



Azure cost control

A pragmatic perspective



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Introduction

Migrating to the cloud can be cost effective, but, if not carefully done, it can also be a huge cost driver. Using a pragmatic approach to identify, continuously monitor and actively manage the costs of Azure consumption will help organizations keep costs from spiralling out of control.

Professionals that have the biggest stake in driving and controlling Azure costs within your organization (for example: finance managers, IT service managers & Azure architects) will benefit the most from reading this pragmatic perspective on Azure cost control.

The contents below are based on our experiences with a multitude of clients struggling with designing, administrating and monitoring Azure costs while minimizing the Total Cost of Ownership (TCO).

A pragmatic approach to Azure cost control must start by identifying the key challenges in steering Azure costs. Such challenges are mainly related to the complexities involved in the different dimension of the Azure cost model. Part of this cost model are key design principles, such as:

- regional availability & failover requirements;
- storage capacity & throughput;
- services and resources required;
- levels in which apps are polling;
- cost on data ingress but most of all data egress.

Such complexities also increase due to difficulties regarding predictability and transparency/visibility of the cost origins (e.g., PowerBI for R&D) and cost types (e.g., yearly license costs). A cost origin is the reason why costs were incurred, while a cost type is the category the costs belong to.

Another key aspect of pragmatically approaching Azure cost control is to align the Azure cost control approach with a clear Azure cloud strategy & design. Therefore, it is advised to map your strategy and design in such a way that

there is a direct link between design choices, cost origins and cost types.

During the course of this article we will first describe some of the business challenges, common pitfalls and architectural elements that we encountered at clients and which we learned have a big impact on Azure costs. We will then describe our five-step pragmatic approach to Azure cost control, which is based on the Plan-Do-Check-Act (PDCA) management cycle. Using these findings will help you to control costs effectively throughout the several phases of your Azure cloud transformation: from strategy to design to utilisation and, finally, to cost accounting in your ERP system.



Business challenges & common pitfalls

In the past five years organizations have moved to some extent to the Azure cloud and therefore have started utilizing a multitude of Azure resources. They usually start with minimal usage of Azure by shifting storage to the cloud and utilizing some Azure-based SAAS applications. In this limited model of the cloud paradigm, costs were sufficiently predictable and transparent. Slowly but surely organizations have added new services to their Azure environment, because this was easy and quick to realize. Without a proper overall design for cost management, costs quickly become high, unpredictable and fuzzy in a sense that they become difficult to properly allocate, which enhances the issue of control. With that in mind it is clear that key business challenges in dealing with Azure costs are spread throughout organizations, as multiple departments and functions deal with them in different ways.

The demand side of Azure services within organizations is characterized by business functions including ERP/Cloud architects, Application Services, Finance and Supply Chain managers, and CRM and SRM managers. All these functions continuously request more agility, flexibility and functionality to support their processes, which creates a necessity for leveraging Azure resources, apps and levels of integration.

The supply side of Azure services are both the internal IT Management departments and Certified Cloud and Service Providers (CCSP). These IT professionals are requested to provide some sort of anticipated cost calculation which is aligned with the actual subscription costs incurred. However, as mentioned earlier, the levels of uncertainty and complexity are strongly impacting the reliability of these Azure cost predictions.

On multiple occasions the overconsumption of Azure costs we observed was more than EUR 200,000, which was primarily caused by:

- underpredicted sudden need for more storage;
- incorrect design in regional availability/takeover;
- insufficient administration of cost origins and cost types beforehand;
- lack of design and transparent structure of Azure tenant > subscription > management groups > resource groups > resources;
- over-utilization of apps being over-triggered (in time);
- simply having forgotten to decommission proof of concept and test environments.

