

The OBA Composition Reference Toolkit Version 2.0

Conceptual and Architecture Overview

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Summary

By using the OBA Composition Reference Toolkit, developers can build adaptable components, enable incremental value by using them, and gain an understanding of how to package and deploy them. (12 printed pages)

The Next Mile in Business and IT Agility

Agility is a competitive differentiator; agile businesses "turn on a dime" and want to adopt new business models, launch new products quickly, dominate global markets, and drive efficiencies throughout their supply chains. These businesses look for information technology (IT) as an enabler for change, and they constantly push the limits on what IT can do to empower their people and arm them with the right tools for success.

However, enterprise IT departments are mired with challenges. As businesses grow through acquisitions and mergers, there is always more than one system to perform a particular task. Information is spread across systems, processes are disjointed and disconnected, and users have to deal with multiple systems to achieve their business tasks. Integration and maintenance of the systems tend to consume the bulk of a typical enterprise's IT resources—thereby, hindering both the ability to adopt new technology advancements that can benefit the business and the ability to scale to servicing the myriad requirements for truly empowering users. This could result in unmet needs and a backlog of requirements for applications that truly can empower users.

Currently, several practices are adopted and applied to address the challenges associated with integrating heterogeneous systems and IT assets. Extract, transform, and load (ETL) and enterprise-application integration (EAI) technologies promised to significantly simplify system integration; data warehousing aimed to provide a single unified view of data for analysis and decision making; and many methodologies and frameworks were invented to unify the processes across the enterprise.

The latest in this crusade is the idea of service-oriented architectures (SOA), which takes a fresh approach at addressing these woes through loose coupling, well-defined service contracts, and service aggregation. All of these approaches enable solution patterns to address the system-integration challenges in an enterprise, but they fail to support the goals of business agility and innovation.

To address this failure, a shift is required from the classic and predominantly "system-centric" focus of enterprise IT priorities to a model that strikes a finer balance between "system-centricities" and "user-centricities." The investments that are made on SOA should directly benefit end users in terms of new, powerful, and integrated experience for analysis and decision making. When composite-solution architectures are adopted and applied, they can help IT deliver this value. The practice of using composite-solution architectures can optimize IT investments to achieve the following:

- Empower users and enable federated "self-service"–style user composition of high-value applications.
- Enable IT to invest resources in research and development that is related to new technology advancements that can benefit the strategic directions of an enterprise.

Composite Solutions

Currently, composite solutions are built in enterprises by assembling and presenting business data and processes from multiple existing and related systems as unified and composite wholes. However, these solutions do not have to be restricted to composing Web services and information feeds; instead, they should include components at higher levels of abstraction and user-centricity, such as structured presentation artifacts, unstructured artifacts as documents and spreadsheets with embedded business semantics, workflows, business rules, alerts, user-comprehensible business-intelligence data models, reports, and data views.

The notion of situational applications is another interesting advent of relevance to the notion of solution composition. A situational application is created on demand for a small number of users who have specific needs, and the duration of the application's existence is short-lived. Even though these types of applications are highly valuable to users in enterprises, they constitute a significant chunk of the "Long Tail" of user requests that are low on the list of enterprise IT priorities.

Situational applications are a common use case for collaboration platforms, such as Microsoft Office SharePoint—for example, an Office SharePoint team-collaboration site that is created to support a new product campaign/launch. Situational applications provide immense value for the duration of the project. Generally, they are built by the users themselves, with IT governance enabled by the underlying IT platforms. Today's applications in this category are used predominantly to facilitate unstructured collaboration among teams of business workers.

The full potential of composite-solution architectures can be materialized by breaking away from the classic IT/system-centric approach of solution composition to optimizing IT investments in a way that enables a finer balance between the IT/system-centricities and user-centricities. Put simply, the key to unlocking the next mile in IT and business agility is to focus IT investments on the creation of user-consumable components that can enable solution composition by users who are familiar with the business domains.

