The DarkSide of the Ransomware Pipeline

splunk.com/en_us/blog/security/the-darkside-of-the-ransomware-pipeline.html

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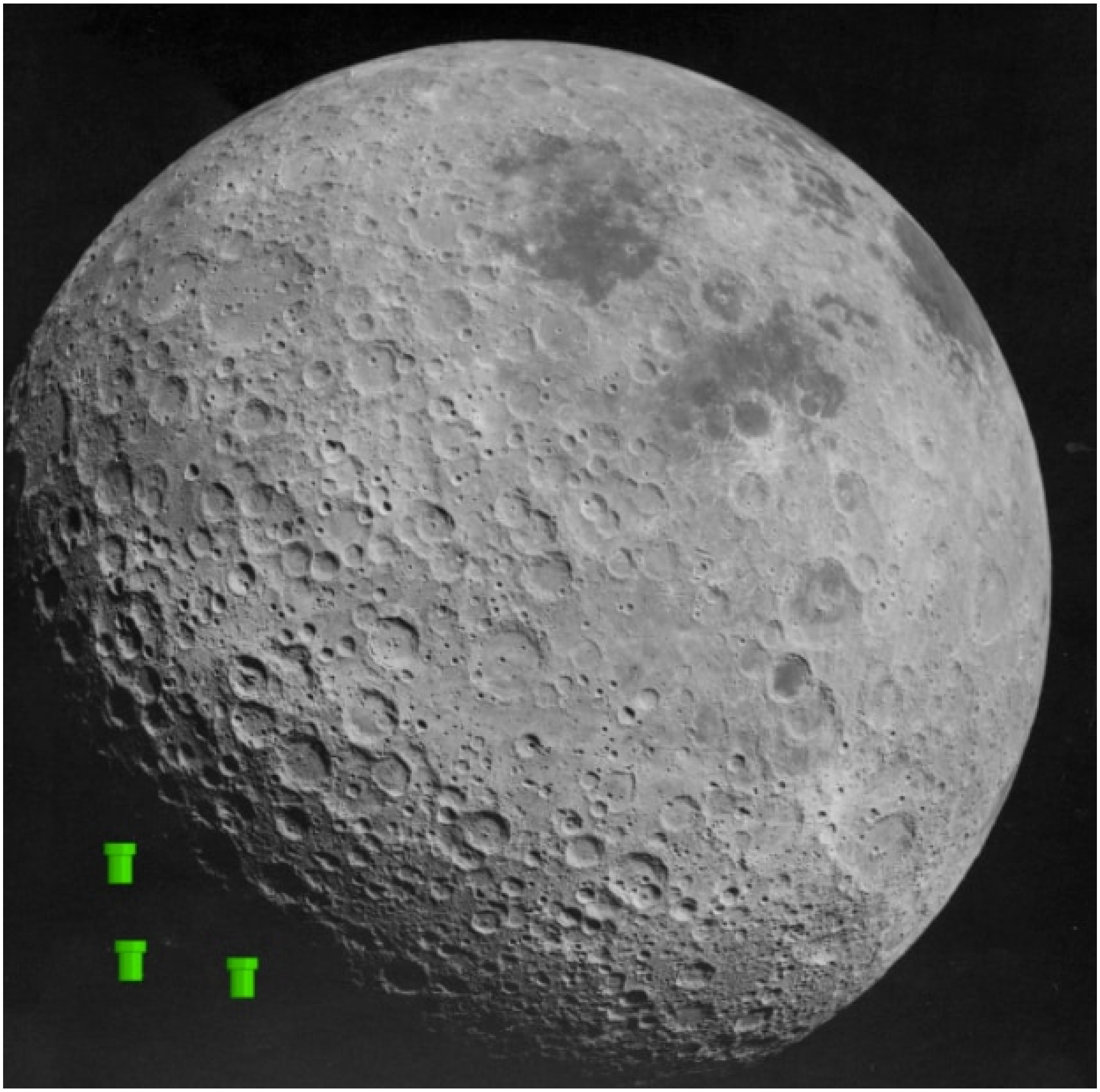

If you want to quickly find out how to use Splunk to find activity related to the DarkSide Ransomware, skip to the "Detection and Remediation of DarkSide" section. Otherwise, read on for a quick breakdown of what happened to the Colonial Pipeline, how to detect the ransomware, and view MITRE ATT&CK mappings.

