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# Accelerate Modernization

Social . Mobility . Analytics . Cloud



## Management and Optimization in Cloud Adoption Framework

**By Nadaraj Prabhu**

# Agenda

1. Cloud Management
2. Organize Resources
3. Management Baselines
4. Manage Costs and Billing
5. Operations and Design Principles
6. Use Monitoring and Reporting
7. Best Practices for Resilience



# Why Cloud Adoption Framework?

- Provides examples of actionable operations management approaches that represent common experiences often encountered by customers.
- Helps you create personalized management solutions based on business commitments.



# Cloud management methodology

## Manage

## Business Alignment

### Criticality



Document the criticality and relative business value of each workload.

### Impact



Establish clear performance expectations and business interruption time/value metrics.

### Commitment



Document, track, and report on commitments to cost and performance

## Cloud Operations Disciplines



### Inventory & Visibility

Establish a defined inventory of assets. Develop visibility into the asset telemetry.



### Operational Compliance

Manage configuration drift and standards. Apply management automation and controls.



### Protect & Recover

Implement solutions to minimize performance interruptions and ensure rapid recovery when needed.



### Platform Operations

Customize operations to improve performance of the common platforms that support multiple workloads.



### Workload Operations

Understand workload telemetry. Align workload operations to performance and reliability commitments.



# Cloud Management

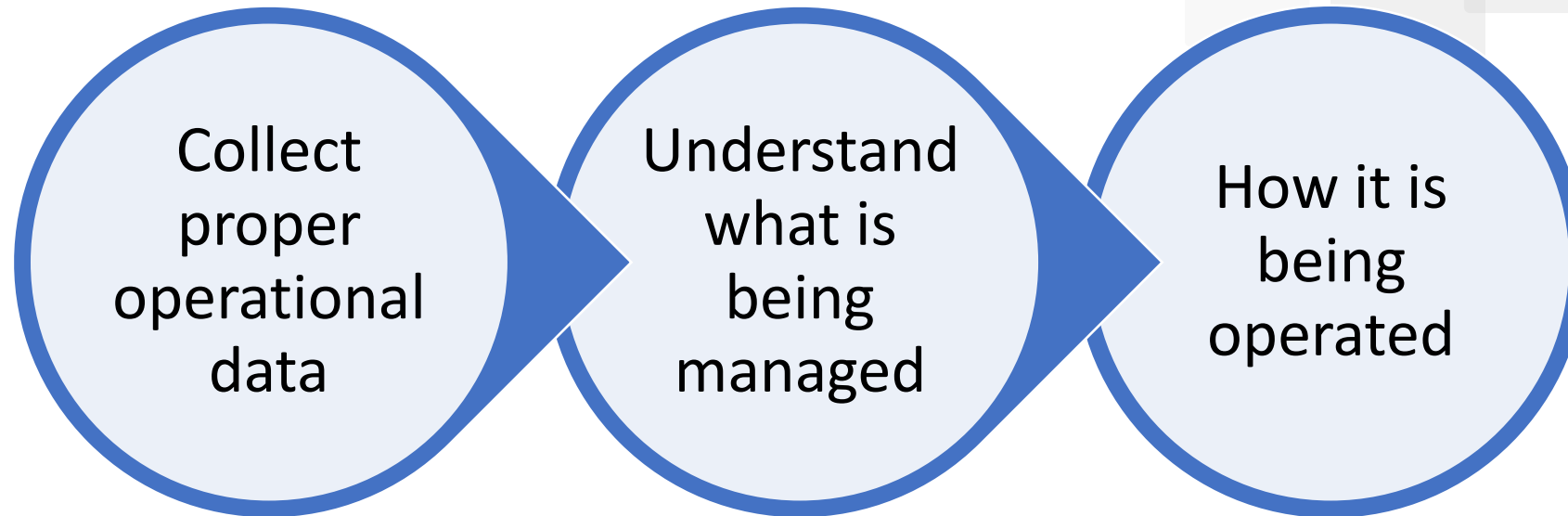


# Baseline of Azure Management

1. Inventory and visibility
2. Operational compliance
3. Protect and recover
4. Enhanced baseline options
5. Platform operations
6. Workload operations



# Inventory and visibility



# Azure Service Health

Azure status

- A global view of the health of Azure services.

Service health

- A personalized view of the health of your Azure services

Resource health

- A deeper view of the health of each of your individual resources.





# Azure Monitor

Monitor and visualize metrics

Query and analyze logs  
(Only with Log Analytics)

Set up alerts and actions

Applications

Containers

Virtual machines

Networks

Azure Monitor



# Log Analytics

Unique environment for storing Azure Monitor log data.

