PandaRoot - A first impression

Torino, July 23-27, 2012

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A BRIEF HISTORY OF THE PANDAROOT FRAMEWORK

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STRUCTURE OF THE FRAMEWORK

... (NASTY) DETAILS DURING THE REST OF THE WORKSHOP

but first ....

.... what about the logo?

Panda Root

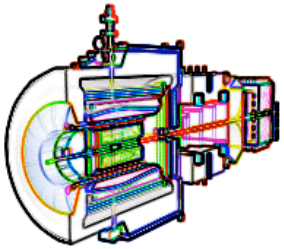
Panda ROOT

Panda Root

Panda Root

PandaRoot

PāndaRoot



Panda Root

Panda Root

PandaRoot

Panda ROOT

Panda Root

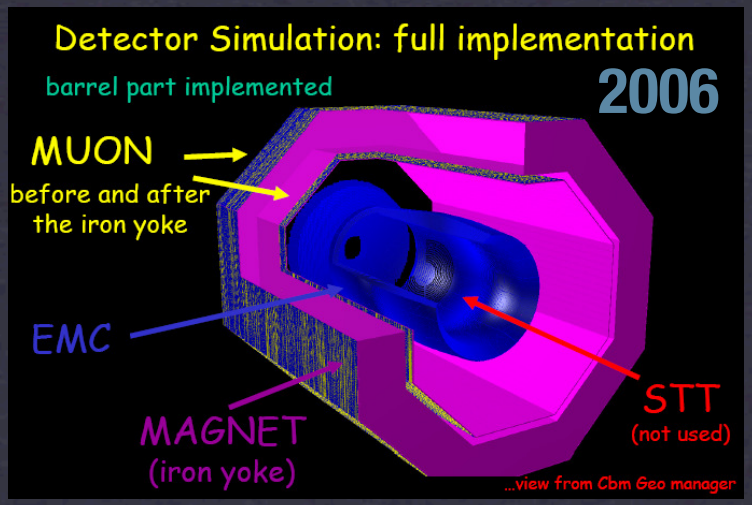
all nice, but .... (Tobias, 2007)

IT SHOULD SATISFY ALL THE FOLLOWING CRITERIA ....

1. RELATED TO THE PANDA EXPERIMENT LOGO
2. LOOK PROFESSIONAL
3. LOOK GOOD IN COLOR AND GRAY SCALE
4. NOT TOO BIG
5. SOME LINK TO ROOT WOULD BE NICE, NOT NECESSARILY

(HOMEWORK FOR IN THE EVENING!)

A brief history of PandaRoot



3RD-GENERATION PANDA FRAMEWORK

BORN AROUND 2005, OFFICIAL SINCE 2006

INITIATED BY GIESSEN, JUELICH, PAVIA, AND TORINO

DERIVED FROM CBMROOT, A.K.A. FAIRROOT

AIMS FOR FULL-SIMULATION & RECONSTRUCTION,
LOW-THRESHOLD USAGE, ROOT+VMC-BASED,
MODULAR & VIRTUAL DESIGN, PLATFORM INDEPENDENT,
DYNAMIC DATA STRUCTURE, ...

A brief history of PandaRoot

Inherent Features

UNIVERSITÄT FRANKFURT AM MAIN

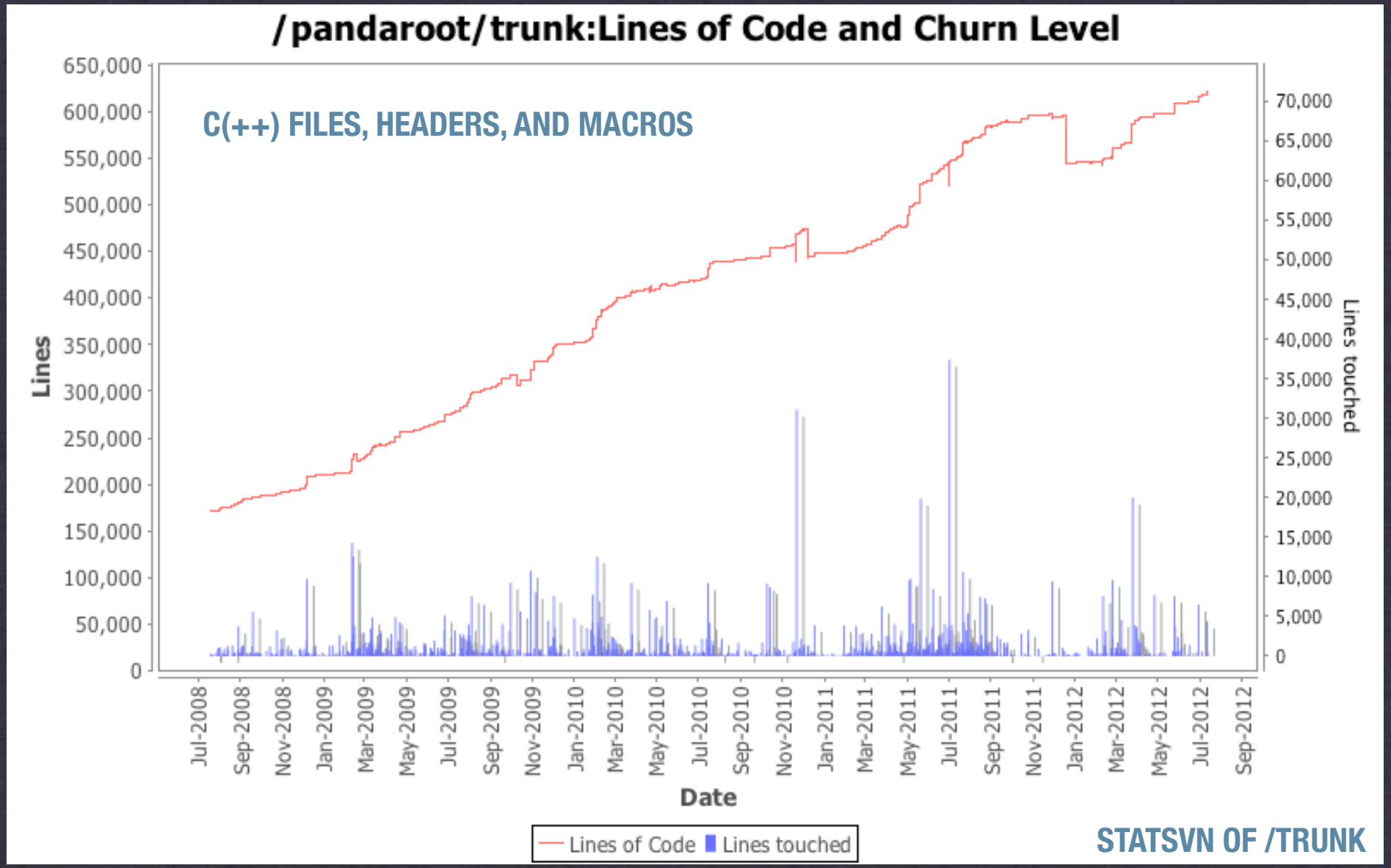
Klaus Peters - Panda Software Evaluation

	Current Framework (BaBar based)	Alternative Framework (PandaRoot)
Availability (Core)	++	o
Availability (Detectorspecific)	o/+	o
Platforms	o	++
External User Community	−−	++
GSI/IT	o	++
Learning curve	o (may improve to +)	++
Doc	o	−
Simulation	o (G4 only)	++ (G3,G4,Fluka)
Scripting	− (only tcl)	++ (C_{root}++)
Transient objects	++ (built−in)	− (to be implemented?)
Proxy Dict	++ (typesafe)	o (not typesafe)

