

Google's Opening Statement

Key Points of Evidence



- Sun gave the Java language to the public
- Google built Android using free and open technologies
- Sun publicly approved Android's use of Java
- Google made fair use of the Java language APIs in Android

Key Points of Evidence



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The Java programming language is open
and free for anyone to use.

Ellison: Java Language Is Free



Larry Ellison
Oracle CEO

- "Q. And you understand that nobody owns the Java programming language; right?
- A. That's correct.
- Q. Anybody can use that without any royalty at all?
- A. Correct."

The names of the various items appearing in the disputed API package specifications, such as names of API files, packages, classes, and methods, are not protected.

Java API Package Names Are Free for All to Use

java.lang.reflect	java.security.spec	javax.crypto.interfaces
java.net	java.sql	javax.crypto.spec
java.nio	java.text	javax.net
java.nio.channels	java.util	javax.net.ssl
java.nio.channels.spi	java.util.jar	javax.security.auth
java.nio.charset	java.util.logging	javax.security.auth.callback
java.nio.charset.spi	java.util.prefs	javax.security.auth.login
java.lang.ref	java.util.regex	javax.security.auth.x500
java.security	java.util.zip	javax.security.cert
java.security.acl	java.lang	javax.sql
java.security.cert	java.lang.annotation	java.awt.font
java.security.interfaces	javax.crypto	java.beans
		java.io

Java API Class Names Are Free for All to Use

BufferedOutputStream	BufferedReader	BufferedWriter	ByteArrayInputStream
ByteArrayOutputStream	CharArrayReader	CharArrayWriter	DataInputStream
DataOutputStream	File	FileDescriptor	FileInputStream
FileOutputStream	FilePermission	FileReader	FileWriter
FilterInputStream	FilterOutputStream	FilterReader	FilterWriter
InputStream	InputStreamReader	LineNumberInputStream	LineNumberReader
ObjectInputStream	ObjectInputStream.GetField	ObjectOutputStream	ObjectOutputStream.PutField
ObjectStreamClass	ObjectStreamField	OutputStream	OutputStreamWriter
PipedInputStream	PipedOutputStream	PipedReader	PipedWriter
PrintStream	PrintWriter	PushbackInputStream	PushbackReader
RandomAccessFile	Reader	SequenceInputStream	SerializablePermission
StreamTokenizer	StringBufferInputStream	StringReader	StringWriter
			Writer

Java API Method Names Are Free for All to Use

static double abs()	static float abs()	static int abs()	static long abs()
static double acos()	static double asin()	static double atan()	static double atan2()
static double cbrt()	static double ceil()	static double cos()	static double cosh()
static double exp()	static double expm1()	static double floor()	static double hypot()
static double IEEEremainder ()	static double log()	static double log10()	static double log1p()
static double max()	static float max()	static int max()	static long max()
static double min()	static float min()	static int min()	static long min()
static double pow()	static double random()	static double rint()	static long round()
static int round()	static double signum()	static float signum()	static double sin()
static double sinh()	static double sqrt()	static double tan()	static double tanh()
static double toDegrees()	static double toRadians()	static double ulp()	static float ulp()

Java Language API



Package java.lang

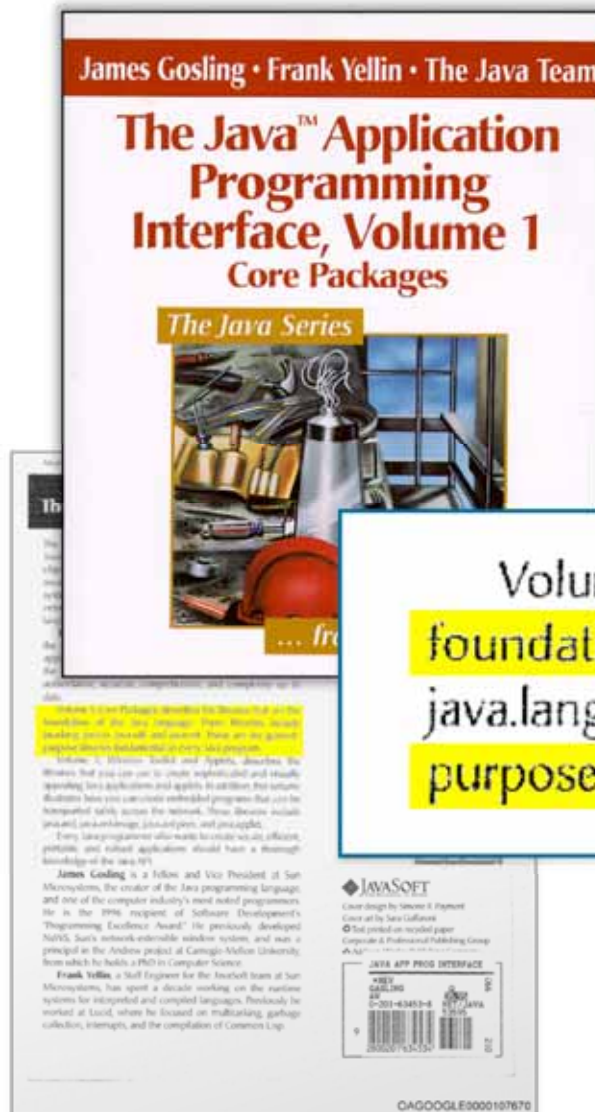
Provides classes that are fundamental to the design of the Java programming language.

A screenshot of the Java Language API website showing the Class Summary table for the Package java.lang. The table lists various classes and interfaces with their descriptions. The classes listed include Boolean, Byte, Character, Character.Subset, Character.UnicodeBlock, Class<T>, ClassLoader, Compiler, Double, Enum<E extends Enum<E>>, Float, InheritableThreadLocal<T>, Integer, Long, Math, and Number. The descriptions provide brief explanations of each class's purpose and functionality.

Runnable	The <code>Runnable</code> interface should be implemented by any class whose instances are intended to be executed by a thread.
Thread.UncaughtExceptionHandler	Interface for handlers invoked when a <code>Thread</code> abruptly terminates due to an uncaught exception.
Class Summary	
Boolean	The <code>Boolean</code> class wraps a value of the primitive type <code>boolean</code> in an object.
Byte	The <code>Byte</code> class wraps a value of primitive type <code>byte</code> in an object.
Character	The <code>Character</code> class wraps a value of the primitive type <code>char</code> in an object.
Character.Subset	Instances of this class represent particular subsets of the Unicode character set.
Character.UnicodeBlock	A family of character subsets representing the character blocks in the Unicode specification.
Class<T>	Instances of the class <code>Class</code> represent classes and interfaces in a running Java application.
ClassLoader	A class loader is an object that is responsible for loading classes.
Compiler	The <code>Compiler</code> class is provided to support Java-to-native-code compilers and related services.
Double	The <code>Double</code> class wraps a value of the primitive type <code>double</code> in an object.
Enum<E extends Enum<E>>	This is the common base class of all Java language enumeration types.
Float	The <code>Float</code> class wraps a value of primitive type <code>float</code> in an object.
InheritableThreadLocal<T>	This class extends <code>ThreadLocal</code> to provide inheritance of values from parent thread to child thread: when a child thread is created, the child receives initial values for all inheritable thread-local variables for which the parent has values.
Integer	The <code>Integer</code> class wraps a value of the primitive type <code>int</code> in an object.
Long	The <code>Long</code> class wraps a value of the primitive type <code>long</code> in an object.
Math	The class <code>Math</code> contains methods for performing basic numeric operations such as the elementary exponential, logarithm, square root, and trigonometric functions.
Number	The abstract class <code>Number</code> is the superclass of classes <code>BigDecimal</code> , <code>BigInteger</code> , <code>Byte</code> , <code>Double</code> , <code>Float</code> , <code>Integer</code> , <code>Long</code> , and <code>Short</code> .

<http://download.oracle.com/javase/6/docs/api/java/lang/package-summary.html> (as of September 26, 2011)

Fundamental to the Language



Volume 1, Core Packages, describes the libraries that are the foundation of the Java language. These libraries include `java.lang`, `java.io`, `java.util`, and `java.net`. These are the general-purpose libraries fundamental to every Java program.

Oracle's Technical Expert



John C. Mitchell
Oracle Expert

"I mean, in a sense, these elements here are like parts of speech. So nouns, verbs, adjectives, and so on. And using those parts of speech, package names, class and interface names, relationships between them, the methods associated with each class, methods associated with interface . . . you form an API using those parts of speech in the same way I'd write a technical paper using, you know, nouns, verbs, objects, so on."



Mark Reinhold

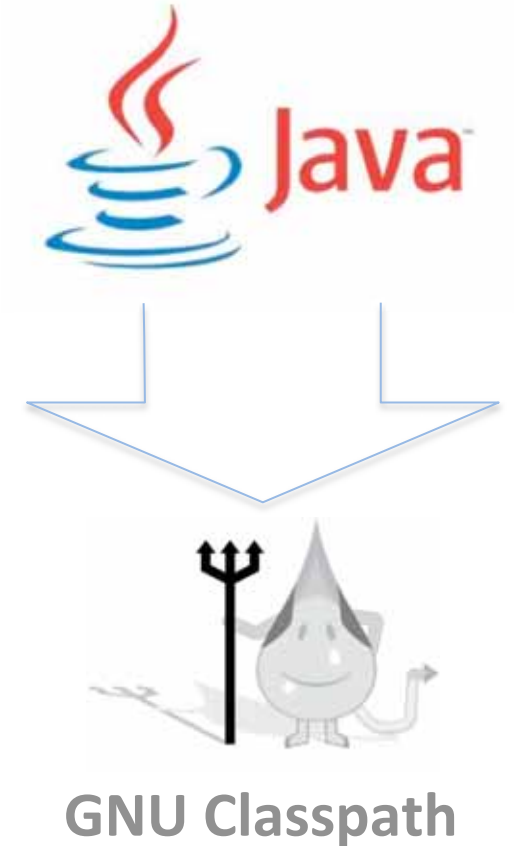
Chief Architect of the Java Platform Group

"Q. Then why does Java have APIs?

A. Well, if there were no APIs, we would only have a language. You would be able to write basic computations that never did any IO, had any communication with the outside world or the underlying platform.

