IMS26

IMS Continuous Availability

pete.sadler @ uk.ibm.com

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MVS, MVS/ESA

IMS/ESA

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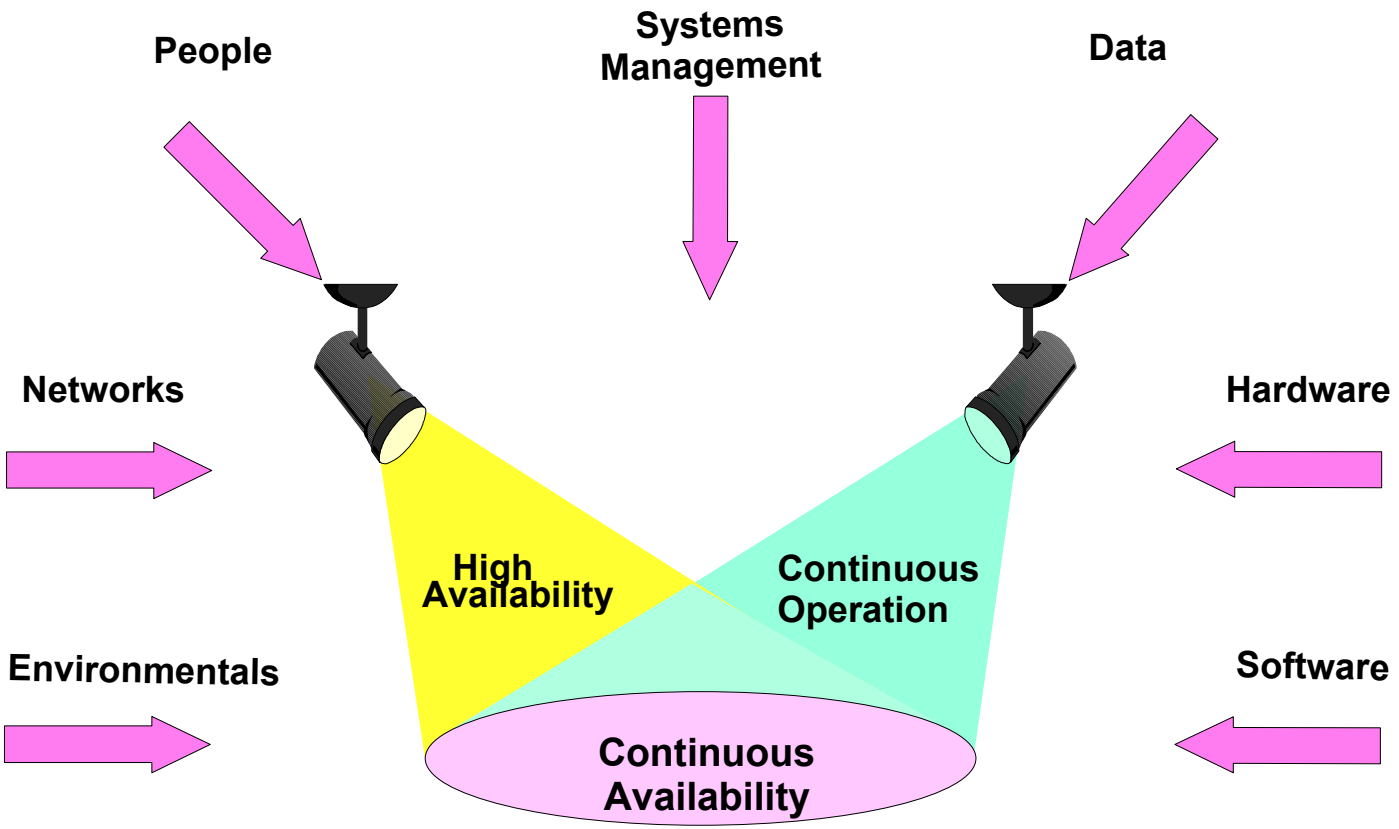
Availability Definitions

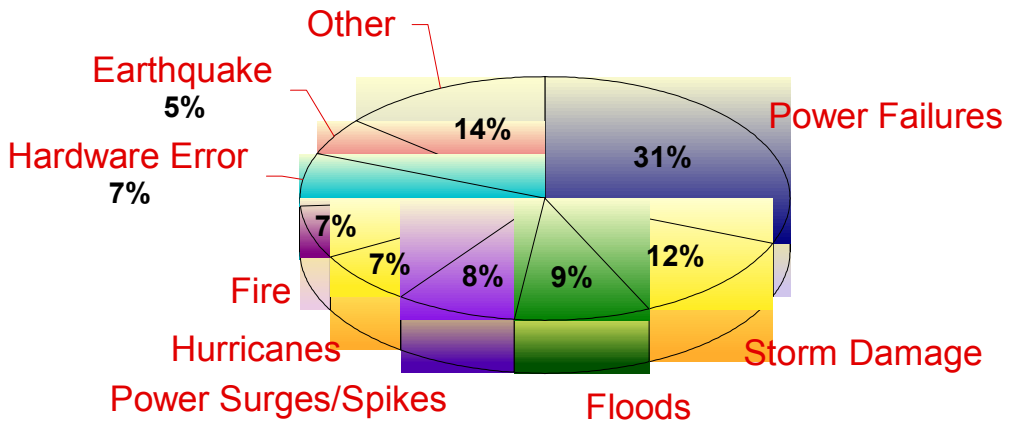
- **High Availability (HA)**
  - **A system that delivers uninterrupted service during scheduled periods**
    - **There are no unplanned outages from an end-user perspective.**
- **Continuous Operation (CO)**
  - **A system that delivers service 7 days a week, 24 hours a day with no scheduled outages.**
    - **There are no planned outages from an end-user perspective.**
- **Continuous Availability (CA)**
  - **A system that delivers uninterrupted service 7 days a week, 24 hours a day**
    - **There are no planned or unplanned outages from an end-user perspective.**