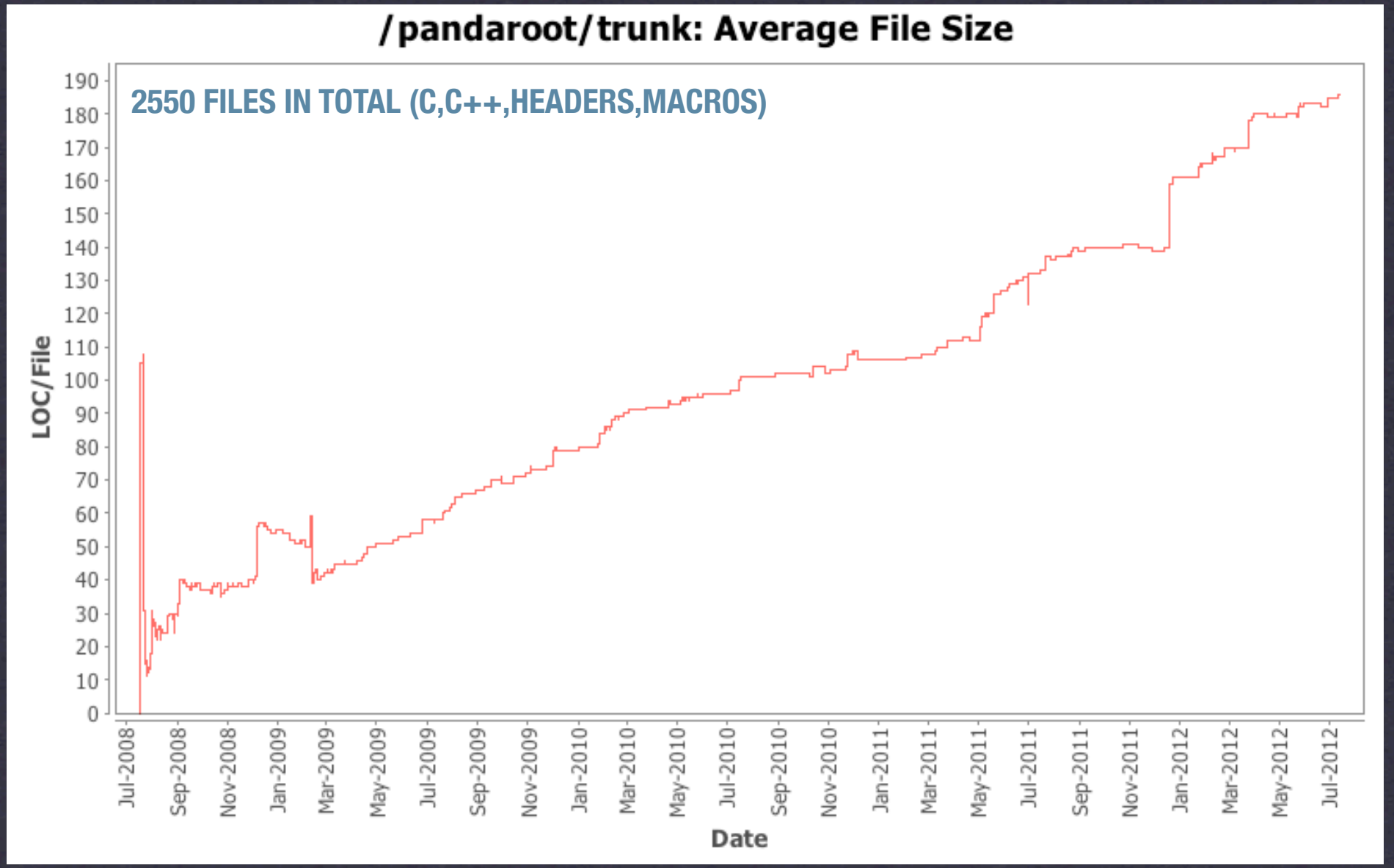
GSI 2

KLAUS PETERS, 2006

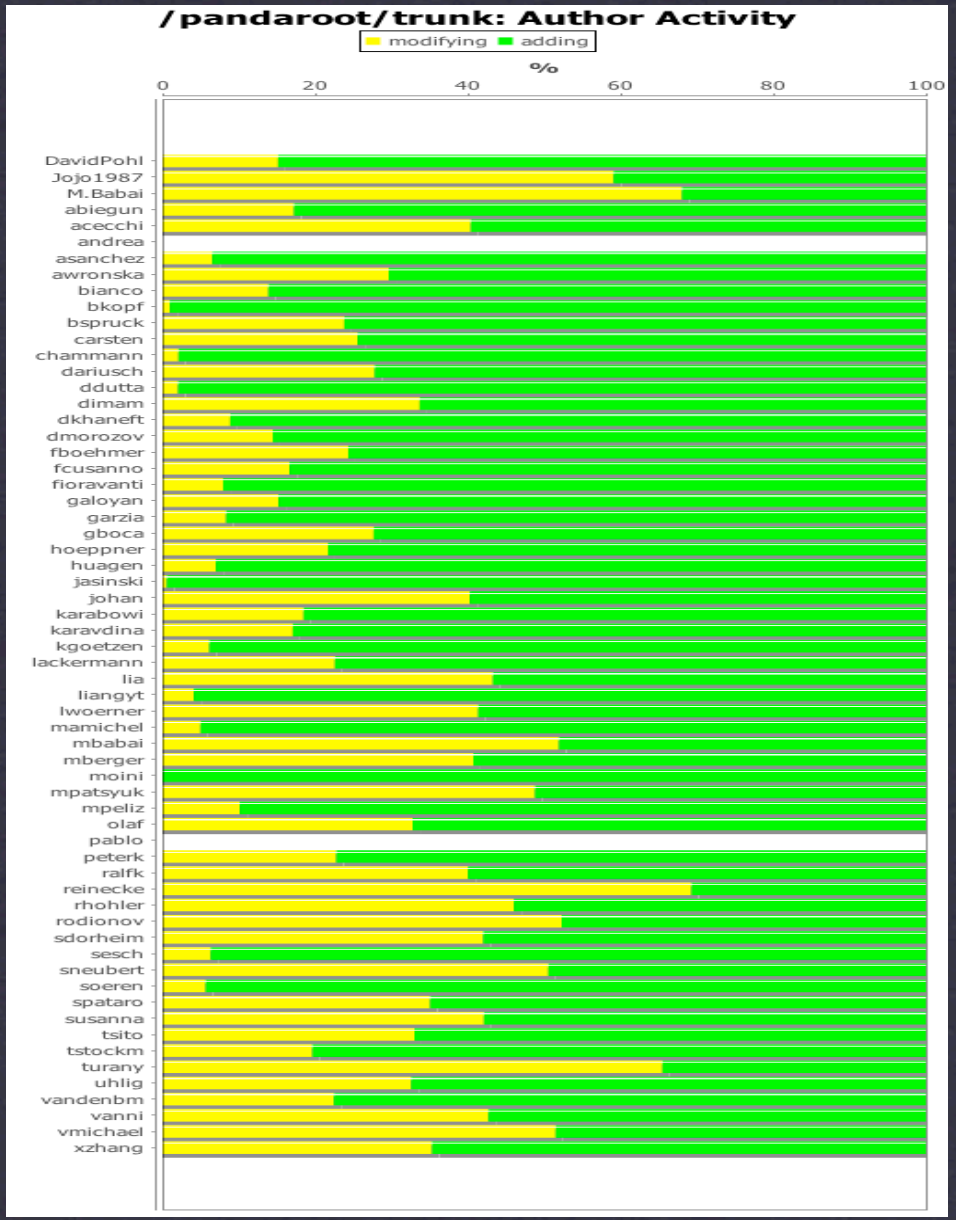
Overview code developments



Overview code developments



Overview code developments

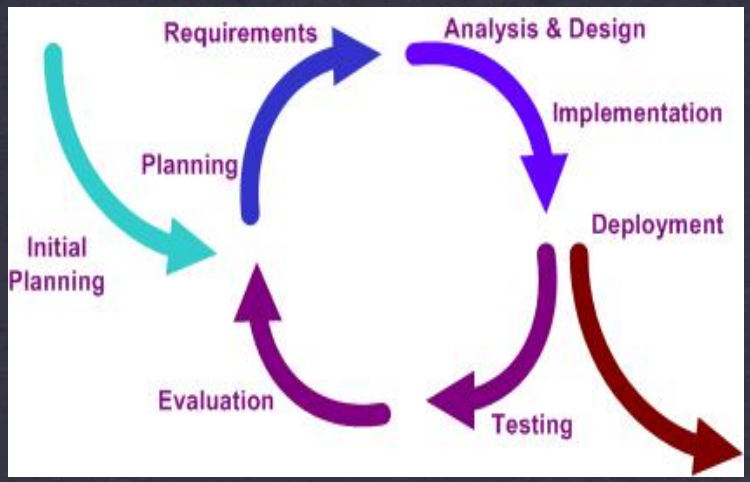


Tag Cloud of Words in Commit Log Messages

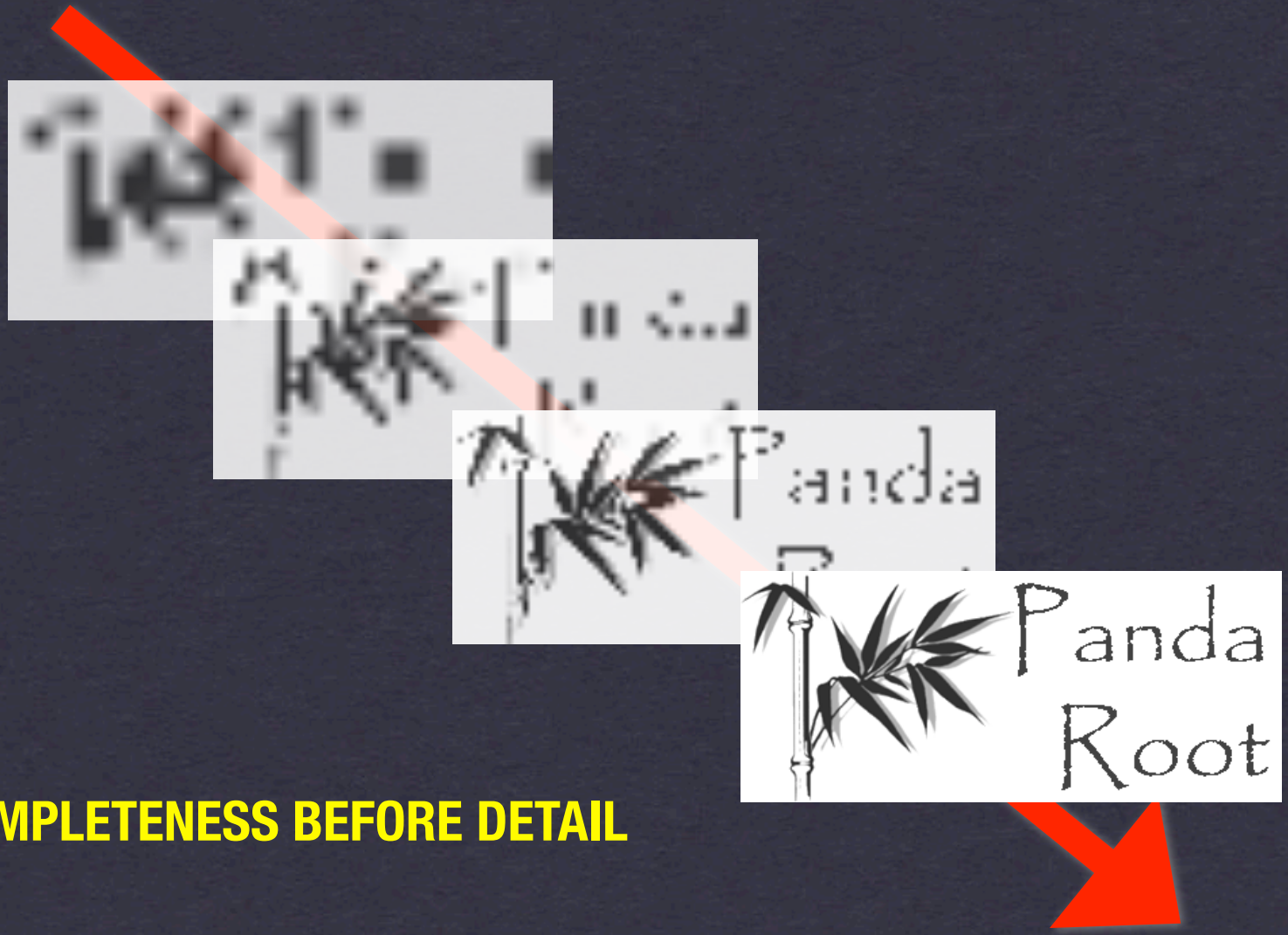
analysi base bugfix bugs calculation change charge check class classes clean cluster code comment commented correct corrected correction data debug default delete detector digi error eta_c event example fairlink field file finder first fixed fixes fixing flag function geane genfit geometry gianluigi histogram hits ideal implementation implemented improve include info init