

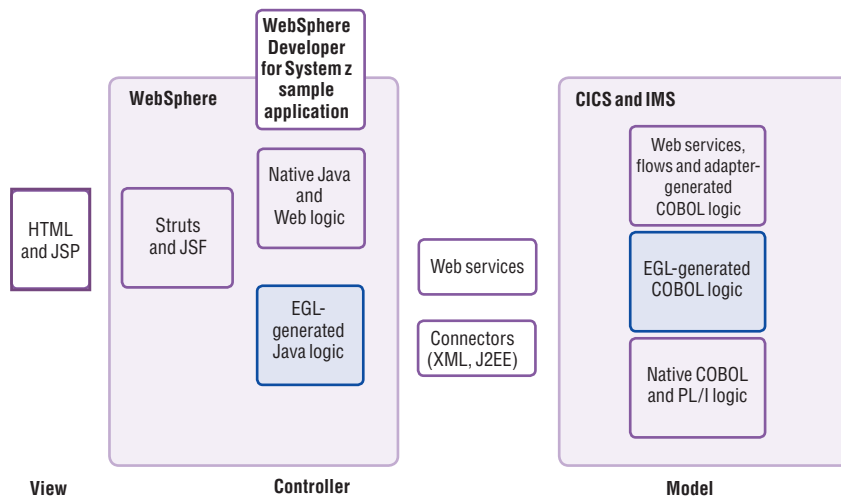
IBM WebSphere Developer for System z, Version 7

Highlights

- **Provides developers with tools that enable them to rapidly create well-built composite processing that integrates WebSphere software and traditional transactional environments**
- **Helps developers quickly create modern, dynamic Web applications and Web user interfaces by facilitating the construction of visual processing through editors based on open JSF and Struts implementations**
- **Promotes the reuse and transformation of existing applications by making them accessible as Web services to help reduce costs and shorten the development cycle**
- **Includes enterprise service tools designed to help simplify the overall service-flow-development process**
- **Improves the productivity of developers creating and maintaining z/OS CICS, IMS, WebSphere and batch applications, while your organization's applications make the transition to services and SOA**
- **Supports team-member collaboration and skill enhancement across the process of development, testing and deployment of multitiered or composite applications**

Building a service oriented architecture (SOA) is a key strategy for many of the largest IT organizations as they seek ways to improve flexibility and business efficiencies. SOA promotes modern interfaces, supports process improvements and enables application reuse—all to provide more rapid delivery of applications that support the highest quality-of-service environments.

Today's SOA can be complex, and often requires assembling teams of people with varying levels of technology backgrounds and areas of expertise. Ideally, everyone on these teams would be familiar with all the technologies necessary to construct SOA applications. However, the reality is that these teams include specialists, each with expertise in a different area, such as modern browser-based user-interface (UI) development in Java™ technology, connectivity development with Web services and business development with languages such as COBOL, PL/I, Java and C/C++. You want to extend these professional skills across your organization, and use both existing and new Web and Web services technologies—along with proven transactional environments, such as IBM CICS® and IBM IMS™—to speed your entire development and deployment processes.



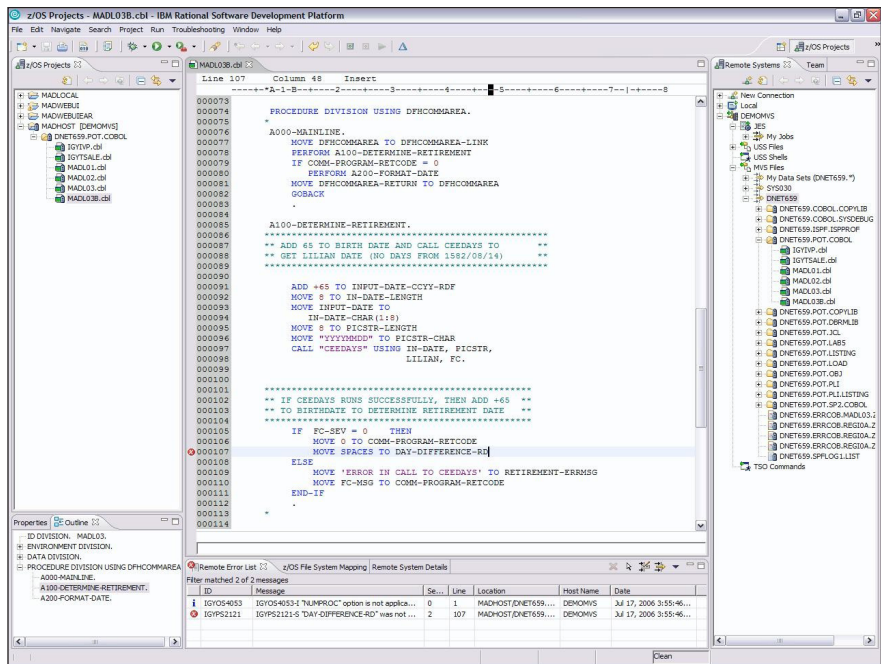
* EGL-generated Java logic requires IBM Rational Business Developer plug-in.

