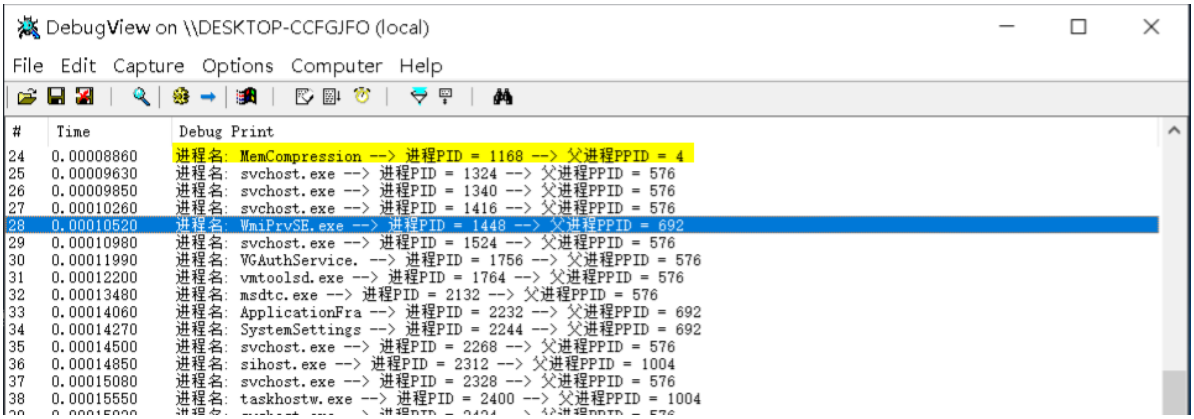
内核枚举进程使用`PspCidTable`这个未公开的函数，它能最大的好处是能得到进程的EPROCESS地址，由于是未公开的函数，所以我们需要变相的调用这个函数，通过`PsLookupProcessByProcessId`函数查到进程的EPROCESS，如果`PsLookupProcessByProcessId`返回失败，则证明此进程不存在，如果返回成功则把EPROCESS、PID、PPID、进程名等通过DbgPrint打印到屏幕上。

内核枚举进程： 进程就是活动起来的程序，每一个进程在内核里，都有一个名为 `EPROCESS` 的结构记录它的详细信息，其中就包括进程名，PID，PPID，进程路径等，通常在应用层枚举进程只列出所有进程的编号即可，不过在内核层需要把它的 EPROCESS 地址给列举出来。

内核枚举进程使用`PspCidTable`这个未公开的函数，它能最大的好处是能得到进程的EPROCESS地址，由于是未公开的函数，所以我们需要变相的调用这个函数，通过`PsLookupProcessByProcessId`函数查到进程的EPROCESS，如果`PsLookupProcessByProcessId`返回失败，则证明此进程不存在，如果返回成功则把EPROCESS、PID、PPID、进程名等通过DbgPrint打印到屏幕上。

```
#include <ntifs.h>

NTKERNELAPI UCHAR* PsGetProcessImageFileName(IN PEPROCESS Process); //未公开的进行导出即可
NTKERNELAPI HANDLE PsGetProcessInheritedFromUniqueProcessId(IN PEPROCESS Process);//未公开进行导出

// 根据进程ID返回进程EPROCESS结构体,失败返回NULL
PEPROCESS LookupProcess(HANDLE Pid)
{
    PEPROCESS eprocess = NULL;
    NTSTATUS Status = STATUS_UNSUCCESSFUL;
    Status = PsLookupProcessByProcessId(Pid, &eprocess);
    if (NT_SUCCESS(Status))
        return eprocess;
    return NULL;
}

VOID EnumProcess()
{
    PEPROCESS eproc = NULL;
    for (int temp = 0; temp < 100000; temp += 4)
    {
        eproc = LookupProcess((HANDLE)temp);
        if (eproc != NULL)
        {
            DbgPrint("进程名: %s --> 进程PID = %d --> 父进程PPID = %d\r\n",PsGetProcessImageFileName(eproc),PsGetProcessId(eproc),
                PsGetProcessInheritedFromUniqueProcessId(eproc));
            ObDereferenceObject(eproc);
        }
    }
}

VOID UnDriver(PDRIVER_OBJECT driver)
{
    DbgPrint(("Uninstall Driver Is OK \n"));
}
```

