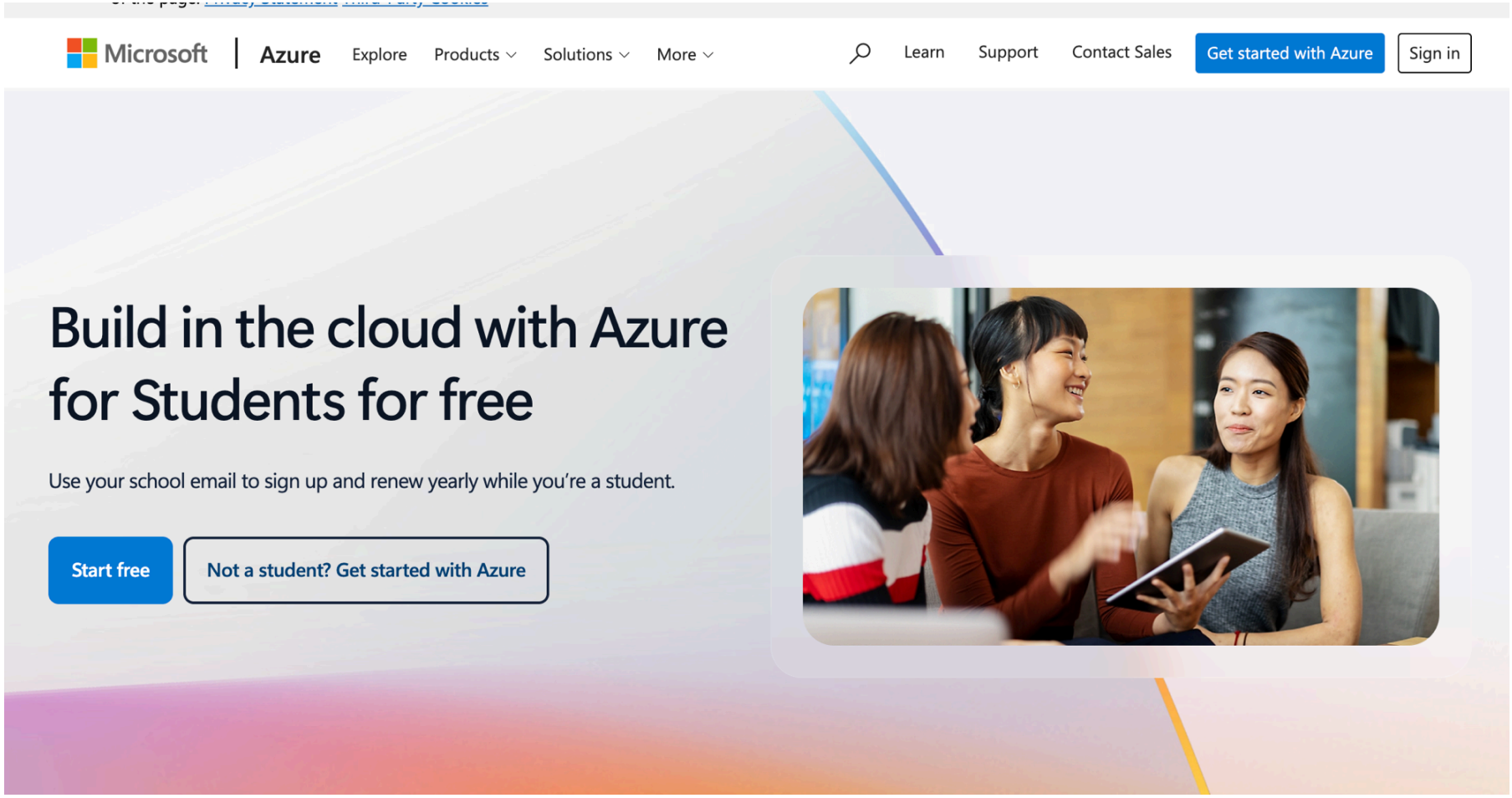
Today

1. Sign in to your cloud account.
2. Start **Assignment 1**. Due **13.09.2026 23:59**, submitted on **Moodle**.

Stuck at any step — that's what we're here for.

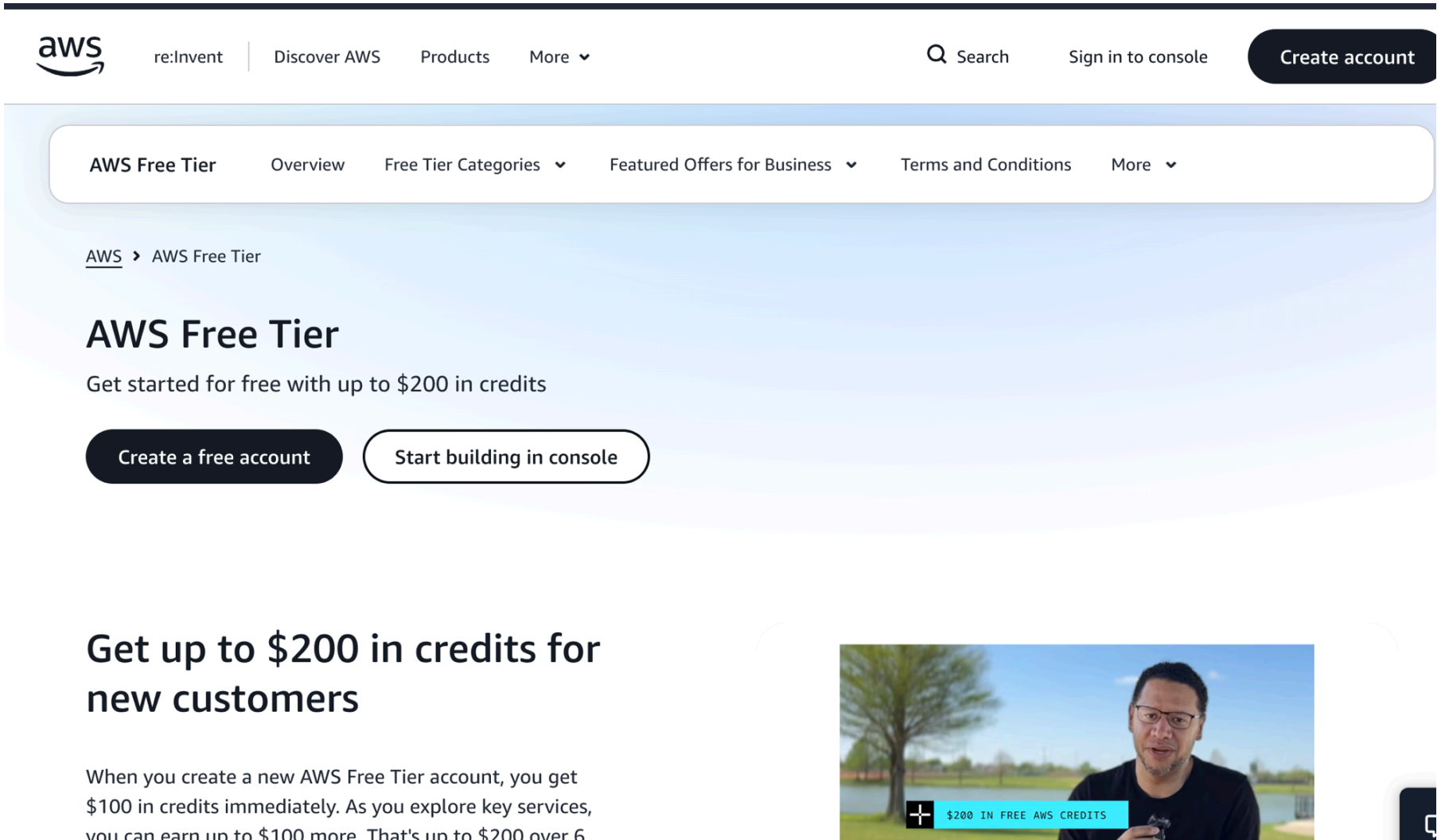
Sign-up: Azure for Students — no credit card

