



Welcome JavaME into your everyday life...

Matt Hosanee
Member of Technical Staff
Partner Engineering, Software
Sun Microsystems



Goal of this session.....

JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources

JavaME update

The new & future APIs

2D & 3D wireless gaming

Java Gaming Server

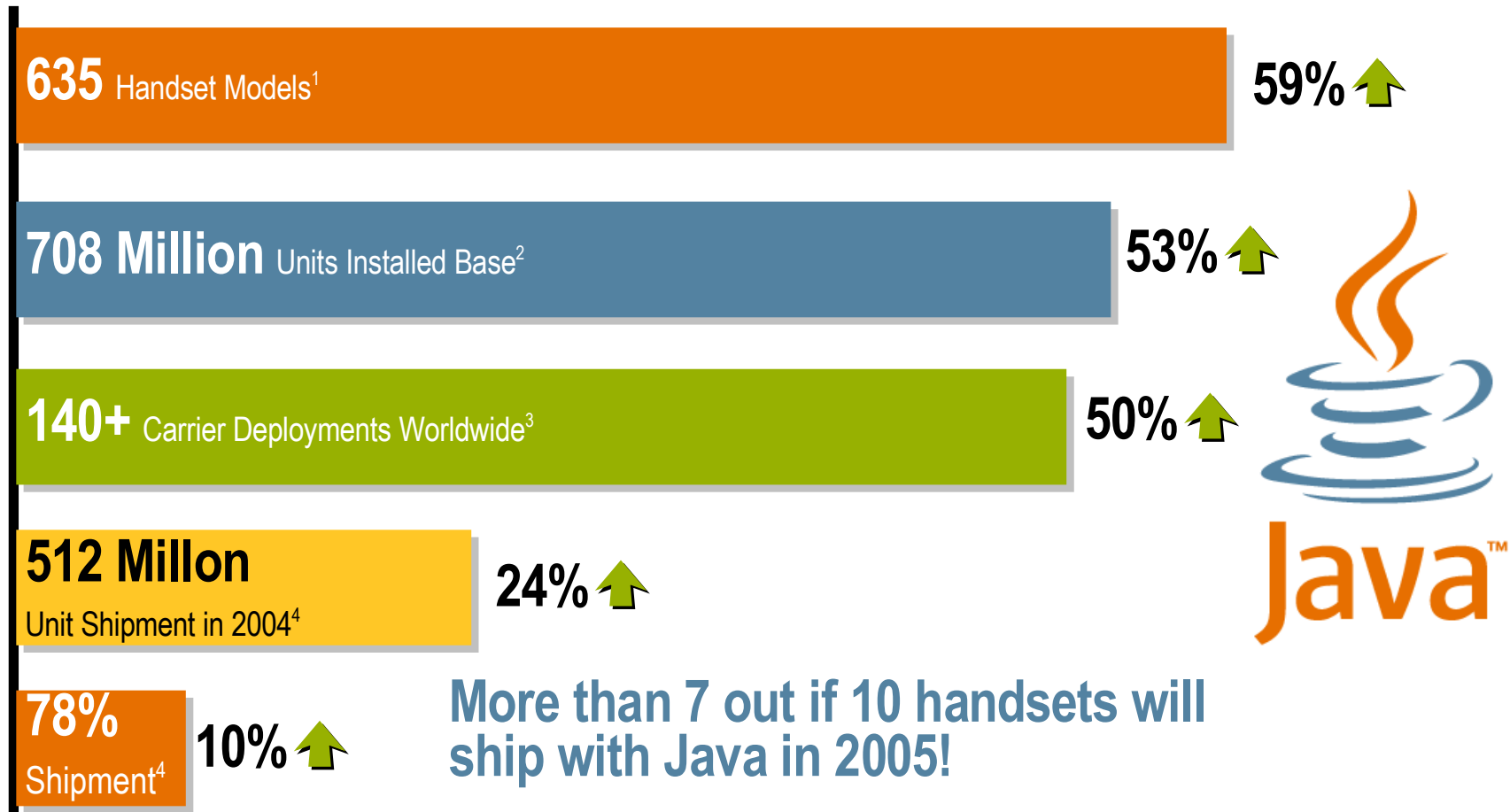
Mobile Tools

Resources

Advantages of Java ME

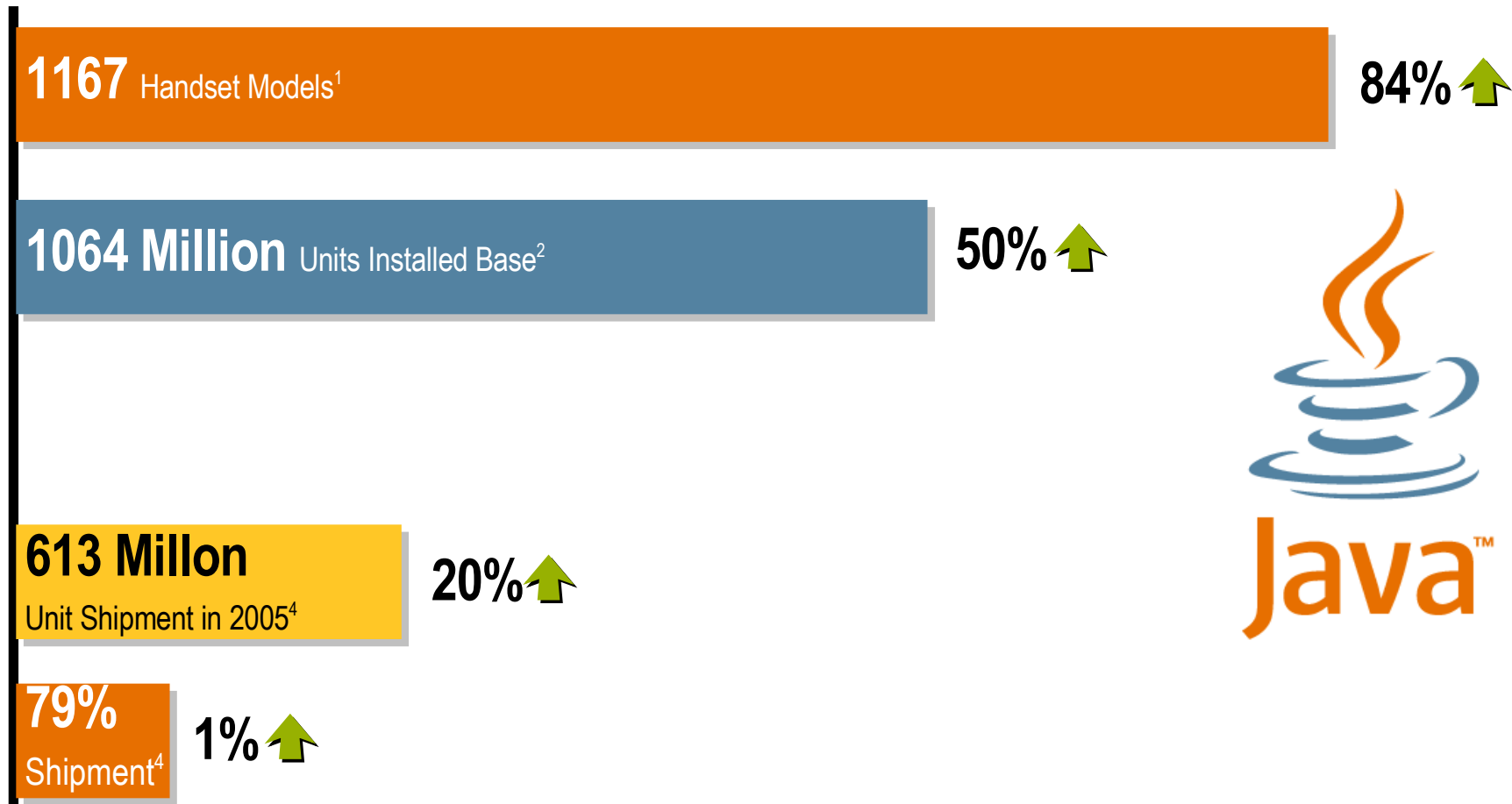
- Portability
 - > “WORA” (Write Once Run Anywhere)
- Security
 - > Code runs in the confines of its JVM
 - > MIDlet can be cryptographically signed and verified on the device
 - > Advance permission architecture
- Rich set of APIs
 - > Mobile Services Architecture (MSA) for CDC/CLDC
 - > Digital Television & more...

