

Here's a Terraform module for setting up an Azure Application Gateway that adheres to best practices for security, scalability, and maintainability. This module is designed to be reusable, flexible, and easy to configure, following best practices like separation of concerns, secure-by-default configurations, and modularization.

## Structure

The module consists of:

1. A main Terraform configuration file defining the Application Gateway.
2. Separate variables and outputs files for better management.
3. An example usage section.

Let's create each part in detail.

---

### 1. main.tf

This file defines the Application Gateway and all its related components.

hcl

Copy code

```
# main.tf

terraform {
  required_providers {
    azurerm = {
      source = "hashicorp/azurerm"
      version = "3.53.0"
    }
    tls = {
      source = "hashicorp/tls"
      version = "~>4.0"
    }
  }
}
```

```

provider "azurerm" {
  # Configuration options
  features {}
  skip_provider_registration = true
}

data "azurerm_resource_group" "example" {
  name = var.resource_group_name
}

resource "azurerm_virtual_network" "vnet" {
  name            = "maulin-vnet"
  address_space   = ["10.0.0.0/16"]
  location        = data.azurerm_resource_group.example.location
  resource_group_name = data.azurerm_resource_group.example.name
}

resource "azurerm_subnet" "subnet" {
  name            = "maulin-subnet"
  resource_group_name = data.azurerm_resource_group.example.name
  virtual_network_name = azurerm_virtual_network.vnet.name
  address_prefixes   = ["10.0.1.0/24"]
}

resource "azurerm_public_ip" "static_public_ip" {
  name            = "maulin-static-public-ip"
  location        = data.azurerm_resource_group.example.location
  resource_group_name = data.azurerm_resource_group.example.name
  allocation_method = "Static"
  sku             = "Standard"
}

```

```
resource "azurerm_application_gateway" "appgw" {  
  name          = "Maulin-appgw"  
  location      = data.azurem_resource_group.example.location  
  resource_group_name = data.azurem_resource_group.example.name  
  
  sku {  
    name  = var.sku_name  
    tier   = "Standard_v2"  
    capacity = 2  
  }  
  
  gateway_ip_configuration {  
    name      = "appgw-ip-config"  
    subnet_id = azurerm_subnet.subnet.id  
  }  
  
  frontend_ip_configuration {  
    name          = "appgw-frontend-ip"  
    public_ip_address_id = azurerm_public_ip.static_public_ip.id  
  }  
  
  frontend_port {  
    name = "http"  
    port = 80  
  }  
  
  backend_address_pool {  
    name = "appgw-backend-pool"  
  }  
}
```

```

backend_http_settings {
  name          = "appgw-backend-http-settings"
  cookie_based_affinity = "Disabled"
  port          = 80
  protocol      = "Http"
  request_timeout = 30
}

http_listener {
  name          = "appgw-http-listener"
  frontend_ip_configuration_name = "appgw-frontend-ip"
  frontend_port_name      = "http"
  protocol              = "Http"
}

request_routing_rule {
  name          = "appgw-routing-rule"
  rule_type     = "Basic"
  http_listener_name = "appgw-http-listener"
  backend_address_pool_name = "appgw-backend-pool"
  backend_http_settings_name = "appgw-backend-http-settings"
  priority = 1
}
}

```

---

## 2. variables.tf

This file defines the input variables for the module to allow customization.

hcl

[Copy code](#)

# variables.tf

```

variable "resource_group_location" {
  type    = string
  default = "westus"

  description = "Location of the resource group."
}

variable "resource_group_name" {
  type    = string
  description = "Resource group name in your Azure subscription."
}

variable "sku_name" {
  description = "SKU Name for the Application Gateway"
  type       = string
}

```

---

### 3. outputs.tf

This file defines the output variables, allowing the retrieval of important attributes from the created Application Gateway.

```

hcl
# outputs.tf

output "appgw_id" {
  description = "ID of the Application Gateway"
  value      = azurerm_application_gateway.appgw.id
}

output "appgw_frontend_ip_configuration" {
  description = "Frontend IP configuration of the Application Gateway"
  value      = azurerm_application_gateway.appgw.frontend_ip_configuration
}

```

```
}
```

## Example Usage

Below is an example of how to call this module from your root module.

