Create Your Own Cloud Infrastructure Like a Pro

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Link to Slides

https://shorturl.at/aEG01

Your Presenter - Florian Stelzer

- Senior Consultant @ ipt
- 5x Microsoft Azure certified
- Broad experience building a secure cloud foundation with Terraform and Azure

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Your Presenter - Weili Gao

- IT Architect @ ipt
- Azure Solution Architect & DevOps Expert
- Cloud-native development & Digital Experience Projects

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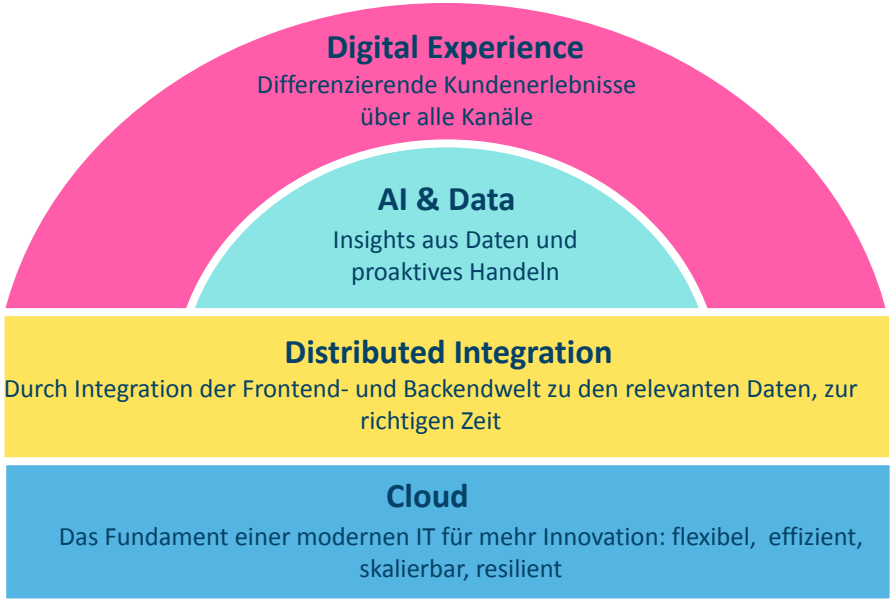
Who is ipt?

- IT-Consulting with a lot of engineering
- About 200 employees
- Our target industries are in the financial service sector and public administration
- Customers in german speaking switzerland



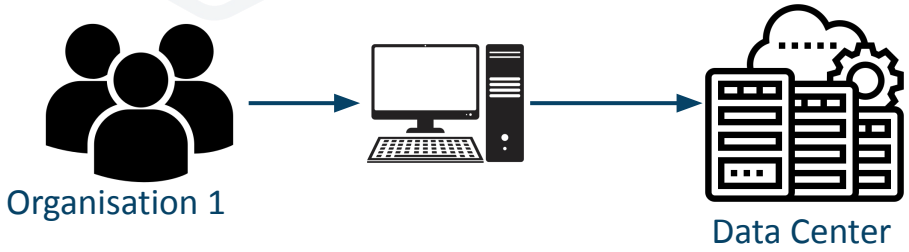
Agenda

<u>Our Objective:</u> You know how to build a cloud infrastructure environment at scale with IaC and GitHub.

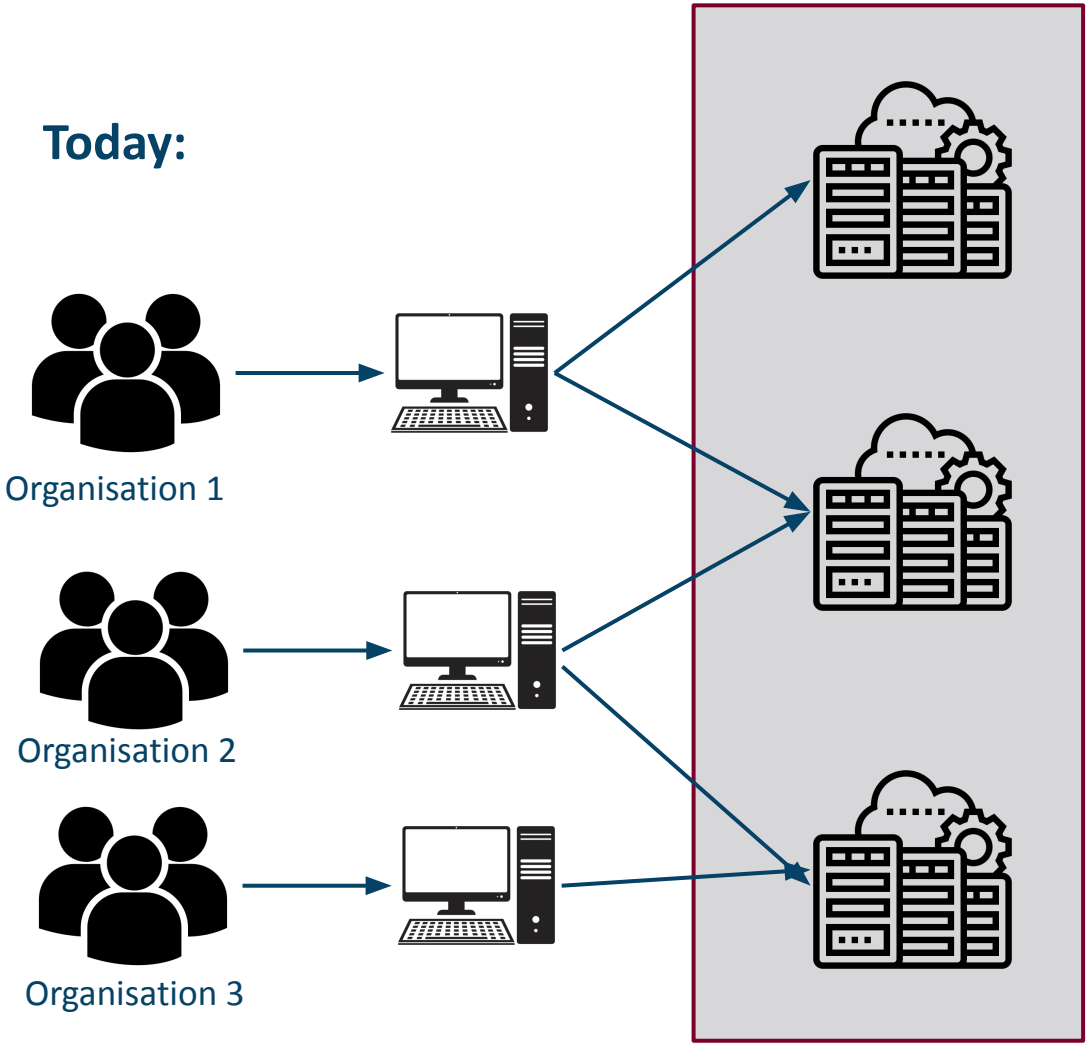
1. Introduction
2. Start with the Public Cloud - Microsoft Azure
3. Create your Cloud Infrastructure - Three Methods
   a. Manual Configuration — **Beginner Level**
   b. Configuration with IaC (Local Deployment) — **Intermediate Level**
   c. Configuration with IaC (Remote Deployment) — **Pro Level**

Introduction - What is Public Cloud and Microsoft Azure?

