



Terraform

Vishwas Mishra

What is Terraform and its uses

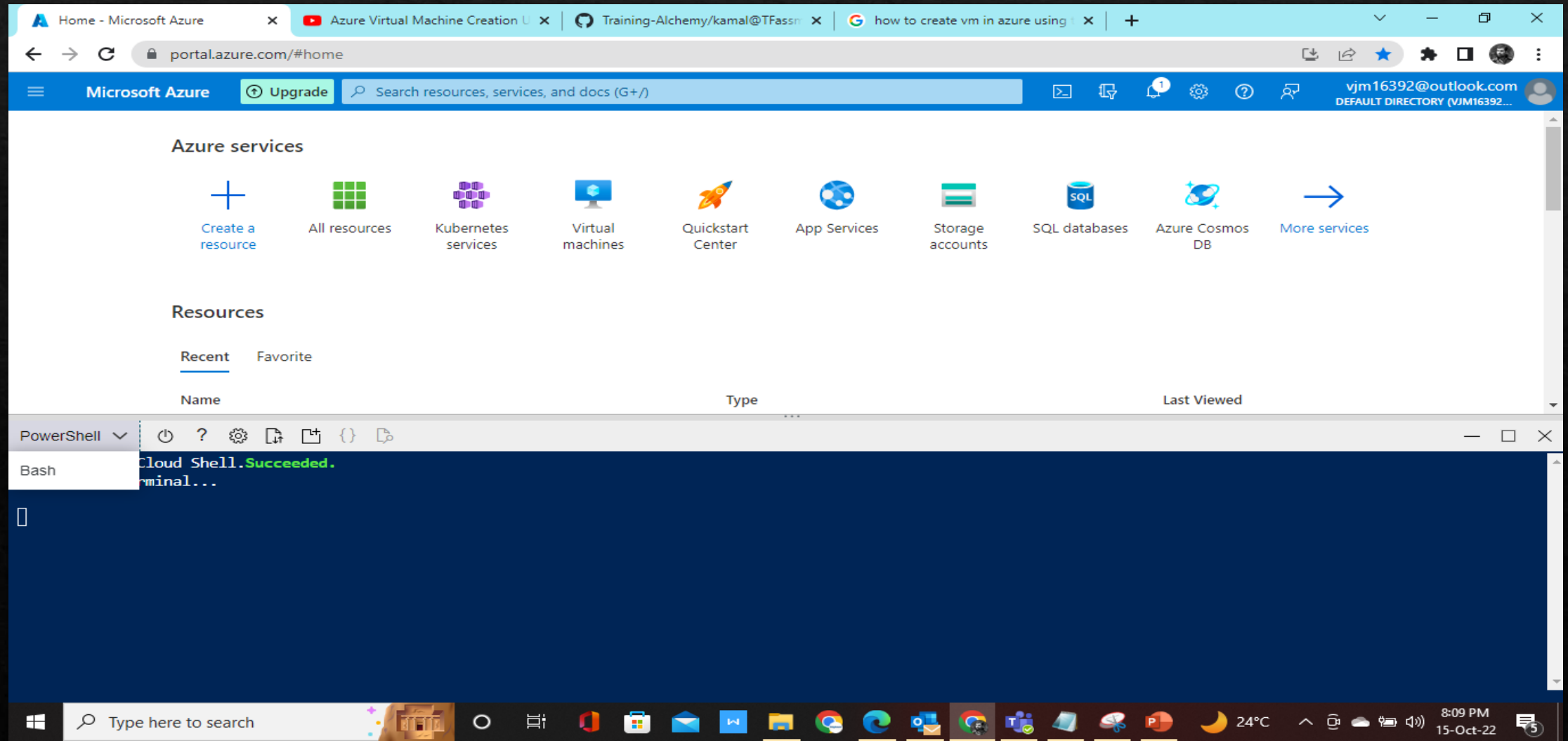
Terraform is an IAC tool, used primarily by DevOps teams to automate various infrastructure tasks. The provisioning of cloud resources, for instance, is one of the main use cases of Terraform. It's a cloud-agnostic, open-source provisioning tool written in the Go language and created by HashiCorp



How to create VM in Azure via using Terraform

- ◆ Login to Azure portal, Each platform having their own shell terminal. In Azure default shell is Bash and powershell so user can choose any terminal by its own choice or as per requirement for performing Terraform execution
- ◆ In next slide will see the image how to access terminal

Image of terminal in Azure portal



Once login in Azure Cli.

