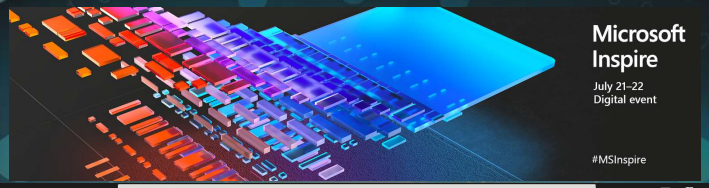

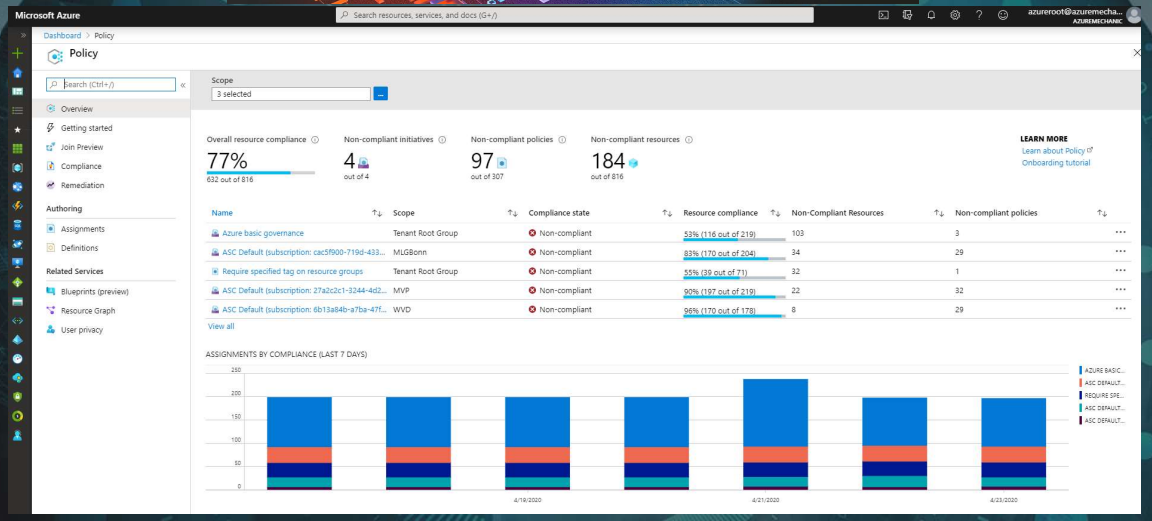

Azure Governance Best Practices

by Thomas Naunheim & Gregor Reimling

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Identity Summit 2020
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Microsoft MVP Most Valuable Professional

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www.AzureBonn.de

Thomas Naunheim


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www.cloud-architekt.net

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Identity Summit 2020
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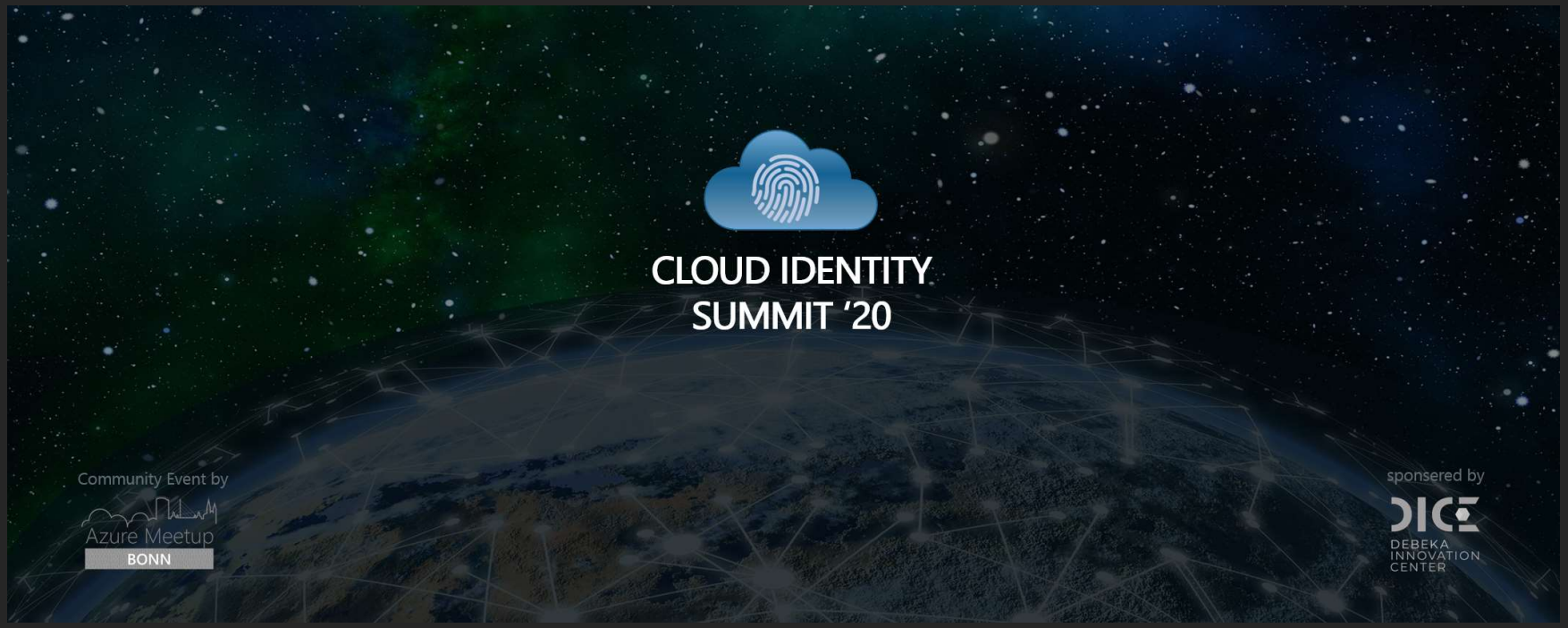
Azure Bonn – Event Tipps

- 04.09. – SharePoint Saturday Cologne (Online)
  - https://www.meetup.com/de-DE/Office-365-Meetup/events/269623756/
- 10.09. – Manage Hybrid Environments with Azure Arc by Thomas Maurer
  - https://www.meetup.com/de-DE/Azure-Bonn-Meetup/events/272462127/
- 24.09. – Rdbuzz Late Night Show zur MS Ignite 2020 (Azure CGN)
  - https://www.meetup.com/de-DE/Office-365-Meetup/events/272661417/
- 06.10. – Azure Ignite Recape (Anmeldung möglich – aktuell in Planung)
  - https://www.meetup.com/de-DE/Azure-Bonn-Meetup/events/257995108/
- 08.10. – Datacenter migration with Sarah Lean (Azure CGN)
  - https://www.meetup.com/de-DE/Azure-Cologne-Meetup/events/272236551/
- 20.10. – Azure Architecture Best Practice by Thomas Maurer & Dominik Zemp
  - https://www.thomasmaurer.ch/2020/09/azure-architecture-best-practices-virtual-event-october-20/
- Many more @ Techwiese Events
  - https://www.microsoft.com/de-de/techwiese/events/default.aspx

Cloud Identity Summit 2020



https://www.identitysummit.cloud/

TN4

Agenda

- Overview Architecture Recommendations and Best Practices
- Technical Implementations
- Management of Security and Compliance Status
- Azure Enterprise-Scale Landing Zones
- Secure Azure Environments with Azure AD (RBAC)

TN2
GR1
TN1

Folie 6

TN1 Das wären mein Themenblock
Thomas Naunheim; 26.08.2020

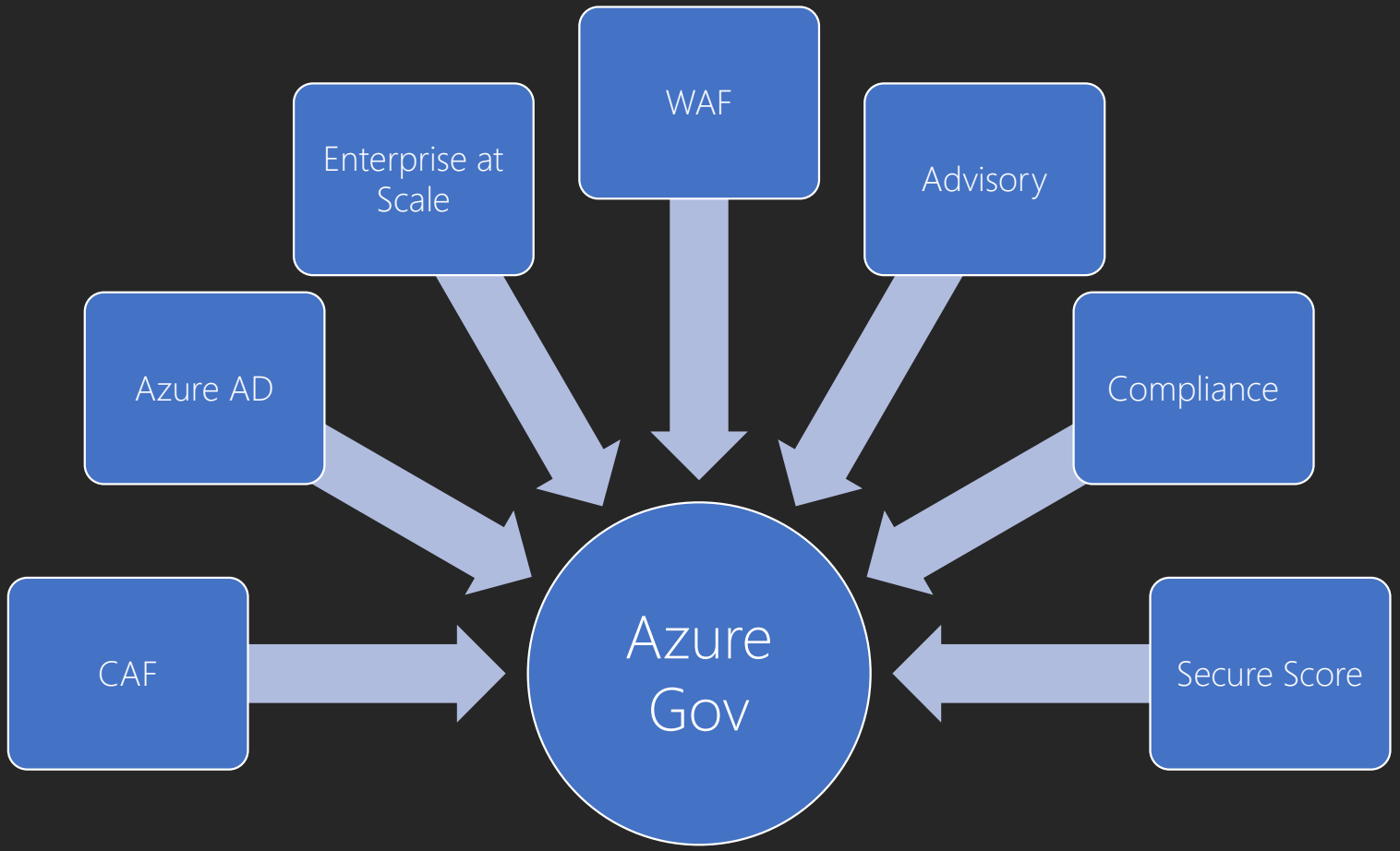
TN2 Soweit könnten wir überlegen das Thema komplett in den Punkt "Absicherung von Azure Ressourcen..." einzubinden
Thomas Naunheim; 26.08.2020

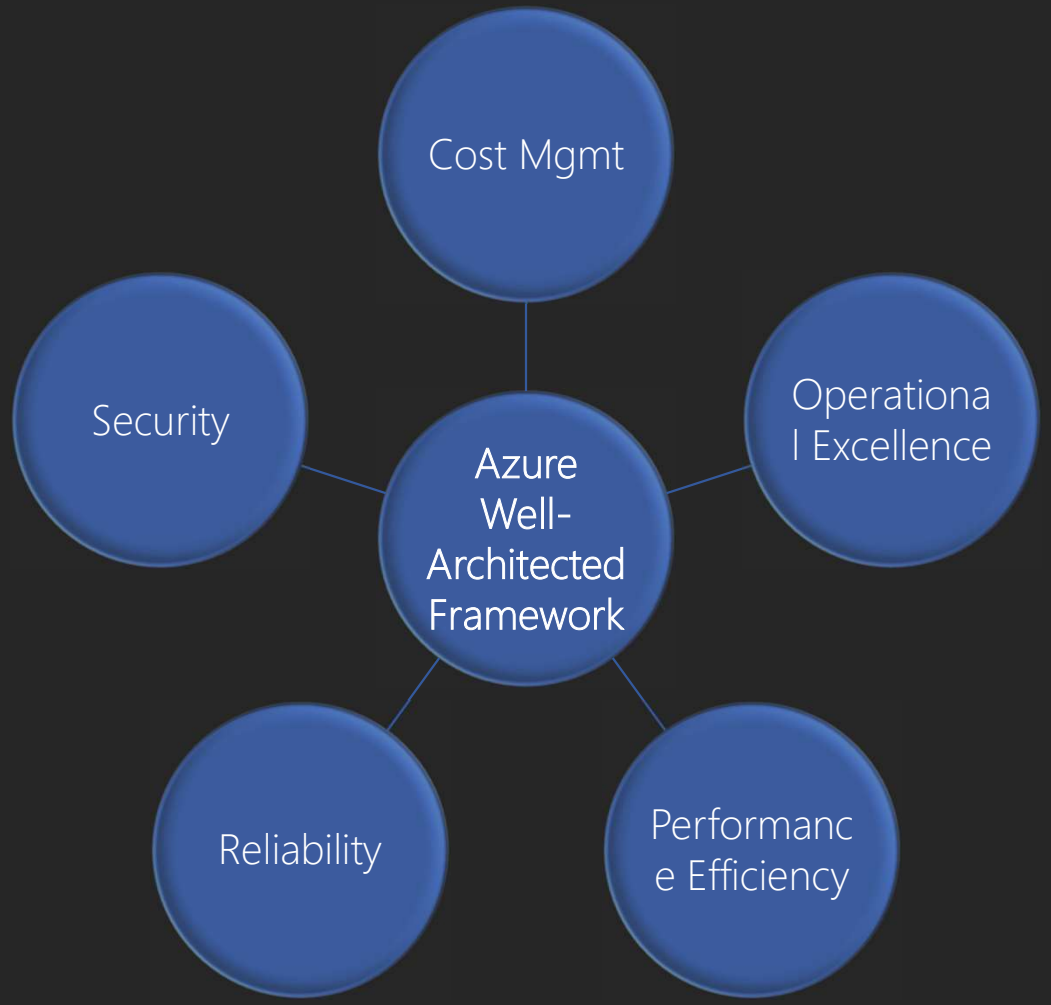
GR1 Passt
Gregor Reimling; 28.08.2020

TN4 Würdest Du eventuell hier Well-Architect Framework noch mit erklären? Das passt ja hier gut rein...
Thomas Naunheim; 26.08.2020

Overview of Architecture Recommendations

Topic Overview





https://docs.microsoft.com/en-us/azure/architecture/framework/

Security

- What design considerations did you make in your workload in regards to security?
- What considerations for compliance and governance do you need to take?
- How are you managing encryption for this workload?
- How are you managing identity for this workload?
- How have you secured the network of your workload?
- What tradeoffs do you need to make to meet your security goals?
- * How are you ensuring your critical accounts are protected?

Microsoft Assessments Azure Well-Architected Review

Examine your workload through the lenses of reliability, cost management, operational excellence, security and performance efficiency [20 minutes].

