

# IOSSPOFD

## A Tool for discovering single points of failure in an I/O configuration.

### Use.

IOSSPOFD can be used to determine if volumes have a singular hardware component common to all paths to the device. It can also be used to determine if a primary volume and an alternate volume have any common hardware components. If such a hardware component were to fail then the volume would not be available. The messages issued are documented in z/OS MVS System Messages, Vol 9 (IGF-IWM) under the IOSPF messages section.

### Installing the Tool.

**Note: Please use this tool on z/OS 1.10 or higher releases.**

- Download the following OBJs for the desired release.

```
IOSSPOFD
IOSHCSLA
IOSHCSP
IOSHCSP
IOSHCSP
```

Note: HBB7750 = z/OS 1.10

- Move downloaded files from your PC to an MVS host using command prompt window.
- Allocate a partitioned dataset to hold your OBJ files on your host system

C:\ cd to your directory where above OBJs are stored.

C:\ ftp to your MVS host and login to your id.

```
FTP> cd to your.obj.dataset
```

```
FTP> bin
```

```
FTP> put iossprof.release# iossprof
```

```
FTP> put ioshcsla.release# ioshcsla
```

```
FTP> put ioshcsp.release# ioshcsp
```

```
FTP> put ioshcsp.release# ioshcsp
```

```
FTP> quit
```

- The OBJs are linked together into a load library.

Here's an example:

Note: Please update linklib and OBJ dataset names and volser information.

```
//LNKIT101 EXEC PGM=HEWL,
//  PARM='LET,LIST,NCAL,RENT,RMOD=ANY,AMOD=31'
//SYSPRINT DD  SYSOUT=A
//SYSUT1 DD UNIT=SYSDA,SPACE=(TRK,(10,10))
//SYSLMOD DD  DSN=your.loadlib.dataset,UNIT=unit,VOL=SER=volser,
```

```

//      DISP=SHR
//IN1      DD      DSN=Your.obj.dataset,DISP=SHR
//SYSLIN   DD      *
          INCLUDE IN1 (IOSSPOFD)
          INCLUDE IN1 (IOSHCSLA)
          INCLUDE IN1 (IOSHCSP)
          INCLUDE IN1 (IOSHCSP)
          INCLUDE IN1 (IOSHCSP)
          ENTRY  IOSSPOFD
          NAME  IOSSPOFD(R) RC=0
/*

```

## Running the Tool.

- Use the JCL like the example provided below to specify devices, volumes or datasets to check if there are any single points of failure on them.

```

//IOSSPOFD JOB MSGLEVEL=(1,1)
//STEP EXEC PGM=IOSSPOFD
//SYSABEND DD SYSOUT=A
//SYSIN      DD *
          VOLLIST(VOLS01) /* VERIFY THE VOLUME VOLS01 */
/*

```

- The tool will display a message like below if a single point of failure was detected

```

IOSPF209I Volume VOLS01 (00980) has all control unit
interfaces share 3 of 3 common components.
+SPOFD001I RTC: 00000008 RSN: 00000000

```

- The tool will display a message such as below if a single point of failure was detected

```

+SPOFD002I NO SINGLE POINTS OF FAILURE DETECTED
+SPOFD001I RTC: 00000000 RSN: 00000000
NOTE: The tool only supports DASD devices.

```

## Basic Syntax of SYSIN.

```

Checking volumes for single points of failure.

>>--VOLLIST-(-vvvvvv-----)-----<<
      'vvvvv*---'  +->|vvvvvv,-|++
                  | 'vvvv*,---' |
                  +-----+

Checking device numbers for single points of failure.

>>--DEVLIST-(-nnnnn-----)-----<<
      'nnnnn-nnnnn---'  +->|nnnnn,-----|++
                  | 'nnnnn-nnnnn,' |
                  +-----+

Checking volumes via datasets for single points of failure.

>>--DSNLIST-(-DS.NAME-----)-----<<
                  +->'DS.NAME,-|---+
                  |
                  +-----+

Checking a primary volume and an alternate volume for single points
of failure between them.

>>--VOLSER1-(vvvvvvv-)---VOLSER2-(vvvvvvv-)-----<<

Checking a primary device number and an alternate device number for
single points of failure between them.

>>--DEVN1-(nnnnn-)---DEVN2-(nnnnn-)-----<<

Checking a primary dataset and an alternate dataset's volume for
single points of failure between them.

>>--DSN1-(DS.NAME-)---DSN2-(DS.NAME-)-----<<

Note: All parameters can be specified in quotes.
      /* */ style comments are also allowed.

