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SEC301

Protecting your ABAC security model through SCP guardrails

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Agenda

Overview of ABAC for AWS

High-level guidance

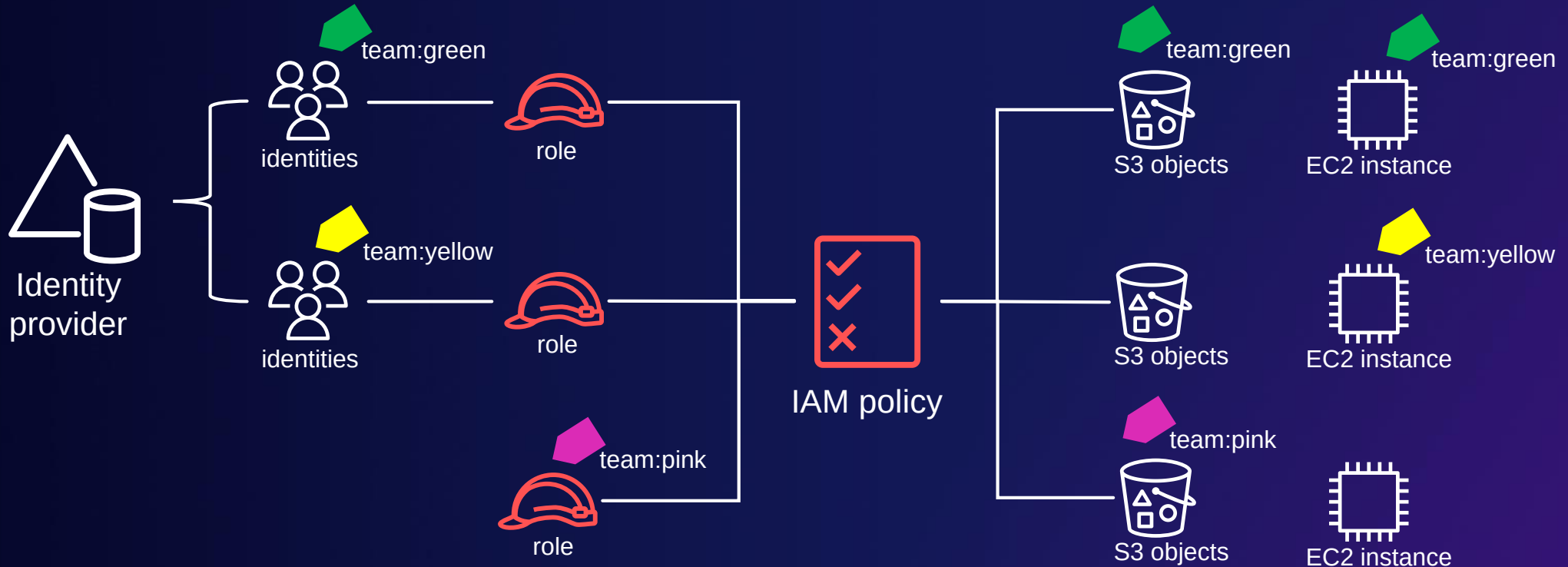
Enforcement examples and strategy

Questions

Overview of ABAC for AWS

ABAC for AWS

- Attribute-based access control (ABAC)
  - Authorization based on principal attributes and resource attributes
  - Attributes – part of the session
  - Attributes on resources are tags



Do you use ABAC?

Do you currently use it?

Why are you using it?

Do you want to use it?

What reasons should you consider ABAC?

- Single account but require fine-grained controls
  - IAM pathing of roles/resources might be a better fit if the services support it
- Associate access with employee attributes
- Fine-grained control within a specific service or set of resources

High-level guidance for ABAC

High-level guidance

- ABAC complements RBAC rather than replaces it
- ABAC relies on mutable tags – key to success is tag governance
- Consider ABAC when a multi-account strategy along with RBAC does not meet your requirements
- Adopt ABAC on a resource-by-resource basis
- Consider human versus application scenarios – applications deployed using pipelines can have built-in guardrails

Implementing ABAC: How do we secure it?