Phenomenal Momentum in 2004-2005



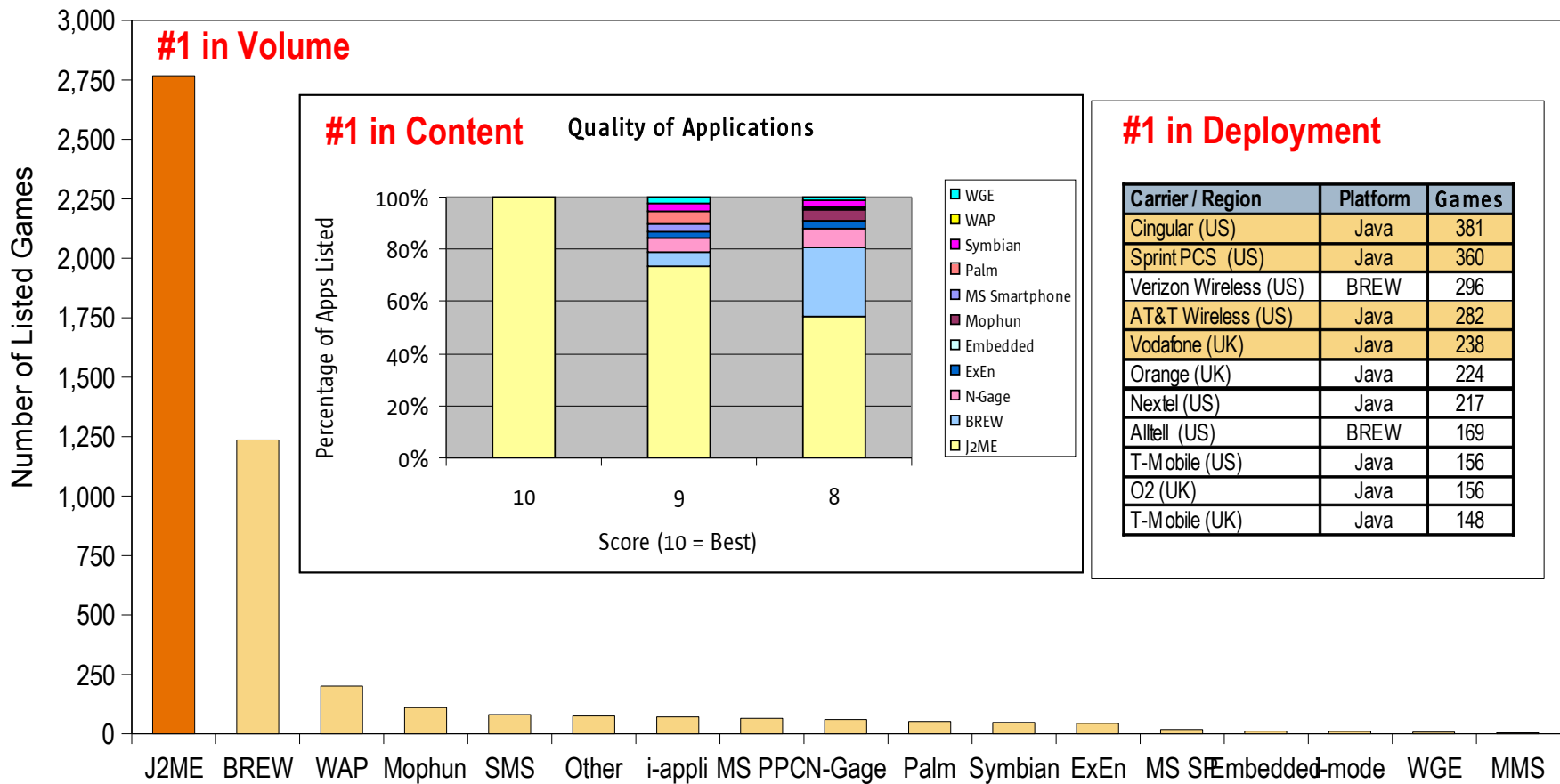
Sources: 1 – Sun Microsystems June'05 2.- Ovum June'05 3 – Nokia June'05 4 – Ovum September'04

Phenomenal Momentum in 2005-



Sources: 1 – Sun Microsystems Feb'06 2.- Ovum Sep'05 4 – Ovum September'05

Java ME in Wireless – Most Popular Gaming Platform



- Review criteria based on: Gameplay, Graphics, Sound, Value, Tilt
- Java ME received the only 10.0 score

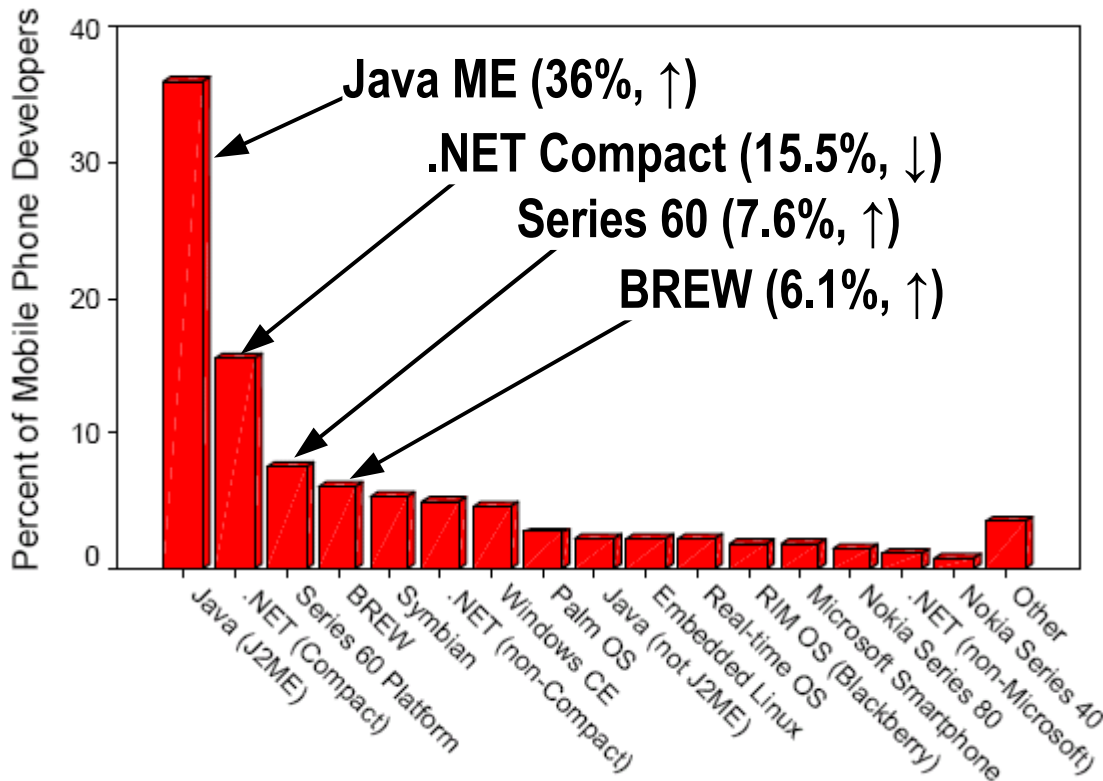


Source (June 2005):



Most Popular development platform

Primary Target Platform: Mobile Phone Developers



Source: Evans Data Wireless Development Survey, March 2005

Survey consists of 537 interviews conducted with developers in North America, Asia Pac, EMEA and Latin America. 60% of respondents are from companies with 100 employees or less, in the categories of ISV, SI, VAR, Corporate, OEM, Scientific and Others.

JavaME in the home

- Digital Video Broadcasting Project (DVB)



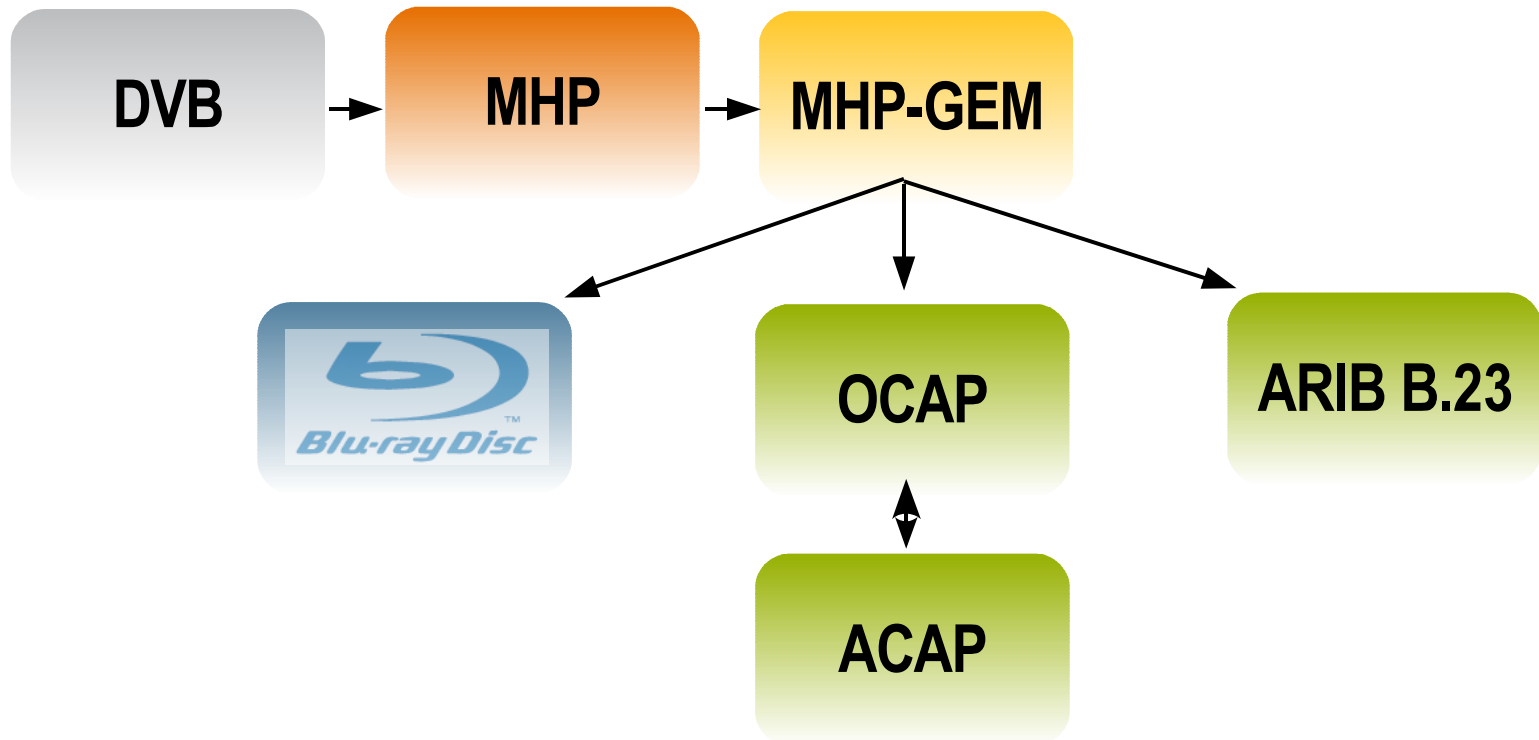
- Multimedia Home Platform (MHP)



- DVB- Globally Executable MHP (GEM)



Relationship of Standards



Blu-Ray (BD-J)