Assessment name *

Microsoft Azure Well-Architected Review - Aug 24, 2020 - 7:43:58 PM

Choose your interests

- [ ] **Cost Optimization**

  An effective architecture achieves business goals and ROI requirements while keeping costs within the allocated budget.

- [ ] **Operational Excellence**

  To ensure that your application is running effectively over time, consider multiple perspectives, from both an application and infrastructure angles. Your strategy must include the processes that you implement so that your users are getting the right experience.

- [ ] **Performance Efficiency**

  Prioritize scalability as you design and implement phases. Scalability leads to lower maintenance costs, better user experience, and higher agility.

- [ ] **Reliability**

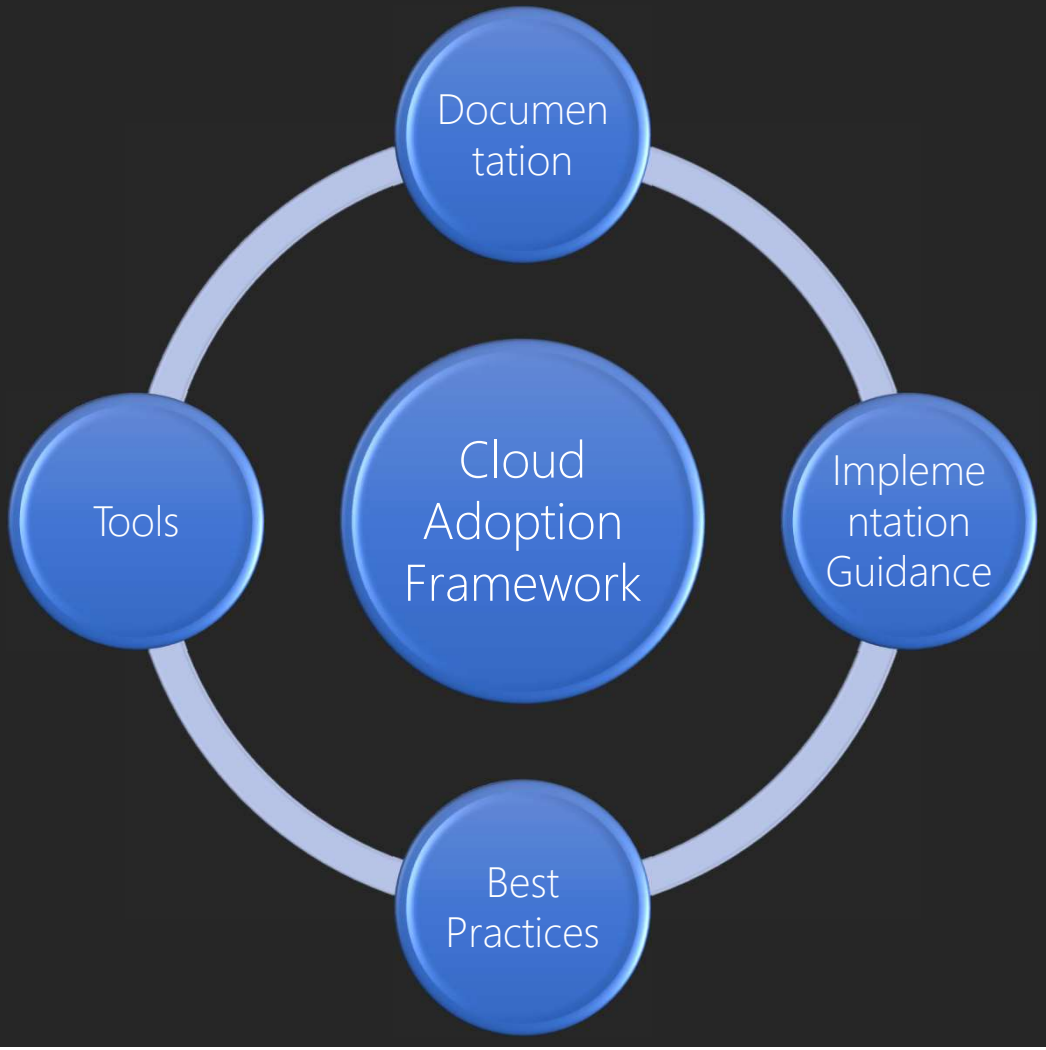
  In a cloud environment you scale out rather than buying higher-end hardware to scale up. While it's always desirable to prevent all failure, focus your efforts in minimizing the effects of a single failing component.

- [x] **Security**

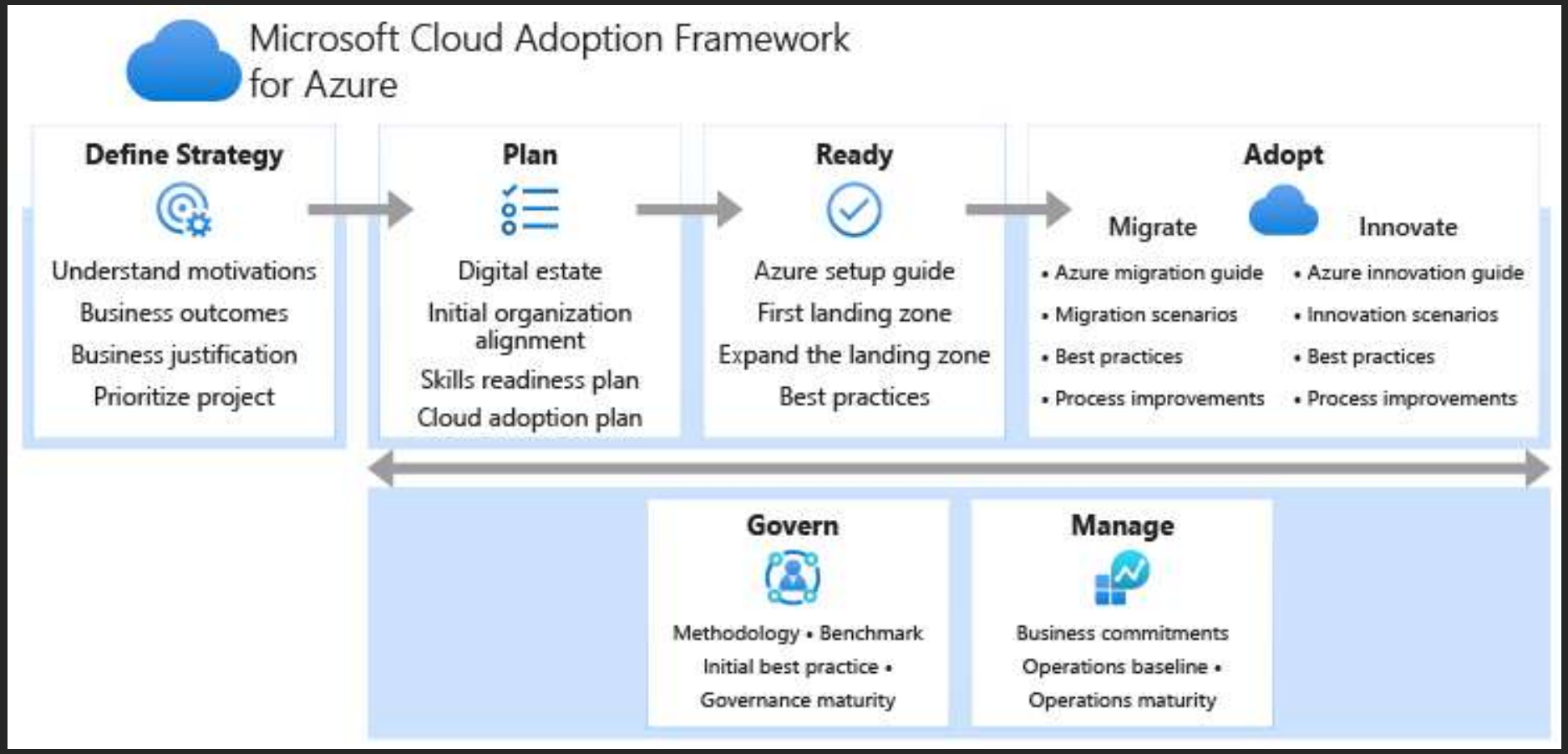
  Security is one of the most important aspects of any architecture. It provides confidentiality, integrity, and availability assurances against deliberate attacks and abuse of your valuable data and systems. Losing these assurances can negatively impact your business operations and revenue, as well as your organization's reputation in the marketplace. In the following series of articles, we'll discuss key architectural considerations and principles for security and how they apply to Azure.

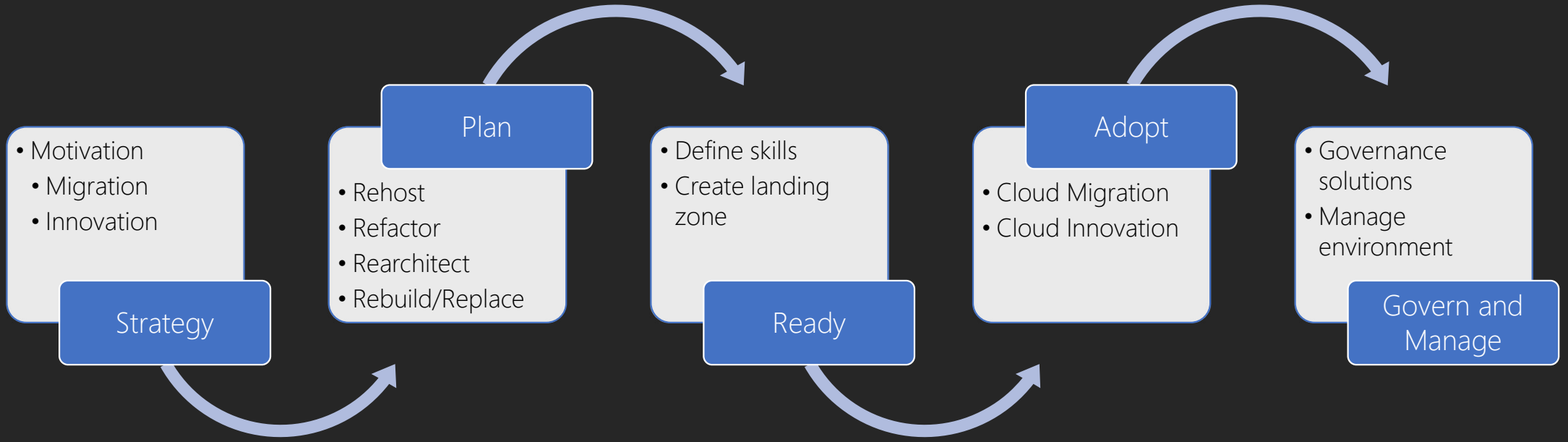
Next →

Cloud Adoption Framework



CAF Overview




• Motivation
• Migration
• Innovation
Strategy
Plan
• Rehost
• Refactor
• Rearchitect
• Rebuild/Replace
• Define skills
• Create landing zone
Ready
Adopt
• Cloud Migration
• Cloud Innovation
• Governance solutions
• Manage environment
Govern and Manage

Cloud Adoption Framework
Well Architecture Framework

DEMO

Azure Meetup
BONN

Azure Policy Concepts 

- Create, assign and manage policies
- Enforce rules to ensure your ressoures are compliant
- Focus on ressource properties for new and existing deployments
- A definition is a set of conditions in audit or deny mode
- An assignment is a policy definition placed on a specific scope
- An initiative is a collection of policies

Azure Policy

Azure Meetup BONN

- Turn on built-in policies or build custom ones for all resource types
- Real-time policy evaluation and enforcement
- Periodic & on-demand compliance evaluation
- VM In-Guest Policy (**NEW**)

Enforcement & Compliance

- Apply policies to a Management Group with control across your entire organization
- Apply multiple policies and & aggregate policy states with policy initiative
- Exclusion Scope

Apply policies at scale

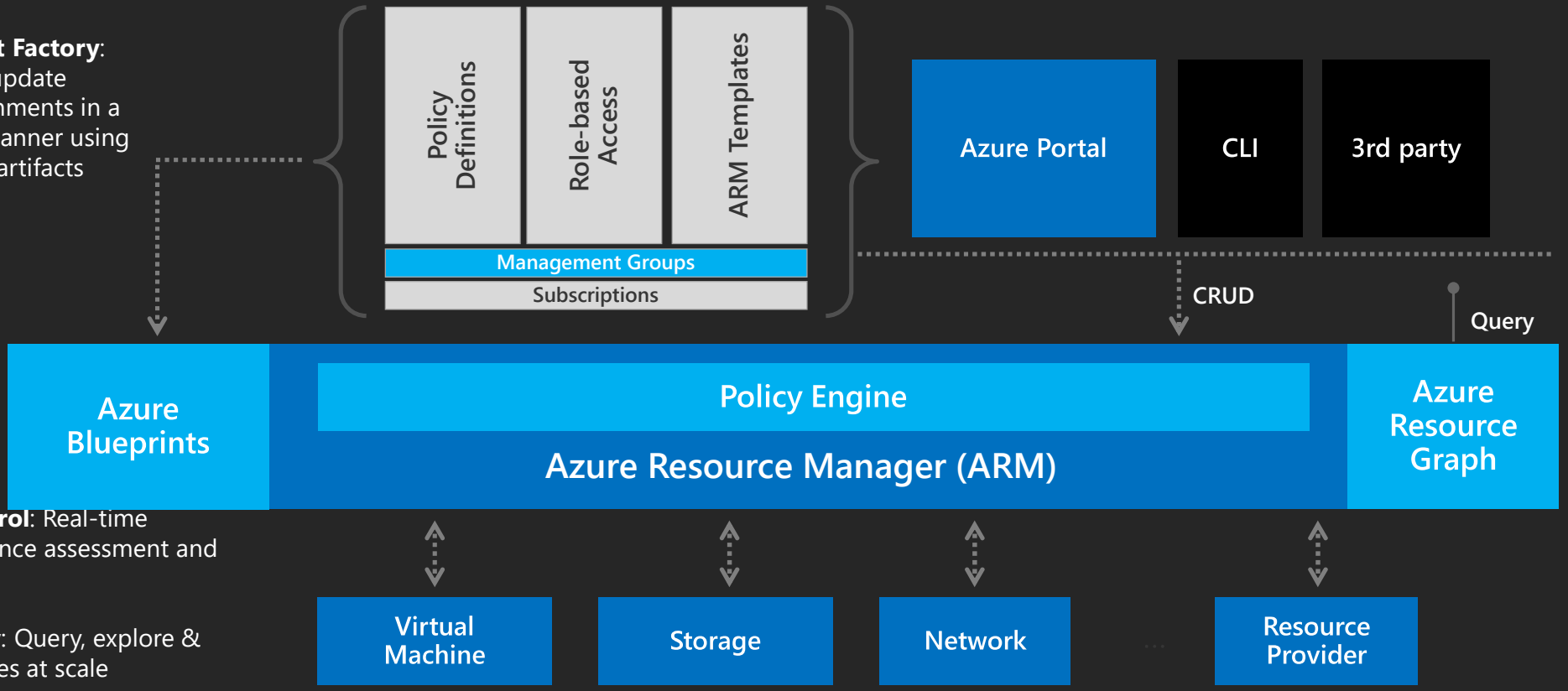
- Real time remediation
- Remediation on existing resources (**NEW**)

Remediation

Azure Governance Architecture

providing control over the cloud environment, without sacrificing developer agility