What is a tag?

Tags are multipurpose attributes
applied to principals and resources

What ABAC looks like

A quick ABAC refresher

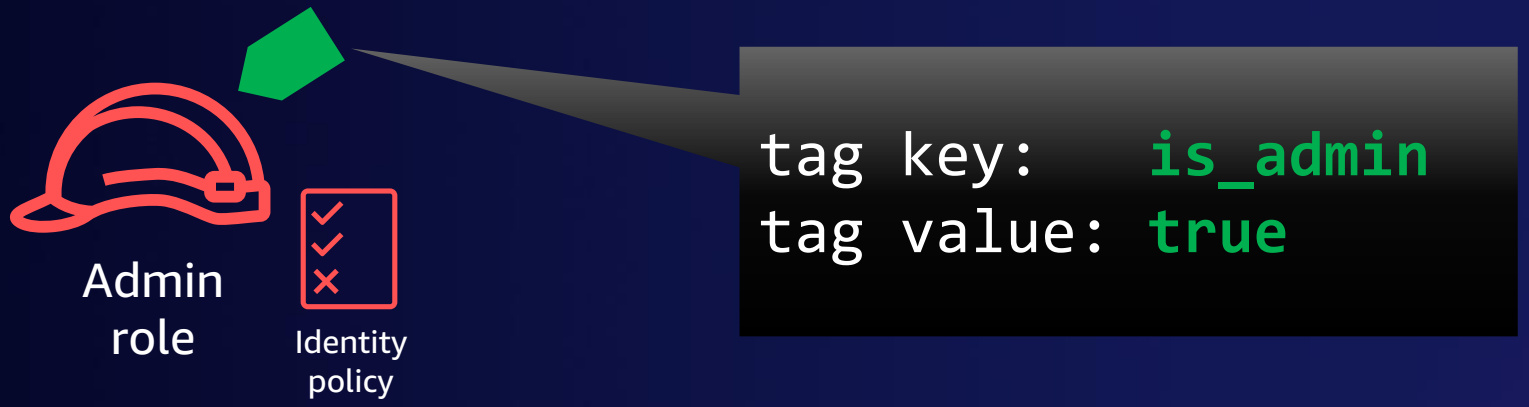
A role's permissions policy, granting the **DeleteSecret** permission

A simple IAM policy statement

```
{
  "Effect":   "Allow",
  "Action":    [ "secretsmanager:DeleteSecret" ],
  "Resource":  [ "arn:aws:secretsmanager:*:*:secret:*" ],
  "Condition": { }
}
```

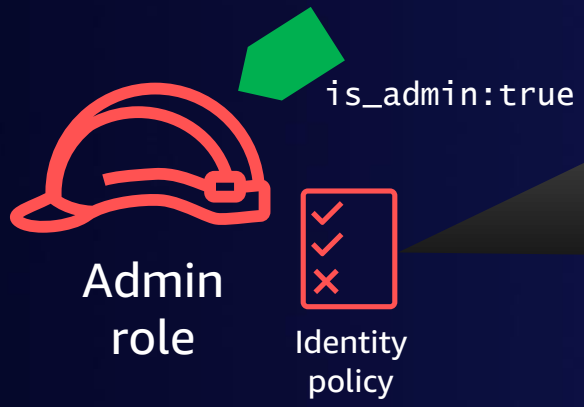
Role with a principal tag

Our role with a tag applied



ABAC using a principal tag

This policy allows us to use our principal's tag for authorization




```
{
  "Sid":       "AllowDeletionForAdmins",
  "Effect":    "Allow",
  "Action":    [ "secretsmanager:DeleteSecret" ],
  "Resource":  [ "arn:aws:secretsmanager:*:*:secret:*" ],
  "Condition": {
    "StringEquals": {
      "aws:PrincipalTag/is_admin": "true"
} } }
```

What ABAC guardrails look like

Where do guardrails come in for tags?

