



# Mobile Opportunities for the Open Source Community

Ravi Belwal ([ravi.belwal@nokia.com](mailto:ravi.belwal@nokia.com))

Sr. Technology Consultant

Forum Nokia

# S60: IT'S WHAT'S IN YOUR PHONE

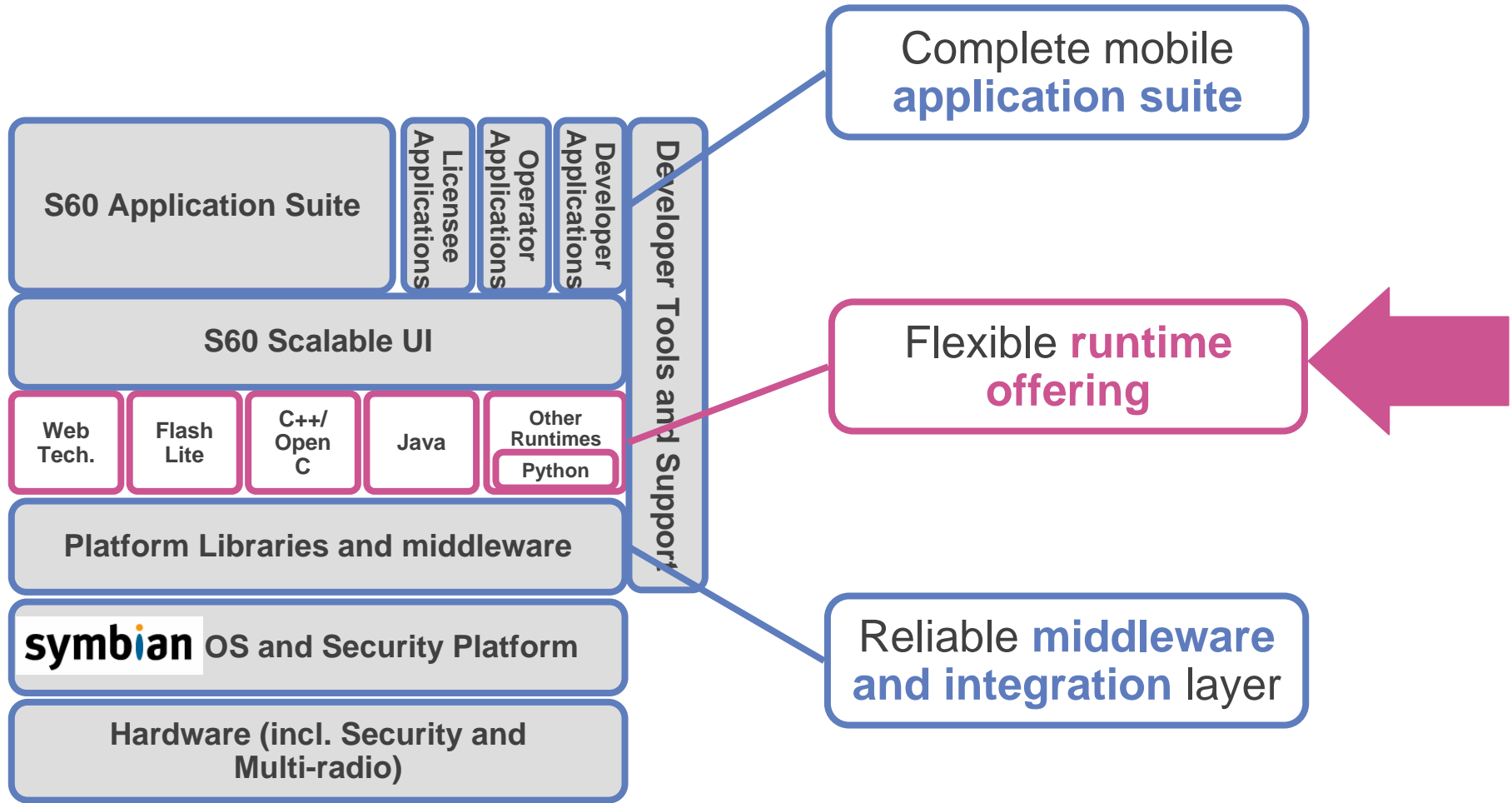


S60

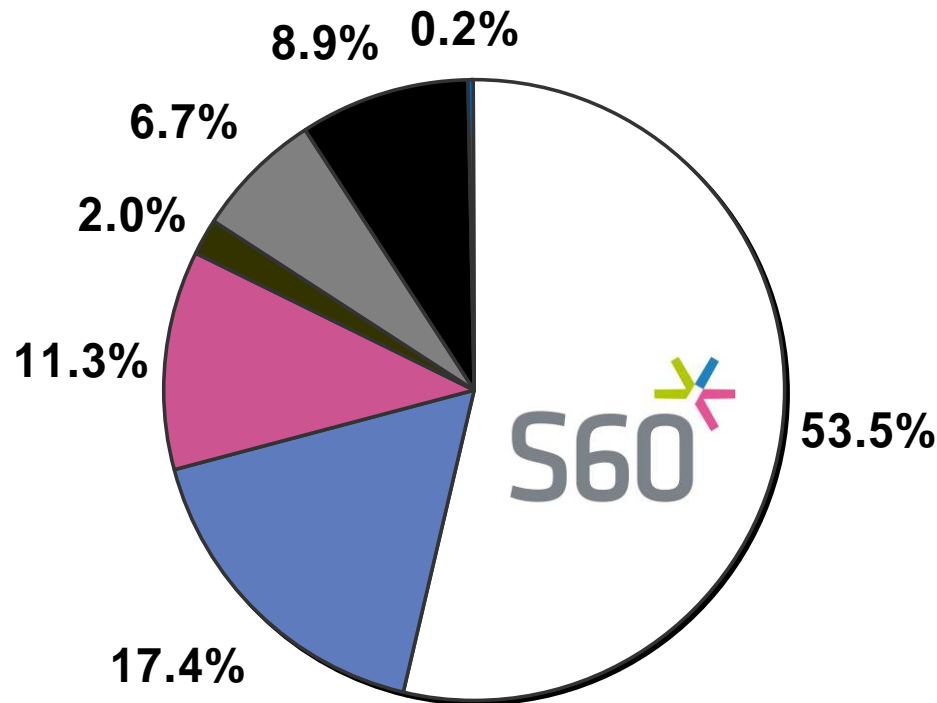


S60 Open to new features

# S60 is the leading converged device platform and application suite



# S60 runs over 100 million phones around the world.



**>50%** share of worldwide converged device market

□ S60 ■ Other Symbian ■ MS ■ Palm ■ Linux ■ RIM ■ Others

**S60 licensees**

**NOKIA**









































**SAMSUNG**

**lenovo** 联想  
Legend Group Limited

