By Ronald Stewart Lim

Terraform Azure pre-requisites:

- Install Terraform
- Install azure cli

Pre-requisite: Install Terraform

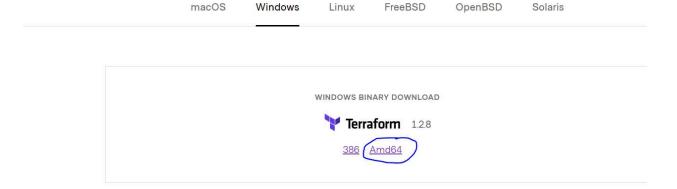
Download terraform exe file in terraform site:

https://www.terraform.io/downloads

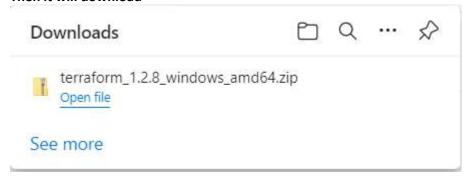
Since I am using windows, go to windows tab and click Amd64



Download Terraform

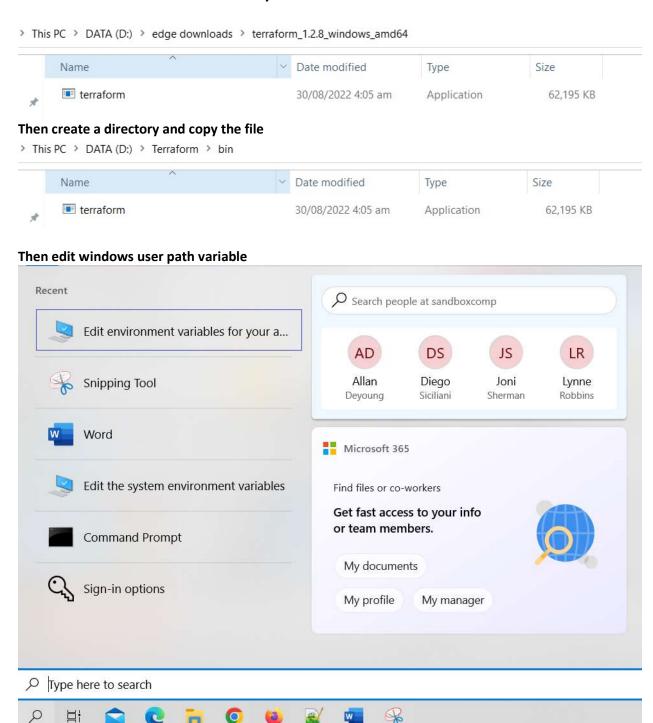


Then it will download



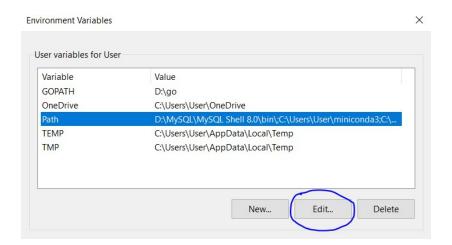
Then extract file you can see terraform executable file

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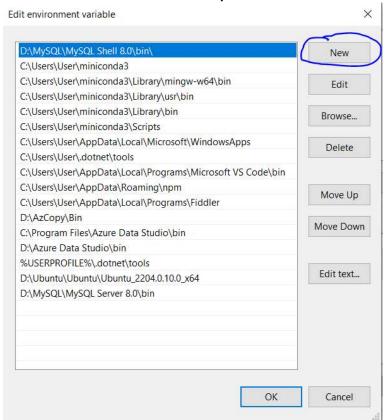


Go to Path variable and click Edit... button

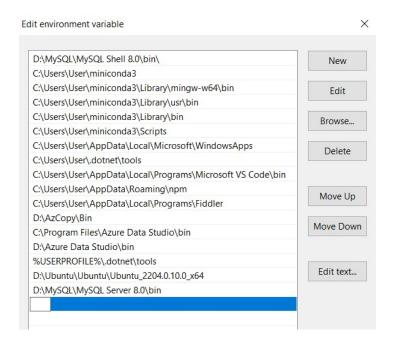
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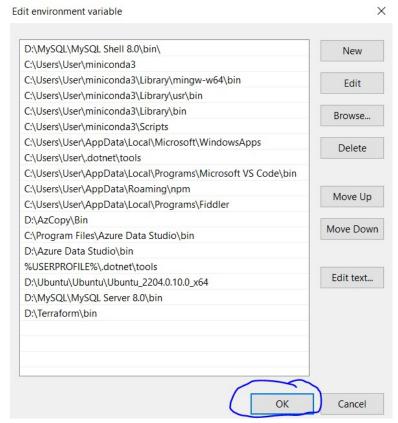
Click New button to Add Terraform path



