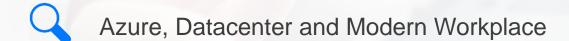


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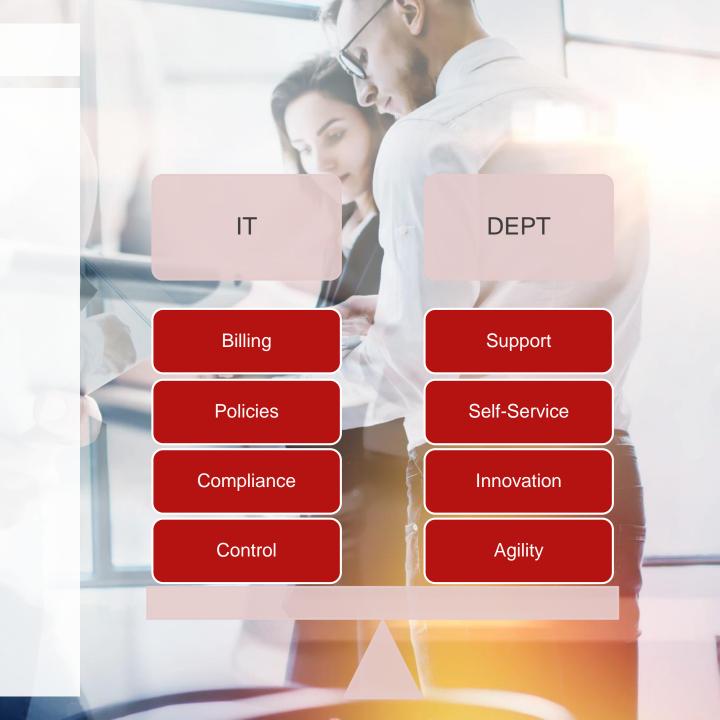
#### **Cloud Governance**

**ESTABLISHMENT** of **POLICIES** and continuous **MONITORING** of their proper **IMPLEMENTATION**, by the members of the governing body of an organization

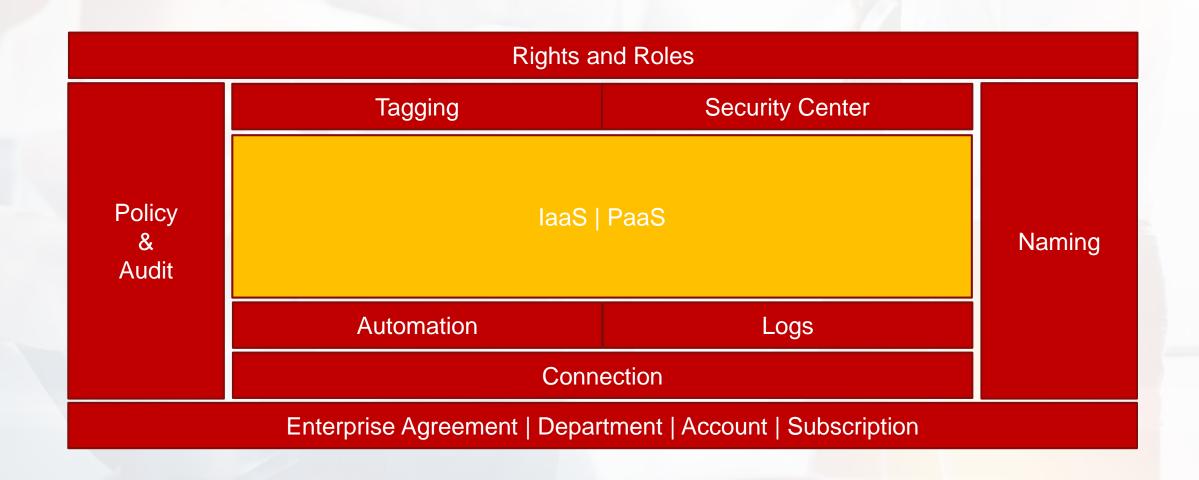
Source: www.businessdictionary.com

### Requirements

- Cloud is (not) an IT topic
- Cloud usage is already there
- IT as trusted advisor in business
- Avoid shadow cloud
- Achieve more with business



### **Azure Governance**



### **Azure Security & Management**



Governance NEW

Proactively apply policies and optimize cloud spend



Security

Industry leading
Security with Advanced
Threat Protection



Resiliency

High availability and protection for VMs, apps and data



Monitoring

Deep operational insights with rich intelligence



**Automate** 

Powerful scripting, configuration and update management

Built-in Azure services options to keep your Azure and hybrid resources secure and well-managed

### **Azure Governance Capabilities**



#### **Policy**

Real-time enforcement, compliance assessment and remediation

Control



#### **Blueprints**

Deploy and update cloud environments in a repeatable manner using composable artifacts

