Vector Plans 2014

Geant V team [present @ FNAL, 24 Jan 2014]

Notes by J. Apostolakis

Milestone - April 11th

- Setup: simple benchmark: ~Ex03 only boxes

- G4 with 'tabulated' physics

- Connect tabulated physics with Vec prot.

- Port Brems to Vector prot, and use also in G4 with tabulated

- Develop USolid and UGeom to be able to run Ex03 in Vector prototype

- Robust scheduler

Field propagation

- Extend Vector I/F for Field Propagation

  - Important for realistic CPU

  - Depends on other objectives, resources

- Decision point: February 14th

ASAP after April

- Move to Geant4 10.0

- Nightly build system

- Both are

  - Recommended or desirable for April

  - Necessary for July

Milestone 2 - end July

- Magnetic Field (may be earlier)

- Intermediate Detector: 3-5 solids all Vector

- CMS(v 2008): 10 solids - Top 5 vector

- Vector Compton process

  - including first pass of abstraction

- Testing all combos (3 geom, VP/VPT/G4T/G4TV/G4V/G4)

  - Check VP=G4TV, VPT=G4T, G4V=G4

Glossary

- VP= Vec Prototype with Max Vector Procs

- VPT= Vec Prototype with Tab Procs only

- G4T= G4 with Tabulated Procs 'only'

- G4TV= G4 w/ max Vec Procs, rest Tab procs

- G4V= G4 replacing only Vec Procs

- G4 = Original Geant4

Vector Physics

- Target: create first version of generic code for Vector and GPU

  - similar to approach of Sandro/Johannes

  - separated from G4

  -

GPU

- Get in sync between GPU and Vector

- Principle shadow developments

  - UGeom

  - Tabulated Physics

- Navigation - 'Lock-step' inquiries to Solid Type (November ?)

MIC

- Expect it to work efficiently if GPU runs well enough

- Seek person (Laurent?)

  - to test April prototype, check efficiency

  - follow development.

November

- Complete EM Physics (for a Phys list)
  - As close as possible to Std EM Physics
  - One process (e.g. MSc) with 2 models in E
- Full set of Primitive Shapes
  - Composites (importance in CMS?)
- Voxelisation?
- Results for MIC

People

- Andrei(30%), Fed(50%), John(40%), Johannes(100%), Mihaly(100%), Sandro(100%), Georgios(50%*0.5), Tatiana(25%+), doctoral student (100% >March) = 5.5 FTE

- Philippe(30%), Soon(50%), Guilherme(100%), Physics-List-X(20%) = 2.0 FTE

- Marilena(?5%), Raman(?100% >June)

- Laurent (?) (~10%)

Who does it?

Milestone 1 - April 1/11

- Setup: simple bench.: ~Ex03 only boxes - ANDREI

- G4 with 'tabulated' physics - JOHN

- Connect tabulated physics with Vec prot. - FEDERICO, ANDREI (Vector), SOON (GPU)

- Port Brems to Vector prot, and use also in G4T, ie G4 w/ tabulated - SOON

- Develop USolid and UGeom to be able to run Ex03 in Vector prototype - SANDRO/Johan./Guilherme

- Robust scheduler - Andrei (Vector) Philippe (GPU)

Manpower, who is doing what?

✻ For first release

Name	Tasks
Johannes	•core CPU/GPU abstraction library •primitive shapes
Sandro	•core CPU/GPU abstraction library •navigation and components necessary for it •detector construction + placement concepts •design
Georgios	•primitive shapes
Guilherme	•validation •testing across platforms •nightly build system (? depends on site) •vectorisation
Tatiana, Gabriele, Raman	??

Field propagation

- Extend Vector I/F for Field Propagation

  - Important for realistic CPU

  - Depends on other objectives, resources

  - Intent: single source code

- Decision point: February 14th

- Who? ANDREI (Vec), Philippe (GPU)

ASAP after April

- Move to Geant4 10.0 - FEDERICO/JOHN

- Nightly build system - SANDRO(tech), FED(resources), Requester(Outside)

- Performance monitoring

  - part of nightly - SPI

  - plots (website) of performance of critical units - SPI

  - we (developers) should define what to measure - SOON/SANDRO

Milestone 2 - end July

- Magnetic Field (may be earlier) -- ANDREI/PHILIPPE

- Intermediate Detector: 3-5 solids all Vector -- GEOM TEAM

- CMS(v 2008): 10 solids - Top 5 vector -- GEOM TEAM

- Vector Compton process -- SOON/PHILIPPE/JOHN

  - including first pass of abstraction -- +SANDRO

- Testing all combos (3 geom, VP/VPT/G4T/G4TV/ G4V/G4) -- SOON/FED/JOHN

  - Check VP=G4TV, VPT=G4T, G4V=G4

Vector Physics

- Target: create first version of generic code for Vector and GPU -- SOON/JOHN/PHILIPPE/SANDRO

  - similar to approach of Sandro/Johannes

  - separated from G4

GPU

- Get in sync between GPU and Vector

- Principle shadow developments

  - UGeom -- GEOM TEAM

  - Tabulated Physics -- SOON

- Navigation - 'Lock-step' inquiries to Solid Type (November ?) -- RESEARCH PROJECT (summer student / phd student)

MIC

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- Seek person (Laurent?)

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  - follow development.

November

- Complete EM Physics (for a Phys list)

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