Terraform is already installed so no need to worry about installation user can directly access and use it.

- ◆ Make a directory in terminal with any name by using mkdir command
- ◆ Inside directory we need to create two files in .tf format. For execution of Terraform. For example (touch abc.tf)
- ◆ File 1 with provider.tf and file 2 main.tf
- ◆ Image in next slide.....

Home - Microsoft Azure

Azure Virtual Machine Creation U

Training-Alchemy/kamal@TFassm

how to create vm in azure using t

+

portal.azure.com/#home

Microsoft Azure

Upgrade

Search resources, services, and docs (G+/)

1

vjm16392@outlook.com

DEFAULT DIRECTORY (VJM16392...

PowerShell

Bash

Cloud Shell.Succeeded.

terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI

Type "help" to learn about Cloud Shell

MOTD: Save files to \$home/clouddrive for persistence across sessions

VERBOSE: Authenticating to Azure ...

VERBOSE: Building your Azure drive ...

PS /home/vishwas> ls

clouddrive vjm

PS /home/vishwas> cd vjm

PS /home/vishwas/vjm> ls

downloads.html main.tf provider.tf terraform.tfstate terraform.tfstate.backup

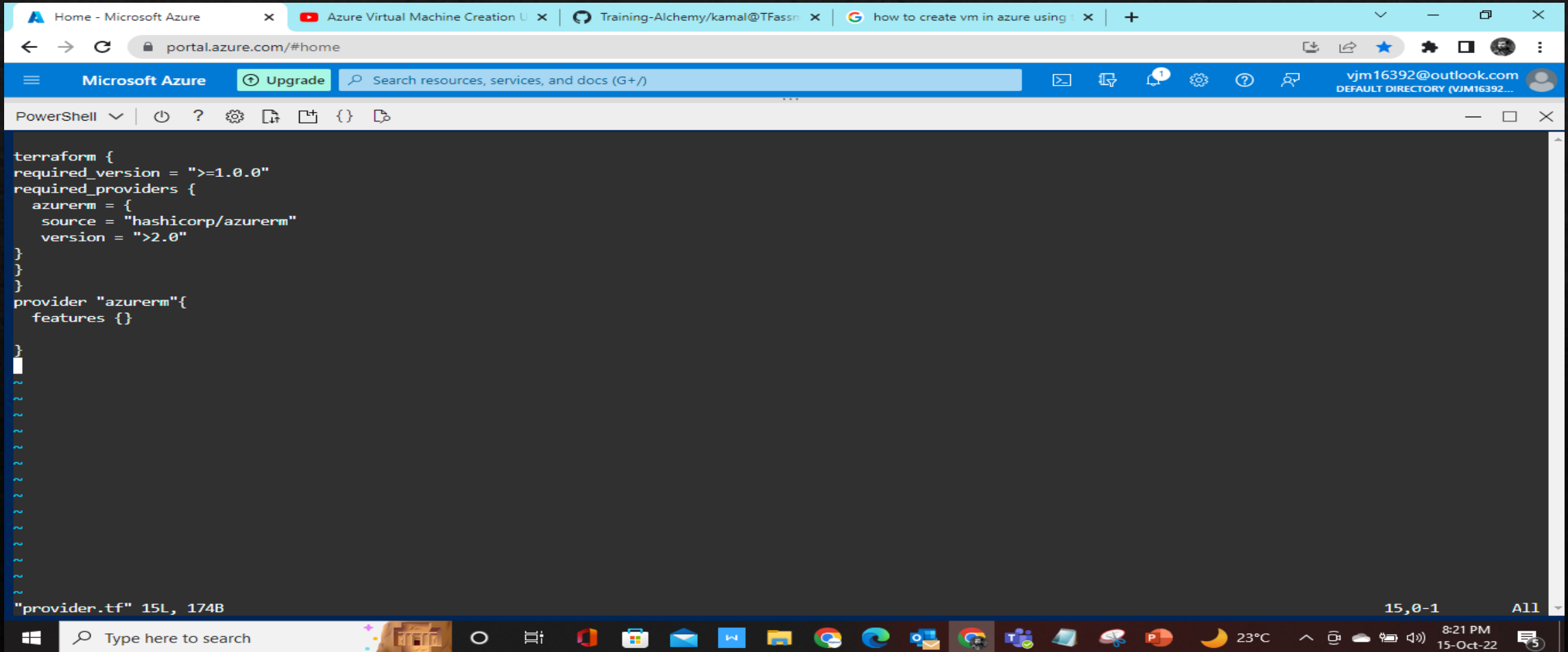
