



**Program Directory for  
XML Toolkit for z/OS and OS/390 V1R5**

Version 1 Release 5, Modification Level 0

Program Number 5655-J51

FMIDs HXML150, HXML140 and HXML130

for Use with  
z/OS and OS/390

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David Megginson, david@megginson.com  
2000-05-05

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## 1.0 Introduction

This program directory is intended for the system programmer responsible for program installation and maintenance. It contains information concerning the material and procedures associated with the installation of the XML Toolkit for z/OS and OS/390 V1R5 (Toolkit). You should read all of this program directory before installing the program and keep it for future reference.

The program directory supports three levels of the Toolkit, the current level V1R5 (FMID HXML150) plus two previous levels V1R4 (FMID HXML140) and V1R3 (FMID HXML130). These three levels together are referred to as the Toolkit V1R5 package. The program directory supports three levels because the Toolkit is based on open source software from the Apache Software Foundation which does not provide for upward compatibility. The Toolkit V1R5 package is designed so that applications using Toolkit V1R4 or V1R3 may continue to run against those levels. So unless otherwise stated, the information contained within the program directory applies to all three levels of the Toolkit (V1R5, V1R4, and V1R3).

The program directory contains the following sections:

- 2.0, “Program Materials” on page 5 identifies the basic and optional program materials and documentation for the Toolkit.
- 3.0, “Program Support” on page 9 describes the IBM support available for the Toolkit.
- 4.0, “Program and Service Level Information” on page 11 lists the APARs (program level) and PTFs (service level) incorporated into the Toolkit.
- 5.0, “Installation Requirements and Considerations” on page 13 identifies the resources and considerations for installing and using the Toolkit.
- 6.0, “Installation Instructions” on page 21 provides detailed installation instructions for the Toolkit. It also describes the procedures for activating the functions of the Toolkit, or refers to appropriate publications.

Before installing the Toolkit, read the Read-Me-First and the Memo-To-Users-Extension that were supplied with this program softcopy as well as this Program Directory and then keep them for future reference.

The Toolkit is supplied in a Custom-Built Product Delivery Offering (CBPDO, 5751-CS3). The Program Directory is provided softcopy on the CBPDO tape which is identical to the printed copy shipped with your order. Your CBPDO contains a softcopy preventive service planning (PSP) upgrade for this product. All service and HOLDDATA for the Toolkit are included on the CBPDO tape.

Do not use this Program Directory if you are installing the Toolkit with a SystemPac or ServerPac. When using these offerings, use the jobs and documentation supplied with the offering. This documentation may point you to specific sections of the Program Directory as required.

For the latest product related material, see the Toolkit Web site at:

<http://www.ibm.com/zseries/software/xml/>

---

## 1.1 The Toolkit

The Toolkit provides XML technology to assist customers in integrating vertical/industry-specific data formats, structures, schemas, and metadata to ensure industry compliance of data representation and content. Some of its key uses include categorizing and tagging data for exchange in disparate environments, as well as transforming ad hoc unstructured data to XML records, enabling you to search, cross-reference, and share records. The Toolkit also provides this support for use by other dependent IBM and vendor products.

The Toolkit includes the XML Parser for z/OS and OS/390, C++ Edition and the XML Parser for z/OS and OS/390, Java Edition. The XML Parser for z/OS and OS/390, C++ Edition is a port of IBM's XML4C parser. The XML Parser for z/OS and OS/390, Java Edition is an unmodified version of IBM's XML4J parser. The two parsers are tested and packaged for use on z/OS and OS/390. Both XML4C and XML4J are based on open source code from the Xerces Apache project of the Apache Software Foundation.

In addition to the parsers, the Toolkit also includes the LotusXSL XSL Transformations (XSLT) Processor for z/OS and OS/390, C++ Edition (not supported in Toolkit V1R5) and LotusXSL XSL Transformations (XSLT) Processor for z/OS and OS/390, Java Edition. The XSLT Processor for z/OS and OS/390, C++ Edition is a port of the LotusXSL-C++ XSLT processor; the XSLT Processor for z/OS and OS/390, Java Edition is an unmodified port of the LotusXSL-Java XSLT processor. They are tested and packaged for use on z/OS and OS/390. Both are implementations of the W3C recommendations for XSL Transformations (XSLT) Version 1.0 and XML Path Language (XPath) Version 1.0. Both LotusXSL-C++ and LotusXSL-Java are based on open source code from the Xalan Apache project of the Apache Software Foundation. They allow users to transform XML documents into other XML documents, HTML, or text, and run on multiple platforms.

The Toolkit is backed by OS/390 and z/OS world-class service and support.

For more information about the Toolkit product, visit the Toolkit Web site at:

<http://www.ibm.com/zseries/software/xml/>

### 1.1.1 Specified Operating Environment

**Machine Requirements:** Version 1 Release 5 XML Toolkit for z/OS and OS/390 runs on hardware that supports one of the following:

- z/OS Version 1 Release 2 or higher operating system
- z/OS.e Version 1 Release 3 or higher operating system

**Programming Requirements:** Version 1 Release 5 XML Toolkit for z/OS and OS/390 requires one of the following:

- z/OS Version 1 Release 2 or higher operating system
- z/OS.e Version 1 Release 3 or higher operating system

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## 1.2 Toolkit FMIDs

The XML Toolkit for z/OS and OS/390 V1R5 package consists of the following FMIDs:

HXML150

HXML140

HXML130





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## 2.0 Program Materials

An IBM program is identified by a program number. The program number for XML Toolkit for z/OS and OS/390 V1R5 package is 5655-J51.

Basic Machine-Readable Materials are materials that are supplied under the base license and feature code, and are required for the use of the product. Optional Machine-Readable Materials are orderable under separate feature codes, and are not required for the product to function.

The program announcement material describes the features supported by the Toolkit. Ask your IBM representative for this information if you have not already received a copy.

---

### 2.1 Basic Machine-Readable Material

The distribution medium for this program is magnetic tape or downloadable files. It is installed using SMP/E, and is in SMP/E RELFILE format. See 6.0, "Installation Instructions" on page 21 for more information about how to install the program. Figure 1 describes the file content.

#### Notes:

1. The data set attributes in the table should be used in the JCL of jobs reading the data sets, but since the data sets are in IEBCOPY unloaded format, their actual attributes may be different.
2. You are installing the Toolkit using the Custom-Built Product Delivery Offering (CBPDO) (5751-CS3). Information about your tape may be found in the CBPDO documentation that came with your order. Additionally, some of the information in these figures may not be valid. Consult the CBPDO documentation for actual values.
3. If any RELFILES are identified as PDSEs, ensure that SMPTLIB data sets are allocated as PDSEs.

Figure 1 (Page 1 of 2). Program File Content

Name	ORG	RCM	REL	BLK SIZE
SMPMCS	SEQ	FB	80	6400
IBM.HXML130.F1	PDS	FB	80	8800
IBM.HXML130.F2	PDS	FB	80	8800
IBM.HXML130.F3	PDS	VB	256	6144
IBM.HXML130.F4	PDS	FB	80	8800
IBM.HXML130.F5	PDS	U	0	6144
IBM.HXML140.F1	PDS	FB	80	8800

Figure 1 (Page 2 of 2). Program File Content

<b>Name</b>	<b>O R G</b>	<b>R E C F M</b>	<b>L R E C L</b>	<b>BLK SIZE</b>
IBM.HXML140.F2	PDS	FB	80	8800
IBM.HXML140.F3	PDS	VB	256	6144
IBM.HXML140.F4	PDS	FB	80	8800
IBM.HXML140.F5	PDS	U	0	6144
IBM.HXML150.F1	PDS	FB	80	8800
IBM.HXML150.F2	PDS	FB	80	8800
IBM.HXML150.F3	PDS	VB	256	6144
IBM.HXML150.F4	PDS	FB	80	8800
IBM.HXML150.F5	PDS	U	0	6144

An SMP/E installable format of the Toolkit is also available through web delivery. Once unpacked, this package is in SMP/E RELFILE format. The code for this deliverable can be downloaded from the Web site:

<http://www.ibm.com/servers/eserver/zseries/software/xml/download/>

From this site you can obtain all the deliverables and documentation required for installation. See 6.1, "Installing the Toolkit" on page 21 for more information about how to install the Toolkit.

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## 2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for the Toolkit.

---

## 2.3 Program Publications

The following sections identify the basic and optional publications for the Toolkit.

### 2.3.1 Basic Program Publications

The basic publications and other information about the Toolkit are available electronically at the XML product web site:

<http://www.ibm.com/zseries/software/xml/>

## 2.3.2 Optional Program Publications

Figure 2 on page 7 identifies the optional unlicensed or licensed publications that are not available hardcopy, but are available through the internet or other media for the Toolkit.

<i>Figure 2. Optional Material: Other Optional Publications</i>		
<b>Publication Title</b>	<b>Form Number</b>	<b>How Available</b>
XML Toolkit for z/OS and OS/390 Users Guide	SA22-7932-00	<a href="http://www.ibm.com/zseries/software/xml/">http://www.ibm.com/zseries/software/xml/</a>
z/OS Support for Unicode: Using Conversion Services	SA22-7649-02	<a href="http://publibz.boulder.ibm.com/epubs/pdf/iea2un20.pdf">http://publibz.boulder.ibm.com/epubs/pdf/iea2un20.pdf</a>

**Note:** The XML Toolkit for z/OS and OS/390 Users Guide applies to V1R4 of the Toolkit only. The z/OS Support for Unicode: Using Conversion Services applies to V1R5 of the Toolkit only.

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## 2.4 Program Source Materials

No program source materials or viewable program listings are provided for the Toolkit.

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## 2.5 Publications Useful During Installation

The publications listed in Figure 3, and Figure 4 on page 8 may be useful during the installation of the Toolkit. To order copies, contact your IBM representative or visit the IBM Publications Center on the world wide web at:

<http://www.elink.ibm.com/applications/public /applications/publications/cgibin/pbi.cgi>

<i>Figure 3. z/OS Publications Useful During Installation</i>	
<b>Publication Title</b>	<b>Form Number</b>
<i>SMP/E for z/OS and OS/390 Messages, Codes and Diagnosis</i>	GA22-7770
<i>SMP/E for z/OS and OS/390 Reference</i>	SA22-7772
<i>SMP/E for z/OS and OS/390 Commands</i>	SA22-7771
<i>SMP/E for z/OS and OS/390 User's Guide</i>	SA22-7773
<i>z/OS Information Roadmap</i>	SA22-7500
<i>z/OS UNIX System Services Planning</i>	GA22-7800
<i>z/OS UNIX System Services Command Reference</i>	SA22-7802

*Figure 4. OS/390 Publications Useful During Installation*

<b>Publication Title</b>	<b>Form Number</b>
<i>OS/390 SMP/E Messages and Codes</i>	SC28-1738
<i>OS/390 SMP/E Reference</i>	SC28-1806
<i>OS/390 SMP/E Commands</i>	SC28-1805
<i>OS/390 SMP/E User's Guide</i>	SC28-1740
<i>OS/390 Information RoadMap</i>	GC28-1727
<i>OS/390 UNIX System Services Planning</i>	SC28-1890
<i>OS/390 UNIX System Services Command Reference</i>	SC28-1892

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## 3.0 Program Support

This section describes the IBM support available for the Toolkit.

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### 3.1 Program Services

Contact your IBM representative for specific information about available program services.

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### 3.2 Preventive Service Planning

Before installing the Toolkit, you should review the current Preventive Service Planning (PSP) information. If you obtained the Toolkit as part of a CBPDO, there is HOLDDATA and PSP information included on the CBPDO.

If the CBPDO for the Toolkit is more than two weeks old when you install it, you should contact the IBM Support Center or use S/390 SoftwareXcel to obtain the current PSP Bucket.

For access to RETAIN, visit <http://www.ibm.com/ibmlink/link2> on the Internet.

PSP Buckets are identified by UPGRADEs, which specify product levels, and SUBSETs, which specify the FMIDs for a product level. The UPGRADE and SUBSET values for the Toolkit are:

<i>Figure 5. PSP Upgrade and Subset ID</i>		
<b>UPGRADE</b>	<b>SUBSET</b>	<b>Description</b>
XML	HXML150	XML Toolkit V1R5 for z/OS
XML	HXML140	XML Toolkit V1R4 for z/OS and OS/390
XML	HXML130	XML Toolkit V1R3 for z/OS and OS/390

---

### 3.3 Statement of Support Procedures

Report any difficulties you have using this program to your IBM Support Center. If an APAR is required, the Support Center will provide the address to which any needed documentation can be sent.

Figure 6 identifies the component IDs (COMPID) for the Toolkit.