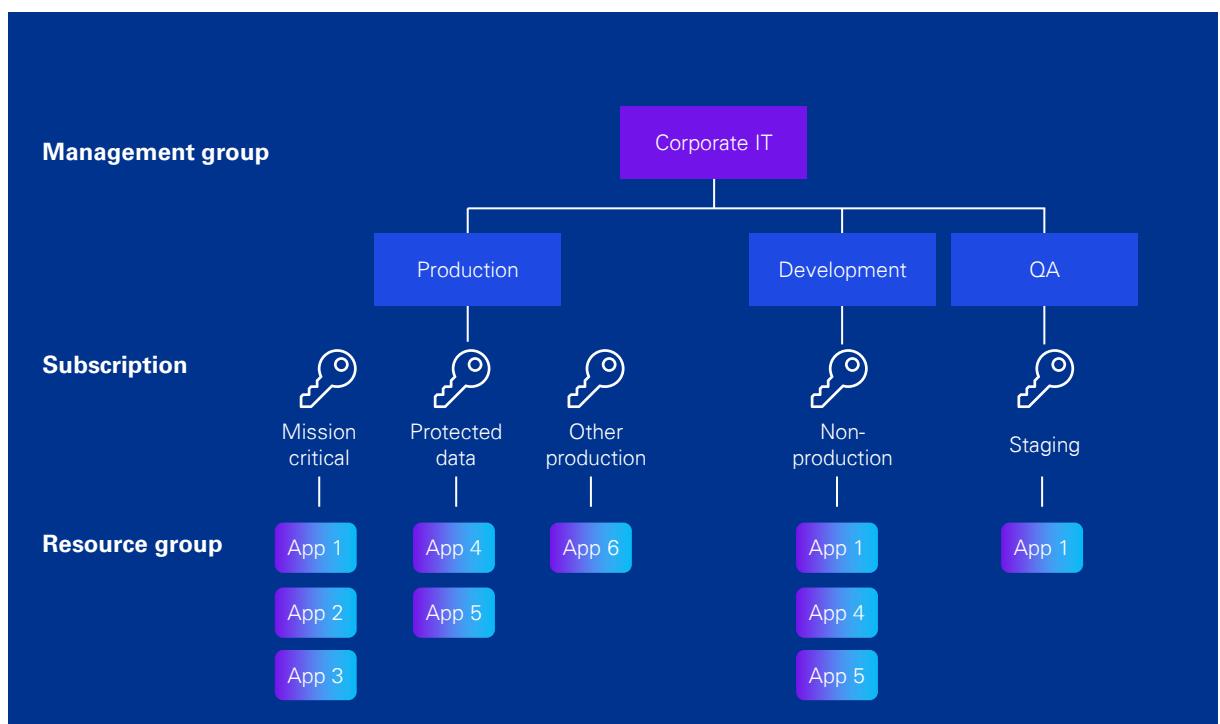
We have noticed a number of common pitfalls on a technical level that contribute to higher costs than required to operate your business, including:

- Managed disk: for non-disk intensive operations prevent using the ultra disk or even the premium managed disks. Also for non-production systems it is advisable to choose standard managed disks.
- Virtual machine utilization: only apply pay-per-use in case it is cheaper than having an Azure Reserved virtual machine. It will depend on the number of users, security and the frequency of usage.
- Replication: only apply automatic replication of Azure workloads in case you require it for business continuity reasons.
- Azure regions: only use multiple Azure regions and be aware that consumption prices vary per region.

Aligning the cloud architecture with expectations is essential to control costs of using Azure

A good strategy and architecture for the use of Azure or any cloud for that matter, is key to control costs and is composed by the motivations for migrating to the cloud, the expected business outcomes, the financial considerations and the technical architecture. As mentioned earlier, the overall Azure strategy and the corresponding design will strongly impact the Azure cost predictability and actual costs.

Important dimensions to take into account in designing and maintaining the Azure design include regional availability and failover, scaling, storage capacity, and quality & levels of computing power. The structure of the Azure subscription hierarchy is depicted in the picture below.



Furthermore, the levels of data storage, data processing & data integration are on the one hand difficult to predict and on the other hand difficult to control, due to the variability of the data requirements and requests. Also the business could require an increasing level of integration and automation to further facilitate agility and growth, which is again difficult to predict.

A last aspect to consider in an Azure design is the management of the complexity and transparency of SaaS/PaaS applications under license. In a lot of cases the cost transparency of the actual usage and storage is part of the overall license fee of the SaaS provider and as such difficult to control. A clear insight into Azure resources, limitations and actual expected usage is crucial in this respect, to further drive responsible Azure cost control.

A better practice approach to controlling Azure costs

There are different ways to manage and control your Azure costs such that the actual costs align with the value achieved by utilizing the Azure resources. However, we propose a four-step model in which a Plan-Do-Check-Act process is followed, giving you a continuous control of the actual costs incurred.



Step 1

Define business objectives & requirements

In this step the business & IT objectives/ requirements are collected in combination with the impact they have on Azure services and associated costs. By using the Microsoft Azure Pricing Calculator the estimated costs can be calculated beforehand and used to budget for step 2. This makes the total impact of requirements clear to all stakeholders.



