The z/Approach for Setting Up a z/OS Operating Environment

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Introduction

- This presentation discusses a process for implementing z/OS into several Operating Environments
- The Target Operating Systems are z/OS 1.4 and above

Reasons

- Create an Environment to Implement System Software and Products in a timely manner (potentially eliminating a need for IPL windows)
- Create an Environment to Implement System Software and Products using a Systems Management Approach (Roll-out/Delivery Process)
- Create an Environment that facilitates Exercising D/R Processes

Reasons

- Create an Environment to support High Availability and Continuous Availability (24x7x365 and Automatic System Failure Recovery)
- Create an Environment to support Increased Data Sharing and Maximize Coupling Facility Resources
- Create an Environment to Simplify Operations and Client Usability

What is z/OS

- It is a concept in large system Mainframe Software Integration that increases System Engineering Productivity through the unique packaging of the Operating System Environment and all of its supporting components
- It provides new arenas to the mainframe environment by supporting an Open System Platform using the UNIX Systems Server, Component Broker, and Websphere MQ. And Websphere Application Servers

What is the z/Approach?

- Based on the z/OS ServerPack and Recommended Service Upgrades (RSU), it is a Systems Managed process for defining and installing the Operating System Environment
- It is a methodology for rolling out a certifiable Operating System Environment in a timely and orderly manner to all System Images on all Sysplexes

Problems

- In past recent years, consistent Operating System Product Support and related Component Maintenance were not always performed in a timely manner
- Different versions of Support Software were supported and maintained on an irregular schedule
- In many instances, “fixes” were applied to support Hardware Upgrades and/or Client Demands

Opportunity

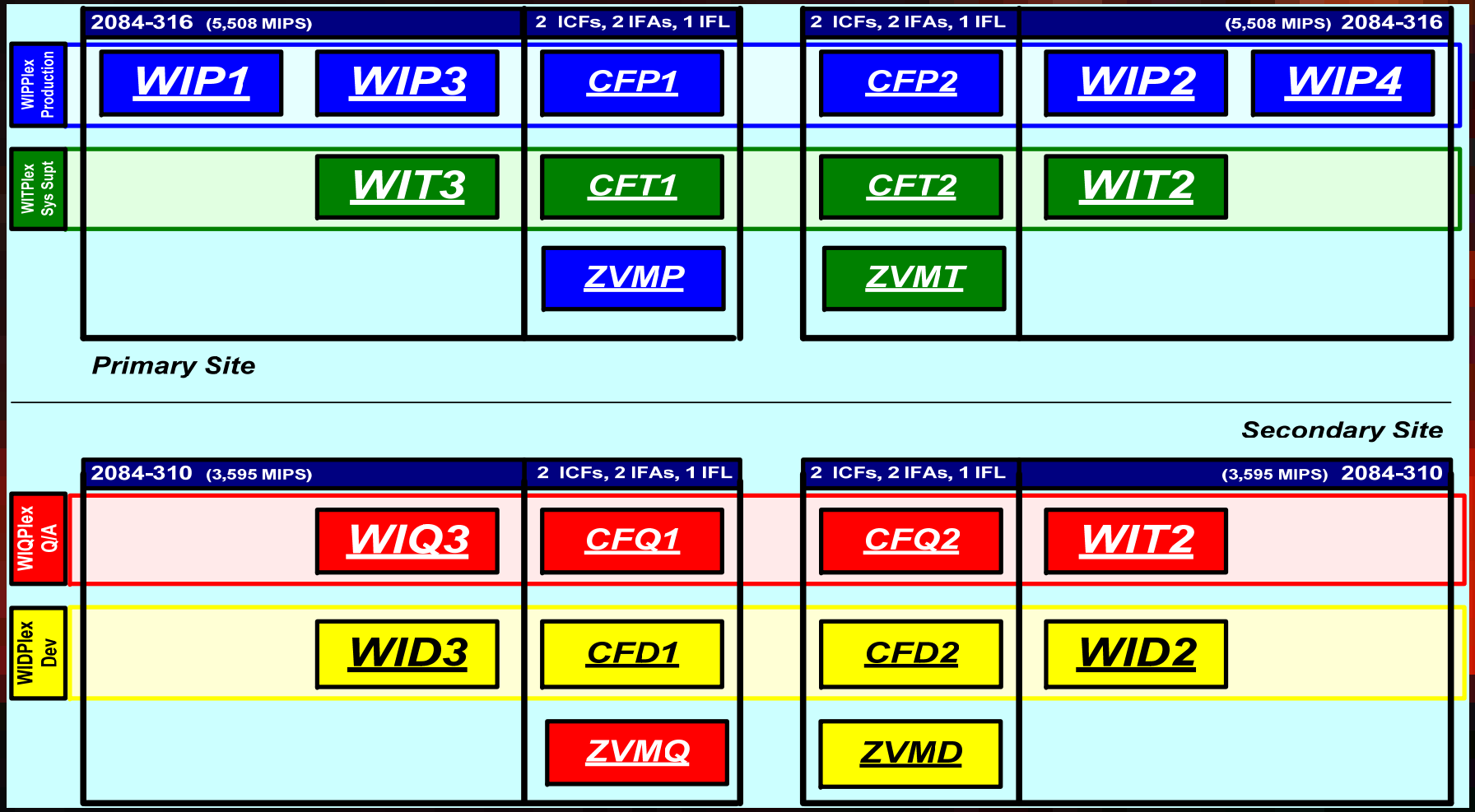
- The z/OS Operating System Environment provides a solid foundation of completely integrated and tested Operating System Components and Subsystems
- The z/Approach provides an Operational Environment that increases Staff Productivity while reducing the amount of Time needed to support that Environment

LPAR Configuration

Strategy: **Sysplex and LPAR Names are defined to provide unique identification within the Data Centers, and for those outside connections into the organization**

- ***WIPPLEX***: **The Production SysPlex, comprised of 4 Images (WIP1, WIP2, WIP3, WIP4)**
- ***WIQPLEX***: **The Q/A SysPlex comprised of 2 Images (WIQ2, WIQ3)**
- ***WIDDPLEX***: **The Development SysPlex comprised of 2 Images (WID2, WID3)**
- ***WITPLEX***: **The Support SysPlex comprised of 2 Images (WIT2, WIT3)**

Welcome to Wizard Industries



z/OS Symbols

Strategy: Define Symbols to Facilitate Maintenance Process and Operational Identification