PS /home/vishwas/vjm>

Type here to search

8:19 PM

15-Oct-22

Every resource type is implemented by a provider; without providers, Terraform can't manage any kind of infrastructure.



The screenshot shows the Microsoft Azure portal interface. The browser tabs include 'Home - Microsoft Azure', 'Azure Virtual Machine Creation U', 'Training-Alchemy/kamal@TFassn', and 'how to create vm in azure using'. The address bar shows 'portal.azure.com/#home'. The portal header includes the 'Microsoft Azure' logo, an 'Upgrade' button, a search bar, and the user's email 'vjm16392@outlook.com'. The main content area displays a Terraform configuration file named 'provider.tf' with the following content:

```
terraform {
  required_version = ">=1.0.0"
  required_providers {
    azurerm = {
      source = "hashicorp/azurerm"
      version = ">2.0"
    }
  }
}
provider "azurerm"{
  features {}
}
```

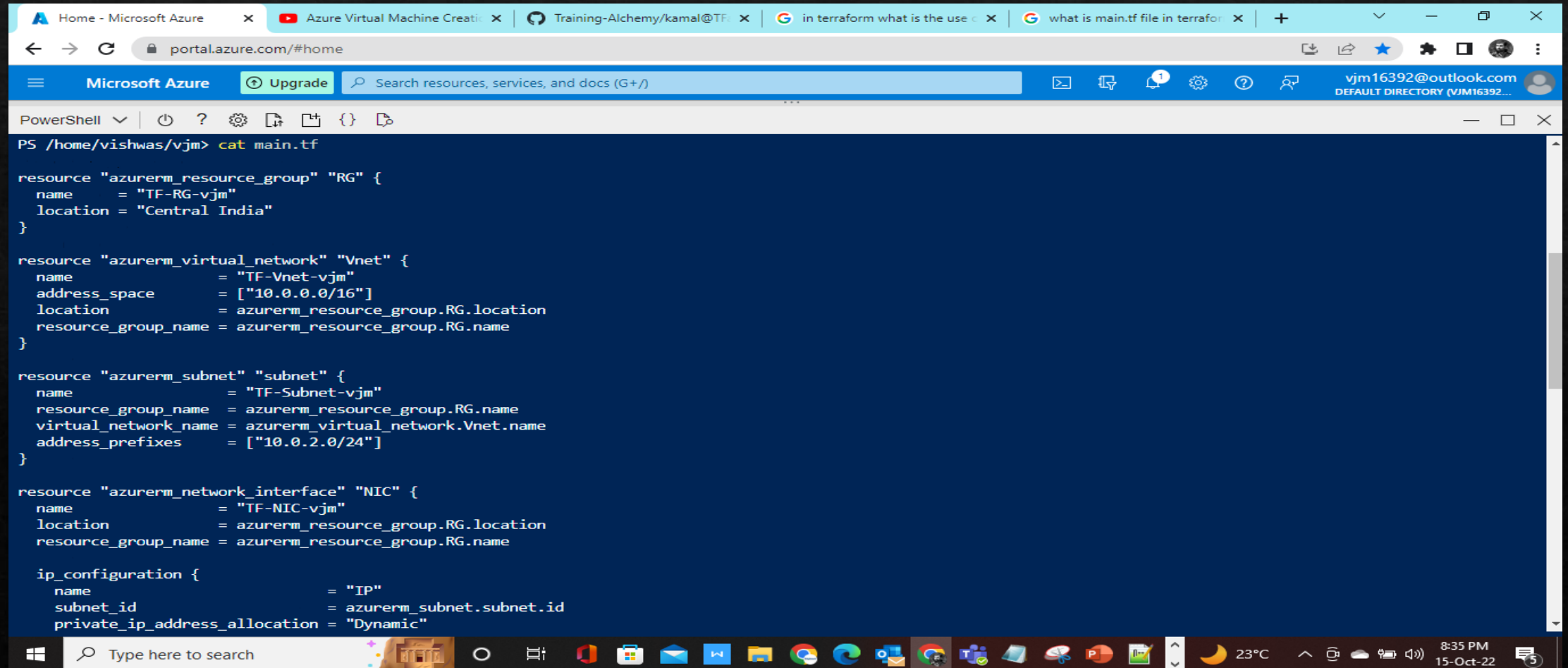
The status bar at the bottom of the code editor shows '15,0-1' and 'All'. The Windows taskbar at the very bottom includes the search bar, task view, and various application icons.

