S 22

Continuous IMS Availability Considerations

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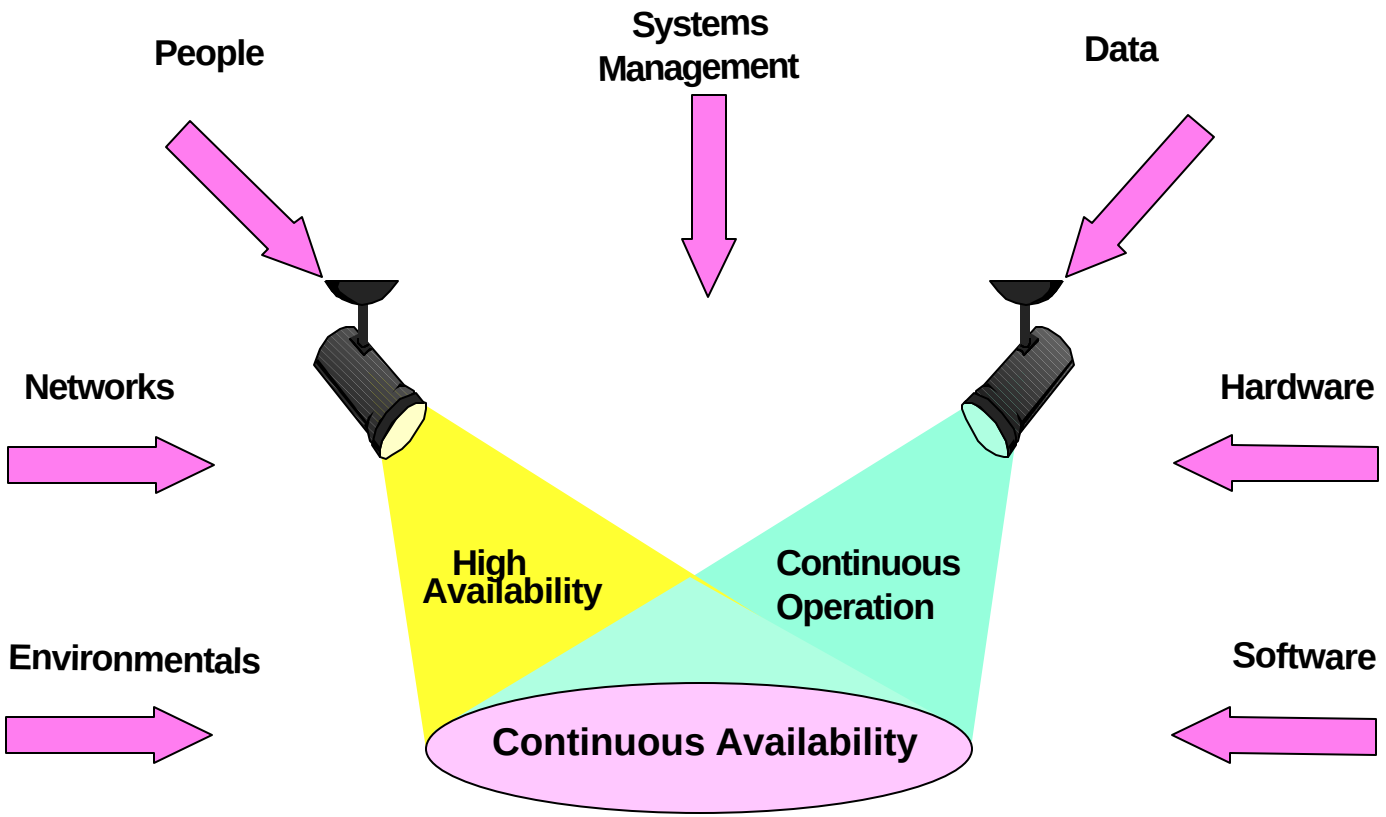
MVS, MVS/ESA