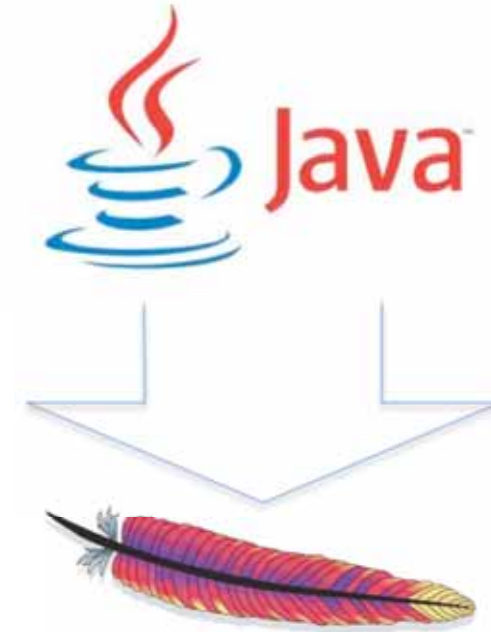
You could write -- you know, you could do computations on numbers and strings and generate them, but you wouldn't be able to do anything with them."

GNU Classpath



Open source based on Java programming language,
including Java language APIs

1998



Apache Harmony

Open source based on Java programming language,
including Java language APIs

2005

Sun's Business Model



Jonathan Schwartz
Former Sun CEO

May 9, 2007:

"Jonathan Schwartz, CEO at Sun, said in a press conference,

'there is no reason that Apache cannot ship Harmony today....'"

TX2341

IBM's Use of Apache Harmony



Apache Harmony



Lotus Notes, SameTime,
Symphony, and Expeditor

Key Points of Evidence

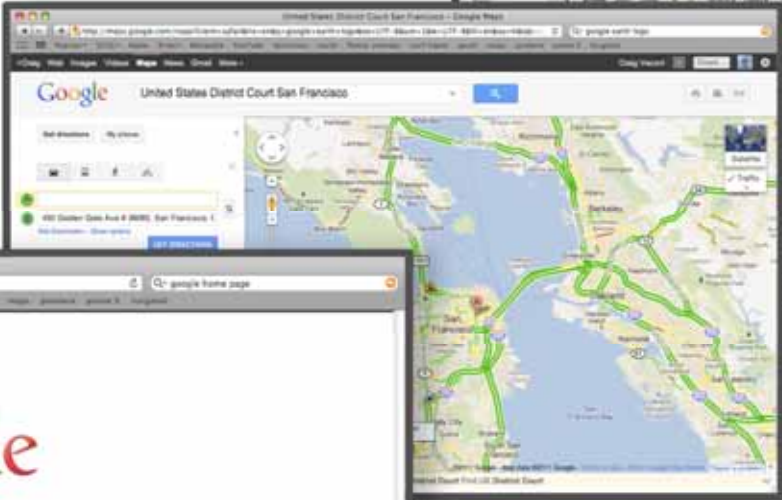


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Google Is a Leader in Technology Innovation



Google search



Google Maps



Gmail

Google Invests in Research & Development



- 13,000 Google employees in California
- 4 out of 10 employees are engineers in Research and Development



The Google Team



Eric Schmidt
Chairman of the Board



Andy Rubin
Senior Vice President of Mobile



Key Android Engineers



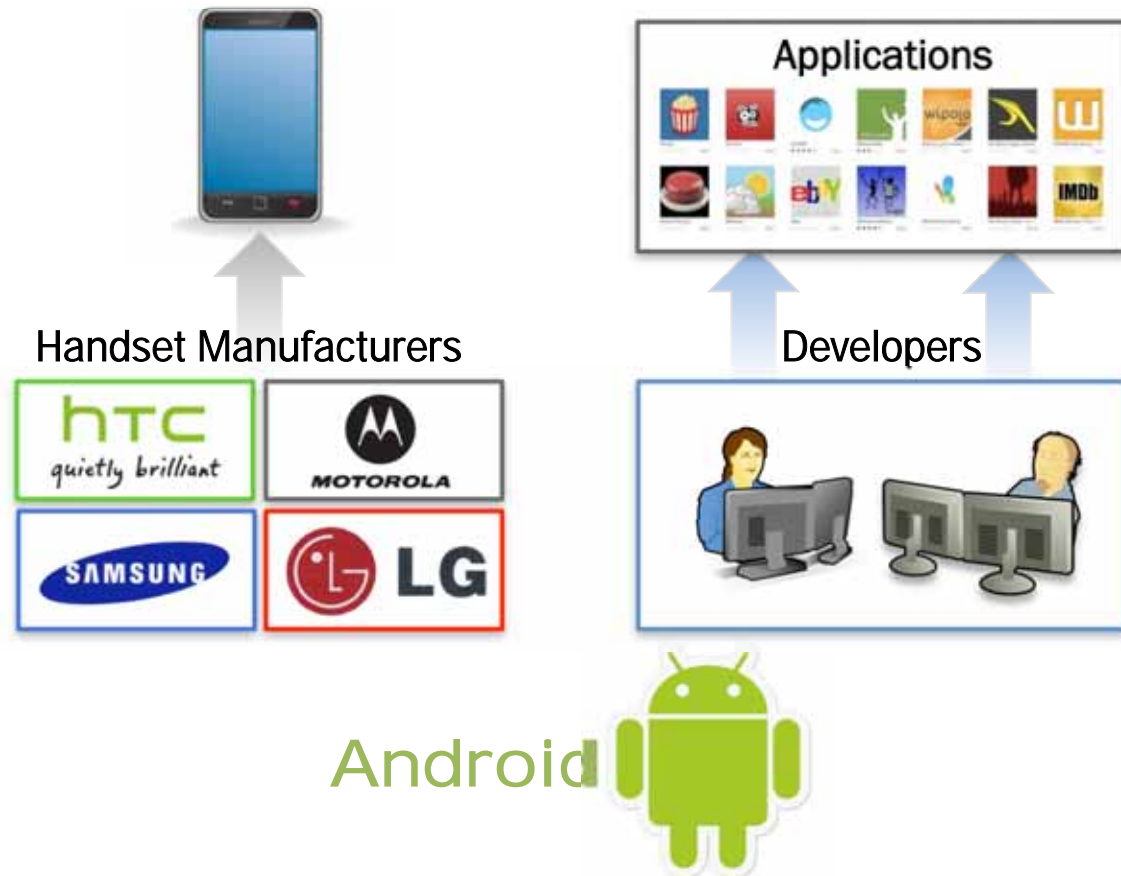
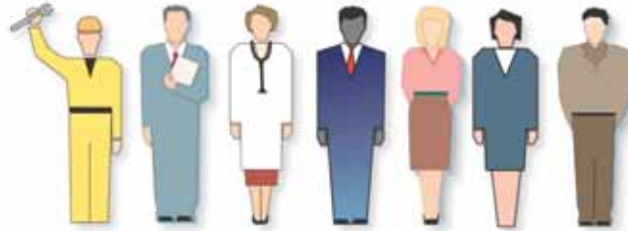
Bob Lee



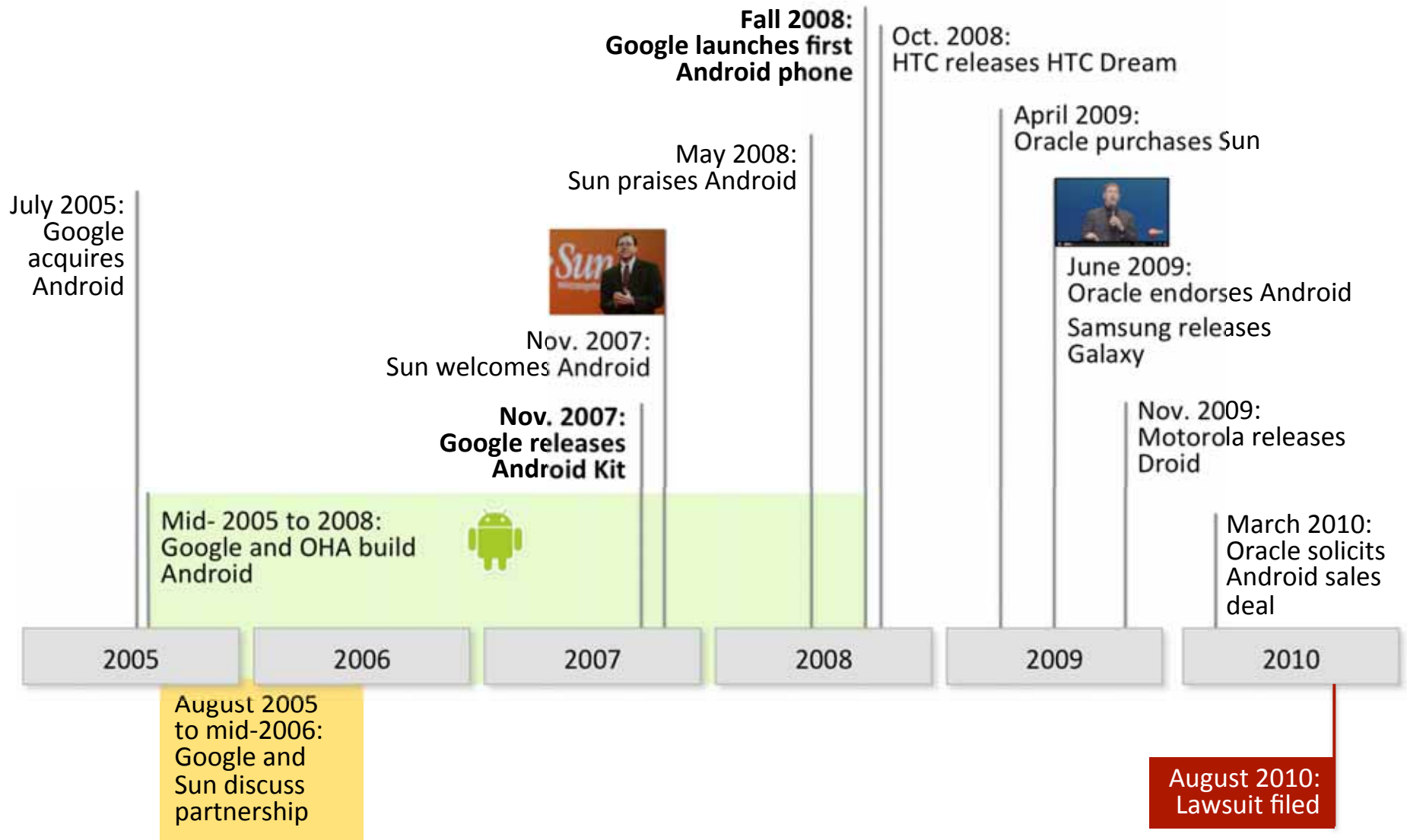
Dan Bornstein



Android Supports



The History of Android



2005-2006: Google and Sun Considered a Partnership

From: Scott McNealy. Sent: 2/8/2006 5:09 AM.
To: [-] Eric Schmidt.
Cc: [-] scott.g.mcnealy@Sun.com; Andy Rubin; Jonathan Schwartz; Greg Papadopoulos.
Bcc: [-] .
Subject: Re: Potential Sun Google partnership in the Mobile Java and OS Space.



