YCIT 018 - Cloud Networking & Security

Lab project

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Overview

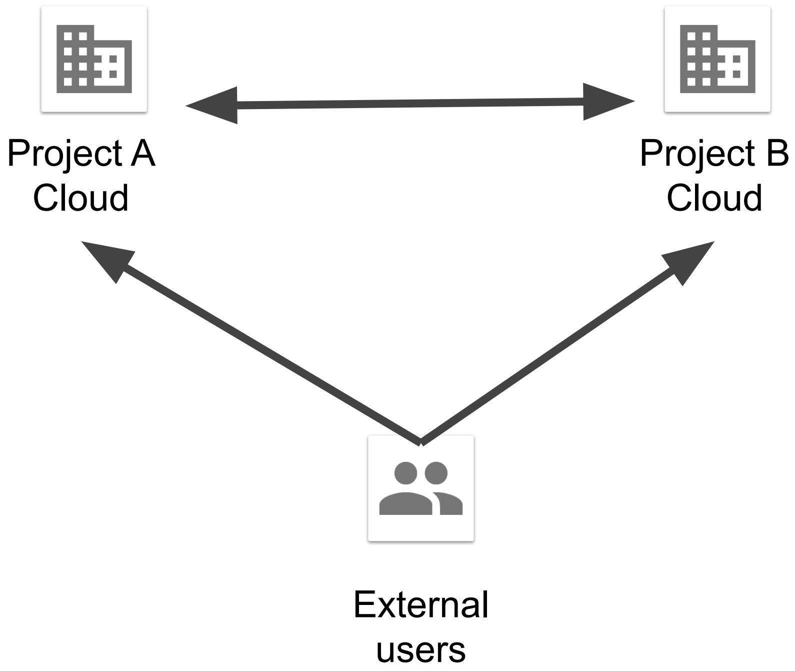
Build a complete Cloud solution to demonstrate networking and cybersecurity learning outcomes covered during the course. Students will need to build a replica of 2 typical architectures in the Cloud, then enable connectivity and security to access services between them and to external users according to provided requirements.

Hand-on topics covered by Lab Project:

- Project structure & permission
- VPC & Networking segmentation
- IAM
- VPN
- Firewalls
- Routing

Evaluation:

- 60% on Cloud configuration
- 30% on Documentation
- 10% on Extra functionality



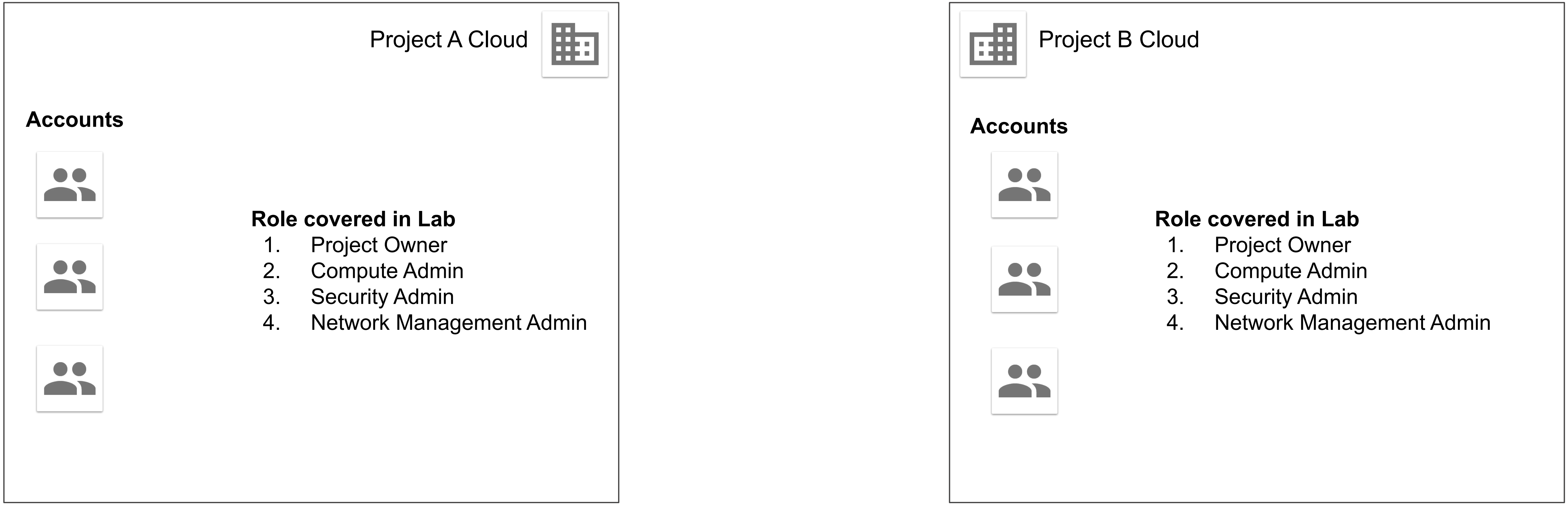
GCP Credits

- You will be asked for a name and email address, which needs to match the domain. A confirmation email will be sent to you with a coupon code.
- You can request a coupon from the URL and redeem it until: 6/2/2021
- Coupon valid through: 2/2/2022
- You can only request ONE code per unique email address.

Configuration (60%)

- Organization, Project, IAM
- Compute Instances
- Network, Router & VPN
- Firewall

Lab Project architecture - Project & IAM



Project A Cloud

Accounts

Role covered in Lab

1. Project Owner
2. Compute Admin
3. Security Admin
4. Network Management Admin

Project B Cloud

Accounts

Role covered in Lab

1. Project Owner
2. Compute Admin
3. Security Admin
4. Network Management Admin

Requirement 1.1 - Create 2 Projects

1. Only 1 Organisation is required for IAM simplicity

Requirement 1.2 - Assign IAM roles to accounts

1. Your main account (used for evaluation) should remain intact
2. Assign the 4 roles covered in the diagram. Extra points for more advanced roles
3. Describe your role assignments and the expected results in your Lab documents for each account

TIPS: To achieve role assignment, student can:

1. Create its own accounts list (extra-points!)
2. Use service-accounts (with no emails)
3. Use provided test account list (GCP only):
   sansareed.832206@gmail.com
   theonfrey.636475@gmail.com
   jonfrey.601857@gmail.com
   petyrmormont.422614@gmail.com
   daenerysbolton.360042@gmail.com
   rickonstone.911790@gmail.com
   catelynsand.630972@gmail.com

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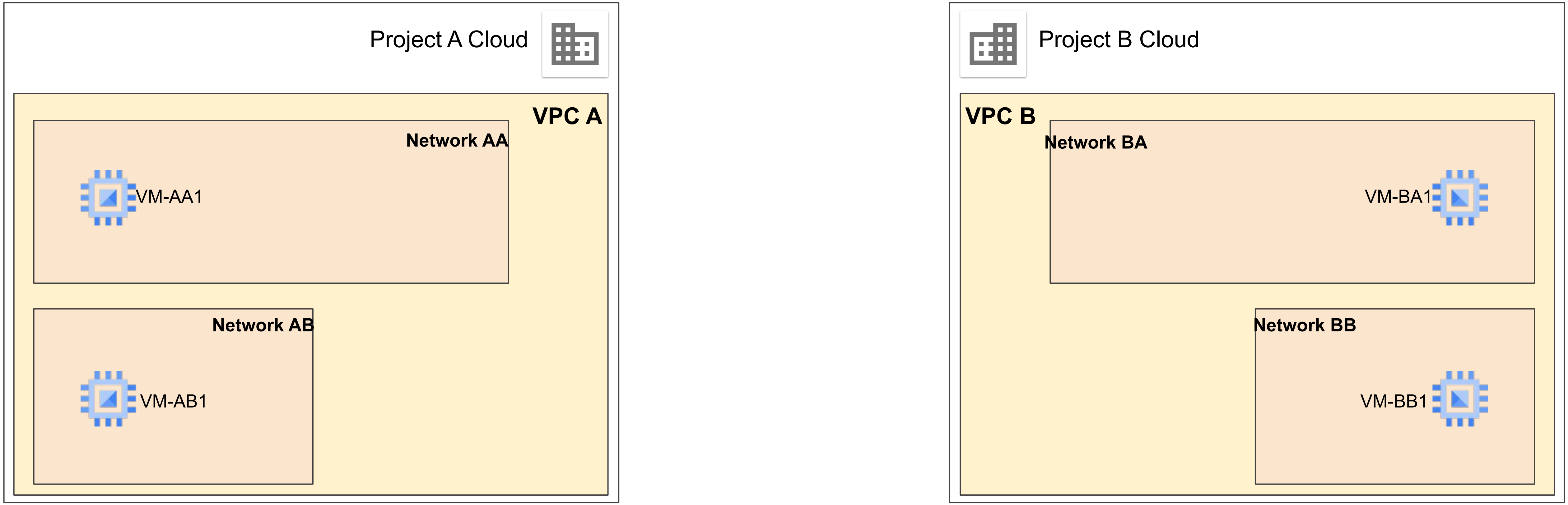
Lab Project architecture - Compute Instances