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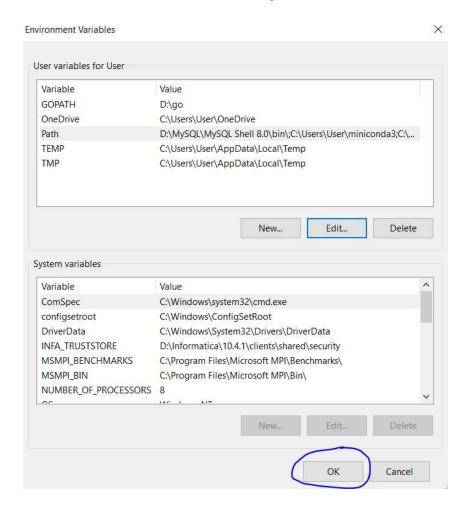


Click OK Button after specifying the path



Click OK Button again

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Open cmd and try to check if terraform is already accessible in any directory by typing: terraform --version

```
Microsoft Windows [Version 10.0.19043.1889]
(c) Microsoft Corporation. All rights reserved.

C:\Users\User>terraform --version

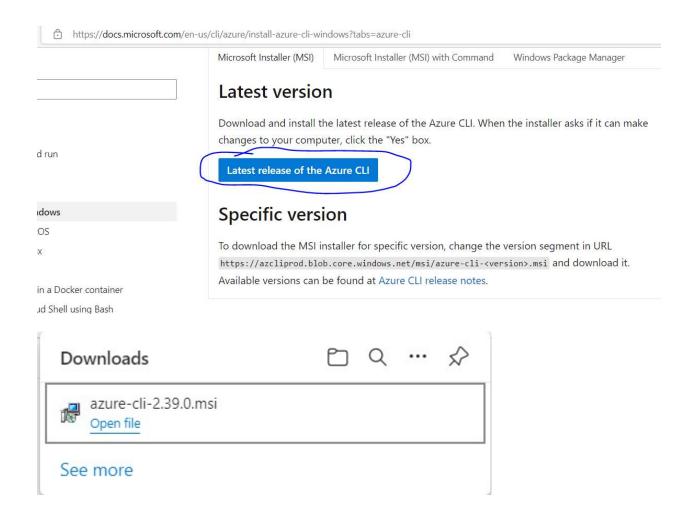
Terraform v1.2.8
on windows_amd64

C:\Users\User>
```

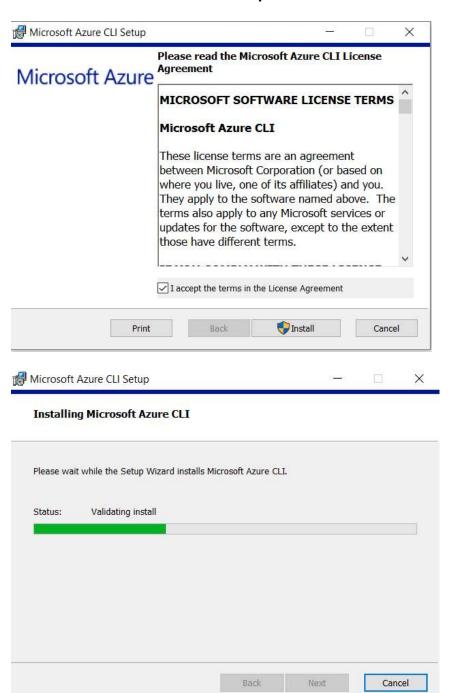
Pre-requisite: Install Azure CLI

Go to the link below and click Latest release of the Azure CLI button to download the installer <a href="https://docs.microsoft.com/en-us/cli/azure/install-azure-cli-windows?tabs=azure-cli-windows.tabs=azur

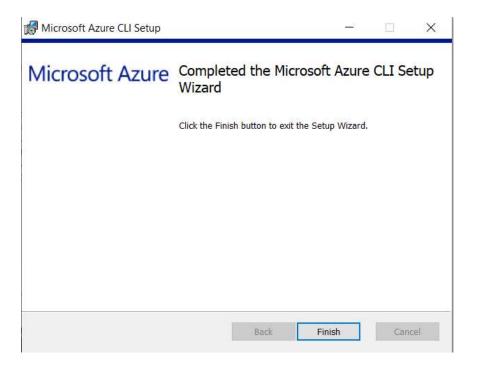
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Then open the installer and install the CLI



