${f Topics}$	Enumeration2-1	.00
	Logon Event2-	
Incident Response Steps1-20-21	Tracking Administrator2-	
1. Preparation1–20	Tracking Creation2-	
2. Identification1–20	Tracking Usage2-	
3. Containment1–21	Tracking Usage (RDP)2-	-89
4. Eradication 1–21	Usage (RDP)2-	
5. Recovery1–21	AceHash2–10, 2–24, 2–	
6. Lessons Learned1–21	ACMRU4-	
	Active Defense1–	
Service Name	Admin Shares2-1	
${\tt DcomLaunch} \hspace{0.1in} \dots \hspace{0.1in} 1-76$	Destination Artifacts2-1	.34
LocalServiceAndNoImpersonation $\dots 1-76$	Source Artifacts	.33
LocalServiceNetworkRestricted $\dots 1-76$	ADMIN\$ W-2.4	<u>l</u> –7
${\tt LocalServiceNoNetwork} \ \dots \dots 1-76$	Advanced NTFS Journal Parser (ANJP)4-1	.92
$\verb netsvcs 1-76$	Alternate Data Stream	.71
NetworkService $\dots 1-76$	Amcache.hve2-	-55
RPCSS $1-76$	Parsing 2-	
	AmcacheParser.exe2-	-58
Windows Process	$AMSI \rightarrow Anti-Malware Scanning Interface \dots$	
csrss.exe1-77	Analysis Scenario2-	-72
explorer.exe	AnalyzeMFT4–157, 4–1	
$\verb lsaiso.exe $	$ANJP \rightarrow Advanced NTFS Journal Parser$	
LSASS.exe1-79	ANONYMOUS LOGON2-	-83
ntoskrnl.exe1-80	Anti-Forensics	.19
${\tt RuntimeBroker.exe} \ \dots \dots 1-80$	Anti-Malware Script Obfuscation2-1	.70
services.exe1-77	Anti-Virus	
${\tt smss.exe} \hspace{0.1in} 1-77$	Bypass1-	-67
$\verb svchost.exe $	Logs2-1	.56
${\tt System} \hspace{0.1cm} \dots \hspace{0.1cm} 176$	$AppCompatCache \rightarrow Application Compatibility$	
taskhostw.exe1-79	Cache	
userinit.exe	${\tt AppCompatCacheParser.exe} \hspace*{0.5cm} \dots \hspace*{0.5cm} 2-$	-54
wininit.exe $1 ext{-}78,1 ext{-}80$	Application Compatibility Cache 4–12, 2–	
winlogon.exe	Application Deployment Software2-1	.48
	APT193-	
wmic	Archives (embedded timestamp)4-	-39
$\verb group \dots 1-109$	Armoring1-	
$\verb netuse \dots 1-109$	Artifacts4	
process $\dots 1-109$	Account Usage4-	
qfe(KBpatch listing)1-109	Browser Usage4-	
$\mathtt{startup} \dots 1 - 109$	Deleted file or File Knowledge4-	
$\verb"useraccount" 1-109"$	File Opening/Creation4-	
	Network 3-1	
	Network Shares2-1	
#	OS Unusual1-	
π	Physical Location4-	
\$STANDARD_INFORMATION 4–38, 4–154, 4–156	PowerShell2-1	
\$FILE_NAME4-154, 4-157	Program Execution 4-	
\$DATA4-168	PsExec	
\$logfile Operation Codes4–186	Remote Desktop Protocol (RDP) 2–130-1	
\$UsnJrnl	Remote Service	
Parsing4–190	Scheduled Tasks2–1	
Reason Code	USB or Drive Usage4-	
	WMI2-1	
A	at.exe	
${f A}$	ATT&CK1-	
Λ	Collection	
Account Built-in accounts 2–83	Command and Control1-	-45
13000 = 10 accounts 7=83		

Credential Access1–45	Malware
Defense Evasion	Command Line Tracking
Discovery	Common Information Model (CIM)1–107
Execution	Compromise Type
Exfiltration	Conficker
Impact1–45	Containment
Initial Access	CozyDuke
Lateral Movement	CreateInstance
Persistence	CreateRemoteThread3–134, 135
Privilege Escalation1–45	creddump 2–10, 2–28
Attack Lifecycle	Local NT Hashes & Cached Hashes 2–24
Asset access and data exfiltration 1–39	Credential
High privileges lateral movement cycle 1–36	Availability
Initial Compromise1–36	Harvesting
Low privileges lateral movement cycle1-36	Credential Attacks mitigation2-8
AutoRun	Credential Guard2-9
AutoRunsc.exe1-79-80	Device Guard
