Chapter 8

Maintaining Cloud Solutions

8.01 Planning Patch Management

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Public Cloud Patch Management

- Virtual machines
- Virtual appliances
- Applications
- Storage components
- Clusters

Private Cloud Patch Management

- Hypervisors
  - Software layer
  - Physical hardware
  - Enables VMs to run
- Network components
  - Update OS and firmware

Patch Management Operations/Procedures

- Production vs. development vs. QA
- Rolling update
- Blue-green deployment
- Failover cluster

Additional Considerations

- Order of operations
  - Patches may require a specified order
- Dependencies
  - What other systems depend on the patched system?

8.02 Manual Patch Management

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Demo

- Patching a Linux system in the cloud

8.03 Automated Patch Management (Lab)

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Hands-On

- Automating Windows patches in the cloud

8.04 Update Types

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Hotfix

- Varying terminology by different vendors
- Generally, a hotfix resolves a specific problem
- May be publicly available
- May be available only upon request
- May be available only with a specific service contract
- Not always automated

Patch

- Generally, a patch is a publicly available hotfix
- May include multiple “fixes” in a bundle
- Usually can be automated

Version Update

- Updating to an entirely new version of the software or operating system
- Requires more extensive analysis
  - What features are removed?
  - What features are added?
- May require significant downtime (hours or days)

Rollback

- The ability to undo a patch, hotfix, or version upgrade
- Should be avoided when possible
- Two common options:
  - Vendor-provided rollback function
  - Restore from backup

Maintenance Windows

- How long will the patch take?
- Will the system be unavailable during the patch?
- How many systems are affected?
- With this information, select the best maintenance window

8.05 Automated Workflows (Lab)

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Automated Workflow Concepts

- Runbook management
  - Single node
- Orchestration
  - Multiple node
  - Multiple runbooks

Automation Activities

- Shut down
- Restart
- Entering maintenance mode
- Patching
- Snapshots
- Clones
- Enabling/disabling alerts

Hands-On

- Show Azure runbooks

8.06 Backup Types (Lab)

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Backup Types

- Full
- Differential
- Incremental
- Change block
- Delta tracking
- Snapshot
  - Redirect-on-write
- Cloning

Hands-On

- Azure
  - Snapshots of instances
  - Cloning instances

8.07 Backup Targets and Options

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Backup Targets

- Local
  - From my cloud to local environment
  - Local to my cloud
- Remote
  - Backing up to a 3rd party
- Replicas
  - Usually has to do with databases
  - Read replica: can only read that database
  - Read/write replica: can read AND write to that database

Backup Schedules

- Schedules include
  - Nightly full backups
  - Weekend full backups
  - Nightly differential backups

Additional Backup Options

- Configurations backup
- Objects backup
- Backup dependencies
- Online vs. offline backups
- SLAs

8.08 Maintenance Automation Techniques

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Impact and Scope of Maintenance Tasks

- User downtime
- Impacted systems
- Stability/reliability
- Performance

Impact and Scope of Maintenance Automation

- Skills required
- Scripting languages supported
- Documentation

Maintenance Schedules

- Must be scheduled based on the impact and scope of the action
  - Rolling maintenance on distributed systems
  - All-at-once maintenance
  - Cost of maintenance

8.09 Maintenance Automation Tasks

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Common Automated Maintenance Tasks

- Clearing logs
- Archiving logs
- Compressing drives

Common Automated Maintenance Tasks

- Removing inactive accounts
- Removing stale DNS entries
- Removing orphaned resources
- Removing outdated rules from firewall/security

Common Automated Maintenance Tasks

- Resource reclamation
- Maintain ACLs for the target object
- Orchestration can be used as appropriate

8.10 Provisioning and Deprovisioning

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Provisioning Resources

- Cloud provisioning is simpler than physical machine provisioning
- Still requires planning for effectiveness
  - Provisioned and used resources incur costs
  - Provisioned and used resources must be managed
  - Monitor usage patterns to plan provisioning

Cloud Bursting

- Typically configured between a private and public cloud
- Allows offloading of processing to the public cloud during heavy loads
- Public cloud may be configured for auto-scaling
- Extending the scope of the public cloud may be best
  - When bursting is occurring frequently
  - When costs would be reduced

Cloud Provider Migrations

- Moving virtual machines
- Moving code
  - More complicated
  - Must support the same or similar APIs
  - Using open architectural solutions with any cloud service provider allows for easier later migrations

Cloud Provider Migrations

- Several drivers of cloud migrations
  - Business need changes
    - Mergers, acquisitions, and divestitures
  - Cloud service requirement changes
  - Regulation and law changes

8.11 Application Life Cycle

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Cloud-Managed Application Life Cycles

- Deployment
- Upgrade
  - Features
  - Usage
  - Licenses
- Migration

Cloud-Managed Application Life Cycles

- Retirement/ replacement
  - How to remove data?
  - Consider feature use
  - Consider new features in other applications

8.12 Monitoring and Reporting (Lab)

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Hands-On

- Monitor in Azure

Selecting Monitoring and Reporting Metrics

- Chargeback/showback models
- Company policy-driven reporting
- SLA-driven reporting

8.13 Monitoring Metrics

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Understanding Monitoring Metrics

- Functional performance measurements used to analyze the effectiveness of a solution
- Choosing the right metric is key to determining effectiveness
- Operating systems, applications, and hardware may provide metrics

Common Metrics

- Connectivity
- Capacity
- Latency
  - Delay
  - Processing, disk, network
- Overall utilization
- System availability
  - Uptime
  - Downtime

Additional Management Metrics

- Health
- Cost
- Elasticity usage
- Incidents