

# The Twelve Pillars of IBM z/VM System Management

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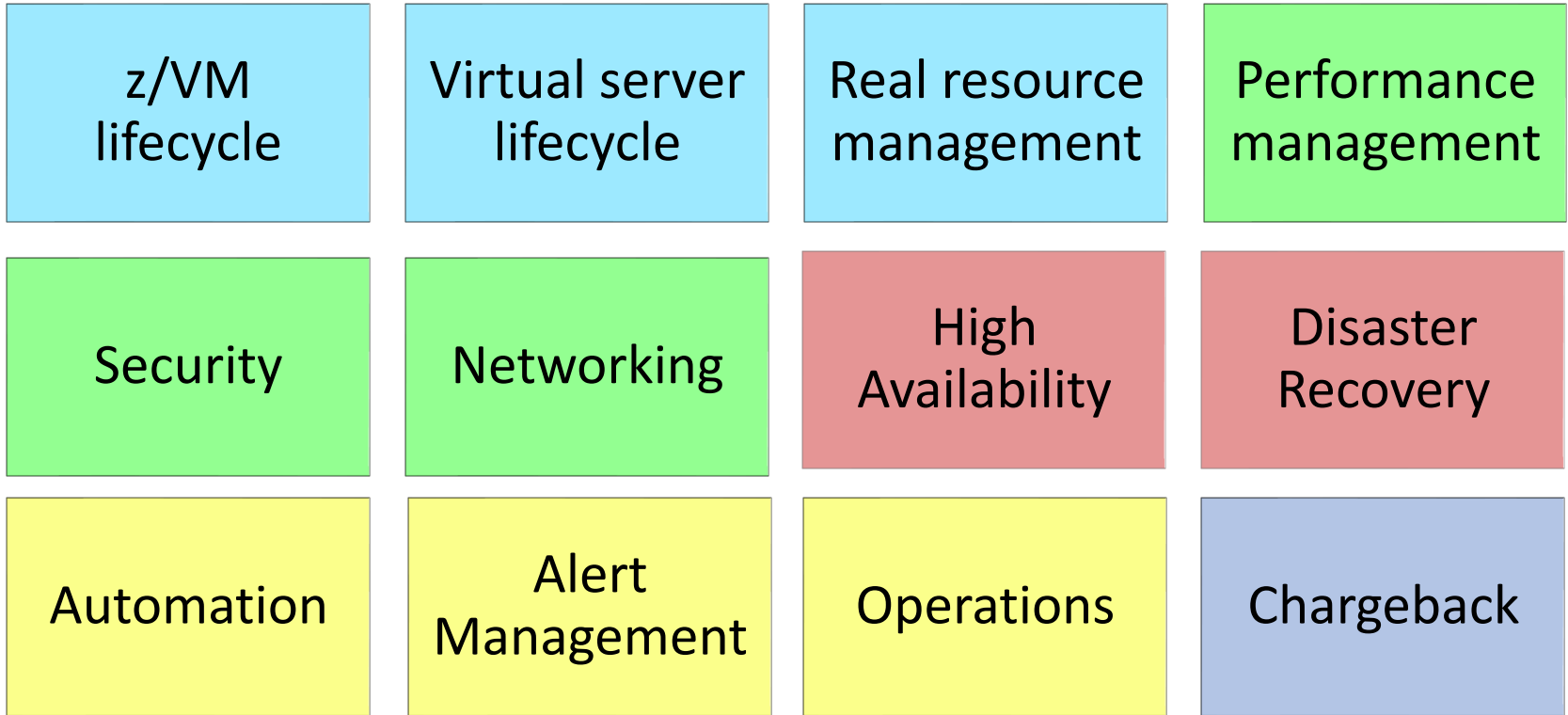
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OK, so they're more like rectangles....



# z/VM Hypervisor Lifecycle

- New installation or cloning an existing system
- Customization
- Patching: RSU, fix packs, feature packs, change logs
- System upgrades
- Decommission
  
- **Practice, practice, practice dumps and patches**
  - Once a quarter
  - You never know when you'll need it in a hurry!