WebSphere Developer for System z simplifies the composite application-development process by providing a JSF and Struts visual construction, linking with connectors and Web services, to support SOA in a core transactional environment.

As IBM's premier enterprise application-development environment, IBM WebSphere® Developer for System z, Version 7 brings core development capabilities, the power of Java 2 Platform, Enterprise Edition (J2EE) and rapid application-development support to diverse enterprise application-development teams. With comprehensive development tools to help create, deploy and maintain traditional enterprise and composite applications, developers from different technical backgrounds can easily participate in important technology projects together. As programmers collaborate in the process of creating modern applications, their exposure to new technologies widens, as they continue to use their existing skills.

Improve productivity with IBM development technology throughout your enterprise

Built on Eclipse open-source technology and written to J2EE specifications, WebSphere Developer for System z optimizes and simplifies application development for traditional processes—and for the SOA that you're building to address your needs today and in the future—through best practices, visual tools, templates, code generation and a comprehensive development environment. These capabilities enable your developers to share a common view of applications and resources accessible from linked environments.



WebSphere Developer for System z helps developers maintain, enhance and reuse existing COBOL and PL/I mainframe applications.

Employing the common services of an integrated development infrastructure helps facilitate reuse, better management and communication, and helps reduce requirements for manual integration—ultimately helping to shorten the development process. Eclipse plug-in technology also enables you to integrate complementary development tools to extend the functionality of the total platform so that it can interoperate with other Eclipse technology-based products.

Beginning with the application interface and user session, WebSphere Developer for System z includes tools for building the underlying business process and infrastructure for Web applications. These tools support the popular, open-source JavaServer Faces (JSF) and Struts run times. They also include a visual construction environment that allows a developer to quickly link views implemented as HTML and JavaServer Pages (JSP) with business logic implemented with a number of different technologies, such as Web services, J2EE Connector Architecture (JCA) adapters, COBOL, PL/I and C/C++. This capability enables individuals with a variety of skill sets to contribute to the construction of sophisticated Web, traditional and composite applications.

Develop, maintain and reuse traditional application processes

Traditional applications and processes can participate in SOA and new business solutions while meeting your quality-of-service requirements as they handle vital business function. WebSphere Developer for System z provides an interactive workstation-based environment to help develop, maintain and reuse traditional COBOL, PL/I and C/C++, CICS, IMS and batch applications for traditional processing or for inclusion in an SOA. With this release, WebSphere Developer for System z, Version 7 offers several new key features and capabilities, including:

- *C and C++ support for development, editing, content assist, remote syntax checking and building z/OS applications.*
- *Local syntax-check upgrades that support remote IBM z/OS® artifacts and include dependency identification of copybooks with the added capability to manage copybooks across projects, as well and IBM CICS Transaction Server for z/OS, Version 3 application programming interface (API) support.*
- *z/OS project restructuring that improves the granularity of artifacts and property management to help simplify compile and build processing.*
- *System z Application Pattern Generator that enables COBOL data access (create, read, update, delete [CRUD]) to back-end processing generated from Unified Modeling Language (UML) and database schemas*
- *Visual editor for creating and changing IMS Message Format Services (MFS) screens*
- *Terminal-emulator keyboard mapping that enables you to customize for the terminal emulator supplied with WebSphere Developer for System z*
- *Upgraded PL/I and COBOL Microsoft® Windows® compilers that synchronize processing with mainframe-based compiles*
- *Upgraded IBM TXSeries® for Windows supporting CICS Transaction Server for z/OS that helps simplify local CICS Windows-based development*
- *Preview support for CITRIX that enables server-based management of WebSphere Developer for System z componentry*
- *Support for IBM AIX® file system access in remote system explorer (RSE), which enhances the local development support of AIX environments*
- *An enhanced visual basic mapping support (BMS) map, and job control language (JCL)-generation capabilities that provide map assembly and build-processing capabilities for BMS maps (also generates JSF artifacts to simplify conversion from green screens to Web UIs.)*
- *Large partitioned data set (PDS) performance improvements to the RSE server, which provides a common view for z/OS data sets and queues with support for hierarchical file system (HFS) files*
- *A menu manager that helps simplify developer access to z/OS processing by enabling developers to create custom menu items associated with commands and scripts with configurable, customizable parameter substitution based on the currently selected artifact*
- *Simplified Interactive System Productivity Facility (ISPF) function access through IBM WebSphere Host Access Transformation Services (HATS) to support developer access through automated rich-client interfaces*
- *Common Access Repository Manager (CARMA)-enabled integrated remote artifact access to user-customizable source-code management systems, with additional command support, helping provide connection to configured repositories*
- *HATS developer technology to support integration to screen-driven interfaces*
- *An enhanced SCLM developer plug-in that provides support for long names, RSE integration and the same function as IBM SCLM Developer Toolkit*

The preceding new and enhanced features of WebSphere Developer for System z, Version 7 are in addition to an already comprehensive set, including:

- *The ability to create and generate code to IBM Enterprise COBOL for z/OS and IBM Enterprise PL/I for z/OS compiler specifications*
- *Direct access to z/OS code without having to copy files from the host to your workstation*
- *Support for z/OS local and remote development to offer workstation-based development with project synchronization and management of z/OS system-based file structures*
- *Access to COBOL, PL/I, Java, C/C++, batch, CICS, IMS and UNIX® System Services application code assist*
- *Color-coded editing of COBOL, PL/I, Java, C/C++ and assembler (ASM) languages as well as JCL*
- *The ability to compare and recover source changes and define templates, including variable substitution of parameters*
- *Remote syntax check (through customizable procedures), compile generation, build (based on extendable JCL procedures) and deployment support*
- *IBM DB2® COBOL and PL/I stored-procedure build and debug support*
- *Remote debug support for z/OS through IBM Debug Tool, which includes COBOL, PL/I, C/C++ and IBM Language Environment® technology-enabled high-level assembler (HLASM) support*

- *Integration with IBM Software Configuration Library Management (SCLM) to provide source-code access and management*
- *Wizards to help you create SOA-based Web services processes for CICS, IMS and WebSphere environments*

Using existing assets through an automated code-extraction process can help reduce development time and costs. IBM WebSphere Studio Asset Analyzer and IBM Asset Transformation Workbench, separately available, complementary products, provide analysis and assessment of traditional applications and their interrelationships to aid in extension and restructuring efforts.

Visually define Web application interfaces and workflow

A comprehensive view of the Web application flow can help ease maintenance requirements and promote a greater understanding of unfamiliar application construction and components. To help support the JSF and Struts frameworks, WebSphere Developer for System z includes both a user-interface-oriented development paradigm and a Web diagram editor that maps applications to help you quickly recognize the flow, structure and components of JSF and Struts technology-based Web applications.

Architects, analysts and developers have quick access to a point-and-click design tool and wizards throughout the development process, including wizards to help quickly generate JSP and Java syntax. As a result, team members can separate responsibilities and improve productivity and focus.

Build J2EE, core and composite applications using EGL extension

Enterprise Generation Language (EGL) combines an easy-to-consume language with links to the popular JSF framework supporting rapid application development for procedural language developers. The platform-neutral, high-level EGL syntax shields developers from the intricacies of coding to low-level language and runtime programming interfaces.

