

GDPS/PPRC User Experience

Session # 2819

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z/OS	NetView	SA/390
GDPS	Parallel Sysplex	IMS
DB2	System Automation	ESS

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Disclaimer

- The following presentation does not include:
 - All possible options
 - All possible techniques
 - All possible choices and combinations
 - Detailed description of how GDPS works
- The following presentation will describe:
 - **A way to do GDPS/PPRC**

Agenda

- Mainframe recovery requirements
- Previous/Target Environments
- GDPS/PPRC Implementation Phases
- Sysplex, DASD, and Tape environment changes
- GDPS/PPRC environment with a simulation of a “disaster”
- Issues and Resolutions
- Future Enhancements

Primary Goal

“ ...provide an S/390 environment that is ***recoverable*** within two hours.”

Recovery Requirements

- Second Data Center
- Data replication at the secondary site
- Workload should be shifted from the primary site to the secondary site either automatically or with minimal intervention
- Workload should be balanced between the primary and secondary sites with no systems remaining idle
- Data integrity should be maintained during the recovery process
- Single points of failure should be minimized

Geographically Dispersed Parallel Sysplex

- IBM's high availability solution that brings together different technologies and provides data and application availability with minimum downtime in the event of a planned or unplanned outage.
 - Parallel Sysplex
 - ESCON, FICON
 - Remote Copy
 - System Automation
 - Processor Management
- Data mirroring technology: **Peer-to-Peer Remote Copy vs. eXtended Remote Copy**
- Single Site workload vs. **Multiple Site workload**

GDPS/PPRC Prerequisites

- **Hardware - secondary site within 40KM**
 - 2 CPUs, Secondary DASD, Redundant CFs, Consoles, Sysplex Timers
 - PPRC functionality
 - FICON, ESCON, ISC, ETR channels
 - Dense Wavelength Data Multiplexing (DWDM) for connectivity between sites and dark fiber
 - Capacity BackUp (CBU)
- **Software**
 - Parallel Sysplex across 2 sites
 - System Automation for OS/390 and Tivoli Netview for OS/390
 - Test DASD isolated from production DASD
 - New “controlling LPARs” for test and production
 - I/O configuration changes to support primary/secondary DASD

Previous Environment

- 1 Data Center
- 2 Mainframe Processors
- 7 Images - 4 OS/390 LPARs and 3 CFs
- OS/390 2.10
- DB2, IMS, CICS, Tivoli NetView 2.1
- 2 Sysplex Environments – Prod and Test with shared DASD
- 2 Mod-1 Sysplex Timers
- 1 VTS and ATL

Target Environment

- 2 Data Centers with 1 Processor each
- 10 Images - 4 in Primary site and 6 in Secondary site
- Additional 20+ MIPs per Processor to support GDPS
- DWDM and dark fiber for cross-site connectivity
- System Automation for OS/390
- GDPS 2.7
- Secondary site – double #TB of DASD for FlashCopy
- DB2, IMS, CICS, Tivoli NetView 2.1
- 2 Mod-2 Sysplex Timers
- Test Environment completely **isolated** from Production Environment
- FICON channels from DASD to Processor; FICON directors
- VTS Peer-to-Peer

GDPS/PPRC Phase 1

- ❑ **Phase 1 – PPRC Management in Test Environment**
 - ❑ **Part 1: PPRC Cross Site/Systems in Primary Site**
 - ❑ Customize Netview for GDPS, Install SA/390 and GDPS
 - ❑ Define SA/390 and GDPS Automation Policies
 - ❑ Isolation of test environment DASD from production DASD in the primary site
 - ❑ Move test data to new ESS
 - ❑ Test TSO PPRC commands
 - ❑ Move test environment DASD to new ESS in primary site
 - ❑ Build “controlling” K LPAR in primary site
 - ❑ **Part 2: Systems Span Sites/Manual DR Testing**
 - ❑ Configure and initialize secondary DASD
 - ❑ PPRC links between Primary and Secondary DASD validation
 - ❑ Mirror all test environment DASD
 - ❑ GDPS/PPRC testing for fail-over exercise
 - ❑ Establish cross-site network
 - ❑ Move test environment LPAR and “controlling” K LPAR to secondary site’s CPU
 - ❑ Validate test sysplex configuration under GDPS for couple data sets and CFs

GDPS/PPRC Phase 2

- ❑ **Phase 2 – PPRC Management in Production Environment**
 - ❑ **Part 1: PPRC Cross Site/Systems in Primary Site**
 - ❑ Customize Netview for GDPS, Install SA/390 and GDPS
 - ❑ Define SA/390 and GDPS Automation Policies
 - ❑ Build “controlling” C LPAR in secondary site
 - ❑ Migrate production data to ESS in primary site
 - ❑ Validate production sysplex configuration under GDPS for couple data sets and CFs
 - ❑ Complete GDPS function testing
 - ❑ **Part 2: Systems Span Sites/Manual DR Testing**
 - ❑ Validate all cross-site connections
 - ❑ Mirror all production DASD
 - ❑ Validate production sysplex configuration under GDPS for couple data sets and CFs
 - ❑ Complete all GDPS/PPRC fail-over and switch-over testing

GDPS/PPRC Phases 3/4

- Phase 3 – Sysplex Management and Recovery Automation in the Test Environment**
 - Install GDPS 2.7
 - Exploit enhanced version of Service Call Language Processor (SCLP) instead of using the Availability and Operations Manager (AOM) for automating HMC functions
 - Re-test all GDPS/PPRC fail-over and switch-over script

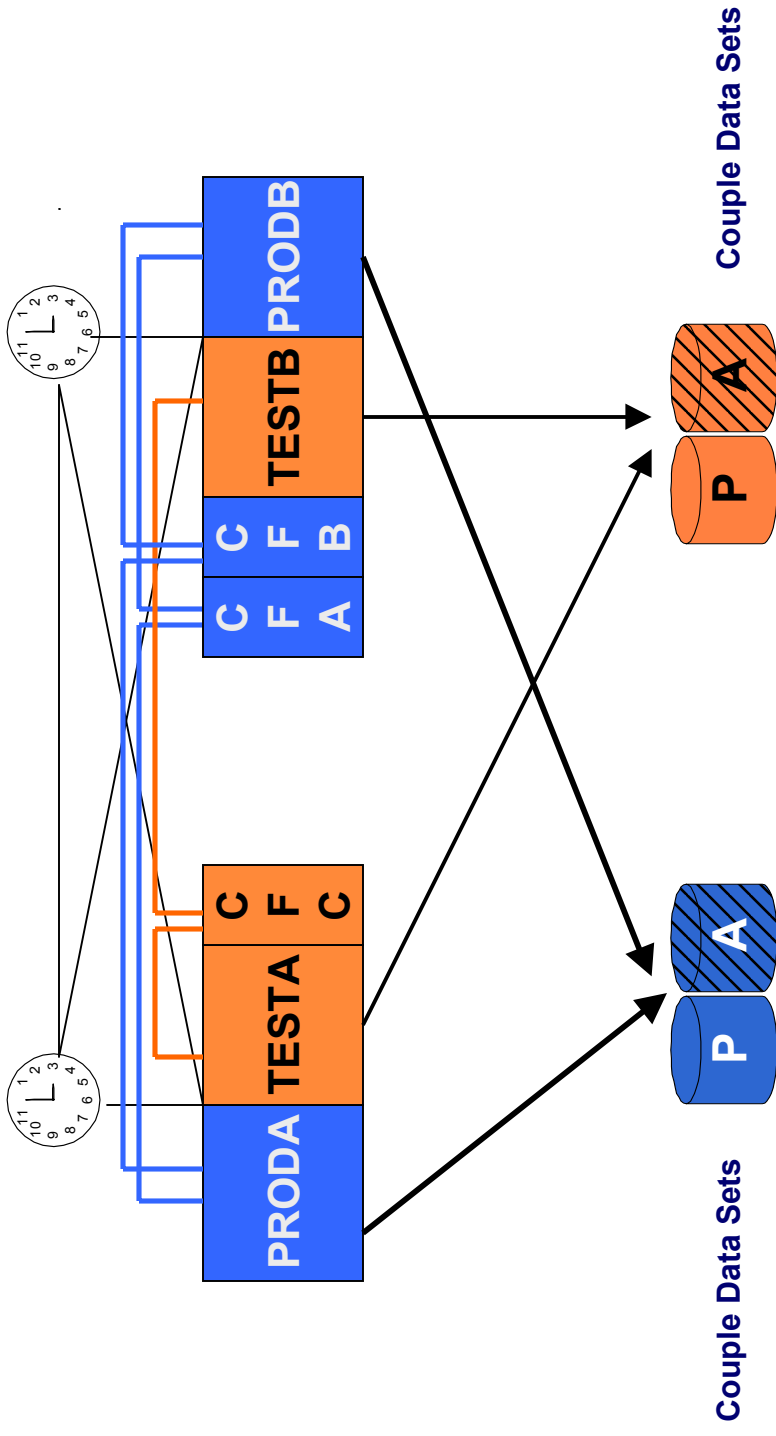
- Phase 4 – Sysplex Management and Recovery Automation in the Production Environment**
 - Install GDPS 2.7
 - Exploit enhanced version of Service Call Language Processor (SCLP) instead of using the Availability and Operations Manager (AOM) for automating HMC functions
 - Re-test all GDPS/PPRC fail-over and switch-over script

Sysplex Environment

Sysplex Environment

- **PRODUCTION**
 - 2 LPARs from each CPU: PRODA and PRODB
 - 2 Coupling Facility LPARs from a dedicated ICF engine:
 - Primary and Backup CF
 - ISC and IC Links
 - System Logger, CICS logger, XCF, RRS
 - Primary and Alternate Couple data sets for XCF, SFM, ARM, WLM, BPX, LOGR,CFRM
- **TEST**
 - 2 LPARs from each CPU: TESTA and TESTB
 - 1 Coupling Facility LPAR sharing MIPs with OS/390 LPARs
 - ISC and IC Links
 - System Logger, CICS logger, XCF, RRS
 - Primary and Alternate Couple data sets for XCF, SFM, ARM, WLM, BPX, LOGR,CFRM

