



the
POWER
of
JAVA™

NOKIA
Connecting People



Java™ Technology for the Mobile Mass Market Series 40 From Nokia

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Purpose

Insights Into Nokia Series 40

Provide an insight into Series 40 now and in the future, and to outline the new technologies you will be able to use for the mobile mass market

Agenda

What Is Series 40?

An Evolving Platform

Meeting the Challenges

- Background MIDlets

- UI Customization

Future JSRs

Summary

Q&A



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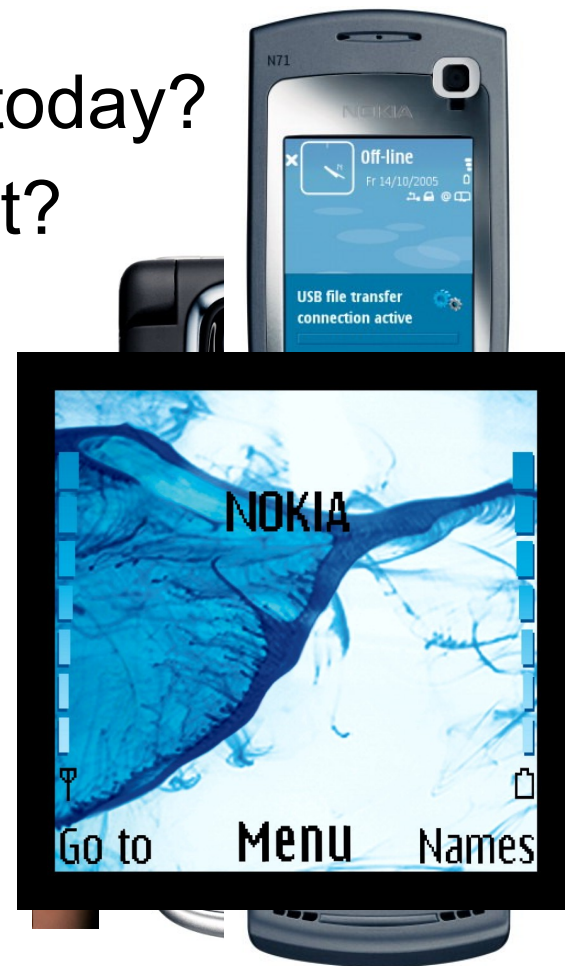
Q&A



Series 40

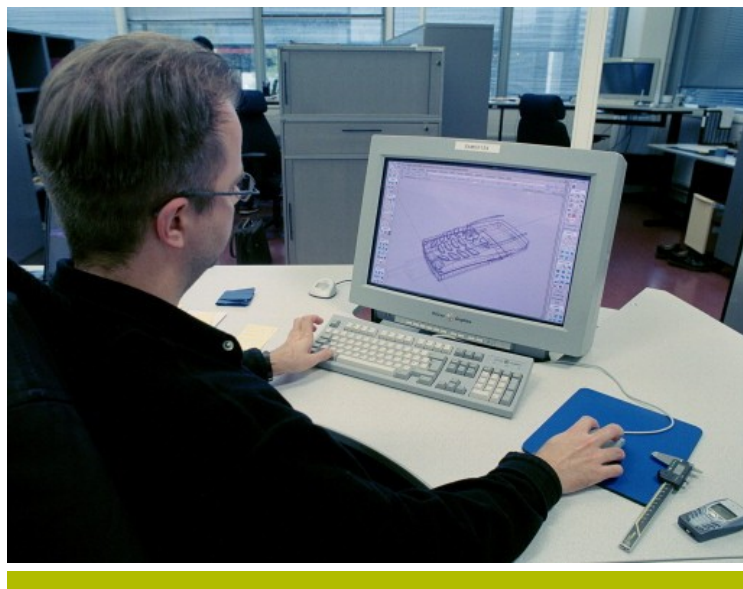
How to Recognise One at 20 Paces

- Do you have a phone with you today?
- Does it have Nokia logo on front?
- Does it have this  key or this  key?
 - Yes: S60
- How many Softkeys?
 - 3: Series 40



Series 40

Series 40 Is for the Mobile Mass Market



Nokia's Mass Market Platform

- Series 40 is the world's most widely used mobile platform
- Installed base of Series 40 products is over 300 million
- Majority of Nokia handsets sold today are Series 40



