



Analyzing Memory With SDSF

Rob Scott
Rocket Software
rscott@rs.com

New Memory Functions In SDSF

- z/OS 2.5 SDSF introduced new displays and functions to help investigate memory usage
- New displays for both traditional 24/31-bit memory and 64-bit memory objects
- Address space level and system level displays
- New facility to allow memory browse of common storage and private storage of any address space.
- z/OS 3.1 SDSF expanded memory functionality
 - DSECT MAP view now in SDSF table format
 - IPCS-like “RunChain” functionality
 - User-defined maps

Topics Covered

- Browsing Memory
 - Browsing memory basics
 - Mapping control blocks
 - Run-chain functionality
 - Address space diagnostics
- Common Storage Analysis
 - Orphaned (or “owner gone”) storage
 - Subpool/key summary and details
 - Address space usage summary and details
- Private Storage Analysis
 - Address space usage summary and details
 - Subpool/key summary and details
- 64-bit Memory Objects
 - Address space usage summary and details

Browsing Memory

Browsing Memory

Primary command “MEM”

Syntax :

- MEM *address {asid} {sysname}*
- Defaults : *address* = 0, *asid* = user address space (hex), *sysname* = local system
- Leading zeroes can be omitted from *address* and *asid*
- Underscore (“_”) can be used to separate high-half and low-half of *address*

Examples :

MEM 7FCE8

Display the memory contents at address 0x0007FCE8 in your own address space on the local system.

MEM 50_48CA000 CD

Display the contents of storage within a 64-bit memory object owned by ASID 0x00CD starting at address 0x000000500048CA000.

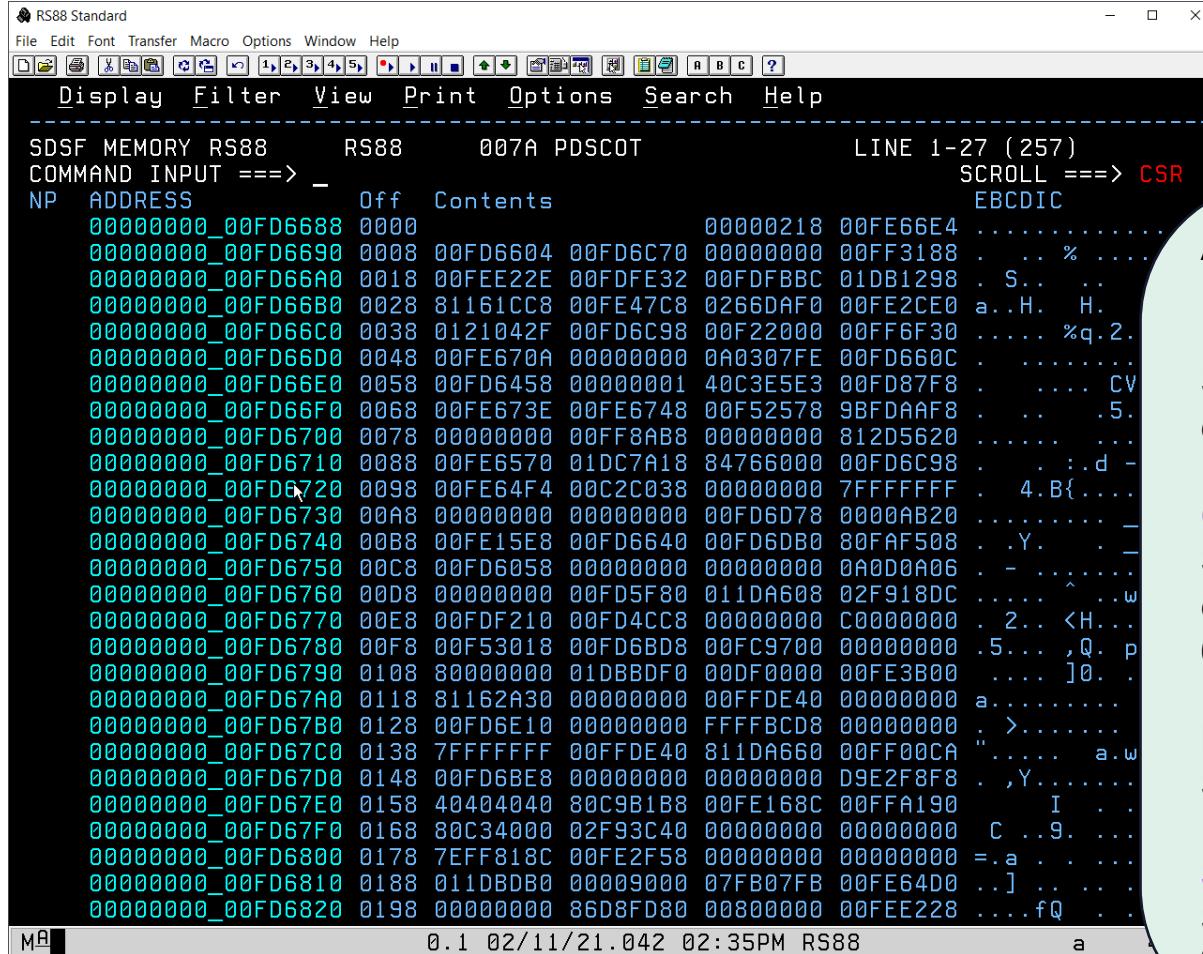
MEM 01E00EAC 00AB SYSA

Display memory contents at address 0x01E00EAC in ASID 0x00AB on remote system SYSA.

Browsing Memory – Point-and-shoot

- Numerous panels in SDSF now have point-and-shoot enabled fields that invoke the SDSF “MEM” command service
- Default screen attribute is green-underlined
 - This can be changed from the “SET SCREEN” options dialogue
 - Option exists to use CUA attributes instead of SDSF attributes
- Any ASID and SYSNAME values are inherited from the scope of the point-and-shoot field
- Common storage is considered owned by :
 - ASID specified explicitly on MEM command
 - Inherited from the row on the display
 - Defaulted to current ASID when otherwise unspecified

Browsing Memory - Panel



The screenshot shows the RS88 Standard memory browser window. The title bar reads "RS88 Standard". The menu bar includes File, Edit, Font, Transfer, Macro, Options, Window, Help, Display, Filter, View, Print, Options, Search, and Help. The main area displays memory contents for SDSF MEMORY RS88, RS88, 007A PDSCOT. The display shows memory addresses from 00000000 to 00FD6820, their hex values, and their ASCII representation. The status bar at the bottom shows "0.1 02/11/21.042 02:35PM RS88".

Actions (NP)

D{n}

Show memory at (n)th word of the “Contents” column (1-4) treating it as 31-bit address.

G{n}

Show memory at (n)th word of the “Contents” column (1-3) treating it and the (n+1)th word as a 64-bit address.

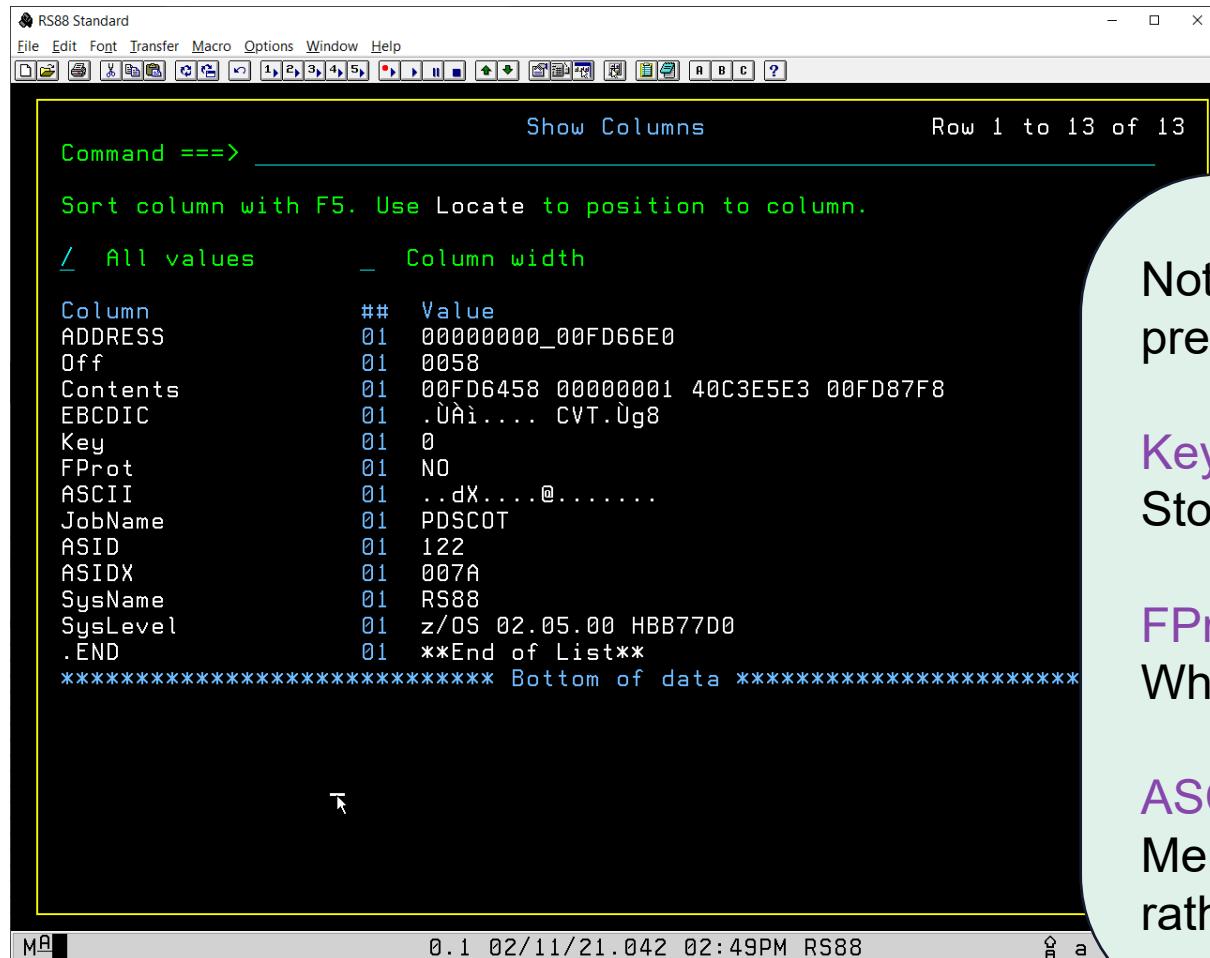
M

Show memory mapped to a known structure.

S

Show memory starting at the value in the “Address” column.

Browsing Memory - Columns



The screenshot shows a window titled "RS88 Standard" with a menu bar including File, Edit, Font, Transfer, Macro, Options, Window, and Help. Below the menu is a toolbar with various icons. The main area is titled "Show Columns" and displays memory data. It includes a command line "Command ==> _____" and a status message "Row 1 to 13 of 13". A note says "Sort column with F5. Use Locate to position to column." Below this, there are two radio buttons: "/ All values" and "_ Column width". The data table has two columns: "Column" and "Value". The "Column" column lists memory addresses and names like ADDRESS, Off, Contents, EBCDIC, Key, FProt, ASCII, JobName, ASID, ASIDX, SysName, SysLevel, and .END. The "Value" column contains corresponding binary or ASCII values. At the bottom, a footer reads "***** Bottom of data *****".

