

Totem Unified Database Access Service

Client-side Interfaces

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1 Luminosity processing - interfaces

- **int** *saveLuminosityByLs*(**long** startTime, **long** endTime, **string** label, **vector**<**LuminosityByLs**> luminosity)

Description: Saves luminosity by lumi-section data into the database. Luminosity can be further identified by a given validity interval (startTime, endTime) and a label describing the data. The method returns version number of saved data (in case of multiple similar inserts the old one is not removed, but new version of the same data is created instead).

Parameters:

- *startTime* - a start time of fill validity interval
 - *endTime* - an end time of fill validity interval
 - *label* - a text label, description of data, i. e. concatenation of lumitype, data-tag, normtag and worktag strings separated by semicolon(*HF;V3;HFV2a;V04-01-01*).
 - *vector*<*LuminosityByLs*> - vector of structures containing luminosity data (i.e. UTC time, lumi section, Beam status, energy etc.). All structures are further described in next section. The structures are saved into the database in the same order as they are in the vector.
- **vector**<**LuminosityByLs**> *loadLuminosityByLs*(**long** timestamp, **string** label)

Description: Loads the latest version of luminosity data (bound to given timestamp and label) from the database and returns it as a vector of *LuminosityByLs* structures. The order of structures in the vector is the same as it was while saving

by *saveLuminosityByLs* method.

Parameters:

- *timestamp* - a timestamp value, it should be between *startTime* and *endTime* specified in *saveLuminosityByLs* method.
- *label* - a text label, description of data, i. e. concatenation of lumitype, data-tag, normtag and worktag strings separated by semicolon(*HF;V3;HFV2a;V04-01-01*).

- **vector<LuminosityByLs>** *loadLuminosityByLsByVersion*(**long** timestamp, **string** label, **int** version)

Description: Loads the specified version of luminosity data (bound to given timestamp and label) from the database and returns it as a vector of *LuminosityByLs* structures. The order of structures in the vector is the same as it was while saving by *saveLuminosityByLs* method.

Parameters:

- *timestamp* - a timestamp value, it should be between *startTime* and *endTime* specified in *saveLuminosityByLs* method.
- *label* - a text label, description of data, i. e. concatenation of lumitype, data-tag, normtag and worktag strings separated by semicolon(*HF;V3;HFV2a;V04-01-01*).
- *version* - a version number, positive integer value.

- **vector<LuminosityMetadata>** *listAllLuminosityByLs*()

Description: Loads the vector of metadata of all luminosity by lumi-section measurements. For each measurement, *LuminosityMetadata* contains information about *startTime* and *endTime* (specified in *saveLuminosityByLs* method), label and number of versions of luminosity data.

- **vector<LuminosityMetadata>** *listLuminosityByLs*(**long** startTime, **long** endTime)

Description: Loads the vector of metadata of luminosity by lumi-section measurements in given period of time: [startTime, endTime].

Parameters:

- *startTime* - a start time
- *endTime* - an end time

- **int** *saveLuminosityByLsXing*(**long** startTime, **long** endTime, **string** label, **vector<LuminosityByLsXing>** luminosity)

Description: Saves luminosity by lumi-section crossing data into the database. Luminosity can be further indentified by a given validity interval (*startTime*, *endTime*) and a label. The method returns version number of saved data (in case of multiple similar inserts the old one is not removed, but new version of the same data is created instead).

Parameters:

- *startTime* - a start time of fill validity interval
- *endTime* - an end time of fill validity interval
- *label* - a text label, description of data, i. e. concatenation of lumitype, data-tag, normtag and worktag strings separated by semicolon(*HF;V3;HFV2a;V04-01-01*).
- *vector<LuminosityByLsXing>* - luminosity data vector. *LuminosityByLsXing* is a structure containing luminosity data (i.e. UTC time, lumi section, and luminosity value for each Bunch Crossing ID). All structures are further described in next section. The structures are saved into the database in the same order as they are in the vector.

