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Symbian Developer Network

# Developer essentials for Symbian OS

**symbian**

# Overview

1. Choosing a language
2. Tooling up
3. Which APIs can I use?
4. What's new for developers in v8.x?

# 1 - Choosing a language

*What languages can I develop in?*

|                                      | <b>Compiled</b> | <b>Scripting</b>     |
|--------------------------------------|-----------------|----------------------|
| <b>Targeted to Symbian OS phones</b> | C++             | OPL                  |
| <b>Multi-platform</b>                | Java,<br>VB.NET | XML, SMIL,<br>Simkin |

# C++ platforms

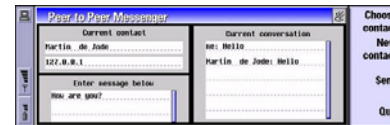
- C++

- ... Series 90

- ... UIQ

- ... Series 60

- ... 9200 Series / Series 80



# Java platforms

- Personal Java (+ JavaPhone)
  - ... 9200 Series, UIQ
- MIDP (CLDC)
  - ... Series 60, Series 80, Series 90, UIQ
- Personal Profile (CDC)
  - ... Series 80
- DoCoMo Java (DoJa)
  - ... FOMA phones



# Other languages

- **OPL** (<http://opl-dev.sourceforge.net/>)
  - ... Open-source runtimes available for
    - *9200 Series*
    - *Series 60 (alpha)*
    - *UIQ (beta)*
- **Visual Basic** (<http://www.appforge.com/>)
  - ... “Crossfire” solution integrates with Visual Studio.NET, supporting
    - *9200 Series / Series 80*
    - *Series 60*
    - *UIQ*



## 2 - Tooling up

*What software do I need for C++ development?*

... Symbian OS SDK

- [www.symbian.com/developer/sdks/](http://www.symbian.com/developer/sdks/)
- PC-based emulation
- build/deployment tools
- docs + examples



# Tools for app development

- Commercial products
  - ... Metrowerks (C++)
    - *CodeWarrior Development Studio for Symbian OS*
      - ... Personal edition
        - Hosted debugging
      - ... Professional edition
        - On-target debugging
    - ... *Borland (C++/Java)*
      - Mobile Studio
      - Enterprise Studio for Mobile
  - Free products
    - ... *Eclipse (C++/Java)*
    - ... *Open QUB (C++ RAD tool for UIQ)*

