Why Portable Code

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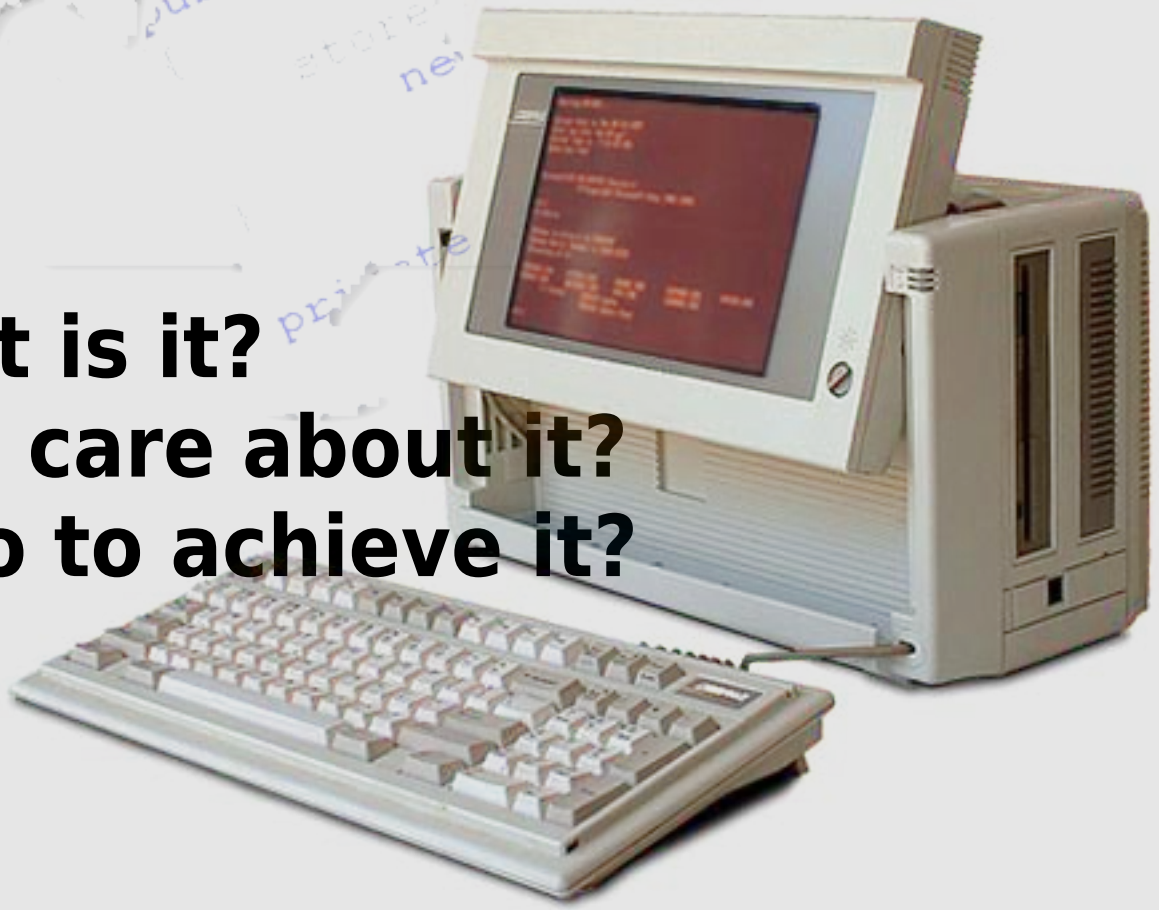
Portable Code



What is it?
Why should I care about it?
What can I do to achieve it?

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What Is Portable Code?

Running on a mobile device?

Running on 2 mobile devices?

Running on Linux and MS Windows?

Cross-compiled for embedding?

Written in Java? Python? C?

Uses a “portable” toolkit
(what makes that portable?)