**LG**

S60 Open to new features

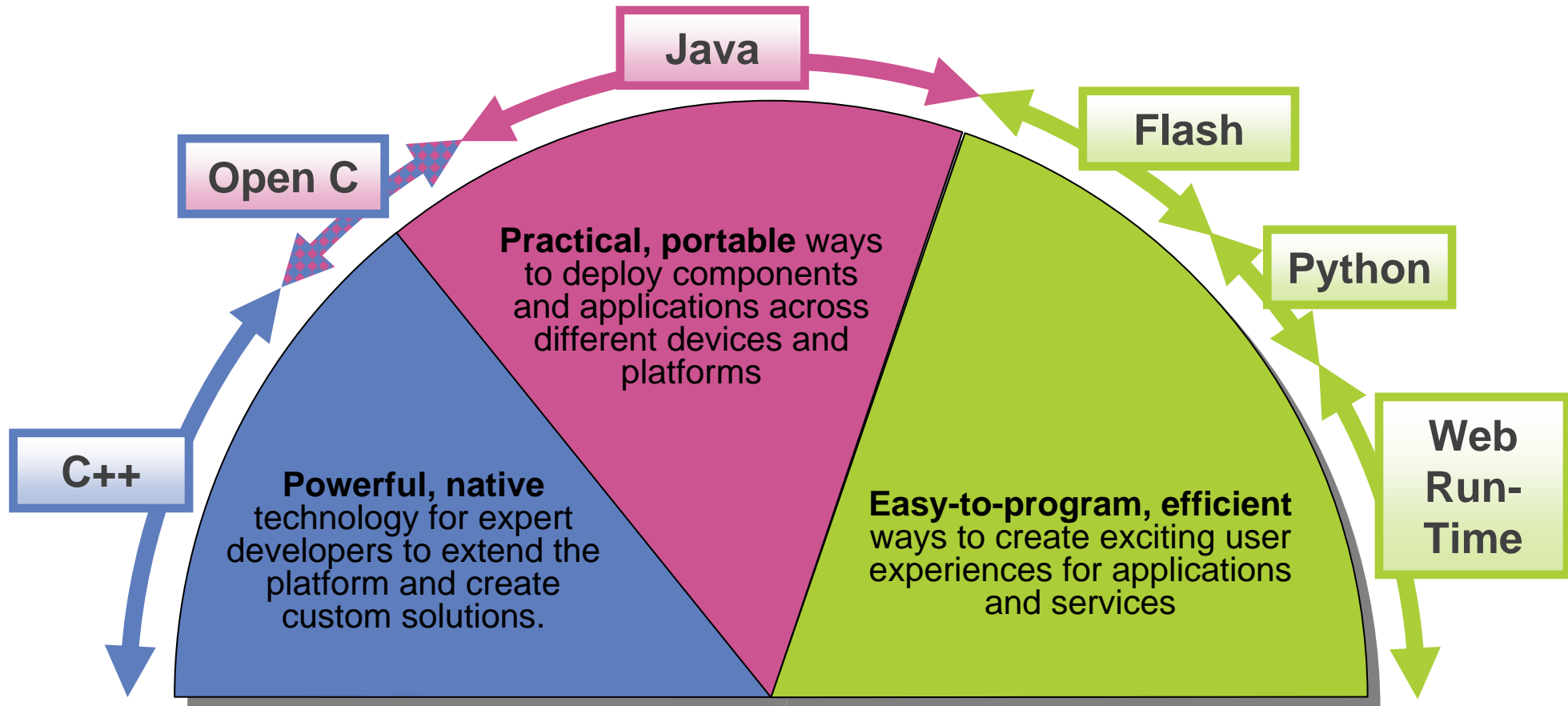
# Over 50 S60 models sold by 200+ operators

 Lenovo P930	 LG KS10	 NEW	 NEW	 Nokia N73	 Nokia N80	 Nokia N92	 Nokia N71
 NEW	 Nokia N77	 Nokia E90	 Nokia E61i	 Nokia E60	 Nokia E61	 Nokia E70	 Nokia 3250
 Nokia E65	 Nokia 6110 Navigator	 Nokia N93i	 Nokia N76	 Nokia N91	 Nokia N70	 Nokia N90	 Nokia 6682
 Nokia 6290	 Nokia N75	 Nokia N95	 Nokia E62	 Nokia 6681	 Nokia 6680	 Nokia 3230	 Nokia 6670
 Nokia E50	 Nokia 5500 Sport	 Nokia N93	 Nokia N72	 Nokia 6630	 Nokia 6260	 Nokia N-Gage QD	 Nokia 7610

S60 Open to new features

