.NET Conf

探索 .NET 新世界

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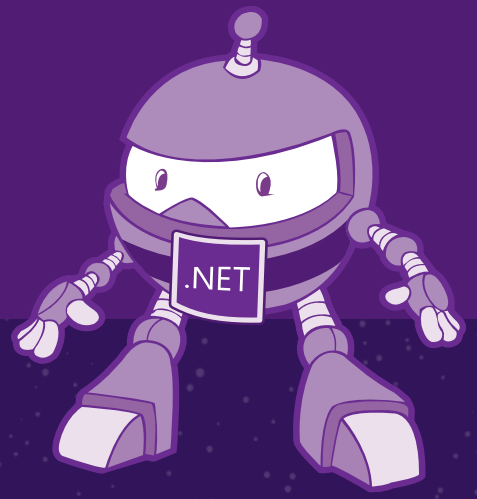
STUDY4

利用 HashiCorp 降低自己的肝指數

Perl Tsai
雲端邊緣肥宅



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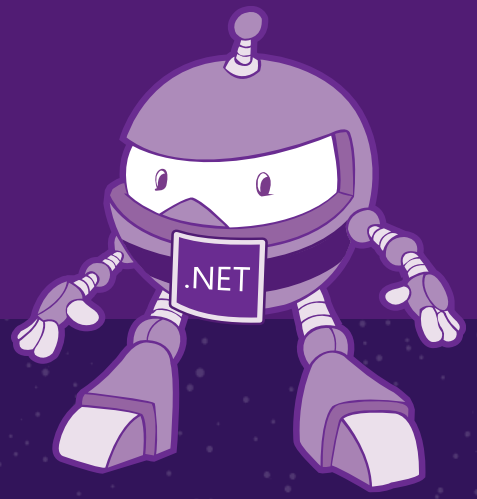

教各位如何 強化自己的肝硬度

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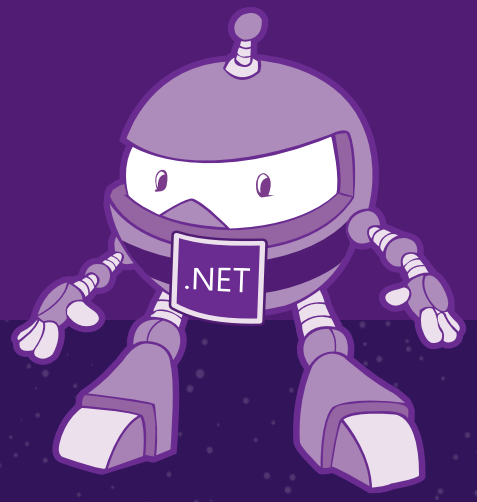
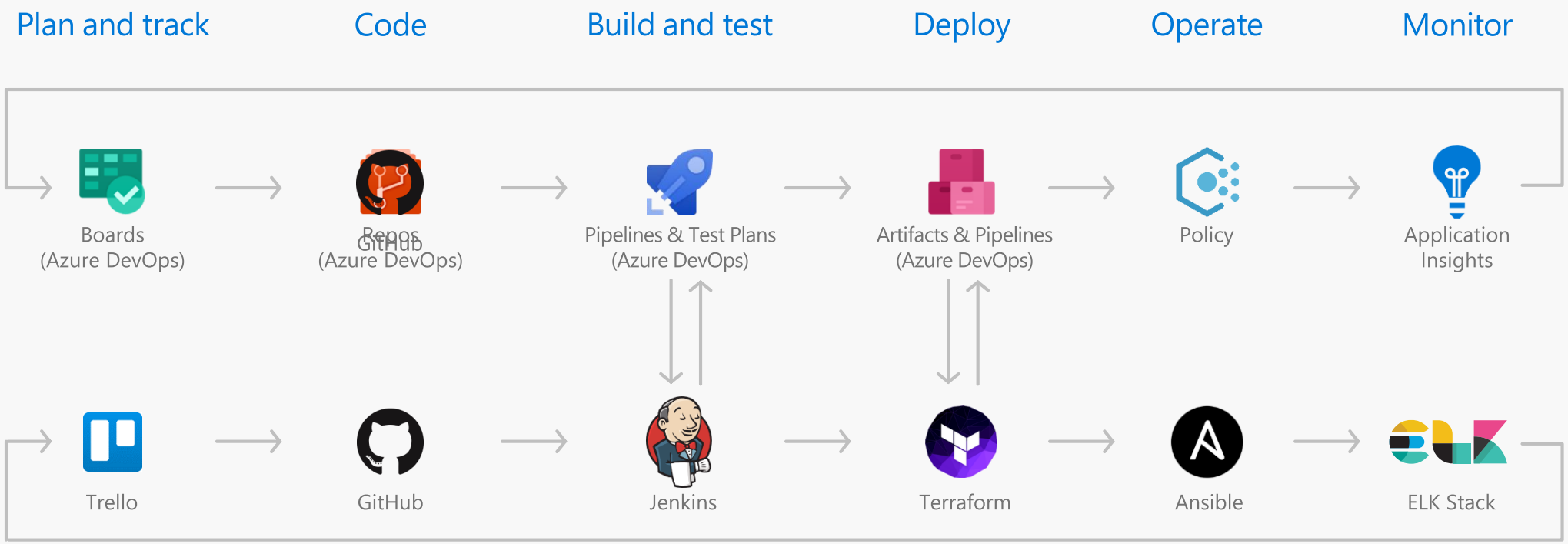


