



Centro de Investigación  
en Computación  
Instituto Politécnico Nacional

## GeantV Performance

Alberto Maldonado Romo   Jesús Alberto Martínez Castro  
Soon Yung Jun   Jose Guilherme Lima   Andrei Gheata

Instituto Politécnico Nacional,  
Centro de Investigación en Computación

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## ► Features about the FullCMS script

- 10,100 and 1000 events
- 10-GeV electrons per event
- threads: 1 or 4
- configuration
  - + 0: scalar mode
  - + 1: vector mode
  - + 2: basketization enabled w/ scalar dispatch

scalar/vector config: Fi\_Pj\_Gk\_Mn

- + F=magField
- + P=(EM)physics
- + G=geometry
- + M=msc

This section has some performance results with different combinations using the single track flag=1, with the version of GeantV pre-beta-4

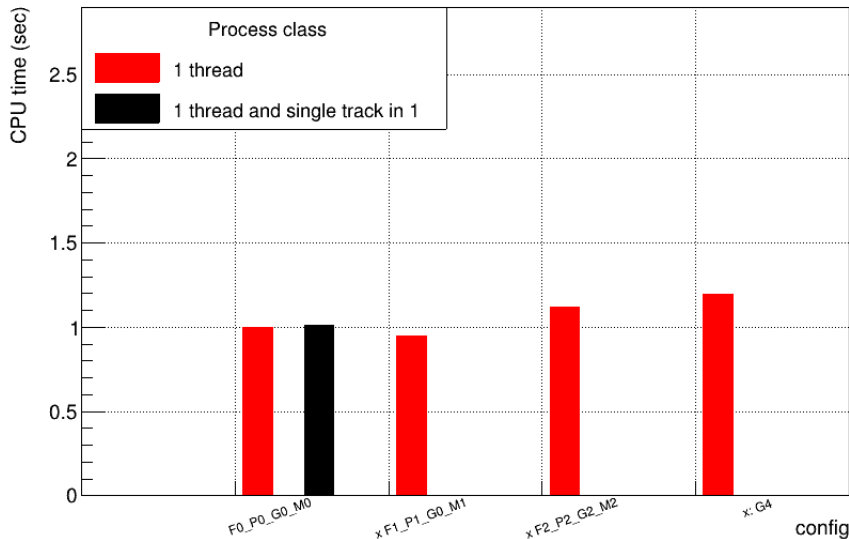
- ▶ `geantv(commit 0abf49ec2ca8cc433)`
- ▶ The latest VecGeom with  
`-DUSE_CACHED_TRANSFORMATIONS=ON`

## ► Software and microprocessor

- Ubuntu 16.04
- gcc 5.4.0
- veccore 0.5.2
- Vc 1.3.3
- Intel® Core™ i7-4790HQ CPU @ 2.50GHz × 8
- Instruction Set Extensions: AVX2
- SmartCache 8MB
- Level 1 cache size 4 × 32 KB 8-way set associative instruction caches
- Level 1 cache size 4 × 32 KB 8-way set associative data caches
- Level 2 cache size 4 × 256 KB 8-way set associative caches
- Level 3 cache size 8 MB 16-way set associative shared cache
- RAM Memory 32GB

