IBM

Program Directory for
XL C/C++ V2R1M1 web deliverable for z/OS

Program Number 5650-ZOS

FMIDs HLB7791, JLB7792, HTV7791, JTV7792

for Use with
z/OS V2R1

Document Date: February 2015

GI13-3013-00
Note

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 25.
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1.0 Introduction

This program directory is intended for the system programmers who are responsible for program installation and maintenance. It contains information about the material and procedures associated with the installation of the XL C/C++ V2R1M1 web deliverable for z/OS, and consists of XL C/C++ and Runtime Library Extensions components. This publication refers to XL C/C++ V2R1M1 web deliverable for z/OS V2R1 as XL C/C++ V2R1M1.

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 2 identifies the basic program materials and documentation for XL C/C++ V2R1M1.
- 3.0, “Program Support” on page 4 describes the IBM support available for XL C/C++ V2R1M1.
- 4.0, “Program and Service Level Information” on page 6 lists the APARs (program level) and PTFs (service level) that have been incorporated into XL C/C++ V2R1M1.
- 5.0, “Installation Requirements and Considerations” on page 7 identifies the resources and considerations that are required for installing and using XL C/C++ V2R1M1.
- 6.0, “Installation Instructions” on page 15 provides detailed installation instructions for XL C/C++ V2R1M1. It also describes the procedures for activating the functions of XL C/C++ V2R1M1, or refers to appropriate publications.

Before installing XL C/C++ V2R1M1, read the 3.2, “Preventive Service Planning” on page 4. This section tells you how to find any updates to the information and procedures in this program directory.

1.1 XL C/C++ V2R1M1 Description

XL C/C++ V2R1M1 web deliverable is designed to support the vector facility, the decimal floating point packed conversion facility, the load/store-on-condition facility, and the conditional-transaction-end facility available on IBM z13 servers.

The XL C/C++ V2R1M1 features that are available to your applications are dependent on your server or processor hardware. You can download XL C/C++ V2R1M1 web deliverable from http://www.ibm.com/systems/z/os/zos/downloads/.

1.2 XL C/C++ V2R1M1 FMIDs

XL C/C++ V2R1M1 consists of the following FMIDs:

- HLB7791 (XL C/C++ Base)
- JLB7792 (XL C/C++ JPN)
- HTV7791 (Runtime Library Extensions Base)
- JTV7792 (Runtime Library Extensions JPN)
2.0 Program Materials

An IBM program is identified by a program number. The program number for XL C/C++ V2R1M1 is 5650-ZOS.

Basic Machine-Readable Materials are materials that are supplied under the base license and are required for the use of the product.

The program announcement material describes the features supported by XL C/C++ V2R1M1. 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 Web Delivery. The code for this deliverable can be downloaded from z/OS downloads at http://www-03.ibm.com/systems/z/os/zos/downloads/.

The deliverable contains all the programs and data needed for installation. This program is in SMP/E RELFILE format and is installed by using SMP/E. See 6.0, "Installation Instructions" on page 15 for more information about how to install the program.

2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for XL C/C++ V2R1M1.

2.3 Program Publications

This section identifies the basic and optional publications for XL C/C++ V2R1M1.

Figure 1 identifies the basic unlicensed publications for XL C/C++ V2R1M1. Those that are in softcopy format publications can be obtained from the URLs listed below.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Form Number</th>
<th>Media Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>z/OS V2R1 XL C/C++ Messages</td>
<td>GC14-7305-01</td>
<td>See note below</td>
</tr>
<tr>
<td>z/OS V2R1 XL C/C++ Compiler and Runtime Migration Guide for the Application Programmer</td>
<td>GC14-7306-01</td>
<td>See note below</td>
</tr>
<tr>
<td>z/OS V2R1 XL C/C++ User's Guide</td>
<td>SC14-7307-01</td>
<td>See note below</td>
</tr>
<tr>
<td>z/OS V2R1 XL C/C++ Language Reference</td>
<td>SC14-7308-01</td>
<td>See note below</td>
</tr>
</tbody>
</table>
2.3.1 Optional Program Publications

No optional publications are provided for XL C/C++ V2R1M1.

2.4 Program Source Materials

No program source materials or viewable program listings are provided for XL C/C++ V2R1M1.

2.5 Publications Useful During Installation

You might want to use the publications listed in Figure 2 during the installation of XL C/C++ V2R1M1.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Form Number</th>
<th>Media Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</td>
<td>GA32-0883</td>
<td><a href="http://www.ibm.com/shop/publications/order/">http://www.ibm.com/shop/publications/order/</a></td>
</tr>
</tbody>
</table>
3.0 Program Support

This section describes the IBM support available for XL C/C++ V2R1M1.

3.1 Program Services

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

3.2 Preventive Service Planning

Before you install XL C/C++ V2R1M1, make sure that you have reviewed the current Preventive Service Planning (PSP) information. Review the PSP Bucket for General Information, Installation Documentation, and the Cross Product Dependencies sections. For the Recommended Service section, instead of reviewing the PSP Bucket, it is recommended you use the IBM.ProductInstall-RequiredService fix category in SMP/E to ensure you have all the recommended service installed. Use the FIXCAT(IBM.ProductInstall-RequiredService) operand on the APPLY CHECK command. See 6.1.8, “Perform SMP/E APPLY” on page 18 for a sample APPLY command.