After provider.tf script will edit main.tf file.

- ◇ main.tf will contain the main set of configuration for your module.
- ◇ Main.tf Image in next slide with VM configuration script

Main.tf script image
code available in github

<https://github.com/vsvvkt/Training-Alchemy.git>
inside vishwas folder



```
PS /home/vishwas/vjm> cat main.tf

resource "azurerm_resource_group" "RG" {
  name     = "TF-RG-vjm"
  location = "Central India"
}

resource "azurerm_virtual_network" "Vnet" {
  name            = "TF-Vnet-vjm"
  address_space   = ["10.0.0.0/16"]
  location        = azurerm_resource_group.RG.location
  resource_group_name = azurerm_resource_group.RG.name
}

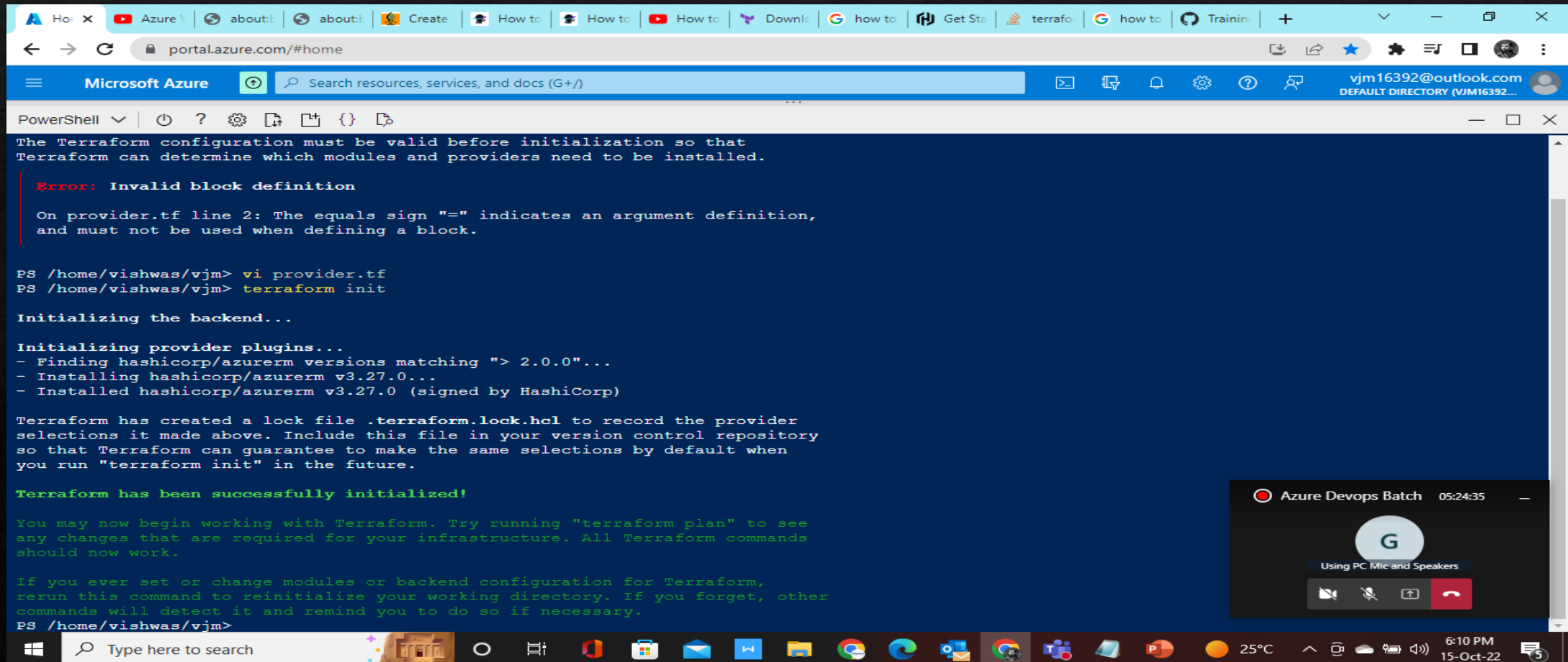
resource "azurerm_subnet" "subnet" {
  name                 = "TF-Subnet-vjm"
  resource_group_name = azurerm_resource_group.RG.name
  virtual_network_name = azurerm_virtual_network.Vnet.name
  address_prefixes     = ["10.0.2.0/24"]
}

resource "azurerm_network_interface" "NIC" {
  name                = "TF-NIC-vjm"
  location            = azurerm_resource_group.RG.location
  resource_group_name = azurerm_resource_group.RG.name

  ip_configuration {
    name                          = "IP"
    subnet_id                    = azurerm_subnet.subnet.id
    private_ip_address_allocation = "Dynamic"
  }
}
```