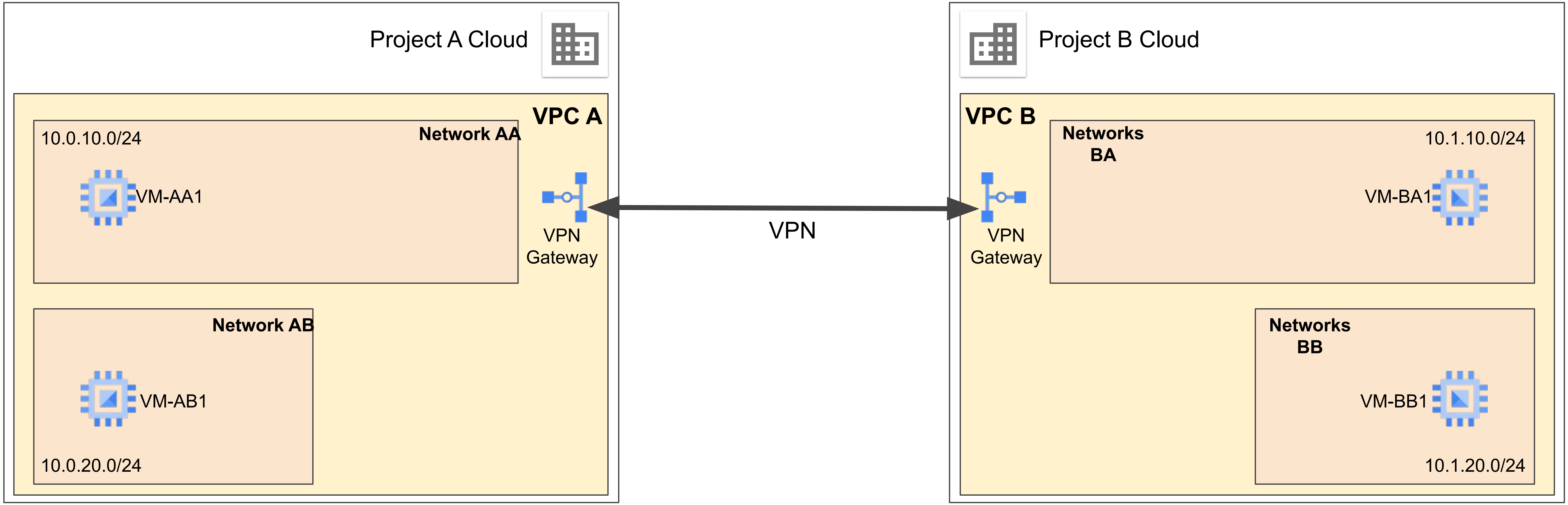
Requirement 2.1 - Create 2 distinct virtual Cloud using Projects

1. Project are named Org_A & Org_B
2. Each project has 1 VPC
3. Each VPC has 2 Networks as per Network & VPN requirements
4. Each VPC has 1 router & VPN gateway as per Network & VPN requirements
5. Each Network had 1 compute instance
6. All resources in same Region & Zones for simplicity

