# Azure ALZ - 400 (GITHUB)

# Deploy using multiple module declarations with remote state

Terraform Resoruce Count: 519

Connectivity: 76 Management: 217

Core: 226

Total Policy Count: 391

**Scope**: Deploying Azure landing zone using multiple declarations of the module using remote state to support running in multiple Terraform workspace.

**Customization:** The main motive of this deployment is to have the deployment with multiple tf state files and to control the configuration of resources by scope. For this, the code was split into the below parts.

Resource Files	Connectivity	Core	Management
Main.tf	$\overline{\checkmark}$	$\overline{\checkmark}$	$\checkmark$
Outputs.tf	$\overline{\checkmark}$	$\overline{\checkmark}$	$\overline{\checkmark}$
Settings.tf	$\overline{\checkmark}$	$\overline{\checkmark}$	$\overline{\checkmark}$
	(settings.connectivity.tf)	(settings.core.tf, settings.identity.tf)	(settings.management.tf)
Variables.tf	$\checkmark$	$\checkmark$	$\checkmark$
Archetypes.json	×	V	×

As shown above, there is  $\underline{no}$  root module to control these sub-modules. So, they need to be deployed as separate and hence, would have different state files.

## Below is the tree structure of the code.

# Connectivity

## Main.tf

```
# Configure Terraform to set the required AzureRM provider # version and features{} block
terraform {
   required_providers {
     azurerm = {
  source = "hashicorp/azurerm"
  version = ">= 3.54.0"
  backend "local" {
  path = "./connectivity.tfstate"
# Define the provider configuration
provider "azurerm" {
  features {}
  subscription_id = var.subscription_id_connectivity
# Get the current client configuration from the AzureRM provider
data "azurerm_client_config" "current" {}
# Declare the Azure landing zones Terraform module
\ensuremath{\text{\#}} and provide the connectivity configuration
module "alz" {
    source = "Azure/caf-enterprise-scale/azurerm"
    version = "4.0.1" # change this to your desired version, https://www.terraform.io/language/expressions/version-constraints
default_location = "eastus"
     azurerm
                              = azurerm
     azurerm.connectivity = azurerm
```

```
# Base module configuration settings
root_parent_id = data.azurerm_client_config.current.tenant_id
root_id = var.root_id

# Disable creation of the core management group hierarchy
# as this is being created by the core module instance
deploy_core_landing_zones = false

# Configuration settings for connectivity resources
deploy_connectivity_resources = true
configure_connectivity_resources = local.configure_connectivity_resources
subscription_id_connectivity = var.subscription_id_connectivity
```

Variables.tf

```
# Use variables to customize the deployment
variable "root_id" {
  description = "Sets the value used for generating unique resource naming within the module."
              = "myorg"
variable "primary_location" {
  type = string
description = "Sets the location for \"primary\" resources to be created in."
default = "northeurope"
variable "secondary_location" {
              = string
  description = "Sets the location for \"secondary\" resources to be created in."
  default = "westeurope"
variable "subscription_id_connectivity" {
  type = string
description = "Subscription ID to use for \"connectivity\" resources."
default = "d8c66092-85bb-49e9-9421-0d2aa529194d"
variable "enable_ddos_protection" {
              = bool
  description = "Controls whether to create a DDoS Network Protection plan and link to hub virtual networks."
variable "connectivity_resources_tags" {
  type = map(string)
description = "Specify tags to add to \"connectivity\" resources."
  default = {
    deployedBy = "terraform/azure/caf-enterprise-scale/examples/1400-multi"
    demo_type = "Deploy connectivity resources using multiple module declarations"
```

