## [Course Overview](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9)

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[Hi everyone.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=0) [My name is Ned Bellavance, and welcome to my course,](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=2.3368571428571427) [Implementing Terraform on Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=9.102) [I am a Microsoft Azure MVP and founder of Ned in the Cloud LLC.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=11.908) [HashiCorp's Terraform is a powerful tool to automate the deployment](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=16.265) [of your infrastructure across multiple clouds,](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=19.7578) [both public and private.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=22.303) [In this course,](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=24.339) [we are going to learn about the nuances of deploying infrastructure](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=24.973666666666666) [as code on Azure using Terraform and leveraging services in Azure](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=28.37883333333334) [to improve your Terraform automation.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=33.34499999999999) [Some of the major topics that we will cover include using the Azure providers,](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=35.868) [including authentication and modules; using multiple providers in a](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=40.006) [single configuration; leveraging Azure Storage for remote state; and](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=44.867285714285714) [automating deployments with Azure DevOps.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=49.0305) [By the end of this course,](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=51.668) [you'll be ready to deploy and manage your infrastructure](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=52.658666666666655) [in Microsoft Azure with Terraform.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=55.422000000000004) [Before beginning the course, you should be familiar with Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=58.046) [especially the Infrastructure as a Service components and have an](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=61.526) [intermediate level of skill with Terraform.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=65.30766666666665) [I hope you'll join me on this journey to learn more about using](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=67.698) [Terraform to deploy infrastructure as code on Microsoft Azure with](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=71.05785714285712) [the Implementing Terraform on Microsoft Azure, course at Pluralsight.](https://app.pluralsight.com/course-player?clipId=502c41ab-7430-40bf-a58d-3c52cae254e9&startTime=75.27640000000001)

## [Using the AzureRM Provider](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043)

### [Introduction](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043)

[Hey everyone, welcome to my course, Implementing Terraform on Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=0) [There are few things that are more fundamental to](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=7.013) [Terraform than working with providers.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=10.337571428571428) [Really, without providers, there's not a whole lot you can use Terraform for,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=12.929) [so that is what we're going to get into in this module.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=16.98025) [Alright, what are we going to cover in this module?](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=22.563) [Well,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=25.174) [the first thing that we're going to talk about is what are the](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=25.36175) [prerequisites that you should be coming to this course with?](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=28.86685714285714) [It's very important that we sort of level set where you need to be in terms](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=31.664) [of your knowledge of both Terraform and Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=35.0002) [And then we're going to dive in a little bit into what the](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=39.736) [differences are between the way Terraform does things in their](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=43.230571428571416) [configurations and the way that Azure Resource Manager does](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=46.441) [things in deployment templates.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=50.51585714285715) [Then we're going to introduce the Globomantics scenario that we'll](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=52.881) [be working with over the duration of this course,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=56.13700000000001) [and finally, dive into some of the minutia of the different Azure providers.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=59.793) [But first, let's talk a little bit about the course prerequisites.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=65.332) [This is not a getting started course.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=69.79) [I'm going to make some assumptions that you already have a base level](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=72.505) [of knowledge about how Terraform works in terms of both syntax and the](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=76.3282857142857) [concepts that exist within Terraform.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=82.137875) [So if you do not have a grasp on the basics of Terraform,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=84.506) [you may want to do a getting started course first.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=87.71844444444443) [In the same vein,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=92.338) [I am assuming that you have a basic working knowledge of Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=93.33933333333331) [especially the IaaS components of Azure,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=98.428) [so things like storage, networking, and compute,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=101.897) [as well as Azure AD.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=104.94628571428572) [You should have a basic working knowledge of all of those things.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=106.847) [If you don't have that core knowledge,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=109.946) [then things might get confusing very quickly,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=111.99) [so I would recommend doing a fundamentals course on Azure if](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=114.101) [you don't already have that knowledge.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=117.44800000000002) [Now with that out of the way,](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=119.07188888888888) [let's talk a little bit about how Terraform does things versus the Azure Resource Manager template deployment.](https://app.pluralsight.com/course-player?clipId=47526a03-51d0-4c92-b3d0-73e225565043&startTime=120.93)

### [Terraform for the Azure Admin](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed)

[I'm going to go with the assumption that you are an Azure administrator,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=1.3456670000000013) [and over the tenure of your administration of Azure,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=5.665667000000001) [you have come into contact with Azure Resource Manager templates.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=9.057917) [You've had to use them at some level,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=14.018667) [so I wanted to compare and contrast how ARM](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=16.239667) [templates do things versus Terraform,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=19.301667000000002) [and I think that will ease the transition to Terraform if](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=21.553667) [you're used to using ARM templates.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=25.050000333333333) [So at a very base level, ARM templates use JSON as their language,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=27.480667) [and Terraform uses HashiCorp configuration language.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=32.436095571428574) [One of the nice things about HashiCorp configuration](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=36.941667) [language is it supports comments, which the JSON and ARM templates don't really.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=39.08450033333333) [Yes, you can add things as metadata, but just generally speaking,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=44.280667) [you can't just throw a hashmark and a comment in there.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=47.22509557142857) [HCL is also a little bit easier for a human to read and a](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=50.340667) [little more forgiving about syntax.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=54.41633366666668) [A point of confusion when you're moving from templates to](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=56.349667000000004) [Terraform is what ARM templates call parameters,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=59.00738128571429) [or the values that you submit to the template,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=61.50666699999999) [Terraform calls variables,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=64.65566700000001) [and the reason that could be a little confusing is because ARM](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=65.94266700000001) [templates do have a thing called variables,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=70.105792) [but those are values that are defined within the template itself,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=72.731667) [and Terraform's version of that is just called local variables that](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=77.198667) [are defined in the locals configuration block.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=80.70180985714286) [So a slight difference there in terms of verbiage,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=84.563667) [and it might trip you up a little bit when you're](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=86.73477811111111) [trying to make that transition.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=89.34054200000001) [Fortunately,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=91.028667) [resources are just resources in the context of both the](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=91.660067) [template and Terraform as are functions.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=95.91591700000001) [The way that you invoke functions is a little bit different,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=99.047667) [but both have functions to deal with things like strings,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=101.446167) [numbers, and dates, and times.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=105.151667) [Another key difference between ARM templates and Terraform,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=109.219667) [in ARM templates, if you want to reference another template,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=112.116167) [say you have a really good template for rolling out a virtual network,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=115.333667) [you would just reference it using a nested template reference.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=119.14666700000001) [In the world of Terraform, there is a similar concept except it's called modules.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=122.27680985714287) [So in the base configuration for a Terraform deployment,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=127.32800033333334) [you would reference a VNet module, let's say,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=132.13766700000002) [and supply that VNet module with the proper variables](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=135.51616700000002) [to create that virtual network.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=139.90141700000004) [So the relationship is very similar,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=142.622667) [the way that you invoke it is a little bit different.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=144.56066700000002) [Another important difference between the two is ARM](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=147.95366700000002) [templates rely on explicit dependency.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=151.59629199999998) [If you're creating a virtual machine in Azure and that virtual](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=153.990667) [machine has a virtual NIC that you're also creating,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=156.64709557142857) [you have to explicitly say that that virtual machine is](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=160.199667) [dependent on the creation of that virtual NIC.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=163.776667) [Terraform will build a dependency graph automatically and determine,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=166.782667) [oh, if I'm going to create that virtual machine,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=170.69416700000002) [I have to create that NIC first.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=173.13066700000002) [That's really nice that you don't have to always put in](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=175.556667) [these explicit depends on statements.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=178.753667) [And then finally, when you're referring to those resources in an ARM template,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=181.20866700000002) [you usually do that through the reference function,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=186.72866700000003) [or the resource ID function, or sometimes,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=188.99200033333335) [you just concatenate the name of the resource.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=191.50980985714287) [In Terraform, it's a little bit simpler.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=194.42626700000005) [You simply refer to the resource by using resource addressing,](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=197.04866700000002) [or you can pull information from the Azure provider using a](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=200.35166700000002) [data source and refer to that data source.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=204.84466700000002) [So I think it's a little more simpler and clearer in Terraform when you](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=207.19666700000002) [want to refer to an existing resource or a data source.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=210.9605241428572) [Speaking of moving from ARM templates to Terraform, let's take a look at our scenario.](https://app.pluralsight.com/course-player?clipId=0229b34e-5999-4b10-bde9-bcc4d8e584ed&startTime=214.866667)

### [Welcome to Globomantics](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6)

[For our scenario in this course, we are going to be helping out at Globomantics.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=1.3223340000000317) [And what is Globomantics?](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=6.133334000000032) [Well, they are a logistics company for restaurants across the globe,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=8.063334000000031) [so they help get that taco from the supplier to the](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=12.107619714285745) [restaurant and into your eager hand,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=15.427334000000032) [and the way that they do that is through applications.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=17.842334000000033) [And those applications are hosted in an on-premises data center today.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=21.54433400000003) [Now Globomantics has just signed a couple really big](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=26.04933400000003) [contracts with new restaurant providers,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=28.936905428571457) [and they're realizing that they don't have the capacity](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=30.82833400000003) [they need in their existing data center.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=33.39047685714289) [So they have chosen to migrate some applications up to Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=35.84419114285717) [and you are going to help them make that goal a reality.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=41.14433400000003) [Now who is on the team for this project?](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=45.23133400000003) [Well, we've got a few different players going on.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=47.34533400000003) [On the cloud side, we've got Chris Jones.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=49.74433400000003) [She is a cloud architect,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=52.52233400000003) [and she is going to be helping build the infrastructure that](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=53.795111777777805) [the applications are going to be running on.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=56.96133400000003) [We've also got Danny Brown, and he's a security administrator.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=59.779334000000034) [He's got some concerns about how things are going](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=63.605334000000035) [to be set up in Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=66.07295900000003) [He wants things to be deployed consistently and repeatedly,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=67.88333400000003) [which makes Terraform a pretty good fit,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=70.94833400000005) [and he also wants to insert his own security tools in the process.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=73.03770900000005) [And then finally, we've got Hector Sanchez who is a software engineer,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=77.80333400000004) [and he is going to be deploying applications in the](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=81.43733400000004) [environment that Chris Jones creates.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=84.73133400000003) [So those are the players at Globomantics that we are going to be](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=87.10533400000003) [working with to get this project complete.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=91.09853400000006) [This group has collectively decided to use Terraform,](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=94.53733400000003) [and in order to interact with Azure, they are going to need to use the Azure providers within Terraform.](https://app.pluralsight.com/course-player?clipId=f048e841-85a5-432f-a963-85f00c4bb9d6&startTime=96.93970900000004)

### [Azure Providers](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b)

[There are actually three different providers for Azure in Terraform.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=1.3680010000000475) [One is the basic Azure provider,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=6.624001000000048) [and this is the one that you will use to interact with Azure public cloud,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=9.201001000000048) [Azure gov cloud, or one of the sovereign clouds.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=13.501001000000047) [It uses the Azure Resource Manager API.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=16.976001000000046) [There used to be an older Azure provider that used the service management,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=20.032001000000047) [but ASM and the provider have both been deprecated.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=23.96900100000005) [Another provider that is very similar to the Azure](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=28.22800100000005) [provider is the Azure Stack Provider.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=31.311751000000047) [If you're not familiar with Azure Stack,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=33.888001000000045) [it's an on-premises extension of Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=35.78300100000005) [and it uses the same ARM API,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=38.891876000000046) [but some of the versions and resources are a little bit different,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=41.894001000000046) [so it actually did require its own provider.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=45.03800100000005) [And lastly,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=48.086001000000046) [there is an Azure provider to deal explicitly with Azure Active Directory.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=48.74275100000005) [That is a relatively new provider.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=54.20000100000005) [There used to be Active Directory components in the regular Azure provider,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=55.71800100000005) [but Microsoft realized with the complexity of Azure Active Directory,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=59.98400100000005) [it probably needed its own provider, so now it has one.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=63.355001000000044) [Now just to refresh your memory a little bit,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=67.52544544444451) [what goes into a Terraform provider, well,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=70.2994454444445) [first of all, Terraform providers are versioned,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=72.47550100000004) [as newer versions of the providers are released,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=75.98100100000005) [you can specify what version you want to use,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=78.49900100000005) [and there's actually a big 2.0 release of the Azure Provider that](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=81.82033433333336) [you might not want to jump up to right away,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=86.20100100000009) [so it's good that versioning is an option.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=88.57200100000004) [Providers have data sources,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=91.51800100000004) [and this is information that you can pull from the](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=92.8774295714286) [provider about your target environment.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=95.79000100000005) [So if you're using the Azure Provider,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=98.54900100000005) [you might want to pull a list of marketplace images or get an existing](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=100.39700100000005) [virtual network that's already been provisioned.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=105.15000100000005) [The other half of that equation is resources,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=108.13100100000005) [and resources are things that you can create in the target environment,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=110.63300100000005) [so for instance,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=114.23600100000004) [you might want to create an Azure virtual machine in a](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=114.88212600000003) [VNet that you got from the data sources.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=117.80233433333338) [While it's not specifically part of the provider,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=120.80300100000005) [most providers have modules associated with them that help you easily](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=123.90100100000005) [deploy common configurations for that provider,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=128.9688581428572) [and those modules can be found on the public Terraform Registry,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=131.77000100000004) [which is registry.terraform .io.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=135.57600100000005) [and then finally,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=138.85200100000006) [most Terraform providers have some form of authentication](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=140.32700100000008) [you use to interact with that provider.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=143.41762600000007) [In the case of the Azure providers,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=146.30400100000006) [you're using Azure Active Directory to provide that authentication.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=148.68000100000006) [Now there are a number of different ways to perform that](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=153.78200100000004) [authentication against Azure Active Directory,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=156.51880100000002) [so let's take a look at those now.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=158.54850100000004) [When you're authenticating to the Azure provider or](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=162.14400100000006) [the Azure Active Directory provider,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=164.88814385714292) [there are a number of different ways to go about that.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=166.78600100000006) [You can use the Azure CLI.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=169.44125100000008) [If you do az login from the Azure CLI,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=172.43900100000005) [Terraform will be able to find those credentials and use](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=176.69000100000005) [them when you're invoking the provider.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=179.83400100000003) [Another way to go about authentication is by using a managed service identity.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=182.87400100000005) [Managed service identities can be assigned to objects that run within Azure,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=187.72500100000005) [so say you're running an Azure virtual machine that has Terraform installed.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=192.98800100000005) [You can tell Terraform to use the managed service identity of](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=197.15500100000006) [that virtual machine for deployments as opposed to using the](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=200.12900100000004) [Azure CLI for authentication.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=203.65300100000005) [Another potential option is using a service principal with a client secret,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=206.88200100000006) [so you can sort of think of this as a username and password.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=210.68275100000002) [You create a service principal in Azure Active Directory,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=214.51000100000005) [and you generate a client secret for it,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=217.27071528571432) [and then you can use those two items to authenticate to Azure Active Directory.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=219.73200100000003) [Now you might not be entirely happy using a client secret.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=225.46100100000004) [You might want to use a certificate instead,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=228.58000100000004) [so the fourth option for authentication is to use that same service principal,](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=231.16833433333338) [but use a generated client certificate for authentication](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=235.94900100000004) [instead of using a secret or password.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=239.88000100000005) [So let's take a look at an example of how you would use this with the Azure provider.](https://app.pluralsight.com/course-player?clipId=e4a4b5c5-d373-4c0d-81db-dd666fc56a6b&startTime=242.99600100000004)

### [AzureRM Provider Examined](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314)

[Now you note at the top of the screen, it says AzureRM Provider.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=1.3880010000000476) [And as I mentioned before, there used to be an Azure Service Manager Provider,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=4.998001000000047) [which was deprecated along with the Service Manager model in Azure.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=9.902001000000048) [Now everything uses Resource Manager,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=14.001001000000047) [but the actual name of the provider when you're invoking it is azurerm.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=17.002001000000046) [So the way that you would use the azurerm provider is](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=21.569001000000046) [to create a configuration block, which is a fundamental component of Terraform.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=24.31442957142862) [In a configuration block,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=29.363001000000047) [you first have to say what type of object you are creating that block for,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=30.754501000000054) [so the provider keyword lets Terraform know we're provoking a provider,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=35.51171528571433) [and then the first to label AzureRM tells it which provider we're using.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=39.794001000000044) [Within the configuration block,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=44.604001000000046) [you can specify a version argument saying what version you want to use.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=46.52600100000005) [And in this case,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=50.82200100000005) [that little squiggle with the greater than sign says I want to use version 1.X,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=52.08750100000005) [so I want to stay in the 1 major version,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=57.35600100000005) [but I will do 1.2, or 1.3, etc.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=61.29300100000005) [Because version 2 is coming out soon and there might be breaking changes,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=65.37700100000005) [this might be a good thing to put in configurations so you stay on the 1.X](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=68.68900100000005) [provider until you're sure you're ready to make the jump to 2.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=73.70600100000004) [You can also specify an alias in your provider,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=78.13033433333337) [and the alias allows you to create multiple instances of the same provider,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=81.48362600000002) [and that's something we're going to deal with in the next module.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=85.95450100000005) [You could specify the subscription ID that corresponds to what](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=89.61600100000005) [subscription you're going to be using for that provider,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=93.55360100000003) [and then you can specify some authentication information.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=96.11500100000005) [If you wanted to use the service principal and the client secret,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=99.89900100000004) [you would specify a client\_ID, which is the ID of that service principal,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=103.58600100000004) [and then client\_secret, which is the password for that service principal,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=108.15325100000004) [so this is an example of using that configuration block](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=113.26200100000004) [with pretty much everything specified out.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=115.80080100000004) [You can also specify some of these values using environment variables.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=118.68900100000005) [If you wanted to use environment variables to specify the values,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=124.35200100000004) [there are many Azure resource provider environment variables,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=127.77300100000004) [so let me just go over a few briefly.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=130.95400100000003) [You can specify the client\_id and client\_secret by using](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=133.83400100000006) [ARM\_CLIENT\_ID and ARM\_CLIENT\_SECRET.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=138.58050100000003) [Please note that these are case sensitive.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=140.58500100000003) [You can use these two to specify that principal ID and secret in the](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=142.58200100000005) [environment variable instead of including it in the configuration.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=146.43085814285712) [You can also specify what environment you're using](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=149.83900100000005) [whether you're using Azure public cloud,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=152.98300100000006) [gov, or one of the sovereign clouds.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=154.83966766666674) [You can specify the SUBSCRIPTION\_ID, the TENANT\_ID,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=157.58600100000004) [which is the Azure Active Directory tenant that has the service](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=160.62571528571434) [principal you're using for authentication,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=164.63800100000006) [or you could specify an environment variable ARM\_USE\_MSI,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=167.24900100000005) [and that tells Terraform to use the managed service identity](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=170.63360100000006) [on the system where terraform is running.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=175.25062600000004) [So these are just some of the different environment variables,](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=178.93700100000004) [but I did want to bring them up because we're going to be using](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=181.09200100000004) [them in some of our configurations instead of putting the](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=184.03928671428577) [information in that provider block.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=187.26471528571437) [So what are we going to be using this provider information to deploy? Good question.](https://app.pluralsight.com/course-player?clipId=a7310a6c-b6d6-4ea2-8432-81103608d314&startTime=188.69277877777785)

### [Deploying a Virtual Network](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22)

[In our Globomantics scenario,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=1.2460010000000474) [one of the first things that they want to get going is a](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=2.394572428571476) [virtual network to do some application testing.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=5.642376000000048) [So you, as Chris Jones,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=8.641001000000047) [are going to be setting up an environment in Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=10.093778777777821) [and basically, you're just going to be creating a virtual network in Azure,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=14.046001000000048) [and you're going to create two subnets in that virtual network,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=19.195001000000047) [one called web and the other one called database.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=22.166858142857187) [Now you don't have Terraform or the Azure CLI](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=25.49000100000005) [already installed in your workstation,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=28.968501000000046) [and you'd like to get this going pretty quickly,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=30.741001000000047) [so you've decided to use Azure Cloud Shell to perform this deployment,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=32.78500100000005) [and the reason is Azure Cloud Shell already has Terraform installed,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=36.78885814285719) [it already has the Azure CLI installed, and in fact,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=40.26737600000004) [it takes care of the authentication piece for you because](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=43.743501000000045) [it uses the Azure Active Directory credentials you used to](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=47.03350100000006) [log into the portal with.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=51.02487600000004) [That makes the deployment process much simpler.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=52.723001000000046) [So let's go ahead and deploy that virtual network.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=55.82600100000005) [For our demo, just a few quick things before we get started,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=59.541001000000044) [we are going to take a look at the Terraform file,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=62.539112111111166) [review what's in there,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=65.90900100000005) [we're going to deploy that configuration using the Azure Cloud Shell,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=66.91871528571431) [and then review the results and make sure that our](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=70.84900100000004) [virtual network creates successfully.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=73.52685814285721) [If you want to play along, you really only need two things.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=75.58900100000005) [You're going to need an Azure subscription,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=78.52987600000003) [obviously, and you're also going to need the demo files,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=81.32400100000004) [which you can find on my GitHub account.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=83.87400100000005) [It's Ned1313 and then just look for the course name,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=86.07200100000004) [or you can find it on the Exercise Files tab on the course web page.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=88.78800100000005) [One final note of caution,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=94.47100100000004) [some of the resources we're going to deploy in this course may cost money.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=97.16600100000005) [You're deploying resources in Azure,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=102.06300100000004) [and while I've tried to keep that cost as low as possible,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=103.85000100000005) [there are going to be resources that may cost some small amount of money,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=106.51012600000006) [so I just want to say that up front.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=110.73991009090915) [I'm trying to keep the cost low,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=112.46300100000005) [but just understand that your Azure subscription may incur some cost to you,](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=114.23100100000005) [so consider yourself suitably warned. Alright, let's go over to our demonstration environment and get started.](https://app.pluralsight.com/course-player?clipId=8ba9b823-193d-4ec1-9c9f-e6be3be9fc22&startTime=118.64000100000004)

### [Reviewing the Virtual Network Config](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b)

[Alright, here we are in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=1.1510010000000475) [and we are going to review the configuration for](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=3.4010010000000475) [rolling out this virtual network.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=6.244001000000048) [You'll note I have the exercise files in the left pane,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=8.869001000000047) [and in the first directory, 1-main-vnet,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=11.95737600000005) [I have the main.tf file open.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=14.731715285714333) [So now that we see that,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=19.07400100000005) [let me just shrink that up to give us a little more room to work.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=20.316601000000052) [Alright, first, we're going to define some variables.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=24.012001000000048) [This should be very familiar if you've ever used Terraform before,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=26.130001000000046) [but we're going to set up a resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=28.77028671428576) [and I've set type equal to string, but I haven't given it a default value,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=30.990858142857196) [so you're going to have to specify that when you run Terraform plan.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=34.82144544444448) [For the location, I have set a default of eastus,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=39.45700100000005) [but you can obviously change that to whatever location makes sense for you.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=41.93771528571433) [And then scrolling down,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=46.07900100000005) [we are setting the IP address range for the virtual network,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=47.58100100000006) [and in this case, it's set to a default of 10.0 .0 .0 /16,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=51.40100100000005) [and directly below that,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=55.503001000000054) [we are setting the subnet\_prefixes that are going to be in that virtual network.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=57.641001000000045) [And you'll note that the type is a list of string,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=62.87400100000005) [so you do have to specify a list here.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=65.92200100000005) [I've set the default to 10.0 .0 .0 /24 and 10.0 .1 .0 /24.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=68.02900100000005) [Please note that these are inside the VNet side of range,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=74.74900100000005) [so you want to make sure that you do that if you don't go with the defaults.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=77.3006676666667) [And finally, we are setting the subnet\_names.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=80.94300100000005) [That is also a list of strings, and we've got web and database in there.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=84.38500100000005) [If you're going to change any of this,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=89.15600100000005) [just make sure you have the same number of subnet\_prefixes that you have](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=90.27600100000005) [of subnet\_names otherwise you're going to get an error.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=93.74360100000006) [Now let's scroll down to our provider definition, and that's it.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=96.87850100000004) [We say provider azurerm,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=101.27200100000005) [and the rest is going to be magically filled in when we're using the Azure CLI,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=102.73600100000004) [and I'll show you how that works in a moment.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=107.58944544444451) [Now let's get down to our resources.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=111.36500100000005) [For our resources, we are using a module to deploy our virtual network,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=113.64400100000005) [and we're specifying the source as Azure/vnet/azurerm,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=119.45700100000005) [so where is that source?](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=121.86983433333337) [That source is on the Terraform public registry.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=125.53400100000005) [Let's go over to a browser and take a look at that.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=129.04600100000005) [If you go to registry.terraform .io, it will take you to this Terraform Registry.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=131.30566766666672) [And if we scroll down a little bit here,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=137.30600100000004) [it shows us the different providers that you can look at modules for,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=139.36300100000005) [and boom!](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=143.027251) [There's Azure!](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=143.62400100000005) [So here are the modules associated with the Azure Provider.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=144.30285814285722) [Let's scroll up a little bit,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=148.18600100000006) [and we can tick this little box here that says Verified,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=149.1073343333334) [so it will only show us modules that have been verified by](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=151.96700100000004) [Microsoft as working for the Azure Provider.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=155.93828671428574) [And the one that we are actually using is the vnet,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=158.79250100000002) [so if we go to the next page, there is the vnet module.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=161.44533433333345) [We can click on the vnet module,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=165.20100100000005) [and it gives instructions for how to use this module,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=167.05100100000004) [what the expected inputs are, and what the expected outputs are,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=170.3478581428572) [and what resources actually get provisioned.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=174.37300100000004) [So this is the module that we are invoking in our configuration.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=177.08400100000006) [Let's go back to the configuration and continue.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=182.03000100000006) [So within the module configuration,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=184.61600100000004) [we're specifying a resource\_group\_name; the location; the name of](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=187.48800100000005) [our vnet; which we're setting to be the same as the](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=192.15500100000003) [resource\_group\_name; we're setting an address\_space,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=194.73200100000005) [the subnet\_prefixes,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=197.80000100000004) [the subnet\_names; and then there's an nsg\_ids property that needs to be](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=199.50200100000004) [set to an empty map otherwise it throws an error.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=204.15566766666674) [If you did have network security groups that you wanted](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=208.19200100000006) [to associate with the virtual network, you could provide a map of them here.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=210.96428671428572) [We don't at the moment, so we're going to leave that empty.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=214.9858581428572) [And then lastly, we're specify two tags for this virtual network.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=218.29500100000004) [We want to set an environment tag equal to dev and the costcenter equal to it.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=222.95300100000006) [So that's all of our resources.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=228.41600100000005) [If we scroll down a little bit more, we get to OUTPUTS,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=229.93100100000004) [and what we are getting as an output is the virtual network id,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=232.993889888889) [which is an output that's exposed by the module,](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=237.74400100000005) [so we're referencing it by doing module.vnet - main.vnet\_id.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=240.18942957142863) [So that's the whole configuration.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=247.11400100000006) [There's not a whole lot going on here.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=248.92900100000006) [So let's go ahead and launch the Cloud Shell and actually deploy this configuration.](https://app.pluralsight.com/course-player?clipId=8d9acda3-cc6f-4557-82b8-96ed8b3a9a2b&startTime=251.31800100000004)