Former:



Today:

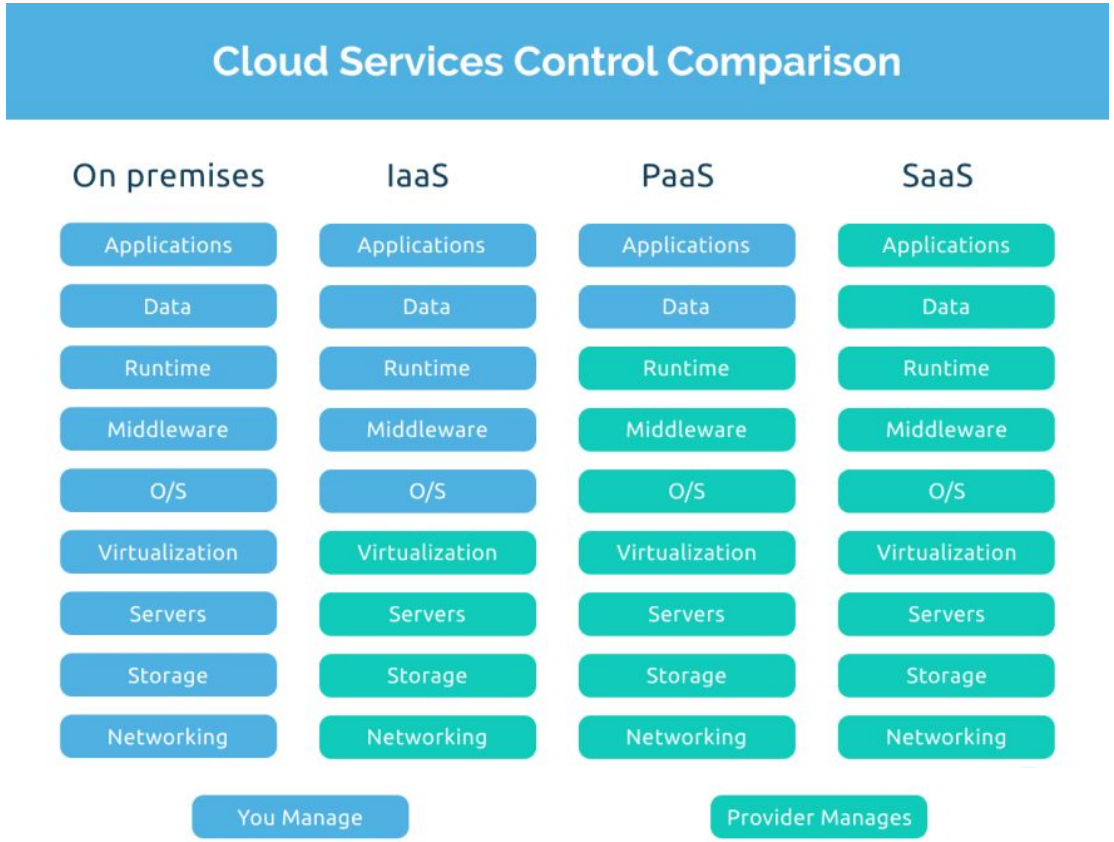


Introduction - What is Public Cloud and Microsoft Azure?

Official Definition by Microsoft [1]:

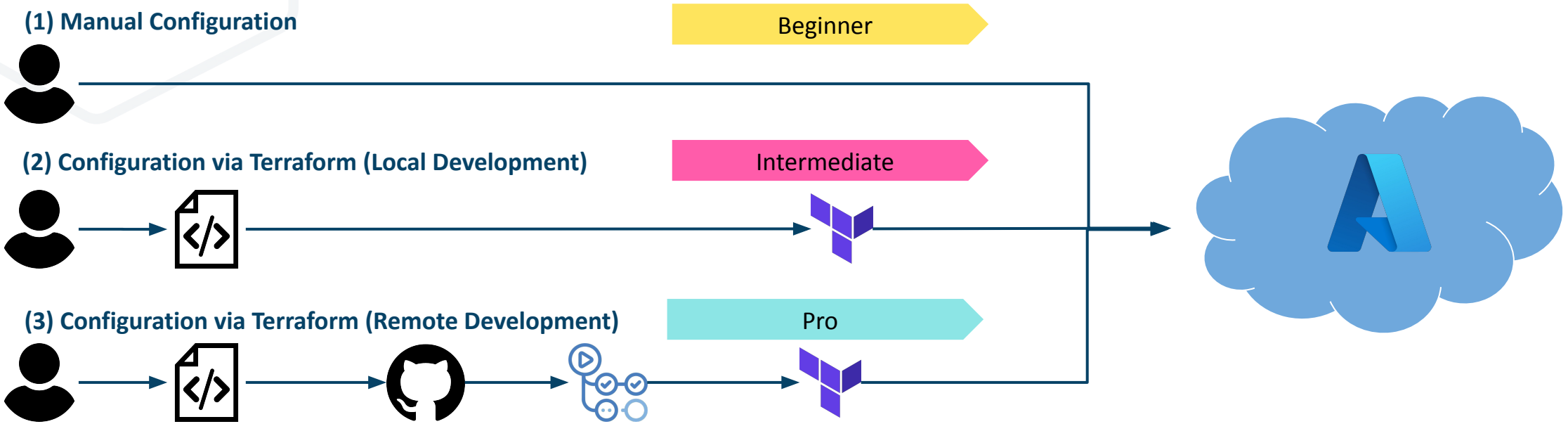
"The public cloud is defined as computing services offered by third-party providers over the public Internet, making them available to anyone who wants to use or purchase them. They may be free or sold on-demand, allowing customers to pay only per usage for the CPU cycles, storage, or bandwidth they consume."

Introduction -
What is Public Cloud and Microsoft Azure?



Introduction -
What is Public Cloud and Microsoft Azure?

Create your Cloud Infrastructure - Three Methods

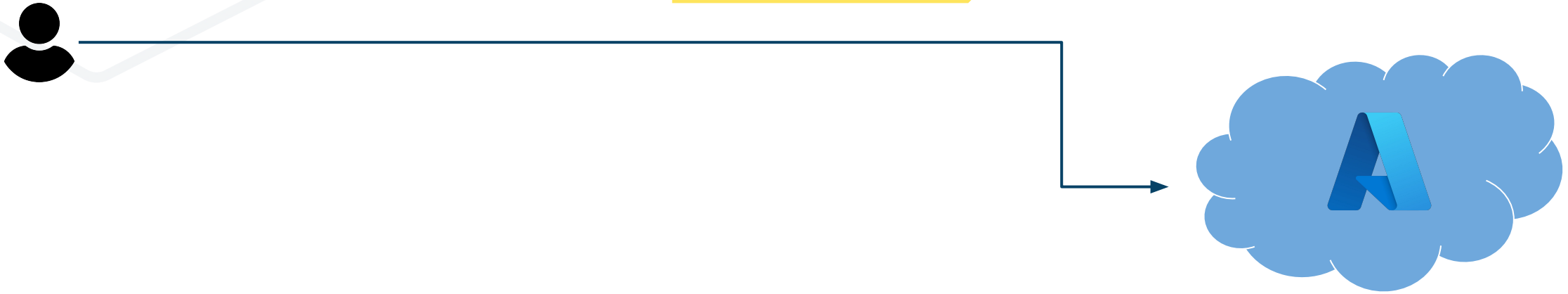


Beginner

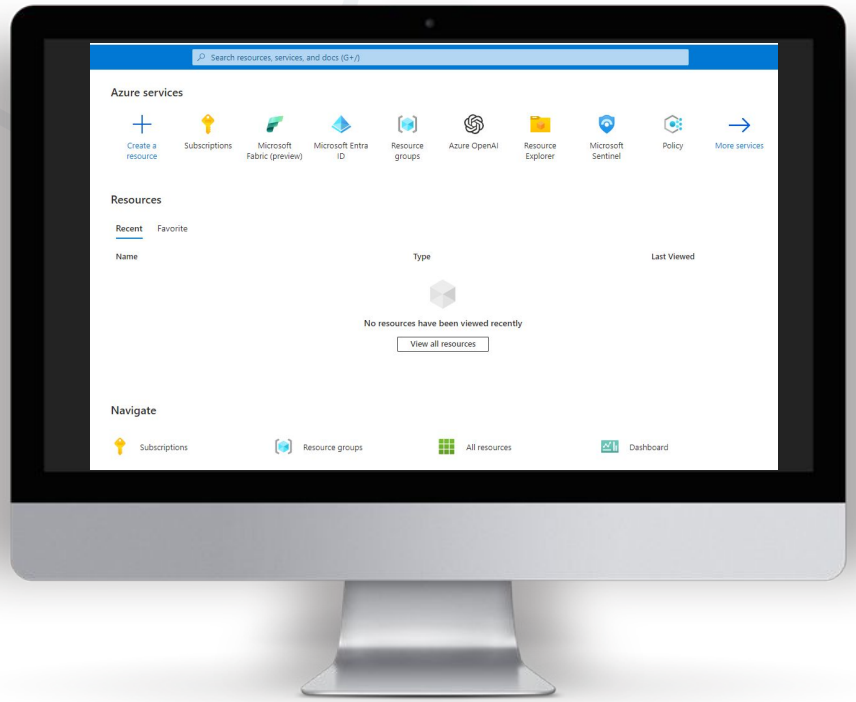
Create your Cloud Infrastructure - (1) Manual Configuration

