COM server realizations: Instruction flow comparisson

HLL (Delphi, but no matter, mostly inline assembler) vs flat assembler

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This document represent list of all procedures used in realizations of COM server.They combined in pairs – one maked in HLL and corresponding one maked in flat assembler.First page mostly placeholder to save even number of pages and realize table of contents.

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```
; Exported entry   4. DllGetClassObject


; Attributes: bp-based frame

; HRESULT __stdcall DllGetClassObject(const IID *const rclsid, const IID *const riid, LPVOID *ppv)
public DllGetClassObject
DllGetClassObject proc near

rclsid= dword ptr  8
riid= dword ptr  0Ch
ppv= dword ptr  10h

push    ebp
mov     ebp, esp
push    ebx
mov     ebx, [ebp+ppv]
test    ebx, ebx
jz      short _ret_E_POINTER
```

```
xor     eax, eax
mov     [ebx], eax
push    esi
push    edi
mov     esi, [ebp+rclsid]
mov     edi, offset CLSID_QuickRegister
mov     ecx, 4
repe cmpsd
pop     edi
pop     esi
jnz     short _ret_CLASS_E_CLASSNOTAVAILABLE
```

```
push    ebx
mov     eax, [ebp+riid]
push    eax
mov     eax, offset QRClassFactory_COMobject
push    eax
mov     eax, [eax]
call    dword ptr [eax]
jmp     short _locret
```

```
_ret_CLASS_E_CLASSNOTAVAILABLE:
mov     eax, CLASS_E_CLASSNOTAVAILABLE
```

```
_ret_E_POINTER:
mov     eax, E_POINTER
jmp     short _locret
```

```
_locret:
pop     ebx
pop     ebp
retn    0Ch
DllGetClassObject endp
```

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```
; Exported entry   1. DllGetClassObject


; Attributes: bp-based frame

; HRESULT __stdcall DllGetClassObject(const IID *const rclsid, const IID *const riid, LPVOID *ppv)
public DllGetClassObject
DllGetClassObject proc near

rclsid= dword ptr  8
riid= dword ptr  0Ch
ppv= dword ptr  10h

push    ebx
mov     ebx, [esp+4+ppv]
test    ebx, ebx
jz      short _ret_E_POINTER
```

```
xor     eax, eax
mov     [ebx], eax
push    esi
push    edi
cld
mov     esi, [esp+0Ch+rclsid]
mov     edi, offset CLSID_QuickRegister
mov     ecx, 4
repe cmpsd
pop     edi
pop     esi
jnz     short _ret_CLASS_E_CLASSNOTAVAILABLE
```

```
push    ebx
push    [esp+8+riid]
mov     eax, QRClassFactory_COMobject
push    eax
mov     eax, [eax]
call    dword ptr [eax]
jmp     short _locret
```

```
_ret_CLASS_E_CLASSNOTAVAILABLE:
mov     eax, CLASS_E_CLASSNOTAVAILABLE
```

```
_ret_E_POINTER:
mov     eax, E_POINTER
jmp     short _locret
```

```
_locret:
pop     ebx
retn    0Ch
DllGetClassObject endp
```

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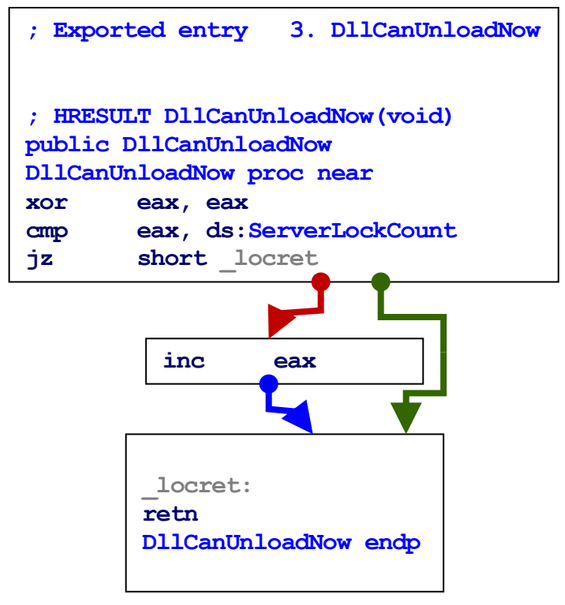

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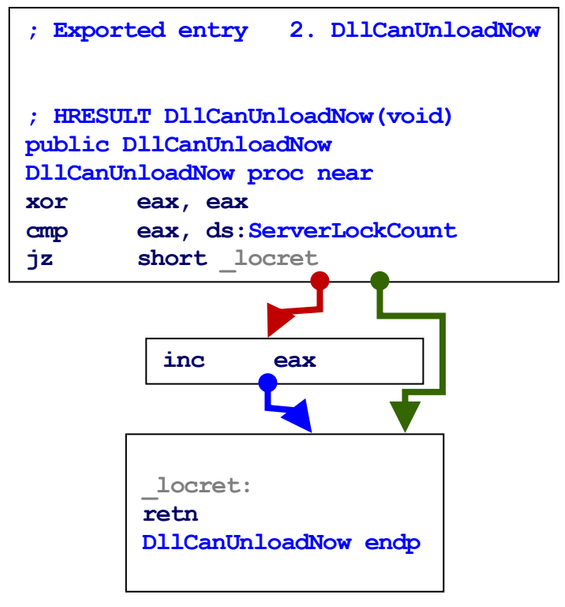

