

```

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        "Maryam R.Aliabadi, August 7th, 2023"
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        "\n",
        "- Set up your Azure account\n",
        "- Understanding the organization of cloud services\n",
        "- Azure user interfaces"
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        "## Organization of cloud services\n",
        "\n",
        "### Region\n",
        "Before setting up a cloud service or setting up a server in Azure, we
first want to know in which part of the world we will set up our
instance. Azure has more than 60 regions worldwide, including the US
(many regions within the US), Canada, China, India, Africa, the Middle
East, etc.\n",
        "\n",
        "Please check out this
[map](https://datacenters.microsoft.com/globe/explore), and it shows all
the available regions and all regions that will be launching soon.\n",
        "\n",
        "{tip}\n",
        "Setting up instances and data storage in a region closest to you is
one of the reasons it can be accessed at lightning speed.\n",
        "\n",
        "\n"
      ]
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}

```

"\n",

"\n",

"> **Important:** Since we are in Canada, we might want to set up our instance in Canada. However, depending on the specific Azure services and configurations, some services might not be available in all regions. Therefore, it's important to check the [products available by region](<https://azure.microsoft.com/en-us/explore/global-infrastructure/products-by-region/>) page on the Azure website. For example, if a specific service is not available in the Canada region, you might choose a nearby region such as `East US` or `Central US`.\n",

"\n",

"\n",

Availability Zones\n",

"A region in Azure consists of one or more availability zones. These are **isolated locations within a region**, and each availability zone **consists of one or more data centers**. Each data center is equipped with independent power, cooling, and networking to ensure resilience. Azure guarantees a 99.99% VM uptime SLA when two or more VMs are deployed across two or more Availability Zones in the same Azure region.\n",

"\n",

"For example, the `East US` region has 3 availability zones represented by a region code followed by a number identifier: `1`, `2`, and `3`. It's important to note that the identifiers for Availability Zones (like `1`, `2`, and `3`) are logically mapped to the physical zones for each subscription. The physical location of zone `1` in one subscription may not map to zone `1` in another subscription.\n",

"\n",

"Azure recommends distributing your VMs across multiple availability zones within a region to ensure high availability and resilience. These availability zones are **interconnected using high-speed private networking (low-latency links)**.\n",

"\n",

Network Security Group\n",

"\n",

"In Azure, a Network Security Group (NSG) serves a similar purpose as a security group in AWS. It acts as a firewall that controls inbound and outbound traffic to resources connected to Azure Virtual Networks (VNet). You can specify rules in the NSG to allow or deny traffic based on source and destination IP address, port, and protocol.\n",

"\n",

Virtual Network and Subnets\n",

"\n",

"Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of Azure resources, such as Azure Virtual Machines (VM), to securely communicate with each other, the internet, and on-premises networks. A VNet is similar to a

traditional network that you'd operate in your own data center but brings with it additional benefits of Azure's infrastructure such as scale, availability, and isolation.\n",

"\n",

Policy\n",

"\n",

"In Azure, policies are used to enforce different rules and effects over your resources, so those resources stay compliant with your corporate standards and service level agreements. Azure Policy does this by running evaluations of your resources and scanning for those not compliant with the policies you have created. For example, you could have a policy to allow only a certain SKU size of virtual machines in your environment.\n",

"\n",

Azure Active Directory (Azure AD)\n",

"\n",

"Azure Active Directory (Azure AD) is Microsoft's cloud-based identity and access management service, which helps your employees sign in and access resources. You can use it to provide secure access to your organization's resources, manage and control access, and analyze access to refine permissions across Azure.\n",

"\n",

"- Create an account in Azure (root user)\n",

" - Root user\n",

" - Azure AD user\n",

"\n",

"- Setup Azure AD users\n",

" - Create ***groups*** based on the responsibilities (eg: Administrators/ Students)\n",