## Outputs.tf

```
# Output a copy of configure_connectivity_resources for use
# by the core module instance

output "configuration" {
    description = "Configuration settings for the \"connectivity\" resources."
    value = local.configure_connectivity_resources
}

output "subscription_id" {
    description = "Subscription ID for the \"connectivity\" resources."
    value = var.subscription_id_connectivity
}
```

```
# Configure custom connectivity resources settings
  configure connectivity resources = {
    settings = {
      # Create two hub networks with hub mesh peering enabled
      # and link to DDoS protection plan if created
      hub_networks = [
        {
          config = {
            address_space
                                            = ["10.100.0.0/22", ]
            location
                                            = var.primary_location
            link_to_ddos_protection_plan
                                           = var.enable_ddos_protection
            enable_hub_network_mesh_peering = true
          config = {
                                            = ["10.101.0.0/22", ]
            address_space
            location
                                            = var.secondary_location
            link_to_ddos_protection_plan
                                            = var.enable_ddos_protection
            enable hub network mesh peering = true
        },
      1
      # Do not create an Virtual WAN resources
      vwan_hub_networks = []
      # Enable DDoS protection plan in the primary location
      ddos_protection_plan = {
        enabled = var.enable_ddos_protection
      # DNS will be deployed with default settings
     dns = \{\}
    # Set the default location
    location = var.primary_location
    # Create a custom tags input
    tags = var.connectivity_resources_tags
}
```

## Core

#### Main.tf

```
# Configure Terraform to set the required AzureRM provider
# version and features{} block.
terraform {
  required_providers {
    azurerm = {
    source = "hashicorp/azurerm"
    version = ">= 3.54.0"
  backend "local" {
    path = "./core.tfstate"
# Define the provider configuration
provider "azurerm" {
  features {}
# Get the current client configuration from the AzureRM provider.
data "azurerm_client_config" "current" {}
# Declare the Azure landing zones Terraform module # and provide the core configuration.
module "alz" {
  source = "Azure/caf-enterprise-scale/azurerm"
  version = "4.0.1" # change this to your desired version, https://www.terraform.io/language/expressions/version-constraints
  default_location = "eastus"
```

```
azurerm.connectivity = azurerm
    azurerm.management
                                                 = azurerm
# Base module configuration settings
root_parent_id = data.azurerm_client_config.current.tenant_id
root_id = var.root_id
root_name = var.root_name
library_path = "${path.module}/lib"
# Enable creation of the core management group hierarchy # and additional custom_landing_zones
deploy_core_landing_zones = true
custom_landing_zones = local.custom_landing_zones
 # Configuration settings for identity resources is
# bundled with core as no resources are actually created
# for the identity subscription
deploy_identity_resources = true
configure_identity_resources = local.configure_identity_resources
 subscription_id_identity
                                                               = var.subscription_id_identity
# The following inputs ensure that managed parameters are
# configured correctly for policies relating to connectivity
# resources created by the connectivity module instance and
# to map the subscription to the correct management group,
# but no resources are created by this module instance
deploy_connectivity_resources = false
configure_connectivity_resources = data.terraform_remote_state.connectivity.outputs.configuration
subscription id connectivity = data_tarpaform_nemote_state.connectivity_cultusts_subscription is
 subscription_id_connectivity
                                                                      = data.terraform_remote_state.connectivity.outputs.subscription_id
 # The following inputs ensure that managed parameters are
# configured correctly for policies relating to management
# resources created by the management module instance and
# to map the subscription to the correct management group,
# but no resources are created by this module instance
deploy_management_resources = false
 configure_management_resources = data.terraform_remote_state.management.outputs.configuration subscription_id_management = data.terraform_remote_state.management.outputs.subscription_id
```

## lib/archetype\_definition\_customer\_online.json

```
sarang [ ~/remote/core ]$ cat lib/archetype_definition_customer_online.json
  "customer_online": {
    "policy_assignments": [
       "Deny-Resource-Locations",
       "Deny-RSG-Locations"
    ],
     "policy_definitions": [],
    "policy_set_definitions": [],
    "role_definitions": [],
"archetype_config": {
       "parameters": {
         "Deny-Resource-Locations": {
           "listOfAllowedLocations": [
             "eastus",
"eastus2",
             "westus",
             "northcentralus",
             "southcentralus"
           ]
         },
"Deny-RSG-Locations": {
           "listOfAllowedLocations": [
             "eastus",
"eastus2",
             "westus",
             "northcentralus",
             "southcentralus"
         }
       },
"access_control": {}
}
```

#### Settings.core.tf

```
parameters = {}
access_control = {}
     7
    var.primary_location, var.secondary_location,
         Deny-RSG-Locations = {
    listOfAllowedLocations = [
      var.primary_location,
      var.secondary_location,
    .
} access_control = {}
}
}
```