DevOps on Azure framework



DevOps Tool Integrations

Your favorite toolchain, seamlessly integrated with Azure

The Best Development Experience

Whether your developing on Azure, on-premise, or another cloud, Visual Studio Code extensions from Microsoft and the community help accelerate development across Linux, macOS and Windows

First-class Integration

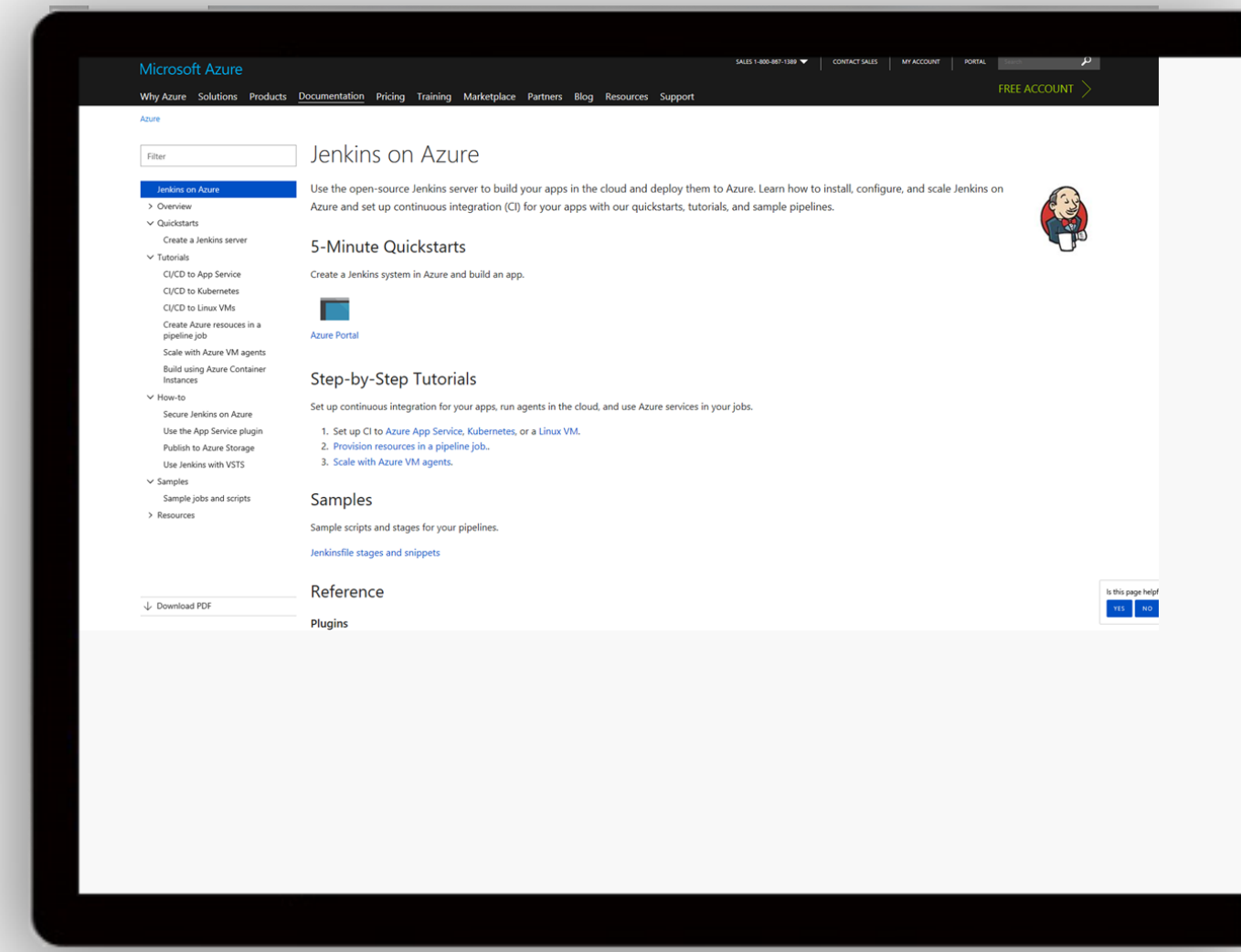
Microsoft collaborates directly in open source projects with our partners, and the community, to bring native Azure integration. Many of these tools are also directly available in Azure Cloud Shell – try them out!

Accelerated Customer Success

You can get clear guidance for integrating your favorite tools with Azure, with dedicated documentation hubs and example solution architecture. Get started, fast.