# The **widest choice** of runtime technologies provides **maximum flexibility** to developers

**S60** has a solution that meets your requirements for features, user experience, and portability





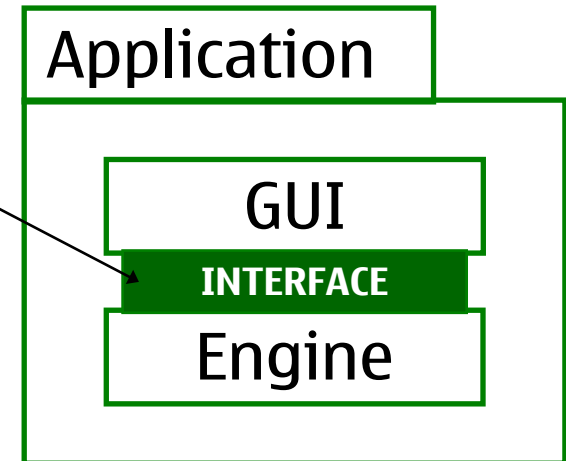
# Introduction to Open C

- Typical Application Architecture
- S60 Platform Porting Problem
- Open C And Its Benefits

# Typical Application Architecture

- Applications split into 2 conceptual parts:
  - GUI module
  - Engine module
- Implementation
  - GUI and Engine in a Single exe (small apps)
  - Engine in a separate DLL (typical)
  - A number of binary components (large and complex applications)

