

Cost management of Azure

Describe factors that can affect cost in Azure

OpEx cost can be impacted by many factors. Some of the impacting factors are:

- Resource type
- Consumption
- Maintenance
- Geography
- Subscription type
- Azure Marketplaces

Pricing and Total Cost of Ownership :

- **Pricing Calculator =** The pricing calculator is designed to give you an estimated cost for provisioning resources in Azure.
- **TCO calculator** = The TCO calculator is designed to help you compare the costs for running an on-premises infrastructure compared to an Azure Cloud infrastructure.

Describe Azure Cost management tool :

Cost Management provides the ability to quickly check Azure resource costs, create alerts based on resource spend, and create budgets that can be used to automate management of resources.

Cost alerts = Cost alerts provide a single location to quickly check on all of the different alert types that may show up in the Cost Management service. They are :

- Budget alerts
- Credit alerts
- Department spending quota alerts

Describe the purpose of tags :

One way to organize related resources is to place them in their own subscriptions. You can also use resource groups to manage related resources. Resource tags are another way to organize resources. Tags provide extra information, or metadata, about your resources.

- This metadata is useful for :
 - Resource management, cost management and optimization, operations management, security, governance and regulatory compliance, workload optimization and automation.

- **How to manage resource tags ?**
 - through Windows PowerShell, the Azure CLI, Azure Resource Manager templates, the REST API, or the Azure portal.
 - You can require that certain tags are to newly provisioned resources
 - Define rules that reapply tags that have been removed.
 - Tags aren't inherited

Describe features and tools in Azure Governance

Describe the purpose of Azure blueprint

Azure Blueprints lets you standardize cloud subscription or environment deployments. Instead of having to configure features like Azure Policy for each new subscription, with Azure Blueprints you can define repeatable settings and policies that are applied as new subscriptions are created.

- **What are Artifacts ?** each component in the blueprint definition is known as Artifact.

Azure Blueprints deploy a new environment based on all of the requirements, settings, and configurations of the associated artifacts. Artifacts can include things such as:

- Role assignments
- Policy assignments
- Azure Resource Manager templates
- Resource groups

Azure Blueprints are version-able, allowing you to create an initial configuration and then make updates later on and assign a new version to the update. With versioning, you can make small updates and keep track of which deployments used which configuration set.

Describe purpose of Azure Policy :

- Azure Policy is a service in Azure that enables you to create, assign, and manage policies that control or audit your resources. These policies enforce different rules across your resource configurations so that those configurations stay compliant with corporate standards.
- Azure Policy enables you to define both individual policies and groups of related policies, known as initiatives. Azure Policy evaluates your resources and highlights resources that aren't compliant with the policies you've created. Azure Policy can also prevent noncompliant resources from being created.

- Azure Policies can be set at each level, enabling you to set policies on a specific resource, resource group, subscription, and so on.
- Azure Policies are inherited.
- **Azure Policy initiatives** = is a way of grouping related policies together.
- Azure Policy includes an initiative named Enable **Monitoring in Azure Security Center**. Its goal is to monitor all available security recommendations for all Azure resource types in Azure Security Center. It contains over 100 separate policy definitions :
 - o Monitor unencrypted SQL Database in Security Center.
 - o Monitor OS vulnerabilities in Security Center.
 - o Monitor missing Endpoint Protection in Security Center.

Describe the purpose of resource locks :

A resource lock prevents a resource from being accidentally deleted or changed.

Even with Azure role-based access control (Azure RBAC) policies in place, there's still a risk that people with the right level of access could delete critical cloud resources. Resource locks prevent resources from being deleted or updated, depending on the type of lock. Resource locks can be applied to individual resources, resource groups, or even an entire subscription. Resource locks are inherited, meaning that if you place a resource lock on a resource group, all of the resources within the resource group will also have the resource lock applied.

- **Types of resource locks**

- o ***Prevent users from deleting*** = means authorized users can still read and modify a resource, but they can't delete the resource.
- o ***Prevent users from changing*** = means authorized users can read a resource, but they can't delete or update the resource. Applying this lock is similar to restricting all authorized users to the permissions granted by the Reader role.
- Even if you're an owner of the resource, you must still remove the lock before you can perform the blocked activity.

Describe the purpose of the Service Trust Portal :

The Microsoft Service Trust Portal is a portal that provides access to various content, tools, and other resources about Microsoft security, privacy, and compliance practices.

