Presentation webinar for RAD Basic

Kickstarter campaign: http://bit.ly/radbasic

HELLO!

I am Carles Royan

Lead developer of RAD Basic

Software Engineer for about 15 years

Worked in compilers in university

Did some work with ANTLR and hibernate (HQL parser).

You can find me at @radbasic

Outline

- Why?
- RAD Basic components
- Architecture
- Main goal: compatibility
- Current status
- Live demo!
- AMA (Ask Me Anything)

Why? How it started?

- In 1990s, I learned to code in GW-BASIC, QBasic and Visual Basic
- In 2002, angry for VB6 abandoned by Microsoft
- In 2003 created my first compiler (transpiler from pseudocode to java).
- In 2008-2016 VB6 compatible compiler came up as a good project, but lack of confidence for do it.

Why? Time line

- Beginning 2018: made some research and found none project/product compatible with VB6.
- Mid 2018: start to do some code and testing if it could be made.
- 2018-2021: developing RAD Basic in free time.
- 2021: For achieving 100% compatibility, it is needed change from free time work to full time work. So this is the reason of this Kickstarter.

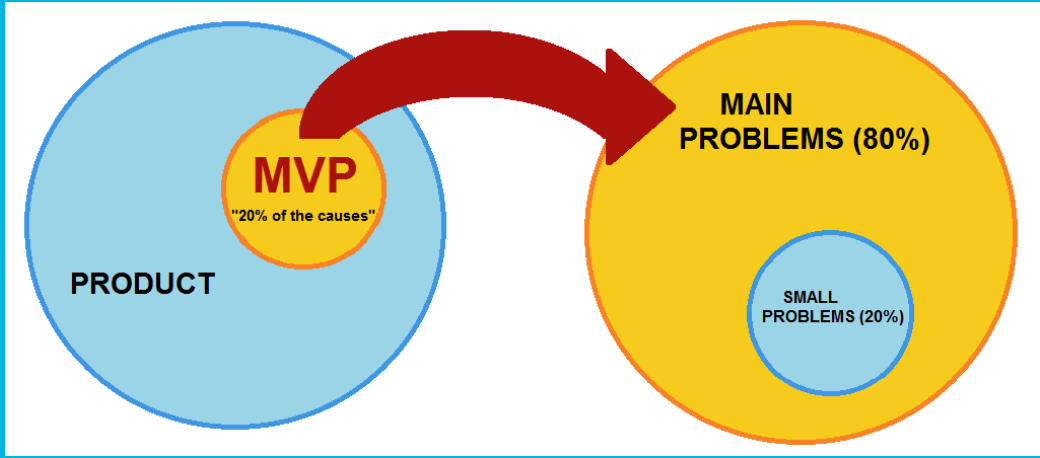
Why matters?

- In 2021 there is ton of maintained VB6 applications.
- We need a modernized IDE, Visual Basic 6 IDE is old and it don't have modern features as refactor operations.
- Visual Basic 6 Runtime (MSVBM60.DLL, OCXs, etc.) have minimum support from Microsoft. No new features.
- 64-bit: RAD Basic allows create and use EXE and OCX of both 32/64 bit.

About 100% Compatibility

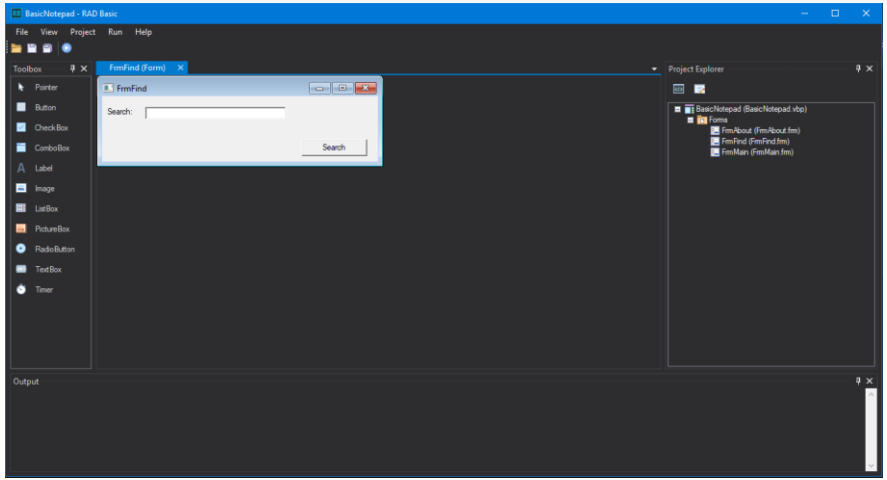
The Pareto Principle (80/20 rule):

20% of efforts bring 80% of results, and the other 80% of efforts bring only 20% of results.