http://azure.microsoft.com/solutions/devops

ANSIBLE CHEF HashiCorp Packer HashiCorp Terraform



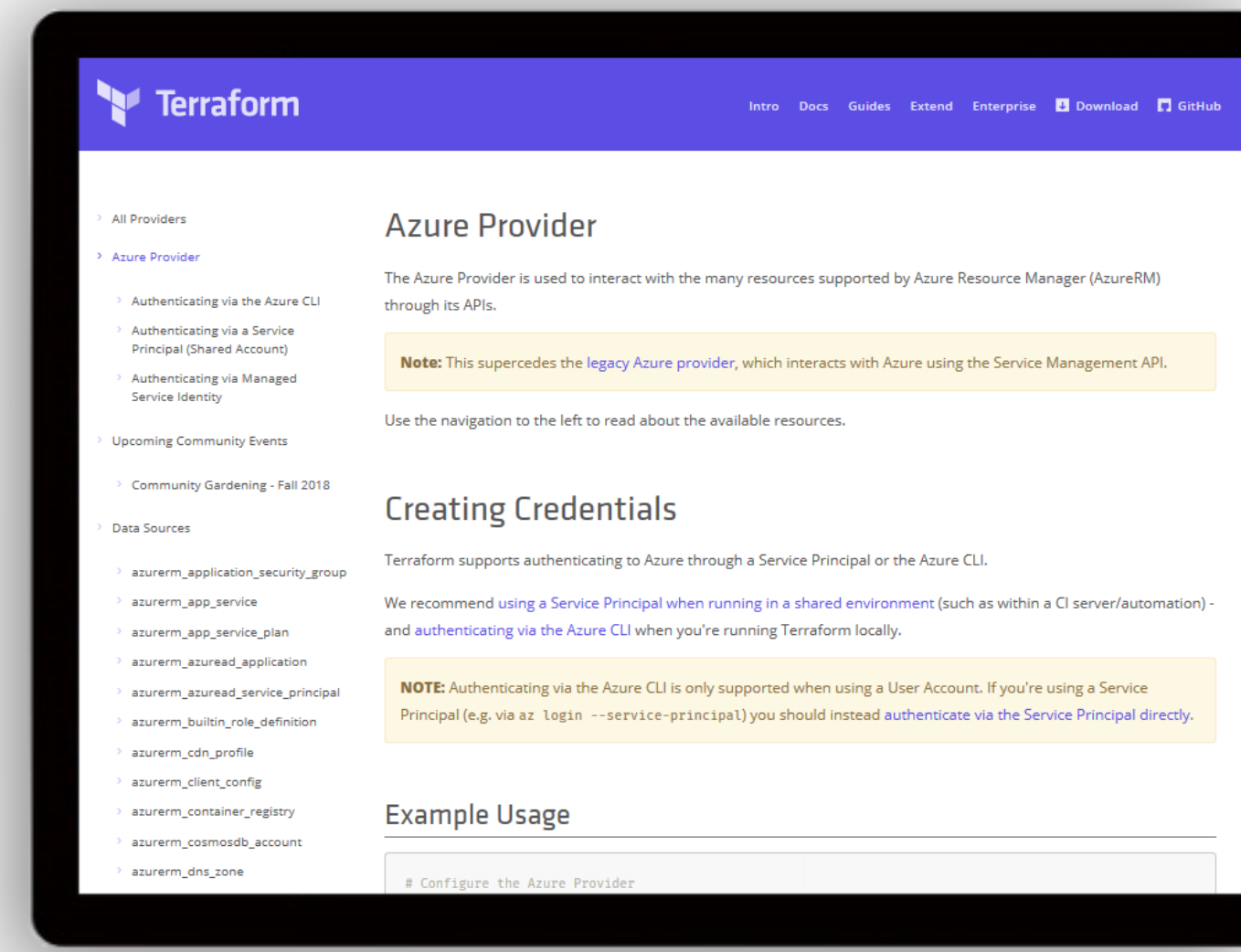
Terraform

Azure DevOps Tool Integrations

HashiCorp Terraform

Bringing native Azure support for customers using Terraform

- Documentation Hub for Terraform
- Terraform in Azure Cloud Shell
- Azure Resource Provider
- Azure Module Registry
- Azure Cloud Shell Integration



docs.microsoft.com/azure/terraform

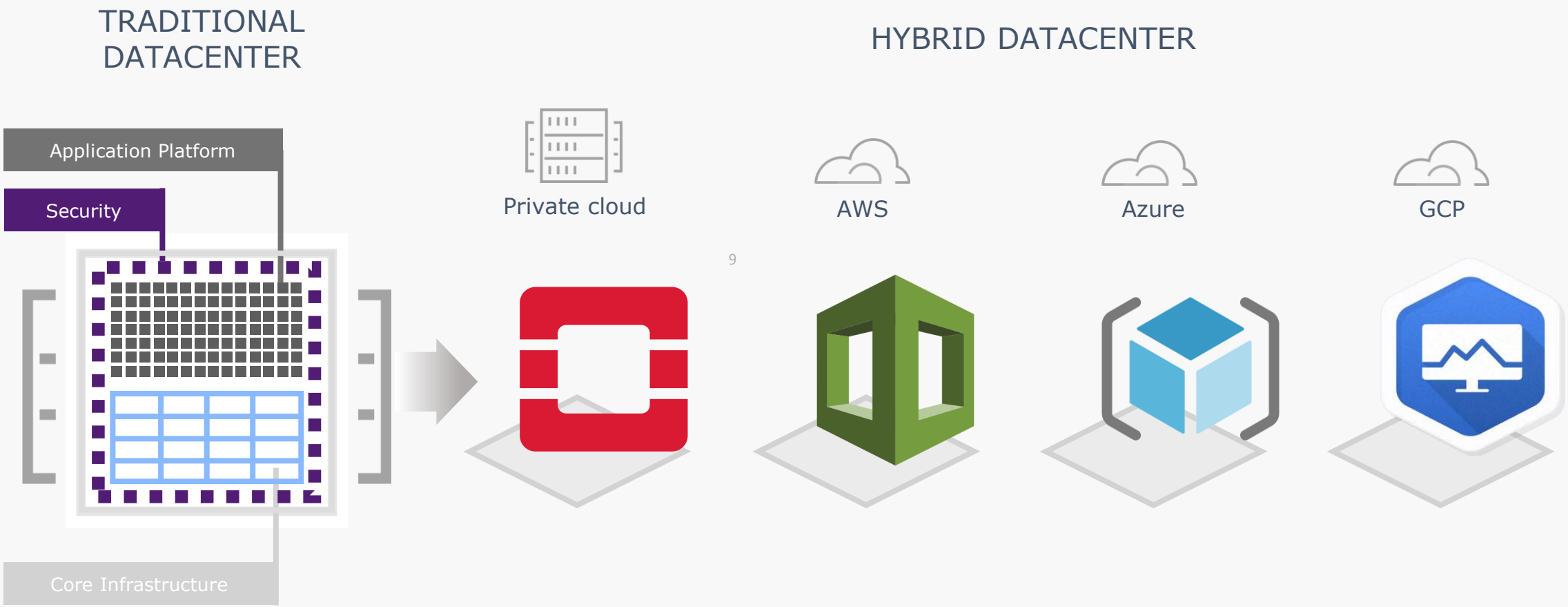
Open Source

According to Forrester, over **forty percent** of CIOs view adoption of open source technologies as critical for them in the next year – primarily because of low cost, avoidance of vendor lock-in and agility.