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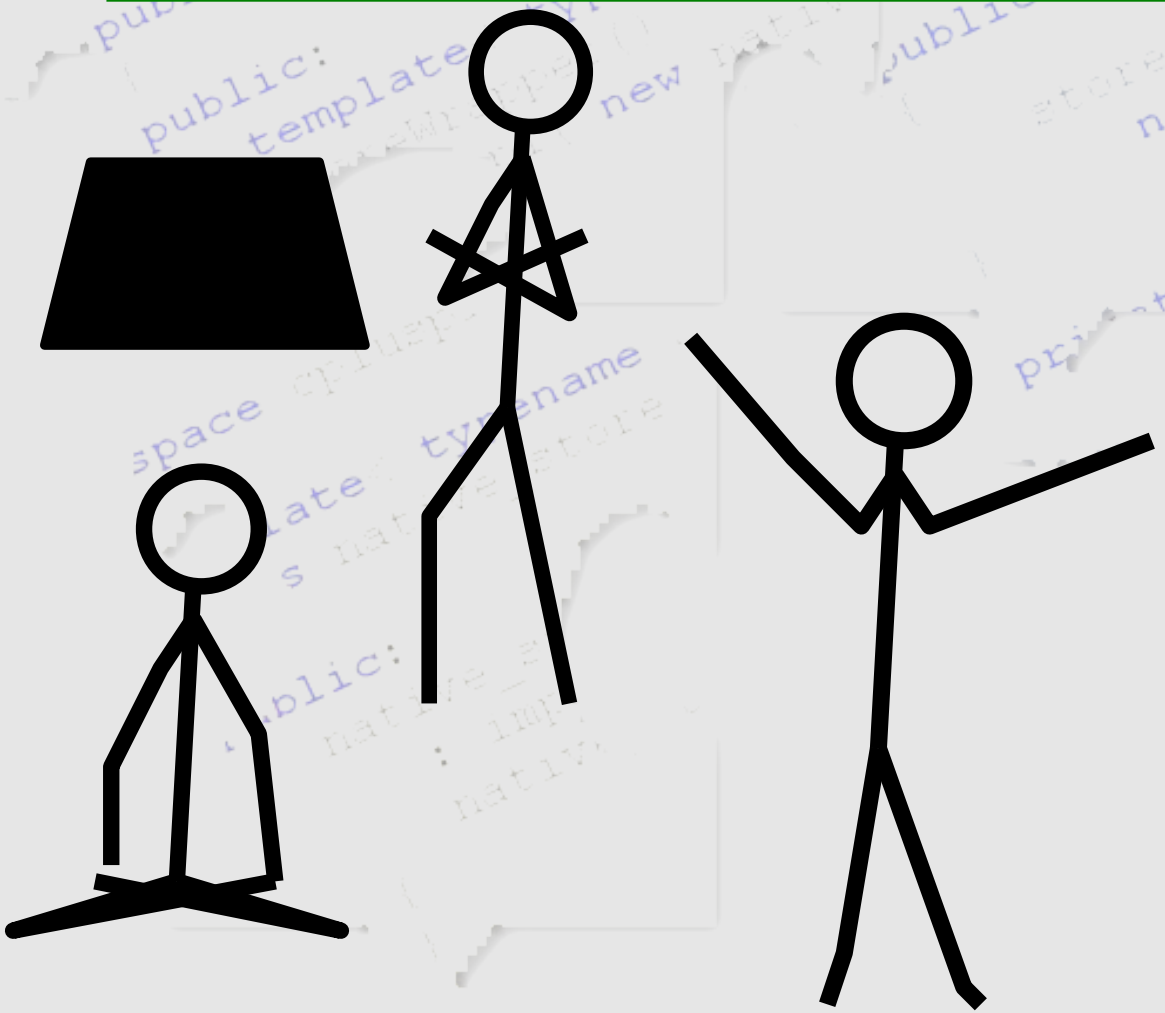
Who Cares?



The Ignorant

The Skeptic

The Zealot

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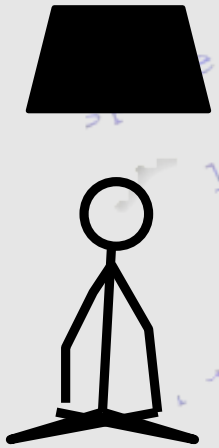
The Ignorant

Integers are intended to be 32bits wide.



I know my platform intimately.
I can always depend on it.

Well, it works on **my** machine.

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Skeptic

My Platform is the one true platform.

The features of my platform make writing software easier and more useful.

The benefits of platform specific features far out-weigh the effort of portability.

Everyone else should use the same platform as me (see (1) above)

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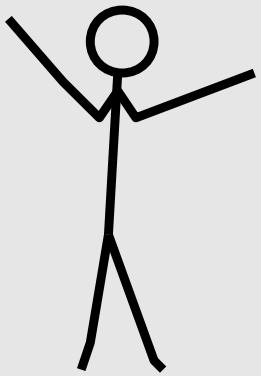
The Zealot

Portability Is All.

