# 编译Emule with VS2008

## [qedit.h中dxtrans.h找不到错误解决方法](http://blog.csdn.net/huang_xw/article/details/8588629)

原因: 当前版本的direct sdk已经将DirectShow分离了，当前版本的sdk没有dxtrans.h文件  
**解决方法:**  
在include "dxtrans.h"前加上

#define \_\_IDxtCompositor\_INTERFACE\_DEFINED\_\_   
#define \_\_IDxtAlphaSetter\_INTERFACE\_DEFINED\_\_   
#define \_\_IDxtJpeg\_INTERFACE\_DEFINED\_\_   
#define \_\_IDxtKey\_INTERFACE\_DEFINED\_\_   
并将dxtrans.h注释掉

## [Vs2008的bug：error C2471: cannot update program database vc90.pdb](http://blog.csdn.net/lly20000/article/details/7428041)

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| --- |
| 编译找不到而且不能升级vc90.pdb文件的问题解决方法  问题描述：  1>e:\vcomh264net\vcomh\vcomh264net2.0 1.0.25 av\video\videoproc.cpp : error C2471: cannot update program database 'e:\vcomh264net\vcomh264net2.0 1.0.25 2008\vcomh264net2.0 1.0.25 av\debug\vc90.pdb'  1>e:\vcomh264net\vcomh\vcomh264net2.0 1.0.25 av\video\videoproc.cpp : fatal error C1083: Cannot open program database file: 'e:\vcomh264net\vcomh264net2.0 1.0.25 2008\vcomh264net2.0 1.0.25 av\debug\vc90.pdb': No such file or directory        为什么我把一个VC6的工程转换为VS2008的工程后，编译总是出现找不到而且不能升级vc90.pdb文件的问题。重新编译了也不行。  从VC6直接跳到VS2008  这个vs2008一个著名的bug。详情可以参见<https://connect.microsoft.com/VisualStudio/feedback/ViewFeedback.aspx?FeedbackID=309462>  官方现有解决方案如下：         I have found an alternate way for the time beging to avoid C2471 error but it works only in the case of successful release build.       for this click Build menu than Configuration manager than create a new setting from release settings. Change following things in your project settings as :  C\C++ | General | Debug Information format | C7 Compatible (/Z7)  C\C++ | Code Generation | Enable String Pooling | Yes (/GF)  Linker |Debuging |General Debug Info | Yes (/DEBUG)          after these settings. Rebuild your application. I'm sure you will be able to resolve the pdb updation issue if it is really not hampering your other settings. Hope it will be helpful to you. |

[**在vs2008中编译（调试）eMule0.50a以及veryCD版的easyMule**](http://blog.csdn.net/jo_say/article/details/8070756)

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关键字：

* Vs2008
* eMule0.50a
* easyMule
* 调试
* atlrx.h
* windows SDK 7.0
* 增量链接
* ITaskbarList3
* LNK2005
* 无法解析的外部符号
* LIBCMT and LIBCMTD
* MTD
* /FORCE:MULTIPLE

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Background：

目的是看看kAD的具体运算，因此下了eMule的最新版0.5a, 源代码的结构如果之前不了解，还是不太容易弄懂，因为开源软件一般都会有较多的依赖库。如果你在linux下debug过开源软件，你就知道库依赖的重要性了。以前在windows下太顺利，所以遇到一点挫折，如果google不出来就急的不行。eMule的源代码要想编译，是必须依赖几个lib的，他们一般也都是通过项目编译而来，试图从网上直接找lib和头文件的，反而太累人，因为你不知道后面需要多少个头文件，nnd，太多了。

【看看这个帖子：<http://blog.csdn.net/colinchan/article/details/4648844> 会增加一些了解，但是版本不同，需要解决的问题可能也就不同了】

按照网上大多数文章的说法，具体如crypto,libpng,resizablelib,zlib等都需要google，然后到官方下，不过这些一般都没有vc9（vc2008）的项目版本，直接用08打开转换即可，很少出问题。但是：事情总是没有那么顺利，不是找不全依赖lib的源项目，就是找到了编译出一堆错。本着前人种树，后人乘凉的想法，我直接g最好的解决方案，试了试，并没有发现完全适合我的环境的（win7+vs08+emula0.50a). 不过还是要感谢CSDN，资源里给了一个：【电驴最新版源码VS2008直接编译】【这个也是我最后编译eMule的重要帮手】

<http://download.csdn.net/download/WS355362/3378757>

* 直接编译（包含了lib解决方案）

但是这里的电驴不是国外eMule-project的那个，而是国内改造的easyMule。发布者给了很给力的说明，按其走着就可以了。

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      编译说明（推荐使用Visual Studio .NET 2008）  
     1.将rcdll.dll复制到Visual Studio .NET 2008安装目录的Vc\bin目录中。（这是为了使用能在vista下显示的图标）  
     2.打开easyMule\_vs2008\_Libs.sln，执行“生成解决方案”。（easyMule\_vs2008\_Libs.sln里所包含的是easyMule所依赖的库文件。）  
     3.打开easyMule\_vs2008.sln编译即可。

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* Atlrx问题：

上面编译easyMule时出现了atlrx.h找不到的问题，如果你g下，会发现这个问题很普遍，是其中正则表达式用到的一个库，下面的这篇帖子告诉你怎么解决，无非是下载库，然后链接而已。

<http://blog.csdn.net/wu_huiwen/article/details/5523128>。

* 增量链接问题

运行时，vs2008又出现了增量链接出错的问题，到属性->链接器->增量链接中关闭其，ok了

* ITaskbarList3问题

这些问题也都是普遍问题，g下就会有解决方案，其实这里是windows7任务栏问题，需要安装对应的windows SDK, 看下面帖子吧：

<http://blog.csdn.net/x313695373/article/details/6068603>。 还有一个无法打开数据库文件的问题，这个帖子也有回答。不瞒您说，这些能遇到的问题我几乎都遇到了，不过还有万能的search engine，要不咱怎么办呢。。。

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解决了以上问题，如果正常的话，easyMule是可以编译运行的，至少我成功了。

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但是我知道easyMule的改造还是蛮大的，虽然提高了eDonkey的一些默认服务连接点，增加了很多资源选择界面。但是实在是不喜欢那么大红大紫的界面，还有那来来往往的广告。决定还是要编译好原始的eMule0.50a。

刚才编译easyMule之所以简单，是因为它的配套库都有了，但是它虽然基于eMule，但是还是有较大变换，甚至源代码的组织都几乎完全不同。

然后事情总没有那么坏，至少现在我可以告诉你，他们的依赖库几乎是可以通用的（我说几乎，表明还是有例外，如后面我要说的CxImage等）

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于是我做了一下事情：

1. 直接把easyMule项目里面的生成lib的解决方案：crypto51，crypto55, resizableLib，zlib, CxImage等全部改拷到了eMule源代码下（按照结构，它们是和srchybrid并列的，当然CxImage是默认放在srchybrid下的。
2. 根据这些项目的位置以及产生的lib位置，调整eMule项目文件属性中链接器->输入->附加依赖项中的具体内容（它默认是有内容的，你要根据当前情况来调整）[注意，两个点开头表示上两级目录，一个点表示上一级目录]

|  |
| --- |
| version.lib winmm.lib ws2\_32.lib gdiplus.lib ADSIId.lib crypt32.lib wmvcore.lib ..\zlib\debug\zlib.lib ..\crypto51\crypto\debug\cryptlib.lib ..\id3lib\libprj\id3libD.lib .\CxImage\debug\cximage.lib ..\libpng\projects\visualc71\Win32\_LIB\_Debug\libpngd.lib ..\ResizableLib\DebugUnicode\ResizableLib.lib .\miniupnpc\debug\_vc9\miniupnpc.lib |

