

IBM TRAINING



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E72
Storage options and
Disaster Recovery Concepts for z/VSE

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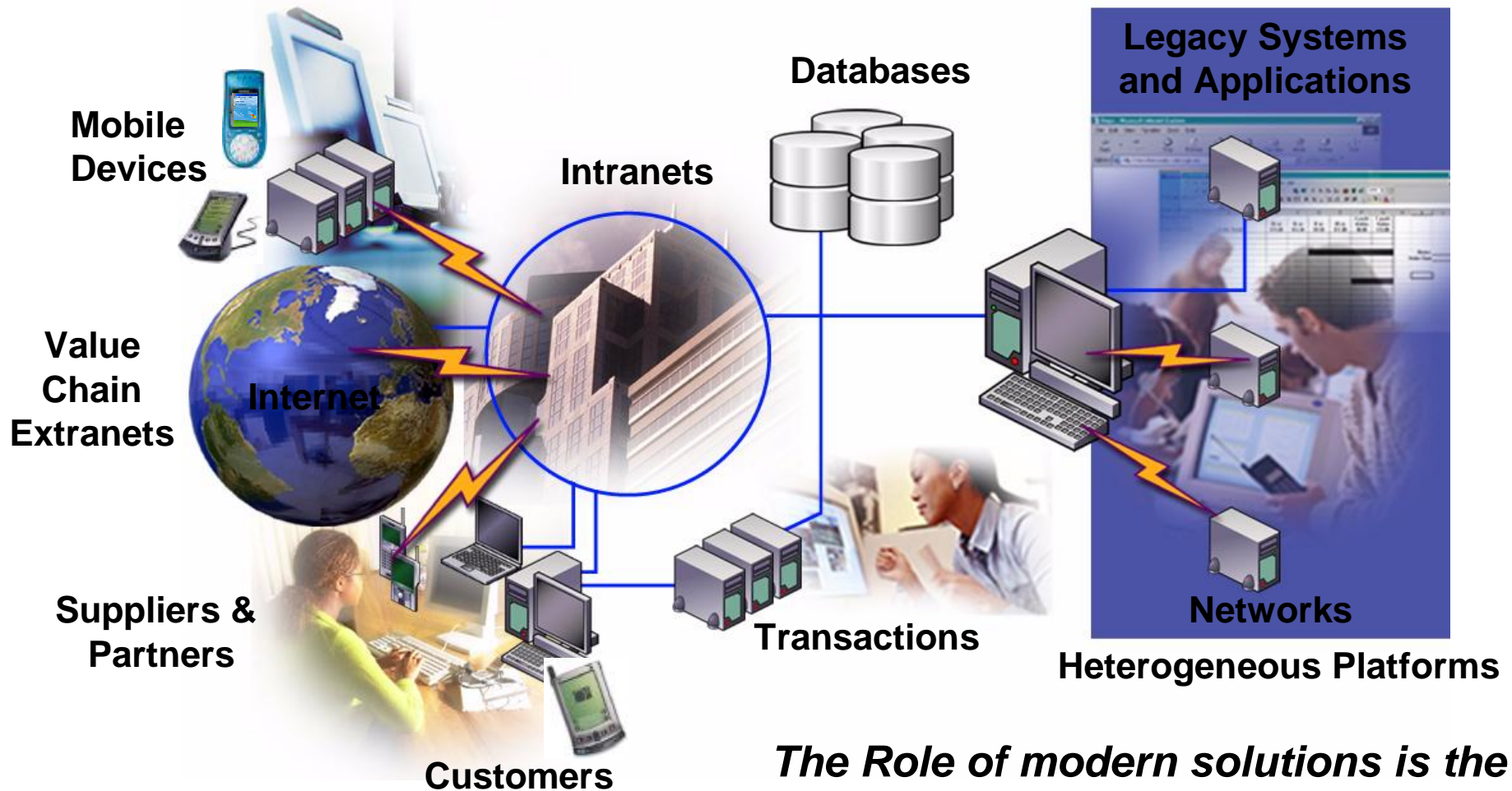
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Today's IT Infrastructure

IT environments are heterogeneous and complex



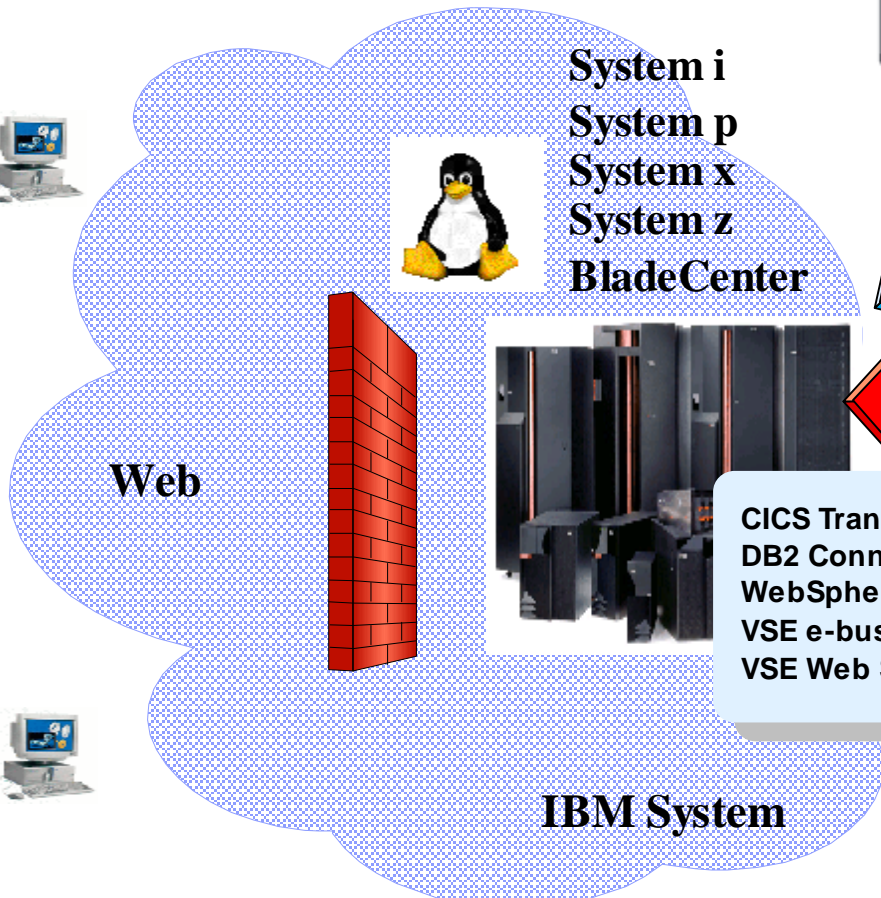
The Role of modern solutions is the Integration and Optimization

VSE Strategy

IBM TotalStorage



IBM System z Enterprise Server



- CICS Transaction Gateway ECI
- DB2 Connect
- WebSphere MQ Series
- VSE e-business connectors
- VSE Web Services

