New IBM VisualAge Generator Products Help You Rapidly Build e-business Applications for High Volume Transactions

Overview
VisualAge® Generator is IBM’s powerful high-end rapid application development environment for building and deploying e-business, multitiered, and stand-alone applications. It offers versatile solutions with scalable, multiplatform exploitation across networked systems. The highly productive development facilities of VisualAge Generator are designed to simplify and shield the complexities of all supported topologies. This allows developers with little or no Java™ expertise to implement end-to-end Java e-business systems, and also enables Object Oriented (OO) and Java developers to implement systems that run on traditional transactional platforms, such as CICS® or IMS™, and access legacy data (for example, DL/I and VSAM) with no need to become mainframe experts.

New features of VisualAge Generator Version 4.5 product set include:

- **Increased support for AS/400®** — AS/400 systems can now be used as a Web server and VisualAge Generator server platform.
- **Support for Solaris as a client/server middle-tier platform.** — Provides a two-tier solution for Java and GUI clients to Solaris and supports Solaris as a middle tier in an n-tier configuration.
- **Improved access to remote data during test** — VisualAge Generator now provides integrated support for accessing DL/I databases on MVS™ and VSE. Remote access is also provided for files on VSE and AS/400.
- **Support for SCO OpenServer as a run-time platform** — Text-based client programs are now supported for this environment.

Key Prerequisites
For the VisualAge Generator Developer program, an IBM-compatible workstation running OS/2® Warp, Windows NT, or Windows 2000, with appropriate database and communications software.

For the VisualAge Generator Server program, an IBM-compatible workstation running OS/2, Windows NT, Windows 2000, AIX®, HP-UX, Solaris, or SCO OpenServer, with appropriate database, communication, and transaction management software.

For the VisualAge Generator Templates Customizer program, an IBM-compatible workstation running OS/2, Windows NT, or Windows 2000, with appropriate database software.

Planned Availability Date
September 29, 2000

At a Glance
The VisualAge Generator Version 4.5 enables customers to leverage existing skills and resources to rapidly build and deploy e-business, multitiered, and stand-alone systems that meet the most stringent availability, scalability, and performance requirements. This new version of VisualAge Generator:

- Simplifies development of MQSeries business integration solutions
- Reduces the cost of entry for e-business by:
  - Generating Java for server programs on Windows 2000 and Windows NT
  - Enhancing the WebSphere rapid application development support
- Speeds development of systems accessing legacy data

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Reference: SE001

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VisualAge Generator is IBM’s VisualAge offering focused on bringing productivity to organizations. It is a powerful, integrated development workbench used by programmers to fully define, test, build, and deploy traditional as well as Web-ready enterprise level systems on a variety of platforms in record time.

With VisualAge Generator, applications are defined from a productive desktop environment, using easy to learn, powerful, high level specifications that are completely independent from the target run-time environment and hide the complexity of the system software infrastructure (transactional and DBMS APIs, Web server complexity, and communications protocols).

A powerful simulation and test environment enables the programmer to fully test the system without ever compiling or deploying to the final target system. This environment, built and integrated into the development workbench, allows rapid iteration between specification and verification. Once the application is fully verified, a code generation facility can be invoked to transform the high level environment-neutral specifications into native 3GL source code (Java, C++, or COBOL) optimized for the selected execution systems for compilation and deployment in production.

The solution combines the best of both worlds — all the productivity of an iterative desktop development environment with the scalability and the performance of a compiled and optimized 3GL production application.

To fully understand the power of VisualAge Generator, the rest of this description will review the following primary design points of this technology:

- Provide the highest possible level of programmer productivity
- Fulfill the demands of an enterprise environment
- Enable rapid deployment of Web-enabled e-business solutions

### Programmer Productivity

To address the first primary design point of programmer productivity, VisualAge Generator has been equipped with four core facilities:

- **Data model driven automatic code generation**

  Industry research has shown the majority of the code written to implement business applications has nothing to do with the business problem, but it is necessary to establish the “mechanical” infrastructure of the system providing functions such as handling error conditions, and keeping track of positioning within an array of data.

  Using the VisualAge Generator Templates facility, developers can have the application infrastructure (framework) generated automatically by the system, reducing the coding requirements up to 80%* and allowing the creation of a fully functional database manipulation application in a matter of minutes.

  * This estimate is based on current customer results. Your experience may vary depending on the amount of layout customization and specific business logic code required.

  Programmers will build the bulk of their application by simply defining instances of the template’s Information Model. This consists of choosing the data to be manipulated (tables, views, and columns), and selecting how it will be displayed. This set of intuitive, and seemingly simple specifications, allows VisualAge Generator Templates to generate automatically surprisingly comprehensive application code to:

  - Access and manipulate database (Create, Read, Update, Delete)
  - Present the data to the end user in different ways (Java or traditional GUI, JSP, or TUI)
  - Manage navigation among multiple windows and session state
  - Manage multiuser data access concurrency
  - Manage paging when data result set is larger than page size
  - Manage error conditions
  - Provide window and field level online help

  Once this application framework is generated, developers simply add the business logic using the standard VisualAge Generator specification facilities to complete the creation of the system.

- **Visual construction from components**

  VisualAge Generator includes IBM’s award winning visual, component-based construction architecture. This facility is much more than a User Interface (UI) layout builder. Programmers can build their own components and make them available for reuse, or they can take advantage of prebuilt, pretested components licensed by IBM or third parties, visually assembling them to meet their system specifications.

  Hundreds of reusable components are already available, and with the growth in popularity of JavaBean and Enterprise Java Bean component models, thousands more should become available, allowing IT shops to implement a “Buy and Integrate” application development strategy instead of the traditional “develop from scratch” approach.

- **High-level specification facility**

  VisualAge Generator provides a simple and yet powerful specification language. This language includes a set of high-level and polymorphic constructs, such as I/O verbs, Unit of Work (UOW) management verbs, and Remote Procedure Call (RPC), and hides the complexity of the underlying target execution environment. The programmer, therefore, can focus on the business problem rather than on writing to complex APIs.

  An example of the power of the abstraction level of such specifications is the Web Transaction Rapid Development facility. Using a logical data structure definition and simple logical verbs, such as CONVERSE, traditional programmers can build and test without the need to learn and master complex Web technologies such as Java servlets and JSP components, fully functional multitiered e-business systems.

  Another example of the power of the abstraction level is the MQSeries rapid application development facility. Using simple and terse “sequential file” metaphors and a few high level verbs to read and write to message queues, saves large amounts of low level coding when implementing message-based business integration systems.

  Beyond the abstraction provided in the language, VisualAge Generator includes many aids to make the programming environment even more productive. These include powerful utilities such as language sensitive editors, wizards, and graphical assistants. Each is fully integrated and designed to speed the programming effort and help to prevent or eliminate errors.
• Interactive Test Facility (ITF) integrated with the development facilities

The most powerful feature of the development workbench is the ITF. This facility is tightly integrated with the specification environment, allowing programmers to easily specify, animate, and verify the application without leaving the development environment. This rapid iteration between specification and verification frees the developers from costly generation/compilation and deployment steps, and facilitates an evolutionary prototyping development approach.

Fulfilling the Enterprise Requirements

An “enterprise class” application development solution must be capable of fulfilling the following key requirements:

• Provide a robust development workbench that can scale up to large development teams

VisualAge Generator is equipped with integrated repository services that facilitate software configuration management and version control. In addition, it is possible to transfer VisualAge Generator source specifications between the integrated repository and external SCM tools to be managed along with other application development artifacts participating in the enterprise-wide problem and change tracking and development process management.

• Deliver systems that can scale up to the highest transactional throughputs

VisualAge Generator generates COBOL, C++, or Java source that can be compiled and run under the control of TXSeries™, CICS/ESA®, and IMS/TV transaction managers. This native support of the most proven TP monitors in the industry provides the transactional scalability required by the most demanding business-critical systems.

• Produce systems that can run on a wide variety of platforms

The code generated by VisualAge Generator can run on a variety of client and server platforms, including Windows 95/98, Windows 2000, Windows NT, Solaris, OS/2, AIX, HP/UX, SCO OpenServer, OS/390®, OS/400®, and other 390 systems such as VSE and VM.

• Ease business integration, access to legacy data, and integration with existing legacy systems

VisualAge Generator systems can easily take advantage of message and queuing technology through the powerful MQSeries rapid application development facilities providing rapid construction of business integration solutions. VisualAge Generator systems can reuse existing legacy programs through a simple CALL API, and can also be invoked by hand-crafted existing COBOL or other 3GL programs. In addition, VisualAge Generator programs can access not only the most popular relational DBMS, DB2®/UDB family, Oracle, and others, but can easily manipulate legacy file systems, such as VSAM, and non-relational IBM databases, such as IMS/DB and DL/I. This allows easy integration of new applications into existing IT infrastructures maximizing the protection of the previous investments.

• Deliver enterprise IT assets to the Web

As explained in more detail in a separate section of this description, VisualAge Generator provides the capability to develop end-to-end multitiered systems with Java servlet/JSP component dynamic HTML front-ends, transparently connected to transactional servers running on any of the supported server platforms and transactional systems mentioned earlier in this paper.

• Be usable by traditionally skilled programmers

Although VisualAge Generator in tightly integrated with a pure Object Oriented (OO) programming environment (Java or Smalltalk), the programmer can exploit these technologies without the need to learn OO programming, and simply use the procedural specifications. The power of the underlying OO technology, however, can be gradually unleashed as the developer becomes more familiar with the component architecture and begins to explore and exploit the additional facilities.

Delivering e-business Solutions

Developing e-business solutions is quickly becoming the next strategic direction as companies see the potential for cost saving, better customer service, and streamlined business processes. This will be possible only if the enormous value of the existing IT assets can be easily brought into a Web-centric world. But the Web is an unforgiving new market, where your competitor is just one click away. Building self-serve systems that do not provide adequate response and availability can be more damaging than not entering the market at all.

IBM is leveraging its experience in delivering highly available, scalable, and secure systems to equip this new world with the correct infrastructure and tools. The result is a set of products and architectures that will support the creation and deployment of end-to-end multitiered e-business systems. If we think of an e-business system as a logical three-tier solution, IBM WebSphere Application Server provides the run-time environment for tier-2, WebSphere Studio provides the tools for Web-site management and page composition, and the VisualAge products allow professional programmers to rapidly create transactional data servers and business logic. In this context, VisualAge Generator plays a central role for the development of new third-tier transactional servers, which must provide high performance and transaction volumes, and reach a variety of legacy platforms and data, automatically generating the code necessary to use their services in a servlet/JSP component dynamic HTML context. This is possible today through three facilities.

Web Transaction Rapid Application Development

The Web Transaction rapid application development facility is an innovative and simple methodology that allows traditionally skilled programmers to develop, test, and deploy multitiered Web systems without having to deal with the complexities of tier-2, such as designing and developing servlets and JSP components that manage and contain data provided by tier-3 servers (mapping data between Java objects and flat data structures, understanding API for host connectivity, and so forth), and manage sessions and state. Using this approach, developers can specify their system at a logical level, and let VisualAge generate both tier-2 (Java and JSP component) and tier-3 (C++ or COBOL) code that implements those specifications.
**Integration with VisualAge for Java**

The VisualAge Generator Developer workbench is seamlessly integrated with the award winning VisualAge for Java workbench to provide the most powerful e-business Integrated Development Environment (IDE) in the industry. Programmers can:

- Develop and test Java clients (applications, applets, or servlets) using either Java or 4GL specifications, or a mix of both
- Easily exchange data content between Java variables and VAGen data items
- Cross invoke business logic implemented in the two languages
- Animate both source definitions in a seamless interactive debugging environment

Tier-3 server logic, specified in 4GL, can be defined and tested together and seamlessly with the client prior to the generation of C++ or COBOL for the target run time. A full, end-to-end, multitiered, Java-to-any-server solution can easily be developed, rapidly and without necessarily having to learn deep Java skills, in a iterative and dynamic environment that does not require lengthy run-time software setup.

