Lucky Seven

Die Java Plattform Strategie

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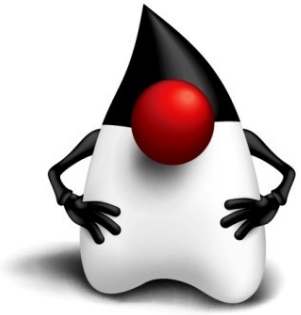
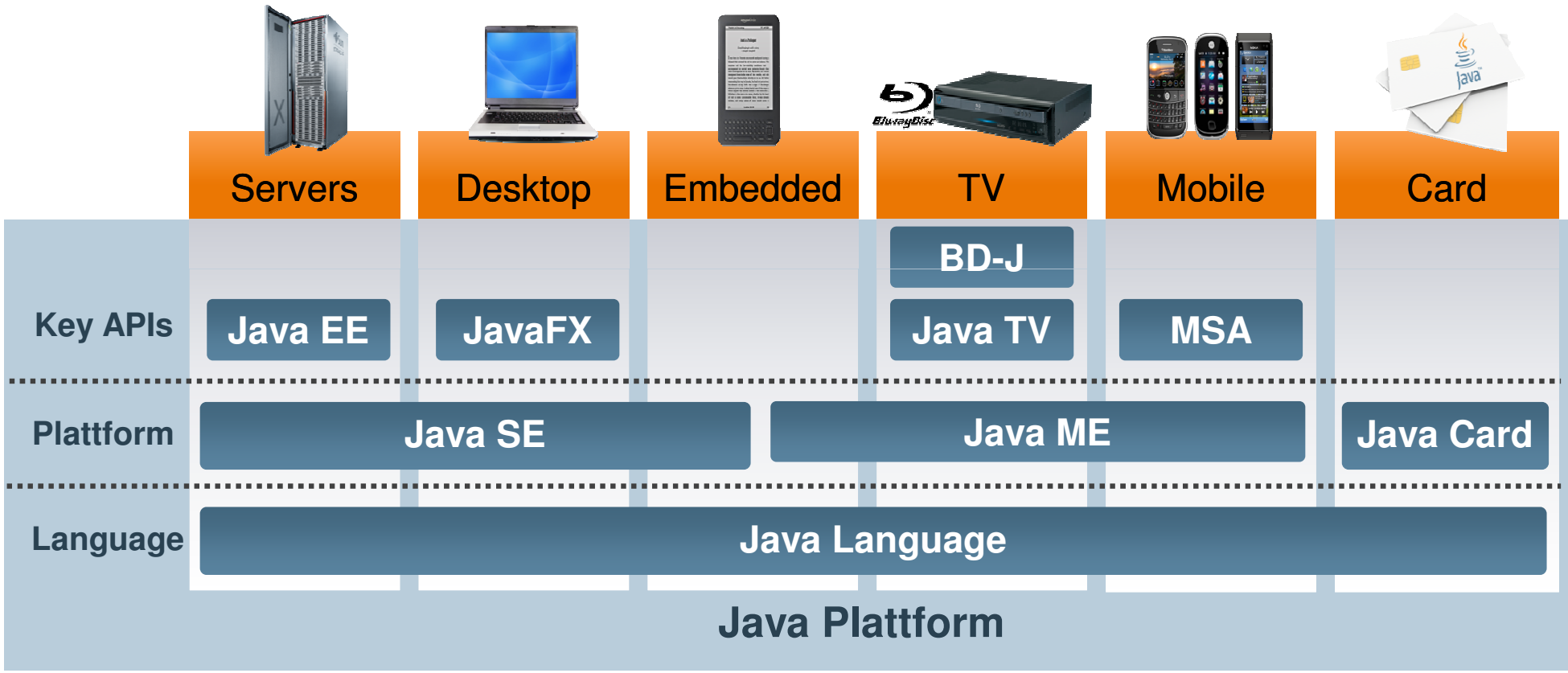
Java Technologie und Architektur



Die Java Plattform



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Was die Zukunft bringt

- Java Strategie Treiber
- Java Community
- JDK 7 Review
- JDK 8 und darüber hinaus
- Entwicklungsumgebung
- JavaFX & Java ME
- Java EE

Java Strategie

- **Höchste Priorität für Java!**
  - Zunehmendes Investment in die Plattform
  - Kontinuierliche Bewegung in Richtung ”free & open” (OpenJDK)
  - Verbesserter Support für Entwickler Community, Open Source Community und JCP
- **Niedrigere Priorität: Direkter Umsatz mit Java**
  - Support für Oracle Software und Hardware
  - Mehrwert auf Basis der Java Plattform, Enterprise Support

Bisher ausgelieferte Technologie

	Verfügbarkeit
Java SE	☑ **JDK 7 for Mac OS X Developer Preview** ☑ JDK 7 ☑ JRockit released gratis under same license as JDK
Java EE	☑ GlassFish 3.1.1 ☑ Java EE 7 specification development underway
Java FX	☑ Java FX 2.0 ☑ Java FX 2.0 for Mac OS X Developer Preview
Java ME/ Embedded	☑ Oracle Java Wireless Client 3.0 ☑ Oracle Java Embedded Client 1.0 ☑ Java SE for Embedded 7 ☑ Java ME SDK 3.0.5 and LWUIT 1.5

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Einige Pläne wurden bereits verwirklicht und neue Projekte gestartet

JDK 7

- Available for Windows, Linux, Solaris, embedded platforms
- Mac OS X Developer Preview released

JVM Konvergenz

- Initial JRockit/HotSpot Konvergenz in JDK 7
- JRockit released under ”gratis” JDK license (BCL)

Open Source

- OpenJDK official Java SE 7 Reference Implementation
- OpenJDK project initiated for JDK 8

JVM Strategie: HotSpot und JRockit Konvergenz

- JRockit und HotSpot werden in einem mehrjährigen Prozess zu einer einheitlichen JVM verschmolzen:
  "HotRockit"
  - unter Berücksichtigung der besten Funktionsmerkmale beider JVM´s
- Die Arbeitsergebnisse wurden inkrementell zum OpenJDK zugeführt
  - JRockit Performance Funktionalität - Bereits im JDK 7
- Ziele
  - Maximale Performance und Skalierbarkeit
  - Multi-Core und Parallelisierungs Optimierungen
  - Feingranulares Monitoring, Profiling und Management
  - Extrem effiziente Garbage Collection

HotRockit Converged JVM (1)

JCMD Command Line utility to enumerate and send commands to running JVMs - ***JDK 7 Time Frame***

JMX Agent Update - ***JDK 7 Time Frame***

Java Discovery Protocol JDP - ***JDK 7 Update Time Frame***

- Multicasting heartbeat for JVM services
- Used to discover manageable JVMs on the network
- Also to discover JVM's no longer running
- Normally used with the JMX management agent

MBean Updates - ***JDK 7 Time Frame***

- Many MBeans from JRockit's JMXMAPI Ported
- Means better support for Hotspot in the Mission Control Console
- Examples:

```
getJVMGeneratedCPULoad();    getAllocatedBytes(long[] threadIDs)
getInvocationCount(MethodID id);      getTiming(MethodID id)
DiagnosticCommandMBean;               PerfCounterMBean
```


HotRockit Converged JVM (2)

No More Perm-Gen - *JDK 7 Time Frame*

- Perm-gen will be removed
- Will use native memory and allocate as needed
- No need to decide the required size up front
- No need for tuning

Java Flight Recorder - *Update to JDK 7*

- Always on
- Very low overhead
- Dump data anytime
- Go back in time to see what lead up to a problem

Memleak Server - *JDK 8 Time Frame*

- Low overhead memory analyzer
- In-situ analysis

Other Improvements - *After JDK 8 Time Frame*

- Deterministic GC (Soft real-time GC; Pause time target)
- Compiler optimizations
- Smaller object headers

Evolutionäre Weiterenwicklung der Sprache

- **Langzeit Perspektive (20+ Jahre)**
  - Ideen reifen in ausgeprägten experimentellen Sprachen
  - Abwärtskompatibilität bleibt extrem wichtig für die Sprache
- **Periodische Anreicherung von ausgewählter Funktionalität**
  - Verbesserte Entwicklerproduktivität
  - Bewahrt Klarheit und Einfachheit

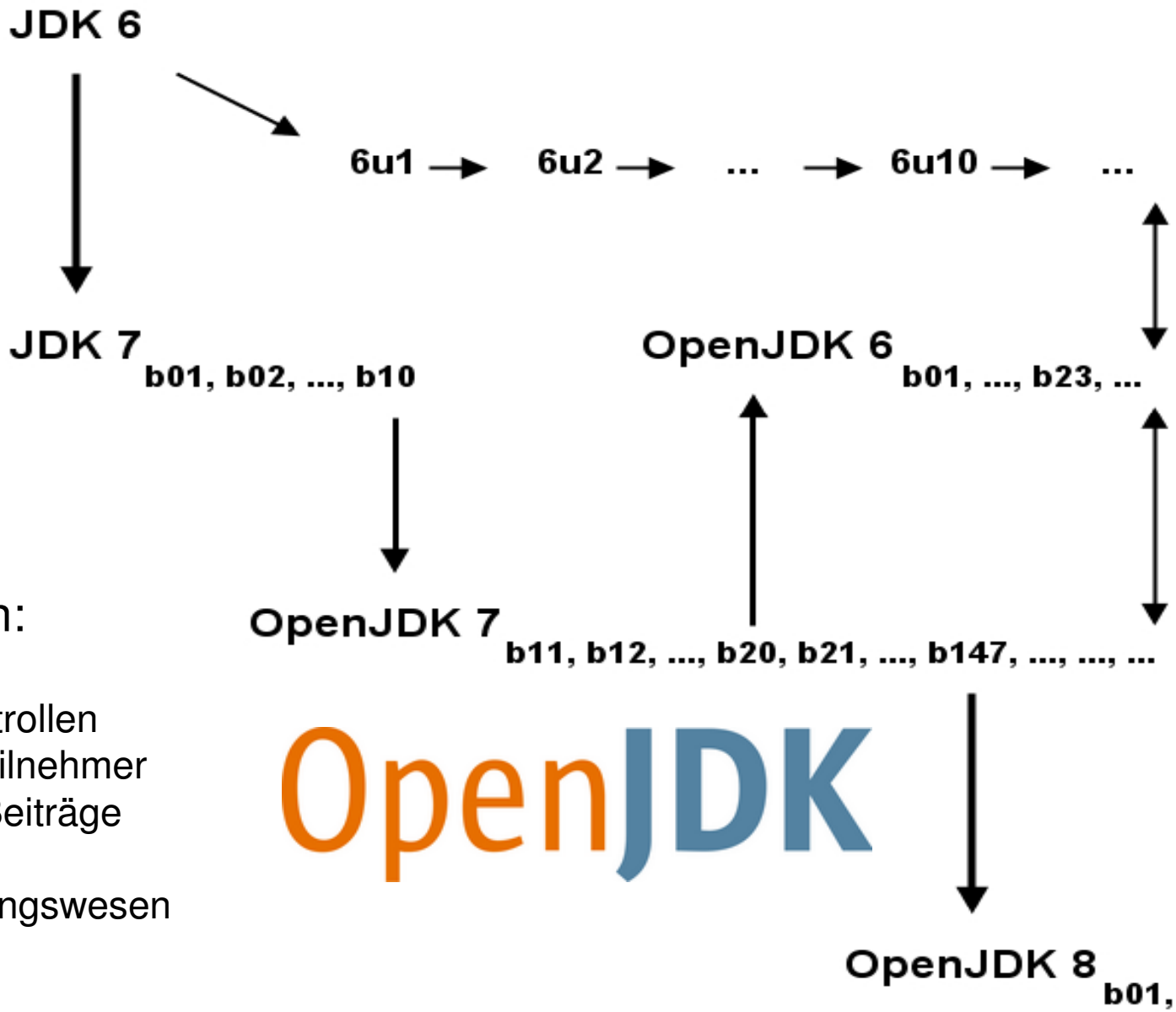
Teilnahme erwünscht!

