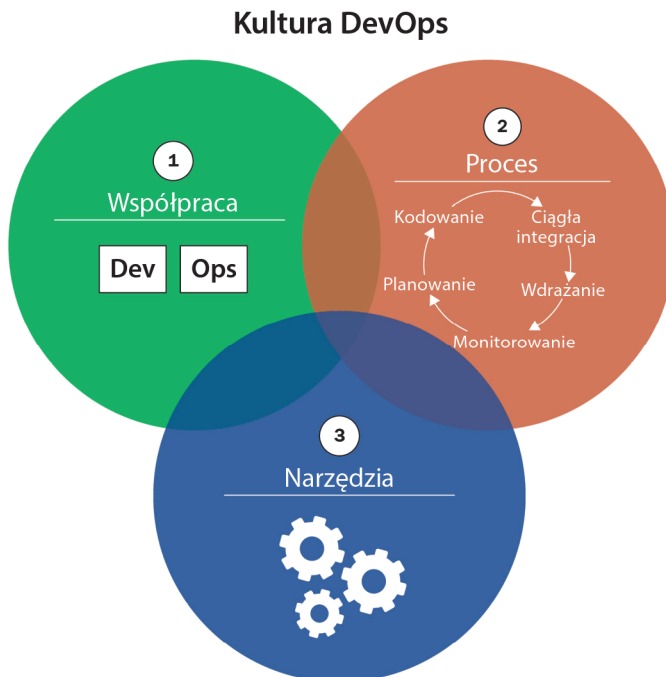
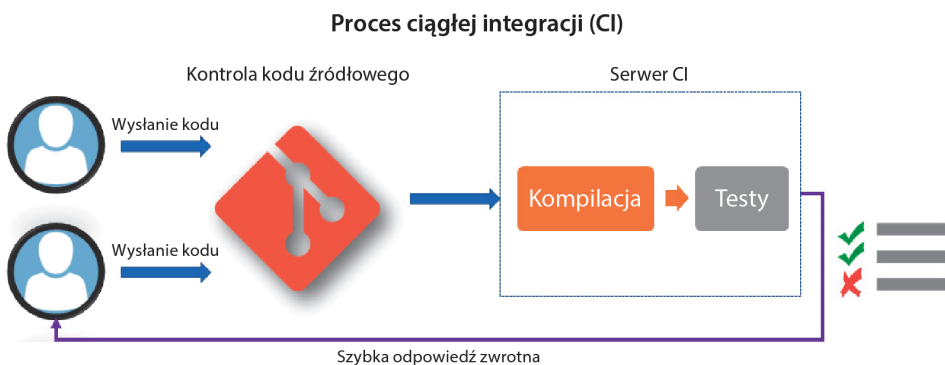


Rozdział 1. Kultura DevOps i praktyki kodowania infrastruktury

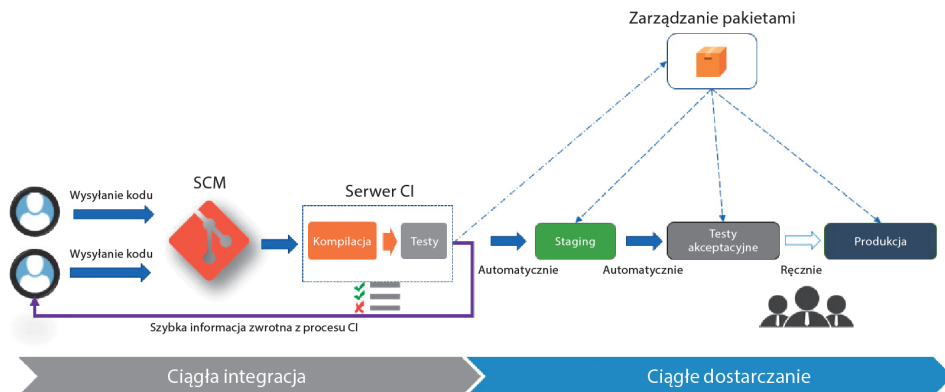


Rysunek 1.1. Kultura DevOps



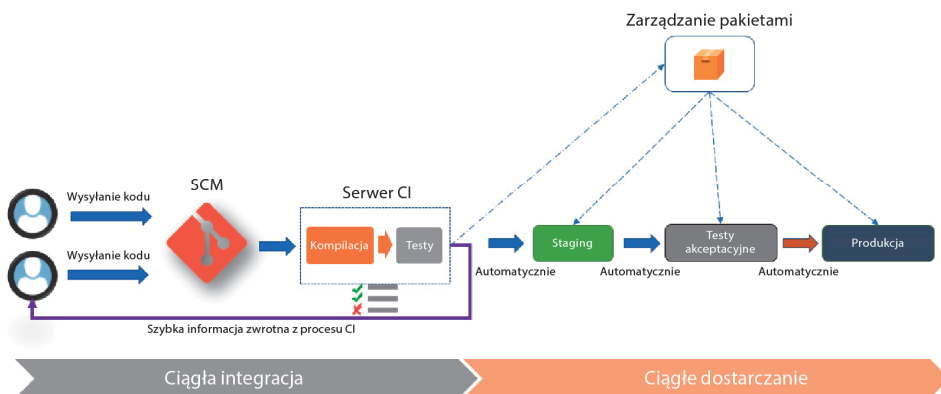
Rysunek 1.2. Proces ciągłej integracji

Proces ciągłego dostarczania



Rysunek 1.3. Proces ciągłego dostarczania

Proces ciągłego wdrażania



Rysunek 1.4. Proces ciągłego wdrażania

Rozdział 2. Udostępnianie infrastruktury chmury za pomocą Terraform

```
root@ubuntu-bionic:/learningdevops/CHAP02# sh Terraform_install_Linux.sh
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload   Total     Spent    Left     Speed
100 7717  100 7717    0     0  20523      0 --:--:-- --:--:-- --:--:-- 20469
gpg: key 34365D9472D7468F: "HashiCorp Security (hashicorp.com/security) <security@hashicorp.com>" not changed
gpg: Total number processed: 1
gpg:      unchanged: 1
gpg: Signature made Tue Jun  8 11:21:42 2021 UTC
gpg:      using RSA key B36CBA91A2C0730C435FC280B0B441097685B676
gpg: Good signature from "HashiCorp Security (hashicorp.com/security) <security@hashicorp.com>" [unknown]
gpg: WARNING: This key is not certified with a trusted signature!
gpg:      There is no indication that the signature belongs to the owner.
Primary key fingerprint: C874 011F 0AB4 0511 0D02 1055 3436 5D94 72D7 468F
Subkey fingerprint: B36C BA91 A2C0 730C 435F C280 B0B4 4109 7685 B676
terraform_1.0.0_linux_amd64.zip: OK
Archive:  terraform_1.0.0_linux_amd64.zip
  inflating: /usr/local/bin/terraform
```

Rysunek 2.1. Skrypt instalacyjny Terraform w systemie Linux

```
PS C:\WINDOWS\system32> choco install terraform -y
Chocolatey v0.10.15
Installing the following packages:
terraform
By installing you accept licenses for the packages.
Progress: Downloading terraform 1.0.0... 100%

terraform v1.0.0 [Approved]
terraform package files install completed. Performing other installation steps.
Removing old terraform plugins
Downloading terraform 64 bit
  from 'https://releases.hashicorp.com/terraform/1.0.0/terraform_1.0.0_windows_amd64.zip'
Progress: 100% - completed download of C:\Users\mika\AppData\Local\Temp\chocolatey\terraform\1.0.0\terraform_1.0.0_windows_amd64.zip (31.79 MB).
Download of terraform_1.0.0_windows_amd64.zip (31.79 MB) completed.
Hashes match.
Extracting C:\Users\mika\AppData\Local\Temp\chocolatey\terraform\1.0.0\terraform_1.0.0_windows_amd64.zip to C:\ProgramData\chocolatey\lib\terraform\tools...
C:\ProgramData\chocolatey\lib\terraform\tools
Shingen has successfully created a shim for terraform.exe
The install of terraform was successful.
  Software installed to 'C:\ProgramData\chocolatey\lib\terraform\tools'

Chocolatey installed 1/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
```

Rysunek 2.2. Instalacja Terraform w systemie Windows

```

~$ terraform --help
Usage: terraform [-version] [-help] <command> [args]

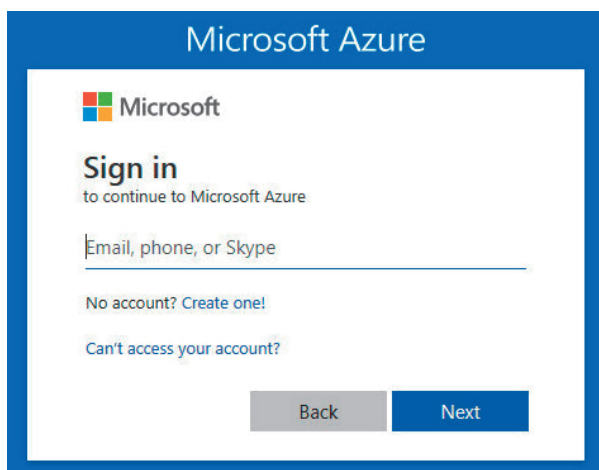
The available commands for execution are listed below.
The most common, useful commands are shown first, followed by
less common or more advanced commands. If you're just getting
started with Terraform, stick with the common commands. For the
other commands, please read the help and docs before usage.

Common commands:
  apply          Builds or changes infrastructure
  console        Interactive console for Terraform interpolations
  destroy        Destroy Terraform-managed infrastructure
  env            Workspace management
  fmt            Rewrites config files to canonical format
  get            Download and install modules for the configuration
  graph          Create a visual graph of Terraform resources
  import         Import existing infrastructure into Terraform
  init           Initialize a Terraform working directory
  output         Read an output from a state file
  plan           Generate and show an execution plan
  providers      Prints a tree of the providers used in the configuration
  push           Upload this Terraform module to Atlas to run
  refresh        Update local state file against real resources
  show           Inspect Terraform state or plan
  taint          Manually mark a resource for recreation
  untaint        Manually unmark a resource as tainted
  validate       Validates the Terraform files
  version        Prints the Terraform version
  workspace      Workspace management

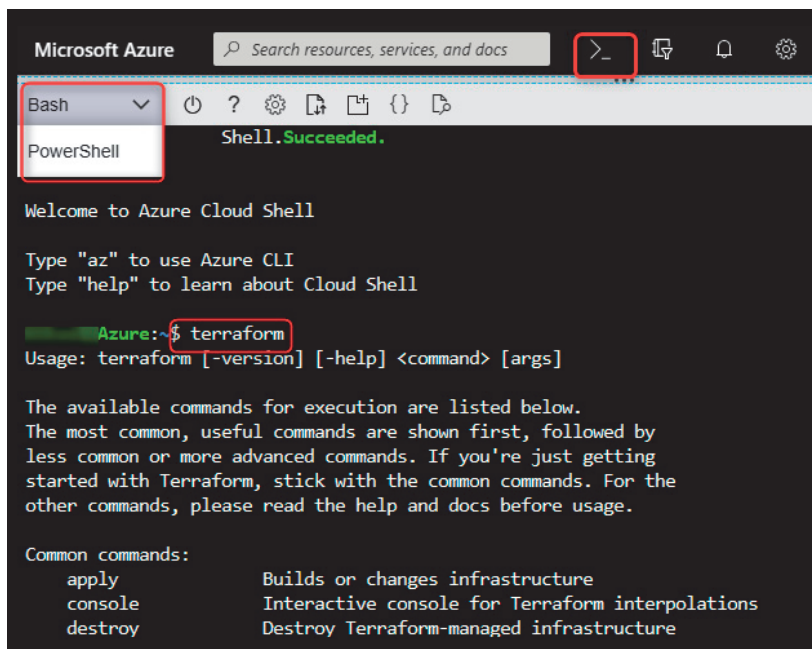
All other commands:
  debug          Debug output management (experimental)
  force-unlock   Manually unlock the terraform state
  state          Advanced state management

```

Rysunek 2.3. Dostępne polecenia Terraform



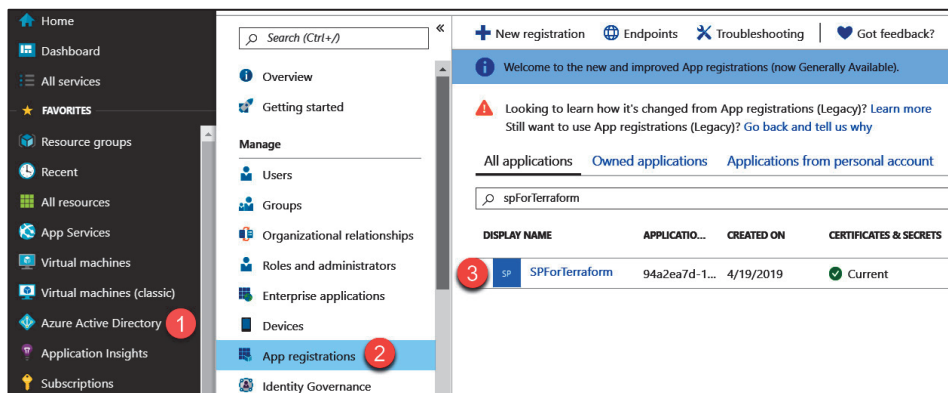
Rysunek 2.4. Strona logowania Azure



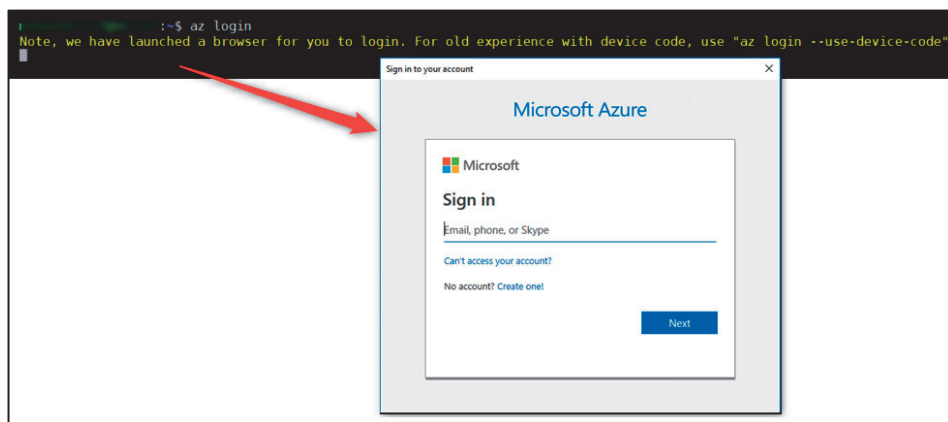
Rysunek 2.5. Azure Cloud Shell



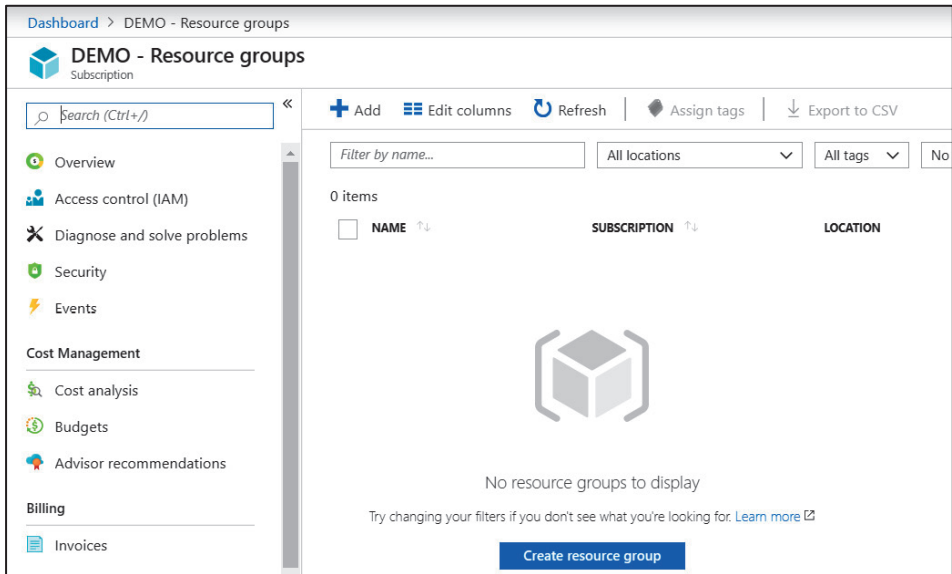
Rysunek 2.6. Tworzenie Azure SP



Rysunek 2.7. Lista rejestracji aplikacji w portalu Azure



Rysunek 2.8. Ekran logowania Azure



Rysunek 2.9. Brak grupy zasobów na platformie Azure

```
root@ubuntu-bionic:/learningdevops/CHAP02/terraform_separate_files# terraform init
Initializing the backend...

Initializing provider plugins...
- Finding hashicorp/azurerm versions matching "2.63.0"...
- Installing hashicorp/azurerm v2.63.0...
- Installed hashicorp/azurerm v2.63.0 (signed by HashiCorp)

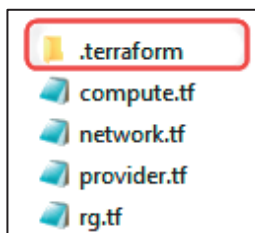
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
```

Rysunek 2.10. Wykonywanie polecenia terraform init



Rysunek 2.11. Katalog konfiguracji Terraform

```

/mnt/d/DevOps/Learning-DevOps/CHAP02/terraform_separate_files$ terraform plan
Refreshing Terraform state in-memory prior to plan...
The refreshed state will be used to calculate this plan, but will not be
persisted to local or remote state storage.

-----

An execution plan has been generated and is shown below.
Resource actions are indicated with the following symbols:
+ create

Terraform will perform the following actions:

+ azurerm_network_interface.nic
  id: <computed>
  applied_dns_servers.#: <computed>
  dns_servers.#: <computed>
  enable_accelerated_networking: "false"
  enable_ip_forwarding: "false"
  internal_dns_name_label: <computed>
  internal_fqdn: <computed>
  ip_configuration.#: "1"
  ip_configuration.0.application_gateway_backend_address_pools_ids.#: <computed>
  ip_configuration.0.application_security_group_ids.#: <computed>
  ip_configuration.0.load_balancer_backend_address_pools_ids.#: <computed>
  ip_configuration.0.load_balancer_inbound_nat_rules_ids.#: <computed>
  ip_configuration.0.name: "bookipconfig"
  ip_configuration.0.primary: <computed>
  ip_configuration.0.private_ip_address_allocation: "dynamic"
  ip_configuration.0.private_ip_address_version: "IPv4"
  ip_configuration.0.public_ip_address_id: "${azurerm_public_ip.pip.id}"
  ip_configuration.0.subnet_id: "${azurerm_subnet.subnet.id}"
  location: "westeurope"

+ azurerm_virtual_network.vnet
  id: <computed>
  address_space.#: "1"
  address_space.0: "10.0.0.0/16"
  location: "westeurope"
  name: "book-vnet"
  resource_group_name: "bookRg"
  subnet.#: <computed>
  tags.%: <computed>

Plan: 7 to add, 0 to change, 0 to destroy.

-----

Note: You didn't specify an "-out" parameter to save this plan, so Terraform
can't guarantee that exactly these actions will be performed if

```

Rysunek 2.12. Wykonywanie polecenia terraform plan

```
:/mnt/d/DevOps/Learning-DevOps/CHAP02/terraform_separate_files$ terraform apply

An execution plan has been generated and is shown below.
Resource actions are indicated with the following symbols:
+ create

Terraform will perform the following actions:

+ azurerm_network_interface.nic
  id:                                     <computed>
  applied_dns_servers.#:                 <computed>

tags.%:                                <computed>

Plan: 7 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: █
```

Rysunek 2.13. Potwierdzenie zmian do zastosowania w Terraform

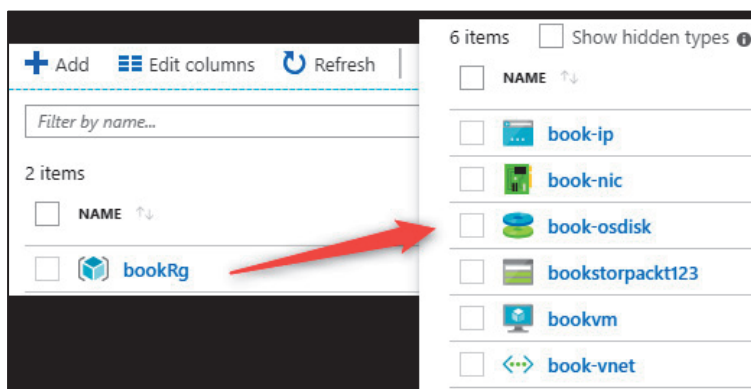
```
Only 'yes' will be accepted to approve.

Enter a value: yes

azurerm_resource_group.rg: Creating...
  location: "" => "westeurope"
  name:     "" => "bookRg"
  tags.%:   "" => "1"
  tags.environment: "" => "Terraform Azure"

azurerm_virtual_machine.vm: Still creating... (2m30s elapsed)
azurerm_virtual_machine.vm: Creation complete after 2m32s (ID: /subscriptions/1da42a
apply complete! Resources: 7 added, 0 changed, 0 destroyed.
```

Rysunek 2.14. Wykonywanie polecenia terraform apply



Rysunek 2.15. Lista udostępnionych zasobów na platformie Azure


```

:~/mnt/d/DevOps/Learning-DevOps/CHAP02/terraform_separate_files$ terraform destroy
azure_rm_resource_group.rg: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg)
azure_rm_storage_account.stor: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg/storageAccounts/bookstorpackt123)
azure_rm_public_ip.pip: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg/publicIPAddresses/book-ip)
azure_rm_virtual_network.vnet: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg/networks/book-vnet)
azure_rm_subnet.subnet: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg/networks/book-vnet/subnets/book-subnet)
azure_rm_network_interface.nic: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg/networkInterfaces/book-nic)
azure_rm_virtual_machine.vm: Refreshing state... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg/machines/book-vm)

An execution plan has been generated and is shown below.
Resource actions are indicated with the following symbols:
- destroy

Terraform will perform the following actions:

- azure_rm_network_interface.nic
- azure_rm_public_ip.pip
- azure_rm_resource_group.rg
- azure_rm_storage_account.stor
- azure_rm_subnet.subnet
- azure_rm_virtual_machine.vm
- azure_rm_virtual_network.vnet

Plan: 0 to add, 0 to change, 7 to destroy.

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

Enter a value: yes

```

Rysunek 2.16. Potwierdzenie wykonania polecenia terraform destroy

```

azure_rm_resource_group.rg: Still destroying... (ID: /subscriptions/1da42ac9-ee3e-4fdb-b294-f7a607f589d5/resourceGroups/bookRg, 2m40s elapsed)
azure_rm_resource_group.rg: Destruction complete after 2m47s

Destroy complete! Resources: 7 destroyed.

```

Rysunek 2.17. Wykonywanie polecenia terraform destroy

```

~/d/Repos/Learning-DevOps/CHAP02/terraform_separate_files$ terraform fmt
compute.tf
network.tf
provider.tf
rg.tf

```

Rysunek 2.18. Wykonywanie polecenia terraform fmt

```

~/d/Repos/Learning-DevOps/CHAP02/terraform_vars_interp$ terraform plan
Error: resource 'azure_rm_public_ip.pip': config: unknown variable referenced: 'ip-name'; define it with a 'variable' block

```

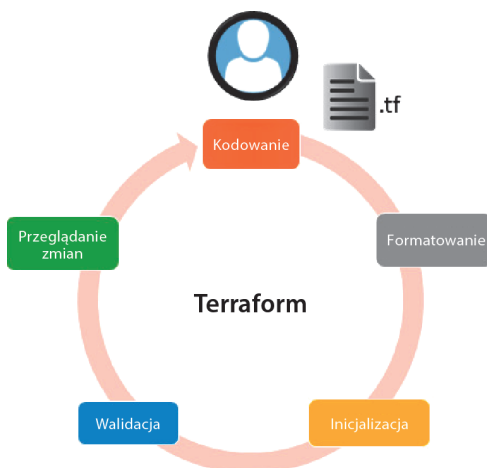
Rysunek 2.19. Wykonanie polecenia plan z błędem

```

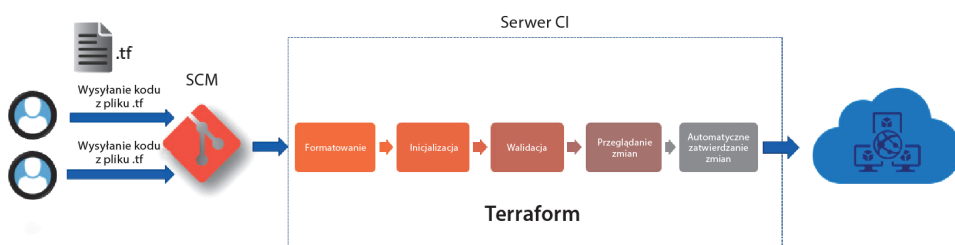
~/d/Repos/Learning-DevOps/CHAP02/terraform_vars_interp$ terraform validate
Error: resource 'azure_rm_public_ip.pip': config: unknown variable referenced: 'ip-name'; define it with a 'variable' block

```

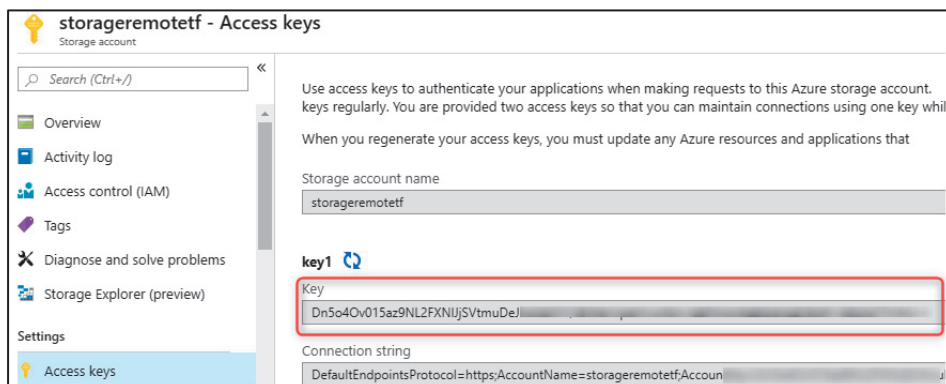
Rysunek 2.20. Wykonanie polecenia terraform validate



Rysunek 2.21. Proces CI/CD Terraform



Rysunek 2.22. Przepływ pracy Terraform CI/CD



Rysunek 2.23. Klucz dostępu do magazynu Azure

```
mikaelkrief@mkrief:/mnt/d/DevOps/Learning-DevOps/CHAP02/terraform_vars_interp$ export ARM_ACCESS_KEY=0n5o40v015
mikaelkrief@mkrief:/mnt/d/DevOps/Learning-DevOps/CHAP02/terraform_vars_interp$ terraform init -backend-config="backend.tfvars"

Initializing the backend...

Successfully configured the backend "azurerm"! Terraform will automatically
use this backend unless the backend configuration changes.

Initializing provider plugins...
- Checking for available provider plugins on https://releases.hashicorp.com...
- Downloading plugin for provider "azurerm" (1.25.0)...

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

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

* provider.azurerm: version = "~> 1.25"

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
```

Rysunek 2.24. Polecenie terraform init z konfiguracją zaplecza

Rozdział 3. Używanie Ansible do konfigurowania infrastruktury IaaS

```
mikael@vmAnsible:~$ ansible --version
ansible 2.8.3
  config file = /etc/ansible/ansible.cfg
  configured module search path = [u'/home/mikael/.ansible/plugins/modules', u'/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python2.7/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 2.7.15+ (default, Oct 7 2019, 17:39:04) [GCC 7.4.0]
```

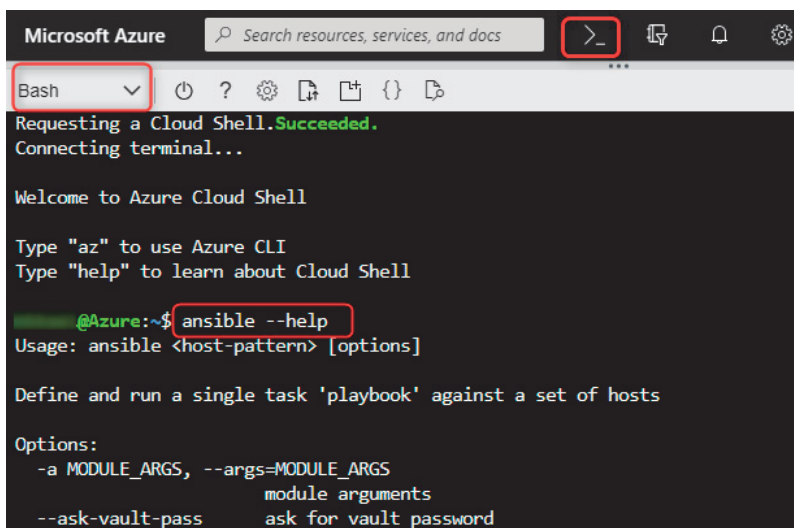
Rysunek 3.1. Polecenie `ansible --version`

```
~$ ansible --help
Usage: ansible <host-pattern> [options]

Define and run a single task 'playbook' against a set of hosts

Options:
  -a MODULE_ARGS, --args=MODULE_ARGS
                        module arguments
  --ask-vault-pass      ask for vault password
  -B SECONDS, --background=SECONDS
                        run asynchronously, failing after X seconds
                        (default=N/A)
  -C, --check           don't make any changes; instead, try to predict some
                        of the changes that may occur
  -D, --diff            when changing (small) files and templates, show the
                        differences in those files; works great with --check
  -e EXTRA_VARS, --extra-vars=EXTRA_VARS
                        set additional variables as key=value or YAML/JSON, if
```

Rysunek 3.2. Polecenie `ansible --help`



Rysunek 3.3. Ansible w Azure Cloud Shell

```
# config file for ansible -- https://ansible.com/
# =====

# nearly all parameters can be overridden in ansible-playbook
# or with command line flags. ansible will read ANSIBLE_CONFIG,
# ansible.cfg in the current working directory, .ansible.cfg in
# the home directory or /etc/ansible/ansible.cfg, whichever it
# finds first

[defaults]

# some basic default values...

#inventory      = /etc/ansible/hosts
#library        = /usr/share/my_modules/
#module_utils   = /usr/share/my_module_utils/
#remote_tmp     = ~/.ansible/tmp
#local_tmp      = ~/.ansible/tmp
#plugin_filters_cfg = /etc/ansible/plugin_filters.yml
#forks          = 5
#poll_interval  = 15
#sudo_user      = root
#ask_sudo_pass  = True
#ask_pass       = True
#transport      = smart
#remote_port    = 22
#module_lang    = C
#module_set_locale = False
```

Rysunek 3.4. Plik konfiguracyjny Ansible

```
:/home/n # ansible-config view
# config file for ansible -- https://ansible.com/
# =====

# nearly all parameters can be overridden in ansible-playbook
# or with command line flags. ansible will read ANSIBLE_CONFIG,
# ansible.cfg in the current working directory, .ansible.cfg in
# the home directory or /etc/ansible/ansible.cfg, whichever it
# finds first

[defaults]

# some basic default values...

#inventory      = /etc/ansible/hosts
#library        = /usr/share/my_modules/
#module_utils   = /usr/share/my_module_utils/
#remote_tmp     = ~/.ansible/tmp
#local_tmp      = ~/.ansible/tmp
#plugin_filters_cfg = /etc/ansible/plugin_filters.yml
#forks          = 5
#poll_interval  = 15
#sudo_user      = root
#ask_sudo_pass  = True
#ask_pass       = True
#transport      = smart
#remote_port    = 22
#module_lang    = C
#module_set_locale = False
```

Rysunek 3.5. Wyświetlenie konfiguracji Ansible za pomocą CLI

```
/devopsansible# ansible -i inventory all -u demobook -m ping
webserver2 | SUCCESS => {
  "changed": false,
  "ping": "pong"
}
database1 | SUCCESS => {
  "changed": false,
  "ping": "pong"
}
webserver1 | SUCCESS => {
  "changed": false,
  "ping": "pong"
}
```

Rysunek 3.6. Testowanie polecenia ansible ping z opcją all

```
/devopsansible# ansible -i inventory webserver -u demobook -m ping
webserver1 | SUCCESS => {
  "changed": false,
  "ping": "pong"
}
webserver2 | SUCCESS => {
  "changed": false,
  "ping": "pong"
}
```

Rysunek 3.7. Testowanie polecenia ansible ping dla określonego hosta



Rysunek 3.8. Folder Ansible

```
/devopsansible# ansible-playbook -i inventory playbook.yml --check

PLAY [webserver] *****
TASK [Gathering Facts] *****
ok: [webserver1]
ok: [webserver2]

TASK [nginx : install and check nginx latest version] *****
changed: [webserver1]
changed: [webserver2]

TASK [nginx : start nginx] *****
changed: [webserver2]
changed: [webserver1]

PLAY RECAP *****
webserver1      : ok=3    changed=2    unreachable=0    failed=0
webserver2      : ok=3    changed=2    unreachable=0    failed=0
```

Rysunek 3.9. Wykonywanie playbooka Ansible

```
/devopsansible# ansible-playbook -i inventory playbook.yml

PLAY [webserver] *****

TASK [Gathering Facts] *****
ok: [webserver1]
ok: [webserver2]

TASK [nginx : install and check nginx latest version] *****
ok: [webserver2]
ok: [webserver1]

TASK [nginx : start nginx] *****
ok: [webserver1]
ok: [webserver2]

PLAY RECAP *****
webserver1      : ok=3    changed=0    unreachable=0    failed=0
webserver2      : ok=3    changed=0    unreachable=0    failed=0
```

Rysunek 3.10. Wykonanie playbooka Ansible z inną informacją

```
/devopsansible# ansible-playbook -i inventory playbook.yml --check

PLAY [webserver] *****

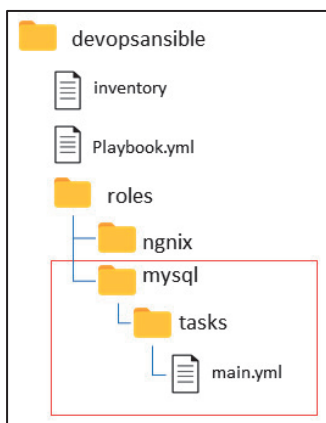
TASK [Gathering Facts] *****
ok: [webserver1]
ok: [webserver2]

TASK [nginx : install and check nginx latest version] *****
changed: [webserver1]
changed: [webserver2]

TASK [nginx : start nginx] *****
changed: [webserver2]
changed: [webserver1]

PLAY RECAP *****
webserver1      : ok=3    changed=2    unreachable=0    failed=0
webserver2      : ok=3    changed=2    unreachable=0    failed=0
```

Rysunek 3.11. Wykonanie testu playbooka Ansible



Rysunek 3.12. Struktura folderów ról w Ansible

```

root@DESKTOP-9Q2U73J:/d/devopsansible# ansible-playbook -i inventory playbook.yml
PLAY [webserver] *****

TASK [Gathering Facts] *****
ok: [webserver1]
ok: [webserver2]

TASK [nginx : install and check nginx latest version] *****
ok: [webserver1]
ok: [webserver2]

TASK [nginx : start nginx] *****
ok: [webserver1]
ok: [webserver2]

PLAY [database] *****

TASK [Gathering Facts] *****
ok: [database1]

TASK [mysql : Update apt cache] *****
ok: [database1]

TASK [mysql : Install required software] *****
changed: [database1]

TASK [mysql : Create mysql user] *****
changed: [database1]

PLAY RECAP *****
database1      : ok=4    changed=2    unreachable=0    failed=0
webserver1     : ok=3    changed=0    unreachable=0    failed=0
webserver2     : ok=3    changed=0    unreachable=0    failed=0

```

Rysunek 3.13. Wywołanie MySQL w playbooku Ansible

```

/devopsansible# ansible-vault encrypt group_vars/database/main.yml
New Vault password:
Confirm New Vault password:
Encryption successful

```

Rysunek 3.14. Szyfrowanie za pomocą Ansible Vault

```

$ANSIBLE_VAULT;1.1;AES256
623131363033636232353435303131393939623264646166613731336335
3236313832323736373064353465353266653336383231660a6134653265
343434663963306634343838613338393038303866393433663332323465
3336633033643735310a6261343131643239333631393234373737303161
356331633035623831626462666534303831383634313934663266303137
333563363037303937666665663538363936656338366339643261363033
626263303233626330323063363136653962

```

Rysunek 3.15. Zaszyfrowany plik

```

/devopsansible# ansible-playbook -i inventory playbook.yml --ask-vault-pass
Vault password:

```

Rysunek 3.16. Odszyfrowanie pliku za pomocą Ansible Vault

Connect Start Restart Stop Capture De

Advisor (1 of 2): Use availability sets for improved fault tolerance →

| | |
|--|---|
| Resource group (change) : demoAnsible | Computer name : VM01 |
| Status : Running | Operating system : Linux (ubuntu) |
| Location : West Europe | Size : Standard DS2 v2 (2 vcpus, 7 GB memory) |
| Subscription (change) : DEMO | Public IP address : 137.117.215.130 |
| Subscription ID : 1da42ac9-ee3e-4fdb-b294-f7a607f589d5 | Private IP address : 10.0.0.4 |
| | Virtual network/subnet : VM01VNET/VM01Subnet |
| | DNS name : Configure |

Tags (change) : role : webserver

Rysunek 3.17. Tag role na platformie Azure

```
root@LP-FYL22X2: /Learning-DevOps-Second-Edition/CHAP03/devopsansible# ansible-inventory -i inv.azure_rm.yml --list
{
  "_meta": {
    "hostvars": {
      "bookvm01_73ec": {
        "ansible_host": "20.61.2.21",
        "availability_zone": [
          "1"
        ],
        "computer_name": "bookvm01",
        "default_inventory_hostname": "bookvm01_73ec",
        "id": "/subscriptions/ /resourceGroups/demoAnsible/providers/Microsoft.Compute/virtualMachines/bookvm01",
        "image": {
          "id": "/subscriptions/ /resourceGroups/demoAnsible/providers/Microsoft.Compute/galleries/demo/images/linux/versions/1.0.0"
        },
        "location": "westeurope",
        "mac_address": "68-45-8D-88-FE-24",
        "name": "bookvm01",
        "network_interface": "bookvm01i663",
        "network_interface_id": "/subscriptions/ /resourceGroups/demoAnsible/providers/Microsoft.Network/networkInterfaces/bookvm01i663",
        "os_disk": {
          "name": "bookvm01_disk1_3d7f0532bd1f4d3a98d5ddb47b65d8af",
          "operating_system_type": "Linux"
        },
        "os_profile": {
          "system": "Linux"
        }
      }
    }
  }
}
```

Rysunek 3.18. Dynamiczna lista inwentarza maszyn wirtualnych Ansible

```
root@LP-FYL22X2: /Learning-DevOps-Second-Edition/CHAP03/devopsansible# ansible-inventory -i inv.azure_rm.yml --graph
@all:
|--database:
| |--bookvm2_2f86
|--ungrouped:
| |--bookvm01_73ec
| |--bookvm1_6823
```

Rysunek 3.19. Dynamiczna lista inwentaryzacji maszyn wirtualnych Ansible pogrupowanych według ról

```
root@LP-FYL22X2: /Learning-DevOps-Second-Edition/CHAP03/devopsansible# ansible-playbook playbook.yml -i inv.azure_rm.yml -u demobook --ask-pass
SSH password:
PLAY [webserver] *****
TASK [Gathering Facts] *****
ok: [bookvm01_73ec]
ok: [bookvm1_6823]
TASK [nginx : install and check nginx latest version] *****
ok: [bookvm01_73ec]
ok: [bookvm1_6823]
TASK [nginx : start nginx] *****
ok: [bookvm01_73ec]
ok: [bookvm1_6823]
```

Rysunek 3.20. Dynamiczne wykonanie pliku inwentarza Ansible

Rozdział 4. Optymalizacja wdrażania infrastruktury za pomocą Packera

```
./CHAP04# sh install_packer.sh
Speed Time Time Current
Upload Total Spent Left Speed
100 1696 100 1696 0 0 3981 0 --:--:-- --:--:-- --:--:-- 3971
gpg: key 51852D87348FFC4C: "HashiCorp Security <security@hashicorp.com>" not changed
gpg: Total number processed: 1
gpg: unchanged: 1
gpg: Signature made Thu Apr 11 20:30:03 2019 DST
gpg: using RSA key 91A6E7F85D05C65630BEF18951852D87348FFC4C
gpg: Good signature from "HashiCorp Security <security@hashicorp.com>" [unknown]
gpg: WARNING: This key is not certified with a trusted signature!
gpg: There is no indication that the signature belongs to the owner.
Primary key fingerprint: 91A6 E7F8 5D05 C656 30BE F189 5185 2D87 348F FC4C
packer_1.4.0_linux_amd64.zip: OK
Archive: packer_1.4.0_linux_amd64.zip
inflating: /usr/local/bin/packer
```

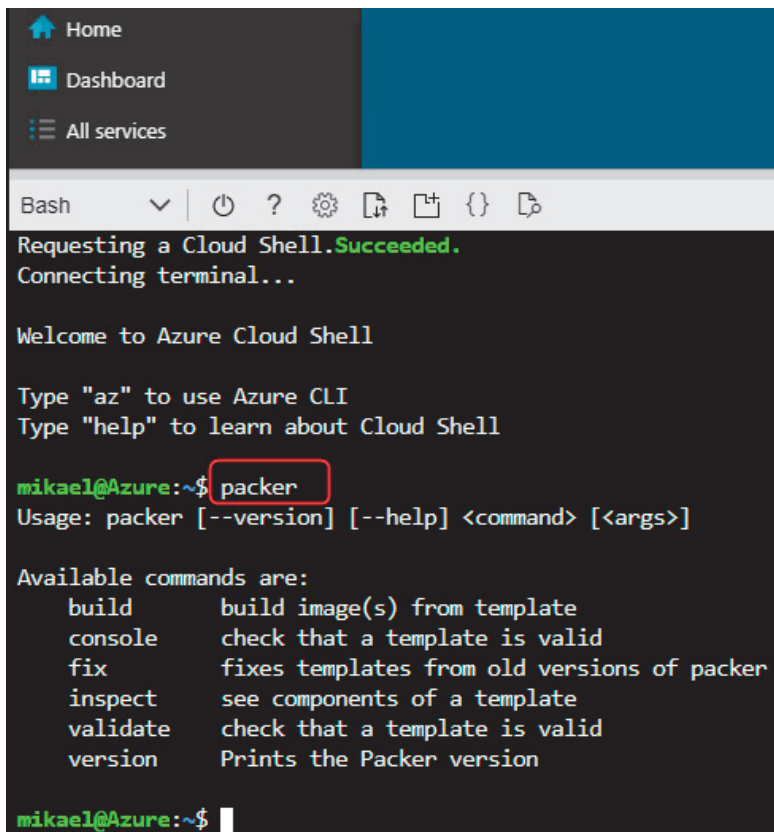
Rysunek 4.1. Wykonanie skryptu instalacyjnego Packera

```
PS C:\Windows\system32> choco install packer -y
Chocolatey v0.10.11
Installing the following packages:
packer
By installing you accept licenses for the packages.
Progress: Downloading packer 1.4.0... 100%

packer v1.4.0 [Approved]
packer package files install completed. Performing other installation steps.
Removing old packer plugins
Downloading packer 64 bit
from 'https://releases.hashicorp.com/packer/1.4.0/packer_1.4.0_windows_amd64.zip'
Progress: 100% - Completed download of C:\Users\MikaelKRIEF\AppData\Local\Temp\chocolatey\packer\1.4.0\packer_1.4.0_wi
ows_amd64.zip (33.61 MB).
Download of packer_1.4.0_windows_amd64.zip (33.61 MB) completed.
Hashes match.
Extracting C:\Users\MikaelKRIEF\AppData\Local\Temp\chocolatey\packer\1.4.0\packer_1.4.0_windows_amd64.zip to C:\ProgramD
ata\chocolatey\lib\packer\tools...
C:\ProgramData\chocolatey\lib\packer\tools
ShimGen has successfully created a shim for packer.exe
The install of packer was successful.
Software installed to 'C:\ProgramData\chocolatey\lib\packer\tools'

Chocolatey installed 1/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
PS C:\Windows\system32>
```

Rysunek 4.2. Instalowanie Packera przy użyciu Chocolatey



The screenshot shows the Azure Cloud Shell interface. On the left, there is a sidebar with 'Home', 'Dashboard', and 'All services'. The main terminal area shows the following text:

```
Bash
Requesting a Cloud Shell.Succeeded.
Connecting terminal...

Welcome to Azure Cloud Shell

Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

mikael@Azure:~$ packer
Usage: packer [--version] [--help] <command> [<args>]

Available commands are:
  build      build image(s) from template
  console    check that a template is valid
  fix        fixes templates from old versions of packer
  inspect    see components of a template
  validate   check that a template is valid
  version    Prints the Packer version

mikael@Azure:~$
```

Rysunek 4.3. Packer w Azure Cloud Shell

```
PS C:\Users\mkrief> packer --version
1.7.3
```

Rysunek 4.4. Polecenie pokazujące wersję Packera

```
PS C:\Users\mkrief> packer --help
Usage: packer [--version] [--help] <command> [<args>]

Available commands are:
  build      build image(s) from template
  console    creates a console for testing variable interpolation
  fix        fixes templates from old versions of packer
  fmt        Rewrites HCL2 config files to canonical format
  hcl2_upgrade transform a JSON template into an HCL2 configuration
  init       Install missing plugins or upgrade plugins
  inspect    see components of a template
  validate   check that a template is valid
  version    Prints the Packer version
```

Rysunek 4.5. Polecenie help Packera

```

"variables": {
  "client_id": "{{env `ARM_CLIENT_ID`}}",
  "client_secret": "{{env `ARM_CLIENT_SECRET`}}",
  "subscription_id": "{{env `ARM_SUBSCRIPTION_ID`}}",
  "tenant_id": "{{env `ARM_TENANT_ID`}}",
  "resource_group": "rg_images",
  "image_name": "linuxWeb",
  "image_version": "0.0.1",
  "location": "West Europe",
  "vm_size": "Standard_DS2_v2"
},

```

Rysunek 4.6. Zmienne szablonu Packera

```

.../templates# packer validate azure_linux.json
Template validated successfully.