(1) Manual Configuration

Beginner



Demo -
(1) Manual Configuration



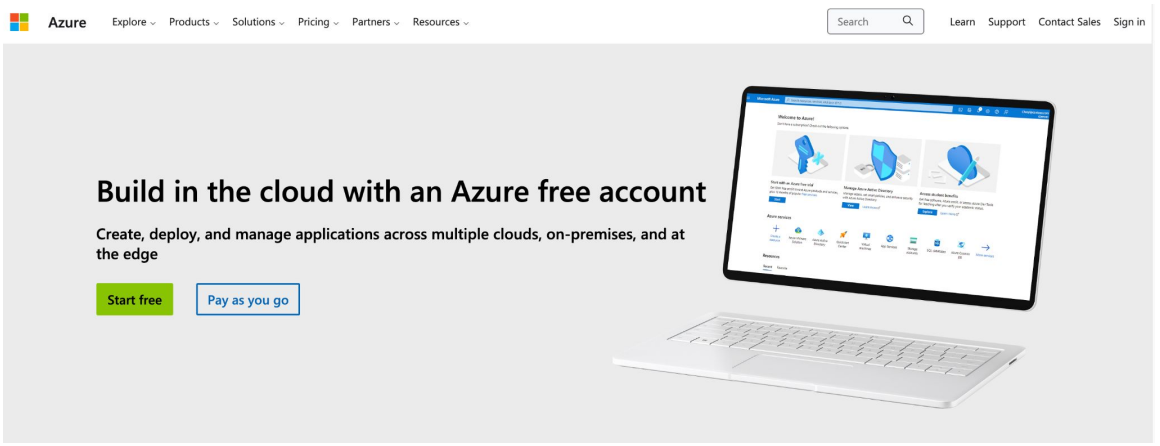
Steps:

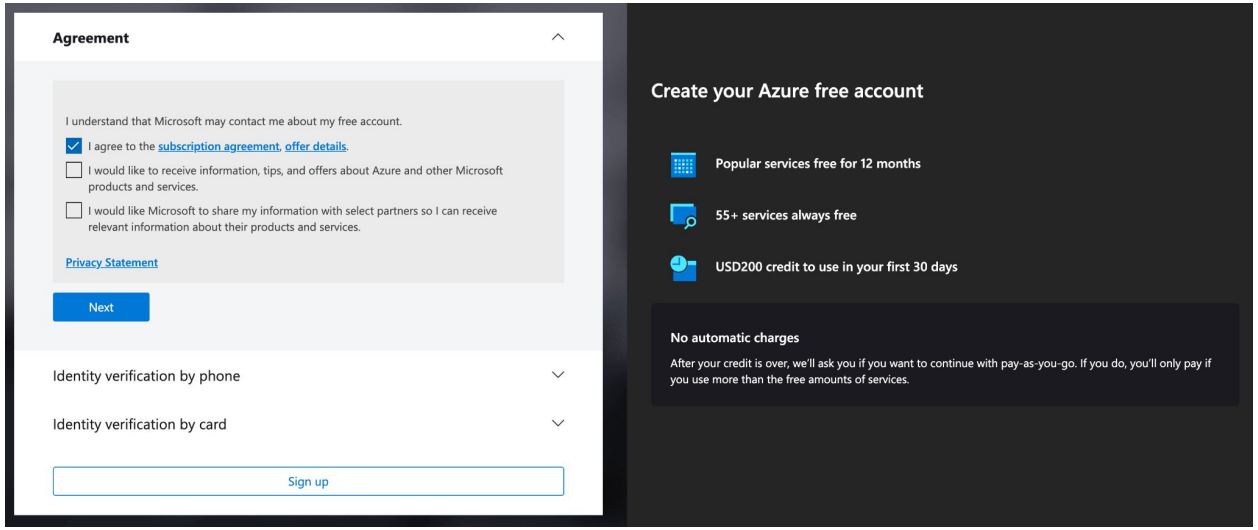
1. Sign-In to Azure
2. Choose subscription
3. Choose resource group
4. Create a resource

