



Program Directory for IBM Automatic Binary Optimizer for z/OS

V02.02.00

Program Number 5697-AB2

FMIDs HALF220, JALJ22J

for use with
z/OS

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Note

Before using this information and the product it supports, be sure to read the general information under 7.0, “Notices” on page 28.

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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 Automatic Binary Optimizer for z/OS. This publication refers to IBM Automatic Binary Optimizer for z/OS as ABO.

The Program Directory contains the following sections:

- 2.0, “Program Materials” on page 3 identifies the basic program materials and documentation for ABO.
- 3.0, “Program Support” on page 6 describes the IBM support available for ABO.
- 4.0, “Program and Service Level Information” on page 8 lists the APARs (program level) and PTFs (service level) that have been incorporated into ABO.
- 5.0, “Installation Requirements and Considerations” on page 9 identifies the resources and considerations that are required for installing and using ABO.
- 6.0, “Installation Instructions” on page 17 provides detailed installation instructions for ABO. It also describes the procedures for activating the functions of ABO, or refers to appropriate publications.

Before installing ABO, 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; then keep them for future 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.

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

Do not use this program directory if you install ABO 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 ABO Description

Automatic Binary Optimizer for z/OS delivers advanced technology to improve the performance of previously compiled COBOL programs, by leveraging the latest COBOL optimization technology. It allows optimization of already compiled COBOL programs. Source-level migration, recompilation, and performance options tuning are not required.

ABO for z/OS

- Generates optimized modules to target the latest IBM Z architecture, including IBM z16.

- Reduces CPU usage and operating costs by directly optimizing COBOL modules that are compiled with VS COBOL II 1.3 to Enterprise COBOL for z/OS 6.4.
- Leverages the Vector Packed Decimal Enhancement Facility 2 of the latest hardware for additional performance improvements.
- Includes the ABO Assistant, a suite of tools to help you understand COBOL applications and to facilitate using Automatic Binary Optimizer for z/OS to improve performance. The ABO Assistant can simplify the evaluation and accelerate the deployment of the optimized COBOL modules for both batch and CICS applications.
- Includes the Installation Verification Program (IVP) BOZJIVP to verify that Automatic Binary Optimizer for z/OS is installed correctly and is functional.
- Includes the IBM Run Time Instrumentation Profiler to help identify COBOL modules that are good candidates for optimization using Automatic Binary Optimizer for z/OS.
- Delivers a simple and easy-to-install setup, which is also configurable to allow setting of target architectures.
- Supports IBM z/OS to automatically load optimized modules without requiring application JCL changes.
- Complements Enterprise COBOL for z/OS. Both Automatic Binary Optimizer and Enterprise COBOL can be used to improve the performance of COBOL applications by using:
 - Enterprise COBOL for z/OS to optimize COBOL programs that require source changes and for application development
 - Automatic Binary Optimizer for z/OS to optimize COBOL program modules that are stable and do not need any source changes
- Integrates with IBM DevOps Tools for problem analysis of optimized applications across the development lifecycle. This includes the IBM Application Delivery Foundation for z/OS family of products.

The price metric of Automatic Binary Optimizer for z/OS 2 is execution-based, sub-capacity licensing that is based on the processing power of the LPAR on which it runs, and includes where Automatic Binary Optimizer for z/OS is used and where the optimized modules are executed. This provides flexibility for gradually adding capacity as the Automatic Binary Optimizer for z/OS workload increases.

1.2 ABO FMIDS

ABO consists of the following FMIDs:

HALF220
JALJ22J

2.0 Program Materials

An IBM program is identified by a program number. The program number for ABO is 5697-AB2.

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 ABO. 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 17 for more information about how to install the program.

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

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

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 for ABO				
Name	ORG	RECFM	LRCL	BLK SIZE
SMPMCS	SEQ	FB	80	6400
IBM.HALF220.F1	PDSE	U	0	6144
IBM.HALF220.F2	PDS	FB	80	8800

Figure 2. Program File Content for ABO (Japanese)

Name	O R G	R E C F M	L R E C L	BLK SIZE
SMPMCS	SEQ	FB	80	6400
IBM.JALJ22J.F1	PDSE	U	0	6144

2.2 Optional Machine-Readable Material

No optional machine-readable materials are provided for ABO.

