



.NET Application Architecture Overview

Edition 7.1

11 January 2013





Portrait Foundation .NET Application Architecture Overview

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Portrait Software is now part of [Pitney Bowes Software Inc.](http://www.pitneybowes.com)

Portrait Software enables organizations to engage with each of their customers as individuals, resulting in improved customer profitability, increased retention, reduced risk, and outstanding customer experiences. This is achieved through a suite of innovative, insight-driven applications which empower organizations to create enduring one-to-one relationships with their customers.

Portrait Software was acquired in July 2010 by Pitney Bowes to build on the broad range of capabilities at Pitney Bowes Software for helping organizations acquire, serve and grow their customer relationships more effectively. The Portrait Customer Interaction Suite combines world leading customer analytics, powerful inbound and outbound campaign management, and best-in-class business process integration to deliver real-time customer interactions that communicate precisely the right message through the right channel, at the right time.

Our 300 + customers include industry-leading organizations in customer-intensive sectors. They include 3, AAA, Bank of Tokyo Mitsubishi, Dell, Fiserv Bank Solutions, Lloyds Banking Group, Merrill Lynch, Nationwide Building Society, RACQ, RAC WA, Telenor, Tesco Bank, T-Mobile, Tryg and US Bank.

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About this document

Purpose of document

This document provides a summary of the approach to .NET adoption within the Portrait Foundation system in relation to the channel and presentation tiers. Its aim is to provide an overview of the architecture and elements of the .NET based capabilities to help with understanding and planning for a Portrait Foundation based solution delivery.

Intended audience

Portrait Foundation implementation teams.

Related documents

.NET Application Development User Guide (*NET ADK User Guide*)

Technical Architecture

Software release

Portrait Foundation 3.1 or later.

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1 Introduction

Portrait Foundation is a Customer Interaction Management product that has a process centric approach to modelling business processes for customer interactions, deploy them efficiently and consistently across all channels and manage and change these processes easily.

The Portrait Foundation system is based on an n-tier, thin client architecture that separates the data, business processes and presentation layers for maximum flexibility and configurability. A channel abstraction approach enables Portrait Foundation to take advantage of the Microsoft .NET technology and empower **Portrait Software's partners and clients with early benefits such as:**

- Early access to new business strategies and services built on emerging technologies;
- Rapid development of Portrait Foundation applications through the use of the **Portrait .NET Application Development Kit** that includes the application framework, wizards and controls library; please refer to the relevant document for more details;
- Rapid UI customisation and rebranding;
- Improved application runtime performance.

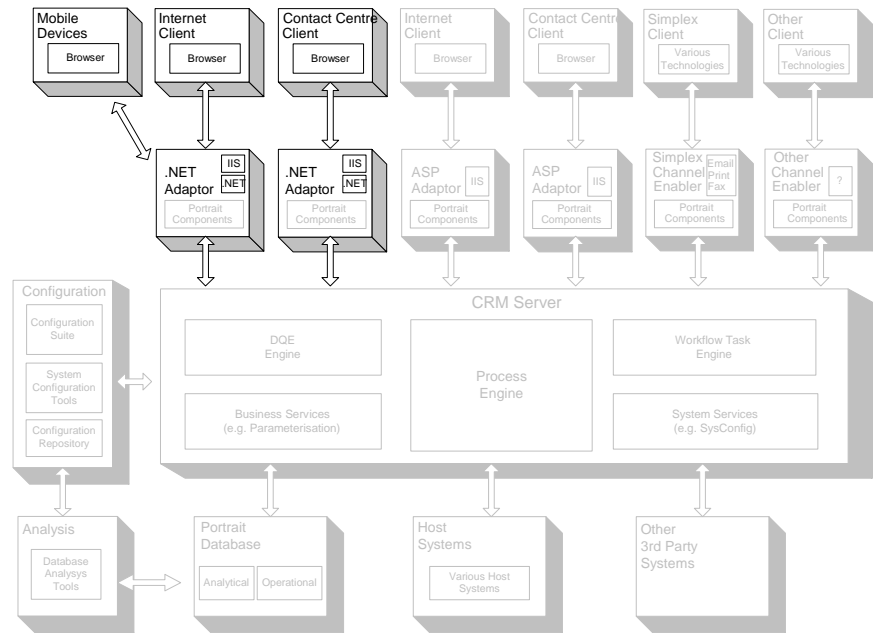
The Portrait Foundation .NET channel infrastructure is used to deliver the presentation tier of typical solutions, in particular the standard pre-configured user applications which make up the Portrait Application Centre. This infrastructure integrates seamlessly with the other elements of the Portrait Foundation system e.g. process server, business models and configuration.