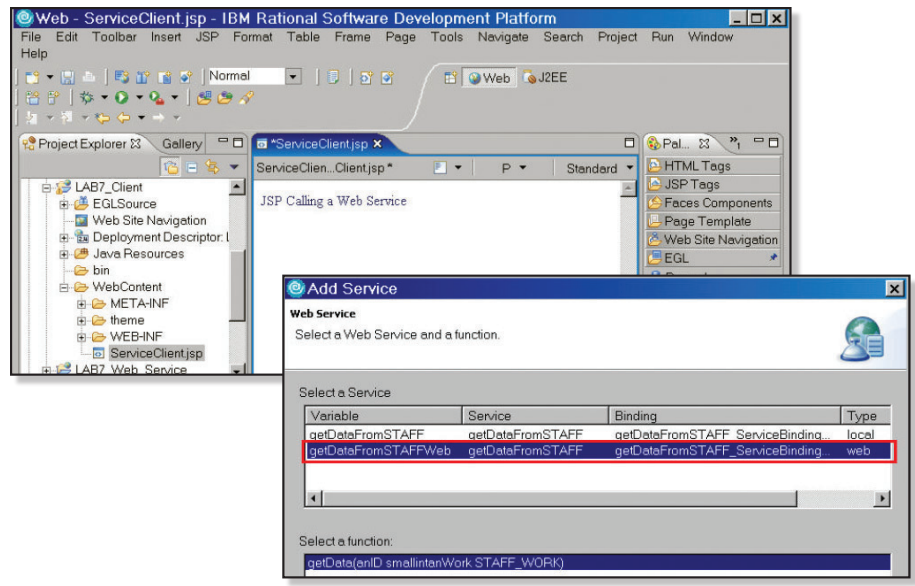
EGL applications can be deployed to run as Java programs under an application server, such as WebSphere Application Server, or as COBOL programs to be run in System z, CICS, IMS and batch environments.

The EGL capability is available as an extension, a separately orderable and installable product feature.

Enhance development capabilities with leading-edge servlet, JSP and EJB tools

You have existing applications that you want to keep and important data residing in existing systems. You need advanced tools to build Web applications that include business logic to preserve investments and reduce development time. With WebSphere Developer for System z, you can define JSP components and servlets, and map entity beans to databases. And you can generate Enterprise JavaBeans (EJB) components and access transaction-processing systems to better use your investments and help lower the cost of retooling, integrating and updating existing applications.

WebSphere Developer for System z offers a fully supported EJB development environment to create and test applications for rapid deployment to application servers. To provide a robust unit-test environment, WebSphere Developer for System z integrates tightly with other WebSphere software and enables easy deployment to WebSphere Application Server. A robust query engine supports deployed code by creating Structured Query Language (SQL) strings to be generated into persister classes. WebSphere Developer for System z also provides tools to create, edit and validate enterprise archive (EAR) files and editors to format deployment descriptors.



WebSphere Developer for System z helps you quickly define the flow, structure and components of JSF and Struts technology-based Web and Web services applications.

Other Web and J2EE capabilities include:

- *Eclipse, Version 3.2 support to provide a more-responsive, attractive and customizable user interface that helps increase developer productivity*
- *Portal tools that enable you to visually develop portal applications*
- *Automated J2EE code-analysis and component-testing tools to improve code quality*
- *Robust J2EE runtime analysis tools to identify and fix performance problems early in the development cycle*
- *Built-in Business Objects Crystal Reports tools to build interactive data reports*
- *The WebSphere Application Server rapid-deployment feature to accelerate application deployment and simplify system testing on WebSphere Application Server*

Build Web services quickly with a robust XML z/OS tool set

Web services give global businesses a common language with shared definitions to discover each other’s resources, connect dynamically and conduct transactions in real time with minimal human input. WebSphere Developer for System z provides wizards and tools to help you rapidly develop Web services in distributed and z/OS environments. You can use these standards-based applications—accessed through XML—individually or combine them to perform complex transactions with minimal programming.

With WebSphere Developer for System z, Version 7, a new feature, enterprise service tools, combines capabilities that were formerly available in the XML services for the enterprise and service-flow modeler plug-ins. Enterprise service tools offer an enhanced user interface that increases usability and helps simplify the overall service-flow-development process.

Enterprise service tools provide an integrated perspective that assists CICS developers in the following tasks:

- *Creating a CICS Web service that uses a new or existing CICS application as its application component*
- *Creating an IBM IMS SOAP Gateway Web service that uses a new or existing IMS application as its application component*

- *Creating a Web service that is not runtime-specific from a new or existing application*
- *Using the IBM System z™ Database Application Generator to create a COBOL CICS application that accesses a z/OS DB2 database*
- *Developing a comprehensive Web service that collects and processes data from multiple sources, including CICS nonterminal applications, CICS terminal applications and Web services*

Enterprise service tools provide six types of projects that enable you to transform an existing CICS application to a Web service or to integrate an existing CICS application into a Web service. The service-flow-specific project can also be driven by IBM WebSphere MQ messages and IBM CICS Transaction Gateway.