PROCLIBs	all members and JCL are identical (not version or location dependent- NET, TCPIP, FTP, etc.)
PARMLIBs	all members and PARMs are identical (VTAMLST, JES2PARM, etc.)
STEPLIBs	all DSNs are identical and use Symbolic (SYS2.&SUBPLEX.LOADLIB)

z/OS Symbols

```
SYS2.AAPPLEX.PARMLIB(IEASYMAP)

SYSDEF                                  /* GLOBAL DEFS */
          SYMDEF(&SYSENV.='P')          /* SYSTEM ENVIRONMENT */
          SYMDEF(&PLEXID.='AP')         /* SHORT SYSPLEXID */

SYSDEF    LPARNAME(AAP1)
          SYSNAME(AAP1)
          SYMDEF(&SUBPLEX.='&SYSNAME(1:3)')
          SYMDEF(&SUBAREA.='01')
          SYMDEF(&LPARNUM.='01')
          SYMDEF(&LPARID.='1')
          SYMDEF(&JESNODE.=11')

SYSDEF    LPARNAME(AAP3)
          SYSNAME(AAP3)
          SYMDEF(&SUBPLEX.='&SYSNAME(1:3)')
          SYMDEF(&SUBAREA.='03')
          SYMDEF(&LPARNUM.='03')
          SYMDEF(&LPARID.='3')
          SYMDEF(&JESNODE.=31')
```

LOAD Parms

SYS0.IPLPARM(LOADWP)

```
IODF          A1  SYS0       WIP1    WP  Y
NUCLEUS       1
NUCLST        WP
PARMLIB       SYS0.SHARED.PARMLIB
PARMLIB       SYS2.WIPPLEX.PARMLIB                                  *MCAT*
SSYCAT        PMCAT1123CATALOG.WIPPLEX.MASTER.PRIMARY SYS2
SYSPLEX       WIPPLEX

HWNAME        PROCA
LPARNAME      WIP1
IEASYM        (WP,P1,L)
SYSPARM       (WP,P1,L)

LPARNAME      WIP3
IEASYM        (WP,P3,L)
SYSPARM       (WP,P3,L)

HWNAME        PROCB
LPARNAME      WIP2
IEASYM        (WP,P2,L)
SYSPARM       (WP,P2,L)

LPARNAME      WIP4
IEASYM        (WP,P4,L)
SYSPARM       (WP,P4,L)
```

IPL Parms

SYS2.WIPPLEX.PARMLIB(IEASYSWP)

```
CLOCK=WP,
CON=(WP,NOJES3),
COUPLE=WP,
DEVSUP=WP,
DIAG=WP,
LOGREC=SYS2.&SYSNAME..LOGREC,
MSTRJCL=WP,
PAGE=(SYS2.&SYSNAME..PAGELPAA,
        SYS2.&SYSNAME..PAGECSAA,
        SYS2.&SYSNAME..PAGELCLA,
        SYS2.&SYSNAME..PAGELCLB,
        SYS2.&SYSNAME..PAGELCLC,
        SYS2.&SYSNAME..PAGELCLD,
        SYS2.&SYSNAME..PAGELCLE,
        SYS2.&SYSNAME..PAGELCLF,
        SYS2.&SYSNAME..PAGELCLG,
        SYS2.&SYSNAME..PAGELCLH,
        SYS2.&SYSNAME..PAGELCLI,
        SYS2.&SYSNAME..PAGELCLJ,L),
PROD=WP,
PROG=(WP,&SYSNAME),
VIODSN=SYS2.&SYSNAME..STGINDEX
```

SYS2.WIPPLEXX.PARMLIB(IEASYSP1)

```
CMD=(WP,P1),
CSA=(1600,64M),
LOGCLS=9,
SQA=(6,128M)
```

Data Set Naming Conventions

- **Strategy:** Define a Naming Convention that allows easy association of System Data

- **Run-time Data Sets**
  hlq.vendor.product.sysplex.description
- **Installation Data Sets**
  hlq.vendor.product.version.description

HLQ Naming Conventions

- **Strategy: Version Numbers do NOT exist in Production, SysPlex affiliation is provided, System Image affiliation is provided, Online Region affiliation is provided, Test designation is provided**

- ***SMPE*** **z/OS Installation Data Sets, SMP/E Data Sets, ServerPack Libraries (Access is very limited)**

HLQ Naming Conventions

- *SYS0* SysPlex-wide Shared Data Sets (IODFs, PARMLibs, Control Files, etc.) (Access is very limited)
- *SYS1* Sysplex-wide Non-Shared Data Sets as provided by z/OS Install Process and RSU (Access is limited to R/O)
- *SYS2* Sysplex-wide Shared Data Sets for Authorized and LinkListed Libraries (Access is limited to Execute-only)

HLQ Naming Conventions

- ***SYS3*** **Sysplex-wide Shared Data Sets for Non-Authorized Product and Customized Libraries**

  (Access is limited to R/O)

- ***SYS4*** **Sysplex-wide Shared Data Sets for Local Data Sets and Customized Libraries**