Clients

Business Services

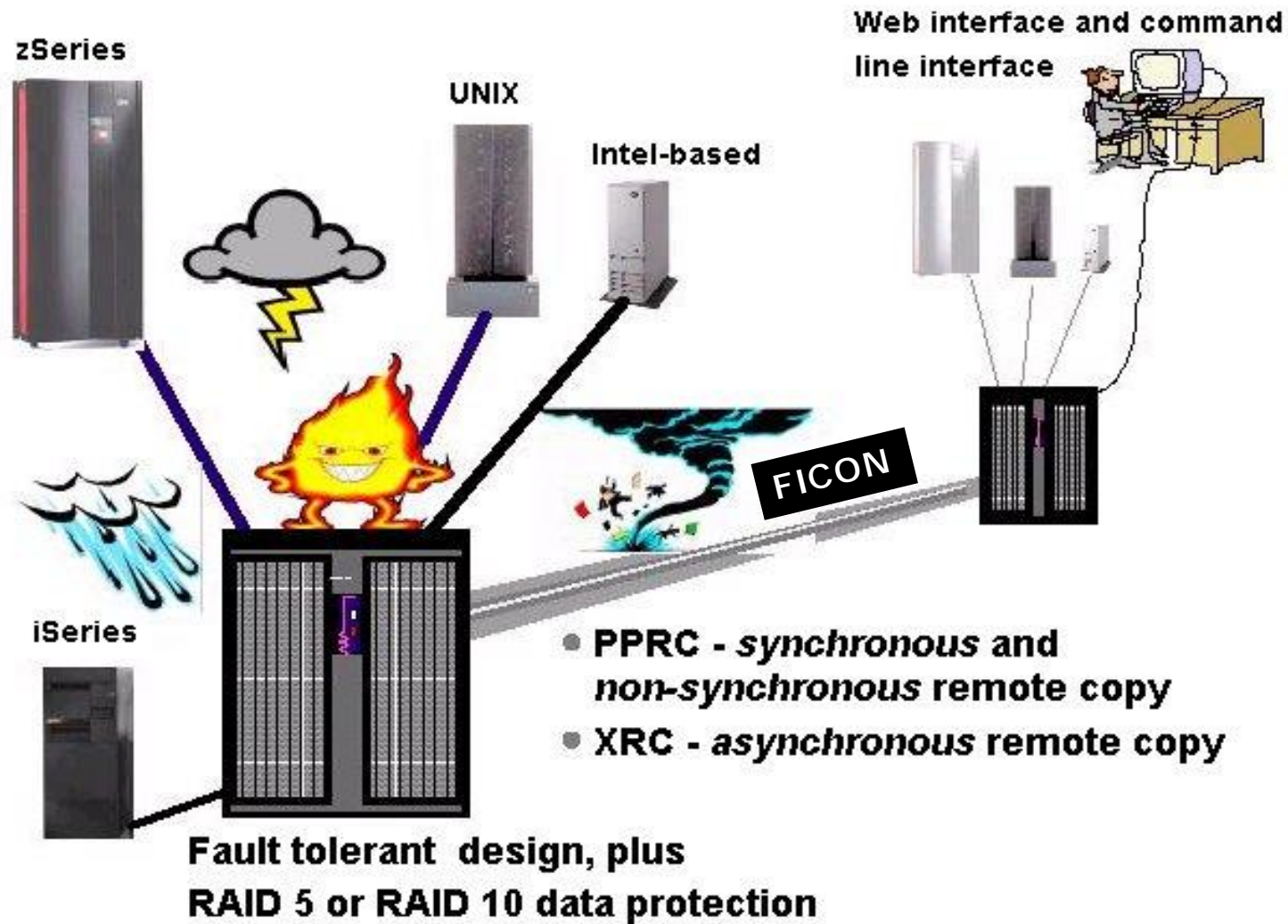
Tran/Data Services

System z Storage Options for z/VSE



IBM TotalStorage	DS6000	ESS 750, 800, 800Turbo	DS8000
ESCON	Not Avail	Yes	Yes
FICON	Yes	Yes	Yes
FCP/SCSI	Yes	Yes	Yes

Enterprise Storage solutions – disaster recovery (Peer to Peer remote Copy - PPRC)



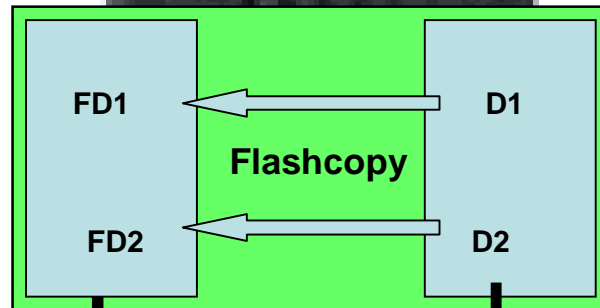
Disaster Recovery Site -
IBM Storage System



PPRC
(Peer to Peer Remote Copy)

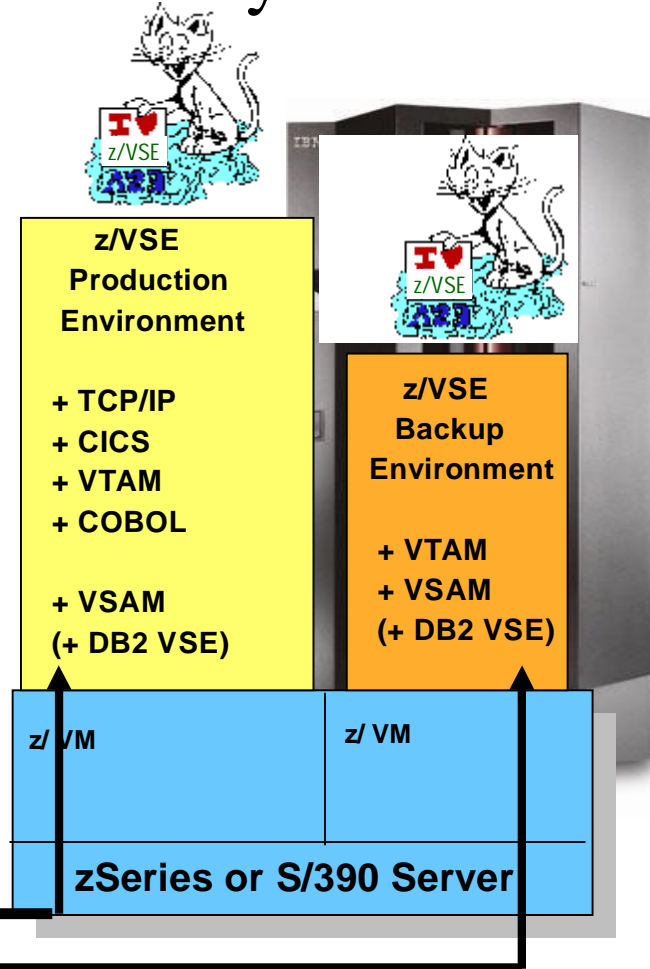
IT Environment Needs for 24x7 Availability

IBM Storage System
ESS, DS6000, DS8000



- § minimal interruption,
- § immediate access to source and target
- § feature available for zSeries and the open system servers

(offline backup process)



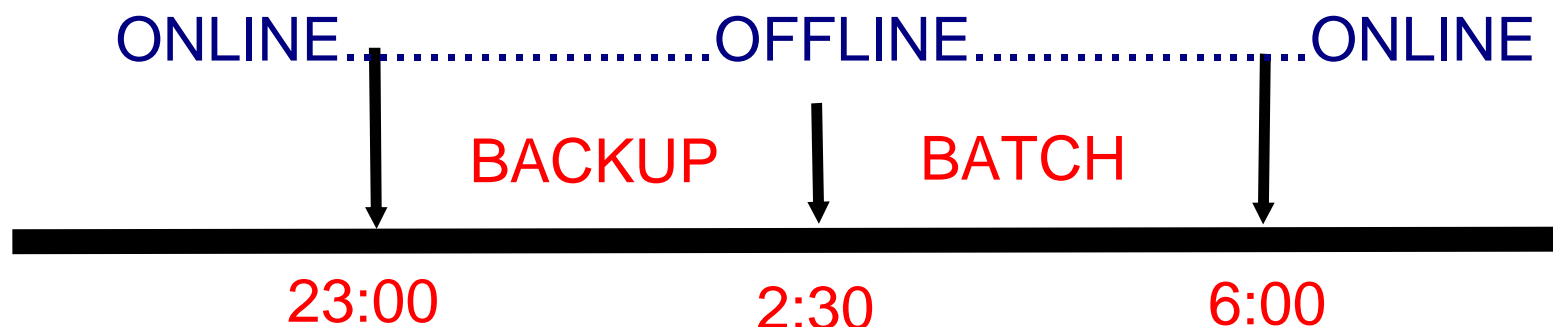
IT Environment Needs for 24x7 Availability

û inhibitors of **online** processing time

F backup-window

F batch-window

Typical processing time-line:



§ modern Storage solutions can reduce OFFLINE time:

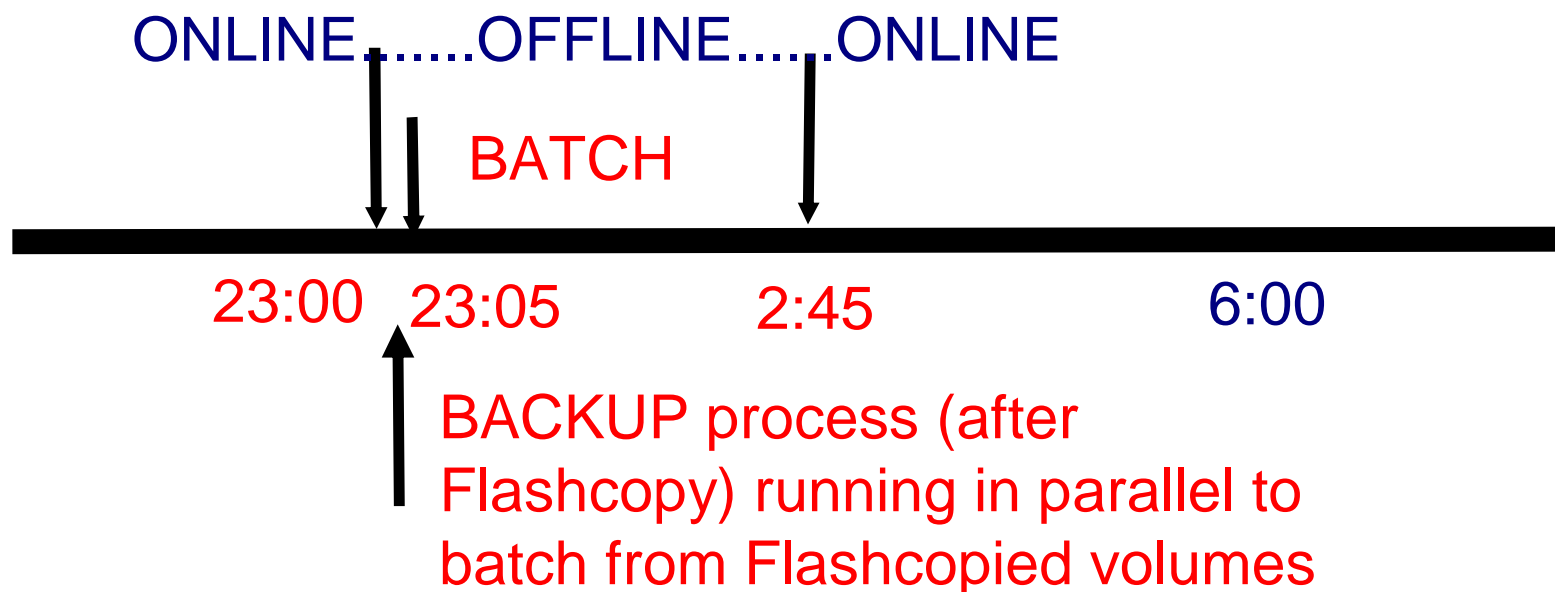
§ eliminate backup window – using FLASHCOPY