### [Deploying the Config with Cloud Shell](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731)

[Okay, here we are in the Microsoft Azure Portal,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=1.2836680000000633) [and you'll note that we're logged in as Chris Jones at Globomantics,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=4.129668000000064) [and we'd now like to launch the Azure Cloud Shell to deploy our configuration.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=7.671668000000062) [So all we have to do is click on the Cloud Shell,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=12.715668000000063) [and it will launch a Cloud Shell below.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=15.015445777777842) [Now if you've never used Cloud Shell before,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=18.573668000000062) [it's actually going to prompt you first to create a storage](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=20.952668000000063) [account where it's going to store any files that you create](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=23.852953714285782) [within the context of the Cloud Shell.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=27.937543000000066) [Now Chris has logged in the Cloud Shell before,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=30.833668000000063) [so she is not getting prompted for that.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=32.567112444444504) [It will also prompt you whether you want a Bash or a PowerShell,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=35.242668000000066) [and you can change it by clicking on the drop-down and](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=37.701779111111165) [selecting PowerShell instead of Bash.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=41.65338228571435) [But for our purposes, we are going to be using the Bash version of PowerShell.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=44.27466800000006) [Now let's go ahead and click on the Maximize button](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=49.02166800000006) [so it takes up the whole screen,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=51.97389022222228) [and what we're going to do first is create a folder to](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=54.004668000000066) [store our Terraform configurations.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=57.51938228571435) [So we're going to run mkdir terraform to create that directory,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=59.49366800000006) [we'll go into that directory,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=63.41581085714292) [and we're going to create a second directory called](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=65.1595251428572) [1-main-vnet and go into that directory.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=69.73416800000007) [Alright, now we're all set with our directory structure.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=74.04866800000006) [Now one of the things that I mentioned is that Terraform is going](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=77.12366800000007) [to be using the credentials for the Azure CLI,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=79.79516800000007) [but we didn't log into the Azure CLI.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=83.13966800000006) [The Cloud Shell does that automatically for us.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=86.01366800000007) [So if we run az account show,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=89.26566800000006) [it is going to show us which subscription we are using,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=92.12026800000002) [which is the PS subscription,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=95.50466800000007) [and it's going to tell us what user we're already logged in as,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=97.56466800000007) [so we're logged in as Chris Jones.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=100.34111244444449) [So as part of the Cloud Shell spin up,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=102.42211244444452) [it logs you into the Azure CLI automatically.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=105.62386800000004) [The other things is if we run terraform version,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=109.46466800000006) [you can see that Terraform is already installed with version 12.10,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=112.38366800000006) [which is the current version of Terraform.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=115.6655251428572) [Sometimes the Cloud Shell is one minor revision behind.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=118.46566800000006) [They do try to keep it as up to date as possible.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=120.86922355555562) [Right now, it's current.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=124.27466800000006) [If it's not, Terraform will say, hey, there is a newer version,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=125.27366800000006) [and this is the newer version, but in Cloud Shell,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=128.16255688888893) [you're not able to install applications.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=130.15466800000007) [It's all preconfigured for you.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=132.50966800000006) [so we validated that we're logged in through the Azure CLI.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=134.84366800000006) [We validated that Terraform is already installed.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=137.89266800000007) [Now let's go ahead and create our configuration in Cloud Shell.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=140.35566800000007) [Fortunately, there is a code editor in Cloud Shell,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=144.13166800000008) [so we can run code to invoke that code editor,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=146.83177911111116) [and give it a file name that we want to work with,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=149.38733466666676) [so we'll call it main.tf, and it launches the code editor above the Cloud Shell.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=152.1248680000001) [That's pretty convenient.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=157.18766800000006) [And this is based off of the same code that Visual Studio Code uses.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=158.12766800000006) [Let's go back to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=162.47466800000007) [and we're going to select the contents of our main.tf configuration and copy it,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=164.46466800000007) [and then we will paste it in here and do Ctrl+S to save the file,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=169.14066800000006) [and you can see it actually adds syntax highlighting throughout the document,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=172.8771680000001) [which is pretty convenient.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=177.83738228571437) [Now that we have main.tf file saved, we can do Ctrl+Q to close out of the editor,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=179.63966800000006) [and I'm just going to do clear to bring the command all the way back up to](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=186.41166800000008) [the top of the screen so it's a little easier to see.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=189.23896800000006) [The next thing to do is to go through the Terraform core workflow,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=191.98266800000007) [which starts with terraform init.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=194.78416800000005) [Terraform init will pull down the module that we're](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=197.58533466666674) [referencing within our configuration,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=202.07483466666676) [as well as add the provider plugin for the AzureRM Provider,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=203.5890965714286) [and you can see, it pulled down version 1.2 of the Azure vnet module,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=208.94166800000005) [and it also pulled down version 1.35 of the azurerm provider.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=214.06741800000003) [So we've successfully initialized our configuration.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=220.57666800000007) [Let me just clear it out again so we can get back to the top of the screen.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=224.22866800000006) [The next thing to do in our configuration would be to run terraform plan,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=228.05566800000005) [and then we do need to specify a value for the resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=232.12433466666673) [so we're going to set that to vnet-main,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=235.40516800000006) [and then we're going to save the plan to a file vnet.tfplan,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=238.01891800000004) [so let's go ahead and run that now.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=244.06466800000007) [And there we go!](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=246.75166800000005) [It runs pretty quickly.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=247.556168) [We can see it's going to add four new resources.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=248.36066800000006) [If we scroll up a little bit, we can see it's creating a resource\_group,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=251.73066800000007) [it's creating two subnets, web and database,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=256.1466680000001) [and if we scroll down a little bit more,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=259.17266800000004) [we can see it's creating a virtual network to house those two subnets.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=260.77766800000006) [Scrolling all the way down, we can see there is one warning that was thrown here,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=265.21766800000006) [and it's telling us that some property inside the](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=269.06666800000005) [module is going to be deprecated.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=271.73316800000003) [Now we don't have to do anything about this.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=273.52266800000007) [It's just a warning.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=275.02366800000004) [And Microsoft is responsible for the upkeep of this module,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=276.4546680000001) [so we're going to assume they're going to swap out the network\_security\_group](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=279.31104300000004) [for that azurerm\_subnet\_network\_security\_group\_association resource at some](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=282.28333466666675) [point in the future before it's fully deprecated.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=287.48779300000007) [Now that we've successfully run our plan,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=290.80266800000004) [we can run terraform apply vnet.tfplan.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=293.1446680000001) [Go ahead and copy that, and we'll paste it here.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=297.04066800000004) [And now it's going to go ahead and create that resource\_group,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=300.83366800000005) [the virtual network, and the subnets within that virtual network.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=304.088268) [Fortunately, creating a virtual network doesn't take very long,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=308.6466680000001) [so this should go relatively quickly.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=311.214168) [Alright, there we go.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=313.0263346666668) [It has successfully created our resources,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=314.72766800000005) [and you can see that the vnet\_id output is there at the bottom of the screen.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=316.26766800000007) [Now if we want to go ahead and minimize this Cloud Shell and](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=321.2116680000001) [refresh our view of the resource groups,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=324.626168) [we can go ahead and confirm that the vnet-main resource group is there,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=326.7165430000001) [and we'll click through on that.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=331.1566680000001) [And within that resource group, there is a single resource,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=333.53266800000006) [the vnet-main virtual network.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=336.661668) [We can click on that, and we can see that the tags were successfully applied.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=338.70166800000004) [We've got costcenter : it, environment : dev.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=343.02766800000006) [It's using the correct address space that we specified.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=346.03066800000005) [And if we go to Subnets,](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=348.8744180000001) [we can see that the database and web subnets have been](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=351.03966800000006) [created with the correct IP address range.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=354.4140965714286) [So we have successfully deployed our first Terraform](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=357.3269537142858) [configuration in Microsoft Azure using the Cloud Shell. Good stuff.](https://app.pluralsight.com/course-player?clipId=46dd4a0a-2a8f-40dd-9cbe-e84fbef49731&startTime=361.91586800000005)

### [Summary](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679)

[Alright, what did we learn in this module?](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=1.1610010000001638) [Well,](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=4.602001000000164) [we looked at the differences between the way Terraform](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=4.844572428571593) [does things versus an ARM template.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=7.4200010000001635) [And I hope by looking at the configuration,](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=9.660001000000165) [you got a feeling for how much easier it is to read through a](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=11.484001000000164) [Terraform config than parse an ARM template.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=14.63057242857159) [That's not a dig on ARM templates.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=17.153001000000163) [It's just the nature of JSON.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=18.694001000000164) [It's a little bit harder to read.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=20.107001000000164) [Terraform is just a little more human readable.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=21.885001000000162) [We also talked about the three different Azure providers that are out there](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=25.345001000000163) [and dug into how to use the AzureRM provider specifically,](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=29.08300100000017) [and then we talked about the different ways that you can authenticate](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=33.52200100000017) [against the Azure providers and went through an actual deployment of](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=36.55328671428587) [resources using the AzureRM Provider.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=40.77114385714302) [Now that's just the beginning of our journey.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=44.019001000000166) [Coming up, the security team and Danny Brown are going to get involved,](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=46.17900100000016) [and that means we're going to have to deal with multiple](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=50.79200100000016) [subscriptions in Microsoft Azure and how to use service principals](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=54.059401000000165) [for authentication when using the providers.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=58.72075100000018) [That's all coming up in the next module. I'll see you there.](https://app.pluralsight.com/course-player?clipId=d80df0de-6838-40e8-8c4c-9e6d3bbf7679&startTime=62.11900100000016)

## [Creating Multiple Providers](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b)

### [Introduction](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b)

[As your configurations grow more mature and complex,](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=0) [there is a really good chance you're going to need to use](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=4.085857142857143) [multiple providers within the same configuration,](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=7.138142857142858) [so that is what we're going to be talking about in this module.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=9.918) [Hey everyone, this is Ned Bellavance.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=13.762) [I'm a Microsoft Azure MVP, and this is Creating Multiple Providers.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=15.011) [What are we going to talk about in this module?](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=20.377) [Well,](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=23.719) [the first thing that we're going to talk about is the multiple](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=23.918125) [providers in Azure and how you could instantiate them,](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=27.223428571428574) [and what I mean when I'm saying multiple providers because](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=30.618) [there could be two different ways to take that.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=33.66733333333333) [And then we're going to dig in a little bit about](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=36.161) [how to use the Azure AD Provider.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=38.806999999999995) [In the previous module, we saw how to use the AzureRM Provider,](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=41.355) [and now it's time to learn a little bit about the Azure AD](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=44.18725) [Provider and how it might be slightly different.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=47.72) [Then we are going to dive into our Globomantics scenario](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=51.243) [and get the security team connected to the environment that](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=54.129333333333335) [we have started to configure. But first, let's talk about multiple providers in Azure.](https://app.pluralsight.com/course-player?clipId=9e8237a6-1b7a-4360-99e9-eb16615c988b&startTime=57.826)

### [Using Multiple Instances](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef)

[As I mentioned in the previous module, there are three different Azure providers,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=1.389666999999994) [there's Azure, Azure Stack, and Azure Active Directory.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=6.474666999999994) [Now we aren't going to be using the Azure Stack Provider in this course because,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=10.681666999999994) [well, it's a lot of work to set up an Azure Stack development kit,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=13.646666999999994) [but we are going to be using the Azure and Azure Active Directory Providers,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=17.379541999999994) [and we'll see why in a moment.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=21.634444777777773) [Now when I say, multiple providers, that can have more than one meaning.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=24.664666999999994) [I could simply mean that we're using both the Azure and](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=28.821666999999994) [Azure Active Directory Providers.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=32.661952714285704) [That would be multiple providers.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=34.57166699999999) [You might have a configuration where you want to create,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=37.377666999999995) [say, an Azure function,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=40.22923842857142) [and then you also want to create an Azure service principle](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=41.660667) [and role for that function to assume.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=44.478666999999994) [I could also be talking about using multiple instance of the same provider,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=46.83080985714286) [same more than one Azure Provider.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=52.85500033333334) [There are two primary reasons to use multiple Azure instances.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=55.355667) [The first is you're going to work with more than one](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=59.359666999999995) [subscription in a configuration.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=61.563666999999995) [Each instance of the Azure Provider is specific to a subscription.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=63.24166699999999) [The second reason would be if you wanted to use multiple](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=67.67066699999998) [authentication sources within your configuration.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=70.540667) [Say you wanted to use the managed service identity for some](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=73.14338128571427) [resources and a service principal for others,](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=76.48966699999998) [that could be a reason to have multiple instances of the Azure Provider.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=79.55766699999998) [Now let's take a look at what's going on with the security team and see which of these two they need for their configuration.](https://app.pluralsight.com/course-player?clipId=ae6a3769-a82c-45b5-ad15-e14defab9eef&startTime=84.06266699999999)

### [Security Network Deployment](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc)

[Danny Brown is a security administrator on the info sec team,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=0.9503340000000026) [and he is responsible for rolling out the security toolsets in Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=6.506834000000003) [so he has set up a separate security subscription to place all of the security](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=11.530334000000003) [related resources and lock down access to that subscription.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=17.051191142857142) [Within that subscription,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=21.315334000000004) [he wants to deploy a virtual network to house some of the](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=22.196834) [security tools that they are going to use for a data](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=25.924459000000002) [analysis and vulnerability assessment.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=30.28033400000001) [Now the resources that will generate this information are](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=32.514334000000005) [going to be living in other virtual networks,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=35.085834) [so what Danny would like to do is have all of those virtual](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=37.68976257142858) [networks have a peering connection to that security-vnet so that](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=42.136111777777764) [it can collect information for analysis.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=45.781834) [So what Danny is asking is anybody who spins up a virtual network within Azure,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=49.398334000000006) [he wants them to be able to create that peering](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=53.177334) [relationship to the security-vnet.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=55.743734) [Fortunately,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=58.341334) [all of these subscriptions within the Globomantics environment are](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=58.820134) [using the same Azure Active Directory tenant.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=62.725334000000004) [And because of that,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=65.567334) [Danny is going to create a service principal within](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=66.40433399999999) [that Azure Active Directory tenant,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=69.47300066666665) [and he's going to create a custom role on the security subscription that](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=71.83933400000001) [allows that service principal to create VNet peerings,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=76.16833400000002) [and he's going to give the credentials for that service principal to the team](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=80.36033400000001) [that is responsible for spinning up these virtual networks,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=84.49408399999999) [so they'll be able to do the peering on their own](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=87.803334) [without Danny having to get involved.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=90.40783400000001) [In order to deploy this configuration,](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=92.758334) [Danny is going to have to use both the AzureRM Provider](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=94.798334) [and the Azure Active Directory Provider, so let's take a look at an example of using the Azure Active Directory Provider.](https://app.pluralsight.com/course-player?clipId=b8b850f4-10f6-433b-bb2d-7110c275fadc&startTime=97.636334)

### [Using the Azure AD Provider](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490)

[Just like the AzureRM Provider,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=1.436667000000016) [the Azure Active Directory Provider starts with a provider block,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=3.310667000000016) [and then you specify the provider type as azure\_ad,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=6.784667000000016) [and then you can also specify a version.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=10.730042000000015) [Now you remember,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=14.577667000000016) [I mentioned that the azure\_ad provider is somewhat new to the scene,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=15.2813812857143) [and for that reason, it's not even at a 1.0 release.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=20.280667000000015) [The current version is .6.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=23.027667000000015) [Now you could skip the version here and just take the latest if you wanted to.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=25.575667000000017) [You can also specify a subscription\_id, and more importantly,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=29.444667000000017) [you can specify the tenant\_id.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=33.41566700000001) [Because we're working with Azure Active Directory,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=35.625667000000014) [we're going to be working with a specific Azure Active Directory tenant.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=38.036667000000016) [And then within the configuration block,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=42.484667000000016) [you could also specify the client\_id of a service](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=44.02066700000002) [principal to work with this provider.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=47.113667000000014) [Now you might not want to specify the client secret within the provider block.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=50.305667000000014) [Maybe you want to use environment variables.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=54.18166700000002) [Well, the good news is, just like the azurerm Provider,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=58.29166700000002) [the azure\_ad Provider also uses environment variables.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=60.63026700000001) [In fact,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=64.08166700000001) [it kind of uses the exact same environment variables that we looked at before,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=64.72388922222223) [so things like ARM\_CLIENT\_ID, ARM\_CLIENT\_SECRET,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=69.38566700000001) [the ARM\_ENVIRONMENT, SUBSCRIPTION\_ID, TENANT\_ID,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=73.08666700000002) [And ARM\_USE\_MSI.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=77.63416700000002) [All of those same environment and variables also apply to](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=79.83366700000002) [the Azure Active Directory Provider.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=83.09079200000002) [So if you specify them for one, you're really kind of specifying them for both.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=85.49766700000002) [If you want to override one of these environment variables,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=90.20866700000002) [you can specify it in the provider block,](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=93.01800033333336) [and that actually takes precedence over anything](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=95.81552414285719) [that's in the environment variable.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=98.23300033333337) [So let's go over to our demonstration environment and help](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=100.19766700000001) [Danny step through the process of spinning up his security-vnet and that service principal.](https://app.pluralsight.com/course-player?clipId=d3f4677f-97cd-4993-8220-c9523d17c490&startTime=103.0380955714286)

### [Reviewing the Security Configuration](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612)

[Okay, here we are in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=1.0733340000000318) [and you'll see I've got the directory 2-sec-vnet open and](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=4.086334000000032) [the main.tf file open in that directory.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=8.120191142857175) [Let's go ahead and minimize that down and give ourselves a little more room.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=11.708762571428602) [Now we've got the standard variables in our configuration,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=15.807619714285748) [we're defining things like the resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=19.45333400000003) [the location, and then we get down into the virtual network settings.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=22.14533400000003) [For the vnet\_cidr\_range, I've set a default of 10.1 .0 .0 /16.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=27.704534000000027) [What I want to point out is the point of this exercise is to create a](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=33.88333400000003) [peering relationship between this security virtual network and the main](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=38.253191142857176) [virtual network that Chris Jones has set up,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=42.20833400000004) [so you want to make sure that whatever you choose for this IP address](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=44.34033400000004) [range does not overlap with the other virtual network that's already been](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=48.217619714285746) [created otherwise the peering relationship is,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=52.97933400000003) [well, it's not going to work very well.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=55.48011177777781) [Then we're setting our subnet prefixes for the security subnet.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=57.56633400000003) [I'm using 10.1 .0 .0 /24 and 10.1 .1 .0 /24 and then](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=60.71733400000003) [giving a name to each of those subnets, siem and inspect.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=67.61288955555558) [So those are the variables for our security deployment.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=70.82404828571434) [Let's scroll down a little bit more, and we have a DATA section here,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=75.16433400000003) [and we are pulling information from Azure about our azurerm\_subscription.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=78.21583400000003) [And what this data source does is it pulls the Azure](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=83.71033400000003) [subscription information about the subscription that's being](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=87.25653400000003) [used along with the azurerm Provider so that we can get](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=90.5516673333334) [information like the ID of the subscription,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=94.37983400000003) [and we're going to be using that information a little bit further down.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=97.65233400000002) [In the PROVIDER section, if we scroll down a bit,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=101.55333400000004) [we are establishing two providers here, the azurerm and azuread providers.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=104.11704828571432) [Now because we are using the Azure CLI for authentication,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=109.11033400000004) [all of the information that we need for each provider will be](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=111.84683400000003) [provided through the Azure CLI authentication,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=116.25708399999999) [so we don't actually need anything in the RESOURCES block of these providers.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=120.06533400000004) [Let's scroll down a little bit more into our resources just to](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=124.78833400000003) [review quickly what we're trying to create here.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=127.85590542857148) [We're trying to create an Azure virtual network,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=130.12633400000004) [and we're also trying to create a service principal in Azure AD and](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=132.62170900000004) [assign it a role on the security subscription.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=137.032084) [So this first section just deals with the networking aspect of it.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=141.04033400000003) [The first thing we're doing is creating an Azure resource\_group,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=144.86033400000002) [and we're giving it a name based off of the resource\_group\_name](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=147.52366733333338) [and a location based off the variable location,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=151.25133400000004) [and we're tagging the resource group security for the environment.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=154.64433400000004) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=158.54933400000004) [just like the configuration from the previous module,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=160.14633400000002) [we are using the vnet module from the Terraform](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=162.6787625714286) [Registry to create our virtual network.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=166.33833400000003) [The only thing that's really different about this configuration is the tags,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=169.33033400000002) [so we are setting the environment equal to security and](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=173.04133400000003) [the costcenter equal to security,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=176.23019114285717) [so we've basically already seen this portion of the configuration before when](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=178.79733400000003) [we were spinning up the virtual network for Chris Jones.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=182.3219054285714) [Now scrolling down a little bit further,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=185.6937625714286) [we get into the creation of our azuread\_service\_principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=187.72408400000006) [and we need to create a number of resources to get this done.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=190.74713400000002) [The service principal will need a password,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=195.97533400000003) [so we're using a special resource called random\_password,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=198.49633400000002) [and random\_password does exactly what you think it does.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=201.24733400000002) [It creates a random password, and within the RESOURCE block,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=205.10833400000004) [we tell it what the length should be for that random password,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=208.7407090000001) [we're making it 16 characters long,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=212.45333400000004) [and whether or not it should use special characters.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=214.71133400000002) [We're setting that to true.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=217.06433400000003) [If you've worked with service principals in Azure Active Directory before,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=218.39833400000003) [you'll know that you actually have to create an Azure AD](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=222.20133400000003) [application for that service principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=225.31090542857146) [and so the next resource is an azuread\_application,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=227.48404828571432) [and we're giving it the name vnet-peer.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=231.69633400000004) [Then we can create our azuread\_service\_principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=234.84033400000004) [and the only thing we need to specify in there is the application\_id.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=236.59433400000003) [We retrieve that by using resource addressing to refer](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=242.24533400000004) [to the attribute application\_id.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=246.14847685714287) [So the way that we do that is we refer to the resource azuread\_application,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=248.45933400000004) [the name label on that resource, vnet\_peering,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=254.13433400000002) [and then the attribute that we want from that resource,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=256.2775006666667) [application\_id.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=261.0358340000001) [So if you're used to ARM templates,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=261.56433400000003) [this is a different way of getting to an attribute than](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=262.947334) [you would use in an ARM template,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=265.6622228888889) [and I thin it's a little bit more straightforward as well.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=267.401334) [Scrolling down a little bit more, now that we have our service principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=270.32533400000005) [we can assign it the password that we generated from random\_password.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=273.49133400000005) [So within this resource,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=277.63533400000006) [we are specifying the principal\_id of this azuread\_service\_principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=279.2330482857144) [we're specifying the value from the random\_password resource,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=285.20133400000003) [and the attribute for that is called result,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=288.426934) [and then we have to set a date for when this password will expire.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=291.7451117777778) [For that value, we're using 17, 520 hours, which is roughly 2 years.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=296.23633400000006) [Now that we have a service\_principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=302.283334) [we can create a role in the security subscription and](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=304.44833400000005) [assign that role to this service\_principal.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=308.34258400000004) [So first, we have to define the role.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=311.841334) [So let's scroll down a little bit.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=314.19633400000004) [We are creating an azurerm\_role\_definition,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=315.783334) [we're naming the role allow-vnet-peering,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=318.981334) [and the scope defines where is this role available.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=322.731334) [For the scope, we are using the data source azurerm\_subscription.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=327.043334) [So the way the resource addressing works for that is we](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=331.70333400000004) [have to say this is a data source, so start with data,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=334.160334) [dot the data source type, azurerm\_subscription,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=337.06983399999996) [the name label on that data source, .current,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=339.548134) [and then the attribute we want from that data source,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=343.4930840000002) [in this case, .id.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=346.49433400000004) [Then we have to give a list of permissions for this role definition,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=347.989934) [and those permissions are made up of actions and not\_actions.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=353.03533400000003) [If you search Microsoft's documentation,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=357.03733400000004) [they outline exactly what actions are necessary to](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=360.024334) [establish a network peering and modify it,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=362.53733400000004) [so I simply took that list of actions and pasted them in here.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=364.95333400000004) [Further down, we get to assignable\_scopes,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=369.30833400000006) [which is where can this role be assigned,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=370.848334) [and once again,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=373.48633400000006) [we're referring back to the subscription\_id of the](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=374.483834) [current subscription we're working with,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=377.594134) [which should be the security subscription.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=379.37276257142867) [Now we have our role definition created.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=382.185334) [The last step is to assign the role to the service\_principal that we created and](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=385.389334) [set it to the scope of the virtual network that we created.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=389.95566733333345) [So the three arguments for this role\_assignment resource are,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=393.5179054285715) [first, the scope, where am I assigning this role,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=397.07413399999996) [and we're setting that to module.vnet - sec.vnet\_id.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=400.211334) [So that's the resource id of the virtual network that we created.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=404.79733400000003) [Then we have to specify the role definition,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=409.110334) [and so we're grabbing that from the role\_definition resource,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=411.30933400000004) [and finally, the principal\_id,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=414.459834) [which is the ID of the service principal that we want to assign this role to.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=416.529834) [Now the whole point of this was to take this service principal and give](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=422.096334) [it to Chris Jones and anybody else who is going to be creating virtual](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=426.29233400000004) [network peerings to the security\_vnet.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=431.1228340000001) [So if we scroll down a little bit more, we get to a PROVISIONERS section.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=433.48433400000005) [There is a special resource in Terraform called the null\_resource.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=437.51833400000004) [And basically,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=442.48433400000005) [the whole point of the null\_resource is that you want to run a provisioner,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=442.82547685714286) [but it's not necessarily triggered by anything specific.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=445.93613400000004) [You're not spinning up a virtual machine or something like that,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=449.632334) [so the null\_resource allows you to embed a provisioner in your configuration.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=452.20283400000005) [We are using the local-exec provisioner,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=457.45333400000004) [which runs a command locally on the system that's invoking the Terraform script.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=459.536334) [And basically,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=464.57633400000003) [all we want this command to do is write all the necessary values that](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=465.1875840000001) [Chris Jones will need for her step out to a text file.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=470.101334) [So we're running a number of echo commands and sending the output to a file,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=473.7668340000001) [next- step.txt.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=479.25333400000005) [We are sending the vnet\_id, the vnet\_name,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=481.45333400000004) [the subscription\_id for the security subscription,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=486.48733400000003) [the application\_id for the service\_principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=489.57633400000003) [the principal\_id for the service\_principal,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=492.42433400000004) [the password for the service\_principal, and then finally,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=495.327334) [the security resource group name.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=498.87733399999996) [We will need all of that information to set up the](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=500.53108399999996) [vnet\_peering in the next step of the process.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=504.09061971428576) [Finally, we are also sending some of this information to OUTPUTS,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=507.46333400000003) [so the vnet\_id, the vnet\_name, the service\_principal\_client\_id,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=510.79283399999997) [the client\_secret,](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=515.9573340000001) [and the resource\_group\_name are all being made available as outputs as well.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=517.179334) [So that's the entire configuration.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=521.489334) [Now functioning as Danny, let's go ahead and deploy this configuration to the Azure environment.](https://app.pluralsight.com/course-player?clipId=bf7239f8-4ad7-4871-a98f-6dac59c71612&startTime=523.4813340000001)