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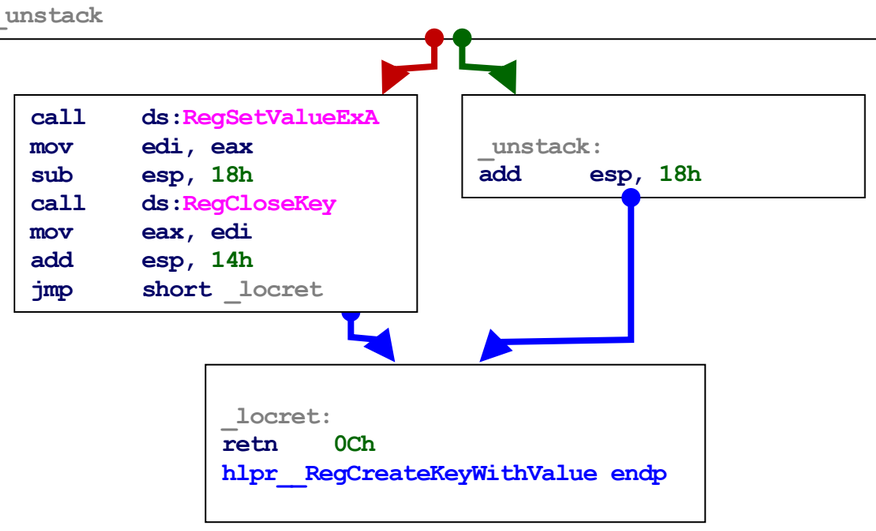
```
; Attributes: bp-based frame

; int __stdcall hlpr__RegCreateKeyWithValue(LPCSTR lpSubKey, LPCSTR lpValueName, BYTE *lpData)
hlpr__RegCreateKeyWithValue proc near

dwDisposition= dword ptr -8
phkResult= dword ptr -4
lpSubKey= dword ptr  8
lpValueName= dword ptr  0Ch
lpData= dword ptr  10h

push    ebp
mov     ebp, esp
add     esp, -8
push    ebx
push    esi
mov     esi, [ebp+lpData]
lea     eax, [ebp+dwDisposition]
push    eax             ; lpdwDisposition
lea     eax, [ebp+phkResult]
push    eax             ; phkResult
push    0               ; lpSecurityAttributes
push    KEY_READ or KEY_WRITE ; samDesired
push    0               ; dwOptions
push    offset Class    ; lpClass
push    0               ; Reserved
mov     eax, [ebp+lpSubKey]
push    eax             ; lpSubKey
mov     eax, ds:RootKey
push    eax             ; hKey
call    RegCreateKeyExA
mov     ebx, eax
test    ebx, ebx
jnz     short _locret
```

```
mov     eax, esi        ; char *
call    @SysutilsMini@StrLen$qqrpxc ; SysutilsMini::StrLen(char *)
inc     eax
push    eax             ; cbData
push    esi             ; lpData
push    REG_SZ          ; dwType
push    0               ; Reserved
mov     eax, [ebp+lpValueName]
push    eax             ; lpValueName
mov     eax, [ebp+phkResult]
push    eax             ; hKey
call    RegSetValueExA
mov     ebx, eax
mov     eax, [ebp+phkResult]
push    eax             ; hKey
call    RegCloseKey
```

```
; Attributes: library function

; _DWORD __fastcall SysutilsMini::StrLen(const char *)
@SysutilsMini@StrLen$qqrpxc proc near
mov     edx, edi
mov     edi, eax
mov     ecx, -1
xor     al, al
repne scasb
mov     eax, -2
sub     eax, ecx
mov     edi, edx
retn
@SysutilsMini@StrLen$qqrpxc endp
```

```
_locret:
mov     eax, ebx
pop     esi
pop     ebx
pop     ecx
pop     ecx
pop     ebp
retn    0Ch
hlpr__RegCreateKeyWithValue endp
```

```
; int __stdcall hlpr__RegCreateKeyWithValue(LPCSTR lpSubKey, LPCSTR lpValueName, BYTE *lpData)
hlpr__RegCreateKeyWithValue proc near

lpSubKey= dword ptr  4
lpValueName= dword ptr  8
lpData= dword ptr  0Ch

cld
mov     edi, [esp+lpData]
mov     ecx, -1
xor     eax, eax
repne scasb
not     ecx
sub     edi, ecx
push    ecx             ; cbData
push    edi             ; lpData
push    REG_SZ          ; dwType
push    eax             ; Reserved
push    [esp+10h+lpValueName] ; lpValueName
push    eax             ; hKey
mov     edi, esp
push    eax             ; lpdwDisposition
push    edi             ; phkResult
push    eax             ; lpSecurityAttributes
push    KEY_READ or KEY_WRITE ; samDesired
push    0               ; dwOptions
push    eax             ; lpClass
push    eax             ; Reserved
push    [esp+34h+lpSubKey] ; lpSubKey
push    RootKey         ; hKey
call    ds:RegCreateKeyExA
test    eax, eax
jnz     short _unstack
```



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```
; Exported entry   2. DllRegisterServer


; Attributes: bp-based frame

; HRESULT __stdcall DllRegisterServer()
public DllRegisterServer
DllRegisterServer proc near
push    ebx
mov     ds:RootKey, HKEY_CLASSES_ROOT
mov     ebx, S_FALSE
push    offset CLSIDDescription ; "Quick Register Context Menu Shell Exten"...
push    offset NullStr  ; ""
push    offset CLSIDStr ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    261             ; nSize
push    offset REGFileName ; lpFilename
mov     eax, ds:hInstance
push    eax             ; hModule
call    GetModuleFileNameA
test    eax, eax
jbe     _unregister
```

```
push    offset REGFileName ; lpData
push    offset NullStr  ; ""
push    offset CLSIDInprocServer ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset ApartmentStr ; "Apartment"
push    offset ThreadingModelStr ; "ThreadingModel"
push    offset CLSIDInprocServer ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset NullStr  ; ""
push    offset NullStr  ; ""
push    offset dllfile_shellex_Str ; "dllfile\\shellex"
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset NullStr  ; ""
push    offset NullStr  ; ""
push    offset dllfile_shellex_CMH_Str ; "dllfile\\shellex\\ContextMenuHandlers"
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset CLSIDString_QuickRegister ; "{40E69241-5D1A-11D1-81CB-0020AF3E97A9}"
push    offset NullStr  ; ""
push    offset dllfile_shellex_CMH_QR_Str ; "dllfile\\shellex\\ContextMenuHandlers\\"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
_unregister:
call    DllUnregisterServer
mov     ebx, SELFREG_E_CLASS
push    MB_ICONERROR or MB_OK ; uType
push    offset REGFileName ; lpCaption
mov     eax, ds:lpErrUpdReg  ; offset ErrUpdRegistry
push    eax             ; lpText
push    0               ; hWnd
call    MessageBoxA
```

```
mov     ds:RootKey, HKEY_LOCAL_MACHINE
push    offset NullStr  ; ""
push    offset NullStr  ; ""
push    offset cur_vers_shellex_Str ; "SOFTWARE\\Microsoft\\Windows\\CurrentVe"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _locret
```

```
push    offset CLSIDDescription ; "Quick Register Context Menu Shell Exten"...
push    offset CLSIDString_QuickRegister ; "{40E69241-5D1A-11D1-81CB-0020AF3E97A9}"
push    offset cur_vers_shellex_approv_Str ; "SOFTWARE\\Microsoft\\Windows\\CurrentVe"...
call    hlpr__RegCreateKeyWithValue
mov     ebx, eax
jmp     _locret
```

```
_locret:
mov     eax, ebx
pop     ebx
retn
DllRegisterServer endp
```

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```
; Exported entry   3. DllRegisterServer


; HRESULT __stdcall DllRegisterServer()
public DllRegisterServer
DllRegisterServer proc near
push    edi
mov     ds:RootKey, HKEY_CLASSES_ROOT
push    offset CLSIDDescription ; "Quick Register Context Menu Shell Exten"...
push    offset NullStr  ; ""
push    offset CLSIDStr ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    261             ; nSize
push    offset REGFileName ; lpFilename
mov     eax, ds:hInstance
push    eax             ; hModule
call    ds:GetModuleFileNameA
test    eax, eax
jbe     _unregister
```

```
push    offset REGFileName ; lpData
push    offset NullStr  ; ""
push    offset CLSIDInprocServer ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset ApartmentStr ; "Apartment"
push    offset ThreadingModelStr ; "ThreadingModel"
push    offset CLSIDInprocServer ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset NullStr  ; ""
push    offset NullStr  ; ""
push    offset dllfile_shellex_Str ; "dllfile\\shellex"
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset NullStr  ; ""
push    offset NullStr  ; ""
push    offset dllfile_shellex_CMH_Str ; "dllfile\\shellex\\ContextMenuHandlers"
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
push    offset CLSIDString_QuickRegister ; "{40E69241-5D1A-11D1-81CB-0020AF3E97A9}"
push    offset NullStr  ; ""
push    offset dllfile_shellex_CMH_QR_Str ; "dllfile\\shellex\\ContextMenuHandlers\\"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _unregister
```

```
_unregister:
call    DllUnregisterServer
mov     ebx, SELFREG_E_CLASS
push    MB_ICONERROR or MB_OK ; uType
push    offset REGFileName ; lpCaption
mov     eax, offset ErrUpdRegistry ; "Error updating registry"
push    eax             ; lpText
push    0               ; hWnd
call    ds:MessageBoxA
```

```
mov     ds:RootKey, HKEY_LOCAL_MACHINE
push    offset NullStr  ; ""
push    offset NullStr  ; ""
push    offset cur_vers_shellex_Str ; "SOFTWARE\\Microsoft\\Windows\\CurrentVe"...
call    hlpr__RegCreateKeyWithValue
test    eax, eax
jnz     _ret_S_FALSE
```

```
_ret_S_FALSE:
xor     eax, eax
inc     eax
```

```
push    offset CLSIDDescription ; "Quick Register Context Menu Shell Exten"...
push    offset CLSIDString_QuickRegister ; "{40E69241-5D1A-11D1-81CB-0020AF3E97A9}"
push    offset cur_vers_shellex_approv_Str ; "SOFTWARE\\Microsoft\\Windows\\CurrentVe"...
call    hlpr__RegCreateKeyWithValue
jmp     _locret
```

```
_locret:
pop     edi
retn
DllRegisterServer endp
```

