Subject: Using openssl functions on U++
Posted by ealabarce on Sun, 09 Dec 2007 21:13:32 GMT
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How to implement opnessl on U++ (no sockets) functions like dgst, md5, working with certificates.

For example:
I need to make in code this commands:

openssl.exe dgst -md5 -sign firma.pem
openssl.exe enc -base64 -A

but U++ don´t include openssl, im working with ultimate++ ver. 2007.1 with mingw on windows.

Thanks

Subject: Re: Using openssl functions on U++
Posted by rylek on Sun, 09 Dec 2007 23:14:16 GMT
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Hello!

U++ contains a very thin wrapper over openssl in the Web/SSL package. This basically implements SSL-based streaming sockets only, all additional work like certificate management has to be done directly via calls to the openssl library. For certain special functions there are tools in the U++ itself, namely the MD5 digest or the BASE64 encoding (see Web/util.h, Base64Encode / Decode & MD5Digest). Some time ago I posted somewhere here a snippet of code demonstrating the usage (mainly the initialization phase) of the SSL-based sockets, if you don't find it, I can re-post it here.

Regards

Tomas Rylek

Subject: Re: Using openssl functions on U++
Posted by ealabarce on Mon, 10 Dec 2007 00:25:42 GMT
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Hi rylek, and thanks for the fast answer, well im try to find the form to get this, but I'm new on c++ and its hard to me, im try this code, on new empty project an add a webssl package to the project this is may code (maybe all is wrong)

#include <iostream>

```
#include <Web/Web.h>
using namespace std;

int main()
{
 char *text;
 char *salida;
 text = "Hola a todos";
 salida=Base64Encode(MD5Digest(*text));
 cout << "Salida en base64 para la digestion de " << text << " = " << salida;
 return 1;
}
```

And when i compile, return this errors:

```
C:\ElectroFactUPP\testssl\main.cpp: In function `int main()':
C:\ElectroFactUPP\testssl\main.cpp:10: error: `MD5Digest' undeclared (first use this func
 tion)
C:\ElectroFactUPP\testssl\main.cpp:10: error: (Each undeclared identifier is reported onl
 y once for each function it appears in.)
C:\ElectroFactUPP\testssl\main.cpp:10: error: `Base64Encode' undeclared (first use this f
 unction)
C:\ElectroFactUPP\testssl\main.cpp:13:2: warning: no newline at end of file
testssl: 1 file(s) built in (0:03.25), 3250 msecs / file, duration = 3250 msecs

There were errors. (0:03.28)
```

Excuse my poor experience on c++ but i want to take the next step and pass all my applications on realbasic to c++ using ultimate++.

Thanks a lot for your assistance....

Best Regards.

Note: Excuse my poor english too

Subject: Re: Using openssl functions on U++
Posted by waxblood on Mon, 10 Dec 2007 04:35:34 GMT
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U++ is written in standard C++, but it douesn't use c++ standard template library (stl) for efficiency reasons, so you should avoid using anything which is included in std namespace - you could start by not writing using namespace std at all for example

This is the corrected version of your program:

```
// not needed std stuff
//#include <iostream>

#include <Web/Web.h>

//not needed, too
//using namespace std;

using namespace UPP; //write this, otherwise upp functions won't get recognised



int main()
{
char *text = "Hola a todos";

String salida; //in this case seems better to use String - NOTE: this is Ultimate++ String, not std::string

//text = "Hola a todos"; // you can write a thing like this only at initialization time

salida = Base64Encode(MD5Digest(text)); // if you write *text you pass MD5Digest a _single_ char, not a vector of chars


//Upp way to std::cout is writing Cout()
Cout() << "Salida en base64 para la digestion de " << text << " = " << salida;

return 0; //Why return 1? If we got so far return 0 (no error) seems better
}
```

I suggest you to read :

String tutorial
http://www.ultimatepp.org/srcdoc$Core$CoreTutorial$en-us.htm l

As for String/char* conversions,

http://www.ultimatepp.org/forum/index.php?t=msg&goto=125 11&#msg_12511

David

Subject: Re: Using openssl functions on U++
Posted by ealabarce on Mon, 10 Dec 2007 20:34:06 GMT
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Thanks so much, David, I need read an make all tutorials, im working on that, thanks for the help.

Best Regards

Subject: Re: Using openssl functions on U++
Posted by ealabarce on Wed, 12 Dec 2007 20:11:45 GMT
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Hello again, well im reading the documentation, and now i can get the md5 and the base64 convertion, but now I need to sign the md5 with a rsa .key private file, I trying to understand who to do this, viewing on the openssl.org API documentation, but I some confuse, let me explain:

First I initilize a RSA struture like this:
RSA *FirmaDigital;

Then i use the FileIn Stream:
FileIn StreamArchivoFirma;

Get a new Struct of RSA
FirmaDigital=RSA_new();

My cuestion is, who to put the file stream on the memory structure of RSA.

