

Лекция 8

COM-SERVER “OUT-OF-PROCESS”

Создание библиотеки динамической компоновки, реализующей заглушки

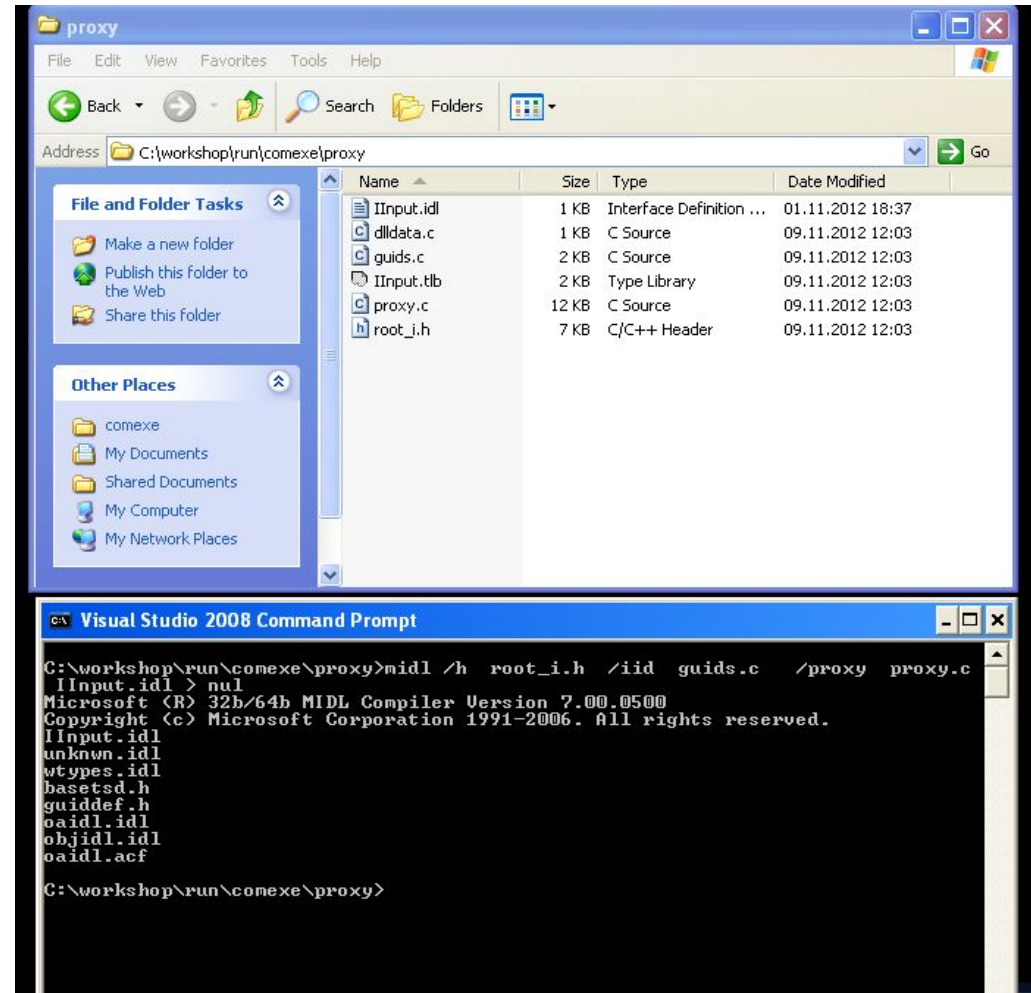
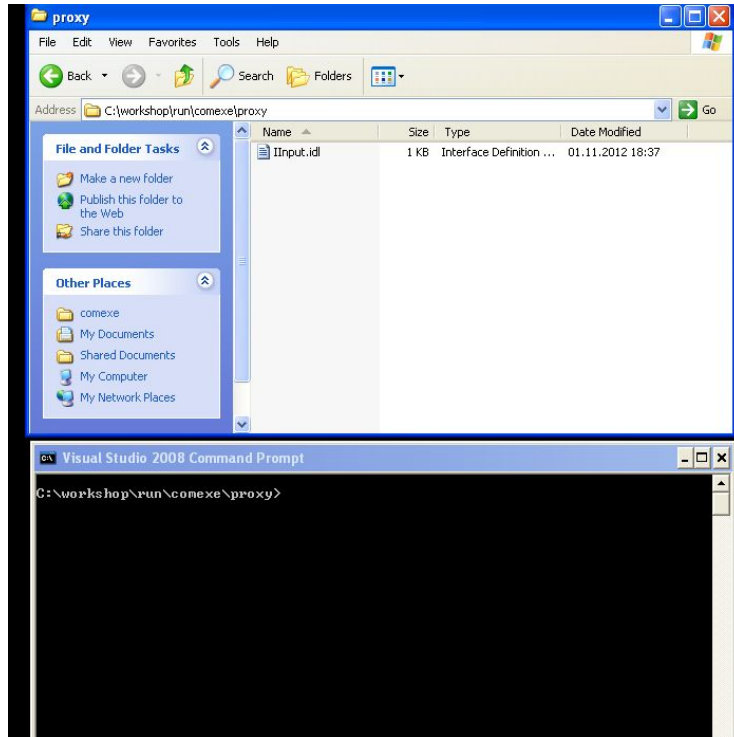
IDL - язык определения интерфейса (*Interface Definition Language*)

```
import "unknwn.idl";
//Interface IInput
[
  object,
  uuid(3DC9017D-10E4-4D83-8097-E0FC0497B965),
  helpstring("IInput Interface"),
  pointer_default(unique)
]
interface IInput : IUnknown
{
  HRESULT input();
  HRESULT output();
};

//Interface IPhone
[
  object,
  uuid(048C493E-A924-4345-8650-18BE597B4129),
  helpstring("IPhone Interface"),
  pointer_default(unique)
]
interface IPhone : IUnknown
{
  HRESULT giveACall([in] int nPhone);
  HRESULT takeACall([in] int nPhone);
};
```

```
[
  uuid(10C1D956-B61A-4B2C-8795-58CA53298ADB),
  version(1.0),
  helpstring("CInput 1.0 Type Library")
]
library InputLib
{
  importlib("stdole32.tlb");
  importlib("stdole2.tlb");
//Component
[
  uuid(36C1D956-B61A-4B2C-8795-58CA53298ADB),
  helpstring("Component class")
]
coclass CInput
{
  [default] interface IInput;
};
};
```