Requirement 2.2 - VM instance

1. 1 Linux VM per Network (smallest VM available - f1-micro)
2. Default configuration (storage)
3. Network configuration as per requirements
4. Firewall configuration as per requirements

Lab Project architecture - Network & VPN



Requirement 3.1 - Create 4 Network

1. Network AA - 10.0.10.0/24
2. Network AB - 10.0.20.0/24
3. Network BA - 10.1.10.0/24
4. Network BB - 10.1.20.0/24

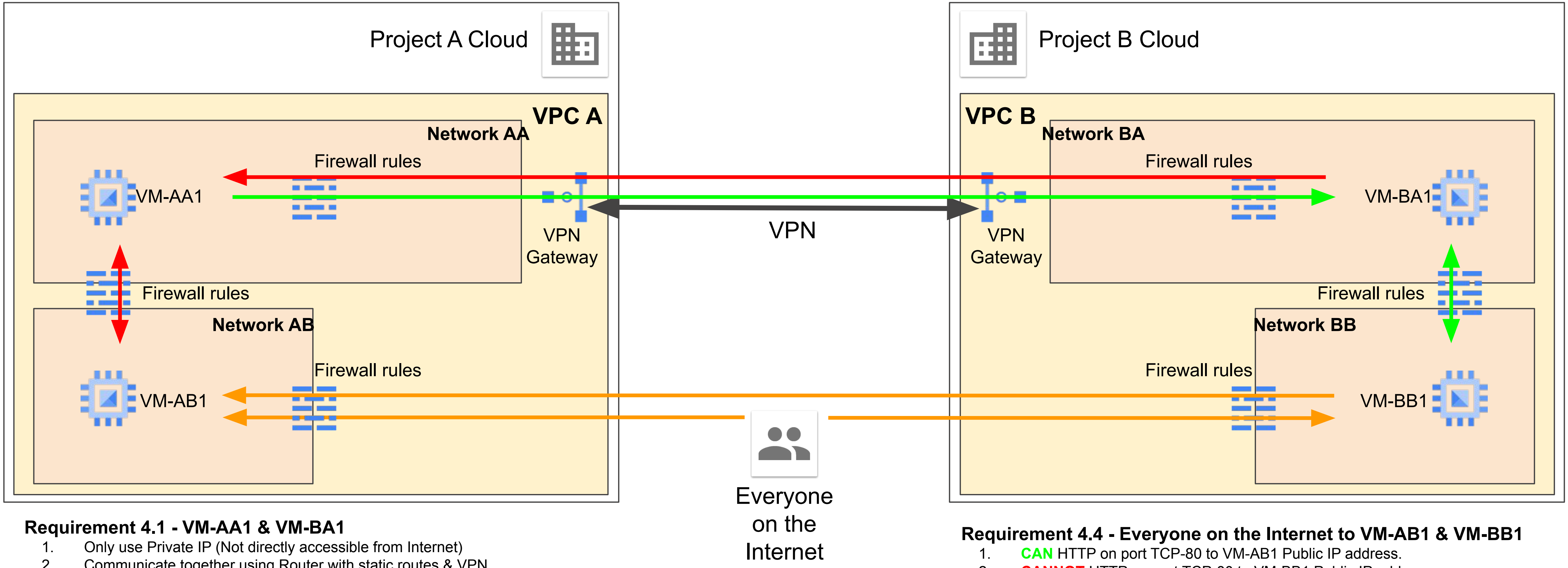
Requirement 3.2 - VM address assignments

1. All VM has Ephemeral addresses
2. VM-AA1 in Network AA (internal only)
3. VM-AB1 in Network AB
4. VM-BA1 in Network BA (internal only)
5. VM-BB1 in Network BB

Requirement 3.3 - Create 1 VPN Between VPC

1. Using Classic VPN mode
2. Using Network AA & AB
3. Using Reserved IP for the Gateway
4. Using IKE pre-shared key
5. Using static routes to reach destination in both directions