**Environment** 



#### **Resource Graph**

Query, explore & analyze cloud resources at scale

Visibility



#### **Management Group**

Define organizational hierarchy

Hierarchy

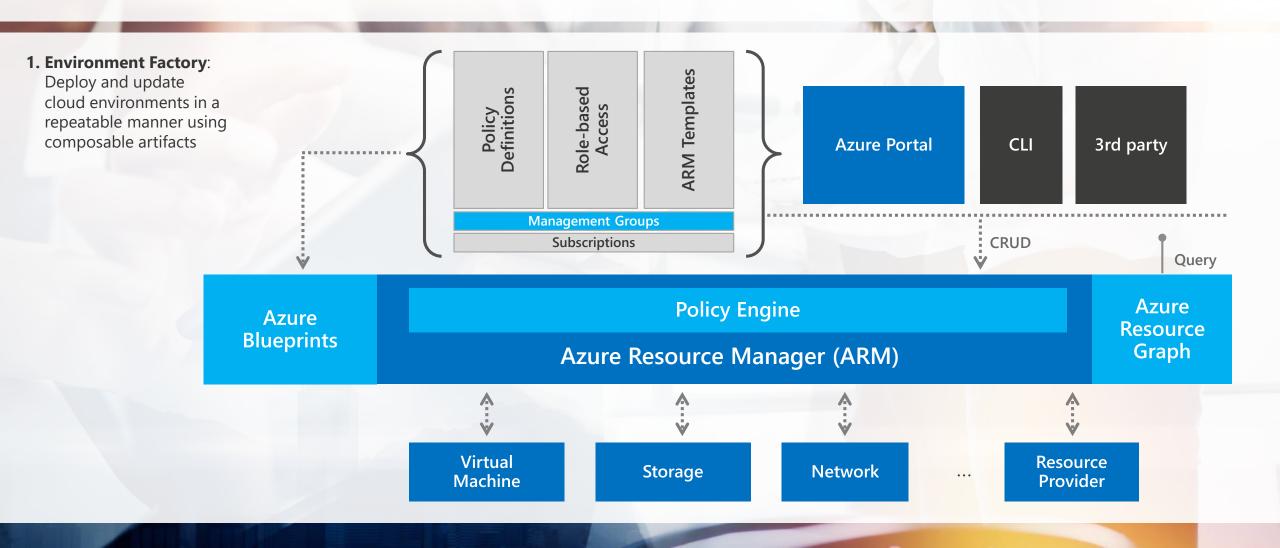


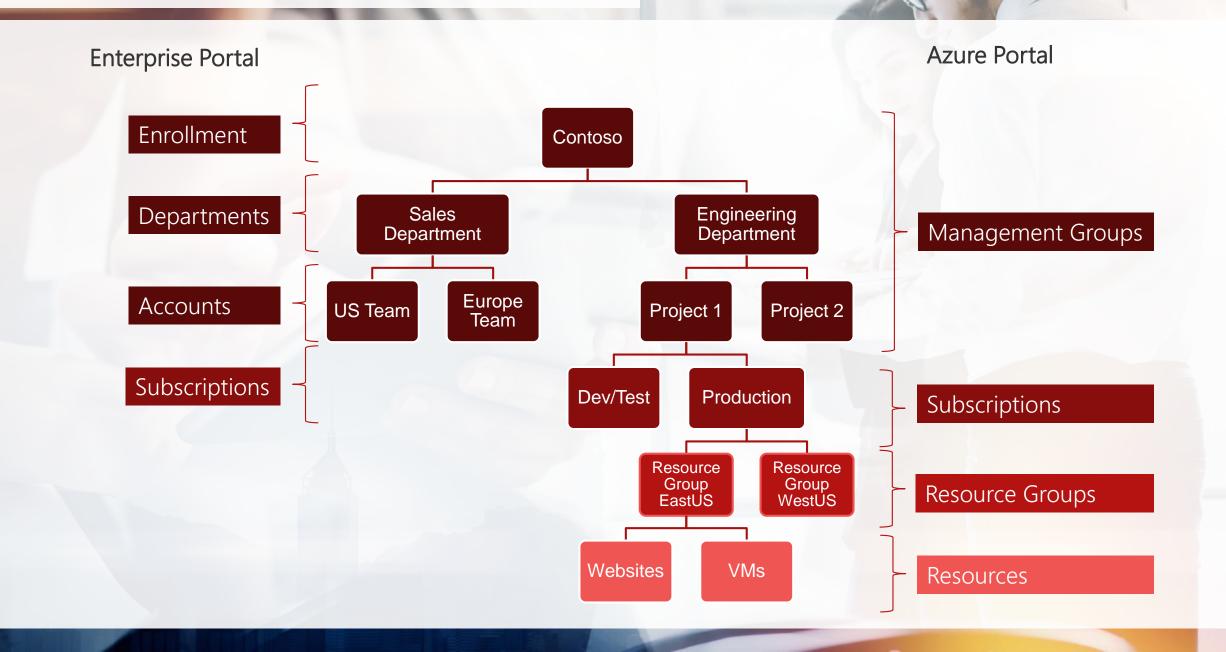
#### Cost

Monitor cloud spend and optimize resources

Consumption

### **Azure Governance Architecture**







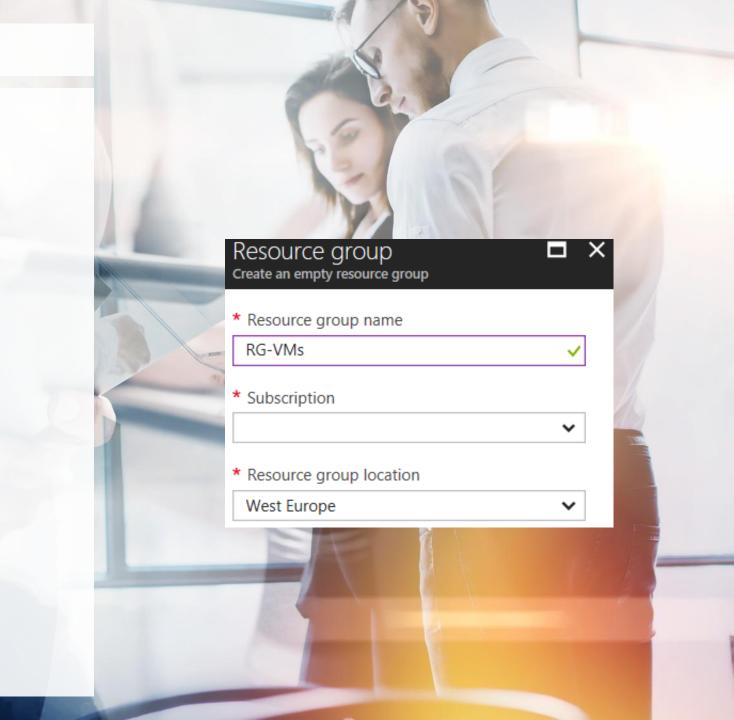
"It is good to collect things, but it is better to go on walks."

