# z/OS Introduction and Workshop

## Configuration

# Unit Objectives

After completing this unit, you should be able to:

- Describe IPL process

- Describe IPL device and LOADPARM device

- Describe Support Element and HMC

- Describe System Parameters/Definitions

- Determine IPL and LOAPARM device using MVS commands

- Determine LOADPARM member read at IPL time

- Determine parameter libraries read at IPL time

- Determine parameter library members read at IPL time
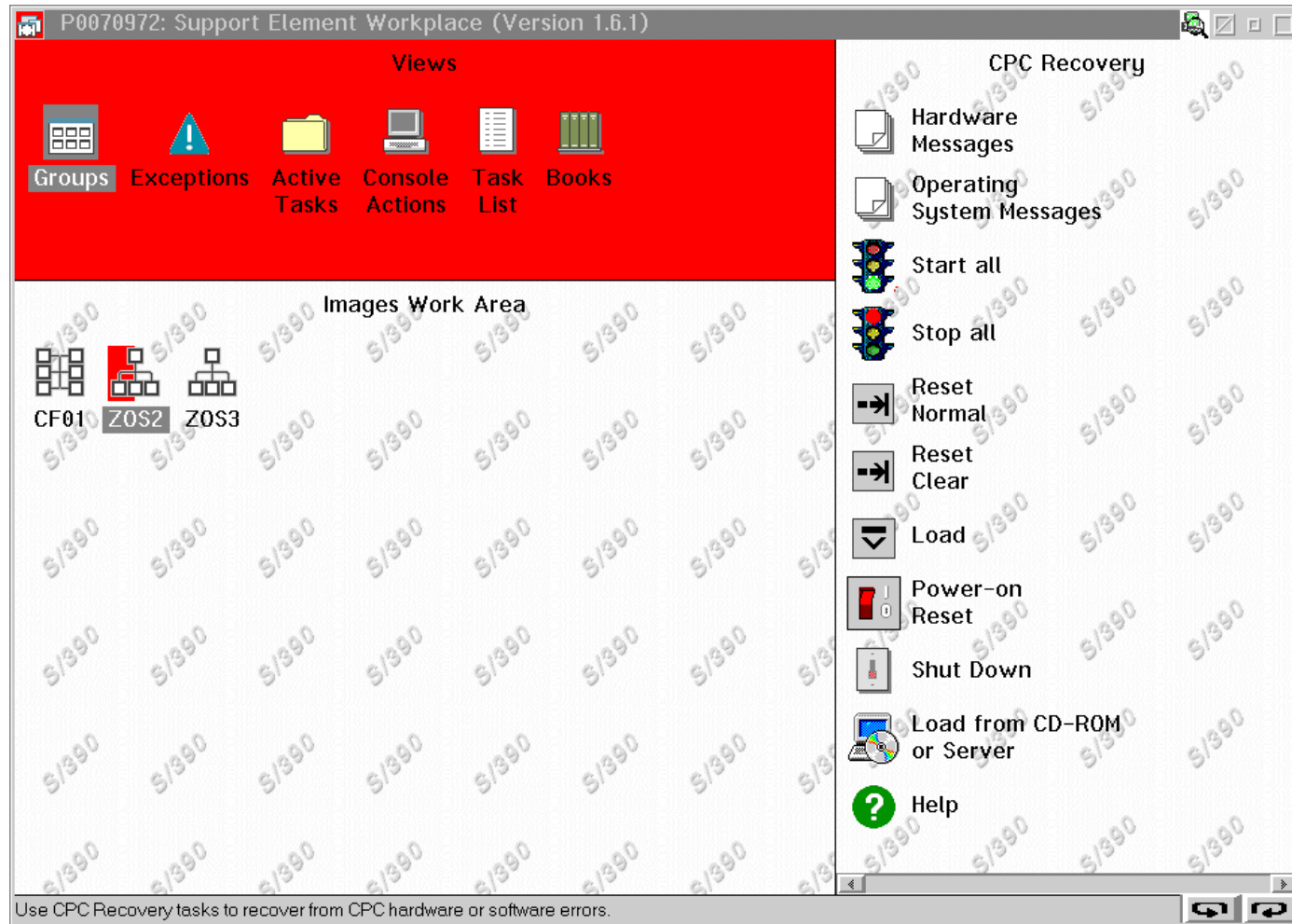
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# System Initialization