Own data repository and configuration

Store data in particular workspaces

Azure monitoring solutions



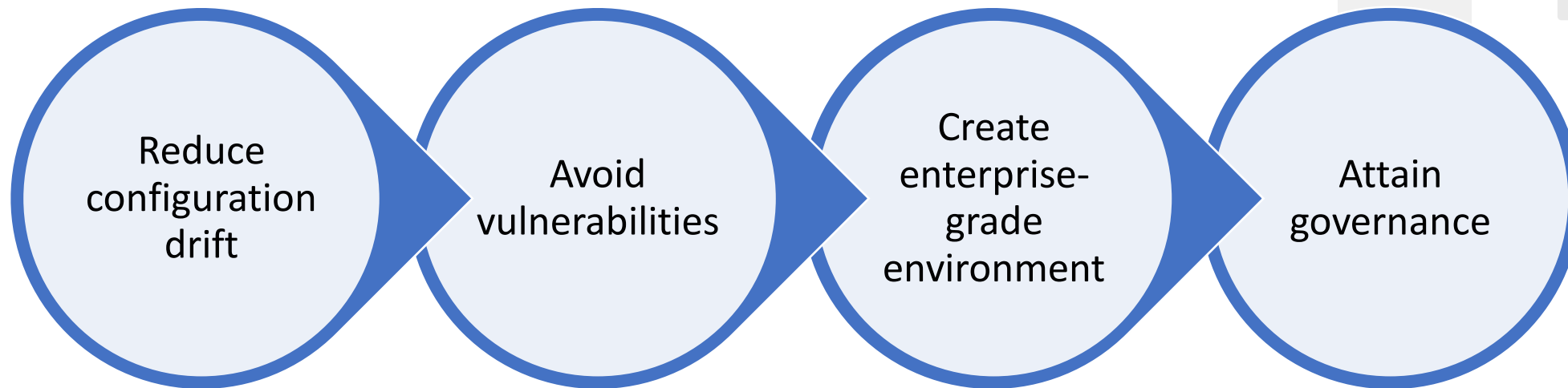
# Monitoring Solutions



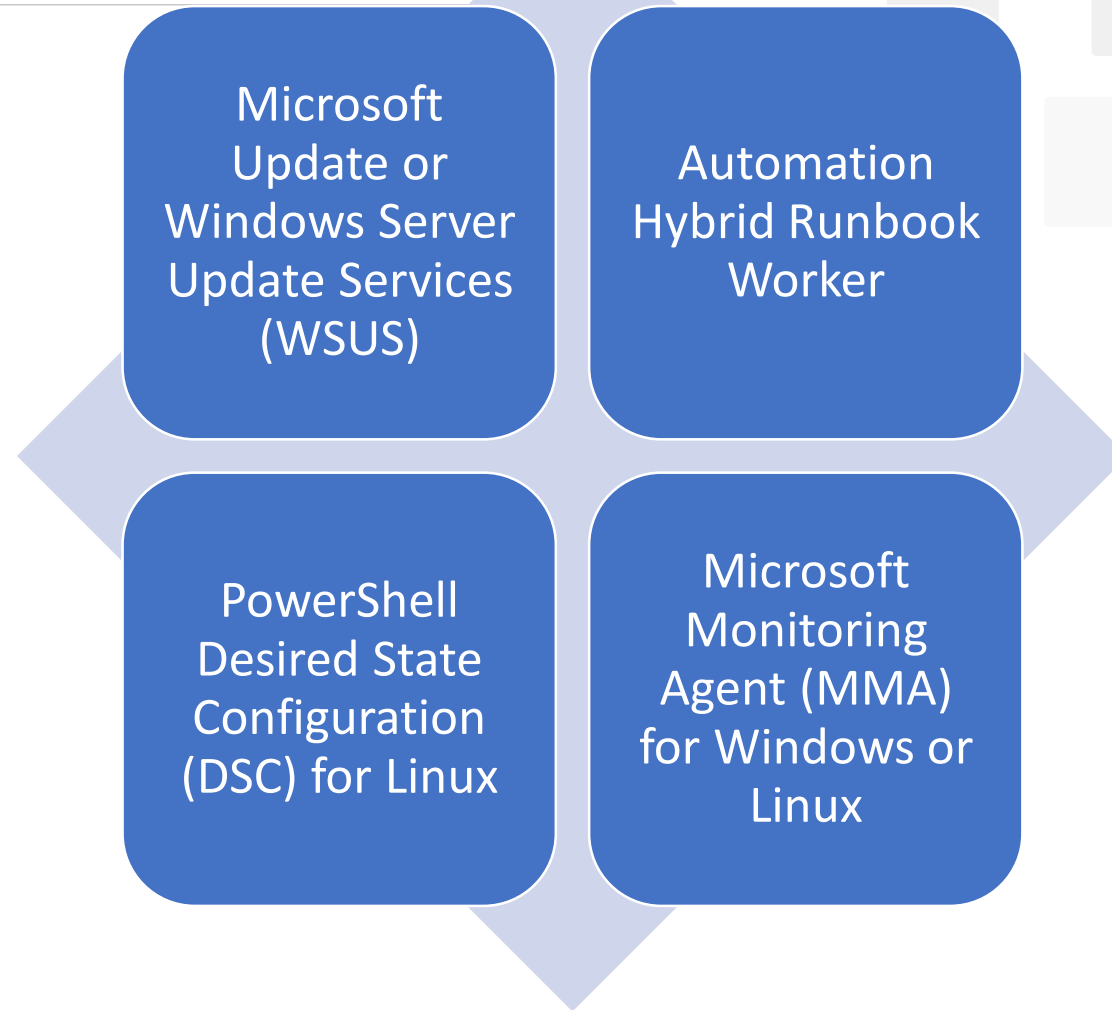
Process	Tool	Purpose
Monitor health of Azure services	Azure Service Health	Health, performance, and diagnostics for services running in Azure
Log centralization	Log Analytics	Central logging for all visibility purposes
Monitoring centralization	Azure Monitor	Central monitoring of operational data and trends
VM Inventory and Change Tracking	Azure Change Tracking and Inventory Service	Inventory VMs and monitor changes for guest os level
Service Health	Azure Activity Log	Monitor change at the subscription level
Guest OS monitoring	Azure Monitor for VMs	Monitor changes and performance of VMs
Network Monitoring	Azure Network Watcher	Monitor network changes and performance
DNS monitoring	DNS Analytics	Security, Performance, and operations of DNS



