Speed is key: Leveraging the Cloud for Forensic Artifact Collection & Processing

Lukas Klein (SAP, Germany)

Jason Ballard (SAP, Germany)

Christian Koepp (SAP, Germany)

About us

- SAP Global Security runs four Incident Response Hubs (US East, US West, Europe, Asia)
- Operates 24/7 IR services for internal stakeholders

Lukas Klein
@RantaSec

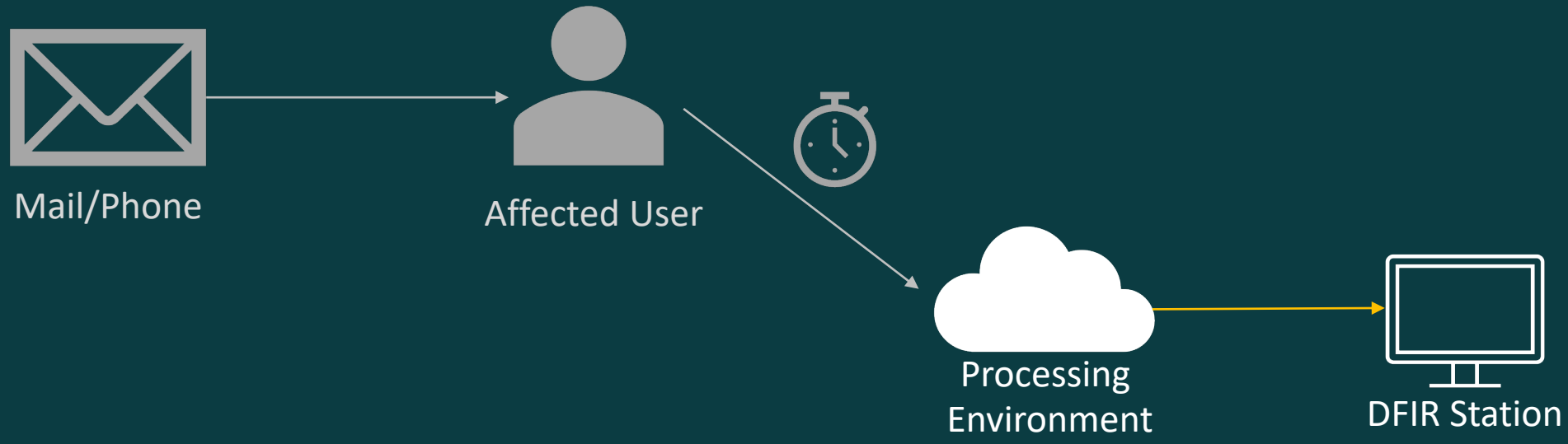
Jason Ballard

Chris Koepp

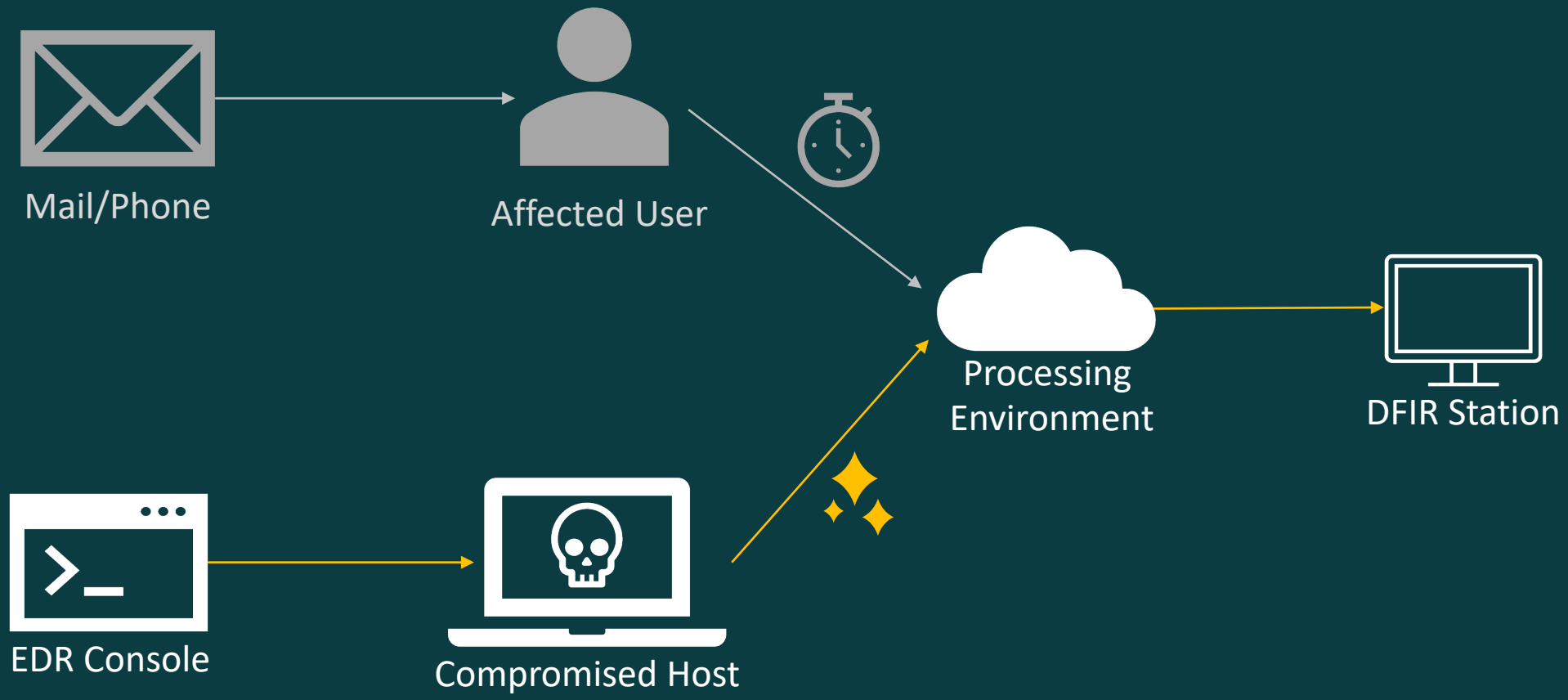
Motivation

- Attackers move quickly (full domain compromise in hours)
- Insights like actionable IoCs as quickly as possible
- Triage artifacts sufficient to answer most questions
- Full forensic image slow and not needed for all cases
- Enterprise forensic tools struggle with complex environments
- Manual processes and (human) decencies delay response