**Generation of Java Bean and Enterprise Java Bean Components**

This facility allows you to generate automatically, from VisualAge Generator server programs specifications, Java Bean and Enterprise JavaBean (EJB) components that can be used within any Java program (applet, application, or servlet) to connect to and exchange data with a VisualAge Generator server program. Generation of the EJB component makes it possible to reach tier-3 VisualAge Generator programs within an EJS (Enterprise Server for Java) run-time environment, such as that provided by WebSphere Application Server Enterprise Edition. The generated bean and the gateway program perform automatically all the data marshaling and conversion necessary to map Java to traditional back-end transactions.

**Year 2000**

These products are Year 2000 ready. When used in accordance with their associated documentation, they are capable of correctly processing, providing, and/or receiving date data within and between the twentieth and twenty-first centuries, provided that all products (for example, hardware, software, and firmware) used with the products properly exchange accurate date data with them.

The service end date for these Year-2000-ready products is December 31, 2002.

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Education Support

Education for VisualAge® Generator Version 4.5 is available through IBM Application and Integration Middleware (AIM) Services, VisualAge Generator Consulting Services, and numerous business partners. For additional information, visit our Web site under Education:

http://www.ibm.com/software/ad/visgen

Services Support

Services Channels: Proper education and consulting assistance have been found to be critical to the success of VisualAge Generator installations. The VisualAge Consulting Services organization provides short term tactical support geared to assure the success of each VisualAge Generator installation.

VisualAge Generator Consulting Services can be tailored to provide support offerings to help customers take full advantage of the VisualAge Generator solution, and custom support for specific situations, applications, or integration needs. The VisualAge Generator Consulting team represents years of experience that can help improve your productivity by:

- Setting up or optimizing a development and generation environment
- Addressing design and execution environment issues related to specific applications
- Optimizing application execution performance
- Establishing interfaces to existing or planned environments on one or more platforms
- Implementing template techniques and optimizing reuse using VisualAge Generator Templates Customizer
- Mentoring, education, and skills transfer to maximize productivity
- Migration of existing IBM 4GL development environments to VisualAge Generator

In addition, if your solution requires other hardware or software expertise, VisualAge Generator Consulting Services can deliver the entire seamless solution with other IBM or non-IBM resources, including VisualAge for Java™, VisualAge Smalltalk, WebSphere™, and DB2®. This gives you one stop shopping for a development solution, and relieves you of managing multiple vendors on a project.

For additional information, contact WebSphere_Consulting@us.ibm.com, or visit our Web site at:

http://www.ibm.com/software/ad/visgen/support

Offering Information

Product information is available through Offering Information (OITOOL) at:

http://www.ibm.com/wwoi

Publications

The following publications will be available after September 29, 2000. To order, contact your IBM representative.

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Displayable Softcopy Publications: The following publications will be provided in displayable softcopy form. The displayable manuals are part of the basic machine-readable material. The files are shipped on the same media type as the basic machine-readable material.

- VisualAge Generator Installation Guide
- VisualAge Generator Getting Started
- VisualAge Generator User’s Guide
- VisualAge Generator System Development Guide
- VisualAge Generator Client/Server Communications Guide
- VisualAge Generator Programmer’s Reference
- VisualAge Generator Generation Guide
- VisualAge Generator Design Guide
- VisualAge Generator Web Transaction Development Guide

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Technical Information

Hardware Requirements

VisualAge Generator Developer for OS/2® and Windows NT®: The following shows the minimum recommended hardware requirements for VisualAge Generator Developer on Java for Windows NT:

- **Processor**
  A 300 MHz Pentium™ processor, or higher, personal computer capable of supporting Windows NT 4.0
  For double-byte character set (DBCS) operation, an IBM Personal System/55 (or equivalent system) with a Pentium, or higher, processor with the appropriate keyboard and peripherals

- **Pointing device**
  A mouse or other pointing device

- **Monitor**
  VGA graphics monitor or higher-resolution (XGA or SVGA) monitor and its appropriate adapter, as supported by OS/2 Warp or Windows NT; XGA recommended

- **Memory**
  128 MB of total memory (RAM) to accommodate Windows NT, VisualAge Generator Developer, and other prerequisite software
  Note: Additional memory may be required, depending on the other user software requirements and the size and complexity of the VisualAge Generator programs being created.

- **Disk space**
  180 MB above the disk space required for any prerequisite software
  Note: When running a local ENVY manager, or if the system is to be used as an ENVY server, at least 300 MB of additional disk storage is recommended.

Note: Additional hard disk space is required to store generation outputs, based on size and number of generated applications.

- **CD-ROM drive**
  One of the following:
  - Local CD-ROM
  - Access to a LAN Server with a CD-ROM drive

The following shows the minimum recommended hardware requirements for VisualAge Generator Developer on Smalltalk on OS/2 or Windows NT:

- **Processor**
  A 150 MHz Pentium processor, or higher, personal computer capable of supporting OS/2 Warp 4.0 or Windows NT 4.0
  For double-byte character set (DBCS) operation, an IBM Personal System/55 (or equivalent system) with a Pentium, or higher, processor with the appropriate keyboard and peripherals

- **Pointing device**
  A mouse or other pointing device

- **Monitor**
  VGA graphics monitor or higher-resolution (XGA or SVGA) monitor and its appropriate adapter, as supported by OS/2 Warp or Windows NT; XGA recommended

- **Memory**
  64 MB of total memory (RAM) to accommodate OS/2 Warp or Windows NT, VisualAge Generator Developer, and other prerequisite software
  Note: Additional memory may be required, depending on the other user software requirements and the size and complexity of the VisualAge Generator programs being created.

- **Disk space**
  180 MB above the disk space required for any prerequisite software
  Note: When running a local ENVY manager, or if the system is to be used as an ENVY server, at least 300 MB of additional disk storage is recommended.

Note: Additional hard disk space is required to store generation outputs, based on size and number of generated applications.

- **CD-ROM drive**
  One of the following:
  - Local CD-ROM
  - Access to a LAN Server with a CD-ROM drive

VisualAge Generator Templates Customizer for OS/2 and Windows NT: The hardware requirements for VisualAge Generator Templates Customizer on Java are the same as for VisualAge Generator Developer on Java, with the following differences:
Disk Space

4 MB above the disk space required for VisualAge Generator Developer and any prerequisite software

The hardware requirements for VisualAge Generator Templates Customizer on Smalltalk are the same as for VisualAge Generator Developer on Smalltalk, with the following differences:

**Disk Space**

27 MB above the disk space required for VisualAge Generator Developer and any prerequisite software

**Memory**

96 MB of total memory (RAM) to accommodate OS/2, Windows NT, VisualAge Generator Developer, and other prerequisite software

Note: Additional memory may be required, depending on the other user software requirements and the size and complexity of the VisualAge Generator programs being created.

**VisualAge Generator Server for OS/2, AIX®, Windows NT, HP-UX, and Solaris**

**VisualAge Generator Server for OS/2 and CICS OS/2**: The following shows the minimum recommended hardware requirements for VisualAge Generator Server on OS/2 and CICS OS/2 environments:

- **Processor**
  A 166 MHz Pentium, or higher, processor or LAN server

- **Memory**
  For OS/2, 8 MB of RAM in addition to the memory requirements of prerequisite software
  For CICS OS/2, 2.5 MB of RAM in addition to the memory requirements of prerequisite software

- **Disk space**
  6 MB of hard disk space to install VisualAge Generator Server, in addition to the disk space required for prerequisite software

- **CD-ROM drive**
  One of the following:
  - Local CD-ROM drive
  - Access to a LAN server with a CD-ROM drive

**VisualAge Generator Server for AIX and CICS/6000**: The following shows the minimum recommended hardware requirements for VisualAge Generator Server for the AIX and CICS/6000 environments.

- **Processor**
  RS/6000®, 300 series model, or above

- **Memory**
  8 MB of RAM in addition to the memory requirements of prerequisite software

**VisualAge Generator Server for Windows NT**: The following shows the minimum recommended hardware requirements for Windows NT and CICS® for Windows NT environments.

- **Processor**
  A 166 MHz, or higher, Pentium processor or LAN server

- **Memory**
  8 MB of RAM in addition to the memory requirements of prerequisite software

- **Disk space**
  6 MB of hard disk space to install VisualAge Generator Server, in addition to the disk space required for prerequisite software

- **CD-ROM drive**
  One of the following:
  - Local CD-ROM drive
  - Access to a LAN server with a CD-ROM drive

**VisualAge Generator Server for SCO OpenServer**: The following shows the minimum recommended hardware requirements for SCO OpenServer.

- **Processor**
  A 166 MHz, or higher, Pentium processor or LAN server

- **Memory**
  8 MB of RAM in addition to the memory requirements of prerequisite software

- **Disk space**
  6 MB of hard disk space to install VisualAge Generator Server, in addition to the disk space required for prerequisite software

- **CD-ROM drive**
  One of the following:
  - Local CD-ROM drive
  - Access to a LAN server with a CD-ROM drive

**VisualAge Generator Server for HP-UX**: The following shows the minimum recommended hardware requirements for the HP-UX environment.

- **Processor**
  HP 9000 Series 700 or 800

- **Memory**
  8 MB of RAM in addition to the memory requirements of prerequisite software
• Disk space
  6 MB of hard disk space to install VisualAge Generator Server, in addition to the disk space required for prerequisite software

• CD-ROM drive
  One of the following:
  - Local CD-ROM drive
  - Access to a LAN server with a CD-ROM drive

VisualAge Generator Server for Solaris: The following shows the minimum recommended hardware requirements for the Solaris and CICS for Solaris environments.

• Processor
  Sun Ultra SPARC

• Memory
  8 MB of RAM in addition to the memory requirements of prerequisite software

• Disk space
  6 MB of hard disk space to install VisualAge Generator Server, in addition to the disk space required for prerequisite software

• CD-ROM drive
  One of the following:
  - Local CD-ROM drive
  - Access to a LAN server with a CD-ROM drive

VisualAge Generator Server for MVS, VSE, and VM: The following shows the minimum hardware requirements for VisualAge Generator Server for MVS, VSE, and VM.

• Processor
  Any S/370™ or S/390® processor that supports any of the following:
  - MVS/ESA™ SP™ Version 4.2, or later (5695-047 or 5695-048)
  - MVS/ESA SP Version 5.1, or later (5655-068 or 5655-069)
  - VSE/ESA™ Version 1.4 (5750-ACD), or later, with appropriate prerequisites
  - VSE/ESA Version 2.1 (5690-VSE), or later, with appropriate prerequisites
  - VM/ESA® Version 1 Release 2.2, or later (5654-030)

Note: It must also have enough processor storage to meet the combined requirements of the host operating system, software prerequisites, and the application programs.

• Storage devices
  - For MVS and VSE:
    -- Any direct-access storage device supported by the Virtual Storage Access Method (VSAM) and the operating system
    -- For system libraries, any devices supported by the operating system
  - For VM
    -- Any CMS minidisk or shared file system directory

• Tape Drive
  Any tape drive supported by the operating system (required for installation and maintenance)

VisualAge Generator Server for AS/400: The following shows the minimum hardware requirements for VisualAge Generator Server for AS/400.

