



RAD Studio 10.3





Agenda

1. New Delphi Language Features
2. C++ 17 for Win32
3. FireMonkey Android zOrder, Native Controls and API Level 26
4. Windows 10, VCL, and HighDPI improvements
5. Extensive IDE UI modernization
6. RAD Server architecture extension
7. Quality and Performance improvements

Idera Inc. Developer Tools



 **embarcadero**® • RAD Studio, C++Builder, Delphi, InterBase, RAD Server

 **Sencha** • ExtJS, ExtReact, GXT, Sencha Test

 **Froala** • JavaScript Web Editor

 **WHOLE TOMATO**
SOFTWARE • Visual Assist for Visual C++

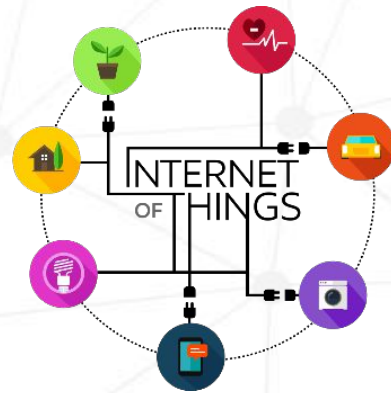
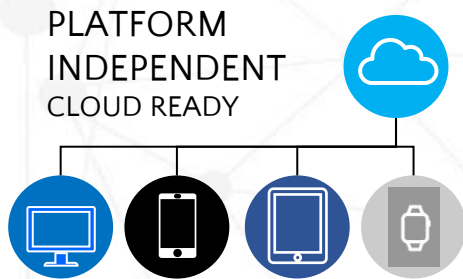
 **ASSEMBLA** • Secure Git™, Secure Software Development in the Cloud

 **embarcadero**®

What is RAD Studio?



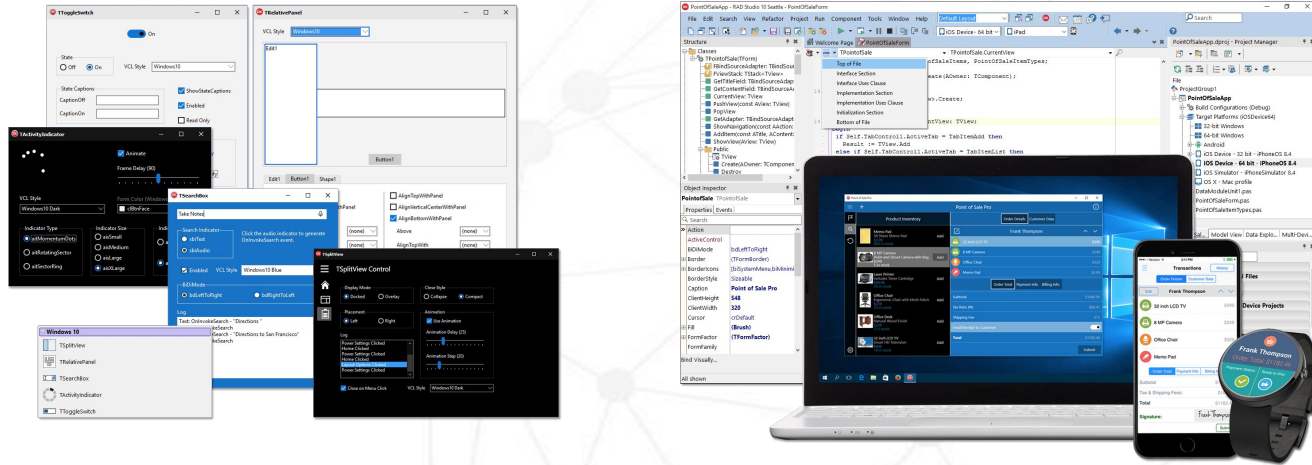
The fastest way to develop cross-platform native apps with flexible cloud services and broad IoT connectivity



Fast, Visual Development



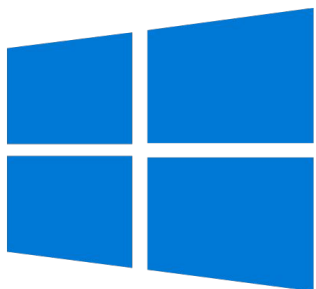
RAD Studio provides powerful VCL controls for Windows 10 and enables FMX cross-platform development for Windows, Mac, iOS and Android



RAD Studio Platform Support



Target the latest versions of major operating systems with one codebase!