AutoStart (ASEPs)1–69	Domain Protected User
	Group Managed Service Account2-9
- -	KB28719972-8
В	Managed Service Account
	Protected Processes2-9
BadRabbit1–111	Remote Credential Guard2-9
base64 W-1.4-9	Restricted Admin2-9
Beacons	User Acess Control (UAC)
Behavior Detection Anomaly1–81	CredSSP
BelgaSoft3–39	CRITS1-49
Binary Padding1–67	Cyber Threat Intelligence1-35, 1-53
blkls2–42	CyberChef2–171
Bloodhound2–100	
Browser	D
Browser Cache	D
Browser Cache	D DarkComet
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25	D DarkComet 3-92 Data Encryption 4-120
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24	
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20	Data Encryption
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25	Data Encryption 4-120 dc3dd 3-18
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81	Data Encryption 4-120 dc3dd 3-18 Deep Panda 3-85 Defense Manipulation 1-67 densityscout 1-82, 1-84
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193	Data Encryption 4-120 dc3dd 3-18 Deep Panda 3-85 Defense Manipulation 1-67 densityscout 1-82, 1-84 Direct Kernel Object Manipulation (DKOM) 3-168
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43	Data Encryption 4-120 dc3dd 3-18 Deep Panda 3-85 Defense Manipulation 1-67 densityscout 1-82, 1-84 Direct Kernel Object Manipulation (DKOM) 3-168 Directory Table Base (DTB) 3-50
Browser 4-24 Cache 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring exe 3-193 BulkExtractor 3-43 bytehist 1-82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring exe 3-193 BulkExtractor 3-43 bytehist 1-82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring exe 3-193 BulkExtractor 3-43 bytehist 1-82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24 Defense 2-27	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 Cachedump 2-24 Cain 2-28	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 cachedump 2-24 Cain 2-28 Certification Authority 1-62	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 cachedump 2-24 Cain 2-28 Certification Authority 1-62 Chat threads 3-37	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser Cache	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 cachedump 2-24 Cain 2-28 Certification Authority 1-62 Chat threads 3-37 CIM → Common Information Model cmd.exe 1-75	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 cachedump 2-24 Cain 2-28 Certification Authority 1-62 Chat threads 3-37 CIM → Common Information Model 1-75 cmd.exe 1-75 Code Injection 1-74, 3-134	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 cachedump 2-24 Cain 2-28 Certification Authority 1-62 Chat threads 3-37 CIM → Common Information Model 1-75 code Injection 1-74, 3-134 Reflective 3-149	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
Browser 4-24 Cookies 4-24 Flash & Supercookies 4-25 History 4-24 Search Terms 4-20 Session Restore 4-25 Brute-Force Password Attack 2-81 bstring.exe 3-193 BulkExtractor 3-43 bytehist 1-82 C Cached Credentials 2-24 Defense 2-27 MsCach2 2-24 Security\Cache key 2-24 cachedump 2-24 Cain 2-28 Certification Authority 1-62 Chat threads 3-37 CIM → Common Information Model 1-75 cmd.exe 1-75 Code Injection 1-74, 3-134	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

