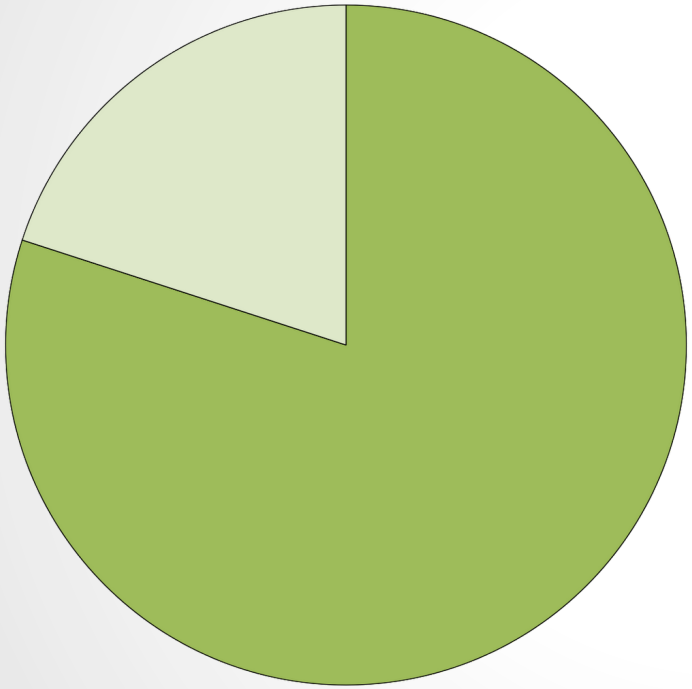
Kerberos + Android

A Tale of Opportunity

Platform Decisions

The Statistics

Why Go Mobile?

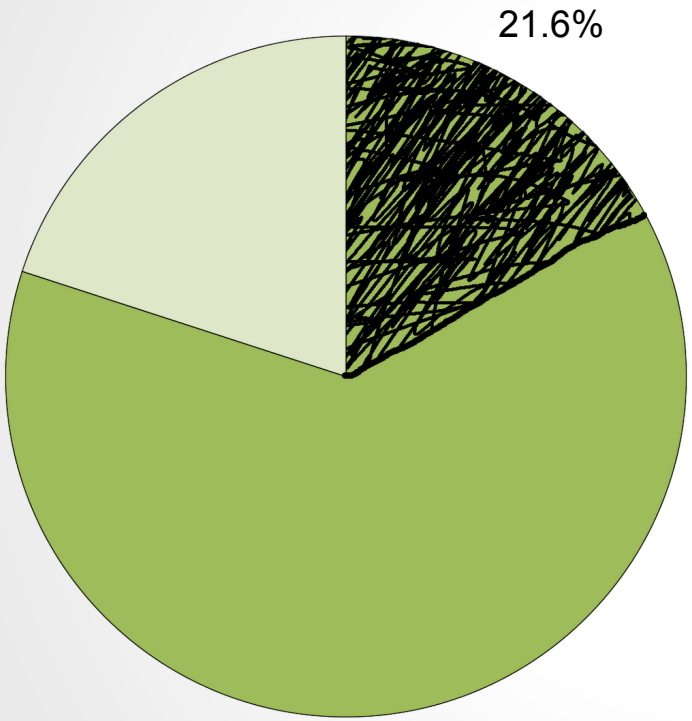


80%

of the world's population now has a mobile phone.

(5 Billion Phones)

Why Go Mobile?

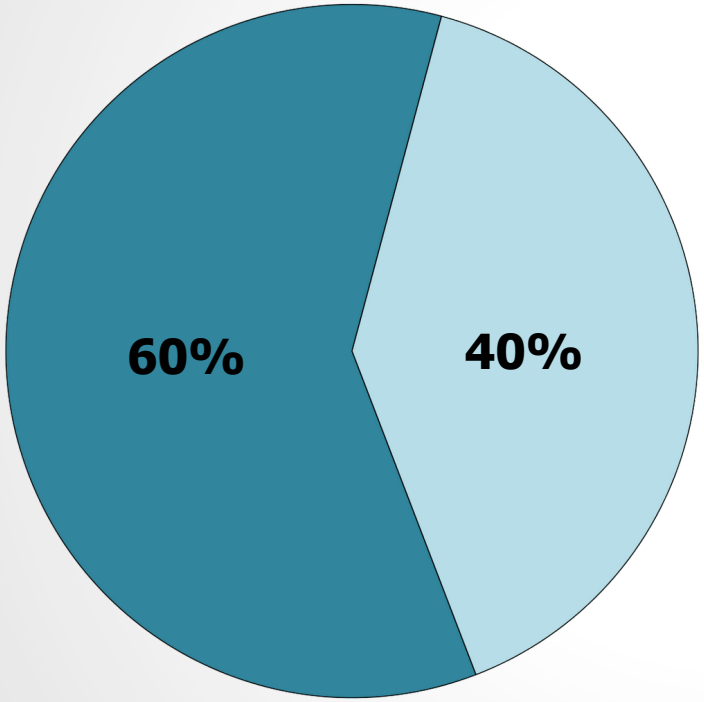


Of those 80%,

1.08 Billion

are smartphones.

