

MICROSOFT .NET

1. What are the three most important parts of the .NET platform? In each case, justify your answer.

Answer:

Microsoft recently announced the .NET platform as their latest vision for building, deploying, and running distributed applications and systems across the Internet. The .NET platform takes advantage of several new technology standards, such as eXtended Markup Language (XML) and Simple Object Access Protocol (SOAP), to fully utilize the abundance of computing and communications resources available and in use today. With the .NET platform, Microsoft hopes to supply the next-generation user experience by providing users with more personalization and seamless integration between multiple applications and devices.

Microsoft .NET provides the framework for the next generation of Internet-based applications. Because some of the Microsoft .NET features might be applicable to measurement and automation applications, it is important to take a closer look at the components of Microsoft .NET—Experiences, Clients, Services, Servers, and Tools—to better understand the new framework.

EXPERIENCES

The Experiences component of Microsoft .NET aims to provide a more productive and purposeful experience by using XML to better organize and display data, as well as integrating digital media support and privacy-enabling technologies for management and control of personal information. In the future, new dynamic delivery systems for secure and

seamless installation, updates, roaming, and offline operation will be a large part of the .NET experience. Microsoft also will offer a selection of .NET experiences including Windows .NET, MSN .NET, Office .NET, bCentral .NET, and Visual Studio .NET.

CLIENTS

Microsoft .NET Clients are “smart” devices including PCs, laptops, workstations, phones, handheld computers, Tablet PCs, game consoles, and other devices. Such .NET clients are unique because they use software that is created to enable them to operate in the .NET platform. Specifically, these smart devices allow access to your information in an appropriate form anytime and from anywhere. .NET clients consume XML Web services and provide .NET experiences by optimizing the way information is presented and gathered—from converting text to speech to recognizing handwriting, regardless of the location, type, and number of clients you use. Some of the .NET client software Microsoft will offer include Windows CE, Windows Embedded, Windows 2000, and Windows XP.

SERVICES

The .NET Services component is crucial to driving the success of the new Microsoft vision. A .NET service is a code module that can be distributed and accessed across the Internet from any platform or operating system. At the core, .NET services are software modules built for data exchange to help applications, services, and devices work together. The .NET services extend modular and component-based application development to Internet-enabled applications. The .NET services also attempt to address the integration issues of dispersed devices and applications. Because these services transfer data using the increasingly popular XML standard, they are commonly referred to as XML Web Services. You will see many general-purpose .NET services appearing over the course of the next few

years. Microsoft is developing a variety of these services and also is working with other companies to create .NET services. Microsoft currently has a .NET service, called Passport, available. With Passport, developers can outsource user authentication. Microsoft is developing a user-centric set of 12 core XML Web services, codenamed HailStorm, for release in 2002.

SERVERS

The Microsoft .NET Enterprise Servers, including the Microsoft Windows 2000 server family, make up the Microsoft .NET server infrastructure for deploying, managing, and orchestrating XML Web services. Some of the existing Microsoft servers, such as SQL Server 2000 and Exchange Server 2000, have been extended to take advantage of the new .NET Framework. Microsoft also is creating several new enterprise server lines that take advantage of the .NET platform. The servers of interest to the measurement and automation industry include the Mobile Information 2001 Server for providing information to mobile devices, the BizTalk Server 2000 for integrating applications with corporate business applications, and the Internet Security and Acceleration Server 2000 for maintaining the privacy required when taking advantage of these new technologies.

TOOLS

To take advantage of .NET capabilities, Microsoft introduces the Visual Studio .NET application development environment. Visual Studio .NET is Microsoft's next generation development tool, built especially for developing and deploying applications that take advantage of the .NET Framework. Visual Studio .NET helps developers build XML Web services and applications using the language of their choice. Visual Studio .NET provides a choice of open, extensible, development languages.

2. Discuss how the design of the .NET Framework and the .NET Common Language Runtime supports interoperability, security, stability, and maintenance. Give at least one example for each area of support.

