



## **An Overview of Microsoft® Visual Studio® code name “Orcas”**

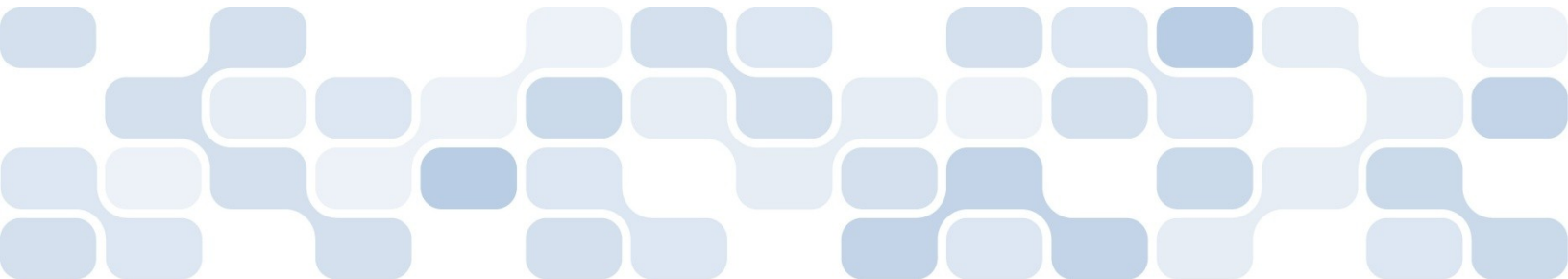
White Paper

April 2007

Tony Goodhew

For the latest information, see

<http://msdn.microsoft.com/vstudio>



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## Overview

Microsoft® Visual Studio® code name “Orcas” delivers on Microsoft’s vision of smart client applications by enabling developers to rapidly create connected applications that deliver the highest quality rich user experiences. With Visual Studio code name “Orcas”, organizations will find it easier than ever before to capture and analyze information so that they can make effective business decisions. Visual Studio code name “Orcas” enables any size organization to rapidly create more secure, manageable and reliable applications that take advantage of Windows Vista™ and the 2007 Office system.

Visual Studio code name “Orcas” delivers key advances for developers in 3 primary pillars:

- Improve Developer Productivity
- Manage the Application Life Cycle
- Employ the Latest Technologies

In this document we will discuss the different customer experiences that deliver on these 3 pillars through 5 different technology areas:

- Target Windows Vista and .NET Framework 3.0 development
  - Developers will be easily able to leverage new platform technologies and deliver more compelling applications to their customers by effortlessly incorporating new Windows Presentation Foundation features into both existing Windows Forms applications and new applications.
- Create Microsoft Office applications
  - Visual Studio Tools for Office (VSTO) is now fully integrated into Visual Studio code name “Orcas” Professional Edition. VSTO enables developers to customize various Office applications, such as Outlook® and PowerPoint®, to improve end-user productivity and significantly improve deployment.
- Handle data more smoothly
  - With the introduction of Language Integrated Query (LINQ) and various other data access improvements, developers can now deal with data using a consistent programmatic approach, perform data access with new data design surfaces and use pre-built classes for the occasionally connected design pattern.
- Enable new web experiences
  - Beyond the secure, reliable and extensible infrastructure of IIS, developers can easily create Web applications with more interactive, more responsive and more efficient client-side execution using the seamless integration and familiar programming model of ASP.NET AJAX and other extensions and enhancements.
- Improves application life-cycle management (ALM)
  - ALM provides great support, not only for managing the entire software development life cycle but also for the critical interaction with the final end-users and managers of an enterprise application.

## Target Windows Vista™ and .NET Framework 3.0 Development

With Visual Studio code name “Orcas”, developers will be easily able to leverage new platform technologies and deliver more compelling applications to their customers. Visual Studio enables customers to effortlessly incorporate new Windows Presentation Foundation features into both existing Windows Forms applications and new applications.

ISVs will also be able to move their applications to the new Windows Vista ‘Look & Feel’ easily with enhancements to MFC and Visual C++®.

Visual Studio offers developers key improvements such as:

- Reduce the cost and increase the effectiveness of client user interface design
  - By supporting common formats (such as XAML) and giving designers more direct control over user interface layout, controls, and data binding, Visual Studio makes the integration of designers into the development process easier. Designers can use familiar tools like the Microsoft® Expression® Suite to create user interfaces and produce files that developers can work with directly in Visual Studio. Visual Studio supports the workflow in which work is handed from designers to developers and from developers to designers, and in which both work in parallel. Designers and developers will also be able to build up libraries of common user interface designs, formats and elements that can be easily managed and reused.
  - By taking advantage of the 2007 Office system as a development platform, designers can leverage the look and feel of both Office and SharePoint to create familiar, intuitive UI. Developers can then use Visual Studio Tools for Office to create the UI in their solutions quickly and easily.
- Enable professional developer early adopters to build “rich experience” Windows Presentation Foundation applications
  - Visual Studio provides tools that enable developers who are early adopters of Windows Presentation Foundation to build “rich experience” applications quickly and easily. These tools include a designer and XAML editor, project templates, debugging support, deployment support etc.
- Leverage existing UI investments
  - Visual Studio not only provides new designers for building the next generation of applications but also makes it easy for developers to extend existing applications to deliver high quality user experiences. Enhancements to the existing Windows Forms designer enable task-oriented design for creating applications that leverage Windows Forms, .NET Framework 3.0, and XAML in the one application. This includes providing a design time experience for using this Windows Presentation Foundation content in an existing Windows Forms application by enabling the Windows Forms visual designer to place and visually layout the new content in relation to the other controls on the form. This ability also enables Windows Forms content to be placed into a new application built on the Windows Presentation Foundation.