2.3 Program Publications

The following sections identify the basic publications for ABO.

Figure 3 identifies the basic unlicensed publications for ABO. Those that are in softcopy format publications can be obtained from the IBM Publications Center website at:
<https://www.ibm.com/docs/en/zos/2.5.0?topic=descriptions-smpe>

Figure 3. Basic Material: Unlicensed

Publication Title	Form Number	Media Format
IBM Automatic Binary Optimizer for z/OS License Information	LC27-8544-04	L-MCHN-CBAMNH
IBM Automatic Binary Optimizer for z/OS User's Guide	SC27-9587	http://www-01.ibm.com/support/docview.wss?uid=swg27046990

2.3.1 Optional Program Publications

No optional publications are provided for ABO.

2.4 Program Source Materials

No program source materials or viewable program listings are provided for ABO.

2.5 Publications Useful During Installation

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

<i>Figure 4. Publications Useful During Installation</i>		
Publication Title	Form Number	Media Format
<i>IBM SMP/E for z/OS User's Guide</i>	SA23-2277	https://www.ibm.com/docs/en/zos/2.5.0?topic=descriptions-smpe
<i>IBM SMP/E for z/OS Commands</i>	SA23-2275	https://www.ibm.com/docs/en/zos/2.5.0?topic=descriptions-smpe
<i>IBM SMP/E for z/OS Reference</i>	SA23-2276	https://www.ibm.com/docs/en/zos/2.5.0?topic=descriptions-smpe
<i>IBM SMP/E for z/OS Messages, Codes, and Diagnosis</i>	GA32-0883	https://www.ibm.com/docs/en/zos/2.5.0?topic=descriptions-smpe

Note: For previous versions of z/OS, change the z/OS version to 2.4 or 2.3

3.0 Program Support

This section describes the IBM support available for IBM Automatic Binary Optimizer for z/OS.

3.1 Program Services

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

3.2 Preventive Service Planning

Before you install ABO, 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 20 for a sample APPLY command.

If you obtained ABO as part of a CBPDO, HOLDDATA is included.

If the CBPDO for ABO 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 <https://www.ibm.com/mysupport/s/>.

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 ABO are included in Figure 5.

<i>Figure 5. PSP Upgrade and Subset ID</i>		
UPGRADE	SUBSET	Description
5697AB2	HALF220	Automatic Binary Optimizer
5697AB2	JALJ22J	Automatic Binary Optimizer Japanese

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 ABO.

<i>Figure 6. Component IDs</i>			
FMID	COMPID	Component Name	RETAIN Release
HALF220	5697AB200	Auto Bin Optimizer	220
JALJ22J	5697AB200	Auto Bin Opt JPN	22J

4.0 Program and Service Level Information

This section identifies the program and relevant service levels of ABO. 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 ABO have been incorporated into this release. They are listed by FMID.

- FMID HALF130

PI87551	PI93353	PI93480	PH02580
PI89057	PI93418	PI93482	PH02585
PI89060	PI93440	PI93483	PH02586
PI89062	PI93464	PI94233	PH07264
PI89063	PI93467	PI98728	PH07421
PI89064	PI93468	PI98729	PH07424
PI89065	PI93470	PI98730	PH07493
PI89066	PI93471	PH01559	PH08467
PI91174	PI93472	PH02578	
PI92153			

4.2 Service Level Information

No PTFs against this release of ABO have been incorporated into the product package.

Frequently check the ABO 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.

5.0 Installation Requirements and Considerations

The following sections identify the system requirements for installing and activating ABO. 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 ABO.

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 or higher	N/A	No

Note: SMP/E is a requirement for Installation and is an element of z/OS but can also be ordered as a separate product, 5655-G44, minimally V03.06.00.

Note: Installation might require migration to new z/OS releases to be service supported. See http://www-03.ibm.com/systems/z/os/zos/support/zos_eos_dates.html.