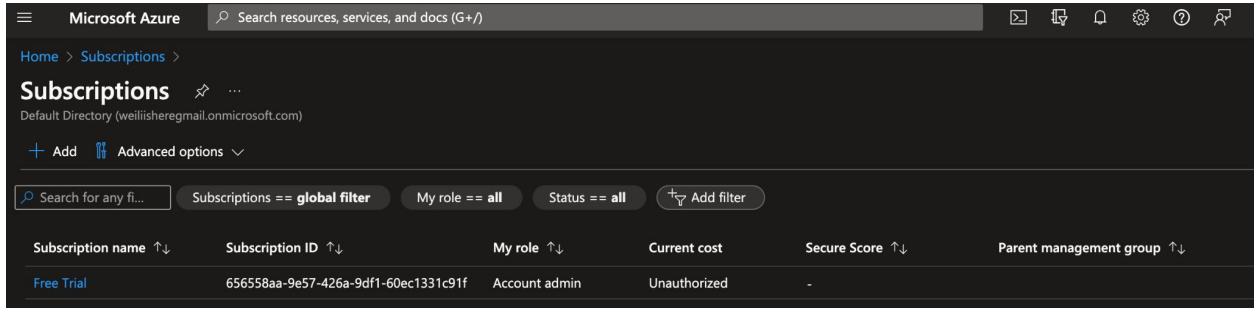
Beginner

Exercise - (1) Manual Configuration

Azure Free Trial: https://azure.microsoft.com/en-us/free/

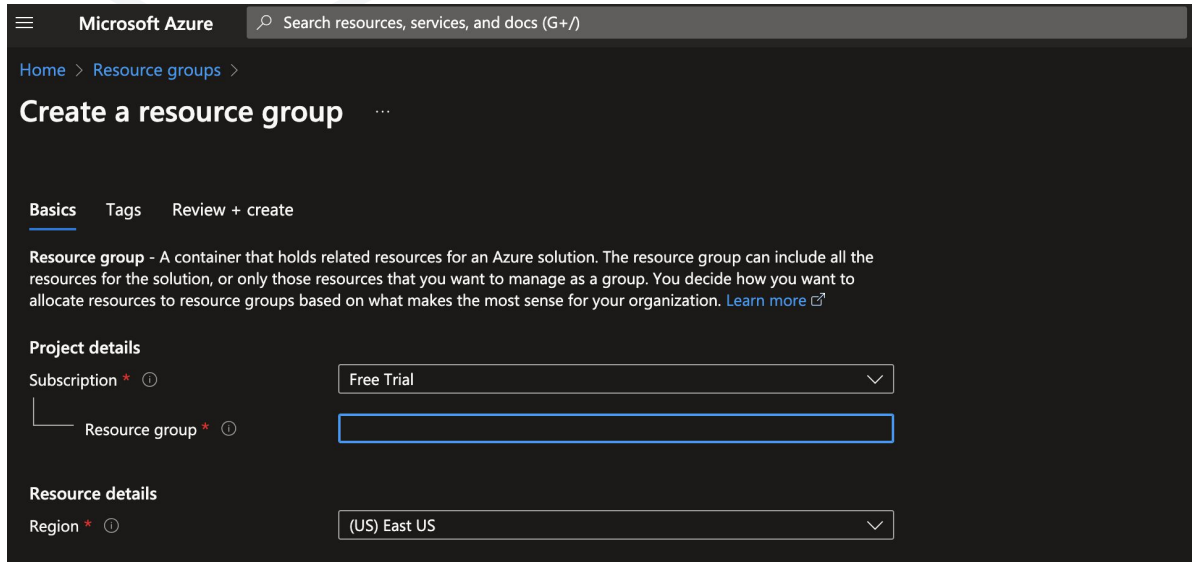


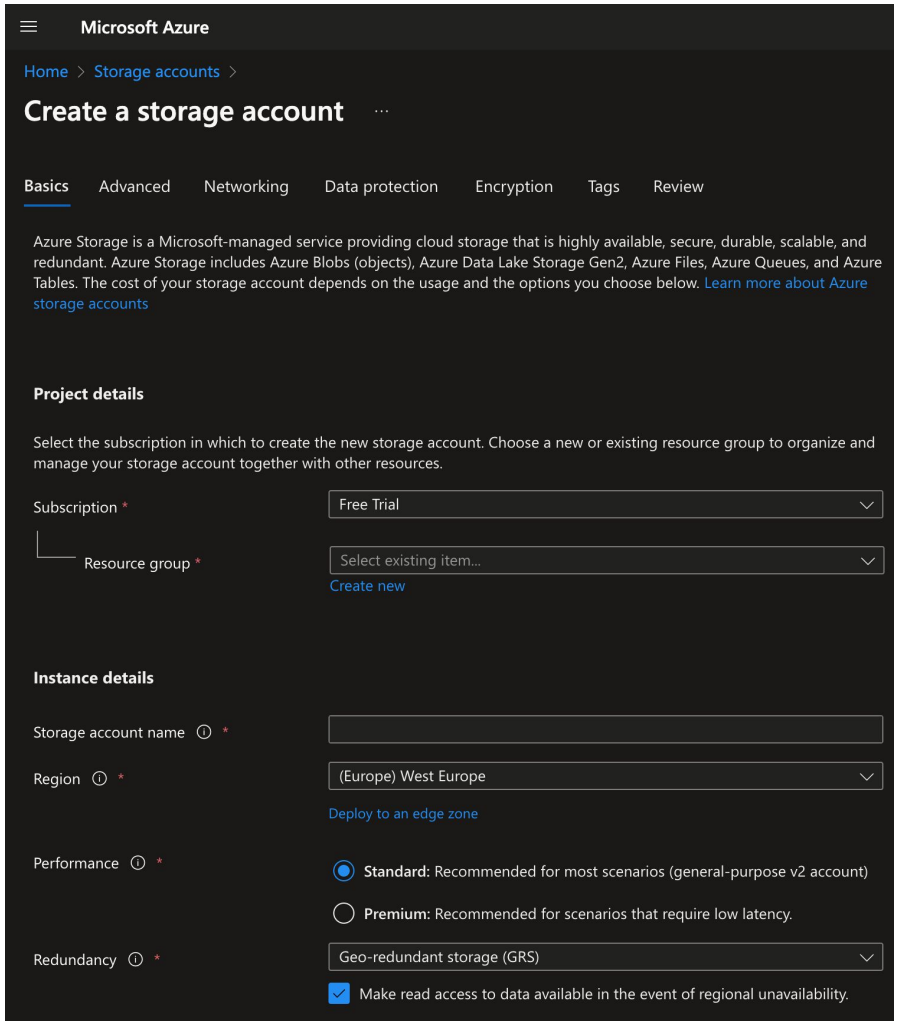




Beginner

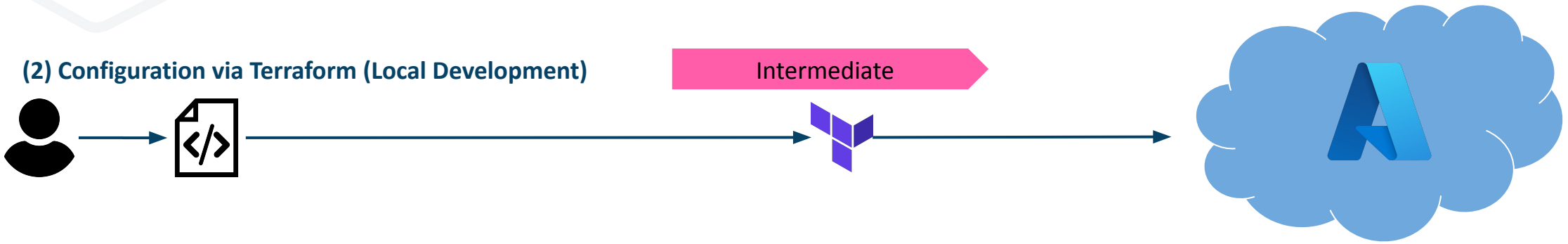
Exercise - (1) Manual Configuration





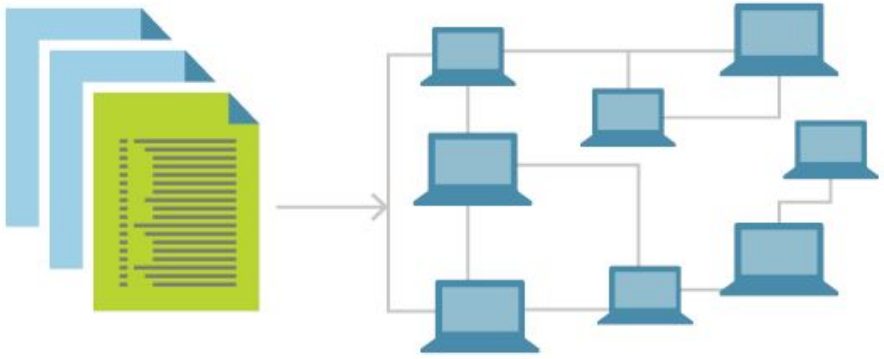
Beginner Intermediate

Create your Cloud Infrastructure - (2) Configuration with IaC (Local Deployment)