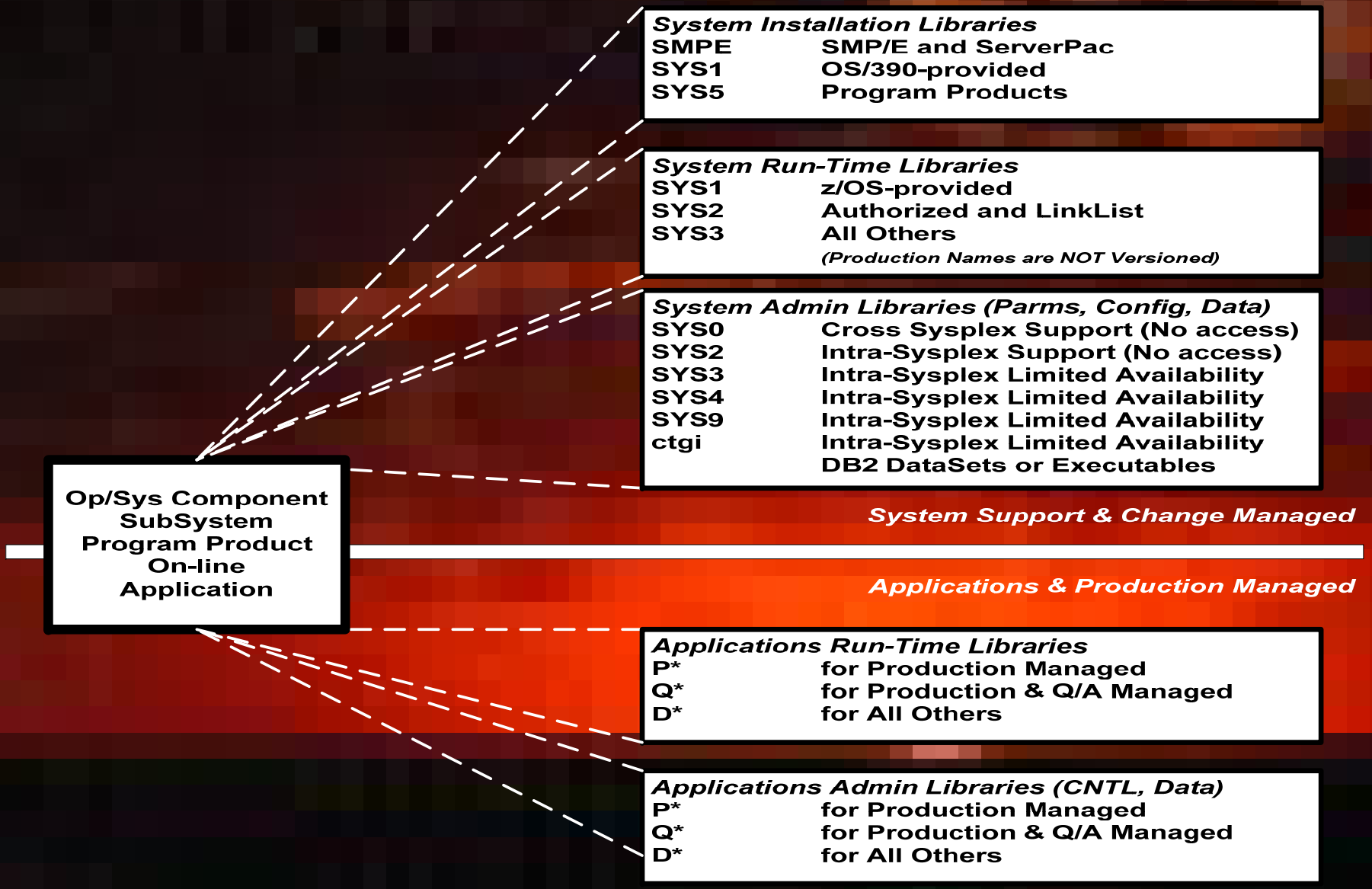
  (Access is limited to R/O with specific Alter authority for some Data Center Staff)

HLQ Naming Conventions

- ***SYS5*** **Sysplex-wide Shared Data Sets for non-SMP/E Product Installation Libraries**
  (Access is very limited)

- ***SYS9*** **Sysplex-wide Shared Data Sets that do NOT require any Backup Processes (Journals, Logs, Dumps, Temporary Data Sets)**
  (Access is very limited, with specific R/O access for Data Center Staff)

Implementation Levels

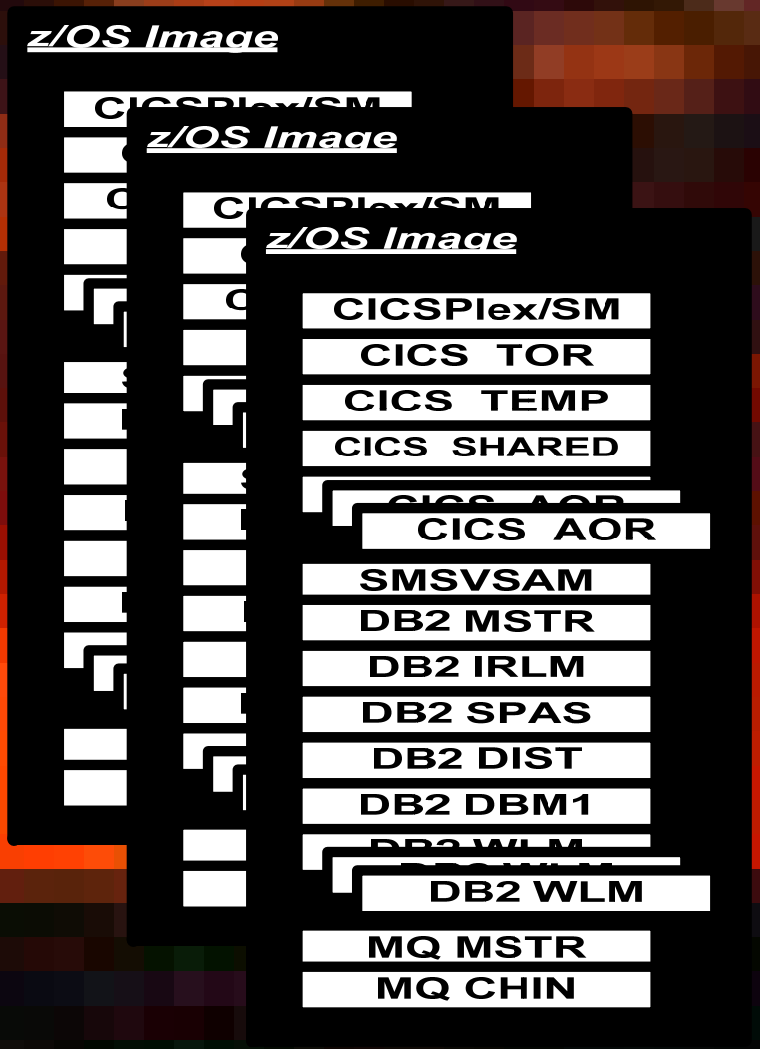


Online Regions

- Define Foundation for High Availability and Continuous Availability
- Define Foundation for Parallel Sysplex Data Sharing
- Create easy Identification of Online Components
- Create Unique Names within and across the SysPlexes
- Create Unique Names to Take Advantage of OS/390 Symbolics
- Incorporate *CTGI* method of Naming Conventions to correspond to SYSIDNT in CICS and SSN in DB2

Online Regions

- CICSPlex/SM
- Terminal Owning Regions
- Temp Storage Server
- CF Shared Data Region
- Application Owning Regions
- SMSVSAM
- DB2 Master
- DB2 Lock Manager
- DB2 Stored Procedures
- Distributed DB2
- DB2 APPL Env
- MQ Master
- MQ Applications



Online Regions CTGI Method

- C — Collection of Regions within the same SysPlex (P,Q,D,T)
- T — Type of Region or SubSystem (C for CICS, D for DB2, M for MQ)
- G — Group Association of Regions that are related to each other (Application A, Application B)
- I — Iteration Indicator or LPAR Allegiance

Online Regions Naming Convention

C T G I x x x x

- CPSM
- TOR1, TOR2
- TMP1, TMP2
- SHR1
- AOR1, AOR2
- MSTR
- IRLM
- SPAS
- DIST
- DBM1
- WLM
- CHIN

Online Regions

Region	*SYSIDNT*
PCA1CPSM	A1M1
PCA1TOR1	A1T1
PCA1AOR1	A1A1
PCA1AOR2	A1A2
PCA1SHR1	A1C1
PCA1TMP1	A1S1
EYUCASP1	

Region	*SSID/GrpID*
PDA1MSTR	PDA1/PDAG
PDA1IRLM	
PDA1SPAS	
PDA1DIST	
PDA1DBM1	
PDAGWLM	

APPLID is comprised of a Descriptive Literal (CICS) or a VTAM SubArea (A01) PLUS SYSIDNT.