Answer:

The .NET Framework consists of framework base classes that are extended to support the Web Services, Web Forms, and Windows Forms technologies. The .NET Framework provides a strongly typed object foundation, and Microsoft plans to supply many fundamental classes inside the framework for creating .NET applications. Using the .NET Framework, you can create distributed Web services in the same way that you currently create Windows applications. The Common Language Runtime (CLR) is the underlying foundation for the .NET Framework. The CLR is a multi-high-level language execution engine that provides a solid foundation for .NET developers to build many types of applications.

Studio .NET languages, such as Visual Basic .NET, Visual C#, and Visual C++, are built on. Because of the CLR, you can easily interchange components between the languages and take advantage of the following benefits:

- Integration of code written in different .NET languages
- Security with code identity
- Deployment eliminating problems with shared components
- Versioning of reusable components
- Reuse through implementation inheritance
- Object lifetime management
- Self-describing objects

- **Interoperability** - Because interaction between new and older applications is commonly required, the .NET Framework provides means to access functionality that is implemented in programs that execute outside the .NET environment. Access to COM components is provided in the EnterpriseServices namespace of the framework, and access to other functionality is provided using the P/Invoke feature.
- **Common Runtime Engine** - Programming languages on the .NET Framework compile into an intermediate language known as the Common Intermediate Language, or CIL (formerly known as Microsoft Intermediate Language, or MSIL). In Microsoft's implementation, this intermediate language is not interpreted, but rather compiled in a manner known as just-in-time compilation (JIT) into native code. The combination of these concepts is called the Common Language Infrastructure (CLI), a specification; Microsoft's implementation of the CLI is known as the Common Language Runtime (CLR).
- **Language Independence** - The .NET Framework introduces a Common Type System, or CTS. The CTS specification defines all possible datatypes and programming constructs supported by the CLR and how they may or may not interact with each other. Because of this feature, the .NET Framework supports development in multiple programming languages. This is discussed in more detail in the .NET languages section below.
- **Base Class Library** - The Base Class Library (BCL), sometimes referred to as the Framework Class Library (FCL), is a library of types available to all languages using the .NET Framework. The BCL provides classes which encapsulate a number of common

functions, including file reading and writing, graphic rendering, database interaction and XML document manipulation.

- **Simplified Deployment** - Installation of computer software must be carefully managed to ensure that it does not interfere with previously installed software, and that it conforms to increasingly stringent security requirements. The .NET framework includes design features and tools that help address these requirements.
- **Security** - .NET allows for code to be run with different trust levels without the use of a separate sandbox.

3. Describe at least four technologies essential for the development of Web services and explain how each is used in a Web service.

Answer:

Web service is a software system designed to support interoperable Machine to Machine interaction over a network. Web services are frequently just Web APIs that can be accessed over a network, such as the Internet, and executed on a remote system hosting the requested services

The next-generation Internet will take advantage of a new data language technology called **eXtensible Markup Language (XML)**. XML is an increasingly popular standard that has been developed through the open Internet standards groups (www.w3c.org) to provide the ability to present data and information and describe the nature of data. XML allows the same information to be consumed by multiple applications or configured appropriately within a Web browser or other display. National Instruments currently offers several products that have integrated XML features. With our test management software, National Instruments TestStand, you can generate XML-based test reports, which provide great

flexibility for displaying test data in a variety of formats. For National Instruments LabVIEW and LabWindows/CVI, NI also offers an add-on Database Connectivity toolset that provides XML capabilities.

Simple Object Access Protocol (SOAP) is a lightweight protocol for exchanging information in a decentralized, distributed environment. Specifically, SOAP is an XML-based protocol that consists of three parts:

- An envelope that defines a framework for describing what is in a message and how to process it
- A set of encoding rules for expressing instances of application-defined data types
- A convention for representing remote procedure calls and responses

Web Services Description Language or WSDL is an XML format for describing network services as a set of endpoints operating on messages containing either document-oriented or procedure-oriented information. The operations and messages are described abstractly, and then bound to a concrete network protocol and message format to define an endpoint. Related concrete endpoints are combined into abstract endpoints (services). WSDL is extensible to allow description of endpoints and their messages regardless of what message formats or network protocols are used to communicate

Universal Description Discovery and Integration is a directory model for web services. UDDI is a specification for maintaining standardized directories of information about web services, recording their capabilities, location and requirements in a universally recognized format. Seen (with SOAP and WSDL) as one of the three foundation standards of web services.