The system operator supplies parameters instructing the system to load
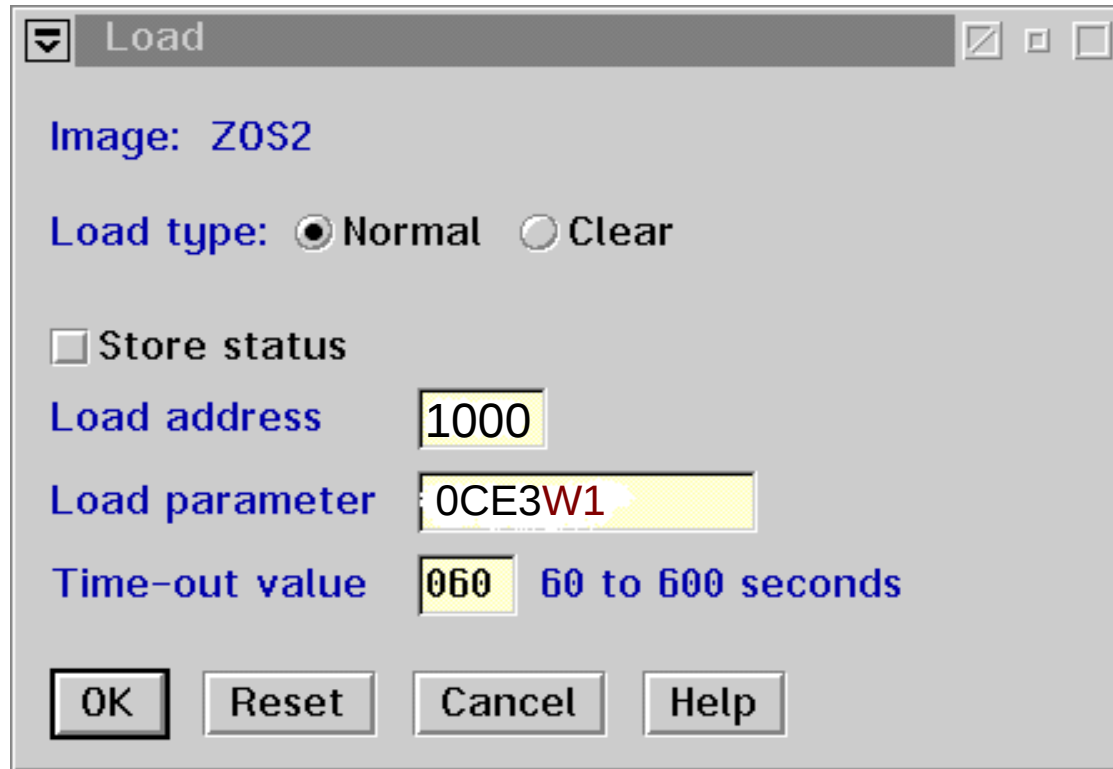
The bootstrap code on the IPL volume is loaded into storage at address 0 and control passed to it

The bootstrap the reads the IPLTEXT program IEAIPL00 which is given control and the complex task of loading the system starts

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# Hardware Management Console (HMC) & Support Element (SE)

# Disk Device Address of SYSRES and SYS1.IPLPARM

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# Initial Program Load (IPL)

Disk Device Address

1000 → Bootstrap (cylinder 0)