The idea of user-centric composition is taking shape today in the consumer/social world, in the form of user-friendly information-consumption experiences that are enabled by such tools as Microsoft Popfly, Yahoo! Pipes, and Google Mashup Editor. *Mashup tools*, *mashing*, and *mashups* are the terms that are used in the consumer/social world to refer to these tools, the experience of using them, and the composite information assets that are created by using them. These tools enable users who have little or no IT/development experience to "mash up" information feeds on the Internet. For example, a user can use Popfly to create a mashup that displays the geographical locations of friends on a map by using the profile information of these friends (stored in Facebook) and Microsoft Virtual Earth. Enabling similar experiences and the related benefits in the context of enterprises is essential to traversing the next mile in business and IT agility.

Figure 1 summarizes the business benefits of composite-solution architectures. Also, it highlights the need for a composite-solutions platform to enable the benefits of composite-solution architectures in an enterprise. The next section describes the capability requirements of a composite-solutions platform.



Figure 1. Business benefits of composite solution architectures

Composite Solutions Platform Capability Requirements

A composite-solutions platform is a core-required enabler to materialize the benefits of composite-solution architectures in an enterprise.

Figure 2 summarizes the core capability requirements of a composite-solutions platform.

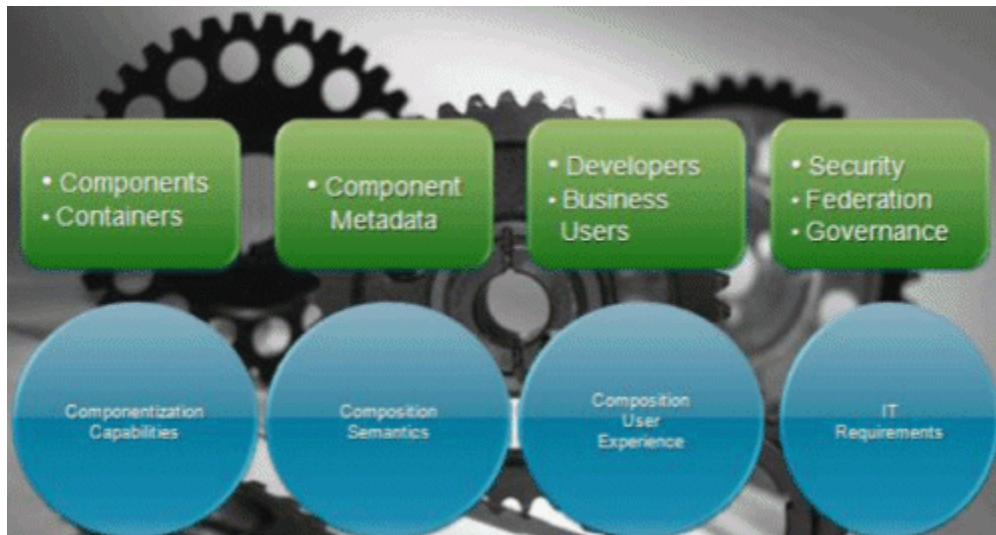


Figure 2. Composite-solutions platform capability requirements

The capabilities can be categorized broadly as *core capabilities* and *advanced surround capabilities*. The core capabilities are "must-have" requirements for any composite-solutions platform to enable and materialize the full benefits of composite-solution architectures in an enterprise. The advanced surround capabilities are additional features that can add rich semantics and value to the overall application-composition experience.

The core capabilities include:

- Platform support for the notion of componentization through capabilities that support the design and implementation of components and the ability to host/render components in run-time containers.
- IT infrastructures capabilities to enable federation, security, and governance, while empowering users and enabling the benefits of composite-solution architectures. In the context of solution composition, this would include the ability for IT to centrally catalog, describe, and control access to components that can be used by users across an organization to compose applications of relevance to their needs.
- Application-composition tools that can cater to the requirements of developers and power business users who have an IT background.
- The advanced surround capabilities include:
- The ability to model and capture rich component metadata that extends beyond descriptive attributes, to capture semantics that pertain to the intricate relationships that can exist between components and enable domain-tailored discoverability of components.

- Application-composition and provisioning tools/services, to extend the reach of composing applications to business domain experts who have minimal IT skills and enable a semantically guided prescriptive application-composition experience.

