Comparison of Attack Chains: APT1 vs. APT29 Using MITRE ATT&CK Navigator By Pranith Jain

Overview

This report examines the attack chains of two prominent Advanced Persistent Threat (APT) groups, APT1 and APT29, using the MITRE ATT&CK framework as a basis for comparison. APT1, attributed to a Chinese state-sponsored actor, is known for its widespread cyber-espionage activities across various industries. In contrast, APT29, linked to Russian intelligence, is renowned for its sophisticated and stealthy operations, particularly targeting governmental and diplomatic sectors.

By leveraging the MITRE ATT&CK Navigator, this report provides a detailed comparison of the tactics, techniques, and procedures (TTPs) utilized by these groups. The analysis highlights commonalities in their methodologies while underscoring the unique approaches each group employs to achieve their objectives. This comparison not only enhances our understanding of these specific threat actors but also offers insights into improving cybersecurity defenses against similar threats.

1. Introduction

Advanced Persistent Threats (APTs) are sophisticated, long-term cyber-espionage campaigns carried out by well-funded and highly skilled threat actors. Two of the most notable APT groups are APT1 and APT29. APT1, attributed to a Chinese state-sponsored group, is known for its extensive cyber espionage operations targeting a broad range of industries. On the other hand, APT29, believed to be associated with Russian intelligence, is recognized for its stealthy operations and focus on government and diplomatic entities.

2. Methodology

The comparison was conducted using the MITRE ATT&CK Navigator, a tool that allows users to create and visualize layers of TTPs used by various threat groups. The following steps were taken:

1. **Layer Creation:** Created separate layers for APT1 and APT29, enabling a side-by-side comparison.

2. Data Collection: Loaded the TTPs associated with APT1 and APT29 from the MITRE ATT&CK database into the Navigator.

3. Analysis: Compared the layers to identify common and unique TTPs across different stages of the attack lifecycle.

4. **Documentation:** Captured insights and visual evidence from the Navigator to include in this report.

3. Analysis

3.1 Initial Access

- APT1: Frequently uses phishing attacks with malicious attachments or links to gain initial access. They also exploit vulnerabilities in web-facing applications.

- APT29: Also relies heavily on spear-phishing but is known for using more sophisticated social engineering techniques. Additionally, APT29 exploits supply chain compromises as part of their initial access.

Comparison: Both APT1 and APT29 use phishing as a primary method for initial access, though APT29 tends to employ more advanced techniques and also targets supply chains.

3.2 Execution

- APT1: Commonly uses malware to execute code after gaining initial access, with tactics such as scheduled tasks and command-line interface (CLI) tools.

- APT29: Leverages various execution techniques, including the use of legitimate credentials to blend in with normal network traffic. They are also known for using customized malware.

Comparison: While both groups use malware and legitimate tools, APT29's approach is more nuanced, often attempting to remain under the radar by mimicking legitimate activities.

3.3 Persistence

- APT1: Maintains persistence through the use of web shells, creating new user accounts, and utilizing backdoors.

- APT29: Uses stealthier methods such as maintaining legitimate remote access tools and embedding backdoors within legitimate software updates.

Comparison: APT1 often relies on creating artifacts that are easier to detect, whereas APT29 prioritizes stealth and evasion, making them harder to detect over long periods.

3.4 Privilege Escalation

- APT1: Exploits known vulnerabilities in operating systems and software to escalate privileges.

- APT29: Similar in approach but often utilizes zero-day vulnerabilities to gain higher privileges without detection.

Comparison: APT29 has a more advanced arsenal for privilege escalation, often using sophisticated zero-day exploits.

3.5 Defense Evasion

- APT1: Uses techniques such as file obfuscation and disabling security tools.

- APT29: Employs advanced evasion techniques, including process hollowing, fileless malware, and exploitation of trust relationships to avoid detection.

Comparison: APT29's defense evasion techniques are significantly more advanced and are designed to avoid detection for extended periods.

3.6 Command and Control (C2)

- APT1: Uses compromised infrastructure for C2, often relying on HTTP/S, DNS, and custom protocols.