Spectrum of Availability Factors



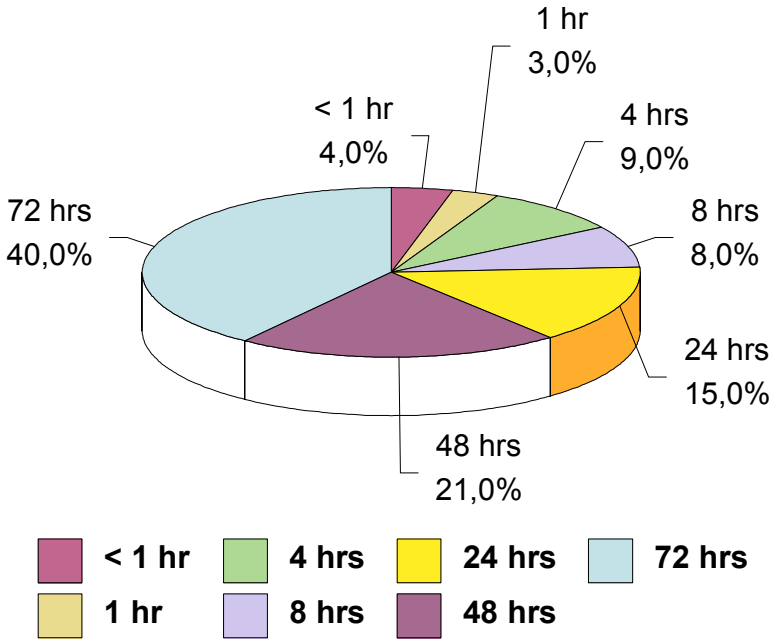
Outage Reasons and Risks

Corporate Computer Disaster Incidents



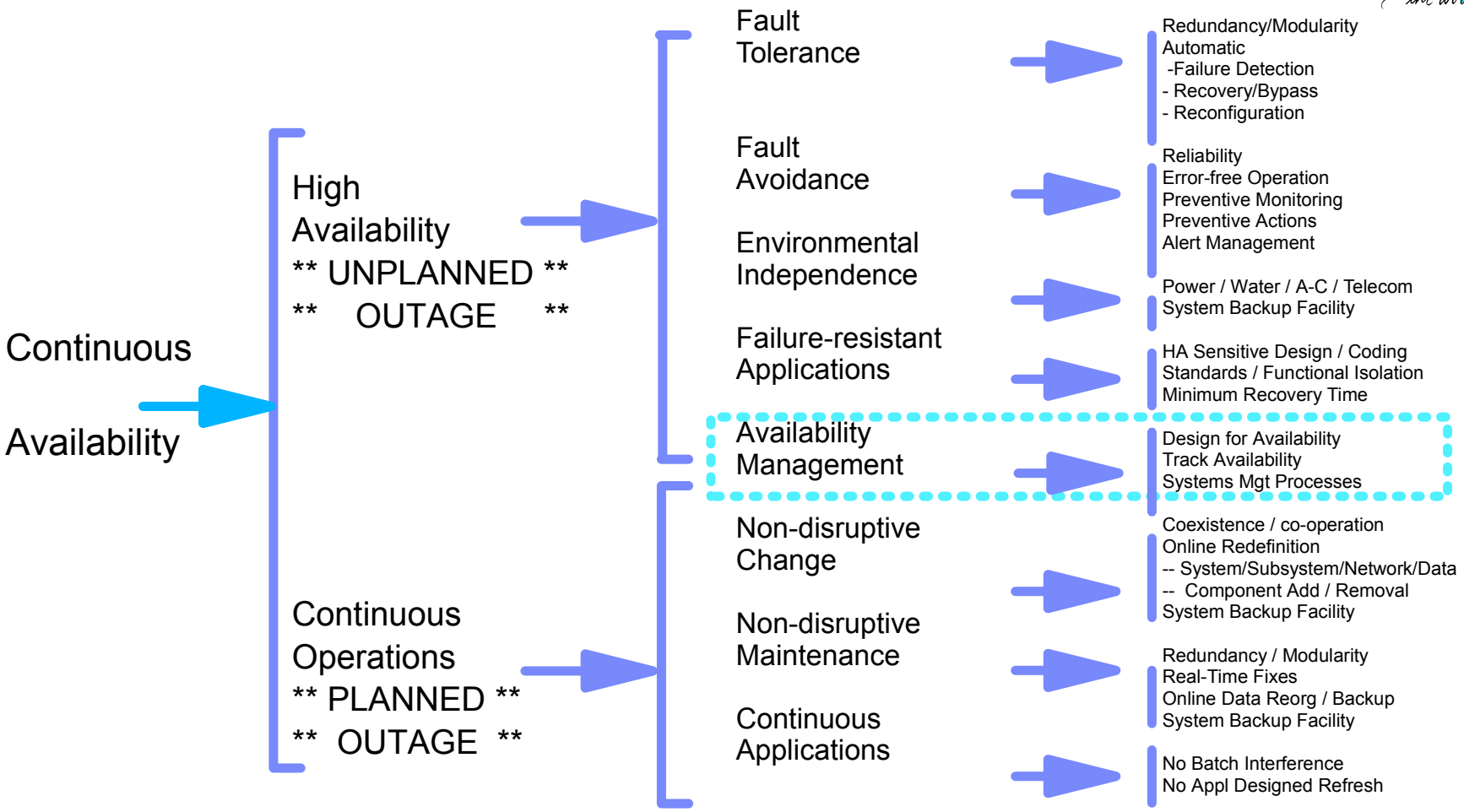
Source: Contingency Planning Research

When is Company at Risk ?