- Tags are mutable

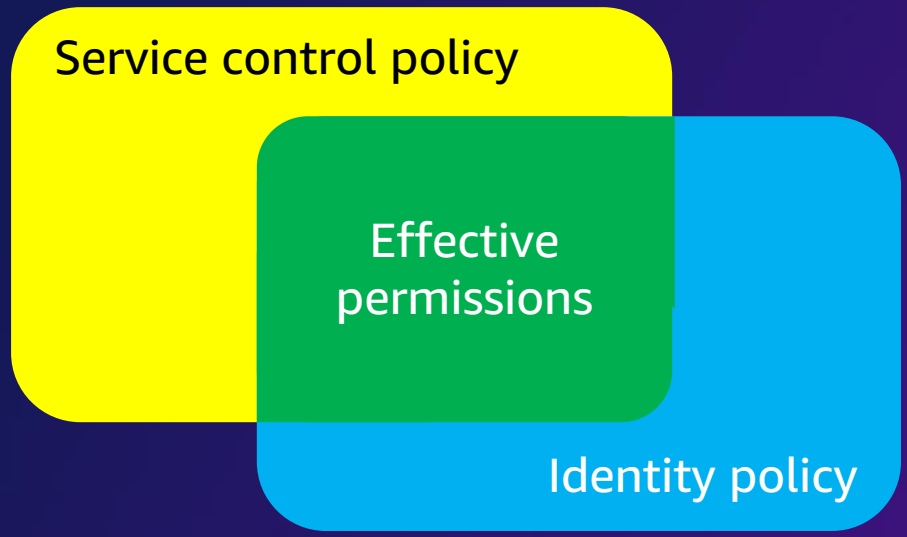
- Tags are used for many things besides authorization

Where do guardrails come in for tags?

- Tags are mutable → Tags used for ABAC need to be protected
- Tags are used for things besides authorization → Tags not used for ABAC need to be modifiable

What's a service control policy (SCP)?

- Manages permissions across your organization
- Specifies maximum available permissions
- Controls maximum available permissions, centrally
- Does not grant permissions



Using SCPs: Protect our ABAC principal tags!

```
{
  "Sid":    "DenyModifyingAdminTag",
  "Effect": "Deny",
  "Action": [
    "iam:TagRole",
    "iam:TagUser",
    "iam:UntagRole",
    "iam:UntagUser"
  ],
  "Resource": "*",
  "Condition": {
    "StringNotEqualsIfExists": {
      "aws:PrincipalTag/is_admin": "true"
    },
    "Null": {
      "aws:RequestTag/is_admin": "false"
    },
    "StringNotLike": {
      "aws:PrincipalArn": "arn:aws::iam::*:role/admin/iam/*"
    }
} }
```

SCP

Deny tagging operations if the principal is not tagged as an admin

Deny tagging if the tag to create/update/delete is the **`is_admin`** tag

Only an IAM admin is able to set the `is_admin` tag

Using SCPs: Enforce attribute-based access!

```
{
  "Sid":       "DenyDeletionForNonAdmins",
  "Effect":    "Deny",
  "Action":    [ "secretsmanager:DeleteSecret" ],
  "Resource":  [ "arn:aws:secretsmanager:*:*:secret:*" ],
  "Condition": {
    "StringNotEqualsIfExists": {
      "aws:PrincipalTag/is_admin": "true"
} } }
```

