
aws
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SEC301

Data perimeter workshop

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Agenda

- Data perimeters on AWS
- Hands-on lab

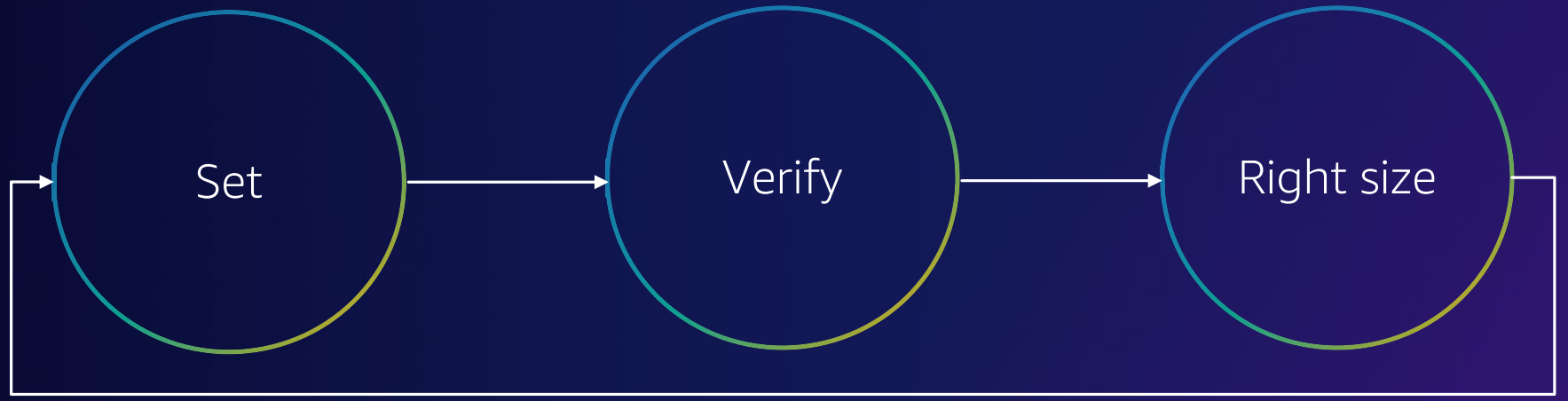
Access management

Data perimeter

Coarse-grained controls

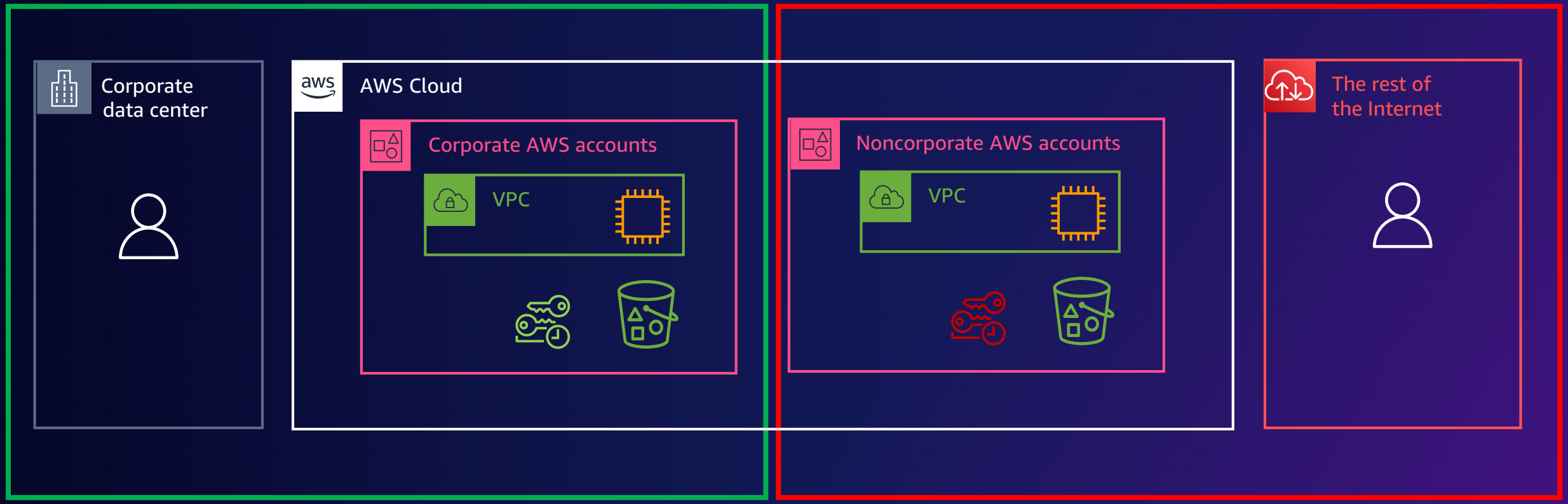
Least privilege

Fine-grained permissions



What is a data perimeter?