• Processor
  AS/400 capable of supporting OS/400® Version 4.4, or later

• CD-ROM drive
  - Local CD-ROM drive

• Disk space
  - 3 MB disk space in addition to that required for the operating system and other applications

• Memory
  16 MB memory in addition to the memory requirements of prerequisite software

Software Requirements

VisualAge Generator Developer for OS/2 and Windows NT

VisualAge Generator Developer for Windows NT: The following shows the minimum software requirements for Windows NT or Windows 2000. VisualAge Generator Developer on Windows NT or Windows 2000 requires that either VisualAge Smalltalk Enterprise Version 5.0 or VisualAge for Java Enterprise Version 3.5 also be installed. Refer to the documentation for those products for additional software requirements. VisualAge Smalltalk Enterprise Version 5.0 and VisualAge for Java Enterprise Version 3.5 are included with VisualAge Generator Developer at no additional cost.

• Operating System
  Windows NT Version 4.0 or Windows 2000

  Note: If double-byte character set (DBCS) support is required, an appropriate DBCS version of Windows must be installed.

The following shows the optional software requirements for VisualAge Generator Developer for Windows NT or Windows 2000:

• DB2 database access
  For accessing local DB2 databases:

  - DB2 for Windows NT, Version 2.1, or later, or DB2 Universal Database® Personal Edition Version 5.0, or later
For accessing DB2 databases on Intel® or UNIX® platforms, with or without access to host DB2 databases:

- DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
- DB2 Universal Database Enterprise Edition Version 5.0, or later, or DB2 Universal Database Enterprise — Extended Edition Version 5.0, or later, or DB2 Universal Developer’s Edition Version 5.0, or later, on the Intel or UNIX machine

For accessing only host DB2 databases:

- DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
- Distributed Database Connection Services (DDCS) for Windows NT, Version 2.3, or later, or DB2 Connect® Enterprise Edition Version 5.0, or later, on the gateway machine

• Database access using ODBC

For accessing relational databases using ODBC:

- The corresponding client or server component of the database system
- An ODBC driver manager
- An ODBC driver (provided either by the client or server component of the database system or by a third party) appropriate for the target database and meets the appropriate ODBC compliance requirements for the driver manager

• Database access using DataJoiner®

For accessing relational databases using DataJoiner, DB2 Client Application Enabler/2 Version 2.1, or later.

• Hierarchical database access

To test VisualAge Generator hierarchical database programs using the Remote DL/I support integrated into VisualAge Generator, one of the following products is required:

- IBM Personal Communications AS/400 and 3270 Version 4.11 for DOS, Windows, Windows 95, Windows NT, and OS/2
- eNetwork™ Communications Server for Windows NT, Version 5.0

To test VisualAge Generator hierarchical database programs using Mainframe Express:

- For database administration activities or for accessing a DL/I database while testing a VisualAge Generator program, one of the following:
  -- Micro Focus Mainframe Express Version 2.0 with IMS™ Option
  -- Micro Focus Mainframe Express Version 1.1 with IMS Option WebSync FixPack Version 1.0.006, or later
- For accessing remote hierarchical databases on an MVS system, the following additional product is required:
  -- Micro Focus Remote IMS Server Version 1.0 for IMS/ESA® requires IMS/ESA® Transaction Manager Version 4.1 (5685-013), or later

• Communications Support

One or more of the following:

- For TCP/IP communications support, the TCP/IP support shipped with Windows or any Winsock Version 1.1-compliant TCP/IP product for Windows
- For DCE communication support, Gradient Technology’s PC-DCE/32 Windows NT Run-time Kit
- For APPC communications support, one of the following:
  -- Microsoft™ SNA Server
  -- IBM Personal Communications AS/400 and 3270 Version 4.11 for DOS, Windows, Windows 95, Windows NT, and OS/2
  -- eNetwork Communications Server for Windows NT, Version 5.0
- For CICS Client communications support, CICS Client for Windows NT, Version 3.0, or later
- For CA/400 communications support, Client Access for Windows 95/NT Client (32-bit)

• MQSeries®

To test programs that use MQSeries, MQSeries for Windows NT, Version 5.0, or later

VisualAge Generator Developer for OS/2: The following shows the minimum software requirements for OS/2. VisualAge Generator Developer on OS/2 requires that VisualAge Smalltalk Enterprise Version 5.0 also be installed. Refer to the VisualAge Smalltalk documentation for additional software requirements. VisualAge Smalltalk Enterprise Version 5.0 is included with VisualAge Generator Developer at no additional cost.

• Operating system

OS/2 Warp 4.0

Note: If double-byte character set (DBCS) support is required, one of the following DBCS versions of OS/2:

- OS/2 Warp J4.0, or later
- OS/2 Warp H4.0, or later
- OS/2 Warp T4.0, or later
- OS/2 Warp P4.0, or later

The following shows the optional software requirements for VisualAge Generator Developer for OS/2:

• DB2 database access
For accessing local DB2 databases:
- DB2/2 Version 2.1, or later, or DB2 Universal Database Personal Edition Version 5.0, or later

For accessing DB2 databases on Intel or UNIX platforms, with or without access to host DB2 databases:
- DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
- DB2 Universal Database Enterprise Edition Version 5.0, or later, or DB2 Universal Database Enterprise — Extended Edition Version 5.0, or later, or DB2 Universal Developer’s Edition Version 5.0, or later, on the Intel or UNIX machine

For accessing only host DB2 databases:
- DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
- Distributed Database Connection Services/2® (DDCS/2) Version 2.3, or later, or DB2 Connect Enterprise Edition Version 5.0, or later, on the gateway machine

- **Database access via ODBC**

  For accessing relational databases via ODBC:
  - The corresponding client or server component of the database system
  - An ODBC driver manager
  - An ODBC driver (provided either by the client or server component of the database system or by a third party) appropriate for the target database and meets the appropriate ODBC compliance requirements for the driver manager

- **Database access via DataJoiner**

  For accessing DB2 or non-IBM relational databases via DataJoiner, DB2 Client Application Enabler/2 Version 2.1, or later

- **Hierarchical database access**

  To test VisualAge Generator hierarchical database programs using the Remote DL/I support integrated into VisualAge Generator, one of the following products is required:
  - IBM Personal Communications AS/400 and 3270 Version 4.11 for DOS, Windows, Windows 95, Windows NT, and OS/2
  - SecureWay® Communications Server for OS/2 Warp

- **Communications support**

  One or more of the following:
  - For TCP/IP communications support, TCP/IP for OS/2, Version 4.0, or later (provided with OS/2 Warp 4.0)
  - For DCE communication support, IBM DCE for OS/2, Version 1.00.2, or later
  - For LU2 communications support, IBM PCOMM Version 4.0, or later
  - For APPC communications support, IBM PCOMM Version 4.0, or later

- **MQSeries**

  To test programs that use MQSeries, MQSeries for Warp OS/2 Version 5.0, or later

  **VisualAge Generator Generation and Preparation**

  Generation on Windows NT or Windows 2000: The following shows the optional software requirements for generation on Windows NT or Windows 2000:

  - **DB2 database access**
    
    For validation of SQL statements during COBOL generation for OS/2, MVS, VSE, VM, or AS/400 systems, one or more of the following:
    
    For accessing local DB2 databases:
    - DB2 for Windows NT, Version 2.1, or later, or DB2 Universal Database Personal Edition Version 5.0, or later
    - DB2 Universal Database Enterprise Edition Version 5.0, or later, or DB2 Universal Database Enterprise — Extended Edition Version 5.0, or later, or DB2 Universal Developer’s Edition Version 5.0, or later, on the gateway machine
    
    For accessing only host DB2 databases:
    - DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
    - DDCS for Windows NT, Version 2.3, or later, or DB2 Connect Enterprise Edition Version 5.0, or later, on the gateway machine

  Note: When generating for C++ target environments, SQL statements are validated during precompile, so there are no special requirements for SQL on the generation machine.

  - **Communications support**
    
    For transmitting generation outputs to the target system for preparation:
    
    - For generation for OS/2, AIX, HP-UX, Solaris, SCO OpenServer, OS/400, or a different system:
      - The TCP/IP support shipped with Windows, or any Winsock Version 1.1-compliant TCP/IP product for Windows NT or Windows NT that supports FTP and REXX
    
    - For generation for MVS, VSE, or VM systems, one of the following:
      - The TCP/IP support shipped with Windows, or any Winsock Version 1.1-compliant TCP/IP product for Windows NT or Windows 2000 that supports FTP and REXX
      - PCOMM Version 4.11, or later
For generation for OS/2 CICS, MVS, VSE, VM, or OS/400, or for a LAN generation server, IBM Object REXX for Windows NT and Windows 95. A copy is included with VisualAge Generator Developer for this purpose.

**Generation on OS/2:** The following shows the optional software requirements for generation on OS/2:

- **DB2 database access**
  
  For validation of SQL statements during COBOL generation for OS/2, MVS, VSE, VM, or AS/400 systems:
  
  For accessing local DB2 databases:
  - DB2/2 Version 2.1, or later, or DB2 Universal Database Personal Edition Version 5.0, or later
  
  For accessing DB2 databases on Intel or UNIX platforms, with or without access to host DB2 databases:
  - DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
  - DB2 Universal Database Enterprise Edition Version 5.0, or later, or DB2 Universal Database Enterprise — Extended Edition Version 5.0, or later, or DB2 Universal Developer’s Edition Version 5.0, or later, on the Intel or UNIX machine
  
  For accessing only host DB2 databases:
  - DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
  - DDCS/2 Version 2.3, or later, or DB2 Connect Enterprise Edition Version 5.0, or later, on the gateway machine.

  **Note:** When generating for C++ target environments, SQL statements are validated during precompile, so there are no special requirements for SQL generation machine.

- **Communications support**
  
  For transmitting generation outputs to the target system for preparation:
  
  - For generation for Windows NT, Windows 2000, AIX, HP-UX, Solaris, SCO OpenServer, OS/400, or a different OS/2 system:
    - TCP/IP Version 4.0 for OS/2, or later (provided with OS/2 Warp 4)
    - For generation for MVS, VSE or VM systems, one of the following:
      - TCP/IP Version 4.0 for OS/2, or later (provided with OS/2 Warp 4.0)
      - PCOMM Version 4.11, or later
  
- **LAN**
  
  For generation for MVS, VSE, VM, and OS/400 systems:
  
  - For configuring a LAN server to support COBOL generation, OS/2 LAN Server (OS/2 LS) Version 3.0, or later

**Preparation of Generated COBOL, C++, or Java Programs:** The following shows the minimum software requirements for preparation of generated COBOL, C++, or Java programs on the target platform:

- **Preparation and compilation on native OS/2**
  - OS/2 system with OS/2 Warp Version 4.0
  - VisualAge Generator Server for OS/2, AIX, Windows NT, HP-UX, and Solaris, Version 4.0
  - VisualAge for C++ for OS/2, Version 3.6
  - OS/2 Procedures Language 2/REXX
  - TCP/IP for OS/2, Version 2.0 or TCP/IP for OS/2, Version 4.0, or later (provided with OS/2 Warp 4.0)

- **Preparation and compilation on CICS OS/2**
  - OS/2 system with OS/2 Warp Version 4.0
  - VisualAge Generator Server for OS/2, AIX, Windows NT, HP-UX, and Solaris, Version 4.0
  - Compiler Library of VisualAge for COBOL for OS/2, Version 2.0 or 2.2
  - OS/2 Procedures Language 2/REXX
  - TCP/IP Version 4.0 for OS/2 or TCP/IP for OS/2, Version 4.0, or later (provided with OS/2 Warp 4.0)
  - CICS for OS/2, Version 3.0

- **Preparation and compilation on AIX**
  - AIX system with AIX Version 4.1.4, or later, with appropriate prerequisites
  - C Set ++® for AIX, Version 3.1, or later
  - TCP/IP Version 4.1, or later, shipped with AIX