- Build using Visual Studio code name “Orcas”, target different .NET Framework platforms
  - Traditionally developers have required tools that are bound to the runtime platform they are building against. With Visual Studio they can now use the one toolset and target the desired platform.
- Easily add the Windows Vista “look and feel” to native C++ applications
  - Developers can use Visual Studio to build ISV applications that exhibit the Windows Vista “look & feel” and take advantage of the more than 8,000 new native APIs available in Windows Vista. A number of the Windows Vista “look & feel” features are available simply by recompiling an MFC application. Deeper integration that requires more coding or design work on the part of the developer is also simplified with Visual Studio’s integrated support for the Windows Vista native APIs.
- Client Application-Level Services
  - Enable client application developers to use the same user profile and login services as their Web applications. This enables customers to utilize on set of backend storage for user personalization and authentication regardless of the applications type.
- Product Quality Improvements
  - Continued focus on improving product quality and fundamental changes in the way Microsoft builds developers tools enables us to deliver a high quality tool with significant servicing investments over previous versions.

## Create Microsoft Office Applications

Visual Studio Tools for Office (VSTO) is now fully integrated into Visual Studio code name “Orcas” Professional Edition. Developers can now easily target the more than 500 million users of Microsoft Office while using the same managed code skills that they’ve developed for writing Microsoft Windows applications or ASP.NET applications. VSTO enables developers to customize Word, Excel®, PowerPoint, Outlook, Visio®, InfoPath®, and Project to improve end user productivity and take advantage of the many improvements in the 2007 Microsoft Office system. VSTO in Visual Studio code name “Orcas” enable developers to perform tasks such as:

- Target the breadth of the new 2007 Microsoft Office system.
  - Developers can use the tools in Visual Studio Tools for Office to create both application level and document level managed code customizations behind 2007 Office system applications easily and quickly. VSTO’s built-in visual designers for key 2007 Office system UI features provide developers with a RAD development experience and enables them to deliver applications with a high-quality Office-based UI.
- Develop Microsoft Office-based UI workflow solutions
  - Easily incorporate key Microsoft Office UI elements, including the Fluent Ribbon and Custom Task Panes, and integrate SharePoint Workflow Services into Visual Studio Tools for Office solutions. Developers can create applications in which Microsoft Office manages process navigation and surfacing of enterprise data, and collaboration requirements are managed through SharePoint workflow services.
- Build applications that target Microsoft Office SharePoint Server
  - Visual Studio Tools for Office simplifies the task of building and debugging a SharePoint Workflow projects, and also enables developers to build applications that provide easy access to back-end data stores and to data from enterprise systems such as SAP, CRM and ERP. Web Parts built for SharePoint are easily reusable in other applications.
- Deploy applications securely and easily
  - Developers now have an easy to use and version resilient security model for their applications that will exist for future versions of Visual Studio and Office. With full support for ClickOnce deployment of all Office customizations and applications, developers and administrators now have the right tools and framework for easy deployment and maintenance of their Office solutions. This greatly simplifies creating and deploying new solutions based on the 2007 Office system.

## Handle Data More Smoothly

Visual Studio code name “Orcas” significantly improves the way developers handle data. Traditionally developers have manipulated data differently depending on where the data resides and how the user connects to it. With the introduction of Language Integrated Query (LINQ) and various other data access improvements, developers can now deal with data using a consistent programmatic approach and perform data access with new data design surfaces. ADO.NET integrates with LINQ and supports an occasionally connected design pattern to simplify the development tasks for those application types.

These new capabilities include:

- Programming model and design experience around language/data access unification
  - LINQ aims to reduce complexity for developers and help boost their productivity through a set of extensions to the C# and Visual Basic programming languages as well as the Microsoft .NET Framework which provide integrated querying for objects, databases and XML data. Using LINQ, developers will be able to write queries natively in C# or Visual Basic without having to use specialized languages, such as Structured Query Language (SQL) and XPath.
- Occasionally connected data access
  - The Microsoft Synchronization Services for ADO.NET provide an application programming interface (API) to synchronize data between data services and a local store. The Synchronization Services API is modeled after the ADO.NET data access APIs and gives you an intuitive way to synchronize data. It makes building applications for occasionally connected environments a logical extension of building applications where you can depend on a consistent network connection.
- Programming model and design experience around language/data access unification.
  - With its deep support for incorporating .NET language integrated query (LINQ to SQL) into ASP.NET Web applications, Visual Studio makes the creation of data-driven Web sites more productive, more efficient and more fun. Developers can use familiar programming semantics to access all data sources in a unified and uniform manner.