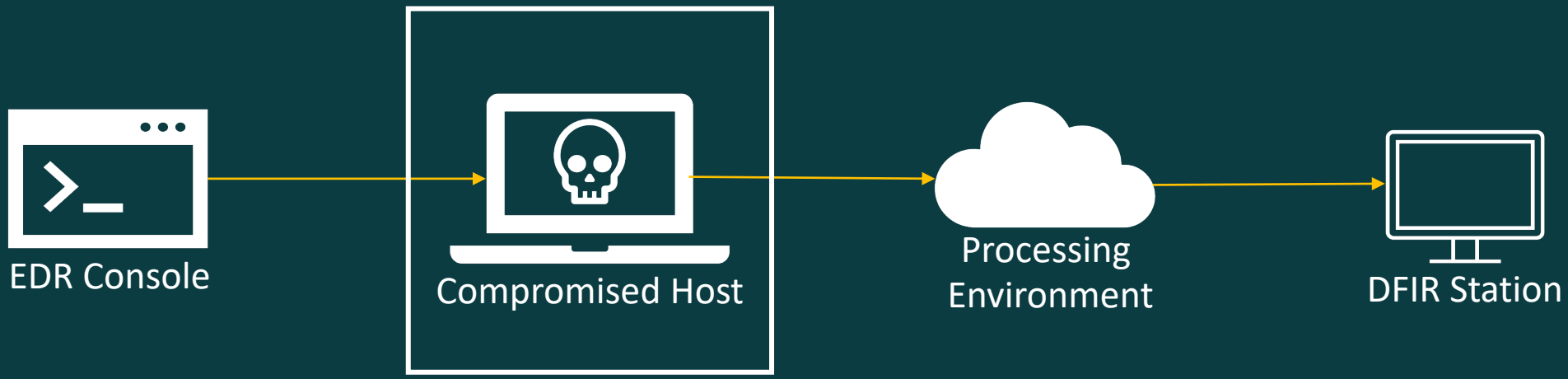
Our Problem


Mail/Phone
Affected User
Processing Environment
DFIR Station

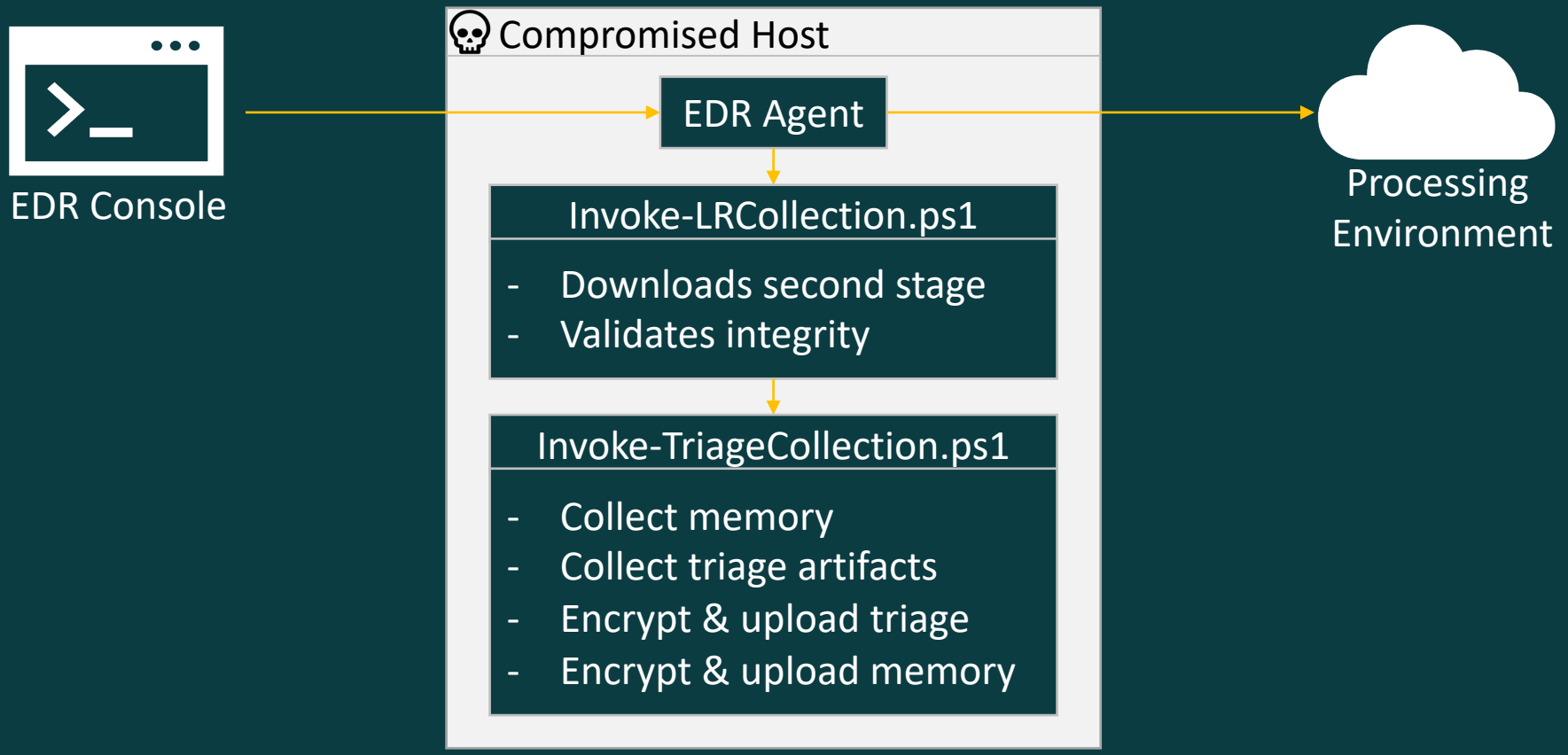
Our Solution



Artifact Collection



Artifact Collection



Artifact Collection: Dependencies

Surge-Collect: Memory Collection

KAPE: Triage Artifact Collection

7zip: Compression & Encryption

AWS PowerShell Tools: Upload

Artifact Collection: KAPE .tkape Config

```
Description: PowerShell Console Log File
Author: Mike Cary
Version: 1.0
Id: efa4332a-89eb-430c-ab61-006a9e6620d7
RecreateDirectories: true
Targets:
    -
        Name: PowerShell Console Log
        Category: PowerShellConsleLog
        Path: C:\Users\%user%\AppData\Roaming\Microsoft\Windows\PowerShell\PSReadline\
        FileMask: ConsoleHost_history.txt

# Documentation
# https://community.sophos.com/malware/b/blog/posts/powershell-command-history-forensics
# https://darizotas.blogspot.com/2018/10/forensics-powershell-artifacts.html
# https://digital-forensics.sans.org/media/DFPS_FOR508_v4.4_1-19.pdf
```