1. Environment Factory: Deploy and update cloud environments in a repeatable manner using composable artifacts



2. Policy-based Control: Real-time enforcement, compliance assessment and remediation at scale

3. Resource Visibility: Query, explore & analyze cloud resources at scale

Leverage built-in initiative & policies

Azure Meetup BONN

Security	Regulatory Compliance	Tags	Resource standardization	Cost
Azure Security Center	NIST SP 800-53 R4	Require specified tag	Allowed/ not allowed RP	Allowed VM SKUs
Guest Config baselines	ISO 27001:2013	Add or replace a tag	Allowed locations	Allowed Storage SKUs
Key Vault certificate	CIS	Inherit a tag from the RG	Naming convention	
NSG rules	PCI v3.2.1:2018	Append a tag	Back up VMs	
AKS & AKS Engine	FedRAMP Moderate		Allowed images for AKS	
RBAC role assignment	Canada Federal PBMM			
	SWIFT CSP-CSCF v2020			
	UK Official and UK NHS			
	IRS 1075			

Azure Policy

DEMO

Policy

- 250 policy definitions per scope
- 100 policy set definitions per scope
- 1000 policy set definitions per tenant
- 100 policyDefinition references per policySetDefinition
- 100 policy assignments per scope
- 250 notScopes per policyAssignment
- https://github.com/Azure/azure-policy

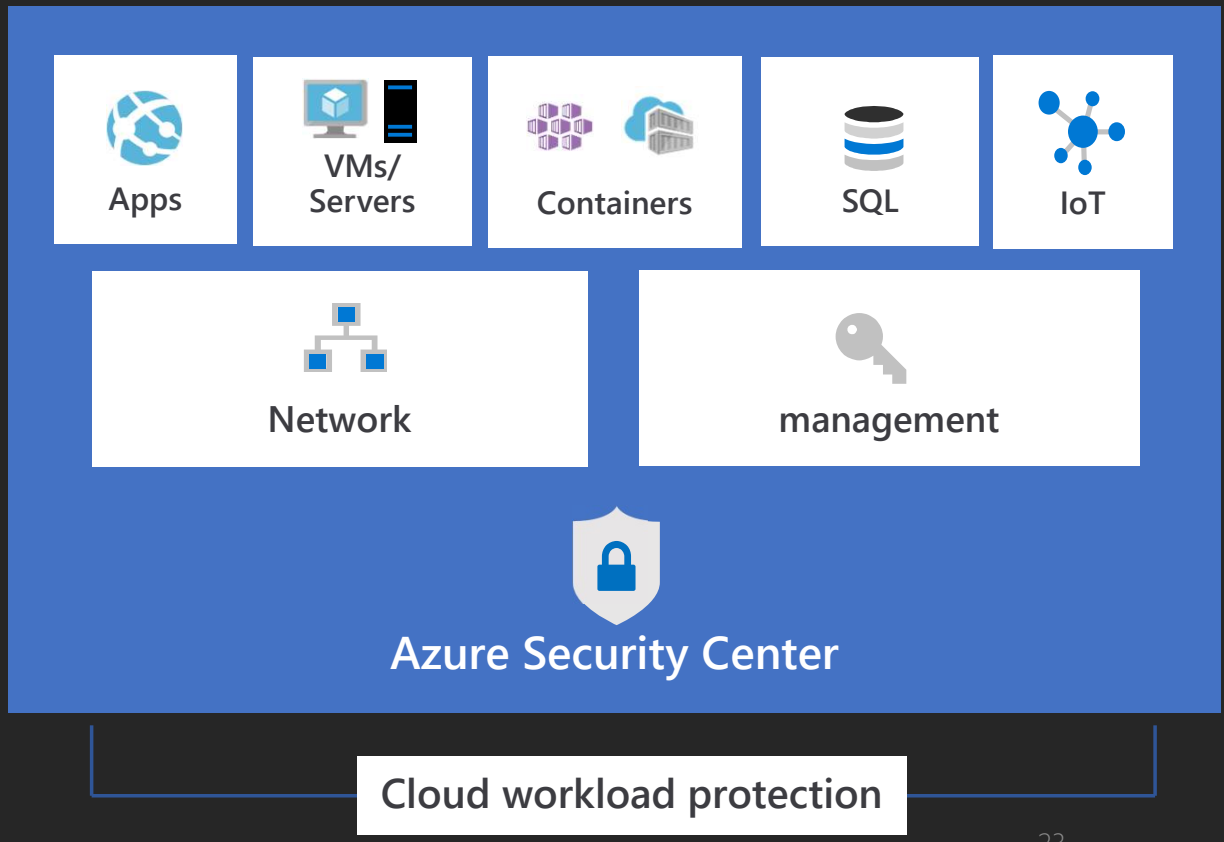
Azure Security Center

Azure Security Center

- A service to strengthen your security posture
- Available in two Tiers – Basic and Standard
- Basic -> Free – Activated by default for all subscriptions
- Based on an security score – scope based
- Available for all workloads (Server, Container, SQL, IoT and more)

Protect your workloads

- Detect & block advanced malware and threats for Linux and Windows Servers on any cloud
- Protect cloud-native services from threats
- Protect data services against malicious attacks
- Protect your Azure IoT solutions with near real time monitoring
- Service layer detections: Azure network layer and Azure management layer (ARM)



Azure Security Center

DEMO

How it works together

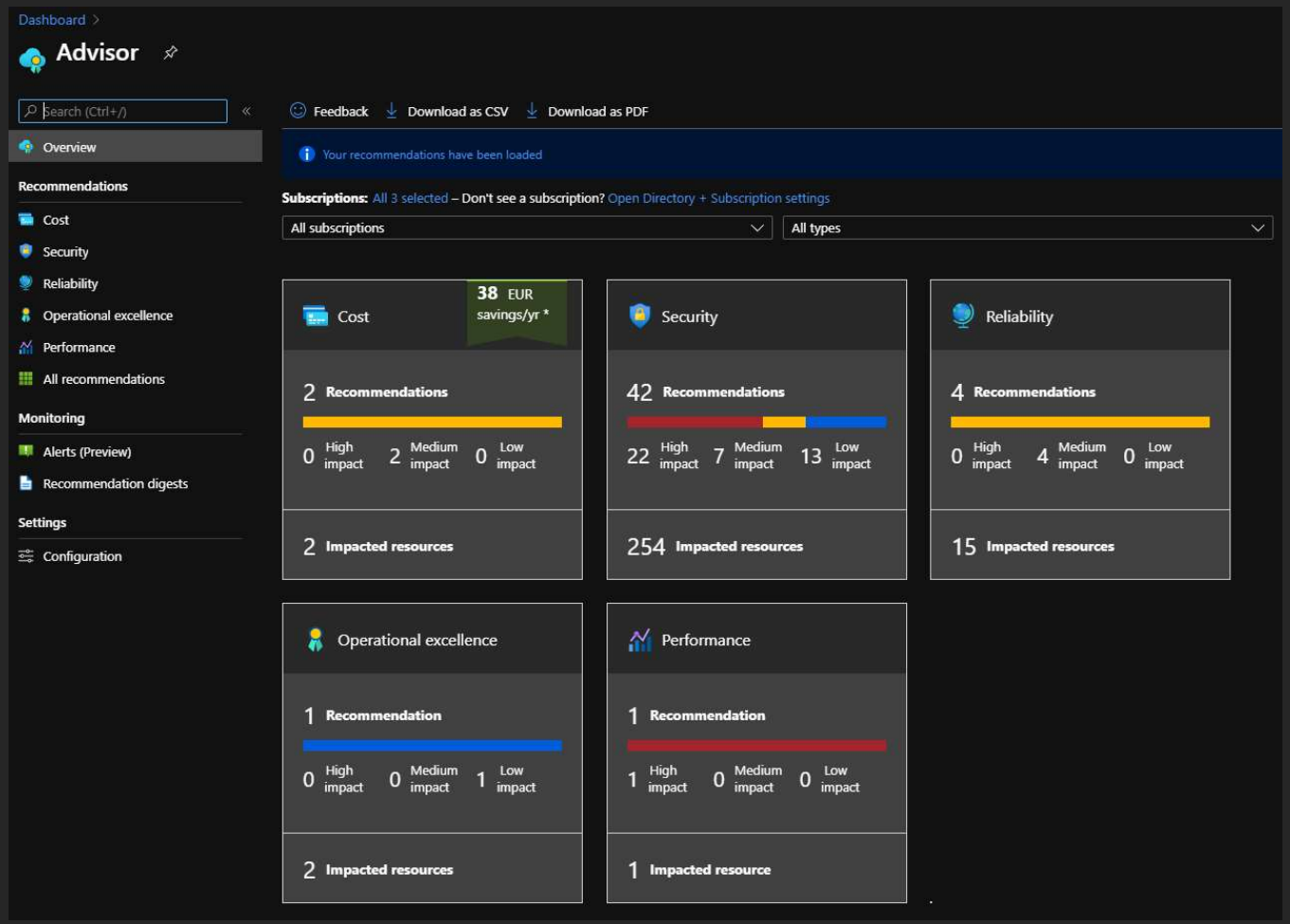
- All Azure Security Center recommendations based on Azure Policy
- Secure score is result of Azure Policy settings
- Recommendation is also a result of Azure Policy
- All Azure Policy are defined in Compliance mode

Azure Policy Recap

- Powerful solution to define Cloud Guards for own Tenant
- Start with an audit effect instead of a deny effect
- Define Management Groups to group subscriptions and set Policies at Higher level
- Use Deny effect for Production workloads with wisdom
- Creating initiatives even for single policy definition
- Integrate Azure Policy in your regulary Azure check

Azure Security Center

- Start with ASC to get a Security Overview
- Use ASC to strengthen your infrastructure
- Check the status in ASC regularly
- Create own security policies for secure score
- Use ASC to proof your infrastructure
- Integrate Azure Policy in your regulary Azure check


Dashboard
Advisor
Search (Ctrl+/)
Overview
Recommendations
Cost
Security
Reliability
Operational excellence
Performance
All recommendations
Monitoring
Alerts (Preview)
Recommendation digests
Settings
Configuration
Feedback
Download as CSV
Download as PDF
Your recommendations have been loaded
Subscriptions: All 3 selected – Don't see a subscription? Open Directory + Subscription settings
All subscriptions
All types
Cost
38 EUR savings/yr *
2 Recommendations
0 High impact 2 Medium impact 0 Low impact
2 Impacted resources
Security
42 Recommendations
22 High impact 7 Medium impact 13 Low impact
254 Impacted resources
Reliability
4 Recommendations
0 High impact 4 Medium impact 0 Low impact
15 Impacted resources
Operational excellence
1 Recommendation
0 High impact 0 Medium impact 1 Low impact
2 Impacted resources
Performance
1 Recommendation
1 High impact 0 Medium impact 0 Low impact
1 Impacted resource

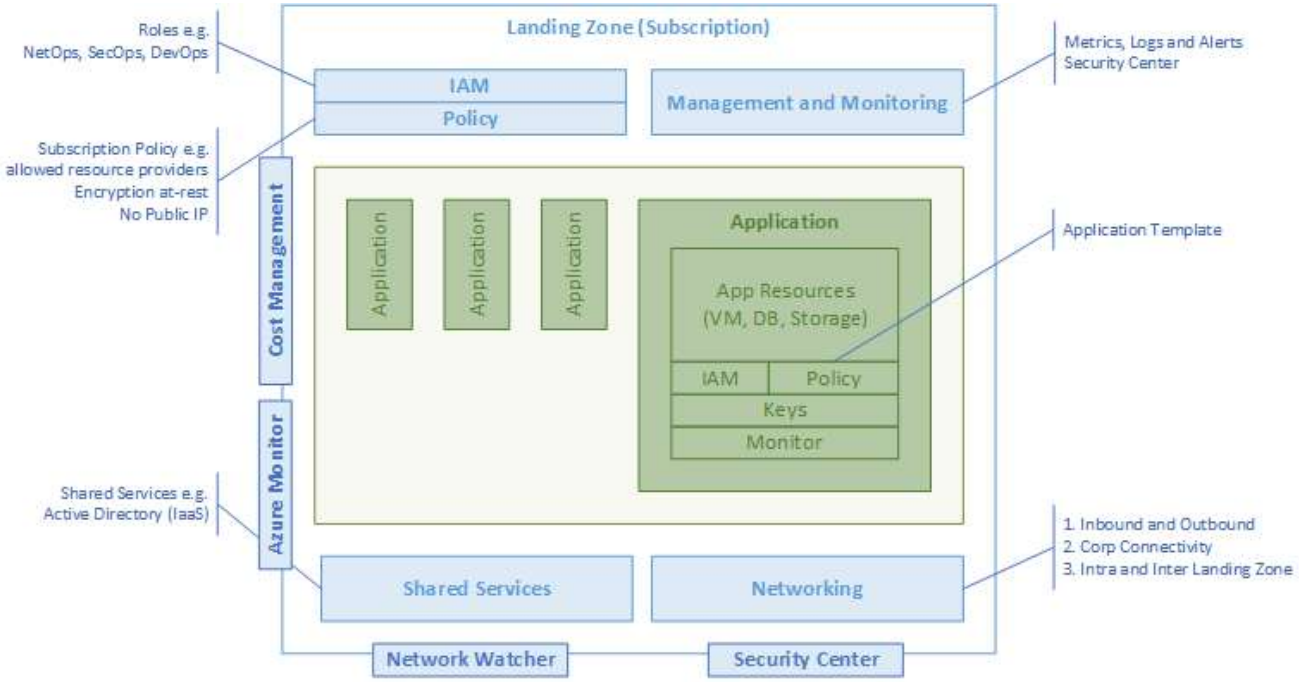
Azure Enterprise-Scale Landing Zones

Landing Zone?

Landing Zone?

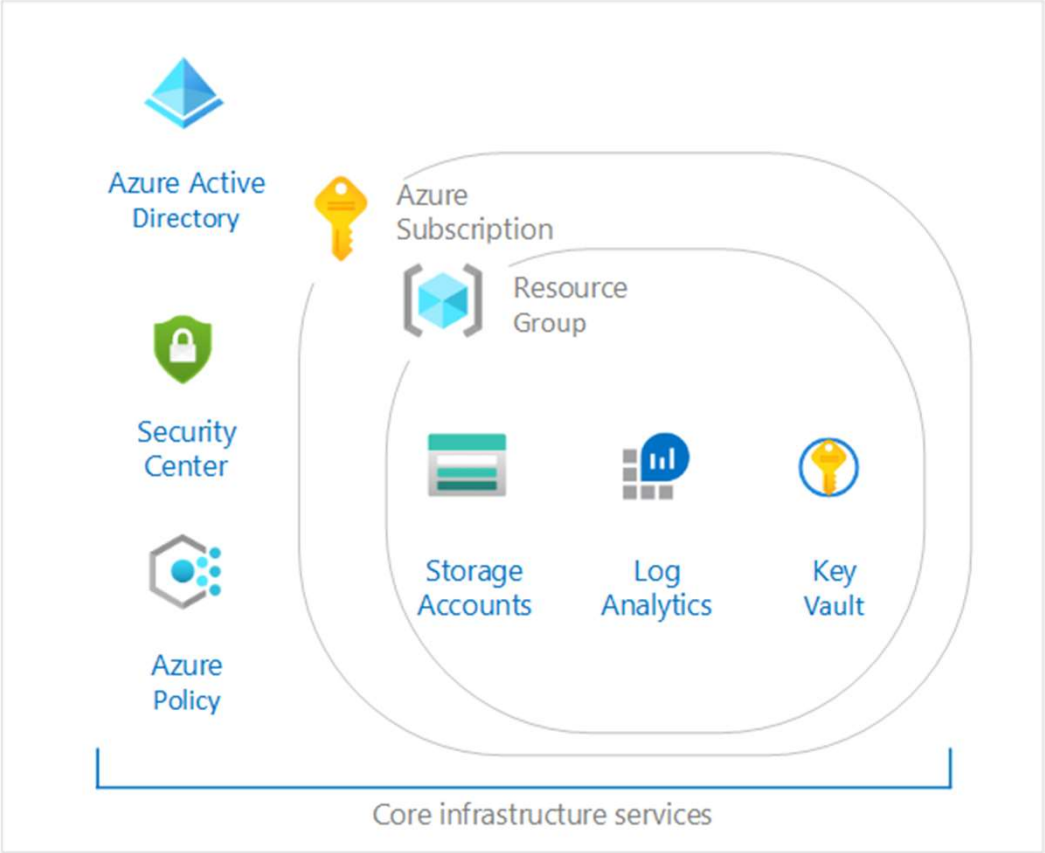
Landing Zone?