Previous Sysplex Environment

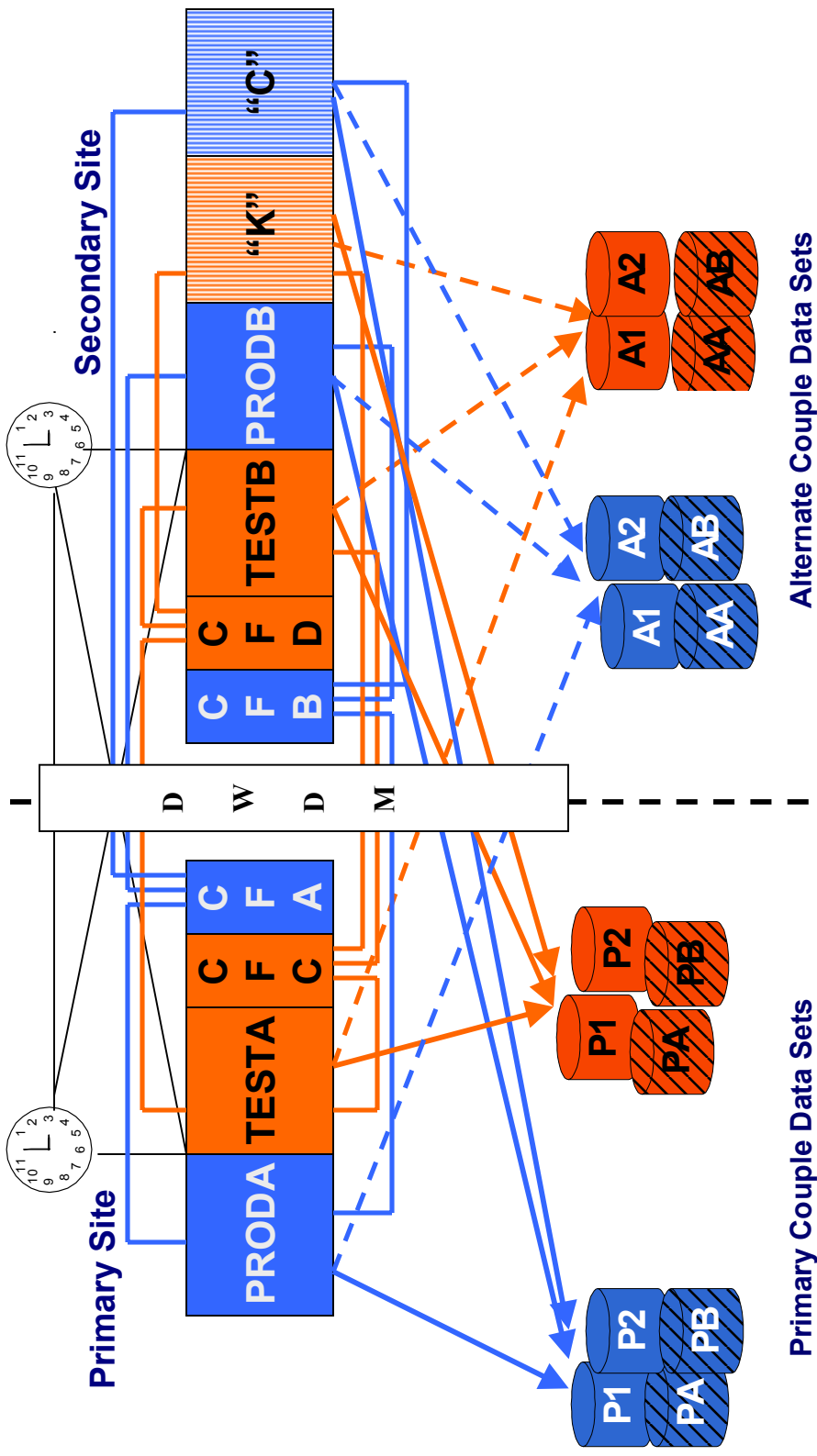


CFA and CFB – Dedicated CF Engine for Production
CFC – CF LPAR for Test

Target Sysplex Environment

- **PRODUCTION**
 - 2 LPARs from each CPU: PRODA, PRODB/ 1 LPAR “C” from Secondary site
 - 2 Coupling Facility LPARs from each dedicated ICF engine:
 - **Primary from Primary Site’s CPU and Backup from Secondary Site CPU**
 - **ISC links going across DWDM and dark fiber/ IC links within same CPU**
 - System Logger, CICS logger, XCF, RRS, **Systems Automation**
 - **Primary Couple data sets in Primary DASD/Alternate Couple data sets in Secondary DASD**
- **TEST**
 - 2 LPARs from each CPU: TESTA, TESTB/ 1 LPAR “K” from Secondary site
 - 2 Coupling Facility LPARs from each dedicated ICF engine:
 - **Primary from Primary Site’s CPU and Backup from Secondary Site CPU**
 - **ISC links going across DWDM and dark fiber/ IC links within same CPU**
 - System Logger, CICS logger, XCF, RRS, **Systems Automation**
 - **Primary Couple data sets in Primary DASD/Alternate Couple data sets in Secondary DASD**

Final Sysplex Environment



“K” LPAR - “Controlling” LPAR for Test Sysplex
 “C” LPAR - “Controlling” LPAR for Production Sysplex

GDPS Primary Panel

```
VPCPPNLI  GDPS - Disaster/Recovery System          GDPS V2.R7.M0

System      = PRODC      NETC      Primary Dasd = SITE1  PSITE1
Current Master = PRODC      NETC
PPRCAPI     = OK
Mirroring   = OK
Automation  = ON

1           Dasd Remote Copy
2           Tape Remote Copy
3           Standard Actions

5           Net Management
6           Planned Actions
7 Sysplex Resource Management
8           Automation ON/OFF
9           View Definitions

C           Config Management

Selection ==> 7
PF1= Help  PF2= End  PF3= Return
PF6= Roll
```

Sysplex Resource Management Panel

VPCSPM1 Sysplex Resource Management

Actions: V view M modify

----- Couple Datasets -----

TYPE	Primary DSN	Alternate DSN
SYSPLEX	SYS1.XCF.PRODPLEX.CDSPP1	SYS1.XCF.PRODPLEX.CDSPA1
ARM	SYS1.XCF.PRODPLEX.ARM.CDSPP2	SYS1.XCF.PRODPLEX.ARM.CDSPA2
BPMXDCS	SYS1.XCF.PRODPLEX.BPX.CDSPP1	SYS1.XCF.PRODPLEX.BPX.CDSPA1
CFRM	SYS1.XCF.PRODPLEX.CFRM.CDSPP2	SYS1.XCF.PRODPLEX.CFRM.CDSPA2
LOGR	SYS1.XCF.PRODPLEX.LOGR.CDSPP1	SYS1.XCF.PRODPLEX.LOGR.CDSPA1
SFM	SYS1.XCF.PRODPLEX.SFM.CDSPP2	SYS1.XCF.PRODPLEX.SFM.CDSPA2
WLM	SYS1.XCF.PRODPLEX.WLM.CDSPP1	SYS1.XCF.PRODPLEX.WLM.CDSPA1

----- Coupling Facilities -----

POLICY	site1	site2
PRODCFR1	PRODCF1	PRODCF2
-	-	-
-	-	-

1 Use Site1 CDS-es 2 USE Site2 CDS-es 3 USE Normal CDS-es
 4 Use Site1 CF-s 5 USE Site2 CF-s 6 USE Normal CF-s

selection ==>

PF1= Help PF2= End PF3= Return PF6= Roll

Sysplex Resource Management Panel

VPCSPM1 Sysplex Resource Management

Actions: V view M modify

----- Couple Datasets -----

TYPE	Primary DSN	Alternate DSN
— SYSPLEX	SYS1.XCF.PRODPLEX.CDSPP1	SYS1.XCF.PRODPLEX.CDSPA1
— ARM	SYS1.XCF.PRODPLEX.ARM.CDSPP2	SYS1.XCF.PRODPLEX.ARM.CDSPA2
— BPXMCDS	SYS1.XCF.PRODPLEX.BPX.CDSPP1	SYS1.XCF.PRODPLEX.BPX.CDSPA1
— CFRM	SYS1.XCF.PRODPLEX.CFRM.CDSPP2	SYS1.XCF.PRODPLEX.CFRM.CDSPA2
— LOGR	SYS1.XCF.PRODPLEX.LOGR.CDSPP1	SYS1.XCF.PRODPLEX.LOGR.CDSPA1
— SFM	SYS1.XCF.PRODPLEX.SFM.CDSPP2	SYS1.XCF.PRODPLEX.SFM.CDSPA2
— WLM	SYS1.XCF.PRODPLEX.WLM.CDSPP1	SYS1.XCF.PRODPLEX.WLM.CDSPA1

----- Coupling Facilities -----

POLICY	site1	site2
PRODCFR1	PRODCF1	PRODCF2
—	—	—
—	—	—

1 Use Site1 CDS-es 2 USE Site2 CDS-es 3 USE Normal CDS-es
 4 Use Site1 CF-s 5 USE Site2 CF-s 6 USE Normal CF-s

selection ==>

PF1= Help PF2= End PF3= Return PF6= Roll

Sysplex Resource Management Panel

VPCSPM5

Sysplex Resource Management

Active CFRM Policy: PRODCFR1
Normal, default Policy: PRODCFR1
Policy using only site1: PRODCFR3
Policy Using only site2: PRODCFR2

Site1 CFs

Site2 CFs

PRODCF1 Working 000000012345

PRODCF2 Working 000000056789

-
-
-
-
-

-
-
-
-
-

1 Use Only site1 2 Use only site2 3 Use Normal

selection ==>

PF1= Help PF2= End PF3= Return PF6= Roll

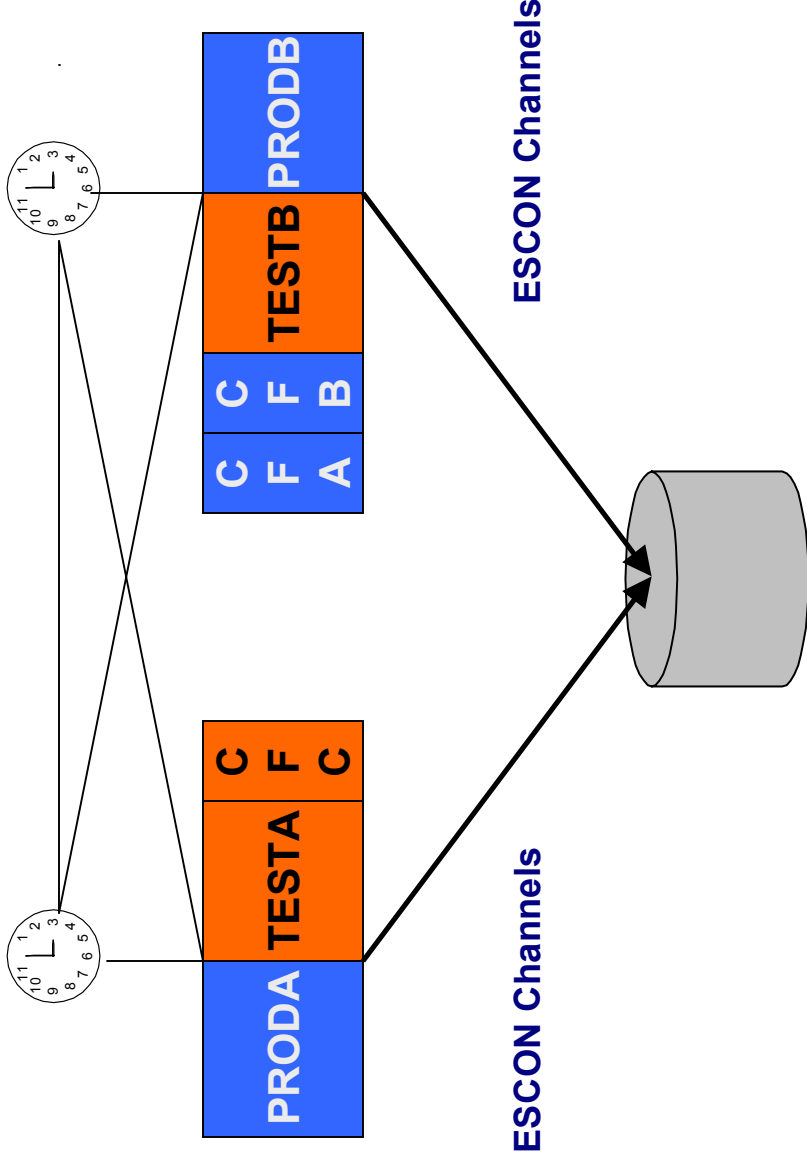
DASD Environment

Previous DASD Environment

PRODUCTION and TEST

- “shared” DASD at one site
- All volumes accessible to both PROD and TEST LPARs
- PARMLIB and system files

