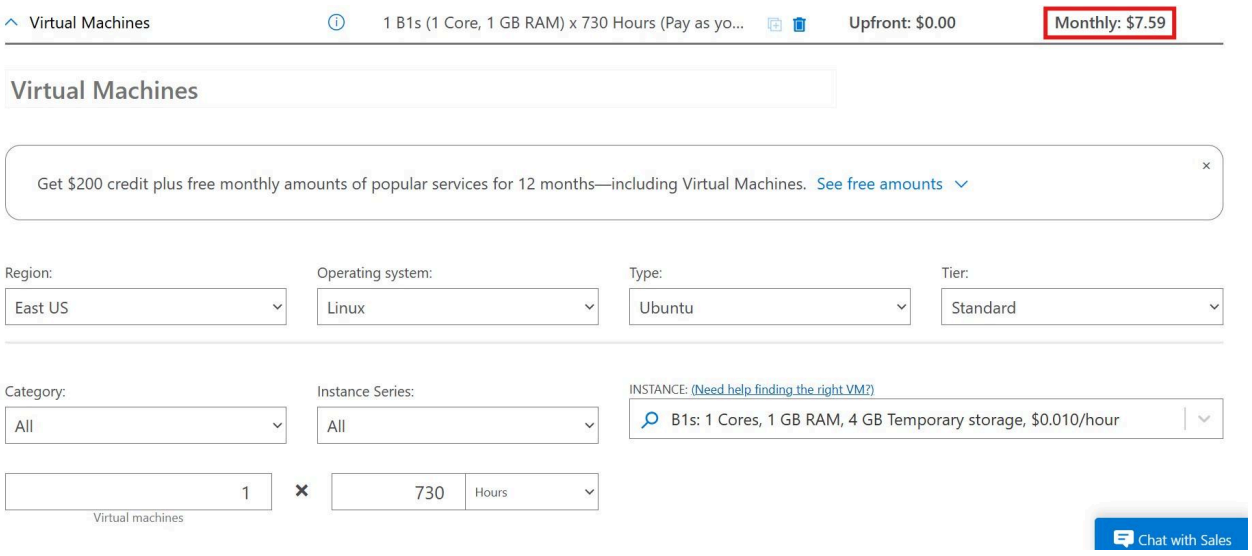
Mini-Project: Exploring Azure Pricing Models using Azure Pricing Calculator

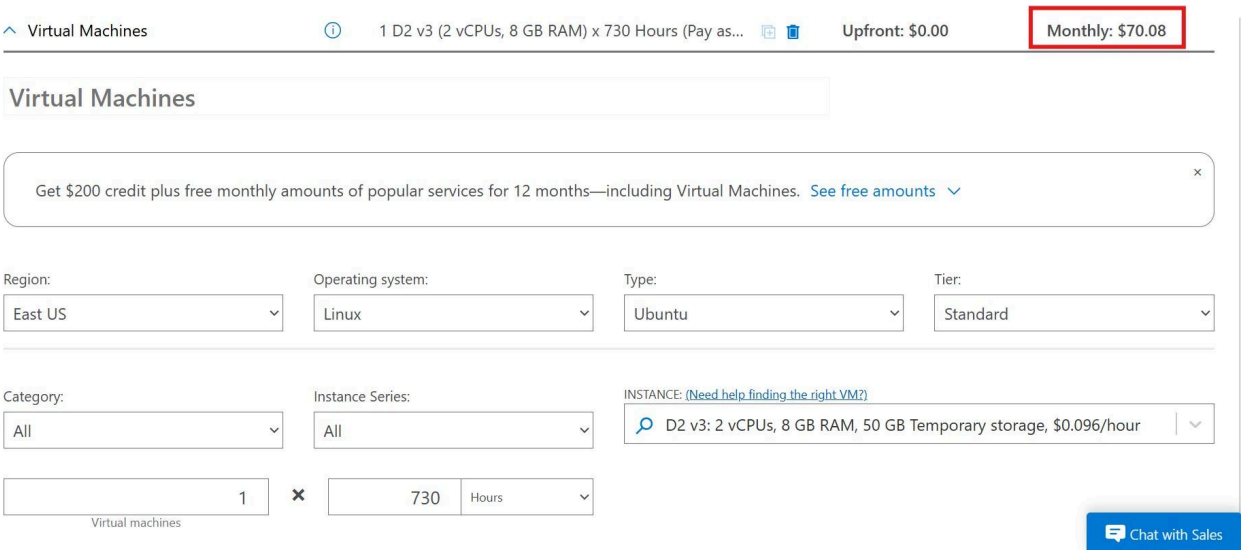
Introduction:

This mini-project explores Azure's pricing structures, focusing on how to estimate and optimize costs using the Azure Pricing Calculator. Through hands-on evaluation of common Azure services, the project aims to build a foundational understanding of cost planning and budgeting in cloud environments.