Figure 6. Component IDs

<b>FMID</b>	<b>COMPID</b>	<b>Component Name</b>	<b>RETAIN Release</b>
HXML150	5655D4401	XML Parser for z/OS, C++ Edition	150
HXML150	5655D4402	XML Parser for z/OS, Java Edition	150
HXML150	5655D4404	XSLT Processor for z/OS, Java Edition	150
HXML140	5655D4401	XML Parser for z/OS and OS/390, C++ Edition	140
HXML140	5655D4402	XML Parser for z/OS and OS/390, Java Edition	140
HXML140	5655D4403	XSLT Processor for z/OS and OS/390, C++ Edition	140
HXML140	5655D4404	XSLT Processor for z/OS and OS/390, Java Edition	140
HXML130	5655D4401	XML Parser for z/OS and OS/390, C++ Edition	130
HXML130	5655D4402	XML Parser for z/OS and OS/390, Java Edition	130
HXML130	5655D4403	XSLT Processor for z/OS and OS/390, C++ Edition	130
HXML130	5655D4404	XSLT Processor for z/OS and OS/390, Java Edition	130

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## 4.0 Program and Service Level Information

This section identifies the program and any relevant service levels of the Toolkit. The program level refers to the APAR fixes incorporated into the program. The service level refers to the PTFs integrated.

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### 4.1 Program Level Information

The following APAR fixes against previous releases of the Toolkit have been incorporated into this release. They are listed by FMID.

#### 4.1.1 Toolkit V1R5 Program Level Information

- FMID HXML150

OW56816

#### 4.1.2 Toolkit V1R4 Program Level Information

- FMID HXML140

OW53326

#### 4.1.3 Toolkit V1R3 Program Level Information

- FMID HXML130

OW49977

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### 4.2 Service Level Information

PTFs containing APAR fixes against Toolkit V1R3 and Toolkit V1R4 have been incorporated into this product tape. For a list of included PTFs, examine the ++VER statement in the product's SMPMCS.





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## 5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating the Toolkit. The following terminology is used:

- *Driving system*: the system used to install the program.
- *Target system*: the system on which the program is installed.

In many cases, the same system can be used as both a driving system and a target system. However, you may want to set up a clone of your system to use as a target system by making a separate IPL-able copy of the running system. The clone should include copies of all system libraries that SMP/E updates, copies of the SMP/E CSI data sets that describe the system libraries, and your PARMLIB and PROCLIB.

Some cases where two systems should be used include the following:

- When installing a new level of a product that is already installed, the new product will delete the old one. By installing onto a separate target system, you can test the new product while still keeping the old one in production.
- When installing a product that shares libraries or load modules with other products, the installation can disrupt the other products. Installing onto a test system or clone will allow you to assess these impacts without disrupting your production system.

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### 5.1 Driving System Requirements

This section describes the environment of the driving system required to install the Toolkit.

#### 5.1.1 Machine Requirements

The driving system can run in any hardware environment that supports the required software.

#### 5.1.2 Programming Requirements

<i>Figure 7. Driving System Software Requirements</i>	
<b>Program Number</b>	<b>Product Name and Minimum VRM/Service Level</b>
Any <b>one</b> of the following:	
5647-A01	OS/390 Version 2 Release 10, with IBM SMP/E Version 3 Release 1 (5655-G44) and PTF UR53536
5694-A01	z/OS Version 1 Release 1 or higher
5655-G52	z/OS.e Version 1 Release 3 or higher

The user ID under which the SMP/E installation jobs execute must be defined to use z/OS UNIX System Services (z/OS UNIX) or OS/390 UNIX System Services (OS/390 UNIX) and have the appropriate access permissions to update the file system. Superuser status is required to preserve access permission bits when running the IXMISMKD job to create HFS directories. z/OS UNIX or OS/390 UNIX must be available in "full-function mode" with the shell and utilities available.

## 5.2 Target System Requirements

This section describes the environment of the target system required to install and use the Toolkit.

### 5.2.1 Machine Requirements

The target system can run in any hardware environment that supports the required software.

### 5.2.2 Programming Requirements

#### 5.2.2.1 Mandatory Requisites

A mandatory requisite is defined as a product that is required without exception; this product either **will not install** or **will not function** unless this requisite is met. This includes products that are specified as REQs or PREs.

*Figure 8. Mandatory Requisite for Toolkit V1R5*

Program Number	Product Name and Minimum VRM/Service Level
Any <b>one</b> of the following:	
5694-A01	z/OS Version 1 Release 2 or higher
5655-G52	z/OS.e Version 1 Release 3 or higher

*Figure 9. Mandatory Requisites for Toolkit V1R4*

Program Number	Product Name and Minimum VRM/Service Level
Any <b>one</b> of the following:	
5647-A01	OS/390 Version 2 Release 10
5694-A01	z/OS Version 1 Release 1 or higher
5655-G52	z/OS.e Version 1 Release 3 or higher

Figure 10. Mandatory Requisites for Toolkit V1R3

Program Number	Product Name and Minimum VRM/Service Level
Any <b>one</b> of the following:	
5647-A01	OS/390 Version 2 Release 10
5694-A01	z/OS Version 1 Release 1 or higher
5655-G52	z/OS.e Version 1 Release 3 or higher

### 5.2.2.2 Functional Requisites

A functional requisite is defined as a product that is **not** required for the successful installation of this product or for the basic function of the product, but **is** needed at run time for a specific function of this product to work. This includes products that are specified as IF REQS.

Figure 11. Functional Requisites

Program Number	Product Name and Minimum VRM/Service Level	Function
5655-D35	IBM Developer Kit for OS/390, Java(TM) 2 Technology Edition Version 1 Release 1 with PTF UQ73928, or higher release required for HXML150	XML Parser for z/OS and OS/390, Java Edition and XSLT Processor for z/OS and OS/390, Java Edition
5655-D35	IBM Developer Kit for OS/390, Java(TM) 2 Technology Edition Version 1 Release 1 with PTF UQ73928, or higher release required for HXML140	XML Parser for z/OS and OS/390, Java Edition and XSLT Processor for z/OS and OS/390, Java Edition
5655-D35	IBM Developer Kit for OS/390, Java(TM) 2 Technology Edition Version 1 Release 1 with PTF UQ73928, or higher release required for HXML130	XML Parser for z/OS and OS/390, Java Edition and XSLT Processor for z/OS and OS/390, Java Edition

### 5.2.2.3 Toleration/Coexistence Requisites

A toleration/coexistence requisite is defined as a product which must be present on a sharing system. These systems can be other systems in a multisystem environment (not necessarily sysplex), a shared DASD environment (such as test and production), or systems that reuse the same DASD at different time intervals.

The Toolkit has no toleration/coexistence requisites. Upwards compatibility for the Toolkit V1R3, V1R4, and V1R5 is provided by shipping the code for the Toolkit V1R3 and V1R4. In addition, V1R3, V1R4, and V1R5 can all coexist together within in the same SMP/E zones, target and distribution libraries, and in the same HFS file system.

### 5.2.2.4 Incompatibility (Negative) Requisites

A negative requisite identifies products which must *not* be installed on the same system as this product.

Toolkit V1R5 is **NOT** upward compatible to Toolkit V1R1 or Toolkit V1R2. Therefore, Toolkit V1R1 and Toolkit V1R2 users must either preserve their version of the Toolkit or migrate applications to use a newer version (V1R3, V1R4, or V1R5).

### 5.2.3 DASD Storage Requirements

The Toolkit libraries can reside on all supported DASD types.

Figure 12 lists the total space required for each type of library.

<i>Figure 12. Total DASD Space Required by the Toolkit</i>	
<b>Library Type</b>	<b>Total Space Required</b>
Target	1805 3390 Trks
Distribution	6793 3390 Trks
HFS	17411 3390 Trks

#### Notes:

1. IBM recommends use of system determined block sizes for efficient DASD utilization for all non-RECFM U data sets. For RECFM U data sets, IBM recommends a block size of 32760, which is the most efficient from a performance and DASD utilization perspective.
2. Abbreviations used for the data set type are:
  - U** Unique data set, allocated by this product and used only by this product. To determine the correct storage needed for this data set, this table provides all required information; no other tables (or Program Directories) need to be referenced for the data set size.
  - S** Shared data set, allocated by this product and used by this product and others. To determine the correct storage needed for this data set, the storage size given in this table needs to be added to other tables (perhaps in other Program Directories). If the data set already exists, it must have enough free space to accommodate the storage size given in this table.
  - E** Existing shared data set, used by this product and others. This data set is **NOT** allocated by this product. To determine the correct storage needed for this data set, the storage size given in this table needs to be added to other tables (perhaps in other program directories). This existing data set must have enough free space to accommodate the storage size given in this table.

For more information on the names and sizes of the required data sets, please refer to 6.1.7, "Allocate SMP/E Target and Distribution Libraries and Paths" on page 24.

3. Abbreviations used for the HFS Path type are:

- N** New path, created by this product.
- X** Path created by this product, but may already exist from a previous release.
- P** Previously existing path, created by another product.

4. All target and distribution libraries listed have the following attributes:

- The default name of the data set may be changed
- The default block size of the data set may be changed
- The data set may be merged with another data set that has equivalent characteristics
- The data set may be either a PDS or a PDSE

5. All target libraries listed have the following attributes:

- The data set may be SMS managed
- It is not required for the data set to be SMS managed
- It is not required for the data set to reside on the IPL volume
- The values in the "Member Type" column are not necessarily the actual SMP/E element types identified in the SMPMCS.

6. All target libraries listed which contain load modules have the following attributes:

- The data set may be in the LPA
- It is not required for the data set to be in the LPA
- The data set may be in the LNKLIST
- It is not required for the data set to be APF authorized

The following table provides an estimate of the storage needed in the SMP/E data sets for the Toolkit. The estimates must be added to those of any other programs and service being installed to determine the total additional storage requirements.

If the table indicates that the SMPLTS data set must be a PDSE, but, your existing SMPLTS is a PDS, you will need to allocate a new PDSE and copy you existing SMPLTS into it and then change the SMPLTS DDDEF entry to indicate the new PDSE data set.

<i>Figure 13. Storage Requirements for SMP/E Data Sets</i>						
<b>Library DDNAME</b>	<b>T Y P E</b>	<b>O R G</b>	<b>R E C F M</b>	<b>L R E C L</b>	<b>No. of 3390 Trks</b>	<b>No. of DIR Blks</b>
SMPLTS	E	PDSE	U	0	1840	5
SMPMTS	E	PDS	FB	80	2	2
SMPPTS	E	PDS	FB	80	1426	2
SMPSCDS	E	PDS	FB	80	2	2
SMPSTS	E	PDS	FB	80	2	2

The following figures describe the target and distribution libraries and HFS paths required to install the Toolkit. The storage requirements of the Toolkit must be added to the storage required by other programs having data in the same library or path.

**Note:** The data in these tables should be used when determining which libraries can be merged into common data sets. In addition, since some ALIAS names may not be unique, ensure that no naming conflicts will be introduced before merging libraries.

Figure 14. Storage Requirements for Toolkit Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SAMPLIB	Sample	TVOL2	E	PDS	FB	80	4	2
SIXMEXP	Data	TVOL2	U	PDS	FB	80	65	2
SIXMMOD1	LMOD	TVOL1	U	PDS	U	0	1740	5

Figure 15. Toolkit HFS Paths

DDNAME	T Y P E	Path Name
SIXMHFS	X	/usr/lpp/ixm/IBM

Figure 16. Storage Requirements for Toolkit Distribution Libraries

Library DDNAME	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
AIXMEXP	U	PDS	FB	80	52	2
AIXMHFS	U	PDS	VB	256	4814	2
AIXMMOD1	U	PDS	U	0	1927	5
ASAMPLIB	E	PDS	FB	80	4	2

### 5.3 FMIDs Deleted

Toolkit V1R5 (HXML150) will not delete Toolkit V1R4 (HXML140) or Toolkit V1R3 (HXML130) if either was installed. Toolkit V1R4 (HXML140) will not delete Toolkit V1R3 (HXML130) if it was installed.

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## 5.4 Special Considerations

The Toolkit product can be obtained in the following ways:

- Customized Offerings distribution
- Download from the Toolkit Web site at:

<http://www.ibm.com/zseries/software/xml/>

If you are installing from the Customized Offerings, continue with the installation process described in section 6.0, “Installation Instructions” on page 21. If you are installing from the Toolkit Web site, use the instructions available on the Web site and make sure to review section 6.1.1, “Considerations for Using the SMP/E Web Download for the Toolkit” on page 21.

Whether you are installing from the tape or Web site, make sure to review sections 6.1.7, “Allocate SMP/E Target and Distribution Libraries and Paths” on page 24 and 6.1.8, “Create DDDEF Entries” on page 24, which discuss how dataset sizes are allocated for Toolkit V1R5.

The Toolkit V1R5 can receive performance enhancements through z/OS support for Unicode. These services are not mandatory for installation of the Toolkit but will be utilized if z/OS support for Unicode is configured correctly. For more information on configuring these services, see page 37.





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## 6.0 Installation Instructions

This chapter describes the step-by-step procedures to install and to activate the functions of the Toolkit.

Please note the following:

- If you want to install the Toolkit into its own SMP/E environment, consult the SMP/E manuals for instructions on creating and initializing the SMPCSI and the SMP/E control data sets.
- Sample jobs have been provided to help perform some or all of the installation tasks. The SMP/E jobs assume that all DDDEF entries required for SMP/E execution have been defined in the appropriate zones.
- The SMP/E dialogs may be used instead of the sample jobs to accomplish the SMP/E installation steps.

---

### 6.1 Installing the Toolkit

#### 6.1.1 Considerations for Using the SMP/E Web Download for the Toolkit

The SMP/E web download package for the Toolkit is packaged using the SMP/E GIMZIP function. The SMP/E GIMUNZIP function is required to process the downloaded package.