https://azure.microsoft.com/free/students → *Start free* with your @taltech.ee account



Sign-up: AWS Free Tier

https://aws.amazon.com/free/ — card needed for validation; not billed unless you upgrade



Assignment 1 · Hello, cloud — 2 pts

`https://<your-domain>/hello` → `{"student":"<your student code>"}`

One VM, set up by hand: nginx serving the JSON · a DNS **A record you created** · a valid HTTPS certificate. The next slides walk through every step.

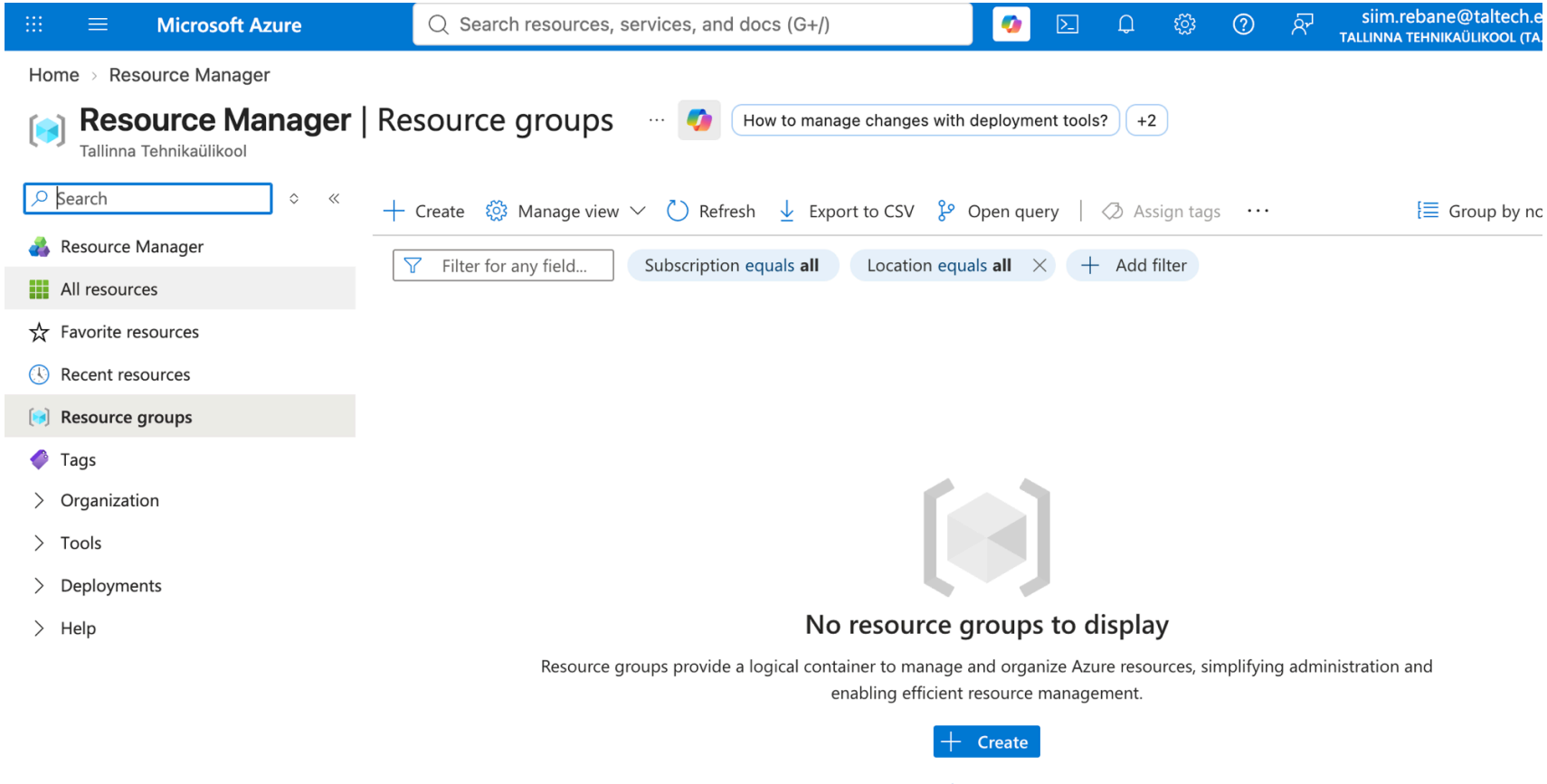
Submit on Moodle: the URL + a screenshot of your cloud portal showing the VM.
I request the URL directly — **keep the VM running until you see your points** (the free tier covers it).

Due **13.09.2026 23:59**.