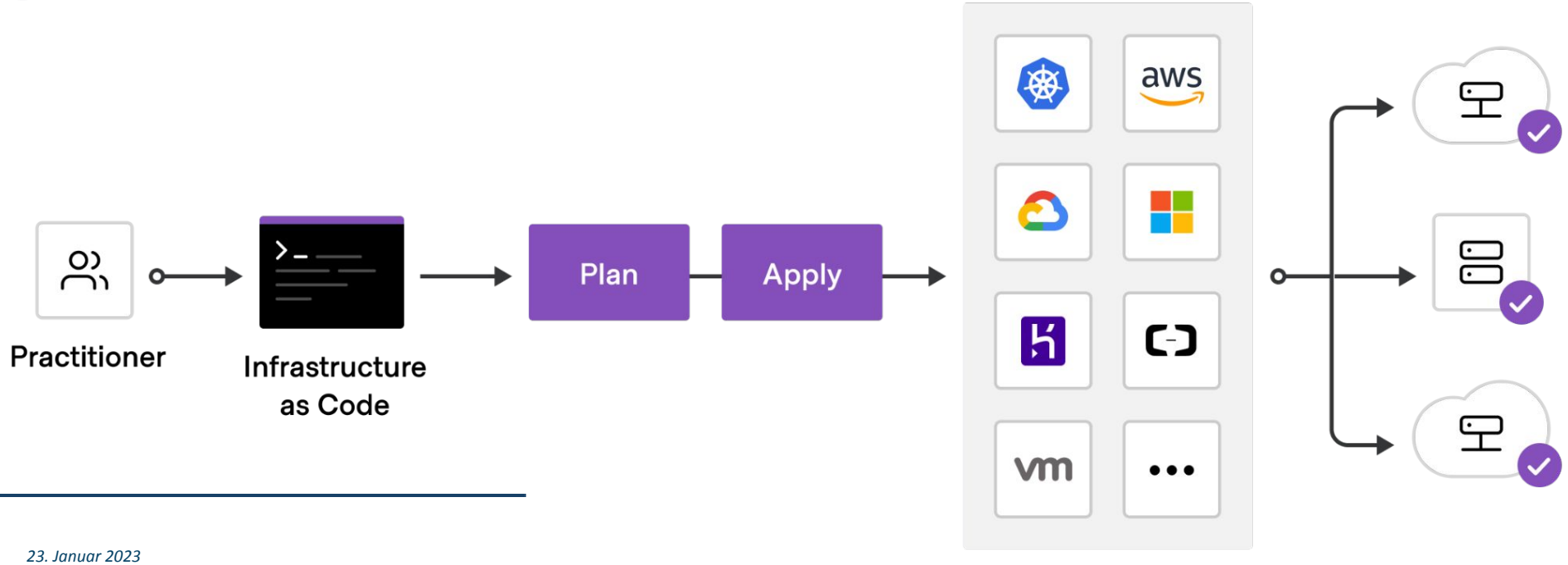
Create your Cloud Infrastructure - (2) Configuration with IaC (Local Deployment)

- Description of IT infrastructure such as networks, VMs, etc. via code
- Integral part of DevOps methodology
- Advantages over manual configuration
  - Consistency
  - Scalability
  - Fewer errors
  - Version control
  - Cost reduction
  - Faster deployments



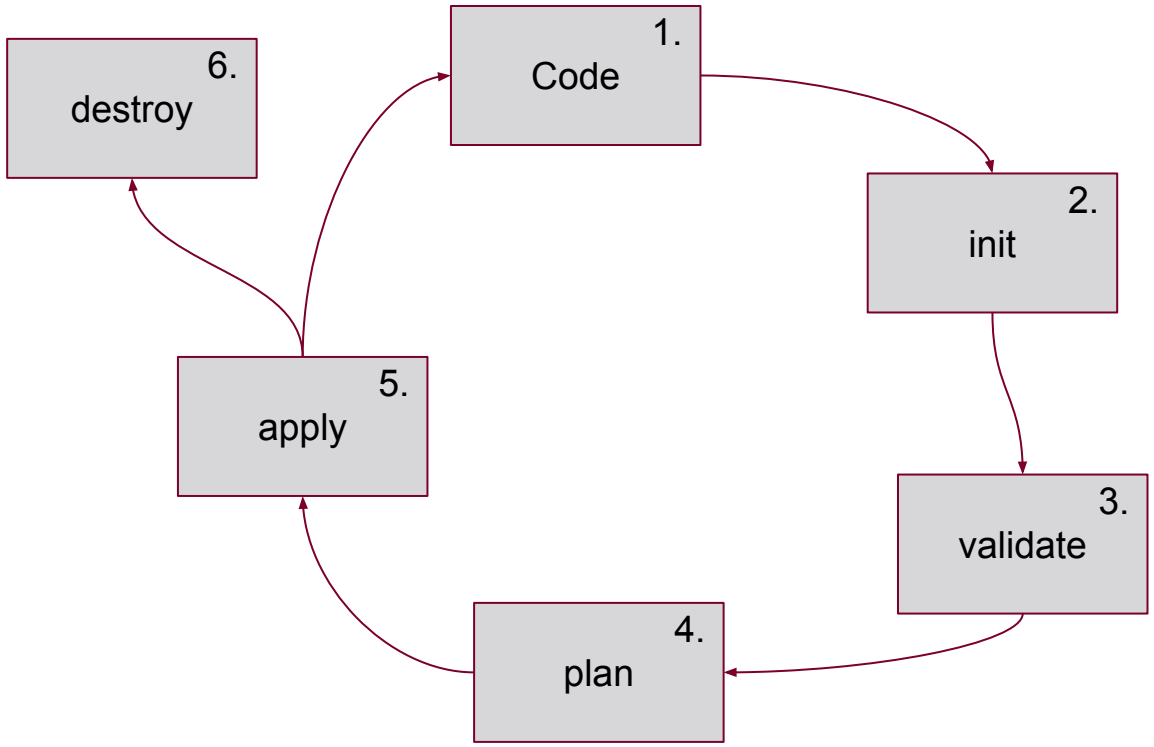
Create your Cloud Infrastructure - (2) Configuration with IaC (Local Deployment)

- Open-source tool for Infrastructure as Code (IaC) automation
- Cloud-agnostic → can be applied to various cloud platforms



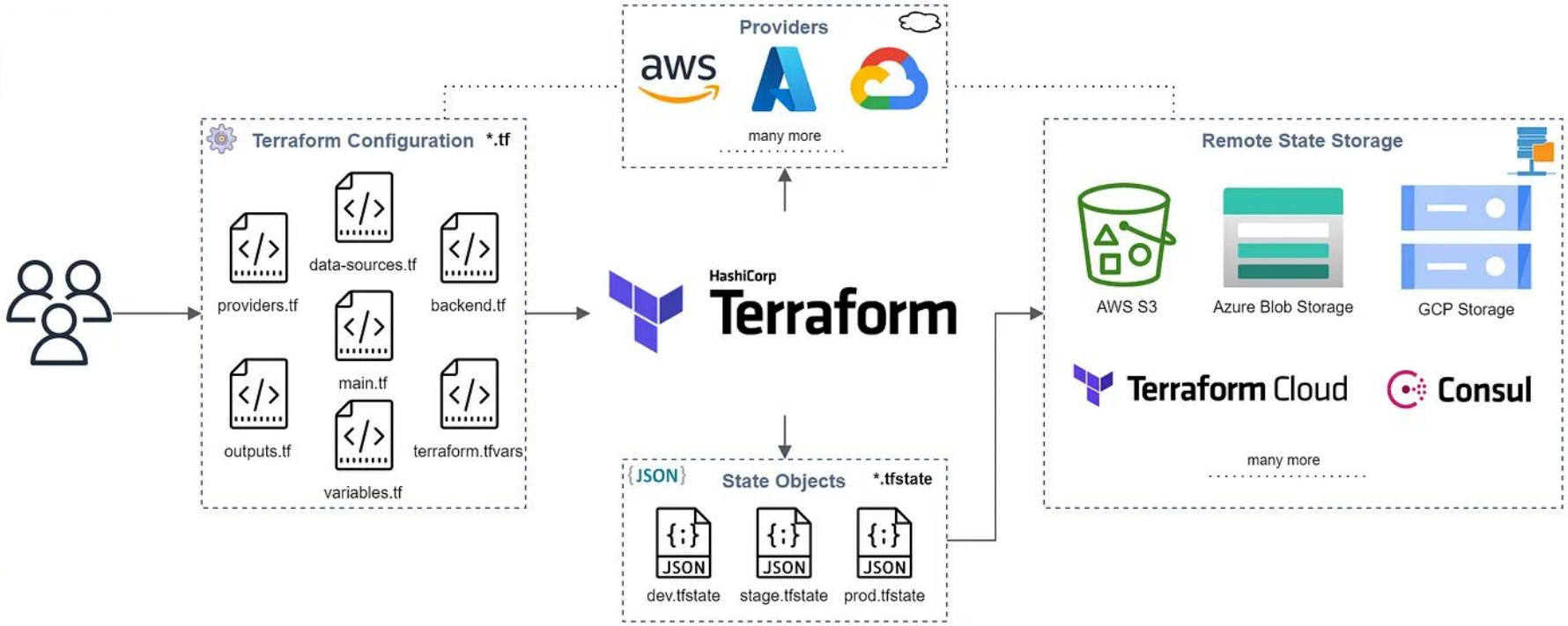
Create your Cloud Infrastructure - (2) Configuration with IaC (Local Deployment)