1. 然后仔细确认各个依赖库生成顺利，边编译eMule，毫无疑问，错误是一大堆的。主要有：

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* 直接移过来的CxImage项目的输出函数MakeBitmap是单参数的，但在eMule0.50a中有一处是两个参数调用。这说明了eMule0.50a对应的那个CxImage版本的MakeBitmap函数（xImage.h定义，ximawnd.cpp中实现）是两个参数的。但这里为了简单，我就把eMule0.50a中的代码中两个参数的第二个给去掉了，这个参数是反应透明与否的，是关于界面，并不影响我对eMule网路的了解，所以果断cancel之。如果反之，即修改CxImage项目为两个参数，会出现【无法解析的外部符号】这样的错误，事实上，这个问题恼了我一个小时，我最终也没有解决之，所以我才不得已采用了上面的方法。
* error LNK2005: \_\_initp\_misc\_invarg 已经在libcmtd.lib(invarg.obj) 中定义。这是因为项目链接了两个库LIBCMT and LIBCMTD，以至于出现already defined。解决办法是：   
  1.确保当前工程的Runtime Library和引用lib的Runtime Library相同便可以解决问题   
  比如：lib库的Runtime Library是MD，当前工程也得设置为MD。 (我这里全是MTD）  
  2.In Debug mode，在Debug命令行中加上/FORCE:MULTIPLE。（我在属性->配置->链接的命令行和调试的命令中都添加了，应该只需要一处吧，我懒得比较了）.方法来自：<http://weihe6666.iteye.com/blog/1405657>
* 至此，基本上ok了。编译，成功1个，警告n个，哎，总算可以歇会了。

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还出现的其他问题是，我试图用release模式时，系统编译时提示我zlib.lib库文件找不到（因为链接到了一个没有的路径）。

我这里其实是投机取巧，把用在easyMule上的库直接用到eMule0.5上，的确简短了我去网上找对应windows版本，然后编译的过程。

其可实现原因和注意点有：

* 主要是这些库都很成熟，多数已经出现很久，切已很少更新，所有这里easyMule和eMule用到的可以一致。
* 还有就是easyMule和eMule这里我都用vs08编译，直接挪过来，不冲突。
* 需要注意的libpng在easyMule中不是这样的，它是pnglib，我也懒得转换，这个是从官网下的，解压后为lpng1513文件夹，从里面深入多层后，可以找到vs7项目，转换，生成即可。
* 另外easyMule用的是crypto55，但应该eMule还是用crypto51.
* 还有CxImage项目编译是需要png文件夹的，由于都是从easyMule项目中copy过来，所以不妨把png folder给copy过来到CxImage同级目录，方便编译。
* 安装windows SDK时，有点慢，不要急。还有只需要安装开发工具和头文件即可。
* 我的系统是windows7。
* 很多地方是debug\_v9，在填写是注意，其实都无所谓，但是要一致。

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以上只是我回头看记起来的，其实我在编译过程中，痛苦的读了大量的国外论坛帖子和国内论坛帖子，对我的理解还是很有帮助的。

部分帖子如下：

http://forum.emule-project.net/index.php?showtopic=149213  
http://www.cnblogs.com/jianu/archive/2010/12/25/how\_to\_compile\_eMule\_in\_vs2008.html  
http://blog.csdn.net/cecilulysess/article/details/4631458  
http://jiangliwei.blogbus.com/logs/28509863.html

<http://blog.csdn.net/wu_huiwen/article/details/5523128>

## How To Build Emule 0.49C With Vs 2008

I built eMule 0.49c under Visual Studio 2008.  
You can use the archive I provide instead of getting the single source packages one-by-one.

ed2k://|file|eMule.0.49c.VS2008.rar|5513085|7813FC47A0BED0FD5406C9B80D5A8331|h=ESXJ7CXOCFW3YIBOUKRDHQN5EZGBTCTD|/

The system I used was equipped as follows:

- Windows XP Professional SP3  
- Visual Studio 2008 SP1  
- Windows SDK v6.1 (Windows SDK for Windows Server 2008 and .NET Framework 3.5, build name: 6.0.6001.18000.367)  
- DirectX 9.0 SDK (October 2005)  
- whole system MSUpdated to 2010-02-08

Under this configuration, neither Microsoft Speech SDK 5.1 nor WMFormat SDK9 was needed.

Solution doesn't build with these SDKs:

WIN SDK  
- 6.1.7600.16385; Microsoft Windows SDK for Windows 7 and .NET Framework 3.5 Service Pack 1  
- 6.1.6000.16384.10; Windows Vista Update & .NET 3.0 SDK

DirectX SDK  
- 9.27.1734 Aug 2009

NOTES:  
- many releases of DirectX SDK can be installed, if you don't want to mess-up your machine, just avoid to install run-time components if they're obsolete.  
- check DX SDK and Win SDK paths in Visual Studio options!!!!

SOURCES  
I used the latest releases, just google the name to find its home page.

eMule v0.49c

ATL Server v9.0.70425 Alpha  
Crypto++ v5.60  
CxImage v6.0.0  
id3lib v3.8.3  
libpng v1.4.0  
ResizableLib v1.3  
zlib v1.2.3

(reported only for thoroughness reason, you don't need it to rebuild eMule)  
Flex v2.5.35 - it generates scanner.cpp/scanner.h

NOTE:  
ATL Server is needed because VS2008 doesn't support it anymore,  
I preferred to place it in the project, rather than under VS components.

NOTE ON STEPS:  
It's useful to verify differences between subsequent steps by a comparison tool (i.e. examDiff).

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STEP1 - merging eMule and libs source in project root  
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The aim of this step is to obtain all the sources merged and organized under a root folder.

to obtain STEP1:

extract eMule sources in the project root folder:

root  
- EditBinX  
- id3lib  
- ReplaceVistaIcon  
- srchybrid  
- zlib

remove id3lib and zlib folders:

root  
- EditBinX  
- ReplaceVistaIcon  
- srchybrid

extract ORIGINAL libs in the project root folder:

root  
- ATL  
- cryptopp  
- EditBinX  
- id3lib  
- libpng  
- ReplaceVistaIcon  
- ResizableLib  
- srchybrid  
- zlib

remove root\id3lib\zlib folder

NOTES:  
- id3lib will reference to zlib in the project root  
- in the STEP1 I provide, id3lib and CxImage source files are the originals, then replaced by PATCH1 with the ones in eMule 0.49c archive.