## Enable New Web Experience

Microsoft offers organizations a robust, end-to-end platform for building, hosting and exposing applications over the Web. Beyond the secure, reliable & extensible infrastructure of IIS, developers can easily create Web applications with more interactive, more responsive and more efficient client-side execution using the seamless integration and familiar programming model of ASP.NET AJAX and via Internet Explorer browser extensions & enhancements.

Teams targeting the Web can collaborate more effectively and obtain faster results by integrating the advanced designers and editors of the new Expression tools into their development workflow and incorporating the broad functionality of Windows Live services into their solutions.

Visual Studio enables the creation of new Web experiences by empowering Web developers and simplifying Web development. Visual Studio code name "Orcas" gives developers the tools they need to build the next generation of Web experiences more quickly, more efficiently and easier than before:

- Enabling Web developers to program "AJAX-style" interactive Web user interfaces
  - Visual Studio provides developers with all the tools and framework support required to create compelling, expressive AJAX-enabled Web applications. Developers will be able to take advantage of these rich client-side and server-side frameworks to easily build client-centric Web applications that integrate with any backend data provider, run within any modern browser and has complete access to ASP.NET application services and the Microsoft platform.
- Designing and implementing a Web service
  - As the concept of what a Web service is evolves, Visual Studio will enable developers to configure service endpoints, using the same tools and code regardless of what wire protocol (HTTP, TCP/IP) is used to transmit messages, and testing the service without code. Developers and partners will be able to extend the underlying protocols to handle any definition of a Web service.
- Easily consume Windows Communication Foundation (WCF) services
  - Developers can use RAD tools to quickly and easily create client connections and proxies to existing services, testing them without needing to write code. In addition, developers can use the same techniques and tools for consuming WCF services no matter where they are.
- Leverage SOAs and WCF in mobile applications
  - Developers will be able to build a mobile device client application that works in a partially connected environment. The application will be able to send and receive data to/from a server even if the device disconnects or roams. By providing the logic to solve the addressability and storage issues, a developer can focus on the mobile application functionality and not worry about the different identities, connection methods or storage models required.

- Service Implementation integrated with workflow design
  - With Visual Studio the developer can orchestrate behavior across services with Windows Workflow Foundation (WF) to visualize, create, edit, and debug workflow tasks and dependencies.

## Improve Application Life-Cycle Management (ALM)

In Visual Studio code name “Orcas”, Microsoft is continuing to invest in the market leading Visual Studio Team System technology. Visual Studio code name “Orcas” provides great support for not only managing the entire software development life cycle but also the critical interaction with the final end users and managers of an enterprise application. Additionally, it is designed to expand the collaborative benefits of Visual Studio Team System to more roles on the project team.

By addressing the needs of a wide range of customers, from the smallest independent developers to the largest enterprise customers, Visual Studio code name “Orcas” will make delivering quality solutions easy regardless of the size of the project or team.

With this release the new capabilities include:

- Integrate the database professional into the software life cycle
  - Bring the database professional into the development life cycle through creation of off-line database representation and database projects. Provide full suite of tools source control, testing and test data generation, rename refactorings, and a deployment solution which includes visual diff/merge and deploy script generation.
- Extend Visual Studio’s Unit Testing capabilities
  - Unit testing is easily one of the most sought after abilities that Visual Studio has and with this release we are extending its capabilities, improving its performance and broadening its reach: unit tests now run faster whether they’re executed from the IDE or from the command-line, test inheritance allows users to reuse inherited methods, usability improvements enable users to execute a test directly from its definition, unit tests are now available to all Visual Studio Professional Edition users and can also be used to test mobile applications.
- Load testing for the enterprise
  - Visual Studio improves on the its existing load testing capabilities by simplifying the load testing interface and providing a multiple machine graph view that brings the test results, performance and health of all machines under test together. Additional improvements enable better management of the test results, rich load modeling and the integration of results from non-PerfMon sources.
- Enable performance tuning and diagnostics of enterprise applications through testing
  - A new area of support in Visual Studio is the ability to drive system performance tuning and diagnostics through the Visual Studio test tools. This enables developers to run profiling during tests, so that they can run load and test procedures against a system, see how it behaves, and use integrated tools to profile, debug and tune. We also include performance base-lining, so that users can save a baseline profile and then, if the performance degrades, compare up-to-date traces to identify the source of the regression.

## Summary

In summary these 5 technology areas:

- Handle data more smoothly
- Enable new web experience
- Improve application life-cycle management
- Target Windows Vista and .NET Framework 3.0 development
- Create Microsoft Office applications

Provide a view of the features that support our primary investment pillars. For developers these pillars in Visual Studio code name “Orcas” deliver:

### *Improve Developer Productivity*

In Visual Studio code name “Orcas”, developer productivity doesn’t end with the code editor and wizards. By extending this concept to application architectures and the underlying platform, Visual Studio code name “Orcas” delivers not only a productive development tool but also enables developers to tackle new business problems while decreasing the total cost of solution construction. In Visual Studio code name “Orcas” developers, designers and database professionals will see new tools and frameworks become available to simplify their tasks.