Note the columns not shown on the previous screen shot :

Key

Storage protection key

FProt

Whether fetch protection is in effect

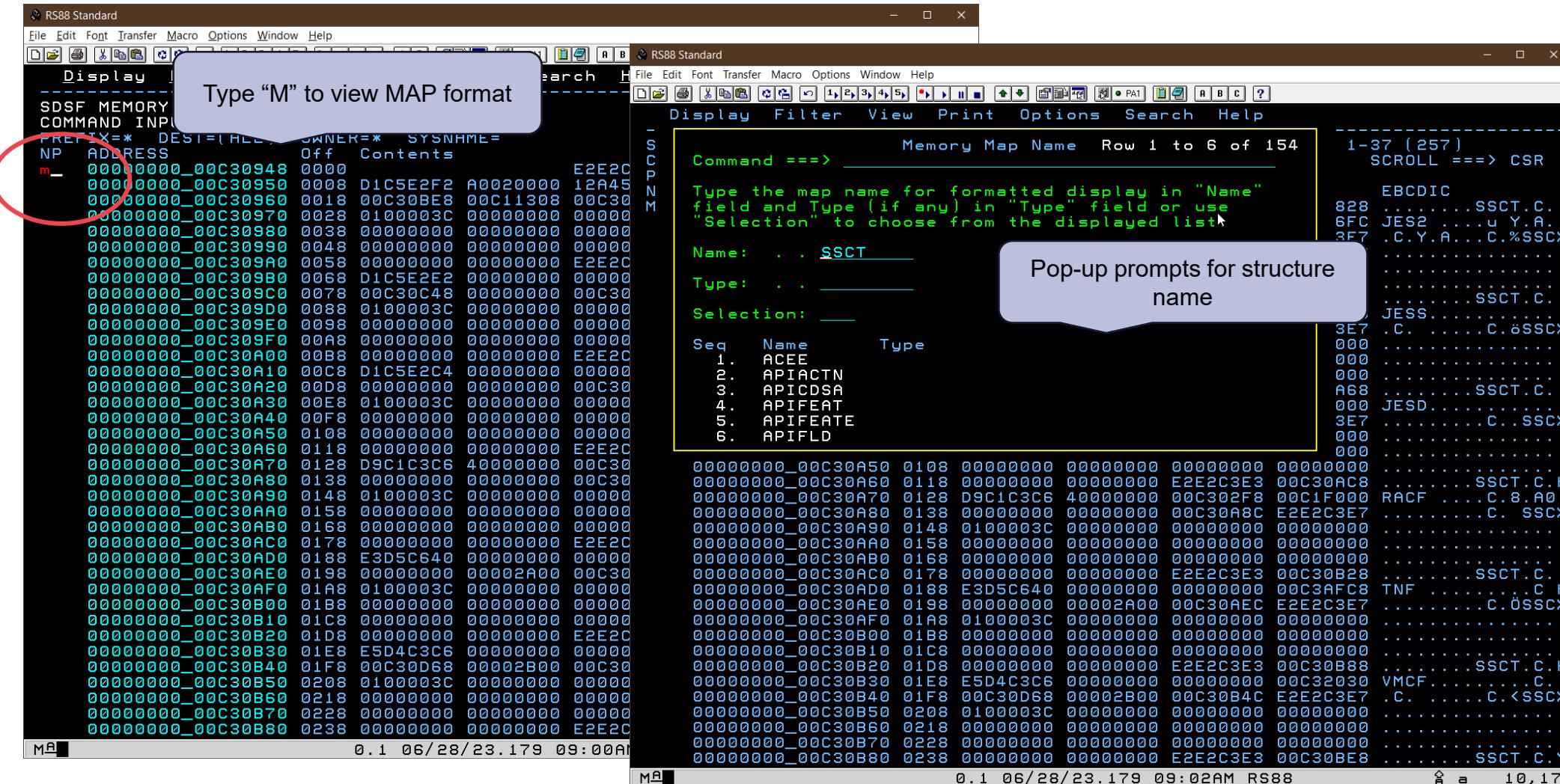
ASCII

Memory contents shown in ASCII rather than EBCDIC

Browsing Memory - Security

- Ability to show memory for address space protected by SAF profile in SDSF class
 - **ISFJOB.STORAGE.owner.jobname.sysname**
 - READ access required
 - Where owner cannot be derived (e.g. some system address spaces), SDSF uses “++++++”
- When page has never been referenced, MEM might show “STORAGE SKIPPED” message and display the next valid storage contents
 - CONTROL access to **ISFJOB.STORAGE.owner.jobname.sysname** will allow SDSF to “touch” the target page to differentiate between unreferenced storage and unavailable storage.

Browsing Memory – DSECT MAP



MEM MAP Table Format

RS88

File Edit Font Transfer Macro Options Window Help

Display Filter View

SDSF MAP RS88 RS88 SSCT 0001 *MASTER* LINE 1-20 (20)
COMMAND INPUT ==> SCROLL ==> CSR

PREFIX=*	DEST=(ALL)	OWNER=*	SYSNAME=	Off	Key	FProt
NP	NAME		Content	0000	0	NO
SSCTSID			SSCT	0004	0	NO
SSCTSCTA			00C37828	0008	0	NO
SSCTSNAME			JES2	000C	0	NO
SSCTFLG1		A0	B'10100000'			
+EQUATED VALUES		--	-----			
+SSCTSFOR		80	B'10000000'			
+SSCTUPSS		40	B'01000000'			
+SSCTARDR		20	B'00100000'			
+SSCTLDEL		10	B'00010000'			
SSCTSSID		02	B'00000010'	000D	0	NO
+EQUATED VALUES		--	-----			
+SSCTJES3		03	B'00000011'			
+SSCTJES2		02	B'00000010'			
+SSCTUNKN		00	B'00000000'			
SSCTRSV1(2)		0000		000E	0	NO
SSCTSUSVT		129499E8		0010	0	NO
SSCTSUSE		00C186FC		0014	0	NO
SSCTSYN		00C37BE8		0018	0	NO
SSCTSUS2		00C18308		001C	0	NO
SSCTSCTX		00C3796C		0020	0	NO

0.1 11/14/22.318 01:50PM RS88 a 4,21

Structure format now shown in
SDSF table.

“D” and “G” actions available to
invoke MEM on address value in
Content field.

“M” action against a row will
invoke MEM for the address and
then format the new content
inheriting the same map.

This allows user to process linked
list in structure format.

Example MAP Structure Definition

S1 - Mainframe Display

File Edit Session Options Transfer View Script Help

Menu Utilities Compilers Help

BROWSE DEV RTE.HSF.HSFA0301.SISFJCL(ISFM7E00) Line 0000003276 col 001 080
Command ==> Scroll ==> CSR

```

MAP NAME(SSCT) REFNAME(IEFJSCVT) LENGTH(36)
  MAPENT FIELD(SSCTID) LENGTH(4) TYPE(CHAR) OFFSET(0000)
  MAPENT FIELD(SSCTSCTA) LENGTH(4) TYPE(ADDR) OFFSET(0004)
  MAPENT FIELD(SSCTSNAME) LENGTH(4) TYPE(CHAR) OFFSET(0008)
  MAPENT FIELD(SSCTFLG1) LENGTH(1) TYPE(BYTE) OFFSET(000C)
  MAPENT FIELD(SSCTSFOR) LENGTH(1) TYPE(BIT) REF(SSCTFLG1) VALUE(80)
  MAPENT FIELD(SSCTUPSS) LENGTH(1) TYPE(BIT) REF(SSCTFLG1) VALUE(40)
  MAPENT FIELD(SSCTARDR) LENGTH(1) TYPE(BIT) REF(SSCTFLG1) VALUE(20)
  MAPENT FIELD(SSCTLDEL) LENGTH(1) TYPE(BIT) REF(SSCTFLG1) VALUE(10)
  MAPENT FIELD(SSCTSSID) LENGTH(1) TYPE(BYTE) OFFSET(000D)
  MAPENT FIELD(SSCTUNKN) LENGTH(1) TYPE(BIT) REF(SSCTS...  
DUPLICATION(2)
  MAPENT FIELD(SSCTSSVT) LENGTH(4) TYPE(ADDR) OFFSET(0010)
  MAPENT FIELD(SSCTSUSE) LENGTH(4) TYPE(HEX) OFFSET(0014)
  MAPENT FIELD(SSCTSNT) LENGTH(4) TYPE(ADDR) OFFSET(0018)
  MAPENT FIELD(SSCTSUS2) LENGTH(4) TYPE(HEX) OFFSET(001C)
  MAPENT FIELD(SSCTSCTX) LENGTH(4) TYPE(HEX) OFFSET(0020)

MB 01A          S88TCP13    04/015
  
```

Bitmask values specify the associated byte using “REF”

TYPE(ADDR) makes the field active for memory browse

S1/A | 192.168.55.188 | S88TCP13 | NUM | 00:00:125 | 04.015

MEM Run Chain

RS88

File Edit Font Transfer Macro Options Window Help

Display Filter View Print Options Search

SDSF MEM
COMMAND
PREFIX=*

NP ADDR

RC 0000 (highlighted with a red circle)

Offset to next pointer 4 (hexadecimal, 000 to FFF)
0000
Length of next pointer 4 (4 or 8 bytes)
0000
Bytes to display . . . 20 (hexadecimal, 000 to 400)
0000
Traversal limit . . . 255

F1=Help F12=Cancel

Memory Run Chain Definition

Type run chain parameters to describe control block.

RS88

File Edit Font Transfer Macro Options Window Help

Display Filter View Print Options Search

SDSF MEMORY CHAIN RS88 RS88 0001 *MAS

PREFIX=* DEST=(ALL) OWNER=*

NP ADDRESS Seq Contents

NP	ADDRESS	Seq	Contents
00000000_00C37948	1	E2E2C3E3	00C37828 D1C5E2F2 A0d20000 SSCT.C.JES2 ...
00000000_00C37958	129499E8	00C186FC	00C37BE8 00C18308 .mrY.Af.C#Y.Ac ...
00000000_00C37828	2	E2E2C3E3	00C37888 D4E2E3D9 00000000 SSCT.C.HMSTR ...
00000000_00C37838	3	E2E2C3E3	00C39468 00000000 00000000 00000000 .Cm ...
00000000_00C37888	3	E2E2C3E3	00C378E8 C9E9E4C7 00000000 SSCT.C.YIZUG ...
00000000_00C37898	4	E2E2C3E3	128D6538 00000000 00000000 00000000 ...
00000000_00C378E8	4	E2E2C3E3	00C379A8 E2D4E240 00000000 SSCT.C.ySMS ...
00000000_00C378F8	5	E2E2C3E3	00C392B8 00000000 00000000 .CK ...
00000000_00C379A8	5	E2E2C3E3	00C37A08 D1C5E2E2 00000000 SSCT.C.JESS ...
00000000_00C379B8	6	E2E2C3E3	00C37C48 00000000 ...C@ ...
00000000_00C37A08	6	E2E2C3E3	00C37A68 D1C5E2C4 00000000 SSCT.C.JESD ...
00000000_00C37A18	7	E2E2C3E3	00C37AC8 D9C1C3C6 40000000 SSCT.C.HRACF ...
00000000_00C37A68	7	E2E2C3E3	00C372F8 00C26000 00000000 .C.8-B- ...
00000000_00C37A78	8	E2E2C3E3	00C37B28 E3D5C640 00000000 SSCT.C#.TNF ...
00000000_00C37AC8	9	E2E2C3E3	00C37AC8 00C41790 00000000 00002900 ...
00000000_00C37AD8	9	E2E2C3E3	00C37B28 E5D4C3C6 00000000 SSCT.C#.hVMCF ...
00000000_00C37B28	10	E2E2C3E3	00C37B88 00C390B8 00000000 00002A00 ...C ...
00000000_00C37B38	10	E2E2C3E3	00C37B88 00000000 00002A00 ...C ...
00000000_00C37B88	11	E2E2C3E3	00C37B98 00000000 00000000 00000000 ...
00000000_00C37BE8	11	E2E2C3E3	00C37C48 C4C6D9D4 00000000 SSCT.C@DFRM ...
00000000_00C37BF8	12	E2E2C3E3	00C37C48 00000000 00000000 90000000 ...
00000000_00C37C48	12	E2E2C3E3	00C37CA8 D3D6C7D9 00000000 SSCT.C@yLOGR ...
00000000_00C37C58	13	E2E2C3E3	00C37CA8 127E3B0 00000000 00000000 ...=.\...D.
00000000_00C37CA8	13	E2E2C3E3	00C37D08 D4D7C6E7 00000000 SSCT.C'.MPFX ...
00000000_00C37CB8	13	E2E2C3E3	00C37CB8 00000000 00000000 00000000 ...

MA

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Results from run chain shown in selectable list using length specified on pop-up.

Virtual Storage Map

RS88 Standard

File Edit Font Transfer Macro Options Window Help

Display Filter View Print Options Search Help

SDFS VIRTUAL STORAGE MAP RS88 RS88

COMMAND INPUT ==> LINE 1-21 (24) SCROLL ==> CSR

PREFIX= * DEST=(ALL) OWNER= * SYSNAME=

NP	NAME	Start-Address	End-Address	Size	Alloc	Alloc%	HWM	HWM%	Seq	SysName	SysLevel
	HV-SHARED	00000200_00000000	0001FFFF_FFFFFFFF	510T	863M	0.00	1069M	0.00	1	RS88	z/OS 03.01.00 HBB77E0
	HV-COMMON	000001EF_80000000	000001FF_FFFFFFFF	66G	9977M	14.76	9977M	14.76	2	RS88	z/OS 03.01.00 HBB77E0
	HV-PRIVATE	00000050_00000000	000001EF_7FFFFFFF	1662G	0	0.00	0	0.00	3	RS88	z/OS 03.01.00 HBB77E0
	LOCALSYSAREA	00000010_00000000	0000004F_FFFFFFFF	256G	0	0.00	0	0.00	4	RS88	z/OS 03.01.00 HBB77E0
	RESERVED	00000000_80000000	0000000F_FFFFFFFF	62G	0	0.00	0	0.00	5	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-PRIVATE	00000000_12C00000	00000000_7FFFFFFF	1748M	0	0.00	0	0.00	6	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-CSA	00000000_0809B000	00000000_12BFFFFF	171M	58M	33.91	59942K	34.15	8	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-MLPA	00000000_00000000	00000000_00000000	0	0	0.00	0	0.00	9	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-FLPA	00000000_08098000	00000000_0809AFFF	12288	0	0.00	0	0.00	10	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-PLPA	00000000_038E1000	00000000_08097FFF	73436K	0	0.00	0	0.00	11	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-SQA	00000000_01E31000	00000000_038E0FFF	27328K	18M	67.87	20009K	73.21	12	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-R/W-NUC	00000000_01DE2000	00000000_01DE30FF	323584	0	0.00	0	0.00	13	RS88	z/OS 03.01.00 HBB77E0
	EXTENDED-R/O-NUC	00000000_01000000	00000000_01DE152F	14213K	0	0.00	0	0.00	14	RS88	z/OS 03.01.00 HBB77E0
	R/O-NUC	00000000_00FDD000	00000000_00FFFFFF	143360	0	0.00	0	0.00	15	RS88	z/OS 03.01.00 HBB77E0
	R/W-NUC	00000000_00FCE000	00000000_00FDCF57	61272	0	0.00	0	0.00	16	RS88	z/OS 03.01.00 HBB77E0
	SQA	00000000_00E2B000	00000000_00FCDFFF	1676K	429K	25.61	976368	56.89	17	RS88	z/OS 03.01.00 HBB77E0
	PLPA	00000000_00000000	00000000_00000000	-	-	-	-	-	-	-	z/OS 03.01.00 HBB77E0
	FLPA	00000000_00000000	00000000_00000000	-	-	-	-	-	-	-	z/OS 03.01.00 HBB77E0
	MLPA	00000000_00000000	00000000_00000000	-	-	-	-	-	-	-	z/OS 03.01.00 HBB77E0
	CSA	00000000_00000000	00000000_00000000	-	-	-	-	-	-	-	z/OS 03.01.00 HBB77E0
	PRIVATE	00000000_00000000	00000000_00000000	-	-	-	-	-	-	-	z/OS 03.01.00 HBB77E0

