



**Program Directory for
IBM Watson Machine Learning for z/OS**

V02.03.00

Program Number 5698-WML

FMID HAQN230

for Use with
z/OS 2.3 or higher

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GI13-5011-02

Note

Before using this information and the product it supports, be sure to read the general information under 7.0, "Notices" on page 27.

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1.0 Introduction

This program directory is intended for system programmers who are responsible for program installation and maintenance. It contains information about the material and procedures associated with the installation of IBM Watson Machine Learning for z/OS. This publication refers to IBM Watson Machine Learning for z/OS as Watson Machine Learning.

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 3 identifies the basic program materials and documentation for Watson Machine Learning.
- 3.0, “Program Support” on page 6 describes the IBM support available for Watson Machine Learning.
- 4.0, “Program and Service Level Information” on page 8 lists the APARs (program level) and PTFs (service level) that have been incorporated into Watson Machine Learning.
- 5.0, “Installation Requirements and Considerations” on page 9 identifies the resources and considerations that are required for installing and using Watson Machine Learning.
- 6.0, “Installation Instructions” on page 19 provides detailed installation instructions for Watson Machine Learning. It also describes the procedures for activating the functions of Watson Machine Learning, or refers to appropriate publications.

Before installing Watson Machine Learning, read the *CBPDO Memo To Users* and the *CBPDO Memo To Users Extension* that are supplied with this program in softcopy format and this program directory; after which, keep the documents for your reference. Section 3.2, “Preventive Service Planning” on page 6 tells you how to find any updates to the information and procedures in this program directory.

Watson Machine Learning is supplied in a Custom-Built Product Delivery Offering (CBPDO, 5751-CS3). The program directory that is provided in softcopy format on the CBPDO is identical to the hardcopy format if one was included with your order. All service and HOLDDATA for Watson Machine Learning are included on the CBPDO.

Do not use this program directory if you install Watson Machine Learning with a SystemPac or ServerPac. When you use one of those offerings, use the jobs and documentation supplied with the offering. The offering will point you to specific sections of this program directory as needed.

1.1 Watson Machine Learning (IBM WMLz) Description

IBM WMLz 2.3 improves online scoring service performance for various types of machine learning models, especially for deep learning models in the ONNX format. In this new release, the IBM WMLz ONNX scoring engine is upgraded with more optimization for z/OS. In addition, the upgraded ONNX scoring engine runs in IBM z/OS Container Extension (zCX), so the deep learning inferencing workload with IBM WMLz 2.3 will be zIIP eligible.

The new IBM Watson Machine Learning for z/OS Online Scoring Community Edition function is a lightweight version of IBM WMLz. Packaged as an s390 Docker image, it provides a no-charge option for clients to try out the streamlined up-and-running IBM WMLz inferencing in-transaction approach.

The Watson Machine Learning for z/OS Online Scoring Community Edition is available for download from the IBM Watson Machine Learning for z/OS product page here:

<https://www.ibm.com/products/machine-learning-for-zos>

IBM WMLz 2.3 introduces a model IDE running on Red Hat OpenShift Container Platform (OCP). This enables the IDE to utilize the included core services and the underlying machine learning infrastructure and resources. The IDE user interface uses the same framework as IBM Cloud Pak for Data. The UI unifies the application experience for data scientists and system administrators as they manage system environments, services, users, data, machine learning assets, and deployment spaces.

IBM WMLz 2.3 has a new look-and-feel for its IDE and base services. With this release, the IBM WMLz UIs start to adopt the standards and principles of Carbon, IBM's open source design system for products and digital experiences. This provides a consistent and simplified experience that helps reduce the time required to learn interfaces and get up and running faster.

IBM WMLz 2.3 introduces several features that are designed to simplify IBM WMLz installation and configuration, including the following:

- Node.js is embedded with IBM WMLz
- Db2 anomaly detection service is merged into the IBM WMLz base
- Enhancements to configuration tool usability

1.2 Watson Machine Learning FMIDs

Watson Machine Learning consists of the following FMIDs:

- Watson Machine Learning for z/OS, V2.3:
 - HAQN230: Watson Machine Learning for z/OS
- Open Data Analytics for z/OS, V1.1:
 - HSPK120: Spark (required)
 - HANA110: Anaconda (optional)
 - HMDS120: Mainframe Data Service (optional for WMLz, required if you are planning to use Db2 anomaly detection feature)

2.0 Program Materials

An IBM program is identified by a program number. The program number for Watson Machine Learning is 5698-WML.

