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# MatrixSSL Getting Started Guide

MatrixSSL 3.3



Minutiae

047 018 281  
106 021 192  
070 023 210  
053 024 000  
073 032 230  
108 032 428  
091 033 174  
058 039 248  
108 054 402  
125 059 400  
099 060 400  
070 061 256  
048 068 340  
065 070 338  
104 071 358  
115 075 358  
041 077 096  
123 079 384  
063 083 064  
053 091 052  
028 097 052  
084 100 031  
050 102 044  
103 106 050  
117 111 046  
104 118 282

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#### **MatrixSSL Getting Started Guide** **3129**

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## Overview

This Getting Started Guide explains how to quickly compile and test the MatrixSSL package on supported reference platforms. This guide also contains instructions on building and running the client and server applications provided in the package.

## Who Is This Document For?

- Software developers working on a supported platform that want to create a development environment for integrating MatrixSSL security into a custom application
- Software developers who want to port MatrixSSL to a new platform
- Anyone wanting to learn more about MatrixSSL

## Documentation Style Conventions

- File names and directory paths are *italicized*.
- C code literals are distinguished with the **Monaco** font.

## Compiling and Testing MatrixSSL

### POSIX Platforms with Makefiles

The POSIX classification in MatrixSSL encompasses support for several operating system platforms including Mac OSX 10.5 and most UNIX/LINUX varieties. This is the default platform for the *Makefile* system that is provided in the package and should be the first build option if you are unsure of your platform configuration.

### Preparation

The development platform must have the following tools installed:

- The *tar* archiver for unzipping the package (or other decompression utility supporting *.TGZ* files)
- A C source code compiler and linker (*GCC* is the default in the provided Makefile system)
- The *make* tool

### Building the source

1. From the command prompt, unpack the zipped tar image.

```
$ tar -xzf matrixssl-3-3-1-open.tgz
```

2. Change directory to the root of the package and build the MatrixSSL library .

```
$ cd matrixssl-3-3-1-open  
$ make
```

3. Confirm there were no compile errors and that the MatrixSSL libraries have been built. A successful build will result in a libmatrixssl shared and static library. Applications interface with this library through the MatrixSSL public API set, which is documented in the MatrixSSL\_API PDF file, included in the distribution.

## Self-Test Application

Source code for a self-test application to exercise the SSL handshake and data exchange functionality of the MatrixSSL library is provided with the package. The following optional steps will enable the developer to build and run the test application to confirm the SSL protocol is fully functional.

1. Having successfully built the static library from the **Building the source** steps above, change directories to the *test* folder where the *ss/Test.c* source is located and compile the application.

```
$ cd matrixssl/test
$ make
```

2. Run the *ss/Test* application from the command line. This sample output shows a successful run of the test using the default configuration of the open source package.

```
$ ./ssTest
Testing TLS_RSA_WITH_AES_128_CBC_SHA suite
  Standard handshake test
    PASSED: Standard handshake
  Re-handshake test (client-initiated)
    PASSED: Re-handshake
  Resumed handshake test (new connection)
    PASSED: Resumed handshake
  Re-handshake test (server initiated)
    PASSED: Re-handshake
  Resumed Re-handshake test (client initiated)
    PASSED: Resumed Re-handshake
  Resumed Re-handshake test (server initiated)
    PASSED: Resumed Re-handshake
  Change cert callback Re-handshake test
    PASSED: Upgrade cert callback Re-handshake
  Change keys Re-handshake test
    PASSED: Upgrade keys Re-handshake
  Change cipher suite Re-handshake test
    PASSED: Change cipher suite Re-handshake

Testing SSL_RSA_WITH_3DES_EDE_CBC_SHA suite
  Standard handshake test
    PASSED: Standard handshake
  Re-handshake test (client-initiated)
    PASSED: Re-handshake
  Resumed handshake test (new connection)
    PASSED: Resumed handshake
  Re-handshake test (server initiated)
    PASSED: Re-handshake
  Resumed Re-handshake test (client initiated)
```

PASSED: Resumed Re-handshake  
Resumed Re-handshake test (server initiated)  
PASSED: Resumed Re-handshake  
Change cert callback Re-handshake test  
PASSED: Upgrade cert callback Re-handshake  
Change keys Re-handshake test  
PASSED: Upgrade keys Re-handshake  
Change cipher suite Re-handshake test  
PASSED: Change cipher suite Re-handshake

## Sockets-Based Client and Server Applications

Source code for TCP/IP sockets-based client and server applications are provided with the MatrixSSL package. The following optional steps will enable the developer to build and run the applications to confirm the development platform is configured for MatrixSSL integration.