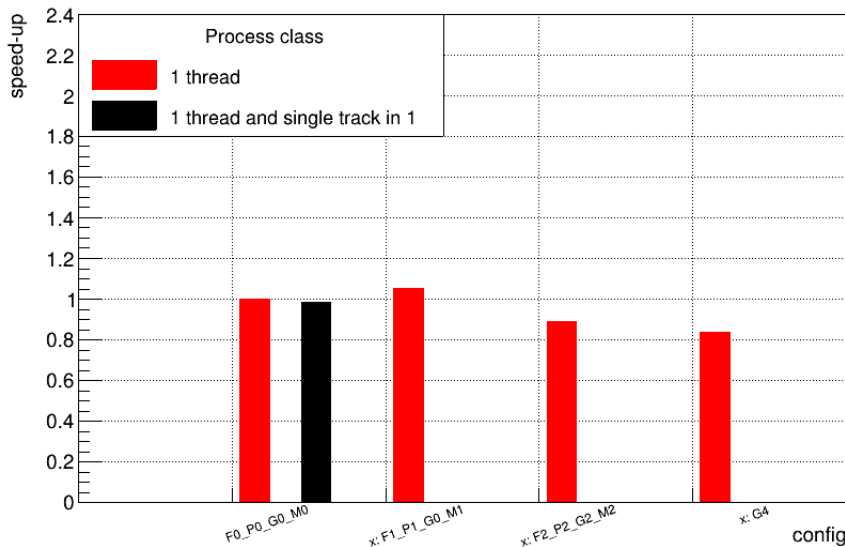
# FullCMS Results - Ubuntu 16.04

## CPU time per event (1000 events)



# FullCMS Results - Ubuntu 16.04

## CPU Speedup (1000 events)

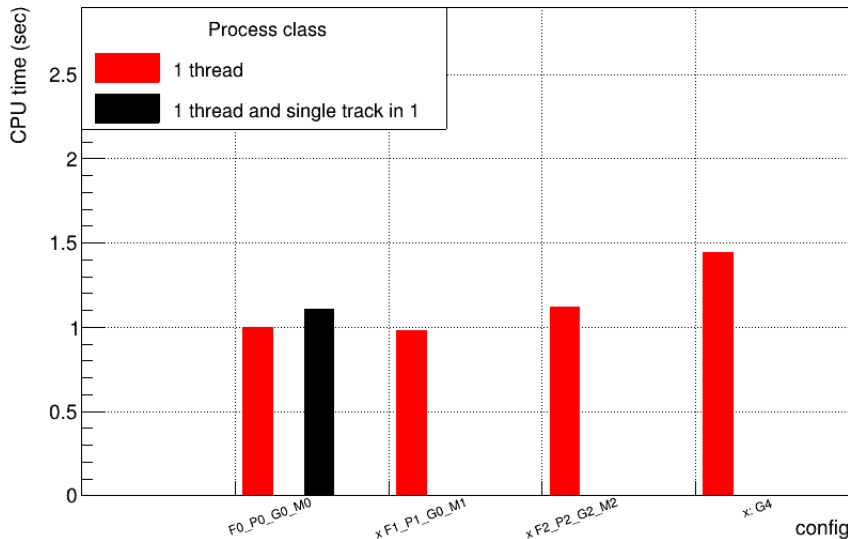


## ► Software and microprocessor

- Ubuntu 18.04
- gcc 7.3.0
- veccore 0.5.2
- Vc 1.3.3
- Intel R Core TM i7-4710HQ CPU @ 2.50GHz × 8
- Instruction Set Extensions: AVX
- SmartCache 6MB
- Level 1 cache size 44 × 32 KB 8-way set associative instruction caches
- Level 1 cache size 4 × 32 KB 8-way set associative data caches
- Level 2 cache size 4 × 256 KB 8-way set associative caches
- Level 3 cache size 6 MB 12-way set associative shared cache
- RAM Memory 8GB

# FullCMS Results - Ubuntu 18.04

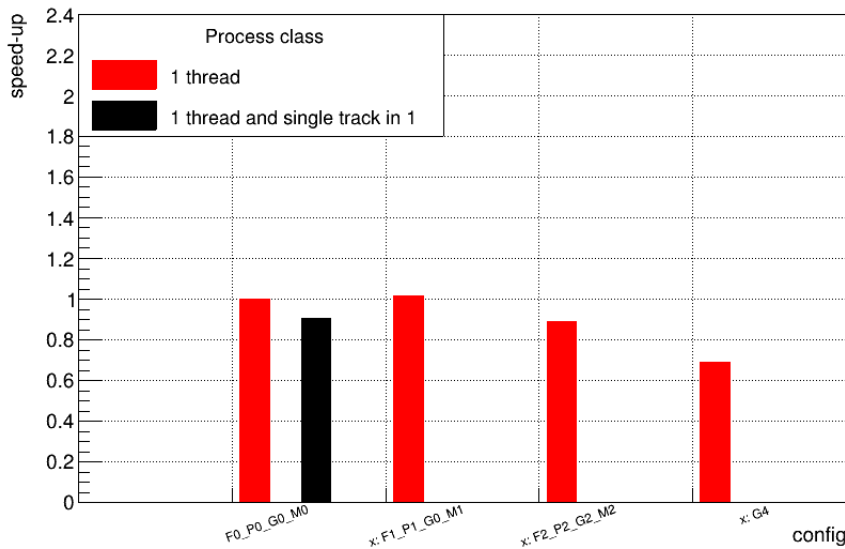
## CPU time per event (1000 events)