Source: 2001 survey by Eagle Rock Alliance
www.eaglerockalliance.com

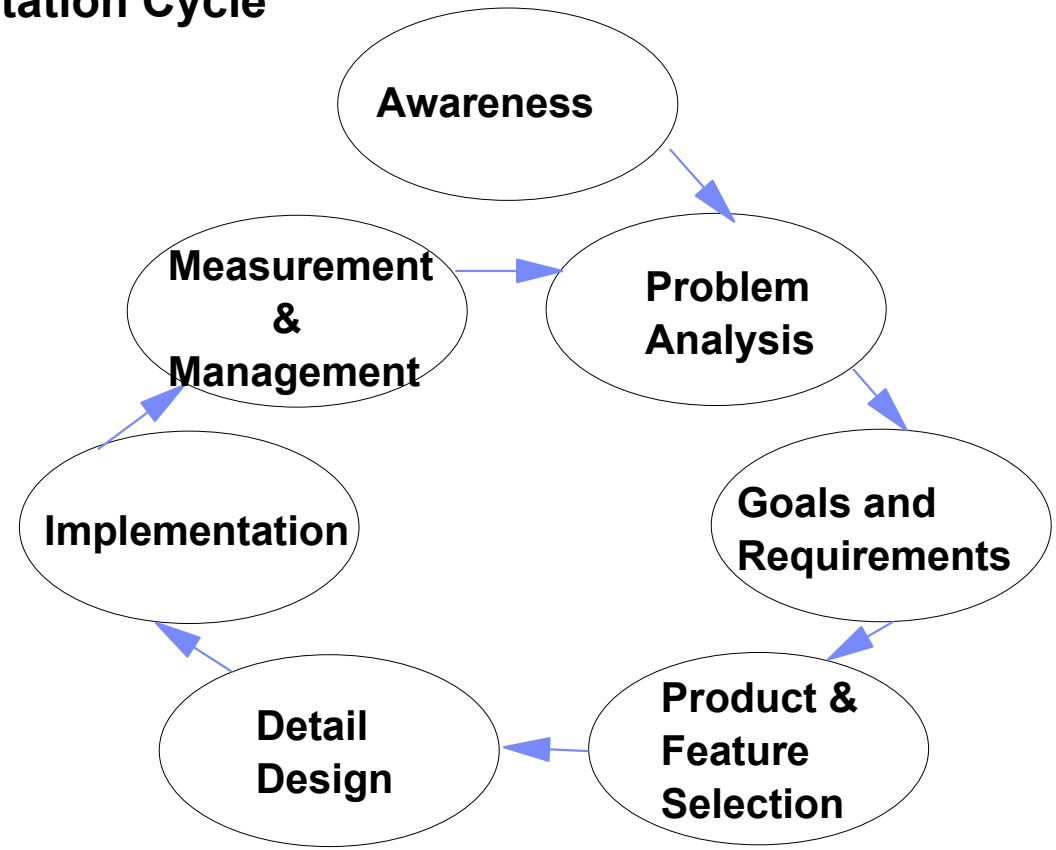
Availability Requirements



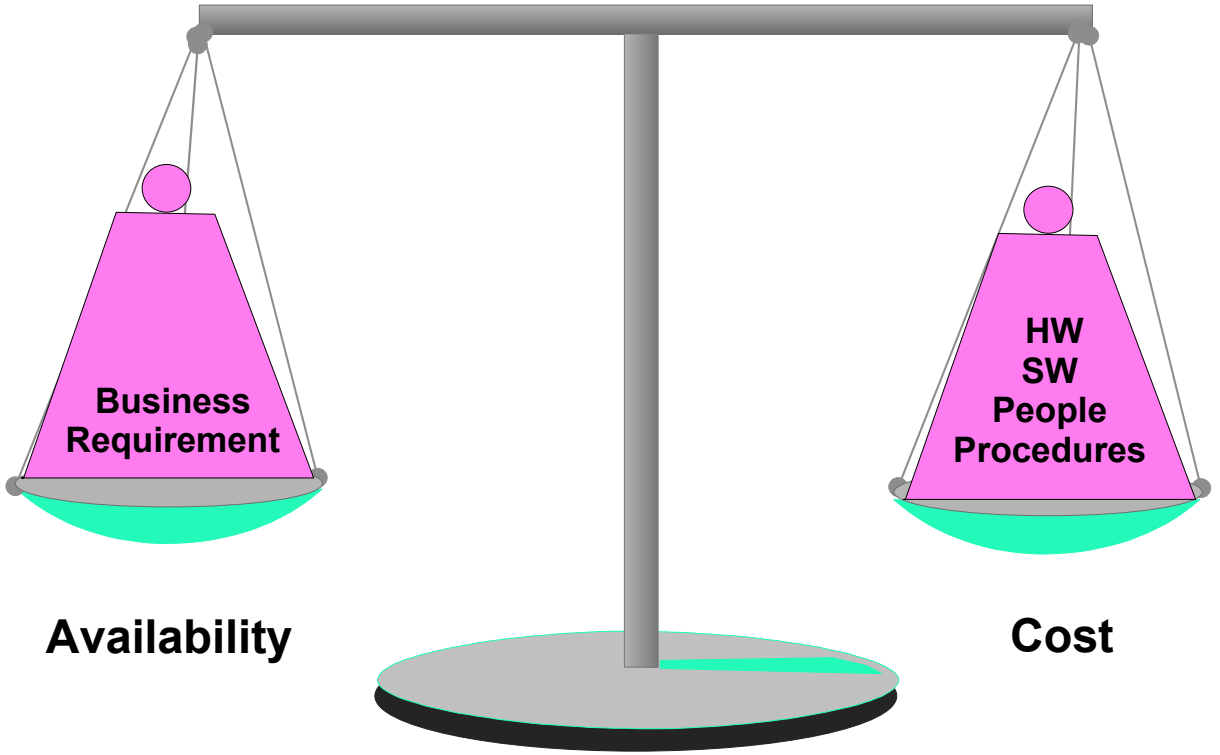
END USER **SYSTEM** **COMPONENT**

Continuous Availability

Implementation Cycle

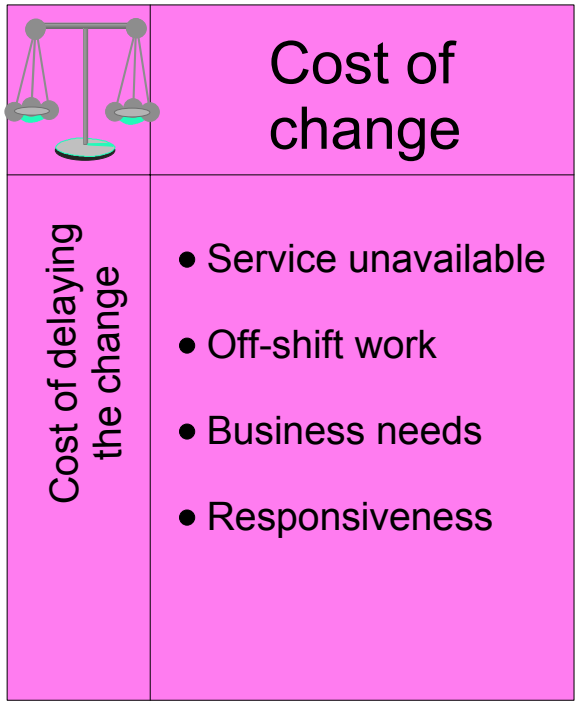


Managing for Availability

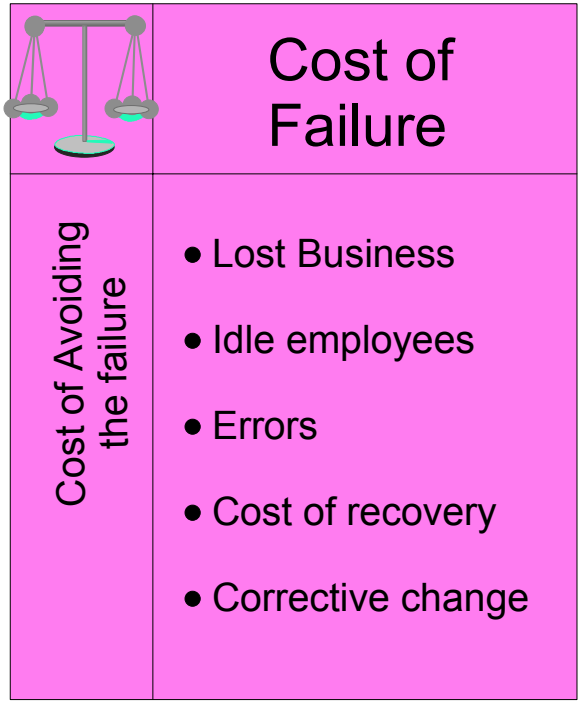


Outage Management

Planned Outage



Unplanned Outage



Tenets of Continuous Availability

- Redundancy
  - Spare components
- Isolation
  - Minimise disturbances from other systems
- Concurrency
  - Perform maintenance and support concurrently with ongoing operations
- Automation
  - Automate the console operations as much as possible

Planning for Redundancy

"You must avoid Single Points of Failure"

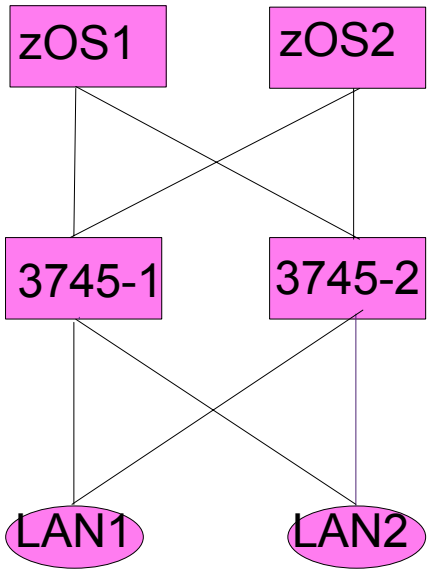
Means:

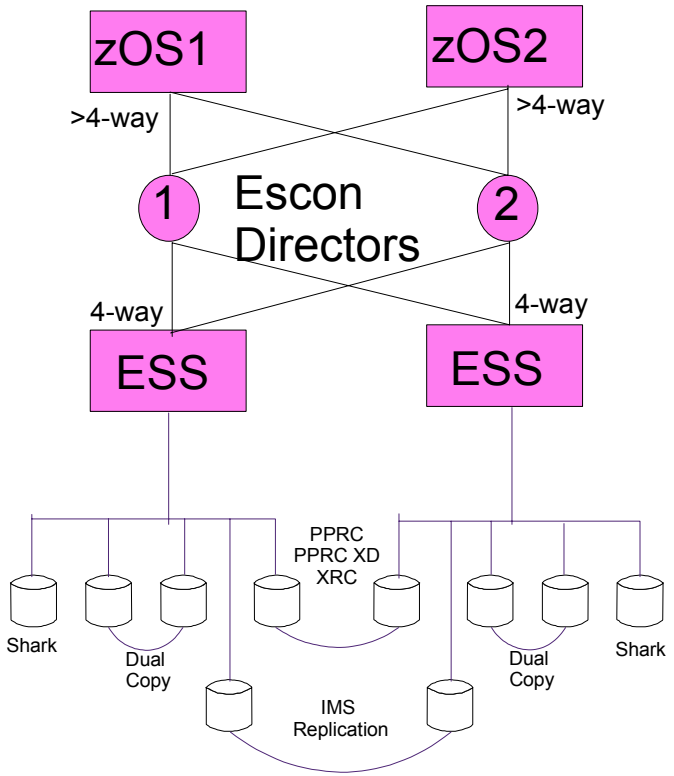
- Dualing/Mirroring
- Parallel Servers
- Standby Components

Resources:

- Machine room
- Environmentals
- Processors
- TP equipment
- I/O Equipment
- Network
- Catalogs
- Data
- SW Subsystems
- Applications

Sample Hardware Configuration





Similar configurations for TCP/IP with routers, Sysplex Distributor and VIPA

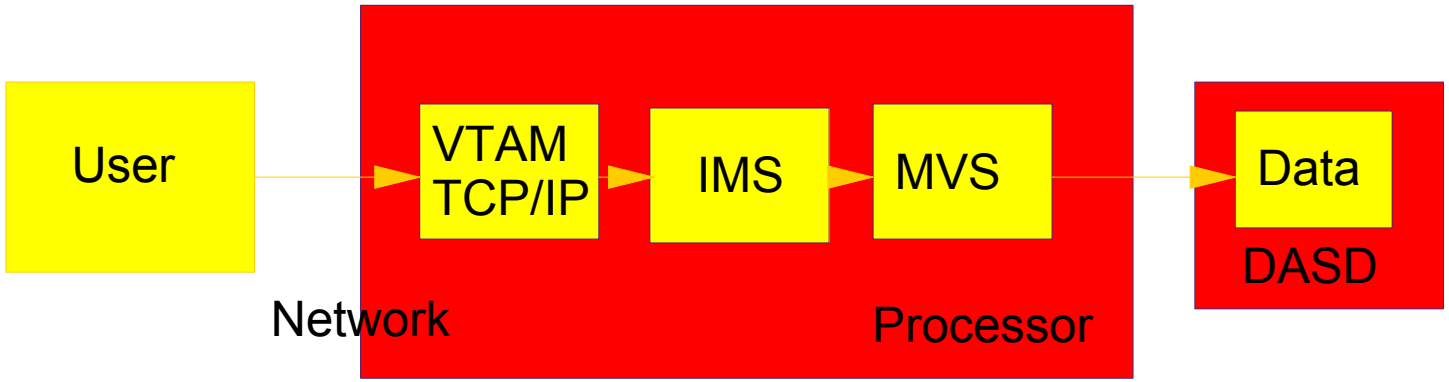
Planning for Isolation

"You must isolate Applications with Availability Requirements"

Resources:

- Machine room
- Environmentals
- Processors
- TP equipment
- I/O Equipment
- Network
- Catalogs
- Data
- SW Subsystems
- Applications

Conventional Online System



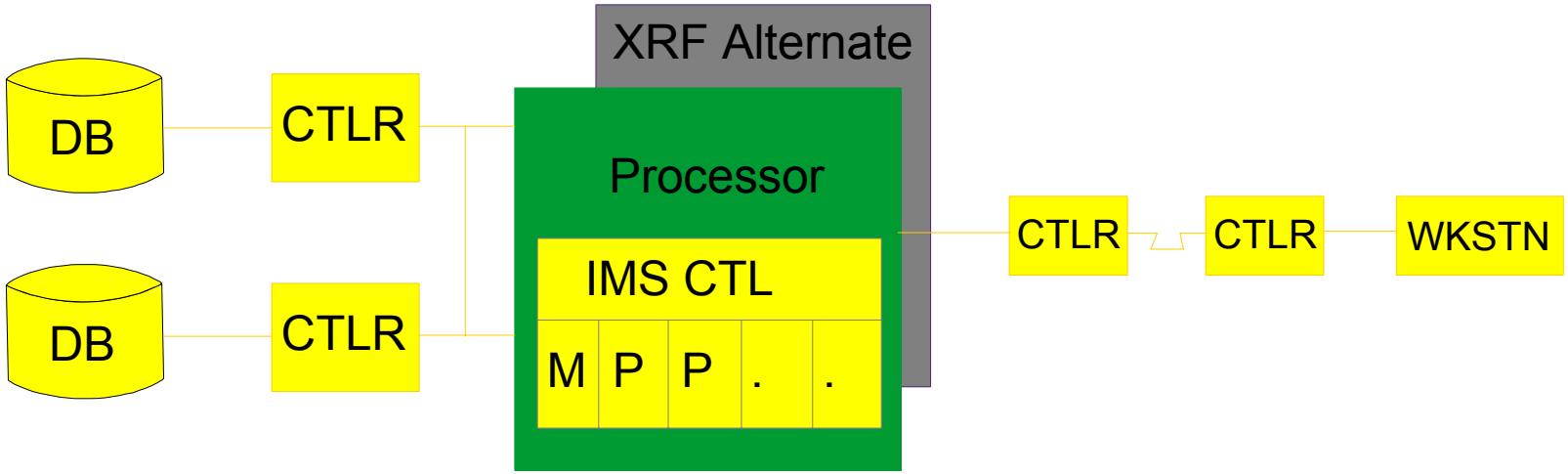
Failure of any one element will result in loss of service to the user

- DASD failure can be mitigated by data duplication (h/w or s/w)
- Processor failure can be mitigated by XRF (and BLDS / SYSPLEX)
- Site failure can be mitigated by RSR or GDPS

A combination can "insure" against most outages.

