Applications Area Overview

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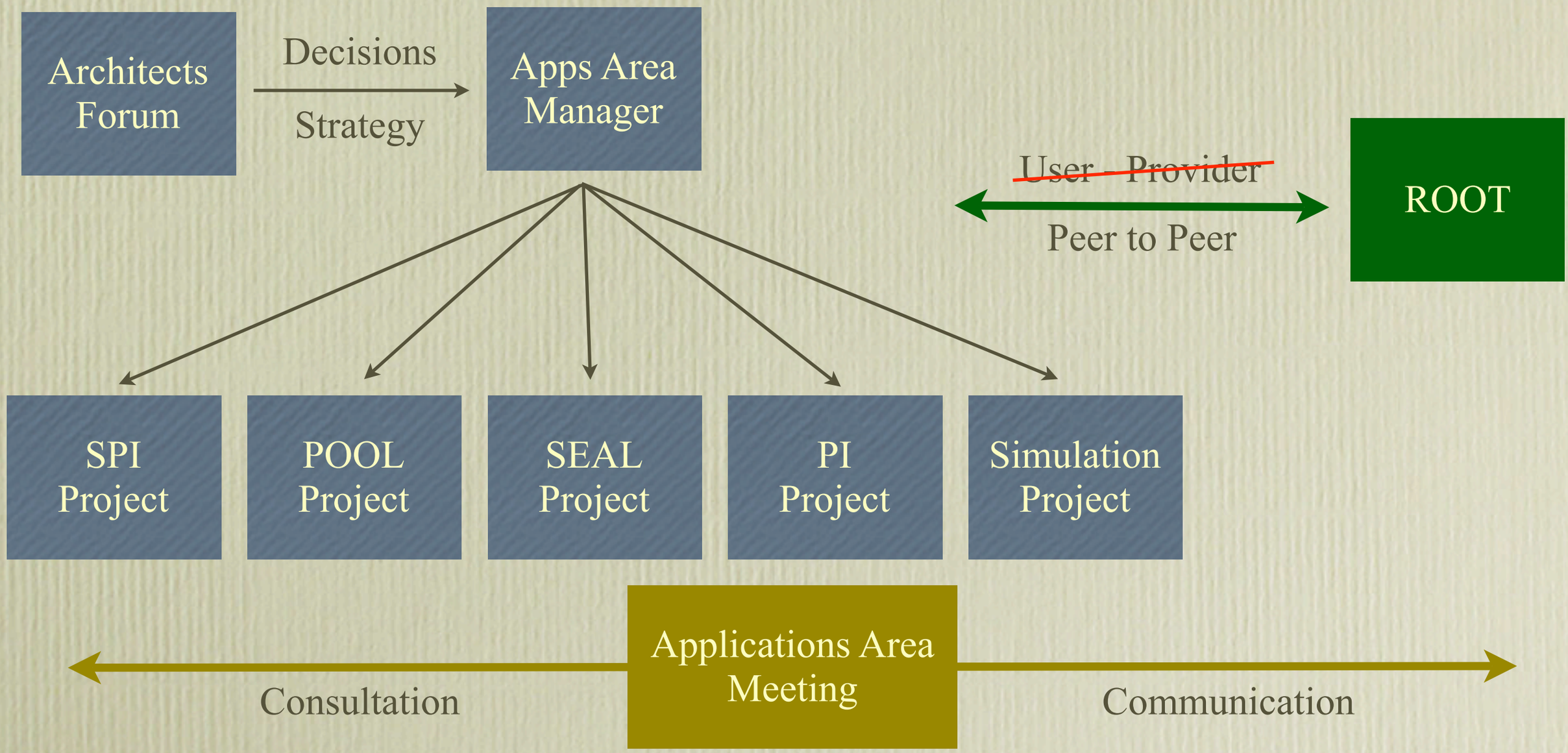
Outline

- Organization, objectives
- Project survey
- Planning and personnel
- Conclusions

Applications Area Organization



Project Focus

- Deliver the common physics applications software
- Organized to ensure focus on real experiment needs
  - SC2/RTAG/PEB: experiment-driven requirements and monitoring
  - AF: architects in management and execution
  - Open information flow and decision making
  - Participation of experiment developers
  - Frequent releases enabling iterative feedback
- Success defined by experiment validation
  - Integration, evaluation, successful deployment