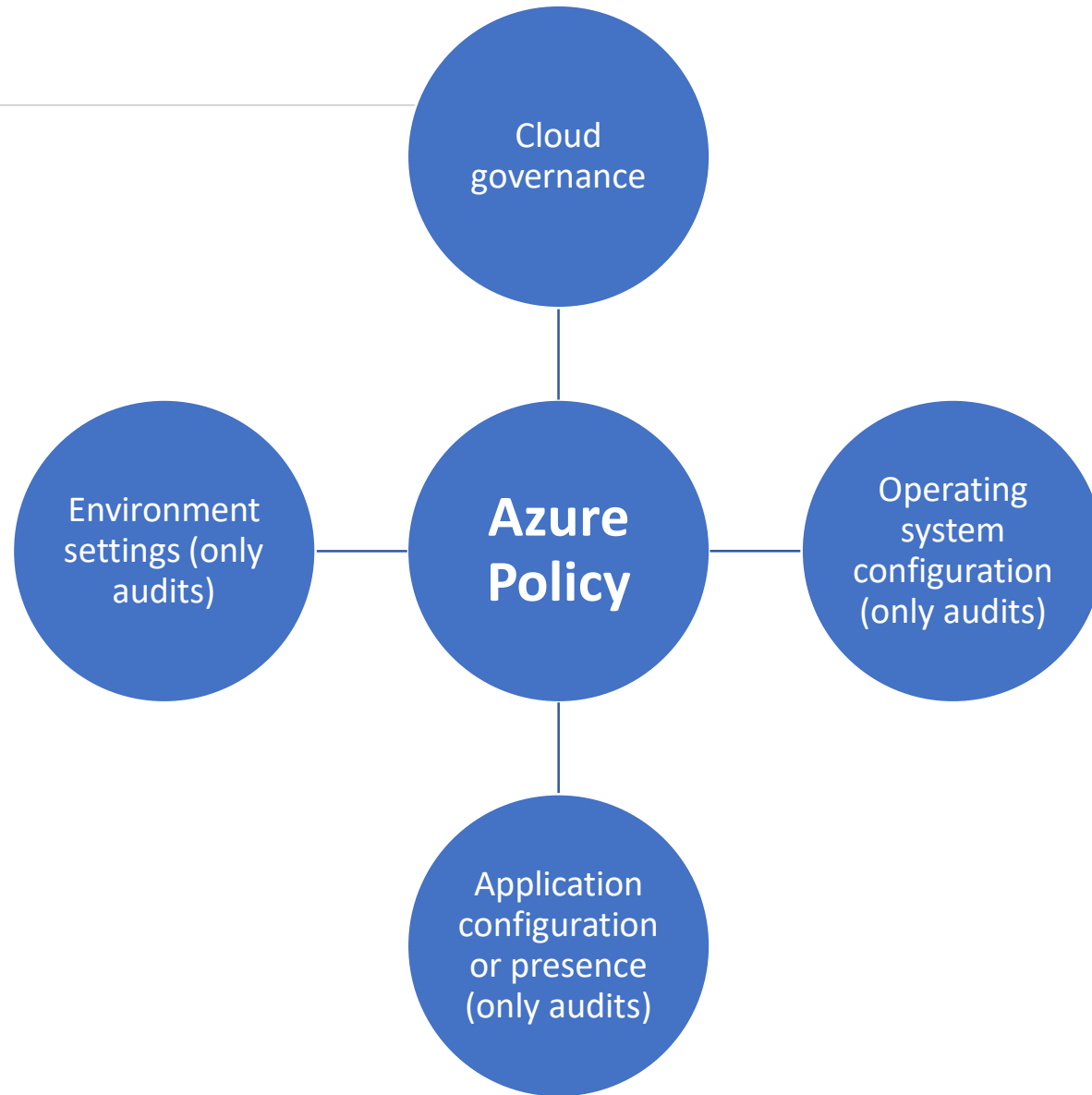
# Operational compliance in Azure



# Update Management



# Azure Policy



# Azure Blueprints

## Azure Blueprints

Define a repeatable set of Azure resources

Orchestrate the deployment using resource templates

Build resources within organizational compliance

## Blueprint Deployments

Role assignments.

Policy assignments.

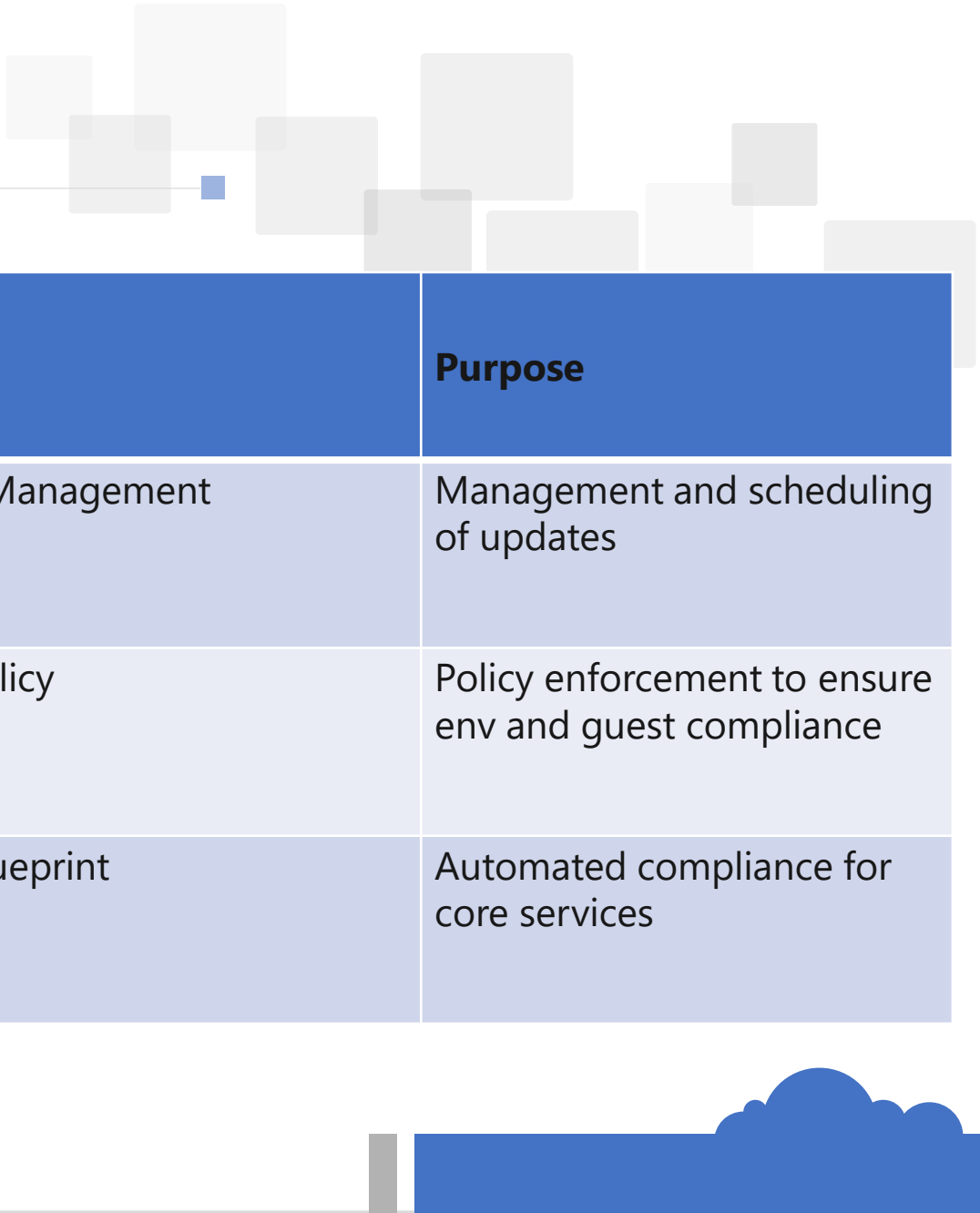
Azure Resource Manager templates.