5.2 Target System Requirements

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

ABO installs in the z/OS (Z038) SREL.

5.2.1 Machine Requirements

ABO runs on any system supported by the z/OS level 2.3 or later. For a complete list of IBM Z servers that support z/OS 2.3 and later, see z/OS Server Support:

<https://www.ibm.com/downloads/cas/W30ZOKQD>

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.

Figure 8. Target System Mandatory Installation Requisites

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 or higher	N/A	No

Note: Installation might require migration to new z/OS releases to be service supported. See 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.

ABO 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 9. Target System Mandatory Operational Requisites

Program Number	Product Name and Minimum VRM/Service Level
5650-ZOS	z/OS V02.03.00 ***
5650-ZOS	z/OS V02.04.00 ****
5650-ZOS	z/OS V02.05.00 *****

Note: *** With following APARs/PTFs applied or higher,

- OA55985/UA97356 (Binder)
- PI84561/UI49013 (Language Environment Automatic Binary Optimizer Runtime Engine)
- PH14705/UI64417 (Language Environment Automatic Binary Optimizer Runtime Engine)
- OA59816/UJ04607 (Binder)

Note: **** With following APARs/PTFs applied or higher,

- PH15921/UI65058 (Language Environment COBOL Runtime)

- PH15921/UI65059 (Language Environment COBOL Runtime - Japanese)
- PH14705/UI64418 (Language Environment Automatic Binary Optimizer Runtime Engine)
- OA59816/UJ04608 (Binder)

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.

Figure 10. Target System Conditional Operational Requisites

Program Number	Product Name and Minimum VRM/Service Level	Function
5655-AC6	IBM Application Delivery Foundation for z/OS 3.3	Integrated development solutions
Or any of the following:		
5655-AC5	IBM Developer for z/OS Enterprise Edition V15.0	Application development tools which includes IBM Debug for z/OS 15.0
5755-Q50	IBM Debug for z/OS 15.0	Debugging tools
5655-Q41	IBM Fault Analyzer for z/OS 14.1	Analyze and fix application and system failures
5655-Q49	IBM Application Performance Analyzer for z/OS 14.2	Identifies z/OS application performance and response time problems

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.

ABO has no toleration/coexistence requisites.

5.2.2.4 Incompatibility (Negative) Requisites: Negative requisites identify products that must *not* be installed on the same system as this product.

ABO has no negative requisites.

5.2.3 DASD Storage Requirements

ABO libraries can reside on all supported DASD types.

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

Figure 11. Total DASD Space Required by ABO

Library Type	Total Space Required in 3390 Trks
Target	1875
Distribution	1875

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 6.1.6, “Allocate SMP/E Target and Distribution Libraries” on page 20.

3. 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 SBOZMOD1, and ABOZMOD1, which must be PDSEs.

4. 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.

5. 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 LNKLIST.
- These data sets are not required to be APF-authorized.
- ABO 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 required to install ABO. The storage requirements of ABO must be added to the storage required by other programs that have data in the same library.

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 12. Storage Requirements for ABO Target Libraries

Library DDNAME	Member Type	Target Volume	T Y P E	O R G	R E C F M	L R E C L	No. of 3390 Trks	No. of DIR Blks
SBOZJCL	SAMP	ANY	U	PDS	FB	80	25	3
SBOZMOD1	LMOD	ANY	U	PDSE	U	0	1850	n/a

Figure 13. Storage Requirements for ABO 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
ABOZMOD1	U	PDSE	U	0	1850	n/a
ABOZSRC1	U	PDS	FB	80	25	3

5.3 FMIDs Deleted

Installing ABO 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 ABO 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

Operational Maintenance Requirements

ABO requires some PTFs to be applied on the systems where ABO is installed and running. Other PTFs are required on systems where the ABO produced optimized modules will be running, even if ABO is not installed on these systems.