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Verify that the Azure CLI is installed successfully via cmd using command below az --version

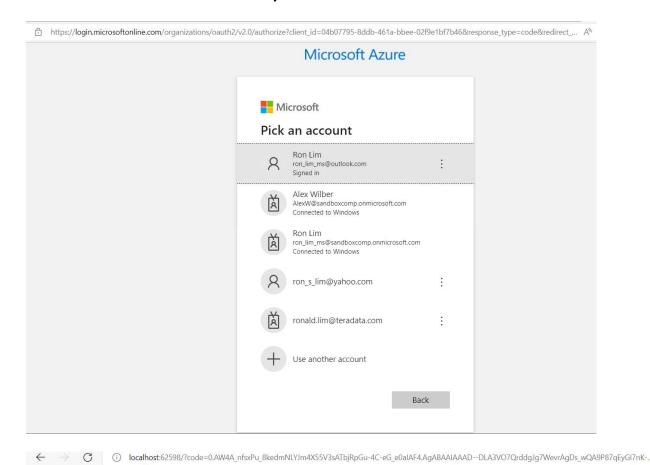
```
:\Users\User>az --version
azure-cli
                                      2.39.0
                                      2.39.0
core
telemetry
Dependencies:
msal
                                    1.18.0b1
azure-mgmt-resource
                                    21.1.0b1
Python location 'C:\Program Files (x86)\Microsoft SDKs\Azure\CLI2\python.exe'
Extensions directory 'C:\Users\User\.azure\cliextensions'
Python (Windows) 3.10.5 (tags/v3.10.5:f377153, Jun 62022, 15:58:59) [MSC v.192932 bit (Intel)]
Legal docs and information: aka.ms/AzureCliLegal
You have 1 updates available.
Please let us know how we are doing: https://aka.ms/azureclihats
and let us know if you're interested in trying out our newest features: https://aka.ms/CLIUXstudy
```

Terraform Implementation: Authentication via Azure CLI

Login to Azure via Azure CLI in cmd

D:\Terraform\terraform_azure>az login
A web browser has been opened at https://login.microsoftonline.com/organizations/oauth2/v2.0/authorize. Please continue the login in the web browser.
open, use device code flow with `az login --use-device-code`.

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You have logged into Microsoft Azure!

You can close this window, or we will redirect you to the Azure CLI documents in 10 seconds.

Go to the location of the desired main.tf and edit the details.

Note: Resource Group and Location are very important here. Also, provider block with features is also very important

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```
D:\Terraform\terraform_azure\Storage>notepad main.tf
D:\Terraform\terraform_azure\Storage>
```

Sample main.tf for Azure Storage Creation:

```
main.tf - Notepad
File Edit Format View Help
provider "azurerm" {
features {}
}
resource "azurerm storage account" "teststorage082022" {
                          = "teststorage082022"
                        = "learn-bef1708a-a461-465d-bf0d-855370cf5bc4"
 resource_group_name
                         = "eastus"
 location
                  = "Standard"
 account tier
 account_replication_type = "LRS"
 tags = {
   environment = "staging"
}
```

After that close the file and initialize the Terraform using command below: terraform init

```
D:\Terraform\terraform_azure\Storage>terraform init

Initializing the backend...

Initializing provider plugins...
- Finding latest version of hashicorp/azurerm...
- Installing hashicorp/azurerm v3.20.0...
- Installed hashicorp/azurerm v3.20.0 (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.

D:\Terraform\terraform\terraform_azure\Storage>
```

(Optional) You can change the main.tf file into terraform-based format by command below:

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terraform fmt

If no output means that the main.tf file is already in terraform format

D:\Terraform\terraform_azure\Storage>terraform fmt

D:\Terraform\terraform_azure\Storage>

If there is an output, the output mentions the file that was converted to terraform format

D:\Terraform\terraform_azure\Storage>terraform fmt main.tf

D:\Terraform\terraform_azure\Storage>

To check and validate the terraform-based codes, execute the command below: terraform validate

If the validation found no errors, then it will output the success message

D:\Terraform\terraform_azure\Storage>terraform validate Success! The configuration is valid.

D:\Terraform\terraform_azure\Storage>

(Optional) Check the Terraform execution plan by using the command below: terraform plan

Sample output below:

```
D:\Terraform\terraform_azure\Storage>terraform plan
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
Terraform will perform the following actions:
 # azurerm_storage_account.teststorage082022 will be created
+ resource "azurerm_storage_account" "teststorage082022" {
                                           = (known after apply)
      + account_kind
                                              "StorageV2"
                                           = "LRS"
      + account_replication_type
+ account_tier
                                           = "Standard"
      + allow_nested_items_to_be_public
                                           = true
      + cross_tenant_replication_enabled = true
       default_to_oauth_authentication = false
       enable_https_traffic_only
                                           = (known after apply)
      + infrastructure_encryption_enabled = false
                                       = false
      + is_hns_enabled
                                        = (known after apply)
= "eastus"
= "TLS1_2"
= "teststorage082022"
       large_file_share_enabled
      + min_tls_version
      + name
      + nfsv3 enabled
                                          = false
      = (sensitive value)
     = (known after apply)
       primary_web_endpoint
primary_web_host
                                          = (known after apply)
= "Service"
       queue_encryption_key_type
                                           = "learn-bef1708a-a461-465d-bf0d-855370cf5bc4"
      resource_group_name
      + secondary_access_key = (sensitive value)
+ secondary_blob_connection_string = (sensitive value)
                                           = (sensitive value)
                                           = (known after apply)
       secondary_blob_endpoint
       secondary_blob_host
                                           = (known after apply)
```

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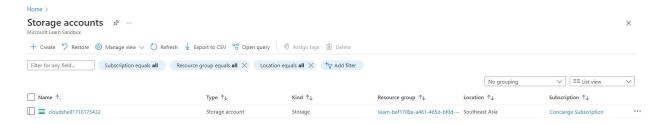
```
+ endpoint_tenant_id = (known after apply)
       + queue_properties {
            + max_age_in_seconds = (known after apply)
           + hour_metrics {
                + enabled = (known after apply)
+ include_apis = (known after apply)
                + retention_policy_days = (known after apply)
+ version = (known after apply)
           + logging {
+ delete
                ogging {
+ delete = (known after apply)
+ read = (known after apply)
+ retention_policy_days = (known after apply)
+ version = (known after apply)
+ write = (known after apply)
                + enabled = (known after apply)

+ include_apis = (known after apply)

+ retention_policy_days = (known after apply)
      + routing {
            publish_microsoft_endpoints = (known after apply)
       + share_properties {
           | are_properties |
| + cors_rule {
| + allowed_headers | = (known after apply)
| + allowed_methods | = (known after apply)
| + allowed_origins | = (known after apply)
                + exposed_headers = (known after apply)
                + max_age_in_seconds = (known after apply)
           + retention_policy {
      + days = (known after apply)
                = (known after apply)
Plan: 1 to add, 0 to change, 0 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 you run "terraform apply" now.
 :\Terraform\terraform_azure\Storage>
```

Before applying changes, check the before state of the Azure Storage. Notice that we only have cloud shell storage

By Ronald Stewart Lim



Execute the command below and confirm changes to create Azure Storage: terraform apply

Note: terraform apply command already contains terraform plan so no need to execute terraform plan

terraform apply = terraform plan + confirmation to apply changes

sample output:

```
D:\Terraform\terraform_azure\Storage>terraform apply
Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
Terraform will perform the following actions:
 # azurerm_storage_account.teststorage082022 will be created
  resource "azurerm_storage_account"
                                              "teststorage082022
       + access_tier
      + account_replication_type = "Stor
+ account_tier = "c+
                                                    "StorageV2"
                                                = "Standard"
        = star

- allow_nested_items_to_be_public = true

- cross_tenant_replication_enabled = true
         default_to_oauth_authentication = false
         enable_https_traffic_only = true
                                                 = (known after apply)
                                             = raise
= faise
= (known after apply)
= "eastus"
= "TLS1_2"
= "tS1_2"
        infrastructure_encryption_enabled = false
         is_hns_enabled
         large_file_share_enabled
         location
        min_tls_version
                                                = "teststorage082022"
         primary_access_key
                                                = (sensitive value)
        primary_blob_connection_string = (sensitive value)
primary_blob_endpoint = (known_after_annl
                                                = (known after apply)
        primary_blob_host
                                                = (known after apply)
        primary_connection_string = (sensitive value)
primary_dfs_endpoint = (known after apply)
         primary_dfs_endpoint
                                             = (known after apply)
= (known after apply)
        primary_dfs_host
primary_dfs_host
primary_file_endpoint
primary_file_host
primary_location
        = (known after apply)
       + resource_group_name
      + secondary_access_key = (sensitive value)