Resource groups



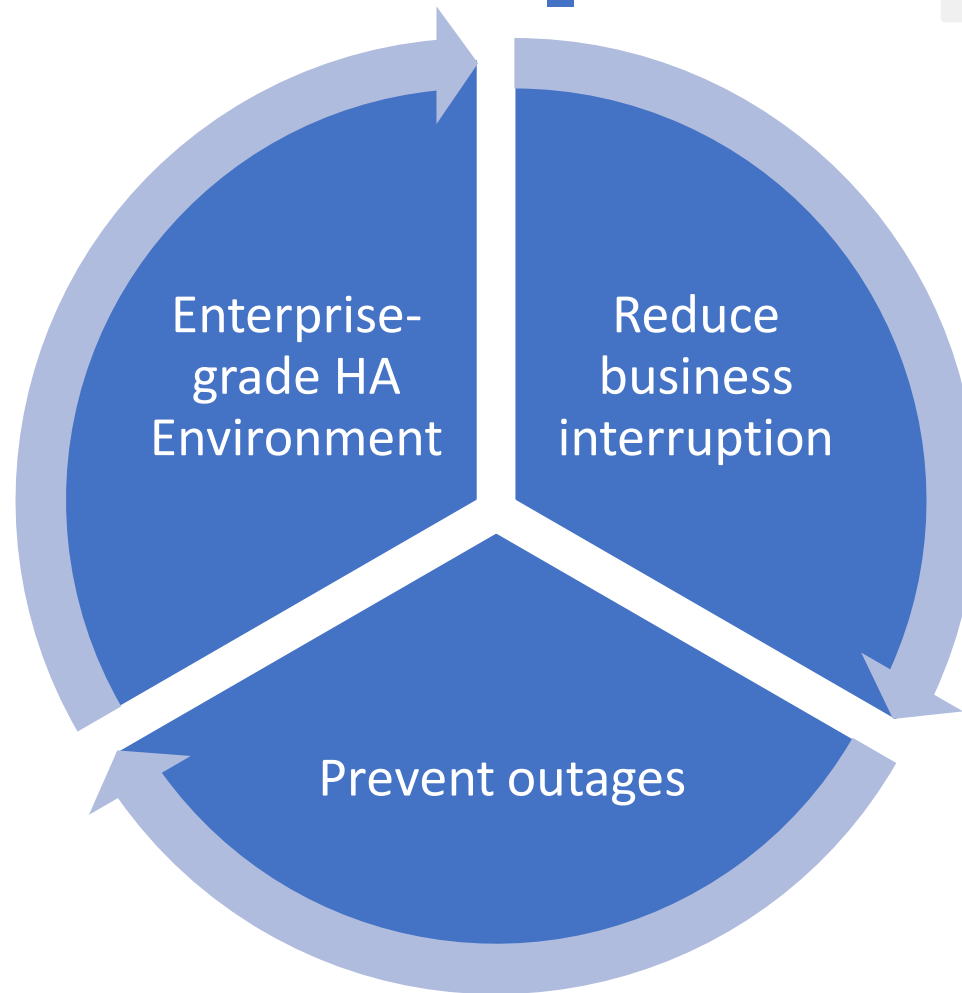


## Inventory and Visibility Tools



Process	Tool	Purpose
Patch management	Update Management	Management and scheduling of updates
Policy enforcement	Azure Policy	Policy enforcement to ensure env and guest compliance
Env. Configuration	Azure Blueprint	Automated compliance for core services

# Protect and Recovery

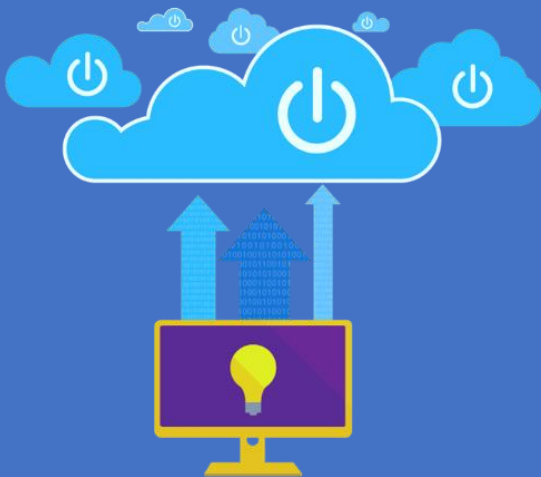


# Azure Backup

Cloud-based solution

Reliable, Secure, and Cost-competitive

Back up (or protect) resources like Azure VM, SQL Database in Azure VM, Azure Files (Azure Storage), On-premise Machines.



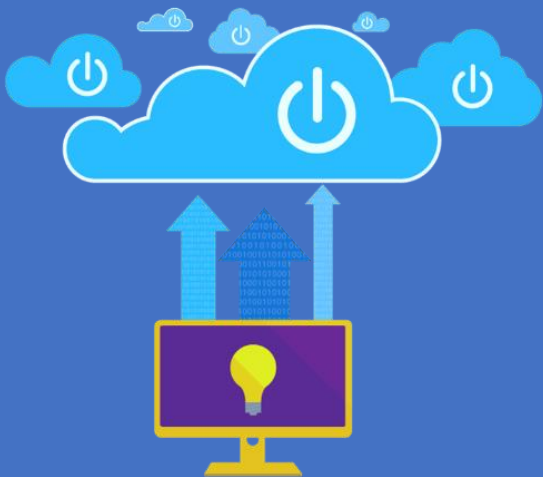
# Azure Site Recovery

## Disaster Recovery Service

Replicate your workload and run active-passive environment.

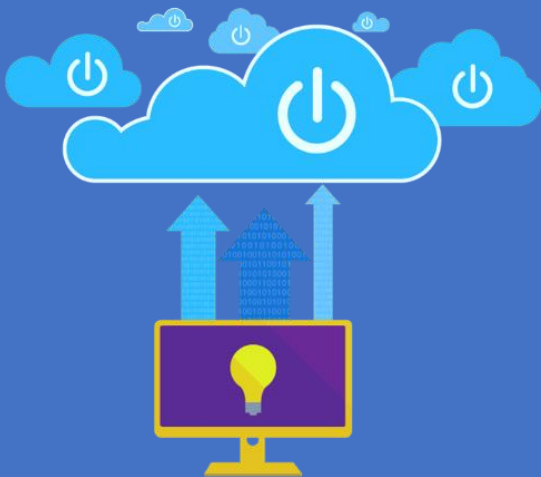
Auto fail-over with least RPO and RTO

Rollback with the changes.



## Summary of Protect and Recovery

Process	Tool	Purpose
Protect data	Azure Backup	Back up data and VMs in the cloud
Protect the environment	Azure Security Center	



# Enhanced management baseline

Lowest relative operations investment

Greater commitment

Minimum viable product (MVP) for cloud management services.

