

Wprowadzenie do Terraforma

Przykład użycia: vmware vsphere
Sebastian Grugel



[AkademiaDatacenter.PL/20](https://akademiaDatacenter.PL/20) ➔ dodatkowe materiały + prezentacja

MATERIAŁY

AkademiaDatacenter.pl/20

- Uczestnictwo w losowaniu na końcu prelekcji
- Dostęp do prezentacji + dodatkowego kodu na GITHUB.



AGENDA RAMOWA

1. VMWARE – teoria
2. TERRAFORM – teoria
3. TERRAFORM – prosty „deployment”
maszyny na vSphere



Sebastian Grugel

- Starszy inżynier VMware w datacenter EXEA
- Specjalizacja VMware + cloud computing
- Certyfikaty VMware VCP / VCAP + vExpert *****
- Mąż i ojciec 3 chłopców
- Cloud Datacenter User Group (leader)
- GDG Cloud Bydgoszcz (leader)
- bITConf.pl - CLOUD program board
- AkademiaDatacenter.pl/vmug – 7 lat
- zPasjaoIT.pl - PODCAST

Początkujący w terraformie

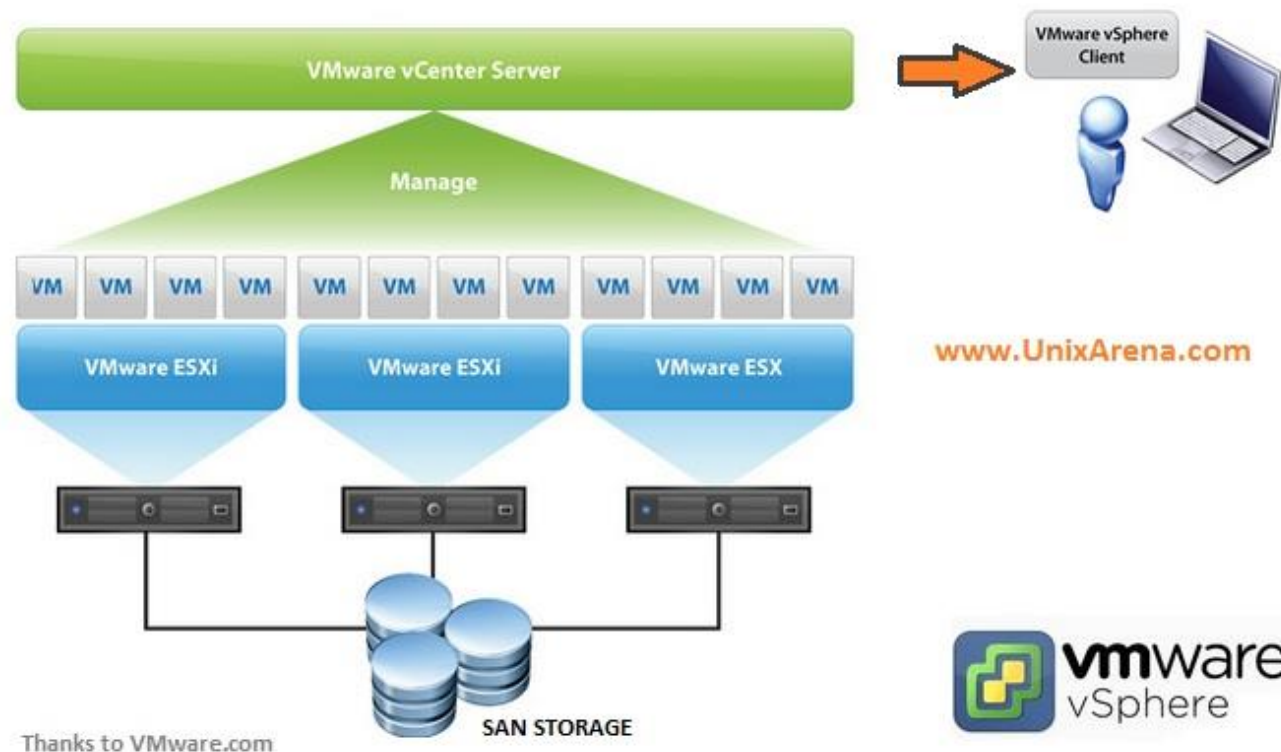


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VMware Fundamenty fundamentów