### *Manage the Application Life Cycle*

Visual Studio code name “Orcas” enhances the end-to-end value of Visual Studio Team System by increasing its role-based coverage and delivering enhanced traceability throughout the software development life cycle. With deep integration across roles in the software life cycle and the Team Foundation Server, Team System enables customers to amplify the impact of their teams and improve software quality.

### *Employ the Latest Technologies*

As users look for new ways of comprehending and retaining information developers must still grapple with basic desktop and application security. Visual Studio, Windows Vista and the 2007 Office system enables developers to deliver a safe, robust and compelling user experience in any type of application.

These fundamental advances enable customers to rapidly create connected applications that deliver the highest quality rich user experiences regardless of project complexity or organization size.

For the latest information about Visual Studio code name “Orcas”, see the Visual Studio Web site (<http://msdn.microsoft.com/vstudio>).

## Appendix: Visual Studio code name “Orcas” Feature List

For Beta 1 the list of features is:

- LINQ
  - VB 9.0 Language Support:
    - Local variable type inference
    - Query expressions (Part 2 of 4)
      - Basic query (From and Select)
      - Filtering (Where)
      - Sorting (Order By)
      - Implicit joins
      - Distinct
    - Object initializers
    - Extension Methods
    - Anonymous Types
    - XML Literals
    - XML Properties
    - XML IntelliSense
  - C# 3.0 Language Support:
    - Local variable type interface
    - Lambda expressions
    - Query expressions
    - Object and collection initializers
    - Extension methods
    - Local variable type inference and anonymous types
    - Expression trees
  - LINQ to Objects API
    - The LINQ to Objects API supports queries over any .NET collection, such as arrays and generic lists. This API is defined in the System.Linq namespaces inside System.Core.dll. [Click here for more details about LINQ.](#)
  - LINQ over XML (X.Linq)
    - Core functionality of the X.Linq API such as load, modify, and save XML documents
    - Annotation support with a lightweight, typed, but general purpose annotation mechanism that can be used to associate information such as line numbers, schema types, and application objects with specific nodes in an X.Linq tree.
    - Enable LINQ over XML feature support such as the ability to apply X.LST to transform into and out of X.Linq trees, support for System.XML reader/writer interfaces for improved XML sharing with DOM applications and System.XML schema validation for X.Linq nodes.
- CLR

- ClickOnce improvements
  - Delivers ClickOnce improvements for the deployment of Windows Presentation Foundation applications, alternative browser support and ISV rebranding.
- Enable Partial Trust Hosting of Add-Ins
- Add-In Activation: Expand Activator to allow for out of process activation
- NET Framework improvements such as:
  - New managed add-in model enables developers to add a version-resilient extensibility model to their products.
  - Support for time zone conversion, enumeration and serialization, including cases where Daylight Saving Time rules change over time.
  - Reflection in Partial Trust, enabling sand box scenarios for all applications that depend on these features.
  - The ability to control the garbage collector's latency mode
  - Improved CLR ThreadPool micro-performance and throughput for worker and IO completion
- Improved 64-bit application working set
  - On 64-bit systems better code layout in system assemblies will result in improved working set.
- Lightweight reader/writer lock with deadlock-free upgrade support.
  - The new `System.Threading.ReaderWriterLockSlim` class supports basic read and write locks, allowing for better scalability for read-only concurrent worker scenarios. As its name implies, this lock performs anywhere from 2x to 5x better than the existing `ReaderWriterLock` class, and scales better on multi-processor and multi-core machines. This type also supports upgradeable-read support: if code needs to inspect some state before deciding to acquire the write-lock, upgradeable-reads allow concurrency-safe reading with an optional deadlock-free upgrade to write. Recursion is also disabled by default, helping to write correct code, with an optional recursive mode turned on at lock instantiation time.
- A high performance trace listener which logs XML to disk in the event schema.
  - The `System.Diagnostics.EventSchemaTraceListener` is the first listener in the namespace which is highly tuned for logging performance. Similar to the `XMLWriterTraceListener`, this trace listener logs XML to disk. In particular, this type logs in the event schema, which is shared by some other new technologies. This tracelister has performance which is drastically improved over previous logging tracelisters, especially on machines with multiple processors. Additionally, this is the first trace listener which allows many different disk logging options, such as circular logging across multiple files
- Getting VSTO and/or controls off machine policy/legacy policy migration
  - Developers of managed browser controls can now create manifests for their controls and Authenticode sign the manifests. An enterprise can then choose to trust the controls by manifest signature, rather than modifying CAS policy. This