Once script is done in main.tf

Run the command terraform init



```
Microsoft Azure
Search resources, services, and docs (G+/)
PowerShell
The Terraform configuration must be valid before initialization so that
Terraform can determine which modules and providers need to be installed.

Error: Invalid block definition

On provider.tf line 2: The equals sign "=" indicates an argument definition,
and must not be used when defining a block.

PS /home/vishwas/vjm> vi provider.tf
PS /home/vishwas/vjm> terraform init

Initializing the backend...

Initializing provider plugins...
- Finding hashicorp/azurerm versions matching "> 2.0.0"...
- Installing hashicorp/azurerm v3.27.0...
- Installed hashicorp/azurerm v3.27.0 (signed by HashiCorp)

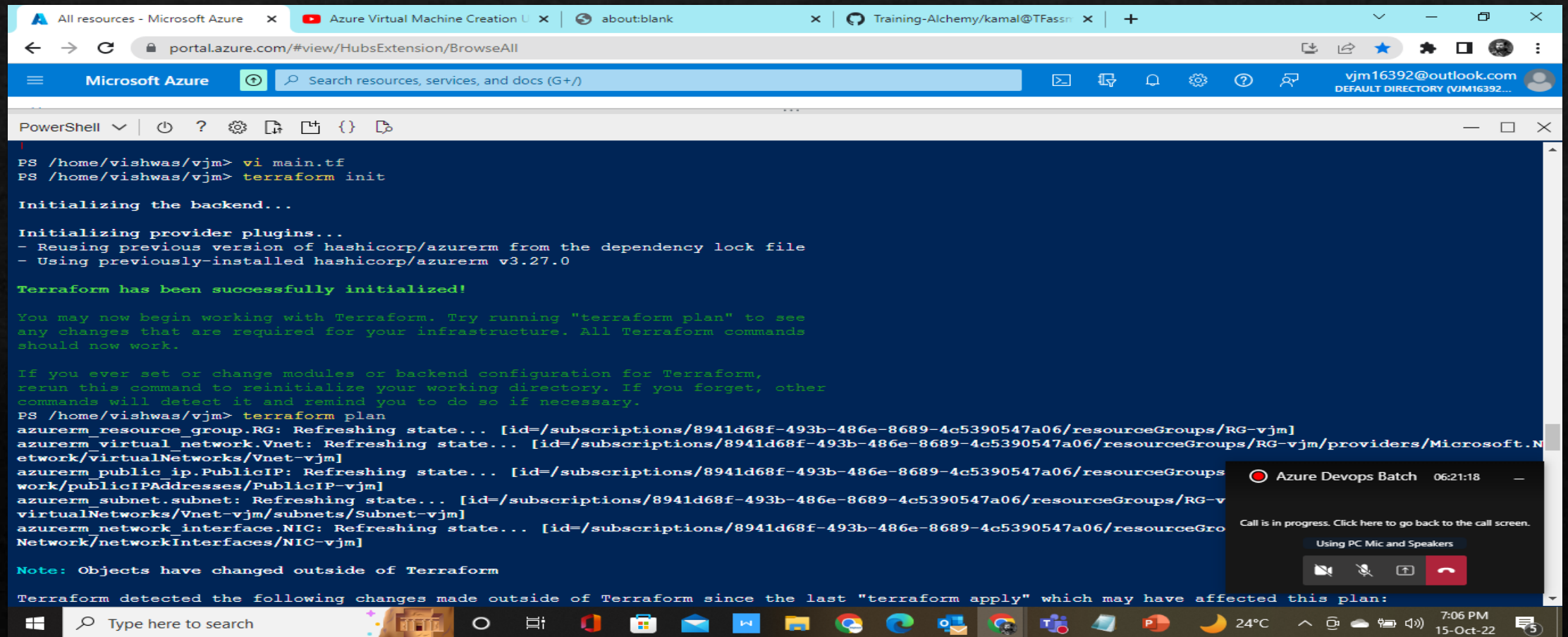
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
PS /home/vishwas/vjm>
```