+ secondary_blob_connection_string = (sensitive value)

+ secondary_blob_endpoint = (known after appl
                                         = (known after apply)
         secondary_blob_host
                                                 = (known after apply)
```

```
= (sensitive value)
+ secondary_dfs_endpoint
+ secondary_file_endpoint
+ secondary_file_endpoint
+ secondary_file_host
+ secondary_location
+ secondary_queue_endpoint
+ secondary_queue_endpoint
+ secondary_queue_host
+ secondary_table_endpoint
+ secondary_table_host
+ secondary_web_endpoint
+ secondary_web_host
+ shared_access_key_enabled
+ table_encryption_key_type
+ tags

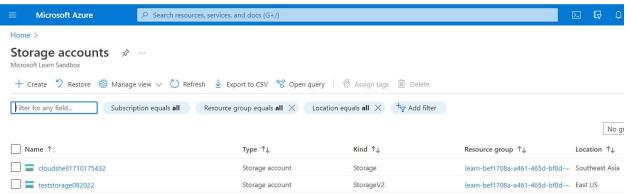
= (known after apply)
= (known after ap
    + secondary_dfs_endpoint
                                                                                                                                                    = (known after apply)
   + tags
+ "environment" = "staging"
   + blob_properties {
                 + change_feed_enabled
                                                                                                                                              = (known after apply)
                    + change_feed_retention_in_days = (known after apply)
                 + default_service_version = (known after apply)
+ last_access_time_enabled = (known after apply)
+ versioning_enabled = (known after apply)
                  + container_delete_retention_policy {
                                   + days = (known after apply)
                  ors_rule {
+ allowed_headers = (known after apply)
+ allowed_methods = (known after apply)
+ allowed_origins = (known after apply)
+ exposed_headers = (known after apply)
                                   + max_age_in_seconds = (known after apply)
                   + delete retention policy {
                                   + days = (known after apply)
                   + network rules {
                   + virtual_network_subnet_ids = (known after apply)
```

```
+ private_link_access {
       + endpoint_resource_id = (known after apply)
        + endpoint_tenant_id = (known after apply)
+ queue_properties {
    + cors_rule {
      + allowed_headers = (known after apply)
+ allowed_methods = (known after apply)
+ allowed_origins = (known after apply)
+ exposed_headers = (known after apply)
        + max_age_in_seconds = (known after apply)
   + retention_policy_days = (known after apply)
        + version = (known after apply)
    + logging {
                 = (known after apply)
= (known after apply)
       + delete
       + read
       + retention_policy_days = (known after apply)
       + version = (known after apply)
+ write = (known after apply)
   + retention_policy_days = (known after apply)
        + version = (known after apply)
+ routing {
                                 = (known after apply)
  + choice
   + publish_internet_endpoints = (known after apply)
    + publish_microsoft_endpoints = (known after apply)
+ share_properties {
  + cors_rule {
      + allowed_headers = (known after apply)
+ allowed_methods = (known after apply)
```

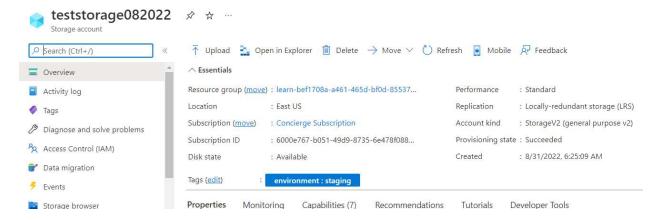
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```
allowed_origins
                                     (known after apply)
              + exposed_headers
                                   = (known after apply)
               max_age_in_seconds = (known after apply)
          + retention_policy {
              + days = (known after apply)
          + smb {
             + authentication_types
                                                = (known after apply)
              + channel_encryption_type
                                                = (known after apply)
              + kerberos_ticket_encryption_type = (known after apply)
                                                = (known after apply)
              + versions
Plan: 1 to add, 0 to change, 0 to destroy.
Do you want to perform these actions?
 Terraform will perform the actions described above.
 Only 'yes' will be accepted to approve.
 Enter a value: yes
azurerm_storage_account.teststorage082022: Creating...
azurerm_storage_account.teststorage082022: Still creating... [10s elapsed]
azurerm_storage_account.teststorage082022: Still creating... [20s elapsed]
azurerm_storage_account.teststorage082022: Still creating... [30s elapsed]
azurerm_storage_account.teststorage082022: Creation complete after 30s [id=/subscriptions/6000e767-b0
e/storageAccounts/teststorage082022]
Apply complete! Resources: 1 added, 0 changed, 0 destroyed.
D:\Terraform\terraform azure\Storage>
```

After applying changes, refresh the web browser and verify that the storage is already created in Azure.