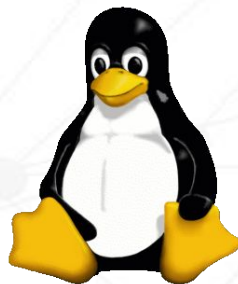


Windows 10

October 2018 Update



macOS Mojave



Linux 64-bit
Ubuntu & Red Hat
Enterprise
(Delphi Only)



Android Pie



iOS 12

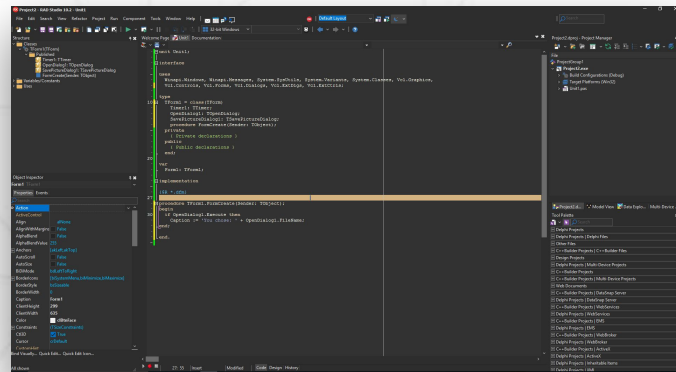
Officially Supporting

RAD Studio 10.2.x



Key features delivered in recent months:

- Mobile (iOS and Android) added to the Professional edition, now Win, Mac, iOS, & Android
- CMake command-line support for C++Builder
- New VCL GUI controls, layouts and FMX & VCL QuickEdit designers
- IDE Enhancements, including a Dark Theme, new component icons and layouts
- C++ compiler and linker improvements
- RAD Server enhancements for Sencha EXT JS
- Community Edition for Delphi and C++Builder



RAD Studio 10.2.3

Enhanced C++ support, IDE UI/UX improvements and quality enhancements



Visual Framework Enhancements

(Delphi & C++)

- VCL High DPI Quality Improvements
- FireMonkey Windows and Android quality
- FireMonkey platform quality
- FireMonkey User Interface Templates

C++Builder

- CMake Support for our toolchain
- C++ Rename Refactoring

RAD Studio (all IDEs)

- IDE UI/UX Improvements
- RAD Server ExtJS Integration for enhanced Javascript client support
- Platform Enhancements across Windows, macOS, iOS, Android and Linux
- Added Mobile support (iOS and Android) to Professional edition for new and Update Subscription customers
- 10.2.3 Community Edition released in July 2018

Delphi and C++Builder Community Edition!



Free, limited use commercial edition with Professional level features

As of 10.2.3, Professional Edition includes Mobile, which means Community does too

- For casual developers, startups, students, and open source developers (restrictions apply, see Eula)
- Develop Windows, macOS, Android and iOS applications with a single codebase
- Visual Design using the C++Builder and Delphi VCL and FireMonkey frameworks
- Hundreds of included components to enhance your app and reduce development cycles
- Community comes for our two personalities, **Delphi and C++Builder**



Coming soon... **10.3 Rio**





10.3 Rio Key Features

- C++ 17 for Win32
- New Delphi Language Features
- FireMonkey Android zOrder and API Level 26
- Windows 10, VCL, and HighDPI improvements
- Extensive IDE UI modernization
- RAD Server architecture extension
- Quality and Performance improvements

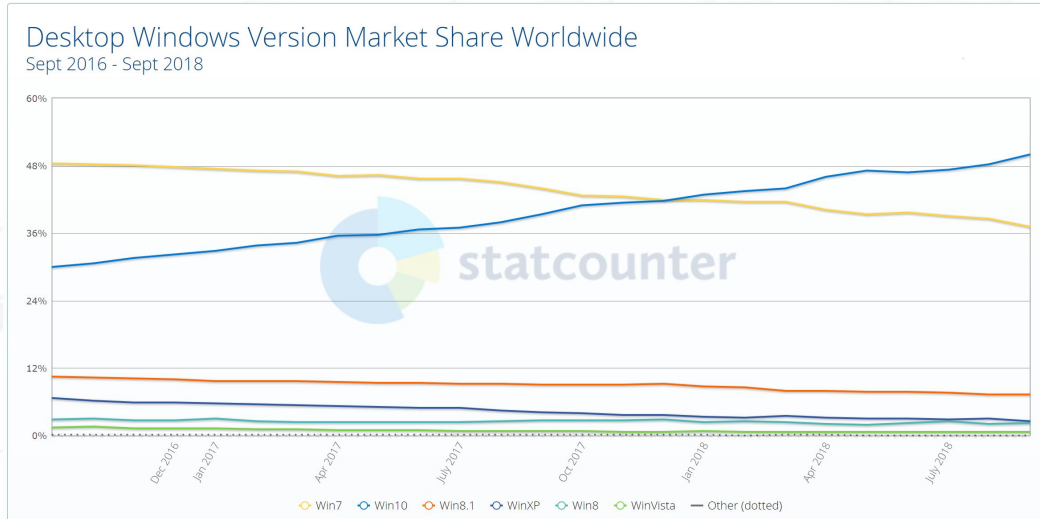


10.3: RAD Studio Platforms

Windows 10 is King



- The most important platform for our current customers
- Add Windows 10 features without breaking Windows 7 compatibility