- **Preparation and compilation on CICS/6000**
  - AIX system with AIX Version 4.1.4, or later, with appropriate prerequisites
  - C Set ++ for AIX, Version 3.1, or later
  - TCP/IP Version 4.1, or later, shipped with AIX
  - Transaction Server for AIX, Version 4

- **Preparation and compilation on Windows NT or Windows 2000**
  - Windows NT Version 4.0 or Windows 2000 with appropriate prerequisites
  - For C++ generation, one of the following products for compiling VisualAge Generator generated C++ programs:
    - VisualAge for C++ for Windows, Version 3.6
    - Microsoft Visual C++ for Windows, Version 6.0
  - For Java Client Generation:
    - JRE V1.1.6, or later
    - Web browser (Netscape or Internet Explorer) that supports Java V1.1.6
    - CSO POWERServer® API component if interface to non-Java program
- The TCP/IP support shipped with Windows NT, or any Winsock Version 1.1-compliant TCP/IP product for Windows NT or Windows 2000

**Preparation and compilation on CICS for Windows NT or Windows 2000**
- Windows NT Version 4.0 or Windows 2000, with appropriate prerequisites
- One of the following C++ products for compiling VisualAge Generator generated programs:
  - VisualAge for C++ for Windows, Version 3.6
  - Microsoft Visual C++ for Windows, Version 6.0
- The TCP/IP support shipped with Windows, or any Winsock Version 1.1-compliant TCP/IP product for Windows NT or Windows 2000
- IBM Transaction Server for Windows NT, Version 4.2

**Preparation and compilation for HP-UX**
- HP system with HP-UX Version 10.20 with appropriate prerequisites
- HP aC++ Version A.01.01, or later
- HP TCP/IP, shipped with HP-UX

**Preparation and compilation for Solaris**
- Sun SPARC system with Solaris Version 2.6 with appropriate prerequisites
- SPARCworks C++ Version 4.2, or later
- Solaris TCP/IP, shipped with Solaris

**Preparation and compilation for SCO OpenServer**
- System with SCO OpenServer 5.04 or 5.05
- VisualAge Generator Server for SCO OpenServer
- SCO UNIXware/OpenServer Development Kit (UDK)

**Preparation and compilation for CICS for Solaris**
- Sun SPARC system with Solaris Version 2.6 with appropriate prerequisites
- SPARCworks C++ Version 4.2
- Solaris TCP/IP, shipped with Solaris
- TXSeries™ for Solaris, Version 4.3 (part of WebSphere Application Server Enterprise Edition Version 3.0)

**Preparation and compilation on MVS**
- MVS system with one of the following environments, including MVS batch functions with the appropriate prerequisites:
  - MVS/ESA Version 4.2 (5695-047 or 5695-048), or later
  - OS/390® Version 1.3 (5645-001), or later
- VisualAge Generator Server for MVS, VSE, and VM, Version 1.2 (5648-B02)
- Language Environment® for MVS and VM, Version 1.5 (5688-198), or later
- One of the following:
  - COBOL for MVS and VM, Version 1.2 (5688-197)
  - COBOL for OS/390 and VM, Version 2.1 (5648-A25), or later
- One of the following products for receiving generation outputs:
  - TCP/IP Version 3.1 (5665-HAL), or later
  - 3270/PC File Transfer Program/MVS Release 1 (5665-311), or later
- For preparation on MVS CICS, MVS/ESA Version 3.3 (5685-083), or later

**Preparation and compilation on VSE**
- VSE system with VSE/ESA Version 1.3.2 (5750-ACD), or later, with the appropriate prerequisites or VSE/ESA Version 2.1 (5690-VSE), or later, with the appropriate prerequisites
- VisualAge Generator Server for MVS, VSE, and VM, Version 1.2 (5648-B02)
- Language Environment for VSE, Version 1.4 (5686-094), or later
- COBOL for VSE, Version 1.1 (5686-068), or later
- For receiving generation outputs:
  - TCP/IP
  - SNA support
- For preparation for CICS VSE, IBM CICS/VSE® Version 2.3 (5686-026), or later

**Preparation and compilation on VM**
- One of the following VM systems with appropriate prerequisites:
  - VM/ESA Version 1.2.2 (5684-112), or later
  - VM/ESA Version 2.1.0 (5654-030), or later
- VisualAge Generator Server for MVS, VSE, and VM, Version 1.2 (5648-B02)
- Language Environment for MVS and VM, Version 1.5 (5688-198), or later
- One of the following:
  - COBOL for MVS and VM, Version 1.2 (5688-197)
  - COBOL for OS/390 and VM, Version 2.1 (5648-A25), or later
- For receiving generation outputs, one of the following:
  - TCP/IP for VM, Version 2.3 (5735-FAL), or later
  - 3270/PC File Transfer Program for VM (5664-281)

**Preparation and compilation on OS/400**
- AS/400 system with OS/400 Version 4.4 (5769-SS1), or later, with appropriate prerequisites
- VisualAge Generator Server for AS/400, Version 4.4 (5769-VG1) with:
  - ILE COBOL/400® Version 3.7 (5716-CB1), or later
  - For receiving generation outputs, TCP/IP
The following shows the optional software requirements for preparation of generated COBOL, C++, or Java programs on the target platform:

- **DB2 database access**

  For preparation on OS/2 systems:
  - For validation and preparation of SQL statements, one of the following:
    -- DB2/2 Single-User Version 2.1.2, or later, and Software Developer’s Kit (SDK) Version 2.1.2, or later; or DB2 Universal Database Personal Developer’s Edition Version 5.0, or later
    -- DB2/2 Server Version 2.1.2, or later, and SDK Version 2.1.2, or later
    -- DB2 Universal Developer’s Edition Version 5.0, or later

  For preparation on AIX systems:
  - For validation of SQL statements during preparation, one of the following:
    -- DB2 AIX/6000® (DB/6000) Version 2.1, or later, and SDK Version 2.1, or later
    -- DB2 Universal Developer’s Edition Version 5.0, or later

  For preparation on Windows NT or Windows 2000 systems:
  - For validation of SQL statements during preparation, one of the following:
    -- DB2 for Windows NT Single-User Version 2.1.2, or later, and SDK Version 2.1, or later; or DB2 Universal Database Personal Developer’s Edition Version 5.0, or later
    -- DB2 for Windows NT, Version 2.1, or later, and SDK Version 2.1, or later
    -- DB2 Universal Developer’s Edition Version 5.0, or later

  For preparation on HP-UX systems:
  - For validation of SQL statements during preparation, one of the following:
    -- DB2 for HP-UX, Version 2.1.2 and SDK Version 2.1.2
    -- DB2 Universal Developer’s Edition Version 5.0, or later

  For preparation on Solaris systems:
  - For validation of SQL statements during preparation, one of the following:
    -- DB2 for Solaris, Version 2.1.2 and SDK Version 2.1.2
    -- DB2 Universal Developer’s Edition Version 5.0

  For preparation on MVS systems:
  - For DB2 precompile and bind during preparation on MVS, one of the following products:
    -- DB2 Version 2.3 (5665-DB2), or later
    -- DB2 Version 3.1 (5685-DB2), or later
    -- DB2 for MVS/ESA, Version 4 (5695-DB2), or later

  For preparation on VM and VSE systems:
  - For SQL precompile during preparation on VM and VSE, Structured Query Language/Data System (SQL/DS™) Version 3.4 (5688-103), or later

  For preparation on OS/400 systems:
  - For DB2 bind during preparation on OS/400, IBM DB2/400 Query Manager and SQL Development Kit Version 3.7 (5716-ST1)

- **Oracle database access**

  For preparation on OS/2 systems:
  - For validation of SQL statements during preparation, Oracle Server for OS/2 Version 7.3.2.2, or later

  For preparation on AIX systems:
  - For validation of SQL statements during preparation, Oracle Server for AIX, Version 7.3.4, or later, or Oracle Server for AIX, Version 8.0.4, or later

  For preparation on Windows NT or Windows 2000 systems:
  - For validation of SQL statements during preparation, one of the following:
    -- Oracle Programmer/2000 for Windows NT and Windows 95 and Windows 98, Version 7.3.4, or later, or Oracle Programmer/2000 for Windows NT and Windows 95 and Windows 98, Version 8.0.4, or later
    -- Oracle Client for Windows NT and Windows 95 and Windows 98, Version 7.3.4, or later, or Oracle Client for Windows NT and Windows 95 and Windows 98, Version 8.0.4, or later
    -- Oracle7 Server for Windows NT, Version 7.3.4, or later, or Oracle8 Enterprise Edition for Windows NT, Version 8.0.4, or later

  For preparation on HP-UX systems:
  - For validation of SQL statements during preparation, Oracle Server Enterprise Edition for HP 9000 Series HP-UX, 10.20 7.3.4, or later, or Oracle8 for HP 9000 Series HP-UX, 8.0.3, or later

  For preparation on Solaris systems:
  - For validation of SQL statements during preparation, Server for Sun SPARC Solaris, 7.3.4, or later, or Server for Sun SPARC Solaris, 8.0.4, or later

- **VisualAge Generator Smalltalk GUI Execution**

  **VisualAge Generator Smalltalk GUI Execution on OS/2:**
  The following shows the minimum software requirements for GUI run-time support for OS/2:
• Operating system
OS/2 Warp 3.0, or later

Note: If DBCS support is required, you’ll need one of the following DBCS versions of OS/2:
- OS/2 Warp J 3.0, or later
- OS/2 Warp H 3.0, or later
- OS/2 Warp T 3.0, or later
- OS/2 Warp P 3.0, or later

The following shows the software requirements for communicating between VisualAge Smalltalk GUIs and VisualAge Generator Server programs:

• Communications support
One or more of the following:
- For TCP/IP communications support, TCP/IP for OS/2, Version 2.0, or later
- For LU 2 communications support, IBM PCOMM Version 4.0, or later
- For DCE communications support, IBM DCE for OS/2, Version 1.00.2, or later
- For APPC communication support, IBM PCOMM Version 4.0, or later
- For calling OS/400 server programs, Optimized for OS/2 Client of IBM Client Access for OS/400, Version 3.1 (5769-XA1), or later
- For calling CICS client communications support, CICS Client for OS/2, Version 1.0, or later

VisualAge Generator Smalltalk GUI Client Execution on Windows 95/98: The following shows the minimum software requirements for GUI run-time support for Windows 95 and Windows 98:

• Operating system
Microsoft Windows 95 or Microsoft Windows 98

Note: If DBCS support is required, you’ll need the appropriate Microsoft Windows 95 or Windows 98 product with DBCS enablement and the appropriate national language version equivalent for the prerequisite products.