SPI - Software Process and Infrastructure

- Now a mature service and tool suite meeting applications area needs and some wider needs
  - Experiments using Savannah portal, software library
- We now have a project-wide librarian, Andreas Pfeiffer
- Personnel contribution from EGEE has kept manpower level (almost) adequate, partially offsetting departures
- Principal open issues:
  - Uniform software packaging/distribution approach with grid deployment
  - Build system. gmake+autoconf being evaluated

Persistency Framework

- POOL, and now a second product: Conditions DB
  - CondDB is refactoring & enhancing existing tool to incorporate experiment extensions, POOL support
- POOL is an operational event data store: successfully deployed in CMS, ATLAS, LHCb data challenges
- Support is top priority but development continues
  - Relational storage manager for conditions data
  - ROOT4 integration: schema evolution, STL I/O
  - Ongoing grid integration as grid tools evolve

SEAL - Core Libraries and Services

- Three experiments using or planning to use SEAL components from all five development work packages
  - Not everyone uses everything, as expected
- Major new effort is a broad math library project
  - Collaborating with ROOT
  - Seeking to involve/leverage the wider HEP community
- Vital current effort is joint work with ROOT on a common dictionary

SEAL Product Usage

		ATLAS	Alice	CMS	LHCb	non-LHC
Foundation	SealBase + Util					
	SealZip					
	SealIOTools					
	PluginManager					
Framework	Component Model					
	Basic Services					
Dictionary	Reflection					
	LCGDict					
	Specific Dictionaries					
Scripting	PyROOT					
	PyLCGDict					
	PyBus					
Mathlibs	C++ Minuit					

Direct use Indirect use Planned use

PI - Physicist Interfaces

- De-scoped early on to narrow deliverables primarily in extending AIDA support to ROOT
  - Delivered and in use by three experiments
- Now a low-level activity mainly in support and feedback response
- Future activity in analysis area requires better understanding of ARDA and the level of interest in common work
  - Current limited objective is to define and address immediate needs for physicist-level event collections

Simulation

- **Geant4:** Strong focus on LHC needs and close collaboration with experiments and physics validation
  - Major achievement: G4 DC deployment in 3 experiments
- **Generic simulation framework:** interest evaporated with the success of Geant4 in reaching production-grade
  - De-scoped objectives: G4+FLUKA infrastructure for test beam studies, and a G4-ROOT geometry exchange tool for ALICE Virtual MC evaluation
- **FLUKA participation:** consultation and assistance

Simulation (2)

- **Physics validation:** Active program delivering results
  - Geant4 EM and hadronic physics validated
  - Simulation physics requirements report
  - 'Simple benchmarks' probing simulation physics
    - Drawing extensively on experiment test beams
- **Generator services:** Generator library deployed and in production use in one experiment so far
  - Recent internal review identified key manpower and communication problems, now being addressed
  - Common generator event database in progress

ROOT

- Relationship with LCG-AA is moving beyond the ‘user-provider’ of the blueprint to a deeper, more peer-to-peer collaboration
  - A more coherent program avoiding duplication
  - Specific collaborative efforts agreed in AF (and up the management hierarchy) and implemented in workplans
    - Dictionary convergence, joint work on mathlib
- POOL-ROOT relationship continues to be productive
  - Performance and functional improvements arising from DC experience
  - Joint planning for a smooth ROOT4 transition