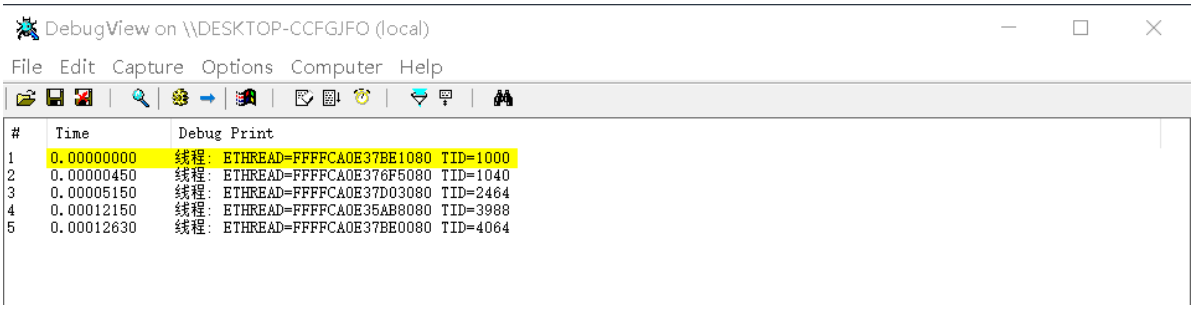
```
NTSTATUS DriverEntry(IN PDRIVER_OBJECT Driver, PUNICODE_STRING RegistryPath)
{
    EnumProcess();
    Driver->DriverUnload = UnDriver;
    return STATUS_SUCCESS;
}
```



内核枚举线程： 内核线程的枚举与进程相似，线程中也存在一个ETHREAD结构，但在枚举线程之前需要先来枚举到指定进程的eprocess结构，然后在根据eprocess结构对指定线程进行枚举。

```
#include <ntddk.h>
#include <windef.h>

// 声明API
NTKERNELAPI UCHAR* PsGetProcessImageFileName(IN PEPROCESS Process);
NTKERNELAPI NTSTATUS PsLookupProcessByProcessId(HANDLE Id, PEPROCESS *Process);
NTKERNELAPI NTSTATUS PsLookupThreadByThreadId(HANDLE Id, PETHREAD *Thread);
NTKERNELAPI PEPROCESS IoThreadToProcess(PETHREAD Thread);

//根据进程ID返回进程EPROCESS，失败返回NULL
PEPROCESS LookupProcess(HANDLE Pid)
{
    PEPROCESS eprocess = NULL;
    if (NT_SUCCESS(PsLookupProcessByProcessId(Pid, &eprocess)))
        return eprocess;
    else
        return NULL;
}

//根据线程ID返回线程ETHREAD，失败返回NULL
PETHREAD LookupThread(HANDLE Tid)
{
    PETHREAD ethread;
    if (NT_SUCCESS(PsLookupThreadByThreadId(Tid, &ethread)))
        return ethread;
    else
        return NULL;
}

//枚举指定进程中的线程
VOID EnumThread(PEPROCESS Process)
{
```

```
    ULONG i = 0, c = 0;
    PETHREAD ethrd = NULL;
    PEPROCESS eproc = NULL;
    for (i = 4; i<262144; i = i + 4) // 一般来说没有超过100000的PID和TID
    {
        ethrd = LookupThread((HANDLE)i);
        if (ethrd != NULL)
        {
            //获得线程所属进程
            eproc = IoThreadToProcess(ethrd);
            if (eproc == Process)
            {
                //打印出ETHREAD和TID
                DbgPrint("线程: ETHREAD=%p TID=%ld\n",ethrd,
(ULONG)PsGetThreadId(ethrd));
            }
            ObDereferenceObject(ethrd);
        }
    }
}

// 通过枚举的方式定位到指定的进程，这里传递一个进程名称
VOID MyEnumThread(char *ProcessName)
{
    ULONG i = 0;
    PEPROCESS eproc = NULL;
    for (i = 4; i<100000000; i = i + 4)
    {
        eproc = LookupProcess((HANDLE)i);
        if (eproc != NULL)
        {
            ObDereferenceObject(eproc);
            if (strstr(PsGetProcessImageFileName(eproc), ProcessName) != NULL)
            {
                EnumThread(eproc);  // 相等则说明是我们想要的进程，直接枚举其中的线程
            }
        }
    }
}

VOID DriverUnload(IN PDRIVER_OBJECT DriverObject){}

NTSTATUS DriverEntry(IN PDRIVER_OBJECT DriverObject, IN PUNICODE_STRING
RegistryPath)
{
    MyEnumThread("calc.exe");
    DriverObject->DriverUnload = DriverUnload;
    return STATUS_SUCCESS;
}
```