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STEP2 - patching sources  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

The aim of this step is to patch the source files which need to be adjusted.

to obtain STEP2, copy PATCH1 over STEP1, overwriting files with the same name.

sources modified in STEP2 by PATCH1 are:

- some id3lib modified in the original eMule 0.49c package  
- some CxImage modified in the original eMule 0.49c package  
- some adjust for include directive paths ("crypto51" to generic "cryptopp")  
- some adjust to comply a couple of fields renamed in the struct png\_info (libpng 1.4.0 - png.h)  
- one adjust in PeerCacheFinder.cpp to comply the change of returned value of Encode(), from crypto++ 5.60  
- file root\id3lib\config.h (it's root\id3lib\config.h.win32 renamed, see root\id3lib\libprj\win32.readme.first.txt)

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STEP3 - converting project/solution/workspace files to VS2008 format  
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The aim of this step is to obtain each sub-project buildable in VS2008, not the whole eMule solution.

to obtain STEP3, copy PATCH2 over STEP2, overwriting files with the same name.

here we get:  
- the emule\_vc9-all.sln (the whole eMule solution)  
- each sub-project (libs and the single eMule prj) in VS2008 format

note:  
- emule\_vc9-all.sln is already adjusted under "configuration manager" / "build order" facet  
- all include/dependence paths are adjusted in each sub-project file

For those prj files that needed conversion to VS2008, I used the newest format available in their own original package.  
For each sub-project, I took care of only the 2 config (release-win32/debug-win32) used in eMule-all solution.  
Since some libray are solutions themselves, I took care of only their .vcproj used in eMule-all solution.

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STEP4 - building eMule solution  
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The aim of this step is to build emule\_vc9-all.sln in both configs: release-win32/debug-win32

to obtain STEP4, copy PATCH3 over STEP3, overwriting files with the same name.

PATCH3 modifies these options:  
- libpng change RuntimeLibrary to /MT - /MTd  
- ResizableLib change CharacterSet to unicode (to comply original 0.49c for VC7.1)  
- zlib remove preprocessor define ZLIB\_WINAPI  
- emule remove AdditionalOptions /safeseh

Release builds with 757 warnings,  
Debug builds with 757 warnings.

# 跟踪CAsyncSocketEx类族

1、CeMuleAPP::InitInstance()🡪CServerConnect::CServerConnect()🡪InLocalIP(),m\_nLocalIP=192.168.1.115

2、CServerListCtrl::OnNmCustomDraw()根据服务器列表反复调用🡪CServerConnect::GetCurrentServer()，

3、eMuleDlg::StartupTimer()🡪CListenSocket::StartListen()

3.1🡪CAsyncSocketEx::Create (UINT nSocketPort /\*=0\*/, int nSocketType /\*=SOCK\_STREAM\*/,long lEvent /\*=FD\_READ | FD\_WRITE | FD\_OOB | FD\_ACCEPT | FD\_CONNECT | FD\_CLOSE\*/, LPCSTR lpszSocketAddress /\*=NULL\*/, BOOL bReuseAddr /\*=FALSE\*/ )

3.1 .1🡪CAsyncSocketEx::InitAsyncSocketExInstance(){ m\_spAsyncSocketExThreadDataList==NULL,执行else分支},

3.1.2🡪CAsyncSocketEx::AttachHandle(SOCKET /\*hSocket\*/)🡪 CAsyncSocketExHelperWindow:: AddSocket(CAsyncSocketEx \*pSocket, int &nSocketIndex){ m\_nWindowDataSize=512, nSocketIndex=-1, m\_nSocketCount=0, m\_nWindowDataPos=0, m\_pAsyncSocketExWindowData[i % m\_nWindowDataSize].m\_pSocket == NULL,执行if语句块一次，为各变量赋值，nSocketIndex=0, m\_nSocketCount=1, m\_nWindowDataPos=1, m\_pAsyncSocketExWindowData[i % m\_nWindowDataSize].m\_pSocket = 0x0494b3a8 {CListenSocket}, return true;}

3.1.3🡪 CAsyncSocketEx::AsyncSelect(long lEvent /\*= FD\_READ | FD\_WRITE | FD\_OOB | FD\_ACCEPT | FD\_CONNECT | FD\_CLOSE\*/=8(FD\_ACCEPT)){ m\_lEvent=8(FD\_ACCEPT)，WSAAsyncSelect(m\_SocketData.hSocket, GetHelperWindowHandle(), m\_SocketData.nSocketIndex + WM\_SOCKETEX\_NOTIFY, lEvent)，return true}

3.1.4🡪bReuseAddr=0🡪 CAsyncSocketEx::Bind(UINT nSocketPort=55358, LPCSTR lpszSocketAddress=NULL){ sockAddr.sin\_addr.saddr=0.0.0.0}

3.2🡪CAsyncSocketEx::Listen(int nConnectionBacklog=5)

4、CUploadQueue::UploadTimer()🡪CServerConnect::KeepConnectionAlive(){if(false)},定时调用，保持连接

5、CemuleDlg::OnBnClickedConnect()🡪StartConnect()🡪CServerConnect::ConnectToAnyServer（UINT startAt=0, bool prioSort=true, bool isAuto=true, bool bNoCrypt=false）🡪StopConnectionTry(){m\_idRetryTimer=0,for不执行}

🡪Disconnect()(if(false),return false；)

🡪TryAnotherConnectionRequest(){next\_server=first Sever in list}🡪ConnectToServer(CServer\* server=next\_server, bool multiconnect=true, bool bNoCrypt=true)

5.1🡪 CAsyncSocketEx::Create(UINT nSocketPort=0, int nSocketType=1/\*=SOCK\_STREAM\*/,

long lEvent=51 /\*=FD\_READ | FD\_WRITE | FD\_CONNECT | FD\_CLOSE\*/,

LPCSTR lpszSocketAddress=NULL /\*=NULL\*/, BOOL bReuseAddr=0 /\*=FALSE\*/ )

5.1.1🡪 CAsyncSocketEx::InitAsyncSocketExInstance(){ if(m\_spAsyncSocketExThreadDataList)==true,执行if分支,if(!pList)==false}

5.1.2同3.1.2 m\_nWindowDataPos=2

5.1.3同3.1.3 lEvent=51

5.1.4 同3.1.4 nSocketPort=0

5.2🡪 ConnectTo(CServer\* server=0x04652650, bool bNoCrypt=true)

5.2.1🡪 CEncryptedStreamSocket::SetConnectionEncryption(bool bEnabled=false, const uchar\* pTargetClientHash=NULL, bool bServerConnection=true){m\_streamCryptState=ECS\_UNKNOWN,执行最后的else块，置m\_StreamCryptState = ECS\_NONE;}

5.2.2🡪SetConnectionState(CS\_CONNECTING){if,else if均未false,直接返回};

5.2.3🡪CEMSocket::Connect(LPCSTR lpszHostAddress=0x05115568, UINT nHostPort=5041)🡪 InitProxySupport(){直接返回}🡪 CAsyncSocketEx::Connect(LPCSTR lpszHostAddress=0x05115568, UINT nHostPort=5041)🡪 connect(m\_SocketData.hSocket=1136, lpSockAddr, nSockAddrLen=16) 5.3🡪CAsyncSocketExHelperWindow::WindowsProc(message=1284>=WM\_SOCKETEX\_NOTIFY){ hSocket=wParam=1136,nEvent=16(FD\_CONNECT)}🡪CServerSocket::OnConnect(nErrorCode=0)🡪 SetConnectionState(CS\_WAITFORLOGIN)🡪 CServerConnect::ConnectionEstablished(CServerSocket\* sender=0x050c5d10)🡪InitLocalIP(){m\_nLocalIP=192.168.1.115}

🡪if(sender->GetConnectionState() == CS\_WAITFORLOGIN),SendPacket(Packet\* packet,bool delpacket= true, CServerSocket\* sender)🡪 CServerSocket::SendPacket(Packet\* packet, bool delpacket=true, bool controlpacket=true, uint32 actualPayloadSize=0, bool bForceImmediateSend=false)🡪