### [Deploying the Security Configuration](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7)

[Alright, we are ready to deploy our configuration to the Azure environment,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=1.6796670000000158) [but where are we going to deploy this configuration from.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=5.601667000000016) [Fortunately,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=9.019667000000014) [Danny Brown has taken the liberty of using the Terraform marketplace item](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=9.729667000000015) [to spin up a virtual machine in the security subscription that has](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=13.287667000000017) [Terraform preinstalled and also creates a storage account for the storage](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=18.206167000000015) [of remote state for Terraform configurations.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=23.110667000000017) [If you're looking for that marketplace item,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=26.514667000000017) [we can go over to the browser, and here we are logged in as Danny Brown.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=28.801667000000016) [If we go to Create a new resource and go ahead and type in Terraform,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=33.34666700000002) [there is a Terraform item right here,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=38.071667000000026) [and this takes you to the marketplace item that you can click through Create,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=40.53795271428574) [and basically,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=44.84826700000001) [what it does is create a virtual machine in your](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=45.582667000000015) [environment that has Terraform preinstalled,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=48.771467000000015) [the Azure CLI preinstalled,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=50.917667000000016) [it actually creates a managed service identity for the](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=53.15366700000001) [virtual machine if you want to use that,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=55.571238428571455) [and it also installs some helper applications like Unzip,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=57.79822255555558) [JQ, and apt-transport-https.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=62.62495271428574) [Now I've already gone through the process of deploying this virtual machine.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=65.11666700000002) [And if we go back to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=68.25566700000002) [I have an SSH connection to that virtual machine.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=70.55666700000002) [So I'll go ahead and pop open the terminal down below,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=74.84366700000001) [and this is our SSH session into that virtual machine.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=77.48266700000002) [If we go ahead and run terraform version,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=82.23166700000002) [you can see we're running 12.10,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=85.07766700000002) [so this is the same version that we were using with](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=86.59566700000002) [Chris Jones in the Azure Cloud Shell.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=89.77166700000002) [If we do an ls of the current directory,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=92.74966700000002) [you'll see there is a file and directory there,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=95.65666700000001) [the tfEnv.sh,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=97.89266700000002) [which allows you to assign that MSI for the virtual machine](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=99.15009557142858) [contributor rights in the subscription, We don't need to do that.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=104.40366700000001) [There is also a tfTemplate directory.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=107.67966700000001) [Let's go into that and look at what's in there.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=110.59866700000002) [There is an azureProviderAndCreds.tf and a remoteState.tf,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=114.91866700000001) [and basically,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=118.54766700000002) [the idea is you could take either of these files and add it to](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=119.34566700000002) [your existing configuration to include the Azure Provider or](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=123.1543812857143) [include the remoteState configuration.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=126.43123842857145) [Let's take a look at what's in that remoteState.tf file.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=128.82166700000002) [Basically,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=131.794667) [what it is is a backend configuration that uses AzureRM as the backend.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=132.13080985714285) [It includes the storage account that was created by the template,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=137.165667) [the container\_name, which is also created by the template,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=141.629667) [and the key to store in that container name,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=143.78233366666666) [and the access\_key for that storage account.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=146.59366700000004) [So all you have to do is include this remoteState.tf file in your configuration,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=149.56666700000002) [and it will be set up to use this storage account as the remoteState backend,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=154.57266700000002) [and we're going to do exactly that in a moment.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=159.70466700000003) [First, let's go up one directory,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=162.218667) [and we'll create a directory to house our Terraform configuration.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=164.68666700000003) [Alright, we've created that directory.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=169.37666700000003) [We'll navigate into it,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=171.63766700000002) [and now we're going to copy that remoteState file to our local directory.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=172.60216700000007) [There we go.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=178.91666700000002) [We now have that remoteState configuration.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=180.01100033333339) [We also want to add our main configuration,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=182.199667) [so we will use vi and create a file called main.tf,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=184.604667) [and all we're going to do is copy the entire main.tf configuration,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=188.4405558888889) [and we'll hit I for insert and paste in the configuration here.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=194.425667) [There we go.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=198.95926700000004) [Hit Escape and then :wq to write the information to file and quite vi.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=201.307667) [There we go.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=208.80966700000002) [If we look at the directory, we now have our main.tf and our remoteState.tf.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=209.51466700000006) [Now that we have our configuration ready,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=215.68566700000002) [the next thing to do is log into the Azure CLI so that we're using Danny's](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=217.63666700000002) [credentials for the deployment of this configuration.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=223.02295271428565) [So all we have to do is az login,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=225.98166700000002) [and now it's going to give us a web page to go to,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=229.67466700000003) [so I'll go ahead and highlight that, copy it,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=232.4234447777778) [go to the browser, paste that address in,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=235.42333366666668) [and now we'll ask for that code, go ahead and grab that code,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=238.752167) [paste it in here, and it's going to ask me to pick an account to sign in with.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=244.39866700000002) [I'm already signed in with Danny Brown's account in the browser,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=249.211667) [so I can simply click that.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=252.44316699999996) [That completes the sign-in process.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=254.58009557142861) [And if we go back to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=256.948667) [it has now logged us in,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=260.416667) [and we can see that we are using the security subscription names Sec,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=261.7138670000001) [and we are logged in as the user DBrown@ globomantics.xyz.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=266.30526699999996) [So when we invoke the configuration,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=272.28866700000003) [it's going to take the information that's cached by the Azure CLI and](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=274.532667) [use that for both the AzureRM and AzureAD providers.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=278.0893336666666) [So let's go ahead and start with terraform init.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=282.821667) [And let me just maximize this so you can see what it just did.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=286.285667) [It initialized the vnet module by downloading it from the Terraform Registry,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=289.987667) [it initialized the storage backend,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=295.73566700000003) [so it was able to successfully connect to that storage account backend,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=298.352667) [and it's going to use that for storage of the state file,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=302.37266700000004) [and it downloaded the providers for null and random,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=305.08423842857144) [which means it already had the AzureRM plugin downloaded](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=307.738667) [from when I was working on this earlier.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=311.06009557142863) [Now the next step is to run terraform plan,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=313.379667) [but we'll run terraform plan sec.tfplan,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=316.59552414285724) [and so this should tell us what resources it's going to generate.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=319.647167) [Okay, it has successfully run our plan,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=326.25466700000004) [and we can see it's adding 12 new resources,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=329.313667) [so that is the virtual network along with all of the Azure AD](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=331.972667) [components and that role that we wanted to create.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=336.27791699999995) [So if we want to go ahead and create all of those resources,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=339.483667) [all we have to do is run terraform apply sec.tfplan.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=342.18488922222224) [We'll go ahead and run that now,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=347.330667) [and it's going to go ahead and create those resources.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=348.902667) [Now while those are creating,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=352.680667) [we can jump over to the portal and verify that they're creating successfully.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=354.00004199999995) [Alright, so we're back in here.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=359.196667) [Let's go into our Resource groups,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=360.648667) [and we can see that there is now a security resource group.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=362.87766700000003) [If we go into the security resource group, there should be a virtual network.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=366.104917) [There we go.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=372.220667) [There is the security virtual network we are looking for.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=373.14916700000003) [We can go ahead and click on that.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=376.200667) [And if we look at our subnets,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=378.30066700000003) [we can validate that the inspect and siem subnets have been created.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=380.268667) [We can also go to Access control.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=384.62766700000003) [And if we look under Access control in Role assignments,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=387.551667) [we can see down at the bottom there is a custom role called ALLOW-VNT-PEERING,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=393.232667) [and the app vnet-peer has been assigned that role.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=398.332667) [So it looks like everything provisioned successfully.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=402.2240955714286) [Let's go back to Visual Studio Code, and we can see the outputs are there.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=405.208667) [If we take a look at what's in the directory, there is our next- step.txt file.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=410.503667) [Let's take a look at what's in that file, and there we go.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=415.922667) [It exports a number of values as environment variables for](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=419.66811144444443) [the next steps in the VNet peering process,](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=424.2536670000001) [which will be executed by Chris Jones.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=428.035667) [So the last step here is for Danny to securely send this](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=430.580667) [information over to Chris Jones so she can move forward](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=433.571167) [with the VNet peering process. So let's take a look at what Chris Jones is going to have to do.](https://app.pluralsight.com/course-player?clipId=38e0bd06-c601-488b-82ad-2be6b830a4b7&startTime=436.652167)

### [Multiple Instances for Network Peering](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea)

[Chris Jones is going to be setting up a virtual network peering between](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=1.5503340000000316) [the virtual network in the development subscription main-vnet and the](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=5.024000666666698) [security-vnet in the security subscription.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=10.535334000000033) [So already, you can see we are working with two different subscriptions here,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=13.989334000000031) [which means we're going to need at least two instances of the Azure Provider.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=18.319334000000033) [In order to successfully create this VNet peering,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=24.23033400000003) [she is being supplied with that service principal that has permissions](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=27.020048285714317) [to create VNet peering on the security-vnet side,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=31.891000666666702) [but one side is not enough for a peering.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=36.328334000000034) [The peering configuration has to be set up on both](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=38.68033400000003) [virtual networks for it to be successful.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=41.42155622222226) [So Chris is going to create a role on the dev subscription that](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=43.91433400000003) [mirrors the role that was created on the security subscription and](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=48.37461971428576) [assign that role to the service principal,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=52.42220900000003) [and basically,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=54.78733400000003) [the service principal will now be able to create the virtual network](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=55.292000666666695) [peering on both subscriptions thereby creating a successful network](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=58.48133400000003) [peering connection between the two virtual networks.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=64.14633400000002) [Now how are we going to go about setting up multiple azurerm providers?](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=67.94233400000003) [Let's take a look at some example provider configurations.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=73.50033400000004) [There is the very minimal azurerm provider configuration where all data is](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=76.86633400000004) [being provided through environment variables or the Azure CLI.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=82.07050066666672) [And if you don't specify a provider for a resource or a module to use,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=86.03133400000004) [it's going to assume that this is the provider that you](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=90.78833400000003) [want to use in your configuration.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=93.82933400000005) [If you do want to get more specific about a particular provider,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=96.33933400000004) [within that provider, you can specify an alias,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=100.22733400000003) [say, security, for instance.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=103.71933400000003) [Now we can refer to this provider directly by specifying its alias.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=105.91033400000003) [Also, within the provider,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=110.18033400000003) [you can tell it what subscription\_id to use this provider with.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=111.34433400000002) [And if we wanted to set up another provider with a different subscription,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=116.34733400000003) [we could invoke the same configuration block,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=119.74933400000003) [use a different alias, say, peering in this case,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=122.70733400000003) [and give it a different subscription\_id,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=125.92033400000003) [and that's exactly what we're going to do in our configuration.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=129.01833400000004) [Now you might be wondering,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=132.43733400000002) [how do you reference these alias providers in the configuration?](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=133.54608399999995) [I'm glad you asked.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=137.99333400000003) [So if you are creating a resource, let's say you're creating a resource group,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=140.22633400000004) [the way that you would reference the provider is by adding a](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=143.87733400000002) [provider argument to the resource block and then referencing the](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=147.59247685714283) [AzureRM Provider by putting in azurerm.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=151.22019114285717) [whatever the alias is for that particular provider.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=155.27533400000004) [So if we wanted to reference the security provider, we'd put azurerm.security.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=158.13933400000002) [With modules, it's a little bit different because when we think about a module,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=163.65933400000003) [that's a full-blown Terraform configuration on its own,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=167.84633400000004) [and it may have multiple providers within it,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=171.190209) [so you need to be able to reference each of those providers](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=173.63900066666673) [with the alias provider you want to use.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=177.5306197142857) [And the way you do that is by submitting a map object to the module](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=180.11133400000003) [using the providers argument instead of provider,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=185.98476257142866) [so you'll notice that providers if plural because there could](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=189.33833400000003) [be more than one provider in the module,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=192.00533400000006) [and each provider in the module is going to have some name associated with it.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=194.77504828571438) [If it's just the vanilla azurerm provider,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=199.16390542857144) [you can refer to it by saying azurerm as the key and then for the value,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=201.59804828571433) [the aliased provider you want to use from your main configuration,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=208.23161971428576) [in this case, azurerm.security.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=211.99833400000003) [So those are the ways to refer to a provider alias when](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=214.92633400000003) [you're provisioning resources and modules.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=218.490334) [So now,](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=221.43633400000004) [let's dive into the configuration and get ready to create that virtual network peering with Chris Jones.](https://app.pluralsight.com/course-player?clipId=2debdbe0-643b-4092-a315-62cacbafceea&startTime=222.27290542857145)

### [Reviewing the Peering Configuration](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038)

[Okay, we're back in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=1.3243340000000317) [and you'll see I've got the directory 3-vnet-peering open,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=3.4833340000000317) [and in that, there is a vnet- peering.tf configuration.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=6.541734000000032) [This is the configuration that Chris Jones is going to use to create](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=12.142334000000032) [that VNet peering connection between the main-vnet she has and the](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=16.95833400000003) [security-vnet that was created by Danny Brown.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=21.690762571428607) [Now if we look in the middle pane,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=24.42733400000003) [let me just hide the EXPLORER so we have a little more room,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=26.539334000000032) [we have a number of variables defined that we're going to need to use](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=30.415084000000036) [to successfully create this peering connection,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=34.85958400000003) [and you might notice that these variables are the](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=37.36233400000003) [output from the next- steps.txt file, so things like the sec\_sub\_id,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=39.98933400000003) [sec\_client\_id, client\_secret, the sec\_vnet\_name,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=45.639334000000034) [vnet\_id, the sec\_resource\_group, the sec\_principal\_id,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=51.134334000000024) [all of those are part of that next- steps.txt document,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=54.91547685714289) [and we'll be getting back to that in a moment.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=60.26533400000003) [If we scroll down a little bit more,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=62.25133400000003) [you can see we are fetching the current subscription that's selected](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=63.53033400000003) [from the default AzureRM Provider because we're going to need that](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=66.52653400000004) [subscription\_id a little further down, and then we're defining our two providers.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=70.92590542857145) [We've got a security provider and a peering provider,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=75.32133400000004) [so let's look at the security provider first.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=79.66433400000003) [So we have defined an alias of security.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=82.55033400000003) [For the subscription\_id, we're giving it the sec\_sub\_id,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=85.55833400000003) [and then we are giving it the client\_id and client\_secret of that](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=88.98533400000002) [service principal that we created in the previous step.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=94.26533400000004) [There are two more values in here,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=97.0914768571429) [which are skip\_provider\_registration and skip\_credientials\_validation.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=98.95633400000003) [The reason those are in there is that the service principal that we created](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=103.09933400000003) [has very restricted rights on the security subscription.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=107.24461971428575) [It only really can do VNET peering, and that's it.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=111.19533400000003) [So if it tries to enumerate all the providers for](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=114.1050006666667) [registration on the Microsoft Azure side,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=117.76319114285715) [that is going to fail and throw an error.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=120.16908400000003) [So by putting these two values in, we're just avoiding that error getting thrown.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=122.71983400000003) [For the next provider, we are giving it an alias of peering,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=127.09833400000004) [so this is the provider we're going to use to establish](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=130.485959) [the peering on the main subscription,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=133.680584) [and then we're giving it the subscription\_id of the main subscription,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=135.45147685714286) [which will be the subscription that's being used by the main azurerm provider,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=139.75013400000003) [and then we're giving it the client\_id and](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=144.1551911428572) [client\_secret of the service principal, and then finally,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=147.15933400000003) [those two skip\_provider and skip\_credentials values.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=150.19833400000005) [So those are our two additional providers.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=154.92833400000004) [We still have our original AzureRM Provider that](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=157.37133400000002) [doesn't have any of these values in it,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=160.79833400000004) [and that's going to use what's stored in the Azure CLI for its values,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=162.60633400000003) [so we actually have three instances of this AzureRM](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=167.44133400000004) [Provider within the configuration.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=170.28693400000003) [Scrolling down a little bit more, we get into the azurerm\_role\_definition,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=172.74133400000002) [and basically,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=177.38133400000004) [what we need to do is create the same role\_definition for our main](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=177.8211117777778) [subscription that we created for the security subscription,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=181.92733400000003) [so all the settings in here are basically the same except the](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=184.5590006666667) [subscription scope is the main subscription,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=188.58533400000005) [and the assignable\_scopes is the main subscription,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=191.50133400000004) [and the name is a little bit different so we don't have a collision of roles.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=194.46533400000004) [And then we're going to assign this newly created role.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=198.34033400000004) [The scope in this case will be the main virtual network,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=201.01233400000004) [we'll refer back to the role\_definition that we just created,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=204.72933400000002) [and we're going to assign the principal\_id to the](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=208.62933400000006) [service\_principal that we created in the previous step.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=212.42433400000004) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=215.31490542857145) [we get to the actual peering process of the two virtual networks,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=217.54695900000002) [and of course,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=221.63008400000007) [you need to configure the peering on both virtual](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=222.39733400000003) [networks to have a successful connection.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=225.1464768571429) [So the first resource creates the network peering](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=227.69733400000004) [connection on the main virtual network,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=230.52861971428572) [so we're giving it the resource\_group\_name of the main virtual network,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=233.32633400000003) [the virtual\_network\_name of that main virtual network,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=237.42833400000004) [we're giving it the remote\_virtual\_network\_id of the sec\_vnet,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=241.14366733333338) [which is why we needed the sec\_vnet\_id, and then for the provider,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=245.32333400000005) [we're specifying that we want to use the azurerm.peering alias,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=249.58133400000003) [so that will use the main subscription and the service](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=252.38161971428573) [principal to create this peering connection.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=257.3256673333334) [You'll note that there is a depends\_on at the end,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=260.17933400000004) [and so far,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=262.9311117777778) [we haven't seen this because Terraform is pretty good at figuring](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=263.7257784444445) [out dependency mappings within a configuration.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=267.93090542857146) [For instance, if we scroll up a little bit,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=271.000334) [we have the role\_definition and the role\_assignment.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=273.170334) [I don't have to explicitly tell Terraform to create the role\_definition](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=275.154334) [first and then the role\_assignment second because I'm referring to the](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=279.13666733333343) [role\_definition within the role\_assignment resource,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=283.845334) [so it just figures out, oh, well,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=286.32553400000006) [I need to create the role\_definition first if I want to](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=288.4541117777778) [create this role\_assigment later.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=291.635334) [Scrolling down and back into our network\_eering configuration.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=294.166334) [In order for the service principal to successfully create this network peering,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=297.565334) [it needs to have permissions to create that peering from that role assignment,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=302.98933400000004) [but that's not a connection that is obvious to Terraform.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=306.57533400000005) [Because of that, we have to specify a depends\_on of azurerm\_role\_assigment.vnet,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=309.4993340000001) [which lets it know,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=314.34253400000006) [wait for this role\_assignment to be created before you](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=317.591334) [try to create this peering connection.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=320.64033400000005) [The second peering connection is from the security virtual](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=323.58033400000005) [network to the main virtual network,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=326.68433400000004) [so we give it the resource\_group\_name of the sec\_resource\_group,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=328.6840482857143) [the sec\_vnet\_name, the vnet\_id of the main virtual network,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=332.2860006666667) [and for the provider,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=337.99933400000003) [we're specifying the security alias instead of the peering alias because of](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=339.26219114285726) [the subscription that we're working with is different,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=343.1626673333334) [and once again,](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=346.0184768571429) [we're adding the depends\_on because we don't want either of these peering](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=347.26133400000003) [connections to occur until that role\_assigment is complete.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=350.353334) [So that's the entire VNET peering configuration.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=354.24833400000006) [Now let's go ahead and add it to our existing configuration so that we can deploy it.](https://app.pluralsight.com/course-player?clipId=04df3bdd-0b40-4230-a088-1936c86bf038&startTime=358.118334)

### [Deploying the Peering Configuration](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db)

[Okay, we are in Cloud Shell, and we're logged in as Chris Jones.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=1.382001000000164) [We can do an az account show to validate that we're using the correct](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=6.415001000000164) [subscription and that we're logged in with the correct user.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=11.733834333333498) [So that all looks good, and we're in the terraform/1-main-vnet directory,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=14.384001000000165) [which is where we had our existing configuration.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=20.235001000000164) [If you destroyed the resources from the previous module,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=23.258001000000164) [you're now going to have to recreate them by running terraform plan and apply.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=26.08185814285731) [I did not delete those resources,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=30.481001000000166) [so now I can just add the VNET peering configuration](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=32.593001000000164) [to this existing configuration.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=35.876801000000164) [So the way that I'm going to do that is by running code vnet- perring.tf.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=38.660001000000165) [That gives me the code editor.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=43.81900100000016) [I'll go back to Visual Studio Code and select all and copy,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=45.64000100000016) [go back to the Cloud Shell, and paste this in.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=50.26620100000016) [There we go.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=54.85028671428587) [Okay, and Ctrl+S to save and Ctrl+Q to quit.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=56.44200100000016) [Now if we look at the directory, we now have this vnet- peering.tf,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=60.85000100000016) [which will become part of our configuration.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=64.19300100000017) [We also need to grab the values that were part of the next- steps.txt](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=66.87400100000016) [file from when Danny Brown configured the security VNET.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=71.72750100000017) [So let's go back to Visual Studio, and we'll unhide the terminal,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=75.48800100000017) [and this is the contents of the next- step.txt file.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=79.43237600000018) [If you look at what we're doing,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=83.75900100000017) [we're actually exporting a number of environment variables,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=84.57500100000017) [and they all start with TF\_VAR\_ and then the name of a](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=87.71400100000017) [variable that's in our configuration.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=93.18500100000017) [When you export an environment variable with TF\_VAR\_ and then variable name,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=96.05100100000017) [Terraform will be able to find that environment](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=102.08600100000017) [variable and use it in the configuration.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=104.33887600000017) [So let's go ahead and grab all of these commands,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=107.76100100000016) [copy them, we'll go back to Cloud Shell,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=111.36700100000016) [we're going to paste them in here,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=113.66200100000016) [and now all of these values are stored in environment variables.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=116.36700100000016) [The next step is to run terraform init just to make sure that we haven't](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=121.32100100000017) [added anything that isn't available from a provider,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=126.87525100000016) [or a module, or backend perspective.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=129.77200100000016) [That all looks good, so let's go ahead and clear the screen,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=132.27200100000016) [and now we're going to run terraform plan.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=135.64050100000017) [We have to specify one variable, which is the resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=138.8775010000002) [and we're going to send this out to main.tfplan.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=144.98700100000016) [So we'll go ahead and run this.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=148.47400100000016) [Alright, and it's telling us that it's got four things to add.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=151.87100100000018) [If we scroll up here,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=154.20966766666686) [we can see that it's going to add a role\_definition and a role\_assignment.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=155.44800100000018) [Scrolling down, we can see it's going to add two network\_peering configurations,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=162.20100100000016) [one for main and one for security.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=166.72700100000017) [So that all looks good.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=168.78700100000017) [Let's scroll back down to the bottom,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=170.41900100000015) [and now we can run terraform apply main.tfplan,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=173.03800100000015) [There we go, and it's going to go out, create that resource assignment,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=179.48600100000016) [and then create those peering connections.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=183.02200100000016) [So that resource assignment has already completed.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=185.63800100000017) [That was very quick.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=188.35100100000017) [Alright, and it has finished successfully,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=190.19400100000016) [so let's go ahead and minimize this Cloud Shell,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=192.10900100000018) [and let's go into Virtual networks for our subscription as Chris Jones,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=196.08700100000016) [and we can see that there is a vnet-main in here.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=200.89550100000014) [That's the virtual network we've been working with.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=204.71500100000017) [If we go into Access control, go to Role assignments,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=207.82400100000015) [scrolling down,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=213.34466766666685) [we can see that the vnet-peer service principal has been](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=214.41000100000016) [assigned the role allow-vnet-peer-main, which is what we were expecting.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=218.83350100000015) [If we go down to Peerings within the settings for the virtual network,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=223.78700100000017) [we can see that the main network is now connected to the security network,](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=228.20800100000017) [so we have successfully established a VNET peering between the main](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=233.28400100000016) [virtual network and the security virtual network using a service](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=237.9453343333335) [principal that was provisioned by Danny Brown.](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=241.63766766666683) [Our work here is complete. Excellent!](https://app.pluralsight.com/course-player?clipId=2891692d-2a5e-46bf-96d3-fbf5f502a8db&startTime=244.61728671428588)