Why Go Mobile?



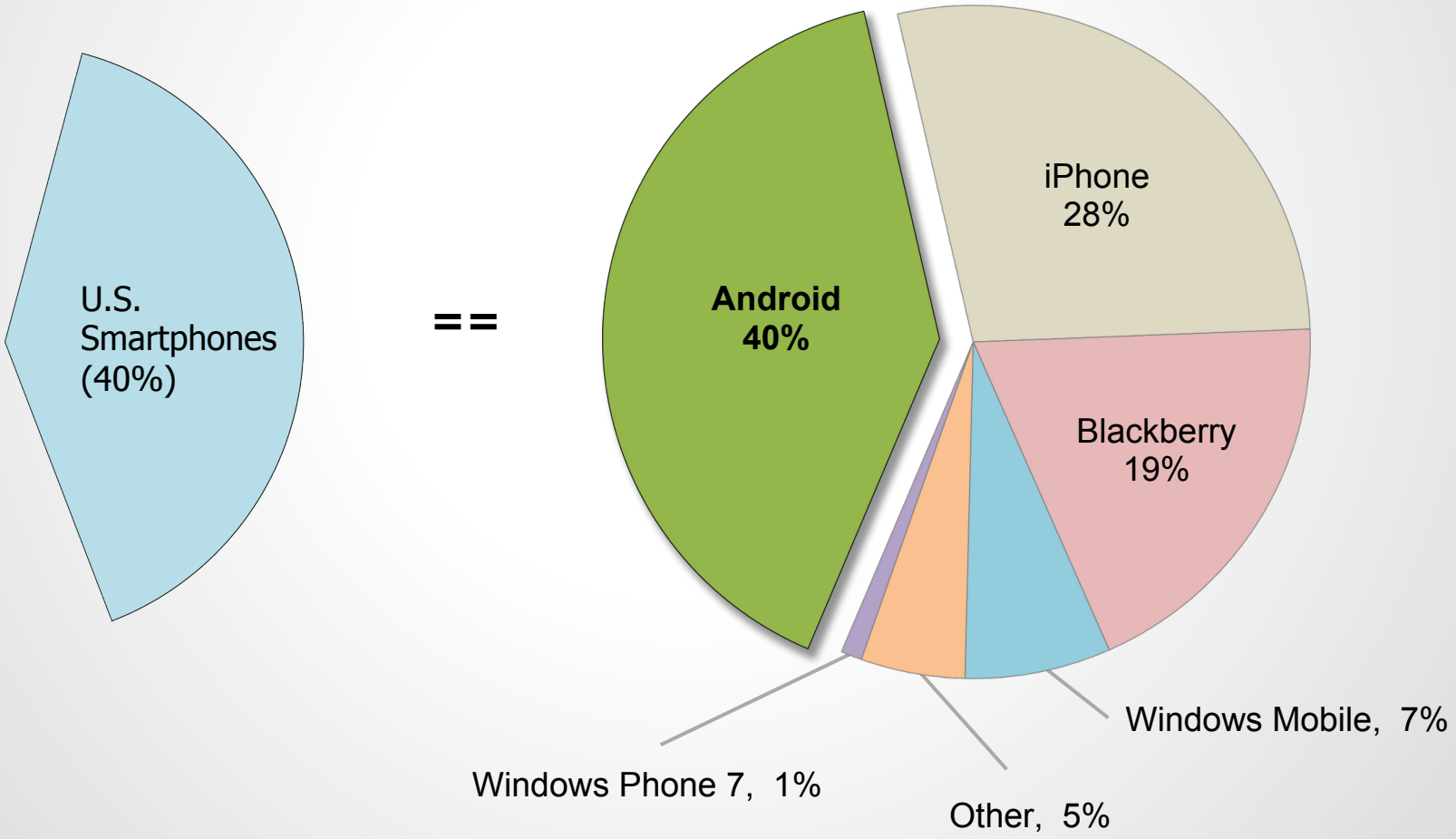
In the US:

the ratio is even higher, with smartphones making up **40%** of all mobile phones.

OK, well why **Android**?

Android?

Reason 1: US Market Dominance



Android?