Lab Project architecture - Firewall



Requirement 4.1 - VM-AA1 & VM-BA1

1. Only use Private IP (Not directly accessible from Internet)
2. Communicate together using Router with static routes & VPN Gateway to encrypt communication.
3. VM-AA1 CAN ping VM-BA1 using Firewall rules
4. VM-BA1 CANNOT ping VM-AA1 using Firewall rules

Requirement 4.2 - VM-AA1 & VM-AB1

1. CANNOT ping in both direction using Firewall rules

Requirement 4.3 - VM-BA1 & VM-BB1-2

1. CAN ping in both direction using Firewall rules

Requirement 4.4 - Everyone on the Internet to VM-AB1 & VM-BB1

1. CAN HTTP on port TCP-80 to VM-AB1 Public IP address.
2. CANNOT HTTP on port TCP-80 to VM-BB1 Public IP address.
3. CAN ping to VM-AB1 & VM-BB1 Public IP address.
4. CANNOT SSH to VM-AB1 & VM-BB1 Public IP address

Requirement 4.5 - VM-BB1 to VM-AB1 (using Public Internet)

1. CANNOT HTTP on port TCP-80 to VM-AB1 Public IP address.
2. CAN ping to VM-AB1 Public IP address.
3. CAN SSH to VM-AB1 Public IP address
4. CANNOT ping 8.8.8.8 (Google's Public DNS)

Documentation (30%)

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Documentation

- 8-10 pages (including 1 front-page)
- Information on how to connect to your cloud
  - Cloud Provider if not Google (AWS or Azure)
  - Username & Password
- High-level text explanation on how you achieved your configuration
- Screenshot of your working configuration to demonstrate everything is working
  - Ping, Traceroute, SSH
  - Logs in Cloud Web interface or console
  - Evidence of working configured ressources
- Extra functionality

Extra functionality (10%)

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Be creative !

- Load-Balancer with Instance-Groups
- Service accounts firewall rules
- 2FA
- Certificates
- Encryption keys
- DNS
- NAT
- Network Tags
- Advanced IAM configuration
- Context-based access (Geo & Time)

GCP Credits & Tips

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GCP Credits and Tips

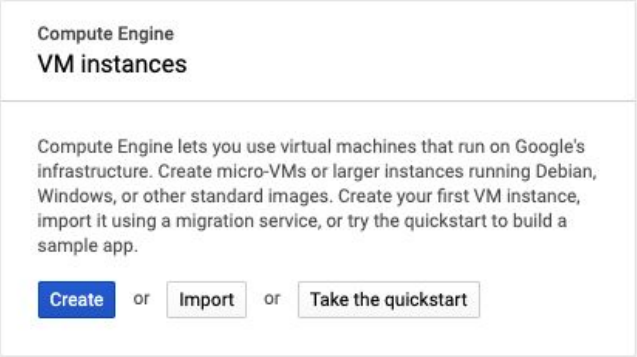
- Student can use any of the 3 main public cloud providers
    - Google Cloud Platform
    - AWS
    - Microsoft Azure
- We provide credit for Google Cloud Platform
- Tips
    - When not in use, stop your VM ! $$
    - Find configuration tips on Youtube if you are blocked !
    - Help your teammates on Slack

Web server set-up for requirement 4.4 & 4.5

Add the following commands under *Management--> Startup script* section when you create your VM-AB1 & VM-BB1 linux virtual machines

~~~
```bash
apt update
apt install -y apache2
cat <<EOF > /var/www/html/index.html
<html><body>
<h2>Welcome to your YCIT-018 Lab Project</h2>
<h3>Your requirements seems to be working well!</h3>
</body></html>
EOF
```
~~~