The standard Portrait Application Centre consists of the following end user applications:

- Contact Centre
- Agent Manager
- Printer Manager
- Document Manager
- Product Manager
- Campaign Manager

The Portrait Foundation .NET solution addresses the presentation layer of the Portrait Foundation system i.e. the Web applications and channel components that facilitate communication with the channel independent Portrait Foundation components, as shown in the diagram below.

Figure 1 - Architectural placement



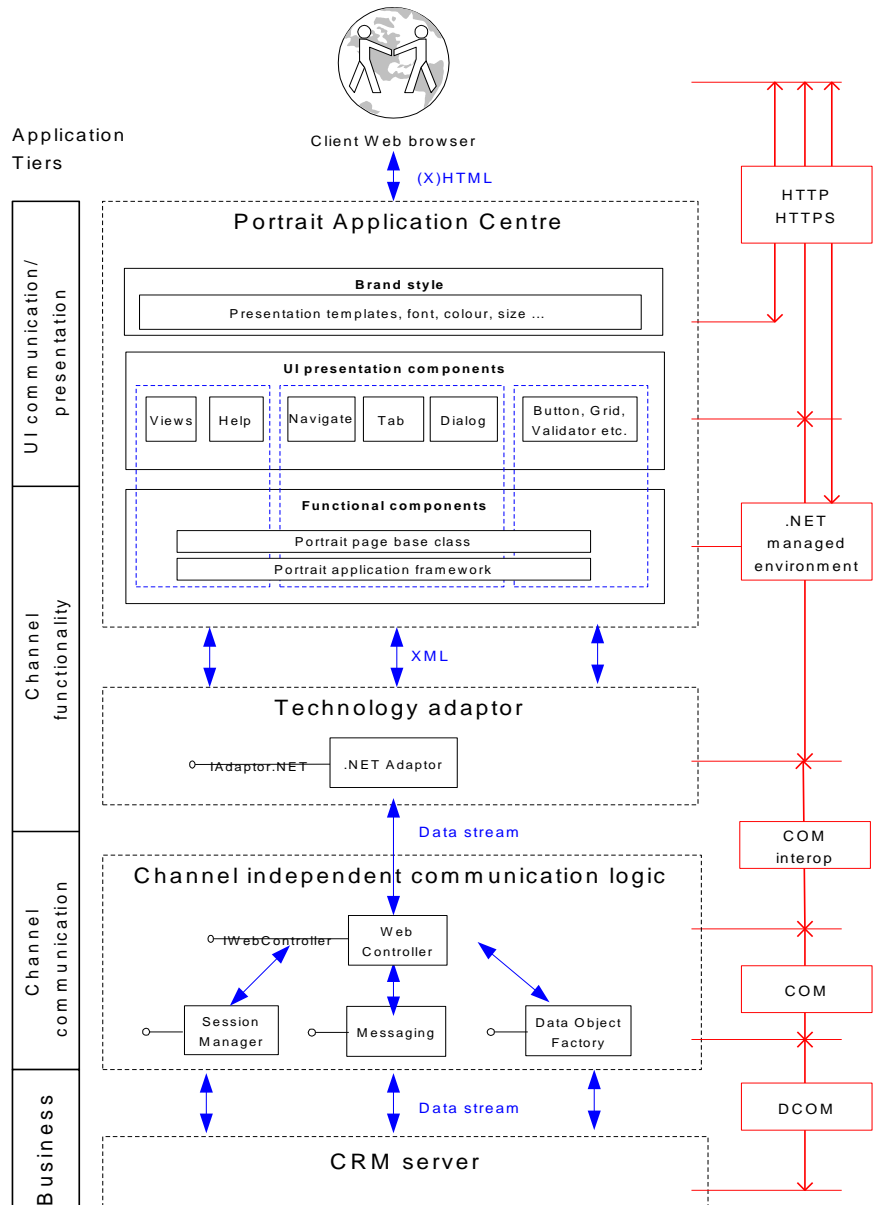
The following sections concentrate on the presentation tiers and assumes the reader is aware of the overall Portrait Foundation product capabilities which are common to all end user applications. This document covers the .NET application architecture from the perspective of a logical view., describe the .NET channel enabling component and the ASP.NET application structure. Security and technology architecture considerations are also discussed.