Clearly defined





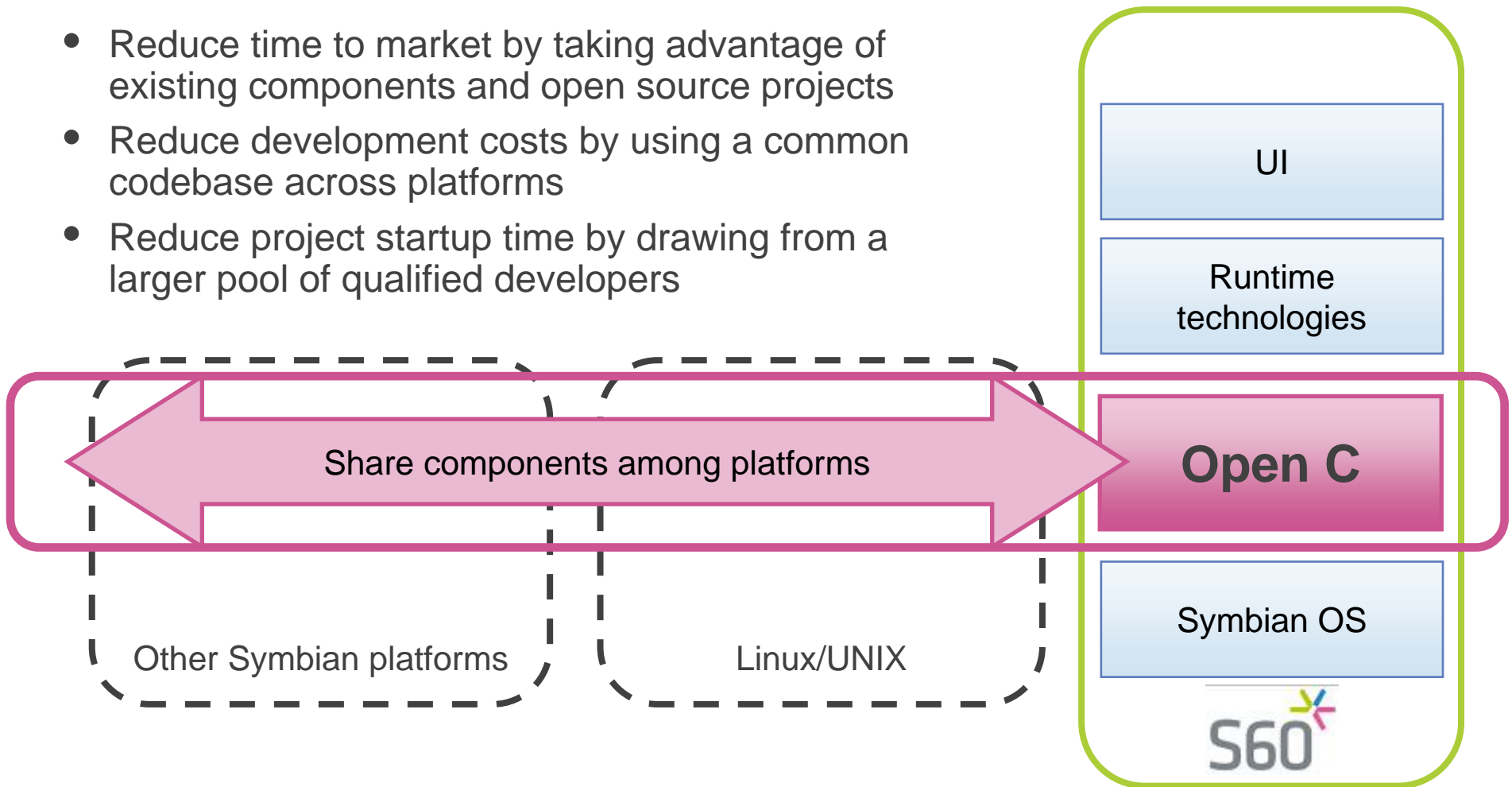


# S60 Platform Porting Problem

- Porting to many platforms:
  - GUI needs rewriting but Engine requires minimal changes
- Porting to S60 Platform:
  - GUI needs rewriting and Engine requires major rework
  - **In many cases this is too much effort to port to S60!**
- Can now use Open C
  - Allows Engine to be ported with much less effort
    - Provided it is C based code using POSIX/glib libraries
  - Only for Engine code though!
    - GUI must still be written in the standard Symbian way