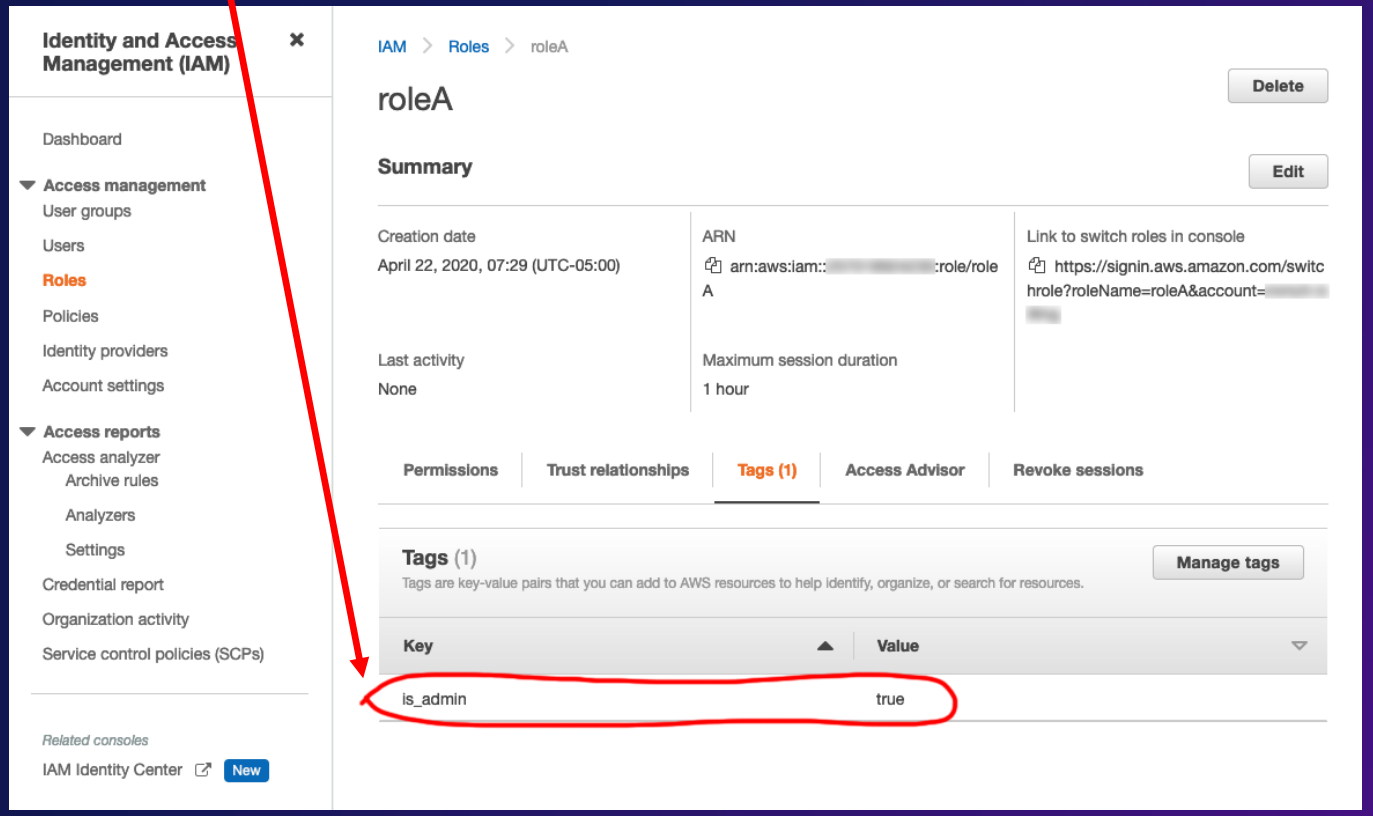
Session tags: First, a role with a standard tag