Once initialize succeed then run the command
(terraform plan) and once plan is succeed
run the command (terraform apply -auto-approve)



The screenshot displays a web browser window with the Microsoft Azure portal open at `portal.azure.com/#view/HubsExtension/BrowseAll`. The browser's address bar shows several tabs, including "All resources - Microsoft Azure", "Azure Virtual Machine Creation U", "about:blank", and "Training-Alchemy/kamal@TFassn". The browser's user interface includes a search bar and a user profile for "vjm16392@outlook.com".

Overlaid on the browser is a PowerShell terminal window. The terminal output shows the following commands and results:

```
PS /home/vishwas/vjm> vi main.tf
PS /home/vishwas/vjm> terraform init

Initializing the backend...

Initializing provider plugins...
- Reusing previous version of hashicorp/azurerm from the dependency lock file
- Using previously-installed hashicorp/azurerm v3.27.0

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
PS /home/vishwas/vjm> terraform plan
azurerm_resource_group.RG: Refreshing state... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm]
azurerm_virtual_network.Vnet: Refreshing state... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm/providers/Microsoft.Network/virtualNetworks/Vnet-vjm]
azurerm_public_ip.PublicIP: Refreshing state... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm/publicIPAddresses/PublicIP-vjm]
azurerm_subnet.subnet: Refreshing state... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm/virtualNetworks/Vnet-vjm/subnets/Subnet-vjm]
azurerm_network_interface.NIC: Refreshing state... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm/networkInterfaces/NIC-vjm]

Note: Objects have changed outside of Terraform

Terraform detected the following changes made outside of Terraform since the last "terraform apply" which may have affected this plan:
```

In the bottom right corner of the terminal window, there is a notification for "Azure DevOps Batch" at 06:21:18, indicating a call is in progress. The Windows taskbar at the bottom shows the time as 7:06 PM on 15-Oct-22, along with various system icons and application shortcuts.

All resources - Microsoft Azure x Azure Virtual Machine Creation U x about:blank x Training-Alchemy/kamal@TFassn x +

portal.azure.com/#view/HubsExtension/BrowseAll

Microsoft Azure Search resources, services, and docs (G+/)

vjm16392@outlook.com
DEFAULT DIRECTORY (VJM16392...