kalman leak macro made memory method minor missing modification modified momentum move name need number only option output parameter pattern photon plane plot pndtrack pndtrackcand point position problem propagation real reco reconstruction remove root setting simulation small stuff task test time

The rules of the game...

1. RE-USE EXISTING AND WELL-TESTED CODE
2. TRY TO STICK AS MUCH AS POSSIBLE TO FAIRROOT
3. LEARN ALONG THE WAY: SHORT TERM OBJECTIVES
4. EARLY CODE DEPLOYMENT & OPEN SOURCE
5. CONTINUOUS INVOLVEMENT OF “USERS”
6. CONTINUOUS TESTING OF THE CODE

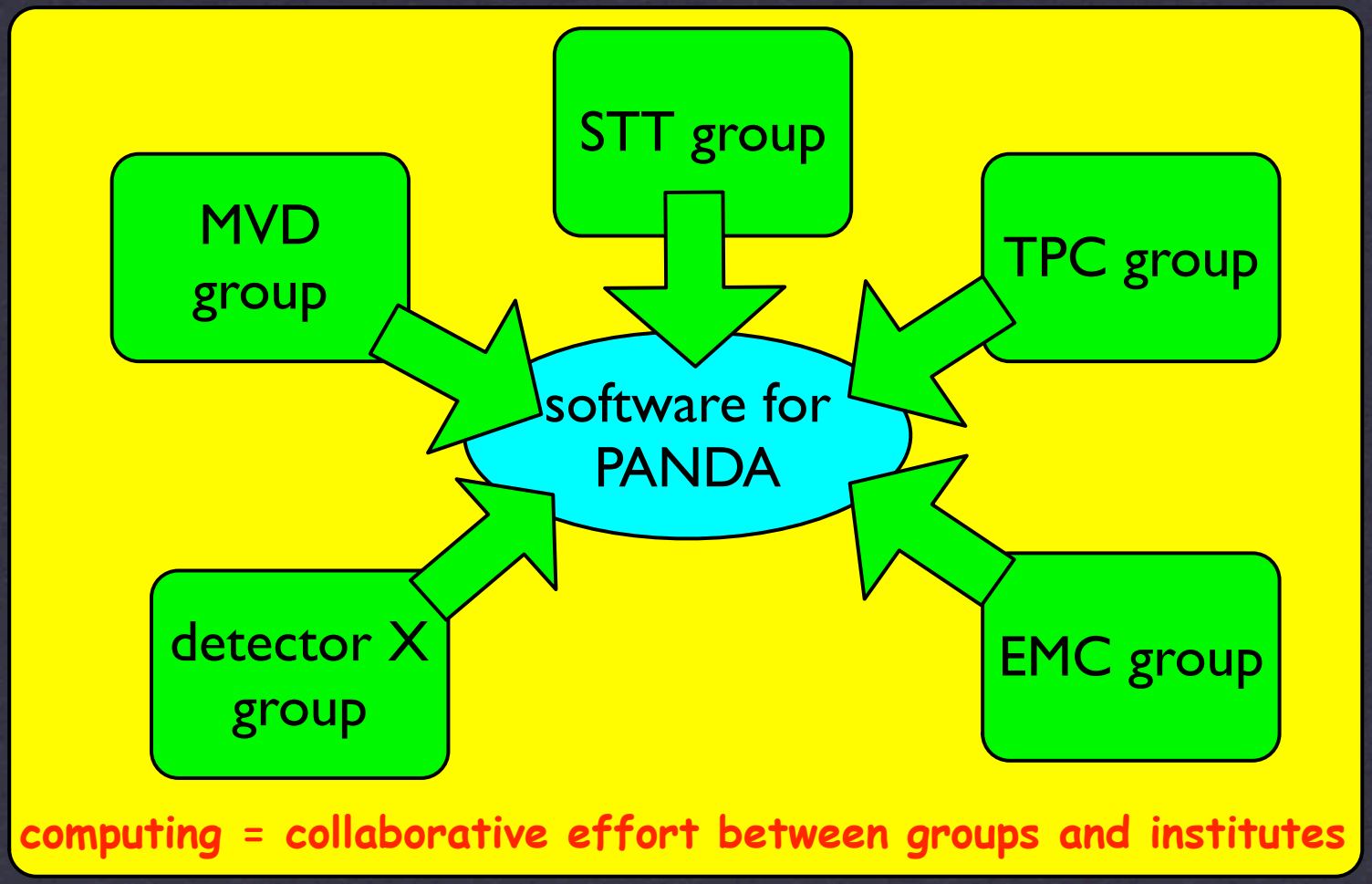


The development strategy



COMPLETENESS BEFORE DETAIL

Who are the developers?