#### Settings.identity.tf

```
sarang [ ~/remote/core ]$ cat settings.identity.tf

# Configure custom identity resources settings
locals {
  configure_identity_resources = {
    settings = {
      identity = {
      config = {
          # Disable this policy as can conflict with Terraform
          enable_deny_subnet_without_nsg = false
      }
      }
    }
}
```

## remote.tf

```
sarang [ ~/remote/core ]$ cat remote.tf
# Get the connectivity and management configuration
# settings from outputs via the respective terraform
# remote state files

data "terraform_remote_state" "connectivity" {
   backend = "local"

   config = {
      path = "${path.module}/../connectivity.tfstate"
   }
}

data "terraform_remote_state" "management" {
   backend = "local"

   config = {
      path = "${path.module}/../management/management.tfstate"
   }
}
```

#### variables.tf

```
sarang [ ~/remote/core ]$ cat variables.tf
# Use variables to customize the deployment
variable "root_id" {
  description = "Sets the value used for generating unique resource naming within the module."

default = "myorg"
variable "root_name" {
            = string
  description = "Sets the value used for the \"intermediate root\" management group display name."

default = "My Organization"
variable "primary_location" {
  type = string
description = "Sets the location for \"primary\" resources to be created in."
default = "northeurope"
variable "secondary_location" {
            = string
  description = "Sets the location for \"secondary\" resources to be created in."

default = "westeurope"
variable "subscription_id_identity" {
  type = string
  description = "Subscription ID to use for \"identity\" resources."
default = ""
  default
```

## **Management**

#### Main.tf

```
# Configure Terraform to set the required AzureRM provider # version and features{} block
  required_providers {
    azurerm = {
  source = "hashicorp/azurerm"
  version = ">= 3.54.0"
  backend "local" {
    path = "./management.tfstate"
# Define the provider configuration
provider "azurerm" {
  features {}
  subscription_id = var.subscription_id_management
# Get the current client configuration from the AzureRM provider
data "azurerm_client_config" "current" {}
# Declare the Azure landing zones Terraform module # and provide the connectivity configuration.
              "Azure/caf-enterprise-scale/azurerm"
  version = "4.0.1" # change this to your desired version, https://www.terraform.io/language/expressions/version-constraints
  default location = "eastus"
     azurerm.connectivity = azurerm
    azurerm.management = azurerm
```

```
# Base module configuration settings
root_parent_id = data.azurerm_client_config.current.tenant_id
root_id = var.root_id

# Disable creation of the core management group hierarchy
# as this is being created by the core module instance
deploy_core_landing_zones = false

# Configuration settings for management resources
deploy_management_resources = true
configure_management_resources = local.configure_management_resources
subscription_id_management = var.subscription_id_management
```

#### Settings.management.tf

```
sarang [ ~/remote/management ]$ cat settings.management.tf
# Configure custom management resources settings
locals {
  configure management resources = {
    settings = {
     log_analytics = {
        config = {
         # Set a custom number of days to retain logs
          retention_in_days = var.log_retention_in_days
        }
     security_center = {
        config = {
          # Configure a valid security contact email address
          email_security_contact = var.email_security_contact
      }
    }
   # Set the default location
   location = var.primary_location
   # Create a custom tags input
   tags = var.management_resources_tags
}
```

#### outputs.tf

```
sarang [ ~/remote/management ]$ cat outputs.tf
# Output a copy of configure_management_resources for use
# by the core module instance

output "configuration" {
    description = "Configuration settings for the \"management\" resources."
    value = local.configure_management_resources
}

output "subscription_id" {
    description = "Subscription ID for the \"management\" resources."
    value = var.subscription_id_management
}

sarang [ ~/remote/management ]$
```