OpenJDK

- Oracle verpflichtet sich zur besten Open-Source Java Implementation
- Ziel der neuen OpenJDK Richtlinien
  - Fördern vom langfristigen Bestand & Wachstum der Community
  - Basis für offene, transparente und leistungsbezogene Aktivitäten der Mitglieder
- Neue OpenJDK Releases
  - Liste der Features unter openjdk.java.net/projects/jdk7/features
- Software-Hersteller beteiligen sich:



OpenJDK Stammbaum

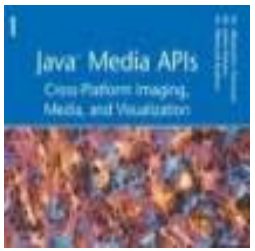


OpenJDK Richtlinien:

- Rollen & Gruppen
- Gruppenrollen & Projektrollen
- Projekte & OpenJDK Teilnehmer
  - Bug-Fixing & Code-Beiträge
- Governing Board
- Reporting & Entscheidungswesen
- Abstimmung

JCP wird reformiert: JSR-348

- Mehr Entwickler im Executive Committee
  - SOUJava
  - Goldman Sachs
  - London JavaCommunity
- JCP startet ein Programm zur Reform
  - JSR 348: Towards a new version of the JCP



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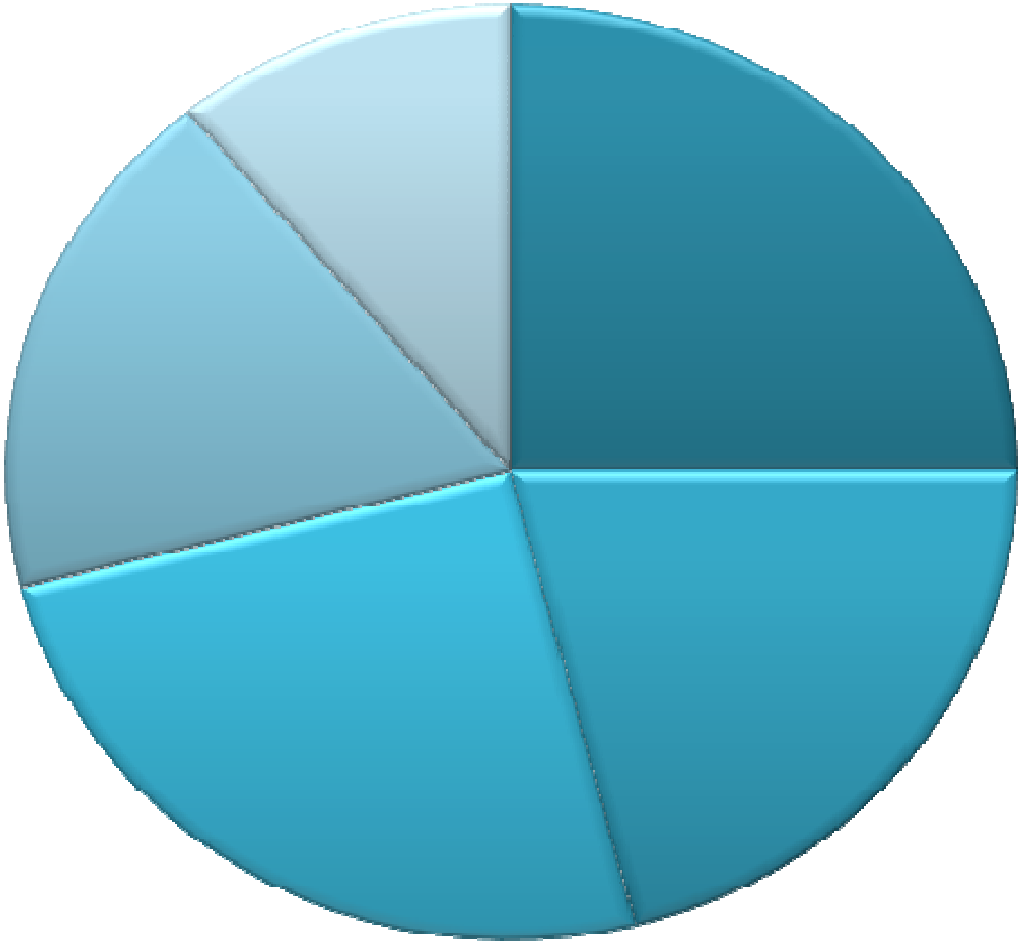
Zusammenarbeit mit der Community

	Aktivitäten
OpenJDK	☑ IBM, Apple, SAP, Azul join OpenJDK ☑ OpenJDK community bylaws ratified ☑ OpenJDK becomes official Java SE 7 Reference Implementation ☑ JVM Language Summit held July 2011 ☑ OpenJDK Twitter feed launched with thousands of followers
JCP	☑ JSR for Java SE 7 passed & JSR for Java SE 8 submitted & in process ☑ SouJava, London JUG elected to JCP Executive Committee ☑ JSR 348 in process for greater transparency ☑ JSR 342 submitted for Java EE 7 platform
JUGs	☑ Oracle lead bi-weekly JUG leaders call ☑ Oracle lead JUG leader summit January 2011 ☑ Over 250 JUGs from 50+ countries involved in JDK 7 launch

Wird Java 7 eingesetzt?

Umfrage auf java.net: "*Have you tried out Java 7 yet?*"



- Yes, and I`m working with it regulary (25%)
- I`ve experimented with it a bit (21%)
- I plan to get started with Java 7 soon (25%)
- I`m waiting for a bug fix release (18%)
- No, and I don´t plan to (11%)

JDK 7 Update Releases

Fehlerbereinigung

OpenJDK

- Projekt entwickelt Updates für JDK 7
- Sponsor ist die Build Group
- Mailing Liste lautet jdk7u-dev
  - Technische Diskussion zum JDK 7 Updates Projekt
  - Archive vorhanden
  - Nachrichten an alle Teilnehmer verschicken:
    - jdk7u-dev@openjdk.java.net
  - jdk7u-dev Subscription
- **Java SE 7 Update 2 Developer Preview Releases**
  - **Liste der Änderungen im aktuellen JDK 7u2 build b11**
  - **Projekt Feedback Forum für Java SE Snapshots**
  - **Report a Bug oder Request a Feature**

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JDK 7 Funktionsumfang

- Coin – Kleine Sprachverbesserungen (JSR 334)
- Dynamic Language Support (JSR 292)
- Concurrency und Collections Updates (JSR 166y)
- Netzwerk und File System (JSR 203)
- Sicherheit
- Internationalisierung
- Weitere Verbesserungen
- JVM Konvergenz

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Strings in Switch Statements

```
int monthNameToDays(String s, int year) {
  switch(s) {
    case "April": case "June":
    case "September": case "November":
      return 30;

    case "January": case "March":
    case "May": case "July":
    case "August": case "December":
      return 31;

    case "February”:
      ...
    default:
      ...
```


Diamond Operator

- Pre-generics

```
List strList = new ArrayList();
```

- With Generics

```
List<String> strList = new ArrayList<String>();
List<Map<String, List<String>> strList =
  new ArrayList<Map<String, List<String>>>();
```

- With diamond (<>) compiler infers type

```
List<String> strList = new ArrayList<>();
List<Map<String, List<String>> strList =
  new ArrayList<>();
```


Copying a File

```
InputStream in = new FileInputStream(src);
OutputStream out = new FileOutputStream(dest);

byte[] buf = new byte[8192];
int n;

while (n = in.read(buf)) >= 0)
  out.write(buf, 0, n);
```


Copying a File (Better, but wrong)

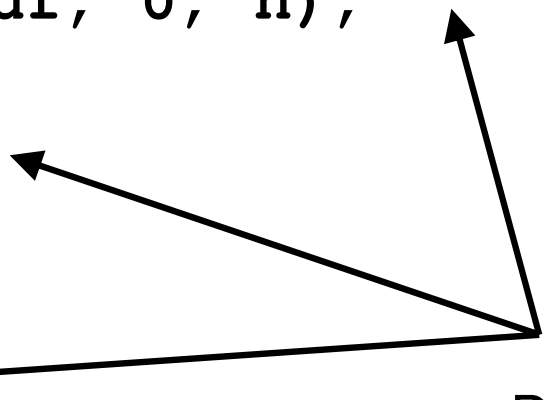
```
InputStream in = new FileInputStream(src);
OutputStream out = new FileOutputStream(dest);

try {
  byte[] buf = new byte[8192];
  int n;
  while (n = in.read(buf)) >= 0)
    out.write(buf, 0, n);
} finally {
  in.close();
  out.close();
}
```