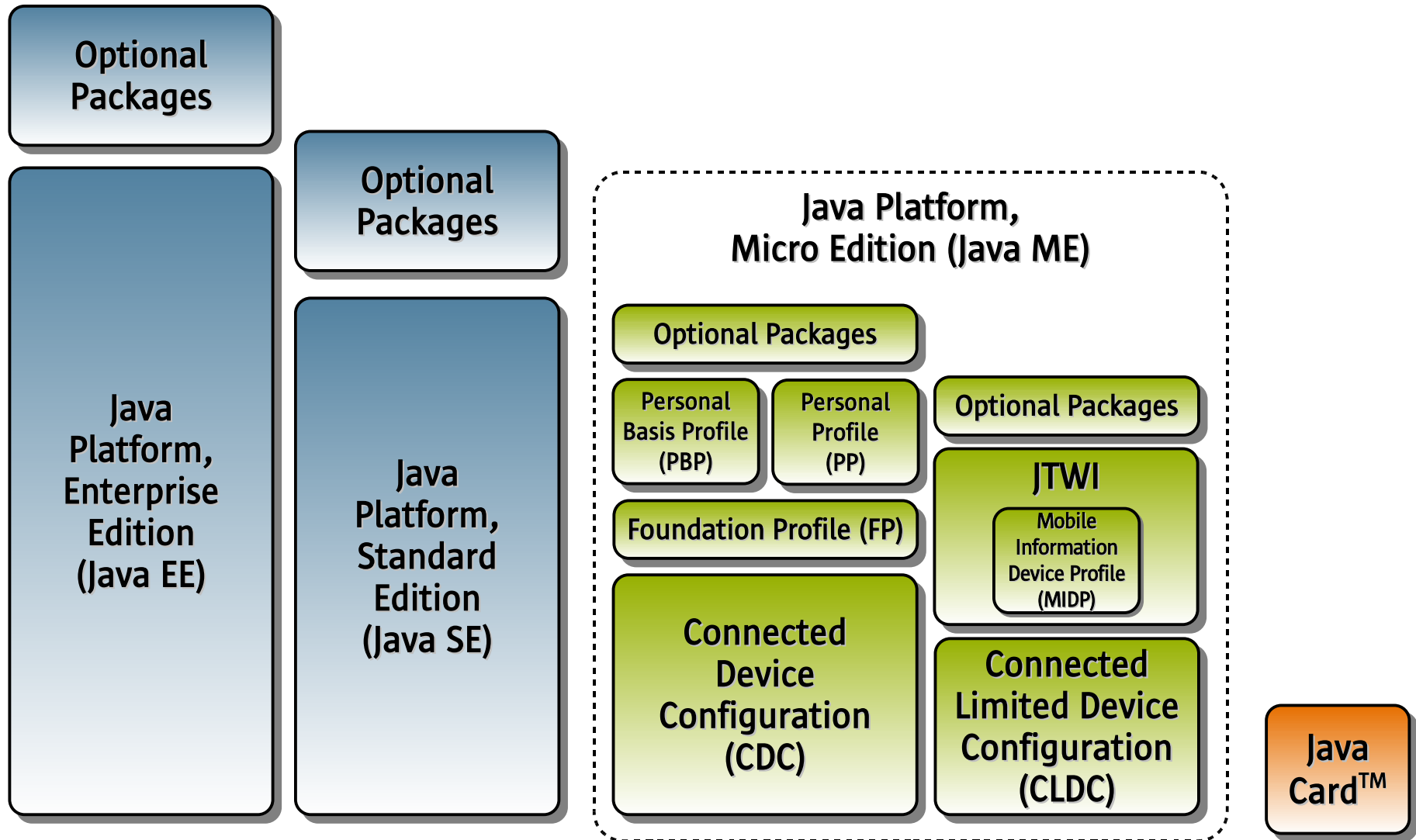


Why Java & Blu-Ray?

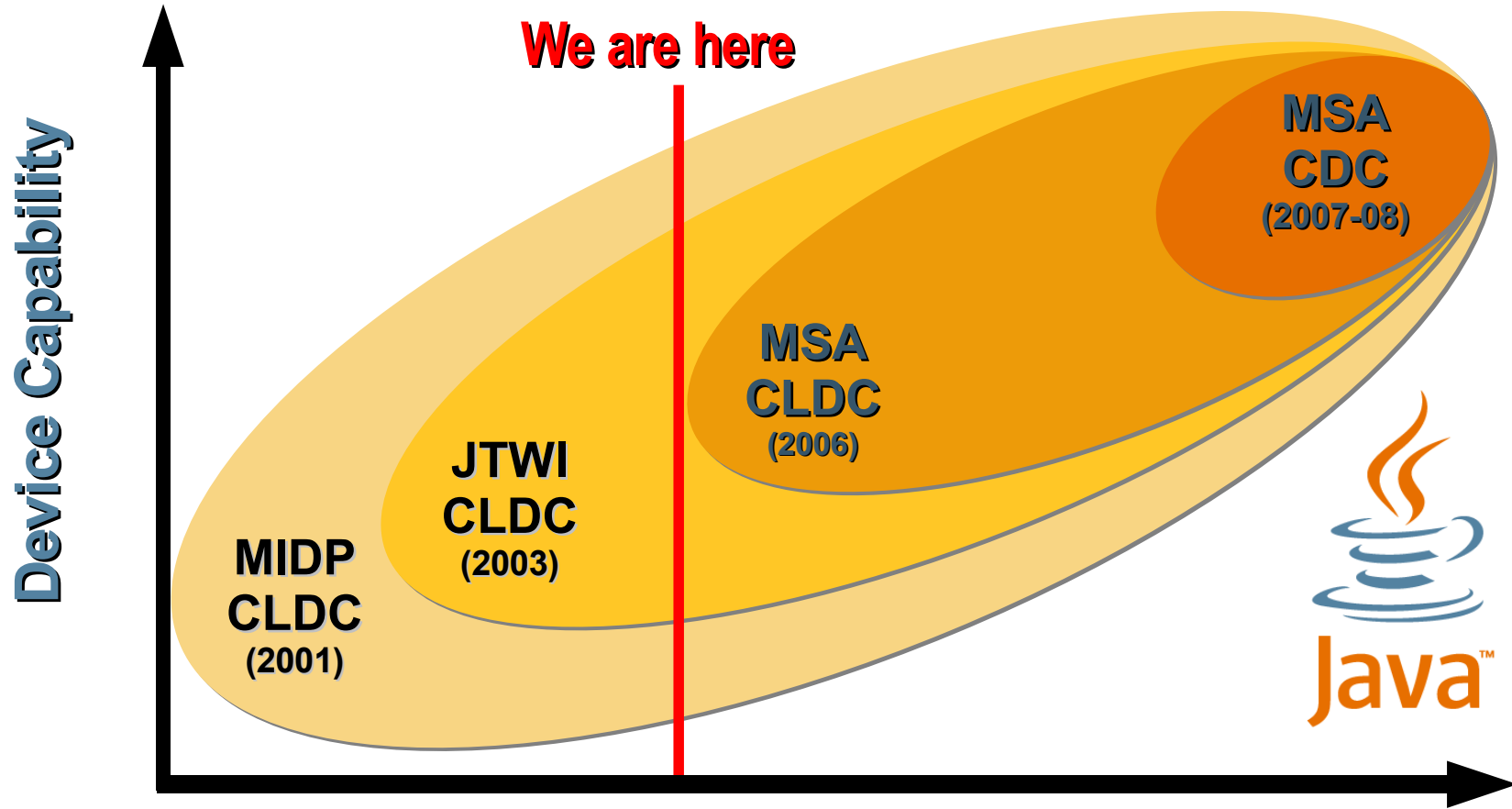
- Richer Interaction
- Special Features
- New Business Models



JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources



Evolution of Java ME in Wireless



MSA for CLDC (JSR 248)

Comms	Graphics	Security & Commerce	Application Connectivity	Personal Information
JSR 82 Bluetooth	JSR 226 2D Scalable Vector Graphics			
JSR 180 SIP	JSR 184 3D Graphics			
JSR 205 MMS Messaging	JSR 234 Mobile-media Supplement	JSR 229 Payment	JSR 211 Content Handler	JSR 179 Location
JSR 120 SMS Messaging	JSR 135 Mobile Media	JSR 177 Security & Trust Services	JSR 172 Web Services	JSR 75 PIM & File
Application Environment	JSR 185 JTWI	JSR 118 MIDP 2.0	JSR 238 I18N	
Virtual Machine		JSR 139 CLDC 1.1		

 Conditional APIs
 JTWI APIs

New Wireless – Related JSRs in the JCP

Future Innovations in the Wireless Stack

Comms	Graphics	Security & Commerce	Application Connectivity	Personal Information	Device Management
JSR 259 Ad Hoc Networking					
JSR 257 Contactless Comm	JSR 258 Mobile UI Customization		JSR 281 IMS		JSR 232 Mobile Operation Mgmt
JSR 272 Mobile Broadcast	JSR 239 OpenGL ES		JSR 279 SOA, Service Connection		JSR 246 Device Management
JSR 253 Mobile Telephony	JSR 209 Advanced GUI		JSR 280 General Purpose XML	JSR 266 Unified Message Box	JSR 230 Data Sync
Application Environment		JSR 278 Resource Management	JSR 271 MIDP 3.0	JSR 256 Mobile Sensor	

Scalable 2D Vector Graphics:JSR 226

- Increasing demand for mobile multimedia
- Mobile devices are diverse
 - > Different screen sizes
 - > Avoid re-authoring content
- Use cases:
 - > Map Visualization
 - > Rich Animations
 - > Simple UI applications
 - > Enterprise applications
- Availability:
 - > Referenced in MSA for CLDC JSR 248
 - > Available in Sun Java Wireless Client 1.1.3



- Animated UI
- “Skinnable” display



- Animated route
- Scalable controls
- Transitions

Location-Based Services: JSR 179

The demo document will appear here shortly <http://www.netbeans.org/kb/50/mobility.html>

- Personalize mobile services is based on location
- New market for developers, cellular network operators, and service providers for value-added services:
 - > Advising users of current traffic conditions
 - > Supplying routing information
 - > Helping them find nearby restaurants
 - > and much more...

What does Location-Based Services Do?

- Where am I? What's around me? How do I get there?
- Determines the location of the user to provide personalized applications and services
- Two approaches to implementing location-based services:
 - I. Process location data in a server and deliver results to the device
 - II. Obtain location data for a device-based application that uses it directly

What can you do?

- Terminals = Devices
- Location Provider
 - > Specify criteria
- Location Listener
 - > Time-out, cache age
- Landmarks
 - > Area search
- Proximity Listener
- Best practices

JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources

Challenges for Wireless Developers

- Device limitations
 - > Processing power and memory
 - > Limited color and sound support
 - > Diverse feature set
 - > Form factor – screen, keyboards, joystick
- Limited application size
 - > Heap size
 - > Storage
- Evolving technologies
- It RINGS at the most unexpected moment!