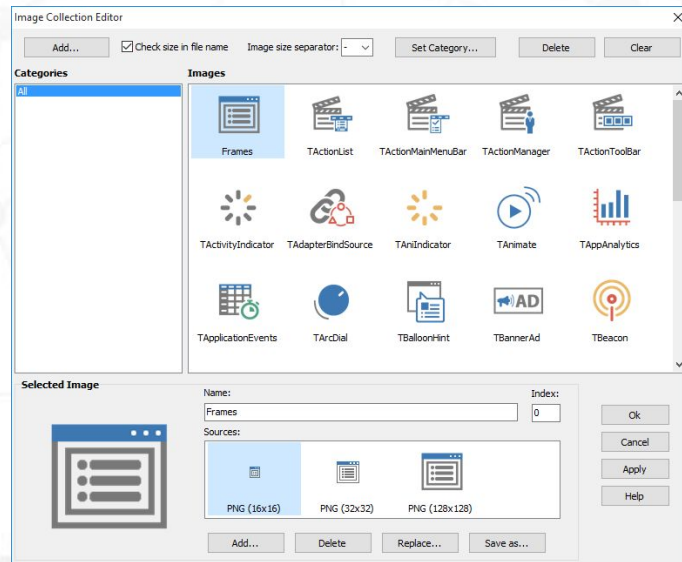


Data by Stat Counter as of September 2018 -
<http://gs.statcounter.com/windows-version-market-share/desktop/worldwide/#monthly-201609-201809>
- CC-BY-SA 3.0 Unported license

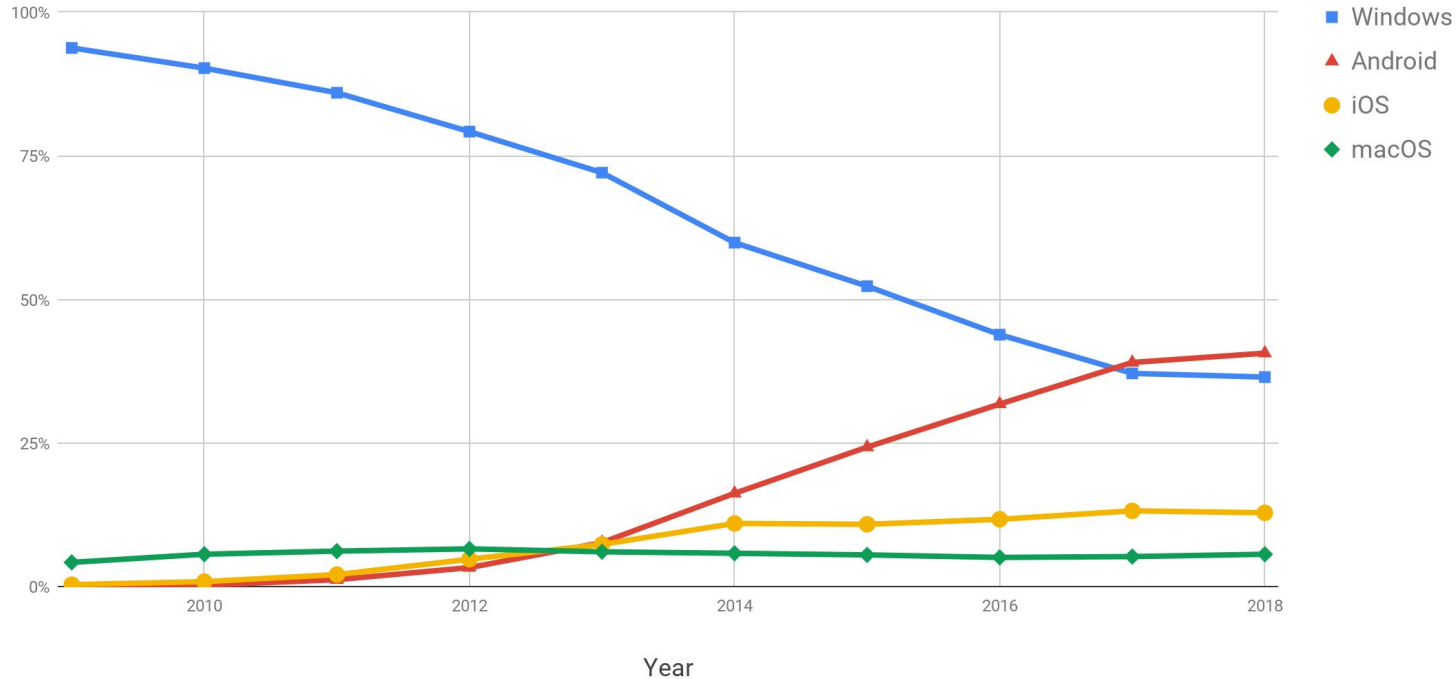
10.3 Windows 10 is King



- Windows 10 = key focus for RAD Studio
- VCL extensions for Hi-DPI and 4K monitors support
 - PerMonitorv2, multi-resolutions image list, new APIs in 2018 flavor of Windows 10
- Additional WinRT API and Windows Store support