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```
; Exported entry   1. DllUnregisterServer


; HRESULT __stdcall DllUnregisterServer()
public DllUnregisterServer
DllUnregisterServer proc near
push    ebx
mov     ebx, offset RootKey
mov     dword ptr [ebx], HKEY_CLASSES_ROOT
push    offset dllfile_shellex_CMH_QR_Str ; "dllfile\\shellex\\ContextMenuHandlers\\"...
mov     eax, [ebx]
push    eax             ; hKey
call    RegDeleteKeyA
push    offset dllfile_shellex_CMH_Str ; "dllfile\\shellex\\ContextMenuHandlers"
mov     eax, [ebx]
push    eax             ; hKey
call    RegDeleteKeyA
push    offset dllfile_shellex_Str ; "dllfile\\shellex"
mov     eax, [ebx]
push    eax             ; hKey
call    RegDeleteKeyA
push    offset CLSIDInprocServer ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
mov     eax, [ebx]
push    eax             ; hKey
call    RegDeleteKeyA
push    offset CLSIDStr ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
mov     eax, [ebx]
push    eax             ; hKey
call    RegDeleteKeyA
push    eax             ; hKey
call    RegDeleteKeyA
xor     eax, eax
pop     ebx
retn
DllUnregisterServer endp
```

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```
; Exported entry   4. DllUnregisterServer


; HRESULT __stdcall DllUnregisterServer()
public DllUnregisterServer
DllUnregisterServer proc near
mov     RootKey, HKEY_CLASSES_ROOT
push    offset dllfile_shellex_CMH_QR_Str ; "dllfile\\shellex\\ContextMenuHandlers\\"...
push    RootKey         ; hKey
call    ds:RegDeleteKeyA
push    offset dllfile_shellex_CMH_Str ; "dllfile\\shellex\\ContextMenuHandlers"
push    RootKey         ; hKey
call    ds:RegDeleteKeyA
push    offset dllfile_shellex_Str ; "dllfile\\shellex"
push    RootKey         ; hKey
call    ds:RegDeleteKeyA
push    offset CLSIDInprocServer ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
push    RootKey         ; hKey
call    ds:RegDeleteKeyA
push    offset CLSIDStr ; "CLSID\\{40E69241-5D1A-11D1-81CB-0020AF3"...
push    RootKey         ; hKey
call    ds:RegDeleteKeyA
retn
DllUnregisterServer endp
```

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```
; BOOL __stdcall hlpr_HeapFreeStack(LPVOID lpMem)
hlpr_HeapFreeStack proc near

lpMem= dword ptr  4

pop     ebx
push    0                   ; dwFlags
push    ds:pHeap            ; hHeap
push    ebx
jmp     HeapFree
hlpr_HeapFreeStack endp
```

```
; LPVOID hlpr_allocCOMobj
hlpr_allocCOMobj proc near
push    10h         ; SIZE_T
jmp     _alloc
```

```
; LPVOID hlpr_allocCOMobjStr
hlpr_allocCOMobj proc near
push    261         ; SIZE_T
```

```
_alloc:
push    0           ; dwFlags
push    ds:pHeap    ; hHeap
call    HeapAlloc
test    eax, eax
retn
```

```
hlpr_allocCOMobj endp
```

```
hlpr_allocCOMobjStr endp
```

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```
; BOOL __stdcall hlpr_HeapFreeStack(LPVOID lpMem)
hlpr_HeapFreeStack proc near

lpMem= dword ptr  4

pop     ebx
push    0               ; dwFlags
push    ds:pHeap        ; hHeap
push    ebx
jmp     ds:HeapFree
hlpr_HeapFreeStack endp
```

```
; LPVOID hlpr_allocCOMobj
hlpr_allocCOMobj proc near
push    10h         ; SIZE_T
jmp     _alloc
```

```
; LPVOID hlpr_allocCOMobjStr
hlpr_allocCOMobj proc near
push    261         ; SIZE_T
```

```
_alloc:
push    0           ; dwFlags
push    ds:pHeap    ; hHeap
call    ds:HeapAlloc
test    eax, eax
retn
```

```
hlpr_allocCOMobj endp
```

```
hlpr_allocCOMobjStr endp
```

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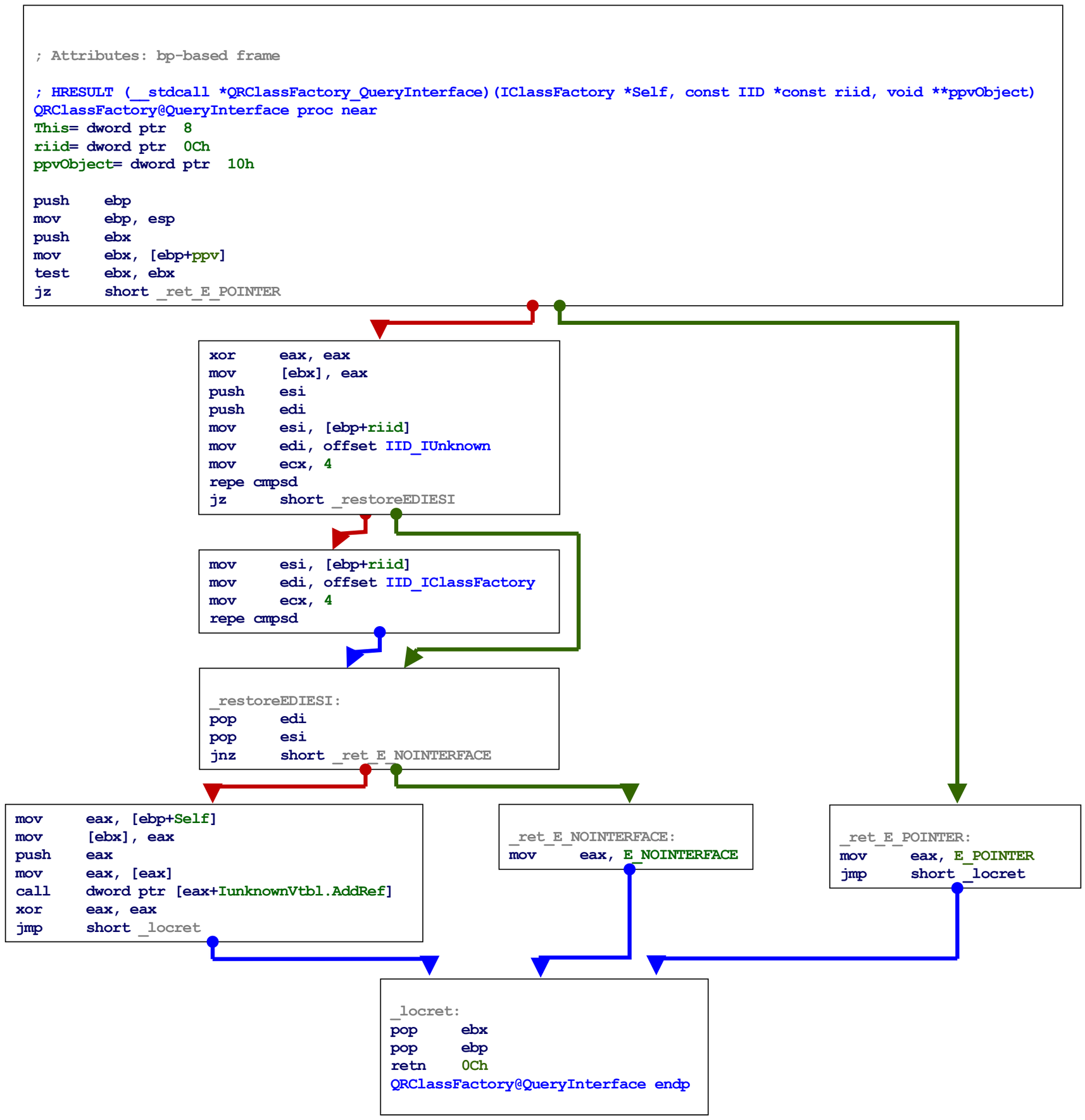