A set of preventive guardrails in your AWS environment that help ensure only your **trusted identities** are accessing **trusted resources** from **expected networks**



What is a data perimeter?

Trusted identities

Principals within your AWS accounts or AWS services acting on your behalf

Trusted resources

Resources owned by your AWS accounts or by AWS services acting on your behalf

Expected networks

Your on-premises data centers and virtual private clouds (VPCs) or networks of AWS services acting on your behalf

Data perimeter controls

Perimeter	Intent/control objective
Identity	Only trusted identities can access my resources
	Only trusted identities are allowed from my network
Resource	My identities can access only trusted resources
	Only trusted resources can be accessed from my network
Network	My identities can access resources only from expected networks
	My resources can only be accessed from expected networks

Benefits

Build corporate boundary

Restrict access to sensitive data based on expected access patterns

Provide developer freedom

Allow developers to innovate and move fast

Meet compliance requirements

Implement guardrails to meet compliance requirements at scale

Defense in depth

Central control over security invariants

Establishing a data perimeter

Primary tools for your data perimeter

Service control policies (SCPs)

Your identities can access only trusted resources from expected networks

VPC endpoint policies

Your network can be used only by trusted identities to access only trusted resources

Resource-based policies

Your resources can be accessed only by trusted identities and from expected networks

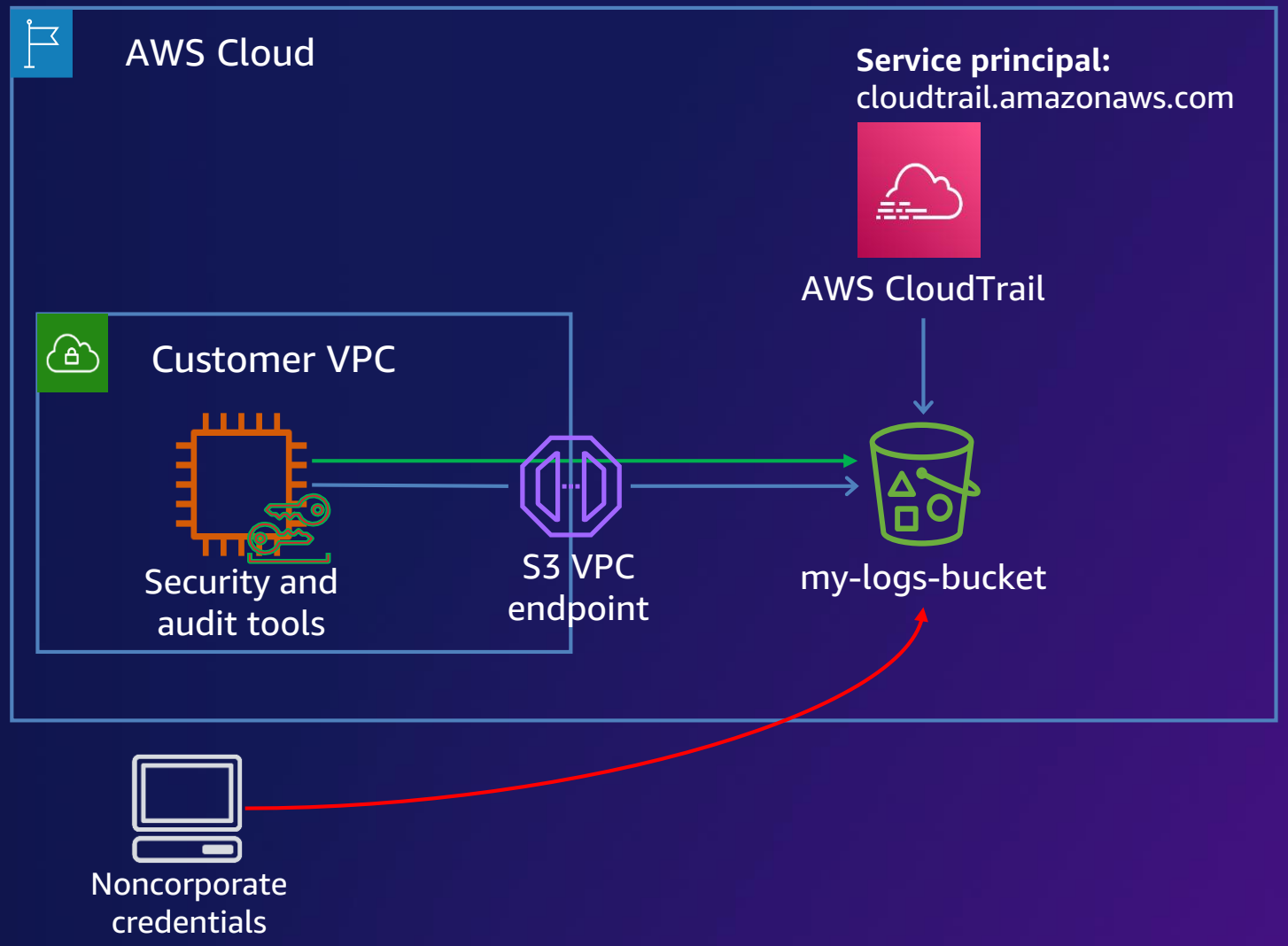
Data perimeter controls

Perimeter	Intent/control objective	Applied on	Using
Identity	Only trusted identities can access my resources	**Resources**	Resource-based policy
	Only trusted identities are allowed from my network	**Network**	VPC endpoint policy
Resource	My identities can access only trusted resources	**Identities**	SCP
	Only trusted resources can be accessed from my network	**Network**	VPC endpoint policy
Network	My identities can access resources only from expected networks	**Identities**	SCP
	My resources can only be accessed from expected networks	**Resources**	Resource-based policy