Eric Schmidt

Eric Schmidt wrote:

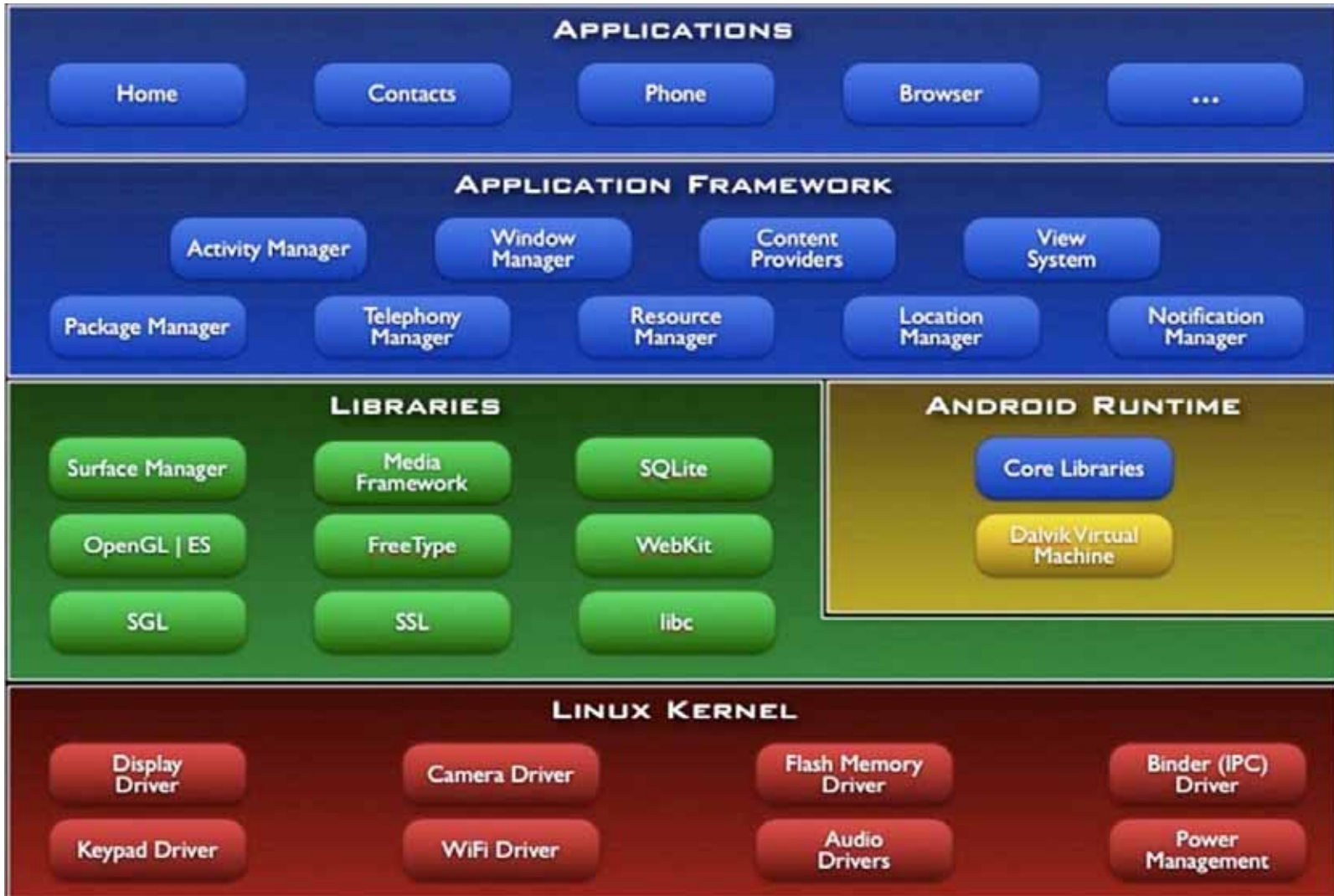
>
>Scott.. I'm in a product review and we are looking at a very interesting
>partnership proposal with Sun. Basically, Andy Rubin runs our mobile
>os/search engineering group; he is talking with Alan Brenner, VP Consumer &
>Mobile Systems Group of Sun.
>
>Google has engaged with Sun's Java team in an effort to form an alliance
>around our Open Handset Platform. It is an opportunity for our two
>companies to work together to define the de-facto standard software stack
>for mobile phones. Google has adopted a completely open source model as a
>way to solve some intricate distribution dependencies. It makes sense to me
>that Sun and Google should do this together; can you check and hopefully
>dedicate the resources necessary to move this ahead at an accelerated pace.
>I wanted to make sure you know I will do the same on my side.
>
>Anyway, this is very exciting and hopefully a good idea for both of us !
>Thanks and take care.. Eric