1. Having successfully built the static library from the **Building the source** steps above, change directories to the *apps* folder where the *client.c* and *server.c* source are located and compile the applications.

```
$ cd apps  
$ make
```

2. Run the *server* application from the command line.

```
$ ./server  
Listening on port 4433
```

3. In a second shell environment, run the client application and verify two connections were made to the running server. Client trace in the successful case:

```
$ ./client  
=== INITIAL CLIENT SESSION ===  
Validated cert for: Sample Server Cert.  
SEND: [GET / HTTP/1.0  
User-Agent: MatrixSSL/3.x  
Accept: */*  
Content-Length: 0  
  
]  
RECV: [HTTP/1.0 200 OK  
Server: AuthenTec Networks MatrixSSL/3.x  
Pragma: no-cache  
Cache-Control: no-cache  
Content-type: text/plain  
Content-length: 9  
  
MatrixSSL]  
SUCCESS: Received HTTP Response  
  
=== CLIENT SESSION WITH CACHED SESSION ID ===  
SEND: [GET / HTTP/1.0  
User-Agent: MatrixSSL/3.x  
Accept: */*
```

```
Content-Length: 0

]
RECV: [HTTP/1.0 200 OK
Server: AuthenTec Networks MatrixSSL/3.x
Pragma: no-cache
Cache-Control: no-cache
Content-type: text/plain
Content-length: 9

MatrixSSL]
SUCCESS: Received HTTP Response
$
```

## Debug Builds vs. Release Builds

The default compiler options in the Makefile build system use the `-Os` optimization flag to create a size-optimized release quality MatrixSSL library. If you wish to create a debug version of the library (or applications) simply type `make debug` to activate the `-g` compiler flag.

## WIN32 Platforms using Visual Studio Projects

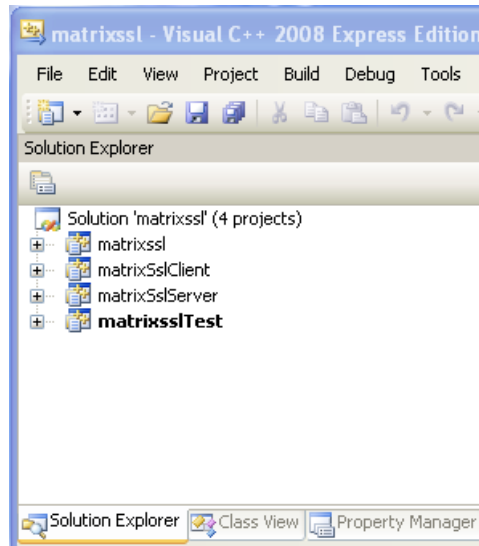
### Preparation

The Windows development platform must have the following installed:

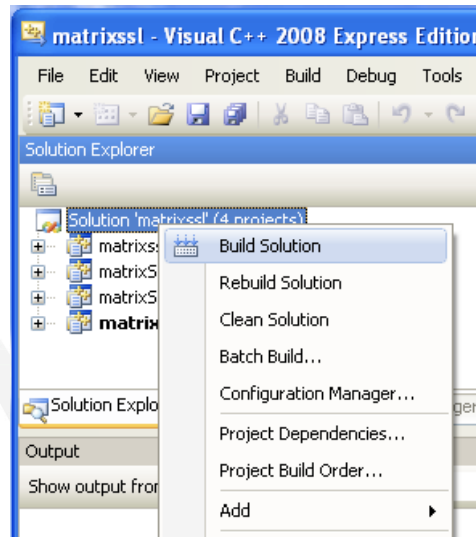
- Microsoft Visual C++ 2010 Express Edition

### Building the source

1. Unpack the product image to the directory of your choosing.
2. Open the *matrixssl.sln* file at the top level of the directory structure by either double clicking the file or choosing it through the *File-->Open-->Project/Solution* menu option of Visual C++. The result should be a solution with four projects:



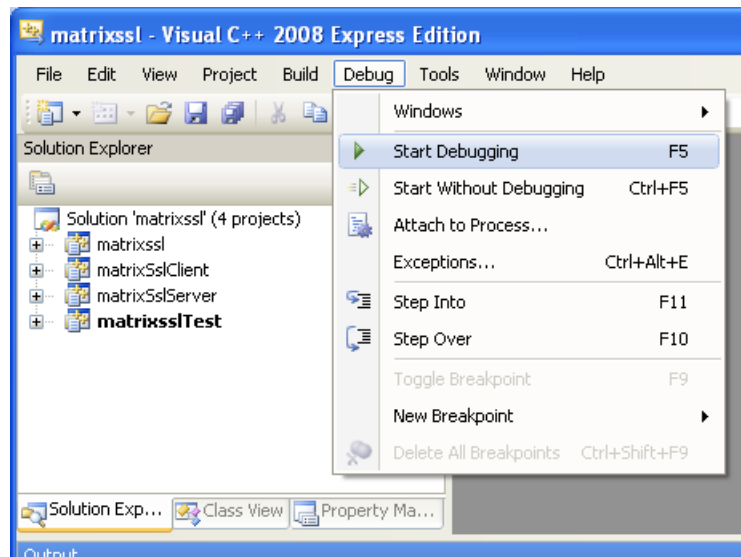
3. Build the solution by right clicking the solution and selecting Build Solution.



4. Confirm there were no compile errors and that the MatrixSSL library and applications have been built. A successful build will result in a *Debug* (or *Release*) directory being created at the top level directory with the object files, libraries, and executables. The *matrixssl.dll*, *matrixSslClient.exe*, *matrixSslServer.exe*, and *matrixsslTest.exe* files are the final outputs to look for.

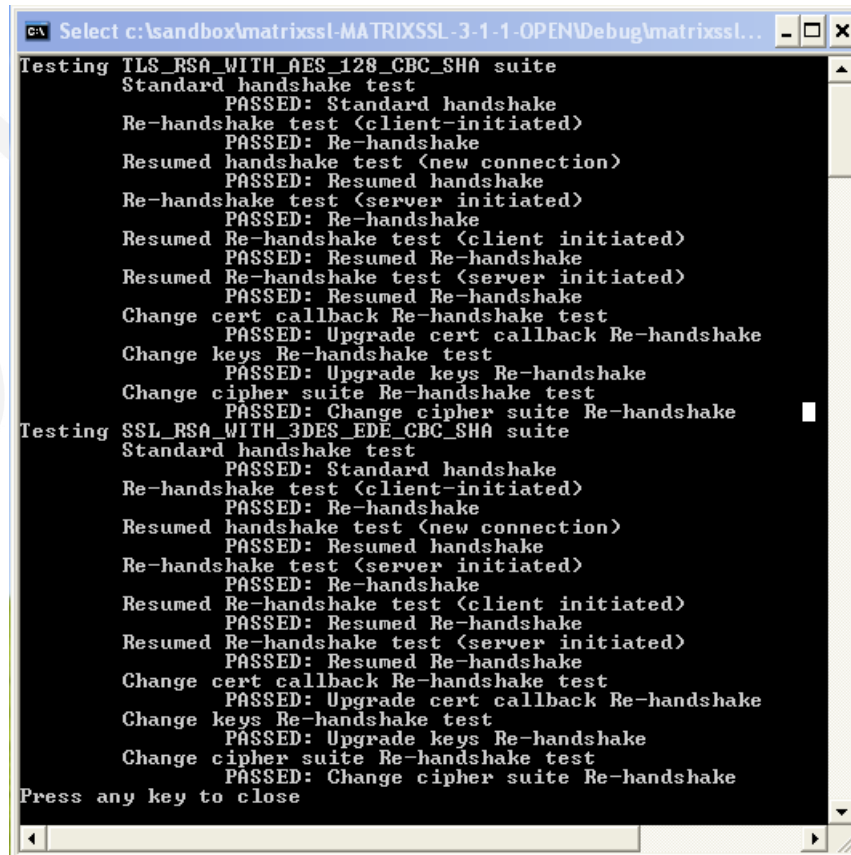
## Self-Test Application

The test application will have been built using the above steps. To run the test application, ensure the **matrixsslTest** project appears in bold in the *Solution Explorer* to indicate it is the *Startup* project. Select *Debug->Start Debugging* from the menu to start the application.