You will need to perform the following tasks:

1. For a description of the GIMZIP and GIMUNZIP function, refer to the SMP/E web page at:

<http://www.ibm.com/servers/eserver/zseries/zos/smpe/>

Ensure that configuration requirements for using GIMUNZIP have been completed.

2. Allocate a R/W HFS directory on the z/OS or OS/390 system where the package will be staged. This is the repository for the download package.
3. Download the Toolkit package.

The package is available from the following Web site:

<http://www.ibm.com/servers/eserver/zseries/software/xml/>

There are two parts of the package:

- xml150.README.txt

This file contains a sample job that performs the following tasks. It must be updated to reflect your environment.

- Executes the z/OS UNIX System Services or OS/390 UNIX System Services pax command to extract the GIMZIP archives from the downloaded package.

- Executes the GIMUNZIP program to expand the GIMZIP archives and places their contents in data sets that can be processed by SMP/E.
- Executes the SMP/E RECEIVE from DASD function to receive the FMID.
- xml150.pax.Z

This pax archive file consists of the base function. The file contains the SMP/E MCS and the associated RELFILES. This must be downloaded to a node that has connectivity to the target z/OS or OS/390 system. Transfer the file to the host using binary format.

4. Run the sample job in xml150.README.txt

This job will perform the required tasks up to and including the SMP/E RECEIVE from DASD step.

5. Complete the installation using the instructions in this program directory, beginning with 6.1.7, “Allocate SMP/E Target and Distribution Libraries and Paths” on page 24.

## 6.1.2 SMP/E Considerations for Installing the Toolkit

The Toolkit package (which includes code for V1R5, V1R4, and V1R3) is installed using the SMP/E RECEIVE, APPLY, and ACCEPT commands. **The current release of the Toolkit package (HXML150, HXML140, and HXML130) must install into separate SMP/E zones, separate target and distributions libraries, and separate HFS file systems from V1R1 and V1R2, of the Toolkit. This will preserve both V1R1 and V1R2 of the Toolkit.** When allocating a separate, unique set of target and distribution libraries, ensure that you allocate unique SAMPLIB and ASAMPLIB data sets for the installation of the current release of the Toolkit to avoid overlaying any sample jobs that were installed with both V1R1 and V1R2.

The SMP/E dialogs may be used to accomplish the SMP/E installation steps.

## 6.1.3 SMP/E Options Subentry Values

The recommended minimum values for some SMP/E CSI subentries are shown in Figure 17. An SMP/E UTILITY entry for the binder is required in the global zone. You can specify any of these program names in the UTILITY entry: IEWBLINK, HEWL, IEWL, LINKEDIT, or HEWLH096. The linkage editor, which uses the names HEWLKED, HEWLF064, IEWLF440, IEWLF880, and IEWLF128, cannot be used. DSSPACE is a subentry in the GLOBAL options entry. PEMAX is a subentry of the GENERAL entry in the GLOBAL options entry. Refer to the SMP/E manuals for instructions on updating the global zone.

*Figure 17. SMP/E Options Subentry Values*

SUB-ENTRY	Value	Comment
DSSPACE	800,500,100	
PEMAX	SMP/E Default	IBM recommends using the SMP/E default for PEMAX.

## 6.1.4 SMP/E CALLLIBS Processing

The Toolkit uses the CALLLIBS function provided in SMP/E to resolve external references during installation. When the Toolkit is installed, ensure that the DDDEF entry exists for the libraries SCEELKED and CSSLIB.

**Note:** The SCEELKED and CSSLIB DDDEFs are used only to resolve the link-edit for the Toolkit using CALLLIBS. These data sets are not updated during the installation of the Toolkit.

## 6.1.5 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install the Toolkit:

*Figure 18. Sample Installation Jobs*

Job Name	Job Type	Description	RELFILE
IXMALLOC	Allocate	Sample job to allocate target and distribution libraries	IBM.HXML150.F2
IXMISMKD	MKDIR	Sample job to invoke the supplied IXMMKDIR EXEC to allocate HFS paths	IBM.HXML150.F2
IXMDDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HXML150.F2
IXMAPPLY	APPLY	Sample APPLY job	IBM.HXML150.F2
IXMACCEP	ACCEPT	Sample ACCEPT job	IBM.HXML150.F2

You can access the sample installation jobs by performing an SMP/E RECEIVE and then copying the jobs from the SMPTLIBs to a work data set for editing and submission. See Figure 18 to find the appropriate SMPTLIB data set.

## 6.1.6 Perform SMP/E RECEIVE

This step loads SYSMOD information for FMID HXML150, HXML140, and HXML130 from the program tape into the SMPPTS data set and the global zone, and places the associated data records into temporary SMPTLIB data sets for subsequent processing.

**Note:** If you obtained the Toolkit as part of a CBPDO, you can use the RCVPDO job found in the CBPDO RIMLIB data set to RECEIVE the Toolkit FMID HXML150, as well as information on each of the following (also included on the CBPDO tape):

1. service
2. HOLDATA
3. preventive service planning (PSP)

For more information, refer to the documentation included with the CBPDO.

## 6.1.7 Allocate SMP/E Target and Distribution Libraries and Paths

Edit and submit sample job IXMALLOC to allocate the SMP/E target and distribution libraries for the Toolkit. IXMALLOC must be run from the Toolkit V1R5 relfiles. Consult the instructions in the sample job for more information.

If you already have HXML130 or HXML140 installed, you need to run IXMALLOC from the Toolkit V1R5 relfile. That will give you the larger datasets in order for you to copy Toolkit V1R3 or V1R4 datasets into the larger datasets allocated by the Toolkit V1R5 IXMALLOC job. After you have allocated the data sets to the correct size, the DDDEFs must reflect the new names, if you used new names of the data sets.

**Expected Return Codes and Messages:** The job is considered successful if return code zero is received.

The IXMISMKD job invokes IXMMKDIR exec to create the ixm directory under `-PathPrefix-/usr/lpp` where `-PathPrefix-` is the high level directory name. Insure the directory path `-PathPrefix-/usr/lpp` exists prior to running this job.

Edit and submit sample job IXMISMKD to allocate the HFS paths for the Toolkit. IXMISMKD must be run from the Toolkit V1R5 relfiles. Consult the instructions in the sample job for more information.

If you plan to create a new HFS for this product, you should consider updating the BPXPRMxx PARMLIB member to mount the new HFS at IPL time. This may be helpful if an IPL occurs before the installation is complete.

**Expected Return Codes and Messages:** The job is considered successful if return code zero is received.

## 6.1.8 Create DDDEF Entries

Edit and submit sample job IXMDDEF to create DDDEF entries for the SMP/E target and distribution libraries for the Toolkit. IXMDDEF must be run from the Toolkit V1R5 relfiles.

SMP/E APPLY and ACCEPT processing for the Toolkit requires DDDEFs for SAMPLIB and ASAMPLIB since elements will be installed in these libraries. These libraries and DDDEFs are created during z/OS or OS/390 installation. DDDEFs are also required for SCEELKED and CSSLIB for CALLLIBS processing. These DDDEFs are created during z/OS or OS/390 installation. Consult the instructions in the sample job for more information.

**Expected Return Codes and Messages:** The job is considered successful if return code zero is received. Check the messages and ensure the DDDEFs were successfully created.

## 6.1.9 Perform SMP/E APPLY

**Note:** If Toolkit V1R3 or V1R4 were not previously installed, the SMP/E APPLY step must be performed for levels V1R3, V1R4, and V1R5, since they are shipped together. Otherwise, V1R3 (HXML130) or V1R4 (HXML140) should be removed from the APPLY job.

**Note:** If Toolkit V1R4 is removed and subsequently reinstalled, PTF UW95866 for APAR OW56816 will need to be reapplied. Also, if Toolkit V1R4 is being installed for the first time, PTF UW95866 for APAR OW56816 will need to be applied to Toolkit V1R4. Similarly, if Toolkit V1R3 is removed and subsequently reinstalled, PTF UW87032 for APAR OW53326 will need to be reapplied. Also, if Toolkit V1R3 is being installed for the first time, PTF UW87032 for APAR OW53326 will need to be applied to Toolkit V1R3.

Edit and submit sample job IXMAPPLY to perform an SMP/E APPLY CHECK for the Toolkit. IXMAPPLY must be run from Toolkit V1R5 relfiles. Run the APPLY CHECK to identify any requisite service and additional holds (for example, HOLDSYS(DOC,EC)) that might need to be resolved before APPLY processing. Resolve any holds and receive any requisite service identified by the APPLY CHECK before the next step. Consult the instructions in the sample job for more information.

Because this job references the Toolkit HFS path `/usr/lpp/ixm/IBM/`, it must run on a system that has z/OS UNIX or OS/390 UNIX in full-function mode (with the shell and utilities available) and have access to the file system containing the path. Superuser status is required to preserve access permission bits. In addition, the user ID under which the job executes must be defined to use z/OS UNIX or OS/390 UNIX (in other words, must contain an OMVS segment).

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the following on the APPLY CHECK: PRE, ID, REQ, and IFREQ. This is because the SMP/E root cause analysis identifies the cause only of **ERRORS** and not of **WARNINGS** (SYSMODs that are bypassed are treated as warnings, not errors, by SMP/E).

Once you have taken any actions indicated by the APPLY CHECK, remove the CHECK operand and run the job again to perform the APPLY.

**Note:** The GROUPEXTEND operand indicates that SMP/E apply all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions.

**Note:** When APPLYing HXML150, HXML140 and HXML130 together, you will receive NOT SELs for parts that are in those levels. The part will be selected for HXML150 and not be selected for HXML140 or HXML130. This is expected and acceptable. A similar situation will occur when APPLYing service to these parts.

**Expected Return Codes and Messages from APPLY CHECK:** The job is considered successful if return code zero is received.

**Expected Return Codes and Messages from APPLY:** For FMIDs HXML150, HXML140 and HXML130, which use SMP/E CALLLIBS, you will receive warning messages IEW2454W when the load modules are link edited into the SMPLTS data set. For example:

```
IEW2454W SYMBOL xxxxxxxx UNRESOLVED. NO AUTOCALL(NCAL) SPECIFIED
```

These warning messages are expected and are acceptable.

The job is considered successful if return code zero is received.

### 6.1.10 Tar Files for Toolkit V1R5, V1R4, and V1R3

Upon successful completion of the SMP/E apply step, tar files are placed into the XML HFS path /usr/lpp/ixm/IBM/. For each release installed, reference the following table for the name of the tar files.

<i>Figure 19. Tar Files Associated with each Toolkit Release</i>	
<b>Toolkit Release</b>	<b>Tar File Names</b>
Toolkit V1R5	IXMC500B, IXMJ410B, IXMJX24B
Toolkit V1R4	IXMC400B, IXMJ400B, IXMCX13B, IXMJX23B
Toolkit V1R3	IXMC351B, IXMJ321B, IXMCX12B, IXMJX22B

### 6.1.11 Directories for Toolkit V1R5, V1R4 and V1R3

The following tables show the directories that are created after a successful job, for each of the Toolkit parsers and XSLT processors:

<i>Figure 20. Directory Paths for the Toolkit V1R5 Parsers and XSLT Processors</i>	
<b>Component</b>	<b>Directory Path</b>
XML Parser for z/OS and OS/390, C++ Edition	/usr/lpp/ixm/IBM/xm14c-5_0
XML Parser for z/OS and OS/390, Java Edition	/usr/lpp/ixm/IBM/xm14j-4_1
XSLT Processor for z/OS and OS/390, Java Edition	/usr/lpp/ixm/IBM/LotusXSL-J_2_4

<i>Figure 21. Directory Paths for the Toolkit V1R4 Parsers and XSLT Processors</i>	
<b>Component</b>	<b>Directory Path</b>
XML Parser for z/OS and OS/390, Java Edition	/usr/lpp/ixm/IBM/xm14j-4_0
XML Parser for z/OS and OS/390, C++ Edition	/usr/lpp/ixm/IBM/xm14c-4_0
XSLT Processor for z/OS and OS/390, Java Edition	/usr/lpp/ixm/IBM/LotusXSL-J_2_3
XSLT Processor for z/OS and OS/390, C++ Edition	/usr/lpp/ixm/IBM/LotusXSL-C_1_3

Figure 22. Directory Paths for the Toolkit V1R3 Parsers and XSLT Processors

Component	Directory Path
XML Parser for z/OS and OS/390, Java Edition	/usr/lpp/ixm/IBM/XML4J-3_2_1
XML Parser for z/OS and OS/390, C++ Edition	/usr/lpp/ixm/IBM/xm14c3_5_1
XSLT Processor for z/OS and OS/390, Java Edition	/usr/lpp/ixm/IBM/lotusxsl-j_2_2
XSLT Processor for z/OS and OS/390, C++ Edition	/usr/lpp/ixm/IBM/lotusxsl-c_1_2

## 6.1.12 Perform SMP/E ACCEPT

**Note:** If Toolkit V1R3 or V1R4 was not previously installed, the SMP/E ACCEPT step must be performed for levels V1R3, V1R4 and V1R5, since they are shipped together. Otherwise, V1R3 (HXML130) or V1R4 (HXML140) should be removed from the ACCEPT job.