- Anatole France



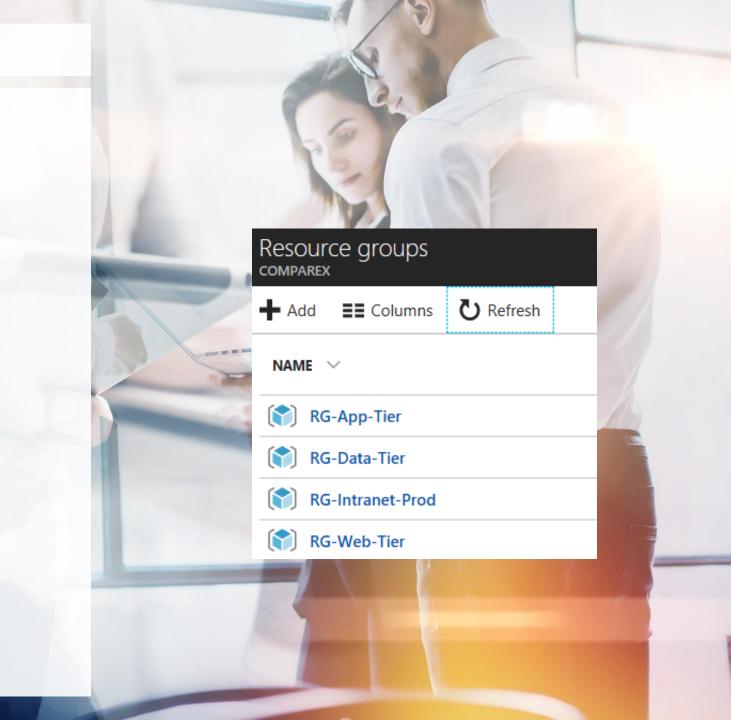
### **Resource Group**

- RGs = container for resources
- Every resource is member of a RG
- Every resource has only one RG
- RGs cannot be encapsulated
- RGs stick to a region



### **Resource Group**

- Decide when to create a RG
- Traditional
  - Same lifecycle
  - APP-Management
- Agile
  - Deployment-Layer
  - Web, App, DB
- Decide and stick through





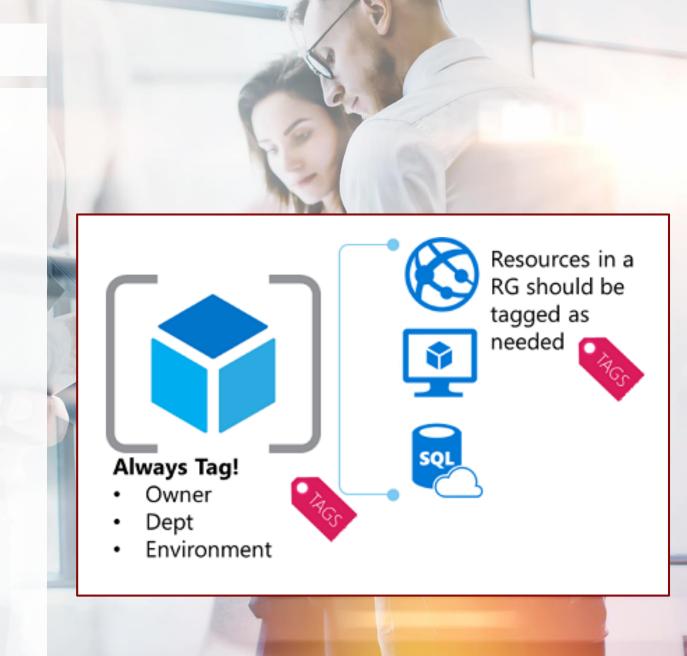
# **Resource Tags**

- Billing in Azure difficult
- List of resource cost

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### **Resource Tags**

- Property : Value
- Tags help to assign cost / responsibility
- Always tag RGs
  - Owner
  - Department
  - Environment
- Other ressources as required
- Tags are your friends!
- Define tags in advance!
- Tag in Template!



# **Resource Policies**

"You are remembered for the rules you break."

- Douglas MacArthur



### **Azure Policy**



- 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

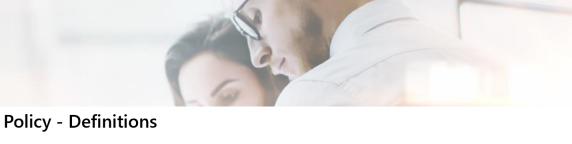


- Real time remediation
- Remediation on existing resources (NEW)

Remediation

#### **Resource Policies**

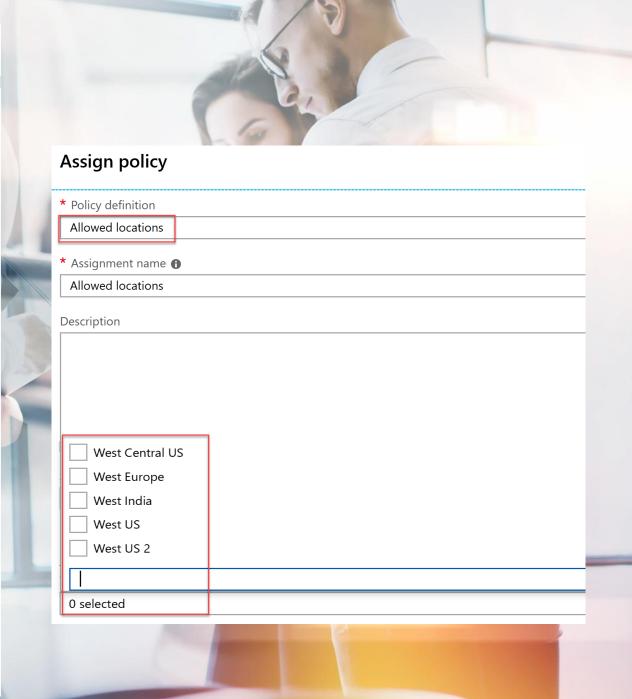
- Set of rules for Subscriptions or RGs
- Policy is the Allow System
- If-then conditions
- Created via JSON
- Actions:
  - Deny
  - Audit
  - Append



