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LAD: z/OS SDSF SYM and ENQ Options

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Introducing the SDSF SYM and ENQ enhancements

The IBM z/OS® continuous delivery program introduces new functionality through the small programming enhancements (SPEs) for SDSF users to display system symbols and enqueue information. The SPE is delivered through functional program temporary fixes (PTFs).

This Learn Adopt Deploy (LAD) IBM® Redpaper™ publication describes the new SYM and ENQ options that appear on the SDSF Primary Menu. The new tabular panels that display system symbols and enqueues in the sysplex are shown. This paper also includes information to help you meet the following goals:

- Learn about the new SYM and ENQ functionality
- Adopt the software into your environment
- Deploy and integrate SYM and ENQ updates into your operational environments

New functionality

The new functionality personalizes system-related information for the SDSF user, as shown in Figure 1.

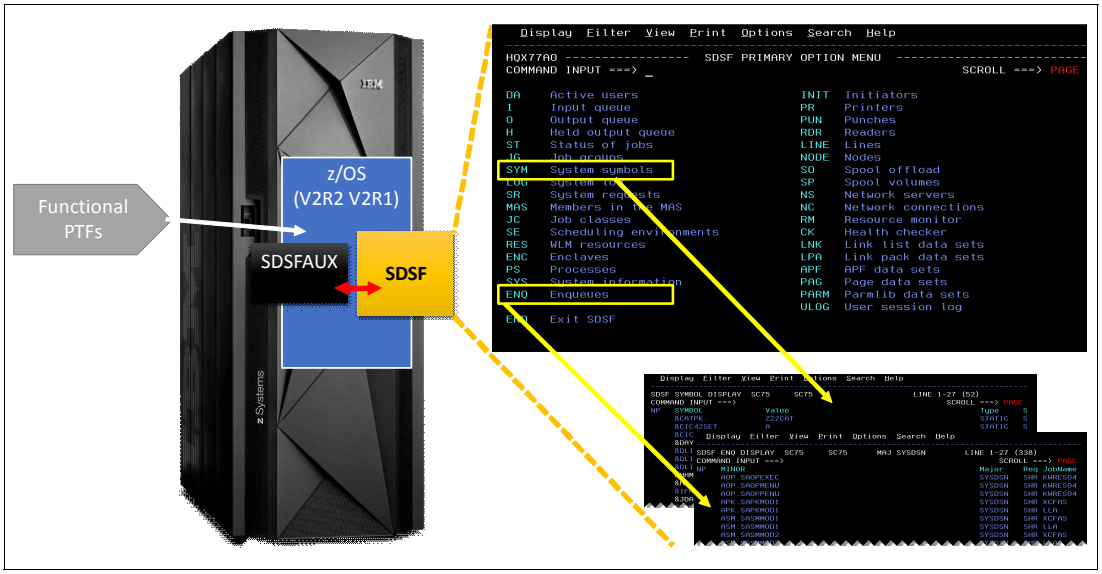

Figure 1 New SDSDF SYM and ENQ options and panels

New SDSF Primary Menu options

The following options were added to the SDSF Primary Menu:

- SYM: Option to display dynamic and static system symbols
- ENQ: Option to display the current enqueue list

The new options are highlighted in Figure 2.