```

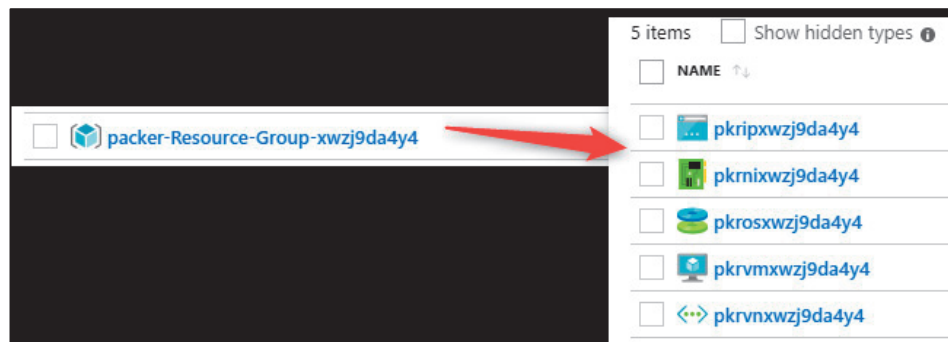
Rysunek 4.7. Sprawdzanie poprawności przez Packera

```

.../CHAP04/templates# packer build azure_linux.json
azure-arm output will be in this color.
==> azure-arm: Running builder ...
==> azure-arm: Getting tokens using client secret
==> azure-arm: Creating Azure Resource Manager (ARM) client ...
==> azure-arm: WARNING: Zone resiliency may not be supported in West Europe, checkout the docs at https://
==> azure-arm: Creating resource group ...
==> azure-arm:   -> ResourceGroupName : 'packer-Resource-Group-xwzj9da4y4'
==> azure-arm:   -> Location          : 'West Europe'
==> azure-arm:   -> Tags                :
==> azure-arm:   ->> version : 0.0.1
==> azure-arm:   ->> role : WebServer
==> azure-arm: Validating deployment template ...
==> azure-arm:   -> ResourceGroupName : 'packer-Resource-Group-xwzj9da4y4'
==> azure-arm:   -> DeploymentName    : 'pkrdpxwzj9da4y4'
==> azure-arm: Deploying deployment template ...
==> azure-arm:   -> ResourceGroupName : 'packer-Resource-Group-xwzj9da4y4'
==> azure-arm:   -> DeploymentName    : 'pkrdpxwzj9da4y4'

```

Rysunek 4.8. Utworzenie tymczasowej maszyny wirtualnej przez Packera



Rysunek 4.9. Tymczasowa grupa zasobów Packera w Azure Portal


```

==> azure-arm: Querying the machine's properties ...
==> azure-arm: -> ResourceGroupName : 'packer-Resource-Group-uhf010tdrw'
==> azure-arm: -> ComputeName       : 'pkrmuht010tdrw'
==> azure-arm: -> Managed OS Disk   : '/subscriptions/8a7aac5-.../resourceGroups/packer-Resource-Group-uhf010tdrw/providers/Microsoft
    .Compute/disk/pkrmuht010tdrw'
==> azure-arm: Querying the machine's additional disks properties ...
==> azure-arm: -> ResourceGroupName : 'packer-Resource-Group-uhf010tdrw'
==> azure-arm: -> ComputeName       : 'pkrmuht010tdrw'
==> azure-arm: -> Compute Location  : 'West Europe'
==> azure-arm: -> Image ResourceGroupName : 'rg_images'
==> azure-arm: -> Image Name         : 'linuxWeb-0.0.2'
==> azure-arm: -> Image Location      : 'westeurope'
==> azure-arm: -> ComputeName       : 'pkrmuht010tdrw'
==> azure-arm: Capturing image ...
==> azure-arm: -> Compute ResourceGroupName : 'packer-Resource-Group-uhf010tdrw'
==> azure-arm: -> Compute Name         : 'pkrmuht010tdrw'
==> azure-arm: -> Compute Location    : 'West Europe'
==> azure-arm: -> Image ResourceGroupName : 'rg_images'
==> azure-arm: -> Image Name         : 'linuxWeb-0.0.2'
==> azure-arm: -> Image Location      : 'westeurope'
==> azure-arm: Deleting resource group ...
==> azure-arm: -> ResourceGroupName : 'packer-Resource-Group-uhf010tdrw'
==> azure-arm: The resource group was created by Packer, deleting ...
==> azure-arm: Deleting the temporary OS disk ...
==> azure-arm: -> OS Disk : skipping, managed disk was used...
==> azure-arm: Deleting the temporary Additional disk ...
==> azure-arm: -> Additional Disk : skipping, managed disk was used...
Build 'azure-arm' finished.

==> Builds finished. The artifacts of successful builds are:
--> azure-arm: Azure.ResourceManagement.VMImage:
OSType: Linux
ManagedImageResourceGroupName: rg_images
ManagedImageName: linuxWeb-0.0.2
ManagedImageId: /subscriptions/8a7aac5-.../resourceGroups/rg_images/providers/Microsoft.Compute/images/linuxWeb-0.0.2
ManagedImageLocation: westeurope

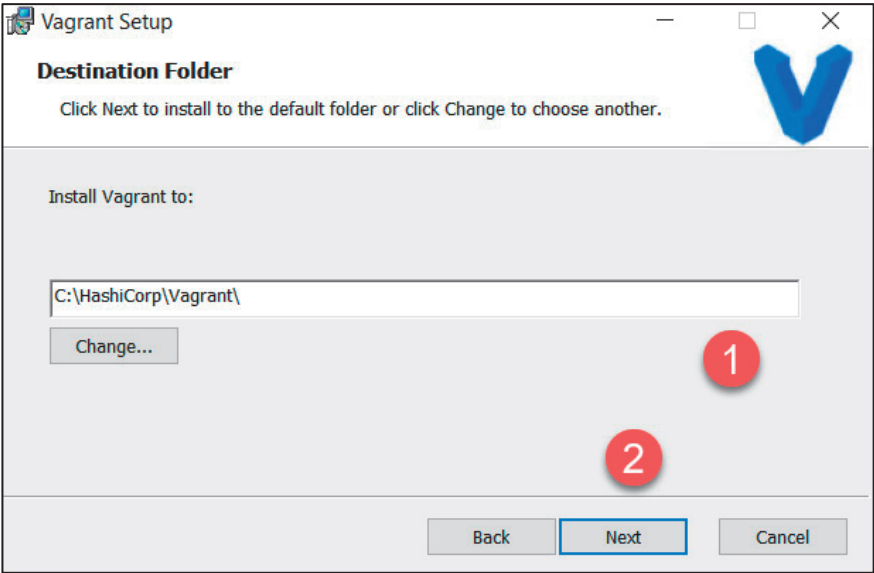
```

Rysunek 4.10. Dane wyjściowe Packera

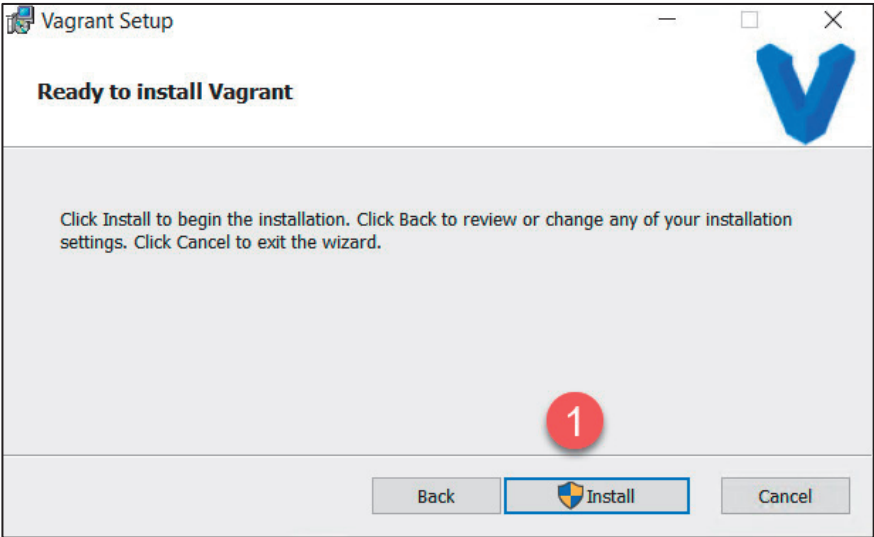
| <input type="checkbox"/> | NAME ↑↓ | TYPE ↑↓ | LOCATION ↑↓ |
|--------------------------|---|---------|-------------|
| <input type="checkbox"/> |  linuxWeb-0.0.1 | Image | West Europe |
| <input type="checkbox"/> |  linuxWebAnsible-0.0.1 | Image | West Europe |

Rysunek 4.11. Obraz maszyny wirtualnej Azure utworzony przez Packera

Rozdział 5. Tworzenie środowiska programistycznego z Vagrantem



Rysunek 5.1. Wybór folderu dla Vagranta



Rysunek 5.2. Przycisk instalacji Vagranta

```
PS C:\Users\mkrief\Documents> choco install vagrant -y
Chocolatey v0.10.15
Installing the following packages:
vagrant
By installing you accept licenses for the packages.
Progress: Downloading vagrant 2.2.18.20210807... 100%

vagrant v2.2.18.20210807
vagrant package files install completed. Performing other installation steps.
Downloading vagrant 64 bit
  from 'https://releases.hashicorp.com/vagrant/2.2.18/vagrant_2.2.18_x86_64.msi'
Progress: 100% - Completed download of C:\Users\mkrief\AppData\Local\Temp\chocolatey\vagrant\2.2.18.20210807\vagrant_2.2.18_x86_64.msi (253.13 MB).
Download of vagrant_2.2.18_x86_64.msi (253.13 MB) completed.
Hashes match.
Installing vagrant...
vagrant has been installed.
Updating installed plugins...
All plugins are up to date.
Repairing currently installed global plugins. This may take a few minutes...
Installed plugins successfully repaired!
vagrant may be able to be automatically uninstalled.
Environment vars (like PATH) have changed. Close/reopen your shell to
see the changes (or in powershell/cmd.exe just type 'refreshenv').
The install of vagrant was successful.
Software installed as 'msi', install location is likely default.

Chocolatey installed 1/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).

Packages requiring reboot:
- vagrant (exit code 3010)

The recent package changes indicate a reboot is necessary.
Please reboot at your earliest convenience.
```

Rysunek 5.3. Instalacja Vagranta przy użyciu Chocolatey

```
PS C:\Learning-DevOps-Second-Edition\CHAP05\VagrantFiles> vagrant --version
Vagrant 2.2.18
```

Rysunek 5.4. Wyświetlanie zainstalowanej wersji Vagranta




https://app.vagrantup.com/boxes/search?utf8=✓&sort=downloads&provider=&q=bionic

Vagrant Cloud Search Pricing Vagrant Help Create an Account Sign In

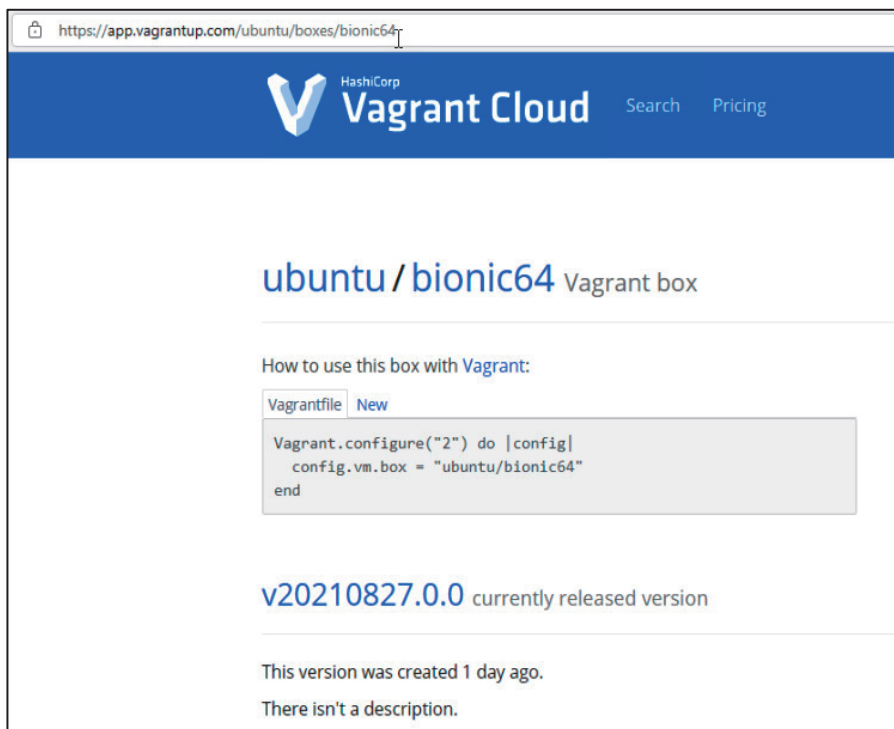
Discover Vagrant Boxes

1

Provider: any virtualbox vmware libvirt more Sort by: Downloads Recently Created Recently Updated

| | | | | |
|---|--|---|----------------------|-------------------------------|
|  | generic/ubuntu1804 3.4.0 A generic Ubuntu 18.04 (aka Bionic Beaver) image, ready for use as an appliance or development environment. | hyperv libvirt parallels virtualbox and 1 more providers | Downloads 799,142 | Released 5 days ago |
|  | ubuntu/bionic64 20210827.0.0 Official Ubuntu 18.04 LTS (Bionic Beaver) builds | virtualbox | Downloads 534,554 | Released 1 day ago |
|  | hashicorp/bionic64 1.0.282 A standard Ubuntu 18.04 LTS 64-bit box | hyperv virtualbox vmware_desktop | Downloads 80,554 | Released about 2 years ago |

Rysunek 5.5. Boksy w Vagrant Cloud



Rysunek 5.6. Szczegóły boks w Vagrant Cloud

```
PS > \Learning-DevOps-Second-Edition\CHAP05\VagrantFiles> vagrant init ubuntu/bionic64
A 'Vagrantfile' has been placed in this directory. You are now
ready to 'vagrant up' your first virtual environment! Please read
the comments in the Vagrantfile as well as documentation on
'vagrantup.com' for more information on using Vagrant.
```

Rysunek 5.7. Inicjalizacja Vagranta

```
PS > \Learning-DevOps-Second-Edition\CHAP05\VagrantFiles> vagrant validate
Vagrantfile validated successfully.
```

Rysunek 5.8. Weryfikacja konfiguracji Vagranta


```

PS > .\Learning-DevOps-Second-Edition\CHAP05\VagrantFiles> vagrant --help
Usage: vagrant [options] <command> [<args>]

    -h, --help                Print this help.

Common commands:
autocomplete    manages autocomplete installation on host
box             manages boxes: installation, removal, etc.
cloud           manages everything related to Vagrant Cloud
destroy        stops and deletes all traces of the vagrant machine
global-status   outputs status Vagrant environments for this user
halt           stops the vagrant machine
help           shows the help for a subcommand
init           initializes a new Vagrant environment by creating a Vagrantfile
login
package        packages a running vagrant environment into a box
plugin         manages plugins: install, uninstall, update, etc.
port           displays information about guest port mappings
powershell     connects to machine via powershell remoting
provision       provisions the vagrant machine
push           deploys code in this environment to a configured destination
rdp            connects to machine via RDP
reload         restarts vagrant machine, loads new Vagrantfile configuration
resume         resume a suspended vagrant machine
snapshot       manages snapshots: saving, restoring, etc.
ssh            connects to machine via SSH
ssh-config     outputs OpenSSH valid configuration to connect to the machine
status        outputs status of the vagrant machine
suspend       suspends the machine
up            starts and provisions the vagrant environment
upload         upload to machine via communicator
validate       validates the Vagrantfile
vbguest        plugin: vagrant-vbguest: install VirtualBox Guest Additions to the machine
version       prints current and latest Vagrant version
winrm         executes commands on a machine via WinRM
winrm-config   outputs WinRM configuration to connect to the machine

```

Rysunek 5.9. Wyświetlanie poleceń Vagranta

```

Bringing machine 'default' up with 'virtualbox' provider...
==> default: Importing base box 'ubuntu/bionic64'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'ubuntu/bionic64' version '20210818.0.0' is up to date...

==> default: Running 'pre-boot' VM customizations...
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
    default:
    default: Vagrant insecure key detected. Vagrant will automatically replace
    default:
    default: default: Removing insecure key from the guest if it's present...
    default: Key inserted! Disconnecting and reconnecting using new SSH key...
==> default: Machine booted and ready!
Got different reports about installed GuestAdditions version:

0 upgraded, 41 newly installed, 0 to remove and 0 not upgraded.

update-initramfs: Generating /boot/initrd.img-4.15.0-194-generic
Unmounting Virtualbox Guest Additions ISO from: /mnt
==> default: Checking for guest additions in VM...
==> default: Mounting shared folders...
    default: /vagrant => C:/REPOSPERSO/Learning-DevOps-Second-Edition/CHAP05/VagrantFiles
    default: /learningdevops => C:/REPOSPERSO/Learning-DevOps-Second-Edition/CHAP03/devopsansible
==> default: Running provisioner: shell...
    default: Running: C:/Users/mkrief/AppData/Local/Temp/vagrant-shell20210829-5524-is6k7s.sh
    default: Hit:1 http://archive.ubuntu.com/ubuntu bionic InRelease
    default: Get:2 http://archive.ubuntu.com/ubuntu bionic-updates InRelease [88.7 kB]

    default: Setting up python-cryptography (2.1.4-1ubuntu1.4) ...
    default: Setting up python-paramiko (2.0.0-1ubuntu1.2) ...
    default: Setting up ansible (2.9.24-1ppa-bionic) ...
    default: Processing triggers for mime-support (3.60ubuntu1) ...
    default: Processing triggers for man-db (2.8.3-2ubuntu0.1) ...

```

Rysunek 5.10. Wykonanie polecenia vagrant up

```
PS C:\Learning-DevOps-Second-Edition\CHAP05\VagrantFiles> vagrant ssh
Welcome to Ubuntu 18.04.5 LTS (GNU/Linux 4.15.0-154-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Sun Aug 29 14:25:23 UTC 2021

System load:  0.01          Processes:            96
Usage of /:   4.1% of 38.71GB Users logged in:          0
Memory usage: 17%          IP address for enp0s3: 10.0.2.15
Swap usage:   0%

0 updates can be applied immediately.

New release '20.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

vagrant@ubuntu-bionic:~$
```

Rysunek 5.11. Podłączanie za pomocą SSH do maszyny wirtualnej Vagranta

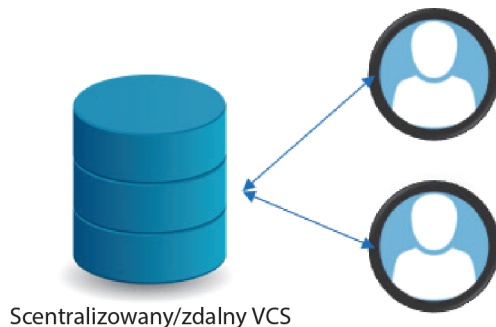
```
vagrant@ubuntu-bionic:~$ ansible --version
ansible 2.9.24
  config file = /etc/ansible/ansible.cfg
  configured module search path = [u'/home/vagrant/.ansible/plugins/modules', u'/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python2.7/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 2.7.17 (default, Feb 27 2021, 15:10:58) [GCC 7.5.0]
vagrant@ubuntu-bionic:~$
```

Rysunek 5.12. Wykonywanie poleceń wewnątrz maszyny wirtualnej

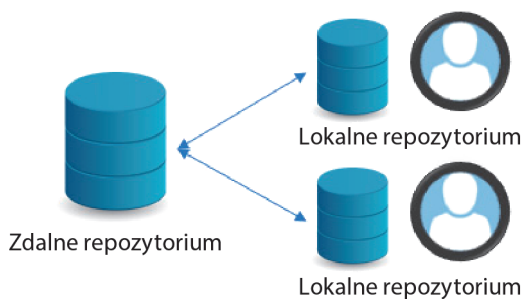
```
PS C:\Learning-DevOps-Second-Edition\CHAP05\VagrantFiles> vagrant destroy
 default: Are you sure you want to destroy the 'default' VM? [y/N] y
==> default: Forcing shutdown of VM...
==> default: Destroying VM and associated drives...
```

Rysunek 5.13. Zniszczenie VM Vagranta

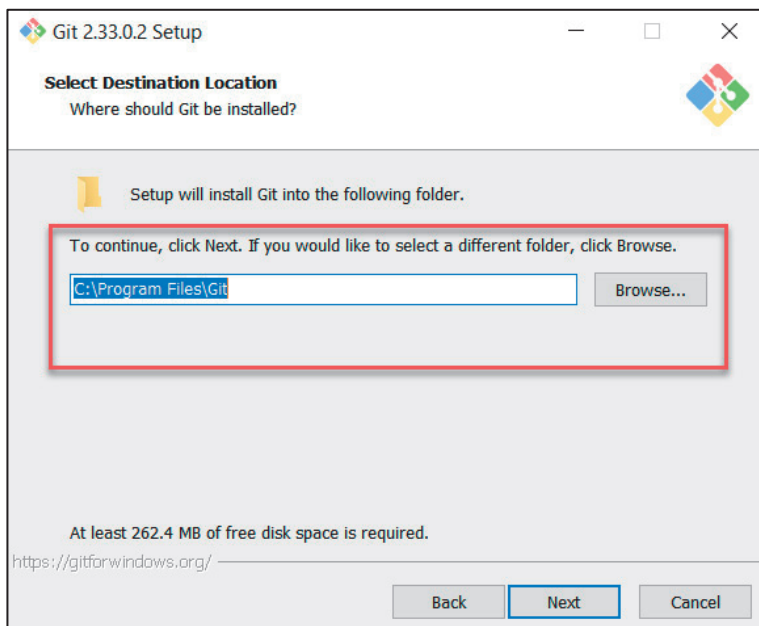
Rozdział 6. Zarządzanie kodem źródłowym za pomocą Gita



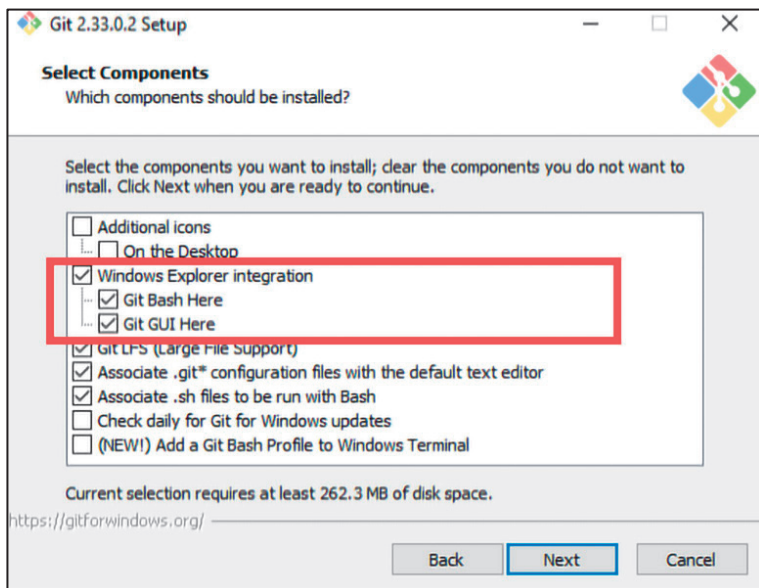
Scentralizowany/zdalny VCS
Rysunek 6.1. Scentralizowana kontrola kodu źródłowego



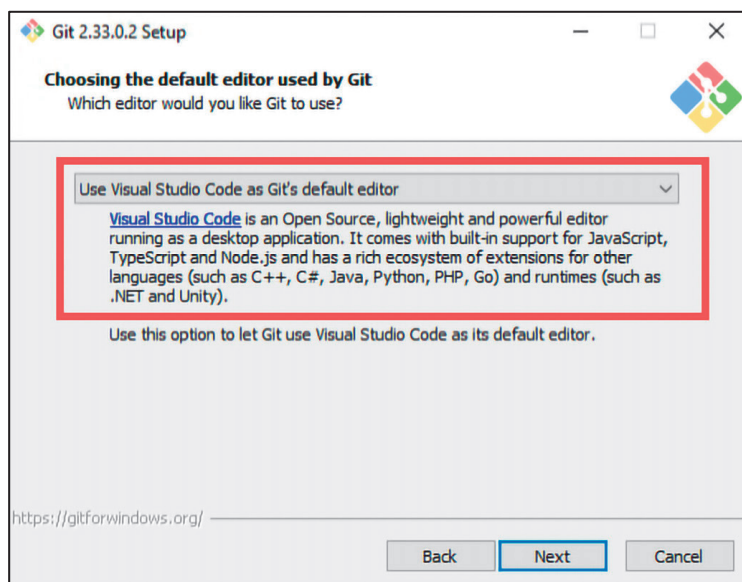
Rysunek 6.2. Rozproszona kontrola kodu źródłowego



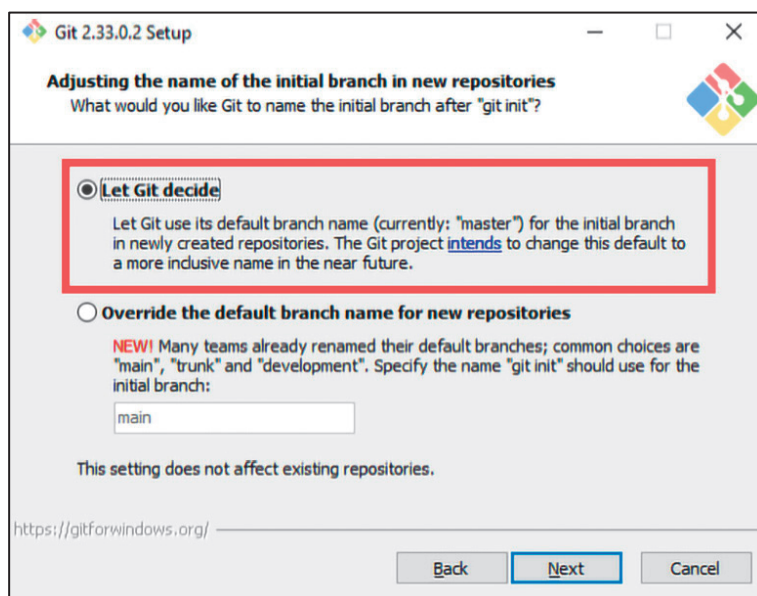
Rysunek 6.3. Ścieżka instalacji Gita



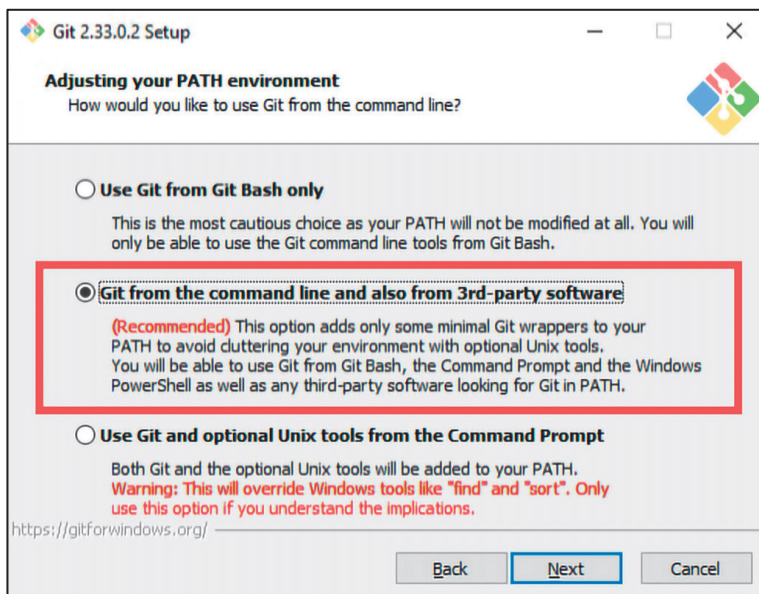
Rysunek 6.4. Wybór komponentów instalacyjnych Gita



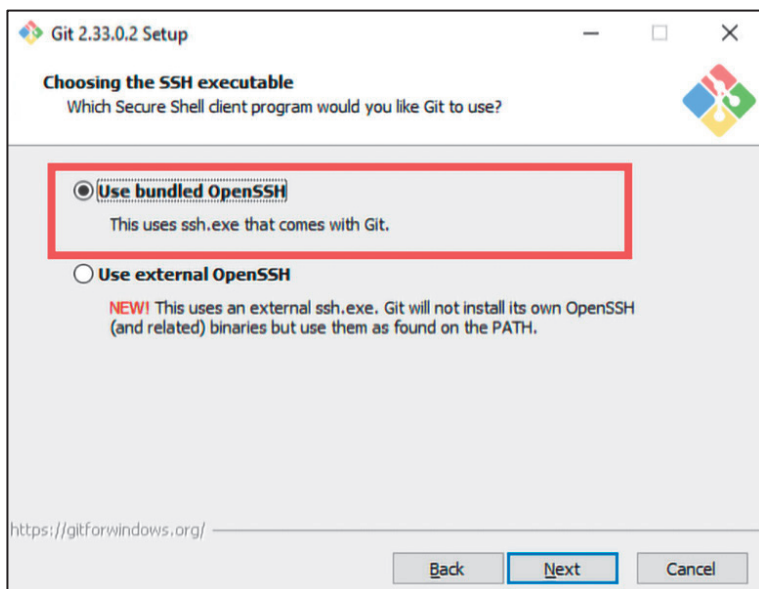
Rysunek 6.5. Wybór edytora Gita



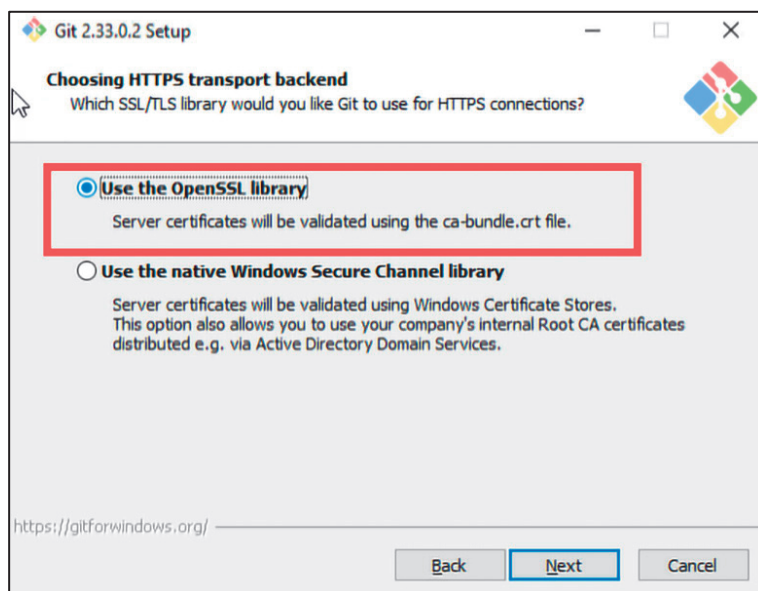
Rysunek 6.6. Domyślna nazwa gałęzi Gita



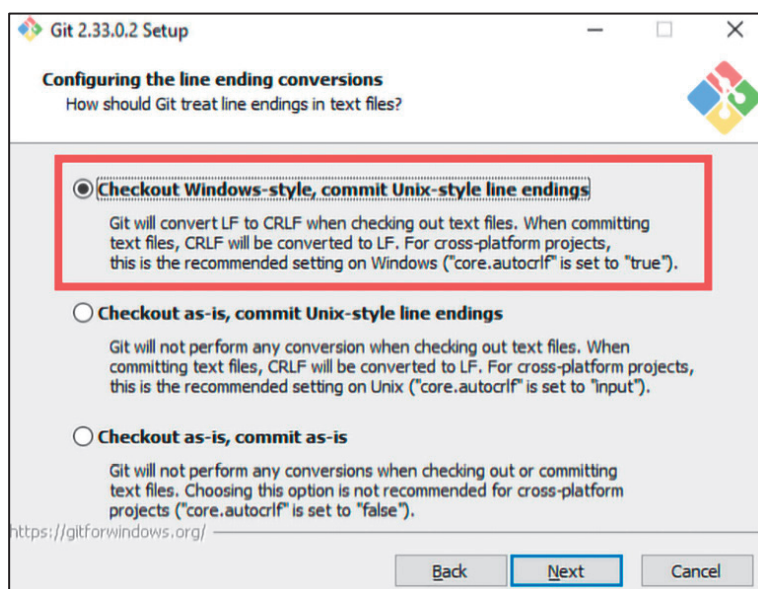
Rysunek 6.7. Konfiguracja PATH podczas instalacji Gita



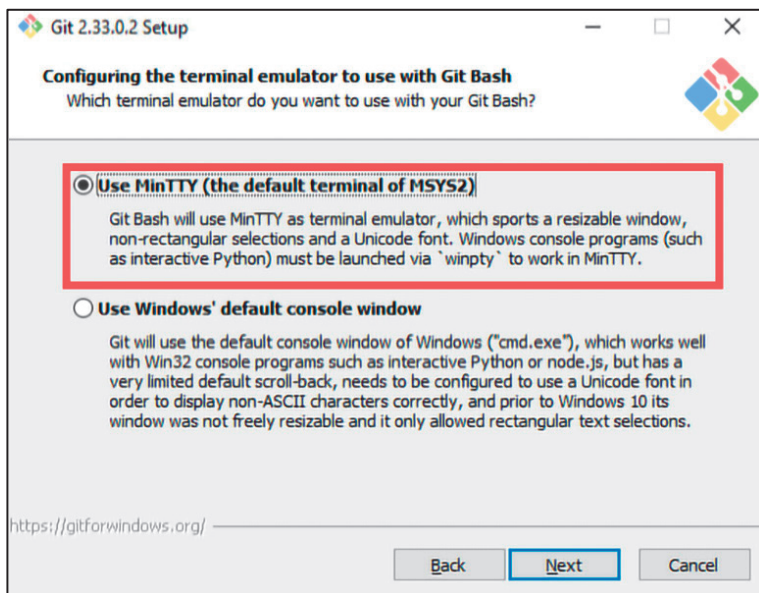
Rysunek 6.8. Wybór SSH podczas instalacji Gita



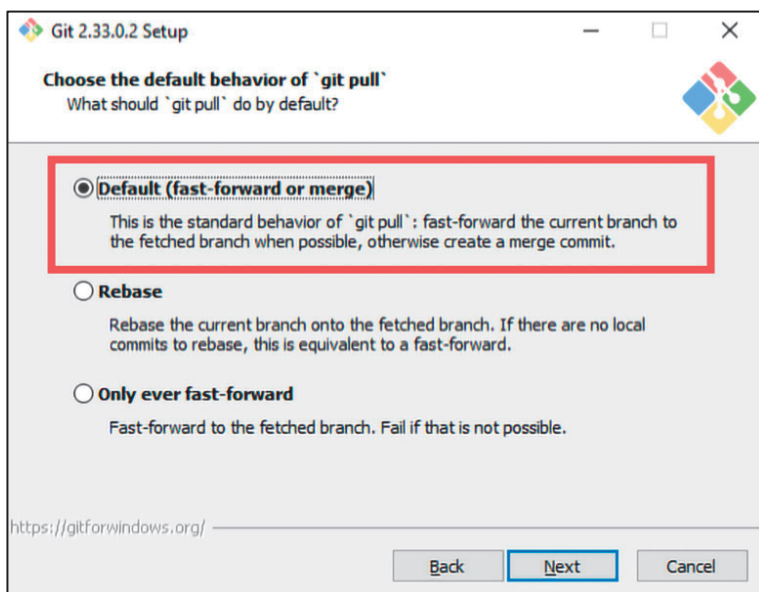
Rysunek 6.9. Wybór OpenSSL podczas instalacji Gita



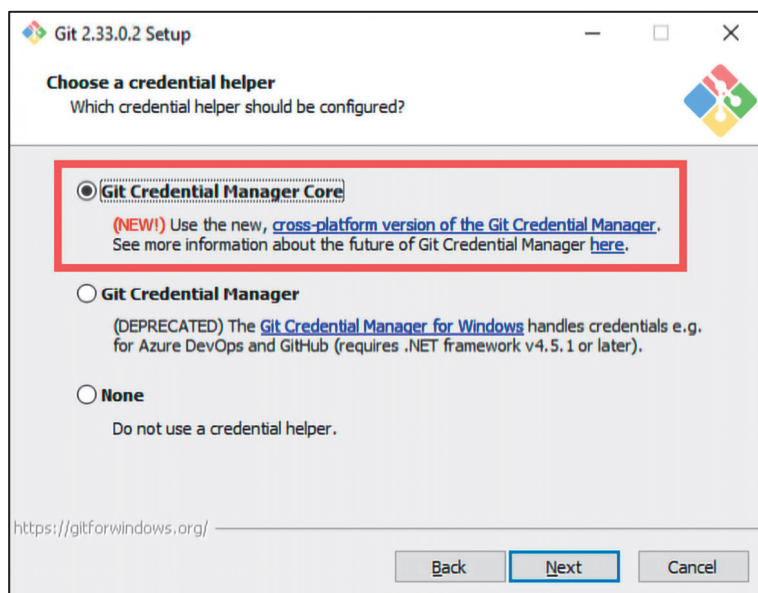
Rysunek 6.10. Wybór kodowania plików Gita



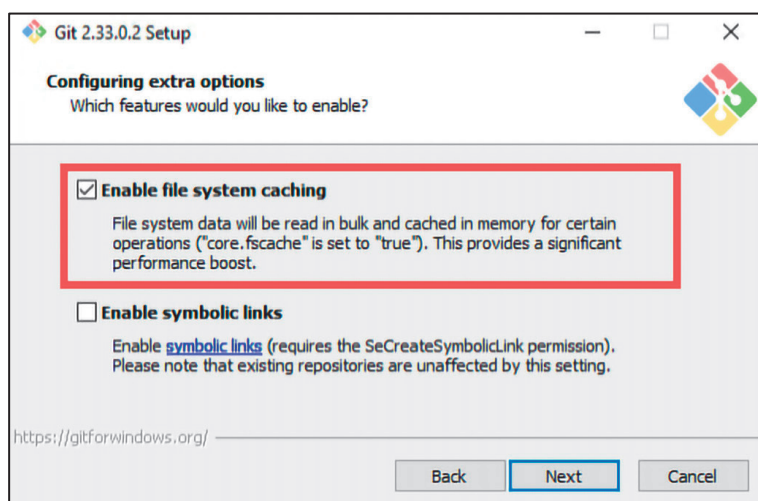
Rysunek 6.11. Emulator terminala Gita



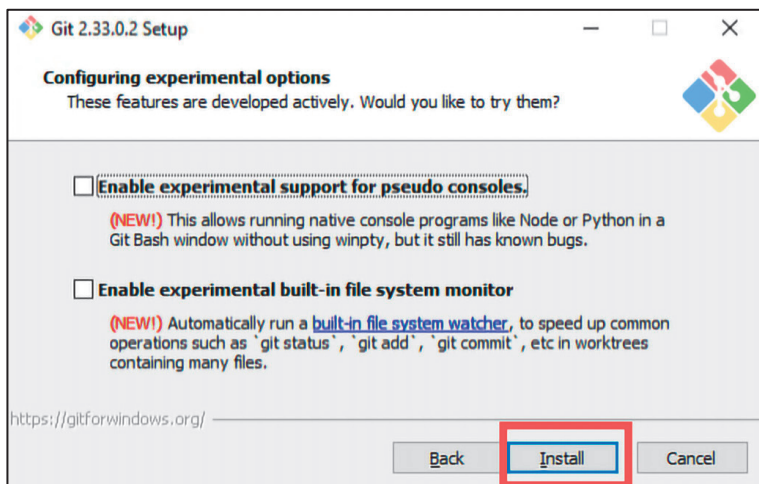
Rysunek 6.12. Domyślne zachowanie polecenia git pull



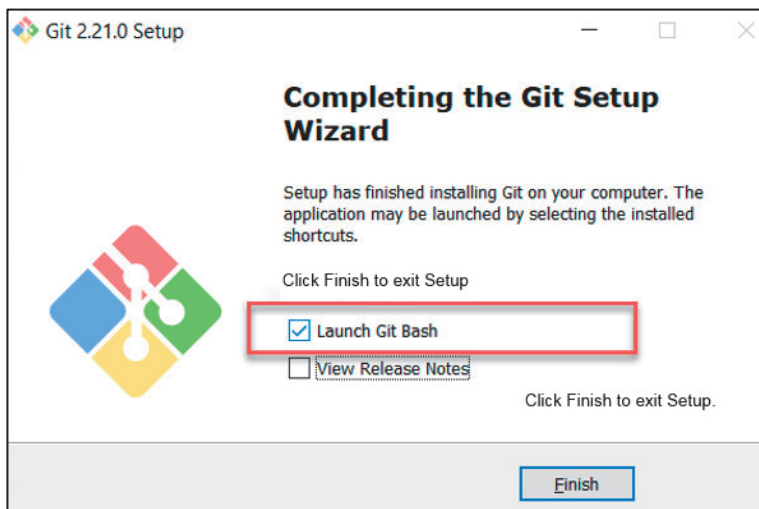
Rysunek 6.13. Menedżer poświadczeń Gita



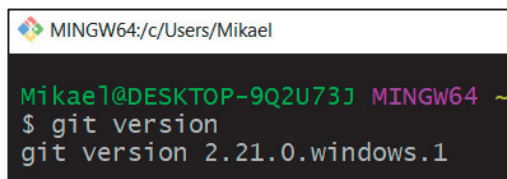
Rysunek 6.14. Buforowanie plików Gita



Rysunek 6.15. Ostatni krok instalacji Gita



Rysunek 6.16. Koniec instalacji Gita



Rysunek 6.17. Wyświetlanie wersji Gita

```
PS C:\WINDOWS\system32> choco install -y git
Chocolatey v0.10.15
Installing the following packages:
git
By installing you accept licenses for the packages.
Progress: Downloading git.install 2.33.0.2... 100%
Progress: Downloading git 2.33.0.2... 100%

git.install v2.33.0.2 [Approved]
git.install package files install completed. Performing other installation steps.
Using Git LFS
Installing 64-bit git.install...
git.install has been installed.
WARNING: Can't find git.install install location
  git.install can be automatically uninstalled.
Environment Vars (like PATH) have changed. Close/reopen your shell to
see the changes (or in powershell/cmd.exe just type `refreshenv`).
The install of git.install was successful.
  Software installed to 'C:\Program Files\Git\'

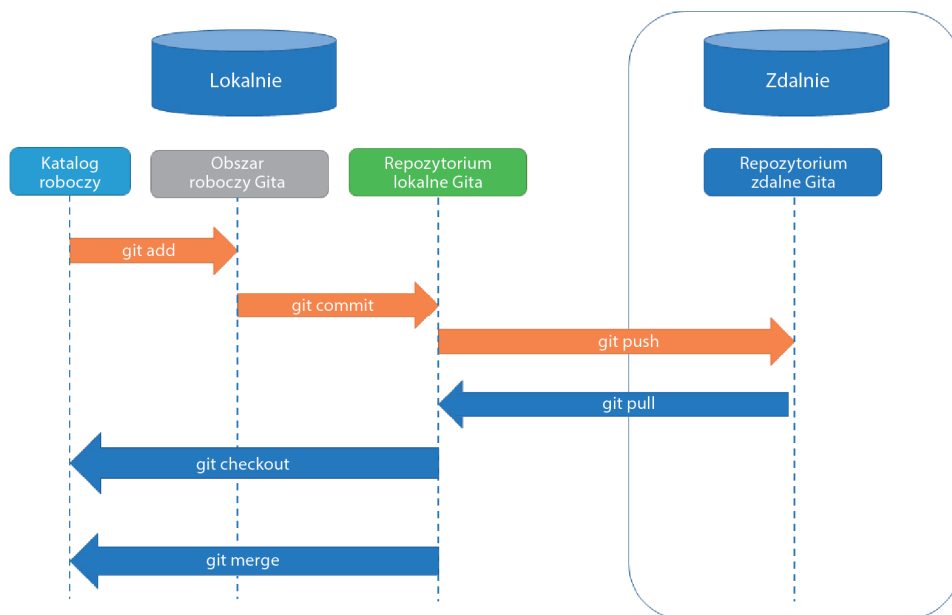
git v2.33.0.2 [Approved]
git package files install completed. Performing other installation steps.
The install of git was successful.
  Software install location not explicitly set, could be in package or
  default install location if installer.

Chocolatey installed 2/2 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
```

Rysunek 6.18. Instalacja Gita za pomocą Chocolatey

```
# git config --global user.name "mikaelkrief"
# git config --global user.email "mikael.krief"
# git config --global --list
user.name=mikaelkrief
user.email=mikael.krief@fr
```

Rysunek 6.19. Konfiguracja Gita



Rysunek 6.20. Przepływ danych w Gicie

Create a project to get started


Project name *

BookDemo ✓


Description

Demo project

Visibility

 Public

Anyone on the internet can view the project. Certain features like TFVC are not supported.

 Private

Only people you give access to will be able to view this project.

^ Advanced

Version control ?

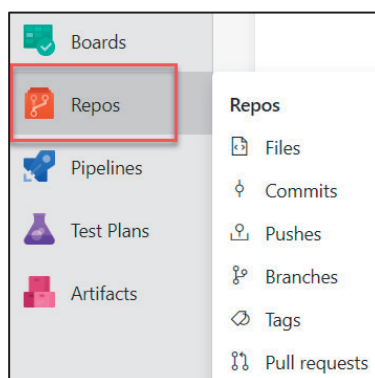
Git ▼

Work item process ?

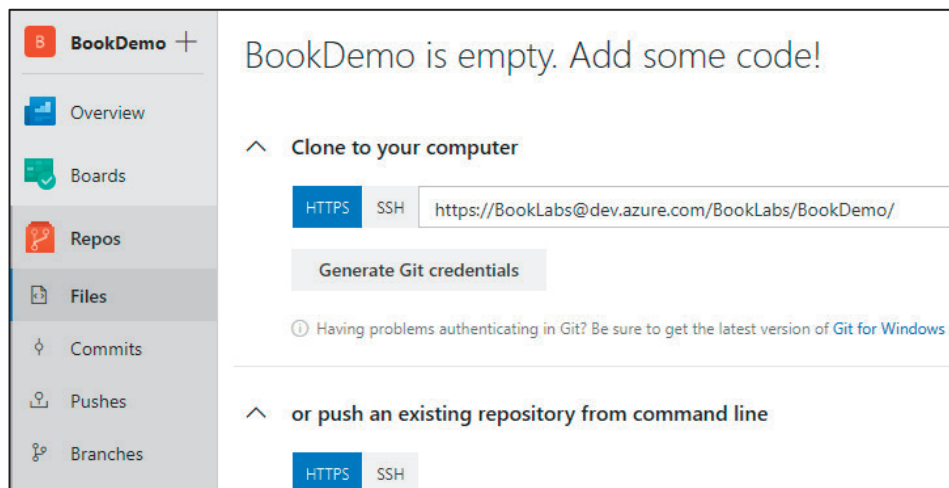
Basic ▼

+ Create project

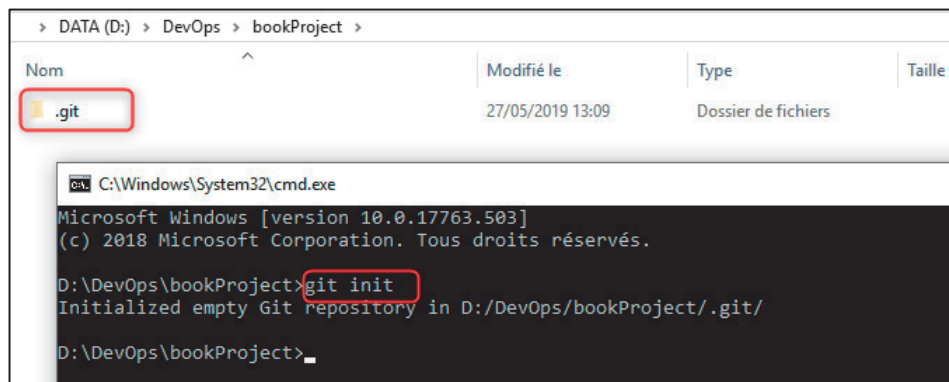
Rysunek 6.21. Tworzenie projektu Azure DevOps



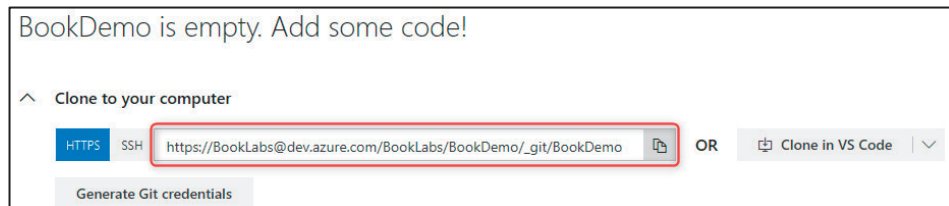
Rysunek 6.22. Menu usługi Azure Repos



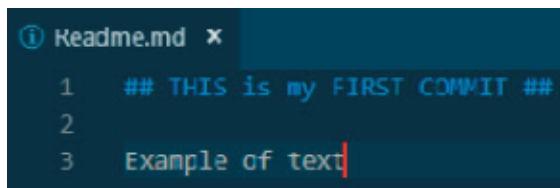
Rysunek 6.23. Nowe repozytorium Azure DevOps



Rysunek 6.24. Polecenie git init

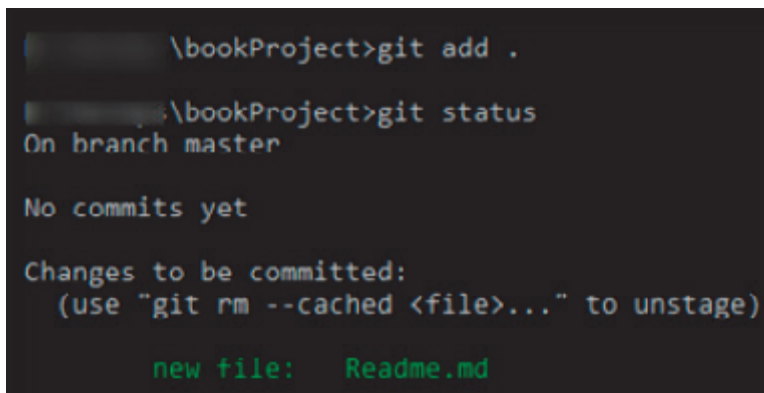


Rysunek 6.25. Adres URL repozytorium Azure DevOps



```
1  ## THIS is my FIRST COMMIT ##
2
3  Example of text
```

Rysunek 6.26. Przykładowy plik README



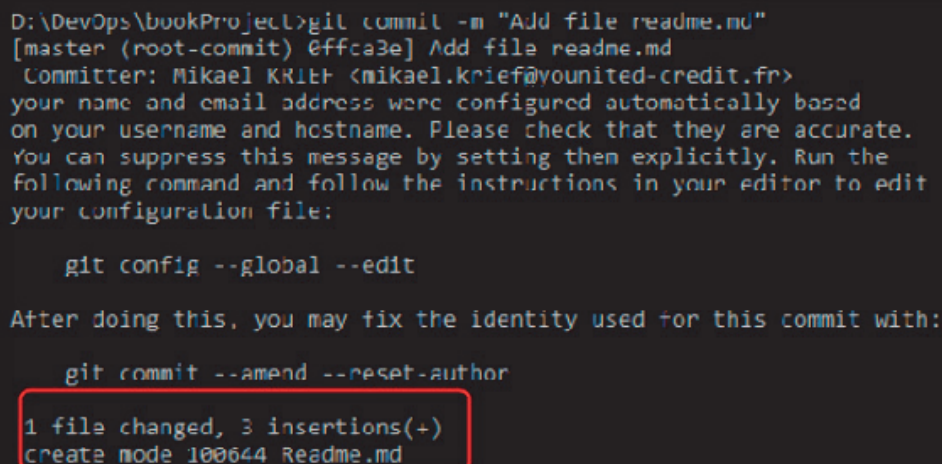
```
\bookProject>git add .
\bookProject>git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)

    new file:   Readme.md
```

Rysunek 6.27. Polecenie git add .



```
D:\DevOps\bookProject>git commit -m "Add file readme.md"
[master (root-commit) 0ffca3e] Add file readme.md
Committer: Mikael KRIEF <mikael.krief@younited-credit.fr>
your name and email address were configured automatically based
on your username and hostname. Please check that they are accurate.
You can suppress this message by setting them explicitly. Run the
following command and follow the instructions in your editor to edit
your configuration file:

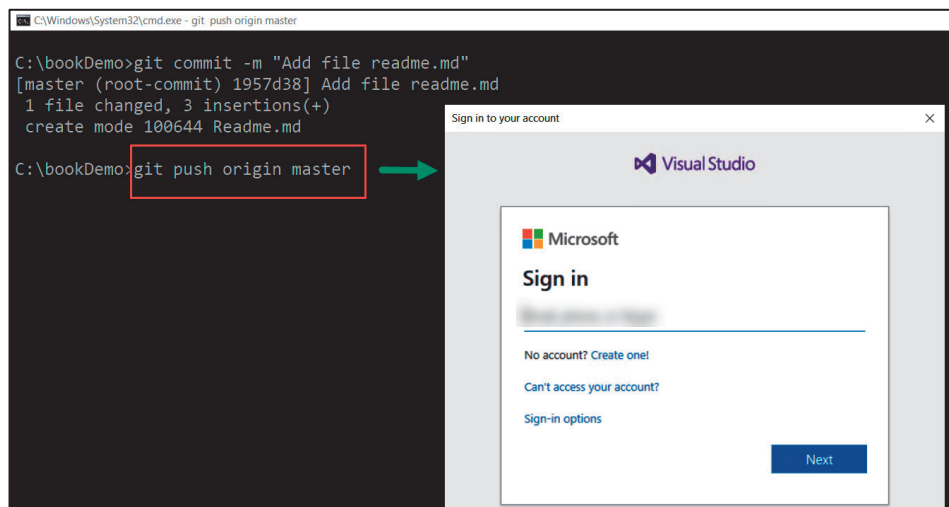
    git config --global --edit

After doing this, you may fix the identity used for this commit with:

    git commit --amend --reset-author

1 file changed, 3 insertions(+)
create mode 100644 Readme.md
```

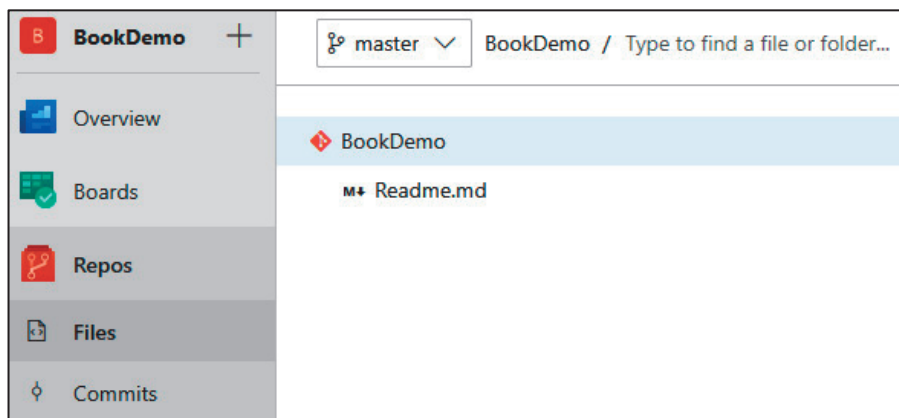
Rysunek 6.28. Polecenie git commit



Rysunek 6.29. git push na Azure DevOps

```
\bookProject>git push origin master  
Enumerating objects: 3, done.  
Counting objects: 100% (3/3), done.  
Writing objects: 100% (3/3), 275 bytes | 275.00 KiB/s, done.  
Total 3 (delta 0), reused 0 (delta 0)  
remote: Analyzing objects... (3/3) (6 ms)  
remote: Storing packfile... done (324 ms)  
remote: Storing index... done (148 ms)  
To https://dev.azure.com/BookLabs/BookDemo/_git/BookDemo  
* [new branch]      master -> master
```

Rysunek 6.30. Wynik git push



Rysunek 6.31. Nowy plik dodany do Azure Repos


```
\bookProject>git pull origin master
remote: Azure Repos
remote: Found 3 objects to send. (0 ms)
Unpacking objects: 100% (3/3), done.
From https://dev.azure.com/BookLabs/BookDemo/_git/BookDemo
 * branch                master      -> FETCH_HEAD
   9113a75..d2daf68      master      -> origin/master
Updating 9113a75..d2daf68
Fast-forward
 README.md | 4 +++-
 1 file changed, 3 insertions(+), 1 deletion(-)
```

Rysunek 6.32. Polecenie git pull



Rysunek 6.33. Schemat rozgałęzień

```
\BookDemo>git branch Feature1

\BookDemo>git checkout Feature1
Switched to branch 'Feature1'
```

Rysunek 6.34. Przełączanie gałęzi Gita

```
\BookDemo>git branch
* Feature1
master
```

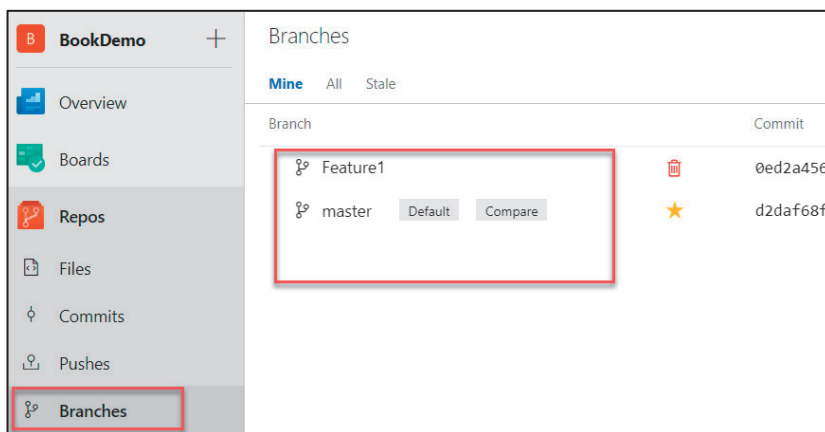
Rysunek 6.35. Polecenie git branch

```
\BookDemo>git add .

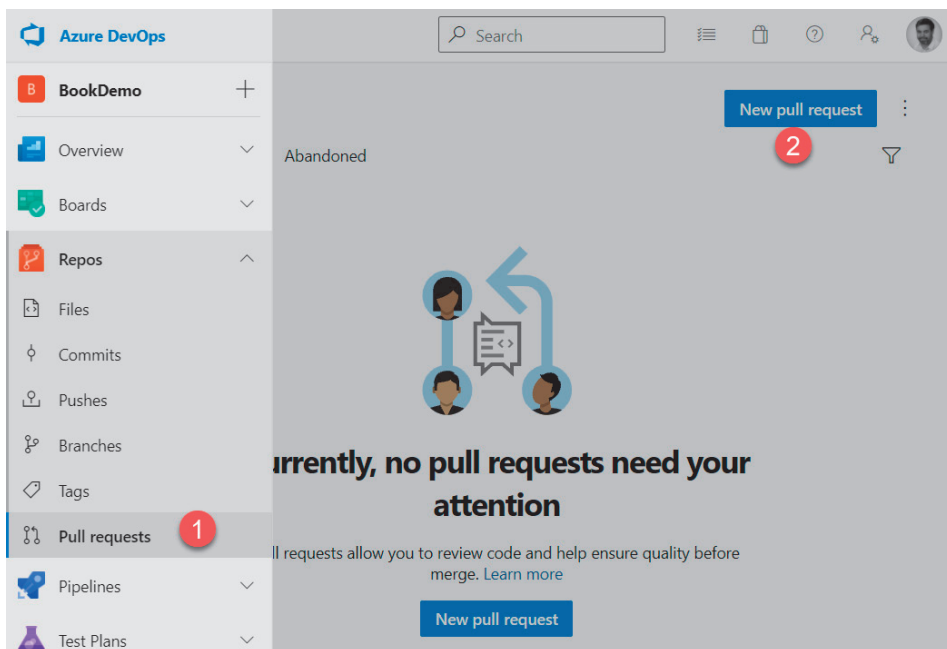
\BookDemo>git commit -m "Add feature 1 code"
[Feature1 0ed2a45] Add feature 1 code
1 file changed, 3 insertions(+), 1 deletion(-)

\BookDemo>git push origin Feature1
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (2/2), done.
Writing objects: 100% (3/3), 306 bytes | 153.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0)
remote: Analyzing objects... (3/3) (97 ms)
remote: Storing packfile... done (188 ms)
remote: Storing index... done (92 ms)
To https://dev.azure.com/BookLabs/BookDemo/_git/BookDemo
 * [new branch] Feature1 -> Feature1
```

Rysunek 6.36. Dodawanie gałęzi Gita



Rysunek 6.37. Lista gałęzi Azure Repos



Rysunek 6.38. Azure Repos — tworzenie PR

The screenshot shows the 'Create Pull Request' form in Azure Repos. At the top, there are dropdowns for the source branch ('Feature1') and the target branch ('into master'). Below these are tabs for 'Overview', 'Files' (with a count of 2), and 'Commits' (with a count of 2). The 'Overview' tab is active. The form contains several sections: a 'Title' field with the text 'Update feature'; a 'Description' field with the placeholder 'Describe the code that is being reviewed'; a 'Reviewers' section with a dropdown menu showing 'Mikael Krief' and a search bar; a 'Work items to link' section with a search bar; and a 'Tags' section. A red arrow points to the 'Create' button at the bottom right.