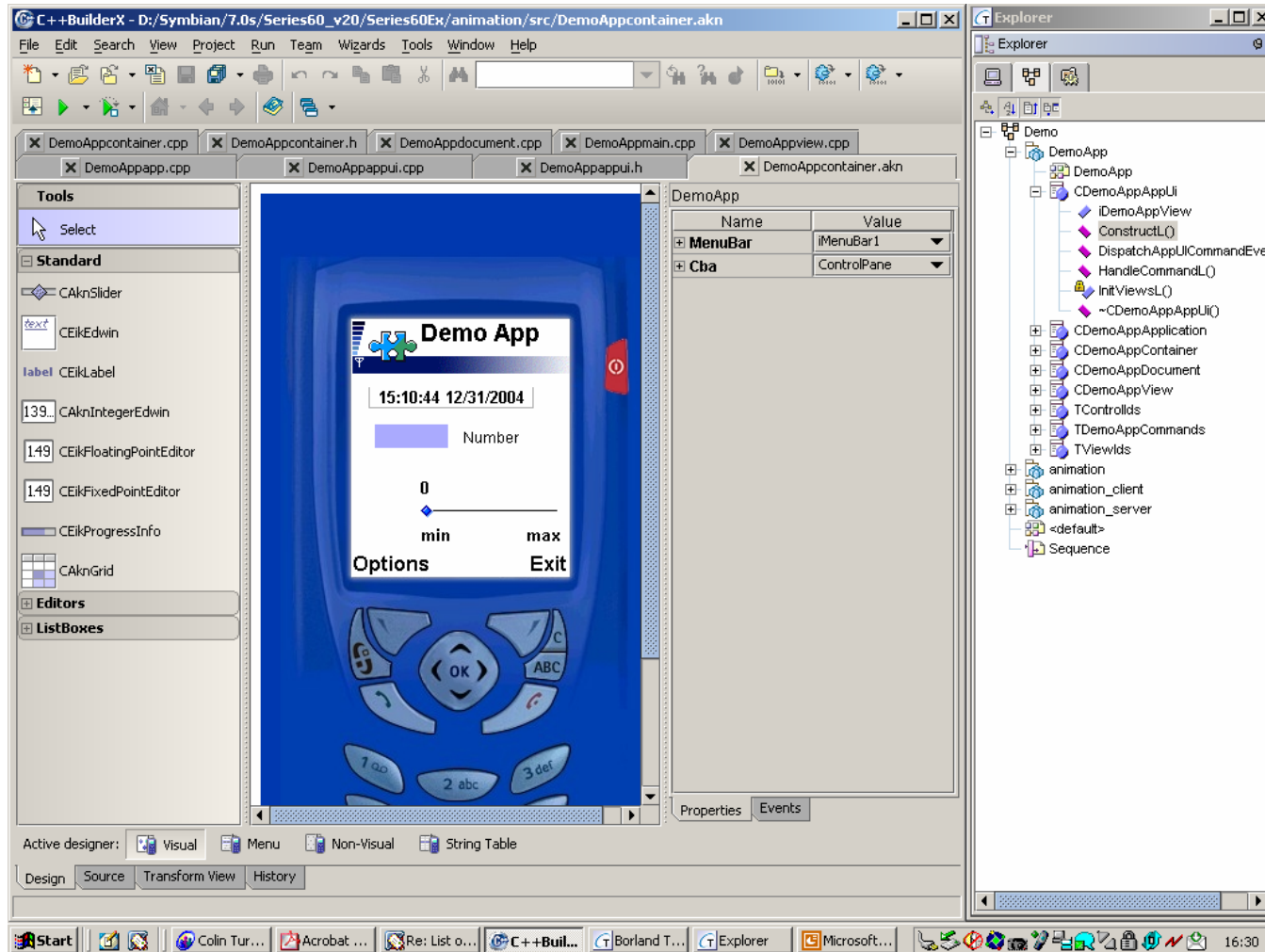




# Tools for system & middleware development

- Symbian OS DevKit
  - ... can be licensed by Platinum Partners
  - ... Symbian OS source code
  - ... in-depth engineering documentation
  - ... ROM building tools
- CodeWarrior IDE, OEM edition
  - ... JTAG debugging support
  - ... profiling