Design areas of Landing Zone(s)



Source: Cloud Adoption Framework enterprise-scale landing zone architecture

„CAF Foundation“ Blueprint



Source: Overview of the Microsoft Cloud Adoption Framework for Azure Migration landing zone blueprint sample

„ISO 27001 – Shared Services“ Blueprint

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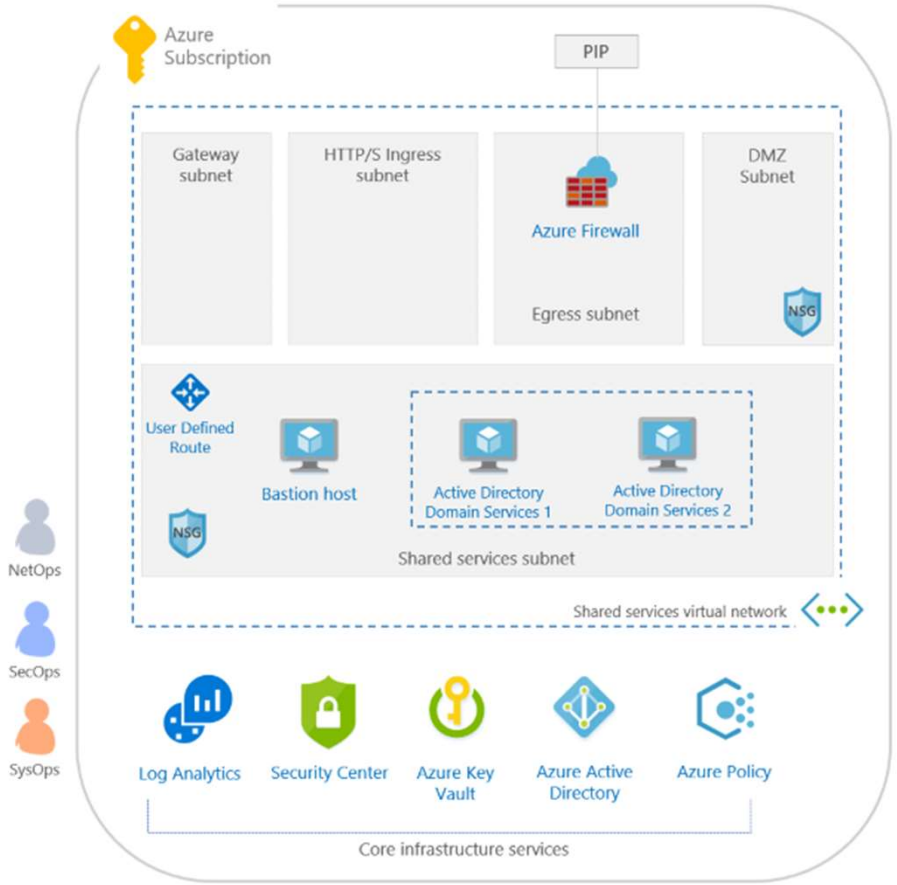
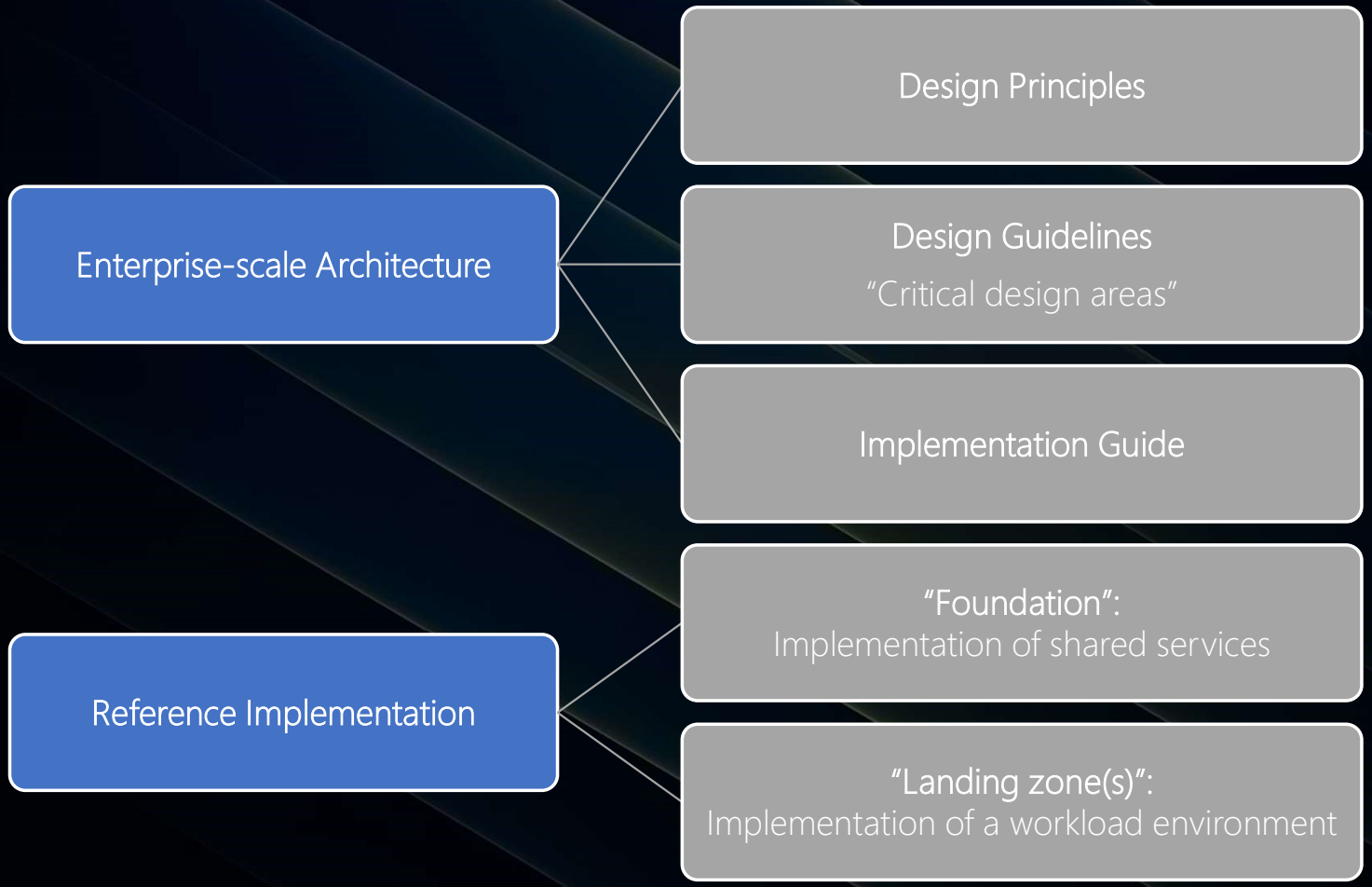
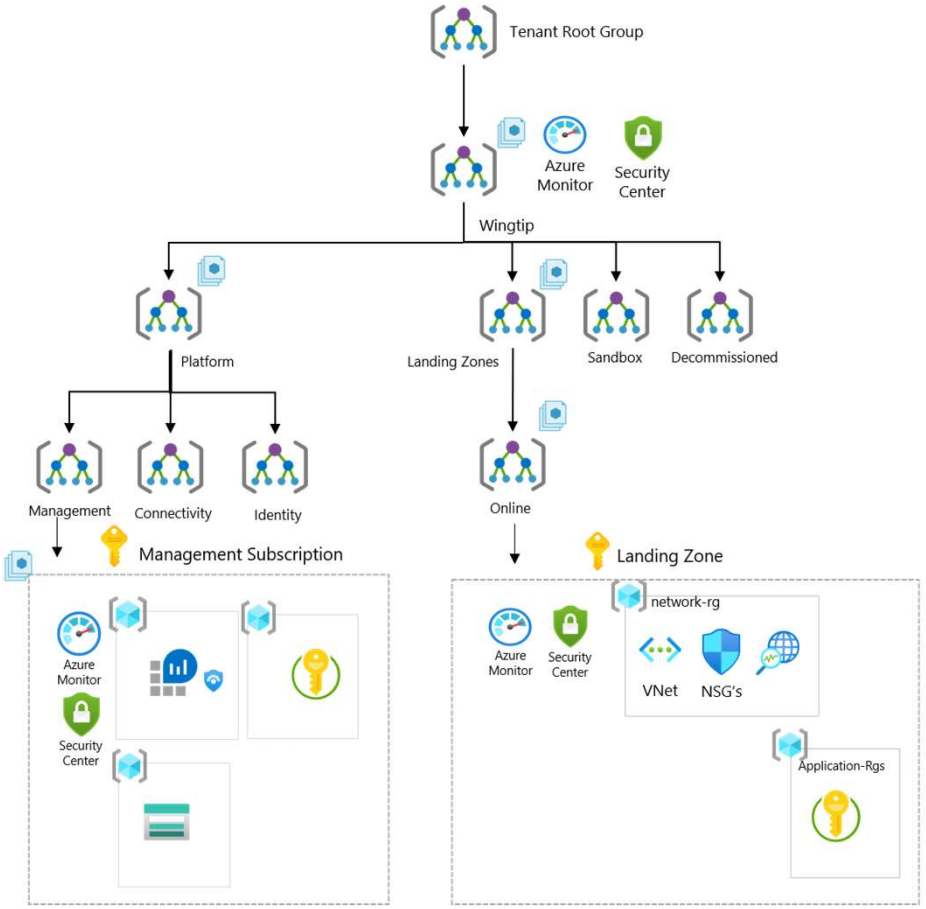


Source: Overview of the ISO 27001 Shared Services blueprint sample

Enterprise-scale?

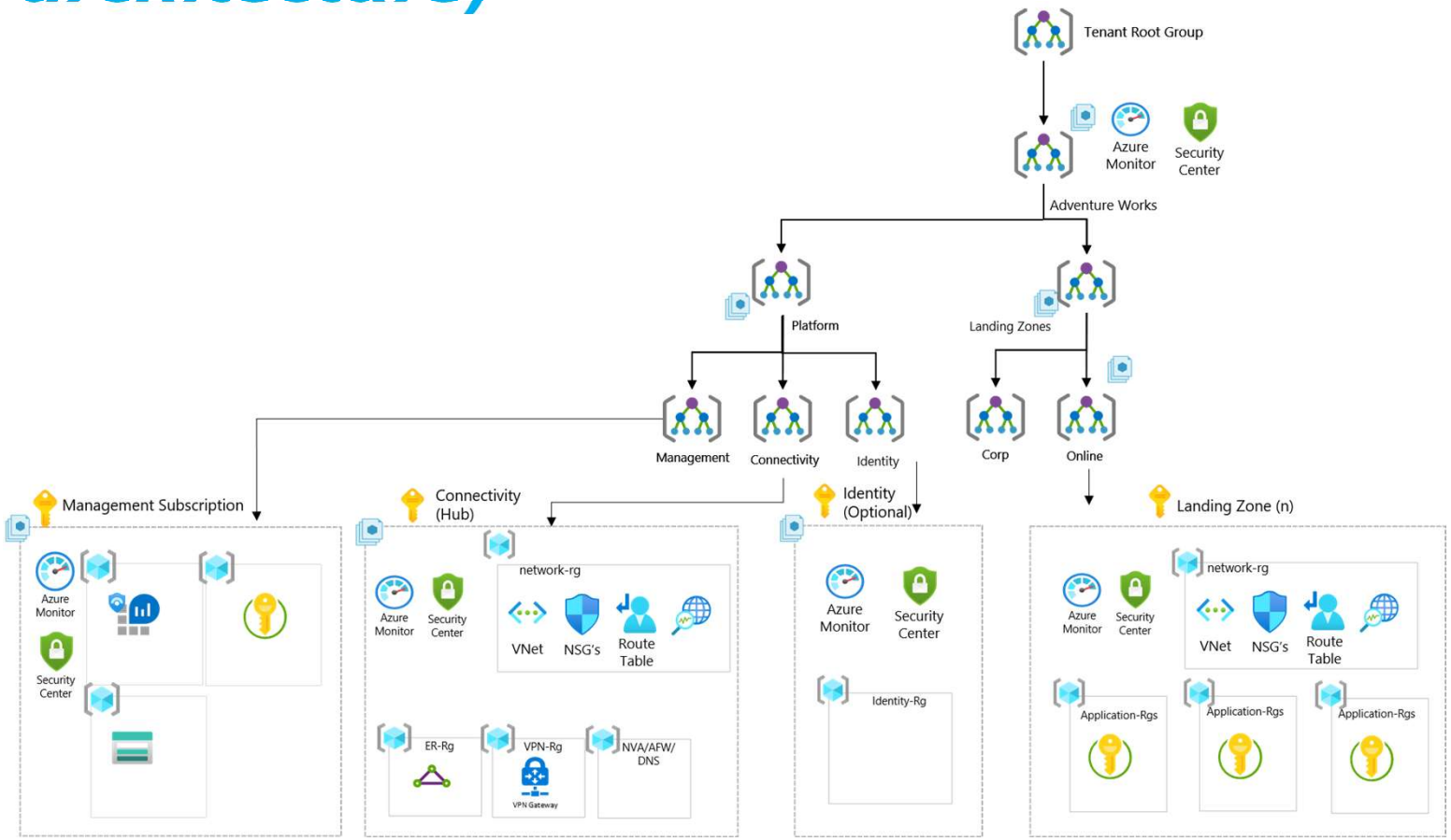


Enterprise-Scale without hybrid connectivity



Source: GitHub-Repo "Azure/Enterprise-Scale" - Deploy Enterprise-Scale foundation

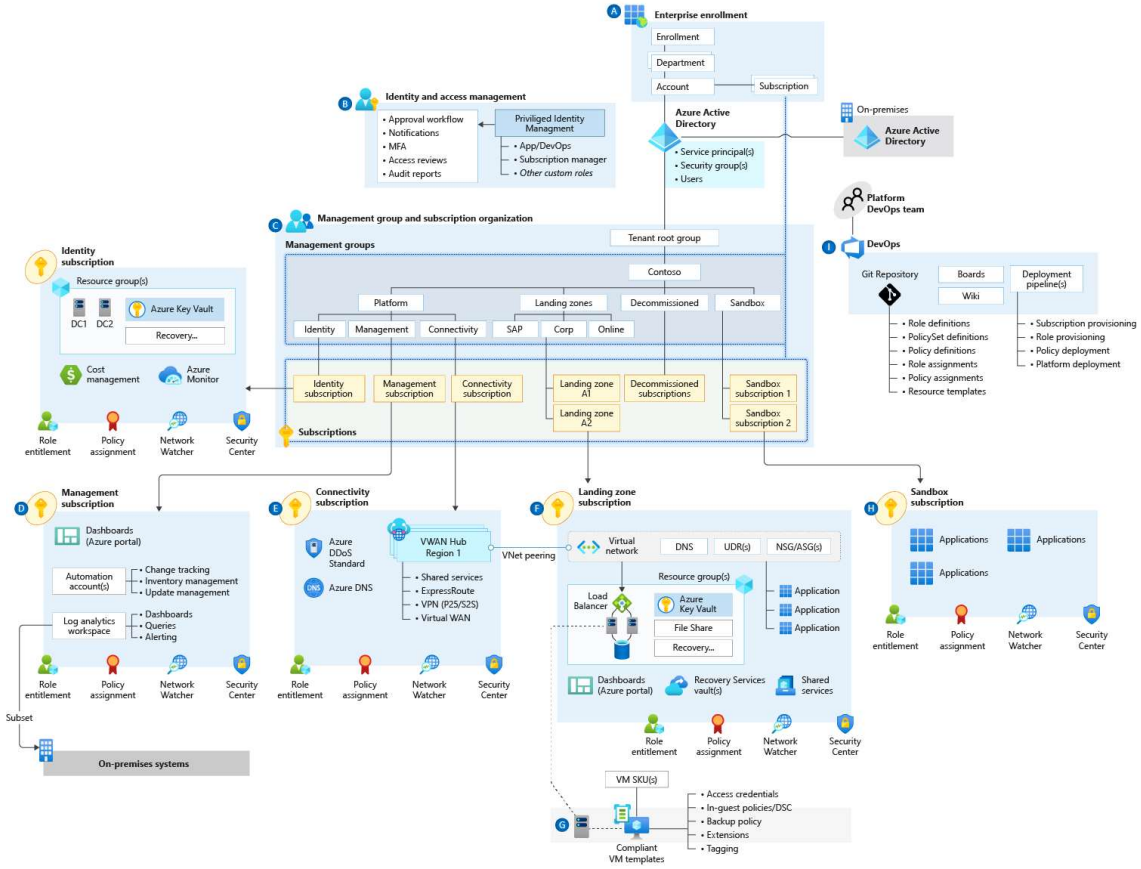
Enterprise-Scale (hub & spoke architecture)