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Then let us try to destroy what we created for learning purposes using command below and confirm: terraform destroy

sample output:

```
azurerm_storage_account.teststorage082022: Refreshing state... [id=/subscriptions/6000e767-b051-49d9-8735-6e478f088167/resourceGroups/learn-bef170
eAccounts/teststorage082022]
 erraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
 Terraform will perform the following actions:
  # azurerm_storage_account.teststorage082022 will be destroyed
                                                        resource "azurerm_storage_account"
- access_tier
- account_kind
          account_replication_type = "LRS" -> null
account_tier = "Standard" -> null
allow_nested_items_to_be_public = true -> null
cross_tenant_replication_enabled
default_to_oauth_authorities
          "/subscriptions/6000e767-b051-49d9-8735-6e478f088167/resourceGroups/learn-bef1708a-a461-465d-bf0d-8553
          -> null infrastructure_encryption_enabled = false -> null
82022"
                                                           = false -> null
= "eastus" -> null
= "TLS1_2" -> null
           is_hns_enabled
           location
          min_tls_version
                                                            = "teststorage082022" -> null
                                                           = tests.or.org.
= false -> null
= (sensitive value)
= (sensitive value)
= "https://teststorage082022.blob.core.windows.net/" -> null
"thetesage082022.blob.core.windows.net" -> null
           nfsv3_enabled
          primary_access_key
primary_blob_connection_string
primary_blob_endpoint
                                                            = "teststorage082022.blob.core.windows.net" -> null
= (sensitive value)
= "https://teststorage082022.dfs.core.windows.net/" -> null
           primary_blob_host
         primary_blob_host
primary_connection_string
primary_dfs_endpoint
primary_dfs_host
primary_file_endpoint
primary_file_host
primary_location
primary_numery_ord
                                                            = "teststorage082022.dfs.core.windows.net" -> null
= "https://teststorage082022.file.core.windows.net/"
                                                               "teststorage082022.file.core.windows.net"
                                                               "https://teststorage082022.queue.core.windows.net/" -> null
           primary_queue_endpoint
          primary_queue_host
primary_table_endpoint
primary_table_host
                                                               "teststorage082022.queue.core.windows.net"
                                                               "https://teststorage082022.table.core.windows.net/" -> null
                                                               "teststorage082022.table.core.windows.net" -> null "https://teststorage082022.z13.web.core.windows.net/"
          primary_web_endpoint
primary_web_host
                                                               "teststorage082022.z13.web.core.windows.net"
           queue_encryption_key_type
                                                               "Service'
                                                               "learn-bef1708a-a461-465d-bf0d-855370cf5bc4"
           resource group name
```

```
= (sensitive value)
secondary_access_key
secondary_connection_string
shared_access_key_enabled
                                    = (sensitive value)
                                   = true -> null
= "Service" -> null
table_encryption_key_type
tags
- "environment" = "staging"
blob_properties {
   change_feed_enabled = false -> r
change_feed_retention_in_days = 0 -> null
                             = false -> null
    last_access_time_enabled = false -> null
    versioning_enabled
                                  = false -> null
network_rules {
    bypass
       - "AzureServices",
    ] -> null
    default_action = "Allow" -> null
in rules = [] -> null
    queue_properties {
    hour_metrics {
        enabled = true -> null
include_apis = true -> null
       - enabled
       - retention_policy_days = 7 -> null
                    = "1.0" -> null
        version
    logging {
                  = false -> null
        delete
        read
                               = false -> null
        retention_policy_days = 0 -> null
version = "1.0" -> null
write = false -> null
    minute_metrics {
        enabled = false -> null
include_apis = false -> null
       enabled
        retention_policy_days = 0 -> null
                              = "1.0" -> null
        version
```

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After applying changes, refresh the web browser and verify that the storage is already removed or deleted in Azure.