# FullCMS Results - Ubuntu 18.04

## CPU Speedup (1000 events)

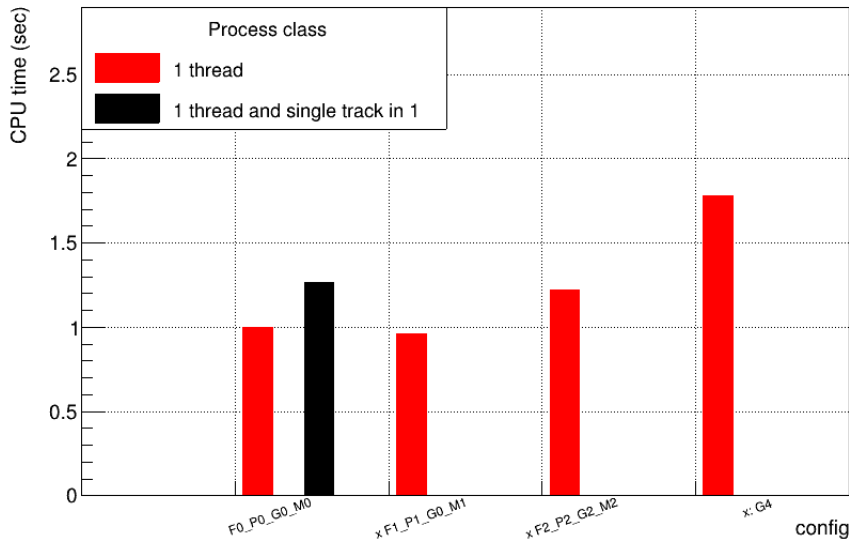


## ► Software and microprocessor

- Workstation 29
- gcc 8.2.1
- veccore 0.5.2
- Vc 1.3.3
- AMD® A10-7700k radeon r7, 10 compute cores 4c+6g × 4
- Instruction Set Extensions: AVX
- Cache memory 4MB
- Level 1 cache size 2 × 96 KB 3-way set associative shared instruction caches  
Level 1 cache size 4 × 16 KB 4-way set associative data caches
- Level 2 cache size 2 × 2 MB 16-way set associative shared caches
- RAM Memory 16GB

