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Using System Symbols User Experience

J.O. Skip Robinson
Southern California Edison Co.

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Suggestions for installation defined system symbols

1. Use all eight characters in every name
   a. Cannot substitute more characters than name length
   b. Allow for maximum substitution just in case
2. Prefix every name with your installation identifier
   a. Use SHARE code or other unique character string
   b. Installation symbols will stand out
   c. Installation symbols will group together in D SYMBOLS
3. Establish patterns for analogous names
   a. Easier to recognize names used for each purpose
   b. Easier to create new names in any schema

Examples of System Symbol Use

1. SYSNAME control

2. Disaster Recovery (DR) scenarios

3. CTC device management

   (Included in handout but not discussed in detail)

Generic Enterprise Configuration

CEC	LPAR		
C1	L1	L2	L3
C2	L1	L2	L3
C3	L1	L2	L3

CEC/LPAR	Sys Name	SYSPLEX
C1/L1	E1	E
C1/L2	F1	F
C1/L3	G1	G (monoplex)
C2/L1	E2	E
C2/L2	F2	F
C2/L3	F4	F
C3/L1	E3	E
C3/L2	H1	H (monoplex)
C3/L3	F3	F

Determining SYSNAME based on CEC/LPAR

- Our requirement
  - Each LPAR on each CEC hosts a specific SYSNAME
  - SYSNAME should always be the same for a CEC/LPAR
  - Workload is managed by SYSNAME/SYSCLONE
- Problems with roving systems
  - Not all LPARs are created equal
    - Heftier/busier systems need more CPU/memory
    - CPUs can be shared but memory is a finite resource
    - CEC/LPAR size needs to match system workload
  - Some software is licensed only on certain CEC(s)
    - On the wrong CEC, ISV license key will not work
- Solution: derive SYSNAME from CEC/LPAR at IPL

Deriving SYSNAME in IEASYMxx

Example for Sysplex 'F' (F1, F2, F3, F4)

```
SYSDEF
  SYSNAME(86)                /* Actual SYSNAME MUST BE SET LATER */

SYSDEF HWNAME(C1) LPARNAME(L2) /* FOR THIS CEC/LPAR */
  SYSNAME(F1)                /* USE THIS SYSNAME */

SYSDEF HWNAME(C2) LPARNAME(L2) /* FOR THIS CEC/LPAR */
  SYSNAME(F2)                /* USE THIS SYSNAME */

SYSDEF HWNAME(C3) LPARNAME(L3) /* FOR THIS CEC/LPAR */
  SYSNAME(F3)                /* USE THIS SYSNAME */

SYSDEF HWNAME(C2) LPARNAME(L3) /* FOR THIS CEC/LPAR */
  SYSNAME(F4)                /* USE THIS SYSNAME */

SYSDEF SYSCLONE(&SYSNAME(-2:2))  /* DERIVE SYSCLONE FROM SYSNAME */
```

Determining SYSNAME

- IPL takes place on a specific CEC in a specific LPAR
  - Each HMC icon is associated with a specific combination
  - Operator initiates IPL according to ICON selected
- During IPL, IEASYMxx is processed in sequence
- When CEC/LPAR matches, SYSNAME is set
- If no CEC/LPAR matches, SYSNAME remains as ‘86’
  - &SYSCLONE is also set to ‘86’
- &SYSCLONE is used to name system data sets
- LOGREC86, PAGE86, etc. do not exist
- IPL fails rather than run SYSNAME in wrong CEC/LPAR

Managing Disaster Recovery Scenarios

- Normal system operations require many ‘values’
  - JES (devices for example)
  - VTAM (APPLs for example)
  - Tape management (volser ranges for example)
- DR operations require different ‘values’
  - Different CEC/LPAR
  - Different accessible devices
  - Different notion of local vs. remote
- Problem: how to set appropriate ‘values’ automatically?
- Solution: use system symbols to establish environment
- AutoOps is guided by system symbol settings

Three Modes or Phases in Disaster Recovery

1. Basic recovery phase (DR)
   a. Requires manual recovery for many components
   b. E.g. log streams, CICS, DB2, MQ
   c. AutoOps starts up only basic z/OS and network functions
2. Network test mode (DN)
   a. Basic recovery phase previously completed
   b. AutoOps starts up limited system functions
   c. DR environment exactly mimics production
   d. Great care required not to allow ‘accidental production’
3. Full production in DR environment (DP)
   a. Used for all production IPLs after basic recovery is complete
   b. AutoOps starts up all system functions tailored for DR
   c. DR environment now is production

