# z/OS Introduction and Workshop

Configuration and Customization

# 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

# 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

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

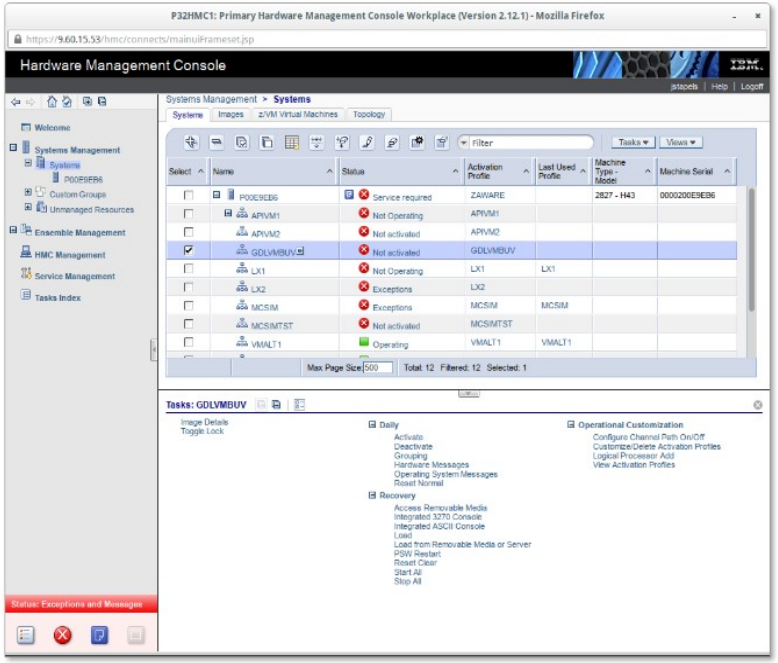
Support Element (SE)
Choice:
- 2 laptops inside the IBM Z frame
- 2 1U rack slots

Hardware Management Console (HMC)
Choice:
- 1 Standalone desktop networked with all SE’s
- 1 Rack mount device netwokred with all SE’s

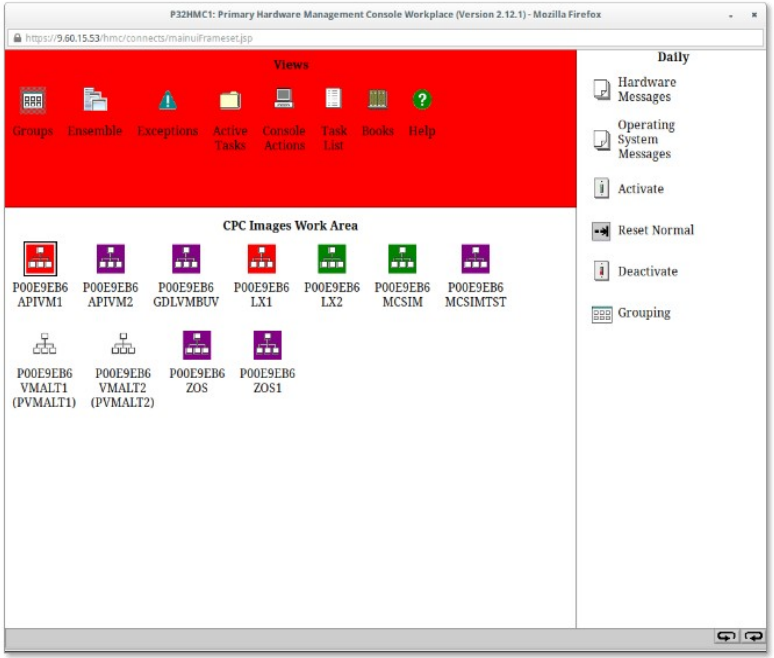
Hardware Management Appliance (HMA)
- 2 1U racks slots running HMC and SE together
- HMA IBM Z network with a primary HMA
- New with z15