```

## SYSIN Parameters.

- IOSSPOFD input has the following structure for lists of devices.

- **DEVLIST(nnnn) or DEVLIST(IIII-hhhh) or DEVLIST( nnnn, IIII-hhhh , ...)**  
DEVLIST can take a comma separated list of device numbers or a range of device numbers. For example to check devices 410,411 and devices 980-9A0.

```
DEVLIST(410,411,980-9A0)
```

If of the devices specified 410 and 980 have only one online path, 9A0 is not online and 9AF does not exist then this will be displayed.

```
IOSPF203I Volume WORK01 (0410) has only one online path.
IOSPF203I Volume SYSRES (0980) has only one online path.
```

```
IOSPF101I Device 09A0 is not online.
IOSPF101I Device 09AF could not be found.
+SPOFD001I RTC: 00000008 RSN: 00000000
```

- **VOLLIST(vvvvvv) or VOLLIST(www\*) or VOLLIST( vvvvvv, wwww\* , ...)**  
VOLLIST can take a comma separated list of volsers or a '\*' wildcard to make a list of devices to check.

```
VOLLIST (SYSRES, WORK*, TEST01)
```

If of the devices specified SYSRES has only one online path,  
WORK01,WORK02 have only one online path and WORK03 and TEST01 is  
offline.

```
IOSPF203I Volume SYSRES (0980) has only one online path.
IOSPF203I Volume WORK01 (0410) has only one online path.
IOSPF203I Volume WORK02 (0411) has only one online path.
IOSPF201I Volume TEST01 could not be found
+SPOFD001I RTC: 00000008 RSN: 00000000
```

Note: Volumes that specified with out a wildcard and are offline will have a  
IOSPF201I message issued indicating that it cannot be found. However  
volumes that that have been found via the wildcard will not have a  
IOSPF201I message issued.

- **DSNLIST( DSN1 , DSN2, DSN3 )**  
DSNLIST can take a comma separated list of dataset names. The dataset  
names are found via the LOCATE service.

```
DSNLIST (SYS1.NUCLEUS, SYS1.LINKLIB, DB2.DATABASE)
```

If of the devices specified SYSRES has only one online path,  
WORK01,WORK02 have only one online path and WORK03 and TEST01 is  
offline.

```
IOSPF303I Volume SYSRES (0980) with SYS1.NUCLEUS has only
one online path.
IOSPF303I Volume SYSRES (0980) with SYS1.LINKLIB has only
one online path.
IOSPF301I Volume *NONE* with DB2.DATABASE could not be
found
+SPOFD001I RTC: 00000008 RSN: 00000000
```

- **VOLLIST(v1,v2,v3) DSNLIST( DSN1 , DSN2, DSN3 )**  
**and**  
**DEVLIST(devn1,devn2,devn3) DSNLIST( DSN1 , DSN2, DSN3 )**

VOLLIST and DSNLIST can be used in conjunction and DEVLIST and DSNLIST  
can be used together to make more descriptive messages. (The DSNLIST  
parameters will be used as a description only)

```

//IOSSPOFD JOB MSGLEVEL=(1,1)
//STEP EXEC PGM=IOSSPOFD
//SYSABEND DD SYSOUT=A
//SYSIN DD *
        DEVLIST(410,411,980,9A0,9AF)
        DSNLIST(DB2.WORK,SPOF.FREE,'THE SYSRES'
                , 'REALLY IMPORTANT DATA', 'I WOULD BE FIRED')
/*