- These PTFs are required on systems where ABO is running:
 - z/OS V2.3
 - OA57354/UJ04426 (Binder)
 - OA55985/UA97356 (Binder)
 - OA59816/UJ04607 (Binder)
 - OA63070/UJ90044 (Binder)
 - z/OS V2.4
 - OA57354/UJ04427 (Binder)
 - OA59816/UJ04608 (Binder)
 - OA63070/UJ90045 (Binder)
 - z/OS V2.5
 - OA63070/UJ90046 (Binder)
- These PTFs are required on systems where ABO optimized modules are running:
 - z/OS V2.3
 - PI84561/UI49013 (Language Environment Automatic Binary Optimizer Runtime Engine)
 - PH14705/UI64417 (Language Environment Automatic Binary Optimizer Runtime Engine)
 - z/OS V2.4
 - PH15921/UI65058 (Language Environment)
 - PH15921/UI65059 (Language Environment - Japanese)
 - PH14705/UI64418 (Language Environment Automatic Binary Optimizer Runtime Engine)

- ABO optimized modules can be run on any of these IBM Z servers:
 - IBM z16
 - IBM z15™ Models T01 and T02
 - IBM z14® Models M01-M05
 - IBM z14 Model ZR1

Note: If the same system is going to be used to both run ABO and run the ABO optimized modules, then all the PTFs listed above per z/OS version must be installed on this system.

ABO and ABO Trial Co-existence:

ABO and ABO Trial, cannot be installed in the same CSI zone, or share the same target and distribution data set names.

PDSE Considerations:

ABO uses the "partitioned data set extended" or PDSE format for the SBOZMOD1 target library. There are some operational differences between PDS and PDSE data sets. The PDS format may be shared by more than one z/OS system and no special precautions are necessary. However the PDSE format may only be shared by z/OS systems which are part of a sysplex or which are connected using Global Resource Serialization (are in a GRS complex). If z/OS systems share use of a PDSE data set outside of a sysplex or GRS environment, you may experience severe problems when the data set is updated. This is due to the fact that PDSE directory information is cached in storage, and when the data set is updated from one system the other system(s) have no knowledge of the update, and their cached directory information will be incorrect.

You must take care not to share the SBOZMOD1 data set between z/OS systems unless they are in a sysplex or are connected in a GRS complex. If you need to share the content of the SBOZMOD1 data set, a separate copy must be created for each z/OS 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 ABO.

Please note the following points:

- If you want to install ABO into its own SMP/E environment, consult the SMP/E manuals for instructions on creating and initializing the SMP/CSI 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 ABO

6.1.1 SMP/E Considerations for Installing ABO

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

6.1.2 SMP/E Options Subentry Values

The recommended values for certain SMP/E CSI subentries are shown in Figure 14. 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.

<i>Figure 14. SMP/E Options Subentry Values</i>		
Subentry	Value	Comment
DSSPACE	(500,500,500)	3390 DASD 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 ABO:

Figure 15. Sample Installation Jobs

Job Name	Job Type	Description	RELFILE
BOZSMPE	SMP/E	Sample job to allocate and initialize a new SMP/E CSI data set and allocate SMP/E data sets (Optional)	IBM.HALF220.F2
BOZRECV	RECEIVE	Sample RECEIVE job	IBM.HALF220.F2
BOZRECV1	RECEIVE	Sample RECEIVE job	IBM.HALF220.F2
BOZALLOC	ALLOCATE	Sample job to allocate target and distribution libraries	IBM.HALF220.F2
BOZDDDEF	DDDEF	Sample job to define SMP/E DDDEFs	IBM.HALF220.F2
BOZAPPLY	APPLY	Sample APPLY job	IBM.HALF220.F2
BOZJIVP	IVP	Sample job to verify installation has been successful	IBM.HALF220.F2
BOZACCEP	ACCEPT	Sample ACCEPT job	IBM.HALF220.F2

You can access the sample installation jobs by performing an SMP/E RECEIVE (refer to 6.1.5, “Perform SMP/E RECEIVE” on page 20) then copy the jobs from the RELFILES to a work data set for editing and submission. See Figure 15 on page 17 to find the appropriate relfile data set.