# Borland Enterprise Studio for Mobile (Series 60 visual designer)



# Borland Enterprise Studio for Mobile (UML view)

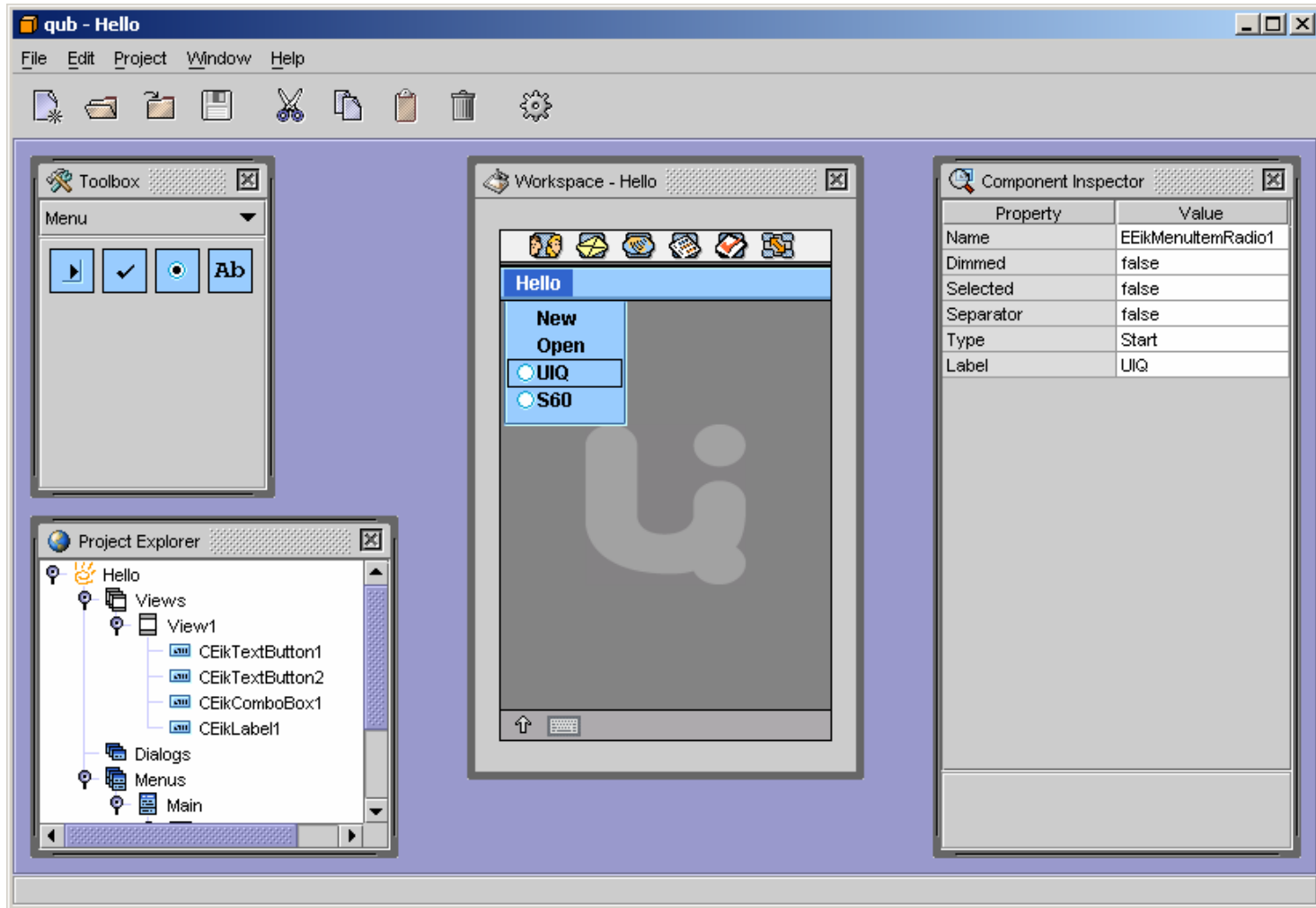
The screenshot displays the Borland Together Edition for C++ BuilderX -- Demo interface. The main window is the Designer, showing a UML class diagram for a mobile application. The diagram includes several classes and their relationships:

- CDemoAppContainer\***: Contains attributes `-Container: CDemoAppContainer*` and `-Identifier: TUid`. It has methods `+NewL: CDemoAppView*`, `+NewLC: CDemoAppView*`, `+Id: TUid`, `+HandleCommandL: void`, `+DoActivateL: void`, `+DoDeactivate: void`, `-CDemoAppView`, and `-ConstructL: void`.
- CDemoAppView\***: Contains attributes `-BackgroundColor: TRgb`, `-CtrlArray: RPointerArray <CCoeControl>`, `-FocusedControl: CCoeControl*`, `-ContextPane: CAknContextPane*`, `-TitlePane: CAknTitlePane*`, `-NaviPane: CAknNavigationControl*`, `-NaviDecorator: CAknNavigationDecorator*`, `-AknSlider1: CAknSlider*`, `-EikLabel1: CEikLabel*`, `-AknIntegerEditor1: CAknIntegerEditor*`, and `-EikTimeAndDateEditor1: CEikTimeAndDateEditor*`. It has methods `+NewL: CDemoAppContainer*`, `+NewLC: CDemoAppContainer*`, `+CountComponentControls: TInt`, `+ComponentControl: CCoeControl*`, `+Draw: void`, `+~CDemoAppContainer`, `+HandleControlEventL: void`, `+OfferKeyEventL: TKeyResponse`, `+DispatchViewCommandEvents: bool`, `-CDemoAppContainer`, `-ConstructL: void`, `-InitComponentsL: void`, `-CleanupComponents: void`, `-DispatchControlEvents: void`, `-HandleKeyEvents: bool`, and `-ChangeFocus: void`.
- CAknDocument**: Contains attribute `-CreateDocumentL: CApaDocument` and `-AppDllUid: TUid`. It has method `+EFirstDemoAppCmd: int`.
- CDemoAppDocument\***: Contains methods `+NewL: CDemoAppDocument*`, `+NewLC: CDemoAppDocument*`, `+~CDemoAppDocument`, `+CreateAppUiL: CAknAppUi*`, `-ConstructL: void`, and `-CDemoAppDocument`.
- CDemoAppAppUi**: Contains methods `-InitViewsL: void`, `+ConstructL: void`, and `+~CDemoAppAppUi.`
- enum TControlIds**: Contains `+EDemoAppStartControlIds: int`.
- enum TViewIds**: Contains `+EDemoAppViewId: int`.