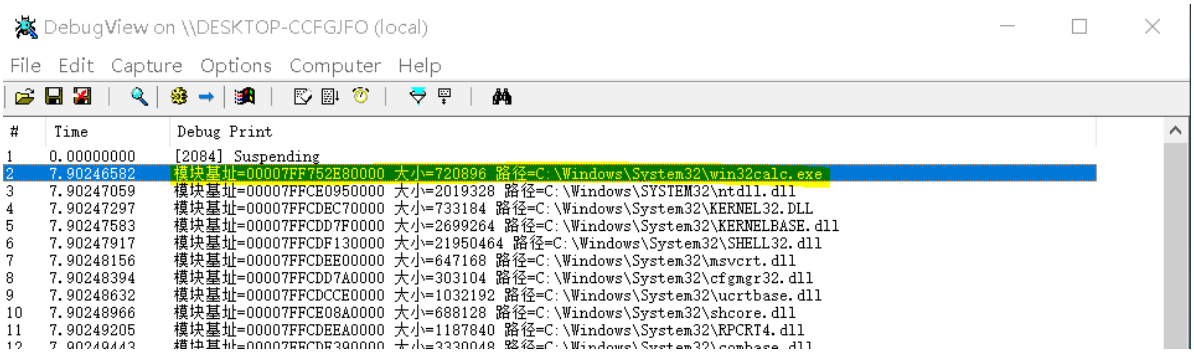


内核枚举进程模块： 枚举进程中的所有模块信息，DLL模块记录在 PEB 的 LDR 链表里，LDR 是一个双向链表，枚举链表即可，相应的卸载可使用 `MmUnmapViewOfSection` 函数，分别传入进程的 EPROCESS，DLL模块基址即可。

```
#include <ntddk.h>
#include <windef.h>

//声明结构体
typedef struct _KAPC_STATE
{
    LIST_ENTRY ApcListHead[2];
    PKPROCESS Process;
    UCHAR KernelApcInProgress;
    UCHAR KernelApcPending;
    UCHAR UserApcPending;
} KAPC_STATE, *PKAPC_STATE;

typedef struct _LDR_DATA_TABLE_ENTRY
{
    LIST_ENTRY64    InLoadOrderLinks;
    LIST_ENTRY64    InMemoryOrderLinks;
    LIST_ENTRY64    InInitializationOrderLinks;
    PVOID           DllBase;
    PVOID           EntryPoint;
    ULONG           SizeOfImage;
    UNICODE_STRING  FullDllName;
    UNICODE_STRING  BaseDllName;
    ULONG           Flags;
    USHORT          LoadCount;
    USHORT          TlsIndex;
    PVOID           SectionPointer;
    ULONG           CheckSum;
    PVOID           LoadedImports;
    PVOID           EntryPointActivationContext;
    PVOID           PatchInformation;
    LIST_ENTRY64    ForwarderLinks;
    LIST_ENTRY64    ServiceTagLinks;
    LIST_ENTRY64    StaticLinks;
    PVOID           ContextInformation;
    ULONG64         OriginalBase;
    LARGE_INTEGER   LoadTime;
} LDR_DATA_TABLE_ENTRY, *PLDR_DATA_TABLE_ENTRY;


ULONG64 LdrInPebOffset = 0x018;     //peb.ldr
ULONG64 ModListInPebOffset = 0x010; //peb.ldr.InLoadOrderModuleList
```

```
//声明API
NTKERNELAPI UCHAR* PsGetProcessImageFileName(IN PEPROCESS Process);
NTKERNELAPI PPEB PsGetProcessPeb(PEPROCESS Process);
NTKERNELAPI HANDLE PsGetProcessInheritedFromUniqueProcessId(IN PEPROCESS
Process);

//根据进程ID返回进程EPROCESS，失败返回NULL
PEPROCESS LookupProcess(HANDLE Pid)
{
    PEPROCESS eprocess = NULL;
    if (NT_SUCCESS(PsLookupProcessByProcessId(Pid, &eprocess)))
        return eprocess;
    else
        return NULL;
}

//枚举指定进程的模块
VOID EnumModule(PEPROCESS Process)
{
    SIZE_T Peb = 0;
    SIZE_T Ldr = 0;
    PLIST_ENTRY ModListHead = 0;