A resource group is a folder for your resources

Everything you create (VM, disk, IP address…) lives in a **resource group**. Delete the group → everything in it is gone. One group per course keeps cleanup one click.

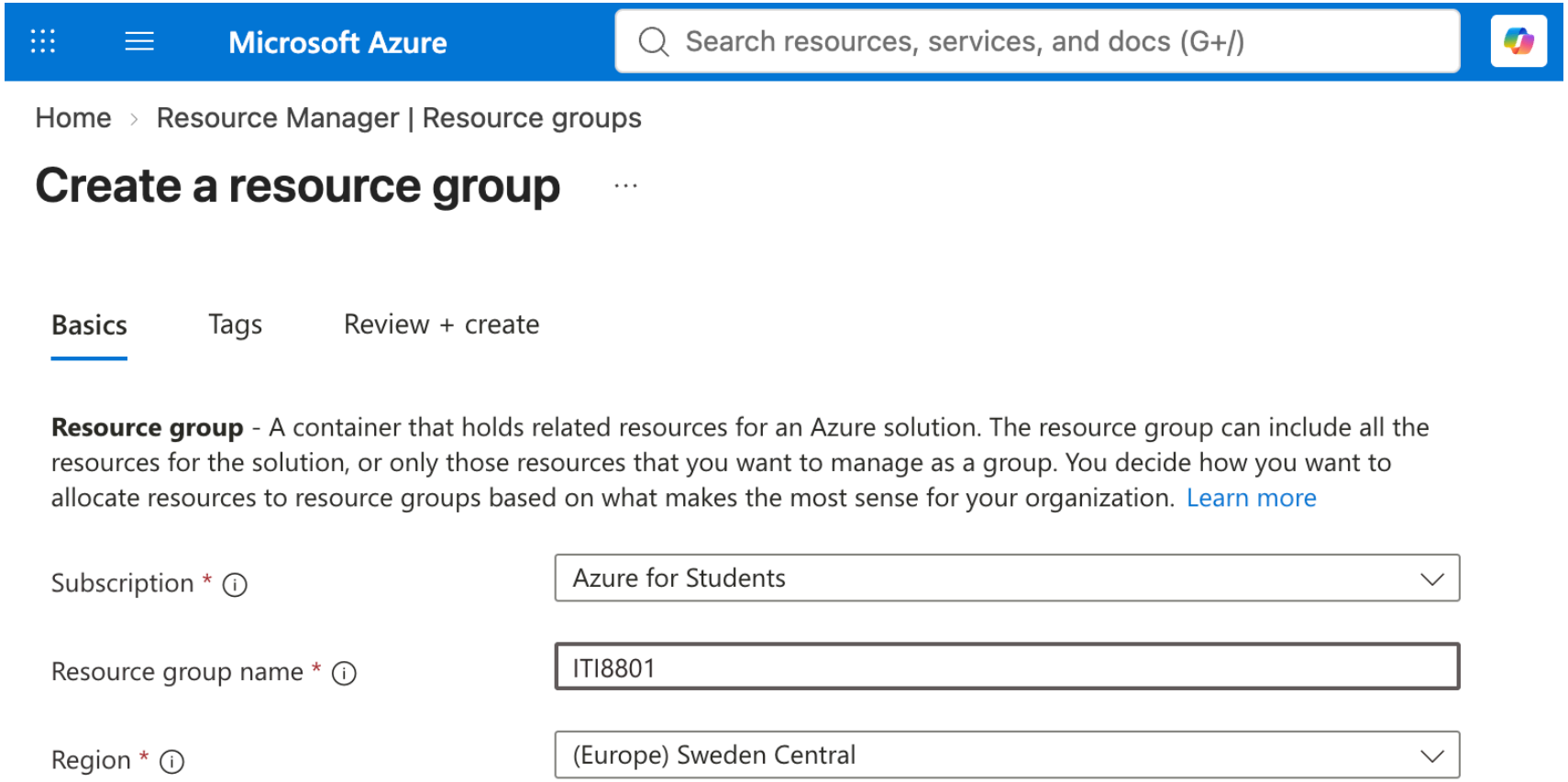
Portal → search **Resource groups** → **Create**



Create the resource group

Subscription **Azure for Students** · name **ITI8801** · region: **one from the list your subscription offers**.

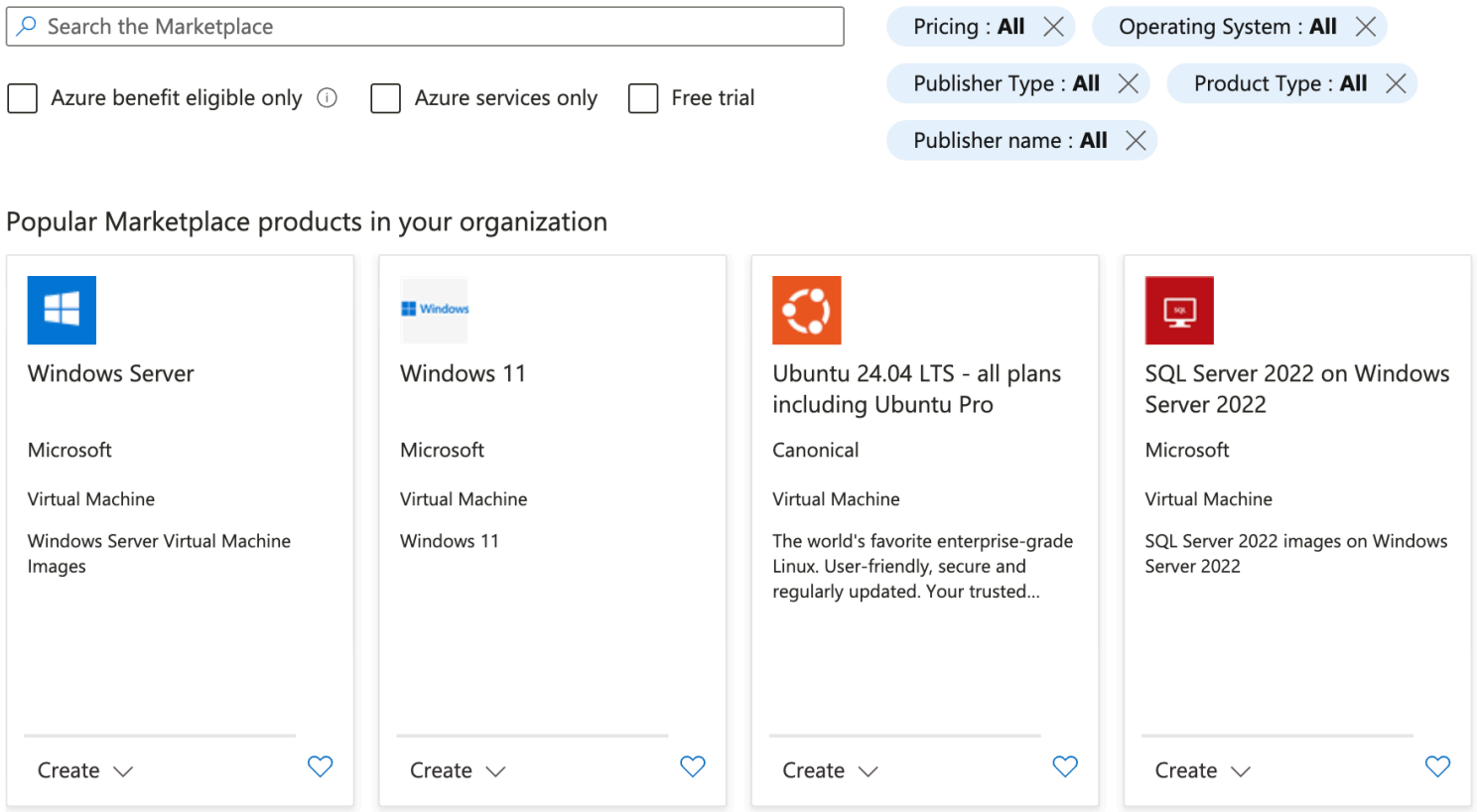
The list differs from student to student; pick one and keep it all semester → *Review + create* → *Create*