TX 205

Android Phone



The Android Platform



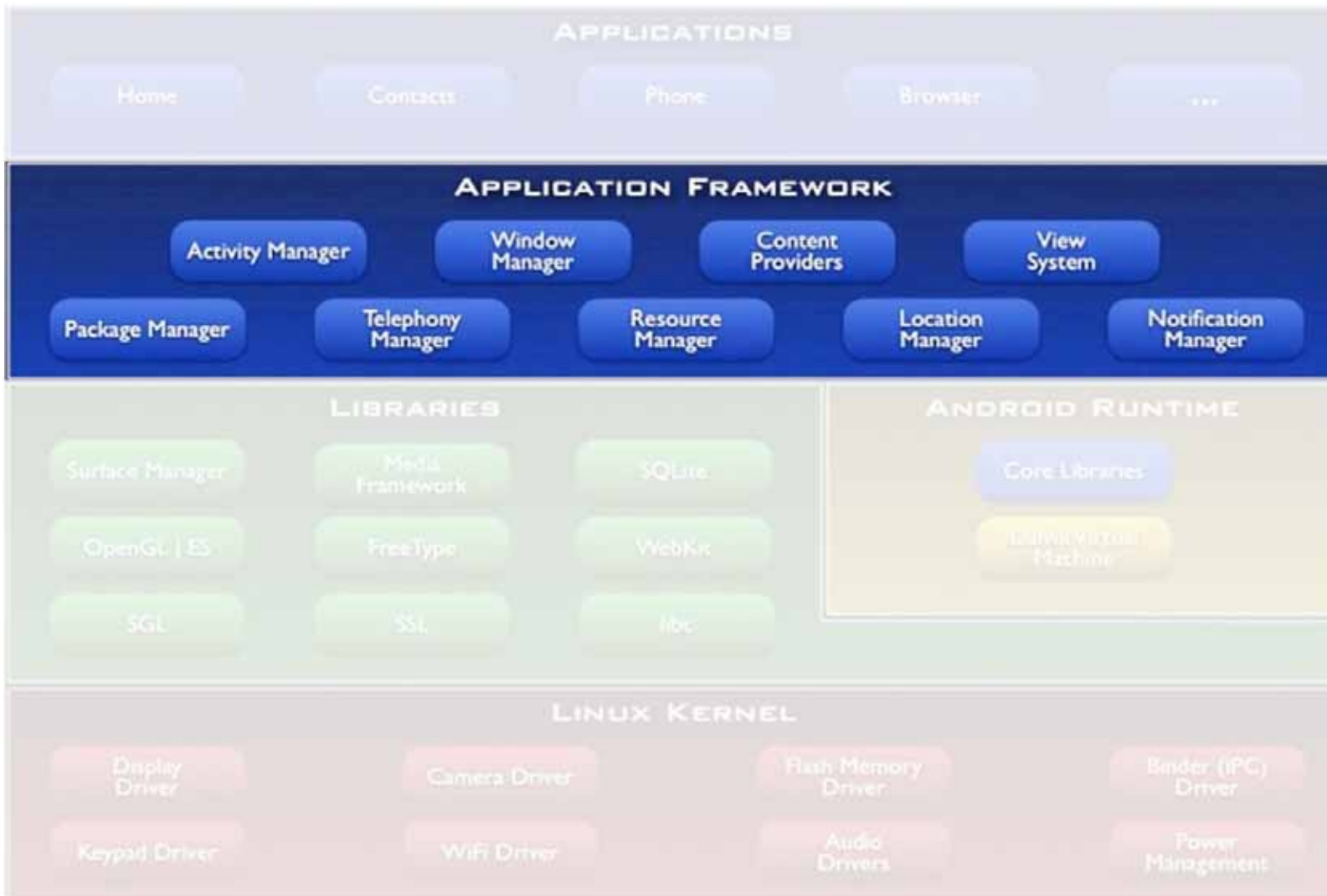
The Android Platform



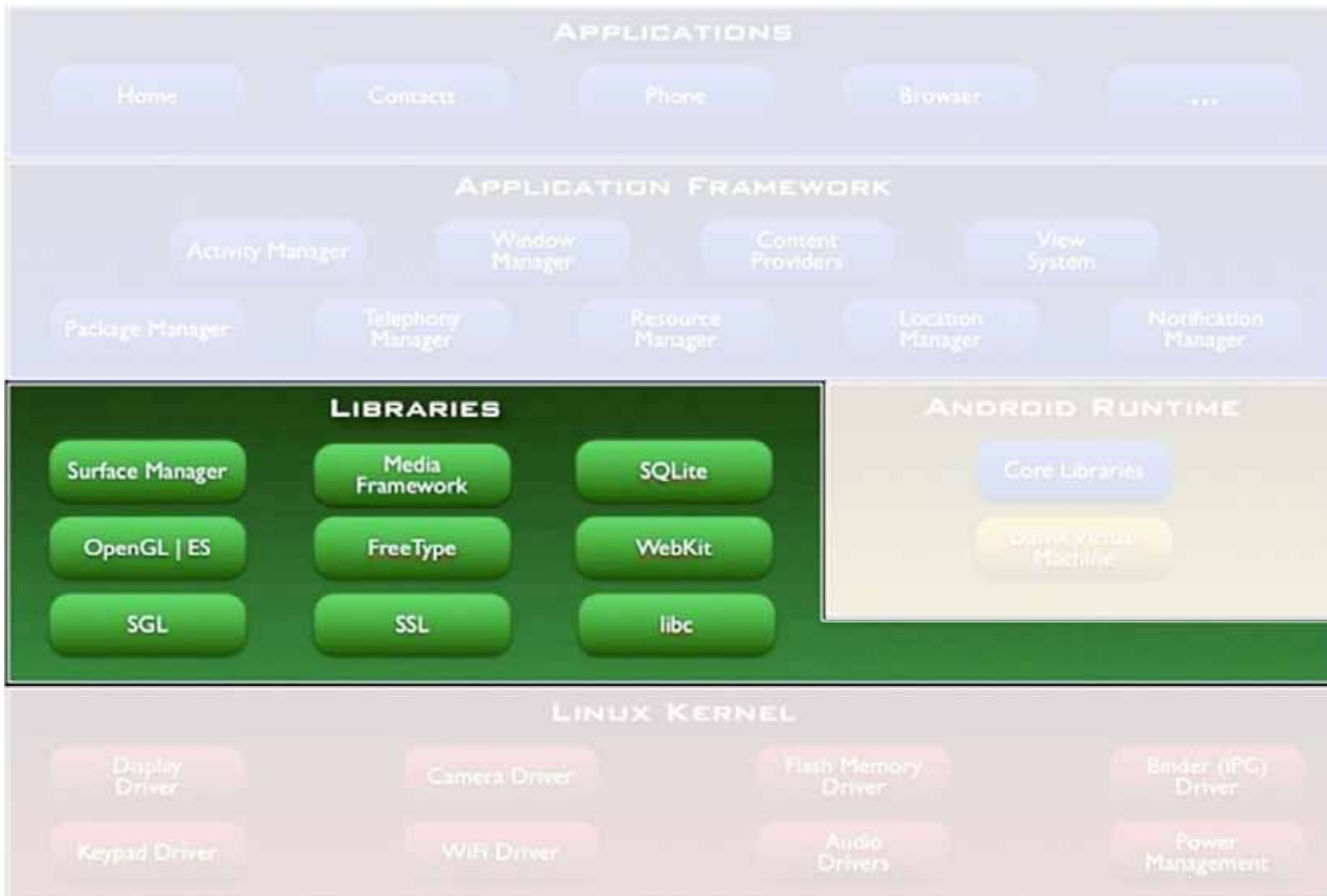
The Android Platform



The Android Platform



The Android Platform



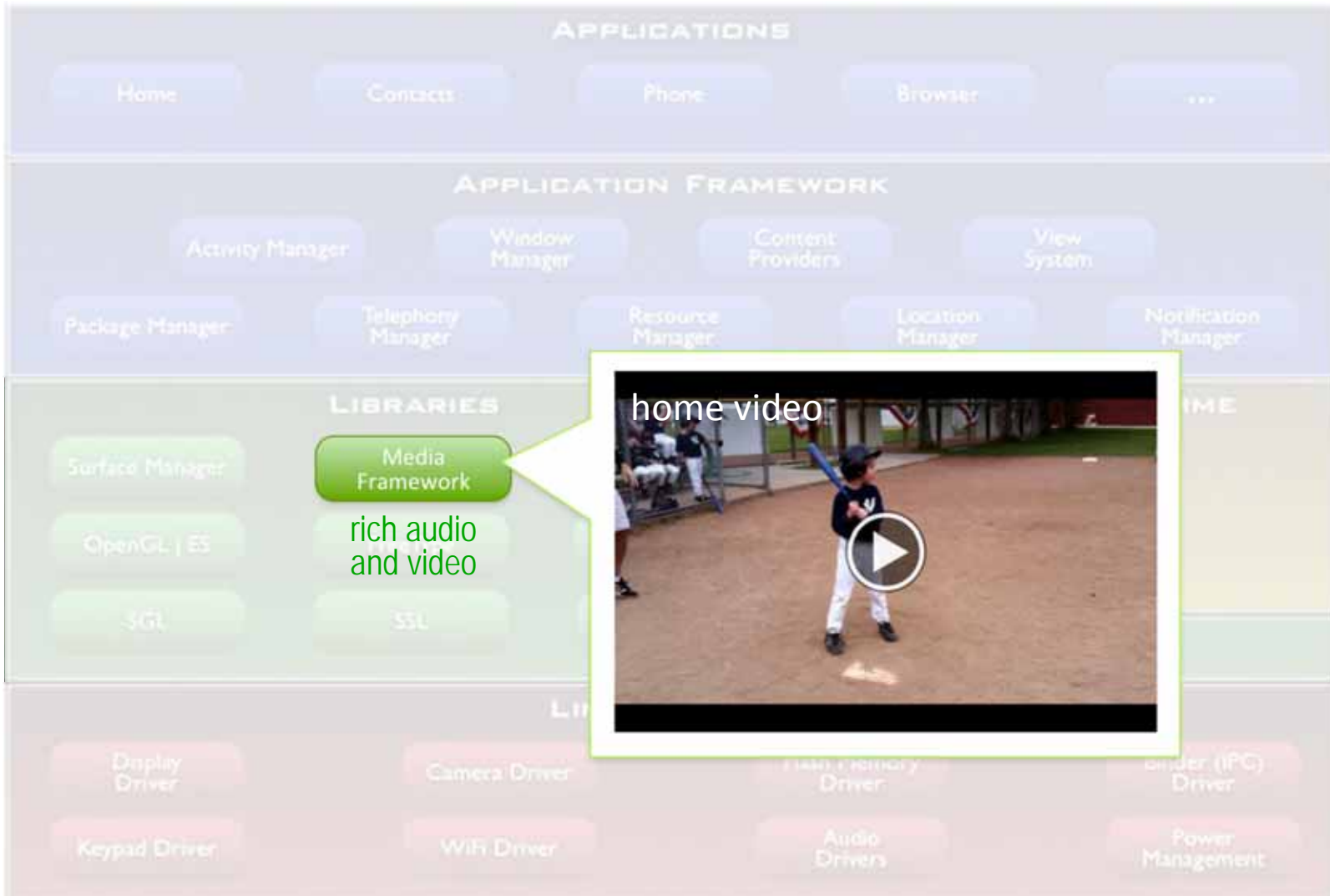
The Android Platform



The Android Platform



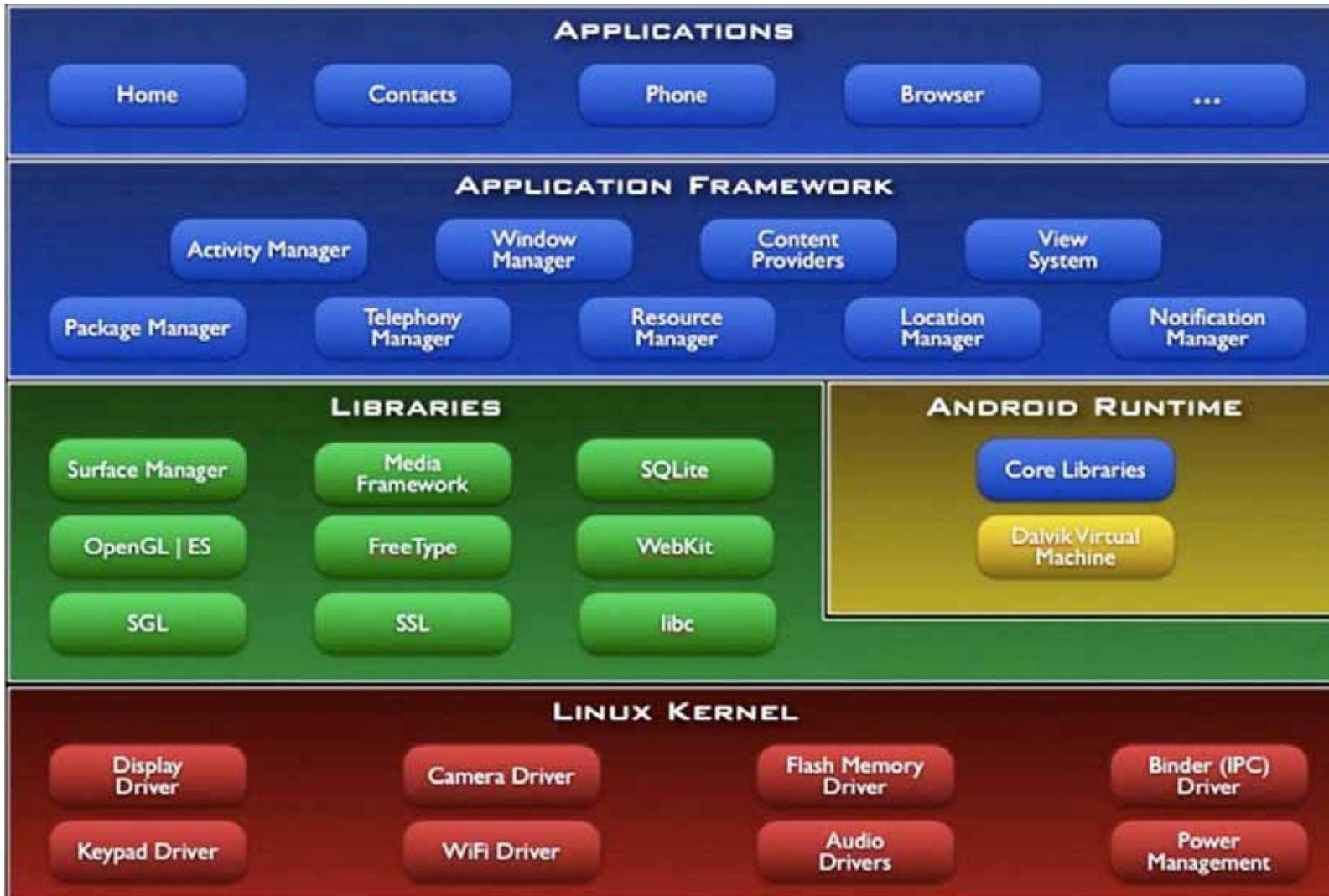
The Android Platform



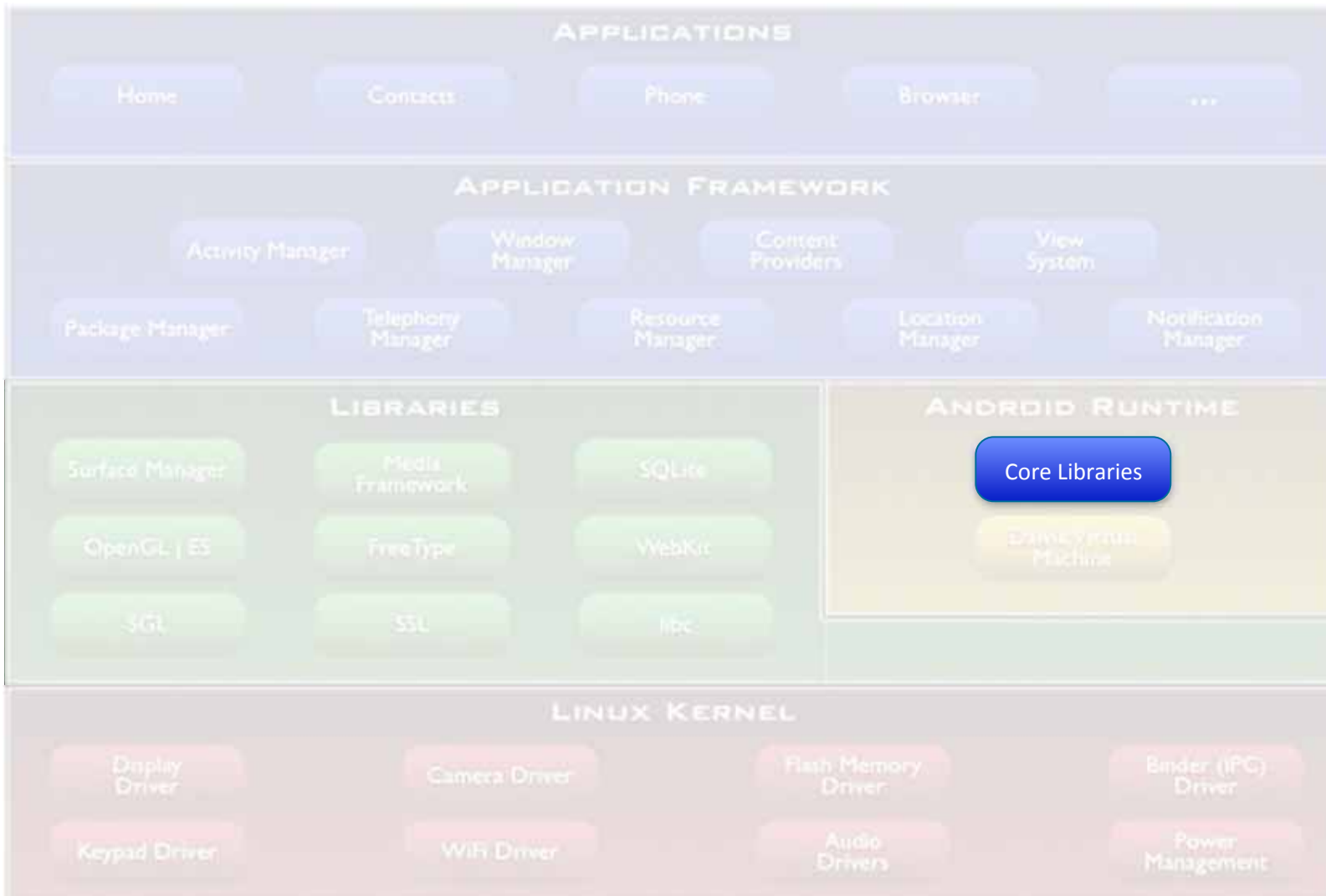
The Android Platform



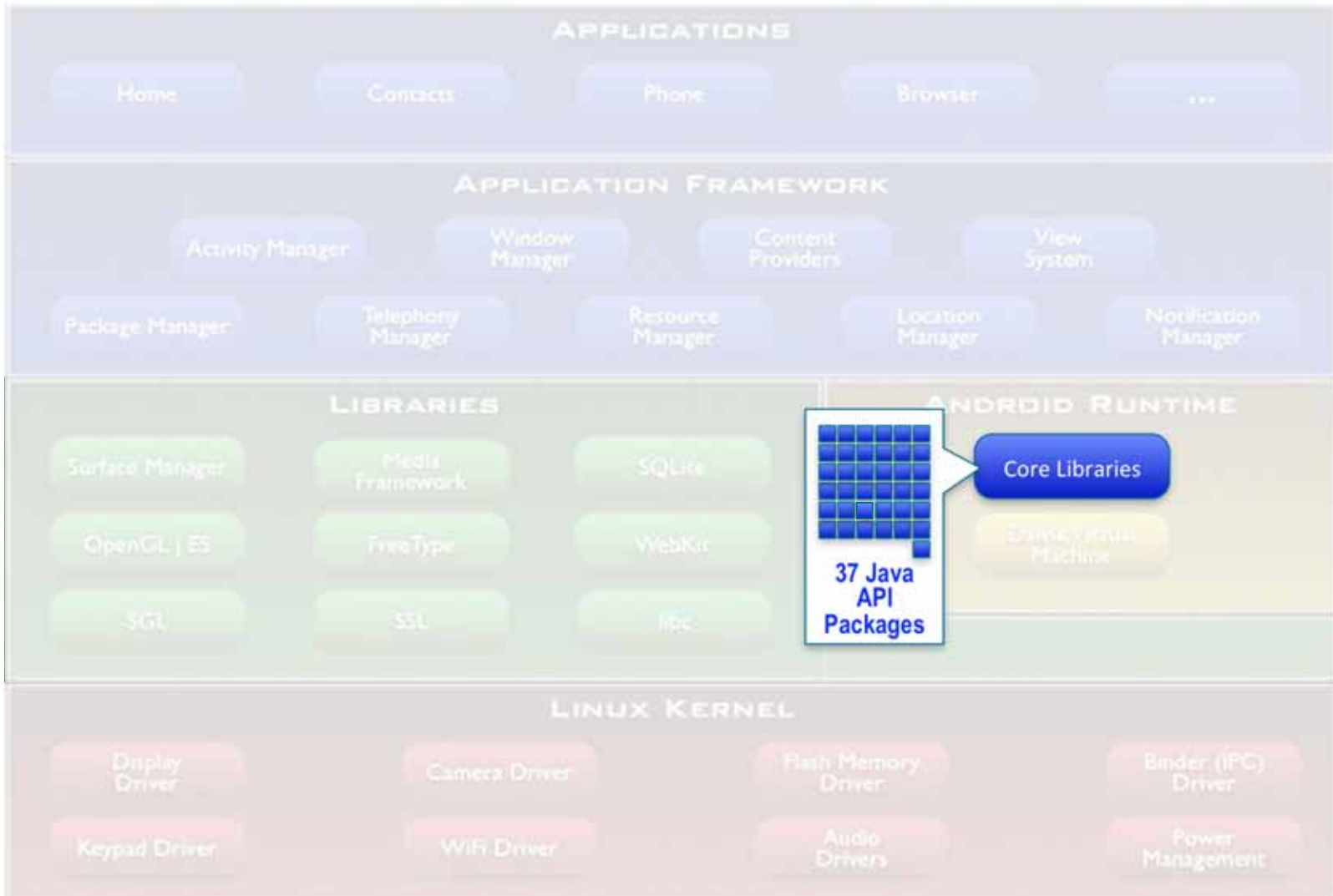
The Android Platform



The Android Platform



The APIs at Issue



The APIs at Issue





Applications



Application Developer



Application Developer



API

max ()

sort by price



Application Developer



Price: High to Low

Sort



Nike
Nike Dual Fusion St 2 Mens Running Shoes

★★★★★ (1 customer review) | Like (3)

Price: \$64.90



ASICS
ASICS Men's GEL-Pulse 3 Running Shoe

★★★★★ (11 customer reviews) | Like (5)

Price: \$59.99



New Balance
New Balance Men's MR860 Running Shoe

★★★★★ (33 customer reviews) | Like (11)

Price: \$51.99

An API Provides Access to Source Code

API

choose greater of two numbers

`max ()`

Source Code Implementation

tells the computer what to do

```
public static float max(float f1, float f2) {
    if (f1 > f2) {
        return f1;
    }
    if (f1 < f2) {
        return f2;
    }
    /* if either arg is NaN, return NaN */
    if (f1 != f2) {
        return Float.NaN;
    }
    /* max(+0.0,-0.0) == +0.0 */