PowerShell

```
+ public_ip_addresses      = (known after apply)
+ resource_group_name      = "TF-RG-vjm"
+ size                    = "Standard_B1S"
+ virtual_machine_id      = (known after apply)

+ os_disk {
+   caching                = "ReadWrite"
+   disk_size_gb          = (known after apply)
+   name                   = (known after apply)
+   storage_account_type   = "Standard_LRS"
+   write_accelerator_enabled = false
+ }

+ source_image_reference {
+   offer    = "WindowsServer"
+   publisher = "MicrosoftWindowsServer"
+   sku      = "2019-Datacenter"
+   version  = "latest"
+ }

+ termination_notification {
+   enabled = (known after apply)
+   timeout = (known after apply)
+ }
+ }
```

Plan: 6 to add, 0 to change, 1 to destroy.

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if

PS /home/vishwas/vjm> terraform apply -auto-approve

Azure Devops Batch 06:22:16

Call is in progress. Click here to go back to the call screen.

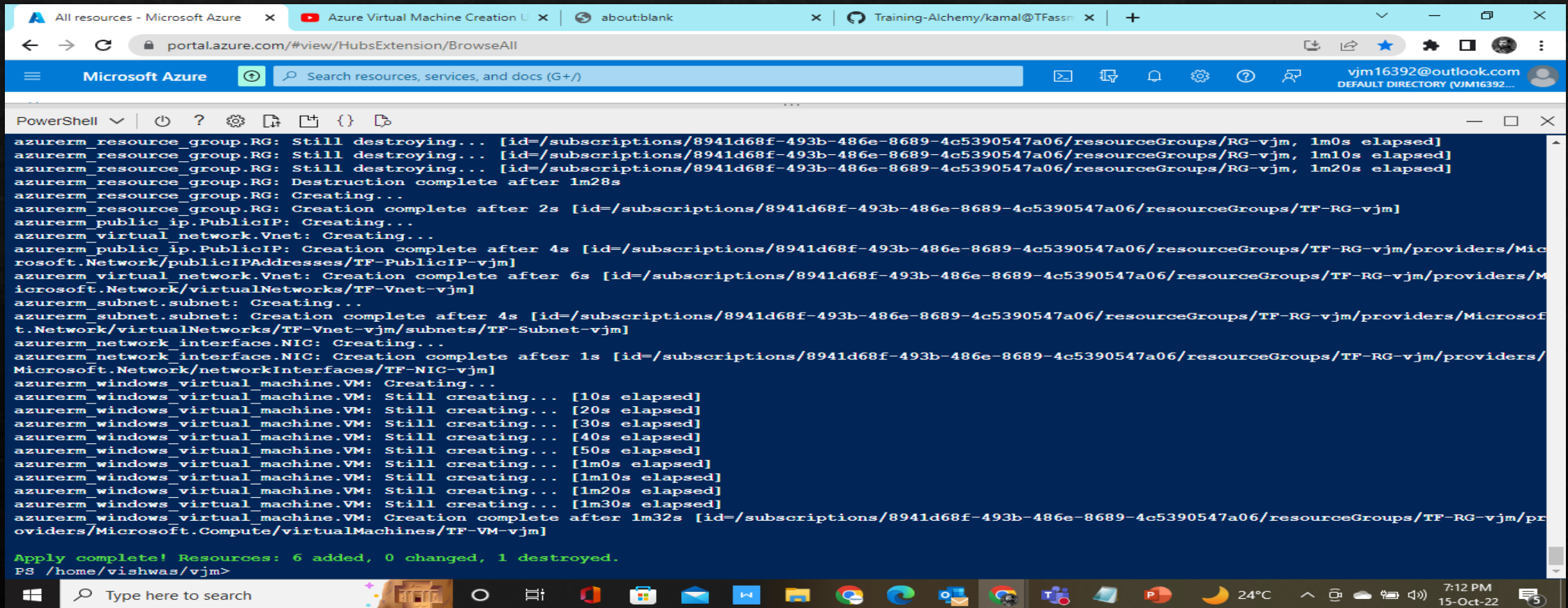
Using PC Mic and Speakers



Type here to search



Once terraform is applied check the resource in Azure portal Vm is Created



The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with the 'All resources - Microsoft Azure' tab selected. Below the navigation bar, there's a search bar and a user profile section. The main content area displays a PowerShell terminal window with the following output:

```
azurerm_resource_group.RG: Still destroying... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm, 1m0s elapsed]
azurerm_resource_group.RG: Still destroying... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm, 1m10s elapsed]
azurerm_resource_group.RG: Still destroying... [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/RG-vjm, 1m20s elapsed]
azurerm_resource_group.RG: Destruction complete after 1m28s
azurerm_resource_group.RG: Creating...
azurerm_resource_group.RG: Creation complete after 2s [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/TF-RG-vjm]
azurerm_public_ip.PublicIP: Creating...
azurerm_virtual_network.Vnet: Creating...
azurerm_public_ip.PublicIP: Creation complete after 4s [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/TF-RG-vjm/providers/Microsoft.Network/publicIPAddresses/TF-PublicIP-vjm]
azurerm_virtual_network.Vnet: Creation complete after 6s [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/TF-RG-vjm/providers/Microsoft.Network/virtualNetworks/TF-Vnet-vjm]
azurerm_subnet.subnet: Creating...
azurerm_subnet.subnet: Creation complete after 4s [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/TF-RG-vjm/providers/Microsoft.Network/virtualNetworks/TF-Vnet-vjm/subnets/TF-Subnet-vjm]
azurerm_network_interface.NIC: Creating...
azurerm_network_interface.NIC: Creation complete after 1s [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/TF-RG-vjm/providers/Microsoft.Network/networkInterfaces/TF-NIC-vjm]