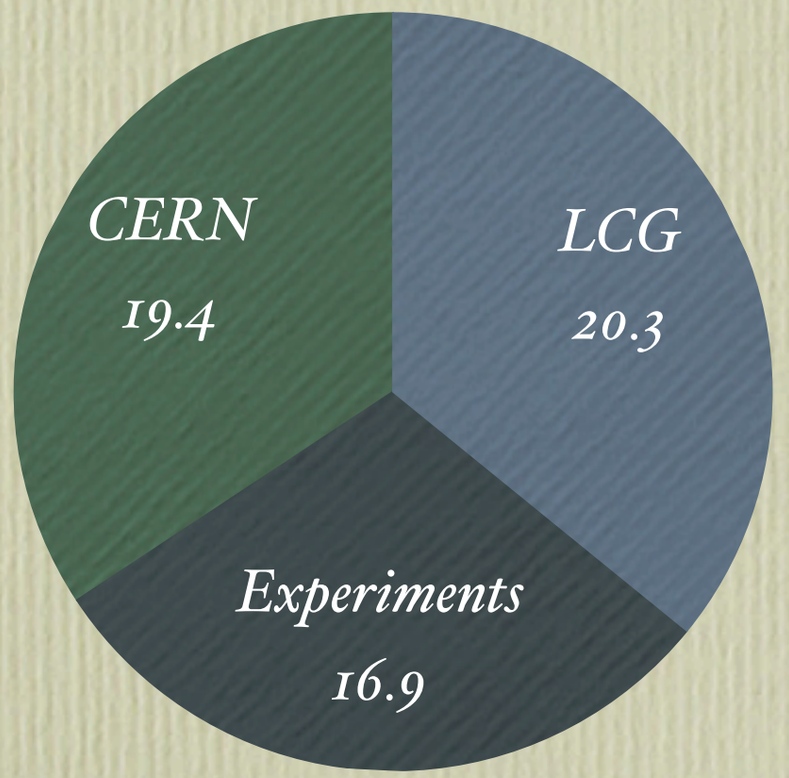
Key 2004 Milestones

- 2004/5/31 - POOL relational abstraction layer done
- 2004/6/30 - New dictionary API & prototype
- 2004/7/31 - Conditions DB production release
- 2004/8/31 - POOL relational storage manager release
- 2004/10/1 - First mathlib release
- 2004/10/15 - Consolidated Geant4 acceptance suite
- 2004/12/1 - Generator production framework beta
- 2004/12/31 - Final physics validation document

New Level 1 Milestones

- 2004/12/31 - Geant4 validation in LHC production
  - Post-DC assessment of Geant4 by experiments
- 2004/12/31 - Work and resource plan through 2008
  - Long term support and development program
    - Scoped to available manpower and informed by DCs
- 2005/9/30 - Phase 1 AA software complete & deployed
  - Full functionality available and successfully used
  - POOL, SEAL, ROOT, G4, CondDB, GENSER, ...
  - Specific description will be union of L2 technical and validation milestones defined in Dec 2004