Previous DASD Environment



“Shared DASD” for Production and Test Data

DASD Environment – Phase 1/1

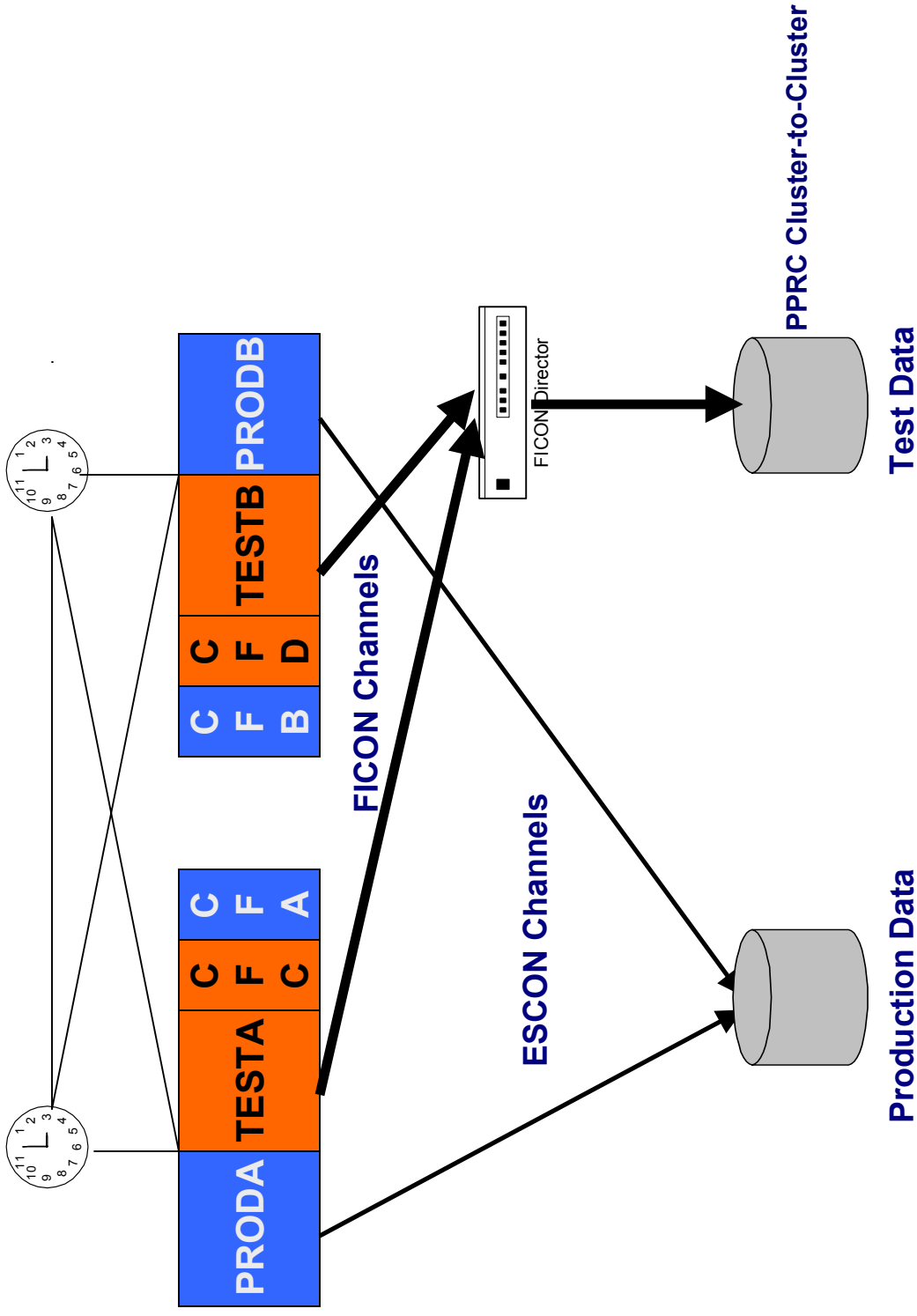
Phase 1/Part 1

- **Connected new DASD using FICON Director**
 - FICON channels
- **New DASD configuration with PPRC functionality**
 - Example configuration will include 2 clusters for PPRC simulation
 - Utility Devices at the end of base address
 - For example: 132 base addresses (2 UDs) /124 PAV addresses = 256
 - ESCON link between cluster 1 and 2 was connected to simulate PPRC link
- **DASD mapping: which volumes were “mirrored” or not “mirrored”?**
- **I/O Configuration changes for OFFLINE/ONLINE in each LPAR**
- **Moved/copied all TEST data sets to new DASD**
- **IPLd TESTA and TESTB to use new DASD**
- **Tested TSO PPRC commands using cluster-to-cluster**
 - CESTPATH, CESTPAIR, CQUERY, CDELPAIR, CDELPATH

SAMPLE TSO PPRC Commands for C250 device

```
CESTPATH DEVN(X'C250') -  
  PRIM(X'00F2' 12345 X'02') -  
  SEC(X'00F3' 12345 X'03') -  
  LINK(X'00A50003') -  
  CGROUP(NO)  
CQUERY DEVN(X'C250') VOLUME FORMAT BITMAP  
CESTPAIR DEVN(X'C250') -  
  PRIM(X'00F2' 12345 X'50' X'02') -  
  SEC(X'00F3' 12345 X'50' X'03') -  
  MODE(COPY) -  
  CRIT(NO) -  
  ONLINSEC(NO) -  
  MSGREQ(NO)  
CSUSPEND DEVN(X'C250') -  
  PRIM(X'00F2' 12345 X'050' X'02') -  
  SEC(X'00F3' 12345 X'050' X'03')  
CDELPAIR DEVN(X'C250') -  
  PRIM(X'00F2' 12345 X'050' X'02') -  
  SEC(X'00F3' 12345 X'050' X'03')  
CDELPATH DEVN(X'C250') -  
  PRIM(X'00F2' 12345 X'02') -  
  SEC(X'00F3' 12345 X'03')
```

Isolation of Test Data from Production



DASD Environment – Phase 1/2

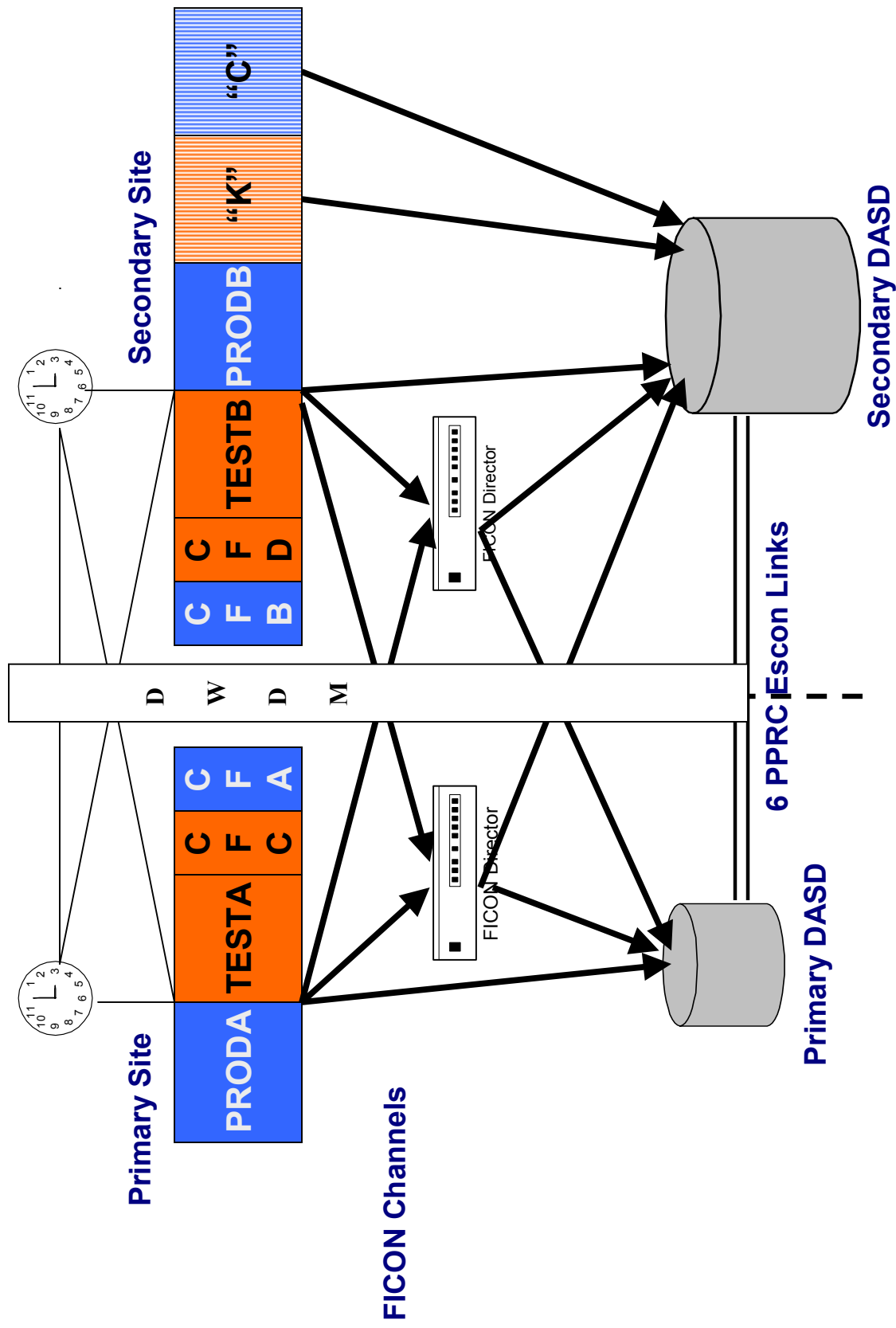
Phase 1/Part 2

- Created “controlling” LPAR “K” for Test with dedicated volumes
- Couple data sets, MIM control file data set “shared”
- All volumes of test data online to “K”
- DWDM and dark fiber
- Tested GDPS/PPRC functionality across sites

Final DASD Environment

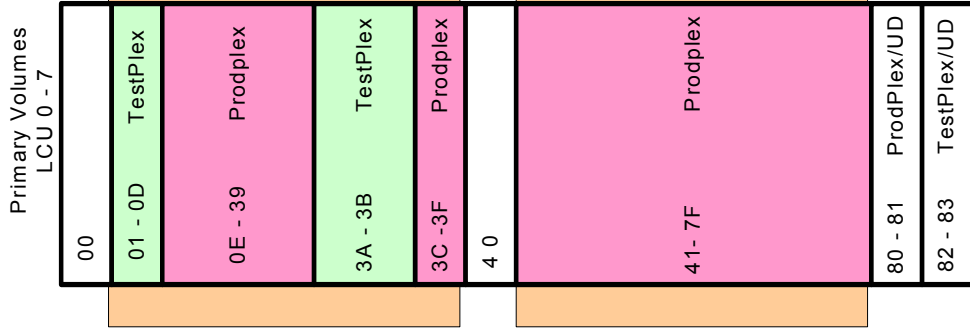
- Connectivity**
 - Primary Shark/Secondary Shark (double the amount in Primary Shark)
 - Ficon Director on each site/ Ficon channels from each CPU
 - Redundant connectivity from CPU to DASD
 - ESCON PPRC links between Primary and Secondary DASD
 - Ficon channels going across the dark fiber
- Phase 2/Part 1**
 - Created “controlling” LPAR “C” for production with dedicated volumes on secondary DASD
 - All volumes for production data online to “C” LPAR
 - DASD mapping and I/O gen changes
 - Moved all Production data to new DASD in Primary Site using TDMF
 - Tested GDPS/PPRC across sites using production sysplex environment
 - Production DASD configuration with FlashCopy
 - Configuration: double the primary DASD
 - Utility Devices at the end of base addresses are required
 - For example: 130 base addresses (4 UD) /126 PAV addresses = 256
- Phase 2/Part 2**
 - Implemented GDPS/PPRC in production