- Global view of virtual storage boundaries
- Usage and high-water-mark values for common storage
- Will dynamically include RUCSA for those licensed customers

Address Space Diagnostics

- New primary command “AD”
- Shows identification and diagnostic information about each active address space
- Intended as a launch pad for memory problem investigations
- Actions include storage related displays for the address space
 - Common storage usage
 - Private storage usage
 - Memory objects
- Important control block addresses for each address space shown and enabled for point-and-shoot to invoke the MEM panel

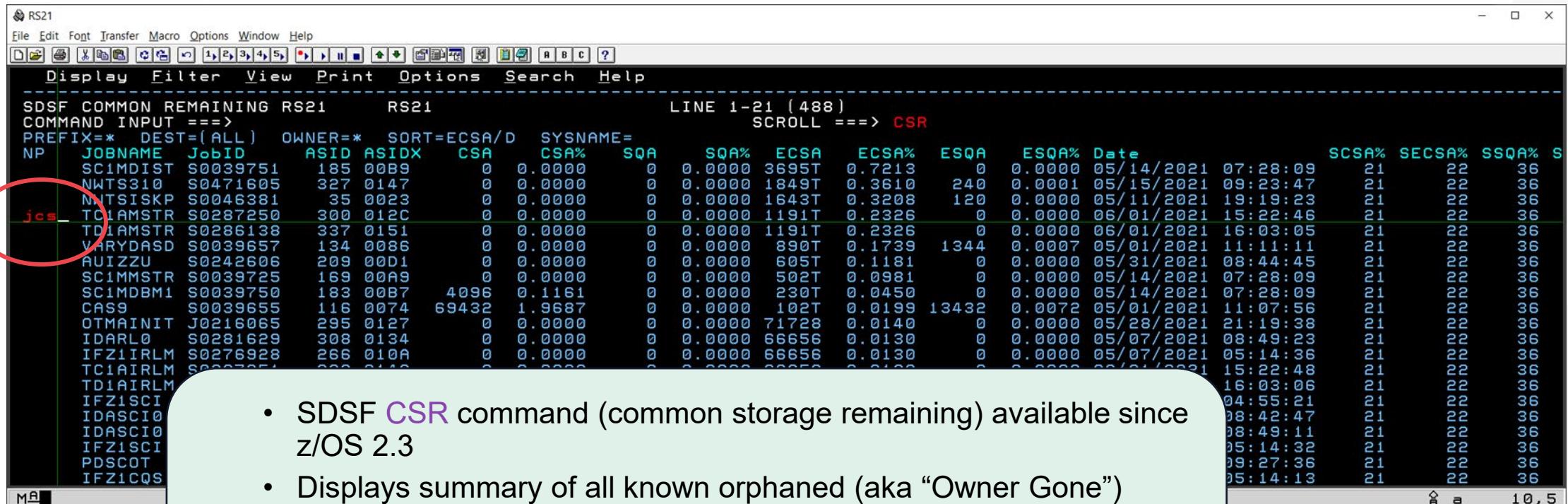
Address Space Diagnostics - Panel

Display		Filter		View		Print		Options		Search		Help													
COMMAND INPUT ==>																									
SCROLL ==> CSR																									
PREFIX=** DEST=(ALL) OWNER=** SORT=JOBNAME/A SYSNAME= FILTERS=1																									
NP JOBNAME ASIDX StepName ProcStep JobID Owner ASCB ASXB TCB QUCB JSAB Pos SR Type ASID SSName CVT ECVT SysNa																									
MASTER	0001			STC02703	+MASTER+	00F05600	01E04B00	00FD5798	008F20A0	01E06C88	02D6A290	NS	STC	1	JES2	00FD6A80	01E1B018	RS88							
ALLOCAS	0015	ALLOCAS				00FB0880	022A3000	008FD000	008FD090	022A2400	00000000	NS	STC	21		00FD6A80	01E1B018	RS88							
ANTAS000	0000	ANTAS000	IEFPROC			00FA2280	02D70000	008FD000	008FB280	02D6F400	00000000	NS	STC	13		00FD6A80	01E1B018	RS88							
ANTMAIN	0000	ANTMAIN	IEFPROC			00FA5080	02D88500	008FD000	008FB280	02D92300	00000000	NS	STC	12		00FD6A80	01E1B018	RS88							
APPC	006C	APPC	APPC			00FBDA80	01F93000	008FD000	008F9280	01F92400	00000000	NS	STC	108		00FD6A80	01E1B018	RS88							
ASCH	006D	ASCH	ASCH			00FBCA80	01F91000	008FD000	008F9280	01F90400	00000000	NS	STC	109		00FD6A80	01E1B018	RS88							
AXR	0019	AXR	IEFPROC			00FC5B80	02128000	008FD000	008FB280	0213D400	00000000	NS	STC	25		00FD6A80	01E1B018	RS88							
AXR02	008B	AXR02		STC02807	++++++	00FB8E80	03821000	008FD000	008FB0C8	03820400	01F8C2A0	OUT	LW STC	138	JES2	00FD6A80	01E1B018	RS88							
AXR03	0089	AXR03		STC02805	++++++	00FB9200	03825000	008FD000	008FB0C8	03824400	01F8C1E0	OUT	LW STC	137	JES2	00FD6A80	01E1B018	RS88							
AXR04	008A	AXR04		STC02806	++++++	00FB8000	03823000	008FD000	008FB0C8	03822400	01F8C120	OUT	LW STC	138	JES2	00FD6A80	01E1B018	RS88							
BPXINIT01	002B	BPXINIT01	BPXINIT			00FE4E400	02180000	008FD000	008FB280	0204D400	00000000	OUT	DW STC	43		00FD6A80	01E1B018	RS88							
CATALOG	0013	CATALOG	IEFPROC			00FB8000	02210000	008FD000	008FB280	0221C400	00000000	NS	STC	19		00FD6A80	01E1B018	RS88							
CEA	001A	CEA	IEFPROC			00FC5A00	0216E000	008FD000	008FB280	02139400	00000000	NS	STC	26		00FD6A80	01E1B018	RS88							
CONSOLE	000A	CONSOLE				00FA5380	022D7500	008FD000	008FED90	02EAD400	00000000	NS	STC	10		00FD6A80	01E1B018	RS88							
CSF	0075	CSF	CSF	STC02780	CSFUSER	00FS94380	01F78000	008FD000	008F9040	01F77400	021200C0	NS	STC	117	JES2	00FD6A80	01E1B018	RS88							
CSSMTP	008F	CSSMTP	CSSMTP	STC02814	CSSMTP	00FB8800	03800000	008FD000	008F9040	0380C400	0383C0A0	IN	STC	143	JES2	00FD6A80	01E1B018	RS88							
DEVMAN	000E	DEVMAN	IEFPROC			00FA2100	02D6E000	008FD000	008FB280	02D6D400	00000000	NS	STC	14		00FD6A80	01E1B018	RS88							
DUMPSRV	0005	DUMPSRV	DUMPSRV			00FA5B00	02F7B500	008FD000	008FB188	02F7F400	00000000	NS	STC	5		00FD6A80	01E1B018	RS88							
FTP01	002C	FTP01		STC02702	FTPD	00FC5880	02136500	008FD000	008FB2F8	02138400	0211F740	OUT	LW STC	44	JES2	00FD6A80	01E1B018	RS88							
GRS	0007	GRS				00FA5800	023C6000	008FD000	008FD090	023C12C0	00000000	NS	STC	7		00FD6A80	01E1B018	RS88							
GTZ	000F	GTZ	GTZ			00FB8000	0228C000	008FD000	008FB188	0228B400	00000000	NS	STC	15		00FD6A80	01E1B018	RS88							
HZR	0020	HZR	IEFPROC			00FA9E80	0217E000	008FD000	008F9188	0219C400	00000000	NS	STC	32		00FD6A80	01E1B018	RS88							
HZSPROC	0012	HZSPROC	HZSSTEP	STC02708	HZSPROC	00FB80B0	02275000	008FD000	008FB040	02221400	021190C0	NS	STC	18	JES2	00FD6A80	01E1B018	RS88							
IOSAS	0017	IOSAS	IEFPROC			00FC5E80	0219F000	008FD000	008FB188	0219E400	00000000	NS	STC	23		00FD6A80	01E1B018	RS88							
IXGLOGR	0018	IXGLOGR	IEFPROC			00FC5D00	0211B000	008FD000	008FB188	02116400	00000000	NS	STC	24		00FD6A80	01E1B018	RS88							
JESXCF	0014	JESXCF	IEFPROC			00FC6080	0258E000	008FD000	008FB280	0258D400	00000000	NS	STC	20		00FD6A80	01E1B018	RS88							
JES2	0021	JES2	IEFPROC			00FA9D00	0219B000	008FD000	008F9188	0219R400	02129010	NS	STC	33	JES2	00FD6A80	01E1B018	RS88							
JES2AUX	002A	JES2AUX				00FA4E580	02064000	008FD000	008FD090	02063400	00000000	NS	STC	42		00FD6A80	01E1B018	RS88							
JES2MON	001F	JES2MON	IEFPROC			00FA99000	02100000	008FD000	008FD090	02100000	00000000	NS	STC	41		00FD6A80	01E1B018	RS88							
JMON	0096	JMON	JMON	STC02833	STCJMON	00FB7E80	03710000	008FD000	008FD090	02100000	00000000	NS	STC	40		00FD6A80	01E1B018	RS88							
OMVS	0010	OMVS	OMVS			00FB80E80	02	008FD000	008FD090	02100000	00000000	NS	STC	39		00FD6A80	01E1B018	RS88							
OSNMPD	008D	OSNMPD	OSNMPD	STC02813	STCUUSER	00FB8D00	005	008FD000	008FD090	02100000	00000000	NS	STC	38		00FD6A80	01E1B018	RS88							
PAGENT	006F	PAGENT	PAGENT	STC02777	PAGENT	00F93080	01	008FD000	008FD090	02100000	00000000	NS	STC	37		00FD6A80	01E1B018	RS88							
PCAUTH	0002	PCAUTH				00FDAD380	02	008FD000	008FD090	02100000	00000000	NS	STC	36		00FD6A80	01E1B018	RS88							
PCIE	0011	PCIE	IEFPROC			00FB80D00	02	008FD000	008FD090	02100000	00000000	NS	STC	35		00FD6A80	01E1B018	RS88							
PDSCOT	0025	ROCKPROC	S88TCP03	TSU02902	PDSCOT	00FA9880	02	008FD000	008FD090	02100000	00000000	NS	STC	34		00FD6A80	01E1B018	RS88							
PORTMAP	008E	PORTMAP	PMAP	STC02816	PORTMAP	00FB8B80	03	008FD000	008FD090	02100000	00000000	NS	STC	33		00FD6A80	01E1B018	RS88							
PRIMEPSA	0071	PRIMEPSA	IGVDGNPP	STC02775	++++++	00FBEB000	01	008FD000	008FD090	02100000	00000000	NS	STC	32		00FD6A80	01E1B018	RS88							
RACF	0027	RACF	RACF	STC02808	RACF	00FA9400	02	008FD000	008FD090	02100000	00000000	NS	STC	31		00FD6A80	01E1B018	RS88							
RASP	0003	RASP				00FDAD200	02	008FD000	008FD090	02100000	00000000	NS	STC	30		00FD6A80	01E1B018	RS88							
RESOLVER	001E	RESOLVER	EZBREINI			00FC5200	01	008FD000	008FD090	02100000	00000000	NS	STC	29		00FD6A80	01E1B018	RS88							
RMF	0073	RMF	IEFPROC	STC02778	RMF	00FA9580	01	008FD000	008FD090	02100000	00000000	NS	STC	28		00FD6A80	01E1B018	RS88							
RSED	0097	RSED	RSED	STC02830	STCRSE	00FB7D00	02	008FD000	008FD090	02100000	00000000	NS	STC	27		00FD6A80	01E1B018	RS88							
RSED1	0098	RSED1		STC02843	STCRSE	00FB7700	02	008FD000	008FD090	02100000	00000000	NS	STC	26		00FD6A80	01E1B018	RS88							
RSED2	0093	RSED2		STC02842	STCRSE	00FB8280	03	008FD000	008FD090	02100000	00000000	NS	STC	25		00FD6A80	01E1B018	RS88							
RSED2	0095	RSED2		STC02840	STCRSE	00FB7B80	03	008FD000	008FD090	02100000	00000000	NS	STC	24		00FD6A80	01E1B018	RS88							
RSED3	0094	RSED3		STC02841	STCRSE	00FB8580	03	008FD000	008FD090	02100000	00000000	NS	STC	23		00FD6A80	01E1B018	RS88							
RSED8	0026	RSED8		STC02771	STCRSE	00F92A00	01	008FD000	008FD090	02100000	00000000	NS	STC	22		00FD6A80	01E1B018	RS88							
RSED9	009A	RSED9		STC02839	STCRSE	00FB7880	03	008FD000	008FD090	02100000	00000000	NS	STC	21		00FD6A80	01E1B018	RS88							
SDSF	0024	SDSF	SDSF	STC02895	SDSF	00FBC700	0218	008FD000	008FD090	02100000	00000000	NS	STC	20		00FD6A80	01E1B018	RS88							
SDSFAUX	0090	SDSFAUX	SDSFAUX	STC02896	SDSF	00FBE900	02107000	008FD000	008F9040	02106400	02132000	NS	STC	157	JES2	00FD6A80	01E1B018	RS88							
SMF	001C	SMF	IEFPROC			00FC5700	02135000	008FD000	008DEE88	02185400	00000000	NS	STC	28		00FD6A80	01E1B018	RS88							
SMS	0016	SMS	IEFPROC			00FC5080	02178300	008FD000	008FB188	02288400	00000000	NS	STC	22		00FD6A80	01E1B018	RS88							
SMSPDSE	0008	SMSPDSE				00FA5680	02457500	008FD000	008FD090	023B2300	00000000	NS	STC	8		00FD6A80	01E1B018	RS88							
SMSPDSE1	0009	SMSPDSE1				00FA5500	02305500	008FD000	008FD090	022D08400	00000000	NS	STC	9		00FD6A80	01E1B018	RS88							
SNMPQE	0090	SNMPQE	SNMPQE	STC02815	SNMPQE	00FB8880	0380A000	008FD000	008F9040	03809400	0383C160	OUT	LW STC	144	JES2	00FD6A80	01E1B018	RS88							