ECTXtract2–183	foremost
$EDR \rightarrow Endpoint Detection and Response \dots$	Forensics (Remote)3-4
Endpoint Detection and Response (EDR)3–29	Format-Wide $\dots 1-88$
Challenge	fr_ace
Importance 3–30	add3–16
Memory 3–32	mount
EPROCESS	query3-16
Eradication Without Identification	Frequent Compilation1-67
Event Log Explorer	FU Rootkit3–170
Event Viewer	fxsst.dll1-75
EventLog	~
Application	${f G}$
Clearing2–123	1.00
Clearing (Selective)2–126	Get-Alias
Deletion 4–121	Get-ChildItem
EventID2–191	Get-LsaSecret.ps1
Extraction2–183	Get-Process
Forwarding	Get-Service
PowerShell2–185	Get-SvcFail.ps1
Security2-68	Get-WinEvent
Security Event2-69	Get-WmiObject
Service2–67	GlassRAT
Summary2–182	Golden Ticket
Tampering4-121	gpedit.msc
Types2-66	grep 3-194 Group Enumeration 2-100
eventlogedit2–126	GRR
eventvwr.exe	gsecdump
EVT	gsecdump2-10, 2-13, 2-20
evtwalk2–183	TT
EVTX2-64	\mathbf{H}
evtx_view2–183	
	Handle 3–111
evtx_view2–183	Handle
evtx_view	Handle
evtx_view2–183	Handle 3-111 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-43
evtx_view	Handle
evtx_view	Handle 3-111 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-43
evtx_view 2–183 Executive Process Block 3–50 F F-Response 3–7 Acquire Memory 3–18	Handle 3-11 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-45 Windows 10 3-47 Hibernation Recon 3-45 hibr2bin 3-45
evtx_view	Handle 3-11 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-45 Windows 10 3-47 Hibernation Recon 3-45 hibr2bin 3-45 Hiding in Plain Sight 1-50
evtx_view 2–183 Executive Process Block 3–50 F F-Response Acquire Memory 3–18 Agent Service 3–15	Handle 3-11 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-45 Windows 10 3-47 Hibernation Recon 3-45 hibr2bin 3-45
Every live 2–183 Executive Process Block 3–50 F 3–50 F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8	Handle 3-111 Hashes 2-16 Defense 2-17 Hibernation Files 3-39, 3-43 Windows 10 3-47 Hibernation Recon 3-43 hibr2bin 3-43 Hiding in Plain Sight 1-59 Historical Data 4-124
evtx_view 2–183 Executive Process Block 3–50 F F-Response Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17	Handle 3-111 Hashes 2-16 Defense 2-17 Hibernation Files 3-39, 3-45 Windows 10 3-47 Hibernation Recon 3-45 hibr2bin 3-45 Hiding in Plain Sight 1-50 Historical Data 4-124 Hunting 1-29, 1-31-34 Automated to Manual 1-50
Every live 2–183 Executive Process Block 3–50 F T F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14	Handle 3-111 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-43 Windows 10 3-47 Hibernation Recon 3-43 hibr2bin 3-43 Hiding in Plain Sight 1-59 Historical Data 4-124 Hunting 1-29, 1-31-34
Every live 2–183 Executive Process Block 3–50 F T F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12	Handle 3-111 Hashes 2-16 Defense 2-17 Hibernation Files 3-39, 3-43 Windows 10 3-47 Hibernation Recon 3-43 hibr2bin 3-43 Hiding in Plain Sight 1-59 Historical Data 4-124 Hunting 1-29, 1-31-34 Automated to Manual 1-56 Steps (Roadmap) 1-56