Characteristics of a Wireless Game

- Design for the user
 - > Short play time (What is the commute time?)
 - > Play on user's schedule
 - > Playable on and offline
 - > Slower game play
- Design to the device
 - > Form factor (single/double handed, stylus)
 - > Uses other part of the device (Camera, lights)
 - > Connectivity options (Bluetooth, SMS, GPRS)
 - > Develop for the stack (MIDP version, other APIs)

Characteristics of a Wireless Game

- Design to work with the operator
 - > Subtle nuances between operator
- Interruptible
 - > It's harder than you think
- Mobile devices are social devices
 - > Leverage social interactions between players
- Massively multiplayer casual online gamers
- Wireless game can be part / extension of a larger game

Types of Games

- Single player
 - > Unconnected game play
 - > One time payment for the software
- Multiplayer
 - > Network connected multiplayer
 - > Multiplayer as a value added service
 - > May or may not be charged for the software
- Connected
 - > Single player network connected
 - > Software content is updated via the network

Network Enabled Mobile Application

- Natural to develop network enabled mobile phone application
 - > A mobile phone is first and foremost a networked device
- Much more fun to play with other players
 - > Challenge to get good AI into a mobile application because of heap size and application size constraints
- Multiple connectivity options from handphone
 - > HTTP(S) over GPRS
 - > SMS and MMS
 - > Bluetooth
- The Telcos will love you for it!

HTTP/Messaging/Bluetooth Comparison

HTTP

Stream based
Point to point
More expensive
Server centric
Mandatory
Limited roaming
Client initiated

SMS/CBS/MSS

Packet based
Point to point and broadcast
Cheaper (maybe)
Server centric and P2P
Mandatory in JTWI
Extensive roaming
Client or server initiated

Bluetooth

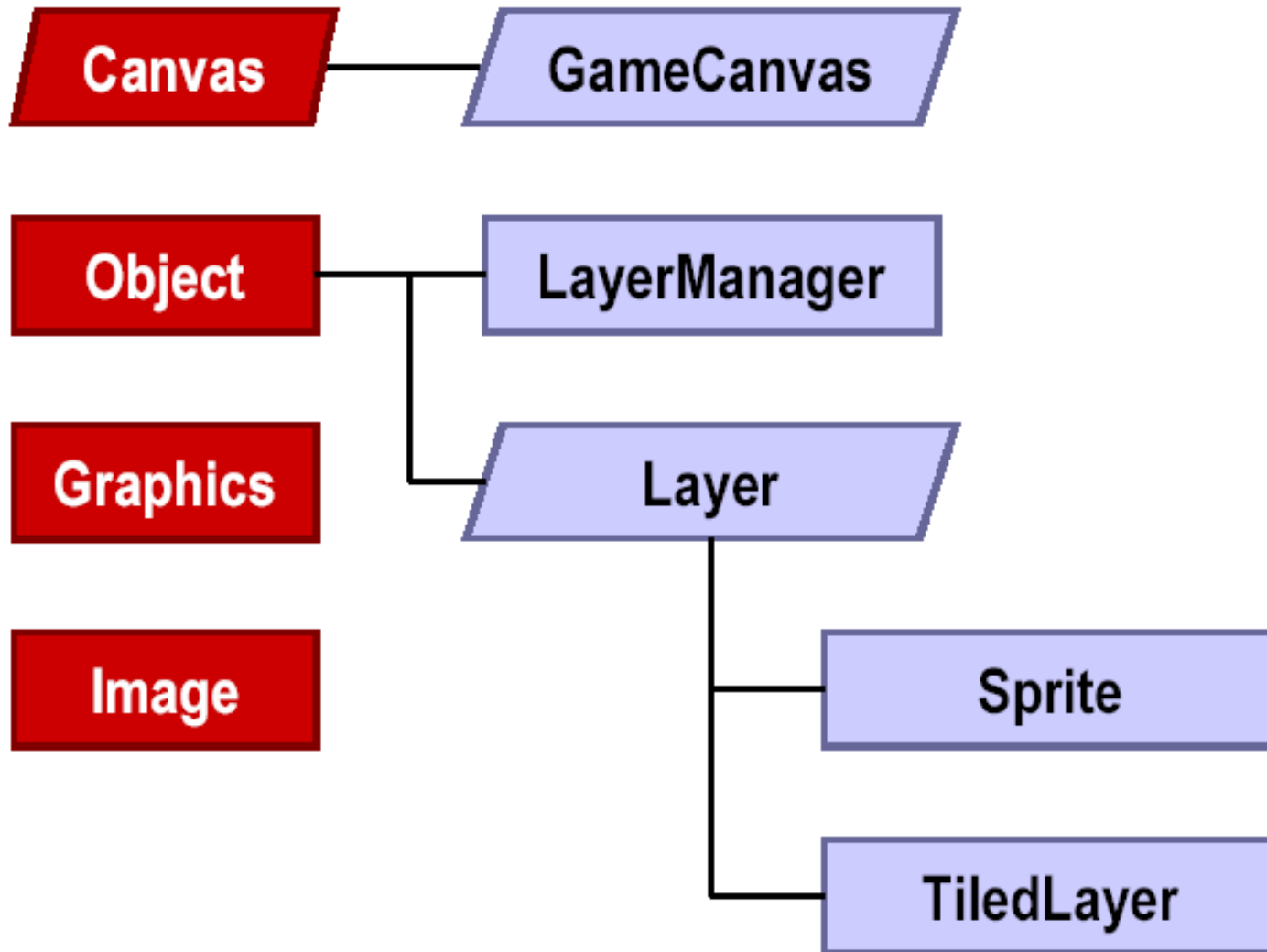
Stream/Packet based
Broadcast
Free
P2P
Mandatory in MSA
No roaming
Peer initiated

Inbound Connection

- Push registry in MIDP 2.0 can wake up a MIDlet in respond to an
 - > External event like inbound SMS, socket connection
 - > Future event by setting an alarm
 - > Can be static or dynamically set
- MIDlet is responsible for reading the data
- Powerful feature for turn based, event driven games
 - > Player is notified when opponent has completed his/her turn
 - > Chess, Diplomacy

JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources

Core Game API Class Hierarchy



Elements in a Game



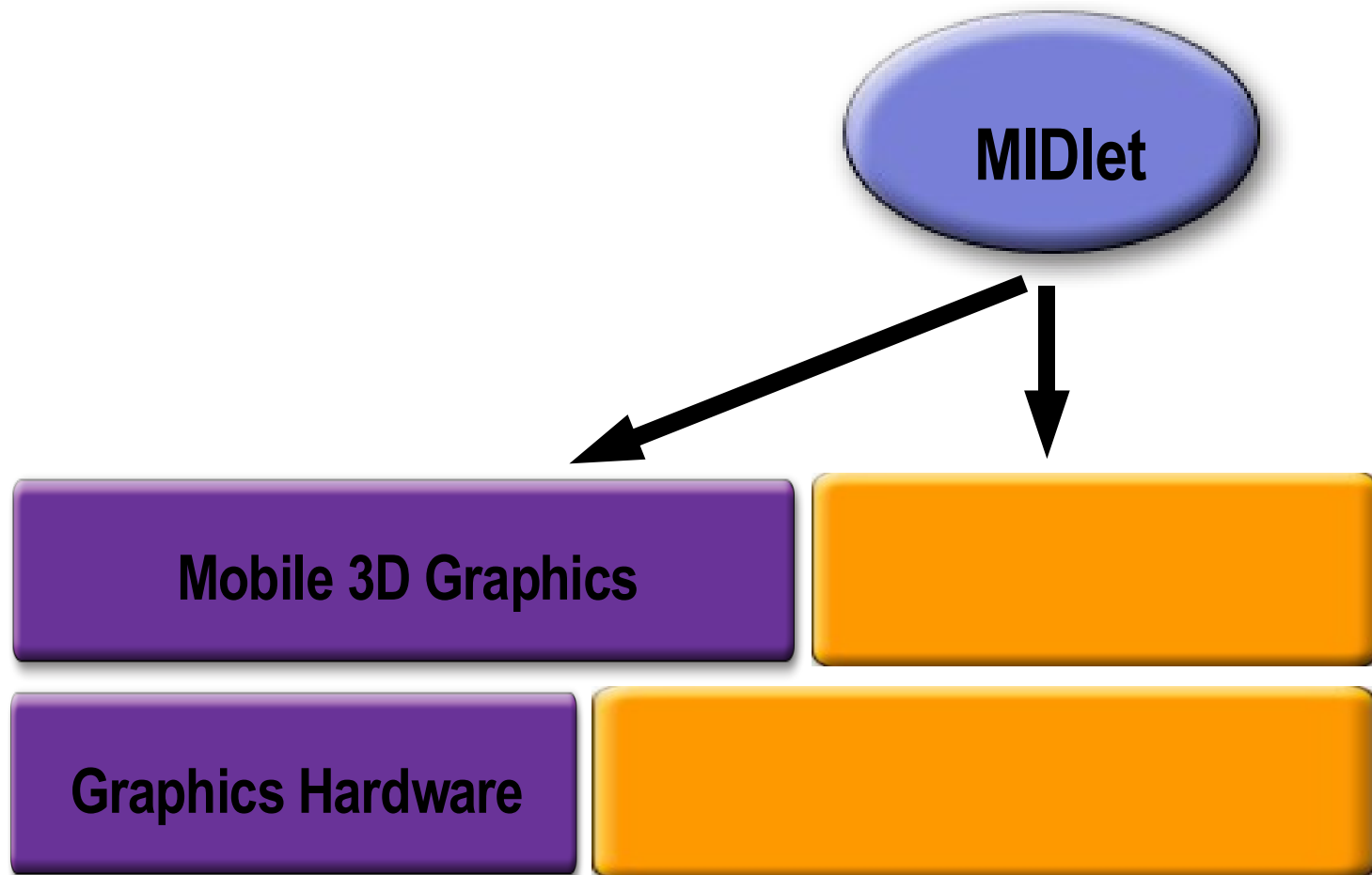
- Background
 - > Composable from basic elements
 - > Static and animated objects
- Background layers
 - > Different layers
 - > Layer management
- Sprites
 - > Transformation
 - > Collision detection

JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources

Benefits of Mobile 3D API

- Exploit graphics hardware without having to write code specific to a particular hardware
 - > Application able to work on newer hardware
- Separate code from content
 - > Animator develop character, animation, appearance and behavior using graphic package
 - > Programmer/developer control character with code
- Built-in high level common functionalities
 - > Scene graph, keyframe animation
- Works on CLDC 1.1/MIDP 2.0
 - > Requires floating point support

Mobile 3D Graphics



Key Classes in Mobile 3D



Graphics3D

3D graphics context
Renders scene graphs



World

Root node for scene graph



Loader

Utility for loading scene
graphs

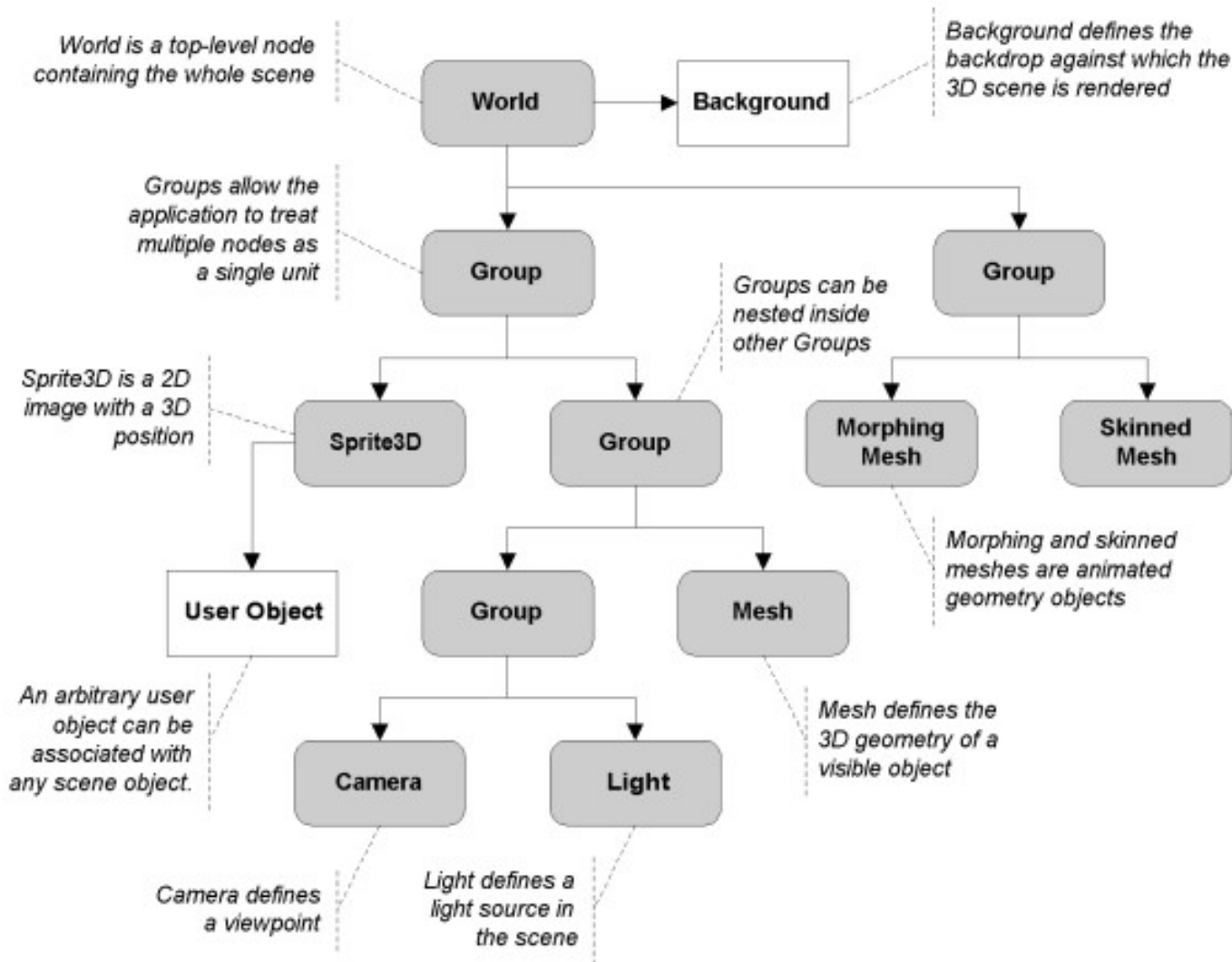
Modes

- Retained mode
 - > Based on scene graphs
 - > Created using graphic package
- Immediate mode
 - > Create an object programatically
 - > Uses triangle as primitives
 - > Low level
- Can mix modes
 - > Inserting an immediate mode object into a scene graph
- Will only be covering retained mode

What is a Scene Graph?

- Hierarchical way of organizing objects within a 3D scene
- Culling at a higher level for better efficiency
- Operations applied to the parent are applied to all its child
 - > Eg. A room (parent) contains a monster (child) – scale the room, the monster is scaled as well
- Scene graph is composed of
 - > 3D objects, behaviors, states, viewing frustum, etc.

Example of a Scene Graph

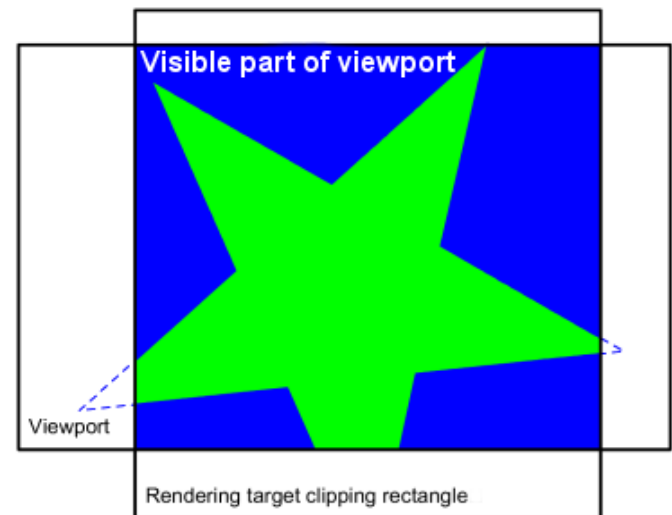


The World Node

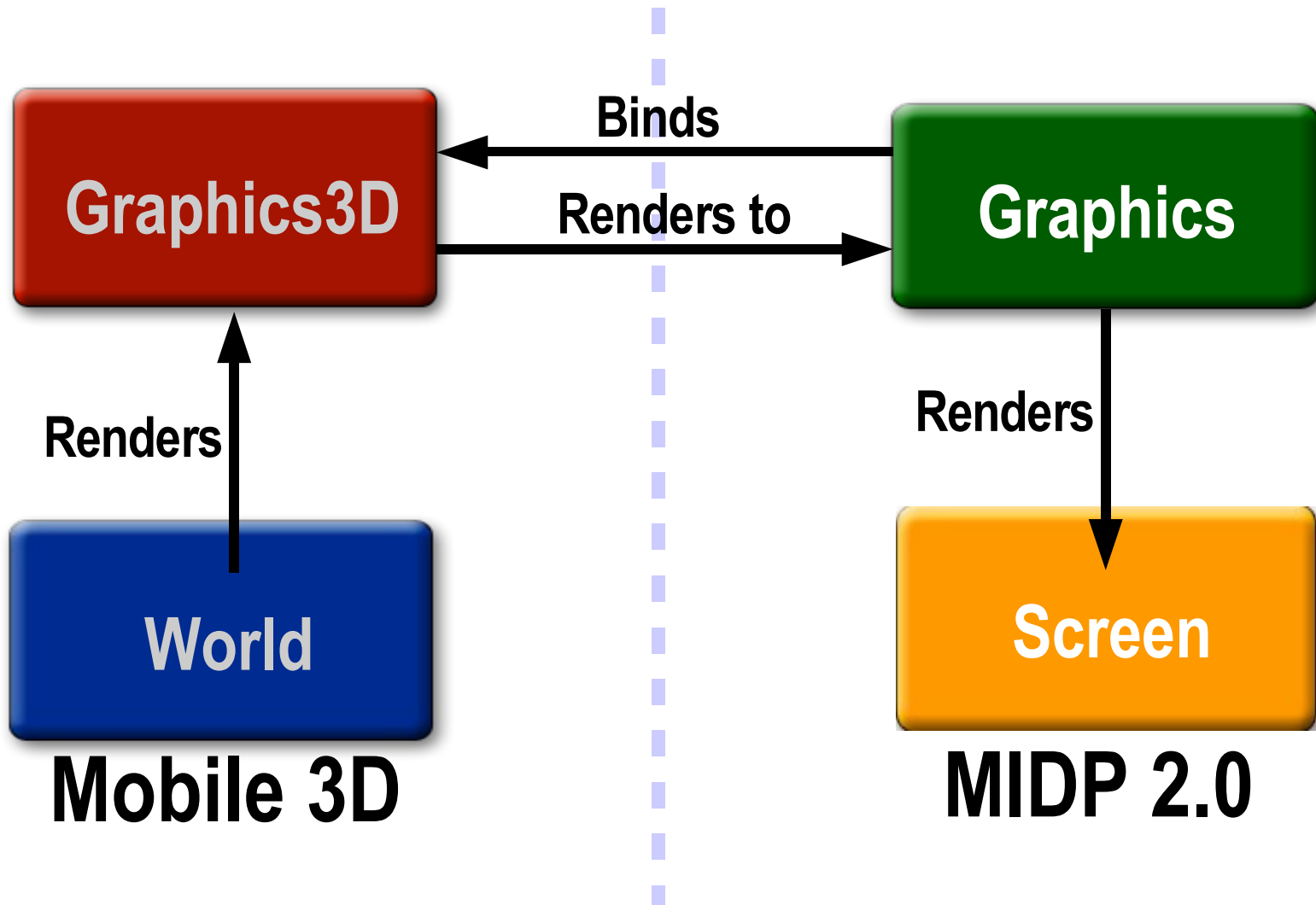
- Top level node for scene graph
- Contains
 - > The other nodes that compose the scene
 - > Background, camera
 - > Light, Fog
- Cannot render without an active camera
 - > Optionally can set transformation during rendering
- Scenes are created with graphic packages and exported to m3g format

Rendering in 3D

- Need to bind Graphics3D object to Graphics
 - > Graphics3D is a singleton
 - > Need to release Graphics3D after rendering
- Rendering hints may improve the quality of the scene but may be slower or consume more resources
 - > Antialiasing
 - > Dithering
 - > True color
- Definable viewport
 - > Relative to the origin



Relationship with MIDP 2.0



JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources

State of Mobile Gaming



Mobile Gaming in 2004

- Classic games
- Interactive
- 3D Graphics
- Single player



Multiplayer Gaming Prospects

- Turn-based games most popular
- Increased number of network games available in market



Mobile Gaming Future Trends

- Multiplayer network games
- Multiple integrated communication channels

Where Are the Games?