# z/VM Hypervisor Lifecycle

- Hot fix
  - Addresses a single APAR, urgent
- Fix pack
  - Fixes for multiple APARs
- Feature pack
  - New function, Small Programming Enhancements (SPEs)
- Recommended Service Upgrade (RSU)
  - Collection of most recent fix packs for all components

# Virtual Server Lifecycle

- Virtual machines
  - Naming conventions
- Provisioning
  - Add / Change / Delete
  - Directory manager (e.g. DIRMAINT)
  - IBM Cloud Infrastructure Center
- Operations
  - Start / Stop / Pause / Move

# Real Resource Management

- LPAR memory, CPU
- Dynamic I/O changes
  - IODF creation and activation
  - HCD v. DPM
- Hardware upgrade (concurrent or off/on)
- Storage migration
- Threshold and status alerts (EREP, operator)

# Performance Management

- Performance management
  - Real-time
  - Historical
  - Capacity planning
  - Advisories
  - Threshold and status alerts
- IBM Performance Toolkit and the Data Pump
- IBM OMEGAMON
- Velocity zVPS

# Security - Policy

- Policy is a **roadmap** for implementation
  - Multi-factor authentication?
  - Password phrases?
- What you are supposed to accomplish, not how
  - Follow on with an **implementation guide** that is z/VM specific
- Policy should avoid implementation-specific naming
  - “Must use the Foo Facility” can lock out platforms that have same functionality, but don’t call it “Foo”
- Virtualization services are substantially different from traditional OS services

# Security - Operational

- Provisioning
  - Person or workload?
  - Naming convention v. Groups
  - Authorizations & privileges
- Emergencies & Error recovery
  - "Break glass"
  - ESM database storage failure
  - ESM failure

# Security - Operational

- What to audit?
- Detecting configuration changes
- Penetration testing

# Security - Data

- Encryption
  - In flight: TLS servers (no self-signed certs, please!)
  - At rest: pervasive encryption (Linux: dmccrypt)
  - Upgrade your TN3270E and ftp clients
- Resource access controls
  - External security manager
  - Access rights review
  - Based on group membership
- Residual data management
  - Clear, purge, destroy

# Networking

- TCP/IP and VSWITCH
  - Bridge, HiperSockets, VLANs
- Planning
- Bandwidth (capacity)
- Hardware (cables, ports, switches, power)
- Alert generation (failure, thresholds, drops)
- Dropped packet diagnostics

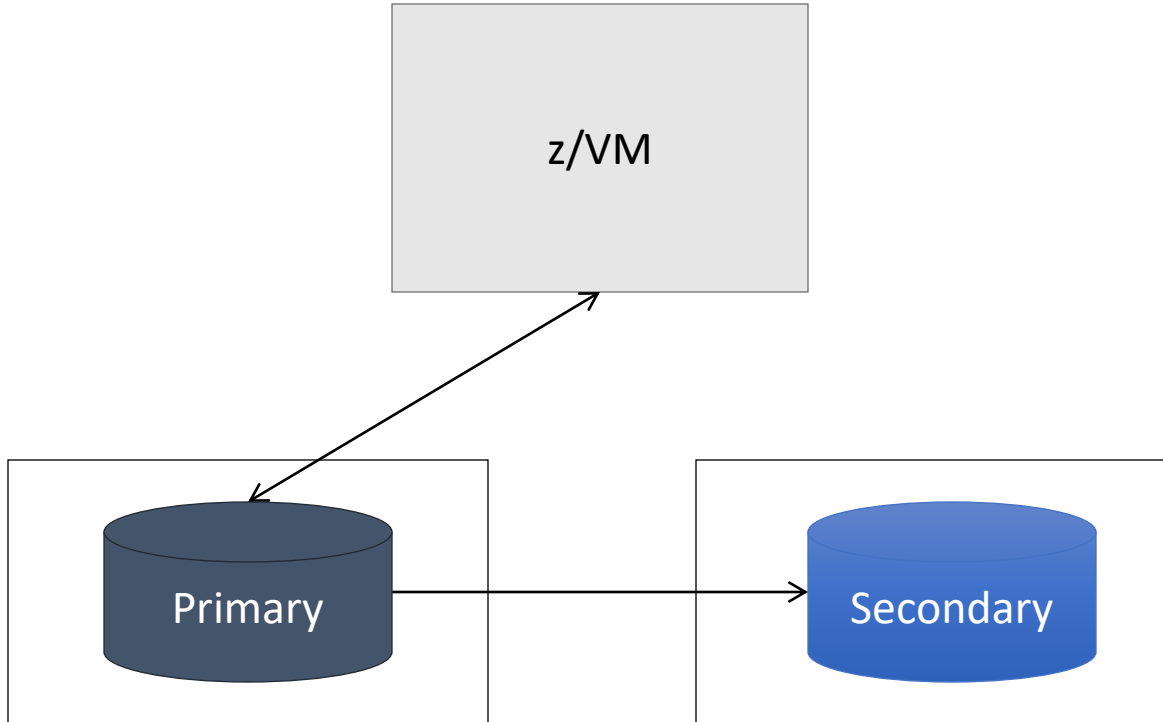
# Networking

- “Just because it’s valid doesn’t mean it’s wise”
  - Sir Alan, Lord of the Protocols
- Configuration review
  - Backup port on same chpid
  - All OSAs plugged into same physical switch
  - Link aggregation / portchannel / bonding
- Vulnerability assessments
- Don’t forget about RoCE and SAN