Building Composite Information Worker Solutions using the 2007 Microsoft Office System

The 2007 Microsoft Office system is a composite-solutions platform that can be used to materialize the benefits of composite-solution architectures and composite solutions.

Figure 3 illustrates the composite-solutions platform capabilities of the 2007 Microsoft Office system.

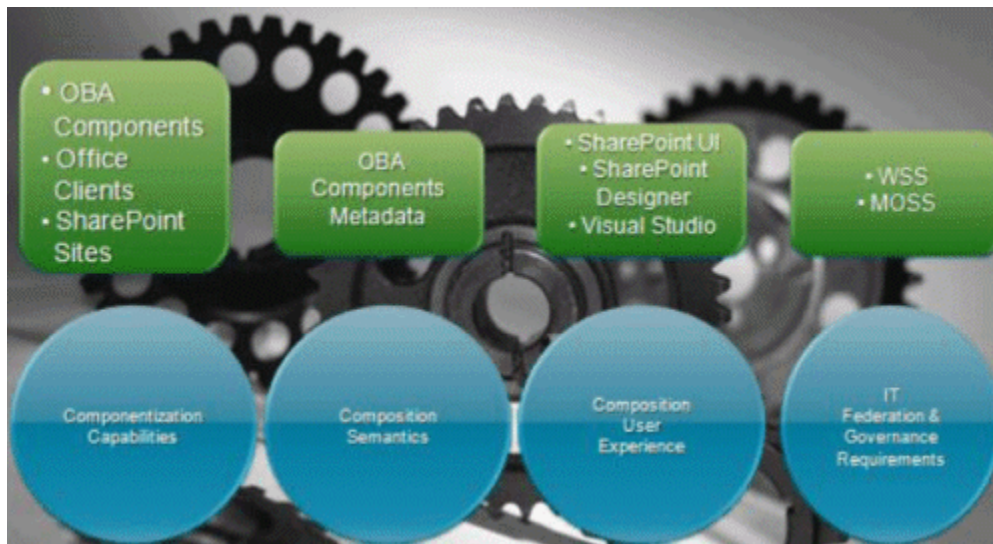


Figure 3. Composite-solution platform capabilities of the 2007 Microsoft Office system

The 2007 Microsoft Office system is a powerful platform for building role-based, collaborative, and analytical applications that aggregate and extend the reach of an enterprise's line-of-business (LOB) systems to information/knowledge workers across the organization. The term that is used to refer to these applications is Office Business Applications (OBAs). OBAs combine the powerful platform capabilities of the 2007 Office system with the user familiarity of the Microsoft Office clients to surface LOB data, information, and processes to information workers within the business-productivity tools, interfaces, and devices that they use to execute and complete their business tasks.

To learn more about the 2007 Office system platform capabilities, OBAs, and the OBA opportunities, see the white paper, "[Integrating LOB Systems with the Microsoft Office System](#)" on MSDN.

A lesser-known or not-so-clearly-visible fact is that OBAs are composite applications that are built by using OBA components and, when they are architected optimally, they can enable the materialization of the benefits of composite-solution architectures and composite solutions. Figure 4 shows some of the common types of OBA components that can be designed and used to compose OBAs. The components in the illustration are shown as they relate to the architectural layers of a solution.