    /* Float.floatToRawIntBits(0.0f) == 0 */
    if (Float.floatToRawIntBits(f1) != 0) {
        return f2;
    }
    return 0.0f;
}
```

Android



An API Provides Access to Source Code

API

choose greater of two numbers

`max ()`

Source Code Implementation

tells the computer what to do

```
public static float max(float a, float b)
{
    // this check for NaN, from JLS 15.21.1, saves a method call
    if (a != a)
        return a;
    // no need to check if b is NaN; > will work correctly
    // recall that -0.0 == 0.0, but [+]-0.0 - [+]-0.0 behaves special
    if (a == 0 && b == 0)
        return a - -b;
    return (a > b) ? a : b;
}
```



GNU Classpath 0.9.8

An API Provides Access to Source Code

API

choose greater of two numbers

`max ()`

Source Code Implementation

tells the computer what to do

```
public static float max(float a, float b) {  
    if (a != a) return a; // a is NaN  
    if ((a == 0.0f) && (b == 0.0f)  
        && (Float.floatToIntBits(a) ==  
negativeZeroFloatBits)) {  
        return b;  
    }  
    return (a >= b) ? a : b;  
}
```

OpenJDK 6

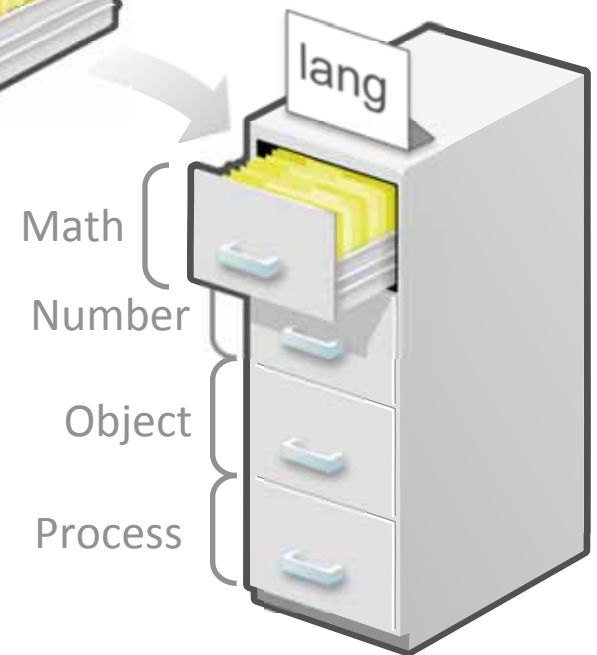
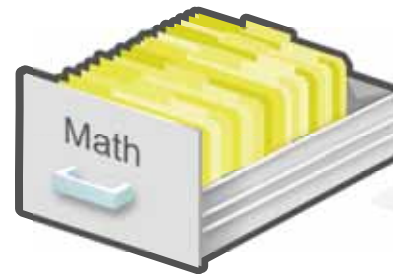
```
public static float max(float a, float b) {
    if (a != a) return a; // a is NaN
    if ((a == 0.0f) && (b == 0.0f)
        && (Float.floatToIntBits(a) ==
negativeZeroFloatBits)) {
        return b;
    }
    return (a >= b) ? a : b;
}
```