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 XL C/C++ V2R1M1 and Runtime Library Extensions are shown in Figure 3

<table>
<thead>
<tr>
<th>UPGRADE</th>
<th>SUBSET</th>
<th>Description</th>
<th>FMID</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZOSV2R1</td>
<td>CCPP7791</td>
<td>XL C/C++</td>
<td>HLB7791, JLB7792</td>
</tr>
<tr>
<td>ZOSV2R1</td>
<td>CCPP7791</td>
<td>Runtime Library Extensions</td>
<td>HTV7791, JTV7792</td>
</tr>
</tbody>
</table>

3.3 Statement of Support Procedures

Report any problems which you feel might be an error in the product materials to your IBM Support Center. You may be asked to gather and submit additional diagnostics to assist the IBM Support Center in their analysis.

Figure 4 lists the component IDs (COMPID) for XL C/C++ V2R1M1.
**Figure 4. Component IDs**

<table>
<thead>
<tr>
<th>FMID</th>
<th>COMPID</th>
<th>Component Name</th>
<th>RETAIN Release</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLB7791</td>
<td>56551210A</td>
<td>XL C/C++ Base</td>
<td>791</td>
</tr>
<tr>
<td>JLB7792</td>
<td>56551210A</td>
<td>XL C/C++ JPN</td>
<td>792</td>
</tr>
<tr>
<td>HTV7791</td>
<td>56551210D</td>
<td>Runtime Library Extensions Base</td>
<td>791</td>
</tr>
<tr>
<td>JTV7792</td>
<td>56551210D</td>
<td>Runtime Library Extensions JPN</td>
<td>792</td>
</tr>
</tbody>
</table>
4.0 Program and Service Level Information

This section identifies the program and relevant service levels of XL C/C++ V2R1M1. The program level refers to the APAR fixes that have been incorporated into the program. The service level refers to the PTFs that have been incorporated into the program.

4.1 Program Level Information

The following APAR fixes against previous releases of z/OS V2R1 XL C/C++ have been incorporated into this release. They are listed by FMID.

- HLB7790

  PI25804  PI25228  PI24986
  PI19301  PI24418  PI25252
  PI20174  PI25812  PI24799

4.2 Service Level Information

No PTFs against this release of XL C/C++ V2R1M1 have been incorporated into the product package.

It is highly recommended that you frequently check the XL C/C++ V2R1M1 PSP Bucket (ZOSV2R1, subset CCPP7791) for HIPER and SPECIAL Attention PTFs against all FMIDs that you must install.
5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating XL C/C++ V2R1M1.

The following terminology is used:

- **Driving system**: the system on which SMP/E is executed to install the program.
  The program might have specific operating system or product level requirements for using processes, such as binder or assembly utilities during the installation.

- **Target system**: the system on which the program is configured and run.
  The program might have specific product level requirements, such as needing access to the library of another product for link-edits. These requirements, either mandatory or optional, might directly affect the element during the installation or in its basic or enhanced operation.

In many cases, you can use a system as both a driving system and a target system. However, you can make a separate IPL-able clone of the running system to use as a target system. The clone must 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.

Use separate driving and target systems in the following situations:

- When you install a new level of a product that is already installed, the new level of the product will replace the old one. By installing the new level onto a separate target system, you can test the new level and keep the old one in production at the same time.

- When you install a product that shares libraries or load modules with other products, the installation can disrupt the other products. By installing the product onto a separate target system, you can assess these impacts without disrupting your production system.

5.1 Driving System Requirements

This section describes the environment of the driving system required to install XL C/C++ V2R1M1.

5.1.1 Machine Requirements

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

5.1.2 Programming Requirements
5.2 Target System Requirements

This section describes the environment of the target system required to install and use XL C/C++ V2R1M1.

XL C/C++ V2R1M1 installs in the z/OS (Z038) SREL.

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 Installation Requisites: Installation requisites identify products that are required and *must* be present on the system or products that are not required but *should* be present on the system for the successful installation of this product.

Mandatory installation requisites identify products that are required on the system for the successful installation of this product. These products are specified as PREs or REQs.

### Figure 6. Target System Mandatory Installation Requisites

<table>
<thead>
<tr>
<th>Program Number</th>
<th>Product Name</th>
<th>Minimum VRM</th>
<th>Minimum Service Level will satisfy these APARs</th>
<th>Included in the shipped product?</th>
</tr>
</thead>
<tbody>
<tr>
<td>5650-ZOS</td>
<td>z/OS</td>
<td>V2.1.0</td>
<td>N/A</td>
<td>No</td>
</tr>
</tbody>
</table>

**Note:** You may need to migrate to z/OS V2.1 and enable the XL C/C++ feature for support. See z/OS Support Lifecycle at http://www-03.ibm.com/systems/z/os/zos/support/zos_eos_dates.html.

Conditional installation requisites identify products that are *not* required for successful installation of this product but can resolve such things as certain warning messages at installation time.

XL C/C++ V2R1M1 has no conditional installation requisites.

5.2.2.2 Operational Requisites: Operational requisites are products that are required and *must* be present on the system or products that are not required but *should* be present on the system for this product to operate all or part of its functions.

Mandatory operational requisites identify products that are required for this product to operate its basic functions.