Introduction to the Colonial Pipeline Ransomware Attack

It might be more expensive for you to take that Great American Road Trip this summer because filling up the tank of the Family Truckster may cost you some serious Dogecoin. Let us give you a little bit more color on this:

Late on Friday, May 7th, one of the US's largest gasoline pipelines was preemptively shut down by operator Colonial Pipeline, because their corporate computer networks were affected by Ransomware-as-a-Service authored and maintained by the group DarkSide. This 5500 mile pipeline transports about 45% of the East Coast's fuel supplies, and at the time of this blog, Colonial Pipeline had not returned to full operation. Now, mind you, ***the ransomware did not directly cause the pipeline to shut down*** *- rather, Colonial shut down operations voluntarily out of an abundance of caution*. But until they can be sure that the adversary leveraging the DarkSide ransomware for the attack does not have the ability to affect operations, the pipeline will remain dry. Colonial is hoping to get the pipeline back to operation by the end of this week.

Regardless of how all of this plays out, what Splunk customers want to know is how to detect and mitigate DarkSide ransomware, especially if they work in critical infrastructure. In fact, last year CISA released an alert about ransomware targeting pipeline operators - so we know this is a big deal. And, they just updated it today with new alert guidance (AA21-131A) specific to DarkSide.

After review, we're happy to find that the behavior of this ransomware isn't particularly novel, and all of the guidance we've shared for years on ransomware detection and mitigation applies. Let's review that guidance, and update it where appropriate.

What You Need to Know

One of the last significant ransomware events was the Ryuk ransomware at the end of October 2020, however our specialists pointed out that Ryuk wasn't particularly novel in terms of its operation. Our Threat Research team also posted about detecting the Clop ransomware last month and recently updated further.

Is the DarkSide variant of ransomware more interesting than either of these? No, it isn't! However, there's significant worldwide interest because of the target chosen. We also see these "affiliate" actors attempt a "double extortion" where not only have they encrypted critical business data, they're also threatening to release it publicly if additional ransom is not paid. DarkSide also contains a killswitch if it detects a Russian language environment. There are also reports that the ongoing global pandemic has made infections like this easier, because operational staff may be working from home and that may broaden the attack surface. However, this is not new, as remote access for Operational Technology (OT) networks is commonplace and long predates the pandemic.

Splunk & Ransomware: Not Our First Rodeo

As we've stated, this blog ain't the first time we're covering our approach to Ransomware. Feast your eyes on the following corpus of material from days of yore:

- .conf talks and videos
  - Splunking the Endpoint 2016: Ransomware Edition! and Video
  - How Splunk Can Help You Prevent Ransomware From Holding Your Business Hostage
  - Windows Ransomware Detection with Splunk (1 of 6) – Vulnerability Detection and Windows Patch Status
- Detections Blogs
  - Clop Ransomware Detection: Threat Research Release, April 2021
  - Ryuk and Splunk Detections Splunk Blogs
  - Detecting Ryuk Using Splunk Attack Range
- Whitepaper

  Splunk Security: Detecting Unknown Malware and Ransomware
- Phantom Responses
  - Automate Your Response to WannaCry Ransomware
  - Playbook: Detect, Block, Contain, and Remediate Ransomware
- Machine Learning Method

  Detect Ransomware in Your Data with the Machine Learning Cloud Service
- Operationalizing Detections

  Operationalize Ransomware Detections Quickly and Easily with Splunk

Also, looking for some fun Ransomware eye-candy to survey the kinds of infections rampant within the US over the past several years? Check out this interactive map from Statescoop.

Detection and Remediation of DarkSide Using Splunk

As regular readers of our blogs will expect, we normally fill this section with TTPs pulled from the zero-day or possibly a breakdown of a new malware variant. But, after reviewing the last six seven years of content that Splunk has created, we are again proud to say we already have you covered. In the list of detections below, you will notice that we did not break out IOCs. As David Bianco has pyramidized in the past, IOCs are ephemeral and change often! I recommend working with a threat intel provider for any low-level IOCs like hashes or IPs. Throw them into a Lookup table or ES threat intel framework, and off you go! If you don’t have a threat intel provider, start skimming Twitter for some tremendous open-source lists.

