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Lateral Movement: Abuse the Power of DCOM Excel Application

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TCP/IP for its network communications; specifically, it uses the `ncacn_ip_tcp` protocol sequence, where:

- `ncacn` stands for "Connection-Oriented Network Computing Architecture."
- `ip_tcp` specifies the use of TCP/IP.

In practical terms, when you see this protocol sequence, it indicates that RPC is using TCP/IP for network communications in a connection-oriented

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The basic flow of communication is like this:

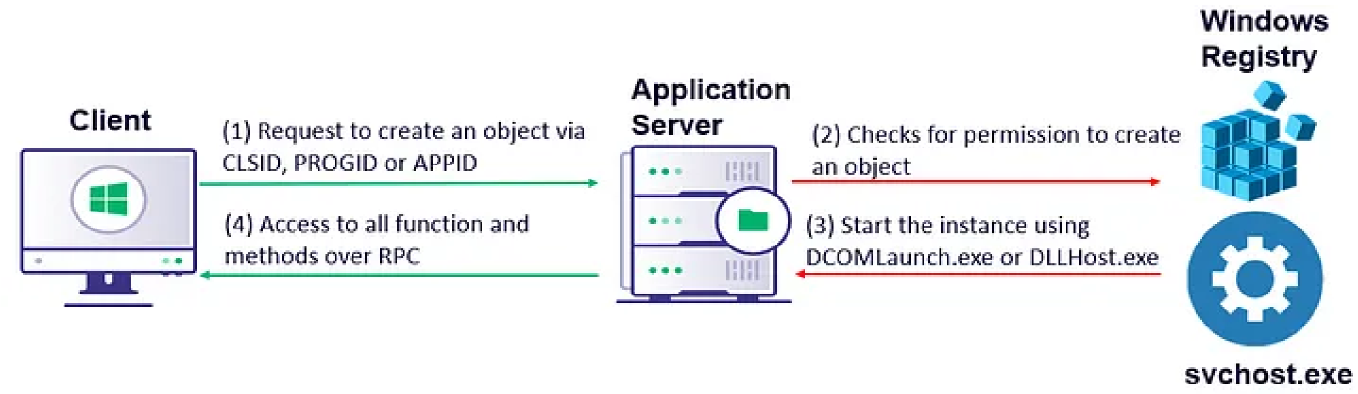
Client
(1) Request to create an object via CLSID, PROGID or APPID
(4) Access to all function and methods over RPC
Application Server
(2) Checks for permission to create an object
(3) Start the instance using DCOMLaunch.exe or DLLHost.exe
Windows Registry
svchost.exe

Figure 01 — DCOM flow over the network

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- Ability to remotely write a file in the system *PATH*
- Tested on Windows 10 and 11
- Tested on 64-bit installation of Office 365

While enumerating different methods of Excel objects, we discovered the ***ActivateMicrosoftApp()*** method could be used to get shell access because Microsoft still supports activation of some end of life (EOL) software such as FoxPro, Schedule Plus, and Office Project. It is unlikely that any of these

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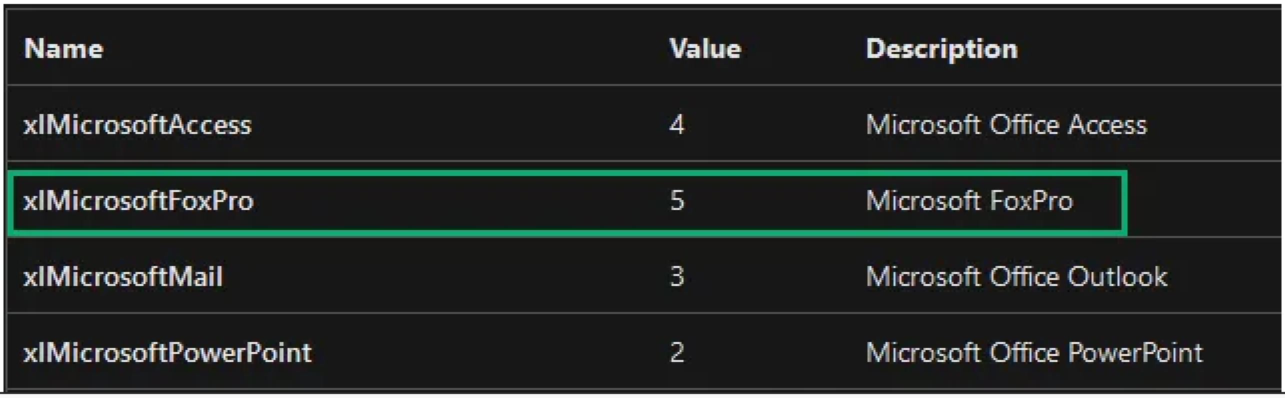
ActivateMicrosoftApp() method takes one parameter which specifies the Microsoft application to activate.



Name	Value	Description
xlMicrosoftAccess	4	Microsoft Office Access
xlMicrosoftFoxPro	5	Microsoft FoxPro
xlMicrosoftMail	3	Microsoft Office Outlook
xlMicrosoftPowerPoint	2	Microsoft Office PowerPoint

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However, if the application is not present on the system ***ActivateMicrosoftApp()*** will throw an error that it “Cannot run ‘*FOXPROW.exe*’. The program or one of its components is damaged or missing.” After some research, we utilized Process Monitor to further investigate underlying operations.

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folder, then our malicious binary will execute and provide us access to the target machine.

```
copy c:\windows\system32\calc.exe '\\192.168.49.160\c$\users\user\AppData\local\Micr

$com = [System.Activator]::CreateInstance([type]::GetTypeFromProgID("Excel.Applicati

$com.ActivateMicrosoftApp("5")
```

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Figure 06 — Error thrown if ProgID could not map to CLSID

Alternatively, we could use CLSID instead of ProgID to identify the Excel COM class object. Please note that CLSID can differ between various

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PowerShell script that initializes an instance of the Excel.Application object via DCOM and invokes the ***ActivateMicrosoftApp()*** method on the localhost. Then, create a scheduled task configured to run at specific intervals, which will execute the PowerShell script we created. Ultimately, ensure that *FOXPROW.exe* is placed within the system *PATH* and wait for the scheduled task to execute.

```
PS C:\Users\User\Desktop> cat .\ExcelPersistence.ps1
$com = [System.Activator]::CreateInstance([type]::GetTypeFromProgID("Excel.Applicati
```

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Note: The initial location where the *ActivateMicrosoftApp()* method searches for *FOXPROW.exe* is within the C:\Program Files\Microsoft Office\root\Office16 folder.

Impact

This technique can have a significant impact since it allows attackers to execute malicious executable on any machine that has Microsoft Office installed, given administrative rights to that machine. It could be abused by attackers in a ransomware scenario. The malicious actor has the capability to upload malware, place it within the *PATH*, and then run the malware by

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To detect this attack, defenders can look for a child process spawning off of *Excel.exe*. If the following processes are spawned as a child process of *Excel.exe*, then you should investigate further:

- FOXPROW.exe
- SCHDPLUS.exe
- WINPROJ.exe

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your environment, you might want to investigate it further.

To learn more about security of DCOM read here.

Mitigation

To mitigate this attack, consider configuring the user identity located under Component Services > Computers > My Computer > DCOM Config > Microsoft Excel Application > Properties. There are three options available:

- The interactive user — runs Excel as the currently logged on user's

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Big thanks to Duane Michael, Jared Atkinson, Matt Nelson and others who have helped review the blog post. Please reach out on X for your thoughts. I am curious to know other creative ways this technique could be abused. Thank you for reading!

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