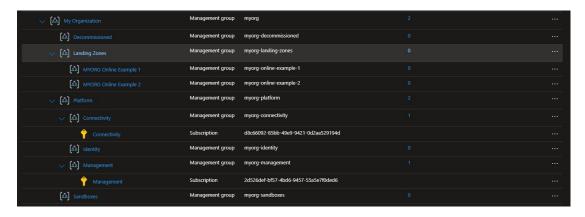
#### Variables.tf

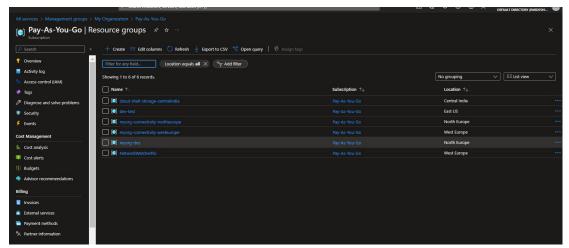
```
sarang [ ~/remote/management ]$ cat variables.tf
# Use variables to customize the deployment
variable "root_id" {
             = string
  description = "Sets the value used for generating unique resource naming within the module."
              = "myorg"
  default
variable "primary_location" {
 type = string
description = "Sets the location for \"primary\" resources to be created in."
default = "northeurope"
variable "subscription_id_management" {
            = string
  description = "Subscription ID to use for \"management\" resources." default = "2d526def-bf57-4bd6-9457-55a5e7f0ded6"
variable "email_security_contact" {
  type = string
description = "Set a custom value for the security contact email address."
             = "pardeshisarang717@gmail.com"
  default
variable "log_retention_in_days" {
              = number
  description = "Set a custom value for how many days to store logs in the Log Analytics workspace."
  default
variable "management_resources_tags" {
             = map(string)
  description = "Specify tags to add to \"management\" resources."
  default = {
    deployedBy = "terraform/azure/caf-enterprise-scale/examples/1400-multi"
    demo_type = "Deploy management resources using multiple module declarations"
```

# **Observations/Descriptions:**

- 1. Firstly, we applied the code for connectivity and management as they consisted of resources and separate subscriptions.
- 2. Then we applied the code for core which has the archetype.json file for the landing zone and did not require a subscription.
- 3. The connectivity resources are properly being created and allocated to the connectivity management group with the connectivity subscription and same for management.
- 4. On successful completion of deployment we get resources, solutions and landing zones with policies with different state files.

# Below are the results of the deployment





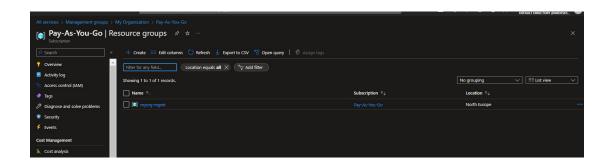
# List of Resources in connectivity

NAME	TYPE	RESOURCE GROUP	LOCATI ON	SUBSCRI PTION
myorg-hub-northeurope	Virtual network	myorg-connectivity- northeurope	North Europe	Pay-As- You-Go
myorg-hub-westeurope	Virtual	myorg-connectivity-	West	Pay-As-