Availability Aspects

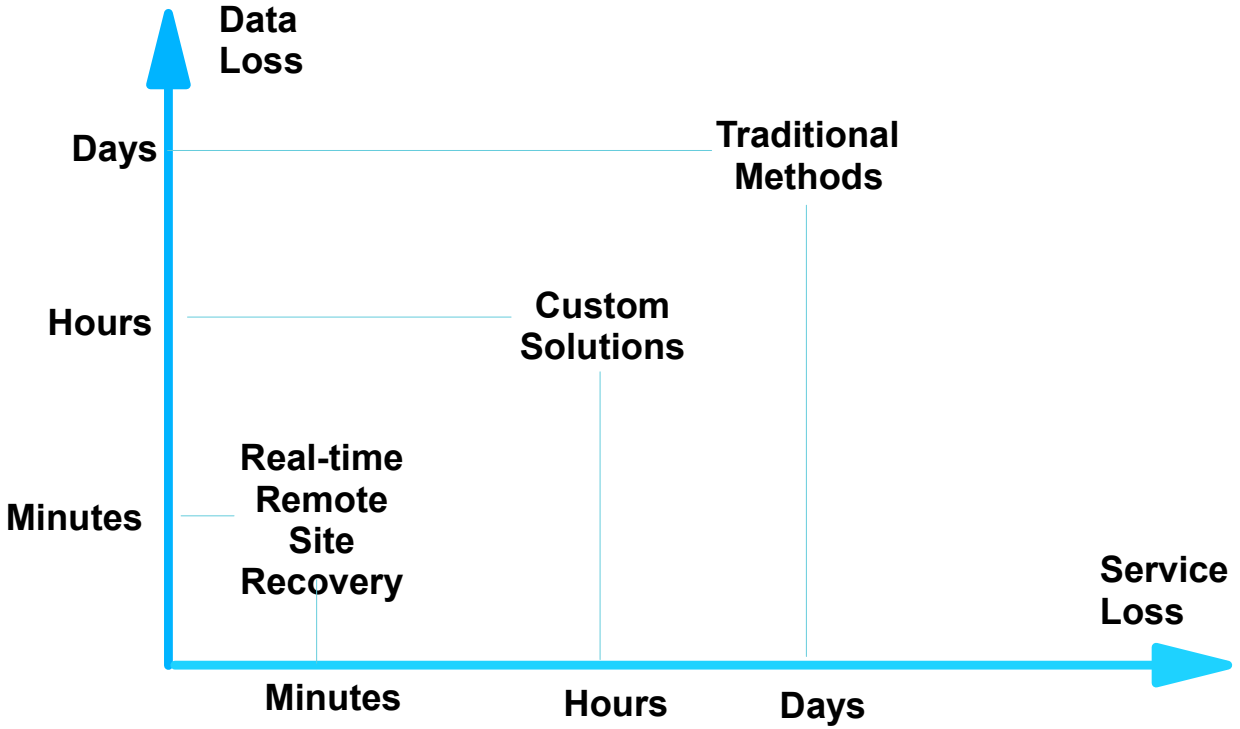
For Processor, MVS, IMS, VTAM failure



Individual application program failures managed through IMS scheduling
Central host failures covered by extended restart facility (XRF)
- Alternate "tracks" Actives work through Log
- Takeover decision made by Alternate work through Log
- Takeover decision made by Alternate based on user criteria
- Only "processor" is duplexed, not DASD or network

Parallel Sysplex is prefrerred solution

Remote Site Recovery



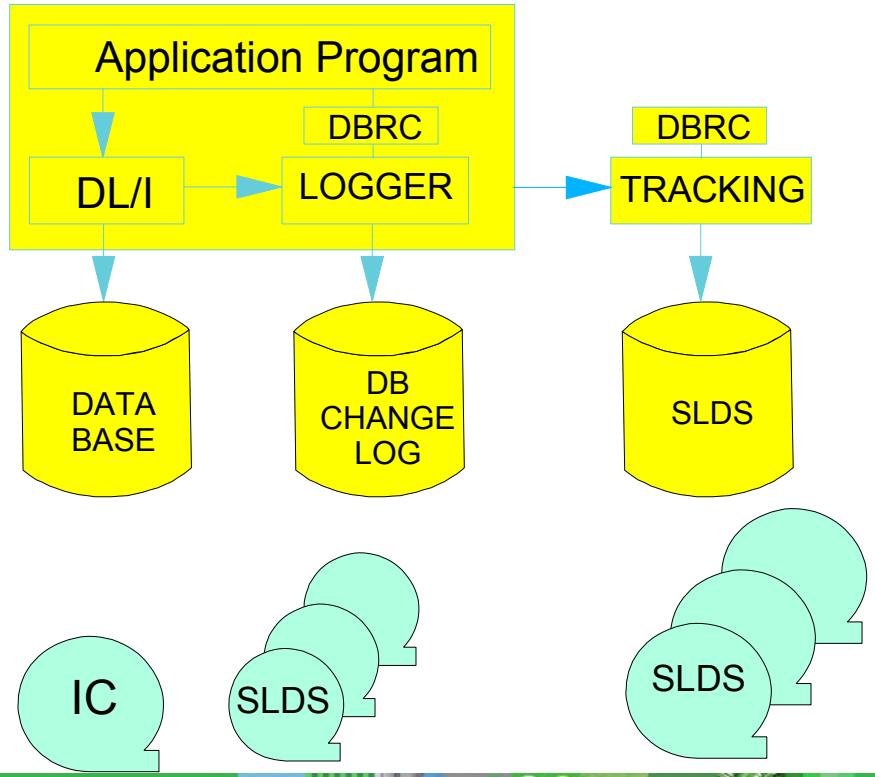
- Mixed requirements in one system
- Cost sensitive
- Availability trade-offs

RSR System Overview

Scenario

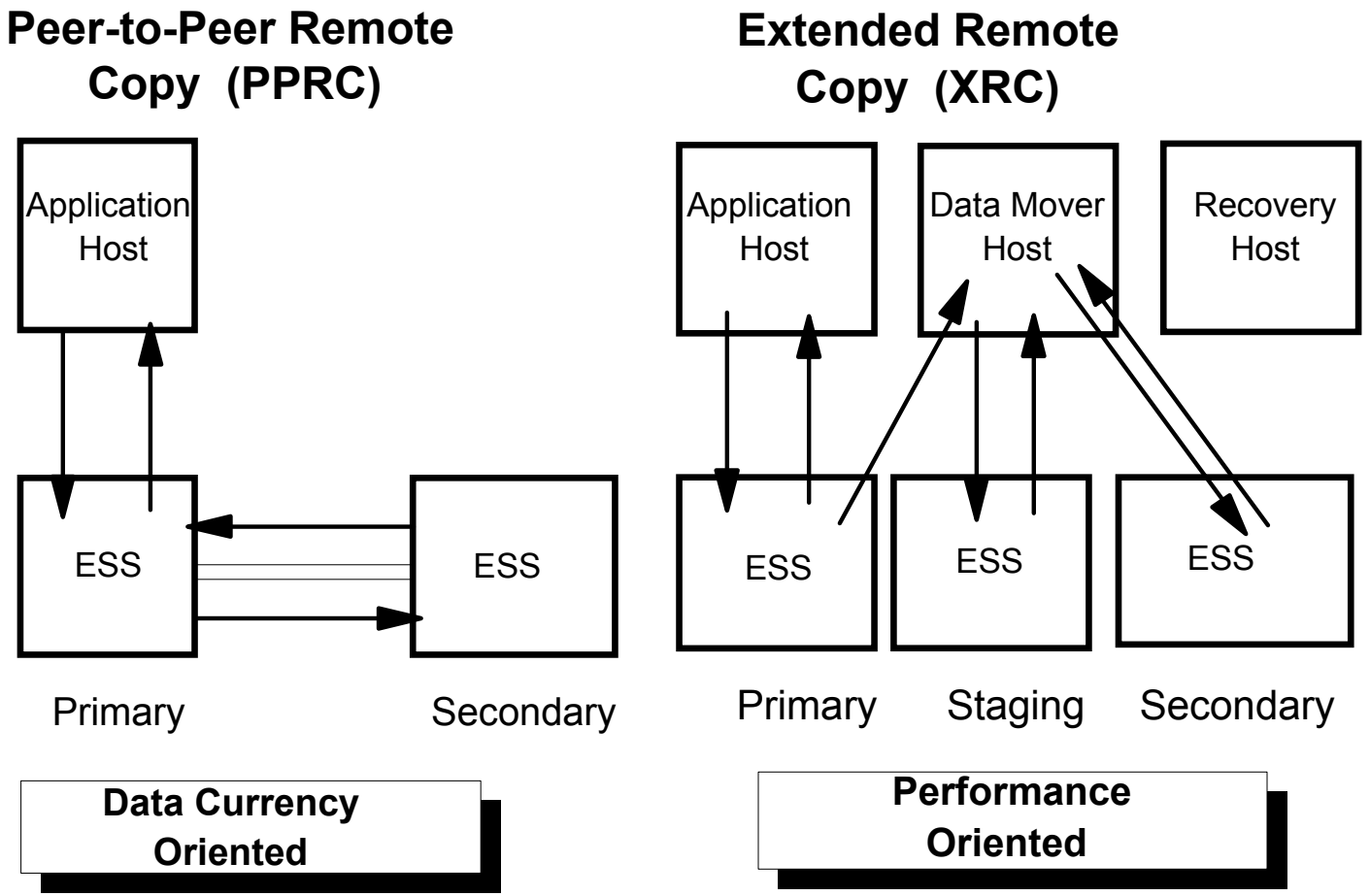
- Extended outage at primary site
  - Planned
  - Unplanned
- "Remote" site is sufficiently distant that it is not affected by the outage
- Remote recovery is the only applicable option