Final DASD Environment

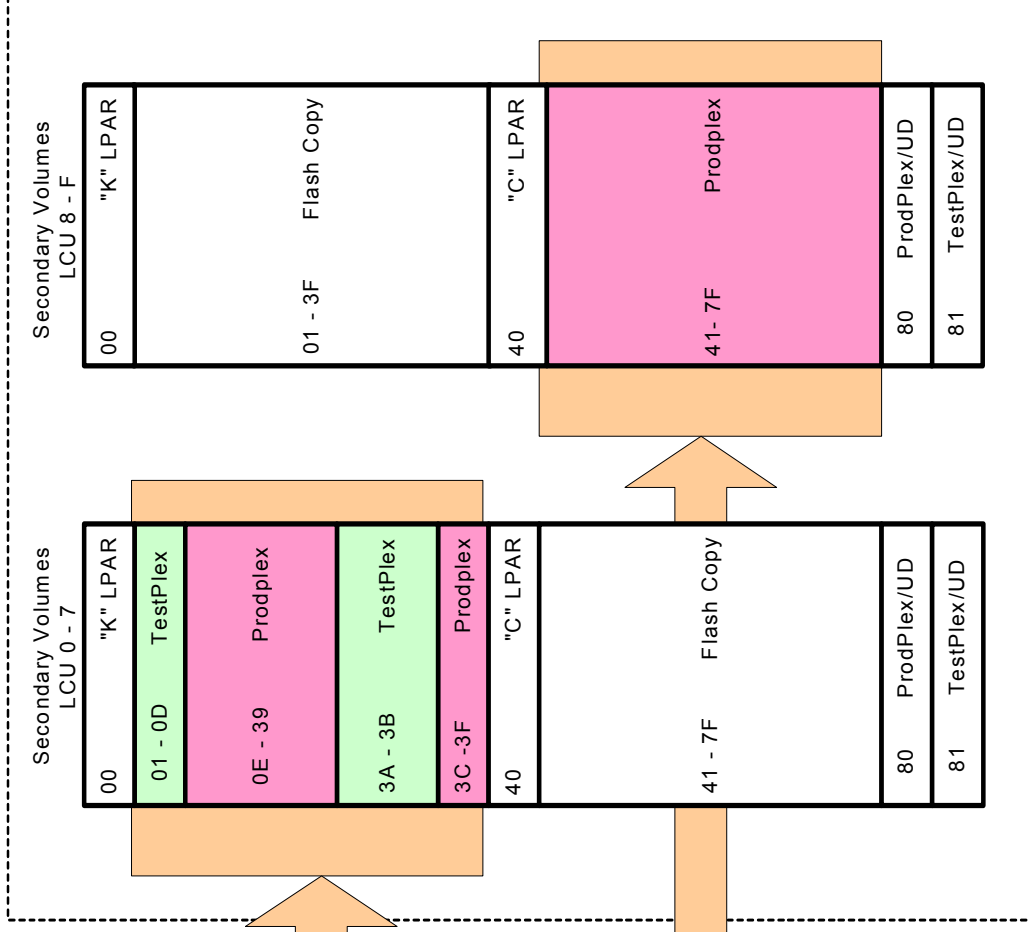


Primary / Secondary Mainframe ESS PPRC Configuration

ESS at Primary Site



ESS at Secondary Site



Courtesy of LeAnne Kamber
Storage Systems Programmer

HCD Definitions

- 2 OSConfigID for each LPAR
 - **PRODAP: Primary DASD addresses**
 - Used under normal circumstance for all LPARs except “controlling” LPARs
 - **LOADPA: IODF ** SYS0 PRODAP 00 Y**
 - **PRODAS: Secondary DASD addresses**
 - Used when a fail-over or switchover is taken
 - **LOADSA: IODF ** SYS0 PRODAS 00 Y**

- **Utility Devices and FlashCopy volumes – offline to all LPARs**
- **Couple Data sets – online on all LPARs**
- **CRITICAL: must match the PPRC configuration**

GDPS GEOPARM Definitions

```
*****
* GEOPARM FOR PRODPLEX DASD W/FLASHCOPY
*****
•DEFINE LINKS
•*****
GEOPLEX LINKS
*****
* SITE1 LINKS
*
SITE1='00C0,00E0,Y,N,00000000,00310000,00900000,00300000,00B10000'
SITE1='00C1,00E1,Y,N,00000001,00310001,00900001,00300001,00B10001'
SITE1='00C2,00E2,Y,N,00000002,00310002,00900002,00300002,00B10002'
SITE1='00C3,00E3,Y,N,00000003,00310003,00900003,00300003,00B10003'
SITE1='00C4,00E4,Y,N,00000004,00310004,00900004,00300004,00B10004'
.
.
* SITE2 LINKS
*
SITE2='00E0,00C0,Y,N,00000000,00310000,00900000,00300000,00B10000'
SITE2='00E1,00C1,Y,N,00000001,00310001,00900001,00300001,00B10001'
SITE2='00E2,00C2,Y,N,00000002,00310002,00900002,00300002,00B10002'
SITE2='00E3,00C3,Y,N,00000003,00310003,00900003,00300003,00B10003'
SITE2='00E4,00C4,Y,N,00000004,00310004,00900004,00300004,00B10004'
```

GDPS GEOPARM Definitions

```
*****
* DEFINE PPRC PAIRS
*****
GEOLX MIRROR
*****
*
*****
PPRCSSID='00C0,00E0'
* MOD3
PPRC='C00E,D00E,43,N,,D04E'
* MOD9
PPRC='C03C,D03C,4,N,,D07C'
*
*****
*
*****
PPRCSSID='00C1,00E1'
* MOD3
PPRC='C10E,D10E,43,N,,D14E'
* MOD9
PPRC='C13C,D13C,4,N,,D17C'
*
.
```


GDPS Primary Panel

```
VPCPPNLI  GDPS - Disaster/Recovery System          GDPS V2.R7.M0

System      = PRODC      NETC      Primary Dasd = SITE1  PSITE1
Current Master = PRODC      NETC
PPRCAPI     = OK        Dasd Config  = 2002-09-22  13:31:59
Mirroring   = OK        FREEZE Date =
Automation  = ON        Time      =

1          Dasd Remote Copy
2          Tape Remote Copy
3          Standard Actions

5          Net Management
6          Planned Actions
7          Sysplex Resource Management
8          Automation ON/OFF
9          View Definitions

C          Config Management

Selection ==> 1
PF1= Help  PF2= End  PF3= Return
PF6= Roll
```

DASD Remote Copy Panel

```
VPCPQSTC      Dasd Mirroring Status = OK      Monitor2 time = 10:01:32
Actions: Q ueryPath Z QueryReverse V iew devices X ceptions D elpath E stpath
Tot Pairs: xxx
-PRI-SSID-SEC- F C ----- LINKS (LINK-STATUS) -----
V 00C0 ===== 00E0 Y N 00000000-01 0310000-01 00900000-01 00300000-01 More
- 00C1 ===== 00E1 Y N 00000001-01 0310001-01 00900001-01 00300001-01 More
- 00C2 ===== 00E2 Y N 00000002-01 0310002-01 00900002-01 00300002-01 More
- 00C3 ===== 00E3 Y N 00000003-01 0310003-01 00900003-01 00300003-01 More
- 00C4 ===== 00E4 Y N 00000004-01 0310004-01 00900004-01 00300004-01 More
- 00C5 ===== 00E5 Y N 00000005-01 0310005-01 00900005-01 00300005-01 More
- 00C6 ===== 00E6 Y N 00000006-01 0310006-01 00900006-01 00300006-01 More
- 00C7 ===== 00E7 Y N 00000007-01 0310007-01 00900007-01 00300007-01 More
- 00C0 ===== 00E8 Y N 00000008-01 0310008-01 00900008-01 00300008-01 More
- 00C1 ===== 00E9 Y N 00000009-01 0310009-01 00900009-01 00300009-01 More
- 00C2 ===== 00EA Y N 0000000A-01 031000A-01 0090000A-01 0030000A-01 More
- 00C3 ===== 00EB Y N 0000000B-01 031000B-01 0090000B-01 0030000B-01 More
- 00C4 ===== 00EC Y N 0000000C-01 031000C-01 0090000C-01 0030000C-01 More
- 00C5 ===== 00ED Y N 0000000D-01 031000D-01 0090000D-01 0030000D-01 More
- 00C6 ===== 00EE Y N 0000000E-01 031000E-01 0090000E-01 0030000E-01 More
- 00C7 ===== 00EF Y N 0000000F-01 031000F-01 0090000F-01 0030000F-01 More
1 Epair 2 Dpair 3 Suspend 4 Resynch 5 Monitor2 6 Q Paths 7 Epath 8 Dpath
10 P/DAS 11 Find 21 FCEP 22 FCEs 23 FCWp 24 FCWs
Selection ==>
PF1=Help PF2=END PF3=Return PF6=Roll PF7=Back PF8=Forw PF11=Right
```

DASD Device Pairs Panel

```
VPCPQST1      Dasd Mirroring Status = OK      Monitor2 time = 10:01:32
Actions:  D elpair  E stpair  S uspend  T Dasd-Mgmt  R esynch  Q uery
          P /DAS      Y RecSec
Pairs:  xx      SSIDs: Pri=00C0 Sec=00E0 F=Y C=N      Devices: All
q C00E D00E DUP      - C01E D01E DUP      - C02E D02E DUP
- C00F D00F DUP      - C01F D01F DUP      - C02F D02F DUP
- C010 D010 DUP      - C020 D020 DUP      - C030 D030 DUP
- C011 D011 DUP      - C021 D021 DUP      - C031 D031 DUP
- C012 D012 DUP      - C022 D022 DUP      - C032 D032 DUP
- C013 D013 DUP      - C023 D023 DUP      - C033 D033 DUP
- C014 D014 DUP      - C024 D024 DUP      - C034 D034 DUP
- C015 D015 DUP      - C025 D025 DUP      - C035 D035 DUP
- C016 D016 DUP      - C026 D026 DUP      - C036 D036 DUP
- C017 D017 DUP      - C027 D027 DUP      - C037 D037 DUP
- C018 D018 DUP      - C028 D028 DUP      - C038 D038 DUP
- C019 D019 DUP      - C029 D029 DUP      - C03C D03C DUP
- C01A D01A DUP      - C02A D02A DUP      - C03D D03D DUP
- C01B D01B DUP      - C02B D02B DUP      - C03E D03E DUP
- C01C D01C DUP      - C02C D02C DUP      - C03F D03F DUP
- C01D D01D DUP      - C02D D02D DUP
1 Estpair 2 Delpair 3 Suspend 4 Resynch 5 Query 6 RecSec 7 All 8 Exceptions
10 P/DAS 11 VOLSEERS 21 FCQueryP 22 FCQueryS
Selection ==>
PF1=Help 2=END 3=Return 6=Roll 7=Prev 8=Next 11=Right
```