	network	westeurope	Europe	You-Go
NetworkWatcher_northeurop	Network	networkwatcherrg	North	Pay-As-
e	Watcher	networkwaterier g	Europe	You-Go
NetworkWatcher_westeurope	Network Watcher	networkwatcherrg	West Europe	Pay-As- You-Go
	Private		•	Pay-As-
privatelink.adf.azure.com	DNS zone	myorg-dns	Global	You-Go
privatelink.afs.azure.net	Private	myorg-dns	Global	Pay-As-
	DNS zone	myorg ans	Global	You-Go
privatelink.agentsvc.azure- automation.net	Private DNS zone	myorg-dns	Global	Pay-As-
privatelink.analysis.windows.n	Private			You-Go Pay-As-
et	DNS zone	myorg-dns	Global	You-Go
	Private		Chalant	Pay-As-
privatelink.api.azureml.ms	DNS zone	myorg-dns	Global	You-Go
privatelink.azconfig.io	Private	myorg-dns	Global	Pay-As-
privatemik.azeomig.io	DNS zone	myorg ans	Global	You-Go
privatelink.azure-api.net	Private	myorg-dns	Global	Pay-As-
·	DNS zone Private	, ,		You-Go
privatelink.azure- automation.net	DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.azure-devices-	Private			Pay-As-
provisioning.net	DNS zone	myorg-dns	Global	You-Go
	Private	may and doc	Clabal	Pay-As-
privatelink.azure-devices.net	DNS zone	myorg-dns	Global	You-Go
privatelink.azurecr.io	Private	myorg-dns	Global	Pay-As-
<b>p</b> a.c	DNS zone	, 6 8 4 6	0.000.	You-Go
privatelink.azurehdinsight.net	Private DNS zone	myorg-dns	Global	Pay-As-
privatelink.azurehealthcareapi	Private			You-Go Pay-As-
s.com	DNS zone	myorg-dns	Global	You-Go
privatelink.azurestaticapps.ne	Private			Pay-As-
t	DNS zone	myorg-dns	Global	You-Go
privatelink.azuresynapse.net	Private	myorg-dns	Global	Pay-As-
privateminazaresynapsemet	DNS zone	myorg and	Global	You-Go
privatelink.azurewebsites.net	Private	myorg-dns	Global	Pay-As-
	DNS zone Private			You-Go Pay-As-
privatelink.batch.azure.com	DNS zone	myorg-dns	Global	You-Go
privatelink.blob.core.windows	Private			Pay-As-
.net	DNS zone	myorg-dns	Global	You-Go
privatelink.cassandra.cosmos.	Private	myorg-dns	Global	Pay-As-
azure.com	DNS zone	myorg-uns	Global	You-Go
privatelink.cognitiveservices.a	Private	myorg-dns	Global	Pay-As-
zure.com	DNS zone	, 0		You-Go
privatelink.database.windows. net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.datafactory.azure.	Private	_		Pay-As-
net	DNS zone	myorg-dns	Global	You-Go
privatelink.dev.azuresynapse.	Private	myora das	Global	Pay-As-
net	DNS zone	myorg-dns	Gional	You-Go

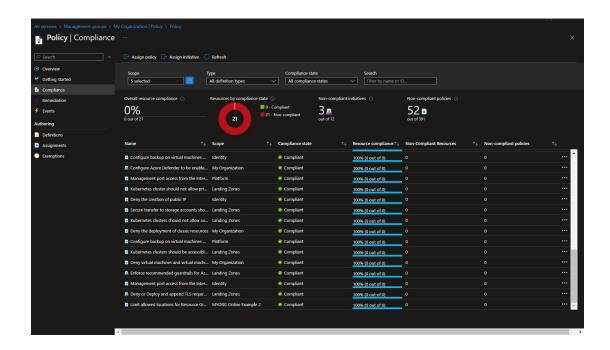
privatelink.developer.azure-	Private	myorg-dns	Global	Pay-As-
api.net privatelink.dfs.core.windows.	DNS zone Private	myorg-dns	Global	You-Go Pay-As-
net	DNS zone	iliyorg-ulis	Global	You-Go
privatelink.dicom.azurehealth careapis.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.digitaltwins.azure. net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.directline.botfram ework.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.documents.azure.c	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.eventgrid.azure.ne t	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.file.core.windows.	Private	myorg-dns	Global	Pay-As-
net privatelink.gremlin.cosmos.az	DNS zone Private	myorg-dns	Global	You-Go Pay-As-
ure.com privatelink.guestconfiguration	DNS zone Private	myorg-dns	Global	You-Go Pay-As-
.azure.com	DNS zone Private			You-Go Pay-As-
privatelink.his.arc.azure.com privatelink.kubernetesconfigu	DNS zone Private	myorg-dns	Global	You-Go Pay-As-
ration.azure.com	DNS zone Private	myorg-dns	Global	You-Go
privatelink.managedhsm.azur e.net	DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.mariadb.database. azure.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.media.azure.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.mongo.cosmos.azu re.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.monitor.azure.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.mysql.database.az ure.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.ne.backup.window sazure.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.northeurope.azmk 8s.io	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.northeurope.kusto .windows.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.notebooks.azure.n et	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.ods.opinsights.azur e.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.oms.opinsights.azu	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
re.com privatelink.pbidedicated.wind	Private	myorg-dns	Global	Pay-As-
ows.net privatelink.postgres.database.	DNS zone Private	myorg-dns	Global	You-Go Pay-As-