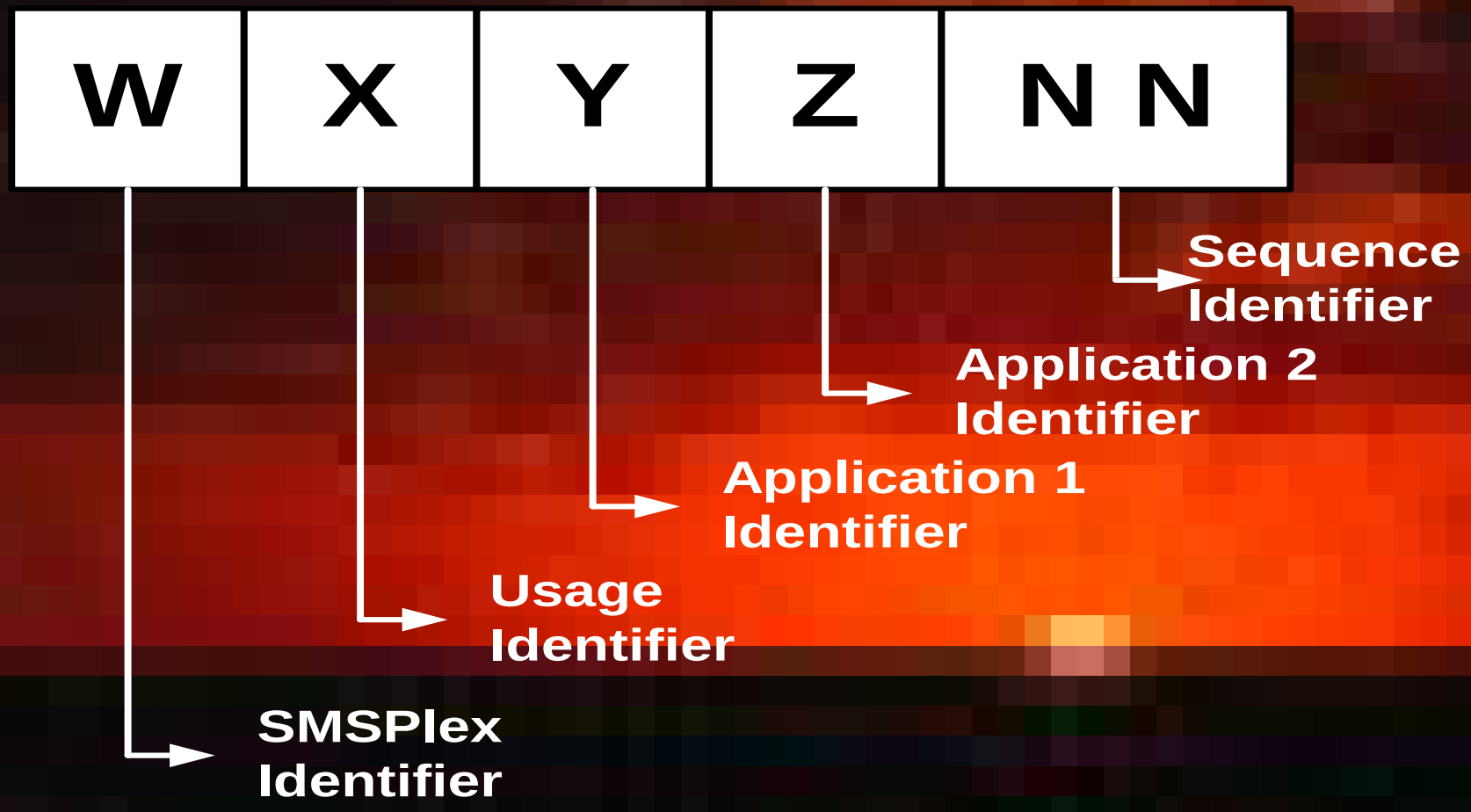
Example: CICSA1M1 or A01A1T1)

DASD Volume Naming Conventions

- Strategy: Define a Naming Convention that allows easy association of System Volumes

- Only a Small Number of Volumes are shared across the Sysplexes
- High Percentage (80-85%) of Volumes are SMS-managed