IPLTEXT
immediately following bootstrap
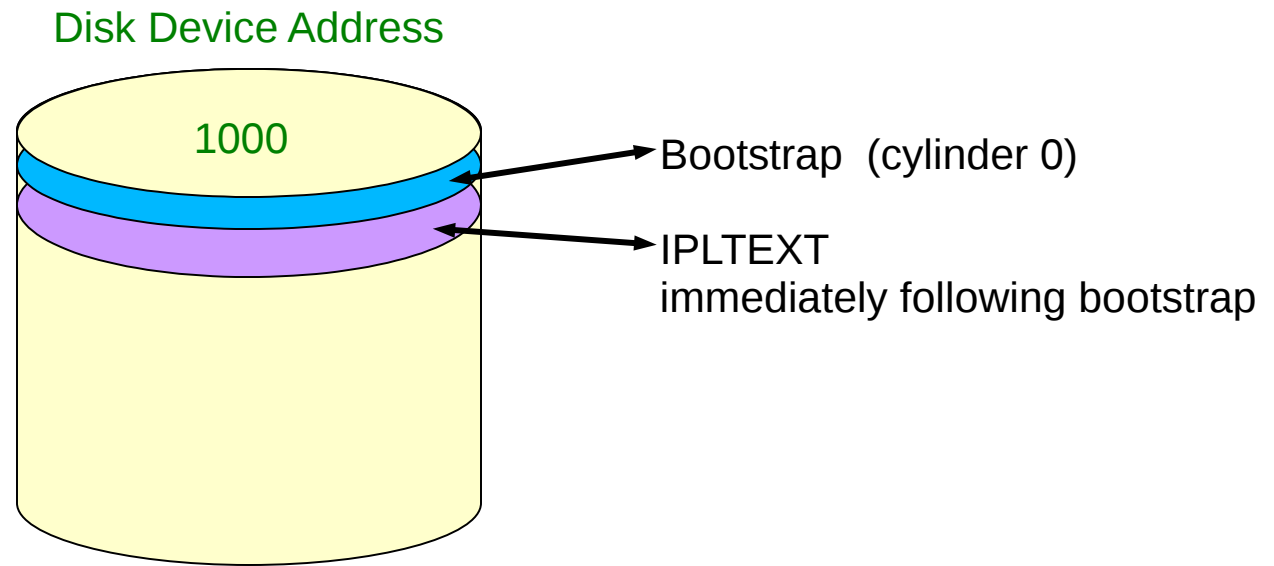
# Initial Program Load (IPL)

IPL 1000 LOADPARM 0CE3W1

Disk Device Address

Disk Device Address

0CE3

SYSx.IPLPARM

LOADW1

1000

Bootstrap (cylinder 0)

IPLTEXT
immediately following bootstrap
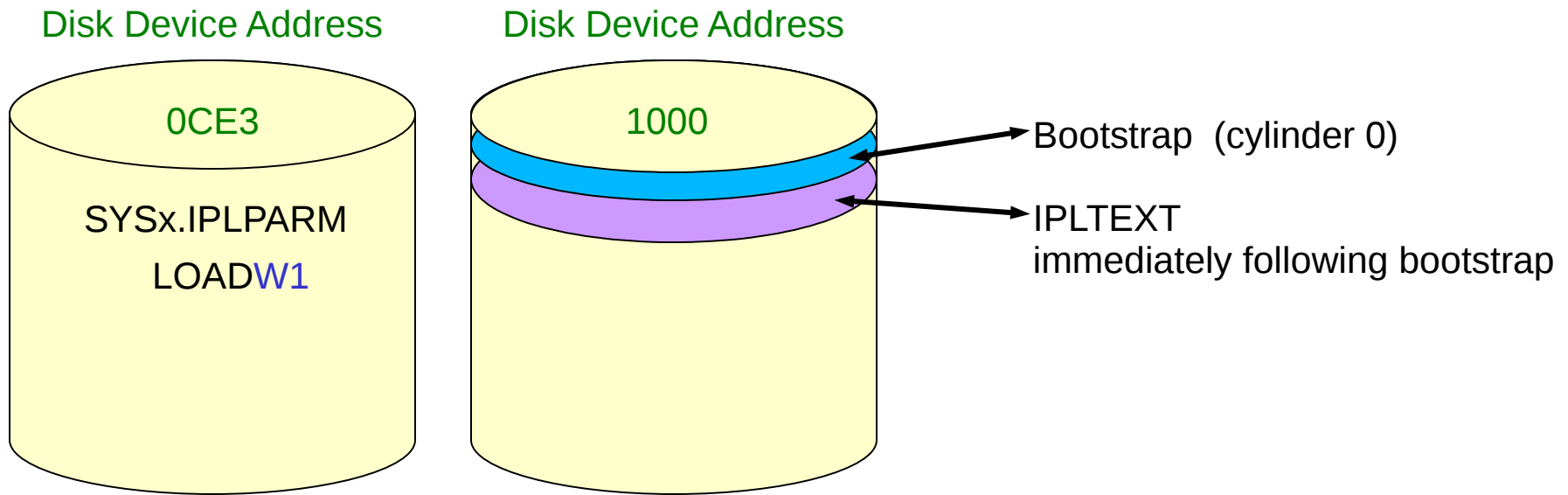
## System Definitions