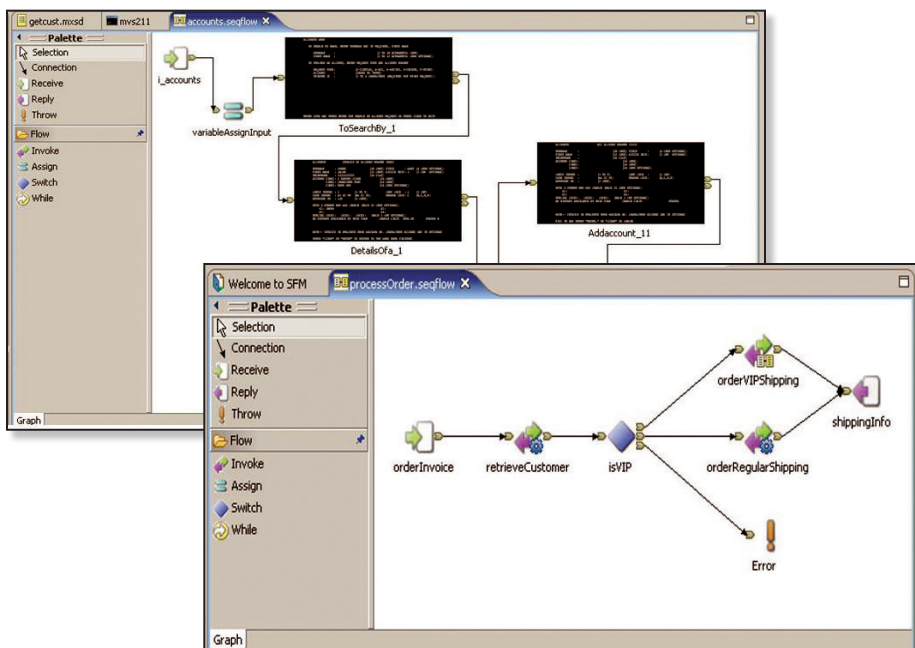
The service-flow project view is one of the six project views provided in Enterprise service tools. This view enables you to develop a comprehensive Web service that collects and processes data from multiple sources, such as programs, screens, databases and Web service-invokable processing.

You must have the CICS service-flow feature installed to run the service-flow project. And the CICS service-flow feature requires IBM CICS Transaction Server, Version 3.1. The CICS service-flow feature provides components that extend CICS Transaction Server by providing adapters that use CICS interfaces to invoke the CICS terminal-oriented transactions and communications area (COMMAREA) programs required by the Web service generated from the service-flow project.

To support the latest capabilities of the service-flow modeler in WebSphere Developer for System z, Version 7, the CICS service-flow feature includes several enhancements:

- *Integration with Web services and WebSphere MQ environments is more easily enabled by providing for the use of CICS Transaction Server containers and channels as input and output interfaces to a service flow.*
- *Support is provided for invoking Web services as part of a service flow.*
- *More management and configuration capabilities have been introduced, along with improved tracing.*

The CICS service-flow run time delivers adapters for access to existing CICS transaction and application interfaces using noninvasive techniques, so that the CICS application assets orchestrated by the service flow do not have to be altered to support the CICS business-service flow. This capability enables you to quickly reuse existing assets while helping to minimize the risk of the new implementation. If required, the CICS business service can persist state data related to the business service between multiple invocations of the CICS application interfaces.



This example shows the flow model for an order process, implemented with underlying CICS transactions, that segments and routes customers through a flow after determining the regular or preferred status.

Likewise, when you need to integrate information from non-CICS applications into the CICS business service, the CICS service-flow run time provides a Web services adapter and a WebSphere MQ adapter that enable the CICS business-service flow to access any application supporting these interfaces, wherever the application might reside in the enterprise solution architecture.

