# Windows Build

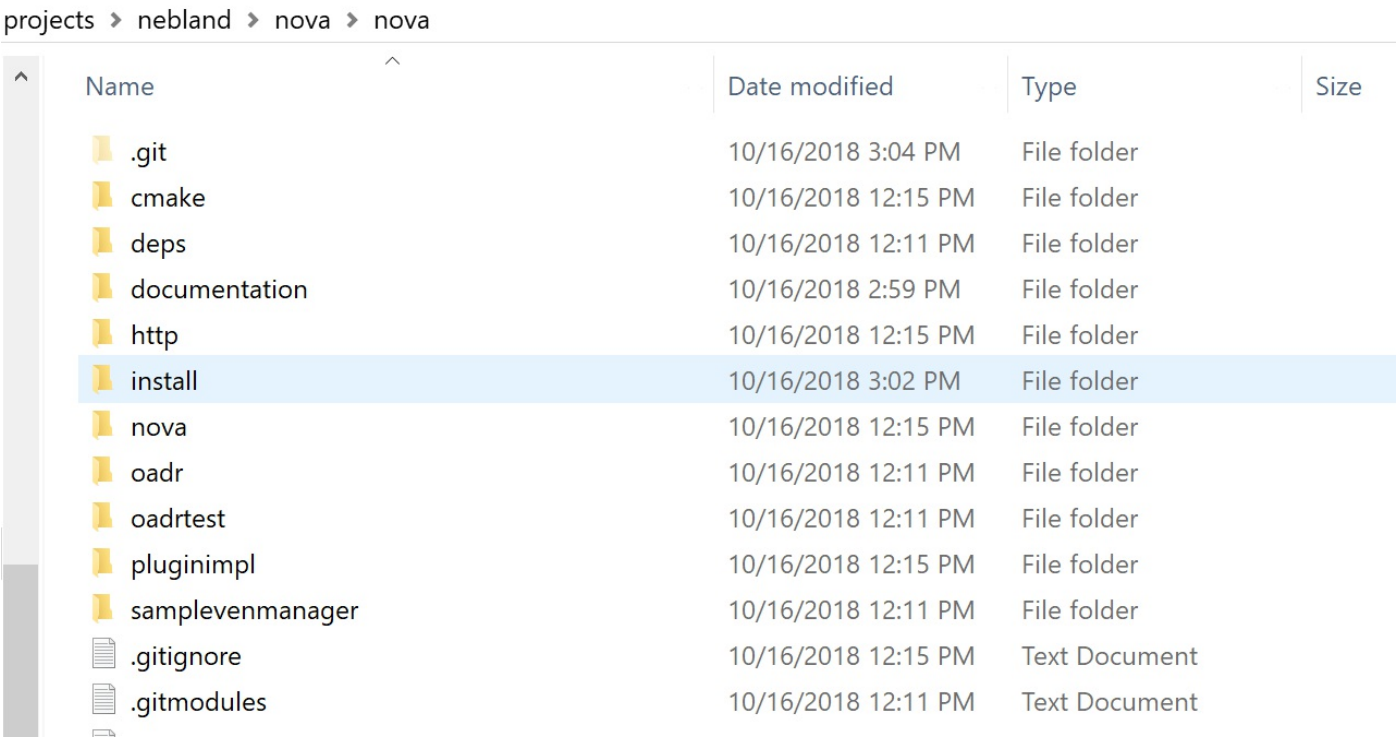
This readme covers the build and execution instructions for *NOVA* on Windows.

*NOVA* has the following library dependencies:

- curl
- OpenSSL (or another libcurl supported TLS library)
- xerces 3.1+

Pre-built binaries for these libraries are provided in a file called install.zip. The files can be downloaded from here: https://app.box.com/s/gnkmook0tl95r4qvunprlacphtc9tlan.

Extract the install directory from `install.zip` and move `nova-source-root\install`:




Instructions for building the 3rd party libraries are in section **Build Third Party Dependencies**. Its far easier to use the pre-built binaries but instructions are provided for situations where the build settings chosen for the pre-built binaries don't match the target system (run 32 bit instead of 64 bit for example).