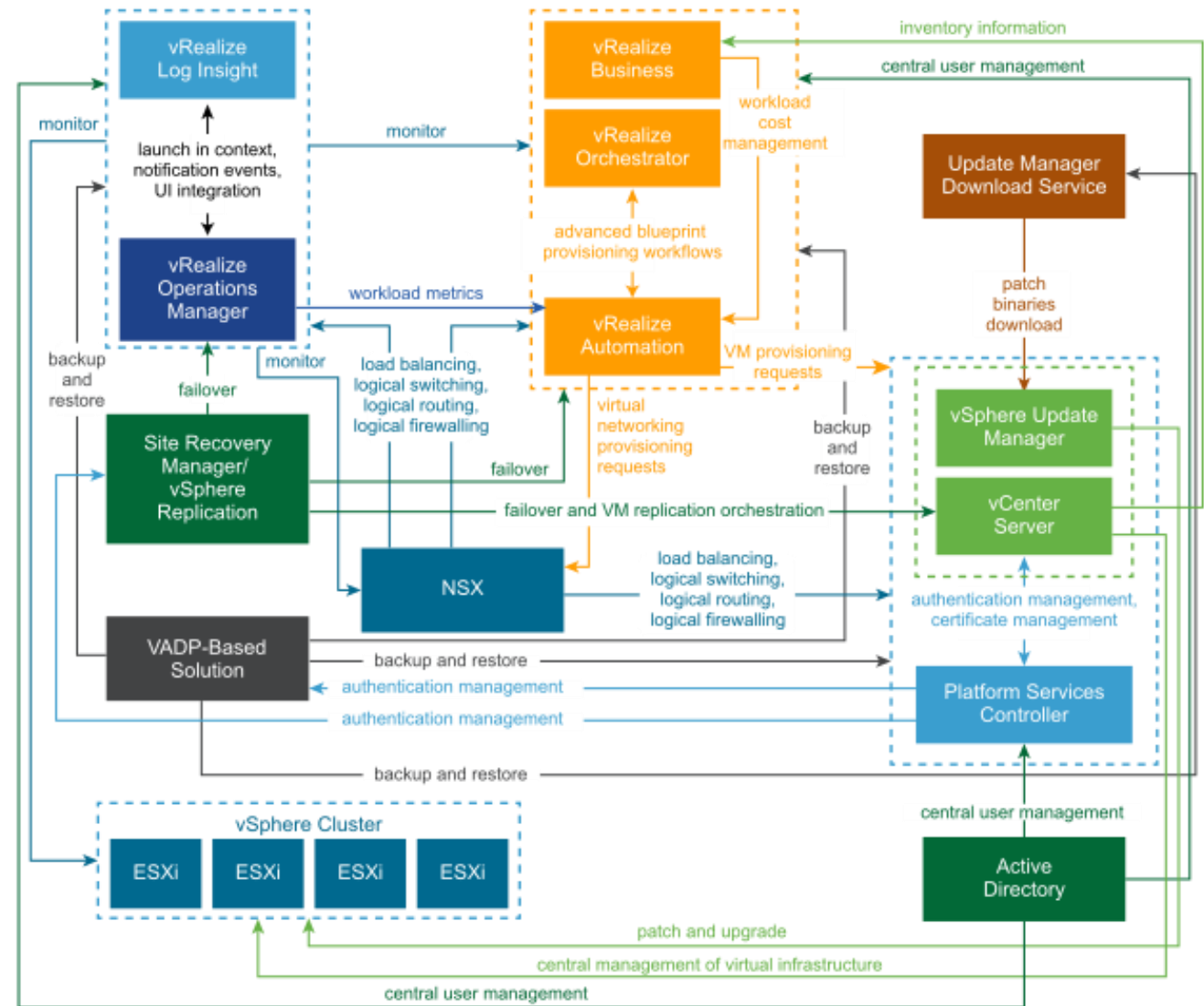
Przeszłość (teraźniejszość):
ESXi + vCenter = vSphere



Co wiemy o ekosystemie VMware ?