- Each line includes CVT and ECVT address for quick access to system control blocks
 - Point-and-shoot on any control block inherits the ASID and SYSNAME from the row

Common Storage Analysis

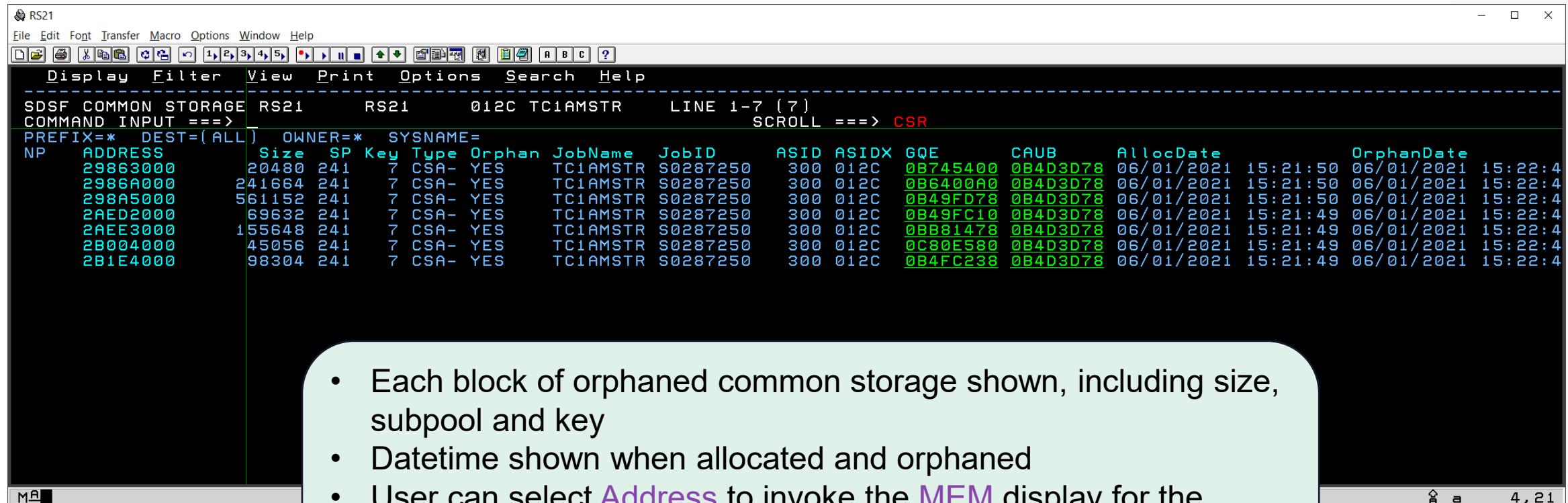
Orphaned Common Storage Analysis



```
RS21
File Edit Font Transfer Macro Options Window Help
Display Filter View Print Options Search Help
SDSF COMMON REMAINING RS21      RS21          LINE 1-21 ( 488 )
COMMAND INPUT ==>           SCROLL ==> CSR
PREFIX=* DEST=( ALL ) OWNER=* SORT=ECSA/D SYSNAME=
NP   JOBNAME JobID   ASID ASIDX CSA   CSA% SQA   SQA% ECSA   ECSA% ESQA   ESQA% Date   SCSA% SECSD% SSQA% S
SC1MDIST S0039751 185 00B9 0 0.0000 0 0.0000 3695T 0.7213 0 0.0000 05/14/2021 07:28:09 21 22 36
NWTS310  S0471605 327 0147 0 0.0000 0 0.0000 1849T 0.3610 240 0.0001 05/15/2021 09:23:47 21 22 36
NTSISKP  S0046381 35 0023 0 0.0000 0 0.0000 1643T 0.3208 120 0.0000 05/11/2021 19:19:23 21 22 36
jcs     TC1AMSTR S0287250 300 012C 0 0.0000 0 0.0000 1191T 0.2326 0 0.0000 06/01/2021 15:22:46 21 22 36
TD1AMSTR S0286138 337 0151 0 0.0000 0 0.0000 1191T 0.2326 0 0.0000 06/01/2021 16:03:05 21 22 36
VARYDASD S0039657 134 0086 0 0.0000 0 0.0000 890T 0.1739 1344 0.0007 05/01/2021 11:11:11 21 22 36
AUZZU   S0242606 209 00D1 0 0.0000 0 0.0000 605T 0.1181 0 0.0000 05/31/2021 08:44:45 21 22 36
SC1MMSTR S0039725 169 00A9 0 0.0000 0 0.0000 502T 0.0981 0 0.0000 05/14/2021 07:28:09 21 22 36
SC1MDBM1 S0039750 183 00B7 4096 0.1161 0 0.0000 230T 0.0450 0 0.0000 05/14/2021 07:28:09 21 22 36
CAS9    S0039655 116 0074 69432 1.9687 0 0.0000 102T 0.0199 13432 0.0072 05/01/2021 11:07:56 21 22 36
OTMAINIT J0216065 295 0127 0 0.0000 0 0.0000 71728 0.0140 0 0.0000 05/28/2021 21:19:38 21 22 36
IDARL0   S0281629 308 0134 0 0.0000 0 0.0000 66656 0.0130 0 0.0000 05/07/2021 08:49:23 21 22 36
IFZ1IRLM S0276928 266 010A 0 0.0000 0 0.0000 66656 0.0130 0 0.0000 05/07/2021 05:14:36 21 22 36
TC1AIRLM S0287251 220 0110 0 0.0000 0 0.0000 66656 0.0130 0 0.0000 05/01/2021 15:22:48 21 22 36
TD1AIRLM
IFZ1SCI
IDASCIO
IDASCIO
IFZ1SCI
PDSCOT
IFZ1CQS
MA
```

- SDSF **CSR** command (common storage remaining) available since z/OS 2.3
- Displays summary of all known orphaned (aka “Owner Gone”) common storage at the address space level
- z/OS 2.5 introduces the **JCS** action to show detailed information about each block of common storage that was owned by the address space

Orphaned Common Storage Analysis – Details

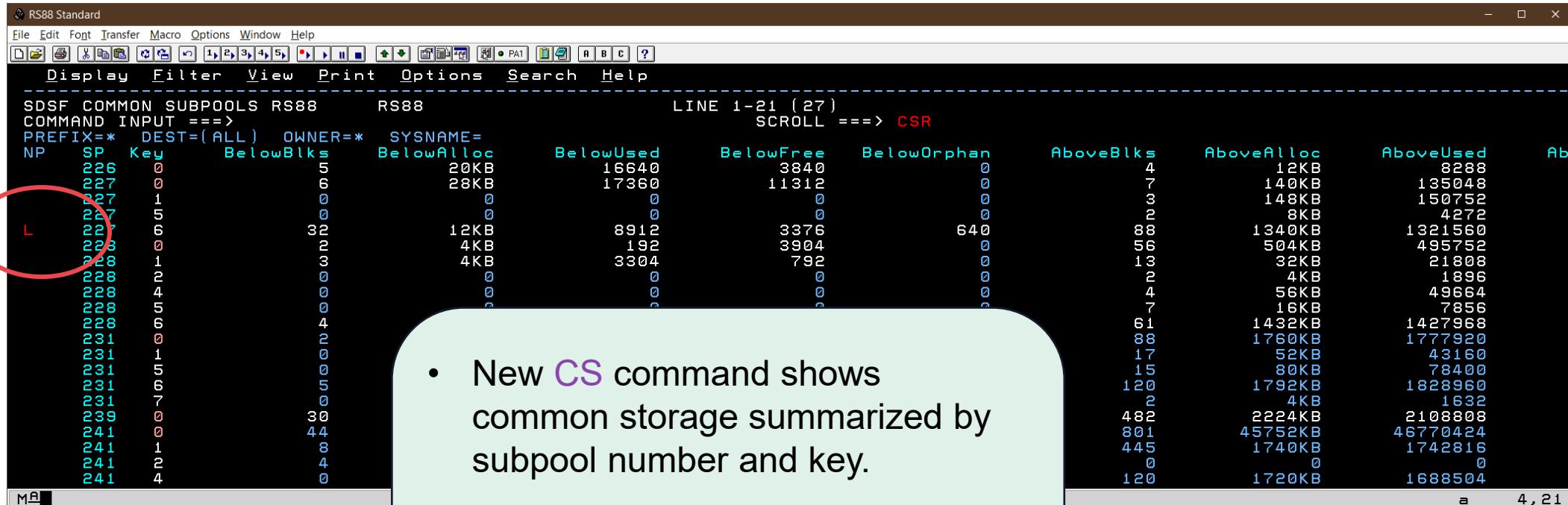


The screenshot shows the SDSF interface displaying the results of the SDSF COMMON STORAGE RS21 command. The output lists various blocks of common storage, each with its address, size, subpool (SP), key, type, owner, job name, job ID, ASID, ASIDX, GQE, CAUB, allocation date, and orphan date. A callout bubble highlights several features of the output:

NP	ADDRESS	Size	SP	Key	Type	Owner	SYSNAME=	JobName	JobID	ASID	ASIDX	GQE	CAUB	AllocDate	OrphanDate
	29863000	20480	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OB745400	OB4D3D78	06/01/2021 15:21:50	06/01/2021 15:22:4
	2986A000	241664	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OB6400A0	OB4D3D78	06/01/2021 15:21:50	06/01/2021 15:22:4
	298A5000	561152	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OB49FD78	OB4D3D78	06/01/2021 15:21:50	06/01/2021 15:22:4
	2AED2000	69632	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OB49FC10	OB4D3D78	06/01/2021 15:21:49	06/01/2021 15:22:4
	2AEE3000	155648	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OB8B1478	OB4D3D78	06/01/2021 15:21:49	06/01/2021 15:22:4
	2B004000	45056	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OC80E580	OB4D3D78	06/01/2021 15:21:49	06/01/2021 15:22:4
	2B1E4000	98304	241	7	CSA-	YES		TC1AMSTR	S0287250	300	012C	OB4FC238	OB4D3D78	06/01/2021 15:21:49	06/01/2021 15:22:4

- Each block of orphaned common storage shown, including size, subpool and key
- Datetime shown when allocated and orphaned
- User can select Address to invoke the MEM display for the memory
- User can point-and-shoot on the GQE or CAUB fields to show the z/OS control blocks that describe this entry