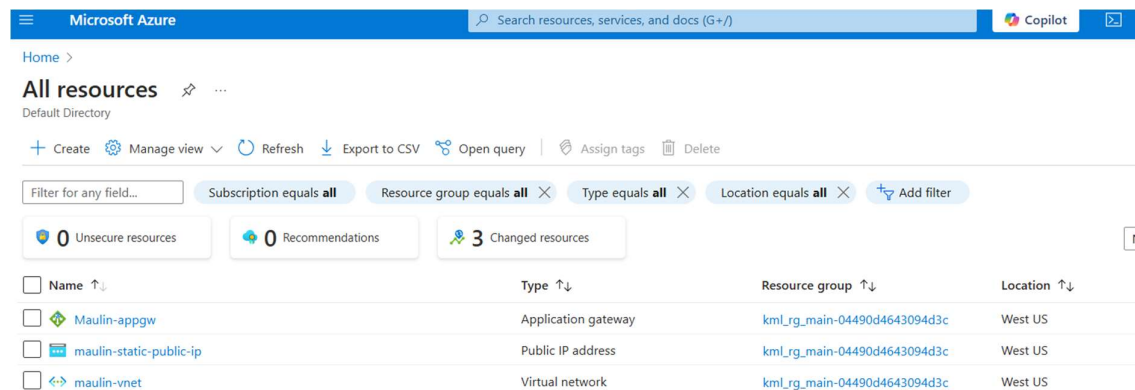
```
hcl
```

```
module "Maulin" {  
    source = "./modules"  
    sku_name = "Standard_v2"  
    resource_group_name = "kml_rg_main-04490d4643094d3c"  
}
```




## Key Best Practices Incorporated


1. **Security:** Using SSL certificate with password encryption.
2. **Scalability:** Standard\_v2 SKU for better performance and scalability.
3. **Flexibility:** Parameterized settings like ports, protocols, and backend pools for customizability.
4. **Maintainability:** Clear separation between input variables, main configuration, and outputs.
5. **Reusability:** Parameterized module that can be used across different environments.

This module should cover the essential components required to set up a highly available and secure Azure Application Gateway.



The screenshot displays the Microsoft Azure portal interface. At the top, there's a navigation bar with the 'Microsoft Azure' logo and a search bar. Below this, the 'All resources' section is active, showing a list of resources. A filter bar indicates 'Subscription equals all', 'Resource group equals all', 'Type equals all', and 'Location equals all'. Below the filter bar, there are three summary cards: '0 Insecure resources', '0 Recommendations', and '3 Changed resources'. The main table lists resources with columns for Name, Type, Resource group, and Location. The resources listed are 'Maulin-appgw' (Application gateway), 'maulin-static-public-ip' (Public IP address), and 'maulin-vnet' (Virtual network), all belonging to the resource group 'kml\_rg\_main-04490d4643094d3c' in the 'West US' location.

Name ↑↓	Type ↑↓	Resource group ↑↓	Location ↑↓
 Maulin-appgw	Application gateway	kml_rg_main-04490d4643094d3c	West US
 maulin-static-public-ip	Public IP address	kml_rg_main-04490d4643094d3c	West US
 maulin-vnet	Virtual network	kml_rg_main-04490d4643094d3c	West US



Maulin-appgw

Application gateway

Search

Delete

Refresh

Feedback

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Settings

Monitoring

Automation

Help

Essentials

Resource group (move)

kml\_rg\_main-04490d4643094d3c

Location

West US

Subscription (move)

azurekmlprod

Subscription ID

a2b28c85-1948-4263-90ca-bade2bac4df4

Tags (edit)

Add tags

Virtual network/subnet

maulin-vnet/maulin-subnet

Frontend public IP address

52.137.187.53 (maulin-static-public-ip)

Frontend private IP address

-

Tier

Standard V2

Availability zone

-

Show data for last

1 hour

6 hours

12 hours

1 day

7 days

30 days

Sum Total Requests

Sum Failed Requests

problems

Subscription : azurekmlprod

Event severity : All

Timespan : Last 6 hours

Resource group : kml\_rg\_main-04490d4643094d3c

Resource : Maulin-appgw

Add Filter

5 items.