Copying a File (Correct, but complex)

```
InputStream in = new FileInputStream(src);
try {
  OutputStream out = new FileOutputStream(dest);
  try {
    byte[] buf = new byte[8192];
    int n;
    while (n = in.read(buf)) >= 0)
      out.write(buf, 0, n);
  } finally {
    out.close();
  }
} finally {
  in.close();
}
```


Copying a File (Correct, but complex)

```
InputStream in = new FileInputStream(src);
try {
  OutputStream out = new FileOutputStream(dest);
  try {
    byte[] buf = new byte[8192];
    int n;
    while (n = in.read(buf)) >= 0)
      out.write(buf, 0, n);
  } finally {
    out.close();
  }
} finally {
  in.close();
}
```



Exception thrown from potentially three places. Details of first two could be lost

 |

Automatic Resource Management

```
try (InputStream in = new FileInputStream(src),
     OutputStream out = new FileOutputStream(dest))
{
  byte[] buf = new byte[8192];
  int n;
  while (n = in.read(buf)) >= 0)
    out.write(buf, 0, n);
}
```


The Details

- Compiler de-sugars try-with-resources into nested try-finally blocks with variables to track exception state
- Suppressed exceptions are recorded for posterity using a new facility of Throwable
- API support in JDK 7
  - New superinterface **`java.lang.AutoCloseable`**
  - All **`AutoCloseable`** and by extension java.io.Closeable types useable with try-with-resources
  - Anything with a **`void close()`** method is a candidate
  - JDBC 4.1 retro-fitted as **`AutoCloseable`** too

More Informative Backtraces

```
java.io.IOException
        at Suppress.write(Suppress.java:19)
        at Suppress.main(Suppress.java:8)
        Suppressed:  java.io.IOException
            at Suppress.close(Suppress.java:24)
            at Suppress.main(Suppress.java:9)
        Suppressed:  java.io.IOException
            at  Suppress.close(Suppress.java:24)
            at  Suppress.main(Suppress.java:9)
```


Varargs Warnings

```
class Test {
   public static void main(String... args) {
      List<List<String>> monthsInTwoLanguages =
        Arrays.asList(Arrays.asList("January",
                                    "February"),
                      Arrays.asList("Enero",
                                    "Febrero" ));
   }
}
```

```
Test.java:7:  warning:
[unchecked]  unchecked  generic  array  creation
for  varargs parameter  of  type  List<String>[]
         Arrays.asList(Arrays.asList("January",
                       ^
1  warning
```


Varargs Warnings Revised

- New mandatory compiler warning at suspect varargs method declarations
- By applying an annotation at the declaration, warnings at the declaration *and call sites* can be suppressed
- **`@SuppressWarnings(value = "unchecked")`**
- **`@SafeVarargs`**

Lots of Exceptions

```
try {
...
} catch(ClassNotFoundException cnfe) {
   doSomethingClever(cnfe);
   throw cnfe;
} catch(InstantiationException ie) {
   log(ie);
   throw ie;
} catch(NoSuchMethodException nsme) {
   log(nsme);
   throw nsme;
} catch(InvocationTargetException ite) {
   log(ite);
   throw ite;
}
```


Multi-Catch

```
try {
...
} catch (ClassCastException e) {
  doSomethingClever(e);
  throw e;
} catch(InstantiationException |
  NoSuchMethodException |
  InvocationTargetException e) {
log(e);
throw e;
}
```

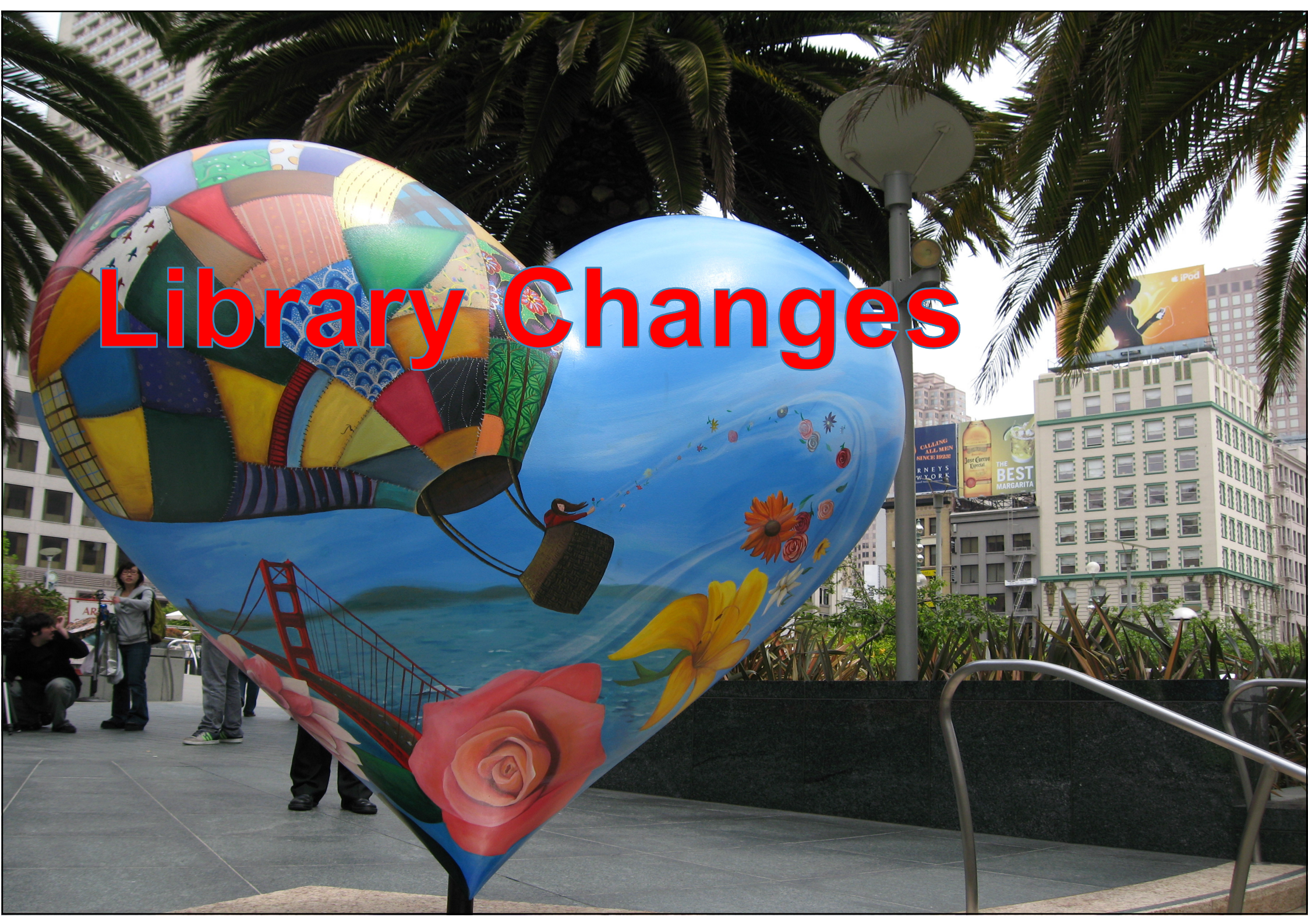

IDE Support

- Beta support in Eclipse
  - http://thecoderlounge.blogspot.com/2011/06/java-7-support-in-eclipse-jdt-beta.html
- IntelliJIDEA 10.5
- NetBeans7.0
  - http://netbeans.org/kb/docs/java/javase-jdk7.html
- Demo

```
37
38
39
40
42
43
44
45
```

Can be replaced with multicatch
--
(Alt-Enter shows hints)

```
            NotFoundException("adasdf");
        } catch (FileNotFoundException fnfo) {
            fnfo.printStackTrace();
        } catch (IOException ioe) {
            ioe.printStackTrace();
        }
```



Library Changes
CALLING ALL MEN SINCE 1923!
THE BEST MARGARITA
iPod

New I/O 2 (NIO2) Libraries

JSR 203

- Original Java I/O APIs presented challenges for developers
- Need something better than java.io.File
  - Doesn't work consistently across platforms
  - No useful exceptions when a file operation fails
  - Missing basic operations (file copy, move, ...)
  - Limited support for symbolic links
  - Limited support for file attributes, performance issues
  - No way to plug-in other file system implementations
- Java NIO2 solves these problems

Java NIO2 Features

- Path is a replacement for File
  - Biggest impact on developers
- Better directory support
- Files
  - Static methods to operate on files and directories
  - Support for symbolic links
- FileStore
  - Represents underlying file storage (partition, concrete file system)
- FileSystem
  - SPI interface to a filesystem (FAT, ZFS, Zip archive, network, etc)
- Access to file metadata

`Path` Class

- Equivalent of **`java.io.File`** in the new API
  - Immutable
- Have methods to access and manipulate **`Path`**
- Supports old libraries
  - Create File from Path using toFile

```
//Make a reference to the path
Path home = Paths.get("/home/fred");

//Resolve tmp from /home/fred -> /home/fred/tmp
Path tmpPath = home.resolve("tmp");

//Create a relative path from tmp -> ..
Path relativePath = tmpPath.relativize(home)

File file = relativePath.toFile();
```


File Operation – Copy, Move

- File copy is really easy
  - With fine grain control

```
Path src = Paths.get("/home/fred/readme.txt");
Path dst = Paths.get("/home/fred/copy_readme.txt");

Files.copy(src, dst,
   StandardCopyOption.COPY_ATTRIBUTES,
   StandardCopyOption.REPLACE_EXISTING);
```

- File move is supported
  - Optional atomic move supported

```
Path src = Paths.get("/home/fred/readme.txt");
Path dst = Paths.get("/home/fred/readme.1st");

Files.move(src, dst, StandardCopyOption.ATOMIC_MOVE);
```


