My time in research computing
Or
From Gown to Dalmatic

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A temporal progression

- Did not use IT at school except for the humble calculator
- Wrote first fortran77 code in 1986 – performed statistical calculations
  - Plus ca change!
- Used first NAG subroutine in 1988
- IBM3090, VAX3400 and NORD500 in 1989-90
  - Modelling and reduction of radio interferometry data
- 1990-1991
  - VAX3400 – produced first data base; pulsar timings and is my highest cited paper
- 1992-1994
  - Used Sun 1 and Sun 2 workstations for PhD thesis. Brilliant viz and data reduction boxes
  - Measured proper motions in stellar outflows
- 1994-1997
  - Simulation of Maser Physics using RAL YMP8, J90 and T90
  - Modelled OH and H2O maser transitions and intensities

- 1998
  - PPARC leaves the National Computing Service. Formed Miracle HPC service with Steve Miller at UCL
  - 1999, bought first system – Origin2000
  - 2001, designed and bought first cluster, with Callum Wright, v880s and myrirnet
  - 2003, V890 cluster that did both parameter search (PSE) and parallel jobs (Keter)
- 2006-2009, helped with the design and purchase of the Legion system at UCL
  - Commodity clusters and parallel file systems
- 2011-2017
  - Chair and Director (2012-17) of the STFC DIRAC HPC Facility
  - 5 systems to deal with 5 problem types in loosely parallel, weakly parallel, strongly parallel and data intensive research
  - Software Engineering
  - Distributed Services – Integration of Services
  - Creation of a ecosystem and the nascent National e-Infrastrcuture
- 2017+ shuffling off…….

Research Computing – A Waffly Construct?

- **It is part of the scientific method**
  - Experiments/Observation
  - Theory
  - Test theory OR apply blind statistical methods
  - Generate new theories, hypotheses and Experiments/Observations
- Research Computing touches all of these aspects of the Scientific Method
- And is contained *within* it

Services or Instruments

- Placing Research Computing in the Context the Scientific Method the valid way to regard research computing is as a set of Experimental Apparatus
- Hardware, workflows and software are instrumentation
  - They make possible the manifestation of the research question and
  - the application of the scientific method to a problem
- The various roles of system & network managers, programmer/software engineer, facilitator, data scientist, hardware engineer, network engineer allow
  - the application of the instruments of the Scientific Method
  - and assist the Researcher in solving her/his research problem

By your fruits shall ye know them?

- Research Computing should produce Science (research)
- How is this measured these days?
  - Papers
  - Citations
  - Journal impact factors
  - Students taught and trained
  - Research income
  - Industrial and public sector engagement
  - Public understanding of science
- These should be the key measures of Research Computing
  - How effective are we?

A blessing and curse?

- The curse of Research Computing is the phrase “IT” and its various jargons such as Services, Management……
- The blessing of Research Computing is the phrase “IT” and its various jargons such as Services, Management…….
- Philosophically if the IT activity is subordinate to the Scientific Method it should produce science more easily
  - What this mean?
  - The science case should inform and be used to create the instrumentation that Research Computing provides
  - The science case provides the criteria for success that is measured.

Looking Ahead

- Tier-2 is very much the beginning
- 2017-19 looks like being an intense period with sustained investment
- The Argument over whether HEIs or National Centres should provide services still rumbles on
- Single-sign-on, Public Cloud and data management promise very stormy conditions
- The tensions between centralisation and local will get worse as OPEX issues start to bite
- …and yet many of us have been here before – there will be lots of opportunity
- As long as you don’t forget the Scientific method