Reducing risk for your Azure resources

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About

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- Cloud Consulting
- Azure-based Platform
- Whatever needs improvement…

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Quick RBAC recap

- Common RBAC assignments and their issues
  - Quick recap of Azure RBAC
  - Common RBAC handling
  - How to get your developers on board
  - Practical implementation of least-privilege

- New way to reduce scope for Owner / User Access Administrator roles

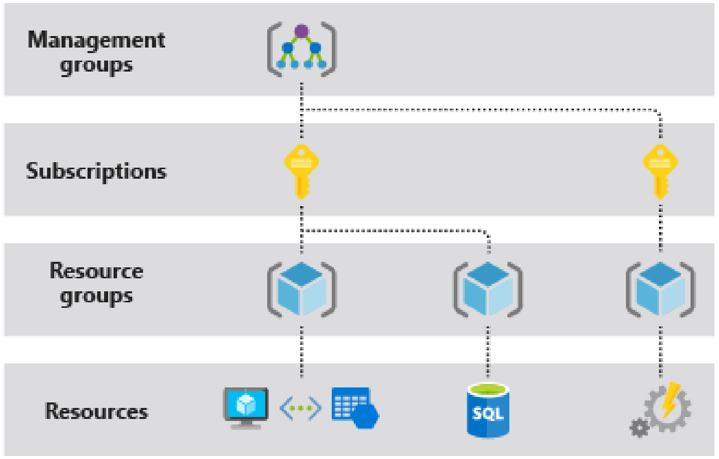
- Blocking resource deletes with DenyAction Azure policies (if time)

Quick RBAC recap

- Access is built on ARM which uses resource providers
  - E.g. Microsoft.Web, Microsoft.Storage, Microsoft.Compute
- Control plane & data plane
  - Actions, NotActions – control plane
  - DataActions, NotDataActions – data actions
- Role assignments can grant RBAC roles to principals
  - Examples - Entra ID groups, users, managed identitites etc.

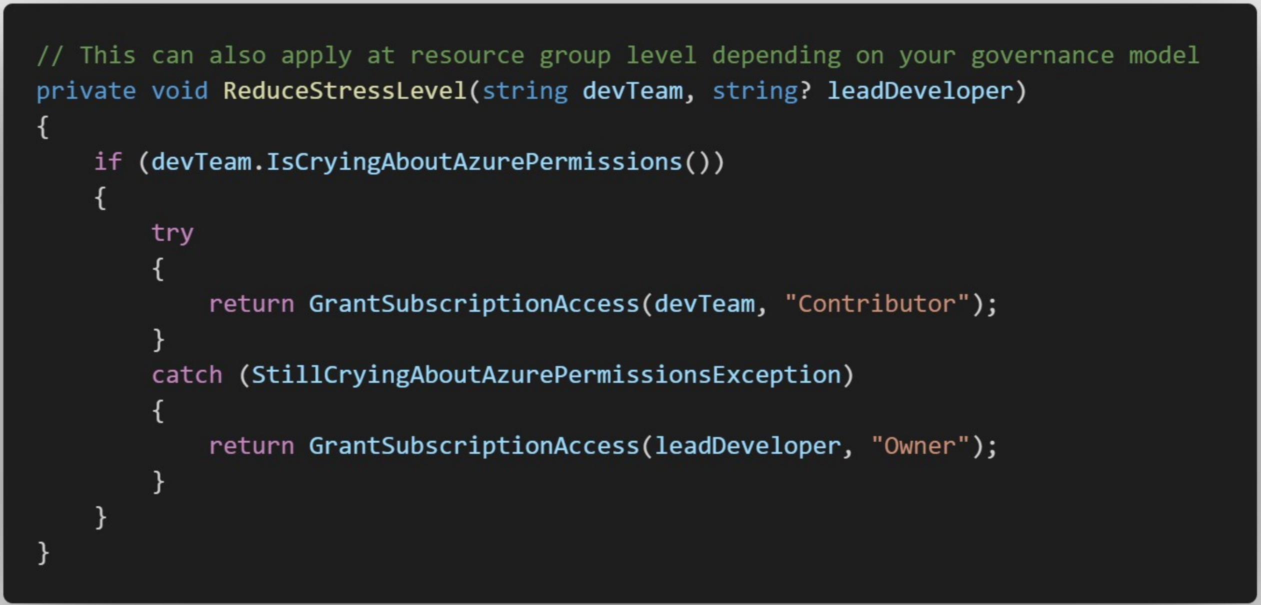
Quick RBAC recap

- Role assignments can be granted at different scopes and are inherited in a hierarchy
  - Up to recently very challenging to block inheritance*