Rysunek 6.39. Formularz PR Azure Repos

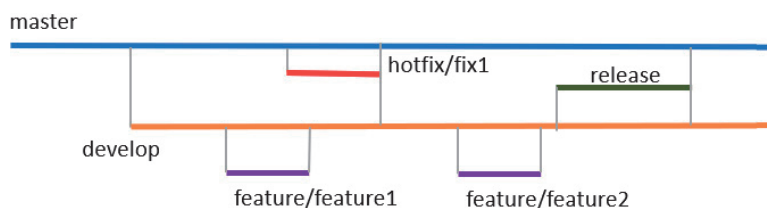
The screenshot shows the details of a Pull Request titled 'Update feature'. The PR is in the 'Active' state and is created by 'Mikael Krief' from the 'Feature1' branch into the 'master' branch. The 'Approve' and 'Complete' buttons are highlighted with a red box. Below the buttons, there are tabs for 'Overview', 'Files', 'Updates', and 'Commits'. The 'Overview' tab is active. The 'Overview' section shows a green checkmark and the text 'No merge conflicts' with 'Last checked Just now'. Below this is a 'Description' field with a placeholder 'Describe the code that is being reviewed'.

Rysunek 6.40. Zatwierdzenie PR Azure Repos

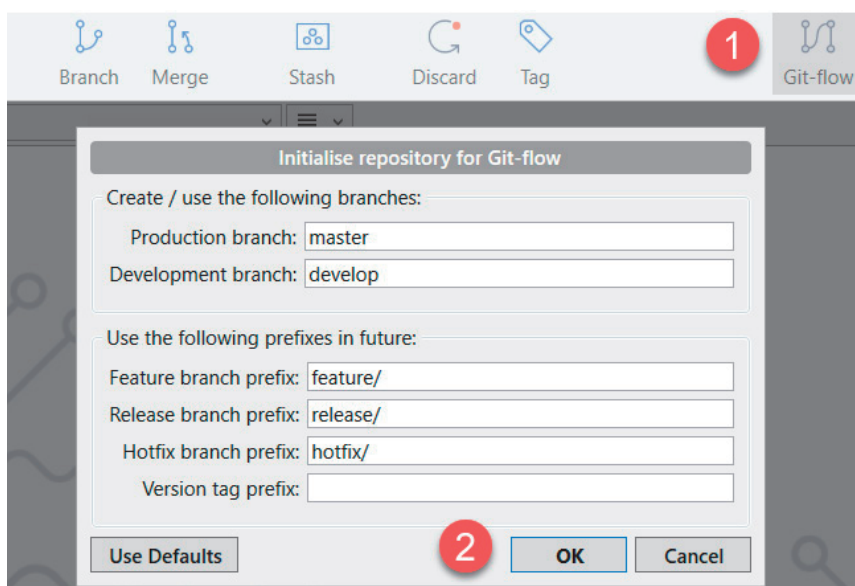
```
\bookProject>git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

\bookProject>git merge Feature1
Updating 0ed2a45..3/b/8ab
Fast forward
 README.md | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)
```

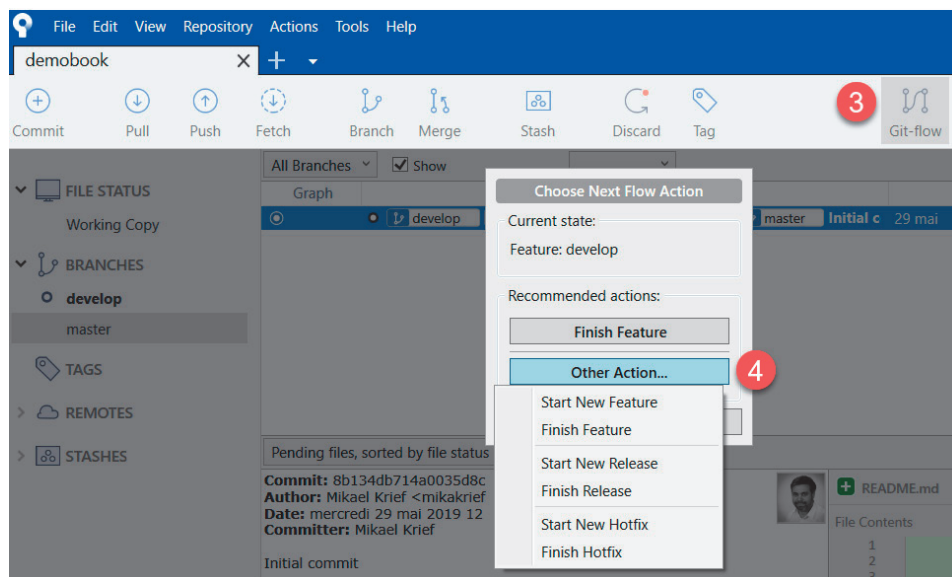
Rysunek 6.41. Scalanie gałęzi



Rysunek 6.42. Diagram Gitflow

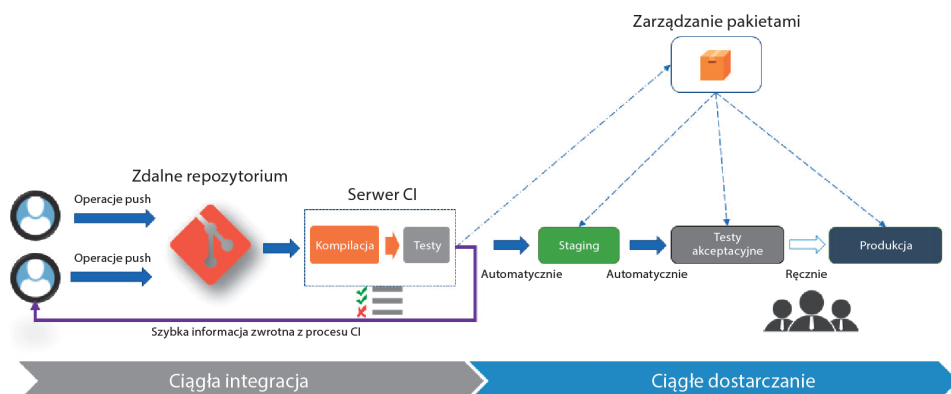


Rysunek 6.43. Narzędzie Git-flow od Sourcetree



Rysunek 6.44. Tworzenie gałęzi za pomocą Sourcetree

Rozdział 7. Ciągła integracja i ciągłe wdrażanie





Rysunek 7.1. Przebieg pracy CI/CD


nuget Packages Upload Statistics Documentation Downloads Blog

Search for packages...

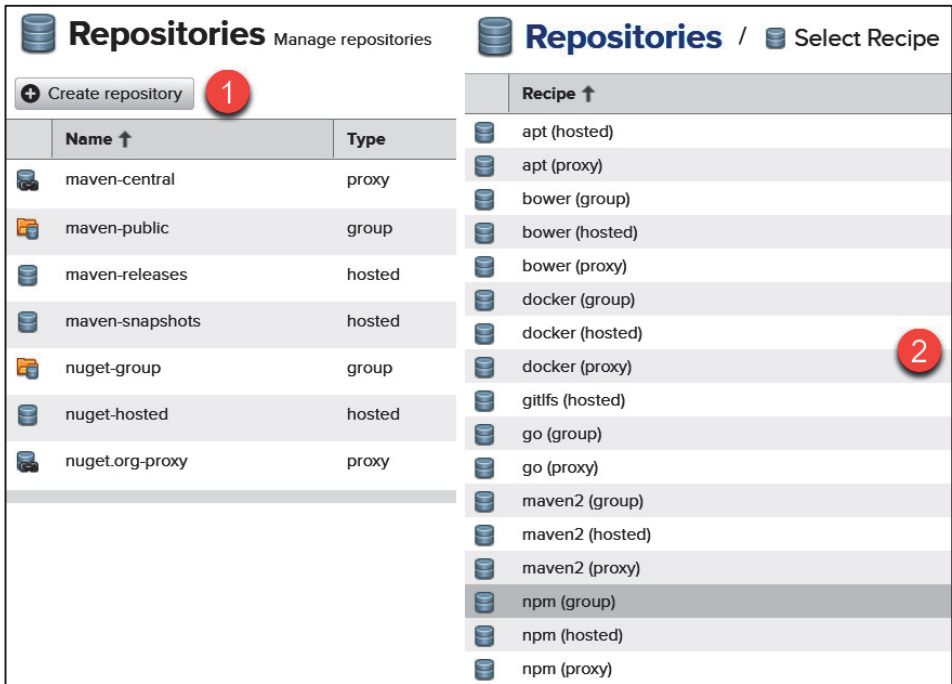
There are 255 875 packages

 **Newtonsoft.Json** ✓ by: dotnetfoundation jamesnk newtonsoft
↓ 1 281 207 499 total downloads ⌚ last updated 6 months ago 📦 Latest version: 13.0.1 🔗 json
Json.NET is a popular high-performance JSON framework for .NET

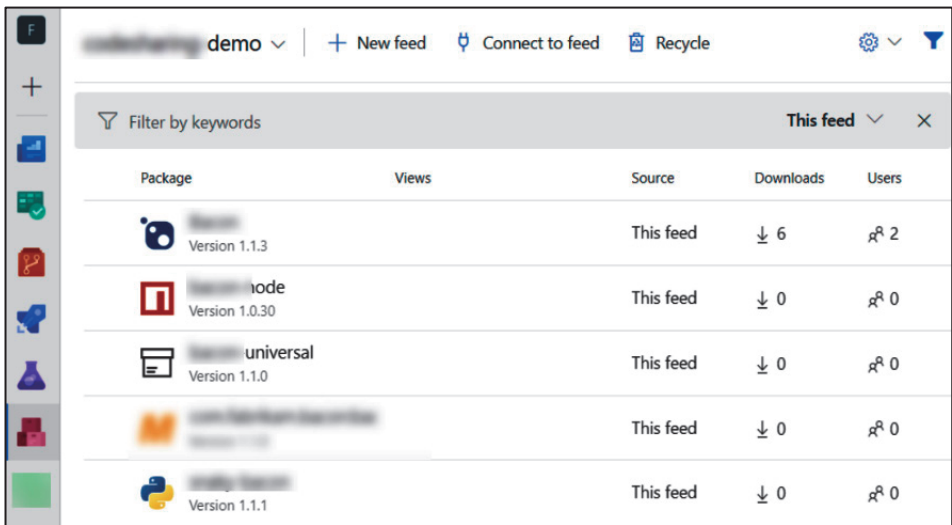
 **Microsoft.Extensions.DependencyInjection** ✓ by: aspnet dotnetframework Microsoft
↓ 753 833 308 total downloads ⌚ last updated 12 days ago 📦 Latest version: 6.0.0-rc.1.21451.13
Default implementation of dependency injection for Microsoft.Extensions.DependencyInjection.

 **Microsoft.Extensions.Logging** ✓ by: aspnet dotnetframework Microsoft
↓ 735 313 652 total downloads ⌚ last updated 12 days ago 📦 Latest version: 6.0.0-rc.1.21451.13
Logging infrastructure default implementation for Microsoft.Extensions.Logging.

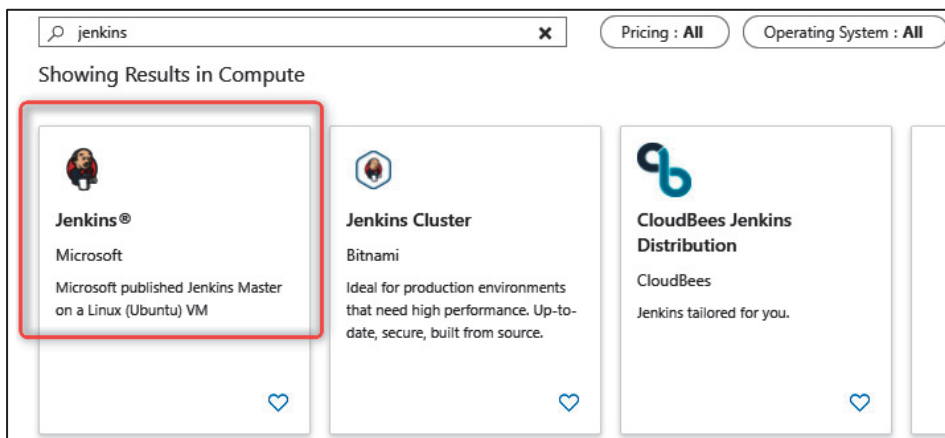
Rysunek 7.2. Menedżer pakietów NuGet



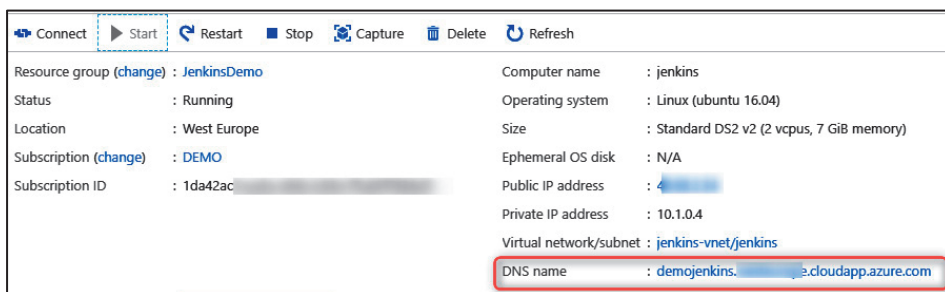
Rysunek 7.3. Menedżer pakietów Nexusa



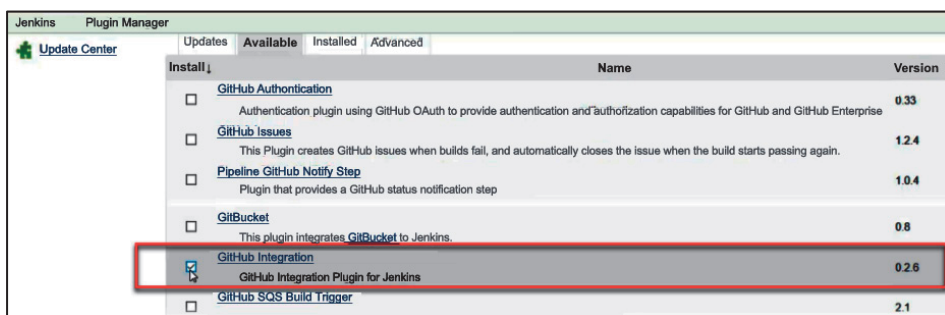
Rysunek 7.4. Pakiety Azure Artifacts



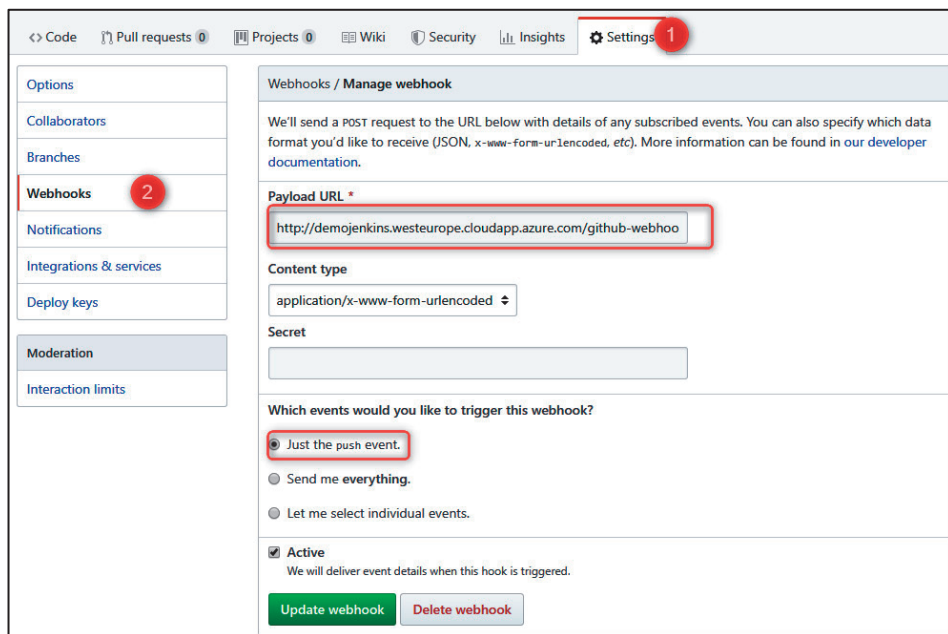
Rysunek 7.5. Jenkins w Azure Marketplace



Rysunek 7.6. Nazwa Jenkinsa w Azure Domain Name System (DNS)

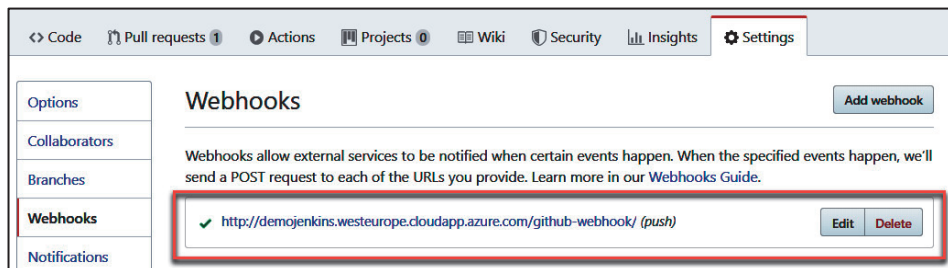


Rysunek 7.7. Integracja Jenkinsa z GitHubem



The screenshot shows the GitHub 'Manage webhooks' configuration page. The left sidebar contains navigation links: Options, Collaborators, Branches, Webhooks (highlighted with a red circle and number 2), Notifications, Integrations & services, Deploy keys, Moderation, and Interaction limits. The main content area is titled 'Webhooks / Manage webhook'. It includes a description of webhooks, a 'Payload URL' field containing 'http://demojenkins.westeurope.cloudapp.azure.com/github-webhook' (highlighted with a red box), a 'Content type' dropdown set to 'application/x-www-form-urlencoded', a 'Secret' field, and a section for selecting events. Under 'Which events would you like to trigger this webhook?', the 'Just the push event.' option is selected (highlighted with a red box). The 'Active' checkbox is checked, with a note: 'We will deliver event details when this hook is triggered.' At the bottom are 'Update webhook' and 'Delete webhook' buttons. The top navigation bar includes links for Code, Pull requests, Projects, Wiki, Security, Insights, and Settings (highlighted with a red circle and number 1).

Rysunek 7.8. Konfiguracja webhooka GitHuba dla Jenkinsa



The screenshot shows the GitHub 'Webhooks' page. The left sidebar contains navigation links: Options, Collaborators, Branches, Webhooks (highlighted with a red box), and Notifications. The main content area is titled 'Webhooks' and includes an 'Add webhook' button. Below the title, there is a description of webhooks. A table lists the configured webhooks, with one entry highlighted by a red box: a green checkmark, the URL 'http://demojenkins.westeurope.cloudapp.azure.com/github-webhook/' followed by '(push)', and 'Edit' and 'Delete' buttons. The top navigation bar includes links for Code, Pull requests, Actions, Projects, Wiki, Security, Insights, and Settings.

Rysunek 7.9. Weryfikacja webhooka GitHuba



Rysunek 7.10. Tworzenie nowego zadania w Jenkinsie

The image shows the 'Enter an item name' form in Jenkins. At the top, there is a text input field containing 'demoCI' (labeled with a red circle 1). Below the input field, there is a link that says '» Required field'. Below the input field, there are two options: 'Freestyle project' (labeled with a red circle 2) and 'Maven project'. The 'Freestyle project' option is selected, and its description is visible: 'This is the central feature of Jenkins. Jenkins will build your project, combining any SCM'. Below the options, there is a blue 'OK' button (labeled with a red circle 3).

Rysunek 7.11. Nazwa zadania Jenkinsa

The image shows the Jenkins configuration form for a GitHub project. At the top, there is a 'Description' field. Below the description field, there is a checkbox labeled 'Enable project-based security'. Below that, there is a checkbox labeled 'Discard old builds'. Below that, there is a checkbox labeled 'GitHub project' which is checked. At the bottom, there is a 'Project url' field containing the text 'https://github.com/mikaelkrief/MyShuttle2/'.

Rysunek 7.12. Zadanie Jenkinsa — GitHub

Source Code Management

☐ None
☒ Git

Repositories

Repository URL

Credentials

Branches to build

Branch Specifier (blank for 'any')

Repository browser

Rysunek 7.13. Zadanie Jenkinsa — konfiguracja GitHuba

Build Triggers

☐ Trigger builds remotely (e.g., from scripts)

☐ Build after other projects are built

☐ Build periodically

☐ Build when a change is pushed to TFS/Team Services

☐ Build when a change is pushed to a TFS pull request

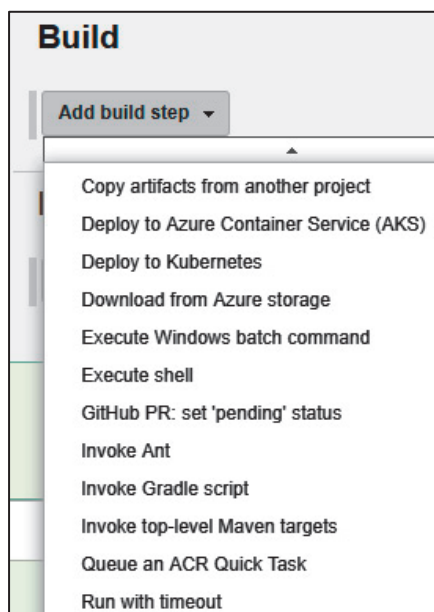
☐ GitHub Branches

☐ GitHub Pull Requests

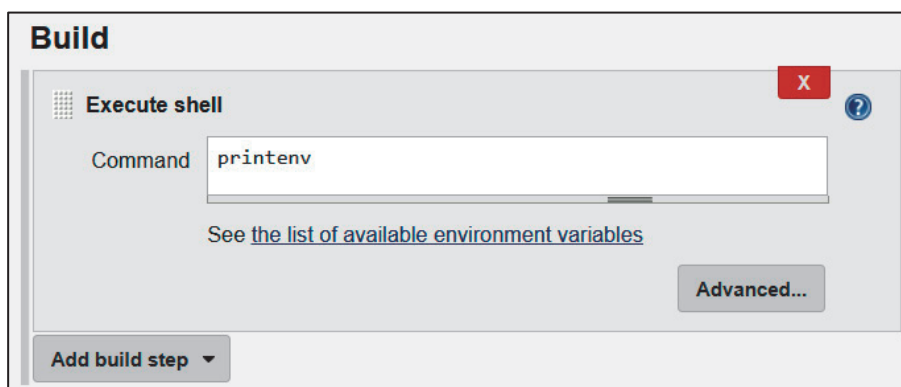
☒ GitHub hook trigger for GITScm polling

☐ Poll SCM

Rysunek 7.14. Zadanie Jenkinsa — konfiguracja GitHuba



Rysunek 7.15. Zadanie Jenkinsa — dodawanie kroku kompilacji



Rysunek 7.16. Przykład uruchamiania zadania Jenkinsa

GitHub Hook Log

GitHub

Open Blue Ocean

Rename

Permalinks

- [Last build \(#4\), 18 sec ago](#)
- [Last stable build \(#4\), 18 sec ago](#)
- [Last successful build \(#4\), 18 sec ago](#)
- [Last completed build \(#4\), 18 sec ago](#)

Build History trend =

| | |
|----|----------------------|
| #4 | Jun 4, 2019 5:02 PM |
| #3 | Jun 4, 2019 5:01 PM |
| #2 | Jun 3, 2019 11:21 PM |
| #1 | Jun 3, 2019 11:14 PM |

Rysunek 7.17. Historia wykonywania zadań Jenkinsa

Jenkins > demoCI > #4

- Back to Project
- Status
- Changes
- Console Output
- View as plain text
- Edit Build Information
- Delete build '#4'
- Polling Log
- Git Build Data
- No Tags

Console Output

```

Started by GitHub push by mikaelkrief
Building in workspace /var/lib/jenkins/workspace/demoCI
No credentials specified
> git rev-parse --is-inside-work-tree # timeout=10
> git fetch --tags --progress https://github.com/mikaelkrief/MyShuttle2.git # timeout=10
> git config remote.origin.url https://github.com/mikaelkrief/MyShuttle2.git # timeout=10
> git fetch upstream changes from https://github.com/mikaelkrief/MyShuttle2.git
> git --version # timeout=10
> git fetch --tags --progress https://github.com/mikaelkrief/MyShuttle2.git +refs/heads/*:refs/remotes/origin/*
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
> git rev-parse refs/remotes/origin/master^{commit} # timeout=10
Checking out Revision 475f4117a5e4d4892427e77104875f7f25ab0734 (refs/remotes/origin/master)

```

Rysunek 7.18. Dane wyjściowe konsoli zadań Jenkinsa

Azure DevOps

BookLabs / BookDemo / Repos / Files / BookDemo

BookDemo

- Overview
- Boards
- Repos**
- Files
- Commits
- Pushes
- Branches

Feature1 BookDemo / Type to find

Contents | History | README | + New

| Name ↑ | Last |
|-----------|------|
| Readme.md | 8/21 |

Filter repositories

BookDemo

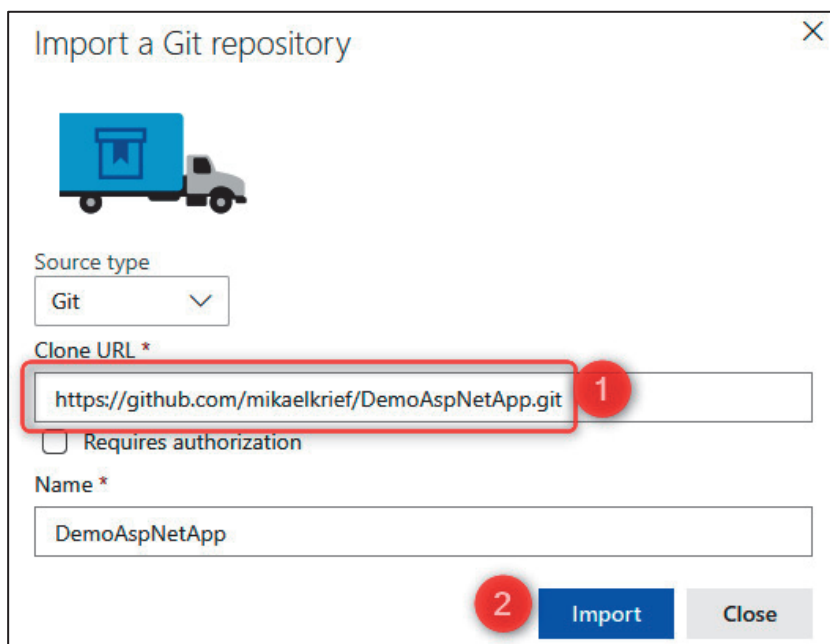
+ New repository

↑ Import repository


⚙ Manage repositories

Readme.md Mikael Krief

Rysunek 7.19. Menu Import repository w Azure Repos



Import a Git repository



Source type
Git

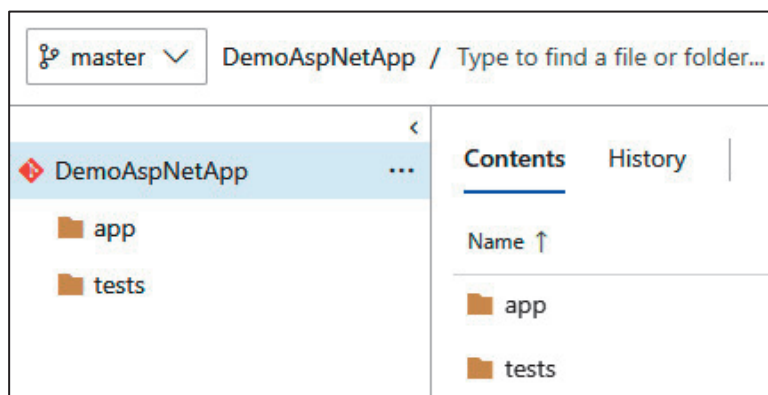
Clone URL *
`https://github.com/mikaelkrief/DemoAspNetApp.git`

☐ Requires authorization

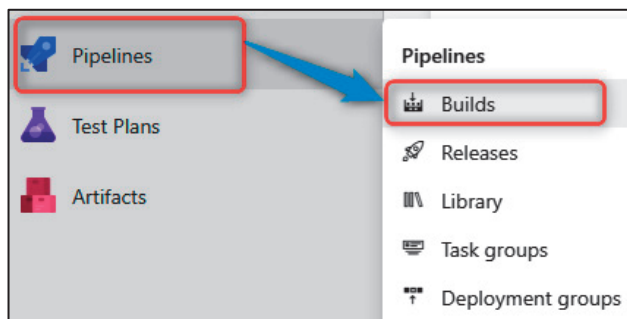
Name *
DemoAspNetApp

Import Close

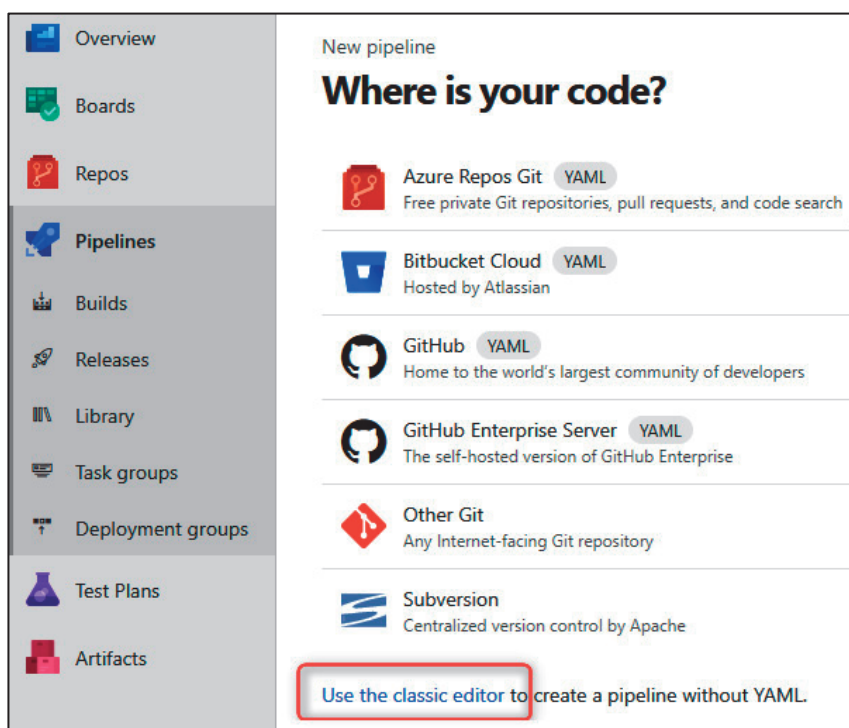
Rysunek 7.20. Import repozytorium w Azure Repos



Rysunek 7.21. Zakończono importowanie repozytorium Azure Repos





Rysunek 7.22. Azure Pipelines — tworzenie kompilacji





Rysunek 7.23. Link do klasycznego edytora Azure Pipelines


Select a source


 Azure Repos Git

 GitHub

 GitHub Enterprise Server

 Subversion

 Bitbucket Cloud

 Other Git

1

Team project

BookDemo

Repository

DemoAspNetApp

2

Default branch for manual and scheduled builds

master


Rysunek 7.24. Azure Pipelines — wybór repozytorium kodu źródłowego



Select a template


Or start with an [Empty job](#)

Search

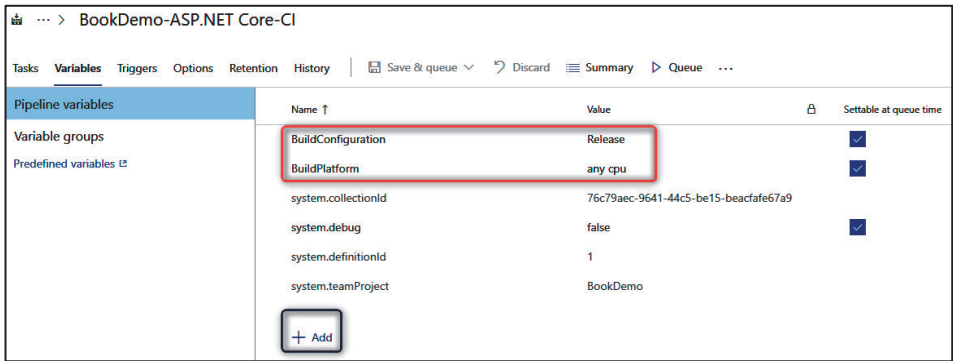
Others

 **Ant**
Build and test a Java project with Apache Ant.

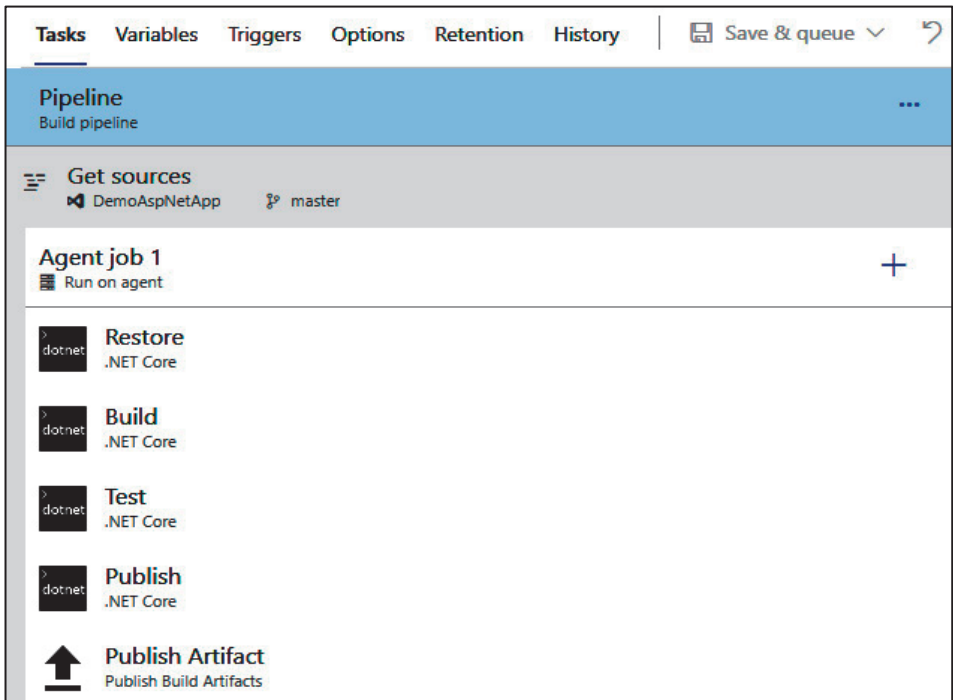
 **ASP.NET Core**
Build and test an ASP.NET Core web application.  **Apply**

 **ASP.NET Core (.NET Framework)**
Build an ASP.NET Core web application that targets the full .NET Framework.

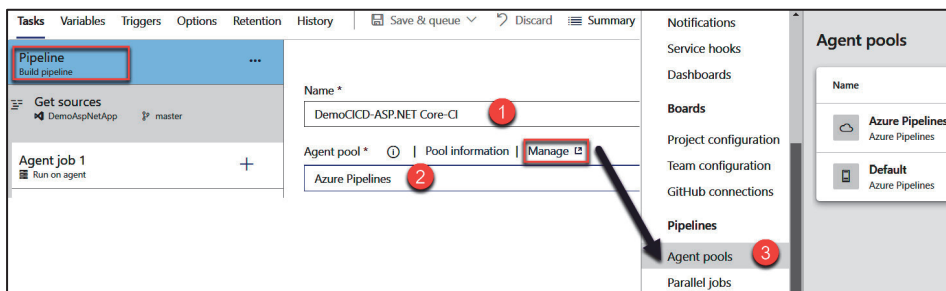
Rysunek 7.25. Azure Pipelines — wybór szablonu



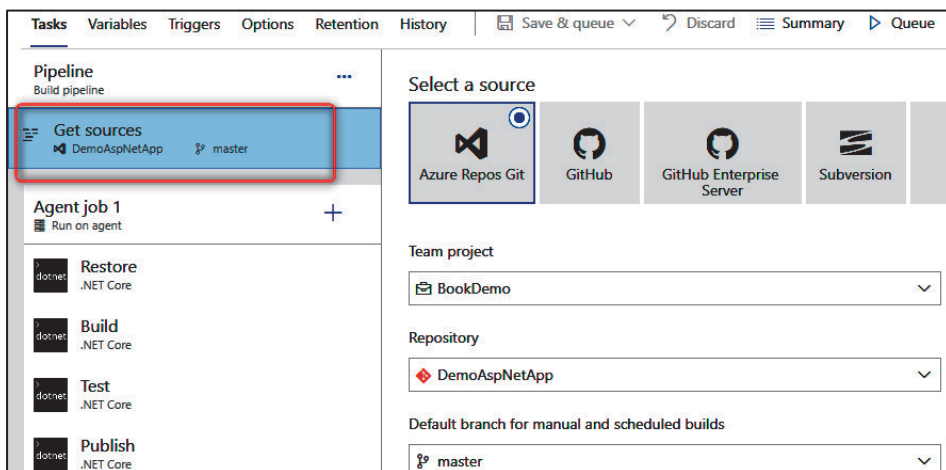
Rysunek 7.26. Azure Pipelines — zakładka Variables



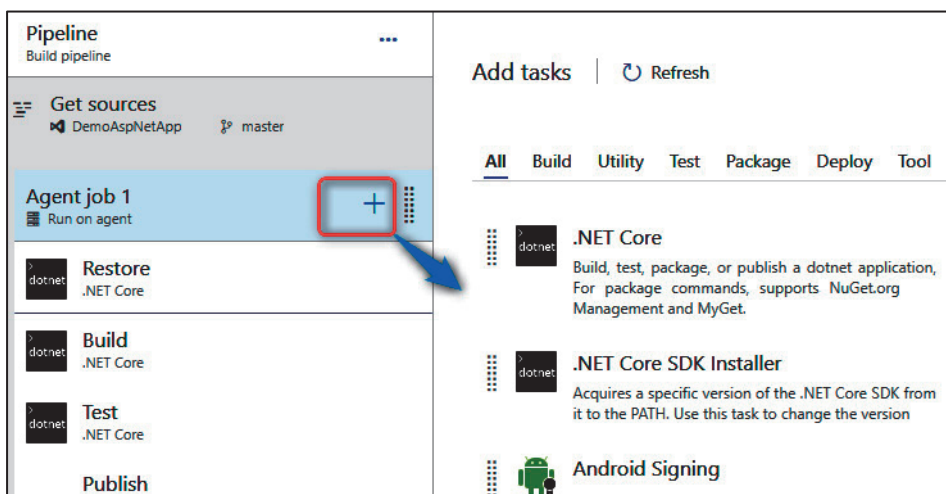
Rysunek 7.27. Azure Pipelines — lista zadań



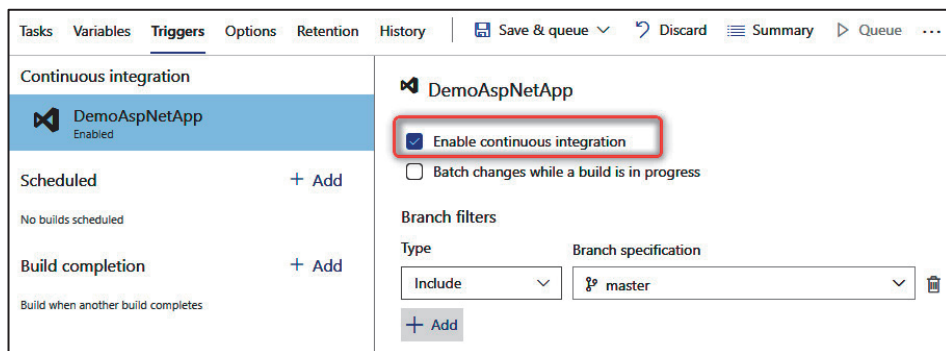
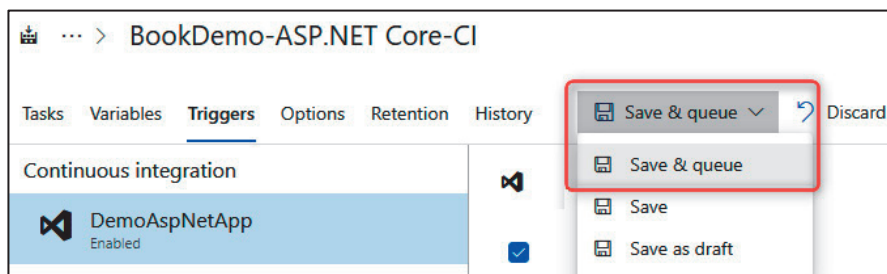
Rysunek 7.28. Azure Pipelines — konfiguracja puli agentów



Rysunek 7.29. Azure Pipelines — konfiguracja kodu źródłowego



Rysunek 7.30. Azure Pipelines — dodawanie zadania

**Rysunek 7.31. Azure Pipelines — włączanie CI****Rysunek 7.32. Azure Pipelines — zapisywanie i kolejkowanie potoku**

✓ #20190606.2: add solution

Manually run today at 13:39 by Mikael Krief DemoAspNetApp master 6dd6855

Logs Summary Tests

Agent job 1

Pool: Hosted Ubuntu 1604 · Agent: Hosted Agent

✓ Prepare job · succeeded

✓ Initialize job · succeeded

✓ Checkout · succeeded

✓ Restore · succeeded

✓ Build · succeeded

✓ Test · succeeded

✓ Publish · succeeded

✓ Publish Artifact · succeeded

✓ Post-job: Checkout · succeeded

✓ Finalize Job · succeeded

✓ Report build status · succeeded

Rysunek 7.33. Wynik uruchomienia Azure Pipelines

✓ #20190606.2: add solution

Manually run today at 13:39 by Mikael Krief DemoAspNetApp master 6dd6855

Logs Summary Tests

Summary

1 Run(s) Completed (1 Passed, 0 Failed)

1

Total tests

1 ● Passed

0 ● Failed

0 ● Others

100%

Pass percentage

6s 974ms

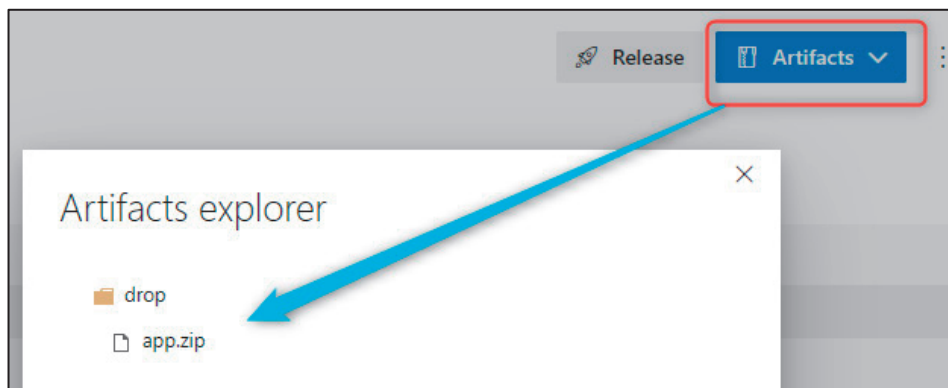
Run duration ⓘ

↑ +2s 787ms

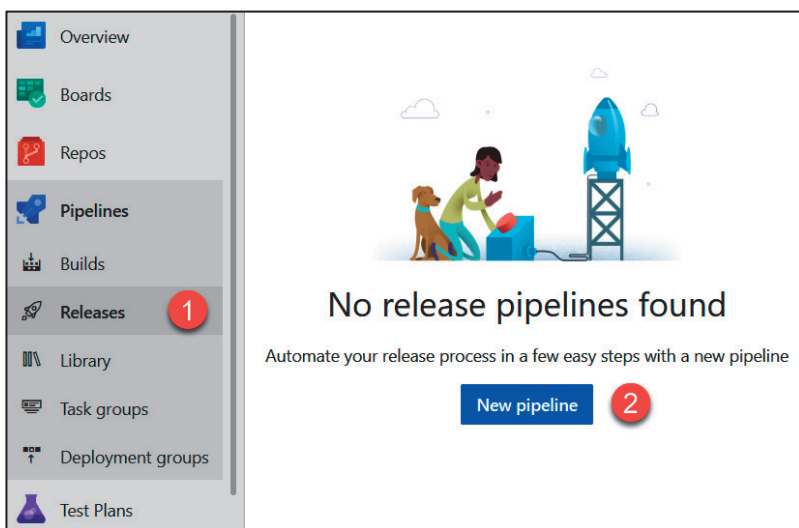
Bug

Link

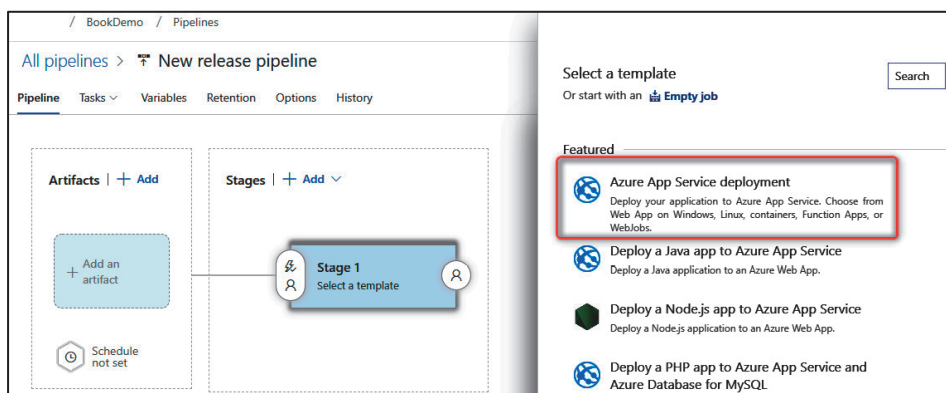
Rysunek 7.34. Azure Pipelines — podsumowanie wykonania testu



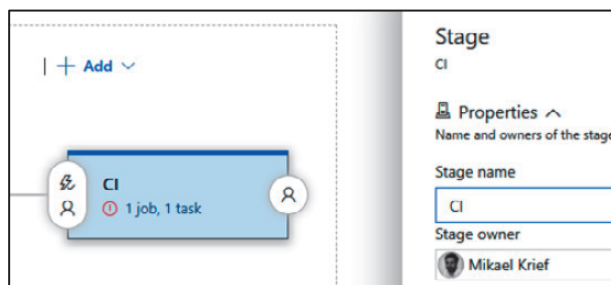
Rysunek 7.35. Azure Pipelines — przeglądanie artefaktów



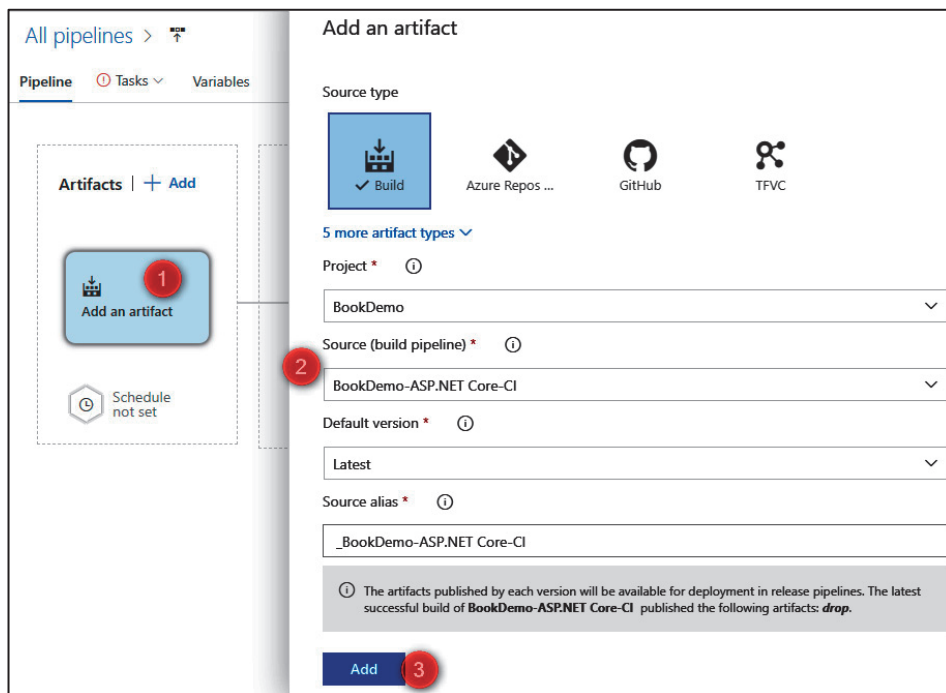
Rysunek 7.36. Azure Pipelines — tworzenie definicji nowej wersji aplikacji



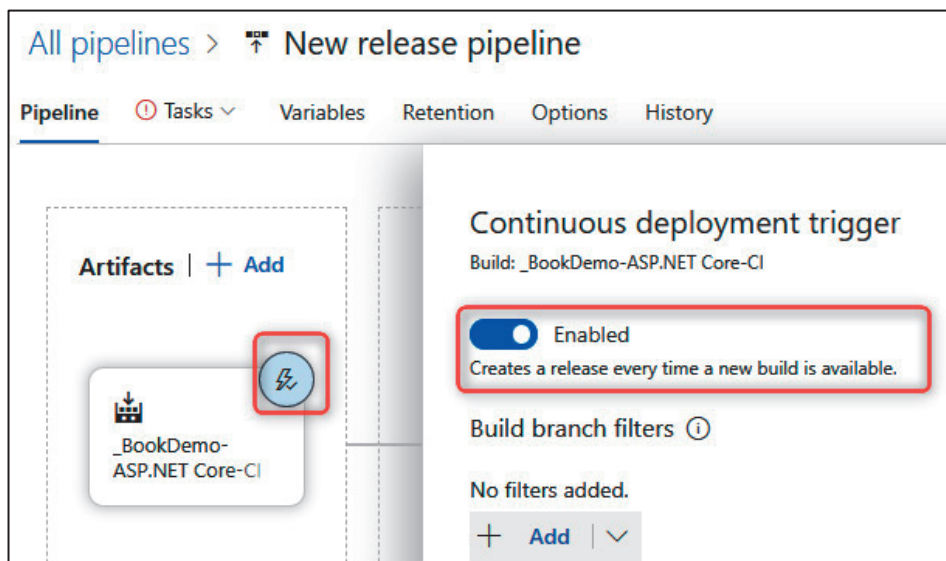
Rysunek 7.37. Azure Pipelines — szablon Azure App Service deployment



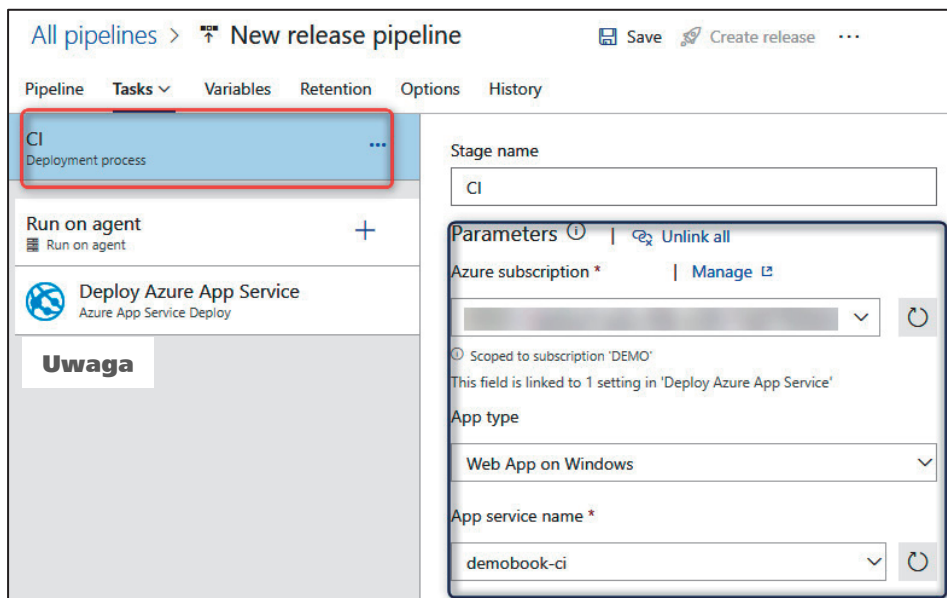
Rysunek 7.38. Azure Pipelines — nazwa etapu



