在笔者前面有一篇文章《断链隐藏驱动程序自身》通过摘除驱动的链表实现了断链隐藏自身的目的，但此方法恢复时会触发PG会蓝屏，偶然间在网上找到了一个作者介绍的一种方法，觉得有必要详细分析一下他是如何实现的进程隐藏的，总体来说作者的思路是最终寻找到`MiProcessLoaderEntry`的入口地址，该函数的作用是将驱动信息加入链表和移除链表，运用这个函数即可动态处理驱动的添加和移除问题。

- MiProcessLoaderEntry(pDriverObject->DriverSection, 1) 添加
- MiProcessLoaderEntry(pDriverObject->DriverSection, 0) 移除

MiProcessLoaderEntry 是Windows内核中的一个结构体，用于描述系统中加载的进程信息。它通常被称为进程加载器入口（Process Loader Entry），是Windows内核中的一个重要数据结构。当一个新的进程被创建时，内核会为该进程分配一个进程对象（EPROCESS结构体），并为该进程加载相应的可执行文件。在加载可执行文件的过程中，内核会使用MiProcessLoaderEntry结构体来跟踪该进程的加载信息。

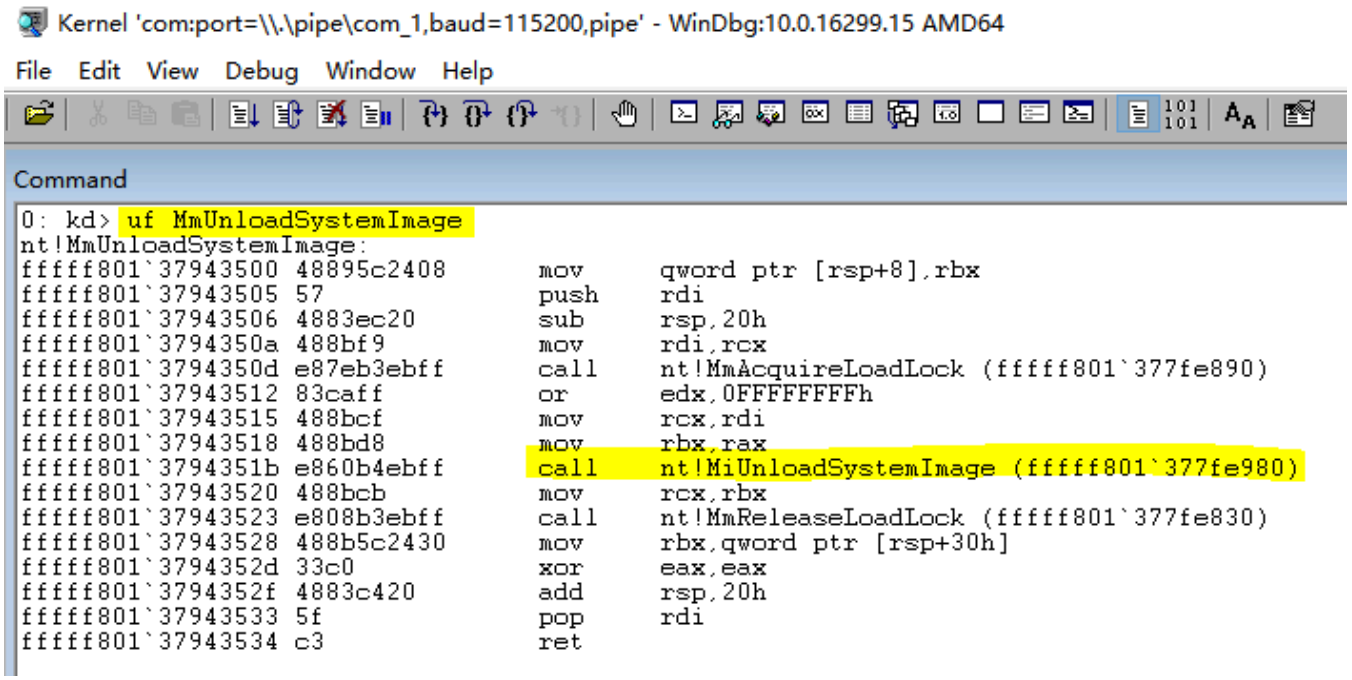
MiProcessLoaderEntry 结构体中包含了进程的各种加载信息，如可执行文件的路径、加载偏移量、加载基地址、入口点地址等。此外，它还包含了一些用于调试和安全的信息，如调试信息指针、保护标志等。