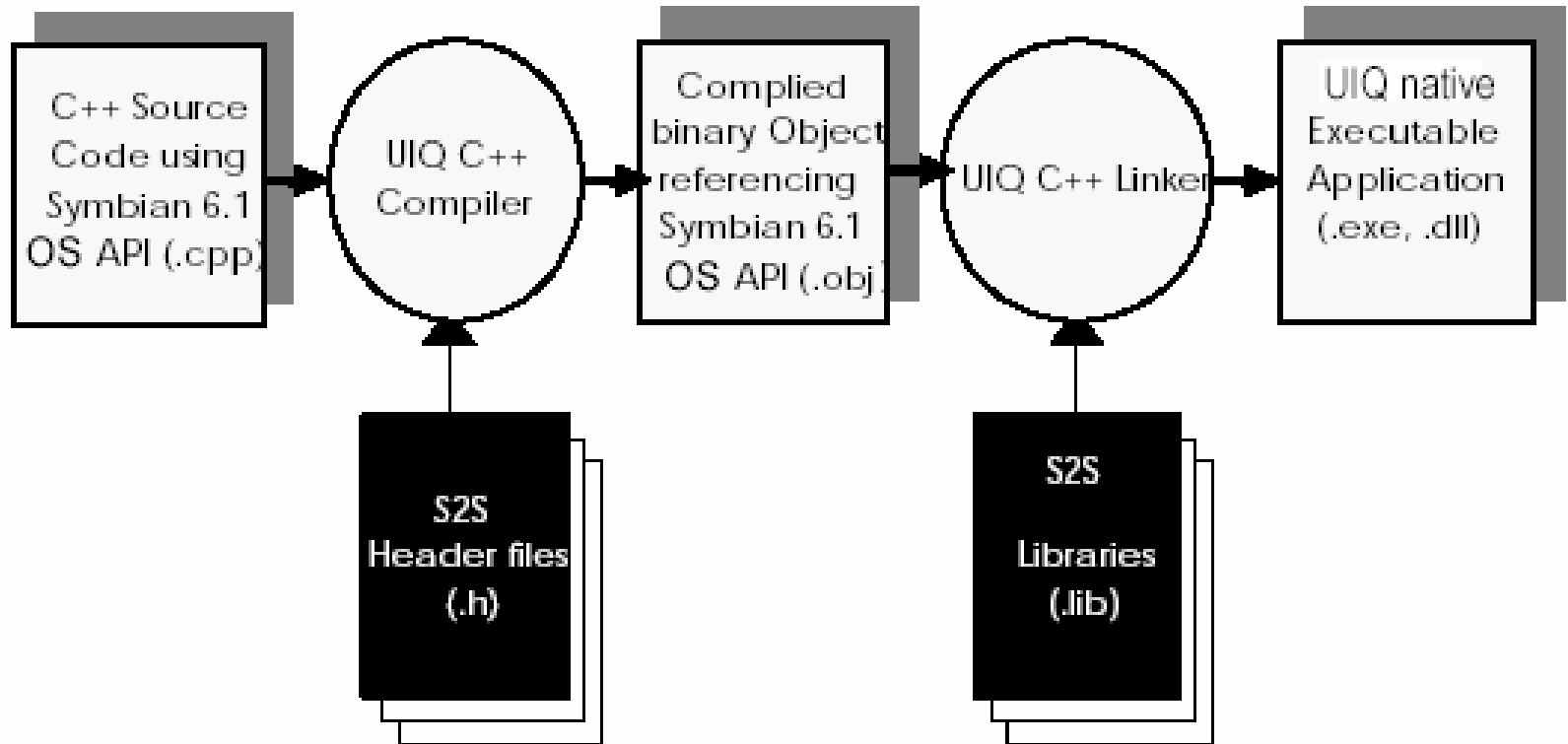
The Explorer window on the right shows the project structure for 'Demo', including folders for 'DemoApp' and 'DemoAppAppUi', and various source files and resources.