Step 2

Design cost model

Designing a cost model for Azure requires the logical modelling and grouping of all Azure subscriptions, management groups, resource (groups) and resource requirements. Also part of cost modelling is using a cost framework such as Activity Based Costing (ABC), which clarifies what origins and locations are needed to enable cost transparency.



Finally, the tagging of resources and workloads is of key importance to identify what the cost origins and cost locations are. Having multiple tags per resource is recommended, as including information such as cost centre, business unit & business function is essential to eventually compare the actual Azure billing against the predicted costs as included in the cost model. These tags can be enforced using Azure policies by populating default tag values in the resources (such as default cost centre for a specific resource group).

Using Azure Cost Management & Billing is key to have a clear and up-to-date insight in Azure cost per period, tenant, management group, subscription, resource (group) and tag. Azure cost management can be used for reporting, alerting and the identification of controls such as decommissioning or the automated shutdown of specific environments when needed.

 **Step 3**
Check

After you have defined your requirements and cost model, it is a key step to check for costs that might not be transparent and/or avoidable. During the check phase the following management reviews are recommended:

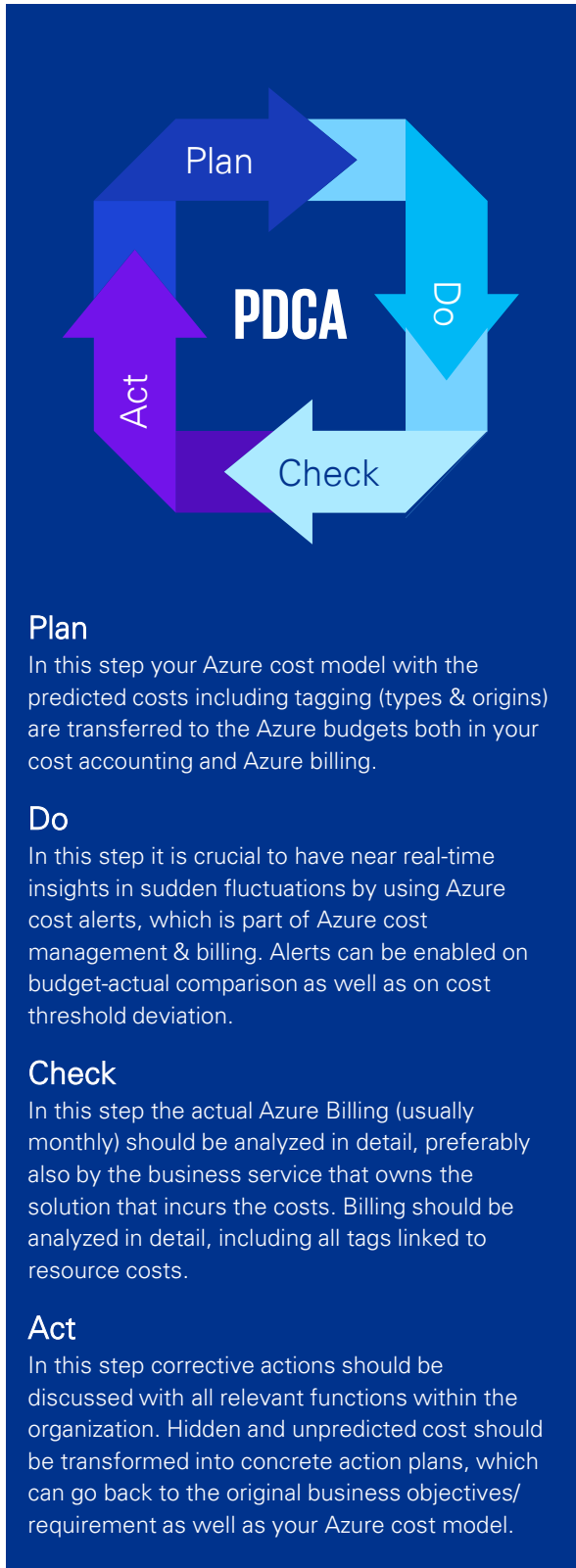
- periodic review and evaluation of the cost performance report per cost type & cost origin;
- periodic review of unused regional availabilities;
- periodic review of underutilized storage capacity & managed disk throughput (performance);
- investigate the possibility to scale down or up dynamically, including switching off services temporarily when not used.

 **Step 4**
Act

During the act phase the analyses and reviews of the check phase are compiled into specific action plans, including:

- reducing capacities, resources and regional availabilities;

- automatic upscaling and downscaling of resources (including virtual machines);
- implementing a revised tagging structure;
- applying appropriate changes to the Azure architectural design & subscription hierarchy.





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