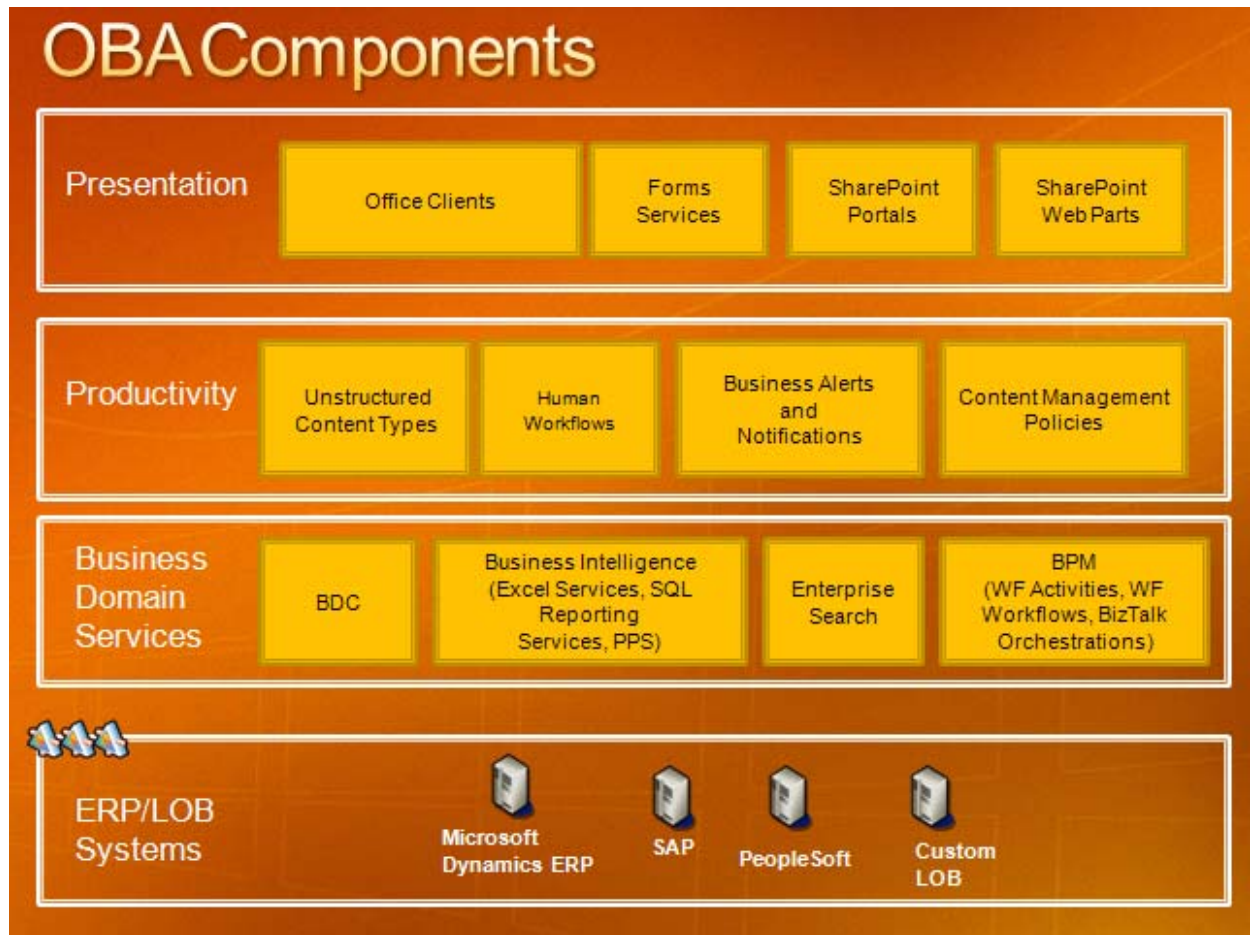


Figure 4. OBA components

The following is a brief summary of the specific capabilities of the 2007 Microsoft Office system, in the context of the generic composite-solutions platform capability requirements that were outlined in the previous section:

• **Componentization capabilities**—The 2007 Office system supports solution components, as shown in Figure 4. OBAs are composite applications that are built by composing OBA components. The user experiences for working with OBAs (and, thereby, using the capabilities of the OBA components) are surfaced using the familiar containers that are enabled by the Microsoft Office Business Productivity Clients and Office SharePoint Portals.

- **IT Federation and Governance requirements**—Office SharePoint (Microsoft Windows SharePoint Services and Office SharePoint Server) enables the IT Federation and Governance platform. Individual OBA components can be cataloged and described in an Office SharePoint farm. The Office SharePoint security model can be applied to control user access to the components.
- A related example is the ability to catalog Office SharePoint Server 2007 Business Data Catalog Application Definition components in an Office SharePoint Service Provider Catalog and define related user-access permissions using the Office SharePoint security model.
- **Composition user experience**—The 2007 Office system includes support for the core capability requirements that relate to composition user experiences. Application-composition tooling for

developers and power business users who have an IT background are enabled by using the Office SharePoint user interface, Office SharePoint Designer, and Microsoft Visual Studio .NET (Microsoft Visual Studio Tools for Office).