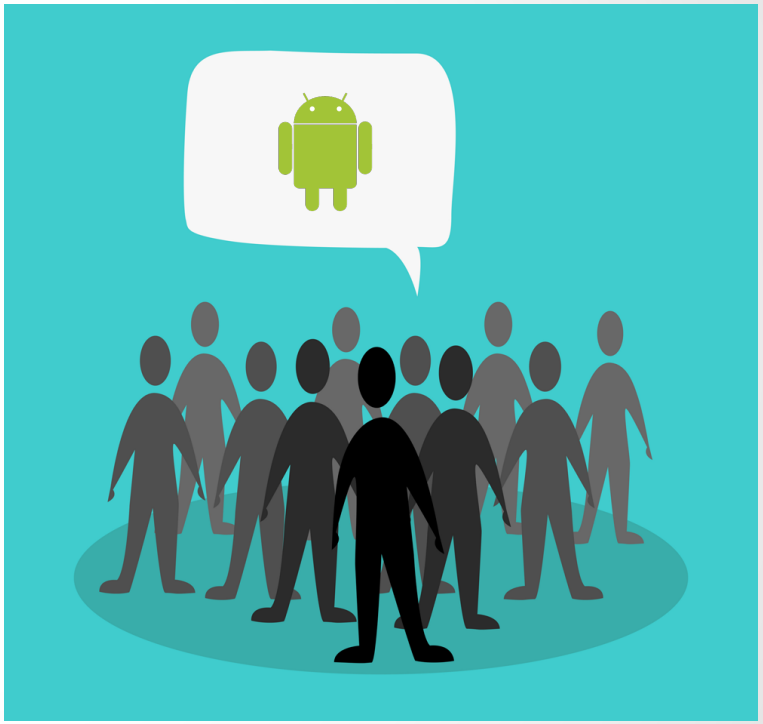
Reason 2: Consumer Popularity

- **100 million** activated Android devices (now 400,000 / day)
- **200,000 apps** in Android Market (4.5 billion activations to date)
- **310 devices** available to consumers (112 countries)

Android?

Reason 3: Developer Popularity

- **450,000 developers**
  building for the platform!



yaSSL

Android.

Meaning?

- **Opportunity** for increased Kerberos visibility
- **Useful** for Android and Kerberos developers
- **Fun** to see where the community takes it

Our Plan

What we wanted to do.

Goals

We wanted to fill a missing gap.

1. Port Kerberos **libraries** to Android

2. Port some C-based Kerberos **client apps** to Android

Goals

We wanted to spark community involvement.

3. Build a sample **Android NDK App** (with a simple **GUI**)

4. Give changes back to **community**

yaSSL

Action!

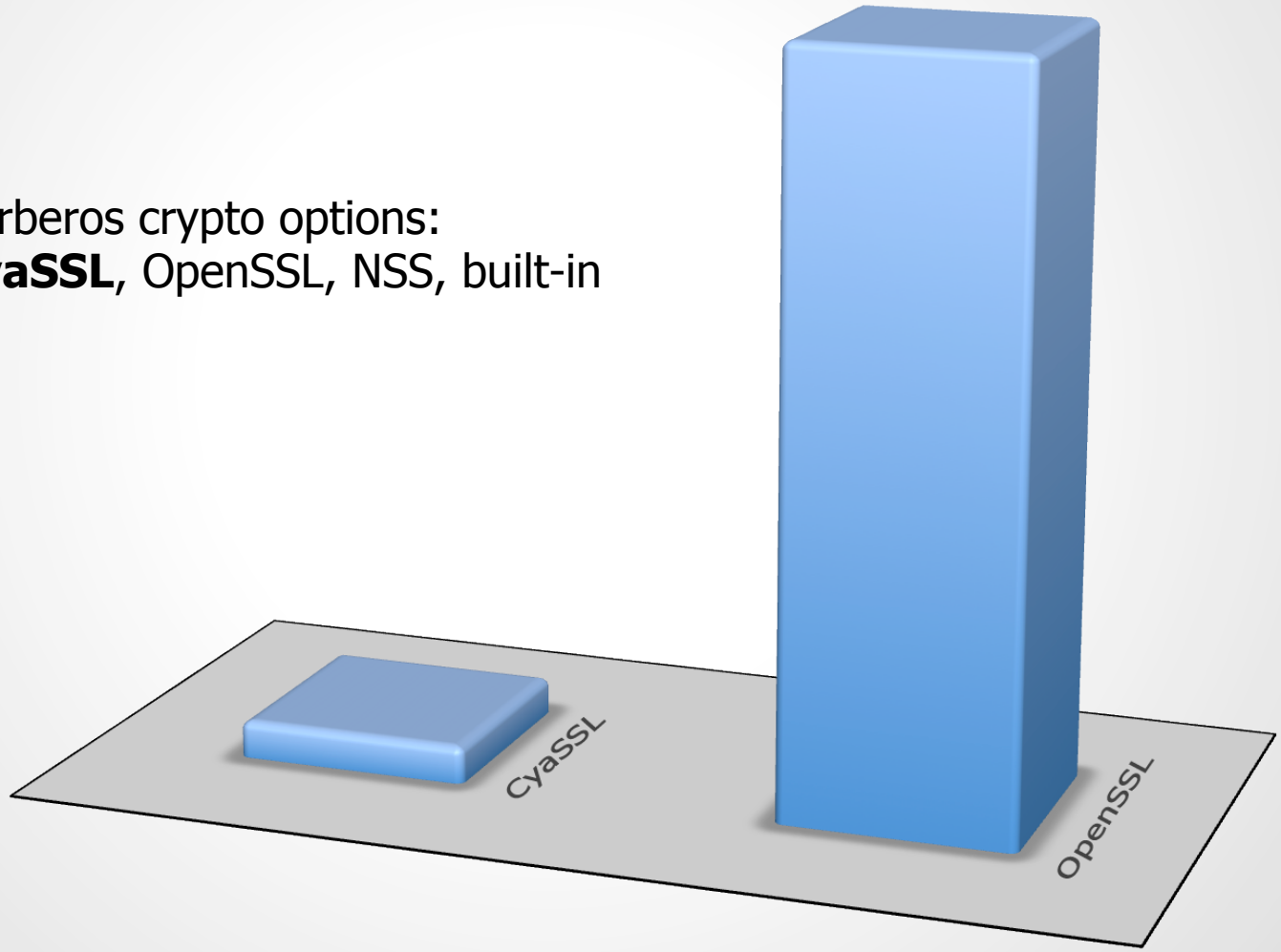
What we did.