### [Summary](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b)

[Alright, what did we cover in this module?](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=1.2833340000002644) [Well, we covered a lot of stuff,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=3.5953340000002645) [so let's just take a step back and talk about it for a moment.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=5.5303340000002645) [We talked about using multiple Azure providers,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=9.101334000000264) [both using AzureRM and Azure AD providers in the same configuration,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=12.728334000000265) [like we did with Danny, and then also,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=17.68044511111138) [using multiple instance of an AzureRM Provider,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=20.422191142857404) [like we did with Chris.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=23.039959000000263) [We had to use three instances of the AzureRM Provider,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=25.074334000000263) [one for Chris and her subscription,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=27.48590542857169) [one for the security subscription and the service principal,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=30.051934000000266) [and another for the main subscription and the service principal,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=33.836334000000264) [so that outlines very clearly why you might need to use](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=37.04533400000027) [multiple Azure Provider instances.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=40.00533400000027) [We also saw how you can reference those aliases in resources and modules by](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=43.195334000000265) [using either a provider argument or a providers argument.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=48.660334000000255) [Coming up in the next module,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=53.278334000000264) [we are going to get into using Azure storage for remote state.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=54.8456673333336) [We saw that a little bit with Danny's configuration.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=59.714334000000264) [It was being stored in a remote state,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=62.63933400000026) [but we didn't configure that remote state ourselves,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=64.07833400000027) [so we're going to get into how you actually provision Azure Storage to do that,](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=67.03433400000027) [and then we're going to see how you can migrate state that's stored locally to](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=71.18433400000026) [a remote state configuration by adding a backend config. That's coming up in the next module.](https://app.pluralsight.com/course-player?clipId=6d21598f-f5bc-4e69-b63a-b100146f708b&startTime=76.03190542857166)

## [Using Azure for Remote State](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f)

### [Introduction](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f)

[Once you've gotten your feet wet with Terraform for a little bit,](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=1.24) [there's a pretty good chance you're going to want to move your locally](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=4.03) [stored state files to something in a remote location, and Azure storage](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=6.95) [is one such place where you can store those state files, and it actually](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=11.98) [supports a bunch of great features.](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=16.01) [So that's what we're going to talk about in this module.](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=18.09) [Hey, everyone, this is Ned Bellavance.](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=20.67) [I'm a Microsoft Azure MVP, and this is Using Azure for Remote State.](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=22.39) [All right, in this module,](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=29.44) [we are going to open with a brief discussion about Terraform remote state.](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=31.08) [If you've been using Terraform for a while,](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=36.75) [you're very familiar with remote state, but I do want to put a refresher](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=38.54) [in here so that I can highlight some of the features that are supported](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=42.16) [by Azure storage when you're using it for remote state. Now we'll talk](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=46.39) [about how to set up Azure storage and what some of your authentication](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=50.86) [options are if that is where your remote state is being stored. And then,](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=54.74) [finally, we are going to get into the process of actually moving your](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=59.28) [state file from where it's stored locally to that remote location. But first, let's do a little refresher on what Terraform remote state is.](https://app.pluralsight.com/course-player?clipId=80f600d3-b303-427a-b010-71aa1790ee5f&startTime=63.29)

### [Remote State Refresher](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc)

[There are basically two reasons that you might want to use remote](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=1.4843329999999988) [state for the storage of your Terraform state file.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=4.761707999999999) [The first is to safeguard the state file itself.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=7.971332999999999) [If you are just storing your state file on your local system,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=11.389332999999999) [then you are subjecting it to the whims of your local hardware,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=14.36519014285714) [maybe that disk is going to fail, maybe you lose the workstation entirely.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=18.189332999999998) [That's not a great scene if you're trying to manage](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=22.444333) [your infrastructure using Terraform.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=24.855999666666662) [So instead,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=26.433332999999998) [moving that state file to a remote location that provides that](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=26.961332999999996) [additional redundancy is probably a good idea.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=30.534333) [It also enables teams to collaborate on shared infrastructure using](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=33.560333) [a single configuration and a single state file,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=39.06333300000001) [or in more complicated environments,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=42.331333) [multiple configurations and multiple state files.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=44.479333) [By putting the state file in a remote area,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=47.751332999999995) [it enables special features that help with team collaboration.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=50.852333) [There are multiple supported backends for the storage of your state file,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=54.803533) [but not all backends are equal.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=60.233332999999995) [There are some special features that only some of those backends support.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=62.972333) [One of those special features is locking.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=68.096333) [The whole idea behind locking is if someone is making changes or](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=70.386333) [updates to the Terraform managed infrastructure,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=74.3469044285714) [you don't want somebody else messing with it as well.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=77.533333) [So when something like plan, apply, or destroy is running,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=80.178583) [Terraform puts a lock on the state file saying,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=83.968333) [nobody else touch this.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=86.578133) [Something is going on.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=87.641333) [Another special feature is workspaces,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=89.692333) [and if you haven't come across workspaces before,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=91.932333) [it's basically multiple environments that are all using the same configuration,](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=94.58333300000001) [but have multiple state files, one for each environment that's being supported.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=98.970833) [How does Azure Storage stack up to these special features? Let's take a look at using Azure Storage for a remote state.](https://app.pluralsight.com/course-player?clipId=02817717-d199-444c-bd22-5c60c5b973bc&startTime=105.407333)

### [Azure Storage for Remote State](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95)

[The storage you're going to be using in Azure for the](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=1.912332999999984) [remote state file is Azure Blob Storage,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=4.692832999999983) [and Azure Blob Storage does support locking.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=7.35447585714284) [So when Terraform is performing one of those operations,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=10.884666333333316) [it's going to add an additional file that indicates that the state is locked.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=14.934332999999985) [Azure Storage also supports workspaces.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=20.315332999999985) [So when you create a new workspace and store data in the state file,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=23.282332999999984) [it's going to create an additional state file that has the base key naming and](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=26.97299966666664) [append the workspace name to the end of that base key naming.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=31.657904428571403) [So that's how it supports workspaces.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=36.069332999999986) [Azure Storage also has multiple authentication methods that](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=38.83133299999999) [are supported by the AzureRM backend.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=42.30853299999999) [So let's take a look at what those authentication methods are now.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=45.80833299999998) [There are essentially four authentication methods that can be](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=50.99433299999998) [used with the AzureRM backend in Terraform.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=54.72333299999998) [The first one is the managed service identity,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=58.14733299999998) [and you would indicate that by adding the argument](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=60.762332999999984) [use\_msi to the configuration block.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=63.34383299999999) [That tells Terraform that it's running on an Azure virtual](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=66.15133299999998) [machine that has a managed service identity,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=68.940833) [and it can used that to access the storage account.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=70.80558299999998) [The next option is using a shared access signature token,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=74.27933299999998) [or SAS token,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=77.63233299999999) [and you indicate that by adding a sas-token argument to the configuration block.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=79.04233299999999) [What's nice about SAS tokens is you control the](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=84.13033299999998) [operations that are allowed by that token,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=86.83319014285713) [and you can set a date for when that token expires.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=88.81373299999997) [Something that you can't set a date for expiration on is the storage access key,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=92.82433299999998) [and the storage access key for a storage account can do](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=98.07404728571429) [pretty much anything on that storage account.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=101.27333299999995) [That's why it's generally not recommended to use the storage](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=104.07933299999999) [access key as an authentication method; however,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=106.978333) [if you do want to use it,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=109.215833) [you simply put the access\_key argument in the configuration block.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=111.57283299999996) [Lastly, you can use a service principal for authentication.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=115.96933299999998) [So assuming that you've configured the service principal with the](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=120.01633299999999) [correct permissions for the storage account,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=122.875733) [you simply have to supply the client\_id in the configuration block,](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=125.39833299999998) [and you'll also need to supply the client\_secret as well.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=129.26483299999995) [Now let's take a look at how Globomantics is going to deploy the storage accounts for their remote state.](https://app.pluralsight.com/course-player?clipId=cd303da3-c58c-4881-ad94-60571faa4b95&startTime=133.58733299999997)

### [Azure Storage Setup](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48)

[As we saw in the previous module,](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=1.5083329999999842) [the security team is already using Azure Storage for remote state,](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=3.072332999999984) [but the storage account was actually created for them as](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=6.442618714285698) [part of the Terraform marketplace item.](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=9.559332999999985) [Now, Chris Jones wants to get in on the action,](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=12.937332999999985) [so she is going to set up her own storage account to house the remote state.](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=15.451332999999984) [So what she's going to need to do is deploy that storage account](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=20.897332999999986) [and then create a container within that storage account to hold](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=24.407761571428555) [the JSON file that is the remote state.](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=28.19377744444443) [So basically, if you happen to open the state file,](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=31.301332999999985) [you'll see it's actually JSON on the inside.](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=34.1686187142857) [In order to provide access to this container,](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=37.21495799999998) [Chris is going to allocate a SAS token when she's standing up this whole](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=40.413190142857125) [configuration and then share that out with those who will be running](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=45.26247585714283) [Terraform with this remote state location.](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=48.140332999999984) [So let's go over to the demonstration environment and help Chris get this deployed.](https://app.pluralsight.com/course-player?clipId=bf5c426b-d72a-4d85-9243-3d36b546dd48&startTime=51.502332999999986)

### [Deploying Azure Storage for Remote State](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1)

[Okay,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=1.44) [we are going to be using the Azure Cloud Shell to deploy this configuration,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=1.7045555555555556) [but first, let's review it in Visual Studio Code.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=6.39) [Now you see, I have the holder 4-remote-state-prep open,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=9.722) [and within there, there is a main.tf file I have open in the main pane.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=13.3222) [So let's go ahead and shrink up the EXPLORER to give us a little more room,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=18.981222222222218) [and let's see what's in this configuration.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=23.198) [It's relatively straightforward.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=25.479) [We've got three variables here, one to name the resource group,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=27.077) [one for the location of the resource group and storage account,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=30.54500000000001) [and one for a naming\_prefix that will be added to the storage account name.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=34.245) [Let's scroll down a little bit more, and we get into the PROVIDERS.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=39.828) [We're simply creating an azurerm provider and letting the Azure](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=43.06) [CLI supply the remainder of the settings.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=46.72971428571429) [Scrolling down some more, we're using a new resource that we haven't seen before.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=49.492) [That's the random\_integer resource,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=53.047) [and this is in the same family as the random\_password resource.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=55.462) [What you can do is give it a minimum and maximum in the arguments,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=59.433) [and it will produce an integer that is within that range.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=62.196) [We are going to be using this resource to help us with the naming process of](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=66.658) [the storage account to assure that it is globally unique.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=70.53350000000002) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=74.08833333333334) [we create our resource group that will hold the storage account,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=76.52925) [and then finally, we are creating the storage account itself.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=80.506) [And you'll see for the naming process,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=84.428) [we're using a lower function for the naming prefix to](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=86.274) [ensure that the name is all lowercase because storage](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=89.36800000000001) [accounts don't allow for uppercase,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=92.2786) [and then we're appending that random integer using the](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=94.0875) [result attribute of that resource.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=97.769) [So at the end, we should have a name that resembles ITMA and the random integer.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=100.331) [That should be globally unique for our storage account.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=106.16) [We're putting it in the resource group that we just created,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=108.82671428571427) [using the location that was defined in the variable,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=112.264) [using the standard account\_tier,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=114.1816) [this doesn't have to be a premium storage account by](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=116.352) [any stretch of the imagination, and for our purposes,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=118.54285714285713) [we're going to use locally replicated storage.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=120.92599999999999) [Of course, you could use GRS if that was required in your situation.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=123.646) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=129.011) [we are creating the storage container that will hold our Terraform state,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=129.97) [and we're just naming it terraform-state to keep it simple and consistent.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=134.218) [Then we also have to tell it which storage account in](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=138.43) [which to create this container.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=141.34714285714287) [That's all we need to create for the actual storage of the state file.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=142.73) [If we want to access that storage, we do need to create a SAS token.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=146.267) [And rather than a resource, the SAS token is actually a data source,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=150.525) [which sounds a little weird.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=154.74587499999998) [But when you think about it, you're passing in a storage account,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=156.13100000000003) [and you're asking for data about that storage account,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=158.712) [and it sort of creates that token on the fly for you.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=161.00928571428574) [So if we scroll down a little bit,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=164.18) [what it needs in this data source is the](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=165.711) [connection\_string for the storage account,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=168.187) [which is one of the attributes of the storage\_account primary\_connection\_string.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=170.212) [You can set https\_only to true, which we do want to use encrypted traffic,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=175.064) [so of course, we're going to set that to true.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=179.098) [In the resource\_types,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=181.304) [you're defining what types of resources this token can interact with.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=182.52200000000002) [In our case, we've set all three resource\_types to true.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=186.27) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=189.697) [we define what services this token can interact with on the storage account,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=191.186) [and we only need Blob, so blob is the only one set to true.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=195.215) [The start defines when the token becomes valid,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=199.00549999999996) [and we're going to use the function timestamp to give it the current time,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=201.64050000000003) [and for the expiry argument,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=205.37457142857144) [we're using the timadd function to add about two](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=207.426) [years of time to the current time, so this token will expire in two years.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=210.7868888888889) [Now you could set this to whatever you want or actually use a variable](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=215.533) [to define how quickly you want this token to expire.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=218.56925000000004) [Then we get into the permissions for the token,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=222.255) [and this will apply to the Blob service.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=224.60222222222222) [We're giving it read, write, delete, list, add, and create.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=226.932) [So basically,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=230.60374999999996) [it has full rights to manipulate the contents of what's in](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=231.22224999999995) [the Blob Storage for the storage account.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=235.22087499999998) [So now, we have our token.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=237.782) [In order to use this storage account and the token,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=239.557) [we're probably going to want to render this information out to a text file.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=243.03075) [So scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=247.69) [we get into a PROVISIONERS section where we're using the](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=249.268) [null\_resource to run a local script.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=252.5544285714286) [And the local script is going to echo out a number of values](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=254.4052857142857) [to a text file called backend- config.txt,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=258.34340000000003) [so we're giving it the storage account name,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=262.553) [the container\_name, a key name,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=264.683) [which will be the name of the state file when it's created,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=266.498) [and finally, the sas\_token.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=269.63800000000003) [And as we'll see a little bit later,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=271.406) [these are the exact key-value pairs that you need to](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=273.135) [configure the backend resource in Terraform.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=276.52914285714286) [Scrolling down a little bit more, as OUTPUT,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=279.0931428571428) [we have the storage\_account\_name and the resource\_group\_name.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=282.16349999999994) [So that's the entire configuration.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=286.176) [Let's go ahead and get this deployed in Cloud Shell.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=287.661) [So we'll go over to the browser, and we're already logged in as Chris Jones,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=290.71866666666665) [so we can go ahead and launch the Cloud Shell,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=295.189) [and we'll go ahead and maximize the Cloud Shell to](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=297.766) [give ourselves plenty of room.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=300.742) [Now let's go into the Terraform Directory,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=302.372) [and we'll create a new directory for our remote state storage configuration.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=304.361) [We'll go into that directory,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=309.62) [and now we are going to create that main.tf file using the built-in code editor.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=311.50125000000014) [Okay, let's jump back to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=317.711) [we'll select the entire configuration and copy it,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=320.177) [go back to the browser, paste it into the code editor,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=322.98071428571427) [do Ctrl+S to save and Ctrl+Q to quit.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=326.86266666666677) [Alright, so our configuration is all set and ready to go.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=330.382) [Now we have to run terraform init,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=334.09033333333343) [and that's downloaded our plugins for the various providers that we're using,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=336.86533333333335) [random, azurerm, and null.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=343.0156666666667) [Let's go ahead and clear the screen,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=345.441) [and now we're going to run terraform plan and pass](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=347.645) [it the one variable that we need, resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=351.3916666666667) [and set it equal to itma-state,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=354.0478333333333) [and then we'll send the plan file out to state.tfplan.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=356.84714285714284) [We'll go ahead and run that, and it's going to add five new resources.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=364.224) [That sounds good, so let me clear the screen here,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=368.166) [and we'll do terraform apply state.tfplan.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=371.40065217391304) [[00:12: 42.888 ] Alright, so it's going to go out and create these resources.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=373.7456086956521) [It should go relatively quickly.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=380.45942857142853) [Storage accounts usually don't take too long to create.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=382.588) [Okay, there we go, and we can see, as Outputs,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=385.24014285714287) [the resource\_group\_name as we set is itma-state,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=388.137) [and the strage\_account\_name ended up being itma72502,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=391.303) [so thankfully, that was globally unique.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=396.636) [Let's go ahead and clear this out and take a look at what's in our directory.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=399.426) [We now have this backend- config.txt file that was](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=403.834) [created by that local exec provisioner.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=407.7885) [If we take a look at what is in that file,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=409.959) [we can see it's got the storage\_account\_name,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=412.38) [the container\_name, the key name, and most importantly,](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=414.2203333333333) [it's got that sas\_token at the end.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=417.835) [We have successfully set up the storage account that](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=420.409) [we're going to use for remote state.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=422.855) [Now how are we going to get that local state file that we already have](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=425.291) [in Cloud Shell up to this remote-state location? By migrating it, of course.](https://app.pluralsight.com/course-player?clipId=0d281e70-d9dd-460f-8a0a-9b9ae0583da1&startTime=429.30375)

### [Migrating Remote State](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e)

[Migrating Terraform state is actually relatively straightforward.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=1.5433330000001007) [The first thing you need to do is update the backend configuration](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=5.8233330000001) [with where you want the state file to reside now.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=8.4388330000001) [How has it changed from the way that it was configured before?](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=11.8063330000001) [The next step is to run the terraform init process.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=14.4983330000001) [If you think about what the init command actually does,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=19.5543330000001) [it configures the backend, it downloads modules,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=22.14066633333343) [and it downloads plugins.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=25.028047285714383) [Now since it's configuring the backend in the initialization routine,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=26.6983330000001) [that's what you need to run to update that backend to a new one.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=29.519833000000098) [And then finally,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=34.799333000000104) [when you run the initialization operation and the backend has changed,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=35.7353330000001) [it will ask you to confirm that you want to change the backend and ask you if](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=40.5785830000001) [you want to move the existing state to this new location.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=44.97711077777788) [In our case, we're going to say yes.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=48.4983330000001) [Now what does a backend configuration look like?](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=50.8993330000001) [When you're creating a backend configuration,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=54.485333000000104) [you start with a terraform configuration block because this is](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=56.7633330000001) [something specific to the Terraform configuration.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=60.192475857142966) [Within that configuration block,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=63.3213330000001) [you add a nested configuration block for the backend,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=64.77619014285723) [and it starts with the keyword backend and then the name of](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=68.1223330000001) [the new backend type that you want to use.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=71.707221888889) [In our case, that's azurerm.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=74.49933300000008) [And then within the nested backend configuration block,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=76.1443330000001) [you can specify information about the backend,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=79.1311330000001) [such as the storage\_account\_name.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=82.33933300000011) [Now you see,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=85.1573330000001) [I have the name of the storage account here hard](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=85.7405330000001) [coded as opposed to using a variable, and there's a good reason for that.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=87.90045800000009) [You can't use variables in the configuration of your](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=91.5883330000001) [backend because the values in the backend are evaluated as](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=94.9923330000001) [part of the initialization process,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=98.7764580000001) [which happens before Terraform evaluates the variables,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=100.9093330000001) [so it can't actually use variables in the backend config.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=104.11561871428582) [Now maybe storage account is something you want to change on the fly,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=108.1073330000001) [but container\_name might be something that you actually want](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=111.3543330000001) [statically defined within your backend, as well as the key.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=114.41883300000012) [Those might be standard values that you use across all](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=118.1333330000001) [of your Terraform backend configs.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=121.00261871428582) [If you want to dynamically set the storage account name or other](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=123.39833300000011) [properties during the initialization process,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=127.03519014285726) [you can use a flag that's called backend-config and then supply it with a](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=128.8746187142858) [key-value pair for whatever setting you want to change.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=135.03690442857152) [So let's say we didn't want to include the SAS token in our backend config,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=137.7913330000001) [we wanted to submit it at runtime.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=141.8913330000001) [We could use terraform init and use the backend flag with the](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=144.2543330000001) [key-value pair sas\_token equals whatever that token is,](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=148.02633300000014) [and it will submit that value at runtime.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=151.6703330000001) [this is something that is called partial config in Terraform parlance.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=154.7033330000001) [So let's go back to the demonstration environment and get our backend configuration ready.](https://app.pluralsight.com/course-player?clipId=4765210f-1097-4470-93de-8438e155e94e&startTime=158.8853330000001)

### [Implementing Remote State Migration](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814)

[Alright, we're back in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=1.5853330000001007) [and let me expand the EXPLORER for a moment.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=3.2773330000001004) [I have this directory, 5-remote-state.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=5.859333000000101) [We'll expand that, and this has the backend.tf config in it.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=9.208333000000101) [Now what's in there?](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=13.1233330000001) [Not much.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=14.0353330000001) [We're simply defining a Terraform configuration block and then](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=14.7733330000001) [specifying the backend within that Terraform configuration block and](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=18.3353330000001) [telling Terraform it's going to be using azurerm.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=22.189133000000094) [The rest of the configuration for this backend is going to be](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=25.2953330000001) [submitted at runtime using that backend config flag.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=29.339333000000106) [So let's go over to Cloud Shell, which I still have running here,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=33.4523330000001) [and we're going to go up a directory and go into our main-vnet directory.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=37.7923330000001) [Whoops!](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=44.8443330000001) [And that has the state file for our currently deployed environment.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=45.2282080000001) [Now if you've wiped out the environment from the previous modules,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=50.2373330000001) [you can go ahead and run through the process of deploying](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=52.772618714285805) [it again now and get back to this point where you have the](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=55.26799966666677) [local Terraform state file.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=58.90847585714297) [I'm going to assume that you haven't torn down that environment,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=59.964083000000095) [and we're just going to add in the backend configuration.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=63.1463330000001) [So let's launch the built-in code editor and create that backend.tf file.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=66.6793330000001) [Okay, let's go over to Visual Studio Code.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=72.2083330000001) [We're going to select this configuration,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=74.7593330000001) [copy it, go back to the browser, paste that in,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=76.5743330000001) [Ctrl+S to save and Ctrl+Q to quit.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=80.6580330000001) [And now, if we take a look at the directory, we now have that backend.tf file.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=84.4373330000001) [Alright, so we've got that configured.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=89.7453330000001) [The next thing to do is we're going to copy the backend-](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=91.8293330000001) [config.txt file from that remote state folder to this folder so](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=95.5843330000001) [that we can use it when we run terraform init.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=100.30070800000007) [So now we've copied that backend- config.txt file.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=103.5843330000001) [We take a look at the look at the contents,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=107.4983330000001) [we can see, there it is, backend- config.txt.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=109.1693330000001) [That's all set.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=113.3273330000001) [And if we take a look at what's in that backend- config.txt,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=114.09743300000008) [it's basically four key-value pairs, storage\_account\_name,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=118.9733330000001) [container\_name, key, and the sas\_token.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=122.26099966666676) [That is a valid set of values that Terraform will look for when it's](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=124.63799966666677) [going to configure the AzureRM remote backend.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=129.68320800000012) [Now we can run terraform init, and we'll specify the backend-config flag,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=133.0213330000001) [and we'll set that equal to the text file where we](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=139.2923330000001) [have all of these key-value pairs, backend- config.txt,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=142.5958330000001) [and we'll go ahead and run this command.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=145.41076157142865) [Now it's going to ask us,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=148.96066633333342) [do we want to copy our existing state to this new backend?](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=150.8133330000001) [If we do, we can simply enter yes.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=154.2376663333334) [If we don't, we can say no,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=156.94299966666676) [and it'll actually just create an empty state in the new](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=159.1433330000001) [backend as opposed to copying your values over.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=162.8838330000001) [We do want to keep this configuration, so I'm going to enter yes.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=166.9793330000001) [And there we go!](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=171.2303330000001) [You can see it says it has successfully configured the backend azurerm.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=171.82193300000006) [So that is the new backend it is using.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=176.8463330000001) [If we go ahead and minimize cloud Shell real quick](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=179.1213330000001) [and refresh our resource groups,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=182.03147585714294) [we'll see there is this new itma-state resource group that](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=184.2043330000001) [should have our storage account in it.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=187.52104728571442) [There is the storage account that we created.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=189.7586187142858) [We can go into there,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=192.4103330000001) [and we can scroll down to the containers portion of the Blob service,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=194.07255522222226) [and there is our terraform-state container.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=199.9193330000001) [And if we go into that,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=202.8203330000001) [we can see there is a terraform.tfstate file in that container.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=204.4179693636365) [We can click on that and click on Edit blob just to see the contents,](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=209.7663330000001) [and now we can see that this is in fact the state file that we're](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=214.01022188888896) [using to configure our main virtual network.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=217.83604728571436) [We have successfully migrated our state from a local location to a remote location using Azure Storage.](https://app.pluralsight.com/course-player?clipId=2289d7c9-4fce-478c-9a6e-d9aee0f2c814&startTime=220.33333300000012)

