Status of WP5: common tools

**JENNIFER2 meeting
(November 2022, Prague)**

S.Bolognesi (CEA Saclay)

WP5: common tools

Task 5.1: Computing and data handling for Belle II and HyperK [INFN,DESY,JSI,CNRS,QMUL,KEK]
- Total number of Person Months allocated = 16
- To study a set of common tools for the computing model of Belle2-T2K-HK experiments, which users from Japanese and European Research centres can use in a transparent way. The activity will focus on the following technologies: a) Computing. Workload Management System based of DIRAC Framework; Data distribution software like CVMFS and Technologies to use Grid and Cloud Resources. b) Storage: Data Access protocol (Grid and Cloud) and Data Transfer system FTS. c) Software: Tools for software development and versioning. d) Network: Common tools for Network Monitoring
- Key people involved: S.Pardi (INFN), M.Bracko (JSI), T.Kuhr (DESY), S.King (QMUL)

Task 5.2: Data Acquisition and remote controls [INFN,DESY,QMUL,RAL,CNRS,KEK]
- Total number of Person Months allocated = 8
- To develop and share hardware and software techniques/knowledge for dealing with the challenges of high trigger rate next generation experiments. These include techniques for high data bandwidth optical data transfer, sub nanosecond timing distribution, intelligent real time algorithms for online data reduction run in parallel on multiple GPUs or FPGAs, as well as novel software solutions for scalable modular DAQ frameworks featuring integrated dynamic service discovery, monitoring, fault tolerance, dynamic routing and remote control.
- Key involved staff: Ben Richards (QMUL), Soeren Lange (DESY), Igor Konorov (DESY)

Task 5.3: Statistical methods and analysis algorithms [INFN,DESY,JSI,CEA,CNRS,UGE,KEK]
- Total number of Person Months allocated = 7
- To develop and document sound statistical methods which allow straightforward combination of results from different experiments, thus extending their individual experimental reach. Study and document the most suited observables to be used in experimental likelihood functions to allow easy combination. Define and documents analysis implementation methods that facilitate combination of results. Leading organizations are CEA and INFN, all the other organizations contribute with specific physics analysis expertise.
- Main involved staff: Sara Bolognesi (CEA), Diego Tonelli (INFN)

Task 5.4: Generators and Phenomenology [INFN,CNRS,DESY,KEK] Person Months allocated = 4
- Develop a coherent theoretical framework from CP violation analyses in both quark and lepton sector, lepton flavour violation analyses, searches for sterile neutrinos. Study possible common techniques (ex. fitting procedures) to determine CKM and PMNS matrix parameters with high precision. Theoretical support to flavour and lepton analyses in WP1-WP4, including neutrino-nucleus cross section analyses.
- Key people involved: Emi Kou (CNRS), Giulia Ricciardi (University of Naples and INFN)

WP5: status of secondments

Institution	WP5 done (months)	WP5 planned	WP5 % done
INFN	2,0	14,0	14,5%
DESY	1,9	11,0	17,0%
OEAW-HEPHY		0,0	
IFJ-PAN		0,0	
UKP		0,0	
JSI	0,2	5,0	4,7%
METU		0,0	
TAU		0,0	
LAL-CNRS	0,4	4,0	9,2%
CEA	1,1	4,0	26,7%
IFAE		0,0	
UNIGE	0,0	2,0	0,0%
NCBJ		0,0	
KCL (Qmul)	0,0	12,0	0,0%
UKRI	0,0	4,0	0,0%
CAEN		0,0	
FBK		0,0	
Total	5,6	56,0	9,9%

INFN: Computing and statistical tools: expected to keep the same fraction in future (unless any new hiring on the subject?)

DESY: at ~50% in the other packages, maybe room to increase WP5 secondments?

JSI: at ~53%, 46% in the other packages, maybe room to increase WP5 secondments?

CNRS (LPNHE): important involvement in HK computing (not there in first phase). Expected to fill the quota

CEA: quite big enlargement of the group. Expected to fill the quota.

UniGe: Other packages at 9%, 4% (2 months planned, low fraction of WP5)

KCL: missing data? (leading HK computing)

UKRI: important role in HK calibration and software development, for now all charged to WP3 (12%, 18% done in other packages of 23 expected). Possibility to have some WP5 secondments

WP5: deliverables

Task 5.1 : **A common Belle II – HyperK Cloud Computing demonstrator** (month 36)
 ~DONE~

Task 5.3: **Reference report on statistical treatment** of rare signal searches for future combination (month 36)
A lot of material already

Task 5.2: **Joint real time and remote control workshop** (month 36)
Possibly shared organization with WP1-WP2 intermediate workshops also in month 36

Task 5.4 **Organization of a common physics workshop** with all activities in WP1 and WP2 (month 48). Single workshops for WP1 and WP2 are an intermediate milestone (month 36)