The “formal” Computing Committee

Ex-officio

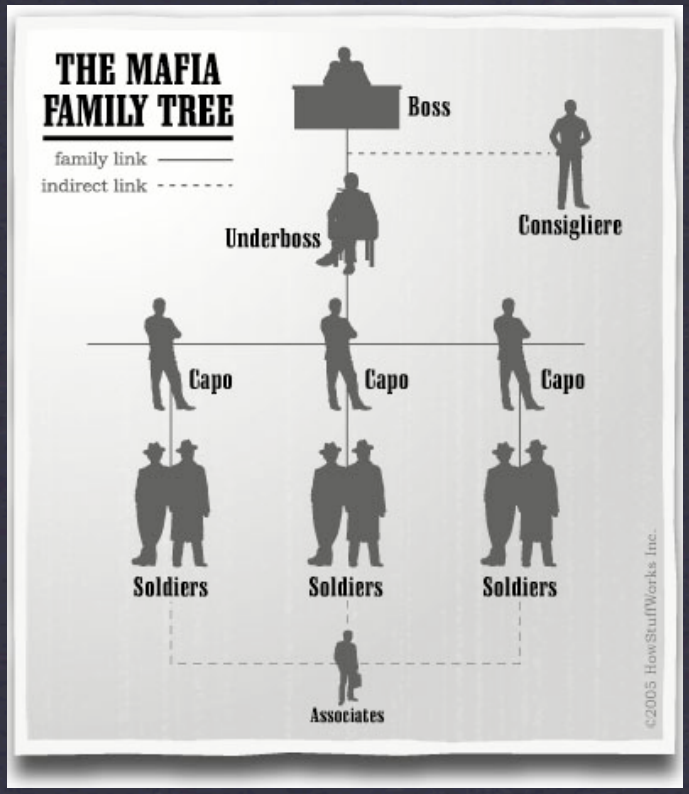
Computing:	J.M., Stefano Spataro
Physics:	Diego Bettoni
Technical:	Lars Schmitt
Spokesperson:	Ulrich Wiedner

Sub-Coordinators

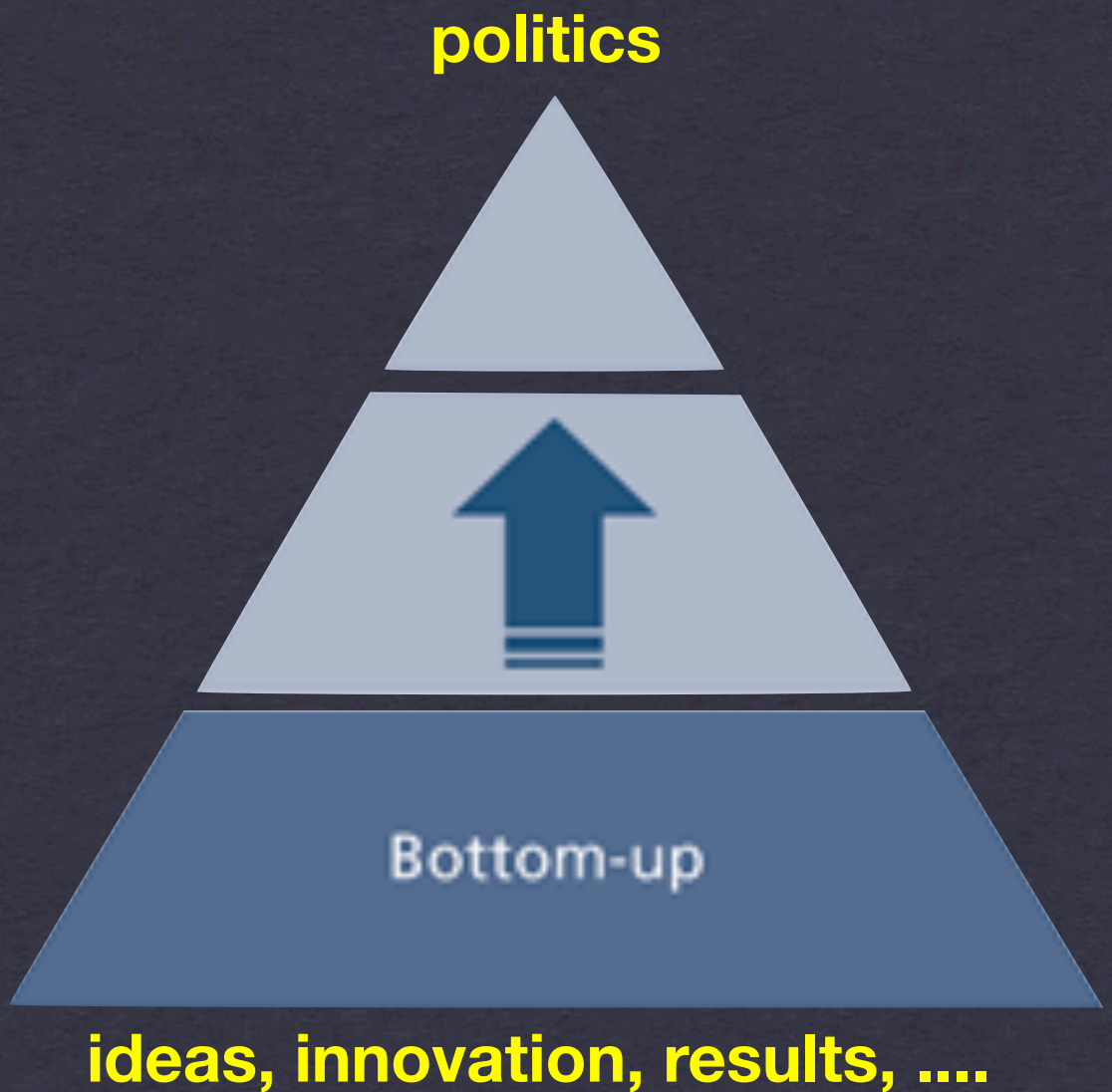
Core framework:	Mohammad Al-Turany
Tracking:	Gianluigi Boca
PID:	Stefano Spataro
EMC:	Dima Melnychuk
Analysis Tools:	Klaus Goetzen
GRID production:	Paul Buehler
GRID coordination:	Radek Karabowicz
Online computing:	Soeren Lange

Advisors

HADES:	Jochen Markert (GSI)
ALICE:	Silvia Masciocchi (GSI)
CBM:	Florian Uhlig (GSI)
GSI-IT:	Kilian Schwarz (GSI)
PANDA:	Tobias Stockmanns (FZJ), Klaus Peters (GSI)



The “real” world



SVN release management

SVN://SUBVERSION.GSI.DE/FAIRROOT/PANDAROOT/...

Revision 16100: /pandaroot

Show the bookmarks in this folder

- ..
- development/
- release/
- ~~stable/~~ OBSOLETE
- trunk/

- asanchez/
- awronska/
- dimam/
- esch/
- fboehmer/
- gem/
- generalTools_T
- hammann/
- hoeppner/
- johan/
- jrauch/
- karabowi/
- karavdina/
- lia/

- ..
- 1_0_0/
- 2_0_0/
- august11/
- feb10/
- july11/
- july12/
- jun08/
- may10/
- may11/
- nov08/
- nov11/

DEVELOPMENT:
POLICY: NONE
READ: WORLD
WRITE: ALL DEVELOPERS

RELEASE:
POLICY: COMPILE+BUILD
+QA MACROS
READ: WORLD
WRITE: SEE TRUNK

TRUNK: (=HEAD)
POLICY: COMPILE+BUILD
READ: WORLD
WRITE: DIRECTORY SPECIFIC

Wanted: release manager!