All software I write *MUST* run on as many different platforms as possible.

Without alteration of any kind.



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What is a Platform anyway?

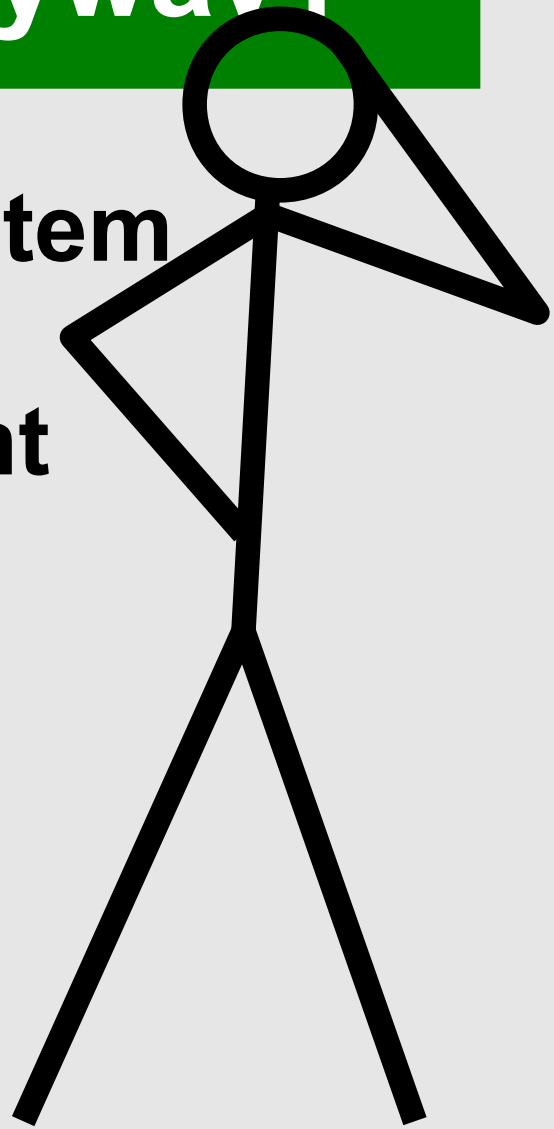
Hardware and Operating System

+

Programming Environment

+

Standard Libraries



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What About....?

Compiler and Library Versions
MSVC6 anyone?

Operating System Releases
XP to Vista?

Basic Platform Changes
32 – 64 bit

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The Common Myths

Portability is not possible for most applications

Portability is about running on any Platform

Portability means sacrificing efficiency

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Another Myth

My code is portable because it's written using...

Python
Java
SOA
wxWidgets
Boost

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So What?

Portability is more than platform independence

Standards are about more than platform independence
...but they do assist portability.

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Bottom Line

Portable Code is

SIMPLER
not
HARDER

To Create, Understand, Maintain

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Trade Off

Sometimes platform dependence is **desired.**

Sometimes non-portability is **unavoidable.**

How much and how far us up to you.

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Common Pitfalls

The Usual Suspects

Byte-ordering and data type sizes
Size of pointers
Endian-ness
Order of evaluation

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Example 1 – Compiler Upgrades

- Using Common Extensions
  - Calling Conventions
  - Dynamic Library Boundaries
  - Platform Libraries like Python COM
- Not Standard Enough
  - Stricter Checking
  - Deprecated or no-longer supported features

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Example 2 – Cross Compiled

- Portable Devices and Mobile Phones
  - Library support is often limited
  - What about testing? E.g. NUnit Bridge
  - Do you really want to debug on the device?
- Embedded Software
  - Hardware can be quite varied
  - Compiler and library support is often limited

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Example 3 – Testing

- Tests are a new platform
  - Make test code independent of its surroundings
  - Drop-in replacement features – UI, DB, etc. are all the platform specifics
- Design for Test == Design for Portability
  - Separate out that which you do not need.

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Example 4 - 3rd Parties

- Services May Change
  - Reuters vs. Bloomberg vs. ???
  - Windows Forms vs. [many]
  - RWTools.h
- SOA Abstracts Comms
  - Middleware is a platform of sorts
  - What if you change it?