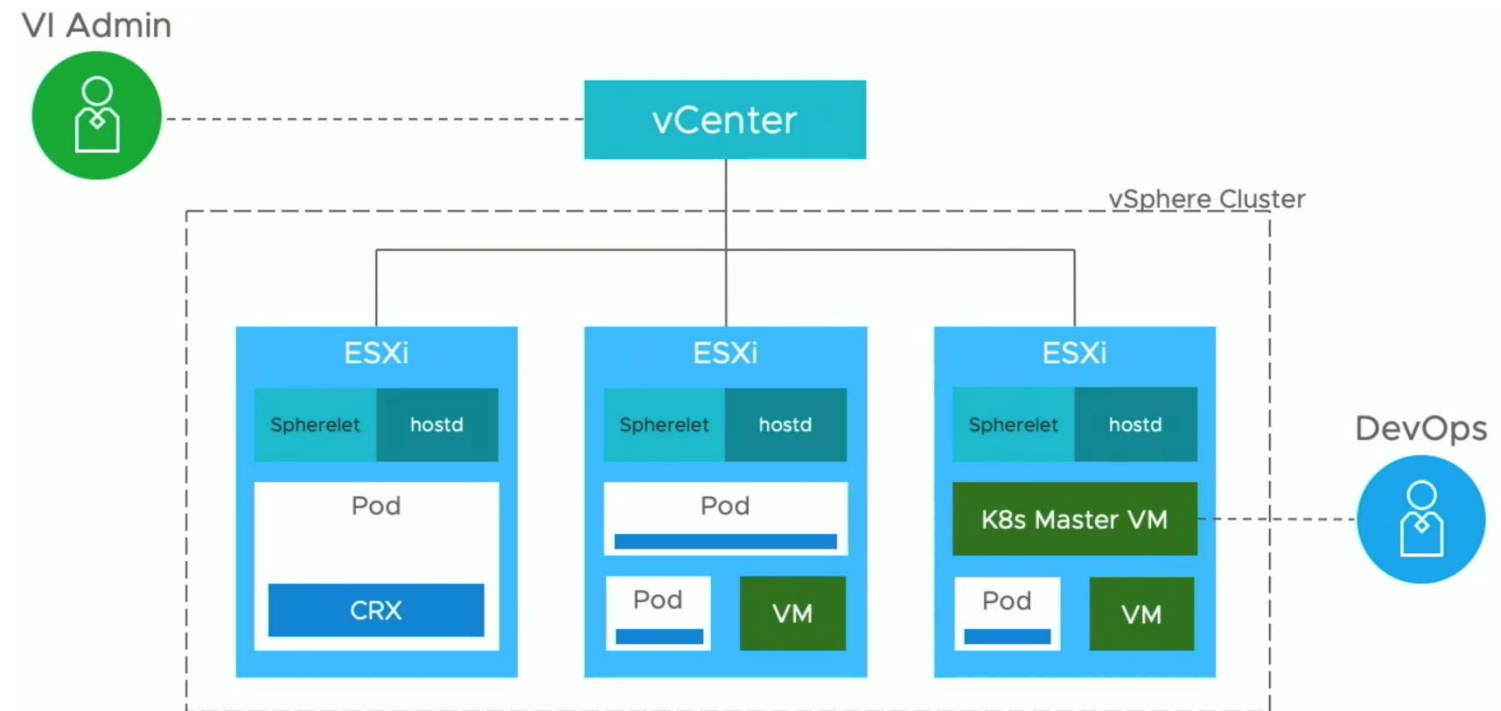
Teraźniejszość:

- Private Cloud
- Hybrid Cloud (OnPremise + VMware Cloud)
- vCloud (local Cloud Providers)



Co wiemy o ekosystemie VMware ?

Przyszłość:
Project Pacific
Tanzu



Agenda – część o Terraformie

- Zanim o Terraformie....
- Co to jest Terraform ?
- Do czego został stworzony ?
- HCL
- Podstawowe komponenty
- Podstawowe komendy
- DEMO
- Pytania



Zanim o Terraformie....

- Z czego może składać się infrastruktura ?
- Czym jest KOD ?
- Typy kodów:
 - Imperatywny
 - deklaracyjny



No to co to je ten... terra..form...

- IaC - Infrastructure as code software od HashiCorp
- Go
- Ostatnia wersja [0.12.16](#)
- Modułowość (providers)



Do czego został stworzony ?

- Budowania infrastruktury
- Zmiany Infrastruktury
- Wersjonowanie Infrastruktury

HCL – Hashicorp Configuration Language

- Wspiera inne produkty Hashicorp
- Wspiera JSONa
- Podobno jest całkiem czytelny :D
- Komentarze
- Przykład:

```
variable "hosts" {  
  default = []  
  type = "list"  
}
```