Multi Device is the Future



Data by Stat Counter as of July 2018 -
<http://gs.statcounter.com/os-market-share/desktop-mobile-tablet/worldwide/#yearly-2009-2018>
- CC-BY-SA 3.0 Unported license

Platform Vendor Tools

Apple iOS

Info.plist

Swift or
Objective-C
Code

NIB File

Resources

Cocoa APIs

Android

AndroidManifest.xml

Java or Kotlin
Code

Layout

Resources

JNI & JDK
Interface

Windows

Visual Studio
Project

C++ or C#
Code

XAML

Resources

Windows APIs

RAD Studio

Single Project file

C++ or Pascal code

DX

CX

FMX layout

Android
Variant

iOS
Variant

Resources

FMX & RTL Libraries

Platform APIs

RAD Studio

Single Project file

C++ or Pascal code



FMX layout

Android
Variant

iOS
Variant

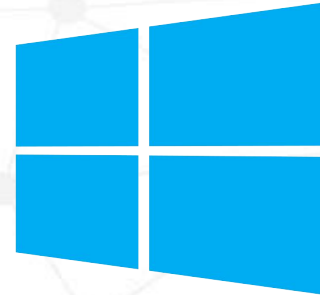
Resources

FMX & RTL Libraries

Platform APIs



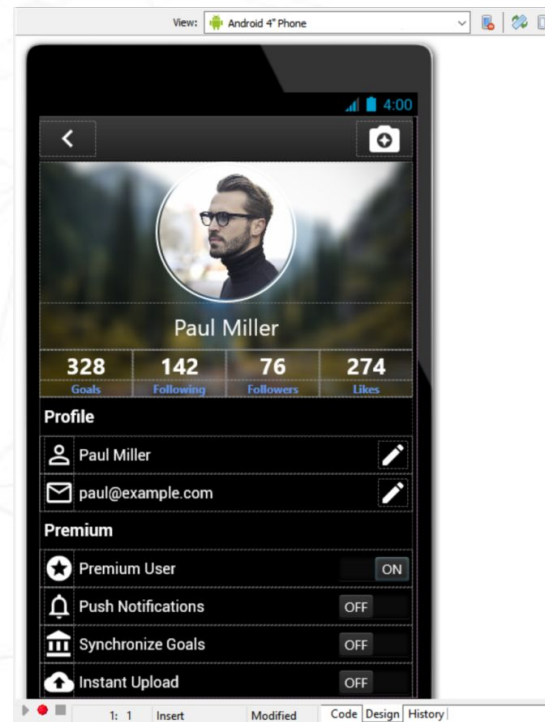
One Project
Every Platform



10.3 Cross-platform is the Future



- Cross-platform = key focus for RAD Studio
 - FireUI multi device designer
 - FireUI preview on device
- Styled and native controls
 - Native on Windows, iOS, and **now Android**
- Support for
 - Android P with API level 26
 - iOS 12