# NOVA Build

NOVA uses cmake and Visual Studio 2015 to build. CMake Windows binaries can be installed from here: https://cmake.org/download/. Visual Studio 2015 is available from Microsoft. Newer versions of Visual Studio should work but will need to set the platform toolset to *Visual Studio 2015 (v140)*.

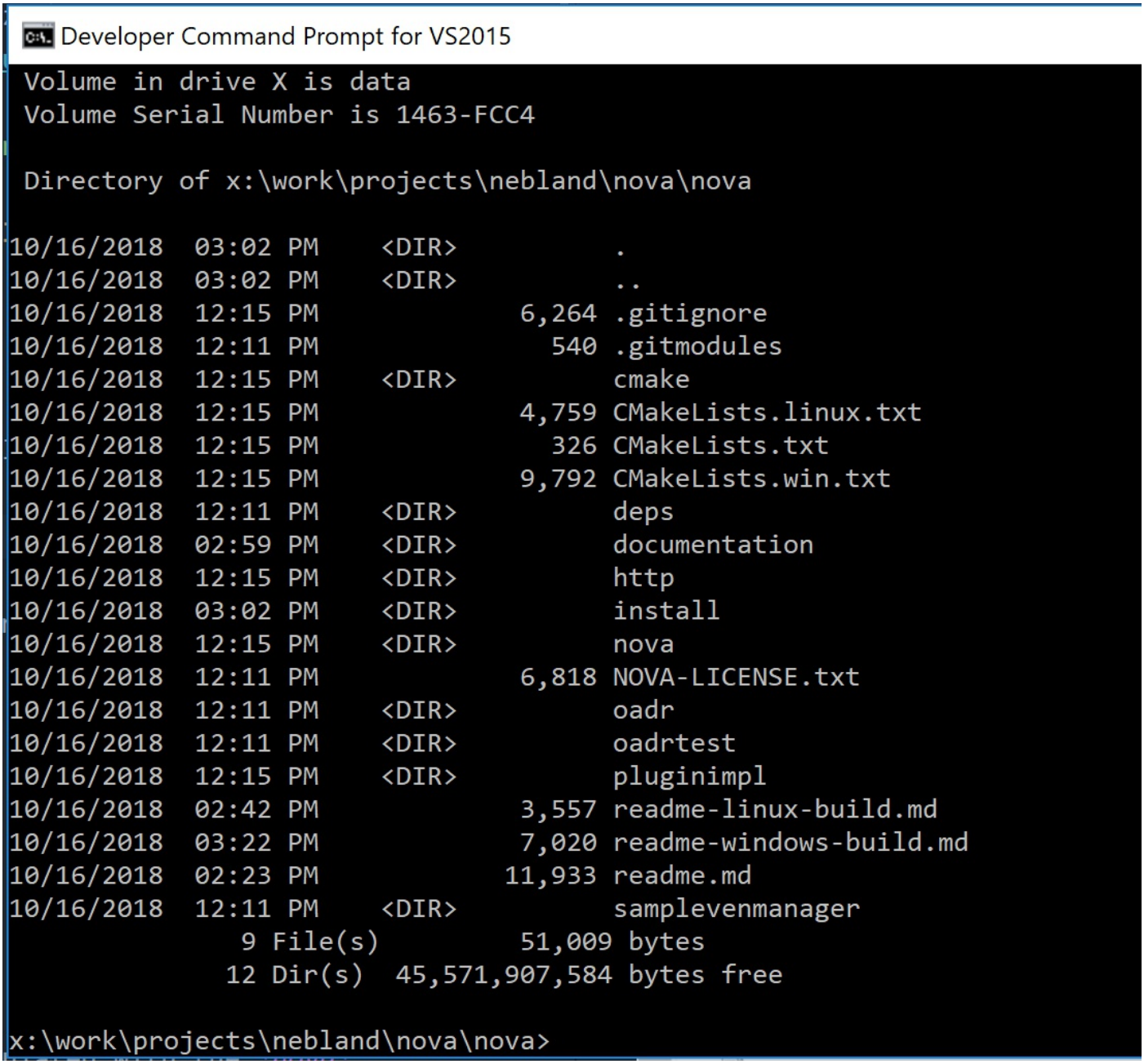
The Windows build creates two components built in separate steps:

- **nove.exe**: nova executable
- **nova-notifierhttp-plugin.dll**: sample nova plugin

Nova.exe uses CMake to generate a Visual Studio project and is built from the command line. To aid in building an debugging the plugin, a hand built Visual Studio project is provided for building the sample plugin **nova-notifierhttp-plugin.dll**.

The following commands must be run from a Visual Studio developer command prompt. Start a prompt in the NOVA

source root directory.

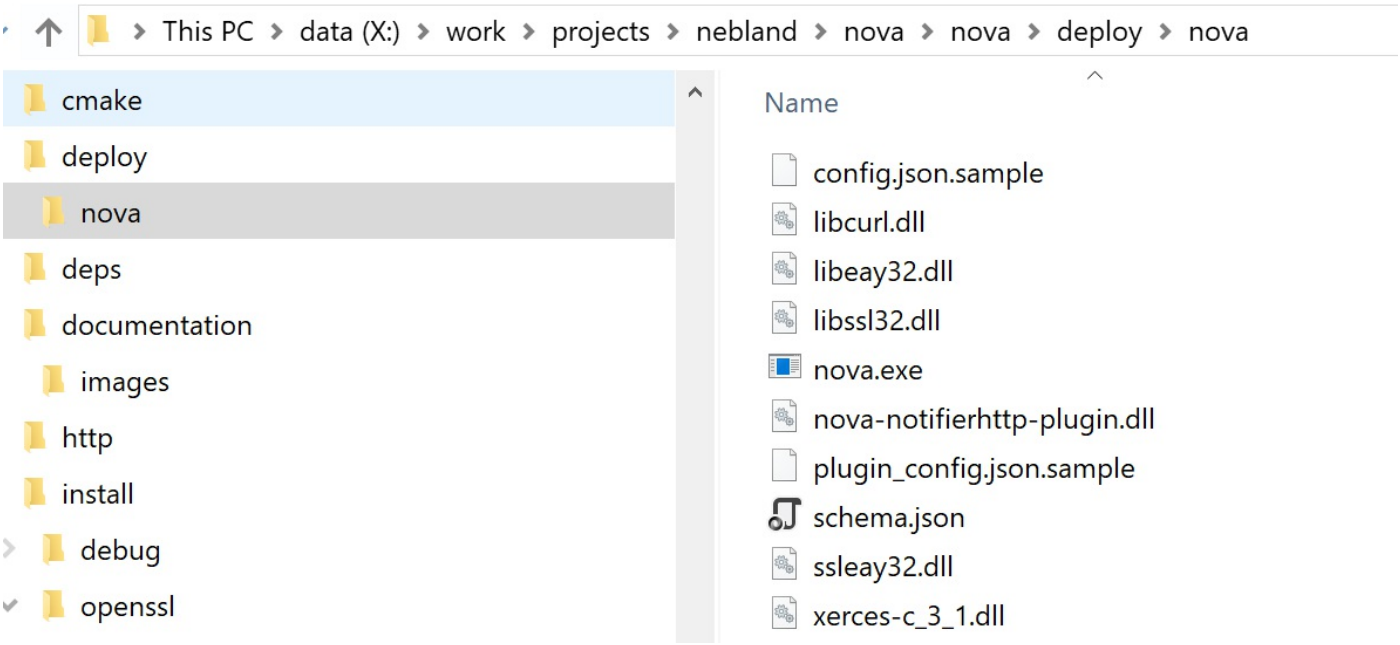



## NOVA Release

To build *nova* in release mode, run the following commands in a Visual Studio 2015 command prompt from the root of the NOVA source:

```
mkdir build\release && cd build\release
cmake -G "Visual Studio 14 2015 Win64" -DCMAKE_BUILD_TYPE=Release ..\..
cmake --build . --config Release
```