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

## Tree Style (default)

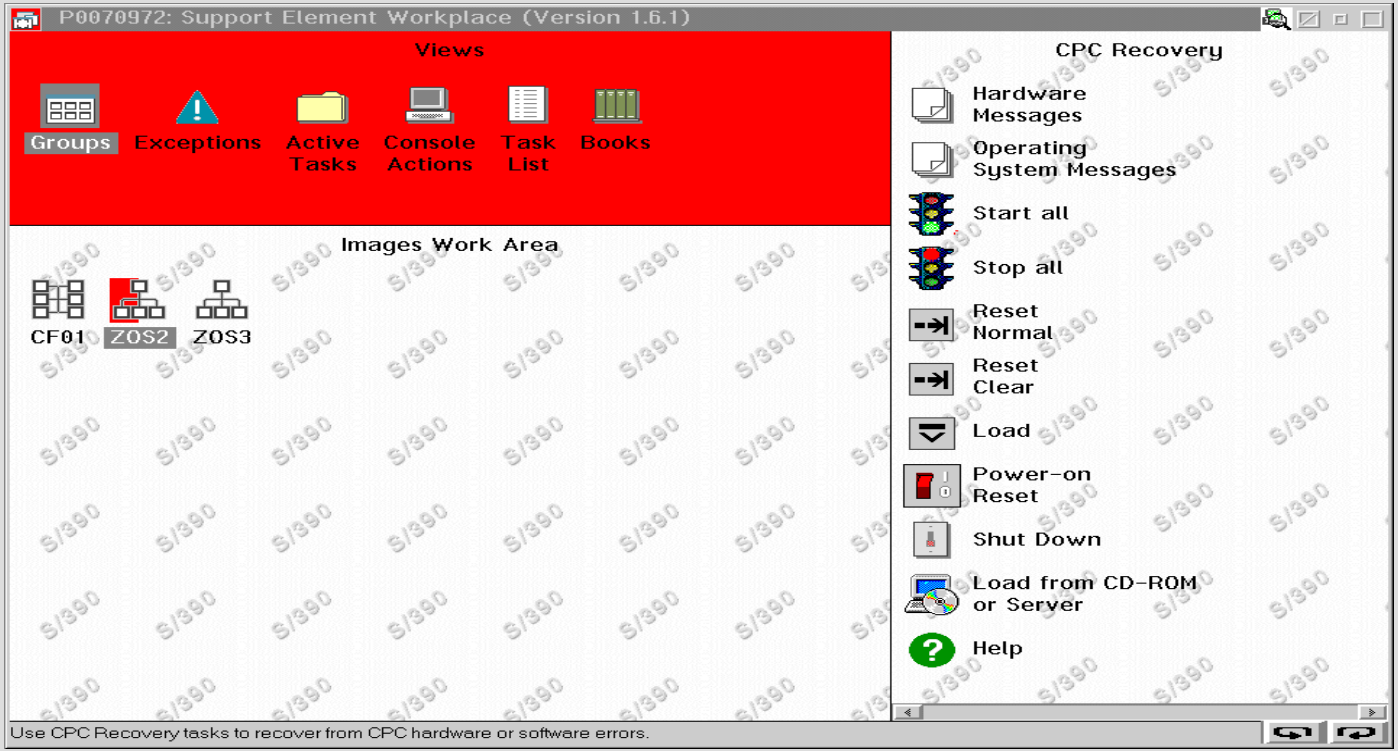



## Classic Style (optional)

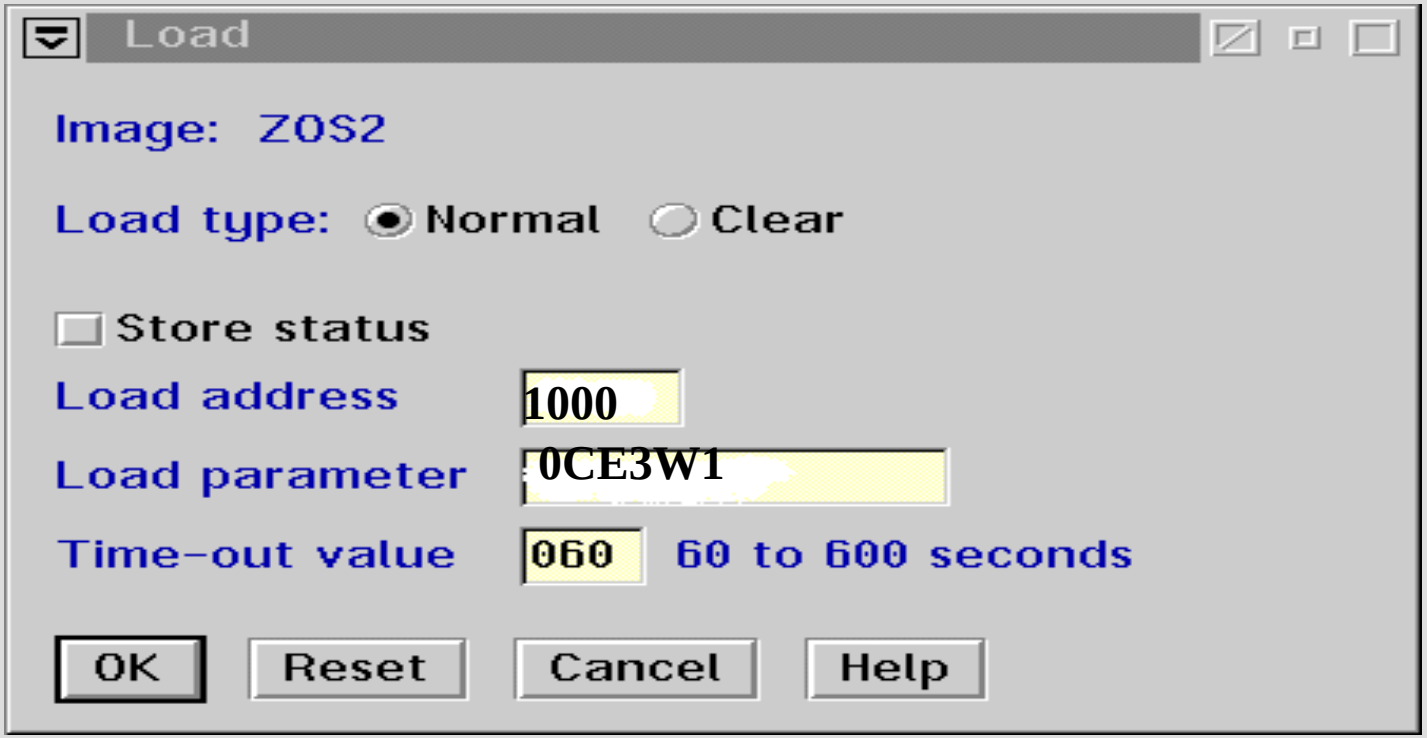



- New users and new installs use Tree Style as default

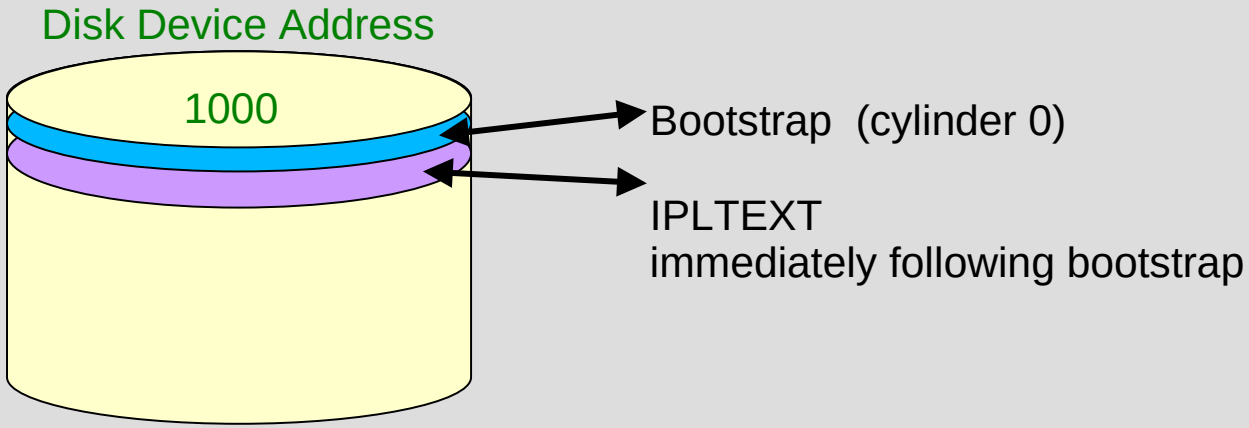
# Hardware Management Console (HMC) – Support Element (SE)



# Disk Device Address of SYSRES and SYS1.IPLPARM

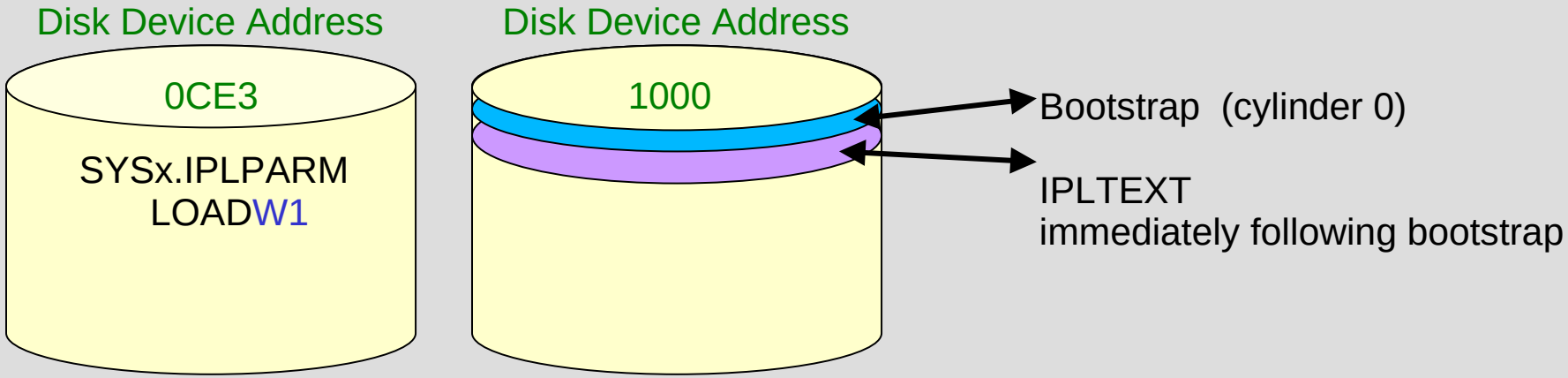


# Initial Program Load  (IPL)



# Initial Program Load  (IPL)

IPL 1000 LOADPARM 0CE3W1



# System Definitions

**IPL** loadparm **SYS1.IPLPARM(LOAD*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

*PARMLIB*(**IEASYS*xx***)