#### **«** + Initiative definition Policy definition Search (Ctrl+/) Scope Definition type Overview COMPAREX - Micros... Policy Getting started Compliance NAME **DEFINITION LOCA** Remediation [Preview]: Audit that Linux VMs d... Authoring [Preview]: Deploy VM extension t... Assignments Allowed locations Definitions Allowed locations for resource gr... Blueprints Allowed resource types Blueprints (preview) Allowed storage account SKUs Resources Allowed virtual machine SKUs Resource Graph (preview) Not allowed resource types Privacy User privacy

#### **Resource Policies**

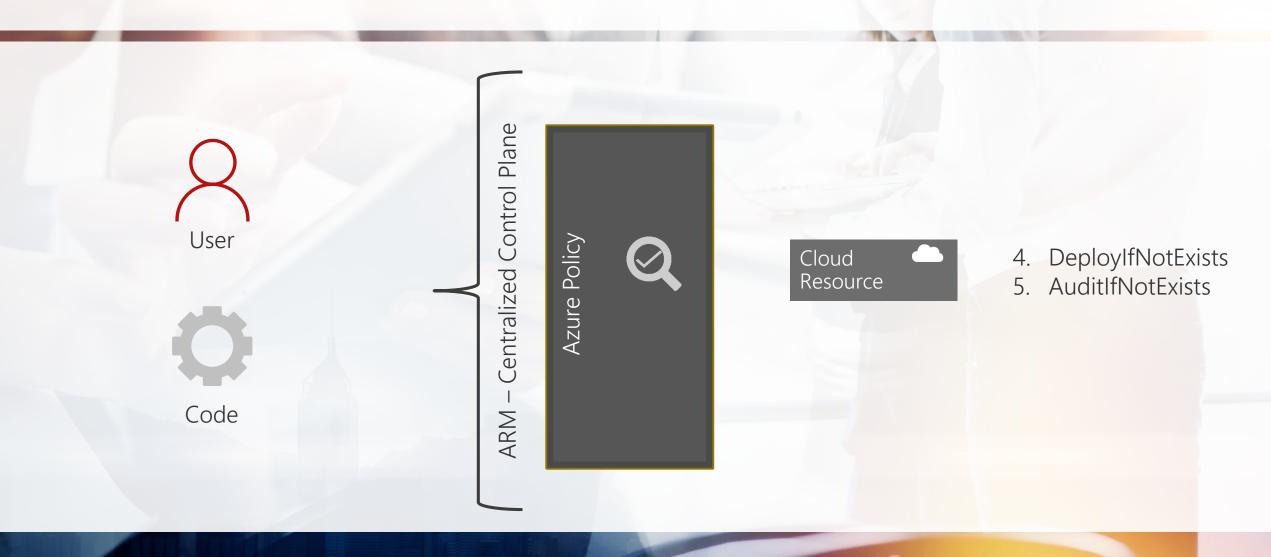
- Define Subscription Policies for:
  - Geo-compliance/data sovereignty
  - Cost management
  - Required tags
- Audit Activities and Log them
- Use Log Analytics



### How does the processing work?



### How does the processing work?

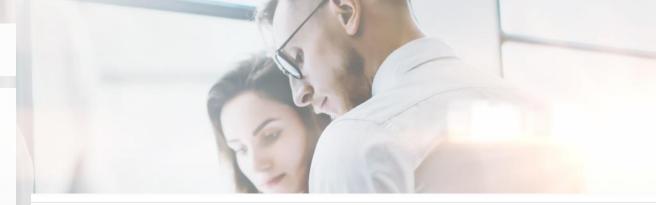


### **Policy limits**

- 100 Policy Definitions per Scope
- 100 Policy Set Definitions per Scope
- 1000 Policy Set Definitions per Tenant
- 100 Policy Definition references per policySetDefinition
- 100 Policy Assignments per scope
- 10 notScopes per policyAssignment

#### **Resource Graph (Preview)**

- Query opportunity for resources based on a Query language
- Evaluation of the scope of the use of a policy
- Examples of queries would be:
  - Counting Azure Resources
  - Listing all resources sorted by name
  - List the resources that consume storage
  - Listing resources with a specific day
  - List of all public IP addresses
  - List of all tags





#### Welcome to Azure Resource Graph PREVIEW

Azure Resource Graph preview enables you to get full visibility into your environments by providing high performance and powerful querying capability across all your resources.

Azure Resource Graph Overview ☑ Report an issue or provide feedback

#### Experience the power of Resource Graph Preview

- 1. Resource Graph powers the new 'All resources' browse experience. It has easy to use filtering and search tools. Visit the new 'All Resources' page now or 'opt-in' to join the preview by clicking 'All resources' from portal settings.
- 2. Cloud Shell also provides extensive access to Resource Graph and it's flexible query language. Launch Cloud Shell with Resource Graph 🗵 .

#### Launch Cloud Shell

Azure Resource Graph can be queried through Azure Cloud Shell. Launch Cloud Shell and try out some queries from the samples below. For more query samples, check out this page 2 . To learn more about the query language, see this documentation 2.

If you need assistance authoring queries for your specific scenario, contact us by submitting your scenario in the Portal Feedback. Please check the 'Microsoft can email you about your feedback' so we can reach out to assist and support.