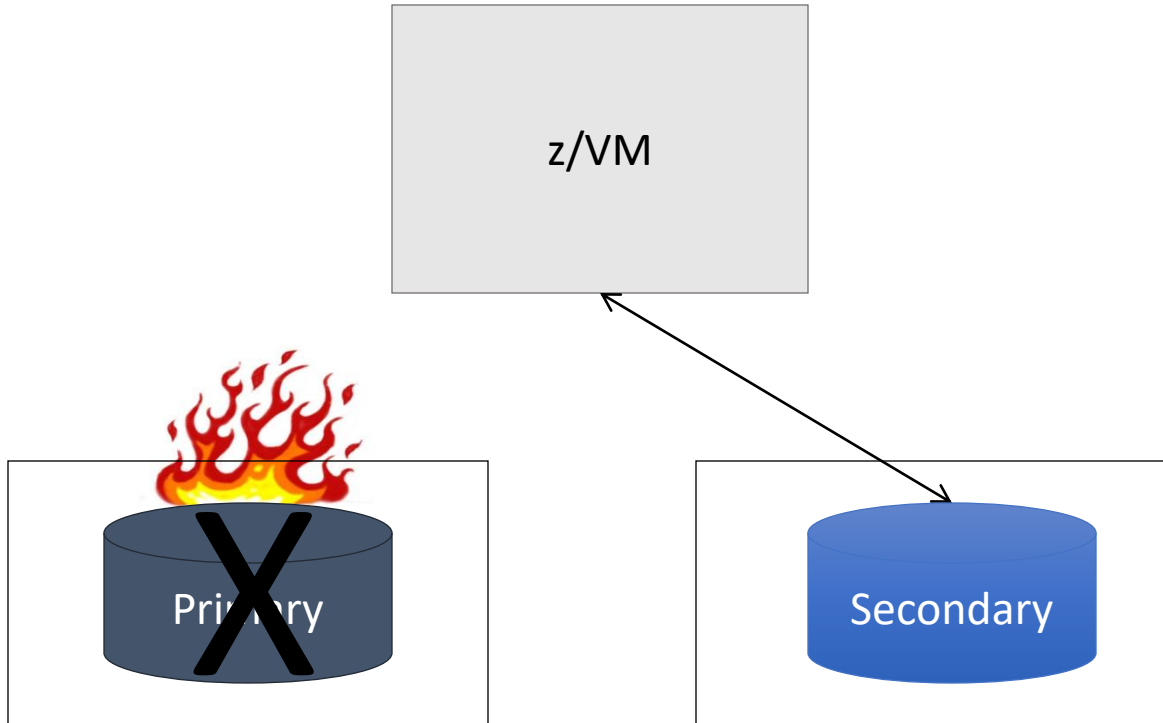
# High Availability

- Single component outage
  - Planned or unplanned
  - Human or machine
- Clusters
  - Application, Database, Hypervisor, Server, Storage
  - All hardware components eventually fail
- Storage mirrors: **GDPS**<sup>®</sup> and **hyperswap**
- Network link aggregation
- Alert generation (predictive, FYI, or unexpected)
- Archive / Retrieve (human failure)