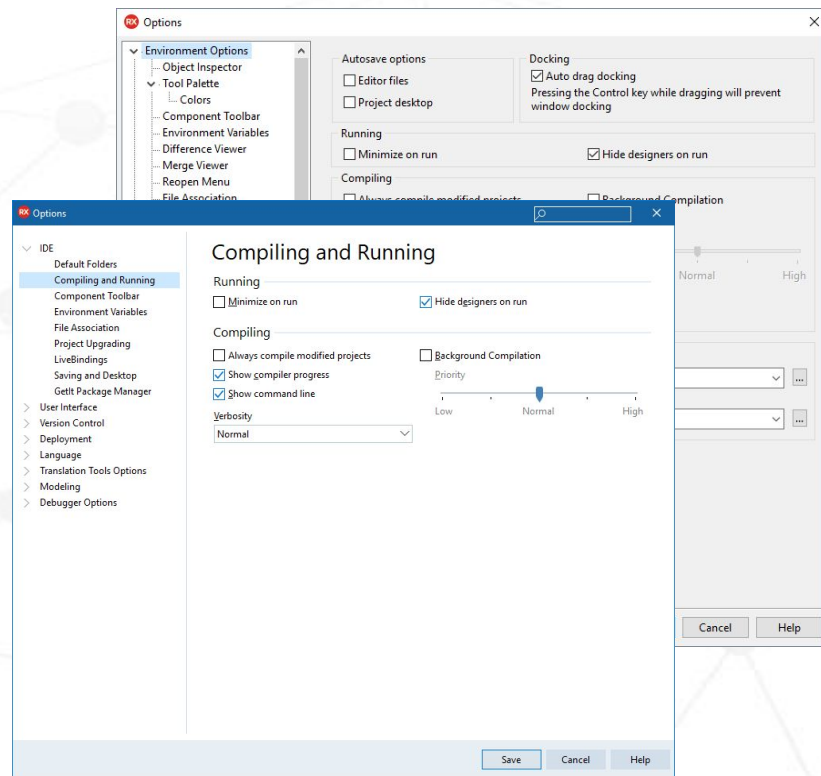


10.3: RAD Studio IDE

UI Enhancements: IDE & Project Options



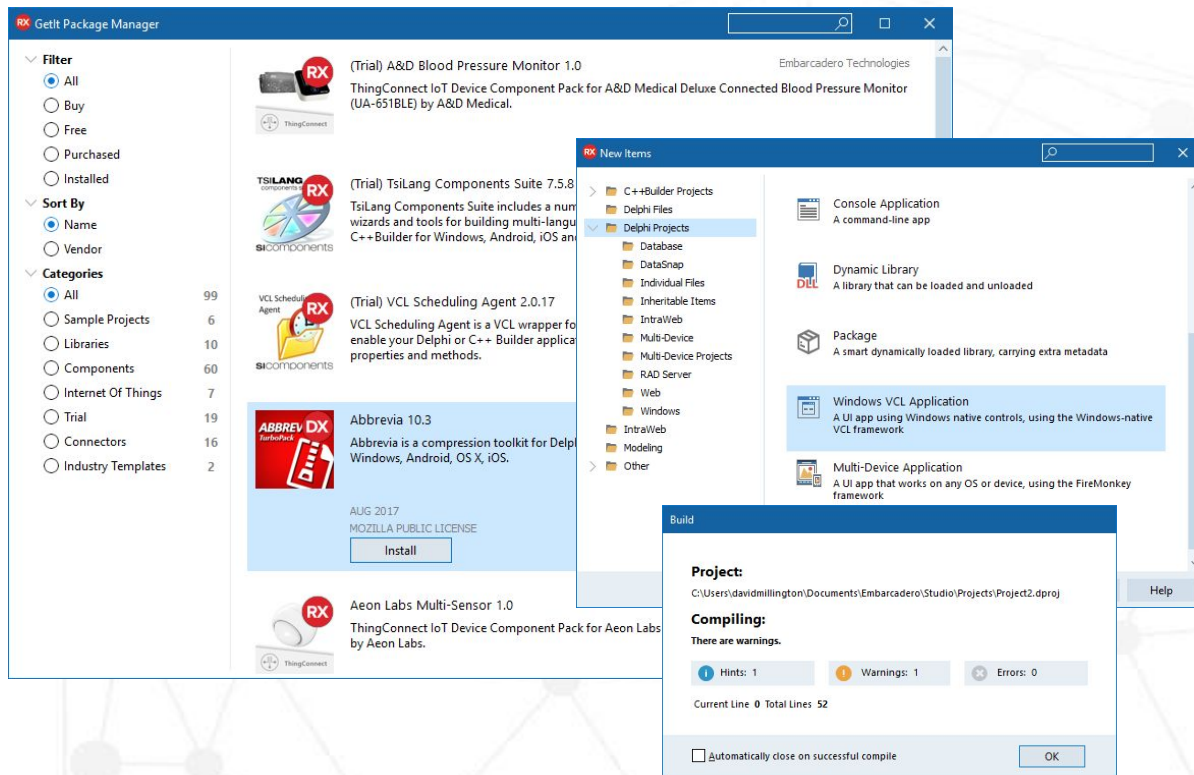
- UI cleanup: layout, alignment
 - Looks consistent
 - Spacing better for translation (eg German)
 - Dependent settings clear and obvious
- Option location cleanup: previously, hard to find items. Now,
 - Some categories renamed, some options moved
 - Dialog-wide option search in title bar