1. Crypto Implementation

Crypto

Added new CyaSSL crypto implementation

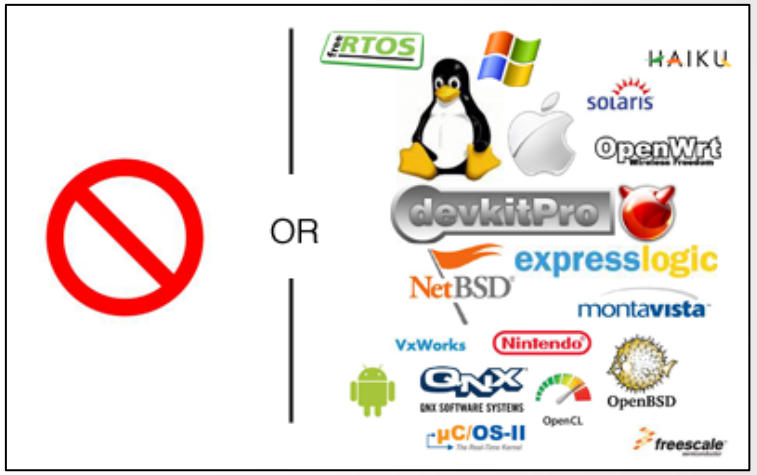
- Kerberos crypto options:
  CyaSSL, OpenSSL, NSS, built-in



Crypto

Added new CyaSSL crypto implementation

- CyaSSL is very portable



yaSSL

2. Porting

Android Port

Kerberos Libraries + CyaSSL ➡ Android.

- Cross-compiled libraries for Android
- Created **shell script** for easy reproduction by developers