The console output should look like this:

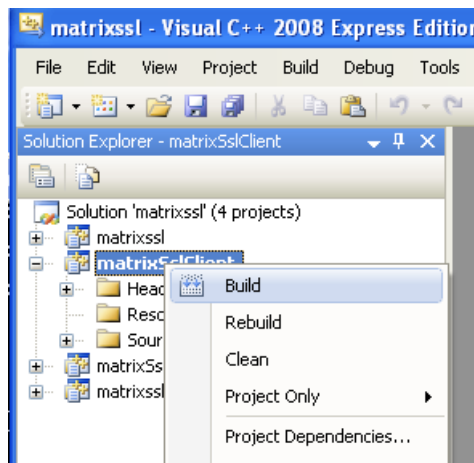


```
Select c:\sandbox\matrixssl-MATRIXSSL-3-1-1-OPENWDebug\matrixssl...
Testing TLS_RSA_WITH_AES_128_CBC_SHA suite
Standard handshake test
    PASSED: Standard handshake
Re-handshake test (client-initiated)
    PASSED: Re-handshake
Resumed handshake test (new connection)
    PASSED: Resumed handshake
Re-handshake test (server initiated)
    PASSED: Re-handshake
Resumed Re-handshake test (client initiated)
    PASSED: Resumed Re-handshake
Resumed Re-handshake test (server initiated)
    PASSED: Resumed Re-handshake
Change cert callback Re-handshake test
    PASSED: Upgrade cert callback Re-handshake
Change keys Re-handshake test
    PASSED: Upgrade keys Re-handshake
Change cipher suite Re-handshake test
    PASSED: Change cipher suite Re-handshake
Testing SSL_RSA_WITH_3DES_EDE_CBC_SHA suite
Standard handshake test
    PASSED: Standard handshake
Re-handshake test (client-initiated)
    PASSED: Re-handshake
Resumed handshake test (new connection)
    PASSED: Resumed handshake
Re-handshake test (server initiated)
    PASSED: Re-handshake
Resumed Re-handshake test (client initiated)
    PASSED: Resumed Re-handshake
Resumed Re-handshake test (server initiated)
    PASSED: Resumed Re-handshake
Change cert callback Re-handshake test
    PASSED: Upgrade cert callback Re-handshake
Change keys Re-handshake test
    PASSED: Upgrade keys Re-handshake
Change cipher suite Re-handshake test
    PASSED: Change cipher suite Re-handshake
Press any key to close
```

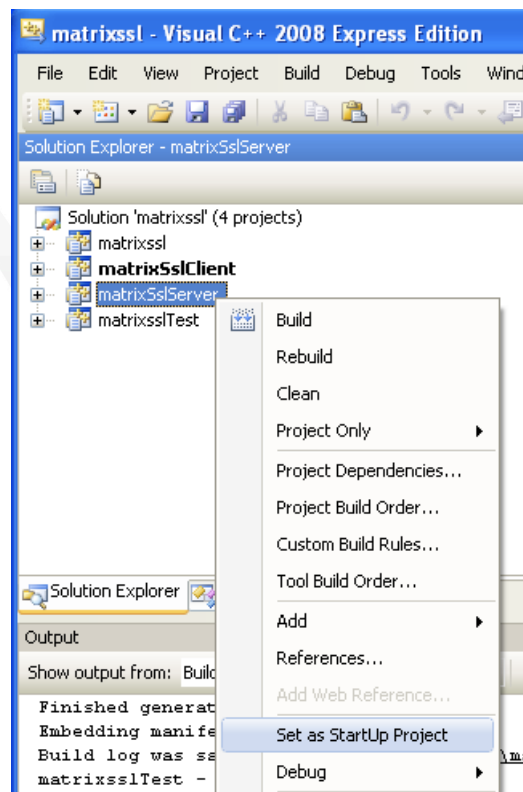
## Sockets-Based Client and Server Applications

Source code for TCP/IP sockets-based client and server applications are provided with the MatrixSSL package. The client and server applications will have been built when the Solution was built in the above steps.