    PLIST_ENTRY Module = 0;
    ANSI_STRING AnsiString;
    KAPC_STATE ks;
    //EPROCESS地址无效则退出
    if (!MmIsAddressValid(Process))
        return;
    //获取PEB地址
    Peb = (SIZE_T)PsGetProcessPeb(Process);
    //PEB地址无效则退出
    if (!Peb)
        return;
    //依附进程
    KeStackAttachProcess(Process, &ks);
    __try
    {
        //获得LDR地址
        Ldr = Peb + (SIZE_T)LdrInPebOffset;
        //测试是否可读，不可读则抛出异常退出
        ProbeForRead((CONST PVOID)Ldr, 8, 8);
        //获得链表头
        ModListHead = (PLIST_ENTRY)(*(PULONG64)Ldr + ModListInPebOffset);
        //再次测试可读性
        ProbeForRead((CONST PVOID)ModListHead, 8, 8);
        //获得第一个模块的信息
        Module = ModListHead->Flink;
        while (ModListHead != Module)
        {
            //打印信息：基址、大小、DLL路径
            DbgPrint("模块基址=%p 大小=%ld 路径=%wZ\n",(PVOID)
(((PLDR_DATA_TABLE_ENTRY)Module)->DllBase),
                (ULONG)(((PLDR_DATA_TABLE_ENTRY)Module)->SizeOfImage),&
(((PLDR_DATA_TABLE_ENTRY)Module)->FullDllName));
```

```
            Module = Module->Flink;
            //测试下一个模块信息的可读性
            ProbeForRead((CONST PVOID)Module, 80, 8);
        }
    }
    __except (EXCEPTION_EXECUTE_HANDLER){;}
    //取消依附进程
    KeUnstackDetachProcess(&ks);
}

// 通过枚举的方式定位到指定的进程，这里传递一个进程名称
VOID MyEnumModule(char *ProcessName)
{
    ULONG i = 0;
    PEPROCESS eproc = NULL;
    for (i = 4; i<100000000; i = i + 4)
    {
        eproc = LookupProcess((HANDLE)i);
        if (eproc != NULL)
        {
            ObDereferenceObject(eproc);
            if (strstr(PsGetProcessImageFileName(eproc), ProcessName) != NULL)
            {
                EnumModule(eproc);  // 相等则说明是我们想要的进程，直接枚举其中的线程
            }
        }
    }
}

VOID DriverUnload(IN PDRIVER_OBJECT DriverObject){}

NTSTATUS DriverEntry(IN PDRIVER_OBJECT DriverObject, IN PUNICODE_STRING
RegistryPath)
{
    MyEnumModule("calc.exe");
    DriverObject->DriverUnload = DriverUnload;
    return STATUS_SUCCESS;
}
```