**IPL** loadparm → **SYS1.IPLPARM(LOADW1)** → PARMLIB*(*IEASYS**xx***)*

**SYS1.IPLPARM(LOADW1)**
IEASYM   (W1,SV,VN)
INITSQA  0000K 0512K
IODF    00 SYS1    MVS     00 Y
NUCLEUS  1
NUCLST   SV N
**SYSCAT   VPMVSB113CMASTERV.CATALOG**
**SYSPARM  (00,LV,SV,VN)**
SYSPLEX  SVSCPLEX
PARMLIB  VENDOR.PARMLIB
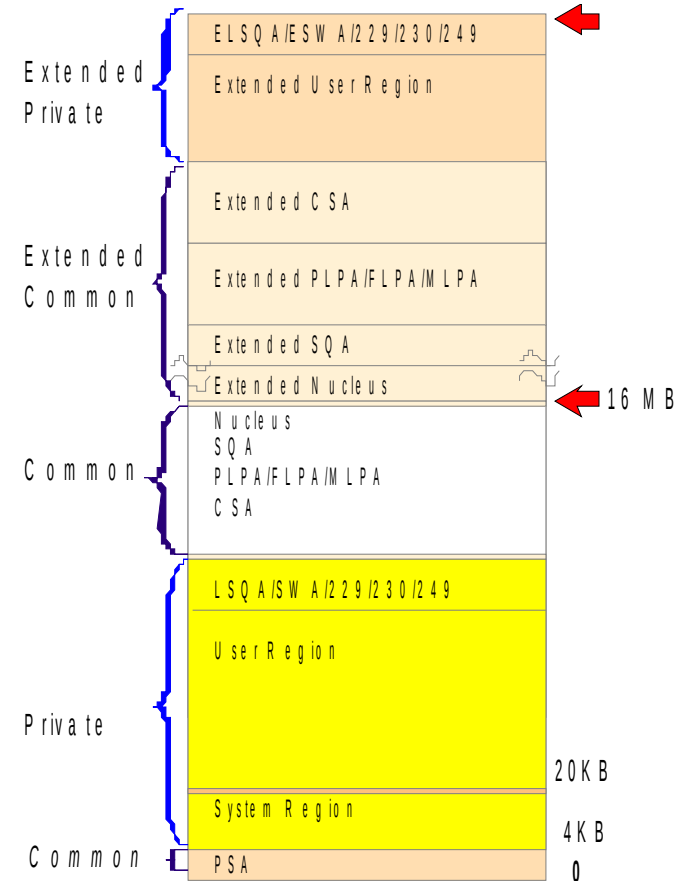PARMLIB  SVTSC.PARMLIB
PARMLIB  LVL0.PARMLIB
PARMLIB  SYS1.PARMLIB

IEASYS**00**
IEASYS**LV**
IEASYS**SV**
IEASYS**VN**

*Search* PARMLIB *concatenation for*
IEASYS**xx**
*PDS member names*

# IEAIPL00 & Storage Map for Address Spaces

IEAIPL00 prepares the system by clearing central storage to zeroes then defines storage areas for the master scheduler