Choose the operating system: Ubuntu

Marketplace → the newest **Ubuntu LTS** by Canonical → *Create*.

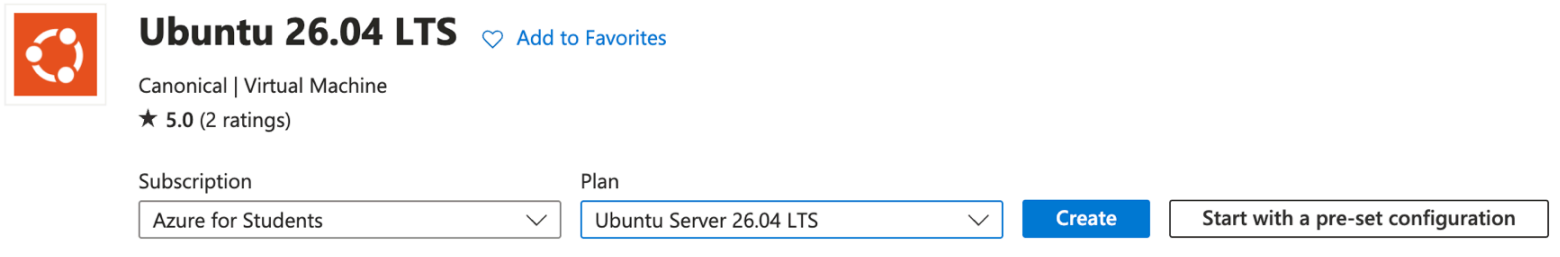
Linux images cost nothing; the free hours apply to the VM size (**B2ats_v2**). Windows and SQL Server images carry licence fees — avoid.

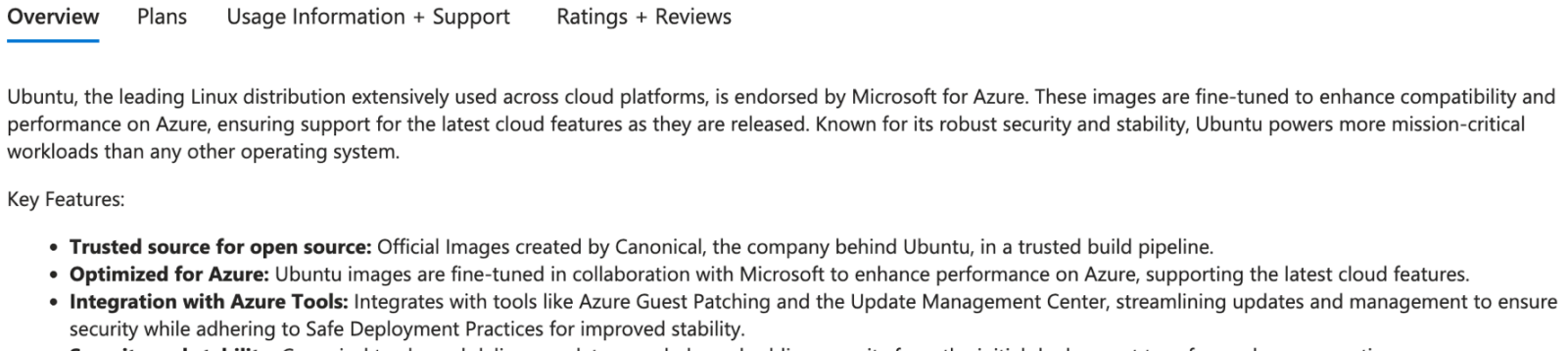


Plan: plain Ubuntu Server — no need for Pro

Plan = **Ubuntu Server … LTS** (the plain one). *Ubuntu Pro* adds a paid subscription for 10-year enterprise patching — your VM lives for hours, no need for Pro.

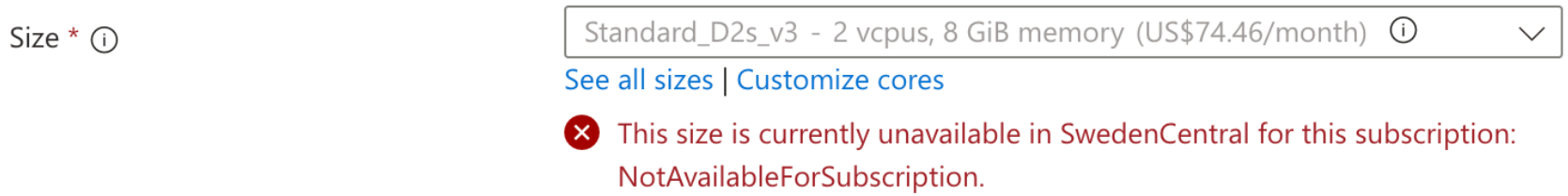
Watch out: on the VM form the *Image* field can still default to **Ubuntu Pro**. Check it says plain *Ubuntu Server* — no "Pro".