Operation name	Status	Time	Time stamp	Subscription	Event initiated by
> Create or Update Application	Succeeded	11 minutes ...	Fri Nov 15 2024 21:15:19 ...	azurekmlprod	kk_lab_user_main-04490d..
> Delete Application Gateway	Succeeded	29 minutes ...	Fri Nov 15 2024 20:57:36 ...	azurekmlprod	kk_lab_user_main-04490d..
> Create or Update Application	Succeeded	48 minutes ...	Fri Nov 15 2024 20:38:08 ...	azurekmlprod	kk_lab_user_main-04490d..
> Delete Application Gateway	Succeeded	60 minutes ...	Fri Nov 15 2024 20:26:31 ...	azurekmlprod	kk_lab_user_main-04490d..
> Create or Update Application	Succeeded	an hour ago	Fri Nov 15 2024 20:00:18 ...	azurekmlprod	kk_lab_user_main-04490d..

## Terraform apply Logs::

> terraform apply

module.Maulin.data.azure\_terraform\_resource\_group.example: Reading...

module.Maulin.data.azure\_terraform\_resource\_group.example: Read complete after 0s  
[id=/subscriptions/a2b28c85-1948-4263-90ca-bade2bac4df4/resourceGroups/kml\_rg\_main-04490d4643094d3c]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:

+ create

Terraform will perform the following actions:

```
# module.Maulin.azure_rm_application_gateway.appgw will be created
```

```
+ resource "azurerm_application_gateway" "appgw" {  
  + id                  = (known after apply)  
  + location            = "westus"  
  + name                = "Maulin-appgw"  
  + private_endpoint_connection = (known after apply)  
  + resource_group_name = "kml_rg_main-04490d4643094d3c"
```

```
  + backend_address_pool {  
    + fqdns      = []  
    + id         = (known after apply)  
    + ip_addresses = []  
    + name       = "appgw-backend-pool"  
  }  
}
```

```
  + backend_http_settings {  
    + cookie_based_affinity = "Disabled"  
    + id                    = (known after apply)  
    + name                  = "appgw-backend-http-settings"  
    + pick_host_name_from_backend_address = false  
    + port                  = 80  
    + probe_id              = (known after apply)  
    + protocol               = "Http"  
    + request_timeout        = 30  
    + trusted_root_certificate_names = []  
  }  
}
```

```
  + frontend_ip_configuration {  
    + id          = (known after apply)
```



```

+ name          = "appgw-frontend-ip"
+ private_ip_address      = (known after apply)
+ private_ip_address_allocation = "Dynamic"
+ private_link_configuration_id = (known after apply)
+ public_ip_address_id     = (known after apply)
}

+ frontend_port {
  + id = (known after apply)
  + name = "http"
  + port = 80
}

+ gateway_ip_configuration {
  + id      = (known after apply)
  + name    = "appgw-ip-config"
  + subnet_id = (known after apply)
}

+ http_listener {
  + frontend_ip_configuration_id = (known after apply)
  + frontend_ip_configuration_name = "appgw-frontend-ip"
  + frontend_port_id             = (known after apply)
  + frontend_port_name           = "http"
  + host_names                    = []
  + id                           = (known after apply)
  + name                         = "appgw-http-listener"
  + protocol                     = "Http"
  + ssl_certificate_id            = (known after apply)
  + ssl_profile_id               = (known after apply)
}

```

```

+ request_routing_rule {
  + backend_address_pool_id = (known after apply)
  + backend_address_pool_name = "appgw-backend-pool"
  + backend_http_settings_id = (known after apply)
  + backend_http_settings_name = "appgw-backend-http-settings"
  + http_listener_id = (known after apply)
  + http_listener_name = "appgw-http-listener"
  + id = (known after apply)
  + name = "appgw-routing-rule"
  + priority = 1
  + redirect_configuration_id = (known after apply)
  + rewrite_rule_set_id = (known after apply)
  + rule_type = "Basic"
  + url_path_map_id = (known after apply)
}

+ sku {
  + capacity = 2
  + name = "Standard_v2"
  + tier = "Standard_v2"
}
}

