Building Swift SDK for Android on Windows

Visual Studio 2019 or newer is needed to build the Swift SDK for Android on Windows.

1. Install Dependencies

- Install the latest version of Visual Studio
- Make sure to include the android NDK in your installation.

1. Clone the repositories

1. Configure git to work with Unix file endings
2. Clone `apple/swift-llvm` into a directory named `llvm`
3. Clone `apple/swift-corelibs-libdispatch` into a directory named `swift-corelibs-libdispatch`
4. Clone `apple/swift-corelibs-foundation` into a directory named `swift-corelibs-foundation`
5. Clone `apple/swift-corelibs-xctest` into a directory named `swift-corelibs-xctest`
6. Clone `compnerd/swift-build` into a directory named `swift-build`

- Currently, other repositories in the Swift project have not been tested and may not be supported.

This guide assumes that your sources live at the root of `S:`. If your sources live elsewhere, you can create a substitution for this:

```
subst S: <path to sources>
```

```
S:
git clone https://github.com/apple/swift-llvm llvm
git clone https://github.com/apple/swift-corelibs-libdispatch swift-corelibs-libdispatch
git clone https://github.com/apple/swift-corelibs-foundation swift-corelibs-foundation
git clone https://github.com/apple/swift-corelibs-xctest swift-corelibs-xctest
git clone https://github.com/compnerd/swift-build swift-build
```

1. Acquire the lastest toolchain and dependencies

1. Download the toolchain, ICU, libxml2, and curl for android from Azure into `S:\b\a\Library`.

- You can alternatively use `swift-build.py` from compnerd/swift-build under the utilities directory.

1. Configure LLVM

```
md S:\b\a\llvm
cd S:\b\a\llvm
```

```
cmake -C S:\swift-build\cmake\caches\android-armv7.cmake
  -G Ninja
  -DCMAKE_BUILD_TYPE=Release
  -DCMAKE_TOOLCHAIN_FILE=S:\swift-build\cmake\toolchains\android.toolchain.cmake
  -DANDROID_ALTERNATE_TOOLCHAIN=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-developm
  -DLLVM_HOST_TRIPLE=armv7-unknown-linux-androideabi
  S:/llvm
```

1. Build and install the standard library

- We must build and install the standard library to build the remainder of the SDK

```
md S:\b\a\stdlib
cd S:\b\a\stdlib
cmake -C S:\swift-build\cmake\caches\android-armv7.cmake
  -C S:\swift-build\cmake\caches\swift-stdlib-android-armv7.cmake
  -G Ninja
  -DCMAKE_BUILD_TYPE=RelWithDebInfo
  -DCMAKE_INSTALL_PREFIX=S:/b/a/Library/Developer/Platforms/android.platform/Developer/SDKs/
  -DCMAKE_TOOLCHAIN_FILE=S:\swift-build\cmake\toolchains\android.toolchain.cmake
  -DANDROID_ALTERNATE_TOOLCHAIN=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-developm
  -DLLVM_DIR=S:/b/a/llvm/lib/cmake/llvm
  -DSWIFT_NATIVE_SWIFT_TOOLS_PATH=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-develo
  S:/swift
ninja
ninja install
```

1. Build libdispatch

- We *cannot* install libdispatch until after all builds are complete as that will cause the Dispatch module to be imported twice and fail to build.

```
md S:\b\a\libdispatch
cd S:\b\a\libdispatch
cmake -C S:\swift-build\cmake\caches\android-armv7.cmake
  -DSWIFT_ANDROID_SDK=S:/b/a/Library/Developer/Platforms/android.platform/Developer/SDKs/and
  -C S:\swift-build\cmake\caches\android-armv7-swift-flags.cmake
  -G Ninja
  -DCMAKE_BUILD_TYPE=RelWithDebInfo
  -DCMAKE_INSTALL_PREFIX=S:/b/a/Library/Developer/Platforms/android.platform/Developer/SDKs/
  -DCMAKE_SWIFT_COMPILER=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-development.xct
  -DCMAKE_TOOLCHAIN_FILE=S:\swift-build\cmake\toolchains\android.toolchain.cmake
  -DANDROID_ALTERNATE_TOOLCHAIN=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-developm
  -DENABLE_SWIFT=YES
  -DENABLE_TESTING=NO
  S:/swift-corelibs-libdispatch
ninja
```