Java Language API: A System of Organization

`java.lang.Math.max()`

max()
implementation
source code

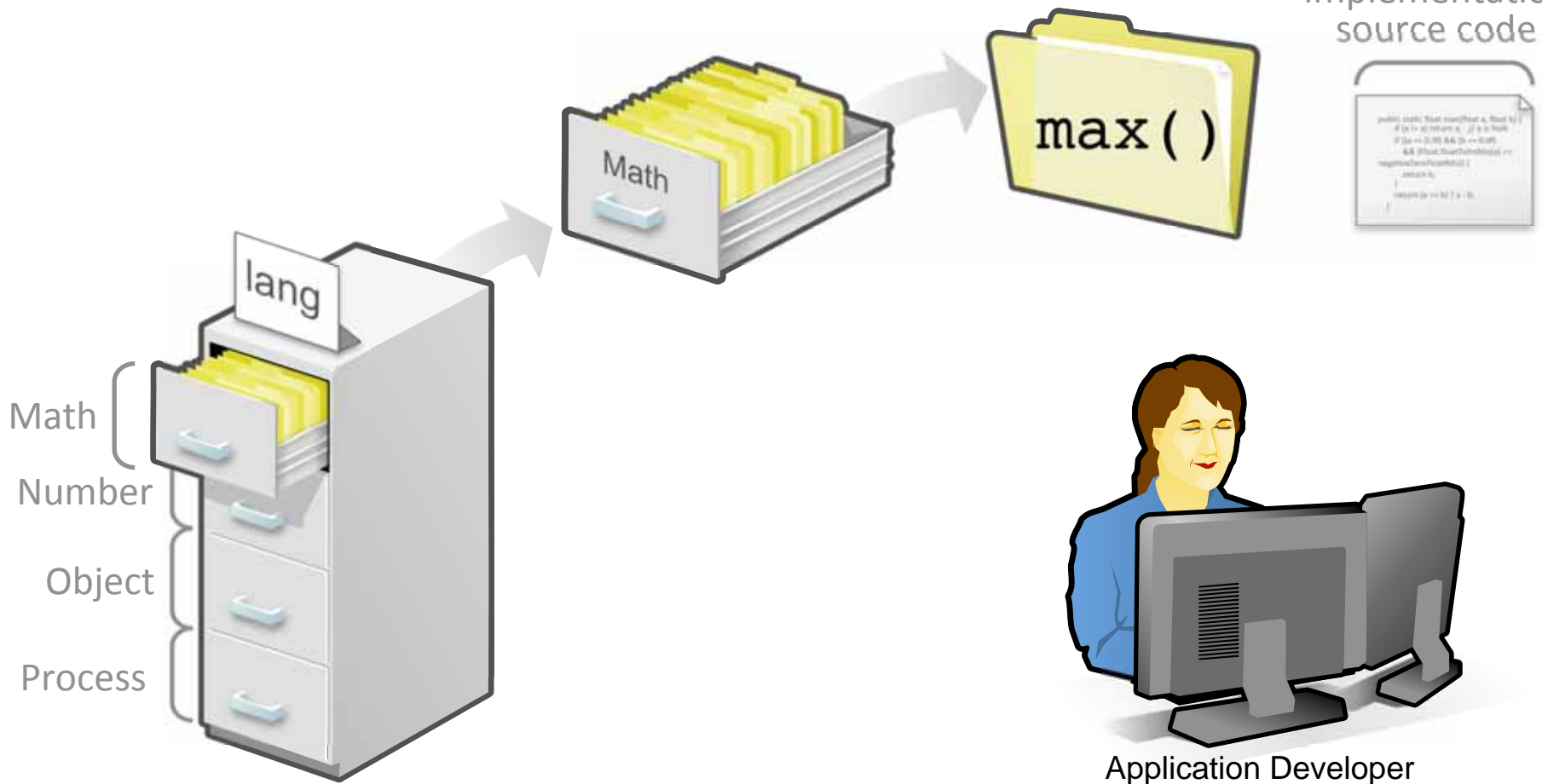
```
public static float max(float a, float b) {  
    if (a != a) return a; // a is NaN  
    if (a == 0.0f) && (b == 0.0f)  
        && (Float.floatToIntBits(a) ==  
            negativeZeroFloatBits) {  
        return b;  
    }  
    return (a >= b) ? a : b;  
}
```



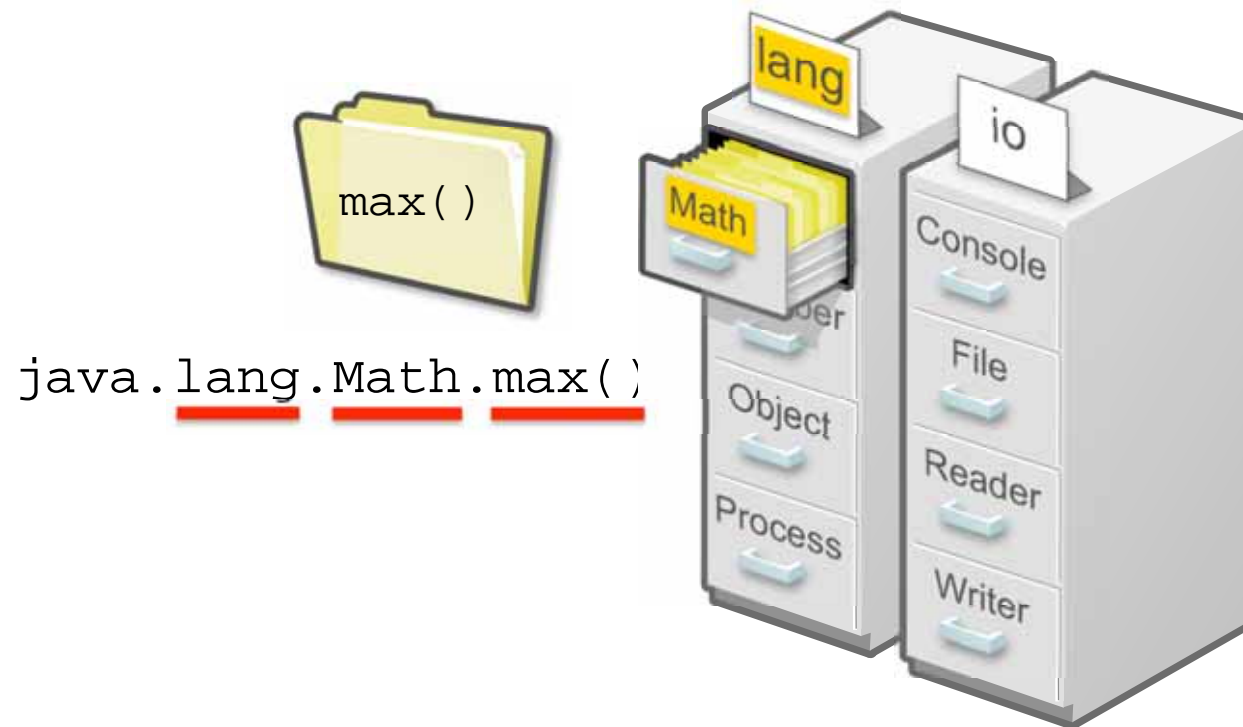
Software Developer Finds Source Code in API Packages

java.lang.Math.max()