- **vector<LuminosityByLsXing>** *loadLuminosityByLsXing*(**long** timestamp, **string** label)

Description: Loads the latest version of luminosity by lumi-section crossing data(bound to given timestamp and label) from the database and returns it as a vector of luminosity structures. Values are held in *LuminosityByLsXing*, which is further described in next section. The order of structures in the vector is the same as it was while saving by *saveLuminosityByLsXing* method.

Parameters:

- *timestamp* - a timestamp value, it should be between *startTime* and *endTime* specified in *saveLuminosityByLsXing* method.
- *label* - a text label, description of data, i. e. concatenation of lumitype, data-tag, normtag and worktag strings separated by semicolon(*HF;V3;HFV2a;V04-01-01*).

- **vector<LuminosityByLsXing>** *loadLuminosityByLsXingByVersion*(**long** timestamp, **string** label, **int** version)

Description: Loads the specified version of luminosity by lumi-section crossing data(bound to given timestamp and label) from the database and returns it as a UTC time - luminosity structure value map. Values are held in *LuminosityByLsXing*, which is further described in next section. The order of structures in the vector is the same as it was while saving by *saveLuminosityByLsXing* method.

Parameters:

- *timestamp* - a timestamp value, it should be between *startTime* and *endTime* specified in *saveLuminosityByLsXing* method.

- *label* - a text label, description of data, i. e. concatenation of lumitype, data-tag, normtag and worktag strings separated by semicolon(*HF;V3;HFV2a;V04-01-01*).
- *version* - a version number, positive integer value.

- **vector<LuminosityMetadata>** *listAllLuminosityByLsXing()*

Description: Loads the vector of metadata of all luminosity by lumi-section crossing measurments. For each measurment, LuminosityMetadata contains information about startTime and endTime (specified in *saveLuminosityByLsXing* method), label and number of versions of luminosity data.

- **vector<LuminosityMetadata>** *listLuminosityByLsXing(long startTime, long endTime)*

Description: Loads the vector of metadata of luminosity by lumi-section crossing measurments in given period of time: [startTime, endTime].

Parameters:

- *startTime* - a start time
- *endTime* - an end time

2 Luminosity processing - structures

- *LuminosityByLs* - a structure representing single luminosity by lumi-section measurment

Fields:

- **long** *timestamp* - a UTC Time of the measurment
- **string** *cmsRun* - a label of CMS run number i.e. *198898*
- **string** *fill* - a label of fill number i.e. *2836*
- **string** *ls* - a label describing a luminosity section, i.e. *1:1*
- **string** *beamStatus* - a label describing beam status, i.e. *SQUEEZE, STABLE BEAMS, ADJUST*
- **double** *energy* - a value of energy in GeV
- **double** *delivered* - a value of delivered luminosity
- **double** *recorder* - a value of recorded luminosity
- **double** *avgPU* - a value of average PU

- *LuminosityByLsXing* - a structure representing single luminosity by lumi-section crossing measurment

Fields:

- **long** *timestamp* - a UTC Time of the measurement
 - **string** *cmsRun* - a label of CMS run number i.e. *198898*
 - **string** *fill* - a label of fill number i.e. *2836*
 - **string** *ls* - a label describing a luminosity section, i.e. *1:1*
 - **double** *delivered* - a value of delivered luminosity
 - **double** *recorder* - a value of recorded luminosity
 - **vector<double>** *luminosity* - luminosity value vector. Each element of the vector corresponds to BCID(Bunch Crossing ID), i.e. *luminosity[0]* is the value of luminosity for BCID = 0. Length of the vector is established in server configuration file (as a default it equals 3564)
- *LuminosityMetadata* - a structure representing luminosity metadata
- Fields:**
- **long** *startTime* - a start time (UTC Time) specified while saving luminosity data
 - **long** *endTime* - a end time (UTC Time) specified while saving luminosity data
 - **string** *label* - a text label, description of data, i. e. concatenation of lumitype, datatag, normtag and worktag strings separated by semicolon(*HF; V3; HFV2a; V04 - 01 - 01*).
 - **int** *numberOfVersions* - a number of different versions, positive integer value. This value is incremented while insertion data for the same validity interval and label more than once.