Block DLL Policy

Introduction

This module introduces a technique that blocks security products from installing hooks into the local and remote processes using a special process creation flag. The process creation flag blocks non-Microsoft signed DLLs from being loaded into the created process, therefore, blocking them from installing hooks and performing other security mitigations, that would get the implementation detected during runtime.

The Flag

The special process creation flag is `PROCESS_CREATION_MITIGATION_POLICY_BLOCK_NON_MICROSOFT_BINARIES_ALWAYS_ON` and can be set on a newly created process using the `UpdateProcThreadAttribute` WinAPI. This flag belongs to a family of other *mitigation policies* that Microsoft created to prevent various types of attacks against the calling process. These mitigation policies are mostly related to exploitation but have other purposes as well. Two examples of mitigation policies are Data Execution Prevention and Control Flow Guard.

The `UpdateProcThreadAttribute` WinAPI was previously used in the *Spoofing PPID* module where an attribute was initialized using `InitializeProcThreadAttributeList` and then added to the attribute list of the process being created.

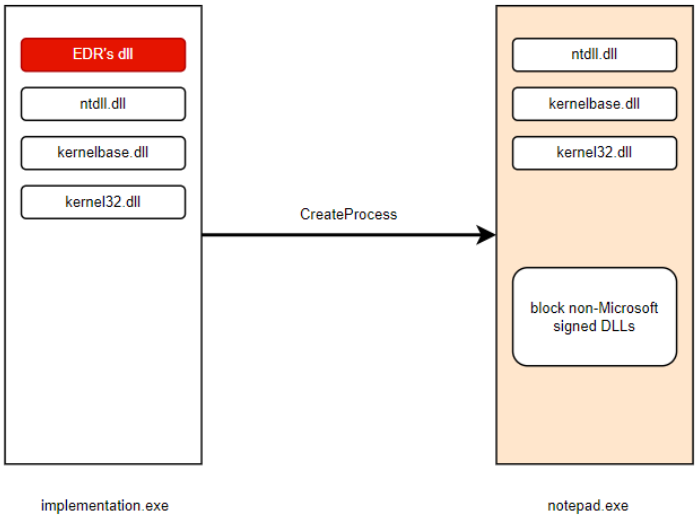
The same approach will be used to block non-Microsoft signed DLLs with the main difference being the flag used is `PROCESS_CREATION_MITIGATION_POLICY_BLOCK_NON_MICROSOFT_BINARIES_ALWAYS_ON`.

Block DLL Policy On Remote Process

Recall from the *Spoofing PPID* module that it's necessary to call `InitializeProcThreadAttributeList` twice, the first time to obtain the required size of the attribute to allocate enough memory and the second time with the correct parameters. Additionally, the `STARTUPINFOEX` structure needs to be used rather than `STARTUPINFO` to update the attributes list.

The `CreateProcessWithBlockDllPolicy` is a custom-built function that takes the path to a remote executable (`lpProcessPath`) and creates the process with the block DLL policy enabled.

Unfortunately, this implementation only benefits the child process since the implementation will not have this policy enabled, rather only its spawned child processes will. This means that the local process will remain hooked, as the policy of blocking the injection of non-Microsoft signed DLLs into the `implementation.exe` process was not enabled when the process was created.



The following `CreateProcessWithBlockDllPolicy` function creates a process with the block DLLs policy enabled. The function takes 4 arguments:

`lpProcessPath` - The name of the process to create.

`dwProcessId` - A pointer to a DWORD that receives the newly created process's PID.

`hProcess` - A pointer to a HANDLE that receives a handle to the newly created process.