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Example 5 – Parallel Development

- Who Does What?
  - A different team?
  - A different organisation?
- When Does it Happen?
  - Their timescales may be different to yours
  - How do you code against something that ***doesn't exist yet?***

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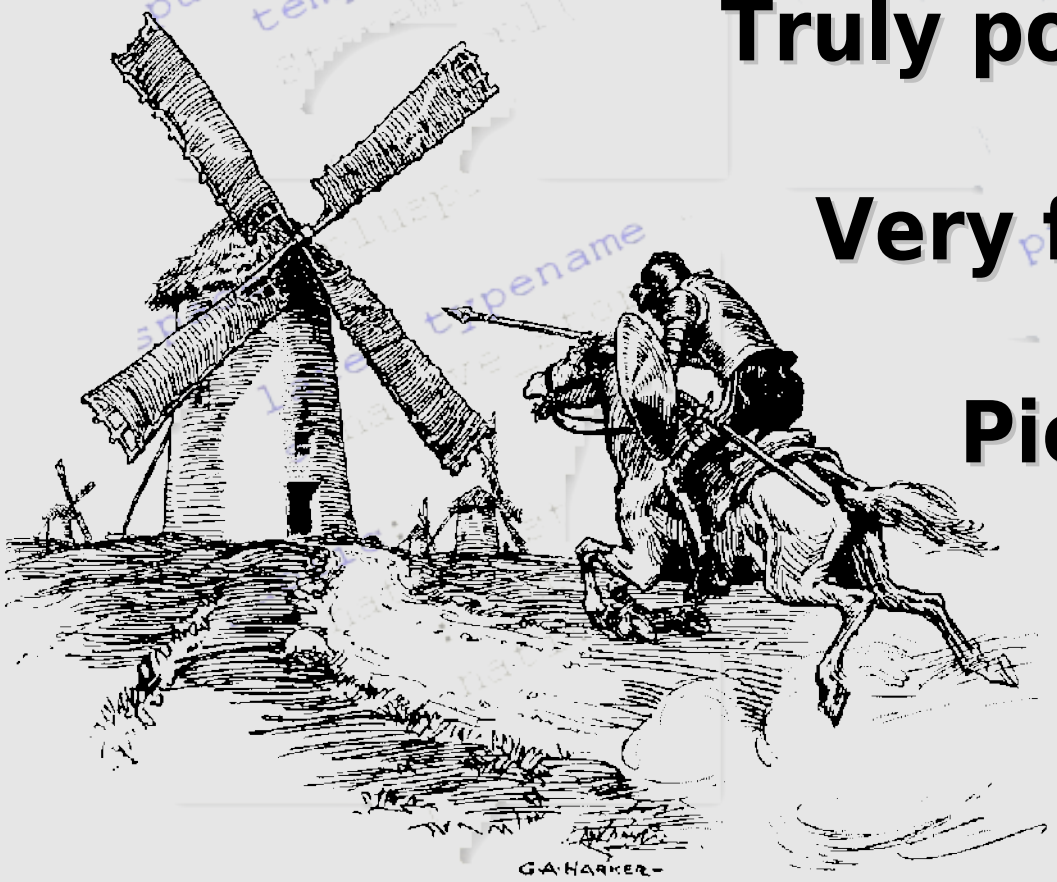
The Good News



Truly portable code is hard.

Very few really need it.

Pick your battles.

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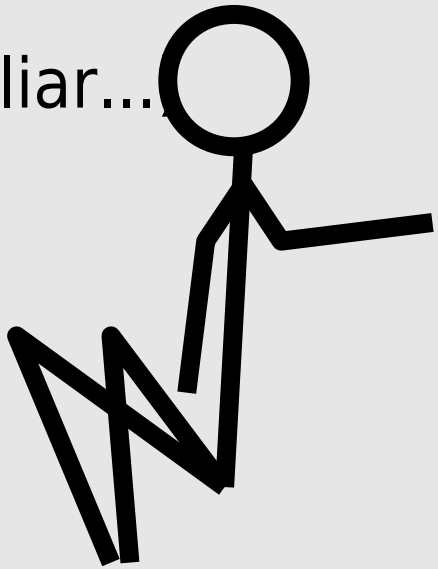
So OK, I Care. Now What?

Some techniques are common to making ***ANY*** code more portable.

(By the way, these techniques should be familiar...)



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Modularity

Partition apps into modules
separated by interfaces

Make ALL interfaces 100% portable

Make as many portable modules as you can
Quarantine platform-specific code

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Standards

Code written according to published/international standards will be easier to port.