User

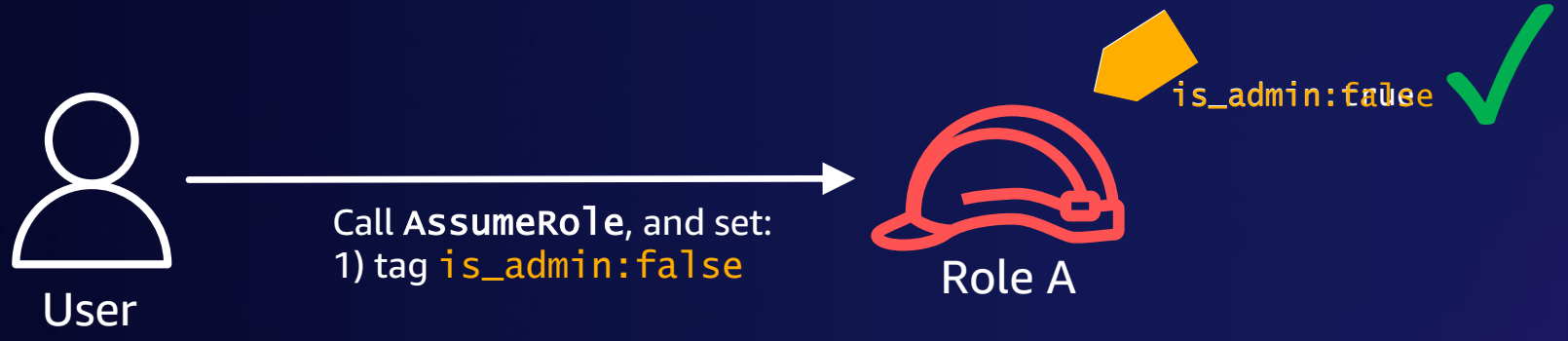
Role A

is_admin:true

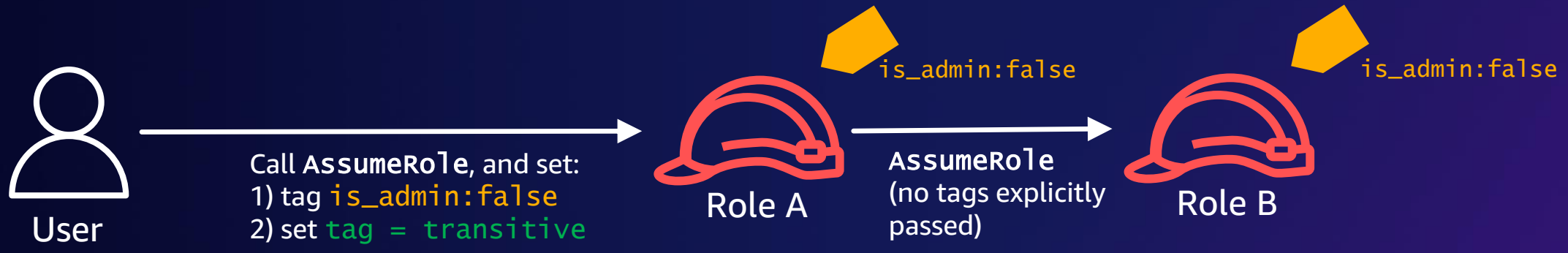
IAM console



Session tags: Overrides existing tags



Transitive tags: Persist across role assumptions



Principal tag guardrails: Summary

Use SCPs to

- Ensure **only authorized users can assign** an ABAC tag
- Ensure **only those authorized can pass** transitive ABAC tags
- **Protect the tags** once assigned
- **Enforce the permissions** that use tags

Use transitive session tags to

- **Pass unmodifiable tags** to roles

Using resource tags with ABAC

Resource tags can be used with principal tags

Role

Secret

ABAC with resource tags

Granting access to resources if the principal has the same tag


```
{
  "Sid":      "AllowGetSecretWithMatchingTags",
  "Effect":   "Allow",
  "Action":   [ "asecretsmanager:GetSecret" ],
  "Resource": [ "arn:aws:secretsmanager:*:*:secret:*" ],
  "Condition": {
    "StringEquals": {
      "aws:PrincipalTag/team": "${aws:ResourceTag/team}"
} } }
```

ABAC guardrails for resource tags

Guardrails to consider implementing

1. **During resource creation**, resources must have an ABAC tag applied (tag-on-create)
2. **During resource creation**, the provided ABAC tag key must be the same case as the principal's

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3. **After resource creation**, the ABAC tag cannot be modified
4. **After resource creation**, the ABAC tag cannot be deleted