You can also copy the sample installation jobs from the tape or product files by submitting the following job. Depending on your distribution medium, use either the //TAPEIN or the //FILEIN DD statement and comment out or delete the other statement. 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=*
//*****
/* Make the //TAPEIN DD statement below active if you install*
/* from a CBPDO tape by uncommenting the DD statement below. *
//*****
/*TAPEIN     DD DSN=IBM.HALF220.F2,UNIT=tunit,
/*           VOL=SER=volser,LABEL=(x,SL),
/*           DISP=(OLD,KEEP)
//*****
/* Make the //TAPEIN DD statement below active if you install*
/* from a product tape received outside the CBPDO process   *
/* (using the optional SMP/E RECEIVE job) by uncommenting   *
/* the DD statement below.                                   *
//*****
/*TAPEIN     DD DSN=IBM.HALF220.F2,UNIT=tunit,
/*           VOL=SER=ALF220,LABEL=(3,SL),
/*           DISP=(OLD,KEEP)
//*****
/* Make the //FILEIN DD statement below active for          *
```

```

/* downloaded DASD files.                                     *
/*****
/*FILEIN DD DSN=IBM.HALF220.F2,UNIT=SYSALLDA,DISP=SHR,
/*      VOL=SER=filevol
//OUT DD DSNAME=jcl-library-name,
//      DISP=(NEW,CATLG,DELETE),
//      VOL=SER=dasdvol,UNIT=SYSALLDA,
//      SPACE=(TRK,(20,10,5))
//SYSUT3 DD UNIT=SYSALLDA,SPACE=(CYL,(1,1))
//SYSIN DD *
COPY INDD=xxxxIN,OUTDD=OUT
SELECT MEMBER=(BOZACCEP,BOZALLOC,BOZAPPLY,BOZDDDEF)
SELECT MEMBER=(BOZRECV,BOZRECV1,BOZSMPE,BOZJIVP)
/*

```

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

TAPEIN:

tunit is the unit value that matches the product package.

volser is the volume serial that matches the product package.

x is the tape file number that indicates the location of the data set name on the tape.

See the documentation that is provided by CBPDO for the location of IBM.HALF220.F2 on the tape.

FILEIN:

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.

SYSIN:

xxxxIN is either TAPEIN or FILEIN depending on your input DD statement.

6.1.4 Allocate SMP/E CSI and initialize CSI zones (Optional)

If you are using an existing CSI, do not execute this job.

If you are allocating a new SMP/E data set for this install, edit and submit sample job BOZSMPE to allocate the SMP/E data set to initialize SMP/E zones for ABO. 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 Perform SMP/E RECEIVE

If you have obtained ABO as part of a CBPDO, use the RCVPDO job in the CBPDO RIMLIB data set to receive the ABO 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 BOZRECV to perform the SMP/E RECEIVE for ABO. 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.

You can also choose to edit and submit sample job BOZRECV1 to perform the SMP/E RECEIVE for ABO Japanese Messages. 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 SMP/E Target and Distribution Libraries

Edit and submit sample job BOZALLOC to allocate the SMP/E target and distribution libraries for ABO. 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.

6.1.7 Create DDDEF Entries

Edit and submit sample job BOZDDDEF to create DDDEF entries for the SMP/E target and distribution libraries for ABO. 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.

6.1.8 Perform SMP/E APPLY

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

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),HOLDFIXCAT) .
..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.

6.1.9 Run the Installation Verification Programs

Make sure you have applied the PTFs for the Language Environment and Program Management APARs listed in Figure 9 on page 11, then edit and submit sample job BOZJIVP to verify that you have installed ABO correctly and it is functional.

Overview of BOZJIVP

The ABO Installation Verification Program (IVP), BOZJIVP, is located in the ABO sample library *HLQ.SBOZJCL*, where *HLQ* is the prefix used for the target libraries in your ABO SMP/E installation.

Run the IVP on any system on which you plan to use ABO and on any system where the optimized modules produced by ABO will be running.

Note: ABO can run on any hardware level down to the z/OS minimum supported level but the ABO generated optimized modules can only run on IBM z14 Model ZR1, IBM z14® Models M01-M05, IBM z15™ Models T01 and T02 and IBM z16 systems. See 5.2.1, “Machine Requirements” on page 10 for more information. Keep these minimum hardware requirements in mind when you examine the IVP results.

Using BOZJIVP

To proceed with the IVP process on the selected system, edit BOZJIVP according to the included JCL description, and then submit it.

Note: The PTFs for APAR OA63070 on z/OS 2.3,2.4 and 2.5 are not currently checked by the IVP so it must be manually verified that they are installed on the systems where ABO is running.

This job contains the following steps:

1. LKED -Link-edit the original COBOL program using as input the object BOZOBJ1 in the samesample library.

Note: The BOZOBJ1 program was compiled using Enterprise COBOL for z/OS V4R2 with the OPT(STD) option in effect. The program source example, BOZSRC1, is also available in the samelibrary for your convenience.

2. GOBEFORE-Run the original program.
3. VERIFY1 -Verify z/OS version eligibility to run ABO.
4. OPTIMIZE -Optimize the original program using ABO.
5. VERIFY2 -Verify IBM Z server type eligibility to run ABO optimized modules.
6. GOAFTER -Run optimized version of the original COBOL program.

7. EXCEPT -Notifies about possible MACHMIG VEF specification in SYS1.IPLPARM(LOADxx). Runs if step GOAFTER condition code is S0C7 only.

Note: The LOADxx member may be located on some systems in SYS1.PARMLIB instead of SYS1.IPLPARM

8. POSTABND -Notifies about possible machine architecture level or LE PTF level conflict. Runs if step GOAFTER condition code is S0C1, S0C4 or S0C6 only.
9. REPORT -Reports IVP results.

Result

You will receive a return code of 0 or 4 for each of the preceding steps when the IVP runs successfully. After the REPORT step completes, a report is available in the SYSTSRPT output file and in the JESMSGLG JOBLOG.

The following example shows a sample IVP report in the SYSTSRPT output file:

```
*** The original program start time is: 10:42:22.72

*** The original program end time is: 10:44:10.71

***                                     ***
***           Optimization successful!           ***
***                                     ***

*** The optimized program start time is: 10:44:11.41

*** The optimized program end time is: 10:44:15.63

***                                     ***
*** The elapsed time is reduced by 103.77 sec      ***
***                                     ***

***                                     ***
***           Installation verification successful!           ***
***                                     ***
```

The following example shows a sample JESMSGLG JOBLOG. Note that the "Installation verification successful!" message is present in both the JOBLOG and in the console.

11.31.22	JOB08327	HTRT01I				CPU (Total)	Elapsed	CPU (TCB)
11.31.22	JOB08327	HTRT02I	Jobname	Stepname	ProcStep	RC	I/O hh:mm:ss.th	hh:mm:ss.th
11.31.22	JOB08327	HTRT03I	BOZIVP	LKED		00	179 00.01	00.14 00.0
11.31.43	JOB08327	HTRT03I	BOZIVP	GOBEFORE		00	192 20.67	20.85 20.67
11.31.43	JOB08327	HTRT03I	BOZIVP	VERIFY1		00	41 00.00	00.01 00.00
11.31.43	JOB08327	HTRT03I	BOZIVP	OPTIMIZE		00	14748 00.05	00.34 00.05
11.31.43	JOB08327	HTRT03I	BOZIVP	VERIFY2		00	39 00.00	00.02 00.00
11.31.44	JOB08327	HTRT03I	BOZIVP	GOAFTER		00	234 00.65	00.78 00.65
11.31.44	JOB08327	HTRT03I	BOZIVP	EXCEPT	FLUSH		0 00.00	00.00 00.00
11.31.44	JOB08327	HTRT03I	BOZIVP	POSTABND	FLUSH		0 00.00	00.01 00.00
11.31.44	JOB08327	****	Installation verification successful!				***	
11.31.44	JOB08327	HTRT03I	BOZIVP	REPORT		00	76 00.01	00.05 00.01

If the VERIFY1 step fails, you will see the following message in both the JOBLOG and in the console:
 "z/OS version: xx.xx is not a supported z/OS version to run ABO."

If the VERIFY2 step fails, you will see the following message in both the JOBLOG and in the console:
 "IBM z server: (xxxx) is not a supported hardware level to run ABO optimized modules."

If the OPTIMIZE step fails, verify the messages in this step log file to see which system or Language Environment component is possibly missing. Fix the problem, and then run the BOZJIVP job again.

If the GOAFTER step fails, verify if step EXCEPT or POSTABND was executed. If the step EXCEPT was executed, you will see the following message in both the JOBLOG and in the console:

If MACHMIG VEF is specified in SYS1.IPLPARM(LOADxx), then it must be removed for ABO optimized modules.

Remove MACHMIG VEF specification from SYS1.IPLPARM(LOADxx), and then run the BOZJIVP job again.

If the step POSTABND was executed, you will see one of two possible messages in both the JOBLOG and in the console.

POSTABND possible message #1:

IVP is incomplete. The ARCH level specified is 13 (z15), but the actual ARCH level is 12 (z14)

If you see message #1 then correct the specified ABO ARCH option to be at, or lower than, the current level of IBM Z where the IVP is being run. Run the BOZJIVP job again after this correction.

POSTABND possible message #2:

If any required LE PTFs is missing, then install it. Otherwise, contact IBM service to report the problem

If you see message #2 then verify which Language Environment PTFs are missing. If one or more of the "Language Environment Automatic Binary Optimizer Runtime Engine" PTFs listed in 5.4, "Special Considerations" on page 15 are not installed, an OC1 abend is likely to occur.

If the "Language Environment Automatic Binary Optimizer Runtime Engine" PTF is installed but is not the latest PTF listed in the Program Directory, an U4038 abend will occur and one of the following messages will be displayed:

IGZ0153S Program BOZSRC1 was compiled with a level of the compiler that requires service to be installed on Language Environment.

IGZ0355S Program BOZSRC1 was optimized with a level of the Automatic Binary Optimizer that requires service to be installed on Language Environment.

"Language Environment Automatic Binary Optimizer Runtime Engine" PTFs on z/OS 2.3 will emit the first message, and PTFs on z/OS 2.4 will emit the second message. The second message will be emitted on z/OS 2.5.

If instead of an abend, the GOAFTER step fails with a non-zero return code then one or more of the following Language Environment APAR/PTFs need to be installed according to the return code from this failing step.

An entry of N/A in the table stands for 'Not Applicable' and means that this return code should not happen on the specified z/OS version.

If the GOAFTER step fails in one of these N/A cases then contact IBM service to report the problem.

Figure 16. Missing Language Environment APARs/PTFs			
Return Code	z/OS 2.3	z/OS 2.4	z/OS 2.5
16 or other nonzero value	PH14705/UI64417	PH14705/UI64418 PH15921/UI65058 PH15921/UI65059	N/A
17	PI84561/UI49013	N/A	N/A

Install the required PTFs, and then run the BOZJIVP job again.

An OC1 abend will also occur if you attempt to run the ABO generated modules on a system that is not supported by ABO. See 5.2.1, "Machine Requirements" on page 10 for the supported systems.

6.1.10 Perform SMP/E ACCEPT

Edit and submit sample job BOZACCEP to perform an SMP/E ACCEPT CHECK for ABO. Consult the instructions in the sample job for more information.

To receive the full benefit of the SMP/E Causer SYSMOD Summary Report, do *not* bypass the 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 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 ABO, 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 IBM Automatic Binary Optimizer for z/OS

6.2.1 Product Registration for Subcapacity Reporting Tool

Subcapacity Reporting Tool (SCRT) V27.1.2 or above is required for subcapacity reporting for IBM Automatic Binary Optimizer for z/OS.

6.2.2 Product Customization

The publication *IBM Automatic Binary Optimizer for z/OS User's Guide* (SC27-9587) contains the necessary information to customize and use ABO.

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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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Program Directory for IBM Automatic Binary Optimizer for z/OS, May 2022

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