Edit and submit sample job IXMACCEP to perform an SMP/E ACCEPT CHECK for the Toolkit. IXMACCEP must be run from the Toolkit V1R5 relfiles. The ACCEPT CHECK processing will identify any requisite service and additional holds (for example, HOLDSYS(DOC,EC)) that may need to be resolved before ACCEPT processing. Resolve any holds, and RECEIVE and APPLY any requisite service identified by ACCEPT CHECK before the next step. Consult the instructions in the sample job for more information.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the following on the ACCEPT CHECK: PRE, ID, REQ, and IFREQ. This is because the SMP/E root cause analysis identifies the cause only of **ERRORS** and not of **WARNINGS** (SYSMODs that are bypassed are treated as warnings, not errors, by SMP/E).

Before using SMP/E to load new distribution libraries, it is recommended that you set the ACCJCLIN indicator in the distribution zone. This will cause entries produced from JCLIN to be saved in the distribution zone whenever a SYSMOD containing inline JCLIN is accepted. For more information on the ACCJCLIN indicator, see the description of inline JCLIN in the SMP/E manuals.

Once you have taken any actions indicated by the ACCEPT CHECK, remove the CHECK operand and run the job again to perform the ACCEPT.

**Note:** The GROUPEXTEND operand indicates that SMP/E accept all requisite SYSMODs. The requisite SYSMODS might be applicable to other functions. If you want SMP/E processing to exclude APARs and usermods, specify 'GROUPEXTEND(NOAPARS,NOUSERMODS)' with the ACCEPT command in the job.

**Note:** When ACCEPTing HXML150, HXML140 and HXML130 together, you will receive NOT SELs for parts that are in those levels. The part will be selected for HXML150 and not be selected for HXML140 or HXML130. This is expected and acceptable. A similar situation will occur when ACCEPTing service to these parts.

**Expected Return Codes and Messages from ACCEPT CHECK:** The job is considered successful if return code zero is received.

**Expected Return Codes and Messages from ACCEPT:** The job is considered successful if return code zero is received.

If PTFs containing replacement modules are being accepted, SMP/E ACCEPT processing will linkedit and bind the modules into the distribution libraries. During this processing, the linkage editor or binder may issue messages documenting unresolved external references, resulting in a return code of 4 from the ACCEPT step. These messages can be ignored, because the distribution libraries are not executable and the unresolved external references will not affect the executable system libraries.

### 6.1.13 Cleaning Up Obsolete Data Sets, Paths, and DDDEFs

There are no obsolete data sets, paths, or DDDEFs to delete in the Toolkit.

---

## 6.2 Activating the Toolkit

The Toolkit consists of a set of interfaces and conforms to various specifications that are necessary for activation. The following two tables presents a quick summary of the major features found in the XML Toolkit for z/OS and OS/390 V1R5 package. Symbols in the tables have the following meaning:

- "-": feature absent;
- "S": completely supported;
- "P": subset;
- "X": experimental;
- "N/A": not applicable.

*Figure 23 (Page 1 of 2). Interfaces and Specifications for the Toolkit Parsers*

Interfaces and Specifications	C++ Edition parser			Java Edition parser		
	V1R5	V1R4	V1R3	V1R5	V1R4	V1R3
DOM 1.0	S	S	S	S	S	S
DOM 2.0	S	S	S	S	S	S
DOM 3.0	P, X	-	-	P, X	P, X	P, X
SAX 1.0	S	S	S	S	S	S
SAX 2.0	S	S	S	S	S	S
IDOM	see below	X	X	-	-	-
XML 1.0	S	S	S	S	S	S
Namespaces	S	S	S	S	S	S
Schema	S	S	P, X	S	S	S
JAXP 1.0	-	-	-	S	S	S



<i>Figure 23 (Page 2 of 2). Interfaces and Specifications for the Toolkit Parsers</i>						
JAXP 1.1	-	-	-	S	S	S
JAXP 1.2	-	-	-	S	-	-

The experimental IDOM has been renamed and now becomes the recommended DOM C++ Binding. This change affects Toolkit V1R5 only.

<i>Figure 24. Interfaces and Specifications for the Toolkit Processors</i>						
Interfaces and Specifications	C++ Edition processor			Java Edition processor		
	V1R5	V1R4	V1R3	V1R5	V1R4	V1R3
XSL Transformations	N/A	S	S	S	S	S
XPATH 1.0	N/A	S	S	S	S	S
TRaX	N/A	-	-	S	S	S

Sample applications have also been provided to demonstrate the features of the Toolkit. The procedures required to set up and configure these sample applications for z/OS, OS/390, z/OS UNIX and OS/390 UNIX environments are described herein.

## 6.2.1 Toolkit Activation Procedure Updates

This section provides a brief summary of the changes and updates to the Toolkit activation procedures for releases V1R5, V1R4, V1R3. Note that the changes are effective in the release they were implemented, as well as all subsequent releases. However, these changes are not effective for releases prior to the changed release. For example, changes implemented in V1R4 **DO NOT** apply to V1R3, but are applicable to V1R5 (with the exception of XSLT Processor for z/OS and OS/390, C++ Edition, since it is not available in V1R5). The following is a list of activation changes for each release of the Toolkit.

- V1R5
  - This release runs only on z/OS.
  - Unicode Services activation instructions provided for XML Parser for z/OS and OS/390, C++ Edition.
  - Export statement changed in build instructions for XML Parser for z/OS and OS/390, C++ Edition z/OS UNIX and OS/390 UNIX environments.
- V1R4
  - A new export statement `export ICU_DATA=$XERCESSROOT/lib` is required for setting the library path for running XML Parser for z/OS and OS/390, C++ Edition and XSLT Processor for z/OS and OS/390, C++ Edition. For more information, see pages 33 and 51, respectively.
  - The XML Parser for z/OS and OS/390, Java Edition `xerces.jar` file has been replaced by two new files: `xercesImpl.jar` and `xmlParserAPIs.jar`. For more information on this, see page 46.

- The XSLT Processor for z/OS and OS/390, Java Edition xerces.jar file has been replaced by two new files: xercesImpl.jar and xml-apis.jar. For more information on this, see page 57.
- The naming conventions for the MVS native definition side-decks have been changed. They will no longer have the same name as the .dll files. Presented below is a list of the new names for the side-decks affected by this change:
  - IXM4C40X, instead of IXM4C40
  - IXM20UCX, instead of IXMI20UC
  - IXM2018X, instead of IXMI2018
  - IXMLC13X, instead of IXMLC13
- V1R3

## 6.2.2 Setting Up and Configuring XML Parser for z/OS and OS/390, C++ Edition

To run the XML Parser for z/OS and OS/390, C++ Edition, certain preconditions must be met. First, International Components for Unicode (ICU) libraries are needed to run XML Parser for z/OS and OS/390, C++ Edition. These are included in the Toolkit package. More information on these libraries and how to use them can be found in the following sections 6.2.2.1.2, “Running sample applications on the z/OS UNIX and OS/390 UNIX Environments” on page 33 and 6.2.2.2.2, “Running sample applications on the z/OS and OS/390 Environments” on page 35.

Second, XML Parser for z/OS and OS/390, C++ Edition requires the run-time library provided by Language Environment, SCEERUN, to be made available in the program search order. The best way to do that is by adding SCEERUN data set in the LNKLST. If you do not wish to add SCEERUN to the LNKLST, access SCEERUN data set through STEPLIB in the Toolkit. The STEPLIB approach is a supported environment by IBM.

Third, the GNU make utility (gmake) is required to build the samples (unless the samples have already been built). To download and install gmake go to:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxa1ty1.html#gmake>

For information on using gmake, see the IBM redbook *Open Source Software for OS/390 UNIX*, SG24-5944 available online at:

<http://www.ibm.com/redbooks/>

Please note that all references to gmake refer to the GNU make utility.

Samples have been provided to demonstrate the features of the XML Parser for z/OS and OS/390, C++ Edition. These samples use simple applications written on top of the SAX, DOM, and IDOM API's. The IDOM API is an experimental, higher performing DOM API in Toolkit V1R3 and V1R4. In Toolkit V1R5 it has been renamed and becomes the recommended DOM C++ Binding. The following samples can be found in the /samples directory:

<b>SAXCount</b>	counts the elements, attributes, spaces and characters in an XML file
<b>SAX2Count</b>	same as SAXCount, except uses SAX 2.0
<b>SAXPrint</b>	parses an XML file and prints it out
<b>SAX2Print</b>	same as SAXPrint, except uses SAX 2.0
<b>DOMCount</b>	counts the elements, attributes, spaces and characters in an XML file
<b>IDOMCount**</b>	counts the elements, attributes, spaces and characters in an XML file (uses experimental IDOM API)
<b>DOMPrint</b>	parses an XML file and prints it out
<b>IDOMPrint**</b>	parses an XML file and prints it out (uses experimental IDOM API)
<b>MemParse</b>	parses XML in a memory buffer, outputting the number of elements and attributes
<b>Redirect</b>	redirects the input stream for external entities
<b>PParse</b>	demonstrates progressive parsing
<b>StdInParse</b>	demonstrates streaming XML data from standard input
<b>EnumVal</b>	shows how to enumerate the markup declarations in a DTD validator
<b>SEnumVal*</b>	shows how to enumerate the markup declarations in a Schema validator
<b>CreateDOMDocument</b>	creates a DOM tree in memory from scratch

\* new in Toolkit V1R4

\*\* not available in Toolkit V1R5

**Note:** These samples are only examples of how to activate the XML Parser for z/OS and OS/390, C++ Edition. You will need to modify your own applications accordingly.

The procedures for building these samples are outlined in sections 6.2.2.1.1, “Building sample applications on the z/OS UNIX and OS/390 UNIX Environments” and 6.2.2.2.1, “Building sample applications on the z/OS and OS/390 Environments” on page 34. The procedures for running these samples are outlined in sections 6.2.2.1.2, “Running sample applications on the z/OS UNIX and OS/390 UNIX Environments” on page 33 and 6.2.2.2.2, “Running sample applications on the z/OS and OS/390 Environments” on page 35.

## 6.2.2.1 z/OS UNIX and OS/390 UNIX Environments

**6.2.2.1.1 Building sample applications on the z/OS UNIX and OS/390 UNIX Environments:** Before being able to build the provided samples, the system environment must be configured correctly. Doing so requires the use of the GNU make utility (gmake). To download and install gmake go to:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxalty1.html#gmake>

For information on using gmake, see the IBM redbook *Open Source Software for OS/390 UNIX*, SG24-5944 available online at:

<http://www.ibm.com/redbooks/>

Please note that all references to gmake refer to the GNU make utility.

The first thing that must be accomplished is setting the XML4C root path. To set the XML4C root path correctly, issue the following command statement:

```
export XERCESCR00T=<full path to parser>
```

For more information on <full path to parser>, see Figure 20 on page 26, Figure 21 on page 26, and Figure 22 on page 27.

Next, environment variables must be set up. This is done through the following sequence:

```
unset _CXX_CXXSUFFIX
export CXX=c++
```

(If you are using V1R3 or V1R4, type the below line)  
export CXXFLAGS=-2 (or -g if building a debug version)

(If you are using V1R5 only, type the following line)  
export CXXFLAGS="-2 -Wc,staticinline" (-g instead of -2, for debug)

Once the environment variables have been properly set, Makefiles must be created. Type the configure command at the prompt inside the <full path to parser>/samples directory

```
cd $XERCESCR00T/samples
configure
```

and the necessary Makefiles will be created for all sample program modules.

Once the Makefiles have been created, you are now ready to build the samples. The following sequence shows how to build the samples:

```
export _CXX_CXXSUFFIX=cpp
export _CXX_CCMODE=1
export _CXX_CVERSION="0x220a0000" - (only if using Toolkit V1R4 or
                                V1R3 - see note below)
```

```
gmake
```

**Note:** Samples from Toolkit V1R4 and V1R3 need to be compiled with an OS/390 V2R10 C/C++ compiler or lower. If you are using a C/C++ compiler level higher than OS/390 V2R10 (for example, z/OS V1R2), you will need to set the C/C++ compiler level to the OS/390 V2R10 version. This is accomplished by issuing the following command: `export _CXX_CVERSION="0x220a0000"`

After issuing the gmake command, the build process is completed. The built samples are placed in the <full path to parser>/bin directory.