Identity perimeter on resources

ONLY TRUSTED IDENTITIES CAN ACCESS MY RESOURCES

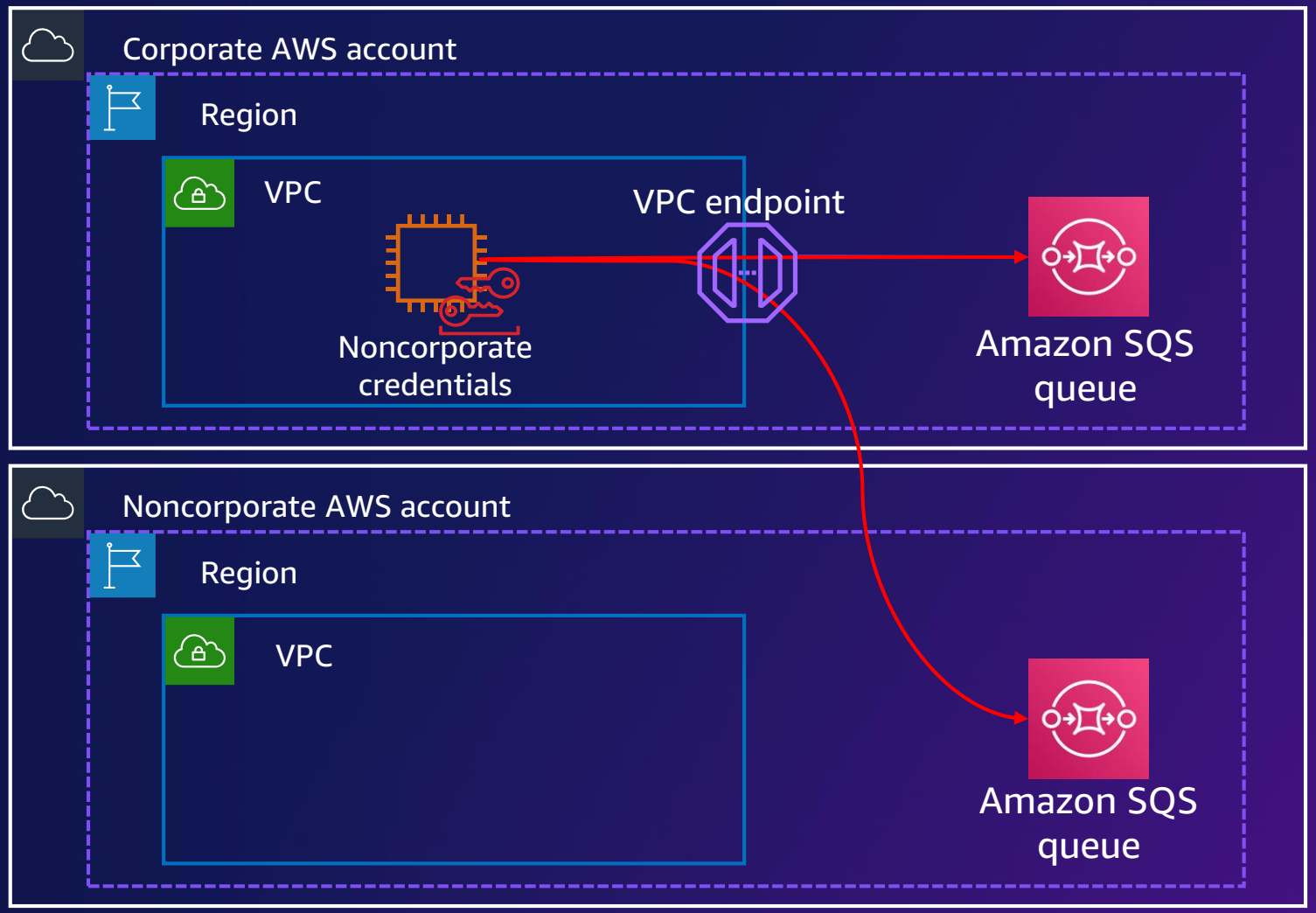
```
.....
{
  "Effect": "Deny",
  "Principal": "*",
  "Action": [
    "s3:ListBucket",
    "s3:PutObject*",
    "s3:GetObject*"
  ],
  "Resource": [
    "arn:aws:s3:::<my-data-bucket>",
    "arn:aws:s3:::<my-data-bucket>/*"
  ],
  "Condition": {
    "StringNotEqualsIfExists": {
      "aws:PrincipalOrgID": "<o-xxxxxxxx>"
    },
    "BoolIfExists": {
      "aws:PrincipalIsAWSService": "false"
    }
  }
}
.....
```