C++ ISO Standard
Java Language Reference
Common Language Interface

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Standards

Where you need to depart from The Standard,
(whatever that is for you)
make your interface boundaries there.

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People

Clever tricks in code make it harder to find new programmers to understand it!

Template Meta-Programming
Using lots of different and arcane languages.

People are an important part of your development environment.

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People

Not all “Clever Tricks” are just tricks.

Treat such code as if it's a different platform and provide an easier-to-use interface to it.

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Structure

Loose Coupling and Strong Cohesion
make code more portable.

Hide platform specifics behind interfaces.

Allow for variation points – using interfaces.

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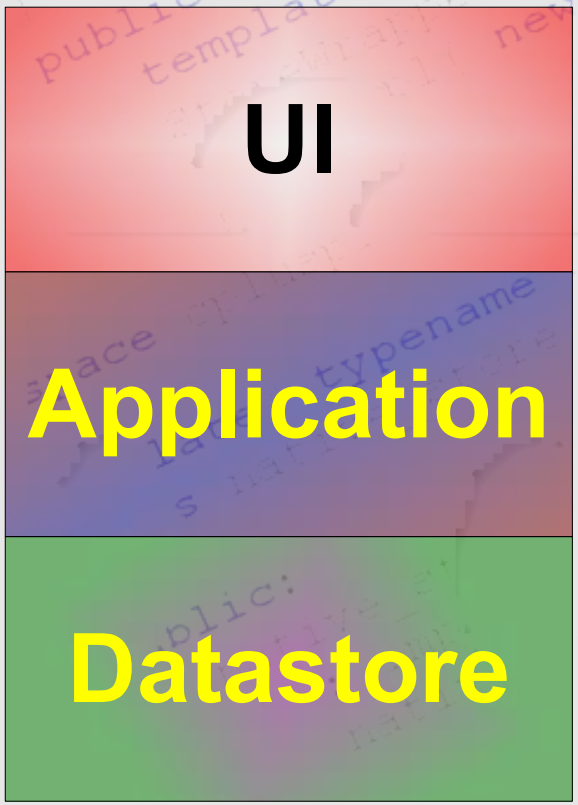
Coupled



- Monolithic
- Everything depends on its neighbour
- Modules are inextricably linked together
- Ultimately, the UI depends on the Datastore

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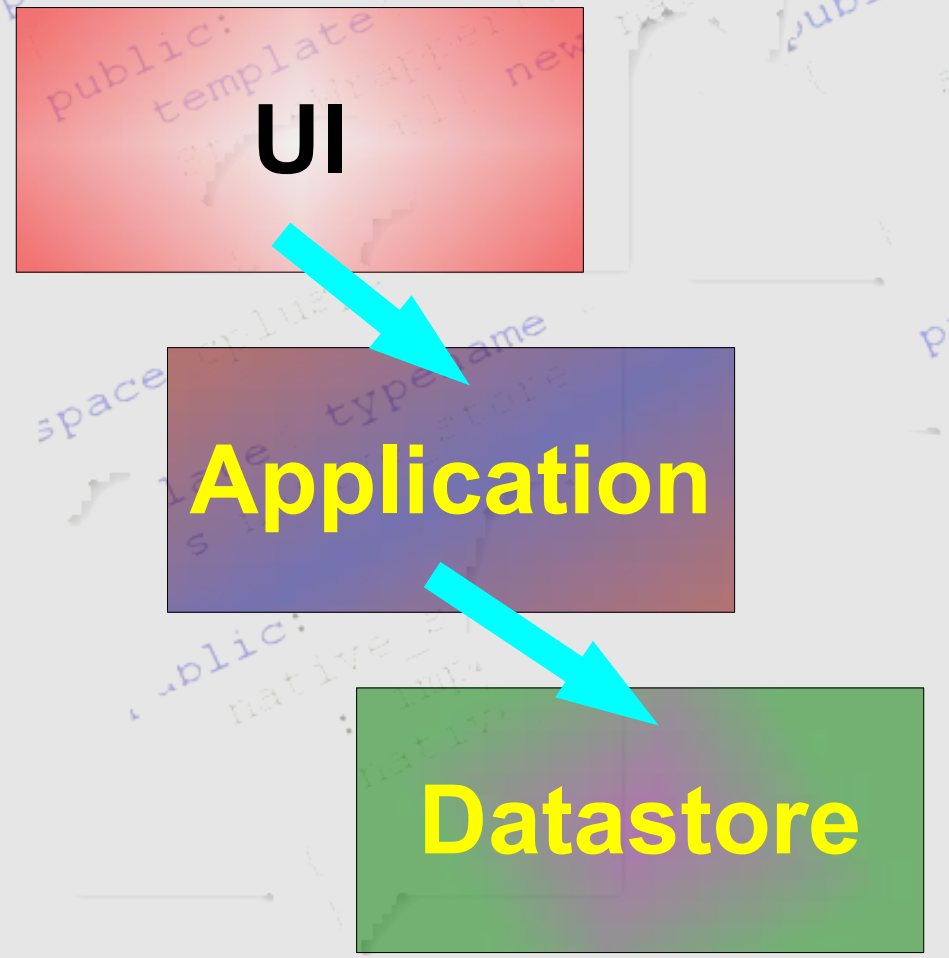
Less Coupled