#### Run through some examples

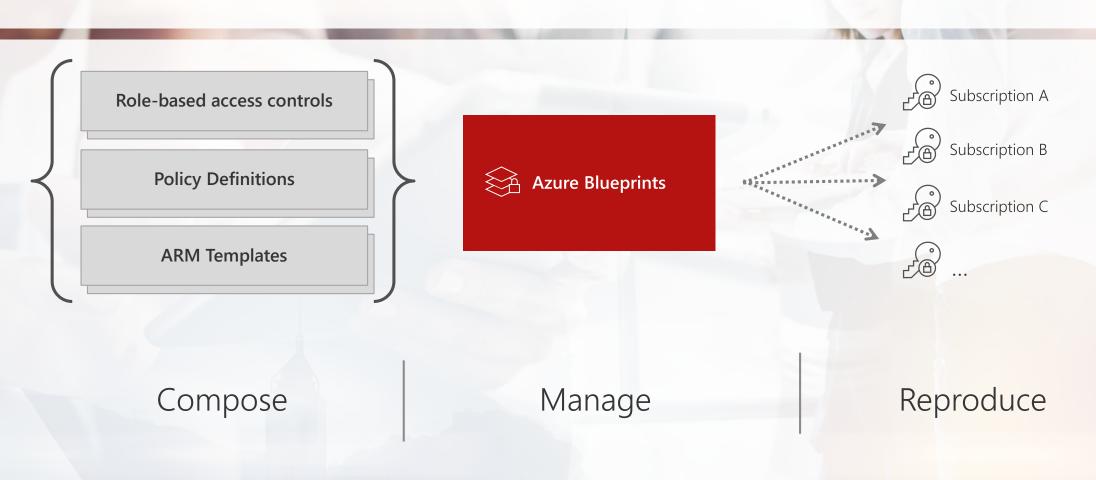
Enable the extension (Bash) or module (PowerShell) and then run your first query:



Run your first Azure Resource Graph query by using the "graph" extension and the "query" command and count all resources in your environment. Please note that all



### **Azure Blueprints**



# **Resource Locks**

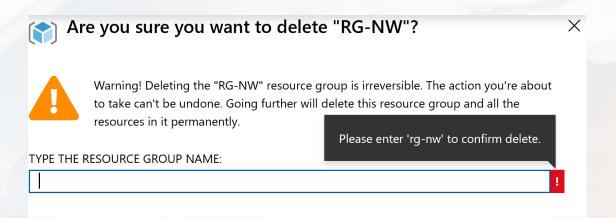
"I guess what scares me the most now is the thought that I won't be able to protect you"

- Julia Hoban



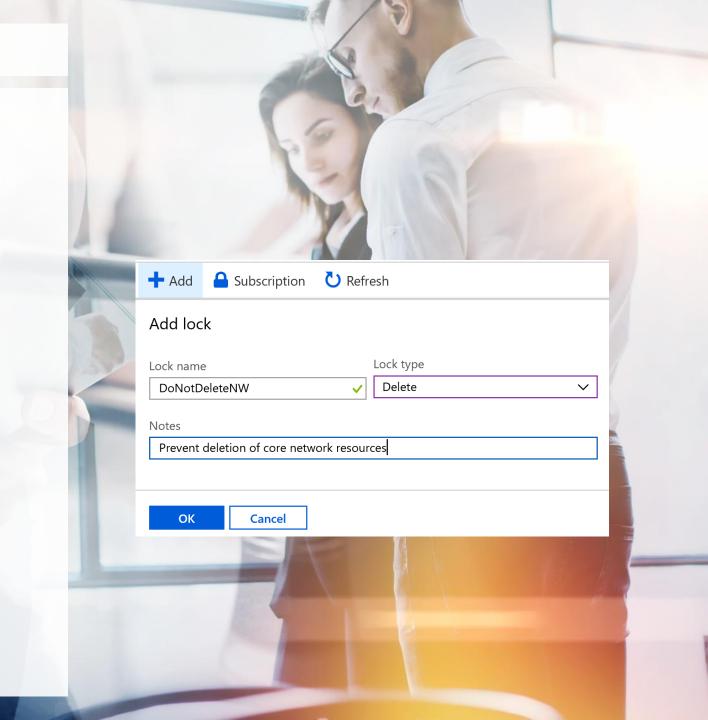
#### **Resource Locks**

- Resources in Azure can be deleted easy
- Protection from Accidental Deletion
- Known from Active Directory



#### **Resource Locks**

- Restrict resource access:
  - CanNotDelete
  - ReadOnly (ATTENTION)
- Set by Owner and User Access Admin
- JSON: { "properties": { "level": "CanNotDelete", "notes": "Optional text notes." } }
- PowerShell: Set-AzureRmResourceLock
- Locks protect!
- Define locks in advance!
- Locks in Template!



# Role-Based Access Control

"Anything out there is vulnerable to attack given enough time and resources."

- Kevin Mitnick



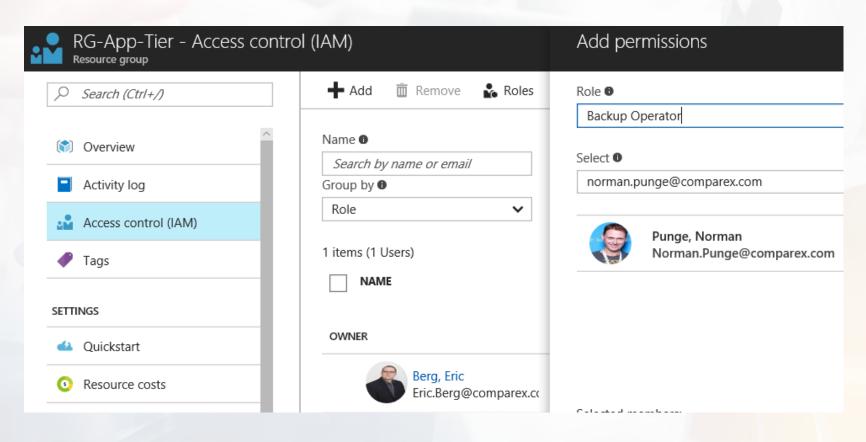
### **Role Based Access Control**

- Connection between Azure AD and Subscription
- Default roles depend on
  - Owner
  - Contributor
  - Reader
- Advanced Roles
  - Automation Operator
  - DevTest Labs User
  - •
- Own roles