DASD Volume Naming Conventions



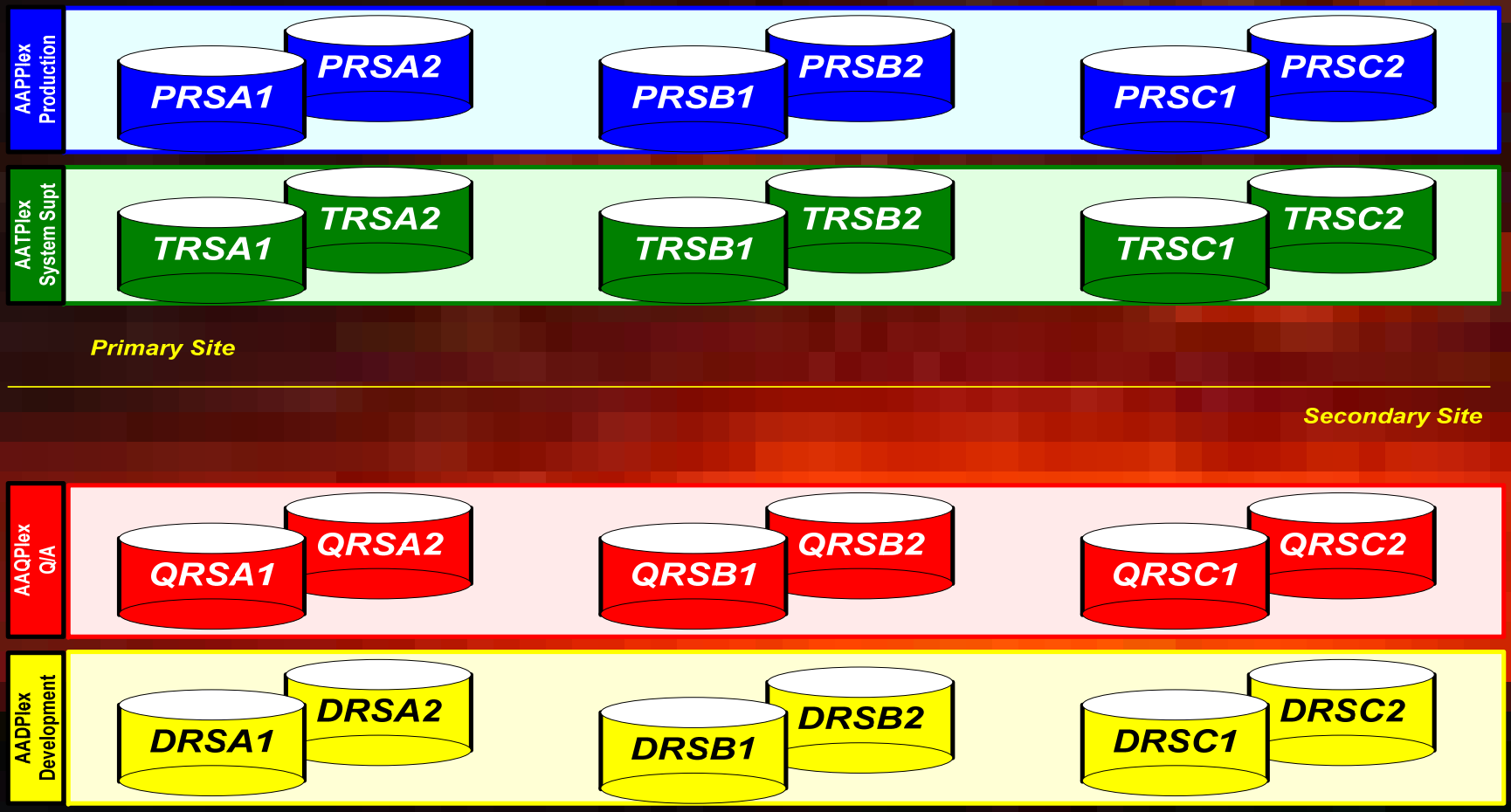
DASD Volume Naming Conventions

- SMSPlex Identifier
  - P WIP1, WIP2, WIP3, WIP4
  - Q WIQ2, WIQ3
  - D WID2, WID3
  - T WIT2, WIT3
  - S All Plexes
- Usage Identifier
  - I Product Installation
  - J JES2
  - P Paging
  - S SMS Managed
  - R SYSRES
  - Y System
- Application Identifier
  - PM Product Maintenance
  - JCK Checkpoint
    JSP SPOOL
  - SCC Production Transaction Servers
    SDV General Batch Datasets
    SMD Development TMM
    SMP Production TMM
    SPI Production Image Datasets
    SPP Production Preferred Batch
    SPV General Batch
    SQA Q/A
    STS TSO User Datasets
    SUS UNIX HFS
    SYF SMF Staging Datasets
    SYL Application Libraries
    SYM Performance Databases
    SYS MVS System Datasets
    SYW Work/Temp Datasets
    S2P Production DB2
    S2D Development DB2
  - YCJ CICS System Journals/Logs, no Backup
    YCL CICS System Libraries
    YDJ DB2 System Journals/Logs, no Backup
    YDL DB2 System Libraries
    YMJ MVS System Journals/Logs, no Backup
    YMJS SMF MANx Datasets, no Backup
    YML MVS System Libraries
    YMR MVS System RACF Databases
    YMS MVS System Data, all SysPlex Shared

SYSRES Volume Structure

- 3 Pairs of SYSRES Volumes to support multiple Operational Environments
  - Previous, Current, Future
- Created from Server Pack
- &SYSRS1 and &SYSRS2 symbols used
- Data Set Placement Recommendations from Appendix E: z/OS Planning for Installation

SYSRES Volume Structure



System Catalog Structure

- 1 Shared Master Catalog per SysPlex
- SYS1 and SYS2 datasets are defined
- TSO USERIDs and all other HLQs are referenced to other User Catalogs
- Master CATALOG.AAxPLEX.MASTER.PRIMARY
  CATALOG.AAxPLEX.MASTER.BACKUP
  (a DFDSS Concurrent Copy on another volume)

System Catalog Structure

SMPE	CATALOG.WISPLEX.SMPE.PRIMARY CATALOG.WISPLEX.SMPE.BACKUP (Shared Catalog across all images excluded from GRS)
SHARED	CATALOG.WISPLEX.SHARED.PRIMARY CATALOG.WISPLEX.SHARED.BACKUP (Shared Catalog across all images for SYS0 HLQ)
SYSDATA	CATALOG.WIxPLEX.SYSDATA.PRIMARY CATALOG.WIxPLEX.SYSDATA.BACKUP (SYS9 HLQ with No Data Set Backups)
SYSLIBS	CATALOG.WIxPLEX.SYSLIBS.PRIMARY CATALOG.WIxPLEX.SYSLIBS.BACKUP (SYS3, SYS4, SYS5 HLQs)

Application and TSO Catalog Structures

- Several User Catalogs per Sysplex to insure adequate performance, backup, and serviceability

TSO	CATALOG.WIxPLEX.TSO.SYS
	CATALOG.WIxPLEX.TSO.DCS
	CATALOG.WIxPLEX.TSO.APS
	CATALOG.WIxPLEX.TSO.CLI
	CATALOG.WIxPLEX.TSO.VEN

Application and TSO Catalog Structures

Apps	CATALOG.WIxPLEX.BATCH.xAPPL1
	CATALOG.WIxPLEX.BATCH.xAPPL2
	CATALOG.WIxPLEX.ONLINE.xAPPL1
	CATALOG.WIxPLEX.ONLINE.xAPPL2

SMP/E Environments

- SMP Libs contained on a Mod 9
- 1 Global Zone for all Images and Targets
- TLIBs on a dedicated Mod 9
- SMP Catalog is unique to SMP Environment
- SMP Volumes are shareable across the SYSPlexes
- Each SYSRES pair maintained as a Target Zone with related SMP Datasets on them
- SMP Zones are created with like Products (BCP, CICS, DB2, VTAM, etc.)