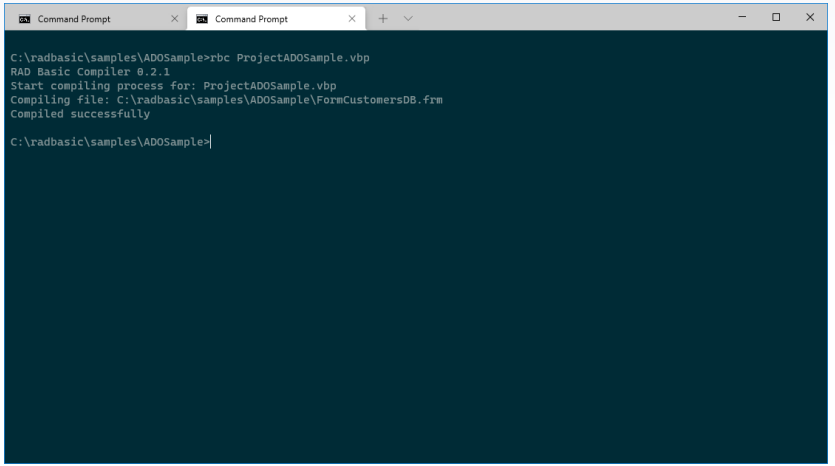
RAD Basic components

IDE



New and modern IDE with syntax highlighting, code completion, refactoring, ...

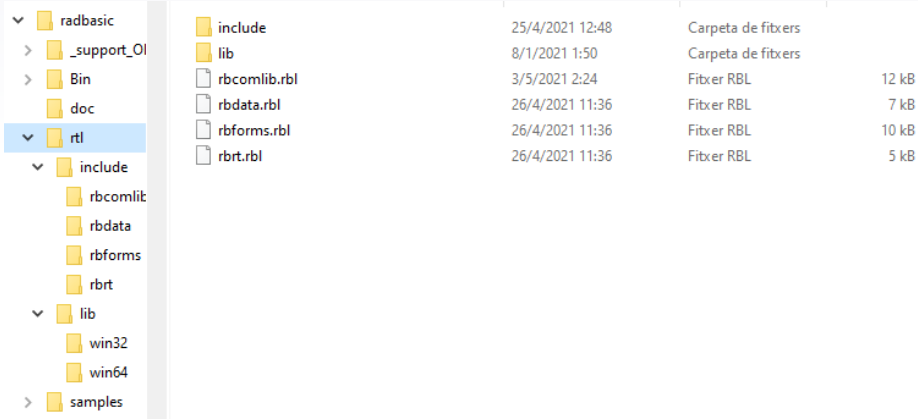
Compiler



New compiler with 32/64 bit support, documented for use by users (no obscure flags as c2.exe of VB6)