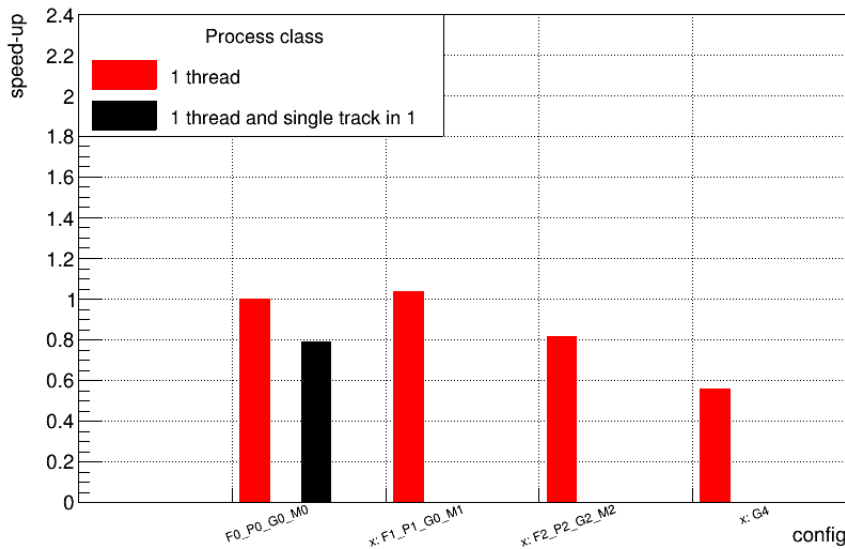
# FullCMS Results - Workstation 29

## CPU time per event (1000 events)



# FullCMS Results - Workstation 29

## CPU Speedup (1000 events)

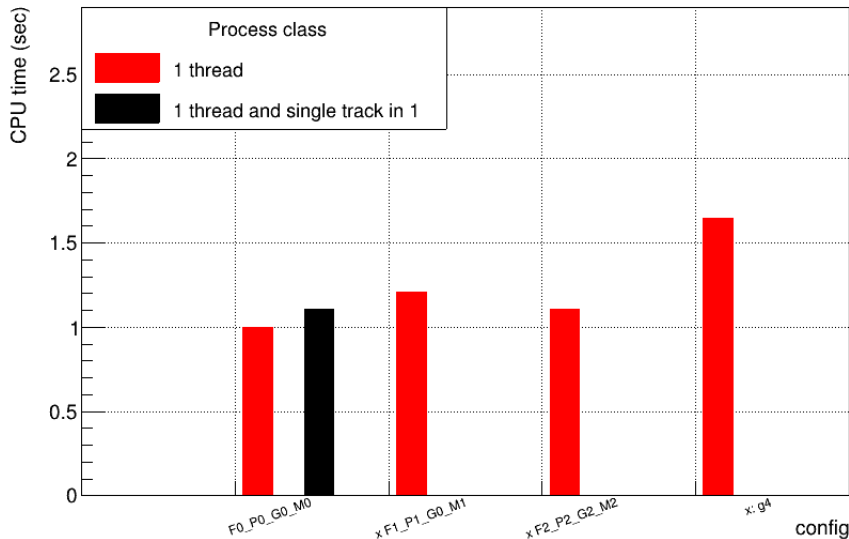


## ► Software and microprocessor

- Workstation 29
- gcc 8.3.1
- veccore 0.5.2
- Vc 1.3.3
- Intel Celeron(r) CPU 1000M @ 1.80GHzx2
- Instruction Set Extensions: SSE4
- 2 MB SmartCache
- Level 1 cache size 2 x 32 KB 8-way set associative instruction caches
- Level 1 cache size 2 x 32 KB 8-way set associative data caches
- Level 2 cache size 2 x 256 KB 8-way set associative caches
- Level 3 cache size shared 2 MB 8-way set associative cache
- RAM Memory 4GB

