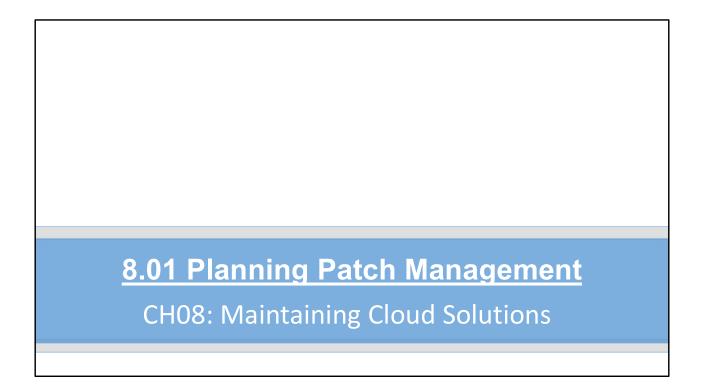
| <u>Chapter 8</u> Maintaining Cloud Solutions |
|--|
| Maintaining Cloud Solutions                  |







## 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?







## <u>Demo</u>

Patching a Linux system in the cloud



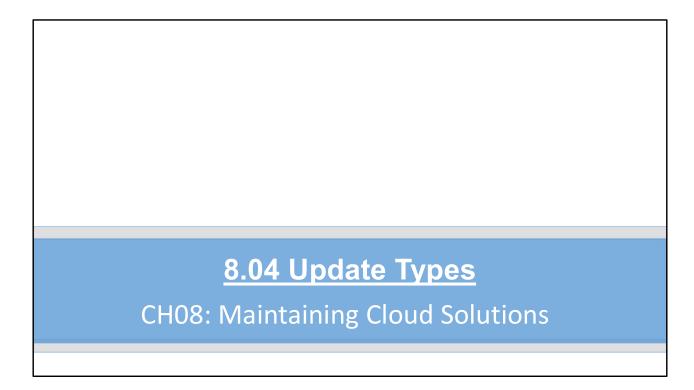




## <u>Hands-On</u>

Automating Windows patches in the cloud







#### **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



## <u>Patch</u>

- •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

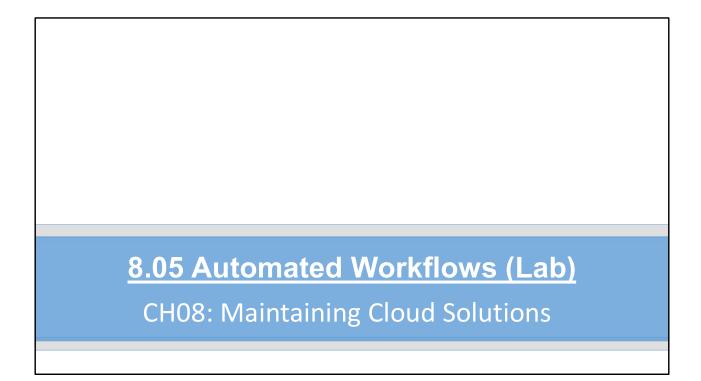
- •The ability to undo a patch, hotfix, or version upgrade
- Should be avoided when possible
- •Two common options:
  - Vendor-provided rollback function
  - Restore from backup



#### **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







## **Automated Workflow Concepts**

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



### **Automation Activities**

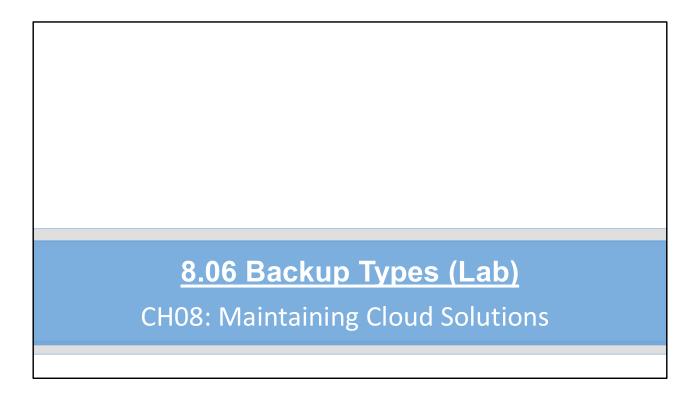
- Shut down
- Restart
- Entering maintenance mode
- Patching
- Snapshots
- Clones
- Enabling/disabling alerts



## Hands-On

Show Azure runbooks







## **Backup Types**

- Full
- Differential
- Incremental
- Change block
- Delta tracking
- SnapshotRedirect-on-write
- Cloning



## <u>Hands-On</u>

- Azure
  - Snapshots of instances
  - Cloning instances







#### **Backup Targets**

- Local
  - From my cloud to local environment
  - Local to my cloud
- Remote
  - Backing up to a 3<sup>rd</sup> 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