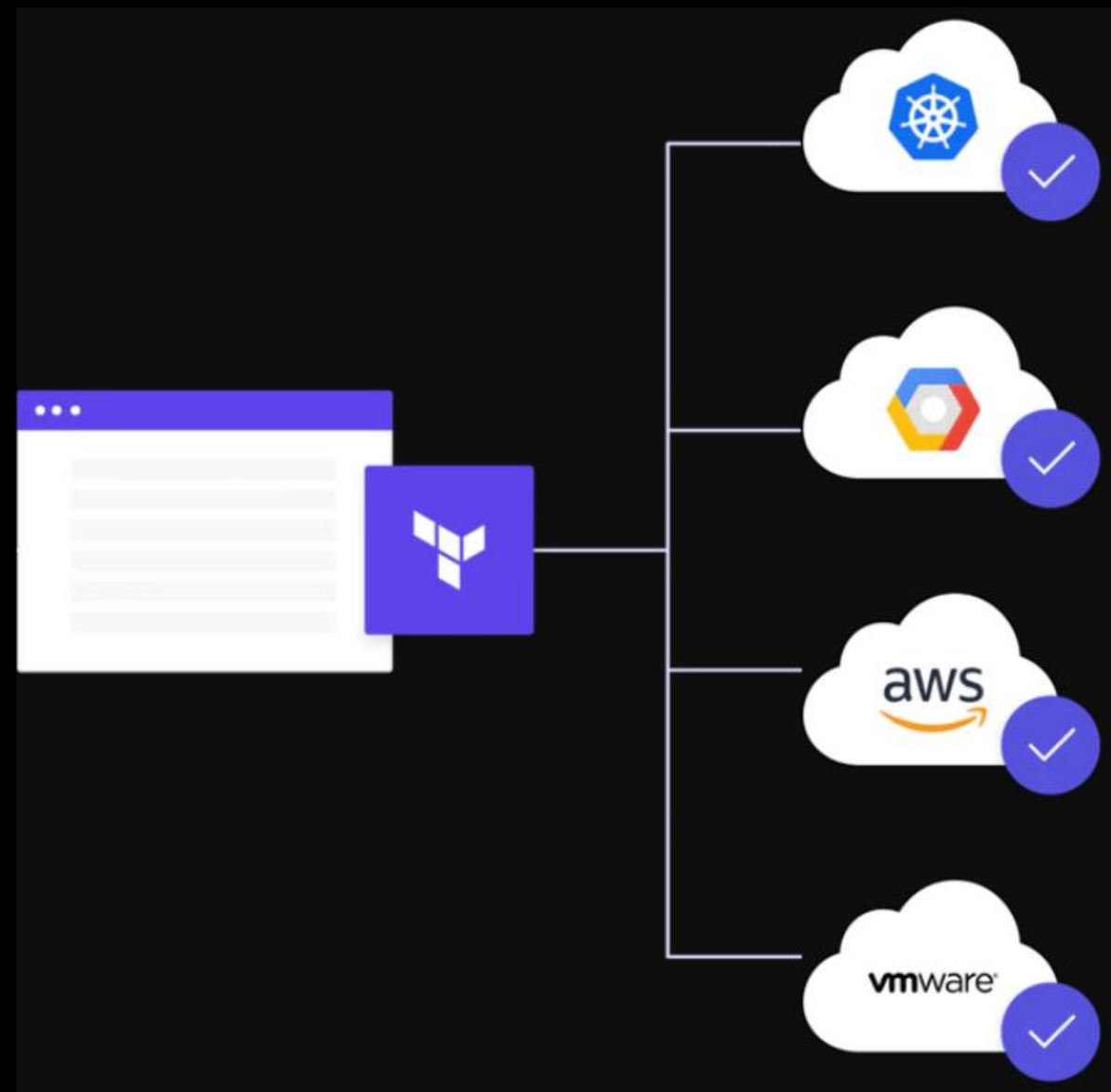


```
provider.tf x
1 provider "vcd" {
2   user      = "${var.vcd_user}"
3   password  = "${var.vcd_pass}"
4   org       = "${var.vcd_org}"
5   vdc       = "${var.vcd_vdc}"
6   url       = "${var.vcd_url}"
7   allow_unverified_ssl = "${var.vcd_allow_unverified_ssl}"
8   max_retry_timeout = "300"
9 }
```

```
provider.tf x
1 // Blok odpowiedzialny za łączenie z vCenter
2 provider "vsphere" {
3   user      = "${var.vc_user}"
4   password  = "${var.vc_pass}"
5   vsphere_server = "${var.vc_vsphere_server}"
6   allow_unverified_ssl = true
7 }
8 |
```

- vsphere_exar
 - .terraform
 - modules
 - plugins
 - windows_amd64
 - lock.json
 - terraform-provider-vsphere_v1.11.0_x4.exe**
- provider.tf
- terraform.tfstate
 - terraform.tfstate.backup
- variables.tf
- vsphere_module_call.tf
 - vsphere_module_call.tf_example
- modules
- .gitignore
- main.tf