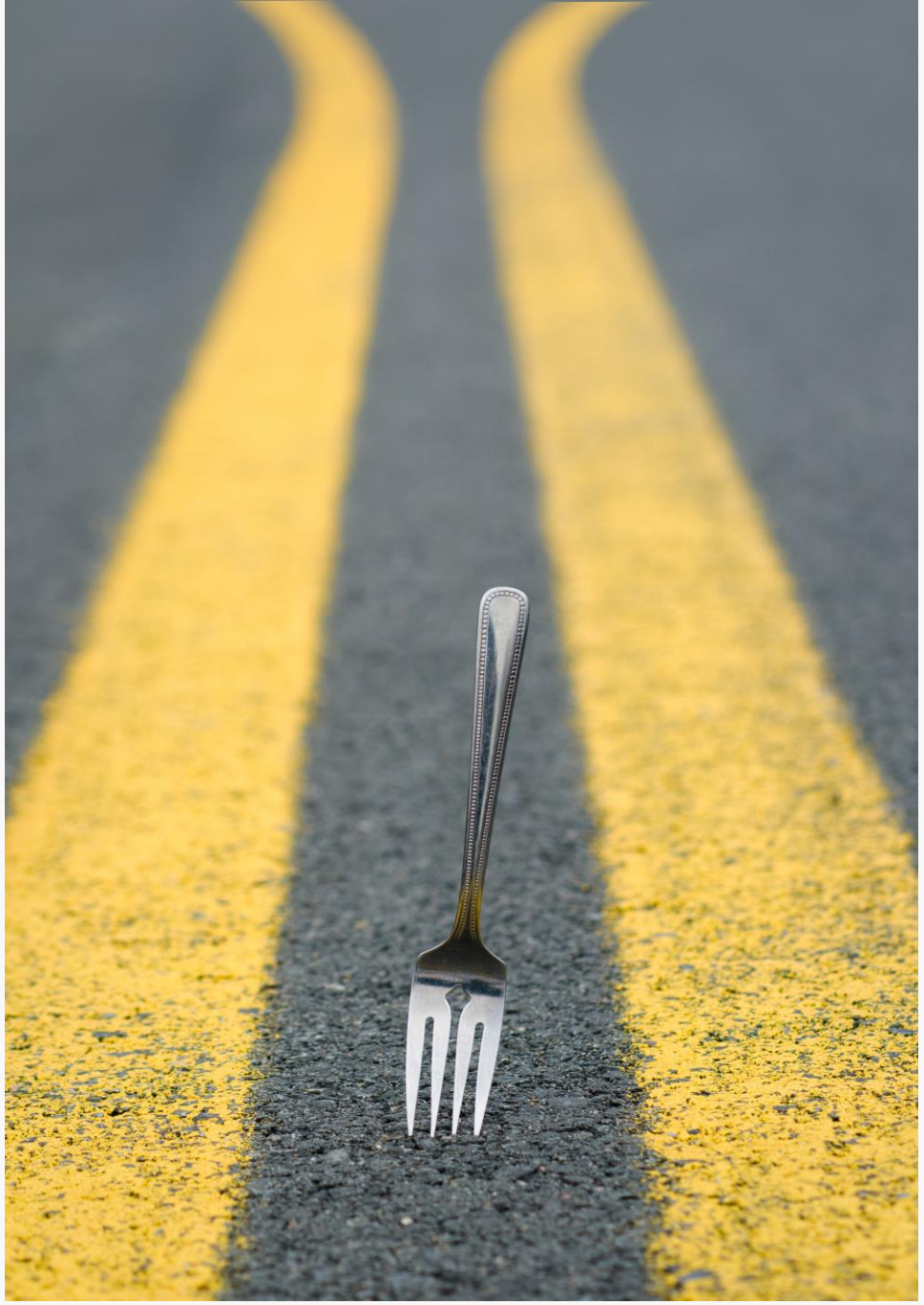
And that same North Bridge study saw use of OSS increased **sixty-five percent** over same companies surveyed from previous year.