2 Application architecture

The Portrait Foundation .NET Application Centre is based on the reusable pattern of the Microsoft .NET Framework architecture, as detailed in the diagram below.

2.1 Logical view

Figure 2 - Portrait .NET Application Centre logical view

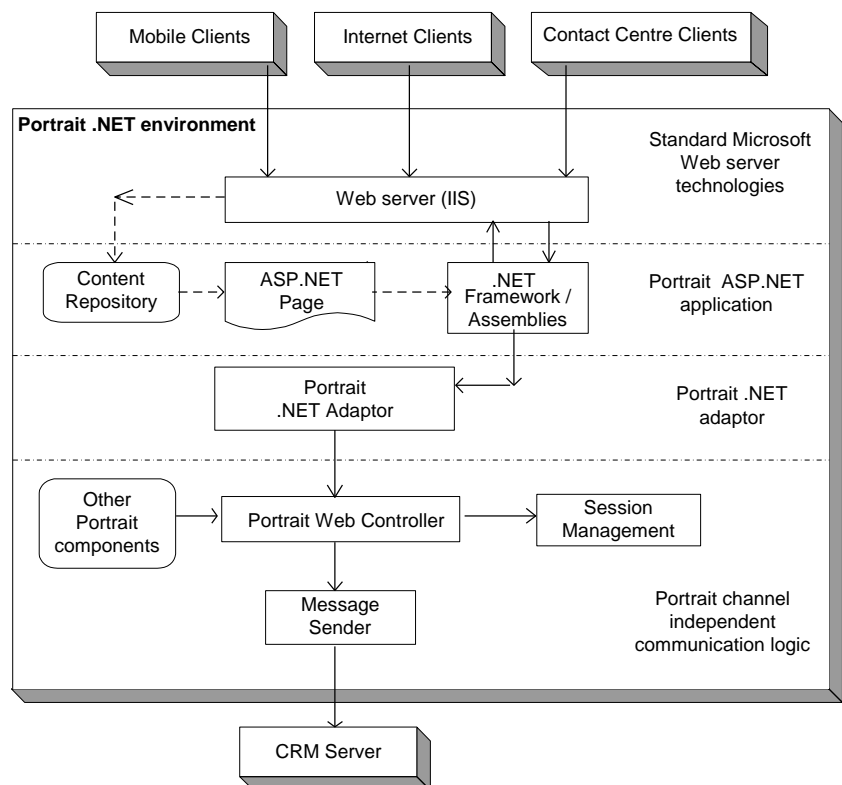


3 Portrait Foundation channel enabler

In the Portrait Foundation context, the *HTML channel enabler* is the term used for a set of components that make the CRM server available to clients in browser-based environments e.g. Contact Centre, Internet, Mobile devices.

The diagram below shows the components that traditionally comprise the Portrait HTML channel enabler, within a .NET environment.

Figure 3 - Portrait channel enabler



The dotted arrows in the diagram above represent interactions between the Web application – as the customisable front end for a specific implementation – and the standard software elements e.g. Microsoft IIS, the Portrait Foundation .NET application framework.