SYS1.NUCLEUS is located and a series of modules loaded which construct the normal environment of control blocks and subsystems

The first part of the Nucleus Initialization Program, NIP, is then loaded

| | |
|---|---|
| Extended Private | ELSQA/ESWA/229/230/249 |
| | Extended User Region |
| Extended Common | Extended CSA |
| | Extended PLPA/FLPA/MLPA |
| | Extended SQA |
| | Extended Nucleus — 16 MB |
| Common | Nucleus SQA PLPA/FLPA/MLPA CSA |
| Private | LSQA/SWA/229/230/249 |
| | User Region |
| | 20KB |
| | System Region — 4KB |
| Common | PSA — 0 |

# Data Areas and Control Blocks

4K pages of
system information

4K page of system
information can reside
in a 'frame' or 'slot'

Some 4K pages of system
information are marked as
a permanent resident in
real storage – 'frame' only

| | | |
|---|---|---|
| Private | High User Region | 16 EB |
| | | 512TB |
| Shared Area | Default Shared Memory Addressing | |
| | | 2TB |
| Low User Private | Low User Region | |
| | | 4G |
| | Reserved | |
| | | 2G |
| Extended Private | Extended LSQA/SWA/229/230 | |
| | Extended User Region | |
| Extended Common | Extended CSA | |
| | Extended PLPA/FLPA/MLPA | |
| | Extended SQA | |
| | Extended Nucleus | 16 Mb |
| Common | Nucleus | |
| | SQA | |
| | PLPA/FLPA/MLPA | |
| | CSA | |
| Private | LSQA/SWA/229/230 | |
| | User Region | |
| | | 24K |
| | System Region | 8K |
| Common | PSA | 0 |

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# Systems are operational and connected to CF (Coupling Facility)
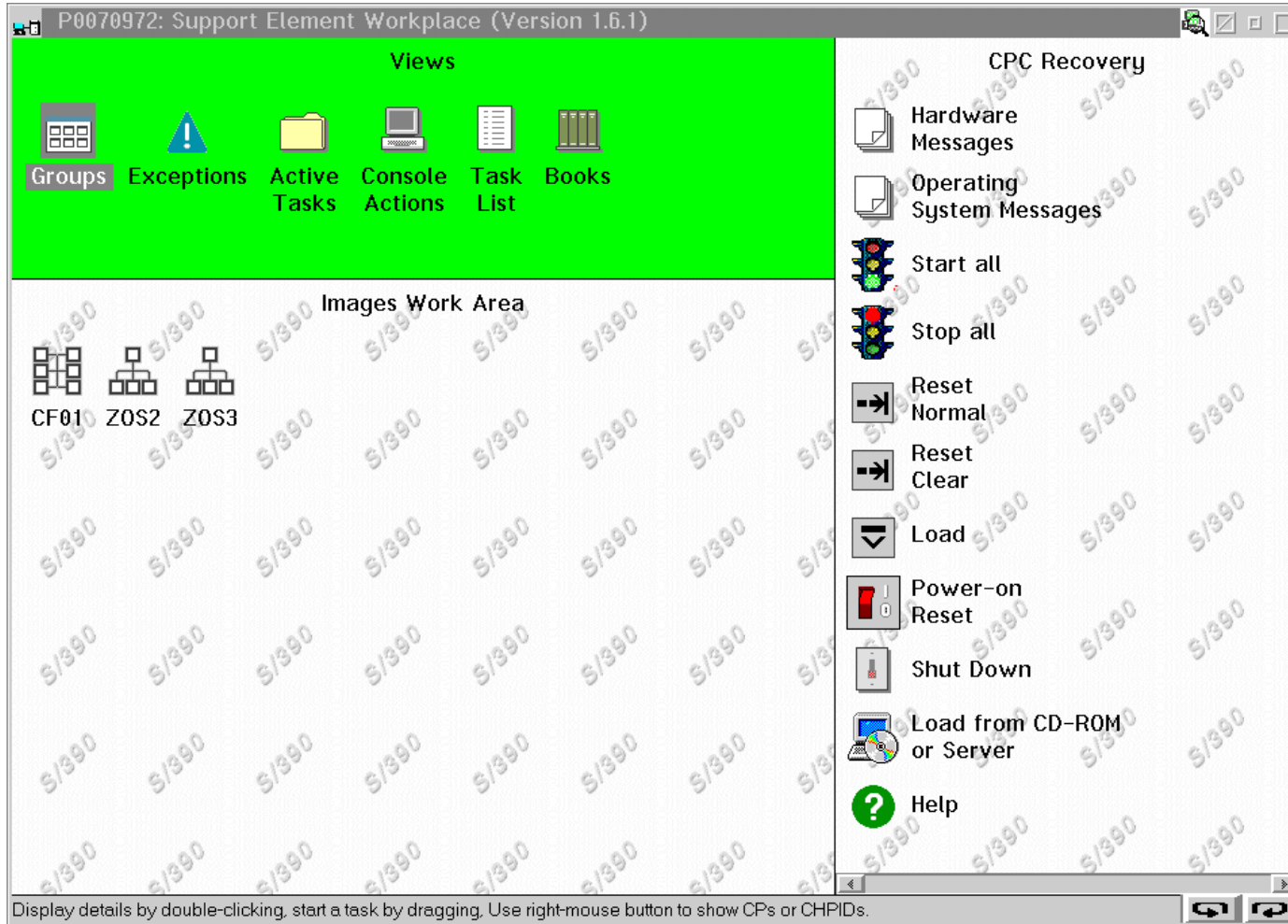
# System Definitions