- provides a bridge from the CAS policy trust model to the trusted publisher model in Visual Studio code name "Orcas".
- Security Platform Parity - Suite B support: AES
    - Cryptography developers can now use the FIPS-certified implementations of advanced SHA hashing algorithms and AES encryption algorithm in managed code. These classes follow the same familiar patterns as the existing cryptography algorithms, making it easy for developers to use the new classes right away.
  - A new date time data structure that can specify an exact point in time relative to the UTC time zone.
    - The current DateTime is insufficient at specifying an exact point in time. DateTimeOffset represents a date time with an offset. It is not meant to be a replacement for DateTime; it should be used in scenarios involving absolute points in time. DateTimeOffset includes most of the functionality of the current DateTime API and allows seamless conversion to DateTime as well.
  - New IO types that expose almost all pipe functionality provided by Windows.
    - Pipes can be used to achieve inter-process communication (IPC) between any process running on the same machine, or on any other windows machine within a network. We've added managed support for both anonymous pipes and named pipes. Anyone familiar with streams should be comfortable using these new APIs to achieve IPC.
  - A new high performance set collection.
    - HashSet is a new generic collection that has been added to the System.Collections.Generic namespace. It is an unordered collection that contains unique elements. In addition to the standard collection operations, HashSet provides standard set operations such as union, intersection, and symmetric difference.
  - Managed classes for Elliptic Curve Diffie-Hellman and Elliptic Curve Digital Signature Algorithm cryptographic functionality
    - With the addition of these classes, cryptographic developers now have managed classes for Elliptic Curve Diffie-Hellman secret agreement and Elliptic Curve Digital Signature Algorithm signing. These classes are built on the new CNG cryptographic libraries in Windows Vista, but still follow the familiar patterns of the cryptographic classes in .NET Framework 2.0.
  - Runtime and design-time support for Office 2007 (including Outlook 2007)
    - Customers can build managed code add-ins with a consistent development experience, regardless of which version of Office they target, which Office application(s) they target, and which programming language they choose. Managed code add-ins enable developers to use strongly-typed class members, with the help of modern development tools, including IntelliSense and auto-complete. In addition, add-ins can potentially run in multiple versions of Office,

- enabled by abstracting version-specific code and supported by a version-resilient infrastructure.
- Support for advanced lifetime management of add-ins and their AppDomains
    - We've added the helper classes that manage the lifetime of add-ins, the objects passed between the host and add-ins, and even of the AppDomains the add-ins live in. By using the ContractBase and LifetimeToken handle, pipeline developer can let the hosts and add-ins act as if everything, including the AppDomain the add-in was activated in, was controlled by the garbage collector even though .Net Remoting would normally make that impossible.
  - Client service support for Login/Logout, Role management and Profiles
    - ASP.NET 2.0 shipped with new application services for authentication, authorization and personalization. Most of these services are not tied to ASP.NET and can work in non-web applications. This release enables the use of these services in smart client applications for Logon/Logoff, Role management and profiles.
  - A trace listener that logs event to ETW (Event Tracing for Windows) in Windows Vista
    - Event tracing for windows is greatly improved in Windows Vista and the most performant loggings facility available in Windows. The System.Diagnostics.EventProviderTraceListener allows managed tracing to provide events to Windows Vista's ETW infrastructure. This is a highly performant, thread-safe listener.
  - Jscript IntelliSense support
    - Jscript code formatting and IntelliSense support provide developers with a richer editing experience. These improvements enable the IDE to provide statement completion, color syntax highlighting and in-place documentation to Jscript and associated script models such as ASP.NET AJAX.
  - A new numeric type that provides support for very large numbers (beyond the range of In64)
    - All existing numeric types in the Framework have a limited range. This is the first type that supports arbitrary range and will extend to accommodate any large number as needed. This type lives in the new System.Numeric namespace where all new numeric and arithmetic features are going to reside. It supports all the basic arithmetic operations including things like Pow, DivRem and GreatestCommonDivisor. It implements the following interfaces: IFormattable, IComparable, IComparable<BigInteger> and IEquatable<BigInteger>. It is serializable and immutable. It has implicit casts from all basic integral types and explicit casts to/from all numeric type.
  - Add IRI support (RFC 3987) to URI related classes
    - This allows resource identifiers to be specified using a character set that supports all languages.
  - New Async model on Socket class