The status bar at the bottom shows the current cursor position: `static CDemoAppDocument* NewL(CEikApplication& aApp)`.

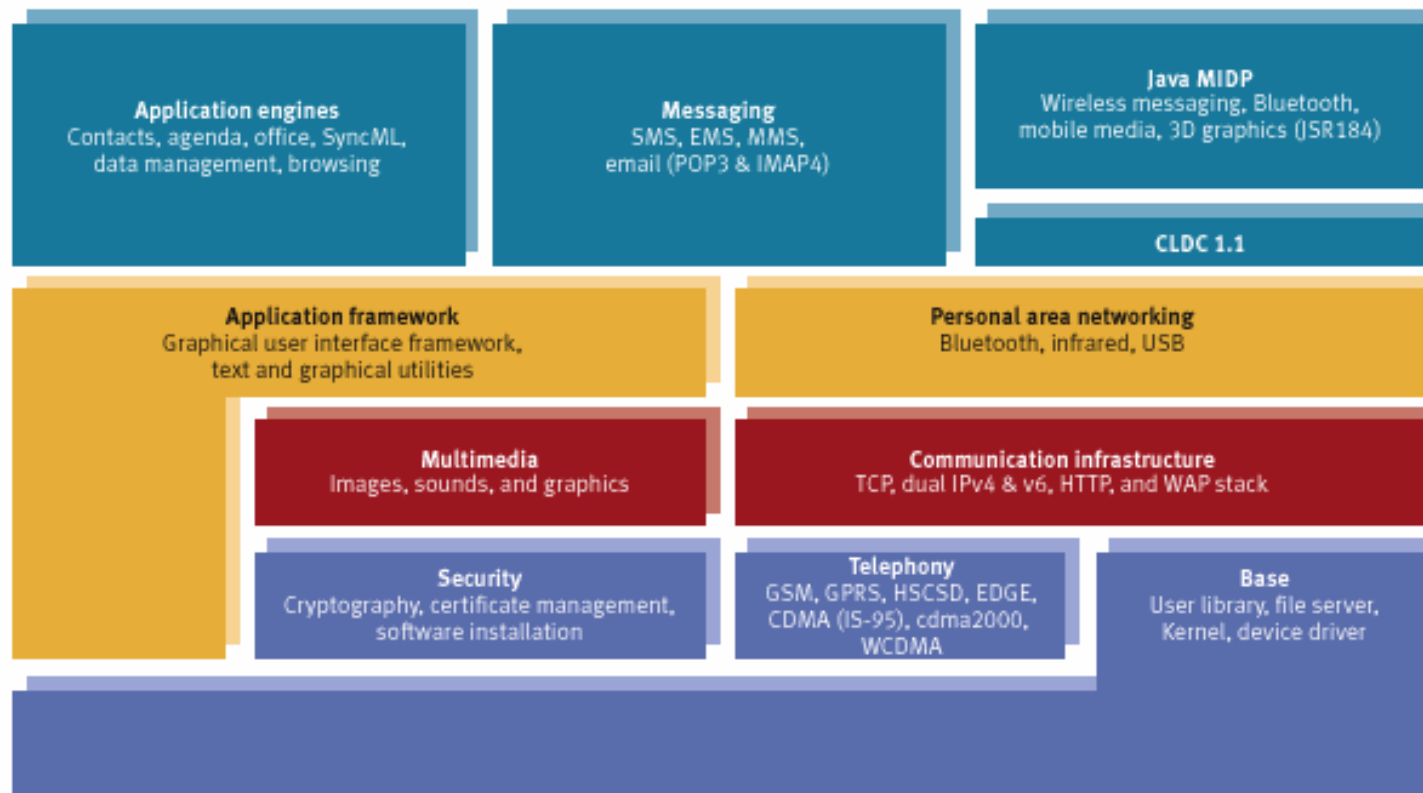
# Open QUB (Visual development tool for UIQ)