IMS/ESA

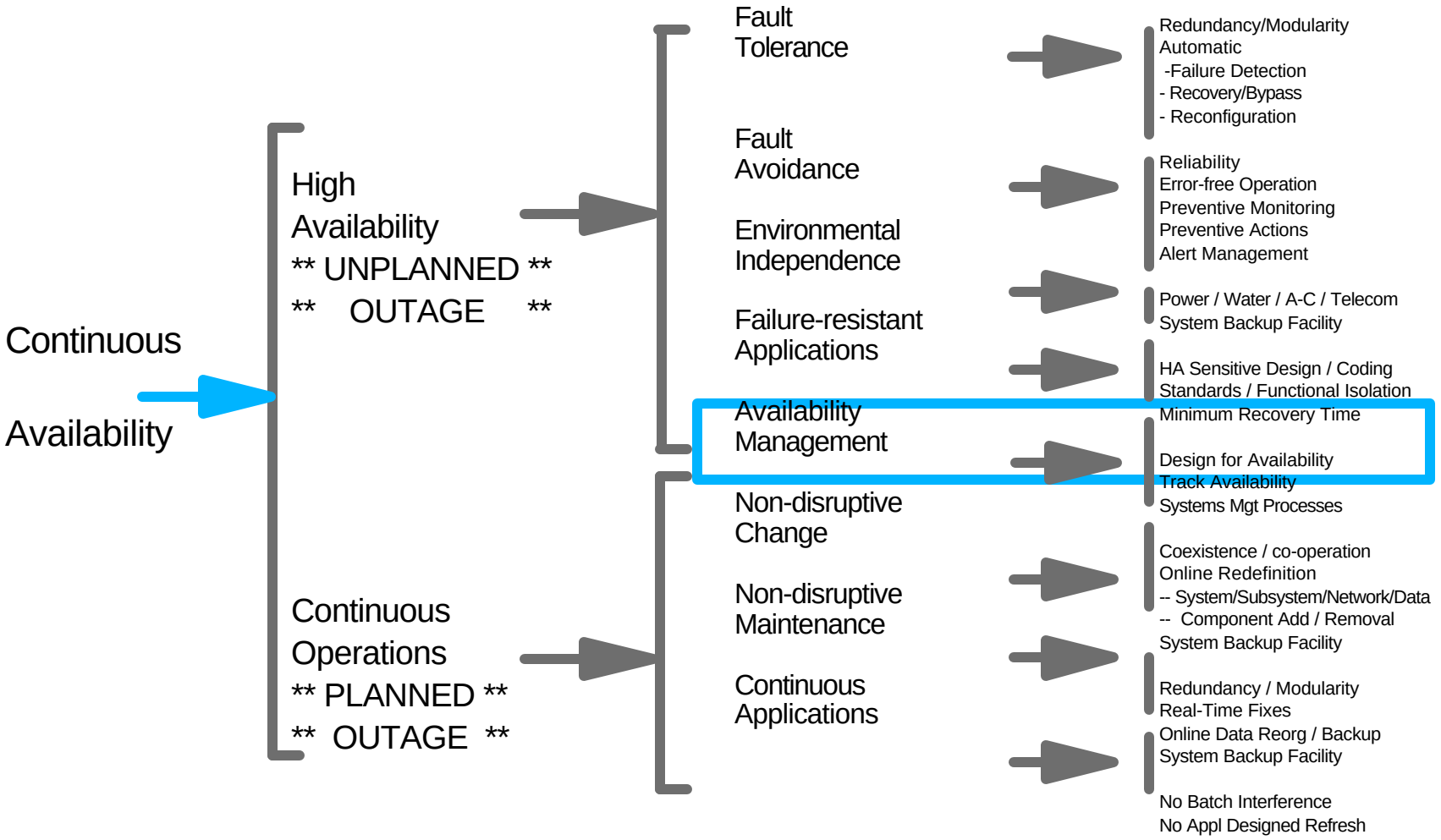
Availability Definitions

- **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

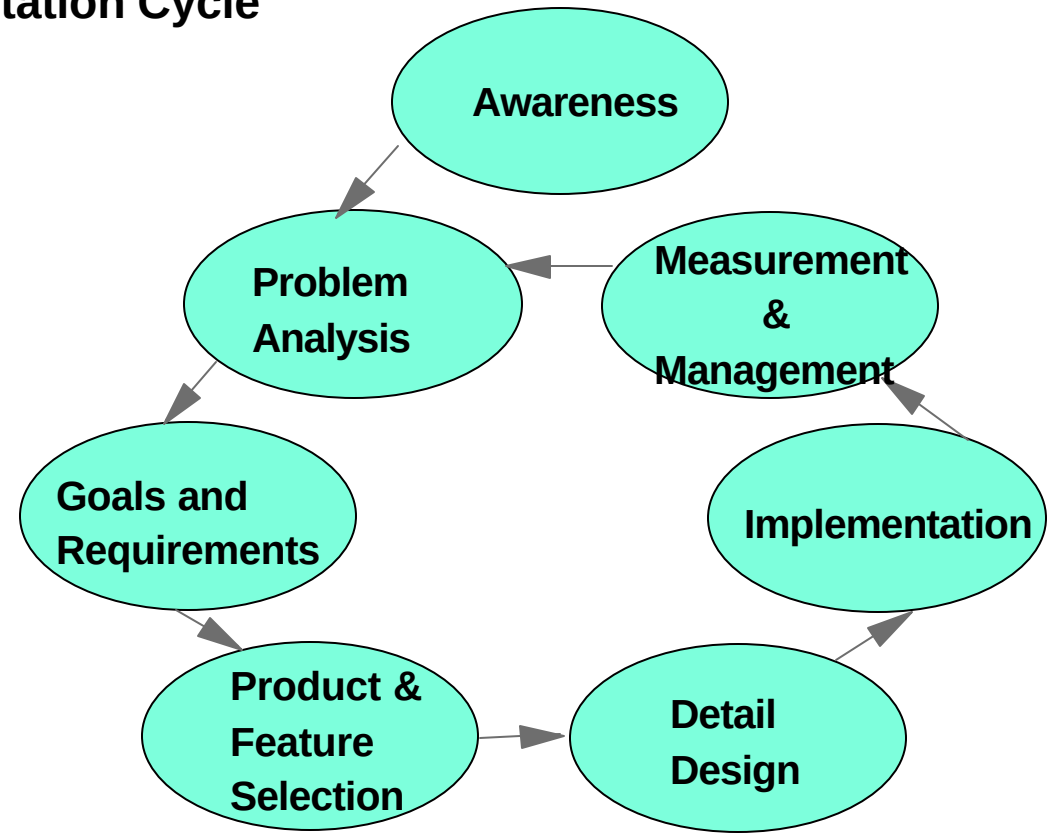


Availability Requirements

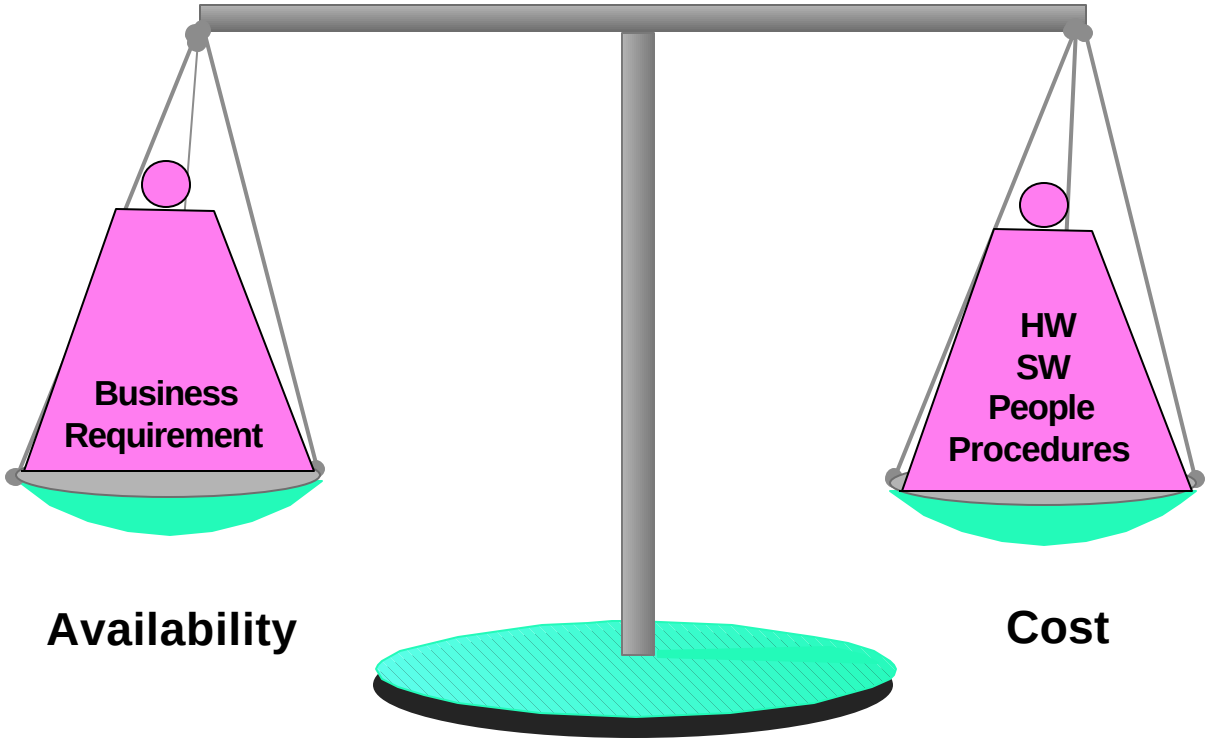


Continuous Availability

Implementation Cycle

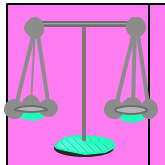


Managing for Availability



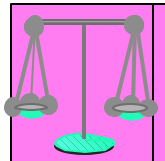
Outage Management

Planned Outage



Cost of change	
Cost of delaying the change	• Service unavailable • Off-shift work • Business needs • Responsiveness

Unplanned Outage



Cost of Failure	
Cost of Avoiding the failure	• Lost Business • Idle employees • Errors • Cost of recovery • Corrective change

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"

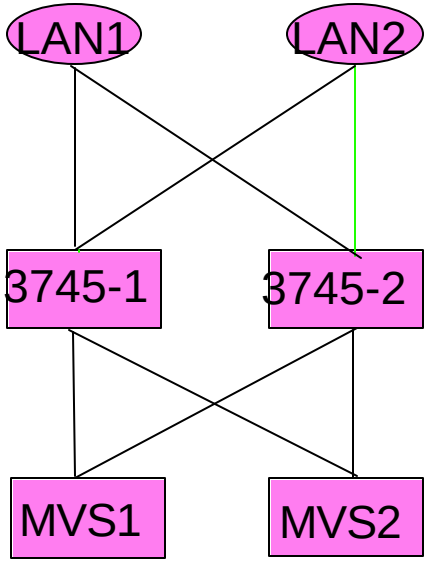
Means:

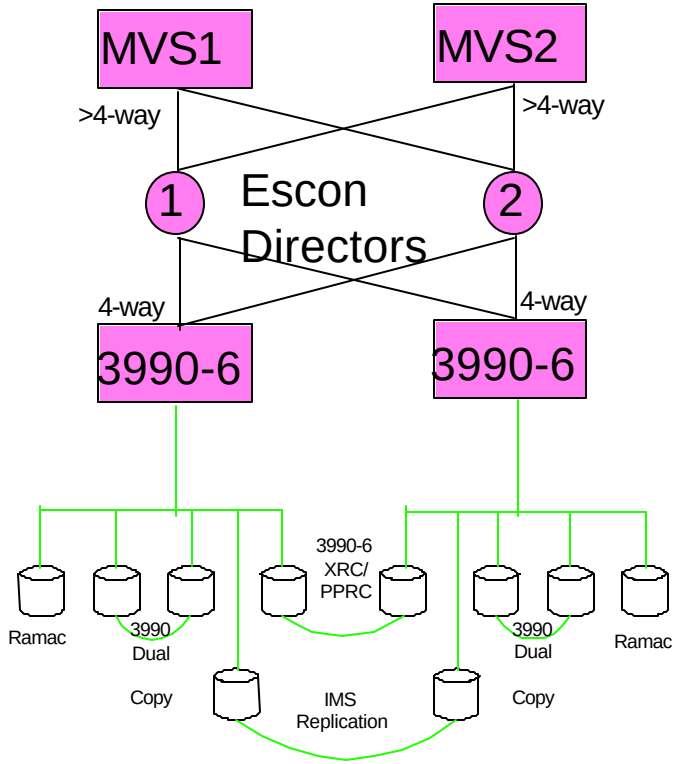
- Dualing/Mirroring
- Parallel Servers
- Standby Components

Resources:

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

Sample Hardware Configuration





Planning for Isolation

"You must isolate

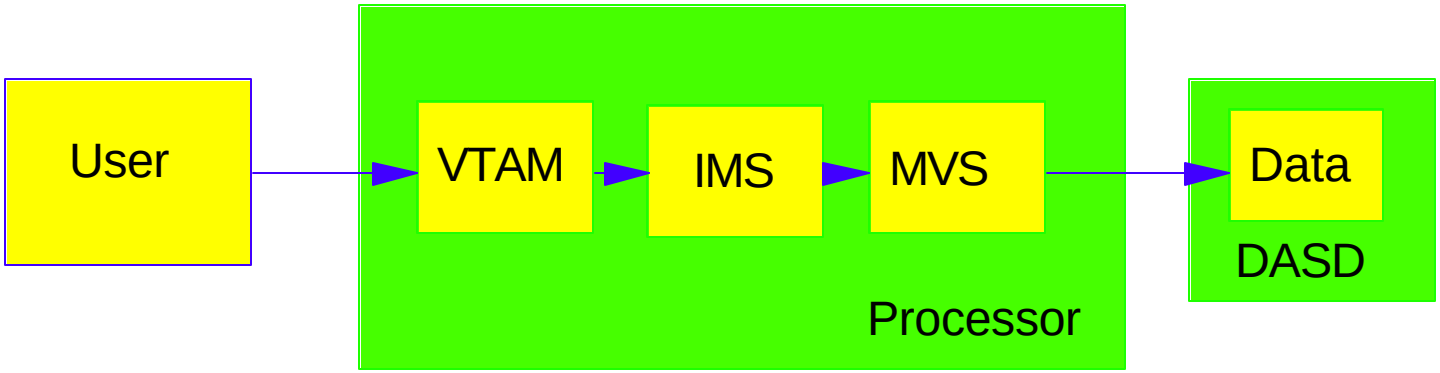
Applications with

Availability Requirements"