Source: GitHub-Repo "Azure/Enterprise-Scale" - Deploy Enterprise-Scale with hub and spoke architecture

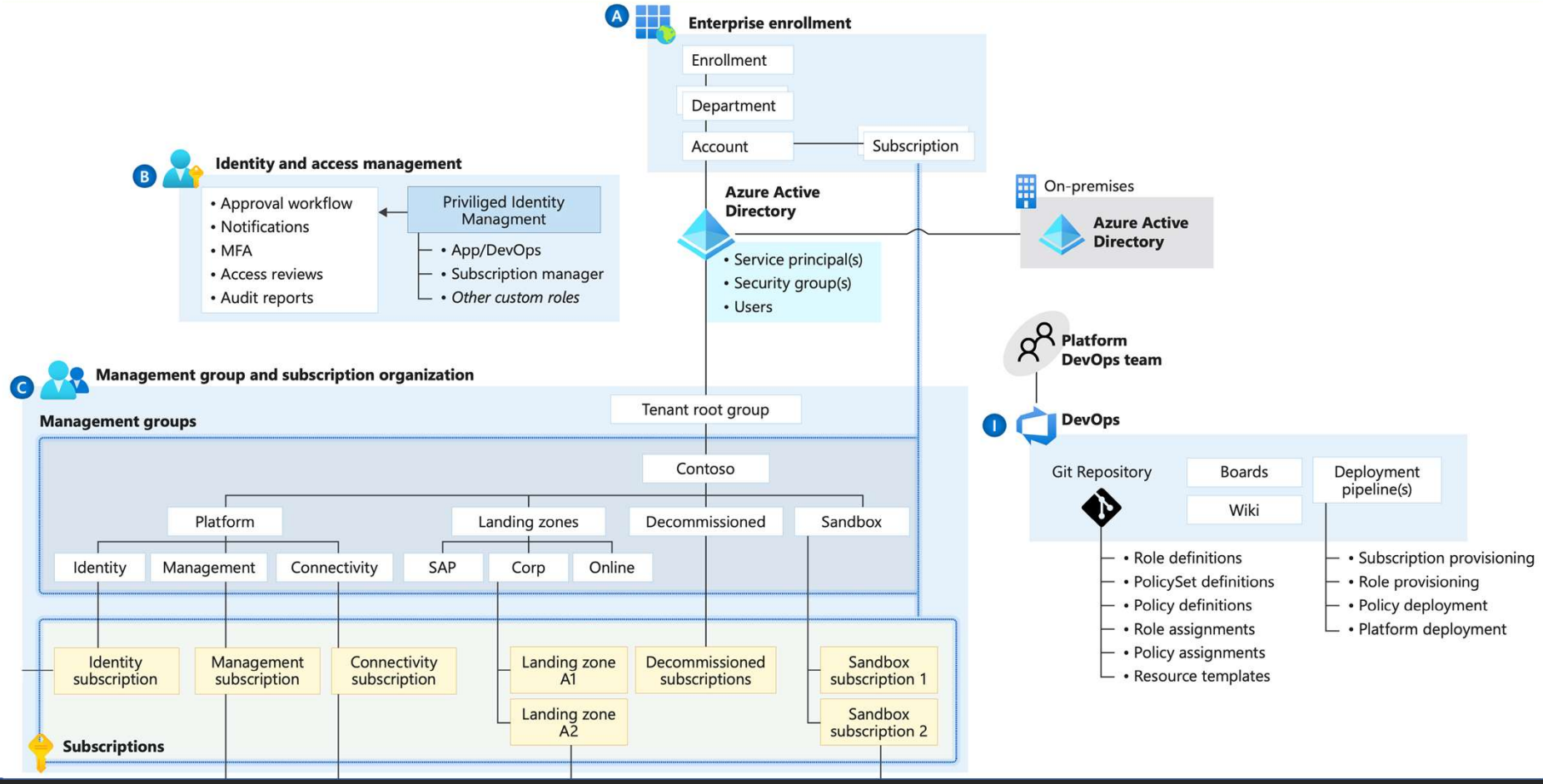
Enterprise-Scale Deployment and Policies

Enterprise-Scale Architecture



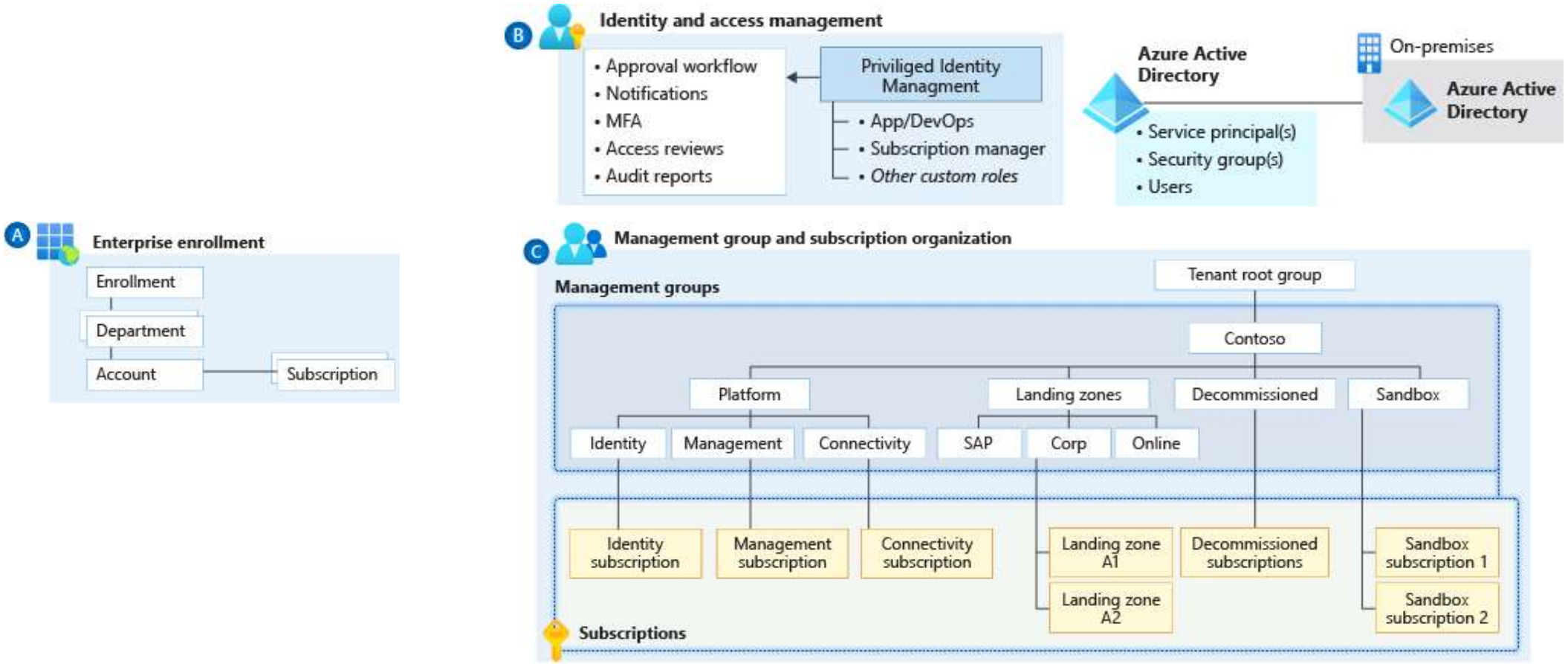
Source: GitHub-Repo "Azure/Enterprise-Scale" - Deploy Enterprise-Scale foundation

Critical Design Areas



Source: Start with Cloud Adoption Framework enterprise-scale landing zones

Critical Design Areas



Source: Start with Cloud Adoption Framework enterprise-scale landing zones

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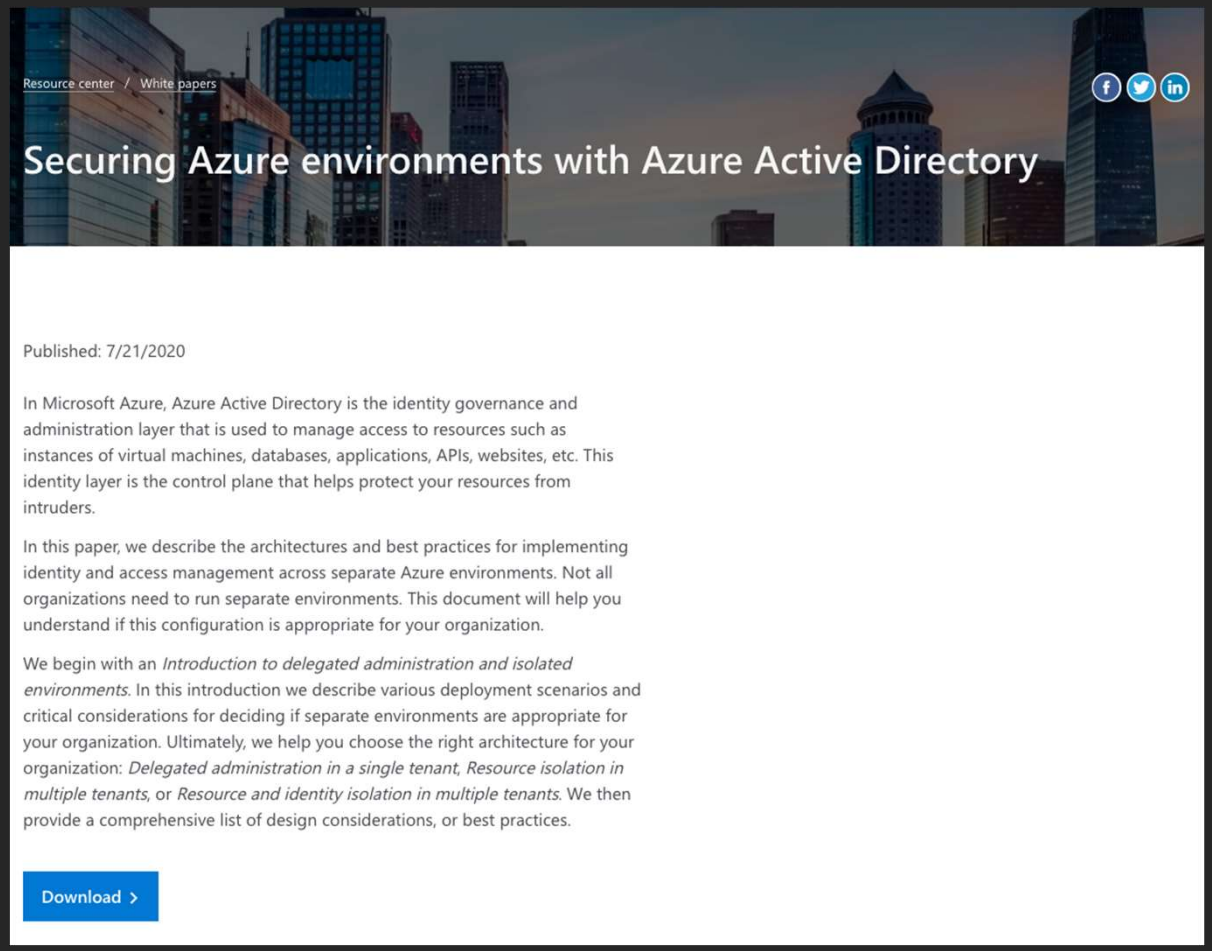
Securing Azure Environments with Azure AD (RBAC)

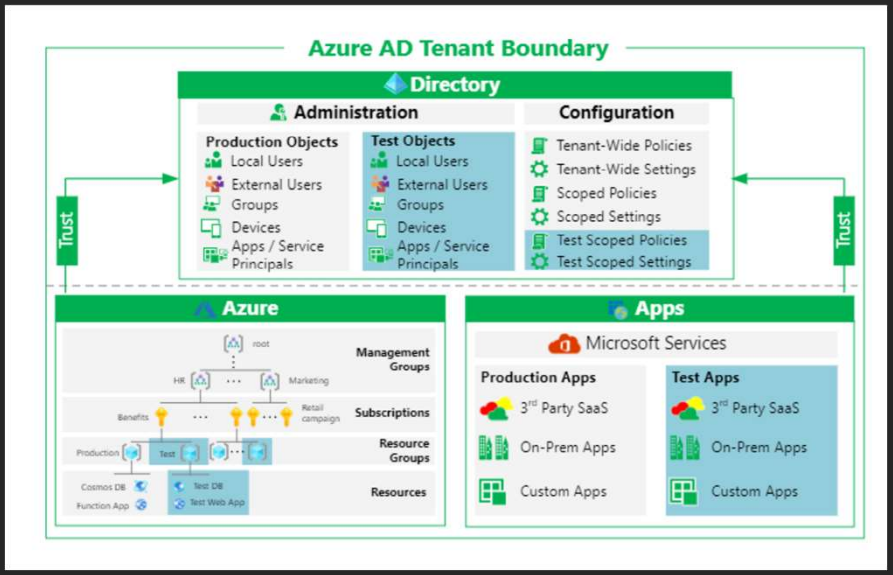
Securing Azure environments with Azure AD



Identity guidance and best practices for designing and securing isolated environments in Azure.
→ **https://aka.ms/AzureADSecuredAzure**

Source: Securing Azure environments with Azure Active Directory

Securing Azure environments with Azure AD
Azure AD Tenant Boundary



- Resource Isolation
  DevOps Teams, Staging, "Secret resources" (shielded from discovery for regulatory or business critical reasons)
- Tenant Isolation
  Tenant-wide configurations, External identities, Compliance (geo-political reasons)
- Administrative Isolation
  Regulations to manage (scoped) environment based on conditions, current limitations of delegation, multi-industry-company

Source: Securing Azure environments with Azure Active Directory

Securing Azure environments with Azure AD
Azure AD Tenant Boundary

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„To mitigate risk of identity compromise, or bad actors, implement tiered administration and ensure that you follow principles of least privilege for Azure AD Administrator Roles."