The fine folks at CyberReason have a detailed walkthrough of how DarkSide behaves after the initial foothold. From a Splunk detection perspective, here are some things we suggest collecting:

- Process execution logs, from our favorite Windows Security 4688 events, or Sysmon EventCode 1, or any commercial EDR, are, as always, key to detection of the parent/child process relationships involved in actions on intent and lateral movement as well as the deletion of Volume Shadow Copies.
- PowerShell Script Block Logging is also critical, so that you can detect certain modules like WebClient.DownloadFile being used where you don't expect, as well as the use of encoded PowerShell.
- Windows System events, so that you can detect Scheduled Tasks being created and enabled (4698, 4700).

And as always, **unusual network connections** from servers and endpoints (can be accomplished via firewall, proxy, Sysmon EventCode 3, or EDR logs) and DNS query logging will be helpful.

Splunk Security Essentials

In case you are unaware (or living under a rock for the last two years), Splunk Security Essentials is the place to get Splunk's security content. And since our last-go round with Ryuk, we've updated Splunk Security Essentials and made it a fully-supported Splunk product (but it's still free!). When you boot up the app, navigate to "Security Content Library," and search for Ransomware, you get a plethora of content!

Splunk Security Essentials - Ransomware content

Splunk Enterprise Security and ESCU

Know Thyself

While we have spent some time explaining this attack and effort needs to be put toward investigating this, it is also important to note that the basics are important. Basic asset management, hopefully via your asset and identity framework, will tell you where your vulnerable systems reside. Running regular vulnerability scans that integrate into Splunk will display which systems are vulnerable and can help you prioritize your patching schedule and better focus your detection efforts.

Splunk Enterprise Security and ESCU

Threat Intelligence Framework

If you are using Splunk Enterprise Security (ES), many organizations are posting IOCs that can be ingested easily into the threat intelligence framework. Perhaps you aren't sure how to do that? No worries, we published some guidance and a how-to on integrating lists of IOCs into the Enterprise Security threat intelligence framework. We won't be publishing a list of IOCs along with this blog as they are quite ephemeral, but use of the Threat Intelligence Framework (or standard lookups within Splunk) will allow you to easily perform IOC matching.

Enterprise Security Content Updates (ESCU)

For folks using ESCU, our Splunk Threat Research team will release a new Splunk Analytic Story called Darkside Ransomware by the end of this week containing detections for this threat. Saying that, check out the MITRE ATT&CK table below. If you have ESCU running today, you already have some great coverage!

MITRE ATT&CK

Reviewing one of the first blog posts on DarkSide Ransomware from Digital Shadows in September 2020, we extracted their MITRE ATT&CK tactics and then linked to Splunk Content to help you hunt for that information. Be aware; these searches are provided as a way to accelerate your hunting. We recommend you configure them via the Splunk Security Essentials App. You may need to modify them to work in your environment! Many of these searches are optimized for use with the tstats command.

Finally, as more information becomes available, we will update these searches if more ATT&CK TTPs become known.

ATT&CK Technique	Technique/Sub-Technique	Splunk Searches
T1098	Account Manipulation	AWS IAM Failure Group Deletion
AWS IAM Successful Group Deletion		
AWS IAM Delete Policy		
Setting Credentials via DSInternals modules		
Assessment of Credential Strength via DSInternals modules		
Illegal Management of Active Directory Elements and Policies via DSInternals modules		
Probing Access with Stolen Credentials via PowerSploit modules		

Setting Credentials via PowerSploit modules		
Reconnaissance of Credential Stores and Services via Mimikatz modules		
Illegal Management of Computers and Active Directory Elements via PowerSploit modules		
Illegal Enabling or Disabling of Accounts via DSInternals modules		
Reconnaissance of Privilege Escalation Opportunities via PowerSploit modules		
Applying Stolen Credentials via Mimikatz modules		
Applying Stolen Credentials via PowerSploit modules		
Setting Credentials via Mimikatz modules		
T1059.001	PowerShell	Any Powershell DownloadFile
Malicious PowerShell Process With Obfuscation Techniques		
Nishang PowershellTCPOneLine		
Set Default PowerShell Execution Policy To Unrestricted or Bypass		
Any Powershell DownloadString		