Common Storage Subpools



SDSF COMMON SUBPOOLS RS88 RS88											
COMMAND INPUT ==> LINE 1-21 (27) SCROLL ==> CSR											
PREFIX=*	SP	Key	BelowBlks	BelowAlloc	BelowUsed	BelowFree	BelowOrphan	AboveBlks	AboveAlloc	AboveUsed	Ab
	226	0	5	20KB	16640	3840	0	4	12KB	8288	
	227	0	6	28KB	17360	11312	0	7	140KB	135048	
L	227	1	0	0	0	0	0	3	148KB	150752	
	227	5	0	0	0	0	0	2	8KB	4272	
	227	6	32	12KB	8912	3376	640	88	1340KB	1321560	
	228	0	2	4KB	192	3904	0	56	504KB	495752	
	228	1	3	4KB	3304	792	0	13	32KB	21808	
	228	2	0	0	0	0	0	2	4KB	1896	
	228	4	0	0	0	0	0	4	56KB	49664	
	228	5	0	0	0	0	0	7	16KB	7856	
	228	6	4					61	1432KB	1427968	
	231	0	2					88	1760KB	1777920	
	231	1	0					17	52KB	43160	
	231	5	0					15	80KB	78400	
	231	6	5					120	1792KB	1828960	
	231	7	0					2	4KB	1632	
	239	0	30					482	2224KB	2108808	
	241	0	44					801	45752KB	46770424	
	241	1	8					445	1740KB	1742816	
	241	2	4					0	0	0	
	241	4	0					120	1720KB	1688504	

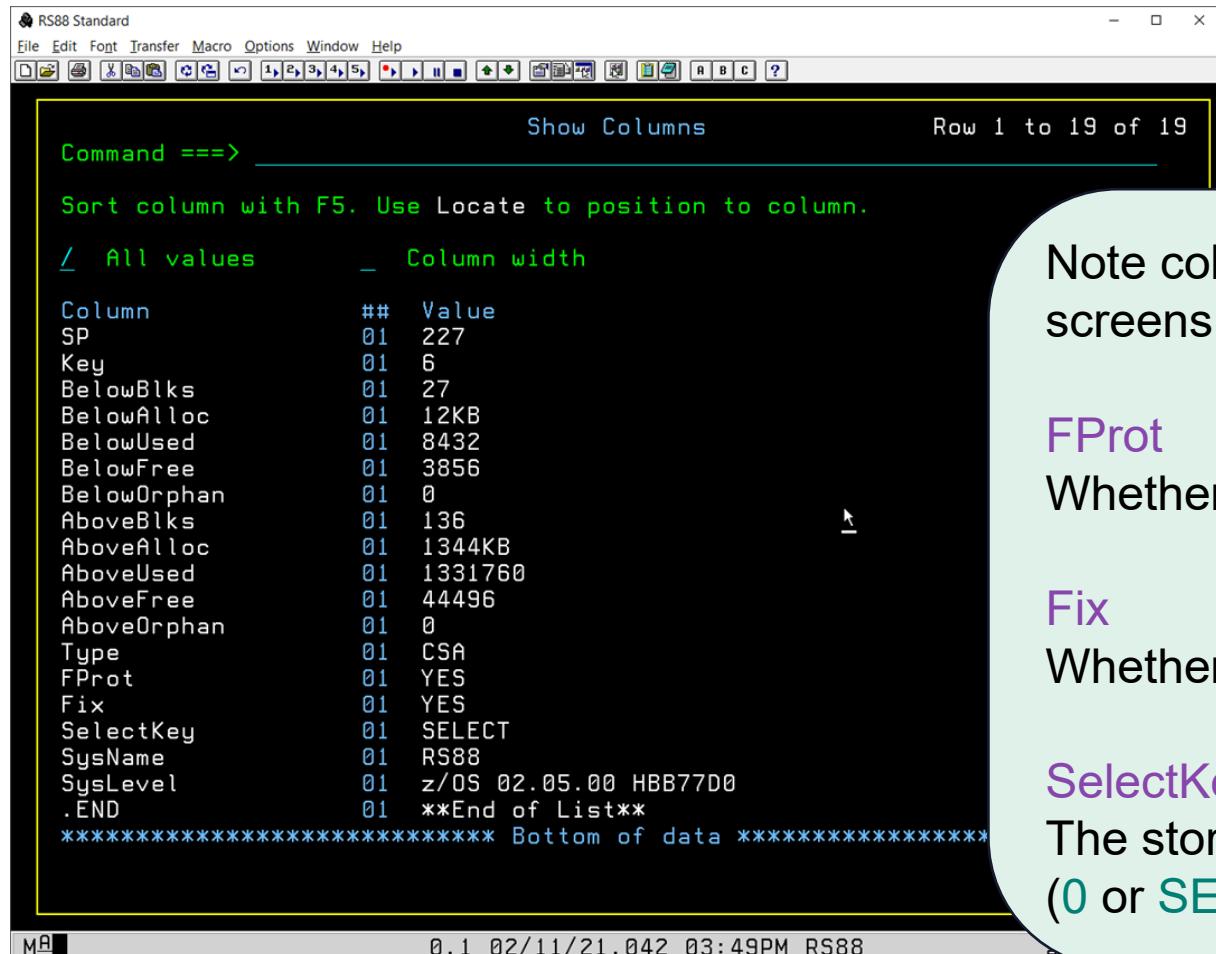
- New **CS** command shows common storage summarized by subpool number and key.
- The **L** action on the row drills down to show every block of storage with the same subpool number and key.

Common Storage Subpools - Details

SDSF COMMON SP227 K06 RS88 LINE 1-56 (168) SCROLL ==> CSR																	
NP	ADDRESS	AddrEnd	Length	Status	SP	Key	BlockAddr	BlockSize	JobName	GQE	Type	Orphan	JobID	ASID	ASIDX	Date	EndDate
	00BE9000	00BE9557	1368	FREE	227	6	00BE9000	4096	VTAM	03758E8	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BE9558	00BE959F	72	ALLOC	227	6	00BE9000	4096	VTAM	03758E8	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BE95A0	00BE9687	280	FREE	227	6	00BE9000	4096	VTAM	03758E8	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BE96B8	00BE96FF	72	ALLOC	227	6	00BE9000	4096	VTAM	01F7CD68	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BE9700	00BE992F	560	FREE	227	6	00BE9000	4096	VTAM	01F7CD68	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BE9930	00BE9FFF	1744	ALLOC	227	6	00BE9000	4096	VTAM	01F7CD68	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BEE000	00BEE047	72	ALLOC	227	6	00BEE000	4096	VTAM	01F7CD68	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BEE048	00BEE057	32	FREE	227	6	00BEE000	4096	VTAM	03758D38	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BEE068	00BEE13F	216	ALLOC	227	6	00BEE000	4096	VTAM	03758D38	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00BEE140	00BEE197	88	FREE	227	6	00BEE000	4096	VTAM	01F5DA68	CSA	NO	STC04562	78	004E		
	00BEE198	00BEE237	160	ALLOC	227	6	00BEE000	4096	TN3270	01F5DA68	CSA	NO	STC04562	78	004E		
	00BEE238	00BEE2CF	152	FREE	227	6	00BEE000	4096	PDSCOT	0378AC8	CSA	NO	TSU06599	122	0076		
	00BEE2D0	00BEE36F	160	ALLOC	227	6	00BEE000	4096	TCPIP	03758A88	CSA	NO	STC04496	80	005		
	00BEE370	00BEE40F	160	ALLOC	227	6	00BEE000	4096	XDCSRVER	01F18658	CSA	NO	STC04569	102	006		
	00BEE410	00BEE44F	160	ALLOC	227	6	00BEE000	4096	TSO	01F55CE8	CSA	NO	STC04492	76	004		
	00BEE480	00BEE54F	160	ALLOC	227	6	00BEE000	4096	VTAM	01F7CC40	CSA	NO	STC04436	35	002		
	00BEE550	00BEE5DF	144	ALLOC	227	6	00BEE000	4096	PDSCOTA	01F187C8	CSA	NO	TSU06718	145	005		
	00BEE5E0	00BEE68F	224	FREE	227	6	00BEE000	4096	VTAM	01F7C880	CSA	NO	STC04436	35	002		
	00BEE6C0	00BEE75F	160	ALLOC	227	6	00BEE000	4096	PDSCOTA	01F187C8	CSA	NO	TSU06718	145	005		
	00BEE760	00BEE83F	224	ALLOC	227	6	00BEE000	4096	VTAM	01F7C880	CSA	NO	STC04436	35	002		
	00BEE840	00BEE89F	384	FREE	227	6	00BEE000	4096	PDSCOTA	01F7C880	CSA	NO	STC04436	35	002		
	00BEE8C0	00BEEA9F	224	ALLOC	227	6	00BEE000	4096	VTAM	01F7C880	CSA	NO	STC04436	35	002		
	00BEEA90	00BEEC1F	384	FREE	227	6	00BEE000	4096	VTAM	01F7C880	CSA	NO	STC04436	35	002		
	00BEEC20	00BEECF7	224	ALLOC	227	6	00BEE000	4096	VTAM	01F7C538	CSA	NO	STC04436	35	002		
	00BEEDE00	00BEEE7F	384	FREE	227	6	00BEE000	4096	VTAM	01F7C880	CSA	NO	STC04436	35	002		
	00BEEF800	00BEEFFF	384	ALLOC	227	6	00BEE000	4096	VTAM	01F7C880	CSA	NO	STC04436	35	002		
	00BEEF900	00BEEFFF	4096	ALLOC	227	6	00BEE000	4096	VTAM	01F87D90	CSA	NO	STC04436	35	002		
	00BEEG600	00BEEG7FF	2048	ALLOC	227	6	00BEE000	4096	VTAM	021217A8	CSA	NO	STC04436	35	002		
	00BEG6000	00BEG6FFF	2048	FREE	227	6	00BEG6000	4096	VTAM	021217A8	CSA	NO	STC04436	35	002		
	00BET7000	00BET77FF	2048	ALLOC	227	6	00BET7000	4096	VTAM	021217B0	CSA	NO	STC04436	35	002		
	00BET7900	00BET7FFF	2048	FREE	227	6	00BET7000	4096	VTAM	021216E8	CSA	NO	STC04436	35	002		
	00BEB8000	00BEB87FF	2048	ALLOC	227	6	00BEB8000	4096	VTAM	021216E8	CSA	NO	STC04436	35	002		
	00BEB8800	00BEB8FFF	2048	FREE	227	6	00BEB8000	4096	VTAM	01F7CD38	CSA	NO	STC04436	35	002		
	00BEB9000	00BEB97FF	2048	ALLOC	227	6	00BEB9000	4096	VTAM	01F7CD38	CSA	NO	STC04436	35	002		
	00BEB9200	00BEB9FFF	2048	FREE	227	6	00BEB9000	4096	VTAM	01F7CD38	CSA	NO	STC04436	35	002		
	00BEBF1FFF	32768	ALLOC	227	6	00BEBF000	32768	VTAM	01F7C948	CSA	NO	STC04436	35	002			
	00BEBF2000	00BEBF9FFF	32768	ALLOC	227	6	00BEBF2000	32768	VTAM	01F7C8E0	CSA	NO	STC04436	35	002		
	00EC18000	00EC185FF	1536	ALLOC	227	6	00EC18000	4096	VTAM	01F7C988	CSA	NO	STC04436	35	002		
	00EC18600	00EC18FFF	2560	FREE	227	6	00EC18000	4096	VTAM	01F7C988	CSA	NO	STC04436	35	002		
	00EC19000	00EC195FF	3840	ALLOC	227	6	00EC19000	28672	VTAM	01F7C988	CSA	NO	STC04436	35	002		
	00EC19E60	00EC1FFF	24992	ALLOC	227	6	00EC19000	28672	VTAM	01F7C988	CSA	NO	STC04436	35	002		
	00EC20000	00EC25FFF	24576	ALLOC	227	6	00EC20000	24576	VTAM	01F7CC58	CSA	NO	STC04436	35	002		
	00EC2S000	00EC267FF	2048	ALLOC	227	6	00EC2S000	4096	VTAM	01F7CC70	CSA	NO	STC04436	35	002		
	00EC2S600	00EC26FFF	2048	FREE	227	6	00EC2S000	4096	VTAM	01F7CC70	CSA	NO	STC04436	35	002		
	00EC2T7000	00EC27FFF	2048	ALLOC	227	6	00EC2T7000	4096	VTAM	01F7CA18	CSA	NO	STC04436	35	002		
	00EC2T8000	00EC28FFF	2048	FREE	227	6	00EC2T7000	4096	VTAM	01F7CB88	CSA	NO	STC04436	35	0023		
	00EC29000	00EC297FF	2048	ALLOC	227	6	00EC29000	4096	VTAM	01F7CA00	CSA	NO	STC04436	35	0023		
	00EC29800	00EC29FFF	2048	FREE	227	6	00EC29000	4096	VTAM	01F7CA00	CSA	NO	STC04436	35	0023		
	00EC31FFF	32768	ALLOC	227	6	00EC32000	32768	VTAM	01F7CB88	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03		
	00EC32000	00EC39FFF	32768	ALLOC	227	6	00EC32000	32768	VTAM	01F7CB88	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00EC32800	00EC41FFF	32768	ALLOC	227	6	00EC32000	32768	VTAM	01F7CB88	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00EC42000	00EC49FFF	32768	ALLOC	227	6	00EC42000	32768	VTAM	01F7CD90	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00EC48000	00EC51FFF	32768	ALLOC	227	6	00EC48000	32768	VTAM	01F7CB20	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	
	00EC52000	00EC52FFF	4096	ALLOC	227	6	00EC52000	4096	VTAM	01F7CB88	CSA	NO	STC04436	35	0023	02/08/2021 04:42:03	