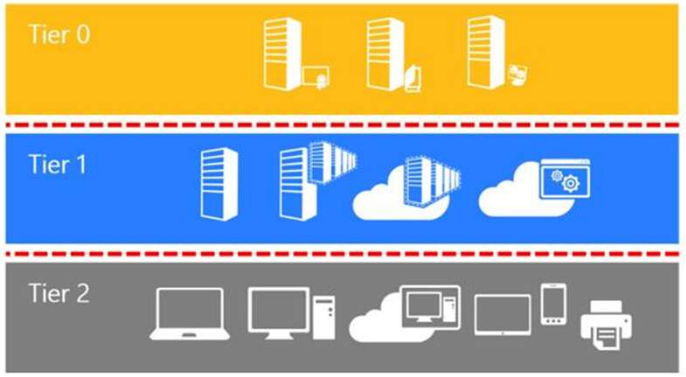
Source: „Securing Azure Environments with Azure AD (Architecture and Design Guide)", Page 8

Active Directory administrative tier model

02/14/2019 • 33 minutes to read • +6

Applies To: Windows Server

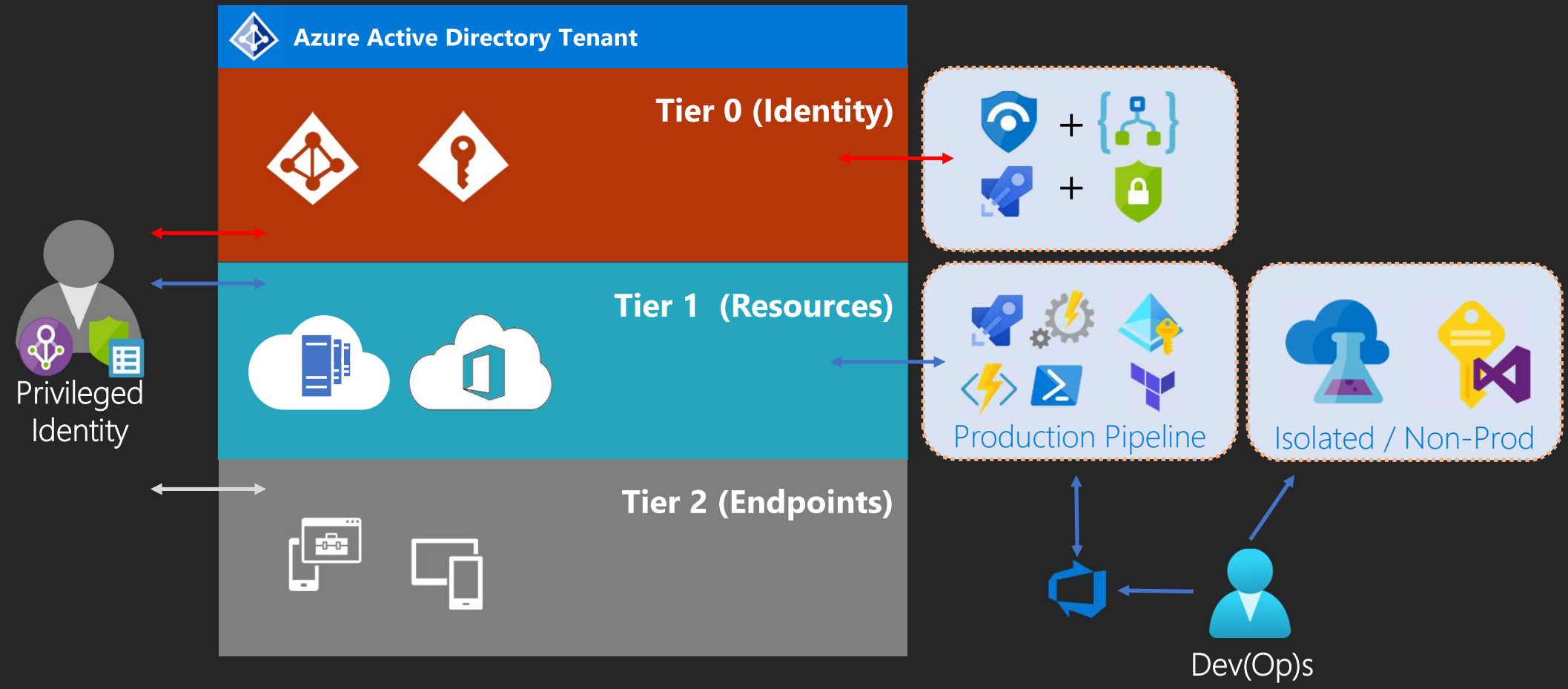
The purpose of this tier model is to protect identity systems using a set of buffer zones between full control of the Environment (Tier 0) and the high risk workstation assets that attackers frequently compromise.



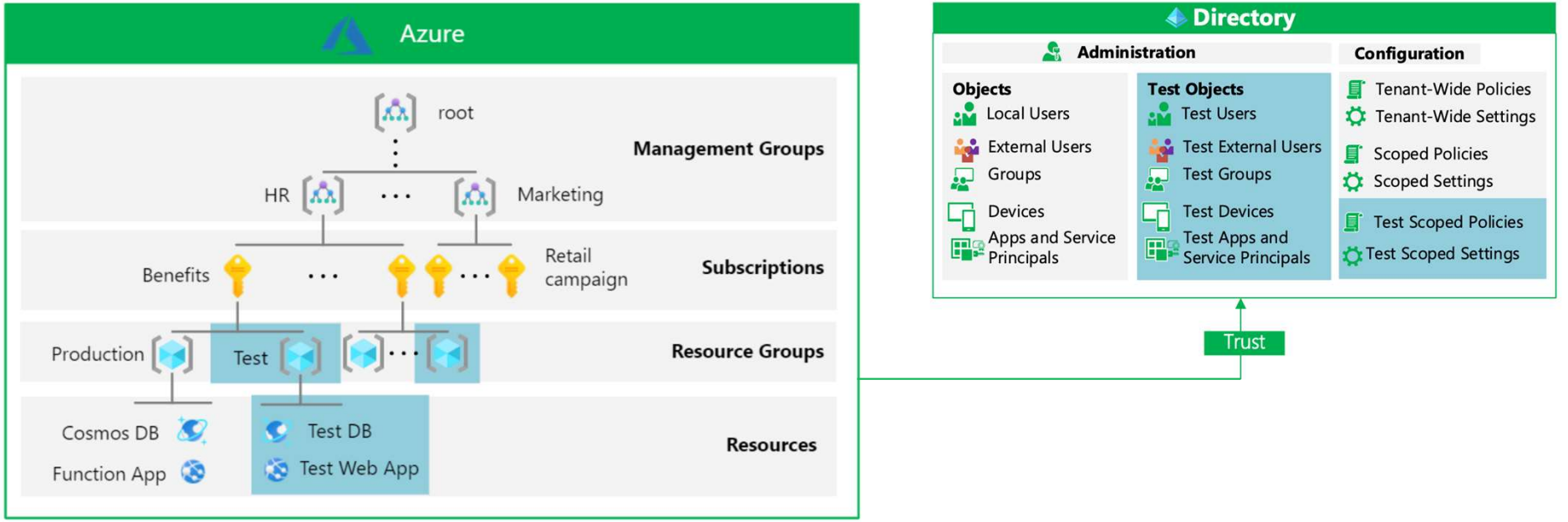
Source: Securing Azure environments with Azure Active Directory

Securing Azure Environment with Azure AD
Example of Tiered Administration Model

Azure Meetup BONN

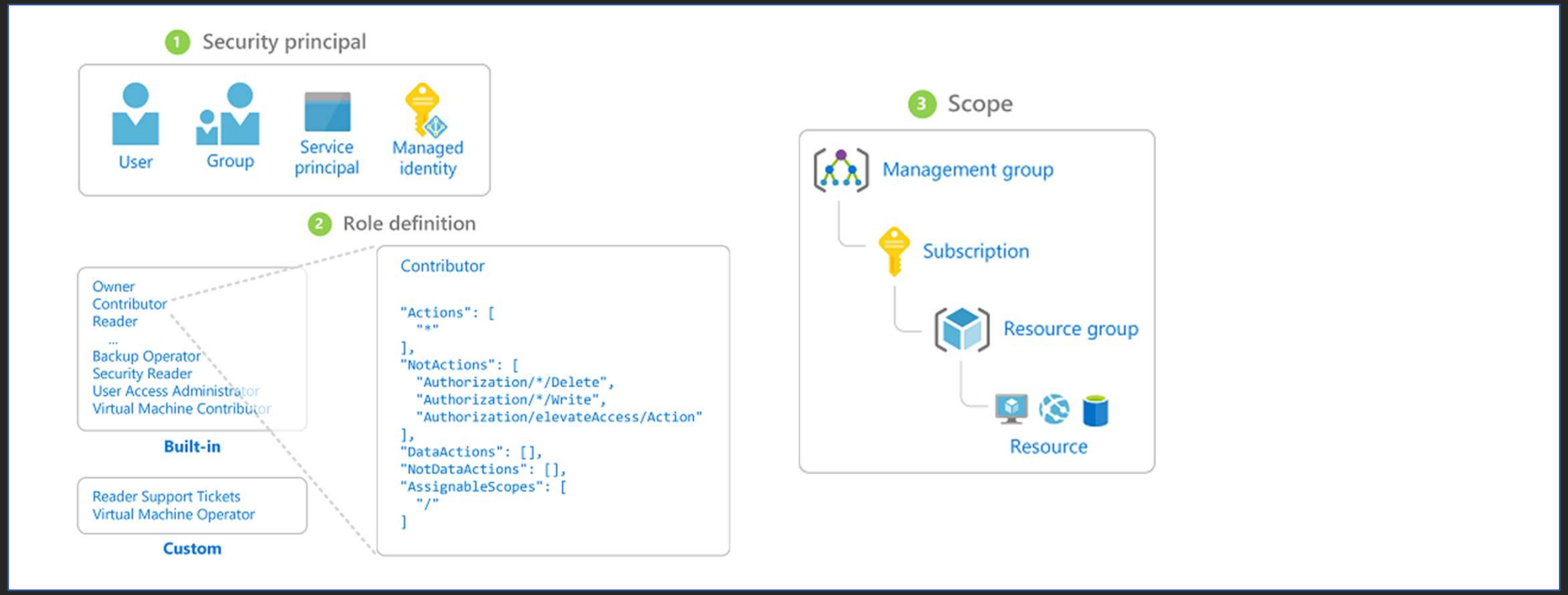


Securing Azure Environment with Azure AD
Resource Isolation in a single tenant



Source: Securing Azure environments with Azure Active Directory

Securing Azure Environment with Azure AD
Only grant the access users need



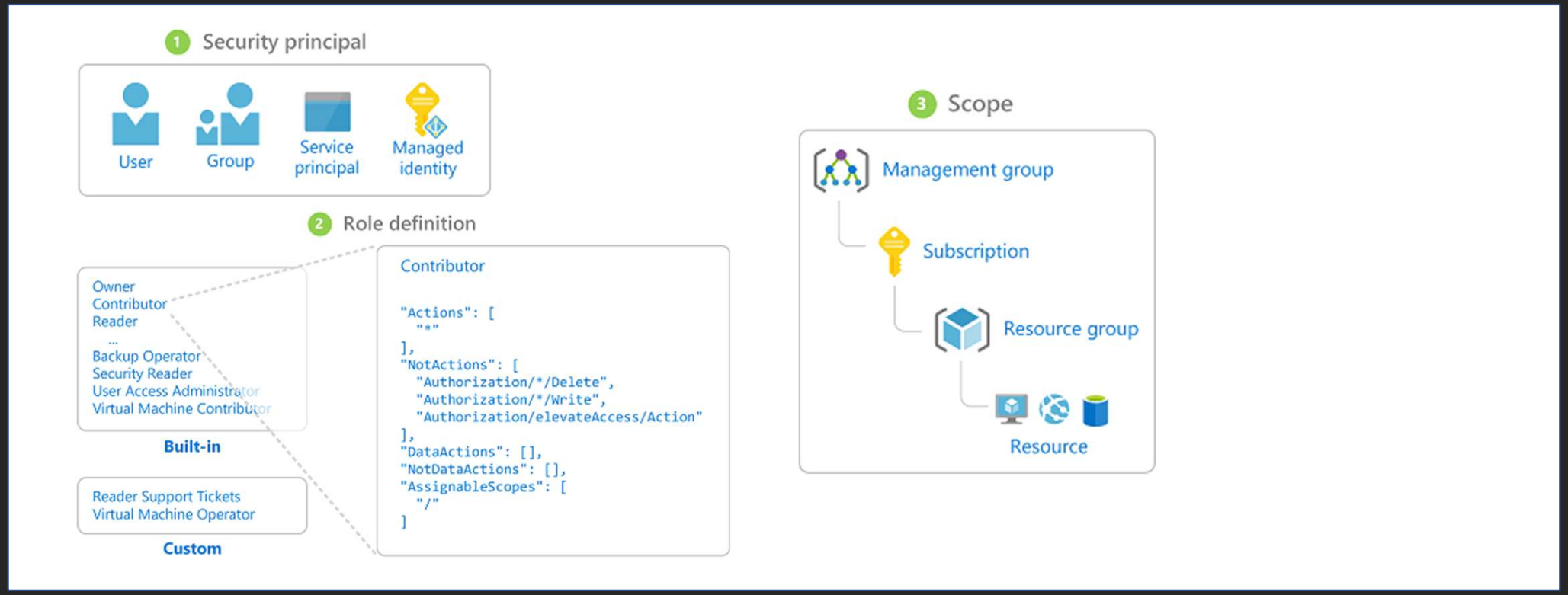
Source: What is Azure role-based access control (Azure RBAC)?

Role Delegation to DevOps Team “NCC-1701”

- ~~Manage Credentials of “Test User”~~
- Manage Service Principal of “DevOps Service Connection”
- Temporary Read Permission of SQL Server Properties for all Project Team Members

Administrative Units, Azure AD Custom Roles and Custom Roles in Azure RBAC

Securing Azure Environment with Azure AD
Only grant the access users need



Source: What is Azure role-based access control (Azure RBAC)?