z/OS is highly configurable to best serve a customers workload

System definitions (system parameters) are read during z/OS initialization

The values of many system parameters can be changed dynamically

Default values exist for the majority of system parameters

More matured systems change the defaults as their workloads change

It is important to develop a back out plan for any system definition change

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# System Initialization (IEE252I messages)

# System Log (Trail of IEE252I messages)

**IEE252I MEMBER** *member* **FOUND IN** *parmdsname*

Explanation: This is an informational message that appears only in the hardcopy log when member *member* is found in **parmlib** dataset *parmdsname*

In the message text:

*member* is the parmlib member name that is being processed.
*parmdsname* is the parmlib data set where member *member* is located.

**System Action:**
The system continues processing.

**System Programmer Response:**
Check the hardcopy to see if all the members in parmlib specified in LOADxx
or in operator input are being used correctly and are found in the correct parmlib
data set.

**Source:** Master scheduler, IPL/NIP

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# System Definitions

**D IPLINFO**
SYSTEM IPLED AT 08.41.25 ON 01/29/2007
RELEASE z/OS 01.07.01    LICENSE = z/OS
USED LOADW1 IN SYS1.IPLPARM ON 0CE3
ARCHLVL = 2   MTLSHARE = N
IEASYM LIST = (W1,SV,VN)
IEASYS LIST = (00,LV,SV,VN) (OP)
IODF DEVICE 0CE3
IPL DEVICE 1000 VOLUME VIMVSB

**D PARMLIB**
PARMLIB DATA SETS SPECIFIED
AT IPL
ENTRY  FLAGS  VOLUME  DATA SET
  1    S   VPMVSD  VENDOR.PARMLIB
  2    S   VTMVSG  SVTSC.PARMLIB
  3    S   VTLVL0  LVL0.PARMLIB
  4    D   VIMVSB  SYS1.PARMLIB

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# SYS1.IPLPARM LOADxx member startup parameters

