

Introduction to Cloud Computing

Session 2 (Practical): Build in the Cloud with Azure for Students

Student Lab Handout — Free-Tier Activities Only (No Payment Card Required)

Before you start — cost safety

Every task in this handout can be completed entirely on Azure's free allowances: the Azure for Students \$100 credit and Azure's "Always Free" service tier. No task requires you to enter payment card details or upgrade to a Pay-As-You-Go subscription. If the portal ever asks you to add a card or upgrade, stop and ask your tutor before continuing.

Session overview

Duration: approximately 2 hours. This session builds directly on the concepts introduced in Session 1 (service models, deployment models, and the economics of cloud computing) by putting them into practice inside a real Azure environment.

Learning outcomes

By the end of this session, students will be able to:

- Distinguish IaaS, PaaS and SaaS by identifying which category each Azure service used in this session belongs to.
- Explain the difference between the Azure for Students free credit, the Always Free tier, and Pay-As-You-Go pricing.
- Use the Azure Pricing Calculator to estimate the cost of a cloud deployment before creating any resources.
- Set up a budget and cost alert in Azure Cost Management as an example of cloud cost governance.
- Deploy and remove a cloud resource, and explain why resource clean-up matters for cost control.

What you need

- A laptop with a modern web browser.
- Your university (institutional) email address — used to verify student status.
- No credit or debit card. None will be requested for anything in this handout.

Part A — Activate Azure for Students (15 minutes)

1. Go to the official sign-up page: azure.microsoft.com/free/students
2. Select “Start free” and sign in with a personal Microsoft account (not your university's shared IT login), then enter your university email address when asked to verify academic status.
3. Follow the verification steps shown on screen. You may be asked to confirm your name and institution, but you will not be asked for card details.
4. Once verified, you will land on your new Azure subscription with a \$100 credit shown in the portal.

Teaching point — three ways Azure is “free”

Three different pricing models used across the whole cloud industry, not just Azure: 1) Azure for Students credit — a fixed \$100 pre-paid amount, valid for 12 months, that is consumed as you use paid services (like a gift voucher). 2) Always Free services — a set of services (e.g. a small web app tier, limited storage, limited function executions) that never draw down the credit, provided usage stays under the stated monthly limit. 3) Pay-As-You-Go — the default commercial model where you are billed for exactly what you consume, with no cap; this is what the credit is protecting students from today.

Part B — Explore cost management before deploying anything (20 minutes)

This part illustrates the costing model itself, without creating any resources yet.

5. In the Azure Portal search bar, type “Cost Management + Billing” and open it.
6. Open “Cost Management” and view your subscription's credit balance and expiry date.
7. Select “Budgets” and create a new budget (e.g. £5) with an email alert at 80% of the budget. This does not spend money — it only warns you.
8. Open the Azure Pricing Calculator (azure.microsoft.com/en-us/pricing/calculator) in a new tab. Add a small virtual machine and a storage account to the estimate, and note the projected monthly cost shown. Do not sign in or check out — this tool only estimates cost and never creates resources.

Teaching point — CapEx vs OpEx and cost estimation

On-premises IT is largely CapEx (Capital Expenditure): buy the server up front, own the risk of over- or under-provisioning. Cloud computing shifts this to OpEx (Operating Expenditure): pay only for what you use, when you use it. The Pricing Calculator is the tool professionals use to forecast that OpEx before committing to a design — compare the estimated cost of a small VM against the Always Free App Service tier you will deploy in Part C, and discuss why an organisation might choose one over the other.

Part C — Deploy a free-tier web app (40 minutes)

This activity illustrates Platform as a Service (PaaS): Azure manages the operating system, runtime and patching, so students focus only on their application.

9. In the portal search bar, type “Resource groups” and select “Create”. Name it something like rg-<yourname>-cloudlab and choose a nearby region.
10. Search for “App Services” and select “Create” → “Web App”.
11. Choose the resource group you just created, give the app a unique name, select a runtime stack (e.g. Node.js or Python), and for the Pricing Plan choose the “Free F1” tier.
12. Confirm the summary screen shows the Free F1 plan (£0.00 / \$0.00 estimated cost) before selecting “Create”.
13. Once deployment finishes, open the app's URL from the Overview page to see the default landing page running live in the cloud.

Teaching point — mapping the activity to service models

Who is responsible for the operating system here? (Microsoft.) Who is responsible for the application code? (You.) This is the defining test for PaaS. Contrast briefly with IaaS (a virtual machine, where you would patch the OS themselves) and SaaS (a finished product like Microsoft 365, where the student controls neither infrastructure nor code).

Part D — Compare costing models side by side (15 minutes)

With the deployed app still open, return to Cost Management and check that the credit balance has not decreased, since the F1 tier is Always Free. Discuss the table below as a class.

Model	How it works	Example in this session
Always Free tier	Fixed free monthly allowance for specific services; never billed if you stay under the limit.	App Service Free F1 plan used in Part C.
Free credit	A pre-paid amount consumed as you use billable services; stops working once used up or expired.	The \$100 Azure for Students credit.
Pay-As-You-Go	Billed per second/hour/GB for exactly what is consumed, no upper limit unless a budget is set.	The VM + storage estimate built in the Pricing Calculator.

Model	How it works	Example in this session
Reserved / committed	Discounted rate in exchange for committing to 1–3 years of usage in advance.	Not used today — an example of CapEx-like thinking inside OpEx pricing.

Part E — Clean up (10 minutes)

Cleaning up unused resources is standard professional practice and a key cost-control habit, even when using free-tier resources.

14. Go back to your resource group (rg-<yourname>-cloudlab).
15. Select “Delete resource group”, type the resource group name to confirm, and delete it.
16. Return to Cost Management and confirm the credit balance is unchanged.

Teaching point — why clean-up matters

In Pay-As-You-Go environments, forgotten resources are one of the most common causes of unexpected cloud bills. Even though today's app was free, imagine the same forgetfulness with a Pay-As-You-Go virtual machine left running for a month — this is why budgets, alerts and clean-up habits (Parts B and E) matter as much as the technical build itself.

Reflection questions (for discussion or homework)

- Which parts of today's activity were IaaS, PaaS or SaaS? Justify your answer.
- Why does Microsoft offer a free credit specifically to students rather than everyone?
- If your class's App Service had instead been deployed on a paid tier, what would you check in Cost Management to catch a billing problem early?
- Give one advantage and one risk of the Pay-As-You-Go pricing model compared with buying and owning physical servers.

End of handout.