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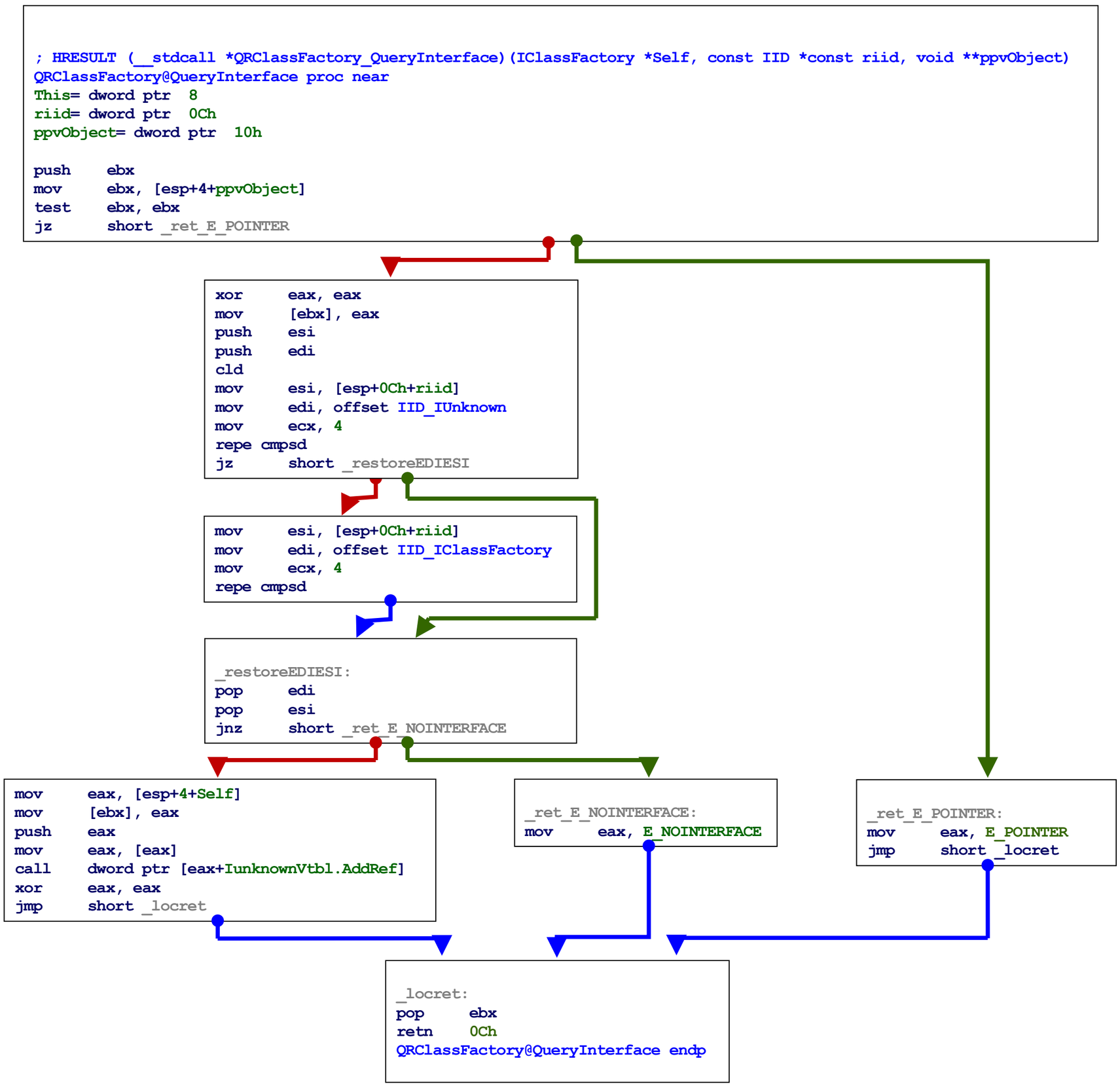

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```
; Attributes: bp-based frame

; ULONG (__stdcall *QRClassFactory_AddRef)(IClassFactory *Self)
QRClassFactory@AddRef proc near
push    ebp
mov     ebp, esp
push    offset ServerLockCount ; lpAddend
call    InterlockedIncrement
mov     eax, 2
pop     ebp
retn    4
QRClassFactory@AddRef endp
```

```
; ULONG (__stdcall *QRClassFactory_AddRef)(IClassFactory *Self)
QRClassFactory@AddRef proc near
push    offset ServerLockCount ; lpAddend
call    ds:InterlockedIncrement
mov     eax, 2
retn    4
QRClassFactory@AddRef endp
```

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```
; Attributes: bp-based frame

; ULONG (__stdcall *QRClassFactory_Release)(IClassFactory *Self)
QRClassFactory@Release proc near
push    ebp
mov     ebp, esp
push    offset ServerLockCount ; lpAddend
call    InterlockedDecrement
mov     eax, 1
pop     ebp
retn    4
QRClassFactory@Release endp
```

```
; ULONG (__stdcall *QRClassFactory_Release)(IClassFactory *Self)
QRClassFactory@Release proc near
push    offset ServerLockCount ; lpAddend
call    ds:InterlockedDecrement
xor     eax, eax
inc     eax
retn    4
QRClassFactory@Release endp
```

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```
; Attributes: bp-based frame

; HRESULT (__stdcall *QRClassFactory_CreateInstance)(IClassFactory *Self, IUnknown *pUnkOuter, const IID *const
riid, void **ppvObject)
QRClassFactory@CreateInstance proc near

pUnkOuter= dword ptr  0Ch
riid= dword ptr  10h
ppvObject= dword ptr  14h

push    ebp
mov     ebp, esp
push    ebx
mov     ebx, [ebp+ppvObject]
test    ebx, ebx
jz      short _ret_E_POINTER
```

```
xor     eax, eax
mov     [ebx], eax
cmp     [ebp+pUnkOuter], eax
jnz     short _ret_CLASS_E_NOAGGREGATION
```

```
call    hlpr_allocCOMobj
jz      short _ret_E_OUTOFMEMORY
```

```
push    eax
call    hlpr_allocCOMobjStr
jz      short _free_ret_E_OUTOFMEMORY
```

```
pop     edx
mov     byte ptr [eax], 0
xchg    esp, edx
add     esp, 10h
push    eax
push    0
push    offset ShellExtInit
push    offset ContextMenu
xchg    esp, edx
push    edx
push    eax
push    ebx
push    [ebp+riid]
push    edx
mov     eax, [edx]
call    dword ptr [eax+IunknownVtbl.QueryInterface]
cmp     eax, 0
jl      short _ret_E_FAIL
```