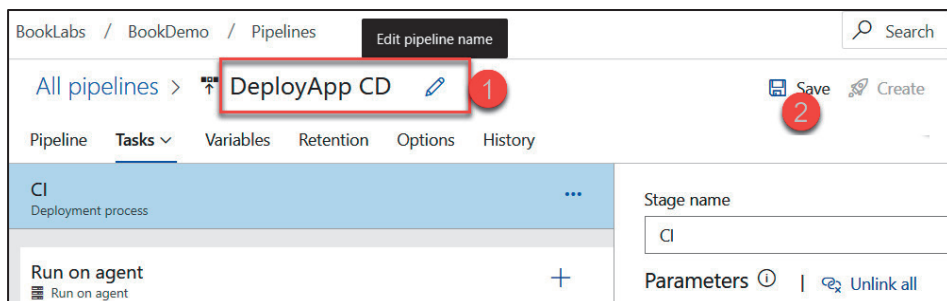
Rysunek 7.39. Azure Pipelines — dodawanie artefaktu nowej wersji aplikacji



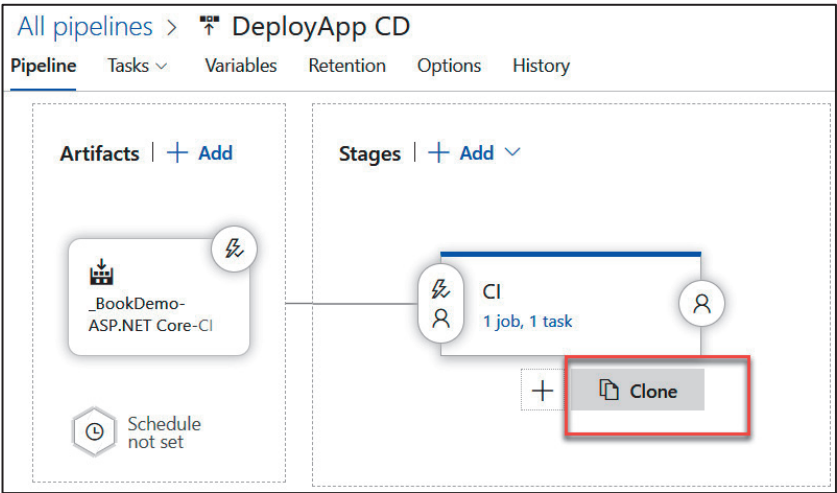
Rysunek 7.40. Azure Pipelines — wersja włączająca proces CD



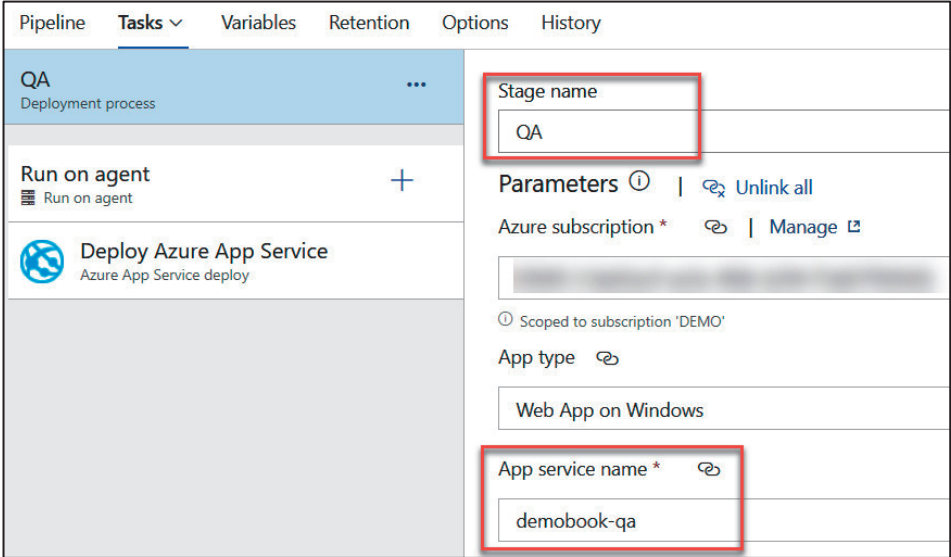
Rysunek 7.41. Azure Pipelines — konfiguracja wersji



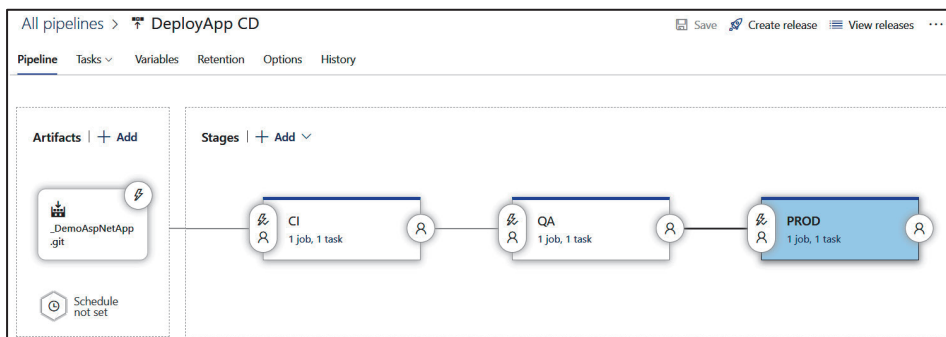
Rysunek 7.42. Azure Pipelines — edycja nazwy wersji



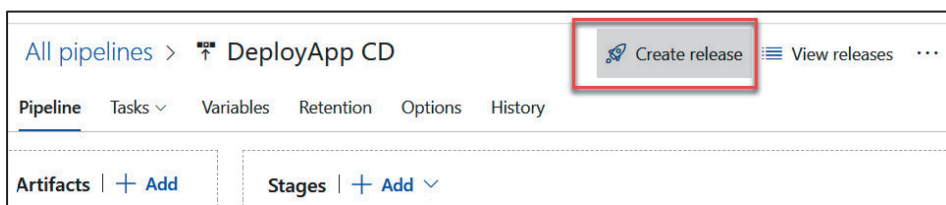
Rysunek 7.43. Etap klonowania wydania platformy Azure



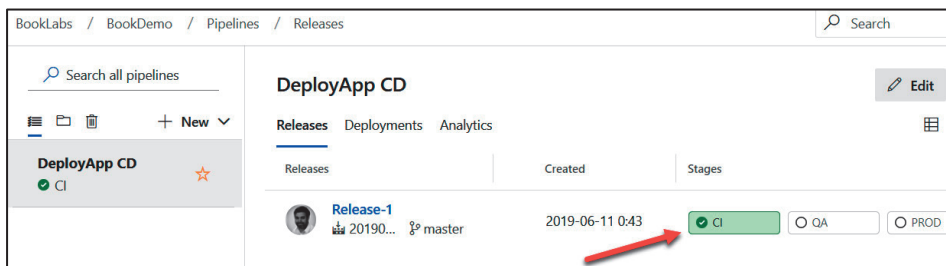
Rysunek 7.44. Wersja Azure — edycja nazwy usługi aplikacji



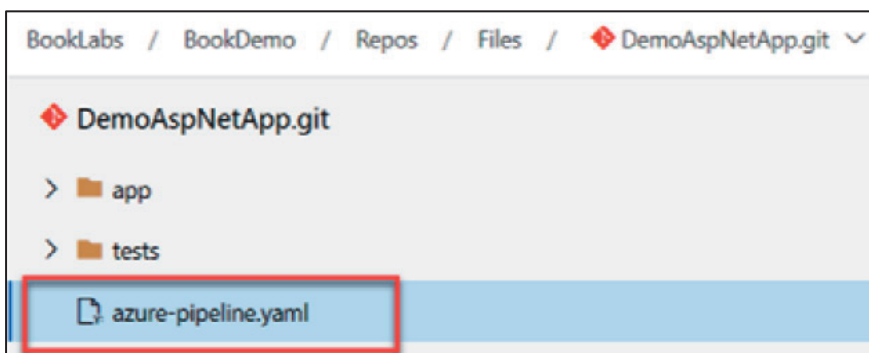
Rysunek 7.45. Azure Pipelines — definicja wersji



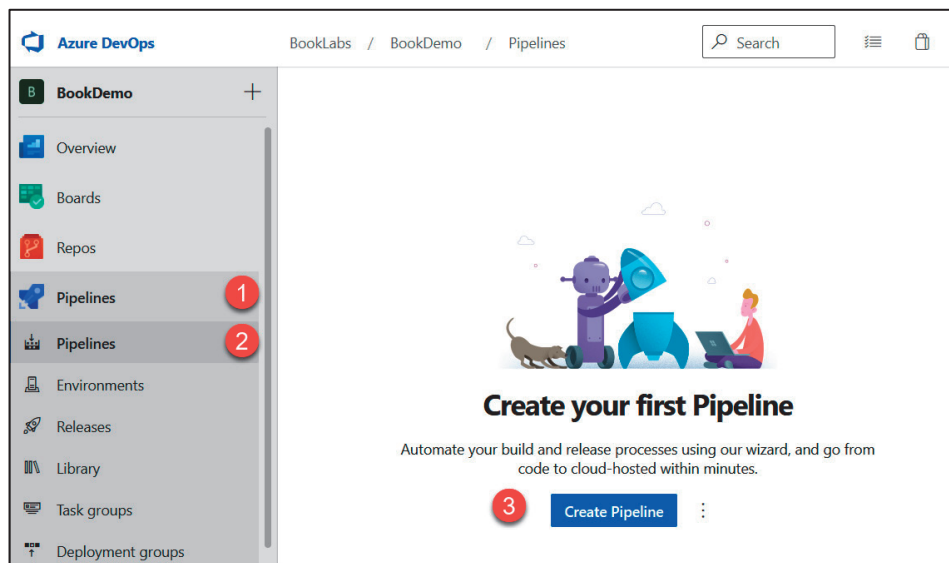
Rysunek 7.46. Azure Pipelines — tworzenie wersji



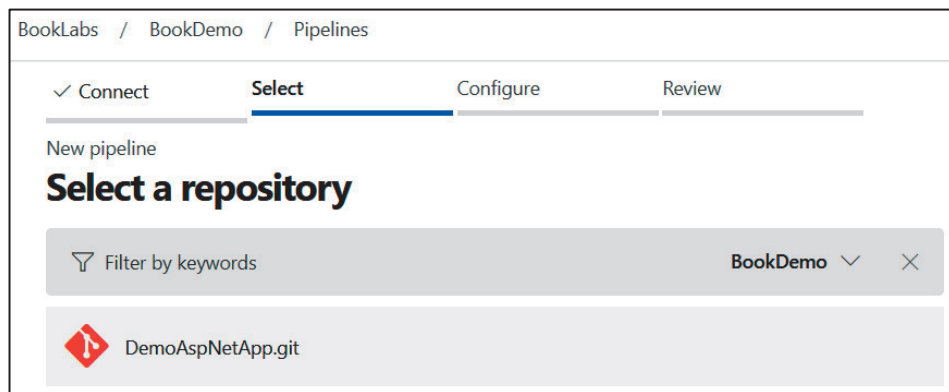
Rysunek 7.47. Azure Pipelines — stan wdrożenia



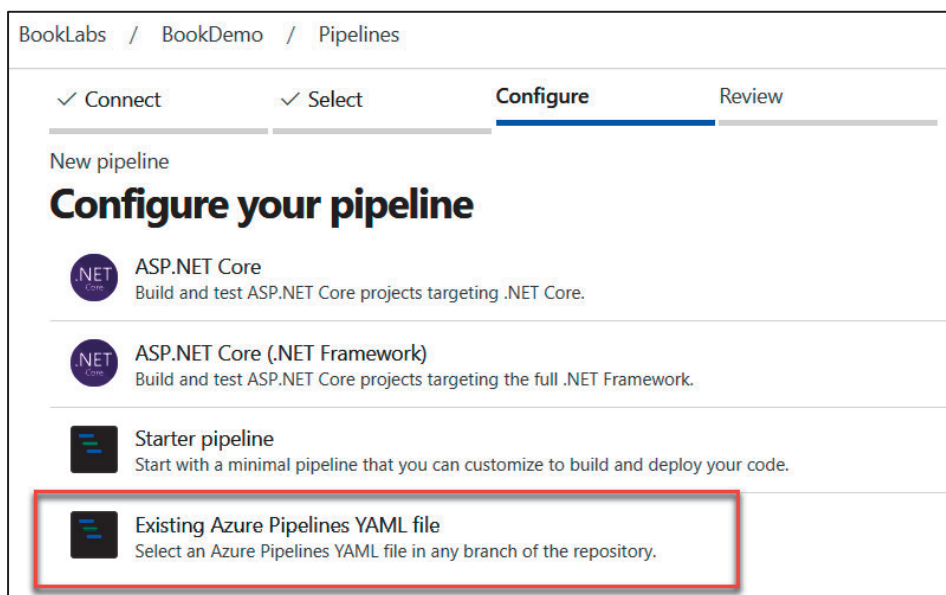
Rysunek 7.48. Azure Pipelines — potok YAML



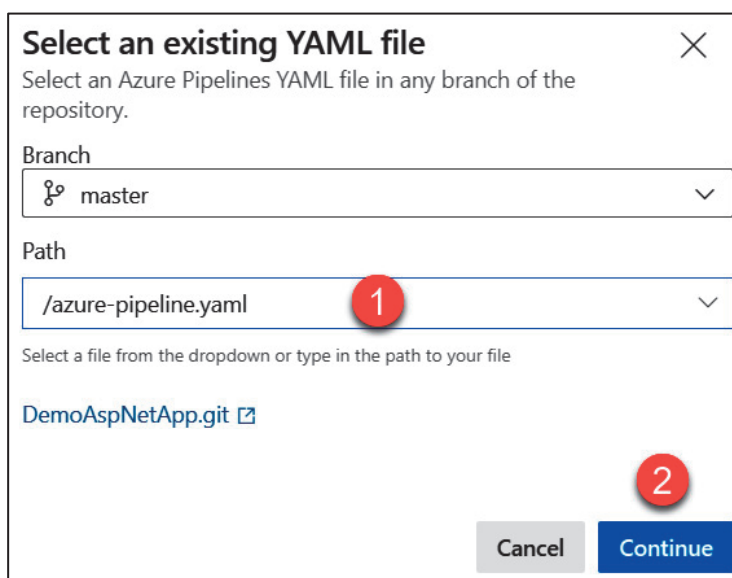
Rysunek 7.49. Azure Pipelines — tworzenie nowego potoku YAML



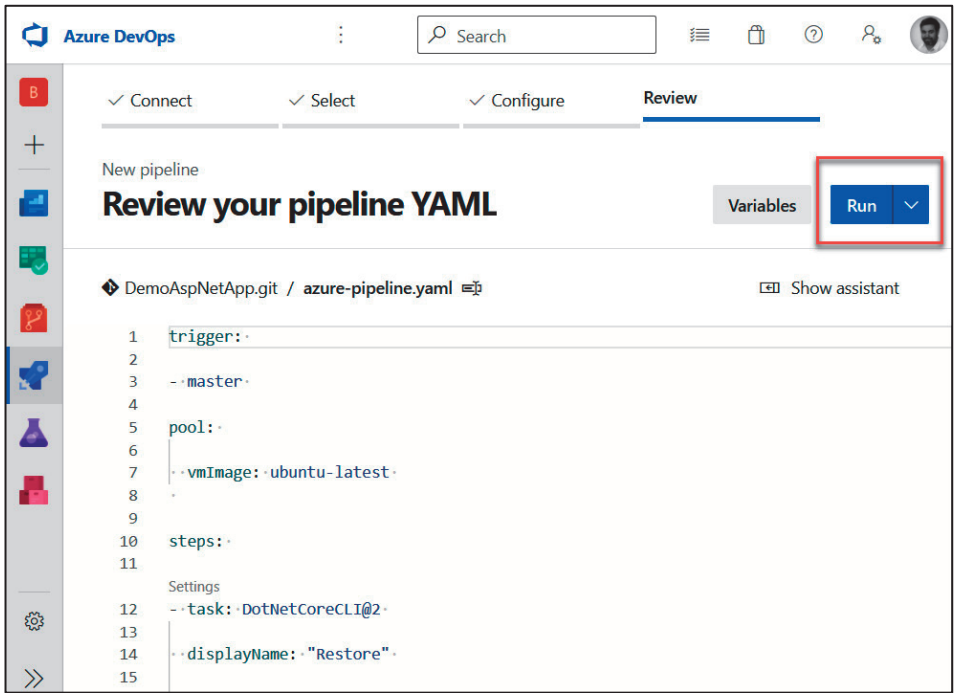
Rysunek 7.50. Azure Pipelines — wybór repozytorium



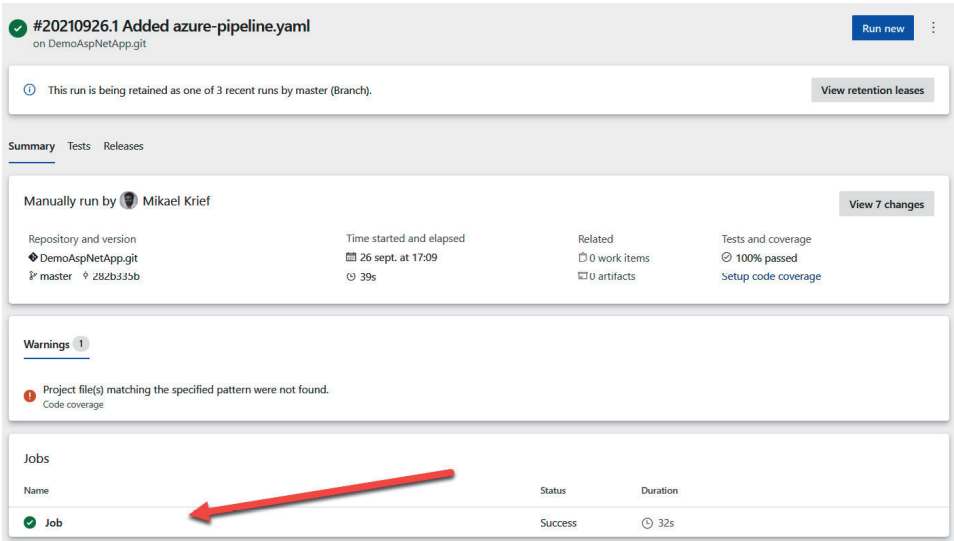
Rysunek 7.51. Azure Pipelines — wybór istniejącego pliku YAML



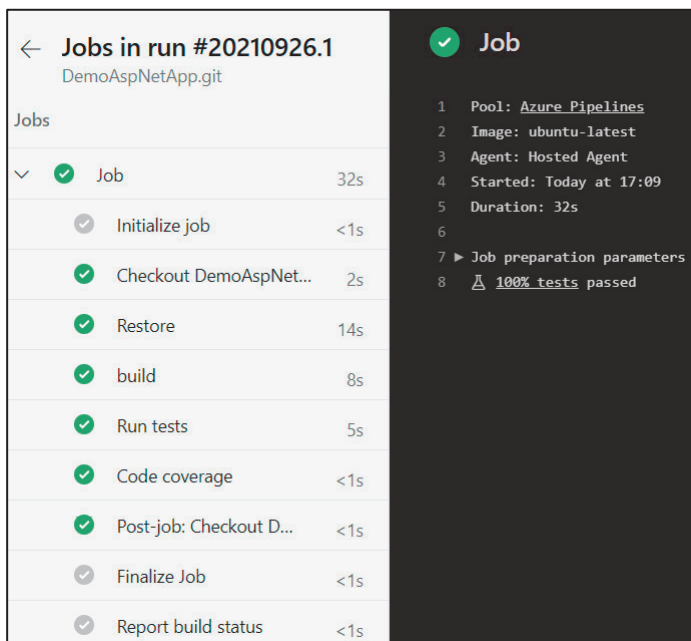
Rysunek 7.52. Azure Pipelines — wybór pliku YAML



Rysunek 7.53. Azure Pipelines — uruchamianie potoku



Rysunek 7.54. Azure Pipelines — wykonanie zadania



Jobs in run #20210926.1
DemoAspNetApp.git

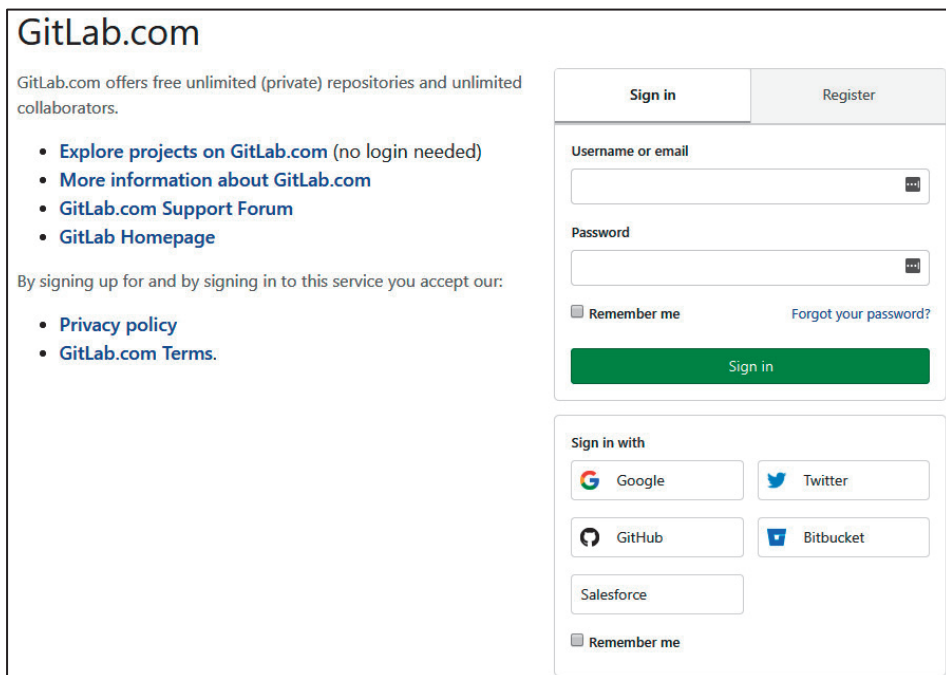
Jobs

| | |
|---------------------------|-----|
| ✓ Job | 32s |
| Initialize job | <1s |
| ✓ Checkout DemoAspNet... | 2s |
| ✓ Restore | 14s |
| ✓ build | 8s |
| ✓ Run tests | 5s |
| ✓ Code coverage | <1s |
| ✓ Post-job: Checkout D... | <1s |
| Finalize Job | <1s |
| Report build status | <1s |

Job

- 1 Pool: [Azure Pipelines](#)
- 2 Image: ubuntu-latest
- 3 Agent: Hosted Agent
- 4 Started: Today at 17:09
- 5 Duration: 32s
- 6
- 7 ▶ Job preparation parameters
- 8 [100% tests passed](#)

Rysunek 7.55. Azure Pipelines — szczegóły wykonania



GitLab.com

GitLab.com offers free unlimited (private) repositories and unlimited collaborators.

- [Explore projects on GitLab.com](#) (no login needed)
- [More information about GitLab.com](#)
- [GitLab.com Support Forum](#)
- [GitLab Homepage](#)

By signing up for and by signing in to this service you accept our:

- [Privacy policy](#)
- [GitLab.com Terms.](#)

Sign in **Register**

Username or email

Password

☐ Remember me [Forgot your password?](#)

Sign in

Sign in with

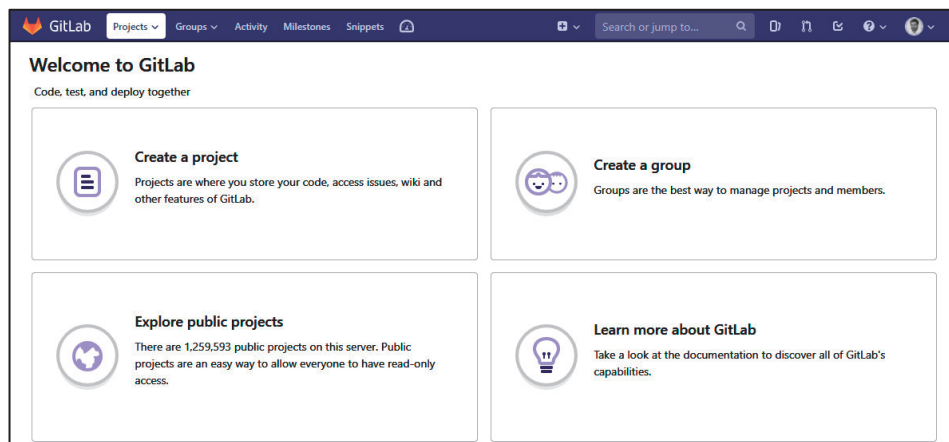
Google Twitter

GitHub Bitbucket

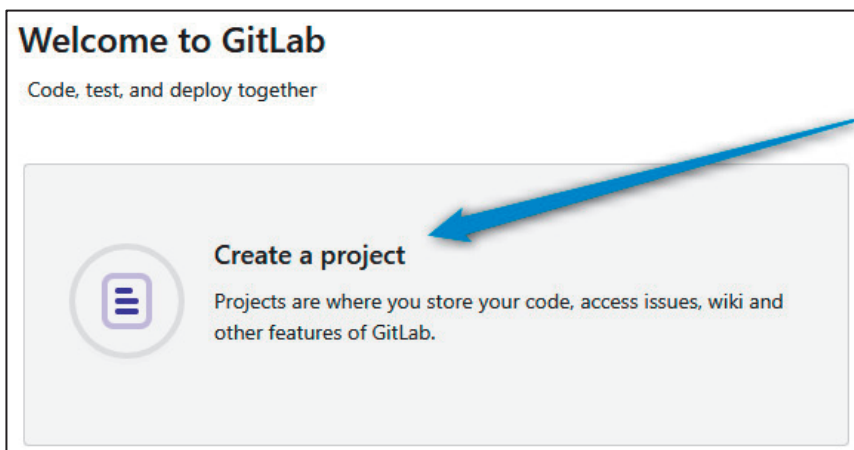
Salesforce

☐ Remember me

Rysunek 7.56. Rejestracja w GitLabie








Rysunek 7.57. Strona główna GitLaba



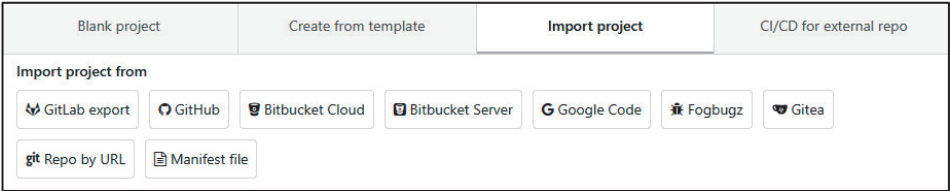
Rysunek 7.58. Nowy projekt GitLaba

| Blank project | Create from template | Import project | CI/CD for external repo |
|--|----------------------|--|---------------------------------------|
| Project name <input type="text" value="BookDemo"/> | | | |
| Project URL <input type="text" value="https://gitlab.com/mikakrief/"/> | | Project slug <input type="text" value="bookdemo"/> | |
| Want to house several dependent projects under the same namespace? Create a group. | | | |
| Project description (optional) <input type="text" value="Description format"/> | | | |
| Visibility Level ⓘ <input checked="" type="radio"/> Private Project access must be granted explicitly to each user. <input type="radio"/> Internal The project can be accessed by any logged in user. <input type="radio"/> Public The project can be accessed without any authentication. | | | |
| <input type="checkbox"/> Initialize repository with a README Allows you to immediately clone this project's repository. Skip this if you plan to push up an existing repository. | | | |
| <input type="button" value="Create project"/> | | | <input type="button" value="Cancel"/> |

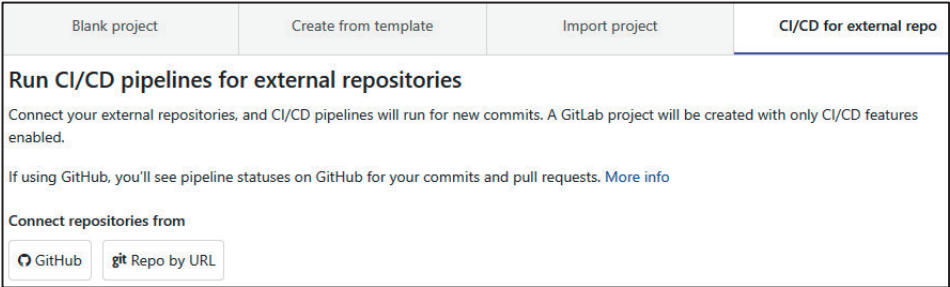
Rysunek 7.59. Konfiguracja projektu GitLaba

| Blank project | Create from template | Import project | CI/CD for external repo |
|--|----------------------|--|---|
| <input type="text" value="Learn how to contribute to the built-in templates"/> | | | |
| Built-in 17 Instance 0 Group 0 | | | |
|  Ruby on Rails Includes an MVC structure, Gemfile, Rakefile, along with many others, to help you get started. | | <input type="button" value="Preview"/> | <input type="button" value="Use template"/> |
|  Spring Includes an MVC structure, mvnw and pom.xml to help you get started. | | <input type="button" value="Preview"/> | <input type="button" value="Use template"/> |
|  NodeJS Express Includes an MVC structure to help you get started. | | <input type="button" value="Preview"/> | <input type="button" value="Use template"/> |
|  iOS (Swift) A ready-to-go template for use with iOS Swift apps. | | <input type="button" value="Preview"/> | <input type="button" value="Use template"/> |
|  .NET Core A .NET Core console application template, customizable for any .NET Core project | | <input type="button" value="Preview"/> | <input type="button" value="Use template"/> |

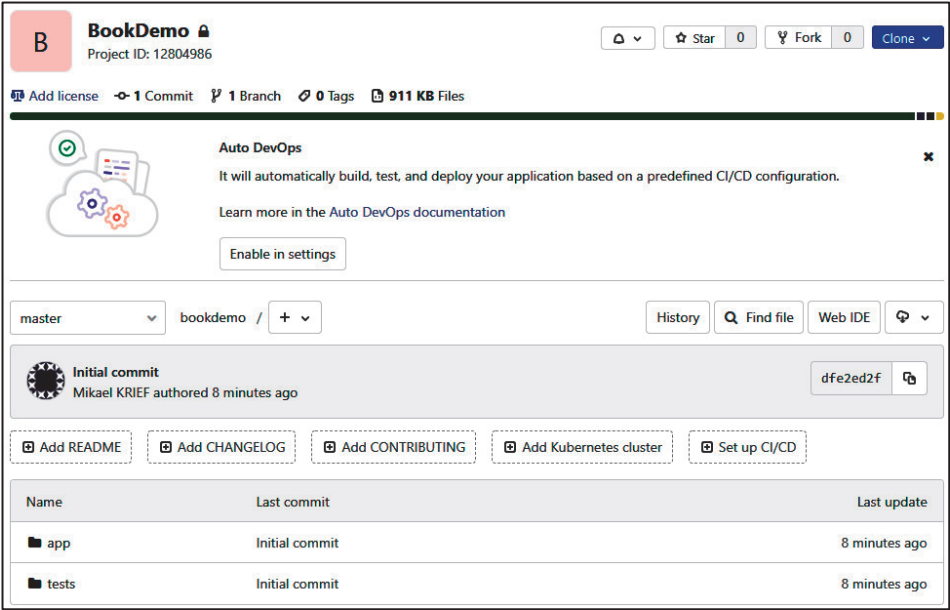
Rysunek 7.60. Szablon projektu GitLaba



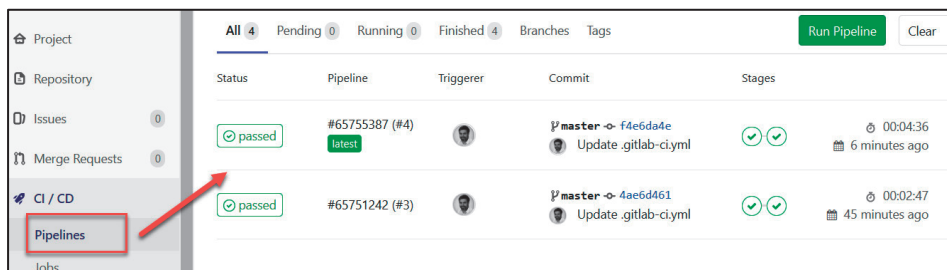
Rysunek 7.61. GitLab — importowanie kodu



Rysunek 7.62. GitLab — CI/CD dla zewnętrznych repozytoriów

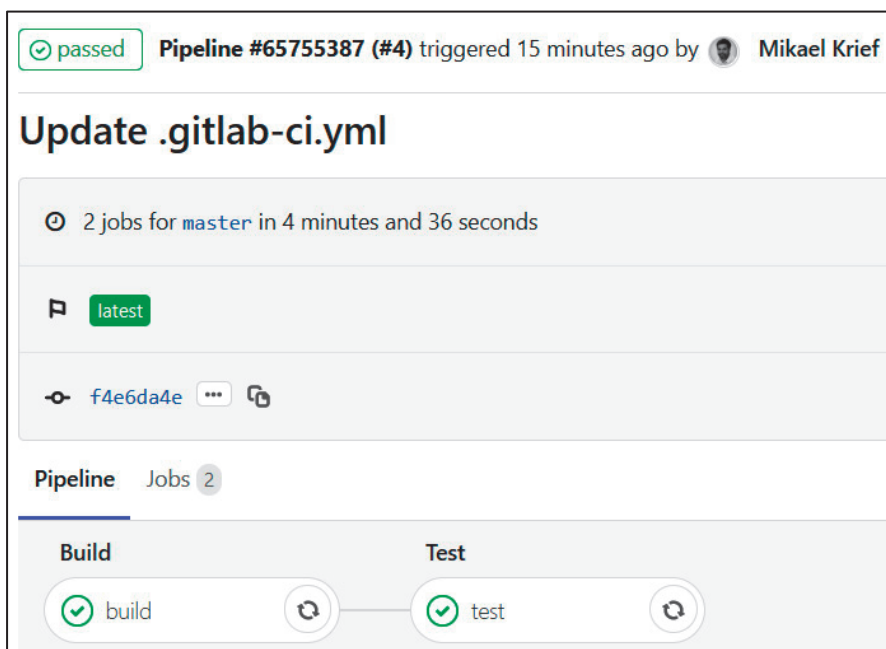


Rysunek 7.63. Repozytorium GitLaba



| | | | | | | | | |
|------------------|--------|--------------------------|-----------|--|----------|----------------------------|--------------|-------|
| Project | All 4 | Pending 0 | Running 0 | Finished 4 | Branches | Tags | Run Pipeline | Clear |
| Repository | Status | Pipeline | Triggerer | Commit | Stages | | | |
| Issues 0 | passed | #65755387 (#4) latest | | master → f4e6da4e Update .gitlab-ci.yml | ✓ ✓ | 00:04:36 6 minutes ago | | |
| Merge Requests 0 | passed | #65751242 (#3) | | master → 4ae6d461 Update .gitlab-ci.yml | ✓ ✓ | 00:02:47 45 minutes ago | | |
| CI / CD | | | | | | | | |
| Pipelines | | | | | | | | |
| Jobs | | | | | | | | |

Rysunek 7.64. Potoki GitLaba



passed Pipeline #65755387 (#4) triggered 15 minutes ago by Mikael Krief

Update .gitlab-ci.yml

2 jobs for master in 4 minutes and 36 seconds

latest

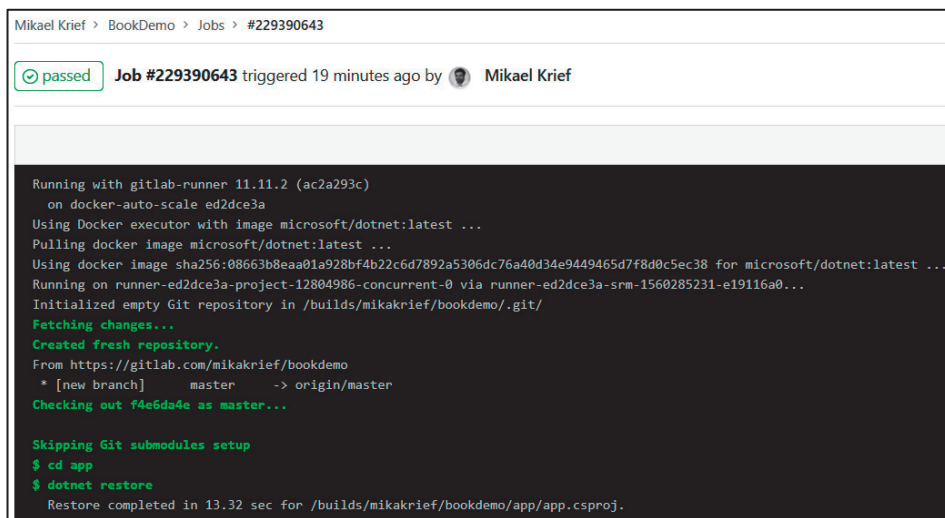
f4e6da4e

Pipeline Jobs 2

Build Test

build test

Rysunek 7.65. Wykonanie potoku GitLaba



Mikael Krief > BookDemo > Jobs > #229390643

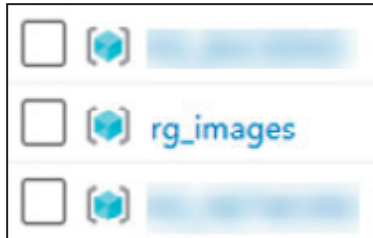
passed Job #229390643 triggered 19 minutes ago by Mikael Krief

```
Running with gitlab-runner 11.11.2 (ac2a293c)
  on docker-auto-scale ed2dce3a
Using Docker executor with image microsoft/dotnet:latest ...
Pulling docker image microsoft/dotnet:latest ...
Using docker image sha256:08663b8eaa01a928bf4b22c6d7892a5306dc76a40d34e9449465d7f8d0c5ec38 for microsoft/dotnet:latest ...
Running on runner-ed2dce3a-project-12804986-concurrent-0 via runner-ed2dce3a-srm-1560285231-e19116a0...
Initialized empty Git repository in /builds/mikakrief/bookdemo/.git/
Fetching changes...
Created fresh repository.
From https://gitlab.com/mikakrief/bookdemo
 * [new branch]      master    -> origin/master
Checking out f4e6da4e as master...

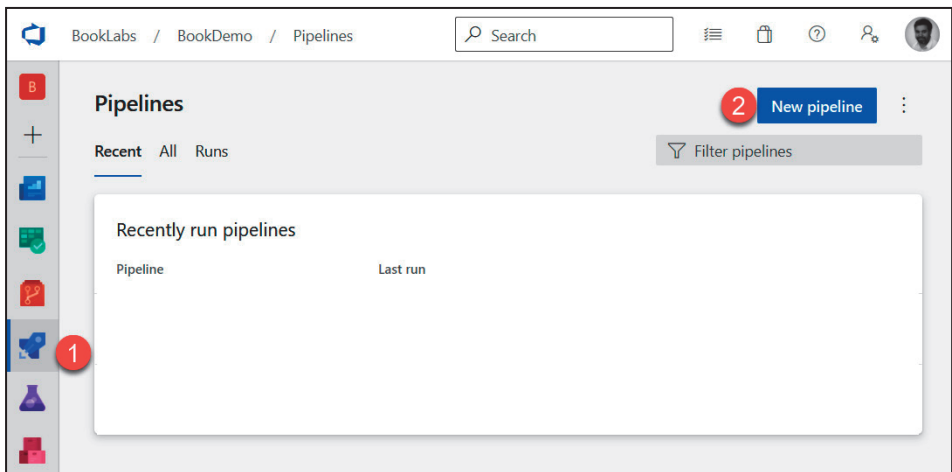
Skipping Git submodules setup
$ cd app
$ dotnet restore
Restore completed in 13.32 sec for /builds/mikakrief/bookdemo/app/app.csproj.
```

Rysunek 7.66. Szczegóły dziennika wykonania GitLaba

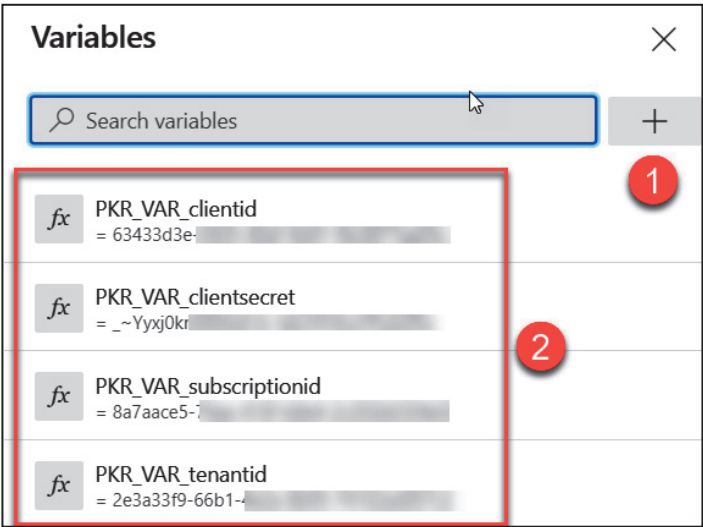
Rozdział 8. Wdrażanie infrastruktury jako kodu za pomocą potoku CI/CD



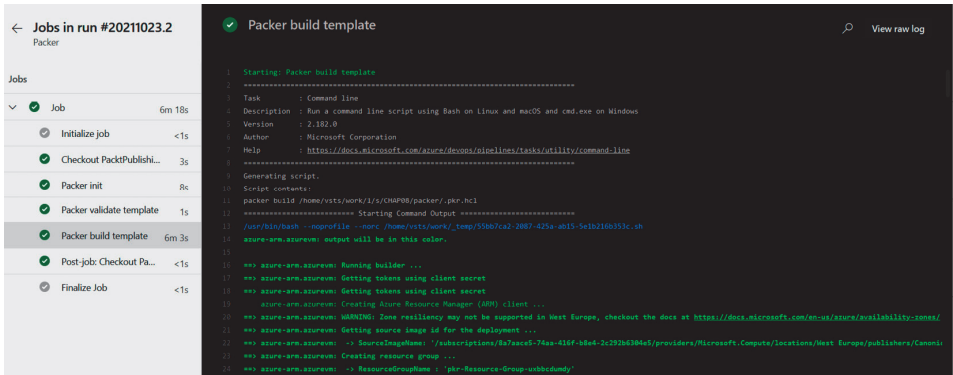
Rysunek 8.1. Grupa zasobów platformy Azure dla obrazu Packera



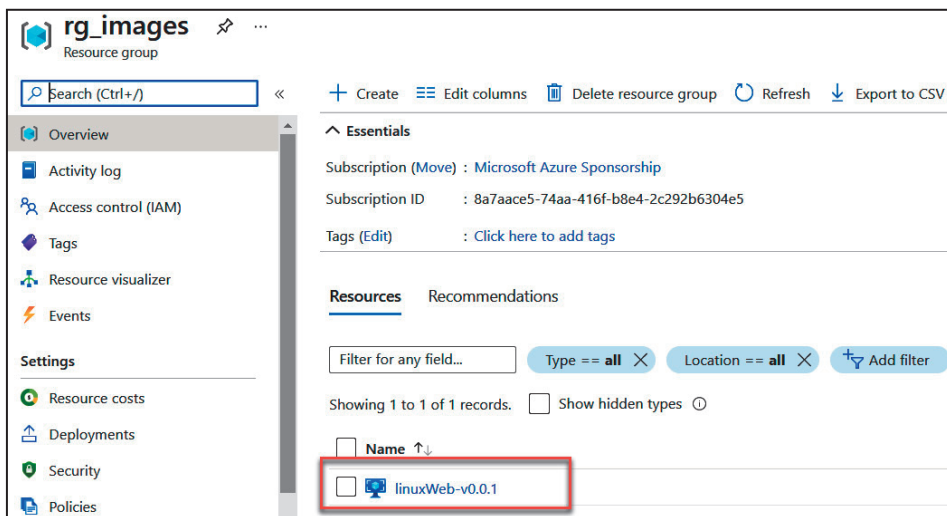
Rysunek 8.2. Tworzenie nowego potoku w Azure Pipelines



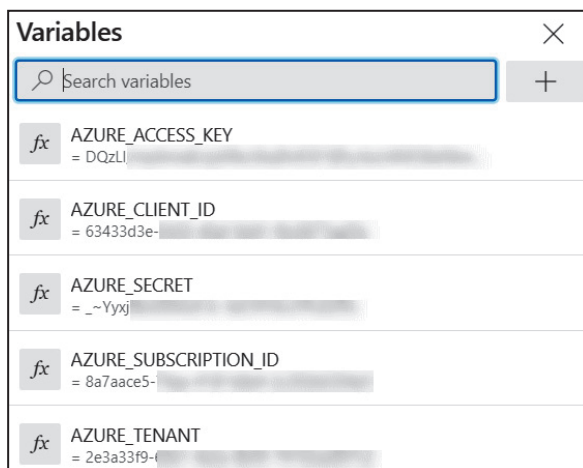
Rysunek 8.3. Zmienne Azure Pipelines



Rysunek 8.4. Dzienniki potoku Azure Pipelines Packer



Rysunek 8.5. Obraz Packera na platformie Azure



Rysunek 8.6. Zmienne Terraform i Ansible w Azure Pipelines

Jobs in run #20211025.4
Terraform-Ansible

Jobs

| Job | Duration |
|--------------------------|----------|
| Initialize job | 1m 26s |
| Checkout PacktPublish... | 1s |
| 1 Terraform init | 4s |
| 2 Terraform plan | 9s |
| 3 Terraform apply | 8s |
| 4 Get requirements | 47s |
| 5 Ansible playbook | 12s |
| Post-job: Checkout Pa... | <1s |
| Finalize Job | <1s |

Ansible playbook

```

5 Version      : 2.10.2.0
6 Author       : Microsoft Corporation
7 Help         : https://docs.microsoft.com/azure/devops/pipelines/tasks/utility/command-line
8
9 Generating script.
10 Script contents:
11 ansible-playbook playbookdemo.yml -i inv.azure_rm.yml
12 ----- Starting Command Output -----
13 /usr/bin/bash --noprofile --norc /home/vsts/work/_temp/2d0f582c-2398-470c-8a98-75b81ed6d644.sh
14
15 PLAY [webserver] *****
16
17 TASK [Gathering Facts] *****
18 ok: [bookvm_90dd]
19
20 TASK [Installing latest version of Nginx] *****
21 [WARNING]: Updating cache and auto-installing missing dependency: python-apt
22 [WARNING]: Could not find aptitude. Using apt-get instead
23 ok: [bookvm_90dd]
24
25 TASK [start nginx service] *****
26 ok: [bookvm_90dd]
27
28 PLAY RECAP *****
29 bookvm_90dd      : ok=3  changed=0  unreachable=0  failed=0  skipped=0  rescued=0  ignored=0
30
31 Finishing: Ansible playbook
  
```

Rysunek 8.7. Szczegóły dziennika Terraform i Ansible Azure Pipelines

Dashboard > Microsoft Azure Sponsorship > book-lab >

bookvm
Virtual machine

Search (Ctrl+F) << >> Connect ▶ Start ◀ Restart ◀ Stop ◀ Capture ◀ Delete ◀ Refresh ◀ Open in mobile ◀ CLI / PS ◀ Feedback

Overview

Activity log
Access control (IAM)
Tags
Diagnose and solve problems

Essentials

Resource group (Move): book-lab
Status: Running
Location: West Europe
Subscription (Move): Microsoft Azure Sponsorship
Subscription ID: 8a7aace5-...

Operating system: Linux (ubuntu 18.04)
Size: Standard D2s v2 (2 vcpus, 7 GiB memory)
Public IP address: 52.166.36.72
Virtual network/subnet: book-vnet/book-subnet
DNS name: bookdevopsiac.westeurope.cloudapp.azure.com

JSON View

Rysunek 8.8. Publiczny adres IP maszyny wirtualnej Azure

← → ↺ ⚠ Non sécurisé | 52.166.36.72 ☆ 🛑 📶 🔧 👤 ⋮

Welcome to nginx!

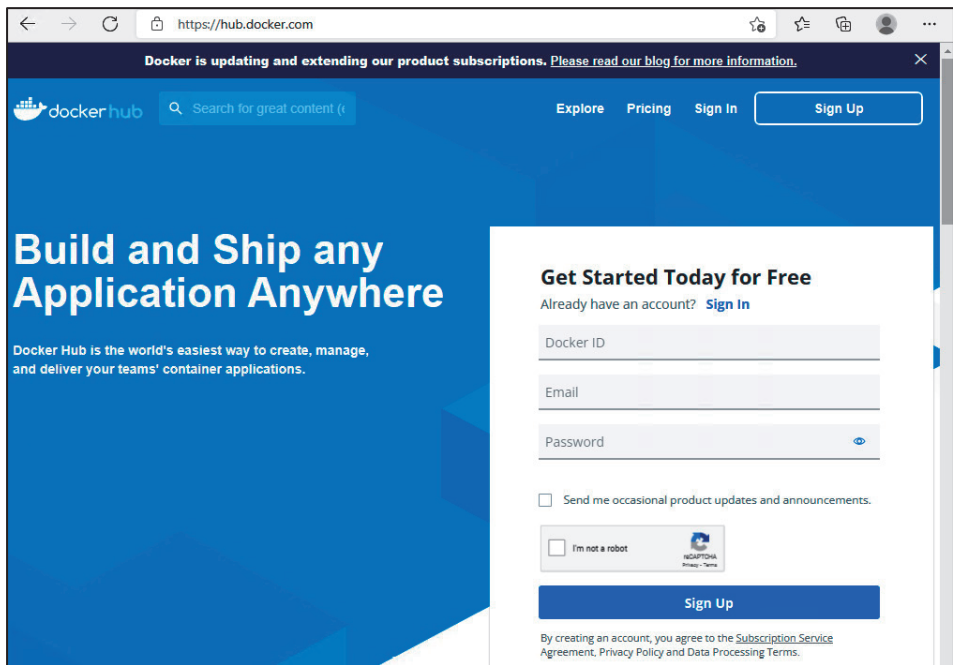
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

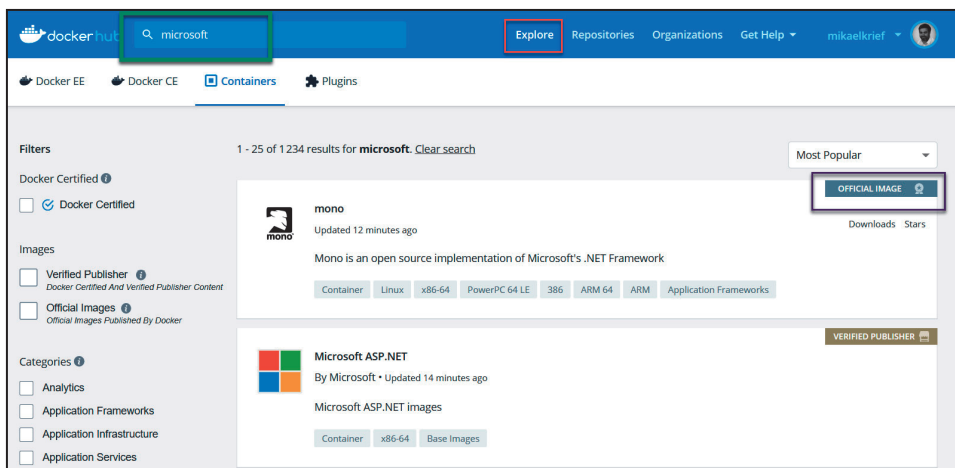
Thank you for using nginx.

