TimeSPOT WP4:
Stato delle attività a Milano

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Stub Constructor grid

Actual (working) implementation (per couple of sensors)**:**

- 2 space parameters (r-phi) from first sensor

- 2 space parameters (r-phi) from second sensor

- A 4-dimensional grid is declared in the VHDL through **"for … generate" statements**

- If each sensor is divided into **N_r*N_phi exclusive areas**, the number of combinations is (virtually) N_r* N_r*N_phi*N_phi

- In a practical example N_r = 8, N_phi = 32 --> Total = **65536**

- In fact, only ~ (N_r * 3) * (N_phi * 3) Stub Makers should be instantiated. This is done in the VHDL through **"if...generate" statements** (i.e. Total_active = 2304)

- The number "3" is given by the fact that **for one hit in a bin** of the first sensor, the second hit is typically in the **same bin or the first neighbor** of the second sensor

- The implementation works only for small values of N_r, N_phi (N_r=4,N_phi=4)
  - Total = 256, with Total_active= 16 (with first neighbor bins on second sensor not instantiated)

New implementation (under construction):

- In the "old" implementation the work of "cutting" the Stub Maker instances is demanded to the the VHDL compiler.

- For higher values of N_r, N_phi there is a big difference between the total numbers of elements of the grid and the actual active (and instantiated) Stub Makers

- The 4 dimensional grid has to be "**flattened**"

- In this new approach, the delivery of the hits has to be changed. In fact, the old approach allowed a very easy delivery through a "Hit Switch", based on the address of the hit (the MSB of the r and phi coordinates)

- Also the recollection of the identified stubs has to be changed (before the Stub Switch, to the Engines)

- A new implementation is under construction. A failed attempt of a simplified approach has been tried in simulation. The structure should be revised, tested with simulation and then implemented.