.... YOU LIKE WORKING WITH A LARGE SOFTWARE PROJECT
.... YOU LIKE WORKING WITH A LARGE DEVELOPER COMMUNITY?
.... YOU LIKE KICKING SOME ASSES ONCE AND A WHILE?

Release Manager

http://panda-wiki.gsi.de/cgi-bin/view/Computing/PandaRootReleaseManagerTask

- **Title:** Release manager
- **Coordinator:** Johan Messchendorp
- **Names involved:**
- **Supervisor(s):**
- **Priority:** HIGH
- **Description**: The PandaRoot software and its developments are presently guided by a release policy following four different branches: development (no restrictions), trunk (has to compile and build), stable (has to compile, build and run QA macros), and production releases (regular snapshots of the stable branch). The tasks of the release manager are
  1. to decide and consult with the PandaRoot/FairRoot developers for upgrading to new external package releases;
  2. to trigger/communicate to developers in the case a policy of a branch is not fulfilled;
  3. to regularly update the stable branch and prepare for production release;
  4. to regularly (every three months) make a new production release;
  5. to document the changes on the Wiki for each production release.
- **Pre-requisites:** release branches and policy in PandaRoot, running dashboard, regular updates of QA macros (all available).
- **Required expertise:** sufficient knowledge in programming (C, C++); understanding of usage subversion; sufficient overview of the different individual software packages in PandaRoot.
- **Estimate humanpower:** 1/2 day/week
- **Start date:**
- **Finish date:**
- **Status summary:**
- **Items done/in progress/not done:** not applicable
- **Documentation:**
- **Comments:** The frequency of making a new production release might change in the course of time, depending on the requests of the collaboration.

Quality Assurance Macros

[your_pandaroot_folder]/macro/qa/....

example: ../macro/qa/fsim/QAmacro_fastsim_1.C

```
QAmacro_fastsim_1(Int_t nEvents = 1000 )
{
  ....
  .... [some simple fast simulation macro] ....
  ....
  cout << " Test passed" << endl;
  cout << " All ok " << endl;
  exit(0);
}
```

example: ../macro/qa/fsim/CMakeList.txt

```
GENERATE_ROOT_TEST_SCRIPT(${PANDAROOT_SOURCE_DIR}/macro/qa/fsim/QAmacro_fastsim_1.C)
add_test(qa_fsim_macro1 ${PANDAROOT_BINARY_DIR}/macro/qa/fsim/QAmacro_fastsim_1.sh)
SET_TESTS_PROPERTIES(qa_fsim_macro1 PROPERTIES TIMEOUT "100")
SET_TESTS_PROPERTIES(qa_fsim_macro1 PROPERTIES PASS_REGULAR_EXPRESSION "TestPassed;All ok")

GENERATE_ROOT_TEST_SCRIPT(${PANDAROOT_SOURCE_DIR}/macro/qa/fsim/QAmacro_fastsim_2.C)
add_test(qa_fsim_macro2 ${PANDAROOT_BINARY_DIR}/macro/qa/fsim/QAmacro_fastsim_2.sh)
SET_TESTS_PROPERTIES(qa_fsim_macro2 PROPERTIES TIMEOUT "100")
SET_TESTS_PROPERTIES(qa_fsim_macro2 PROPERTIES DEPENDS qa_fsim_macro1)
SET_TESTS_PROPERTIES(qa_fsim_macro2 PROPERTIES PASS_REGULAR_EXPRESSION "TestPassed;All ok")
```

Quality Assurance Macros

[your_pandaroot_folder]/macro/qa/....

[in your build folder]

```
$ cmake [path_to_pandaroot_folder]
.....
$ make test
Running tests....
Test project ......
.....
```

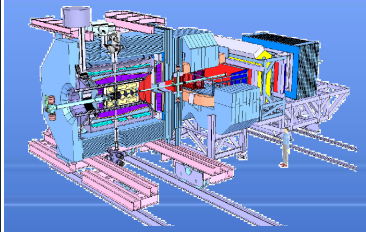
or via the central DashBoard for nightly/experimental tests....

$ [path_to_dash_script]/Dart.sh [experimental/nightly]

(modify Dart.sh to specify your own system settings!!)

Login | All Dashboards

Thursday, July 19 2012 21:58:00 CEST



PANDAROOT Dashboard

http://cdash.gsi.de/CDash/....

DASHBOARD CALENDAR PREVIOUS CURRENT PROJECT

Information about stability and validity of the newest PandaRoot subversion revision

RESPONSIBILITY OF ALL DEVELOPERS TO CHECK REGULARLY THE DASHBOARD! AIM: CODE HAS TO WORK ON ALL NIGHTLY PLATFORMS!!

No file changed as of **Thursday, July 19**

[Show Filters]

Nightly

Site	Build Name	Update		Configure			Build			Test				Build Time
		Files	Min	Error	Warn	Min	Error	Warn	Min	NotRun	Fail	Pass	Min	
lxir034.gsi.de	Debian_Squeeze64-linux-x86_64-gcc4.4.5-fairsoft_Jan12	1	0.6	0	0	29.9	0	500 +9 -52	4	0	4	22	4.8	2012-07-19T09:31:16 CEST
demac004	MacOSX-darwin-i386-gcc4.2.1-fairsoft_Jan12	0	0.5	0	0	0.1	0	500 +19 -2	4.4	0	2	24	3.4	2012-07-19T06:01:06 CEST
leonardo.cb.uni-bonn.de	openSUSE_11.2-linux-i686-gcc4.4-fairsoft_jan12_pndtrunk	0	0.6	0	0	0	0	500	10.3	0	3	23	9.6	2012-07-19T01:01:19 CEST
fb07-nucular.physik.uni-giessen.de	SLC_5.5-linux-x86_64-gcc4.1.2-fairsoft_install_2012_01_27	0	0.3	0	0	0.1	0	500 +304 -304	1.6	0	0 -2	26 +2	4.9	2012-07-19T02:01:01 CEST
briareos	Ubuntu12.04-linux-x86_64-	0	0.9	0	0	0	0	500 +31	2.7	0	4	22	2.3	2012-07-19T02:31:47

Quality Assurance

.... BUT DON'T WORRY, THERE ARE VARIOUS TOOLS AND TRICKS TO HELP YOU IN WRITING QUALITY ASSURED CODE!

.... MORE ON "HOW TO WRITE DECENT PANDAROOT SOFTWARE" FROM TOBIAS!!!!!

.... GOLDEN TIP: DON'T HESITATE TO ASK "OTHERS"

Communication

“MANY EYEBALLS MAKE ALL BUGS SHALLOW”