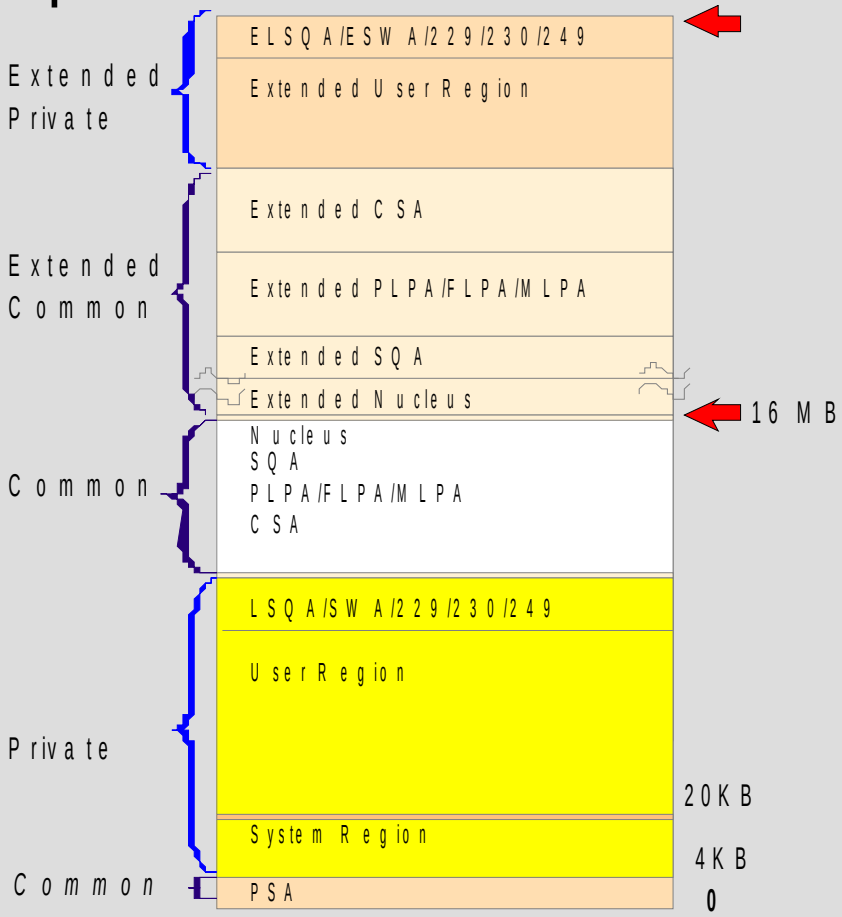
# IEAIPL00

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 is then loaded

# Storage Map

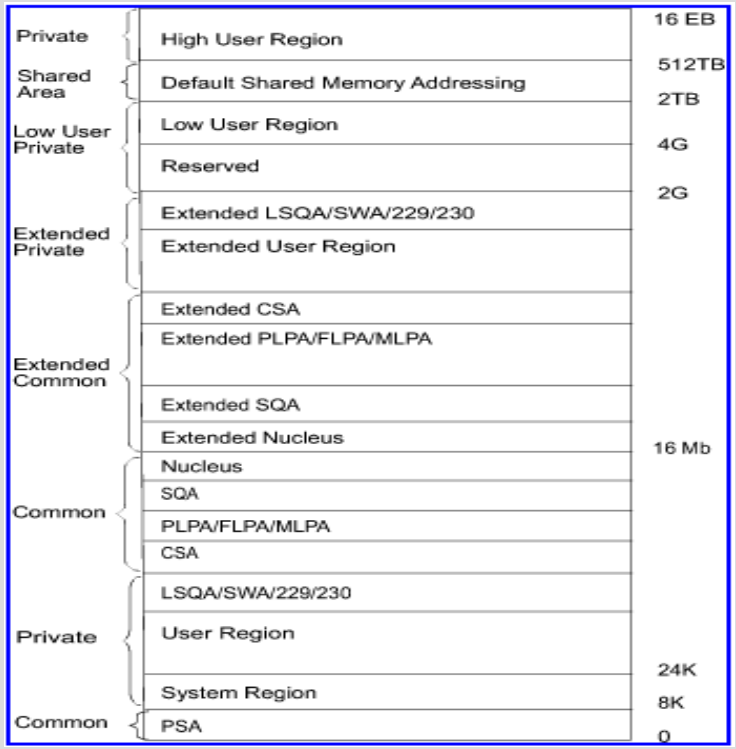

Extended Private
Extended Common
Common
Private
Common
ELSQA/ESWA/229/230/249
Extended User Region
Extended CSA
Extended PLPA/FLPA/MLPA
Extended SQA
Extended Nucleus
16 MB
Nucleus
SQA
PLPA/FLPA/MLPA
CSA
LSQA/SWA/229/230/249
User Region
20KB
System Region
4KB
PSA
0