Identity perimeter on network

ONLY TRUSTED IDENTITIES ARE ALLOWED FROM MY NETWORK

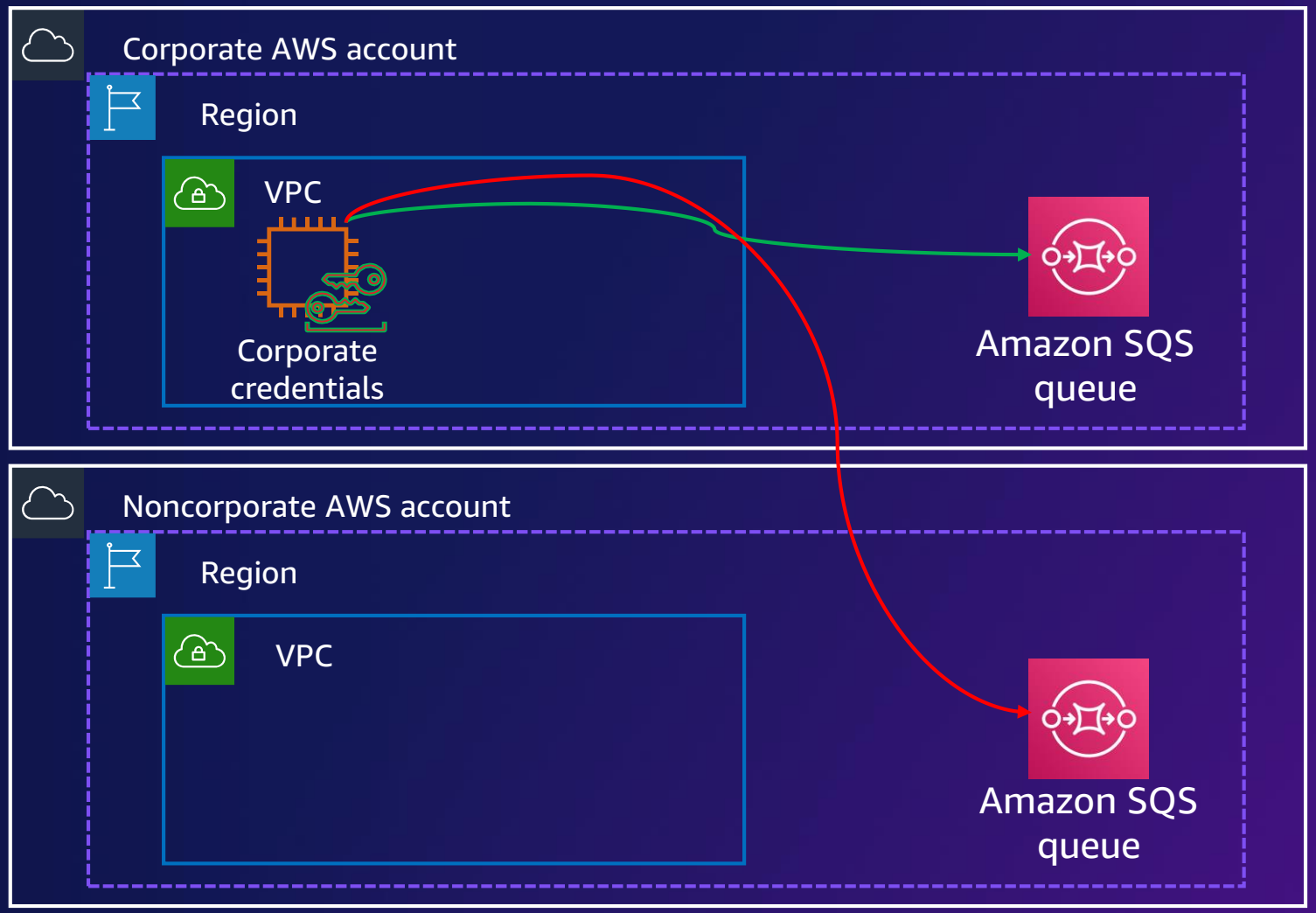
```
{
  "Statement": [
    {
      "Action": "*",
      "Effect": "Allow",
      "Resource": "*",
      "Principal": {
        "AWS": "*"
      },
      "Condition": {
        "StringEquals": {
          "aws:PrincipalOrgID":
"o-xxxxxxxx"
        }
      }
    }
  ]
}
```