# Open C leverages the flexibility of open source to reduce development costs

- Reduce time to market by taking advantage of existing components and open source projects
- Reduce development costs by using a common codebase across platforms
- Reduce project startup time by drawing from a larger pool of qualified developers



# Open C Coverage


Library	Description	Open Source Project	Coverage (%) *
libc	Standard C libraries	POSIX	47
libpthread	Implements multi-threading within a traditional user process.	POSIX	60
libm	Arithmetical and mathematical functions	POSIX	42
libdl	Allows loading of dynamic link libraries.	POSIX	100
libz	Provides in-memory compression and decompression functionality.	LIBZ	100
libcrypt	Provides functionality for encrypting blocks of data , messages, and password hashing.	OpenSSL	100
libcrypto	Implements a wide range of cryptographic algorithms used in various Internet standards.	OpenSSL	77
libglib	A general-purpose utility library.	GNOME	100
libssl	Implements the Secure Sockets Layer (SSL v2/v3) and Transport Layer Security (TLS v1) protocols.	OpenSSL	86
<b>Total</b>			<b>72</b>

\*Percentage of functions of the full open-source project that is included in Open C.



# Open C Offering

- For S60 3<sup>rd</sup> Edition and For S60 3<sup>rd</sup> Edition FP1 SDKs
  - Open C comes as a plugin to install over the SDK
- For S60 3<sup>rd</sup> Edition FP2 and beyond
  - Open C will be integrated into the SDK
- All S60 3<sup>rd</sup> Edition SDKs and Open C plugin are freely downloadable from the Forum Nokia website
- Open C comes with:
  - Open C APIs (headers and libraries)
  - Documentation (Open C API reference and Developer Guides)
  - Example applications
  - Open C runtime for S60 3<sup>rd</sup> Edition devices



# What you need to know about S60?

- How To Program For Mobile Devices?
- Tools
- SDKs
- Carbide.c++

# Programming For Mobile Devices

- Factors to consider when developing for mobile devices:
  - Robustness
    - Device must be able to run for very long periods without rebooting
  - Code Size
    - Not so much of a problem now with MMC cards
  - Memory Usage
    - Available memory is low compared with PCs and likely to run out
  - Performance
    - Processors are slow compared to those on PCs
  - Battery Life
    - Minimise processor usage to extend battery life
  - Screen Size
    - Devices have limited screen size

# Writeable Static data

- Global writeable static data (WSD) is any per-process variable which exists for the lifetime of the process.

- i.e. Globally scoped data and function scoped static variables

```
int index; //WSD
void SetFileName()
{
    static int count; //WSD
    ...
}
```

- WSD in EXEs is supported by all versions of S60
- WSD in DLLs is supported by S60 3<sup>rd</sup> Edition BUT
  - Is very memory inefficient
  - Should use only as a last resort! – For example use TLS instead!
  - Porting projects are usually justified in using WSD
- Add **EPOCALLOWDLLDATA** keyword to mmp file.



# Tools

- An Integrated Development Environment (IDE)
  - Preferably Carbide.c++
- An S60 3<sup>rd</sup> Edition SDK
  - Contains all the necessary S60 C++ headers and libs
  - Contains a free target gcc compiler (install separately)
- Java Runtime
  - Required by SDK and by Carbide.c++
- Perl
  - Required by SDK and by Carbide.c++
- Open C Plugin
  - Required for S60 3<sup>rd</sup> Edition and S60 3<sup>rd</sup> Edition FP1 SDKs only