The following shows the software requirements for communicating between VisualAge Smalltalk GUIs and VisualAge Generator Server programs:

• Communications support
One or more of the following:
- For TCP/IP communications support, TCP/IP support shipped with Windows or any Winsock Version 1.1-compliant TCP/IP product for Windows NT or Windows 2000
- For DCE communications support, Gradient Technologies PC-DCS/32 Windows NT Runtime Kit
- For APPC communications support, IBM PCOMM Version 4.0, or later
- For CICS Client communications support, IBM CICS Client for Windows NT, Version 1.0, or later
- For CA/400 communications support, Client Access for Windows 95 or Windows NT Client (32-bit)

VisualAge Generator Java Client Support

VisualAge Generator Java Client Support on OS/2: The following shows the software requirements for Java applications or an application server system middle tier on OS/2 for Java applets or servlets that call VisualAge Generator Server programs:

• One of the following:
  - Java Development Kit Version 1.2
  - Java Runtime Environment Version 1.2
• For applets and servlets, a Web server application, such as Apache
• VisualAge Generator Common Services component

The following shows the software requirements for communicating between VisualAge Generator Server programs:

• Communications support
One or more of the following:
- For TCP/IP communications support, IBM TCP/IP for OS/2, Version 2.0, or later
- For LU 2 communications support, IBM PCOMM Version 4.0, or later
- For DCE communications support, IBM DCE for OS/2, Version 1.00.2, or later
- For APPC communication support, IBM PCOMM Version 4.0, or later
- For calling OS/400 server programs, Optimized for OS/2 Client of IBM Client Access for OS/400, Version 3.1 (5769-XA1), or later
- For calling CICS client communications support, CICS Client for OS/2, Version 1.0, or later

**VisualAge Generator Java Client Support on Windows:**
The following shows the software requirements for Java applications or an application server system middle tier on Windows 95, Windows 98, Windows NT, or Windows 2000 for Java applets or servlets that call VisualAge Generator Server program:

- One of the following:
  - Java Development Kit Version 1.2
  - Java Runtime Environment Version 1.2
- For applets and servlets, a Web server application, such as Apache
- VisualAge Generator Common Services component

The following shows the software requirements for communicating between Java applications or an application server and VisualAge Generator Server programs:

**Communications support**
One or more of the following:
- For TCP/IP communications support, TCP/IP support shipped with Windows or any Winsock Version 1.1-compliant TCP/IP product for Windows
- For DCE communications support, Gradient Technologies PC-DCS/32 Windows Runtime Kit
- For APPC communications support, IBM PCOMM Version 4.0, or later
- For CICS Client communications support, IBM CICS Client for Windows, Version 1.0, or later
- For CA/400 communications support, Client Access for Windows 95 or Windows NT Client (32-bit)

**VisualAge Generator Java Client Support on AIX:**
The following shows the software requirements for Java applications or an application server system middle tier on AIX for Java applets or servlets that call VisualAge Generator Server programs:

- One of the following:
  - Java Development Kit Version 1.2
  - Java Runtime Environment Version 1.2
- For applets and servlets, a Web server application, such as Apache
- VisualAge Generator Common Services component

The following shows the software requirements for communicating between Java applications or an application server and VisualAge Generator Server programs:

**Communications support**
One or more of the following:
- For TCP/IP communications support, TCP/IP Version 4.1, or later, shipped with AIX
- For DCE communications support, DCE Base Services for AIX, Version 2.1, or later, with feature number 5055

**VisualAge Generator Templates Customizer for OS/2 and Windows NT:**
The following shows the minimum software requirements for VisualAge Generator Templates Customizer, which is installed as a feature of VisualAge Generator Developer:

- **DB2 Database Access**
  - Client configuration for Windows NT or Windows 2000
    -- For local DB2 database, DB2 for Windows NT (Single-User or Server), Version 2.1.2
    -- For all remote DB2 databases, DB2 for Windows NT (Client Application Enabler or Server), Version 2.1.2
    -- For remote DB2/MVS or DB2/400 database, DDCS for Windows NT (Single-User or Multi-User), Version 2.4
  - Client configuration for OS/2
    -- For local DB2 database, DATABASE 2 OS/2 (DB2/2) Server Version 2.1.2
    -- For all remote DB2 databases, Database 2 OS/2 (DB2/2) Client Application Enabler or Server Version 2.1.2
    -- For remote DB2/MVS or DB2/400 database, DDCS (Single-User or Multi-User) Version 2.4
  - Server configuration
    -- For remote DB2 for Windows NT database, DB2 for Windows NT Server Version 2.1.2
    -- For remote DB2/2 database, DB2/2 Server Version 2.1.2
    -- For remote DB2/MVS database, DB2 MVS Version 3.1 Server (5685-DB2)
    -- For remote DB2/400 database, OS/400 Version 3.1.0 Server (5769-ST1)
    -- For remote DB2/6000 database, DB2/6000 Version 1.1.0 Server (5765-172)

- **Oracle 7 Database Access**
  - Client configuration for Windows NT or Windows 2000
    Oracle 7 Server Release 7.2 for Windows NT
    -- Required Support Files 7.2.2.4.0C
    -- SQL*Net Client 2.2.2.1.0
    -- Oracle TCP/IP Adapter 2.2.2.1.0 (TCP/IP, for example)
    -- Oracle 7 Utilities 7.2.2.4.0
  - Client configuration for OS/2
    Oracle 7 Server LAN Server Edition Version 7.0 OS/2
    -- Required Support Files 7.0.12.1.0
    -- SQL*Net TCP/IP Client 1.1.1.8 (TCP/IP, for example)
  - Server configuration (UNIX)
    Oracle 7 Server Release 7.0.16.4.0
    -- Oracle 7 XA Library
    -- TCP/IP Protocol Adapter (V2)
    -- SQL*Net TCP Version 1 (TCP/IP, for example)
    -- SQL*Net Version 2
VisualAge Generator Server for Workstation Environments

VisualAge Generator Server for CICS OS/2: The following shows the minimum software requirements for VisualAge Generator Server CICS OS/2 environment:

- Operating system
  - OS/2 Warp Version 4.0
  - Note: If DBCS support is required, you’ll need one of the following DBCS versions of OS/2:
    - OS/2 Warp J 3.0, or later
    - OS/2 Warp H 3.0, or later
    - OS/2 Warp T 3.0, or later
    - OS/2 Warp P 3.0, or later

- COBOL for run time
  - Run-time libraries of VisualAge COBOL for OS/2, Version 2.0, or later

- Transaction Management
  - CICS for OS/2, Version 3, or later

The following shows the optional software requirements for the VisualAge Generator Server CICS OS/2 environment:

- DB2 database access
  - For local database access, one of the following:
    - DB2/2 Single-User Version 2.1, or later, or DB2 Universal Database Personal Edition Version 5.0, or later
    - DB2/2 Server Version 2.1, or later, or DB2 Universal Database Workgroup Edition Version 5.0, or later, or DB2 Universal Database Enterprise Edition Version 5.0, or later

  For remote database access:
  - DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
  - DDCS/2 Version 2.3, or later, or DB2 Connect Enterprise Edition Version 5.0, or later
  - DB2 Universal Database Enterprise Edition Version 5.0, or later

  If preparation is to be done on this machine:
  - For validation and preparation of SQL statements, you’ll need one of the following:
    - DB2/2 Single-User Version 2.1.2, or later, and SDK Version 2.1.2, or later; or DB2 Universal Database Personal Developer’s Edition Version 5.0, or later
    - DB2/2 Server Version 2.1.2, or later, and SDK Version 2.1.2, or later
    - DB2 Universal Developer’s Edition Version 5.0, or later

- Database access via DataJoiner
  - For accessing IBM or non-IBM databases via DataJoiner, DB2 Client Application Enabler/2 Version 2.1, or later

- Communications support
  - One or more of the following:
    - For TCP/IP communications support, TCP/IP for OS/2, Version 2.0 or TCP/IP Version 4.0 for OS/2, or later (provided with OS/2 Warp 4.0)
    - For DCE communications support, DCE for OS/2, Version 1.00.2, or later
    - For LU2 communications support, IBM PCOMM Version 4.0, or later
    - For APPC communications support, IBM PCOMM Version 4.0, or later
    - For CA/400 communications support, Optimized for OS/2 Client of Client Access for OS/400, Version 3.1 (5769-XA1), or later
    - For calling CICS communications support, CICS Client for OS/2, Version 1.0, or later

VisualAge Generator Server for OS/2: The following shows the minimum software requirements for the Generator Server OS/2 environment:

- Operating system
  - OS/2 Warp Version 4.0
  - Note: If DBCS support is required, you’ll need one of the following DBCS versions of OS/2:
    - OS/2 Warp J 3.0, or later
    - OS/2 Warp H 3.0, or later
    - OS/2 Warp T 3.0, or later
    - OS/2 Warp P 3.0, or later

The following shows the optional software requirements for the VisualAge Generator Server OS/2 environment:

- DB2 database access
  - For local database access, one of the following:
    - DB2/2 Single-User Version 2.1, or later, or DB2 Universal Database Personal Edition Version 5.0, or later
    - DB2/2 Server Version 2.1, or later, or DB2 Universal Database Workgroup Edition Version 5.0, or later, or DB2 Universal Database Enterprise Edition Version 5.0, or later

  For remote database access:
  - DB2 Client Application Enabler Version 2.1, or later (included with DB2 Version 5.0)
  - DDCS/2 Version 2.3, or later, or IBM DB2 Connect Enterprise Edition Version 5.0, or later
  - DB2 Universal Database Enterprise Edition Version 5.0, or later

  If preparation is to be done on this machine:
  - For validation and preparation of SQL statements, you’ll need one of the following:
    - DB2/2 Single-User Version 2.1.2, or later, and SDK Version 2.1.2, or later; or DB2 Universal Database Personal Developer’s Edition Version 5.0, or later

- Communications support
  - One or more of the following:
    - For TCP/IP communications support, TCP/IP for OS/2, Version 2.0 or TCP/IP Version 4.0 for OS/2, or later (provided with OS/2 Warp 4.0)
    - For DCE communications support, DCE for OS/2, Version 1.00.2, or later
    - For LU2 communications support, IBM PCOMM Version 4.0, or later
    - For APPC communications support, IBM PCOMM Version 4.0, or later
    - For CA/400 communications support, Optimized for OS/2 Client of Client Access for OS/400, Version 3.1 (5769-XA1), or later
    - For calling CICS communications support, CICS Client for OS/2, Version 1.0, or later
-- DB2/2 Server Version 2.1.2, or later, and SDK
  Version 2.1.2, or later
-- DB2 Universal Developer’s Edition Version 5.0,
  or later

• Oracle database access
  For local database access, remote database access,
or validation and preparation of SQL statements,
Oracle Server for OS/2, 7.3.2.2, or later

• Database access via ODBC
  For accessing relational databases via ODBC:
  - The corresponding client or server component of
    the database system
  - An ODBC driver manager
  - An ODBC driver appropriate for the target database
    and meets the appropriate ODBC compliance
    requirements for the driver manager

• Database access via DataJoiner
  For accessing IBM or non-IBM databases via
  DataJoiner, DB2 Client Application Enabler/2
  Version 2.1, or later

• File access
  - For accessing Btrieve files, SQL Version 7.0 for
    OS/2
  - For accessing Micro Focus files, Micro Focus
    COBOL for DOS and OS/2, Version 3.0.60

• Communications support
  One or more of the following:
  - For TCP/IP communications support, TCP/IP
    Version 2.0 for OS/2, or TCP/IP Version 4.0 for
    OS/2, or later (provided with OS/2 Warp 4.0)
  - For DCE communications support, IBM DCE for
    OS/2, Version 1.00.2, or later
  - For LU2 communications support, IBM PCOMM
    Version 4.0, or later
  - For APPC communications support, IBM PCOMM
    Version 4.0, or later
  - For CA/400 communications support, Optimized for
    OS/2 Client of Client Access for OS/400, Version 3.1
    (5769-XA1), or later
  - For calling CICS client communications support,
    CICS Client for OS/2, Version 3.0

• MQSeries
  MQSeries for OS/2 Warp Version 5.0, or later

• LAN
  For sharing files in a LAN environment, OS/2 LAN
  Server (OS/2 LS) Version 3.0, or later, Advanced
  package

• Web transaction gateway
  - A Web application server that supports JSP
    level 1.0 and servlet support 2.1, such as
    WebSphere Application Server Standard Edition
    Version 3.0

  - For server programs that reside on CICS systems,
    CICS Transaction Gateway Version 3.03 must be
    installed on the gateway

VisualAge Generator Server for AIX: The following shows
the minimum software requirements for the VisualAge
Generator Server AIX environment:

• Operating system
  AIX Version 4.1.4 (5765-393 or 5764-C34), or later

The following shows the optional software requirements
for VisualAge Generator Server AIX environment:

• Transaction Management
  TXSeries for AIX, Version 4.2, or later

• DB2 database access
  For local database access:
  - DB2 Server for AIX, Version 2.1, or later, or DB2
    Universal Database Enterprise Edition Version 5.0,
    or later, or DB2 Universal Database Enterprise
    — Extended Edition Version 5.0, or later
  - For remote database access:
    - DB2 Client Application Enabler for AIX, Version 2.1,
      or later (included with DB2 Version 5.0)
  - And one of the following:
    - DDCS, Version 2.3, or later (part number 62G3791
      or 62G3799), or DB2 Connect Enterprise Edition
      Version 5.0, or later
    - DB2 Universal Database Enterprise Edition
      Version 5.0, or later
    - DB2 Universal Database Enterprise — Extended
      Edition Version 5.0, or later
  If preparation is to be done on this machine:
  - For validation of SQL statements during
    preparation, DB2 AIX/6000 (DB/6000) Version 2.1,
    or later, and SDK Version 2.1, or later; or DB2
    Universal Developer’s Edition Version 5.0, or later

• Oracle database access
  For local database access, remote database access,
or validation of SQL statements during preparation,
Oracle Server for AIX, 7.3.4 or later, or Oracle Server
for AIX, 8.0.4, or later

• Database access via ODBC
  For accessing relational databases via ODBC (native
  AIX only):
  - The corresponding client or server component of
    the database system
  - An ODBC driver manager
  - An ODBC driver (provided either by the client or
    server component of the database system or by a
    third party) appropriate for the target database
    and meets the appropriate ODBC compliance
    requirements for the driver manager

• Database access via DataJoiner
  - DataJoiner for AIX, Version 1, or later
  - AIX DB2 Client Application Enabler/6000
    Version 1.1, or later
Communications
- For TCP/IP communications support, TCP/IP Version 4.1, or later, shipped with AIX
- For MQ communications support, MQ Series for AIX, Version 2.2 (5765-514), or later
- For DCE communications support, DCE Base Services for AIX, Version 2.1 (5765-117), or later, with feature number 5055

MQSeries
MQSeries for AIX, Version 5.0, or later

Web transaction gateway
- A Web application server that supports JSP level 1.0 and servlet support 2.1, such as WebSphere Application Server Standard Edition Versions 3.0 and 3.5
- For server programs that reside on CICS systems, CICS Transaction Gateway Version 3.03 must be installed on the gateway.

For generated session beans to access server beans
- An application server that supports Enterprise JavaBeans, such as WebSphere Application Server Enterprise Edition Versions 3.0 and 3.5. Refer to the application server requirements for Java run time and Web server.
- VisualAge Generator Common Services must be installed.

VisualAge Generator Server for Windows NT or Windows 2000: The following shows minimum software requirements for the VisualAge Generator Server Windows NT or Windows 2000 environment:

Operating system
Windows NT Version 4.0 or Windows 2000

The following shows the optional software requirements for VisualAge Generator Server Windows NT or Windows 2000 environment:

Transaction Management
TXSeries Windows NT, Version 4.2, or later

DB2 database access
For local database access, one of the following:
- DB2 for Windows NT Single-User Version 2.1.2, or later, or DB2 Universal Database Personal Edition Version 5.0, or later
- DB2 Server for Windows NT, Version 2.1, or later, or DB2 Universal Database Workgroup Edition Version 5.0, or later, or DB2 Universal Database Enterprise Edition Version 5.0, or later

For remote database access:
- DB2 Client Application Enabler for Windows NT, Version 2.1, or later (included with DB2 Version 5.0)

And one of the following:
- DDCS for Windows NT, Version 2.3, or later, or DB2 Connect Enterprise Edition Version 5.0
- DB2 Universal Database Enterprise Edition Version 5.0, or later

Oracle database access
For local and remote database access, and validation and preparation of SQL statements, you’ll need one of the following:
- Oracle Programmer/2000 for Windows NT and Windows 95/98, 7.3.4, or later, or Oracle Programmer/2000 for Windows NT and Windows 95/98, 8.0.4, or later
- Oracle Client for Windows NT and Windows 95/98, 7.3.4, or later, or Oracle Client for Windows NT and Windows 95/98, 8.0.4, or later
- Oracle7 Server for Windows NT, 7.3.4, or later, or Oracle8 Enterprise Edition for Windows NT, 8.0.4, or later

Database access via ODBC
For accessing databases via ODBC (native Windows NT only):
- The corresponding client or server component of the database system
- An ODBC driver manager
- An ODBC driver appropriate for the target database and meets the appropriate ODBC compliance requirements for the driver manager

Database access via DataJoiner
- DataJoiner for Windows NT, Version 1.1, or later
- DB2 Client Application Enabler for Windows NT, Version 2.1, or later

Communications
One or more of the following:
- For TCP/IP communications, the TCP/IP support shipped with Windows NT or any Winsock Version 1.1-compliant TCP/IP product for Windows NT
- For DCE communications support, Gradient Technologies PC-DCE/32 Windows NT Runtime Kit
- For APPC communications support, one of the following:
  - IBM Personal Communications Version 4.11, or later
  - Microsoft SNA Server
- For CICS Client communications support, IBM CICS Client for Windows NT, Version 3.0, or later
- For CA/400 communications support, Client Access for Windows NT Client (32-bit)

If preparation is to be done on this machine:
- For validation of SQL statements during preparation, you’ll need one of the following:
  - DB2 for Windows NT Single-User Version 2.1.2, or later, and SDK Version 2.1, or later, or DB2 Universal Database Personal Developer's Edition Version 5.0, or later
  - DB2 for Windows NT Version 2.1, or later, and SDK Version 2.1, or later,
  - DB2 Universal Developer's Edition Version 5.0, or later

VisualAge Generator Server for Windows NT or Windows 2000: The following shows minimum software requirements for the VisualAge Generator Server Windows NT or Windows 2000 environment:

Operating system
Windows NT Version 4.0 or Windows 2000

The following shows the optional software requirements for VisualAge Generator Server Windows NT or Windows 2000 environment:

Transaction Management
TXSeries Windows NT, Version 4.2, or later

DB2 database access
For local database access, one of the following:
- DB2 for Windows NT Single-User Version 2.1.2, or later, or DB2 Universal Database Personal Edition Version 5.0, or later
- DB2 Server for Windows NT, Version 2.1, or later, or DB2 Universal Database Workgroup Edition Version 5.0, or later, or DB2 Universal Database Enterprise Edition Version 5.0, or later

For remote database access:
- DB2 Client Application Enabler for Windows NT, Version 2.1, or later (included with DB2 Version 5.0)

And one of the following:
- DDCS for Windows NT, Version 2.3, or later, or DB2 Connect Enterprise Edition Version 5.0
- DB2 Universal Database Enterprise Edition Version 5.0, or later

Oracle database access
For local and remote database access, and validation and preparation of SQL statements, you’ll need one of the following:
- Oracle Programmer/2000 for Windows NT and Windows 95/98, 7.3.4, or later, or Oracle Programmer/2000 for Windows NT and Windows 95/98, 8.0.4, or later
- Oracle Client for Windows NT and Windows 95/98, 7.3.4, or later, or Oracle Client for Windows NT and Windows 95/98, 8.0.4, or later
- Oracle7 Server for Windows NT, 7.3.4, or later, or Oracle8 Enterprise Edition for Windows NT, 8.0.4, or later

Database access via ODBC
For accessing databases via ODBC (native Windows NT only):
- The corresponding client or server component of the database system
- An ODBC driver manager
- An ODBC driver appropriate for the target database and meets the appropriate ODBC compliance requirements for the driver manager

Database access via DataJoiner
- DataJoiner for Windows NT, Version 1.1, or later
- DB2 Client Application Enabler for Windows NT, Version 2.1, or later

Communications
One or more of the following:
- For TCP/IP communications, the TCP/IP support shipped with Windows NT or any Winsock Version 1.1-compliant TCP/IP product for Windows NT
- For DCE communications support, Gradient Technologies PC-DCE/32 Windows NT Runtime Kit
- For APPC communications support, one of the following:
  - IBM Personal Communications Version 4.11, or later
  - Microsoft SNA Server
- For CICS Client communications support, IBM CICS Client for Windows NT, Version 3.0, or later
- For CA/400 communications support, Client Access for Windows NT Client (32-bit)
• **MQSeries**
  MQSeries for Windows NT, Version 5.0, or later

• **File access**
  For accessing Btrieve files, SQL Version 7.0 for Windows NT

• **Java Generation**
  The following software is required to run the generated 4GL Java program parts:
  - JRE V1.1.6, or later
  - Web browser (Netscape or Internet Explorer) that supports Java V1.1.6
  - CSO PowerServer API component if interface to non-Java program

• **Web transaction gateway**
  - A Web application server that supports JSP level 1.0 and servlet support 2.1, such as WebSphere Application Server Standard Edition Versions 3.0 and 3.5.
  - For server programs that reside on CICS systems, CICS Transaction Gateway Version 3.03 must be installed on the gateway.

**VisualAge Generator Server for HP-UX:** The following shows minimum software requirements for the VisualAge Generator Server HP-UX environment:

• **Operating system**
  HP-UX Version HP-UX 10.20

• **C++ for executing**
  HP aC++ Version A.01.01, or later

The following shows the optional software requirements for the VisualAge Generator Server HP-UX environment:

• **DB2 database access**
  For local database access, you’ll need one of the following:
  - DB2 Server for HP-UX, Version 2.1.2, or DB2 Universal Database Enterprise Edition Version 5.0, or later

  For remote database access:
  - DB2 Client Application Enabler for HP-UX, Version 2.1.2 (included with DB2 Version 5.0)

  And one of the following:
  - DDCS for HP-UX, Version 2.1.2, or DB2 Connect Enterprise Edition Version 5.0, or later
  - DB2 Universal Database Enterprise Edition Version 5.0, or later

  For validation of SQL statements during preparation, you’ll need one of the following:
  - DB2 for HP-UX, Version 2.1.2, and SDK Version 2.1.2
  - DB2 Universal Developer’s Edition Version 5.0, or later

• **Oracle database access**
  For local database access, remote database access, or validation of SQL statements during preparation, you’ll need one of the following:
  - Oracle Server Enterprise Edition for HP 9000 series HP-UX 10.20, 7.3.4
  - Oracle 8 for HP 9000 series HP-UX, 8.03, or later

• **Database access via ODBC**
  For accessing databases via ODBC:
  - The corresponding client or server component of the database system
  - An ODBC driver manager
  - An ODBC driver (provided either by the client or server component of the database system or by a third party) appropriate for the target database and meets the appropriate ODBC compliance requirements for the driver manager

• **Database access via DataJoiner**
  For accessing databases via DataJoiner:
  - DataJoiner for HP-UX, Version 1.1, or later
  - DB2 Client Application Enabler for HP-UX, Version 2.1.2

• **Communications**
  Requires TCP/IP component of HP-UX

• **MQSeries**
  MQSeries for HP-UX, Version 5.0, or later

• **Web transaction gateway**
  - A Web application server that supports JSP level 1.0 and servlet support 2.1, such as WebSphere Application Server Standard Edition Version 3.0
  - For server programs that reside on CICS systems, CICS Transaction Gateway Version 3.03 must be installed on the gateway.