# Data Areas and Control Blocks

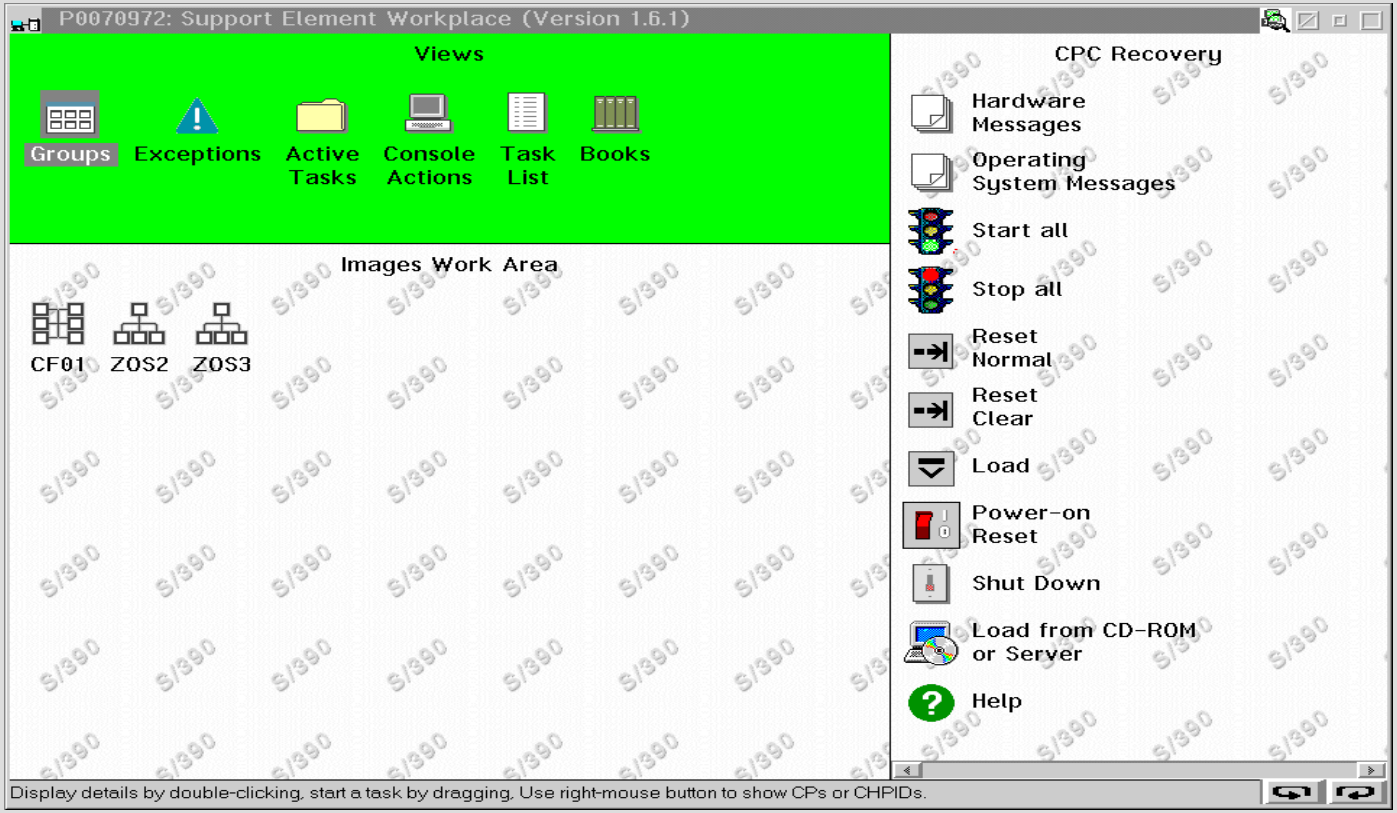
4K pages of system information

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



# 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

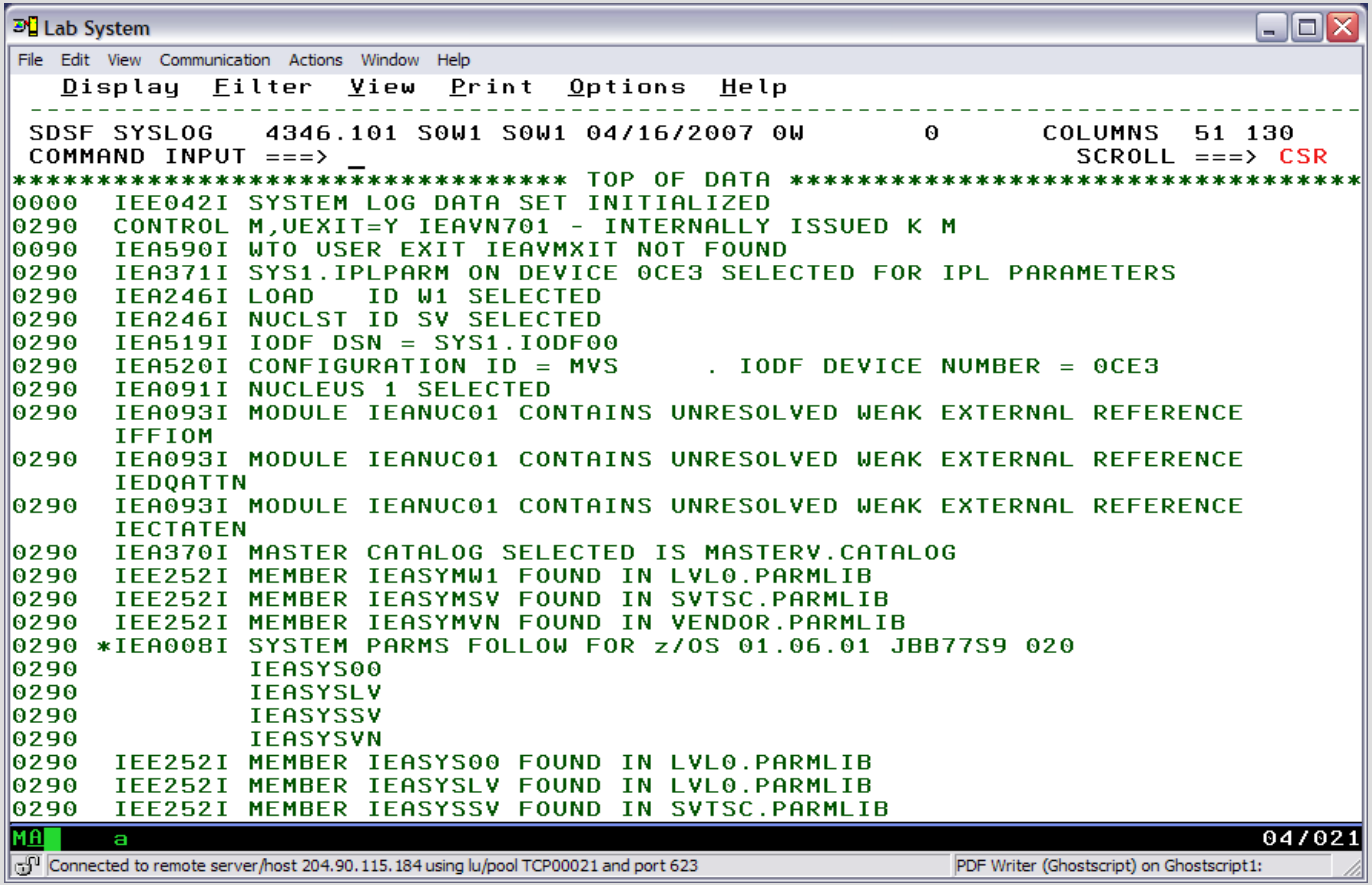
The values of many system parameters can be changed dynamically

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

# 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

# System Definitions

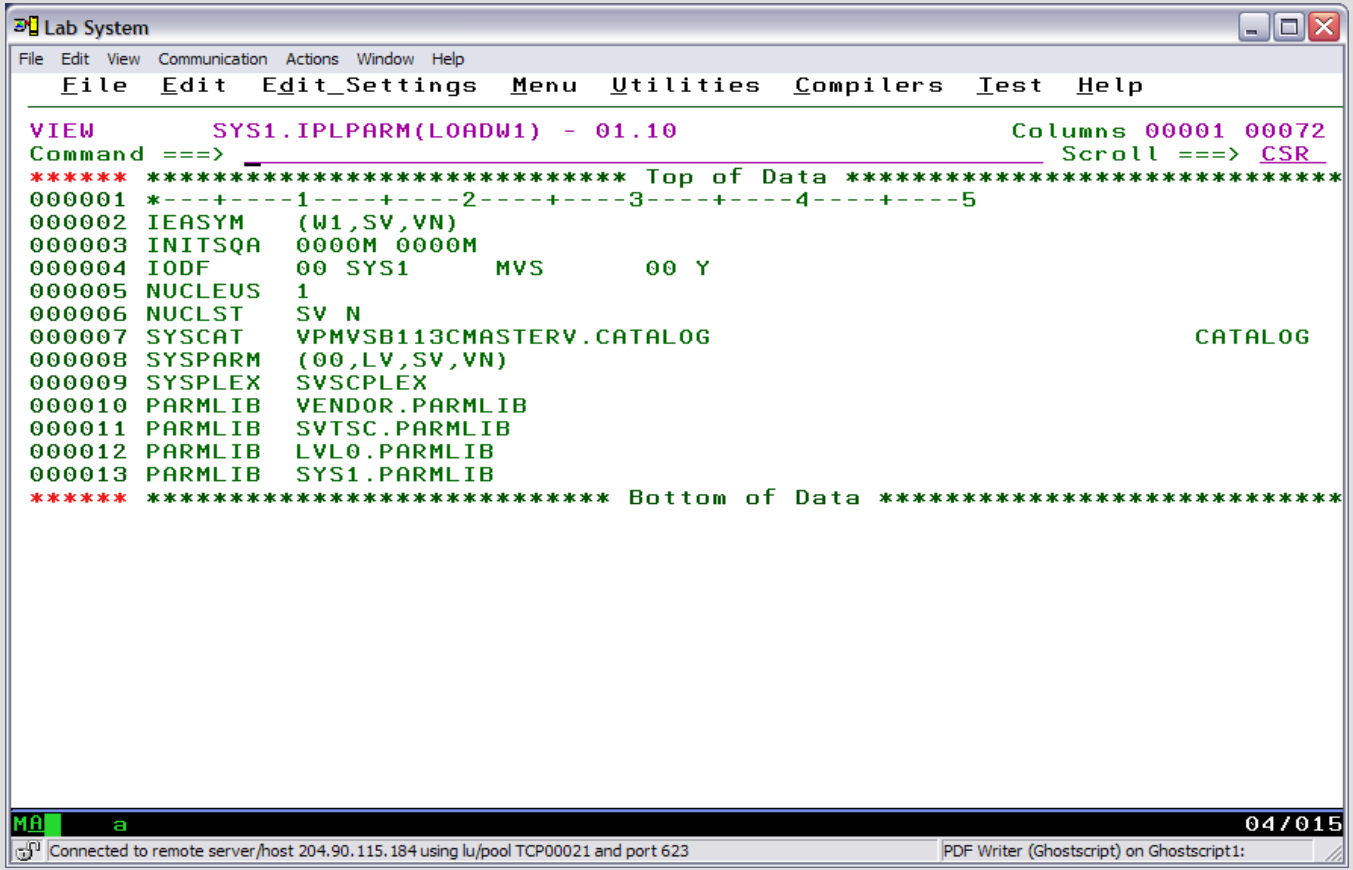
**D IPLINFO**

```
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
```

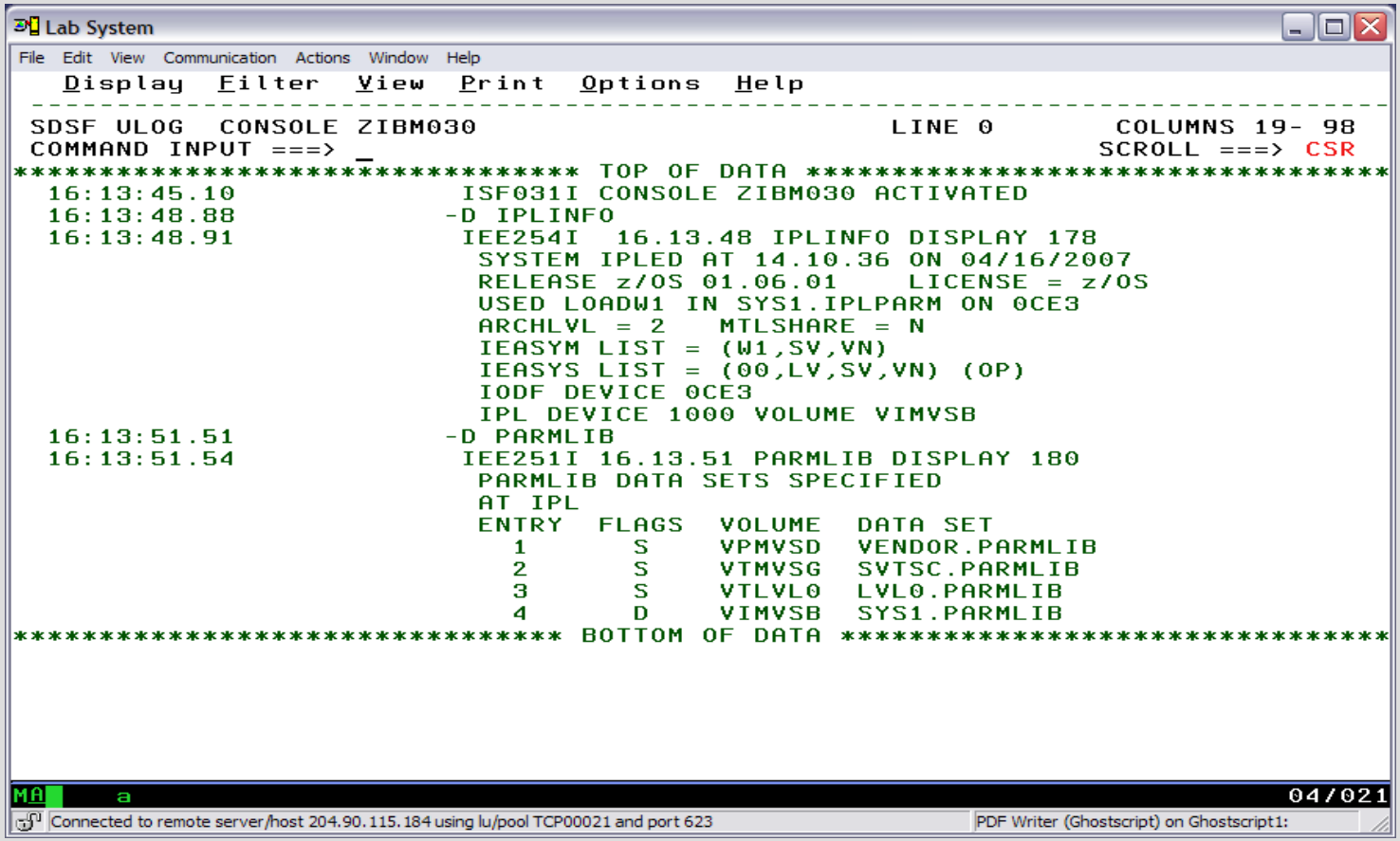
**D PARMLIB**

```
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
```