- **Composition semantics**—The 2007 Office system includes support for the basic, core capability requirements that enable the defining and capturing of identification and limited component dependency relationships metadata.

Although the core capabilities to support composite-solution architectures and composite solutions are enabled by the 2007 Office system, related architectural and engineering practices also must be adopted and applied to materialize the benefits and potential. Additionally, there are some key value-adding capabilities that can be built around the core 2007 Office system platform to enhance the solution-composition experience even further.

The OBA Composition Reference Toolkit was built to illustrate these practices and capabilities. The following section describes the OBA Composition Reference Toolkit and provides links to additional resources that you can explore to use and extend the toolkit.

The OBA Composition Reference Toolkit

The OBA Composition Reference Toolkit was built to illustrate:

- Application (OBA) composition opportunities and best practices, using the capabilities of the 2007 Office system.
- Benefits of advanced surround capabilities related to building composite applications (OBAs) on the 2007 Office system. These include richer composition metadata services and application-composition services for business domain experts who have a limited IT background. The goal for illustrating these capabilities is to demonstrate related possibilities and gather user feedback on related value perceptions.

Figure 5 illustrates the high-level architecture of the OBA Composition Reference Toolkit. It depicts the elements that constitute the toolkit, the relationships between them, and their integration/use with the out-of-the-box capabilities that are enabled by the 2007 Office system (all items with a green background).

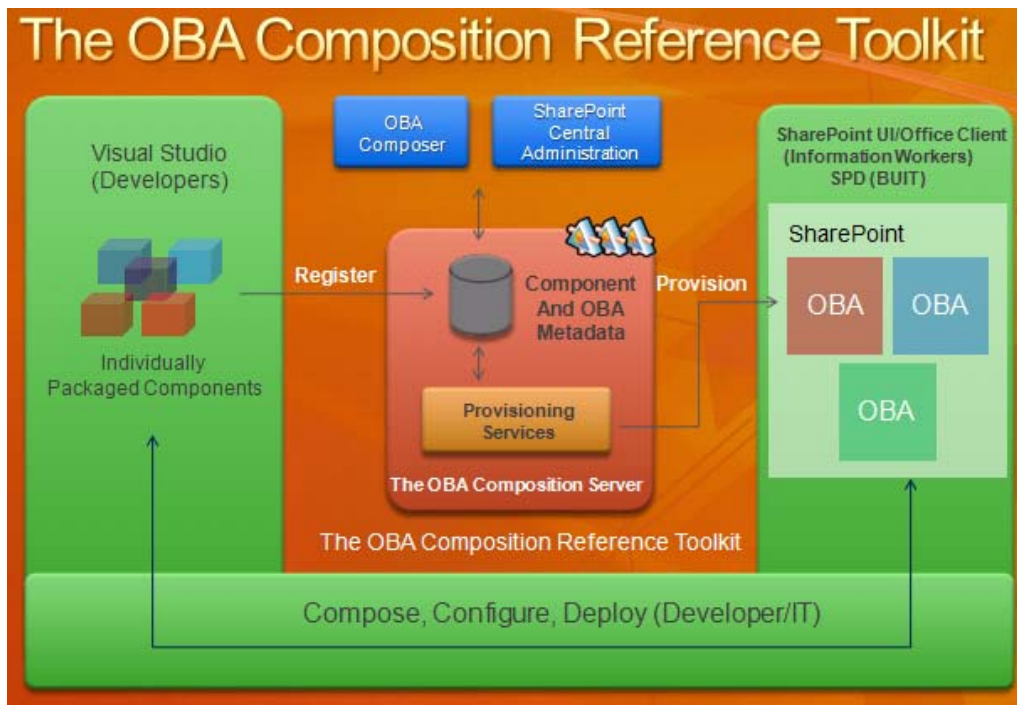


Figure 5. The OBA Composition Reference Toolkit

Both the installation guide and user guide that are referenced at the end of this overview contain step-by-step instructions to install the toolkit and explore its capabilities by composing and deploying OBAs, using an included set of sample OBA components to facilitate user testing and experimentation. We recommend that you walk through these documents to install and work with the toolkit and to learn more about the capabilities and concepts that are summarized in this section.