Every view 2–183 Executive Process Block 3–50 F F F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39	Handle 3-111 Hashes 2-16 Defense 2-17 Hibernation Files 3-39, 3-45 Windows 10 3-47 Hibernation Recon 3-45 hibr2bin 3-45 Hiding in Plain Sight 1-50 Historical Data 4-124 Hunting 1-29, 1-31-34 Automated to Manual 1-50
Executive Process Block 2–183 Executive Process Block 3–50 F F-Response Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80	Handle 3-111 Hashes 2-16 Defense 2-17 Hibernation Files 3-39, 3-43 Windows 10 3-47 Hibernation Recon 3-43 hibr2bin 3-43 Hiding in Plain Sight 1-59 Historical Data 4-124 Hunting 1-29, 1-31-34 Automated to Manual 1-56 Steps (Roadmap) 1-56
Every live 2–183 Executive Process Block 3–50 F F F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10	Handle 3-111 Hashes 2-10 Defense 2-17 Hibernation Files 3-39, 3-43 Windows 10 3-47 Hibernation Recon 3-43 hibr2bin 3-43 Hiding in Plain Sight 1-59 Historical Data 4-124 Hunting 1-29, 1-31-34 Automated to Manual 1-56 Steps (Roadmap) 1-54
Every live 2–183 Executive Process Block 3–50 F F F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File	Handle
Executive Process Block 2–183 Executive Process Block 3–50 F F-Response Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete	Handle
Executive Process Block 2–183 Executive Process Block 3–50 F F-Response Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete Download 4–11	Handle
Every live 2–183 Executive Process Block 3–50 F T F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete 4–119 Download 4–11 Handle 3–111	Handle
Executive Process Block 2–183 Executive Process Block 3–50 F F F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete Download 4–11 Handle 3–111 Wiping 4–119	Handle
Executive Process Block 2–183 Executive Process Block 3–50 F F F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete 4–119 Download 4–11 Handle 3–111 Wiping 4–119 File System	Handle
Executive Process Block 2–183 Executive Process Block 3–50 F FResponse Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete 4–119 Download 4–11 Handle 3–111 Wiping 4–119 File System Journaling	Handle
Ferrogram 2-183 Executive Process Block 3-50 F 3-7 Acquire Memory 3-18 Agent Service 3-15 Attach Remote Drive 3-17 Enterprise 3-8 GPO 3-14 MSI 3-12 SIFT 3-39 Fast forensics 4-80 fgdump 2-10 File Delete 4-119 Download 4-11 4-11 Handle 3-111 Wiping 4-119 File System Journaling 4-182-185 Filename Hijacking 1-67 Filename 4-176	Handle
Executive Process Block 2–183 Executive Process Block 3–50 F F F-Response 3–7 Acquire Memory 3–18 Agent Service 3–15 Attach Remote Drive 3–17 Enterprise 3–8 GPO 3–14 MSI 3–12 SIFT 3–39 Fast forensics 4–80 fgdump 2–10 File Delete 4–119 Download 4–11 Handle 3–111 Wiping 4–119 File System Journaling Journaling 4–182-185 Filename Hijacking Hijacking 1–67	Handle
Ferrogram 2-183 Executive Process Block 3-50 F 3-7 Acquire Memory 3-18 Agent Service 3-15 Attach Remote Drive 3-17 Enterprise 3-8 GPO 3-14 MSI 3-12 SIFT 3-39 Fast forensics 4-80 fgdump 2-10 File Delete 4-119 Download 4-11 4-11 Handle 3-111 Wiping 4-119 File System Journaling 4-182-185 Filename Hijacking 1-67 Filename 4-176	Handle

Computed	${f L}$
InInitializationOrderModule List3-140	$LAPS \rightarrow Local Administrator Password Solution$
Inline API3–161	Last visited MRU4-12, 4-15, 4-17