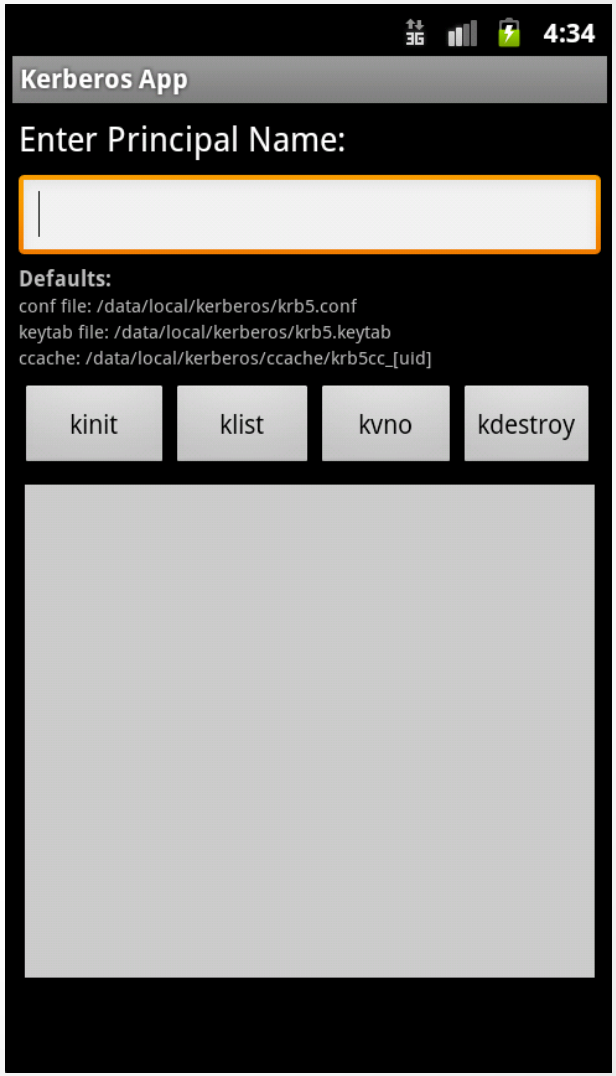
3. Android Application

Android App

Simple sample NDK project

Home Screen

- Single screen
- Uses JNI
- Wrapper around native client apps



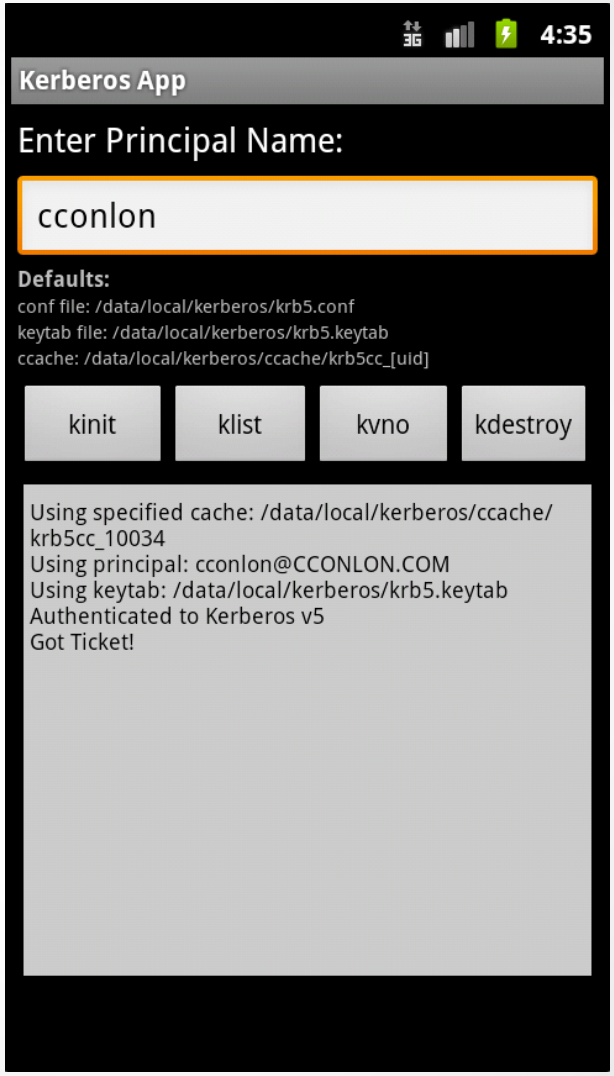
yaSSL

Android App

Simple sample NDK project

kinit

- Gets a ticket using specified principal



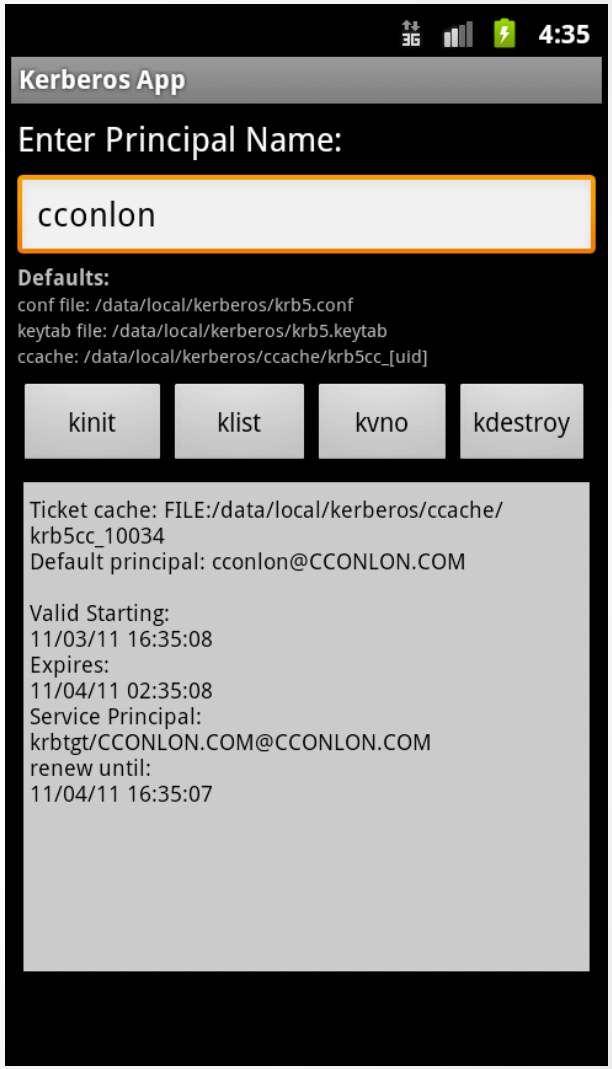
yaSSL

Android App

Simple sample NDK project

klist

- Lists our tickets



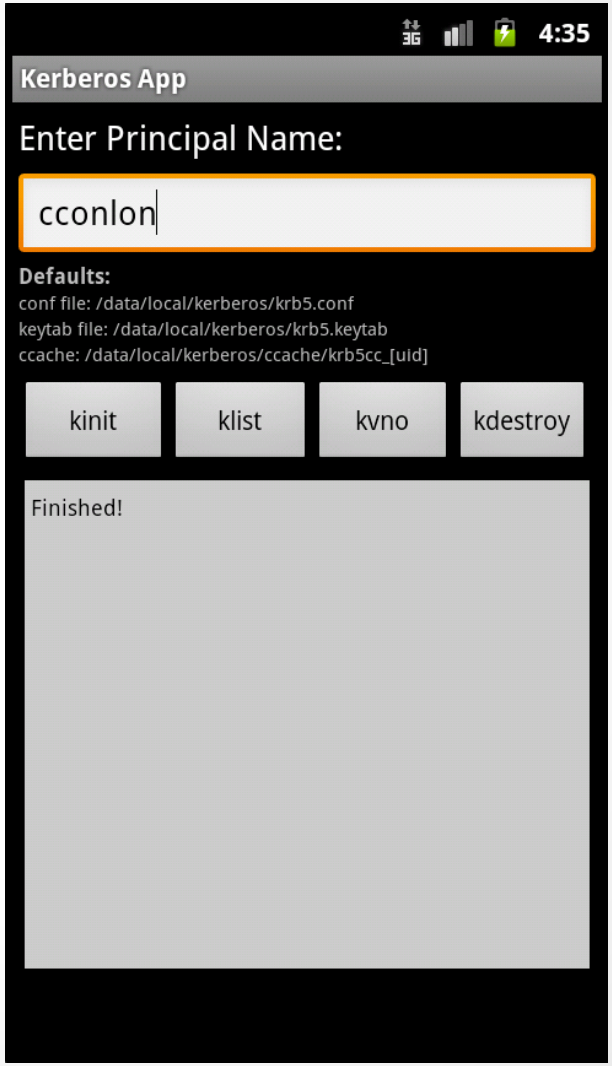
yaSSL

Android App