IMS "Instance"

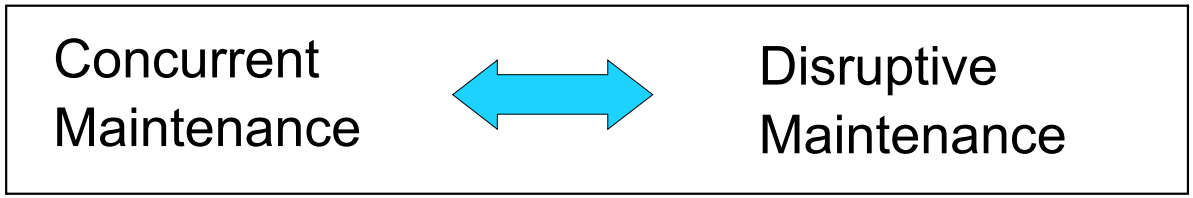


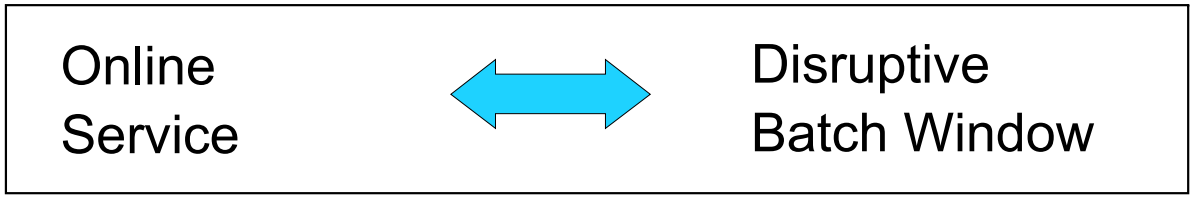
- Support IMS TM/DB, DBCTL, and Batch
- Minimise/eliminate data loss
  - Rebuild DBs and environment to most recent possible state
- Minimise outage of IT services
  - Allow restoration of service within hours or minutes
  - Installation dependent
- No change to existing applications
  - Addition to existing recovery procedures
- Remain consistent with continuous availability strategy
  - Including XRF and FDBR

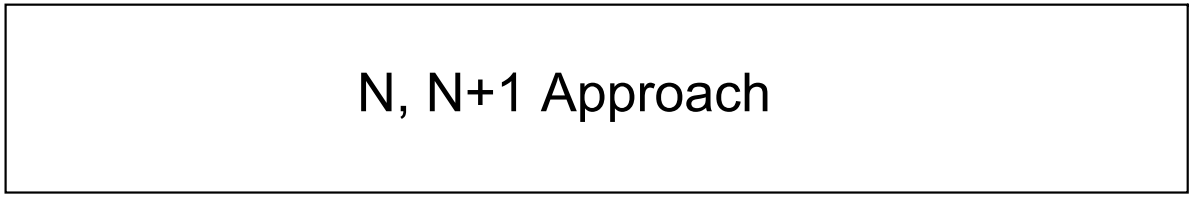
IBM Enterprise Storage Subsystem



Planning for Concurrency



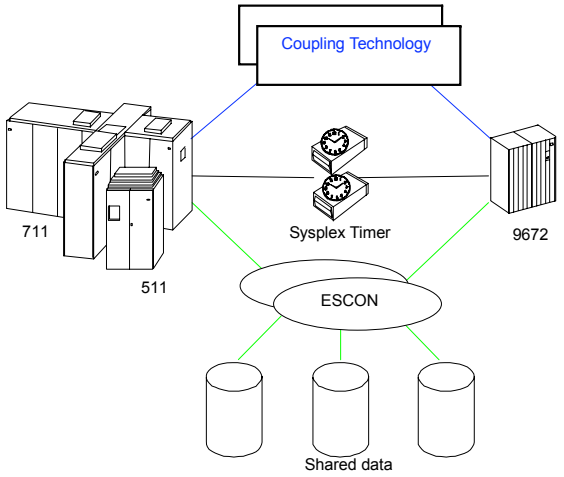




The Parallel Sysplex

What it provides:

- High Performance Data Sharing
- Dynamic Workload Balancing
- Single System Image
- Platform for Continuously Available Applications

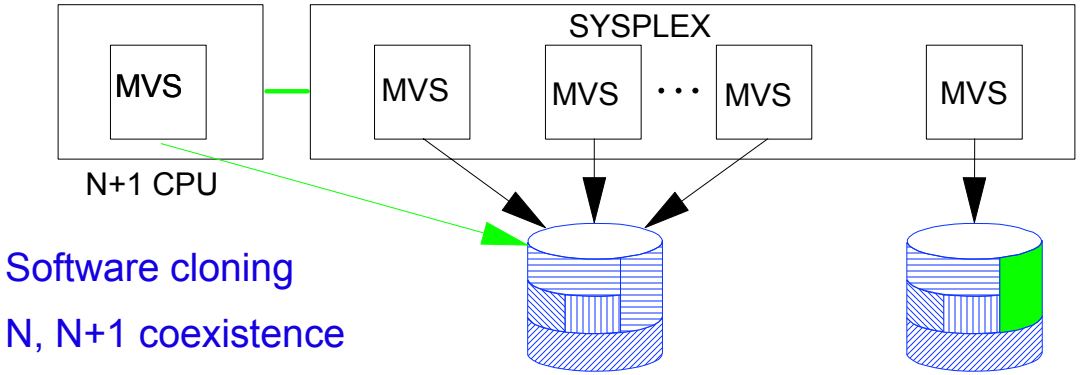


How it does it:

- Flexible processor options
- Coupling Facility and Links
- MVS/ESA SP V 5.1 +
- Enhanced Subsystems

Fewer Planned Outages

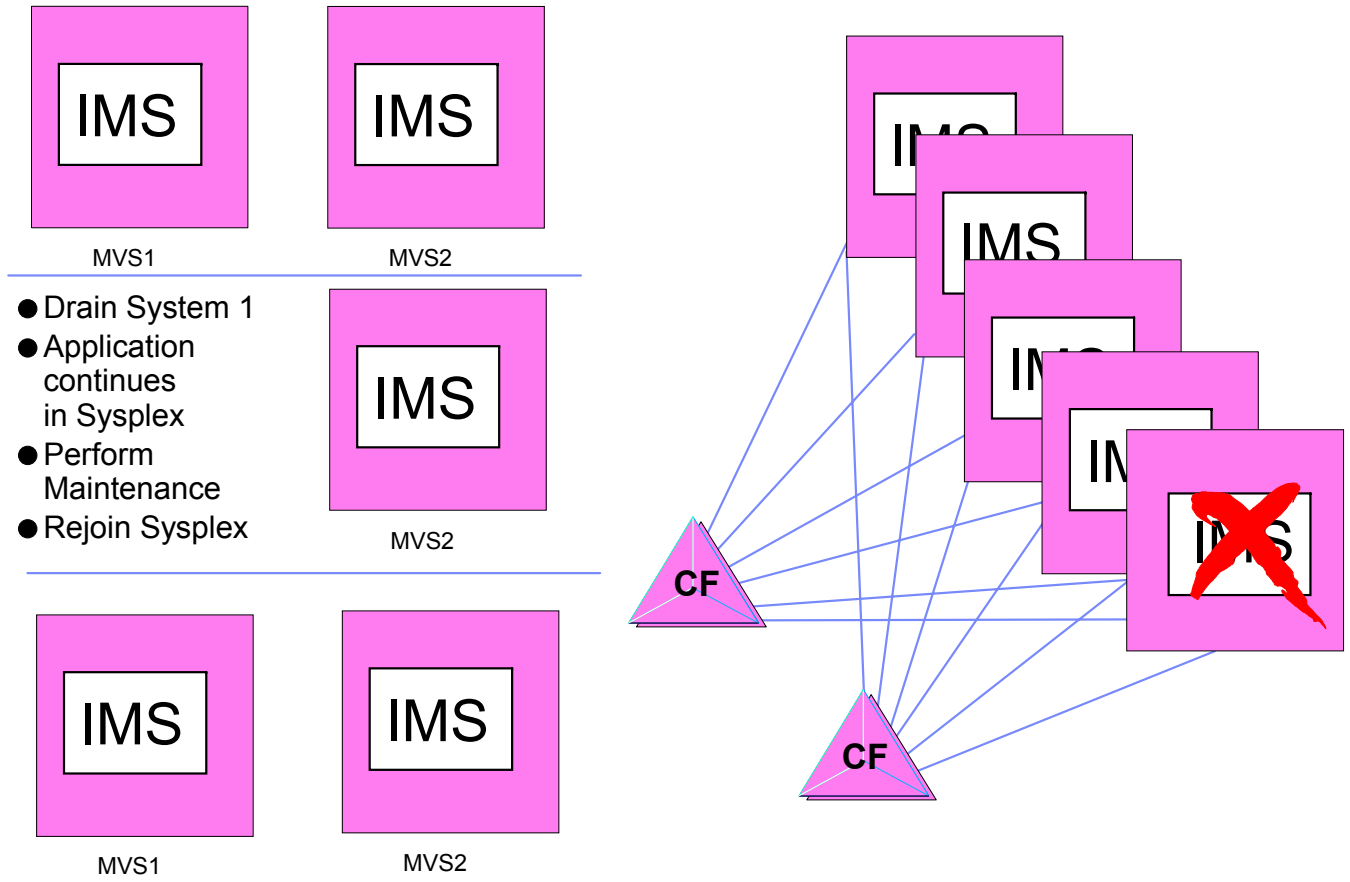
- Software: -Dynamic change
  - -Non-disruptive S/W changes (N, N+1 coexistence)
- Hardware: -Dynamic change
- Applications: -Concurrent online/batch
  - -Dynamic change