### Figure 7. Target System Mandatory Operational Requisites

<table>
<thead>
<tr>
<th>Program Number</th>
<th>Product Name and Minimum VRM/Service Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>5650-ZOS</td>
<td>Language Environment for z/OS V2.1.0</td>
</tr>
<tr>
<td>5650-ZOS</td>
<td>UNIX System Service for z/OS V2.1.0</td>
</tr>
<tr>
<td>5650-ZOS</td>
<td>Program Management for z/OS V2.1.0</td>
</tr>
</tbody>
</table>

Conditional operational requisites identify products that are *not* required for this product to operate its basic functions but are required at run time for this product to operate specific functions.
5.2.2.3 Toleration/Coexistence Requisites: Toleration/coexistence requisites identify products that must be present on sharing systems. 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 environment at different time intervals.

For systems with Runtime Library Extensions FMID HTV7790, PTF for APAR PI12281 must be installed.

5.2.2.4 Incompatibility (Negative) Requisites: XL C/C++ V2R1M1 has no negative requisites.

5.2.3 DASD Storage Requirements

XL C/C++ V2R1M1 libraries can reside on all supported DASD types.

Figure 9 lists the total space that is required for each type of library.

<table>
<thead>
<tr>
<th>Program Number</th>
<th>Product Name and Minimum VRM/Service Level</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>5650-ZOS</td>
<td>Language Environment for z/OS V2R1 with the PTFs for APARs PI12412, PI12415, PI20843, and PI12283 applied</td>
<td>PI12412 SIMD support, PI12415 Defer debug support, PI20843 Vector new format support, PI12283 builtins.h and MASS header files</td>
</tr>
<tr>
<td>5650-ZOS</td>
<td>Supervisor Control for z/OS V2.1.0 with PTF for APAR OA43803 applied</td>
<td>SIMD support</td>
</tr>
<tr>
<td>5650-ZOS</td>
<td>HLASM with PTF for APARs PM79901 and PI21235 applied</td>
<td>Inline and vector assembler support</td>
</tr>
</tbody>
</table>

Notes:

1. For non-RECFM U data sets, IBM recommends using system-determined block sizes for efficient DASD utilization. For RECFM U data sets, IBM recommends using a block size of 32760, which is most efficient from the performance and DASD utilization perspective.
2. Abbreviations used for data set types are shown as follows.

**U** Unique data set, allocated by this product and used by only this product. This table provides all the required information to determine the correct storage for this data set. You do not need to refer to other tables or program directories for the data set size.

**S** Shared data set, allocated by this product and used by this product and other products. To determine the correct storage needed for this data set, add the storage size given in this table to those given in 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 other products. This data set is not allocated by this product. To determine the correct storage for this data set, add the storage size given in this table to those given in 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.

If you currently have a previous release of this product installed in these libraries, the installation of this release will delete the old release and reclaim the space that was used by the old release and any service that had been installed. You can determine whether these libraries have enough space by deleting the old release with a dummy function, compressing the libraries, and comparing the space requirements with the free space in the libraries.

For more information about the names and sizes of the required data sets, see 6.1.5, “Allocate SMP/E Target and Distribution Libraries” on page 17.

3. Abbreviations used for the file system path type are as follows.

**N** New path, created by this product.

**X** Path created by this product, but might 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 can be changed.
- The default block size of the data set can be changed.
- The data set can be merged with another data set that has equivalent characteristics.
- The data set can be either a PDS or a PDSE, except for SCCNCMP, ACLBDLL2, and ACCNCMP, which must be PDSEs.

5. All target libraries listed have the following attributes:

- These data sets can be SMS-managed, but they are not required to be SMS-managed.
- These data sets are not required to reside on the IPL volume.
- The values in the "Member Type" column are not necessarily the actual SMP/E element types that are identified in the SMPMCS.

6. All target libraries that are listed and contain load modules have the following attributes:

- These data sets can be in the LPA, but they are not required to be in the LPA.
- These data sets can be in the LNKLST.
- These data sets are not required to be APF-authorized.
XL C/C++ V2R1M1 requires that the SMPLTS data set must be a PDSE. If your existing SMPLTS is a PDS, you will need to allocate a new PDSE and copy your existing SMPLTS into it and then change the SMPLTS DDDEF entry to indicate the new PDSE data set.

The following figures describe the target and distribution libraries and file system paths required to install XL C/C++ V2R1M1. The storage requirements of XL C/C++ V2R1M1 must be added to the storage required by other programs that have data in the same library or path.

**Note:** Use the data in these tables to determine 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 10 (Page 1 of 2). Storage Requirements for XL C/C++ V2R1M1 Target Libraries