TAPE Environment

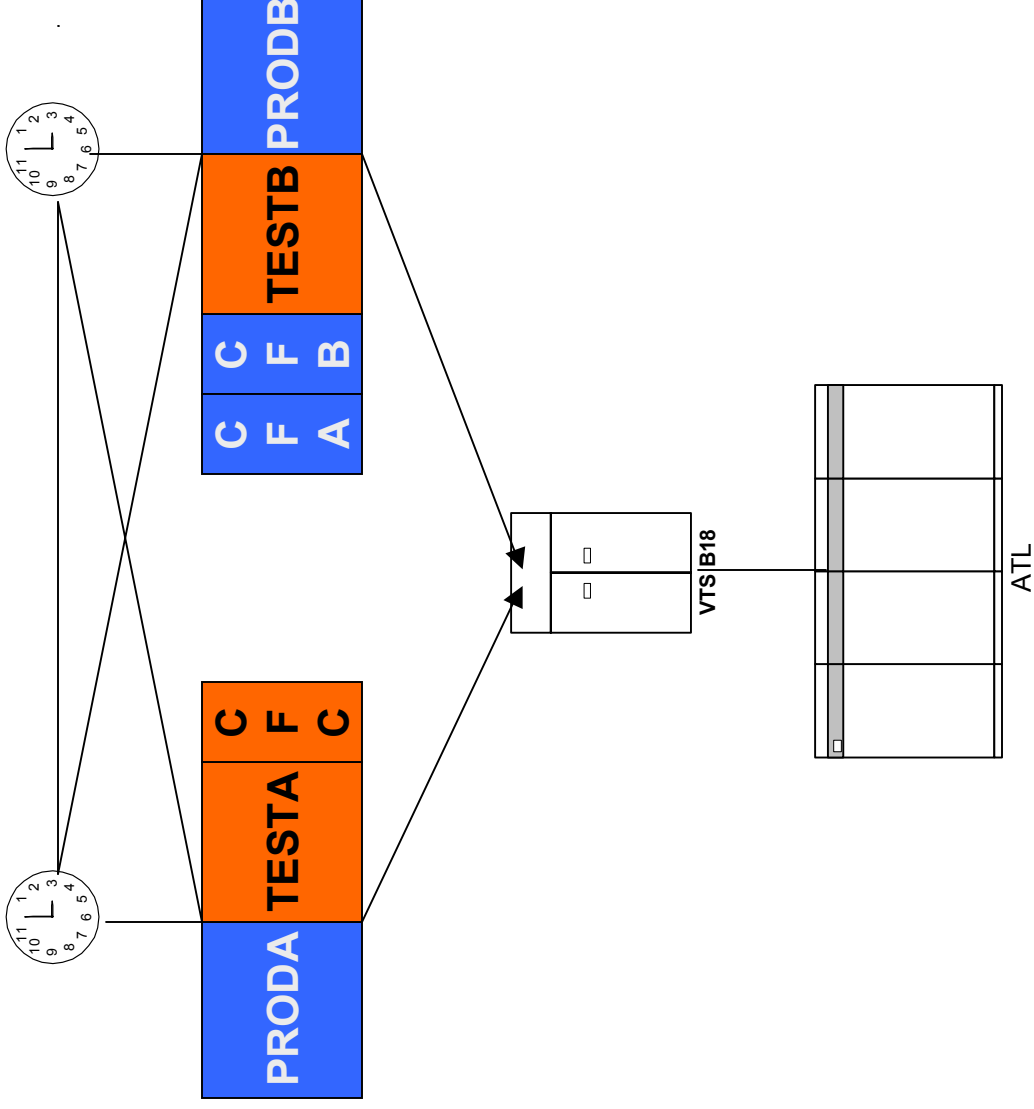


Previous TAPE Environment

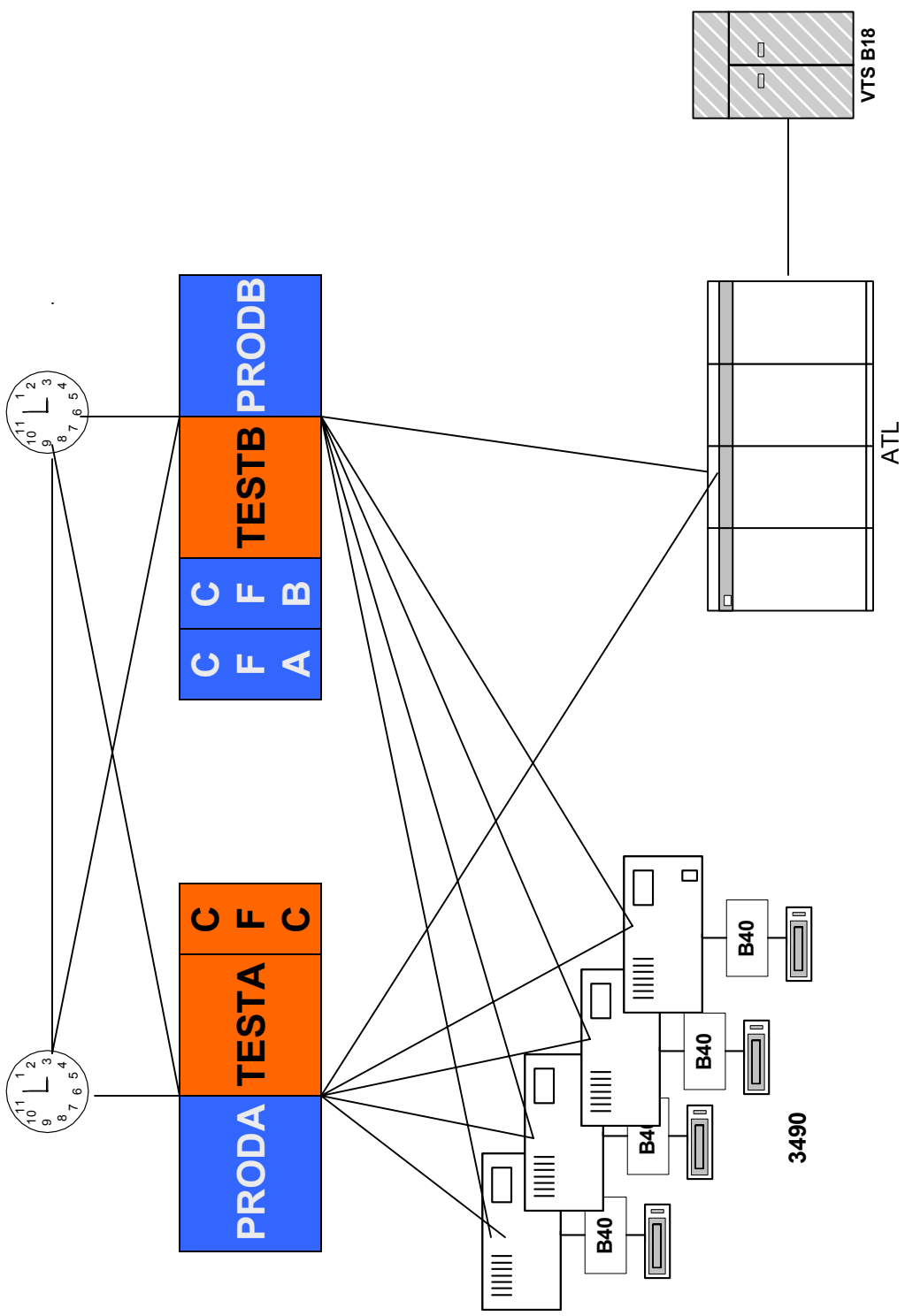
“Shared” between Production and Test

- 1 VTS/ 1 ATL
- Native 3590 drives
- 3490 drives

Previous Virtual Tape System Environment



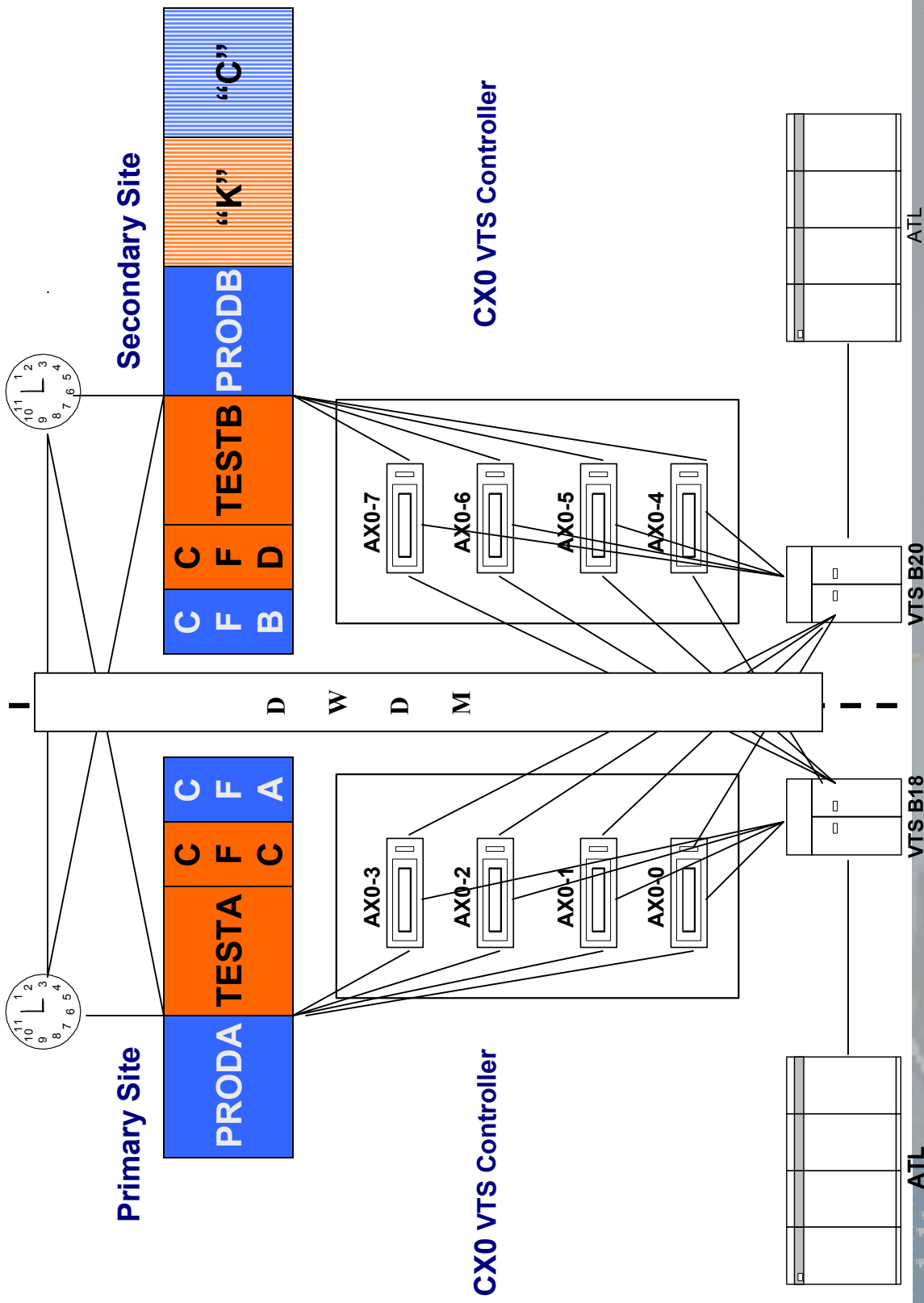
Previous Native 3590 and 3490 Environment



Final TAPE Environment

- VTS Peer-to-Peer
 - 1 VTS on each site
 - 1 CXO VTS Controller on each site
 - Equal Number of VTS device addresses@site
- ATLS
 - Equal Number of 3590 native drives@site
 - Dedicated addresses for PROD and TEST