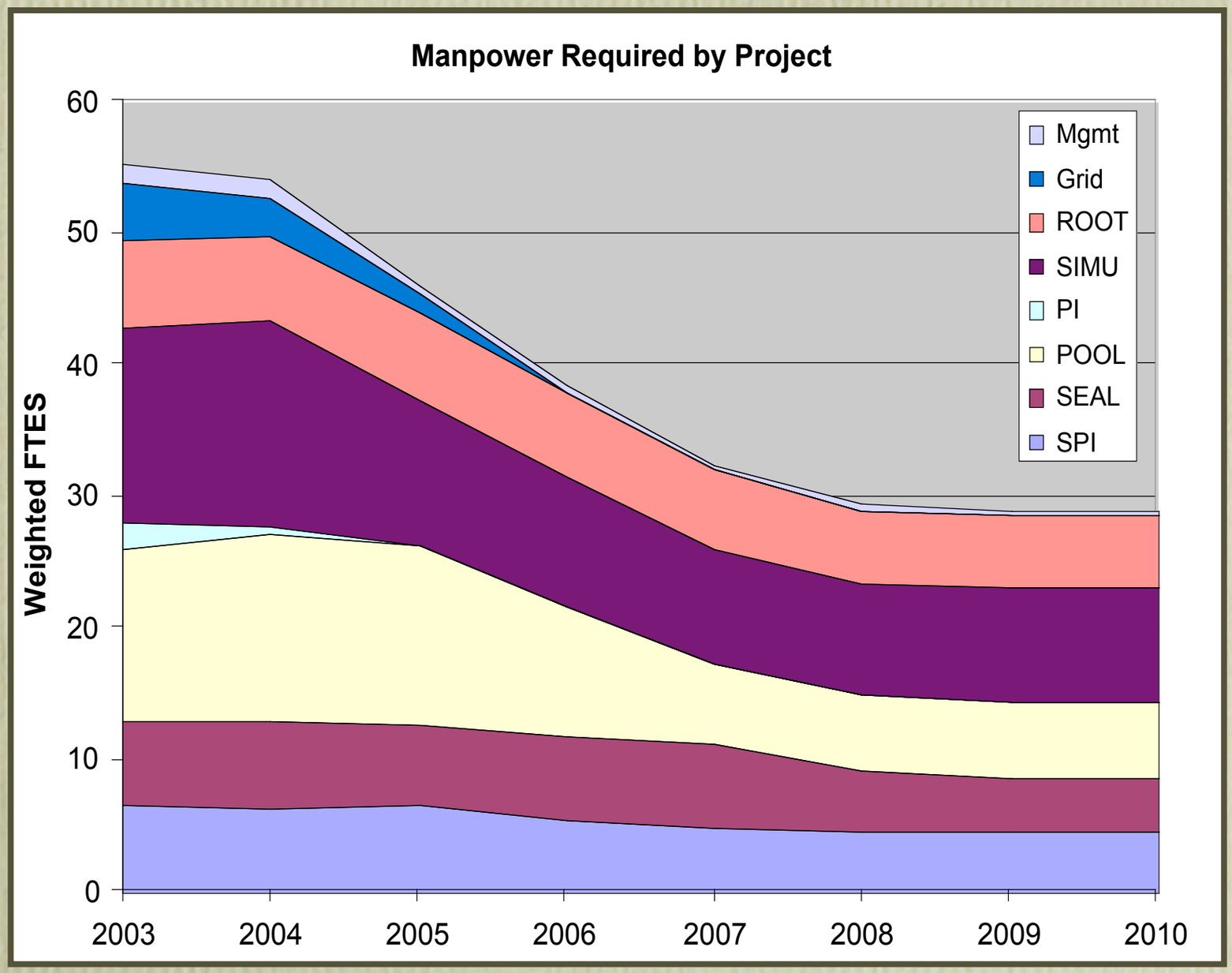
Personnel Resources



Fall 2003 FTEs. Little changed. Experiment number includes CERN people working on experiments.

- Stable for now
- PPARC supports 9 AA+ROOT developers - much of our core developer talent
- Decline due to LCG departures starts in early 2005
- Have recently done a long term resource planning exercise led by John Harvey