Resources:

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

Conventional Online System



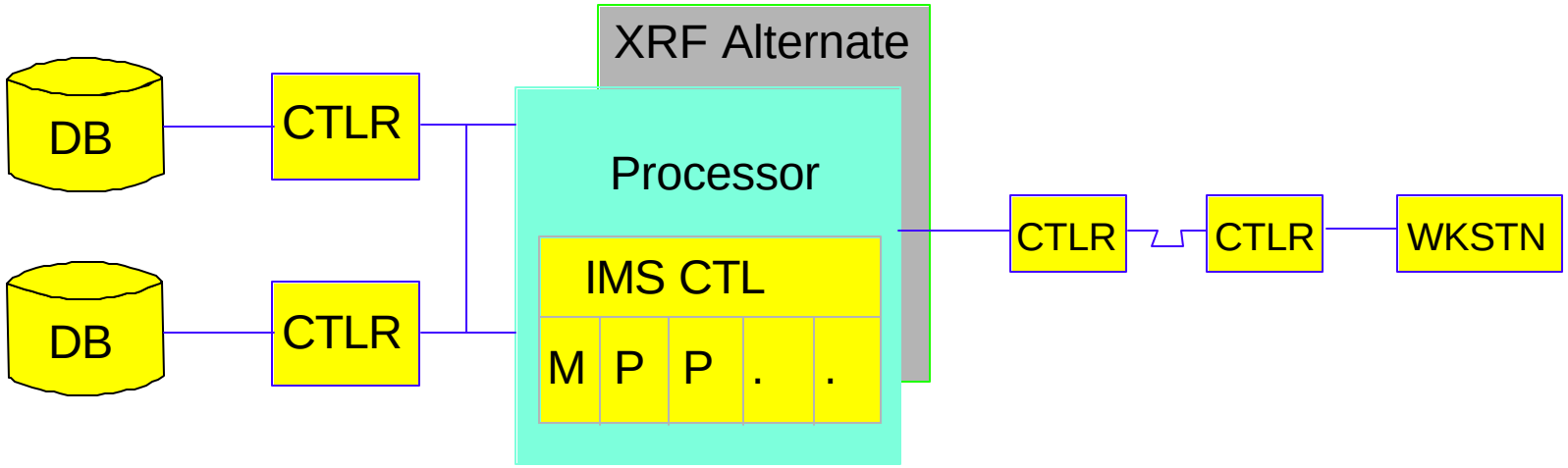
Failure of any one element will result in loss of service to the user

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

A combination can "insure" against most outages.

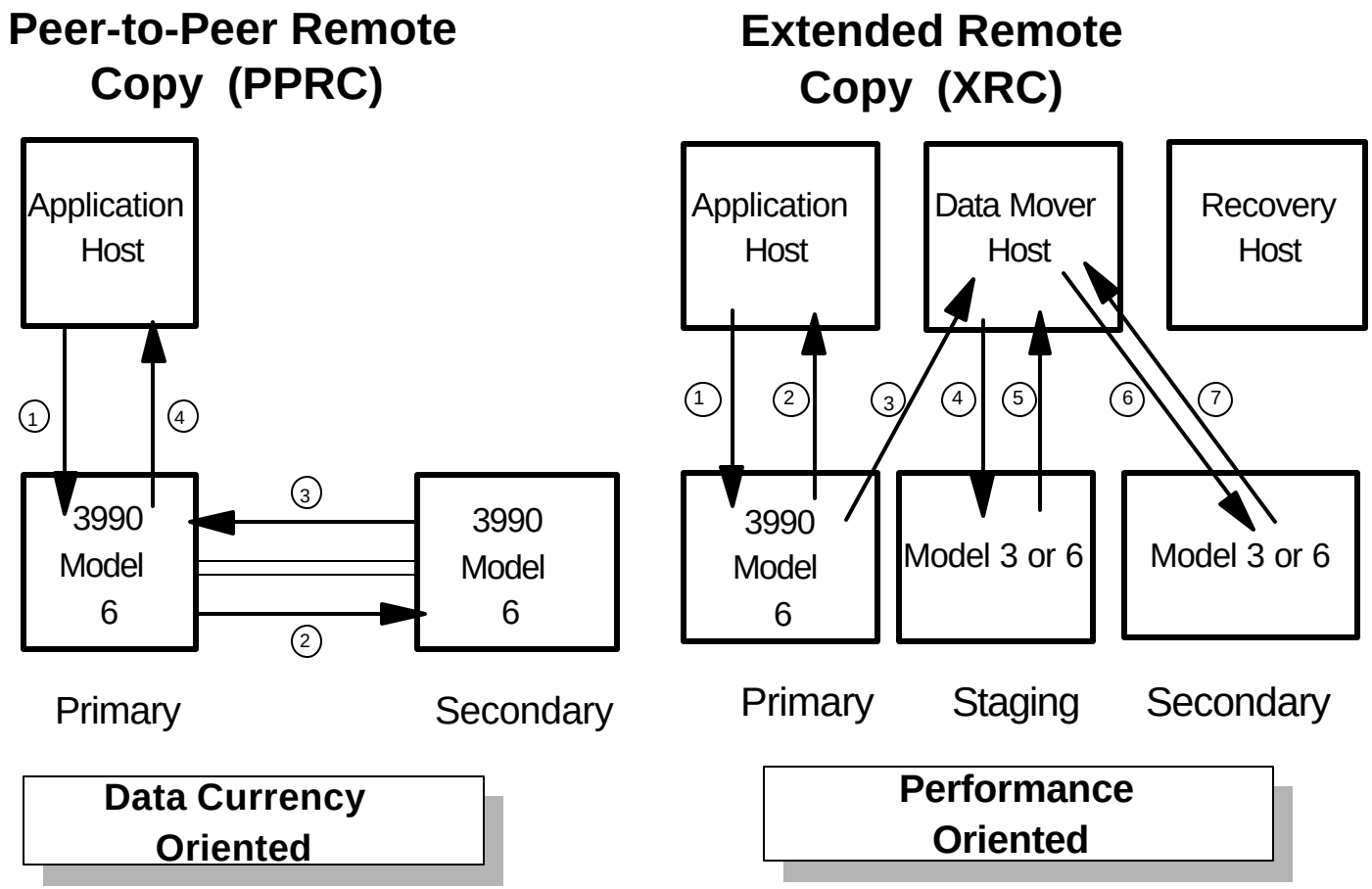
Availability Aspects

For Processor, MVS, IMS, VTAM failure

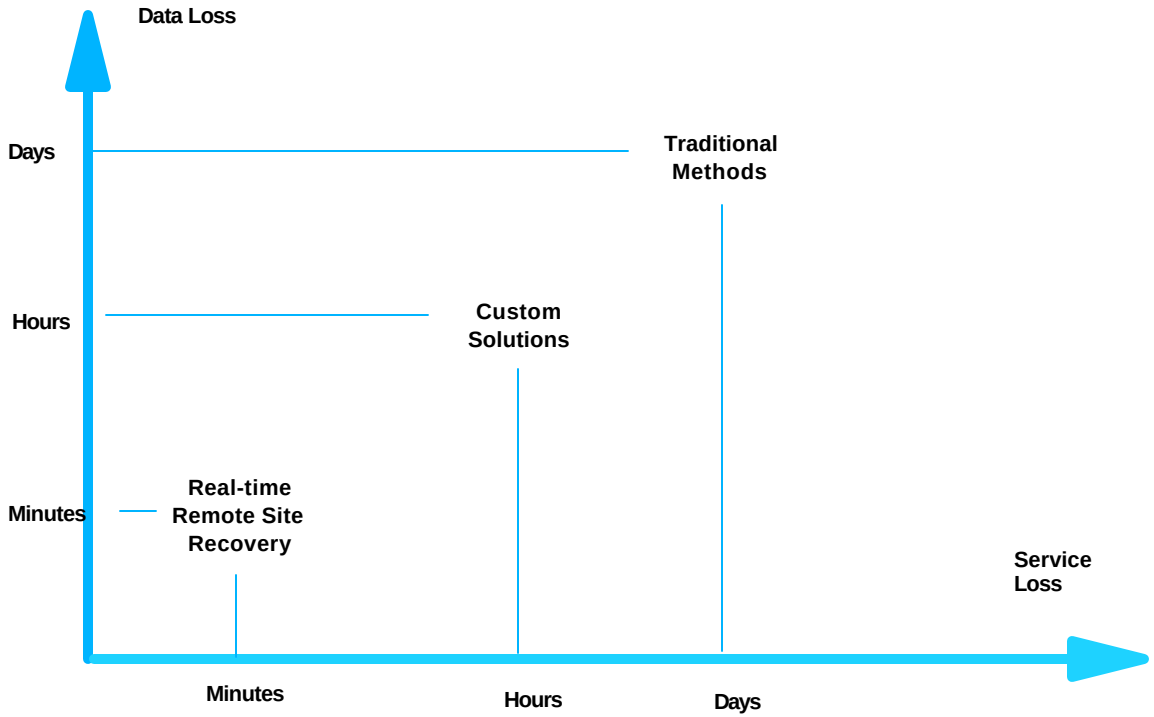


Individual application program failures managed through IMS scheduling
Central host failures covered by extended restart facility (XRF)
- Alternate "tracks" Actives work through Log
- Takeover decision made by Alternate work through Log
- Takeover decision made by Alternate based on user criteria
- Only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