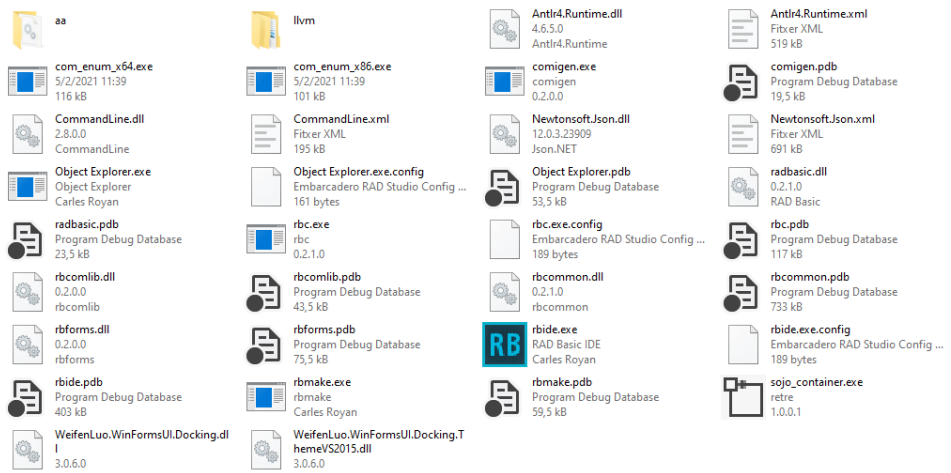
RAD Basic components

Runtime libraries



Reimplemented VB6 runtime libraries (compatible at source code level). So, it could be maintained, fixed bugs and add new features.

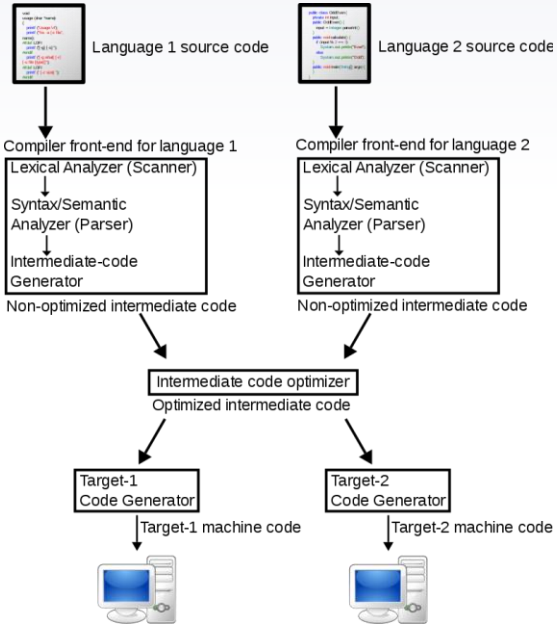
Tooling and support utilities



CLANG/LLVM, RBMake for C compiling, comigen for generating C code for wrapper COM classes, Object Explorer (COM and RAD Basic symbols), SOJO lib, ...

Architecture: build a Compiler

Modern compiler architecture



Build and walk an AST (Abstract Syntax Tree)

