

Porting an AITALC product through a master/worker scheme

Alejandro Lorca

in collaboration with

E. Huedo, J.L. Vázquez-Poletti, I.M. Llorente



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Information Society
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Motivation: why phenomenologists might need the grid

Application porting:

aTALC for Bhabha scattering

Master/Worker scheme

GridWay metascheduler

Results

Performance at phenogrid

Theoretical predictions

Summary and outlook

Theoretical predictions in HEP need to match experiment precision

- Approaches:
 - Lattice simulations (see Moscicki's talk)
 - Perturbation theory
- Calculations requiring much algebra manipulation
- Often cancellations happen at numerical level
- Parameter sweeping as scenario finding strategy (e.g. SUSY)

AITALC is a tool for automating loop calculations

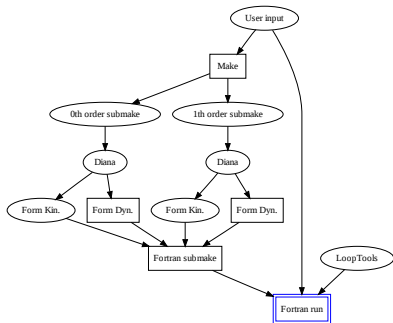
- Published and tested
- Working under Linux
- Free, based on GPL license

Very well known process: Bhabha scattering ($e^+e^- \rightarrow e^+e^-$)

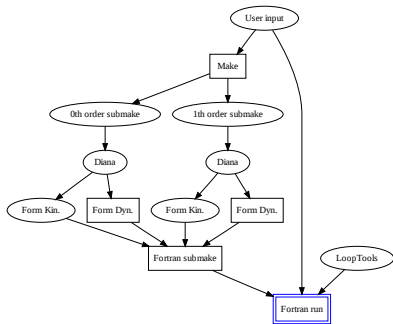
- including one-loop electroweak corrections
- soft γ radiation

It generates a Fortran code for integrated cross sections

Porting AITALC?

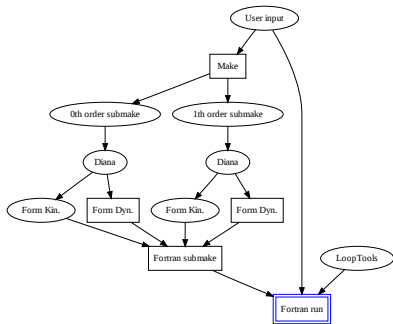


Porting AITALC?

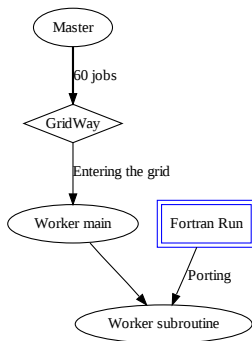


Not really necessary because of timings

Porting AITALC?

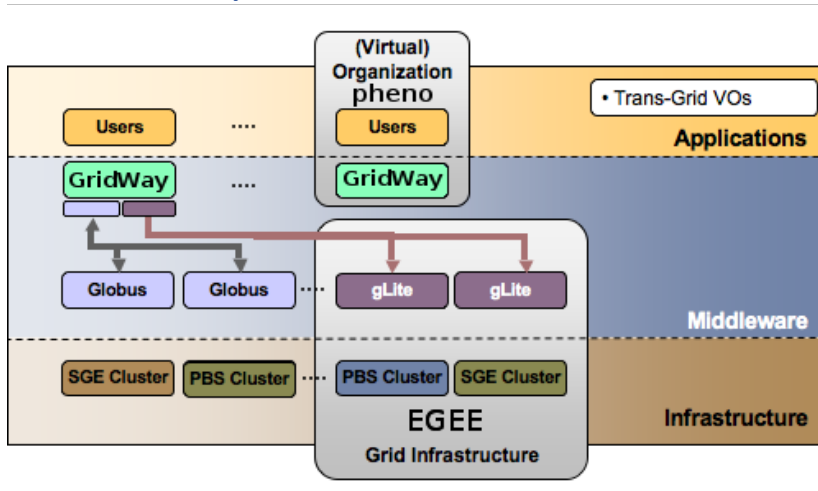


Porting the product!

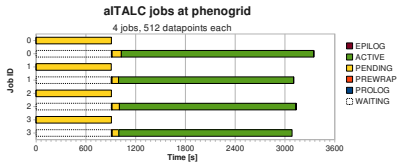


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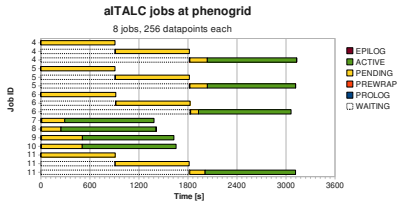
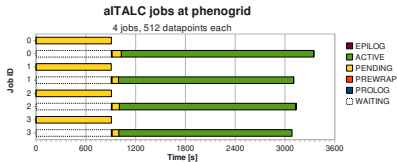
Mission of GridWay within the Grid Infrastructure