The base capabilities provided by CICS Transaction Server to access CICS application interfaces extend to capabilities such as:

- *Web services*
- *Link3270 Bridge*
- *Distributed Program Link (DPL)*
- *WebSphere MQ Adapter*
- *Front End Programming Interface (FEPI)*

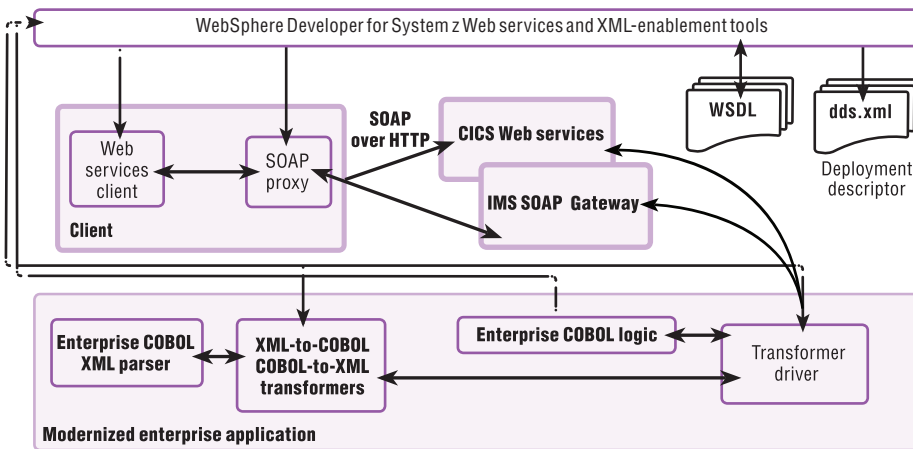
The CICS service-flow run time uses these capabilities when generating the CICS business-service function to provide the implementation needed to reuse the existing CICS applications as components in the CICS business-service flow.

WebSphere Developer for System z also facilitates Web services development tasks to help you build and deploy Web services-enabled applications for your business goals across a broad range of software and hardware platforms. These Web services include development tasks such as:

- *Using a Web services explorer to discover, browse, invoke and publish WSDL in a Universal Description, Discovery and Integration (UDDI) registry.*

- *Creating Web services from existing artifacts, such as Java beans, EJB components, URLs that take and return data, IBM DB2 XML Extender calls, DB2 stored procedures and SQL queries.*
- *Wrapping existing artifacts as SOAP and HTTP GET and POST method-accessible services and describing them in WSDL.*
- *Creating Web services, Web services clients and test environments, and deploying them into WebSphere Application Server.*
- *Using the WSDL editor, a graphical tool used to edit WSDL files and embedded XML schemas.*

WebSphere Developer for System z includes a comprehensive XML tool set to help you build document type definitions (DTDs), XML schemas and files, and integrate relational data with Web services. You can quickly and easily transform and combine IBM Enterprise COBOL code into XML-based applications to redeploy them as Web services. The Web services you create with WebSphere Developer for System z conform to UDDI, SOAP and WSDL standards.



WebSphere Developer for System z enables you to create dynamic applications.

Specialized z/OS system-based Web services support includes mapping XML schema files, WSDL files, DTDs and other XML documents to and from COBOL data structures, the ability to generate the underlying transformers, and high-speed parsing in the IBM Enterprise COBOL language environment. Specific options support deployment to various z/OS run times, including specialized support for the CICS Web services and IMS SOAP Gateway features.

Test and debug during run time on local or remote servers

With the WebSphere Developer for System z unit-test environment, you can configure local or remote servers to perform cross-platform interactive testing and debugging live in WebSphere, CICS, IMS and DB2 transactional environments, and in z/OS batch environments. The testing and debugging process begins early in application development, with a break-point and monitor-testing capability available in the visual-assembly environment. This capability enables each aspect of the flow and the associated connections to perform as required.

WebSphere Developer for System z includes a validation framework to identify errors on the fly—helping programmers save time and their companies money by enabling them to immediately identify and correct errors. Troubleshooting options include traditional debugging in

composite environments, and distributed code profiling and unit testing in J2EE environments. WebSphere Developer for System z enables you to edit, test, check syntax and compile the source code locally. Then, to recompile the source, build a load module, and test and debug it on a remote z/OS system. You can take advantage of remote debugging capabilities through the product's integration with IBM Debug Tool and IBM Debug Tool Utilities and Advanced Functions software.

Deploy composite application patterns as Web interfaces

The new System z Application Pattern Generator feature is designed to support the generation of composite application patterns deployed as Web interfaces linked with data access and business processing delivered through COBOL-generated CICS services. This support is implemented through JSF technology-based Web processing, session management and controller functions that interface with CRUD and browse processing delivered through COBOL-generated CICS services. System z Application Pattern Generator enables CRUD COBOL back-end processing and JSF front-end processing to be generated from UML and database schemas. Also, transformations can be defined and customized, with popular transformations, such as CRUD and view controller.