Компиляция .idl файла



Компоновка и регистрация proxy.dll

The screenshot shows the Visual Studio 2008 IDE with the 'proxy' project open. The File Explorer displays the following files:

| Name | Size | Type | Date Modified |
|-------------|-------|--------------------------|------------------|
| IInput.idl | 1 KB | Interface Definition ... | 01.11.2012 18:37 |
| dlldata.c | 1 KB | C Source | 09.11.2012 12:03 |
| guids.c | 2 KB | C Source | 09.11.2012 12:03 |
| IInput.tlb | 2 KB | Type Library | 09.11.2012 12:03 |
| proxy.c | 12 KB | C Source | 09.11.2012 12:03 |
| root_i.h | 7 KB | C/C++ Header | 09.11.2012 12:03 |
| dlldata.obj | 3 KB | Intermediate file | 09.11.2012 12:05 |
| proxy.obj | 4 KB | Intermediate file | 09.11.2012 12:06 |
| guids.obj | 1 KB | Intermediate file | 09.11.2012 12:06 |

The Command Prompt shows the following commands:

```
basetsd.h
guiddef.h
oidl.idl
objidl.idl
oidl.acf

C:\workshop\run\comexe\proxy>cl /c /DWIN32 /DREGISTER_PROXY_DLL dlldata.c
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.30729.01 for 80x86
Copyright (C) Microsoft Corporation. All rights reserved.

dlldata.c

C:\workshop\run\comexe\proxy>cl /c /DWIN32 /DREGISTER_PROXY_DLL proxy.c
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.30729.01 for 80x86
Copyright (C) Microsoft Corporation. All rights reserved.

proxy.c

C:\workshop\run\comexe\proxy>cl /c /DWIN32 /DREGISTER_PROXY_DLL guids.c
Microsoft (R) 32-bit C/C++ Optimizing Compiler Version 15.00.30729.01 for 80x86
Copyright (C) Microsoft Corporation. All rights reserved.

guids.c

C:\workshop\run\comexe\proxy>
```