Artifact Collection: Envelope Encryption

Artifact Collection: Envelope Encryption

Compromised Host

Random
Symmetric Key

Artifact Collection: Envelope Encryption

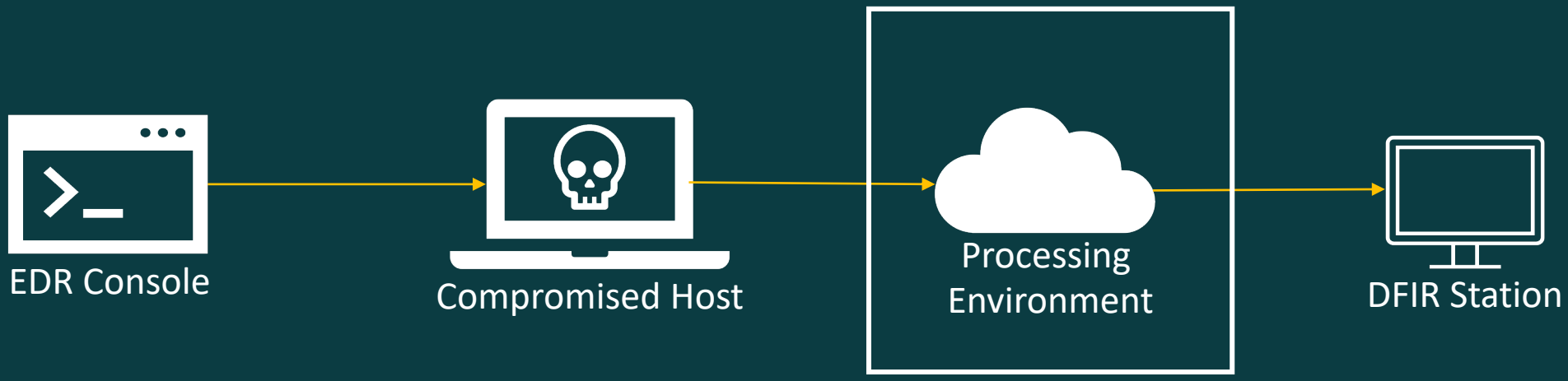
Compromised Host

Random
Symmetric Key

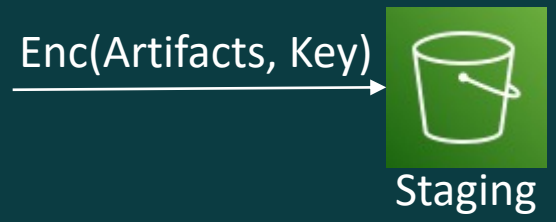
Cloud Processing Environment

Private
Decryption Key

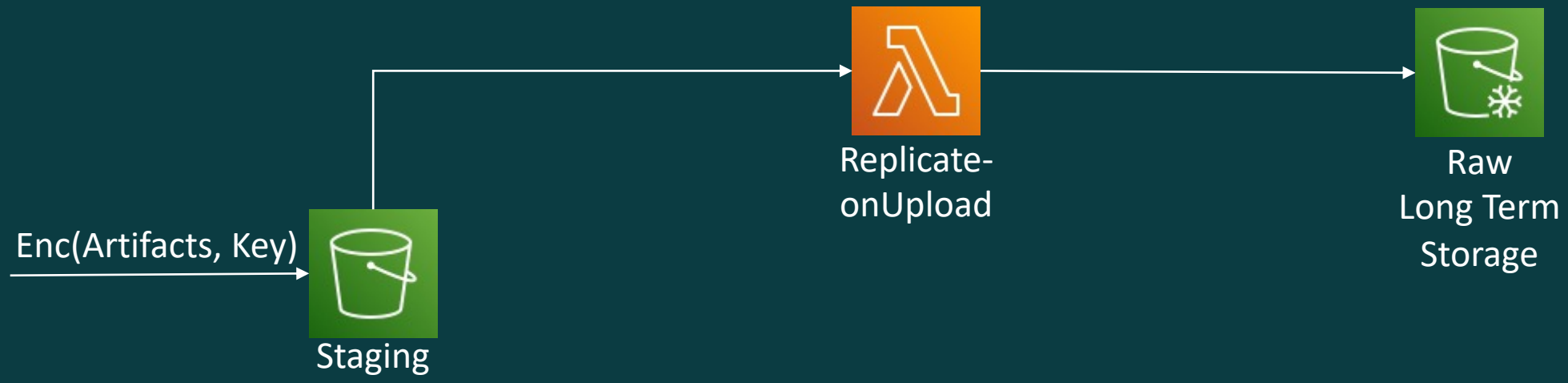
Artifact Processing



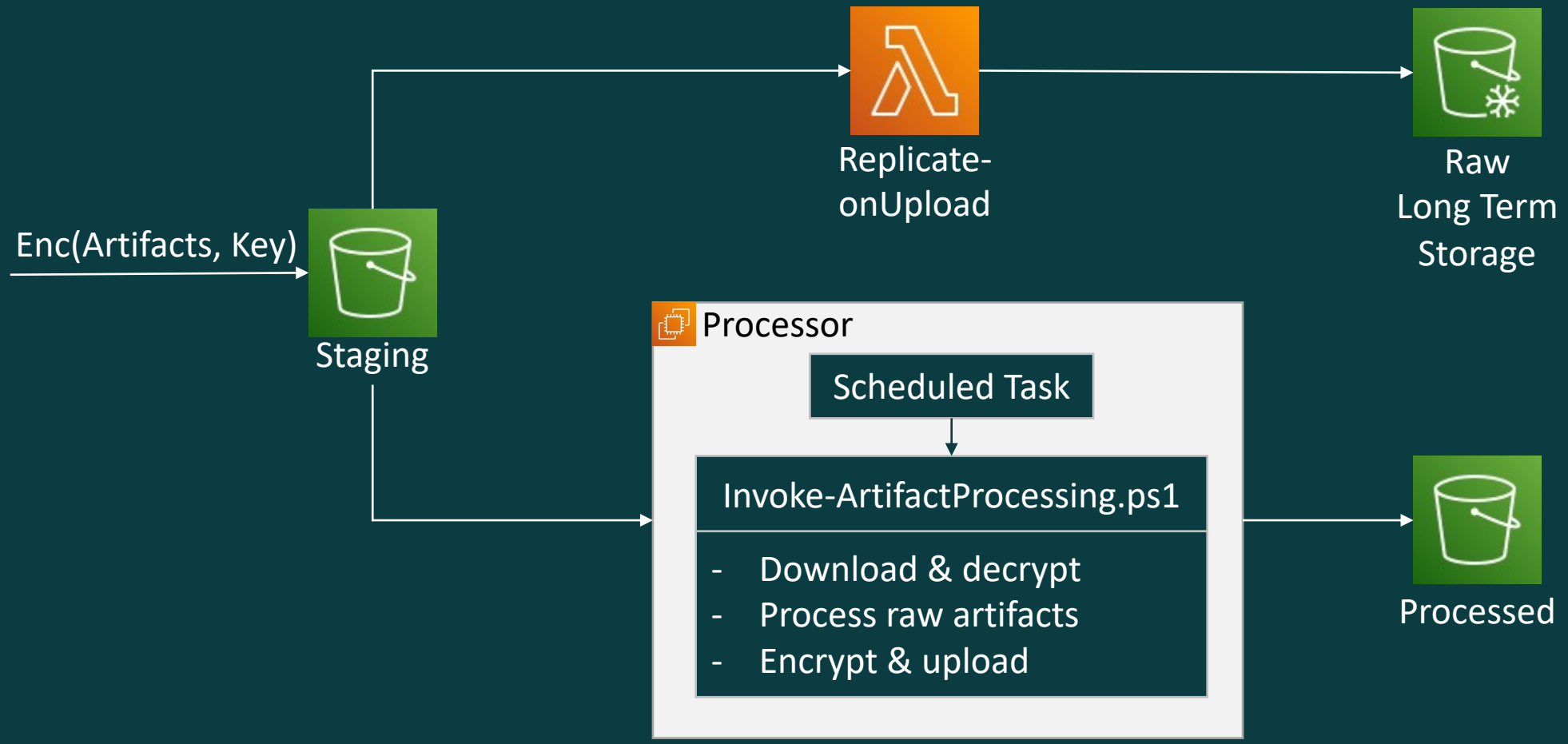