Malicious PowerShell Process - Connect To Internet With Hidden Window		
Malicious PowerShell Process - Execution Policy Bypass		
T1548	Abuse Elevation Control Mechanism	Illegal Privilege Elevation via Mimikatz modules
Applying Stolen Credentials via Mimikatz modules		
Illegal Privilege Elevation and Persistence via PowerSploit modules		
Applying Stolen Credentials via PowerSploit modules		
T1078	Valid Accounts	AWS SAML Access by Provider User and Principal
Cloud Provisioning Activity From Previously Unseen City		
Cloud API Calls From Previously Unseen User Roles		
Cloud Provisioning Activity From Previously Unseen Country		
Cloud Provisioning Activity From Previously Unseen IP Address		
Cloud Provisioning Activity From Previously Unseen Region		
AWS SAML Update identity provider		

Reconnaissance of Access and Persistence Opportunities via PowerSploit modules

Setting Credentials via DSInternals modules

Assessment of Credential Strength via DSInternals modules

Probing Access with Stolen Credentials via PowerSploit modules

Reconnaissance and Access to Accounts Groups and Policies via PowerSploit modules

Setting Credentials via PowerSploit modules

Reconnaissance of Credential Stores and Services via Mimikatz modules

Reconnaissance and Access to Accounts and Groups via Mimikatz modules

Illegal Enabling or Disabling of Accounts via DSInternals modules

Reconnaissance of Privilege Escalation Opportunities via PowerSploit modules

Applying Stolen Credentials via Mimikatz modules

Applying Stolen Credentials via PowerSploit modules

Setting Credentials via Mimikatz modules		
aws detect permanent key creation		
GCP Detect gcploit framework		
aws detect attach to role policy		
aws detect role creation		
aws detect sts assume role abuse		
T1490	Inhibit System Recovery	BCDEdit Failure Recovery Modification
WBAdmin Delete System Backups		
Resize ShadowStorage volume		
Deleting Shadow Copies		
T1087	Account Discovery	Assessment of Credential Strength via DSInternals modules
Reconnaissance and Access to Accounts Groups and Policies via PowerSploit modules		
Reconnaissance and Access to Accounts and Groups via Mimikatz modules		
Reconnaissance and Access to Computers and Domains via PowerSploit modules		

T1057	Process Discovery	Reconnaissance and Access to Processes and Services via Mimikatz modules
Reconnaissance and Access to Operating System Elements via PowerSploit modules		
T1569	System Services	Illegal Service and Process Control via PowerSploit modules
Illegal Service and Process Control via Mimikatz modules		
T1486	Data Encrypted for Impact	AWS Detect Users with KMS keys performing encryption S3
AWS Detect Users creating keys with encrypt policy without MFA		
High Process Termination Frequency		
Ransomware Notes bulk creation		
Samsam Test File Write		
Ryuk Test Files Detected		
T1055	Process Injection	Reconnaissance of Process or Service Hijacking Opportunities via Mimikatz modules
Suspicious DLLHost no Command Line Arguments		
Illegal Service and Process Control via PowerSploit modules		

DLLHost with no Command Line Arguments with Network		
Illegal Service and Process Control via Mimikatz modules		
Cobalt Strike Named Pipes		
Trickbot Named Pipe		
Suspicious GPUpdate no Command Line Arguments		
Suspicious SearchProtocolHost no Command Line Arguments		
Applying Stolen Credentials via Mimikatz modules		
SearchProtocolHost with no Command Line with Network		
Powershell Remote Thread To Known Windows Process		
Applying Stolen Credentials via PowerSploit modules		
GPUpdate with no Command Line Arguments with Network		
T1113	Screen Capture	Illegal Access To User Content via PowerSploit modules
T1082	System Information Discovery	System Information Discovery Detection

Web Servers Executing Suspicious Processes

Detect attackers scanning for vulnerable JBoss servers

Conclusion

We know that such a publicly visible example of the impact of Ransomware can stoke visceral fear, but we've got your back. Hopefully, these searches, blogs, videos, conference papers, and whitepapers will provide you the ability to have more visibility into your environment and any malicious activity that you might be experiencing. If they don't work perfectly, think of them as "SplunkSpiration" :-). As soon as we have more information, we will update this blog and, as we talked about earlier, be on the lookout for some more detailed info about DarkSide and an Analytic Story delivered via ESCU from our Splunk Threat Research team.

Thanks!
James Brodsky

Posted by

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