CEMSocket:: SendPacket(Packet\* packet, bool delpacket=true, bool controlpacket=true, uint32 actualPayloadSize=0, bool bForceImmediateSend=false){if(controlpacket){ controlpacket\_queue.AddTail(packet); // queue up for controlpacket

theApp.uploadBandwidthThrottler->QueueForSendingControlPacket(this, HasSent());},if(bForceImmediateSend)==false}



6、UploadBandwidthThrottler::RunProc(LPVOID pParam)启动🡪RunInternal()🡪CEMSocket:: SendControlData(uint32 maxNumberOfBytesToSend=9, uint32 minFragSize=536)🡪Send(uint32 maxNumberOfBytesToSend=9, uint32 minFragSize=536, bool onlyAllowedToSendControlPacket=true)

🡪CAsyncSocketExHelperWindow::WindowProc(){case FD\_WRITE}🡪CEMSocket::OnSend(0)

🡪 CEncryptedStreamSocket::OnSend(int nErrorCode=0){nothing to do}

byConnected = ES\_CONNECTED;

7、UploadBandwidthThrottler::RunProc(LPVOID pParam)启动🡪RunInternal()🡪CEMSocket:: SendControlData(uint32 maxNumberOfBytesToSend=33800, uint32 minFragSize=1300)🡪Send(uint32 maxNumberOfBytesToSend=33800, uint32 minFragSize=1300, bool onlyAllowedToSendControlPacket=true)🡪CEncryptStreamSocket::Send(const \*lpBuf=0x051fbc40,int nBuflen=86,int nFlags=0)🡪CAsyncSocketEx:Send(const \*lpBuf=0x051fbc40,int nBuflen=86,int nFlags=0)

# UploadBandwidthThrottler工作流程

一、各变量的含义

1、m\_StandardOrder\_list：标准列表，可发送控制包和标准包

2、

二、节流阀工作原理

1、统计一个循环经过的时间timeSinceLastLoop，再统计一个循环发送的字节数bytesToSpend，计算出传输速率datarate=bytesToSpend/timeSinceLastLoop，与允许传输速率比较，快了则休眠一段时间。需要注意的是，设定的速率是以秒为单位的，而循环里的计时则是以毫秒为单位的，字节数也是有以Byte为单位的，有以KB为单位的，需要换算。

假设限速300K/S，则换算成B/ms则为300\*1024/10000=307b/ms。如果前200ms传输了200K，则速率达到了1MB/S，还剩100K还需100ms，休眠时间则为1000-300=700毫秒。当然一个循环需要时间没有这么多，（调试跟踪到底需要多少时间）假设需要20ms，则能发送的字节为6K。如果上一个循环发送了7K字节，则本循环仅需要发送5K，需要时间为5/6\*20=17ms，则本次循环需要休眠的时间为3ms。而如果上一个循环发送了5K字节，则本循环需要发送7K，则本次循环不需要休眠，相反可以提高传输速率到350K/S。

假设限速300K/S，上一个循环到现在经历了20ms，则理论应该发送6K，

2、计时部分

2.1 thisLoopTick 在while()中定义const DWORD thisLoopTick = timeGetTime();代码块常变量，初始化之后没再赋值

2.2 lastLoopTick

2.2.1RunInternal局部变量，初始化DWORD lastLoopTick = timeGetTime();

2.2.2

UINT UploadBandwidthThrottler::RunInternal()

{

DWORD lastLoopTick = timeGetTime();

……

While(doRun)

{

DWORD timeSinceLastLoop = timeGetTime() - lastLoopTick;

……..

const DWORD thisLoopTick = timeGetTime();

if(allowedDataRate != \_UI32\_MAX) //在有速度限制的情况下，

{ …….

else if(\_I64\_MAX/timeSinceLastLoop > allowedDataRate && \_I64\_MAX-allowedDataRate\*timeSinceLastLoop > realBytesToSpend)

{

if(timeSinceLastLoop > sleepTime + 2000) ///snow:超过2秒

{ ……

timeSinceLastLoop = sleepTime + 2000;

lastLoopTick = thisLoopTick - timeSinceLastLoop;

}

…..…

}

………..

}

lastLoopTick = thisLoopTick;

if(bytesToSpend >= 1 || allowedDataRate == 0)

{

发送数据 ，分四批发送，首先发送控制包信息，其次发送m\_StandardOrder\_list中长时间没发送过数据的socket，第三再正常发送m\_StandardOrder\_list中各socket，最后如果带宽没用完，就再次发送m\_StandardOrder\_list中的各socket，尽量用完带宽。如果实在用不完，则允许在下一循环中多发送999字节。

}

….

}

…….

}

2.3 在循环开始之前，记下当前时刻，存入lastLoopTick，作为初始值（其实有必要吗？）；每次循环开始执行，用循环开始时间，减去lastLoopTick，为运行已过时间，存入timeSinceLastLoop。因为第一次循环时，计算timeSinceLastLoop的语句紧挨着lastLoopTick赋值语句，所以timeSinceLastLoop=0。在循环执行中，当准备发送数据 的时候，记下当前时刻，用当前时刻的值去更新lastLoopTick，这样在第二次或以后的循环时，timeSinceLastLoop的值就相当于上次循环时发送数据的时间。当需要限速时(allowedDataRate != \_UI32\_MAX)，计算spentBytes/timeSinceLastLoop就可以获取当前上传速度了。

# UploadSpeedSense

automatically finds the best upload speed for your connection.

The goal is to make eMule work right out of the box, without need for configuration of upload speed. The users should be able to just leave the upload speed limit at default 0 (unlimited) in preferences and relax. If they use other programs that want bandwidth, UploadSpeedSense will automatically lower the upload limit for eMule while the other transfer is going on. When the transfer is done, UploadSpeedSense raises the upload limit back to normal speed. UploadSpeedSense will not work for multihomed hosts.

This version contain only UploadSpeedSense, and no other of the ZZ features. I've created this separate version to make it easier to evaluate this feature and to hopefully get it included in the official version.

UploadSpeedSense is based on the DynUp idea, and in fact uses a few lines of code from DynUp. Thanks!

## How UploadSpeedSense works

* Uses traceroute to find one of your ISP's routers to ping. The tracerouting finds the last common host for 10 randomly chosen ips in your server list and known clients. TTL is increased one step at a time, and each host is pinged until the returned ip differs. This means none of the hosts are actually pinged, only your ISPs infrastructure gets the pings. Last common host is saved, and one ip of the routers one hop furhter than that last common host (this is the ping ip, the ip that pings will be sent to). During this phase the lower right corner of eMule will say "Preparing...". When a good host to ping has been found, the ip of that host is reported in the debug log. There's currently no way to manually set which host should be pinged. This may be changed in a future version.
* UploadSpeedSense now regurarly pings the ping ip, but it sets the TTL one to short, to get the ip from the last common host back. It uses this ping to measure latency for the connection. When the ping gets to high, it lowers the upload limit. When the ping gets low, it raises the upload limit. You can see the current ping in the lower right corner in eMule (statusbar).
* If the responding ip for the set TTL changes (remember, we set TTL one shorter than the number of hops to the ip we ping), then UploadSpeedSense assumes that the topology has changed, and will redo the tracerouting phase to find the new topology. This may happen if the computer has been reconnected to the internet, i.e a modem redial.

Preferences

You might need to experiment with the defaults in the Extended settings page in preferences.

These are the defaults:

Ping Tolerance: 800%  
Up Slowness: 1000  
Down Slowness: 1000  
Max number of pings for average: 1

Higher ping tolerance will make it accept a higher ping before it lowers the speed.