Size: don't take the default

The form defaults to **D2s_v3 — US$74/month** — and on the student subscription it's blocked anyway:



Click **See all sizes**.

Size: the free B-series one

B-Series v2 → **B2ats_v2** (2 vCPU, 1 GiB, ~US$7/month list price — and free-tier on Azure for Students). Regions without v2 sizes offer **B1s** instead, under **B-Series**, on the same free-tier terms.

B-Series v2									
	Ideal for workloads that do not need continuous full CPU performance								
B2ats_v2	General purpose	2	1	4	3750	-	Supported	US$7.10	
B2ts_v2	General purpose	2	1	4	3750	-	Supported	US$7.88	
B2als_v2	General purpose	2	4	4	3750	-	Supported	US$28.40	
B2ls_v2	General purpose	2	4	4	3750	-	Supported	US$31.54	
B2as_v2	General purpose	2	8	4	3750	-	Supported	US$56.79	Popular
B2s_v2	General purpose	2	8	4	3750	-	Supported	US$63.07	
B4als_v2	General purpose	4	8	8	6400	-	Supported	US$100.74	
B4ls_v2	General purpose	4	8	8	6400	-	Supported	US$111.69	
B4as_v2	General purpose	4	16	8	6400	-	Supported	US$113.88	Popular

Why the B-series size is free

Your subscription's free services include **750 hours/month** — enough to run one VM around the clock:

Virtual Machines, Bpsv2 Series, B2pts v2	0%	0 / 750 (1 Hour)	Not in use
Virtual Machines, Basv2 Series Windows, B2ats v2	0%	0 / 750 (1 Hour)	Not in use
Virtual Machines, Bpsv2 Series Windows, B2pts v2	0%	0 / 750 (1 Hour)	Not in use
Virtual Machines, Basv2 Series, B2ats v2	0%	0 / 750 (1 Hour)	Not in use

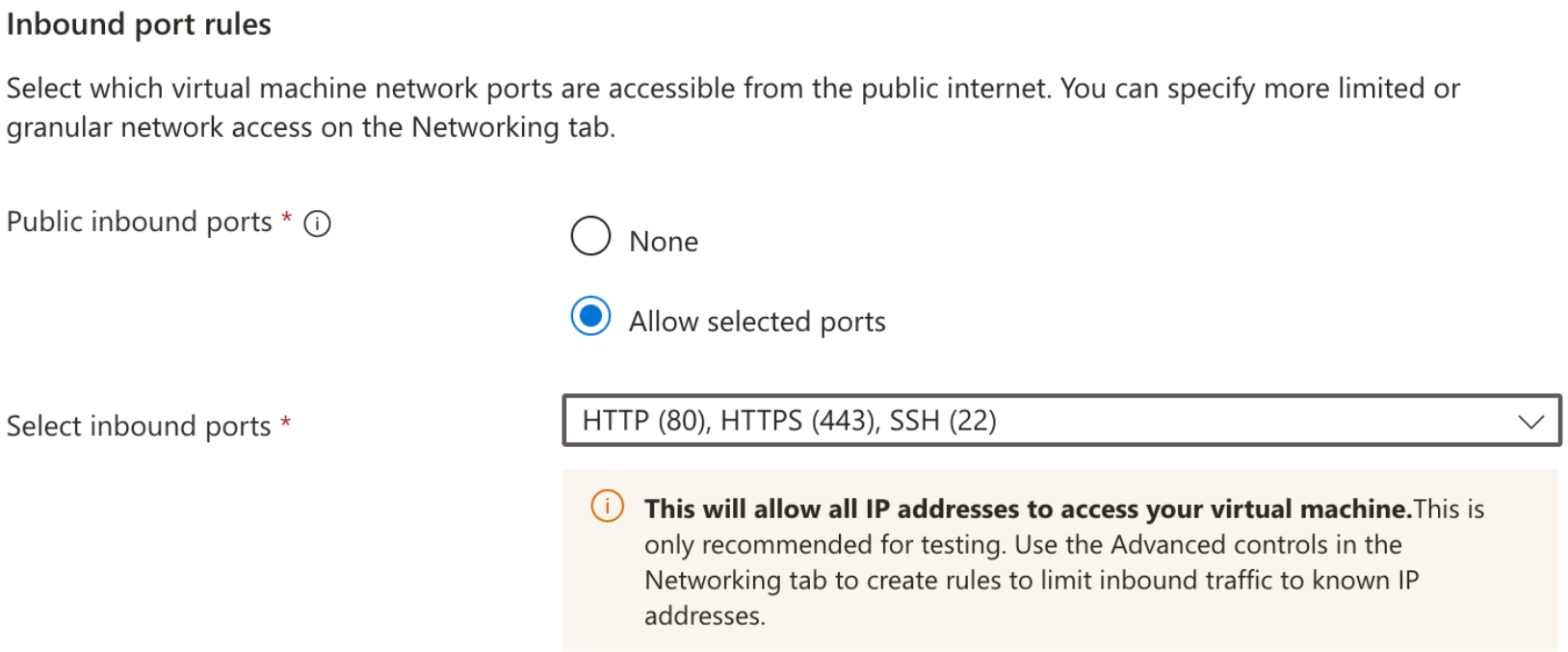
Virtual Machines, BS Series, B1s	0%	0 / 750 (1 Hour)	Not in use
Virtual Machines, BS Series Windows, B1s	0%	0 / 750 (1 Hour)	Not in use

Which of the two your region has depends on the region; both are 750 free hours. B2pts v2 is Arm — software built for x86 won't run there; take B2ats_v2, not B2pts.

Inbound ports — and read the warning

Select **HTTP (80)**, **HTTPS (443)** and **SSH (22)**. 80 serves the assignment, 443 is for the certificate step, 22 is how you get in.

