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# Table of Contents

| Chapter 1. | ZPSaver Suite Overview | 1.1 |
| Chapter 2. | **Installation**  | 2.1 |
| | Installing ZPSaver Suite | 2.1 |
| | Obtaining a license key | 2.1 |
| | Authorization requirements | 2.2 |
| Chapter 3. | Messages | 3.1 |
| Chapter 4. | Technical Support | 4.1 |
Chapter 1. ZPSaver Suite Overview

ZPSaver Suite is a set of enhanced technologies for Syncsort MFX to offload copy, SMS compression and sort processing to zIIP processors, effectively reducing the workload on the main CPU. Specifically, the ZPSaver Suite includes:

Copy in zIIP
A high-performance, transparent enhanced replacement for MFX copy processing that executes almost all copy steps on zIIP engines.

Compression in zIIP
An enhancement that offloads to zIIP engines the CPU time that is associated with SMS compression used in MFX sort and copy processing.

Sort in zIIP
A high-performance, transparent enhanced replacement for sort processing that executes almost all sort steps on zIIP engines.

How does ZPSaver Suite enhance Syncsort MFX?
ZPSaver Suite offers a new Syncsort architecture to offload processing to zIIP engines. This means that for copy, SMS version 1 compression and sort processing, ZPSaver Suite offloads the maximum amount of TCB and SRB CPU time processing to the zIIP engines in most use cases. This offload lowers the workload on the main CPU, frees the CPU for other workloads and reduces the TCB processing time.

For copy and sort applications, maximum performance improvements occur with feature usage, such as INCLUDE/OMIT, INREC, OUTREC and OUTFIL.
For sort and copy steps with SMS compression, maximum performance improvement occurs when SORTOUT is compressed.

For copy applications, input and output processing is improved by reading and writing blocks in parallel when the input/output is allocated on PAV-capable devices. This parallel processing reduces the elapsed time of the copy application.

**Copy in zIIP** is used with SORT FIELDS=COPY
Benchmark tests show significant performance advantages when using Copy in zIIP:
- Significantly reduced TCB CPU time – up to 95%
- Significantly reduced elapsed time – up to 25%

**Compression in zIIP** is used in most use cases when a sort or copy has SMS version 1 compression attributes on SORTIN or SORTOUT (non-VSAM, non-OUTFIL) data sets.

When reading or writing SMS-compressed data sets, CPU time typically increases significantly while DASD usage and elapsed time are reduced dramatically. Compression in zIIP reduces the CPU time of compression/decompression by offloading this processing to zIIP engines – performing 100% compatible decompression on SORTIN and 100% compatible compression for SORTOUT while achieving the equivalent reductions in DASD usage and elapsed time.

Benchmark tests for Compression in zIIP demonstrate:
- Between 80% and 90% reduction in CPU time

**Sort in zIIP** is initiated with SORT FIELDS=(x,y,ZZ,A…)
Benchmark tests show significant performance advantages when using Sort in zIIP:
- Significantly reduced TCB CPU time – up to 95%

**How is ZPSaver Suite enabled?**
ZPSaver Suite is enabled through a license key that you must apply to Syncsort MFX 2.1:
- Existing SORT FIELDS=COPY applications will automatically utilize Copy in zIIP.
- All sort and copy applications with SMS version 1 compression will automatically utilize Compression in zIIP.
- Existing SORT FIELDS=(x,y,ZZ,A…) applications will automatically utilize Sort in zIIP.

**Notes:** 1. ZPSaver Suite requires no changes to an application’s JCL or control statements. 2. Syncsort MFX Release 2.1 is required for ZPSaver Suite.
Installing ZPSaver Suite

Most of the ZPSaver Suite components are automatically installed with Syncsort MFX Release 2.1. Additional components need to be installed by the application of PTFs. Contact your Syncsort representative for the PTFs.

ZPSaver Suite requires a license key to be activated. There are also some authorization requirements that are described in the “Authorization requirements” section below.

Obtaining a license key

A ZPSaver Suite license key is required for every machine on which ZPSaver Suite will be run. Contact us with the serial numbers of the machines you want to license for ZPSaver Suite and we will generate the appropriate keys for you.

When you have received the license keys, add them to your existing MFX key data set. For more information about the key data set, see Appendix B in the Syncsort MFX Installation Guide.