§ disaster recovery solution with PPRC

IT Environment Needs for 24x7 Availability

- § modern Storage solutions can reduce OFFLINE time:
- § eliminate backup window – using FLASHCOPY

Typical processing time-line:



IBM TS1120 Tape Drive Encryption

The industry's first comprehensive end-to-end tape encryption

- First encrypting tape drive - IBM System Storage TS1100 tape drive family
 - Standard feature on all TS1120 Tape Drives
 - Chargeable upgrade feature for existing TS1120 Tape Drives
- A new, innovative IBM Encryption Key Manager component for the Java platform™ component supported on a wide range of systems including:
 - z/OS, i5/OS, AIX, HP, Sun, Linux (incl System z), and Windows
- Integration with IBM tape systems, libraries
- Enhancements to Tivoli Storage Manager to exploit TS1120 encryption
- Integration with System z encryption key, policy management, security and cryptographic capabilities
- Complements existing System z Encryption Facility for z/OS program product
- New services and consulting for tape data encryption and key management



TS1120
500 GB
100 MB/sec

**Encryption Key
Manager**



IBM TS1120 Tape Drive Encryption – SOD for z/VSE

SOD*: “z/VSE V3.1 support of the TS1120 Tape Drive with encryption is planned for first half 2007. It is also IBM's intent to support z/VSE V4.1 (when made available) using Systems Managed Encryption with the TS1120. z/VSE support will require the Encryption Key Manager component running on another operating system other than z/VSE using an out-of-band connection.”

Centralized key management

§ Help protect and manage encryption keys

§ Highly secure and available key data store

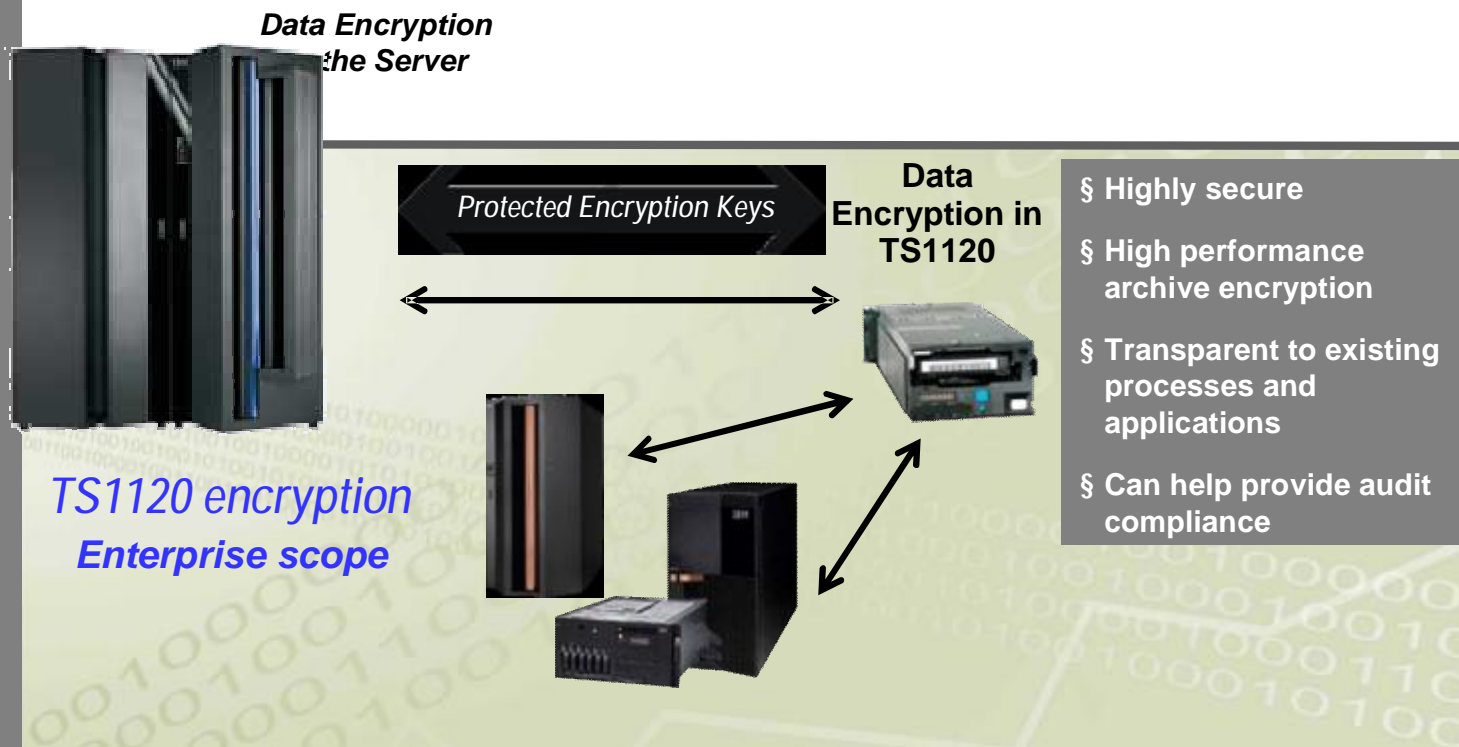
§ Long term key management

§ Disaster recovery capabilities

§ Single point of control

§ Non-VSE, Java-based platform

§ TCP/IP connection to tape control unit



Scenarios for Disaster Recovery with VSE

- (1) Concepts of Disaster Recovery (DR)
- (2) One active production site and one for DR
- (3) Two active sites with production and test
- (4) Borrowed Resources for Disaster Recovery

Concepts of Disaster Recovery with VSE

A Disaster Recovery is needed if the main systems are unable to work.

- Ø Main machines
- Ø Storage subsystems
- Ø Communication of people with Data Center

Reasons for failures:

- Ø Outage of power
- Ø Natural catastrophe (Water, Wind, earthquake,...)
- Ø Technical failures
 - Ø Human error
 - Ø Hardware errors and outages
- Ø Political (terror)

Impact: Inability to be productive – loss of money

Major discussion areas

- Possible Systems affected
 - Type of systems, relation, how many systems participate in the DR scenario
- System positions – Geographically
 - Distance between them for data mirroring
- Connectivity and attachments
 - Ability to replace each other w/o application/user adjustments
- Separation of Data Stores
 - Logical connected data should reside on same side
- Network topology
 - Types of networks to be interconnected
- Operating Systems and application Landscape
 - Application execution based on operating systems

Objectives for Disaster Recovery with VSE

Following Objectives are the same for Systems and Storage

- Minimize time of outage (0-25 min)
- Minimize affected systems in case of a disaster
- Minimize effort for a restart

Required knowledge in case of a DR:

- Special Communication hardware for the DR case – to avoid busy lines from users
- Documentation of DR Process

System environment Agreements for DR

IBM special Agreements for Recovery:

- Ø IBM Customer Agreement (ICA),
- Ø IBM Agreement for Programs (IAP),
- Ø International Program License Agreement (IPLA)

Ø The level of use acquired is documented in a Proof of Entitlement (PoE)
Ø “one install”, (w/o other restrictions), allows a copy of the program on more than one machine under the customer’s control, but only one program is authorized to be in use at any given time. Or customer may use the program **temporarily** on another machine, if the Designated Machine is inoperable.

It applies to all programs licensed under these agreements for:

- Backup use,
- Disaster Recovery (DR),
- BRS when a backup and recovery service is involved

System environment Agreements for DR

IBM defines 3 types of situations for programs running or resident on backup machines: "cold"; "warm"; and "hot".

Accepted actions concerning the copy of the program used for backup purposes:

- ✓ cold - a copy of the program may be stored for backup purposes on a machine as long as the program has not been started.
 - ✓ There is no charge for this copy.

- ✓ warm - a copy of the program may reside for backup purposes on a machine and is started, but is "idling", and is **not doing any work of any kind**.
 - ✓ There is no charge for this copy.

- ✓ hot - a copy of the program may reside for backup purposes on a machine, is started and is doing work. However, this program must be ordered.
 - ✓ There is a charge for this copy.

System environment Agreements for DR - continued

For the 'warm' situation - "Doing Work", includes:

- Ø production,
- Ø development,
- Ø program maintenance,
- Ø testing
- Ø mirroring of transactions,
- Ø updating of files,
- Ø synchronization of programs, data or other resources (e.g., active linking with another machine, program, data base or other resource, etc.)
- Ø any activity or configurability that would allow an active hot-switch or other synchronized switch-over between programs, data bases, or other resources to occur.