After building the plugin (see below) and NOVA In release mode, everything needed to run NOVA is copied to `nova-source-root\deploy`:




## NOVA Debug

To build *nova* in debug mode, run the following commands in a Visual Studio 2015 command prompt from the root of the NOVA source:

```
mkdir build\debug && cd build\debug
cmake -G "Visual Studio 14 2015 Win64" -DCMAKE_BUILD_TYPE=Debug ..\..
cmake --build . --config Debug
```

The NOVA executable built in debug can be used to debug the plugin. The plugin build (covered below) will copy the debug NOVA build along with all binaries need to run NOVA into the plugin output directory.

# Sample Plugin Build

A pre-built Visual Studio project is provided for the sample plugin in `pluginimpl\nova-notifierhttp-plugin.sln`. Prior to building the plugin, follow the instructions above to build NOVA for debug or release.

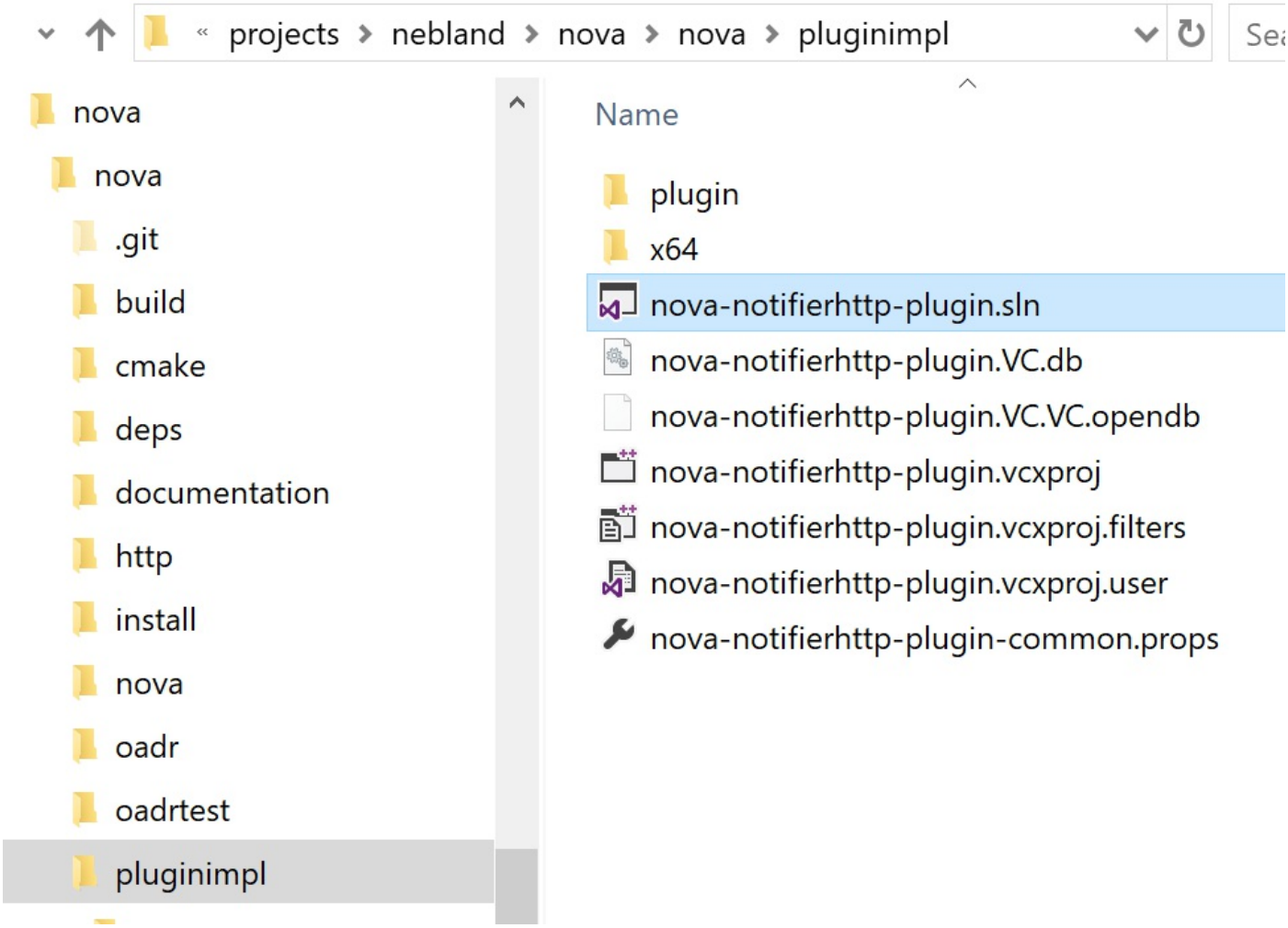
NOVA and the plugin require a config file. Before starting the plugin build, rename the following files:

- **config.json.sample** in `nova\nova\config\` to **config.json**
- **plugin_config.json.sample** in `pluginimpl\plugin\http\config` to **plugin_config.json**

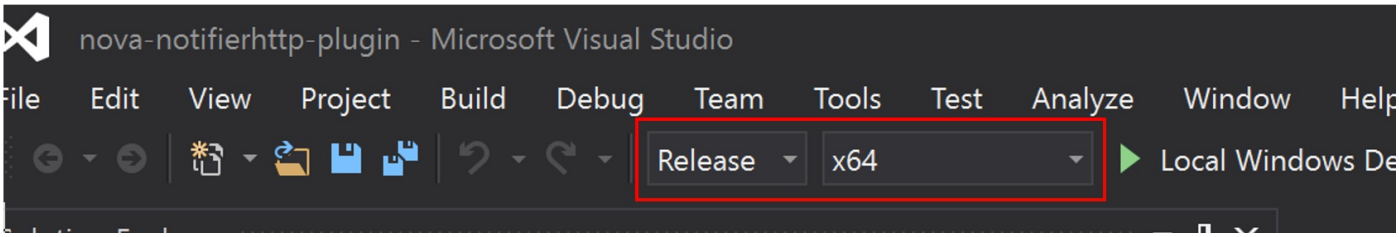
Follow the instructions in **readme.md** to set the parameters in these config files.

The Visual Studio debug build contains a *post-build step* to copy **config.json** and plugin **plugin_config.json** and all binaries needed to debug the plugin to the plugin output directory.

Next, Open the Visual Studio project file found in `pluginimpl/nova-notifierhttp-plugin.sln`:




Change the build type to *Debug* or *Release* to match the corresponding build type selected for NOVA: the nova build type and plugin build type must match.