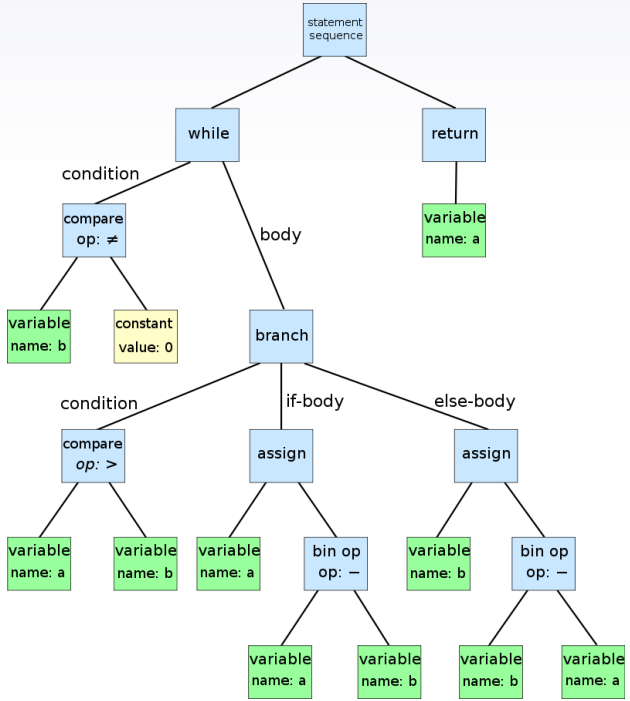


Image from: https://en.wikipedia.org

Architecture: RBC Compiler

VB6 grammar definition

Automated lexical and syntax analyzer

C# classes for lexical and syntax analyzer

RAD Basic Compiler source code

Semantic analyzer and code generator

RBC.exe

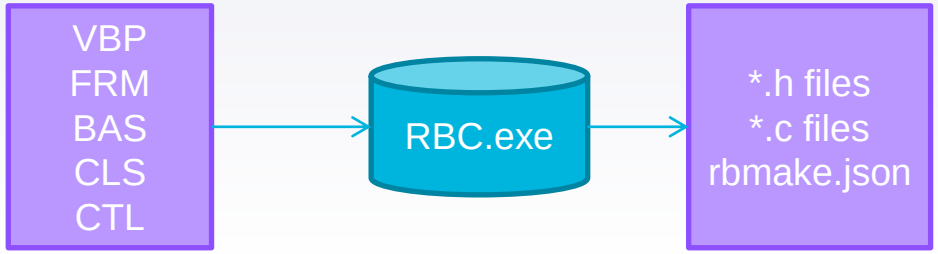
RBC implements frontend using ANTLR classes from grammar definition.

Delegates backend (optimization IL and generation of native code) to CLANG/LLVM.

RBC generates C code from VB6. Runtime Library is written in C too. The output exe is generated from c code by CLANG (LLVM C compiler)

Architecture: Compiler process

1



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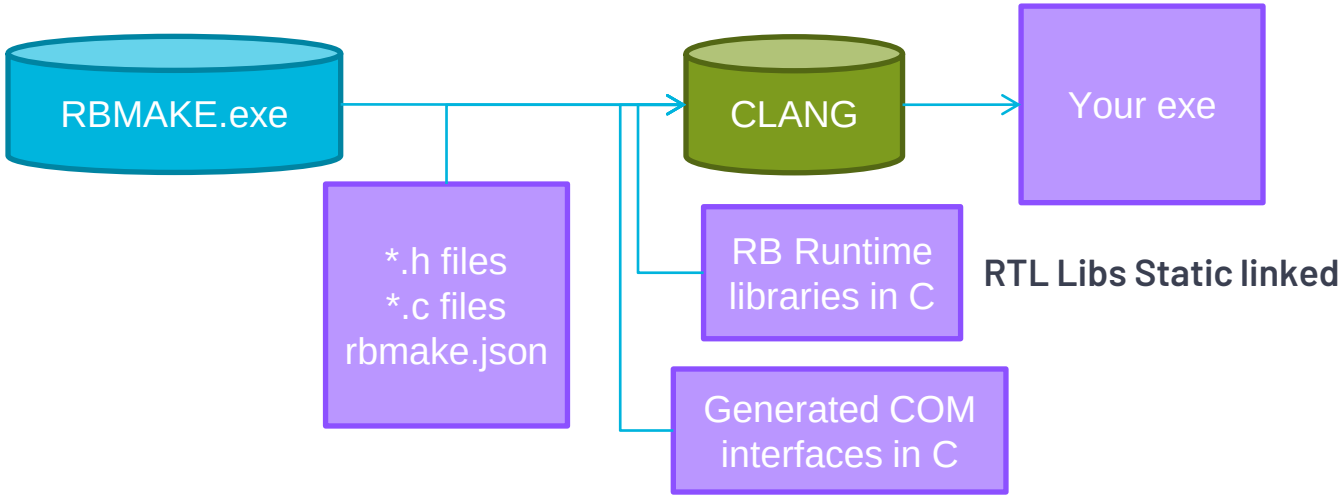


Architecture: Languages

- RBC Compiler in C#/.NET (one of the ANTLR lang ouput)
- For maintainability, IDE and toolchain in C#/.NET too
- Runtime Library in C (portability, low level)
- Generated executables are native: No .NET dependencies.

Architecture: Why not in VB6?

- It could be great to have RAD Basic as self-hosting compiler.

- But:
  - Visual Basic is great for graphical apps. But lack support for command line.
  - There are no tools as ANTLR for automatize Lexical and Syntactical analyzer. It could be written by hand, but it slows down development-
  - IDE and language are pretty old (hey! We are here for...) so it will slow down development.
- Maybe rewritten in future... 