IDE UI Enhancements: Other Dialogs



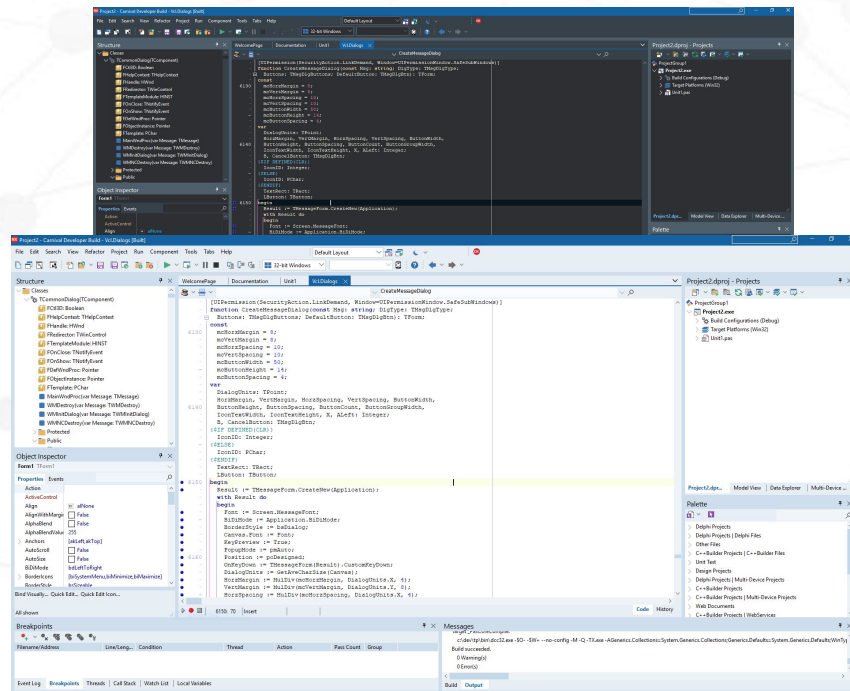
- GetIt:
 - Scrolling list
 - Nicer look
- New Items:
 - More modern look
- Compile:
 - More modern look
 - Hint / warning / error icons light up, showing status at a glance



IDE UI Enhancements: Main Window



- New Light and Dark styles, based on blue brand colours
- General cleanup: alignment, spacing
 - Everything where you expect, but neater
 - Readable (eg code editor tabs)
 - Search (IDE Insight) on title bar
- Better product first impression
- Better for long-term (eg 8 hours / day) use



*** Features are not committed until completed and GA released*

IDE Enhancements Live Demo



Code Completion



- For Delphi,
 - Focused on code completion correctness – giving good results
 - Testing with very large projects
 - Big quality fixes in 10.2.3 and 10.3
- For C++ with the C++17 compiler,
 - Code completion results are much more accurate
 - Completion results are significantly faster
 - Code completion is *asynchronous*. You can keep typing with no delays, code completion occurs in the background. This is a new feature for the IDE
 - It uses the Language Server Protocol and cquery

.Net 4.x Upgrade



- RAD Studio now requires .Net 4.x as a prerequisite before installing
 - Replaces .Net 3.5
- This is most likely already on the target PC, given our Windows 7 minimum platform requirements

Key IDE Quality Improvements



- Removed the RAD Studio Community Toolbar from the IDE
- The installer now distributes the Windows 10 April 18 version of the Windows SDK
- Significantly improved LiveBindings designer performance (aka. fixed the slow loading of large forms in the designer)
- We incorporated some of Andreas' "IDE Fix Pack" fixes/improvements



10.3: Languages

10.3 Languages



- Delphi has benefited from stability
 - Focus to improve the core language, keep it modern (new features in 10.3)
 - Improve compiler quality, stability and correctness — for large projects
- C++ 17 for Win32 in 10.3, and other platforms in 10.3.x
 - Most significant update of our C++ compiler in a few years
- Next focus will be on macOS 64-bit platform support for both languages



New Delphi Language Features



- Inline variables and constants declarations, direct assignment of value at inline variable declaration point, block scope

begin

```
var s: string := 20.ToString();
```

```
for var I: Integer := 1 to 100 do ...
```

- Type inference for inline variables

```
var aDict := TDictionary<Integer, string>.Create;
```

Delphi Language Changes



- Improved C++ compatibility
 - Changes in the way records between 4 and 8 bytes in size are passed as parameters
- Improved compiler performance

Linux Compiler Changes



- Linux 64-bit compiler moves to non-ARC
 - Part of the new overall direction of removing ARC
 - Reasons: Performance, dual memory model complexity, cannot move VCL to ARC
 - ARC still on for mobile compilers in 10.3
- Side effect: AnsiString / AnsiChar available on Linux
- Improved C++ compatibility
 - Changes in the way records between 4 and 8 bytes in size are passed as parameters
- Improved compiler performance

Delphi Language Live Demo



C++17



- C++17 Clang-enhanced compiler and toolchain for Win32 (bcc32x and bcc32c)
- C++ runtime library (RTL) built with the updated Clang-enhanced compiler for Win32, including 2018 edition of Dinkumware STL
- Also includes support for C++14
- Greatly improved code completion
 - Faster
 - Better results
 - Asynchronous, uses LSP



10.3: VCL

VCL High DPI Image List



- New components: **virtual image collection** (holds images), **image list** (DPI-aware specific view of that collection)
- Multi-resolution, alpha channel, 32bpp bitmap / PNG (and can import old bitmaps)
- List is compatible with TImageList (including HIMAGELIST handle)
- Image list scales as parent form DPI scales (that means, share an image collection, but don't share an image list between two forms)
- Migration tools for old -> new lists