" - Attach a ***role*** to the group\n",

" - Built-in roles (eg: Owner, Contributor, Reader)\n",

" - Custom/ User defined roles\n",

" - Add the ***users*** to the respective groups\n",

"\n",

"Azure AD provides an advanced set of features including enterprise-level identity governance, Privileged Identity Management (PIM), Identity Protection, Access Reviews, and more. It also supports a broad range of industry protocols including SAML, WS-Federation, and OAuth.\n",

"\n",

Useful links to Azure global infrastructure & security\n",

"\n",

"Here are some articles related to Azure global infrastructure and security.\n",

"\n",

"- [Regions and availability zones](<https://docs.microsoft.com/en-us/azure/availability-zones/az-overview>)\n",

```

    "- [List of regions and availability
zones](https://azure.microsoft.com/en-us/global-infrastructure/geographies/
)\n",
    "- [Virtual Network and
subnets](https://docs.microsoft.com/en-us/azure/virtual-network/virtual-net
works-overview)\n",
    "- [Network Security
Group](https://docs.microsoft.com/en-us/azure/virtual-network/security-over
view)\n",
    "- [Route
tables](https://docs.microsoft.com/en-us/azure/virtual-network/manage-route
-table)\n",
    "- [Security
groups](https://docs.microsoft.com/en-us/azure/virtual-network/security-ove
rview#network-security-groups)"
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    "# Azure Lab Setup\n",
    "\n",
    "Great! Let's get started with setting up your Azure account. Azure
provides a wide range of cloud services that you'll be using throughout
this course. Here are the steps to get started:\n",
    "\n",
    "1. Check your email for an invitation to join Azure Lab Services.\n",
    "2. Click on the link provided in the email.\n",
    "3. You'll be redirected to a sign-in page. Sign in with your
student.ubc.ca microsoft account.\n",
    "4. After signing in, you'll be able to see the lab that you've been
invited to.\n",
    "5. Click on 'Accept' to join the lab.\n",
    "\n",
    "Once you've accepted the invitation, you can start using the resources
provided in the lab. Enjoy exploring Azure! Let me know if you have any
other questions.\n",
    "Azure for Students provides a $100 credit when you create your
account. This should be more than enough for you to complete your projects.
However, if you exhaust this credit, additional credits will not be
provided. So, please make sure you manage your resources wisely and shut
down any resources when not in use to avoid unnecessary charges.\n"
  ]
},

```

```

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    "## Ways to interact with Azure\n",
    "\n",
    "### Web interface\n",
    "A [web-based GUI](https://portal.azure.com/) provides the capability
to interact with the services within Azure.\n",
    "\n",
    "- Login to your Azure Lab Services account and navigate to the
[lab](https://portal.azure.com/#view/Microsoft_Azure_Education/EducationMen
uBlade/~~/overview) you've been invited to. This will show you the Lab you
are enrolled in. Now click on Microsoft Azure banner which will take you to
the Azure portal. Here you can see all the services that Azure provides,
and you can interact with them."
  ]
},
{
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    "### Azure Extension in VS Code\n",
    "\n",
    "1. Open Visual Studio Code.\n",
    "2. Press `Ctrl+Shift+X` to open the Extensions window.\n",
    "3. In the search bar, type \"Azure Tools\" to find the Azure Tools
extension.\n",
    "4. Click on the Install button to install the extension.\n",
    "\n",
    "Once the extension is installed, you'll need to sign in to your Azure
account:\n",
    "\n",
    "1. On the left-hand panel, you'll see an Azure icon. Select this icon,
and a control panel for Azure services will appear.\n",
    "2. Choose \"Sign in to Azure...\" to complete the authentication
process for the Azure tools in Visual Studio Code.\n",
    "3. After you've signed in, you'll see all of your existing resources
in the Resources view.\n",
    "\n",
    "Now you can create and manage these services directly from Visual
Studio Code.\n"
  ]
},
}