`hThread` - A pointer to a HANDLE that receives a handle to the newly created process's thread.

```
BOOL CreateProcessWithBlockDllPolicy(IN LPCSTR lpProcessPath, OUT DWORD*
dwProcessId, OUT HANDLE* hProcess, OUT HANDLE* hThread) {


	STARTUPINFOEXA		SiEx		= { 0 };
	PROCESS_INFORMATION	Pi		= { 0 };
	SIZE_T			sAttrSize	= NULL;
	PVOID			pAttrBuf	= NULL;

	if (lpProcessPath == NULL)
		return FALSE;

	// Cleaning the structs by setting the member values to 0
	RtlSecureZeroMemory(&SiEx, sizeof(STARTUPINFOEXA));
	RtlSecureZeroMemory(&Pi, sizeof(PROCESS_INFORMATION));

	// Setting the size of the structure
```

```
        SiEx.StartupInfo.cb       = sizeof(STARTUPINFOEXA);
        SiEx.StartupInfo.dwFlags  = EXTENDED_STARTUPINFO_PRESENT;

//------------------------------------------------------------------------
------

        // Get the size of our PROC_THREAD_ATTRIBUTE_LIST to be allocated
        InitializeProcThreadAttributeList(NULL, 1, NULL, &sAttrSize);
        pAttrBuf =
(LPPROC_THREAD_ATTRIBUTE_LIST)HeapAlloc(GetProcessHeap(), HEAP_ZERO_MEMORY,
sAttrSize);

        // Initialise our list
        if (!InitializeProcThreadAttributeList(pAttrBuf, 1, NULL,
&sAttrSize)) {
                printf("[!] InitializeProcThreadAttributeList Failed With
Error : %d \n", GetLastError());
                return FALSE;
        }

        // Enable blocking of non-Microsoft signed DLLs
        DWORD64 dwPolicy =
PROCESS_CREATION_MITIGATION_POLICY_BLOCK_NON_MICROSOFT_BINARIES_ALWAYS_ON;

        // Assign our attribute
        if (!UpdateProcThreadAttribute(pAttrBuf, NULL,
PROC_THREAD_ATTRIBUTE_MITIGATION_POLICY, &dwPolicy, sizeof(DWORD64), NULL,
NULL)) {
                printf("[!] UpdateProcThreadAttribute Failed With Error :
%d \n", GetLastError());
                return FALSE;
        }

        SiEx.lpAttributeList = (LPPROC_THREAD_ATTRIBUTE_LIST)pAttrBuf;

//------------------------------------------------------------------------
------

        if (!CreateProcessA(
                NULL,
                lpProcessPath,
                NULL,
                NULL,
                FALSE,
```

```
                EXTENDED_STARTUPINFO_PRESENT,
                NULL,
                NULL,
                &SiEx.StartupInfo,
                &Pi)) {
                printf("[!] CreateProcessA Failed With Error : %d \n",
GetLastError());
                return FALSE;
        }


        *dwProcessId  = Pi.dwProcessId;
        *hProcess     = Pi.hProcess;
        *hThread      = Pi.hThread;

        // Cleaning up
        DeleteProcThreadAttributeList(pAttrBuf);
        HeapFree(GetProcessHeap(), 0, pAttrBuf);

        if (*dwProcessId != NULL && *hProcess != NULL && *hThread != NULL)
                return TRUE;
        else
                return FALSE;
}
```

Block DLL Policy On Local Process

To enable this policy on the local process, a Linux-style fork implementation will be used, whereby the local process creates another process of itself with this mitigation policy enabled. To prevent this cycle from continuing indefinitely, an argument will be passed to the second instance of the process to indicate that it should stop running the `CreateProcessWithBlockDllPolicy` function and instead execute the payload. The pseudocode below demonstrates the logic that will be employed in the code.

```
int main (int argc, char* argv[]){

  if (argc == 2 && (strcmp(argv[1], STOP_ARG) == 0)) {
    //
PROCESS_CREATION_MITIGATION_POLICY_BLOCK_NON_MICROSOFT_BINARIES_ALWAYS_ON
is enabled
    //  Running the payload injection code for example
  }
  else {
    // 'STOP_ARG' is not passed to the process, so we create another copy
of the local process with the block dll policy
    // The 'STOP_ARG' argument will be passed in to the another process,
```

```
making the above if-statement valid, so no more processes will be created
  }
}
```

The Code

The function below includes preprocessor code to determine if the implementation will enable the block DLL policy remotely or locally. Additionally, the function performs the following:

- If `LOCAL_BLOCKDLLPOLICY` is not enabled then the `CreateProcessWithBlockDllPolicy` function is called with the path of the remote executable to run with the block DLL policy enabled.
- If the `LOCAL_BLOCKDLLPOLICY` is defined, an if-else statement checks if the `STOP_ARG` argument is present. If `STOP_ARG` is not found, then the process has not enabled the block DLL policy, so the `CreateProcessWithBlockDllPolicy` function is called to re-run the local executable with the `STOP_ARG` argument.
- The next time the process is executed, it will have the `STOP_ARG` argument, indicating that the block DLL policy is enabled. This will result in the main function proceeding to execute the payload.

```
// Comment to create a remote process with block dll policy enabled
//
#define LOCAL_BLOCKDLLPOLICY


#ifdef LOCAL_BLOCKDLLPOLICY
#define STOP_ARG "MalDevAcad"
#endif // LOCAL_BLOCKDLLPOLICY

//...

int main(int argc, char* argv[]) {

        DWORD   dwProcessId   = NULL;
        HANDLE  hProcess      = NULL,
            hThread       = NULL;

#ifdef LOCAL_BLOCKDLLPOLICY

        if (argc == 2 && (strcmp(argv[1], STOP_ARG) == 0)) {
                /*
                        the real implementation code
                */
                printf("[+] Process Is Now Protected With The Block Dll
Policy \n");
```

```
                WaitForSingleObject((HANDLE)-1, INFINITE);
        }
        else {

                printf("[!] Local Process Is Not Protected With The Block
Dll Policy \n");

                // getting the local process path + name
                CHAR pcFilename[MAX_PATH * 2];
                if (!GetModuleFileNameA(NULL, &pcFilename, MAX_PATH * 2)) {
                        printf("[!] GetModuleFileNameA Failed With Error :
%d \n", GetLastError());
                        return -1;
                }

                // re-creating local process, so we add the process
argument
                // 'pcBuffer' = 'pcFilename' + 'STOP_ARG'

                DWORD dwBufferSize      = (DWORD)(lstrlenA(pcFilename) +
lstrlenA(STOP_ARG) + 0xFF);
                CHAR* pcBuffer          =
(CHAR*)HeapAlloc(GetProcessHeap(), HEAP_ZERO_MEMORY, dwBufferSize);
                if (!pcBuffer)
                        return FALSE;

                sprintf_s(pcBuffer, dwBufferSize, "%s %s", pcFilename,
STOP_ARG);

                // fork with block dll policy
                if (!CreateProcessWithBlockDllPolicy(pcBuffer,
&dwProcessId, &hProcess, &hThread)) {
                        return -1;
                }

                HeapFree(GetProcessHeap(), 0, pcBuffer);

                printf("[i] Process Created With Pid %d \n", dwProcessId);


        }
#endif // LOCAL_BLOCKDLLPOLICY
```

```
#ifndef LOCAL_BLOCKDLLPOLICY
        // if LOCAL_BLOCKDLLPOLICY is not defined
        if
(!CreateProcessWithBlockDllPolicy("C:\\Windows\\System32\\RuntimeBroker.exe",
 &dwProcessId, &hProcess, &hThread)) {
                return -1;
        }
        printf("[i] Process Created With Pid %d \n", dwProcessId);

#endif // !LOCAL_BLOCKDLLPOLICY

        return 0;

}
```

Setting Block DLL Policy At runtime

There are alternative methods to activate the mitigation policy at the local level, aside from using CreateProcess, such as using the SetMitigationPolicy WinAPI with the `ProcessSignaturePolicy` flag during runtime. This can be implemented within the following function.

While this approach may require less effort, it is important to note that executing `SetProcessMitigationPolicy` may raise suspicion as it occurs after EDRs have already injected their DLLs meaning the DLLs will remain injected even after the policy is enabled.