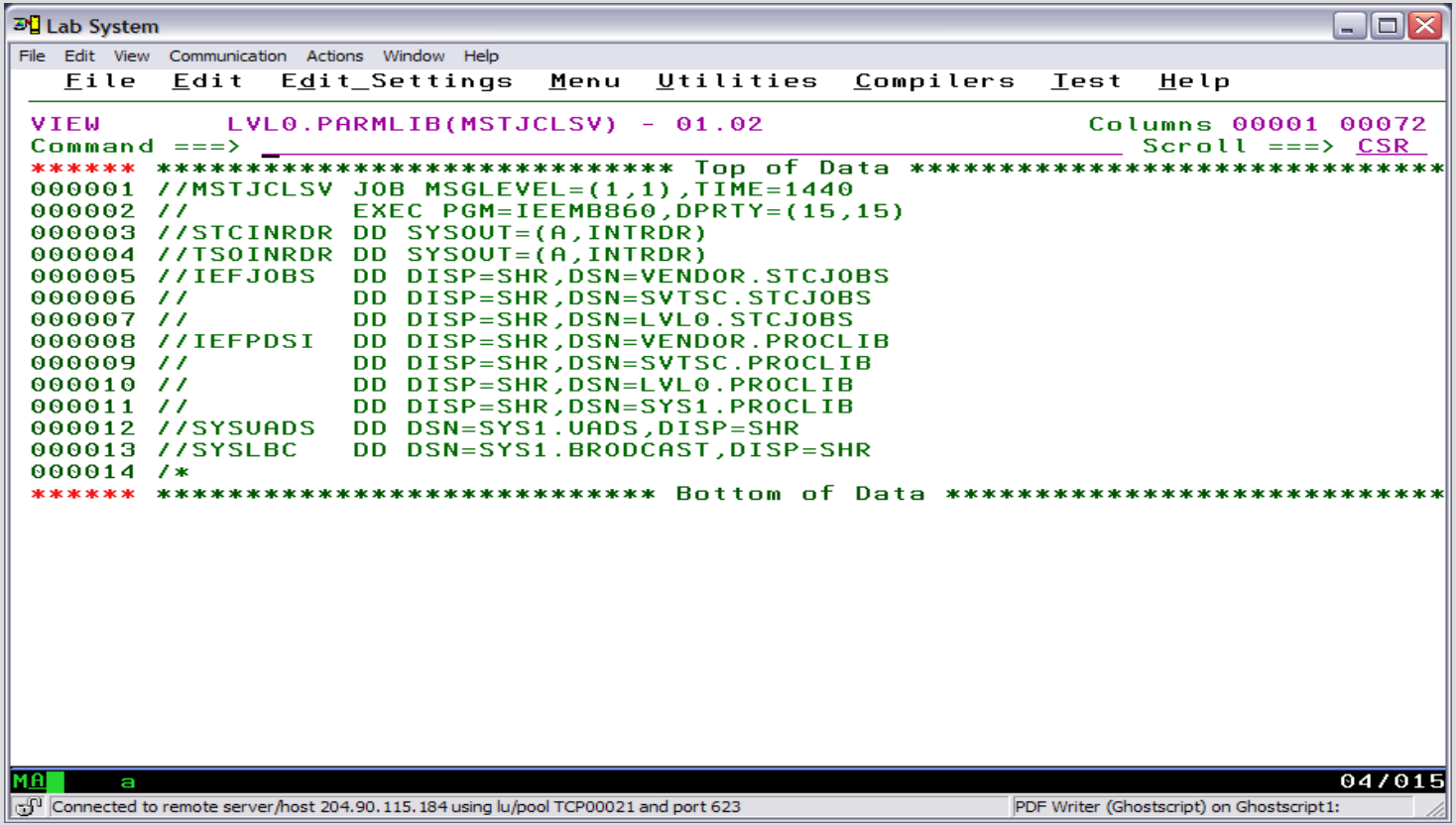
# SYS1.IPLPARM LOADxx member startup parameters



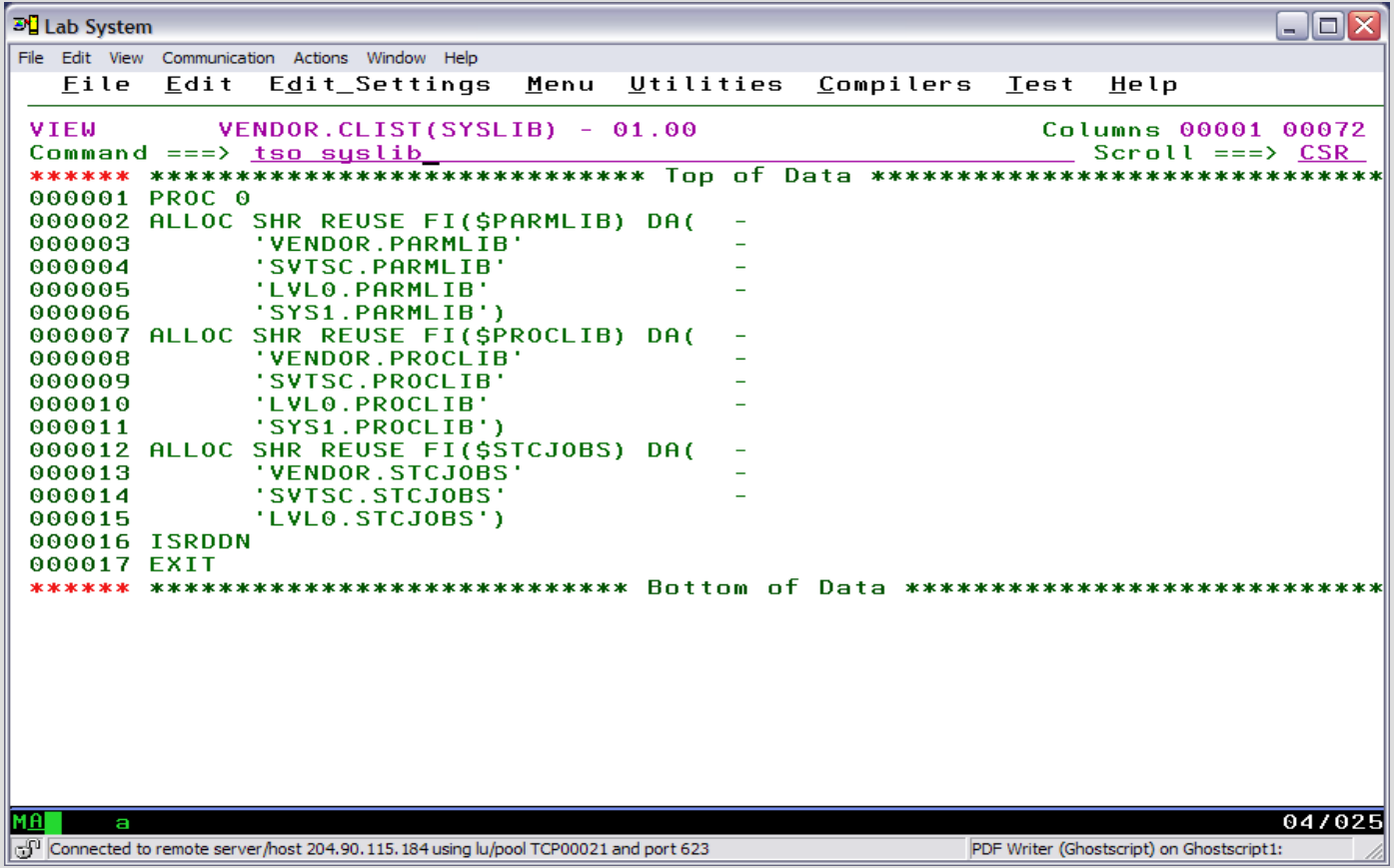
# Display IPLINFO and system PARMLIB concatenation