Linus Torvalds

Communication

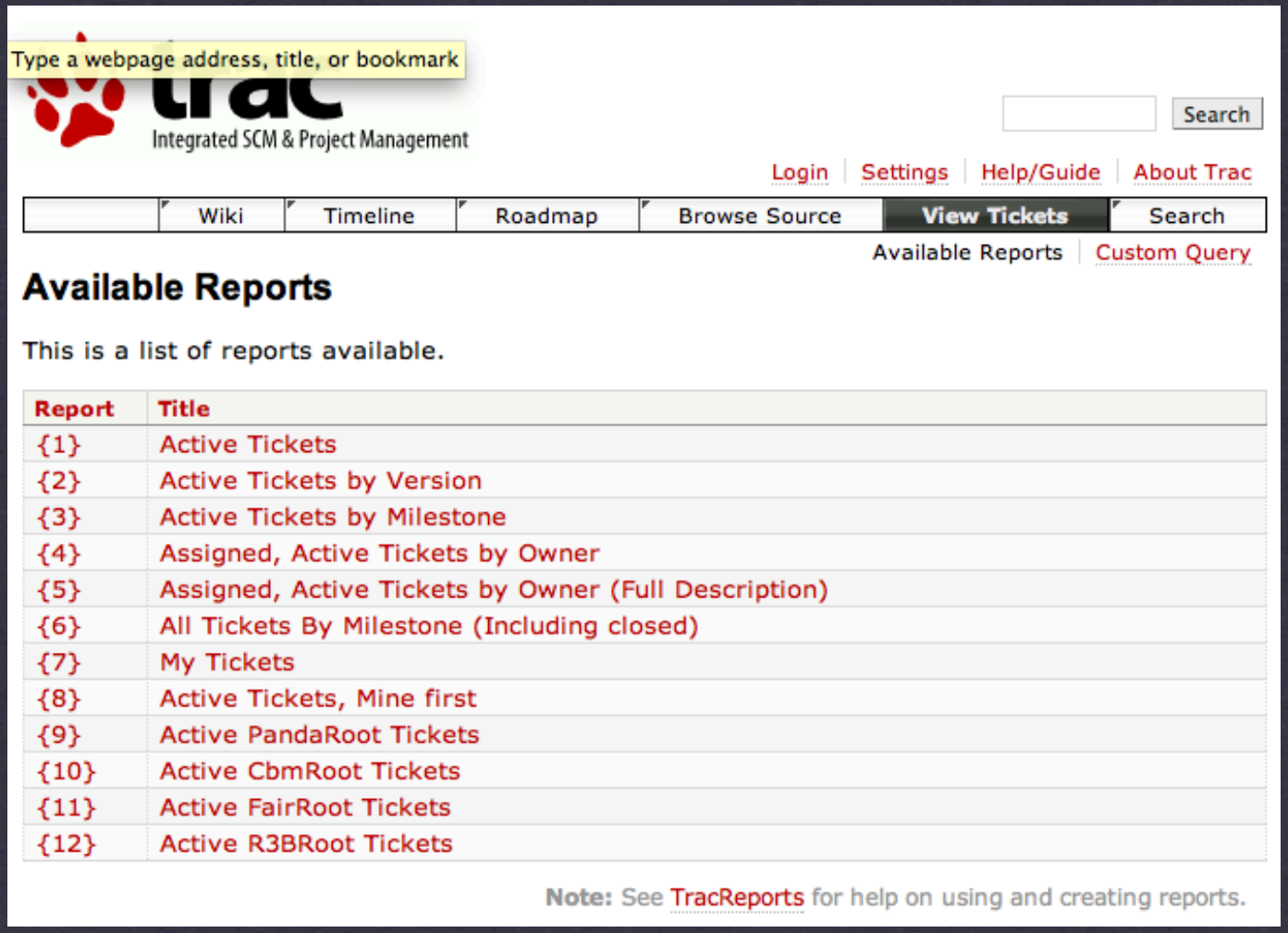
FORUM: general problems, questions, discussion, information releases/meetings, etc. http://forum.gsi.de/

PANDA				
PANDA - General		1	1	Tue, 05 June 2007 By: Olaf Hartmann
PandaRoot - PANDA Software				
General	**Moderator(s):** Johan Messchendorp Stefano Spataro	1258	274	Wed, 11 July 2012 By: Mohammad Al-Turany
Bugs, Fixes, Releases	**Moderator(s):** Johan Messchendorp Stefano Spataro	2564	429	Thu, 19 July 2012 By: Maria Carmen Mora Espi
Tracking	**Moderator(s):** Johan Messchendorp Stefano Spataro	1107	166	Tue, 24 April 2012 By: Stefano Spataro
Event Generators	**Moderator(s):** Johan Messchendorp Stefano Spataro	227	49	Mon, 11 June 2012 By: Martin J Galuska
Meetings	**Moderator(s):** Johan Messchendorp Stefano Spataro	532	187	Wed, 18 July 2012 By: Maria Carmen Mora Espi
Particle Identification	**Moderator(s):** Johan Messchendorp Stefano Spataro	20	5	Wed, 24 October 2007 By: Florian Uhlig
Analysis	**Moderator(s):** Johan Messchendorp Stefano Spataro	39	8	Tue, 12 June 2012 By: Dmitry Khaneft
Monte Carlo Engines G3, G4, Fluka, VMC	**Moderator(s):** Johan Messchendorp Stefano Spataro	99	27	Tue, 13 March 2012 By: Ivana Hrivnacova
EMC	**Moderator(s):** Johan Messchendorp Stefano Spataro	300	82	Wed, 20 June 2012 By: Tobias Stockmanns
Hypernuclear Simulation	**Moderator(s):** Alicia Sanchez Johan Messchendorp	2	2	Thu, 14 June 2007 By: Alicia Sanchez
MVD	**Moderator(s):** Johan Messchendorp Ralf Kliemt	72	21	Fri, 06 July 2012 By: Ankhi

Do get yourself a forum account!!!! Meant for users and developers, and there are no stupid question!!!

Communication

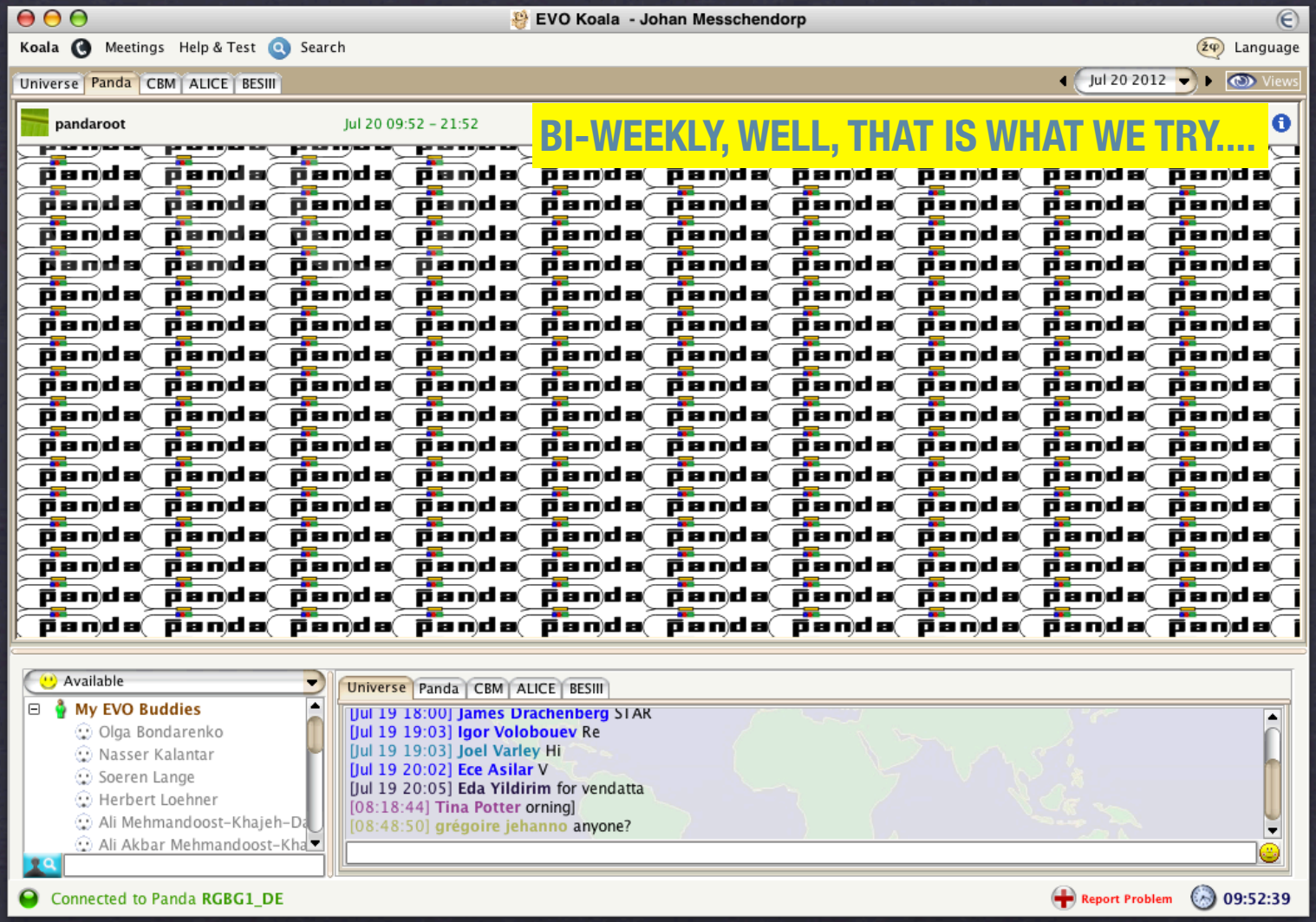
https://subversion.gsi.de/trac/fairroot/report/



For code bugs etc..... the ticket system (coupled to your SVN account)