Resource perimeter on identity

MY IDENTITIES CAN ACCESS ONLY TRUSTED RESOURCES

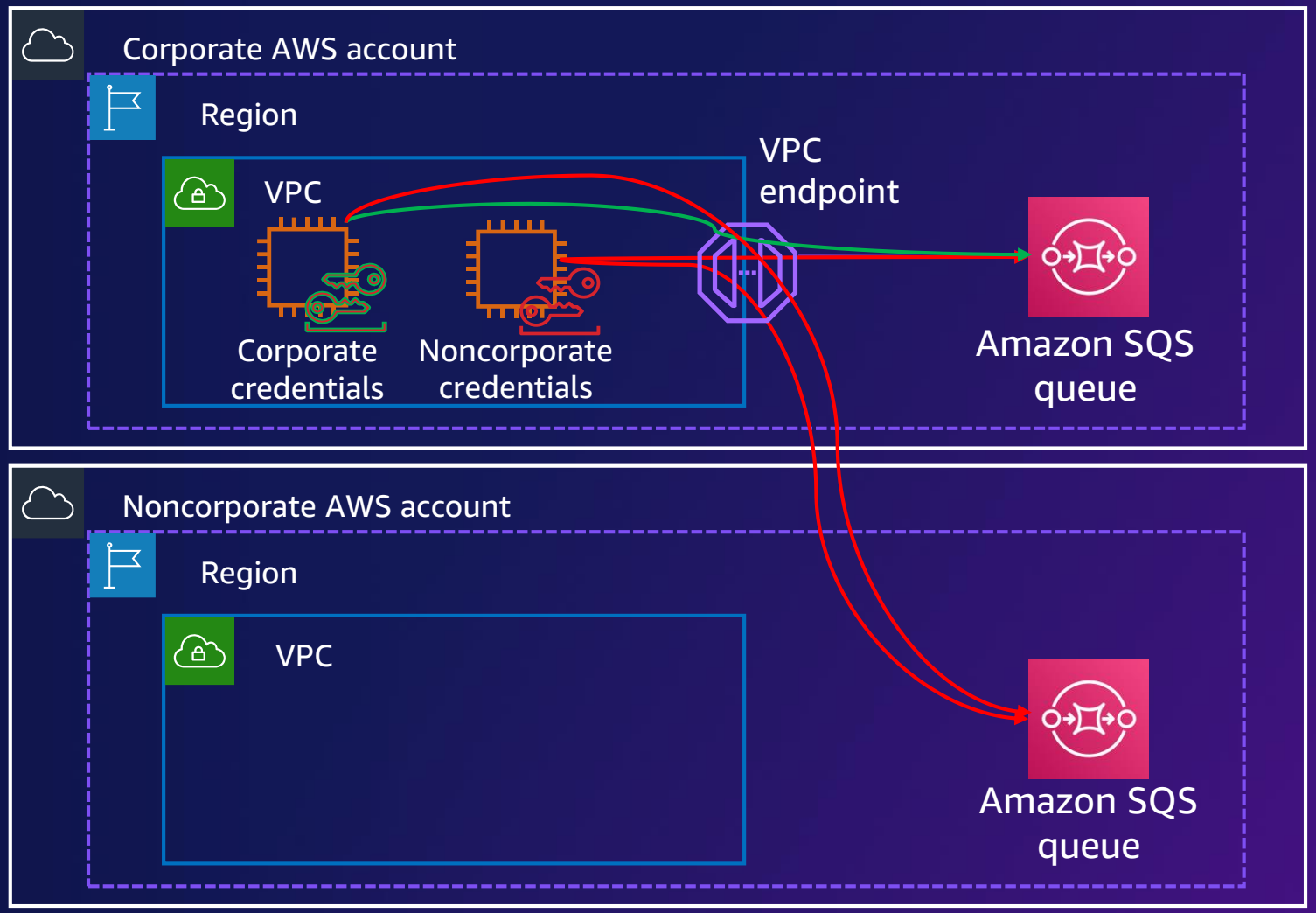
```
.....
{
  "Effect": "Deny",
  "Action": [
    "sqs:SendMessage"
  ],
  "Resource": "*",
  "Condition": {
    "StringNotEqualsIfExists ": {
      "aws:ResourceOrgID ": "o-
xxxxxxxxxx"
    }
  }
}
.....
```