- Separate modules
- When it's one way (down) all is fine
- What happens if the Application needs to call-back on the UI?
- UI ***still*** depends on the DB

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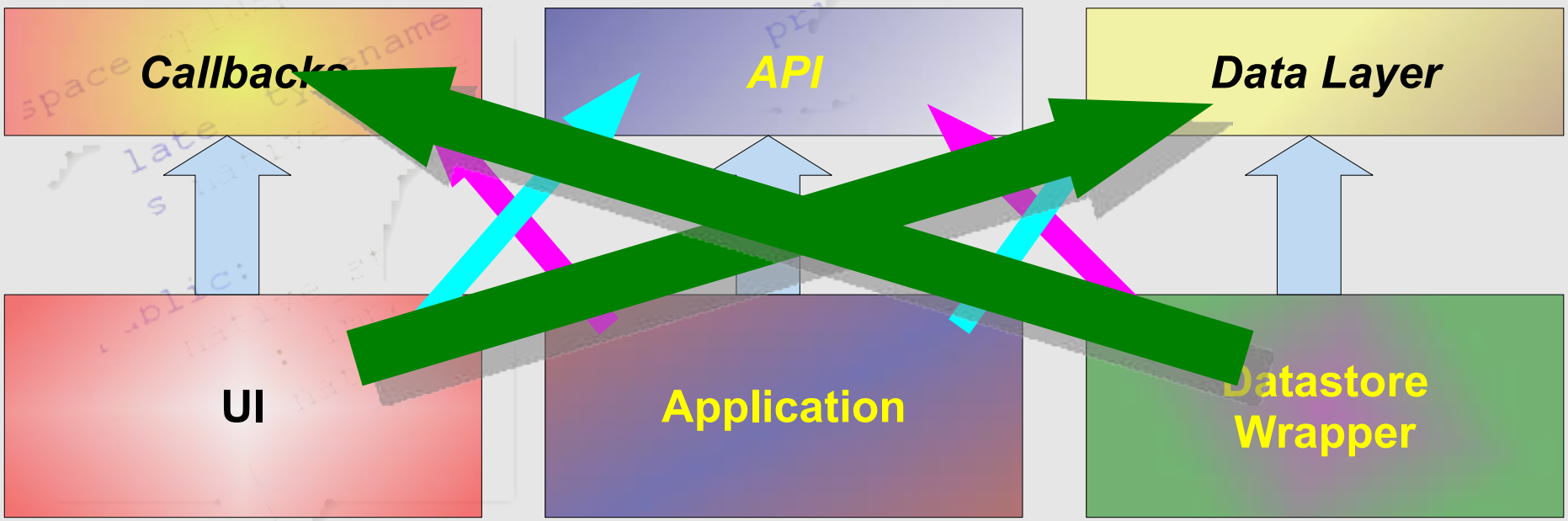
Decoupled

Objects depend only on interfaces
Interfaces depend only on other interfaces
Notice how dependencies go *upward*!



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Why Portable Code?

Why NOT Portable Code?

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Why Portable Code?

- Portability is not just platform independence
  - Platform can mean many things.
  - Platform independence may be important
    ...or it may not be
- Your people are important
  - think about the programmers you have today
  - ...and those you'll need tomorrow

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Why Portable Code?

Program Structure Is All

Separate Interface From Implementation
Hide clever tricks, optimisations, complexity, platform specifics behind interfaces

Design for portability – like testing –
results in better design

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In The End....

It's really about making it simpler.