The next sections describe the services and tools that are included in the OBA Composition Reference Toolkit.

Version 2.0 includes the source code and related artifacts for all the components that constitute the OBA Composition Reference Toolkit. Pointers to the locations of the source artifacts for each of the constituent components are included in following sections that describe them. Architects and developers are encouraged to use these artifacts to explore the implementation of the toolkit and to customize/extend to toolkit to meet their additional requirements.

Note: The source code and artifacts of the OBA Composition Reference Toolkit can be found in the <installation folder>:\Source Code folder. The default installation folder is <drive>:\Program Files\CompOBARefToolkit. This folder will be referred to as the <OCRT Source Folder> in the remainder of this document

The OBA Composition Server

The OBA Composition Server constitutes the core of the services and capabilities that are enabled by the OBA Composition Reference Toolkit. It is the central engine that enables the rich composition metadata and application-composition services that constitute the advanced surround capabilities for a composite-solutions platform.

The OBA Composition Server includes the following subcomponents:

- **Metadata Catalog**—This is a semantic Metamodel that is materialized as a Microsoft SQL Server 2005 database to capture metadata that pertains to OBA components and OBAs that are composed by using the components. The metadata includes support for defining advanced semantics that are required to define/navigate intricate component relationships, define adaptable component bindings to LOB systems, and facilitate domain-tailored discoverability of components.

Metadata that pertains to OBA components that have been developed by using the standard Microsoft OBA development tools is stored in the Metadata Catalog. The metadata that is stored in the catalog facilitates locating components and traversing relationships between the components, to enable a prescriptive application (OBA) composition experience in the Composer. The Metadata Catalog is also used to store the definitions of the composed OBAs, which are utilized by the OBA Provisioning Service component to deploy the OBAs to a configured Office SharePoint farm.

The SQL Server database backup of the metadata catalog can be found in the **<OCRT Source Folder>\OBA Composition Server\Metadata Database** folder.

- **OBA Composition Metadata Web Services**—This is a Web service that is hosted in an Office SharePoint Web application to service-enable access to the OBA component and OBA metadata that is stored in the Metadata Catalog. The Web service methods are used extensively by the OBA Composer to enable the OBA composition and deployment user experiences. The Web service methods include APIs that facilitate searching for OBA components, retrieving component metadata, navigating component relationships, identifying LOB system bindings for components, saving/retrieving the definitions of composite OBAs, and other related capabilities.

The source project\code for the metadata web services can be found in the **<OCRT Source Folder>\OBA Composition Server\Web Services** folder.

- **Provisioning Services**—This is a Windows service to provision components, LOB adapters, user environments, composed OBAs. Components and LOB adapters are the building blocks of OBAs. They are built by developers and registered in an OBA Composition Server using the Composition Server administration interfaces. Users can use the OBA Composer application included in the toolkit to browse the catalog of registered components and select/use components to compose and deploy OBAs to their sandboxed OBA run-time environment—a SharePoint site. The OBA Composition Reference Toolkit includes provisioning services to deploy components and LOB adapters registered in an OBA Composition Server, deploy OBAs composed by users, and create/configure sandboxed OBA run-time environments for users. The component, LOB adapter, and user provisioning services are invoked when new components, LOB adapters, and users are registered in an OBA Composition Server. The OBA provisioning service is invoked when users compose and provision OBAs using the OBA Composer application.

The source project\code for the provisioning services can be found in the **<OCRT Source Folder>\OBA Composition Server\Provisioning Services** folder.

- **Administration Capabilities**—Administration capabilities for the OBA Composition Server are integrated into the SharePoint Central Administration Portal. These capabilities enable IT/SharePoint administrators to register, administer, and manage OBA components and LOB adapters in an OBA Composition Server. The administration capabilities also include user management features that enable administrators to register users in the OBA Composition Server and provision sandboxed OBA run-time environments for them to compose, deploy, and run OBAs.