Directories

- DirectoryStream iterate over entries
  - Scales to large directories
  - Uses less resources
  - Smooth out response time for remote file systems
  - Implements **`Iterable`** and **`Closeable`** for productivity
- Filtering support
  - Build-in support for glob, regex and custom filters

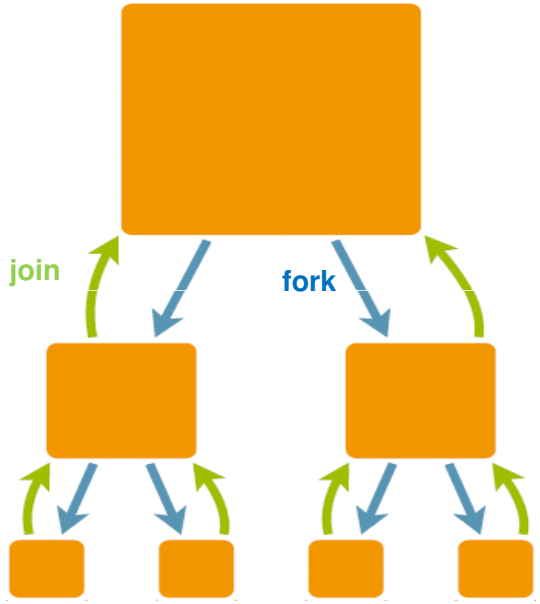
```
Path srcPath = Paths.get("/home/fred/src");

try (DirectoryStream<Path> dir =
   srcPath.newDirectoryStream("*.java")) {
for (Path file: dir)
   System.out.println(file.getName());
}
```


Concurrency APIs

- JSR166y
  - Update to JSR166x which was an update to JSR166
- Adds a lightweight task framework
  - Also referred to as Fork/Join
- **`Phaser`**
  - Barrier similar to **`CyclicBarrier`** and **`CountDownLatch`**
- **`TransferQueue`** interface
  - Extension to **`BlockingQueue`**
  - Implemented by **`LinkedTransferQueue`**

Fork Join Framework

- Goal is to take advantage of multiple processor
- Designed for task that can be broken down into smaller pieces
  - Eg. Fibonacci number fib(10) = fib(9) + fib(8)
- Typical algorithm that uses fork join




```
if I can manage the task
perform the task
else
fork task into x number of smaller/similar task
join the results
```


Key Classes

- **`ForkJoinPool`**
  - Executor service for running **`ForkJoinTask`**
- **`ForkJoinTask`**
  - The base class for forkjoin task
- **`RecursiveAction`**
  - A subclass of **`ForkJoinTask`**
  - A recursive resultless task
  - Implements **`compute()`** abstract method to perform calculation
- **`RecursiveTask`**
  - Similar to **`RecursiveAction`** but returns a result

ForkJoin Example – Fibonacci

```
public class Fibonacci extends RecursiveTask<Integer> {
    private final int number;
    public Fibonacci(int n) { number = n; }

    @Override protected Integer compute() {
        switch (number) {
            case 0: return (0);
            case 1: return (1);
            default:
              Fibonacci f1 = new Fibonacci(number - 1);
              Fibonacci f2 = new Fibonacci(number - 2);
                f1.fork(); f2.fork();
                return (f1.join() + f2.join());
        }
    }
}
```

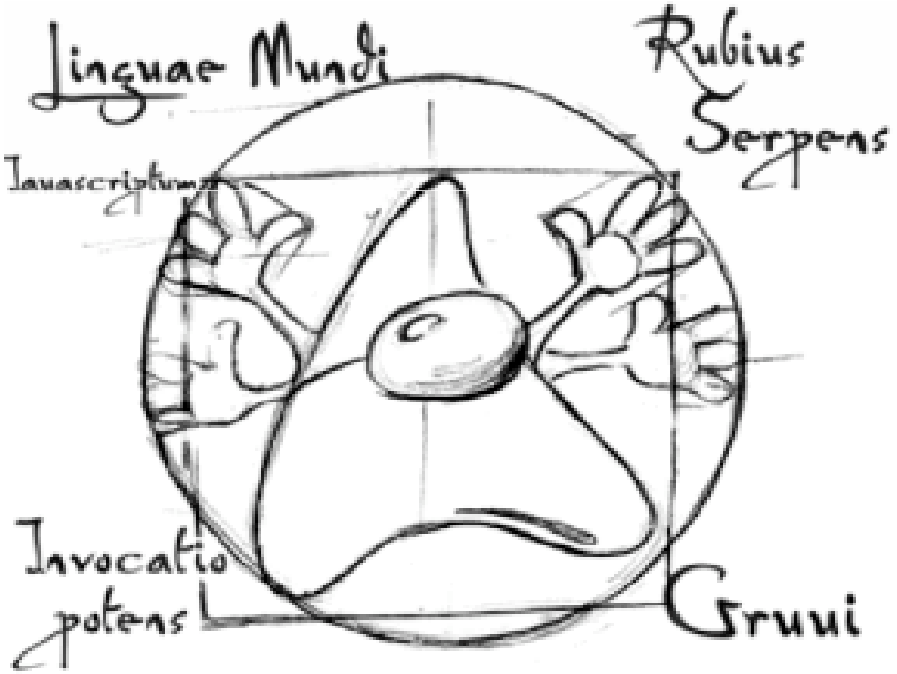

ForkJoin Example – Fibonacci

```
ForkJoinPool pool = new ForkJoinPool();
Fibonacci r = new Fibonacci(10);
pool.submit(r);

while (!r.isDone()) {
//Do some work
...
}

System.out.println("Result of fib(10) = "
   + r.get());
```


ForkJoin Performance Discussion

- Choosing the sequential threshold
  - Smaller tasks increase parallelism
  - Larger tasks reduce coordination overhead
  - Ultimately you must profile your code
- Minimizes overhead for compute-intensive tasks
  - Not recommended for tasks that mix CPU and I/O activity
- A portable way to express many parallel algorithms
  - Reasonably efficient for a wide range of core counts
  - Library-managed parallelism

The DaVinci Machine Project (JSR-292)
(A multi-language renaissance for the JVM)



Languages Like Virtual Machines

- Programming languages need runtime support
  - Memory management / Garbage collection
  - Concurrency control
  - Security
  - Reflection
  - Debugging integration
  - Standard libraries
- Compiler writers have to build these from scratch
- Targeting a VM allows reuse of infrastructure

JVM Specification

"The Java virtual machine knows nothing about the Java programming language, only of a particular binary format, the class file format."

1.2 The Java Virtual Machine Spec.

Languages Running on the JVM

Groovy
JRuby
…
…
Scala
Clojure

InvokeDynamic Bytecode

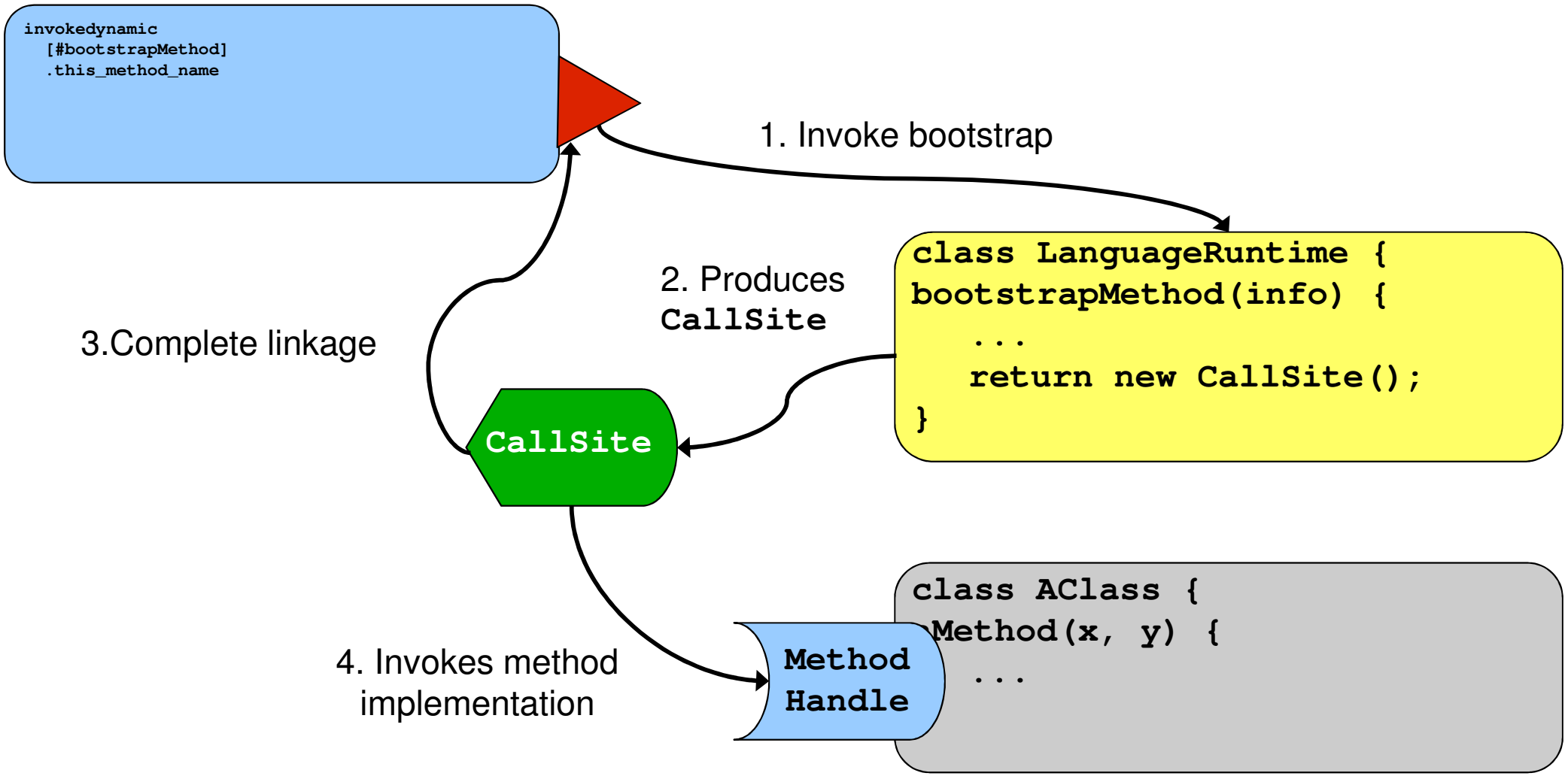
- JVM currently has four ways to invoke method
  - Invokevirtual, invokeinterface, invokestatic, invokespecial
- All require full method signature data
- InvokeDynamic will use method handle
  - Effectively an indirect pointer to the method
- When dynamic method is first called bootstrap code determines method and creates handle
- Subsequent calls simply reference defined handle
- Type changes force a re-compute of the method location and an update to the handle
  - Method call changes are invisible to calling code