Rysunek 8.9. Strona główna nginx

Rozdział 9. Konteneryzacja aplikacji za pomocą Dockera



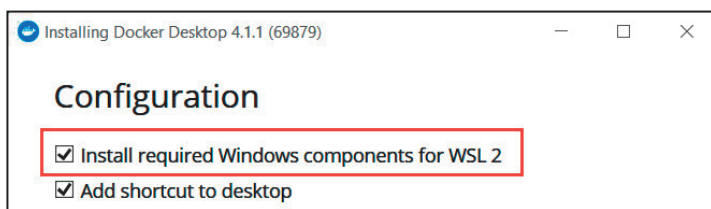
Rysunek 9.1. Strona logowania Docker Huba



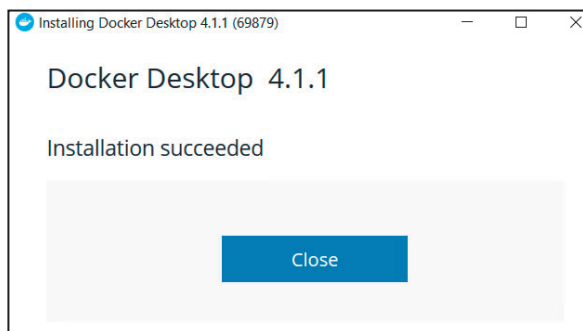
Rysunek 9.2. Sekcja Explore w Docker Hubie



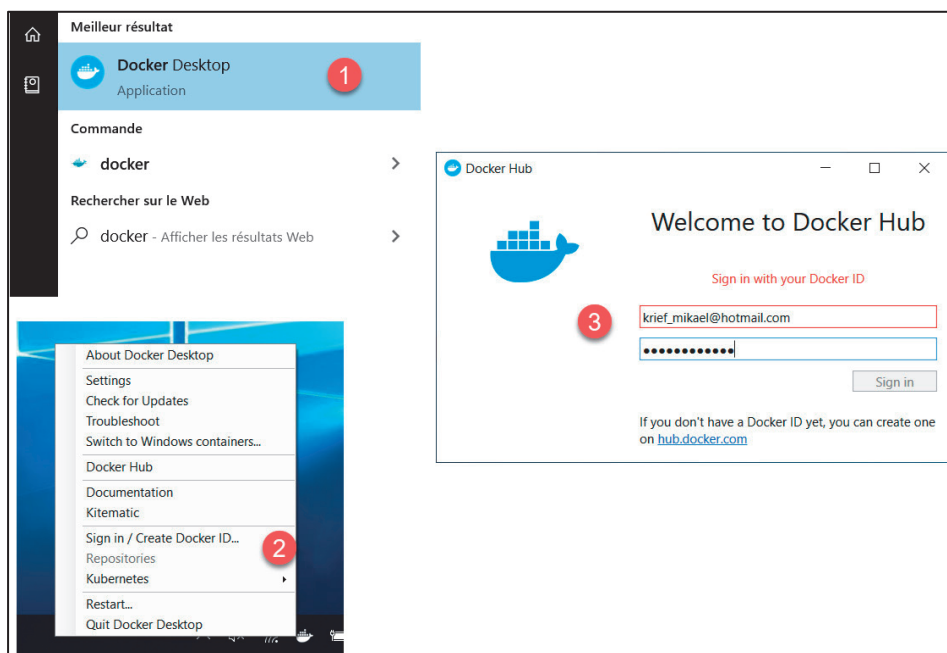
Rysunek 9.3. Link do pobrania Docker Desktop



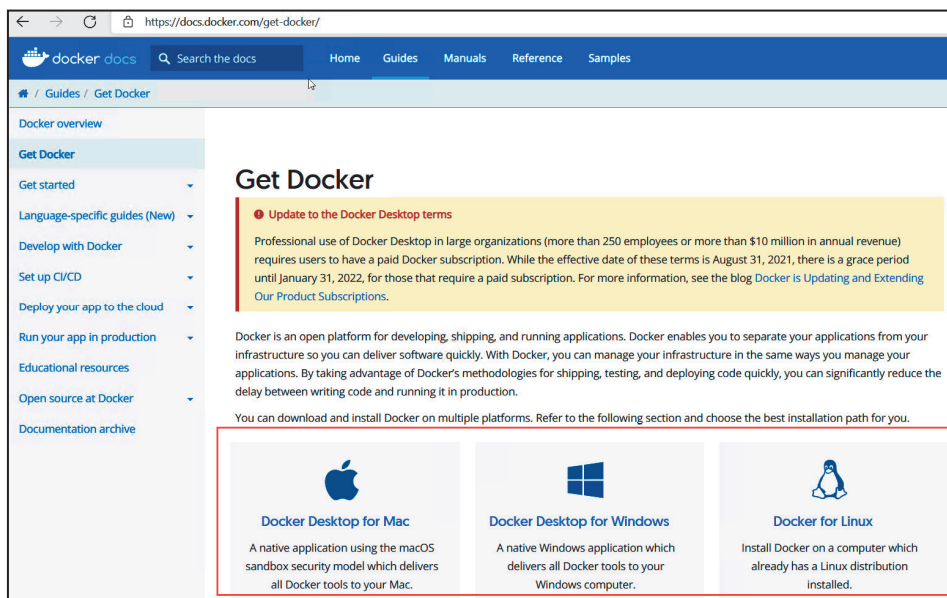
Rysunek 9.4. Konfiguracja Docker Desktop



Rysunek 9.5. Koniec instalacji platformy Docker Desktop



Rysunek 9.6. Logowanie do Docker Huba z poziomu Docker Desktop



Rysunek 9.7. Dokumentacja instalacji Dockera

```
PS C:\Users\mkrief> docker --help
Usage:
  docker [flags]
  docker [command]

Available Commands:
  compose      Docker Compose
  context       Manage contexts
  ecs
  exec          Run a command in a running container
  help          Help about any command
  inspect       Inspect containers
  kill          Kill one or more running containers
  login         Log in to a Docker registry or cloud backend
  logout        Log out from a Docker registry or cloud backend
  logs          Fetch the logs of a container
  prune         prune existing resources in current context
  ps            List containers
  rm            Remove containers
  run           Run a container
  secret        Manages secrets
  serve         Start an api server
  start         Start one or more stopped containers
  stop          Stop one or more running containers
  version       Show the Docker version information
  volume        Manages volumes
```

Rysunek 9.8. Polecenie docker --help

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\appdocker> docker build -t demobook:v1 .
[+] Building 40.5s (7/7) FINISHED
=> [internal] load build definition from Dockerfile                                0.3s
=> => transferring dockerfile: 98B                                                0.1s
=> [internal] load .dockerignore                                                  0.1s
=> => transferring context: 2B                                                    0.0s
=> [internal] load metadata for docker.io/library/httpd:latest                  5.6s
=> [internal] load build context                                                 0.1s
=> => transferring context: 191B                                                  0.0s
=> [1/2] FROM docker.io/library/httpd:latest@sha256:f70876d78442771406d7245b8d3425e8b0a86891c79811af94fb2e12af0fadeb 33.9s
=> => resolve docker.io/library/httpd:latest@sha256:f70876d78442771406d7245b8d3425e8b0a86891c79811af94fb2e12af0fadeb 0.1s
=> => sha256:4082565671564bb0b369534aa40409f13c5fe4ee6aable2da04d144f663eed4 913.73kB / 913.73kB 0.6s
=> => sha256:f70876d78442771406d7245b8d3425e8b0a86891c79811af94fb2e12af0fadeb 1.36kB / 1.36kB 0.0s
=> => sha256:7132c9b78208a693058838e9e3519e7f5723d702ada3e42c45f10744b4d88f486e 1.36kB / 1.36kB 0.0s
=> => sha256:1132a4fc88faaf5c19959f03535c1356d3004ced1978cb9c3f32a73d9c139532 8.78kB / 8.78kB 0.0s
=> => sha256:7d63c13d9b9b6ec5f05a2b07daadacaa9c610d01102a662ae9b1d082105f1ffa 31.36MB / 31.36MB 17.4s
=> => sha256:ca52f3eeea665ce537eec1840e21d7d024ab70fb555a609cd748e710779db9e0 1.76B / 1.76B 0.5s
=> => sha256:21d69ac90caf9d24441bfa868ed24c4bf82e421f95d9a2abf957c9b111978c03 24.11MB / 24.11MB 15.3s
=> => sha256:462e88bc307455be86d7af71d19421a240793468d7ab879e36c86b54d8e0ec7d 296B / 296B 0.8s
=> => extracting sha256:7d63c13d9b9b6ec5f05a2b07daadacaa9c610d01102a662ae9b1d082105f1ffa 6.0s
=> => extracting sha256:ca52f3eeea665ce537eec1840e21d7d024ab70fb555a609cd748e710779db9e0 0.0s
=> => extracting sha256:4482565671564bb0b369534aa40409f13c5fe4ee6aable2da04d144f663eed4 0.4s
=> => extracting sha256:21d69ac90caf9d24441bfa868ed24c4bf82e421f95d9a2abf957c9b111978c03 4.3s
=> => extracting sha256:462e88bc307455be86d7af71d19421a240793468d7ab879e36c86b54d8e0ec7d 0.0s
=> [2/2] COPY index.html /usr/local/apache2/htdocs/                             0.1s
=> => exporting to image                                                           0.1s
=> => exporting layers                                                            0.1s
=> => writing image sha256:9a3862a66c65d0a431b70b464d8deedf1a73927fad7475ac520f876644c3301 0.0s
=> => naming to docker.io/library/demobook:v1                                   0.0s
```

Rysunek 9.9. Polecenie docker build

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\appdocker> docker images
REPOSITORY          TAG          IMAGE ID       CREATED        SIZE
demobook            v1           9a3862a66c65  5 minutes ago 143MB
gcr.io/k8s-minikube/kicbase v0.0.12-snapshot3 25ac91b9c8d7 14 months ago 952MB
```

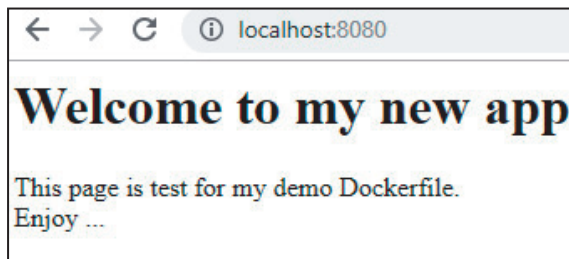
Rysunek 9.10. Polecenie docker image

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\appdocker> docker run -d --name demoapp -p 8080:80 demobook:v1
6c2e2099b174cbe29fcd408d044cd5b2ebbf50cedfb1a5e2984e346ebee7e1a
```

Rysunek 9.11. Polecenie docker run

```
PS C:\Users\mkrief> docker ps
CONTAINER ID   IMAGE      COMMAND                  CREATED        STATUS        PORTS                    NAMES
6c2e2099b174   demobook:v1 "httpd-foreground"      2 weeks ago   Up About a minute   0.0.0.0:8080->80/tcp    demoapp
```

Rysunek 9.12. Polecenie docker ps



Rysunek 9.13. Uruchomiona aplikacja Docker

```
PS C:\Learning-DevOps\CHAP07\appdocker> docker login -u mikaelkr
Password:
Login Succeeded
```

Rysunek 9.14. Polecenie docker login

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\appdocker> docker images
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
demobook             v1           9a3862a66c65     17 hours ago    143MB
gcr.io/k8s-minikube/kicbase v0.0.12-snapshot3 25ac91b9c8d7     14 months ago   952MB
```

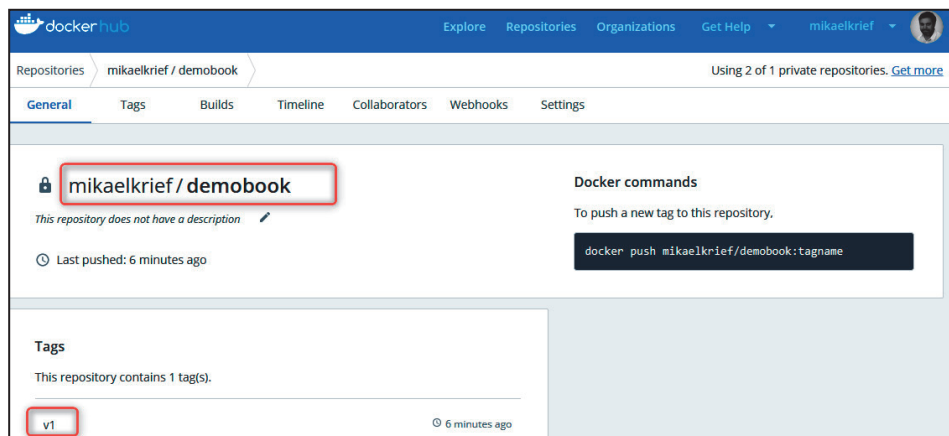
Rysunek 9.15. Lista obrazów Dockera

```
PS C:\Learning-DevOps\CHAP07\appdocker> docker tag (a121d88f6e18) (mikaelkrief) demobook:v1
```

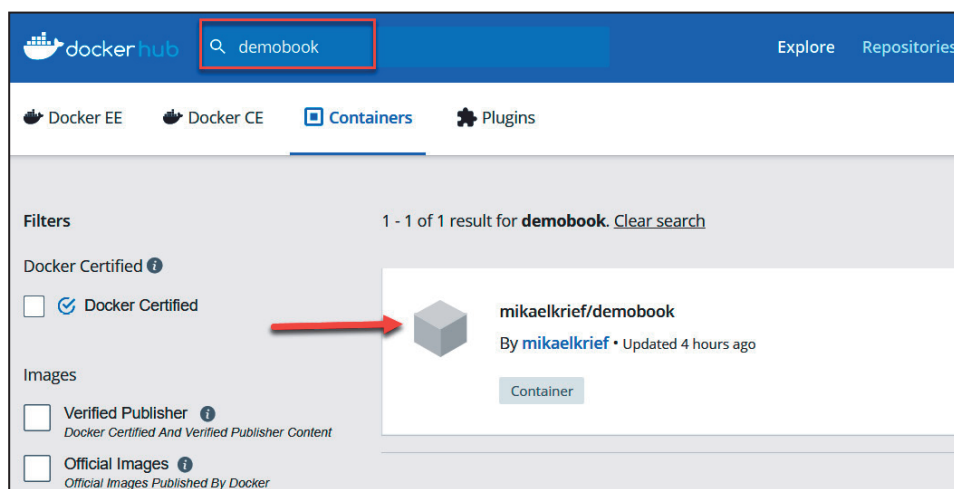
Rysunek 9.16. docker tag

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\appdocker> docker push docker.io/mikaelkrief/demobook:v1
The push refers to repository [docker.io/mikaelkrief/demobook]
f083a28f9cfa: Pushed
4dcdec0b7a0e: Mounted from library/httpd
c86537ee54f9: Mounted from library/httpd
ecd2b49ef243: Mounted from library/httpd
7511c367f47a: Mounted from library/httpd
e8b689711f21: Mounted from library/httpd
v1: digest: sha256:380d9e0b2b2bc495b496c7047bd3d808f048307a5b5c84cc1e1de3fe119e79 size: 1572
```

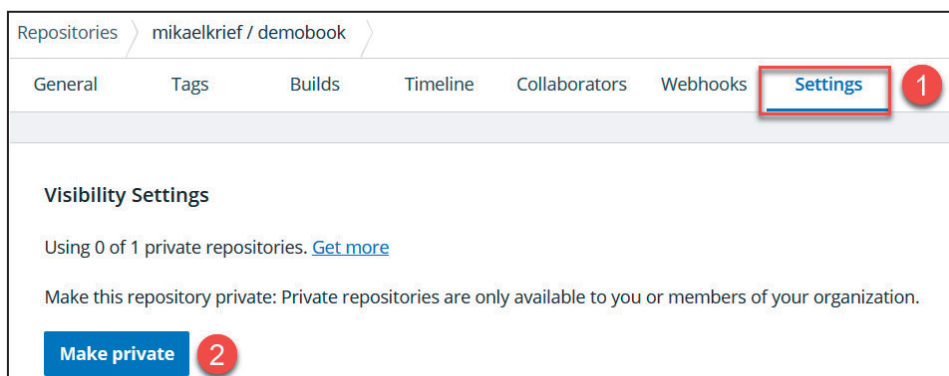
Rysunek 9.17. docker push



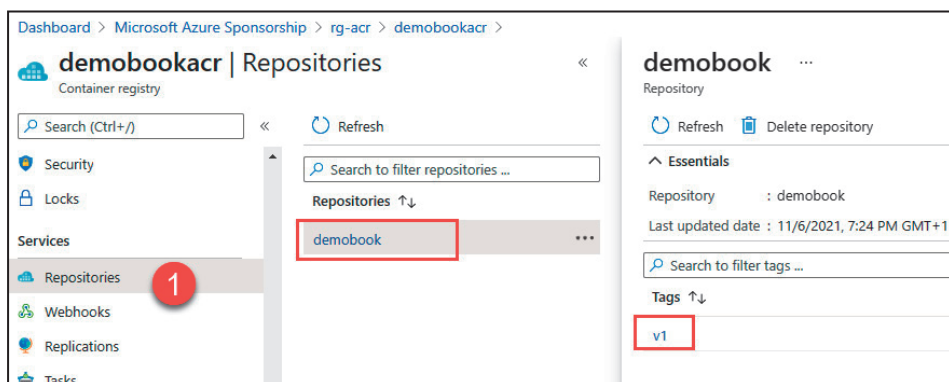
Rysunek 9.18. Przesłany otagowany obraz w Docker Hubie




Rysunek 9.19. Znajdowanie obrazu w Docker Hubie


**Rysunek 9.20. Ustawianie dostępu prywatnego dla obrazu Dockera**


```
PS C:\Users\mkrief> docker tag demobook:v1 demobookacr.azurecr.io/demobook:v1
PS C:\Users\mkrief> docker push demobookacr.azurecr.io/demobook:v1
The push refers to repository [demobookacr.azurecr.io/demobook]
f083a28f9cfa: Pushed
4dcdec0b7a0e: Pushed
c86537ee54f9: Pushed
ecd2b49ef243: Pushed
7511c367f47a: Pushed
e8b689711f21: Pushed
v1: digest: sha256:380d9e0b2beb20c495b496c7047bd3d808f048307a5b5c84cc1e1de3fe119e79 size: 1572
```


Rysunek 9.21. Wysyłanie obrazu Dockera do ACR**Rysunek 9.22. Obraz Dockera w ACR**


Select a source


 Azure Repos Git



 **GitHub**


 GitHub Enterprise Server

 Subversion


 Bitbucket Cloud

 Other Git

 Authorized using connection: PacktPublishing [Change](#) 


Repository * | [Manage on GitHub](#) 

PacktPublishing/Learning-DevOps-Second-Edition



Default branch for manual and scheduled builds *

main



Continue

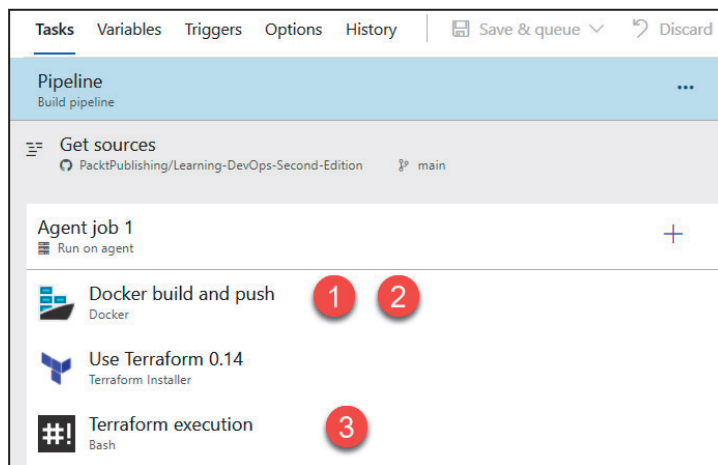
Rysunek 9.23. Azure Pipelines ze źródłami GitHuba

Uwaga

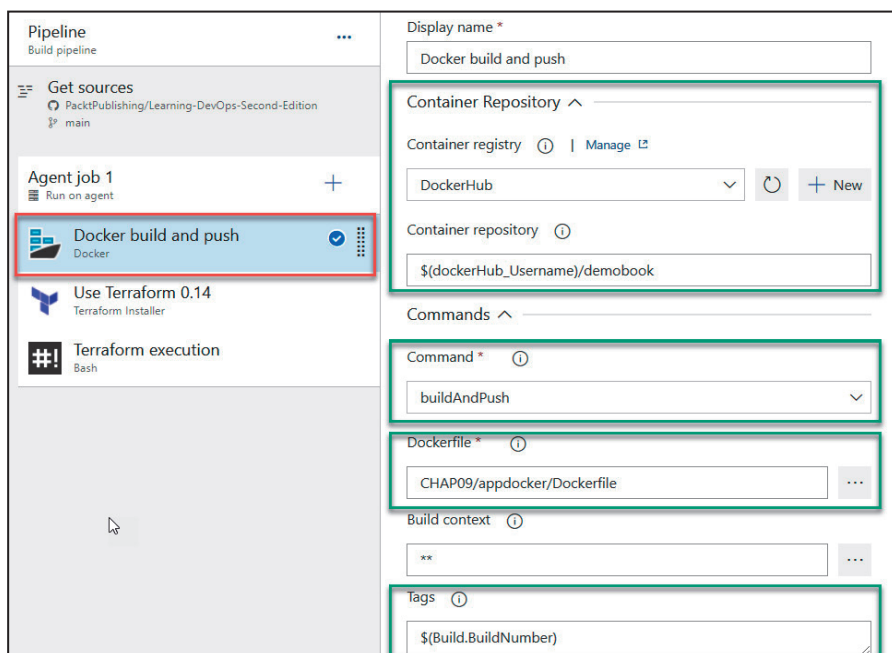
gers Options Retention History Save & queue Discard Summary Queue ...

| | | |
|----------------------|---------------------|-------------------------------------|
| Pipeline variables | Name ↑ | Value |
| Variable groups | ARM_CLIENT_ID | 94a2ea7d-10c9-46b3-8[redacted] |
| Predefined variables | ARM_CLIENT_SECRET | ***** |
| | ARM_SUBSCRIPTION_ID | 1da42ac9-ee3e[redacted] |
| | ARM_TENANT_ID | 2e3a33f9-66b1[redacted] |
| | dockerhub_username | mikael[redacted] |
| | system.collectionId | 76c79aec-9641-44c5-be15-beacafe67a9 |
| | system.debug | true |
| | system.definitionId | 2 |
| | system.teamProject | BookDemo |

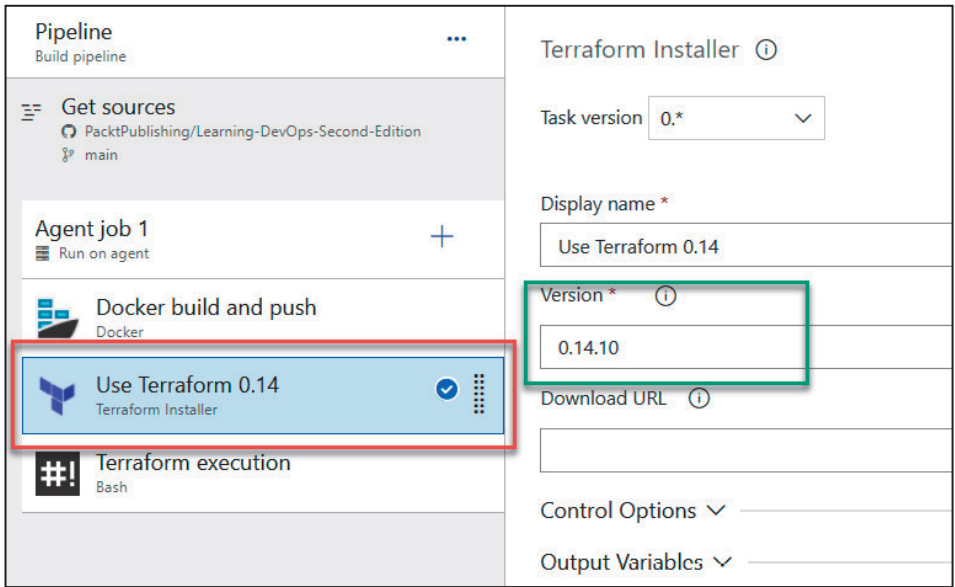
Rysunek 9.24. Zmienne potoku



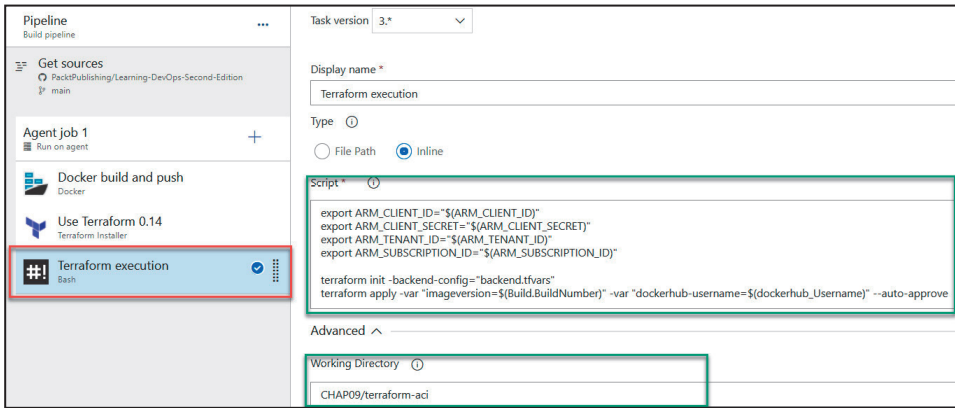
Rysunek 9.25. Lista kroków potoku



Rysunek 9.26. Parametry kroku wysyłania i budowania Dockera



Rysunek 9.27. Parametry kroku Terraform



Rysunek 9.28. Parametry kroku Bash

Get sources
PacktPublishing/Learning-DevOps-Second-Edition
main

Agent job 1
Run on agent

Docker build and push
Docker

Use Terraform 0.14
Terraform Installer

Terraform execution
Bash

Display name *
Agent job

Agent selection ^

Agent pool ⓘ | Pool information | Manage ↗

Azure Pipelines

Agent Specification * 2
ubuntu-latest

Rysunek 9.29. Parametry pracy agenta

Tasks Variables **Triggers** Options History | Save & queue ▾ Discard Summary Queue ...

Continuous integration

PacktPublishing/Learning-DevOps-Second-Edition
Enabled

Pull request validation

PacktPublishing/Learning-DevOps-Second-Edition
Disabled

Scheduled + Add
No builds scheduled

Build completion + Add
Build when another build completes

PacktPublishing/Learning-DevOps-Second-Edition

☒ Enable continuous integration
☐ Batch changes while a build is in progress

Branch filters

Type Branch specification

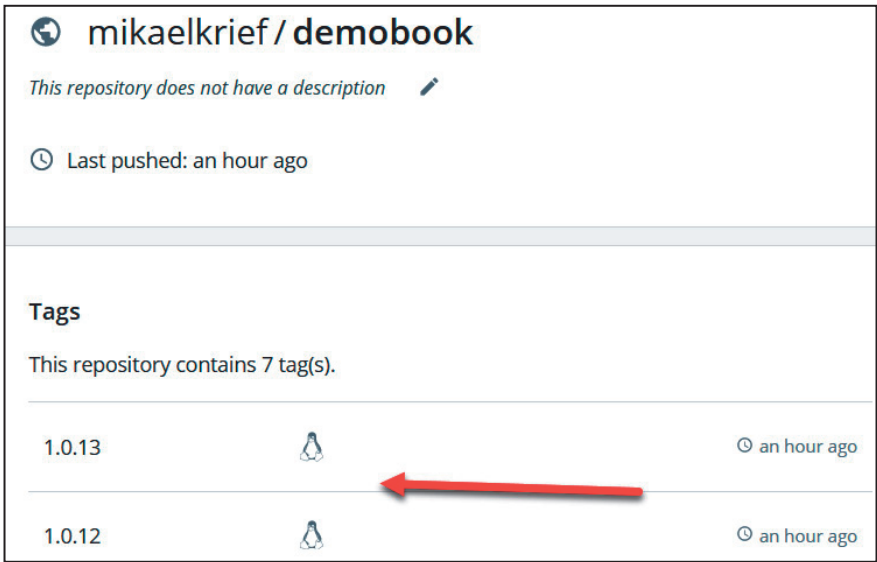
Include ▾ main

+ Add

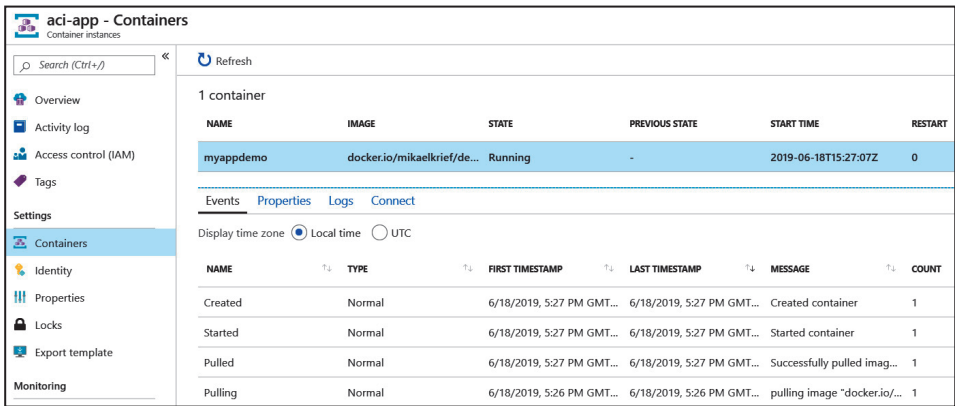
Path filters

+ Add

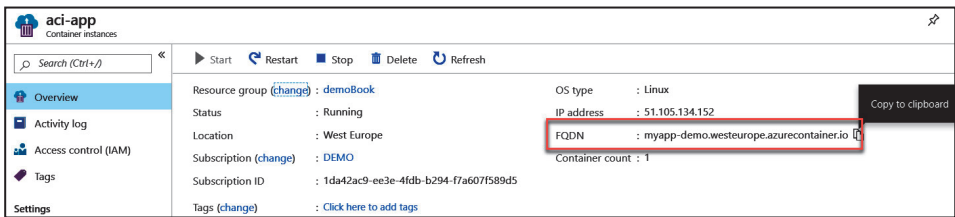
Rysunek 9.30. Włączony CI



Rysunek 9.31. Przesłany obraz Dockera, za pośrednictwem potoku, w Docker Hubie



Rysunek 9.32. Kontenery ACI



Rysunek 9.33. FQDN kontenera aplikacji w ACI



Rysunek 9.34. Testowanie aplikacji

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\terraform-aci> docker pull hashicorp/terraform
Using default tag: latest
latest: Pulling from hashicorp/terraform
a0d0a0d46f8b: Pull complete
2bb95c284368: Pull complete
e04940e4168e: Pull complete
Digest: sha256:b54ec7c5c0599bc943373835889ecfae1ef5adcfc229854c758a5c94172c30856
Status: Downloaded newer image for hashicorp/terraform:latest
docker.io/hashicorp/terraform:latest
```

Rysunek 9.35. Polecenie docker pull, służące do pobrania obrazu Terraform

```
PS C:\Learning-DevOps-Second-Edition\CHAP09\docker-compose> docker-compose version
docker-compose version 1.29.2, build 5becea4c
docker-py version: 5.0.0
CPython version: 3.9.0
OpenSSL version: OpenSSL 1.1.1g 21 Apr 2020
```

Rysunek 9.36. Polecenie docker-compose version

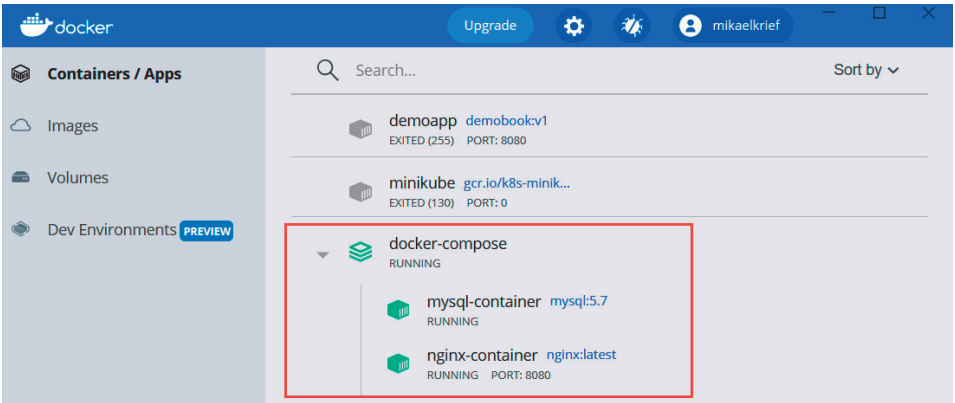
```
PS C:\Learning-DevOps-Second-Edition\CHAP09\docker-compose> docker-compose up -d
[+] Running 12/12
- mysql Pulled                                42.7s
- b380bbd43752 Already exists                  0.0s
- f23cbf2ecc5d Pull complete                  0.6s
- 30cfc6c29c0a Pull complete                  2.6s
- b38609286cbe Pull complete                  2.7s
- 8211d9e66cd6 Pull complete                  2.8s
- 2313f9eeca4a Pull complete                  8.7s
- 7eb487d00da0 Pull complete                  8.7s
- a71aacf913e7 Pull complete                  8.8s
- 393153c555df Pull complete                  40.0s
- 06628e2290d7 Pull complete                  40.1s
- ff2ab8dac9ac Pull complete                  40.1s
[+] Running 2/2
- Container mysql-container Started            4.0s
- Container nginx-container Running           0.0s
```

Rysunek 9.37. Polecenie docker-compose up -d

```
PS C:\Users\mkrief> docker ps
```

| CONTAINER ID | IMAGE | COMMAND | CREATED | STATUS | PORTS | NAMES |
|--------------|--------------|--------------------------|---------------|--------------|----------------------|-----------------|
| 2fc77d3debb0 | nginx:latest | "/docker-entrypoint..." | 3 minutes ago | Up 3 minutes | 0.0.0.0:8080->80/tcp | nginx-container |
| 7db499e87466 | mysql:5.7 | "docker-entrypoint.s..." | 3 minutes ago | Up 3 minutes | 3306/tcp, 33060/tcp | mysql-container |

Rysunek 9.38. Polecenie docker ps



Rysunek 9.39. Lista kontenerów Docker Compose w Docker Desktop

```
PS > \Learning-DevOps-Second-Edition\CHAP09\docker-compose> docker context create aci demobookaci
? Select a subscription ID Microsoft Azure Sponsorship (8...)
? Select a resource group rg-acicompose (westeurope)
Successfully created aci context "demobookaci"
```

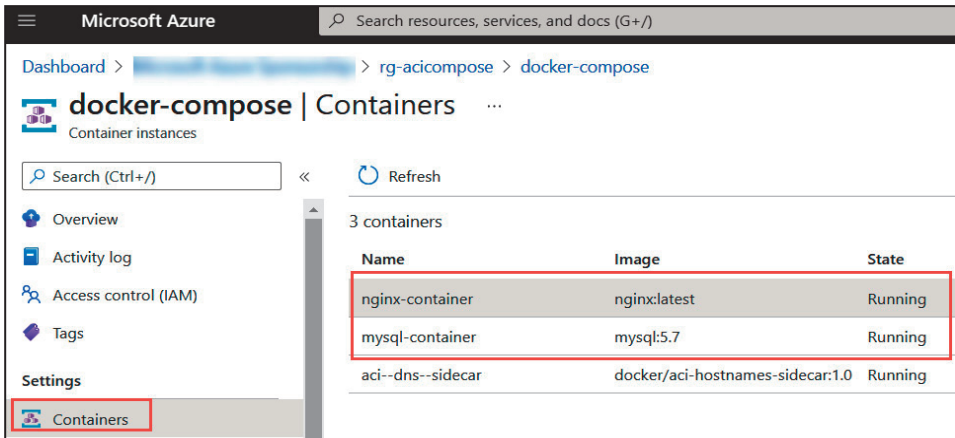
Rysunek 9.40. Tworzenie kontekstu Dockera dla ACI

```
PS > \Learning-DevOps-Second-Edition\CHAP09\docker-compose> docker context ls
NAME      TYPE      DESCRIPTION          DOCKER ENDPOINT
ATOR
default * moby      Current DOCKER_HOST based configuration   npipe:///pipe/docker_engine
demobookaci aci       rg-acicompose@westeurope                  npipe:///pipe/dockerDesktopLinuxEngine
desktop-linux moby
```

Rysunek 9.41. Lista kontekstów Dockera

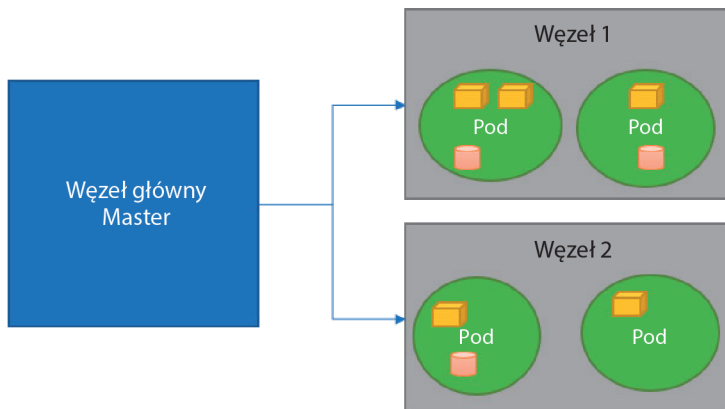
```
PS > \Learning-DevOps-Second-Edition\CHAP09\docker-compose> docker compose up
[+] Running 3/3
- Group docker-compose Created
- nginx-container Created
- mysql-container Created
```

Rysunek 9.42. Polecenie służące do wdrożenia w ACI — docker compose up

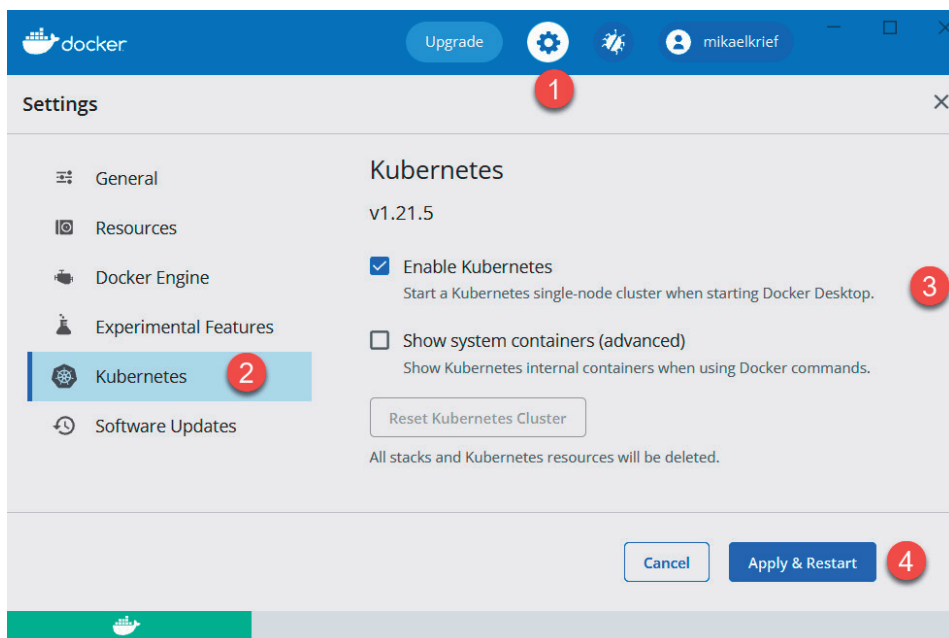


Rysunek 9.43. Kontenery ACI utworzone przez Docker Compose

Rozdział 10. Efektywne zarządzanie kontenerami za pomocą Kubernetesa



Rysunek 10.1. Architektura Kubernetesa



Rysunek 10.2. Włączanie Kubernetesa w Docker Desktop

```
PS C:\Users\mkrief> kubectl version --short
Client Version: v1.20.5
Server Version: v1.20.9
```

Rysunek 10.3. kubectl zwraca numer wersji

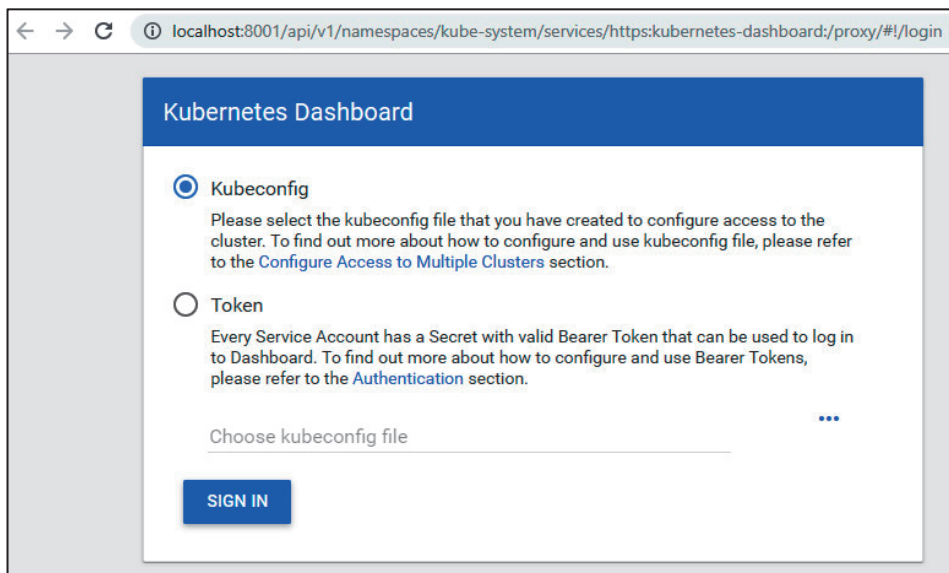
Uwaga `kubectl apply -f https://raw.githubusercontent.com/kubernetes/dashboard/v2.4.0/aio/deploy/recommended.yaml`

```
namespace/kubernetes-dashboard created
serviceaccount/kubernetes-dashboard created
service/kubernetes-dashboard created
secret/kubernetes-dashboard-certs created
secret/kubernetes-dashboard-csrf created
secret/kubernetes-dashboard-key-holder created
configmap/kubernetes-dashboard-settings created
role.rbac.authorization.k8s.io/kubernetes-dashboard created
clusterrole.rbac.authorization.k8s.io/kubernetes-dashboard created
rolebinding.rbac.authorization.k8s.io/kubernetes-dashboard created
clusterrolebinding.rbac.authorization.k8s.io/kubernetes-dashboard created
deployment.apps/kubernetes-dashboard created
service/dashboard-metrics-scraper created
deployment.apps/dashboard-metrics-scraper created
```

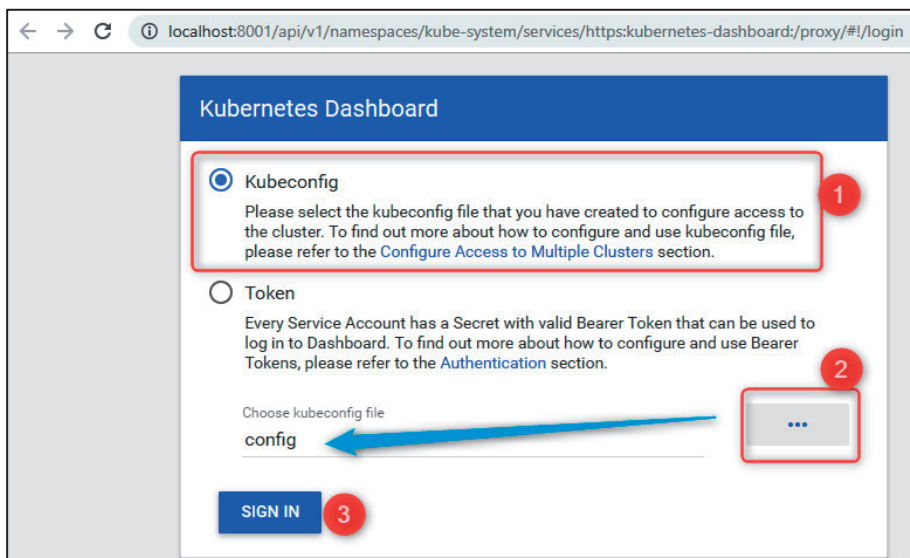
Rysunek 10.4. Instalacja pulpitu nawigacyjnego Kubernetesa

```
>kubectl proxy
Starting to serve on 127.0.0.1:8001
```

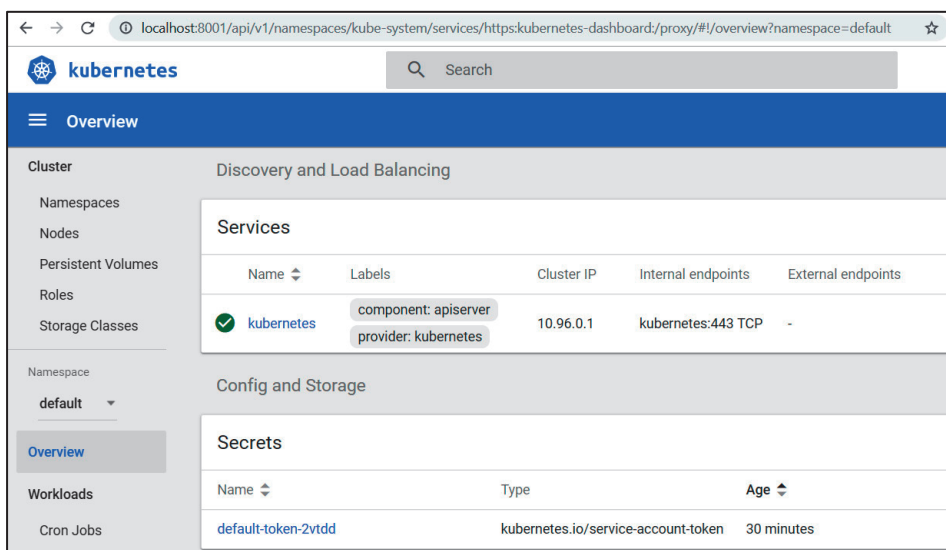
Rysunek 10.5. Polecenie kubectl proxy



Rysunek 10.6. Uwierzytelnianie na pulpicie Kubernetesa



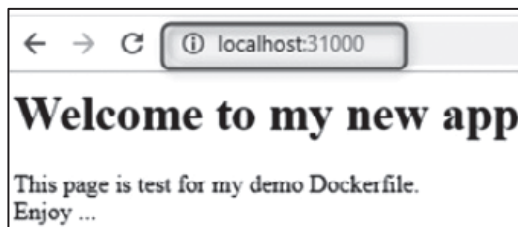
Rysunek 10.7. Uwierzytelnianie na pulpicie nawigacyjnym Kubernetesa za pomocą pliku kubeconfig



Rysunek 10.8. Lista zasobów pulpitu nawigacyjnego Kubernetesa

```
PS \Learning-DevOps-Second-Edition\CHAP10\k8sdeploy> kubectl apply -f myapp-deployment.yml
deployment.apps/webapp created
PS \Learning-DevOps-Second-Edition\CHAP10\k8sdeploy> kubectl get pods
NAME          READY   STATUS    RESTARTS   AGE
webapp-799697d7d6-gjv7x  1/1     Running   0           100s
webapp-799697d7d6-rd96r  1/1     Running   0           100s
```

Rysunek 10.9. Polecenie kubectl apply



Rysunek 10.10. Demo aplikacji Kubernetesa

```
PS C:\Users\mkrief> helm --help
The Kubernetes package manager

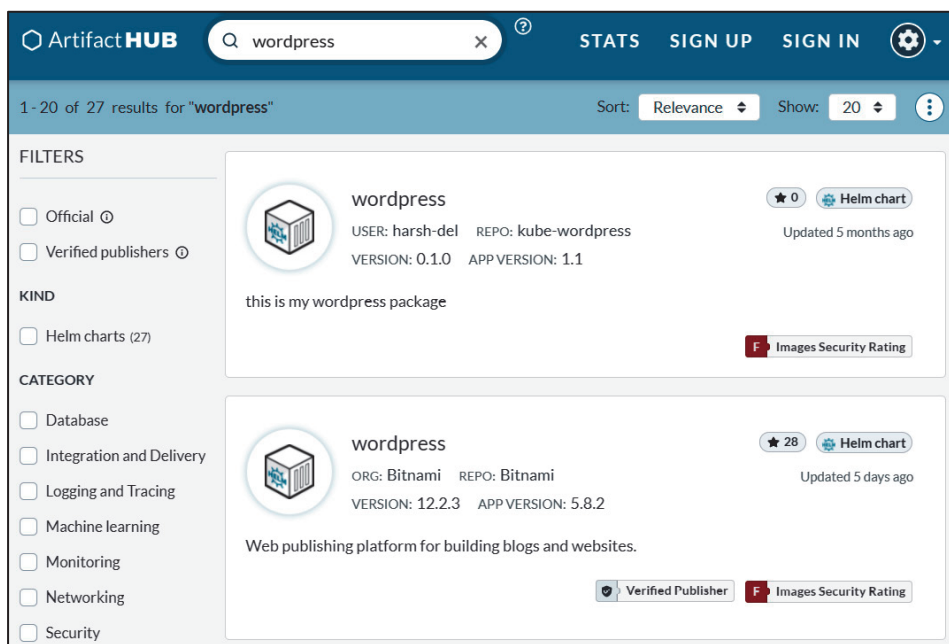
Common actions for Helm:

- helm search:      search for charts
- helm pull:        download a chart to your local directory to view
- helm install:     upload the chart to Kubernetes
- helm list:        list releases of charts
```

Rysunek 10.11. Polecenie helm --help

```
PS C:\Users\mkrief> helm search hub wordpress
URL                                     CHART VERSION   APP VERSION     DESCRIPTION
https://artifacthub.io/packages/helm/kube-wordp... 0.1.0           1.1             this is my wordpress package
https://artifacthub.io/packages/helm/bitnami/wo... 12.2.3          5.8.2           Web publishing platform for building blogs and ...
https://artifacthub.io/packages/helm/bitnami-ak... 12.2.3          5.8.2           Web publishing platform for building blogs and ...
https://artifacthub.io/packages/helm/groundhog2... 0.4.4           5.8.2-apache    A Helm chart for Wordpress on Kubernetes
https://artifacthub.io/packages/helm/riftbit/wo... 12.1.16         5.8.1           Web publishing platform for building blogs and ...
https://artifacthub.io/packages/helm/homeenterp... 0.1.0           5.8.0-php8.0-apache Blog server
https://artifacthub.io/packages/helm/mcoulabs/w... 0.1.0           1.16.0          A Helm chart for Kubernetes
https://artifacthub.io/packages/helm/securecode... 3.4.0           4.0             Insecure & Outdated Wordpress Instance: Never e...
https://artifacthub.io/packages/helm/wordpress... 1.0.0           0.11.1          This is the Helm Chart that creates the Wordpre...
https://artifacthub.io/packages/helm/bitpoke/w... 0.11.1          0.11.0-alpha.3 Bitpoke WordPress Operator Helm Chart
https://artifacthub.io/packages/helm/presslabs/... 0.11.0-alpha.3 0.11.0-alpha.3 Presslabs WordPress Operator Helm Chart
https://artifacthub.io/packages/helm/presslabs/... v0.12.0-rc.2   v0.12.0-rc.2   A Helm chart for deploying a WordPress site on ...
https://artifacthub.io/packages/helm/phntom/bin... 0.0.3           0.0.3           www.binaryvision.co.il static wordpress
https://artifacthub.io/packages/helm/gh-shessell... 1.0.35          5.8.2           Web publishing platform for building blogs and ...
https://artifacthub.io/packages/helm/somu-wordp... 1.0.0           2              This is my custom chart to deploy wordpress and...
https://artifacthub.io/packages/helm/uvaise-wor... 0.2.0           1.1.0           Wordpress for Kubernetes
https://artifacthub.io/packages/helm/wordpress/... 0.2.0           1.1.0           Wordpress for Kubernetes
https://artifacthub.io/packages/helm/wordpress-... 1.0.0           2              This is my custom chart to deploy wordpress and...
https://artifacthub.io/packages/helm/bitpoke/stack 0.11.0-rc.3    0.11.0-rc.3    Your Open-Source, Cloud-Native WordPress Infras...
https://artifacthub.io/packages/helm/securecode... 3.4.0           v3.8.20        A Helm chart for the WordPress security scanner...
https://artifacthub.io/packages/helm/vivexshu2... 1.0.0           2              This is my custom chart to deploy wordpress and...
https://artifacthub.io/packages/helm/presslabs/... 0.11.0-rc.2    v0.11.0-rc.2   Open-Source WordPress Infrastructure on Kubernetes
https://artifacthub.io/packages/helm/presslabs/... 0.12.0-rc.2    v0.12.0-rc.2   Open-Source WordPress Infrastructure on Kubernetes
https://artifacthub.io/packages/helm/six/wordpress 0.2.0           1.1.0           Wordpress for Kubernetes
https://artifacthub.io/packages/helm/jinchi-cha... 0.2.0           1.1.0           Wordpress for Kubernetes
https://artifacthub.io/packages/helm/wordpress... 0.1.0           1.1            Wordpress for Kubernetes
https://artifacthub.io/packages/helm/presslabs/... 0.11.6          0.11.6          Presslabs WordPress Operator Helm Chart
```

Rysunek 10.12. Wyszukiwanie pakietów Helma



Rysunek 10.13. Wyszukiwanie pakietu wordpress w Artifact Hubie



Rysunek 10.14. Szczegóły pakietu wordpress z Artifact Huba

```
PS C:\Users\mkrief> helm repo add bitnami https://charts.bitnami.com/bitnami
*bitnami* has been added to your repositories
PS C:\Users\mkrief> helm install wpdemo bitnami/wordpress
NAME: wpdemo
LAST DEPLOYED: Sat Dec 4 19:29:46 2021
NAMESPACE: default
STATUS: deployed
REVISION: 1
TEST SUITE: None
NOTES:
CHART NAME: wordpress
CHART VERSION: 12.2.3
APP VERSION: 5.8.2

** Please be patient while the chart is being deployed **

Your WordPress site can be accessed through the following DNS name from within your cluster:

    wpdemo-wordpress.default.svc.cluster.local (port 80)

To access your WordPress site from outside the cluster follow the steps below:

1. Get the WordPress URL by running these commands:

    NOTE: It may take a few minutes for the LoadBalancer IP to be available.
    Watch the status with: 'kubectl get svc --namespace default -w wpdemo-wordpress'

    export SERVICE_IP=$(kubectl get svc --namespace default wpdemo-wordpress --template "{{ range (index .status.loadBalancer.ingress 0) }}{{.}}{{ end }}" )
    echo "WordPress URL: http://$SERVICE_IP/"
    echo "WordPress Admin URL: http://$SERVICE_IP/admin"

2. Open a browser and access WordPress using the obtained URL.

3. Login with the following credentials below to see your blog:

    echo Username: user
    echo Password: $(kubectl get secret --namespace default wpdemo-wordpress -o jsonpath="{.data.wordpress-password}" | base64 --decode)
```

