



C++Builder XE5技術研討會

唯快不破

Agenda

- 簡介
- C/C++ : 跨平台開發的霸主
- C++Builder XE5 : 最快速, 強大的C/C++開發工具
- 萬眾矚目 : C++Builder For Mobile
- 一份程式碼同時開發移動和桌面應用程式
- C/C++ MEAP : Mobile Enterprise Application Platform
- 結論

Embarcadero Technologies

Founded 1993

3.2 Million Customers

500+ Employees in 29 Countries

5 R&D Centers of Excellence

World Wide Sales & Support

The Big Picture

A recent market study of Windows developers and mobile

Research Goal

The primary research goal was to quantify the current levels of experience and expertise among developers making the move **from Windows desktop to mobile** applications.

Methodology

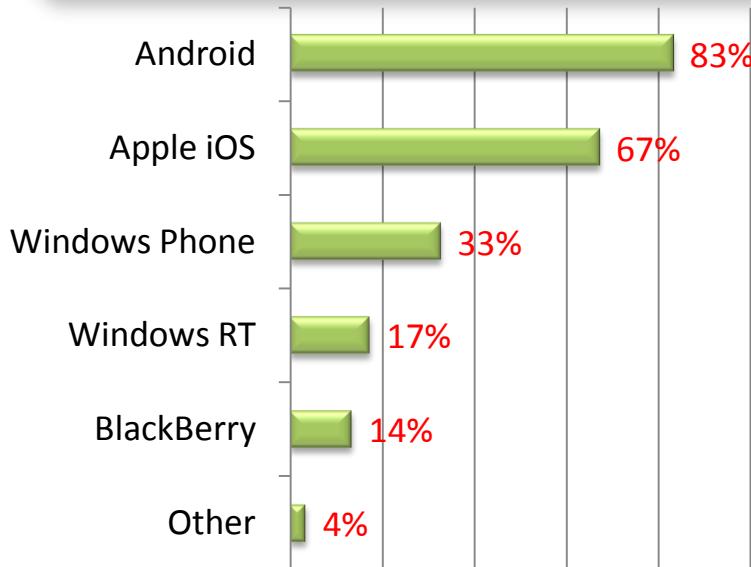
Windows developers from around the world were invited to participate in an online survey. They were asked a series of questions about demand for mobile applications, **experience** with delivering apps, and **challenges**. The survey was fielded in English and German.

Participants

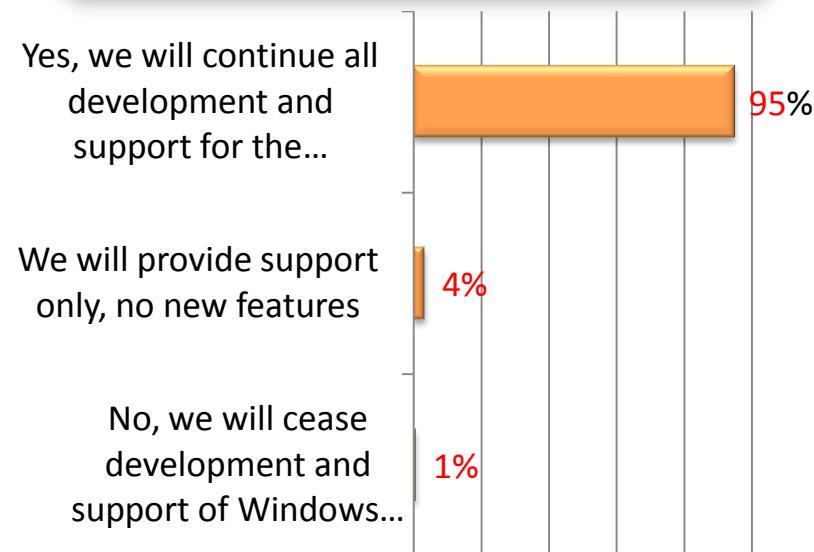
A total of 1337 individuals completed in the survey. All had responsibility for development of Windows **desktop** applications.

Windows developers must deliver mobile apps on iOS and Android **and** continue to support Windows

What mobile platforms are most important for your users to have applications for? Choose all that apply.

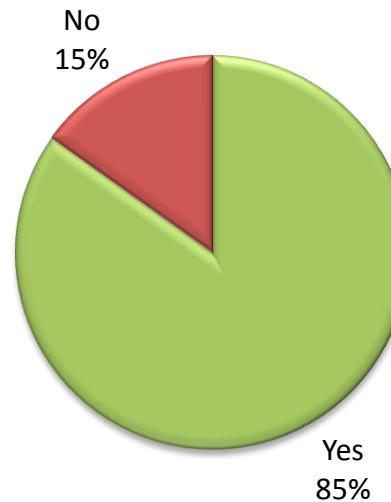


Will you still be required to develop and support your existing Windows applications?



85% say native apps are best for users

Do you believe natively compiled apps deliver a better user experience and performance than a scripted/interpreted language solution (i.e. HTML5, Java, JavaScript, Python, etc.)?