Ø A scheduled hardware outage, such as preventive maintenance or installation of upgrades, is NOT considered a backup situation.

System environment Agreements for DR – continued (2)

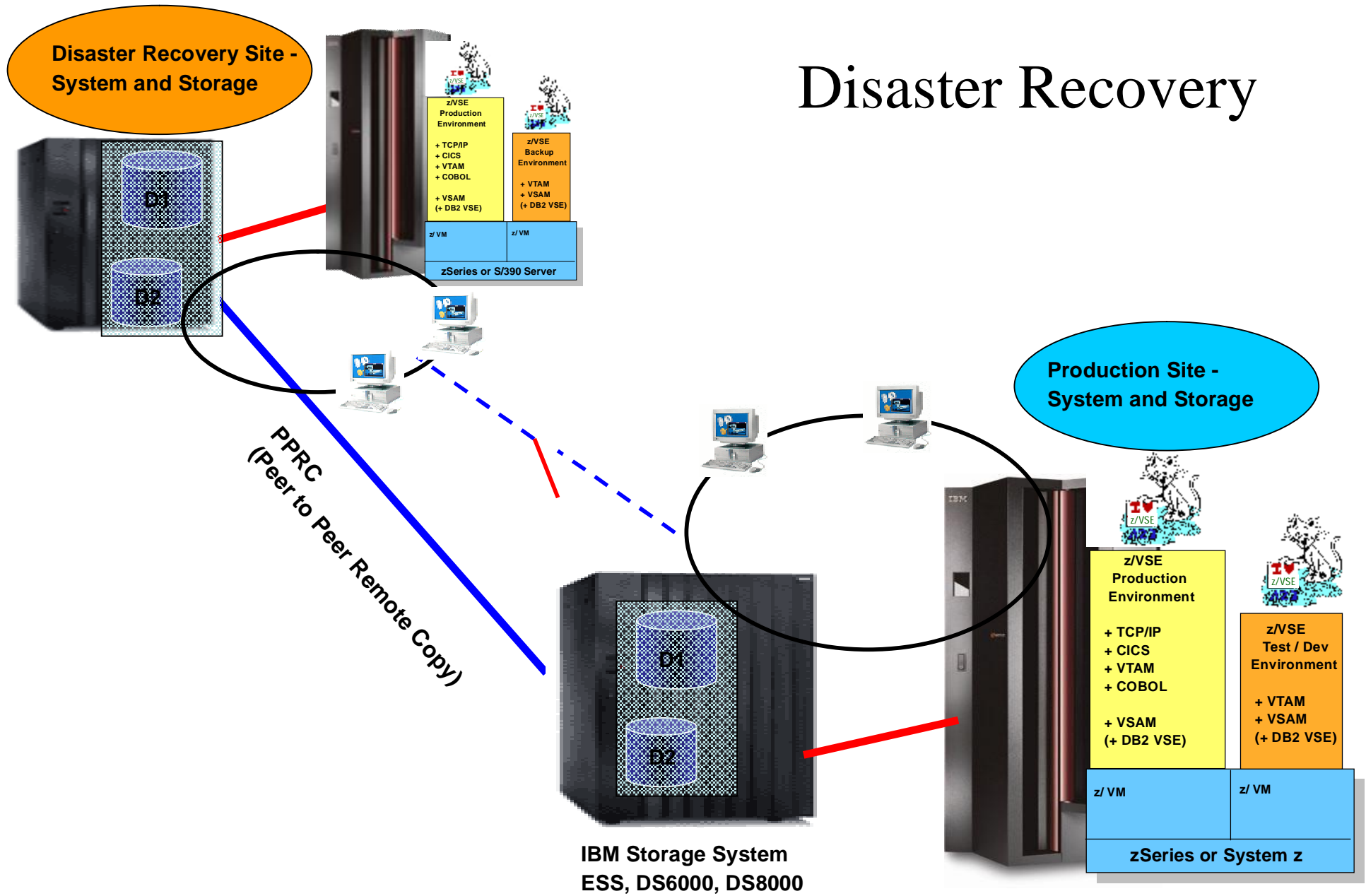
Preparation for emergency backup situations requires periodic tests – based on the requirements of system availability.

No extra program charges apply for these tests if:

- Ø The number is appropriate (e.g., 1-3 tests per year)
- Ø The duration is adequate, (e.g. 2 to 3 days per test).
- Ø For more frequent tests required (e.g. for on-line systems running 24x7 critical customer business operation)
 - Ø a shorter duration without exceeding the total hours of above guidelines.

There can be no productive output or work done from the tests and no development, program maintenance or testing as part of the tests. IBM has the right to review the customer's rationale for not licensing the IBM Program copy for the backup environment.

Disaster Recovery



Scenarios for Disaster Recovery with VSE

- (1) Concepts of Disaster Recovery (DR)
- (2) One active production site only and one for DR
- (3) Two active sites with production and test
- (4) Borrowed Resources for Disaster Recovery

(1) One active production site only and one for DR

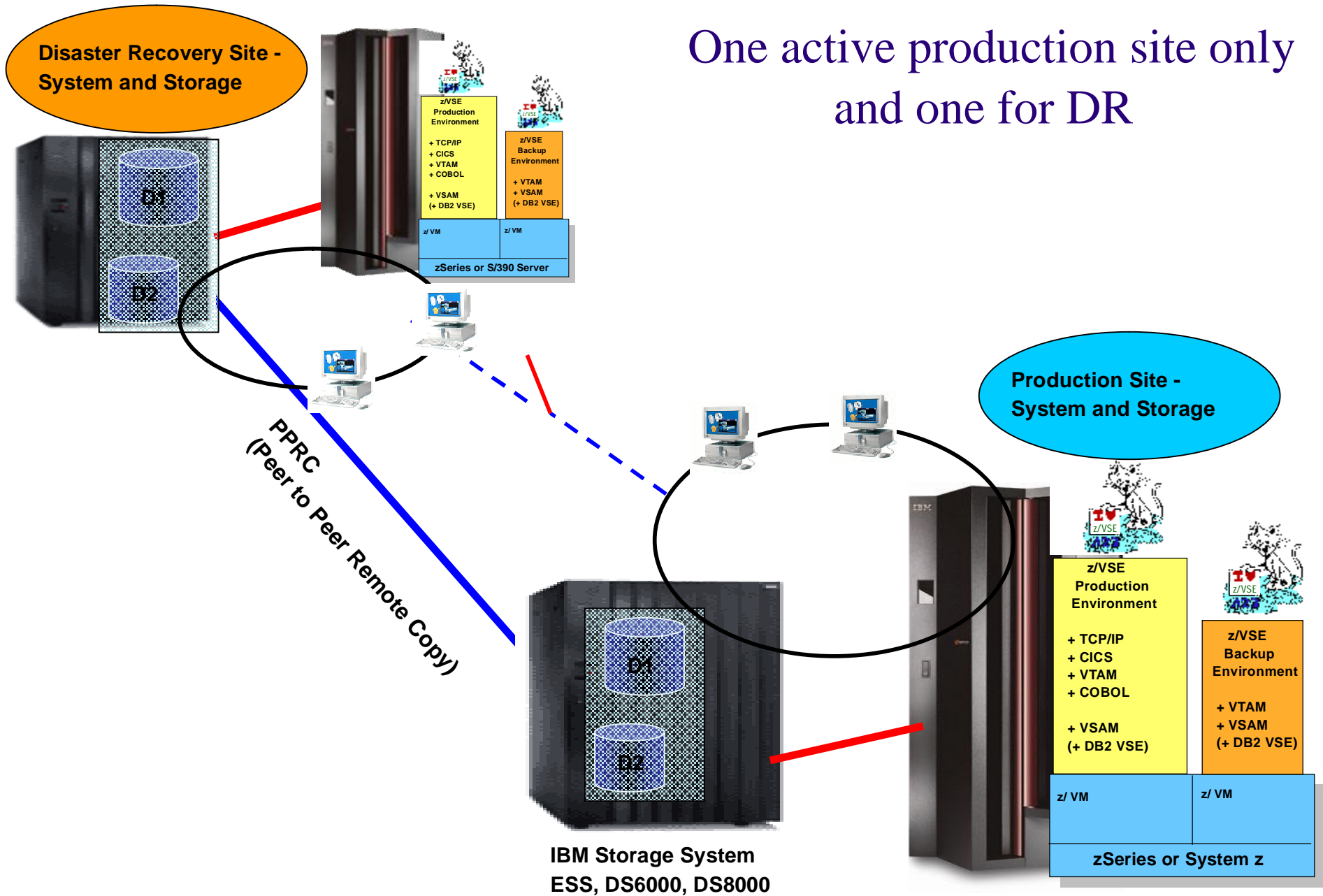
Environment setup for disaster Recovery

- ✓ **DR System**
 - ✓ **An IBM agreement is done to start this machine with the same power as the production site in Case of Recovery**
 - ✓ **An additional agreement can be made for increased capacity, to shorten the startup time of the VSE systems**
 - ✓ **A COLD environment setup - the System is switched off**
 - ✓ **A WARM environment setup - the System is idling**
 - ✓ **Both Systems are able to connect to both Storage subsystems**
 - ✓ **(on the production and DR site)**