### [Summary](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3)

[Okay, what were the key highlights of this module?](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=1.6223330000001006) [Well, the first thing that I do want to mention is that,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=4.7193330000001) [generally speaking, unless you're doing something purely for dev,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=7.8725330000001) [you should probably be using remote state by default.](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=10.7613330000001) [Get into the habit of using it.](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=13.786221888888988) [Azure Storage makes it super simple,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=16.2813330000001) [and Azure Storage also supports locking and workspaces,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=18.1243330000001) [which means as your configuration grows and other people join it,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=21.1437330000001) [you'll have these features already available to you.](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=25.5393330000001) [Now if you don't do it by default,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=28.32666633333344) [we saw that migration is actually super simple.](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=30.58447585714296) [You simply add a backend configuration with the necessary values,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=34.0203330000001) [and Terraform gracefully moves the state from its local](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=37.5883330000001) [location up to whatever new backend you have set.](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=40.99908300000011) [coming up in the next module,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=45.1623330000001) [we are going to get into automating the deployment of our configurations,](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=47.05099966666677) [and the engine that we're going to use to drive that automation is going](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=51.784999666666764) [to be Azure DevOps using both repos and pipelines. That's coming up in the next module.](https://app.pluralsight.com/course-player?clipId=65ab0a4c-9044-40ee-a318-880ea43a73c3&startTime=56.4733330000001)

## [Using Azure DevOps](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e)

### [Introduction](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e)

[As you're progressing through your adventure in](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=0) [infrastructure as code and adopting Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=3.6879999999999997) [there is going to come a point where you want to automate the deployment of](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=6.536571428571428) [infrastructure and integrate it into the application deployment lifecycle](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=11.9042) [that the rest of your organization is using.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=16.072666666666667) [And once you reach that point, you can start using tools,](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=19.444) [such as source control and CI/CD pipelines.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=22.583875) [That's what we're going to be talking about in this module.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=26.298) [Hey everyone, this is Ned Bellavance.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=28.314000000000004) [I'm a Microsoft Azure MVP, and in this module, we're using Azure DevOps.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=30.01) [Alright, how are we going to approach our adoption of Azure DevOps?](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=37.031) [First, I'd like to start with infrastructure as code fundamentals.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=41.98) [There are some fundamental things to think about when](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=46.262) [you're adopting infrastructure as code.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=48.720200000000006) [Obviously, part of it is building templates,](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=50.78325) [but there is more to it than just doing that.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=53.6625) [Once we've gone over the fundamentals,](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=56.035124999999994) [we'll dig a little deeper into source control and automation and](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=58.03333333333334) [how those can help you achieve better reliable and consistent](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=62.2932857142857) [deployments in your Azure environment.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=66.327) [And then to help us put those principles into practice,](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=69.127) [we are going to adopt Azure DevOps as our deployment platform,](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=72.46199999999999) [[00:01: 17.124 ] so we're staying very much in the Microsoft Azure family. Now let's talk a little bit about IaC fundamentals.](https://app.pluralsight.com/course-player?clipId=b9be890e-9c39-489c-b993-e7bf79f6162e&startTime=75.96826315789477)

### [Infrastructure as Code Fundamentals](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a)

[When you think about infrastructure as code,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=1.5416670000000012) [I'm sure a few things spring to mind.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=3.1846670000000015) [It might just be the template system that you use,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=5.402667000000001) [whether it's ARM templates, or Terraform,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=7.704000333333335) [or Ansible, or some other tool.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=9.722167) [Basically, what all those things have in common is that they're software defined.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=12.060667) [You are defining the structure of your infrastructure through some sort of code.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=16.505667000000003) [It's software defined.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=21.276667) [This isn't a manual process.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=22.488667) [Ideally,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=25.060667000000002) [you'll apply some software development principles and make that](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=25.791867000000003) [software defined infrastructure both reusable in the form of](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=29.809667) [modules or templates and repeatable,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=34.04838128571429) [meaning that you can deploy that configuration in multiple environments.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=35.973667000000006) [Because it's code, you're going to want to put it in source control,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=41.628667) [and I'll talk about that in more detail in a moment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=45.55529199999999) [Once you have a reusable and repeatable configuration,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=48.889667) [deploying it through automation just kind of makes sense.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=51.606167) [It's the next logical step, so we'll take a look at how you can do that as well.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=54.980667000000004) [First, let's talk about source control management.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=60.089667) [As an IT Ops person,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=63.412667) [I know that I came to source control management a little bit late in the game,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=64.4167579090909) [and that's because I was busy configuring switches and racking servers.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=68.674667) [I didn't really concern myself with the fact that I might want](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=72.938667) [to store my source code somewhere that's,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=75.62155588888892) [you know, safer than my desktop, but eventually,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=77.856467) [I did get it.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=81.269667) [And in that process, I learned a few things.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=82.27716699999999) [There are multiple formats when it comes to source control management.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=85.036667) [The most popular is probably Git,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=88.910667) [but you may have also encountered Team Foundation Version Control,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=91.257667) [which used to be SourceSafe back in the day.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=94.52316700000002) [So if you were a Microsoft-heavy shop, you probably encounter it as SourceSafe.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=97.593667) [There's also Subversion, which you may encounter in some open source shops.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=101.992667) [There are also multiple platforms on which you can run](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=106.88466700000001) [this type of source control management,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=109.49333366666664) [some of which are managed for you and some which you deploy and manage yourself.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=111.286667) [Some common examples would be GitHub, BitBucket,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=115.495667) [GitLab, and of course, Azure DevOps with their repos service.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=118.40486700000001) [Finally, source control management is meant to enable two very important things.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=123.575667) [First of all, it's meant to enable collaboration.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=128.325667) [You can have multiple developers working on the same repository](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=130.696667) [of code without stepping on each other's toes.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=134.293167) [It's also version controlled.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=137.96066700000003) [So if you roll out a change in your code and it happens to break something,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=139.95866700000002) [it's very easy to roll back to the previous version and](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=143.41766700000002) [then fix whatever the problem is,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=146.672417) [and that's especially important as your code rolls from](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=149.35066700000002) [development all the way through to production.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=152.04438128571434) [Now how does your code get there?](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=155.063667) [That is the job of CI/CD pipelines.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=157.408667) [CI/CD pipelines, or continuous integration and continuous delivery pipelines,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=161.00566700000002) [are able to run on multiple different platforms,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=166.253667) [and some of the more common ones you might have heard of are Jenkins,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=169.31066700000002) [Azure DevOps, and Atlassian's Bamboo.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=173.2233812857143) [But there is a whole plethora of platforms out there that you](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=176.47266700000003) [could potentially run your pipelines on.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=179.52566700000006) [What they all have in common is some sort of](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=181.378542) [continuous integration for code checking.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=184.74000033333337) [So when you commit your code as a developer,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=186.884667) [it goes into a continuous integration process and gets integrated with the](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=189.866667) [existing repository of code and tested to make sure it's not going to](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=194.069667) [break anything and that it merges successfully.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=198.43766699999998) [Typically, it also builds or compiles that code into a releasable package.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=201.062667) [Now in the case of infrastructure as code,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=206.05566700000003) [there is nothing to really build because you're not compiling source code.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=208.12066700000003) [You're simply submitting a template and some variables.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=211.931667) [So that gets us into the continuous delivery portion of things.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=214.270667) [Generally, that's done in release pipelines.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=218.62566700000002) [In a release pipeline,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=221.550667) [you are delivering the artifacts that are generated by](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=222.76209557142855) [the continuous integration process.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=225.65238128571426) [And in our case,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=228.19266700000003) [that's going to be the infrastructure as code configurations that we've](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=229.00466700000004) [put together being deployed onto a target environment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=232.659667) [As part of this CI and CD process, ideally,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=235.921917) [you have automated testing and validation embedded in the process.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=240.64966700000005) [So for instance, when you upload a Terraform script,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=245.45866700000002) [maybe it's deployed in a development environment and a series of](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=248.4175241428572) [infrastructure tests are run to validate that the environment](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=251.76966700000003) [that's deployed matches what's intended.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=254.79266700000002) [You might also validate the configuration to make sure that](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=257.172667) [the formatting and syntax is correct.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=260.6998098571428) [Once we've moved to the continuous delivery phase of things,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=262.7278098571429) [generally speaking, the delivery moves through multiple environments,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=266.459667) [usually starting in a development environment and then moving](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=270.56766700000003) [to something like user acceptance testing,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=273.5286669999999) [quality assurance, and eventually rolls into production.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=276.530667) [The movement of a release from one environment to another can be automatic,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=279.4169527142858) [but oftentimes,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=284.332667) [there is a gate once you get to production where someone has to manually](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=284.889417) [pull the lever to actually release that code to production.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=288.710667) [Terraform has an interesting way to deal with these multiple environments,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=293.399667) [and that is through the form of Terraform workspaces,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=297.150667) [so let's talk about those for a brief moment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=300.075667) [Terraform workspaces are a way to deal with multiple environments.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=302.669667) [It all starts with a common configuration.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=307.281667) [You're using the same Terraform configuration files for each environment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=309.99766700000004) [What's different is that each environment gets its own individual state file,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=314.025667) [and that state file is basically what represents each environment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=318.349667) [As you shift from one workspace to another,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=322.27866700000004) [you're basically selecting a different state file to](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=325.392667) [manage that other environment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=328.5072384285714) [So in that way,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=330.154667) [Terraform workspaces is able to support multiple](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=331.5558098571428) [environments from a single common configuration.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=334.3613336666667) [It also makes the current workspace available through our resource address,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=337.152667) [terraform.workspace.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=341.390667) [So within your configurations,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=343.111667) [you can use the value that's stored in terraform.workspace to make](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=344.49223842857134) [decisions about how the environment is configured.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=348.76406700000007) [For instance, you may want different size virtual machines,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=351.969667) [depending on whether the environment is a development](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=354.69866700000006) [environment versus a production environment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=357.57186699999994) [So with all of this in mind,](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=359.844667) [let's see how Globomantics is planning to leverage source control, automation, and Terraform workspaces in their environment.](https://app.pluralsight.com/course-player?clipId=f0b286f2-d9a2-4655-bf95-86e1ca14944a&startTime=361.2383669999999)

### [Adopting Azure DevOps at Globomantics](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93)

[Globomantics has made the decision to move forward with their use of](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=1.14) [Terraform when deploying resources in Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=4.95) [They'd also like to adopt source control and automation, and what](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=8.78) [better tool to use than Azure DevOps since they actually get it for](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=12.14) [free through some of their MSDN subscriptions.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=15.38) [So they have asked Chris Jones to go ahead and set up an](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=18.33) [environment in Azure DevOps to support their initiative.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=21.44) [So, Chris Jones is going to do a few things.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=25.34) [First,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=28.39) [she is going to update the existing configuration that we've been using](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=28.78) [to take advantage of Terraform workspaces, and support multiple](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=33.27) [environments, and then she's going to establish source control](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=37.05) [management using Azure DevOps repos to store this updated configuration](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=40.66) [and keep it versioned and controlled.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=45.67) [She's also going to use that source control as the basis to set up a](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=48.44) [release pipeline for the deployment of infrastructure.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=52.23) [Now, in addition to source control,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=55.88) [there's also some variables and values that need to](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=57.51) [be supplied at deployment time.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=59.69) [Some of those values are going to be stored in a tfvars file that's](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=61.84) [also stored in source control, but some of them are going to be](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=65.06) [stored in variables in the release pipeline,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=68.19) [especially things like secrets and passwords.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=70.31) [So what Chris is going to do is have this source control act as the](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=73.49) [beginning of the pipeline, and also add in any variables that need](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=77.48) [to be defined in that release pipeline.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=81.85) [Once we've entered the release pipeline,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=84.34) [the first thing to be deployed is a development environment,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=86.15) [and we're going to use Terraform workspaces to](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=89.4) [create that development environment.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=91.57) [Assuming that everything goes smoothly with development and](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=93.84) [the deployment doesn't throw any errors,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=96.29) [the pipeline is going to move forward to deploy a](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=98.38) [user acceptance testing environment.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=101.36) [If that also deploys without issue,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=103.77) [the process will move forward to a gated portion of the pipeline,](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=106.19) [where someone who has authority can decide whether or not to release](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=109.84) [this build to the production environment.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=113.45) [So that is what we're going to be building in our demonstration.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=116.54) [Let's go over to the demo environment, and first, we're going to review what's in the updated configuration.](https://app.pluralsight.com/course-player?clipId=ada65fb6-3de4-405f-97f3-2c9b27e13b93&startTime=119.68)

### [Reviewing the Updated Configuration](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48)

[Okay, here we are in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=1.567667000000016) [and we are going to review the updated configuration that's going to](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=3.4746670000000157) [take advantage of Azure DevOps and workspaces.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=7.064267000000014) [So I have the folder 7-azure-DevOps-workspaces open,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=11.269667000000016) [and we're going to look at the main.tf file first.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=16.525667000000016) [So let me open that,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=20.378667000000014) [and I will shrink up the EXPLORER to give us a little more room,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=21.31766700000001) [and as usual, we start with the variables.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=24.483667000000015) [Some of these are the same as our original configuration,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=27.160667000000014) [but some things have shifted a little bit.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=29.100500333333347) [We still need a resource\_group\_name and a location,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=31.12366700000002) [but when we look at the vnet\_cidr\_range,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=34.07566700000002) [instead of having a list of strings, there is now a map in there,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=36.32866700000002) [and the map has keys that corresponds to different](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=40.14526700000001) [workspaces and then a value for each key,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=43.192667000000014) [which is the cidr\_range that should be used for that environment.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=45.887667000000015) [Below that, we're defining our subnet names,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=50.60166700000001) [web, database, and app, so we're creating three subnets,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=53.201667000000015) [but you'll notice we don't have a subnet\_prefixes variable.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=55.991381285714304) [That's something we're going to allocate dynamically a little bit further down.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=59.804667000000016) [Scrolling down, we get to our locals block.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=63.90066700000001) [Locals is how you can define local variables within a Terraform configuration.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=67.09366700000001) [It's equivalent to variables in an ARM template.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=71.75166700000001) [And here, we're defining one local variable,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=75.29166700000002) [the full\_rg\_name, or full resource group name,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=77.91166700000002) [and this is a combination of the current Terraform workspace,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=82.38366700000002) [which we referenced by doing terraform.workspace,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=85.54266700000001) [and the resource\_group\_name variable that's submitted at runtime.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=88.66666700000002) [So for instance,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=92.26466700000002) [if this was the development workspace and the resource\_group\_name was vnet,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=92.87195271428573) [then we would have a resource\_group\_name of development-vnet.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=96.24116699999999) [Scrolling down some more, we get into providers.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=101.70166700000001) [There's only one provider in this case, the azurerm provider,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=104.23666700000001) [and all the values are going to be supplied by Azure DevOps at build time.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=106.72852414285715) [Scrolling down further, we get into our first resource,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=111.54806700000002) [and this is actually a data source called template\_file.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=115.12033366666668) [What the template\_file data source allows you to do is create](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=118.77766700000002) [one or more strings based off of a template.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=122.29422255555556) [In our case,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=125.36566700000002) [we're trying to create the subnet prefixes based off of the virtual network IP](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=125.89479200000002) [address range and the number of subnet names that we have.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=130.57491700000003) [So we set the count to the length of the variable subnet\_names.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=134.50066700000002) [In our case, we have three subnet names, so the count is going to be 3.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=138.538667) [Then we can either define a template in line or point it to a file.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=142.28066700000002) [In this case, we're defining the template in line,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=146.13066700000002) [and what we're doing is invoking cidrsubnet,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=148.58491700000002) [which is a function.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=150.806067) [We're handing it the IP address range of the virtual network.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=152.66766700000002) [We're adding 8 bits to the subnet mask, so currently, it's 16.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=156.438667) [We would add 8 and make it 24, so the subnet mask would now be 24 bit.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=160.260667) [And based off of the current count,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=164.70766700000001) [we're selecting which subnet out of that range we'd want.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=166.78066700000002) [We also have to give some variables for the template to use.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=169.403667) [And in this case, the vnet\_cidr is being defined by the vnet\_cidr\_range variable,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=173.401667) [which is a map,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=178.17866700000002) [and we're asking for the value that is at the key of terraform.workspace.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=179.19200033333334) [If our workspace is development,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=184.41166700000002) [let me scroll up to where we define our vnet\_cidr\_range map,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=186.36866700000002) [the development key maps to the 10.2 .0 .0 /16 IP address range.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=190.07426700000005) [Scrolling back down,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=197.813667) [we are going to set the current count for the template to count.index,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=198.71029200000004) [so it's going to iterate through 0, 1,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=203.760667) [2 because we have 3 subnets in our variable subnet names.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=206.29766700000002) [This is a fairly common pattern for getting subnet prefixes](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=210.6148098571429) [based off of a larger block of IP addresses.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=214.52683366666673) [It also means all we have to do is add another subnet](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=217.82766700000002) [name to our subnet\_name variable,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=220.61000033333337) [and it will dynamically create another subnet prefix for us.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=222.406167) [Scrolling down some more, we get into the creation of our Azure resource group.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=226.91266700000003) [This is the same as it was before.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=230.45466700000003) [The main difference now is the environment tag](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=232.24566700000003) [corresponds to the current Terraform workspace.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=234.52366700000002) [Scrolling down some more,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=237.949667) [the last thing under resources is the vnet module from the Terraform Registry,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=238.87423842857143) [and again, most of the settings here are the same,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=242.86809557142857) [but I do want to point out a few things that are different.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=245.48166700000002) [The address space is based off that vnet\_cidr\_range map,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=248.164667) [and we're using terraform.workspace as the key to get the](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=250.946267) [value stored for that address space.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=255.485667) [Second, for the subnet\_prefixes we are referencing our template file data source,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=258.524667) [and the way that we do that is data.template\_file .subnet\_prefixes,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=263.40866700000004) [and then we have the square bracket with a star.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=267.543667) [Because we have multiple subnet prefixes defined by the template,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=270.270667) [star says, give me a list of all of those,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=274.8103336666667) [and then the attribute I want from those is rendered,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=277.738667) [so I want the rendered text from each of those subnet prefixes.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=280.483167) [Terraform will take those results and submit it as a list to subnet prefixes.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=285.465667) [Then we have subnet\_names.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=290.58666700000003) [That's the same.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=291.91366700000003) [And then finally, under tags, again,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=292.4036669999999) [we're using terraform.workspace to define our environment tag.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=294.351667) [Scrolling down some more, we have our outputs,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=298.906667) [and these are just standard outputs.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=301.43266700000004) [We're getting the vnet\_id, the vnet\_name,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=302.87766700000003) [and the resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=305.640667) [and the reason we have these as output is in a later module,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=306.3541670000001) [we are going to reference these outputs when we're deploying an application.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=309.88966700000003) [So that's the entire main.tf.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=314.279667) [Let's see what else is in this configuration.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=317.839667) [Well, we have our vnet-peering, and in this case,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=320.056667) [the vnet-peering has not changed significantly.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=323.4598098571429) [We still need all the values relating to the security subscription,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=325.90866700000004) [the virtual network,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=329.67066700000004) [and the service principal that was created for us by Danny Brown.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=330.486667) [The changes here are mostly about the role definition](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=334.244667) [and the vnet-peering resources,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=336.246867) [so let's scroll down to those and take a look at the role\_definition.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=338.095667) [The main difference here is that the name for the](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=343.33666700000003) [role\_definition adds terraform.workspace to the end,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=345.76866700000005) [so if this was the development environment,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=347.855667) [it would be allow-vnet-peer-action-development.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=349.81966700000004) [This prevents the roles from colliding with each other as](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=352.982667) [you create a role for each workspace.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=356.353067) [Everything else about the role definition stays the same as it was before.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=358.472667) [Scrolling down some more, we get to the azure\_role\_assignment.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=362.49266700000004) [That is the same.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=365.457667) [We're assigning the role we've defined to the service principal that was](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=366.607167) [created by Danny Brown for us to do the network\_peering.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=370.385867) [And then scrolling down some more,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=373.290667) [we are creating our two network\_peering resources,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=375.14238128571435) [one going from the virtual network we just created to the](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=377.636467) [security network and the other one going from the security](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=381.237667) [network back to this virtual network.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=383.63295271428564) [And for both,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=385.342667) [we're updating the naming to use terraform.workspace as part of the name so we](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=386.668667) [know which workspace this peering connection belongs to.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=391.69100033333336) [So that is the vnet-peering portion of our configuration.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=395.34866700000003) [Let's see what else we have in here.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=400.083667) [The next thing that we have is our backend.tf.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=401.89666700000004) [And for that, we're simply defining that the backend is going to be azurerm.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=405.543667) [And when we create our pipeline,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=410.019667) [we will help define how it's going to use AzureRM](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=412.09366700000004) [for storage of the remote state.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=414.9328098571429) [Now if you remember from the slide,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=417.861667) [we need some values to submit as part of this configuration,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=419.42066700000004) [so I do have a terraform.tfvars file that defines a bunch of values](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=422.79538128571426) [to use for the variables in the configuration.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=428.745267) [And these can be pretty safely hard coded because the security](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=431.991667) [subscription and the service principal are unlikely to change,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=435.35216699999995) [as well as the virtual network and the virtual network id](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=438.58866700000004) [that we're peering to for security.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=441.18809557142856) [One thing that might change is the service principal password,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=443.04095271428577) [so we're not going to hard code that here,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=446.19266700000003) [but we'll define that as a released variable.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=448.313667) [Also, because it is a sensitive piece of data,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=450.81466700000004) [we might not want to check the password into source control.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=453.492292) [There is one more file in the directory,](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=457.351667) [the workspacetest.sh, and we'll get to that as we set up our release pipelines. Now let's go over to Azure DevOps and review the source control configuration.](https://app.pluralsight.com/course-player?clipId=9f180148-884b-436d-8edb-98f91476fe48&startTime=459.669667)

### [Using Azure DevOps Repos](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438)

[Here we are logged into Azure DevOps as Chris Jones,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=1.57) [and a basic building block of Azure DevOps is the project.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=4.4275) [A project holds within it things like your repositories and your pipelines.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=7.97) [I already have a project created here called globomantics-testing.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=13.252) [So let's go ahead and open up this project and see what's inside.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=17.119) [As I mentioned earlier,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=21.182) [we're going to be using Azure DevOps repos and Azure DevOps](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=22.299999999999994) [pipelines to form the source control management and CI/CV](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=25.566) [pipelines for our solution.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=29.66414285714286) [Let's go into Repos and see what's defined in there.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=32.023) [Within Repos, under Files, there is already a globomantics-testing repository,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=35.36966666666667) [and within that, we have a networking folder.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=40.80385714285714) [Expanding the networking folder,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=43.8005) [we can see that the file structure here maps to the file](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=45.392999999999994) [structure that was in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=48.619714285714274) [so I've already taken the liberty of adding these files to](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=51.802) [the globomantics-testing source repository.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=55.31139999999999) [If we wanted to make changes to this repository,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=57.11328571428572) [we could click on Clone and clone this to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=59.97142857142858) [make changes, commit them, and then sync them to this repository.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=64.018) [We can also make changes in line.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=68.275) [So if we wanted to change something about the main.tf file,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=70.697) [we could simply click on the main.tf file,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=73.4125) [Azure DevOps repos would load the content,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=77.05457142857145) [and by clicking on Edit, we can edit something about this,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=80.01525000000001) [so let's just add something in the comments here.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=83.424) [We'll just say, Hello Pluralsight Learners, and then click on Commit.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=87.715) [It will prepopulate the Comment field just letting us know](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=93.042) [that we've updated our main.tf file.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=96.63942857142855) [You always want to add some sort of comment when you](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=98.16525000000001) [are committing something to Git.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=101.33314285714283) [Once we've clicked on Commit, that has now been committed to the master branch,](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=103.0692857142857) [and it's part of our source code.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=107.77055555555556) [We could look at the history of our commits and compare previous](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=110.373) [versions to what's in the main.tf file now.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=113.38942857142858) [Now let's take what we have stored in Azure DevOps repos and deploy it using Azure DevOps pipelines.](https://app.pluralsight.com/course-player?clipId=6b140971-8f0b-4649-b45a-ee3310423438&startTime=117.167)