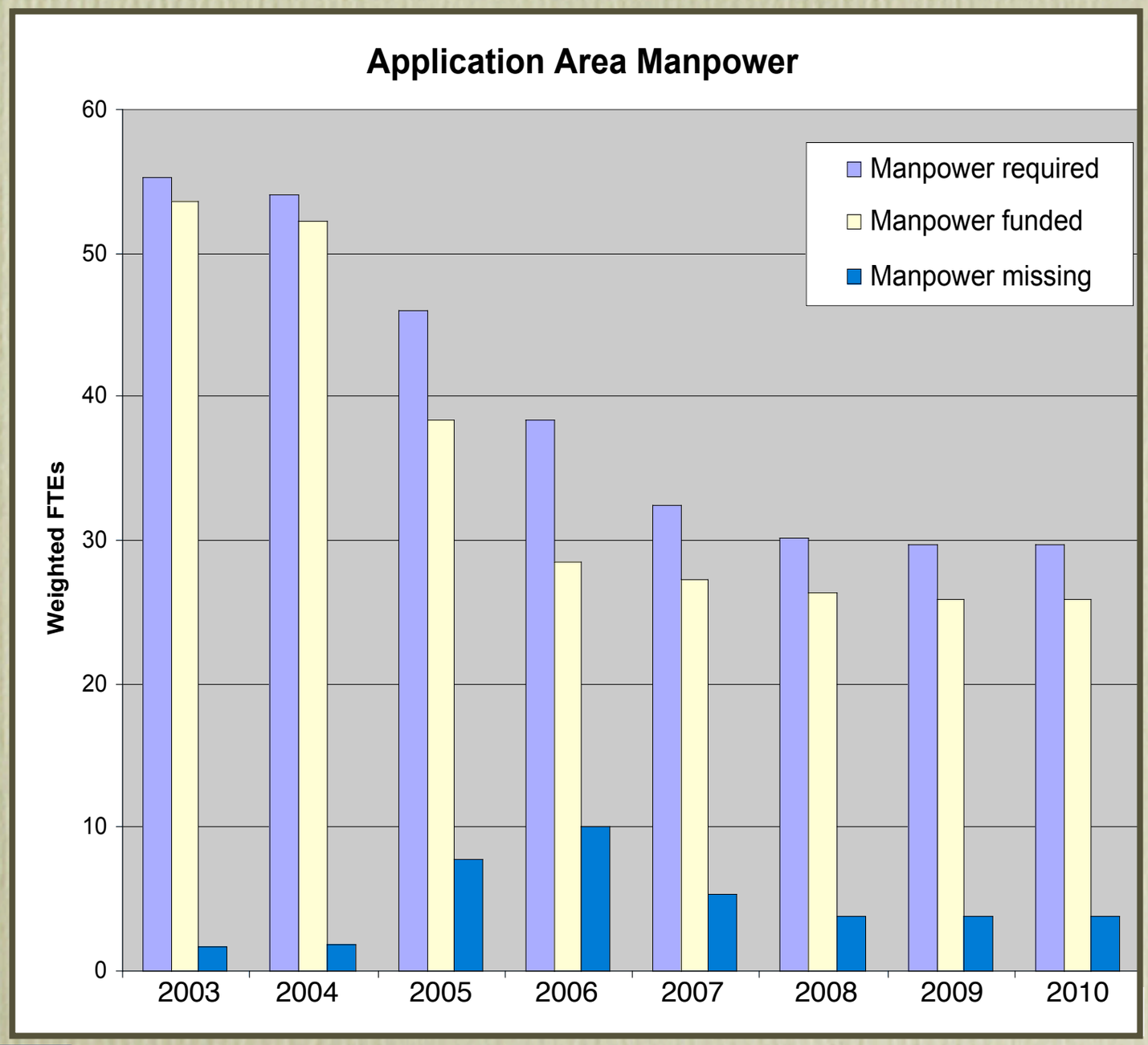
Required Personnel Profile



(Conservative) assumptions underlying the requirements:

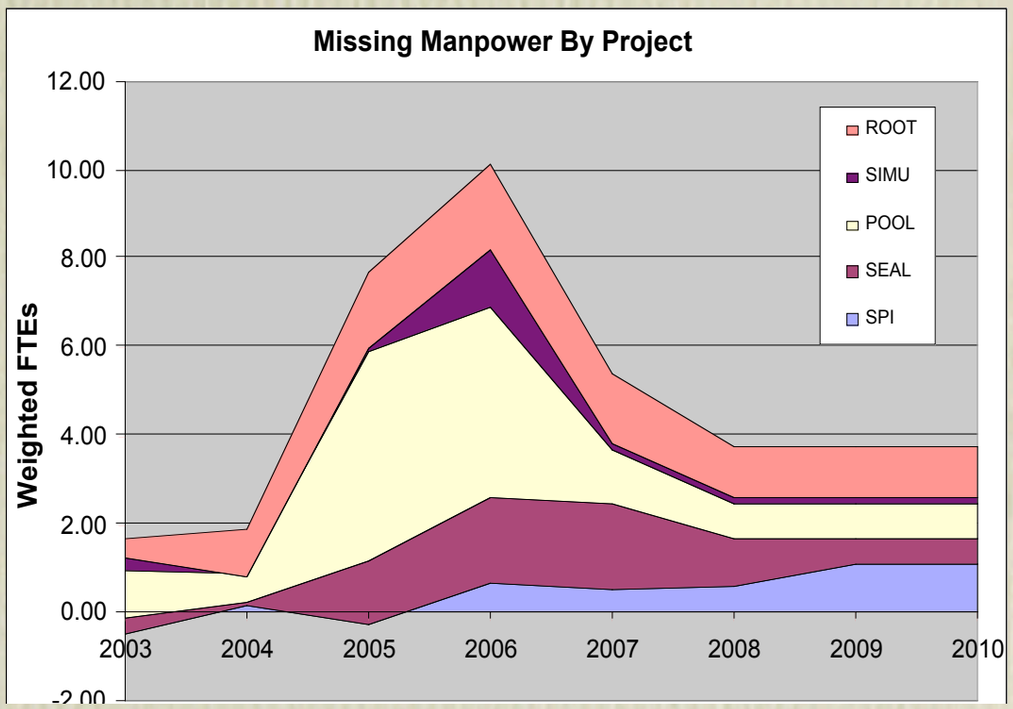
- Based on completing tasks in the approved program
- Reduction in requirements as work is completed (no major new developments)
- Longer term requirements are for maintenance and support
- Long term increases in efficiency assumed; identify & strengthen commonalities
  - e.g. infrastructure, math library, dictionary

Personnel Required vs Funded



Funding assumptions:

- LCG contract end dates
- No LCG Phase 2 funds assumed
- Strong experiment fall-off from 2005
- Continuity of CERN fellows, associates, etc.
- IT/DB long term plan



Conclusions

- AA software from all projects successfully integrated and deployed in experiments
  - Success defined by experiment validation
- Some areas (PI, simu framework) descoped due to lack of interest - without investing (wasting) manpower
- Successful, invaluable and evolving relationship with ROOT
- Long term plan recognizes a steep manpower fall-off, but conservative requirements still lead to a shortfall
- Good case for an AA component to LCG Phase 2 if the approved work program is to be completed