需要注意的是，MiProcessLoaderEntry结构体是一个内部结构体，不应该直接访问它。如果需要访问进程的加载信息，可以使用Windows内核提供的API函数，如ZwQueryInformationProcess和NtQueryInformationProcess等函数。

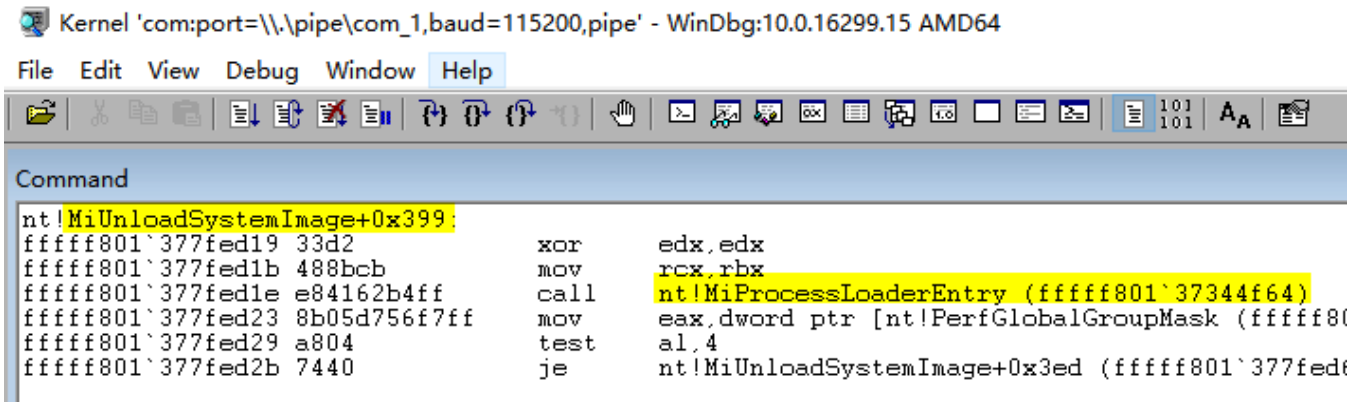
如何找到`MiProcessLoaderEntry`函数入口地址就是下一步的目标，寻找入口可以总结为；

- 1.寻找`MmUnloadSystemImage`函数地址，可通过`MmGetSystemRoutineAddress`函数得到。
- 2.在`MmUnloadSystemImage`里面寻找`MiUnloadSystemImage`函数地址。
- 3.在`MiUnloadSystemImage`里面继续寻找`MiProcessLoaderEntry`即可。