Simple sample NDK project

kvno

- Gets a service ticket for the entered principal



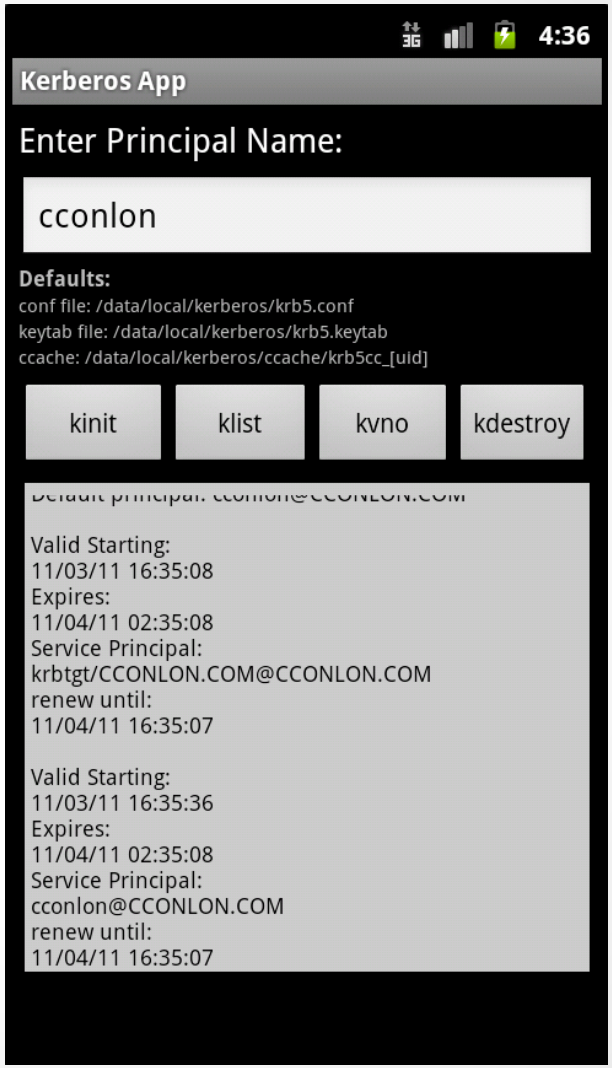
yaSSL

Android App

Simple sample NDK project

klist after kvno

- Verify that we got a ticket



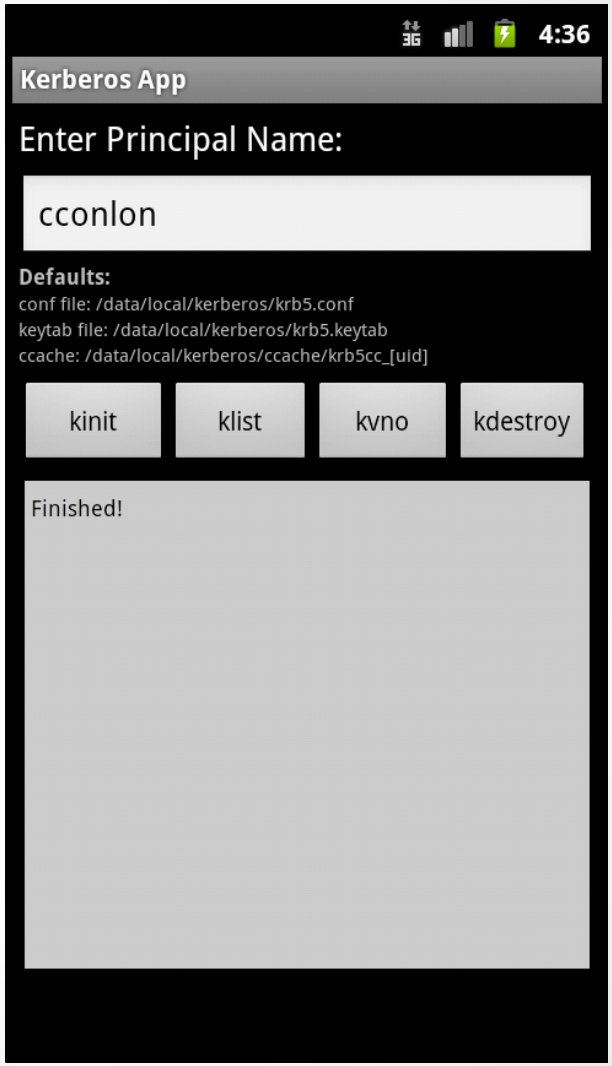
yaSSL

Android App

Simple sample NDK project

kdestroy

- Clear our ticket cache



yaSSL

Android App

Notes

- Uses a keytab instead of passwords
- Storage locations have been chosen for convenience
  - Can be easily modified to what the developer needs