# Display IPLINFO and system PARMLIB concatenation



```
Lab System                                                          _ □ ✕
File  Edit  View  Communication  Actions  Window  Help
   Display   Filter   View   Print   Options   Help
 ---------------------------------------------------------------------
 SDSF ULOG   CONSOLE ZIBM030                        LINE 0       COLUMNS 19- 98
 COMMAND INPUT ===> _                                            SCROLL ===> CSR
 ****************************** TOP OF DATA *******************************
   16:13:45.10                  ISF031I CONSOLE ZIBM030 ACTIVATED
   16:13:48.88                 -D IPLINFO
   16:13:48.91                  IEE254I  16.13.48 IPLINFO DISPLAY 178
                                SYSTEM IPLED AT 14.10.36 ON 04/16/2007
                                RELEASE z/OS 01.06.01    LICENSE = z/OS
                                USED LOADW1 IN SYS1.IPLPARM ON 0CE3
                                ARCHLVL = 2   MTLSHARE = N
                                IEASYM LIST = (W1,SV,VN)
                                IEASYS LIST = (00,LV,SV,VN) (OP)
                                IODF DEVICE 0CE3
                                IPL DEVICE 1000 VOLUME VIMVSB
   16:13:51.51                 -D PARMLIB
   16:13:51.54                  IEE251I 16.13.51 PARMLIB DISPLAY 180
                                PARMLIB DATA SETS SPECIFIED
                                AT IPL
                                ENTRY  FLAGS  VOLUME  DATA SET
                                   1     S     VPMVSD   VENDOR.PARMLIB
                                   2     S     VTMVSG   SVTSC.PARMLIB
                                   3     S     VTLVL0   LVL0.PARMLIB
                                   4     D     VIMVSB   SYS1.PARMLIB
 *************************** BOTTOM OF DATA *******************************



MA     a                                                              04/021
Connected to remote server/host 204.90.115.184 using lu/pool TCP00021 and port 623    PDF Writer (Ghostscript) on Ghostscript1:
```

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# Master JCL for Master Scheduler

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# CLIST to easily find system PARMLIB and PROCLIB members

# View system $PARMLIB concatenation

# SYSPARM IEASYSxx values in PARMLIB

# IEASYS00 is read first.  IEASYS00 has few parameters

```
Lab System
File  Edit  View  Communication  Actions  Window  Help

    File    Edit    Edit_Settings    Menu    Utilities    Compilers    Test    Help

 VIEW          LVL0.PARMLIB(IEASYS00) - 01.00                    Columns 00001 00072
 Command ===> _                                                       Scroll ===> CSR
 ****** ************************** Top of Data ******************************
 000001 CLPA,
 000002 REAL=280,                         ALLOWS 2 64K JOBS OR 1 128K JOB TO RUN V=R
 000003 RSU=0,                            NO RECONFIG STORAGE UNITS              DEFAULT
 000004 VRREGN=140                        DEFAULT REAL-STORAGE REGION SIZE
 ****** ************************** Bottom of Data ****************************



 MA      a                                                                    04/015
```
Connected to remote server/host 204.90.115.184 using lu/pool TCP00021 and port 623       PDF Writer (Ghostscript) on Ghostscript1:

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# IEASYSLV is read 2nd.  IEASYSLV has more parameters

# IEASYSSV is read 3rd -- duplicate parm values are overridden

# IEASYS<u>VN</u> the last member read has only one PARMLIB entry

# System Libraries

SYS1.LINKLIB prime system software library

−LNKLST concatenation

SYS1.LPALIB system subroutines

SYS1.NUCLEUS basic supervisor modules

SYS1.PROCLIB system procedure JCL

−PROCLIB concatenation

SYS1.PARMLIB control parameters

−PARMLIB concatenation

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# System search order for programs

Programs (load modules) must be in central storage and therefore in the virtual storage of the address space before they can run

System has a defined search order for a newly requested program

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# Search order for programs

1) JCL STEPLIB      (if present)

2) JCL JOBLIB      (if present)

3) Link Pack Area      (LPA)

    Fixed LPA      (FLPA)

    Modified LPA      (MLPA)

    Pageable LPA      (PLPA)

4) LINKLST      (Concatenated Group of Partitioned Data Sets)

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## SYS1.LPALIB

The Link Pack Area (LPA) is built at IPL time from the modules defined in the LPALSTxx member of parmlib.