Final VTS/ATL Environment



GDPS Environment

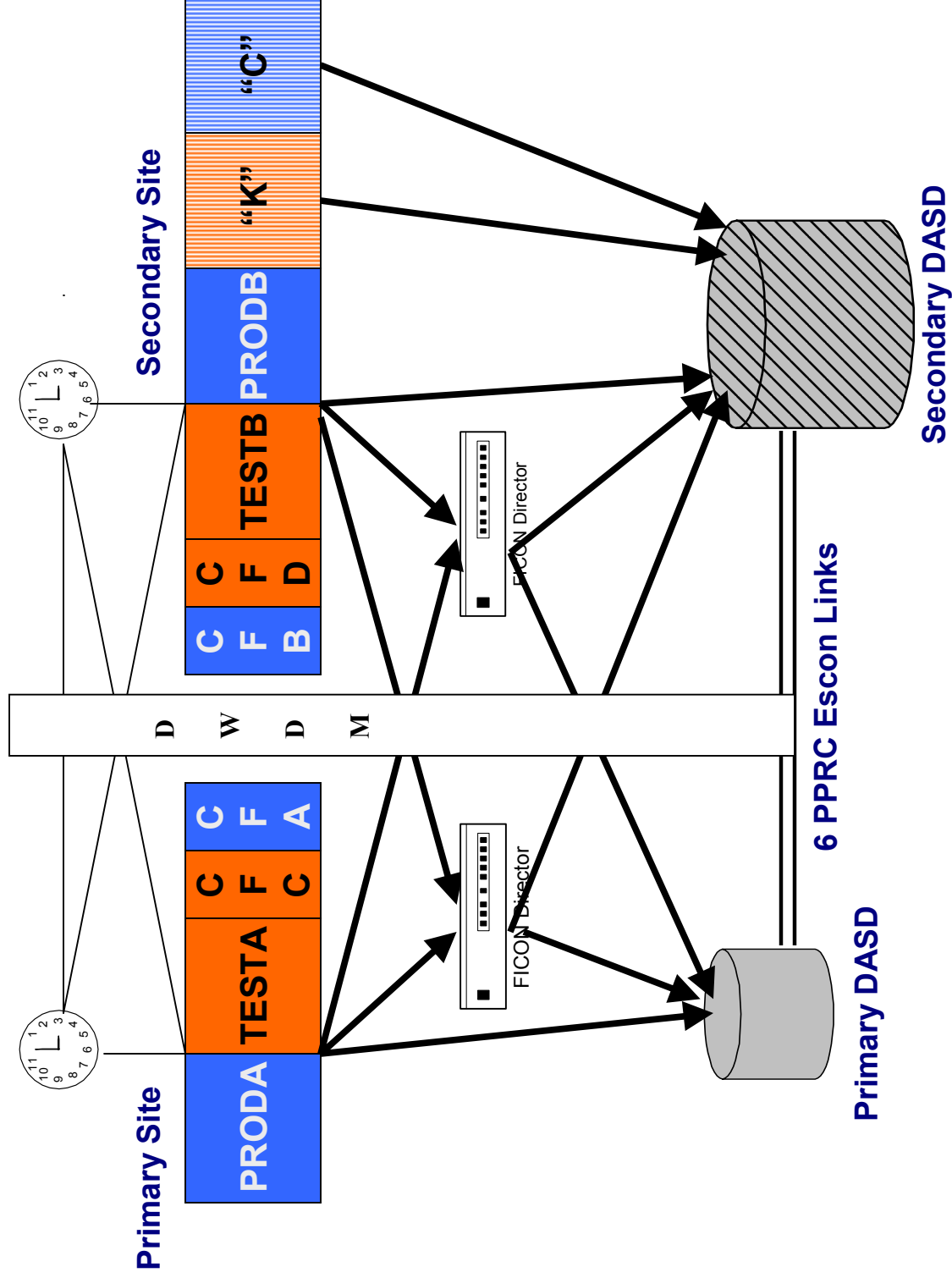
GDPS Configuration

- Procs**
 - Netview, SA/390, GDPS
- Parmlib**
 - **COMMNDxx, CONSOLxx, COUPLExx, IEFSSNxx, IJKTS0xx, MPFLSTxx, LPALSTxx, PROGxx, SCHEDxx**
- New Libraries:** SA/390, GDPS, NetView
- Policy Database** for automation and GDPS configurations
- WLM**
 - Started Tasks INGEPROC, INGESSI, and HSAMPROC
- Security product**
- Sysplex couple datasets**
- DSIPARM customization**
- REXX environment changes**
 - Default of 40 increased to 1000

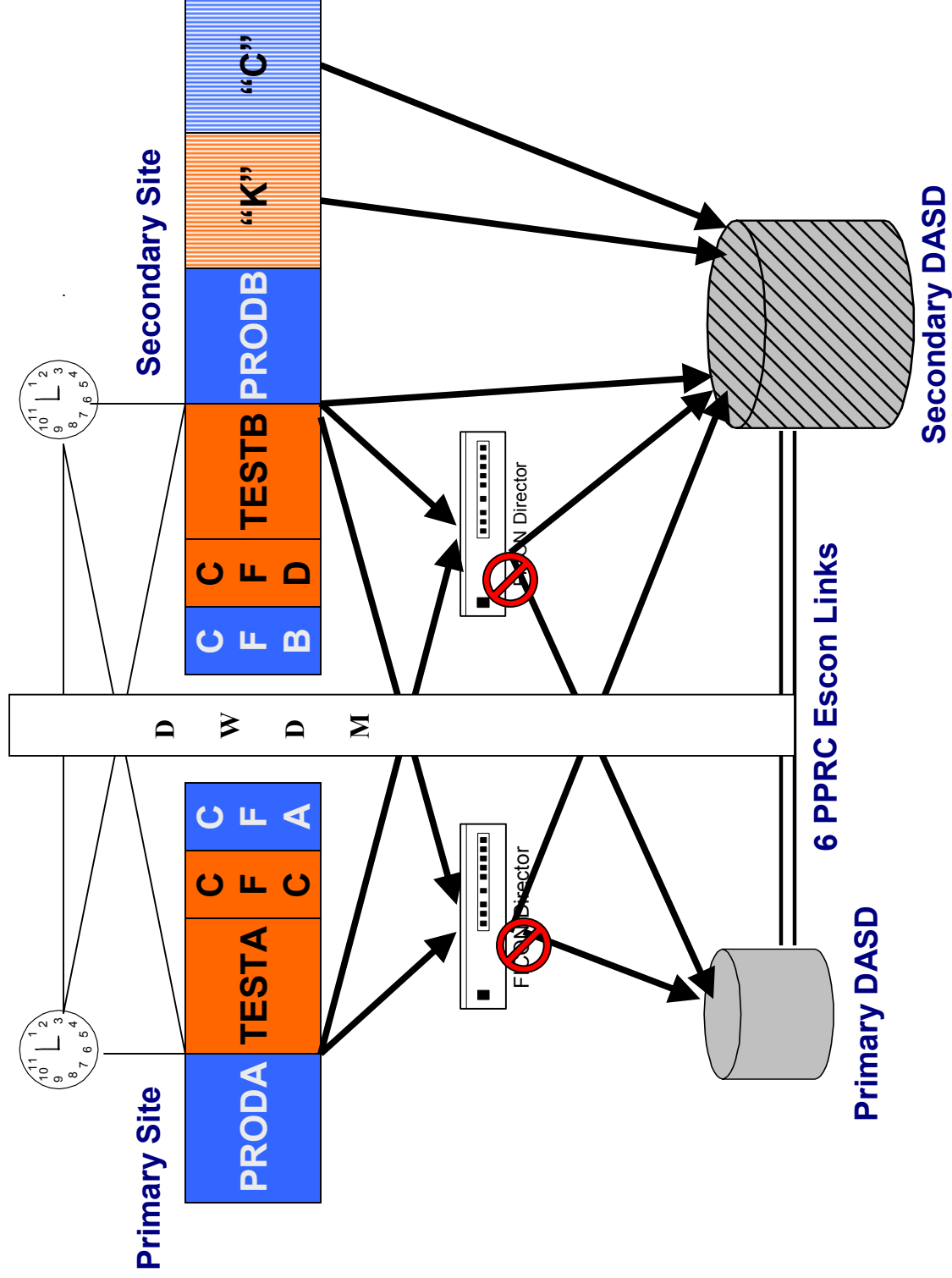
GDPS Scripts

- **Types of Scripts**
 - Site Failure
 - CPU Failure
 - DASD Failure
- **Types of Outages**
 - Planned
 - Unplanned
- **Takeover Processing scripts**
 - ALLSITE1/ ALLSITE2
 - DASDSITE1/ DASDSITE2
 - SYSSysname
 - “User-defined”