`CallSite` and `MethodHandle`

- **`invokedynamic`** linked to a **`CallSite`**
  - **`CallSite`** can be linked or unlinked
  - **`CallSite`** holder of **`MethodHandle`**
- **`MethodHandle`** is a directly executable reference to an underlying method, constructor, field
  - Can transform arguments and return type
  - Transformation – conversion, insertion, deletion, substitution

`invokedynamic` Step 1-to-4

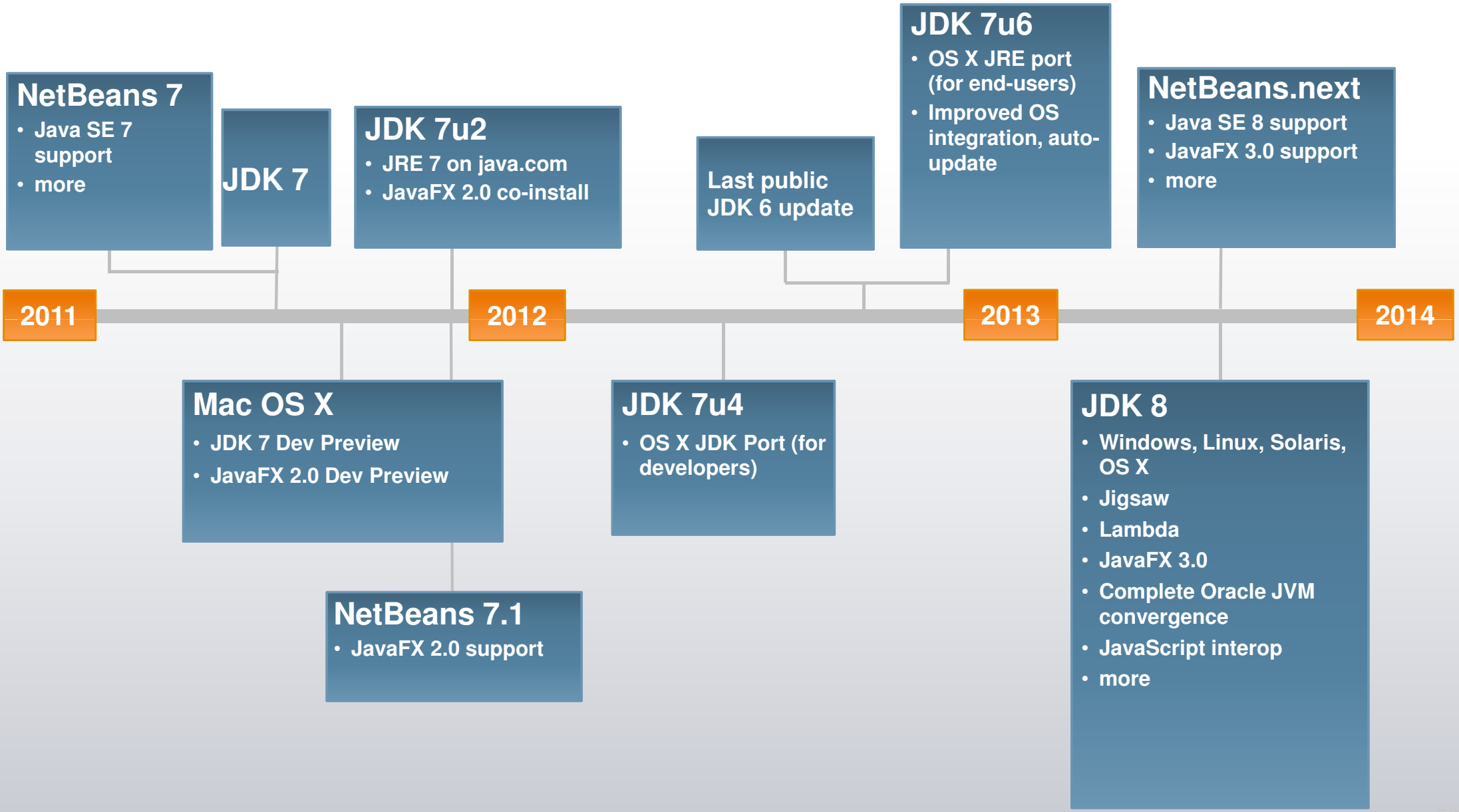
```
this[method_name](x, y)
```



Miscellaneous Things

- Security
  - Elliptic curve cryptography
  - TLS 1.2
- JAXP 1.4.4
- JAX-WS 2.2
- JAXB 2.2
- ClassLoader architecture changes
- `close()` for URLClassLoader
- Javadoc support for CSS

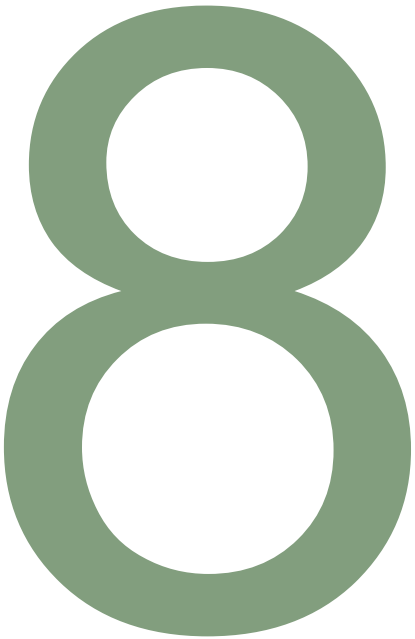
JDK Roadmap


NetBeans 7
• Java SE 7 support
• more
JDK 7
JDK 7u2
• JRE 7 on java.com
• JavaFX 2.0 co-install
Last public JDK 6 update
JDK 7u6
• OS X JRE port (for end-users)
• Improved OS integration, auto-update
NetBeans.next
• Java SE 8 support
• JavaFX 3.0 support
• more
2011
2012
2013
2014
Mac OS X
• JDK 7 Dev Preview
• JavaFX 2.0 Dev Preview
JDK 7u4
• OS X JDK Port (for developers)
JDK 8
• Windows, Linux, Solaris, OS X
• Jigsaw
• Lambda
• JavaFX 3.0
• Complete Oracle JVM convergence
• JavaScript interop
• more
NetBeans 7.1
• JavaFX 2.0 support

JDK 8 geplant für Sommer 2013

- Feedback der Community – **Zwischen den neuen JDK-Versionen werden 2 Jahre Zeit benötigt**
- Release Datum im Sommer 2013 (geändert von 2012)
- Funktionsumfang:
  - Projekt Jigsaw
  - komplette Plattform Modularisierung und Container-Unterstützung
  - Projekt Lambda (JSR 335)
  - JavaScript Interoperabilität
  - Device-Unterstützung
- Weitere kleine Sprachverbesserungen

Projekt Coin Teil 2



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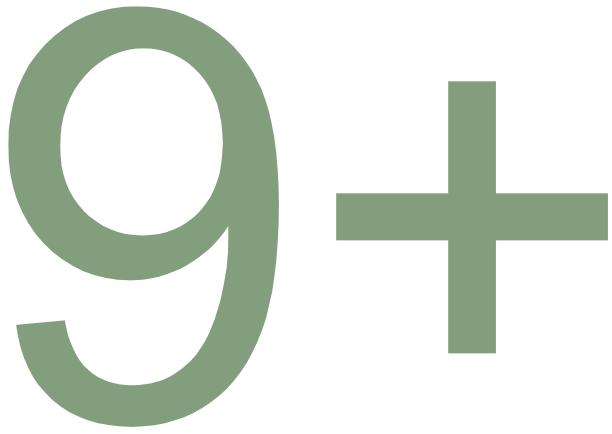
JDK 8 - Sommer 2013

Geplante Inhalte

Thema	Beschreibung/Inhalt
Project Jigsaw	• Module system for Java applications and the Java platform
Project Lambda	• Closures and related features in the Java language (JSR 335) • Bulk parallel operations in Java collections APIs (filter/map/reduce)
Oracle JVM Convergence	• Complete migration of performance and serviceability features from JRockit, including Mission Control and the Flight Recorder
JavaFX 3.0	• Next generation Java client
JavaScript Neu	• Next-gen JavaScript-on-JVM engine (Project Nashorn) • JavaScript/Java interoperability on JVM
Device Support Neu	• Multi-Touch (JavaFX), Camera, Location, Compass and Accelerometer
Developer Productivity	• Annotations on types (JSR 308), Minor language enhancements
API and Other Updates	• Enhancements to Security, Date/Time, (JSR 310) Networking, Internationalization, Accessibility, Packaging/Installation
Open Source	• Open development in OpenJDK, open source additional closed components

JDK 9 und darüber hinaus ..

- Zurück zum Ursprung: Zur tatsächlichen Wirkung der Plattform-Unabhängigkeit von Java
- Verbesserte Interoperabilität mit Non-Java, nativen Sprachen
- Verbesserte Datenintegration von SQL über Name/Value Stores zu Online Feeds
- Verbesserte Device Unterstützung
- Und vieles mehr ... die Arbeiten haben bereits angefangen!