**VisualAge Generator Server for Solaris:** The following shows minimum software requirements for the VisualAge Generator Server Solaris and CICS for Solaris environments:

• **Operating system**
  Solaris Version 2.6

• **C++ for executing**
  SPARCworks C++ Version 4.2

The following shows the optional requirements for the VisualAge Generator Server Solaris and CICS for Solaris environments:

• **Transaction Management**
  TXSeries for Solaris, Version 4.3 (part of WebSphere Application Server Enterprise Edition Version 3.0)
• **DB2 database access**

For local database access, one of the following:
- DB2 for Solaris, Version 2.1.2
- DB2 Universal Database Enterprise Edition Version 5.0

For remote database access:
- DB2 Client Application Enabler for Solaris, Version 2.1.2 (included with DB2 Version 5.0)
- DDCS for Solaris, Version 2.1.2
- DB2 Connect Enterprise Edition Version 5.0
- DB2 Universal Database Enterprise Edition Version 5.0

For validation of SQL statements during preparation, one of the following:
- DB2 for Solaris, Version 2.1.2, and SDK Version 2.1.2
- DB2 Universal Developer’s Edition Version 5.0

• **Oracle database access**

For accessing Oracle databases, one of the following:
- Server for Sun SPARC Solaris, 7.3.4., or later
- Server for Sun SPARC Solaris, 8.0.4, or later

• **Database access via ODBC**

For accessing relational databases via ODBC (native Solaris only):
- The corresponding client or server component of the database system
- An appropriate ODBC driver for the target database. It must be ODBC Version 2-compliant and at least level-1 conforming.
- An ODBC driver manager

• **Communications**

TCP/IP component of Solaris

• **Two Tier C/S Support**

CICS Universal Client for Solaris

• **MQSeries**

MQSeries for Sun Solaris, Version 5.0, or later

• **Web transaction gateway**

- A Web application server that supports JSP level 1.0 and servlet support 2.1, such as WebSphere Application Server Standard Edition Versions 3.0 and 3.5.
- For server programs that reside on CICS systems, CICS Transaction Gateway Version 3.03 must be installed on the gateway.

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**VisualAge Generator Server for SCO OpenServer:** The following shows minimum software requirements for the VisualAge Generator Server for SCO OpenServer environment:

- **Operating system**
  - SCO OpenServer 5.04 or 5.05

- **C++ for executing**
  - SCO UNIXware/OpenServer Development Kit (UDK)

The following shows the optional requirements for the VisualAge Generator Server for SCO OpenServer environment:

- **Communications**
  - CICS Client for SCO, Version 2.0
  - TCP/IP component of SCO OpenServer

**VisualAge Generator Server for MVS, VSE, and VM, Version 1.2**

**VisualAge Generator Server for MVS:** The following shows the minimum software requirements for VisualAge Generator Server for MVS:

- **MVS system**
  - One of the following MVS environments, including MVS batch functions with the appropriate prerequisites:
    - MVS/ESA Version 4.2 (5695-047 or 5695-048), or later
    - OS/390 Version 1.1 (5645-001), or later
  - Note: MVS/ESA Version 5.1, or later, is required for using DCE communications. OS/390 Version 1.3 (5647-A01), or later, is required for OpenEdition Web server support. If Domino™ Go Webserver is used, OS/390 Version 2.4 (5647-A01) is required.
    - System Modification Program/Extended (SMP/E) Version 1.8.1 (5668-949), or later

- **ISPF products**
  - Interactive System Productivity Facility (ISPF) Version 4.1 (5655-042)

- **Assembler**
  - IBM High Level Assembler Version 1.2 (5696-234), or later

- **COBOL for run time**
  - Language Environment for MVS and VM, Version 1.5 (5688-198), or later

- **File Transfer**
  - One of the following:
    - TCP/IP Version 3.1 (5665-HAL), or later
    - 3270/PC File Transfer Program/MVS, Release 1 (5665-311)

- **Web transaction gateway**
  - A Web application server that supports JSP level 1.0 and servlet support 2.1, such as WebSphere Application Server Standard Edition Version 3.0.2
• **Program Temporary Fixes (PTFs)**
  To execute programs generated with VisualAge Generator Developer Version 4.5, APARs must be applied to VisualAge Generator Server Version 1.2.

The following shows the **optional** software requirements for VisualAge Generator Server for MVS:

• **Transaction management**
  CICS/ESA® Version 3.3 (5685-083), or later
  **Note:** For OS/390 OpenEdition Web server support, CICS/ESA Version 4.1, or later, is required.

• **IMS products**
  To use hierarchical databases or run IMS programs, IMS/ESA Database Manager Version 4.1 (5685-012), or later, is required. The IMS/ESA Transaction Manager Version 4.1 (5685-013), or later, is required in addition to the IMS/ESA Database Manager Version 4.1, or later, for MPPs, Fast Path regions or Fast Path main-storage databases.

• **Remote IMS DL/I**
  Remote DL/I between OS/390 and Windows NT or OS/2:
  - One of the following is required:
    -- IMS/ESA Database Manager Version 5 Release 1 (5695-176) plus PTF UQ11446
    -- IMS/ESA Database Manager Version 6 Release 1 (5655-158)
  - One of the following is required:
    -- OS/390 Release 3 Language Environment feature (5645-001)
    -- Language Environment for MVS & VM, Release 5 (5688-198)

Remote DL/I between MVS and Windows NT or OS/2:
  - One of the following is required:
    -- IMS/ESA Database Manager Version 5 Release 1 (5695-176) plus enabling PTF
    -- IMS/ESA Database Manager Version 6 Release 1 (5655-158)
  - Language Environment for MVS & VM, Release 5 (5688-198)

• **Relational database access**
  For relational database access, DB2 Version 3.1 (5685-DB2), or later
  **Note:** DB2 for MVS/ESA, Version 4, or later, is required for a DRDA® distributed unit of work support.

• **Communications support**
  For DCE client/server communications, Open Edition DCE Application Support for MVS/ESA, Version 1.2 (5655-064)

• **MQSeries**
  MQSeries for MVS/ESA, Version 1.2, or later

• **VisualAge Generator Java gateway**
  For a VisualAge Generator Java gateway:
  - OS/390 Version 1.3 (5645-001), or later, with MVS Open Edition and TCP/IP enabled
  - CICS/ESA Version 4.1 (5655-018), or later
  - Java Development Kit 1.1.4 for OS/390 (5655-A46), or later
  - One of the following:
    -- IBM Internet Connection Secure Server (ICSS) for OS/390, Version 2.1 (5697-B14), or later (required for OS/390 Version 1.3)
    -- Domino Go Webserver for OS/390, Version 4.6.1 (5697-C58) must be installed on the MVS Open Edition platform (required for OS/390 Version 2.4, or later)
    -- To execute programs generated with VisualAge Generator Developer Version 4.5, APARs PQ31180 and PQ31181 must be applied to VisualAge Generator Server Version 1.2.

• **Web transaction programs**
  For Web transaction programs under IMS:
  -- IMS/ESA Transaction Manager Version 5.1, or later
  -- TCP/IP for MVS, Version 3.2 with PTF UQ03104
  -- Resource Access Control Facility (RACF®) Version 1.9.2, or an equivalent product

• **Interactive Chart Utility access**
  To access the Interactive Chart Utility from a VisualAge Generator program, Graphical Data Display Manager/MVS (GDDM®/MVS), Version 3.1 (5695-167), or later

**VisualAge Generator Server for VSE:** The following shows the **minimum** software requirements for VisualAge Generator Server for VSE:

• **VSE System**
  VSE/ESA Version 1.3.2 (5750-ACD), or later, or VSE/ESA Version 2.1 (5690-VSE), or later

• **Transaction Management**
  IBM CICS/VSE Version 2.3 (5686-026), or later
  **Note:** To use the full spool file function (including trace functions) on VSE CICS, you must have the CICS/VSE Report Controller feature on your system.

• **Assembler**
  - IBM High Level Assembler Version 1.2 (5696-234), or later

• **COBOL for run time**
  - Language Environment for VSE, Version 4.1 (5686-026), or later

• **Program Temporary Fixes (PTFs)**
  To execute programs generated with VisualAge Generator Developer Version 4.5, APARs PQ26899 and PQ26900 must be applied to VisualAge Generator Server Version 1.2.

The following shows the **optional** software requirements for VisualAge Generator Server for VSE:

• **Hierarchical database access**
  DL/I DOS/VS, Version 1.10 (5746-XX1), or later, at a level compatible with CICS/VSE Version 2.3 (5686-026)
• **Relational database access**
  One of the following products:
  - SQL/DS Version 3.5 (5688-103), or later
  - DB2 Server for VSE and VM, Version 5.1 (5648-158), or later

• **Communications support**
  For client/server processing between VisualAge Generator client/server application systems running under CICS OS/2 and CICS/VSE, CICS/VSE Version 2.3 (5686-026), or later

• **MQSeries**
  MQSeries for VSE/ESA, Version 2.1

• **Interactive Chart Utility access**
  For accessing the Interactive Chart Utility from a VisualAge Generator program, Graphical Data Display Manager/VSE (GDDM/VSE) Version 3.1 (5686-057), or later, at a level compatible with CICS/VSE Version 2.3 (5686-026).

**VisualAge Generator Server for VM:** The following shows the minimum software requirements for VM:

- **VM System**
  One of the following:
  - VM/ESA Version 1.2.2 (5684-112)
  - VM/ESA Version 2.1 (5654-030), or later

- **Assembler**
  IBM High Level Assembler/MVS and VM and VSE, Version 1.2 (5696-234), or later

- **COBOL for run time**
  - Language Environment for MVS and VM, Version 1.5 (5688-198, 5688-197, 5648-A25), or later

- **File Transfer**
  One of the following:
  - TCP/IP for VM, Version 2.3 (5735-FAL), or later
  - 3270/PC File Transfer Program for VM (5664-281)

- **Program Temporary Fixes (PTFs)**
  To execute programs generated with VisualAge Generator Developer Version 4.5, APAR PQ26899 must be applied to VisualAge Generator Server Version 1.2.

The following shows the optional software requirements for VisualAge Generator Server for VM:

- **Relational database access**
  To use relational databases, you’ll need one of the following:
  - Structured Query Language/Data System (SQL/DS) Version 3.5 (5688-103), or later
  - DB2 Server for VSE and VM, Version 5.1 (5648-158), or later

- **Communications**
  - OpenEdition Distributed Computing Environment for VM/ESA, Version 2.1

• **MQSeries**
  MQSeries for VM/ESA, Version 2.1, or later

• **Interactive Chart Utility Access**
  For accessing the Interactive Chart Utility from a VisualAge Generator program:
  - GDDDM/VM Version 3.1.0 (5684-168-01) with APAR PN39848
  - GDDDM/PGF Version 2.1.1 (5668-812-01), or later

**VisualAge Generator Server for AS/400:** The following shows the minimum software requirements for the VisualAge Generator Server for the AS/400 environment:

- **Operating system**
  OS/400 V4R4 (5769-SS1), or later

- **Languages**
  For compiling the VisualAge Generator AS/400 program, ILE COBOL/400 V3R7 (5716-CB1), or later

The following shows the optional software requirements for VisualAge Generator Server for AS/400:

- **Relational database access**
  For compilation with relational tables, DB2/400 Query Manager and SQL Development Kit Version 4 Release 4 (5769-ST1)

- **Two Tier C/S Support**
  - OS/400 Host Services V4R2, or later
  - AS/400 Toolbox for Java (at the same level as the OS/400 Host Services) plus all it’s required prerequisites

- **MQSeries**
  MQSeries Version 5.0, or later

- **Web transaction gateway**
  A Web application server that supports JSP level 1.0 and servlet support 2.1, such as WebSphere Application Server Standard Edition Version 3.0

**Planning Information**

**PartnerWorld for Developers:** PartnerWorld for Developers is especially designed to encourage commercial software developers to successfully explore the business of building applications, and VisualAge-enabled and Java reusable software components. In addition to component development, this program supports independent software vendors building VisualAge-complementary tools, frameworks, and end-user applications.