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 Watson Machine Learning. 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 physical media or downloadable files. This program is in SMP/E RELFILE format and is installed by using SMP/E. See 6.0, "Installation Instructions" on page 19 for more information about how to install the program.

You can find information about the physical media for the basic machine-readable materials for Watson Machine Learning in the *CBPDO Memo To Users Extension*.

Figure 1 describes the program file content for Watson Machine Learning. You can refer to the *CBPDO Memo To Users Extension* to see where the files reside on the image.

Notes:

1. The data set attributes in this table must be used in the JCL of jobs that read the data sets. However, because the data sets are in IEBCOPY unloaded format, their actual attributes might be different.
2. If any RELFILEs are identified as PDSEs, ensure that SMPTLIB data sets are allocated as PDSEs.

Figure 1. Program File Content

Name	O R G	R E C F M	L R E C L	BLK SIZE
SMPMCS	SEQ	FB	80	8
IBM.HAQN230.F1	PS	VS	8816	12
IBM.HAQN230.F2	PS	VS	32650	32654
IBM.HAQN230.F3	PS	VS	32650	32654
IBM.HAQN230.F4	PS	VS	32650	32654
IBM.HAQN230.F5	PS	VS	32650	32654

2.2 Program Publications

The following sections identify the basic publications for Watson Machine Learning.

Figure 2 on page 4 identifies the basic licensed program publications for Watson Machine Learning.

<i>Figure 2. Basic Material: Licensed Publications</i>		
Publication Title	Form Number	Media Format
<i>Accessing IBM Machine Learning services on Linux</i>	LCD4-8600	CD image

Note: See the Special Considerations section for more information about the content and purpose of this licensed CD.

Figure 3 identifies the basic unlicensed publications for Watson Machine Learning. Those that are in softcopy format publications can be obtained from the IBM Publications Center website at <https://www.ibm.com/resources/publications>

<i>Figure 3. Basic Material: Unlicensed Publications</i>		
Publication Title	Form Number	Media Format
<i>IBM Watson Machine Learning for z/OS License Information</i>	GC34-7802	Electronic
<i>IBM Open Data Analytics for z/OS License Information</i>	G113-4349	Electronic
<i>IBM Watson Machine Learning for z/OS Program Directory</i>	G113-5011	Electronic
<i>IBM Open Data Analytics for z/OS Program Directory</i>	G113-4348	Electronic

To view the Unlicensed Publications for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (G113-4348)* included in this Product Package.

2.2.1 Optional Program Publications

No optional publications are provided for Watson Machine Learning.

To view the Optional Program Publications for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (G113-4348)* included in this Product Package.

2.3 Program Source Materials

No program source materials or viewable program listings are provided for Watson Machine Learning.

2.4 Publications Useful During Installation

You might want to use the publications listed in Figure 4 on page 5 during the installation of Watson Machine Learning.

<i>Figure 4. Publications Useful During Installation</i>	
Publication Title	Form Number
<i>IBM SMP/E for z/OS User's Guide</i>	SA23-2277
<i>IBM SMP/E for z/OS Commands</i>	SA23-2275
<i>IBM SMP/E for z/OS Reference</i>	SA23-2276
<i>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</i>	GA32-0883

Note: IBM Publications Center <https://www.ibm.com/resources/publications>
IBM Knowledge Center <https://www.ibm.com/support/knowledgecenter>

3.0 Program Support

This section describes the IBM support available for Watson Machine Learning.

3.1 Program Services

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

3.2 Preventive Service Planning

Before you install Watson Machine Learning, 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-REQUIRESERVICE fix category in SMP/E to ensure you have all the recommended service installed. Use the **FIXCAT(IBM.PRODUCTINSTALL-REQUIRESERVICE)** operand on the **APPLY CHECK** command. See 6.1.9, "Perform SMP/E APPLY" on page 23 for a sample APPLY command

If you obtained Watson Machine Learning as part of a CBPDO, HOLDDATA is included.