```
_free_ret_E_OUTOFMEMORY:
call    hlpr_HeapFreeStack
```

```
pop     ebx
pop     ebx
push    offset ServerLockCount ; lpAddend
call    InterlockedIncrement
xor     eax, eax
jmp     short _locret
```

```
_ret_E_FAIL:
call    hlpr_HeapFreeStack
call    hlpr_HeapFreeStack
mov     eax, E_FAIL
```

```
_ret_E_OUTOFMEMORY:
mov     eax, E_OUTOFMEMORY
jmp     short _locret
```

```
_ret_ CLASS_E_NOAGGREGATION:
mov     eax, CLASS_E_NOAGGREGATION
```

```
_ret_E_POINTER:
mov     eax, E_POINTER
jmp     short _locret
```

```
_locret:
pop     ebx
pop     ebp
retn    10h
QRClassFactory@CreateInstance endp
```

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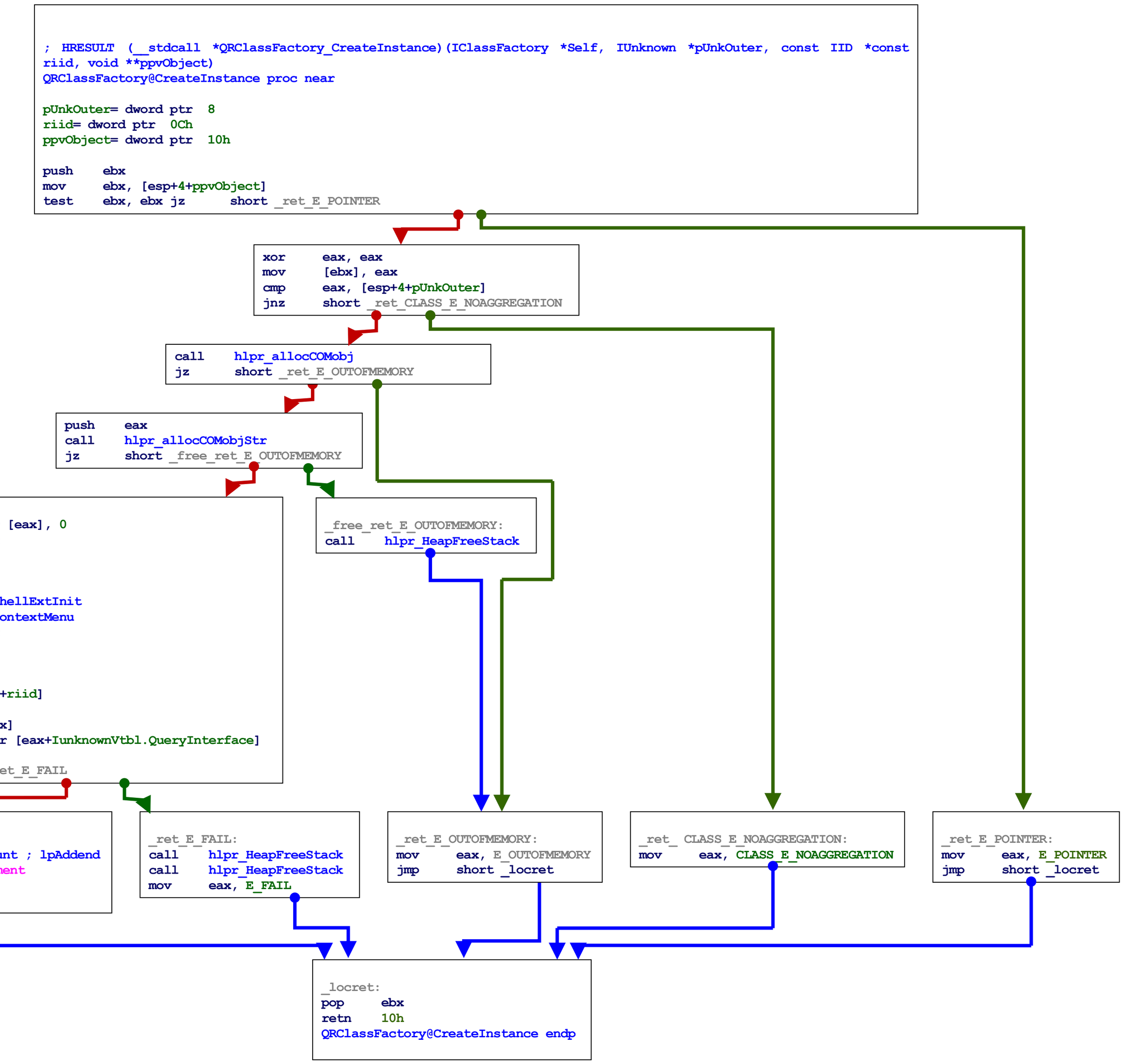

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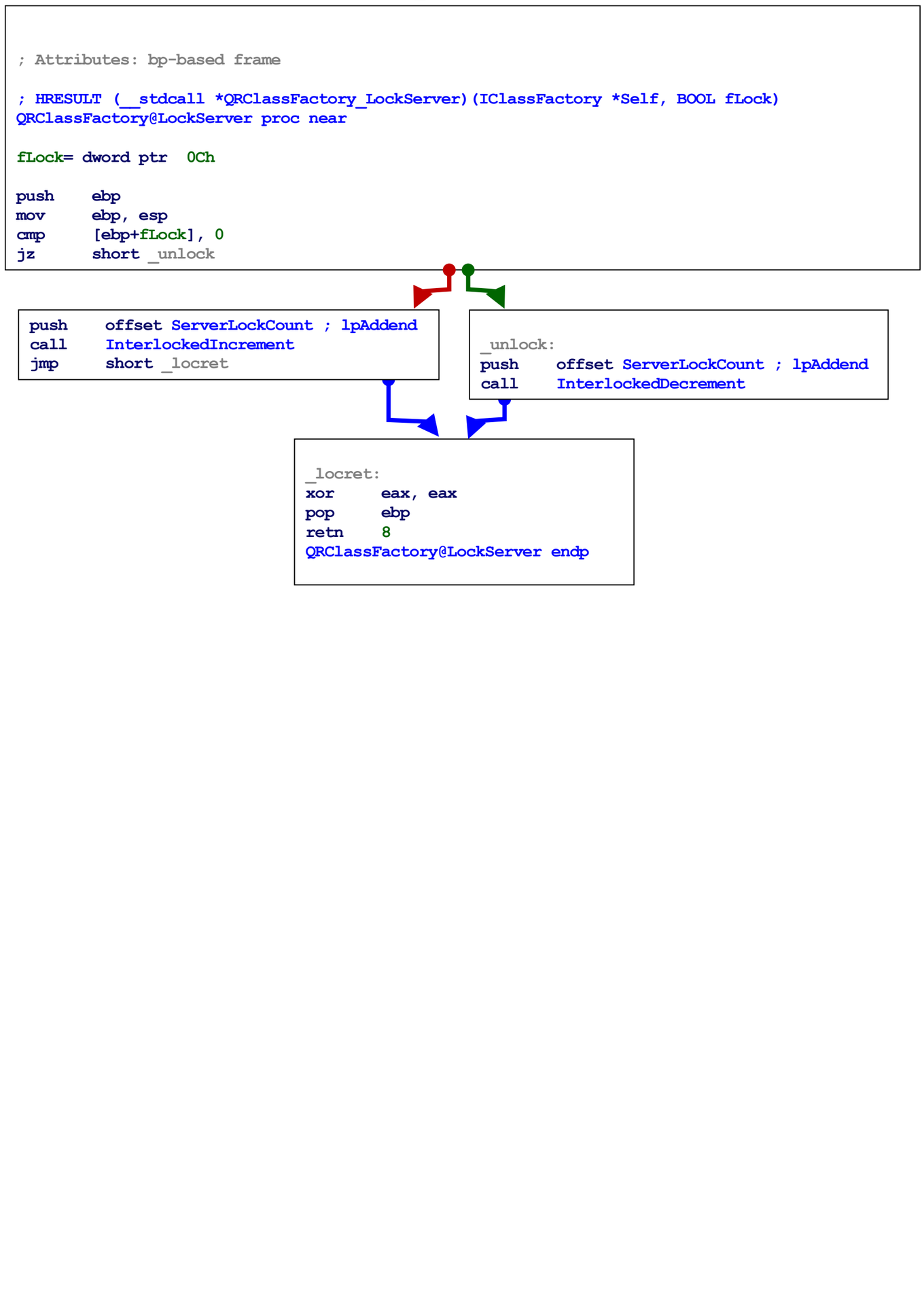