```

```

{
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    "### Azure CLI\n",
    "This is a command-line way to interact with Azure. \n",
    "\n",
    "To install the Azure CLI, you can follow the instructions  

[here](https://learn.microsoft.com/en-us/cli/azure/install-azure-cli).\n",
    "\n",
    "Here are minimal instructions:\n",
    "\n",
    "1) Download the Azure CLI.\n"
  ]
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  },
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    "curl -sL https://aka.ms/InstallAzureCLIDeb | sudo bash"
  ]
},
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    "2) With step 1, you have installed Azure CLI. Now we need to set it up  

(configuration) to interact with services in your account. We usually need  

***access key*** and ***secret***, and usually, you set up this in your  

account as mentioned in [this  

article](https://docs.microsoft.com/en-us/cli/azure/authenticate-azure-cli)  

. But in our case, we are using a student account or a student way of  

accessing an Azure account, so we don't have that option mentioned in the  

article. You need to get ***access key***,***secret*** and ***session  

token*** (an additional parameter) from the current session in your  

***Azure Lab Services console***.\n",
    "\n",

```

```

    "First to create the file under `~/azure/credentials` you can run;"
  ]
},
{
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    }
  },
  "outputs": [],
  "source": [
    "az configure"
  ]
},
{
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  "source": [
    "\n",
    "and you can use the following configuration:\n"
  ]
},
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    "vscode": {
      "languageId": "plaintext"
    }
  },
  "outputs": [],
  "source": [
    "aryan@Aryan$ az configure\n",
    "\n",
    "Welcome to the Azure CLI! This command will guide you through logging  

in and setting some default values.\n",
    "\n",
    "Your settings can be found at /home/aryan/.azure/config\n",
    "Your current configuration is as follows:\n",
    "\n",
    "[cloud]\n",

```

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    "name = AzureCloud\n",
    "\n",
    "Do you wish to change your settings? (y/N): y\n",
    "\n",
    "What default output format would you like?\n",
    " [1] json - JSON formatted output that most closely matches API
responses.\n",
    " [2] jsonc - Colored JSON formatted output that most closely matches
API responses.\n",
    " [3] table - Human-readable output format.\n",
    " [4] tsv - Tab- and Newline-delimited. Great for GREP, AWK, etc.\n",
    " [5] yaml - YAML formatted output. An alternative to JSON. Great for
configuration files.\n",
    " [6] yamlc - Colored YAML formatted output. An alternative to JSON.
Great for configuration files.\n",
    " [7] none - No output, except for errors and warnings.\n",
    "Please enter a choice [Default choice(1)]:\n",
    "\n",
    "Would you like to enable logging to file? (y/N): y\n",
    "\n",
    "Microsoft would like to collect anonymous Azure CLI usage data to
improve our CLI. Participation is voluntary and when you choose to
participate, your device automatically sends information to Microsoft about
how you use Azure CLI. To update your choice, run \"az configure\"
again.\n",
    "Select y to enable data collection. (Y/n): n\n",
    "\n",
    "CLI object cache time-to-live (TTL) in minutes [Default: 10]:\n",
    "\n",
    "You're all set! Here are some commands to try:\n",
    " $ az login\n",
    " $ az vm create --help\n",
    " $ az feedback"
]
},
{
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    "Now you can run `az login` to SSO into your Azure account. Select your
student.ubc.ca email address to complete the authentication. After
successful authentication, you can see your account details as follows:"
]
},
{

```