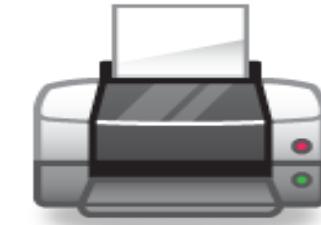


95% see value in common source code for mobile and desktop

Would it be valuable to have a tool that would allow you to use common source code to produce both desktop applications and native mobile apps with a single development effort?



C/C++：跨平台開發的霸主



C and C++ are everywhere

New Turbo C++ Professional

When the object is programming



Be Objective

Object-Oriented
Programming

(OOP) is programming in the '90s. It's the next step after structured programming and is the best way to write applications. So Borland combined the power of OOP with the efficiency of C to produce new Turbo C++ Professional.

And Turbo C++ Professional is the first Turbo-charged native code C++ compiler that brings Object-Oriented Programming to your PC. Since Turbo C++ Professional also compiles ANSI C code, you can be productive with C now, and move to C++ at your own pace.

Environment ++

The best compiler deserves the best environment, and our new Programmer's Platform™ environment makes you more productive. It features overlapping windows and mouse support. And sports a new multi-file editor, an integrated debugger, and a smart project manager. Its advanced open architecture lets you integrate the tools you need to feel right at home.

VROOMM adds room

VROOMM™ (Virtual Runtime Object-Oriented Memory Manager) lets you break

the 640K barrier. Just select the application code you want to overlay, and VROOMM does the rest—swapping modules on demand. It's fast, easy, automatic.

Another +

Turbo C++ Professional gives you all the tools you need to build fast, reliable C++ programs.

Turbo Debugger® 2.0 debugs your object-oriented programs. This powerful new version is the first and only debugger to support *reverse execution*. Letting you step backwards through your code to find the bugs you might have missed.

New Turbo Profiler,™ the world's first interactive profiler, displays histograms of your program's performance. With it, you



can easily spot execution bottlenecks, and see where improvements or redesign of your code will yield maximum performance gains.

And Turbo Assembler® 2.0 lets you replace time-critical segments of your code using the world's fastest MASM-compatible assembler.

Turbo C++ Professional Compiler

- C++ conforming to AT&T's 2.0 specification
- C++ class libraries
- Full ANSI C compiler
- VROOMM overlay manager
- Complete documentation and tutorials

Programmer's Platform

- Open architecture for integration of your own tools
- Overlapping windows with mouse support
- Multifile, macro-based editor
- Smart project manager provides visual MAKE
- Integrated debugging and hypertext help

Turbo Debugger 2.0

- Class hierarchy browser and inspectors
- Reverse execution provides "true" undo
- 286 protected-mode and 386 virtual-mode debugging
- Keystroke record and playback

NEW Turbo Profiler

- Displays histograms of program execution
- Tracks call history, overlays, interrupts, file I/O

Turbo Assembler 2.0

- Multipass assembler with NOP squishing and 486 support

Special Introductory Offer

The suggested retail price for Turbo C++ Professional is \$299.95 (\$199.95 for Turbo C++). For a limited time, Borland is offering its dealers and distributors special introductory discounts.* So be objective, and SEE YOUR DEALER or call Borland** at 1-800-331-0877 now!