* Deployment stacks (preview) may finally make this more manageable

Common RBAC handling



```
// This can also apply at resource group level depending on your governance model
private void ReduceStressLevel(string devTeam, string? leadDeveloper)
{
    if (devTeam.IsCryingAboutAzurePermissions())
    {
        try
        {
            return GrantSubscriptionAccess(devTeam, "Contributor");
        }
        catch (StillCryingAboutAzurePermissionsException)
        {
            return GrantSubscriptionAccess(leadDeveloper, "Owner");
        }
    }
}
```

Common RBAC handling

- Contributor role
  - Used because it is a practical «catch-most» issue handling
    - Grants permissions to the control plane **only**
  - Some unfortunate accesses most principals shouldn’t have
    - PaaS – often involves access to admin credentials
    - IaaS – reset admin password / SSH key / run command
    - CRUD to any resource. Is this really required if you use IaC?

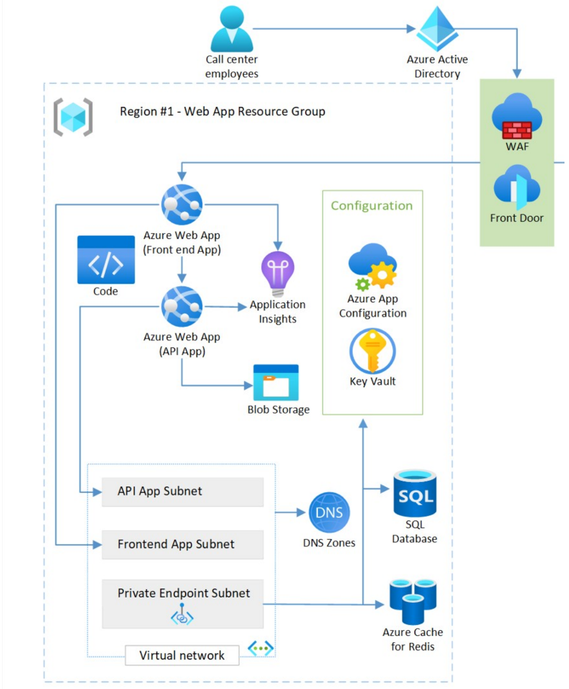
Common RBAC handling

- Owner role
  - Any action in the control plane possible, no data plane access!
  - Essentially everything a contributor can do + more
    - Most relevant: Microsoft.Authorization resource provider
      - Write and delete role assignments to anyone in your directory
      - Create and delete resource locks
      - Assign, modify and delete Azure Policy assignments

Authenticating with the data plane

- Nearly all Azure PaaS services supports using keys for authentication
    - Contributors have access to these keys. Since developers are often granted contributor permissions, these keys are often used in app code (with or without Azure Key Vault)
- Keys should ideally be removed or disabled whereever possible
    - Assign RBAC roles with the required data plane permissions instead.
    - For greenfield development – disable all keys for PaaS services by default

Access keys and Action roles



- How many keys or «Action-centric» role assignments are required for your managed identities and developers?
- Including preview functionality – 0 Action-centric roles, 1 or 0 keys (app insights connection string from frontend)