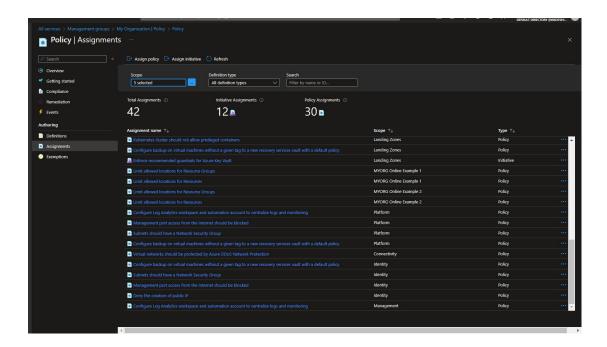
azure.com privatelink.prod.migration.win	DNS zone Private	muara das	Clobal	You-Go Pay-As-
dowsazure.com	DNS zone Private	myorg-dns	Global	You-Go Pay-As-
privatelink.purview.azure.com	DNS zone	myorg-dns	Global	You-Go
privatelink.purviewstudio.azur e.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.queue.core.windo ws.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.redis.cache.windo ws.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.redisenterprise.cac he.azure.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.search.windows.ne t	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.service.signalr.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.servicebus.window s.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.siterecovery.windo wsazure.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.sql.azuresynapse.n et	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.table.core.window s.net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.table.cosmos.azur e.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.tip1.powerquery. microsoft.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.token.botframewo rk.com	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.vaultcore.azure.ne t	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.web.core.windows .net	Private DNS zone	myorg-dns	Global	Pay-As- You-Go
privatelink.webpubsub.azure.	Private DNS zone	myorg-dns	Global	Pay-As- You-Go



# **List of Resources in Management**

NAME	TYPE	RESOURCE GROUP	LOCATION	SUBSCRIPTI ON
AgentHealthAssessment(myorg-la)	Solution	myorg-mgmt	North Europe	Pay-As- You-Go
AntiMalware(myorg-la)	Solution	myorg-mgmt	North	Pay-As-
Antiiviaiwai e(iiiyoi g-ia)	Solution	illyorg-illgillt	Europe	You-Go
ChangeTracking(myorg-la)	Solution	myorg-mgmt	North	Pay-As-
Change Hacking (myorg-ia)			Europe	You-Go
ContainerInsights(myorg-la)	Solution	myorg-mgmt	North	Pay-As-
Container msignts(myorg-ia)		illyOrg-illgillt	Europe	You-Go
myorg-automation	Automatio n Account	myora mamt	North	Pay-As-
myorg-automation		myorg-mgmt	Europe	You-Go
	Log Analytics n workspace		North	Pay-As-
myorg-la		myorg-mgmt	Europe	You-Go
Socurity/myorg la)	Solution	myorg-mgmt	North	Pay-As-
Security(myorg-la)			Europe	You-Go
SecurityInsights(myorg-la)	Solution	myorg-mgmt	North	Pay-As-
Security in signts (myorg-ia)	301011011	illyorg-illgillt	Europe	You-Go
SQLAdvancedThreatProtection(	Solution	myorg-mgmt	North	Pay-As-
myorg-la)	301011011	illyorg-illgillt	Europe	You-Go
SQLAssessment(myorg-la)	Solution	myorg mamt	North	Pay-As-
3QLASSESSITIETT(TTYOTE-TA)	301011011	myorg-mgmt	Europe	You-Go
SQLVulnerabilityAssessment(my	Solution	myorg-mgmt	North	Pay-As-
org-la)			Europe	You-Go
Updates(myorg-la)	Solution	myorg-mgmt	North	Pay-As-
opuates(myorg-ia)	Solution	illyOrg-illgillt	Europe	You-Go
VMInsights(myorg-la)	Solution	myorg-mgmt	North	Pay-As-
vivinisignis(inyorg-ia)	Jointion	inyong-inginit	Europe	You-Go





```
sarang [ ~/remote ]$ ls
connectivity core management
sarang [ ~/remote ]$ find * -type f -iname "*.tfstate"
connectivity/.terraform/terraform.tfstate
connectivity/connectivity.tfstate
core/core.tfstate
core/.terraform/terraform.tfstate
management/.terraform/terraform.tfstate
management/management.tfstate
sarang [ ~/remote ]$
```