1. Build foundation

```
md S:\b\a\foundation
cd S:\b\a\foundation
cmake -C S:\swift-build\cmake\caches\android-armv7.cmake
  -DSWIFT_ANDROID_SDK=S:/b/a/Library/Developer/Platforms/android.platform/Developer/SDKs/and
  -C S:\swift-build\cmake\caches\android-armv7-swift-flags.cmake
  -G Ninja
  -DCMAKE_BUILD_TYPE=RelWithDebInfo
  -DCMAKE_INSTALL_PREFIX=S:/b/a/Library/Developer/Platforms/android.platform/Developer/SDKs/
  -DCMAKE_SWIFT_COMPILER=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-development.xct
  -DCMAKE_TOOLCHAIN_FILE=S:\swift-build\cmake\toolchains\android.toolchain.cmake
  -DANDROID_ALTERNATE_TOOLCHAIN=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-developm
  -DCURL_LIBRARY=S:/b/a/Library/libcurl-development/usr/lib/libcurl.a
  -DCURL_INCLUDE_DIR=S:/b/a/Library/libcurl-development/usr/include
  -DICU_INCLUDE_DIR=S:/b/a/Library/icu-64/usr/include
  -DICU_UC_LIBRARY=S:/b/a/Library/icu-64/usr/lib/libicuuc64.so
  -DICU_UC_LIBRARY_RELEASE=S:/b/a/Library/icu-64/usr/lib/libicuuc64.so
  -DICU_I18N_LIBRARY=S:/b/a/Library/icu-64/usr/lib/libiucin64.so
  -DICU_I18N_LIBRARY_RELEASE=S:/b/a/Library/icu-64/usr/lib/libicuin64.so
  -DLIBXML2_LIBRARY=S:/b/a/Library/libxml2-development/usr/lib/libxml2.a
  -DLIBXML2_INCLUDE_DIR=S:/b/a/Library/libxml2-development/usr/include/libxml2
  -DFOUNDATION_PATH_TO_LIBDISPATCH_SOURCE=S:/swift-corelibs-libdispatch
  -DFOUNDATION_PATH_TO_LIBDISPATCH_BUILD=S:/b/a/libdispatch
  S:/swift-corelibs-foundation
ninja
```

1. Build XCTest

```
md S:\b\a\xctest
cd S:\b\a\xctest
cmake -C S:\swift-build\cmake\caches\android-armv7.cmake
  -C S:\swift-build\cmake\caches\android-armv7-swift-flags.cmake
  -G Ninja
  -DCMAKE_BUILD_TYPE=RelWithDebInfo
  -DCMAKE_INSTALL_PREFIX=S:/b/a/Library/Developer/Platforms/android.platform/Developer/SDKs/
  -DCMAKE_SWIFT_COMPILER=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-development.xct
  -DCMAKE_TOOLCHAIN_FILE=S:\swift-build\cmake\toolchains\android.toolchain.cmake
  -DANDROID_ALTERNATE_TOOLCHAIN=S:/b/a/Library/Developer/Toolchains/unknown-Asserts-developm
  -DSWIFT_ANDROID_SDK=S:/b/a/Library/Developer/Platforms/andrfoid.platform/Developer/SDKs/an
  -DXCTEST_PATH_TO_FOUNDATION_BUILD=S:/b/a/foundation
  -DXCTEST_PATH_TO_LIBDISPATCH_SOURCE=S:/swift-corelibs-libdispatch
  -DXCTEST_PATH_TO_LIBDISPATCH_BUILD=S:/b/a/libdispatch
  -DENABLE_TESTING=NO
  S:/swift-corelibs-foundation
ninja
```

1. Install libdispatch

```
cd S:\b\a\libdispatch
ninja install
```

1. Install Foundation

```
cd S:\b\a\foundation
ninja install
```

1. Install XCTest

```
cd S:\b\a\xctest
ninja install
```