```
; HRESULT (__stdcall *QRClassFactory_LockServer)(IClassFactory *Self, BOOL fLock)
QRClassFactory@LockServer proc near

fLock= dword ptr  8

mov     eax, [esp+fLock]
lea     eax, _Interlockeds[eax*4]
push    offset ServerLockCount
call    dword ptr [eax]
xor     eax, eax
retn    8
QRClassFactory@LockServer endp
```

```
dd offset InterlockedIncrement
_Interlockeds:
dd offset InterlockedDecrement
dd offset InterlockedIncrement
```

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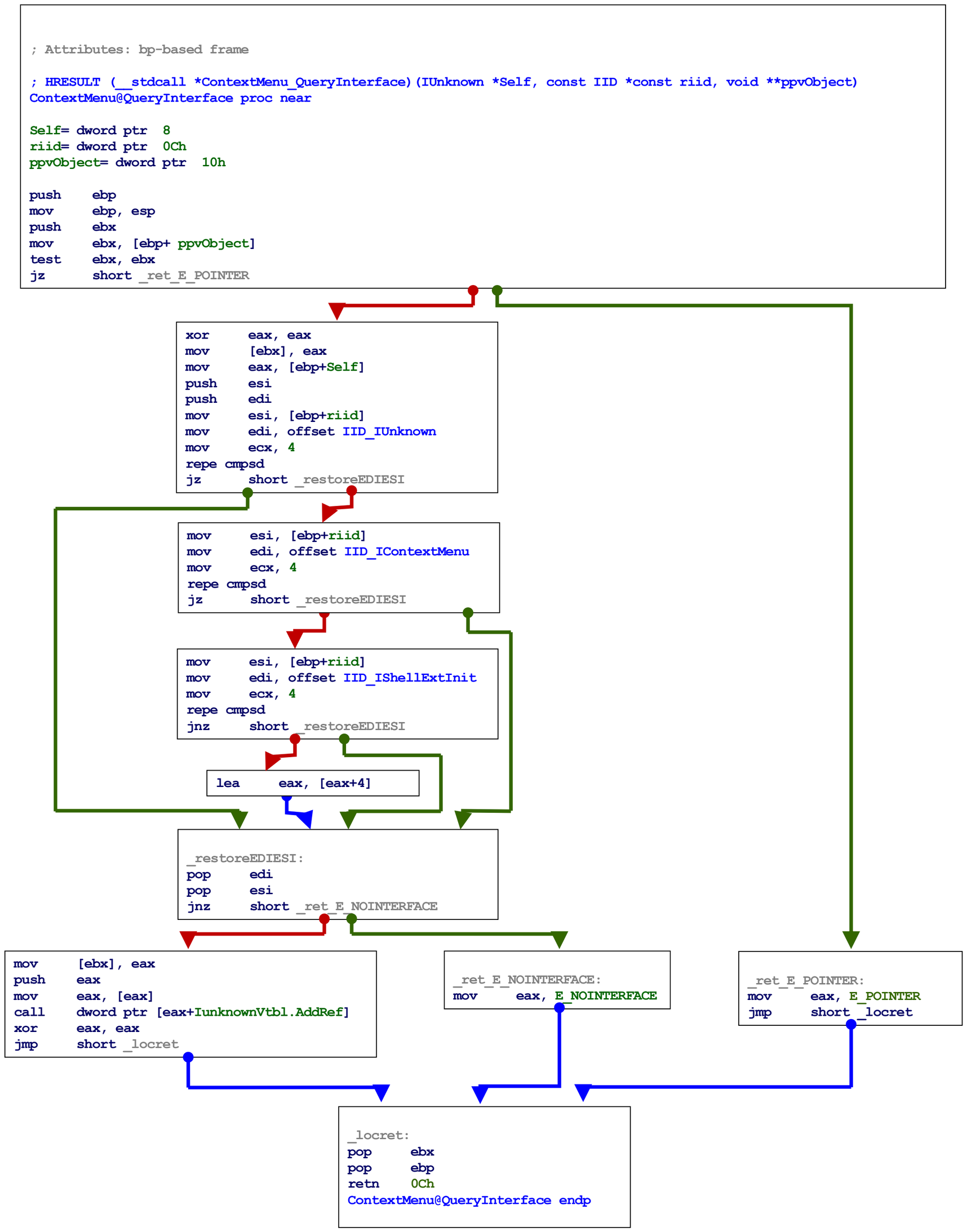

= Errornous Fasm compiled COM Server =
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```
; HRESULT (__stdcall *ContextMenu_QueryInterface)(IUnknown *Self, const IID *const riid, void **ppvObject)
ContextMenu@QueryInterface proc near

Self= dword ptr  4
riid= dword ptr  8
ppvObject= dword ptr  0Ch

push    ebx
mov     ebx, [esp+4+ppvObject]
test    ebx, ebx
jz      short _ret_E_POINTER
```

```
xor     eax, eax
mov     [ebx], eax
mov     eax, [esp+4+Self]
push    esi
push    edi
cld
mov     esi, [esp+0Ch+riid]
mov     edi, offset IID_IUnknown
mov     ecx, 4
repe cmpsd
jz      short _restoreEDIESI
```

```
mov     esi, [esp+0Ch+riid]
mov     edi, offset IID_IContextMenu
mov     ecx, 4
repe cmpsd
jz      short _restoreEDIESI
```

```
mov     esi, [esp+0Ch+riid]
mov     edi, offset IID_IShellExtInit
mov     ecx, 4
repe cmpsd
jnz     short _restoreEDIESI
```

```
lea     eax, [eax+4]
```

```
_restoreEDIESI:
pop     edi
pop     esi
jnz     short _ret_E_NOINTERFACE
```

```
mov     [ebx], eax
push    eax
mov     eax, [eax]
call    dword ptr [eax+IunknownVtbl.AddRef]
xor     eax, eax
jmp     short _locret
```

```
_ret_E_NOINTERFACE:
mov     eax, E_NOINTERFACE
```

```
_ret_E_POINTER:
mov     eax, E_POINTER
jmp     short _locret
```

```
_locret:
pop     ebx
retn    0Ch
ContextMenu@QueryInterface endp
```

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```
; Attributes: bp-based frame

; ULONG (__stdcall *ContextMenu_AddRef)( Iunknown *Self)
ContextMenu_AddRef proc near

Self= dword ptr  8

push    ebp
mov     ebp, esp
mov     eax, [ebp+Self]
add     eax, 8
push    eax ; lpAddend
call    InterlockedIncrement
pop     ebp
retn    4
ContextMenu_AddRef endp
```

```
; ULONG (__stdcall *ContextMenu_AddRef)( Iunknown *Self)
ContextMenu_AddRef proc near