### [Using Azure DevOps Pipelines](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135)

[Based off of what we have in Azure DevOps repos,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=1.628) [we can create a release pipeline for deploying this infrastructure in Azure.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=4.235625) [So let's go to Pipelines and select Releases.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=9.899) [Like I said before,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=13.241) [the build pipeline is more about compiling software](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=14.670500000000004) [and preparing artifacts for release.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=17.705333333333336) [Because we're doing infrastructure as code,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=20.034) [there's not really anything to compile in our case,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=21.797) [so we can go straight to the Releases pipeline,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=24.21677777777778) [and I have one pipeline defined here, workspaces.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=26.798142857142857) [Let's go ahead and click on Edit and take a look at what's in workspaces.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=31.45) [In the release pipeline, we start with artifacts.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=35.259) [Where is the information coming from for this pipeline?](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=38.468) [In our case, We're using Azure DevOps repos as our artifacts for deployment.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=41.0282) [And if we look at this little lightning bolt here,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=46.802) [there is an option to enable continuous deployment.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=49.071000000000005) [We won't set that up right now,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=52.26) [but what that means is every time a Git push happens to the selected repository,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=53.93) [it will kick off a new release to deploy the updated source to the](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=58.409) [environments that are in the stages portion of the pipeline.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=62.868285714285726) [Right now, we don't have that turned on,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=67.197) [but we will turn that on later so you can see how it works.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=68.372) [Go ahead and close that out.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=71.83199999999998) [The next thing you'll note is that we have a](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=73.719) [development stage in our Stages area,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=75.98914285714287) [and that development stage has a lightning bolt as well.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=78.882) [So if we click on that,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=81.51699999999998) [it will take a look at what triggers this portion of the stage.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=82.949) [And right now, the trigger is set to After release.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=86.809) [So if a release is created either manually or through the continuous deployment,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=89.707) [it will kick off this development stage.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=93.734) [Let's go ahead and close this out and take a look at](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=96.767) [what is in the development stage.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=99.96533333333332) [It has 1 job and 5 tasks.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=101.522) [Here are the tasks that are set up to run on an agent.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=104.633) [Now let's look at the agent first before we look at the tasks.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=107.37466666666666) [The agent is using a hosted agent that's provided by Azure DevOps.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=112.221) [Basically, it spins up an Ubuntu 1604 agent and runs these tasks on that agent.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=116.42) [When the tasks are complete, the agent is shut down and discarded,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=122.671) [so you don't have to do anything to set up a persistent agent of any kind.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=126.3135) [You absolutely can do that, but for our purposes,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=130.58274999999998) [it's not necessary, and it's actually a little bit more work.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=133.301) [On our agent, we are going to run a number of tasks.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=137.054) [Now because this agent is being spun up from a base configuration,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=138.8135) [it does not have Terraform preinstalled.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=143.308) [so the first thing that we need to run is a Terraform installer process.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=145.447) [This task and other Terraform tasks are available](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=150.405) [from the Azure DevOps marketplace.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=153.07216666666667) [If we click on plus here to add a task, it will ask us what task we want to add.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=155.573) [And if we start typing in Terraform,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=161.128) [you'll see it has two tasks that we've already selected to run on the agent,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=163.52) [but there are additional tasks that exist in the marketplace.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=167.213) [And if you wanted to use one of those,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=170.02175) [you could highlight it and click on Get it for free and it](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=172.00049999999993) [will add that item to your marketplace.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=174.93489999999989) [We don't need to actually add a task at this point,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=177.346) [so I'm going to close that out,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=179.98399999999998) [and we can take a closer look at what's going on in this Use Terraform 0.12 .10.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=181.517) [That's the display name,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=188.04) [and the only thing that we need to specify in the Terraform installer](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=188.94949999999997) [is what version of Terraform we want it to install.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=191.89842857142858) [In this case,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=194.9532857142857) [we want to install 0.12 .10 to keep it consistent with the version](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=195.78) [we've been using for all of the other deployments.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=199.9873333333333) [Once Terraform is installed successfully,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=202.879) [we can go through the terraform initialization process,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=204.987) [so let's select that task,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=207.46439999999998) [and you can see it's running terraform init as its command,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=209.69325) [and there is a Configuration Directory defined.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=213.27175000000003) [let's scroll this over a little bit to give more room](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=216.408) [for the Configuration Directory.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=218.64866666666668) [And as you can see,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=220.156) [it's using the system.default working directory as its](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=221.08537500000006) [base directory for the configuration,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=224.315) [and what Azure DevOps actually does is it clones down the](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=226.496) [repository that's in Azure DevOps repos to this agent so that you](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=229.89542857142854) [can use the files that are in source control.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=234.20977777777782) [So what we're doing is running init in the networking directory that](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=236.312) [has all of our files that make up our configuration.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=239.47371428571427) [And if we scroll down a little bit more,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=242.662) [you can see it provides you the ability to specify a backend yourself.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=244.535) [In this case, we want to use azurerm.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=248.753) [Then we have to specify the details of the backend configuration,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=251.073) [so let's go ahead and drop that down.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=253.621) [And we can see that it's asking for the Resource Group](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=255.86100000000002) [Name where our storage account exists, the Storage Account Name,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=258.6622857142858) [which is the storage account that we created in the previous module,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=262.0388571428571) [72502, the Container Name, which is terraform-state,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=265.4336666666666) [and then finally,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=268.9175) [what's the key we want to use for the storage of the state file?](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=270.078) [In this case, we're using terraform.tfstate.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=274.073) [Now remember, as we use workspaces,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=277.234) [the workspace name is going to be appended to terraform.tfstate,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=279.209) [so we won't have a collision of keys based off of different environments.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=282.58371428571434) [We're going to be okay on that one.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=287.865) [Speaking of workspaces, the next task in the process is a Bash Script,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=289.68) [and the Bash Script is intended to check whether or not a](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=294.17899999999986) [workspace exists and create it if it does not.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=297.7505) [Let's take a look at that script in VS Code.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=300.626) [Now I told you we were going to get back to that workspacetest script,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=303.669) [and this is the script right here.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=305.88428571428574) [It's very straightforward.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=308.384) [Basically,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=309.622) [what the script is doing is running](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=309.9144285714286) [terraform\_workspace\_list to get the list of current](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=312.07759999999996) [workspaces and then running grep with the -c argument,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=314.86357142857145) [which gives us the count of how many times it finds a search term.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=317.80525) [We are going to supply the search term as an argument to this script,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=321.20750000000004) [say development.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=325.282) [So if in terraform workspace list, it does not find development,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=326.01) [if it equals 0,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=329.899875) [then this will test it to true and the script will run terraform workspace new](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=330.97937500000006) [and then the name of the workspace that we want to create.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=335.76071428571436) [If it does find the workspace, this will test to false,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=339.46) [and we'll get to the else statement.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=342.2269999999999) [The else statement in this case will run terraform](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=344.11171428571424) [workspace select and the name of the workspace.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=347.91766666666655) [So basically,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=350.111) [we'll be selecting to use the development workspace if it already exists.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=350.68525) [That's the entirety of what this script does.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=354.871) [Let's go back to the task in pipelines.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=357.114) [Now we can't see what the Script Path is set to at the moment,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=359.424) [so let's click on the breadcrumbs,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=362.38549999999987) [and we'll see that the location is](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=363.65883333333335) [globomantics-network/networking/workspacetest.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=365.621) [That is where our script is.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=370.002) [That's correct.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=371.443) [The next thing is the Arguments.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=372.17025) [We need to pass it a workspace name.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=374.352) [The argument that we're using is Release.EnvironmentName.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=376.768) [That is a built-in variable in pipelines that gets you the](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=380.629) [name of the stage that you're currently in.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=384.3877777777778) [And as we can see, the stage that we're in is development,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=387.135) [so it's going to submit development as the argument.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=389.89371428571434) [If we create another stage called, say, uat,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=392.716) [then it would submit uat as the argument.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=395.89855555555556) [Expanding the Advanced for a moment,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=399.807) [we do have to set the Working Directory as well.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=402.232) [Where should this script be run from?](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=405.052) [And the path for the working directory is the same as the script path.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=407.224) [We want it to run in the same folder as all of our other configuration files.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=410.683) [Once we've either created the workspace or selected it,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=415.192) [we can move on to terraform plan where we plan out](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=418.0245) [the deployment of our resources.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=421.3183749999999) [So we'll go ahead and select terraform plan here,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=422.6282857142857) [and you can see the Command it's running is plan,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=425.0235) [the Configuration Directory is networking,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=428.202) [that's where our .tf files are,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=430.302) [and then we get to select an Azure subscription where](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=432.0193333333332) [we want to deploy these resources.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=435.264) [We're telling it we want to deploy these resources in the PS subscription.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=437.252) [Scrolling down some more, we do have some Command Options here,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=442.028) [and the Command Options specify a variable inline for the sec\_client\_secret,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=445.2335) [which is the service principal password,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=449.7296) [and that we want to store the plan in main.tfplan.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=452.0771428571429) [Now the way of referencing a variable in pipelines is by](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=457.135) [doing that dollar sign and parentheses and then putting the](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=459.65462500000007) [name of the variable in there.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=462.30042857142865) [The variables are stored on the Variables tab,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=464.306) [so let's go over to the Variables tab,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=466.59) [and we can see we have one variable defined,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=468.871) [sec\_client\_secret.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=471.19) [And if we scroll over a little bit and look at this little lockbox,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=471.6088571428571) [it says that it is currently locked,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=476.208) [so pipelines knows to treat this as secret text,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=478.388) [and it won't show the variable in pain text in the logs.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=481.1275) [It'll keep it all just stars.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=484.619) [So that is the one variable we have defined in our pipeline variables.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=487.779) [Now let's go back to Tasks.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=491.781) [At this point, we have run terraform init,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=495.017) [we have selected our workspace or created it,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=497.372) [and we've created the terraform plan for what we're going to deploy.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=499.589) [The last thing to do is run terraform apply,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=502.198) [and you can see, we are funning the apply command.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=505.344) [If I can line this out a little bit,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=508.772) [our Configuration Directory is the same as the one we used for init and plan,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=511.008) [we are using the same Azure subscription that we used before,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=515.865) [and the only command option that we're submitting as part of](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=519.2819999999998) [our apply command is the main.tfplan file,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=522.2846249999996) [so this is the plan file that we generated with terraform plan.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=525.817) [Assuming that each task completes successfully,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=529.423) [the agent will run the next task in succession.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=532.525) [At the end of all the tasks,](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=535.75) [we should have a successfully deployed virtual network](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=537.2116) [that is peered with the security network. In order to kick off this process, all we have to do is create a release.](https://app.pluralsight.com/course-player?clipId=2e4e2609-f045-4c73-8601-04d6d6482135&startTime=540.198)

### [Deploying the Development Workspace](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc)

[Now that we've reviewed the configuration of our pipeline,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=1.569) [it's time to create a release.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=4.152333333333333) [And for that,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=5.683) [all we have to do is click on this fun button that says Create release.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=6.194909090909091) [And what it will do is trigger a release and kick off the development stage.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=10.441) [Let's go ahead and click on Create here, and that release has now been created.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=15.543) [We can click on the hyperlink here to go to Release 12,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=19.571) [and this shows us the same pipeline, but in the view of a release happening,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=22.86275) [and it's currently set to Queued.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=27.956) [So we can click on that, and basically,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=30.058) [it waiting for an agent to be ready to accept the job.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=31.712) [Once it's accepted,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=35.1645) [it will go through the tasks that we've defined for this agent.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=36.38) [The first thing it does is download the artifacts,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=39.893) [and then it's going to install Terraform as we asked it to do.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=41.95485714285714) [Now it's running terraform init to initialize our Terraform configuration.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=45.619) [Now it's running the Bash script.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=50.55) [That was very quick,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=52.315) [and now it's running terraform plan to plan out what's](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=53.978999999999985) [going to be deployed in our environment.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=57.213499999999996) [It looks like that succeeded,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=60.045) [so now we're going to the terraform apply portion of the task](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=61.194999999999986) [where it's going to create that virtual network,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=64.16085714285714) [the role definition, and the VNET all as part of the apply process.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=66.5296) [So let me scroll down a little bit and wait for the console output to complete.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=72.011) [Alright, and all of the tasks have completed successfully.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=76.419) [That infrastructure should be in place.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=79.565) [Let's go over to the Azure Portal, and we'll take a look at our Resource groups,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=81.576) [and in there, you can see there is now a development-vnet resource group.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=87.122) [And if we click on that,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=91.83) [we should see that there is a virtual network that](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=92.81519999999996) [is part of this resource group.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=94.97333333333331) [There it is, development-vnet.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=96.582) [We can click on that and take a look at the Peerings that are](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=99.288) [configured here and see that we have a connected peering between this](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=103.426) [virtual network and the security virtual network,](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=108.02966666666667) [so our deployment has been successful. Now let's go back to Azure DevOps and add the uat environment to our stages.](https://app.pluralsight.com/course-player?clipId=e0fa09b8-1c1f-4d75-90f1-684d7d8d2cfc&startTime=110.58874999999999)

### [Adding the UAT Workspace](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4)

[Alright, we're back in Azure DevOps,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=1.5753330000001007) [and we're going to add a uat stage to our existing pipeline,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=3.2173330000001004) [so let's go back to the workspaces pipeline,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=6.988083000000101) [and we are going to select to edit the workspaces pipeline.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=9.794190142857243) [Now as you can see, we only have one stage defined.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=15.0933330000001) [It's development.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=17.4793330000001) [Now what's nice is that you can actually clone a stage,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=18.08076157142867) [like this, and then click on that stage,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=22.28283300000011) [and all we have to do is rename the stage uat and then click Save up here,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=24.18566633333343) [and click OK, and that's all there is to it.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=32.5043330000001) [Now you can see there's a little lightning bolt here](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=35.9173330000001) [with pre-deployment conditions.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=38.285333000000094) [And if we click on that, by default,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=39.7163330000001) [it is going to trigger this UAT stage if the development stage is successful.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=41.2753330000001) [That's what we want it to do.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=47.0083330000001) [If we've successfully deployed to development,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=48.238333000000104) [we would like it to move on and deploy to uat.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=50.485333000000104) [So let's go ahead and close this out,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=53.5253330000001) [and we are going to create another release here,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=55.7743330000001) [and you can see now in the pipeline, it's going from development to uat.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=58.9623330000001) [We'll go ahead and click on Create, and now it has created a new release for us.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=62.5693330000001) [We can go ahead into this release and see that currently development is Queued.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=68.0513330000001) [We can go ahead and click on that and see that it is](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=72.6693330000001) [preparing an agent for the job.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=75.16166633333343) [Now there shouldn't be any changes to our development environment](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=77.0603330000001) [because we haven't made any changes to the source code.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=79.4951330000001) [It should just roll through and say that no changes are required.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=82.9983330000001) [Now since this will take a little while,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=87.26433300000011) [I'm going to speed up the video so we don't have to wait for the](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=88.6803330000001) [entire deployment of the development stage.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=91.67958300000006) [Okay, our development stage has succeeded successfully.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=94.8363330000001) [So now we can go back to release 13 and see that our uat stage is queued up.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=98.8343330000001) [That's the next thing that is going to deploy.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=103.5363330000001) [The Agent job is about to start,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=107.5813330000001) [and it is provisioning an agent to run this deployment.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=108.82313300000014) [This one's going to take a little bit longer than the development](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=112.4323330000001) [because it doesn't have any of the resources yet.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=115.09733300000009) [It has to create these resources.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=117.4603330000001) [Now what I want to say while this is deploying is while you're seeing green now,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=119.9733330000001) [usually when you first set up a pipeline,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=124.1463330000001) [it's going to be a lot of red.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=126.0113330000001) [Your releases are going to fail,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=128.1653330000001) [and the reason is because there are going to be assumptions you've made or](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=129.8613330000001) [things that don't work quite like you expected them to.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=132.4223330000001) [That's normal, and don't get discouraged.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=135.7145330000001) [When I was first setting up this demonstration,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=138.0163330000001) [I had about 13 failed releases before I finally got a green release,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=139.7673330000001) [and that felt great!](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=144.59499966666672) [Once it goes green,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=146.1043330000001) [it tends to stay green because you've worked out the kinks of your pipeline,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=147.225221888889) [and now you have an automated way to deploy your infrastructure.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=150.5905830000001) [Alright, our uat stage has also successfully deployed.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=154.5663330000001) [If we go back to the Azure Portal and take a look at the Resource groups,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=158.2233330000001) [we can see that there is now a uat-vnet resource group,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=162.5423330000001) [within there, there is a uat virtual network,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=167.4933330000001) [and if we look at the Peerings for this virtual network,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=171.7483330000001) [we can see it is also peered with security,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=173.84408300000007) [so the configuration was successful in this regard as well.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=176.72133300000007) [If we take a look at our storage accounts to see](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=179.9663330000001) [what's happening with remote state, here is our storage account,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=182.47947585714294) [72502, and let's go into Containers, and there is the terraform-state container,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=187.32066633333343) [and within that container, we're going to see there are three files now.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=192.33733300000011) [There is our original terraform.tfstate before we started using workspaces,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=195.8753330000001) [and then there is the terraform.tfstateenv :development and uat.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=199.8043330000001) [So you can see how it appends the name of the](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=205.6633330000001) [workspace to the terraform.tfstate key.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=207.95316633333343) [Now you remember,](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=211.1423330000001) [one of the things that I talked about was enabling continuous deployment, so let's go ahead and enable that now.](https://app.pluralsight.com/course-player?clipId=937b3f78-2545-442d-bf0e-bbfe5dfa4fe4&startTime=211.50666633333344)

### [Adding the Production Workspace](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f)

[Looking back at our original diagram,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=1.693666000000201) [the idea was to set up continuous deployment from](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=3.464666000000201) [development to UAT and then to production,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=6.207380285714487) [but to have a gate for approvals before it hit production.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=8.5869160000002) [So let's go back to Azure DevOps, we'll set up the production stage,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=12.4346660000002) [enable the gate, and enable continuous deployment.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=16.5266660000002) [Alright, here we are in our pipeline configuration,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=21.2266660000002) [and we're ready to add the production stage to our environment,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=22.998951714285916) [and all we have to do is click on Clone for the uat,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=27.245666000000202) [and then click on the stage itself, and change the Stage name to production,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=30.399777111111312) [and click on Save.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=36.1836660000002) [Now remember, we want this to be gated.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=37.820999333333546) [We don't want it to automatically deploy.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=39.7426660000002) [If we look at the lightning bolt here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=41.7086660000002) [it's going to deploy this as soon as uat is done,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=43.3906660000002) [but we want to have a gatekeeper here, so we can click on the person icon here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=46.4396660000002) [and scrolling down, we can require Pre-deployment approvals.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=51.5776660000002) [And under Approvers, we can select our self as an approver.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=58.0286660000002) [So basically, once it gets to this stage,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=60.84266600000019) [it will pause here until Chris Jones comes in and actually](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=62.91716600000019) [approves this portion of the deployment.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=66.0006660000002) [That all looks good, so we are going to click on Save here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=68.1696660000002) [and hit OK, scroll up, and we can exit out of this.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=71.81122155555573) [The other thing that I talked about setting up was continuous deployment,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=76.7536660000002) [so we can go to this lightning bolt here and set up](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=79.3976660000002) [a continuous deployment trigger, we will set this to enabled,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=82.48466600000019) [so every time we commit to our repository,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=86.16199933333353) [a new release is going to be created.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=89.18866600000021) [Let's go ahead and click on Save on that and exit out of here.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=91.5331660000002) [So now we have continuous deployment set up and three stages in our pipeline.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=96.2316660000002) [Let's go into Repos and make a change to one of the files.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=101.1266660000002) [Let's go into Networking, let's say, and go into main.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=105.74966600000022) [Now let's say we wanted to add a tag to our resource group deployment.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=109.9806660000002) [Let's go ahead and click on Edit here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=114.1306660000002) [and then we'll scroll down to where we defined our resource group,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=117.6296660000002) [and let's add another line, we'll call it costcenter,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=120.70980885714303) [set it equal to it,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=126.2446660000002) [and go ahead and click on commit to commit this change to source control.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=128.77966600000022) [We'll click on Commit here to commit it with the comment.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=135.3856660000002) [Now that that change has been committed,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=138.6769160000002) [let's go back to our Releases pipeline,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=140.83380885714305) [and you'll see that an additional release has been created,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=143.4460945714288) [Release-14.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=148.6288326666669) [This was automatically created because of the commit.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=149.1256660000002) [We can go ahead into this release and see that it's](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=151.92241600000023) [currently in the development stage.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=155.51741600000014) [Now the only change here is the tag,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=157.27333266666687) [so this shouldn't take very long to deploy to development and uat.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=159.7521660000002) [So I'm going to speed up the recording so we can get to](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=163.5416660000002) [where it hits the production gate.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=166.63306600000024) [Okay, it has successfully gotten through the development and uat stages,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=168.3766660000002) [and now it's gotten to the production stage,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=171.3876660000002) [and it's waiting on our approval.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=173.6446660000002) [It's not going to deploy to production until we've approved it.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=175.1636660000002) [Let's go ahead and click on the Approve button here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=178.5486660000002) [and we could leave a comment saying Update tag and go](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=181.3411660000002) [ahead and click on Approve again.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=185.79266600000017) [Now that this has been approved for production deployment,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=188.23152314285733) [if we close out of here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=192.3696660000002) [you can see that it has queued a job for production deployment,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=193.62666600000014) [and it will go through the same deployment process.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=196.9356660000002) [Now because we haven't deployed to production yet,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=200.2566660000002) [it will be standing up net new infrastructure,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=202.63180885714308) [so this will take a little while, so I'm going to speed up the recording.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=204.58866600000022) [Okay, and here's that red that I talked about.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=210.0256660000002) [It looks like something went wrong with production, and I wonder what it was.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=212.0166660000002) [We can go ahead and click on Failed,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=215.2186660000002) [and it actually will give us the error as Terraform](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=216.6426660000002) [was going through its process.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=219.1921660000002) [Now it looks like what it's saying is that the key](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=221.1996660000002) [production was not found in vnet\_cidr\_range.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=223.5389160000002) [Is that correct?](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=226.6866660000002) [Let's go ahead and close this, and we can take a look at our repositories.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=227.2930410000002) [We'll go into networking, into main.tf,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=231.6696660000002) [and let's take a look at what we have in here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=235.1816660000002) [and it's absolutely correct.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=237.3476660000002) [The map says prod and not production, so we can go ahead and edit in here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=238.8136660000002) [change the variable to production, commit it,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=244.3866660000002) [and click on commit again, and guess what's going to happen?](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=248.16209457142875) [It is now going to create a new release and go through the](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=251.4516660000002) [Release pipeline to fix the mistake.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=255.27833266666684) [So let's go back to Pipelines and go into Releases,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=257.5436660000002) [and now Release-15 has kicked off based off the change that we made.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=260.33480885714306) [Let's go into Release-15, and we can see how the stages progress to production.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=266.1146660000002) [And obviously,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=271.0466660000002) [I'm going to speed this up so we don't have to wait](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=271.4419160000002) [around for each stage to complete.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=273.7296660000003) [Alright, and we're back at Pending approval for our production deployment,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=275.16009457142883) [so we'll click on Approve and say that map has been fixed,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=278.48180885714305) [which hopefully it has, and click on Approve here,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=282.65066600000023) [and now it will move forward with the production component of the deployment,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=285.79066600000016) [and we can go into the queue for this and actually watch the deployment process,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=291.9486660000002) [and now it's running the job on our agent,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=296.9706660000002) [so I'm going to speed up the recording again because this is](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=299.1476660000002) [going to take a little while to deploy all the resources for](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=301.8836660000003) [the production environment.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=305.5804160000002) [Okay, and this time, our production deployment succeeded.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=307.3346660000002) [If we look at the entire Release pipeline, we've got green across the board.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=310.4676660000002) [That's really nice to see.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=314.3496660000002) [If we go back to the Azure Portal and go into our Resource groups,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=316.2726660000002) [there is now a production-vnet resource group,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=320.9371660000003) [and as you might assume, in there, there is a virtual network,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=323.98116600000014) [a production-vnet.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=327.8796660000002) [And within that production-vnet, if we go down to Peerings,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=329.1296660000002) [we can see that the production network has also been](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=332.44666600000016) [peered with the security network,](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=335.9274993333336) [so we have accomplished the goal of setting up Azure DevOps to deploy our infrastructure as code in an automated fashion.](https://app.pluralsight.com/course-player?clipId=fb77f248-e2e4-404c-ae08-e80fb9af901f&startTime=337.35366600000015)

### [Summary](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5)

[Alright, that was a heck of an adventure.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=2.6143330000001006) [Let's sum up what we've learned in this module.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=4.0733330000001) [Well, first thing that I want to stress is please, please use source control.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=6.449333000000101) [I'm using source control for all of the example files for this course.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=10.9953330000001) [Anything that you're building that you think you might want](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=14.993333000000101) [to share or at least just keep track of,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=16.989888555555652) [I would recommend using source control.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=19.232333000000096) [There's a ton of free options, and there's even private repositories in GitHub,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=20.899583000000103) [so you don't have to make it publicly available.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=24.6917080000001) [Also, automate your deployments.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=27.378666333333435) [First of all,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=30.0453330000001) [you're going to learn a lot about your deployments](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=30.68166633333343) [just through the automation process.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=32.9368330000001) [Assumptions that you might make when you're doing something manually will](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=34.7005330000001) [get called out when you try to automate that thing,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=37.6040830000001) [and that helps sharpen your skills as an engineer.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=40.36976157142868) [Also, we didn't really have time for it in this module,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=43.9993330000001) [but I highly recommend adding testing for your infrastructure.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=46.15504728571439) [There's a number of different packages out there for testing,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=49.6613330000001) [and there's actually one specifically for Terraform itself called TerraTest,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=52.0628330000001) [which Microsoft uses.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=55.3318330000001) [So if that seems to be something you're interested in,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=57.1423330000001) [I'd recommend searching out TerraTest and checking it out.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=59.3443330000001) [Coming up in the next module,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=62.7653330000001) [it's time to deploy an actual application on top of this infrastructure.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=63.82133300000011) [So we are going to build upon this infrastructure and also access the](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=67.8733330000001) [existing state file as a data source for the next configuration,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=71.84516633333344) [and we'll also see how you can deploy an ARM template using Terraform,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=76.1983330000001) [which sounds a little funky,](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=79.9973330000001) [but it actually comes up more often than you might think. That's all coming up in the next module.](https://app.pluralsight.com/course-player?clipId=110ebadb-fde1-4347-90ad-45cc8ff155e5&startTime=80.9223330000001)

## [Using Data Sources and ARM Templates](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f)

### [Introduction](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f)

[After you deploy your first Terraform configuration,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=0) [there's a pretty good chance you're going to deploy additional](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=3.504) [configurations that have some dependencies or need some](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=6.0958000000000006) [information about that original configuration.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=8.761) [You might even say they're using it as a data source.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=11.978) [There's also a chance that you already have some things deployed in](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=14.501142857142858) [Azure that you're using ARM templates to maintain,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=17.935) [and you may not be quite ready to refactor those templates,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=21.258) [so that's what we're going to be talking about in this module.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=24.264571428571433) [Hey everyone, this is Ned Bellavance.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=27.454) [I'm a Microsoft Azure MVP, and this is Using Data Sources and ARM templates.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=29.22) [Alright, what are we going to get into in this module?](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=36.217) [Well, like I said in the opening,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=39.574999999999996) [we're going to be talking about what I like to call layering configurations,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=41.32485714285715) [the idea that you are going to have multiple deployments of](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=46.524) [multiple configurations in your environments,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=50.48899999999999) [and some of those configurations are going to need information about each other.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=53.073) [There is a layering and a dependency that exists between](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=57.907) [different components and deployments.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=61.81) [The way in which that information is consumed is](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=64.324) [often done through data sources,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=67.28299999999999) [and that data source could be an Azure Provider data source,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=69.093) [or it could actually be the remote state of that other](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=72.50957142857143) [configuration that you're consuming as a data source,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=76.362) [so we'll see how you can incorporate either of those](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=78.95975) [scenarios into a configuration.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=81.87299999999999) [And then finally, as promised,](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=83.7076) [we are going to talk about ARM templates and how you can use](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=85.97355555555556) [them in your Terraform configurations and why you would use](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=89.472) [them in your Terraform configurations. But first, let's talk a little bit about layering configurations.](https://app.pluralsight.com/course-player?clipId=b36e7d11-c2c0-46b2-ba2b-860d1f57b96f&startTime=93.72333333333333)