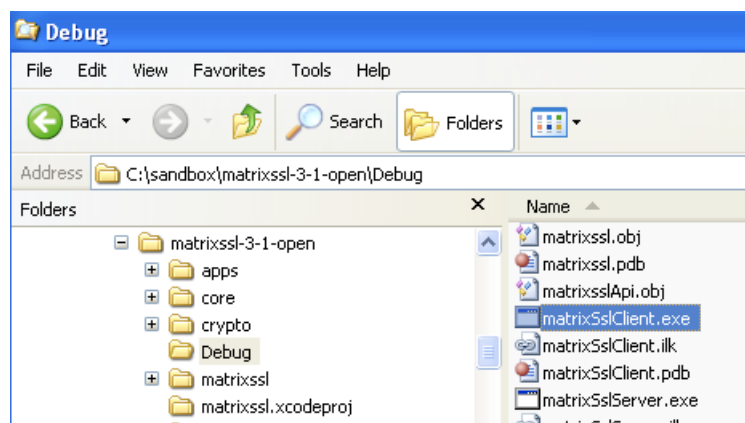
To individually recompile a project, simply right click the project name and choose Build from the drop down list:



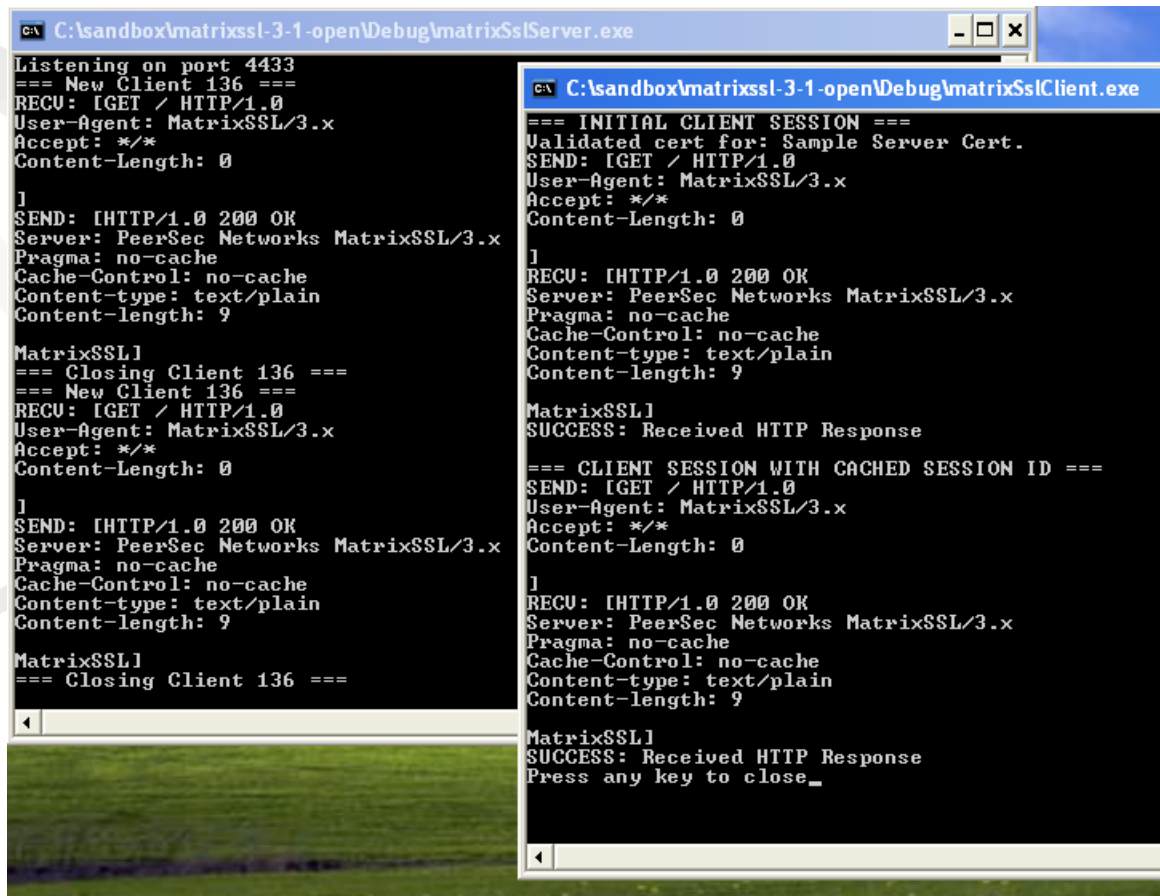
To run the client or server application in the Visual C++ environment, ensure the target project appears in bold in the Solution Explorer to indicate it is the StartUp project. Select Debug->Start Debugging from the menu to start the application.