Resource perimeter on network

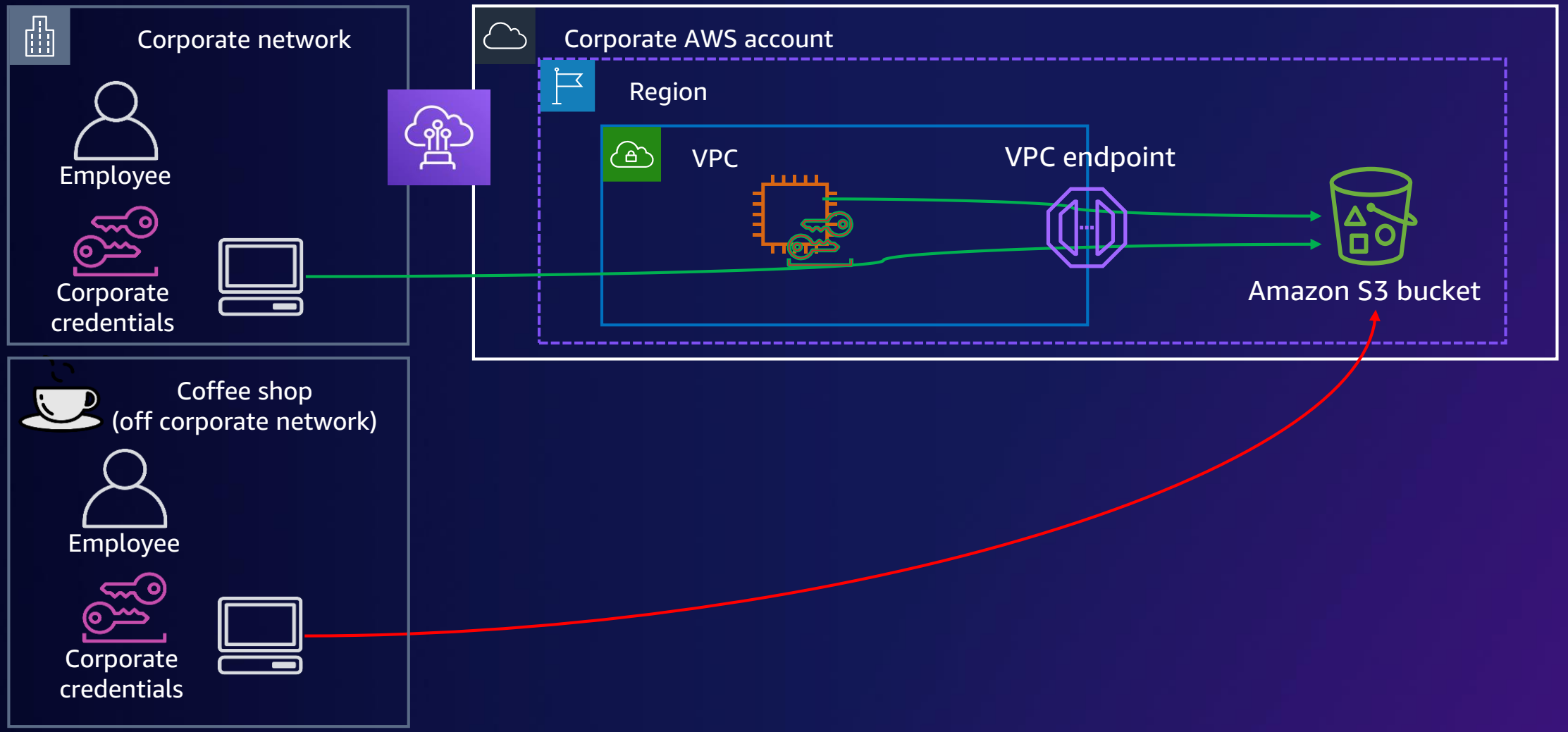
ONLY TRUSTED RESOURCES CAN BE ACCESSED FROM MY NETWORK

```
{
  "Statement": [
    {
      "Action": "*",
      "Effect": "Allow",
      "Resource": "*",
      "Principal": {
        "AWS": "*"
      },
      "Condition": {
        "StringEquals": {
          "aws:PrincipalOrgID": "o-xxxxxxxxxx",
          "aws:ResourceOrgID": "o-xxxxxxxxxx"
        }
      }
    }
  ]
}
```



Network perimeter on resource

MY RESOURCES CAN ONLY BE ACCESSED FROM EXPECTED NETWORKS



Network perimeter on resource

MY RESOURCES CAN ONLY BE ACCESSED FROM EXPECTED NETWORKS

```
……
{
  "Effect": "Deny",
  "Principal": "*",
  "Action": "s3:*",
  "Resource": [
    "arn:aws:s3:::my-data-bucket",
    "arn:aws:s3:::my-data-bucket/*"
  ],
  "Condition": {
    "NotIpAddressIfExists": {
      "aws:SourceIp": "<cidr>"
    },
    "StringNotEqualsIfExists": {
      "aws:SourceVpc": "<vpc-xxxxxxxx>"
    },
    "BoolIfExists": {
      "aws:PrincipalIsAWSService": "false",
      "aws:ViaAWSService": "false"
    },
    "ArnNotLikeIfExists": {
      "aws:PrincipalArn": "arn:aws:iam::<AccountNumber>:role/aws-service-role/*"
    }
  }
}
……
```