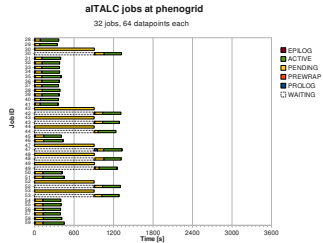
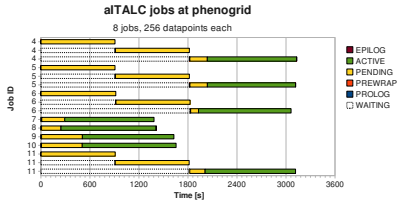
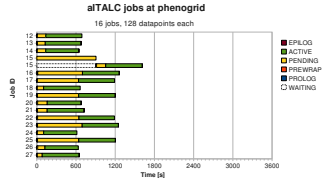
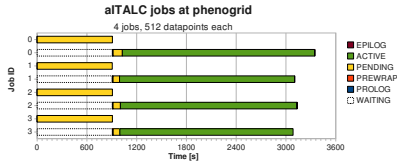
Each block evaluates 2048 datapoints



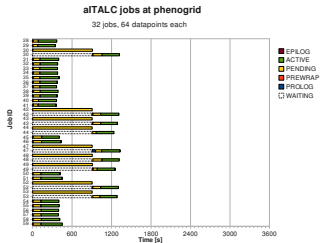
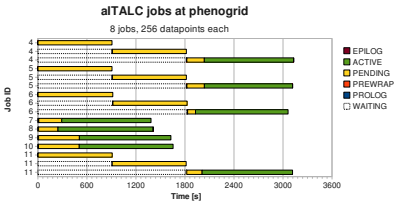
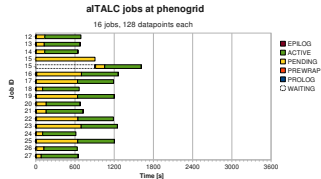
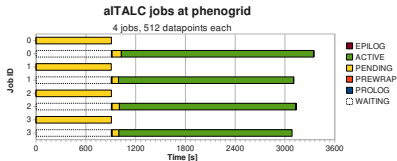
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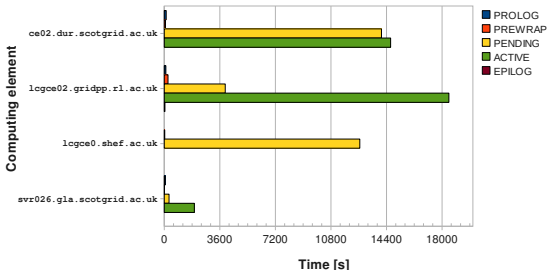


Jobs are successfully finished, but pending time can be improved

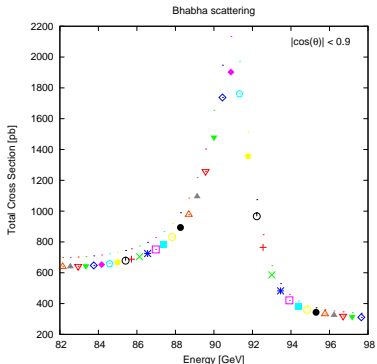
Computing Element	Time performance [s]					
	FQDN	Prolog	Prewrap	Pending	Active	Epilog
ce02.dur.scotgrid.ac.uk		127	78	14074	14670	0
lcgce02.gridpp.rl.ac.uk		104	243	3948	18447	41
lcgce0.shef.ac.uk		0	27	12673	0	0
svr026.gla.scotgrid.ac.uk		66	11	306	1949	0

aTALC jobs time analysis at phenogrid

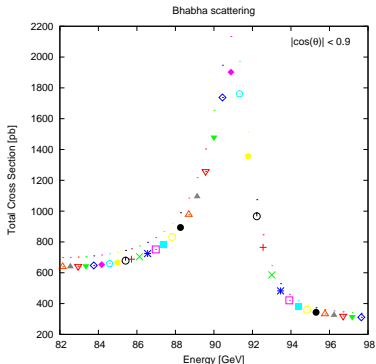
60 jobs, total of 18.55 distributed hours



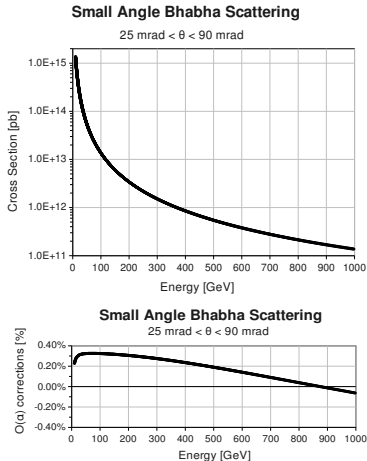
Integrated Cross section



Integrated Cross section



Small Angle Bhabha



What has been done in this work:

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- Master/Worker method
 - Allows for job submission control and postprocessing
 - Interacts well via GridWay middleware
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What's ongoing and can be improved:

- AITALC could implement `--static` and support UI
- Pending (waiting for worker node) time bottlenecks scalability
 - End-user should not monitor grid availability
 - Middleware requires more advanced job feedback
- HEP/TH and HEP/PH should be aware and participative