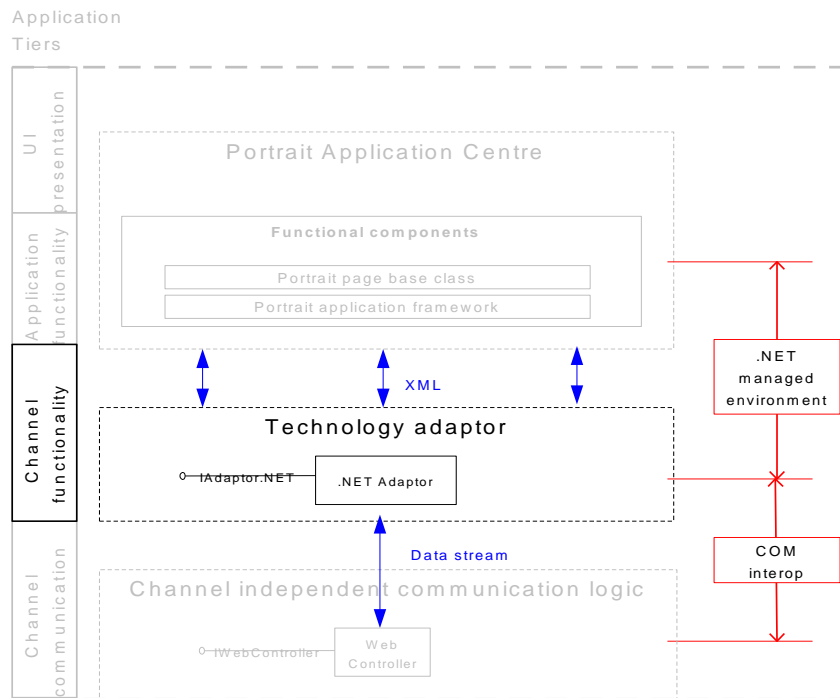
The Portrait .NET adaptor is the technology specific component that interfaces the .NET Web application with the rest of the channel enabler. This component is detailed in the next section.

3.1 .NET technology adaptor

Within the .NET framework environment, the layer between the ASP.NET Web application and the Portrait Foundation channel communication logic is represented by the *.NET adaptor* component.

The diagram below positions this component in the channel specific context.

Figure 4 - Portrait .NET adaptor



Listed below are the main features of this component:

- Uses the managed environment provided by the .NET framework;
- Implements a well-defined interface for communication with the Web application (ASP.NET);
- Ensures minimal requests from the Web application;
- Ensures minimal requests to the COM component (Web controller) reducing the COM-interop;
- Maximises the use of .NET managed functionality and built-in classes e.g. button, edit, tab, validators.

4 Portrait Foundation ASP.NET applications

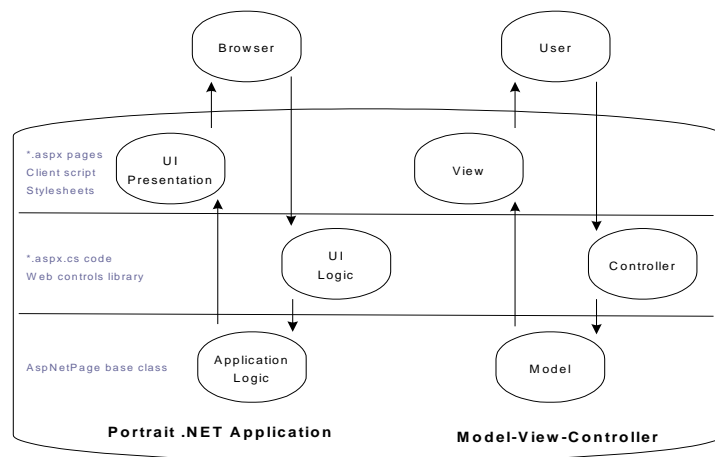
The Portrait Foundation ASP.NET infrastructure deliver Portrait-specific channel functionality and runs on standard Microsoft .NET Web server technologies. It has a modular logical structure distributed over a number of layers, as shown in the diagram below, and complies to global industry standards supported by the .NET framework e.g. XHTML, XML.

4.1 Application design concepts

The design goals for the Portrait Foundation .NET Application Centre take into account a mix of business and technical requirements.