<table>
<thead>
<tr>
<th>Library DDNAME</th>
<th>Member Type</th>
<th>Target Volume</th>
<th>REPO</th>
<th>LRE</th>
<th>No. of 3390 Trks</th>
<th>No. of DIR Blks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCLBCPP DATA T1 U PDS FB</td>
<td>80</td>
<td>75</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCLBDLL LMOD T1 U PDS U</td>
<td>0</td>
<td>20</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCLBDLL2 LMOD T1 U PDSE U</td>
<td>0</td>
<td>20</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCLBH DATA T2 U PDS FB</td>
<td>120</td>
<td>10</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCLBJCL SAMP T2 U PDS FB</td>
<td>80</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCLBSID DATA T1 U PDS FB</td>
<td>80</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCEEHH MAC T2 E PDS FB</td>
<td>80</td>
<td>126</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCEELIB DATA T1 E PDS FB</td>
<td>80</td>
<td>48</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCEEPROC PROC T1 E PDS FB</td>
<td>80</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCEERUN LMOD T1 E PDS U</td>
<td>0</td>
<td>1612</td>
<td>926</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCEERUN2 LMOD T1 E PDSE U</td>
<td>0</td>
<td>24766</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNCMP LMOD T1 U PDSE U</td>
<td>0</td>
<td>4200</td>
<td>n/a</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNDOC SAMP T2 U PDS FB</td>
<td>80</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNJCL SAMP T2 U PDS FB</td>
<td>80</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNOBJ DATA T1 U PDS FB</td>
<td>80</td>
<td>24</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNPRC PROC T1 U PDS FB</td>
<td>80</td>
<td>7</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNSAM SAMP T2 U PDS FB</td>
<td>80</td>
<td>26</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNUTL EXEC T1 U PDS FB</td>
<td>80</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNM10 DATA T1 U PDS FB</td>
<td>80</td>
<td>22</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNN10 DATA T1 U PDS FB</td>
<td>80</td>
<td>35</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCCNN11 DATA T1 U PDS FB</td>
<td>80</td>
<td>22</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note: SCCNM10, SCCNN10, SCCNM11, and SCCNN11 are new libraries introduced in this release of XL C/C++ V2R1M1.

### Figure 10. Storage Requirements for XL C/C++ V2R1M1 Target Libraries

<table>
<thead>
<tr>
<th>Library DDNAME</th>
<th>Member Type</th>
<th>Target Volume</th>
<th>Type</th>
<th>E</th>
<th>R</th>
<th>C</th>
<th>E</th>
<th>R</th>
<th>No. of 3390 Trks</th>
<th>No. of DIR Blks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCCNN11</td>
<td>DATA</td>
<td>T1</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>55</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Figure 11. HFS or zFS Paths for XL C/C++ V2R1M1

<table>
<thead>
<tr>
<th>DDNAME</th>
<th>Path Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCLBHFS1</td>
<td>/usr/lpp/cbclib/IBM</td>
</tr>
<tr>
<td>SFSUMBIN</td>
<td>/bin/IBM</td>
</tr>
<tr>
<td>SFSUMMSC</td>
<td>/usr/lib/nls/msg/C/IBM</td>
</tr>
</tbody>
</table>

### Figure 12. Storage Requirements for XL C/C++ V2R1M1 Distribution Libraries

<table>
<thead>
<tr>
<th>Library DDNAME</th>
<th>Type</th>
<th>E</th>
<th>R</th>
<th>C</th>
<th>E</th>
<th>R</th>
<th>No. of 3390 Trks</th>
<th>No. of DIR Blks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACLBDLL</td>
<td>U</td>
<td>PDS</td>
<td>U</td>
<td>0</td>
<td>55</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACLBDLL2</td>
<td>U</td>
<td>PDSE</td>
<td>U</td>
<td>0</td>
<td>360</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACLBHFS1</td>
<td>U</td>
<td>PDS</td>
<td>VB</td>
<td>255</td>
<td>2170</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACLBOBJ</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>121</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACLBSR1</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>120</td>
<td>18</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCNCMP</td>
<td>U</td>
<td>PDSE</td>
<td>U</td>
<td>0</td>
<td>4200</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCNSR1</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>68</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCNSR2</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>27</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCNSR3</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>45</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCNSR4</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>22</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACCNSR5</td>
<td>U</td>
<td>PDS</td>
<td>FB</td>
<td>80</td>
<td>55</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Note: ACCNSR2, ACCNSR3, ACCNSR4, and ACCNSR5 are new libraries introduced in this release of XL C/C++ V2R1M1.

5.3 FMIDs Deleted

Installing XL C/C++ V2R1M1 might result in the deletion of other FMIDs. To see which FMIDs will be deleted, examine the ++VER statement in the SMPMCS of the product.

Note: These FMIDs are not automatically deleted from the Global Zone. If you want to delete these FMIDs from the Global Zone, use the SMP/E REJECT NOFMID DELETEFMID command. See the SMP/E Commands book for details.

5.4 Special Considerations

XL C/C++ V2R1M1 has no special considerations for the target system.
6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of XL C/C++ V2R1M1.

Please note the following points:

- If you want to install XL C/C++ V2R1M1 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.

- You can use the sample jobs that are provided to perform part or all of the installation tasks. The SMP/E jobs assume that all DDDEF entries that are required for SMP/E execution have been defined in appropriate zones.

- You can use the SMP/E dialogs instead of the sample jobs to accomplish the SMP/E installation steps.

6.1 Installing XL C/C++ V2R1M1

This product is available as a web download package. If you are downloading this product from the web, follow the instructions below.

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

The SMP/E Web download package for XL C/C++ V2R1M1 is packaged using the SMP/E GIMZIP function, which was introduced in SMP/E for z/OS V3.1. Although GIMZIP and GIMUNZIP are used for the packaging, the full SMP/E RECEIVE FROMNETWORK function is not available with this package. The SMP/E GIMUNZIP function is required to process the downloaded package. See the z/OS SMP/E Reference for information about using GIMZIP and GIMUNZIP. Ensure that you meet the driving system requirements as documented in Driving System Requirements.