Business commitment for all supported workloads

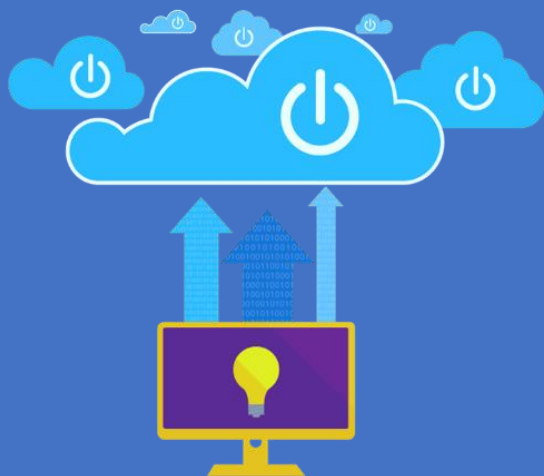
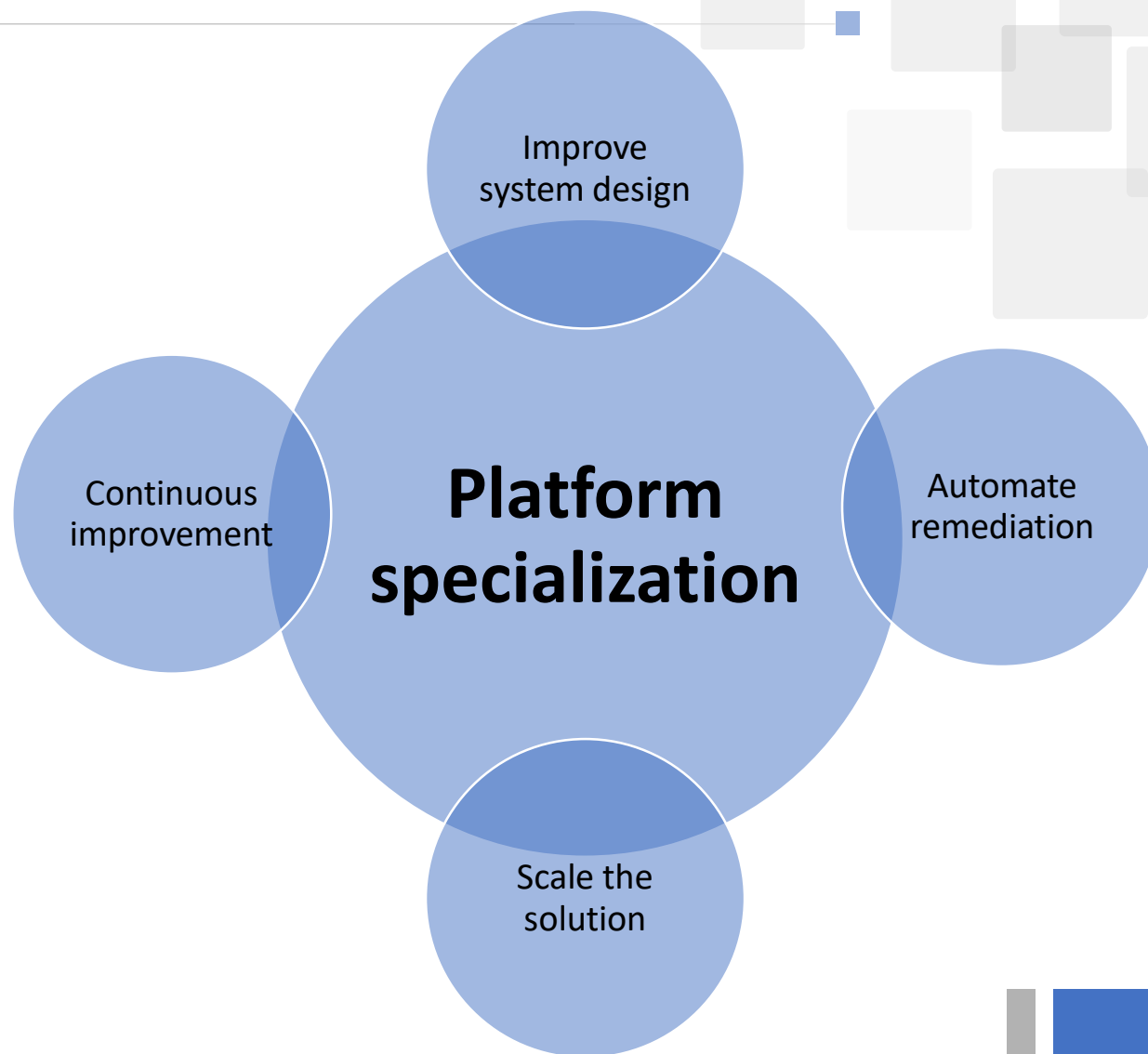
Optimized operational management with minimal deviation



# Tools for enhanced management baselines

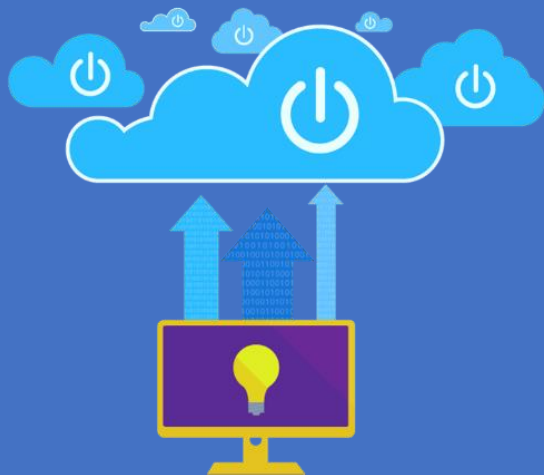
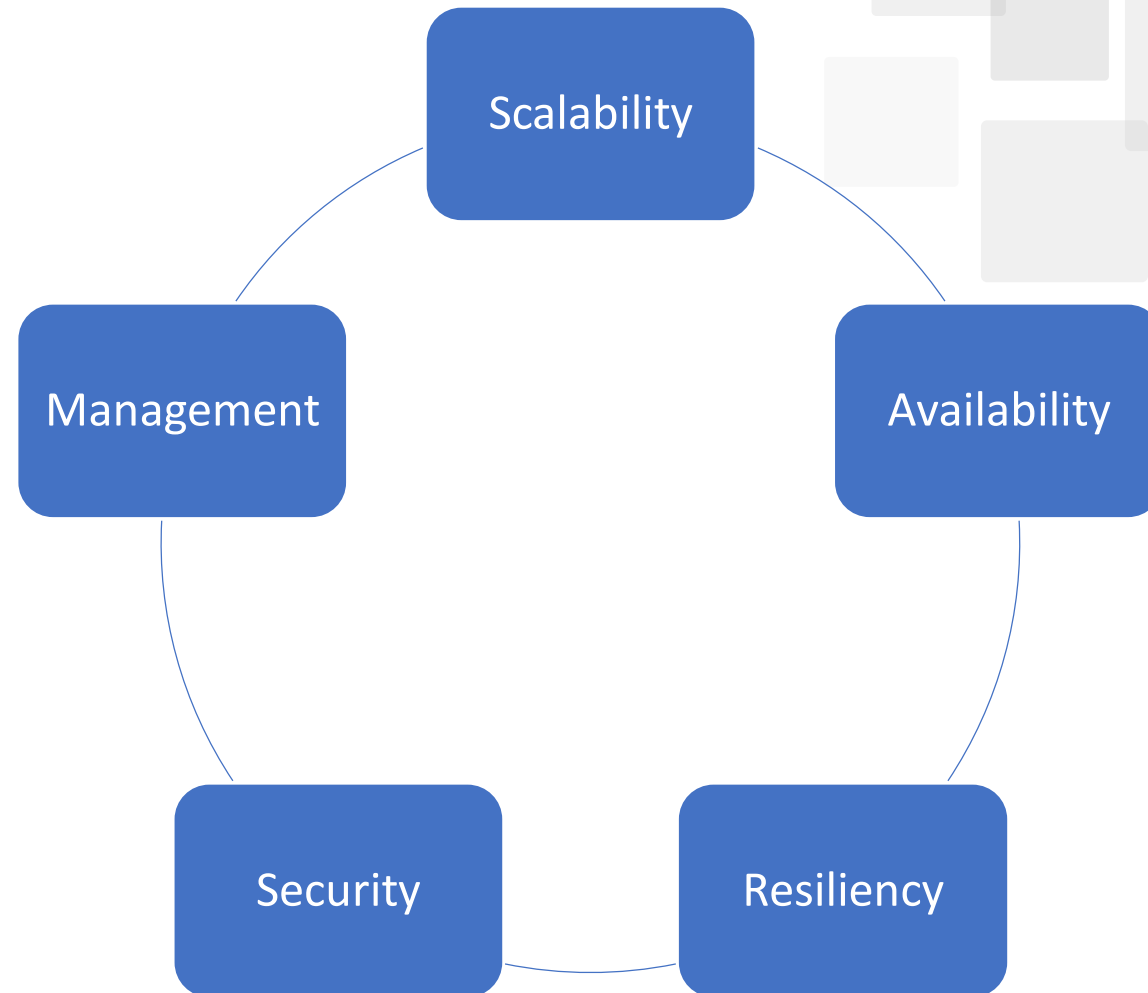
Discipline	Process	Tool	Potential impact
Inventory and visibility	Service Change Tracking	Azure Resource Graph	Greater visibility into changes to Azure services may help detect negative impacts sooner or remediate faster
Inventory and visibility	IT Service Management (ITSM) integration	IT Service Management Connector	Automated ITSM connection creates awareness sooner
Operational compliance	Operations automation	Azure Automation	Automate operational compliance for faster and more accurate response to change
Operational compliance	Multicloud operations	Azure Automation Hybrid Runbook Worker	Automate operations across multiple clouds
Operational compliance	Guest automation	Desire State Configuration (DSC)	Code-based configuration of Guest OSs to reduce errors and config drift
Protect and recover	Breach notification	Azure Security Center	Extend protection to include security breach recovery triggers