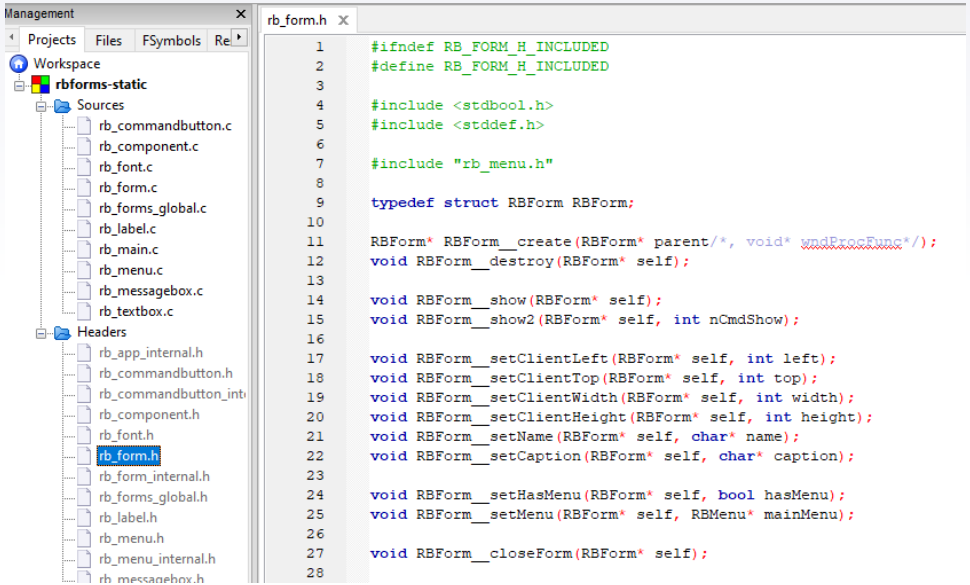
Architecture: COM/OCX support

- RAD Basic supports COM (OLE/ActiveX) and COM is a first citizen. Visual Basic relies heavily in COM/OCX.
- RAD Basic toolchain (comigen.exe) do the plumbing for creating COM interface with the help of RBCOMLIB.
- It generates header files and utility C file for being called from application generated code. All is done with no user interaction, as in VB6.
- So using OCX/COM/OLE is as easy and transparent as it is in Visual Basic.

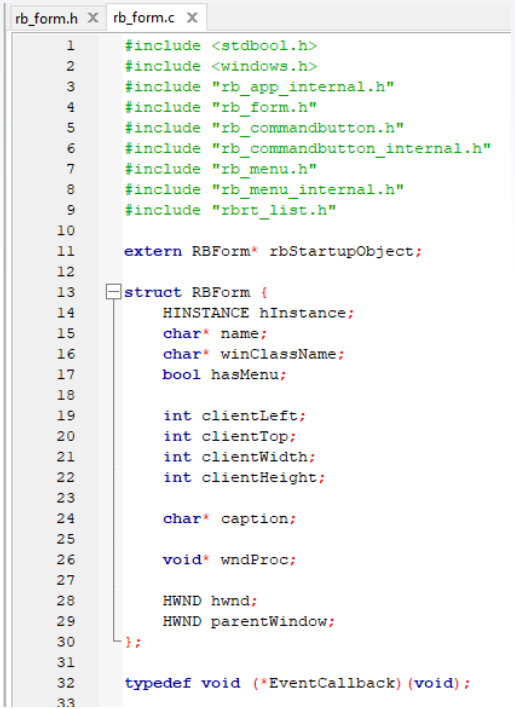
Architecture: Why not COM based?

- RAD Basic is designed with cross platform in mind. COM technology is very hard to be made in a portable way.
- Easier for user to not have external dependencies. Prefer to static linked and avoid dll hell.
- If it is needed, it could have a COM wrapper interface for plain static lib runtime.
- You could use COM and RAD Basic static runtime library in the same project with no problem!