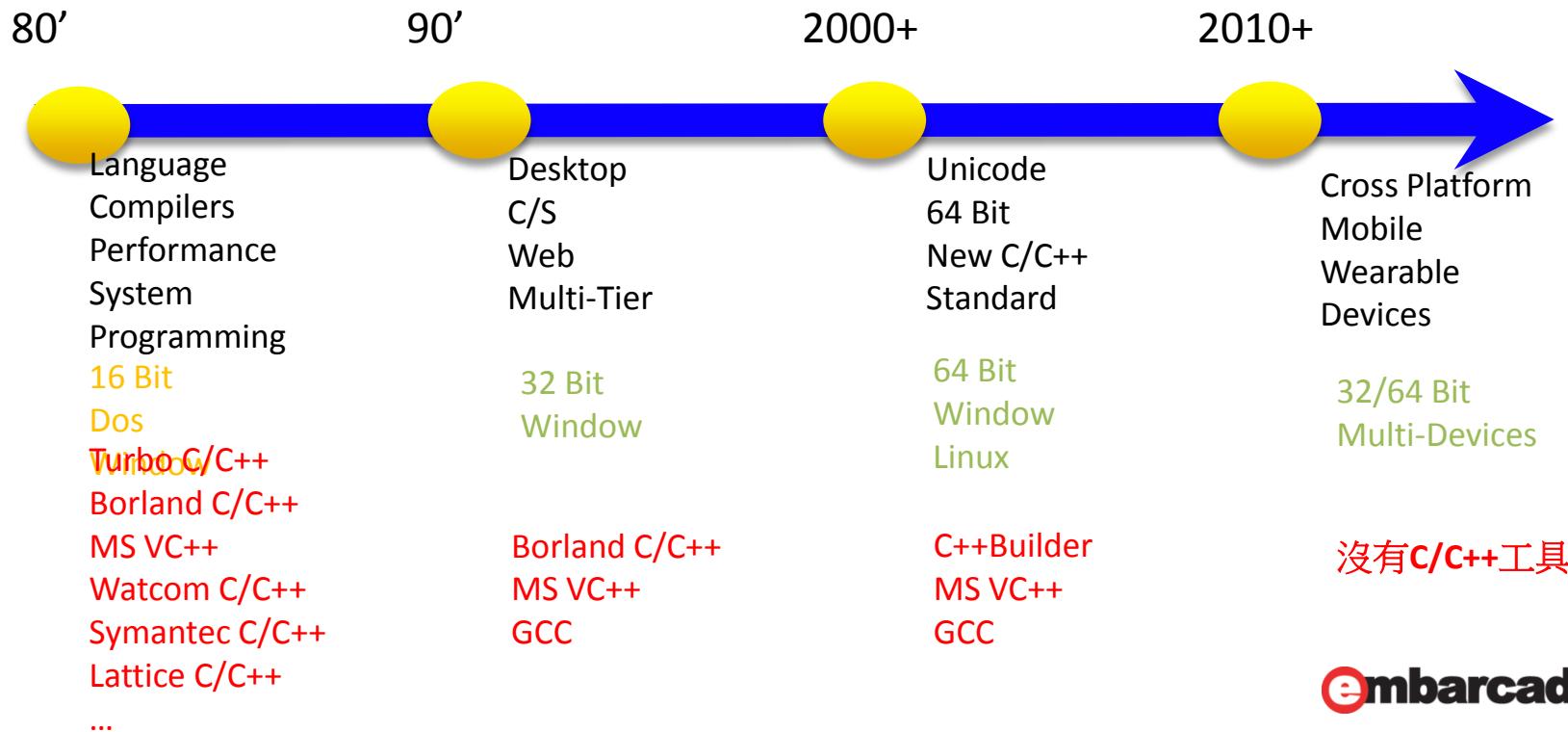
*Offer expires July 31, 1990 or while supplies last. Offer good in United States and Canada only. **Special discounts for registered Turbo C++ owners are available from Borland. Mail orders to: Borland, P.O. Box 600001, Scotts Valley, CA 95067-0001. For orders outside the U.S., call (408) 438-5000. Turbo Debugger, Turbo Profiler and Turbo Assembler are trademarks or registered trademarks of Borland International, Inc. Copyright © 1990, Borland International, Inc. All rights reserved. 80-1333

C++03 & TR1

- C++03 was a bug fix release for implementers
 - No change to the specification
- TR1 was library focused
 - Much of the standard library began its life in Boost
- Regular expressions
- Smart pointers
- Hash tables
- Random number generators
- Reference wrapper
- Function objects
- Tuple type
- Fixed size array

C++11

- Rvalue references and move constructors
- constexpr - Generalized constant expressions
- Core language usability enhancements
- Initializer lists
- Uniform initialization
- Type inference
- Range-based for-loop
- Lambda functions and expressions
- Alternative function syntax
- Object construction improvement
- Explicit overrides and final
- Null pointer constant
- Strongly typed enumerations
- Right angle bracket
- Explicit conversion operators
- Alias templates
- Unrestricted unions
- Variadic templates
- New string literals
- User-defined literals
- Multithreading memory model
- Thread-local storage
- Explicitly defaulted and deleted special member functions
- Type long long int
- Static assertions
- Allow sizeof to work on members of classes without an explicit object
- Control and query object alignment
- Allow garbage collected implementations
- Threading facilities
- Tuple types
- Hash tables
- Regular expressions
- General-purpose smart pointers
- Extensible random number facility
- Wrapper reference
- Polymorphic wrappers for function objects
- Type traits for metaprogramming