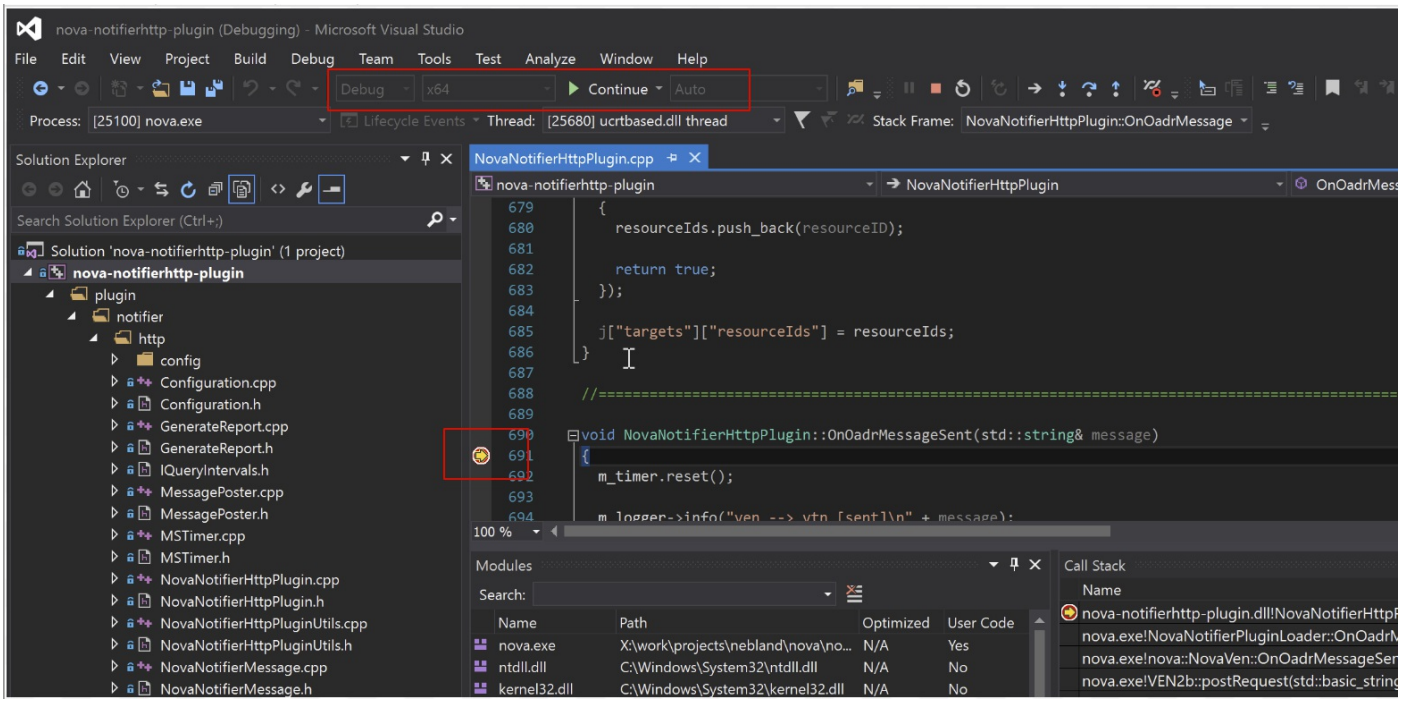



Start the build by selecting *Build -> Build Solution* from the menu.