Only a single project can be executed from within the Visual C++ environment at a time so when testing the server and client applications against each other, at least one of them must be manually run by double clicking the executable file. The server application must be started before the client.



A successful test will result in console output like this:

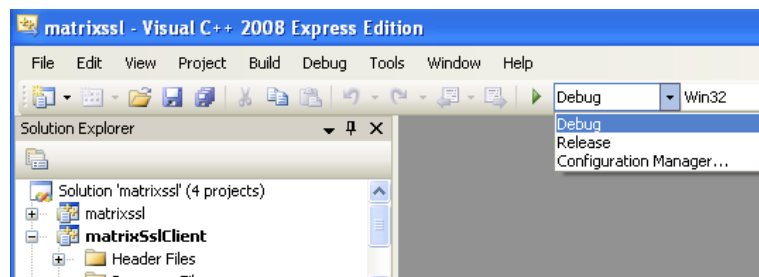


```
C:\sandbox\matrixssl-3-1-open\Debug\matrixSslServer.exe
Listening on port 4433
=== New Client 136 ===
RECU: [GET / HTTP/1.0
User-Agent: MatrixSSL/3.x
Accept: */*
Content-Length: 0
]
SEND: [HTTP/1.0 200 OK
Server: PeerSec Networks MatrixSSL/3.x
Pragma: no-cache
Cache-Control: no-cache
Content-type: text/plain
Content-length: 9
MatrixSSL]
=== Closing Client 136 ===
=== New Client 136 ===
RECU: [GET / HTTP/1.0
User-Agent: MatrixSSL/3.x
Accept: */*
Content-Length: 0
]
SEND: [HTTP/1.0 200 OK
Server: PeerSec Networks MatrixSSL/3.x
Pragma: no-cache
Cache-Control: no-cache
Content-type: text/plain
Content-length: 9
MatrixSSL]
=== Closing Client 136 ===

C:\sandbox\matrixssl-3-1-open\Debug\matrixSslClient.exe
=== INITIAL CLIENT SESSION ===
Validated cert for: Sample Server Cert.
SEND: [GET / HTTP/1.0
User-Agent: MatrixSSL/3.x
Accept: */*
Content-Length: 0
]
RECU: [HTTP/1.0 200 OK
Server: PeerSec Networks MatrixSSL/3.x
Pragma: no-cache
Cache-Control: no-cache
Content-type: text/plain
Content-length: 9
MatrixSSL]
SUCCESS: Received HTTP Response
=== CLIENT SESSION WITH CACHED SESSION ID ===
SEND: [GET / HTTP/1.0
User-Agent: MatrixSSL/3.x
Accept: */*
Content-Length: 0
]
RECU: [HTTP/1.0 200 OK
Server: PeerSec Networks MatrixSSL/3.x
Pragma: no-cache
Cache-Control: no-cache
Content-type: text/plain
Content-length: 9
MatrixSSL]
SUCCESS: Received HTTP Response
Press any key to close_
```

## Debug Builds vs. Release Builds

The default build configuration for the provided Visual Studio projects is set to Debug. If you wish to create release versions of the library or applications, simply select the Configuration pull-down list and select Release as shown below.



By default the output files will be created in a directory at the top level matching the name of the build (Debug or Release).

## Mac OS X Platforms using Xcode Projects

Xcode projects have been included for building the MatrixSSL library, the test application, and the client/server applications. The Xcode version used to create the projects was 4.2. The version of Mac OS X used to test the projects was 10.7.4.



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