System Symbols to Control DR - 1

- &insPLXID is the first character of SYSNAME
- Normal Operation mode IPLs with [LOAD]00 on HMC
  - Contains line: IEASYM (01,02,03,L)
  - These members set symbols with normal values
  - SYMDEF(&insPLXDR='&insPLXID')
  - SYMDEF(&insTYPDR='&insPLXID')
- DR Recovery Mode IPLs with [LOAD]DR on HMC
  - Contains line: IEASYM (R1,R2,DR,L)
  - These members set symbols with DR environment values
  - SYMDEF(&insPLXDR='R') /* INDICATES DR MODE */
  - SYMDEF(&insTYPDR='R') /* RECOVERY PHASE */

System Symbols to Control DR - 2

- DR Network Test mode IPLs with [LOAD]DN on HMC
  - Contains: IEASYM (R1,R2,DN,L)
  - These members set symbols with DR network test values
  - SYMDEF(&insPLXDR='R') /* INDICATES DR MODE */
  - SYMDEF(&insTYPDR='N') /* NETWORK TEST MODE */
- DR Production Mode IPLs with [LOAD]DP on HMC
  - Contains: IEASYM (R1,R2,DP,L)
  - These members set symbols with DR production values
  - SYMDEF(&insPLXDR='R') /* INDICATES DR MODE */
  - SYMDEF(&insTYPDR='P') /* DR PRODUCTION MODE */

AutoOps Starts Tasks Based on System Symbols as Determined by LOAD Parm

- **HSM**
  - //HSM PROC CMD=&SYSCLONE
  - // PARM=('CMD=&CMD')
  - Normal/DR ops: S HSM → S HSM,CMD=DR
- **TCP/IP**
  - //TCPIP PROC TYPE=''
  - //PROFILE DD DSN=dsn(PROF&SYSCLONE&TYPE)
  - Normal/DR ops: S TCPIP → S TCPIP,TYPE=DR
- **VTAM**
  - Normal ops: S VTAM,,,(LIST=0A)
  - DR ops: S VTAM,,,(LIST=F0)

Questions?

Setting CTC Addresses by CEC/LPAR

- Problem: CTC addresses can be a quagmire to manage
  - Every LPAR should be able talk to every other LPAR…
  - …on the same CEC
  - …on another CEC on the same floor
  - …on a CEC in a different data center via ‘extender’
- Solution
  1. Define a schema for CTC device addresses by CEC/LPAR
  2. Use system symbols to define connections
- Connect appropriate CTC addresses in IODF
- CTCs in all LPARs on all CECs connect to each other

CTC Device Address Schema: xyyz

CEC	LPAR		
C1	L1	L2	L3
C2	L1	L2	L3
C3	L1	L2	L3

x: e.g. 4 or 5 (for XCF PATHIN/PATHOUT)
z: e.g. 0 - 3 by exploiter, e.g. 0=XCF, 1=VTAM, ...
yy: uniquely assigned by CEC/LPAR (see below)

CEC-LPAR	Sys Name	Plex ID	'To' CTC Device
C1/L1	E1	E	x11z
C1/L2	F1	F	x12z
C1/L3	G1	G (monoplex)	x13z
C2/L1	E2	E	x21z
C2/L2	F2	F	x22z
C2/L3	F4	F	x23z
C3/L1	E3	E	x31z
C3/L2	H1	H (monoplex)	x32z
C3/L3	F3	F	x33z

Note: xyyz used by *anyone* talking *to* that image

Setting System Symbols for CTC devices

IEASYMxx for symbols &insC$Sxx on *all* systems

ins - 2 or 3 character installation prefix
C - 'CTC device marker'
$S - 'system name marker'
xx - system identifier or SYSCLONE

```
SYMDEF(&insC$SE1='11')
SYMDEF(&insC$SF1='12')
SYMDEF(&insC$SG1='13')
SYMDEF(&insC$SE2='21')
SYMDEF(&insC$SF2='22')
SYMDEF(&insC$SF4='23')
SYMDEF(&insC$SE3='31')
SYMDEF(&insC$SH1='32')
SYMDEF(&insC$SF3='33')
```

COUPLExx Pathing for Sysplex 'E'

- PATHIN DEVICE(4&insC$SE1.0) --> 4110
- PATHIN DEVICE(4&insC$SE2.0) --> 4120
- PATHIN DEVICE(4&insC$SE3.0) --> 4130

- PATHOUT DEVICE(5&insC$SE1.0) --> 5110
- PATHOUT DEVICE(5&insC$SE2.0) --> 5120
- PATHOUT DEVICE(5&insC$SE3.0) --> 5130

CTC Device Addresses within a Sysplex

- A CTC cannot talk to itself
- Going from CTC-addr to same CTC-addr gets XCF error
  - IXC355I DEVICE (LOCAL/REMOTE): xyyz/????
  - '????' indicates that device is unreachable or unsuable
- Could limit each system's definitions to only 'valid' addrs
  - Requires either separate COUPLExx for each system…
  - Or more elaborate management of system symbols
- Or just tolerate the error message
  - Treat it as informational noise
  - But don't ignore real error conditions!