The screenshot shows the Visual Studio 2008 IDE with the 'proxy' project open. The File Explorer displays the following files:

| Name | Size | Type | Date Modified |
|-------------|-------|--------------------------|------------------|
| IInput.idl | 1 KB | Interface Definition ... | 01.11.2012 18:37 |
| proxy.def | 1 KB | Export Definition File | 01.11.2012 18:45 |
| dlldata.c | 1 KB | C Source | 09.11.2012 12:03 |
| guids.c | 2 KB | C Source | 09.11.2012 12:03 |
| IInput.tlb | 2 KB | Type Library | 09.11.2012 12:03 |
| proxy.c | 12 KB | C Source | 09.11.2012 12:03 |
| root_i.h | 7 KB | C/C++ Header | 09.11.2012 12:03 |
| dlldata.obj | 3 KB | Intermediate file | 09.11.2012 12:05 |
| proxy.obj | 4 KB | Intermediate file | 09.11.2012 12:06 |
| guids.obj | 1 KB | Intermediate file | 09.11.2012 12:06 |
| proxy.dll | 48 KB | Application Extension | 09.11.2012 12:34 |
| proxy.exp | 2 KB | Exports Library File | 09.11.2012 12:34 |
| proxy.lib | 2 KB | Object File Library | 09.11.2012 12:34 |

The Command Prompt shows the following commands:

```
C:\workshop\run\comexe\proxy>link /dll /out:proxy.dll /def:proxy.def dlldata.obj proxy.obj guids.obj kernel32.lib rpcndr.lib rpcns4.lib rpcrt4.lib uuid.lib > nul

C:\workshop\run\comexe\proxy>regsvr32 /s proxy.dll

C:\workshop\run\comexe\proxy>
```

proxy.def

| LIBRARY | Proxy.dll |
|---------------------|------------------|
| DESCRIPTION | 'Proxy/Stub DLL' |
| EXPORTS | |
| DllGetClassObject | @1 PRIVATE |
| DllCanUnloadNow | @2 PRIVATE |
| GetProxyDllInfo | @3 PRIVATE |
| DllRegisterServer | @4 PRIVATE |
| DllUnregisterServer | @5 PRIVATE |

Изменения в коде сервера, код компонента (*CInput.cpp*):

```
STDMETHODIMP CInput::input(){
    MessageBox(NULL, "Enter data", "input Info", MB_OK);
    return S_OK;
}
STDMETHODIMP CInput::output(){
    MessageBox(NULL, "Output data", "output Info", MB_OK);
    return S_OK;
}
STDMETHODIMP CInput::giveACall(int phoneNumber){
    char str[32];
    sprintf(str, "You are ringing up to %i", phoneNumber);
    MessageBox(NULL, str, "output Info", MB_OK);
    return S_OK;
}
STDMETHODIMP CInput::takeACall(int phoneNumber){
    char str[32];
    sprintf(str, "Dzine, dzine ... : %i", phoneNumber);
    MessageBox(NULL, str, "output Info", MB_OK);
    return S_OK;
}
```