**6.2.2.1.2 Running sample applications on the z/OS UNIX and OS/390 UNIX Environments:** Library files are required to run XML Parser for z/OS and OS/390, C++ Edition on z/OS UNIX and OS/390 UNIX. These files can be found in the \$XERCESSROOT/lib directory, where \$XERCESSROOT=<full path to parser> The file names and their descriptions are displayed in the following table:

*Figure 25. Library Files Required to Run XML Parser for z/OS and OS/390, C++ Edition on z/OS UNIX and OS/390 UNIX*

Library File Name for Toolkit V1R5	Library File Name for Toolkit V1R4	Library File Name for Toolkit V1R3	Library File Description
libxerces-c2_1_0.dll	libxerces-c1_6_0.dll	libxerces-c1_5.dll	the XML Parser for z/OS and OS/390, C++ Edition library file
libxerces-c2_1_0.x	libxerces-c1_6_0.x	libxerces-c1_5.x	the definition side-deck that describes the XML Parser for z/OS and OS/390, C++ Edition functions and the variables
libicuuc22.0.dll, libicudata22.0.dll, libicudata_stub22.dll	libicuuc.20.2.dll, libicudt20e.dll, libicudt20e_390.dll	libicuuc18.dll, libicudt18e.dll, libicudt18e_390.dll	ICU library files

**Note:** Any application that is to invoke the XML Parser for z/OS and OS/390, C++ Edition parser under the OS/390 UNIX System Services environment must include libxerces-c2\_1\_0.x, libxerces-c1\_6.x, or libxerces-c1\_5.x (depending on the release of the Toolkit) when they bind. The binder uses the definition side-deck to resolve references to functions and variables defined in libxerces-c2\_1\_0.dll, libxerces-c1\_6.dll, or libxerces-c1\_5.dll (again, depending on the release of the Toolkit).

Before running the samples, you must ensure that the library path is set properly. This is done by typing in the following command statements:

```
export LIBPATH=$XERCESSROOT/lib:$LIBPATH
(If you are using V1R3, skip the next line)
export ICU_DATA=$XERCESSROOT/lib
export PATH=$XERCESSROOT/bin:$PATH
```

You are now set to run the sample applications. For example, to run the SAXCount application from the \$XERCESSROOT/bin directory, type the following command statement:

```
SAXCount $XERCESSROOT/samples/data/personal.xml
```

This sample application will then count the number of elements, attributes, spaces and characters in the XML file personal.xml.

## 6.2.2.2 z/OS and OS/390 Environments

**6.2.2.2.1 Building sample applications on the z/OS and OS/390 Environments:** Before being able to build the provided samples, the system environment must be configured correctly. Doing so requires the use of the GNU make utility (gmake). To download and install gmake go to:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxalty1.html#gmake>

For information on using gmake, see the IBM redbook *Open Source Software for OS/390 UNIX*, SG24-5944 available online at:

<http://www.ibm.com/redbooks/>

Please note that all references to gmake refer to the GNU make utility.

To be able to run the sample applications, you must first allocate a data set. The following is an example of a dataset allocation:

```
userid.SAMPLES.rel.LOAD, 100 tracks on 3390, Record format: U,  
Record Length: 0, Block size: 32760, ORG: PDS,  
Directory blocks: 6
```

**Note:** If you are building samples from multiple releases, you will need a unique PDS for each release. For example, SAMPLES.V1R3.LOAD for samples from Toolkit V1R3 and SAMPLES.V1R4.LOAD for samples from Toolkit V1R4. Also, if you are expecting to build samples from both XSLT Processor for z/OS and OS/390, C++ Edition and XML Parser for z/OS and OS/390, C++ Edition, you will need an additional 150 tracks for the XSLT Processor for z/OS and OS/390, C++ Edition samples. This will raise the total number of required tracks to 250 in this example.

The XML4C root path must now be set. To set the XML4C root path correctly, issue the following command statement:

```
export XERCECROOT=<full path to parser>
```

**Note:** For more information on <full path to parser>, see Figure 20 on page 26, Figure 21 on page 26, and Figure 22 on page 27.

After which the environment variables must be set up. This is done through the following sequence:

```
export LOADMOD=userid.SAMPLES.rel.LOAD  
export LOADEXP=hlq.SIXMEXP  
export OS390BATCH=1
```

```
unset _CXX_CXXSUFFIX  
export CXX=c++
```

(If you are using V1R3 or V1R4, type the below line)  
export CXXFLAGS=-2 (or -g if building a debug version)

(If you are using V1R5 only, type the following line)  
export CXXFLAGS="-2 -Wc,staticinline" (-g instead of -2, for debug)

Once the environment variables have been properly set, Makefiles must be created. Type the configure command at the prompt inside the <full path to parser>/samples directory

```
cd $XERCESSROOT/samples
configure
```

and the necessary Makefiles will be created for all sample program modules.

After the Makefiles have been created, you are now ready to build the samples. The following sequence shows how to build the samples:

```
export _CXX_CXXSUFFIX=cpp
export _CXX_XSUFFIX_HOST=SIXMEXP
export _CXX_CCMODE=1
export _CXX_CVERSION="0x220a0000" - (only if using V1R4 or V1R3
                                   - see note on page 32)
```

```
gmake
```

After you have issued the gmake command, the build process is now completed. The built samples are placed into the *userid.SAMPLES.rel.LOAD* data set.

**6.2.2.2 Running sample applications on the z/OS and OS/390 Environments:** Library files are required to run XML Parser for z/OS and OS/390, C++ Edition on z/OS and OS/390. The following table is a list of library files required, a short description of the files, and the dataset names of where these files are located. The required library files are listed for three versions of the Toolkit: V1R5, V1R4 and V1R3.

*Figure 26 (Page 1 of 2). Library Files Required to Build and Run XML Parser for z/OS and OS/390, C++ Edition on z/OS and OS/390*

Library File Name for V1R5	Library File Name for V1R4	Library File Name for V1R3	Library File Description	Library Dataset Name
IXM4C50	IXM4C40	IXM4C35	XML Parser for z/OS and OS/390, C++ Edition library file	hlq.SIXMMOD1
IXM4C50X	IXM4C40X	IXM4C35	definition side-deck that describes the XML Parser for z/OS and OS/390, C++ Edition functions and the variables	hlq.SIXMEXP
IXMI22UC	IXMI20UC	IXMI18UC	ICU library file (explicitly loaded by IXM4C50, IXM4C40 or IXM4C35)	hlq.SIXMMOD1

Figure 26 (Page 2 of 2). Library Files Required to Build and Run XML Parser for z/OS and OS/390, C++ Edition on z/OS and OS/390

Library File Name for V1R5	Library File Name for V1R4	Library File Name for V1R3	Library File Description	Library Dataset Name
IXMI22D1	IXMI20D1	IXMI18D1	ICU converter data library file (implicitly loaded by IXM4C50, IXM4C40 or IXM4C35)	hlq.SIXMMOD1
IXMI22DA	IXMI20DA	IXMI18DA	ICU converter data library file (implicitly loaded by IXM4C50, IXM4C40 or IXM4C35)	hlq.SIXMMOD1

**Note:** Any application that is to invoke the XML Parser for z/OS and OS/390, C++ Edition parser under the native z/OS or OS/390 environments must include the IXM4C50X, IXM4C40X, or IXM4C35 definition side-deck when they bind. The binder uses the definition side-deck to resolve references to functions and variables defined in IXM4C50, IXM4C40, or IXM4C35.

Before you run the samples, you must make sure that you have access to the library, SIXMMOD1. You can ask your system programmer to install SIXMMOD1 in LNKLST. If the SIXMMOD1 data set cannot be placed in LNKLST, you can STEPLIB the data set for each application that requires it. You can invoke the samples from TSO or a JCL job. For example, you can submit the following JCL to run SAXCount.

```
//USERJOB JOB MSGLEVEL=(1,1),CLASS=A
//TEST EXEC PGM=SAXCOUNT,
//* HFS file input
// PARM='<full path to parser>/samples/data/personal.xml'
//*
//* DDNAME input
//* PARM='///DD:XMLDATA(PERSONAL)'
//* PARM='DD:XMLDATA(PERSONAL)'
//*
//* Data set input
//* PARM='""/'USERID.XML.DATA(PERSONAL)''''
//* PARM='""/XML.DATA(PERSONAL)''
//*
//STEPLIB DD DSN=hlq.SIXMMOD1,DISP=SHR
// DD DSN=userid.SAMPLES.rel.LOAD,DISP=SHR
//*XMLDATA DD DSN=userid.XML.DATA,DISP=SHR
/*
```



**Note:** In the above PARM statement `PARM='/<full path to parser>/samples/data/personal.xml'`, make sure there is an additional starting slash '/' inside `<full path to parser>` For example, if `<full path to parser>` is

```
/usr/lpp/ixm/IBM/xml4c-4_0
```

then the PARM statement should look like

```
PARM='/usr/lpp/ixm/IBM/xml4c-4_0/samples/data/personal.xml'
```

Using the same example, to run under a POSIX environment specify

```
PARM='POSIX(ON)//usr/lpp/ixm/IBM/xml4c-4_0/samples/data /personal.xml'
```

### 6.2.2.3 z/OS Support for Unicode

The Toolkit V1R5 can receive performance enhancements through z/OS support for Unicode. These services are not mandatory for installation of the Toolkit but will be utilized if z/OS support for Unicode is configured correctly. You will need to read and understand the instructions from *z/OS Support for Unicode: Using Conversion Services*, SA22-7649-02, available for download at:

<http://publibz.boulder.ibm.com/epubs/pdf/iea2un20.pdf>

If you are not currently using z/OS Support for Unicode, install the component as described in *z/OS Support for Unicode: Using Conversion Services*. When you get to chapter 3, "Creating the conversion environment", use the sample job provided with the XML Toolkit to create the conversion environment. Then follow the directions to activate the conversion environment. The Toolkit will now be able to take advantage of the services.

If you are currently using z/OS support for Unicode, you may have to make changes to your existing conversion environment. You will need to:

1. Locate the job you used to create your existing conversion environment.
2. Compare your existing job to the sample job provided with the Toolkit
3. Add any new control statements which do not exist in your current job.
4. If the the ccsid parameters are the same on any entry, but the techniques are different, then you must add the control statement with the different technique.
5. Create the new conversion environment.
6. Refer to chapter 4, "Changing the conversion environment" for instructions on how to activate the new conversion environment.

The following sample job is provided with the Toolkit to create the conversion environment.

```
//IMGJOB JOB CLASS=B,REGION=99000K
/* **PROPRIETARY_STATEMENT*****
/*
/*
/* LICENSED MATERIALS - PROPERTY OF IBM
/* THIS MACRO IS "RESTRICTED MATERIALS OF IBM"
/*
```

```

/* 5655-D44 (C) COPYRIGHT IBM CORP. 2002 *
/* *
/* STATUS= HXML150 *
/* *
/* **END_OF_PROPRIETARY_STATEMENT*****
/* *
/* This is a sample job which illustrates how to configure z/OS *
/* Unicode Services for use with the XML Parser, C++ edition. If you *
/* already are using Unicode Services with other applications, then *
/* merge these entries with your existing configuration. *
/* *
/* See "z/OS Support for Unicode: Using Conversion Services" for *
/* information on how to configure Unicode Services. You will need *
/* to change the TABIN and SYSIMG DD statements for your own *
/* installation. *
/* *
/* It is important that the "technique-search-order" parameters *
/* be defined as shown in this job or the XML Parser will not *
/* operate correctly. *
/* *
/* *****
//CUNMIUTL EXEC PGM=CUNMIUTL
//SYSPRINT DD SYSOUT=*
//TABIN DD DISP=SHR,DSN=SYS1.UNC.SCUNTB
//SYSIMG DD DSN=SYS1.PARMLIB(CUNIMG01),DISP=SHR
//SYSIN DD *
CASE NORMAL; /* ENABLE TOUPPER AND TOLOWER */
CONVERSION 37,1200;
CONVERSION 1200,37;
CONVERSION 37,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,37,L; /* THIS SWAPS NL AND LF */
CONVERSION 273,1200;
CONVERSION 1200,273;
CONVERSION 277,1200;
CONVERSION 1200,277;
CONVERSION 278,1200;
CONVERSION 1200,278;
CONVERSION 280,1200;
CONVERSION 1200,280;
CONVERSION 284,1200;
CONVERSION 1200,284;
CONVERSION 285,1200;
CONVERSION 1200,285;
CONVERSION 297,1200;
CONVERSION 1200,297;
CONVERSION 367,1200;
CONVERSION 1200,367;
CONVERSION 420,1200;
CONVERSION 1200,420;

```

CONVERSION 424,1200;  
CONVERSION 1200,424;  
CONVERSION 437,1200;  
CONVERSION 1200,437;  
CONVERSION 500,1200;  
CONVERSION 1200,500;  
CONVERSION 806,1200;  
CONVERSION 1200,806;  
CONVERSION 808,1200;  
CONVERSION 1200,808;  
CONVERSION 819,1200;  
CONVERSION 1200,819;  
CONVERSION 848,1200;  
CONVERSION 1200,848;  
CONVERSION 849,1200;  
CONVERSION 1200,849;  
CONVERSION 850,1200;  
CONVERSION 1200,850;  
CONVERSION 851,1200;  
CONVERSION 1200,851;  
CONVERSION 852,1200;  
CONVERSION 1200,852;  
CONVERSION 855,1200;  
CONVERSION 1200,855;  
CONVERSION 856,1200;  
CONVERSION 1200,856;  
CONVERSION 857,1200;  
CONVERSION 1200,857;  
CONVERSION 858,1200;  
CONVERSION 1200,858;  
CONVERSION 859,1200;  
CONVERSION 1200,859;  
CONVERSION 860,1200;  
CONVERSION 1200,860;  
CONVERSION 861,1200;  
CONVERSION 1200,861;  
CONVERSION 862,1200;  
CONVERSION 1200,862;  
CONVERSION 863,1200;  
CONVERSION 1200,863;  
CONVERSION 864,1200;  
CONVERSION 1200,864;  
CONVERSION 865,1200;  
CONVERSION 1200,865;  
CONVERSION 866,1200;  
CONVERSION 1200,866;  
CONVERSION 867,1200;  
CONVERSION 1200,867;  
CONVERSION 868,1200;