InLoadOrderModule List3-140	Lateral Movement
InMemoryOrderModule List3-140	Overview2-5
Intelligence Development1–24	Scheduled Tasks
Internet Evidence Finder	Shares2–106
Interrupt Descriptor Table (IDT)3–161	Tracking
IOC Analysis3–212	Least frequency of occurence analysis1-100
$IPRIP \rightarrow RIP$ Listener Service	Link (soft and hard)4–142
$IRP \rightarrow I/O$ Request Packet	LiveSSP
istat4-162, 4-173-175	Living off the Land Binaries (LOLbin)1-60
	LoadLibrary
т.	Local Account
${f J}$	Abuse
	Local Admin (Limitations)
$\verb jobparser.py 2-115$	Local Administrator Password Solution (LAPS)2–18 LOCAL SERVICE2–83
jp4-191	Location: Internet Explorer
Jump List	log2timeline
	Arguments
	Device examples
\mathbf{K}	Parser lists
	VSS
Kansa1–93-103	Logon
3^{rd} party tools	Error Code
Configuration	Event2-95
${\tt Get-AutoRunsc.ps1} \dots 1-99$	Last
$\texttt{Get-CertStore.ps1} \dots 1-99$	Session Identification2-79
${\tt Get-FlsBodyfile.ps1} \ \dots \dots 1-99$	Success/Failure
${\tt Get-Handle.ps1} \dots 1-99$	Type2–12, 4–23
Get-LogparserStack.ps1 1 - 100	Type Codes2–77
Get-ProcDump.ps11-99	LSA Secret
Get-RekalPslist.ps11-99	Defense
Remote W-1.5–6	LSASS2-10
Run	Security EventLog
KAPE3–22 Collection3–25	
Options	${f M}$
$KDBG \rightarrow Kernel Debugger Datablock \dots$	1V1
KdCopyDataBlock	MACB4–35-36
Kerberoasting	mactime
Kerberos	MagnetForensics
Attacks	Malware
Attacks (Defense)2–38	Code Signing1-63
Kernel Debugger Datablock (KDBG)3-50	Dormant
Identification3–59	Evasion techniques1–61
Kernel Patch Protection3–164	Execution
Kernel Processor Control Region (KPCR) 3–50	Fileless 4–120
Kill Chain1–38	Identification
Actions on Objectives1–41	Locations
Delivery 1–40	Names1-59
Exploitation	Paradox1-53
Persistence	Malware Persistence1–68
Reconnaissance	AutoStart Locations
kpartx3–17	BIOS Flashing1–78
kpartx W-3.1-16	DLL Hijacking
KPCR → Kernel Processor Control Region	Local Group Policy



MS Office Add-in1–78	NotPetya1–111
Scheduled Tasks	NTDS.DIT2–39
Service Creation/Replacement 1–71	ntdsdump2-39
Service Failure Recovery	NTDSXtract
WMI Event Consumers	NTFS4–140
Master File Table (MFT)4–147	Alternate Data Stream4–171
File Record Header	Features
Outlier 4–166	File Deletion4–195
Sequential Entries4–151	File Write 4–194
Structure 4–148	Index slack space
Memory	System Files
Acquisition 3–39	Timestamp 4–36
Analysis	NTLM2–10
Analysis 🎉	ntoskrnl.exe3-161
Compression	
Dump	
Finding the first hit	O
Forensics	
Advantages3–37	Office Recent Files4–15
Motivations	Open/Save MRU4-11, 4-14
Windows 10	OpenIOC1–49
Offset	Order of Volatility1–95
Page Execute ReadWrite3–150	Out-GridView1-88
Virtual Machine 3–41	Overpass the Hash2-34
Metadata Layer 4–150	
MetaSploit2–10, 2–19, 2–24, 2–28, 2–39	
$MFT \rightarrow Master File Table \dots$	P
MFTECmd $4-30, 4-46, 4-157$	
Microsoft Online Accounts2–79	Packing 1–67
Mimikatz2–9, 10, 2–15, 2–28, 2–32	Page Directory Offset (PDB)3–78
EventLog Clearing2–126	Page File3–39
Token Stealing2–20	Pass-the-hash attacks2-10, 2-15
MOF1–112	Mitigations
$MOF \rightarrow WMI/MOF$ Files	Pass-the-ticket
mofcomp.exe1-123, 2-144	Passware 3–43
mount	Password
MountPoints2	Last change4-23
MsCash22–24	PatchGuard3-164
mstsc.exe2-130	$PDB \rightarrow Page Directory Offset \dots$