# Platform specialization

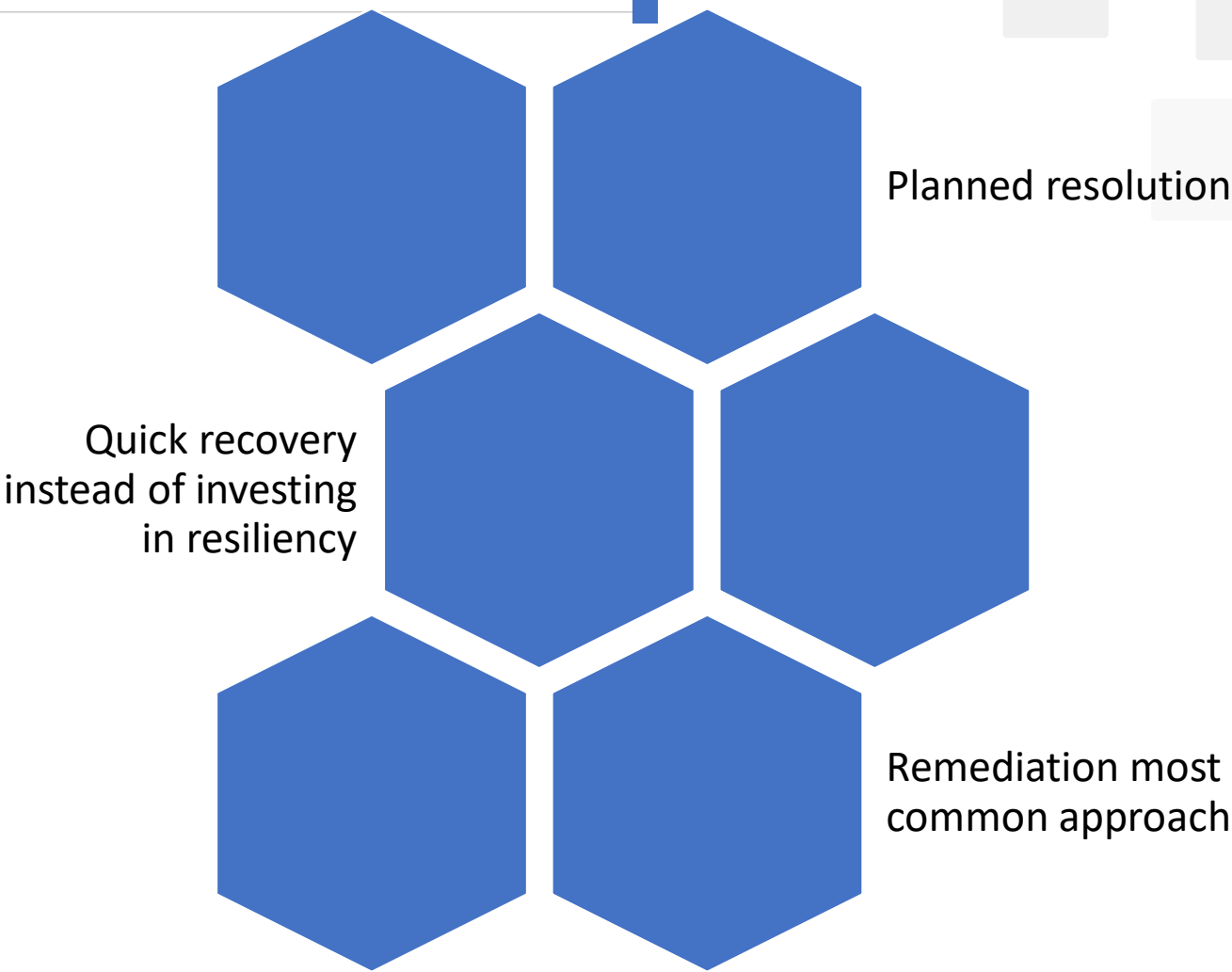




# Pillars of system design



# Automated Remediation



## Scale the solution

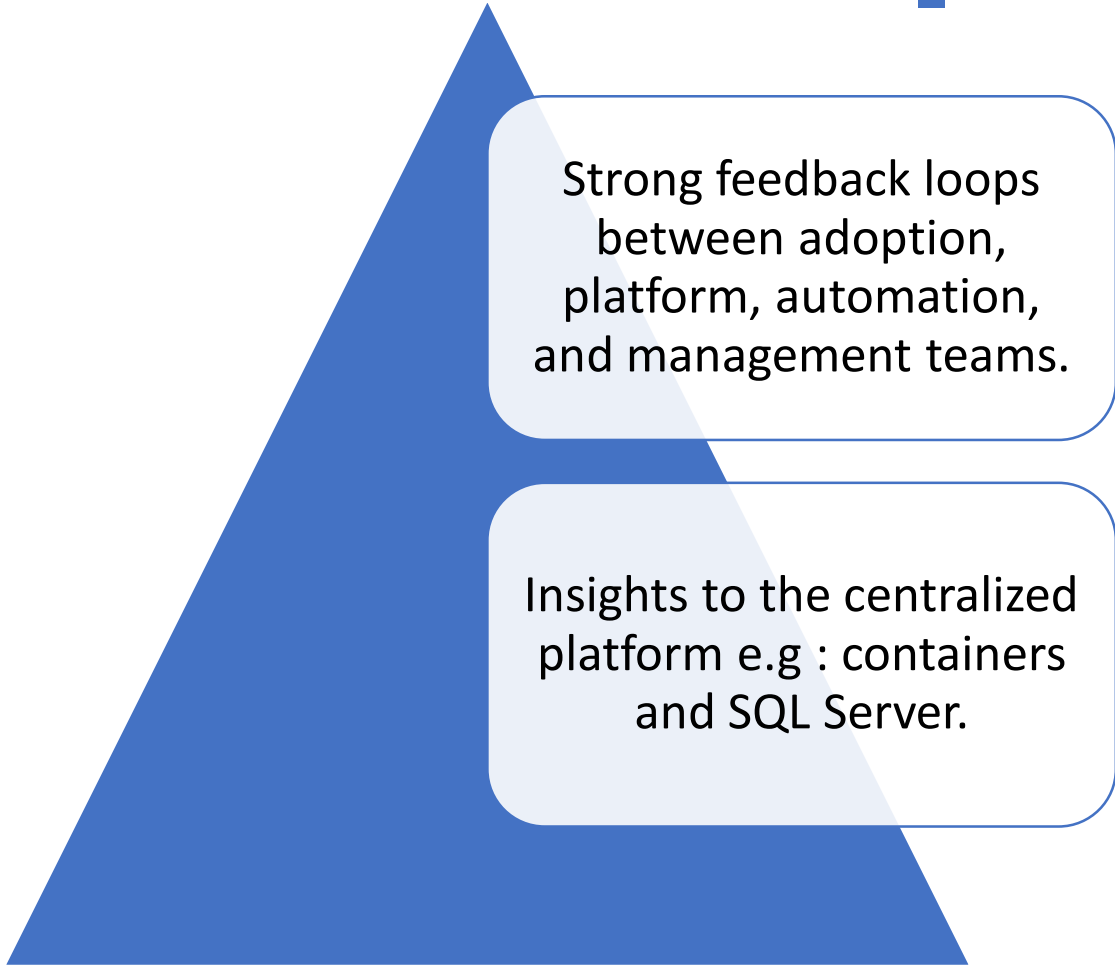
Well-  
managed  
service  
catalog

Easy for  
consumers  
to deploy  
and  
operate  
solution

Check  
application  
compliance  
using Azure  
Policy



# Continuous improvement



Strong feedback loops  
between adoption,  
platform, automation,  
and management teams.

Insights to the centralized  
platform e.g : containers  
and SQL Server.



# Tools for Platform specialization

Process	Tools	Purpose
Improve system design	Azure Architecture Framework	Improve the architectural design of the platform to improve operations
Automate remediation	Azure Automation	Respond to advanced platform data with platform specific automation
Service Catalog	Managed applications center	Provide a self-service catalog of approved solutions that meet organizational standards
Container performance	Azure Monitor for Containers	Monitoring and diagnostics of containers
PaaS data performance	Azure SQL Analytics	Monitoring and diagnostics for PaaS DBs
IaaS data performance	SQL Server Health Check	Monitoring and diagnostics for IaaS DBs



# Workload specialization

- Cultural change
  - Approach with Cloud Adoption Framework
- Beyond platform specialization (App Insights)
  - Application Monitoring
    1. Application Insights
    2. Monitoring and diagnostics for apps
  - Performance, Availability, Usage
    1. Advanced application monitoring with App Dashboard
    2. Application Insights



# Azure Dashboard



## Azure Resiliency/Best Practice checklist (App Service)

- **Use Standard or Premium tier** - support staging slots and automated backups.
- **Use staging slot** - to verify deployment into production.
- **Use deployment slot to hold the last-known-good (LKG) deployment**
- **Avoid scaling up or down** - scale out to handle traffic volume.