.. die Vision für die Java SE

Interoperability	• Multi-language JVM • Improved Java/Native integration
Cloud	• Multi-tenancy support • Resource management
Ease of Use	• Self-tuning JVM • Language enhancements
Advanced Optimizations	• Unified type system • Data structure optimizations
Works Everywhere and with Everything	• Scale down to embedded, up to massive servers • Support for heterogenuous compute models

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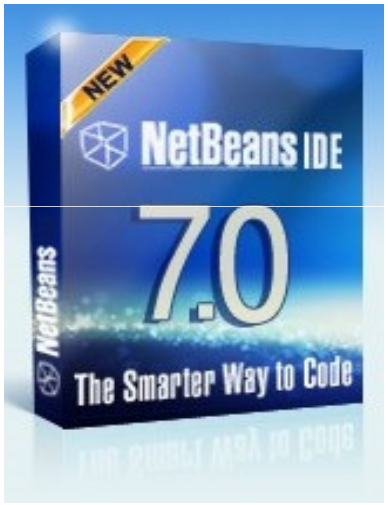
NetBeans IDE 7.0.1 und 7.1beta

- Entwicklungswerkzeug für Desktop, mobile und Web Anwendungen
  - **Java EE 6, Java SE 6 (REST, CDI, JPA), Java SE 7, Swing, Java FX**
    - Java Editor support for Project Coin (Diamond Operator, Strings in switch, Multi-catch)
    - Bulk refactoring of projects and packages to Java SE 7
    - JavaFX 2.0 Full edit/compile/debug cycle support
    - Visual debugging of JavaFX apps
  - Java ME und Embedded
  - PHP, Ruby, Groovy, C / C++
  - HTML5 Editing, JSON Formatter
  - Debugger, Profiler, Refactoring



- Läuft auf MS Windows, Linux, Mac OS X und Solaris
- NetBeans IDE ist open-source und frei verfügbar
- Feature Liste & Builds
  - netbeans.org/community/releases/roadmap.html

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Unterstützung für eclipce IDE

- Eclipse Projekte mit Werkzeugen und Frameworks
- Ganzheitliche Unterstützung vom Software Development Lebenszyklus
  - Modellierung
  - Entwicklung
  - Deployment Werkzeuge
  - Reporting
  - Daten Manipulation
  - Testing und Profiling
- Primärer Fokus zur Entwicklung von Anwendungen
  - Java EE, Web Services und Web Anwendungen
- Eclipse Unterstützung für andere Programmiersprachen
  - C/C++, PHP, andere

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JavaFX 2.0

- **Java/JavaFX als strategische UI für Rich-Client-Applikationen**
- **Einheitliche Applikationsentwicklung für native und Web-Lösungen**
  - Browser Plug-in, Web Start, Native Executables
  - Hardware Accelerated Graphics (DirectX, OpenGL)
  - Nahtloser DOM Zugriff zwischen HTML5 & Java
- **JavaFX 2.0 Plattform Sprachwechsel**
  - Java als native Sprache - anstatt JavaFX Script
  - JavaFX APIs werden in Java implementiert
  - Vorteile bei Verwendung von Generics, Annotations und Multithreading für JavaFX
- **JavaFX 2.0 Release verfügbar**
  - wird bereits vom NetBeans 7.1 Developer Preview unterstützt
  - Migrationspfad für Swing- und SWT-basierte Anwendungen
  - wird Open Source und im JCP standardisiert

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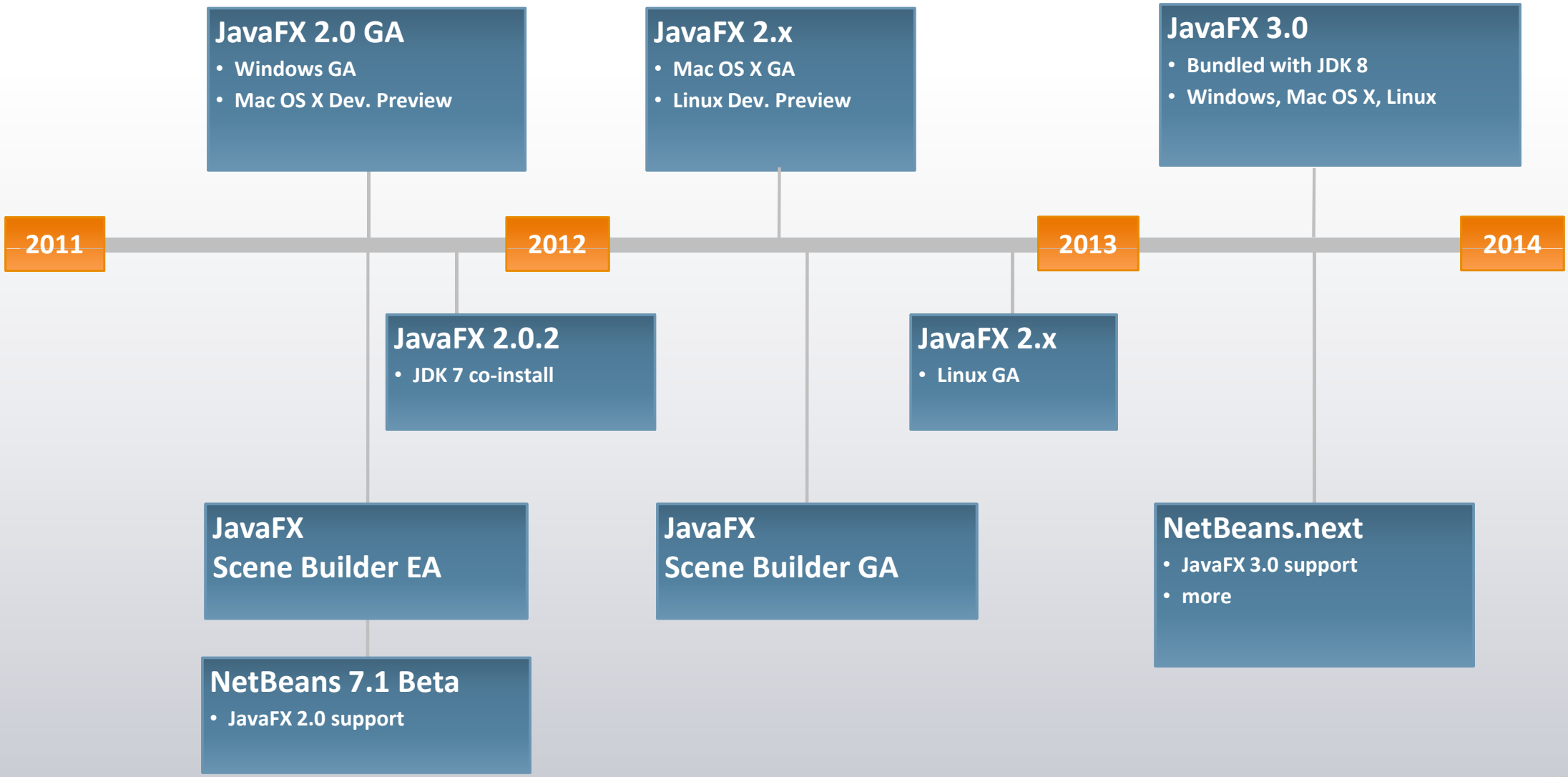
JavaFX Roadmap



Design Ziele für Java ME

Abstand von Java SE zu Java ME verringern

- Synchronize CLDC and JDK releases
- Converge CDC and Java SE Embedded

Volle Einbeziehung vom Embedded Markt

- Java Platform covering all CPU/Footprint variants
- Dedicated APIs for vertical market segments

Tiefgreifende Integration von Content und Services

- Services embedded into Oracle runtimes and tools
- Developer/consumer access to carrier services

Java ME und Java SE rücken näher zusammen

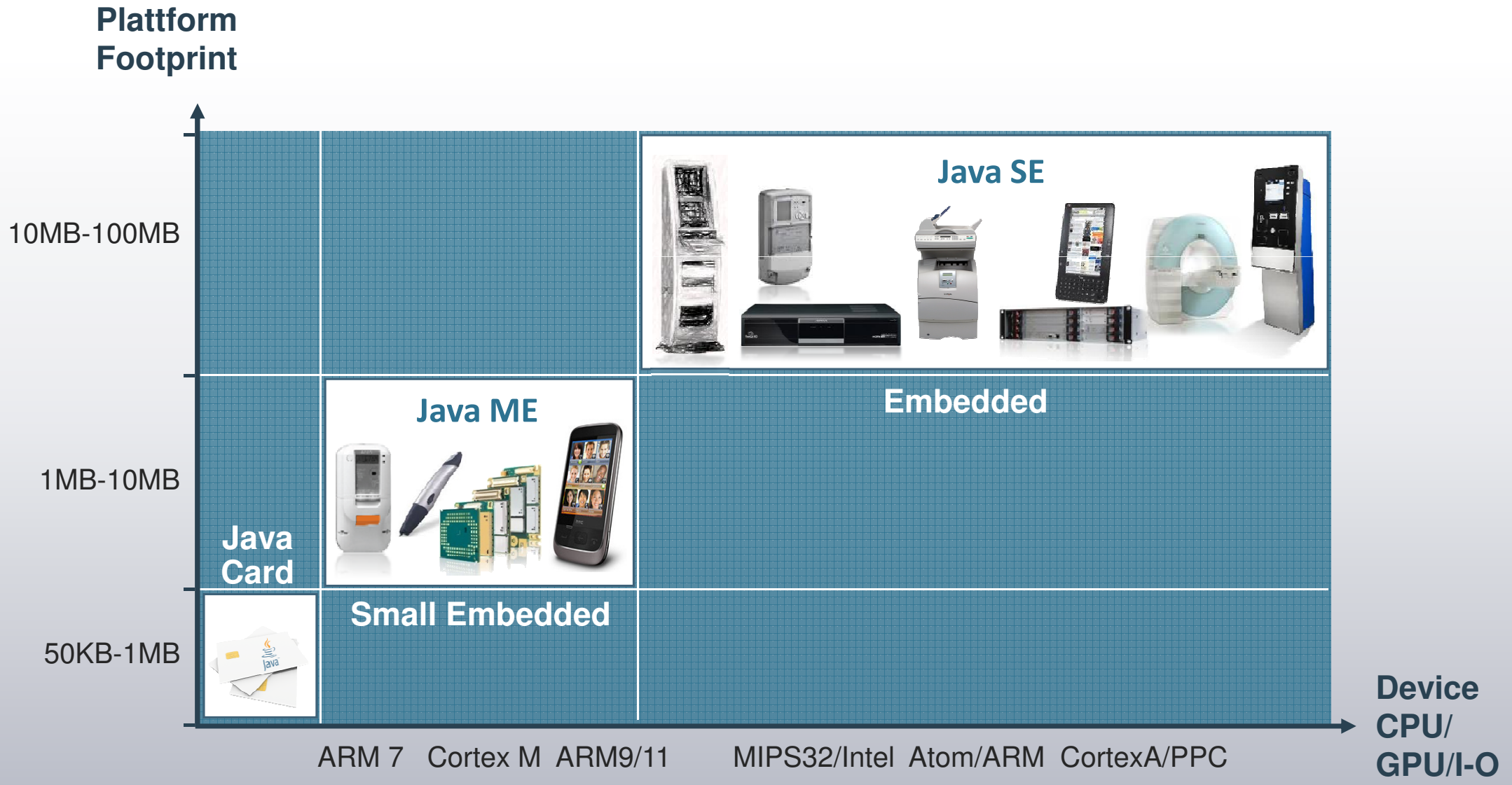
Java ME 7 und Java ME 8

- Java ME alignment with SE
  - Synchronized releases
  - Latest Java language support
  - Java ME APIs can run on Java SE
  - Consistent tool interfaces
- New APIs for mobile phones and billions of connected devices