Perform the following tasks:

1. Ensure that the configuration requirements for using GIMUNZIP are completed. For a description of the GIMZIP and GIMUNZIP functions, see the SMP/E web page at http://www.ibm.com/servers/eserver/zseries/zos/smpe/.

2. Allocate a R/W file system directory on the z/OS system where the package will be staged. The R/W file system directory is the repository for the download package.

3. Download the web package from http://www.ibm.com/systems/z/os/zos/downloads/. The package contains two parts, XLC211.README.txt and XLC211.pax.Z. The file XLC211.README.txt contains a sample job that performs the following tasks. You must update this file to reflect your environment. Make sure this file is transferred from the download site as a text file.

   - Executes the z/OS UNIX System Services pax command to extract the GIMZIP archives from the download 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 FMIDs.

The file XLC211.pax.Z contains the SMP/E MCS and the associated RELFILEs. You must download this pax archive file to a node that has connectivity to be downloaded to a node that has connectivity to the target z/OS system. Transfer this file to the host using binary format.

4. Run the sample job in XLC211.README.txt. This job will perform the required tasks up to and including the SMP/E RECEIVE from DASD step.

**Expected Return Codes:** RC=0.

5. Upgrade your target system (z/OS V2.1.0) with current service. To obtain PTF service for the XL C/C++ V2R1M1 FMIDs, see [3.2, “Preventive Service Planning” on page 4](#)

6. Complete the installation by using the instructions in this program directory.

### 6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 13. Using values lower than the recommended values can result in failures in the installation. DSSPACE is a subentry in the GLOBAL options entry. PEMAX is a subentry of the GENERAL entry in the GLOBAL options entry. See the SMP/E manuals for instructions on updating the global zone.

<table>
<thead>
<tr>
<th>Subentry</th>
<th>Value</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSSPACE</td>
<td>Existing target CSI value</td>
<td>IBM suggests using your existing target system CSI's DSSPACE value.</td>
</tr>
<tr>
<td>PEMAX</td>
<td>SMP/E Default</td>
<td>IBM suggests using the SMP/E default for PEMAX.</td>
</tr>
</tbody>
</table>

### 6.1.3 SMP/E CALLLIBS Processing

XL C/C++ V2R1M1 uses the CALLLIBS function that is provided in SMP/E to resolve external references during installation. When XL C/C++ V2R1M1 is installed, ensure that DDDEFs exist for the following libraries:

• SCEEBND2
• SCEELIB

**Note:** CALLLIBS uses the previous DDDEFs only to resolve the link-edit for XL C/C++ V2R1M1 compiler. These data sets are not updated during the installation of XL C/C++ V2R1M1, except for SCEELIB, which is a Language Environment data set and is shared with Runtime Library Extensions.
6.1.4 Sample Jobs

The following sample installation jobs are provided as part of the product to help you install XL C/C++ V2R1M1:

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Job Type</th>
<th>Description</th>
<th>RELFILE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLB3JALL</td>
<td>ALLOCATE</td>
<td>Sample job to allocate target and distribution libraries for Runtime Library Extensions</td>
<td>IBM.HTV7791.F1</td>
</tr>
<tr>
<td>CLBISMKD</td>
<td>MKDIR</td>
<td>Sample job to invoke the supplied CLBMKDIR EXEC to allocate HFS paths for Runtime Library Extensions</td>
<td>IBM.HTV7791.F1</td>
</tr>
<tr>
<td>CCNISMKD</td>
<td>MKDIR</td>
<td>Sample job to invoke the supplied CCNMKDIR EXEC to allocate HFS paths for XL C/C++ V2R1M1</td>
<td>IBM.HLB7791.F1</td>
</tr>
<tr>
<td>CCNJALOC</td>
<td>ALLOCATE</td>
<td>Sample job to allocate target and distribution libraries for XL C/C++ V2R1M1</td>
<td>IBM.HLB7791.F1</td>
</tr>
<tr>
<td>CLB3JDDF</td>
<td>DDDEF</td>
<td>Sample job to define SMP/E DDDEFs for Runtime Library Extensions</td>
<td>IBM.HTV7791.F1</td>
</tr>
<tr>
<td>CCNJDDDF</td>
<td>DDDEF</td>
<td>Sample job to define SMP/E DDDEFs for XL C/C++ V2R1M1</td>
<td>IBM.HLB7791.F1</td>
</tr>
<tr>
<td>CCNJV1</td>
<td>IVP</td>
<td>Sample job to verify installation has been successful for XL C/C++ V2R1M1</td>
<td>IBM.HLB7791.F1</td>
</tr>
<tr>
<td>CCNJV2</td>
<td>IVP</td>
<td>Sample job to verify installation has been successful for XL C/C++ V2R1M1</td>
<td>IBM.HLB7791.F1</td>
</tr>
<tr>
<td>CLB3JIV1</td>
<td>IVP</td>
<td>Sample job to verify installation has been successful for Runtime Library Extensions</td>
<td>IBM.HTV7791.F1</td>
</tr>
</tbody>
</table>

You can access the sample installation jobs by performing an SMP/E RECEIVE and then copying the jobs from the relfiles to a work data set for editing and submission. See Figure 14 to find the appropriate relfile data set.

6.1.5 Allocate SMP/E Target and Distribution Libraries

Edit and submit sample jobs CLB3JALL and CCNJALOC to allocate the SMP/E target and distribution libraries for XL C/C++ V2R1M1. Consult the instructions in the sample job for more information.