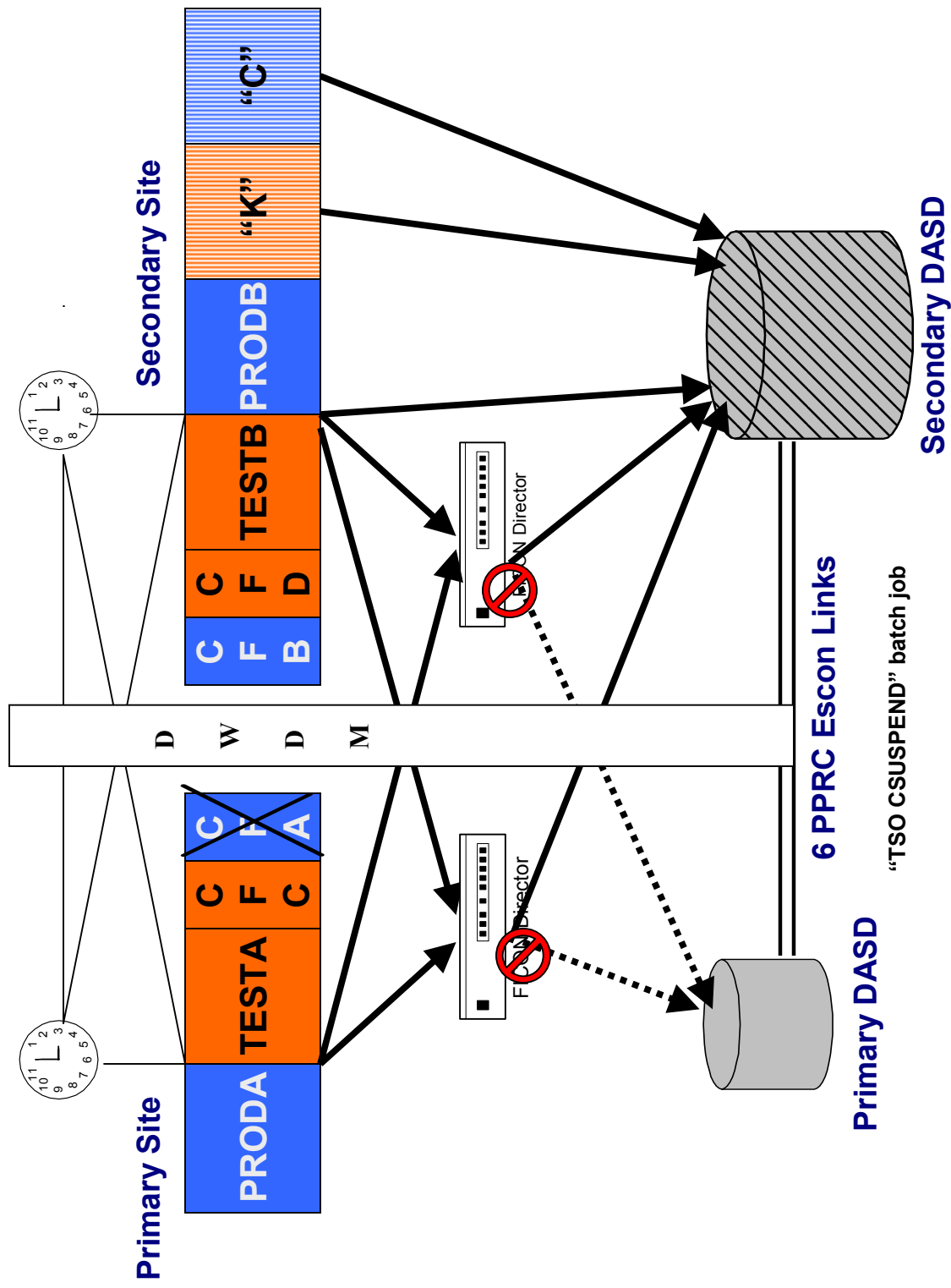
Simulation of an "ALLSITE1" Disaster



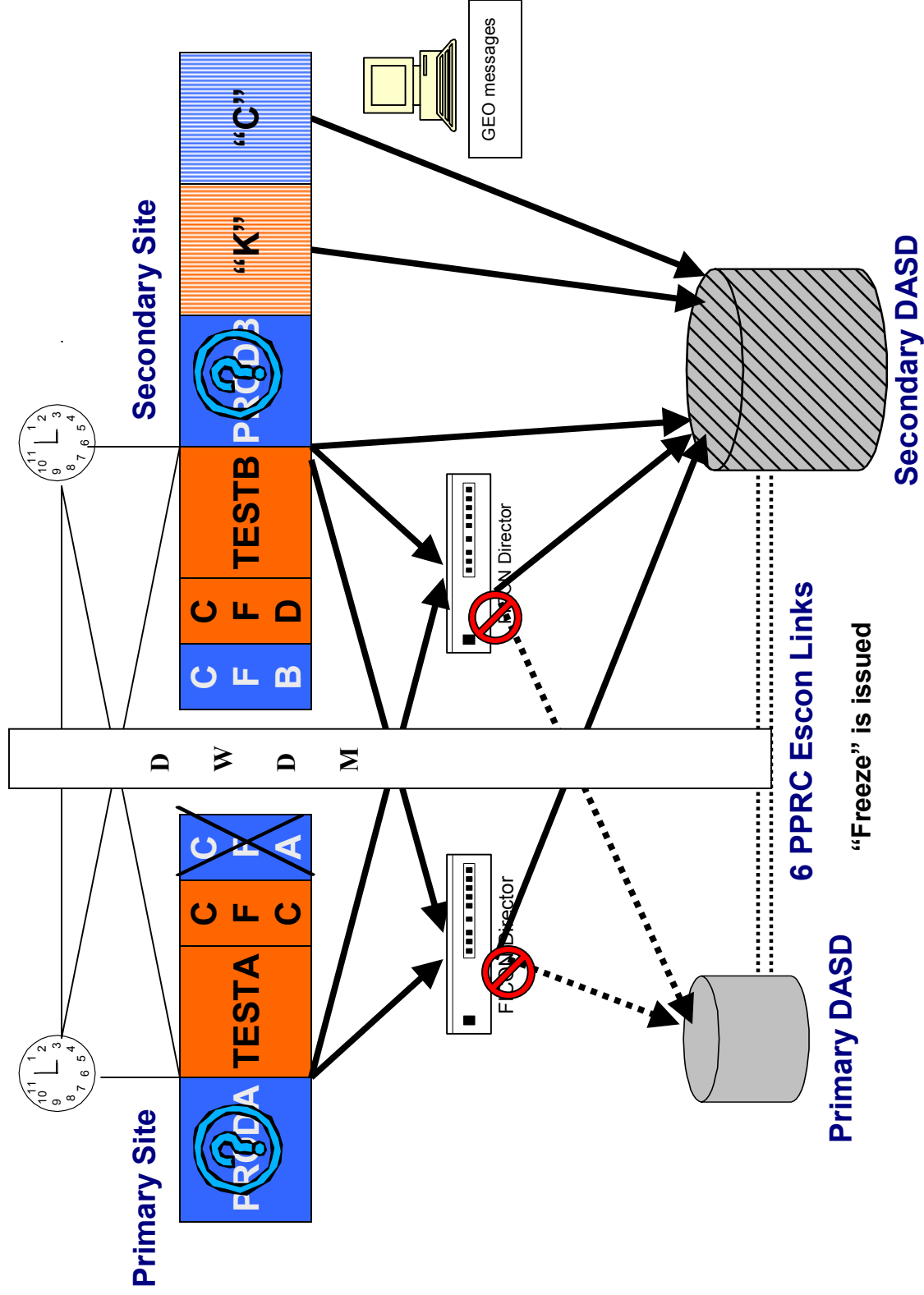
Simulation of an "ALLSITE1" Disaster



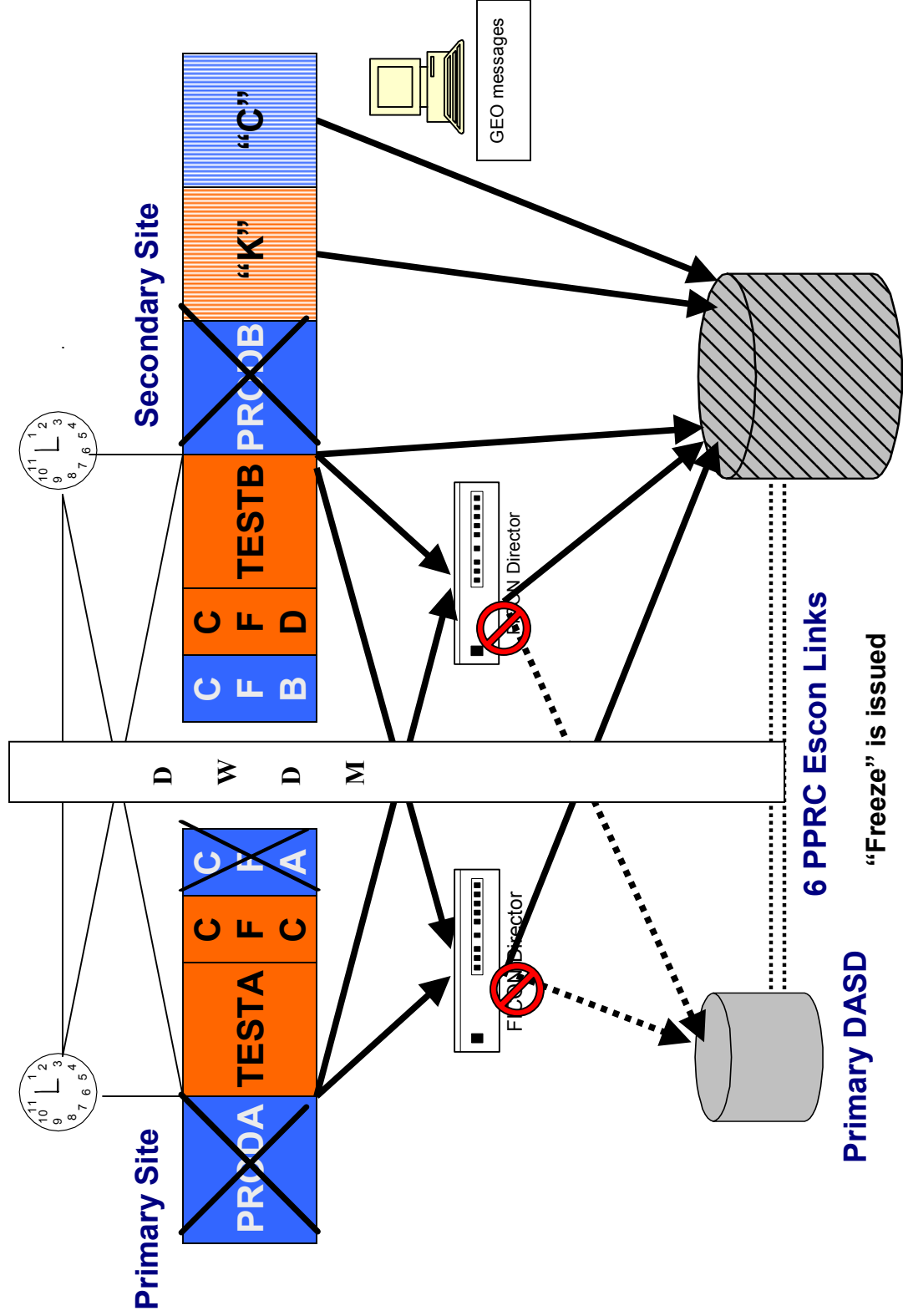
Simulation of an "ALLSITE1" Disaster



Simulation of an "ALLSITE1" Disaster



“ALL SITE1” Disaster is declared



2 hours or less – get set, ready, go!!!!

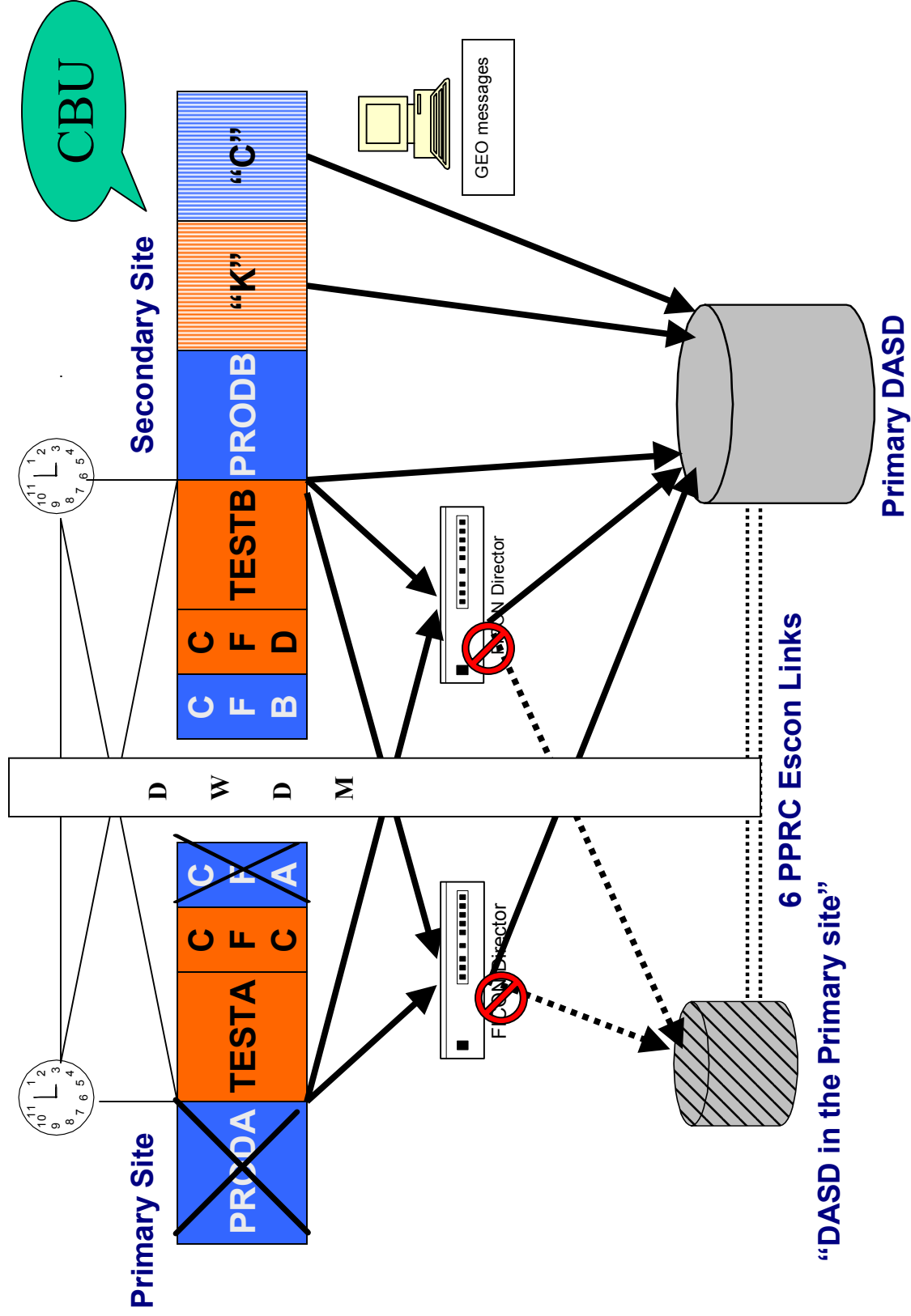
“Freeze” is issued

6 PPRC Escon Links

Primary DASD

Secondary DASD

Running Production in Secondary Site



Primary Site Failure Simulation

- “Freeze” DASD
- Vary FICON channels offline
- Deactivate Primary Coupling Facility in Primary site
- Block ports from FICON Director
 - while running DB2 and IMS jobs and CICS regions are up
- Measure length of time for “recoverability”
 - Phase 2: **67 minutes**
 - Phase 4 (with automation interface): **38 minutes!!!**