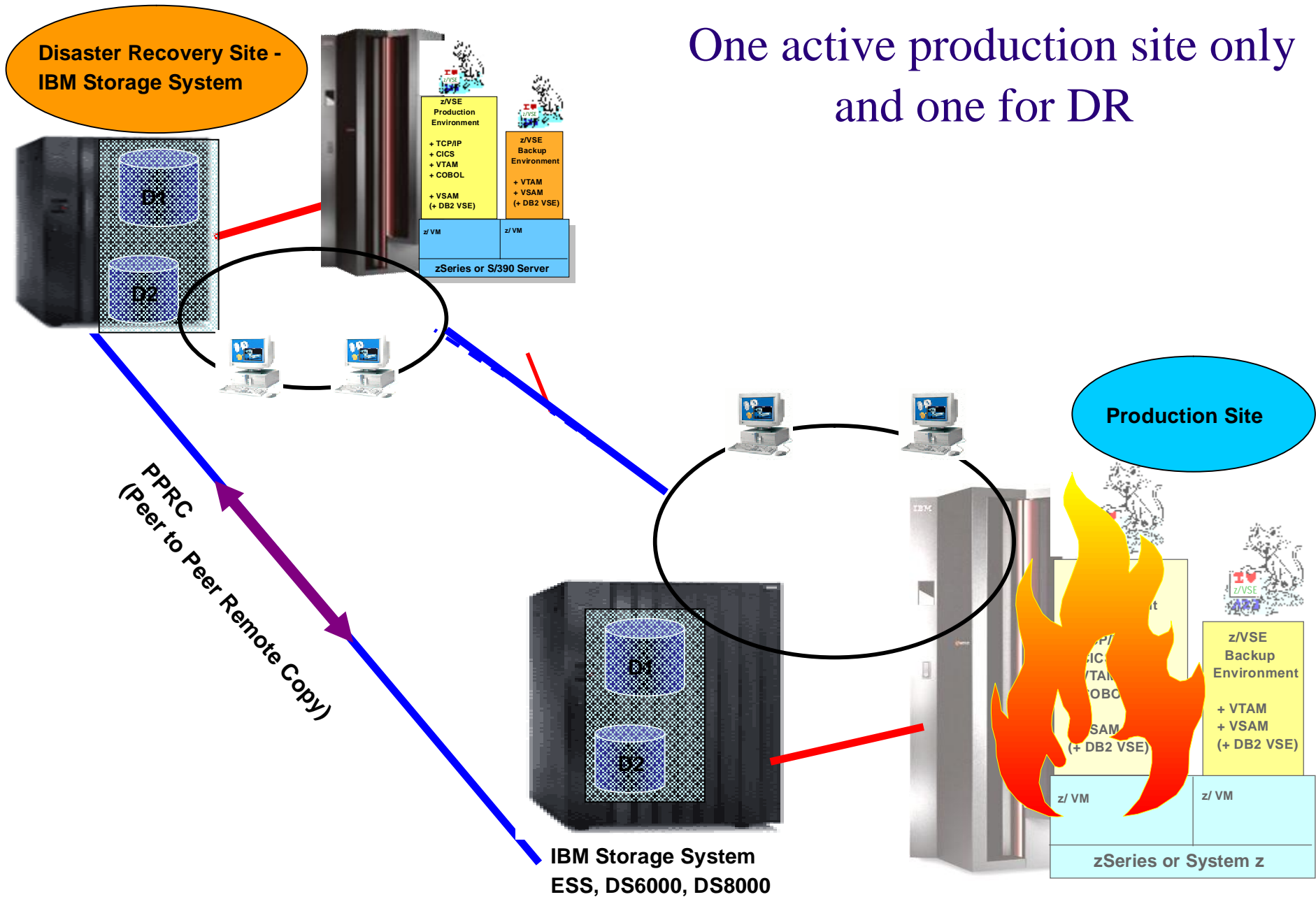
- ✓ **Storage Systems**
 - ✓ **The Production Storage system is connected to the one for DR**
 - ✓ **The DR Storage system is connected to the production Storage**
 - ✓ **Data is mirrored via PPRC (real time or asynchronous)**
 - ✓ **Enablement to switch the PPRC direction**

- ✓ **Network**
 - ✓ **Possibility to switch between the productional and DR network**

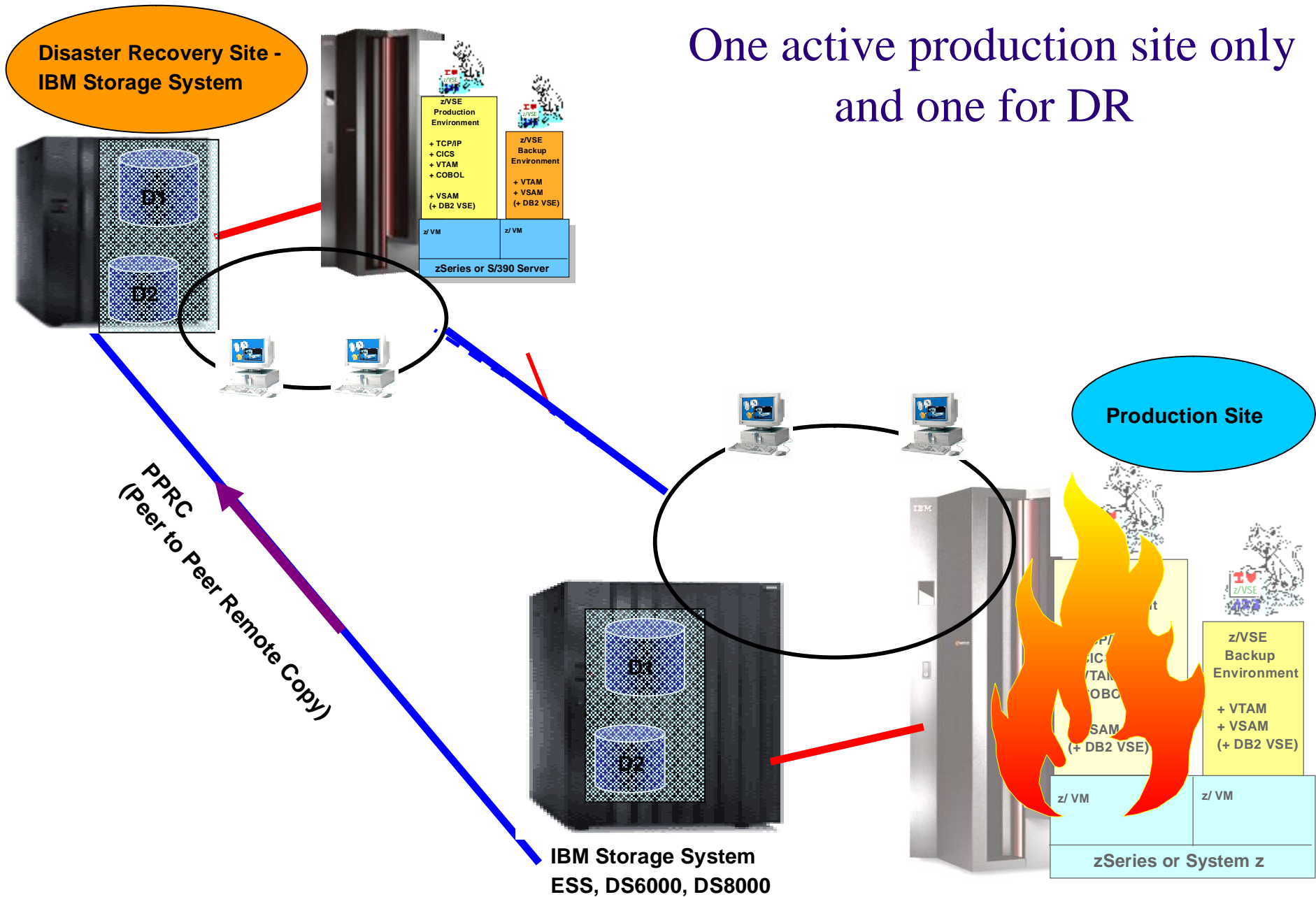
One active production site only and one for DR