If the CBPDO for Watson Machine Learning is older than two weeks by the time you install the product materials, you can obtain the latest PSP Bucket information by going to the following website:

<http://www14.software.ibm.com/webapp/set2/psearch/search?domain=psp>

You can also use S/390 SoftwareXcel or contact the IBM Support Center to obtain the latest PSP Bucket information.

For program support, access the Software Support Website at <http://www.ibm.com/support/>.

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 Watson Machine Learning are included in Figure 5.

Figure 5. PSP Upgrade and Subset ID

UPGRADE	SUBSET	Description
5698WML	HAQN230	Watson Machine Learning for z/OS

To view the Preventive Service Planning (PSP) for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (GI13-4348)* included in this Product Package.

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 6 on page 7 identifies the component IDs (COMPID) for Watson Machine Learning.

<i>Figure 6. Component IDs</i>			
FMID	COMPID	Component Name	RETAIN Release
HAQN230	5698ML100	Watson Machine Learning for z/OS	230

To view the Component IDs (COMPID) for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (GI13-4348)* included in this Product Package.

4.0 Program and Service Level Information

This section identifies the program and relevant service levels of Watson Machine Learning. 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

No APARs have been incorporated into Watson Machine Learning.

4.2 Service Level Information

No PTFs against this release of Watson Machine Learning have been incorporated into this Product Package.

Frequently check the Watson Machine Learning PSP Bucket for HIPER and SPECIAL attention PTFs against all FMIDs that you must install. You can also receive the latest HOLDDATA, then add the **FIXCAT(IBM.PRODUCTINSTALL-REQUIRESERVICE)** operand on your **APPLY CHECK** command. This will allow you to review the recommended and critical service that should be installed with your FMIDs.

To view the Service Level Information for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (G113-4348)* included in this Product Package.

5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating Watson Machine Learning. 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 Watson Machine Learning.

5.1.1 Machine Requirements

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

5.1.2 Programming Requirements

Figure 7. Driving System Software Requirements

Program Number	Product Name	Minimum VRM	Minimum Service Level will satisfy these APARs	Included in the shipped product?
5650-ZOS	z/OS	V02.03.00	N/A	No

Note: SMP/E is a requirement for Installation and is an element of z/OS.

Note: Installation might require migration to new z/OS releases to be service supported. See <https://www.ibm.com/support/lifecycle/>

Watson Machine Learning invokes UNIX shell scripts during installation. These shell scripts require the following:

- UID(0) or READ access or higher to the BPX.SUPERUSER facility class
- Be connected to a group that has a GID with read access or higher to the following:
 - BPX.FILEATTR.APF resource in the FACILITY class
 - BPX.FILEATTR.PROGCTL resource in the FACILITY class
 - BPX.FILEATTR.SHARELIB resource in the FACILITY class
- Have WRITE access to the /usr/lpp/IBM/aln/v2r3/IBM path

Watson Machine Learning is installed into a file system, either HFS or zFS. Before installing Watson Machine Learning, you must ensure that the target system file system data sets are available for processing on the driving system. OMVS must be active on the driving system and the target system file data sets must be mounted on the driving system.

If you plan to install Watson Machine Learning in a zFS file system, this requires that zFS be active on the driving system. Information on activating and using zFS can be found in z/OS Distributed File Service zSeries File System Administration, SC24-5989.

5.2 Target System Requirements

This section describes the environment of the target system required to install and use Watson Machine Learning.

Watson Machine Learning and Open Data Analytics FMIDs install in the z/OS (Z038) SREL.

5.2.1 Machine Requirements

IBM Watson Machine Learning for z/OS V2.3 requires one of the following Z systems running IBM z/OS V2.3 or higher:

- IBM z15, IBM z14, IBM z14 Model ZR1, IBM z13, IBM z13s, or IBM zEnterprise EC12 server

Optimal results can be obtained by allocating 4 or more zIIP processors, 1 general-purpose processor and 100 GB or more memory with 100 GB storage to the LPAR where Watson Machine Learning for z/OS V2.3 components will operate.