- Every block of common storage for a specific subpool and key combination
- Owning jobname and jobid displayed along with the date and time of when storage obtained

Common Storage Subpools - Columns



The screenshot shows a terminal window titled "RS88 Standard" with the command "Show Columns" entered. The output displays various storage subpool parameters and their values. A callout bubble highlights the "SelectKey" parameter.

```
RS88 Standard
File Edit Font Transfer Macro Options Window Help
>Show Columns Row 1 to 19 of 19
Command ==> Show Columns
Sort column with F5. Use Locate to position to column.

/ All values _ Column width
Column      ## Value
SP          01 227
Key         01 6
BelowBlks   01 27
BelowAlloc   01 12KB
BelowUsed    01 8432
BelowFree    01 3856
BelowOrphan  01 0
AboveBlks   01 136
AboveAlloc   01 1344KB
AboveUsed    01 1331760
AboveFree    01 44496
AboveOrphan  01 0
Type        01 CSA
FProt       01 YES
Fix         01 YES
SelectKey   01 SELECT
SysName     01 RS88
SysLevel    01 z/OS 02.05.00 HBB77D0
.END        01 **End of List**
***** Bottom of data *****

0.1 02/11/21.042 03:49PM RS88
```

Note columns not shown on previous screens :

FProt

Whether fetch protection applies

Fix

Whether the memory is fixed

SelectKey

The storage key selection method used
(0 or SELECT)

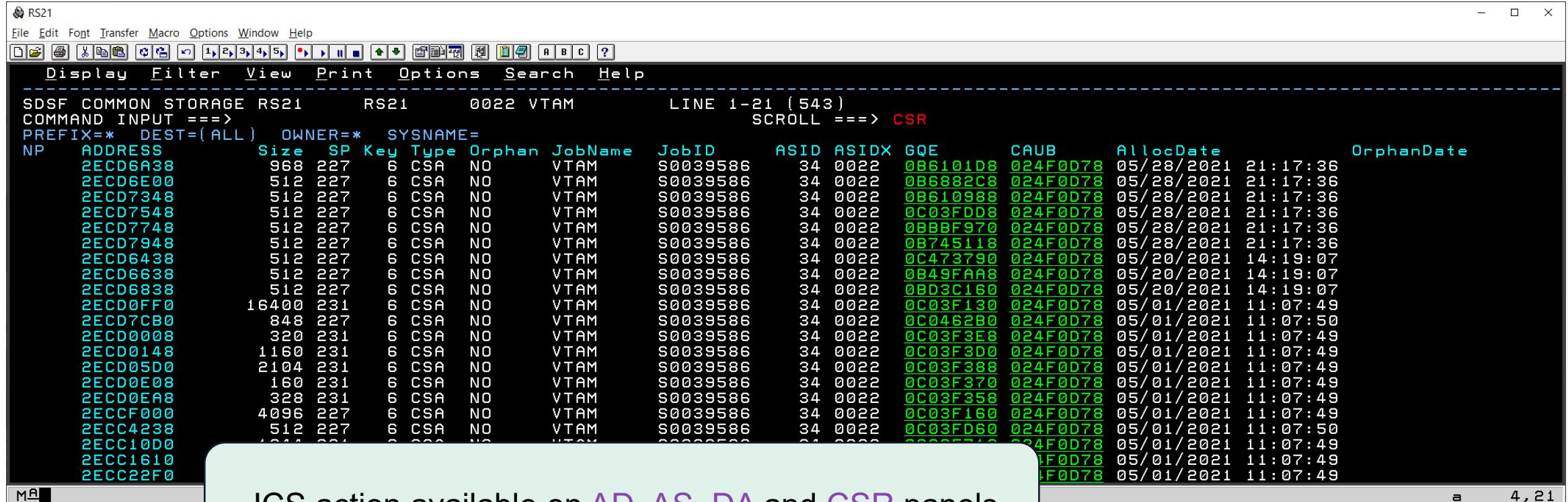
Common Storage By Jobname

The screenshot shows the SDSF interface with the command `AS DISPLAY RS21` entered. The output displays memory usage statistics for various jobs, sorted by jobname. A red circle highlights the row for job `JCS`, which is expanded in a callout box below.

NP	JOBNAME	ASIDX	Real	Fixed	CSA	CSA%	ECSA	ECSA%	SQA	SQA%	ESQA	ESQA%	Aux	MemLimit	MemObjNum	MemObjUse	
	TS5812	0153	155	90	0	0.00	0	0.00	0	0.00	144	0.00	281	20000MB	8	12M	
	TS5815	0097	150	90	0	0.00	0	0.00	0	0.00	144	0.00	306	20000MB	8	12M	
	TS5815	00E9	150	90	0	0.00	0	0.00	0	0.00	144	0.00	308	20000MB	8	12M	
	TS5815	00EF	158	94	0	0.00	0	0.00	0	0.00	144	0.00	311	20000MB	8	12M	
	TS5815	0130	153	91	0	0.00	0	0.00	0	0.00	144	0.00	307	20000MB	8	12M	
	TS58153	0162	371	118	0	0.00	0	0.00	0	0.00	144	0.00	3018	20000MB	13	19M	
	TS58154	00E2	249	118	0	0.00	0	0.00	0	0.00	144	0.00	3130	20000MB	13	19M	
	TS58158	0152	403	123	0	0.00	0	0.00	0	0.00	144	0.00	2999	20000MB	13	19M	
	TS58159	0140	386	121	0	0.00	0	0.00	0	0.00	144	0.00	2997	20000MB	13	19M	
	TS6077	0145	337	116	0	0.00	0	0.00	0	0.00	144	0.00	3020	20000MB	13	19M	
	TS6106	0161	1006	148	160	0.00	3032	0.00	96	0.00	432	0.00	2046	20000MB	17	2750M	
	TS6290	0031	2291	147	160	0.00	2472	0.00	96	0.00	432	0.00	0	20000MB	22	2850M	
	VLF	0021	16236	216	0	0.00	352	0.00	256	0.01	552	0.00	9046	16383PB	3	6M	
	VMCF	006A	237	76	0	0.00	0	0.00	0	0.00	680	0.00	57	16383PB	3	6M	
	JCS	VTAM	0022	6907	175	25832	0.73	4525232	0.88	0	0.00	91720	0.04	487	16383PB	6	4104M
	WLM	000C	3073	264	0	0.00	100968	0.01	0	0.00	832984	0.44	693	16383PB	3	6M	
	WMLENV2	00BA	6463	419	0	0.00	0	0.00	0	0.00	144	0.00	15024	16383PB	201	1512M	
	WMLSCSRV	00CD	239T	1313	0	0.00								383PB	703	17723M	
	WMLSISRV	00CE	188T	1044	0	0.00								383PB	576	17570M	
	XCFAS	0006	16056	8226	0	0.00								83PB	8	11M	
	ZAISRVR	009D	14641	334	0	0.00								00MB	112	639M	

- **AS** command available since z/OS 2.2
- Displays summary of memory usage at the address space level including common storage
- z/OS 2.5 introduces the **JCS** action to show detailed information about each block of common storage that is owned by the address space

Common Storage By Jobname - Details



The screenshot shows a terminal window titled "RS21" displaying the output of the SDSF command "COMMON STORAGE RS21". The output lists storage records with columns for Address, Size, SP, Key, Type, Orphan, JobName, JobID, ASID, ASIDX, GQE, CAUB, AllocDate, and OrphanDate. A callout bubble points to the "JCS action available on AD, AS, DA and CSR panels" message.

NP	ADDRESS	Size	SP	Key	Type	Orphan	JobName	JobID	ASID	ASIDX	GQE	CAUB	AllocDate	OrphanDate
	2ECD6A38	968	227	6	CSA	NO	VTAM	S0039586	34	0022	0B6101D8	024F0D78	05/28/2021	21:17:36
	2ECD6E00	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0B6882C8	024F0D78	05/28/2021	21:17:36
	2ECD7348	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0B610988	024F0D78	05/28/2021	21:17:36
	2ECD7548	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0C03FDD8	024F0D78	05/28/2021	21:17:36
	2ECD7748	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0BBBF970	024F0D78	05/28/2021	21:17:36
	2ECD7948	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0B745118	024F0D78	05/28/2021	21:17:36
	2ECD6438	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0C473790	024F0D78	05/20/2021	14:19:07
	2ECD6638	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0B49FAA8	024F0D78	05/20/2021	14:19:07
	2ECD6838	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0BD3C160	024F0D78	05/20/2021	14:19:07
	2ECD0FF0	16400	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F130	024F0D78	05/01/2021	11:07:49
	2ECD7CB0	848	227	6	CSA	NO	VTAM	S0039586	34	0022	0C0462B0	024F0D78	05/01/2021	11:07:50
	2ECD0008	320	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F3E8	024F0D78	05/01/2021	11:07:49
	2ECD0148	1160	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F3D0	024F0D78	05/01/2021	11:07:49
	2ECD05D0	2104	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F388	024F0D78	05/01/2021	11:07:49
	2ECD0E08	160	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F370	024F0D78	05/01/2021	11:07:49
	2ECD0EA8	328	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F358	024F0D78	05/01/2021	11:07:49
	2ECCF000	4096	227	6	CSA	NO	VTAM	S0039586	34	0022	0C03F160	024F0D78	05/01/2021	11:07:49
	2ECC4238	512	227	6	CSA	NO	VTAM	S0039586	34	0022	0C03FD60	024F0D78	05/01/2021	11:07:50
	2ECC10D0	1611	231	6	CSA	NO	VTAM	S0039586	34	0022	0C03F710	024F0D78	05/01/2021	11:07:49
	2ECC1610	1611	231	6	CSA	NO	VTAM	S0039586	34	0022	0F0D78	024F0D78	05/01/2021	11:07:49
	2ECC22F0	1611	231	6	CSA	NO	VTAM	S0039586	34	0022	0F0D78	024F0D78	05/01/2021	11:07:49

JCS action available on AD, AS, DA and CSR panels

Private Storage Analysis

Private Storage Analysis – All Address Spaces

SDSF AS DISPLAY RS88 RS88																
COMMAND INPUT ==> SCROLL ==> CSR																
PREFIX=*	DEST=(ALL)	OWNER=*	SORT=JOBNAME/A	SYSNAME=												
NP	JOBNAME	ASIDX	Real	Fixed	Priv	Priv%	EPriv	EPriv%	MemLimit	MemObjNum	MemObjUsed	MemObjReal	MemObjHWM	MemLimSrc	Elapsed	Time
	MASTER	001	3860	2643	8M	14.88	1G	0.02	NOLIMIT	2	4MB	256	4MB	REG0		21:16:51
	ALLOCAS	0015	2651	153	8M	0.04	32M	0.43	0	1	3MB	0	3MB			21:31:09
	ANTAS000	000D	1641	194	8M	0.47	1G	0.26	NOLIMIT	13	16MB	41	16MB	REG0		21:31:03
	ANTMAIN	000C	1752	219	8M	0.47	1G	0.28	NOLIMIT	13	16MB	41	17MB	REG0		21:31:08
	APPC	006C	1117	141	8M	2.00	1G	0.82	NOLIMIT	13	16MB	41	16MB	REG0		21:16:30
	ASCH	006D	405	89	8M	0.08	1G	0.00	NOLIMIT	13	16MB	41	16MB	REG0		21:16:30
	AXR	0019	1038	121	8M	0.95	1G	0.12	NOLIMIT	13	16MB	41	32MB	REG0		21:31:05
	AXR02	008B	646	92	8M	0.78	1G	0.06	NOLIMIT	6	9MB	30	17MB	REG0		21:16:25
	AXR03	0089	650	94	8M	0.78	1G	0.06	NOLIMIT	6	9MB	30	17MB	REG0		21:16:25
	AXR04	008A	643	92	8M	0.78	1G	0.05	NOLIMIT	6	9MB	30	17MB	REG0		21:16:25
	BPXOINIT	002B	382	101	8M	0.08	1G	0.01	NOLIMIT	5	8MB	28	8MB	REG0		21:31:02
	CATALOG	0013	1689	503	8M	0.13	1G	0.06	NOLIMIT	10	13MB	437	13MB	REG0		21:31:08
	CEA	001A	3192	116	8M	1.13	1G	0.03	NOLIMIT	5	8MB	29	8MB	REG0		21:31:08
	CONSOLE	000A	2433	148	8M	0.08	1G	0.08	0	1	3MB	0	3MB			21:31:09
	CSF	0075	2788	416	8M	0.17	1G	0.06	NOLIMIT	1	4MB	REG0				21:16:30
	CSSMTP	008F	1468	142	8M	0.73							1B	REG0		21:16:15
	DEVMAN	000E	760	83	8M	11.53							3	REG0		21:31:08
	DUMPSRV	0005	450	139	8M	3.04							3	AUTHPGM		21:31:05
	FTPDL	002C	714	101	4M	1.44							3	SMF		21:16:50
	GRS	0007	2266	146	8M	1.04							3	AUTHPGM		21:31:09
	GTZ	000F	370	93	8M	0.08							3	JCL		21:31:03