Simplified, Secured & Least Privileged Access

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Evaluate built-in roles instead of creating custom roles

- Custom Roles are powerful but can be also complex
- RBAC-as-Code approach

Avoid permissions referencing to specific resources or user

- Using Management Groups (Enterprise) or Resource Groups Level Permissions

Assign eligible permissions based to Azure AD Groups

- Reduce standing access (Just in Time, Access Review)
- Implement Break-Glass /Emergency access for Tier1

Access to Azure resources by „Managed identities“ / KeyVault

- where service principals are needed, use certificate credentials for service principals
- use Azure KeyVault to protect your secrets, keys or certificates

Securing Azure Environment with Azure AD

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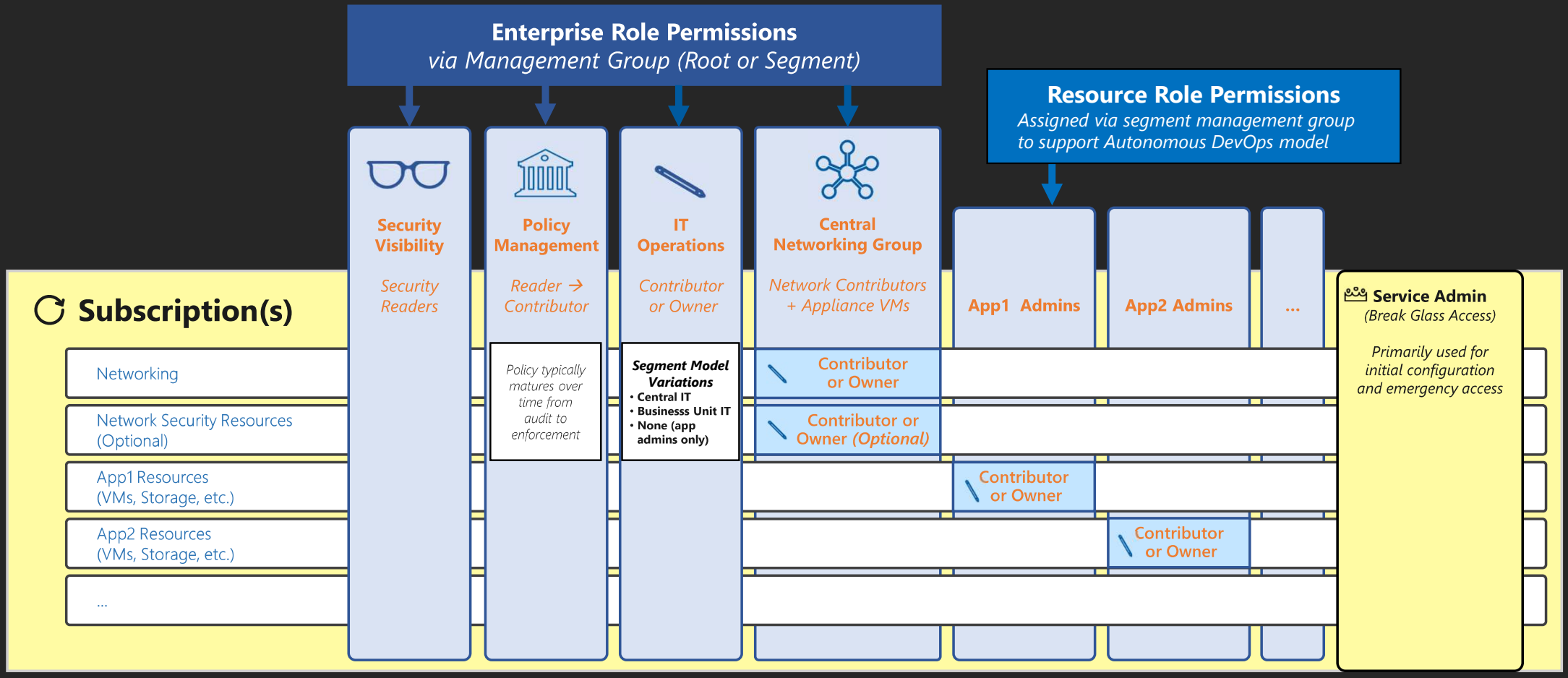

Source: Microsoft Security Compass

Securing Azure Environment with Azure AD
Example of Tiered Administration Model

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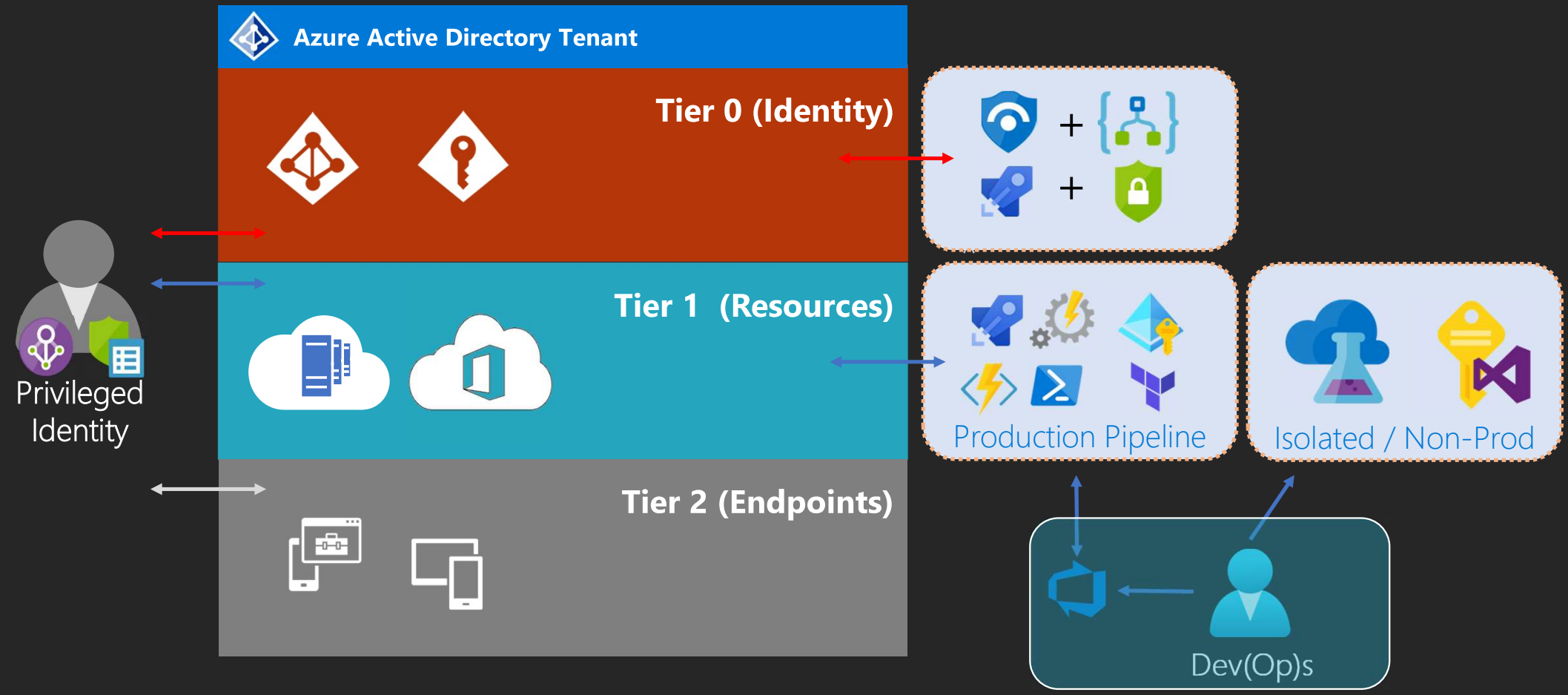

Azure PIM Privileged Access Groups

Securing Azure Environment with Azure AD
Azure AD Tenant Boundary

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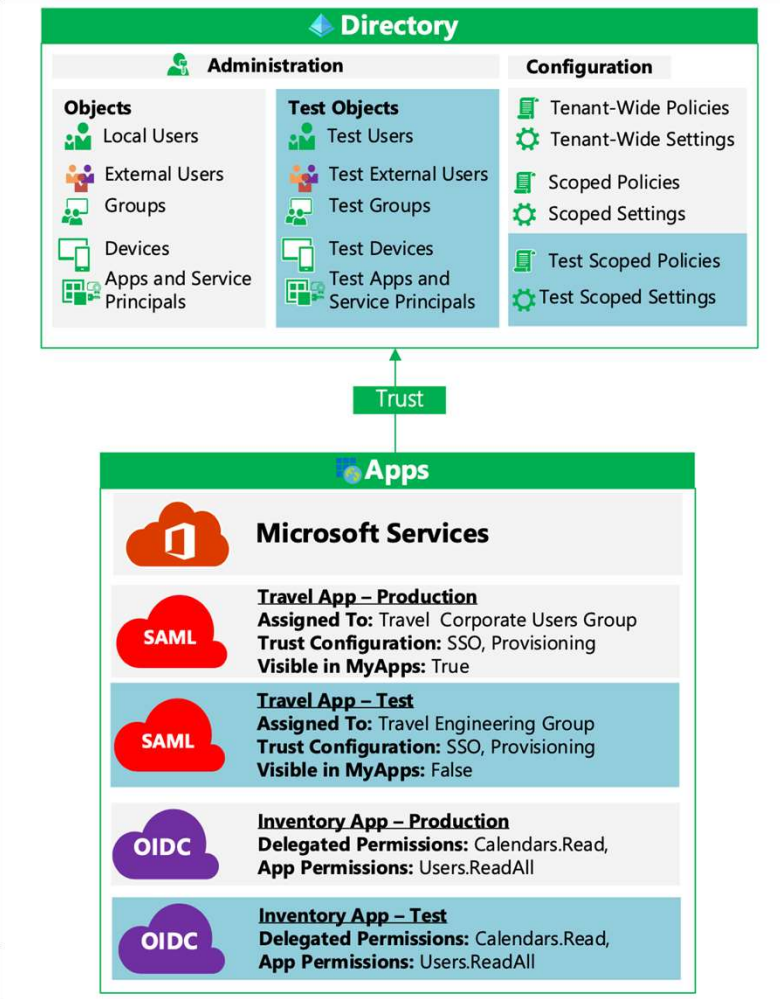
„The lifecycle of Microsoft SaaS services such as Office 365, Microsoft Dynamics, and Microsoft Exchange are bound to the Azure AD tenant. As a result, multiple instances of these services necessarily require multiple Azure AD tenants."

Source: „Securing Azure Environments with Azure AD (Architecture and Design Guide)", Page 14



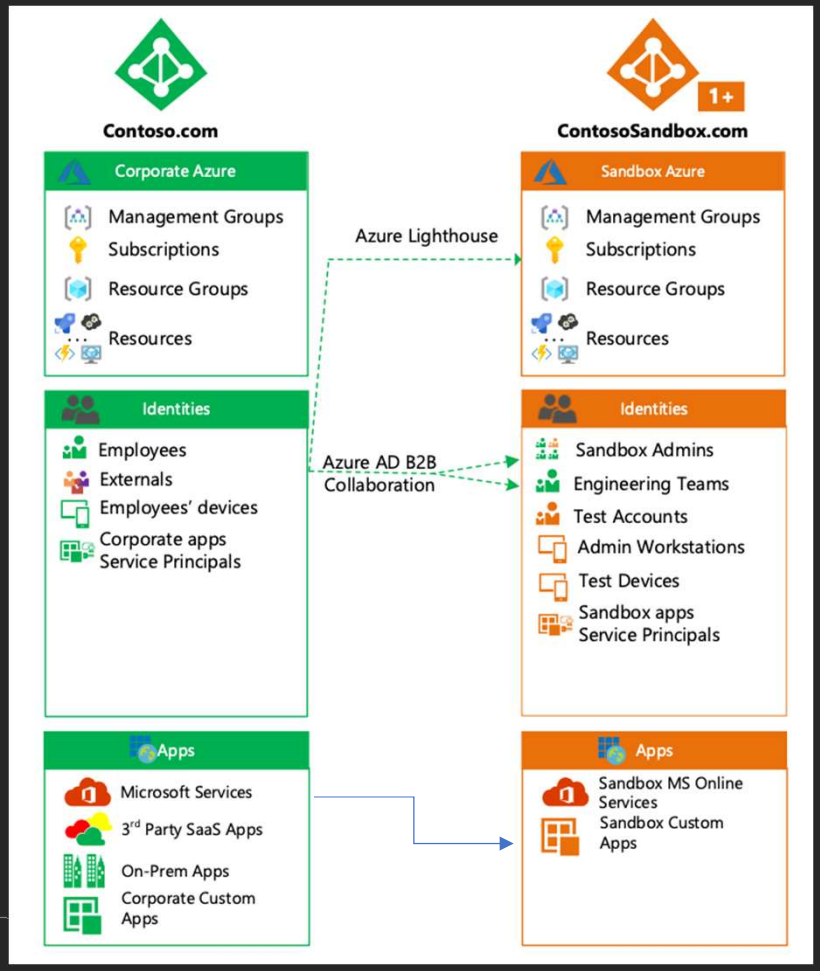
Source: Securing Azure environments with Azure Active Directory

Securing Azure Environment with Azure AD
Resource Isolation in a multiple tenant

Azure Meetup BONN

„Multi-tenant architectures with external identity access enabled provide only resource isolation, but do not enable identity isolation. Resource isolation using Azure AD B2B collaboration and Azure Lighthouse do not mitigate risks related to identities."

Source: „Securing Azure Environments with Azure AD (Architecture and Design Guide)", Page 17



Source: Securing Azure environments with Azure Active Directory

Securing Azure Environment with Azure AD
Azure AD B2B in privileged access scenarios

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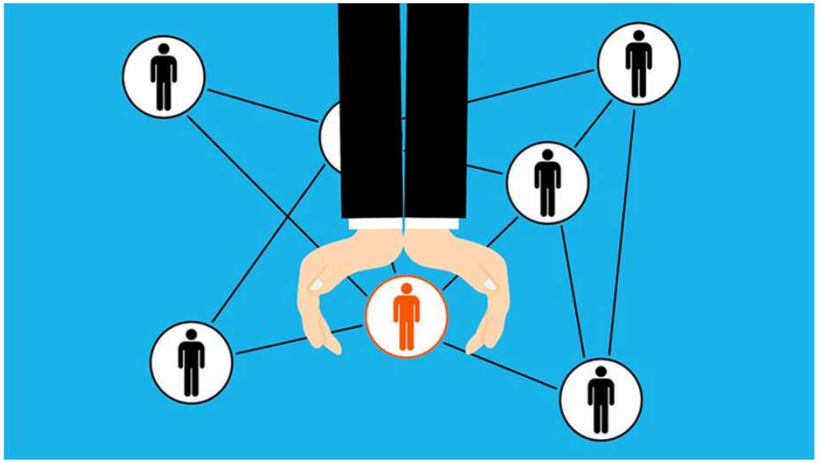
Azure AD B2B: Security considerations to protect external (privileged) identities



In the recent months I've spent time on research of identity security in B2B scenarios (when users are invited to another Azure AD tenant). In this blog post I like to share a few insights about known but also undocumented limitations or concerns of identity protection in Azure AD B2B. All results of my research were double checked in my lab environments, but I would be very interested to hear feedback from others about their experiences or technical insights.

Security considerations and potential attack scenarios
→ https://www.cloud-architekt.net/azuread-b2b-security-considerations/

Securing Azure Environment with Azure AD
Resource Isolation in a multiple tenant

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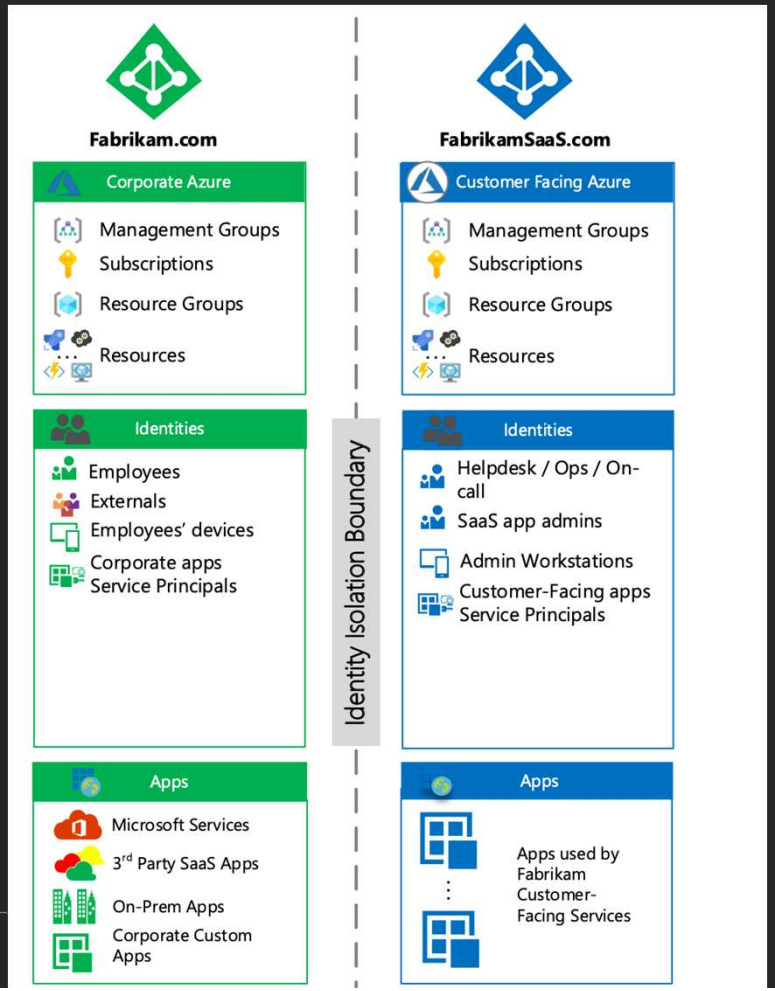
„A separate identity boundary is typically used for business-critical applications and resources such as customer- facing services."