Least privilege for the API

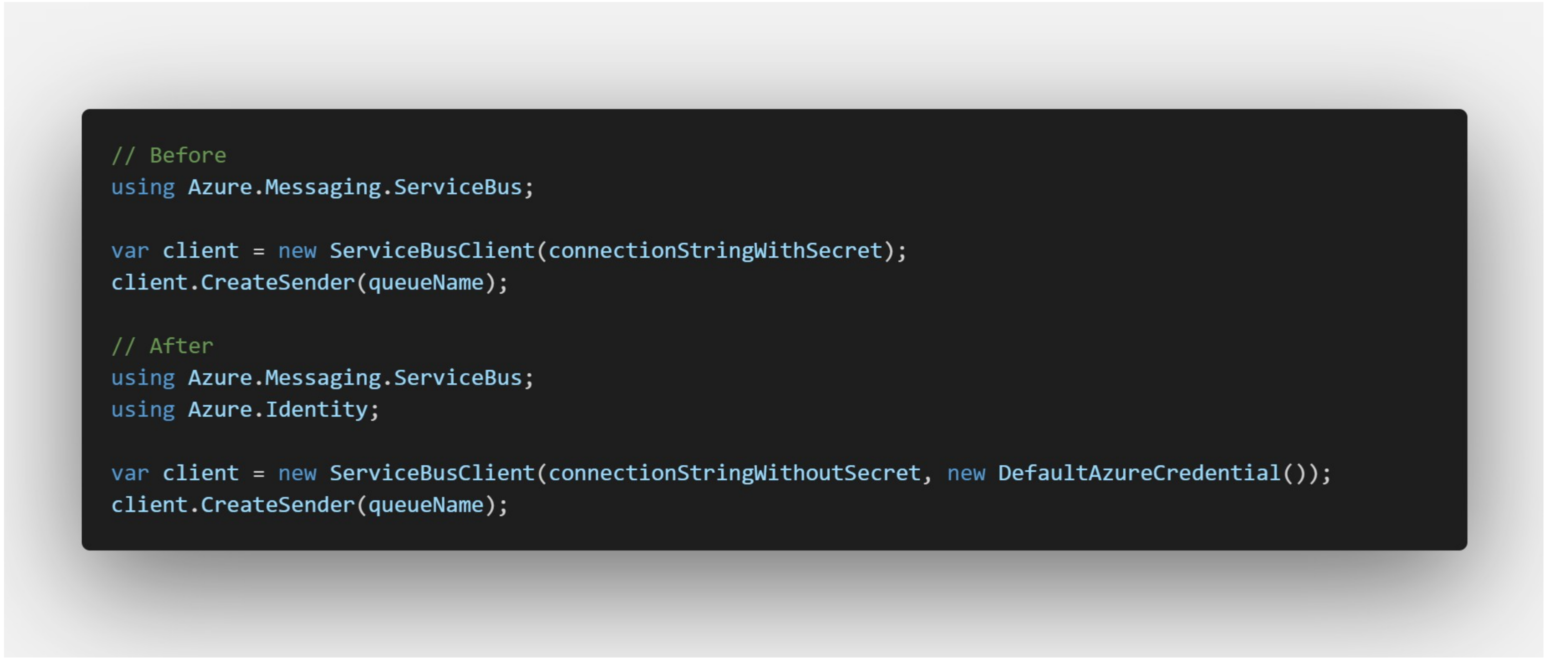
Azure RBAC roles

- Storage Blob Data Contributor / Reader
- Monitoring Metrics Publisher (preview in SDK versions)
- Key Vault Secrets User
- App Configuration Data Reader

- Special roles
  - SQL database
    - "CREATE USER [my-app-name] FROM EXTERNAL PROVIDER; ALTER ROLE(..)»
    - Also possible to grant Entra admin at server level if feeling frisky..
  - Redis cache - (preview) «Data Contributor» or custom access policy

DefaultAzureCredential

- Typically you only need to change this part of your app code
    - This exact example requires .NET 6 or higher