搜索`MmUnloadSystemImage`可定位到`call nt!MiUnloadSystemImage`地址。



搜索`MiUnloadSystemImage`定位到`call nt!MiProcessLoaderEntry`即得到了我们想要的。



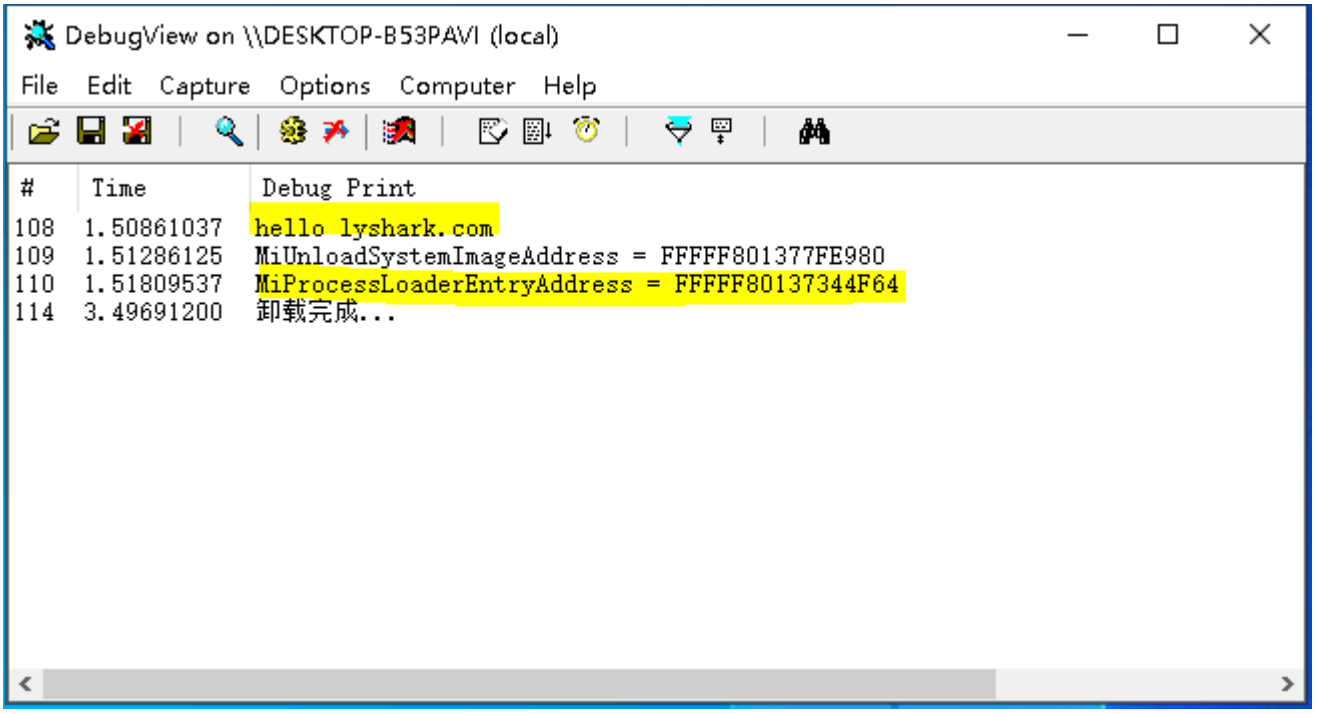
根据前面 枚举篇 系列文章，定位这段特征很容易实现，如下是一段参考代码。

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

typedef NTSTATUS(__fastcall *MiProcessLoaderEntry)(PVOID pDriverSection, BOOLEAN bLoad);

// 取出指定函数地址
PVOID GetProcAddress(WCHAR *FuncName)
{
    UNICODE_STRING u_FuncName = { 0 };
    PVOID ref = NULL;

    RtlInitUnicodeString(&u_FuncName, FuncName);
    ref = MmGetSystemRoutineAddress(&u_FuncName);

    if (ref != NULL)
    {
        return ref;
    }

    return ref;
}

// 特征定位 MiUnloadSystemImage
ULONG64 GetMiUnloadSystemImageAddress()
{
    // 在MmUnloadSystemImage函数中搜索的Code
    /*
    lyshark.com: kd> uf MmUnloadSystemImage
        fffff801`37943512 83caff          or      edx,0FFFFFFFFh
        fffff801`37943515 488bcf          mov     rcx,rdi
        fffff801`37943518 488bd8          mov     rbx,rax
        fffff801`3794351b e860b4ebff      call    nt!MiUnloadSystemImage (fffff801`377fe980)
    */
    CHAR MmUnloadSystemImage_Code[] = "\x83\xCA\xFF"  // or      edx, 0FFFFFFFFh
        "\x48\x8B\xCF"                                // mov     rcx, rdi
        "\x48\x8B\xD8"                                // mov     rbx, rax
        "\xE8";                                       // call    nt!MiUnloadSystemImage
(fffff801`377fe980)
```