- A new Async model is reduces the per I/O overhead compared to the current I/O model
  - Peer Networking Classes
    - Delivers a set of peer-to-peer network APIs that allow a developer to easily extend an application with compelling collaboration functionality.
  - WMI Provider Extension 2.0
    - WMI Provider Extension 2.0 simplifies and enhances the development of WMI providers in the .Net framework to enable the management of the .NET applications while minimizing the impact on the development time.
    - Delivers equivalent access to WMI features and functions available to native code providers.
    - Exposes property updates and methods to managed code.
    - Improved scalability for large collections of WMI entities.
- ADO.NET
  - ADO.NET 3.0 Advancements
    - ADO.NET Entity Framework: The ADO.NET Entity Framework enables developers to program against relational data in terms of entities. This representation often more closely matches the shape of the data that is desired for application logic than the shape of tables, columns, and rows found in the database.
    - Entity SQL language support: The Entity Framework and Entity SQL together represent a richer data model and query language and have been designed to enable applications such as CRM, ERP, data-intensive services such as Reporting Services, Business Intelligence, Replication, Synchronization, and data-intensive application developers to model and manipulate data at a level of structure and semantics that is closer to their business.
    - Object to Entity mapping : This mapping enables developers to program against the database using .NET Objects. This is great for applications that want to write business logic with data returned from the store or want to use objects for binding data to a user interface.
    - Enhanced .NET Data Provider model to work with ADO.NET Orcas features. ADO.NET 2.0 providers can be updated to support the Entity Framework, object mapping.
  - Extended, more powerful data APIs with the ADO.NET Entity Framework and LINQ to ADO.NET
    - With the ADO.NET Entity Framework developers will be able to model the view of the data that is appropriate for each one of the applications they are building, independently of the structure of the data in the underlying database. The use of the Entity Data Model (EDM) enables developers to design models that follow the concepts built into the application, instead of having to map them to constructs available in relational stores. Once the model is in place, the powerful ADO.NET Entity Framework API is used to access and manipulate the

data as .NET classes or as rows and columns, whatever is appropriate for each application.

- ADO.NET is fully integrated with LINQ and offers many options for using LINQ in various scenarios: LINQ to SQL provides direct access to database tables from the programming environment, LINQ to Entities enables developers to use LINQ over EDM models, and LINQ to Dataset allows the full expressivity of LINQ to be used over Datasets.
- Added paging and stored procedures for update (“update customization”) for ADO.NET Entity Framework:
  - Paging: the paging support in the ADO.NET Entity Framework allows developers to “page” over data in a database by indicating the start row and number of rows to be included in the result. Paging is available through Entity SQL (using the LIMIT AND SKIP keywords) and through the query-builder methods in the ObjectQuery <T> class (Top and Skip)..
  - Stored procedures for update customization: the Entity Framework by default automatically generates SQL statements for insert, update and delete operations when processing changes to entities in memory to be sent to the database. With the stored-procedures update customization feature developers have the option to override the automatic SQL generation and instead provide stored-procedures that will perform the insert, update and delete operations, which the system will call during entity change processing. Among other things, this enables scenarios where direct access to tables is restricted in the database and the only way to make changes to the data is through stored-procedures.
- Microsoft Synchronization Services for ADO.NET
  - Provides an application programming interface (API) to synchronize data between data services and a local store. The Synchronization Services API is modeled after the ADO.NET data access APIs and provides an intuitive way to synchronize data. It makes building applications for occasionally connected environments a logical extension of building applications that can depend on a consistent network connection. For more information, see <http://go.microsoft.com/fwlink/?LinkId=80742>.
- Visual Studio Dataset Designer improvements
  - The Visual Studio Dataset Designer supports the ability to generate the typed TableAdapters and typed Dataset definitions into separate Visual Studio projects resulting in separate assemblies common in N-Tier application development.
  - Generation of a TableAdapter Manager capable of managing hierarchical inserts, updates and deletes of related tables.
- IDE
  - Multi-targeting

- Support multi-targeting within the IDE by enabling Visual Studio to leverage MSBuild using the tasks and targets that were shipped in Visual Studio 2005. Additionally, command line solutions will build using the toolset appropriate for the .NET Framework version that is being targeted.
  - Windows Presentation Foundation (WPF) Designer & Application Tools to deliver the ability to:
    - Create, edit, build, run and debug WPF projects
    - Use the WPF Designer to:
      - Preview any XAML in the designer including user defined controls and types
      - Design Windows, Pages and User Controls
      - Do basic layout tasks in a Grid
      - Do basic property editing using the new property browser
      - Easily understand and navigate “document structure” using the Document Outline
      - See changes in the designer immediately in the XAML
    - Use the XAML Editor to:
      - Edit XAML with IntelliSense
      - See changes in the XAML immediately in the designer
      - Build design time for WPF controls
  - Improved Visual Basic IntelliSense support (part 1 of 2)
    - Additional IntelliSense trigger points when writing code within a method body
    - Improved placement of IntelliSense completion list window
  - UAC manifests in the IDE for Windows Vista applications
    - Enable developers on Windows Vista to easily include the UAC manifest as an embedded resource.
- Windows Communication Foundation (WCF) and Windows Workflow Foundation (WF)
  - WF Designer and Debugger integration with Visual Studio
  - WF & WCF integration:
    - New WCF Send and Receive Activities
    - Enhanced Workflow and Service hosting
  - Enhancement to WF Rules:
    - Added support for operator overloading
    - Added support for the “new” operator to allow users to new up objects and arrays from WF Rules
    - Added support for extension methods to make user’s experience calling extension methods from WF Rules compatible with how they code in C#
  - Partial Trust support in WCF when using the BasicHttpBinding
  - Enhanced REST/POX Support in WCF
  - RSS and Atom Programming Model
  - Atlas Integration, end-to-end programming model for building Ajax style web applications using WCF services.