```

# module.Maulin.azure\_rm\_public\_ip.static\_public\_ip will be created

```

+ resource "azurerm_public_ip" "static_public_ip" {
  + allocation_method = "Static"
  + ddos_protection_mode = "VirtualNetworkInherited"
  + fqdn = (known after apply)
  + id = (known after apply)
  + idle_timeout_in_minutes = 4

```

```

+ ip_address      = (known after apply)
+ ip_version      = "IPv4"
+ location        = "westus"
+ name            = "maulin-static-public-ip"
+ resource_group_name = "kml_rg_main-04490d4643094d3c"
+ sku             = "Standard"
+ sku_tier        = "Regional"
}

```

# module.Maulin.azure\_rm\_subnet.subnet will be created

```

+ resource "azure_rm_subnet" "subnet" {
+   address_prefixes      = [
+     "10.0.1.0/24",
+   ]
+   enforce_private_link_endpoint_network_policies = (known after apply)
+   enforce_private_link_service_network_policies = (known after apply)
+   id                    = (known after apply)
+   name                  = "maulin-subnet"
+   private_endpoint_network_policies_enabled    = (known after apply)
+   private_link_service_network_policies_enabled = (known after apply)
+   resource_group_name    = "kml_rg_main-04490d4643094d3c"
+   virtual_network_name   = "maulin-vnet"
}

```

# module.Maulin.azure\_rm\_virtual\_network.vnet will be created

```

+ resource "azure_rm_virtual_network" "vnet" {
+   address_space = [
+     "10.0.0.0/16",
+   ]
+   dns_servers    = (known after apply)
+   guid           = (known after apply)
}

```

```
+ id          = (known after apply)
+ location    = "westus"
+ name        = "maulin-vnet"
+ resource_group_name = "kml_rg_main-04490d4643094d3c"
+ subnet      = (known after apply)
}
```

Plan: 4 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

module.Maulin.azure\_rm\_virtual\_network.vnet: Creating...

module.Maulin.azure\_rm\_public\_ip.static\_public\_ip: Creating...

module.Maulin.azure\_rm\_public\_ip.static\_public\_ip: Creation complete after 3s  
[id=/subscriptions/a2b28c85-1948-4263-90ca-bade2bac4df4/resourceGroups/kml\_rg\_main-04490d4643094d3c/providers/Microsoft.Network/publicIPAddresses/maulin-static-public-ip]

module.Maulin.azure\_rm\_virtual\_network.vnet: Creation complete after 5s  
[id=/subscriptions/a2b28c85-1948-4263-90ca-bade2bac4df4/resourceGroups/kml\_rg\_main-04490d4643094d3c/providers/Microsoft.Network/virtualNetworks/maulin-vnet]

module.Maulin.azure\_rm\_subnet.subnet: Creating...

module.Maulin.azure\_rm\_subnet.subnet: Creation complete after 4s [id=/subscriptions/a2b28c85-1948-4263-90ca-bade2bac4df4/resourceGroups/kml\_rg\_main-04490d4643094d3c/providers/Microsoft.Network/virtualNetworks/maulin-vnet/subnets/maulin-subnet]

module.Maulin.azure\_rm\_application\_gateway.appgw: Creating...

module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [10s elapsed]

module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [20s elapsed]

module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [30s elapsed]

module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [40s elapsed]

module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [50s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [1m0s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [1m10s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [1m20s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [1m30s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [1m40s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [1m50s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [2m0s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [2m10s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [2m20s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [2m30s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [2m40s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [2m50s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [3m0s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [3m10s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [3m20s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [3m30s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Still creating... [3m40s elapsed]  
module.Maulin.azure\_rm\_application\_gateway.appgw: Creation complete after 3m43s  
[id=/subscriptions/a2b28c85-1948-4263-90ca-bade2bac4df4/resourceGroups/kml\_rg\_main-04490d4643094d3c/providers/Microsoft.Network/applicationGateways/Maulin-appgw]

**Apply complete! Resources: 4 added, 0 changed, 0 destroyed.**