- **Workflow Lifecycle**



Create your Cloud Infrastructure - (2) Configuration with IaC (Local Deployment)

- Terraform state holds the consistency and versioning



Demo -
(2) Configuration with IaC (Local Deployment)

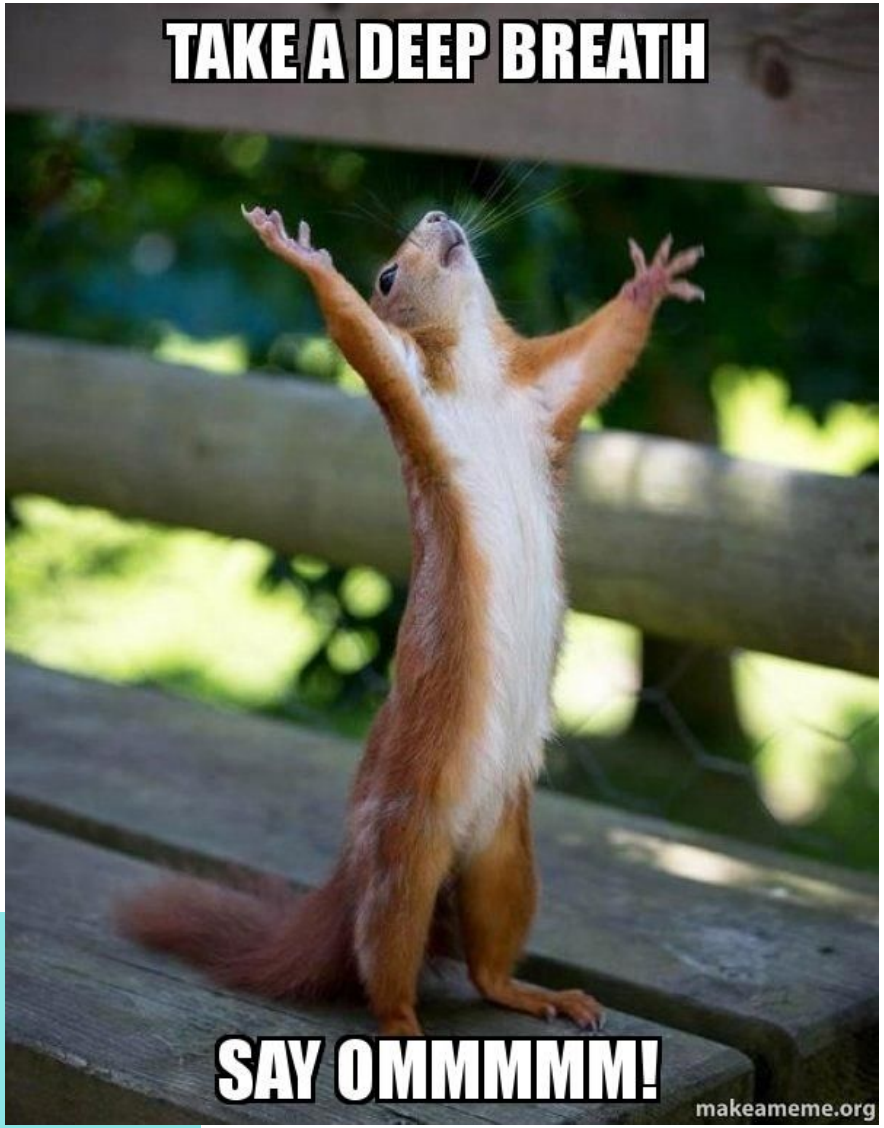
```
data "azuread_user" "conditional_access_administrator_emergency_account" {
  user_principal_name = "admcap@swica.onmicrosoft.com"
}

resource "azurerm_monitor_scheduled_query_rules_alert_v2" "conditional_access_emergency_account_usage" {
  name = format("alert-%s-%s",
    local.workload_context,
    "conditionalAccessEmergencyAccountUsage"
  )
  location            = azurerm_resource_group.monitoring.location
  resource_group_name = azurerm_resource_group.monitoring.name
  tags                = data.azurerm_subscription.management.tags

  action {
    action_groups = [
      azurerm_monitor_action_group.notify_cet.id,
      azurerm_monitor_action_group.notify_security.id
    ]
  }
  scopes      = [azurerm_log_analytics_workspace.monitoring.id]
  description = "The conditional access administrator emergency account has been used for sign in. https://con
  enabled     = true

  severity             = 0
  evaluation_frequency = "PT5M"
  window_duration      = "PT5M"

  criteria {
    query                   = <<-QUERY
      SigninLogs
        | project UserId
        | where UserId == "${data.azuread_user.conditional_access_administrator_emergency_account.object_id}"
    QUERY
    time_aggregation_method = "Count"
```

Steps:

- Create Code describing your Infrastructure
- Set details for provider to connect to Azure
- Deploy with Terraform commands

Exercise -
(2) Configuration with IaC (Local Deployment)

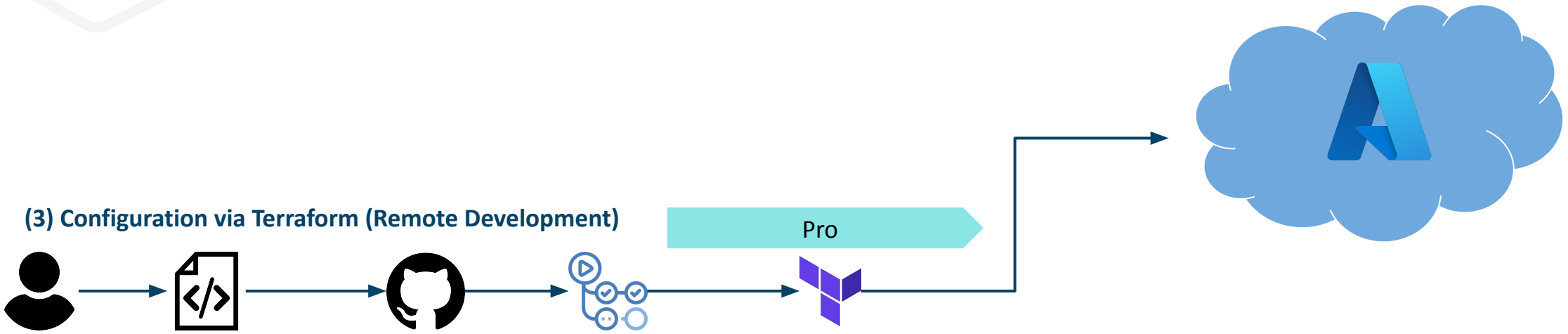
1. Install Terraform: https://developer.hashicorp.com/terraform/tutorials/azure-get-started/install-cli
2. Install Azure CLI (skip step about creating service principal): https://developer.hashicorp.com/terraform/tutorials/azure-get-started/azure-build
3. Clone the GitHub repo: https://github.com/weiligao/terraform-github-demo
4. Run in following order: terraform init, terraform plan, terraform apply
5. Stepwise uncomment the cloned terraform code and run above commands again, and check the results in Azure



Break

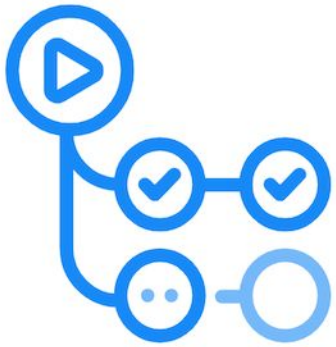
20 minutes

Create your Cloud Infrastructure - (3) Configuration with IaC (Remote Deployment)