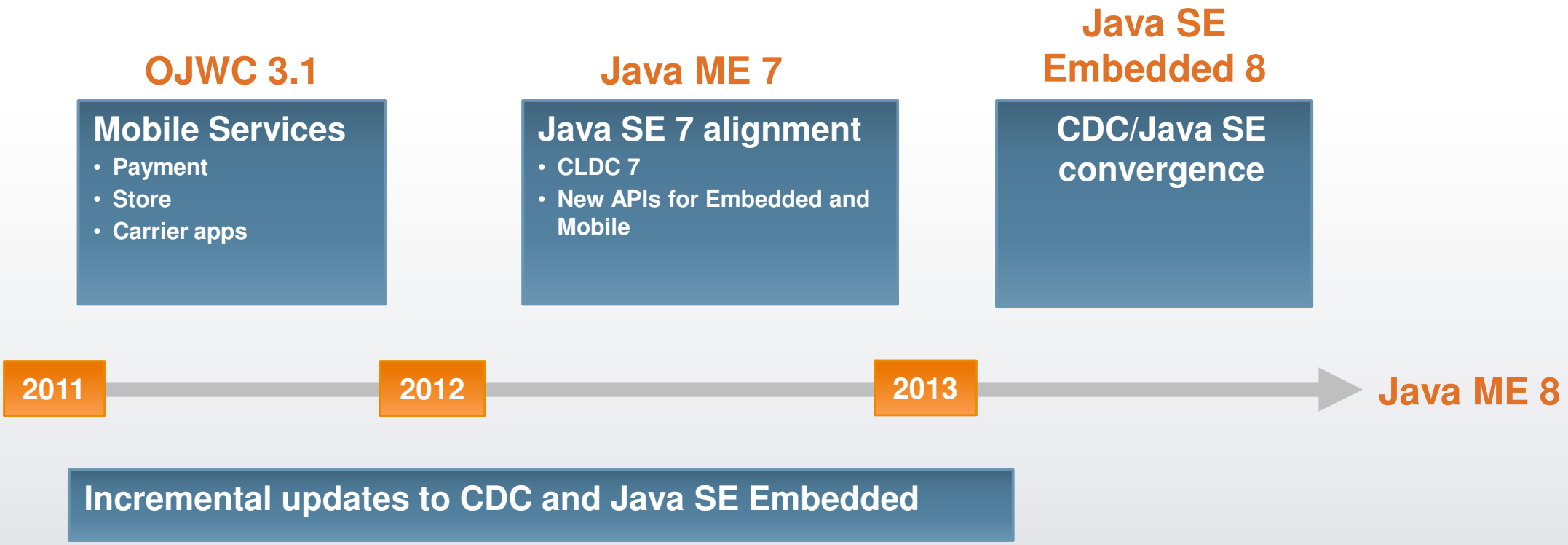
CDC/Java SE 8 Convergence

- "CDC Profile" in SE 8
  - Porting CVM features to Hotspot JVM
  - JDK 8 libraries with smaller and faster variants/subsets
- JavaFX as graphics framework
- Best features and performance from CDC and SE for Embedded

Java Technologie für Embedded Device - 2013



Java ME/Embedded Roadmap



Developer Tools zum Download verfügbar:

- **Java ME SDK 3.0.5**
- **LWUIT 1.5**

Design Ziele für künftige Java EE

Standard zur Entwicklung von Enterprise Anwendungen

Von kleineren Web Anwendungen bis zu hochskalierbaren Multi-tier Enterprise Anwendungen

Verbesserte Produktivität für Enterprise Java Entwickler

Vereinfachtes und umfassendes Programmiermodell

Portabilität: Hersteller- und Infrastruktur-übergreifend

Anpassungsfähig: Einbinden von Non-Java EE Frameworks

Granularität: Unterstützung für modulares Design

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Wie sich die Entwicklung durch die Wolke schrittweise verändert

- **Entwickler für Unternehmensanwendungen wollen Cloud-Lösungen von der eigenen IT-Abteilung**
  - IaaS als neuer “Self-Service Data Center”
  - Unmittelbar, On-Demand Provisioning
  - Hosted, sichere Cloud Services

- **Virtualisierung ist ein wertvoller technischer “Building Block”, aber keine Plattform**
- **Entwickler schauen nach einem PaaS Standard für die nächste Generation Cloud-basierter Anwendungen**
  - Die Java EE Plattform eignet sich als PaaS Standard
- **Java EE hat bereits vergleichbare Herausforderungen für die IT gelöst**

Java EE 7 und Java EE 8 – Themenschwerpunkte

Cloud	Modularität *	HTML5
• Provisioning	• Building on Jigsaw	• Emerging Web Standards require a programming model
• Elastic & Autonomic Scalability	• Focus on OSGi interop	• JSON, WebSockets, off-line, APIs & DOM
• Multi-Tenancy	• Supporting Profiles & Modular Applications	

* Aligning with delivery schedules of Jigsaw in Java SE 8

Java EE 7 – Provisioning

Java EE Vorhandenes Modell

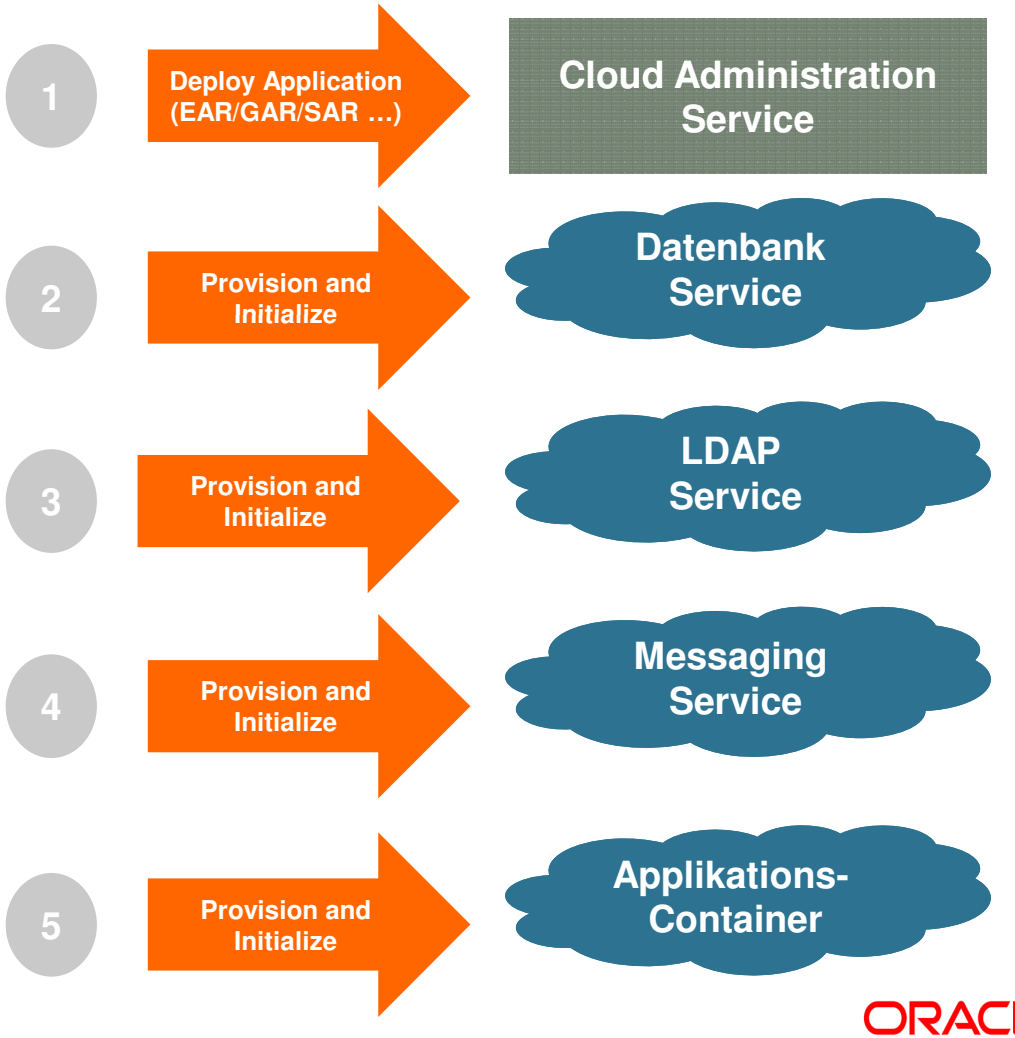
- Konfiguration Java EE Ressourcen – JDBC, JMS, etc.
- Deploy Application Archive (.EAR)

Java EE 7 Modell

- Auto-Provision Services von Application Dependencies
  e.g. Datenbank, LDAP

Extensible Deployment Modelle für Frameworks

- Spring, Seam, etc.