Artifact Processing



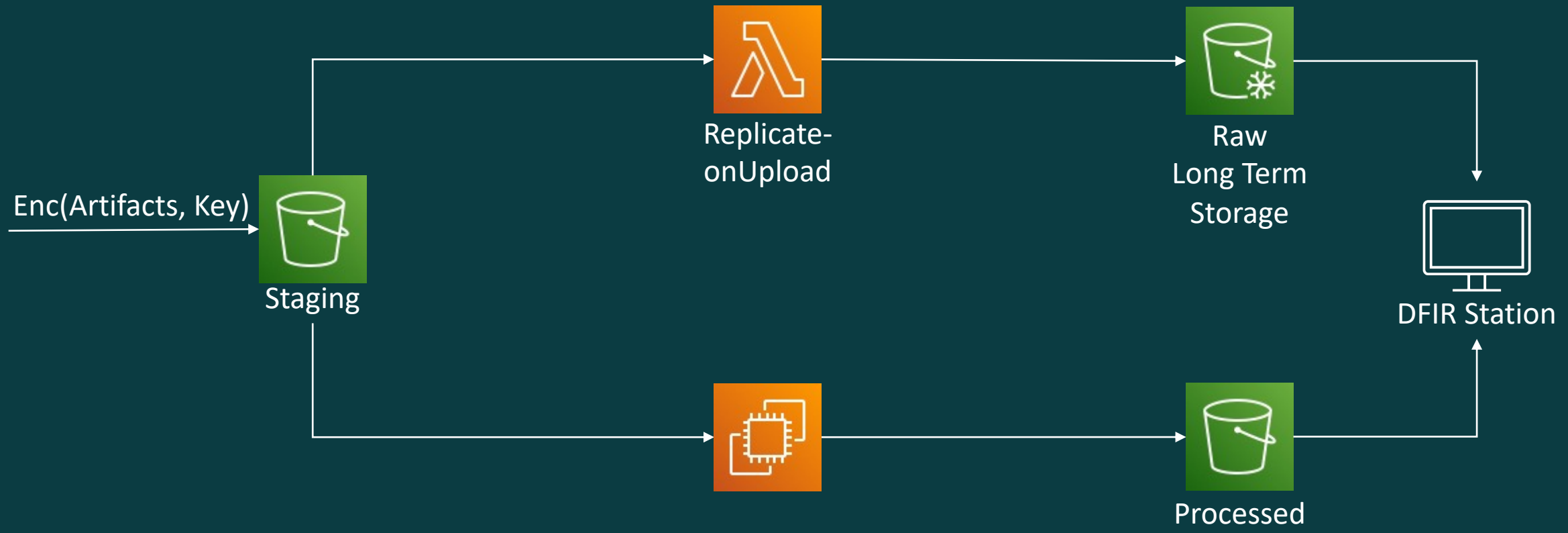
Artifact Processing



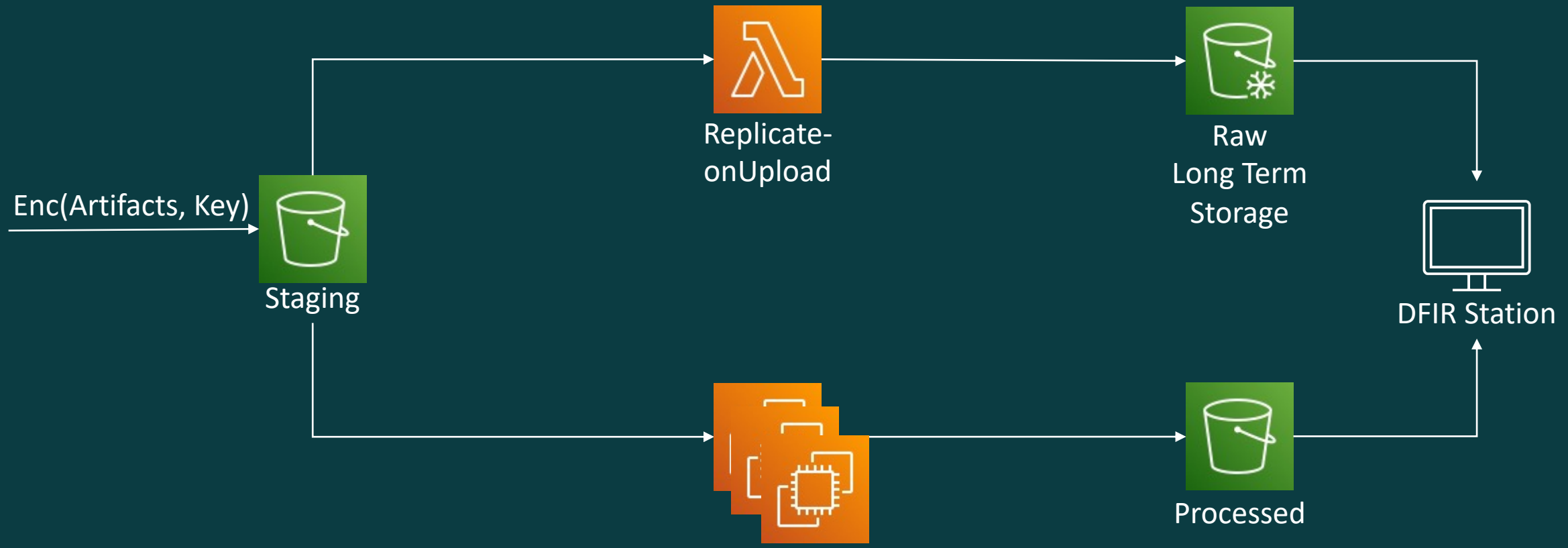
Artifact Processing



Artifact Processing



Artifact Processing: Scaling

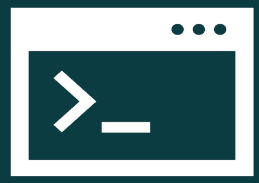


EDR API Trigger

EDR API Trigger: Hands-On

```
{
  "Commands": [
    {
      "type": "RunScript",
      "params": [
        {
          "key": "ScriptName",
          "value": "Invoke-LRCollection.ps1"
        },
        {
          "key": "Args",
          "value": "-casenum INCIDENT001337 -skipmem"
        }
      ]
    }
  ],
  "Comment": ”Triggered by joe.doe@sap.com"
}
```

POST request



EDR Console API

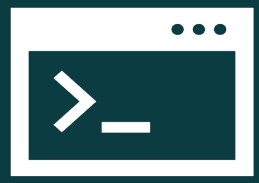
```
https://api.securitycenter.microsoft.com/api/machines/<machine_uuid>/runliveresponse
```

- SOAR-ready
- Audit-ready
- Response Timeout is 10 minutes
  use sub-process to carry on executing long running tasks

EDR API Trigger: Hands-On

```
{
  "Commands": [
    {
      "type": ”GetFile",
      "params": [
        {
          "key": ”Path",
          "value": "C:\\Windows\\System32\\msrpc22.dll”
        }
      ]
    }
  ],
  "Comment": ”Triggered by SOAR bot"
}
```

POST request



EDR Console API

```
https://api.securitycenter.microsoft.com/api/machines/
<machine_uuid>/runliveresponse
```