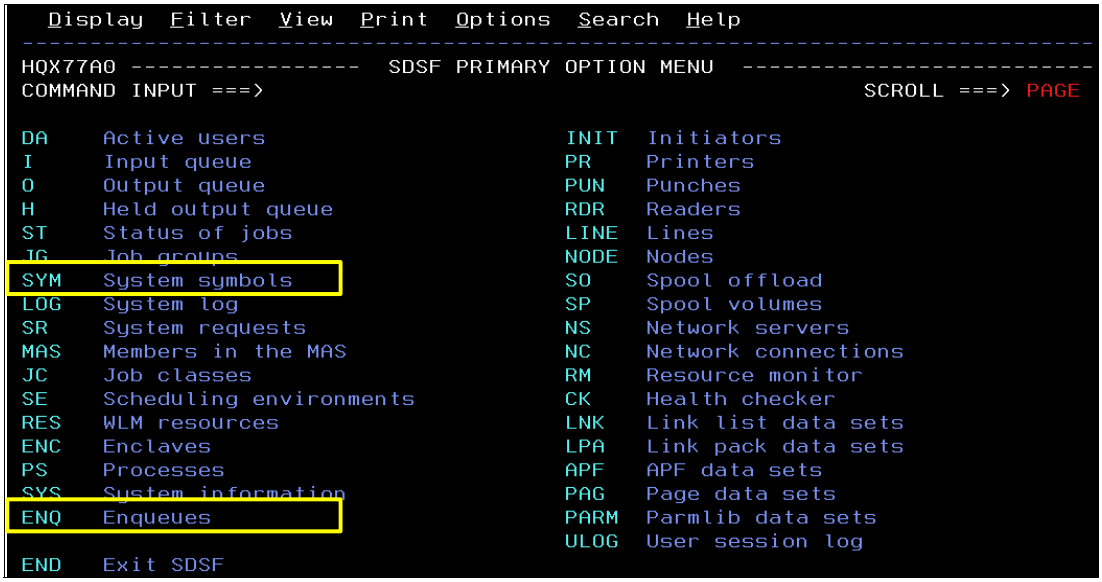

Figure 2 SDSF new options

The SYM option appears on the SDSF Primary Option Menu. When selected, it issues the **SDSF SYM** command and displays the dynamic and static system symbols and their current value. The display is presented in a tabular form.

The ENQ option also appears on the SDSF Primary Option Menu. When selected, it issues the **SDSF ENQ** command and displays active system enqueues. You can also issue an **SDSF ENQC** command (this option is not available on the menu) that displays all enqueues with contention. The displays are presented in a tabular form.

Note: The SDSF user must be authorized to use these commands.

SYM option

You can select the SYM option on the SDSF Primary Option Menu or you can use the command method.

From SDSF Primary Option Menu, authorized users can use SYM to display system dynamic and static symbols, as shown in Figure 3.

```
  Display  Filter  View  Print  Options  Search  Help
------------------------------------------------------------------------------
SDSF SYMBOL DISPLAY  SC74     SC74                    LINE 1-17 (48)
COMMAND INPUT ===> _                                    SCROLL ===> CSR
ACTION=+-Extend,//-Block,%-RunExec,=-Repeat,D-Display,DL-DisplayLong
NP    SYMBOL             Value           Type     SysName  SysLevel
      &CATPK.            Z22CAT          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &CIC42SET.         A               STATIC   SC74     z/OS 02.02.00 HBB77A0
      &CIC42VOL.         BH5CI1          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &DAY.              21              DYNAMIC  SC74     z/OS 02.02.00 HBB77A0
      &DLIB1.            Z22DE1          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &DLIB2.            Z22DE2          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &DLIB3.            Z22DE3          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &HHMMSS.           172511          DYNAMIC  SC74     z/OS 02.02.00 HBB77A0
      &HR.               17              DYNAMIC  SC74     z/OS 02.02.00 HBB77A0
```

Figure 3 SYM panel

The symbols are often used in PARMLIB definitions that are shared among systems, while their values relate to each individual system.

You might choose to filter the information and enter the **FILTER** command, as shown in Example 1.

Example 1 Filter command to show only static variables

```
FILTER TYPE EQ STATIC
```

The output of the **FILTER** command is shown in Figure 4.

```
  Display  Filter  View  Print  Options  Search  Help
------------------------------------------------------------------------------
SDSF SYMBOL DISPLAY  SC74     SC74                    LINE 1-18 (25)
COMMAND INPUT ===> _                                    SCROLL ===> CSR
ACTION=+-Extend,//-Block,%-RunExec,=-Repeat,D-Display,DL-DisplayLong
NP    SYMBOL             Value           Type     SysName  SysLevel
      &CATPK.            Z22CAT          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &CIC42SET.         A               STATIC   SC74     z/OS 02.02.00 HBB77A0
      &CIC42VOL.         BH5CI1          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &DLIB1.            Z22DE1          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &DLIB2.            Z22DE2          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &DLIB3.            Z22DE3          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &IFAPRDXX.         00              STATIC   SC74     z/OS 02.02.00 HBB77A0
      &JNKPK.            Z22JNK          STATIC   SC74     z/OS 02.02.00 HBB77A0
      &LPALIST1.         1A              STATIC   SC74     z/OS 02.02.00 HBB77A0
      &OMVSPARM.         2A              STATIC   SC74     z/OS 02.02.00 HBB77A0
      &PRISUBSY.         JES2            STATIC   SC74     z/OS 02.02.00 HBB77A0
```

Figure 4 STATIC symbol display by using a FILTER command

You can use the **FILTER SYSNAME** command to filter symbols for a specific system or for all systems in the sysplex, as shown in Figure 5, which shows SC74 and SC75 system symbols.