PROVIDER



<https://www.terraform.io/docs/providers/index.html>

Statefile

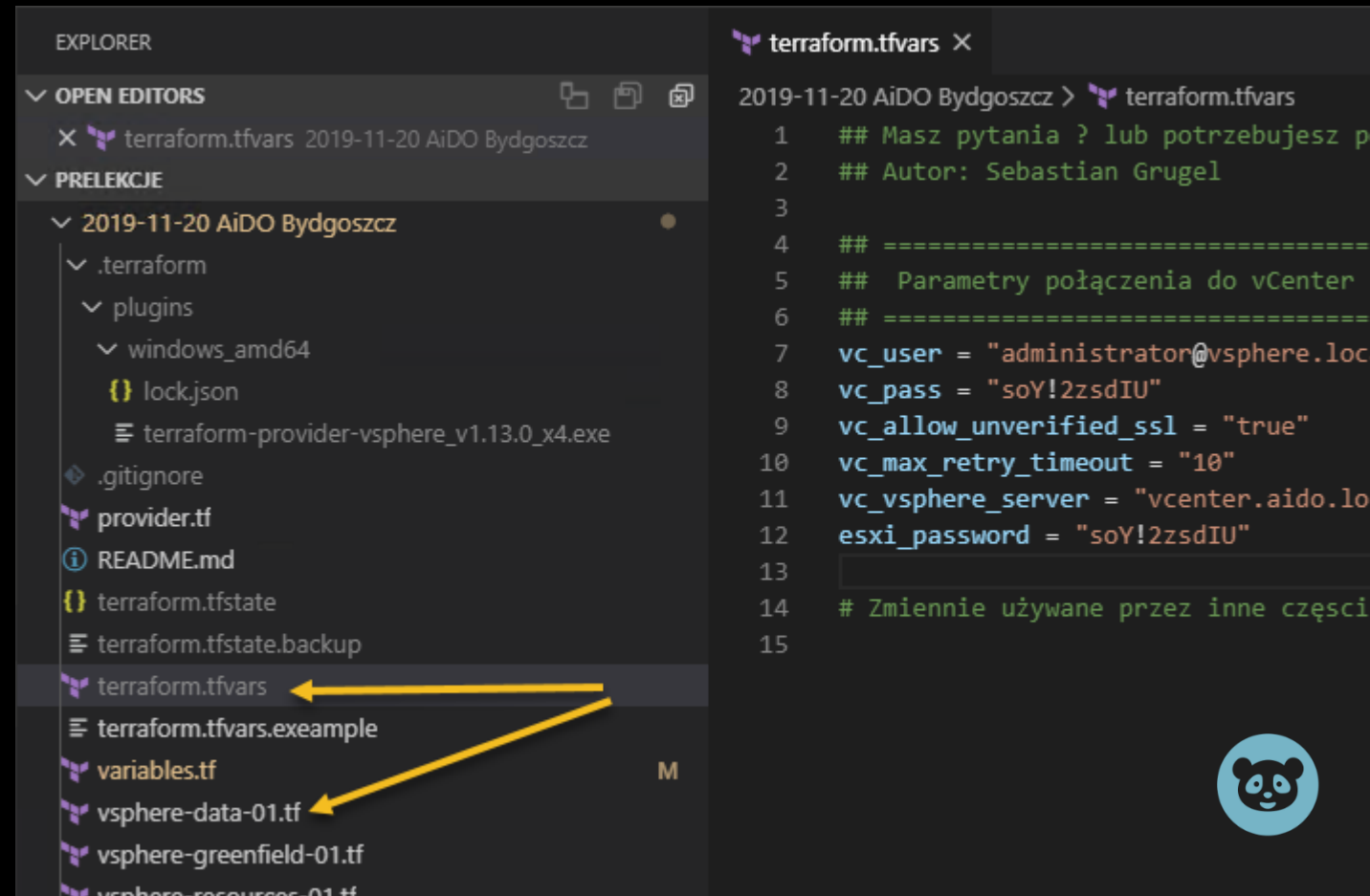
- Domyślnie: plik o nazwie „terraform.tfstate”
- Może być przechowywany zdalnie: np. na S3 bucket.
- Przechowuje aktualne informacje o infrastrukturze
- Służy do tworzenia planów i wprowadzania zmian w infrastrukturze
- Format JSON
- Nie edytuj bezpośrednio, użyj polecenia **terraform state**, aby manipulować tym plikiem

```
terraform.tfstate x
1  {
2      "version": 3,
3      "terraform_version": "0.11.14",
4      "serial": 23,
5      "lineage": "3df4442c-5646-9bb2-a2l",
6      "modules": [
7          {
8              "path": [
9                  "root"
10             ],
11             "outputs": {},
12             "resources": {},
13             "depends_on": []
14         },
15         {
16             "path": [
17                 "root",
18                 "dev_environment"
19             ],
20             "outputs": {},
21             "resources": {},
22             "depends_on": []
23         },
24         {
25             "path": [
26                 "root",
```