Nokia 6101

Series 40



Series 40

Opportunity for You

- Reach the mass market
- Large revenue
- Diversity without fragmentation



Series 40

Capability

Cool Technology

- Hardware
 - 2MB Heap
 - 32bit QVGA display
 - 2 MPix camera
 - 3G networks
- Software
 - All the core APIs
 - Excellent benchmarks
 - JSR:
 - 75, 82, 120, 135, 172, 179, 184, 185, 205, 226, 234

Series 40

Java Is Key

- Java technology is the premier way to develop applications for Series 40
 - Expand Series 40 platform
 - Sell applications for Series 40
 - Opening the platform for fresh applications
- We are 100% committed to Java Community ProcessSM services



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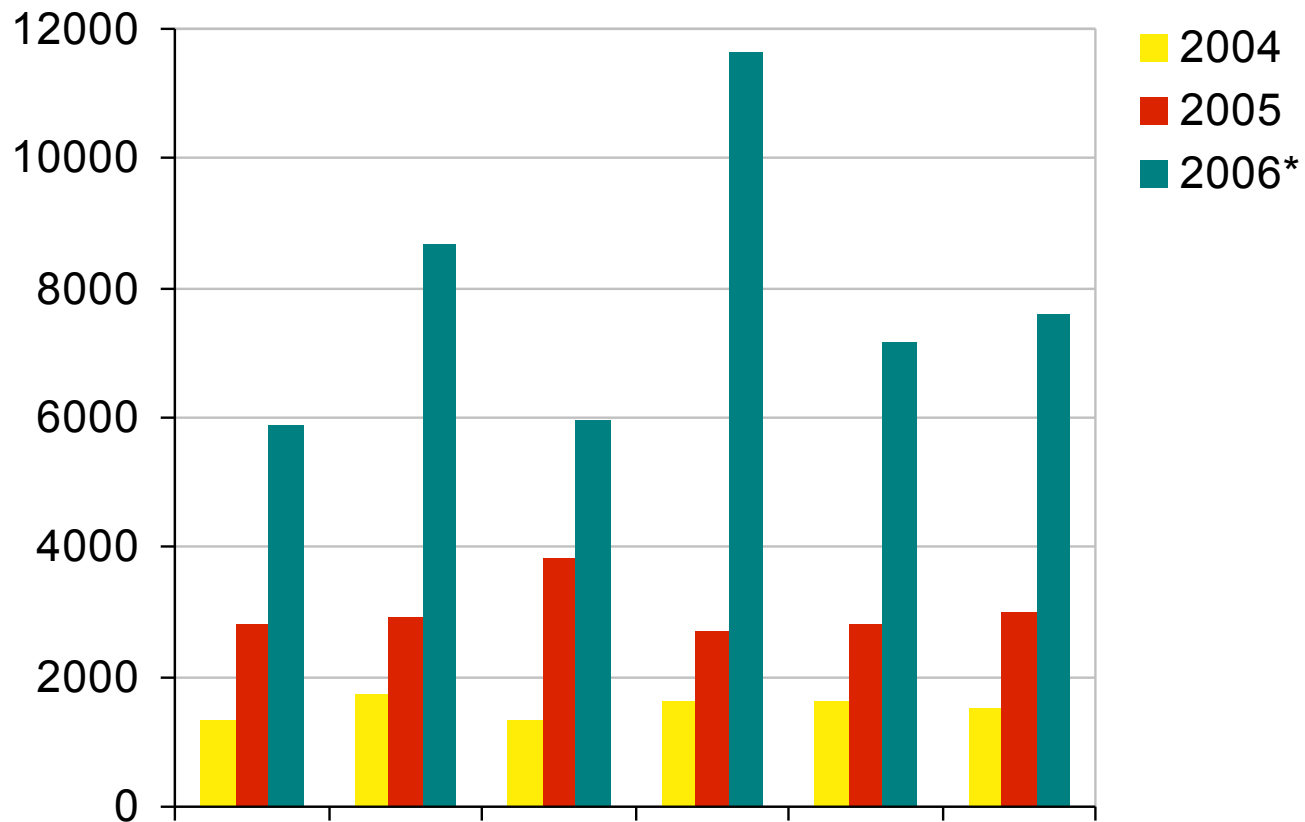
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Performance

Benchmarks



Performance

JBenchmark Results

- Nokia 6280
 - JBenchmark 2: 254
 - JBenchmark 3D: 140
- Nokia 6111
 - JBenchmark 2: 212
 - JBenchmark 3D: 166
- Nokia 6230i
 - JBenchmark 2: 208
 - JBenchmark 3D: 106