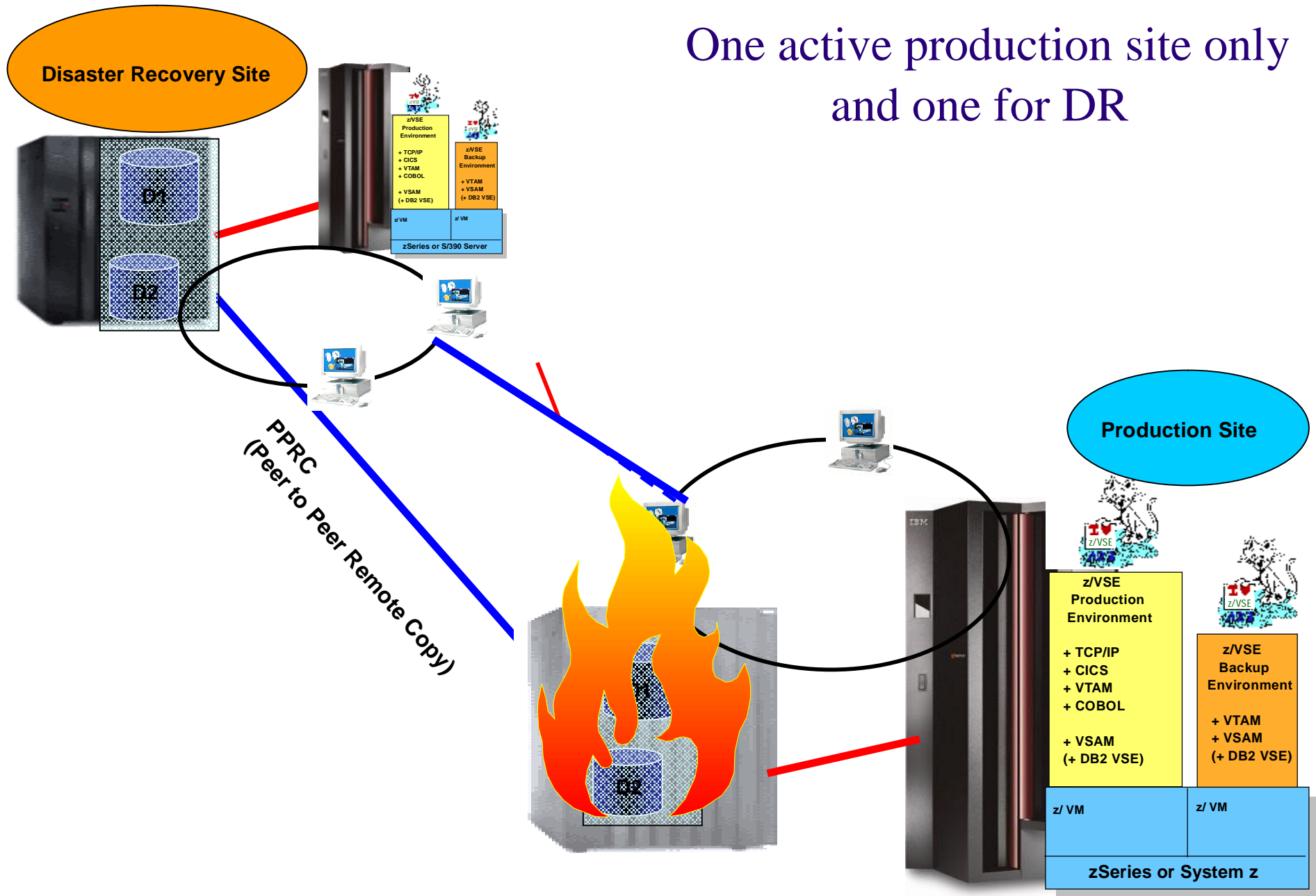
One active production site only and one for DR



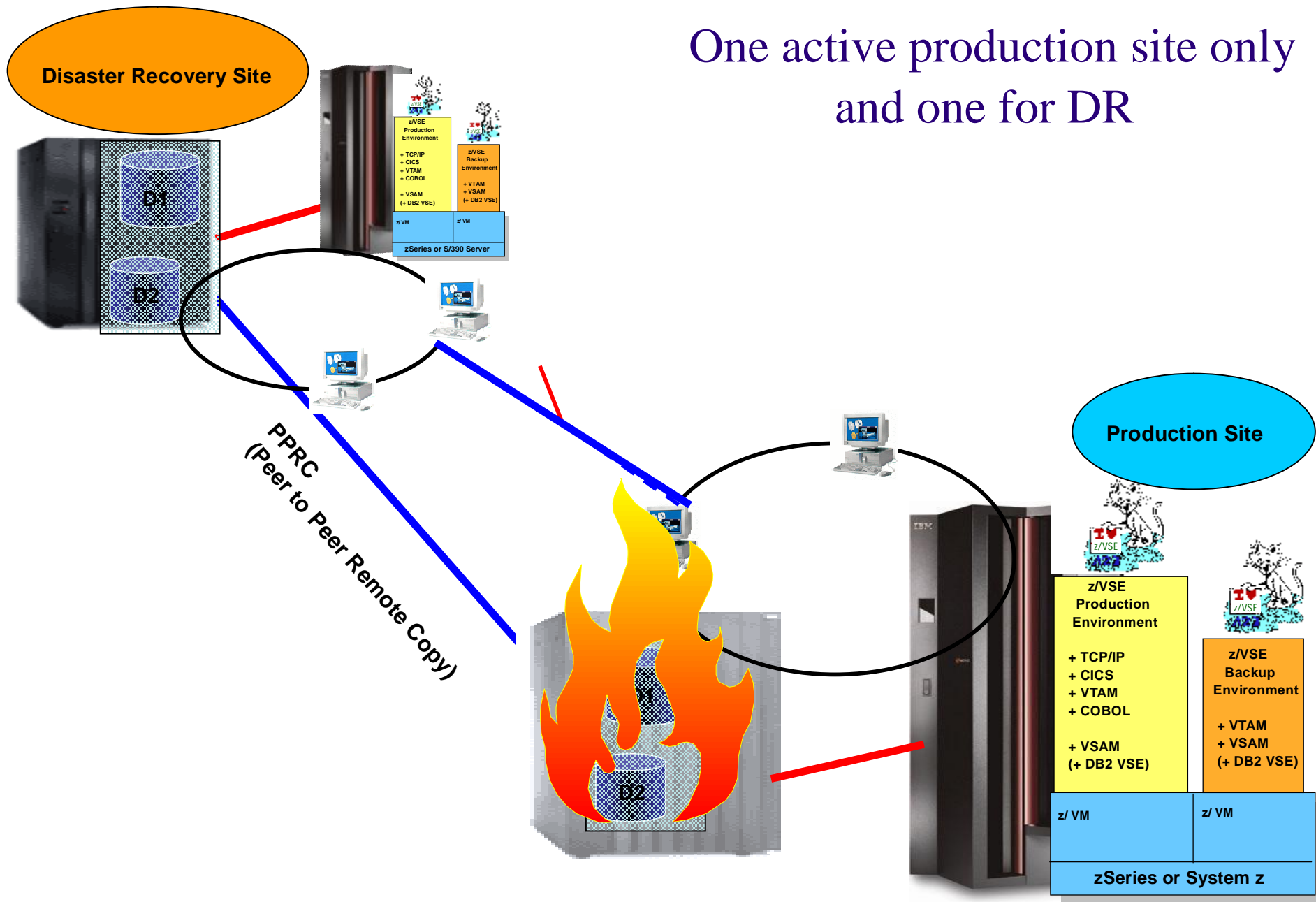
One active production site only and one for DR