Data perimeter controls

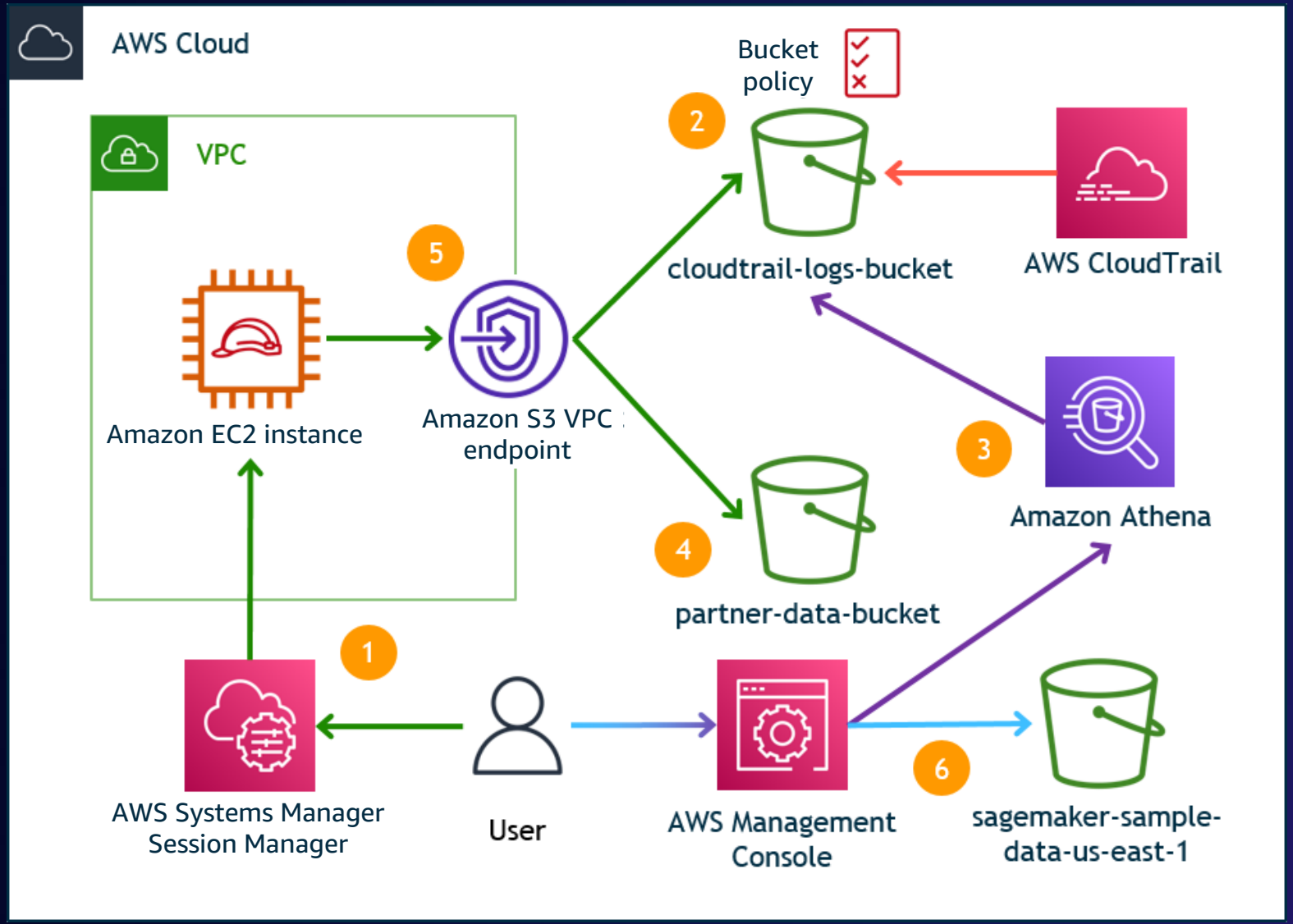
Perimeter	Intent/control objective	Applied on	Using	Primary AWS Identity and Access Management (IAM) feature
Identity	Only trusted identities can access my resources	**Resources**	Resource-based policy	aws:PrincipalOrgID aws:PrincipalIsAWSService
	Only trusted identities are allowed from my network	**Network**	VPC endpoint policy	aws:PrincipalOrgID aws:PrincipalIsAWSService
Resource	My identities can access only trusted resources	**Identities**	SCP	aws:ResourceOrgID
	Only trusted resources can be accessed from my network	**Network**	VPC endpoint policy	aws:ResourceOrgID
Network	My identities can access resources only from expected networks	**Identities**	SCP	aws:SourceIp aws:SourceVpc/SourceVpce aws:ViaAWSService
	My resources can only be accessed from expected networks	**Resources**	Resource-based policy	aws:SourceIp aws:SourceVpc/SourceVpce aws:ViaAWSService aws:PrincipalIsAWSService

Hands-on lab

Lab agenda

- Lab 0: Test environment
- Lab 1: Identity controls for resources
- Lab 2: Network controls for resources
- Lab 3: Identity controls for network
- Lab 4: Resource controls for network
- Lab 5: Resource controls for identities