### **RBAC**

IAM can be set at all levels



### **Role Based Access Control – assigning rights**

Users in local Active Directory

Nesting in Active Directory global security group

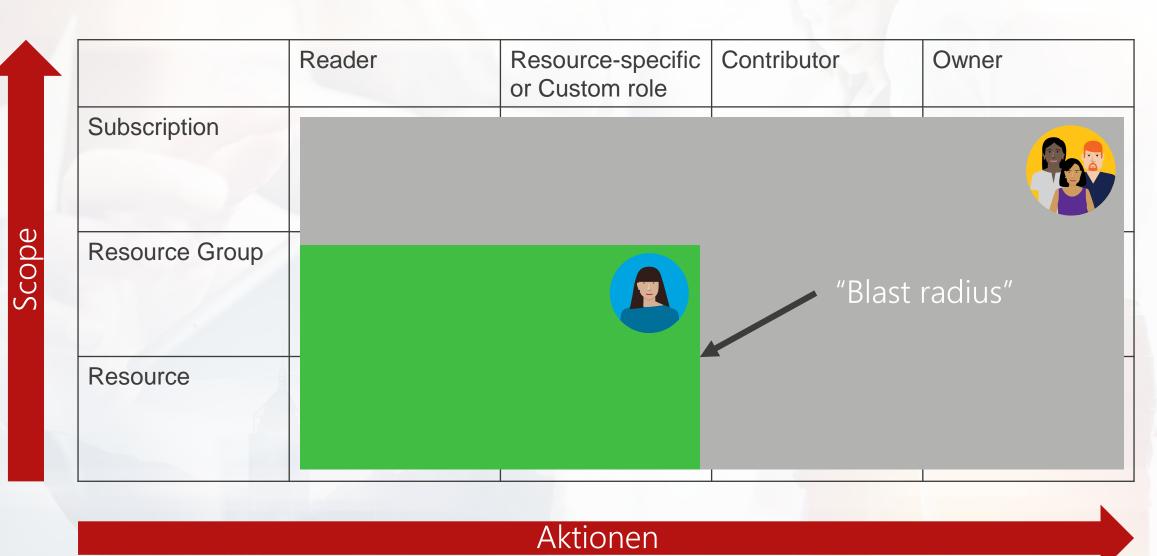
Synchronisation in Azure Active Directory

Scope rights are granted through the role

Assigning the role to a scope

Nesting the Active Directory group in the role

### Role Based Access Control – Blast Radius

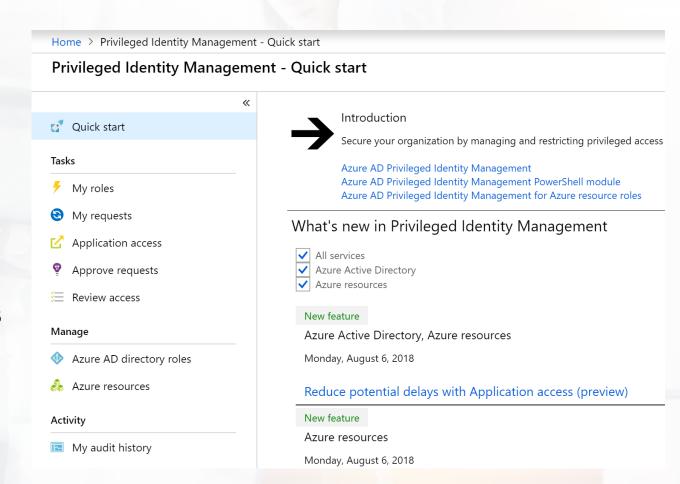


# Role Based Access Control – Least Privilege Prinzip

	Reader	Resource-specific or Custom role	Contributor	Owner						
Subscription  Resource Group	Observers	People who subsc	Emergency account (like Domain Admin							
Resource	Account for debugging or special services account for individual systems									

### **Azure AD Privileged Identity Management**

- Used to monitor highly privileged accounts
- Just in Time Access for Azure VMs
- Access goes off automatically
- Assigning temporary rights for special tasks
- Generating alerts when assigning rights to new or other resources than usual
- Generation of alarms when permanent rights are set for specific resources



# **Naming Conventions**

"Fear of a name increases fear of the thing itself."

- J. K. Rowling



#### **Azure Governance**

#### **Names**

- All ressources require names
  - NIC
  - Public IP
  - NSG
- Naming conventions in Azure per resource
- Prefixes or suffixes help



usage>



### **Employee Organizational Change and Operations**

- Transformation of organization, tied to DevOps
  - Increased multi-skill frameworks

Teams

Emphasis on code, repeatability, automation

Traditional IT Organization

Windows Linux Team Storage Team Team Network Management Security Team Team Team **ITSM** Virtualization Automation **Identity Team** Team Team **Business Unit** Architecture **Application Team** 