The source project\code for the Administration UI can be found in the **<OCRT Source Folder>\OBA Composition Server\Administration UI** folder.

The source project\code for the Administration Web Services can be found in the **<OCRT Source Folder>\OBA Composition Server\Web Services** folder.

The OBA Composer

The OBA Composer is the face of the OBA Composition Reference Toolkit. It is a manifestation of the kinds of capabilities that can be implemented to enable a compelling application-composition experience for business domain experts who have a limited IT background. The OBA Composer is implemented as a rich-client Windows Presentation Foundation (WPF) application. It uses the OBA Composition Metadata Web services to enable a prescriptive user experience for guiding users through the end-to-end process of searching for OBA components, traversing relationships between components, selecting components to compose an OBA, saving composed OBA definitions, deploying a composed OBA, and previewing the composed application.

Figure 6 shows a screen shot of the OBA Composer.



Figure 6: The OBA Composer

A very compelling capability introduced in the OBA Composer in version 2.0 of the OBA Composition Reference Toolkit is the “prescriptively secure user experience.” User permissions configured by administrators for components and LOB adapters registered in an OBA Composition Server flow seamlessly to the OBA Composer user interface to prescriptively filter and/or control the access that a user should have to these objects when composing OBAs. This helps ensure that related security and governance policies defined by IT cannot be bypassed by users when composing and deploying OBAs using the OBA Composer application.

The following types of OBA components are supported in this release and can be used to compose OBAs using the OBA Composer and the Toolkit services:

- Office SharePoint lists/document libraries (Microsoft Office Word, Microsoft Office Excel, Microsoft Office PowerPoint)/Microsoft Office InfoPath 2007 Form libraries
- Document templates (Office Word, Office Excel, Office PowerPoint, Office InfoPath) that are packaged as Office SharePoint content types
- Office SharePoint content types
- Office SharePoint site pages
- Web Parts
- Workflows

- Business Data Catalog (BDC) application definitions
- Business-intelligence components:
- Excel Services Reports and Dashboards
- SQL Server Reporting Services reports
- Visual Studio Tools for Office Add-ins (application add-ins) for:
 - Microsoft Word
 - Microsoft Excel
 - Microsoft Outlook
- Data sources:
 - ASMX Web Services
 - Relational databases: SQL Server 2005 and Access 2007
 - OLA databases: SQL Server Analysis Services 2005 databases, .cub files (offline OLAP db files created using Excel)
- The source project\code for the OBA Composer can be found in the **<OCRT Source Folder>\OBA Composer** folder.

Sample Components

A set of sample components can be obtained and installed to experiment with composing and deploying OBAs using the tools and services enabled by the OBA Composition Reference Toolkit. An MSI to install the sample components can be downloaded from the toolkit's MSDN site and used to install the sample components. The sample components cover a variety of scenarios, information about which can be found in the User's guide document.

The source projects\code for the sample components can be found in the **<OCRT Source Folder>\Seed Components** folder.

OBA Composition Reference Toolkit Benefits

The OBA Composition Reference Toolkit provides an easy way to compose OBAs by using OBA components. It provides a model for collaboration between enterprise IT developers, administrators, and information workers to drive innovation, agility, and reuse. Instead of constantly having to write and revise custom applications, developers can populate a component repository with company/domain-specific reusable components. IT administrators can secure, federate, and govern access to the component repositories. Information workers can use the components to compose and deploy OBAs that address their situational/business requirements, while working the security/governance boundaries established by IT.

To learn composite-solution development best practices by using the 2007 Office system, download the toolkit from the MSDN Architecture Center (<http://msdn2.microsoft.com/en-us/architecture/default.aspx>).

Next Steps

You are encouraged to download, install, experiment with, and customize/extend the OBA Composition Reference Toolkit. The release artifacts include the following:

Windows Installers (.msi files) to install the toolkit and sample components to experiment with composing and deploying OBAs using the toolkit.

The source code/projects for the toolkit and the sample components

Supporting documentation, which includes an installation/setup guide, a user guide, an administrator's guide, and developers guide for designing and packaging components for the