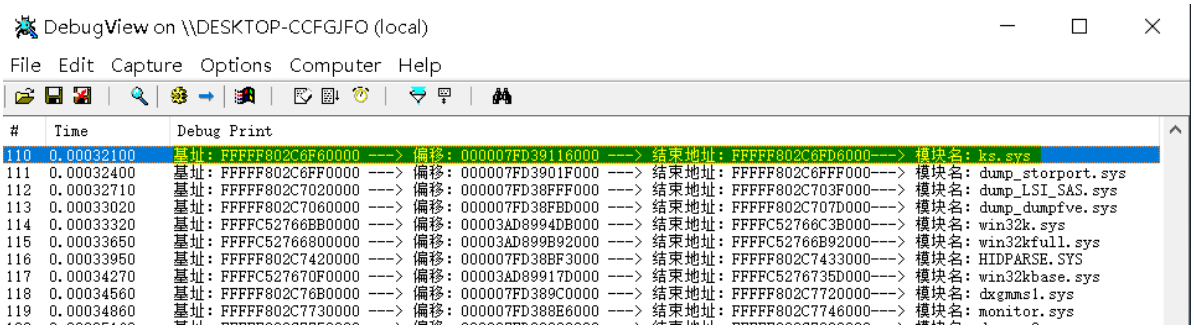


内核枚举加载SYS文件： 内核中的SYS文件也是通过双向链表的方式相连接的，我们可以通过遍历 `LDR_DATA_TABLE_ENTRY` 结构(遍历自身DriverSection成员)，就能够得到全部的模块信息。

```
#include <ntddk.h>
#include <wdm.h>
```

```
typedef struct _LDR_DATA_TABLE_ENTRY {
    LIST_ENTRY InLoadOrderLinks;
    LIST_ENTRY InMemoryOrderLinks;
    LIST_ENTRY InInitializationOrderLinks;
    PVOID DllBase;
    PVOID EntryPoint;
    ULONG SizeOfImages;
    UNICODE_STRING FullDllName;
    UNICODE_STRING BaseDllName;
    ULONG Flags;
    USHORT LoadCount;
    USHORT TlsIndex;
    union {
        LIST_ENTRY HashLinks;
        struct {
            PVOID SectionPointer;
            ULONG CheckSum;
        };
    };
    union {
        struct {
            ULONG TimeDateStamp;
        };
        struct {
            PVOID LoadedImports;
        };
    };
}LDR_DATA_TABLE_ENTRY, *PLDR_DATA_TABLE_ENTRY;

VOID DriverUnload(IN PDRIVER_OBJECT DriverObject){}

NTSTATUS DriverEntry(IN PDRIVER_OBJECT DriverObject, PUNICODE_STRING
RegistryPath)
{
    ULONG count = 0;
    NTSTATUS Status;
    DriverObject->DriverUnload = DriverUnload;

    PLDR_DATA_TABLE_ENTRY pLdr = NULL;
    PLIST_ENTRY pListEntry = NULL;
    PLDR_DATA_TABLE_ENTRY pModule = NULL;
    PLIST_ENTRY pCurrentListEntry = NULL;

    pLdr = (PLDR_DATA_TABLE_ENTRY)DriverObject->DriverSection;
    pListEntry = pLdr->InLoadOrderLinks.Flink;
    pCurrentListEntry = pListEntry->Flink;

    while (pCurrentListEntry != pListEntry)
    {
        pModule = CONTAINING_RECORD(pCurrentListEntry, LDR_DATA_TABLE_ENTRY,
InLoadOrderLinks);
        if (pModule->BaseDllName.Buffer != 0)
        {
            DbgPrint("基址：%p ---> 偏移：%p ---> 结束地址：%p---> 模块名：%wZ \r\n",
pModule->DllBase, pModule->SizeOfImages - (LONGLONG)pModule->DllBase,
```

```
                (LONGLONG)pModule->DllBase + pModule->SizeOfImages,pModule->BaseDllName);
        }
        pCurrentListEntry = pCurrentListEntry->Flink;
    }
    DriverObject->DriverUnload = DriverUnload;
    return STATUS_SUCCESS;
}
```



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