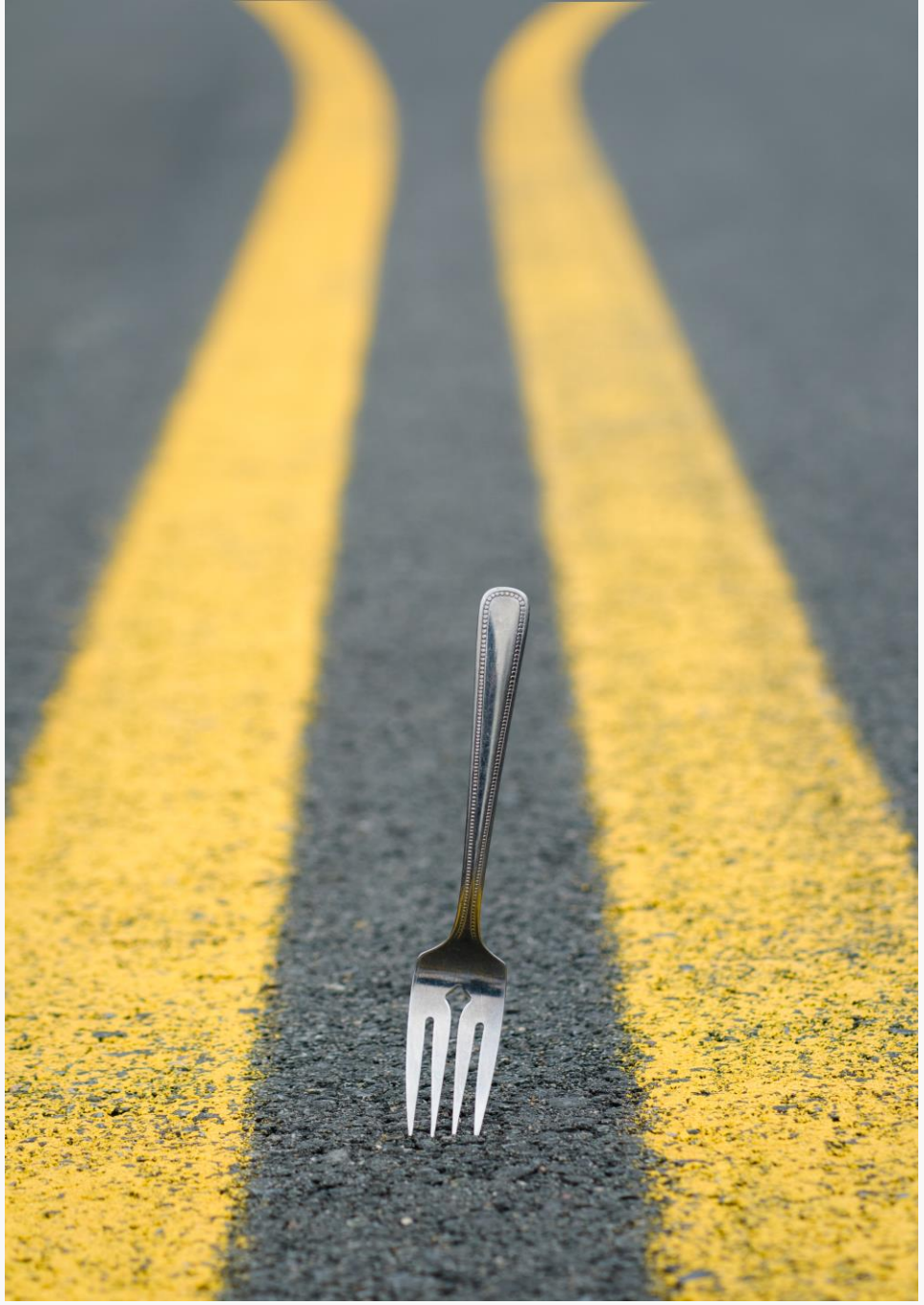
Mark Russinovich on Microsoft Blog

Multi-cloud infrastructure transition



ARM and az CLI





ARM and az CLI

HashiCorp Terraform

Fully OSS
Multi-cloud
Hybrid

Terraform vs Chef/Puppet/Ansible

Terraform	Chef/Puppet/Ansible
Infra management tool at data center level	Config management tools to deploy apps
Integrates with config management tools	Traditional config as code app deployments
Integrates with Packer, Consul and Vault for immutable app deployments	Not recommended for immutable app deployments (as leads to config drift)

Infrastructure as Code

- ☑ Reproducible Environments
- ☑ Automation – CI/ CD
- ☑ Trackable – GitHub
- ☑ Language - HCL
- ☑ Workflow
- ☑ Providers

- ☒ Apply same config across clouds

The HashiCorp Configuration Language (HCL)

The HashiCorp Configuration Language (HCL) is a small domain specific language which is based on JSON.

```
resource "azurerm_redis_cache" "sample" {
  name                = "tf-redis-basic"
  location            = "${azurerm_resource_group.test.location}"
  resource_group_name = "${azurerm_resource_group.test.name}"
  capacity            = 0
  family              = "C"
  sku_name            = "Basic"
  enable_non_ssl_port = "${var.redis_enable_non_ssl}"
  tags                = "${local.all_tags}"
}
```