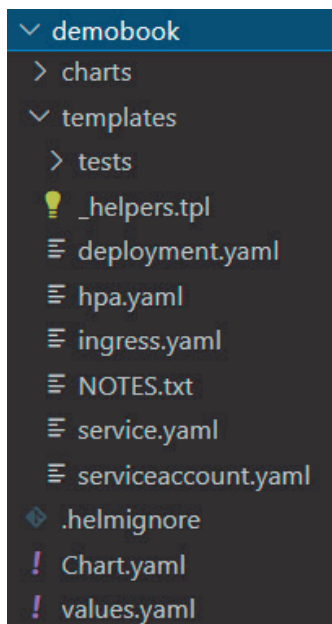
Rysunek 10.15. Instalowanie aplikacji za pomocą Helma

| NAME | NAMESPACE | REVISION | UPDATED | STATUS | CHART | APP VERSION |
|--------|-----------|----------|---------------------------------------|----------|------------------|-------------|
| wpdemo | default | 1 | 2021-12-04 19:29:46.8115125 +0100 CET | deployed | wordpress-12.2.3 | 5.8.2 |

Rysunek 10.16. Lista zainstalowanych pakietów Helma

```
PS C:\Users\mkrief> helm delete wpdemo
release "wpdemo" uninstalled
```

Rysunek 10.17. Polecenie helm delete



Rysunek 10.18. Folder struktury charta Helma

```
PS > Learning-DevOps-Second-Edition\CHAP10> helm install demochart ./demobook
NAME: demochart
LAST DEPLOYED: Sun Dec 5 17:16:19 2021
NAMESPACE: default
STATUS: deployed
REVISION: 1
NOTES:
1. Get the application URL by running these commands:
  export POD_NAME=$(kubectl get pods --namespace default -l "app.kubernetes.io/name=demobook,app.kubernetes.io/instance=demochart" -o
  jsonpath="{.items[0].metadata.name}")
  export CONTAINER_PORT=$(kubectl get pod --namespace default $POD_NAME -o jsonpath="{.spec.containers[0].ports[0].containerPort}")
  echo "Visit http://127.0.0.1:8080 to use your application"
  kubectl --namespace default port-forward $POD_NAME 8080:$CONTAINER_PORT
```

Rysunek 10.19. Polecenie helm install

```
PS > \Learning-DevOps-Second-Edition\CHAP10> kubectl get pods
NAME                                READY   STATUS    RESTARTS   AGE
demochart-demobook-77458bfd9f-h4mrv 1/1     Running   0           104s
```

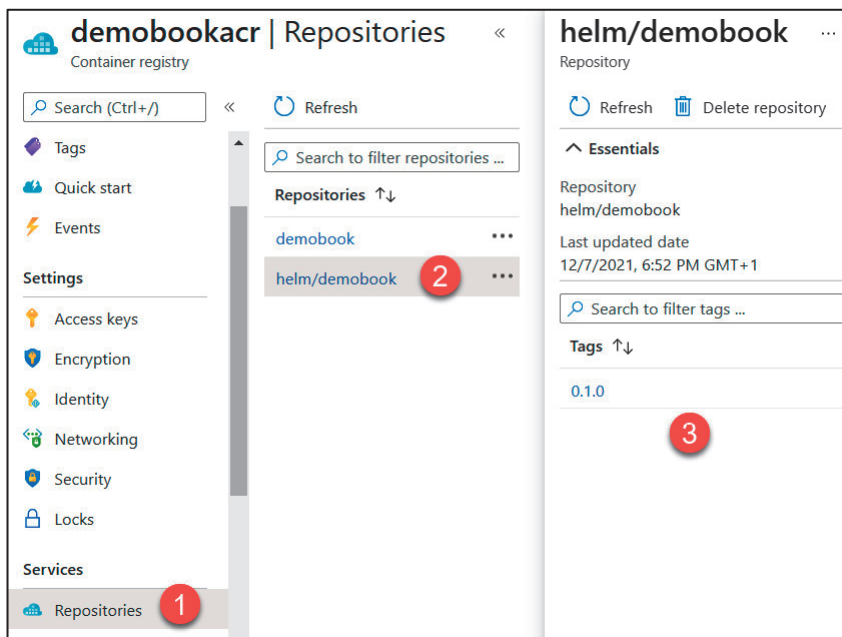
Rysunek 10.20. kubectl get pods

```
PS > \Learning-DevOps-Second-Edition\CHAP10> helm ls
NAME      NAMESPACE   REVISION   UPDATED                               STATUS   CHART           APP VERSION
demochart default      1          2021-12-05 17:16:19.0370031 +0100 CET deployed  demobook-0.1.0  1.16.0
```

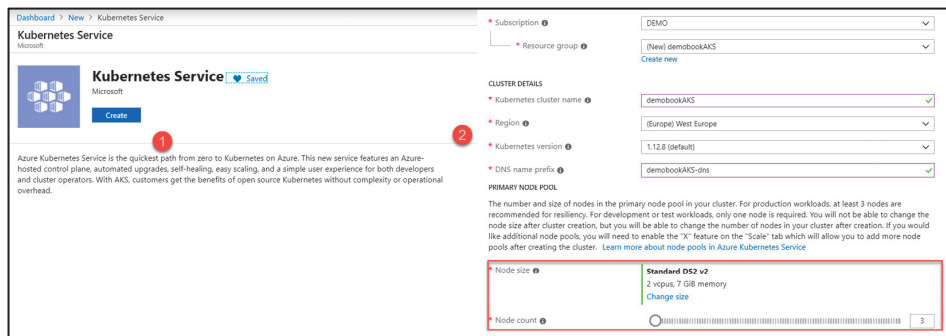
Rysunek 10.21. Lista pakietów Helma

```
PS > \Learning-DevOps-Second-Edition\CHAP10\demobook> helm package .
Successfully packaged chart and saved it to: \Learning-DevOps-Second-Edition\CHAP10\demobook\demobook-0.1.0.tgz
```

Rysunek 10.22. Tworzenie pakietu Helma



Rysunek 10.23. Repozytorium Helma w ACR



Rysunek 10.24. Tworzenie AKS za pośrednictwem portalu Azure

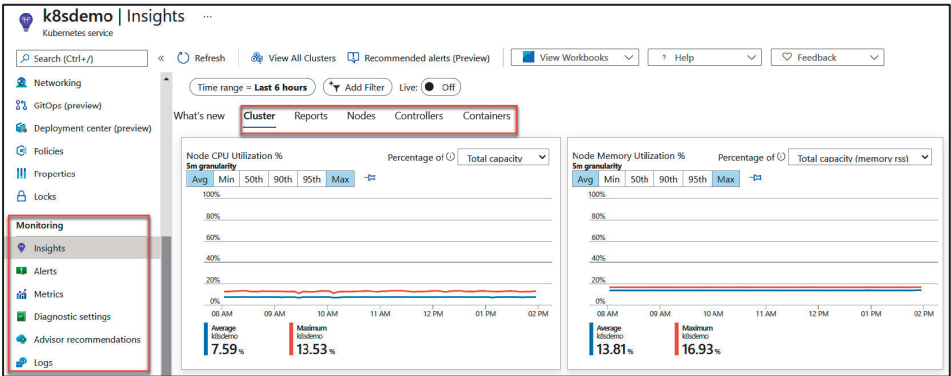
```
C:\> az aks get-credentials --resource-group Rg-AKS --name demoBookAKS
Merged "demoBookAKS" as current context in C:\.kube\config
```

Rysunek 10.25. AKS pobiera dane uwierzytelniające za pośrednictwem polecenia az cli

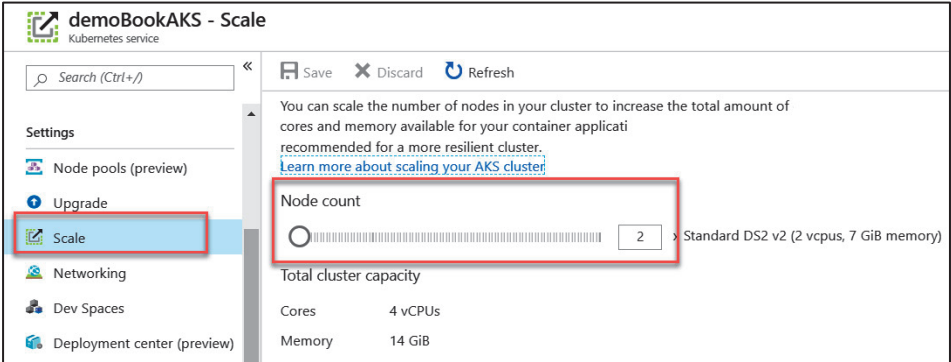
```
>kubectl get nodes
```

| NAME | STATUS | ROLES | AGE | VERSION |
|--------------------------|--------|-------|-----|---------|
| aks-nodepool1-41966373-0 | Ready | agent | 8m | v1.12.8 |
| aks-nodepool1-41966373-1 | Ready | agent | 8m | v1.12.8 |

Rysunek 10.26. Lista zwracana przez polecenie kubectl get nodes



Rysunek 10.27. Monitorowanie AKS



Rysunek 10.28. Skalowanie AKS

```
PS C:\Users\mkrief> kubectl get pods,svc
```

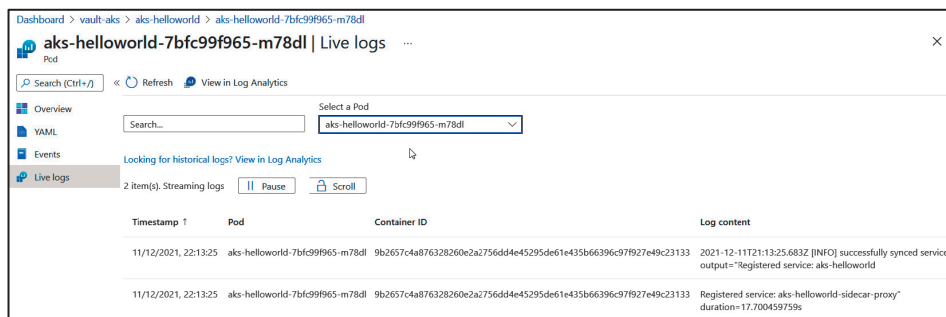
| NAME | READY | STATUS | RESTARTS | AGE |
|---|-------|---------|---------------|------|
| pod/demochart-demobook-77458bfd9f-h4mwv | 1/1 | Running | 2 (3m27s ago) | 6d4h |
| pod/webapp-799697d7d6-gjv7x | 1/1 | Running | 2 (3m27s ago) | 6d7h |
| pod/webapp-799697d7d6-rd96r | 1/1 | Running | 2 (3m27s ago) | 6d7h |

| NAME | TYPE | CLUSTER-IP | EXTERNAL-IP | PORT(S) | AGE |
|----------------------------|-----------|----------------|-------------|--------------|------|
| service/demochart-demobook | ClusterIP | 10.111.122.236 | <none> | 80/TCP | 6d4h |
| service/kubernetes | ClusterIP | 10.96.0.1 | <none> | 443/TCP | 8d |
| service/webapp | NodePort | 10.110.12.30 | <none> | 80:31000/TCP | 6d6h |

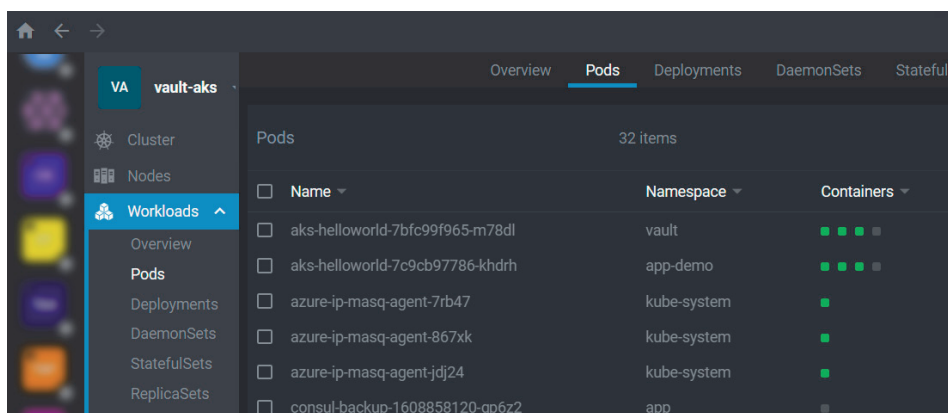
Rysunek 10.29. kubectl pobiera zasoby

```
PS C:\Users\mkrief> kubectl logs pod/webapp-799697d7d6-gjv7x
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 10.1.0.35. Set the 'ServerName' directive globally to suppress this message
AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 10.1.0.35. Set the 'ServerName' directive globally to suppress this message
[Sat Dec 11 20:57:07.523851 2021] [mpm_event:notice] [pid 1:tid 140521422701696] AH00489: Apache/2.4.41 (Unix) configure d -- resuming normal operations
[Sat Dec 11 20:57:07.532170 2021] [core:notice] [pid 1:tid 140521422701696] AH00094: Command Line: 'httpd -D FOREGROUND'
```

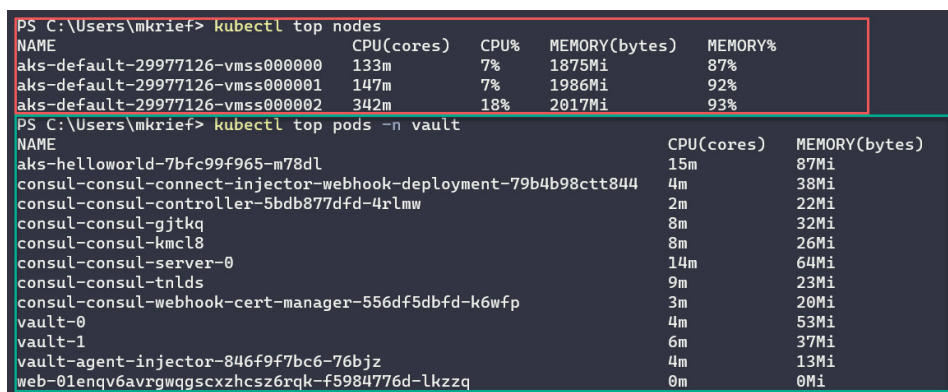
Rysunek 10.30. kubectl pobiera logi poda



Rysunek 10.31. Logi w czasie rzeczywistym w AKS

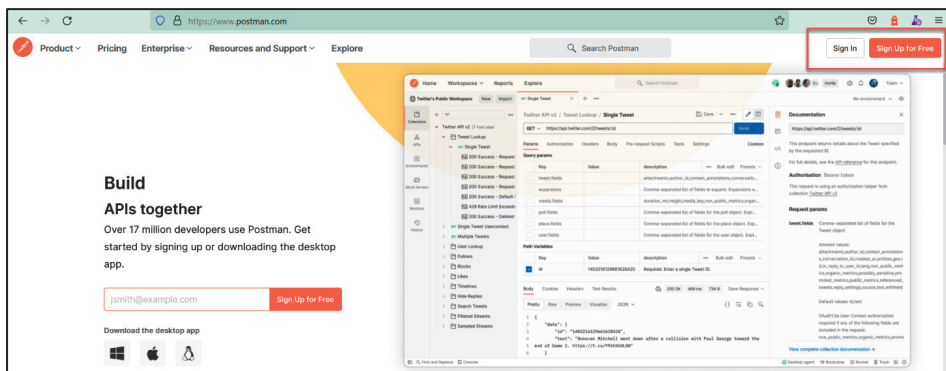


Rysunek 10.32. Pulpit nawigacyjny Lens



Rysunek 10.33. kubectl pobiera metryki

Rozdział 11. Testowanie interfejsów API za pomocą Postmana



Rysunek 11.1. Rejestracja w serwisie Postmana

The Postman app

The ever-improving Postman app (a new release every two weeks) gives you a full-featured Postman experience.

Windows 32-bit

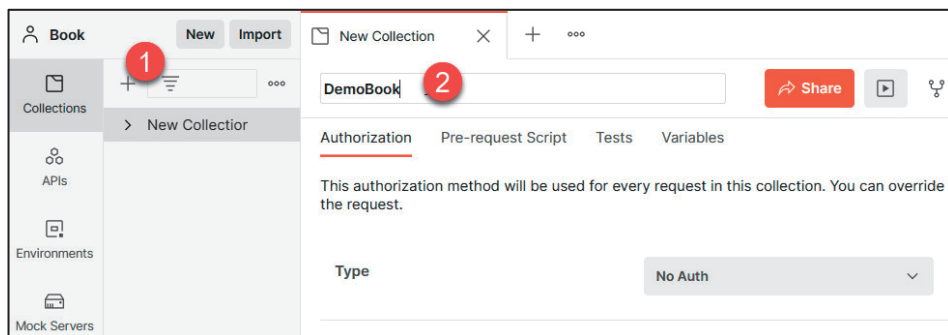
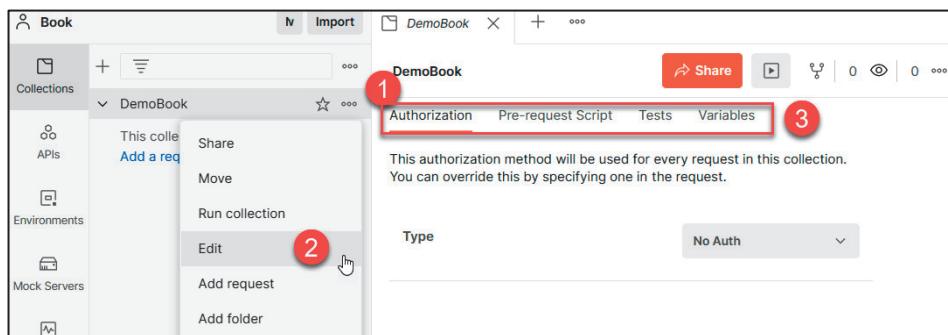
Windows 64-bit

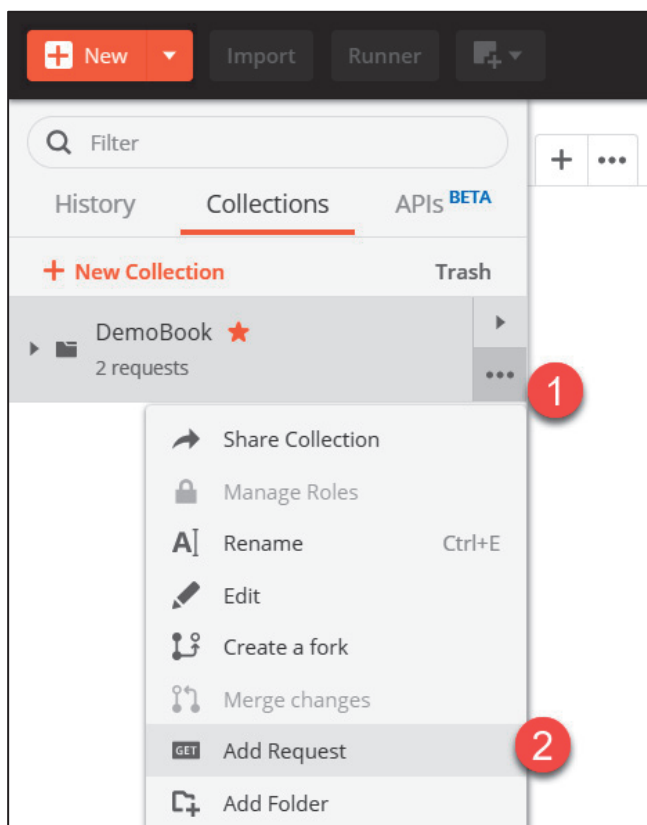
By downloading and using Postman, I agree to the [Privacy Policy](#) and [Terms](#).

Version 9.4.1 · [Release Notes](#) · [Product Roadmap](#)

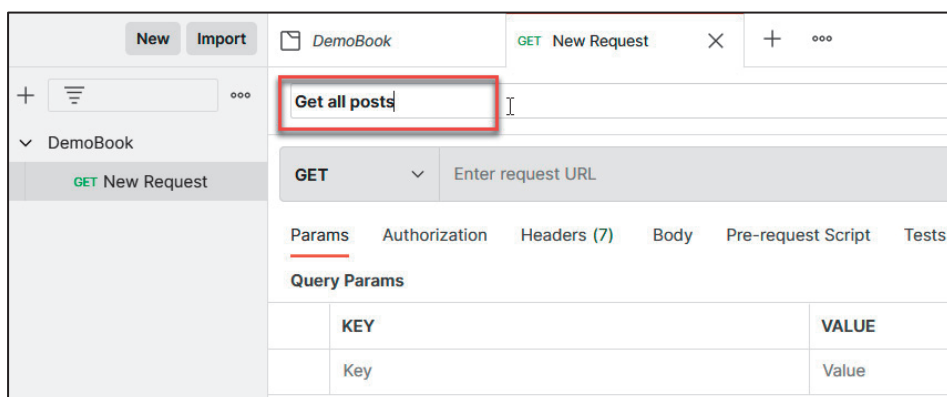
Not your OS? Download for Mac ([Intel Chip](#) / [Apple Chip](#)) or Linux ([x64](#))

Rysunek 11.2. Pobieranie Postmana

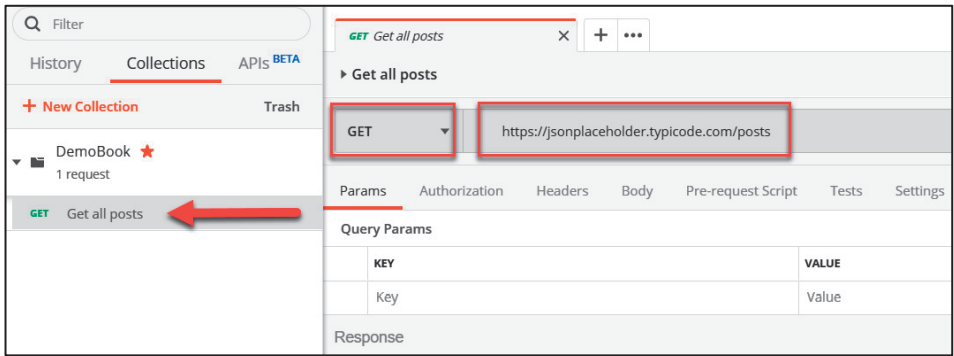
**Rysunek 11.3. Tworzenie kolekcji Postmana****Rysunek 11.4. Edycja kolekcji Postmana**



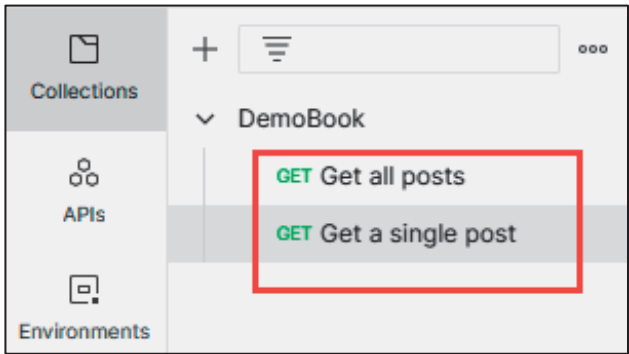
Rysunek 11.5. Dodaj żądanie w Postmanie



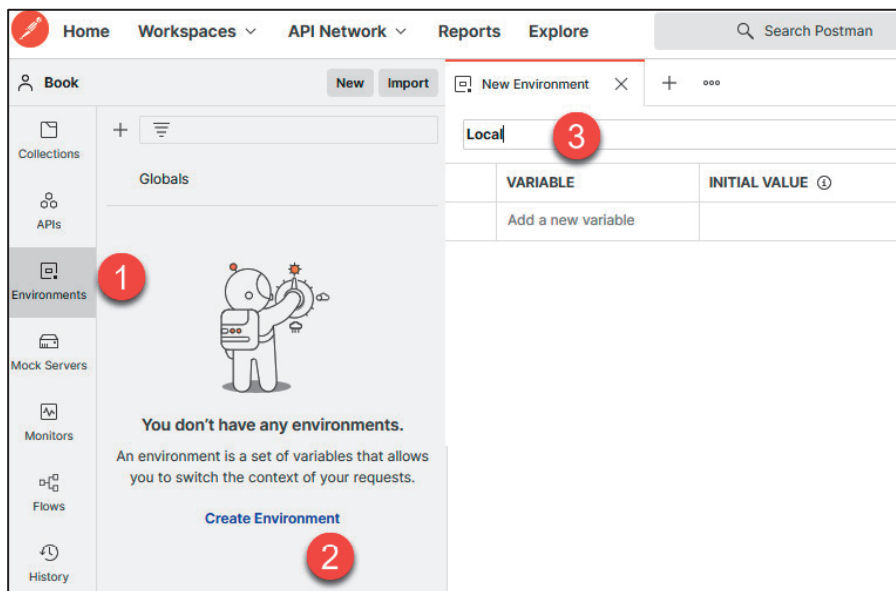
Rysunek 11.6. Nowe żądanie w Postmanie



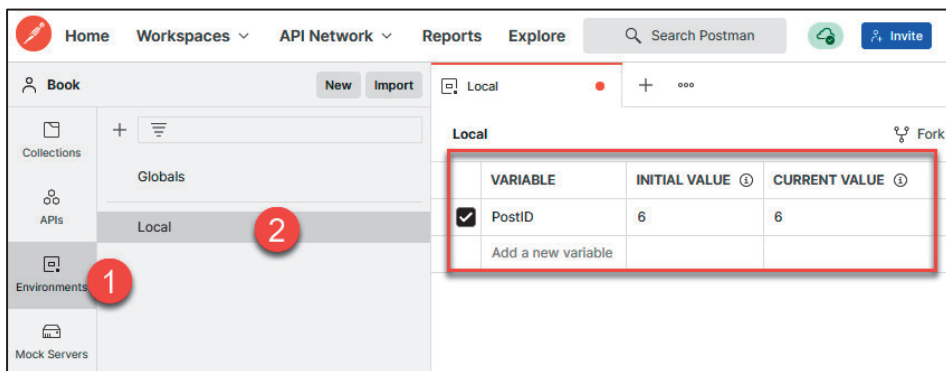
Rysunek 11.7. Edycja żądania Postmana



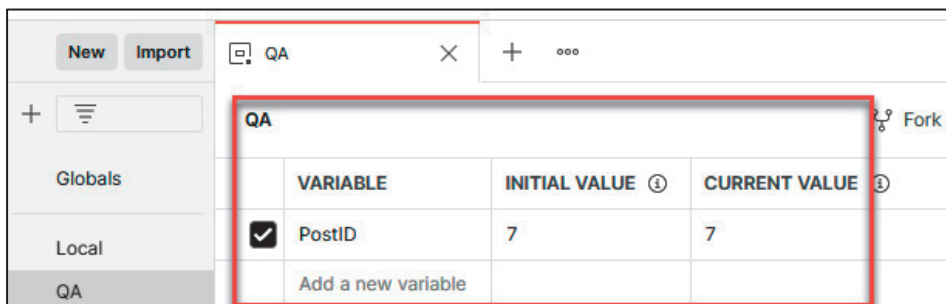
Rysunek 11.8. Lista żądań Postmana



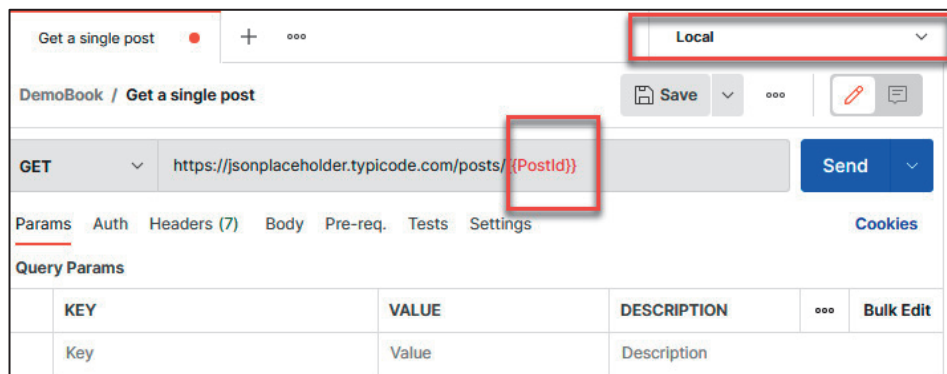
Rysunek 11.9. Dodawanie środowiska w Postmanie



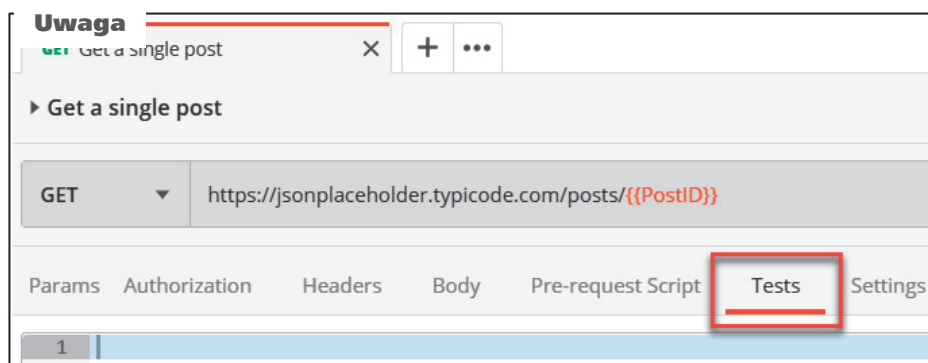
Rysunek 11.10. Dodawanie zmiennej środowiskowej w Postmanie



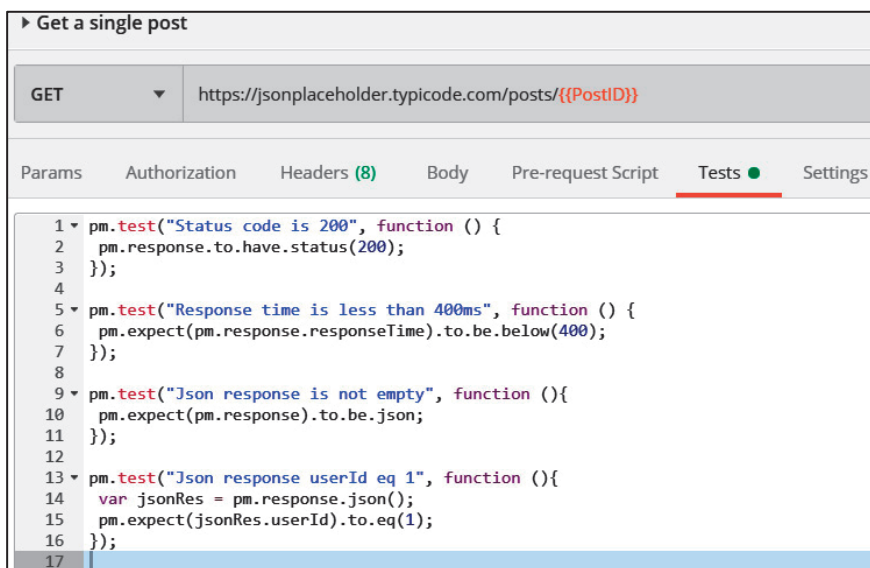
Rysunek 11.11. Dodawanie drugiego środowiska w Postmanie



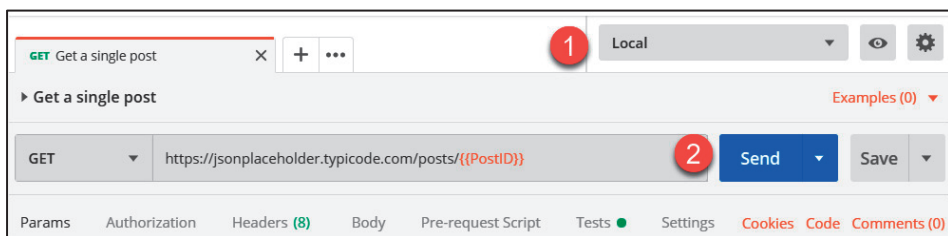
Rysunek 11.12. Używanie zmiennej środowiskowej w Postmanie



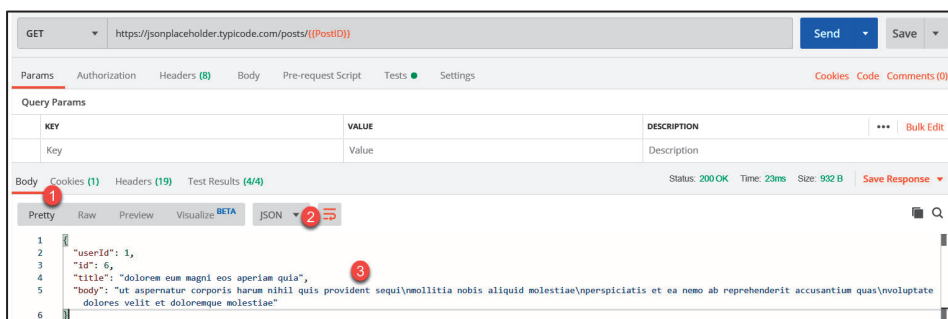
Rysunek 11.13. Zakładka Tests Postmana



Rysunek 11.14. Kod testów Postmana



Rysunek 11.15. Rejestracja za pomocą Postmana



Rysunek 11.16. Treść odpowiedzi w Postmanie

| KEY | VALUE | DESCRIPTION | ... | Bulk Edit |
|------|----------------------------------|--------------|--------------------|---|
| Key | Value | Description | | |
| Body | Cookies (1) | Headers (19) | Test Results (4/4) | Status: 200 OK Time: 23ms Size: 932 B Save Response ▾ |
| All | Passed | Skipped | Failed | |
| PASS | Status code is 200 | | | |
| PASS | Response time is less than 400ms | | | |
| PASS | Json response is not empty | | | |
| PASS | Json response userId eq 1 | | | |

Rysunek 11.17. Wyniki testu Postmana

| | | | |
|------|--|--------------|--------------------|
| Body | Cookies (1) | Headers (19) | Test Results (3/4) |
| All | Passed | Skipped | Failed |
| PASS | Status code is 200 | | |
| PASS | Response time is less than 400ms | | |
| PASS | Json response is not empty | | |
| FAIL | Json response userId eq 1 AssertionError: expected 1 to equal 10 | | |

Rysunek 11.18. Test Postmana nie powiódł się

Book

New Import

Runner

Local

Collections

DemoBook

GET Share

GET Move

Run collection

Edit

Add request

Add folder

Monitor collection

Mock collection

Create a fork

Create pull request

RUN ORDER

Deselect All Select All Reset

✓ GET Get all posts

✓ GET Get a single post

Iterations 1

Delay 0 ms

Data Select File

☐ Save responses ⓘ

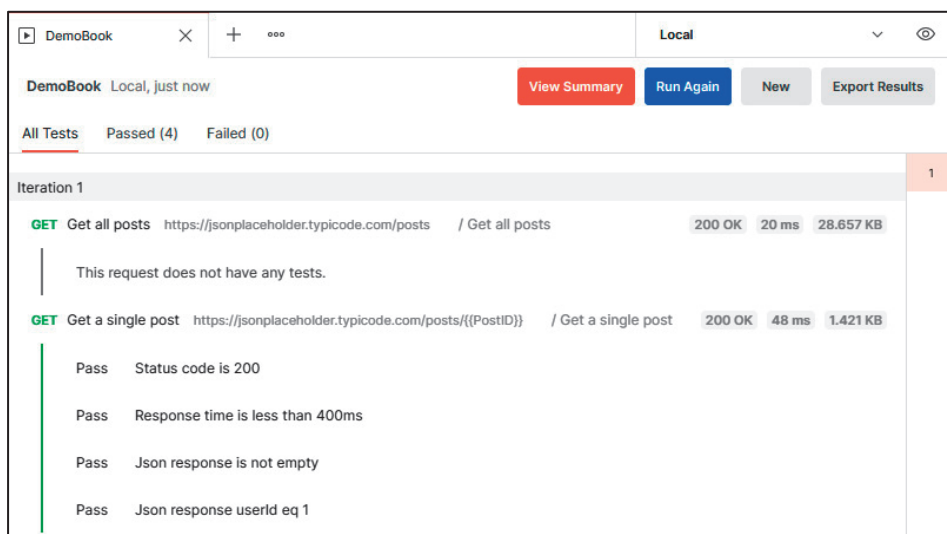
☒ Keep variable values ⓘ

☐ Run collection without using stored cookies

☒ Save cookies after collection run ⓘ

Run DemoBook

Rysunek 11.19. Postman Runner



Rysunek 11.20. Wykonanie Postman Runniera

```
P: Uwaga > npm install -g newman
C: ppData\Roaming\npm\newman -> C:\Users\mkrief\AppData\Roaming\npm\node_modules\newman\bin\newman.js
+ newman@5.3.0
added 129 packages from 189 contributors in 23.971s
```

Rysunek 11.21. Instalacja Newmana

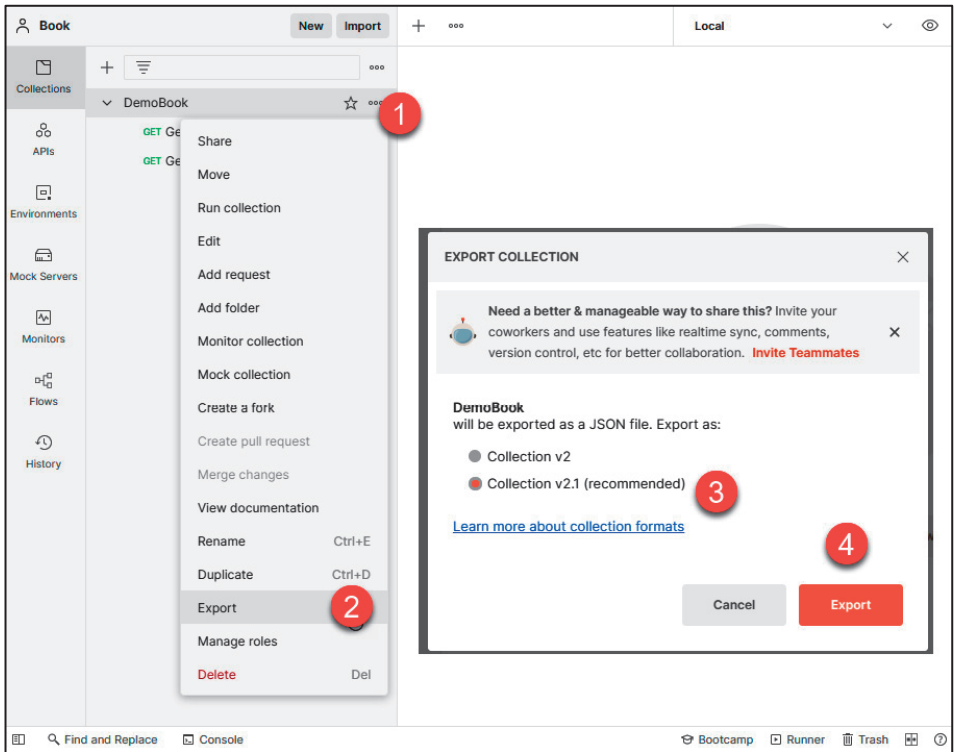
```
>newman --help
Usage: newman [options] [command]

Options:
  -v, --version          output the version number
  -h, --help             output usage information

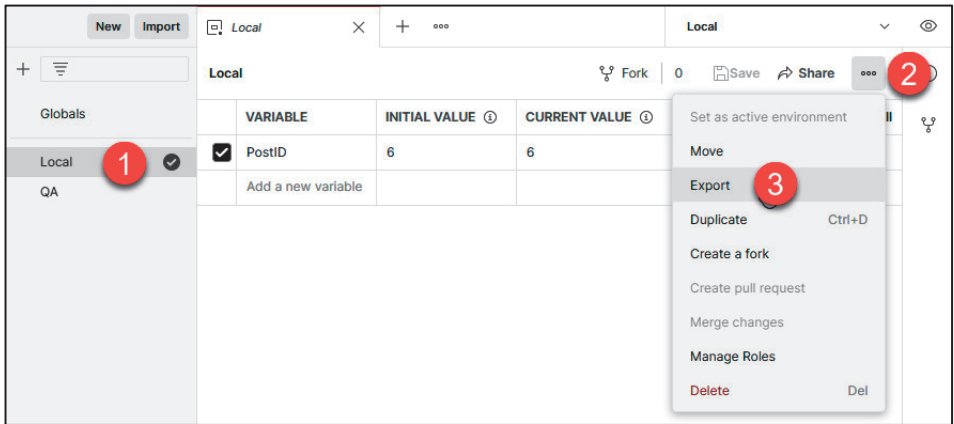
Commands:
  run [options] <collection> URL or path to a Postman Collection.

To get available options for a command:
  newman [command] -h
```

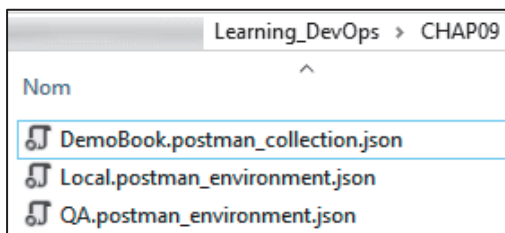
Rysunek 11.22. Polecenie pomocy Newmana



Rysunek 11.23. Eksport kolekcji Postmana



Rysunek 11.24. Eksport środowiska w Newmanie



Rysunek 11.25. Folder plików eksportu programu Postman

```
C:\Users\Mikael\Documents\Postman>newman run DemoBook.postman_collection.json -e Local.postman_environment.json
newman

DemoBook

→ Get all posts
GET https://jsonplaceholder.typicode.com/posts [200 OK, 27.64KB, 194ms]

→ Get a single post
GET https://jsonplaceholder.typicode.com/posts/6 [200 OK, 932B, 27ms]
✓ Status code is 200
✓ Response time is less than 400ms
✓ Json response is not empty
✓ Json response userId eq 1
```

| | executed | failed |
|--|----------|--------|
| iterations | 1 | 0 |
| requests | 2 | 0 |
| test-scripts | 1 | 0 |
| prerequisite-scripts | 0 | 0 |
| assertions | 4 | 0 |
| total run duration: 338ms | | |
| total data received: 27.16KB (approx) | | |
| average response time: 110ms [min: 27ms, max: 194ms, s.d.: 83ms] | | |

Rysunek 11.26. Wykonanie Newmana

```
C:\Users\Mikael\Documents\Postman>newman run DemoBook.postman_collection.json -e qa.postman_environment.json
newman

DemoBook

→ Get all posts
GET https://jsonplaceholder.typicode.com/posts [200 OK, 27.64KB, 254ms]

→ Get a single post
GET https://jsonplaceholder.typicode.com/posts/7 [200 OK, 868B, 28ms]
✓ Status code is 200
✓ Response time is less than 400ms
✓ Json response is not empty
1. Json response userId eq 1
```

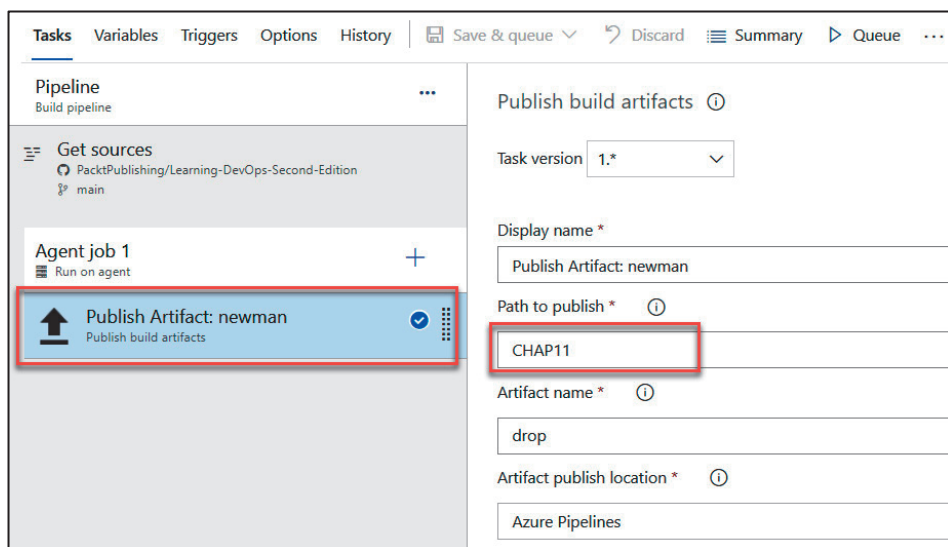
| | executed | failed |
|----------------------|----------|--------|
| iterations | 1 | 0 |
| requests | 2 | 0 |
| test-scripts | 1 | 0 |
| prerequisite-scripts | 0 | 0 |
| assertions | 4 | 1 |

total run duration: 412ms
total data received: 27.09KB (approx)
average response time: 141ms [min: 28ms, max: 254ms, s.d.: 113ms]

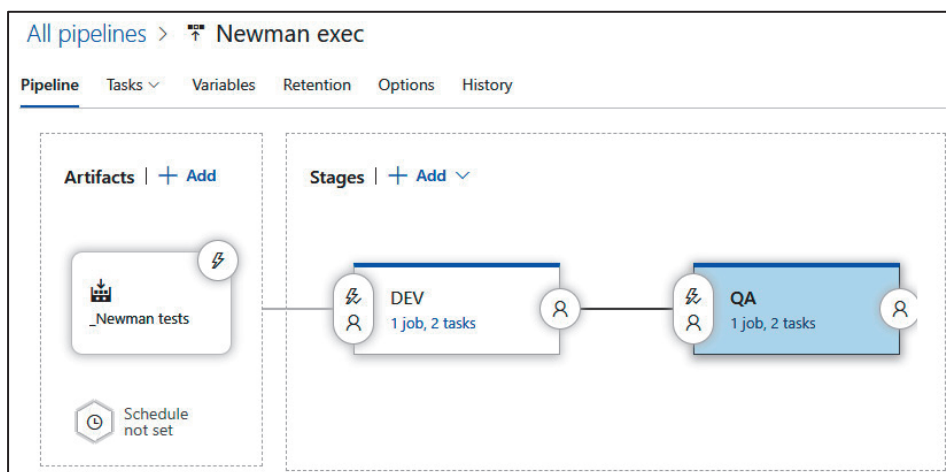
failure detail

1. AssertionError
Json response userId eq 1
expected 1 to equal 10
at assertion:3 in test-script
inside "Get a single post"

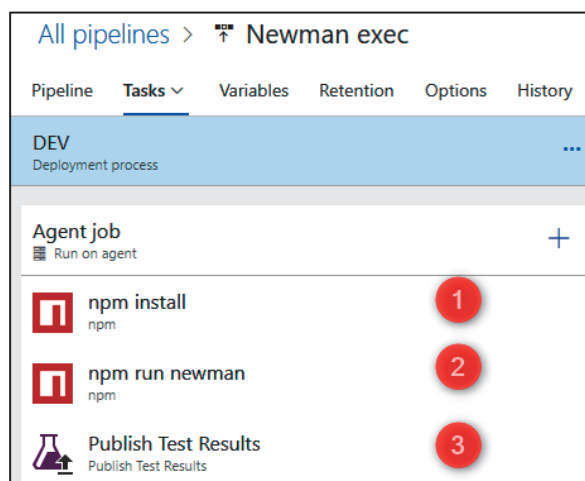
Rysunek 11.27. Nieudane testy Newmana



Rysunek 11.28. Azure Pipelines publikuje pliki Newmana



Rysunek 11.29. Tworzenie wydania w Azure Pipelines za pomocą Newmana



Rysunek 11.30. Kroki przygotowania wydania przez Newmana w Azure Pipelines

The screenshot shows the configuration for the 'npm install' task in the Azure Pipelines 'DEV' deployment process. On the left, the 'Agent job' section lists three tasks: 'npm install' (selected and highlighted with a red box), 'npm run newman', and 'Publish Test Results'. On the right, the configuration for the 'npm' task is shown. The 'Task version' is set to '1.*'. The 'Display name' is 'npm install'. The 'Command' is set to 'install' (highlighted with a red box). The 'Working folder that contains package.json' is set to '\$(System.DefaultWorkingDirectory)/_Newman tests/drop'.

DEV
Deployment process

Agent job
Run on agent

npm install
npm

npm run newman
npm

Publish Test Results
Publish Test Results

npm ⓘ

Task version 1.* ▼

Display name *
npm install

Command ⓘ
install

Working folder that contains package.json ⓘ
\$(System.DefaultWorkingDirectory)/_Newman tests/drop

Rysunek 11.31. Instalacja npm w Azure Pipelines

The screenshot shows the configuration for the 'npm run newman' task in the Azure Pipelines 'DEV' deployment process. On the left, the 'Agent job' section lists three tasks: 'npm install', 'npm run newman' (selected and highlighted with a red box), and 'Publish Test Results'. On the right, the configuration for the 'npm' task is shown. The 'Task version' is set to '1.*'. The 'Display name' is 'npm run newman'. The 'Command' is set to 'custom' (highlighted with a red box). The 'Working folder that contains package.json' is set to '\$(System.DefaultWorkingDirectory)/_Newman tests/drop'. The 'Command and arguments' are set to 'run testapilocal' (highlighted with a red box).

DEV
Deployment process

Agent job
Run on agent

npm install

npm run newman
npm

Publish Test Results
Publish Test Results

npm ⓘ

Task version 1.* ▼

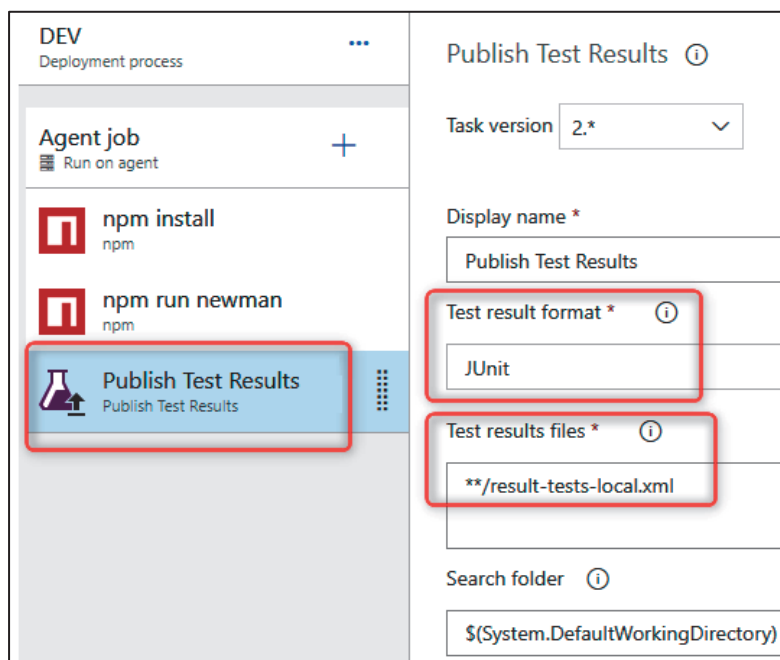
Display name *
npm run newman

Command * ⓘ
custom

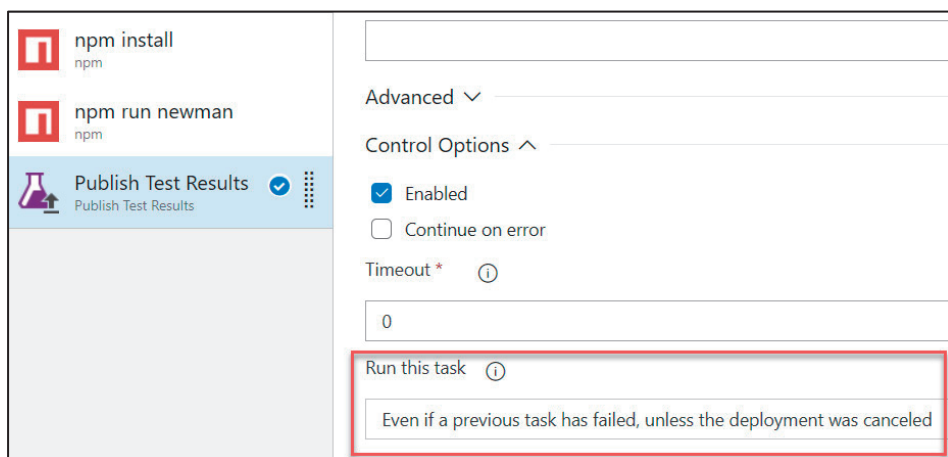
Working folder that contains package.json ⓘ
\$(System.DefaultWorkingDirectory)/_Newman tests/drop

Command and arguments * ⓘ
run testapilocal

Rysunek 11.32. Uruchomienie Newmana w Azure Pipelines

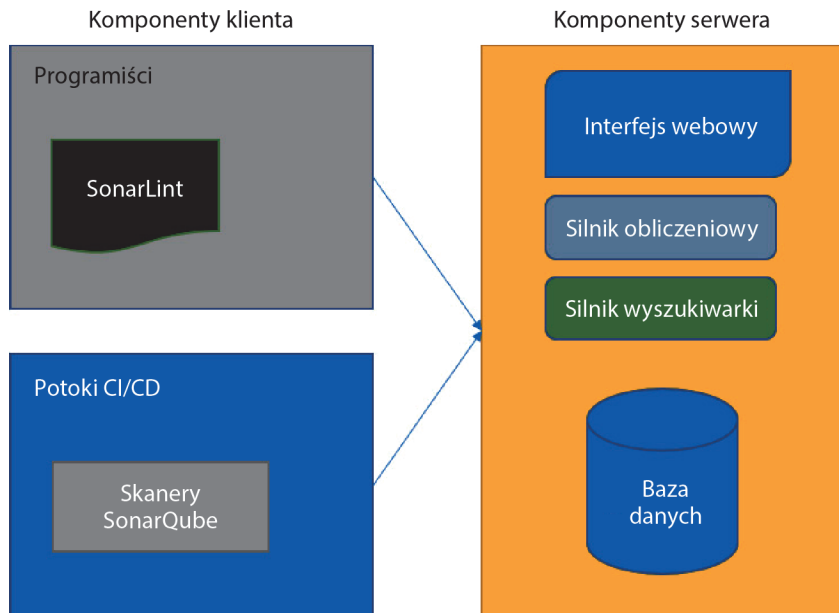


Rysunek 11.33. Publikacja wyniku testów Newmana w Azure Pipelines



Rysunek 11.34. Opcja publikacji wyniku testów Newmana w Azure Pipelines

Rozdział 12. Statyczna analiza kodu za pomocą SonarQube



Rysunek 12.1. Architektura SonarQube z komponentami klienta i serwera

The screenshot shows the SonarQube Bitnami marketplace page. The header includes the SonarQube logo, the title "SonarQube packaged by Bitnami", and a link to "Add to Favorites". Below the header, the page displays the Bitnami logo, the version "5.0 (1 Azure ratings)", and two buttons: "Create" (highlighted with a red box) and "Start with a pre-set configuration". A link "Want to deploy programmatically? Get started" is also present.