JBenchmark

- Nokia S40
 - Top 25% JBenchmark 2
 - Top 20% JBenchmark 3D

Performance

Game Performance

- Consistent performance/
fast start-up
- Optimized GC/no stutter
- Good VM performance
- Fast graphics APIs



Evolving Platform

Improvements

Great for

- Games and fun stuff
- Mini-applications (calculators, world clocks, currency converters)

Currently not so great for

- Deep integration into platform
- Event/monitoring applications
- 3rd party branding

Evolving Platform

Improvements

- User initiated
 - 24/7 MIDlet support
- Only one application at a time
 - Multi-MIDlet execution
- MIDlets look like the phone
 - Customization API to support branding

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Background/Multiple MIDlets

What?

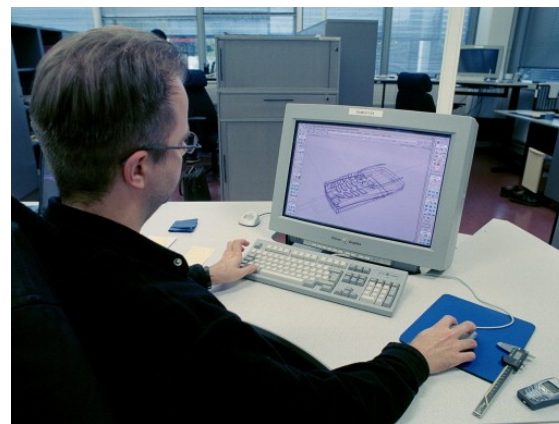
For

- Email/Instant messaging
- Music
- News feeds
- Traffic alerts



Not For

- Seti @ mobile
- Calculating Pi
- Chess master
- Printing



Background/Multiple MIDlets

Why?

- Fast development
- Rapid time to market
- Better outsourcing
- OTA upgrades
- Operator/Product customization

Background/Multiple MIDlets

Key Elements

- Event monitoring
- Attention signalling (notification)
- Auto-start at power-on
- Backgrounding on exit
- Foregrounding on select

Background/Multiple MIDlets

Nokia Series 40: Initial Steps

- Email/IM client in background
 - Pre-installed
 - Always launched at power on
 - Strict memory protection
 - Hidden/No user configuration

DEMO

MVM

Background/Multiple MIDlets

Demo Features

- What you've seen:
 - Multiple MIDlet VM
 - MIDlet in menu structure
 - MIDlet started from idle/notification and menu
 - Status icons
- What you haven't seen:
 - MIDlets interrupting user
 - Task/Application manager

Background/Multiple MIDlets

Technical Details

- Jad tags
- Special API for notifications
- Launch state System Property
- Status indicator API
- Memory model

Background/Multiple MIDlets

Technical Details

- Jad tag changes End key behaviour

```
Nokia-MIDlet-auto-start: yes
```

```
Nokia-MIDlet-no-exit: true
```

Background/Multiple MIDlets

Technical Details

- Special API for notifications

```
com.nokia.mid.ui.lcdUI.LCDUIUtils.setCurrent(  
    display,  
    myInboxList,  
    "1 New Email Message Received",  
    myEmailIcon);
```

```
static void setDisplayStateListener(  
    Display display,  
    DisplayStateListener listener)
```

Background/Multiple MIDlets

Technical Details

- Launch state property

```
void displayActive() {
    String s = System.getProperty(
        "com.nokia.mid.impl.isa.launch_state");
    if (s.equals("idle_prompt")) {
        startInbox();
    } else if (s.equals("email_menu")) {
        startEmail();
    } else if (s.equals("email_settings_menu")) {
        startSettings();
    }
}
```