IBM 3990 Model 6 and RVA



Remote Site Recovery



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

Remote Site Recovery

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

Definition

- Ability to continue/resume processing of the critical workload at a remote site

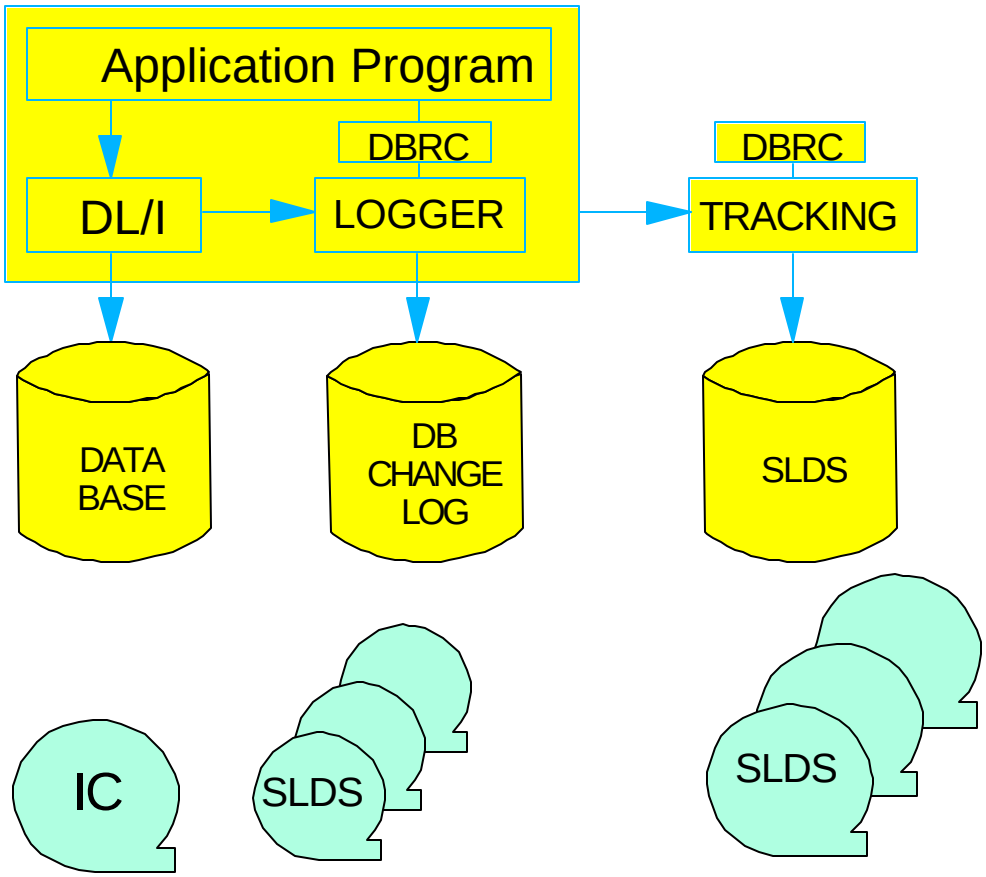
Remote Site Recovery Strategy

Objectives

- 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

RSR System Overview

IMS "Instance"



Planning for Concurrency

Concurrent Maintenance	⟷	Disruptive Maintenance
Online Service	⟷	Disruptive Batch Window

N, N+1 Approach

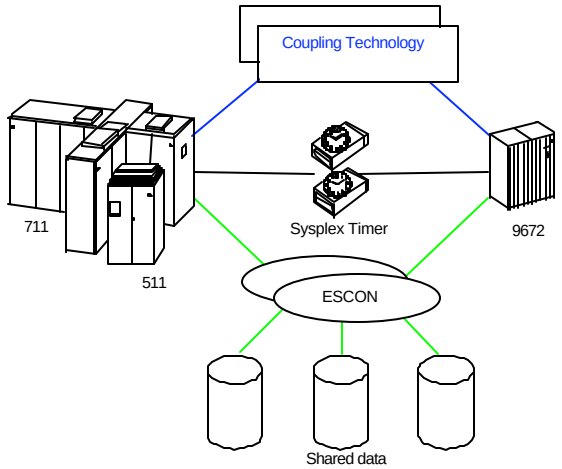
The Parallel Sysplex

What it provides:

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

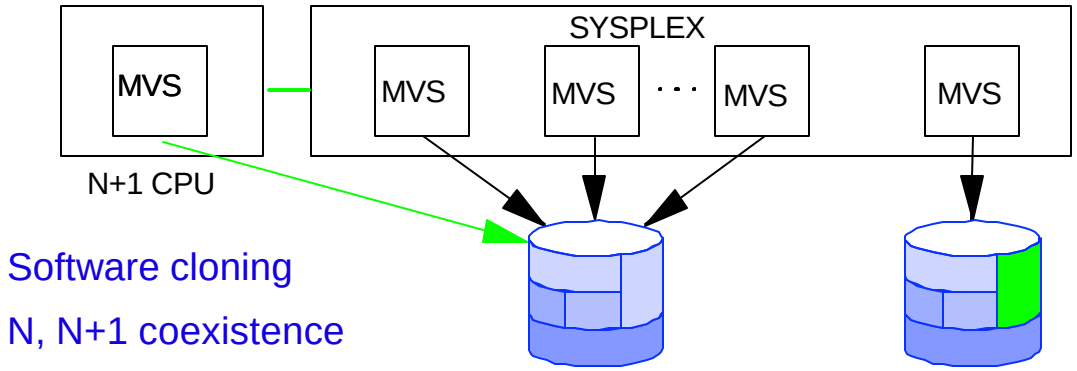
How it does it:

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



Reduced Planned Outages

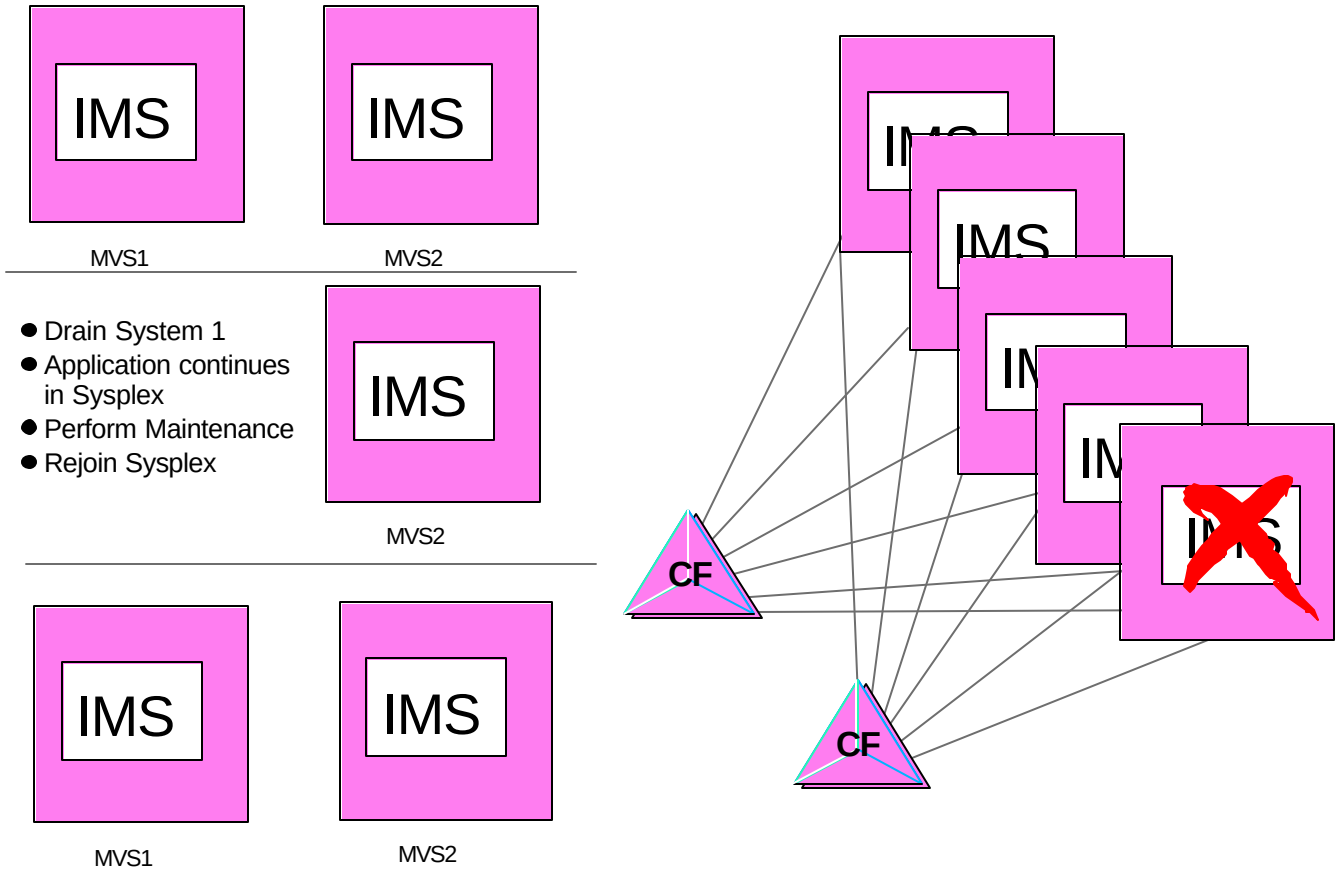
- Software: -Dynamic change
  - -Non-disruptive S/W changes (N, N+1 coexistence)
- Hardware: -Dynamic change
- Applications: -Concurrent online/batch
  - -Dynamic change