Optionally, you can install and configure IBM WMLz model IDE on Linux or Linux x86 for model deployment capabilities. To view the hardware requirements for these deployment options, please see the *Planning WML for z/OS IDE installation* page from the below url for more details:

https://www.ibm.com/support/knowledgecenter/SS9PF4_2.3.0/src/tpc/mlz_home.html

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.

5.2.2.2 IBM WMLz base on z/OS only

z/OS V2.3 or V2.4

5.2.2.3 IBM WMLz model IDE on Linux and model IDE on x86

Both WMLz base on z/OS w/IBM WMLz model IDE on Linux *and* IBM WMLz on z/OS w/IBM WMLz model IDE on Linux x86 require the following for installation:

z/OS: V2.3 or V2.4

Linux on Z and Linux x86: Red Hat OCP 4.6

To view the Installation Requirements for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (GI13-4348)* included in this Product Package.

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. These products are specified as IF REQs.

Watson Machine Learning has no conditional installation requisites.

5.2.2.4 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.

<i>Figure 8. Target System Mandatory Operational Requisites base z/OS</i>	
Program Number	Product Name and Minimum VRM/Service Level
5698-WML	IBM Open Data Analytics FMID HSPK120 (delivered with IBM WMLz)
5650-ZOS	IBM z/OS, either of the following, required for the Node.js embedded in IBM WMLz 2.3: - z/OS V2.3 plus PTFs UI61308, UI61375, UI61747 - z/OS V2.4 plus PTFs UI64830, UI64837, UI64839, UI64940, UI65567
5650-ZOS	IBM z/OS Integrated Cryptographic Service Facility (ICSF) component of z/OS V2.3, or higher - Ensure that the ICSF component is properly configured and started
5655-DGH	IBM 64-bit SDK for z/OS, Java Technology Edition, V8, SR6 or higher - Ensure that JAVA_HOME is set as your installation directory
	z/OS OpenSSH
5655-Y04	IBM CICS Transaction Server for z/OS, V5.4.0 or V5.3.0 with APAR PI63005 applied - <i>Only</i> if you plan to install and run the machine learning scoring service in a CICS region
5650-ZOS	IBM z/OS Container Extensions 2.4 plus PTF OA59111 applied - <i>Only</i> if you plan to configure your scoring service to support ONNX models - Requirements for zCX can be found here: https://www.ibm.com/support/knowledgecenter/SSLTBW_2.4.0/com.ibm.zos.v2r4.izso100/izso100_setupreqs.htm
Any one of the following:	
5650-DB2	IBM Db2 12 for z/OS
5770-AF3	IBM Db2 12 for z/OS Value Unit Edition
5615-DB2	IBM Db2 11 for z/OS
5697-P43	IBM Db2 11 for z/OS Value Unit Edition

Note: Installation might require migration to new releases to obtain support. See <https://www.ibm.com/support/lifecycle/>

The Watson Machine Learning for z/OS V2.3 components required to operate with a model IDE running on Linux on Z require the following on z/OS. See the Note following this figure for requirements for Linux on Z.

Figure 9. Target System Mandatory Operational Requisites w/IDE on Linux on Z

Program Number	Product Name and Minimum VRM/Service Level
5698-WML	IBM Open Data Analytics FMID HSPK120 (delivered with IBM WMLz)
5650-ZOS	IBM z/OS, either of the following, required for the Node.js embedded in IBM WMLz 2.3: - z/OS V2.4 plus PTFs UI64830, UI64837, UI64839, UI64940, UI65567 - z/OS V2.3 plus PTFs UI61308, UI61375, UI61747
5650-ZOS	IBM z/OS Integrated Cryptographic Service Facility (ICSF) component of z/OS V2.3, or higher - Ensure that the ICSF component is properly configured and started
5655-DGH	IBM 64-bit SDK for z/OS, Java Technology Edition, V8, SR6 or higher - Ensure that JAVA_HOME is set as your installation directory
	z/OS OpenSSH
Any one of the following:	
5650-DB2	IBM Db2 12 for z/OS
5770-AF3	IBM Db2 12 for z/OS Value Unit Edition
5615-DB2	IBM Db2 11 for z/OS
5697-P43	IBM Db2 11 for z/OS Value Unit Edition

Note: Watson Machine Learning base on z/OS with IBM WMLz IDE on Linux on Z requires Red Hat OCP 4.6 for operational tasks

The Watson Machine Learning base on z/OS with IBM WMLz IDE on Linux on x86 require the following on z/OS. See the Note following this figure for requirements for Linux x86.