Expected Return Codes and Messages: RC=0
6.1.6 Allocate File System Paths

Mount the file system data set of the target system on the driving system when you run the sample jobs CLBISMKD and CCNISMKD because the jobs will create external link files and paths in the file system.

Before you run the sample jobs to create the paths and external link files in the file system, you must ensure that OMVS is active on the driving system and that the file system of the target system is mounted to the driving system. If you install XL C/C++ V2R1M1 into a zFS file system, zFS must be active on the driving system.

If you plan to install XL C/C++ V2R1M1 into a new file system, you must create the mount point and mount the new file system to the driving system. For XL C/C++ V2R1M1, the recommended mount point is: /usr/lpp/cbclib.

The CLBISMKD job invokes CLBMKDIR exec to create the directory paths under -PathPrefix-/usr/lpp/cbclib, which is the high level directory name. Before running the sample job, you must ensure that the directory path -PathPrefix-/usr/lpp/cbclib exists.

The CCNISMKD job invokes CCNMKDIR exec to create an external link file under -PathPrefix-/bin, which is the high level directory name. Before running the sample job, you must ensure that the directory path -PathPrefix-/bin exists.

Edit and submit sample jobs CLBISMKD and CCNISMKD to create the directory paths and external link files for XL C/C++ V2R1M1. Consult the instructions in the sample job for more information.

If you create a new file system for this product, consider updating the BPXPRMxx PARMLIB member to mount the new file system at IPL time. This action can be helpful if an IPL occurs before the installation is completed.

**Expected Return Codes and Messages:** RC=0

6.1.7 Create DDDEF Entries

Edit and submit sample jobs CLB3JDDF and CCNJDDDF to create DDDEF entries for the SMP/E target and distribution libraries for XL C/C++ V2R1M1. Consult the instructions in the sample jobs for more information.

**Expected Return Codes and Messages:** RC=0

6.1.8 Perform SMP/E APPLY

1. Ensure that you have the latest HOLDDATA; then edit and submit sample job, as shown below, to perform an SMP/E APPLY CHECK for XL C/C++ V2R1M1.

The latest HOLDDATA is available through several different portals, including http://service.software.ibm.com/holdata/390holddata.html. The latest HOLDDATA may identify HIPER and FIXCAT APARs for the FMIDs you will be installing. An APPLY CHECK will help you determine if
any HIPER or FIXCAT APARs are applicable to the FMIDs you are installing. If there are any applicable HIPER or FIXCAT APARs, the APPLY CHECK will also identify fixing PTFs that will resolve the APARs, if a fixing PTF is available.

You should install the FMIDs regardless of the status of unresolved HIPER or FIXCAT APARs. However, do not deploy the software until the unresolved HIPER and FIXCAT APARs have been analyzed to determine their applicability. That is, before deploying the software either ensure fixing PTFs are applied to resolve all HIPER or FIXCAT APARs, or ensure the problems reported by all HIPER or FIXCAT APARs are not applicable to your environment.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do not bypass the PRE, ID, REQ, and IFREQ on the APPLY CHECK. The SMP/E root cause analysis identifies the cause only of errors and not of warnings (SMP/E treats bypassed PRE, ID, REQ, and IFREQ conditions as warnings, instead of errors).

Here are sample APPLY commands:

a. To ensure that all recommended and critical service is installed with the FMIDs, receive the latest HOLDDATA and use the APPLY CHECK command as follows

```bash
APPLY S(HTV7791,JTV7792,HLB7791,JLB7792) CHECK
FORFMID(HTV7791,JTV7792,HLB7791,JLB7792)
SOURCEID(RSU+)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND
```

Some HIPER APARs might not have PTFs available yet. You should analyze the symptom flags for to determine if you want to bypass the specific ERROR HOLDs and continue the installation of the FMIDs.

This method requires more initial research, but can provide resolution for all HIPERs that have fixing PTFs available and are not in a PE chain. Unresolved PEs or HIPERs might still exist and require the use of BYPASS.

b. To install the FMIDs without regard for the HIPERs, you can add a BYPASS(HOLDCLASS(HIPER)) operand to the APPLY command. This will allow you to install FMIDs even though one or more unresolved HIPER APARs exist. After the FMIDs are installed, use the SMP/E REPORT ERRSYSM0DS command to identify unresolved HIPER APARs and any fixing PTFs.

```bash
APPLY S(HTV7791,JTV7792,HLB7791,JLB7792) CHECK
FORFMID(HTV7791,JTV7792,HLB7791,JLB7792)
SOURCEID(RSU+)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND
BYPASS(HOLDCLASS(HIPER),HOLDFIXCAT)
```

This method is the quicker, but requires subsequent review of the Exception SYSMOD report produced by the REPORT ERRSYSM0DS command to investigate any unresolved HIPERs. If you have received the latest HOLDDATA, you can also choose to use the REPORT MISSINFIX command and specify Fix Category IBM.ProductInstall-RequiredService to investigate missing recommended service.
If you bypass HOLDs during the installation of the FMIDs because fixing PTFs are not yet available, you can be notified when the fixing PTFs are available by using the APAR Status Tracking (AST) function of ServiceLink or the APAR Tracking function of ResourceLink.

2. After you take actions that are indicated by the APPLY CHECK, remove the CHECK operand and run the job again to perform the APPLY.