Mutant3–113	$PEB \rightarrow Process Environment Block \dots$
Mutex	PECmd.exe
MZ3–152-154	Perimeter
	Persistance 1–68
7 8. T	pescan1-82, 1-87
N	Phishing Attack
	pinfo4–89
net.exe1-75, 2-133	pinfo4-60
net1.exe2-133	Pivot4-26-27
netstat.exe1-88	Places.sqlite4-12
NetTraveler	Plaso4-60
Network Artifacts	Linux/Android/Mac Parsers 4–66
Review	mactime4-68
Network History4–20	Registry Parsers 4–65
NETWORK SERVICE2–83	Web History Parsers4-65
Network Shares	Windows Parsers4-61
Admin2–133	Plug-and-Play Event Log4-22
Tracking2–106	PlugX1–75
New-PSDrive1-88	Poison Ivy1–105
Nishang2–29	Ports W-3.4-4

powercfg.exe 3-43 PowerShell 1-87	${f Q}$
Authentication1–92	qc 1 – 74
Basics	qprivs1-74
Command History2–176	qtriggerinfo $1-74$
Enabling logs	queryex1-74
Log hunting2–168	
Logs2–164	${ m R}$
Malicious (logs)2–167	- v
Obfuscation2–170	rar.exe1-75
Processes	RasAuto1–72
Remote Artifacts	rdpclip.exe2-132
Source Artifacts	Reactive Response1–29, 1–31
Transcript Logs2–173-174	Recent Files4–14
PowerShell Authentication1–92	RecentFileCache.bcf2–55
CredSSP1–92	Reconnaissance Tracking2–100
Enter-PSSession $\dots 1-92$	Recycle Bin4–18
PowerShell Remoting1–90	reg.exe1-75, 2-139
Enter-PSSession1-90	Registry
${\tt Invoke-Command} \ \dots \dots 1-90$	Deletion 4–120
WS-Management (WSMAN)1-90	Hiding Data4–120
powershell.exe	RegRipper1–98, 2–130
PowerView2–100	Rekall1–103, 3–210
Prefetch	Remediation1–27
First/Last Execution2–45	Requirements
From memory4–137	Steps1–29
prefetchparser 4-137	Remote Desktop Protocol (RDP)
Privileged Local Account Abuse2–98	Logging2–93
Proactive Response	Source Artifacts
ProcDump1-75	Usage4–24
Process	Remote Service Artifacts2–141
Acquisition	RID 5002-7
Analysis	RIP Listener Service (IPRIP)1–71
Anomaly №1–76	rip.pl
Environment Block (PEB)3-50	Rogue Process Analysis3–94
Hollowing3–135	Rootkit1–67, 1–74, 1–103
Injection1–67	Detection
Objects3–94, 3–121	Hooking3–161
Process tree	Run MRU4–14
Rogue1–73	
Terminated	${f S}$
Tracking2–158, 2–160	
Command Line2–162	$SACL \rightarrow System Access Control List \dots$
Profiling Account Usage2–72	Sakula 1–103
PsActiveProcessHead3-50	SAM Registry Hive2–10
PsExec2-11, 1-75, 2-121, 2-136	$\mathtt{sc.exe} \dots 1 - 72, \ 1 - 74, \ 75, \ 2 - 139$
Destination Artifacts2–136	Scheduled Tasks1–73
Source Artifacts	Artifacts2–142
psexesvc.exe2-137	Artifacts (v1.2)2–115
PsLoggedOn1-75	at.exe1-73
PsLogList2-183	Logs2–114
psort	schtasks.exe
psort 4-60	Tracking2–112
PspCid3-170	$\verb schtasks.exe $
PSReadline2-176	$SCM \rightarrow Service Control Manager \dots$
PWDumpX2-24	scrcons.exe
PWDumpX2-10	Scripting1–85
	Bash1–85
	PowerShell

WMI1–85	Defense2–36
Search (Win7-10)4-19	Timeline
Search (XP)	Benefits
Security Identifier (SID)3–103, 3–107	Comparison
Security Tokens → Tokens	Context
SeDebug2-85	Filesystem
Select-String1-88	Process Analysis
Service Control Manager2–119	Super Timeline 4–53
Service Events	Utopia and Reality
Service Hijacking	Timestamp
Service Replacement	Lateral Movement Analysis
Services	Timestomp
Suspicious	Detection
Unknown	Evidence
SeTakeOwnership	Timezone
SetWindowsHookEx	Tokens
Shell bags	Defense
ShimCache	SeImpersonate 2-19
shimcachemem	Tracking