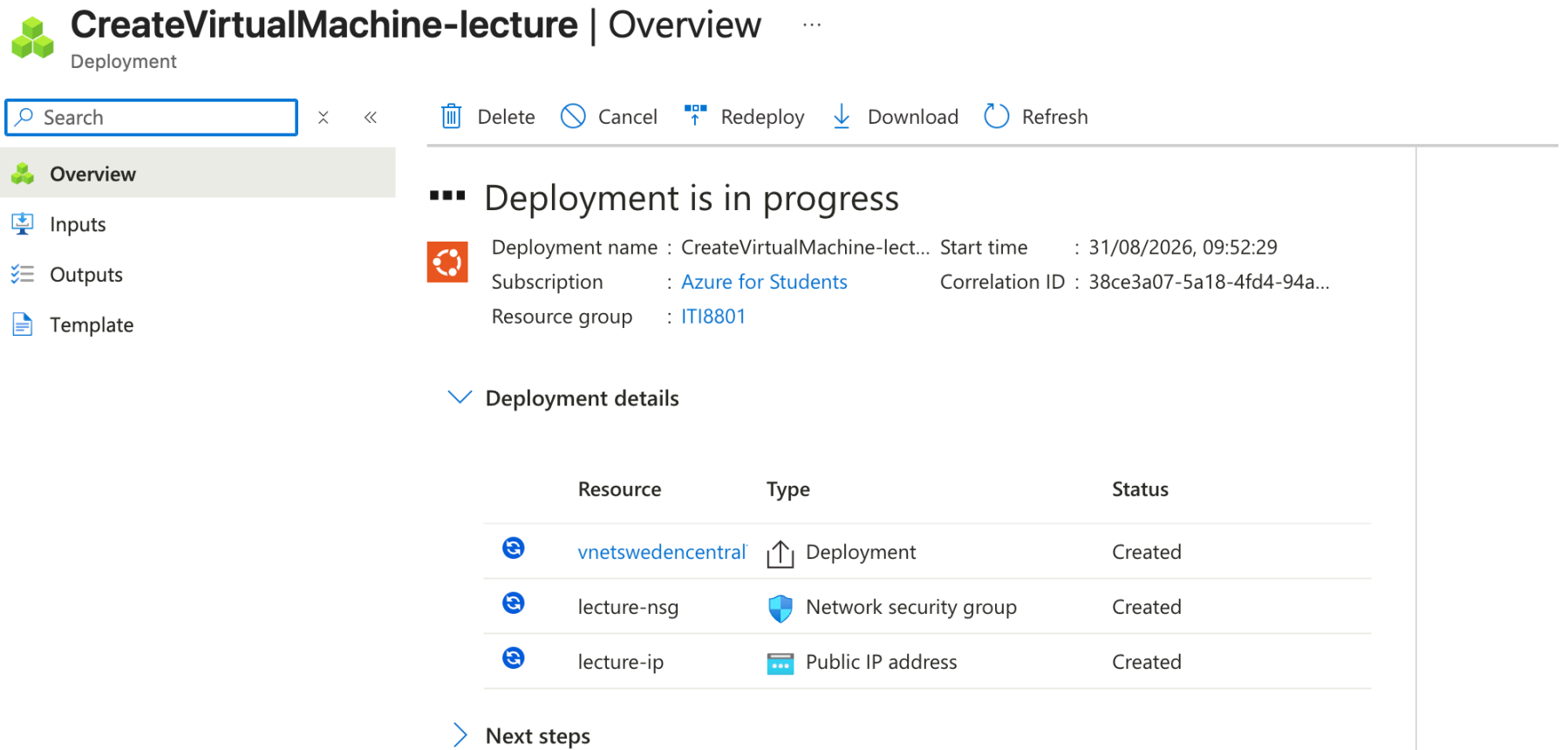
The warning is real: this opens the ports to **every IP address on the internet**. Good practice: after creation, edit the SSH rule in the network settings to allow only your own IP.



One click, many resources

You asked for one VM. Azure creates a **virtual network, a network security group, a public IP, a network card, a disk — and the VM**. Each is a separate object with its own lifecycle.

That's why cleanup means **deleting the resource group** — not just the VM.



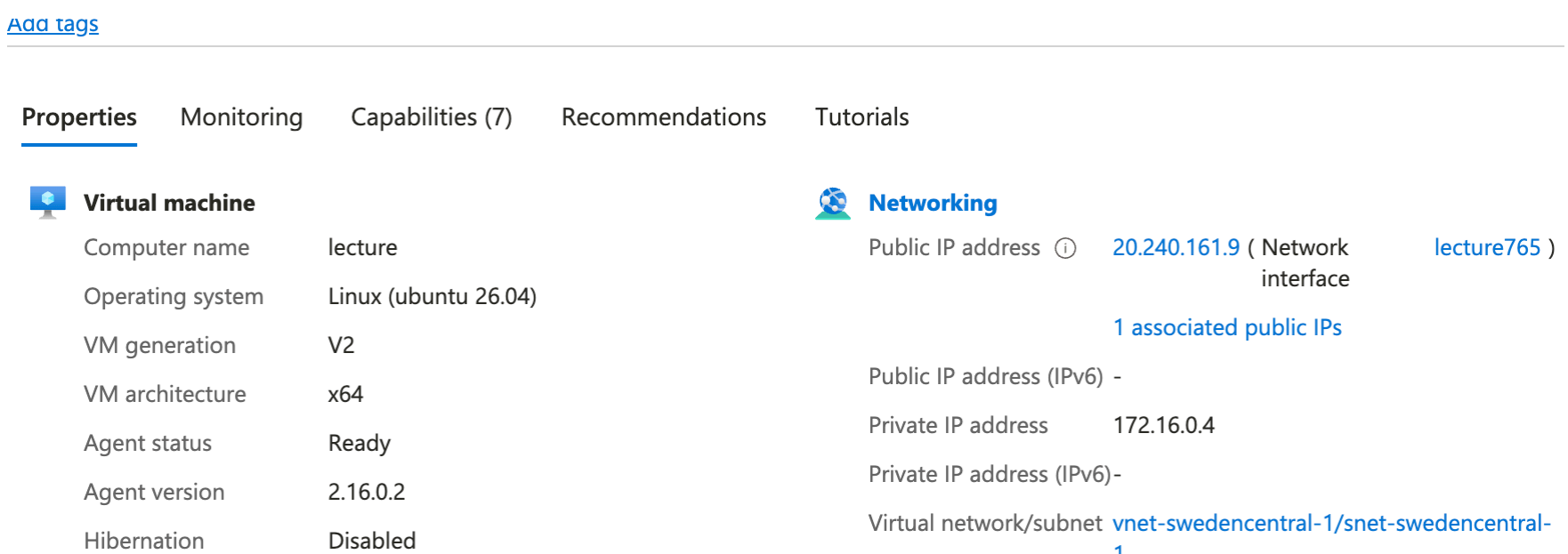
The VM's addresses — and logging in

VM → *Properties*: a **public IP** (the internet reaches this) and a **private IP** (`172.16.x.x` — one of the reserved local ranges). The public IP is what your A record will point at.