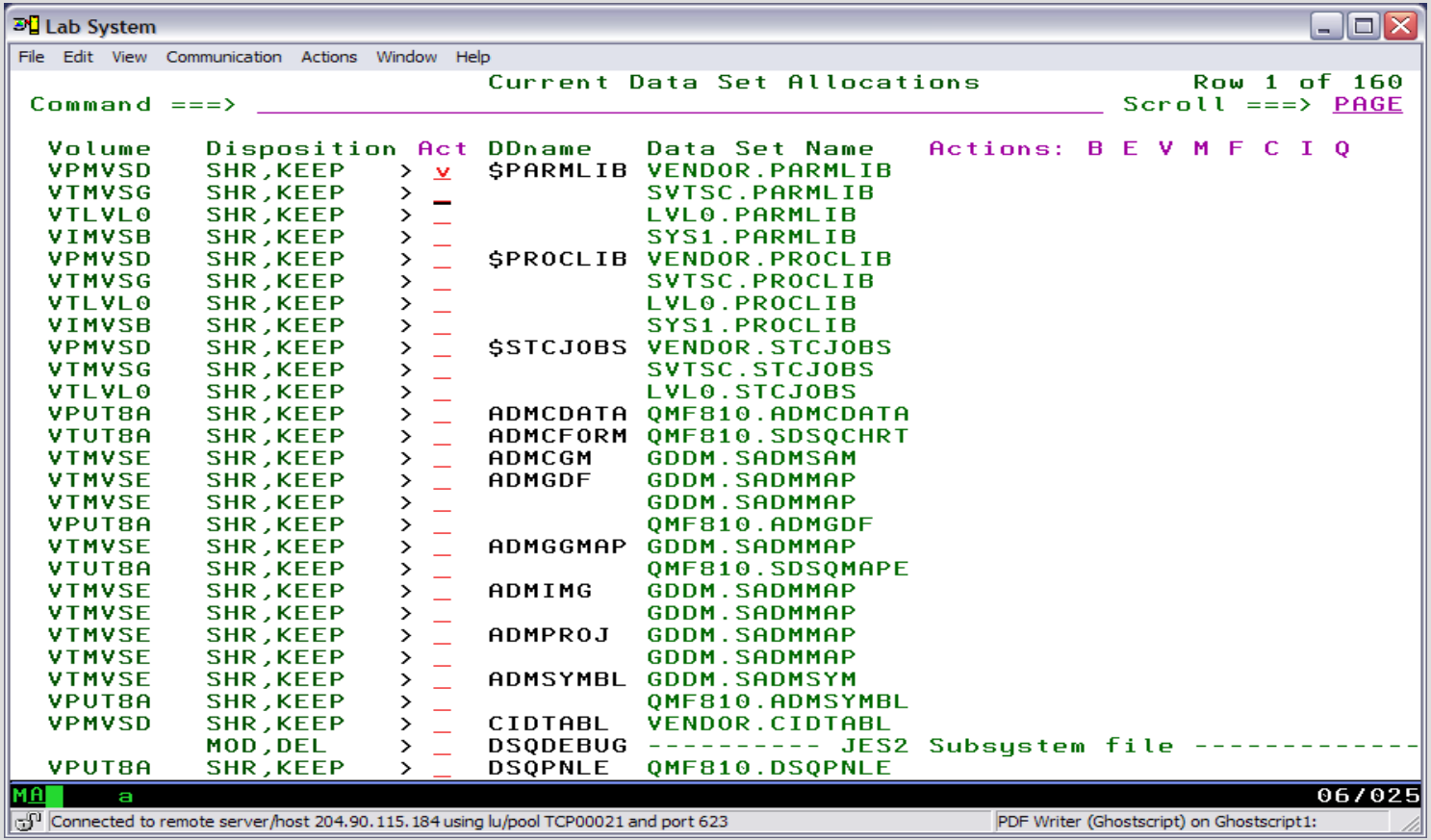
# Master JCL for Master Scheduler



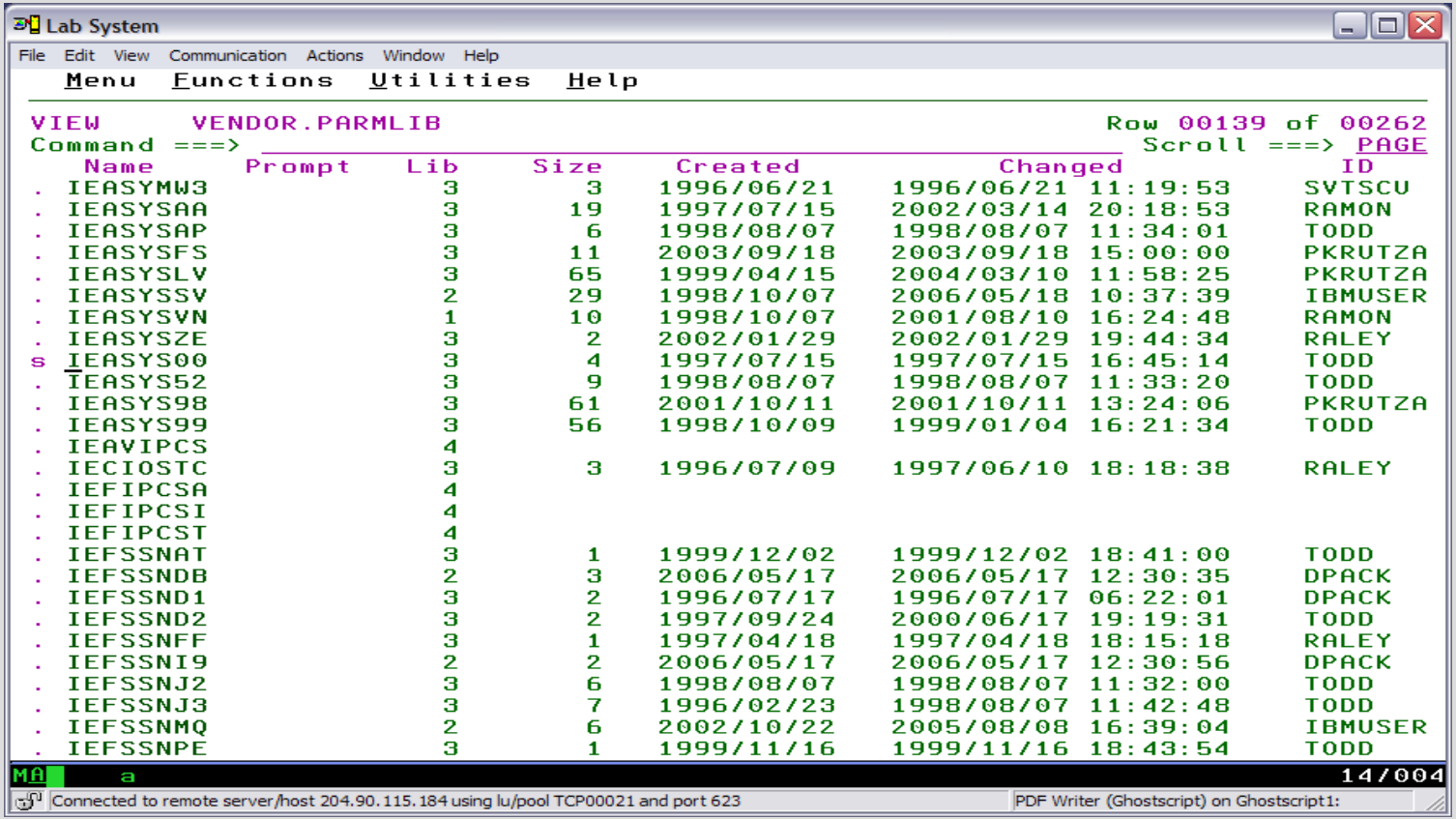
# CLIST to easily find system parm and proc members