Figure 10 (Page 1 of 2). Target System Mandatory Operational Requisites w/IDE on Linux x86

Program Number	Product Name and Minimum VRM/Service Level
5698-WML	IBM Open Data Analytics FMID HSPK120 (delivered with IBM WMLz)
5650-ZOS	IBM z/OS, either of the following, required for the Node.js embedded in WMLz 2.3: - z/OS V2.4 plus PTFs UI64830, UI64837, UI64839, UI64940, UI65567 - z/OS V2.3 plus PTFs UI61308, UI61375, UI61747
5650-ZOS	IBM z/OS Integrated Cryptographic Service Facility (ICSF) component of z/OS V2.3, or higher - Ensure that the ICSF component is properly configured and started
5655-DGH	IBM 64-bit SDK for z/OS, Java Technology Edition, V8, SR6 or higher - Ensure that JAVA_HOME is set as your installation directory
	z/OS OpenSSH
5655-Y04	IBM CICS Transaction Server for z/OS, V5.4.0 or V5.3.0 with APAR PI63005 applied - <i>Only</i> if you plan to install and run the machine learning scoring service in a CICS region

Figure 10 (Page 2 of 2). Target System Mandatory Operational Requisites w/IDE on Linux x86

Program Number	Product Name and Minimum VRM/Service Level
5650-ZOS	IBM z/OS Container Extensions 2.4 with PTF OA59111 applied - Only if you plan to configure your scoring service to support ONNX models - Requirements for zCX can be found here: https://www.ibm.com/support/knowledgecenter/SSLTBW_2.4.0/com.ibm.zos.v2r4.izso100/izso100_setupreqs.htm
Any one of the following:	
5650-DB2	IBM Db2 12 for z/OS
5770-AF3	IBM Db2 12 for z/OS Value Unit Edition
5615-DB2	IBM Db2 11 for z/OS
5697-P43	IBM Db2 11 for z/OS Value Unit Edition

Note: Watson Machine Learning base on z/OS on Linux x86 requires Red Hat OCP 4.6 for operational tasks

To view the Mandatory Operational Requisites for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (G113-4348)* included in this Product Package.

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. These products are specified as IF REQs.

Watson Machine Learning has no conditional operational requisites.

5.2.2.5 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.

Watson Machine Learning has no toleration/coexistence requisites.

5.2.2.6 Incompatibility (Negative) Requisites

Negative requisites identify products that must *not* be installed on the same system as this product.

Watson Machine Learning has no negative requisites.

5.2.3 DASD Storage Requirements

Watson Machine Learning libraries can reside on all supported DASD types.

Figure 11 on page 15 lists the total space that is required for each type of library.

<i>Figure 11. Total DASD Space Required by Watson Machine Learning</i>		
Library Type	Total Space Required in 3390 Trks	Description
Target	8 3390 tracks	
Distribution	96000 3390 tracks	
File System(s)	150000 3390 tracks	

To view the DASD Storage Requirements for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (GI13-4348)* included in this Product Package.

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 21.

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, with some exceptions. If the value in the "ORG" column specifies "PDS", the data set must be a PDS. If the value in "DIR Blks" column specifies "N/A", the data set must be a PDSE.

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 not be in the LPA, with some exceptions. If the data set should be placed in the LPA, see the Special Considerations section below.
- These data sets can be in the LNKLIST. If so, see the Special Considerations section below.
- These data sets are not required to be APF-authorized, with some exceptions. If the data set must be APF-authorized, see the Special Considerations section below.

Figure 12. Storage Requirements for SMP/E Work Data Sets

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
SMPWRK1	S	PDS	FB	80	500	500
SMPWRK2	S	PDS	FB	80	500	500
SMPWRK3	S	PDS	FB	80	500	500
SMPWRK4	S	PDS	FB	80	500	500
SMPWRK6	S	PDS	FB	80	500	500
SMPLTS	S	PDSE	FB	80	120	150
SYSUT1	U	SEQ	--	--	500	0
SYSUT2	U	SEQ	--	--	500	0
SYSUT3	U	SEQ	--	--	500	0
SYSUT4	U	SEQ	--	--	500	0

The following table provides an estimate of the storage needed in the SMP/E data sets for Watson Machine Learning. You must add the estimates to those of any other programs and service that you install to determine the total additional storage requirements.