Background/Multiple MIDlets

Technical Details

- Status indicator API

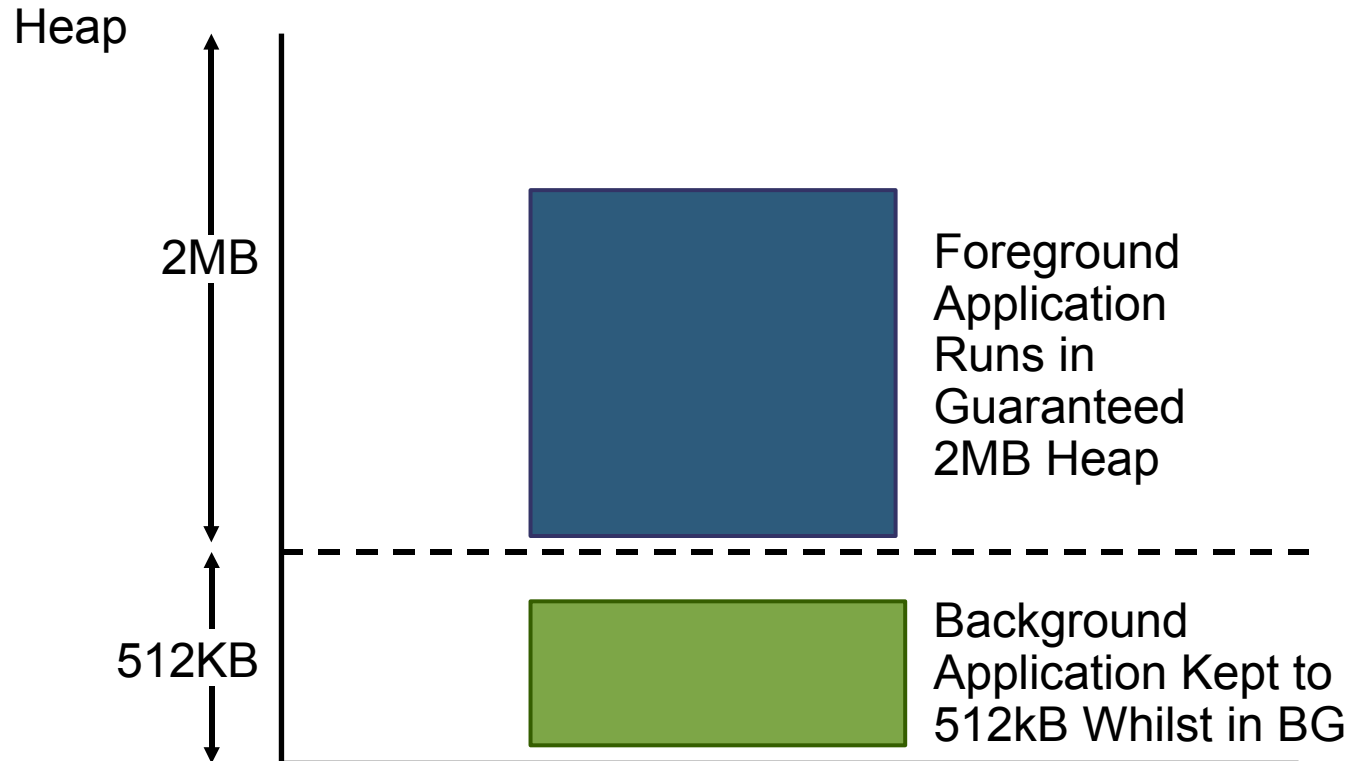
```
EmailClientUtils.setStatusIndicator (STATUS_EMAIL_IND, true) ;
```

- Each indicator controls up to 4 icons
- Can't use an image

Background/Multiple MIDlets

Technical Details

- Full memory isolation



Background/Multiple MIDlets

Achievements

- MIDlet in background
- Good isolation/foreground performance
- Reliable platform
- Integrated to device
- Good for non-computer literate
- Users don't have to manage applications