Technology previews available with this release

With this release of WebSphere Developer for System z, IBM announces a technology preview of integrated application understanding using a Windows technology-based asset-analyzer component (for workstation and single-user usage only).

Another technology preview is the IBM File Manager for z/OS integration technology preview, which provides Eclipse technology-based integration and access to File Manager Virtual Storage Access Method (VSAM) key-sequenced data set (KSDS) processing. This feature moves more core ISPF-based processing to the more-productive workstation-based environment. To take advantage of this technology preview, you must use IBM File Manager for z/OS, Version 7.

The XML enterprise services PL/I technology preview provides support for generating WSDL and PL/I adapters from PL/I source, and includes supporting SOA-based Web services integration to CICS and IMS technology-based PL/I processing. This capability enables you to take advantage of the value of SOA by reusing PL/I components.

For a geographically distributed development team or teams working with sensitive data, IBM is offering a WebSphere Developer for System z technology preview of installing on a Citrix server to provide more-secure remote access to better protect your data with a single installation of the product.

You can participate in these technology previews to gain early experience with this support by visiting ibm.com/software/awdtools/devzseries/support/. This site provides detailed information about availability dates, and terms and conditions.

A comprehensive integrated development environment

WebSphere Developer for System z, Version 7 supports a broad range of developers with added flexibility and the ability to integrate with existing applications. With WebSphere Developer for System z, you can:

- *Create Web applications by melding diverse employee skills sets and extending existing systems.*
- *Develop, maintain and integrate CICS and IMS transactional applications and batch applications.*
- *Take advantage of proven runtime environments, using SOAs and Web services, while helping reduce your deployment risks.*

WebSphere Developer for System z offers an IDE with advanced, easy-to-use tools and features to help diverse developers rapidly design, code and deploy complex composite and traditional applications.

For more information

To learn more about IBM WebSphere Developer for System z, Version 7, contact your IBM representative or IBM Business Partner, or visit:

ibm.com/software/awdtools/devzseries

To join the Global WebSphere Community, visit:

www.websphere.org

IBM WebSphere Developer for System z, Version 7 at a glance

Hardware requirements

- Intel® Pentium® III 800 MHz processor minimum; faster recommended
- 1024x768 display resolution required
- 1 GB RAM minimum
- A visual graphics array (VGA) display of 1024x766
- 2.0 GB minimum available disk space (based on Microsoft Windows NT® File System [NFS]), depending on the optional features selected for installation and in addition to space for the resources you develop

Software requirements

- One of the following operating systems:
 - Microsoft Windows XP Professional with Service Pack (SP) 2 or later
 - Windows 2000 Professional with SP4 or later
 - Windows 2000 Server with SP4 or later
 - Windows 2000 Advanced Server with SP4 or later
 - Windows Server 2003 Standard with SP1 or later
 - Windows Server 2003 Enterprise with SP1 or later
- TCP/IP installed and configured
- One of the following Web browsers: (to view readme files and the installation guide)
 - Microsoft Internet Explorer, Version 5.5 with SP1 or later
 - Firefox, Version 1.5 or 2.0
- Adobe Flash Player, Version 6.0 Release 65 or later (to view multimedia user assistance, such as tours, tutorials and show-me servlets)
- IBM DB2 Universal Database™ for z/OS, Version 8.1 with Fix Pack 3 (included for optional installation with WebSphere Developer for System z) to review trade sample applications and a subset of other examples

Note: For more details about WebSphere Developer for System z software requirements, such as the required components and PTFs for the programs listed here, refer to the softcopy publication *Prerequisites for WebSphere Developer for System z* (SC31-6352).

Host prerequisites

- z/OS, Version 1.5 or later with appropriate program temporary fixes (PTFs)
- One of the following REXX levels installed on the host:
 - IBM REXX/370 Library, Version 1.3
 - IBM REXX/370 Alternate Library

Corequisites

The following products and other stated software are required to support specific features of WebSphere Developer for System z. The workstation client can be successfully installed without these corequisites; however, a stated corequisite must be installed and operational at run time for the corresponding feature to work as designed.