Figure 13. Storage Requirements for SMP/E Data Sets

Library DDNAME	T Y P E	O R G A N I Z A T I O N	R E C O R D S	L E N G T H	No. of 3390 Trks	No. of DIR Blks
SMPMTS	S	PDS	FB	80	135	60
SMPPTS	S	PDS	FB	80	30000	50
SMPSCDS	S	PDS	FB	80	150	300
SMPSTS	S	PDS	FB	80	150	150

The following figures describe the target and distribution libraries and file system paths required to install Watson Machine Learning. The storage requirements of Watson Machine Learning 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 14. Storage Requirements for Watson Machine Learning Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G A N I Z A T I O N	R E C O R D S	L E N G T H	No. of 3390 Trks	No. of DIR Blks
SALNBASE	Sample	ANY	U	PDS	FB	80	15	3

Figure 15. Watson Machine Learning File System Paths

DDNAME	T Y P E	Path Name
SALNHFS	X	/usr/lpp/IBM/aln/v2r3/IBM

Figure 16. Storage Requirements for Watson Machine Learning 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
AALNBASE	U	PDS	FB	80	15	3
AALNHFS	U	PDSE	VB	32630	35000	N/A
AALNHFS2	U	PDSE	VB	32630	35000	N/A
AALNHFS3	U	PDSE	VB	32630	35000	N/A
AALNHFS4	U	PDSE	VB	32630	35000	N/A

5.3 FMIDs Deleted

Installing Watson Machine Learning 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.

If you do not want to delete these FMIDs at this time, install Watson Machine Learning into separate SMP/E target and distribution zones.

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

Getting Watson Machine Learning up and running involves a sequence of tasks that might be best performed by people in different roles. Close collaboration and staying on track are key to the success of completing these tasks. Consider creating a high level action plan or using the IBM WMLz roadmap in the IBM Knowledge Center to manage, coordinate, and track all major planning, installation, and configuration activities.

Watson Machine Learning includes several executable programs which are installed into the Unix System Services (USS) path. Some of these programs require that USS file extended attributes be set so that they can properly execute under APF-authorized, program control, or shared library environments.

The *Accessing IBM Machine Learning Services on Linux* CD included with this Product Package, provides a Memo to Users with the url and access key required to access an IBM Web Membership (IWM) site where Watson Machine Learning services on Linux files are available for download.

To view the Special Considerations for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (GI13-4348)* included in this Product Package.

6.0 Installation Instructions

This chapter describes the installation method and the step-by-step procedures to install and to activate the functions of Watson Machine Learning.

Please note the following points:

- If you want to install Watson Machine Learning 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 Watson Machine Learning

6.1.1 SMP/E Considerations for Installing Watson Machine Learning

Use the SMP/E RECEIVE, APPLY, and ACCEPT commands to install this release of Watson Machine Learning.

To view the SMP/E installation instructions for IBM Open Data Analytics for z/OS, V1.1, refer to the *IBM Open Data Analytics Program Directory (GI13-4348)* included in this Product Package.

6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 17. 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.

Subentry	Value	Comment
DSSPACE	500,500,500	3390 Tracks
PEMAX	SMP/E Default	IBM recommends using the SMP/E default for PEMAX.

6.1.3 Sample Jobs

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

Figure 18. Sample Installation Jobs

Job Name	Job Type	Description	SMPTLIB Data Set
ALNALA	CSI Allocation	Optional sample to allocate a new SMP/E CSI	IBM.HAQN230.F1
ALNALB	SMP/E dataset Allocation	Optional sample to allocate datasets needed by SMP/E itself	IBM.HAQN230.F1
ALNRECEV	RECEIVE	Optional sample RECEIVE job	IBM.HAQN230.F1
ALNALLOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HAQN230.F1
ALNZFS	ALLOMZFS	Sample job to allocate, create mountpoint, & mount zFS data sets	IBM.HAQN230.F1
ALNISMKD	MKDIR	Sample job to invoke the supplied ALNMKDIR EXEC to allocate file system paths	IBM.HAQN230.F1
ALNDDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HAQN230.F1
ALNAPPLY	APPLY	Sample APPLY job	IBM.HAQN230.F1
ALNACCEP	ACCEPT	Sample ACCEPT job	IBM.HAQN230.F1
ALNDELFN	DELETE FUNCTION	Optional sample job to delete prior WMLz releases from SREL P115	IBM.HAQN230.F1

