PPRP Proposal
HEP Software UK
(Finalising the proposal)

19 June 2020

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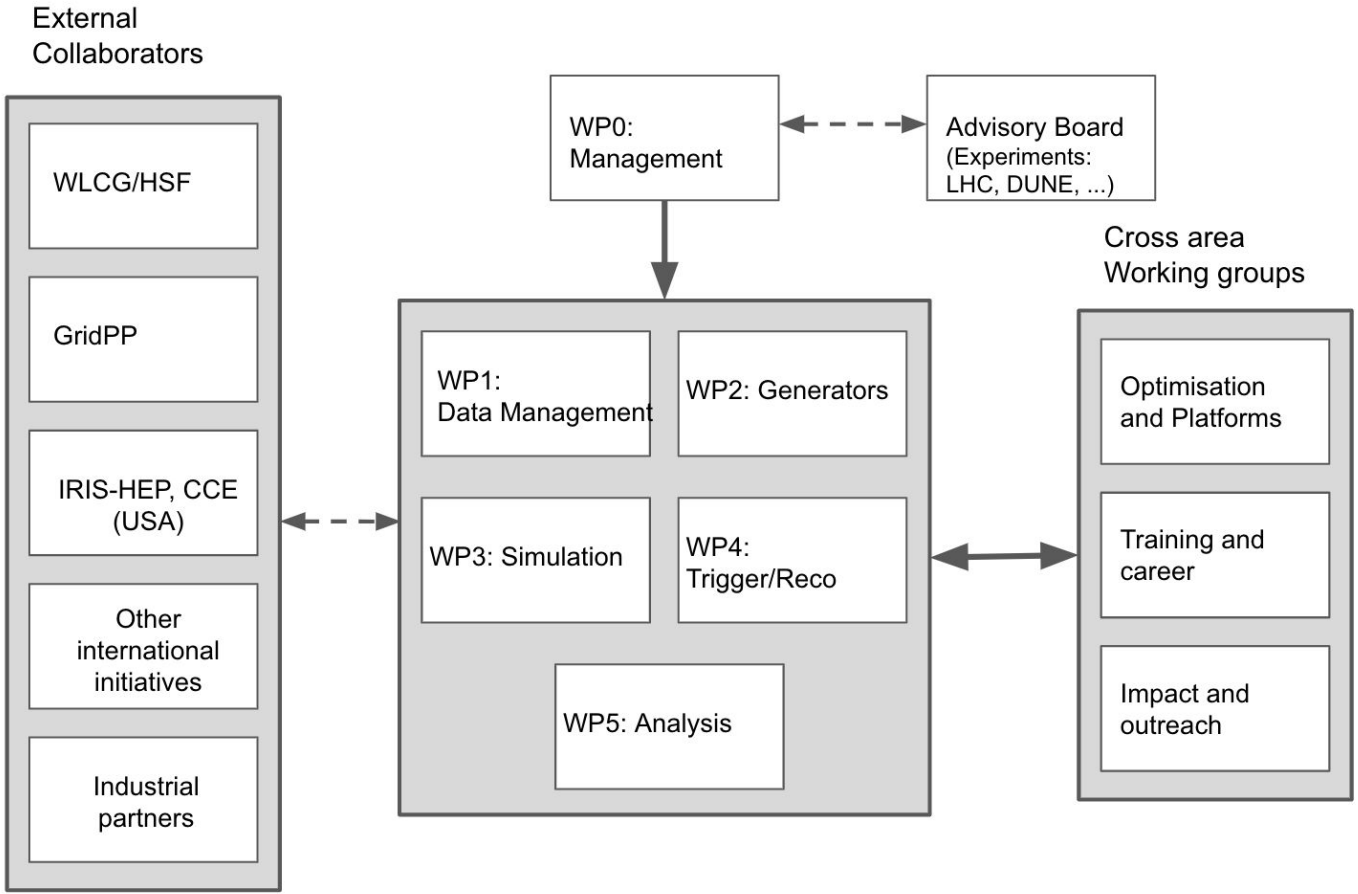
4. Other essential scientific activities for particle physics

Computing and software infrastructure

- There is a need for strong community-wide coordination for computing and software R&D activities, and for the development of common coordinating structures that will promote coherence in these activities, long-term planning and effective means of exploiting synergies with other disciplines and industry
- A significant role for artificial intelligence is emerging in detector design, detector operation, online data processing and data analysis
- Computing and software are profound R&D topics in their own right and are essential to sustain and enhance particle physics research capabilities
- More experts need to be trained to address the essential needs, especially with the increased data volume and complexity in the upcoming HL-LHC era, and will also help in experiments in adjacent fields.

d) Large-scale data-intensive software and computing infrastructures are an essential ingredient to particle physics research programmes. The community faces major challenges in this area, notably with a view to the HL-LHC. As a result, the software and computing models used in particle physics research must evolve to meet the future needs of the field.
The community must vigorously pursue common, coordinated R&D efforts in collaboration with other fields of science and industry to develop software and computing infrastructures that exploit recent advances in information technology and data science. Further development of internal policies on open data and data preservation should be encouraged, and an adequate level of resources invested in their implementation.