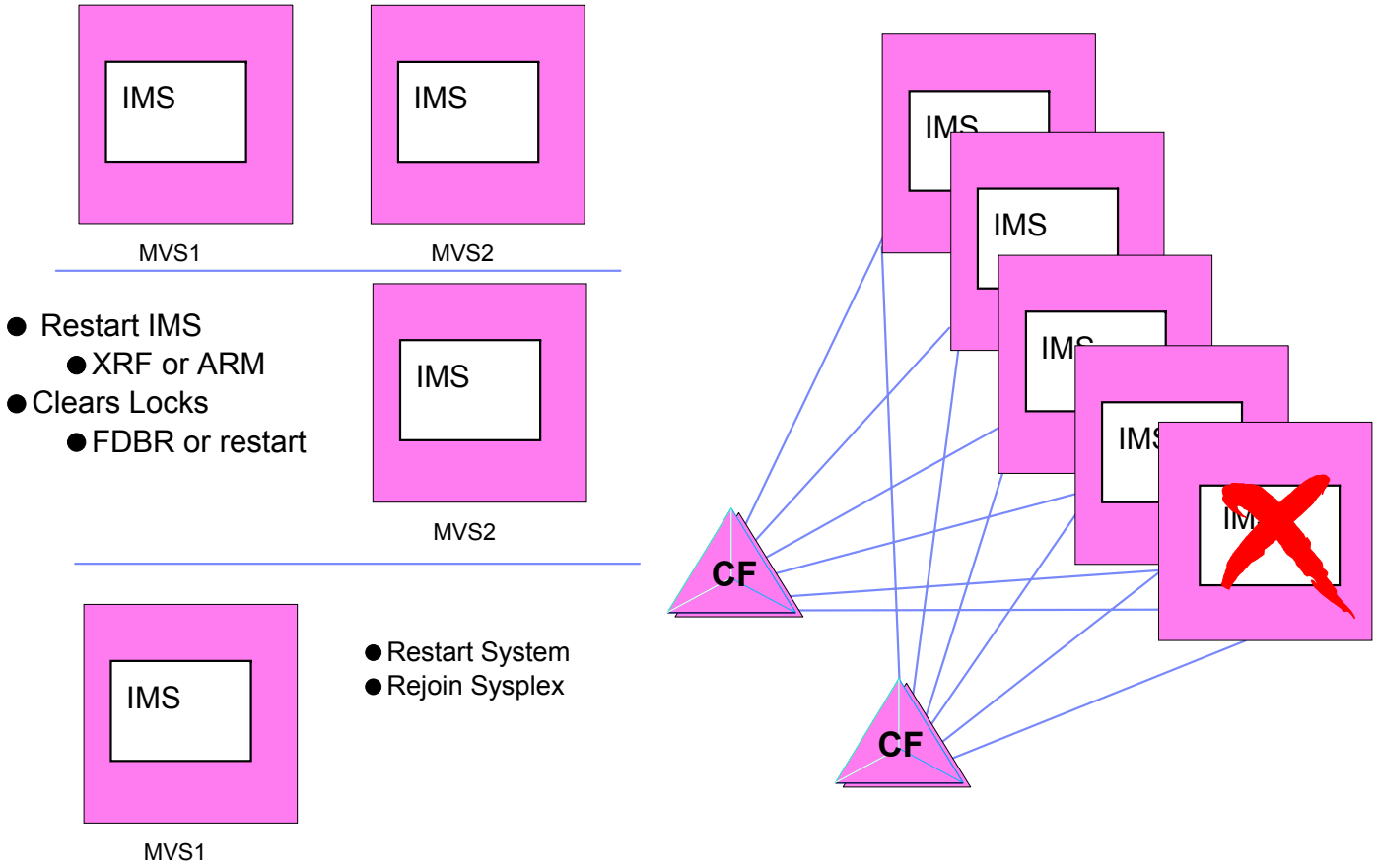
Software cloning

N, N+1 coexistence

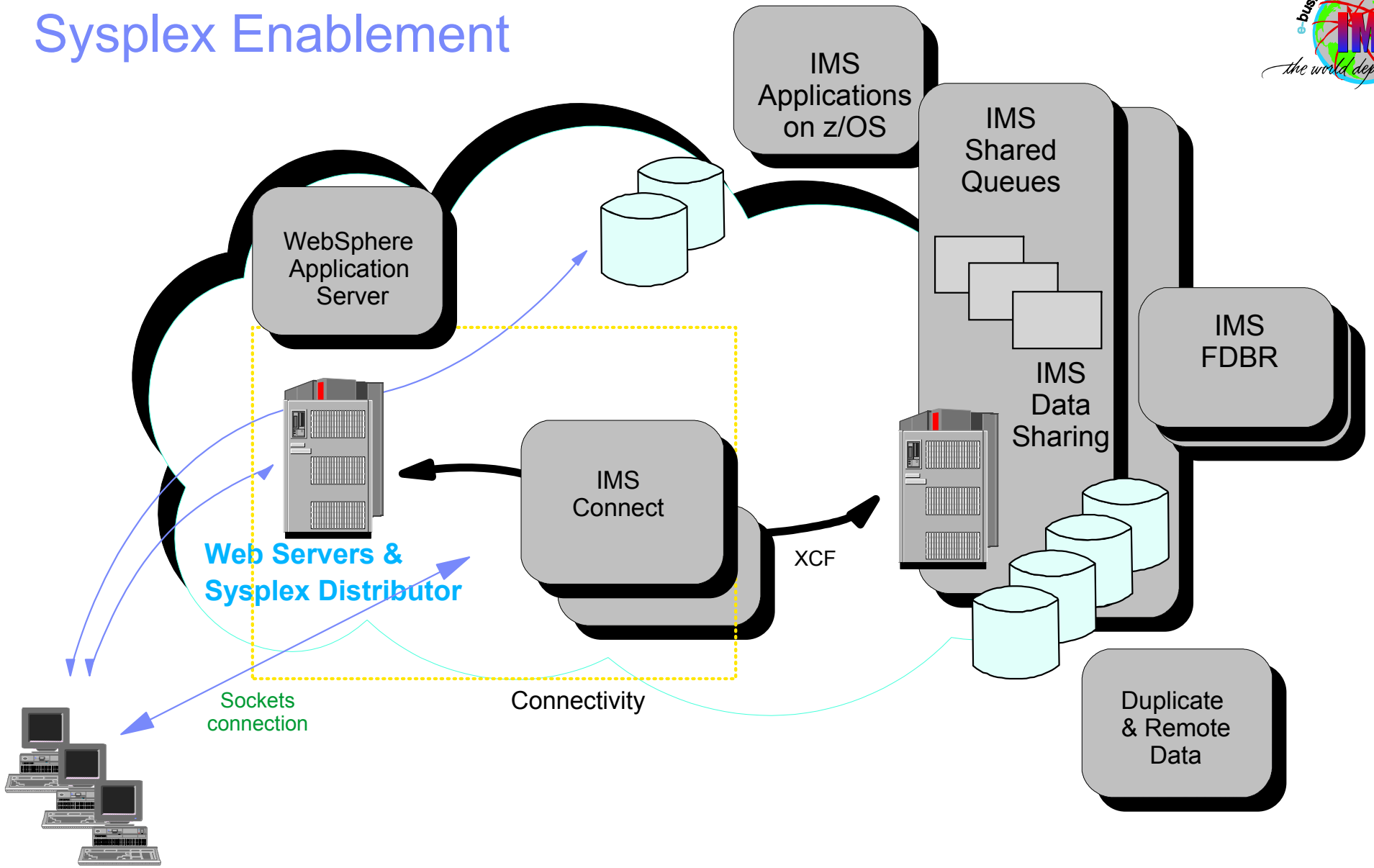
Shutdown for Planned Outage



Failing MVS or CEC



Sysplex Enablement



Planning for Automation

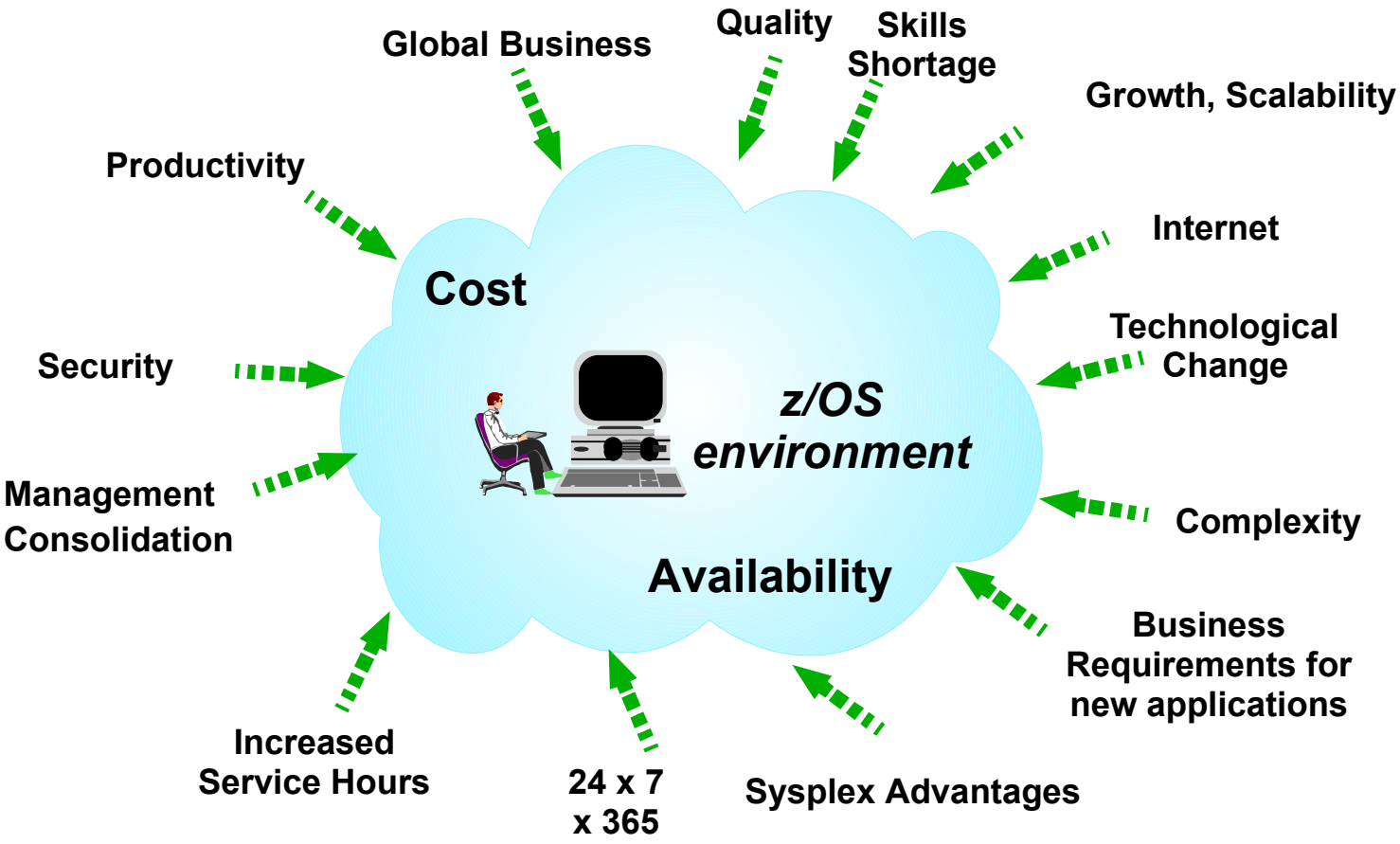
Reasons:

- Accuracy
- Speed
- Unattended
- Single Image
- Complexity

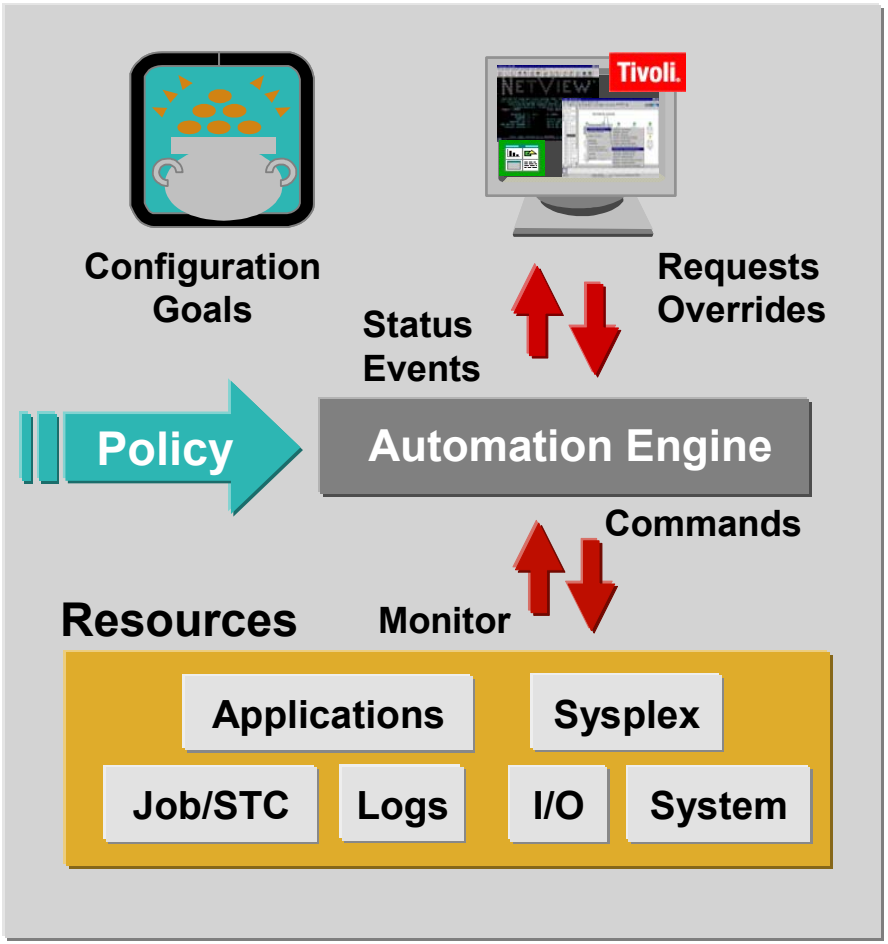
Objects:

- Daily Operations
  - Maintenance
  - Open hours
  - Alert monitor
- Recovery
  - Components
  - Automation itself

Systems Management Challenges



Tivoli System Automation
SA z/OS Component System Operations

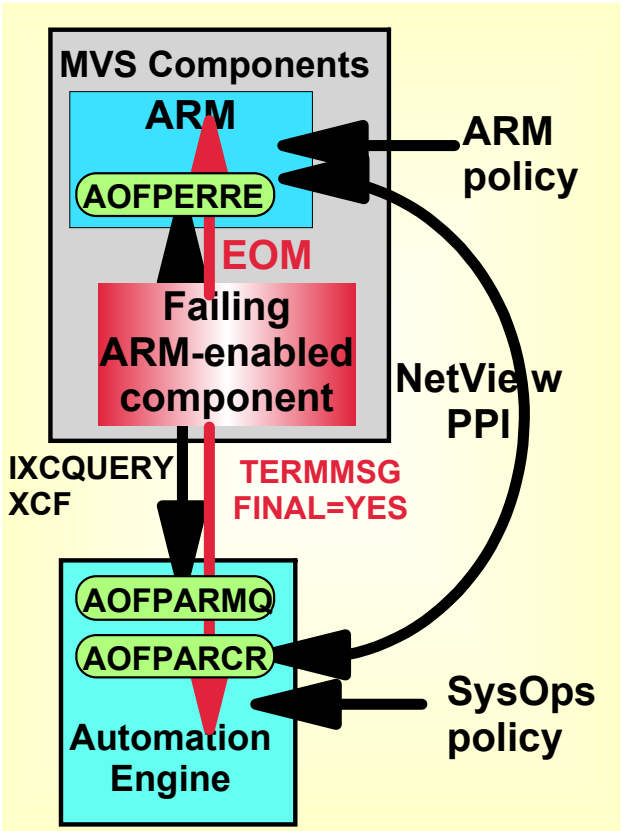


- **Automation**
  - Start, recover and termination
  - Manage applications
  - Operator task automation
  - Message monitoring & response
  - Prevent outages of critical resources (WTO buffers, spool)
  - CICS, IMS, DB2,TWS, SAP, WebSphere, MQ automation
- **Graphical interface**
  - Applications, systems, events, critical Sysplex resources
  - Command interface

Integrated IMS Automation & Management

- Startup and shutdown with triggers and service periods including dependent regions
- Support for XRF and FDBR(sysplex)
- Extended automation using IMS automation operator exit
- State dependant automation (State/action table)
- Recovery of OLDS, MSC-links, transactions, programs and regions
  - Thresholds, codes
- Single point of control operator interface
- Alerting to SDF and NMC
- Broadcast