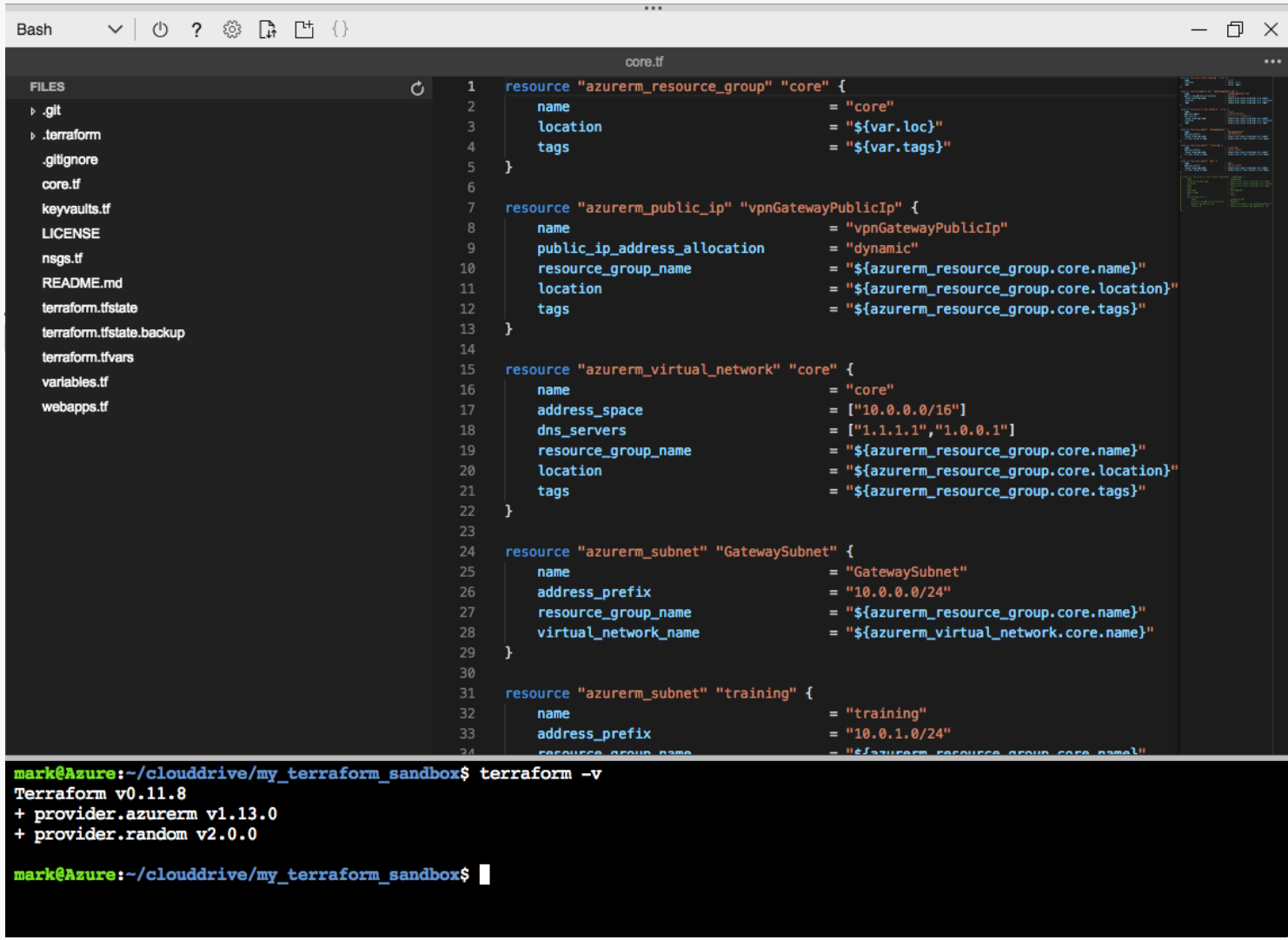
Assembly

Cloud Shell

- Terraform integration
- Editor with Terraform Syntax Highl

Visual Studio Code

- Terraform extension
- Azure Terraform extension



Azure Resource Manager Template Example

```
{
    "$schema": "https://schema.management.azure.com/..json#",
    "contentVersion": "1.0.0.0",
    "parameters": {},
    "variables": {},
    "resources": [{
            "type": "Microsoft.Resources/resourceGroups",
            "apiVersion": "2018-05-01",
            "location": "eastus",
            "name": "demo-storage",
            "properties": {}
        },
        {
            "type": "Microsoft.Storage/storageAccounts",
            "name": "demo-storage",
            "apiVersion": "2018-02-01",
            "location": "eastus",
            "sku": {
                "name": "Standard_LRS"
            },
            "kind": "Storage",
            "properties": {}
        }
    ]
}
```

Resource Group

Storage Account

Terraform Example

```
resource "azurerm_resource_group" "testrg" {
    name = "resourceGroupName"
    location = "westus"
}

resource "azurerm_storage_account" "testsa" {
    name = "storageaccountname"
    resource_group_name = "testrg"
    location = "westus"
    account_tier = "Standard"
    account_replication_type = "GRS"
}
```

Resource Group

Storage Account

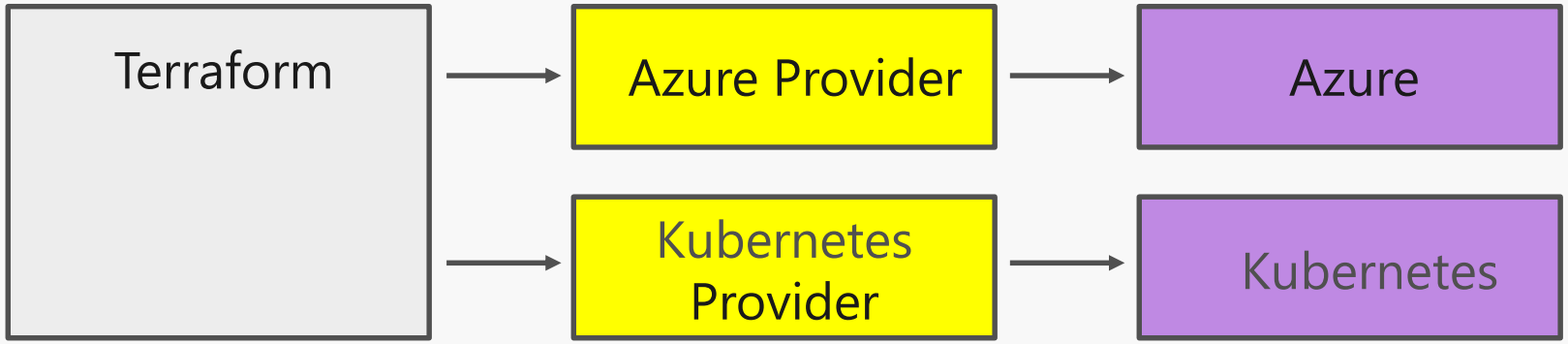
Demo

Terraform Authoring

Providers

What is a Terraform provider?