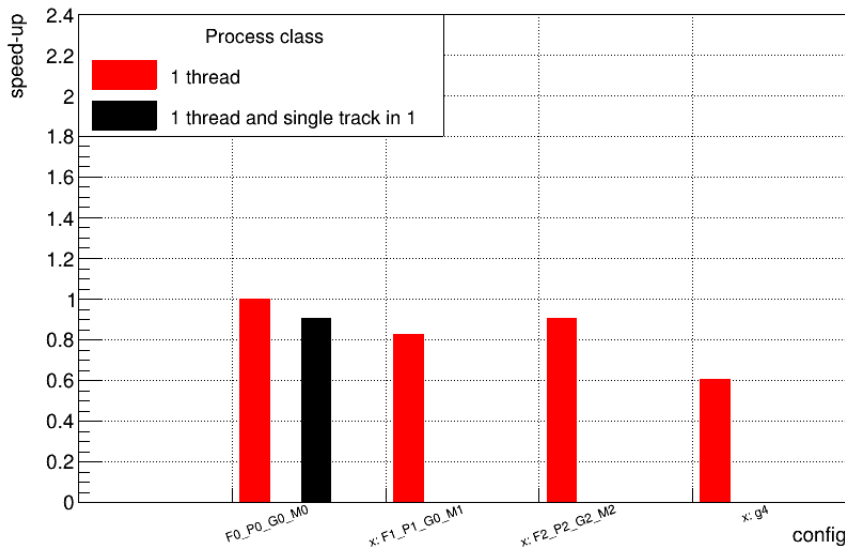
# FullCMS Results - Workstation 29

## CPU time per event (1000 events)



# FullCMS Results - Workstation 29

## CPU Speedup (1000 events)

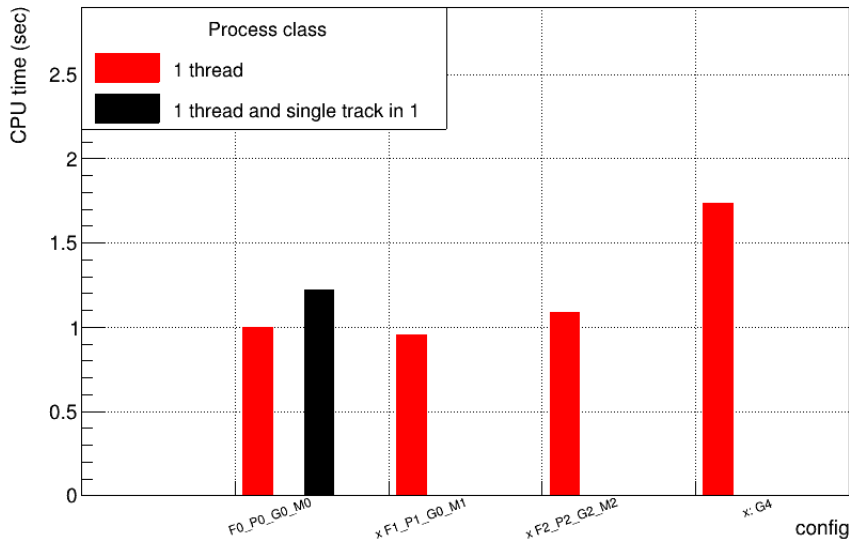


- ▶ Software and microprocessor
  - Workstation 29
  - gcc 8.2.1
  - veccore 0.5.2
  - Vc 1.3.3
  - IntelCentrino 2
  - Instruction Set Extensions: AVX
  - Cache Memory 4 MB L2
  - Level 2 cache size 6
  - RAM Memory 4GB