```
    ULONG_PTR MmUnloadSystemImageAddress = 0;
    ULONG_PTR MiUnloadSystemImageAddress = 0;
    ULONG_PTR StartAddress = 0;

    MmUnloadSystemImageAddress = (ULONG_PTR)GetProcAddress(L"MmUnloadSystemImage");
    if (MmUnloadSystemImageAddress == 0)
    {
        return 0;
    }

    // 在MmUnloadSystemImage中搜索特征码寻找MiUnloadSystemImage
    StartAddress = MmUnloadSystemImageAddress;
    while (StartAddress < MmUnloadSystemImageAddress + 0x500)
    {
        if (memcmp((VOID*)StartAddress, MmUnloadSystemImage_Code,
strlen(MmUnloadSystemImage_Code)) == 0)
        {
            // 跳过call之前的指令
            StartAddress += strlen(MmUnloadSystemImage_Code);

            // 取出 MiUnloadSystemImage地址
            MiUnloadSystemImageAddress = *(LONG*)StartAddress + StartAddress + 4;
            break;
        }
        ++StartAddress;
    }

    if (MiUnloadSystemImageAddress != 0)
    {
        return MiUnloadSystemImageAddress;
    }
    return 0;
}

// 特征定位 MiProcessLoaderEntry
MiProcessLoaderEntry GetMiProcessLoaderEntry(ULONG64 StartAddress)
{
    if (StartAddress == 0)
    {
        return NULL;
    }

    while (StartAddress < StartAddress + 0x600)
    {
        // 操作数MiProcessLoaderEntry内存地址是动态变化的
        /*
        lyshark.com: kd> uf MiUnloadSystemImage
            fffff801`377fed19 33d2            xor     edx,edx
            fffff801`377fed1b 488bcb          mov     rcx,rbx
            fffff801`377fed1e e84162b4ff      call    nt!MiProcessLoaderEntry
(fffff801`37344f64)
            fffff801`377fed23 8b05d756f7ff    mov     eax,dword ptr [nt!PerfGlobalGroupMask
(fffff801`37774400)]
```

```
            fffff801`377fed29 a804            test    al,4
            fffff801`377fed2b 7440            je      nt!MiUnloadSystemImage+0x3ed
(fffff801`377fed6d)  Branch
            E8 call | 8B 05 mov eax
        */

        // fffff801`377fed1e   | fffff801`377fed23
        // 判断特征 0xE8(call) | 0x8B 0x05(mov eax)
        if (*(UCHAR*)StartAddress == 0xE8 && *(UCHAR *)(StartAddress + 5) == 0x8B && *(UCHAR
*)(StartAddress + 6) == 0x05)
        {
            // 跳过一个字节call的E8
            StartAddress++;

            // StartAddress + 1 + 4
            return (MiProcessLoaderEntry)(*(LONG*)StartAddress + StartAddress + 4);
        }
        ++StartAddress;
    }
    return NULL;
}

VOID UnDriver(PDRIVER_OBJECT driver)
{
    DbgPrint("卸载完成... \n");
}

NTSTATUS DriverEntry(IN PDRIVER_OBJECT Driver, PUNICODE_STRING RegistryPath)
{
    DbgPrint("hello lyshark.com \n");

    ULONG64 MiUnloadSystemImageAddress = GetMiUnloadSystemImageAddress();
    DbgPrint("MiUnloadSystemImageAddress = %p \n", MiUnloadSystemImageAddress);

    MiProcessLoaderEntry MiProcessLoaderEntryAddress =
GetMiProcessLoaderEntry(MiUnloadSystemImageAddress);
    DbgPrint("MiProcessLoaderEntryAddress = %p \n", (ULONG64)MiProcessLoaderEntryAddress);