PARMLIB Structure

- Strategy: Define a Naming Convention that allows easy association of PARMLIBs and their Members
- Members are shared within the Sysplex utilizing Symbolics
- SYS0 PARMLIBs span Sysplexes
- PARMLIBs are defined at a Sysplex and Image level

PARMLIB Structure

- Example

SYS0.WIS.JES2PARM	Shared
SYS2.WIP.JES2PARM	SysPlex
SYS2.WIP1.JES2PARM	Image

- Suffixes- 00 is NOT used, Sysplex Name, Image Name, or Shared is used

IEASYSWP COMMNDW1 COUPLEWS

LPALIB Structure

SYS2.WIPPLEX.PARMLIB(PROGWP)

```
SYSLIB    LPALIB(SYS2.&SUBPLEX.LPALIB)
          LPALIB(SYS2.&SYSNAME.LPALIB)
          LPALIB(SYS1.LPALIB)
          LPALIB(SYS2.&SUBPLEX.CICS.LPALIB)
          LPALIB(SYS2.&SYSNAME.CICS.LPALIB)

          Plus DB2, SDSF, TSO, RMF, TCP/IP, etc.
```

LINKLIB Structure

SYS2.WIPPLEX.PARMLIB(PROGWP)

```
LINKLIST   DEFINE NAME(WP)
LINKLIST   ADD NAME(WP)
           DSNAME(SYS2.&SYSNAME..LINKLIB)
LINKLIST   ADD NAME(WP)
        DSNAME(SYS2.&SYSCLONE..AUTH.LINKLIB)
LINKLIST   ACTIVATE NAME(WP)
```

Plus all SYS1 LinkLibs, SYS2 Product Libs
(Only SYS1 and SYS2 HLQs)

APFLIB Structure

SYS2.WIPPLEX.PARMLIB(PROGWP)

```
APF   FORMAT(DYNAMIC)
APF   ADD
      DSNAME(SYS1.CMDLIB)
VOLUME(&SYSR2)
APF   ADD
      DSNAME(SYS2.&SUBPLEX..AUTH.LINKLIB)
SMS
```

Plus all SYS1 APFLibs, SYS2 Product Libs
(Only SYS1 and SYS2 HLQs)

Master JCL Definition

- Strategy: The Master JCL is defined in the PARMLIB Concatentation, rather than as a Load Module in SYS1.LINKLIB. For each SysPlex, IEASYSxx points to the member as indicated by MSTR=xx.

```
//IEFJOBS  DD  DISP=SHR,DSN=SYS2.&SYSNAME..STCJOBS
//           DD  DISP=SHR,DSN=SYS2.&SYSPLEX..STCJOBS
//IEFPDSI   DD  DISP=SHR,DSN=SYS2.&SYSNAME..PROCLIB
//          DD  DISP=SHR,DSN=SYS2.&SYSPLEX..PROCLIB
//          DD  DISP=SHR,DSN=SYS1.PROCLIB
//           DD  DISP=SHR,DSN=SYS1.IBM.PROCLIB
//IEFPARM DD  DISP=SHR,DSN=SYS2.&SUBPLEX.PARMLIB
//           DD  DISP=SHR,DSN=SYS1.PARMLIB
//************  IEFPARM DDCARD SUPERCEEDED BY
LOADxx
```

Language Environment Structure

- **Strategy: LE Parms are implemented in all Sysplexes as they are in Production**

- **LE Loadlibs are included in the LinkList and should NOT be specified in STEPLIBs or JOBLIBs**
- **LE is supported from the base OS/390 ServerPack and have SYS1 DSNs (SYS1.CEE.*)**
- **LE-specific Sub-routines reside in SYS1.CEE.SCEELINK**

CICS ERRCOUNT=(0,OVR)
TERMTHDACT=((DUMP,OVR))
STORAGE=((00,NONE,NONE,0K),OVR)

Batch/TSO ABTERMENC=((ABEND,OVR))

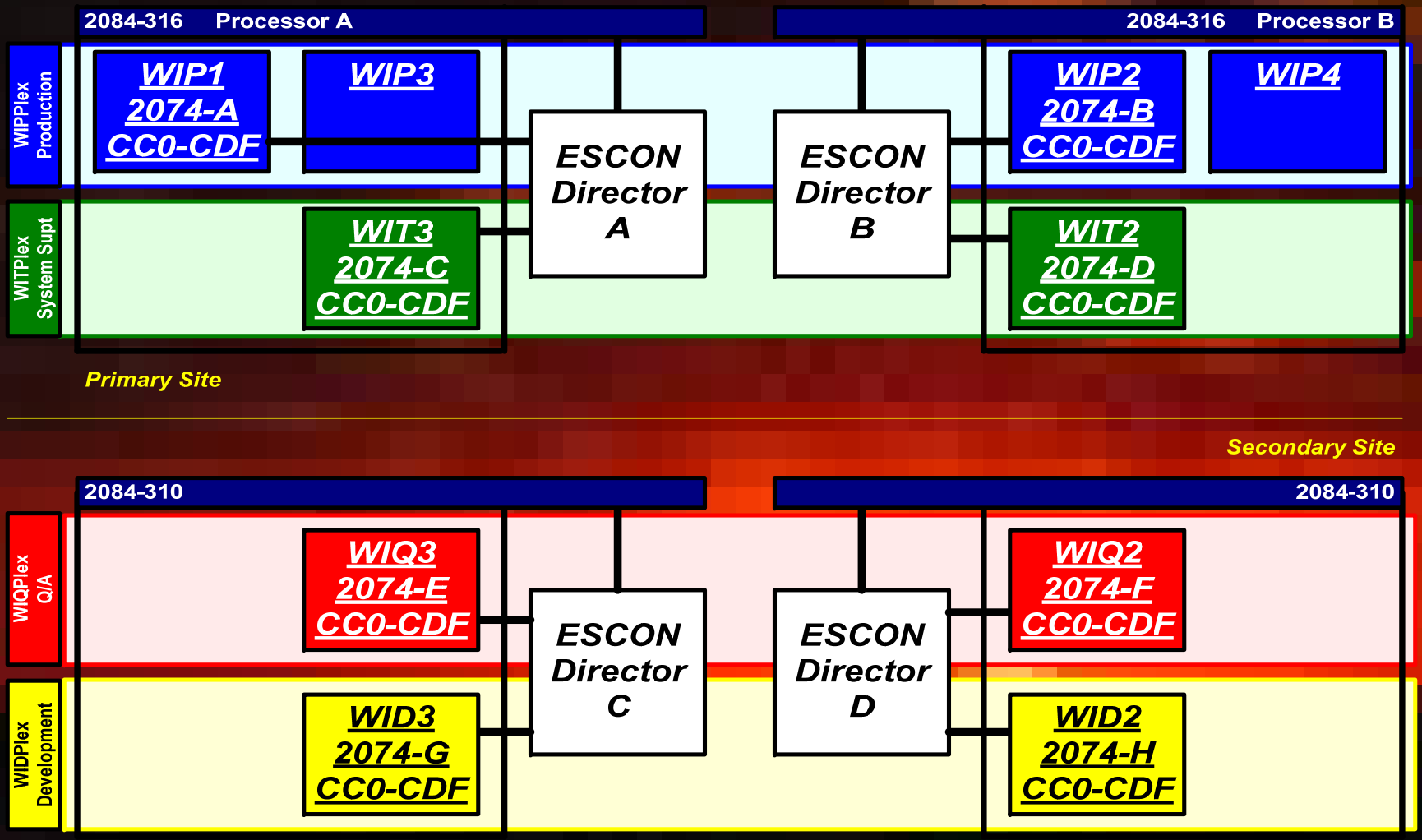
ANYHEAP=((32K,16K,ANYWHERE,FREE),OVR)