Today's Network Multiplayer Games



Tomorrow's Network Multiplayer Games



DARK STAR

POWERED BY
SUN MICROSYSTEMS

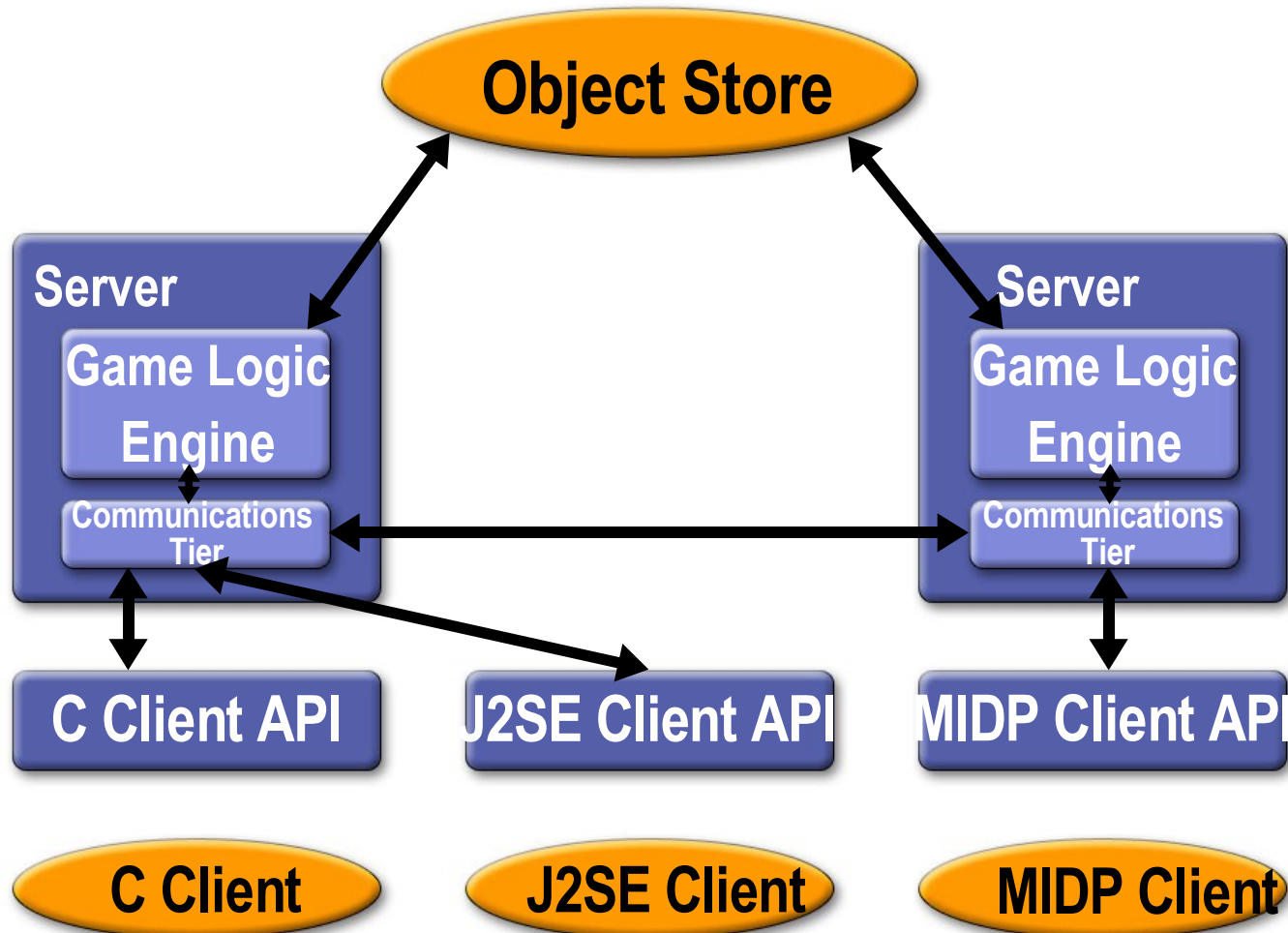
Multiplayer Game Servers

- Developing a game server is **HARDER** and way more **EXPENSIVE** than you think
- Require diverse skill set
 - > Scalable – able to add servers to handle load
 - > Fast – lag will completely ruin the user experience
 - > Persistence – object identity, object storage
 - > Distributed computing – moving objects from servers to servers
 - > Fault tolerant, multi-threaded, presence, administration
- Typically custom built for a particular game
 - > Like building your own web server when you roll out a web site

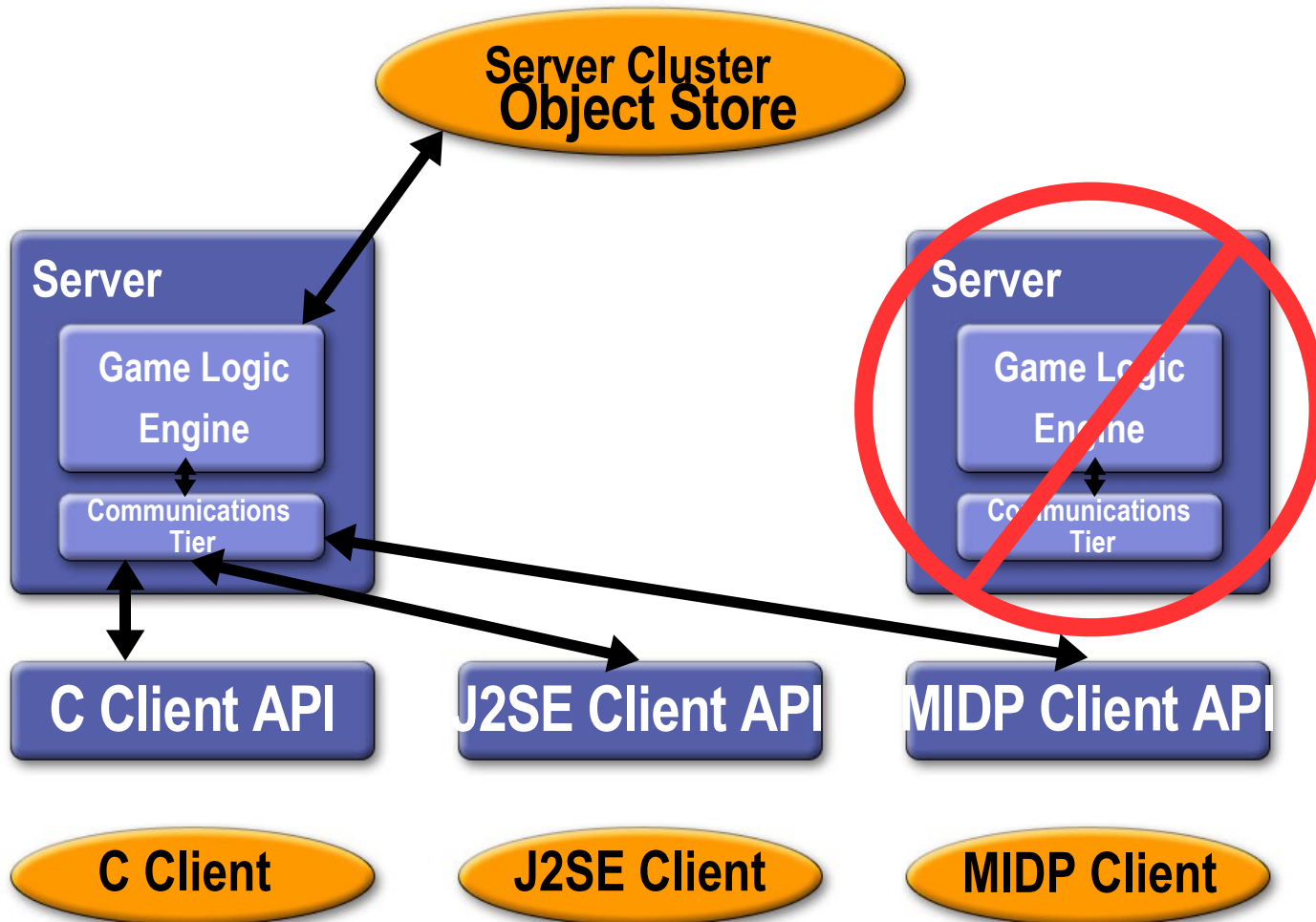
DarkStar Architecture

- A 3-tier system
- Communications tier
 - > Fast publish/subscribe based interconnect
- Game logic engine
 - > Runtime environment for the server game logic
- Object store
 - > Where all the game server state is stored
 - > Fast highly scalable cloud of persistent objects
 - > ACID compliant