Thanks in advance.

Subject: Re: Using openssl functions on U++
Posted by Zardos on Wed, 12 Dec 2007 21:00:58 GMT
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ealabarce wrote on Wed, 12 December 2007 21:11Hello again, well im reading the documentation, and now i can get the md5 and the base64 convertion, but now I need to sign the md5 with a rsa .key private file, I trying to understand who to do this, viewing on the openssl.org API documentation, but I some confuse, let me explain:

First I initilize a RSA struture like this:
RSA *FirmaDigital;

Then i use the FileIn Stream:
FileIn StreamArchivoFirma;

Get a new Struct of RSA
FirmaDigital=RSA_new();

My cuestion is, who to put the file stream on the memory structure of RSA.

Thanks in advance.

I have attached a Upp package "CryptOpenSsl.zip".

There is a class with the following intefarce:

```
struct Rsa : public Moveable<Rsa> {
 Rsa() { rsa = NULL; }
 ~Rsa() { if(rsa) RSA_free(rsa); }

 void GenerateKeyPair(int bits = 1024, int exponent = 17);

 String PrivateKeyToPem();
 String PublicKeyToPem();
 void PrivateKeyFromPem(const String &pem);
 void PrivateKeyFromPem(uint8 *d, int l);
 void PublicKeyFromPem(const String &pem);
 void PublicKeyFromPem(uint8 *d, int l);

 String SignSHA(const String &msg);
 String Decrypt(const String &msg, int padding = RSA_PKCS1_OAEP_PADDING);

 bool VerifySHA(const String &msg, const String &sig);
 String Encrypt(const String &msg, int padding = RSA_PKCS1_OAEP_PADDING);

 int MaxMsgCount(int padding = RSA_PKCS1_OAEP_PADDING);

 void Serialize(Stream &s);

protected:
 RSA *rsa;
};
```

a example:

```
#ifdef _DEBUG
TEST(Rsa) {
```

```
 Rsa rsa;
 rsa.GenerateKeyPair(512);

 String pri = rsa.PrivateKeyToPem();
 String pub = rsa.PublicKeyToPem();

 Rsa rsa2;
 rsa2.PrivateKeyFromPem(pri);

 String pri2 = rsa2.PrivateKeyToPem();
 String pub2 = rsa.PublicKeyToPem();

 CHECK(pri == pri2);
 CHECK(pub == pub2);
 CHECK(rsa.VerifySHA("Kleiner Test", rsa2.SignSHA("Kleiner Test")));
 CHECK(rsa.Decrypt(rsa2.Encrypt("Kleiner Test")) == "Kleiner Test");
 CHECK(!rsa.VerifySHA("Kleiner Test", rsa2.SignSHA("@Kleiner Test")));
}
#endif
```

Use "SignSHA" and "VerifySHA" for signing and verification.
"Encrypt" and "Decrypt" for crypting.

The functions "PrivateKeyToPem" "PublicKeyToPem" "PrivateKeyFromPem" "PublicKeyFromPem" are useful, too. Use them to strore or load a public / private key.

Just look in the cpp file how it is done and copy what you need or tweak the class for your requirements.

- Ralf

File Attachments

1) CryptOpenSsl.zip, downloaded 565 times
2) UnitTest.zip, downloaded 545 times

Subject: Re: Using openssl functions on U++
Posted by ealabarce on Thu, 13 Dec 2007 05:30:12 GMT
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Thanks Ralf, i have a cuestion, the two projects are the class, or I only need the CryptOpenSsl.zip one, or the UnitTest.zip is part of the class, now, to use the class i need only a declaration like "Rsa Firma;", like other classes and then access to the methods. because im doing this:

I add the CryptOpenSsl project to my project, and then...