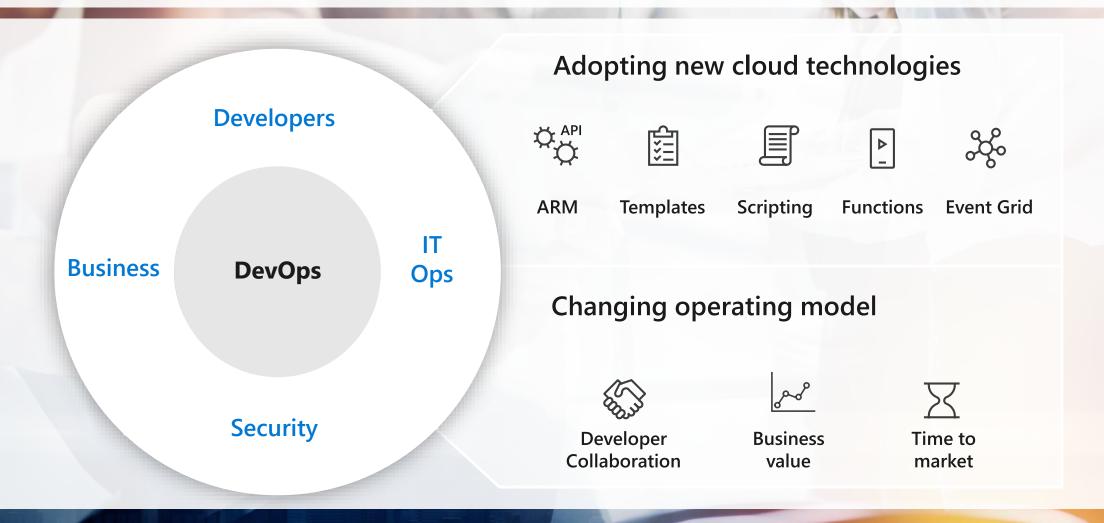
Modern IT Organization

Corporate Cloud Architecture & Operations

Application DevOps Teams

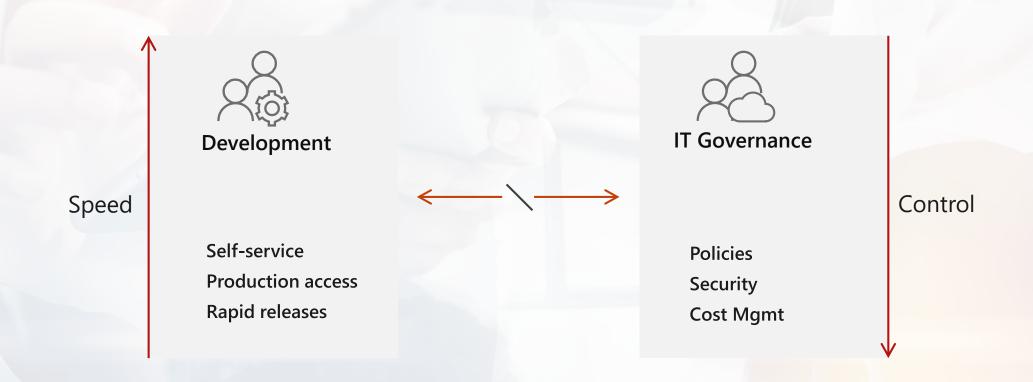
Security

### IT skills need an update



# Traditional approach needs rethinking

Speed <u>versus</u> Control



Speed

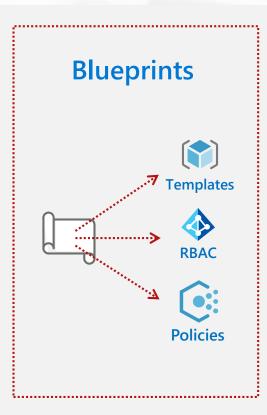
#### **Built-in modern governance**

Speed and Control

Development

Policies
Mgmt as code

Agile Development



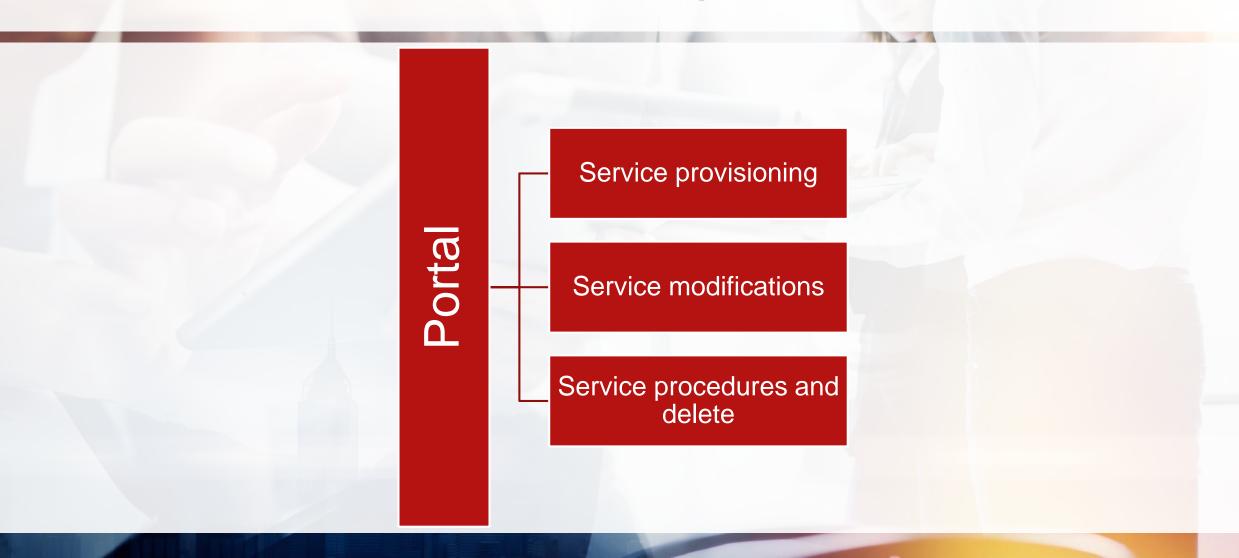




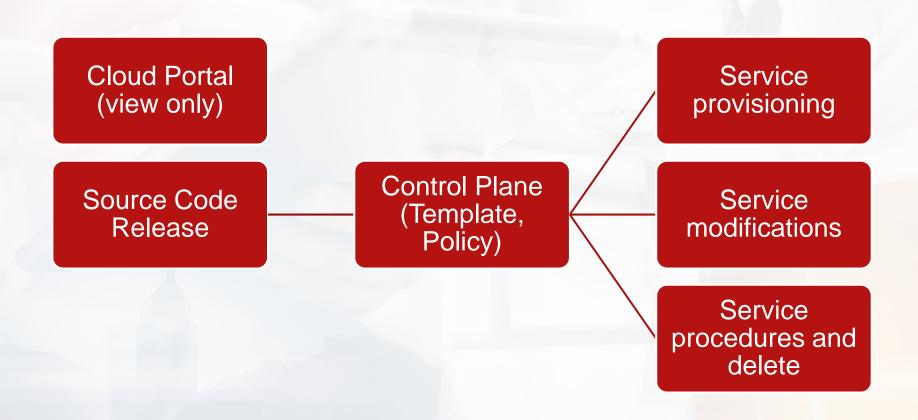
Policies
Security
Cost Control

Control

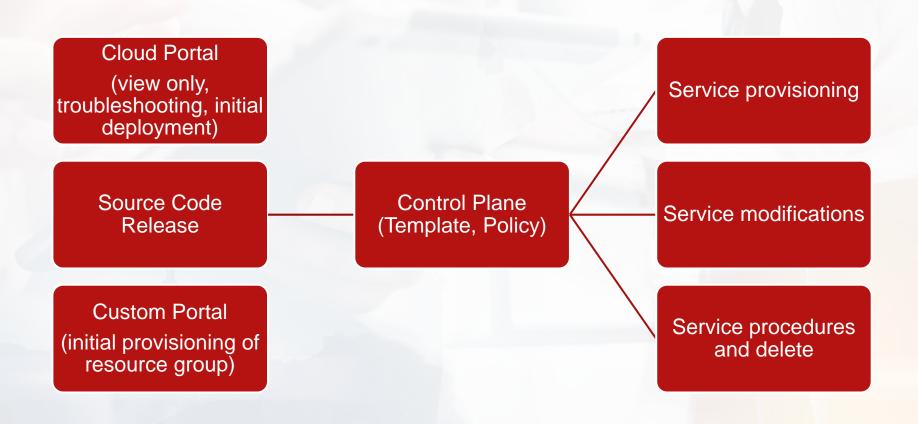
# **Bad Assumption**



#### **Goal Destination**

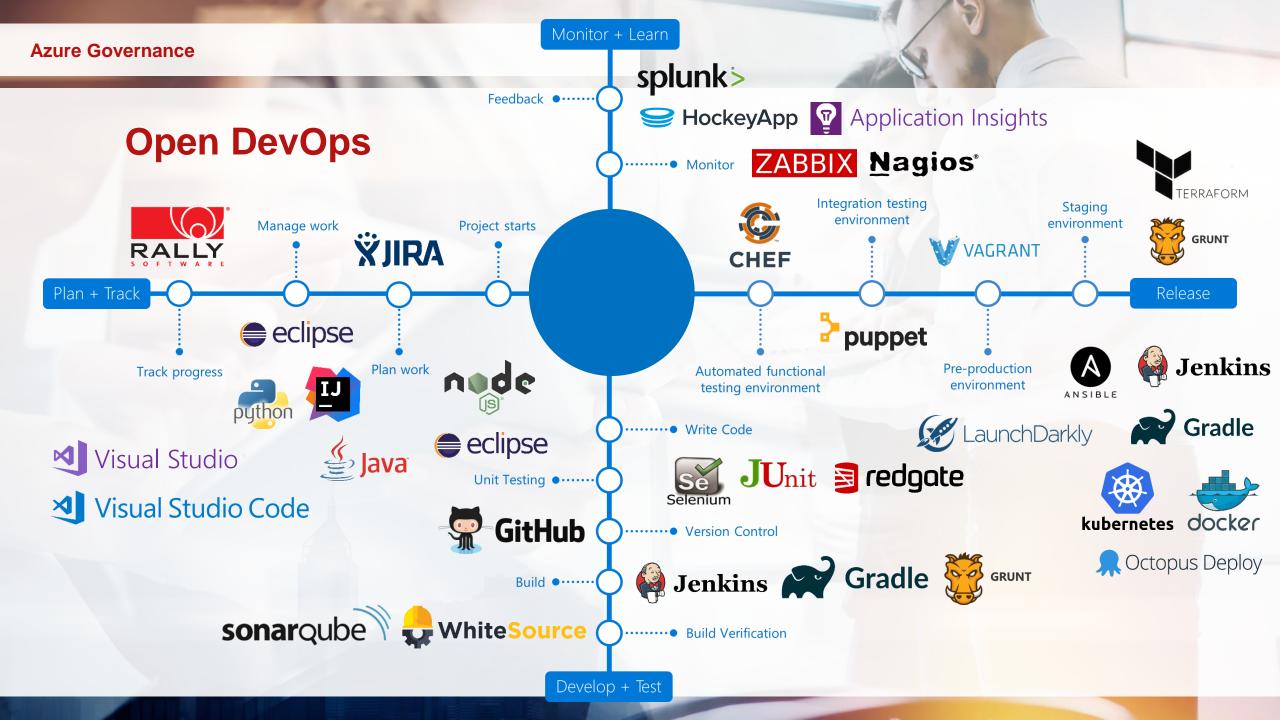


### **Stepping Stone**



#### **Corp Infrastructure as Code**

- Assume Re-Deployability, DevOps at every level
  - The Corp IT infrastructure is code too, store it in a code repository
  - Build based on release management pipeline
- Build a Corp-Infrastructure release management pipeline
  - Azure DevOps, Ansible, Chef, Puppet
  - Technology doesn't matter, approach does
- Use Native Providers
  - Terraform for Multi-Cloud Management (as far as integrated) (Corp)
  - JSON for Cloud specifics (App)



#### **Optimized Model**

Monitor: Applnsights / Azure Monitor

Release: JSON / Terraform / DSC / Chef

Develop: Git / TFS / BitBucket

Plan: JIRA / Azure DevOps