Create your Cloud Infrastructure - (3) Configuration with IaC (Remote Deployment)

- What is **GitHub**?
  - Platform for code management and teamwork
- What is **GitHub Actions**?
  - Automation of development processes
  - Rapid testing and deployments



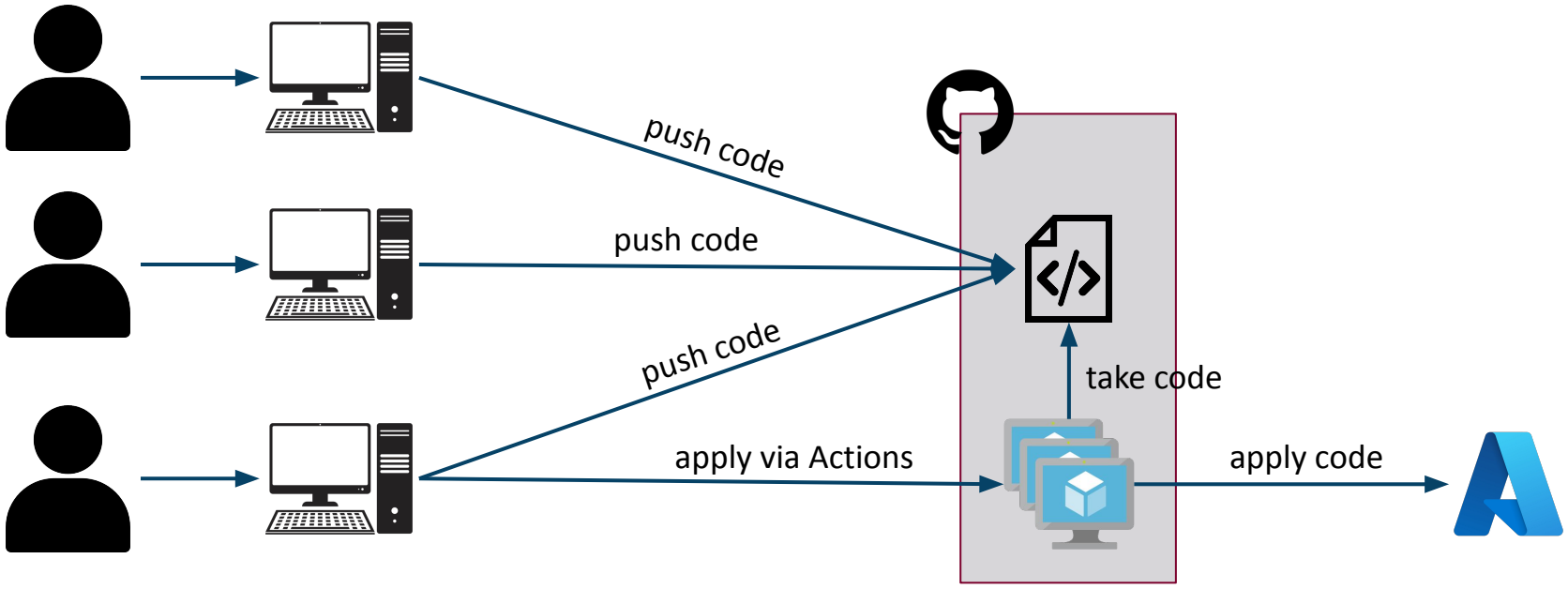
GitHub Actions

Create your Cloud Infrastructure - (3) Configuration with IaC (Remote Deployment)

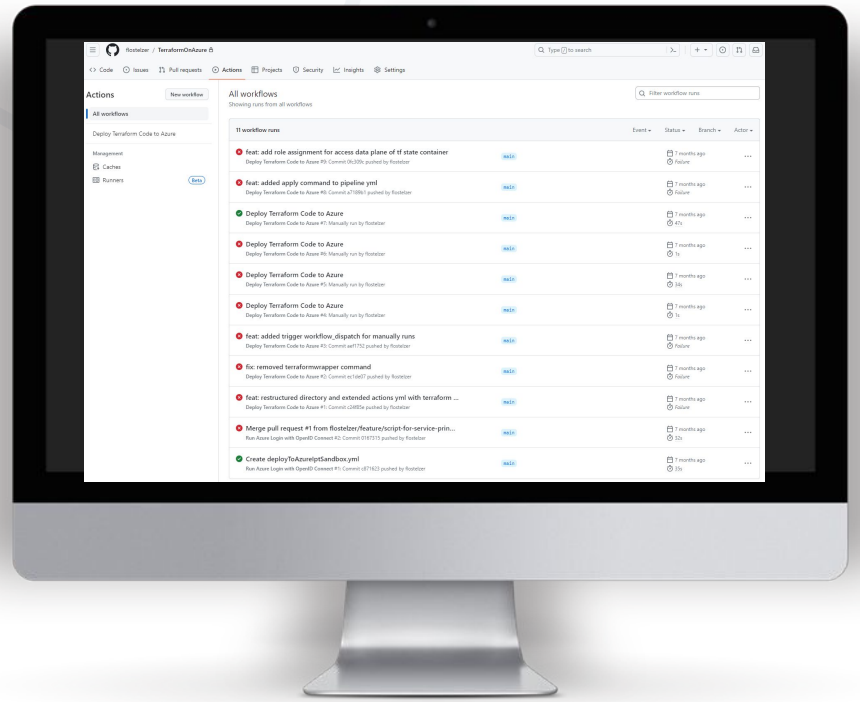
- **Advantages:**
  - Accelerates development.
  - Enhances code quality.
  - Facilitates rapid deployment.
- **Use Cases:**
  - Automated testing (CI)
  - Instant deployment (CD)
  - Customizable workflows

Create your Cloud Infrastructure - (3) Configuration with IaC (Remote Deployment)

- **Development flow with GitHub:**



Demo -
(3) Configuration with IaC (Remote Deployment)



Steps:

- Adjust code for deployment via GitHub Actions
- Upload Code
- Create Pipeline with YAML-File
- Deployment via GitHub Actions

Exercise -
(3) Configuration with IaC (Remote Deployment)

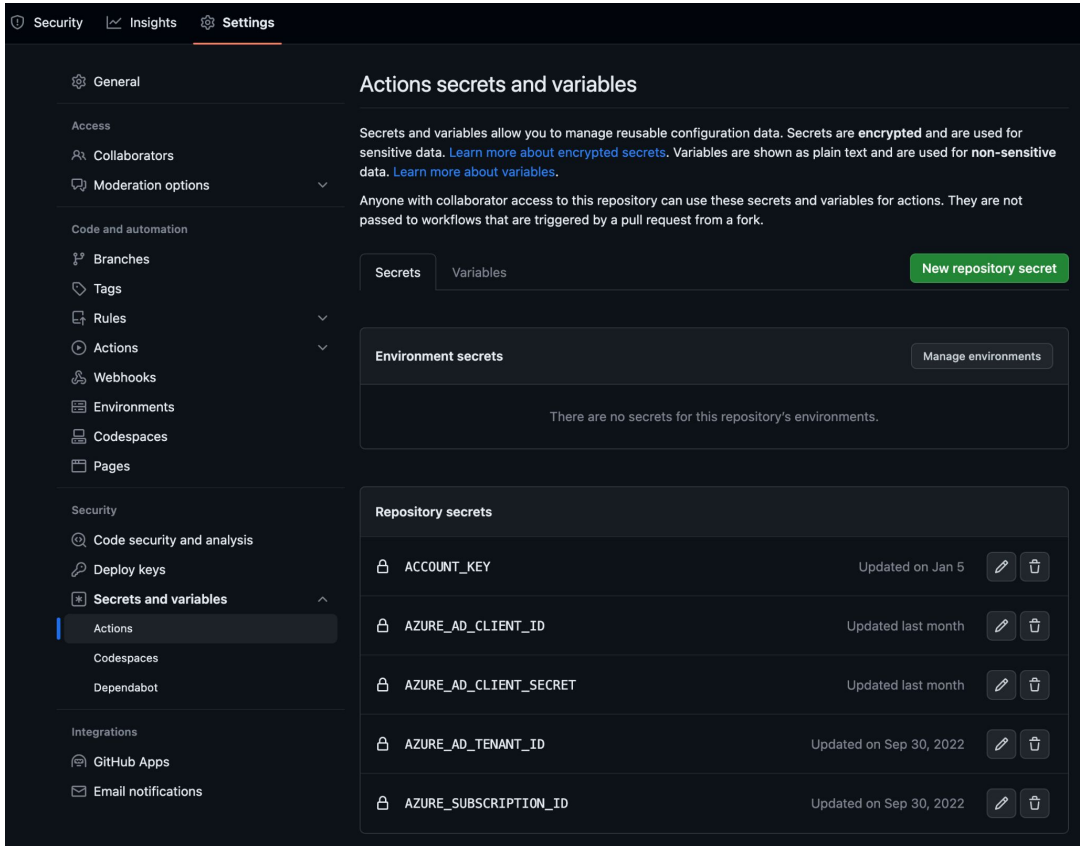
1. Create Service Principal:
   https://developer.hashicorp.com/terraform/tutorials/azure-get-started/azure-build#create-a-service-principal