As a PartnerWorld for Developers member, you receive PartnerWorld benefits, including access to VisualAge software from Software Mall® (for development purposes) and product listings of your products in the Global Solutions Directory. Additionally, members may also receive electronic Q&A support for installation, product usage, and defects.
To Join:

- Update your Project Profile to indicate an interest in VisualAge.
- Create a Project Profile describing your product and indicate the VisualAge tools you plan to use.

IBM will contact you regarding your membership.

For more information about PartnerWorld for Developers and developing with VisualAge, contact us via:

- e-mail: pwd@us.ibm.com
- Phone:
  - U.S. and Canada: 800-627-8363
  - Worldwide: 770-835-9902
- Fax: 770-835-9444

Packaging

VisualAge Generator Version 4.5: The VisualAge Generator Developer product kit contains the following:

- VisualAge Generator Developer CD-ROMs (including a single-user copy of VisualAge Generator Server for OS/2 and Windows NT)
- VisualAge for Java Enterprise Version 3.5 CD-ROMs
- VisualAge Smalltalk Enterprise Version 5.0 CD-ROMs
- Object REXX for Windows NT and Windows 95 Interpreter Edition CD-ROM and License Information (LI) booklet
- DB2 Connect Personal Edition CD-ROMs and LI booklet
- NetObjects BeanBuilder CD-ROM
- VisualAge Generator Developer Proof of Entitlement
- VisualAge Developer’s Domain Subscription coupon
- VisualAge Generator Service brochure
- International Program License Agreement (IPLA) pointer sheet
- IPLA booklet
- Mail-In (for European and Middle Eastern customers)
- IBM Customer Service and Support card
- VisualAge Generator Installation Guide
- VisualAge Generator Getting Started
- Introducing VisualAge Generator Templates
- VisualAge Generator System Development Guide
- VisualAge Smalltalk Getting Started

The VisualAge Generator Server product kit contains the following:

- VisualAge Generator Server CD-ROM
- VisualAge Generator Server LI booklet
- VisualAge Generator Installation Guide
- VisualAge Generator Server Guide
- VisualAge Generator Server Proof of Entitlement
- IPLA pointer sheet
- IPLA booklet
- Mail-In (for European and Middle Eastern Customers)
- IBM Customer Service and Support card

The VisualAge Generator Templates Customizer product kit contains the following:

- VisualAge Generator Templates Customizer CD-ROM
- Introducing VisualAge Generator Templates
- VisualAge Generator Templates Customizer — User’s Guide
- VisualAge Generator Templates Customizer Proof of Entitlement

- IPLA pointer sheet
- IPLA booklet
- Mail-In (for European and Middle Eastern Customers)
- IBM Customer Service and Support Card

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Security, Auditability, and Control

Security data with respect to user access is to be enabled by the operating system.

The customer is responsible for evaluation, selection, and implementation of security features, administrative procedures, and appropriate controls in application systems and communication facilities.

Ordering Information

VisualAge Generator Developer Version 4.5 is available at an upgrade price for those customers currently licensed for the following qualifying programs:

Upgrades to VisualAge Generator Developer

<table>
<thead>
<tr>
<th>Program Title</th>
<th>Version</th>
<th>Program Number</th>
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</thead>
<tbody>
<tr>
<td>VisualAge Generator Developer</td>
<td>4.0</td>
<td>5697-G98</td>
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<tr>
<td>VisualAge Generator Developer</td>
<td>3.1</td>
<td>5697-C29</td>
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<tr>
<td>VisualAge Generator Developer</td>
<td>3.0</td>
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<tr>
<td>VisualAge Generator Developer</td>
<td>2.2</td>
<td>5622-580</td>
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<tr>
<td>VisualAge Smalltalk Enterprise</td>
<td>5.0</td>
<td>5648-B84</td>
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<td>4.5</td>
<td>5648-B21</td>
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<tr>
<td>VisualAge for Java Enterprise</td>
<td>3.0</td>
<td>5639-H43</td>
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<tr>
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<td>2.0</td>
<td>5639-F52</td>
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<tr>
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<td>5639-B74</td>
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Upgrades to VisualAge Generator Server

<table>
<thead>
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<th>Program Title</th>
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<td>4.0</td>
<td>5639-G97</td>
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<tr>
<td>VisualAge Generator Server</td>
<td>3.1</td>
<td>5639-C28</td>
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<tr>
<td>VisualAge Generator Server</td>
<td>3.0</td>
<td>5639-C28</td>
</tr>
<tr>
<td>VisualAge Generator Workgroup Services</td>
<td>2.2</td>
<td>5622-585</td>
</tr>
<tr>
<td>VisualAge Generator Workgroup Services</td>
<td>2.0</td>
<td>5622-585</td>
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<td>VisualAge Generator Workgroup Services</td>
<td>1.1</td>
<td>5648-076</td>
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Upgrades to VisualAge Generator Templates Customizer

<table>
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<tr>
<th>Program Title</th>
<th>Version</th>
<th>Program Number</th>
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<tr>
<td>VisualAge Generator Templates</td>
<td>4.0</td>
<td>5639-H09</td>
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<tr>
<td>VisualAge Generator Templates</td>
<td>3.1</td>
<td>5639-E26</td>
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<td>3.0</td>
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<tr>
<td>VisualAge Generator Templates</td>
<td>2.2</td>
<td>5639-C32</td>
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</table>

Upgrades may be obtained through IBM Authorized Software Dealers and Industry Remarketers. The end user must present the original proof of license along with a completed and signed IBM Personal Computer/System Program Remarketer Upgrade and Certification Form (available from the remarketer) with payment to the remarketer. The proof of license must be the original; no
copies will be accepted. The remarketer will then give the end user a new VisualAge Generator product. Remarketers are free to set their own prices to the end user for these upgrades.

## Program Package

<table>
<thead>
<tr>
<th>Program Name/Description</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Program Package</td>
<td>00P7724</td>
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<tr>
<td>VisualAge Generator Server, Version 4.5 for OS/2, AIX, Windows NT, HP-UX, and Solaris Program Package</td>
<td>00P7647</td>
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<tr>
<td>VisualAge Generator Templates Customizer, Version 4.5 for OS/2 and Windows NT Program Package</td>
<td>00P7717</td>
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## Electronic Delivery

<table>
<thead>
<tr>
<th>Program Name/Description</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Program Package</td>
<td>00P7728</td>
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<td>VisualAge Generator Server, Version 4.5 for OS/2, AIX, Windows NT, HP-UX, and Solaris Program Package</td>
<td>00P7650</td>
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<tr>
<td>VisualAge Generator Templates Customizer, Version 4.5 for OS/2 and Windows NT Program Package</td>
<td>00P7719</td>
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## Upgrades

<table>
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<th>Program Name/Description</th>
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<tr>
<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Program Package Upgrade from VisualAge Generator Developer Version 1, 2, 3, or 4, or VisualAge Smalltalk Enterprise Version 4 or 5, or VisualAge for Java Enterprise Version 1, 2, or 3</td>
<td>00P7727</td>
</tr>
<tr>
<td>VisualAge Generator Server, Version 3 or 4, or VisualAge Generator Workgroup Services Version 1 or 2 1 Server Install</td>
<td>00P7649</td>
</tr>
<tr>
<td>VisualAge Generator Templates Customizer, Version 4.5 for OS/2 and Windows NT Program Package Upgrade from VisualAge Generator Templates Version 2, 3, or 4</td>
<td>00P7721</td>
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</table>
Program Name/Description | Part Number
---|---
VisualAge Generator Server, Version 4.5 for OS/2, AIX, Windows NT, HP-UX, and Solaris | 00P7651
Program Package Upgrade from VisualAge Generator Server Version 3 or 4, or VisualAge Generator Workgroup Services Version 1 or 2 | 00P7720
VisualAge Generator Templates Customizer, Version 4.5 for OS/2 and Windows NT | 00P7720
Program Package Upgrade from VisualAge Generator Templates Version 2, 3, or 4 | 00P7720
VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Client Media Pack | BA6FHML
VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Documentation Pack | BA6FIML
VisualAge Generator Server, Version 4.5 for OS/2, AIX, Windows NT, HP-UX, and Solaris Media Pack | BA76NML
VisualAge Generator Templates Customizer, Version 4.5 for OS/2 and Windows NT Media Pack | BA6FGML

Passport Advantage

VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT | GH23-0274
VisualAge Generator Developer License Information | GH23-0273
VisualAge Generator Templates Customizer License Information | GH23-0278

Limited Warranty: Yes

Program Services: Program services for the following programs will be available until December 31, 2002:

- VisualAge Generator Developer for OS/2 and Windows NT, Version 4.5
- VisualAge Generator Templates Customizer for OS/2 and Windows NT, Version 4.5

The Program Services section in the License Information included with this program describes this service.

Program Service Extension for VisualAge Generator Version 4.0: Program services for the following programs is extended to September 30, 2001:

- VisualAge Generator Developer for OS/2 and Windows NT, Version 4.0
- VisualAge Generator Server for OS/2, Windows NT, AIX, HP-UX, and Solaris, Version 4.0
- VisualAge Generator Templates Customizer for OS/2 and Windows NT, Version 4.0


Money-Back Guarantee: 30-day, money-back guarantee

Copy and Use on Home/Portable Computer: No

Volume Orders (IVO): No

Passport Advantage Applies: Yes

Passport Advantage Subscription Applies: Yes

Upgrades: Customers can acquire upgrades up to the currently authorized level of use of the qualifying programs.

Support Line: Yes

AIX/UNIX Upgrade Protection Applies: No

Entitled Upgrade for Current AIX/UNIX Upgrade Protection Licensees: No

AS/400 Software Subscription Applies: No

Variable Charges Apply: No

Educational Allowance Available: Not applicable

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**Prices**

<table>
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<th>Part Number</th>
<th>OTC 1</th>
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<tr>
<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Program Package 1 Registered User</td>
<td>00P7724</td>
<td>$7,499</td>
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<tr>
<td>VisualAge Generator Server, Version 4.5 for OS/2, AIX, Windows NT, HP-UX, and Solaris Program Package 1 Server Install</td>
<td>00P7647</td>
<td>2,499</td>
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<td>Program Name/Description</td>
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<tr>
<td><strong>Program Package</strong></td>
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<tr>
<td>VisualAge Generator Templates, Version 4.5 for OS/2 and Windows NT</td>
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<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT</td>
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<td>VisualAge Generator Server, Version 4.5 for OS/2, AIX, Windows NT, HP-UX, and Solaris 1 Server Install</td>
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<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT</td>
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<tr>
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<td>VisualAge Generator Templates, Version 4.5 for OS/2 and Windows NT</td>
<td>00P7723</td>
<td>14,979</td>
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<tr>
<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT Program Package Upgrade from VisualAge Generator Developer Version 1, 2, 3, or 4, or VisualAge Smalltalk Enterprise Version 4 or 5, or VisualAge for Java Enterprise Version 4 or 5, or VisualAge for Java Enterprise Version 1, 2, or 3</td>
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**Upgrades**
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<tr>
<td>VisualAge Generator Templates Customizer, Version 4.5 for OS/2 and Windows NT</td>
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<td>$7,499</td>
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<td>Program Package Upgrade from VisualAge Generator Templates Version 2, 3, or 4</td>
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<td>VisualAge Generator Developer, Version 4.5 for OS/2 and Windows NT</td>
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<td>Program Package Upgrade from VisualAge Generator Developer Version 1, 2, 3, or 4, or VisualAge Smalltalk Enterprise Version 4 or 5, or VisualAge for Java Enterprise Version 1, 2, or 3</td>
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- One-time charge

Contact your sales channel for Support Line pricing information.

**Passport Advantage**

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