  - Currently at /data/local/kerberos

Android App

License Type

- Application code will remain under the MIT license

4. GSS-API Wrapper

GSS-API

Java Wrapper

- Provide Java bindings for developers to use
- Uses 

framework
- Wrapper around native Kerberos GSS-API library

(Contains functionality found in **gssapi.h**)

GSS-API

Java Wrapper

2 example clients:

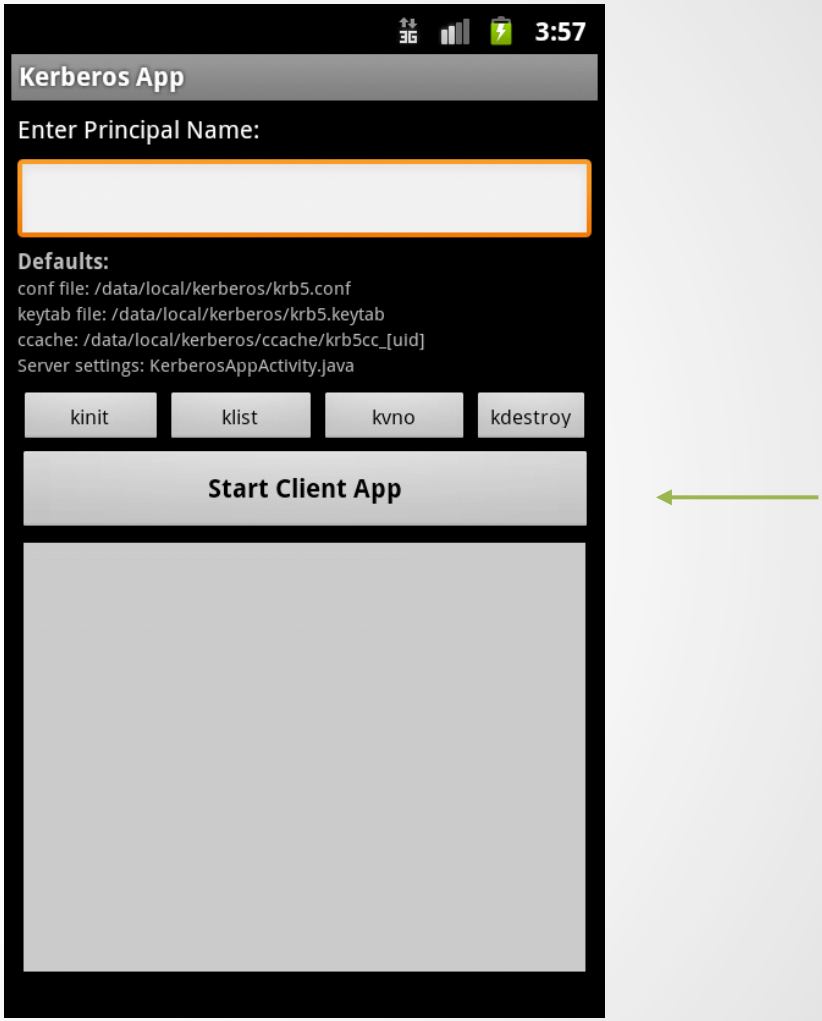
- Android client functionality
- Stand-alone Java app for desktop use