max()
implementation
source code



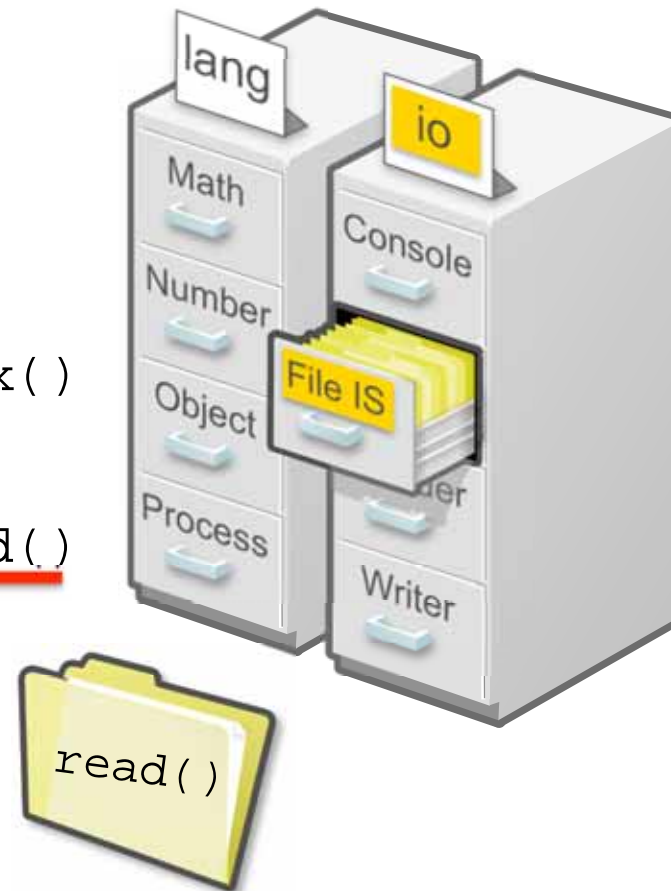
APIs are Organized in Packages



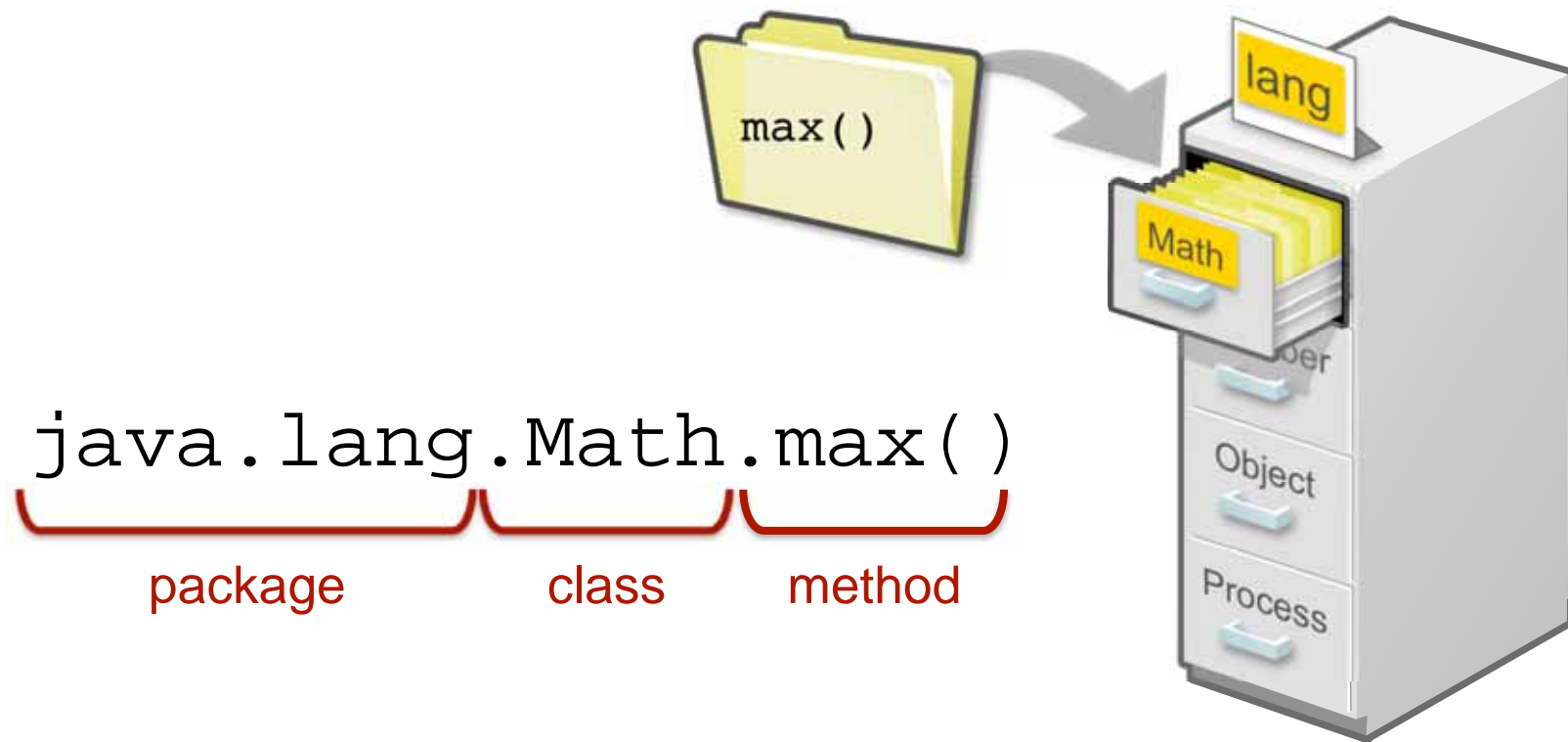
APIs are Organized in Packages

```
java.lang.Math.max()
```

```
java.io.FileInputStream.read()
```



APIs are Organized in Packages



Android Source Code/Implementations Differ from Java

Oracle JDK 1.5 String.compareTo

```
public int compareTo(String anotherString) {
    int len1 = count;
    int len2 = anotherString.count;

    int n = Math.min(len1, len2);

    char v1[] = value;
    char v2[] = anotherString.value;
    int i = offset;

    int j = anotherString.offset;

    if (i == j) {
        int k = i;
        int lim = n + i;
        while (k < lim) {
            char c1 = v1[k];
            char c2 = v2[k];
            if (c1 != c2) {
                return c1 - c2;
            }
            k++;
        }
    } else {
        while (n-- != 0) {
            char c1 = v1[i++];
            char c2 = v2[j++];
            if (c1 != c2) {
                return c1 - c2;
            }
        }
    }
    return len1 - len2;
}
```

Android String.compareTo

```
public int compareTo(String anotherString) {
    // Code adapted from K&R, pg 101
    int o1 = offset, o2 = string.offset,
    result;
    int end = offset + (count < string.count ?
    count : string.count);
    char[] target = string.value;
    while (o1 < end) {
        if ((result = value[o1++] - target[o2++])
            != 0) {
            return result;
        }
    }
    return count - string.count;
}
```

Android Source Code/Implementations Differ from Java

Oracle JDK 1.5 ZipFile.getInputStream [fragment]

```
public InputStream getInputStream(ZipEntry
entry) throws IOException {
    return getInputStream(entry.name);
}
private InputStream getInputStream(String
name) throws IOException {
    if (name == null) {
        throw new
        NullPointerException("name");
    }
    long jzentry = 0;
    ZipFileInputStream in = null;
    synchronized (this) {
        ensureOpen();
        jzentry = getEntry(jzfile, name,
        false);
        if (jzentry == 0) {
            return null;
        }
        if (mappedBuffer != null) {
            in = new
            MappedZipFileInputStream(jzentry,
            name);
        } else {
            in = new
            ZipFileInputStream(jzentry);
        }
    }
}
...

```

Android ZipFile.getInputStream [fragment]

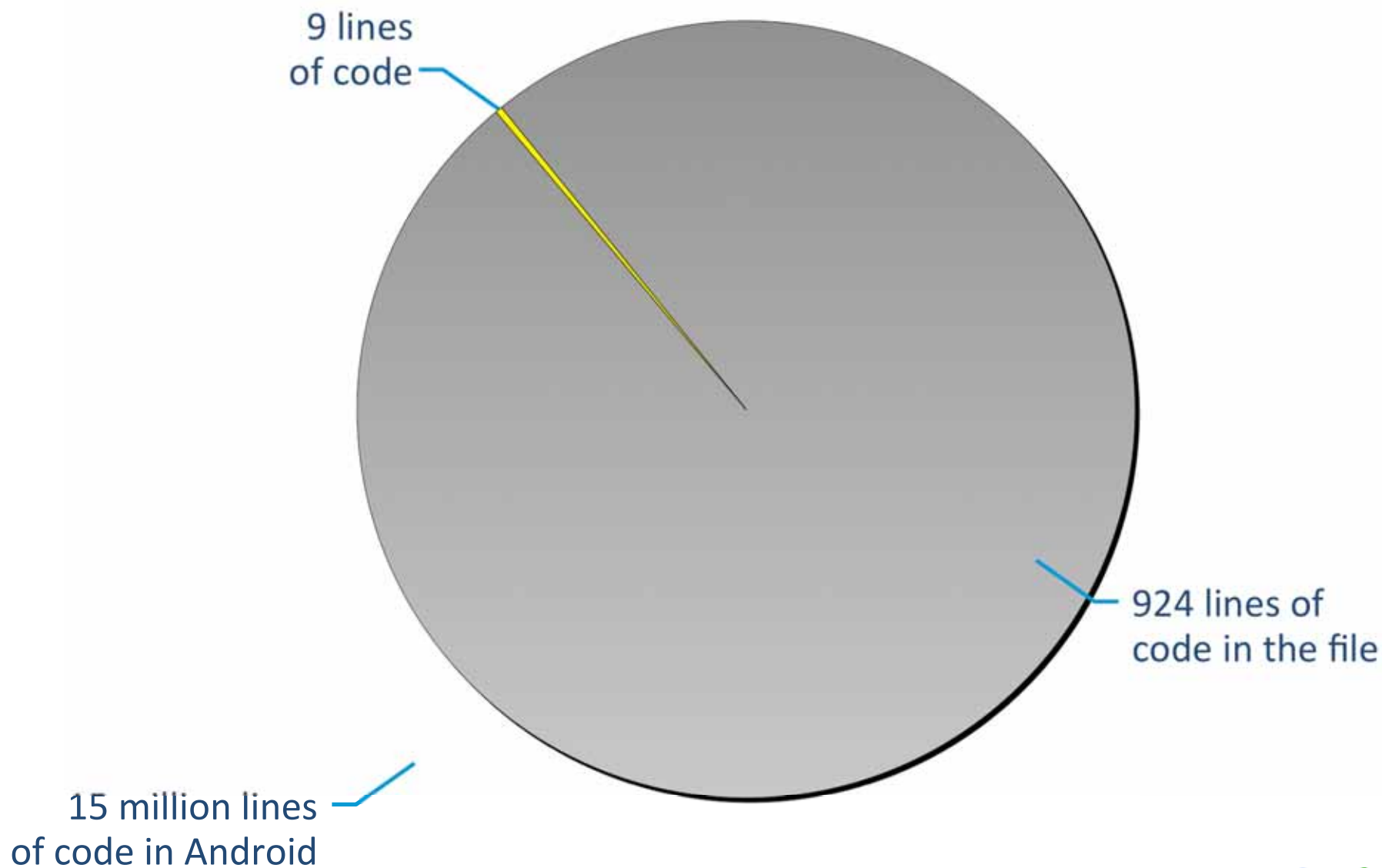
```
public InputStream getInputStream(ZipEntry
entry) throws IOException {
    entry = getEntry(entry.getName());
    if (entry == null) {
        return null;
    }
    ...
}
...