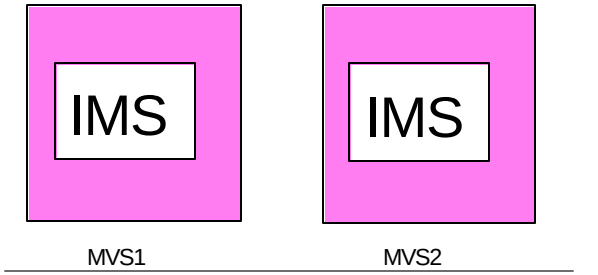
Software cloning

N, N+1 coexistence

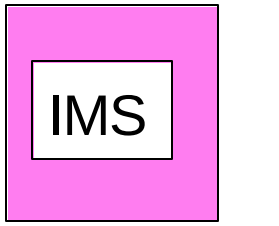
Shutdown for Planned Outage

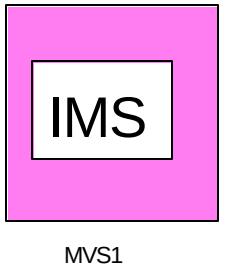


Failing MVS or CEC

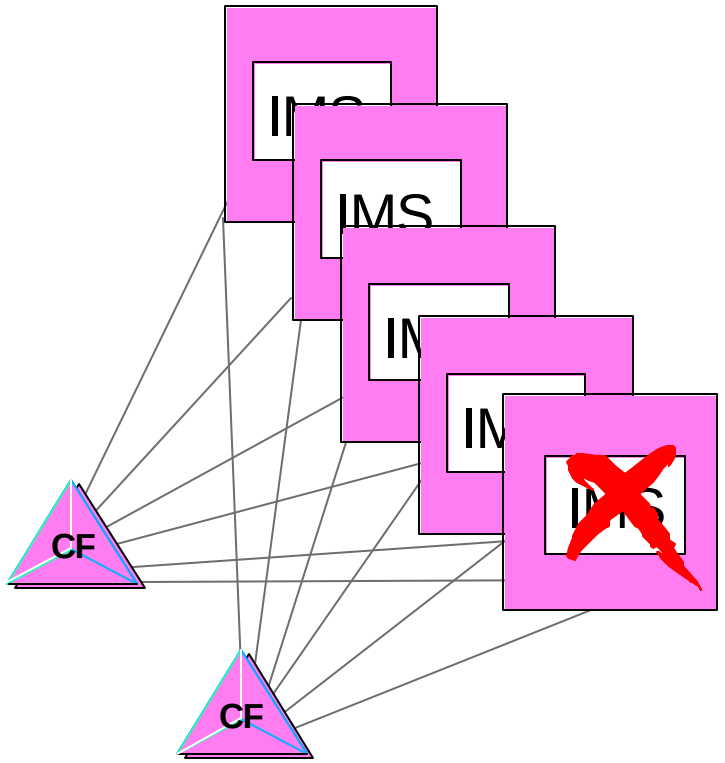


- Restart IMS
  - XRF or ARM
- Clears Locks
  - FDBR or restart

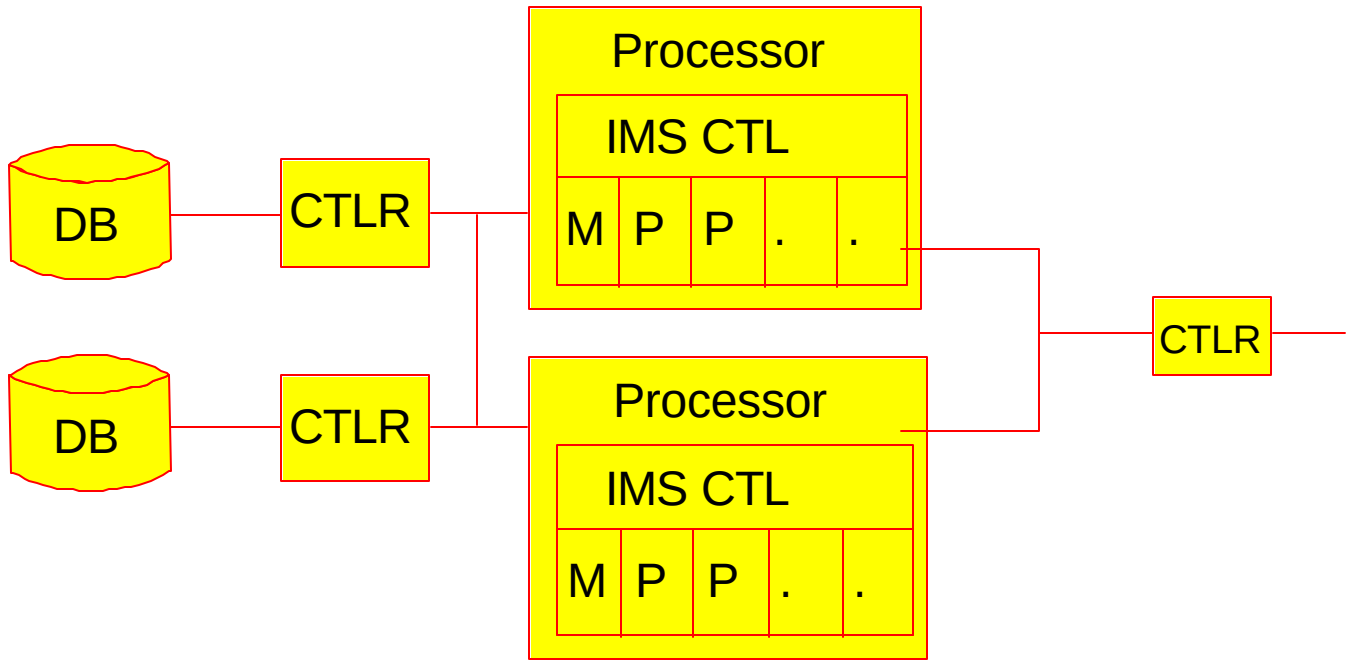




- Restart System
- Rejoin Sysplex

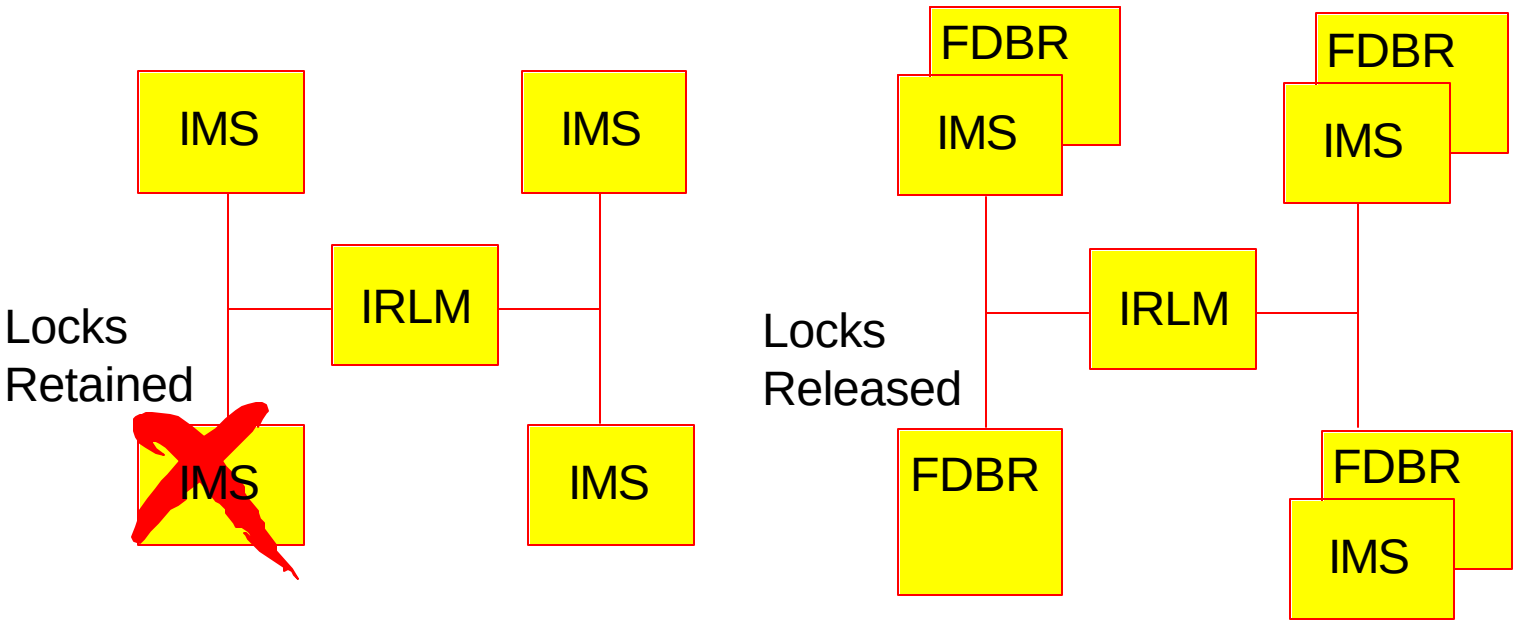


Availability Aspects



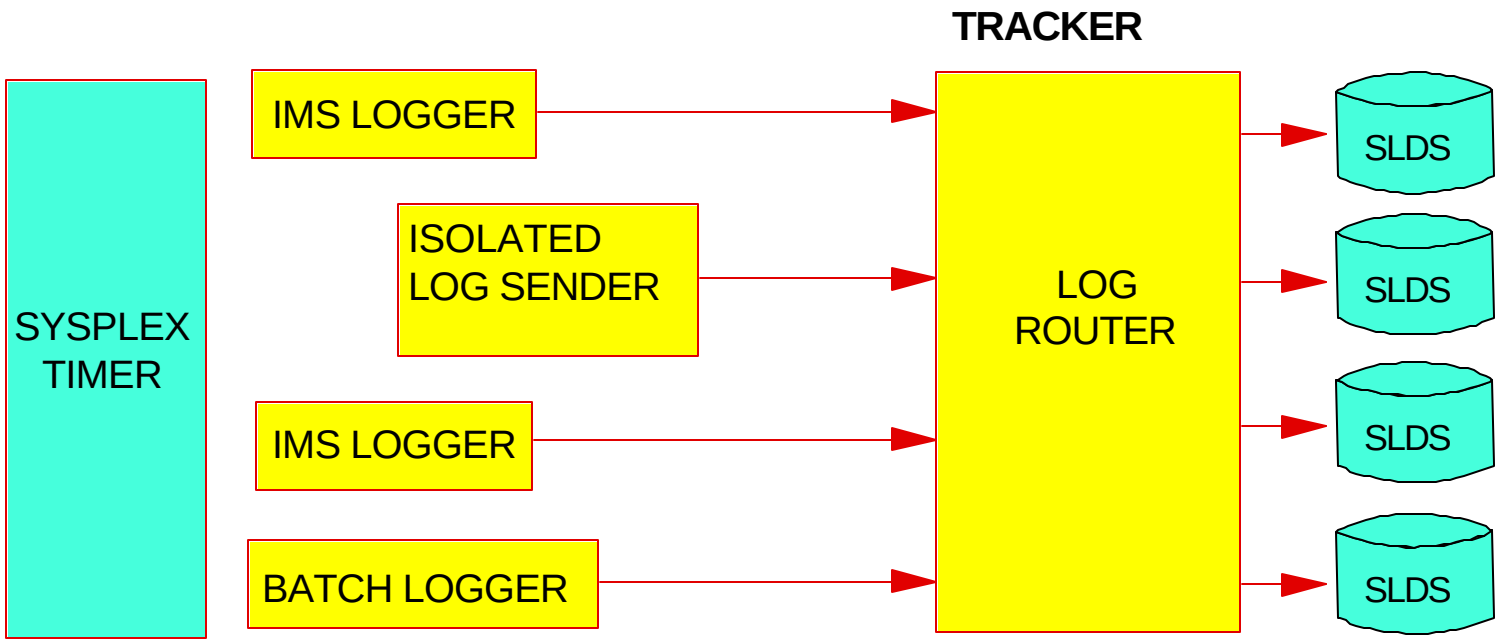
Introduced for increased capacity, now helps availability