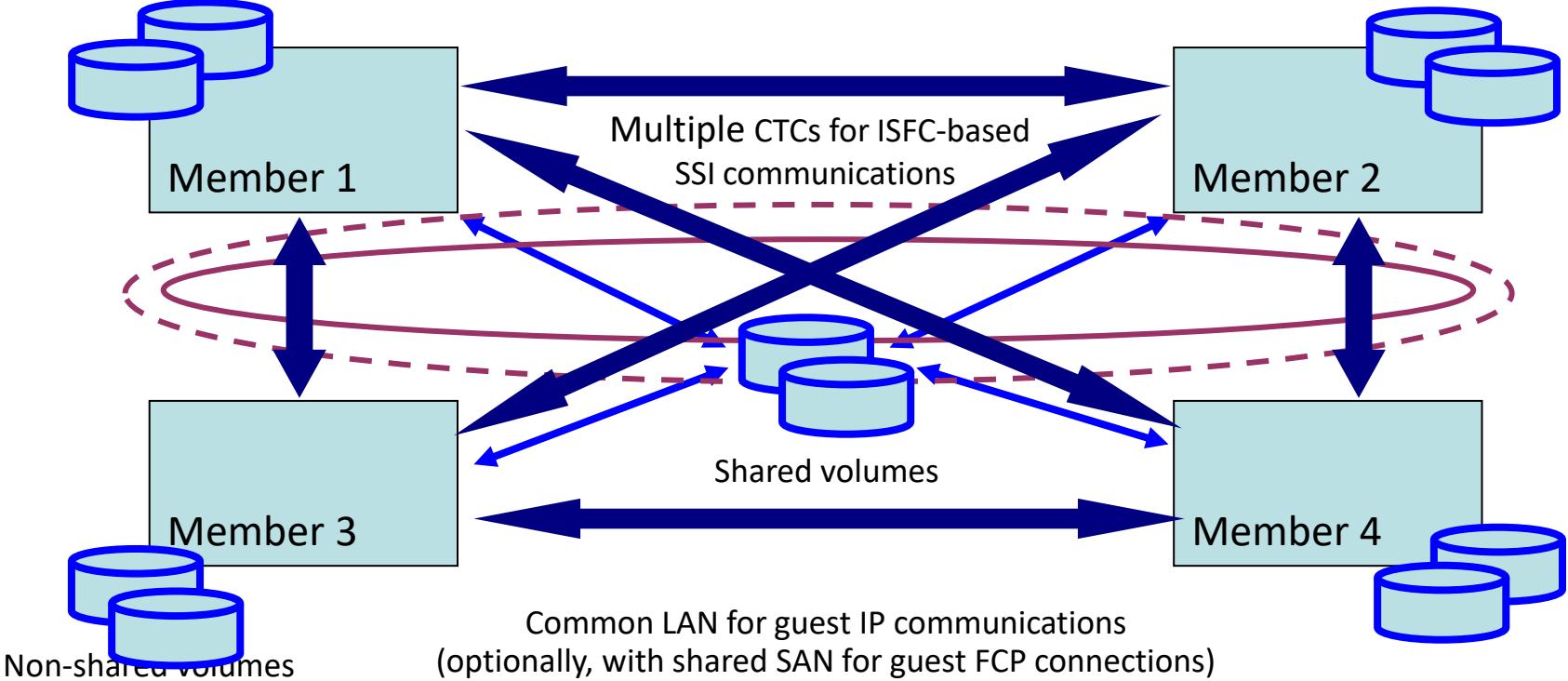
# Hyperswap



# Hyperswap



# Single System Image



# Disaster Recovery

- Multiple component failure
  - Includes complete site failure
- Asynchronous storage mirror
- Alternate machine, if you don't have another one nearby
- GDPS-managed **region swap**
- Alternate configuration management
  - Return home
  - Planned test
- Backup / Restore

# Automation

- Monitor system operator console
  - Tourist information or Important?
  - Response to prompts (e.g. from security server)
  - Use SECUSER or OBSERVER - don't run software IN the OPERATOR virtual machine
- Console log recording
  - All guests
  - Keep console data out of z/VM spool!
- Generate enterprise alerts
- Timed events
- Startup / Shutdown staging and coordination with CP SIGNAL
- IBM Operations Manager

# Alert Management

- Performance
- User revocation (potential intrusion attempt)
- Predictive hardware failure
  
- Enterprise event management integration
  - IBM, CA, HP, Microsoft, ....
  - Syslog forwarding
  - SNMP traps
  - SIEM for RACF
  
- Locally generated e-mail

# Operations

- IPL: Standalone program loader (SAPL)
  - LOADPARM
  - IPL parameters
  - SALIPL to set defaults
  
- SHUTDOWN / SHUTDOWN REIPL
  
- SNAPDUMP
- System restart full dump
- Stand-alone dump
- Practice, practice!

# Operations

- HMC
  - Get your own ID
- OSA-ICC
  - “Gotta have it”
- Auto-IPL
- Recording: EREP (OFF), Symptom (OFF), ACCOUNT (if needed)
- Backup / Restore
- Service virtual machine (SVM) data collection and archive (sweep)

# Chargeback

- Unit price per virtual server
- Unit price per CPU, disk, network
- Consumption (CPU) [hint: Don't do this!]
- Premium charge for premium service
- See OPERACCT for accounting records
  
- No requirement to bill
  - May be used to calculate TCO for comparisons
  - Not using? Then turn off ACCOUNT record recording.

# The goal is in sight!

z/VM  
lifecycle ✓

Virtual server  
lifecycle ✓

Real resource  
management ✓

Performance  
management ✓

Security ✓

Networking ✓

High  
Availability ✓

Disaster  
Recovery ✓

Automation ✓

Alert  
Management ✓

Operations ✓

Chargeback ✓

# Contact information

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