- **Store configuration as app settings** - part of an automated deployment / update process.
- **Create separate App Service plans** for production and test.
- **Separate web apps from web APIs** – decompose web front end and a web API.
- **Avoid using the App Service backup feature to back up Azure SQL databases**





## Azure Resiliency/Best Practice checklist (Azure SQL and Azure SQL VM)

- **Use Standard or Premium tier**
- **Enable SQL Database auditing**
- **Use DTU-based model** (for simple, preconfigured resource options)
- **Use vCore-based model** (for flexibility, control, and transparency)
- **Enable SQL Database encryption**
- **Back up the database** (for DB VMs instead of full VM)



# Azure Resiliency/Best Practice checklist (Azure VM)

- Avoid running a **production workload on a single VM**
- Specify an **availability set** when you provision the VM
- Put each application tier into a **separate Availability Set**
- Replicate VMs using **Azure Site Recovery**
- Use **Azure Backup** to back up VMs.
- Use Azure Backup to **migrate or replicate Azure VM** on the **same region**
- Choose the **right VM size** based on performance requirements
- Install **applications on a data disk**, not the OS disk
- Enable **diagnostic logs** (with retention policy)
- Use the **AzureLogCollector extension**. (Windows VMs only.)



# Azure Resiliency/Best Practice checklist (General)

- **Enable diagnostics logging** – must for production.
- **Create a separate storage account for logs**
- **Monitor performance**
- **Provision at least two instances**
- **Replicate the database across regions** (at least 2 paired regions)



# Management baseline Relationship

- **Workload operations:**

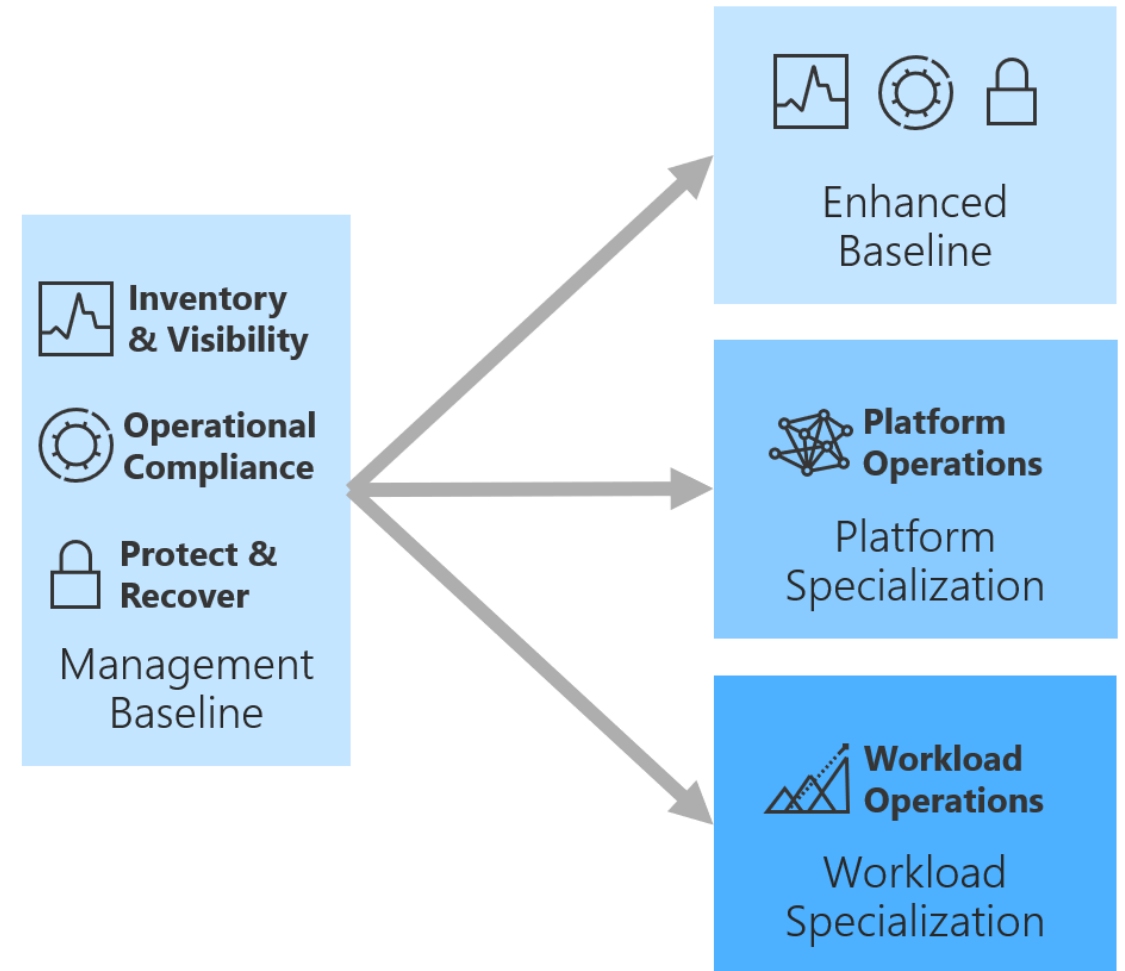
- Largest per workload operations investment.
- Highest degree of resiliency.
- Suggested for the approximately 20% of workloads that drive business value.
- Typically reserved for high-criticality or mission-critical workloads.