```

If of the devices specified 410 and 980 have only one online path, 9A0 is not online and 9AF does not exist then this will be displayed.

```

IOSPF303I Volume WORK01 (0410) with DB2.WORK has only one
online path.
IOSPF303I Volume SYSRES (0980) with THE SYSRES has only one
online path.
IOSPF301I Volume N/A (09A0) with REALLY IMPORTANT DATA is
not online.
IOSPF301I Volume N/A (09AF) with I WOULD BE FIRED could not
be found.
+SPOFD001I RTC: 00000008 RSN: 00000000

```

- **IOSSPOFD input has the following syntax for primary and alternate backup volume checking**

- **VOLSER1 ( vvvvv1 ) and VOLSER2 ( vvvvv1 )**  
take two different volsers as input. When VOLSER1 and VOLSER2 are specified the single points of failure service will find common hardware of both devices and the single points of failure of each device individually.

For example: if both devices share a physical control unit.

```

IOSPF253I Volumes PRMRY (0980) and ALT (0981) share the
same physical control unit.
+SPOFD001I RTC: 00000008 RSN: 00000000

```

- **DEVN1 ( nnnn1 ) and DEVN2 ( nnnn2 )**  
can take two up to 5-digit device numbers as input. When DEVN1 and DEVN2 are specified the single points of failure service will find common hardware of both devices and the single points of failure of each device individually.

For example: if both devices share a physical control unit.

```

DEVN1(980) DEVN2(981) /* VERIFY THE PRIMARY and ALTERNATE*/

IOSPF253I Volumes PRMRY (0980) and ALT (0981) share the
same physical control unit.
+SPOFD001I RTC: 00000008 RSN: 00000000

```

- **DSN1 ( dsn.name1 ) and DSN2 ( dsn.name2 )**  
can take two 44 character dataset names as input. When DSN1 and DSN2 are specified the single points of failure service will find common hardware of both devices and the single points of failure of each device individually.

For example: if both devices share a physical control unit.

```
DSN1(SYS1.PRMRY) DSN2(SYS1.ALT) /* VERIFY THE PAIR*/

IOSPF353I Volumes PRMRY (0980) with SYS1.PRMRY and ALT
(0981) with SYS1.ALT share the same physical control unit.
+SPOFD001I RTC: 00000008 RSN: 00000000
```

- **DEVN1(nnnn1) DSN1 ( dsn.name1 ) DEVN2(nnnn2) DSN2 ( dsn.name2 )**  
and  
**VOLSER1(nnnn1) DSN1 (dsn.name1) VOLSER2(nnnn2) DSN2 (dsn.name2)**

Like VOLLIST and DEVLIST; DEVN1, DEVN2, VOLSER1 and VOLSER2 can be used in conjunction with DSN1 and DSN2 to make more descriptive messages. (DSN1 and DSN2's parameters will be used as a description only).

For example: if both devices share a physical control unit.

```
VOLSER1(PRMRY) DSN1("The primary dataset")
VOLSER2(ALT) DSN2("Our alternate dataset")
/* VERIFY THE PAIR */

IOSPF353I Volumes PRMRY (0980) with THE PRIMARY DATASET and
ALT (0981) with OUR ALTERNATE DATASET share the same
physical control unit.
+SPOFD001I RTC: 00000008 RSN: 00000000
```