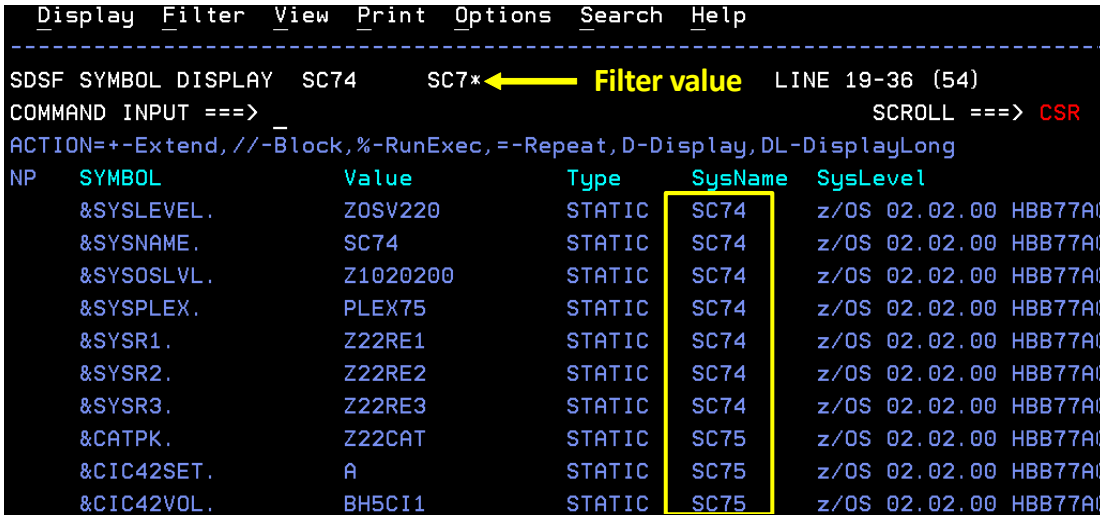

Figure 5 SYM display for multiple systems in the sysplex

SYM panel columns

Depending on your column width settings, you might have to navigate by using PF11 (depending on your PFK settings) to move to the right side of the panel to see the display columns.

Table 1 lists the column headers.

Table 1 SYM Display Panel Column headings

Column	Description
Symbol	Symbol name
Value	Symbol value
Type	Symbol type: ► Dynamic ► Static
SysName	System name
SysLevel	Name, Level, and FMID of the operating system

SYM line commands

From the SDSF SYM panel, you can see which line commands are available. You also can issue the **SET ACTION ON** command to show the available line commands for a panel.

On the SYM panel, users can issue a **D** (Display symbol name) command, which is equivalent to IBM MVS™ commands, as shown in the following example:

```
D SYMBOLS,S=symname
```

If we issue a **D** command on the &CATPK symbol line, the resulting display is similar to what is shown in Figure 6.

```
  Display  Filter  View  Print  Options  Search  Help
-------------------------------------------------------------------------------
SDSF SYMBOL DISPLAY  SC74     SC74                      COMMAND ISSUED
COMMAND INPUT ===> _                                        SCROLL ===> CSR
RESPONSE=SC74
 IEA007I STATIC SYSTEM SYMBOL VALUES 757
  &CATPK.             = "Z22CAT"
    &CIC42SET.          A               STATIC   SC74     z/OS 02.02.00 HBB77A0
    &CIC42VOL.          BH5CI1          STATIC   SC74     z/OS 02.02.00 HBB77A0
    &DAY.               21              DYNAMIC  SC74     z/OS 02.02.00 HBB77A0
    &DLIB1.             Z22DE1          STATIC   SC74     z/OS 02.02.00 HBB77A0
    &DLIB2.             Z22DE2          STATIC   SC74     z/OS 02.02.00 HBB77A0
    &DLIB3.             Z22DE3          STATIC   SC74     z/OS 02.02.00 HBB77A0
```