- APT29: Operates through encrypted channels and often uses multi-layered C2 infrastructures to obscure communications.

Comparison: APT29's C2 operations are more sophisticated, using encryption and multi-layered approaches to protect their command and control mechanisms from being intercepted.

3.7 Exfiltration

- APT1: Typically exfiltrates data via compressed archives sent over HTTP/S or FTP.

- APT29: Employs more covert methods, including embedding exfiltrated data in legitimate network traffic or using encrypted communications.

Comparison: APT29’s methods of exfiltration are more covert and harder to detect compared to APT1’s more straightforward approach.

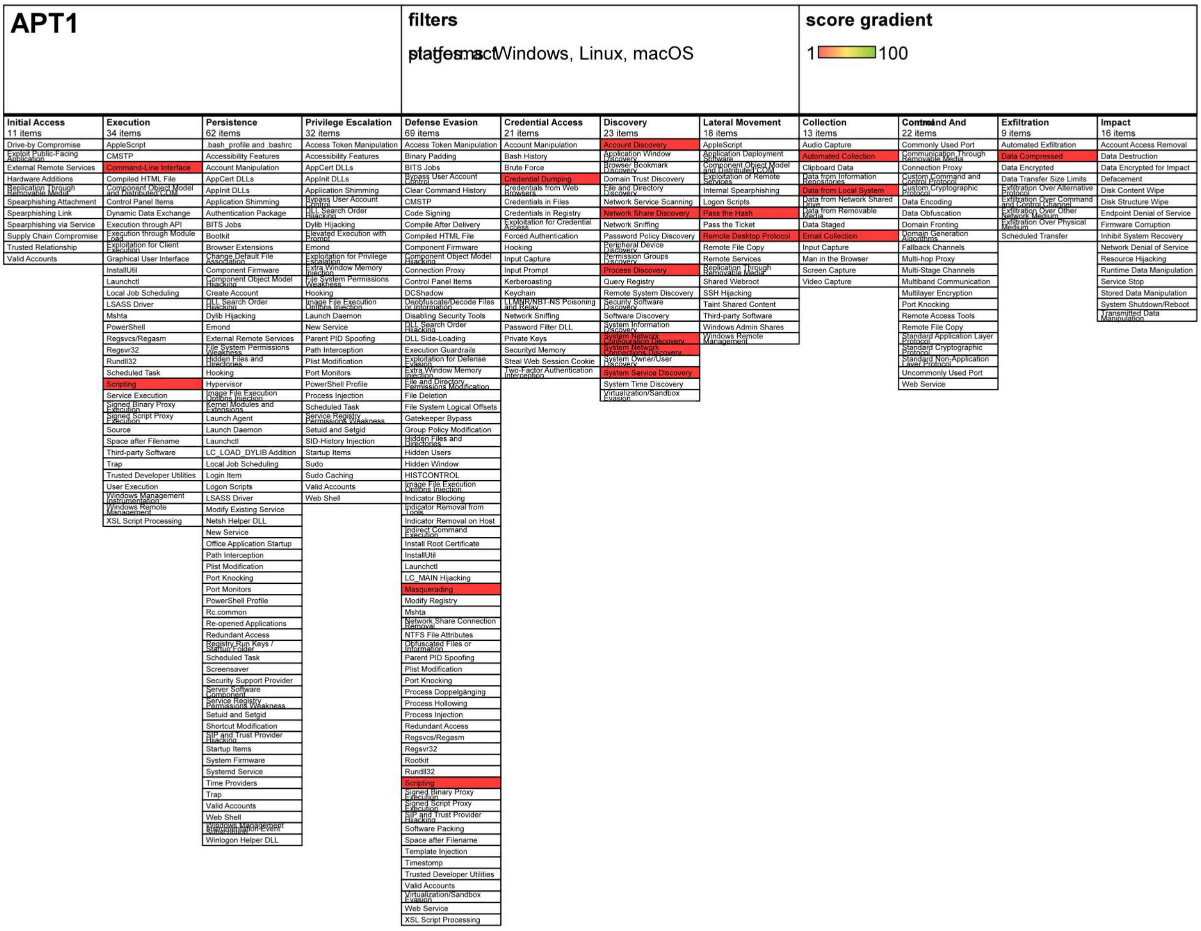
4. Conclusion

The comparison between APT1 and APT29 reveals both commonalities and differences in their attack chains. While both groups employ similar tactics, such as phishing for initial access and using malware for execution, APT29 demonstrates a higher level of sophistication and stealth across the entire attack lifecycle. Their techniques for defense evasion, persistence, and C2 are particularly advanced, indicating a significant investment in avoiding detection and maintaining long-term access to compromised environments.

For organizations, understanding these differences is crucial for developing effective threat detection and response strategies. By focusing on the advanced techniques used by groups like APT29, security teams can better prepare for and mitigate the risks posed by these and similar threat actors.

5. Visual Representation

APT1:



APT1

filters

stages: act
platforms: Windows, Linux, macOS

score gradient

1 100

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Exploit Public-Facing Application	CMSTP	Accessibility Features	Accessibility Features	Binary Padding	Bash History	Application Window Discovery	Application Deployment Software	Automated Collection	Communication Through Removable Media	Data Compressed	Data Destruction
External Remote Services	Command-Line Interface	Account Manipulation	AppCert DLLs	BITS Jobs	Brute Force	Browser Bookmark Discovery	Component Object Model and Distributed COM	Clipboard Data	Connection Proxy	Data Encrypted	Data Encrypted for Impact
Hardware Additions	Compiled HTML File	AppCert DLLs	AppInit DLLs	Bypass User Account Control	Credential Dumping	Domain Trust Discovery	Exploitation of Remote Services	Data from Information Repositories	Custom Command and Control Protocol	Data Transfer Size Limits	Defacement
Replication Through Removable Media	Component Object Model and Distributed COM	AppInit DLLs	Application Shimming	Clear Command History	Credentials from Web Browsers	File and Directory Discovery	Internal Spearphishing	Data from Local System	Custom Cryptographic Protocol	Exfiltration Over Alternative Protocol	Disk Content Wipe
Spearphishing Attachment	Control Panel Items	Application Shimming	Bypass User Account Control	CMSTP	Credentials in Files	Network Service Scanning	Logon Scripts	Data from Network Shared Drive	Data Encoding	Exfiltration Over Command and Control Channel	Disk Structure Wipe
Spearphishing Link	Dynamic Data Exchange	Authentication Package	DLL Search Order Hijacking	Code Signing	Credentials in Registry	Network Share Discovery	Pass the Hash	Data from Removable Media	Data Obfuscation	Exfiltration Over Other Network Medium	Endpoint Denial of Service
Spearphishing via Service	Execution through API	BITS Jobs	Dylib Hijacking	Compile After Delivery	Exploitation for Credential Access	Network Sniffing	Pass the Ticket	Data Staged	Domain Fronting	Exfiltration Over Physical Medium	Firmware Corruption
Supply Chain Compromise	Execution through Module Load	Bootkit	Elevated Execution with Prompt	Compiled HTML File	Forced Authentication	Password Policy Discovery	Remote Desktop Protocol	Email Collection	Domain Generation Algorithms	Scheduled Transfer	Inhibit System Recovery
Trusted Relationship	Exploitation for Client Execution	Browser Extensions	Emond	Component Firmware	Hooking	Peripheral Device Discovery	Remote File Copy	Input Capture	Fallback Channels		Network Denial of Service