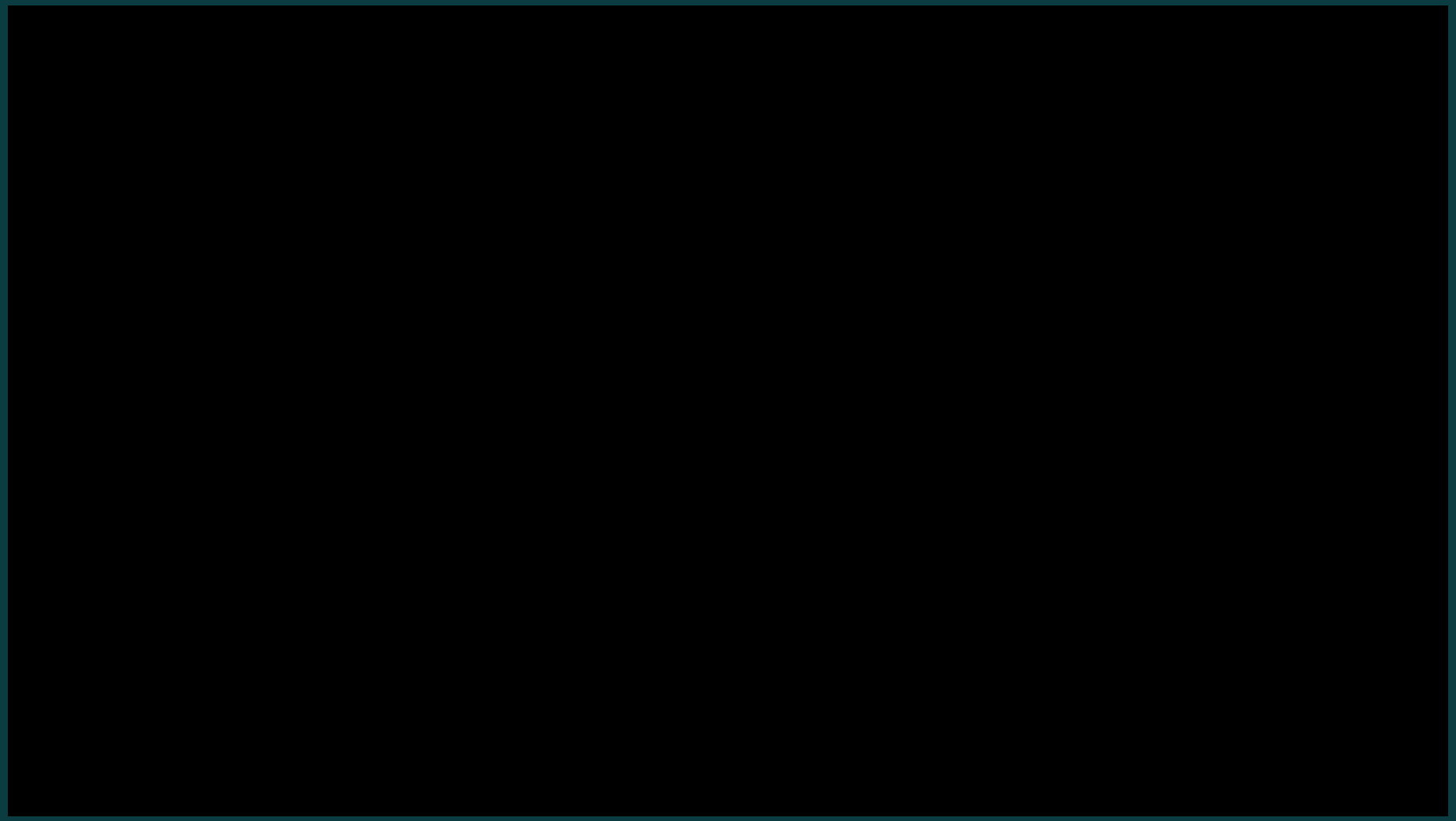
Do it before RunScript

- Dedicated API call
- index=0 in Commands array

Results available at

```
https://api.securitycenter.microsoft.com/api/
machineactions/<machineaction_uuid>/
GetLiveResponseResultDownloadLink(index=0)
```

Demo



Summary

- Reference architecture
- Triggered via API
  - Manual execution as a backup
- DFIR artifacts in minutes
- Repeatable collection
- Free tools fitting each budget
- Automated cloud processing can be added at scale

Future Work

- Open sourcing in progress
- infrastructure as code
- Additional processing capabilities
- Automatic ingestion into time sketch
- LiveResponse Library API:
  Automated creation and upload of highly customized scripts per host