Organisation



Timeline

- Proposal draft growing at (link)
- Deadline for submission: **22 July**
- Need to clarify the details to move on,

- Note, this is the initial phase of what we wish to be a larger programme

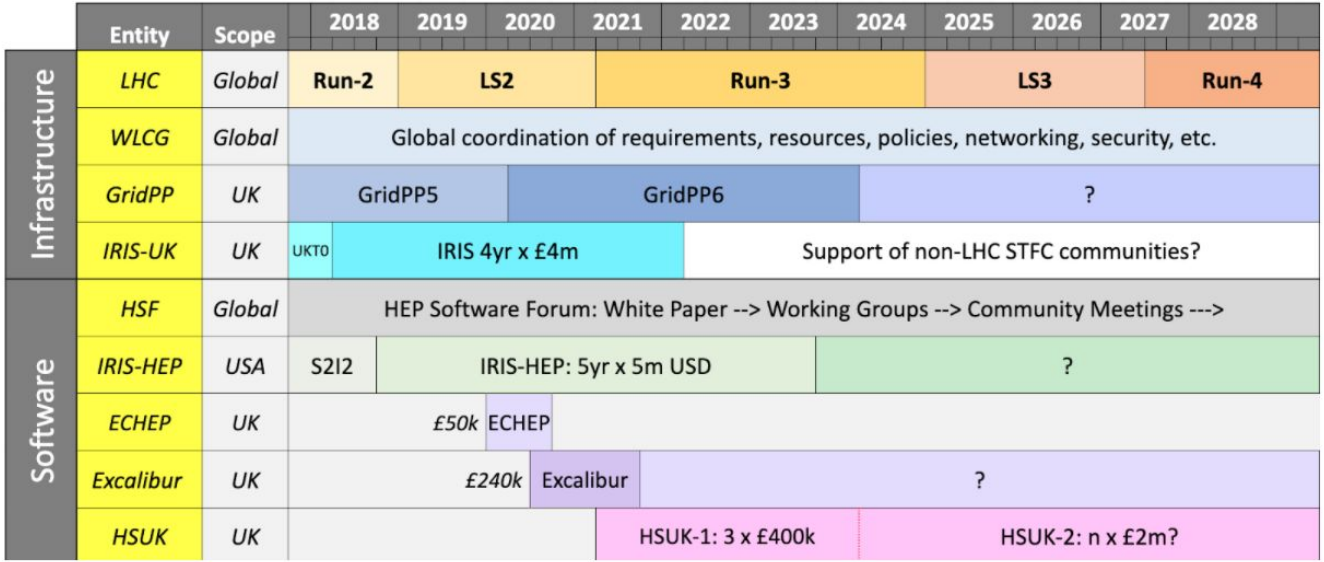
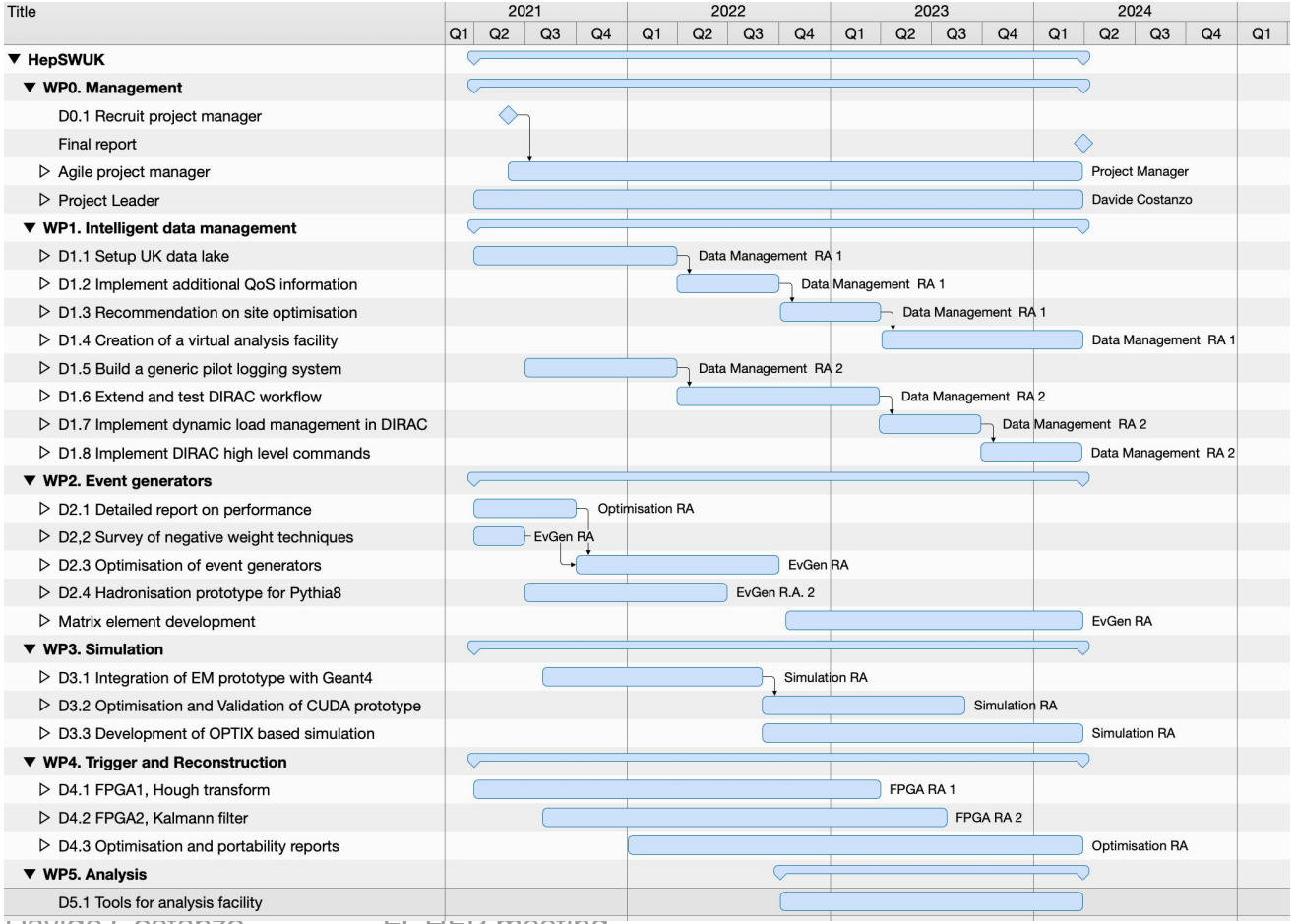