Architecture: cross platform design

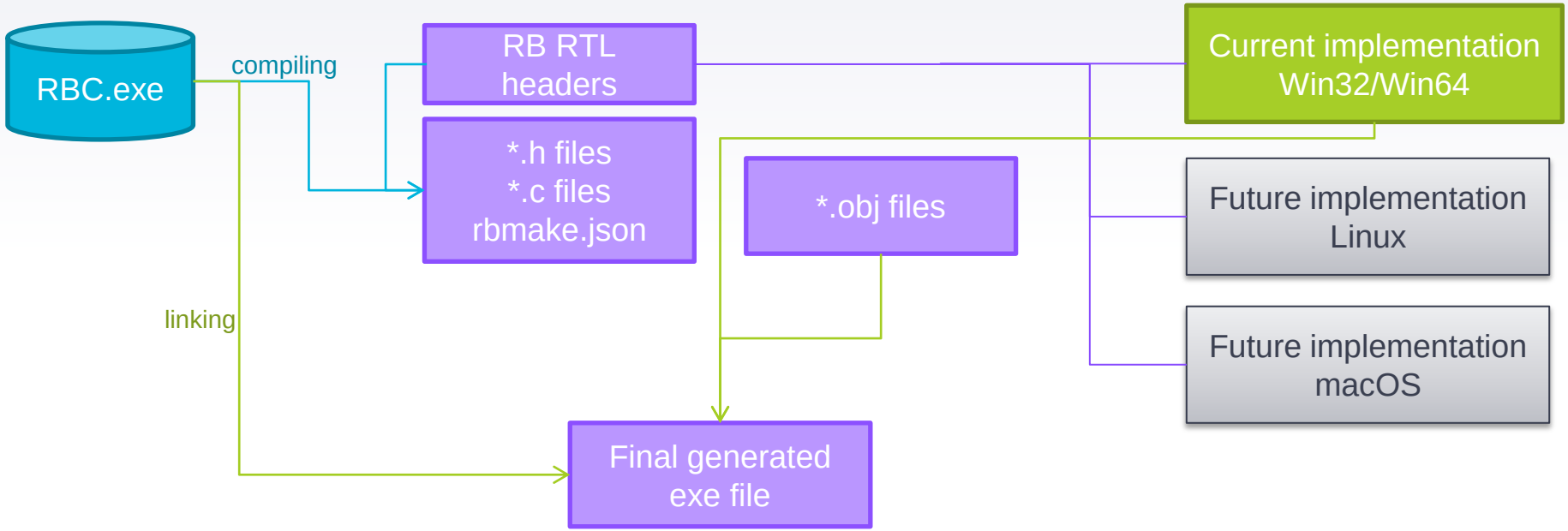


RBC compiles using this platform agnostic header



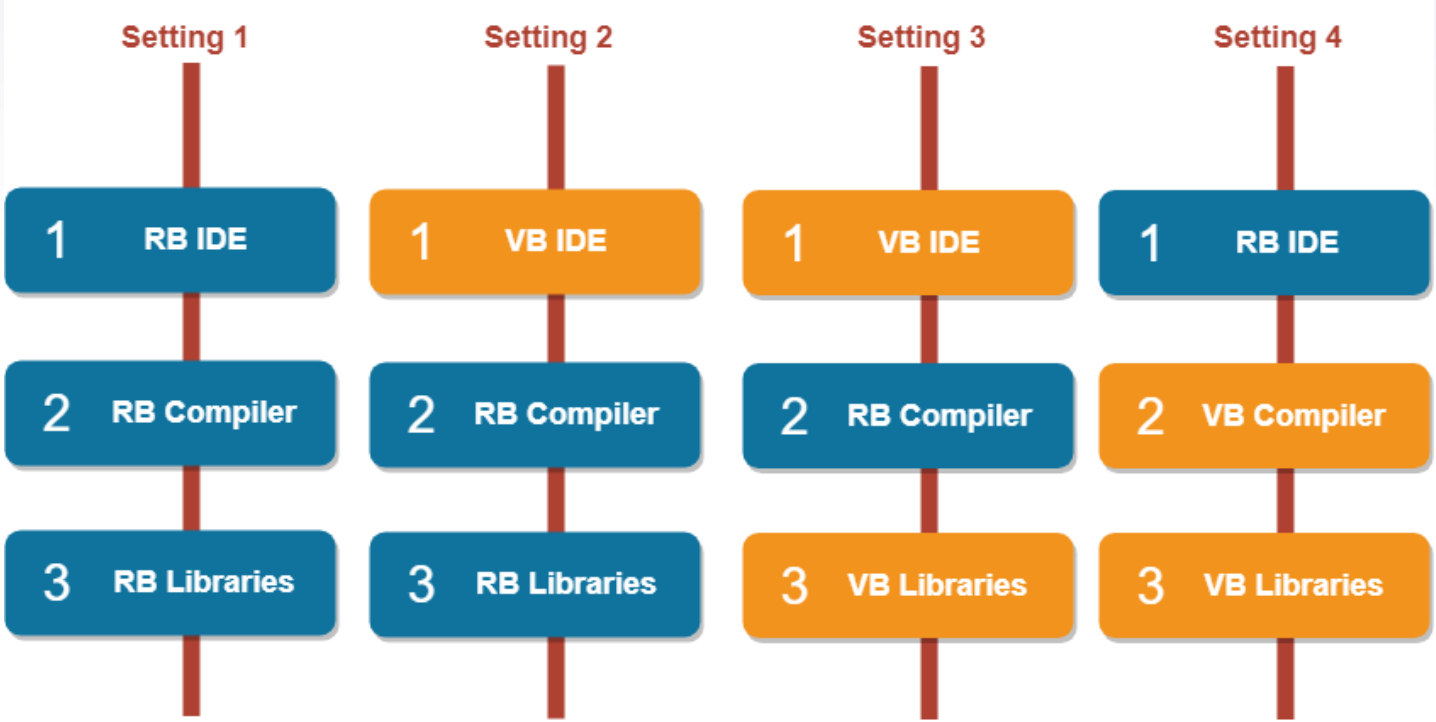
Win 32 implementation is wrapped in static lib