Operational Procedures

- **Respond to GEO message that indicates a “failure”**
 - GDPS script ALLSITE1 will automatically execute
- **Operations staff re-IPLs “controlling” LPAR C**
 - System Logger issues
- **Execute user-defined GDPS script PART2ALLSITE1**
 - IPL PRODB in secondary site using secondary DASD
 - Automation in script will bring up only production subsystems
 - Validation of major subsystems: DB2, IMS, CICS
- **Re-establish “mirroring” of DASD**
 - Length of time depends on number of volumes and PPRC links
- **Return to primary site with GDPS script SITE1RTN**

GEO Message

```
*GEO112E GDPS TAKEOVER PROMPT 392
.
. REMOTE COPY PROBLEM, FREEZE DONE
.
. STATUS:
. CF(S) IN SITE1 (NOK)
. CF(S) IN SITE2 (OK)
. DASD(FRZ) (PRIMARY DASD IN SITE1, SECONDARY
DASD FROZEN)
.
. OPTIONS:
. 'DASD' TO EXECUTE DASDSITE1 FOR
.   COMM=PRIMARY DASD FAILURE
. 'ALL' TO EXECUTE ALLSITE1 FOR
.   COMM=PRIMARY SITE FAILURE
. 'SECALLSITE2' FOR
.   COMM=SECONDARY SITE FAILURE.
. 'SECDABSITE2' FOR
.   COMM=SECONDARY DASD FAILURE.
. 'NO' TO SUPPRESS ANY ACTION
. 'REPEAT' TO CHECK STATUS AGAIN
*14 GEO113A REPLY ONE OF THE OPTIONS
```

ALLSITE1 Script

VPCPFLFY

View Unplanned/Batch Action Definition

GDPS V2.R7.M0

Requested action =====> ALLSITE1

Steps:

```
COMM='PRIMARY SITE FAILURE'  
SYSPLEX='RESET PRODA'  
SYSPLEX='RESET PRODB'  
USERPROC='MVS &FREE PRODA'  
USERPROC='MVS &FREE PRODB'  
SYSPLEX='CDS SITE2'  
USERPROC='MVS SETXCF CPL,TYPE=LOGR,PSWITCH'  
SYSPLEX='CFRECOVER UNCOND'  
DASD='RECOVER'  
ASSIST='SHUTDOWN AND RESET PRODC.'
```

Press Any Key to Continue PF8 = Forward

PART2ALLSITE1 Script

VPCPFLFX

View Planned Action

GDPS V2.R7.M0

```
Requested action  ==>>> PART2ALLSITE1
Of               ==>>>
Total no of steps 7           Current step  1           Est.Time
Steps:
COMM='IPL PRODB AFTER ALLSITE1'
IPLTYPE='PRODB ABNORMAL'
SYSPLEX='LOAD PRODB'
ASSIST='REPLY "Y" TO AUT0001. REPLY OK WHEN COMPLETE.'
ASSIST='RESPOND "DR" TO NEXT PROMPT. REPLY OK WHEN COMPLETE.'
ASSIST='REPLY "Y" TO AUT0002 MESSAGE. REPLY OK WHEN COMPLETE.'
ASSIST='BRING UP PRODA SUBSYSTEMS ON PRODB. REPLY OK WHEN COMPLETE.'
```

PF1=Help Press Any Key to Continue PF7= Back PF8= Forward

SITE1RTN Script

VPCPFLFX

View Planned Action

GDPS V2.R7.M0

Requested action =====> SITE1RTN

Of =====>

Total no of steps 19 Current step 1

Steps:

```
COMM='RETURN TO PRIMARY'  
ASSIST='ENSURE DASD GREEN OK. REPLY OK.'  
SYSPLEX='ACTIVATE PRODCF1 LPAR'  
SYSPLEX='CF NORMAL'  
SYSPLEX='STOP ALL'  
SYSPLEX='CDS SITE2'  
DASD='SWITCH DELPAIR'  
USERPROC='MVS V (D237),OFFLINE'  
ASSIST='REPLY OK WHEN D237 IS OFFLINE.'  
USERPROC='MVS V (C237,C039,C139,C439),ONLINE'  
ASSIST='REPLY OK WHEN C237,C039,C139,C439 ARE ONLINE.'  
SYSPLEX='CDS NORMAL'  
USERPROC='MVS F MIM,DEALLOCATE DDNAME=MIMTBL00'  
USERPROC='MVS F MIM,ALLOCATE DSNAMESYS1.MIM.CNTL0,DDNAME=MIMTBL00  
USERPROC='MVS &MIGRATE CONTROLFILE=00'  
IPLTYPE='PRODA NORMAL'  
IPLTYPE='PRODB NORMAL'  
SYSPLEX='LOAD PRODA'  
SYSPLEX='LOAD PRODB'
```

GDPS Primary Panel

```
VPCPPNLI  GDPS - Disaster/Recovery System          GDPS V2.R7.M0

System      = PRODC      NETC      Primary Dasd = SITE1  PSITE1
Current Master = PRODC      NETC
PPRCAPI     = OK
Mirroring   = OK
Automation  = ON

1           Dasd Remote Copy
2           Tape Remote Copy
3           Standard Actions

5           Net Management
6           Planned Actions
7           Sysplex Resource Management
8           Automation ON/OFF
9           View Definitions

C           Config Management

Selection ==> 3
PF1= Help  PF2= End  PF3= Return
PF6= Roll
```

IPL from GDPS Panels

VPCPSTD1

Standard Actions

Actions: S Stop R ReIPL M Modify IT type IM mode SA Automatic
 I IPL L Load X Reset A Activate D Deactivate SM Manual

Sysname	CA	Status	IPLtype	LPAR	IPLmode	Auto	L-addr	Loadparm
SITE1		PPRIMARY						
PRODA	A	ACTIVE	NORMAL	LRP2	RESPK1	YY	C111	C222P2M1
PRODFC1		MANUAL	NORMAL	CFP1	NORMAL	NN		
SITE2		PSECONDARY						
PRODB	A	ACTIVE	NORMAL	LHP1	RESPKA	YY	C444	C222P1M1
PRODC	CA	MASTER	NORMAL	LHPC	RESPKC	YY	D777	DE40MCM1
PRODFC2		MANUAL	NORMAL	CFP2	NORMAL	NN		

Selection ==>

PF1=Help PF2=END PF3=Return PF6=Roll PF8=Next

LOAD Parns/Address Changes

VPCPFLFZ

Query a System

GDPS V2.R7.M0

PRODA

SYSTEM IPLED AT 11.19.37 ON 04/13/2003 IODF DEVICE C333
 RELEASE OS/390 02.10.00 IPL DEVICE C111 VOLUME RESPK1
 USED LOADP2 IN SYS0.IPLPARM ON C333
 ARCHLVL = 1 MTLSHARE = N
 IEASYS LIST = 00
 IEASYS LIST = P2 (OP)

Ipltype	Iplmode	L-addr	L-parm	Ipltype	Iplmode	L-addr	L-parm
NORMAL	RESPK1	C111	C222P2M1	-	-	-	-
ABNORMAL	RESPK1	D111	D222S2M1	-	-	-	-
NORMAL	RESPKA	C444	C222P2M1	-	-	-	-
ABNORMAL	RESPKA	D444	D222S2M1	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

PF1 =Help PF3 to Return Line cmd: S/D Select/Modify/Delete Ipltype/Iplmode

Issues and Resolutions

- **ANTAS0000 address space dumped with an 0C4**
 - Known problem and APAR OW53695 was applied
- **GDPS does not always use the FORCE command to remove a system from a sysplex**
 - Be patient, it eventually will
- **PPRC link connection was showing status of offline**
 - Card had to be replaced in the DWDM control unit
- **FICON channels experiencing errors**
 - Card had to be replaced in the DWDM control unit
- **LPARs unable to communicate over ISC links**
 - Attenuator issue with DWDM had to be tuned properly
- **System Logger when using “Freeze and Go”**
 - Re-IPL “controlling” LPAR and logger CDS in mirrored DASD
- **HMC automation interface with Support element “drops”**
 - Microcode upgrade of HMC to level 143

Future Enhancements

- z/OS 1.4
- GDPS HyperSwap
 - Planned/Unplanned outages will not need a re-IPL
 - CA-MIM limitations vs. GRS
- Eliminate re-IPL of “controlling LPAR”
 - **completed as of May 2004** *20 minutes vs. 40 minutes outage!!!*
- Cascading Ficon Directors
- Fibre Channel Protocol for PPRC links
- Coupling Facility Duplexing *not recommended across sites*
- DB2 Data Sharing
- CA-MIM control file in Coupling Facility
- VTS P-to-P under GDPS

UPDATED ALLSITE1 Script

VPCPFLFY

View Unplanned/Batch Action Definition

GDPS V2.R8.M0

Requested action =====> ALLSITE1

Steps:

```
COMM='PRIMARY SITE FAILURE'  
SYSLEX='RESET PRODA'  
SYSLEX='RESET PRODB'  
USERPROC='MVS &FREE PRODA'  
USERPROC='MVS &FREE PRODB'  
SYSLEX='CDS SITE2'  
USERPROC='MVS SETXCF CPL,TYPE=LOGR,PSWITCH'  
SYSLEX='CFRECOVER UNCOND'  
DASD='RECOVER'  
USERPROC='MVS VARY D237,ONLINE.'  
ASSIST='REPLY OK WHEN D237 IS ONLINE.'  
USERPROC='MVS SETXCF  
CPL,TYPE=LOGR,ACOUPL=(SYS1.XCF.PRODPLEX.LOGR.CDSPP1)'  
USERPROC='MVS SETXCF CPL,TYPE=LOGR,PSWITCH'  
USERPROC='MVS SETXCF  
CPL,TYPE=LOGR,ACOUPL=(SYS1.XCF.PRODPLEX.LOGR.CDSPAL)'  
USERPROC='MVS D XCF,CPL,TYPE=LOGR'  
ASSIST='ENSURE PRIMARY LOGR IS POINTING TO D237. REPLY OK WHEN  
COMPLETE'
```

Team Effort

- IBM GDPS Team
- Sysprogs: MVS, Storage, Network, Database
- Performance Group
- Network Group
- Operations
- DBAs
- IBM CEs

End of Presentation



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