GSS-API

Integrated into sample app.

Example Client

- Est. context with example server
- Send wrapped message, verify returned sig. block (gss_wrap, gss_verify_mic)
- Repeat #2, but with gss_seal, gss_verify
- Misc. API tests and exit.



yaSSL

GSS-API

Integrated into sample app.

Example Server

- Est. context with client
- Receive and unwrap a message from the client
- Generate & send signature block for received message

The Future

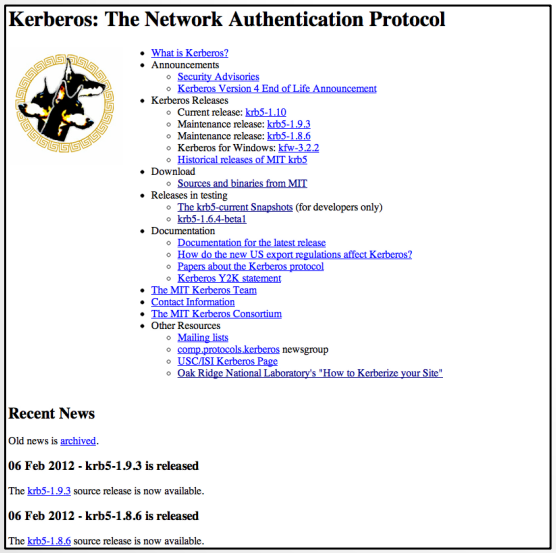
What's happening next?

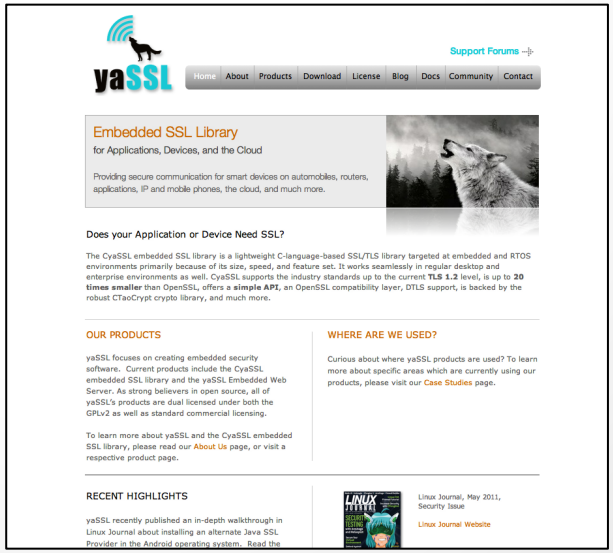
The Future

Look to the Community.

Availability

- Code will be linked from both MIT and yaSSL websites





The Future

Look to the Community.

PR Activity / Visibility

- Blog posts
- Forum posts
- Press releases
- GitHub
- Mailing lists
- etc...

The Future

Other ideas or thoughts?

References

Statistics

- http://ansonalex.com/infographics/smartphone-usage-statistics-2012-infographic/
- http://www.go-gulf.com/blog/smartphone
- http://blog.nielsen.com/nielsenwire/online_mobile/40-percent-of-u-s-mobile-users-own-smartphones-40-percent-are-android/
- Google I/O 2011: http://www.google.com/events/io/2011

Project Locations

Kerberos: http://web.mit.edu/kerberos/
CyaSSL: http://www.yassl.com/

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

Thanks!

www.yassl.com