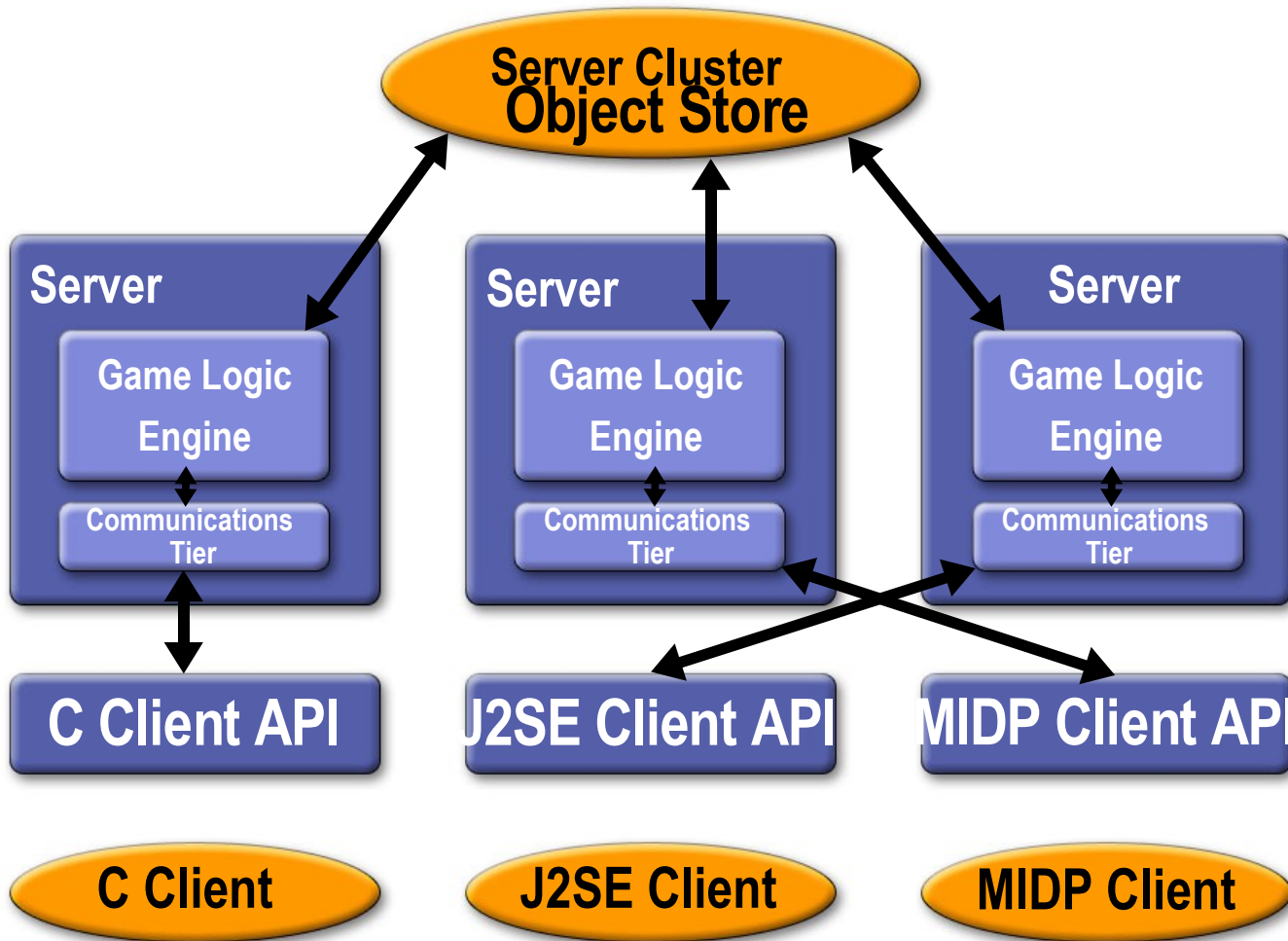
DarkStar Architecture



Failover



Load balancing



JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources



Sun Java Wireless Toolkit



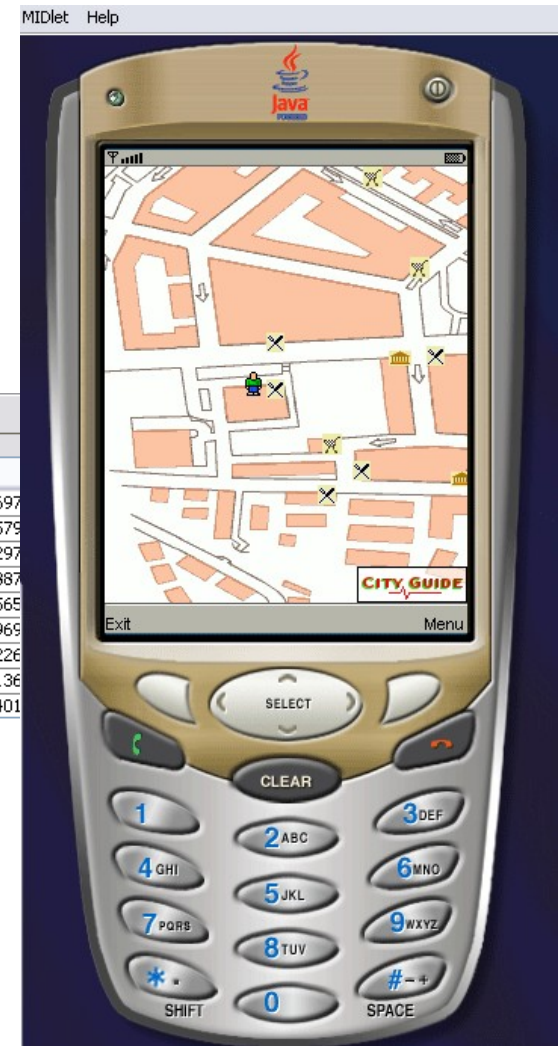
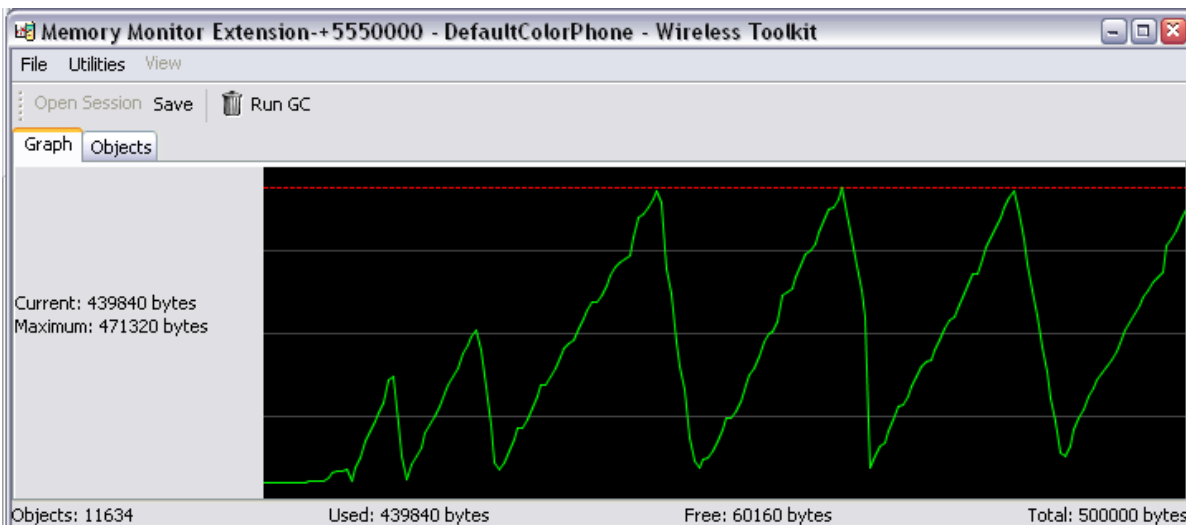
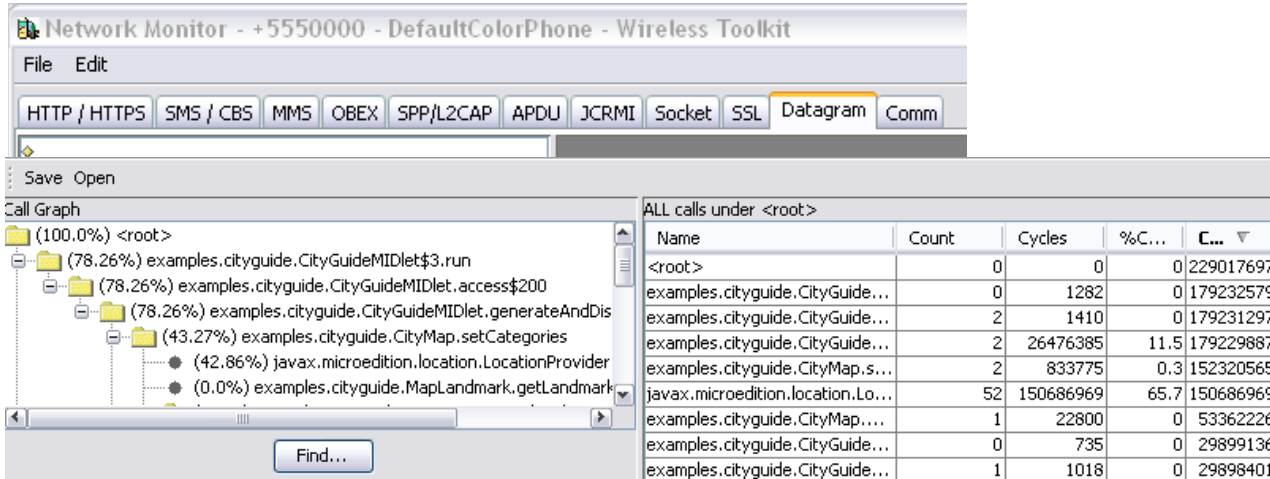
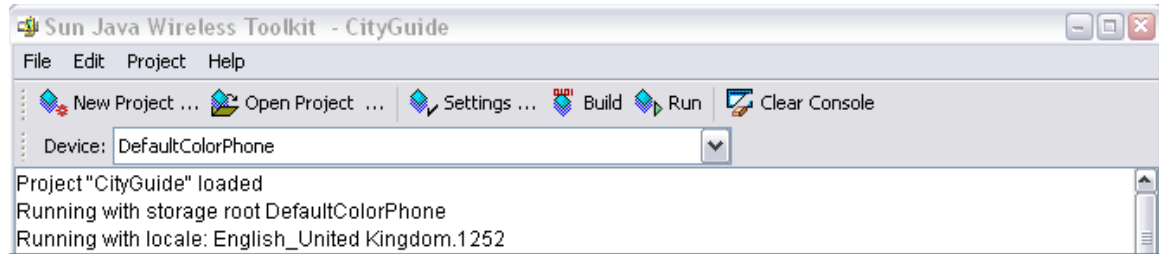
Sun Java Wireless Toolkit 2.3

- Set of Sun tools for creating Java applications that run on JTWI devices
- Build tools, utilities and device emulator to support
 - > CLDC 1.1/MIDP 2.0
 - > Content Handler API
 - > JTWI 1.0
 - > WMA/MMAPI
 - > Location API
 - > Security and Trust Services
 - > PDA Optional packages for Java ME Platform
 - > Java API for Bluetooth
 - > Java ME Web services
 - > Mobile 3D Graphics API