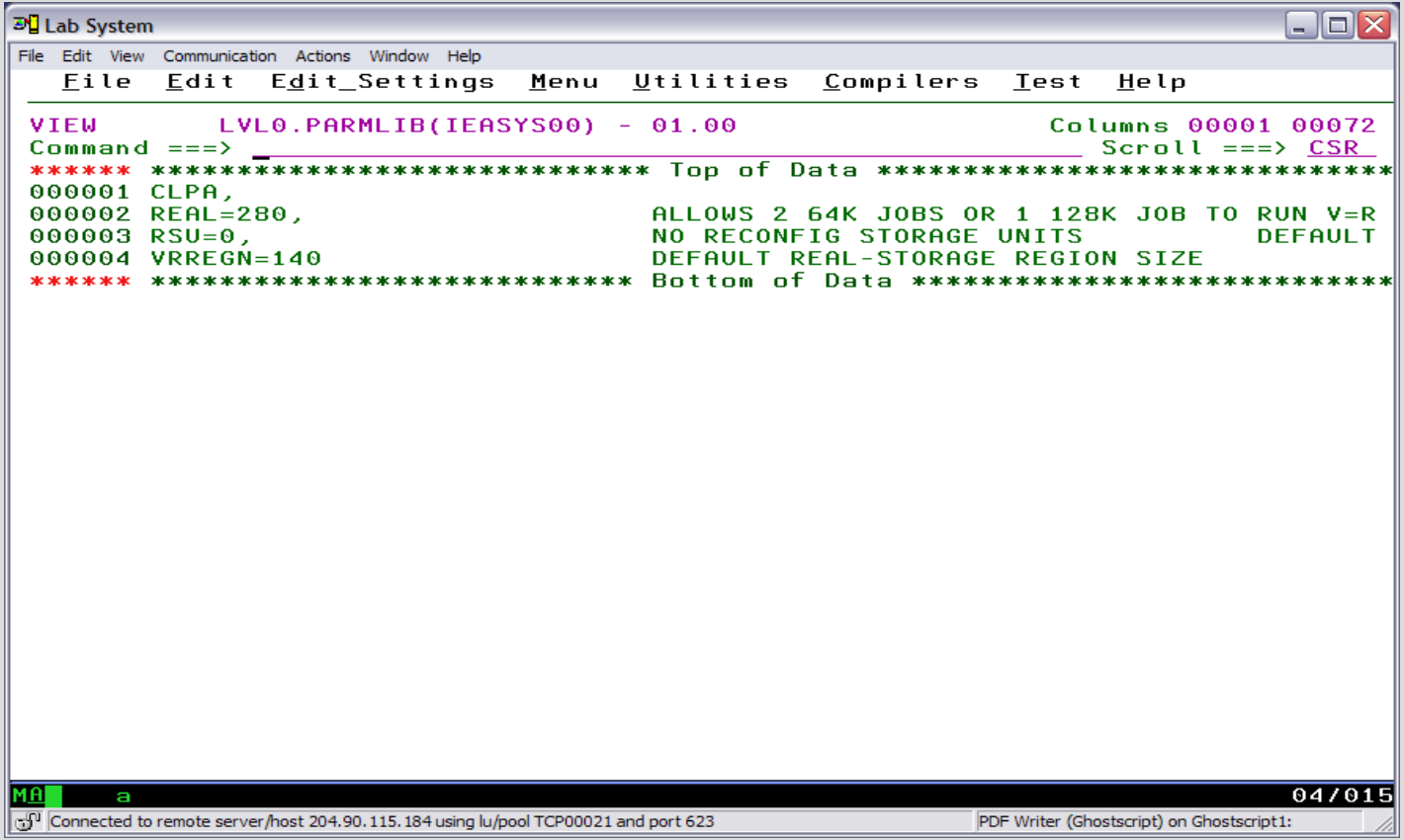
# View system PARMLIB concatenation



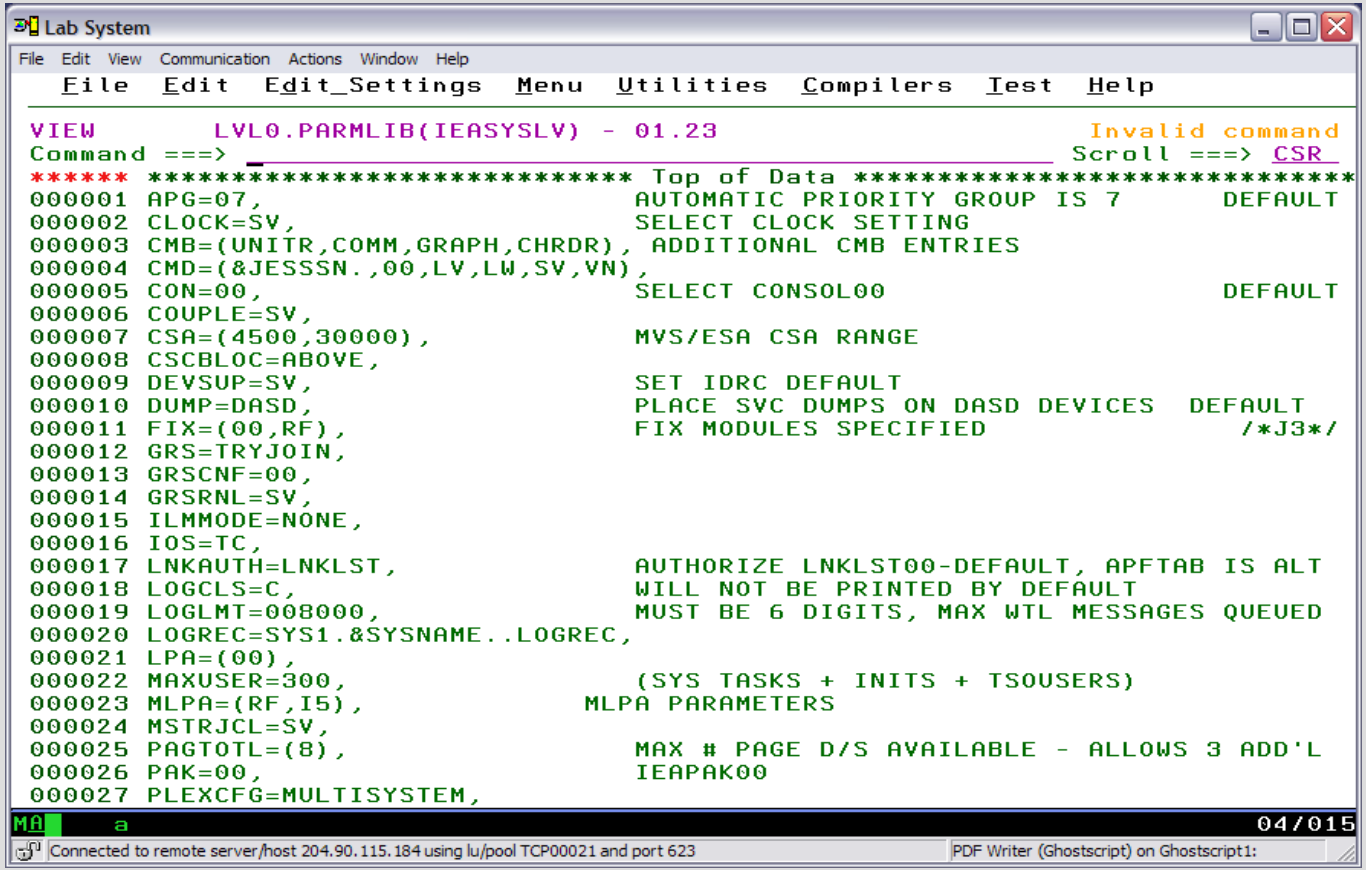
# SYSPARM IEASYSxx values in PARMLIB



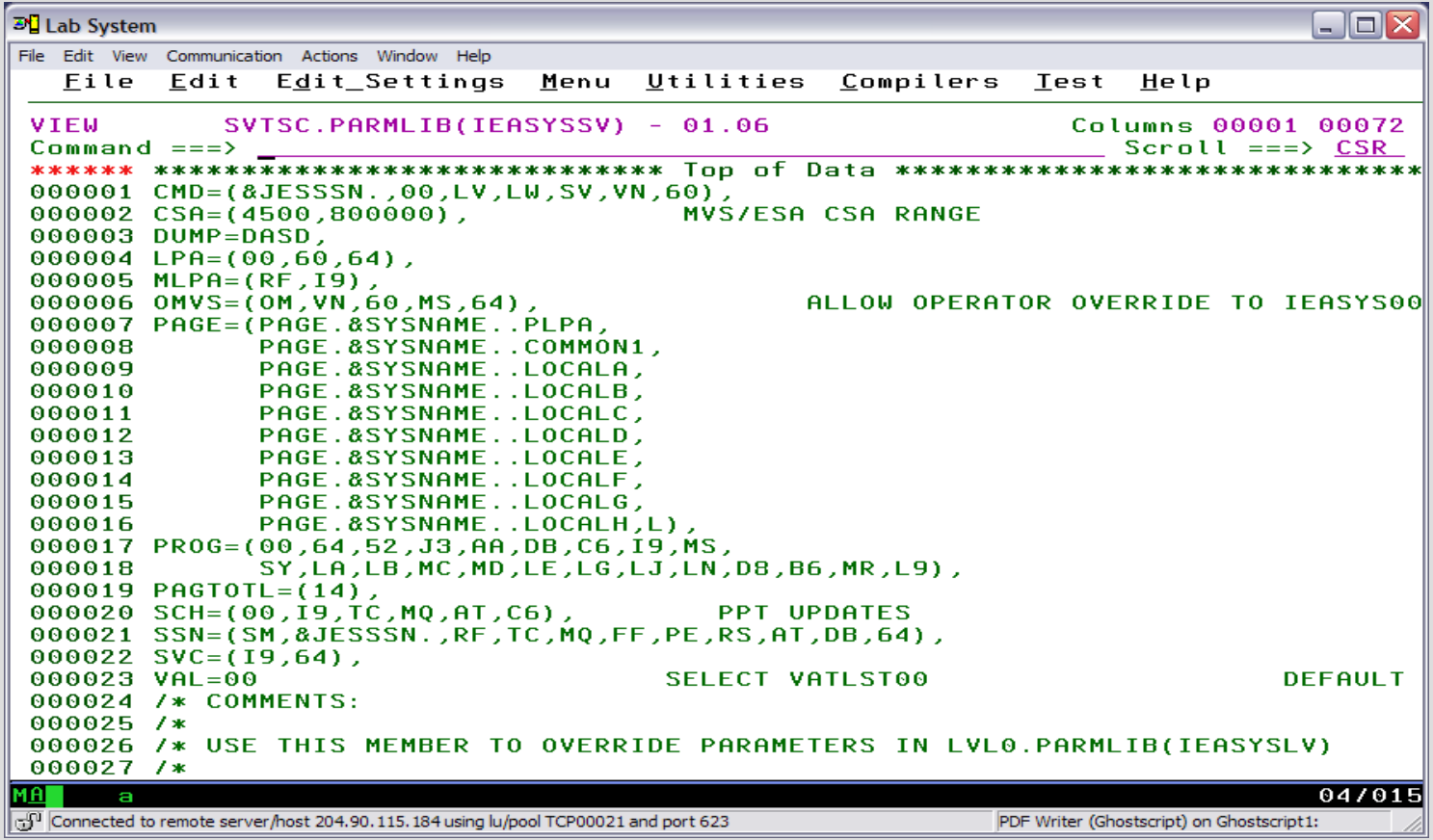
# IEASYS00 is read first.  IEASYS00 has few parameters



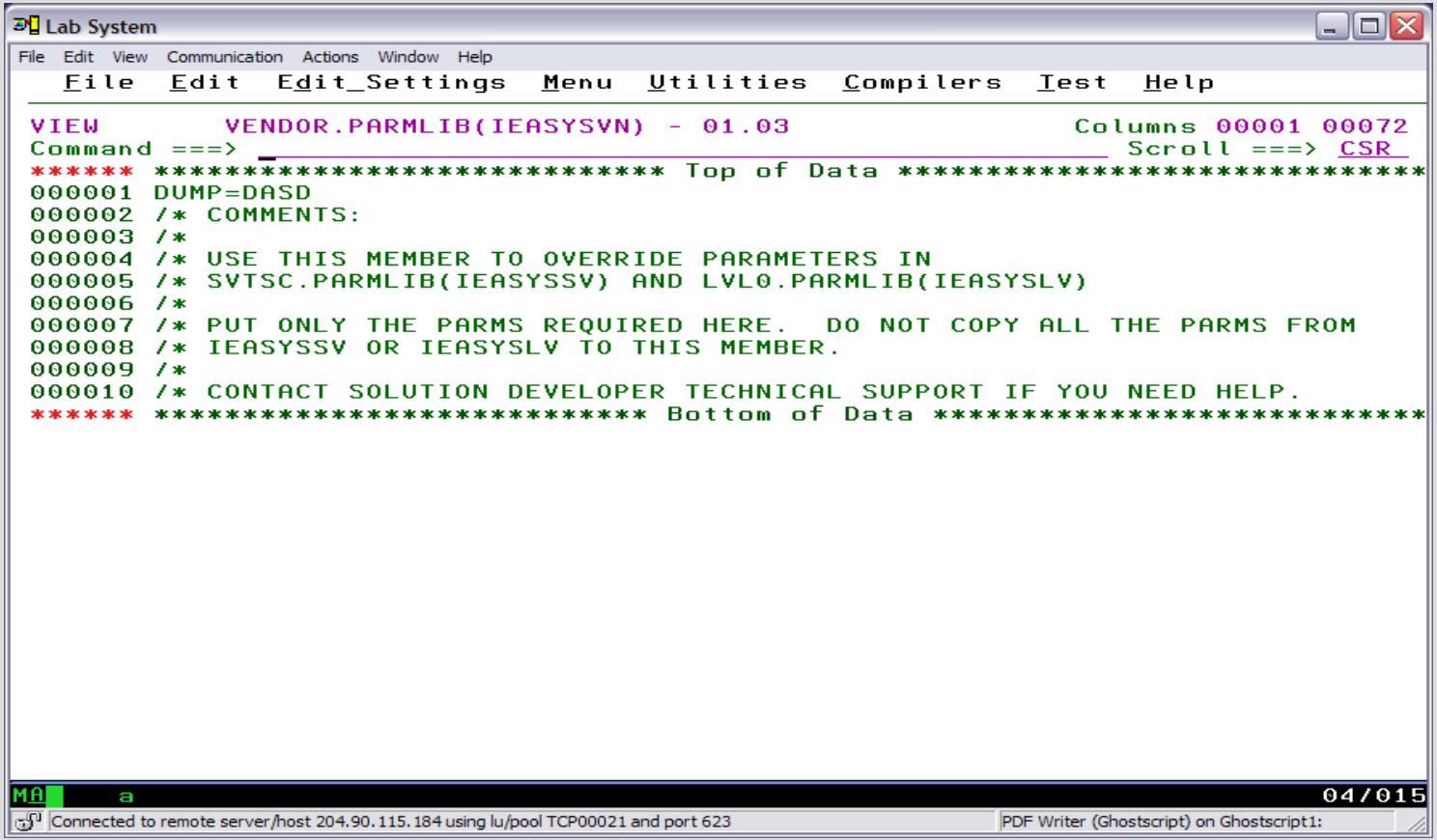
# IEASYSLV is read 2nd. IEASYSLV has more parameters



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



# IEASYSVN the last member read has only one parm 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

# 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

# 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)

# 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

# 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.

# 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
...
```

# 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 data sets such as the page data sets

# Professional Manuals

+ z/OS MVS

| | | | |
|---|---|---|---|
| **z/OS MVS Initialization and Tuning Guide** | SA23-1379-40 | 18 Dec 2019 | PDF **ieae100_v2r4.pdf** (1.92MB) |
| **z/OS MVS Initialization and Tuning Reference** | SA23-1380-40 | 23 Jun 2020 | PDF **ieae200_v2r4.pdf** (3.44MB) |

+ z/OS JES2

| | | | |
|---|---|---|---|
| **z/OS JES2 Initialization and Tuning Guide** | SA32-0991-40 | 25 Mar 2020 | PDF **hasa300_v2r4.pdf** (3.3MB) |
| **z/OS JES2 Initialization and Tuning Reference** | SA32-0992-40 | 25 Mar 2020 | PDF **hasa400_v2r4.pdf** (2.45MB) |

# 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
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