C++Builder XE5：最快速，強大的 C/C++開發工具

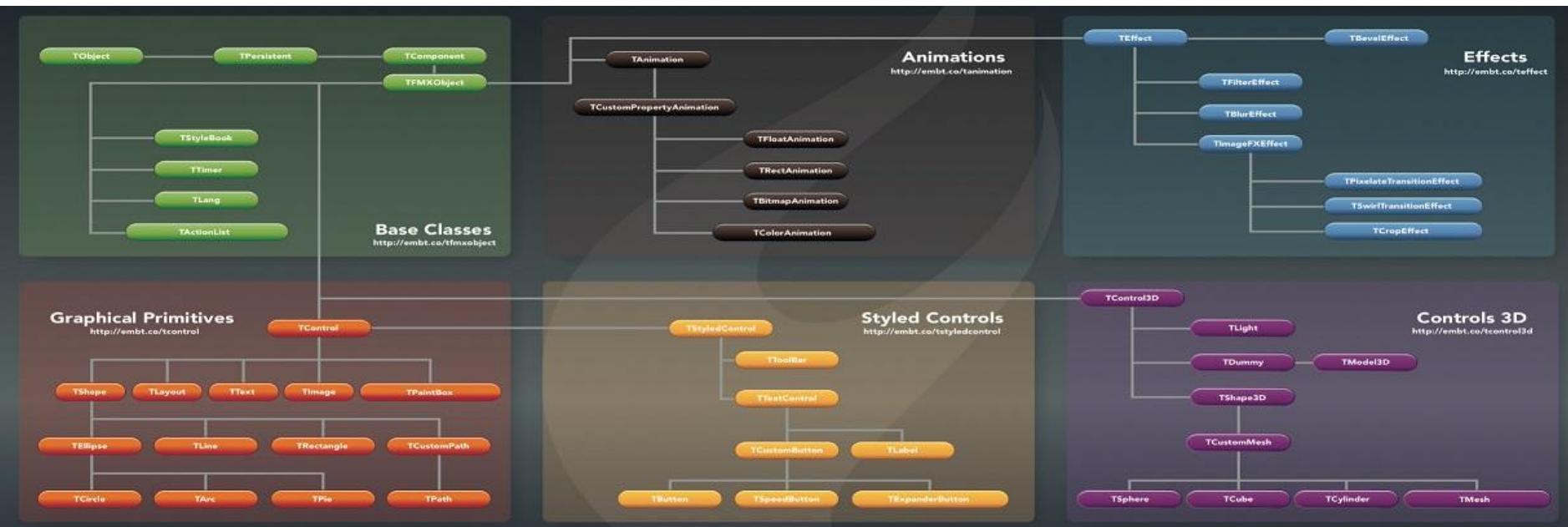
Application Frameworks

- C++ (OWL)
 - Windows Encapsulation
 - Inheritance
 - Multiple-Inheritance
 - v-tables
 - Fields
 - Pure-code generation
 - **Windows Only**
- Delphi/C++ (VCL)
 - Windows Encapsulation
 - Delegation
 - Method Pointers (closures)
 - Properties
 - Text file form
 - Streaming-system
 - RTTI
 - **Windows Only**

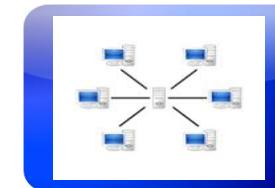
FireMonkey Architecture

Language		 
Framework		
3D API	Microsoft® DirectX	 
Platform	 Desktop	 iOS  Mobile