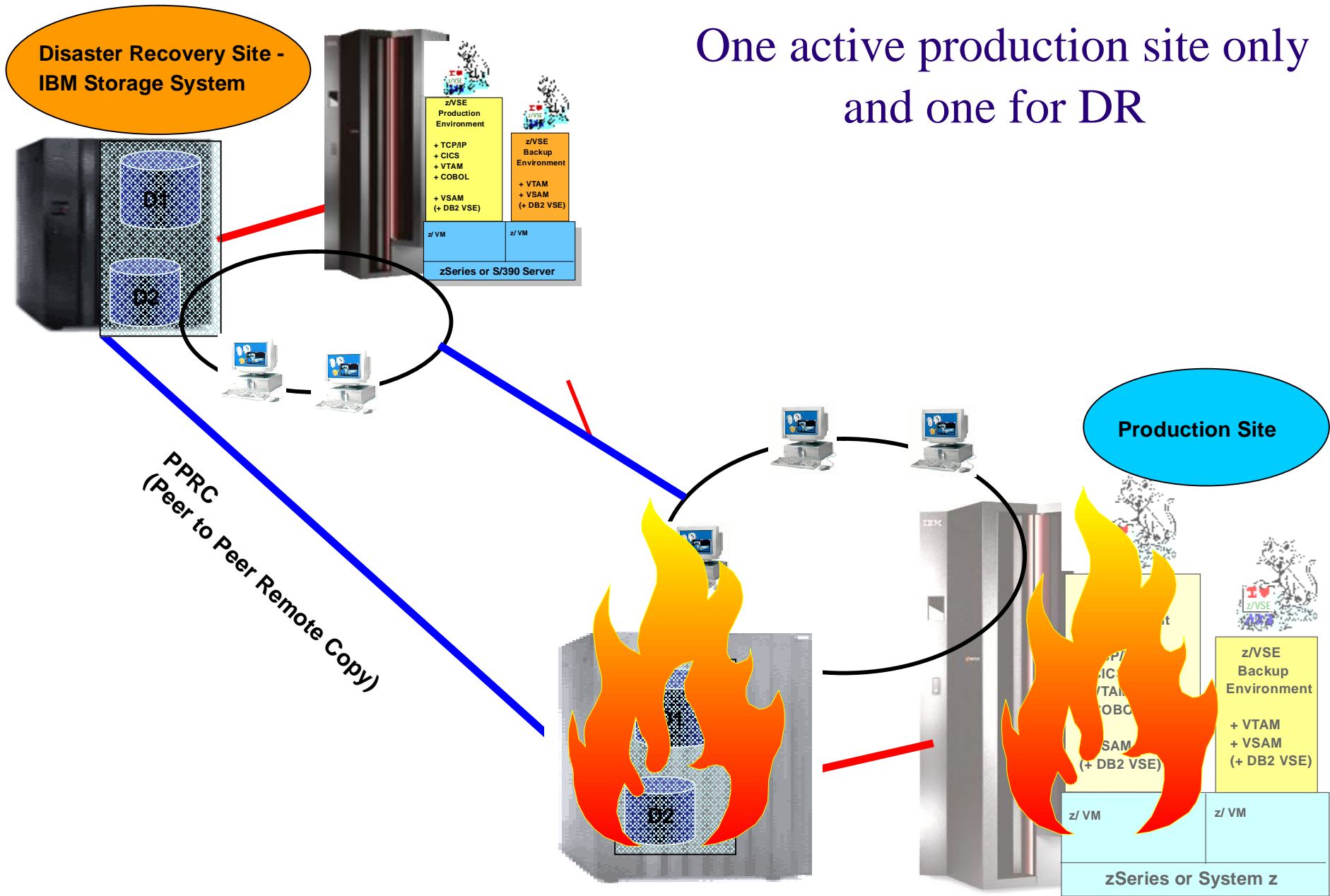


One active production site only and one for DR



One active production site only and one for DR





One active production site only
and one for DR

Steps in case of a disaster Recovery

1. **Emergency phones and messaging methods have to be enabled**
2. **Start z/VM on the Recovery Site (on a COLD environment)**
 1. **Start the CBU (Capacity Backup Upgrade) if defined – to accelerate start of VSE systems**
3. **Switch the OSA Adapter Network Connectivity**
4. **Start Online VSE machines (all CICS partitions should start automatically)**
5. **After all productional machines are running – the capacity can be reduced to the normal productional capacity**

Note: These Steps must be tested and trained periodically to have a well functioning process in case of a disaster Recovery failure.

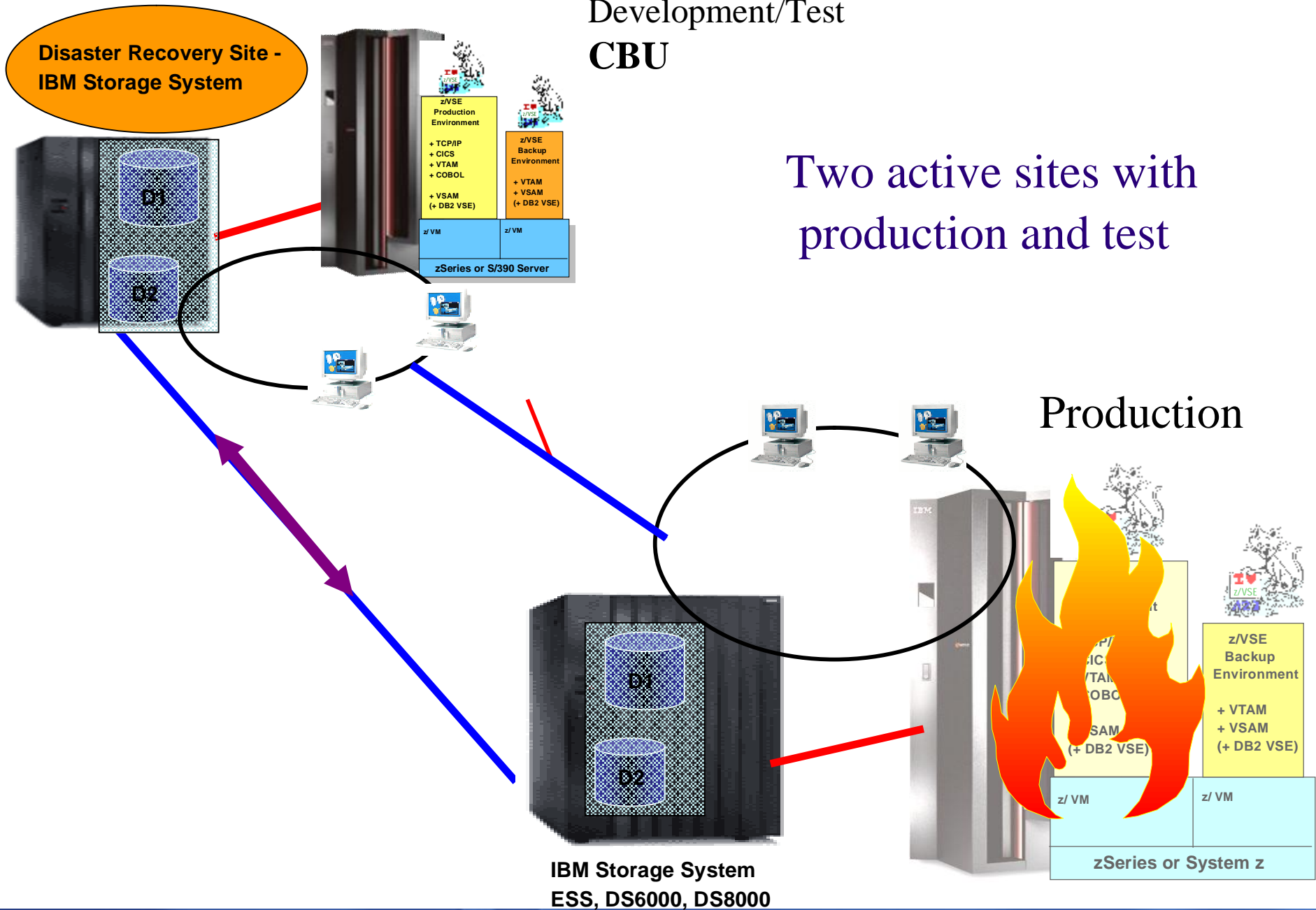
Scenarios for Disaster Recovery with VSE

- (1) Concepts of Disaster Recovery (DR)
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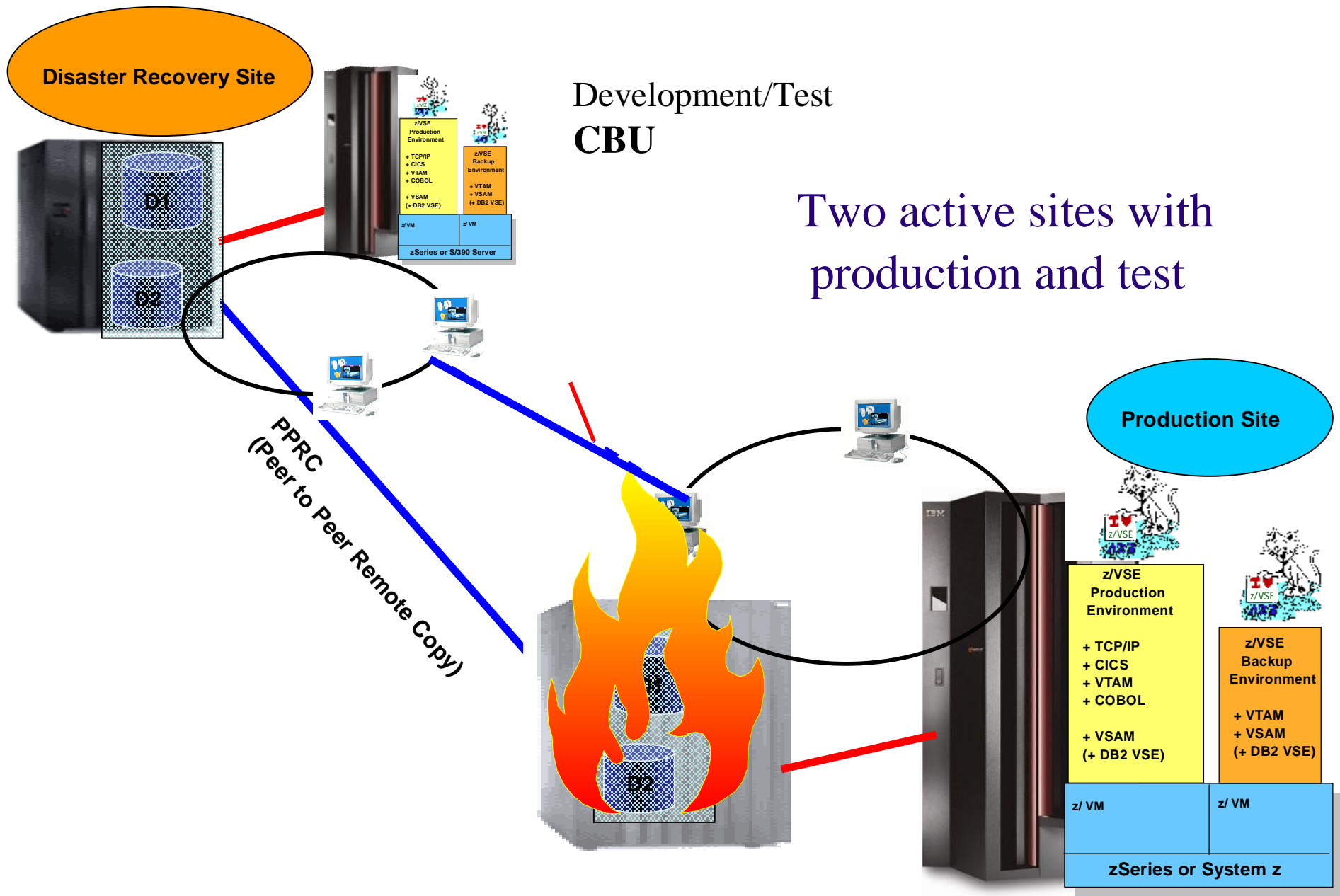
Development/Test CBU