On a method of my class i put this:

```
void firmafactSAT_GUI::CargarSello() //Carga archvio del sello
{
 B64.Clear(); //Clean result editfield
 Cadena=CadenaOriginal.GetData();  //Get the string to sign
 ArchivoFirma.Type("Sello Digital", "*.key"); //file type to the key file
 if (ArchivoFirma.ExecuteOpen("Seleccione el archivo de sello digital"))
 {
   RutaSello.SetText(ArchivoFirma.Get()); //Path to key file
   if (StreamArchivoFirma.Open(ArchivoFirma.Get())) //Open the file stream
    PromptOK("Archivo abierto correctamente!!!"); //only to test

   B64=Base64Encode(rsa.SignMD5(Cadena)); //sign the string and convert to base64
   //FirmaDigital=RSA_new();
   //FirmaDigital=StreamArchivoFirma.;

 }

}
```

And on the declare of my class i have the declaration of Rsa object:

```
class firmafactSAT_GUI : public WithfirmafactSAT_GUILayout<TopWindow> {
 String Cadena;      // Para guardar la cadena original del campo de edicion
 String Digestion;     // Para guardar la digestion de la cadena
 String Hexadecimal;    // Para guardar la digestion expresada en Hexadecimal
 String B64;      // Para guardar la digestion expresada en base64
 Rsa rsa; // <-- here is
 //RSA *FirmaDigital;
 FileSel ArchivoFirma;   //Selector para cargar el archivo de la firma
 FileIn  StreamArchivoFirma;  //Stream del archvio de la firma

..... etc.
```

Because I need to use MD5 I add this code to CryptOpenSsl.h

```
struct Rsa : public Moveable<Rsa> {
 Rsa() { rsa = NULL; }
 ~Rsa() { if(rsa) RSA_free(rsa); }

 void GenerateKeyPair(int bits = 1024, int exponent = 17);

 String PrivateKeyToPem();
```

```
 String PublicKeyToPem();
 void PrivateKeyFromPem(const String &pem);
 void PrivateKeyFromPem(uint8 *d, int l);
 void PublicKeyFromPem(const String &pem);
 void PublicKeyFromPem(uint8 *d, int l);

 String SignSHA(const String &msg);
 String SignMD5(const String &msg);  // Added by me
 String Decrypt(const String &msg, int padding = RSA_PKCS1_OAEP_PADDING);

 bool VerifySHA(const String &msg, const String &sig);
 bool VerifyMD5(const String &msg, const String &sig); // Added by me
 String Encrypt(const String &msg, int padding = RSA_PKCS1_OAEP_PADDING);

 int MaxMsgCount(int padding = RSA_PKCS1_OAEP_PADDING);

 void Serialize(Stream &s);

protected:
 RSA *rsa;
};
```

And to CryptOpenSsl.cpp

```
String Rsa::SignMD5(const String &msg) {
 ASSERT(rsa);

 String ret(0, RSA_size(rsa));
 unsigned int len;
 uint8 h[16];

 MD5((uint8 *)~msg, msg.GetCount(), h);

 RSA_sign(NID_md5, h, 16, (uint8 *)~ret, &len, rsa);
 ret.Trim(len);

 return ret;
}

bool Rsa::VerifyMD5(const String &msg, const String &sig) {
 ASSERT(rsa);

 uint8 h[16];

 MD5((uint8 *)~msg, msg.GetCount(), h);
```

```
 return RSA_verify(NID_md5, h, 16, (uint8 *)~sig, sig.GetCount(), rsa);
}
```

But when I compile the project, the compiler show me this error:

```
C:\ElectroFactUPP\firmafactSAT_GUI\main.cpp: In member function `void
firmafactSAT_GUI::CargarSe
 llo()':
C:\ElectroFactUPP\firmafactSAT_GUI\main.cpp:53: error: `rsa' undeclared (first use this function
 )
```

I need to put a include to a some file?

Thanks for the help...

Subject: Re: Using openssl functions on U++
Posted by Zardos on Thu, 13 Dec 2007 08:32:54 GMT
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ealabarce wrote on Thu, 13 December 2007 06:30Thanks Ralf, i have a cuestion, the two projects are the class, or I only need the CryptOpenSsl.zip one, or the UnitTest.zip is part of the class, now, to use the class i need only a declaration like "Rsa Firma;", like other classes and then access to the methods. because im doing this:

You can leave out the UnitTest package. I just attached it to make the CryptOpenSsl compile.

If you remove the UnitTest remove

```
#ifdef _DEBUG
TEST(Rsa) {
 Rsa rsa;
 rsa.GenerateKeyPair(512);

 String pri = rsa.PrivateKeyToPem();
 String pub = rsa.PublicKeyToPem();

 Rsa rsa2;
 rsa2.PrivateKeyFromPem(pri);

 String pri2 = rsa2.PrivateKeyToPem();
 String pub2 = rsa.PublicKeyToPem();

 CHECK(pri == pri2);
 CHECK(pub == pub2);
 CHECK(rsa.VerifySHA("Kleiner Test", rsa2.SignSHA("Kleiner Test")));
 CHECK(rsa.Decrypt(rsa2.Encrypt("Kleiner Test")) == "Kleiner Test");
```

```
 CHECK(!rsa.VerifySHA("Kleiner Test", rsa2.SignSHA("@Kleiner Test")));
}
#endif
```

...from CryptOpenSsl.cpp

and
#include <UnitTest/UnitTest.h> from CryptOpenSsl.h

Quote:But when I compile the project, the compiler show me this error:

```
C:\ElectroFactUPP\firmafactSAT_GUI\main.cpp: In member function `void
firmafactSAT_GUI::CargarSe
 llo()':
C:\ElectroFactUPP\firmafactSAT_GUI\main.cpp:53: error: `rsa' undeclared (first use this function
 )
```

I need to put a include to a some file?