The slowness values controls how fast/slow the speed is changed to match the ping. Higher values makes it change the speed slower. Lower values makes it change the speed faster. The higher values, the smoother graph, and the slower it reacts to ping changes.

"Max number of pings for average" controls how many pings it will average to calculate the ping. Higher value will make it react less, and slower, to ping changes. Too high value here will make the upload graph wave-formed.

## How to tweak

First set the upload limit value to the highest speed you want to allow eMule to upload to. UploadSpeedSense will never raise upload limit to a higher value than this value. If you want UploadSpeedSense to control speed completely, disable upload limit.

**The UploadSpeedSense are available in Preferences->Extended settings.**

**Find best upload limit automatically:** Check this to enable.

**Lowest allowed upload speed:** the lowest speed that UploadSpeedSense is allowed to set.

**Ping tolerance (%)**: This value is only used if "Method for ping tolerance" is set to "Percent (%)". Start at 500% and then try to raise it 100 or lower it 100 and see the difference. The lower this value, the lower upload speed you will get. 100% is the lowest value possible, and will probably make USS lower your upload limit to whatever MIN SPEED is set to.

**Ping tolerance (ms):** If you prefer, you can set the actual ping value you want. This value is only used if "Method for ping tolerance" is set to "Milliseconds (ms)".

**Going up/down slowness:** These values effect how fast the speed is adjusted. You will probably want both of these to both be set to one single value. Start these at 1000. If you get a roller coaster in the upload graph, try to raise them to 2000, then 3000, etc. The HIGHER the value, the SLOWER USS changes the upload limit. Too high value here will more or less prevent USS from changing upload speed at all.

**Number of pings for average:** Should ALWAYS be 1. I've never gotten good results with any other value.

# [emule中节点加入Kad网络过程（源代码详解）【对原文部分改进】](http://blog.csdn.net/jo_say/article/details/8082491)

emule中节点加入Kad网络过程（源代码详解）

程序启动：

**EmuleDlg.cpp中函数**BOOL CemuleDlg::OnInitDialog()**，此函数用于对话框的初始化，在这个函数里添加了定时器**：VERIFY( (m\_hTimer = ::SetTimer(NULL, NULL, 300, StartupTimer)) != NULL );

**在这里添加了函数**void CALLBACK CemuleDlg::**StartupTimer**(HWND /\*hwnd\*/, UINT /\*uiMsg\*/, UINT /\*idEvent\*/, DWORD /\*dwTime\*/)，

case 2:

theApp.Kad\_Dlg->status++;

if(!theApp.listensocket->StartListening())

ASSERT(0);

if(!theApp.clientudp->Create())

ASSERT(0);

theApp.Kad\_Dlg->status++;

break;

**[PS: 现在已经不是这样了，没有了Kad\_Dlg, 在cemuleDlg.cpp的2087行调用了Kad的Start()函数]**

**在StartupTimer这个函数里，添加了一个ListenSocket的侦听端，并且在本地节点创建了一个CClientUDPSocket\* clientudp;**

然后程序启动。

顺便说一句，在CEmule类中定义了许多的类的实例，这都在今后使用到：

UploadBandwidthThrottler\* uploadBandwidthThrottler;

CClientList\* clientlist;

CClientUDPSocket\* clientudp;

CListenSocket\* listensocket;

CSharedFileList\* sharedfiles;

CDownloadQueue\* downloadqueue;

CUploadQueue\* uploadqueue;

CServerList\* serverlist;

LastCommonRouteFinder\* lastCommonRouteFinder;

CServerConnect\* serverconnect;

CIPFilter\* ipfilter;

CClientCreditsList\* clientcredits;

CSearchList\* searchlist;

CKnownFileList\* knownfiles;

CMMServer\* mmserver;

AppState m\_app\_state; // defines application state for shutdown

CMutex hashing\_mut;

CString m\_strCurVersionLong;

CPeerCacheFinder\* m\_pPeerCache;

CFriendList\* friendlist;

CFirewallOpener\* m\_pFirewallOpener;//hyper added

节点加入网络：

**[emuledlg.cpp的：2087行 ]**

**Emule连接Kad网络时**，调用函数：Kademlia::CKademlia::Start(); Start()这个函数没有做什么实际意义上的事情，主要是new了几个类：

m\_pInstance = new CKademlia();

m\_pInstance->m\_pPrefs = pPrefs;

m\_pInstance->m\_pUDPListener = NULL;

m\_pInstance->m\_pRoutingZone = NULL;

m\_pInstance->m\_pIndexed = new CIndexed();

m\_pInstance->m\_pRoutingZone = new CRoutingZone();

m\_pInstance->m\_pUDPListener = new CKademliaUDPListener();

并且更改了几个定时器的时间。

**接着程序转入到routingzone.cpp中执行**。

在上面那部分的Start ()函数体内部初始化了CRoutingZone这个类，这个类的构造函数CRoutingZone::CRoutingZone()体中调用函数 Init(NULL, 0, CUInt128((ULONG)0));来初始化根节点（应该就是本地节点）。

             // Can only create routing zone after prefs

             // Set our KadID for creating the contact tree

             CKademlia ::GetPrefs ()-> GetKadID(& uMe );

             m\_sFilename = szFilename ;

             // Init our root node.

             Init (NULL , 0, CUInt128(( ULONG )0));

在void CRoutingZone::Init(CRoutingZone \*pSuper\_zone, int iLevel, const CUInt128 &uZone\_index)函数体内部创建了一个新的m\_pBin = new CRoutingBin();

             // Init all Zone vars

             // Set this zones parent

             m\_pSuperZone = pSuper\_zone ;

             // Set this zones level

             m\_uLevel = iLevel ;

             // Set this zones CUInt128 Index

             m\_uZoneIndex = uZone\_index ;

             // Mark this zone has having now leafs.

             m\_pSubZones [0] = NULL ;

             m\_pSubZones [1] = NULL ;

             // Create a new contact bin as this is a leaf.

             m\_pBin = new CRoutingBin();

             // Set timer so that zones closer to the root are processed earlier.

             m\_tNextSmallTimer = time ( NULL) + m\_uZoneIndex .Get32BitChunk (3);

             // Start this zone.

             StartTimer ();

             // If we are initializing the root node, read in our saved contact list.

             if ((m\_pSuperZone == NULL) && ( m\_sFilename .GetLength () > 0))

                         ReadFile ();

**接着调用函数StartTime（）**，用来开始这个区域。在StartTime（）函数内部添加事件CKademlia::AddEvent(this);

             time\_t tNow = time( NULL );

             // Start filling the tree, closest bins first.

             m\_tNextBigTimer = tNow + SEC(10);

             CKademlia ::AddEvent ( this);

在调用完函数StartTime（）函数后，从文件中读取以前保存的联系人。

在调用完函数Kademlia::CKademlia::Start();之后，Kademlia开始处理，转入函数**Kademlia:: CKademlia::Process()**开始执行，在函数void CKademlia::Process()中调用函数**pZone->OnSmallTimer();即CRoutingZone中 OnSmallTimer().。**

line 274:

if (pZone -> m\_tNextSmallTimer <= tNow )

                        {

                                     pZone ->OnSmallTimer ();

                                     pZone ->m\_tNextSmallTimer = MIN2S(1) + tNow ;