# Peroon “DIMA” – automated porting ([www.peroon.co.il](http://www.peroon.co.il)) e.g. from Series 60 to UIQ



# 3 – Which APIs can I use?



Symbian OS v8.0 architecture

# Platform SDKs and phones

- Symbian OS defines the core APIs (~80%) in any platform SDK or phone

|                                 |                       |                    |                        |                               |                                 |                                 |                              |
|---------------------------------|-----------------------|--------------------|------------------------|-------------------------------|---------------------------------|---------------------------------|------------------------------|
| <b>Nokia<br/>9210,<br/>9290</b> | <b>Nokia<br/>7650</b> | <b>Sendo<br/>X</b> | <b>Siemens<br/>SX1</b> | <b>S-E<br/>P900/<br/>P910</b> | <b>Moto-<br/>rola<br/>A1000</b> | <b>Nokia<br/>6620,<br/>9500</b> | <b>Nokia<br/>6630</b>        |
| <b>9200<br/>Series</b>          | <b>Series 60</b>      |                    |                        | <b>UIQ</b>                    |                                 | <b>Series 60,<br/>80</b>        | <b>Series 60,<br/>80, 90</b> |
| v6.0                            | v6.1                  |                    | v7.0                   |                               | v7.0s                           | v8.x                            |                              |
| <b>Symbian OS</b>               |                       |                    |                        |                               |                                 |                                 |                              |



# Which APIs where?

- Public C++ APIs are well-defined
    - ... System architecture papers
      - [www.symbian.com/developer/techlib/papers/cpp\\_sysarch.html](http://www.symbian.com/developer/techlib/papers/cpp_sysarch.html)
      - “Symbian OS System definition”
      - “Symbian OS System definition – detailed view”
    - ... Symbian Developer Library
      - “API Reference”
- work out which *Symbian OS* APIs are supported on which phone!

## 4 - What's new for C++ developers in Symbian OS v8.x?

- Telephony
- Graphics
- IPC mechanisms
- XML parser
- Strong stream encryption
- API tagging
- Bluetooth and networking
- Local time synchronization

# 3rd party telephony API (from v7.0s)

- Easy API for core telephony services
- What's my number?
  - ... IMEI, IMSI, own phone number
  - ... caller ID
- Network info
  - ... Flight mode status, network availability, signal strength, network registration status
- Location
  - ... Area code and cell ID
- Others
  - ... Battery status, DTMF tone generation