The Portrait Application Centre implementation is based on the MVC2 (Model-View-Controller) design pattern i.e. the MVC pattern applied to the ASP.NET environment, as shown in the diagram below.

Figure 5 - MVC design mapping

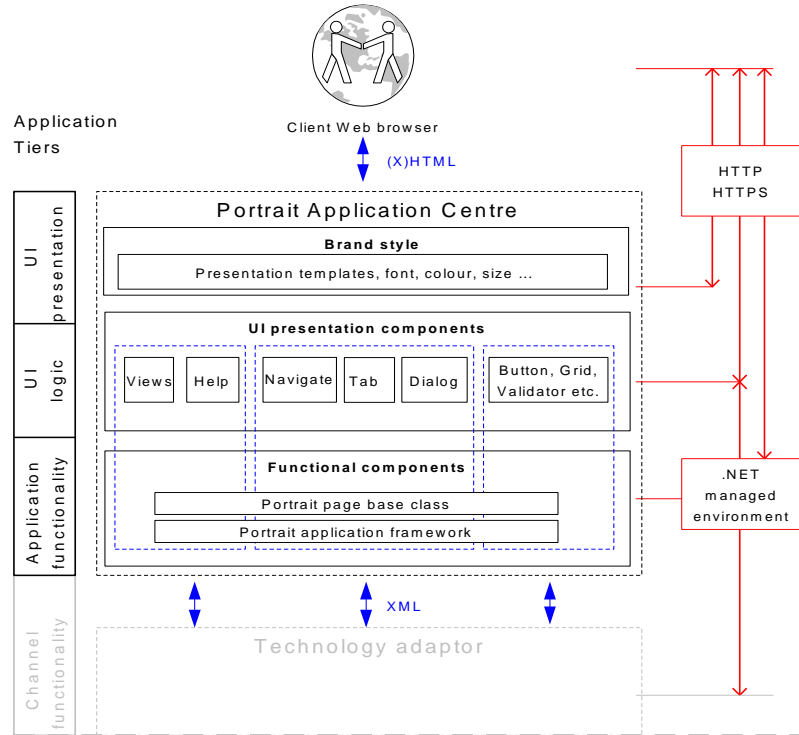


MVC2 provides the Portrait Foundation .NET application with the following features represented in the diagram above:

- Clean separation between the Model implemented as the Portrait Foundation .NET framework and managed through the page base class, the Controller represented by the .Net Web controls and specific page logic, and the View expressed through UI elements;
- Mechanism to rename source files (*.aspx) and re-organise their location without impacting any application code;
- Logical to physical mapping of command-to-name of source file that implements it i.e. a Portrait Foundation custom or generated interaction.

This design pattern is achieved through a consistent componentised approach throughout the application logical and physical structure at all levels of granularity, as detailed in the diagram below.

Figure 6 - Portrait application design

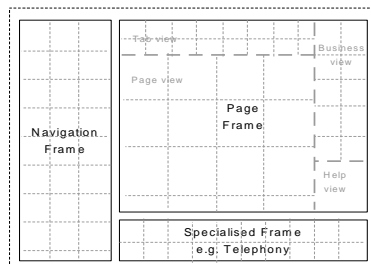


Within the overall configured Portrait Foundation application, the channel delivery consists of three layers:

- Application logic performed by functional components that are compiled into the Portrait Foundation .NET application framework and managed through the Portrait Foundation .NET page base class.;
- Application UI communication logic that is compiled into the Portrait Foundation .NET control library and page specific logic;
- Application brand/style that is specific to the business proposition.

A typical user interface in a Portrait Foundation application e.g. the Contact Centre, consists of three main frame components i.e. navigation, page, telephony. Each frame component is based on a templated table layout for maximum flexibility and reusability. Where complex functionality is required the frame consists of a number of views e.g. page view, tab view, business view, help view, as shown in the diagram below.

Figure 7 - Application page structure



5 Technology summary

The Portrait Foundation .NET Application Centre is delivered using the infrastructure technologies available in the Microsoft .NET Framework e.g. Microsoft .NET Enterprise Servers, that provide easy-to-use functionality for designing, constructing, deploying and managing Web-based enterprise applications.