Log in with the username from the form — Azure's default is **azureuser**:

```
ssh azureuser@<public-ip>
```

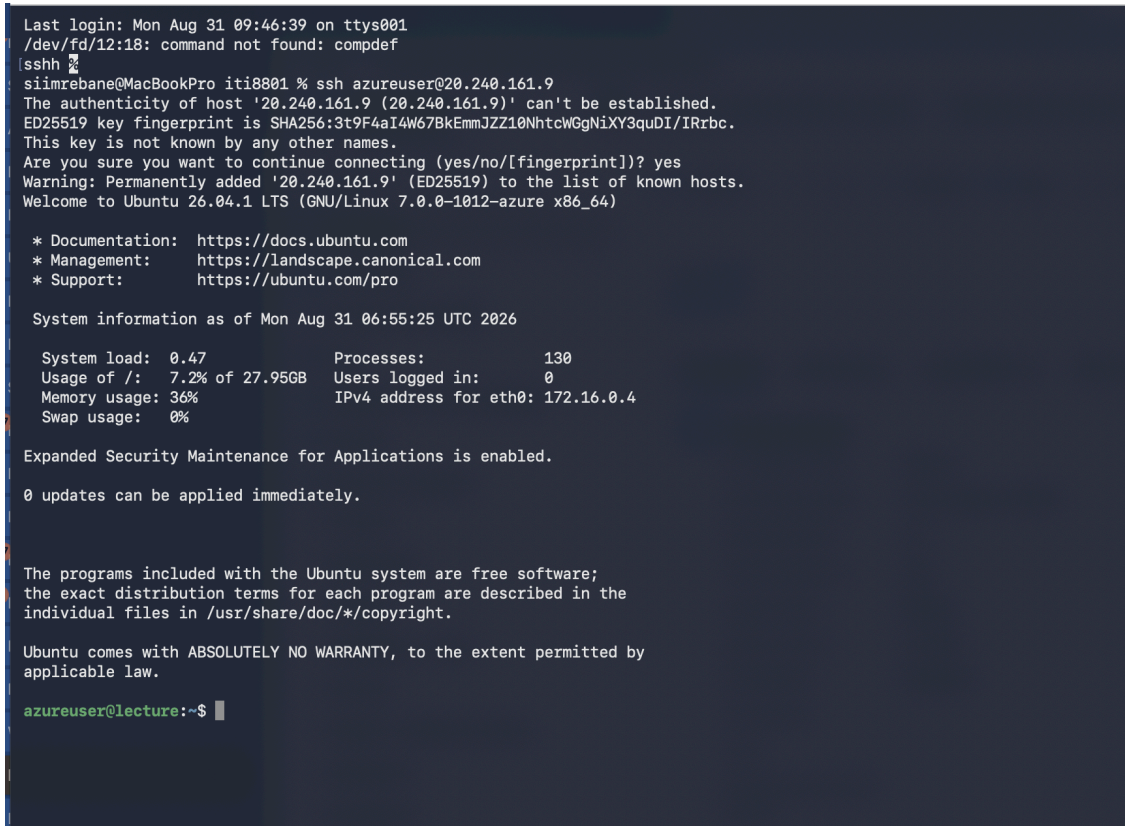
(`ubuntu@` is AWS's convention, not Azure's.)



First login

```
ssh azureuser@<public-ip>
```

The fingerprint question appears **once per new machine** — answer `yes`. Then you're on your VM; the message of the day even shows your private IP.



Install nginx and answer /hello

```
sudo apt update && sudo apt install -y nginx
sudo nano /etc/nginx/sites-enabled/hello.conf
```

Put this in the file (**use nano — pasting multi-line commands into the shell breaks**):

```
server {
    listen 80 default_server;
    location /hello {
        default_type application/json;
        return 200 '{"student":"<your student code>"}';
    }
}
```

```
sudo rm /etc/nginx/sites-enabled/default
sudo nginx -t && sudo systemctl reload nginx
curl localhost/hello                 # on the VM
curl http://<public-ip>/hello      # from your laptop — if this hangs, check the port-80 rule
```