Communication

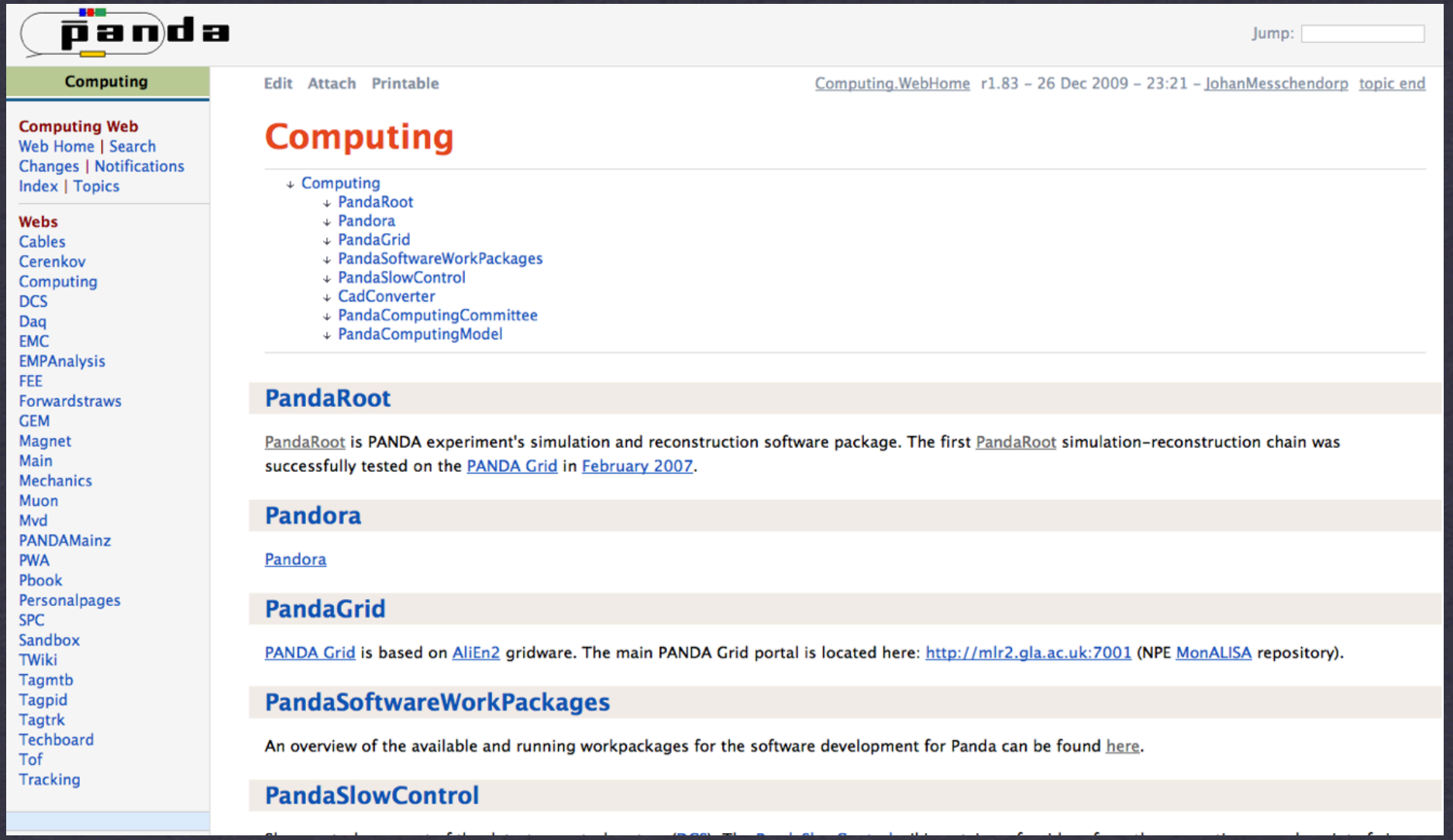
http://evo.caltech.edu/evoGate/



Keep on eye on forum messages for announcements on meetings!!
Feel free to arrange your own meetings!!