- Terraform ‘extensions’ for deploying resources
- Manages cloud / endpoint specific API interactions
- Available for major clouds and other platforms
- Hand authored (azurerm)



Providers

Defines how Terraform will interact with:

Cloud	Infrastructure	Network	Version Control	Monitoring	Database	Etc.
Azure	Kubernetes	DNS	GitHub	DataDog	InfluxDB	
AWS	Docker	Cloudflare	GitLab	Grafana	MySQL	
Google	Rancher	HTTP	Bitbucket	PagerDuty	PostgreSQL	
AliCloud						
OpenStack						

Basic resource creation

Deployment foundations.

- Resource Type: required provider
- Name: internal name
- Configuration: deployment details

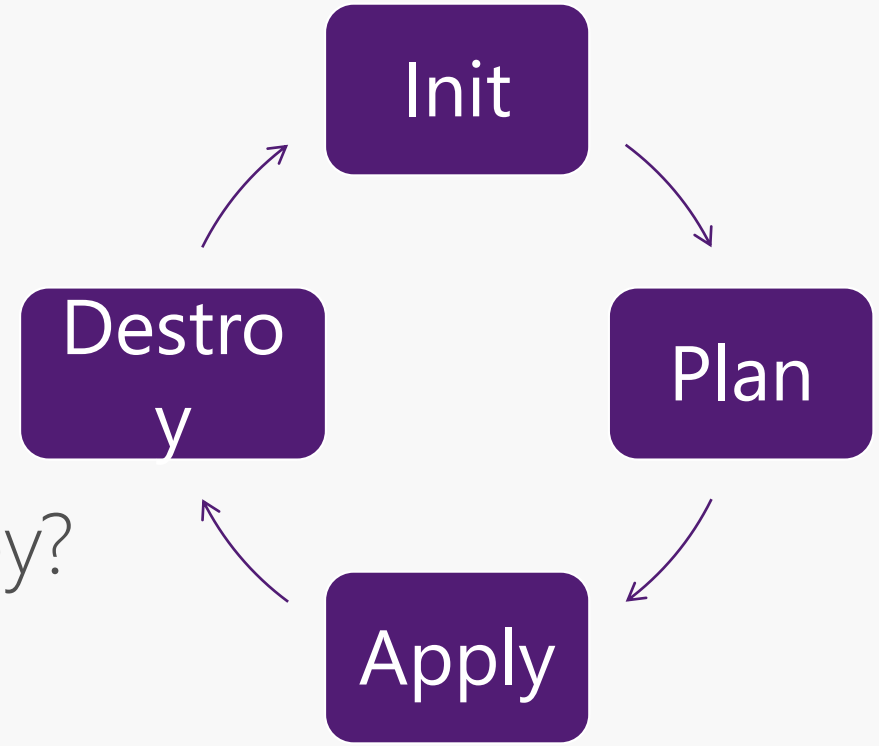
Resource Type

Name

```
resource "azurerm_resource_group" "demo-rg" {
    name = "demo-rg"
    location = "westus"
}
```

Resource Configuration

Basic Terraform commands



Once we have authored, how do we deploy?

- Terraform init –初始化工作目錄
- Terraform plan – 執行前驗證
- Terraform apply –部署和更新資源
- Terraform destroy –刪除配置中定義的所有資源

Variables and output

Variables and output

- Input variables: parameters for Terraform modules
- Environment variables: TF_VAR_azureclientid

```
$ TF_VAR_azureclientid = “00000000-0000-0000-0000-000000000000”

variable “azureclientid” {}
```

String Interpolation

Interpolation: the insertion of something of a different nature into something else.

- Variables
- Other resources
- Functions: ${count.index + 1}
- Others (Docs)

```
resource "azurerm_container_group" "demo-aci" {
    name = "demo-aci"
    location = "${azurerm_resource_group.demo-rg.location"
}
```

from resource

Dependencies

How are resource dependencies managed?

- Implicit – derived from interpolation
- Explicit – hard coded / explicit dependency

```
resource "azurerm_container_group" "demo-aci” {
    name = “demo-aci”

    depends_on = [“azure_cosmosdb_account.vote-db”]
}
```

Demo

Creating Azure Services

State / Backend

State / Backend

What is Terraform state and why store it remotely?

Issues with local state:

- No collaboration
- Easy to delete / loose
- State files include secrets

Alternative:

- Store state in a backend (Azure Storage)

Azurerm backend

Standard Backend with state locking & consistency checking

Azure Storage (Blob)

remote-state.tf

```
terraform {
  backend "azurerm" {}
}
```

.backend.tfvars

```
storage_account_name = "tfbackend4mcg"
container_name = "tfstate"
key = "sandbox.terraform.tfstate"
access_key = "[redacted]
```

Data Sources

What is a Terraform data source?