Sun Java Wireless Toolkit

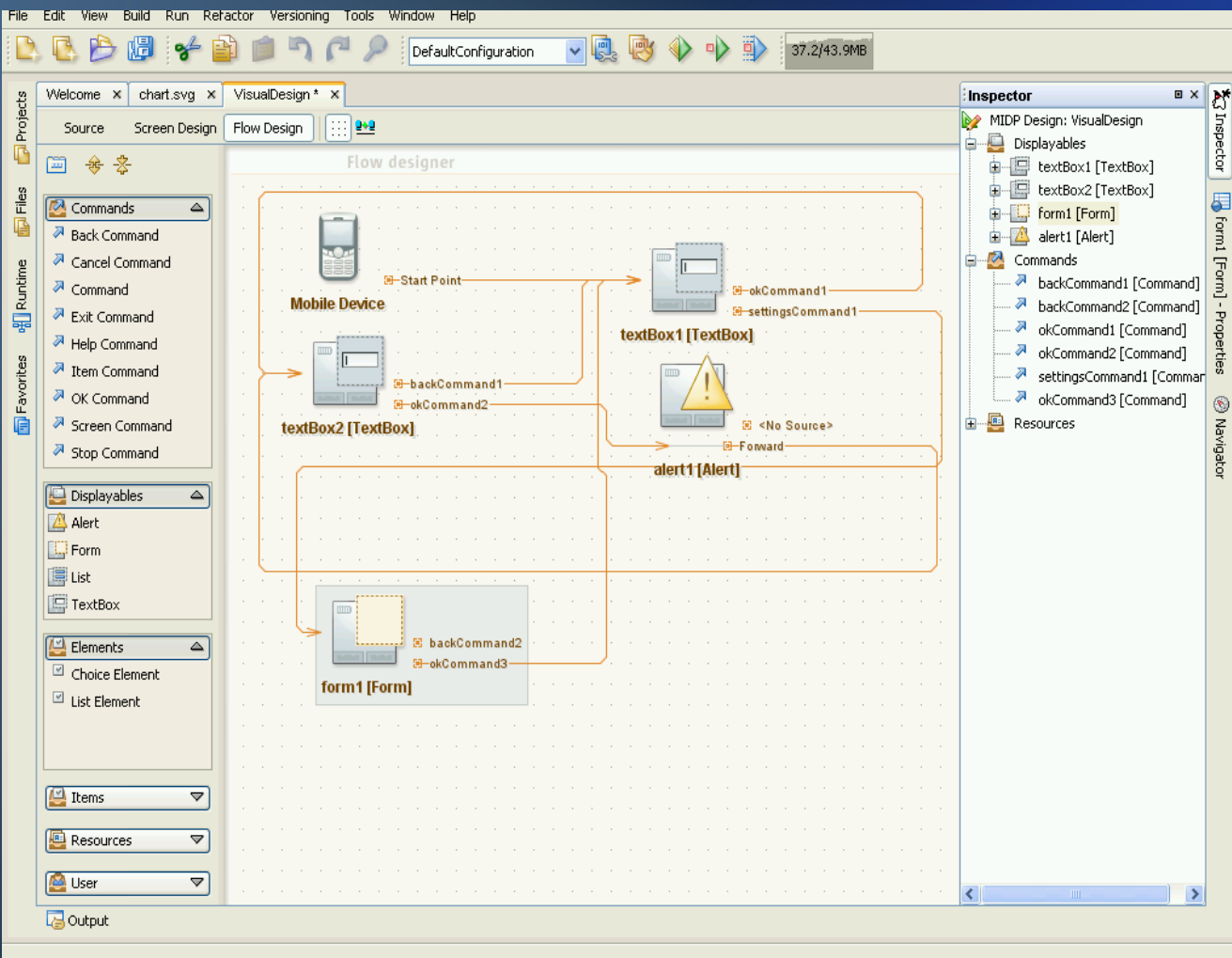
- Over 1,000,000 downloads
- The *de facto* standard for MIDP development
- Awards include:
 - > 2005 Jolt Product Excellence Award for Mobility Development Tool
 - > Developer.com 2005 Wireless Development Product of the Year
 - > *Java Pro* 2004 Readers' Choice awards
 - > 2004 Software Development Jolt Product Excellence Award
 - > Developer.com 2004 Wireless Development Product of the Year





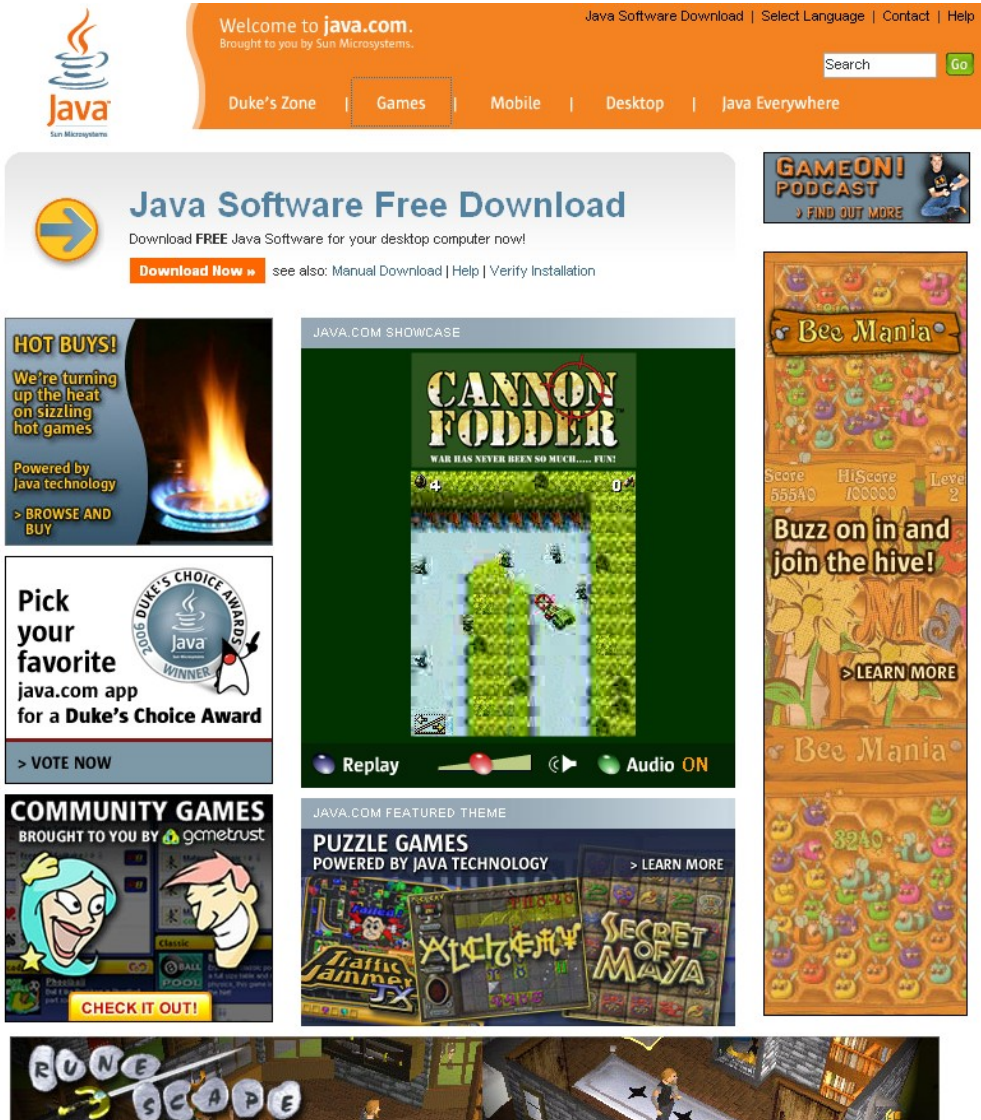
NetBeans Mobility Pack 5.0

- Open source Java ME development tool on top of open source NetBeans platform
- Enables rapid application development of Java ME applications
 - > Visual Mobile Designer
 - > Drag and drop Java ME RAD tool
 - > Wireless Connection Wizard
 - > Easy access to Web services and other server side applications from MIDlets via Servlet programming model
 - > Integrates with Sun Java Wireless Toolkit 2.2



netBeans IDE

JavaME update
The new & future APIs
2D & 3D wireless gaming
Java Gaming Server
Mobile Tools
Resources



The screenshot shows the Java.com homepage with the following sections:

- Welcome to java.com.** Brought to you by Sun Microsystems. Navigation links: Java Software Download | Select Language | Contact | Help. Search bar with "Go" button.
- Duke's Zone** | **Games** | **Mobile** | **Desktop** | **Java Everywhere**
- Java Software Free Download**
 - Download **FREE** Java Software for your desktop computer now!
 - Download Now** see also: Manual Download | Help | Verify Installation
- HOT BUYS!**
 - We're turning up the heat on sizzling hot games
 - Powered by java technology
 - > BROWSE AND BUY
- Pick your favorite java.com app for a Duke's Choice Award**
 - 2006 DUKE'S CHOICE AWARDS Java WINNER
 - > VOTE NOW
- COMMUNITY GAMES** BROUGHT TO YOU BY gametrust
 - CHECK IT OUT!
- JAVA.COM SHOWCASE**
 - CANNON FODDER** WAR HAS NEVER BEEN SO MUCH..... FUN!
 - Replay Audio ON
- JAVA.COM FEATURED THEME**
 - PUZZLE GAMES** POWERED BY JAVA TECHNOLOGY > LEARN MORE
 - Games shown: Traffic Jammer, X-CHANGERS, SECRET OF MAYA
- GAMEON! PODCAST** FIND OUT MORE
- Bee Mania**
 - Buzz on in and join the hive!
 - Score: 85540 HiScore: 100000 Level: 2
 - > LEARN MORE
- RUNE SCAPE**

- <http://javagaming.org>
 - > Forums & announcements
- <http://community.java.net/games>
- <http://java.com>
- <http://java.sun.com/j2me/>
- <http://developers.sun.com>
 - > Academic program
 - > JavaME
- <http://netbeans.org>
- <http://blogs.sun.com>



Matt Hosanee

matt.hosanee@sun.com

<http://blogs.sun.com/scoobeesnac>