Изменения в коде сервера (код приложения *input_exe.cpp*):

```
#include <windows.h>
#include <objbase.h>
#include <stdio.h>
#include "guid.h"
#include "CInput.h"

IClassFactory* g_pClassFactory;
DWORD g_dwRegister = 0;
HWND g_hWnd;

LRESULT CALLBACK WndProc (HWND, UINT, WPARAM, LPARAM) ;
BOOL Init();
void UnInit();

int APIENTRY WinMain (HINSTANCE hInstance, HINSTANCE hPrevInstance,
                    LPSTR lpszCmdLine, int nCmdShow)
{
    HWND    hwnd ;
    MSG     msg ;
    WNDCLASS wndclass ;

    Init();
```

```
if (!hPrevInstance) {
    wndclass.style      = CS_HREDRAW | CS_VREDRAW ;
    wndclass.lpfWndProc = WndProc ;
    wndclass.cbClsExtra = 0 ;
    wndclass.cbWndExtra = 0 ;
    wndclass.hInstance  = hInstance ;
    wndclass.hIcon       = LoadIcon (NULL, IDI_APPLICATION) ;
    wndclass.hCursor     = LoadCursor (NULL, IDC_ARROW) ;
    wndclass.hbrBackground = (HBRUSH) GetStockObject (WHITE_BRUSH) ;
    wndclass.lpszMenuName = NULL;
    wndclass.lpszClassName = "Class CInput" ;
    RegisterClass (&wndclass) ;
}
hwnd = CreateWindow ("Class CInput", "Exe COM CInput",
    WS_OVERLAPPEDWINDOW,
    CW_USEDEFAULT, 0,
    CW_USEDEFAULT, 0,
    NULL, NULL, hInstance, NULL) ;
g_hWnd = hwnd;

ShowWindow (hwnd, nCmdShow) ;
UpdateWindow (hwnd) ;

while (GetMessage (&msg, NULL, 0, 0)){
    TranslateMessage (&msg) ;
    DispatchMessage (&msg) ;
}
return msg.wParam ;
}
```



```
LRESULT CALLBACK WndProc (HWND hwnd, UINT message,
                          WPARAM wParam, LPARAM lParam){
    static char str[80] = "It is an Exe Server";
    HDC hDC;
    PAINTSTRUCT ps;
    switch (message){
        case WM_PAINT:
            hDC = BeginPaint (hwnd, &ps);
            TextOut (hDC, 0, 0, str, lstrlen (str));
            EndPaint (hwnd, &ps);
            return 0;
        case WM_DESTROY :
            PostQuitMessage (0) ;
            return 0;
        default:
            break;
    }
    return DefWindowProc (hwnd, message, wParam, lParam) ;
}
```

```
BOOL Init(){
    HRESULT hr;
    hr = CoInitialize(NULL);
    if (FAILED(hr)){
        MessageBox(NULL, "CoInitialize failed", "CInput", MB_OK);
        return FALSE;
    }

    g_pClassFactory = new CInputClassFactory;

    if (g_pClassFactory == NULL)
        return FALSE;

    g_pClassFactory->AddRef();

    hr = CoRegisterClassObject(CLSID_Input, g_pClassFactory, CLSCTX_LOCAL_SERVER,
        REGCLS_MULTIPLEUSE, &g_dwRegister);

    if (FAILED(hr))
        return FALSE;

    return TRUE;
}
```

```

void UnInit()
{
    if (g_dwRegister != 0)
        CoRevokeClassObject(g_dwRegister);

    if (g_pClassFactory != NULL)
        g_pClassFactory->Release();
    CoUninitialize();
}

