MBS to AGATA data receiver:

The MBS to AGATA data receiver is needed to receive data from the MBS for gamma tracking purposes inside the AGATA / NARVAL data acquisition.

A template environment for such an MBS to AGATA receiver can be found in the agatadaq account at GSI in the directory: ~/agata/from_mbs_to_agata. Please see also comments in the source code.

This template receiver covers already the TCP connect / disconnect procedures, data transport and unpacking of the MBS event up to the point where payload data (sub-system id, AGAVA data, tracking data) can be accessed by pointers.

This receiver template must be embedded into the AGATA / NARVAL environment and multi instances, for connection to more than one MBS data source, shall be foreseen.

AGATA to MBS data sender:

A new data sender needs to be developed for sending AGATA data to the MBS event builders for further merging with other sub-systems. The following process flow is required:

First it connects (try to connect every 1-3 seconds in a loop) to an existing TCP socket on port 6500. The name of the node to connect to must be entered as a parameter. It might be helpful if the port number may also be an input parameter.

After successful connection this data sender shall send first a protocol buffer with a size of 1024 bytes. It contains two 32 bit words: In the first word the data sender writes a 1. This will be used by the MBS receiver as a tag for the endian type of the sender. The second data word contains the buffer size of the event data, which will be send afterwards. Sensible values for the data buffer size are 0x1000 – 0x1000000 bytes. With buffer sizes in the indicated range the full network bandwidth can be utilized. At the same time they give some freedom for the number of events stored in a single buffer. Needless to say, that the size of an AGATA event shall never be larger than the buffer size minus 12 bytes for header (see below):

The data sender sends now in a loop buffers of AGATA events into the connected socket, whenever a buffer is completely filled. I might be a good choice to implement a flushing mechanism in order to send buffers at latest one second after the previous one, which would result in sending partially or even empty buffers.
The MBS receiver expects for each AGATA event a sub-event header of 12 byte (see format below), which has to be filled and put just before the AGATA event data. Immediately after this 12 byte sub-event header the 4 byte AGATA subsystem identifier (= 0x800) must follow. Afterwards the AGAVA / GTS data must follow. The size and structure of the AGAVA / GTS data still needs to be finalized, but it must be of the same size and structure as the MBS provides as input (MBS to AGATA receiver) for the AGATA tracking.

If the MBS receiver disconnects, the AGATA data sender stops sending data to TCP and enters again in a loop, trying to connect again to a socket on port 6500 on a predefined node.

A template AGATA to MBS data sender environment can be found on the agatadaq account at GSI in the directory: ~/agata/from_agata_to_mbs. Please see also comments in the source code.

**MBS Sub-Event Header**

The 12 bytes sub-event header C structure to be filled by the AGATA data sender (see protocol flow above) depends on the endian type of the processor node, where the data sender is running:

```c
/* ============== GSI VME Sub event header ================ */
#ifdef BIGENDIAN
typedef struct
{
  INTS4 l_dlen;    /* Data length (in 16 bits) + 2 */
  INTS2 i_subtype;
  INTS2 i_type;
  CHARS h_control;
  CHARS h_subcrate;
  INTS2 i_procid;
} s_ves10_1;
#endif /* BIGENDIAN */

#ifdef LITTLEENDIAN
typedef struct
{
  INTS4 l_dlen;    /* Data length ( in 16 bits) + 2 */
  INTS2 i_type;
  INTS2 i_subtype;
  INTS2 i_procid;
  CHARS h_subcrate;
  CHARS h_control;
} s_ves10_1;
#endif /* LITTLEENDIAN */
```
l_dlen: data size in 16 bit words + 2. Data size shall contain the four d32 bytes
time stamp information plus the original CHIMERA event data size.
Please note the + 2!

i_subtype: 1
i_type: 10
h_control: free. Could be used for analysis steering.
h_subcrate: 0
i_procid: 1