- 用於Terraform配置的外部來源數據
- 就像在資源創建中一樣使用提供程序

Data Source Provider

Name

```
data "terraform_remote_state" "azurerm" {
    <configuration goes here>
}
```

```
"${data.terraform_remote_state.azurerm.resource-group}"
```

Terraform Module

Modules

```
module "MyApp-Network-AWS" {
    source                  = "terraform-aws-modules/vpc/aws"

    name                    = "network1"

    tags                    = {
        environment           = "dev"
        costcenter            = "it"
    }
}
```

```
module "MyApp-Network-Azure" {
    source                  = "Azure/network/azurerm"

    vnet_name               = "nework1"
    location                = "westus"

    tags                    = {
        environment         = "dev"
        costcenter          = "it"
    }
}
```

Terraform Module Registry and Microsoft Azure

Terraform | Module Registry

Search | Browse | Publish | Sign-in

FILTER BY azurerm × Verified

loadbalancer
azurerm
Terraform Azure RM Module for Load Balancer
Version 1.0.1 · By Azure

network
azurerm
Terraform Azure RM Module for Network
Version 1.1.1 · By Azure

computegroup
azurerm
Terraform Azure RM Compute Group Module
Version 1.1.0 · By Azure

compute
azurerm
Terraform Azure RM Compute Module
Version 1.1.0 · By Azure

database
azurerm
Terraform Azure RM Module for Database
Version 1.0.1 · By Azure

consul
azurerm
A Terraform Module for how to run Consul on AzureRM using Terraform...
Version 0.0.5 · By hashicorp

vault
azurerm
A Terraform Module for how to run Vault on AzureRM using Terraform...
Version 0.0.2 · By hashicorp

kubernetes
azurerm
Install a Kubernetes cluster the CoreOS Tectonic Way: HA, self-hosted, RBAC,...
Version 1.7.9-tectonic.2 · By coreos

nomad
azurerm
A Terraform Module for how to run Nomad on AzureRM using Terraform...
Version 0.0.1 · By hashicorp

Demo

Terraform Module for Azure

Demo

AKS + KafKa

Terraform

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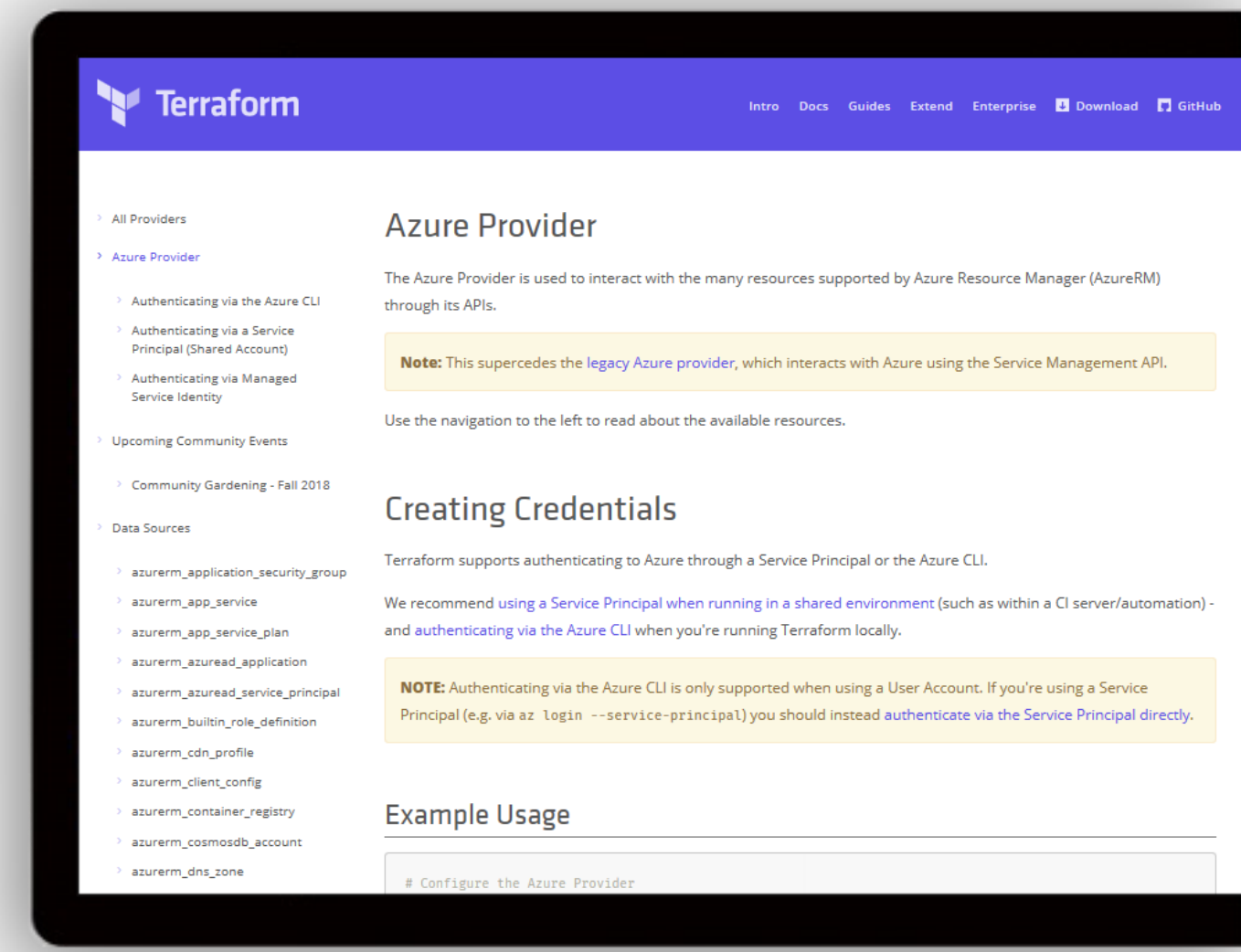

docs.microsoft.com/azure/terraform

Session resources

Docs – http://aka.ms/terraform

Code – http://aka.ms/tfgit

Articles – http://aka.ms/tfhub

Solution – http://aka.ms/azdotf

Advisors – email me (perltsai223@gmail.com)

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