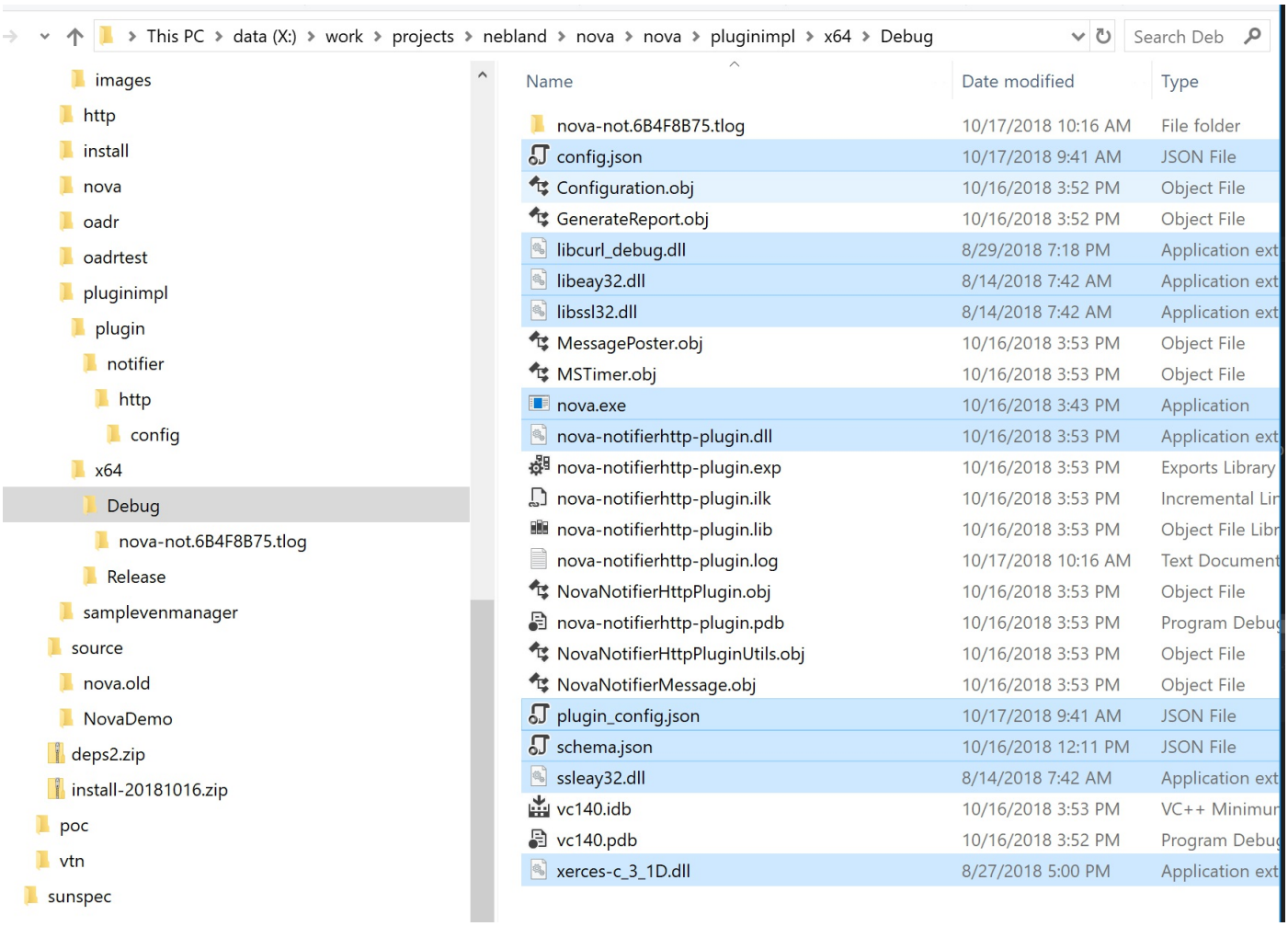
The final step of the build will copy files to the plugin *debug* output directory when in debug mode or to *deploy* in the nova source root directory when in release mode. The deploy directory contains everything needed to run NOVA in release mode. The plugin debug output directory contains everything needed to debug the plugin from Visual Studio.

## Debugging the plugin

When built in debug mode, the plugin can be debugged from the Visual Studio solution. Executing the debugger will launc ha debug build of NOVA. Breakpoints set in the IDE will be hit when NOVA calls the callbacks in the plugin. The image blow shows a breakpoint triggered in the `OnOadrMessageSent` calblack:




The project is pre-configure to run nova.exe from the plugin output directory. Files involved with running NOVA are highlighted below for reference:




# Running NOVA

*NOVA* is executed from the command line and takes two parameters: a path to a json formatted schema file (which describes the NOVA config), and the path to a *NOVA* config file. See the sample file `nova-source-root\nova\config\config.json.sample`.

In a release build, the outputs of the build are copied to `nova-source-root\deploy\nova`. To run *NOVA* using the default plugin and default *NOVA* config, execute the following command from `nova-source-root\deploy\`:

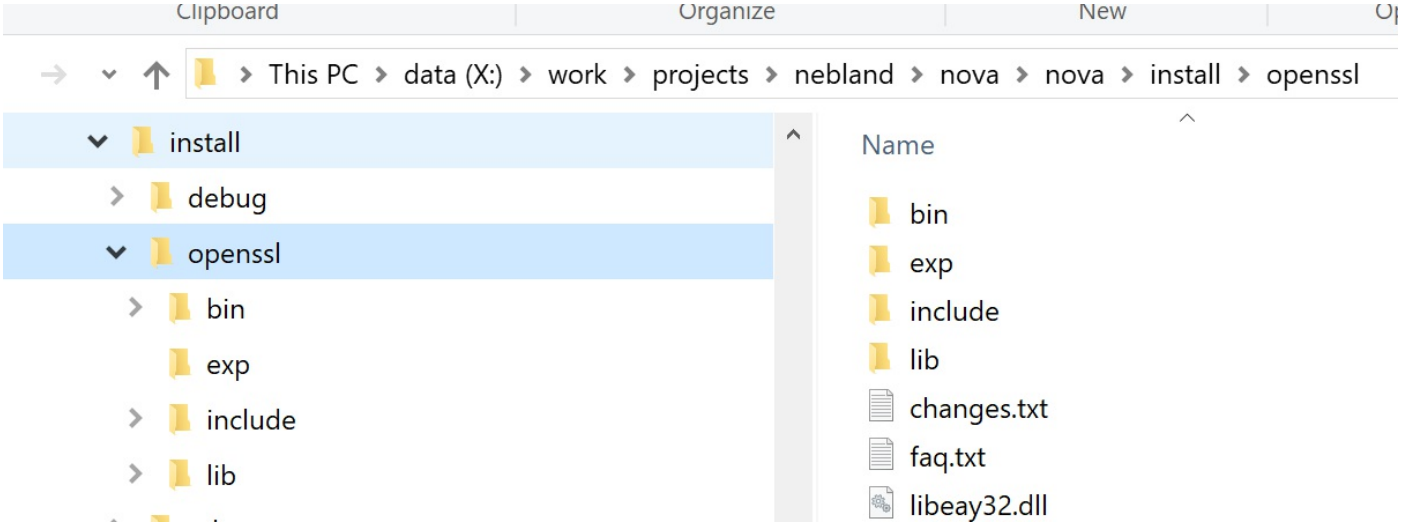
```
.\nova.exe schema.json config.json
```

# Build Third Party Dependencies

Binaries of the third party dependencies used by *NOVA* are included in the `install.zip`. The following instructs building these binaries from source.

## Openssl

We use the installer from Shining Light: https://slproweb.com/products/Win32OpenSSL.html. Nova expects the binaries to be located at `nova-source-root\install\openssl`. Note the *openssl* installer will try to append another directory past `nova-source-root\install\openssl`, so be sure to remove this directory from the installer path. If install correctly, the `nova-source-root\install\openssl` directory will have `bin`, `include`, and `lib` directories:




## curl

The source for curl is provided in `deps\curl`. To build curl, run the following commands from `nova-source-root`:

```
cd deps\curl
.\buildconf.bat
cd winbuild
nmake /f Makefile.vc  VC=14 MACHINE=X64  mode=dll ENABLE_WINSSL=no DEBUG=no
WITH_SSL=dll WITH_DEVEL=..\..\..\install\openssl
```

This creates a directory that will be named similarly to `nova-source-root\deps\curl\builds\libcurl-vc14-X64-release-dll-ipv6-sspi-winssl` that contains `bin`, `include`, and `lib` directories. Copy the `bin`, `include`, and `lib` directories to `nova-source-root\install\release\curl\` directory.

Note that the **WITH_DEVEL** option tells curl where to find openssl, so be sure to install openssl as outlined in this document prior to building curl.

To create a release build, change `DEBUG=no` to `DEBUG=yes` and copy the files to `nova-source-root\install\debug\curl\` when the build completes.

# Xerces

Xerces is built using Visual Studio. The procedures outlined below are for a release build. Replace "release" with "debug" for a debug build.

1. Open `nova-source-root\deps\xerces-c\projects\Win32\VC14\xerces-all\XercesLib\XercesLib.vcxproj` with Visual Studio 2015
2. Change the build to **Release** and **x64** using the combo boxes under the menu
3. Build **XercesLib** by right clicking and selecting *Build*.
4. Copy `nova-source-root\deps\xerces-c\build\Win64\VC14\Release\xerces-c_3_1.dll` to `nova-source-root\install\release\xerces\bin\`
5. Copy `nova-source-root\deps\xerces-c\build\Win64\VC14\Release\xerces-c_3.lib` to `nova-source-root\install\release\xerces\lib\`
6. Copy `nova-source-root\deps\xerces-c\src` to `nova-source-root\install\release\xerces\src`
7. Rename `nova-source-root\install\release\xerces\src` to `nova-source-root\install\release\xerces\include`