azurerm_windows_virtual_machine.VM: Creating...
azurerm_windows_virtual_machine.VM: Still creating... [10s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [20s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [30s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [40s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [50s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [1m0s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [1m10s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [1m20s elapsed]
azurerm_windows_virtual_machine.VM: Still creating... [1m30s elapsed]
azurerm_windows_virtual_machine.VM: Creation complete after 1m32s [id=/subscriptions/8941d68f-493b-486e-8689-4c5390547a06/resourceGroups/TF-RG-vjm/providers/Microsoft.Compute/virtualMachines/TF-VM-vjm]

Apply complete! Resources: 6 added, 0 changed, 1 destroyed.
PS /home/vishwas/vjm>
```

The terminal window is titled 'PowerShell' and has standard window controls. The background of the terminal is blue with white text. The output shows the successful creation of various Azure resources, including a resource group, public IP, virtual network, subnet, network interface, and a Windows virtual machine. The final line indicates that the application was successful, with 6 resources added, 0 changed, and 1 destroyed.

Image of VM creation and resource

Microsoft Azure

Upgrade

Search resources, services, and docs (G+)

1

vjm16392@outlook.com
DEFAULT DIRECTORY (VJM16392...

Home >

All resources

Default Directory (vjm16392outlook.onmicrosoft.com)

+ Create

Manage view

Refresh

Export to CSV

Open query

Assign tags

Delete

Filter for any field...

Subscription equals all

Resource group equals all

Type equals all

Location equals all

Add filter

0 Unsecure resources

0 Recommendations

No grouping

List view

<input type="checkbox"/> Name	Type	Resource group	Location	Subscription	
<input type="checkbox"/> csg10032002359a79ac	Storage account	cloud-shell-storage-centralindia	Central India	Free Trial	...
<input type="checkbox"/> NetworkWatcher_centralindia	Network Watcher	NetworkWatcherRG	Central India	Free Trial	...
<input type="checkbox"/> TF-NIC-vjm	Network Interface	TF-RG-vjm	Central India	Free Trial	...
<input type="checkbox"/> TF-PublicIP-vjm	Public IP address	TF-RG-vjm	Central India	Free Trial	...
<input type="checkbox"/> TF-VM-vjm	Virtual machine	TF-RG-vjm	Central India	Free Trial	...
<input type="checkbox"/> TF-VM-vjm_OsDisk_1_8dce5bad832e4f208cc451d569408b45	Disk	TF-RG-VJM	Central India	Free Trial	...
<input type="checkbox"/> TF-Vnet-vjm	Virtual network	TF-RG-vjm	Central India	Free Trial	...

< Previous

Page 1 of 1

Next >

Showing 1 to 7 of 7 records.

Give feedback

Thankyou.....

◆ End of PPT