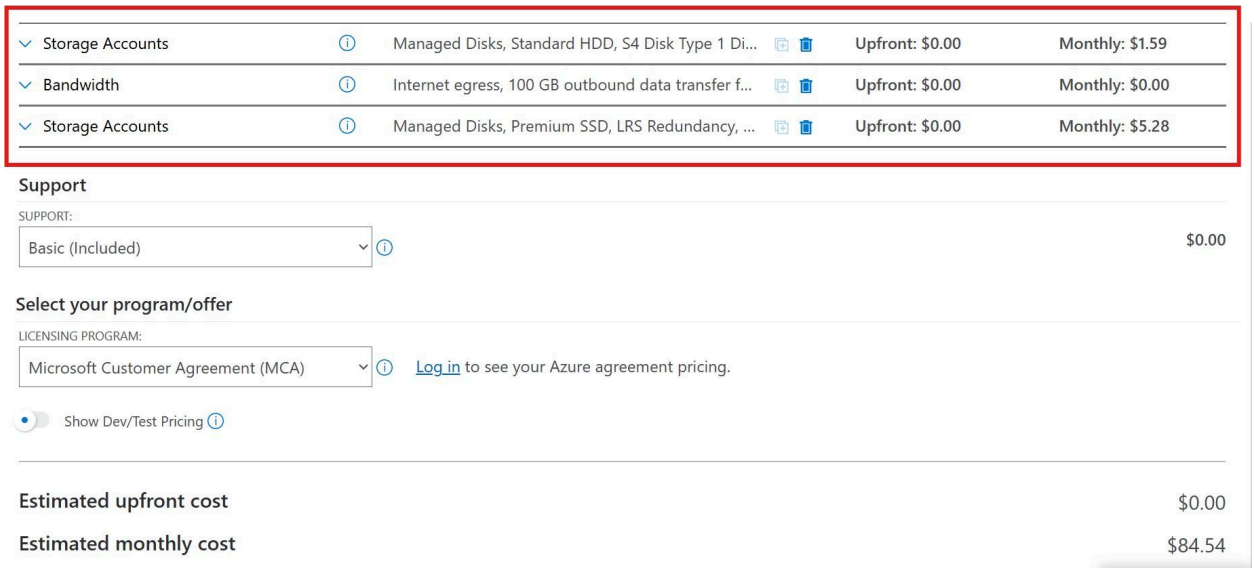
1. Screenshot of B1's Virtual Machine (Free Tier)