```

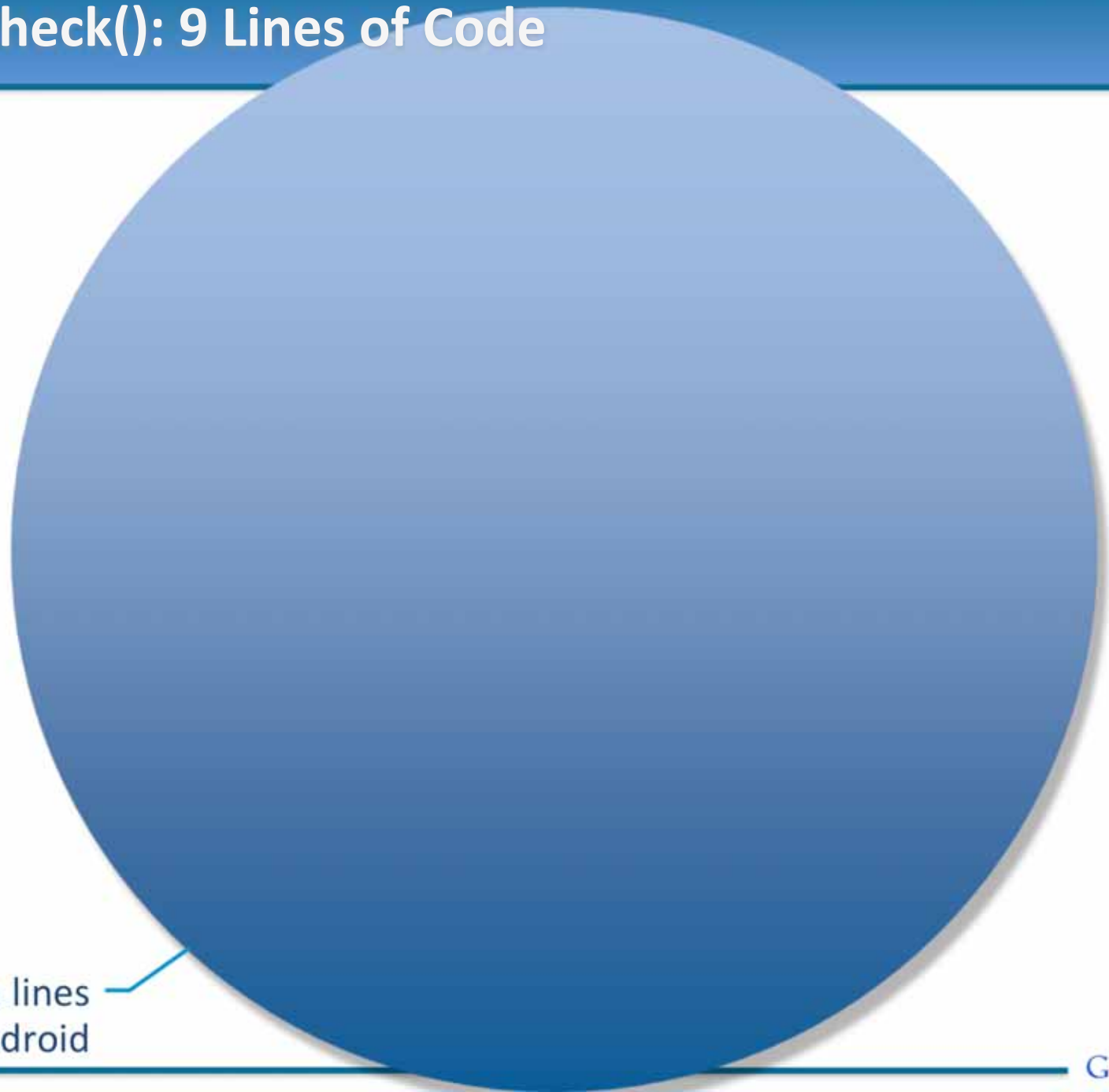
TX 2392

Rebuttal Expert Report of Dr. Owen Astrachan, ¶30

rangeCheck(): 9 Lines of Code



rangeCheck(): 9 Lines of Code



15 million lines
of code in Android



Iain Cockburn
Oracle Expert Witness

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Late-2007: Sun Publicly Applauds Android



MONDAY NOV 05, 2007

Congratulations Google, Red Hat and the Java Community!



I just wanted to add my voice to the chorus of others from Sun in offering my heartfelt congratulations to Google on the announcement of their new Java/Linux phone platform, Android. Congratulations!

I'd also like Sun to be the first platform software company to commit to a complete developer environment around the platform, as we throw Sun's **NetBeans** developer platform for mobile devices behind the effort. We've obviously done a ton of work to support developers on all Java based platforms, and were pleased to add Google's Android to the list.

Jonathan Schwartz
Sun's Chief Executive Officer

TX 2352

Late-2007: Sun Publicly Applauds Android



And needless to say, Google and the Open Handset Alliance just strapped another set of rockets to the community's momentum - and to the vision defining opportunity across our (and other) planets.



And in the spirit of offering congratulations, I'd like to offer a similar shout out to our friends at Red Hat Linux - who today announced their support for the OpenJDK project. With friends like Google and Red Hat, it sure seems like the momentum behind Java's on the rise...



Jonathan Schwartz
Sun's Chief Executive Officer

Late-2007: Sun Offers its Support for Android



- > -----Original Message-----
- > From: Jonathan.Schwartz@sun.com [mailto:Jonathan.Schwartz@sun.com]
- > On Behalf
- > Of Jonathan Schwartz
- > Sent: Friday, November 09, 2007 10:57 AM
- > To: Eric Schmidt
- > Subject: android
- >
- > Let us know how we can help support your announcements next week -
- > we're
- > happy to do so.
- >
- > Jonathan
- >



Jonathan Schwartz
Sun's Chief Executive Officer

June 2009: Ellison Vows to Give Java to the World



Larry Ellison
Oracle CEO

"Sun, has done a fantastic job, uh, invent-inventing Java, uh, expanding Java, opening up Java, giving Java to the world. And we're going to do more of the same."

TX 2041 at GOOGLE-00-00001732-33

June 2009: Ellison Praises Android



Larry Ellison
Oracle CEO

"I'm reading a lot, uh, in the newspaper about, uh, you know, uh, devices based on Java that are Android devices, which is very exciting. You know, we're flat uh, I guess everyone should be flattered. ...I think we can see lots and lots of Java devices, some coming from our friends at Google."

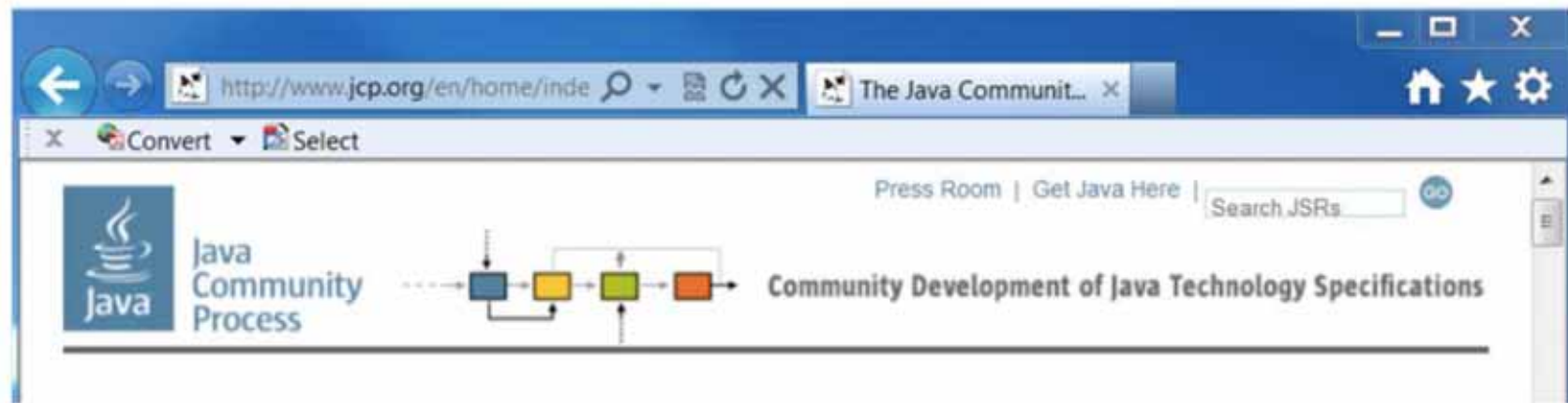
TX 2041 at GOOGLE-00-00001732-33

Key Points of Evidence



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And Participate In The Java Community Process



NORDSTROM

ORACLE



NORTEL



Sony Ericsson

Bank of America



SONY



NOKIA



CREDIT SUISSE



Panasonic



vmware

Sun's Failed Efforts to Build a Java Platform for Smartphones



TX 2200



TX 2199



TX 2969

April 2009: Enter Oracle



Larry Ellison

Oracle's Failed Attempt to Create Smartphone

From: Lawrence Ellison <larry.ellison@oracle.com>
Sent: Friday, May 22, 2009 9:53 PM
To: Scott McNealy <scott.mcnealy@sun.com>
Cc: larry.ellison@oracle.com; safra.catz@oracle.com; charles.phillips@oracle.com
Subject: RE: [Fwd: Status of Apple JVM]

Scott,

I think the best way to increase Java revenue is to build a mobile phone applications suite on top of JavaFx which will make Apple's iPhone a direct competitor of ours. We would then license the Java Phone software to carriers like Verizon

Sorry you did not see the Java Phone. It is a separate issue. We are working on it. We are not sure if the iPhone needs a response and the Java Phone is it. We should be able to get at least 10-15 per phone plus lots more for the provisioning, content management and being server-side software.

Because Apple is destined to become a major competitor, I think we should be very careful working with Apple on things like Blurry we get access to the Mac and iPhone in return.

Larry

-----Original Message-----

From: Scott McNealy [mailto:Scott.McNealy@Sun.COM]

Sent: Friday, May 22, 2009 8:54 PM

To: Lawrence Ellison

Subject: [Fwd: Status of Apple JVM]

Sorry we missed connecting on the phone today.

FYI re Apple below.

Maybe you, me and Dave should have dinner sometime

and just chat about stuff.

Scott

-----Original Message-----

Subject: Status of Apple JVM

Date: Thu, 21 May 2009 09:53:27 -0700

From: Anil Gade <Anil.Gade@Sun.COM>

To: Scott McNealy <Scott.McNealy@Sun.COM>

CC: Brian Sulphur <Brian.Sulphur@Sun.COM>, Jeet Kaul <jeet.kaul@sun.com>

References: <E7FE783C-1A0B-4224-AC10-9114895B79EC@Sun.COM>

Scott: here is the short update on the Apple JVM relationship you asked for.

1. Apple has a license from Sun to create and ship their own compatible JVM. I believe this is because they have always wanted to build and own their own.
2. Their current official shipping release is actually 6u7. They have released 6u13 as a developer release a few weeks ago and they are waiting for the next update of macOS to get that release to go out. We do not have a date for that. (Our next update is v14 which we officially announce at Java One)
3. We have offered to build a JVM for them just as we do for



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TX 02042

Oracle's Failed Project -- Java Phone



TX 2044 at OAGOOGL0006624738

Internal Oracle Presentation: “Project Java Phone: Strategy & Product Definition”

June 2009

Organizational Model

Options & Recommendation

FAILED

- Issues
 - Problem 1: Very short time to market
 - Problem 2: Many interlinked decisions & deliverables
 - Problem 3: Very limited internal expertise to make smart decisions
 - Problem 4: Each decision affects others and overall cost & price
 - Problem 5: Delays have significant impact on successful delivery

▪ Problem 3: Very limited internal expertise to make smart decisions

- Note 4: Move Development function for Java Store to this team
- Note 5: Have this team own pricing, packaging, specifications, revenue sharing structure & model + other aspects of the business
- Have Superstar Lead report directly to LJE to speed decision making
- Next Steps
 - Have identified 3-4 Star Teams with their Key Leads
 - Recommend: Possibly have Corp Dev reach the key individuals

Oracle Restricted and Confidential

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TX 2044 at OAGOOGL0006624759

Ellison: Tried to Sell Oracle's Java VM to Google



Larry Ellison
Oracle CEO

- "Q. What was the business proposition? Did you want Google to replace its virtual machine with a Java machine? Is that what you said?
- A. The prime — yeah, we wanted — we wanted to demonstrate — we thought we could demonstrate that our JVM would boot faster, run faster, use less power, do all of those things, and we would then have a joint project with Google where we could save them money and deliver better technology, you know, if — and there would be one and only one Java."

Key Points of Evidence



- Sun gave the Java language to the public
- Google built Android using free and open technologies
- Sun publicly approved Android's use of Java
- Google made fair use of the Java language APIs in Android