#### Impact and Scope of Maintenance Tasks

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



#### <u>Impact and Scope of Maintenance</u> <u>Automation</u>

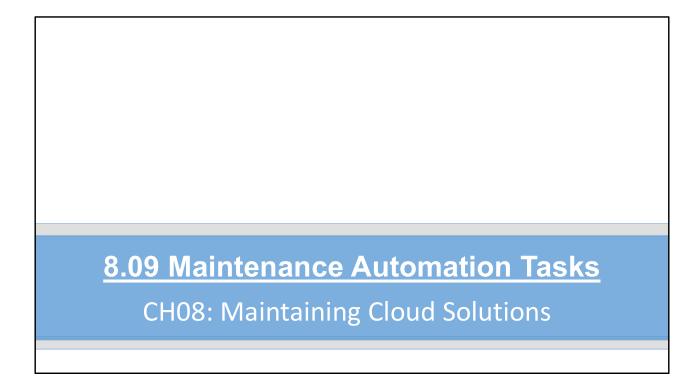
- Skills required
- Scripting languages supported
- Documentation



#### **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







# Common Automated Maintanance Tasks

- Maintenance Tasks
   Clearing logs
- Archiving logs
- Compressing drives



#### **Common Automated**

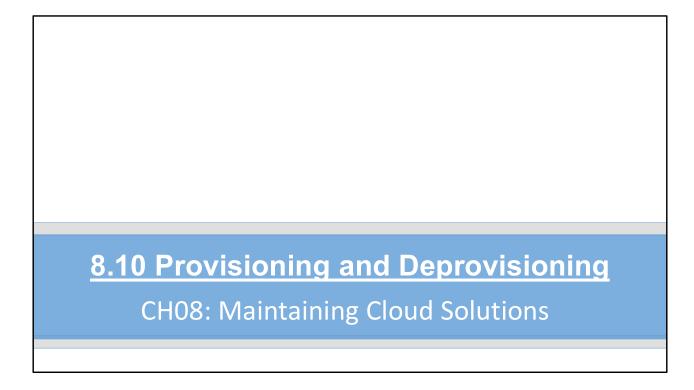
- Maintenance Tasks
   Removing inactive accounts
- Removing stale DNS entries
- Removing orphaned resources
- Removing outdated rules from firewall/security



#### **Common Automated**

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







## **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 frequentlyWhen costs would be reduced



## **Cloud Provider Migrations**

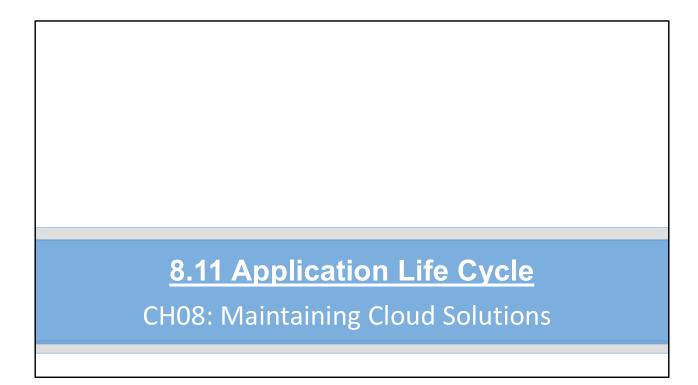
- Moving virtual machines
- Moving code
  - More complicated
  - Must support the same or similar APIs
  - Using open architectural solutions with any cloud service provider allows for easier later migrations



# **Cloud Provider Migrations**

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







## **Cloud-Managed Application Life Cycles**

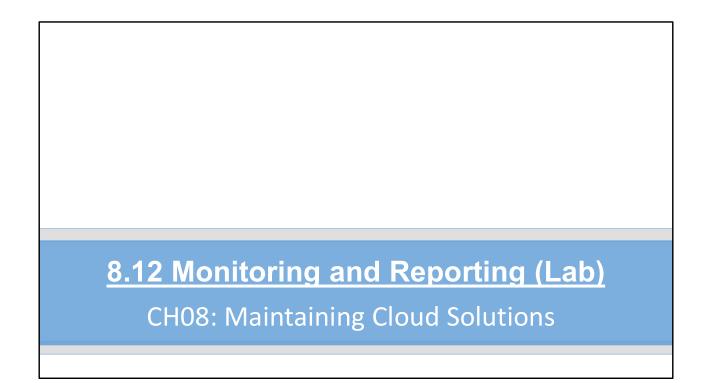
- Deployment
- Upgrade
  - Features
  - Usage
  - Licenses
- Migration



#### **Cloud-Managed Application Life Cycles**

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







# Hands-On

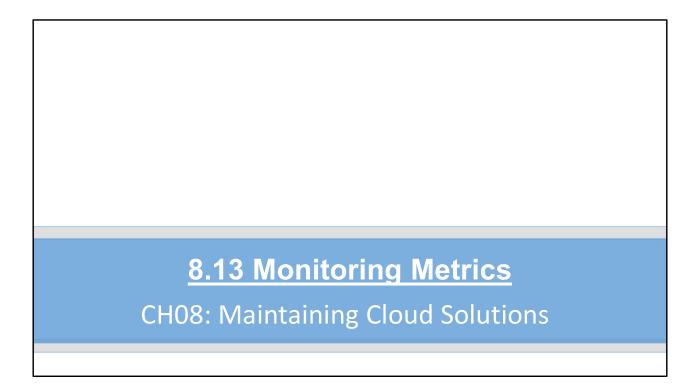
Monitor in Azure



# Selecting Monitoring and Reporting Metrics

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







## **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