2. Screenshot of D2s v3 Virtual Machine (Production)

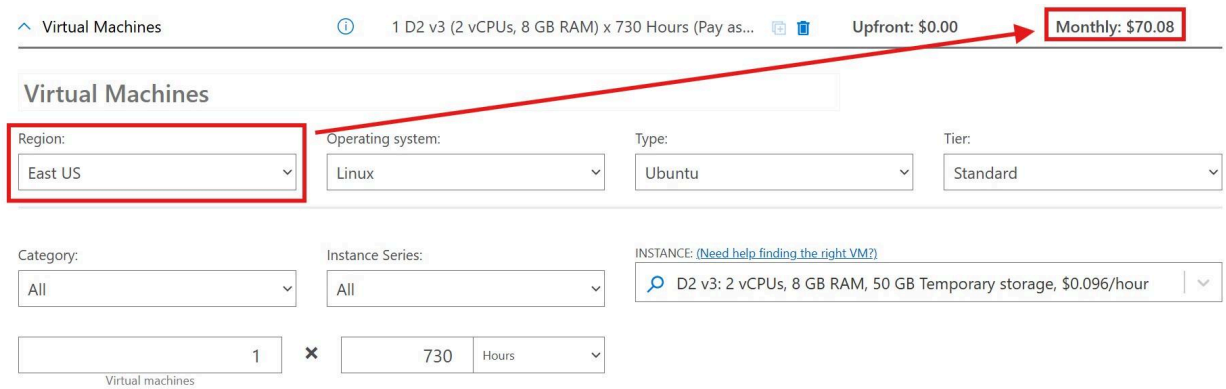


3. Screenshot of Added Storage Costs (Standard HDD & Premium SSD) and Bandwidth cost

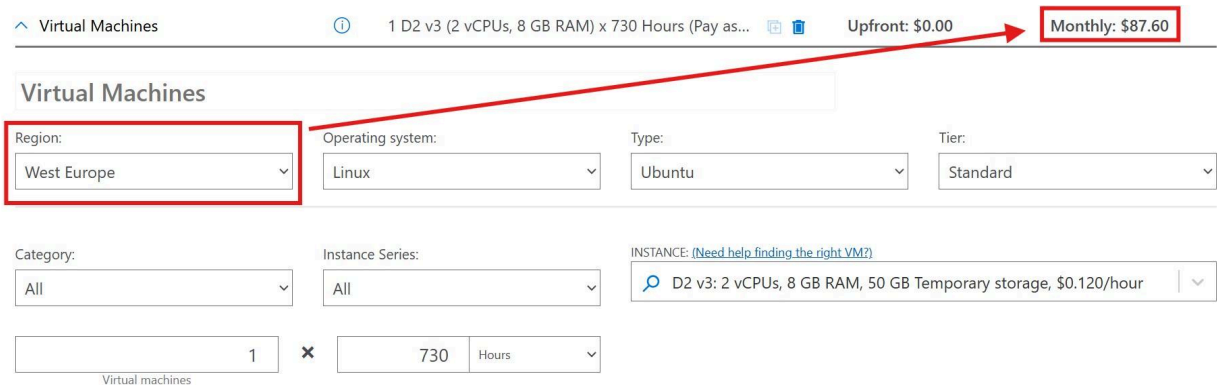


Note: The Bandwidth cost is $0.00 because the first X GB per month is free.

4. Screenshots of comparison of VM costs between East US and Western Europe regions



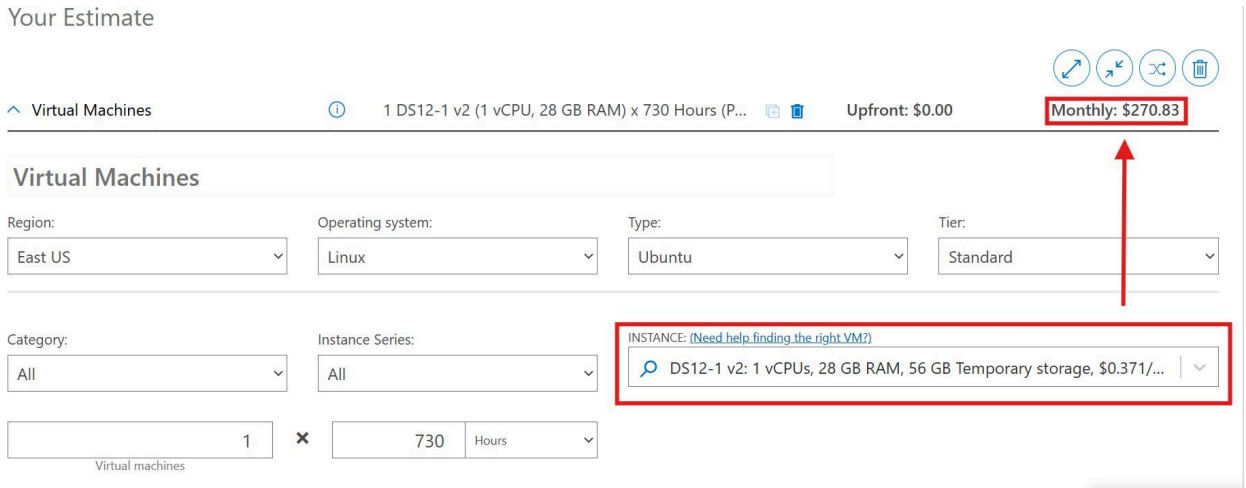
East US region costs $70.08 monthly



Western Europe Region Cost $87.60

Key takeaway: Region choice is a significant factor in Azure pricing. As seen above, the difference between the Western Europe Region and the East US Region is $17.52, which could mean a lot in terms of savings.

5. Screenshot showing the cost of scale-up VM (D12)



VM (D4s v3) is not available instances, so VM (DS12-1 v2) serves same purpose, cost: $270.83 monthly

Note the Cost Increase:

- Observe the monthly cost for this `DS12-1 v2` VM. It should now be approximately **~$271/month** (prices vary), which is roughly **2 times the cost** of the `D2s v3` VM.
- **Key takeaway:** Scaling up resources directly impacts costs. Understanding the cost per vCPU/GB RAM for different VM series helps in right-sizing.