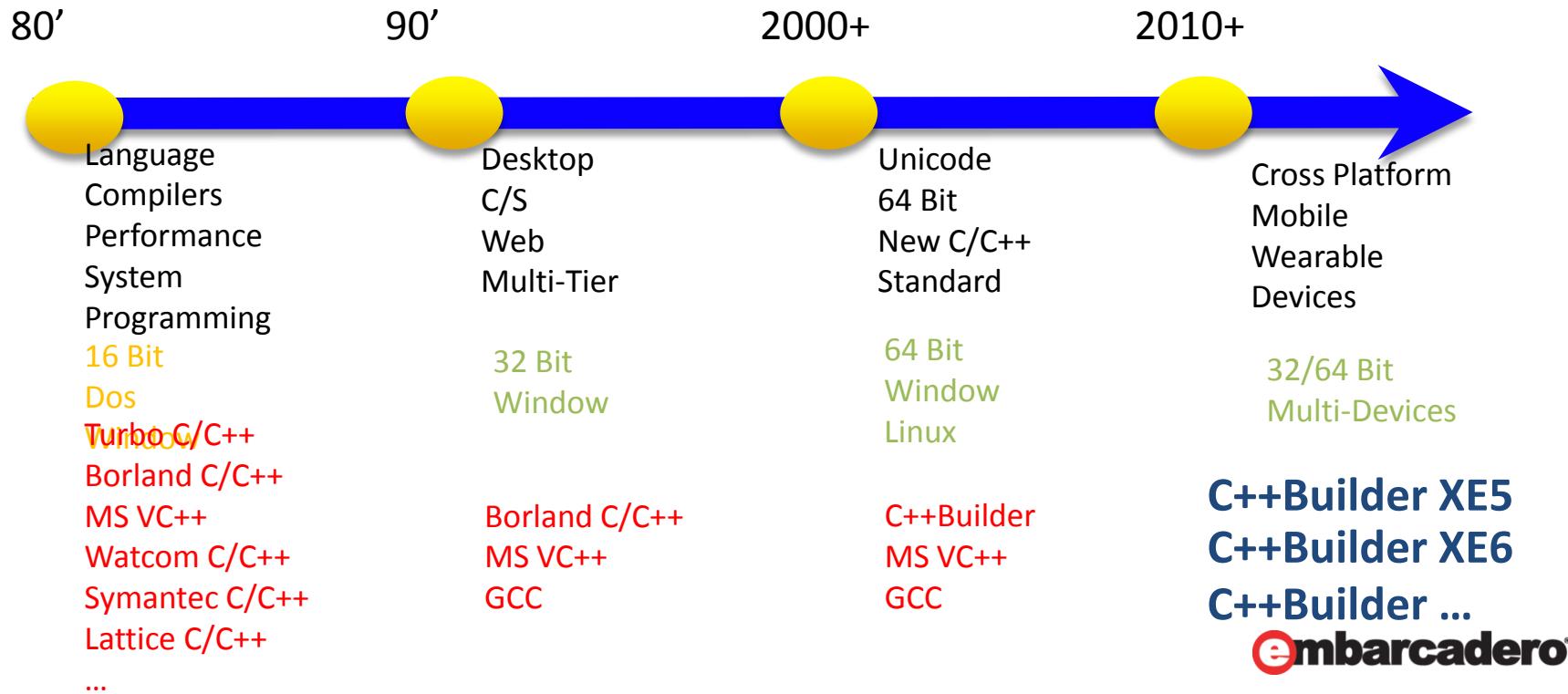
Component-Based Framework



C++Builder XE5



C++Builder XE5 : 最快速, 強大的 C/C++開發工具



C++Builder XE5：最快速，強大的 的C/C++開發工具

- <http://stlab.adobe.com/performance/>
- <http://slashdot.org/topic/cloud/speed-test-2-comparing-c-compilers-on-windows/>

C++Builder XE5：最快速，強大的C/C++開發工具

範例

- C++Builder XE5 Clang編譯器
 - Function Objects測試
 - Simple Types Constant Folding測試
 - Simple Types Loop Invariant測試
 - Stepanov Abstraction測試
 - Stepanov Vector測試
 - Unroll測試

C++Builder XE5：最快速，強大的C/C++開發工具

	Win64	Mac OSX 32	iOS	Android
C/C++編譯器	CLANG/LLVM	CLANG/LLVM	CLANG/LLVM	CLANG/LLVM

C++Builder XE5：最快速，強大的C/C++開發工具

	Win32	Linux	Mac OSX 64	Android Intel
C/C++編譯器	Soon To Be CLANG/LLVM	In The Future CLANG/LLVM	In The Future CLANG/LLVM	In The Future CLANG/LLVM

INTRODUCING FIREDAC



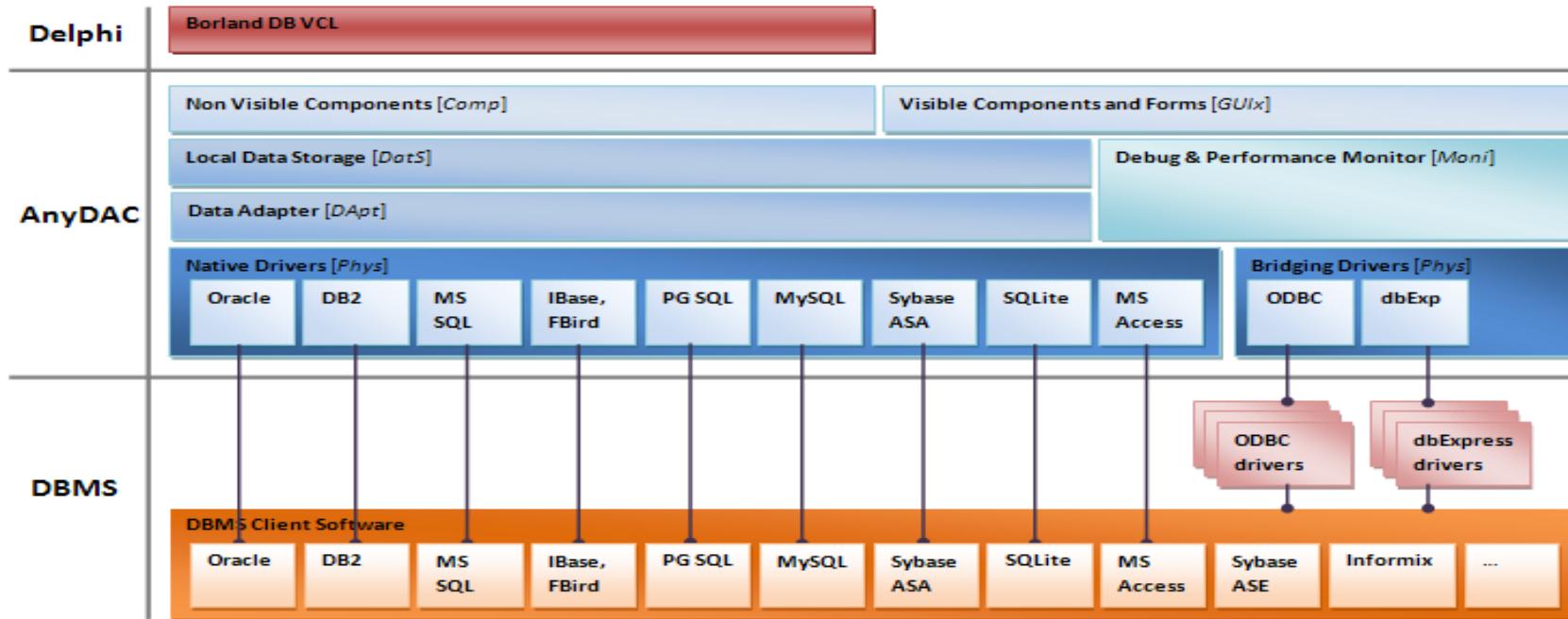
Key FireDAC Features

- Data Access Engine
 - Foundation classes + TDataSet comps
- High Performance Data Access
 - From Live Data Window to Array DML
- Unified API
 - SQL abstraction and scripting
 - Unified errors and transactions