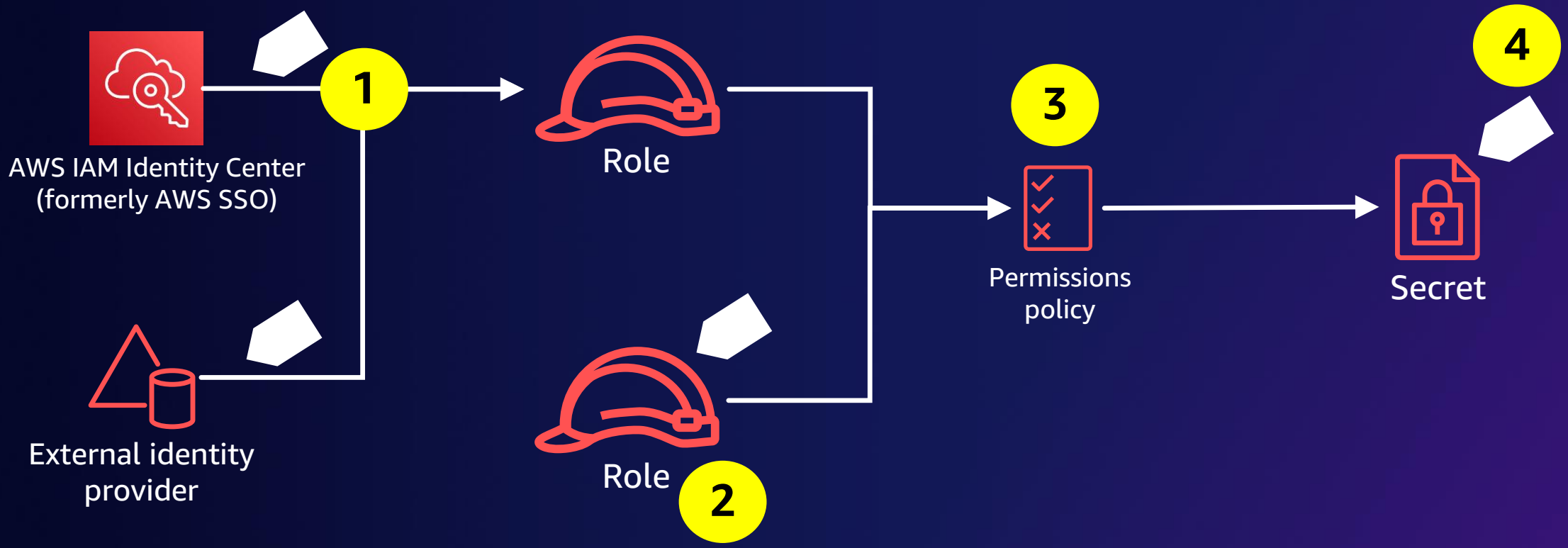
ABAC guardrails for resource tags

Guardrails to consider implementing

1. **During resource creation**, resources must have an ABAC tag applied (tag-on-create)
2. **During resource creation**, the provided ABAC tag key must be the same case as the principal's
3. **After resource creation**, the ABAC tag cannot be modified
4. **After resource creation**, the ABAC tag cannot be deleted
5. A principal **cannot modify any tags** on resources they didn't create
6. A principal **cannot delete any tags** on resources they didn't create
7. A principal **cannot do tagging operations** if its principal tag doesn't exist

ABAC guardrails visual summary

Where you need to secure



ABAC guardrails summary

If you use principal tags or resource tags for ABAC, remember to

1. Ensure directories **are passing ABAC tags securely** to principals (roles)
2. Ensure **only authorized users can assign** an ABAC tag to principals
3. **Enforce the permissions** that use tags
4. **Protect the tags on resources** once assigned

Note: All guardrail policy samples are available in our gist repo:

https://bit.ly/3Ket6r2

Additional guidance

- Be mindful of SCP space – implement only needed guardrails
- Implement ABAC only for resources that need it
- Test your policies
- *AWS services that work with IAM* page lists high-level ABAC support

https://docs.aws.amazon.com/IAM/latest/UserGuide/reference_aws-services-that-work-with-iam.html

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