```

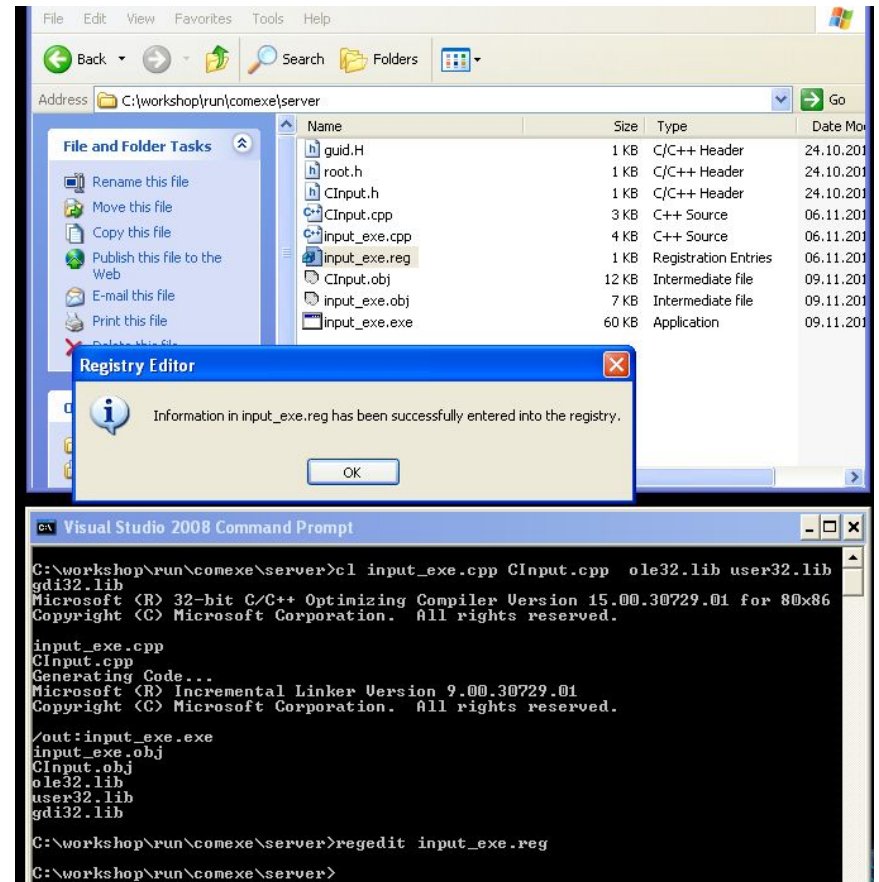
Компоновка и регистрация COM-сервера

input_exe.reg

```

REGEDIT
HKEY_CLASSES_ROOT\CInput.MyInput\CLSID =
{36C1D956-B61A-4B2C-8795-58CA53298ADB}
HKEY_CLASSES_ROOT\CLSID\{36C1D956-B61A-4B2C-8795-58
CA53298ADB} = CInput MyInput DLL
HKEY_CLASSES_ROOT\CLSID\{36C1D956-B61A-4B2C-8795-58
CA53298ADB}\LocalServer32 =
C:\workshop\run\comexe\server\input_exe.exe
HKEY_CLASSES_ROOT\CLSID\{36C1D956-B61A-4B2C-8795-58
CA53298ADB}\ProgId = CInput.MyInput
HKEY_CLASSES_ROOT\Interface\{3DC9017D-10E4-4D83-8097-E
0FC0497B965} = Iinput
HKEY_CLASSES_ROOT\Interface\{3DC9017D-10E4-4D83-8097-E
0FC0497B965}\NumMethods = 2
HKEY_CLASSES_ROOT\Interface\{048C493E-A924-4345-8650-18
BE597B4129} = IPhone
HKEY_CLASSES_ROOT\Interface\{048C493E-A924-4345-8650-18
BE597B4129}\NumMethods = 2

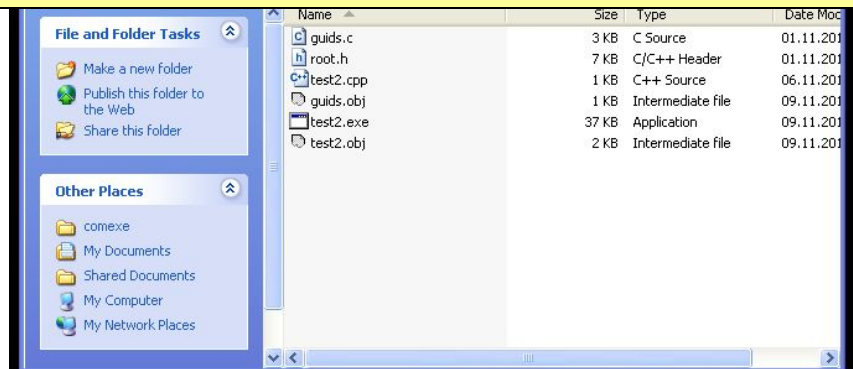
```



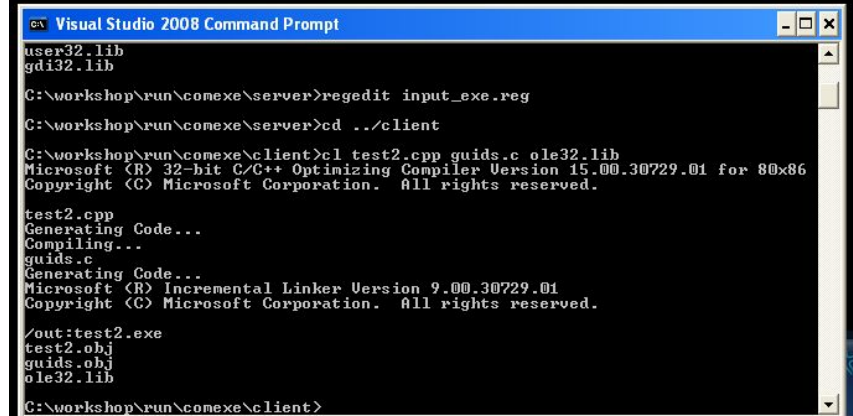
Изменения в коде клиента (*test2.cpp*):

```
#include <windows.h>
#include <stdio.h>
#include <objbase.h>
#include "guids.c"
#include "root.h"

int main(){
.....
DWORD dwContext = CLSCTX_LOCAL_SERVER; // необязательно
.....
```



Компиляция и компоновка клиента (*test2.cpp*):



Тестирование COM-сервера