SYS1.LPALIB is always the first library used unless overridden by a SYSLIB statement

Modules are loaded into common storage at IPL time and so are available to all address spaces

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# SYS1.LPALIB

Fixed LPA comprises those modules defined in IEAFIXxx that are fixed in central storage

Pageable LPA comprises most other modules whose pages are eligible to be stolen

Modified LPA has modules which are temporary replacements for PLPA modules and is searched first.

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# JES JOB JCL Procedure Library

**JES2 JCL Procedure Librares are searched for JOB and STC PROCs**

```
//PROC00      DD      DSN=SYS1.PROCLIB,DISP=SHR
//            DD      DSN=SYS3.PROD.PROCLIB,DISP=SHR
//PROC01      DD      DSN=SYS1.PROC2,DISP=SHR
//PROCnn      DD      DSN=SYS1.LASTPROC,DISP=SHR

...
```

**JOB JCL can have personal JCL Procedure Libraries search first**

```
//MYJOB       JOB
//MYLIBS      JCLLIB ORDER=(MY.PROCLIB.JCL,YOUR.PROCLIB.JCL)
//S1          EXEC  PROC=MYPROC1

...
```

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# System Symbols

System symbols allow the use of a shared PARMLIB by two or more systems

Each symbol has a name which can be used in various places and then substituted at IPL time

Major uses are indirect cataloging and substituting system specific datasets such as the page data sets

Static and Dynamic System Symbols

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## Static and Dynamic System Symbols

| SYMBOL | Value | Type |
|---|---|---|
| &DAY. | 15 | DYNAMIC |
| &HHMMSS. | 184422 | DYNAMIC |
| &HR. | 18 | DYNAMIC |
| &JDAY. | 046 | DYNAMIC |
| &JESSSN. | J2 | STATIC |
| &JOBNAME. | ZIBM050 | DYNAMIC |
| &J2MLQX. | | STATIC |
| &J3MLQX. | | STATIC |
| &LDAY. | 15 | DYNAMIC |
| &LHHMMSS. | 124422 | DYNAMIC |
| &LHR. | 12 | DYNAMIC |
| &LJDAY. | 046 | DYNAMIC |
| &LMIN. | 44 | DYNAMIC |
| &LMON. | 02 | DYNAMIC |
| &LSEC. | 22 | DYNAMIC |
| &LWDAY. | WED | DYNAMIC |

| SYMBOL | Value | Type |
|---|---|---|
| &LYR2. | 17 | DYNAMIC |
| &LYR4. | 2017 | DYNAMIC |
| &LYYMMDD. | 170215 | DYNAMIC |
| &MIN. | 44 | DYNAMIC |
| &MON. | 02 | DYNAMIC |
| &SEC. | 22 | DYNAMIC |
| &SVTSC. | SV | STATIC |
| &SYSALVL. | 2 | STATIC |
| &SYSCLONE. | W1 | STATIC |
| &SYSNAME. | S0W1 | STATIC |
| &SYSOSLVL. | Z1020200 | STATIC |
| &SYSPLEX. | SVSCPLEX | STATIC |
| &SYSR1. | VIMVSB | STATIC |
| &UNIXVER. | VERSYSB | STATIC |
| &VENDOR. | V1 | STATIC |
| &VTAMLST. | W1 | STATIC |
| &WDAY. | WED | DYNAMIC |
| &YR2. | 17 | DYNAMIC |
| &YR4. | 2017 | DYNAMIC |
| &YYMMDD. | 170215 | DYNAMIC |

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# Manuals

MVS Initialization and Tuning Guide

MVS Initialization and Tuning Reference

JES2 Initialization and Tuning Guide

JES2 Initialization and Tuning Reference

hyperlinks

## Unit Summary

Having completed this unit, you should be able to:

✓ Describe IPL process

✓ Describe IPL device and LOADPARM device

✓ Describe Support Element and HMC

✓ Describe System Parameters/Definitions

✓ Determine IPL and LOAPARM device using MVS commands

✓ Determine LOADPARM member read at IPL time

✓ Determine parameter libraries read at IPL time

✓ Determine parameter library members read at IPL time

✓

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