Retained Locks on failure degrade total availability - use XRF, FDBR or ARM
Planning for affinity needs consideration (network and DB2)

FDBR and BLDS for Faster Lock Release



- How long for IMS to restart? - Manual or automated vs FDBR cleanup
- What scope of data "retained" - Control records?

RSR and BLDS IMS Systems



All IMSs in BLDS environment are one Service Group

Only 1 ILS used - could be anywhere on Active site

Sysplex Timer is mandatory for log sequencing

Planning for Automation

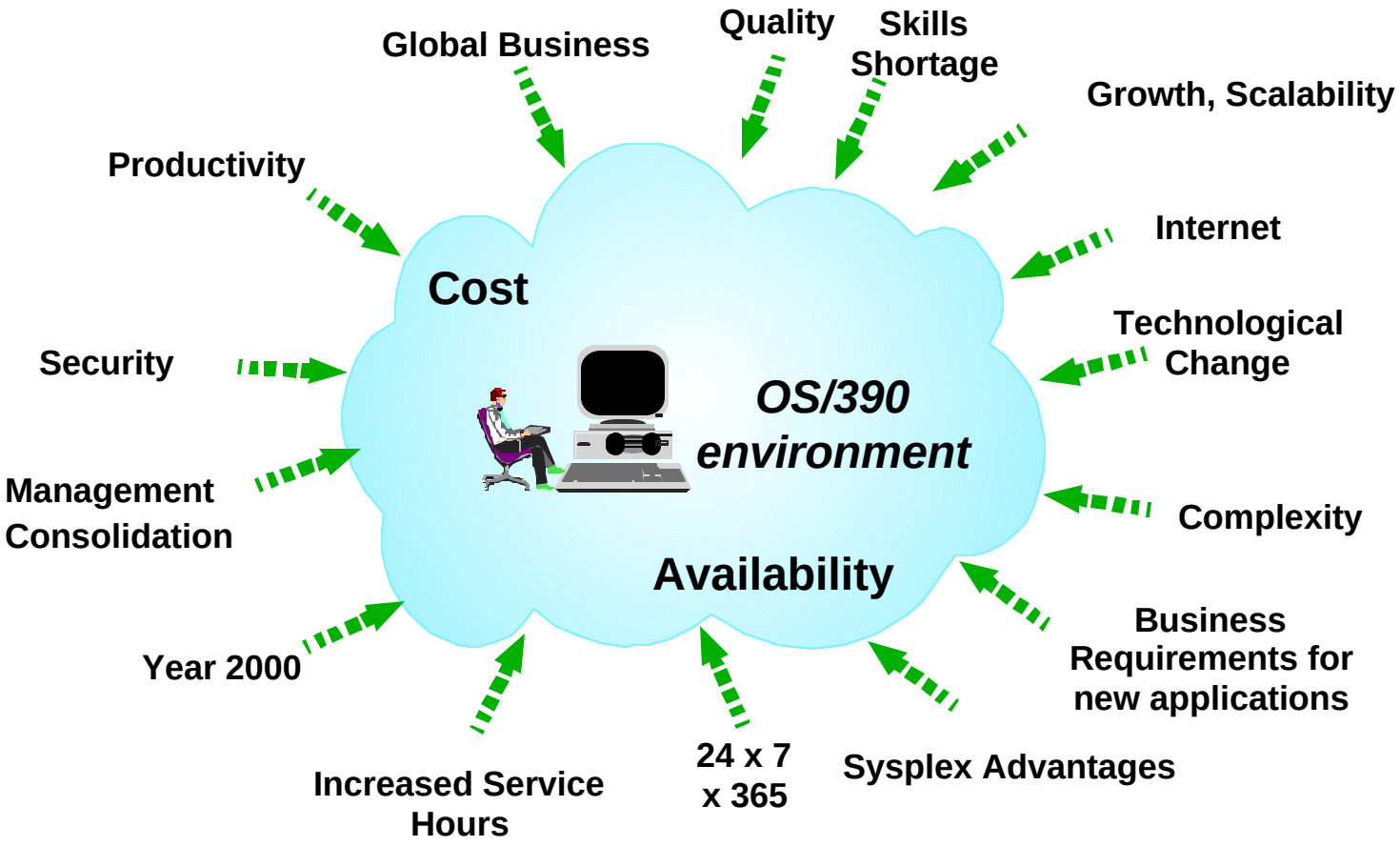
Reasons:

- Accuracy
- Speed
- Unattended
- Single Image
- Complexity

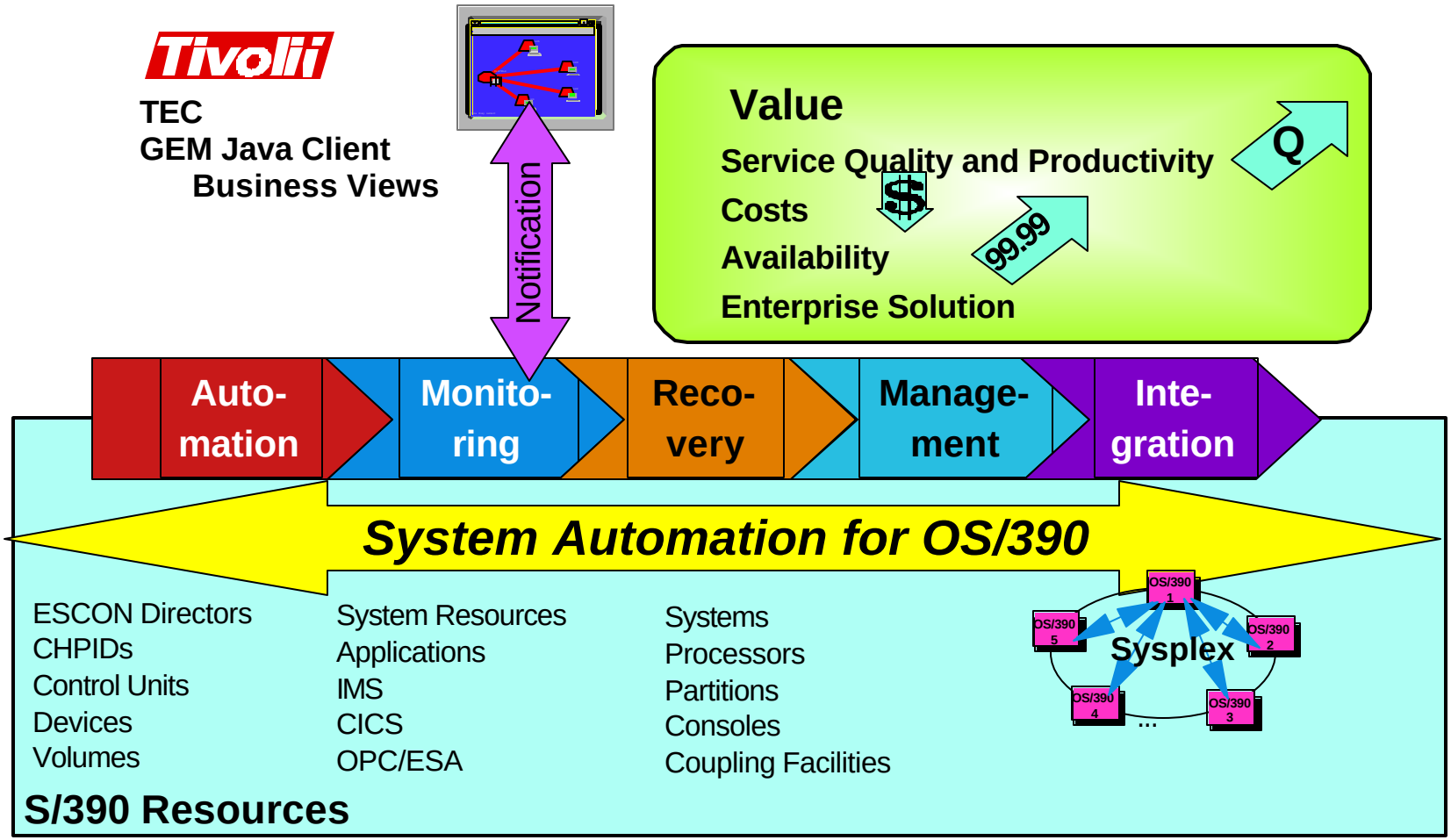
Objects:

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

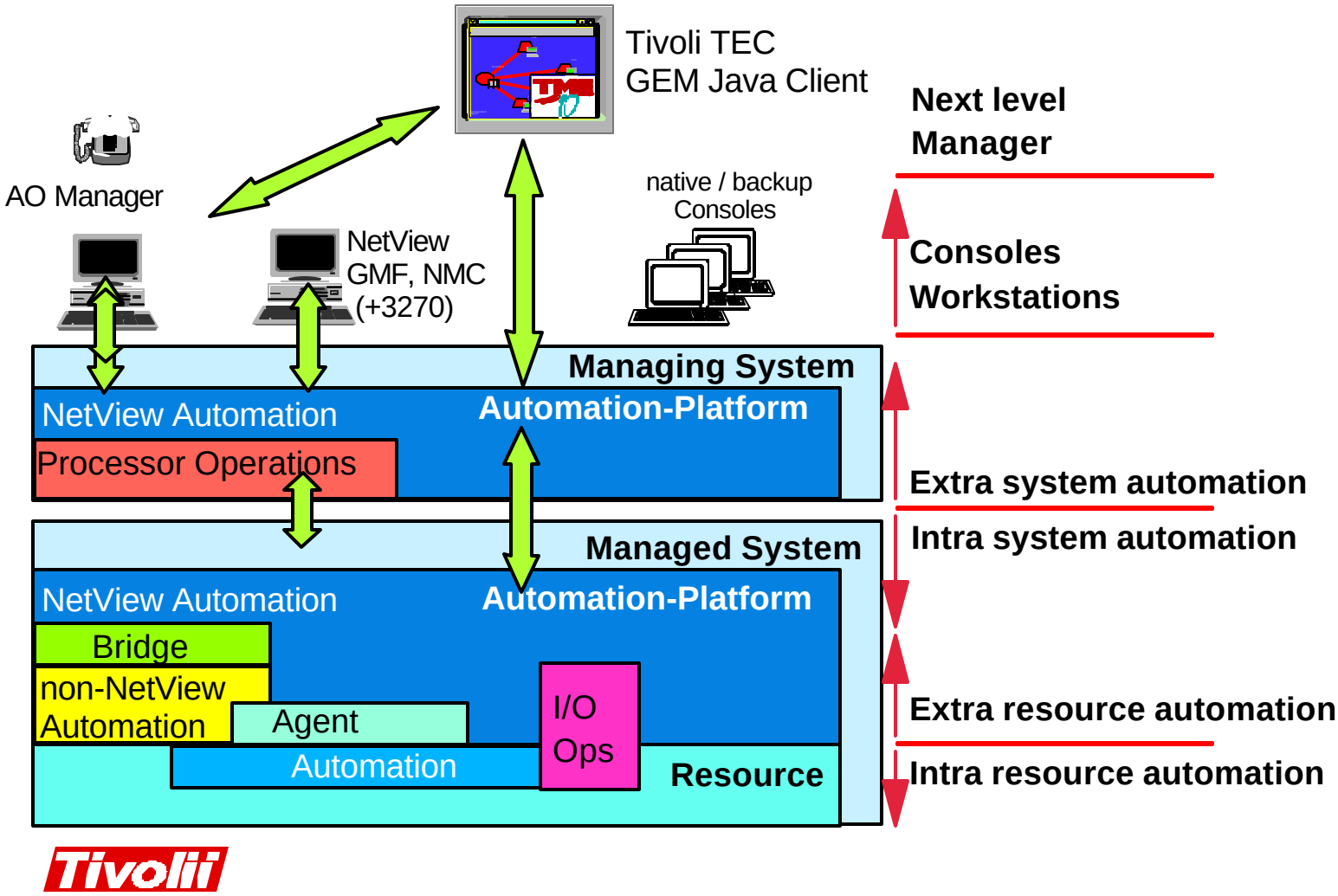
Systems Management Challenges



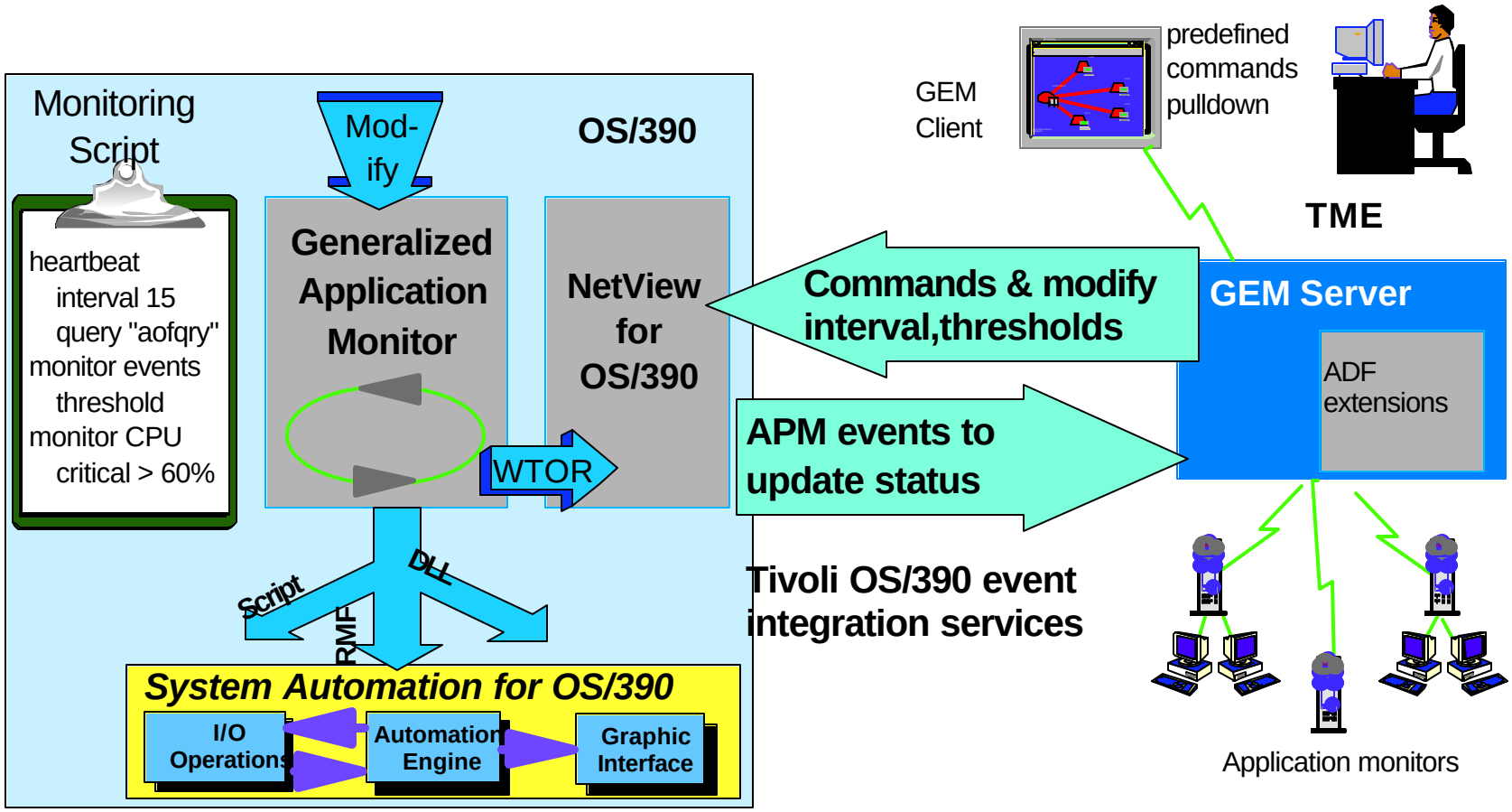
Overview


Tivoli
TEC
GEM Java Client
Business Views
Notification
Value
Service Quality and Productivity
Costs
Availability
Enterprise Solution
Q
$
99.99
Auto-mation
Monito-ring
Reco-very
Manage-ment
Inte-gration
System Automation for OS/390
ESCON Directors
CHPIDs
Control Units
Devices
Volumes
System Resources
Applications
IMS
CICS
OPC/ESA
Systems
Processors
Partitions
Consoles
Coupling Facilities
S/390 Resources
OS/390 1
OS/390 2
OS/390 3
OS/390 4
OS/390 5
Sysplex

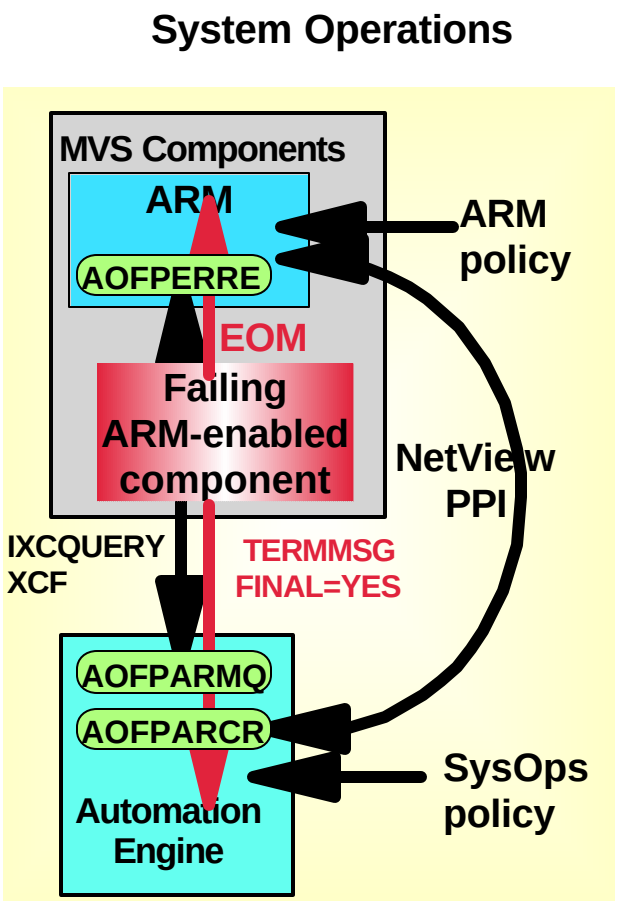
Enterprise



Global Enterprise Manager Instrumentation

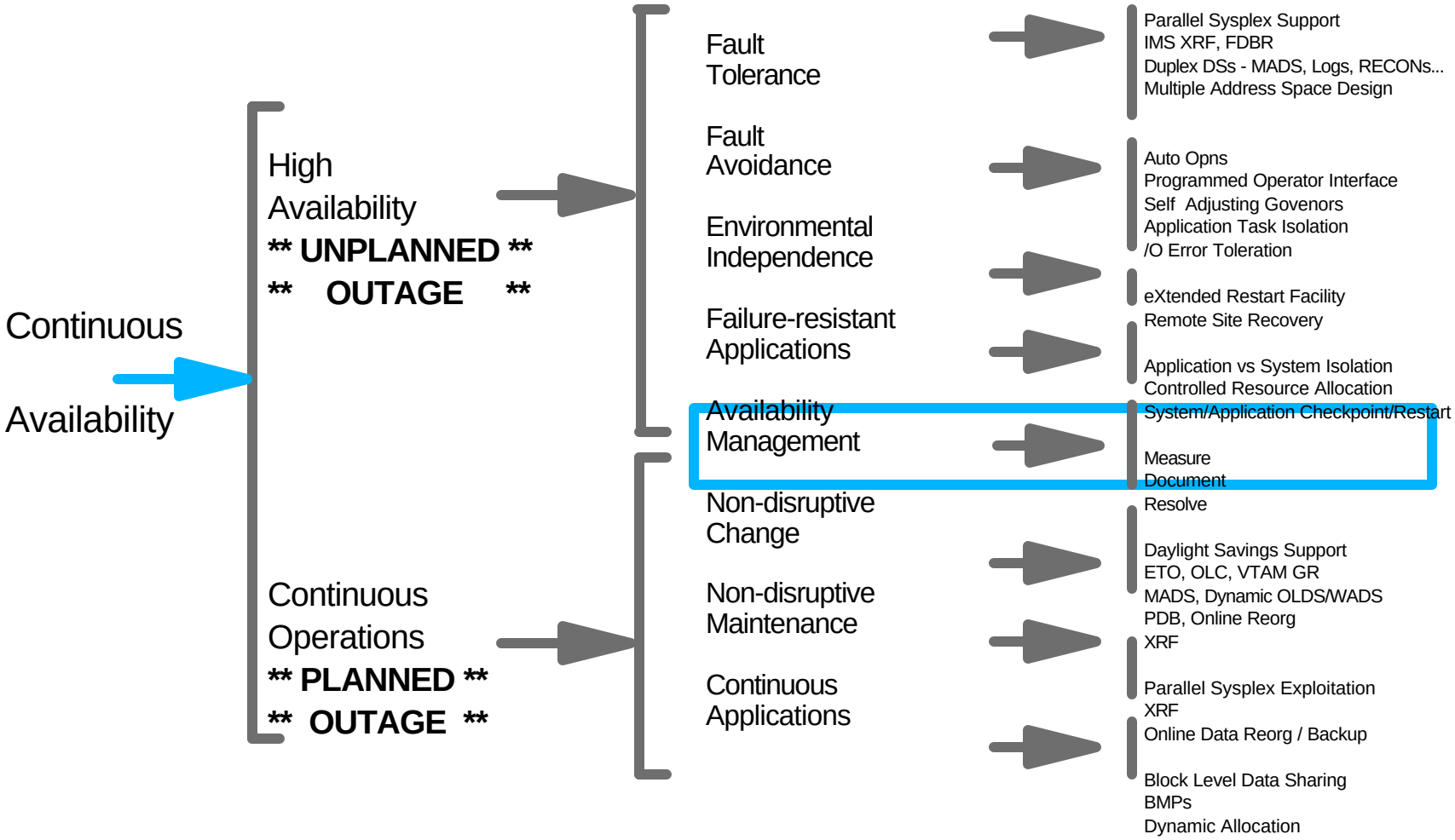


Co-operation with ARM



- 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 MVS system failure:
  - SysOps does not restart applications that have been ARM-moved to another system.
  - CICSAO will move them back next service period

Availability Solutions in IMS



What else is important?

MINDSET

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

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