

What can frameworks do for you?

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Outline



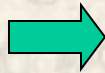
- Scientific software development
- What is a framework - and why is it relevant?
- Who the heck is VPAC?
- Why are we here?

Scientific Software Development

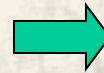


- An evolutionary trend

Small scale
“throwaway”
models



Larger scale
shared and
reused models



Community
codes, shared
repositories of
models and data

- Maturity varies greatly across scientific disciplines and projects within those disciplines, e.g.
 - HIGH: genetics (blast searches, web interfaces, NCBI database)
 - LOW: astrophysics

Scientific Software Development



- A higher maturity level usually means a more mature discipline
- There is often no particular “community plan” to the evolution
- Software evolution proceeds in parallel with community evolution
 - Usually by accident or natural selection
 - This is very inefficient
- Large scale community codes and model and data repositories come at a considerable cost to develop and maintain
 - Scientists rarely have the expertise in “software engineering” to do it
 - Computer scientists are not very interested in getting involved
- Frameworks are a potential solution

Frameworks



- Frameworks are
 - Reusable software components
 - Packaged yet adaptable software solutions
- Endemic in commercial and open-source software
 - Websites: Jakarta/Struts; Gridsphere; ...
 - Visualization: VTK
 - Databases: MySQL
 - Generic: .NET and J2EE
- Frameworks can be
 - Off the shelf (all of the above)
 - Custom built (StGermain, Pyre)

Frameworks - Success Stories



- Increasing sophistication of the www
 - Anyone can setup an “eTailer”
- Sophistication possible thru good architecture and tools
 - Decoupling of
 - Presentation (page style)
 - Input processing (forms)
 - Back-end databases
 - Business logic

Frameworks - Failures



- Unfortunately, it does not always work
- Just because you are using or building a framework does not mean you will “lower the cost” of moving to a more mature discipline
- Common failures
 - POOMA: “build it and they will come”
 - Globus3: “overwhelming complexity, buggy software”
 - Gridbus: “selling solutions to non-existent problems”
- Keys to success:
 - Development must be driven by the community needs
 - Do it in small iterative steps, with constant feedback
 - Prefer an “off the shelf” solution (but choose wisely)
 - Do not let computer scientists run the show

Why are we here?



1. There is an Australian version of CIG we are major players in
 - Access
2. We want CIG to succeed
 - And merge the Australian and American efforts
3. We want to aid the scientific community develop “better” software
 - Lower time/cost to develop
 - More adaptable/maintainable

Our hypothesis:

“Scientific software development, maintenance, and support is increasingly expensive and slow, yet increasingly important to the advancement of geophysical sciences”

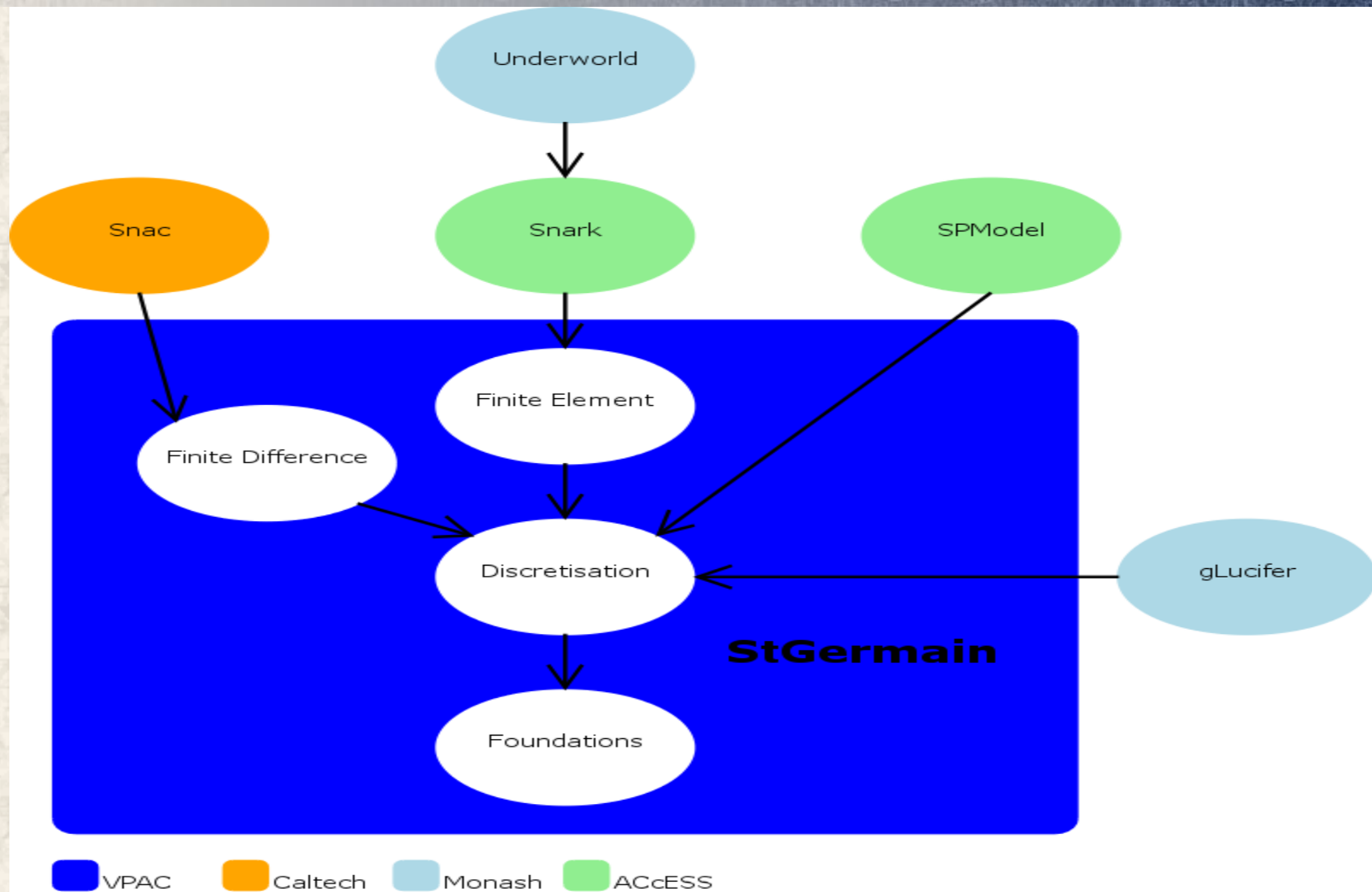
That includes websites, portals, data archives, scripts, not just applications!

StGermain



- A framework for the development of computational codes
- Science neutral
- Numerical technique neutral
- Differs as it focuses on “maintainability”
 - Ability to create new products/derivatives
 - Ability to customize (extend/adapt) a derivative
 - Enforces maintenance of “integrity”
- Experts deciding performance/flexibility tradeoffs

The StGermain Family tree



Thanks



- VPAC CSD (StGermain)
 - Pat Sunter
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 - Snark
 - Rob Turnbull
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 - Dave Stegman
 - Cecile Duboz
 - Greg Watson
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 - Luc Lavier

The Agenda Today



- We are here to listen
 - We are not selling anything!
- I'm here to offer technical advice
 - What is feasible/not feasible in software
 - Choices and alternatives in frameworks
 - What works and does not
- I can offer quite a bit of organizational/project management advice
 - We do a lot of commercial project management