Figure 6 Symbol &CATPK D line command response

The line command **DL** (display all symbols) is equivalent to the IBM MVS command. The **D SYMBOLS** command also is available. The resulting display is shown in Figure 7.

```
  Display  Filter  View  Print  Options  Search  Help
-------------------------------------------------------------------------------
SDSF SYMBOL DISPLAY  SC74     SC74                    7 RESPONSES NOT SHOWN
COMMAND INPUT ===> _                                        SCROLL ===> CSR
RESPONSE=SC74
 IEA007I STATIC SYSTEM SYMBOL VALUES 759
  &SYSALVL.           = "2"
  &SYSCLONE.          = "74"
  &SYSNAME.           = "SC74"
  &SYSOSLVL.          = "Z1020200"
  &SYSPLEX.           = "PLEX75"
  &SYSR1.             = "Z22RE1"
  &CATPK.             = "Z22CAT"
  &CIC42SET.          = "A"
  &CIC42VOL.          = "BH5CI1"
  &DLIB1.             = "Z22DE1"
```

Figure 7 DL line command response

SYM summary

The SYM panel provides a simple, reliable way for operations and support teams to identify system symbols and values for an individual system or for all systems across the sysplex.

Within this panel, you can perform the following tasks:

- Identify symbols and their values.
- Determine whether the symbols are static or dynamic.
- Use filters and commands to display information in a preferred format.

ENQ option

The new ENQ panel provides the option to check all system enqueues on the system, sort and filter data by any fields, and determine possible contention on resources. It offers a simple and fast way to check system enqueues, and determine the possible causes for jobs and applications delays. It can also help operations and support teams to determine the cause of the delay.

You can select the ENQ option on the SDSF Primary Option Menu or you can use the **SDSF** command alternative. The enqueue panel can be called by using one of the following commands:

- `ENQ`: Displays all of the current enqueues in the system. You can add parameters that can be used to display enqueues for specific major and system names.
- `ENQC`: Displays all of the resources that are in a contention status.

If no parameters are specified when the panel is accessed by using the **ENQ** command or the ENQ option on the SDSF Primary Option Menu is selected, only SYSDSN Major enqueues are displayed, as shown in Figure 8.

```
 Display  Filter  View  Print  Options  Search  Help
-------------------------------------------------------------------------------
SDSF ENQ DISPLAY  SC74     SC74      MAJ SYSDSN        LINE 163-179 (345)
COMMAND INPUT ===> _                                    SCROLL ===> CSR
PREFIX=*  DEST=(ALL)  OWNER=KWRES08  SORT=MINOR/A Major/A  SYSNAME=*
FILTERS=1
NP   MINOR                                              Major    Req JobName
     ISP.SISPSLIB                                       SYSDSN   SHR KWRES08
     ISP.SISPTENU                                       SYSDSN   SHR KWRES08
     IXM.SIXMLOD1                                       SYSDSN   SHR XCFAS
     IXM.SIXMLOD1                                       SYSDSN   SHR LLA
     JES2.ZFS                                           SYSDSN   SHR OMVS
     KWRES08.ISP06171.SC74.SPFLOG1.LIST                 SYSDSN   EXC KWRES08
     KWRES08.ISP06171.SC74.SPFTEMP0.CNTL                SYSDSN   EXC KWRES08
     KWRES08.SC74.ISPF42.ISPPROF                        SYSDSN   SHR KWRES08
     LDAPCFG.PP.LDAP1.ZFS                               SYSDSN   SHR OMVS
     LOGR.IFASMF.DEFAULT.SC74                           SYSDSN   SHR IXGLOGR
```

Figure 8 ENQ panel

The Req column denotes the enqueue request type. The exclusive and shared enqueues are displayed in different colors, which helps to identify potential issues when troubleshooting is performed. Figure 8 shows shared and exclusive enqueues in blue and white. Enqueues that are displayed in white are the exclusive type.