Background/Multiple MIDlets

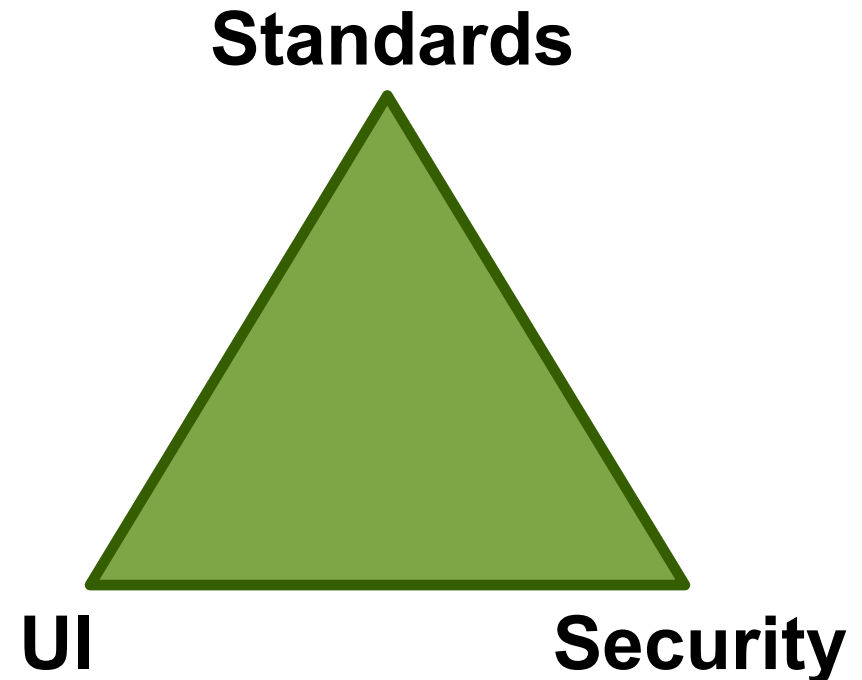
Lessons Learned

- End key behavior
- Private APIs required
- Memory management
- Security

Background/Multiple MIDlets

S40 Approach

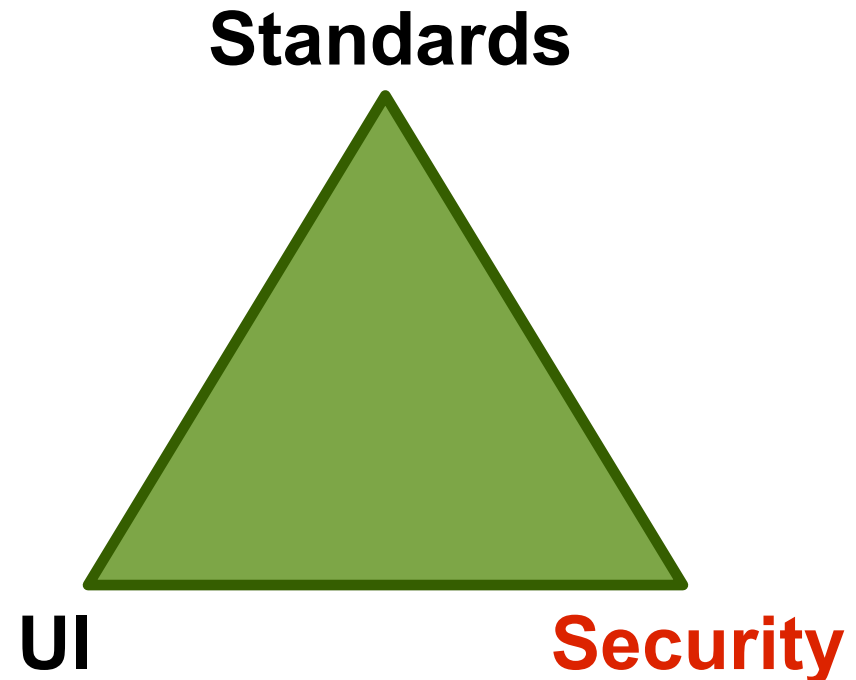
- Evolution pyramid



Background/Multiple MIDlets

Evolution Pyramid

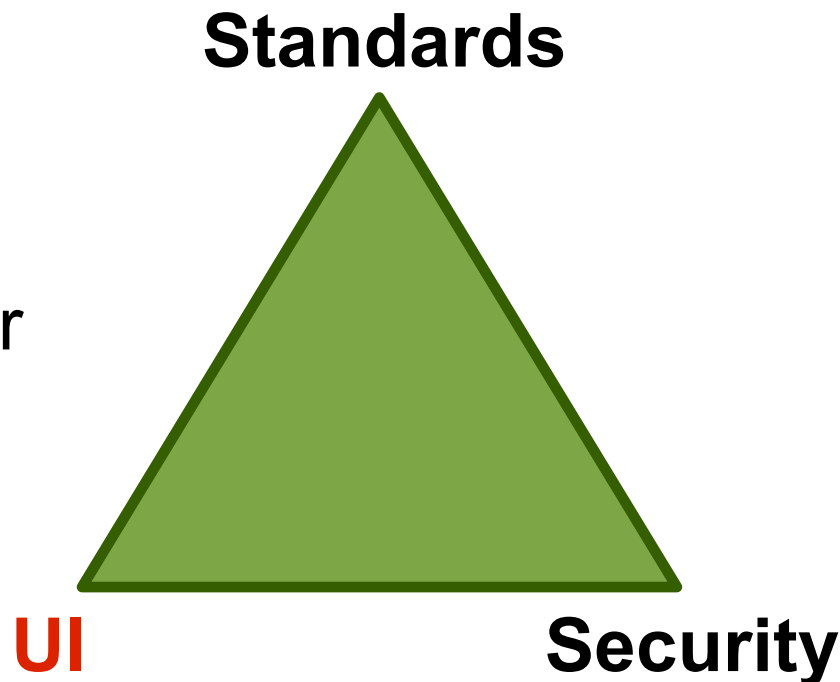
- Security
 - Domain restrictions
 - API restrictions
 - Pre-installation
 - Processor monitoring
 - Memory restrictions
 - Recovery mode