A sample APPLY job is shown below.

```verbatim
//APPLY JOB <job parameters>
//STEP1 EXEC PGM=GIMSMP,REGION=0M,TIME=NOLIMIT
//SMPCSI DD DSN=csiname,DISP=SHR
//SMPCNTL DD *
SET BOUNDARY(targetzone).
APPLY CHECK
FORFMID(HTV7791,JTV7792,HLB7791,JLB7792)
SELECT(HTV7791,JTV7792,HLB7791,JLB7792)
GROUPEXTEND(NOAPARS,NOUSERMODS)
SOURCEID(RSU/c5197)
BYPASS(HOLDSYSTEM,
HOLDUSER,HOLDCLASS(UCLREL,ERREL,HIPER)) .
/*

Required Updates:
1. Update the job parameters.
2. Replace the csiname on the SMPCSI DD statement with your CSI name.
3. Update targetzone to your target zone name.

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

Expected Return Codes and Messages from APPLY CHECK: You will receive a return code of 0 if this job runs correctly.

Expected Return Codes and Messages from APPLY: You will receive a return code of 0 if this job runs correctly.

6.1.9 Customize XL C/C++ V2R1M1.

Once you have successfully performed SMP/E APPLY with the XL C/C++ V2R1M1, you must customize the product. Customization may be run from your driving system unless otherwise specified.

6.1.9.1 PARMLIB member considerations: You must tailor the system for XL C/C++ V2R1M1 to meet the needs of your installation.
6.1.9.2 IFAPRDxx considerations: With z/OS, products can use registration services to determine if they are enabled to run on a particular system. This requires the product to be defined appropriately in the enablement policy for the system using the IFAPRDxx PARMLIB member. You must ensure that the policy in IFAPRDxx enables only what are licensed. Use of (and enablement of) z/OS features is subject to the z/OS license terms and conditions and must be done with the knowledge of your asset manager according to the terms and conditions for z/OS. See the Usage Restriction section of the z/OS Licensed Program Specifications for additional license terms and conditions. See z/OS Planning for Installation for additional information on enabling z/OS features.

6.1.9.3 LNKLSTxx considerations: Many elements, features, and functions of z/OS Version 2 Release 1 require the runtime libraries provided by XL C/C++ V2R1M1, SCCNCMP, SCLBDLL, and SCLBDLL2, to be made available in the program search order. The best way to do that is by adding the SCCN CMP, SCLBDLL, and SCLBDLL2 data sets in LNKLST.

6.1.9.4 PROCLIB member consideration: The XL C/C++ V2R1M1 provides you a compiler proclib data set CBC.SCCNPRC. You can copy members to SYS1.PROCLIB or add members to a PROCLIB concatenation accessible to JES. For more information about customization procedures for XL C/C++ V2R1M1, see z/OS XL C/C++ User’s Guide.

6.1.10 Run the Installation Verification Programs

The XL C/C++ V2R1M1 web delivery consists of XL C/C++ and Runtime Library Extensions components. Therefore, you need to run:

- two IVP jobs to ensure that the XL C/C++ compilers were properly installed.
- one IVP job to ensure that the Runtime Library Extensions was properly installed.

The following sections describe installation verification procedures for the XL C/C++ V2R1M1.

<table>
<thead>
<tr>
<th>PARMLIB Member</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNKLSTxx</td>
<td>Adds the following data sets to the LNKLST. See 6.1.9.3, “LNKLSTxx considerations” on page 21.</td>
</tr>
<tr>
<td></td>
<td>CBC.SCCN CMP</td>
</tr>
<tr>
<td></td>
<td>CBC.SCLBD LL</td>
</tr>
<tr>
<td></td>
<td>CBC.SCLBDLL 2</td>
</tr>
</tbody>
</table>

Figure 15. PARMLIB members and description
6.1.10.1 Run the XL C/C++ V2R1M1 Installation Verification Procedures: If XL C/C++ V2R1M1 has been enabled (see 6.1.2, “IFAPRDxx considerations”), verify that the XL C/C++ V2R1M1 has been installed properly.

Notes:

1. As of z/OS V1R8, the IPA link step of the XL C/C++ V2R1M1 compiler uses 64-bit virtual memory, which requires sufficient storage above the 2 GB bar (2 GB address line). You can set the MEMLIMIT system parameter to provide the required virtual storage above the 2 GB bar. Use the following checklist to ensure that sufficient storage above the 2 GB bar is available:
   - Increase the default size of the MEMLIMIT system parameter in the SMFPRMxx PARMLIB member to 3 GB.
   - Increase the MEMLIMIT value for z/OS UNIX System Services users through the RACF OMVS segment to 3 GB.
   - If you use the IEFUSI exit routine, ensure that the MEMLIMIT value is more than 3 GB.

   For additional information about the MEMLIMIT system parameter, see z/OS MVS Programming: Extended Addressability Guide.

2. The CCNJIV1 and CCNJIV2 IVP jobs allocate one of the temporary data sets as a PDSE data set. You cannot allocate a PDSE data set to a VIO device type or to multiple volumes. Before you run these two IVP jobs, check the storage and data classes that allocate temporary data sets to verify if you can allocate temporary data sets as PDSE data sets. You can check the class by viewing the dataclas attributes in the panel that is displayed for option 4 of ISMF. If you cannot allocate temporary data sets as PDSE data sets due to system configuration, for example, the device type is VIO or the volume count of SMS-managed data sets is greater than one, add the following code to the DFSMS DATACLAS routines:

   ```
   FILTLIST CCPGM /* IPALINK Note */
   INCLUDE(CCN*) /* Desc: Bypass CCN Programs */
   IF (((&DATACLAS = !/!/) && (&PGM EQ &CCPGM)) THEN /* Bypass CCN C/C++ Programs */
   DO /* Example: CCNDRVR */
   SET &DATACLAS = !/!/ /* Bypass Dataclas */
   WRITE 1/DC IS BLANKED OUT!/ /* Write out a Message */
   EXIT
   ```

   You need to run the following IVP jobs to ensure that the C/C++ compilers were properly installed. The JCL can be found in your SCCNJCL library. Refer to the JCL for instructions and expected output.

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Job Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCNJIV1</td>
<td>Verify the XL C compiler installation</td>
</tr>
<tr>
<td>CCNJIV2</td>
<td>Verify the XL C++ compiler installation</td>
</tr>
</tbody>
</table>

Figure 16. IVPs for XL C/C++ Compilers
Expected Return Codes and Messages: RC=0.

6.1.10.2 Run the Runtime Library Extensions Installation Verification Procedures:
You need to run an IVP job to ensure that the Runtime Library Extensions was properly installed. The JCL can be found in your SCLBJCL library. Refer to the JCL for instructions and expected output.

<table>
<thead>
<tr>
<th>Job Name</th>
<th>Job Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLB3JV1</td>
<td>Verify the IO Streams Class Library and Complex Class Library installation</td>
</tr>
</tbody>
</table>

Expected Return Codes and Messages: RC=0.

6.1.11 Perform SMP/E ACCEPT

Edit and submit the sample job, as shown in 6.1.8, “Perform SMP/E APPLY” on page 18, to perform an SMP/E ACCEPT CHECK for XL C/C++ V2R1M1.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do not bypass the PRE, ID, REQ, and IFREQ on the ACCEPT CHECK. This is because the SMP/E root cause analysis identifies the cause of only errors but not warnings (SMP/E treats bypassed PRE, ID, REQ, and IFREQ conditions as warnings rather than errors).

Before you use SMP/E to load new distribution libraries, it is recommended that you set the ACCJCLIN indicator in the distribution zone. In this way, you can save the entries that are produced from JCLIN in the distribution zone whenever a SYSMOD that contains inline JCLIN is accepted. For more information about the ACCJCLIN indicator, see the description of inline JCLIN in the SMP/E manuals.

After you take actions that are indicated by the ACCEPT CHECK, remove the CHECK operand and run the job again to perform the ACCEPT.

A sample APPLY job is shown below.