CONVERSION 1200,868;  
CONVERSION 869,1200;  
CONVERSION 1200,869;  
CONVERSION 870,1200;  
CONVERSION 1200,870;  
CONVERSION 871,1200;  
CONVERSION 1200,871;  
CONVERSION 872,1200;  
CONVERSION 1200,872;  
CONVERSION 874,1200;  
CONVERSION 1200,874;  
CONVERSION 875,1200;  
CONVERSION 1200,875;  
CONVERSION 878,1200;  
CONVERSION 1200,878;  
CONVERSION 901,1200;  
CONVERSION 1200,901;  
CONVERSION 902,1200;  
CONVERSION 1200,902;  
CONVERSION 912,1200;  
CONVERSION 1200,912;  
CONVERSION 913,1200;  
CONVERSION 1200,913;  
CONVERSION 914,1200;  
CONVERSION 1200,914;  
CONVERSION 915,1200;  
CONVERSION 1200,915;  
CONVERSION 916,1200;  
CONVERSION 1200,916;  
CONVERSION 918,1200;  
CONVERSION 1200,918;  
CONVERSION 920,1200;  
CONVERSION 1200,920;  
CONVERSION 921,1200;  
CONVERSION 1200,921;  
CONVERSION 922,1200;  
CONVERSION 1200,922;  
CONVERSION 923,1200;  
CONVERSION 1200,923;  
CONVERSION 933,1200;  
CONVERSION 1200,933;  
CONVERSION 935,1200;  
CONVERSION 1200,935;  
CONVERSION 937,1200;  
CONVERSION 1200,937;  
CONVERSION 939,1200;  
CONVERSION 1200,939;  
CONVERSION 942,1200;  
CONVERSION 1200,942;

```
CONVERSION 943,1200;
CONVERSION 1200,943;
CONVERSION 949,1200;
CONVERSION 1200,949;
CONVERSION 950,1200;
CONVERSION 1200,950;
CONVERSION 970,1200;
CONVERSION 1200,970;
CONVERSION 1006,1200;
CONVERSION 1200,1006;
CONVERSION 1025,1200;
CONVERSION 1200,1025;
CONVERSION 1047,1200;
CONVERSION 1200,1047;
CONVERSION 1047,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1047,L; /* THIS SWAPS NL AND LF */
CONVERSION 1051,1200;
CONVERSION 1200,1051;
CONVERSION 1089,1200;
CONVERSION 1200,1089;
CONVERSION 1097,1200;
CONVERSION 1200,1097;
CONVERSION 1098,1200;
CONVERSION 1200,1098;
CONVERSION 1112,1200;
CONVERSION 1200,1112;
CONVERSION 1122,1200;
CONVERSION 1200,1122;
CONVERSION 1123,1200;
CONVERSION 1200,1123;
CONVERSION 1124,1200;
CONVERSION 1200,1124;
CONVERSION 1125,1200;
CONVERSION 1200,1125;
CONVERSION 1129,1200;
CONVERSION 1200,1129;
CONVERSION 1130,1200;
CONVERSION 1200,1130;
CONVERSION 1131,1200;
CONVERSION 1200,1131;
CONVERSION 1132,1200;
CONVERSION 1200,1132;
CONVERSION 1133,1200;
CONVERSION 1200,1133;
CONVERSION 1137,1200;
CONVERSION 1200,1137;
CONVERSION 1140,1200;
CONVERSION 1200,1140;
CONVERSION 1140,1200,L; /* THIS SWAPS NL AND LF */
```

```
CONVERSION 1200,1140,L; /* THIS SWAPS NL AND LF */
CONVERSION 1141,1200;
CONVERSION 1200,1141;
CONVERSION 1142,1200;
CONVERSION 1200,1142;
CONVERSION 1142,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1142,L; /* THIS SWAPS NL AND LF */
CONVERSION 1143,1200;
CONVERSION 1200,1143;
CONVERSION 1143,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1143,L; /* THIS SWAPS NL AND LF */
CONVERSION 1144,1200;
CONVERSION 1200,1144;
CONVERSION 1144,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1144,L; /* THIS SWAPS NL AND LF */
CONVERSION 1145,1200;
CONVERSION 1200,1145;
CONVERSION 1145,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1145,L; /* THIS SWAPS NL AND LF */
CONVERSION 1146,1200;
CONVERSION 1200,1146;
CONVERSION 1146,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1146,L; /* THIS SWAPS NL AND LF */
CONVERSION 1147,1200;
CONVERSION 1200,1147;
CONVERSION 1147,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1147,L; /* THIS SWAPS NL AND LF */
CONVERSION 1148,1200;
CONVERSION 1200,1148;
CONVERSION 1148,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1148,L; /* THIS SWAPS NL AND LF */
CONVERSION 1149,1200;
CONVERSION 1200,1149;
CONVERSION 1149,1200,L; /* THIS SWAPS NL AND LF */
CONVERSION 1200,1149,L; /* THIS SWAPS NL AND LF */
CONVERSION 1153,1200;
CONVERSION 1200,1153;
CONVERSION 1154,1200;
CONVERSION 1200,1154;
CONVERSION 1156,1200;
CONVERSION 1200,1156;
CONVERSION 1157,1200;
CONVERSION 1200,1157;
CONVERSION 1158,1200;
CONVERSION 1200,1158;
CONVERSION 1159,1200;
CONVERSION 1200,1159;
CONVERSION 1160,1200;
CONVERSION 1200,1160;
```

CONVERSION 1164,1200;  
CONVERSION 1200,1164;  
CONVERSION 1208,1200;  
CONVERSION 1200,1208;  
CONVERSION 1250,1200;  
CONVERSION 1200,1250;  
CONVERSION 1251,1200;  
CONVERSION 1200,1251;  
CONVERSION 1252,1200;  
CONVERSION 1200,1252;  
CONVERSION 1253,1200;  
CONVERSION 1200,1253;  
CONVERSION 1254,1200;  
CONVERSION 1200,1254;  
CONVERSION 1255,1200;  
CONVERSION 1200,1255;  
CONVERSION 1256,1200;  
CONVERSION 1200,1256;  
CONVERSION 1257,1200;  
CONVERSION 1200,1257;  
CONVERSION 1258,1200;  
CONVERSION 1200,1258;  
CONVERSION 1275,1200;  
CONVERSION 1200,1275;  
CONVERSION 1276,1200;  
CONVERSION 1200,1276;  
CONVERSION 1277,1200;  
CONVERSION 1200,1277;  
CONVERSION 1280,1200;  
CONVERSION 1200,1280;  
CONVERSION 1281,1200;  
CONVERSION 1200,1281;  
CONVERSION 1282,1200;  
CONVERSION 1200,1282;  
CONVERSION 1283,1200;  
CONVERSION 1200,1283;  
CONVERSION 1363,1200;  
CONVERSION 1200,1363;  
CONVERSION 1364,1200;  
CONVERSION 1200,1364;  
CONVERSION 1370,1200;  
CONVERSION 1200,1370;  
CONVERSION 1371,1200;  
CONVERSION 1200,1371;  
CONVERSION 1381,1200;  
CONVERSION 1200,1381;  
CONVERSION 1383,1200;  
CONVERSION 1200,1383;  
CONVERSION 1386,1200;

CONVERSION 1200,1386;  
CONVERSION 1388,1200;  
CONVERSION 1200,1388;  
CONVERSION 1392,1200;  
CONVERSION 1200,1392;  
CONVERSION 1399,1200;  
CONVERSION 1200,1399;  
CONVERSION 4909,1200;  
CONVERSION 1200,4909;  
CONVERSION 4971,1200;  
CONVERSION 1200,4971;  
CONVERSION 5104,1200;  
CONVERSION 1200,5104;  
CONVERSION 5123,1200;  
CONVERSION 1200,5123;  
CONVERSION 5346,1200;  
CONVERSION 1200,5346;  
CONVERSION 5347,1200;  
CONVERSION 1200,5347;  
CONVERSION 5348,1200;  
CONVERSION 1200,5348;  
CONVERSION 5349,1200;  
CONVERSION 1200,5349;  
CONVERSION 5350,1200;  
CONVERSION 1200,5350;  
CONVERSION 5351,1200;  
CONVERSION 1200,5351;  
CONVERSION 5352,1200;  
CONVERSION 1200,5352;  
CONVERSION 5353,1200;  
CONVERSION 1200,5353;  
CONVERSION 5354,1200;  
CONVERSION 1200,5354;  
CONVERSION 9030,1200;  
CONVERSION 1200,9030;  
CONVERSION 9044,1200;  
CONVERSION 1200,9044;  
CONVERSION 9049,1200;  
CONVERSION 1200,9049;  
CONVERSION 9061,1200;  
CONVERSION 1200,9061;  
CONVERSION 9066,1200;  
CONVERSION 1200,9066;  
CONVERSION 9238,1200;  
CONVERSION 1200,9238;  
CONVERSION 12712,1200;  
CONVERSION 1200,12712;  
CONVERSION 16804,1200;  
CONVERSION 1200,16804;



```

CONVERSION 17248,1200;
CONVERSION 1200,17248;
CONVERSION 33722,1200;
CONVERSION 1200,33722;

```

/\*

### 6.2.3 Setting Up and Configuring XML Parser for z/OS and OS/390, Java Edition

Samples have been provided to help demonstrate the features of the XML Parser for z/OS and OS/390, Java Edition. These samples use simple applications written on top of the SAX and DOM API's. The following two tables display the samples that are found in the /samples directory. The first table shows samples found in Toolkit V1R5 and V1R4. The second table shows samples found in Toolkit V1R3.

<i>Figure 27. Samples for Toolkit V1R5 and V1R4 XML Parser for z/OS and OS/390, Java Edition</i>	
Sample Name	Sample Description
<b>DOM Samples from Package 'dom'</b>	
Counter	displays the time and count of elements, attributes, spaces, and characters in an XML file
GetElementsByTagName	parses an XML document searching for specific elements by name
Writer	parses an XML document and prints it
ASBuilder	prepares xml schema documents and validates instance documents against prepared schema grammars
<b>SAX Samples from Package 'sax'</b>	
Counter	displays the time and count of elements, attributes, spaces, and characters in an XML file
DocumentTracer	provides a trace of SAX2 events for files parsed
Writer	parses an XML document and prints it
<b>Socket Samples from Package 'socket'</b>	
DelayedInput	delays the input to the SAX parser to simulate reading data from a socket
KeepSocketOpen	wraps both the input and output stream on both ends of a socket

<i>Figure 28 (Page 1 of 2). Samples for Toolkit V1R3 XML Parser for z/OS and OS/390, Java Edition</i>	
Sample Name	Sample Description

Figure 28 (Page 2 of 2). Samples for Toolkit V1R3 XML Parser for z/OS and OS/390, Java Edition

DOM Samples from Package 'dom'	
DOMCount	counts the elements, attributes, spaces, and characters in an XML file
DOMFilter	parses an XML document searching for specific elements by name, or elements with specific attributes
DOMWriter	parses an XML document and prints it out
IteratorView	an interactive UI sample that displays the DOM tree
TreeViewer	displays the XML input file in a graphical tree based interface
SAX Samples from Package 'sax'	
SAXCount	counts the elements, attributes, spaces and characters in an XML file
SAX2Count	same as SAXCount, except uses SAX 2.0
SAXWriter	parses an XML file and prints it out
SAX2Writer	same as SAXWriter, except uses SAX 2.0

**Note:** These samples are only examples of how to activate the XML Parser for z/OS and OS/390, Java Edition. You will need to modify your own applications accordingly.

The procedures for running these samples are outlined in section 6.2.3.1, “Running XML Parser for z/OS and OS/390, Java Edition on z/OS UNIX and OS/390 UNIX.”

### 6.2.3.1 Running XML Parser for z/OS and OS/390, Java Edition on z/OS UNIX and OS/390 UNIX

The following command statement is required to run Toolkit V1R5 and V1R4 XML Parser for z/OS and OS/390, Java Edition samples on z/OS UNIX and OS/390 UNIX:

```
export XERCESJROOT=<full path to parser>
export CLASSPATH=.:$XERCESJROOT/xercesImpl.jar:$CLASSPATH
export CLASSPATH=$XERCESJROOT/xmlParserAPIs.jar:$CLASSPATH
export CLASSPATH=$XERCESJROOT/xercesSamples.jar:$CLASSPATH
```

The following command statement is required to run Toolkit V1R3 XML Parser for z/OS and OS/390, Java Edition samples on z/OS UNIX and OS/390 UNIX:

```
export XERCESJROOT=<full path to parser>
export CLASSPATH=.:$XERCESJROOT/xerces.jar:$XERCESJROOT/xercesSamples.jar:$CLASSPATH
```

**Note:** For more information on <full path to parser>, see Figure 20 on page 26, Figure 21 on page 26, and Figure 22 on page 27.

To run a sample application, just type the following:

```
java <package name>.<sample name> $XERCESJROOT/data/personal.xml
```

This will run the <sample name> application on the personal.xml file.