Background/Multiple MIDlets

Evolution Pyramid

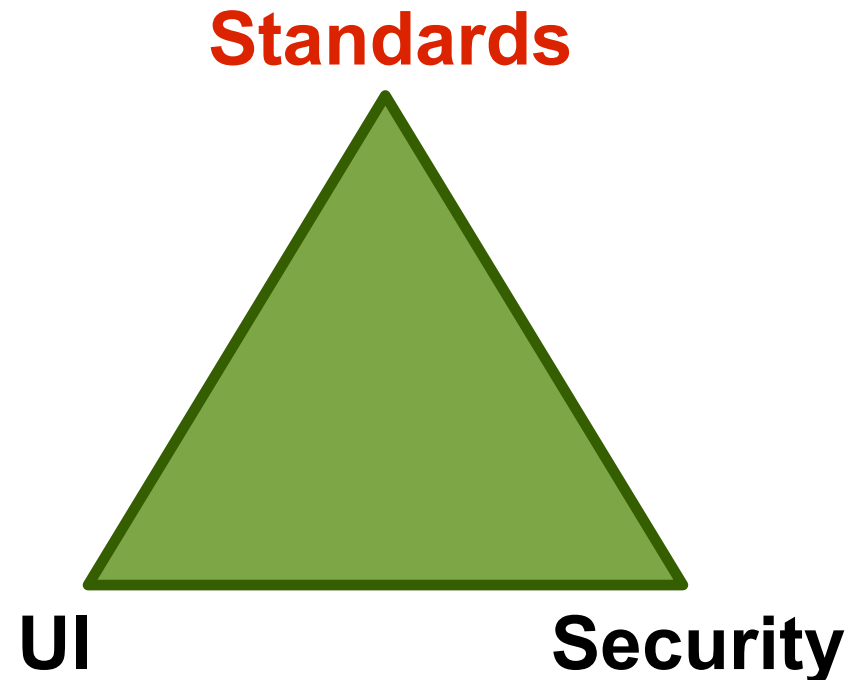
- UI
 - Simple
 - Safe
 - Reliable
- Users are not computer literate
- Blend into device



Background/Multiple MIDlets

Evolution Pyramid

- Standards
 - MIDP3



Background/Multiple MIDlets

Summary

- Combined email client
- Support for non-computer literate

...Standards to come

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UI Enhancements

What We Do Well at the Moment

- Series 40 today:
 - LCDUI components
 - Canvas and Game APIs
 - 2D SVG and 3D API
 - Video playback
 - Platform theme engine
- LCDUI looks just like the rest of the phone
 - **We don't want the user to know it is Java technology!**

UI Enhancements

What We Can't Do Today

- Status and indicator icons
- Active idle
- Screen savers
- 2nd displays
- Customisation
 - Why does every game have to write its own UI?
 - Why can't I brand my midlet?



UI Enhancements

Directions going forward

- Desktop toolkits aren't the answer
 - They're great for the job they do, but...
 - Phones aren't just little PCs
- The answer is to define new toolkits designed specifically for the mobile space: MIDP3

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Future JSRs

Take a Look in Our Crystal Ball

- Java Community Process services is one of the greatest strengths of Java technology
- Nokia is active in the Java Community Process
 - Take a look at the areas we are spec lead to get a good idea of where we see Java going
- Sometimes it produces specs faster than we can get them in to products!
- Which JSRs are most important?

Future JSRs

Enterprise Connectivity and E-commerce

- JSR 172 the bridge to the Java EE world
- JSR 177 gives us the security framework
- JSR 229 gives us a way to make payments
- **These are already standardized and on their way into products**

Future JSRs

Fragmentation

- Java Community Process leads to some fragmentation
 - There is no guarantee that a JSR is on every platform
- Every now and then we need to set a new level
- JSR 248 MSA is that new level

Future JSRs

MIDP3 and Other UI Enhancements

- MIDP3 is vital to Java ME platform
- JSR 258 brings wholesale customisation of UI
- XML and SVG based UI tools

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