More information appears in the display columns. Users can navigate to the right to see more information about the enqueue. For more information about the columns and their descriptions, see Table 2 on page 8.

The ENQ command features the following format:

```
ENQ (major-name) (system-name)
```

We used two systems that are in the sysplex in our controlled environment: SC74 and SC75. While logged on to SC74, the command that is shown in Example 2 on page 7 is entered to display the current enqueues on SC75. You can use wild characters on major or system parameters.

Example 2 ENQ command with parameters

```
ENQ SYSDSN SC75
```

The output is shown in Figure 9.

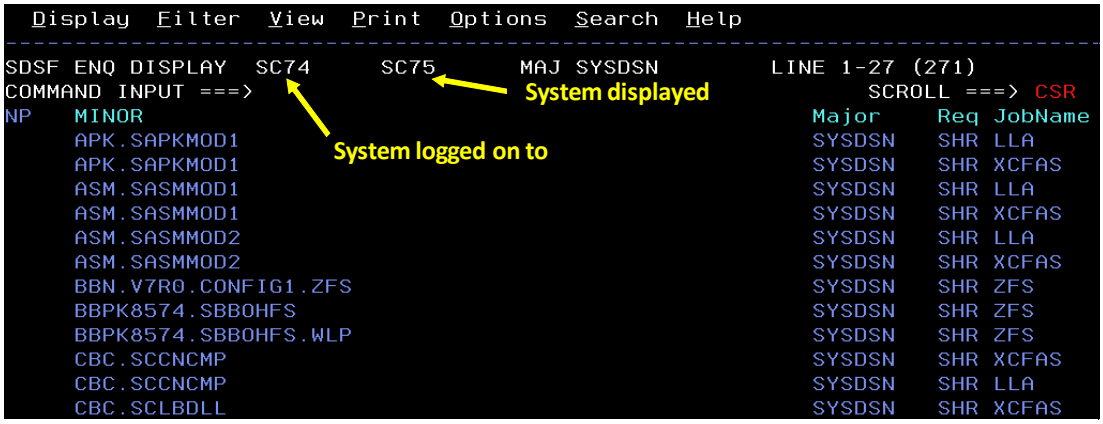

Figure 9 Display of active enqueues on SC75

You might choose to filter the information and enter the **FILTER** command (as shown in Example 3) to show the enqueue details of a particular job.

Example 3 Filter enqueues by JobName column

```
FILTER JOBNAME KWRES*
```

The result of this command in our controlled environment is shown in Figure 10.