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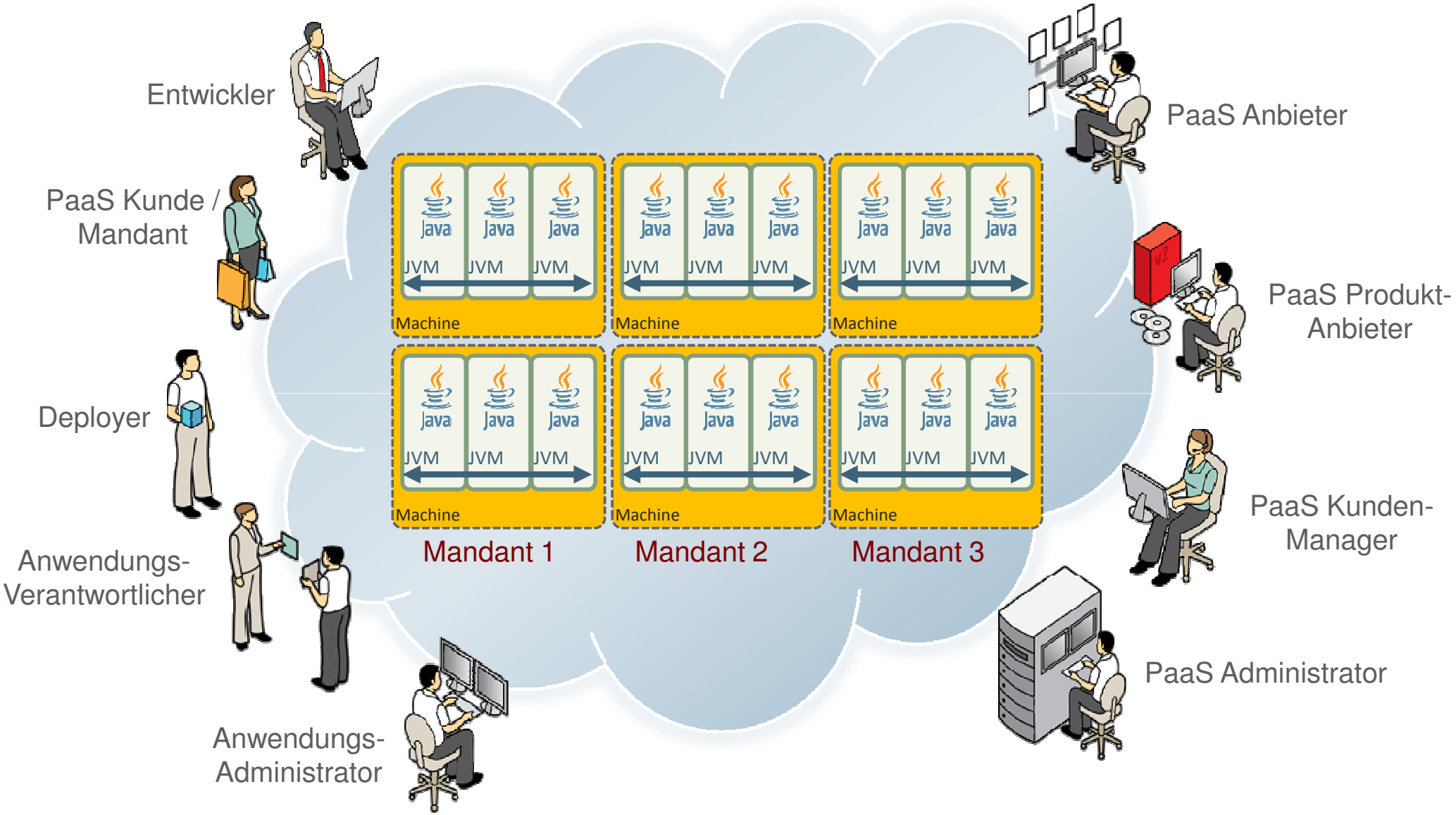
Java EE 7 - Rollenmodell



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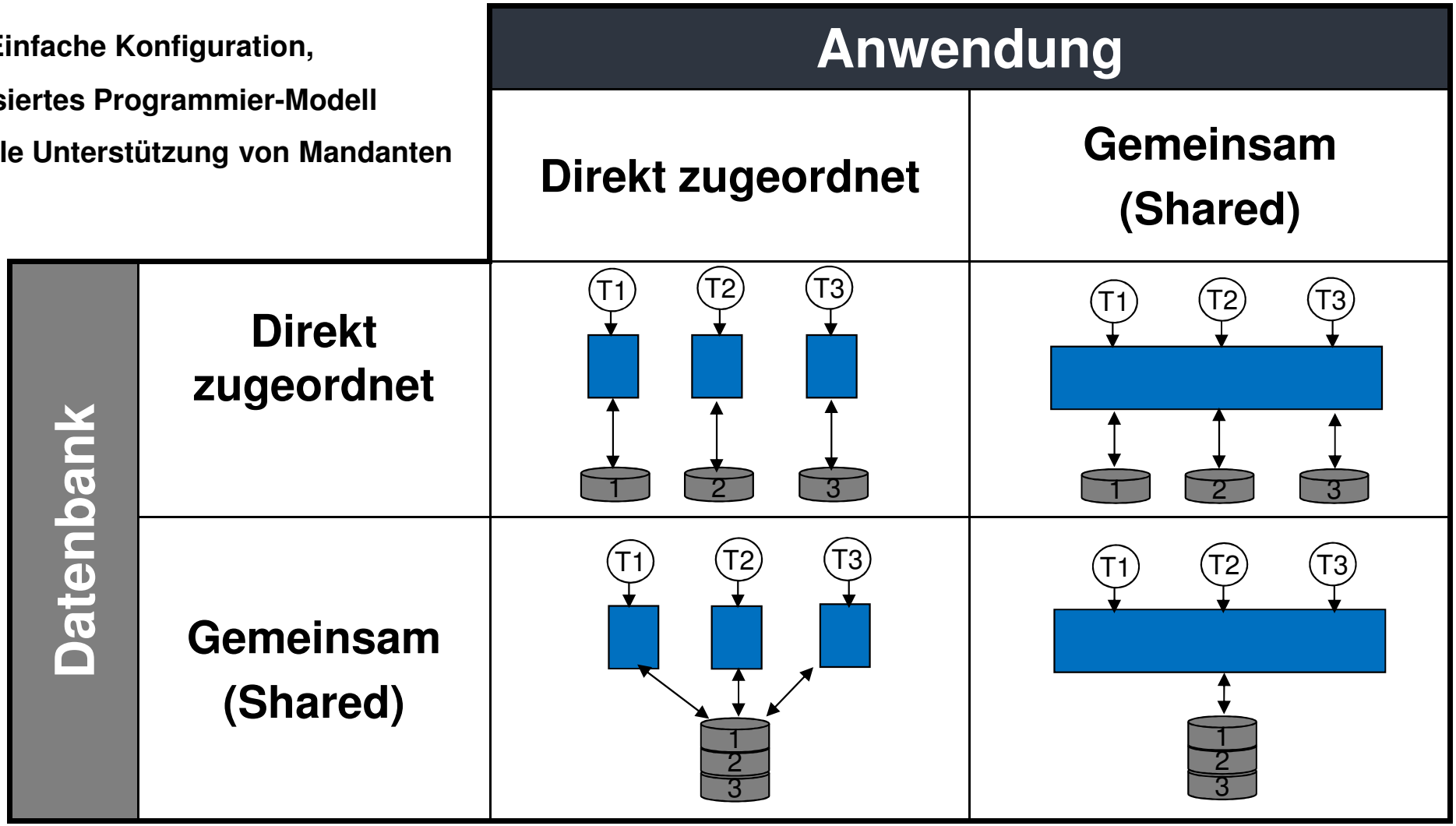
Java EE 7: Persistenz und Mandantenfähigkeit

- **Ziel: Einfache Konfiguration, CDI-basiertes Programmier-Modell**
- **Flexible Unterstützung von Mandanten**



Einzelanwendungs-Deployment mit Unterstützung für unterschiedliche Mandanten-Architekturen (Multi-Tenancy)

Java EE 7 – Geplante Inhalte

Thema	Beschreibung/Inhalt
PaaS Enablement	• Service Definitions and Provisioning to enable Java as Platform as a Service • Enable Multi-tenancy in APIs
Web Profile	• Provide popular additions to the Web Profile including JAX RS 2.0 Support
JMS 2.0	• Simplify the programing model for building messaging based applications • Dependency Injection support
CDI	• Tighter Integration with JSF • Expand scope of container managed transactions • Expanded service metadata and improved configuration
Caching	• Provide APIs for accessing caching systems
Concurrency Utilities	• Support for Java concurrency APIs within the container
Pruning	• Allow vendors to optionaly support older APIs • EJB CMP/BMP, JAX-RPC
Open Source and Transparency	• Open development under project GlassFish on java.net • Java EE 7 JSRs run in open with publicly viewable Expert Group mail archive

Java EE 7 JSRs

- **Plattform 7 / Web Profile 7**
- **JPA 2.1**
- **JAX-RS 2.0**
- **EJB 3.2**
- **JMS 2.0**
- **Servlet 3.1**
- **EL 3.0**
- **JSF 2.2**
- **CDI 1.1**
- **Bean Validation 1.1**
- **JCache 1.0 (JSR 107)**
- **Concurrency Utilities 1.0**
- **State Management 1.0**
- **Batch Processing 1.0**
- **JSON 1.0**
- **Common Annotations 1.2 MR**
- **JAX-WS 2.3 MR**
- **JTA 1.2 MR**
- **JSP 2.3 MR**
- **JASPIC 1.2 MR**

➢ Die Arbeiten an den Java EE 7 JSRs sind öffentlich: siehe java.net
  – http://javaee-spec.java.net
  – Eigenes Projekt pro Spezifikation: jpa-spec, jax-rs-spec, jms-spec, …

Zusammenfassung

- Die Java Plattform nutzt Innovationen im Ökosystem und wird sich weiterentwickeln
- Java Plattform liefert eine echten Mehrwert
- Unternehmen profitieren von existierende Investitionen in Java EE
- Java SE 8 wird einige neue und größere Features beinhalten
- Die Ausrichtung für Java SE 9 läuft bereits

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Vielen Dank für Ihre Aufmerksamkeit!

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