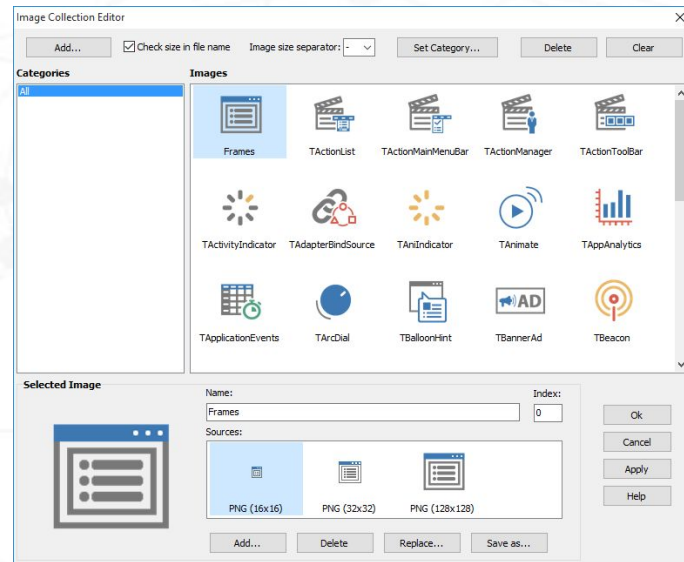


Image Collection Live Demo





- PerMonitor v2 support in project options
 - Requires
- New GetSystemMetrics model
 - GetSystemMetricsForWindow
 - TControl.GetSystemMetrics
 - Highly compatible with existing source code
- Significant focus on VCL High-DPI Fixes

Manifest

Target
Debug configuration - Windows 32-bit platform ▾ Apply... Save...

Manifest File
Auto Generate ▾

Tags To Include
☒ Enable Runtime Themes

DPI Awareness
Per Monitor v2 ▾

Execution Level
As Invoker ▾

☐ UI Access

Windows 10 API Enhancements



- New native Win32/Win64 APIs
 - High-DPI area
 - WM_POINTER area (pen support)
- Updated Object Pascal headers to the latest WinRT API
 - A dozen additional WinRT units
- New TWindowsStore component -- for Desktop Bridge applications
 - Manage paid apps
 - In-app purchase
 - Trial mode
- Additional WinRT controls improvements (Contracts)



10.3: FireMonkey

Android API Upgrade



RAD Studio 10.3 Rio includes support for Android API version 26 development:

- Required by Google for new Play Store applications starting August 2018 and for updates starting November 2018. Changes include:
 - New information in the manifest (with the proper API level)
 - The default configuration uses a recent version of the SDK/NDK
 - Requires installation of new SDK
 - Android permissions architecture redesigned
 - Might require changes to your code



Android New Permission Model



Recent versions of the Android API have changed the mechanism to request permissions:

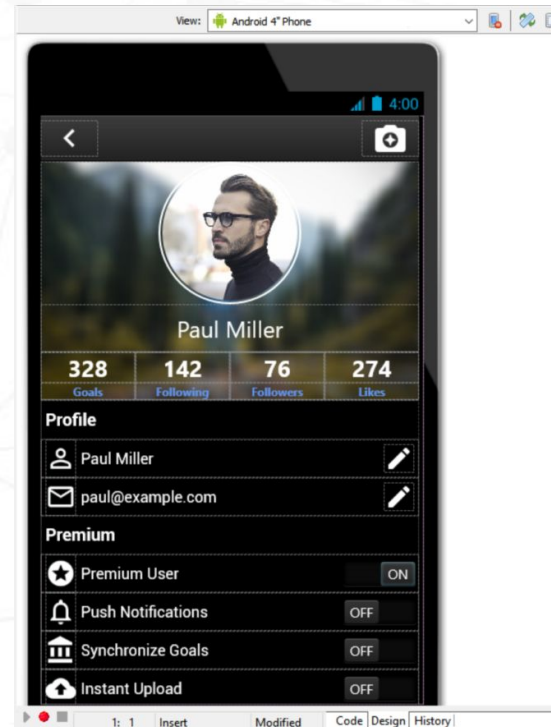
- The user can call `requestPermissions` on the activity and the callback triggers a RTL message subscription message
- New relevant/related types imported into the RTL Android import units include `Manifest.permission` and `Build.VERSION` in `Androidapi.JNI.Os.pas`, `ContextCompat`, `ActivityCompat`, and `PermissionChecker` in `Androidapi.JNI.Support.pas`.