For example, to run the Counter application for Toolkit V1R5 or V1R4 on personal.xml, type:

```
java sax.Counter $XERCESJROOT/data/personal.xml
```

Similarly, to run the SaxCount application for Toolkit V1R3 on personal.xml, type:

```
java sax.SaxCount $XERCESJROOT/data/personal.xml
```

The applications will count the elements, attributes, spaces and characters in the personal.xml file. See Figures 27 and 28 for the complete package and sample names for the XML Parser for z/OS and OS/390, Java Edition.

## 6.2.4 Setting Up and Configuring XSLT Processor for z/OS and OS/390, C++ Edition

**Note:** XSLT Processor for z/OS and OS/390, C++ Edition is **NOT** available in Toolkit V1R5.

To run the XSLT Processor for z/OS and OS/390, C++ Edition, certain preconditions must be met. First, XML Parser for z/OS and OS/390, C++ Edition is required to run XSLT Processor for z/OS and OS/390, C++ Edition. Second, International Components for Unicode (ICU) libraries are also needed to run XSLT Processor for z/OS and OS/390, C++ Edition. These are included in the Toolkit package. More information on these libraries and how to use them can be found in the section 6.2.4.1.2, "Running sample applications on the z/OS UNIX and OS/390 UNIX Environments" on page 50.

Third, XSLT Processor for z/OS and OS/390, C++ Edition requires the run-time library provided by Language Environment, SCEERUN, to be made available in the program search order. The best way to do that is by adding SCEERUN data set in the LNKLST. If you do not wish to add SCEERUN to the LNKLST, access SCEERUN data set through STEPLIB in the Toolkit. The STEPLIB approach is a supported environment by IBM.

Fourth, the GNU make utility (gmake) is required to build the samples (unless the samples have already been built). To download and install gmake go to:

```
http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxa1ty1.html#gmake
```

For information on using gmake, see the IBM redbook *Open Source Software for OS/390 UNIX*, SG24-5944 available online at:

```
http://www.ibm.com/redbooks/
```

Please note that all references to gmake refer to the GNU make utility.

Lastly, to build samples or your own applications, the XSLT Processor for z/OS and OS/390, C++ Edition requires the XML4C and ICU header (.hpp) files, the XML4C and ICU definition side deck (.x) files, and the use of the Standard Template Library (STL). STL is now part of the ANSI/ISO C++ standard. Because the XSLT Processor for z/OS and OS/390, C++ Edition supports operating system releases that

do not contain the STL class library, it does not rely on the STL support in z/OS V1R2 or later. Therefore, you will need to install STLport. It is a multiplatform ANSI C++ Standard Library implementation. It is also a free, open-source product. Currently, STLport-4.0 is the only version that is supported. The STLport-4.0 version is available for download from the site:

<http://www.stlport.com/archive/>

For more details on the STL, see:

[http://www.sgi.com/tech/stl/stl\\_introduction.html](http://www.sgi.com/tech/stl/stl_introduction.html)

Samples have been provided to help demonstrate the features of the XSLT Processor for z/OS and OS/390, C++ Edition. These samples use simple applications written on top of the SAX, DOM, and LotusXSL (Xalan) API's. The following is a list of samples that can be found in the /samples directory:

<b>CompileStylesheet</b>	use a compiled stylesheet to perform a series of transformations
<b>DocumentBuilder</b>	programmatically constructs an XML document, applies the foo.xsl stylesheet to this document, and writes the output to foo.out
<b>ExternalFunctions</b>	implements, installs, and illustrates the usage of three extension functions
<b>SerializeNodeSet</b>	serializes the node set returned by the application of an XPath expression to an XML document
<b>SimpleTransform</b>	uses the foo.xsl stylesheet to transform foo.xml, and writes the output to foo.out
<b>SimpleXPathAPI</b>	uses the XPathEvaluator interface to evaluate an XPath expression from the specified context node of an XML file and displays the nodeset returned by the expression
<b>SimpleXPathCAPI</b>	uses the XPathEvaluator C interface to evaluate an XPath expression and displays the string value returned by the expression
<b>StreamTransform</b>	processes character input streams containing a stylesheet and an XML document, and writes the transformation output to a character output stream
<b>TraceListen</b>	trace events during a transformation
<b>UseStylesheetParam</b>	set a stylesheet parameter that the stylesheet uses during the transformation
<b>XalanTransform</b>	uses the XalanTransformer class and the associated C++ API to apply an XSL stylesheet file to an XML document file and write the transformation output to either an output file or to a stream
<b>XalanTransformerCallback</b>	returns transformation output in blocks to a callback function, which writes the output to a file
<b>XPathWrapper</b>	use this sample to find out what a given XPath expression returns from a given context node in an XML file.

**Note:** These samples are only examples of how to activate the XSLT Processor for z/OS and OS/390, C++ Edition. You will need to modify your own applications accordingly.

The procedures for building these samples are outlined in sections 6.2.4.1.1, “Building sample applications on the z/OS UNIX and OS/390 UNIX Environments” on page 49 and 6.2.4.1.3, “Building sample applications on the z/OS and OS/390 Environments” on page 53. The procedures for running these samples are outlined in sections 6.2.4.1.2, “Running sample applications on the z/OS UNIX and OS/390 UNIX Environments” on page 50 and 6.2.4.1.4, “Running sample applications on the z/OS and OS/390 Environments.” on page 54.

## 6.2.4.1 z/OS UNIX and OS/390 UNIX Environments

**6.2.4.1.1 Building sample applications on the z/OS UNIX and OS/390 UNIX Environments:** Library files are required to build XSLT Processor for z/OS and OS/390, C++ Edition on z/OS UNIX and OS/390 UNIX. These files can be found in the \$XALANCROOT/lib and \$XERCECROOT/lib directories, where \$XALANCROOT=<full path to processor> and \$XERCECROOT=<full path parser>.

<i>Figure 29. Library Files Required to Build XSLT Processor for z/OS and OS/390, C++ Edition on z/OS UNIX and OS/390 UNIX</i>	
Library File Name	Library File Description
<b>Toolkit V1R4</b>	
libxalan-c1_3.x	the definition side-deck that describes the XSLT Processor for z/OS and OS/390, C++ Edition functions and the variables
libxerces-c1_6_0.x	the definition side-deck that describes the XML Parser for z/OS and OS/390, C++ Edition functions and the variables
libicuuc.20.2.x	ICU definition side-deck
libicui18n.20.2.x	ICU definition side-deck
<b>Toolkit V1R3</b>	
libxalan-c1_2.x	the definition side-deck that describes the XSLT Processor for z/OS and OS/390, C++ Edition functions and the variables
libxerces-c1_5.x	the definition side-deck that describes the XML Parser for z/OS and OS/390, C++ Edition functions and the variables
libicuuc18.x	ICU definition side-deck
libicui18n18.x	ICU definition side-deck

Before being able to build the provided samples, the system environment must be configured correctly. Doing so requires the use of the GNU make utility (gmake) and the STLport, version 4.0 (STLport-4.0).

To download and install gmake go to:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxa1ty1.html#gmake>

For information on using gmake, see the IBM redbook *Open Source Software for OS/390 UNIX*, SG24-5944 available online at:

<http://www.ibm.com/redbooks/>

Please note that all references to gmake refer to the GNU make utility.

To download and install the STLport-4.0 go to:

<http://www.stlport.com/archive/>

For more details on the STL, see:

[http://www.sgi.com/tech/stl/stl\\_introduction.html](http://www.sgi.com/tech/stl/stl_introduction.html)

The first thing that must be accomplished is setting the XALANC root path. To set the XALANC root path correctly, issue the following command statement:

```
export XALANCROOT=<full path to processor>
export XERCESCROOT=<full path to parser>
export STLPORTROOT=<full path to STLport root directory>
export XALANCOUT=<full path to your own sample output directory>
```

**Note:** You must have write permission to this directory, for example: /userid/xalancout

**Note:** For more information on *<full path to parser>* and *<full path to processor>*, see Figure 20 on page 26, Figure 21 on page 26, and Figure 22 on page 27.

Next, environment variables must be set up. This is done through the following sequence:

```
export _CXX_CXXSUFFIX=cpp
export _CXX_CCMODE=1
export _CXX_CVERSION="0x220a0000" - (only if using V1R4 or V1R3
                                   - see note on page 32)
```

The makefile for the samples is provided with the package. To build the samples with gmake, type the gmake command at the prompt inside the *<full path to processor>/samples* directory:

```
cd $XALANCROOT/samples
gmake
```

**Note:** gmake is GNU make.

After issuing the gmake command, the build process is completed. The built samples are placed in the \$XALANCOUT/bin directory.

**6.2.4.1.2 Running sample applications on the z/OS UNIX and OS/390 UNIX Environments:** Library files are required to run XSLT Processor for z/OS and OS/390, C++ Edition on z/OS UNIX and OS/390 UNIX. These files can be found in the \$XALANCROOT/lib and \$XERCESCROOT/lib directories, where \$XALANCROOT=*<full path to processor>* and \$XERCESCROOT=*<full path parser>*. Since XSLT Processor for z/OS and OS/390, C++ Edition has a prerequisite of XML Parser for z/OS and OS/390, C++ Edition, all the files in Figure 25 on page 33 are required as well as those listed in the table below:

Figure 30. Library Files Required to Run XSLT Processor for z/OS and OS/390, C++ Edition on z/OS UNIX and OS/390 UNIX

Library File Name	Library File Description
<b>Toolkit V1R4</b>	
libxalan-c1_3.dll	the XSLT Processor for z/OS and OS/390, C++ Edition library file
libxerces-c1_6_0.dll	the XML Parser for z/OS and OS/390, C++ Edition library file
libicuuc.20.2.dll	ICU converter data library file
libicui18n.20.2.dll	ICU converter data library file
<b>Toolkit V1R3</b>	
libxalan-c1_2.dll	the XSLT Processor for z/OS and OS/390, C++ Edition library file
libxerces-c1_5.dll	the XML Parser for z/OS and OS/390, C++ Edition library file
libicuuc18.dll	ICU converter data library file
libicui18n18.dll	ICU converter data library file

Any application that is to invoke Toolkit V1R4 XSLT Processor for z/OS and OS/390, C++ Edition under the OS/390 UNIX System Services environment must include libxalan-c1\_3.x, libxerces-c1\_6\_0.x, libicuuc.20.2.x, and libicui18n.20.2.x when they bind. The binder uses the definition side-deck to resolve references to functions and variables defined in libxalan-c1\_3.dll, libxerces-c1\_6\_0.dll, libicuuc.20.2.dll, and libicui18n.20.2.dll, respectively.

Any application that is to invoke Toolkit V1R3 XSLT Processor for z/OS and OS/390, C++ Edition under the OS/390 UNIX System Services environment must include libxalan-c1\_2.x, libxerces-c1\_5.x, libicuuc18.x, and libicui18n18.x when they bind. The binder uses the definition side-deck to resolve references to functions and variables defined in libxalan-c1\_2.dll, libxerces-c1\_5.dll, libicuuc18.dll, and libicui18n18.dll, respectively.

Before running the samples, you must ensure that the path and library path are set properly. This is done by typing in the following command statements:

```
export LIBPATH=$XALANCR00T/lib:$XERCESCR00T/lib:$LIBPATH
export ICU_DATA=$XERCESCR00T/lib
export PATH=$XALANCOU/bin:$PATH
```

You are now set to run the sample applications. With most of the samples, you can use the following procedure:

1. Go to the samples subdirectory containing the sample.
2. Run the sample from the command line.
3. Examine the application source files. You may want to modify the source files to produce its output in EBCDIC format instead of the default UTF-8 format.

For example, to run the SimpleTransform application from the \$XALANCR00T/bin directory, type the following:

```
cd $XALANCR00T/samples/SimpleTransform
SimpleTransform
```

This sample application will then use the foo.xsl stylesheet to transform foo.xml, and write the output to foo.out.

If you do not have WRITE access to the samples subdirectory, you may want to make a copy of the samples subdirectory under your own userid directory. For example, cp -fr \$XALANCR00T/samples \$XALANCOU and work from your own samples subdirectory to avoid file access errors. If you are having problems editing the .xml, .xsl, or .out files, it's probably because they are in UTF-8 format. You need to use viascii, a tool for editing ascii files with the 'vi' editor, which can be downloaded from the z/OS UNIX Tools page:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxalty2.html>

You can also use the LotusXSL-C++ command line utility to perform transformations. See section 6.2.4.1.2.1, "LotusXSL-C++ Command Line Utility" for more information on this method.

**6.2.4.1.2.1 LotusXSL-C++ Command Line Utility:** To perform a transformation, you can call LotusXSL-C++ from the command line. The testXSLT executable provides a command-line interface for performing XSLT transformation. To perform a transformation from the command line, do the following:

1. Set the PATH to include \$XALANCR00T/bin.
2. Set the LIBPATH to include \$XALANCR00T/lib;\$XERCESCR00T/lib.
3. Call the testXSLT executable with the appropriate flags and arguments (or enter *testXSLT -h* to show the options).