    Driver->DriverUnload = UnDriver;
    return STATUS_SUCCESS;
}
```

运行驱动程序，即可得到`MiProcessLoaderEntryAddress`的内存地址。



得到内存地址之后，直接破坏掉自身驱动的入口地址等，即可实现隐藏自身。

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

typedef NTSTATUS(*NTQUERYSYSTEMINFORMATION)(
  IN ULONG SystemInformationClass,
  OUT PVOID   SystemInformation,
  IN ULONG_PTR    SystemInformationLength,
  OUT PULONG_PTR  ReturnLength OPTIONAL);

NTSYSAPI NTSTATUS NTAPI ObReferenceObjectByName(
  __in PUNICODE_STRING ObjectName,
  __in ULONG Attributes,
  __in_opt PACCESS_STATE AccessState,
  __in_opt ACCESS_MASK DesiredAccess,
  __in POBJECT_TYPE ObjectType,
  __in KPROCESSOR_MODE AccessMode,
  __inout_opt PVOID ParseContext,
  __out PVOID* Object
  );

typedef struct _SYSTEM_MODULE_INFORMATION
{
  HANDLE Section;
  PVOID MappedBase;
  PVOID Base;
  ULONG Size;
  ULONG Flags;
  USHORT LoadOrderIndex;
  USHORT InitOrderIndex;
  USHORT LoadCount;
  USHORT PathLength;
```

```
  CHAR ImageName[256];
} SYSTEM_MODULE_INFORMATION, *PSYSTEM_MODULE_INFORMATION;

typedef struct _LDR_DATA_TABLE_ENTRY
{
  LIST_ENTRY InLoadOrderLinks;
  LIST_ENTRY InMemoryOrderLinks;
  LIST_ENTRY InInitializationOrderLinks;
  PVOID      DllBase;
  PVOID      EntryPoint;
}LDR_DATA_TABLE_ENTRY, *PLDR_DATA_TABLE_ENTRY;

extern POBJECT_TYPE *IoDriverObjectType;
typedef NTSTATUS(__fastcall *MiProcessLoaderEntry)(PVOID pDriverSection, BOOLEAN bLoad);
ULONG64 MiUnloadSystemImageAddress = 0;

// 取出指定函数地址
PVOID GetProcAddress(WCHAR *FuncName)
{
    UNICODE_STRING u_FuncName = { 0 };
    PVOID ref = NULL;

    RtlInitUnicodeString(&u_FuncName, FuncName);
    ref = MmGetSystemRoutineAddress(&u_FuncName);

    if (ref != NULL)
    {
    return ref;
    }

    return ref;
}

// 特征定位 MiUnloadSystemImage
ULONG64 GetMiUnloadSystemImageAddress()
{
    CHAR MmUnloadSystemImage_Code[] = "\x83\xCA\xFF\x48\x8B\xCF\x48\x8B\xD8\xE8";

    ULONG_PTR MmUnloadSystemImageAddress = 0;
    ULONG_PTR MiUnloadSystemImageAddress = 0;
    ULONG_PTR StartAddress = 0;

    MmUnloadSystemImageAddress = (ULONG_PTR)GetProcAddress(L"MmUnloadSystemImage");
    if (MmUnloadSystemImageAddress == 0)
    {
    return 0;
    }

    // 在MmUnloadSystemImage中搜索特征码寻找MiUnloadSystemImage
    StartAddress = MmUnloadSystemImageAddress;
    while (StartAddress < MmUnloadSystemImageAddress + 0x500)
    {
```

```
    if (memcmp((VOID*)StartAddress, MmUnloadSystemImage_Code,
strlen(MmUnloadSystemImage_Code)) == 0)
    {
        StartAddress += strlen(MmUnloadSystemImage_Code);
        MiUnloadSystemImageAddress = *(LONG*)StartAddress + StartAddress + 4;
        break;
    }
    ++StartAddress;
    }

    if (MiUnloadSystemImageAddress != 0)
    {
    return MiUnloadSystemImageAddress;
    }
    return 0;
}

// 特征定位 MiProcessLoaderEntry
MiProcessLoaderEntry GetMiProcessLoaderEntry(ULONG64 StartAddress)
{