For applications using RSE server

- IBM Software Developer Kit (SDK) for z/OS Java 2 Technology Edition, Version 1.4 or 1.5

To compile C and C++ programs developed or edited within WebSphere Developer for System z

- IBM z/OS C/C++, Version 1.4, 1.5 or 1.6 with appropriate PTFs
- IBM z/OS XL C/C++, Version 1.7 with appropriate PTFs

To compile COBOL programs developed or edited within WebSphere Developer for System z (one of the following)

- IBM Enterprise COBOL for z/OS, Version 3.1 with appropriate PTFs
 - IBM Enterprise COBOL for z/OS, Version 3.2 or later
-

IBM WebSphere Developer for System z, Version 7 at a glance (continued)

Corequisites (continued)

For COBOL run-time support for z/OS

- IBM Enterprise Developer Server for z/OS, Version 5.0 with appropriate PTFs

To compile PL/I programs developed or edited within WebSphere Developer for System z (one of the following)

- IBM PL/I for MVS™ and VM, Version 1.1
- IBM VisualAge PL/I for OS/390, Version 2.2
- IBM Enterprise PL/I for z/OS, Version 3.1 or later with appropriate PTFs

To compile High-Level Assembler programs developed or edited within WebSphere Developer for System z

- IBM High-Level Assembler/MVS and VM and VSE, Version 1.5

To support remote debugging of COBOL, PL/I, C/C++ and High-Level Assembler programs from WebSphere Developer for System z (one of the following)

- IBM Debug Tool for z/OS, Version 7.1 or later with appropriate PTFs
- IBM Debug Tool Utilities and Advanced Functions for z/OS, Version 7.1 or later with appropriate PTFs

Note: Debug Tool Utilities and Advanced Functions for z/OS, Version 7.1 or later with appropriate PTFs is required for assembler support, loading and clearing of specific load modules, describing load-module contents, supporting the automonitor feature and displaying the source for a compile unit prior to the application's loading of the load module containing the compile unit and prior to running the compile unit for COBOL.

To support applications with embedded CICS statements (one of the following)

- IBM CICS Transaction Server for z/OS, Version 2.2 or later
- IBM CICS Transaction Server for z/OS, Version 3.1 with appropriate PTFs

To use enterprise service tools

- For Web services for CICS project: CICS Transaction Server for z/OS, Version 3.1
- For SOAP for CICS project: CICS Transaction Server for z/OS, Version 3.1
- For IMS SOAP Gateway project: IMS, Version 9
- For batch, TSO or UNIX System Services project: IBM Batch, TSO and UNIX System Services environments for z/OS
- For database application project: IBM CICS Transaction Server for z/OS, Version 3.1
- For service-flow project:
 - CICS Transaction Server for z/OS, Version 3.1
 - CICS service-flow feature of CICS Transaction Server for z/OS, Version 3.1
- For HATS macro:
 - HATS, Version 6.0.3 or later
 - WebSphere Application Server, Version 5.1 or 6.0 (required by HATS)

To support applications using IMS database and data communications (one of the following)

- IBM IMS/ESA®, Version 7.1 or later
- IBM IMS/ESA, Version 8.1 or later
- IBM IMS/ESA, Version 9.1 or later

To support IBM DB2 Universal Database for z/OS or OS/390 (one of the following)

- DB2 Universal Database, Version 7.1 or later with appropriate PTFs
 - DB2 Universal Database, Version 8.2 or later with appropriate PTFs
 - DB2, Version 9.1 or later with appropriate PTFs
-



© Copyright IBM Corporation 2006

IBM Corporation
Software Group
Route 100
Somers, NY 10589
U.S.A.

Produced in the United States of America
12-06
All Rights Reserved

AIX, CICS, DB2, DB2 Universal Database, IBM, the IBM logo, IMS, IMS/ESA, Language Environment, MVS, OS/390, Rational, System z, TXSeries, VisualAge, WebSphere, z/OS and zSeries are trademarks of International Business Machines Corporation in the United States, other countries or both.

Intel and Pentium are trademarks of Intel Corporation in the United States, other countries or both.

Microsoft, Windows and Windows NT are trademarks of Microsoft Corporation in the United States, other countries or both.

Java and all Java-based trademarks are trademarks of Sun Microsystems, Inc. in the United States, other countries or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Other company, product and service names may be trademarks or service marks of others.