Console Configuration

- ***Strategy***: Each SysPlex will have at least 2 Console Controllers to provide continuous Console availability

- CC1 MSTCons
- CC4 AltCons, Tape Pool
- CC6 AltCons, Automation (DFT)
- CC8 AltCons, Printer Pool
- CCC AltCons, Network Area

Console Configuration



Console Configuration

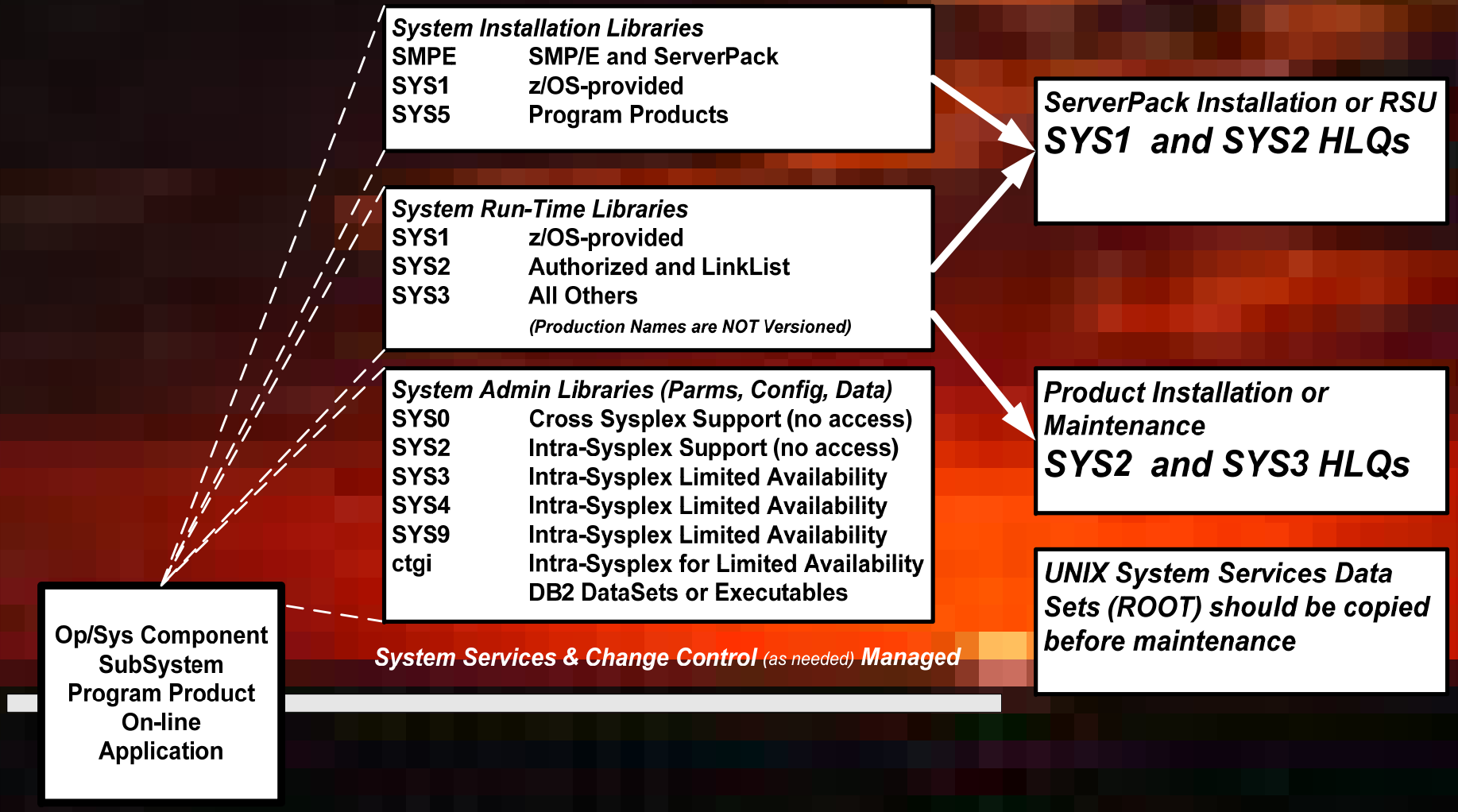
SYS0.SHARED.PARMLIB(CONSOLWP)

```
CONSOLE DEVNUM(SYSCONS)
        NAME(SYSCN@&SYSCLONE)
        AUTH(ALL)
        ROUTCODE(NONE)
        LEVEL(ALL,NB)
        CMDSYS(*)
        MSCOPE(*)
        UD(Y)
        MONITOR(JOBNAMES.T)

CONSOLE DEVNUM(6C1)                    MSTCONS
        UNIT(3270-X)
        NAME(MTO1@&SYSCLONE)
        AUTH(ALL)
        USE(FC)
        ALTGRP(MTOGRP)
        Etc.

CONSOLE DEVNUM(SUBSYSTEM)
        AUTH(ALL)
        NAME(SS01@&SYSCLONE)

        Up to 99
```