Getting a name — you create the A record yourself

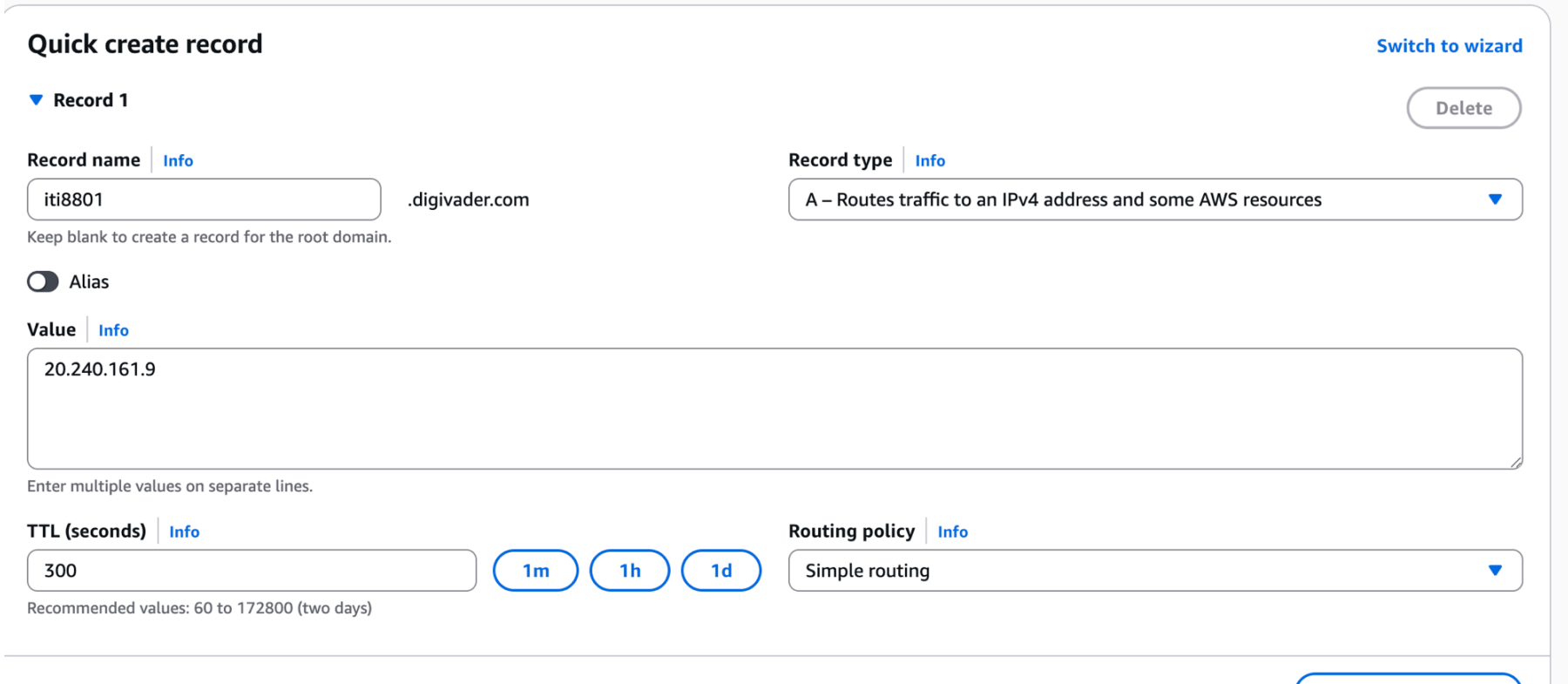
The point of this step is that **you** create a DNS **A record** pointing at your VM's public IP. A provider-generated name (Azure's DNS label, `nip.io`) doesn't count — no record of yours involved.

Where	What you get	Cost
GitHub Student Developer Pack — education.github.com/pack	a real domain for a year (Namecheap `.me`, Name.com) with a DNS console	free with student status
Free subdomain services — freedns.afraid.org, DuckDNS	a subdomain under a shared domain, you manage the record	free
Your own domain	have one or buy one (`.ee` registrar, Cloudflare Registrar) — full control	~€10–20/year

A domain of your own is one record

An **A record**: name → IPv4 address. **This is my domain, in AWS (Route 53) — your screen depends on where your domain lives, but the record is the same everywhere:** name, type A, the VM's public IP. Here it points at an Azure VM — DNS does not care where the machine is.

TTL 300 = resolvers cache the answer for 5 minutes; short TTL means changes take effect fast.



HTTPS: a certificate is bound to a *name*

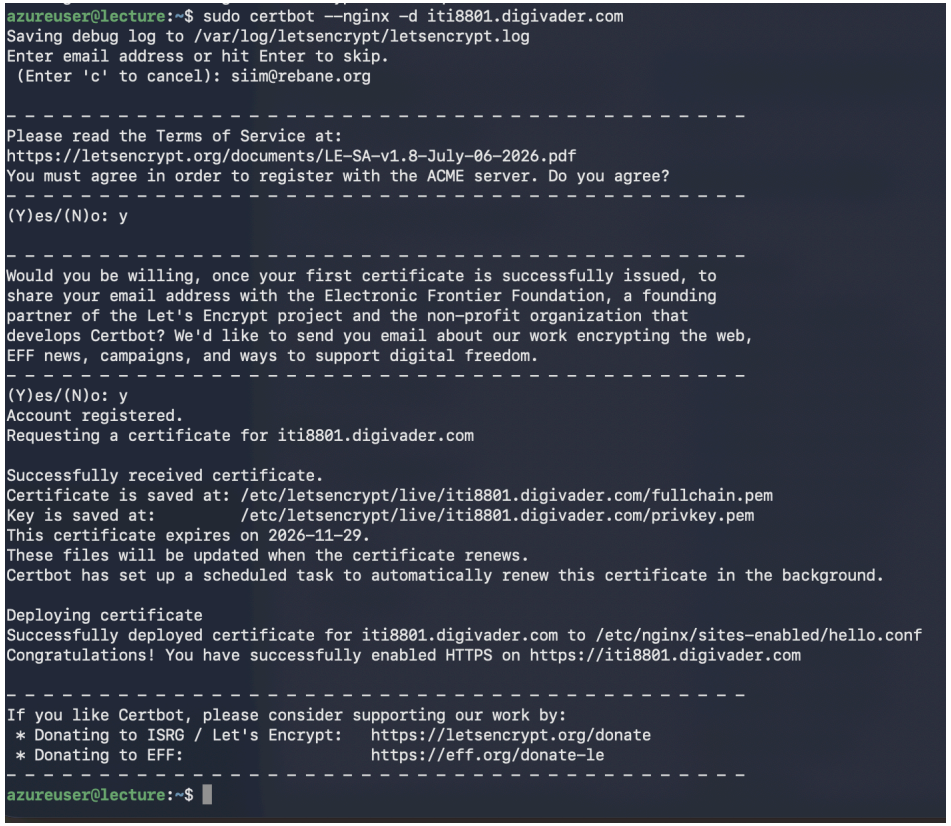
That's why HTTPS had to wait for DNS. With the domain in place it's three commands:

```
sudo apt install -y certbot python3-certbot-nginx
sudo certbot --nginx -d <your-domain>
curl https://<your-domain>/hello
```

Port 443 must be open in the network rules, and the nginx block needs `server_name <your-domain>;`.

What certbot just did

Proved to Let's Encrypt **over port 80** that this machine answers for the name → got a certificate → **rewrote the nginx config itself** → scheduled automatic renewal. Certificates live 90 days; the renewal timer means nobody has to remember.



Stuck?

Problems, questions — **ask**. That's what this session is for.

The problems that blocked people in week 1, with their fixes, are a deck of their own on the course site: **Practice 1 · Known problems and fixes**. Start there if the VM form shows no usable size.