Self= dword ptr  4

mov     eax, [esp+Self]
add     eax, 8
push    eax ; lpAddend
call    ds:InterlockedIncrement
retn    4
ContextMenu_AddRef endp
```

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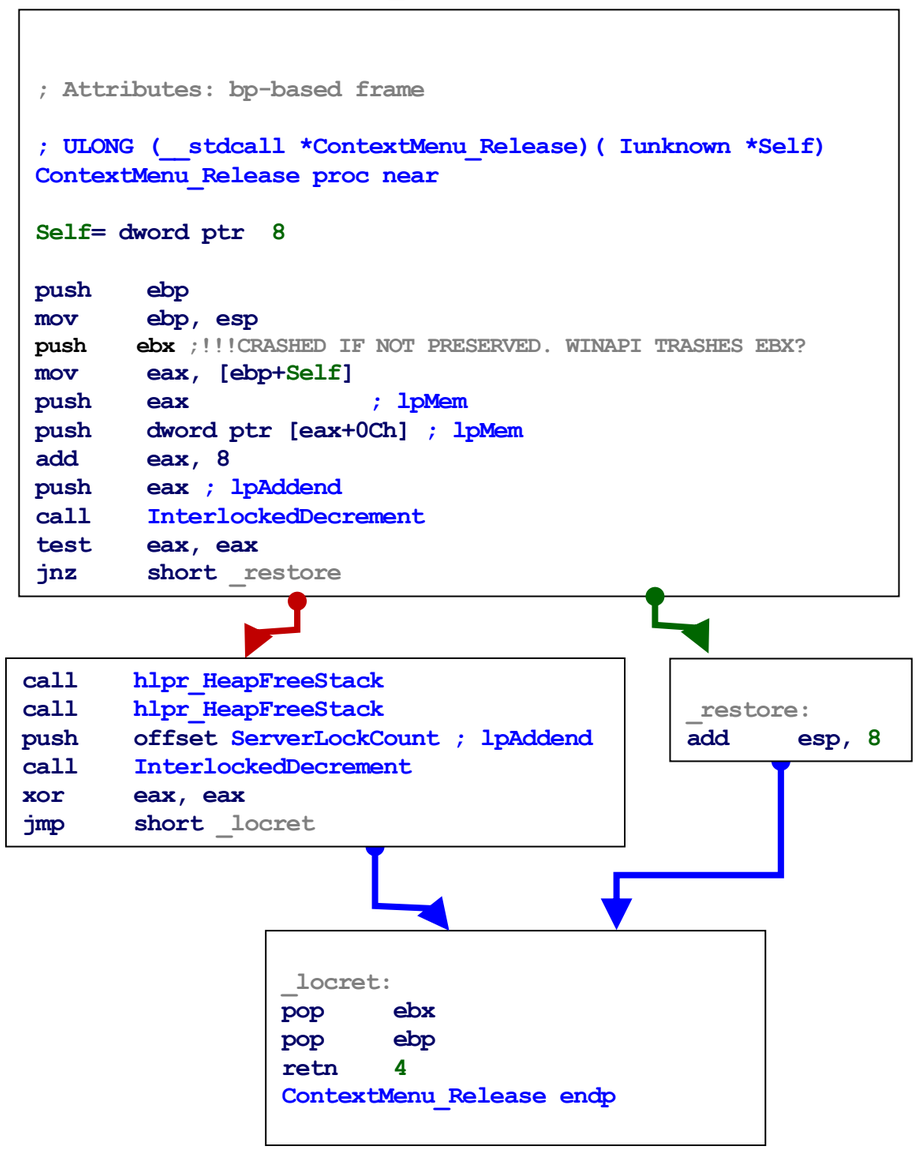

= Errornous Fasm compiled COM Server =

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```
; ULONG (__stdcall *ContextMenu_Release)( Iunknown *Self)
ContextMenu_Release proc near

Self= dword ptr  8
push    ebx ;!!! BELOW CODE DON`T TRASH IT, BUT WINAPI DOES?
mov     eax, [esp+Self
add     eax, 8
push    eax ; lpAddend
call    ds:InterlockedDecrement
test    eax, eax
jnz     short _restore
```

```
mov     eax, [esp+Self]
push    eax
push    dword ptr [eax+0Ch]
call    hlpr_HeapFreeStack
call    hlpr_HeapFreeStack
push    offset ServerLockCount ; lpAddend
call    ds:InterlockedDecrement
xor     eax, eax
```

```
_locret:
pop     ebx
retn    4
ContextMenu_Release endp
```

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```
; Attributes: bp-based frame

; HRESULT (__stdcall *ContextMenu_QueryContextMenu)(IContextMenu *Self, HMENU hmenu, UINT indexMenu, UINT idCmdFirst, UINT idCmdLast, UINT uFlags)
ContextMenu@QueryContextMenu proc near

hmenu= dword ptr  0Ch
indexMenu= dword ptr  10h
idCmdFirst= dword ptr  14h
uFlags= dword ptr  1Ch

push    ebp
mov     ebp, esp
mov     eax, [ebp+uFlags]
and     eax, 0Fh
jz      short _handle
```

```
test    eax, CMF_EXPLORE
jz      short _idle
```

```
_handle:
push    ebx
push    esi
push    edi
mov     ebx, [ebp+hmenu]
mov     esi, [ebp+indexMenu]
mov     edi, [ebp+idCmdFirst]
push    0               ; lpNewItem
push    0               ; uIDNewItem
push    MF_SEPARATOR or MF_BYPOSITION ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    InsertMenuA
inc     esi
push    ds:lplpRegMenu  ; offset lpRegMenu
push    edi             ; uIDNewItem
push    MF_BYPOSITION   ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    InsertMenuA
inc     esi
inc     edi
push    ds:lplpUnregMenu; offset lpUnregMenu
push    edi             ; uIDNewItem
push    MF_BYPOSITION   ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    InsertMenuA
inc     esi
push    0               ; lpNewItem
push    0               ; uIDNewItem
push    MF_SEPARATOR or MF_BYPOSITION ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    InsertMenuA
mov     eax, 2
pop     edi
pop     esi
pop     ebx
jmp     short _locret
```

```
_idle:
xor     eax, eax
```

```
_locret:
pop     ebp
retn    18h
ContextMenu@QueryContextMenu endp
```

```
; HRESULT (__stdcall *ContextMenu_QueryContextMenu)(IContextMenu *Self, HMENU hmenu, UINT indexMenu, UINT idCmdFirst, UINT idCmdLast, UINT uFlags)
ContextMenu@QueryContextMenu proc near

hmenu= dword ptr  8
indexMenu= dword ptr  0Ch
idCmdFirst= dword ptr  10h
uFlags= dword ptr  18h

mov     eax, [esp+uFlags]
and     eax, 0Fh
jz      short _handle
```

```
test    eax, CMF_EXPLORE
jz      short _idle
```

```
_idle:
xor     eax, eax
```

```
_handle:
push    ebx
push    esi
push    edi
mov     ebx, [esp+0Ch+hmenu]
mov     esi, [esp+0Ch+indexMenu]
mov     edi, [esp+0Ch+idCmdFirst]
push    0               ; lpNewItem
push    0               ; uIDNewItem
push    MF_SEPARATOR or MF_BYPOSITION ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    ds:InsertMenuA
inc     esi
push    offset lpRegMenu; "register"
push    edi             ; uIDNewItem
push    MF_BYPOSITION   ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    ds:InsertMenuA
inc     esi
inc     edi
push    offset lpUnregMenu; "unregister"
push    edi             ; uIDNewItem
push    MF_BYPOSITION   ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    ds:InsertMenuA
inc     esi
push    0               ; lpNewItem
push    0               ; uIDNewItem
push    MF_SEPARATOR or MF_BYPOSITION ; uFlags
push    esi             ; uPosition
push    ebx             ; hMenu
call    ds:InsertMenuA
mov     eax, 2
pop     edi
pop     esi
pop     ebx
jmp     short _locret
```