Workshop setup

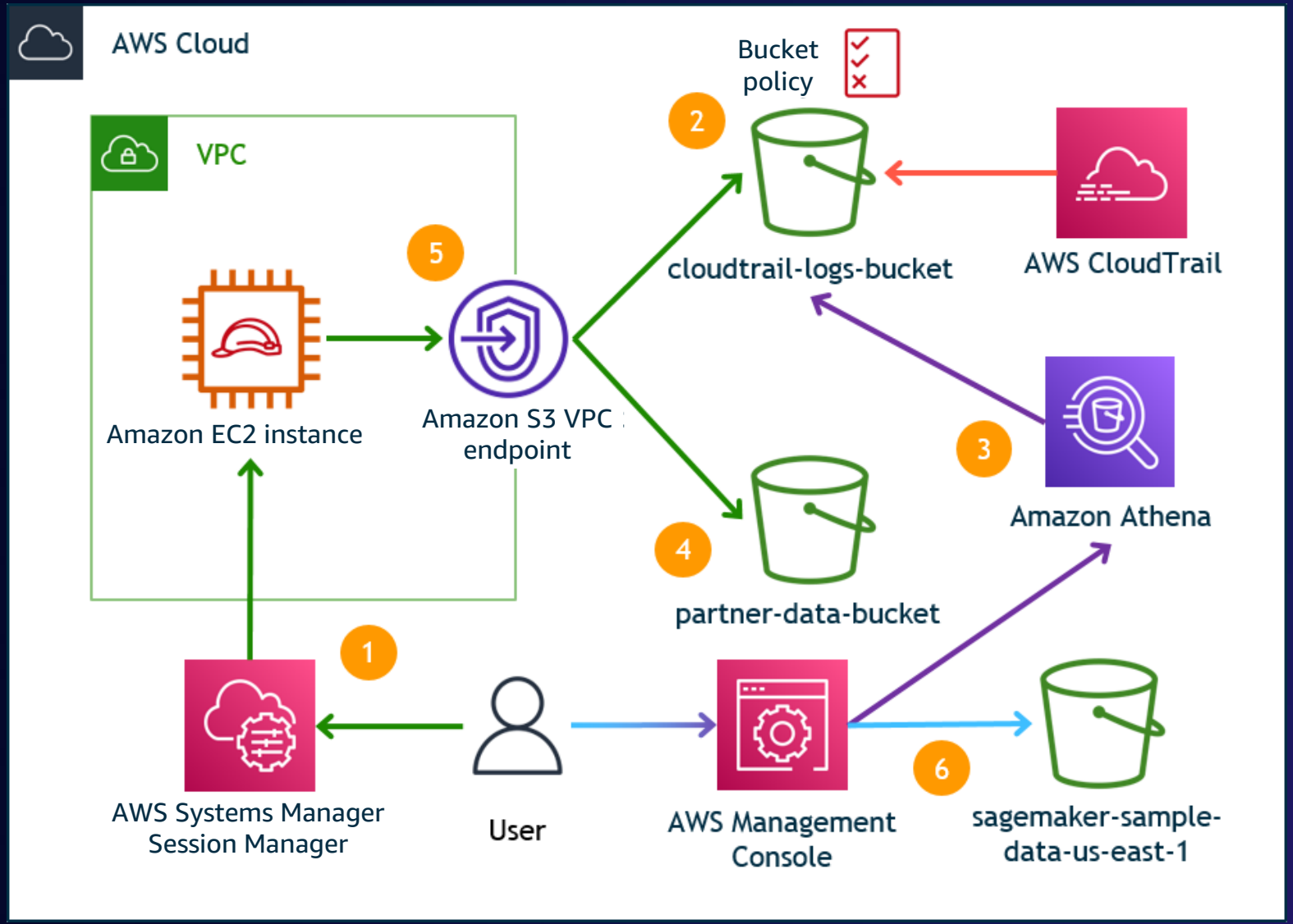


1. You will use AWS Systems Manager Session Manager to access the Amazon EC2 instance in the VPC. The VPC does not have internet connectivity and will connect to all resources through VPC endpoints.

2. In Lab 1, you will access the CloudTrail bucket contents and create a bucket policy that only allows specific principals to access the content; then in Lab 2, you will update that bucket policy to restrict what networks can be used to access the resource.

3. In Lab 2, you will use the AWS Management Console to access Amazon Athena and run a query on the data in the CloudTrail bucket.

Workshop setup



4. In Lab 3, you will access your partner's Amazon S3 data bucket, demonstrating an access pattern you don't want to occur.

5. Continuing in Lab 3, in order to prevent the cross-account access, you will update the Amazon S3 VPC endpoint policy to only allow principals from a specific account to access Amazon S3 resources from the network; then in Lab 4, you will update that policy again to restrict what resources can be accessed from the network.

6. In Lab 5, you will use the AWS Management Console to create an IAM policy that restricts the Amazon S3 resources that can be accessed by your IAM role and test that policy on an AWS-owned public Amazon S3 bucket.

Instructions: https://data-perimeter.workshop.aws/

AWS account login: https://dashboard.eventengine.run

Event hash: 71ce-133f9c7354-1e

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Thank you!