- **IOSSPOFD can use the following options to filter output.**
- **IND\_CHECKS(YES) or IND\_CHECKS(NO) or IND\_CHECKS(ONLY)**  
Specify whether checks on individual devices will be checked for pair checks. If individual checks are not done, warnings that the channel component and the control unit interface checks could not be done will not be issued.

```
VOLSER1(PRMRY) VOLSER2(ALT)
IND_CHECKS(YES)

IOSPF253I Volumes PRMRY (0980) and ALT (0981) share the
same physical control unit.
IOSPF203I Volume PRMRY has only one online path.
+SPOFD001I RTC: 00000008 RSN: 00000000
Or.
VOLSER1(PRMRY) VOLSER2(ALT)
IND_CHECKS(NO)

IOSPF253I Volumes PRMRY (0980) and ALT (0981) share the
same physical control unit.
+SPOFD001I RTC: 00000008 RSN: 00000000
```

Or.

```
VOLSER1 (PRMRY) VOLSER2 (ALT)  
IND_CHECKS (ONLY)
```

```
IOSPF203I Volume PRMRY has only one online path.  
+SPOFD001I RTC: 00000008 RSN: 00000000
```

- **SWITCH\_CHECKS(YES) or SWITCH\_CHECKS (NO)**  
Specify whether switch single points of failure will be checked.
- **CU\_CHECKS(YES) or CU\_CHECKS (NO)**  
Specify whether control unit single points of failure will be checked.

## IOSSPOFD Examples.

- Use this to check all online volumes.

```
//IOSSPOFD JOB MSGLEVEL=(1,1)  
//STEP EXEC PGM=IOSSPOFD  
//SYSABEND DD SYSOUT=A  
//SYSIN DD *  
VOLLIST(*) /* CHECK ALL ONLINE VOLUMES */  
/*
```

- Use this to check all online volumes and ignore switch single points of failure.

```
//IOSSPOFD JOB MSGLEVEL=(1,1)  
//STEP EXEC PGM=IOSSPOFD  
//SYSABEND DD SYSOUT=A  
//SYSIN DD *  
VOLLIST(*) SWITCH_CHECKS (NO) /* CHECK ALL VOLSERS */  
/*
```

- Use this to check some important system datasets.

```
//IOSSPOFD JOB MSGLEVEL=(1,1)  
//STEP EXEC PGM=IOSSPOFD  
//SYSABEND DD SYSOUT=A  
//SYSIN DD *  
DSNLIST (SYS1.PARMLIB, SYS1.LINKLIB, SYS1.LPALIB)  
/*
```

- Use this to check a range of device numbers.

```
//IOSSPOFD JOB MSGLEVEL=(1,1)  
//STEP EXEC PGM=IOSSPOFD  
  
//SYSABEND DD SYSOUT=A  
//SYSIN DD *  
DEVLIST (980, 981, B300-B310)  
/*
```

- Use this to check a primary and alternate volser

```
//IOSSPOFD JOB MSGLEVEL=(1,1)
```

```
//STEP EXEC PGM=IOSSPOFD

//SYSABEND DD SYSOUT=A
//SYSIN DD *
    VOLSER1 (PRMRY) VOLSER2 (ALT)
/*
```

- Use this to check a pair of devices.

```
//IOSSPOFD JOB MSGLEVEL=(1,1)
//STEP EXEC PGM=IOSSPOFD
//SYSABEND DD SYSOUT=A
//SYSIN DD *
    DEVN1 (410) DEVN2 (411)
/*
```

- Use this to check a pair of datasets.

```
//IOSSPOFD JOB MSGLEVEL=(1,1)
//STEP EXEC PGM=IOSSPOFD

//SYSABEND DD SYSOUT=A
//SYSIN DD *
    DSN1 (SYS1.PRIMARY) DSN2 (SYS1.ALT)
/*
```

## IOSSPOFD Messages.

### +SPOFD001I RTC: xxxxxxxx RSN: xxxxxxxx

Specifies the Return and Reason codes to the Single Point of Failure Service. Refer to the IOSSPOF single point of failure service documentation for accurate return codes.

### +SPOFD002I NO SINGLE POINTS OF FAILURE DETECTED

Indicates that no single points of failure were detected.