- Support for OASIS specifications WS-AtomicTransaction 1.1, WS-Coordination 1.1, WS-ReliableMessaging 1.1, WS-SecureConversation 1.3, and WS-Trust 1.3
- New Templates for simplified WCF Service Authoring
- Office
  - Increased Support for Office 2003 and 2007 Applications
    - There is additional add-in support for many Office applications including the 2003 versions of Outlook, Excel, Word, PowerPoint, and Visio, and the 2007 versions of Excel, Word, PowerPoint, Visio, InfoPath, and Outlook. This new support expands the range and variety of solutions developers can build, providing them with greater opportunities to develop customized Office-based solutions using VSTO.
  - Improved Deployment
    - Deployment was one of the areas that we really wanted to improve in this version of VSTO, and we've done so by implementing support for ClickOnce deployment. This will significantly improve the deployment experience, making it easier to develop, deploy and secure Office-based solutions locally or on a corporate network.
  - New Outlook Development Tools
    - This release enables developers to create and deploy custom Outlook 'form regions' quickly and easily. (The Outlook form region is a new feature that enables developers to customize the surface of an Outlook item (such as a contact page, meeting request or a mail message) with controls that can be bound to enterprise data sources.) Using Visual Studio's Windows Form designer, developers can easily create a custom form region and populate it by dragging and dropping controls onto its surface. They can then deploy it either as an aligned form region (i.e., aligning it to other native form regions within Outlook) or as a replacement for a given native form region.
  - Support for creating Smart Documents
    - Word 2007's new "content controls" enable developers to improve the functionality and look and feel of their documents. They can incorporate these controls into the document by dragging and dropping them on to the document surface. They can then bind them to enterprise data sources, lock them for editing, or set various other properties such as hide and show. In addition, there is now support for the new Office XML-based file formats.
  - Support for Interoperability between VBA and VSTO
    - Based on popular demand for VBA applications to interact with VSTO customizations, we've added VBA/VSTO interoperability support that enables developers to access VSTO add-ins from VBA application code. They can now use this feature to create add-ins that they then call programmatically from their VBA code. This is a significant first step towards the integration of VBA and VSTO.
  - SharePoint workflow support

- SharePoint workflow encompasses processes for creating, managing and deploying documents within SharePoint. The steps to create SharePoint workflow previously have been cumbersome and difficult. This version of VSTO enables developers to create SharePoint workflow easily and quickly, write custom code within the individual processes, and then deploy that custom workflow to the enterprise.
  - Support for customizing the Office Ribbon
    - VSTO 2005 SE enabled developers to customize the ribbon in native XML. The native XML developer experience persists in this release also, but they can now use the new Visual Ribbon designer to create new or customize existing ribbons. It's as easy as dragging and dropping controls from the Ribbon Designer Toolbar onto the ribbon. We'll add support for additional controls in future releases, so look out for more functionality as we near RTM. The Visual Ribbon designer is a great tool that makes the process of ribbon customization quick and straightforward.
  - Office 2003 and 2007 parity
    - One of the key features for this release is the ability to create custom applications for Office 2003 and 2007. We've added many parity features to this release, such as data-binding, the ability to create actions pane and add dynamic controls, and support for smart tags just to name a few.
  - Support for migrating VSTO projects forward
    - Many of our customers requested the ability to migrate VSTO projects across the different versions of VSTO. The new project migration tool enables developers to migrate projects they've built in previous versions of VSTO to newer releases of VSTO, enabling them to reuse code as opposed to rewriting it completely from scratch. This is a significant feature because it will enable developers to migrate across product versions as well as support customizations across multiple Office releases.
- SQL Server Compact Edition (SSCE)
  - SQL Server Compact Edition (SSCE) provides a local relational data store for occasionally connected client applications from desktops to devices. SSCE is light weight, embeddable and is easy to deploy with client applications without requiring complex administration work from users. Timestamp (row version id) data type, improved table designer, Query processor enhancements and support for local transaction scope are some of the new features developers will find in this version of SSCE.
- Improved SQL Reporting Services Support
  - New SQL Server Reporting Services Report Wizard.
  - New Report Project templates (for VB, C#, Web) that using SQL Reporting Services.
- Web
  - Improvements for web development include:
    - New ASP.NET WebForms design-surface with advanced XHTML and CSS features