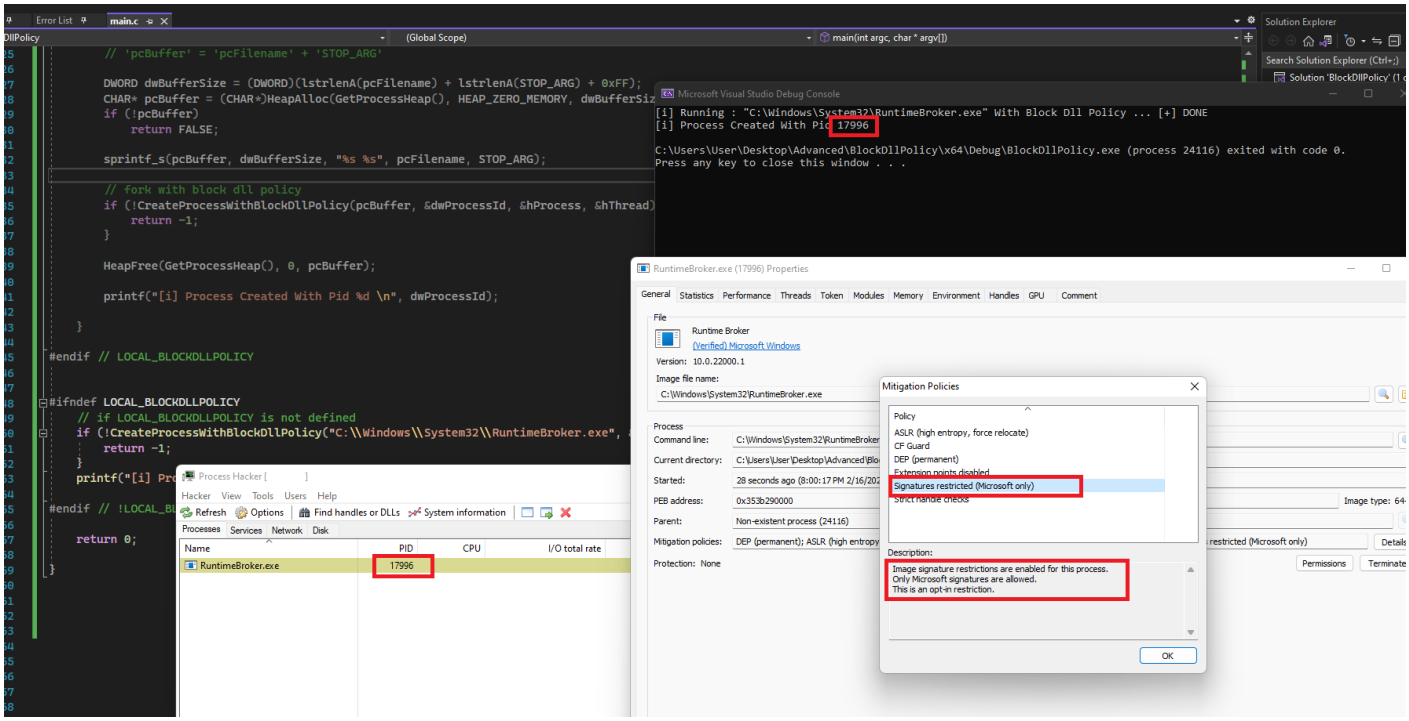
```
int main() {

    // block dll policy is disabled

        PROCESS_MITIGATION_BINARY_SIGNATURE_POLICY Struct = { 0 };

        Struct.MicrosoftSignedOnly = 1;

        if (!SetProcessMitigationPolicy(ProcessSignaturePolicy, &Struct,
sizeof(Struct))) {
                printf("[!] SetProcessMitigationPolicy Failed With Error :
%d \n", GetLastError());
        }

    // local process now have block dll mitigation policy enabled - but
hooks remain installed
}
```

Conclusion

Unfortunately, this method will be ineffective against EDRs that have their files digitally signed by Microsoft, since their DLLs are allowed to be injected even with the block DLL policy enabled.

Demo

- Enabling the block DLL policy on a remote process.



- Enabling the block DLL policy on the local process.