### [Layering Configuration and Using Data Sources](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0)

[Now I want you to imagine in your mind that you have an existing](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=1.336) [configuration deployed in an Azure subscription,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=5.421666666666666) [say a virtual network.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=8.458) [Now what are you going to be putting in that virtual network?](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=10.585) [Because it's not very useful all by itself,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=13.322) [you are probably going to be placing some sort of application in there.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=16.461) [Let's say you have a business logic app,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=19.431) [so now you have one deployment, that is your networking,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=22.165) [and a second deployment, that is your business logic app.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=25.290428571428578) [Your business logic application is going to need to know](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=28.963) [information about that virtual networking environment to be](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=32.29342857142857) [able to deploy successfully.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=35.61300000000001) [Let's add another component to this environment.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=37.644) [Let's say you're using an app service.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=39.808) [Well,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=42.381) [the app service may have a dependency on the business logic app that may](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=42.663125) [consume information or interact with that logic app,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=46.99087500000002) [so it may need to pull information about that business logic app,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=49.864) [but it doesn't necessarily need to know about the virtual network,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=53.329714285714275) [just the business logic app itself.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=56.946) [You may also be deploying Azure SQL in your environment,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=59.439) [and the app service is consuming that.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=62.377) [Now you could, of course,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=64.06371428571428) [put the app service and Azure SQL in a single Terraform](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=65.768) [configuration and deployment together,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=69.7255) [but what if you're using Azure SQL for more than just App Service?](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=71.34933333333333) [Do you deploy Azure SQL as a separate configuration,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=75.872) [as a module within the App Service configuration,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=78.814) [or some other way entirely?](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=81.632) [Let's look at another potential scenario.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=83.198) [You have a database warehouse service in your virtual network,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=85.6) [so when you deploy that, you need information about the virtual network.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=89.12275) [In addition,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=93.17) [that database warehouse may be publicly accessible through a DNS entry.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=94.11114285714287) [And in this case, we're using Azure DNS for the deployment,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=98.91) [so you're going to need an Azure DNS zone to already exist in](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=101.76599999999999) [order for the database warehouse to be able to successfully](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=106.33687500000003) [add a record to that DNS zone.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=109.8445) [So do you create the DNS zone as part of your database warehouse deployment?](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=113.46) [Probably not.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=118.255) [That zone is probably going to be used for other services as well,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=118.83185714285713) [but the database warehouse does need to be able to query Azure DNS for](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=122.313) [that zone in order to add a record successfully.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=126.37699999999998) [So these are just some of the different ways that](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=129.891) [configurations can become layered and interdependent.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=132.24399999999997) [In some cases, you'll be pulling this information from Azure as a data source.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=134.86399999999998) [So what are some of the more common data sources](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=141.063) [that exist in Azure you might use?](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=144.08275) [Well, one we've already seen a few times,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=147.133) [and that's pulling information about the subscriptions that](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=149.249) [you have access to in the environment.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=151.70414285714287) [That's actually been fairly useful for configuring roles or](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=154.39759999999998) [even setting up additional AzureRM providers.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=157.9352857142857) [You can also pull networking information,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=161.579) [and that might be a virtual network, it might be a subnet configuration,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=164.156) [it might be a load balancer.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=167.623) [There's a bunch of different data sources that exist within the Azure](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=168.807) [Provider so you can get information about the networking.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=172.6) [You can also query about custom images.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=176.29) [You may have a build process where custom images are](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=179.648) [created and stored in a gallery in Azure,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=183.019) [and you use those images for your virtual machine deployments.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=185.66588888888887) [You may want to be able to query that gallery to determine what the newest](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=189.631) [version of an image is and use that image in your VM deployment.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=193.641) [Another one that is commonly used is key vaults.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=198.392) [Key vaults are a secrets management and lifecycle](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=201.805) [solution within Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=204.5846) [You can store keys, secrets, and certificates in it.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=206.707) [Those are all very useful things for other deployments,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=210.046) [say if you're spinning up an app service and it needs a certificate or a secret,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=212.44885714285712) [it may want to use Key Vault as a data source.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=216.503) [And finally,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=219.795) [recovery vaults allow you to query existing query vaults to](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=220.45528571428568) [automatically configure backup for your Azure virtual machine,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=224.413) [and that seems fairly useful.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=227.93650000000002) [You're probably not going to create a new recovery vault](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=229.79333333333332) [for every virtual machine you deploy, so instead,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=232.91775000000004) [you can query for information about that recovery](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=236.07) [vault to properly set up backup.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=238.655) [Now how would you actually configure some of these data sources?](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=240.839) [Let's look at a few examples.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=244.091) [If you wanted to query for all the subscriptions available](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=246.101) [for the currently used service principal,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=248.84040000000002) [you could use the AzureRM subscriptions data source,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=251.1167142857143) [and you'd do that by simply using the data keyword followed by](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=255.111) [azurerm\_subscriptions for the data source type and then give it a name that](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=260.0285) [you can refer to in the remainder of the configuration,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=263.68199999999996) [perhaps subs.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=267.0296) [If you wanted to use Key Vault as part of your configuration,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=268.314) [you would, again, use the data keyword,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=271.2824) [the data source name is azurerm\_key\_vault,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=273.60600000000005) [and then give it a name.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=275.73625000000004) [You also have to provide some information about that key](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=278.929) [vault so it can retrieve the proper one,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=281.04666666666674) [so you have to specify the name of the key vault,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=282.7464444444445) [as well as the resource group name that key vault resides in.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=285.320888888889) [Finally, for the AzureRM virtual network, it's very similar to the key vault.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=289.595) [You have to give it the name of the virtual network and the](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=294.56) [resource group name that houses that virtual network,](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=297.63471428571427) [and then you now have access to all of the](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=300.3027142857144) [information about that virtual network.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=303.51975) [It's a very useful data source as you're trying to configure](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=305.732) [Azure virtual machines or load balancers.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=309.326) [Now let's take a look at how Globomantics is planning to use some of these data sources.](https://app.pluralsight.com/course-player?clipId=f35c5a59-8dd7-438e-b8e0-6549bdc372c0&startTime=311.20025)

### [Provisioning the Application Remote State](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588)

[So far in Globomantics,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=1.519122000000032) [we've worked with Chris Jones to set up a basic virtual networking](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=2.6505505714286035) [environment for the deployment of applications.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=7.056722000000032) [Now it's time to actually start laying down some of those applications,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=9.261122000000032) [so we are going to be working with Hector Sanchez,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=12.994122000000033) [and we are going to be deploying an application within the](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=15.445122000000032) [main VNET that is in each environment.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=19.34712200000003) [What does Hector want to deploy?](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=22.447122000000032) [He'd like to deploy an app tier that consists of two virtual machines](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=24.37912200000003) [and also a front-end load balancer for that app tier,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=29.173747000000038) [and this is an internal-only app,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=33.52912200000003) [so the load balancer is not going to be deployed with a public IP address.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=35.213122000000034) [It all resides within the app subnet within the main-vnet.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=39.57512200000003) [As part of setting up this configuration,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=43.46262200000003) [Hector is going to make use of remote state storage,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=46.13083628571432) [so we are going to have to set up a place to store that app remote state.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=49.18223311111114) [Why don't we go ahead and take care of that now in](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=54.05912200000003) [the demonstration environment?](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=57.924788666666686) [Okay, we're here in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=59.118122000000035) [and I've got the folder 8-app-remote-state open.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=61.716122000000034) [We are going to open the main.tf file,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=66.75012200000003) [and I'll go ahead and minimize the EXPLORER to give](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=69.56212200000003) [ourselves a little more room.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=72.92883628571433) [This is basically the same configuration that we used to](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=74.11312200000003) [deploy the storage account for remote state storage for](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=77.86062200000003) [the networking infrastructure.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=82.24337200000004) [So I'm not going to spend too much time going through the configuration.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=83.88212200000004) [We're basically specifying a resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=87.11412200000004) [a location, and the naming\_prefix for our storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=89.00945533333336) [we're using the azurerm provider,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=93.48112200000003) [we're creating a random\_integer for the naming of the storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=96.34212200000003) [we're creating a resource\_group to house the storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=100.36512200000003) [we're creating a storage account, and within that storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=103.61512200000004) [we're creating a storage container named terraform-state to hold that state.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=107.80328866666669) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=112.90112200000003) [we're creating a SAS token to access the storage account to be](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=114.23312200000004) [able to write the remote state and read it.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=117.83612200000002) [And if we scroll down to the PROVISIONERS,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=120.26012200000004) [we are going to be using the local-exec provisioner to create a file,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=122.57812200000004) [backend- config.txt,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=126.87212200000003) [that has all of the key-value pairs we're going to need in order](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=127.94669342857146) [to properly set up our remote state backend.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=133.67101088888893) [Now one slight difference between this configuration and the previous one is](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=137.50212200000004) [we're going to be running this locally as Hector Sanchez,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=140.60240771428582) [and Hector is running from a PowerShell prompt.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=143.22697914285718) [So I've updated the local-exec provisioner to use PowerShell](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=146.1037886666667) [commands instead of Bash commands to send the proper](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=150.39512200000004) [information to the backend- config.txt file.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=153.65092200000007) [So it's a small difference,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=157.32412200000005) [but it does illustrate how you can use PowerShell or](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=158.17474699999997) [Bash in your local-exec provisioner.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=161.06512200000003) [So let's go ahead and open up the terminal window,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=164.17612200000002) [and we're already in the proper folder.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=166.02912200000003) [I just want to confirm that I am logged in as Hector Sanchez,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=169.13712200000003) [so let's run az account show,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=172.543122) [and we can see I am logged in as Hector Sanchez using the PS subscription.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=175.38152200000005) [So I just wanted to make sure before I ran any other](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=180.97112200000004) [commands that everything was set up properly.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=183.02940771428575) [Now we can go ahead and run terraform init to initialize the local](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=185.2305664444445) [backend we're using to provision this storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=190.53212200000004) [as well as the provider plugins.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=193.12912200000005) [Okay, that was successful.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=195.45712200000003) [Now we can run the terraform plan,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=196.83012200000005) [and I actually have the exact command stored in this commands.txt](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=199.48812200000003) [just to make it a little bit easier for you and me.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=203.156122) [So we're going to run terraform plan and pass the resource\_group\_name](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=207.44312200000005) [of itma-app-state and the naming prefix of appitma.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=212.78492200000005) [So let's go ahead and grab this whole command here,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=217.93512200000004) [copy it, and we'll paste it down here, hit Enter.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=220.31062200000002) [So this should go out and plan to create the resource group,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=224.31412200000003) [as well as the storage account and give us that SAS token.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=228.242122) [Okay, that has completed its planning successfully,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=232.54612200000003) [so we're going to go ahead and run terraform apply state.tfplan,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=235.69812200000004) [and now that's going to go out and provision that storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=240.53712200000004) [and it should write the information that we want out](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=243.54412200000004) [to that backend- config.txt file.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=247.38497914285716) [Okay, good.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=251.38212200000004) [It completed successfully.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=252.13972200000006) [If we look in our file explorer again,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=253.27612200000004) [we can see there is now a backend- config.txt file.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=255.91912200000004) [If we open that up, we can see it has the storage\_account\_name,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=260.085122) [container\_name, the key,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=263.438122) [and the sas\_token we'll use to write to the storage account,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=265.224622) [so it looks like everything was set up correctly](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=268.3872470000001) [for the app state remote storage.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=271.19497914285733) [There is one missing component,](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=273.871122) [and that is how Hector Sanchez is going to get the information about the networking environment.](https://app.pluralsight.com/course-player?clipId=aaacf210-ae69-47af-90c7-9384d0cc5588&startTime=275.3211220000001)

### [Adding the Networking Remote State](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661)

[In addition to setting up a storage account for the storage of the](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=1.3316330000000307) [remote state for the application deployment,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=4.454744111111141) [Hector is also going to need access to the network](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=6.503633000000031) [state for the network configuration,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=10.773883000000033) [and that is because he is going to use information that is](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=12.563918714285746) [stored in that networking state to access the information](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=15.928061571428602) [about the main-vnet in the deployment.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=19.51863300000003) [Let's take a look at how that is going to be configured.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=21.921258000000034) [In order to use a remote state as a data source,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=25.73763300000003) [we're going to use the data source type terraform\_remote\_state,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=28.29325800000003) [and of course, we have to give it a name,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=31.947033000000033) [and in this case, networking probably makes the most sense.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=35.360269363636405) [And then within the data source,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=38.51163300000003) [you have to specify what type of backend is holding the remote state.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=40.07063300000003) [In our case, we're using azurerm.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=44.16663300000003) [And then within a configuration block,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=46.52763300000003) [you have to specify information about where that remote state is configured,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=48.03463300000003) [as well as how to access it.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=52.29300800000002) [So in our case, we're using an Azure Storage account,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=54.04113300000004) [so we have to specify the storage\_account\_name,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=56.92063300000003) [the container\_name, the key that's being used,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=58.94796633333336) [and in our case,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=61.770188555555585) [we're going to be using a SAS token to access that storage account.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=62.87863300000003) [So let's go back to the demo environment and provision that SAS](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=67.49663300000003) [token to access the networking storage account.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=70.86663300000001) [Okay, here we are logged into the Azure Portal as Hector Sanchez,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=74.12563300000004) [and you can see there is an appitma storage account and an itma storage account.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=77.86363300000002) [The itma storage account is the one that has the](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=83.52963300000003) [networking remote state stored in it,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=87.07988300000002) [so that's the one that Hector needs access to to get](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=89.24363300000003) [information about the networking state.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=92.30763300000004) [So we'll go ahead and click on that storage account,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=94.42263300000003) [and we want to provision a SAS token.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=97.41763300000004) [So we'll go down to Shared access signature.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=100.80663300000003) [And for Allowed services, we only need access to the Blob services,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=103.91563300000003) [so we'll uncheck all the other ones.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=108.20963300000003) [We do want to allow the resource types of Service,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=110.96963300000003) [Container, and Object, so we'll leave those selected.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=113.62488300000003) [Now in terms of permissions, Hector only needs Read and List.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=116.34363300000003) [He doesn't need any other access to this storage account,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=120.35963300000003) [so we'll remove these levels of access so Hector can't accidentally](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=123.52463300000002) [do something to the network state and corrupt it.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=127.4182996666667) [We'll leave the Start date as is and set an End date,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=130.49263300000004) [let's say, a month in the future, and then go ahead and generate the SAS token.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=133.84907744444445) [Now that that's been generated,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=140.03663300000002) [we'll go ahead and copy that SAS token to the clipboard,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=141.20963300000003) [and we're going to use that SAS token in our](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=143.86438300000006) [configuration to access the network state.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=146.92206157142857) [Where is that information being stored?](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=149.24013300000001) [Let's go over to Visual Studio Code, and in Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=152.08963300000002) [I have the folder 9-app-deploy open.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=155.58025800000007) [This is where the configuration resides for the](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=160.06463300000004) [application that Hector Sanchez wants to deploy.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=162.5142996666667) [In our terraform.tfvars file,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=165.64196633333336) [we have a network\_state variable being defined here,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=168.39063300000004) [and it's a map type that has a number of key-value pairs.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=172.09763300000006) [One of these key-value pairs is sts, which is the SAS token,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=176.16063300000002) [so we can go ahead and paste the SAS token we just](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=180.67663300000004) [grabbed into that portion of the variable.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=184.29963299999997) [The storage account we also need the name of.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=187.19563300000004) [So if we go back to the portal, the storage account is itma72502.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=190.01863300000002) [So we'll just put in 72502 here,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=196.11363300000002) [and now the storage account is correct in our tfvars file.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=198.79663300000004) [The container name and the key name are already configured correctly,](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=201.59306157142862) [so we don't have to do anything there.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=205.18063300000003) [We can just go ahead and save this file.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=207.07663300000004) [Now let's go ahead and take a look at the actual main.tf file to see what we're deploying in our configuration.](https://app.pluralsight.com/course-player?clipId=2ddb6623-e55a-41b0-b390-be24da84d661&startTime=209.33863300000004)

### [Reviewing the Application Configuration](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7)

[Now that we have access to the networking remote state all worked out,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=1.6807000000000698) [let's take a look at what's actually in our main.tf file.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=5.164200000000071) [And I'll go ahead and minimize the EXPLORER to give us a little more room here.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=9.95370000000007) [For the backend, we are going to be using azurerm to store our remote state,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=14.16370000000007) [so that's set up correctly.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=18.93370000000007) [For our variables, we will be defining a number of variables here.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=20.79870000000007) [We'll need a resource\_group\_name for where we're](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=23.91670000000007) [going to deploy the application, a naming\_prefix for the application,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=26.481033333333404) [scrolling down some more, we're setting the location as a default of eastus,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=30.12670000000007) [and then we have our network\_state variable that we](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=35.09470000000007) [just defined in terraform.tfvars.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=38.43070000000007) [So this is a map of strings, and within the description,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=40.61670000000007) [we're defining that we need sa, cn, key,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=44.31620000000007) [and sts as keys with the appropriate values assigned.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=48.000033333333405) [Below that, we're specifying a vm\_count for our variable,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=52.576700000000066) [so how many virtual machines do we want to provision?](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=56.139128571428635) [Hector 1 and 2 so we have the default set to 2,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=58.87170000000007) [and then we have a local variable being defined,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=61.760255555555624) [and that local variable takes the terraform.workspace and](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=64.8470333333334) [then adds a dash and the naming prefix,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=68.2390333333334) [and we'll use that for naming some of the resources within the configuration.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=70.74403333333343) [For instance, if we were in the development workspace,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=75.15170000000008) [the prefix would be development-itma.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=78.33386666666674) [Scrolling down some more, for PROVIDERS,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=81.70470000000007) [we're using the azurerm provider,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=83.62170000000008) [and we're using the Azure CLI for authentication,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=85.30770000000007) [so we don't have to put anything in there.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=88.02770000000007) [Then we get down into our data sources.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=89.90370000000007) [So here, we have the actual data sources that we'll be using.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=92.62170000000008) [The first data source is an Azure data source.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=95.60670000000007) [We're getting the current subscription.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=98.18870000000007) [The second data source is our terraform\_remote\_state for networking.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=100.46170000000006) [And just like we saw in the example earlier,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=104.55470000000007) [we're specifying the backend as azurerm and then specifying the configuration.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=106.68170000000006) [Each of the values for the configuration are stored as a](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=111.83270000000007) [key in the variable network state map.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=115.2329222222223) [So for storage\_account\_name,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=117.81910000000008) [we're specifying the variable network\_state and the key sa,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=119.31670000000007) [same thing for container\_name.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=123.47520000000007) [The keys is a little bit different because we have to get the key name,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=125.40070000000007) [but we are going to be using workspaces with this.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=128.45840000000007) [If we go back to the portal very briefly and go into the](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=131.40870000000007) [Containers for the networking remote state,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=134.9208428571429) [go into terraform-state,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=138.20770000000005) [we can see that the naming of the keys is](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=140.34170000000006) [terraform.tfstateenv : and then the name of the workspace,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=143.26470000000006) [so we have to make sure that our key that we're using as](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=148.2657000000001) [a data source matches that format.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=151.51603333333335) [Going back to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=154.27170000000007) [we can see that we've set up key to be whatever we specify](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=156.16870000000006) [in the network state map and then appending env: and the](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=159.86870000000008) [current terraform.workspace.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=165.1282) [And then finally, the sas\_token that we set up,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=167.32270000000008) [which is a read-only SAS token for this storage account.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=169.94347777777784) [So that's going to set up our Terraform remote state.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=173.21545000000006) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=177.52670000000006) [we want to deploy this application on the app subnet within the virtual network,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=179.02870000000007) [and so we are using the data source type azurerm\_subnet to](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=184.65370000000007) [query information about that app subnet.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=188.30990000000006) [In order to do that, we have to specify the virtual network name.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=191.1268250000001) [We're getting that network name from the terraform\_remote\_state data source.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=195.49270000000007) [One of the outputs that was part of that](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=201.21870000000007) [configuration was an output named vnet\_name,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=204.34870000000006) [and now we're actually consuming that output.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=207.71370000000007) [So in order to get any information out of configuration,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=209.94770000000008) [that information has to be exposed via outputs](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=212.9760333333334) [within that Terraform configuration.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=217.6239857142858) [Likewise,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=220.54570000000007) [the resource\_group\_name is also an output of that Terraform configuration,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=221.02150000000006) [so it's available from the remote state as resource\_group\_name,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=225.82670000000007) [so that's how we're querying for our AzureRM subnet.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=229.21150000000006) [Going down into RESOURCES,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=234.57170000000008) [we'll first provision a resource group using the prefix that we](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=236.40970000000007) [created in the local variables and appending -app to it,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=240.2427) [and then we're going to create an availability set to store our virtual](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=244.13970000000006) [machines using the prefix for the naming and adding -aset to it.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=248.15770000000006) [Scrolling down some more, we get into the network\_interface,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=253.13370000000006) [so each of those virtual machines will need a network interface.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=256.3617000000001) [We use the count argument to specify the number of network interfaces we need,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=260.5277000000001) [which should be equal to the number of virtual machines,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=265.18570000000005) [so it's set to var.vm\_count.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=267.75598571428577) [The naming will be the prefix variable, dash the index of the count, -nic.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=270.46170000000006) [And if we look down in the ip\_configuration,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=275.57270000000005) [we're using the azurerm\_subnet data source to tell it which](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=277.2927000000001) [subnet\_id to put this network interface in,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=282.45270000000005) [so that is how we're using our azurerm\_subnet data source.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=286.0497000000001) [Scrolling down some more, we're provisioning our Azure load balancer.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=291.0617000000001) [For naming,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=294.8697000000001) [we're going to use the prefix for the name of the Azure load balancer.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=295.49845000000005) [And just like the network interfaces,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=300.2017000000001) [our front-end IP configuration for the load balancer](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=302.39670000000007) [is also going to be on this subnet, so we're using the same data source,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=305.0950333333334) [data.azurerm\_subnet .app .id.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=309.5407000000001) [Scrolling down a little bit more,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=314.0567000000001) [we have to establish a backend\_address\_pool that the](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=315.3377000000001) [virtual machines will participate in,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=319.75255714285726) [and then we have to create an address\_pool association between](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=321.9897000000001) [the network interfaces that we created further up and the](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=326.3569000000001) [backend\_address\_pool that we just created.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=330.19970000000006) [It's a little confusing if you've never worked with Azure load balancers before,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=332.87070000000006) [but basically,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=336.89170000000007) [we need to create a backend\_address\_pool and then](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=337.42027142857154) [associate the virtual machines, or more specifically,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=340.33590000000015) [the NICs for those virtual machines with that backend\_address\_pool so](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=344.03170000000006) [the load balancer has something to send traffic to.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=347.44930000000005) [Within that configuration,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=350.9077000000001) [we need to create an association for each network interface,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=351.8872000000001) [so we're setting the count argument to vm\_count,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=356.33170000000007) [the network\_interface\_id we can get from the resource](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=359.1127000000001) [azurerm\_network\_interface.app and specifying the count.index with the square brackets,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=363.8677) [which will return the appropriate network interface from the list](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=368.2770333333334) [of network interfaces that we created earlier.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=372.14270000000005) [And then for the backend\_address\_pool\_id,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=375.1767000000001) [we're just giving it the id of the backend\_address\_pool](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=377.52170000000007) [that we created directly above it.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=379.56495000000007) [Now it's time to create the virtual machines,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=381.96945000000005) [so we're setting the count to the vm\_count.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=385.0525571428572) [That's the number of virtual machines we want to create.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=388.65970000000004) [For the naming of those virtual machines,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=390.87270000000007) [we're using the prefix and then adding - and the count.index,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=392.70103333333344) [so the first virtual machine will be the prefix -0,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=396.3497000000001) [and then we're specifying the location, the resource\_group\_name.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=399.2218428571429) [For the network\_interface\_ids,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=403.93370000000004) [we're using the same syntax that we used for that](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=406.6127000000001) [backend\_pool\_association using azurerm\_network\_interface.app and then](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=410.1367000000001) [using the square brackets and then which element out of the list of](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=414.88470000000007) [network interfaces we'd want for this configuration.id.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=419.0162714285714) [We're associating the virtual machines with the](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=422.6077000000001) [availability\_set we created earlier.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=425.15510000000006) [The size of the virtual machines will be a DS1\_v2.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=427.09670000000006) [We're also setting the operating system disk and data](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=431.9507000000001) [disks to be deleted on termination.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=435.04336666666677) [For the storage\_image\_reference, we're using Ubuntu 16.04 for our storage\_image.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=437.45670000000007) [For the storage\_os\_disk,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=443.7037000000001) [we're using a name that corresponds to the virtual machine name.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=444.6979857142857) [For the os\_profile, we're specifying the computer\_name,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=448.8647000000001) [which is a combination of the naming\_prefix,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=451.4033666666667) [the count.index, and then VM.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=454.1042000000001) [The admin\_username will be tfadmin,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=456.2925571428572) [and I'm giving it a very simple admin password.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=458.0843250000001) [You can change this if you feel like you need to.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=460.56395000000003) [We're not actually going to be logging into these servers anyway.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=463.00970000000007) [And then finally, for the Linux config,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=466.84870000000006) [we are setting disable\_password\_authentication to false](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=468.6027000000001) [because we are specifying a password.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=471.40870000000007) [So that's everything in the configuration.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=474.01270000000005) [And if we scroll down to OUTPUTS,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=476.07270000000005) [the only output here is the load balancer private IP.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=477.7347000000001) [And since we're specifying this as an output,](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=480.9297000000001) [that would enable a separate Terraform configuration to use](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=483.7987000000001) [the remote state from this configuration and get that](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=487.90970000000004) [private IP address if it needed it. That is the configuration, so let's go ahead and prepare for deployment.](https://app.pluralsight.com/course-player?clipId=d6693014-599f-4428-9a13-c9c88ff558c7&startTime=491.19420000000014)