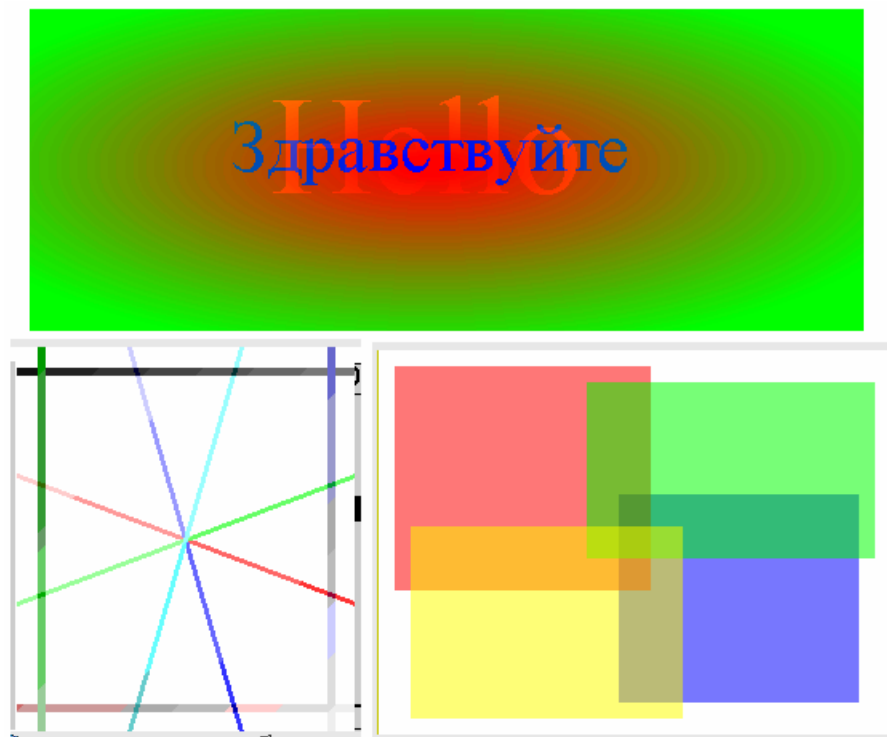
# Semi-transparent windows/dialogs (from v7.0s)

Four new methods:

- 1 `void RWindow::HandleTransparencyUpdate () ;`
- 2 `TInt RWindow::SetTransparencyFactor ( const TRgb& aTransparencyFactor) ;`
- 3 `TInt RWindow::SetTransparencyBitmap ( const CFbsBitmap& aTransparencyBitmap) ;`
- 4 `void RWindow::SetNonTransparent () ;`

Extended to stretched bitmaps in v8.1

# Semi-transparent window - example



# IPC mechanisms

## **Publish and Subscribe:**

- system-wide global variables
- peer-to-peer inter-process communication
- User- and Kernel-side API

## **Message Queue**

- Classic reader/writer paradigm
- Share data processing between threads

# XML parser framework (from v7.0s)

- Unified API to support all XML parser capabilities
- Based on ECOM plug-in framework
- Implementations provided for
  - ... Text XML parsing
  - ... Binary WAP XML parsing



# Strong stream encryption (from v7.0s)

- Public API for strong encryption of streams
  - ... Enhancements to **REncryptStream/RDecryptStream**
  - ... Implements a strong symmetric cipher
  - ... User password based

# API tagging (from v7.0s)

- Introduction of API tagging with clear indication of the access status and release status for each API clearly indicated in the header file.
  - ... Access status:
    - @internalTechnology, @internalComponent, @internalAll, @publishedPartner, @publishedAll
  - ... Release Status:
    - @prototype, @released, @deprecated, @removed, and @test

# 3D graphics OpenGL ES API (from v8.0)

- Public API for OpenGL ES 3D graphics library
  - ... version 1.2.1
  - ... platform-independent API
  - ... Open GL ES types #def'd to Symbian OS types
  - ... prototype in v8.0
- Reference implementation available to licensees
  - ... Suitable for inclusion in SDKs
- Accessible also through Java API
  - ... JSR184

# Bluetooth extensions (from v8.1)

## Bluetooth Personal Area Networking

- Ad-hoc IP based connectivity over L2CAP
- Connect phones, PCs and Apple iMACs
- No PPP service required

## Bluetooth 1.2 L2CAP flow and error control

- run simultaneously applications with different link requirements:
  - ... e.g., reliability, packet size

# Graphics enhancements (from v8.1)

## **Screen Scaling and Positioning**

- Allows for legacy applications written for a smaller screen size to be run on a larger screen size and positioned appropriately.

## **Scalable Application Icons**

- Scalable application icons extends vector graphic support in the UI layer for icons and text.

# Multi-port USB (from v8.1)

- Multiple ACM ports are supported over USB
  - ... Particularly useful when connecting a phone to the emulator

## Synchronisation using universal time (from v8.1)

- Provides conversion services between UTC and local time (including allowance for Daylight Saving Time)
- Enables interworking with UTC to support syncing with Notes and Outlook.



## So remember...

- Plenty opportunities for app development on Symbian OS phones
- You can use C++, Java and other languages
- Watch out for phones based on v8.x!