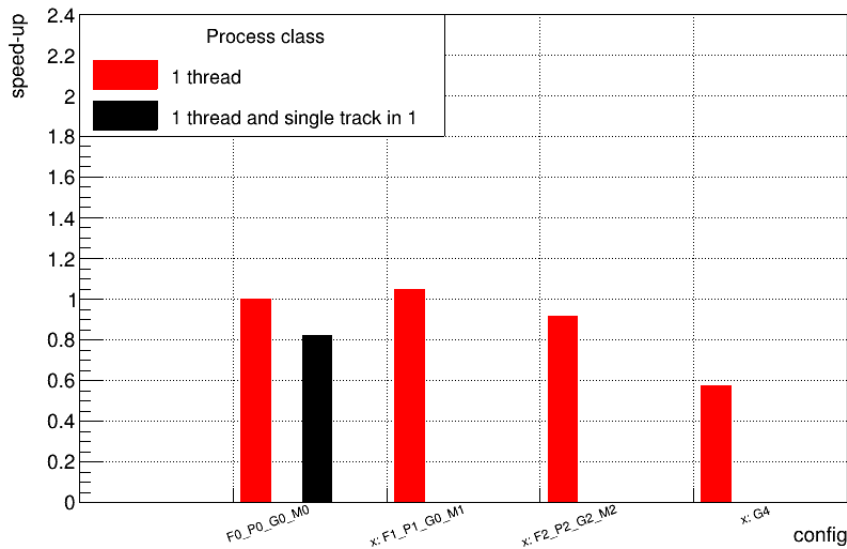
# FullCMS Results - Workstation 29

## CPU time per event (1000 events)



# FullCMS Results - Workstation 29

## CPU Speedup (1000 events)

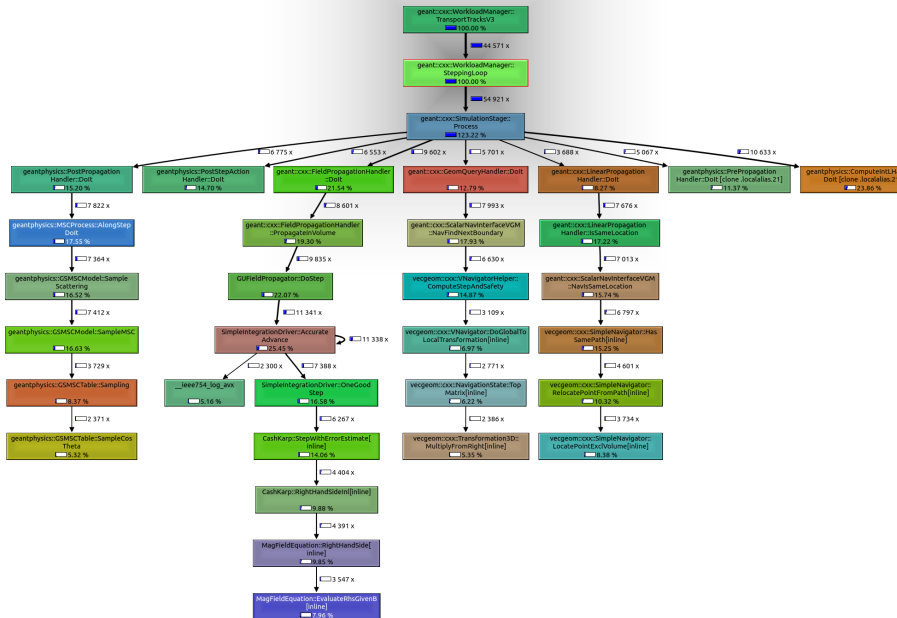


# Summary

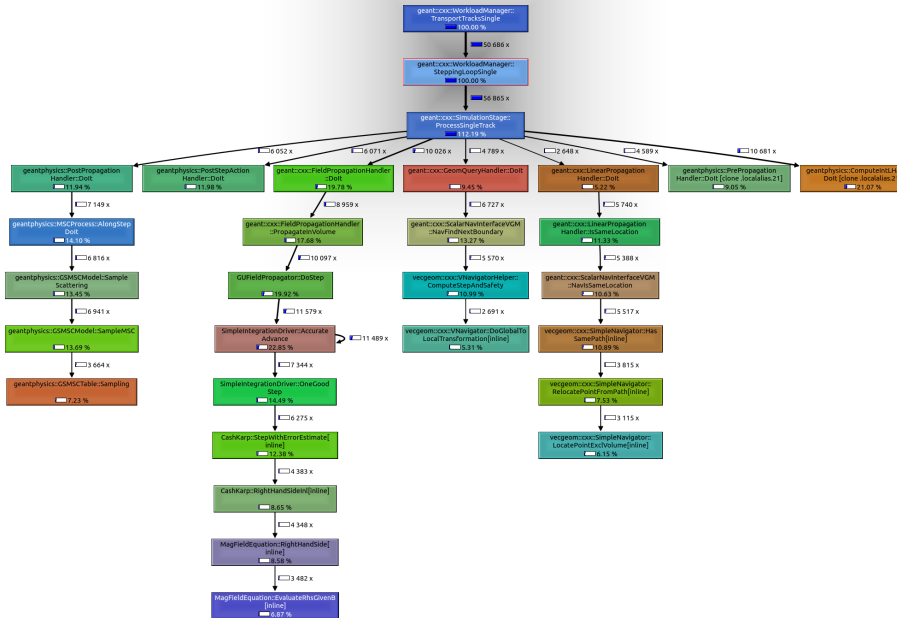
Test	CPU	Instruction set	Time-F0-P0-G0-M0(GV0)	G4/GV0	strk/GV0	F1-P1-G0-M1/GV0	F2-P2-G2-M2/GV0
1	Intel i7 2.5GHz	AVX2	1063.74s	1.1959	1.0139	0.9475	1.1225
2	Intel R 2.5GHz	AVX	1214.8s	1.4457	1.1049	0.9823	1.1206
3	AMD A10-7700k	AVX	1837.06s	1.7813	1.2667	0.9635	1.2210
4	Intel R 1.8GHz	SSE4	2397.41s	1.6453	1.1051	1.2112	1.1060
5	Intel Centrino2	AVX	2768.37s	1.7348	1.2195	0.9552	1.0911