Thanks for the help...

add: #include <openssl/md5.h> to CryptOpenSsl.h

The .h file now looks like this (UnitTest.h is still included - remove it if you want. See note above):

```
#ifndef _CryptOpenSsl_CryptOpenSsl_h_
#define _CryptOpenSsl_CryptOpenSsl_h_

// ----------------------------------------------------------------------------------------

#include <Core/Core.h>
#include <UnitTest/UnitTest.h>

 #define OPENSSL_THREAD_DEFINES
 #include <openssl/opensslconf.h>
 #if !defined(OPENSSL_THREADS)
 @@@
 #endif

#include <openssl/rsa.h>
#include <openssl/md5.h>
#include <openssl/engine.h>
#include <openssl/pem.h>

using namespace Upp;

// ----------------------------------------------------------------------------------------
```

```
String ToString(BIGNUM *b);
BIGNUM * ToBigNum(String& str);
String ToString(BIO *bp);
BIO * ToBIO(String &str);

// -----------------------------------------------------------------------------------------

struct Rsa : public Moveable<Rsa> {
 Rsa() { rsa = NULL; }
 ~Rsa() { if(rsa) RSA_free(rsa); }

 void GenerateKeyPair(int bits = 1024, int exponent = 17);

 String PrivateKeyToPem();
 String PublicKeyToPem();
 void PrivateKeyFromPem(const String &pem);
 void PrivateKeyFromPem(uint8 *d, int l);
 void PublicKeyFromPem(const String &pem);
 void PublicKeyFromPem(uint8 *d, int l);

 String SignSHA(const String &msg);
 String SignMD5(const String &msg);  // Added by me
 String Decrypt(const String &msg, int padding = RSA_PKCS1_OAEP_PADDING);

 bool VerifySHA(const String &msg, const String &sig);
 bool VerifyMD5(const String &msg, const String &sig); // Added by me
 String Encrypt(const String &msg, int padding = RSA_PKCS1_OAEP_PADDING);

 int MaxMsgCount(int padding = RSA_PKCS1_OAEP_PADDING);

 void Serialize(Stream &s);

protected:
 RSA *rsa;
};

// -----------------------------------------------------------------------------------------

#endif
```

- Ralf

Subject: Re: Using openssl functions on U++
Posted by Zardos on Thu, 13 Dec 2007 08:42:30 GMT
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Just another remark:

Make sure you call GenerateKeyPair(...) or PrivateKeyFromPem(...) before signing a message!

GenerateKeyPair: creates a new (random) public/private key pair. The private key is used for signing and decryption. The public key is used to verify a signed messages and to encrypt a message

PrivateKeyFromPem: reads a private key from a string -> PrivateKeyToPem save a private key to a string. The string is in PEM format, probably what you need

To verify a message you need a public key. Use PublicKeyFromPem(...) for this.

- Ralf

Subject: Re: Using openssl functions on U++
Posted by nixnixnix on Tue, 14 Jul 2009 00:51:27 GMT
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when I add the code

#include <openssl/ssl.h>

in my program I get an error so I assume I need to download the openssl source from the web (which I have done). Now where do I put it please and why are there lines in Web/ssl which reference this when it isn't there?

Cheers,

Nick

Subject: Re: Using openssl functions on U++
Posted by nixnixnix on Fri, 24 Jul 2009 19:14:33 GMT
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Ok, got it to compile in win32 and win64 but not for a DEBUG build. Any ideas on how to debug with openssl compiled in please?

Nick

Subject: Re: Using openssl functions on U++
Posted by nixnixnix on Mon, 10 Aug 2009 18:48:00 GMT
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Ok I had problems linking for several reasons which I will list here for anyone else who comes across this thread with similar issues:

1) didn't specify the libraries in the package organizer (Project->Package Organizer)

2) tried to use the same libraries for both 32 and 64 bit builds - no no no! Need to download both builds from http://www.slproweb.com/products/Win32OpenSSL.html

3) need to specify libraries that match your build. I was using MSC9 and linking statically so I need to use the libraries in ..\OpenSSL\lib\VC\static\

Hope this helps,

Nick