- **Platform operations:**

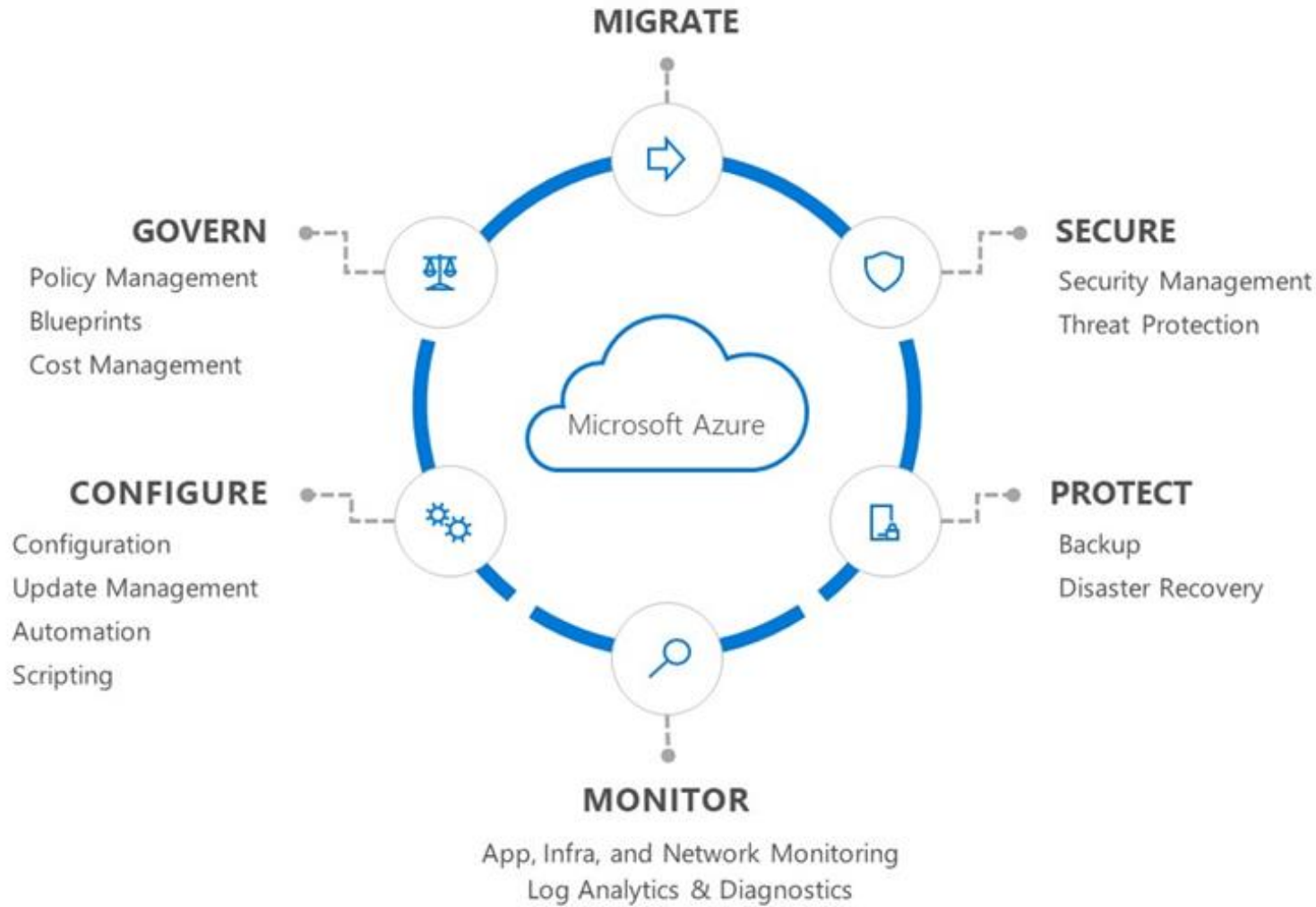
- Operations investment is spread across many workloads.
- Resiliency improvements impact all workloads that use the defined platform.
- Suggested for the +/-20% of the highest criticality platforms.
- Typically reserved for medium-criticality to high-criticality workloads.

- **Enhanced management baseline:**

- Lowest relative operations investment.
- Slightly improved business commitments using additional cloud-native operations tools and processes.



# Azure Cloud Adaption Framework

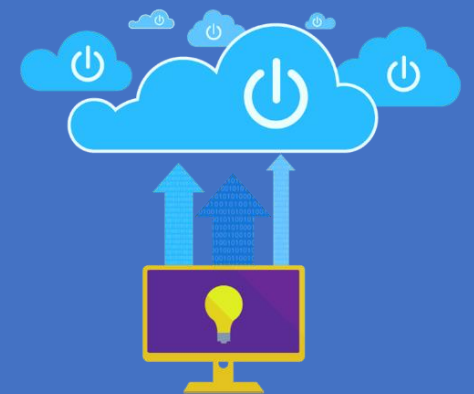


# Reference

- <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/ready/azure-best-practices/>
- <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/manage/azure-management-guide/>
- <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/manage/>
- <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/manage/considerations/>
- <https://docs.microsoft.com/en-us/azure/architecture/checklist/resiliency-per-service?toc=https://docs.microsoft.com/azure/cloud-adoption-framework/toc.json&bc=https://docs.microsoft.com/azure/cloud-adoption-framework/ bread/toc.json>
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# Q&A





# Thank You



By Nadaraj Prabhu