Architecture: cross platform design

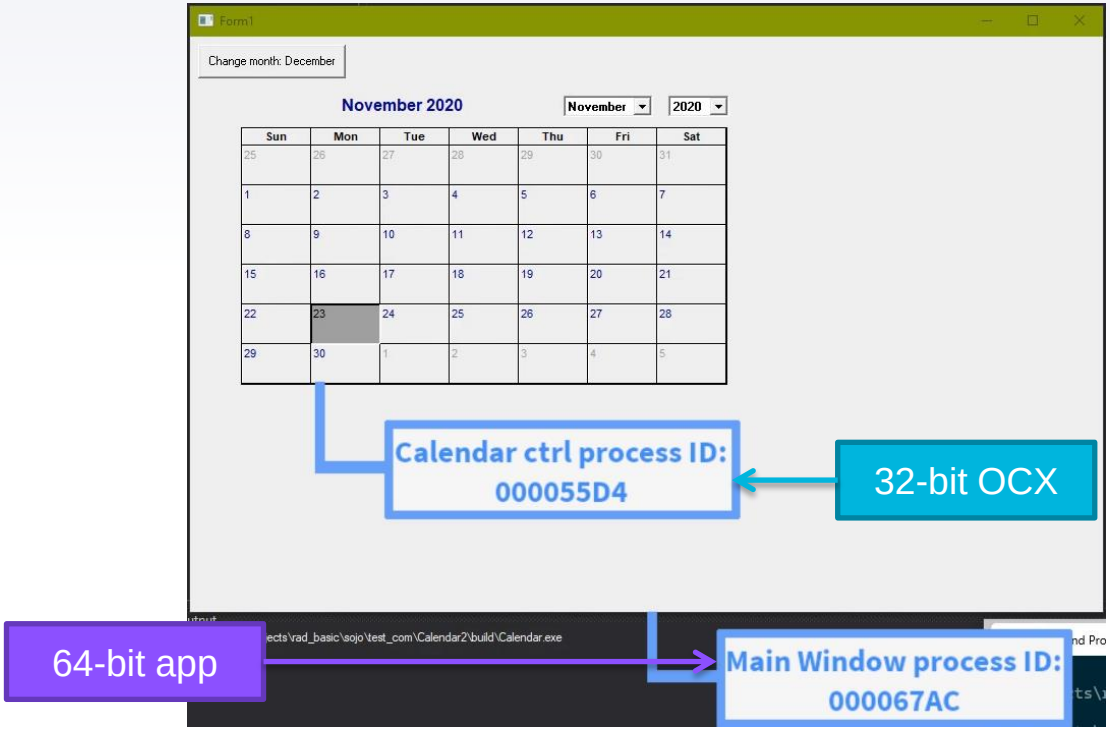


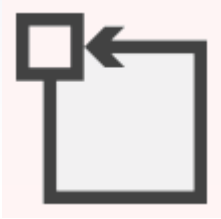
There is one header as API and there will be **n implementations** for each platform. So, it could be swapped in compile time.