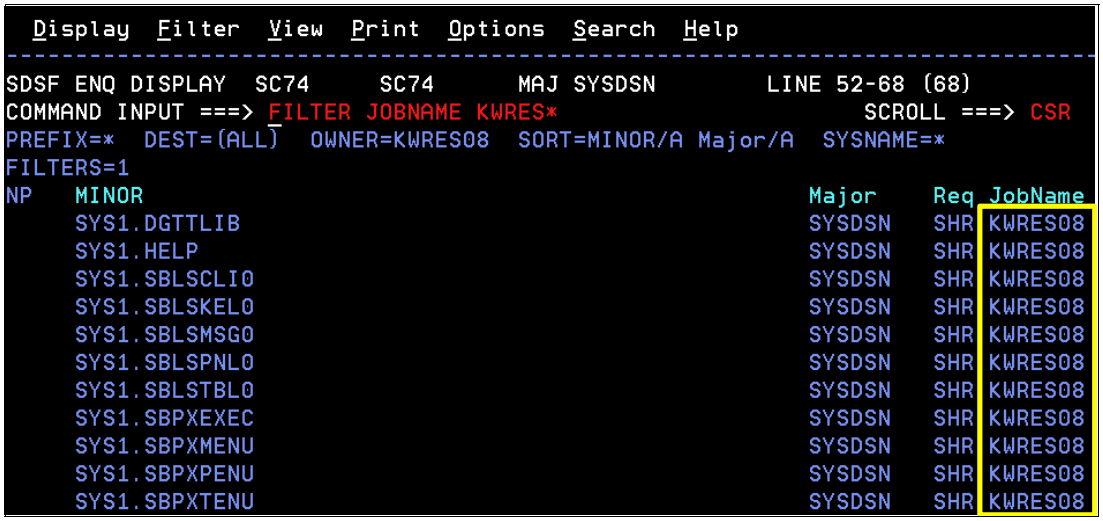

Figure 10 ENQ Jobname filter

When a contention is investigated, you can use the **ENQC** command to display the current contentions in your system. You can then analyze the resource owner and take the necessary steps to solve the problem. Figure 11 on page 8 shows the ENQC panel display when there is a contention for resource *KWRES08.DATASET.DATASETS* between *KWRES08* (a TSO user) and *KWRES080* (a batch job).

```
  Display  Filter  View  Print  Options  Search  Help
-------------------------------------------------------------------------------
SDSF ENQ DISPLAY  SC74     CONTENTION                 LINE 1-2 (2)
COMMAND INPUT ===> _                                    SCROLL ===> CSR
PREFIX=*  DEST=(ALL)  OWNER=KWRES08  SORT=MINOR/A Major/A  SYSNAME=*
FILTERS=1
NP   MINOR                                              Major    Req JobName
     KWRES08.DATASET.DATASETS                           SYSDSN   EXC KWRES08
     KWRES08.DATASET.DATASETS                           SYSDSN   EXC KWRES080
```

Figure 11 Use of ENQC to identify contention

ENQ panel columns

You can use PF11 (depending on your PFK settings) to move to the right in the panel to see the rest of the display. Table 2 lists the column headers.

Table 2 ENQ Display Panel Column headings

Column	Description
#	Row number, displayed with SET ROWNUM ON
MINOR	Enqueue minor name (RNAME)
MAJOR	Enqueue major name (QNAME)
Req	Request type (SHR or EXC)
Jobname	Jobname holding or requesting enqueue
ASID	Jobname ASID (decimal)
ASIDX	Jobname ASID (hexadecimal)
Level	Request level: ► ENQ-normal enqueue ► Reserve-hardware reserve ► Global enq-hardware reserve converted to global enqueue
SMC	Step must complete indicator
Scope	Enqueue scope (step, system, systems, global)
Status	Resource status (own, wait)
Owners	Number of resource owners for enqueue
Waiters	Number of tasks waiting for enqueue
WaitExc	Number of tasks waiting for exclusive use
WaitShr	Number of tasks waiting for shared use
Unit	Device address for reserves
UserData	User data passed on ISGENQ
ReqTime	Date and time of request
EnqToken	Enqueue token
RnameLong	Longer version of minor name, up to 127 characters. Control characters are converted to periods.
Sysname	System name

ENQ line commands

If you want to see which line commands are available, you can issue the **SET ACTION ON** command from the SDSF ENQ panel to show the available line commands for a panel.

You can also issue a **D** command next to the enqueue to display GRS information for the enqueue. If we enter a **D** line command against SYS1.CMDLIB, the following MVS system command is generated:

```
D GRS,HEX,RES=(SYSDSN,SYS1.CMDLIB)
```

The result is shown in Figure 12.

```
 Display  Filter  View  Print  Options  Search  Help
-------------------------------------------------------------------------------
DSF ENQ DISPLAY  SC74     SC74      MAJ SYSDSN          COMMAND ISSUED
OMMAND INPUT ===>                                        SCROLL ===> CSR
ESPONSE=SC74
ISG343I 14.44.26 GRS STATUS 362
S=SYSTEMS SYSDSN   SYS1.CMDLIB
          EEECED44 EEEF4CDCDCC
          28242500 2821B344392
SYSNAME        JOBNAME         ASID     TCBADDR   EXC/SHR    STATUS
SC74       XCFAS               0006       007FEE88   SHARE      OWN
SC74       LLA                 0020       007FEE88   SHARE      OWN
SC75       XCFAS               0006       007FEE88   SHARE      OWN
SC75       LLA                 0020       007FEE88   SHARE      OWN
    RRSF.JCL                                                SYSDSN   SHR RACF
    SYS1.APPCTP                                             SYSDSN   SHR APPC
    SYS1.BRODCAST                                           SYSDSN   SHR *MASTER*
    SYS1.CMDLIB                                             SYSDSN   SHR XCFAS
    SYS1.CMDLIB                                             SYSDSN   SHR LLA
    SYS1.CSSLIB                                             SYSDSN   SHR LLA
    SYS1.CSSLIB                                             SYSDSN   SHR XCFAS
```

Figure 12 ENQ D line command

ENQ summary

The ENQ panel provides a simple, reliable way for operations and support teams to identify system resources that are in use by specific tasks and jobs. The feature reduces the time that is required to troubleshoot contention issues.