                        }

**CRoutingZone中OnSmallTimer()**，在此函数体内，当判断联系人为非空时，调用函数 CKademlia::GetUDPListener()->SendMyDetails\_KADEMLIA2(KADEMLIA2\_HELLO\_REQ, pContact->GetIPAddress(), pContact->GetUDPPort());来发送本地节点的一些信息，其中函数的第一个参数是消息的类型， KADEMLIA2\_HELLO\_REQ表明是Kademlia 2.0网络的加入请求，相当于TCP/IP中的ACK，即表明这个消息是用来加入网络的。第二个参数是本地节点的IP，第三个节点是本地节点的端口。

             if (pContact != NULL)

            {

                         pContact ->CheckingType ();

                         if (pContact -> GetVersion() >= 6){ /\*48b\*/

                                     if (thePrefs . GetDebugClientKadUDPLevel() > 0)

                                                 DebugSend ("KADEMLIA2\_HELLO\_REQ" , pContact ->GetIPAddress (), pContact-> GetUDPPort ());

                                     CUInt128 uClientID = pContact-> GetClientID ();

                                     CKademlia ::GetUDPListener ()-> SendMyDetails( KADEMLIA2\_HELLO\_REQ , pContact ->GetIPAddress (), pContact-> GetUDPPort (), pContact -> GetVersion(), pContact ->GetUDPKey (), & uClientID, false );

                                     if (pContact -> GetVersion() >= KADEMLIA\_VERSION8\_49b ){

                                                 // FIXME:

                                                 // This is a bit of a work arround for statistic values. Normally we only count values from incoming HELLO\_REQs for

                                                 // the firewalled statistics in order to get numbers from nodes which have us on their routing table,

                                                 // however if we send a HELLO due to the timer, the remote node won't send a HELLO\_REQ itself anymore (but

                                                 // a HELLO\_RES which we don't count), so count those statistics here. This isn't really accurate, but it should

                                                 // do fair enough. Maybe improve it later for example by putting a flag into the contact and make the answer count

                                                 CKademlia ::GetPrefs ()-> StatsIncUDPFirewalledNodes( false );

                                                 CKademlia ::GetPrefs ()-> StatsIncTCPFirewalledNodes( false );

                                    }

**接着转入**KademliaUDPListener.cpp中函数void CKademliaUDPListener::SendMyDetails\_KADEMLIA2(byte byOpcode, uint32 uIP, uint16 uUDPPort)运行，主要是调用函数SendPacket(byPacket, uLen, uIP, uUDPPort);，SendPacket(byPacket, uLen, uIP, uUDPPort);函数在KademliaUDPListener.cpp内部，此函数体内部调用函数theApp.clientudp-> SendPacket(pPacket, ntohl(uDestinationHost), uDestinationPort);来发送包。

uint32 uLen = sizeof( byPacket ) - byteIOResponse . GetAvailable();

                         if (byKadVersion >= KADEMLIA\_VERSION6\_49aBETA){

                                     if (isnulmd4 ( uCryptTargetID-> GetDataPtr ())){

                                                 DebugLogWarning (\_T ( "Sending hello response to crypt enabled Kad Node which provided an empty NodeID: %s (%u)"), ipstr (ntohl ( uIP)), byKadVersion );

                                                 SendPacket (byPacket , uLen,  uIP , uUDPPort , targetUDPKey, NULL );

                                    }

                                     else

                                                 SendPacket (byPacket , uLen,  uIP , uUDPPort , targetUDPKey, uCryptTargetID );

                        }

                         else {

                                     SendPacket (byPacket , uLen,  uIP , uUDPPort , 0, NULL);

                                     ASSERT ( targetUDPKey . IsEmpty() );

                        }

KademliaUDPListener.cpp内部CKademliaUDPListener ::SendPacket之一：

{

             if (uLenData < 2) {

                         ASSERT (0);

                         return ;

            }

             AddTrackedOutPacket (uDestinationHost , pbyData[1]);

             Packet \* pPacket = new Packet (OP\_KADEMLIAHEADER );

             pPacket ->opcode = pbyData[1];

             pPacket ->pBuffer = new char [uLenData +8];

             memcpy (pPacket -> pBuffer, pbyData +2, uLenData -2);

             pPacket ->size = uLenData-2;

             if ( uLenData > 200 )

                         pPacket ->PackPacket ();

             theStats .AddUpDataOverheadKad ( pPacket-> size );

**theApp .clientudp -> SendPacket( pPacket , ntohl ( uDestinationHost), uDestinationPort , true**

**, ( uCryptTargetID != NULL ) ? uCryptTargetID-> GetData () : NULL**

**, true , targetUDPKey . GetKeyValue( theApp .GetPublicIP ( false)));**

}

**ClientUDPSocket.cpp中（565line）函数**theApp.clientudp->SendPacket(pPacket, ntohl(uDestinationHost), uDestinationPort);体内部将刚才的消息包（或者叫数据包）加入到controlpacket\_queue的队尾，

**controlpacket\_queue.AddTail(newpending); // line586**

 controlpacket\_queue是一个链表，类型是CTypedPtrList<CPtrList, UDPPack\*> controlpacket\_queue;，

CTypedPtrList <CPtrList , UDPPack\*> controlpacket\_queue ;

// ZZ:UploadBandWithThrottler (UDP) -->

    sendLocker. Lock ();

             controlpacket\_queue .AddTail ( newpending);

    sendLocker. Unlock ();

    theApp. uploadBandwidthThrottler ->QueueForSendingControlPacket ( this);

             return true ;

// <-- ZZ:UploadBandWithThrottler (UDP)

是通过**模板**来实现的。接着继续调用函数theApp.uploadBandwidthThrottler- >QueueForSendingControlPacket(this);此时数据包在链表UploadBandwidthThrottler\* uploadBandwidthThrottler;中排队。

**类UploadBandwidthThrottler继承自CWinThread类，主要是作为线程来运行的。**

类在初始化，在构造函数中调用函数 UINT AFX\_CDECL UploadBandwidthThrottler::RunProc(LPVOID pParam)，

UploadBandwidthThrottler ::UploadBandwidthThrottler ( void) {

             m\_SentBytesSinceLastCall = 0;

             m\_SentBytesSinceLastCallOverhead = 0;

    m\_highestNumberOfFullyActivatedSlots = 0;

             threadEndedEvent = new CEvent(0, 1);

             pauseEvent = new CEvent( TRUE , TRUE );

             doRun = true ;

             AfxBeginThread (RunProc , ( LPVOID) this );

}

UINT AFX\_CDECL UploadBandwidthThrottler:: RunProc (LPVOID pParam) {

             DbgSetThreadName ("UploadBandwidthThrottler" );

             InitThreadLocale ();

             UploadBandwidthThrottler \* uploadBandwidthThrottler = ( UploadBandwidthThrottler\*) pParam ;

             return uploadBandwidthThrottler -> RunInternal();

}

这个函数调用uploadBandwidthThrottler->RunInternal();，RunInternal()函 数主要用来发送来自socket的数据包，函数体内调用两个函数：

SocketSentBytes socketSentBytes = socket->SendControlData(allowedDataRate > 0?(UINT)(bytesToSpend - spentBytes):1, minFragSize);

以及

   if( socket != NULL ) {

                    SocketSentBytes socketSentBytes = socket-> SendControlData (allowedDataRate > 0?(UINT )(bytesToSpend - spentBytes):1, minFragSize );

                                                    uint32 lastSpentBytes = socketSentBytes .sentBytesControlPackets + socketSentBytes. sentBytesStandardPackets ;

                                                    spentBytes += lastSpentBytes ;