Architecture: Three layer arch



Architecture: SOJO library





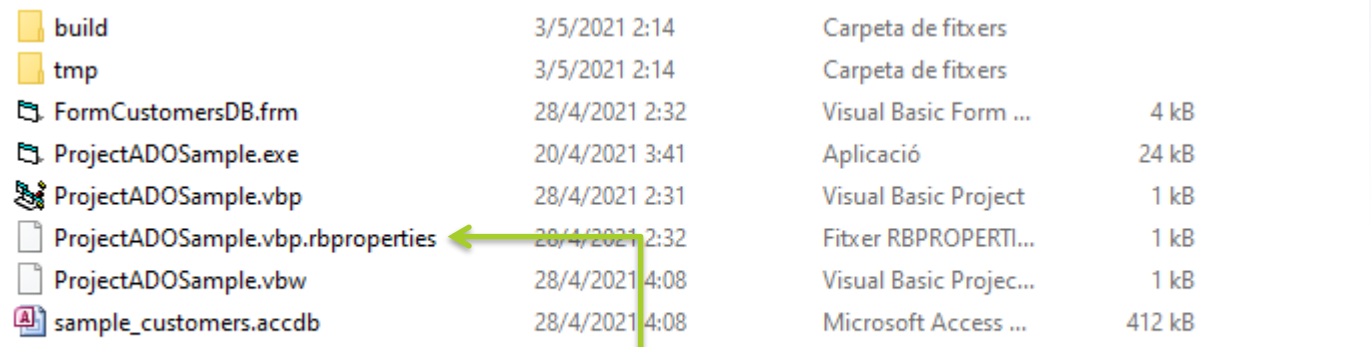
SOJO library: allows 32-bit OCX run inside 64-bit applications.

It could be integration problems, so it have to be used as a workaround

Main goal: compatibility

- RAD Basic is focused on compatibility. So, there won't be new features or language enhancements.
- RAD Basic has no conversions or migrations.
- RAD Basic allows **easy** "transition" from VB. It works with native files, so you could go back and forth between environments freely.
- RAD Basic follow Visual Basic language reference. But not only this, it behaves some way as VB6 does, implementing same tricks and oddities.

Main goal: compatibility



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tmp	3/5/2021 2:14	Carpeta de fitxers	
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ProjectADOSample.vbp	28/4/2021 2:31	Visual Basic Project	1 kB
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ProjectADOSample.vbw	28/4/2021 4:08	Visual Basic Projec...	1 kB
sample_customers.accdb	28/4/2021 4:08	Microsoft Access ...	412 kB

Extended properties as platform (32-bit/64-bit) are stored in a separate file, for preserve compatibility with VB6 file format

True current status (not as good)

- There is support for using OCX, although it has to be improved (it fails with coClasses with more than one interface, and sometimes needs to tweak the output code) Thanks **OleView.exe**!!!
- At this moment only compiles exe files. Working in OCX generator: OCX projects could be loaded in IDE but compiling fails.
- IDE with code completion deactivated. Working in LSP (Language Server protocol) implementation.
- There is a solid foundation, but there is a lot of work to do for reaching 100% compatibility.

True current status (the good)

- It has support for basic flow structures (IF, WHILE), method calls, variable declaration and some basic math operation.

- Core features are developed and RBC (RAD Basic Compiler) could compile some small application test (calculator, ADO navigating through database, simple text editor,...).

- There is a solid foundation, well designed architecture and there are solved many challenges as: visual forms designer, (partial) COM support, future cross platform, ...


LIVE
DEMO

THANKS!

AMA time: Any questions?

You can find me at:

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