2. Create remote backend (storage account in Azure), save its access key somewhere (you'll need it in the next step) and uncomment code for remote backend in main.tf:
   https://learn.microsoft.com/en-us/azure/developer/terraform/store-state-in-azure-storage?tabs=azure-cli

Exercise -
(3) Configuration with IaC (Remote Deployment)

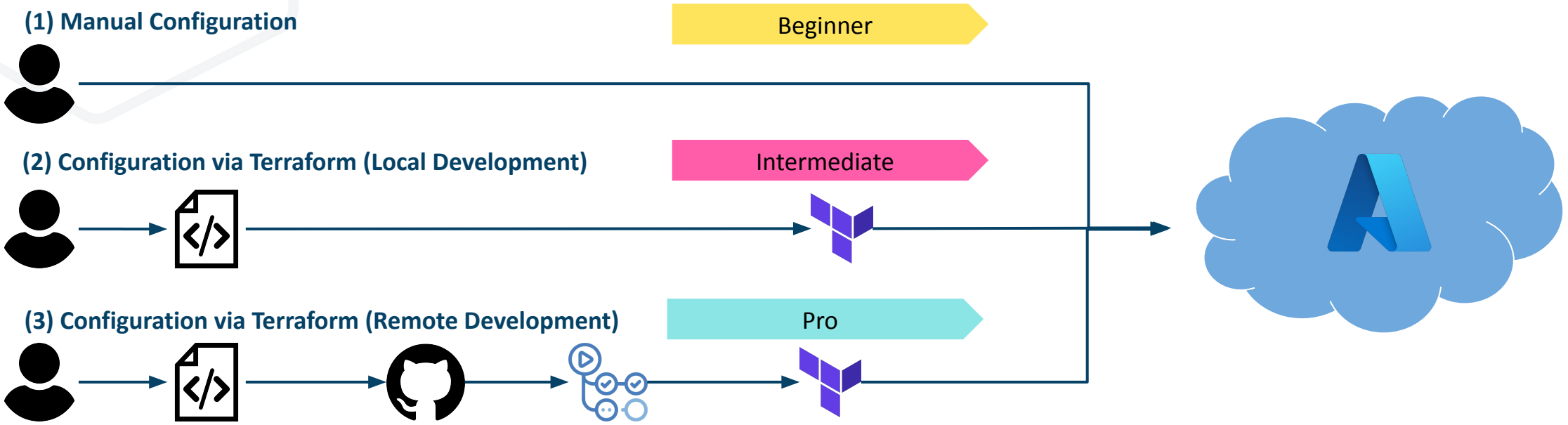
3. Create a new GitHub repo and configure Action secrets

4. Commit and push your code into the new repo: https://docs.github.com/en/migrations/importing-source-code/using-the-command-line-to-import-source-code/adding-locally-hosted-code-to-github



Recap

Create your Cloud Infrastructure - Three Methods

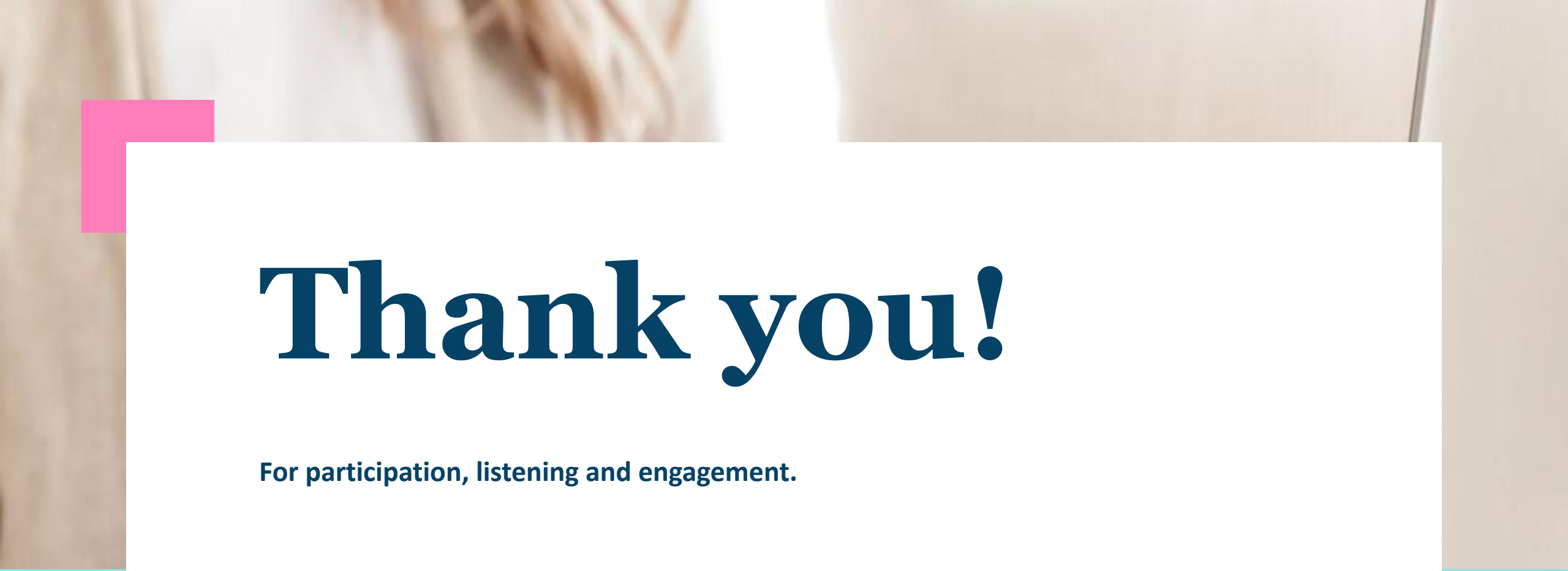


Summary

- **Take-aways:**
  - In enterprise and real-world context use always the **Pro Level** for configuration of your infrastructure
  - **Every** serious enterprise is using this approach in a modern software development environment
  - **Almost mandatory** - not just best practice.

Questions

- What do you want to know?



Thank you!

For participation, listening and engagement.

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Sources

- https://dev.to/artemkobilinskiy/cloud-service-models-saas-paas-iaas-which-is-better-for-business-574k
- [1] https://azure.microsoft.com/en-us/resources/cloud-computing-dictionary/what-is-a-public-cloud