Valid Accounts	Graphical User Interface	Change Default File Association	Exploitation for Privilege Escalation	Component Object Model Hijacking	Input Capture	Permission Groups Discovery	Remote Services	Man in the Browser	Multi-hop Proxy		Resource Hijacking
	InstallUtil	Component Firmware	Extra Window Memory Injection	Connection Proxy	Input Prompt	Process Discovery	Replication Through Removable Media	Screen Capture	Multi-Stage Channels		Runtime Data Manipulation
	Launchctl	Component Object Model Hijacking	File System Permissions Weakness	Control Panel Items	Kerberoasting	Query Registry	Shared Webroot	Video Capture	Multiband Communication		Service Stop
	Local Job Scheduling	Create Account	Hooking	DCShadow	Keychain	Remote System Discovery	SSH Hijacking		Multilayer Encryption		Stored Data Manipulation
	LSASS Driver	DLL Search Order Hijacking	Image File Execution Options Injection	Deobfuscate/Decode Files or Information	LLMNR/NBT-NS Poisoning and Relay	Security Software Discovery	Taint Shared Content		Port Knocking		System Shutdown/Reboot
	Mshta	Dylib Hijacking	Launch Daemon	Disabling Security Tools	Network Sniffing	Software Discovery	Third-party Software		Remote Access Tools		Transmitted Data Manipulation
	PowerShell	Emond	New Service	DLL Search Order Hijacking	Password Filter DLL	System Information Discovery	Windows Admin Shares		Remote File Copy		
	Regsvcs/Regasm	External Remote Services	Parent PID Spoofing	DLL Side-Loading	Private Keys	System Network Configuration Discovery	Windows Remote Management		Standard Application Layer Protocol		
	Regsvr32	File System Permissions Weakness	Path Interception	Execution Guardrails	Securityd Memory	System Network Connections Discovery			Standard Cryptographic Protocol		
	Rundll32	Hidden Files and Directories	Plist Modification	Exploitation for Defense Evasion	Steal Web Session Cookie	System Owner/User Discovery			Standard Non-Application Layer Protocol		
	Scheduled Task	Hooking	Port Monitors	Extra Window Memory Injection	Two-Factor Authentication Interception	System Service Discovery			Uncommonly Used Port		
	Scripting	Hypervisor	PowerShell Profile	File and Directory Permissions Modification		System Time Discovery			Web Service		
	Service Execution	Image File Execution Options Injection	Process Injection	File Deletion		Virtualization/Sandbox Evasion					
	Signed Binary Proxy Execution	Kernel Modules and Extensions	Scheduled Task	File System Logical Offsets							
	Signed Script Proxy Execution	Launch Agent	Service Registry Permissions Weakness	Gatekeeper Bypass							