Native FireDAC Drivers

- MySQL
- Microsoft SQL Server
- Oracle Database
- InterBase
- PostgreSQL
- DataSnap
- SQLite
- Sybase SQL Anywhere
- Microsoft Access
- IBM DB2 Server
- Firebird
- Advantage Database
- ODBC gateway
- dbExpress gateway

FireDAC Overview



C++Builder XE5 : 最快速, 強大的C/C++開發工具

範例

- C++Builder XE5資料存取
 - dbExpress
 - FireDAC
 - FireDAC Array DML

萬眾矚目

C++ Builder For Mobile

Android NDK

Android NDK app

Android
manifest

Dalvik classes

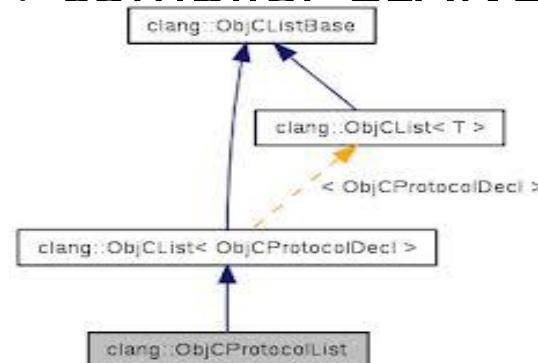
Resource
bundle

Libraries
& JNI

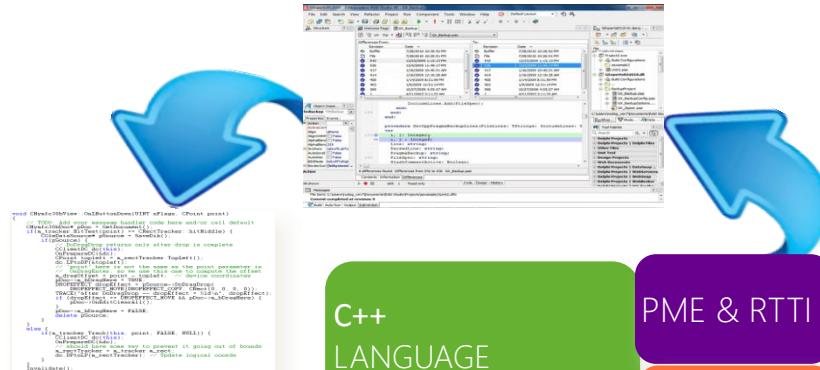


iOS

- Objective-C
 - C-based OO language modeled after SmallTalk
- Now shares a common front-end and architecture with a major C++ compiler CLANG



Embt C++ Architecture



C99, C++98, C++11

Borland C++
C++Builder, CLANG

C++
LANGUAGE
ENGINE

COMPATIBILITY

PME & RTTI
IR ENGINE

CODE
GEN
ENGINE

INTEL
ARM

LIBRARIES

STL, Boost, Loki, ACE



C++Builder For Mobile

範例

- C++Builder For iOS
- C++Builder For Android
- C++Builder Mobile Database App

中場休息

一份程式碼同時開發移動和桌面應用
程式



One Codebase, One Team

- One set of development resources to create apps for multiple platforms
 - one codebase
 - one team
 - one schedule
- Reduced budgets and complexity



整合傳統資訊架構和行動架構

- 多個平台使用相同的程式技巧，一份程式碼

	VCL程式單元	FMX程式單元	RTL程式單元	LiveBinding	Data.*程式單元
Win32/Win64	可	可	RTL.Common RTL.Sys RTL.Win	可	Data.*
Mac/iOS	否	可	RTL.Common RTL.Sys RTL.ios, RTL.osx, RTL.posx	可	Data.*, 除了Data.BDE. Data.ADO不行
Android	否	可	RTL.Common RTL.Sys	可	Data.*, 除了Data.BDE. Data.ADO不行
Linux	否	可	RTL.Common RTL.Sys	可	Data.*, 除了Data.BDE. Data.ADO不行

整合傳統資訊架構和行動架構

- 多個平台使用相同的程式技巧，一份程式碼

	XML程式單元	Indy程式單元	SOAP程式單元	DUNIT程式單元	Web程式單元
Win32/Win64	是	是	是	是	是
Mac/iOS	是	是	是	是	否
Android	是	是	是	是	否
Linux	是	是	是	是	否

整合傳統資訊架構和行動架構

- 多個平台使用相同的程式技巧，一份程式碼
 - 範例1：iOS App可和VCL程式一樣使用資料元件、Indy元件和

The screenshot shows a Windows application window titled "Form10". It contains a tab control with tabs: TabSheet1, TabSheet2, TabSheet3, Location, and TabSheet5. The "Location" tab is selected, displaying a list of entries:

NAME	RTIME	FEATURENAME
李維	2013/4/19 上午 10:45:45	久康街 165號
李維	2013/4/19 上午 10:45:57	久康街 165號
李維	2013/4/19 上午 10:45:58	久康街 165號
李維	2013/4/19 上午 10:50:36	久康街 165號
李維	2013/4/19 上午 10:50:37	久康街169巷
李維	2013/4/19 上午 10:50:38	久康街169巷

Below the list is a Google Map showing a route from "秀明路一段 177號" to "秀明路二段 112巷". The route is highlighted in yellow. A red marker labeled "A" is placed on the map at the start of the route. The map includes street names like 木橋路、秀明路、新光路等, and landmarks like 文山區公所.



