

# 508.3 – Memory Forensics in Incident Response and Threat

## Incident Response ..... 4-21

Enterprise IR challenges.....	4-5
Rapid-Response Tooling.....	6
Enterprise IR Agents.....	7-20
Remote Access Agents.....	7
Remote Analysis Agents.....	8
F-Response.....	9-12
KAPE.....	13-15
Velociraptor.....	16-20

## EDR..... 22-27

Why EDR?.....	24
EDR Challenges.....	25
Memory Forensics.....	26-27

## Memory Forensics..... 30-202

Why Memory Forensics?.....	30-32
Overview and possible findings/artifacts.....	31
Memory analysis advantages.....	32
Memory Acquisition.....	33-39
Windows.....	34-37
Overview.....	34-35
hiberfil.sys.....	36-37
Virtual machines.....	38
Memory Analysis Introduction.....	40-118
Definition.....	40
Windows Analysis.....	42-44
KDBG / KPCR / PEB / VAD.....	42
Unlinking.....	43
Hooking.....	43
Memory structure simplified.....	44
Volatility.....	45-57
Overview.....	45
How-to.....	46-47
Help flag (-h).....	48

Volatility Version 3.0.....	49
Volatility Profiles.....	51
Image Identification.....	52
Build Numbers (how-to).....	52
kdbgscan.....	53-55
Hibernation file conversion.....	56-57
Starting analysis (finding the first hit).....	58-118
Step 1: Identify rogue processes.....	59-87
Process Blocks (EPROCESS).....	60-61
Analyzing Processes.....	62-64
Volatility Plugins.....	65-86
pslist (process overview).....	66-68
psscan.....	71-74
pstree.....	75-79
Baseline.....	84-86
Know normal (Windows).....	69
EchoTrail.....	70
WMI & PowerShell processes.....	80-81
Overview.....	80-81
Suspicious WMI processes.....	82-83
wmiprvse.exe.....	82
scrcons.exe.....	83
Review.....	87
Step 2: Analyzing process objects.....	89-110
Process overview.....	90-91
Volatility plugins overview.....	92
dlllist.....	93-95
Cobalt Strike Sacrificial Processes.....	96-97
getsids.....	98-101
Understanding SIDs.....	102-103
Handles.....	104-106
Named pipes.....	107
Mutants/Mutexes.....	108-109
Review.....	110
Step 3: Network Artifacts.....	111-118
Overview.....	112
Unusual behavior.....	113
Volatility plugins.....	114-117

Overview.....	114	cmdscan & consoles.....	185-186
netscan.....	115-117	Windows 10 memory compression.....	189
Review.....	118	Extracting files.....	191-196
Code Injection, Rootkits and Extraction ....	120-198	dumpfiles.....	191-193
Starting analysis (finding the first hit).....	121	filesan.....	192
Step 4: Look for Code Injection.....	122-148	filesan + dumpfiles.....	193
Why code injection?.....	123	Extracting Registry.....	197
Overview (DLL injection/Process hollowing)...	124	shimcachemem.....	197
Simple DLL Injection.....	125-127	Review.....	198
Volatility plugins.....	128-137	Scaling Analysis.....	201-203
Overview.....	128	Live memory forensics.....	201-202
ldmodules.....	129-137	Using IOCs.....	203
Reflective Code Injection.....	138-139	openioc_scan.....	203
Overview.....	138	yarascan.....	203
Detecting reflective/hidden code injection ....	139	page_brute.py.....	203
Detecting code injection.....	140-148		
malfind.....	140-147		
Review.....	148		
Step 5: Hooking and Rootkit Detection.....	149-169		
Overview.....	150-151		
SSDT/IDT/IAT/IRP.....	150-151		
Volatility plugins.....	152-168		
Overview.....	152		
ssdt.....	153-156		
psxview (cross-view analysis).....	158-159		
modscan & modules.....	161-163		
driverbl.....	164-165		
apihooks.....	166-168		
Direct Kernel Object Manipulation (DKOM).....	157		
Review.....	169		
Plugin use-cases.....	169		
Step 6: Extracting objects from memory.....	172-198		
Volatility plugins.....	173-180		
dlldump.....	174-175		
moddump.....	176-178		
procdump.....	179		
memdump / vaddump.....	180		
strings.....	181		
grep.....	182		
Using strings and grep with memdump.....	183-184		
Command history and active consoles.....	185-188		