Android Z-order and Native Controls



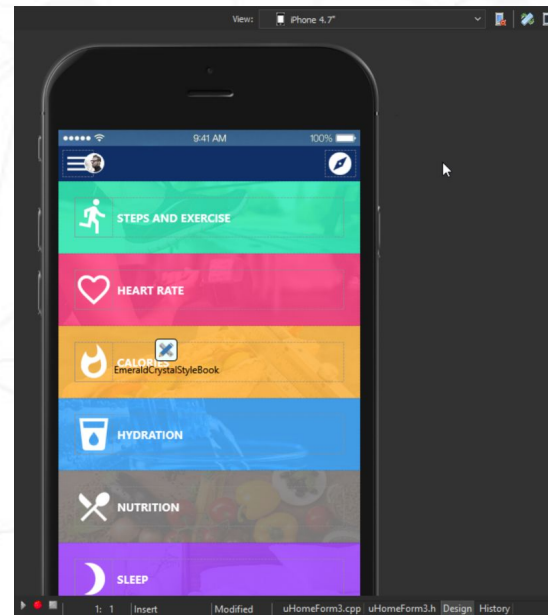
- Easily mix styled and natively rendered controls on the same form using the new Z-Order Support
 - Very similar to what we provide for Windows and iOS today
- Natively rendered components:
 - TSwitch
 - TEdit
 - TCalendar
 - TMultiView
- TWebBrowser, TMapView etc. will use material design theme on Android 5.0 or above



Enhanced iOS Support



- Support for iOS 10, 11, 12 (Device and App Store)
- Support for the iOS 10 Simulator
- Support for targeting new iPhone devices





10.3: RTL and Data

Delphi RTL Changes and Optimization



- Data structures growth strategy modified (slower growth) and configurable (can be replaced)
- TStringBuilder improvements and performance
- JSON improvements (and correctness)
- Generics lists related improvements and performance
 - For example, TList<T>.Add is 3x faster
- TMemIniFile performance improvement
- Regular Expressions: PCRE with UTF-16 on Windows
- The Zlib library has been updated to a newer version

New in FireDAC and Database



- FireDAC drivers updates and improvements for
 - MySQL, MariaDB, SQL Server, PostgreSQL
 - Firebird, MongoDB, InterBase, SQLite, SQL Anywhere
- TFDBatchMoveJSONWriter and optimized Batch Move (10.2.x)
- New TClientDataSet.IncludeBlobsInDelta
- DataSnap
 - TDSRestConnection.SecureProtocols property
 - DataSnap REST uses "Content-Type=application/json"

HTTP and REST and Cloud



- HTTP Client Library
 - Optimizations and improvements in multipart form data, MIME types (TMimeType), Accept headers
- REST Client Library
 - New events and properties in TRESTClient
- SOAP clients use the HTTP client library
 - Better HTTPS support on mobile
- Cloud
 - Azure storage emulator
 - AWS S3 support for recently added regions

RAD Server Enhancements



- Performance enhancements and better memory management
- New EndPoint Attributes for Content-Type and Accept based URL mapping
- HTTP Verb to Custom Method Name Mapping
- Ability to Delegate Processing of a Request to a Custom Class or Component
- Ready-to-use components for JSON processing datasets and files/folders

```
type
[ResourceName('rio')]
| TRioResource1 = class(TDataModule)
| [ResourceSuffix('.')] |
| EMSDataSetResource1: TEMSDataSetResource;
| EmployeeConnection: TFDConnection;
| EmployeeTable: TFDQuery;
```


EMSDatasetResource Live Demo



RAD Server Licensing



- RAD Server development features are included in Enterprise edition
 - Development / debug version of RAD Server with limited development license is built into RAD Studio
- Licenses for Apache and IIS deployment
 - Enterprise edition includes one free deployment single server license
 - Architect edition includes a free deployment multi-site license



RAD Studio 10.3 SKUs

RAD Studio 10.3 SKUs



- Delphi **Community Edition** and C++Builder **Community Edition**
- **Professional Editions**, including **Mobile** platforms
 - Include IBLite (no hassle deployment)
- **Enterprise Editions**
 - Include DataSnap, Full FireDAC support, RAD Server
 - Single Site RAD Server deployment
 - Now with IBToGo free deployment for mobile
- **Architect Editions** — see next slide

10.3 Architect SKU Reinvented



- Adding AquaFold Aqua Data Studio
 - General database management
- Adding Sencha Ext JS Professional Edition
 - For building Web clients
- Including multi-site deployment for RAD Server
 - Offer active since August 2018
- Removing ER/Studio Developer Edition and DB PowerStudio developer edition (existing customers retain their license)



RAD Studio 10.3

RAD Studio 10.3 Rio – Highlights



- New language features!
 - C++ 17 for Win32
 - Delphi inline variables, type inference
- FireMonkey Android zOrder, Android native controls and API Level 26
- Windows 10, Windows Store, WinRT, VCL, and HighDPI improvements
- Extensive IDE UI modernization: cleaner, great to use for long periods of time
- Database: JSON and ExtJS integration, many updated FireDAC drivers
- RTL improvements: JSON, data structures, regex, REST and SOAP, and more
- RAD Server architecture extension and performance
- Large Quality and Performance improvements

10.3 Rio is one of our biggest ever releases!