Co-operation with ARM



- Application-system correlation concept
  - **Primary** = system where application should be started normally
  - **Secondary** = system where application should be defined but not started i.e. backup
- Subsystem statuses:
  - EXTSTART: started by an external agent like ARM
  - MOVED: application should be active on this system but has been moved to one of the backup systems
  - FALLBACK: application may be recovered on this (secondary) system
- ARM interface via ARM API and NetView PPI
- During restart after job failure:
  - Controlled by the application's ARM automation flag
  - SysOps defers to ARM if ARM-enabled application
  - If ARM does not restart the application then SysOps continues restart
  - SysOps overrides ARM if application failed during SA/MVS initiated shutdown
  - Decision "Don't recover" when application is still active, part of an active shutdown, suffering from non-restartable ABEND codes or has to be down by order
- During restart after z/OS system failure:
  - SysOps does not restart applications that have been ARM-moved to another system.
  - CICSAO will move them back next service period

OMEGAMON for zSeries - IMS

Manage Vital Systems For Maximum Performance And Minimal Downtime

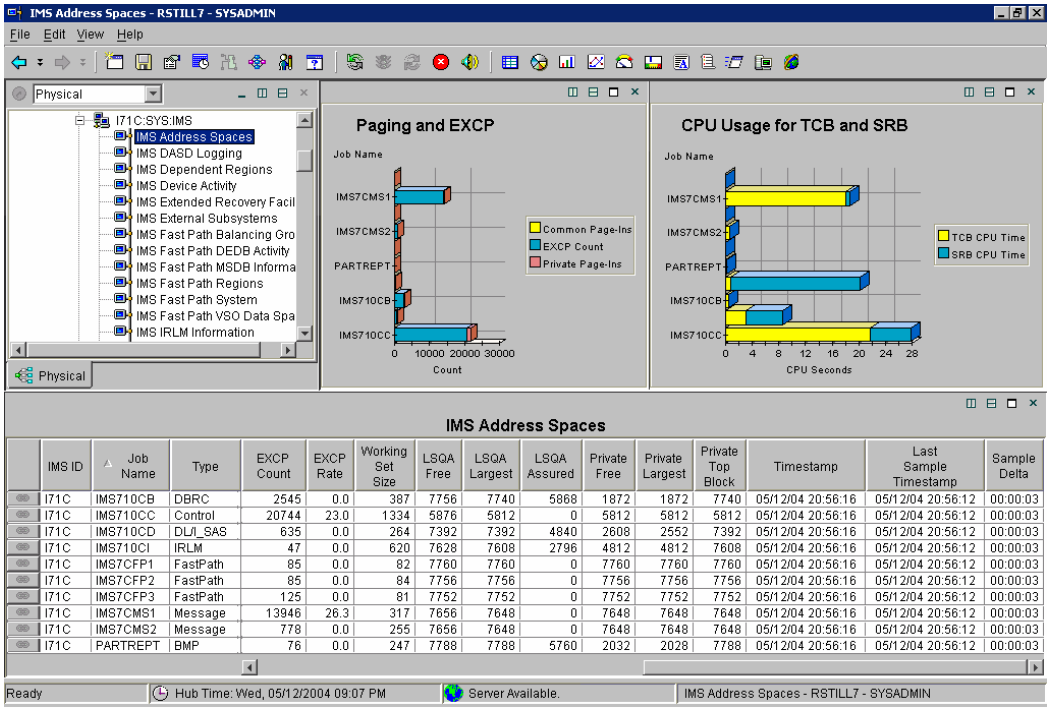
- Provide a detailed view of CPU, LPARs, I/O, and storage resource use
- Reveals Coupling Facility statistics, shared queue status and database lock conflicts

Benefits

- Create complex thresholds, situations, and alerts to work on the "real problems"
- Analyze historical reports and current trends to plan for future needs

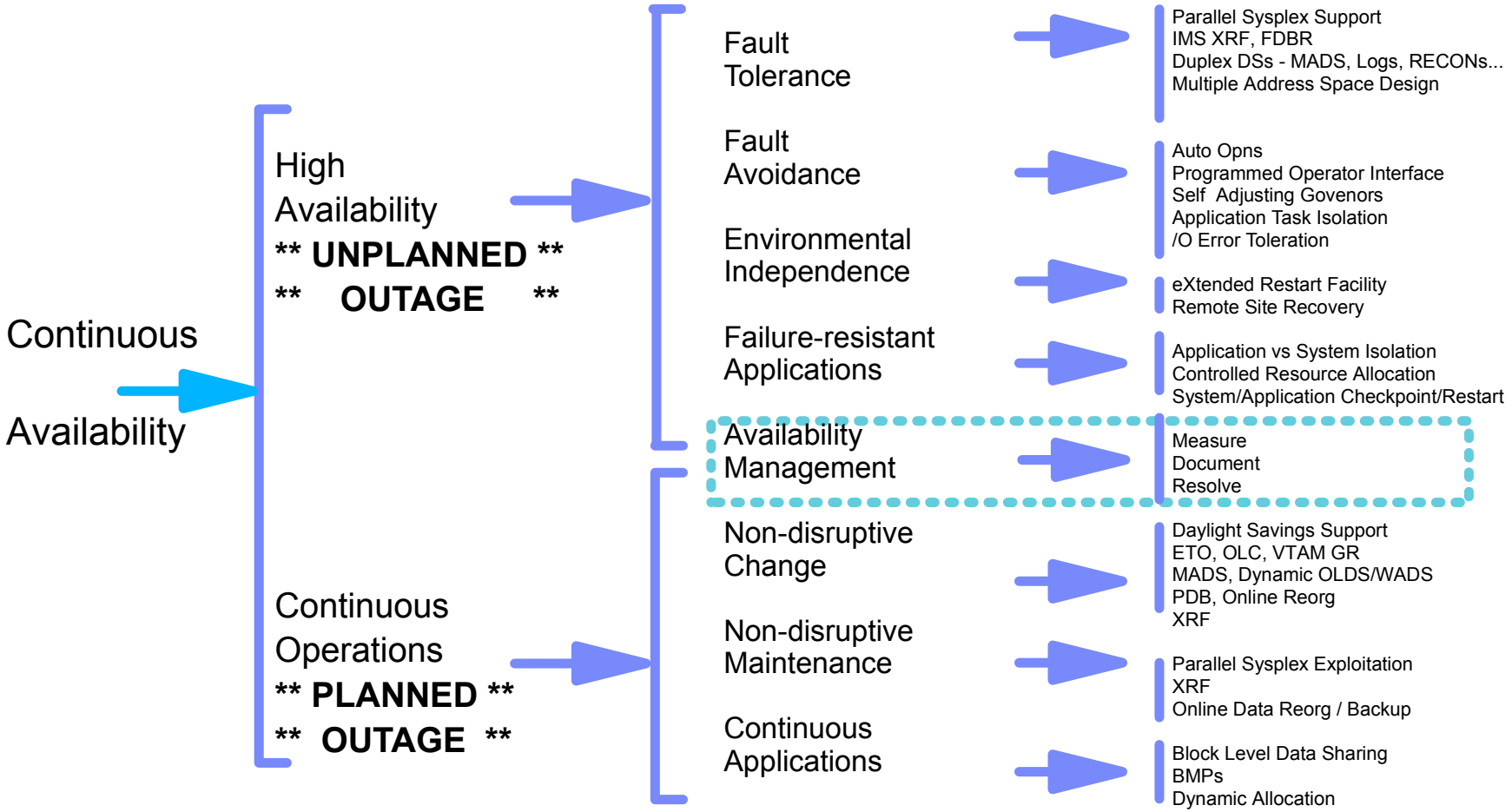
Solution Components

- OMEGAMON XE for IMS (includes OMEGAMON II for IMS)
- OMEGAMON XE for IMSPlex
- OMEGAMON DE



IMS ID	Job Name	Type	EXCP Count	EXCP Rate	Working Set Size	LSQA Free	LSQA Largest	LSQA Assured	Private Free	Private Largest	Private Top Block	Timestamp	Last Sample Timestamp	Sample Delta
I71C	IMS710CB	DBRC	2545	0.0	387	7756	7740	5868	1872	1872	7740	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS710CC	Control	20744	23.0	1334	5876	5812	0	5812	5812	5812	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS710CD	DLI_SAS	635	0.0	264	7392	7392	4840	2608	2552	7392	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS710CI	IRLM	47	0.0	620	7628	7608	2796	4812	4812	7608	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS7CFP1	FastPath	85	0.0	82	7760	7760	0	7760	7760	7760	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS7CFP2	FastPath	85	0.0	84	7756	7756	0	7756	7756	7756	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS7CFP3	FastPath	125	0.0	81	7752	7752	0	7752	7752	7752	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS7CMS1	Message	13946	26.3	317	7656	7648	0	7648	7648	7648	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	IMS7CMS2	Message	778	0.0	255	7656	7648	0	7648	7648	7648	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03
I71C	PARTREPT	BMP	76	0.0	247	7788	7788	5760	2032	2028	7788	05/12/04 20:56:16	05/12/04 20:56:12	00:00:03

Availability Solutions in IMS



END USER **SYSTEM** **COMPONENT**

What else is important?

MINDSET

If you don't THINK continuous availability.....
you won't ACHIEVE continuous availability