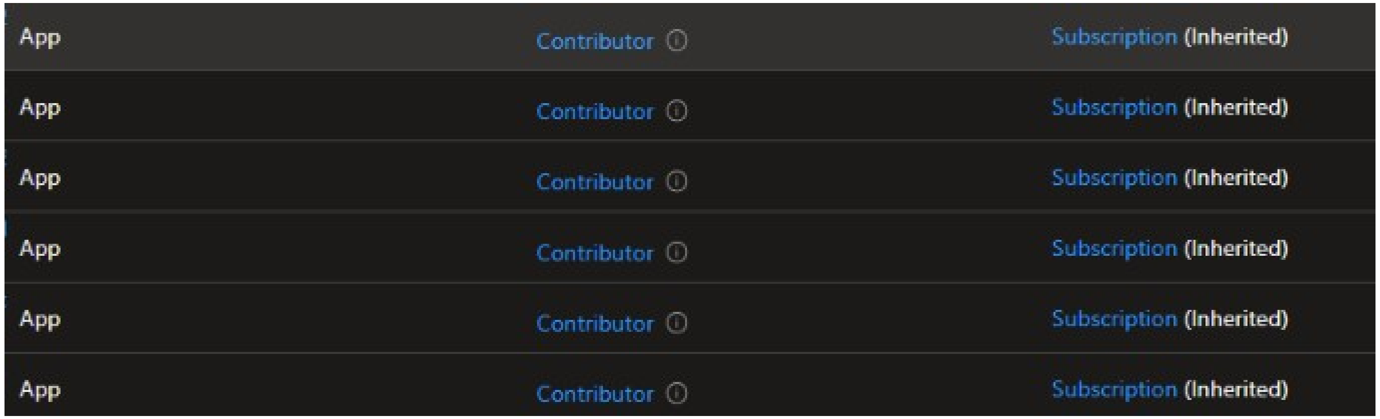
```
// Before
using Azure.Messaging.ServiceBus;

var client = new ServiceBusClient(connectionStringWithSecret);
client.CreateSender(queueName);

// After
using Azure.Messaging.ServiceBus;
using Azure.Identity;

var client = new ServiceBusClient(connectionStringWithoutSecret, new DefaultAzureCredential());
client.CreateSender(queueName);
```

OIDC

- DefaultAzureCredential
  - ManagedIdentityCredential
  - WorkloadIdentityCredential
  - AzureCliCredential
- Workload Identity
  - Kubernetes, Github, Azure DevOps ++
- Same principle can work against other Microsoft services
  - Microsoft Graph

Azure DevOps service connections…

- Check if your Sub / RG IAM looks something like this
  - This can now easily be improved via a few clicks
  - Also consider manual assignment to reduce the permissions



App	Contributor ⓘ	Subscription (Inherited)
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Practical implementation

- Strongly consider IaC + Git to make this manageable!
- Grant needed roles access to groups and managed identities only
- Inform your developers how to deal with this
- Disable all keys / passwords whereever possible

- Suggested role assignments
  - Entra ID groups with users
    - create two baseline «platform level» custom roles, assign to RG/Sub
    - Or Assign every role assignment needed to the group
    - In production – consider PIM for Azure resources / PIM for groups
  - Managed identity / Entra ID group with identities
    - Assign every role assignment needed to the group

Questions regarding part 1?

New ABAC possibilities

- Reducing scope of Owner / User Access Administrator roles
- The problem with delegating user access is limiting which principals and which roles can be assigned
- In preview – great improvements on limiting this
- Working Terraform code
  - https://github.com/solomno/sharing/tree/main/terraform/rbac
- Quick demo..

Questions regarding ABAC?

DenyAction Azure policies

- Up to this point we have looked at reducing permissions
- In the end, some admins will still need privileged access to resources
- How to deal with this

DenyAction Azure policies

- Resource locks
  - Inheritance based
  - Can be bothersome on nested objects
  - Only works on resources which support location and tags
  - Locks can be removed by Owners / User Access Administrators
  - Protection against resource moves(?)

DenyAction Azure policies

- DenyAction effect Azure policies
  - Supported on non-indexed objects
  - Works better with nested objects
  - Can only be removed by adjusting central policy
  - Does not care what IAM role you are assigned
  - Can be used in conjunction with resource locks to fill the gaps

DenyAction Azure policies

- Recommended
  - Protect resources which should rarely, if ever be deleted
    - Azure DNS Zones
    - Azure Firewall
    - Container Registry
    - VWAN / Hub
    - WAF
    - Public IPs at specific scopes
    - **LTR SQL backups**
    - And more..
  - Sample policy

Questions regarding DenyActions?

Thank you for attending!

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