You can access the sample installation jobs by performing an SMP/E RECEIVE (refer to 6.1.4, “Perform SMP/E RECEIVE” on page 21) then copy the jobs from the SMPTLIB data sets to a work data set for editing and submission. See Figure 18 to find the appropriate data set.

You can also copy the sample installation jobs from the product files by submitting the following job. Before you submit the job, add a job card and change the lowercase parameters to uppercase values to meet the requirements of your site.

```
//STEP1 EXEC PGM=IEBCOPY
//SYSPRINT DD SYSOUT=*
//IN DD DSN=IBM.HAQN230.F1,UNIT=SYSALLDA,DISP=SHR,
// VOL=SER=filevol
//OUT DD DSNAME=jc1-library-name,
// DISP=(NEW,CATLG,DELETE),
// VOL=SER=dasdvol,UNIT=SYSALLDA,
// SPACE=(TRK,(primary,secondary,dir))
//SYSUT3 DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN DD *
```



```
COPY INDD=IN,OUTDD=OUT
/*
```

See the following information to update the statements in the previous sample:

IN:

filevol is the volume serial of the DASD device where the downloaded files reside.

OUT:

jcl-library-name is the name of the output data set where the sample jobs are stored.

dasdvol is the volume serial of the DASD device where the output data set resides.

6.1.4 Perform SMP/E RECEIVE

If you have obtained Watson Machine Learning as part of a CBPDO, use the RCPDO job in the CBPDO RIMLIB data set to receive the Watson Machine Learning FMIDs, service, and HOLDDATA that are included on the CBPDO package. For more information, see the documentation that is included in the CBPDO.

You can also choose to edit and submit sample job ALNRECEV to perform the SMP/E RECEIVE for Watson Machine Learning. Consult the instructions in the sample job for more information.

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

6.1.5 Allocate SMP/E Target and Distribution Libraries

Edit and submit sample job ALNALLOC to allocate the SMP/E target and distribution libraries for Watson Machine Learning. Consult the instructions in the sample job for more information.

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

6.1.6 Allocate, create and mount ZFS Files (Optional)

This job allocates, creates a mountpoint, and mounts zFS data sets.

If you plan to install Watson Machine Learning into a new z/OS UNIX file system, you can edit and submit the optional ALNZFS job to perform the following tasks:

- Create the z/OS UNIX file system
- Create a mountpoint
- Mount the z/OS UNIX file system on the mountpoint

Consult the instructions in the sample job for more information.

Before running the sample job to create the z/OS UNIX file system, you must ensure that OMVS is active on the driving system. zFS must be active on the driving system if you are installing Watson Machine Learning into a file system that is zFS.

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.

```
MOUNT FILESYSTEM('#dsn')
MOUNTPOINT('&mntpnt1.')
MODE(RDWR) /* can be MODE(READ) */
TYPE(ZFS) PARM('AGGRGROW') /* zFS, with extents */
```

See the following information to update the statements in the previous sample:

#dsn is the name of the data set holding the z/OS UNIX file system.

&mntpnt1. is the name of the mountpoint where the z/OS UNIX file system will be mounted.

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

6.1.7 Allocate File System Paths

The target system HFS or zFS data set must be mounted on the driving system when running the sample ALNISMKD job since the job will create paths in the HFS or zFS.

Before running the sample job to create the paths in the file system, you must ensure that OMVS is active on the driving system and that the target system's HFS or zFS file system is mounted to the driving system. zFS must be active on the driving system if you are installing Watson Machine Learning into a file system that is zFS.

If you plan to install Watson Machine Learning into a new HFS or zFS file system, you must create the mountpoint and mount the new file system to the driving system for Watson Machine Learning.