# Back Slides

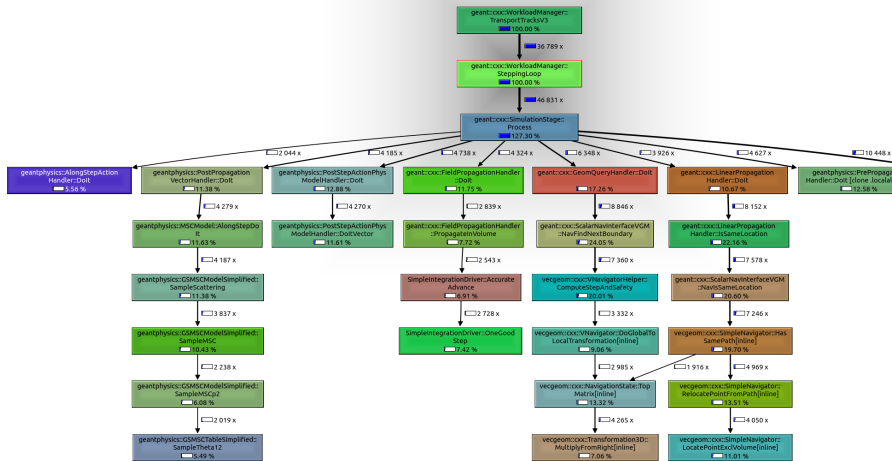
# Intel i7 2.5 GHz F0-P0-G0-M0



# Intel i7 2.5 GHz strk0



# Intel i7 2.5 GHz F1-P1-G0-M1



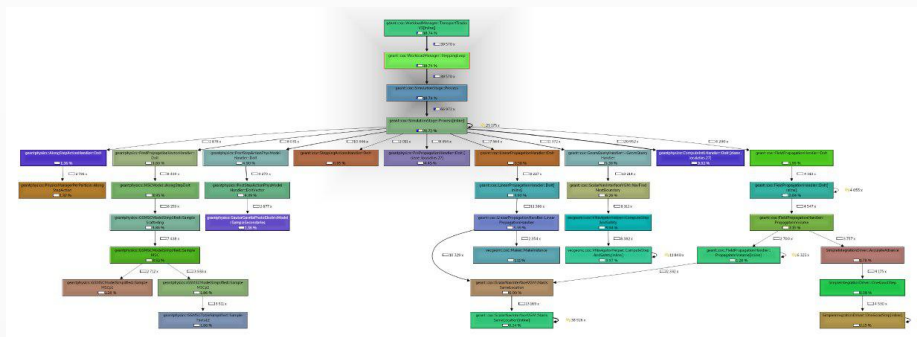






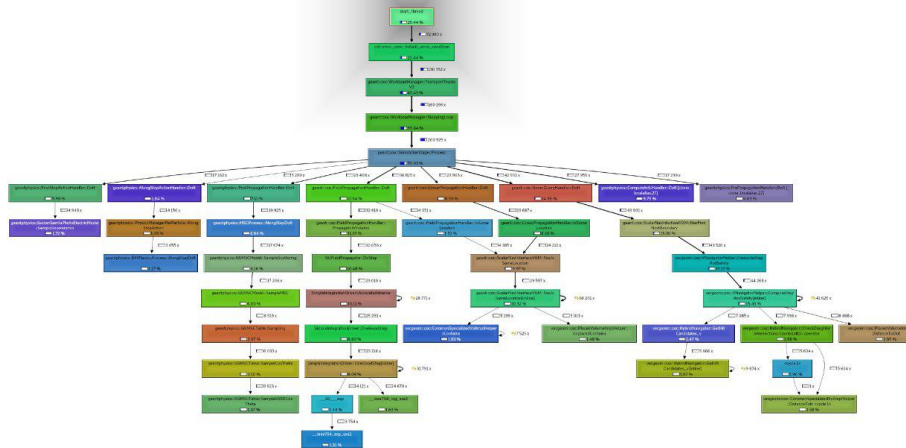


# AMD A10-7700k F1-P1-G0-M1





# Intel R 1.8GHz F0-P0-G0-M0





# Intel R 1.8GHz F1-P1-G0-M1