Within this panel, you can perform the following tasks:

- Allocate specific resources
- Check resource contention
- List tasks sharing or waiting for resources
- Determine the type and scope of the enqueue
- Identify the time the enqueue was requested
- Identify the requesting system
- Filter and sort data for a better view

SYM and ENQ installation and considerations

The enhancements are available through functional PTFs, as listed in Table 3. Check the latest software status before installing the PTFs to ensure that you have the latest maintenance.

Table 3 PTF summary by z/OS version

	z/OS V2R2	z/OS V2R1	z/OS V1.13
FMID	HQX77A0	HQX7790	HQX7780
SYM and ENQ	UI90046	UI90045	UI90047
SYM and ENQ Toleration and co-existence	UI90049	UI90048	
SYM and ENQ SDSF JES2 support		UI36875	
SDSFAUX and LNK, LPA, APF, PAG, PARM, SYS, and SRCH	UI90032	UI90031	UI90033
PPT	UA79546	UA79547	N/A
XCF (recommended)	UA79840	UA79842	N/A

The z/OS V1.13 PTFs are toleration only. The new enhancements are not available for versions older than z/OS V2.1; however, these fixes allow the V1.13 to share the SFPRMxx with systems that have the new functions installed and active.

The SYM and ENQ toleration and coexistence allow V2.1 and V2.2 systems to share the ISPFPRMxx with other instances of the SDSF server on the same z/OS system or in the Sysplex that are not yet updated with the new functionality.

SDSFAUX address space

SDSFAUX is another address space that was introduced via a previous SPE. That SPE also introduced the LNK, LPA, APF, PAG, PARM, SYS options, and the **SRCH** command. It is a prerequisite for the SYM and ENQ enhancements. The last three rows in Table 3 list the prerequisite information we used in our laboratory environment. For more information about SDSFAUX, see *LAD: z/OS SDSFAUX*, REDP-5337, which is available at this website:

`http://www.redbooks.ibm.com/abstracts/redp5337.html`

In addition, check the latest Preventive Service Planning (PSP) buckets to ensure that you have the most updated information.

If you did not install SDSFAUX, see the following publications (depending on which level of z/OS you use):

- *SDSF Operation and Customization V2R1,* SA23-2274
- *SDSF Operation and Customization V2R2,* SA23-2274

If you have SDSFAUX and the prerequisite maintenance applied and you are installing the SYM and ENQ enhancements, check the latest DOC information and your own local procedures and standards.

In our controlled environment, we completed the following steps after the PTFs were applied:

1. End all SDSF sessions and environments (TSO, ISPF, batch, REXX, Java, and z/OSMF SDSF plug-in).
2. Stop the SDSF server. The SDSFAUX address space also is stopped after all SDSF sessions ended or the timeout occurs.
3. After the SDSF and SDSFAUX address spaces end, issue a **`MODIFY LLA,REFRESH`** operator command and wait for it to complete (CSV210I message).
4. Restart the SDSF server, which restarts the SDSFAUX address space.
5. Restart all SDSF sessions and environments (TSO, ISPF, batch, REXX, Java, and z/OSMF SDSF plug-in).

Note: Ensure that the appropriate security is in place for authorized access as per your local security policy and guidelines.

Related information

For more information, see the following IBM Redbooks publications:

- *IBM z/OS Continuous Delivery*, REDP-5340

  `http://www.rebooks.ibm.com/abstracts/redp5340.html`
- *LAD: z/OS SDSFAUX*, REDP-5337

  `http://www.rebooks.ibm.com/abstracts/redp5340.html`

The following are also relevant as further information sources:

- *SDSF Operation and Customization V2R1,* SA23-2274
- *SDSF Operation and Customization V2R2,* SA23-2274

Ensure that you have the necessary documentation level for your system.

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