Screenshot of Savings Achieved by using a 1-year Reserved Instance

Observe Savings:

- Look at the monthly cost for this `D12-1 v2` VM. You should see a significant reduction, typically around **~52% savings** compared to the "Pay As You Go" price. For a `D12-1 v3`, this might bring the cost down to approximately **~$80-90/month** (from ~$140/month, depending on region and current rates).
- **Key takeaway:** Committing to 1-year or 3-year Reserved Instances for stable, long-running workloads can lead to substantial cost savings.

Understanding Azure Pricing Models (My Deeper Insight)

This section is where I'll share my perspective on the core concepts behind Azure's pricing.

Introduction to Azure Pricing: More Than Just Pay-As-You-Go

- At its heart, Azure embodies the "pay-as-you-go" principle. Think of it like a utility bill for your IT: you only pay for the electricity, water, or gas you consume. But in the cloud, this gets nuanced. Factors like the **region** you choose, the specific **service** (a simple storage account versus a complex Kubernetes cluster), your **consumption levels** (how much data you transfer, how many transactions hit your database), and even **data transfer direction** (data leaving Azure is usually charged) all heavily influence your bill.

Common Azure Pricing Models: Strategies for Every Workload

- **Consumption-Based Pricing:** This is the purest form of pay-as-you-go. For services like Azure Functions (serverless compute), Logic Apps (workflow automation), or storage transactions, you're billed purely on usage.
  - **My Insight:** This is fantastic for unpredictable or bursty workloads. Imagine a website that gets huge traffic spikes only during holiday sales – you don't want to pay for dedicated servers all year round. Consumption models let you scale down to (almost) zero during quiet periods, significantly cutting costs. The challenge here is forecasting, as very high, unexpected usage can lead to "bill shock."
- **Reserved Instances (RIs):** This is where you commit to a certain usage for a discounted rate, typically for 1-year or 3-year terms.
  - **My Insight:** This is your go-to for stable, always-on workloads like production databases or core application servers. I've seen organizations save *massive* amounts – 40% or more – by committing to RIs. It's like pre-paying for a year of your phone service at a lower rate. The catch? If your workload changes significantly or you shut down the reserved resource, you might still pay for the reservation, so accurate forecasting is key.
- **Azure Hybrid Benefit:** If you have existing Windows Server or SQL Server licenses with Software Assurance, you can bring them to Azure.
  - **My Insight:** This is a *huge* cost-saver, especially for enterprises migrating from existing on-premises infrastructure. It essentially lets you use your existing software licenses instead of buying new ones in Azure, drastically reducing the VM software cost. I always recommend exploring this first if you have eligible licenses.

- **Spot Instances/Low-Priority VMs:** These allow you to utilize unused Azure capacity at steep discounts, sometimes 60-90% off standard prices.
    - **My Insight:** Think of these as "bargain bin" VMs. They're perfect for flexible, fault-tolerant, or stateless workloads like batch processing, development/testing environments, or rendering farms. The catch is that Azure can reclaim these VMs on short notice if it needs the capacity back. So, don't put your critical, stateful production databases on Spot Instances!
- **Dev/Test Pricing:** Special pricing is available for development and testing environments, often through specific subscription types (e.g., Visual Studio subscriptions).
    - **My Insight:** This is essential for controlling costs in non-production environments. You want to give your developers and testers enough resources without breaking the bank. It helps prevent "shadow IT" where teams might spin up resources on personal accounts to avoid internal cost controls.
- **Free Services/Free Tier:** Azure offers perpetually free services (like certain amounts of Cosmos DB, Azure Functions, etc.) and time-limited free trials with credits.
    - **My Insight:** For learning, prototyping, and very small projects, this is invaluable. I always advise new users to leverage the free account credits to experiment without financial risk. Just remember to monitor your usage to avoid accidental charges after the free limits are exceeded.

Data Transfer Costs: The Hidden Line Item

- **My Insight:** Many beginners overlook data transfer costs, especially "egress" (outbound) data. Inbound data is generally free, but every GB leaving an Azure region (to the internet, to another Azure region, or sometimes even between availability zones) incurs a charge. This can quickly add up for applications with high download traffic, large backups moving off-site, or data replication across distant regions. Always consider your data flow patterns when estimating.