### +SPOFD003I Unable to perform xxxxxxxx single point of failure check for the following:

Indicates that the xxxxxxxx single point of failure check could not be made.  
Where xxxxxxxx is “channel components” or “control unit interface”

### +SPOFD004I Volume vvvvvv (sdddd)

Follows the SPOFD003I message and lists the volumes and their device numbers for which the single point of failure check could not be made.

### +SPOFD101E PARSE ERROR: SYSIN LINE: nnnnn value1 IS EXPECTED BEFORE value2

A parse error was detected on line nnnnn where a value was found but value2 was expected.

### +SPOFD102E PARSE ERROR: SYSIN LINE: nnnnn value SEEN v1,v2,...,vn EXPECTED



A parse error was detected on line *nnnnn* where a *value* was found but one of *v1,v2,...,vn* was expected.

**+SPOFD103E PARSE ERROR: SYSIN LINE: *nnnnn*  
MISSING COMMENT TERMINATOR**

A parse error was detected on line *nnnnn* where a comment terminator “\*/” was not found to end a comment.

**+SPOFD104E PARSE ERROR: SYSIN LINE: *nnnnn*  
INCORRECT QUOTED VALUE**

A parse error was detected on line *nnnnn* where a quoted value was started but not ended.

**+SPOFD105E PARSE ERROR: SYSIN LINE: *nnnnn*  
*xxxx* INCORRECT DEVICE NUMBER**

A parse error was detected on line *nnnnn* where *xxxx* is the invalid device number.

**+SPOFD106E PARSE ERROR: SYSIN LINE: *nnnnnn*  
*vvvvvv* INCORRECT VOLSER**

A parse error was detected on line *nnnnn* where *xxxx* is the invalid volses. Volsers are up to 6 alpha numeric characters. VOLLIST parameters support the \* wildcard operator at the end of the value.

**+SPOFD107E PARSE ERROR: SYSIN LINE: *nnnnn*  
*dsn* DSN IS TOO LONG**

A parse error was detected on line *nnnnn* where *dsn* is longer than 44 characters.

**+SPOFD108E PARSE ERROR: SYSIN LINE: *nnnnn*  
*xxxx* INCORRECT RANGE SPECIFIED**

A parse error was detected on line *nnnnn* where *xxxx* is the invalid range. Ranged device numbers must go from low to high. E.g. 1000-990 is not a valid range.

**+SPOFD201E SPECIFICATION ERROR:  
ONLY ONE OF DEVN1, VOLSER1, DEVLIST OR VOLLIST  
CAN BE SPECIFIED IN ONE CHECK**

DEVN1, VOLSER1, DEVLIST OR VOLLIST are mutually exclusive parameters in IOSPOFD. Only specify one of them at a time.

**+SPOFD202E SPECIFICATION ERROR:  
NO VOLUMES MATCH VOLLIST SPECIFICATION**

In a VOLLIST specification no volumes were found that match the specification. I.e. the wildcard specification did not find any volumes that match the criteria.

**+SPOFD203E SPECIFICATION ERROR:  
DSNLIST NUMBER DOES NOT MATCH VOLLIST OR DEVLIST**

When VOLLIST or DEVLIST is used in conjunction with DSNLIST the numbers of devices and datasets must match to ensure proper messages.

**+SPOFD204E SPECIFICATION ERROR:  
DEVN2, VOLSER2 AND DSN2 MUST BE SPECIFIED WITH THEIR  
CORRESPONDING DEVN1, VOLSER1 AND DSN1**

When DEVN2, VOLSER2 or DSN2 is specified then DEVN1, VOLSER1 or DSN1 must also be specified.

**+SPOFD205E SPECIFICATION ERROR:  
TOO MANY VOLUMES IN SPECIFICATION**

You can only check up to 65535 devices in one check.

**+SPOFD300E IOSSPOF SERVICE NOT INSTALLED**

The IOSSPOF service is on release R1.10 and above.

**+SPOFD301E UCBSCAN ERROR:  
RETCODE: xxxxxxxx RSNCODE: xxxxxxxx**

Volume scan failed with the above return code.