```
_locret:
retn    18h
ContextMenu@QueryContextMenu endp
```

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```
; Attributes: bp-based frame

; int __stdcall hlpr_RegisterCOMServer(LPCSTR lpProcName, int hwnd, LPCSTR lpLibFileName)
hlpr_RegisterCOMServer proc near

lpProcName= dword ptr  8
hwnd= dword ptr  0Ch
lpLibFileName= dword ptr  10h

push    ebp
mov     ebp, esp
push    ebx
push    esi
push    edi
xor     ebx, ebx
mov     eax, [ebp+lpLibFileName]
push    eax             ; lpLibFileName
call    LoadLibraryA
mov     edi, eax
test    edi, edi
jz      short _locret
```

```
mov     eax, [ebp+lpProcName]
push    eax             ; lpProcName
push    edi             ; hModule
call    GetProcAddress
mov     esi, eax
test    eax, eax
jz      short _freelib
```

```
call    esi
test    eax, 80000000h
setz    bl
```

```
_freelib:
push    edi             ; hLibModule
call    FreeLibrary
```

```
_locret:
mov     eax, ebx
pop     edi
pop     esi
pop     ebx
pop     ebp
retn    0Ch
hlpr_RegisterCOMServer endp
```

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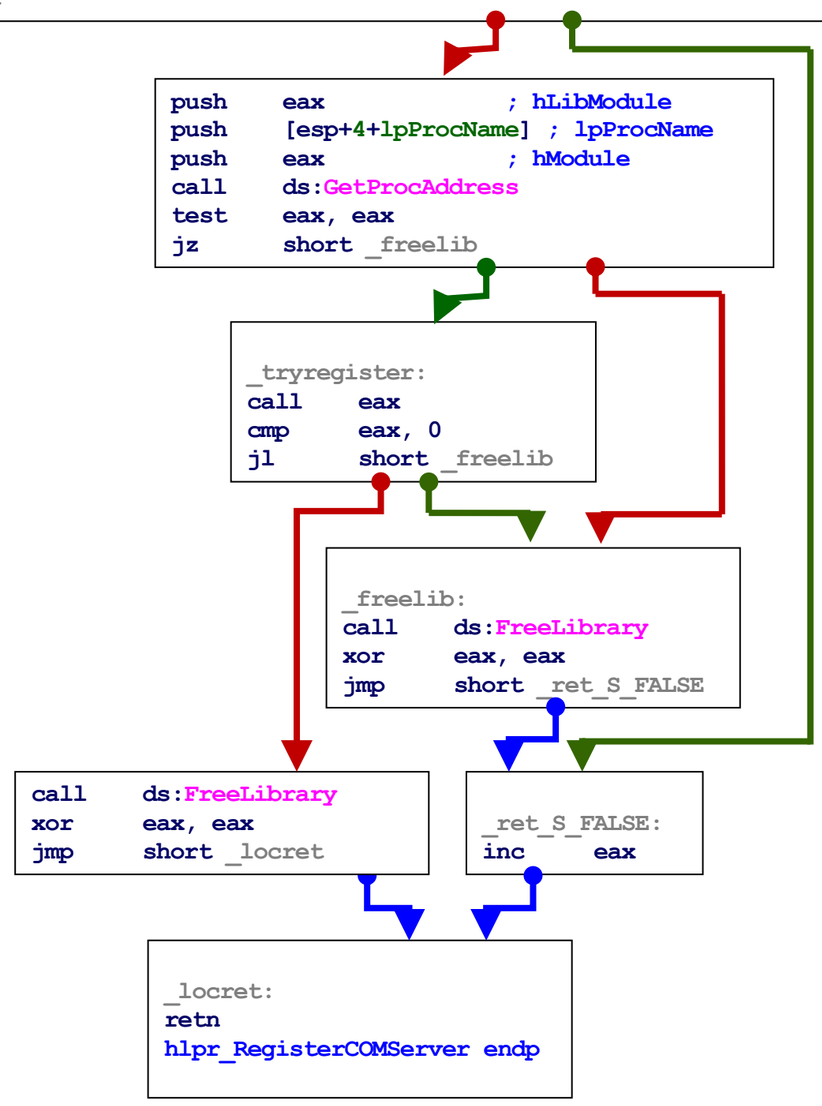
```
; int __stdcall hlpr_RegisterCOMServer(LPCSTR lpProcName, int hwnd, LPCSTR lpLibFileName)
hlpr_RegisterCOMServer proc near

lpProcName= dword ptr  4
hwnd= dword ptr  8
lpLibFileName= dword ptr  0Ch

push    [esp+lpLibFileName] ; lpLibFileName
call    ds:LoadLibraryA
test    eax, eax
jz      short _locret
```



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```
; Attributes: bp-based frame

; int __stdcall hlpr_MessagingInvokeCommand(LPCSTR fmt, int fError, LPCSTR lpProcName, HWND hWnd, LPCSTR lpLibFileName)
hlpr_MessagingInvokeCommand proc near

fmt= dword ptr  8
fError= dword ptr  0Ch
lpProcName= dword ptr  10h
hWnd= dword ptr  14h
lpLibFileName= dword ptr  18h

push    ebp
mov     ebp, esp
push    [ebp+lpLibFileName]
push    [ebp+lpProcName]
push    [ebp+fmt]       ; LPCSTR
push    offset Buffer   ; LPSTR
call    wsprintfA
add     esp, 10h
mov     eax, [ebp+fError]
push    ds:MBCases[eax*4] ; uType
push    ds:QRCases[eax*4] ; lpCaption
push    offset Buffer   ; lpText
push    [ebp+hWnd]      ; hWnd
call    MessageBoxA
mov     eax, [ebp+fError]
pop     ebp
retn    14h
hlpr_MessagingInvokeCommand endp
```

```
MBCases:
dd MB_ICONINFORMATION or MB_OK
dd MB_ICONERROR or MB_OK
```

```
QRCases:
dd offset cptSuccessed ; "Quick Register"
dd offset cptFailed    ; "Quick Register - Error"
```

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```
; int __stdcall hlpr_MessagingInvokeCommand(LPCSTR fmt, int fError, LPCSTR lpProcName, HWND hWnd, LPCSTR lpLibFileName)
hlpr_MessagingInvokeCommand proc near

fmt= dword ptr  4
fError= dword ptr  8
lpProcName= dword ptr  0Ch
hWnd= dword ptr  10h
lpLibFileName= dword ptr  14h

push    [esp+lpLibFileName]
push    [esp+4+lpProcName]
push    [esp+8+fmt]     ; LPCSTR
push    offset Buffer   ; LPSTR
call    ds:wsprintfA
add     esp, 10h
mov     eax, [esp+fError]
push    MBCases[eax*4]    ; uType
push    QRCases[eax*4] ; lpCaption
push    offset Buffer   ; lpText
push    [esp+0Ch+hWnd]  ; hWnd
call    ds:MessageBoxA
mov     eax, [esp+fError]
retn    14h
hlpr_MessagingInvokeCommand endp
```

```
MBCases:
dd MB_ICONINFORMATION or MB_OK
dd MB_ICONERROR or MB_OK
```

```
QRCases:
dd offset cptSuccessed ; "Quick Register"
dd offset cptFailed    ; "Quick Register - Error"
```