1- Create VM

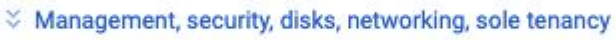


Compute Engine

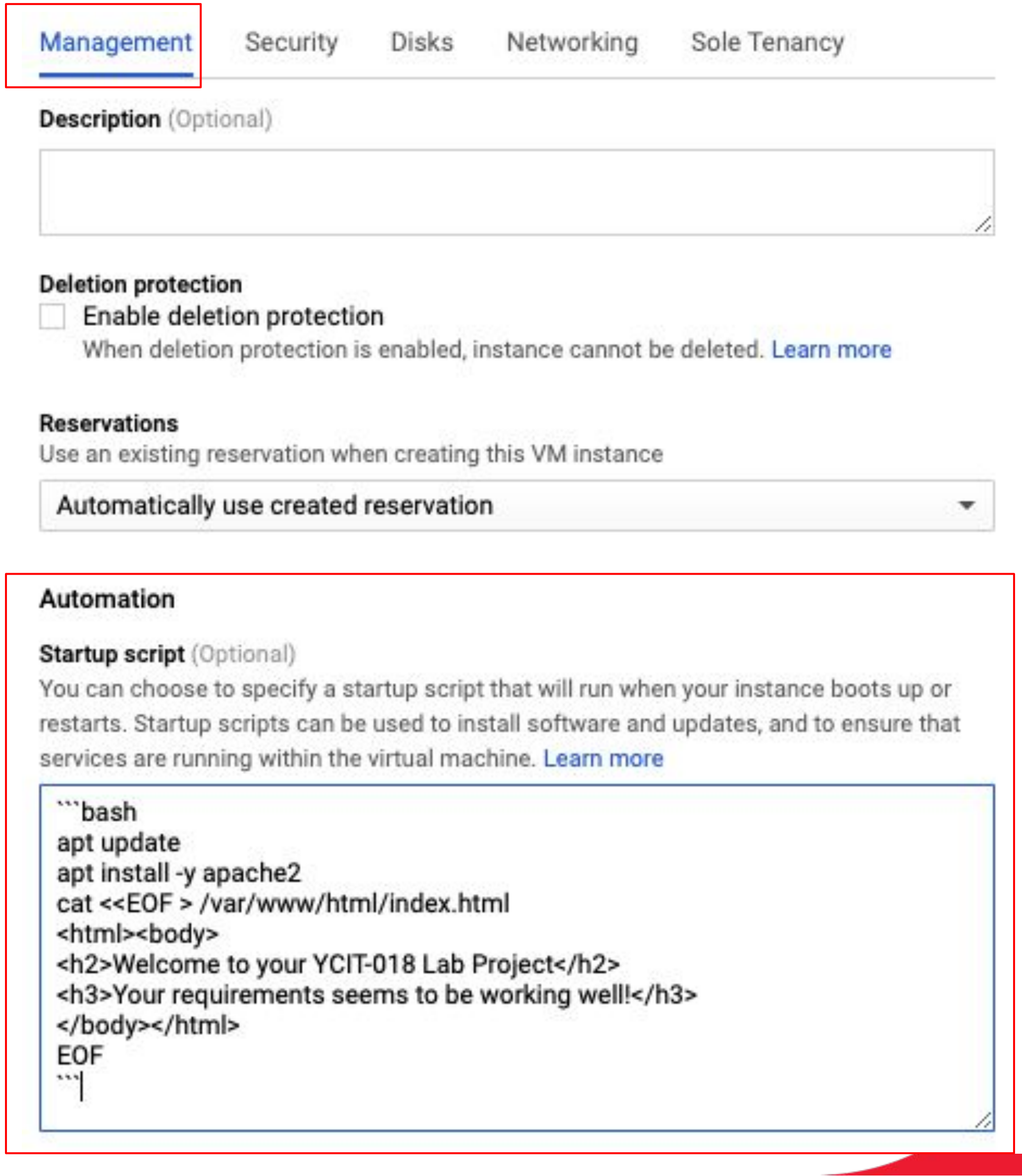
VM instances

Compute Engine lets you use virtual machines that run on Google's infrastructure. Create micro-VMs or larger instances running Debian, Windows, or other standard images. Create your first VM instance, import it using a migration service, or try the quickstart to build a sample app.