### [Deploying the Application Configuration](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf)

[We've completed reviewing the configuration,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=1.4334110000000801) [so now, let's get started on deploying it.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=3.82441100000008) [Let's go ahead and open up the terminal,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=7.01341100000008) [and you can see we are in the directory 9-app-deploy.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=8.11141100000008) [The first thing we need to do is copy the backend-config from](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=12.972411000000081) [the previous deployment so we can use it to initialize our](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=15.86641100000008) [remote backend for this deployment.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=19.56352211111118) [So now we have that backend- config.txt file in this directory,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=22.31741100000008) [we can run terraform init --backend-config and set it](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=27.45041100000008) [equal to the backend- config.txt file.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=32.54869671428579) [And as you can see,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=37.28841100000008) [it successfully initialized the backend and also downloaded the](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=38.65241100000008) [provider plugin for the azurerm provider,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=42.503982428571504) [and now we're going to create a workspace to deploy](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=45.17798242857151) [the application configuration.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=49.11441100000008) [So we'll do terraform workspace new development,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=51.44941100000008) [and now we're using the development workspace.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=57.66041100000008) [So we're going to be deploying this application into a development workspace,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=60.11741100000008) [and it's going to be using the development Vnet for its deployment.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=64.53741100000008) [Now we can run terraform plan -out app.tfplan.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=69.66241100000008) [And the reason we can do that is because we have all of the additional values](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=74.74541100000008) [stored in the terraform.tfvars file in this same directory.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=78.11816100000006) [I'll go ahead and run that.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=83.29841100000009) [And as you can see,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=85.74741100000008) [it is going through the process of refreshing state for all of the data sources,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=86.78941100000007) [and that includes, not only the Azure-based data sources,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=91.35941100000008) [but that remote state data source, and there we go.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=95.21641100000008) [It looks like it was able to successfully access the remote data sources,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=98.60661100000006) [including the remote state, to be able to properly plan out the deployment.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=103.69061100000008) [So let's go ahead and run terraform apply app.tfplan,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=108.10741100000008) [and while that's deploying, let's go back to the portal,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=112.42421100000008) [and we'll go back home and go into Resource groups.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=117.64541100000012) [And within Resource groups,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=122.55341100000008) [we can see there is a development-itma-app and a development-vnet.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=123.34255385714293) [If we go into development-vnet, that has our development-vnet virtual network.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=128.62841100000009) [We can go in there.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=134.63741100000007) [And if we look at the connected devices,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=136.23877463636376) [we can see there is now a load balancer and two network interfaces,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=138.62441100000007) [and all of them have been provisioned in the app subnet,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=143.50541100000007) [so that's what we were looking to do.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=146.54941100000008) [We wanted to provision two virtual machines and a](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=149.4886610000001) [load balancer in the app subnet,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=152.13091100000008) [and we were able to do that by querying for information](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=153.72741100000007) [from both Azure and the remote state.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=157.7294110000001) [If we go back to the Resource groups and take a look in](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=160.86441100000008) [this development-itma-app resource group,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=164.09941100000012) [I'll just shrink that up a little bit,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=165.66816100000008) [we can see that it has successfully deployed the load balancer,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=168.2031610000001) [the virtual machines, the availability set,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=172.22941100000008) [the disks, and the network interfaces.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=175.04341100000008) [So all the components have been deployed.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=177.00541100000007) [And if we go back to Visual Studio Code,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=178.75941100000009) [we can see that the deployment has completed successfully,](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=181.92241100000007) [and the output is that private IP address of the load balancer.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=184.3864110000001) [So we are all set.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=188.99741100000008) [We have deployed the first application in our networking environment.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=190.08629988888893) [But wait!](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=194.8734110000001) [There is more to deploy. Let's talk about ARM templates for a minute.](https://app.pluralsight.com/course-player?clipId=50fa5fdd-5310-4c7f-8058-83c2a76f6aaf&startTime=195.53169671428583)

### [ARM Templates with Terraform](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346)

[This whole time,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=1.1749780000001193) [we've been talking about using Terraform to replace ARM templates,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=1.9802637142858337) [so now it might seem a little strange that we're](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=6.29297800000012) [bringing ARM templates back into the mix,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=8.09222800000012) [but there's a few reasons why that might happen.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=10.24997800000012) [The first reason is you simply have existing templates](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=13.542978000000119) [that you're not ready to refactor, maybe somebody else wrote it,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=15.99647800000012) [maybe you wrote it, and you just don't have the time.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=19.704978000000118) [So if you have those existing templates,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=22.005644666666786) [you can still use Terraform to manage your deployments,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=25.10197800000012) [but use the ARM template to actually do the deployments,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=27.596835142857262) [and we'll see how that works in a moment.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=31.242263714285837) [Another reason is because the Azure providers are](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=34.11997800000012) [updated as often as they can be,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=36.811728000000116) [but there may be times where a particular resource is not yet supported](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=39.27010300000012) [by the AzureRM Provider or the Azure AD Provider,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=43.94483514285726) [but it is supported through an ARM template.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=47.65197800000012) [During that period of time,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=50.63197800000012) [you could use an ARM template as a stop-gap measure](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=51.851978000000116) [until the provider gets updated.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=55.01560300000012) [Now the way that you use Terraform to deploy ARM](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=57.83197800000012) [templates is through a resource, a template resource,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=60.4726922857144) [so let's take a look at how that template resource is used.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=63.16460300000012) [Just like any other resource you might deploy with Terraform,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=68.36197800000012) [it all starts with a resource configuration block.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=71.0211030000001) [Now the resource in question here is the azurerm\_template\_deployment resource,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=74.48297800000012) [and we have to give it a name, so we'll call this one template.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=79.63097800000011) [The first argument is name,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=83.10797800000012) [and this is the name that you'll see if you go into a](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=84.62020022222235) [resource group and look at the deployments.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=88.07897800000012) [Each deployment has a name.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=90.45397800000012) [This is the name that is going to appear for that resource group deployment.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=92.06597800000011) [You also need to specify a resource group where this](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=97.02497800000012) [deployment is going to happen.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=100.04797800000011) [That's no big surprise if you've used ARM templates for a while,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=101.78797800000012) [and then you have to specify the actual template itself,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=104.83942244444455) [so there's really two ways to do this.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=108.71797800000012) [You can specify the entire template body in line using heredoc syntax,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=110.38897800000012) [but that's not very appealing to the eye.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=114.53983514285726) [The easier and more common option is to use the file function and just point](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=117.44597800000012) [it at the JSON file where your ARM template already exists.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=120.47431133333343) [Now in addition to having a template file,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=125.34197800000013) [you do need to specify parameters for that ARM template,](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=127.18797800000011) [and that is handled by the parameters configuration block where you'll](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=130.46247800000012) [just have a series of keys and values that correspond to the](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=134.03197800000012) [parameters that are required by your template.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=138.37247800000011) [And finally, you can specify a deployment\_mode for your template.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=142.18697800000012) [By default, it's set to Incremental, but you can set it to Complete mode.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=146.42697800000013) [Now let's see how Globomantics is planning to use the ARM template deployment in their application deployment architecture.](https://app.pluralsight.com/course-player?clipId=851ec1fb-adf6-4adb-aad6-748cb37f3346&startTime=150.27597800000012)

### [Adding the Subnet Delegation](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20)

[So far, Hector has been responsible for the application deployment,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=1.4082890000001063) [but now he is going to need a little bit of help from Chris Jones.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=4.1864318571429635) [They're going to work together to get this additional](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=8.440289000000107) [component of the application deployed.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=10.622455666666774) [So let's take a look at our existing architecture that we have so far.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=13.618289000000106) [We've got our main virtual network, and in there,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=16.892289000000105) [we've already deployed the first application.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=19.86986042857154) [It's this app tier with an internal load balancer.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=21.59100328571439) [Now it's time to add an additional component to the application.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=25.239289000000106) [This is going to be the web front end that talks to this app tier,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=28.640289000000106) [and that's going to run in Azure App Service.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=32.37784455555566) [In order for the App Service to access that internal load balancer,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=35.7312890000001) [it's going to need to talk to this virtual network,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=39.1860032857144) [and the way that you do that in Azure is by creating a subnet delegation.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=42.39428900000011) [And what this is is a dedicated subnet within the virtual](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=46.669289000000106) [network that is associated with the App Service.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=50.81028900000011) [So it can go in through this subnet delegation and talk to the](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=53.9232890000001) [app tier through that internal load balancer.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=57.4062890000001) [Now since Hector doesn't own the networking component of the deployment,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=60.54928900000011) [he is going to ask Chris to set up the subnet delegation for him](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=64.6002890000001) [in her current configuration of the networking,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=69.34540011111122) [so let's go ahead and set that up now.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=72.3802890000001) [So here we are in VS Code, and I have the folder 10-ARM-template open,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=74.68528900000011) [and within there, there is a subnet\_delegation.tf file.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=80.12228900000011) [Let's go ahead and open that and take a look at it.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=83.69128900000011) [And basically,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=86.01878900000013) [all this is doing is creating an additional subnet called appservice.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=86.66978900000014) [This resource is going to be added to the existing network configuration](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=91.25562233333345) [that's already been deployed in development UAT and production.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=96.34968900000011) [Because of that, we can reference resources that exist in that configuration.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=100.7792890000001) [For the virtual network,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=104.40828900000011) [we're referring to the virtual network that's created by the vnet module.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=105.44486042857156) [For the address\_prefix,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=109.55228900000012) [we're simply looking at the existing number of subnets and grabbing the](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=111.24128900000011) [next available address space after those subnets.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=115.84271757142865) [Then we have to specify a delegation for this subnet,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=119.55428900000011) [and that is done through a nested delegation block where](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=122.5652890000001) [we specify a name for the delegation, we're calling this appservicedelegation,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=126.13943185714295) [and then which services should be delegated.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=130.2120390000001) [The name for the service delegation is Microsoft.Web /serverFarms,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=134.6202890000001) [and then there are three actions that needs to go into that delegation,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=137.8718890000001) [which is the virtualNetworks/subnets/preparteNetworkPolicies/action,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=142.8666890000001) [virtualNetworks/subnets/action, and virtualNetworks/subnets/join/action.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=147.8252890000001) [If this look like it's a role, it's because it basically is.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=153.4462890000001) [We're granting the Microsoft.Web /serverFarms permissions](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=156.3132890000001) [to perform these actions on this subnet.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=160.06403900000012) [So we're going to take this configuration and add it to the existing](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=164.9902890000001) [configuration that's already been deployed for the networking.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=168.8900032857144) [So we'll go ahead and grab this entire configuration and copy it,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=172.41628900000012) [and let's go over to Azure DevOps where we have our](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=175.71757471428583) [configuration being deployed, and here we are in Azure DevOps,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=179.2932890000001) [we're logged in as Chris Jones,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=182.98728900000015) [and we are in the repos where our networking configuration is stored.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=185.03162233333344) [We can go into the networking folder,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=190.3422890000001) [and now we can click the drop-down and do New,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=192.9007890000001) [File.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=196.6592890000002) [We'll call the file subnet-delegation and click on Create.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=197.0362890000001) [Now it will allow us to paste in contents for this file.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=201.2016223333334) [There we go.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=205.4142890000001) [We've pasted in the contents, and we can click on Commit.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=206.3019140000001) [It will allow us to add a comment for the commit.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=210.0622890000001) [Since we have continuous deployment already set up in this pipeline,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=213.2112890000001) [it's going to create a new deployment.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=216.97141400000015) [And if we go over to Pipelines and into Releases,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=219.92228900000012) [we can see that a new Release, Release number 21,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=224.1742890000001) [has been kicked off.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=227.4380032857144) [We can click on Release-21 and see that it's currently in the development state.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=228.8762890000001) [If you skipped the module for Azure DevOps,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=235.2602890000001) [then you're going to need to go ahead and deploy the networking](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=238.3852890000001) [environment using at least the development workspace and add in this](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=241.5462890000001) [subnet- delegation.tf file to make sure that subnet delegation has been](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=246.52886042857153) [created within the development-vnet.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=251.51428900000013) [While this is progressing through the other environments,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=254.6462890000001) [let's go over to the Azure Portal and take a look at our resource groups.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=256.6412890000001) [This should be updating the virtual network that's in](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=262.2952890000001) [the development-vnet resource group, we'll go into there,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=265.77995566666675) [and now we'll go into the development-vnet virtual network.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=268.5230667777778) [And if we take a look at the subnets here,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=272.4812890000001) [we can see there is now an appservice subnet,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=276.5012890000001) [and we can see it has been delegated to Microsoft.Web /serverFarms,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=279.09128900000013) [so the development environment has been updated successfully.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=283.5332890000001) [If we go back to Azure DevOps, we can see it has succeeded on uat.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=287.8572890000001) [And if we would like to roll this change into production,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=293.2622890000001) [we can click Approve and Approve here,](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=295.639431857143) [and the change will be rolled into the production environment as well.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=298.06103900000005) [So we've successfully added our subnet delegation, and now we can move forward with the application deployment on app services.](https://app.pluralsight.com/course-player?clipId=6aa33669-0ca4-4cc6-90ef-a911661fef20&startTime=303.1102890000001)

### [Deploying the ARM Template Configuration](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8)

[The App Service application deployment is based off of an existing](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=1.001256000000052) [ARM template that was written by somebody else.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=5.677506000000054) [Now unfortunately,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=8.392256000000053) [Hector doesn't have time to refactor this ARM](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=9.225922666666719) [template to a Terraform configuration.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=11.85382742857148) [He'd like to just deploy it as is for now and refactor it later.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=14.722256000000051) [That's no problem.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=18.252256000000052) [He can go ahead and use the template deployment](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=19.049922666666717) [resource to deploy this template.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=21.806256000000054) [So let's go over to VS Code, take a look at the configuration,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=23.50525600000005) [and get it deployed.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=27.05625600000005) [Alright, here we are back in VS Code,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=28.610256000000053) [and if you look in the folder 10-ARM-template,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=30.482256000000053) [there is an azuredeploy.json file and a template- deploy.tf file.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=33.949256000000055) [The azuredeploy.json is the ARM template,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=39.87725600000005) [so we can go ahead and take a look at that first.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=42.672256000000054) [And looking at the template, we have a number of parameters listed out here.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=46.26225600000005) [It's got the webAppName, the sku of the App Service plan that we're going to use,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=50.11025600000005) [the location where this will be deployed,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=55.37525600000005) [scrolling down some more,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=57.971256000000054) [we have the vnetName that contains the subnet we'll be delegating,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=59.42897028571433) [and then the actual subnet reference itself,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=62.84042266666672) [which is the id of that delegated subnet.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=65.21875600000006) [If we scroll down some more, we get into the variables for the ARM template,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=67.9471131428572) [and we're simply defining the webAppPortalName and the appServicePlanName.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=72.81225600000005) [Then we get down into Resources,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=78.13625600000005) [and there's not a whole lot of resources being deployed within this template.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=80.48725600000006) [If we scroll down,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=83.93925600000006) [we can see that the first thing that's being deployed is a server farm,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=84.74458933333341) [which is basically an App Service plan.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=88.21168457142862) [Within that App Service plan, we're going to provision the next resource,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=90.56292266666674) [which is Microsoft.Web /sites, which is the actual App Service itself.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=94.20225600000006) [And for that,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=99.61625600000005) [we need to refer back to the serverFarmId of the server farm we](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=100.29965600000006) [just created and specify and explicit dependency.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=104.71425600000005) [You'll remember, in ARM templates, you have to explicitly define dependencies,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=108.29025600000006) [whereas in Terraform, you generally do not.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=112.30725600000005) [Scrolling down some more, we get into a nested resource for this App Service,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=114.97125600000005) [and this is where we defined the delegated subnet for](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=119.41725600000005) [this App Service to connect to.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=122.94525600000004) [For that, the type is config, and the name is virtualNetwork,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=125.40825600000005) [and we have to specify that this is dependent on the](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=128.56397028571433) [creation of the website itself first.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=131.505006) [And within the properties, we specify the subnetResourceId,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=134.44825600000004) [and we also have to add this additional property,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=137.25597028571434) [swiftSupported true.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=141.95585600000007) [So that's everything in the ARM template.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=143.56225600000005) [It's really just creating a simple app service in an App](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=145.11625600000005) [Service plan with this subnet delegation.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=148.49125600000002) [Now let's take a look at the Terraform configuration.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=150.61939885714293) [So we'll expand that out and open up template-deploy.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=154.11525600000004) [There we go.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=157.20825600000006) [For the template deployment,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=158.16525600000003) [we need to know some information about the virtual](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=159.44125600000004) [network and subnet that's been delegated,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=161.6983988571429) [and we can do that through a data source.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=164.05725600000005) [So the data source is azurerm\_subnet,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=166.01225600000006) [and we know that the name of the subnet is appservice.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=168.39925600000007) [The network name we can get from the networking remote state,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=171.42525600000005) [as well as the resource\_group\_name for this subnet.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=173.94554171428575) [Scrolling down some more,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=177.60425600000005) [we first will create a resource group to hold this template deployment,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=178.74939885714295) [and then we'll do the actual template deployment itself.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=182.74368457142862) [So you can see, the name that we've given it is weappdeployment,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=186.93925600000006) [the resource\_group\_name corresponds to the resource\_group we just created.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=190.12025600000004) [For the template\_body,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=193.88825600000004) [we're specifying file and then the azuredeploy.json file we just looked at,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=195.05425600000007) [and we do have to pass it the parameters that didn't have default values.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=199.76525600000005) [So the webAppName will be the prefix local variable -web,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=203.55425600000007) [the vnetName we can grab from the remote state,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=207.2651131428572) [and the subnetRef we can grab from the azurerm\_subnet](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=210.9188274285715) [data source that we created further up.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=214.40268457142858) [And then finally, the deployment\_mode is set to incremental.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=217.10825600000004) [Alright, we're going to add this to existing application deployment,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=220.1880060000001) [so we're going to have to copy these two files to the folder 9-app-deploy.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=222.9515893333334) [Let's go ahead and do that now.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=229.26925600000004) [So I am going to copy the azuredeploy file,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=232.39225600000006) [and then I'll go ahead and copy the template-deploy file.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=236.83325600000006) [Okay, so both of those files, if we expand 9-app-deploy,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=240.71425600000006) [we can see that the azuredeploy file is there and the](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=243.07675600000005) [template-deploy file is there now.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=246.94225600000004) [Let's go ahead and clear out the terminal,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=249.78625600000007) [and we'll shrink this up and just bump this up a little bit so we](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=252.10925600000004) [can see the entire output as it's happening,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=256.085856) [and all we need to do is go ahead and run terraform plan,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=257.815756) [again.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=261.5554560000003) [This will refresh the remote state from networking,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=261.8592560000001) [so we'll get that additional App Service subnet that's been delegated,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=264.96675600000003) [and we'll now grab the appservice subnet as its own data source as we can see,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=269.73525600000005) [and it now knows it has to add two new resources,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=275.7462560000001) [one is the template deployment and the other one is the resource group.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=278.83825600000006) [So that looks all set.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=282.10125600000003) [Let's go ahead and copy this, and we'll run terraform apply,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=283.4072560000001) [and that will go out and create that resource group,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=287.75525600000003) [as well as create that app service.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=290.794398857143) [Now there is one important thing to note about the template\_deployment resource.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=293.98825600000004) [It will create the deployment object,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=297.9262560000001) [and then that deployment object will create resources within Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=299.86225600000006) [If you destroy the template\_deployment resource within Terraform,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=304.73725600000006) [it will not destroy the resources that were created by that deployment.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=307.81775600000014) [The workaround for that is for each deployment to create a](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=312.57392266666676) [resource group and then delete that resource group as part of](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=316.481756) [the deletion of the template\_deployment,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=319.75068457142856) [and in that way,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=320.89145600000006) [you're guaranteeing that anything that was created as part of the deployment](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=323.13225600000004) [is also destroyed when you destroyed that resource group.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=326.1977560000002) [Alright, there we go!](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=329.75725600000004) [It has successfully deployed.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=330.90425600000003) [Let's go over to the Azure Portal and take a look.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=332.361256) [Alright, here are the resource groups,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=334.8062560000001) [and we can see there is now a development-itma-webapp](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=336.55203377777786) [that is for our template\_deployment.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=338.702056) [Let's go into that,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=342.9602560000001) [and we can see we have an App Service plan and an App Service.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=344.06945599999995) [Let's go into the properties of the App Service.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=347.70225600000003) [And if we scroll down on the side, going into Networking,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=350.64625600000005) [there is the VNet Integration option.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=353.94897028571427) [We can click here to configure.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=356.83875600000005) [And if we scroll down a little bit,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=359.6212560000001) [we can see that it's already connected to a VNet,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=360.98825600000004) [the development-vnet, that's what we wanted,](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=363.2294226666667) [and under Subnet Details, we can see that the Subnet NAME is appservice.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=365.65625600000004) [We have successfully deployed the ARM template and attached this](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=369.7582560000001) [App Service to the delegated subnet in the VNet. Good job everybody.](https://app.pluralsight.com/course-player?clipId=4f1b57e5-0dd1-4235-8954-4c6e174621a8&startTime=373.67482742857146)

### [Summary](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc)

[Alright, what are the key takeaways for this module?](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=1.7819780000001193) [I want to highlight a few things here.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=4.67622800000012) [One is when you're designing your Terraform configurations,](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=7.25240657142869) [it's important to consider the overall architecture of what you're](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=12.222978000000118) [planning to deploy and some of the interdependencies there.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=15.350978000000122) [That will lead you to determine whether you should](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=18.90197800000012) [create a single monolithic configuration,](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=21.623811333333453) [should you break things into modules for reusability,](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=24.58797800000012) [or should you create several separate configurations and tie them](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=27.91897800000012) [together through a remote state and data sources.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=31.642178000000115) [My advice would be to keep configurations relatively atomic,](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=34.65497800000012) [single units that can be deployed on their own.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=38.10954942857155) [There may be some dependencies there,](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=42.36697800000012) [but you don't want to create these monolithic configurations that](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=43.88297800000012) [will break easily when one single thing changes.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=47.01377800000011) [It's better to try to take this more atomic and loosely coupled approach.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=51.15297800000012) [The last key takeaway of this module is that ARM templates are an option.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=56.08297800000012) [They're not a great option.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=60.55097800000012) [Ideally, you would refactor that ARM template as a Terraform configuration.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=61.97597800000012) [But if you don't have the time or that's not currently](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=66.87397800000012) [an option because of the providers, you can absolutely use ARM templates as a stop-gap measure.](https://app.pluralsight.com/course-player?clipId=ff06ec9a-3135-48b3-9a58-a86ed638cbfc&startTime=69.05822800000013)

### [Course Summary](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1)

[Now that concludes the course.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=1.3789890000000595) [So let's just do a high-level summary of the course in general and](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=2.6669890000000596) [what are some things that you could do next.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=5.80223900000006) [At a high level,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=8.087989000000059) [you've learned about the multiple providers from](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=9.181489000000058) [Microsoft Azure that exist in Terraform.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=11.879389000000062) [That includes AzureRM, and Azure AD, and also,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=14.47098900000006) [the Azure Stack Provider, which we didn't get into,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=18.32732233333339) [but it's very similar to the AzureRM provider.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=21.026614000000066) [We also went over the many ways that you can authenticate to these providers,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=24.29898900000006) [whether it's through a service principal,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=28.18898900000006) [the Azure CLI, or a managed service identity.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=30.33198900000006) [We also saw how you can configure a backend to store state](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=34.07598900000006) [remotely using Azure Storage and then use that remote state as a](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=38.5438461428572) [data source for additional configuration.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=43.27387788888893) [And then finally,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=46.32598900000006) [we saw how you can use some of the native tools within Microsoft Azure and](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=46.94698900000006) [Azure DevOps to implement source control and automation.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=51.013846142857204) [Now where can you go next with this skill set?](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=55.130989000000056) [Well, I'm sure there's a lot of places you can go with it.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=57.61298900000006) [This probably opens up a few doors for you.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=59.82276677777785) [But if you wanted to do some experimentation on your own,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=61.69558900000006) [I would highly recommend going through the documentation for the](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=64.69798900000006) [providers and experimenting with other interesting resources.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=67.70538900000007) [There was obviously not enough time in this course to cover the](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=71.96598900000006) [multitude of resources that exist in the provider,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=74.83784614285722) [so my goal was to give you a background in the high-level generalities of](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=77.34754455555561) [the provider and allow a deep dive as an exercise for you.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=81.49527471428577) [You could also get started on infrastructure testing.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=86.28098900000006) [One of the things that we didn't get to in this course was how to properly](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=89.51498900000006) [test your infrastructure once Terraform has provisioned it.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=93.09623900000008) [So if that seems interesting to you,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=96.47932233333339) [I'd highly recommend checking out TerraTest and maybe even Pester to do](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=98.77948900000007) [some infrastructure testing in your automation pipeline.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=103.37927471428577) [And that will conclude the course.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=106.83298900000005) [I want to say thank you so much for taking the time to learn more](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=108.53998900000006) [about HashiCorp Terraform and Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=112.15098900000008) [I'd love to hear your feedback about the course and ideas for additional course.](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=114.87398900000007) [You can find me on Twitter, it's @ned1313,](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=118.89098900000006) [or leave a comment in the Discussions tab of this course. Until next time, go build something great!](https://app.pluralsight.com/course-player?clipId=d0c26984-206a-4e0d-9f21-6b8ee34f05b1&startTime=122.23098900000006)