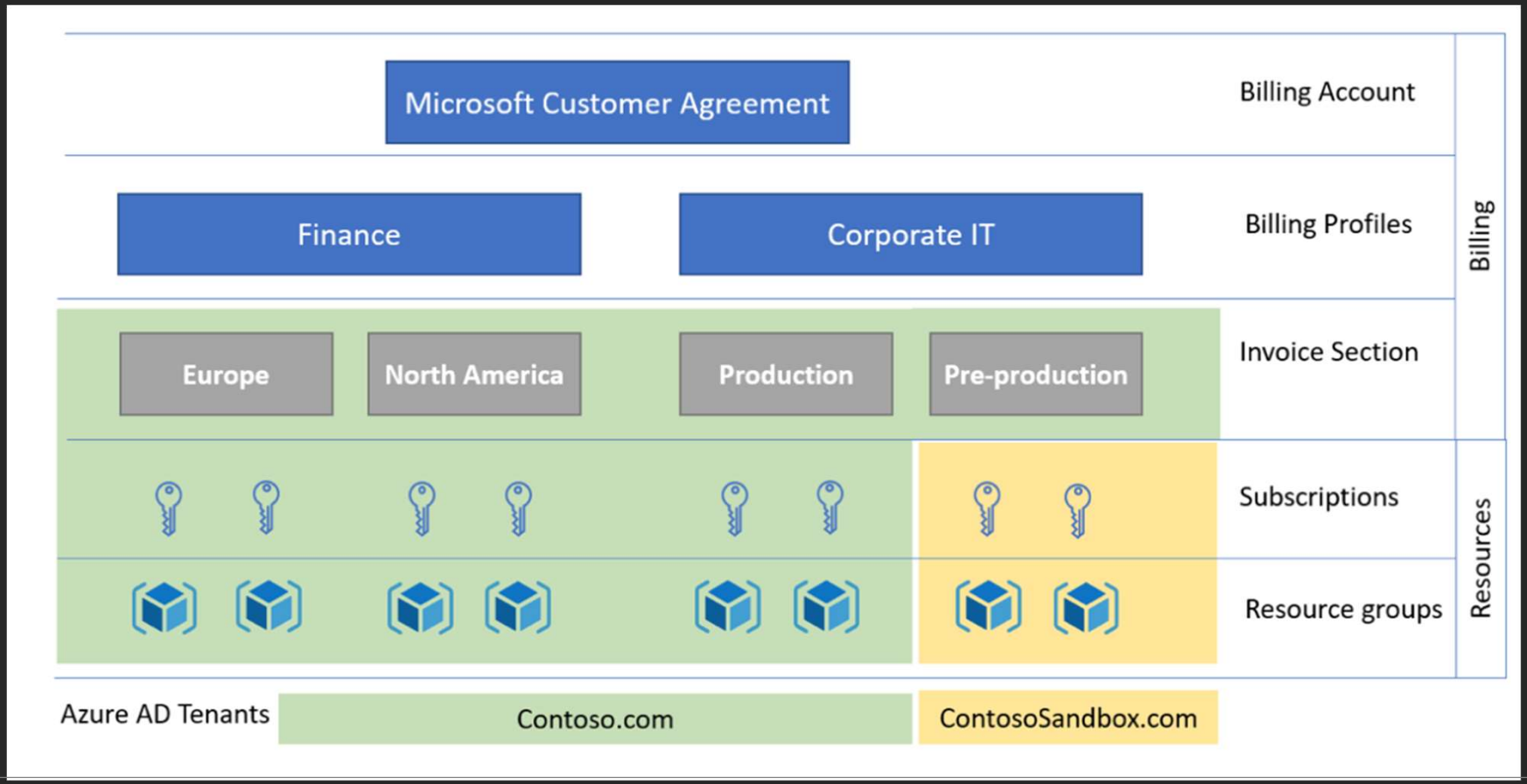
„... avoid the risk of employee identity compromise affecting their SaaS customers"

Source: „Securing Azure Environments with Azure AD (Architecture and Design Guide)", Page 19



Source: Securing Azure environments with Azure Active Directory

Securing Azure Environment with Azure AD
Microsoft Customer Agreement Hierachy



Source: Securing Azure environments with Azure Active Directory

Azure DevOps & Governance

Policy Assessment as part of DevOps

Azure Meetup BONN

Code | Build/Test | Deploy | Operate

Policy as Code

- Pre-flight
- Validation
- Authoring


Policy


Security


Monitoring


Azure DevOps

Source: https://techcommunity.microsoft.com/t5/microsoft-ignite-the-tour-2019/azure-security-fundamentals

Policy Assessment as part of DevOps

Azure Meetup BONN

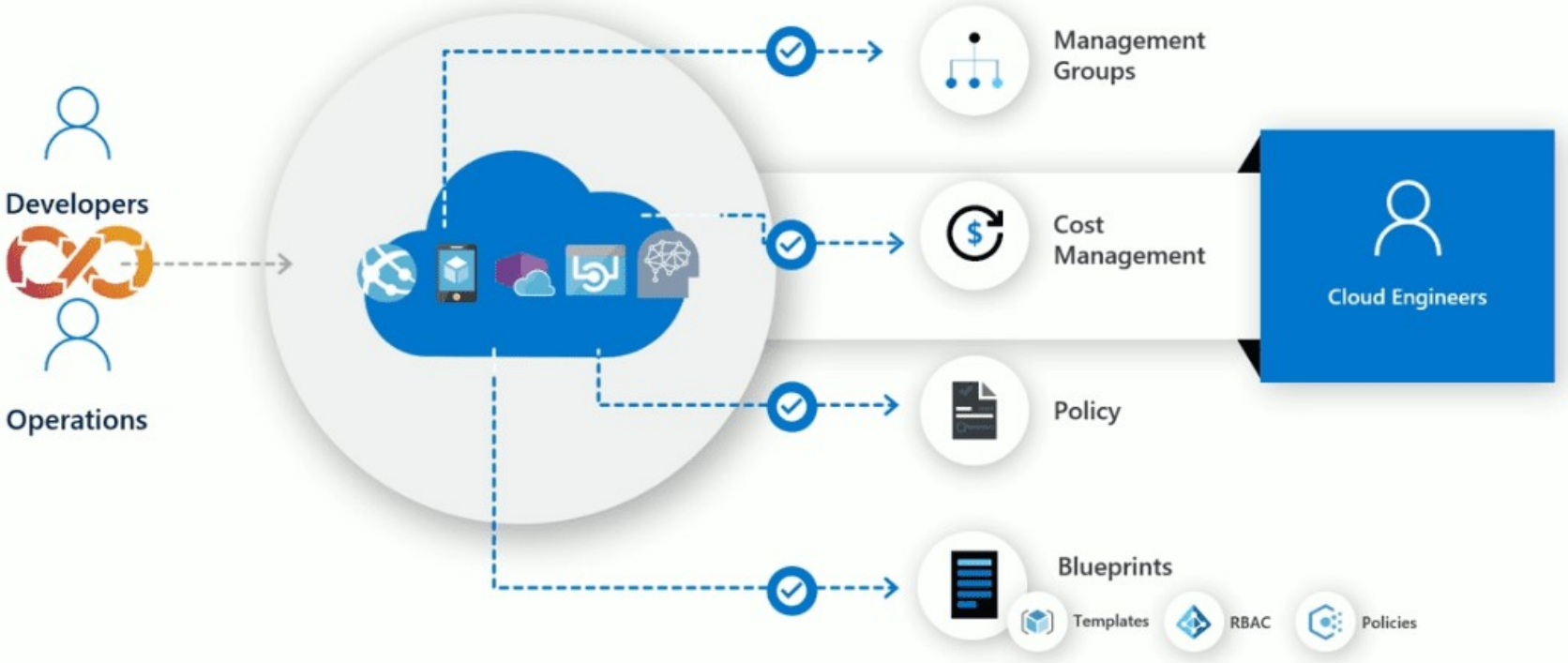
Code | Build/Test | Policy as Code: Pre-flight / Validation / Authoring | Deploy | Operate

Policy | Security | Monitoring

Azure DevOps + Azure Policy

Source: https://techcommunity.microsoft.com/t5/microsoft-ignite-the-tour-2019/azure-security-fundamentals

Speed and Control



Source: https://techcommunity.microsoft.com/t5/microsoft-ignite-the-tour-2019/azure-security-fundamentals

Auditing and Secrets in CD Pipelines

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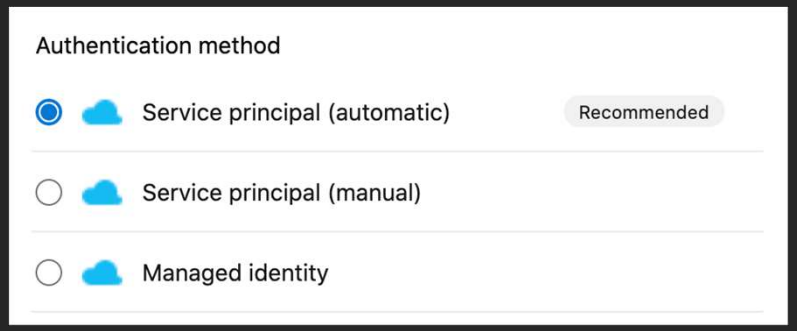
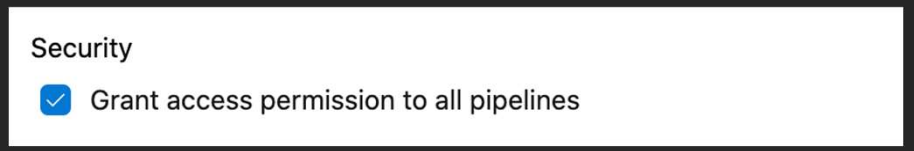
- Secrets and Service Principals in Pipeline
  - Accessing Azure Key Vault Secrets from your pipelines
  - Service Principal or Managed Identities in Service Connections

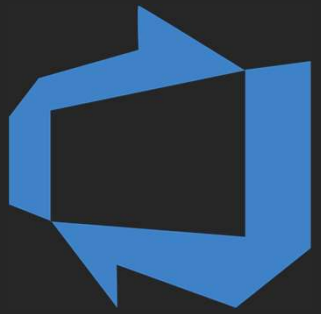




- Audit in Azure DevOps in Public Preview
  - Rest-API: https://auditservice.dev.azure.com/<OrgName>/_apis/audit/actions

  - Streaming of "Auditing Logs" → *EventHub, Log Analytics*
    - No correlation between Azure Activity and Pipeline Events → *My feature request*

Azure DevOps CD Configuration, Auditing and Quality Gates



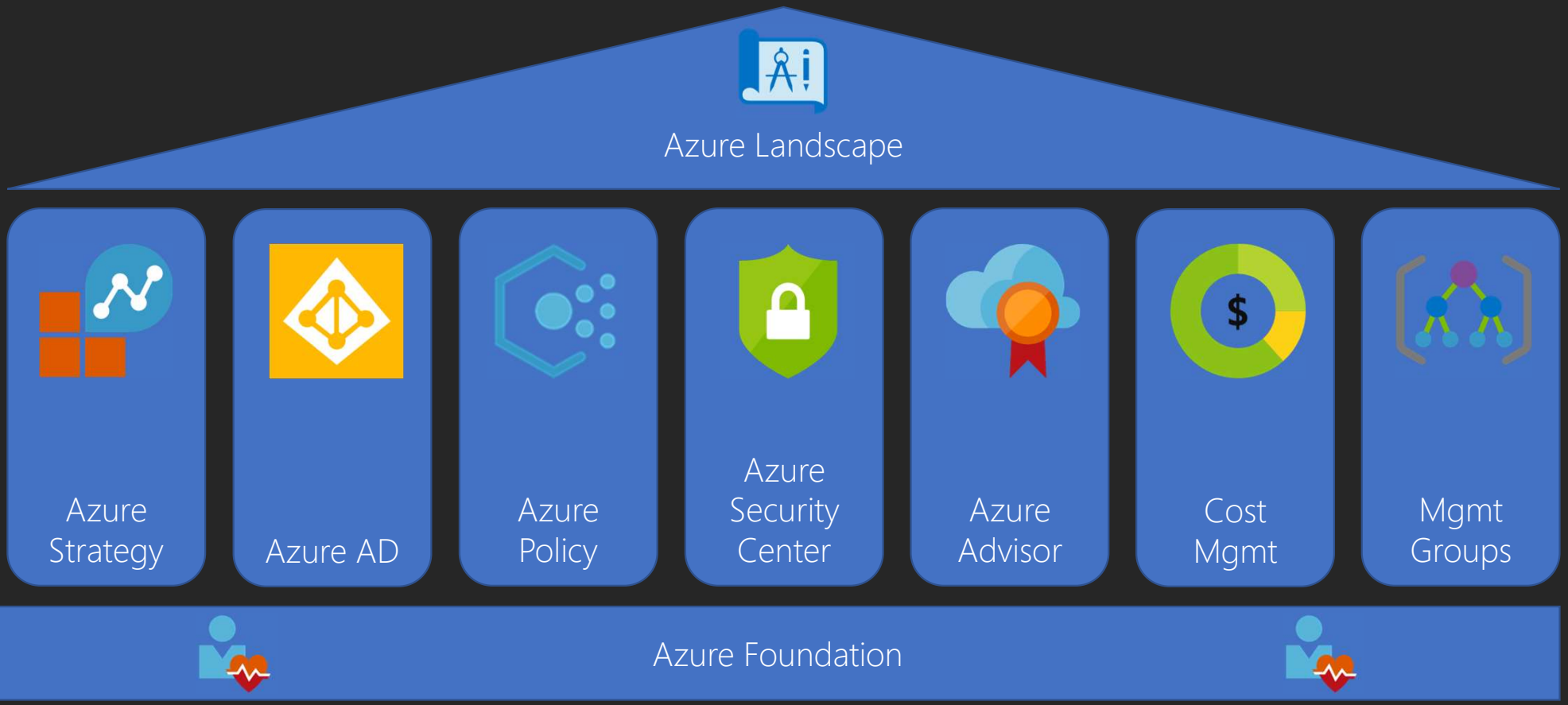
DEMO

Links

- https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/
- https://docs.microsoft.com/en-us/azure/architecture/framework/
- https://docs.microsoft.com/en-us/azure/advisor/
- https://docs.microsoft.com/en-us/azure/governance/policy
- https://www.reimling.eu/2019/03/azure-management-groups-und-blueprints-ueberblick-und-einrichtung-teil-1/
- https://aka.ms/SecurityCommunity
- https://blog.azureandbeyond.com/2020/04/24/mastering-azure-security-my-latest-adventure/

- Virtual Live Event (October 20th): Azure Architecture Best Practices https://mktoevents.com/Microsoft+Event/198675/157-GQE-382

How brings it to Azure?



Our Recommendations

- Define a Cloud Strategy
  - Use the available Tools and Guidelines
  - Define the added value of the cloud
- Create a Team for Cloud Services of different people
- Evaluate guidelines and best practices
- Organize a regulary meeting/call for Cloud news
- Get in touch with Partners and Community for help and support

Azure Meetup BONN

Session Slides

Questions? ->
Reach us via Twitter ☺

Identity Summit 2020
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