2- Expand menu



3- Input script



Description (Optional)

Deletion protection

□ Enable deletion protection

When deletion protection is enabled, instance cannot be deleted. Learn more

Reservations

Use an existing reservation when creating this VM instance

Automatically use created reservation

Automation

Startup script (Optional)

You can choose to specify a startup script that will run when your instance boots up or restarts. Startup scripts can be used to install software and updates, and to ensure that services are running within the virtual machine. Learn more

~~~
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</body></html>
EOF
```
~~~
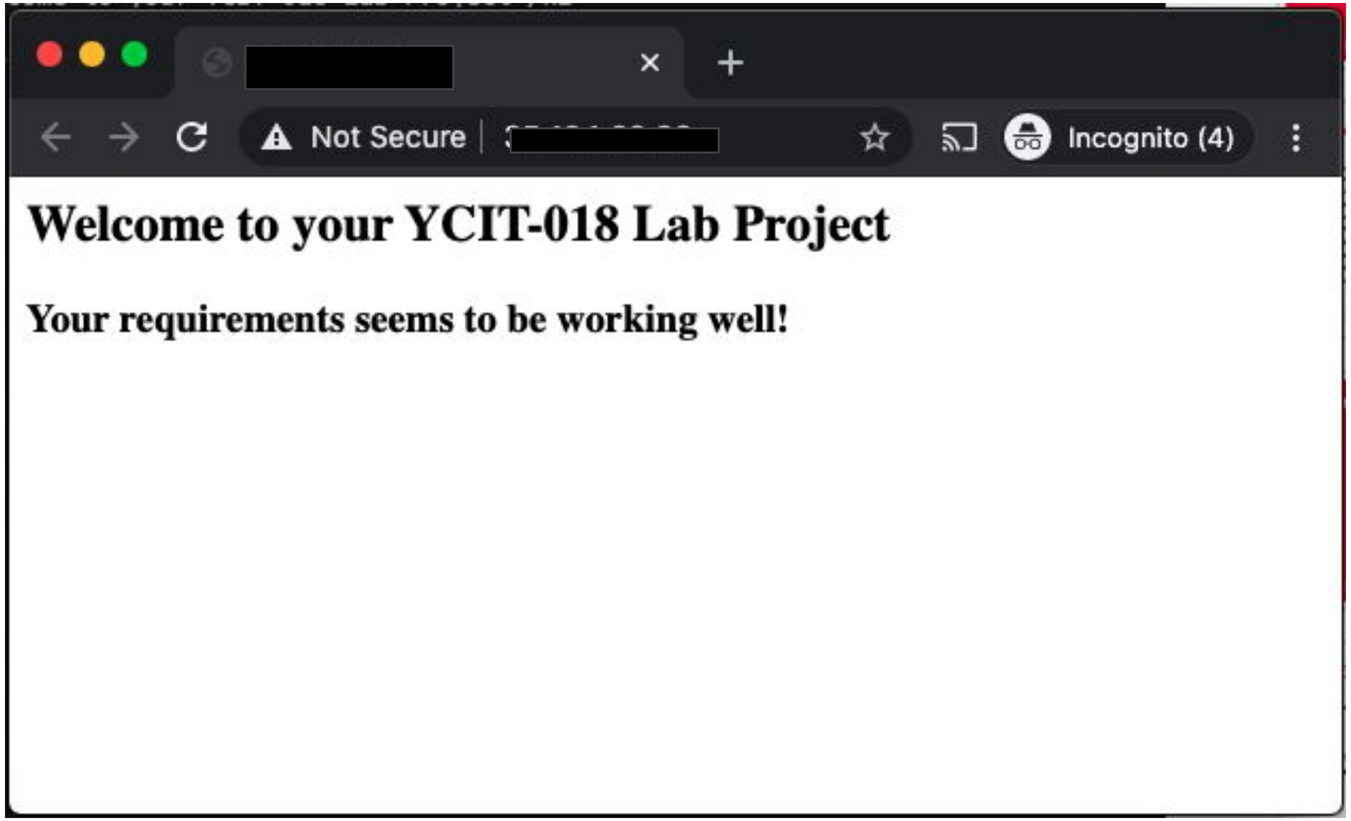

Web server set-up for requirement 4.4 & 4.5

You should see this Web page if your VM & Security is set-up properly



Welcome to your YCIT-018 Lab Project

Your requirements seems to be working well!

IMPORTANT: Suspend your VM when not in use ! Don't tempt the crypto-miners devil !