The following command line, for example, includes the -IN, -XSL, and -OUT flags with their accompanying arguments; the XML source document, the XSL stylesheet, and the output file:

```
testXSLT -IN $XALANCR00T/samples/SimpleTransform/foo.xml
          -XSL $XALANCR00T/samples/SimpleTransform/foo.xsl
          -OUT foo.out
```

**Note:** All three segments of the above example must be entered on the same command line

As of Toolkit V1R4, a new LotusXSL-C++ command line utility is available called Xalan. This utility is equivalent to testXSLT, with the exception that the user can enter *Xalan* or *Xalan -?* to show all the options. The following is an example of the Xalan command line:

```
Xalan    -o foo.out
         $XALANCR00T/samples/SimpleTransform/foo.xml
         $XALANCR00T/samples/SimpleTransform/foo.xsl
```

**Note:** All three segments of the above example must be entered on the same command line.



### 6.2.4.1.3 Building sample applications on the z/OS and OS/390 Environments:

**Note:** The following *build* process only applies to samples from Toolkit V1R4 XSLT Processor for z/OS and OS/390, C++ Edition.

Library files are required to run XSLT Processor for z/OS and OS/390, C++ Edition on z/OS and OS/390. The following table is a list of library files required, a short description of the files, and the dataset names of where these files are located. Since XSLT Processor for z/OS and OS/390, C++ Edition has a prerequisite of XML Parser for z/OS and OS/390, C++ Edition, all the files in Figure 25 on page 33 are required as well as those listed in the table below:

*Figure 31. Library Files Required to Build XSLT Processor for z/OS and OS/390, C++ Edition on z/OS and OS/390*

Library File Name	Library File Description	Library Dataset Name
IXMLC13X	Definition side-deck that describes the XSLT Processor for z/OS and OS/390, C++ Edition functions and variables	hlq.SIXMEXP
IXM4C40X	Definition side-deck that describes the XML Parser for z/OS and OS/390, C++ Edition functions and variables	hlq.SIXMEXP
IXM20UCX	ICU definition side-deck	hlq.SIXMEXP
IXM2018X	ICU definition side-deck	hlq.SIXMEXP

Before being able to build the provided samples, the system environment must be configured correctly. Doing so requires the use of the GNU make utility (gmake). To download and install gmake go to:

<http://www.ibm.com/servers/eserver/zseries/zos/unix/bpxalty1.html#gmake>

For information on using gmake, see the IBM redbook *Open Source Software for OS/390 UNIX*, SG24-5944 available online at:

<http://www.ibm.com/redbooks/>

Please note that all references to gmake refer to the GNU make utility.

To be able to run the sample applications, you must first allocate a data set. **If you have already allocated a data set for XML Parser for z/OS and OS/390, C++ Edition, skip this step.** The following is an example of a dataset allocation:

```
userid.SAMPLES.rel.LOAD, 150 tracks on 3390, Record format: U,  
Record Length: 0, Block size: 32760, ORG: PDS,  
Directory blocks: 6
```

The XALANC root path must now be set. To set the XALANC root path correctly, issue the following command statement:

```
export XALANCROOT=<full path to processor>
```

**Note:** For more information on *<full path to processor>*, see Figure 20 on page 26, Figure 21 on page 26, and Figure 22 on page 27.

The environment variables must then be set up. This is done through the following sequence:

```
export LOADMOD=userid.SAMPLES.rel.LOAD
export LOADEXP=hlq.SIXMEXP
export OS390BATCH=1

unset _CXX_CXXSUFFIX
export CXX=c++
export CXXFLAGS=-2 (or -g if building a debug version)
```

Once the environment variables have been properly set, Makefiles must be created. Type the configure command at the prompt inside the *<full path to processor>/samples* directory

```
cd $XALANCR00T/samples
configure
```

and the necessary Makefiles will be created for all sample program modules.

After the Makefiles have been created, you are now ready to build the samples. The following sequence shows how to build the samples:

```
export _CXX_CXXSUFFIX=cpp
export _CXX_XSUFFIX_HOST=SIXMEXP
export _CXX_CCMODE=1
export _CXX_CVERSION="0x220a0000" - (only if using V1R4 or V1R3
                                   - see note on page 32)

gmake
```

After you have issued the gmake command, the build process is now completed. The built samples are placed into the *userid.SAMPLES.rel.LOAD* data set.

#### **6.2.4.1.4 Running sample applications on the z/OS and OS/390 Environments.:**

**Note:** The following *run* process only applies to samples from Toolkit V1R4 XSLT Processor for z/OS and OS/390, C++ Edition.

Library files are required to run XSLT Processor for z/OS and OS/390, C++ Edition on z/OS and OS/390. The following table is a list of library files required, a short description of the files, and the dataset names of where these files are located.

Figure 32. Library Files Required to Run XSLT Processor for z/OS and OS/390, C++ Edition on z/OS and OS/390

Library File Name	Library File Description	Library Dataset Name
IXMLC13	XSLT Processor for z/OS and OS/390, C++ Edition library file	hlq.SIXMMOD1
IXM4C40	XML Parser for z/OS and OS/390, C++ Edition library file	hlq.SIXMMOD1
IXMI20UC	ICU converter data library file (explicitly loaded by IXM4C40)	hlq.SIXMMOD1
IXMI2018	ICU converter data library file (implicitly loaded by IXM4C40)	hlq.SIXMMOD1

**Note:** Any application that is to invoke the XSLT Processor for z/OS and OS/390, C++ Edition processor under the native z/OS or OS/390 environments must include the IXMLC13X and IXM4C40X definition side-decks when they bind. The binder uses the definition side-decks to resolve references to functions and variables defined in the IXMLC13 and IXM4C40.

Before you run the samples, you must make sure that you have access to the library, SIXMMOD1. You can ask your system programmer to install SIXMMOD1 in LNKLST. If the SIXMMOD1 data set cannot be placed in LNKLST, you can STEPLIB the data set for each application that requires it. You can invoke the samples from TSO or a JCL job. For example, you can submit the following JCL to run TRACELSN.

```
//USERJOB JOB MSGLEVEL=(1,1),CLASS=A
//TEST1 EXEC PGM=TRACELSN,
/* HFS file input
// PARM='/-tt'
//STEPLIB DD DSN=hlq.SIXMMOD1,DISP=SHR
// DD DSN=userid.SAMPLES.rel.LOAD,DISP=SHR
```

## 6.2.5 Setting Up and Configuring XSLT Processor for z/OS and OS/390, Java Edition

Samples have been provided with the Toolkit to help demonstrate the features of the XSLT Processor for z/OS and OS/390, Java Edition. These samples use simple applications written on top of the SAX, DOM, Xalan, and TRaX (Transformational API for XML) API's. The following is a list of samples that can be found in the *<full path to processor>/samples* directory:

**SimpleTransform** uses the *foo.xml* stylesheet to transform *foo.xml*, and writes the output to *foo.out*

**UseStylesheetPI** uses the stylesheet processing instruction in the XML source document to determine which stylesheet to use to perform the transformation

**UseStyleSheetParam** uses *foo.xml* and a stylesheet parameter to transform *foo.xml*, and prints the output to *System.out*

<b>SAX2SAX</b>	explicitly set the SAX XMLReader and SAX ContentHandler for processing the stylesheet (birds.xsl), processing the XML input (birds.xml), and producing the output (birds.out)
<b>DOM2DOM</b>	uses the birds.xsl stylesheet to transform a DOM Document generated from birds.xml, produces an output DOM, and traverses the DOM, printing the traversal to System.out
<b>Pipe</b>	pipes the output from one transformation to a second transformation, then from the second transformation to the third transformation
<b>UseXMLFilters</b>	chains together a series of transformations
<b>ApplyXPath</b>	uses the XPathAPI convenience methods to execute an XPath expression against an XML document and return the nodes (if any) it finds
<b>AppletXMLtoHTML</b>	an applet that uses a stylesheet to transform an XML document into HTML
<b>ApplyXPathDOM</b>	uses the API in the DOM Level 3 XPath Specification to execute an XPath expression against an XML document and return the nodes (if any) it finds
<b>servlet.SimpleXSLTServlet</b>	applies a particular stylesheet to a particular XML document
<b>servlet.UseStylesheetParamServlet</b>	sets a stylesheet parameter (the parameter name is hardwired into the servlet), and requires the user to supply parameters for the XML document and XSL stylesheet
<b>jspSample.jsp</b>	a Java ServerPage that sets a stylesheet parameter and applies the stylesheet to the XML document
<b>servlet.XSLTServletWithParams</b>	accepts parameters for the XML document, the XSL stylesheet, and any number of stylesheet parameters
<b>1-redir</b>	uses the Redirect extension elements shipped with Xalan-Java to direct output to two output files
<b>2-basicJScript</b>	Uses an extension element and extension function implemented in JavaScript to compute a deadline for responding to a customer inquiry
<b>3-java-namespace</b>	uses extension functions to format dates
<b>4-numlistJava</b>	uses a Java extension to transform a set of name elements into a numbered and alphabetized list
<b>5-numlistJscript</b>	uses a JavaScript extension to transform a set of name elements into a numbered and alphabetized list
<b>Trace</b>	uses the TraceListener and TraceManager classes to log transformation events
<b>ValidateXMLInput</b>	uses SAXParserFactory to turn on validation, and XMLReader to parse the XML input and report errors and warnings to a SAX event handler
<b>Validate</b>	verifies that an individual file or all the .xml files in a directory are well-formed and valid
<b>trax/Examples</b>	runs a number of samples illustrating uses of the TRaX interfaces

**Note:** These samples are only examples of how to activate the XSLT Processor for z/OS and OS/390, Java Edition. You will need to modify your own applications accordingly.

The procedures for running these samples are outlined in section 6.2.5.1, “Running XSLT Processor for z/OS and OS/390, Java Edition on z/OS UNIX and OS/390 UNIX.”

### 6.2.5.1 Running XSLT Processor for z/OS and OS/390, Java Edition on z/OS UNIX and OS/390 UNIX

The following table lists the .jar files required to run XSLT Processor for z/OS and OS/390, Java Edition samples on z/OS UNIX and OS/390 UNIX:

<i>Figure 33. Java Archive Files Required to Run XSLT Processor for z/OS and OS/390, Java Edition on z/OS UNIX and OS/390 UNIX</i>			
<b>Java Archive File Name for Toolkit V1R5</b>	<b>Java Archive File Name for Toolkit V1R4</b>	<b>Java Archive File Name for Toolkit V1R3</b>	<b>Java Archive File Description</b>
xalan.jar	xalan.jar	xalan.jar	Java archive file containing processor class files
xercesImpl.jar	xercesImpl.jar	xerces.jar	Java archive file containing parser class files
xml-apis.jar	xml-apis.jar	-	Java archive file containing the standard API's implemented by the parser
bsf.jar	bsf.jar	bsf.jar	Java archive file required to test Xalan-Java extensions that are written in languages other than Java

**Note:** In Toolkit V1R4, xerces.jar is replaced by xercesImpl.jar and xml-apis.jar.

To run a sample application, use the following procedure:

1. Go to the samples subdirectory containing the samples ( the samples provided with XSLT Processor for z/OS and OS/390, Java Edition can be found in xalansamples.jar and xalanservlet.jar)
2. Verify that the CLASSPATH environment variable is set up correctly.
3. Run the sample from the command line.
4. Examine the application source files.

You may want to copy the entire samples directory to a directory under your own userid so that you can modify the source files. For example, if you have copied the \$XALANJROOT/samples to the \$USERID/samples directory, you can run the DOM2DOM sample by typing the following:

```
cd $USERID/samples/DOM2DOM
java DOM2DOM > test.out
```

This will run the DOM2DOM application on the birds.xml file. The application will use the birds.xml stylesheet to transform the DOM Document generated from birds.xml file, producing an output DOM, and traversing the DOM, printing the traversal to test.out. The reason for saving the sample output to test.out is because the default output is in UTF-8 format. Since OS/390 and z/OS are incapable of displaying in UTF-8 format, saving it to a file enables it to be viewed by a UTF-8 supported editor, such as viascii, or converted to EBCDIC using ICONV and then displayed to the screen.

You can also use the LotusXSL-Java command line utility to perform transformations. See section 6.2.5.1.1, "LotusXSL-Java Command Line Utility" for more information on this method.

**6.2.5.1.1 LotusXSL-Java Command Line Utility:** To perform a transformation, you can call LotusXSL-Java from the command line. The org.apache.xalan.xslt.Process main() method provides a command-line interface for performing XSL transformation. To perform a transformation from the command line, do the following:

1. Set the java classpath to include xalan.jar, xercesImpl.jar, and xml-apis.jar (in Toolkit V1R3, xerces.jar is used in place of xercesImpl.jar and xml-apis.jar).
2. Call java and the Process class with the appropriate flags and arguments (or enter java org.apache.xalan.xslt.Process to show the usage).

The following command line, for example, includes the -IN, -XSL, and -OUT flags with their accompanying arguments; the XML source document, the XSL stylesheet, and the output file:

```
java org.apache.xalan.xslt.Process -IN $XALANJROOT/samples/DOM2DOM/birds.xml
                                   -XSL $XALANJROOT/samples/DOM2DOM/birds.xml
                                   -OUT birds.out
```

**Note:** The example above must be typed on a single command line

# Reader's Comments

## Program Directory for the XML Toolkit for z/OS and OS/390 V1R5 March 6, 2003

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