4. You are the CIO for a medium-sized firm of approximately 500 persons specializing in eCommerce (i.e. sales of product over the Internet). You must coordinate a sales force, account representatives, and a group of vendors to provide the products that you sell. Which .NET Enterprise servers might be useful to you? Give at least four examples and explain each example by giving at least two reasons why it would be useful

Answer:

Windows Server (formerly .NET Server)

Windows Server 2003 is a server operating system produced by Microsoft. Introduced on April 24, 2003 as the successor to Windows 2000 Server, it is considered by Microsoft to be the cornerstone of their Windows Server System line of business server products.

This is useful because it is more scalable and delivers better performance than its predecessor, Windows 2000. It is the next generation of the Windows 2000 network operating system with .NET enhancements. In 2003, .NET Server 2003 was renamed Windows Server 2003.

It has Terminal Services support (using the Remote Desktop Protocol), enabling multiple simultaneous remote graphical logins. This enables thin client computing on the windows platform, where all applications run remotely on the server. This feature was first introduced with a special "Terminal Server Edition" of Windows NT Server 4.0, but became more important when made a standard part of Windows 2000.

It also has increased default security over previous versions, due to the built-in firewall and most services being disabled by default. And it also has the ability to Manage Your Server - a role management administrative tool that allows an administrator to choose what functionality the server should provide.

Internet Security and Acceleration (ISA) Server

Microsoft Internet Security and Acceleration Server (ISA Server) is described by Microsoft as an "*integrated edge security gateway*". Originating as Microsoft Proxy Server, **ISA** is a Firewalling & Security product based on Microsoft Windows primarily designed to securely publish webservers and other server systems, provide Stateful, Application-Layer Firewalling, act as a VPN endpoint, and provide Internet Access for client systems in a Business Networking environment.

It is useful because it has a firewall, Web caching and policy management server. It replaces Microsoft Proxy Server.

SQL Server

Microsoft's database management system (DBMS). Microsoft SQL Server is a relational database management system (RDBMS) produced by Microsoft. Its primary query language is Transact-SQL, an implementation of the ANSI/ISO standard Structured Query Language (SQL) used by both Microsoft and Sybase

SQL Server includes support for database mirroring and clustering. A SQL server cluster is a collection of identically configured servers, which help distribute the workload among multiple servers. All the servers share an identical virtual server name, and it is resolved into

the IP address of any of the identically configured machines by the clustering runtime. Automatic fail over clustering is also available, in which the workload of a server is transferred to another system in the event of a system failure. SQL server also supports data partitioning for distributed databases. Database mirroring, introduced in SQL Server 2005, allows creation of mirrors (or replicas) of database contents, along with transaction logs, on another instance of SQL Server, based on certain predefined triggers. SQL Server 2005 also allows creation of *snapshots*, which are like backup images that can be reverted back to when needed..

Host Integration Server

It is an extension to SNA server. Provides integration of Windows, AS/400s and mainframes

An estimated 70 percent of all corporate data is stored on host systems, such as IBM mainframe and AS/400 computers. Yet, increasingly, organizations rely on personal computers together with Web-based and Windows®-based applications for everyday productivity and line-of-business solutions. Companies have discovered that Web and Windows solutions often are easier to learn and quicker to implement than comparable host-based applications. To preserve their time and capital investments in host technology, organizations must either migrate all of their host-based resources to the Windows platforms, which can be expensive and time-consuming, or integrate their host-based resources with more efficient Windows-based and Web-based solutions.

Integrating host-based data and applications with Web-based and Windows-based applications offers significant benefits, including:

Preserves investment in currently deployed host and PC technology while taking advantage of new architectures and products being offered for the PC platform.

Allows rapid deployment of custom, high-performance solutions, using a choice of Windows-based development tools and leveraging a large pool of qualified developers who do not need to know or learn host programming.

Lowers administrative resources and reduces hardware expenses, thereby reducing the total cost of ownership (TCO).

REFERENCES

Retrieved from:

<http://www.directionsonmicrosoft.com/sample/DOMIS/research/2001/07jul/0701sttnc.htm>

<http://msdn2.microsoft.com/en-us/library/h50dxzwx.aspx>