



## **MIT Kerberos**

### **Example GSS-API Android NDK App**

November 19th 2012, version 1.0

## **Introduction**

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This is a sample Android NDK application which provides a GUI wrapper around the MIT Kerberos kinit, klist, kvno, and kdestroy client applications. It also provides a sample client which uses the Java GSS-API interface. The GSS-API interface is a Java interface for the existing native MIT GSS-API library.

This package includes cross-compiled versions of the MIT Kerberos libraries as well as the CyaSSL Embedded SSL Library. It should be helpful to Android developers who are interested in using the Kerberos libraries or the GSS-API interface in their own Android NDK Applications.

By default, this package uses pre-built static Kerberos and CyaSSL libraries which are needed in order to be linked to the KerberosApp application's native library (libkerberosapp.so).

For detailed information on the Java GSS-API interface, please see the GSSAPI\_README file included in this project's root directory or see the kerberos-java-gssapi project on GitHub, here:

<https://github.com/cconlon/kerberos-java-gssapi>

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## 1. Requirements

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Before building or installing this package, you must have the Android SDK and NDK installed and set up on your system. It is also helpful to have the Android Emulator setup and configured with an Android platform greater than or equal to version 2.3.3 (Gingerbread). For details on downloading and setting these up, please see the following links:

**Android SDK:** <http://developer.android.com/sdk/index.html>

**Android NDK:** <http://developer.android.com/sdk/ndk/index.html>

**Android Emulator:** <https://developer.android.com/guide/developing/tools/emulator.html>

SWIG will also need to be installed in order to build the underlying GSS-API wrapper. To download and install SWIG, please visit see the project homepage at <http://www.swig.org>. This project has been developed using SWIG version 1.3.40 running on Linux.

## 2. Building

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To build and install this package, including Java GSS-API bindings, run the following commands.

```
android update project -p . -s
swig -java -package edu.mit.jgss.swig -outdir ./src/edu/mit/jgss/swig
      -o ./jni/gsswrapper_wrap.c ./jni/gsswrapper.i
ndk-build
ant debug
```

If you want to rebuild the pre-built Kerberos libraries, please use the android-config.sh shell script. This will allow the MIT Kerberos libraries to be cross-compiled for the Android platform. More detailed instructions can be found in the script comments.

## 3. Installing

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To install this package in a running Android emulator, run:

```
ant <debug> install
```

Where <debug> is either "debug" or "release", depending on what build configuration used with ndk-build.

Before running the KerberosApp application, the user needs to install both a Keytab file and a Kerberos configuration file. Reference the MIT Kerberos documentation for guidelines for creating these files. Once created, they can be installed using the adb push command, using:

```
adb push <local-file-path> <destination-file-path>
```

For example, to load a krb5.conf and krb5.keytab file from the current directory to an Android emulator under the /data/local/kerberos directory, run:

```
adb push krb5.conf /data/local/kerberos/  
adb push krb5.keytab /data/local/kerberos/
```

If the application is set to use a client keytab instead of a password, the keytab file needs to contain an entry for the client principal (whose TGT will be obtained by using the "kinit" button in the sample Application).

#### **NOTE: hosts file**

If you need to edit the hosts file on the android emulator to accommodate for KDC locations, use the following steps:

```
emulator -avd <name> -partition-size 128  
adb remount  
adb pull /system/etc/hosts ./  
<< edit hosts file on local machine >>  
adb push ./hosts /system/etc
```

## **4. Usage**

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This NDK application's GUI is split into three tabs:

1. Client Info
2. Server Info
3. Client App

These tabs should be addressed in the order they are listed above. A short summary of each is below.

1. Client Info

This tab displays the wrappers around native kinit, klist, kvno, and kdestroy application code. It provides the functionality to get a ticket for a given client principal using either a keytab or password for principal authentication. The default configuration file and credential cache locations are listed on this screen as well.

## 2. Server Info

This tab allows the user to enter information about the server which the client application will attempt to make a GSS-API connection with in Tab 3. Server principal name, IP address, and port number should be given in this tab.

## 3. Client App

This tab allows the user to start the client GSS-API application. The client application will attempt to connect to the GSS-API server given in Tab 2, using the client principal info gathered in Tab 1. This client application was designed to connect to the example server from the kerberos-java-gssapi package. The client app will do the following:

- a. Establish a GSS-API context with the example server
- b. Sign, encrypt, and send a message to the server
- c. Verify the signature block returned by the server

## 5. Default Storage Locations

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The following locations are the default paths used for the Kerberos sample application.

**Kerberos config file:** /data/local/kerberos/krb5.conf

**Credentials cache:** /data/local/kerberos/ccache/krb5cc\_<uid>

**Keytab:** /data/local/kerberos/krb5.keytab

The credentials cache location may be changed in KerberosAppActivity.java. The Kerberos config file and keytab file locations may be changed by editing the default locations in ./include/osconf.h when cross compiling the MIT kerberos libraries.

## 6. Library Versions

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The CyaSSL and Kerberos libraries used in this package:

CyaSSL 2.0.0rc3

<http://www.yassl.com>

Kerberos (cconlon krb5 fork) GitHub master

Repository: <http://github.com/cconlon/krb5>

Homepage: <http://web.mit.edu/kerberos/>

## 7. Licenses

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## 8. Support

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If you have any questions or comments, please contact [support@yassl.com](mailto:support@yassl.com) or the MIT Kerberos community.

## 9. References

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MIT Kerberos: <http://web.mit.edu/kerberos/>  
yaSSL: <http://www.yassl.com/>

Kerberos Java GSS-API Wrapper: <https://github.com/cconlon/kerberos-java-gssapi>  
Example GSS-API Android NDK App: <https://github.com/cconlon/kerberos-android-ndk>

RFC 5653: <http://tools.ietf.org/html/rfc5653>