```

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},
"outputs": [],
"source": [
  "aryan@Aryan$ az login\n",
  "A web browser has been opened at
https://login.microsoftonline.com/organizations/oauth2/v2.0/authorize.
Please continue the login in the web browser. If no web browser is
available or if the web browser fails to open, use device code flow with
`az login --use-device-code`.\n",
  "[\n",
  "  {\n",
  "    \"cloudName\": \"AzureCloud\",\n",
  "    \"homeTenantId\": \"2fff08c9-91d4-4fc8-bbdd-XXXXXXXXXX\",\n",
  "    \"id\": \"63150a0a-8be1-4eca-92b0-XXXXXXXXXX\",\n",
  "    \"isDefault\": true,\n",
  "    \"managedByTenants\": [],\n",
  "    \"name\": \"XXXXXXXXXXXXXXXXXX\",\n",
  "    \"state\": \"Enabled\",\n",
  "    \"tenantId\": \"2fff08c9-91d4-4fc8-bbdd-XXXXXXXXXX\",\n",
  "    \"user\": {\n",
  "      \"name\": \"XXXXXXX@student.ubc.ca\",\n",
  "      \"type\": \"user\"\n",
  "    }\n",
  "  }\n",
  "]\n",
]
},
{
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  "metadata": {},
  "source": [

```

"[Here](<https://docs.microsoft.com/en-us/cli/azure/authenticate-azure-cli>) is an article that you can refer to. (just put here as a reference, it is not necessary to check out this)\n",

"\n",

"3) ALL DONE !!! The Azure CLI can be used to interact with many services. Check this

```
[out](https://docs.microsoft.com/en-us/cli/azure/reference-index). We will use CLI to interact with storage and VMs (next lecture).\n",
```

```
"\n",
```

```
"Just to make sure that you configured it correctly, you can run `az account show` and you should see the above message again. If you see an error, then you need to check your credentials."
```

```
]
```

```
},
```

```
{
```

```
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```

```
"id": "2d26116f",
```

```
"metadata": {},
```

```
"source": [
```

```
"### Azure SDK\n",
```

```
"\n",
```

```
"[Azure SDK Webpage](https://azure.microsoft.com/en-us/downloads/)\n",
```

```
"\n",
```

```
"A software development kit (SDK) is a collection of software development tools in one installable package. They ease the creation of applications by having a compiler, debugger and perhaps a software framework. They are normally specific to a hardware platform and operating system combination. To create applications with advanced functionalities such as advertisements, push notifications, and more, most app developers use specific software development kits.\n",
```

```
"\n",
```

```
"Azure SDKs are collections of libraries built to make it easier to use Azure services from your language of choice. These libraries are designed to be consistent, approachable, diagnosable, dependable, and idiomatic1. You can find the Azure SDK for various programming languages like .NET, Java, JavaScript/TypeScript, Python, Go, C++, etc. \n",
```

```
"\n",
```

```
"You can find more information about Azure SDKs on their [GitHub page](https://github.com/Azure/azure-sdk). A good [blog post](https://adamraffe.com/2019/02/20/aws-fundamentals-part-3-interacting-with-aws/) explains various ways of interaction with AWS which can be applied to Azure as well.\n"
```

```
]
```

```
},
```

```
{
```

```
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```

```
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```

```
"source": [
```

```
"### [Azure Resource
```

```
Manager](https://docs.microsoft.com/en-us/azure/azure-resource-manager/management/overview)\n",
```

```
"\n",
```

```
"Azure Resource Manager 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. You use management features, like access control, locks, and tags, to secure and organize your resources after deployment.\n",
```

```
"\n",
```

```
"When a user sends a request from any of the Azure tools, APIs, or SDKs, the Resource Manager receives the request. It authenticates and authorizes the request. Resource Manager sends the request to the Azure service, which takes the requested action. Therefore, all requests to manage resources using the tools or code must be sent through the Resource Manager.\n",
```

```
"\n",
```

```
"Just like AWS CloudFormation, Azure Resource Manager allows you to provision your applications using a declarative template. In a single template, you can deploy multiple services along with their dependencies. You use the same template to repeatedly deploy your application during every stage of the application lifecycle."
```

```
]
```

```
},
```

```
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```

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```

```
],
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```
  },
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```

```
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```

```
    },
```

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```

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```

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```

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```

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    }
  },
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