- JScript IntelliSense for ASP.NET AJAX and browser DOM
  - Multi-targeting for .NET Framework 2.0, 3.0, and 3.5 in websites and web applications
  - LINQ to SQL designer integration in websites and web applications
- .NET CF
  - WCF based messaging support for devices
    - This enables the developer to use the WCF messaging-layer programming model to create an application running on a device that sends/receives messages to/from a server in a connected environment.
  - Implemented LINQ for XML on devices
  - Enable support for both connect-in and connect-out scenarios in partially connected environments
    - Support is now provided for developers creating mobile device client applications that will work in an environment where the connection is not maintained continuously (i.e., partially connected environment). The application will be able to send and receive data to/from a server even if the device disconnects or roams. In addition, the framework will provide much of the logic required to solve the addressability and storage issues.
  - Increase parity GUI features .NET Compact Framework with full .NET Framework to allow customers to leverage their Desktop GUI experience
    - Developers will be able to deliver user experiences that share many common UI elements with full desktop applications. This assists end users to be more productive with their device application by leveraging the knowledge they have of the full desktop experience.
- XML
  - XML Tools: XSLT Debugger
    - Enables Input Data Breakpoints allowing the user to break the execution of the style-sheet whenever a certain node in input document is hit.
  - XML Editor Performance Improvements
    - Performance in the Xml Editor for IntelliSense, schema validation etc is improved by implementing incremental parsing of the XML Document.
  - Seamless transition between XML Editor and XSD Designer
    - Improves the experience a user has when working with an XML Schema in textual and graphical mode at the same time.
- MSBuild
  - Parallel/Multi-Processor Builds
    - Building multiple projects in parallel, as much as possible based on the use of dependency information in projects to parallelize
    - Allowing the developer/builder to control the parallelism by providing them the ability to specify the number of processors to use for build.
  - UAC Manifests in the Managed Build Process

- Support for manifests that are embedded into the final executable via the Build process.
- Team Edition for Architects
  - Top-down service design
    - Top-down system design allows an application architect/lead developer to perform the design of a business solution without having to be confronted with technology decisions. It enables the user to progressively refine a high-level system design, designing new sub-systems and applications in the context of the system in which they are to be used.
  - Architectural Roles on System, Applications and Endpoints
    - Enables an architect, while working on the high-level design of a system's architecture using the System Designer, to introduce elements into the design that play a specific pre-defined architectural role(s) within architectural patterns.
- Team Edition for Developers
  - Profiler Support for WCF Applications
    - Enable profiling of WCF based applications to improve application performance
  - Customize and extend code correctness policies
    - Code Analysis Check-in Policy improvements to communicate to a developer why the check-in policy failed and to provide guidance on how to pass the policy requirements.
  - Performance tune an enterprise application
    - Enables developers to run profiling during load and test procedures for a system, to see how it behaves, and use integrated tools to profile, debug and tune. This also enables performance base-lining, so that users can save a baseline profile and then, if the performance degrades, compare up-to-date traces to identify the source of the regression
- Team Edition for Testers
  - Unit Test Generation Improvements
    - Improvements to unit test generation provide an easy way for the user to specify what methods to test, and generate test methods and helper code to do unit testing, as well as providing unit test support for generics.
  - Web Test Validation Rule Improvements
    - Web Test rules improvements enable testers to create more comprehensive validation rules for the application being tested. These improvements include the following functions:
      - Stop test on error
      - Search request and response
      - Add validation rule for title
      - Redirect validation
      - Provide test level validation rules

- Expected HTTP code
    - Warning level for errors on dependents
  - Better Web Test Data Binding
    - This feature allows users to data bind .CSV and XML files, as well as databases to a web test, using a simple data binding wizard.
  - Improved Load Test Results Management
    - With this feature user can open or remove an existing load test result from the load test repository. User can also import and export load test results files.
- Team Foundation Server
  - Team Foundation Build
    - Support multi-threaded builds with the new MSBuild.
    - Continuous Integration – There are many components to this, including build queuing and queue management, drop management (so that users can set policies for when builds should be automatically deleted), and build triggers that allows configuration of exactly how when CI builds should be triggered, for example – every check-in, rolling build (completion of one build starts the next), etc.
    - Improved ability to specify what source, versions of source, etc to include in a build.
    - Improved ability to manage multiple build machines.
    - Simplified ability to specify what tests get run as part of a build
  - Version Control support
    - Destroy- The version control destroy operation provides administrators with the ability to remove files and folders from the version control system. The destroyed files and folders cannot be recovered once they are destroyed. Destroy allows administrators to achieve SQL server disk space usage goals without constantly needing to add more disks to the data tier machine. Destroy also facilitates removing versioned file contents that must be permanently removed from the system for any other reason.
    - Annotate - Annotate is a feature that allows developers to inspect a source code file and see at line-by-line level of detail who last changed each section of code. It brings together changeset data with difference technology to enable developers to quickly learn change history inside a source file.
    - Folder Diff - Team Foundation Server now supports compare operations on folders, whereby the contents of the folder are recursively compared to identify files that differ. Folder diff can compare local folders to local folders, local folders to server folders, and server folders to server folders. It's a great way of identifying differences between branches, files that have changed locally, and files that have changed between two points in time.
    - Get Latest on Checkout - As an optional setting on a team project or on an individual basis, developers can have Team Foundation Server always download



the latest version of a file when they check it out. This helps ensure that they don't have to merge their changes with somebody else's when they check the file back in.

- Performance and Scale
  - This release includes numerous improvements in performance and scalability of Team Foundation Server.
- Visual C++
  - Easily add the Windows Vista "Look and Feel" to native C++ applications
    - Developers can use Visual Studio to build ISV applications that exhibit the Windows Vista "look & feel". A number of the Windows Vista "look & feel" features are available simply by recompiling an MFC application. Deeper integration that requires more coding or design work on the part of the developer is also simplified with Visual Studio's integrated support for the Windows Vista native APIs.