The recommended mountpoint is */usr/lpp/IBM/aln/v2r3/IBM*.

Edit and submit sample job ALNZFS to allocate the HFS or zFS paths for Watson Machine Learning. 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: You will receive a return code of 0 if this job runs correctly.

6.1.8 Create DDDEF Entries

Edit and submit sample job ALNDDDEF to create DDDEF entries for the SMP/E target and distribution libraries for Watson Machine Learning. Consult the instructions in the sample job for more information.

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

6.1.9 Perform SMP/E APPLY

1. Ensure that you have the latest HOLDDATA; then edit and submit sample job ALNAPPLY to perform an SMP/E APPLY CHECK for Watson Machine Learning. Consult the instructions in the sample job for more information.

Perform an SMP/E APPLY CHECK for Watson Machine Learning.

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

```
APPLY S(fmid,fmid,...) CHECK
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND .
```

Some HIPER APARs might not have fixing PTFs available yet. You should analyze the symptom flags for the unresolved HIPER APARs to determine if the reported problem is applicable to your environment and if you should bypass the specific ERROR HOLDS in order to 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 unresolved HIPER APARs, you can add the BYPASS(HOLDCLASS(HIPER)) operand to the APPLY CHECK 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 ERRSYSMODS command to identify unresolved HIPER APARs and any fixing PTFs.

```
APPLY S(fmid,fmid,...) CHECK
FORFMID(fmid,fmid,...)
SOURCEID(RSU*)
FIXCAT(IBM.ProductInstall-RequiredService)
GROUPEXTEND
BYPASS(HOLDCLASS(HIPER)) .
..any other parameters documented in the program directory
```

This method is quicker, but requires subsequent review of the Exception SYSMOD report produced by the REPORT ERRSYSMODS command to investigate any unresolved HIPERs. If you have received the latest HOLDDATA, you can also choose to use the REPORT MISSINGFIX 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.

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.

6.1.10 Perform SMP/E ACCEPT

Edit and submit sample job ALNACCEP to perform an SMP/E ACCEPT CHECK for Watson Machine Learning. Consult the instructions in the sample job for more information.

Perform an SMP/E ACCEPT CHECK for Watson Machine Learning.

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. The SMP/E root cause analysis identifies the cause of *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 Commands book for details.

After you take actions that are 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 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.

6.1.11 Perform SMP/E CLEANUP of SREL P115 (Optional)

The Watson Machine Learning V2.2 and V2.1 FMIDs were packaged to SMP/E install in either the DB2 SREL (P115) or the z/OS SREL (Z038). Beginning with Watson Machine Learning V2.3, the FMIDs required to install IBM WMLz 2.3 only install in to the Z038 SREL.

Optional job ALNDELFN is provided for you to SMP/E delete an IBM WMLz 2.2 or 2.1 that you may have installed in to SREL P115, and no longer need.

Edit and submit sample job ALNDELFN to perform an SMP/E DELETE of prior releases of Watson Machine Learning from SREL P115.

Expected Return Codes and Messages from ACCEPT CHECK: 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 Watson Machine Learning, 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.

6.1.13 Cleaning Up Obsolete Data Sets, Paths, and DDDEFs

The following file system paths, which were created and used by previous releases of this product, are no longer used in this release. You can delete these obsolete file system paths after you delete the previous release from your system.

- /usr/lpp/IBM/aln/v2r1m0/IBM
- /usr/lpp/IBM/aln/v2r1ma/IBM

6.2 Activating Watson Machine Learning

If you mount the file system in which you have installed Watson Machine Learning in read-only mode during execution, then complete the following tasks to activate Watson Machine Learning:

6.3 Product Customization

The Watson Machine Learning welcome page url below provides the necessary information to customize and use Watson Machine Learning.

https://www.ibm.com/support/knowledgecenter/SS9PF4_2.3.0/src/tpc/mlz_home.html

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APAR numbers are provided in this document to assist in locating PTFs that may be required. Ongoing problem reporting may result in additional APARs being created. Therefore, the APAR lists in this document may not be complete. To obtain current service recommendations and to identify current product service requirements, always contact the IBM Customer Support Center or use S/390 SoftwareXcel to obtain the current "PSP Bucket".

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