5.1 Technologies

The followings are the key infrastructure technologies involved, please refer to the relevant installation and support material for the latest information on specific software versions.

5.1.1 Internet Information Server

IIS (Internet Information Server) is the default server for hosting the Portrait HTML channel enabler and Web applications.

5.1.2 Microsoft .NET framework

Portrait Foundation uses the Microsoft .NET framework for running managed components and Web applications.

5.1.3 ASP.NET

ASP.NET is the default technology used by the Portrait Foundation .NET Application Centre. This is the area that is customised in a typical project implementation.

5.2 Security model

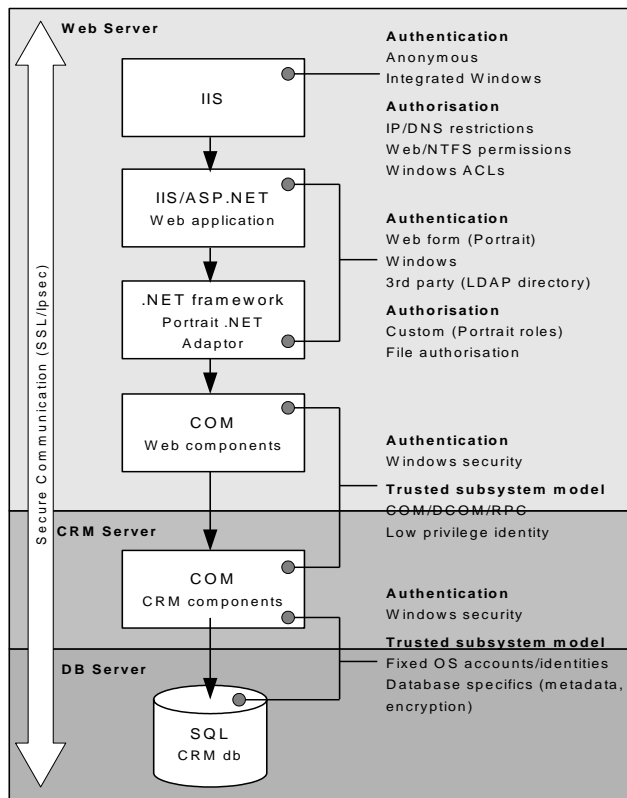
The majority of Portrait Foundation implementations involve handling of customer sensitive information e.g. personal data, credit card numbers. Data is protected by the Portrait Web applications using encryption, authentication, authorisation and secure communication protocols e.g. HTTP over SSL, IPsec.

Portrait Foundation utilises the trusted subsystem model operation, whereby the CRM server uses fixed operating system accounts to access downstream resources e.g. data sources, and user identity is flowed through the application **by Portrait Foundation's authentication and authorisation mechanisms**.

The Portrait Foundation .NET implementation has the flexibility to take advantage of the framework built-in mechanisms e.g. HTTP pipeline security layered onto the Web application, specifically for user authentication and authorisation e.g. Windows, Forms, Passport.

The diagram below shows the security services applied to the Portrait Foundation .NET application model. At the Web tier level, the main security service providers are IIS, ASP.NET and the Portrait Foundation trusted subsystem model.

Figure 8 - Portrait .NET application security model



Deployment security

Portrait Foundation uses the *Remote Application Tier* deployment pattern which ensures that the Web tier is self-contained and separated from end users and the remote application tier with packet filtering firewalls (in DMZ), as shown in Figure 8 – Portrait .NET application security model.

The Portrait Foundation .NET vanilla profile implementation uses private deployment, as it applies to a limited number of physical applications i.e. assemblies run in the Portrait Foundation **application's local directory**.

In a production environment there could be situations that require different applications hosted on the same Web server(s), in different application directories, to rely on the same Portrait Foundation control/assembly. In this case the assembly could be hosted in a private central repository or the shared GAC (Global Assembly Cache).

All Portrait Foundation assemblies are signed to ensure versioning support and code access security through strong naming in any deployment configuration.