# Rapid Application Deployment with R.

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Background

- Our group consists of ~15 statisticians who consult across all areas of the business.
- Gone are the days were a standard statistical report of the results is acceptable as a project deliverable.
- Clients expect delivery of statistical toolkits/applications for all manner of different projects.
- Solutions often delivered to a very small client base with tight deadlines.

Aspects of Building Client Solutions with R.
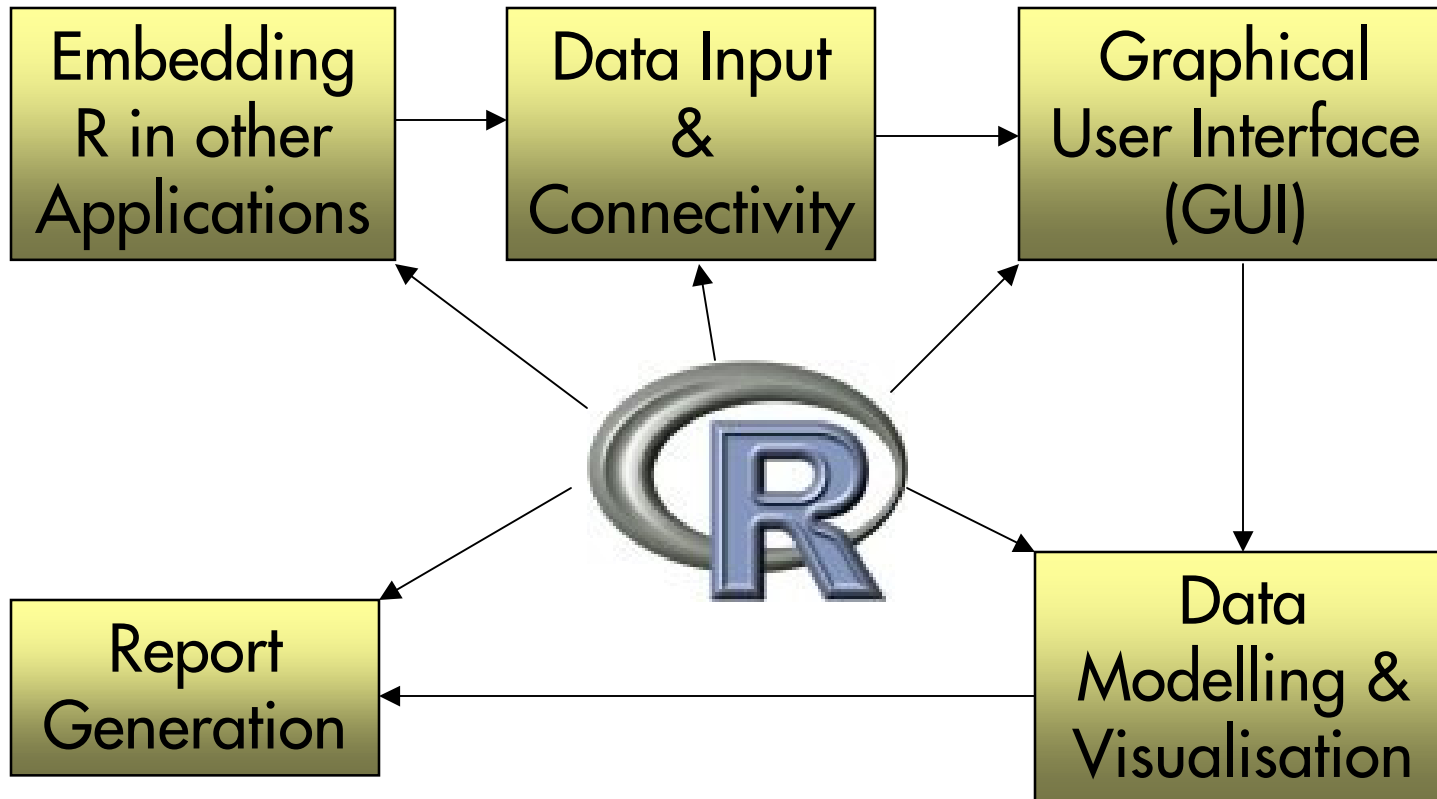
Embedding R in other Applications

- Often best to embed R in another application which serves as a familiar entry point for the user:
  - Excel.
  - Web based applications.
  - Applications built with .Net, C#, C++ and VB.
- For Windows applications we have found R(D)Com developed by Thomas Baier to be an excellent method of embedding R.
- RExcel is an addin developed by Erich Neuwirth which allows the user to use R directly from Excel.
- Web applications. Rwui, Rpad,Rweb.
- The client need not even know that R is being used!

Data Connectivity and R

- R has excellent facilities to communicate between different data sources:
    - Input/Output of text or CSV files.
    - RODBC: ODBC Database interface package to query and write tables for a wide range of different databases, e.g. Access, SQL Server, Oracle..
    - (D)COM allows data transfer between R and windows applications.
    - RExcel: Excellent bespoke functionality for data transfer between R and Excel.
    - XML: R package for Input/Output of XML documents.

R GUIs

- We cannot ask our clients to learn the R language!

- GUIs are used to allow the user to easily accomplish the tasks in hand.

- Many more R GUIs are now available:
    - Tcl/Tk, rpanel.
    - Gtk, Gwidgets, PMG (Poor Man's GUI).
    - Java based GUIs: rJava, JGR
    - Web based: Rpad,Rwui.

- R GUIs can be complemented with other GUIs, e.g. VBA forms.

- Application development is not reliant on a single type of GUI and the choice can be tailored to the problem in hand.

Data Modelling & Visualisation

- The benefits of R for statistics and data analysis are clear!

    - Excellent graphical capabilities.
    - Extremely concise coding with the R language.
    - Hundreds of libraries of functions to use, as well as the ability to write your own functions.

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R Methods for Report Generation

- Sweave: framework for mixing text and R code to generate latex documents.

- R2HTML: Functions to easily generate HTML reports.

- rcom: Uses COM to communicate with windows applications. Excellent method for automatically generating PowerPoint slide packs.

Why is application development "Rapid"?

- A lot of the hard work has already been done by package contributors!

- The combination of available R packages makes for a very powerful and diverse tool kit for building client solutions which can be developed in in a very concise manner.

- An experienced R programmer knows how to make the most of R data handling and modelling functionality.

- The alternative of building an application without R would mean developing statistical application from a lower level language such as C or C++. This would enormously increase the work overhead.

- The rapid nature of deployment makes application development with a small client base viable.

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Examples of Applications Developed for Shell

- Monte Carlo Simulation Tools.
- Data Visualisation and Exploration Tool.
- Forecasting Toolbox.
- Curve Fitting.
- Automatic Report Generation.
- Groundwater monitoring tool.....

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