



Introductory Remarks

2020 Online Geant4 Collaboration
Meeting

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Our “get together” event, online

- Collaboration Meetings are our main opportunity for a “get together” event
 - To state on current developments
 - with the mission to converge on the next release
 - Elaborate medium terms plans
 - Discuss long terms issues
- But the pandemic makes this year CM special
 - And specially uneasy for our collaborators in distant time slots !
 - For next year, we hope a more classical meeting.
- Our appreciation goes to Laurent Garnier
 - Whose efforts to prepare the CM in Rennes have been aborted...
 - **But who is still enthusiastic to hold the next meeting in Rennes !**
- This week hosts the plenary sessions
 - + some parallel ones
 - And some other parallel sessions happen last week
- Session conveners have been invited to leave enough time for discussion
 - Specially because remote participation makes discussions less fluent

Focus of this CM

- The program committee was composed of
 - Anna Zaborowska,
 - Ben Morgan,
 - Laurent Garnier,
 - Shogo Okada,
 - + ex-officio : Alberto Ribon, Marc Verderi
- It shaped the plenary sessions
 - Proposed the contours of these
- And underlined two topics:
 - Welcoming the new generation of developers :
 - how to make the Collaboration more attractive and more friendly to newcomers ?
 - What features can be identified for the next release in 2021
 - expected to be a major one.

What features can be identified for the next release in 2021

- This year we will produce release 10.7
 - Hence 8 years since 10.0, which, in particular, introduced the MT capabilities
- Many physics & functionality developments achieved or ongoing since then
 - Contributing to many areas : HEP, medical, space, DNA, etc.
 - **The added value of these deserves we move to a major release !**
- New tasking mechanism in deployment, in view of renewing the MT scheme
 - **A major opportunity for new functionalities** (sub-event parallelism)
 - **And for opening to hybrid computing !**
 - Backward compatible this year for first stages
 - **Not compatible in its final version**
- Several developments kept pending, as non-backward compatible
- **The 2021 major release is the opportunity to include these !**
 - **This requires establishing solid development and validation plans !**
 - **It is time to start collecting and discussing these items !**

Welcoming the new generation of developers

- Geant4 started ~25 years ago
 - Many “historical” developers are still active
 - And make the **backbone of the sustainability** of the toolkit
 - They were as young as the current young generation...
 - But 25 years is a lot in a human being life !
- **Several years are needed for a young developer working on a precise field to become experienced enough to manage in depth transformations of the toolkit**
 - **We must have enough overlap between generations !**
 - **A questionnaire will be circulated within a few weeks to establish the “age pyramid” of Geant4**
 - With care on privacy
 - The goal is to understand where we stand, and extrapolate in five (& ten) years from now
- We need to attract new developers
- We must promote them inside the Collaboration
- Geant4 needs enough of them to contribute for a long time
 - But the short term contract policies deployed now are a problem..
 - Likely an example of money saving that costs more than what it saves...
 - We must insist to whoever we can that **one G4 developer work** may be **critical to many projects or users !**



Attracting new developers ?

- An item we should elaborate on !
- Some questions:
 - Do we advertise well enough the benefit of our developments ?
 - Do we advertise well enough the challenges in front of us ?
 - Do we communicate enough on our short manpower ?
- **But of course, attracting new developers requires funding**
 - **Do we communicate enough on users' community needs in terms of simulation ?**
- Could we also benefit from “modern cooperative tools” like Git ?
 - Would pros > cons for a simulation software like Geant4 ?
 - Discussion initiated, with some pros & concerns identified:

Pros	Concerns
Valuable contributions from external	Code downloadable/usable during inconsistent development stage or before physics validation
Faster bug-fix round cycle	G4 member intellectual property of current developments
Attraction & identification of new members	Inappropriate use of artificial numerous PR for “recognition”

- More input on other experiences and thoughts are needed

Promoting new developers

- Newcomers may feel their “Geant4 horizon” is limited to their WG
 - We must improve the collaboration spirit wrt to newcomers
- Next to come actions:
 - Create a page to explain (shortly and in plain English) the Collaboration functioning:
 - The way the Geant4 Collaboration works, its structure, its history, etc.
 - **Open “testing shifts” to all members:**
 - Shifts are an excellent opportunity to see developments by others & interact with them
 - And newcomers have often strong skills with modern tools !
 - **This will be on a voluntary basis, with WG coordinator agreement**
- And also:
 - Involve newcomers as much as possible in “cross-category” discussions
 - Involve them as much as possible in tutorials:
 - An excellent opportunity to learn more !
 - By exchanging with other developers
 - By exchanging with users, our “raison d’être”
 - Always a source of surprises
 - **Better advertise and share information on job offers**
- And of course : ask for their opinions about improving the Collaboration !
- Not a closed subject !

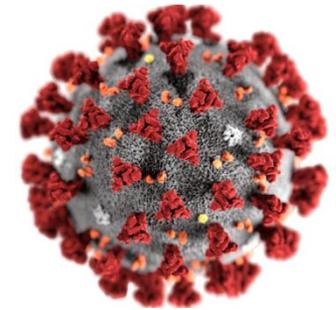
HSF - Geant4 relation

- In May, I offered Graeme Stewart (CERN HSF coordinator), who kindly accepted, to discuss about HSF – Geant4 relation
 - In view of improving our relation, expose requests, debate issues, etc.
- Underlying motivation is that Geant4 is the most or one of the most difficult software to be evolved to “modern computing” -which if mostly based on parallelism, and with several parallelism "flavors"- because of its
 - very Monte Carlo nature
 - high heterogeneity
 - high complexity
- HSF (my view), because of its wide and cross experiments & cross projects basis, could be the perfect body to play a “think-tank” role:
 - Survey, inform, educate on “modern architectures”, languages ,etc.
 - Consult other domains about their issues, solutions, practices, etc.
 - Elaborate educated practices guides, etc.
- An open and advanced dialog involving both expertise in Geant4 and HSF would be very fruitful to try to tackle the coming HEP challenges !
- **Graeme will make a presentation after this one.**

R&D

- Geant4 was born from an R&D : RD44
 - Evolutions, including major ones, have been part of the life cycle of Geant4
- “Change of paradigm” since O(10 years):
 - Increase of computing power only possible by parallelisms
 - Many material flavors came, in a still very dynamic process:
 - GPU, many-core platforms, hybrid CPU-GPU & use of accelerators, etc.
 - And recently, the promising high speed memory access chip Fujitsu A64FX
- Inevitably, this questions how to cope with these hardware, how to exploit the parallelism they provide, the opportunities they offer, their limitations, etc.
 - **We must learn by concrete investigations of our own**
 - **And must learn from investigations by others**
 - This is mainly the mandate of the R&D Task Force
- This questions too the intrinsic parallelism of the particle transport problem
 - As we have to fit it into these hardware
 - **We –Geant4 Collaboration- have to study, specify and document that**
 - **For ourselves, for externals, for the young generation**
 - **And for helping new ideas to emerge**
 - A documentation effort which is starting
- To me, these two aspects are needed to guide us in the future transformations

In summary



- Unusual Collaboration Meeting
- We will miss the so useful and needed discussions at coffee breaks, restaurants, etc.
- But let's try to do our best under these circumstances !
- With focus on:
 - Converging on this year next minor release
 - Initiating discussions on 2021 major release
 - Thinking of how to better promote the new generation
- And please : stay safe !