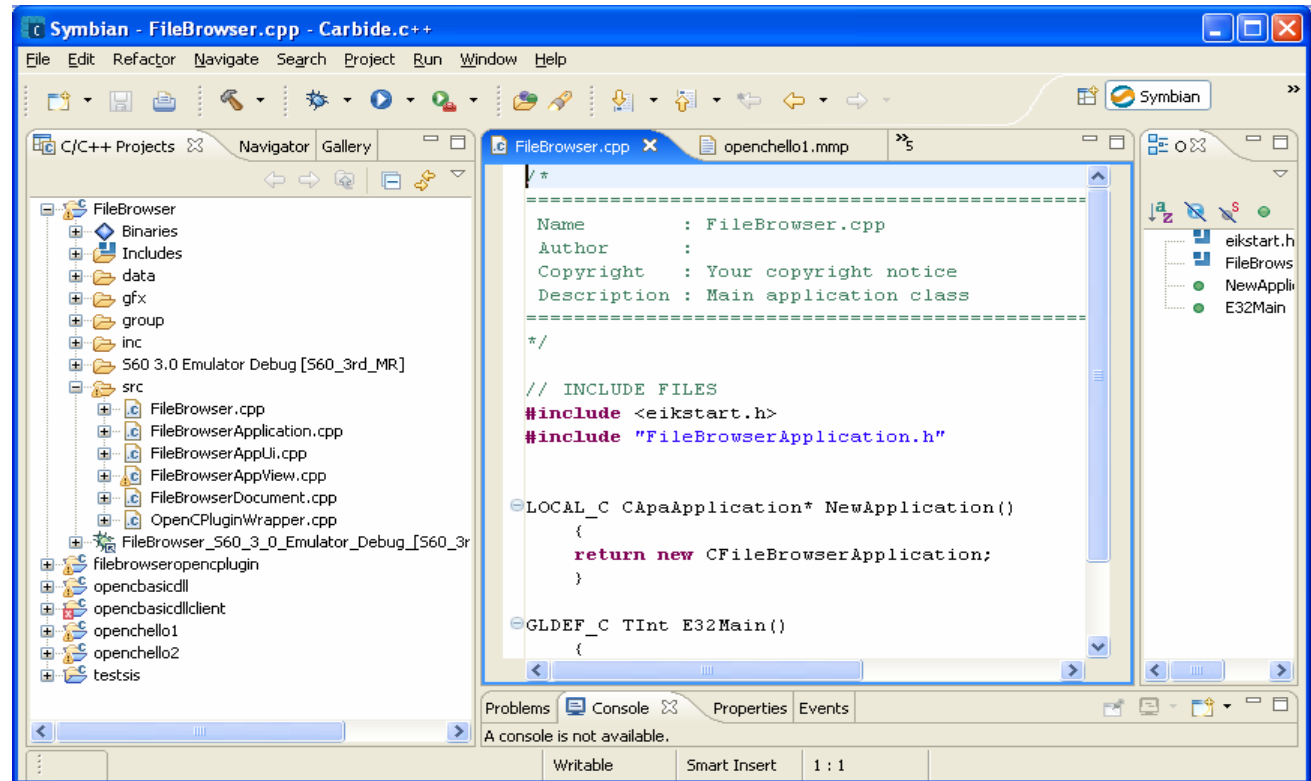


# S60 3<sup>rd</sup> Edition SDKs

- S60 3<sup>rd</sup> Edition SDK contents:
  - Emulator – Win32 port of S60 Platform
    - Used for viewing and testing
  - System header files
    - `<EPOCROOT>\epoc32\include`
  - Two sets of library files (for emulator and target)
    - `<EPOCROOT>\epoc32\release`
  - Example Code
    - `<EPOCROOT>\Examples` (Symbian Examples)
    - `<EPOCROOT>\S60Ex` (S60 Examples)
  - Documentation
    - `<EPOCROOT>\S60Doc`

# Carbide.c++

- Fully featured IDE based on Eclipse and Java
- Carbide.c++ comes in a number of Editions:
  - Express (free), Developer, Professional, OEM
- Comes with an x86 compiler
  - For building software for the Emulator



# Where to go from here?

- Download Tools
  - [www.forum.nokia.com](http://www.forum.nokia.com) for SDKs and Carbide.c++
  - [www.java.com](http://www.java.com) for java runtime
  - [www.activestate.com](http://www.activestate.com) for active perl
- S60 SDK Documentation – \*.chm file in **S60Doc** folder
  - Available as part of any S60 SDK
  - Gives further information on all aspects of S60
- Additional Open C Material
  - Search the forum nokia website ([www.forum.nokia.com](http://www.forum.nokia.com)) for further information on Open C
- Certification
  - For further information on certification browse the Symbian Signed website ([www.symbiansigned.com](http://www.symbiansigned.com))





More information: <http://www.forum.nokia.com>