The page has a navigation bar with links: **Overview**, **Plans + Pricing**, **Usage Information + Support**, and **Reviews**.

The main content area describes SonarQube as a quality management platform designed for continuously analyzing and measuring code technical quality, from the earliest stages of planning to production. It combines static and dynamic analysis tools for monitoring duplicated code, coding standards, unit tests, complex code, potential bugs, comments and design, and architecture.

SonarQube is used for major programming languages such as C/C++, JavaScript, Java, C#, PHP, or Python, and is able to analyze several programming languages simultaneously.

This open source solution is packaged by Bitnami. Learn how to install, configure, and manage it at docs.bitnami.com. For deployment issues, reach out our support team at community.bitnami.com.

Trademarks: This software listing is packaged by Bitnami. The respective trademarks mentioned in the offering are owned by the respective companies, and use of them does not imply any affiliation or endorsement.

Rysunek 12.2. Azure SonarQube w Marketplace

Create a virtual machine ...

Basics Disks Networking Management Advanced Tags Review + create

Create a virtual machine that runs Linux or Windows. Select an image from Azure marketplace or use your own customized image. Complete the Basics tab then Review + create to provision a virtual machine with default parameters or review each tab for full customization. [Learn more](#)

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * ⓘ Microsoft Azure Sponsorship ▼

Resource group * ⓘ (New) demo-sonar ▼ [Create new](#)

Instance details

Virtual machine name * ⓘ demo-sonar ✓

Region * ⓘ (Europe) West Europe ▼

Availability options ⓘ No infrastructure redundancy required ▼

Security type ⓘ Standard ▼

Image * ⓘ SonarQube packaged by Bitnami - Gen1 ▼ [See all images](#) | [Configure VM generation](#)

[Review + create](#) < Previous Next : Disks >

Rysunek 12.3. Tworzenie SonarQube w Azure

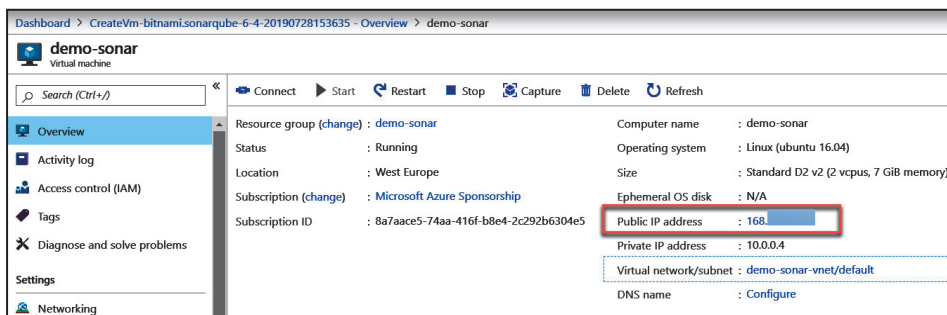
✓ Your deployment is complete

Deployment name: CreateVm-bitnami.sonarqube-6-4-2019072815... Start time: 7/28/2019, 3:40:26 PM
 Subscription: [Microsoft Azure Sponsorship](#) Correlation ID: 6bfacfb4-78eb-4e07-8f79-8...
 Resource group: [demo-sonar](#)

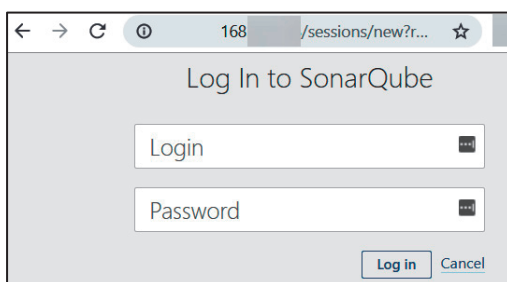
^ Deployment details ([Download](#))

| RESOURCE | TYPE | STATUS | OPERATION DETAILS |
|-----------------------------------|----------------------------|---------|-----------------------------------|
| ✓ demo-sonar | Microsoft.Compute/virt... | OK | Operation details |
| ✓ demo-sonar592 | Microsoft.Network/netw... | Created | Operation details |
| ✓ demosonardiag | Microsoft.Storage/stora... | OK | Operation details |
| ✓ demo-sonar-vnet | Microsoft.Network/virtu... | OK | Operation details |
| ✓ demo-sonar-nsg | Microsoft.Network/netw... | OK | Operation details |
| ✓ demo-sonar-ip | Microsoft.Network/publ... | OK | Operation details |

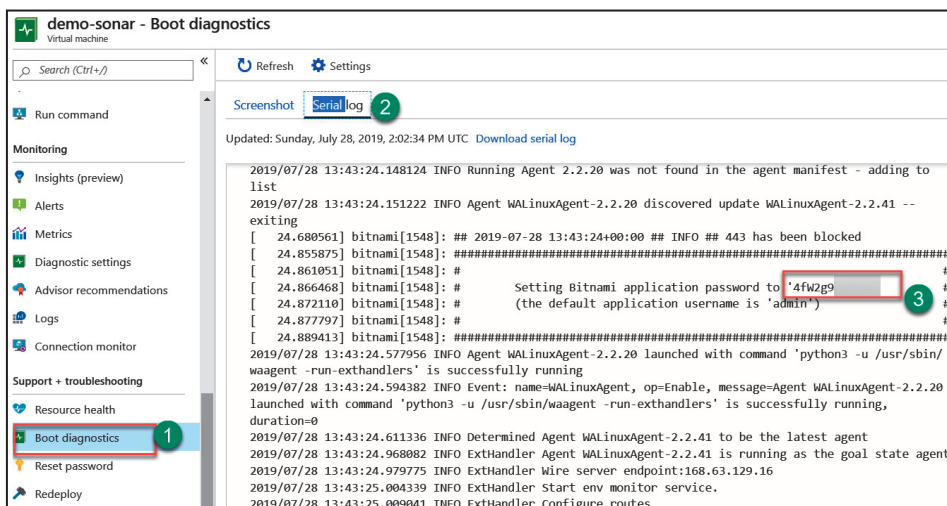
Rysunek 12.4. Wdrożenie SonarQube w Azure



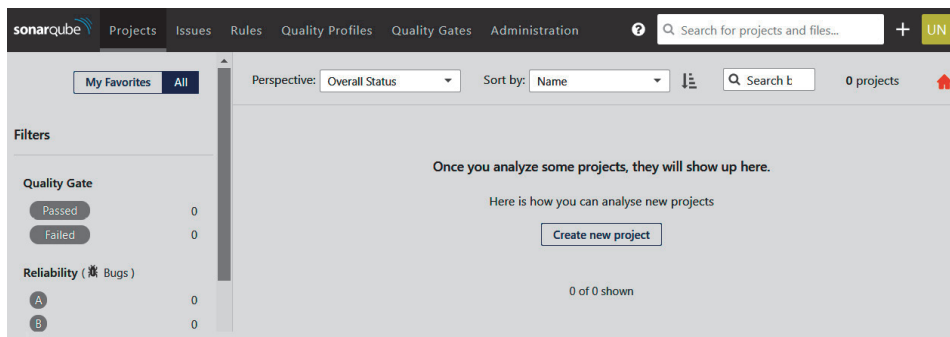
Rysunek 12.5. Adres IP SonarQube w Azure



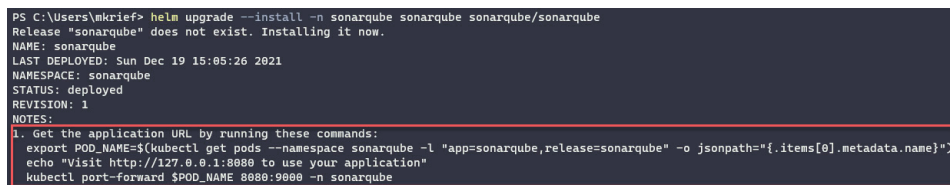
Rysunek 12.6. Ekran logowania SonarQube



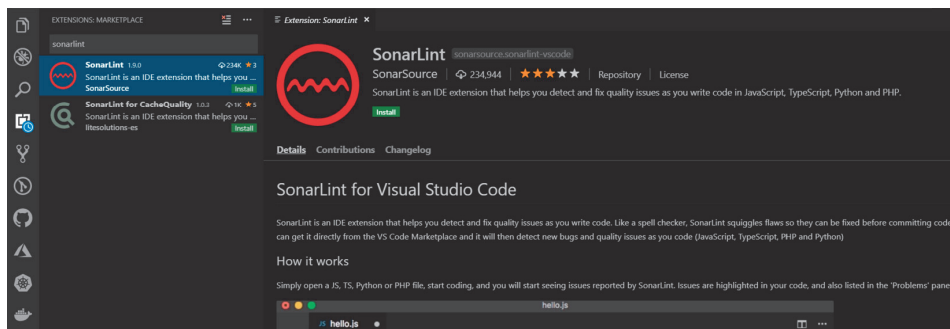
Rysunek 12.7. Odzyskiwanie hasła SonarQube



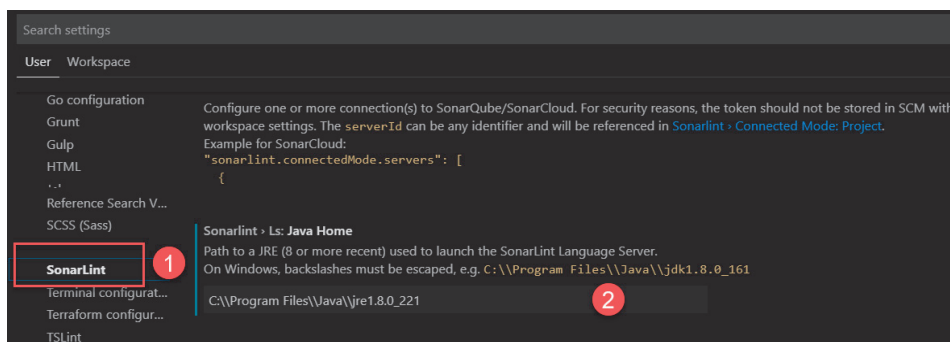
Rysunek 12.8. Strona główna SonarQube



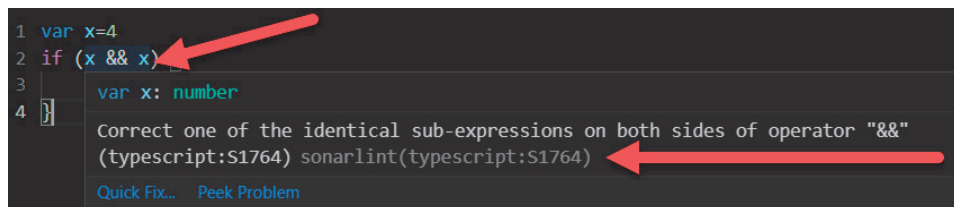
Rysunek 12.9. Instalacja SonarQube na Kubernetesie z Helmem



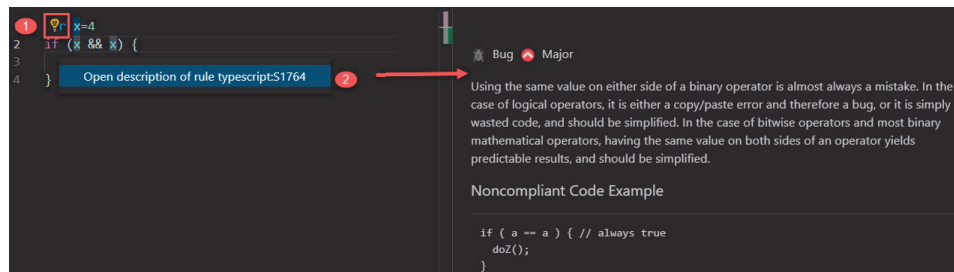
Rysunek 12.10. Rozszerzenie SonarLint w VS Code



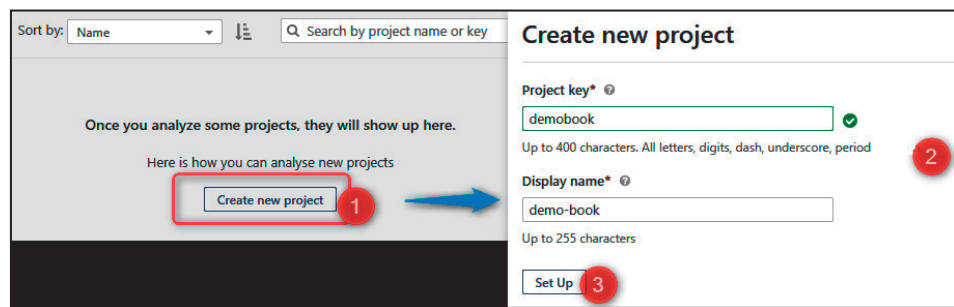
Rysunek 12.11. Konfiguracja rozszerzenia SonarLint w VS Code



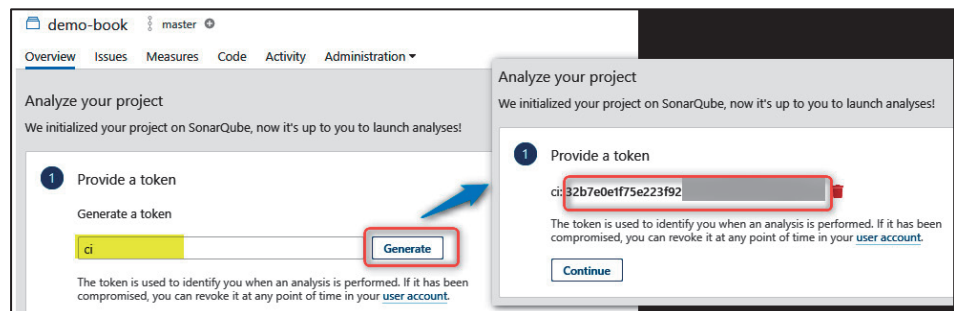
Rysunek 12.12. Przykładowe sprawdzenie kodu przez SonarLint



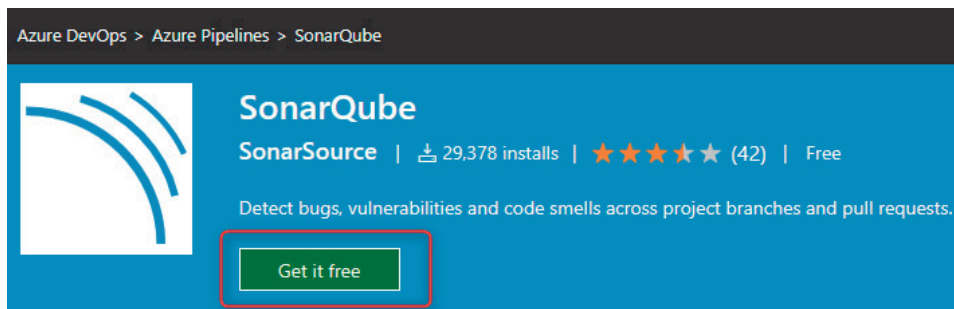
Rysunek 12.13. Szczegóły na temat błędnego kodu prezentowane przez SonarLint



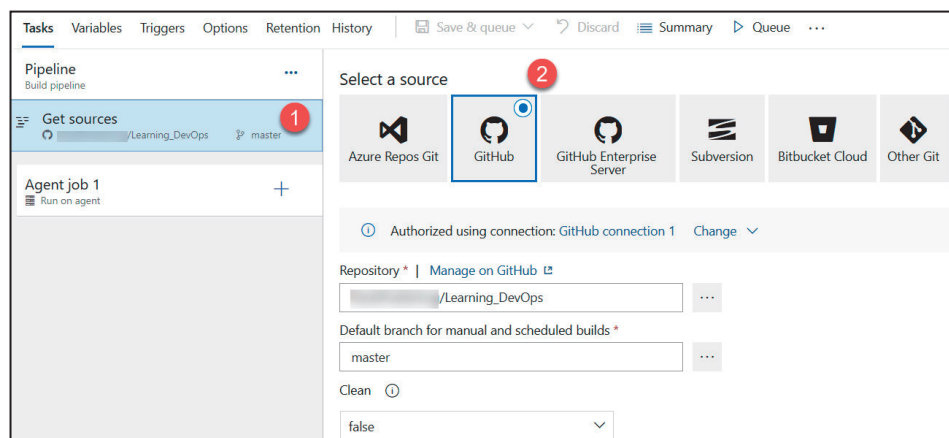
Rysunek 12.14. Tworzenie projektu SonarQube



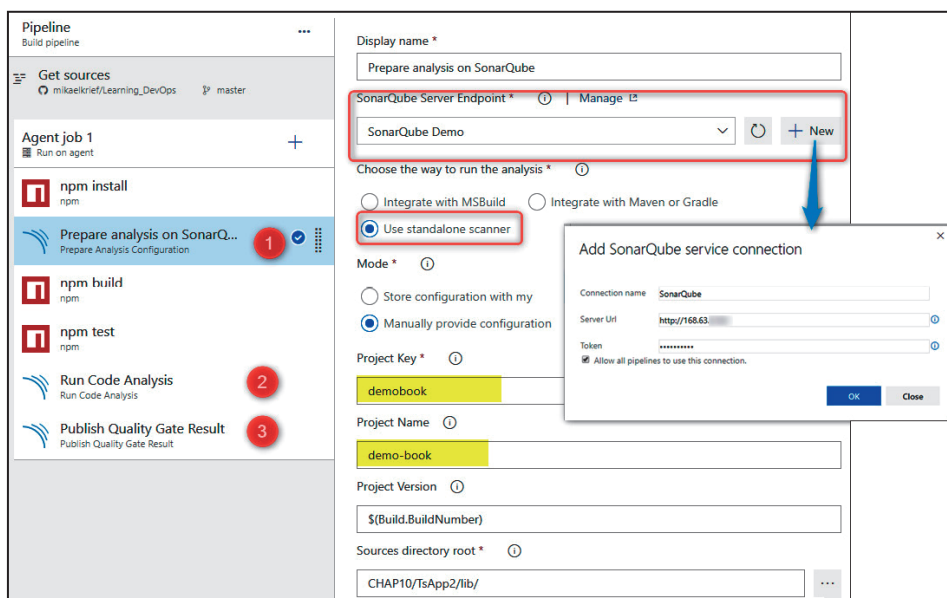
Rysunek 12.15. Generowanie tokena SonarQube



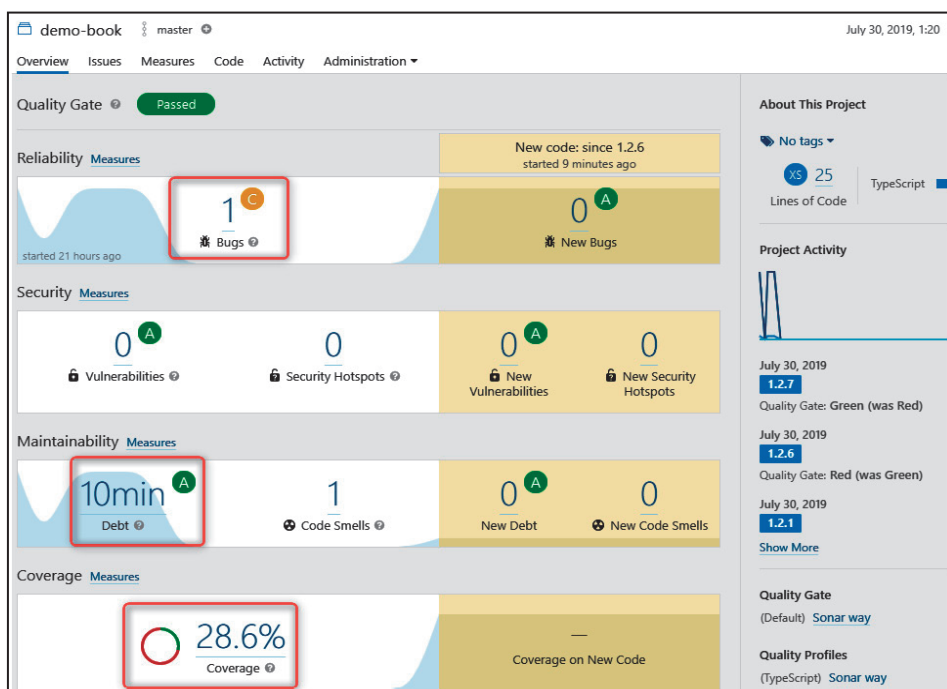
Rysunek 12.16. Rozszerzenie SonarQube w Azure DevOps



Rysunek 12.17. Repozytorium wybrane dla usługi Azure DevOps

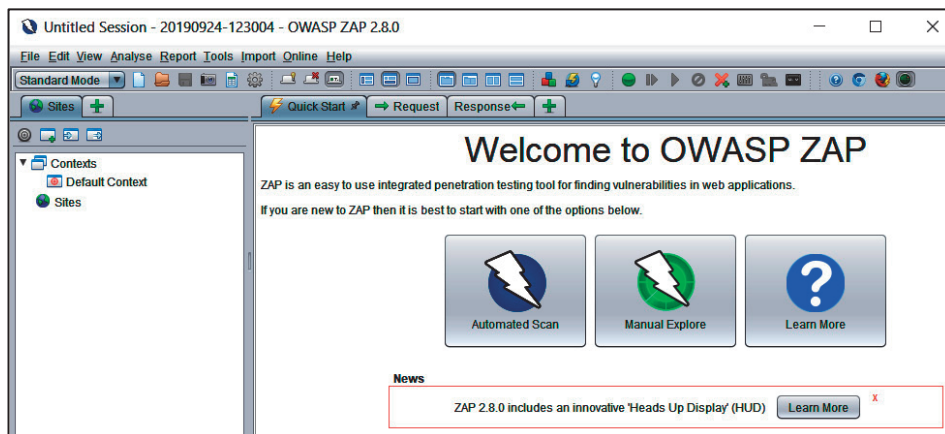


Rysunek 12.18. SonarQube w Azure Pipelines — przygotowywanie analizy

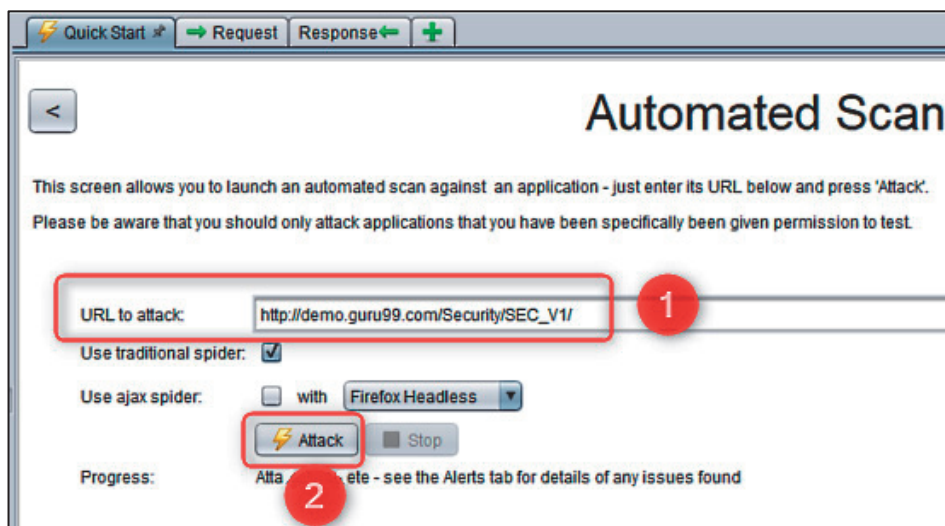


Rysunek 12.19. Analiza na pulpicie SonarQube

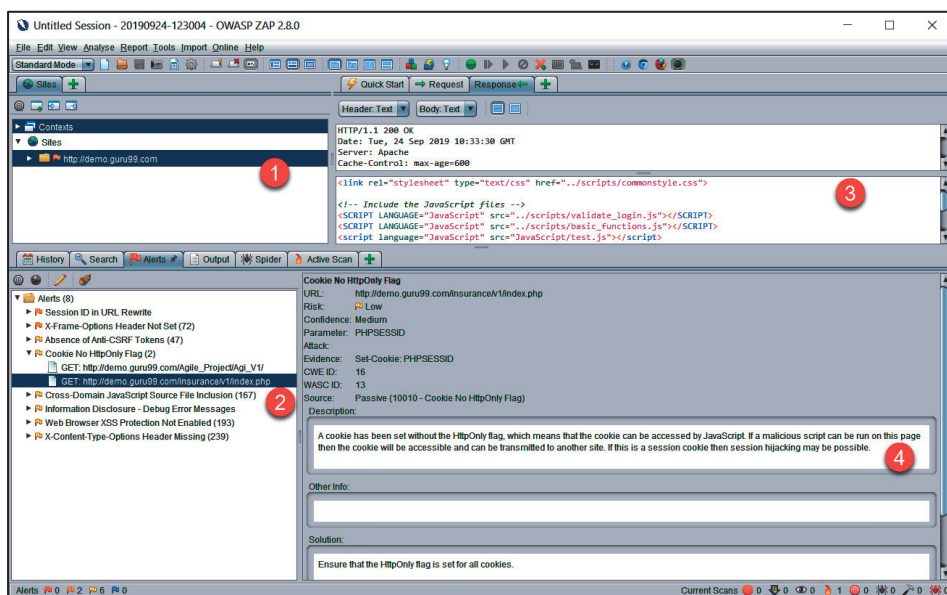
Rozdział 13. Testy bezpieczeństwa i wydajności



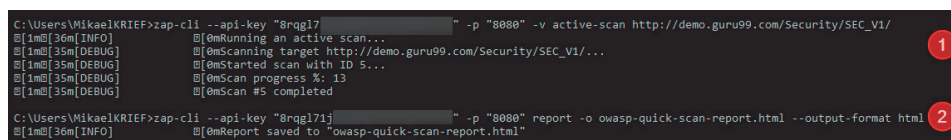
Rysunek 13.1. Narzędzie OWASP ZAP



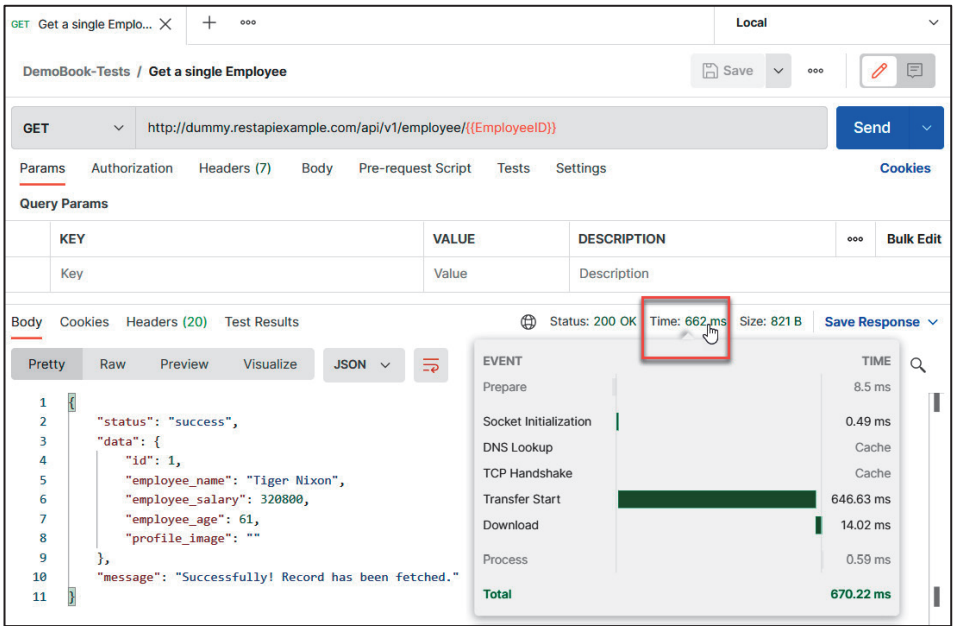
Rysunek 13.2. OWASP ZAP — automatyczne skanowanie



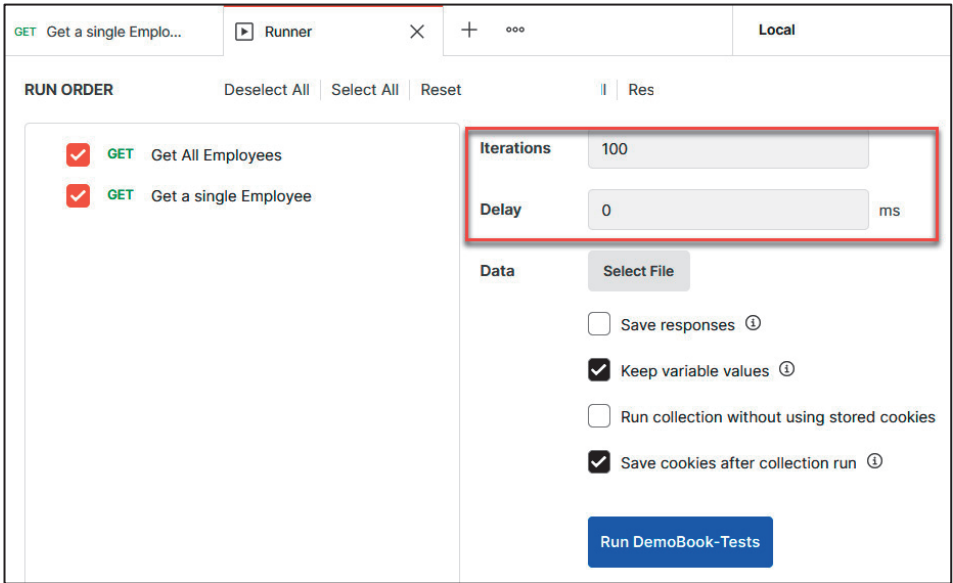
Rysunek 13.3. Wynik skanowania OWASP ZAP



Rysunek 13.4. Wiersz poleceń dla zap-cli



Rysunek 13.5. Test wydajności Postamana



Rysunek 13.6. Test konfiguracji Runnera

GET Get a single Emplo... DemoBook-Tests Local

View Summary Stop Run Pause

All Tests Passed (0) Failed (0)

Iteration 1

GET All Employees http://dummy.restaplexample.com/api/v1/employees / Get All Employees 200 OK 704 ms 1.297 KB

This request does not have any tests.

GET a single Employee http://dummy.restaplexample.com/api/v1/employee/{EmployeeID} / Get a single Employee 429 Too Many Requests 655 ms 1.228 KB

This request does not have any tests.

Iteration 2

GET All Employees http://dummy.restaplexample.com/api/v1/employees / Get All Employees 200 OK 788 ms 1.297 KB

This request does not have any tests.

GET a single Employee http://dummy.restaplexample.com/api/v1/employee/{EmployeeID} / Get a single Employee 200 OK 758 ms 821 B

This request does not have any tests.

Rysunek 13.7. Wyniki testu Runnera

Rozdział 14. Bezpieczeństwo w procesie DevOps z wykorzystaniem DevSecOps

```
PS C:\WINDOWS\system32> choco install inspec
chocolatey v0.10.15
Installing the following packages:
inspec
By installing you accept licenses for the packages.
Error retrieving packages from source 'http://srv-rd-packages.talentsoft.com/nuget/TalentsoftChoco':
Le nom distant n'a pas pu être résolu: 'srv-rd-packages.talentsoft.com'
Progress: Downloading Inspec 4.46.13... 100%

inspec v4.46.13 [Approved]
inspec package files install completed. Performing other installation steps.
The package inspec wants to run 'chocolateyinstall.ps1'.
Note: If you don't run this script, the installation will fail.
Note: To confirm automatically next time, use '-y' or consider:
choco feature enable -n allowGlobalConfirmation
Do you want to run the script?([Y]es/[A]ll - yes to all/[N]o/[P]rint): A

Downloading inspec 64 bit
  from 'https://packages.chef.io/files/stable/inspec/4.46.13/windows/2016/inspec-4.46.13-1-x64.msi'
Progress: 100% - Completed download of C:\Users\mkrief\AppData\Local\Temp\chocolatey\inspec\4.46.13\inspec-4.46.13-1-x64.msi (127.29 MB).
Download of inspec-4.46.13-1-x64.msi (127.29 MB) completed.
Hashes match.
Installing inspec...
inspec has been installed.
  inspec may be able to be automatically uninstalled.
Environment Vars (like PATH) have changed. Close/reopen your shell to
see the changes (or in powershell/cmd.exe just type 'refreshenv').
The install of inspec was successful.
  software installed as 'msi', install location is likely default.

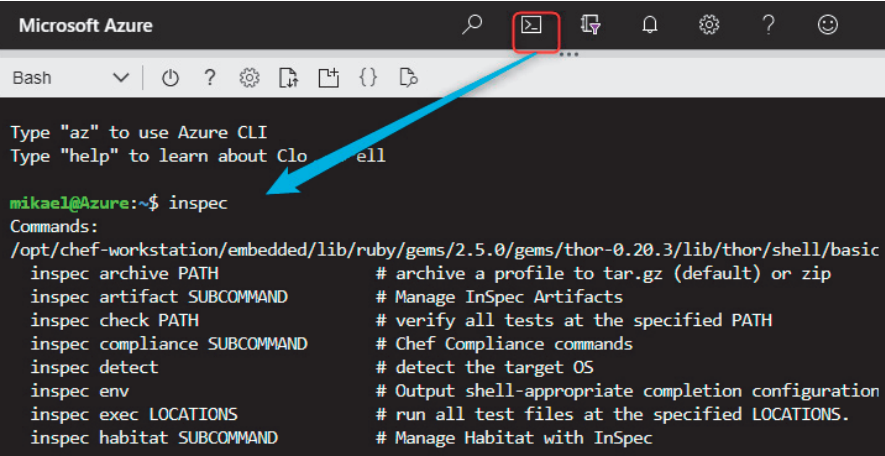
Chocolatey installed 1/1 packages.
See the log for details (C:\ProgramData\chocolatey\logs\chocolatey.log).
```

Rysunek 14.1. Instalacja InSpec w systemie Windows

```
PS C:\Users\mkrief> inspec --version
4.46.13
PS C:\Users\mkrief> inspec
Commands:
  inspec archive PATH                # archive a profile to...
  inspec artifact SUBCOMMAND        # Manage Chef InSpec A...
  inspec automate SUBCOMMAND or compliance SUBCOMMAND # Chef Automate commands
  inspec check PATH                 # verify all tests at ...
  inspec clear_cache                # clears the InSpec ca...
  inspec detect                     # detect the target OS
  inspec env                        # Output shell-appropri...
  inspec exec LOCATIONS              # Run all tests at LOC...
  inspec habitat SUBCOMMAND         # Manage Habitat with ...
  inspec help [COMMAND]             # Describe available c...
  inspec init SUBCOMMAND            # Generate InSpec code
  inspec json PATH                  # read all tests in PA...
  inspec plugin SUBCOMMAND          # Manage Chef InSpec A...
  inspec shell                       # open an interactive ...
  inspec supermarket SUBCOMMAND ... # Supermarket commands
  inspec vendor PATH                # Download all depende...
  inspec version                    # prints the version o...

Options:
  -l, [--log-level=LOG_LEVEL]      # Set the log level: info (default), debug, warn, error
  [-log-location=LOG_LOCATION]    # Location to send diagnostic log messages to. (default: $stdout or Inspec:Log.error)
  [--diagnose], [--no-diagnose]   # Show diagnostics (versions, configurations)
  [--color], [--no-color]         # Use colors in output.
  [--interactive], [--no-interactive] # Allow or disable user interaction
  [--disable-user-plugins]         # Disable loading all plugins that the user installed.
  [--enable-telemetry], [--no-enable-telemetry] # Allow or disable telemetry
  [--chef-license=CHEF_LICENSE]   # Accept the license for this product and any contained products: accept, accept-no-persist, accept-sil
ent
```

Rysunek 14.2. Sprawdzanie wersji i wyświetlanie opcji InSpec



```
Microsoft Azure
Bash
Type "az" to use Azure CLI
Type "help" to learn about Cloud Shell

mika@Azure:~$ inspec

Commands:
/opt/chef-workstation/embedded/lib/ruby/gems/2.5.0/gems/thor-0.20.3/lib/thor/shell/basic
inspec archive PATH          # archive a profile to tar.gz (default) or zip
inspec artifact SUBCOMMAND   # Manage InSpec Artifacts
inspec check PATH            # verify all tests at the specified PATH
inspec compliance SUBCOMMAND # Chef Compliance commands
inspec detect                 # detect the target OS
inspec env                    # Output shell-appropriate completion configuration
inspec exec LOCATIONS        # run all test files at the specified LOCATIONS.
inspec habitat SUBCOMMAND    # Manage Habitat with InSpec
```

Rysunek 14.3. InSpec w Azure Cloud Shell

```
PS > \Learning-DevOps-Second-Edition\CHAP14\azuretests> inspec check
Location : .
Profile : azuretests
Controls : 3
Timestamp : 2021-12-26T16:21:45+01:00
Valid : true

No errors or warnings
```

Rysunek 14.4. Sprawdzanie profilu InSpec

```
PS > \Learning-DevOps-Second-Edition\CHAP14\azuretests> inspec exec . -t azure://
Profile: InSpec Profile (azuretests)
Version: 0.1.0
Target: azure://8a7aace5-74aa-416f-b8e4-2c292b6394e5

[PASS] rg InspectTest RG
[PASS] Azure Resource Groups - api.version: 2021-04-01 latest: /resourcegroups/ /resourcegroups/ names is expected to include "bookrg"
[PASS] subnet: InspectTest Subnet
[PASS] Azure Subnet - api.version: 2021-06-01 latest: bookrg Microsoft.Network/virtualNetworks book-subnet is expected to exist
[PASS] Azure Subnet - api.version: 2021-06-01 latest: bookrg Microsoft.Network/virtualNetworks book-subnet address_prefix is expected to eq "10.0.10.0/24"
[PASS] vm: InspectTest VM
[PASS] Azure Virtual Machine - api.version: 2021-11-01 latest: bookrg Microsoft.Compute/virtualMachines bookvm is expected to exist
[PASS] Azure Virtual Machine - api.version: 2021-11-01 latest: bookrg Microsoft.Compute/virtualMachines bookvm location is expected to eq "westeurope" [PASS] Azure Virtual Machi
me - api.version: 2021-11-01 latest: bookrg Microsoft.Compute/virtualMachines bookvm properties.hardwareProfile.osSize is expected to eq "Standard_D3_2"
[PASS] Azure Virtual Machine - api.version: 2021-11-01 latest: bookrg Microsoft.Compute/virtualMachines bookvm properties.storageProfile.osDisk.osType is expected to eq "Linux"

Profile: Azure Resource Pack (inspec-azure)
Version: 1.04.1
Target: azure://8a7aace5-74aa-416f-b8e4-2c292b6394e5

No tests executed.

Profile Summary: 3 successful controls, 0 control failures, 0 controls skipped
Test Summary: 3 successful, 0 failures, 0 skipped
```

Rysunek 14.5. Wykonanie testów za pomocą InSpec

```

mika@BP-FYL22X2:/mnt/c/Users/mkrief$ vault server -dev
=> Vault server configuration:
  Api Address: http://127.0.0.1:8200
  Cgo: disabled
  Cluster Address: https://127.0.0.1:8201
  Go Version: go1.17.5
  Listener 1: tcp (addr: "127.0.0.1:8200", cluster address: "127.0.0.1:8201", max_request_duration: "1m30s", max_request_size: "33554432", tls: "disabled")
  Log Level: info
  Mlock: supported: true, enabled: false
  Recovery Mode: false
  Storage: inmem
  Version: Vault v1.9.2
  Version Sha: f4c6d873e2767c0d6853b5d9ffc77b0d297bfbd4

=> Vault server started! Log data will stream in below:

WARNING! dev mode is enabled! In this mode, Vault runs entirely in-memory
and starts unsealed with a single unseal key. The root token is already
authenticated to the CLI, so you can immediately begin using Vault.

You may need to set the following environment variable:

  $ export VAULT_ADDR='http://127.0.0.1:8200'

The unseal key and root token are displayed below in case you want to
seal/unseal the Vault or re-authenticate.

Unseal Key: 6LqjGz8nNv3iuidQjM90Rrh8f8T/HKjYjoa6UR0w7ZCo=
Root Token: s.oSr2LL8mqvWwy90706p4rcIo

Development mode should NOT be used in production installations!

```

Rysunek 14.6. Uruchomienie programu Vault — tryb programistyczny

```

root@mkrif:/home/mikaelkrief# vault status
Key          Value
---          -
Seal Type    shamir
Initialized   true
Sealed       false
Total Shares  1
Threshold    1
Version      1.2.1
Cluster Name  vault-cluster-9e7d6ef4
Cluster ID    82bfd424-73ce-9c3d-1dd1-dae6d88bb604
HA Enabled    false

```

Rysunek 14.7. Status Vault

```

root@mkrif:/home/mikaelkrief# vault kv put secret/vmadmin vmpassword=admin123*
Key          Value
---          -
created_time  2019-08-13T13:56:14.5200652Z
deletion_time n/a
destroyed     false
version       1

```

Rysunek 14.8. Zapis hasła w Vault za pomocą polecenia vault kv put

```

root@mkrrief:/home/mikaelkrief# vault kv get secret/vmadmin
===== Metadata =====
Key          Value
---          -
created_time 2019-08-13T14:09:20.4661459Z
deletion_time n/a
destroyed    false
version      2

===== Data =====
Key          Value
---          -
vmadmin      bookadmin
vmpassword   admin123*

```

Rysunek 14.9. Pobranie sekretu za pomocą polecenia vault kv get

```

root@mkrrief:/home/mikaelkrief# vault kv get -version=1 secret/vmadmin
===== Metadata =====
Key          Value
---          -
created_time 2019-08-13T13:56:14.5200652Z
deletion_time n/a
destroyed    false
version      1

===== Data =====
Key          Value
---          -
vmpassword   admin123*
root@mkrrief:/home/mikaelkrief#

```

Rysunek 14.10. Pobranie sekretu według wersji

```

root@mkrrief:/home/mikaelkrief# vault server -dev
==> Vault server configuration:

    Api Address: http://127.0.0.1:8200
           Cgo: disabled
    Cluster Address: https://127.0.0.1:8201
    Listener 1: tcp (addr: "127.0.0.1:8200", cluster address: "127.0.0.1:8
    Log Level: info
    Mlock: supported: true, enabled: false

$ export VAULT_ADDR='http://127.0.0.1:8200'

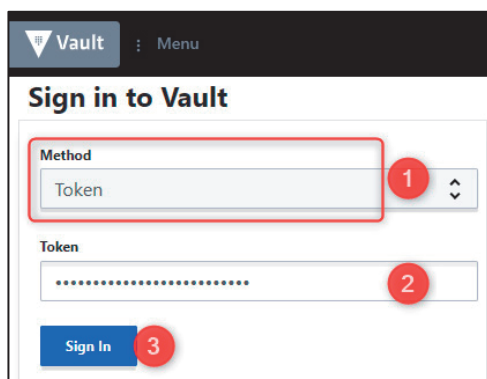
The unseal key and root token are displayed below in case you want to
seal/unseal the Vault or re-authenticate.

Unseal Key: fh7vj+J8lHHXr+AtTva4DU2Ru4kcPtqQuM9jKBo01BA=
Root Token: s.6MGUVmH1bnhD36aWf0Fb9oR4

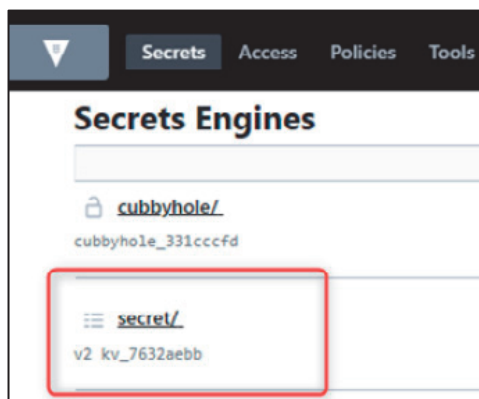
Development mode should NOT be used in production installations!