```plaintext
//ACCEPT JOB <job parameters>
//STEP1 EXEC PGM=GIMSMP,REGION=/zerodotM,TIME=NOLIMIT
//SMPCSI DD DSN=csiname,DISP=SHR
//SMPCNTL DD * 
  SET BOUNDARY(dlibzone) .
  ACCEPT CHECK
  FORFMID(HTV7791,JTV7792,HLB7791,JLB7792)
  SELECT(HTV7791,JTV7792,HLB7791,JLB7792)
  GROUPEXTEND(NOAPARS,NOUSERMODS)
  BYPASS(HOLDSYSTEM,
     HOLDUSER,HOLDCALL((UCLREL,ERREL,HIPE)ราชกิจจานุเบกษา)
  /*
```
Required Updates:

1. Update the job parameters.
2. Replace the csiname on the SMPCSI DD statement with your CSI name.
3. Update dlibzone to your dlib zone name.

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

**Expected Return Codes and Messages from ACCEPT CHECK:** You will receive a return code of 0 if this job runs correctly.

If PTFs that contain replacement modules are accepted, SMP/E ACCEPT processing will link-edit or bind the modules into the distribution libraries. During this processing, the Linkage Editor or Binder might issue messages that indicate unresolved external references, which will result in a return code of 4 during the ACCEPT phase. You can ignore these messages, because the distribution libraries are not executable and the unresolved external references do not affect the executable system libraries.

**Expected Return Codes and Messages from ACCEPT:** You will receive a return code of 0 if this job runs correctly.

### 6.1.12 Run REPORT CROSSZONE

The SMP/E REPORT CROSSZONE command identifies requisites for products that are installed in separate zones. This command also creates APPLY and ACCEPT commands in the SMPPUNCH data set. You can use the APPLY and ACCEPT commands to install those cross-zone requisites that the SMP/E REPORT CROSSZONE command identifies.

After you install XL C/C++ V2R1M1, it is recommended that you run REPORT CROSSZONE against the new or updated target and distribution zones. REPORT CROSSZONE requires a global zone with ZONEINDEX entries that describe all the target and distribution libraries to be reported on.

For more information about REPORT CROSSZONE, see the SMP/E manuals.

### 6.2 Activating XL C/C++ V2R1M1

For detailed information about customization and usage of XL C/C++ compilers, see z/OS XL C/C++ User’s Guide, SC14-7307.

#### 6.2.1 File System Execution

If you mount the file system in which you have installed XL C/C++ V2R1M1 in read-only mode during execution, you do not have to take further actions to activate XL C/C++ V2R1M1.
7.0 Notices

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Reader's Comments

Program Directory for XL C/C++ V2R1M1 web deliverable for z/OS, February 2015

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