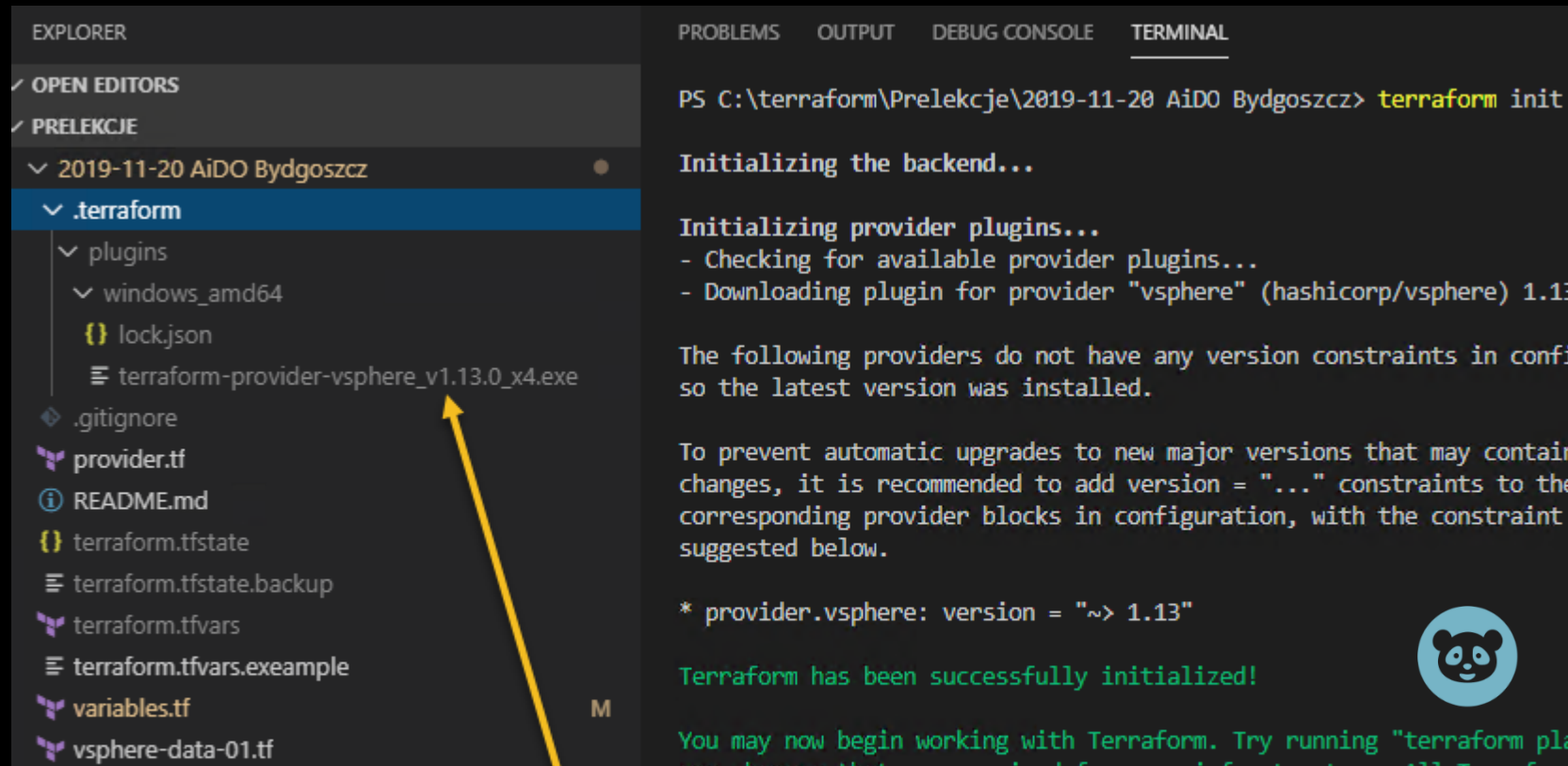
Pliki konfiguracyjne

- Pliki tekstowe
- Rozszerzenie .tf
- Dodatkowe pliki .tfvars – na dane „wrażliwe” .tfvars
- Napisane w HashiCorp Configuration Language