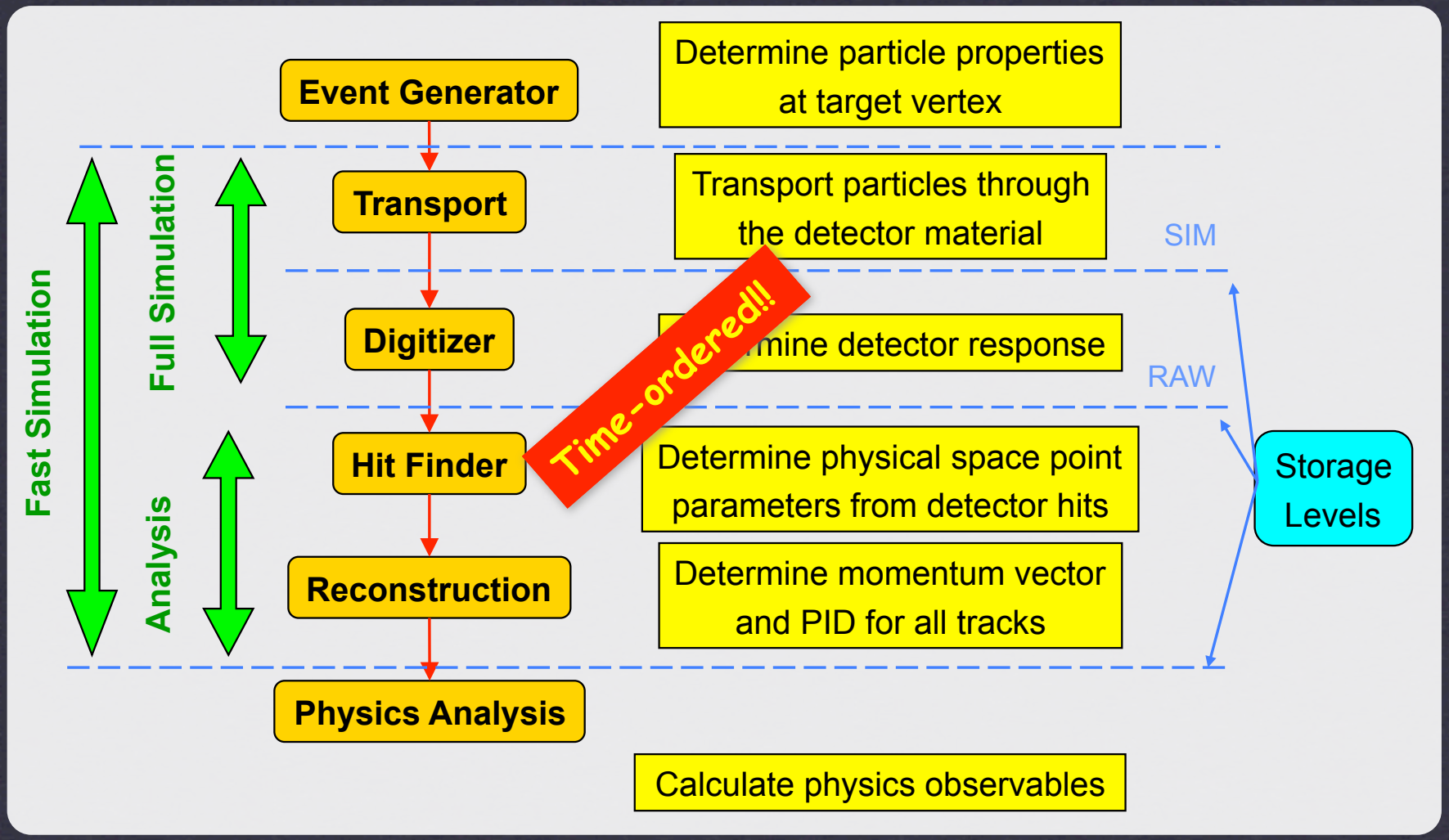
Documentation

http://panda-wiki.gsi.de



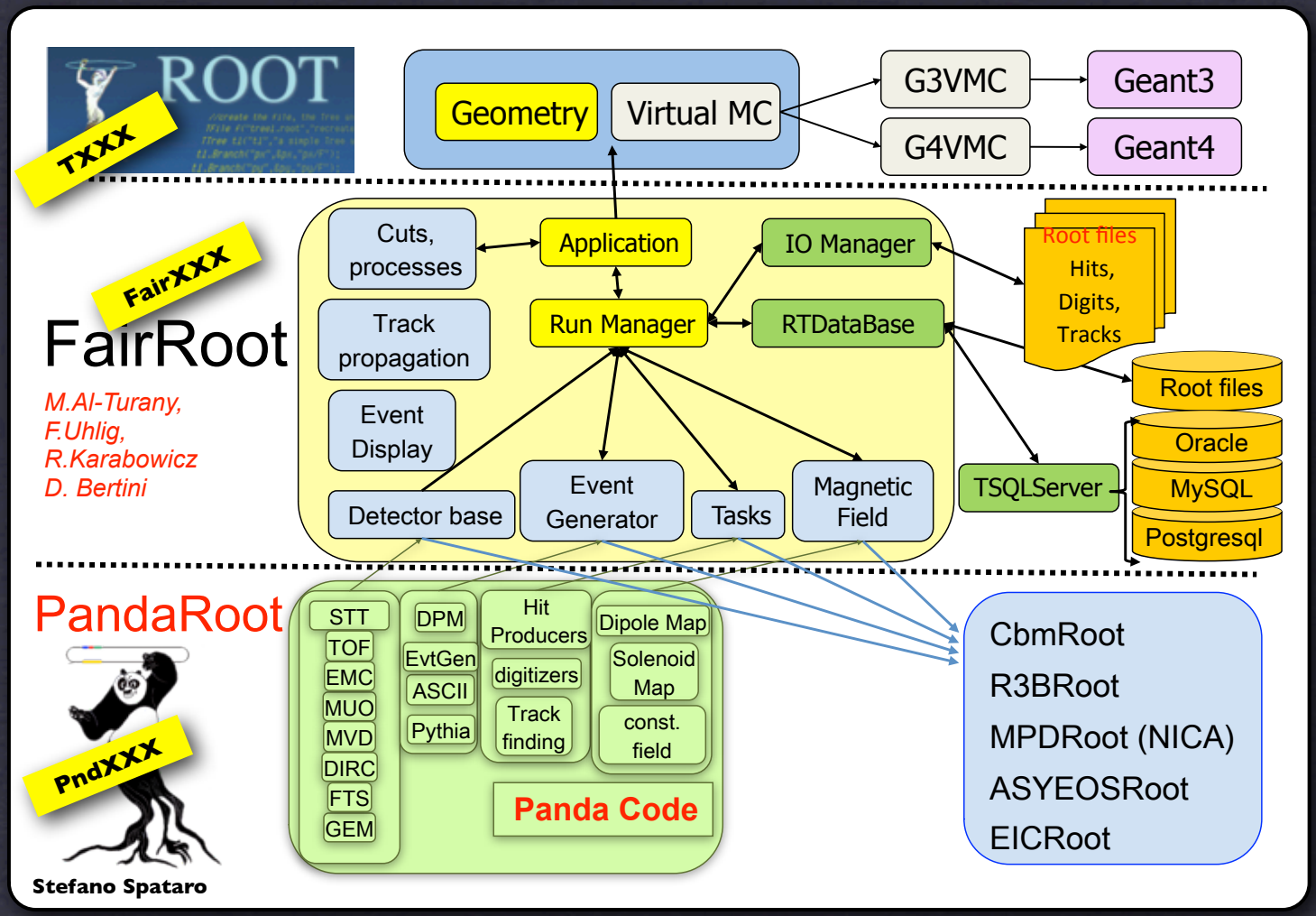
Use in the "WIKI" spirit!!!

The mission!



Aim: full simulations and data analysis scheme

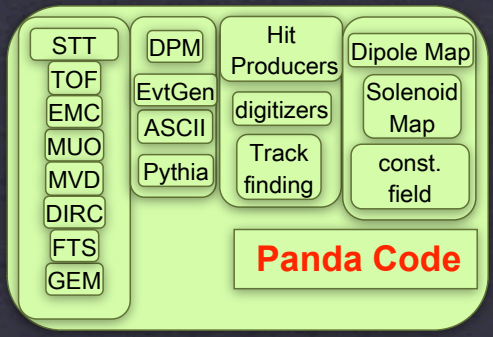
The basic structure



The file structure

PandaRoot (svn https://subversion.gsi.de/fairroot/pandaroot/....)

Detectors:	dch,drc,drpc,dsk,emc,fdrc,ftof,fts,fwd,gem,hyp,hypGe,lmd, lumi,mdt,mvd,rpc,scitil,sds,stt,tof
Global configurations:	gconfig,geometry,pnddata
Global tracking&pid:	tracking,sttmvdtracking,pid
Generators:	pgenerators
Analysis:	rho
Fast simulation:	fsim
Macros&tutorial:	macro,tutorials
Various tools:	PndTools

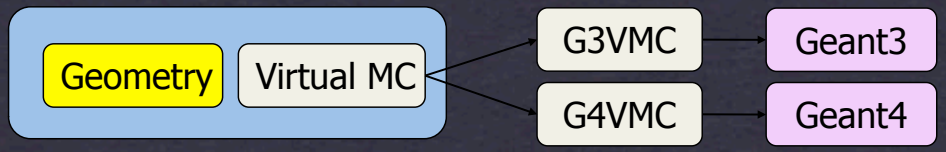


Externals of PandaRoot (svn propedit svn:externals .)

FairRoot:	base,generators,geobase,ora,parbase,cmake,geane,eventdisplay, trackbase,fairtools,dbase
GenFit:	genfit

External packages (svn https://subversion.gsi.de/fairroot/fairsoft/....)

Root, Geant3, Geant4, VMC, VGM, Boost, GSL, CLHEP, CMake, MonaLisa



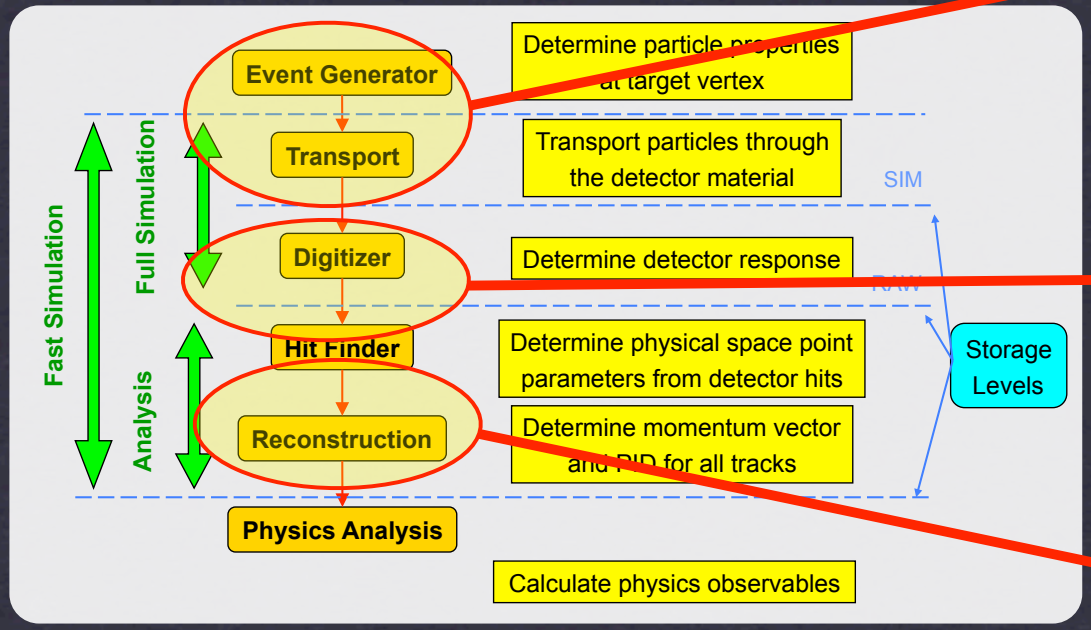
let's play around ....

.... a few tasks to digest!

1. Play around with a complete simulation and reconstruction chain

check [your_pandaroot_folder]/macro/pid/....

run_sim_sttcombi_xxx.C



run_digi_sttcombi.C

run_reco_sttcombi.C

Suggestions:

Make it run.
Visualize the output. Try to understand the results.
Try to understand the structure of the macros.
Localize the corresponding code in the repository.
Modify & run the macros as QA tests and submit results to Dashboard.