The Service Trust Portal contains details about Microsoft's implementation of controls and processes that protect our cloud services and the customer data therein.

Describe features and tools for managing and deploying Azure resources

Describe tools for interacting with Azure :

- Azure Portal : The Azure portal is a web-based, unified console that provides an alternative to command-line tools. With the Azure portal, you can manage your Azure subscription by using a graphical user interface.
- Azure cloud Shell : Azure Cloud Shell is a browser-based shell tool that allows you to create, configure, and manage Azure resources using a shell.
 - o support Azure PowerShell
 - o support the Azure Command Line Interface (CLI), which is a Bash shell.
- Azure Powershell : Azure PowerShell is a shell with which developers, DevOps, and IT professionals can run commands called command-lets (cmdlets). These commands call the Azure REST API to perform management tasks in Azure.
- Azure CLI : The Azure CLI is functionally equivalent to Azure PowerShell, with the primary difference being the syntax of commands. While Azure PowerShell uses PowerShell commands, the Azure CLI uses Bash commands.

Describe the purpose of Azure Arc :

- **Azure Arc** lets you manage your Azure, on-premises, and multi-cloud environments. Azure Arc simplifies governance and management by delivering a consistent multi-cloud and on-premises management platform.
 - o Manage your entire environment together by projecting your existing non-Azure resources into ARM.
 - o Manage multi-cloud and hybrid virtual machines, Kubernetes clusters, and databases as if they are running in Azure.
 - o Use familiar Azure services and management capabilities, regardless of where they live.
 - o Continue using traditional ITOps while introducing DevOps practices to support new cloud and native patterns in your environment.
 - o Configure custom locations as an abstraction layer on top of Azure Arc-enabled Kubernetes clusters and cluster extensions.
- **What can Azure Arc do outside of Azure ?** = allows you to manage the following resource types
 - o Servers
 - o Kubernetes clusters
 - o Azure data services
 - o SQL Server
 - o machines (preview)

Describe Azure Resource Manager and Azure ARM templates :

Azure Resource Manager (ARM) is the deployment and management service for Azure. It provides a management layer that enables you to create, update, and delete resources in your Azure account. Anytime you do anything with your Azure resources, ARM is involved.

Benefits of ARM :

- Manage your infrastructure through declarative templates rather than scripts. A Resource Manager template is a JSON file that defines what you want to deploy to Azure.
 - Deploy, manage, and monitor all the resources for your solution as a group, rather than handling these resources individually.
 - Re-deploy your solution throughout the development life-cycle and have confidence your resources are deployed in a consistent state.
 - Define the dependencies between resources, so they're deployed in the correct order.
 - Apply access control to all services because RBAC is natively integrated into the management platform.
 - Apply tags to resources to logically organize all the resources in your subscription.
 - Clarify your organization's billing by viewing costs for a group of resources that share the same tag.
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- **ARM templates** : Infrastructure as code is a concept where you manage your infrastructure as lines of code. Leveraging Azure Cloud Shell, Azure PowerShell, or the Azure CLI are some examples of using code to deploy cloud infrastructure. ARM templates are another example of infrastructure as code at work.
 - **Azure blueprint + ARM template = lets you build infra as code**

Describe Monitoring tools in Azure

Describe the purpose of Azure advisor :

Azure Advisor evaluates your Azure resources and makes recommendations to help improve reliability, security, and performance, achieve operational excellence, and reduce costs. Azure Advisor is designed to help you save time on cloud optimization.

- Recommendations are divided into 5 categories :
 - o Reliability
 - o Security
 - o Performance
 - o Operational Excellence
 - o Cost

Describe Azure Service Health :

Microsoft Azure provides a global cloud solution to help you manage your infrastructure needs, reach your customers, innovate, and adapt rapidly. Knowing the status of the global Azure infrastructure and your individual resources could seem like a daunting task. Azure Service Health helps you keep track of Azure resource, both your specifically deployed resources and the overall status of Azure.

It combines three different services for this purpose :

- Azure status
- Service Health
- Resource Health

By using Azure status, Service health, and Resource health, Azure Service Health gives you a complete view of your Azure environment-all the way from the global status of Azure services and regions down to specific resources.

Describe Azure monitor :

Azure Monitor is a platform for collecting data on your resources, analyzing that data, visualizing the information, and even acting on the results. Azure Monitor can monitor Azure resources, your on-premises resources, and even multi-cloud resources like virtual machines hosted with a different cloud provider.