    if (StartAddress == 0)
    {
    return NULL;
    }

    while (StartAddress < StartAddress + 0x600)
    {
    if (*(UCHAR*)StartAddress == 0xE8 && *(UCHAR *)(StartAddress + 5) == 0x8B && *(UCHAR *)
(StartAddress + 6) == 0x05)
    {
        StartAddress++;
        return (MiProcessLoaderEntry)(*(LONG*)StartAddress + StartAddress + 4);
    }
    ++StartAddress;
    }
    return NULL;
}

// 根据驱动名获取驱动对象
BOOLEAN GetDriverObjectByName(PDRIVER_OBJECT *DriverObject, WCHAR *DriverName)
{
    PDRIVER_OBJECT TempObject = NULL;
    UNICODE_STRING u_DriverName = { 0 };
    NTSTATUS Status = STATUS_UNSUCCESSFUL;

    RtlInitUnicodeString(&u_DriverName, DriverName);
    Status = ObReferenceObjectByName(&u_DriverName, OBJ_CASE_INSENSITIVE, NULL, 0,
*IoDriverObjectType, KernelMode, NULL, &TempObject);
    if (!NT_SUCCESS(Status))
    {
    *DriverObject = NULL;
    return FALSE;
    }
```

```
    *DriverObject = TempObject;
    return TRUE;
}

BOOLEAN SupportSEH(PDRIVER_OBJECT DriverObject)
{
    PDRIVER_OBJECT Object = NULL;;
    PLDR_DATA_TABLE_ENTRY LdrEntry = NULL;

    GetDriverObjectByName(&Object, L"\\Driver\\tdx");
    if (Object == NULL)
    {
        return FALSE;
    }

    // 将获取到的驱动对象节点赋值给自身LDR
    LdrEntry = (PLDR_DATA_TABLE_ENTRY)DriverObject->DriverSection;
    LdrEntry->DllBase = Object->DriverStart;
    ObDereferenceObject(Object);
    return TRUE;
}

VOID InitInLoadOrderLinks(PLDR_DATA_TABLE_ENTRY LdrEntry)
{
    InitializeListHead(&LdrEntry->InLoadOrderLinks);
    InitializeListHead(&LdrEntry->InMemoryOrderLinks);
}

VOID Reinitialize(PDRIVER_OBJECT DriverObject, PVOID Context, ULONG Count)
{
    MiProcessLoaderEntry m_MiProcessLoaderEntry = NULL;
    ULONG *p = NULL;

    m_MiProcessLoaderEntry = GetMiProcessLoaderEntry(MiUnloadSystemImageAddress);
    if (m_MiProcessLoaderEntry == NULL)
    {
        return;
    }

    SupportSEH(DriverObject);

    m_MiProcessLoaderEntry(DriverObject->DriverSection, 0);
    InitInLoadOrderLinks((PLDR_DATA_TABLE_ENTRY)DriverObject->DriverSection);

    // 破坏驱动对象特征
    DriverObject->DriverSection = NULL;
    DriverObject->DriverStart = NULL;
    DriverObject->DriverSize = 0;
    DriverObject->DriverUnload = NULL;
    DriverObject->DriverInit = NULL;
    DriverObject->DeviceObject = NULL;
```

```
    DbgPrint("驱动隐藏 \n");
}

VOID UnDriver(PDRIVER_OBJECT driver)
{
  DbgPrint("卸载完成... \n");
}

NTSTATUS DriverEntry(IN PDRIVER_OBJECT Driver, PUNICODE_STRING RegistryPath)
{
    DbgPrint("hello lyshark.com \n");

    MiUnloadSystemImageAddress = GetMiUnloadSystemImageAddress();
    MiProcessLoaderEntry MiProcessLoaderEntryAddress =
GetMiProcessLoaderEntry(MiUnloadSystemImageAddress);

    // 无痕隐藏
    IoRegisterDriverReinitialization(Driver, Reinitialize, NULL);

    Driver->DriverUnload = UnDriver;
    return STATUS_SUCCESS;
}
```

运行驱动程序，让后看到如下输出信息；