                                                    spentOverhead += socketSentBytes . sentBytesControlPackets;

                                        }

  if( neededBytes > 0) {

                                                                            SocketSentBytes socketSentBytes = socket ->SendFileAndControlData ( neededBytes, minFragSize );

                                                                            uint32 lastSpentBytes = socketSentBytes .sentBytesControlPackets + socketSentBytes. sentBytesStandardPackets ;

                                                                            spentBytes += lastSpentBytes ;

                                                                            spentOverhead += socketSentBytes .sentBytesControlPackets ;

                            if (lastSpentBytes > 0 && slotCounter < m\_highestNumberOfFullyActivatedSlots ) {

                                m\_highestNumberOfFullyActivatedSlots = slotCounter ;

                            }

                                                                }

SocketSentBytes socketSentBytes = socket->SendFileAndControlData(neededBytes, minFragSize);

其中的socket类型是ThrottledFileSocket\*，在类ThrottledFileSocket中这两个函数被定义为虚函数，

class ThrottledFileSocket : public ThrottledControlSocket

{

public :

    virtual SocketSentBytes SendFileAndControlData ( uint32 maxNumberOfBytesToSend , uint32 minFragSize ) = 0;

    virtual DWORD GetLastCalledSend () = 0;

    virtual uint32   GetNeededBytes () = 0;

             virtual bool           IsBusy () const = 0;

    virtual bool     HasQueues () const = 0;

             virtual bool           UseBigSendBuffer ()                                                                                            { return false ; }

};

而 且在这个类内部没有具体实现，它们的实现在类CClientUDPSocket中，类CClientUDPSocket继承自**CAsyncSocket**以 及**ThrottledControlSocket**，如下代码：

class CClientUDPSocket : public CAsyncSocket, public ThrottledControlSocket // ZZ:UploadBandWithThrottler (UDP)。

socket->SendControlData(allowedDataRate > 0?(UINT)(bytesToSpend - spentBytes):1, minFragSize);

class CClientUDPSocket : public CAsyncSocket , public CEncryptedDatagramSocket, public ThrottledControlSocket // ZZ:UploadBandWithThrottler (UDP)

{

public :

             CClientUDPSocket ();

             virtual ~CClientUDPSocket ();

             bool       Create ();

             bool       Rebind ();

             uint16    GetConnectedPort ()                               { return m\_port ; }

             bool       SendPacket ( Packet\* packet , uint32 dwIP, uint16 nPort , bool bEncrypt , const uchar \* pachTargetClientHash );

    SocketSentBytes  SendControlData (uint32 maxNumberOfBytesToSend, uint32 minFragSize ); // ZZ:UploadBandWithThrottler (UDP)

protected :

以及

SocketSentBytes socketSentBytes = socket->**SendFileAndControlData**(neededBytes, minFragSize);的实现体在**ClientUDPSocket**.cpp中424行：[ps:newversion中可能没这个了]

SocketSentBytes CClientUDPSocket::**SendControlData**(uint32 maxNumberOfBytesToSend, uint32 /\*minFragSize\*/){ // ZZ:UploadBandWithThrottler (UDP)

**在它们内部调用了函数SendTo**，if (!SendTo(sendbuffer, cur\_packet->packet->size+2, cur\_packet->dwIP, cur\_packet->nPort))（在ClientUDPSocket.cpp中528行）。这个函数是类CClientUDPSocket 的成员函数。int CClientUDPSocket::SendTo(char\* lpBuf,int nBufLen,uint32 dwIP, uint16 nPort)，在这个函数体内调用类CAsyncSocket的成员函数uint32 result = CAsyncSocket::SendTo(lpBuf,nBufLen,nPort,ipstr(dwIP));，类CAsyncSocket是MFC 的类库中的一个类。【NND，终于找到头了】

  if (! SendTo ((char \*) sendbuffer, nLen , cur\_packet -> dwIP, cur\_packet ->nPort )){

                sentBytes += nLen ; // ZZ:UploadBandWithThrottler (UDP)

                                                 controlpacket\_queue .RemoveHead ();

                                                 delete cur\_packet -> packet;

                                                 delete cur\_packet ;

            }

int CClientUDPSocket :: SendTo( char \* lpBuf , int nBufLen ,uint32 dwIP, uint16 nPort ){

             // NOTE: \*\*\* This function is invoked from a \*different\* thread!

**uint32 result = CAsyncSocket:: SendTo (lpBuf , nBufLen, nPort ,ipstr ( dwIP));**

             if (result == ( uint32) SOCKET\_ERROR ){

                         uint32 error = GetLastError();

                         if (error == WSAEWOULDBLOCK){

                                     m\_bWouldBlock = true ;

                                     return -1;

                        }

                         if (thePrefs . GetVerbose())

                                     DebugLogError (\_T ( "Error: Client UDP socket, failed to send data to %s:%u: %s"), ipstr( dwIP ), nPort , GetErrorMessage( error , 1));

            }

             return 0;

}

至此，本地节点加入网络的请求就发送完毕。

* 下面讲述本地节点在接收到来自其他节点的回应后在本地采取的一些措施从而把自己加入到网络内。

**当网络事件发生时（即本地网卡接收到数据包），“socket窗口”接收WM\_SOCKET\_NOTIFY消息，消息处理函数OnSocketNotify被调用，。“socket窗口”的定义和消息处理是MFC实现的，其中OnSocketNotify函数定义如下：**

LRESULT CSocketWnd::OnSocketNotify(WPARAM wParam, LPARAM lParam)

{

CSocket::AuxQueueAdd(WM\_SOCKET\_NOTIFY, wParam, lParam);

CSocket::ProcessAuxQueue();

return 0L;

}

**在CSocket::ProcessAuxQueue();函数中回调CAsyncSocket的成员函数DoCallBack，DoCallBack调用事件处理函数OnReceive。**

int PASCAL CSocket::ProcessAuxQueue()

{

……………………//省略部分

if (pMsg->message == WM\_SOCKET\_NOTIFY)

{

CAsyncSocket::DoCallBack(pMsg->wParam, pMsg->lParam);

}

………………//省略部分

return nCount;

}

void PASCAL CAsyncSocket::DoCallBack(WPARAM wParam, LPARAM lParam)

{

……………………//省略部分

pSocket->OnReceive(nErrorCode);

**/\*pSocket类型是：CClientUDPSocket，因为类CClientUDPSocket继承了类 CAsyncSocket，而OnReceive在CAsyncSocket定义的虚函数，OnReceive在CClientUDPSocket中重新 做了实现，因此调用的时候会转到CClientUDPSocket中OnReceive执行。\*/**

}

void CClientUDPSocket::OnReceive(int nErrorCode)

{

……………………

case OP\_KADEMLIAHEADER:

{

// theStats.AddDownDataOverheadKad(length);

if (length >= 2)

Kademlia::CKademlia::ProcessPacket(buffer, length, ntohl(sockAddr.sin\_addr.S\_un.S\_addr), ntohs(sockAddr.sin\_port));

else

throw CString(\_T("Kad packet too short"));

break;

}

……………………

}

**接着调用在kademlia.cpp中定义的函数ProcessPacket。**

void CKademlia::ProcessPacket(const byte \*pbyData, uint32 uLenData, uint32 uIP, uint16 uPort)

{

if( m\_pInstance && m\_pInstance->m\_pUDPListener )

m\_pInstance->m\_pUDPListener->ProcessPacket( pbyData, uLenData, uIP, uPort);