C++Builder XE5：最快速，強大的C/C++開發工具

範例

- C++移動分散式架構

C/C++ MEAP

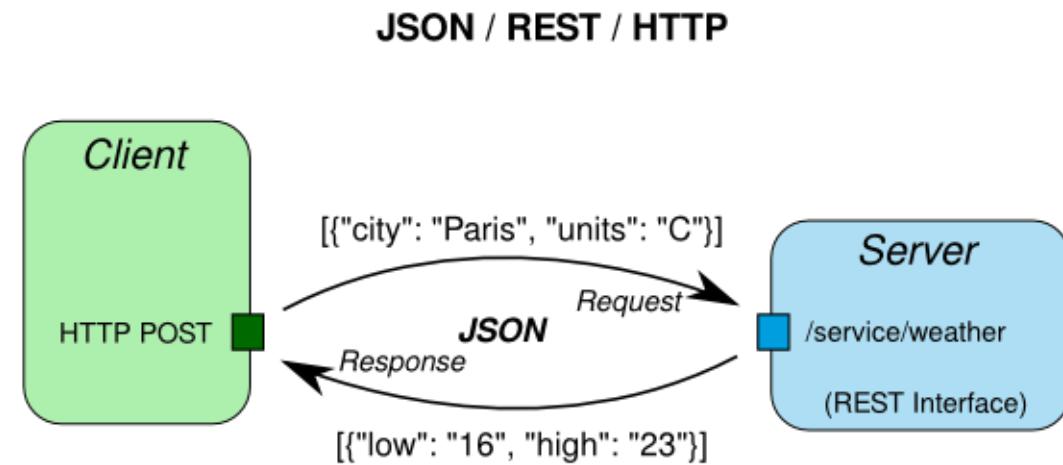
Mobile Enterprise Application Platform

XE5 REST Client Stack

- REST components
 - For developing REST client application
- RESTDemos.exe
 - Uses REST components to access a few different providers
- RESTDebugger.exe
 - Uses REST components to execute ad hoc requests

REST component features

- Comprehensive HTTP client
 - Asynchronous execution
 - Proxy connection
 - HTTPS
- Authentication
 - Basic, OAuth1, OAuth2
- JSON
 - Parsing, Formatting
 - JSON to TObject, TObject to JSON
- Rapid Prototyping
 - LiveBindings
 - Design time execution



C++Builder XE5：最快速，強大的C/C++開發工具

- C++Builder XE5 REST技術



- REST Client

TRESTClient

 TRESTRequest

TRESTResponse

 TRESTResponseDataSetAdapte

Device diversity will continue to expand!



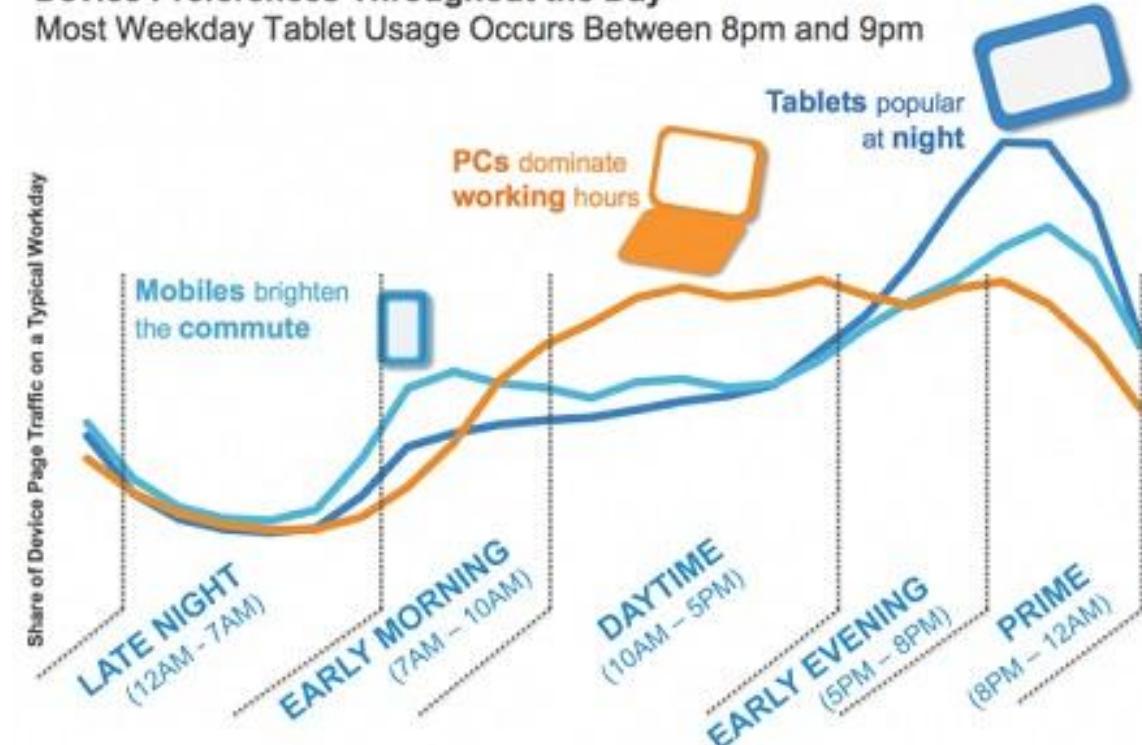
APPS FOR EVERY DEVICE!



