How to use Terraform Dynamic blocks?

[*Terraform Dynamic Block*](https://www.terraform.io/docs/language/expressions/dynamic-blocks.html) is important when you want to create multiple resources inside of similar types, so instead of copy and pasting the same terraform configuration in the terraform file does not make sense and it is not feasible if you need to create hundreds of resources using terraform.

If we describe terraform dynamic block in simple words then it is for loop which is going to iterate over and will help you to create a dynamic resource. With the help of dynamic blocks you can create nested repeatable blocks such as settings, ingress rules etc...

If this is the first time you are trying to learn to terraform then I would highly recommend reading my Getting started guide on Terraform -

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1. Syntax of Dynamic Block

As we said dynamic block is more or less another way to implement for loop. Here are few facts about dynamic block which you should keep in mind -

1. ***Collections*** - You need to have collections .e.g. - list, map, set
2. ***Iterator*** - To create a dynamic block you need to define an iterator.
3. ***Content*** - Content is something onto which you wanna iterate.

Here is the syntax of dynamic block -

Terraform dynamic block syntax

dynamic "my\_setting" {

for\_each = VARIABLE\_NAME # set | map | list

content = {

key = my\_setting.value

}

}

2. How to create your first ***terraform dynamic block***

Before we implement our first *terraform dynamic block* let's first see an example without dynamic block.

In this example, we are going to create two *ingress rules* for the aws\_security\_group. Both *ingress rules* are exactly the same apart from the port numbers .i.e. - **80** and **443**. So if we do not use dynamic block then we need to create two ingress rules blocks inside the terraform file.

resource "aws\_security\_group" "main" {

name = "resource\_without\_dynamic\_block"

vpc\_id = data.aws\_vpc.main.id

ingress {

description = "ingress\_rule\_1"

from\_port = 443

to\_port = 443

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

ingress {

description = "ingress\_rule\_2"

from\_port = 80

to\_port = 80

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

ingress {

description = "ingress\_rule\_3"

from\_port = 22

to\_port = 22

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

ingress {

description = "ingress\_rule\_4"

from\_port = 8080

to\_port = 8080

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

tags = {

Name = "AWS security group non-dynamic block"

}

}

The same terraform file can be improved by using *dynamic block*, now look at the following terraform file -

locals {

ingress\_rules = [{

port = 443

description = "Ingress rules for port 443"

},

{

port = 80

description = "Ingree rules for port 80"

}]

}

resource "aws\_security\_group" "main" {

name = "resource\_with\_dynamic\_block"

vpc\_id = data.aws\_vpc.main.id

dynamic "ingress" {

for\_each = local.ingress\_rules

content {

description = ingress.value.description

from\_port = ingress.value.port

to\_port = ingress.value.port

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

}

tags = {

Name = "AWS security group dynamic block"

}

}

Now you can imagine, if you need to define more than *2 ingress rules* then using dynamic block can help you to reduce the line of code inside your terraform file.

Ingress rules are just an example but the same concept can be applied to another resource block.

variable "sg\_ports" {

type = list(number)

description = "list of ingress ports"

default = [8080, 80,21, 22, 443]

}

resource "aws\_security\_group" "dynamicsg" {

name = "dynamic-sg"

description = "Ingress for Vault"

dynamic "ingress" {

for\_each = var.sg\_ports

iterator = port

content {

from\_port = port.value

to\_port = port.value

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

}

dynamic "egress" {

for\_each = var.sg\_ports

content {

from\_port = egress.value

to\_port = egress.value

protocol = "tcp"

cidr\_blocks = ["0.0.0.0/0"]

}

}

}

3. Best practices for dynamic block

1. Do not overuse the dynamic block when it is not necessary
2. Multiple nested dynamic blocks should be avoided otherwise it might cause you trouble in debugging and troubleshooting.
3. If the dynamic block is getting too complex inside your terraform file then [it's better to use terraform module](https://www.terraform.io/docs/language/modules/develop/index.html#when-to-write-a-module).

provider "aws" {

  region  = "ap-south-1"

  profile = "mr-cloud-book"

}

variable "sg\_ports" {

  type        = list(number)

  description = "list of ingress ports"

  default     = [8080, 80, 21, 22, 443]

}

resource "aws\_instance" "ec2\_example" {

  ami                    = "ami-01a4f99c4ac11b03c"

  instance\_type          = "t2.micro"

  key\_name               = "mr-cloud-book"

  vpc\_security\_group\_ids = [aws\_security\_group.main.id]

}

resource "aws\_security\_group" "main" {

  dynamic "ingress" {

    for\_each = var.sg\_ports

    iterator = port

    content {

      from\_port   = port.value

      to\_port     = port.value

      protocol    = "tcp"

      cidr\_blocks = ["0.0.0.0/0"]

    }

  }

  egress {

    from\_port   = 0

    to\_port     = 0

    protocol    = "-1"

    cidr\_blocks = ["0.0.0.0/0"]

  }

}

resource "aws\_key\_pair" "deployer" {

  key\_name   = "mr-cloud-book"

  public\_key = "ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQCihDAhkioSWqfTDzJSKag2lqQCPNh/hayPl+3TTogfK2+F8WiWIn3wXeP8F1xT1VzZY/s+nGMvT+zGGtAfNk8WWdw7orLY7LRYP3zYNzlDSc8U3bg+CA3B4POaQvK6ypUAc+SW2zaRMyLYaQpMsF/ZD3h7G6Ptr/7+A8xabEk2Lm4aHgXRLoqDOBnK99W1ri9i8Qc7HK3hgYdD3Bnc917NkNsKh/qaOpKmpslKkRWICrDIR6wFnZYVWTkizr85KAjuC7HKPilCNkntYoYA6HDFhPPPZSb53+E8pFnwxSQjJzks9q1B+viZ0BUUbLSBMYnlR9CFrkAS2JI5BvrtGodV admin@DESKTOP-0S3CU0K"

}