- AS command using private storage column layout
- Private region size and usage percentage available since SDSF for z/OS 2.3
- Recent columns added include MemObjReal that shows actual real storage backing 64-bit memory
- SDSF for z/OS 3.1 added MemLimSrc and ElapsedTime columns

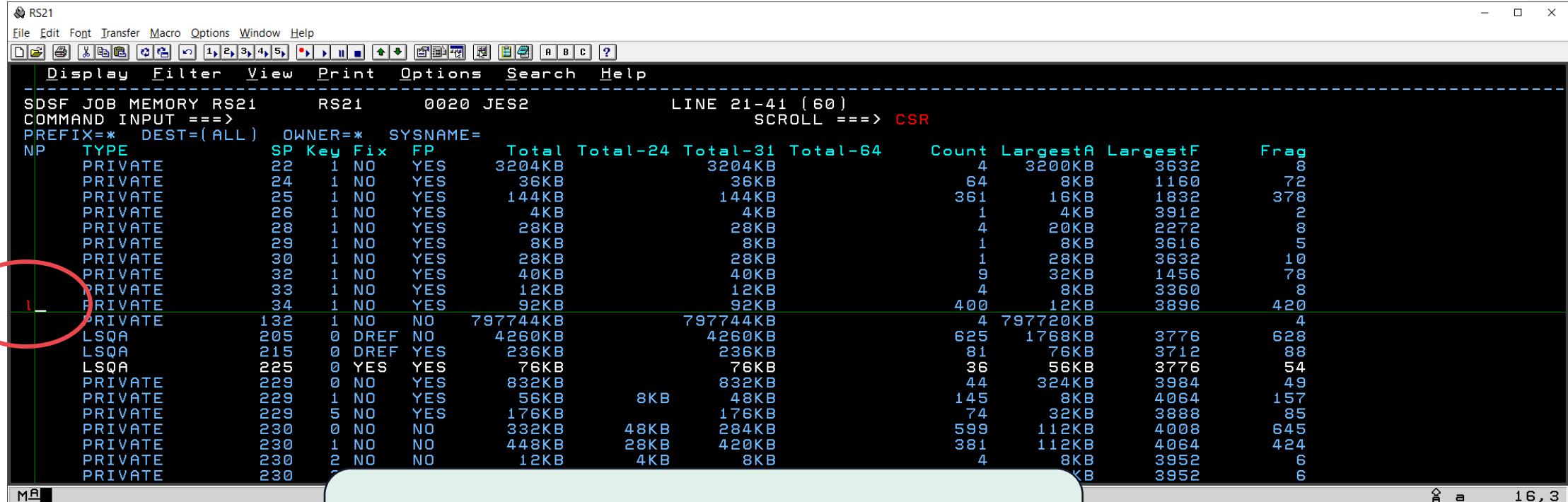
Private Storage Analysis – Single ASID

The screenshot shows the RS21 SDSF AS DISPLAY output. The command entered was `PREFIX=*= DEST=(ALL) OWNER=* SORT=JOBNAME/A SYSNAME=`. The output displays memory usage statistics for various subpools and keys. A red circle highlights the row for 'jm' (Job Management), which corresponds to the information in the callout box below.

NP	JOBNAME	ASIDX	Real	Fixed	CSA	CSA%	ECSA	ECSA%	SQA	SQA%	ESQA	ESQA%	Aux	MemLimit	MemObjNum	MemObjUse
	HTTPD21A	006C	308	83	0	0.00	0	0.00	0	0.00	144	0.00	95	512MB	6	10M
	HTTPD21A	006D	529	114	0	0.00	0	0.00	0	0.00	144	0.00	2922	512MB	11	17M
	HTTPD21A	0095	817	244	0	0.00	0	0.00	0	0.00	144	0.00	3561	512MB	93	99M
	HTTPD21A	00A2	325	108	0	0.00	0	0.00	0	0.00	0	0.00	3046	512MB	11	17M
	HTTPD21A	00AF	328	79	0	0.00	736	0.00	64	0.00	408	0.00	64	512MB	4	7M
	HTTPD21A	0111	454	248	0	0.00	0	0.00	0	0.00	144	0.00	3926	512MB	93	99M
	HWIBCP II	001C	2200	156	0	0.00	736	0.00	0	0.00	648	0.00	1648	16383PB	11	14M
	HZSPROC	0013	5646	201	0	0.00	736	0.00	0	0.00	2344	0.00	552	16383PB	14	8207M
	IEFSCHAS	0015	72	40	0	0.00	0	0.00	0	0.00	808	0.00	20		1	3M
	INETD1	0070	261	92	0	0.00	0	0.00	0	0.00	0	0.00	168	16383PB	8	12M
	IOSAS	0019	2855	657	0	0.00	712704	0.13	64	0.00	59568	0.03	14331	16383PB	17	20M
	IXGLOGR	0018	9228	596	0	0.00	34640	0.00	64	0.00	20848	0.01	2775	16383PB	16	19M
	IZUANG1	0098	283	95	0	0.00	14616	0.00	0	0.00	800	0.00	190	16383PB	6	9M
	IZUSVR1	0099	118T	1575	0	0.00	15744	0.00	0	0.00	504	0.00	17653	6GB	929	2525M
jm	JESXCF	0016	1211	120	0	0.00	350648	0.06	64	0.00	2752	0.00	542	16383PB	11	14M
jm	JES2	0020	25652	1066	14384	0.40	1422648	0.27	64	0.00	8264	0.00	1526	16383PB	25	5097M
	JES2AUX	002E	1087	133	0	0.00	232304	0.04	0	0.00	568	0.00	2696		1	3M
	JES2EDS	0155	219	95	0	0.00	736	0.00	64	0.00	408	0.00	1084	16383PB	5	8M
	JES2MON	002F	312	82	0	0.00	56	0.00	64	0.00	472	0.00	250	16383PB	3	6M
	JMON	00AC	241	104							0.00	448	16383PB	8	11M	
	LLA	001E	4309	199							0.00	7788	16383PB	3	6M	

- JM action to show “Job Memory” available since z/OS 1.12
- Shows summary of private storage usage by subpool and key
- Available from AD, AS and DA panels

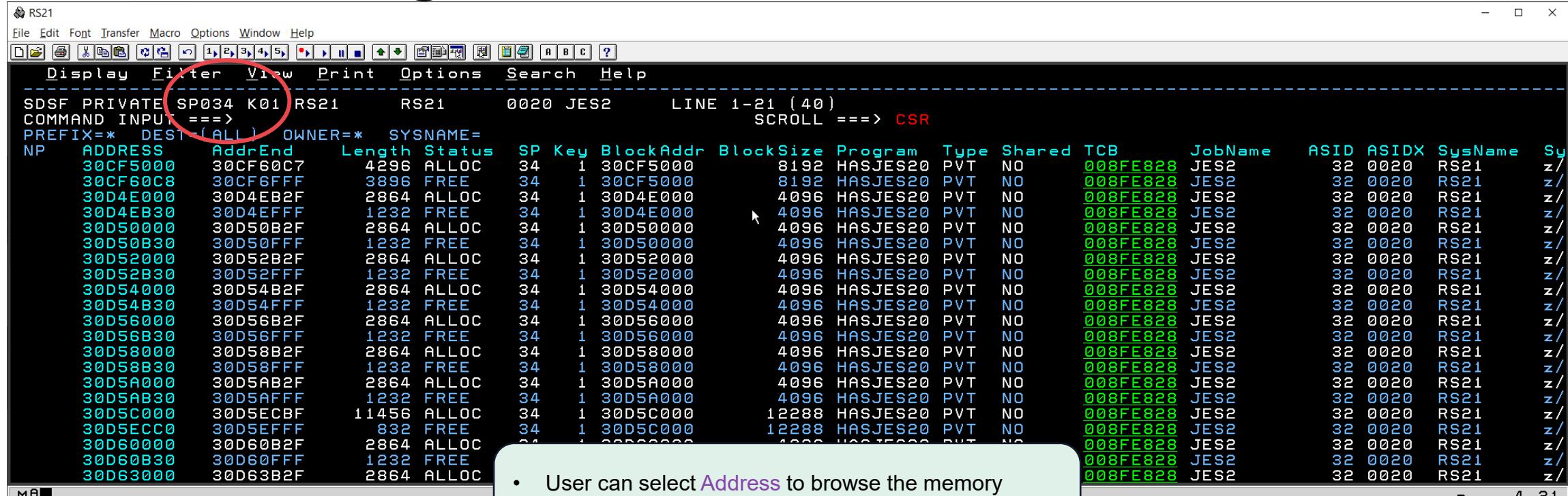
Private Storage Summary



SDSF JOB MEMORY RS21 RS21 0020 JES2 LINE 21-41 (60)																	
COMMAND INPUT ==> SCROLL ==> CSR																	
PREFIX=*	DEST=(ALL)	OWNER=*	SYSNAME=	NP	TYPE	SP	Key	Fix	FP	Total	Total-24	Total-31	Total-64	Count	LargestA	LargestF	Frag
				PRIVATE	22	1	NO	YES	3204KB	3204KB	3204KB	3204KB	4	3200KB	3632	8	
				PRIVATE	24	1	NO	YES	36KB	36KB	36KB	36KB	64	8KB	1160	72	
				PRIVATE	25	1	NO	YES	144KB	144KB	144KB	144KB	361	16KB	1832	378	
				PRIVATE	26	1	NO	YES	4KB	4KB	4KB	4KB	1	4KB	3912	2	
				PRIVATE	28	1	NO	YES	28KB	28KB	28KB	28KB	4	20KB	2272	8	
				PRIVATE	29	1	NO	YES	8KB	8KB	8KB	8KB	1	8KB	3616	5	
				PRIVATE	30	1	NO	YES	28KB	28KB	28KB	28KB	1	28KB	3632	10	
				PRIVATE	32	1	NO	YES	40KB	40KB	40KB	40KB	9	32KB	1456	78	
				PRIVATE	33	1	NO	YES	12KB	12KB	12KB	12KB	4	8KB	3360	8	
				PRIVATE	34	1	NO	YES	92KB	92KB	92KB	92KB	400	12KB	3896	420	
				PRIVATE	132	1	NO	NO	797744KB	797744KB	797744KB	797744KB	4	797720KB		4	
				LSQA	205	0	DREF	NO	4260KB	4260KB	4260KB	4260KB	625	1768KB	3776	628	
				LSQA	215	0	DREF	YES	236KB	236KB	236KB	236KB	81	76KB	3712	88	
				LSQA	225	0	YES	YES	76KB	76KB	76KB	76KB	36	56KB	3776	54	
				PRIVATE	229	0	NO	YES	832KB	832KB	832KB	832KB	44	324KB	3984	49	
				PRIVATE	229	1	NO	YES	56KB	8KB	48KB	48KB	145	8KB	4064	157	
				PRIVATE	229	5	NO	YES	176KB	176KB	176KB	176KB	74	32KB	3888	85	
				PRIVATE	230	0	NO	NO	332KB	48KB	284KB	284KB	599	112KB	4008	645	
				PRIVATE	230	1	NO	NO	448KB	28KB	420KB	420KB	381	112KB	4064	424	
				PRIVATE	230	2	NO	NO	12KB	4KB	8KB	8KB	4	8KB	3952	6	
														KB	3952	6	

- New L action to drill down to show each block of private storage for the subpool and key combination