WANTED

Device Preferences Throughout the Day

Most Weekday Tablet Usage Occurs Between 8pm and 9pm



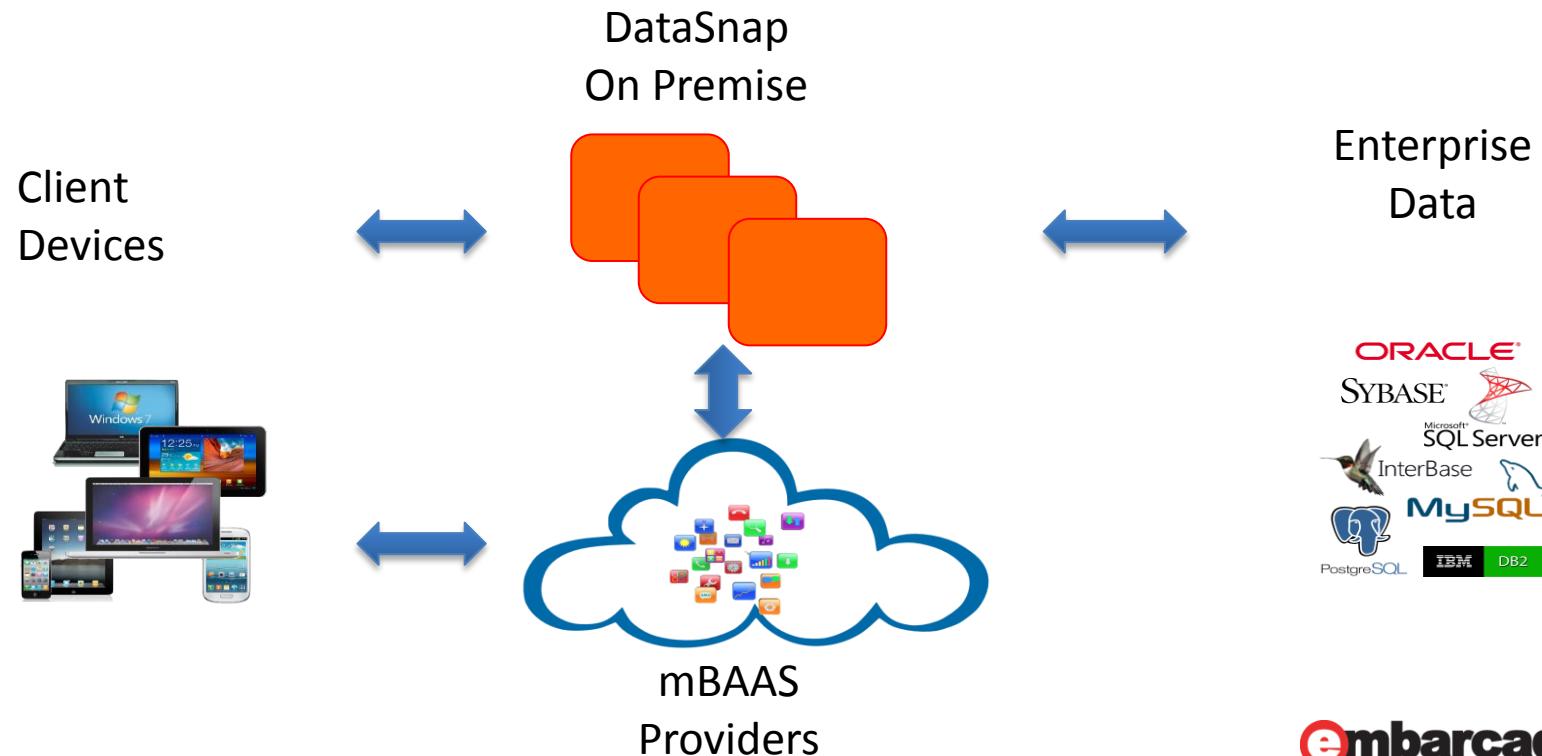
comSCORE

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Source: comScore Device Essentials, Monday, 21st January 2013, UK.

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Multi-Device Application Platform



謝謝您的參加