```

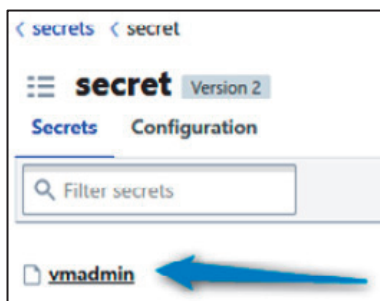
Rysunek 14.11. Pobieranie tokena głównego



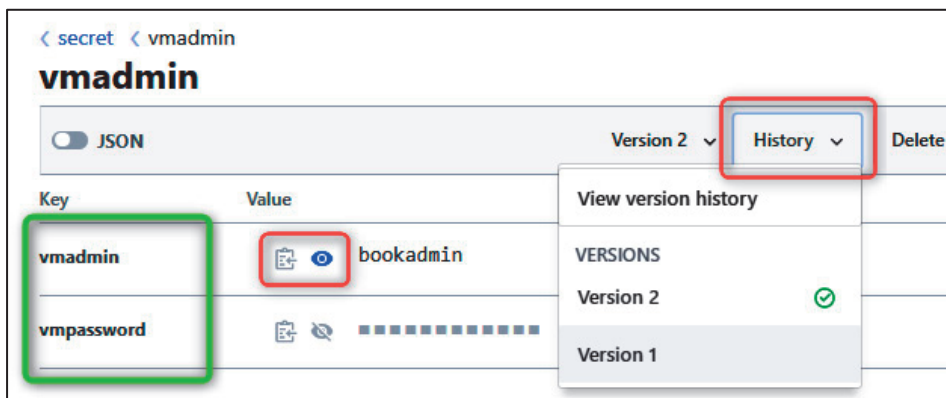
Rysunek 14.12. Logowanie do UI Vault



Rysunek 14.13. Secrets Engines



Rysunek 14.14. Sekret w interfejsie webowym Vault



Rysunek 14.15. Interfejs Vault — odczytywanie szczegółów sekretów

```
PS Learning-DevOps-Second-Edition\CHAP14\vault\terraform_usevault> terraform apply

An execution plan has been generated and is shown below.
Resource actions are indicated with the following symbols:

Terraform will perform the following actions:

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

Changes to Outputs:
+ vmpassword = (sensitive value)

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

Enter a value: yes

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

Outputs:
vmpassword = <sensitive>
```

Rysunek 14.16. Wyświetlenie danych wrażliwych przez Terraform

```
PS Learning-DevOps-Second-Edition\CHAP14\vault\terraform_usevault> terraform output -json
{
  "vmpassword": {
    "sensitive": true,
    "type": "string",
    "value": "admin123*"
  }
}
```

Rysunek 14.17. Dane wyjściowe Terraform w formacie JSON

Rozdział 15. Skrócenie czasu przestoju wdrażania

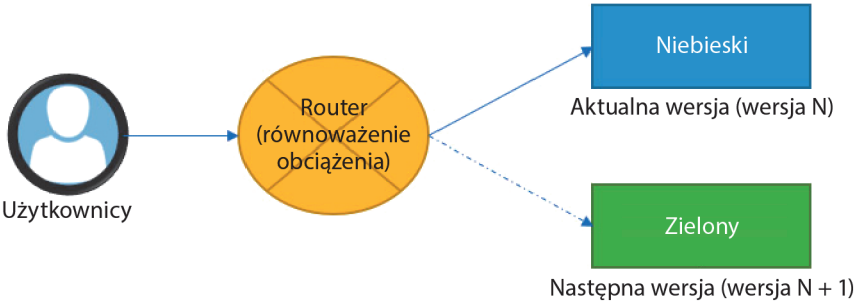
```
PS D:\Repos\Learning_Devops\CHAP13\terraform_webapp> terraform apply
azurerm_resource_group.rg-app: Refreshing state... [id=/subscriptions/8a7aace5-74aa-416f-b8e4-2c292b6304e5/resourceGroups/rgApp/providers/Microsoft.Web/serverfarms/planApp]
azurerm_app_service_plan.serviceplan-app: Refreshing state... [id=/subscriptions/8a7aace5-74aa-416f-b8e4-2c292b6304e5/resourceGroups/rgApp/providers/Microsoft.Web/serverfarms/planApp]
azurerm_app_service.webapp: Refreshing state... [id=/subscriptions/8a7aace5-74aa-416f-b8e4-2c292b6304e5/resourceGroups/rgApp/providers/Microsoft.Web/sites/MyWebAppBook]
azurerm_app_service_slot.test: Refreshing state... [id=/subscriptions/8a7aace5-74aa-416f-b8e4-2c292b6304e5/resourceGroups/rgApp/providers/Microsoft.Web/sites/MyWebAppBook/slots/Stagedoreen]

An execution plan has been generated and is shown below.
Resource actions are indicated with the following symbols:
  ~ destroy and then create replacement
  + create replacement and then destroy

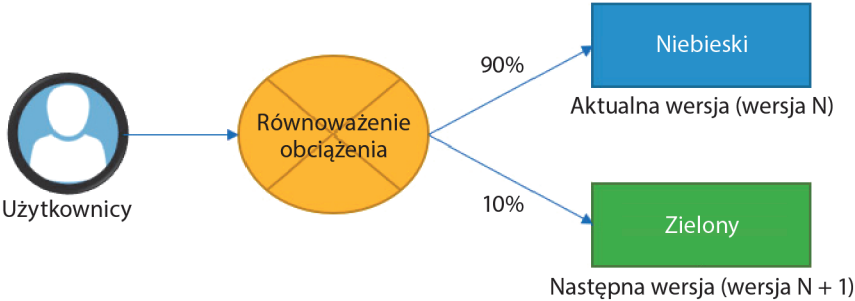
Terraform will perform the following actions:

# azurerm_app_service.webapp must be replaced
~ resource "azurerm_app_service" "webapp" {
  app_service_plan_id = /subscriptions/8a7aace5-74aa-416f-b8e4-2c292b6304e5/resourceGroups/rgApp/providers/Microsoft.Web/serverfarms/planApp
  app_settings = {
    WEBSITE_RUN_FROM_PACKAGE = "0"
  }
  ~ client_affinity_enabled = true -> (known after apply)
  ~ client_cert_enabled = false -> (known after apply)
  ~ default_site_hostname = "mywebappbook.azurewebsites.net" -> (known after apply)
  ~ enabled_https_only = false -> (known after apply)
  ~ id = /subscriptions/8a7aace5-74aa-416f-b8e4-2c292b6304e5/resourceGroups/rgApp/providers/Microsoft.Web/sites/MyWebAppBook
  ~ location = "westeurope" -> (known after apply)
  ~ name = "MyWebAppBook1" -> (known after apply)
  ~ outbound_ip_addresses = "52.233.128.61,52.233.135.180,52.233.131.224,52.233.128.247,52.233.129.243" -> (known after apply)
  ~ possible_outbound_ip_addresses = "52.233.128.61,52.233.135.180,52.233.131.224,52.233.128.247,52.233.129.243,52.233.130.50,52.233.135.227" -> (known after apply)
  ~ resource_group_name = "rgApp" -> (known after apply)
  ~ site_credentials {
    password = "Mn2Gnkxvps7nRDr07HbHvt1Bbw8rhucvvg6uTtdZw5qETbPcpHxohzk1Fr4"
    username = "MyWebAppBook"
  }
  ~ source_control {
    branch = "master"
    repo_url = ""
  }
  ~ tags = {} -> (known after apply)
}
```

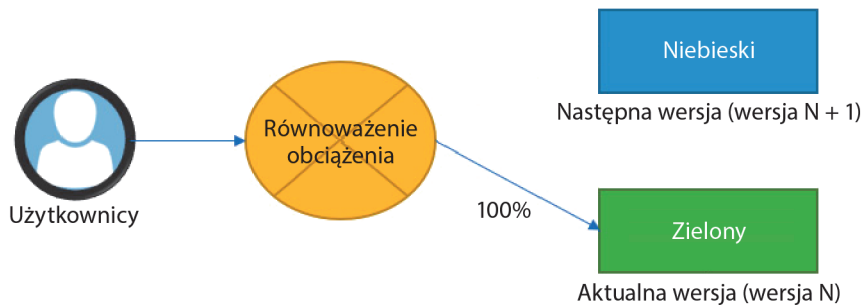
Rysunek 15.1. Przestój Terraform



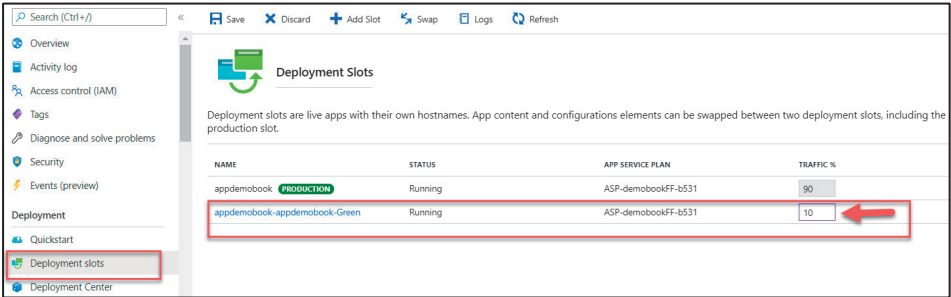
Rysunek 15.2. Zielono-niebieska architektura



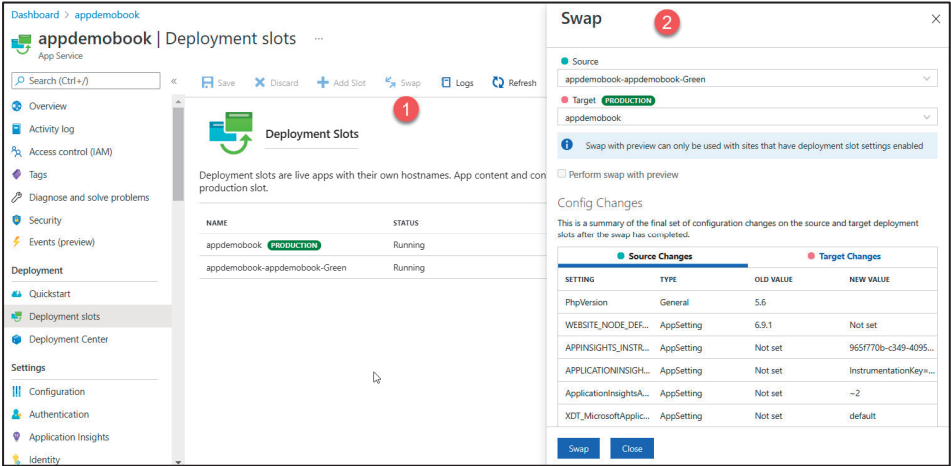
Rysunek 15.3. Zielono-niebieskie wdrożenie Canary release



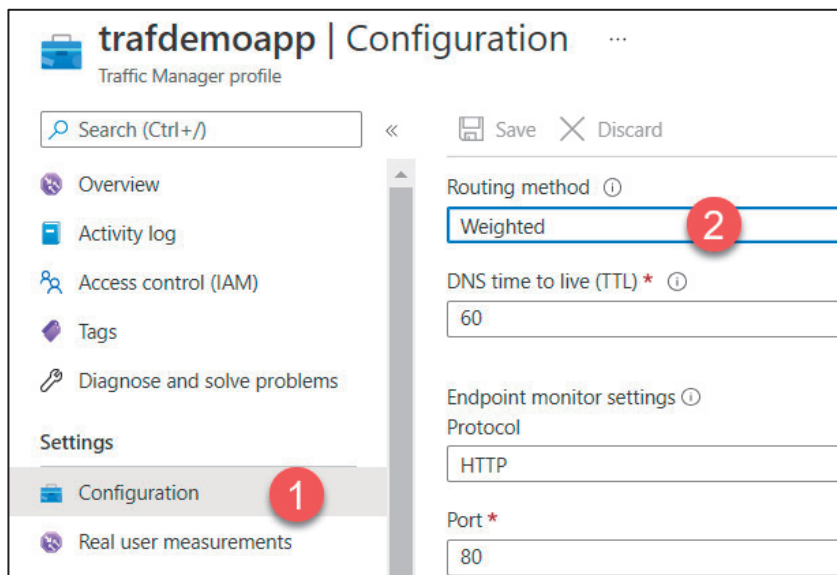
Rysunek 15.4. Architektura zielono-niebieska z routerem



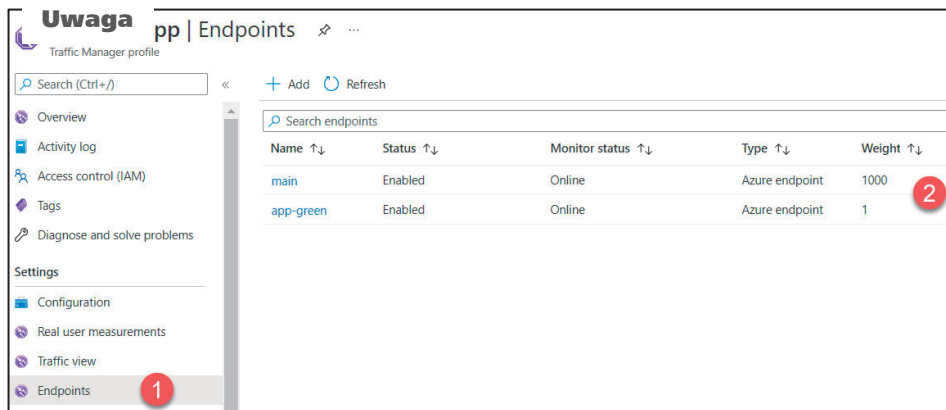
Rysunek 15.5. Sloty wdrażania na platformie Azure



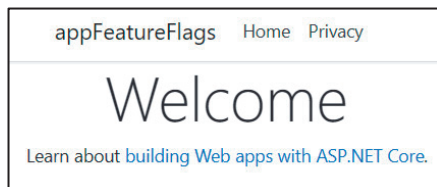
Rysunek 15.6. Zamiana slotów



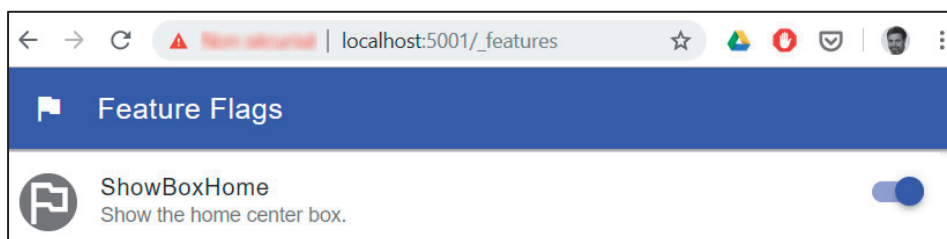
Rysunek 15.7. Konfiguracja usługi Azure Traffic Manager



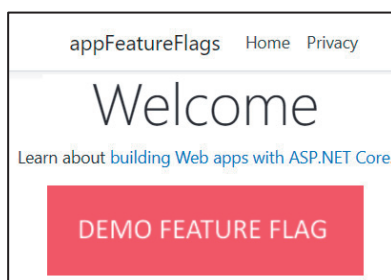
Rysunek 15.8. Punkty końcowe usługi Azure Traffic Manager



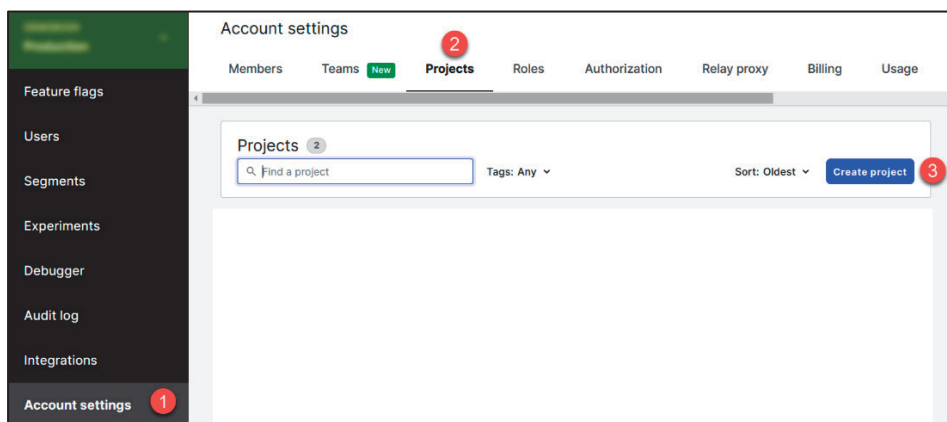
Rysunek 15.9. Aplikacja prezentująca wykorzystanie flagi funkcjonalności



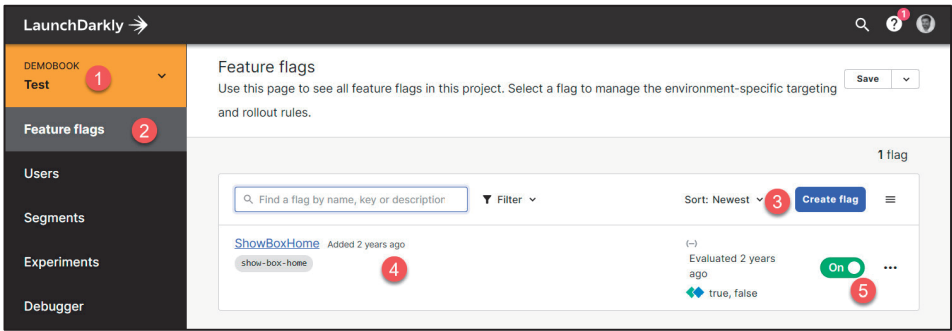
Rysunek 15.10. Prezentacja przełączania flagi funkcjonalności



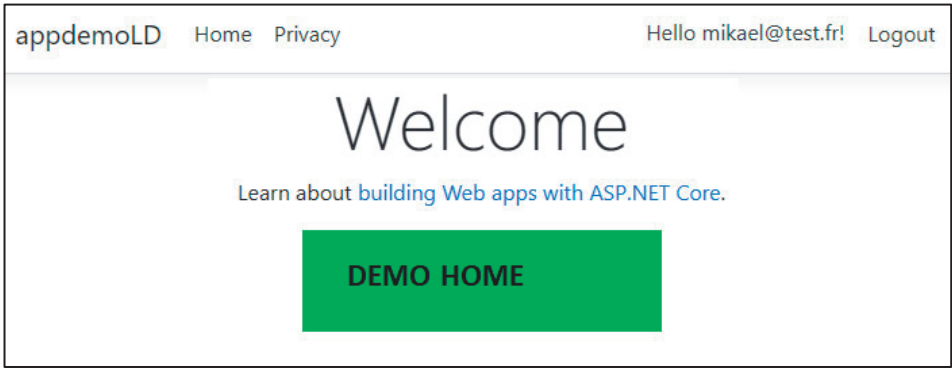
Rysunek 15.11. Aplikacja prezentująca wykorzystanie flagi funkcjonalności



Rysunek 15.12. Tworzenie projektu LaunchDarkly



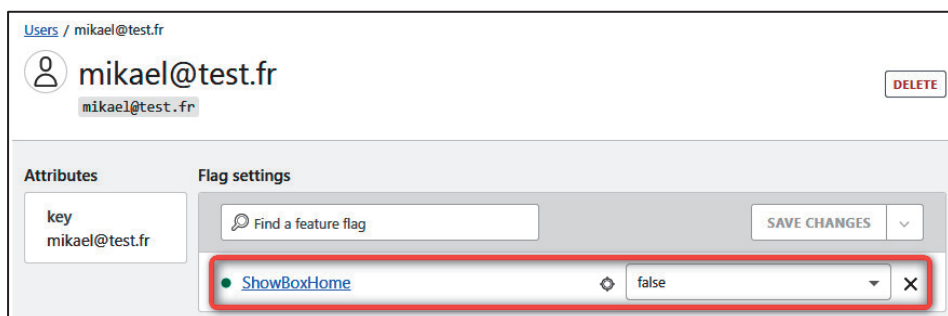
Rysunek 15.13. Tworzenie flagi funkcjonalności LaunchDarkly



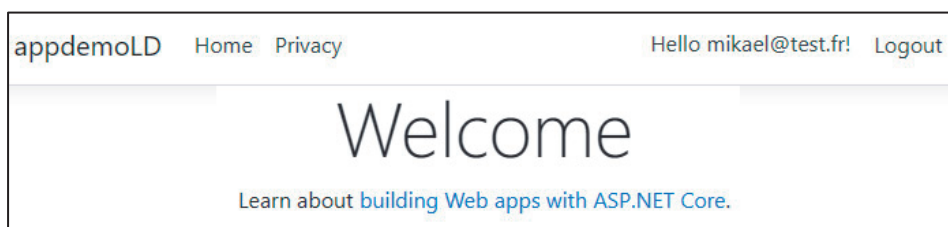
Rysunek 15.14. Aplikacja prezentująca wykorzystanie flagi funkcjonalności w LaunchDarkly



Rysunek 15.15. Użytkownik LaunchDarkly

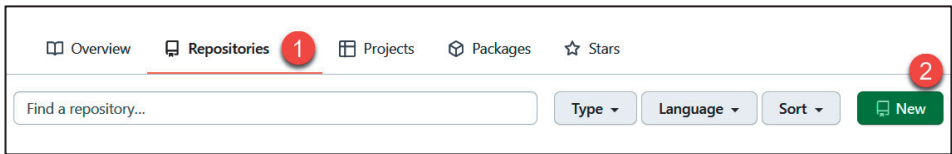


Rysunek 15.16. LaunchDarkly — ustawienia flagi funkcjonalności dla użytkownika

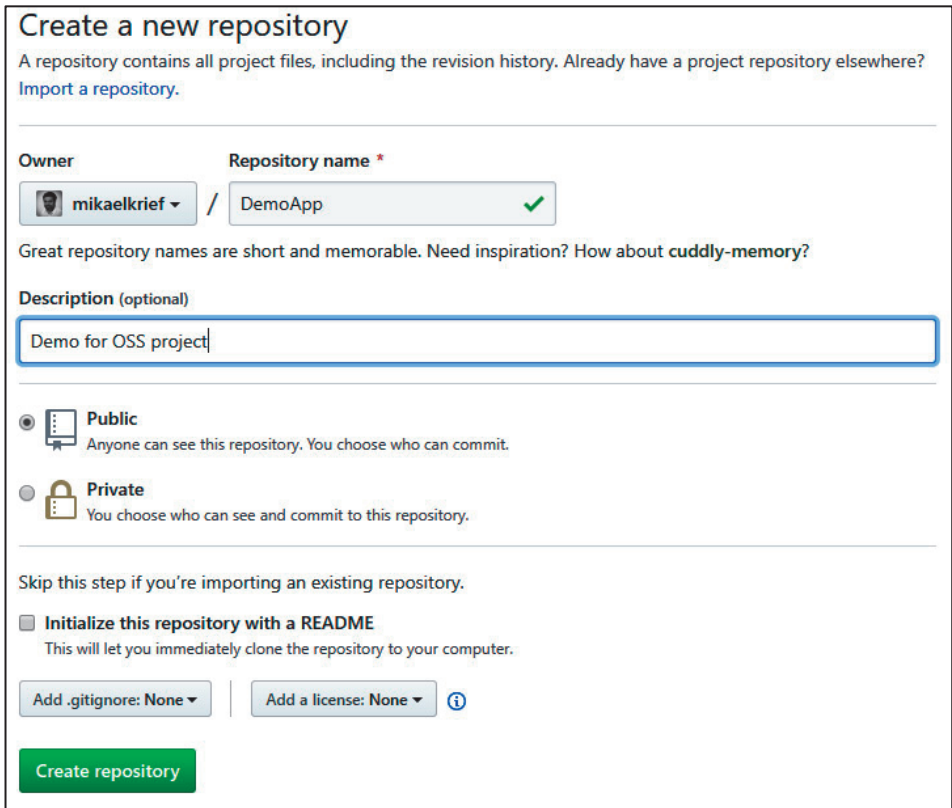


Rysunek 15.17. Aplikacja prezentująca flagi funkcjonalności w LaunchDarkly

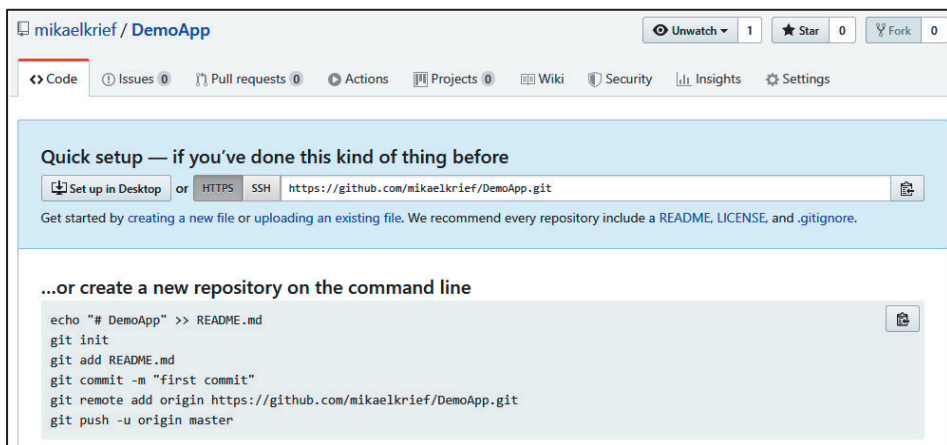
Rozdział 16. DevOps dla projektów open source



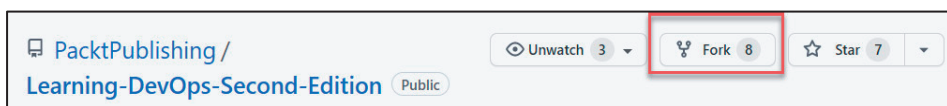
Rysunek 16.1. Dodawanie repozytorium



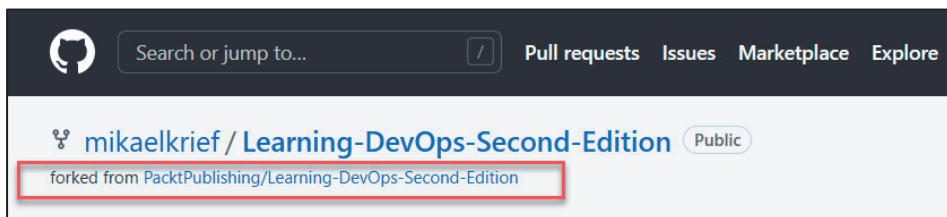
Rysunek 16.2. Szczegóły repozytorium GitHuba



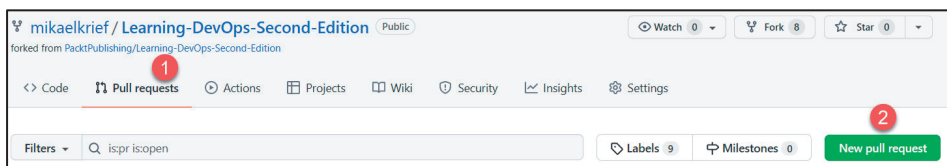
Rysunek 16.3. Repozytorium GitHuba — pierwsze instrukcje



Rysunek 16.4. GitHub — rozwidlanie repozytorium



Rysunek 16.5. Link do rozwidlenia GitHuba



Rysunek 16.6. GitHub — New pull request

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also [compare across forks](#).

base repository: PacktPublishing/Learning-Dev... base: main ← head repository: mikaelkrief/Learning-DevOps... compare: main

✓ Able to merge. These branches can be automatically merged.

Discuss and review the changes in this comparison with others. [Learn about pull requests](#)

Create pull request

2 commits 1 file changed 1 contributor

Commits on Jan 8, 2022

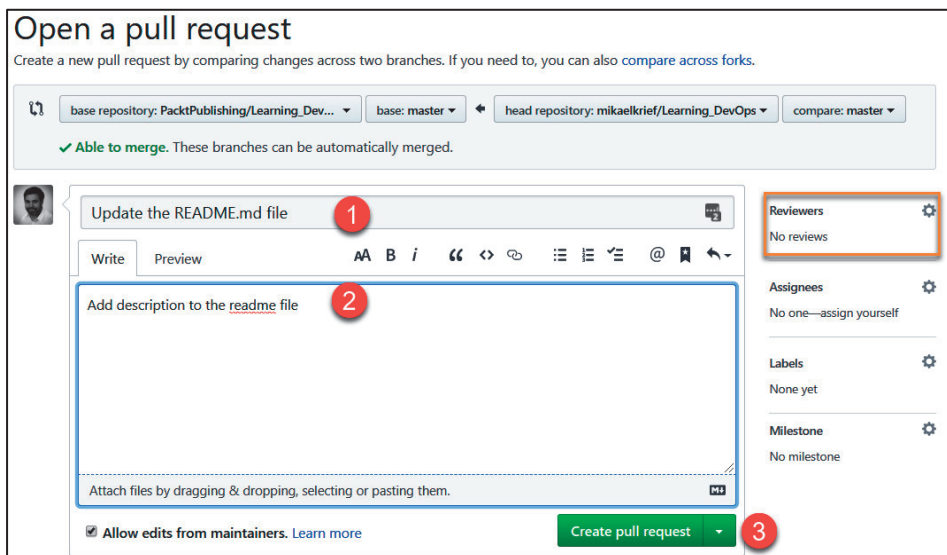
Update the readme ... Verified 88d8e7e <>

mikaelkrief committed 41 minutes ago

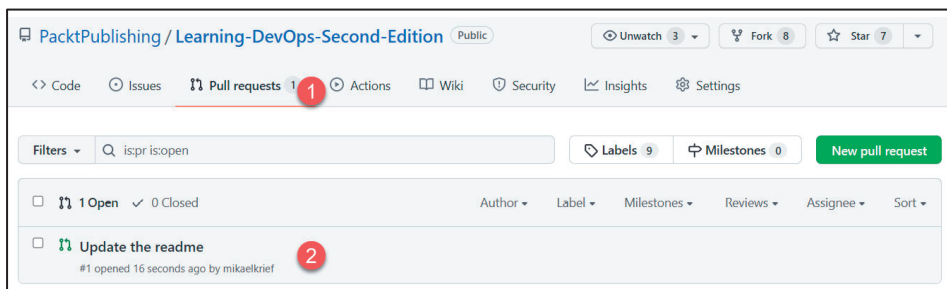
Showing 1 changed file with 6 additions and 5 deletions. Split Unified

```
@@ -28,13 +28,13 @@ alt="https://www.packtpub.com/" border="5" /></a>
28 28 All of the code is organized into folders. For example, Chapter02.
29 29
30 30 The code will look like the following:
31 -
31 + hcl
32 32 resource "azurerm_resource_group" "rg" {
33 -   name = var.resource_group_name
33 +   name = var.resource_group_name
34 34   location = var.location
35 -   tags {
35 +   tags {
36 36     environment = "Terraform Azure"
37 -   }
37 + }
```

Rysunek 16.7. Szczegóły żądania pobierania w GitHubie



Rysunek 16.8. Tytuł i opis żądania pobierania w GitHubie



Rysunek 16.9. Lista żądań pobierania w GitHubie

Update the readme #1

Open mikaelkrief wants to merge 2 commits into `PacktPublishing:main` from `mikaelkrief:main`

Conversation 0 Commits 2 Checks 2 Files changed 1 **1**

mikaelkrief commented 4 minutes ago Collaborator

update the readme

mikaelkrief added 2 commits 1 hour ago

- Update README.md Verified 15eff6c
- Update the readme Verified 88d8e7e

Add more commits by pushing to the `main` branch on `mikaelkrief/Learning-DevOps-Second-Edition`.

Some checks were not successful **5** [Show all checks](#)
1 failing and 1 successful checks

This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request **3** You can also [open this in GitHub Desktop](#) or [view command line instructions](#).

Write **Preview** **H B I** **<>** **⌵ ⌶** **🔗** **📋** **📋** **👤** **🔗** **↶**

Leave a comment **2**

Attach files by dragging & dropping, selecting or pasting them. **📎**

4 **Close pull request** **Comment**

Remember, contributions to this repository should follow our [GitHub Community Guidelines](#).

Rysunek 16.10. Weryfikacja żądania pobrania w GitHubie

1.30.1 (June 07, 2019)

BUG FIXES:

- Ensuring the authorization header is set for calls to the User Assigned Identity API's (#3613)

1.30.0 (June 07, 2019)

FEATURES:

- **New Data Source:** `azurerms_redis_cache` (#3481)
- **New Data Source:** `azurerms_sql_server` (#3513)
- **New Data Source:** `azurerms_virtual_network_gateway_connection` (#3571)

IMPROVEMENTS:

- dependencies: upgrading to Go 1.12 (#3525)
- dependencies: upgrading the `storage` SDK to `2019-04-01` (#3578)
- Data Source `azurerms_app_service` - support windows containers (#3566)
- Data Source `azurerms_app_service_plan` - support windows containers (#3566)
- `azurerms_api_management` - rename `disable_triple_des_chipers` to `disable_triple_des_ciphers` (#3539)
- `azurerms_application_gateway` - support for the value `General` in the `rule_group_name` field within the `disabled_rule_group` block (#3533)
- `azurerms_app_service` - support for windows containers (#3566)
- `azurerms_app_service_plan` - support for the `maximum_elastic_worker_count` property (#3547)
- `azurerms_managed_disk` - support for the `create_option` of `Restore` (#3598)
- `azurerms_app_service_plan` - support for windows containers (#3566)

Rysunek 16.11. Przykład dziennika zmian w GitHubie

mikaelkrief / MyShuttle2 (Public)

forked from microsoft/MyShuttle2

Watch 0 Fork 55 Star 0

Code Pull requests 1 Actions Projects Wiki Security Insights Settings

master 2 branches 1 tag

This branch is 9 commits ahead of microsoft:master. Contribute Fetch upstream

| File | Commit | Time |
|----------------------------|----------------|-------------|
| .settings | Initial Commit | 5 years ago |
| gradle | Initial Commit | 5 years ago |
| src | Initial Commit | 5 years ago |
| .gitignore | Initial Commit | 5 years ago |
| README.md | update2 | 2 years ago |
| docker-compose.env.dev.... | Initial Commit | 5 years ago |

About

The project containing the code for the MyShuttle2 application that was showed at Connect 2016

Readme 0 stars 0 watching 55 forks

Releases 2

1 tags

Create a new release 3

Rysunek 16.12. GitHub — link do wydania

The screenshot shows the GitHub 'New Release' form. At the top, there are tabs for 'Releases' and 'Tags'. Below them is a dropdown menu for the release version, currently set to 'v1.0.0' (annotated with a red circle 1). Underneath is a radio button for 'Existing tag' (annotated with a red circle 2). Below that is a text input field for the release title, currently containing 'First release' (annotated with a red circle 2). The form has two tabs: 'Write' and 'Preview'. Below the tabs is a rich text editor with various formatting options (bold, italic, link, etc.) and a button for 'Auto-generate release notes'. The main text area contains the text 'This first release contain:' followed by a bulleted list: '- feature 1' and '- feature 2' (annotated with a red circle 3). Below the text area is a dashed line indicating where to attach files. Below that is a large dashed box for attaching binaries (annotated with a red circle 4). At the bottom, there is a checkbox for 'This is a pre-release' (annotated with a red circle 5) and a note: 'We'll point out that this release is identified as non-production ready.' At the very bottom, there are two buttons: 'Publish release' and 'Save draft' (annotated with a red circle 6).

Releases Tags

v1.0.0 1

✓ Existing tag 2

First release 2

Write Preview

H B I + Auto-generate release notes

This first release contain:

- feature 1 3
- feature 2

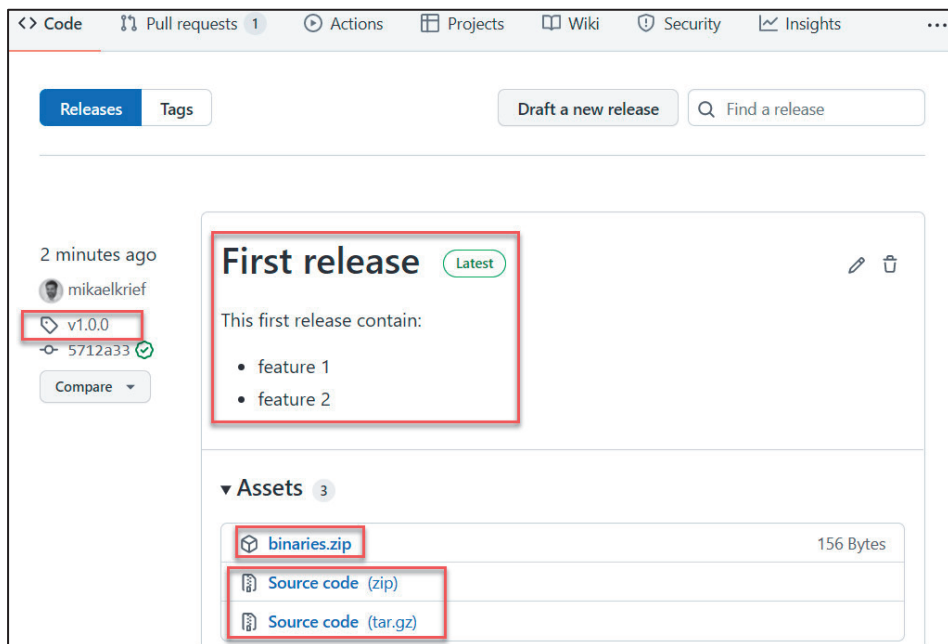
Attach files by dragging & dropping, selecting or pasting them.

↓ Attach binaries by dropping them here or selecting them. 4

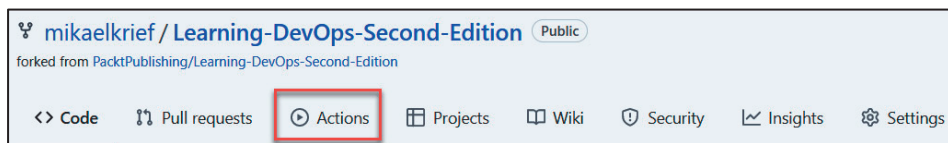
☐ This is a pre-release 5
We'll point out that this release is identified as non-production ready.

Publish release Save draft 6

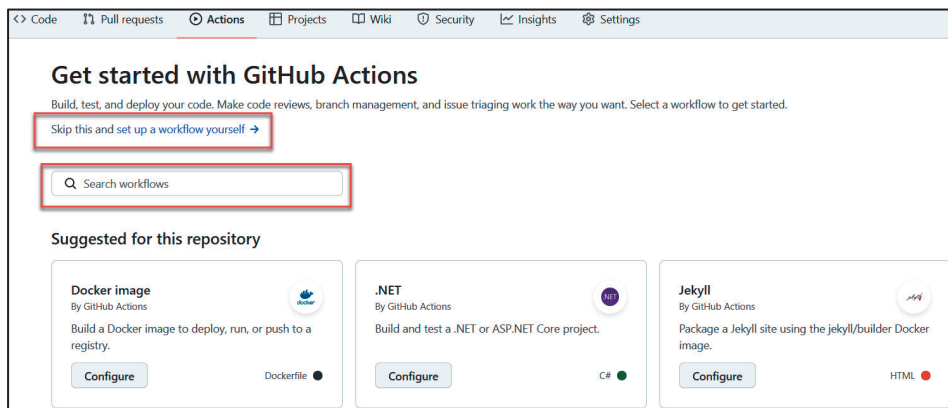
Rysunek 16.13. GitHub — tworzenie wydania



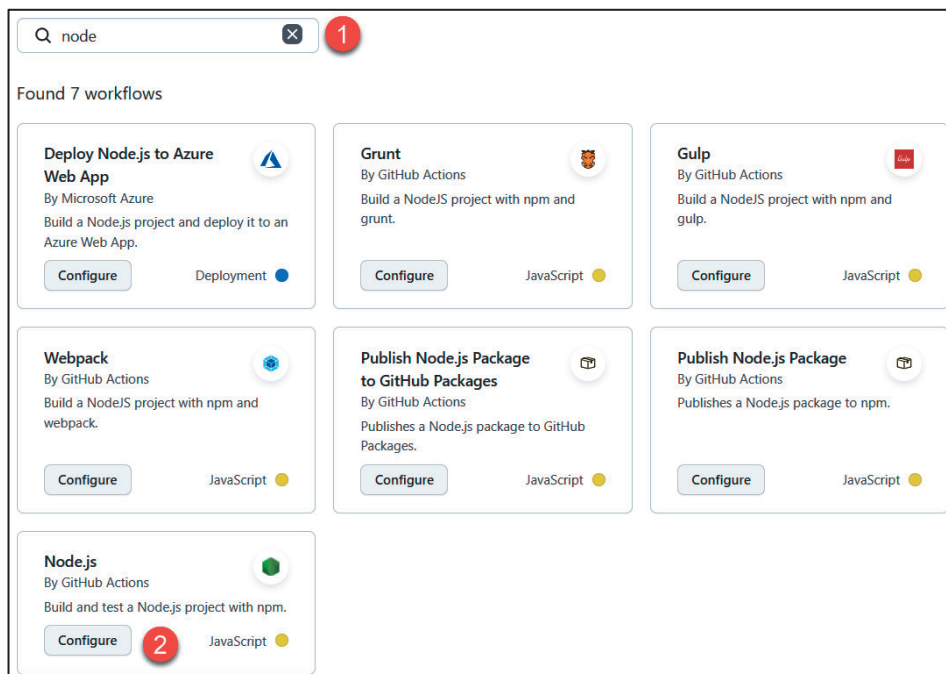
Rysunek 16.14. Szczegóły wydania w GitHubie



Rysunek 16.15. GitHub — zakładka Actions



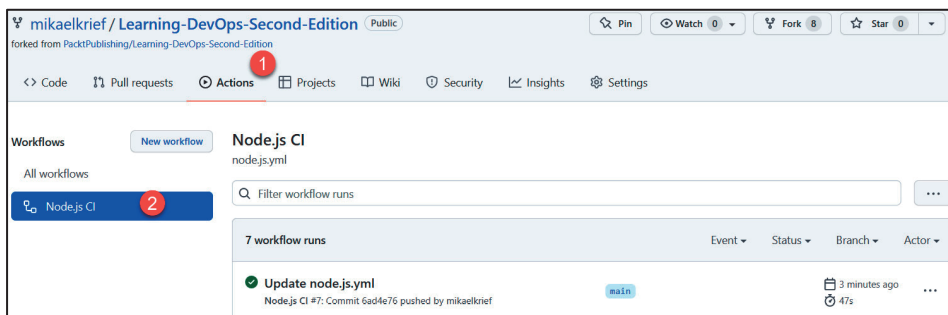
Rysunek 16.16. Szablony przepływów pracy GitHub Actions



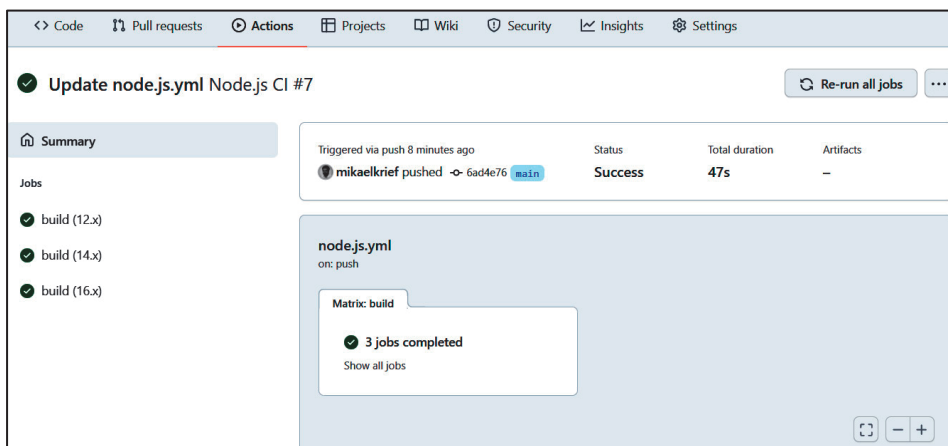
Rysunek 16.17. GitHub Actions — wybór szablonu Node.js

```
build:
  runs-on: ubuntu-latest
  strategy:
    matrix:
      node-version: [12.x, 14.x, 16.x]
      # See supported Node.js release schedule at https://nodejs.org/en/about/releases/
  steps:
    - uses: actions/checkout@v2
    - name: Use Node.js ${{ matrix.node-version }}
      uses: actions/setup-node@v2
      with:
        node-version: ${{ matrix.node-version }}
    - run: |
      cd CHAP16/appdemo
      npm ci
      npm run build --if-present
      npm test
```

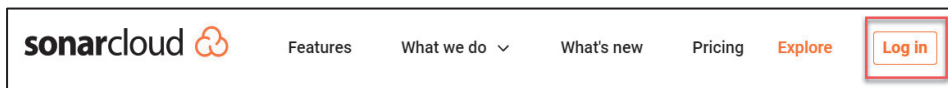
Rysunek 16.18. Kod źródłowy przepływu pracy GitHub Actions



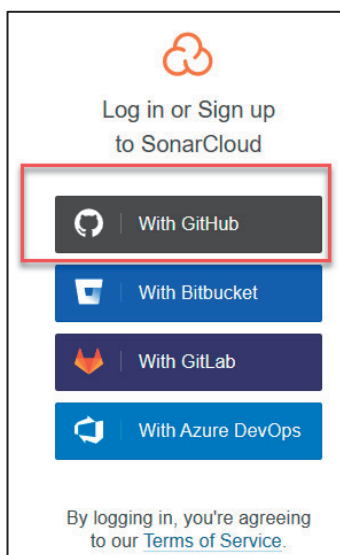
Rysunek 16.19. Uruchomiony przepływ pracy GitHub Actions



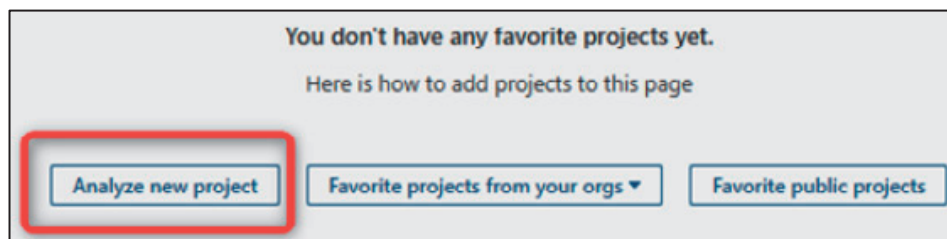
Rysunek 16.20. Szczegóły wykonania przepływu pracy GitHub Actions



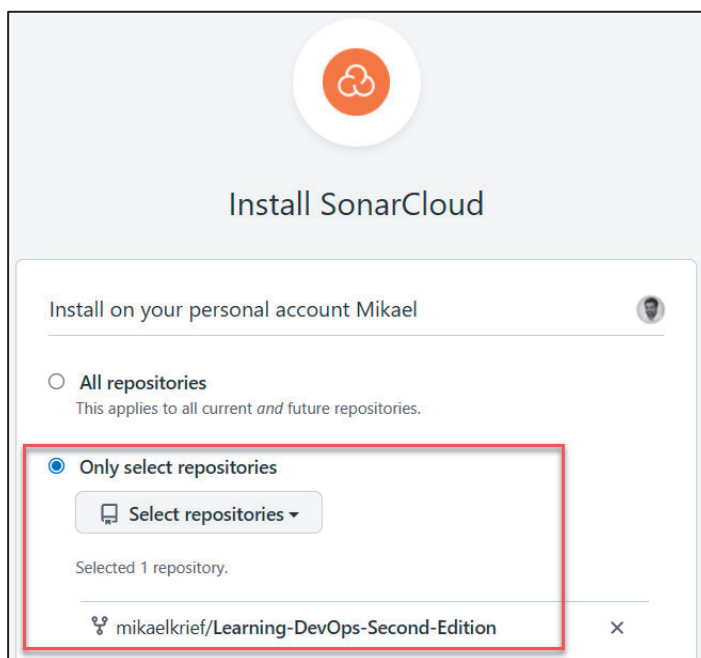
Rysunek 16.21. SonarCloud — logowanie



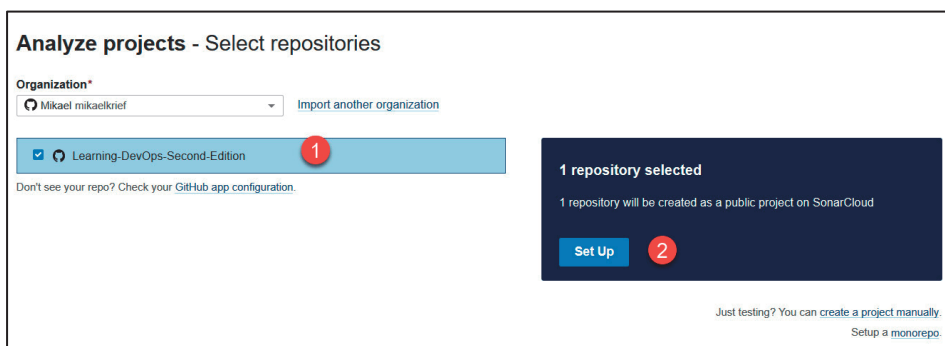
Rysunek 16.22. SonarCloud — logowanie za pomocą GitHuba



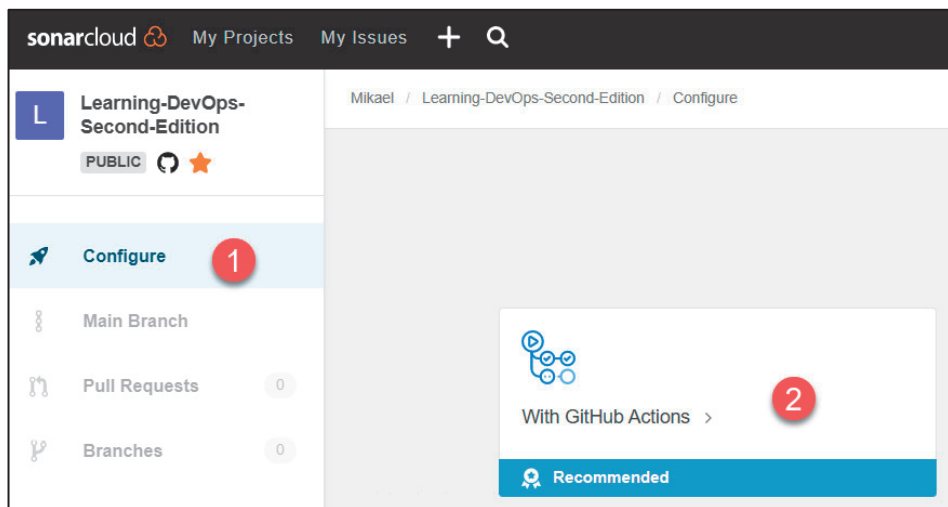
Rysunek 16.23. SonarCloud — analiza nowego projektu



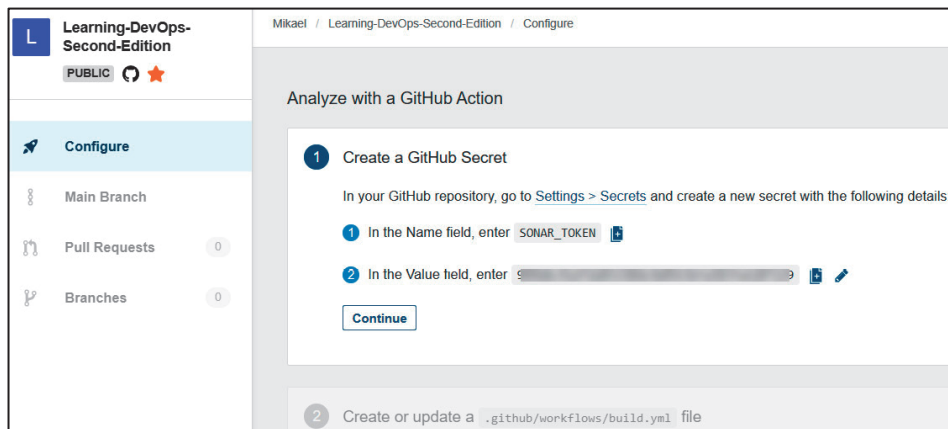
Rysunek 16.24. SonarCloud — wybór repozytorium



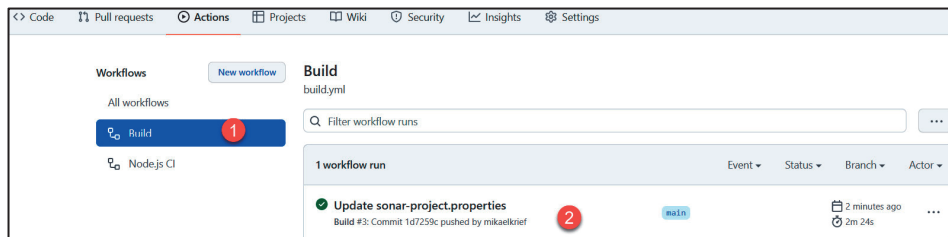
Rysunek 16.25. SonarCloud — konfigurowanie repozytorium



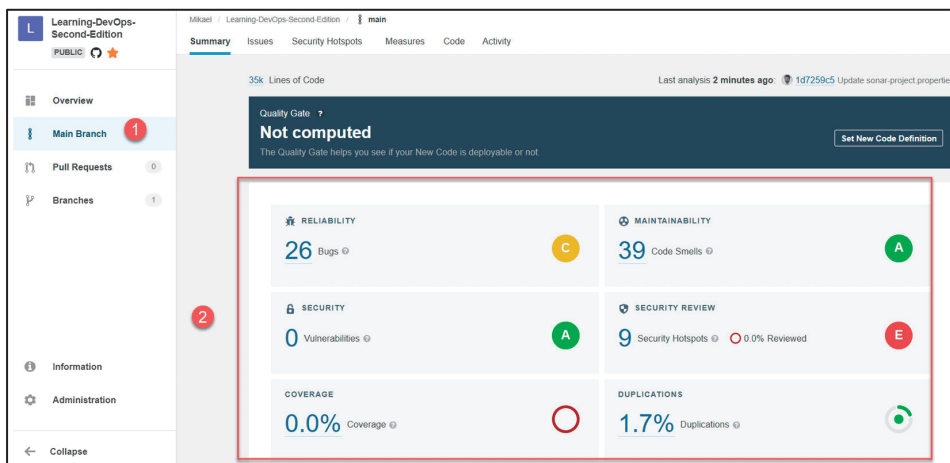
Rysunek 16.26. SonarCloud — używanie szablonu GitHub Actions



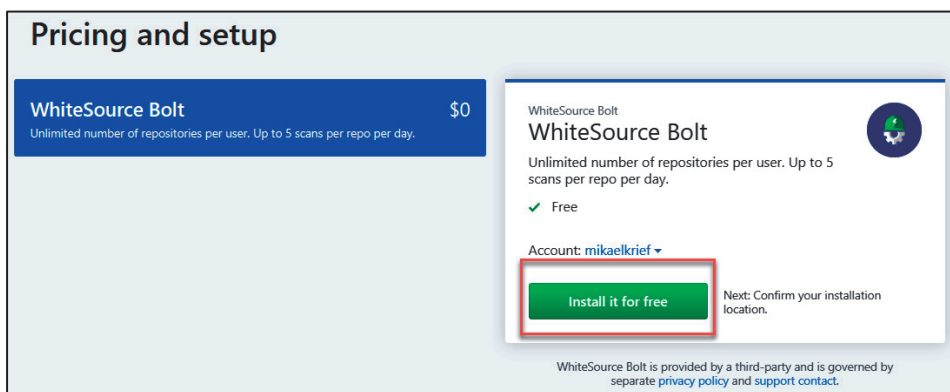
Rysunek 16.27. Instrukcje dotyczące GitHub Actions



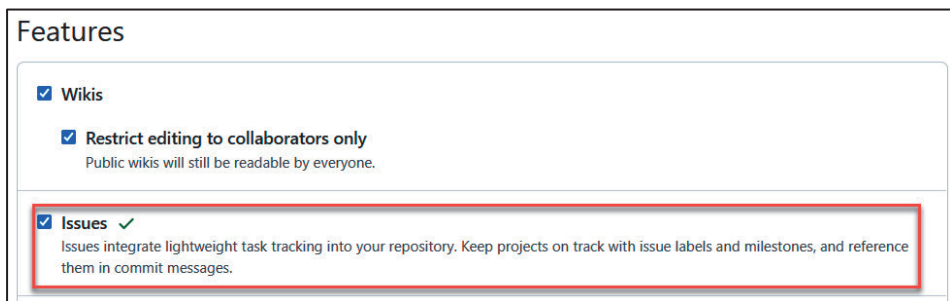
Rysunek 16.28. Analiza za pomocą GitHub Actions



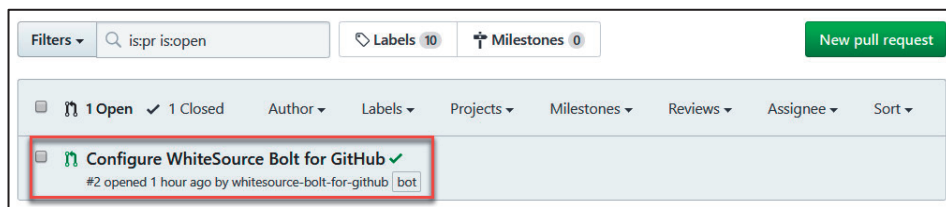
Rysunek 16.29. Wyniki analizy SonarCloud



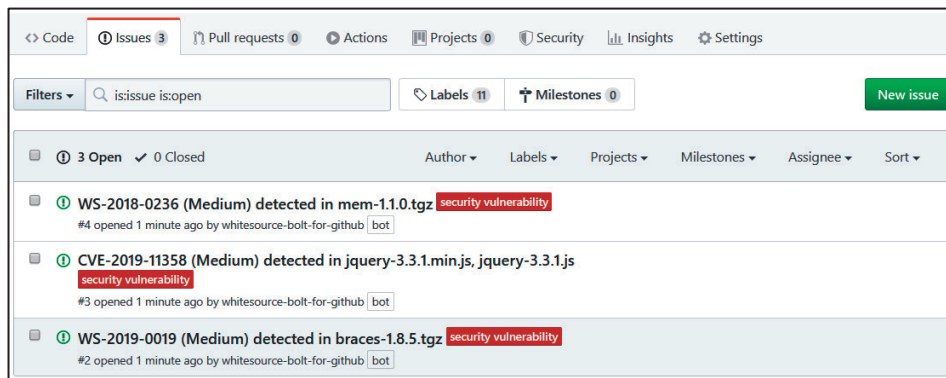
Rysunek 16.30. Instalacja WhiteSource Bolt



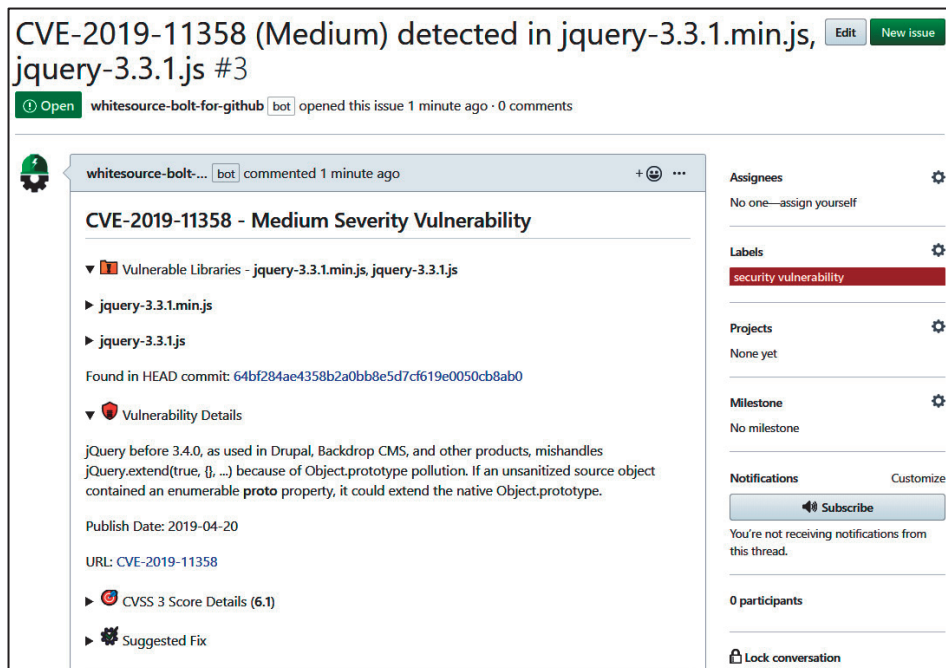
Rysunek 16.31. GitHub — aktywacja Issues



Rysunek 16.32. Konfiguracja WhiteSource Bolt



Rysunek 16.33. Problemy wykryte podczas analizy WhiteSource w GitHubie



Rysunek 16.34. WhiteSource Bolt — analiza szczegółów