Private Storage Details

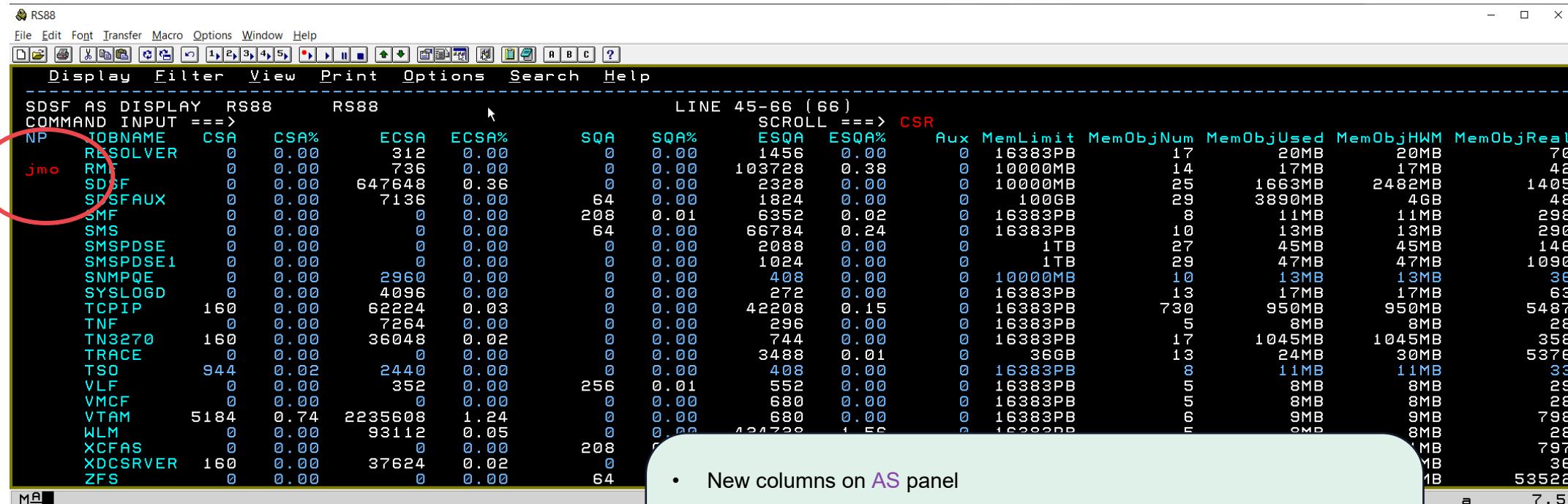


SDSF PRIVATE SP034 K01 RS21		RS21		0020 JES2		LINE 1-21 (40)		SCROLL ==> CSR									
COMMAND INPUT ==>																	
PREFIX=*		DEST=(ALL)		OWNER=*		SYSNAME=											
NP	ADDRESS	AddrEnd	Length	Status	SP	Key	BlockAddr	BlockSize	Program	Type	Shared	TCB	JobName	ASID	ASIDX	SysName	Sy
	30CF5000	30CF60C7	4296	ALLOC	34	1	30CF5000	8192	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30CF60C8	30CF6FFF	3896	FREE	34	1	30CF5000	8192	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D4E000	30D4EB2F	2864	ALLOC	34	1	30D4E000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D4EB30	30D4EFFF	1232	FREE	34	1	30D4E000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D50000	30D50B2F	2864	ALLOC	34	1	30D50000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D50B30	30D50FFF	1232	FREE	34	1	30D50000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D52000	30D52B2F	2864	ALLOC	34	1	30D52000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D52B30	30D52FFF	1232	FREE	34	1	30D52000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D54000	30D54B2F	2864	ALLOC	34	1	30D54000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D54B30	30D54FFF	1232	FREE	34	1	30D54000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D56000	30D56B2F	2864	ALLOC	34	1	30D56000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D56B30	30D56FFF	1232	FREE	34	1	30D56000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D58000	30D58B2F	2864	ALLOC	34	1	30D58000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D58B30	30D58FFF	1232	FREE	34	1	30D58000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D5A000	30D5AB2F	2864	ALLOC	34	1	30D5A000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D5AB30	30D5AFFF	1232	FREE	34	1	30D5A000	4096	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D5C000	30D5ECBF	11456	ALLOC	34	1	30D5C000	12288	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D5ECC0	30D5EFFF	832	FREE	34	1	30D5C000	12288	HASJES20	PVT	NO	008FE828	JES2	32	0020	RS21	z/
	30D60000	30D60B2F	2864	ALLOC								008FE828	JES2	32	0020	RS21	z/
	30D60B30	30D60FFF	1232	FREE								008FE828	JES2	32	0020	RS21	z/
	30D63000	30D63B2F	2864	ALLOC								008FE828	JES2	32	0020	RS21	z/

- User can select Address to browse the memory
- Program name from top RB for the TCB is shown

64-Bit Memory

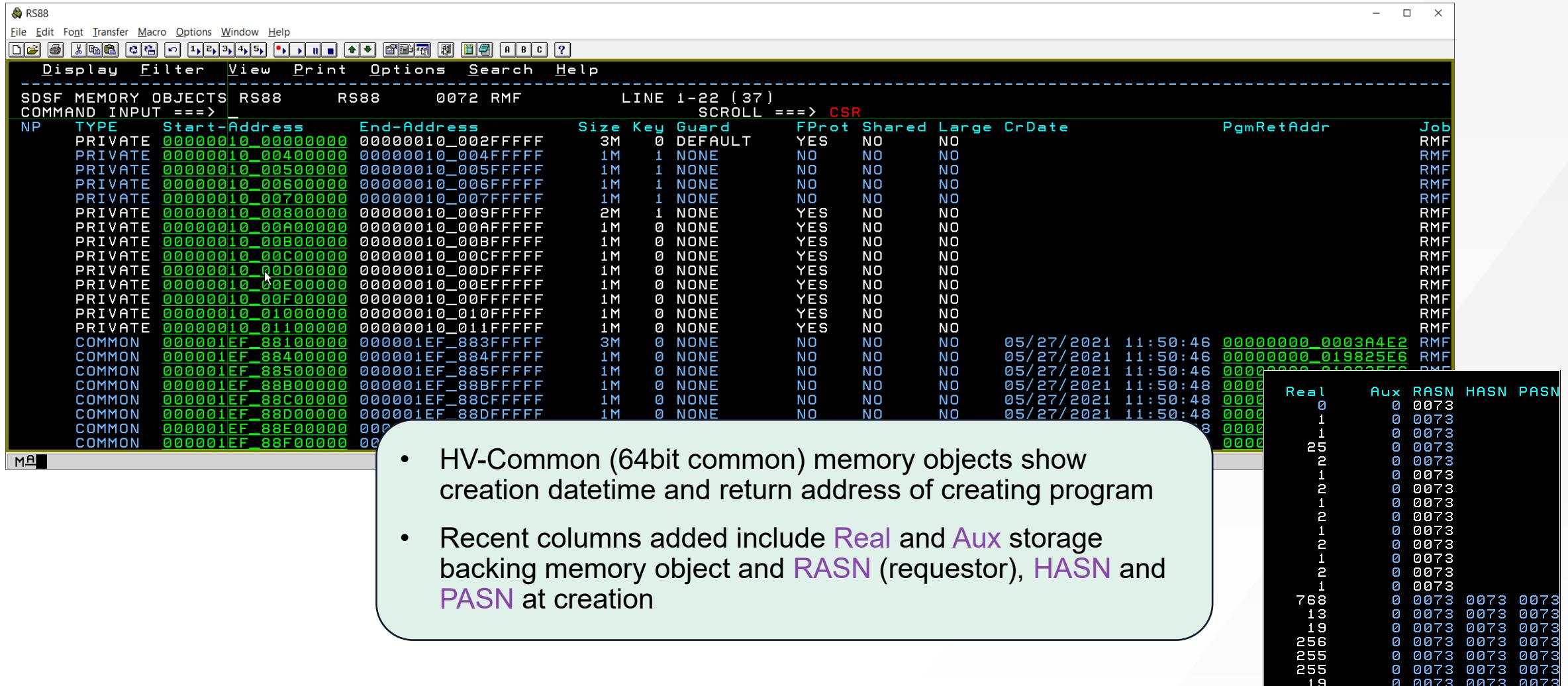
64-bit Memory Objects Summary



LINE 45-66 (66)																		
SCROLL ==> CSR																		
NP	TBNAME	CSA	CSA%	ECSA	ECSA%	SQA	SQA%	ESQA	ESQA%	Aux	MemLimit	MemObjNum	MemObjUsed	MemObjHWM	MemObjReal			
jmo	RESOLVER	0	0.00	312	0.00	0	0.00	1456	0.00	0	16383PB	17	20MB	20MB	70			
	RM	0	0.00	736	0.00	0	0.00	103728	0.38	0	10000MB	14	17MB	17MB	42			
	SDSF	0	0.00	647648	0.36	0	0.00	2328	0.00	0	10000MB	25	1663MB	2482MB	1405			
	SPSFaux	0	0.00	7136	0.00	64	0.00	1824	0.00	0	100GB	29	3890MB	4GB	48			
	SMF	0	0.00	0	0.00	208	0.01	6352	0.02	0	16383PB	8	11MB	11MB	298			
	SMS	0	0.00	0	0.00	64	0.00	66784	0.24	0	16383PB	10	13MB	13MB	290			
	SMSPDSE	0	0.00	0	0.00	0	0.00	2088	0.00	0	1TB	27	45MB	45MB	146			
	SMSPDSE1	0	0.00	0	0.00	0	0.00	1024	0.00	0	1TB	29	47MB	47MB	1090			
	SNMPQE	0	0.00	2960	0.00	0	0.00	408	0.00	0	10000MB	10	13MB	13MB	36			
	SYSLOGD	0	0.00	4096	0.00	0	0.00	272	0.00	0	16383PB	13	17MB	17MB	63			
	TCPIP	160	0.00	62224	0.03	0	0.00	42208	0.15	0	16383PB	730	950MB	950MB	5487			
	TNF	0	0.00	7264	0.00	0	0.00	296	0.00	0	16383PB	5	8MB	8MB	28			
	TN3270	160	0.00	36048	0.02	0	0.00	744	0.00	0	16383PB	17	1045MB	1045MB	358			
	TRACE	0	0.00	0	0.00	0	0.00	3488	0.01	0	36GB	13	24MB	30MB	5376			
	TSO	944	0.02	2440	0.00	0	0.00	408	0.00	0	16383PB	8	11MB	11MB	33			
	VLF	0	0.00	352	0.00	256	0.01	552	0.00	0	16383PB	5	8MB	8MB	29			
	VMCF	0	0.00	0	0.00	0	0.00	680	0.00	0	16383PB	5	8MB	8MB	28			
	VTAM	5184	0.74	2235608	1.24	0	0.00	680	0.00	0	16383PB	6	9MB	9MB	798			
	WLM	0	0.00	93112	0.05	0	0.00	424720	1.50	0	16383PB	8	8MB	8MB	28			
	XCFAS	0	0.00	0	0.00	208	0.00	0	0.00	0	16383PB	1	1MB	1MB	797			
	XDCSRVER	160	0.00	37624	0.02	0	0.00	0	0.00	0	16383PB	1	1MB	1MB	36			
	ZFS	0	0.00	0	0.00	64	0.00	0	0.00	0	16383PB	1	1MB	1MB	53522			

- New columns on AS panel
- MemObjReal shows number of real frames backing 64-bit memory objects
- MemObjAux column for auxiliary storage slots
- JMO action to show “Job Memory Objects” available since z/OS 2.4

64-Bit Memory Objects - Details



The screenshot shows a terminal window titled "RS88" displaying memory object details. The command entered is "SDSF MEMORY OBJECTS RS88 RS88 0072 RMF". The output lists memory objects with the following columns:

NP	TYPE	Start-Address	End-Address	Size	Key	Guard	FProt	Shared	Large	CrDate	PgmRetAddr	Job
	PRIVATE	00000010_00000000	00000010_002FFFFF	3M	0	DEFAULT	YES	NO	NO			RMF
	PRIVATE	00000010_00400000	00000010_004FFFFF	1M	1	NONE	NO	NO	NO			RMF
	PRIVATE	00000010_00500000	00000010_005FFFFF	1M	1	NONE	NO	NO	NO			RMF
	PRIVATE	00000010_00600000	00000010_006FFFFF	1M	1	NONE	NO	NO	NO			RMF
	PRIVATE	00000010_00700000	00000010_007FFFFF	1M	1	NONE	NO	NO	NO			RMF
	PRIVATE	00000010_00800000	00000010_009FFFFF	2M	1	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_00A00000	00000010_00AFFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_00B00000	00000010_00BFFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_00C00000	00000010_00CFFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_00D00000	00000010_00DFFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_00E00000	00000010_00EFFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_00F00000	00000010_00FFFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_01000000	00000010_010FFFFF	1M	0	NONE	YES	NO	NO			RMF
	PRIVATE	00000010_01100000	00000010_011FFFFF	1M	0	NONE	YES	NO	NO			RMF
	COMMON	000001EF_88100000	000001EF_883FFFFF	3M	0	NONE	NO	NO		05/27/2021 11:50:46	00000000_0003A4E2	RMF
	COMMON	000001EF_88400000	000001EF_884FFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:46	00000000_019825E6	RMF
	COMMON	000001EF_88500000	000001EF_885FFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:46	00000000_010025E6	RMF
	COMMON	000001EF_88600000	000001EF_88BFFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:48	00000000_00000000	RMF
	COMMON	000001EF_88C00000	000001EF_88CFFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:48	00000000_00000000	RMF
	COMMON	000001EF_88D00000	000001EF_88DFFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:48	00000000_00000000	RMF
	COMMON	000001EF_88E00000	000001EF_88EFFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:48	00000000_00000000	RMF
	COMMON	000001EF_88F00000	000001EF_88FFFFFF	1M	0	NONE	NO	NO		05/27/2021 11:50:48	00000000_00000000	RMF

A callout box highlights the following points:

- HV-Common (64bit common) memory objects show creation datetime and return address of creating program
- Recent columns added include Real and Aux storage backing memory object and RASN (requestor), HASN and PASN at creation



For more SDSF presentations :

github.com/IBM/IBM-Z-zOS/tree/main/zOS-Education/