terraform init

- Inicjalizuje katalog roboczy
- Pobiera informacje o providerach
- Pobiera moduły TF do ukrytego katalogu
- Inicjuje backend (dla terraform.tfstate) ➔ nie testowałem



```
EXPLORER
OPEN EDITORS
PRELEKCJE
2019-11-20 AiDO Bydgoszcz
  .terraform
    plugins
      windows_amd64
        lock.json
        terraform-provider-vsphere_v1.13.0_x4.exe
  .gitignore
  provider.tf
  README.md
  terraform.tfstate
  terraform.tfstate.backup
  terraform.tfvars
  terraform.tfvars.example
  variables.tf
  vsphere-data-01.tf

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
PS C:\terraform\Prelekcje\2019-11-20 AiDO Bydgoszcz> terraform init

Initializing the backend...

Initializing provider plugins...
- Checking for available provider plugins...
- Downloading plugin for provider "vsphere" (hashicorp/vsphere) 1.13.0

The following providers do not have any version constraints in config,
so the latest version was installed.

To prevent automatic upgrades to new major versions that may contain
changes, it is recommended to add version = "..." constraints to the
corresponding provider blocks in configuration, with the constraint
suggested below.

* provider.vsphere: version = "~> 1.13"

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan"
to see the changes it will make to the infrastructure.
```



terraform plan



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
+ module.dev_environment.vsphere_folder.teamfolder[4]
  id: <computed>
  datacenter_id: "datacenter-2"
  path: "Teams/Team-5"
  type: "vm"

+ module.dev_environment.vsphere_folder.teams
  id: <computed>
  datacenter_id: "datacenter-2"
  path: "Teams"
  type: "vm"

+ module.dev_environment.vsphere_nas_datastore.nfsdatastore
  id: <computed>
  access_mode: "readwrite"
  accessible: <computed>
  capacity: <computed>
  free_space: <computed>
  host_system_ids.#: "2"
  host_system_ids.1622726607: "host-141"
  host_system_ids.411055375: "host-134"
  maintenance_mode: <computed>
  multiple_host_access: <computed>
  name: "Datastore-DEV-NFS"
  protocol_endpoint: <computed>
  remote_hosts.#: "1"
  remote_hosts.0: "██████████"
  remote_path: "/mnt/nfs/nfs1"
  type: "NFS"
  uncommitted_space: <computed>
  url: <computed>

+ module.dev_environment.vsphere_resource_pool.resource_pool_mgmt
  id: <computed>
  cpu_expandable: "true"
  cpu_limit: "-1"
  cpu_reservation: "0"
  cpu_share_level: "normal"
  cpu_shares: <computed>
  memory_expandable: "true"
```



terraform apply



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
wait_for_guest_ip_timeout: "0"
wait_for_guest_net_routable: "true"
wait_for_guest_net_timeout: "0"

+ module.dev_environment.vsphere_vmfs_datastore.datastore1
  id: <computed>
  accessible: <computed>
  capacity: <computed>
  disks.#: "3"
  disks.0: "naa.6000c291"
  disks.1: "naa.6000c296"
  disks.2: "naa.6000c29c"
  free_space: <computed>
  host_system_id: "host-141"
  maintenance_mode: <computed>
  multiple_host_access: <computed>
  name: "Datastore-sg"
  uncommitted_space: <computed>
  url: <computed>

+ module.dev_environment.vsphere_vmfs_datastore.datastore2
  id: <computed>
  accessible: <computed>
  capacity: <computed>
  disks.#: <computed>
  free_space: <computed>
  host_system_id: "host-134"
  maintenance_mode: <computed>
  multiple_host_access: <computed>
  name: "Datastore-sg"
  uncommitted_space: <computed>
  url: <computed>
```

Plan: 35 to add, 0 to change, 0 to destroy.

Do you want to perform these actions?

Terraform will perform the actions described above.

Only 'yes' will be accepted to approve.

Enter a value:



terraform destroy



PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
- module.dev_environment.vsphere_nas_datastore.nfsdatastore
- module.dev_environment.vsphere_resource_pool.resource_pool_mgmt
- module.dev_environment.vsphere_resource_pool.resource_pool_priority
- module.dev_environment.vsphere_resource_pool.resource_pool_regular
- module.dev_environment.vsphere_virtual_machine.vm[0]
- module.dev_environment.vsphere_virtual_machine.vm[1]
- module.dev_environment.vsphere_virtual_machine.vm[2]
- module.dev_environment.vsphere_virtual_machine.vm[3]
- module.dev_environment.vsphere_virtual_machine.vm[4]
- module.dev_environment.vsphere_virtual_machine.vm[5]
- module.dev_environment.vsphere_virtual_machine.vm[6]
- module.dev_environment.vsphere_virtual_machine.vm[7]
- module.dev_environment.vsphere_virtual_machine.vm[8]
- module.dev_environment.vsphere_virtual_machine.vm[9]
- module.dev_environment.vsphere_vmfs_datastore.datastore1
- module.dev_environment.vsphere_vmfs_datastore.datastore2
```

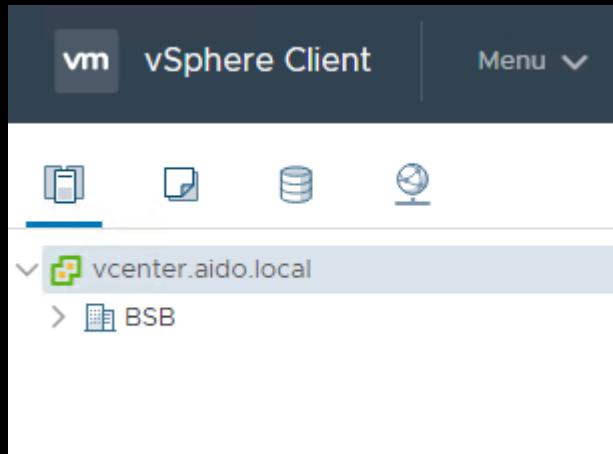
Plan: 0 to add, 0 to change, 35 to destroy.

Do you really want to destroy all resources?
Terraform will destroy all your managed infrastructure, as shown.
There is no undo. Only 'yes' will be accepted to confirm.

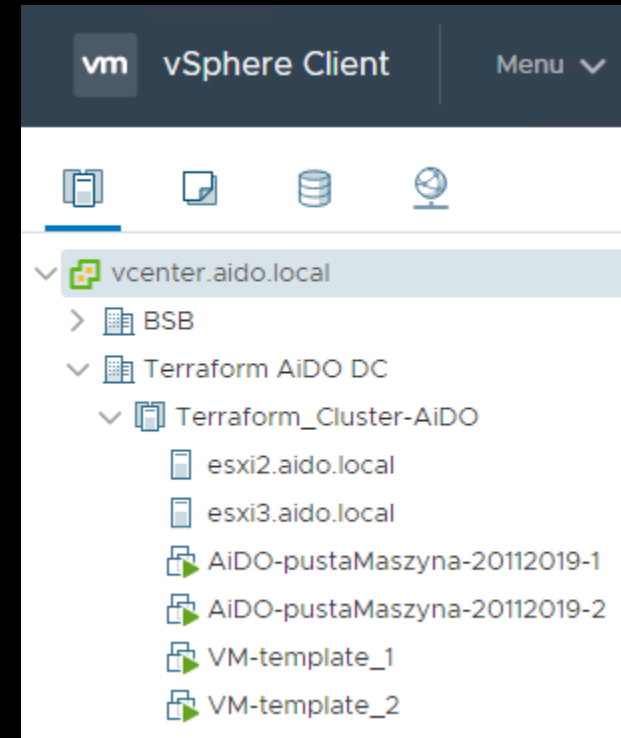
Enter a value:

Task2: Konfiguracja vSphere na życzenie

Stan obecny:



Stan docelowy:



Tylko Hosts & Clusters.
Opcjonalnie można storage,
networking, VM & Templates

Źródła:

terraform.io

[vSphere provider dokumentacja](#)

[vCloudDirector provider dokumentacja](#)

<https://vcloudvision.com/2019/04/12/provision-vsphere-vms-using-terraform>

<https://blogs.vmware.com/vcloud/2019/04/vcloud-director-terraform.html>

<https://anthonyspiteri.net/infrastructure-as-code-vs-restful-apis-terraform-and-everything-in-between/>

<https://anthonyspiteri.net/infrastructure-as-code-vs-restful-apis-a-working-example-with-terraform-and-vcloud-director>

<https://www.virtualtothecore.com/learning-how-to-use-terraform-in-vcloud-director/>

<https://mycloudrevolution.com/2018/01/02/vmware-vcloud-director-provider-for-terraform/>

<https://www.consdata.com/pl/blog/terraform-czyli-o-tym-jak-okielznac-chmure-od-amazona>

<https://medium.com/@amolkokje/terraform-vsphere-virtual-machines-limitations-57621a73019a>

<https://akademiadatacenter.pl/tag/terraform/> - artykuły z mojego bloga w temacie terraforma

<https://github.com/josenk/terraform-provider-esxi> – działa na bezpłatnej wersji ESXi



W sumie to już wszystko 😊

**Pytania ?
Sugestie ?**

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