Microsoft.NET class library which exposes a public set of methods that are called by the HR.net Enterprise Web Application and Administrator Console Web Service. The Business Rules class library implements the functionality of the HR.net Enterprise framework and performs tasks such as coordinating the writing of data to the HR.net Enterprise

Client Requirements

Clients (for example HR users, employees, managers) accessing HR.net Enterprise Web application must have the following specification:

Item	Requirement
Web Browser	Internet Explorer Version 6 (IE 6) or above
Operating System	Any Windows operating system capable of running IE6 including Vista
Bandwidth	Minimum of 64kbs per user. 128kbs recommended.

For clients wishing to run the HR.net Enterprise Administrator Console and/or Document Explorer (for authoring reports, mail merge templates and data export definitions) the following specification is required:

Item	Requirement
Operating System	Windows XP Professional/Vista
	Windows 2000 (all versions — no Service Packs required)
	Windows NT 4.0 (all versions — Service Pack 6a required)
.NET Framework	.NET Framework version 3.5 must be installed*
Prerequisites	Internet Explorer version 6 or above must be installed prior to installing the .NET Framework. Microsoft Data Access Components version 2.8 (MDAC 2.8)
Bandwidth	Minimum of 64kbs per user. 128kbs recommended.