Shortcut (LNK) files	Account Creation2–87
SID \rightarrow Security Identifier	Account Usage
sigcheck	Account Usage (RDP)
Silver Ticket	Command Line
Skeleton Key	Lateral Movement
·	Network Shares
Skype4–11	
SMB	Process
File copy	Reconnaissance
$SSDT \rightarrow System Service Descriptor Table$	Scheduled Tasks2–112
Stacking	Triage
Statistics (incident)	Filesystem Timeline4–35
STIX1–49	Trusted Code
Strings	TsPkg2–9, 10
StuxNet1–112, 3–147	tstheme.exe2-132
Super Timeline	
Creation steps	\mathbf{U}
Filter	G
Output	$UAC \rightarrow User Acess Control \dots$
Targeted	UMFD2–83
Suspicious Services2–119	USB First/Last Times
Swap File 3–39	USB Key Identification
$SxS \rightarrow DLL Hijacking/DLL Side-Loading \dots$	UserAssist4–14
SysMon	
SYSTEM2–83	T 7
System Access Control List2–69	\mathbf{V}
System Service Descriptor Table (SSDT) 3–161	TAR THE LAND BY
SYSTEM32	$VAD \rightarrow Virtual Address Descriptor \dots$
SYSWOW64	Virtual Address Descriptor (VAD)3-50
	Virtual Secure Mode3–45
TT.	VirtualAllocEx
${f T}$	Visibility3–30
	VNC2–131
Target Collection3–25	Volatility
Task (Start time)	apihooks $3-163, 3-177$
TDL3/TDSS3-144	baseline $\ldots 3-91$
TeamViewer2–131	cmdline3-99
Temporal proximity	$\verb cmdscan $
Thumbnails 4–18	$\verb connections 3-125 $
Thumbs.db4-19	connscan3-125
Tickets2–31	consoles3-184, 3-197-198

${\tt devicetree} \; \dots $	WannaCry
dlldump	WBEM \rightarrow Web-Based Entreprise Managment
dlllist3-99, 100	WCE2–10
driverbl3-91, 3-175	WDigest2-9, 10
driverirp3-163	WDigest Registry key2-17
dumpfiles3-184, 3-201	Web Server Intrusion
filescan3-61, 3-184, 3-204	Web-Based Entreprise Managment (WBEM) 1–107
getsids	WebShell
handles	What is Evil?
hivelist	What is Normal?
hollowfind	win32k.sys
idt	Windows Remote Management2–115, 2–139
imagecopy	Windows Service
imageinfo	Windows Time Rules
kdbgscan	winpmem Driver
ldrmodules	winrm.vbs
malfind	winrs.exe
malprocfind	wisp
marprocrind	WMI
moddump	Attacks
modscan	Binding
modules	Database
mutantscan	Destination Artifacts
netscan	Event Consumer Backdoor1–112
openioc_scan	Event Consumer types
procdump	Event Consumers
processbl	Event Filter (trigger)1–76
pslist	Get-WmiObject
psscan	Hunting tips
pstree	Investigation1–114
psxview	Lateral Movement
servicebl	Log Hunting
sockets3-125	Logs
sockscan	MOF Files1–123
ssdt3-163, 164	mofcomp.exe
svcscan	Persistence
threadmap3-139	PowerShell commands
$\verb vaddump $	Privilege Escalation1–110
vainfo3-201	Processes 3–87
Help3-56	Processes (scrons.exe for ActiveScriptEventCon-
Image identification3-61	sumers)
Profile	Processes (svchost.exe/WmiPrvSE.exe for com-
Usage3-54	mandLineEventConsumers)1-127
Volume GUID	PyWMIPersistenceFinder.py1-119
Volume Name	Reconnaissance
Volume Serial Number4–22	Source Artifacts
Volume Shadow Copy	Threat hunting1-129
Examination	WBEM AutoRecover Folder1–125
log2timeline	WBEM AutoRecover Key1–126
vshadowinfo4-127	WMI explorer1–118
${\tt vshadowmount} \hspace{0.5cm}4-128$	wmic.exe
$VSM \rightarrow Virtual Secure Mode \dots$	wmiprvse.exe
VSSAdmin2–39	WordWheelQuery4-19
Vulnerability	WriteProcessMemory3-135
Exploitation2-150	wsmprovhost.exe

 \mathbf{W}





Yara1–50	Zbot	3–178
	Zero Configuration	
_	Zeus	3–178
\mathbf{Z}	Zone Identifier	4-179