Two active sites with
production and test

Production



IBM Storage System
ESS, DS6000, DS8000



Two active sites with production and test

(1) Two active sites with production and test Environment setup for disaster Recovery

- ✓ **DR System**
 - ✓ **An IBM agreement is done to increase the machine for DR capacity with the power of the production site, using CBU (Capacity Backup Upgrade)**
 - ✓ **In a WARM environment setup - the System is idling**
 - ✓ **In a HOT Environment setup – the system is very fast ready to take over the production workload**
 - ✓ **Both Systems are able to connect to both Storage subsystems**
 - ✓ **(on the production and DR site)**
- ✓ **Storage Systems**
 - ✓ **The Production Storage system is connected to the one for DR**
 - ✓ **The DR Storage system is connected to the production Storage**
 - ✓ **Data is mirrored via PPRC (real time or asynchronous)**
 - ✓ **Enablement to switch the PPRC direction**
- ✓ **Network**
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Steps in case of a disaster Recovery

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2. **Start the CBU (Capacity Backup Upgrade)**
3. **Switch the OSA Adapter Network Connectivity**
4. **Start the Online VSE machines if not already started (all CICS partitions should start automatically)**
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Scenarios for Disaster Recovery with VSE

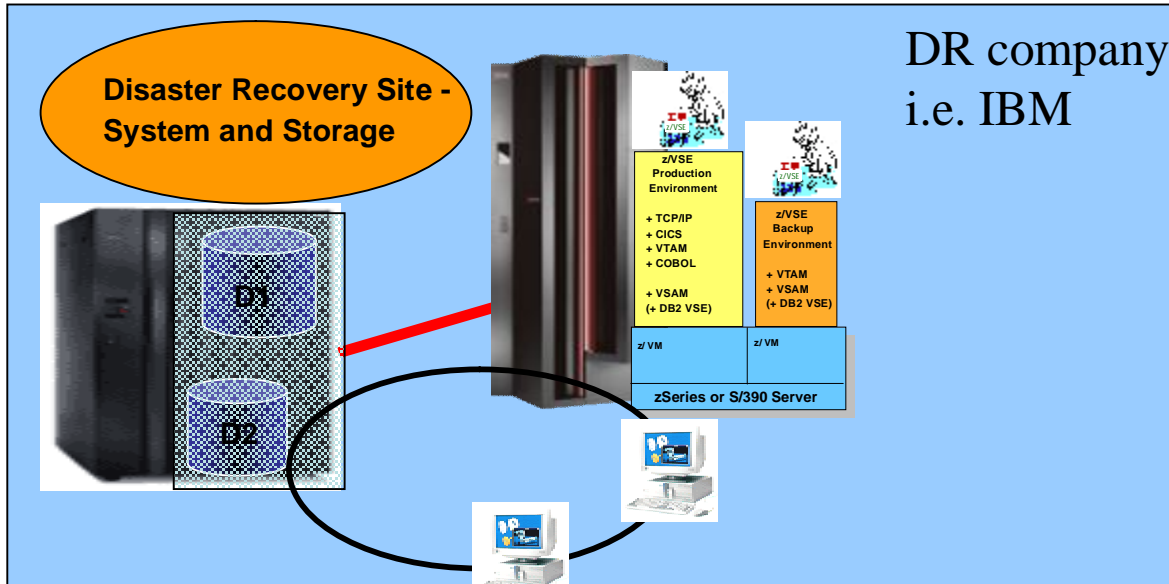
- (1) Concepts of Disaster Recovery (DR)
- (2) One active production site and one for DR
- (3) Two active sites with production and test
- (4) Borrowed resources for Disaster Recovery

Borrowed resources for Disaster Recovery

A Disaster Recovery Site can be made offsite on other customers with IBM equipment.

Necessary Agreements are required:

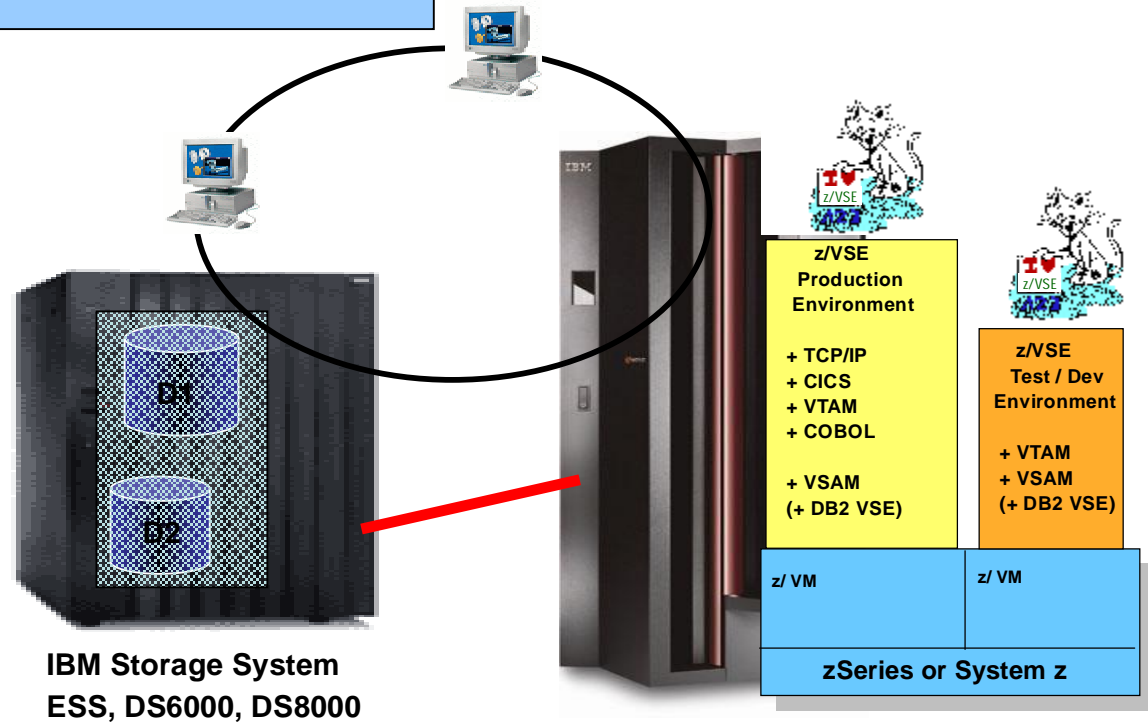
- Ø An contract with HW details
- Ø The DR procedure must be well defined and described
- Ø Data for the DR case are provided periodically to the DR Center
- Ø Training is done periodically and the DR procedure is verified



DR company
i.e. IBM

Borrowed resources for Disaster Recovery

Depending on failure,
not all actual running processes
can be redone entirely.



IBM Storage System
ESS, DS6000, DS8000

z/VSE on the web

z/VSE Solutions

The screenshot shows the IBM z/VSE website interface. The address bar displays `http://www.ibm.com/servers/eserver/zseries/zvse/`. The navigation menu includes Home, Products, Services & solutions, Support & downloads, and My account. A left-hand navigation pane lists various categories, with 'Solutions' highlighted by a red circle. The main content area features a 'z/VSE' heading, a descriptive paragraph about the product's capabilities, and a 'Learn more' section with links to 'About VSE', 'News', and 'History of VSE'. A prominent banner announces 'Announcing z/VSE V3.1' with a '40 YEARS' logo. Below this, a section titled 'Redesigned z/VSE homepage' explains the site's updates. A 'z/VSE Version3 Release 1' section lists supported hardware and software configurations. The right-hand sidebar contains several utility boxes: 'We're here to help' with an 'E-mail us' link, 'Mark your calendar' for the 'Guide Share Europe' event, 'Spotlights' on infrastructure simplification and service levels, and 'Middleware' options like WebSphere software.

F New Web presence: ibm.com/servers/eserver/zseries/zvse/solutions

Additional Informations

| z/VSE Home Page

<http://www.ibm.com/servers/eserver/zseries/zvse/>

| z/VSE Solutions and Utilities

<http://www-1.ibm.com/servers/eserver/zseries/zvse/solutions/>



| e-business Solutions for VSE/ESA

SG24-5662

| e-business Connectivity for VSE/ESA

SG24-5950

| CICS Transaction Server for VSE/ESA

CICS Web Support

SG24-5997-00

| ***WebSphere Handbook (Connectors to z/OS and VSE)*** ***SG24-7042***

z/VSE Contact: zvse@de.ibm.com