	Source	Launch Daemon	Setuid and Setgid	Group Policy Modification							
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	Trap	Local Job Scheduling	Sudo	Hidden Window							
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	User Execution	Logon Scripts	Valid Accounts	Image File Execution Options Injection							
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	Windows Remote Management	Modify Existing Service		Indicator Removal from Tools							
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		New Service		Indirect Command Execution							
		Office Application Startup		Install Root Certificate							
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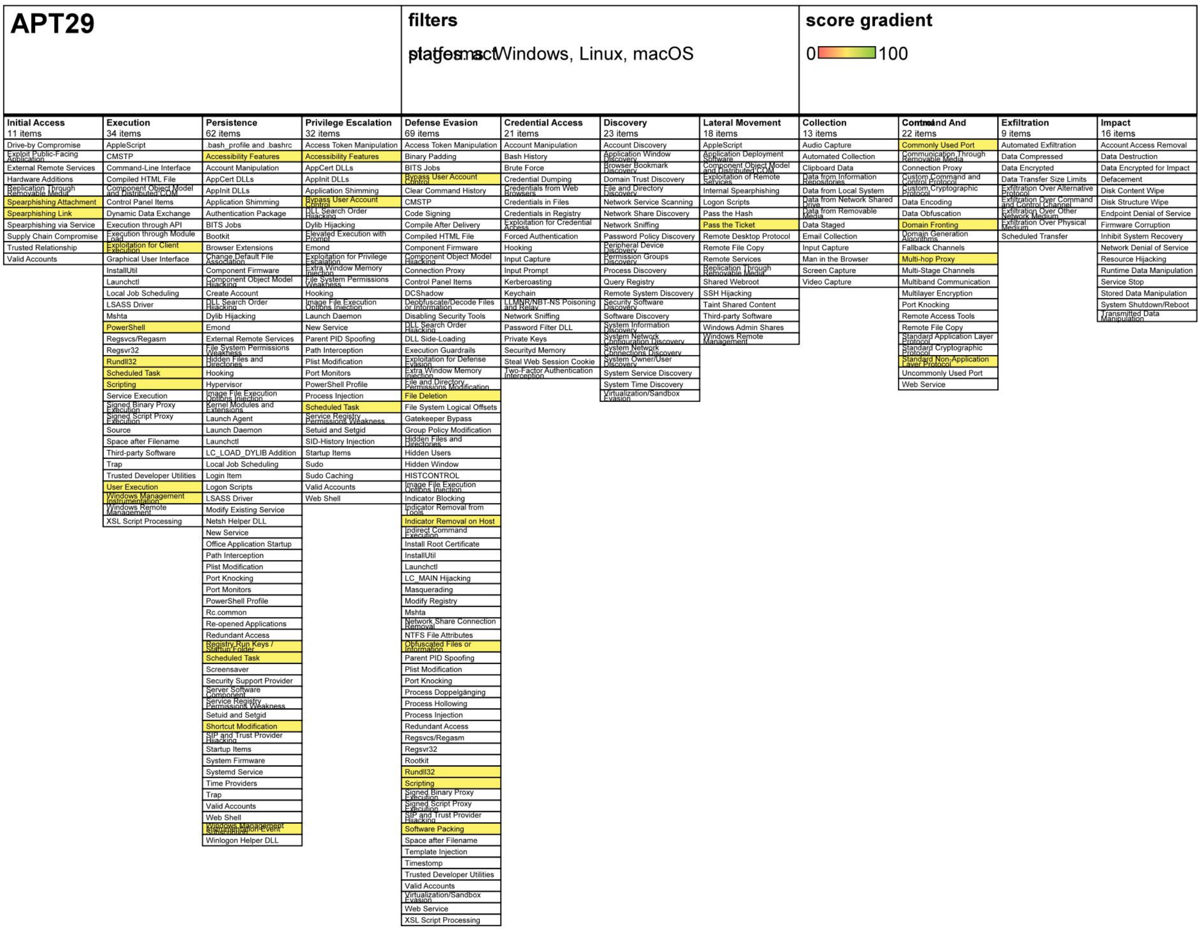
		Port Monitors		Masquerading							
		PowerShell Profile		Modify Registry							
		Rc.common		Mshta							
		Re-opened Applications		Network Share Connection Removal							
		Redundant Access		NTFS File Attributes							
		Registry Run Keys / Startup Folder		Obfuscated Files or Information							
		Scheduled Task		Parent PID Spoofing							
		Screensaver		Plist Modification							
		Security Support Provider		Port Knocking							
		Server Software Component		Process Doppelgänging							
		Service Registry Permissions Weakness		Process Hollowing							
		Setuid and Setgid		Process Injection							
		Shortcut Modification		Redundant Access							
		SIP and Trust Provider Hijacking		Regsvcs/Regasm							
		Startup Items		Regsvr32							
		System Firmware		Rootkit							
		Systemd Service		Rundll32							
		Time Providers		Scripting							
		Trap		Signed Binary Proxy Execution							
		Valid Accounts		Signed Script Proxy Execution							
		Web Shell		SIP and Trust Provider Hijacking							
		Windows Management Instrumentation Event Subscription		Software Packing							
		Winlogon Helper DLL		Space after Filename							
				Template Injection							
				Timestomp							
				Trusted Developer Utilities							
				Valid Accounts							
				Virtualization/Sandbox Evasion							
				Web Service							
				XSL Script Processing							

APT29:



APT29

filters

stages: act

platforms: Windows, Linux, macOS

score gradient

0 100

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				Virtualization/Sandbox Evasion							
				Web Service							
				XSL Script Processing							

Comparison APT1 and APT29:

APT1 + APT29

filters

stages: act

platforms: Windows, Linux, macOS

score gradient

1 ▨ 3

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