The Muon Digitization process consists of two steps:
1. the output of the Muon Simulation, henceforth referred to as Muon Hits, is converted to Muon Digits, i.e. intermediate objects that can be fed into the reconstruction.
2. the Muon Digits are converted into RDOs, the transient representation of the raw data bytestream. This step is realized by means of ATHENA Converters, which take into account of cabling and readout.

MuonHits and Simulation Identifiers for the four Muon technologies

From Muon Hits to Muon Digits

The MDT Digitization consists of several steps:
1. conversion from drift radius to drift time
2. calculation of the time structure of the event drift time (+ ADC charge) + time of flight + bunch time relative to the current bunch + propagation delay of the signal with respect to the tube readout side + dead time
3. trigger match for the digit
4. conversion of total time into TDC counts

For a given tube the hits are sorted in time (drift + TOF + prop + bunch)

The CSP Digitization simulates the charge distribution on the CSP cathode strip, identifying strip numbers and orientations. This occurs in different steps:
1. Charge calculation on a strip together with the strip OID
2. Simulation of the raw data, i.e. the output of the electronics

The RPC Digitization simulates the following detector responses:
1. multi hits due to tracks passing several wire gangs and the intrinsic time response, signal propagation along wires and strips
2. detector efficiency (sensitivity) of wire gangs and strips

The TGC Digitization simulates the following detector responses:
1. Multi Hits by a single track
2. for hits along the phi coordinate

Digitization Validation

RRT (RunTime Test) is running every nightly build on the digitization algorithms to perform a DigitValidation.