Authorization requirements

The ZPSaver Suite components are installed in the Syncsort MFX load module libraries. Since ZPSaver Suite must execute as an authorized program, the SYNCLINK and SYNCRENT libraries must be made authorized.
In addition, certain Syncsort MFX load modules must be relinked with the load module attribute AC=1. To assign this attribute to the necessary load modules in the SYNCLINK library you must submit certain SMP/E UCLIN and LINK LMODS commands and afterward issue the system command MODIFY LLA,REFRESH.

Figure 1 includes a sample JCL job with the SMP/E commands that will set the load module attribute AC=1. To access this job, copy and paste these JCL statements into an MVS file. Modify the JCL for execution on your system. Submit the job at an appropriate time.

```plaintext
//JOBNAME JOB (ACCOUNTING-INFO),MSGCLASS=A,REGION=7M
//SETAC1 EXEC PGM=GIMSMP,REGION=7M,
//       PARM='CSI=SYNCSORT.MFX.R21.SMP.CSI'
//SMPCNTL DD *
SET BDY (SYNCTGT).
   UCLIN.
   ADD LMOD(SYNCSORT) AC=1.
   ADD LMOD(SYNT00L) AC=1.
   ADD LMOD(SORT64) AC=1.
   ADD LMOD(SYNCLD) AC=1.
   ADD LMOD(SYNCFNI) AC=1.
   ADD LMOD(SYNCGENR) AC=1.
ENDUCL.
LINK LMODS(SYNCSORT
   SYNT00L
   SORT64
   SYNCBLD
   SYNCFNI
   SYNCGENR).
/*

Figure 1. SMP/E commands to set the load module attribute AC=1
```

In order to benefit from ZPSaver Suite, user programs that invoke Syncsort MFX must be linked with AC=1 and they must reside in an authorized library. For a program to run as authorized, all libraries in the JOBLIB or STEPLIB concatenations, if present, must be authorized libraries.

PARMEXIT routines also have to reside in an authorized library, but they do not need to be linked with AC=1. (A PARMEXIT is specified as a Syncsort MFX installation option.)

At run time, ZPSaver Suite will verify that it is running as an authorized program. If it is not, ZPSaver Suite will be disabled and the function will be performed by Syncsort MFX.

For more information about program authorization, see the chapter on “Protecting the System” in the IBM publication MVS Programming: Authorized Assembler Services Guide, SA22-7608.
In addition to MFX messages, the following informational ZPSaver Suite messages may be displayed.

WER550I  ZPCOPY EXECUTED – TYPICAL SAVINGS ARE UP TO 95% TCB TIME AND 20% ELAPSED TIME

EXPLANATION: This message appears when ZPSaver Suite is in effect.

WER551I  ZPSAVER IS ATTEMPTING TO RUN IN AN UNAUTHORIZED ENVIRONMENT. ZPSAVER IS DISABLED.

EXPLANATION: ZPSaver Suite could not be used because the library or module is not APF-authorized.

ACTION: Determine why the library or module is not authorized and correct the problem so ZPSaver Suite will be enabled. The most frequent causes are:
1. ZPSaver Suite is executing out of an unauthorized library.
2. Certain Syncsort MFX load modules were not relinked with the load module attribute AC=1.
3. An unauthorized library was included in the JOBLIB or STEPLIB concatenation.

See “Authorization requirements” on page 2.1 for more information.
WER553I  ZPCOMPRESS USED FOR SORTOUT

EXPLANATION: This message indicates that ZPSaver Suite was used for SORTOUT compression.

WER554I  ZPCOMPRESS USED FOR SORTIN

EXPLANATION: This message indicates that ZPSaver Suite was used for SORTIN decompression.

WER558I  ZPSORT EXECUTED - x% CPU TIME SAVED, ADDITIONAL y% COULD HAVE BEEN SAVED IF ZIIP ENGINES WERE NOT BUSY

EXPLANATION: ZPSaver Suite was executed. x% of CPU time has been saved as a result of zIIP offload. Because the zIIP engines were busy, y% of CPU time that could have been offloaded to zIIP was offloaded to a regular CP.
Chapter 4. Technical Support

If you have a question or problem, have your Syncsort My Support username and password ready and check in the Syncsort Knowledge Base by clicking here. If you need further assistance, contact us by phone or e-mail using the following contact information.

Customers in North America can contact Syncsort Mainframe Product Services directly for expert advice at (201) 930-8260 or by email at zos_tech@Syncsort.com.

Customers in Europe, Middle East, and Africa can contact Syncsort Mainframe Product Services directly for expert advice at +31 20 219 9912 or by email at supportemea@syncsort.com.

Customers in other regions should contact their local Syncsort representative.