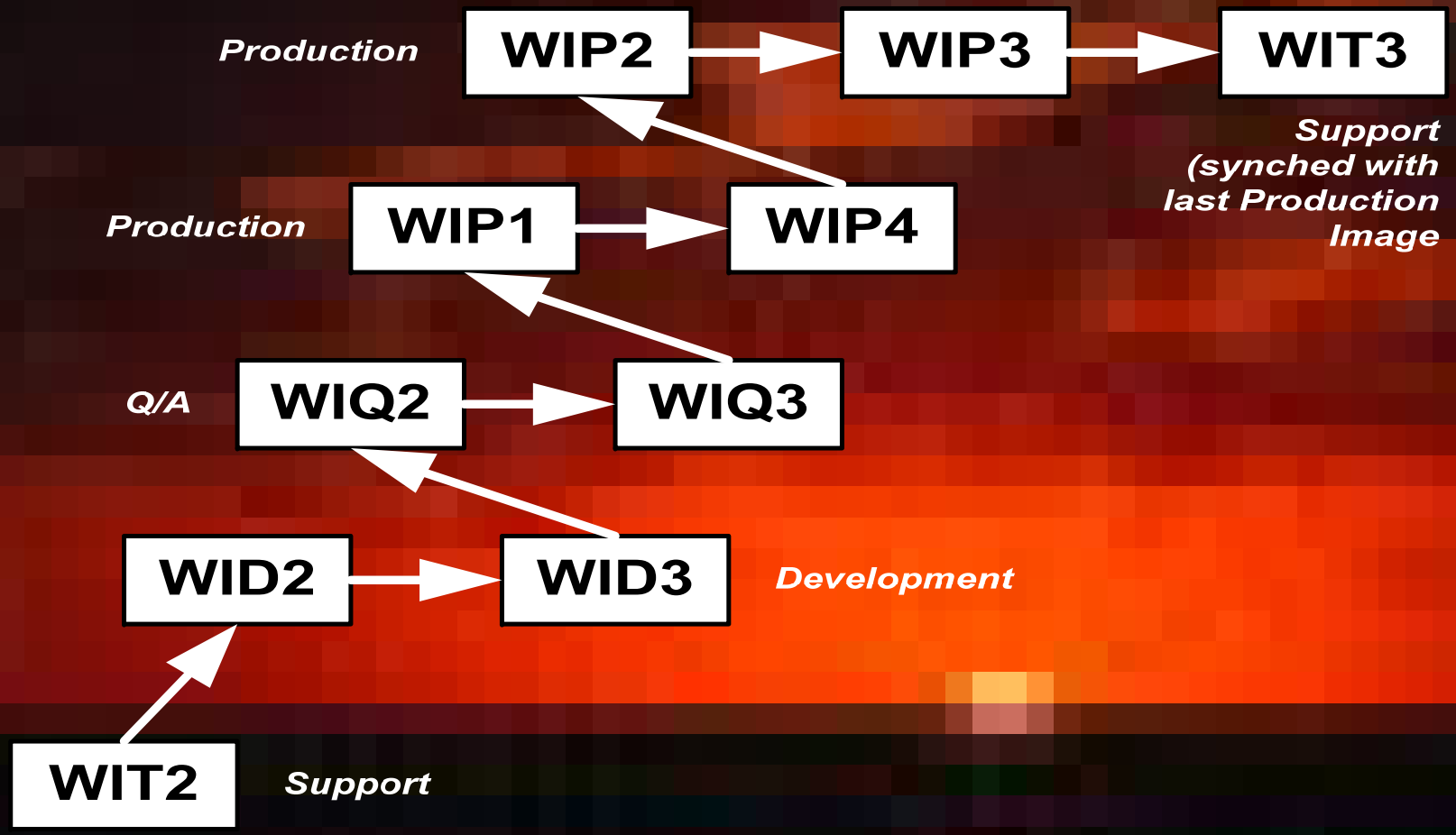
SYS2.WIPPLEX.PARMLIB(CNGRPWP)

```
GROUP   NAME(MTOGRP)    /* CONSOLE GROUP IN MTO AREA
        MEMBERS(MTO1@P1,MTO1@P2,MTO1@P3,MTO1@P4
```

Roll-Out Process



Roll-Out Process



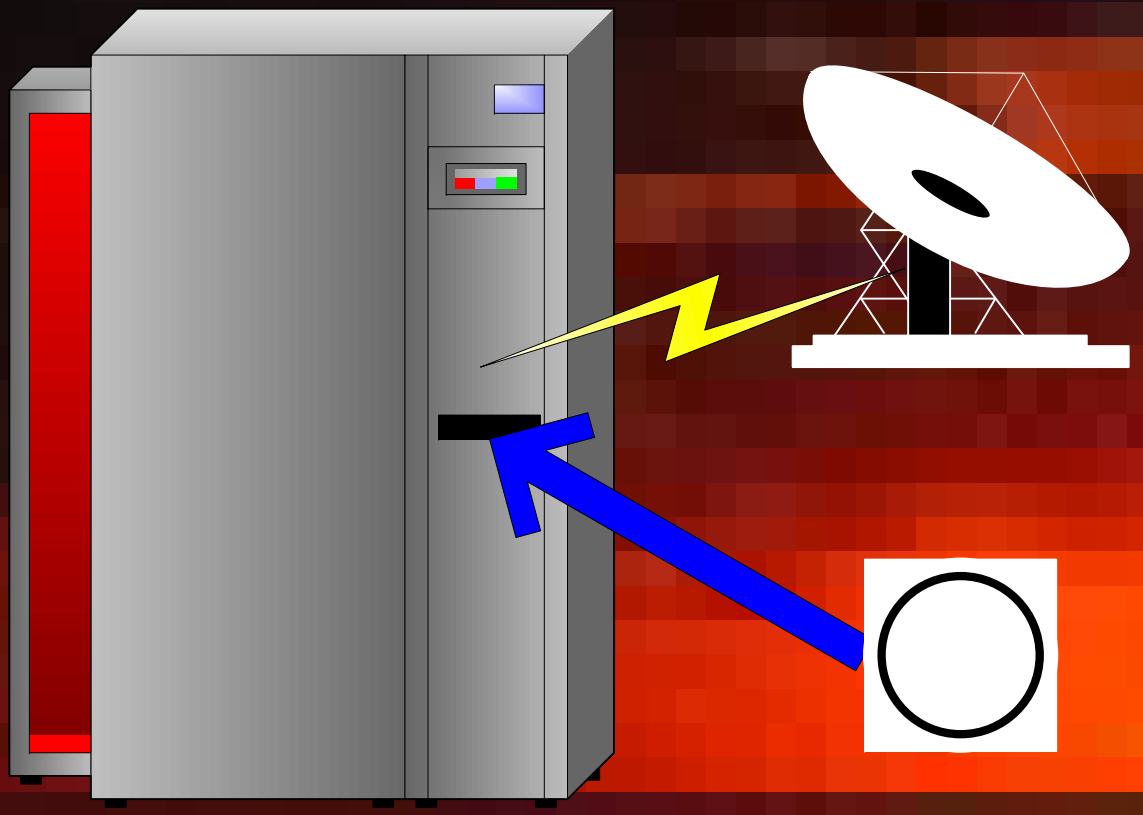
Maintenance Strategy

- Quarterly Cycles
- 2 for z/OS Releases and/or RSU
- 2 for Product Installs and/or Maintenance
- Various Fixes Applied as needed and synchronized to the Quarterly Cycles
- All Emergency Fixes re-applied to all Targets

Conclusion

- This presentation presented a process for Implementing z/OS Operating Environments
- Reality Check-
  - Maintenance Cycles can be completed with 1 week and rolled-out within 30 days
  - LPARs can be cloned in a 1/2 day

In the Near Future



z/OS V2 CDRom or Receive from Internet

d:autoinstall or d:setup