}

**转入KademliaUDPListener类中ProcessPacket函数运行。**

void CKademliaUDPListener::ProcessPacket(const byte\* pbyData, uint32 uLenData, uint32 uIP, uint16 uUDPPort)

{

//………………………………省略部分

switch (byOpcode)

{

………………………………//省略部分

case KADEMLIA\_RES:

if (thePrefs.GetDebugClientKadUDPLevel() > 0)

DebugRecv("KADEMLIA\_RES", uIP, uUDPPort);

Process\_KADEMLIA\_RES(pbyPacketData, uLenPacket, uIP, uUDPPort);

break;

………………………………//省略部分

}

}

**转入函数Process\_KADEMLIA\_RES(pbyPacketData, uLenPacket, uIP, uUDPPort);执行：**

**void CKademliaUDPListener::Process\_KADEMLIA\_RES (const byte \*pbyPacketData, uint32 uLenPacket, uint32 uIP, uint16 uUDPPort) 【我拦截它就ok了】**

{

//……………………

if(CKademlia::GetPrefs()->GetRecheckIP())

{

FirewalledCheck(uIP, uUDPPort);

if (thePrefs.GetDebugClientKadUDPLevel() > 0)

DebugSend("KADEMLIA\_HELLO\_REQ", uIP, uUDPPort);

SendMyDetails(KADEMLIA\_HELLO\_REQ, uIP, uUDPPort);

}

if(::IsGoodIPPort(ntohl(uIPResult),uUDPPortResult))

{

pRoutingZone->Add(uIDResult, uIPResult, uUDPPortResult, uTCPPortResult, 0);

pResults->push\_back(new CContact(uIDResult, uIPResult, uUDPPortResult, uTCPPortResult, uTarget, 0));

}

}

}

CSearchManager::ProcessResponse(uTarget, uIP, uUDPPort, pResults);

}

在这个函数体内部主要包括对4个函数的调用，分别是：

SendMyDetails(KADEMLIA\_HELLO\_REQ, uIP, uUDPPort);

pRoutingZone->Add(uIDResult, uIPResult, uUDPPortResult, uTCPPortResult, 0);

pResults->push\_back(new CContact(uIDResult, uIPResult, uUDPPortResult, uTCPPortResult, uTarget, 0));

CSearchManager::ProcessResponse(uTarget, uIP, uUDPPort, pResults);

其中第一个函数是在判断自己在防火墙或者NAT之后重新发送本地节点信息的函数，包括重新得到的IP地址以及端口。

第二和第三个函数用来添加此节点作为联系人之一。

**第三个函数是将此消息转入到CSearchManager中相应处理响应的函数进行处理。**

void CSearchManager::ProcessResponse(const CUInt128 &uTarget, uint32 uFromIP, uint16 uFromPort, ContactList \*plistResults)

{

pSearch->ProcessResponse(uFromIP, uFromPort, plistResults);// pSearch是 CSearch类的指针

}

**进一步转入到pSearch->ProcessResponse(uFromIP, uFromPort, plistResults)中执行。**

void CSearch::ProcessResponse(uint32 uFromIP, uint16 uFromPort, ContactList \*plistResults)

{

// Not interested in responses for FIND\_NODE.

// Once we get a results we stop the search.

// These contacts are added to contacts by UDPListener.

if (m\_uType == NODE)

{

// Note we got an answer

**m\_uAnswers++;**

// We clear the possible list to force the search to stop.

// We do this so the user has time to visually see the results.

m\_mapPossible.clear();

delete plistResults;

// Update search on the GUI.

//IMPREVIEW theApp.emuledlg->kademliawnd->searchList->SearchRef(this);

return;

}

}

在这个函数内部我们将响应的节点数目增加一。

后面陆续接收到的消息处理流程与上述情形相似，只是对于不同的消息采取的响应以及动作并不相同。

# Emule.cpp

CemuleApp

## 构造函数流程

1. InitDEP
2. InitHeapCorruptionDetection
3. 加载gdiplus.dll，什么作用？
4. 版本检查—主程序版本，协议版本
5. EnableHtmlHelp

## Initinstance()流程

1. 加载配置文件preferences.ini
2. Install crash dump creation
3. Locale initialization
4. AfxOleInit(); //snow: ATL 初始化
5. // snow : 检查Comctl32和shell32版本
6. AfxSocketInit() //snow: Socket初始化
7. AfxEnableControlContainer();
8. thePrefs.Init();
9. theStats.Init();
10. 配置LOG文件
11. // snow : 检查防火墙设置
12. 初始化UPNP
13. Highres scheduling //干什么的？
14. 上传带宽设置
15. clientlist = new CClientList();
16. friendlist = new CFriendList();
17. searchlist = new CSearchList();
18. knownfiles = new CKnownFileList();
19. serverlist = new CServerList();
20. serverconnect = new CServerConnect();
21. sharedfiles = new CSharedFileList(serverconnect);
22. listensocket = new CListenSocket();
23. clientudp = new CClientUDPSocket();
24. clientcredits = new CClientCreditsList();
25. downloadqueue = new CDownloadQueue(); // bugfix - do this before creating the uploadqueue
26. uploadqueue = new CUploadQueue();
27. ipfilter = new CIPFilter();
28. webserver = new CWebServer(); // Webserver [kuchin]
29. mmserver = new CMMServer();
30. scheduler = new CScheduler();
31. m\_pPeerCache = new CPeerCacheFinder();
32. thePerfLog.Startup();
33. dlg.DoModal();

# DH交换密钥建立加密连接流程

## 客户端到服务器的呼出连接

1、CServerSocket::ConnectTo(CServer\* server, bool bNoCrypt)

根据bNoCrypt，客户端设置里是否要求加密连接，以及服务器是否支持加密连接

是：SetConnectionEncryption(true, NULL, true);

否：SetConnectionEncryption(false, NULL, true);

**m\_StreamCryptState为ECS\_UNKNOWN 或 ECS\_NONE**

2、CEncryptedStreamSocket::SetConnectionEncryption(bool bEnabled, const uchar\* pTargetClientHash, bool bServerConnection)

/// snow :不是到服务器的连接，目标客户端的ID哈希值不是NULL,且目的是要启动加密连接

if (bEnabled && pTargetClientHash != NULL && !bServerConnection){

**m\_StreamCryptState = ECS\_PENDING;** ///snow:是outgoing connection，状态为连接等待

///snow start：建立混淆密钥 - Client A (Outgoing connection):

/// Sendkey: Md5(<UserHashClientB 16><MagicValue34 1><RandomKeyPartClientA 4>) 21

/// Receivekey: Md5(<UserHashClientB 16><MagicValue203 1><RandomKeyPartClientA 4>) 21

m\_pRC4SendKey = RC4CreateKey(md5.GetRawHash(), 16, NULL);

m\_pRC4ReceiveKey = RC4CreateKey(md5.GetRawHash(), 16, NULL);

}

3、CServerSocket:: Connect(CStringA(server->GetAddress()), nPort))🡪CEMSocket::Connect(LPCSTR lpszHostAddress, UINT nHostPort)🡪CEncryptedStreamSocket::Connect(lpszHostAddress, nHostPort);🡪 CAsyncSocketEx::Connect(LPCSTR lpszHostAddress, UINT nHostPort)🡪 connect(m\_SocketData.hSocket, lpSockAddr, nSockAddrLen)

向服务器发出连接请求

4、

## 客户端到客户端的呼出连接

## 客户端到客户端的呼入连接