Fig. 2: Long term timeline and international context

Proposal details (current thinking)

- WP1 (data and workflow management)
  - WP1.1 18 Person-months. Create a data lake move towards analysis facility
  - WP1.2 15 person-months. Generic system for users job submission
- WP2 (Event generators)
  - WP2.1 8 person-months. Technical code improvements / negative weights reduction
  - WP2.2 10 person-months. Matrix element calculation prototyping
  - Some work on (re)hadronisation (4 person-months??)
- WP3 (Simulation)
  - WP3.1 (16 person-months) Participation to Geant4 R&D. EM prototype to be used on accelerators
  - Some work on OPTIX as part of this? (or on top of this)
- WP4 (Reconstruction)
  - WP4.1 (24 person-months) Algorithmic developments on FPGA. To be used for Triggers and offline. Split across two algorithms
  - WP4.2 (8 person-months) Optimisation work to be defined (e.g. workflow deployment on GPU)
- WP5 (Analysis)
  - WP5.1 (10 person-months) Development of techniques for analysis on grid. E.g. using WP1's analysis facility and data lake

Initial Gantt chart



Note: Some misalignment between the proposal text and the ECHEP documents. (To be sorted in the coming days)

Effort required per WP

		FY 21	FY 22	FY 23	Total
WP0	PM				10
	K£				
WP1	PM				33
	k£				
WP2	PM				22
	K£				
WP3	PM				16 + x
	k£				
WP4	PM				32
	k£				
WP5	PM				10
	k£				
TOTAL	PM				123
Travel	k£	20	20	20	60
Training	k£				30??
W. A.	K£				??
Equipment	k£				50??

- This number will change once we inject realism into the proposal
- Probably overcommitted

- Separate section on further activities for which we don't request funding, as requested by STFC

- Travel and training budgets to be held centrally as with experiment's budgets
  - One of main goals is to provide a platform for exchange of ideas

- Equipment towards a development facility at RAL
  - Compile and run small jobs interactively
  - Provide access to e.g. GPUs or FPGAs

Process going forward

- In the SoI we said that we would look into funding part-posts to have staff working on common Software and A.N. Other experiment
- The WP definition is still flexible (within reason!) to take into account what can realistically be done
- I invite interest to bid for the effort currently indicated from institutes
  - Please email before **Wed 24** June at 4pm
  - Indicate, as much as possible, how part post would be formed with existing posts or other funding
- I will then collect this information and put forward a proposal to the Advisory Board
  - The AB represents the experiments, so has an overall view of what is needed

And finally….

The name! So far we used HepSoftwareUK for lack of a better name

Many proposals came forward. The most interesting one was SwiftHEP
"SoftWare Infrastructure and Future Technology for High Energy Physics"

Let's settle this once and for all!
https://doodle.com/poll/hyq7mdrd35tnhu6d

Everyone(*) can vote before Wed 4pm

(*) The poll is anonymised. To vote you should be participating to a HEP experiment in the UK, please vote only once